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# A MULTIPLET TABLE OF ASTROPHYSICAL INTEREST

Revised Edition

Part I—Table of Multiplets

Part II—Finding List of All Lines in the Table of Multiplets

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

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NATIONAL BUREAU OF STANDARDS

*Technical Note*

36

NOVEMBER 1959

# A MULTIPLET TABLE OF ASTROPHYSICAL INTEREST

Revised Edition

**Charlotte E. Moore**

Part I—Table of Multiplets

Part II—Finding List of All Lines in the Table of Multiplets

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## ABSTRACT

Pending the completion of a current edition, the 1945 Multiplet Table is being reprinted here to meet continuing demands. The leading lines in 196 atomic spectra of 85 chemical elements are listed in related groups called multiplets. Estimated intensities, excitation potentials and multiplet designations are given for the individual lines, and each multiplet is assigned a number. An extensive bibliography covers the source material used for the compilation.

The Table is presented in two parts:

Part I includes the multiplets, with the spectra of each element being given in order of increasing ionization, and the elements in order of increasing atomic number.

Part II is a Finding List in which all the lines in Part I are entered in order of increasing wavelength, with their multiplet numbers.

The range of the Table is from 2951 A to 13164 A. A supplementary table of "Forbidden Lines" extends from 2972 A to 12645 A.

# Part I—Table of Multiplets

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# PREFACE

The preparation of a Multiplet Table that will meet the needs of all astrophysicists both now and in the future is an almost overwhelming undertaking. The most eminent workers would have to exercise careful judgment in handling the spectroscopic literature today. The writer has been bold enough to attempt it, only because of the many requests for a revision of the earlier Table and the enthusiasm with which it was received in spite of its many faults. Admittedly the present work is far from ideal. With all its limitations, however, it could never have been published without a vast amount of collaboration. The generosity and encouragement of spectroscopists and astrophysicists both at home and abroad has been the inspiration for this book. No two people would present the same choice of material, and the writer feels that her judgment has been far from adequate for this task. Whatever usefulness the volume may have is due to the many workers who have stood by, ready to supply material, to discuss puzzling questions and to offer the most valuable suggestions.

Since 1932 work on spectrum analysis has progressed so speedily that the *selection of data useful to the astrophysicist* has been one of the major problems. Requests for an entirely complete Multiplet Table have been received, but the purpose of this work has been to provide a book whose scope is limited—one that contains *astrophysically* useful data but is not unwieldy because of the inclusion of other material from the vast storehouse of spectroscopic literature now accessible. The bibliography should be consulted by those who desire more complete Tables of Multiplets.

More work of astrophysical importance remains to be done, chiefly on the spectra of the rare-earths and on the second spark spectra in general. It is hoped that a supplement can be prepared to cover these spectra and that a large part of the present work will prove to be definitive.

This book has been brought to a conclusion during the second world war. Consequently, restrictions of all kinds have been imposed and assistance has been limited. A very careful attempt has been made to prepare the manuscript accurately. The writer believes, however, that errors have inevitably been made in the compiling and editing of more than 25,750 spectral lines, for the work has been done with the minimum amount of clerical aid. She relies upon the users to detect serious errors and report them to her so that a list of errata may be published. Suggestions will be welcome.

Mention has been made of the cordial cooperation experienced from the beginning of this work. It could not now have been brought to a conclusion without the hearty and enthusiastic support of Henry Norris Russell, the author of the first list of multiplets of astrophysical importance. He has generously offered his valuable collection of data on spectra and has been ever ready to help in spite of the many complications that have arisen in carrying out such an extensive program.

Charlotte E. Moore

Princeton University Observatory
Princeton, New Jersey
April 3, 1945

# A MULTIPLET TABLE OF ASTROPHYSICAL INTEREST

## Part I

## TABLE OF MULTIPLETS

### I. INTRODUCTION

1. The detailed interpretation of stellar spectra demands of the laboratory investigators an ever increasing amount of careful work on spectrum analysis. With the impetus provided by Hund's theory, remarkably rapid strides have been made. Additional encouragement, particularly in handling complex spectra, has resulted from the great development of mechanical devices to decrease the enormous labor of measuring and reducing spectrograms. The valuable machine developed by Harrison at the Massachusetts Institute of Technology for this purpose has already proven its worth and promises much more in the future.

2. From an astrophysical point of view there is a definite need for a compendium of multiplets. The manuscript lists prepared for the present work have been almost continuously on loan to various investigators.

Spectrum analysis has not been carried far enough to compile a completely satisfactory Table. So many spectra have been analyzed, however, that to wait for perfection is to retard scientific progress. For many spectra "prediction" may be invoked to extend the existing lists of observed laboratory lines, and this has been done throughout the work. Three general classes of lines are tabulated: those observed in the laboratory; predicted "permitted" lines calculated from combinations among spectroscopic term values; and predicted "forbidden" lines.

3. A complete multiplet table would be welcomed by many scientists. It is not the purpose of the present work to furnish this. The range of wave-lengths is roughly from λ2950 to λ13000. The violet limit is imposed by the ozone in our atmosphere, which cuts off stellar observations beyond this region. In the infra-red the scarcity and inaccuracy of laboratory wave-lengths have made it necessary to predict many lines.

Even within these limits, only the lines thought to be useful in the interpretation of astronomical spectra are listed. These are selected from the elements sufficiently abundant to appear in stellar spectra, and from only those stages of ionization and types of excitation which are to be expected.

4. The importance of handling the various laboratory spectra by multiplets was stressed in 1925 by Russell,[1] who published the original multiplet table under the title "A List of Ultimate and Penultimate Lines of Astrophysical Interest." Useful as it was, this soon proved to be incomplete, not only because it was intentionally limited, but also because more data were becoming available. Work on spectrum analysis was proceeding so rapidly that an extension of his list was imperative.

5. When the writer was at the Mount Wilson Observatory in 1931 she prepared a solar multiplet table for private use in revising and extending the identification of lines in the solar and sun-spot spectra. This manuscript was constantly used by astronomers. In response to requests for copies, the laboratory data for light elements present in early type stars were added and a limited edition was printed in 1933.[2] This edition was out of date and out of print almost immediately—the demand for it had not been anticipated. To meet the situation the present book was planned; it is the first book designed from the start as a multiplet table for astrophysicists. For this reason, solar wave-lengths and intensities are excluded. It is essentially a manual of laboratory data needed by astronomers.

6. In the Multiplet Table (Part I) the *elements* are arranged in order of increasing atomic number. For each spectrum of each element the *multiplets* are listed in order of increasing energy level (see § 27 for details), and are numbered for reference. While such an arrangement is useful in studying stellar spectra, it introduces one serious disadvantage. The search for a *particular line* is laborious. This has been a widespread and an entirely justified criticism of the earlier Table. A Finding List has, therefore, been prepared and forms Part II of this Contribution. Here every line in the Revised Multiplet Table (hereinafter referred to as the R M T), is entered in order of wave-length, listing the spectrum to which the line belongs, and the number of the multiplet containing it.

### II. THE MULTIPLET TABLE—General Considerations

7. The astronomical spectra forming the basis of selection of the elements, spectra and lines included, fall into several general classes. The sun receives first consideration. The observed solar spectrum now extends from λ2914* to λ13495, which accounts for the range covered in this Table. In addition, the spot and chromospheric spectra, stellar spectra of every type from Wolf-Rayet stars down through M-stars, including giants and dwarfs, spectra of novae and nebulae, and of the corona must be taken into account.

---

[1] *Mt. Wilson Contr.* No. 286; *Ap. J.* **61**, 223, 1925.
[2] A Multiplet Table of Astrophysical Interest, Princeton 1933.
* Accurate measures have not been made to the violet of λ2949.

8. The astrophysical importance of a spectrum depends upon the abundance of the element in the most favorable celestial sources, and the number and excitation potentials of the lines in the visible region. Almost all of the elements of atomic number 1-30 (*H-Zn*) have, on this account, preference over those that follow. The analyses of their arc spectra are almost all adequate for astrophysical purposes.

For the first spark spectra, which on the whole are more important, the analyses are fairly complete (except for *Mn* II and *Co* II) The lists for these spectra in the R M T include all but the weakest observed lines except for a few elements of low abundance.

The second spark spectra are less completely analyzed in the two short periods. In the first long period *Fe* III is complete and only a beginning has been made for any of the rest.

Detailed knowledge of spectra of more highly ionized atoms is confined to a few of the lighter elements.

9. The spectra of the elements from *Ga* to *Ba* are on the average considerably richer, and much less completely analyzed; but these elements are decidedly less abundant and the existing data are usually, though not always, fairly adequate for astrophysical purposes.

10. The rare earths, which are no rarer than neighboring elements in cosmical abundance, usually have rich spectra, which adds to their significance. The arc spectra rarely appear. The first spark spectra are important in many stars, and lines of the second spark spectra of several of them have recently been identified.[1] Analysis of the third spectra is barely begun; for the second spectra it is well advanced for six of these elements and well begun for four more.

The lists given here for the rare earths are approximately definitive for *La* II, *Eu* II and *Lu* II. It is hoped that greatly improved data for the others will be available in the near future. Extended tables for rare earths are likely to form the larger part of a supplement to the R M T.

11. The elements from *Hf* onward are of low abundance, and the data for them, though incomplete, meet most astrophysical needs tolerably.

## III. BASIS OF SELECTION

12. The Short Periods (*H-A*).

These spectra are so important in the hotter stars that the lists are entirely or almost complete for all degrees of ionization included, except for a few elements of low cosmic abundance.

The spectra of Wolf-Rayet stars,[2, 3] novae and nebulae contain many "predicted" lines of these elements, not yet observed in the laboratory. For many light elements more predicted lines could probably have been included to advantage. More accurate values of predicted wave-lengths could also have been given, particularly in the spark spectra of *C*, *N*, and *O*. The precedent set by Edlén in his work on *Wolf-Rayet*[3] stars was followed. In many cases the term separations are known with sufficient accuracy to justify predictions to 0.1 A, although he uses no decimals. Use of the photographic method of reproduction for this book has prevented all but the most necessary alterations of the original manuscript. Changes later realized to be improvements have been omitted because of this restriction.

13. Bowen's [4] work naturally forms the guide for selecting material related to *nebular* spectra. The leading nebular lines are due to forbidden lines of the light elements. In anticipation of future needs, the lists of forbidden lines have, however, been greatly extended throughout the first long period.

14. No particular type of stellar spectrum has influenced the choice of lines from the first spark spectra of light elements. The lists have not been restricted to include only those lines known to be present in the stars. The abundance of the element has been the chief factor considered in omitting lines. For elements known to be fairly abundant, favorable predicted lines have been added. The lists are as extensive as the present state of analysis permits.

15. For some years Mr. H. D. Babcock at Mount Wilson, has been preparing for publication a monograph on the Infra-Red Solar Spectrum. His work now covers the interval λλ6600–13495 and includes approximately 7300 lines. The leading accessible lines of the arc spectra of most of the light elements lie in this interval. For example, important solar lines are unquestionably due to *H*, *C* I, *N* I, *O* I, *Mg* I, *Si* I, *P* I, and *S* I. In fact, the presence of phosphorus could not be detected until the solar observations were extended to the infra-red. The present Table has been compiled with Mr. Babcock's work especially in mind.

For unblended lines the solar wave-lengths in this region are far more accurate than many laboratory measures. *Si* affords an excellent illustration. The lines are sharp in the sun and the term separations among solar wave-

[1] Swings, *Ap. J.* **100**, 132, 1944.
[2] Payne, *Zeit. fur Ap.* **7**, 1, 1933.
[3] Edlén, *Zeit. fur Ap.* **7**, 378, 1933.
[4] *Rev. Mod. Phys.* **8**, 55 (No. 2), 1936.

numbers are so consistent that accurate solar term values can be calculated. These term values have been very useful in predicting wave-lengths. Similarly, the triplet and singlet "F" series of *Mg* I were extended with the aid of solar data.[1] The constancy of the term separations proves beyond doubt the correctness of the identifications.

16. The First Long Period (*K-Kr*).

The elements in the first long period from *K* through *Ni* constitute by far the major portion of this book (pp. 23–77), on account of the complexity of their spectra. Generally speaking, the arc and first spark spectra are well analyzed except for those mentioned in § 8. Many lines of these spectra (as far as *Cu*) are present throughout the entire range of the solar and sun-spot spectra, the flash spectrum, stellar spectra like those of $\gamma$ Cygni and $\alpha$ Persei, and later type stars.

The only second spark spectrum in this group that can be given completely is that of *Fe* III. Astronomers eagerly await the definitive analysis of the rest.

17. The spectrum of *Fe* I deserves special mention. Although the importance of the analysis has long been realized, a complete monograph of this spectrum has only recently been published.[2] Practically every known line of *Fe* I is present in the sun. An amazing number of predicted lines agree well with solar wave-lengths. A statistical study of these coincidences indicates that most of them are real. For the statistical work the predicted lines were graded as "good," "fair," or "poor." The grades were based on the behavior of all the lines of each multiplet in the solar spectrum, the agreement in wave-length, and other factors. Only the "good" and "fair" lines have been published to date. Since the grading was severe, and since predicted wave-lengths are much in demand, many of the lines graded "poor," but considered useful to other workers, have been retained in the R M T.

18. The Second Long Period (*Rb-Xe*).

These elements are observed chiefly in the solar and sun-spot spectra and later dwarf stars. Except for *Y* II and *Zr* II the lists are restricted to the lines from low atomic energy levels. They are, however, more extensive than in the earlier Multiplet Table and slightly longer than are necessary to meet present needs.

19. Forbidden lines are assuming more and more significance in astronomical sources. A special section of the R M T (pp. 100–110) and one of the Finding List (pp. 87–96) are devoted to them. It is extremely difficult to predict what the future needs will be.

To list the array of possible predicted lines even among only abundant elements would be prohibitive. The present selection has been based largely on suggestions made by Dr. P. Swings. He was planning to publish a paper on this subject, but this was unknown to the writer when she was confronted with the problem of including them in the R M T. He generously suggested that they be given here instead of in a separate paper, and has examined the manuscript carefully. The author is extremely fortunate to have had the benefit of his extensive knowledge of both the theoretical and astrophysical aspects of forbidden lines while preparing this section of the Table. Details are discussed later in § 44.

## IV. GENERAL ARRANGEMENT OF THE MULTIPLET TABLE

20. The foregoing remarks serve only as the most general guide to the scope of the material presented here. The book is colored throughout by individual judgment in the editing of spectroscopic literature. A serious attempt has been made to limit it in such a manner that it will be a useful astrophysical handbook. Even so, it is now more than twice the size of the earlier edition.

21. The elements in the R M T are discussed in order of increasing atomic number, and the spectra of each element in order of increasing ionization.

Table 1 gives a convenient arrangement of the Periodic Table of the elements. This Table is self-explanatory. The atomic number and chemical symbol of each element are given and elements with similar spectra in the short and long periods are connected by diagonal lines.

---

[1] Russell, Babcock and Moore, *Phys. Rev.* (2) **46**, 826 (No. 9), 1934. Babcock and Moore, *Ap. J.* **101**, 374, 1945.
[2] Russell, Moore and Weeks, *Trans. Am. Phil. Soc.* **34**, 111 (Part 2), 1944.

## Table 1

### The Periodic Table [1]

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| First Period | 1 H | | | | | | | | | | | | 2 He | | | | |
| Second Period | 3 Li | | | | | | 4 Be | | | | | | 5 B | 6 C | 7 N | 8 O | 9 F | 10 Ne |
| Third Period | 11 Na | | | | | | 12 Mg | | | | | | 13 Al | 14 Si | 15 P | 16 S | 17 Cl | 18 A |
| Fourth Period | 19 K | 20 Ca | 21 Sc | 22 Ti | 23 V | 24 Cr | 25 Mn | 26 Fe | 27 Co | 28 Ni | 29 Cu | 30 Zn | 31 Ga | 32 Ge | 33 As | 34 Se | 35 Br | 36 Kr |
| Fifth Period | 37 Rb | 38 Sr | 39 Y | 40 Zr | 41 Cb | 42 Mo | 43 (Ma) | 44 Ru | 45 Rh | 46 Pd | 47 Ag | 48 Cd | 49 In | 50 Sn | 51 Sb | 52 Te | 53 I | 54 Xe |
| Sixth Period | 55 Cs | 56 Ba | 57* La | 72 Hf | 73 Ta | 74 W | 75 Re | 76 Os | 77 Ir | 78 Pt | 79 Au | 80 Hg | 81 Tl | 82 Pb | 83 Bi | 84 Po | 85 | 86 Rn |
| Seventh Period | 87 | 88 Ra | 89 Ac | 90 Th | 91 Pa | 92 U | | | | | | | | | | | | |

* Atomic numbers 58–71—Rare Earths. See below.

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rare Earths | 58 Ce | 59 Pr | 60 Nd | 61 (Il) | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu |

In Table 2 the elements are listed in the alphabetical order of their names. The successive columns contain, respectively, the name, the chemical symbol, and the atomic number of each element.

## Table 2

### Alphabetical List of Elements

| Name | Symbol | Atomic No. | Name | Symbol | Atomic No. | Name | Symbol | Atomic No. |
|---|---|---|---|---|---|---|---|---|
| Actinium | Ac | 89 | Chlorine | Cl | 17 | Holmium | Ho | 67 |
| Aluminium | Al | 13 | Chromium | Cr | 24 | Hydrogen | H | 1 |
| Antimony | Sb | 51 | Cobalt | Co | 27 | (Illinium | Il | 61)† |
| Argon | A | 18 | Columbium | Cb | 41 | Indium | In | 49 |
| Arsenic | As | 33 | Copper | Cu | 29 | Iodine | I | 53 |
| Barium | Ba | 56 | Dysprosium | Dy | 66 | Iridium | Ir | 77 |
| Beryllium | Be | 4 | Erbium | Er | 68 | Iron | Fe | 26 |
| Bismuth | Bi | 83 | Europium | Eu | 63 | Krypton | Kr | 36 |
| Boron | B | 5 | Fluorine | F | 9 | Lanthanum | La | 57 |
| Bromine | Br | 35 | Gadolinium | Gd | 64 | Lead | Pb | 82 |
| Cadmium | Cd | 48 | Gallium | Ga | 31 | Lithium | Li | 3 |
| Caesium | Cs | 55 | Germanium | Ge | 32 | Lutecium | Lu | 71 |
| Calcium | Ca | 20 | Gold | Au | 79 | Magnesium | Mg | 12 |
| Carbon | C | 6 | Hafnium | Hf | 72 | Manganese | Mn | 25 |
| Cerium | Ce | 58 | Helium | He | 2 | (Masurium | Ma | 43)† |

† Not isolated.

[1] International Chemical Symbols—1941.

TABLE 2—Continued

| Name | Symbol | Atomic No. | Name | Symbol | Atomic No. | Name | Symbol | Atomic No. |
|---|---|---|---|---|---|---|---|---|
| Mercury | Hg | 80 | Radium | Ra | 88 | Tellurium | Te | 52 |
| Molybdenum | Mo | 42 | Radon | Rn | 86 | Terbium | Tb | 65 |
| Neodymium | Nd | 60 | Rhenium | Re | 75 | Thallium | Tl | 81 |
| Neon | Ne | 10 | Rhodium | Rh | 45 | Thorium | Th | 90 |
| Nickel | Ni | 28 | Rubidium | Rb | 37 | Thulium | Tm | 69 |
| Nitrogen | N | 7 | Ruthenium | Ru | 44 | Tin | Sn | 50 |
| Osmium | Os | 76 | Samarium | Sm | 62 | Titanium | Ti | 22 |
| Oxygen | O | 8 | Scandium | Sc | 21 | Tungsten | W | 74 |
| Palladium | Pd | 46 | Selenium | Se | 34 | Uranium | U | 92 |
| Phosphorus | P | 15 | Silicon | Si | 14 | Vanadium | V | 23 |
| Platinum | Pt | 78 | Silver | Ag | 47 | Xenon | Xe | 54 |
| Polonium | Po | 84 | Sodium | Na | 11 | Ytterbium | Yb | 70 |
| Potassium | K | 19 | Strontium | Sr | 38 | Yttrium | Y | 39 |
| Praseodymium | Pr | 59 | Sulphur | S | 16 | Zinc | Zn | 30 |
| Protoactinium | Pa | 91 | Tantalum | Ta | 73 | Zirconium | Zr | 40 |

22. Headings.

Each spectrum of each element for which multiplets are given, begins with a heading containing four entries: the ionization potential, an astrophysical grade of the analysis, a grade of the list, expressing the fraction of classified lines listed, and finally, the date of completion of the manuscript of that spectrum. For example, *Cr* I (p. 37) starts with the heading

*Cr* I  I P 6.74  Anal A  List B  March 1941.

23. The Ionization Potential.

For arc spectra many of these have been taken from the list published by Meggers in 1941.[1] For the first spark spectra he has kindly furnished a similar list [2] which has been extensively used. The monograph by Edlén [3] has furnished many more, but the values have been recalculated using the factor 0.00012345 instead of the one he used (see § 35). Edlén's unpublished values are quoted [4] for *Ne*. For many other elements the I P has been obtained from the limits published in the papers on analysis, as for Edlén's results. The list by Boyce [5] is frequently quoted, particularly in the section dealing with Forbidden Lines. Those interested in the source are advised to consult the part of the bibliography pertaining to analysis (Tables 9 and 10), or one of the above mentioned general lists.

24. The completeness of analysis from the standpoint of the astrophysicist (§§ 8–11) is indicated by four grades. "Anal A" signifies that practically all the important lines of wave-length > 2950 are classified, "Anal B" that only a small fraction remain unclassified, "Anal C" that a considerable proportion are unclassified and "Anal D" that the analysis is seriously incomplete.

This rating necessarily involves a large amount of opinion and should not be given too much weight. No two appraisements would agree completely. Its purpose is to indicate the present state of analysis with regard to the needs of the astronomer.

From the viewpoint of the physicist, the state of the *term* analysis of the various spectra has been similarly summarized elsewhere by means of grades A, B, C etc. With the aid of Hund's theory the physicist can compare the number of predicted and observed *terms* and assign a grade accordingly, whether or not most of the leading lines occur in a given region of the spectrum. Both Boyce [5] and Shenstone [6] have published extensive surveys.

On account of the different viewpoints, the two grades are often not identical for the same spectrum.

25. A similar grading "List A, B, C, or D" is introduced to indicate the percentage of classified lines of a given spectrum included in the R M T. Since all lines of each spectrum considered are not equally useful to the astrophysicist, the omissions have been much more drastic in some cases than in others. For example, practically every

[1] *Journ. Opt. Soc. Am.* **31**, 39 (No. 1), 1941.
[2] Unpublished material, April 1941.
[3] *Nova Acta Regiæ Societatis Scientiarum Upsaliensis* (IV) **9**, No. 6, 1933.
[4] Communicated by Swings in a letter, March 1945.
[5] *Rev. Mod. Phys.* **13**, 1 (No. 1), 1941.
[6] Reports on Progress in Physics **5**, 210, 1939.

line of *Fe* I observed in the laboratory is present or accounted for in the solar spectrum.[1] This applies to weak as well as strong lines. Hence, all classified lines of *Fe* I to the red of λ2950 are entered and the list entry in the heading is "List A". Most of the spark spectra of the first long period are in this class, unless the element is scarce in stars. For many spark spectra most of the observed lines are in the violet and ultra-violet. In such cases the list may be very short, although graded "List A". This means that only a small fraction of the total number of observed classified lines lie in the region considered in this book.

When all but the weakest classified lines are given, the list is graded "B". The spectra of *Na* I and *Mg* I illustrate "List B", the higher series members having been omitted as unimportant. In anticipation of requests for more material, the general policy has been to include slightly more than is necessary. Since all classified lines are not given, however, the list cannot be graded "A".

"List C" denotes that most of the strong lines are entered: "List D", that only the leading strong lines are given.

In grading the *lists*, unclassified lines have not been given consideration (although the stronger ones are listed after the multiplets of a spectrum). The purpose of this grading is to enable the reader to judge how many classified lines have been omitted, regardless of whether or not the *analysis* is complete. Thus for *Co* II few lines are classified, but all these are listed. Hence this element is in the class "Anal C, List A."

26. The last entry at the head of each spectrum gives the month and year in which that section of manuscript was completed. This work has extended over such a long period that the date of publication does not apply even approximately to the date at which some spectra were last examined. It is hoped that the lists are up to date, but if important references have been missed, or if existing unpublished material should replace that included here, the writer invites such suggestions.

## V. ARRANGEMENT OF THE MULTIPLETS OF EACH SPECTRUM

27. Reference must be made to some details of spectrum analysis in order to discuss the plan of presentation adopted here. In brief, the atoms of a gas, when excited by radiation, absorb certain wave-lengths corresponding to transitions of their outer electrons from lower energy levels to higher ones. From differences in the wave numbers of the observed lines, energy levels can be worked out, each line being produced by a transition between two such levels. Related *levels* are grouped accordingly to well known rules to form spectroscopic *terms*. Transitions between *terms* give rise to groups of related lines called *multiplets*.

In the RMT the terms of each spectrum have been arranged in order of increasing value of the component of *lowest* energy. This defines the relative level of the term, starting with the lowest term zero. The excitation potentials (columns 4 and 5) express in electron volts the values of the energy levels of those term components involved in the production of each line (see §35).

To illustrate, the lowest term of *Fe* I is $a^5D$. This term is made up of five energy levels whose E P's are respectively 0.00, 0.05, 0.09, 0.11 and 0.12. The next term is $a^5F$. Here the components have E P's 0.86, 0.91, 0.95, 0.99 and 1.01. For the purposes of this book the terms are considered in order of the lowest level of each, i.e. $a^5D$ 0.00, $a^5F$ 0.86 etc. This is to avoid confusion in spectra whose term values overlap seriously.

In each spectrum all multiplets with the same low term are in one group. The various groups are listed in the order of increasing value of the low terms. Within a group (which represents the combinations of a given low term with higher terms) the multiplets follow the order of increasing high term values.

For example, all combinations from $a^5D$ of *Fe* I (Multiplets 1–11) form the first group. These multiplets are listed in order of increasing high E P, 2.39, 2.82, 2.93, 3.20 etc. The next low term is $a^5F$. The combinations from this term form the next group (Multiplets 12–31) etc.

In certain multiplets, the lowest components of one or both of the terms involved are not represented. This does not alter the arrangement.

Whenever the low level changes, the break in the continuity is indicated by three long dashes between the groups. For *Fe* I the first of these occurs between multiplets 11 and 12.

When terms are widely separated this arrangement results in listing the multiplets from a given low term in the order of decreasing wave-length of the leading line of each multiplet, since increasing energy of the high terms automatically results in increasing wave number, or decreasing wave-length.

The wave-length criterion alone was used for part of the R M T until the overlapping of terms in some complex spectra of the first long period introduced serious complications of arrangement. Then the more rigorous procedure

[1] Russell, Moore and Weeks, *Trans. Am. Phil. Soc.* **34** (Part 2), 111, 1944.

described above was adopted. Some spectra had been typed before the strictly orderly listing was put into effect. Owing to the excessive amount of labor involved in making such minor changes, slight irregularities of arrangement have not been corrected. For the greater part of the Table, however, the multiplets are in orderly array.

28. The energy *levels* that are grouped to form spectroscopic *terms* are defined by inner quantum numbers, commonly known as J-values. The terms have *multiplicities* (which are either all odd or all even in a given spectrum), and are further defined by azimuthal quantum numbers L which have the values 1, 2, 3 etc. for terms labeled S, P, D, F, G, H, I, K. The complete multiplet designation of any line includes all of these quantities for both the lower and upper energy level involved in the production of the line.

In the R M T a simplified plan has been adopted. The inner quantum numbers are listed separately from the rest of the designation, in column six, under the heading J. The J-value belonging to the lower term comes first and is followed by that of the higher term. In the next column, headed "Multiplet Desig" the spectroscopic designation of the lower term is always stated first, followed by a dash, then that of the higher term. For example, in multiplet No. 5 of *Fe* I the first line, 3719.935 has J-values 4–5. The rest of the designation is $a^5D$-$z^5F^\circ$. In the complete notation the "4" appears as the subscript of $a^5D$ and 5 as that of $z^5F^\circ$, i.e. $a^5D_4$-$z^5F^\circ_5$. The complete designation of the second line λ3737.133, is $a^5D_3$-$z^5F^\circ_4$ etc. The "a" and "z" merely distinguish these $^5D$ and $^5F^\circ$ terms from others of the same type. This notation is discussed later in § 38. For both terms the superscript 5 denotes the multiplicity.

"Permitted" lines occur among combinations between two sets of terms, one "odd" and the other "even". The superscript "°" attached to $^5F$ tells that this is the odd term. When both terms belong to the same set (odd or even), the lines are commonly called "Forbidden".

Within a multiplet the arrangement of the individual lines is governed by the J-values. Each multiplet is entered as if it were written in multiplet array, i. e. the lines on the main diagonal come first, then the strongest satellite lines, then the next strongest etc. This is best illustrated by considering the inner quantum numbers, J, of each type of spectroscopic term. For convenience the J-values of all terms from S through I, of multiplicities 1–11 and 2–10 are given in Table 3, which applies equally to odd or even terms.

Even multiplicites are on the left and odd on the right half of the table. The types of terms (in order of increasing L value) S, P, D, F, G, H, I are in the vertical column on the left.

To arrange any multiplet in standard array, such as Multiplet No. 5 of *Fe* I, $a^5D$-$z^5F^\circ$, find the J-values of the two types of terms (odd or even) from Table 3. The term $^5D$ is listed under multiplicity 5, and entry D on the left (J-values are 4, 3, 2, 1, 0). The term $^5F^\circ$ has J-values 5, 4, 3, 2, 1. Write these arrays as follows, with the *low* term *horizontally* arranged, and the *high* one *vertically* arranged:

| $z^5F^\circ$ \ $a^5D$ | $^5D_4$ | $^5D_3$ | $^5D_2$ | $^5D_1$ | $^5D_0$ |
|---|---|---|---|---|---|
| $^5F^\circ_5$ | $x_1$ | | | | |
| $^5F^\circ_4$ | $y_1$ | $x_2$ | | | |
| $^5F^\circ_3$ | $z_1$ | $y_2$ | $x_3$ | | |
| $^5F^\circ_2$ | | $z_2$ | $y_3$ | $x_4$ | |
| $^5F^\circ_1$ | | | $z_3$ | $y_4$ | $x_5$ |

## Table 3

### J-Values of Spectroscopic Terms

| Multiplicity | | 2 | 4 | 6 | 8 | 10 | 1 | 3 | 5 | 7 | 9 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | Term | | | | | | | | | | | |
| 1 | S | ½ | 1½ | 2½ | 3½ | 4½ | 0 | 1 | 2 | 3 | 4 | 5 |
| 2 | P | 1½ | 2½ | 3½ | 4½ | 5½ | 1 | 2 | 3 | 4 | 5 | 6 |
| | | ½ | 1½ | 2½ | 3½ | 4½ | | 1 | 2 | 3 | 4 | 5 |
| | | | ½ | 1½ | 2½ | 3½ | | 0 | 1 | 2 | 3 | 4 |
| 3 | D | 2½ | 3½ | 4½ | 5½ | 6½ | 2 | 3 | 4 | 5 | 6 | 7 |
| | | 1½ | 2½ | 3½ | 4½ | 5½ | | 2 | 3 | 4 | 5 | 6 |
| | | | 1½ | 2½ | 3½ | 4½ | | 1 | 2 | 3 | 4 | 5 |
| | | | ½ | 1½ | 2½ | 3½ | | | 1 | 2 | 3 | 4 |
| | | | | ½ | 1½ | 2½ | | | 0 | 1 | 2 | 3 |
| 4 | F | 3½ | 4½ | 5½ | 6½ | 7½ | 3 | 4 | 5 | 6 | 7 | 8 |
| | | 2½ | 3½ | 4½ | 5½ | 6½ | | 3 | 4 | 5 | 6 | 7 |
| | | | 2½ | 3½ | 4½ | 5½ | | 2 | 3 | 4 | 5 | 6 |
| | | | 1½ | 2½ | 3½ | 4½ | | | 2 | 3 | 4 | 5 |
| | | | | 1½ | 2½ | 3½ | | | 1 | 2 | 3 | 4 |
| | | | | ½ | 1½ | 2½ | | | | 1 | 2 | 3 |
| | | | | | ½ | 1½ | | | | 0 | 1 | 2 |
| 5 | G | 4½ | 5½ | 6½ | 7½ | 8½ | 4 | 5 | 6 | 7 | 8 | 9 |
| | | 3½ | 4½ | 5½ | 6½ | 7½ | | 4 | 5 | 6 | 7 | 8 |
| | | | 3½ | 4½ | 5½ | 6½ | | 3 | 4 | 5 | 6 | 7 |
| | | | 2½ | 3½ | 4½ | 5½ | | | 3 | 4 | 5 | 6 |
| | | | | 2½ | 3½ | 4½ | | | 2 | 3 | 4 | 5 |
| | | | | 1½ | 2½ | 3½ | | | | 2 | 3 | 4 |
| | | | | | 1½ | 2½ | | | | 1 | 2 | 3 |
| | | | | | ½ | 1½ | | | | | 1 | 2 |
| | | | | | | ½ | | | | | 0 | 1 |
| 6 | H | 5½ | 6½ | 7½ | 8½ | 9½ | 5 | 6 | 7 | 8 | 9 | 10 |
| | | 4½ | 5½ | 6½ | 7½ | 8½ | | 5 | 6 | 7 | 8 | 9 |
| | | | 4½ | 5½ | 6½ | 7½ | | 4 | 5 | 6 | 7 | 8 |
| | | | 3½ | 4½ | 5½ | 6½ | | | 4 | 5 | 6 | 7 |
| | | | | 3½ | 4½ | 5½ | | | 3 | 4 | 5 | 6 |
| | | | | 2½ | 3½ | 4½ | | | | 3 | 4 | 5 |
| | | | | | 2½ | 3½ | | | | 2 | 3 | 4 |
| | | | | | 1½ | 2½ | | | | | 2 | 3 |
| | | | | | | 1½ | | | | | 1 | 2 |
| | | | | | | ½ | | | | | | 1 |
| | | | | | | | | | | | | 0 |
| 7 | I | 6½ | 7½ | 8½ | 9½ | 10½ | 6 | 7 | 8 | 9 | 10 | 11 |
| | | 5½ | 6½ | 7½ | 8½ | 9½ | | 6 | 7 | 8 | 9 | 10 |
| | | | 5½ | 6½ | 7½ | 8½ | | 5 | 6 | 7 | 8 | 9 |
| | | | 4½ | 5½ | 6½ | 7½ | | | 5 | 6 | 7 | 8 |
| | | | | 4½ | 5½ | 6½ | | | 4 | 5 | 6 | 7 |
| | | | | 3½ | 4½ | 5½ | | | | 4 | 5 | 6 |
| | | | | | 3½ | 4½ | | | | 3 | 4 | 5 |
| | | | | | 2½ | 3½ | | | | | 3 | 4 |
| | | | | | | 2½ | | | | | 2 | 3 |
| | | | | | | 1½ | | | | | | 2 |
| | | | | | | | | | | | | 1 |

Only those combinations between the low and high terms, for which J changes by O or $\pm 1$ are "permitted". This rule restricts the number of lines to be expected to those denoted by x, y, and z, where the subscripts 1, 2, 3 represent decreasing J-values. The main diagonal lines are $x_1$–$x_5$. The first satellites are $y_1$–$y_4$ and the second satellites, $z_1$–$z_3$.

In the R M T, the lines on the main diagonal are listed first, in order of decreasing J-values. From the example, the first lines entered are those in the positions $x_1$, $x_2$, $x_3$, $x_4$, $x_5$ in the Multiplet. The line at $x_1$ has the designation $a^5D_4$–$z^5F^\circ_5$, at $x_2$ $a^5D_3$–$z^5F^\circ_4$ etc. In the R M T the lines of this multiplet appear in the following order:

| | λ | J | Desig | |
|---|---|---|---|---|
| $x_1$ | 3719.935 | 4–5 | $a^5D$–$z^5F^\circ$ | Main Diagonal |
| $x_2$ | 3737.133 | 3–4 | " | |
| $x_3$ | 3745.561 | 2–3 | " | |
| $x_4$ | 3748.264 | 1–2 | " | |
| $x_5$ | 3745.901 | 0–1 | " | |
| $y_1$ | 3679.915 | 4–4 | " | First Satellites |
| $y_2$ | 3705.567 | 3–3 | " | |
| $y_3$ | 3722.564 | 2–2 | " | |
| $y_4$ | 3733.319 | 1–1 | " | |
| $z_1$ | 3649.304 | 4–3 | " | Second Satellites |
| $z_2$ | 3683.054 | 3–2 | " | |
| $z_3$ | 3707.828 | 2–1 | " | |

An example of a symmetrical multiplet should also be given. Multiplet No. 12 of *Cr* II (p. 43) has the designation $a^4P$–$z^4P^\circ$. Since the multiplicity (4) and type of term (P) are identical for both terms, the J-values are also identical. From Table 3 the J-values for a $^4P$ term are $2\frac{1}{2}$, $1\frac{1}{2}$, $\frac{1}{2}$.

| $a^4P$ / $z^4P^\circ$ | $^4P_{2\frac{1}{2}}$ | $^4P_{1\frac{1}{2}}$ | $^4P_{\frac{1}{2}}$ |
|---|---|---|---|
| $^4P^\circ_{2\frac{1}{2}}$ | $x_1$ | $y_1$ | |
| $^4P^\circ_{1\frac{1}{2}}$ | **$y_1$** | $x_2$ | $y_2$ |
| $^4P^\circ_{\frac{1}{2}}$ | | **$y_2$** | $x_3$ |

Here both sets of satellites involve the same J-values, $1\frac{1}{2}$–$2\frac{1}{2}$, $\frac{1}{2}$–$1\frac{1}{2}$ and $2\frac{1}{2}$–$1\frac{1}{2}$, $1\frac{1}{2}$–$\frac{1}{2}$. Throughout the R M T for such cases, combinations in which J-values read from *larger* J to *smaller* J are entered first. Here, for example the pair $2\frac{1}{2}$–$1\frac{1}{2}$, $1\frac{1}{2}$–$\frac{1}{2}$ ($y_1$ and $y_2$ in bold face type above), precede the pair with J-values $1\frac{1}{2}$–$2\frac{1}{2}$, $\frac{1}{2}$–$1\frac{1}{2}$ respectively.

According to elementary theory the leading line of the principal diagonal is the strongest in the multiplet, and first satellites are stronger than the second, while the two sets of satellites in a symmetrical multiplet are comparable.[1]

In the majority of spectra intersystem combinations occur, i.e. those in which the multiplicities of the terms differ by 2 or even 4, as for example multiplets 1 and 332 of *Fe* I, $a^5D$–$z^7D^\circ$ and $z^7F^\circ$–$e^3G$ respectively. These multiplets often include strong lines, particularly for the heavier elements. The rule $\Delta J = 0$ or $\pm 1$ is strictly observed but there are no known formulae for the prediction of intensities, which are often apparently erratic. When intersystem lines are strong, intensities in regular multiplets often deviate from the formulae. The intersystem multiplets are arranged in the R M T on the "diagonal" basis described above, so far as irregularities permit.

29. For all types of multiplets the reader must bear in mind that the arrays described above, and the J-values in Table 3 give all the possible permitted *theoretical* transitions.

In many cases the R M T does not give theoretically complete multiplets. Reasons for this are:

1. When the strongest lines of a multiplet are likely to be very weak in astrophysical sources, the weaker ones have been deliberately omitted even though they may have been observed in the laboratory. Omissions are indicated by a "†" following the "Multiplet Designation".

2. Individual lines in a multiplet are sometimes much fainter than theoretically expected and have never been observed. Sequences along the diagonals are thus broken. For such lines predicted positions are given only when it is believed that they *may* be observable astrophysically.

[1] For details see Russell, *Mt. Wilson Contr.* No. 537; *Ap. J.* **83**, 129, 1936.

3. In some cases one or more components of a spectroscopic term have not yet been indentified.

Such cases may be detected by comparing the column headed J for a given multiplet with the theoretical array of permitted lines, just described.

30. For the more important spectra, limited lists of the leading unclassified lines follow the multiplets. The R M T is not designed as a source for the investigator who is interested primarily in unclassified lines.

Three general factors have controlled the selection: the abundance of the element in astronomical sources, the grade of the analysis and the accuracy of the laboratory material. Under "Anal A" more lines will be unclassified for a complex spectrum like *Fe* I than for a simpler spectrum, but the percentage of strong lines will be small. Under "Anal B" there will be more and stronger unclassified lines than if the grade were A, etc.

If A. S. King has made a temperature classification of the spectrum the leading unclassified lines can be readily chosen from his lists. In such cases his temperature class follows the intensity in the R M T

Among arc spectra the lists of unclassified lines are longest for *N* I, *Ti* I, *Cr* I, *Mn* I, *Fe* I, *Ni* I, *Tm* I. Only a few lines are listed for *Si* I, *S* I, *Ca* I, *Sc* I, *V* I, *Co* I, *Y* I, *Lu* I, and none for any other elements.

For first spark spectra the lists of unclassified lines may be summarized as follows:

| | |
|---|---|
| Limited | *Si* II, *A* II, *Fe* II, *Cb* II, *La* II, *Nd* II, *Sm* II, *Gd* II, *Tm* II. |
| Very limited | *O* II, *S* II, *Cl* II, *Ti* II, *V* II, *Cr* II, *Y* II, *Zr* II, *Ce* II, *Pr* II, *Eu* II, *Hf* II. |
| Measures inadequate | *Mn* II, *Co* II, *Ni* II. |

Lists are given for only five "third" spectra: *C* III (where a dubious classification has been suggested for the lines) *N* III, *Si* III, *S* III and *Fe* III. The only one of any length is that of *Fe* III.

For some spark spectra, notably *La* II and *Fe* III it is not certain that the separation of the lines in different states of ionization is definitive. This is mentioned in the R M T under these spectra. For many spectra the separation is so uncertain that no unclassified lines have been included. For no spectrum is a complete list given.

31. A few notes are appended to the list of multiplets for certain spectra. These fall into two classes: those dealing with notation (see § 37), and those dealing with fine structure. This book does not discuss fine structure or isotope effects in any detail. Those spectra in which the fine structure or isotope effects should be called especially to the attention of the astrophysicist have this fact mentioned, as follows:

| | |
|---|---|
| *Li* II | Very wide fine structure |
| *Mg* I, *Al* II | Fine structure |
| *Hg* I, *Tl* I | Many lines show fine structure |
| *He* II, *Bi* I | Wide fine structure. |

## VI. COLUMNS OF THE TABLE OF MULTIPLETS

32. Wave-length.

The data for each spectrum are given in seven columns. The first contains the *laboratory* wave-length in I A units. In the earlier edition solar wave-lengths were listed for all but the lighter elements (see § 5). Since any solar line may be a blend, it was decided to replace this entry by laboratory material. An effort has been made to select the best available wave-length for each line. The individual lists are far from homogeneous—there is often an enormous range in accuracy among the lines of a given spectrum.

The reference from which each line has been taken is indicated in column two, by the letters A, B, C etc. Table 7 (p. xxiv), contains the number of the reference in the bibliography to which the letters refer. The letter "P" in this column denotes throughout that the wave-length is predicted from the laboratory term values, which may be found in the references to analysis, Table 9 (p. xxvii).

The order of the letters represents roughly the estimated precision of the measures, but this must not be interpreted too literally because some investigators have measured only limited regions of a spectrum. Consequently, several accurate sources may be used within a multiplet. Furthermore, the letters A, B, etc. denote very different degrees of accuracy for different spectra. While the earlier letters of the alphabet are the more favored choices, it would be erroneous to conclude that the letters are arranged strictly according to the writer's rating of the accuracy of the measures.

33. Symbols in the R M T.

Since most of the symbols occur in column one, they will all be described here.

Wave-length column:

// This symbol follows the wave-length of the "Raie Ultime" as determined from observations in the laboratory. High transition probabilities as well as low energy levels are involved, and they do not always come from the lowest levels. When the known *Raies Ultimes* are to the violet of λ2950 they are not included in the R M T. With the exception of Eu II[1] they are all quoted from Meggers [2], who generously furnished the data on first spark spectra [3] in advance of publication.

* An asterisk precedes the wave-length throughout the R M T to denote a blend. If no symbol follows the wave-length, the line is blended with another line in the same spectrum. For example, the line *2970.106 appears in multiplets 10 and 11 of *Fe* I.

An "*" is also used to denote blended intensities. For symbols in the intensity column see § 34G.

§ This symbol follows the wave-length (an "*" always preceding) to indicate a blend of an arc and spark line; or of two spark lines of the same element in spectra of different degrees of ionization. When this pair of symbols appears with an arc line it denotes that the arc line is blended with a line in the first spark spectrum of the element. Similarly, if it appears with a line in a first spark spectrum, the spark line is blended with an arc line of that element. Examples:

*Fe* I Multiplet No. 28 *3116.633§—Blend of *Fe* I and *Fe* II.

*Cr* II Multiplet No. 4 *3349.34§—Blend of *Cr* II and *Cr* I.

All uses of pairs of symbols not covered by the general cases of blends of arc lines with those in the first spark spectra or vice-versa, as described above, are summarized in Table 4, where another pair of symbols "* and §§" is also introduced.

TABLE 4

SYMBOLS DENOTING BLENDS—SPECIAL CASES

| Spectrum | * and § | * and §§ |
|---|---|---|
| C II | ..... | C II and C III |
| C III | ..... | C III " C II |
| P II | P II and P III | P II " P IV |
| P III | P III " P II | P III " P IV |
| P IV | P IV " P III | P IV " P II |
| S II | S II " S III | |
| S III | S III " S II | |
| K III | K III " K II | |
| Fe II | ..... | Fe II " Fe III |
| Fe III | Fe III " Fe II | Fe III " Fe I |

Column one of Table 4 indicates the spectrum in which the symbols are found. Columns two and three of the Table contain the pairs of symbols used and the meaning of each. For example:

*C* II Multiplet No. 45 *4368.14§§—Blend of *C* II and *C* III.

*S* II Multiplet No. 50 *3860.64§—Blend of *S* II and *S* III.

The symbols mentioned above apply to blended lines which have come to the attention of the writer, but doubtless many more blends exist than are thus noted. A careful examination of the Finding List should reveal any important blends, but this list was prepared after the R M T was typed, and consequently could not be used to check the thoroughness with which the blended lines are marked.

m An "m" preceding the wave-length indicates that the line is masked (see § 34F).

† This symbol follows the Multiplet Designation to call attention to the fact that not all the lines observed in the multiplet are listed in the R M T. The violet limit λ2950 explains the omission of some strong lines. Most of the omitted lines are too faint to be of astrophysical importance.

[1] Russell, Unpublished material.
[2] Meggers, *Journ. Opt. Soc. Am.* **31**, 39 (No. 1), 1941.
[3] April 1941.

34. Intensity.

Column three contains the estimated laboratory intensity. It has been included only because of persistent requests. The intensities must be used with great caution not only because of the glaring lack of homogeneity in the estimates, but also on account of the difference in the intensity scales used by various investigators.

For each spectrum the writer has tried to adopt the best existing set of estimates made by a good observer who has covered a long range of wave-length. In the red, the intensities by Meggers and Kiess have been the first choice. In the visible, the arc intensities by A. S. King are given for arc spectra and for first spark spectra of the rare earths. For other spark spectra, spark intensities have been used.

When the intensities of the lines of a spectrum are taken from one or two main references they are not given in parentheses. If only a few intensities are from one source, or if the listed ones are probably on a very different scale from the majority used for a spectrum, parentheses are used. In general, the parentheses denote that the intensity is not the first or second choice. Table 8, Page xxvi, gives the references from which the intensities have been taken. The reader is warned not to assume that the wave-length and intensity come from the same reference. This may be the case, but frequently it is not.

The intensity column contains several types of notes discussed below under entries A to G:

A The letters used to describe the intensities are as follows:

d Double
g Ghost; g coin Ghost coincident; gn Ghost near
l Shaded to longer wave-length [1]
n Diffuse (without structure) or hazy
N Very diffuse (without structure) or very hazy
p Part of band
r Narrow self-reversal
R Wide self-reversal
s Shaded to shorter wave-length (noted by "v" or "ny" in some papers)[1]
tr Trace
w Wide (fine structure type), broad or complex
W Very wide (fine structure type) or very broad

B The intensity column is often blank for predicted lines because most of them have not been observed in the laboratory. If the predicted position is assumed to be more accurate than the measured one, the laboratory intensity is given with a predicted wave-length.

C A dash indicates that the line is so faint that no laboratory intensity has been assigned, except for *H*, *D* and *He* II, where no intensities are listed.

D "Forb" indicates that the line is forbidden but has been observed in the laboratory. Lines due to Stark Effect are thus marked.

E Familiar "names" of selected lines are included:

Series Names:

| | |
|---|---|
| H | H$\alpha$, H$\beta$ etc. |
| D | D$\alpha$, D$\beta$ " |

Fraunhofer Names:

| | |
|---|---|
| He I | $D_3$ |
| Na I | $D_1$ and $D_2$ |
| Ca II | H and K |

F When an important line is masked, "m" precedes the wave-length, the predicted position of the masked line is given, and the spectrum to which the masking line belongs, is noted by the chemical symbol in the intensity column. The Roman numerals have been omitted except for masked lines of *Fe* III. If for example "*Fe*" or "*Ti*" appears in the intensity column, the line in question is masked by *Fe* I or *Ti* I the "I" being omitted because of the limited space in this column. Similarly, a "+" is mostly used for first spark spectra in place of "II," although the conventional use of Roman numerals is fully recognized.

[1] Recommended by the International Astronomical Union—*Trans. Intern. Astr. Union* 6, 100, 1938.

G Symbols in the intensity column:

* Blended Intensity

⊙ Predicted line of *Fe* I present in the solar spectrum; ⊙? denotes that the solar identification as *Fe* I is subject to some question.

35. Columns four and five give the low and high excitation potentials (E P) of the levels involved in the production of the line (see § 27). Some E P's are given in parentheses in the R M T to denote that they are not accurately known.

In analyzing a spectrum it often happens that two or more sets of terms of different multiplicity exist that are unconnected, since no intersystem combinations have been detected. If long series, whose correctness is unquestionable, can be found, the limits furnish a fairly accurate determination of the relative positions of the different types of terms. This is the case for *Be* I, *B* II, *C* III, *O* III, and *O* IV, but no symbol has been introduced to indicate that intersystem combinations have not been observed.

The limits are less accurate for *N* II, *N* IV, *O* II, *O* V and *F* II. The E P's affected by this are in parentheses.

For *Ce* II, two sets of terms are well known but they are unconnected. For this reason the lines are listed in two Groups, I and II. Within each group the relative values of the E P's are correct, but the terms in Group I are believed to be lower than those in Group II by about 0.6 volt.[1] In Group II all values are, therefore, enclosed in parentheses.

For *Ce* III parentheses are used because the lowest level may not have been found.

For *Si* II, *P* III and *Mn* II some terms are established by their internal separations, but are entirely unconnected with the rest of the terms. Here the E P columns contain question marks.

In the earlier Multiplet Table all E P's were obtained by multiplying the term values in $cm^{-1}$ by the factor 0.00012345. An improved value of this factor, 0.00012336, was published by Birge[2] in 1929. Since then he has announced that 0.00012395 is more nearly correct[3]. This last change deserves serious consideration—it involves a change in "e", the charge on the electron, which will doubtless be carefully checked experimentally in the near future. The change is surprisingly large and affects many calculations of an astrophysical nature.

Although it is wrong, in principle, to perpetuate the use of an incorrect value of a fundamental physical constant, the old value 0.00012345 has been used throughout the R M T in calculating the E P's (and I P's for which the limits were known. See § 23). The reason is threefold:

1. The errors in stellar temperatures and other quantities based on observational data far exceed those introduced by the change in this factor.

2. Until a definitive value of the constant is available it has seemed an unjustifiable expenditure of time and money to revise the extensive calculations, many of which had already been done with the oldest value.

3. The change in the value of "e" enters into so many calculations, that to recalculate the E P's and I P's is far from sufficient. As soon as the new value is confirmed without likelihood of further change, it should be used in *all* calculations of astrophysical importance.

The last two columns contain J-values and Multiplet Designations. These have already been discussed in § 28, but a few comments are in order. When levels of a term are so close that they are unresolved, all the J-values for the term should be listed. This is impossible because of limited space, and consequently the column headed J is frequently blank or has the J-value of only one level entered.

The multiplet numbers which appear in parentheses under the Multiplet Designation are reference numbers to be used in locating any line. (See §6). In each spectrum the numbers start with "1." All lines in a multiplet have the same multiplet number. These numbers are entered in the Finding List.

## VII. SPECTROSCOPIC NOTATION

The notation used in the column headed "Multiplet Designation" differs for spectra which contain conspicuous series and for the complex spectra which do not.

### A. *Series Spectra*

36. For many elements the spectra become more complex as the degree of ionization decreases. The terms of each spectrum are the parent terms or "limits" of the terms in the spectrum of the next lower degree of ionization. The addition of s, p, d, f, etc. electrons to each limit produces arrays of terms accurately predictable from theory.

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[1] Harrison, Albertson and Hosford, *Journ. Opt. Soc. Am.* **31**, 439 (No. 6), 1941.
[2] *Phys. Rev. Suppl.* **1**, 62 (No. 1), 1929.
[3] *Rev. Mod. Phys.* **13**, 237 (No. 4), 1941; *Reports on Progress in Physics* **8**, 131, 1941.

The simplest case is illustrated by *O* VI. Here the lowest term of *O* VII, $1s^2\ {}^1S$, is so much lower than any other that no other limit need be considered. The addition of a "running" s, p, d, f . . . electron to this state produces series of doublet S, P°, D, F° . . . terms in *O* VI. In this case the electron and the terms are of the same type. For example, the ground term of *O* VI is $1s^22s\ {}^2S$, and the next term $1s^22p\ {}^2P°$. The term type and total quantum number of the running electron suffice to define the configuration. In the R M T the notation $2^2S$, $2^2P°$ etc. is used in spectra of this type. To illustrate, Multiplet No. 1 of *Li* I has the designation $2^2S–2^2P°$. (Other features of the notation are discussed in §28 and in Table 3).

The case of *O* V is more complicated because $2^2P°$ of *O* VI is not much higher than $2^2S$ and terms from both limits are important. The addition of a running electron to these limits gives the following terms:

| O VI | Limit | $1s^22s$ | $^2S$ | | $1s^22p$ | $^2P°$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| O V | Added Electron | Config | Terms | | Config | Terms | | | | | |
| | 3s | $1s^22s3s$ | $^1S$ | $^3S$ | $1s^22p3s$ | $^1P°$ | | | $^3P°$ | | |
| | 3p | $1s^22s3p$ | $^1P°$ | $^3P°$ | $1s^22p3p$ | $^1S$ | $^1P$ | $^1D$, | $^3S$ | $^3P$ | $^3D$ |
| | 3d | $1s^22s3d$ | $^1D$ | $^3D$ | $1s^22p3d$ | $^1P°$ | $^1D°$ | $^1F°$, | $^3P°$ | $^3D°$ | $^3F°$ |

The configuration is $1s^22s^2$ gives only $^1S$; and $1s^22p^2$ only $^1S\ {}^1D\ {}^3P$.

It appears from this array that if the terms having the limit $2^2S$ in *O* VI are labeled $3^1S$, $3^3S$, $3^1P°$, $3^3P°$, $3^1D$, $3^3D$, and those from $2^2P°$ are labeled $3s^1P°$, $3s^3P°$, $3p^1S$ . . . . $3d^1P°$ no ambiguity occurs. This notation has been adopted in the R M T for a number of spectra in which two limits, one odd and one even, had to be considered.

When two or more of the effective limits are all even or all odd an addition to this notation is necessary. For terms derived from the lowest of such a group of limits, the running electron is given as before; for those derived from the next higher limit a prime is affixed; and for those from the limit above this a double prime. Where the lowest limit is an S term, the type of the electron and of the term itself are the same, and the former is omitted. For example, the limiting terms in *O* II are $^4S°$, $^2D°$ and $^2P°$ in order. The addition of a 3p electron to these gives (among others) the terms in *O* I here called $3^5P$ from $^4S°$, $3p'\ {}^3D$ from $^2D°$ and $3p''\ {}^3D$ from $^2P°$.

In several spectra there remain terms which cannot be described by this scheme: but it has been found possible to give a special abbreviated form of the configuration notation, etc. which make their nature intelligible to one versed in the theory of spectral structure.

There is at present no general agreement regarding the use of abbreviated notation of this sort. The notation here adopted has been largely influenced by the limitations of the photographic process—and is not presented as an ideal system—but it illustrates the glaring need for the preparation and general adoption of a better one.

37. Special Cases.

The notation used in the R M T for *Ne* I, *Na* II, *A* I, *K* II and *Ca* III deserves special mention. Paschen's notation formerly used for spectra of this type defined the total quantum number and the type of electron, but introduced subscripts that were not inner quantum numbers. A revised notation which is given in detail by Bacher and Goudsmit [1] is adopted here. The levels with "s" electrons were called by Paschen $s_2$, $s_3$, $s_4$ and $s_5$; those with "p" electrons were $p_1$ to $p_{10}$ etc. In this book the subscripts used by Paschen have been omitted but the rest of his notation is retained with numbers assigned to the levels, in order of increasing values for the lowest group of levels of each type. All the members of a series have the same number, but with this arrangement homologous levels which have the same J-values for different elements are not always assigned the same index number. *Ne* I illustrates the changes:

*Ne* I NOTATION

| Paschen | Revised | Paschen | Revised |
|---|---|---|---|
| | | . . . . . | . . . . . |
| $3s_5$ | 3s 1° | . . . . . | . . . . . |
| $3s_4$ | 3s 2° | $4d_6$ | 4d 1° |
| . . . . . | . . . . . | $4d_5$ | 4d 2° |
| $3p_{10}$ | 3p 1 | $4d'_4$ | 4d 3° |
| $3p_9$ | 3p 2 | $4d_4$ | 4d 4° |
| $3p_8$ | 3p 3 | . . . . . | . . . . . |

[1] Atomic Energy States, McGraw Hill, New York, London, 1932.

Most of the levels for spectra of this type are not grouped into terms and consequently multiplets in the ordinary sense cannot be listed. Arbitrary groups of lines have been formed and numbered to facilitate the search for a given line. In *Ne* I for example, all important lines from the level 3s 1° combining with "3p" levels have multiplet number 1; those from 3s 1° combining with 4p levels have multiplet number 2 etc.

### B. Complex Spectra

38. In the majority of complex spectra the terms are so numerous that it is impracticable to designate them by their configurations. For these spectra the prefixes a, b, c, d are assigned to the low terms of each type and z, y, x etc. to those which combine with them. In *Fe* I, for example, the lowest $^3F$ term is $a^3F$, the next higher one $b^3F$ etc. There are ten $^3G°$ terms. They are labeled $z^3G°$, $y^3G°$ . . . . . $q^3G°$. In Multiplet No. 449 the designation is $b^3G$-$t^3G°$. Here the low term is the second $^3G$ term as indicated by the prefix "b". The high term is the seventh odd $^3G$ term, as indicated by "t".

39. In many complex spectra it is impossible to group all known levels into spectroscopic terms. These miscellaneous levels are assigned numbers, and the superscript "°" if they belong to the odd set. Many combinations between terms and miscellaneous levels are given in the R M T and assigned multiplet numbers. For example, the designation of multiplet number 450 of *Fe* I is $b^3G$–12°.

Numbered levels are numerous in spectra of the rare earths. The arrangement is similar to that described in § 27, i.e. the lines from a given low term are listed in order of increasing E P of the numbered levels.

In *Sm* II only the low levels have been grouped into terms. All high levels are numbered odd levels. In the R M T the combinations of the separate components of the low terms with arbitrarily grouped odd levels are assigned multiplet numbers. For example, the combinations of $a^8F_{1/2}$ with the levels labeled 1°, 2°, 5°, 23°, 35°, 37° have multiplet number 1. The E P's increase for the various groups similarly to those in spectra with regular terms, as discussed in §27.

## VIII. SPECIAL NOTES ON INDIVIDUAL SPECTRA

40. *H*, *D*, *He* II The wave-lengths listed for these spectra have been calculated for the center of gravity of the lines, taking into account the fine structure, and using the values of $R_H$, $R_D$ and $R_{He}$ respectively, given by Birge in 1941 [1]. These computations were made by Dr. J. E. Mack for inclusion here. The writer is deeply indebted to Dr. Mack for his cordial cooperation in furnishing this unpublished material.

No intensities have been included for these spectra.

*O* II Improved term values are needed. The writer has constructed the multiplets from Edlén's term list. Measures by different investigators are discordant, and considerable editing has been done, especially in the interpretation of blends.

For the sextet terms the configuration in abbreviated form is used to indicate that the terms are from the high limit $sp^3\ ^5S°$ in *O* III, namely: $sp^3 3p\ ^6P$, $sp^3 3d\ ^6D°$, $sp^3 4s\ ^6S°$.

*Na* I The fine structure components of $D_1$ and $D_2$ have been measured with the interferometer by Meissner and Luft [2], as follows:

| | $D_1$ | $D_2$ |
|---|---|---|
| | 5895.9316 | 5889.9579 |
| | 5895.9103 | 5889.9380 |
| Center of Gravity | 5895.9236 | 5889.9504 |

The measures listed in the R M T are taken from a source where the lines appeared as impurities, since it was thought that for astrophysical purposes these measures might be preferable to those of the fine structure components.

The two lines λ11403 and λ11381 were also measured as impurities.

Improved laboratory intensities are needed for *Na* I.

[1] *Rev. Mod. Phys.* **13**, 233 (No. 4), 1941.
[2] *Ann. der Phys.* (5) **29**, 698, 1937.

*Na* II The changes made in the Paschen notation for *Na* II have been discussed in § 37. Some *terms* are also known in this spectrum, and two types of notation appear. The lines are listed in order of increasing low level and these *levels* combine with the *terms*. Although no complete multiplets are listed, multiplet numbers have been assigned as usual. For example, multiplet No. 17 is 3p 9–4s$^3$P°. In spectra of this type no attempt has been made to indicate omitted lines by the use of a "†". The "List D" indicates that only the leading lines are listed.

*Mg* I Two sets of series, 3$^1$D–$^1$F° and 3$^3$D–$^3$F° have been extended by the use of infra-red solar wave-lengths from Babcock's Table (see § 15)[1]. This has been done on the assumption that the $^1$F° and $^3$F° terms are coincident, as Paschen suggested for the first members of the series. The predicted wave-lengths in the R M T are obtained from solar term values. The series appear to be so well confirmed that the solar wave-lengths are preferable to the predicted ones, but for uniformity, no exception has been made for these series lines of *Mg* I.

In Multiplets 7, 8 and 9 the J-values and designation apply to all three lines entered. In each case singlet combinations are involved. Normally one one line is observed in a combination of this type, but the fine structure components of each line are listed.

*Al* II The G and H terms given by Paschen and Ritschl[2] are in both cases assumed to be coincident singlet and triplet terms. When combinations of these terms with singlet terms are listed in the R M T, $^1$G or $^1$H° has been used in place of $^{1,3}$G or $^{1,3}$H°. Similarly, the last three entries are given as singlet combinations, but in reality they are probably singlet and triplet combinations. Double multiplicities for unresolved terms have not been used in the R M T.

*Si* II Owing to the use of the photographic method of publication, it has been impossible to add lines without retyping one or more pages. One predicted multiplet of *Si* II has been omitted which should possibly have been inserted.

| I A | Ref | E P | | J | Multiplet |
|---|---|---|---|---|---|
| | | Low | High | | Desig |
| 4075.81 | P | 9.80 | 12.82 | 2½–1½ | 3$^2$D–5$^2$P° |
| 4077.09 | P | 9.79 | 12.82 | 1½– ½ | |
| 4073.05 | P | 9.79 | 12.82 | 1½–1½ | |

*P* III The multiplets are listed slightly out of order, but it was thought unnecessary to retype the page on this account.

*S* II The measures by different observers are very discordant. This spectrum needs thorough observation. Accurate wave-lengths, intensity estimates and term values, and further analysis are desirable.

*A* II This spectrum is fairly well analyzed but needs careful editing before a definitive analysis can be published. Rosenthal[3] has measured many lines and from his measures alone a consistent set of term values could probably be calculated. The lists of classified lines are not homogeneous and a larger residual in the observed minus calculated wave number must be permitted than for most spectra. The multiplets listed in the R M T appear to be fairly satisfactory in spite of the inaccurate term values.

One term, labeled a$^2$P by de Bruin is puzzling because it has no configuration assignment. It has been retained, but needs to be checked carefully when the analysis is carried further. This is the only case where both the running electron notation and the prefix "a" appear in a given spectrum.

*Ca* I Although the analyses of these spectra are almost completed, the spectra require further laboratory
*Ca* II observation. Accurate wave-lengths, especially of the fainter lines are urgently needed. It is surprisingly difficult to obtain accordant term values. The interferometer measures made at Allegheny furnish an excellent starting point, but these spectra still invite the attention of the laboratory investigator, from the violet through the infra-red.

[1] Babcock and Moore, *Ap. J.* **101**, 374, 1945.
[2] *Ann. der Phys.* (5) **18**, 867, 1933.
[3] *Ann. der Phys.* (5) **4**, 49, 1930.

*Sc* II Multiplet No. 9. Enter intensity 2 for λ3923.503.

41. *Fe* I The rigorous arrangement of multiplets described in § 27 applies only approximately to *Fe* I. In this spectrum the multiplet numbers reach 1352 but this figure is not definitive. Owing to an extension of the analysis which altered some term assignments, a number of multiplets were rearranged after the lines and multiplet numbers had been entered and checked in the Finding List.

All the revisions were entered in the R M T. For unchanged multiplets the original multiplet numbers were retained. The revised multiplets were inserted as nearly as possible in the correct place and assigned the available numbers, or to avoid duplication, a number followed by "a". As a result of these changes the multiplets do not always have consecutive numbers and some numbers are omitted. The renumbering of all the multiplets entailed so many changes in the Finding List that it was not undertaken.

In three multiplets of *Fe* I, Nos. 3, 7 and 81, an "R" is entered under the multiplet number. A line has been inadvertently omitted from each of these multiplets. The omitted lines are listed on page 65 at the end of the *Fe* I multiplets, and preceding the list of unclassified lines.

In multiplet No. 78, columns one and two, λ3497.137 V should read 3497.15 P.

Multiplet No. 1151 should be rejected; λ4618.568 is erroneous.

*Ni* I Attention has been called to the fact that the intensities in Multiplet No. 62 are not so abnormal as indicated here. It has been impossible to insert revised estimates.

*Rh* II The use of the symbol "†" to denote omitted lines has not been checked owing to the lack of a complete line list. It has been assumed from the term lists that the fainter members of the multiplets thus marked have been observed.

*Ce* II The lack of connection between Groups I and II has been mentioned (§ 35). It is assumed that the terms in Group I are the lower set.

The prefixes a, b and c etc. have been assigned to the low set of terms of each Group. There can be no ambiguity because in Group I the low set is even, while in Group II it is odd.

*W* II All the miscellaneous levels published by Laun [1] have been numbered in order. These numbers are used in the R M T in place of Laun's notation.

## IX. SPECTRA OMITTED FROM THE R M T.

These may be grouped in several general classes.

42. Spectra of probable astrophysical importance for which there is no analysis to date.

These spectra are mentioned in the R M T in the appropriate place with the remark "No Analysis" and the date. If A. S. King has assigned a Temperature Class to the lines, this fact is noted. For example: page 86, *Ce* I No Analysis May 1942 (Temperature Class). The spectra in this class are listed in Table 5.

TABLE 5

SPECTRA OMITTED FROM R M T

NO ANALYSIS

| Spectrum | Ref. to Temp. Class | Spectrum | Ref. to Temp. Class |
|---|---|---|---|
| Ce I | 215 | Dy I | 217 |
| Pr I | 215 | Dy II | 217, 229 |
| Nd I | 219 | Ho I | 217 |
| Tb I | 217 | Ho II | 217 |
| Tb II | 217 | Th I | 123 |

All but *Th* I have been observed by A.S. King. The bibliography numbers of the references to the work on temperature classification are entered in column two.

[1] *Bur. St. Journ. Res.* **21**, 207 (RP 1125), 1938.

**43. Analyzed spectra having lines observed** in the visible region, but omitted from the R M T as unimportant astrophysically.

These spectra are mentioned in the R M T with the remark "See Introduction". They are listed in Table 6 with numbers from the bibliography referring to the papers on analysis.

TABLE 6

SPECTRA OMITTED FROM R M T

NOT OF ASTROPHYSICAL INTEREST

| Spectrum | Ref. to Analysis | Spectrum | Ref. to Analysis | Spectrum | Ref. to Analysis |
|---|---|---|---|---|---|
| B I [1] | 16, 89 | Rb II | 238 | Cs II | 309, 405 |
| F IV | 84 | Pd II | 384, 24 | Ta II | 192 |
| F VI | 83, 87 | Ag II | 383, 24 | Pt II | 387 |
| Cl IV | 31, 32 | Cd II | 372, 401 | Au II | 324 |
| Ga II | 376 | In II | 317 | Hg II | 313 |
| Se II | 244 | Sb II | 236 | Tl II | 106 |
| Br I | 194 | I I | 107, 69, 325 | Pb II | 80 |
| Br II | 232 | I II | 232 | Bi II | 64, 115 |
| Kr I | 274, 276, 165 | Xe I | 156 | Rn I | 329 |
| Kr II | 53 | Xe II | 155 | Th III | 54 |

The low abundance of these elements in celestial sources, and the high E P of the lines in the visible region have been the determining factors for omission.

44. There are three types of spectra for **which** little or nothing is known:

*Er, U.* Lines have been observed in **spectra of** these elements, but the spectra of various degrees of ionization have not been separated.

*Te* II, *Re* II, *Os* II, *Ir* II, *Po, Ac, Pa.* The writer has found no references to work on these spectra.

*Ma, Il*, 85, 87. There is nothing known about these elements. It appears doubtful whether they have been successfully isolated.

No reference is made in the body of the R M T to those spectra whose leading lines are in the region to the violet of λ2950, since this is a book designed for astrophysical use. Selected spectra of this type are included in the section dealing with Forbidden Lines (see § 45 and pp. 100–110).

## X. FORBIDDEN LINES

45. The author of a "Multiplet Table of Astrophysical Interest" published in 1945 is obliged to consider the probable importance of the forbidden lines of *all abundant* elements. This is indicated by the work of Bowen on nebular lines, of Edlén on coronal lines, and of Swings, Merrill and others on various astronomical spectra.

Following the body of the R M T is a Table of Forbidden Lines of Astrophysical Interest (pp. 100–110). This Table is arranged in detail similarly to the R M T. The lines in a multiplet are listed by diagonals and the multiplets are listed in the order described in § 27. In order to avoid duplication, all multiplets of forbidden lines have an "F" following the multiplet number, 1F, 2F etc. Unlike the R M T, the headings for each spectrum contain only the name of spectrum and the I P. No grading of analysis or list has been attempted and no date of completion of the manuscript is given. All of this section has been written between January and May 1945.

In preparing this manuscript the writer has been most cordially assisted by Dr. Swings. He has edited the lists and offered many valuable suggestions concerning the limitations of the Table. No explicit statement can be made as to the principles of selection adopted, but severe restrictions have been necessary in complex spectra because of the great array of possible forbidden transitions. For simple spectra only a limited number of transitions occurs, but as the complexity increases the number increases rapidly. The general principles followed are:

A Only transitions from metastable states are forbidden. Consequently only the lowest terms in a spectrum are considered.

[1] Lines of B I have not been observed in the visible, but should exist.

B The lists are restricted to multiplets involving likely combinations as regards multiplicity and azimuthal quantum numbers, except for those in which the lowest terms are involved. In *Fe* II, for example, many more combinations and more unlikely combinations from the lowest term, $a^6D$ are listed than from higher terms.

C Transitions involving $\Delta J = \pm 2$ as well as $\Delta J = 0$ or $\pm 1$ are listed for the multiplets most likely to be important.

D The high E P is limited to about 4.0 for the most abundant elements and to about 3.5 for arc spectra of these elements.

E The lists have been extended to include lines that may be important in the red and infra-red. Forbidden lines of neutral atoms are included only for the most abundant elements.

The multiplets listed must be interpreted with caution, because of these restrictions. If complete multiplet arrays are written up from Table 3, lines omitted from any multiplet among the forbidden lines can be detected. Those interested in longer lists must construct them from the term lists given in the papers on the analysis of each spectrum (Table 10 p. xxix).

The great majority of forbidden lines are predicted from the term values. If accurate *measures* have been obtained, they are entered with a letter indicating the source, as follows:

| | | |
|---|---|---|
| N | Nebular | *N* II, *O* II, *O* III, *Ne* III, *Ne* V, *S* II |
| L | Laboratory | *O* I |
| A | Auroral | *O* I |
| C | Coronal | Entered under the predicted positions of lines of highly ionized *Fe* and *Ni* |

When term values permit, the wave-lengths of predicted lines have been calculated to two decimal places. For some spectra the term values are not accurately known, but the internal separations are well established. For these the position is given to 0.1 A. For the most inaccurate wave-lengths no decimals are recorded and in very dubious cases a "?" follows the wave-length.

Some I P's and some predicted wave-lengths have been obtained by interpolation or extrapolation along the isoelectronic sequences. These are:

| Term | | Term | | I P | |
|---|---|---|---|---|---|
| Sp | Term | Sp | Term | Sp | Sp |
| Cl II | $^1S$ | Ca VII | $^1S$ | Ca V | Fe X |
| S XII | $^2P$ | Ca XV | $^3P$ | Sc VI | Fe XI |
| A III | $^1S$ | Fe XV | $^3P^\circ$ | V VIII | Fe XIII |
| A XI | $^3P$ | Ni XII | $^2P^\circ$ | Cr VIII | Fe XIV |
| A XIV | $^2P^\circ$ | Ni XIII | $^3P$, $^1D$ | Cr IX | Fe XV |
| K V | $^2P^\circ$ $^2D^\circ$ | Ni XV | $^3P$ | Mn IX | Co XI |
| K VI | $^1S$ | Ni XVI | $^2P^\circ$ | Mn X | Ni XIII |
| | | | | | Ni XV |

As in the body of the R M T, E P's in parentheses denote that the terms involved do not have observed connections with the rest of the terms of the spectrum.

Dr. Swings has pointed out that forbidden lines are essentially emission lines, and therefore, astrophysically the high E P is the important one. For this reason the multiplets of a spectrum should be listed by high E P rather than by low E P (§ 27). It is fully recognized that emission lines are better handled in this order and it is hoped that all multiplets having the same high term can be readily selected in any spectrum. The arrangement by low terms has been adopted merely for the sake of uniformity.

Another highly significant comment has been made by Dr. Swings [1], namely, that "certain forbidden transitions that are not directly observable may play a role in astronomy, for example, by flourescence excitation, ionization or dissociation."

[1] Letter, May 1945.

The importance of lines in the extreme violet such as λ303.7 of *He* II, λ303.7 and λ374.4 of *O* III and the pair at λ374.4 of *N* III, in producing the nebular lines has been fully discussed by Bowen [1]. The violet limit, λ2950, imposed in this book has excluded both permitted and forbidden lines in the violet that are extremely important in the interpretation of forbidden lines observed in astronomical spectra. Readers are, therefore, urged to consult the individual papers on this subject, as it has been regarded as beyond the scope of the present work.

## XI DETAILS OF PUBLICATION

The preparation of the manuscript of this book has covered such a long period of time that the typing has been done as various spectra were finished, which is not in the order of increasing atomic number. It has been practically impossible to terminate every section of the manuscript at the end of a typed page. Some important insertions have also broken the continuity of typing. Consequently, the pages are frequently unequal in length and some have large gaps. No serious effort has been made to avoid irregularities of this kind, for two reasons: first, the retyping and rechecking of these large pages in order to adjust spacing has seemed an unjustifiable procedure, particularly since there is always the chance of introducing new errors in handling so much tabular data; second, the blank spaces may prove to be useful for notes.

Doubtless there are more serious irregularities, namely inconsistencies in notation of similar spectra. During the course of the work the manuscript has been widely distributed to interested investigators. To date it has never all been assembled in one place. The writer has been unable to remember all the details connected with each spectrum, but has proceeded on the assumption that minor irregularities would not impair the value of the R M T so seriously as the delays required to correct all of them.

46. One of the purposes of this book has been to provide adequate material for fairly definitive identifications of solar lines. Mention has been made of the forthcoming publication by Babcock and others on the Infra-Red Solar Spectrum λλ6600–13495 (§§ 7, 15). A similar program covering the violet solar spectrum is being carried on at Mount Wilson by Babcock. The writer has been working on the identifications of the solar lines throughout the entire solar spectrum, with the aid of the manuscript of the R M T. The publication of the results to the violet of λ6600 has been postponed in order to complete the present book. It is planned to publish them as soon as possible.

## XII. BIBLIOGRAPHY

Following the text is a Bibliography in which all references used in the preparation of this book are listed in the alphabetical order of the names of the authors. Each reference is assigned a number for purposes of cross reference.

47. In the R M T (excluding the section on Forbidden Lines) each spectrum has three sets of references: one giving the sources from which the wave-lengths have been taken—Table 7; one giving the first, second, etc. choices of references for intensity estimates—Table 8; and one referring to papers on analysis—Table 9.

The Tables are arranged similarly. In each, the first column gives the chemical symbol of the element and the spectrum (I = arc, II first spark etc.), the second the number with which to enter the Bibliography. In Table 7 the letters A, B, C, etc. are taken from column 2 of the R M T for each spectrum. In Table 8 the first choice for intensity is indicated in column one, the second in column two etc. In general, reference numbers are in italics when the intensities from the reference are in parentheses in the R M T (see § 34). Table 9 does not list choices. It contains references to papers on analysis that were used in compiling the R M T.

Table 10 gives the sources used for analysis of spectra contained in the Table of Forbidden Lines. It is arranged similarly to Table 9.

Following the Bibliography are an index by pages, and one by elements arranged in the alphabetical order of the chemical symbols.

[1] *Ap. J.* **81**, 1, 1935.

## Table 7

### References—Wave-Length

| Sp | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| H | 243 | | | | | |
| D | 243 | | | | | |
| He I | 263 | 299 | 319 | 174 | 275 | |
| He II | 243 | | | | | |
| Li I | 206 | 175 | 149 | | | |
| Li II | 378 | 404 | | | | |
| Be I | 318 | 315 | 149 | | | |
| Be II | 318 | | | | | |
| B II | 81 | | | | | |
| B III | 81 | | | | | |
| C I | 185 | 300 | 169 | 160 | 370 | |
| C II | 122 | 81 | 89 | | | |
| C III | 81 | 121 | | | | |
| C IV | 81 | | | | | |
| N I | 93 | 78 | 160 | 370 | | |
| N II | 20 | 125 | 120 | | | |
| N III | 124 | 81 | | | | |
| N IV | 126 | 81 | | | | |
| O I | 98 | 263 | 127 | 116 | 316 | 128 |
| O II | 20 | 118 | 301 | | | |
| O III | 119 | 86 | 302 | | | |
| O IV | 81 | 126 | 86 | | | |
| O V | 81 | | | | | |
| O VI | 81 | | | | | |
| F I | 88 | | | | | |
| F II | 73 | | | | | |
| F III | 72 | 85 | | | | |
| Ne I | 162 | 277 | 154 | 276 | 311 | 263 |
| Ne II | 52 | | | | | |
| Na I | 149 | 116 | 263 | 298 | 259 | 338 |
| Na II | 130 | 393 | | | | |
| Mg I | 295 | 314 | 141 | 261 | 116 | |
| Mg II | 116 | | | | | |
| Al I | 403 | 315 | 116 | 319 | 310 | |
| Al II | 319 | 377 | | | | |
| Al III | 312 | | | | | |
| Si I | 186 | | | | | |
| Si II | 117 | | | | | |
| Si III | 117 | | | | | |
| Si IV | 117 | 101 | | | | |
| P I | 180 | | | | | |
| P II | 133 | 181 | 70 | | | |
| P III | 133 | | | | | |
| P IV | 133 | | | | | |
| P V | 133 | | | | | |
| S I | 297 | 129 | | | | |
| S II | 157 | 19 | 158 | 25 | 136 | |
| S III | 157 | 159 | | | | |
| S IV | 303 | | | | | |
| Cl I | 182 | | | | | |

| Sp | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cl II | 195 | | | | | | | | | | | |
| Cl III | 31 | 27 | | | | | | | | | | |
| A I | 277 | 154 | 263 | | | | | | | | | |
| A II | 340 | 18 | 48 | 47 | | | | | | | | |
| A II | 49 | 51 | | | | | | | | | | |
| A IV | 50 | | | | | | | | | | | |
| K I | 149 | 403 | 263 | 259 | 88 | 116 | 108 | 380 | | | | |
| K II | 46 | | | | | | | | | | | |
| K II | 47a | 51a | | | | | | | | | | |
| Ca I | 403 | 66 | 259 | 369 | 373 | 241 | 374 | | | | | |
| Ca II | 168 | 403 | 66 | 375 | 390 | | | | | | | |
| Ca III | 11 | | | | | | | | | | | |
| Sc I | 245 | 253 | 349 | | | | | | | | | |
| Sc II | 245 | 253 | | | | | | | | | | |
| Sc III | 172 | | | | | | | | | | | |
| Ti I | 178 | 65 | 185 | 282 | 245 | 201 | 212 | 348 | 199 | 172 | 177 | 21 |
| Ti II | 178 | 65 | 245 | 201 | 347 | 172 | | | | | | |
| Ti IV | 364 | | | | | | | | | | | |
| V I | 264 | 368 | 245 | 242 | 266 | 213 | 109 | | | | | |
| V II | 266 | | | | | | | | | | | |
| Cr I | 183 | 184 | 245 | 142 | {204 / 213} | 173 | | | | | | |
| Cr II | 184 | 245 | 142 | 110 | | | | | | | | |
| Mn I | 260 | 245 | 246 | 131 | | | | | | | | |
| Mn II | {67 / 68} | 245 | 108 | | | | | | | | | |
| Fe I * | | | | | | | | | | | | |
| Fe II | 76 | 222 | 55 | | | | | | | | | |
| Fe III | 103 | 102 | 222 | | | | | | | | | |
| Co I | 56 | 282 | 245 | 280 | 71 | 230 | 62 | 147 | | | | |
| Co II | 255 | | | | | | | | | | | |
| Ni I | 282 | 245 | 178 | 143 | 109 | 146 | 280 | 398 | | | | |
| Ni II | 252 | 245 | 111 | | | | | | | | | |
| Cu I | 58 | | | | | | | | | | | |
| Cu II | 137 | | | | | | | | | | | |
| Zn I | 149 | | | | | | | | | | | |
| Zn II | 149 | 319 | | | | | | | | | | |
| Ga I | 402 | | | | | | | | | | | |
| Ge I | 188 | 245 | | | | | | | | | | |
| Ge II | 188 | 235 | | | | | | | | | | |
| As I | 273 | | | | | | | | | | | |
| As II | 328 | | | | | | | | | | | |
| Se I | 189 | | | | | | | | | | | |
| Rb I | 149 | 333 | | | | | | | | | | |
| Sr I | 399 | 245 | 116 | | | | | | | | | |
| Sr II | 399 | | | | | | | | | | | |
| Y I | 254 | 245 | | | | | | | | | | |
| Y II | 254 | 351 | 245 | | | | | | | | | |
| Zr I | 197 | 282 | | | | | | | | | | |
| Zr II | 196 | | | | | | | | | | | |
| Cb I | 283 | | | | | | | | | | | |
| Cb II | 283 | | | | | | | | | | | |

* See references for Fe I at end of Table 7.

TABLE 7—Continued

REFERENCES—WAVE-LENGTH

| Sp | A | B | C | D | E |
|---|---|---|---|---|---|
| Mo I | 326 | 176 | 113 | | |
| Mo II | 245 | 113 | | | |
| Ru I | 245 | | | | |
| Ru II | 272 | | | | |
| Rh I | 304 | | | | |
| Rh II | 150 | | | | |
| Pd I | 256 | 109 | | | |
| Ag I | 149 | | | | |
| Cd I | 149 | 163 | | | |
| In I | 402 | | | | |
| Sn I | 265 | | | | |
| Sn II | 248 | | | | |
| Sb I | 279 | | | | |
| Te I | 189 | | | | |
| Cs I | 259 | 149 | | | |
| Ba I | 400 | | | | |
| Ba II | 400 | 245 | 259 | 330 | |
| La I | 258 | | | | |
| La II | 258 | | | | |
| La III | 258 | | | | |

| Sp | A | B | C | D | E |
|---|---|---|---|---|---|
| Ce II | 144 | | 9 | 245 | |
| Ce III | 362 | | | | |
| Pr II | 339 | 245 | | | |
| Nd II | 10 | 245 | 219 | | |
| Sm I | 221, 4 | 221, 2 | | | |
| Sm II | 221 | | | | |
| Eu I | 223 | | | | |
| Eu II | 223 | | | | |
| Gd I | 225 | | | | |
| Gd II | 225 | | | | |
| Tm I | 268 | | | | |
| Tm II | 269 | 268, 224 | | | |
| Yb I | 291 | | | | |
| Yb II | 291 | | | | |
| Lu I | 288 | | | | |
| Lu II | 288 | | | | |
| Hf I | 287 | | | | |
| Hf II | 289 | | | | |

| Sp | A | B | C | D | E |
|---|---|---|---|---|---|
| Ta I | 200 | | | | |
| W I | 22 | | | | |
| W II | 239 | | | | |
| Re I | 257 | | | | |
| Os I | 245 | | | | |
| Ir I | 6 | | | | |
| Pt I | 109 | | | | |
| Au I | 324 | | | | |
| Hg I | 396 | 166 | | | |
| Tl I | 307 | 109 | | | |
| Pb I | 149 | 135 | | | |
| Bi I | 214 | 17 | | | |
| Ra I | 332 | | | | |
| Ra II | 331 | | | | |
| Th II | 250 | | | | |

| Sp | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fe I | 164 | 161 | 278 | 185 | 262 | 282 | 59 | 167 | 14 | 371 | 57 | 281 | 220 | 139, 138† | 280 | 15 | 227 | 77 | 391 | 247 | 55 | 171 | 379 | †74 |

† These references have been used for lines to the violet of the range covered in the RMT, but are included for completeness.

## Table 8

### References—Intensity

| Sp | Reference Numbers | Sp | Reference Numbers | Sp | Reference Numbers |
|---|---|---|---|---|---|
| He I | 263 275 *174 116 319* | A II | 340 | Ru II | 272 |
| Li I | 113 *175* | A III | 49 51 | Rh I | 105 |
| Li II | 378 404 | A IV | 50 | Rh II | 150 |
| Be I | 315 318 | K I | 259 116 *88 108* | Pd I | 256 |
| Be II | 318 | K II | 410 *46* | Ag I | 389 |
| B II | 81 | K III | 47a 51a | Cd I | 173 |
| B III | 81 | Ca I | 207 259 *369 241 374* | In I | 402 |
| C I | 185 300 169 *160 370* | Ca II | 259 207 *375 390 66* | Sn I | 265 |
| C II | 81 *122* | Ca III | 11 | Sn II | 248 |
| C III | 81 | Sc I | 210 *253 349 367* | Sb I | 279 |
| C IV | 81 | Sc II | 253 *365* | Te I | 189 |
| N I | 93 78 *160* 370 | Sc III | *172* | Cs I | 259 *245* |
| N II | 20 125 120 | Ti I | 185 282 212 203 *348 199 172* | Ba I | 207 *259* |
| N III | 124 81 | Ti II | 347 | Ba II | 207 *259 330* |
| N IV | 81 | Ti IV | 364 | La I | 228 *258* |
| O I | 98 263 127 *116 128* | V I | 264 213 204 | La II | 258 |
| O II | 20 118 301 | V II | 266 | La III | 258 |
| O III | 119 86 *302* | Cr I | 183 184 *204 213* | Ce II | 215 *144 9 245* |
| O IV | 81 *126* | Cr II | 184 | Ce III | 362 |
| O V | 81 | Mn I | 260 209 *131 61 113* | Pr II | 215 *339* |
| O VI | 81 | Mn II | 67 68 *108* | Nd II | 219 *10* |
| F I | 88 | Fe I | 185 282 220 211 202 227 *59 57* | Sm I | 221 |
| F II | 73 | | *281 280 55 15 77 391 171 74* | Sm II | 221 |
| F III | 72 85 | Fe II | 76 222 *55* | Eu I | 223 |
| Ne I | 263 276 *311* | Fe III | 103 102 | Eu II | 223 |
| Ne II | 52 | Co I | 205 208 282 *280 71 56 230 62 147* | Gd I | 225 |
| Na I | 259 *172 116* | Co II | 255 | Gd II | 225 |
| Na II | 130 393 | Ni I | 208 205 282 *143 109 146 280 398 245* | Tm I | 268 |
| Mg I | 261 207 *295 314 170* | Ni II | 252 382 | Tm II | 269 268 224 |
| Mg II | 116 | Cu I | 58 | Yb I | 291 |
| Al I | 315 116 319 *310* | Cu II | 137 | Yb II | 291 |
| Al II | 319 377 | Zn I | 149 | Lu I | 288 |
| Al III | 312 | Zn II | 372 | Lu II | 288 |
| Si I | 186 | Ga I | 402 174 | Hf I | 216 |
| Si II | 117 | Ge I | 188 *132* | Hf II | 289 |
| Si III | 117 | Ge II | 188 *235* | Ta I | 200 |
| Si IV | 117 101 | As I | 273 | W I | 218 *22* |
| P I | 180 | As II | 328 | W II | 239 |
| P II | 133 *181* | Se I | 189 | Re I | 257 |
| P III | 133 | Rb I | 172 | Os I | 245 |
| P IV | 133 | Sr I | 207 259 | Ir I | 6 |
| P V | 133 | Sr II | 207 259 | Pt I | 109 |
| S I | 297 *129* | Y I | 228 | Au I | 324 |
| S II | 25 19 *136* | Y II | 254 *351* | Hg I | 112 108 |
| S III | 157 *159* | Zr I | 228 282 *197* | Tl I | 109 |
| S IV | 303 | Zr II | 196 | Pb I | 109 *271* |
| Cl I | 182 | Cb I | 283 | Bi I | 308 *17* |
| Cl II | 195 | Cb II | 283 | Ra I | 332 |
| Cl III | 31 27 | Mo I | 326 176 *113* | Ra II | 331 |
| A I | 263 276 *293 294* | Mo II | 113 | Th II | 226 |
| | | Ru I | 251 *109* | | |

TABLE 9

REFERENCES—ANALYSIS

| Sp | Reference Numbers | Sp | Reference Numbers |
|---|---|---|---|
| H | 243 23 116 | S II | 157 19 158 25 136 |
| D | 243 23 | S III | 157 159 136 337 |
| He I | 16 45 319 263 275 134 | S IV | 303 27 29 |
| He II | 243 23 | Cl I | 182 193 92 |
| Li I | 116 16 206 | Cl II | 195 96 |
| Li II | 16 81 | Cl III | 31 27 |
| Be I | 318 315 | Cl IV | 31 32 |
| Be II | 318 | A I | 154 276 42 16 293 294 |
| B I | 16 89 | A II | 92 42 48 47 |
| B II | 81 89 | A III | 49 51 42 44 96 |
| B III | 81 | A IV | 42 50 |
| C I | 81 300 | K I | 116 88 |
| C II | 81 89 | K II | 46 28 105 |
| C III | 81 89 82 | K III | 47a 92 |
| C IV | 81 82 | Ca I | 373 369 259 116 |
| N I | 104 78 160 | Ca II | 375 346 390 |
| N II | 89 81 125 120 | Ca III | 28 16 |
| N III | 89 81 | Sc I | 365 |
| N IV | 89 81 82 | Sc II | 365 285 |
| N V | 81 82 | Sc III | 364 392 |
| O I | 98 | Ti I | 348 355 282 185 178 |
| O II | 86 81 350 118 | Ti II | 347 |
| O III | 95 81 119 86 302 | Ti IV | 364 |
| O IV | 81 82 | V I | 286 305 |
| O V | 81 82 | V II | 284 |
| O VI | 81 82 | Cr I | 179 183 187 346 |
| F I | 88 | Cr II | 184 |
| F II | 85 73 | Mn I | 61 79 260 346 |
| F III | 85 30 72 | Mn II | 67 68 |
| F IV | 84 | Fe I | 363a |
| F VI | 83 87 | Fe II | 75 76 94 139 |
| Ne I | 154 41 276 16 311 | Fe III | 103 102 |
| Ne II | 41 52 | Co I | 363 |
| Na I | 298 338 116 | Co II | 114 |
| Na II | 130 393 16 | Ni I | 352 |
| Mg I | 295 296 314 345 | Ni II | 382 233 |
| Mg II | 116 16 | Cu I | 381 |
| Al I | 315 319 | Cu II | 386 |
| Al II | 319 377 | Zn I | 149 116 |
| Al III | 312 16 | Zn II | 319 372 |
| Si I | 186 | Ga I | 116 |
| Si II | 117 29 16 | Ga II | 376 |
| Si III | 117 29 | Ge I | 188 327 |
| Si IV | 117 101 | Ge II | 188 234 |
| P I | 180 335 | As I | 273 |
| P II | 26 335 336 | As II | 140 328 |
| P III | 29 303 336 | Se I | 343 |
| P IV | 29 336 | Se II | 244 |
| P V | 336 40 | Br I | 194 |
| S I | 297 342 | Br II | 232 |

TABLE 9—Continued

REFERENCES—ANALYSIS

| Sp | Reference Numbers | Sp | Reference Numbers |
|---|---|---|---|
| Kr I | 274 276 165 | Gd I | 2 357 358 |
| Kr II | 53 | Gd II | 8 358 |
| Rb I | 116 | Tm I | 270 |
| Rb II | 238 | Tm II | 270 269 |
| Sr I | 116 369 399 | Yb I | 291 359 |
| Sr II | 116 259 399 | Yb II | 291 359 |
| Y I | 285 | Lu I | 288 267 |
| Y II | 285 | Lu II | 288 |
| Zr I | 197 282 | Hf I | 287 |
| Zr II | 196 | Hf II | 289 |
| Cb I | 290 | Ta I | 192 |
| Cb II | 290 | Ta II | 192 |
| Mo I | 63 191 | W I | 237 |
| Mo II | 190 | W II | 239 |
| Ru I | 394 145 | Re I | 257 |
| Ru II | 272 292 | Os I | 1 5 |
| Rh I | 395 304 | Ir I | 6 |
| Rh II | 150 | Pt I | 240 148 |
| Pd I | 385 | Pt II | 387 |
| Pd II | 384 24 | Au I | 324 306 |
| Ag I | 388 | Au II | 324 |
| Ag II | 383 24 | Hg I | 16 |
| Cd I | 116 16 | Hg II | 313 |
| Cd II | 372 401 | Tl I | 116 |
| In I | 116 | Tl II | 106 |
| In II | 317 | Pb I | 16 |
| Sn I | 265 | Pb II | 80 |
| Sn II | 248 | Bi I | 16 |
| Sb I | 279 | Bi II | 64 115 |
| Sb II | 236 | Rn I | 329 |
| Te I | 341 | Ra I | 332 354 |
| I I | 107 69 325 | Ra II | 331 |
| I II | 232 | Th II | 249 250 |
| Xe I | 156 | Th III | 54 |
| Xe II | 155 | | |
| Cs I | 116 | | |
| Cs II | 309 405 | | |
| Ba I | 400 344 353 | | |
| Ba II | 330 400 | | |
| La I | 366 | | |
| La II | 366 | | |
| La III | 366 | | |
| Ce II | 144 7 9 | | |
| Ce III | 362 | | |
| Pr II | 339 356 | | |
| Nd II | 10 | | |
| Sm I | 2 4 | | |
| Sm II | 3 | | |
| Eu I | 361 | | |
| Eu II | 360 | | |

## Table 10

### References—Forbidden Lines

| Sp | Reference Numbers | Sp | Reference Numbers | Sp | Reference Numbers |
|---|---|---|---|---|---|
| Be I | 318 315 | Ca VI | 33 | Fe XIV | 97 |
| C I | 81 | Ca VII | 337 | Fe XV | 90 |
| N I | 104 | Ca XII | 97 | Co II | 114 |
| N II | 81 43 409 | Ca XIII | 97 | Co VI | 37 |
| O I | 98 13 151 | Ca XV | 97 | Co VII | 12 |
| O II | 81 409 | Sc II | 365 | Co VIII | 60 |
| O III | 81 409 | Sc III | 364 | Co XI | 92 |
| F II | 85 | Sc VI | 91 231 | Ni I | 352 |
| F III | 85 | Sc VII | 231 | Ni II | 382 233 |
| F IV | 84 | Ti I | 348 | Ni VII | 322 |
| Ne III | 41 43 409 | Ti II | 347 | Ni VIII | 12 |
| Ne IV | 320 | Ti III | 364 | Ni IX | 60 |
| Ne V | 100 320 35 397 | Ti VII | 231 91 | Ni XII | 97 |
| Na IV | 393 | Ti VIII | 231 | Ni XIII | 97 |
| Na V | 393 | V II | 284 | Ni XV | 97 |
| Mg VI | 393 | V III | 407 | Ni XVI | 97 |
| Al VII | 393 | V IV | 406 | Cu II | 386 |
| Si I | 186 | V VIII | 91 | Kr III | 152 |
| P I | 180 335 | Cr I | 179 183 187 | Sr II | 116 259 399 |
| P II | 26 335 336 | Cr II | 184 | Y II | 285 |
| S I | 96 342 33 | Cr III | 36 | Y V | 321 |
| S II | 157 19 158 25 136 409 | Cr IV | 36 38 | Zr II | 196 |
| S III | 157 159 136 337 | Cr V | 406 | Zr III | 198 |
| S VIII | 97 337 | Cr VIII | 92 | Zr VI | 321 |
| S XII | 97 | Cr IX | 91 | Xe II | 155 |
| Cl II | 96 195 | Mn II | 67 68 | Xe III | 99 153 |
| Cl III | 31 27 | Mn IV | 36 | La II | 366 |
| Cl IV | 31 32 | Mn V | 34 38 | La III | 366 |
| A III | 96 | Mn VI | 60 | Eu II | 360 |
| A IV | 42 50 | Mn IX | 92 | | |
| A V | 323 334 | Mn X | 91 | | |
| A X | 97 | Fe I | 363a | | |
| A XI | 97 | Fe II | 75 76 94 139 | | |
| A XIV | 97 | Fe III | 103 102 | | |
| K IV | 96 33 | Fe V | 36 | | |
| K V | 33 | Fe VI | 34 38 | | |
| K VI | 337 408 334 | Fe VII | 39 | | |
| Ca I | 373 369 259 116 | Fe X | 92 97 | | |
| Ca II | 375 | Fe XI | 91 97 | | |
| Ca V | 96 33 91 | Fe XIII | 97 | | |

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## BIBLIOGRAPHY


1 Albertson, Phys. Rev. (2) 45, 304, 1934.

2 Albertson, Phys. Rev. (2) 47, 370, 1935.

3 Albertson, Mt. Wilson Contr. No. 546; Ap. J. 84, 26, 1936.

4 Albertson, Phys. Rev. (2) 52, 644, 1937.

5 Albertson, Phys. Rev. (2) 53, 940, 1938.

6 Albertson, Phys. Rev. (2) 54, 183, 1938.

7 Albertson, Unpublished material, Nov. 1941.

8 Albertson, Bruynes and Hanau, Phys. Rev. (2) 57, 292, 1940.

9 Albertson and Harrison, Phys. Rev. (2) 52, 1209, 1937.

10 Albertson, Harrison and McNally, Jr., Phys. Rev. (2) 61, 167, 1942.

11 Anderson, J. A., Ap. J. 59, 76, 1924.

12 Anderson, E. E. and Mack, Phys. Rev. (2) 59, 717, 1941.

13 Babcock, Mt. Wilson Contr. No. 259; Ap. J. 57, 209, 1923.

14 Babcock, Mt. Wilson Contr. No. 343; Ap. J. 66, 256, 1927.

15 Babcock, Unpublished material.

16 See Bacher and Goudsmit, Atomic Energy States, McGraw-Hill, N. Y. and London, 1932.

17 Back und Goudsmit, Zeit. f. Phys. 47, 174, 1928.

18 Baly, de Bruin, Bloch, L., Bloch, E., meas. quoted by Rosenthal, Ann. der Phys. (5) 4, 49, 1930.

19 Bartelt und Eckstein, Zeit. f. Phys. 86, 77, 1933.

20 Beals, Publ. Dom. Ap. Obs. 6, 17, 1931.

21 Behner, Zeit. f. Wiss. Ptg. 23, 325, 1925.

22 Belke, Zeit. f. Wiss. Ptg. 17, 132 and 145, 1918.

23 Birge, Rev. Mod. Phys. 13, 233 (No. 4), 1941.

24 Blair, Phys. Rev. (2) 36, 173, 1930.

25 Bloch, L. et Bloch, E., Annales de Physique (10) 12, 5, 1929.

26 Bowen, Phys. Rev. (2) 29, 510, 1927.

27 Bowen, Phys. Rev. (2) 31, 34, 1928.

28 Bowen, Phys. Rev. (2) 31, 497, 1928.

29 Bowen, Phys. Rev. (2) 39, 8, 1932.

30 Bowen, Phys. Rev. (2) 45, 82, 1934.

31 Bowen, Phys. Rev. (2) 45, 401, 1934.

32 Bowen, Phys. Rev. (2) 46, 377, 1934.

33 Bowen, Phys. Rev. (2) 46, 791, 1934.

34 Bowen, Phys. Rev. (2) 47, 924, 1935.

35 Bowen, Rev. Mod. Phys. 8, 55 (No. 2), 1936.

36 Bowen, Phys. Rev. (2) 52, 1153, 1937.

37 Bowen, Phys. Rev. (2) 53, 889, 1938.

38 Bowen, see Pasternack, Ap. J. 92, 140, 1940.

39 Bowen and Edlén, Nature 143, 374, 1939.

40 Bowen and Millikan, Phys. Rev. (2) 25, 295, 1925.

41 Boyce, Phys. Rev. (2) 46, 378, 1934.

42 Boyce, Phys. Rev. (2) 48, 396, 1935.

43 Boyce, Mon. Not. Royal Astr. Soc. 96, 690 (No. 7), 1936.

44 Boyce, Phys. Rev. (2) 49, 351, 1936.

45 Boyce and Robinson, Journ. Opt. Soc. Am. 26, 143, 1936.

46 de Bruin, Zeit. f. Phys. 38, 94, 1926.

47 de Bruin, Zeit. f. Phys. 51, 108, 1928.

47a de Bruin, Zeit. f. Phys. 53, 658, 1929.

48 de Bruin, Zeit. f. Phys. 61, 307, 1930.

49 de Bruin, Proc. Amsterdam Acad. 36, 724 (No. 7), 1933.

50 de Bruin, Physica 3, 809 (No. 8), 1936.

51 de Bruin, Proc. Amsterdam Acad. 40, 340 (No. 4), 1937.

51a de Bruin, see Edlén, Zeit. f. Phys. 104, 407, 1937.

52 de Bruin und Bakker, Zeit. f. Phys. 69, 19, 1931.

53 de Bruin, Humphreys and Meggers, Bur. St. Journ. Rsg. 11, 409 (RP 599) 1933.

54 de Bruin, Klinkenberg und Schuurmans, Zeit. f. Phys. 118, 58, 1941.

55 Burns, Lick Bull. 8, 27 (No. 247), 1913.

56 Burns, Unpublished material. For interferometer meas. see Ref. No. 363.

57 Burns and Walters, Jr., Publ. Allegheny Obs. 6, 159 (No. 11), 1929.

58 Burns and Walters, Jr., Publ. Allegheny Obs. 8, 27 (No. 3), 1930.

59 Burns and Walters, Jr., Publ. Allegheny Obs. 8, 39 (No. 4), 1931.

60 Cady, Willoughby, Phys. Rev. (2) 43, 322, 1933.

61 Catalán, Phil. Trans. Royal Soc. A 223, 127, 1922.

62 Catalán y Antunes, Ann. de la Soc. Esp. de Fisica y Quimica 34, 207, 1936 (Some measures by Exner and Haschek included here)

63 Catalán y Madariaga, Ann. de la Soc. Esp. de Fisica y Quimica 31, 707, 1933

64 Crawford and McLay, Proc. Royal Soc. A 143, 540, 1934.

65 Crew, Ap. J. 60, 108, 1924.

66 Crew and McCauley, Ap. J. 39, 29, 1914.

67 Curtis, Phys. Rev. (2) 53, 474, 1938.

68 Curtis, Unpublished material, July 1941.

69 Deb, Proc. Royal Soc. A 139, 380, 1933.

70 Déjardin, Canadian Journ. Res. 7, 556, 1932.

71 Dhein, Zeit. f. Wiss. Ptg. 19, 289, 1920.

72 Dingle, Proc. Royal Soc. A 122, 144, 1929.

73 Dingle, Proc. Royal Soc. A 128, 600, 1930.

74 Dingle, Mon. Not. Royal Astr. Soc. 94, 866, 1934.

75 Dobbie, Phys. Rev. (2) 45, 76, 1934.

76 Dobbie, Ann. Solar Phys. Obs. 5, 1 (Part I), 1938.

77 Dobbie, Unpublished material.

78 Duffendack and Wolfe, Phys. Rev. (2) 34, 409, 1929.

79 Dunham, T. Jr., Unpublished material, 1926.

80 Earls and Sawyer, Phys. Rev. (2) 47, 115, 1935.

81 Edlén, Nova Acta Regiae Societatis Scientiarum Upsaliensis, Ser. IV, 9 (No. 6), 1933.

82 Edlén, Zeit. f. Ap. 7, 378, 1933.

83 Edlén, Zeit. f. Phys. 89, 179, 1934.

84 Edlén, Zeit. f. Phys. 92, 19, 1934.

85 Edlén, Zeit. f. Phys. 93, 433, 1935.

86 Edlén, Zeit. f. Phys. 93, 726, 1935.

87 Edlén, Zeit. f. Phys. 94, 47, 1935.

88 Edlén, Zeit. f. Phys. 98, 445, 1936.

89 Edlén, Zeit. f. Phys. 98, 561, 1936.

90 Edlén, Zeit. f. Phys. 103, 536, 1936.

91 Edlén, Zeit. f. Phys. 104, 188, 1937.

92 Edlén, Zeit. f. Phys. 104, 407, 1937.

93 Edlén, Festskrift Tillägnad, Östen Bergstrand p. 135, 1938.

94 Edlén, Unpublished material, Feb. 1940.

95 Edlén, Naturwiss. 30, 279, 1942.

96 Edlén, Phys. Rev. (2) 62, 434, 1942.

97 Edlén, Zeit. f. Ap. 22, 30, 1942; see Swings, Ap. J. 98, 116, 1943.

98 Edlén, Kungl. Svenska Vetenskapsakademiens Handlingar, Tredje Serien, 20 (No. 10), 1943.

99 Edlén, Phys. Rev. (2) 65, 348, 1944.

100 Edlén, Unpublished material.

101 Edlén und Söderqvist, Zeit. f. Phys. 87, 317, 1933.

102 Edlén and Swings, Unpublished material, Dec. 1941.

103 Edlén and Swings, Contr. McDonald Obs. No. 49; Ap. J. 95, 532, 1942.

104 Ekefors, Zeit. f. Phys. 63, 437, 1930.

105 Ekefors, Zeit. f. Phys. 71, 53, 1931.

106 Ellis and Sawyer, Phys. Rev. (2) 49, 145, 1936.

107 Evans, Proc. Royal Soc. A 133, 417, 1931.

108 Exner und Haschek, see Kayser, Handbuch der Sp. 5, 1910.

109 Exner und Haschek, see Kayser, Handbuch der Sp. 6, 1912.

## BIBLIOGRAPHY


110 Exner und Haschek, see Kayser und Konen, Handbuch der Sp. 7, Part 1, 1924.

111 Exner and Haschek, see Shenstone, Phys. Rev. (2) 30, 355, 1927.

112 Exner und Haschek, see Kayser und Konen, Handbuch der Sp. 7, Part 2, 1930.

113 Exner und Haschek, see Kayser und Konen, Handbuch der Sp. 7, Part 3, 1934.

114 Findlay, Phys. Rev. (2) 36, 5, 1930.

115 Fisher and Goudsmit, Phys. Rev. (2) 37, 1057, 1931.

116 See Fowler, Report on Series in Line Spectra, Fleetway Press, London, 1922.

117 Fowler, Phil. Trans. Royal Soc. A 225, 1, 1925.

118 Fowler, Proc. Royal Soc. A 110, 476, 1926.

119 Fowler, Proc. Royal Soc. A 117, 317, 1928.

120 Fowler and Freeman, Proc. Royal Soc. A 114, 662, 1927.

121 Fowler and Selwyn, Proc. Royal Soc. A 120, 312, 1928.

122 See Fowler and Selwyn, Proc. Royal Soc. A 120, 312, 1928.

123 Fred, Ap. J. 87, 176, 1938.

124 Freeman, Proc. Royal Soc. A 121, 318, 1928.

125 Freeman, Proc. Royal Soc. A 124, 654, 1929.

126 See Freeman, Proc. Royal Soc. A 127, 330, 1930.

127 Frerichs, Phys. Rev. (2) 34, 1239, 1929.

128 Frerichs, Naturwiss. 21, 849, 1933.

129 Frerichs, Zeit. f. Phys. 80, 150, 1933.

130 Frisch, Zeit. f. Phys. 70, 498, 1931.

131 Fuchs, see Kayser und Konen, Handbuch der Sp. 7, Part 3, 1934.

132 Gartlein, Phys. Rev. (2) 31, 782, 1928.

133 Geuter, Zeit. f. Wiss. Ptg. 5, 1, 1907. (See Kayser, Handbuch der Sp. 6, 1912.)

134 Gibbs and Kruger, Phys. Rev. (2) 37, 1559, 1931.

135 Gieseler und Grotrian, Zeit. f. Phys. 34, 374, 1925.

136 Gilles, Annales de Physique (10) 15, 267, 1931.

137 Green, L.C., See Shenstone, Phil. Trans. Royal Soc. A 235, 195 (No. 751), 1936.

138 Green, L.C., Unpublished material, 1937.

139 Green, L.C., Phys. Rev. (2) 55, 1209, 1939.

140 Green, J.B. and Barrows, Jr., Phys. Rev. (2) 47, 131, 1935.

141 Gremmer, see Paschen, Sitz. der Preuss. Akad. der Wiss., Phys.-Math. Klasse 32, 709, 1931.

142 Hall, see Kayser und Konen, Handbuch der Sp. 7, Part 1, 1924.

143 Hamm, Zeit. f. Wiss. Ptg. 13, 105, 1913.

144 Harrison, Albertson and Hosford, Journ. Opt. Soc. Am. 31, 430, 1941.

145 Harrison and McNally, Jr., Phys. Rev. (2) 58, 703, 1940.

146 Hasselberg, see Kayser, Handbuch der Sp. 6, 1912.

147 Hasselberg or Exner und Haschek, see Kayser, Handbuch der Sp. 5, 1910.

148 Haussmann, Ap. J. 66, 333, 1927.

149 Hetzler, Boreman and Burns, Phys. Rev. (2) 48, 656, 1935.

150 Hitchcock, W. J., Unpublished material, Nov. 1942.

151 Hopfield, Phys. Rev. (2) 37, 160, 1931.

152 Humphreys, Phys. Rev. (2) 47, 712, 1935.

153 Humphreys, Bur. St. Journ. Res. 16, 639 (RP 898) 1936.

154 Humphreys, Bur. St. Journ. Res. 20, 17 (RP 1061) 1938.

155 Humphreys, Bur. St. Journ. Res. 22, 19 (RP 1164) 1939.

156 Humphreys and Meggers, Bur. St. Journ. Res. 10, 139 (RP 521), 1933.

157 Hunter, Phil. Trans. Royal Soc. A 233, 303, 1934.

158 Ingram, Phys. Rev. (2) 32, 172, 1928.

159 Ingram, Phys. Rev. (2) 33, 907, 1929.

160 Ingram, Phys. Rev. (2) 34, 421, 1929.

161 International Standard, see Trans. Intern. Astr. Union 3, 86, 1928.

162 International Standard, see Trans. Intern. Astr. Union 5, 85, 1935.

163 International Standard, see Trans. Intern. Astr. Union 6, 79, 1938.

164 International Standard, see Trans. Intern. Astr. Union 6, 80, 1938.

165 International Standard, see Trans. Intern. Astr. Union 6, 89, 1938.

166 Jackson, Proc. Royal Soc. A 130, 395, 1931.

167 Jackson, Proc. Royal Soc. A 133, 553, 1931.

168 Jackson, Mon. Not. Royal Astr. Soc. 93, 98 (No. 1), 1932.

169 Johnson or Merton and Johnson, see Kayser und Konen, Handbuch der Sp. 8, Part 1, 1932.

170 See Kayser, Handbuch der Sp. 5, 1910.

171 Kayser, Handbuch der Sp. 6, 893, 1912.

172 See Kayser, Handbuch der Sp. 6, 1912.

173 See Kayser und Konen, Handbuch der Sp. 7, Part 1, 1924.

174 See Kayser und Konen, Handbuch der Sp. 7, Part 2, 1930.

175 See Kayser und Konen, Handbuch der Sp. 7, Part 3, 1934.

176 Kiess, Sci. Papers Bur. St. 19, 113 (No. 474), 1923.

177 Kiess, Unpublished material, 1924?.

178 Kiess, Bur. St. Journ. Res. 1, 75 (RP 4), 1928.

179 Kiess, Bur. St. Journ. Res. 5, 775 (RP 239), 1930.

180 Kiess, Bur. St. Journ. Res. 8, 393 (RP 425), 1932.

181 Kiess, Unpublished material, May 1932.

182 Kiess, Bur. St. Journ. Res. 10, 827 (RP 570), 1933.

183 Kiess, Bur. St. Journ. Res. 15, 79 (RP 812) 1935.

184 Kiess, Unpublished material, Jan. 1936, June 1940, Mar. 1941, Apr. 1941.

185 Kiess, Bur. St. Journ. Res. 20, 33 (RP 1062), 1938.

186 Kiess, Bur. St. Journ. Res. 21, 185 (RP 1124), 1938.

187 Kiess, Unpublished material, Feb. 1939, June 1940, Feb. 1941.

188 Kiess, Bur. St. Journ. Res. 24, 1 (RP 1266), 1940.

189 Kiess, Letter, June 1942.

190 Kiess, Unpublished material, Aug. 1942.

191 Kiess, Unpublished material, Oct. 1942.

192 Kiess, Unpublished material, Dec. 1942.

193 Kiess and de Bruin, Bur. St. Journ. Res. 2, 1117 (RP 73), 1929.

194 Kiess and de Bruin, Bur. St. Journ. Res. 4, 667 (RP 172), 1930.

195 Kiess and de Bruin, Bur. St. Journ. Res. 23, 443 (RP 1244), 1939.

196 Kiess, C. C. and Kiess, H. K., Bur. St. Journ. Res. 5, 1205 (RP 255) 1930.

197 Kiess, C. C. and Kiess, H. K., Bur. St. Journ. Res. 8, 621 (RP 398) 1931.

198 Kiess and Lang, Bur. St. Journ. Res. 5, 305 (RP 202), 1930.

199 Kiess and Meggers, Sci. Papers Bur. St. 18, 54 (No. 372), 1920.

200 Kiess and Stowell, Bur. St. Journ. Res. 12, 459 (RP 671), 1934.

201 Kilby, Ap. J. 30, 243, 1909.

202 King, A. S., Mt. Wilson Contr. No. 66; Ap. J. 37, 239, 1913.

203 King, A. S., Mt. Wilson Contr. No. 76; Ap. J. 39, 139, 1914.

204 King, A. S., Mt. Wilson Contr. No. 94; Ap. J. 41, 86, 1915.

205 King, A. S., Mt. Wilson Contr. No. 108; Ap. J. 43, 347, 1915.

206 King, A. S., Mt. Wilson Contr. No. 123; Ap. J. 44, 189, 1916.

207 King, A. S., Mt. Wilson Contr. No. 150; Ap. J. 48, 13, 1918.

208 King, A. S., Mt. Wilson Contr. No. 181; Ap. J. 51, 179, 1920.

209 King, A. S., Mt. Wilson Contr. No. 198; Ap. J. 53, 133, 1921.

210 King, A. S., Mt. Wilson Contr. No. 211; Ap. J. 54, 28, 1921.

211 King, A. S., Mt. Wilson Contr. No. 247; Ap. J. 58, 318, 1923.

212 King, A. S., Mt. Wilson Contr. No. 274; Ap. J. 59, 155, 1924.

213 King, A. S., Mt. Wilson Contr. No. 283; Ap. J. 60, 282, 1924.

214 King, A. S., Unpublished material, 1927?.

215 King, A. S., Mt. Wilson Contr. No. 368; Ap. J. 68, 194, 1928.

216 King, A. S., Mt. Wilson Contr. No. 384; Ap. J. 70, 105, 1929.

217 King, A. S., Mt. Wilson Contr. No. 414; Ap. J. 72, 231, 1930.

218 King, A. S., Mt. Wilson Contr. No. 448; Ap. J. 75, 379, 1932.

219 King, A. S., Mt. Wilson Contr. No. 470; Ap. J. 78, 9, 1933.

220 King, A. S., Mt. Wilson Contr. No. 496; Ap. J. 80, 134, 1934.

221 King, A. S., Mt. Wilson Contr. No. 523; Ap. J. 82, 140, 1935.

222 King, A. S., Mt. Wilson Contr. No. 584; Ap. J. 87, 109, 1938.

BIBLIOGRAPHY


223 King, A. S., Mt. Wilson Contr. No. 608; Ap. J. 89, 377, 1939.

224 King, A. S., Mt. Wilson Contr. No. 651; Ap. J. 94, 226, 1941.

225 King, A. S., Mt. Wilson Contr. No. 678; Ap. J. 97, 323, 1943.

226 King, A. S., see Sitterly and King, Proc. Am. Phil. Soc. 86, 339 (No. 3), 1943.

227 King, A. S., Unpublished material.

228 King, A. S. and Carter, Mt. Wilson Contr. No. 326; Ap. J. 65, 86, 1927.

229 King, A. S. and Moore, Mt. Wilson Contr. No. 681; Ap. J. 98, 33, 1943.

230 Krebs, Zeit. f. Wiss. Ptg. 16, 292, 1917.

231 Kruger and Pattin, Phys. Rev. (2) 52, 621, 1937.

232 Lacroute, Annales de Physique (11) 3, 1, 1935.

233 Lang, Phys. Rev. (2) 31, 773, 1928.

234 Lang, Proc. Nat. Acad. Sci. 14, 32, 1928.

235 Lang, Phys. Rev. (2) 34, 697, 1929.

236 Lang and Vestine, Phys. Rev. (2) 42, 233, 1932.

237 Laporte and Mack, Phys. Rev. (2) 63, 246, 1943.

238 Laporte, Miller and Sawyer, Phys. Rev. (2) 38, 843, 1931.

239 Laun, Bur. St. Journ. Res. 21, 207 (RP 1125), 1938.

240 Livingood, Phys. Rev. (2) 34, 185, 1929.

241 Lorenser, see Kayser und Konen, Handbuch der Sp. 7, Part 1, 1924.

242 Ludwig, Zeit. f. Wiss. Ptg. 16, 157, 1917.

243 Mack, Unpublished material, June 1942.

244 Martin, Phys. Rev. (2) 48, 938, 1935.

245 Mass. Inst. Tech., Wave Length Tables, Wiley, New York, 1939.

246 Mass. Inst. Tech., Unpublished material, May 1941.

247 Mass. Inst. Tech., Unpublished material, June 1942.

248 McCormick and Sawyer, Phys. Rev. (2) 54, 71, 1938.

249 McNally, Jr., Unpublished material, May 1944.

250 McNally, Jr., Harrison and Park, Journ. Opt. Soc. Am. 32, 334, 1942.

251 Meggers, Sci. Papers Bur. St. 20, 19 (No. 499), 1925.

252 Meggers (Bureau of Standards), see Shenstone, Phys. Rev. 30, 255, 1927.

253 Meggers, Sci. Papers Bur. St. 22, 61 (No. 549), 1927.

254 Meggers, see Meggers and Russell, Bur. St. Journ. Res. 2, 733 (RP 55), 1929.

255 Meggers, see Findlay, Phys. Rev. (2) 36, 5, 1930.

256 Meggers, see Shenstone, Phys. Rev. (2) 36, 669, 1930.

257 Meggers, Bur. St. Journ. Res. 6, 1027 (RP 322), 1931.

258 Meggers, see Russell and Meggers, Bur. St. Journ. Res. 9, 625 (RP 497), 1932.

259 Meggers, Bur. St. Journ. Res. 10, 669 (RP 558), 1933.

260 Meggers, Bur. St. Journ. Res. 10, 757 (RP 564), 1933.

261 Meggers, Unpublished material, Feb. 1934.

262 Meggers, Bur. St. Journ. Res. 14, 33 (RP 755), 1935.

263 Meggers, Bur. St. Journ. Res. 14, 487 (RP 781) 1935.

264 Meggers, see Meggers and Russell, Bur. St. Journ. Res. 17, 125 (RP 906), 1936.

265 Meggers, Bur. St. Journ. Res. 24, 153 (RP 1275), 1940.

266 Meggers, see Meggers and Moore, Bur. St. Journ. Res. 25, 83 (RP 1317), 1940.

267 Meggers, Journ. Opt. Soc. Am. 31, 39, 1941.

268 Meggers, see King, A.S., Mt. Wilson Contr. No. 651; Ap. J. 94, 226, 1941.

269 Meggers, Unpublished material, Nov. 1941.

270 Meggers, Rev. Mod. Phys. 14, 96, 1942.

271 Meggers, Unpublished material, Jan. 1943.

272 Meggers, Unpublished material.

273 Meggers and de Bruin, Bur. St. Journ. Res. 3, 765 (RP 116), 1929.

274 Meggers, de Bruin and Humphreys, Bur. St. Journ Res. 7, 643 (RP 364), 1931.

275 Meggers and Dieke, Bur. St. Journ. Res. 9, 121 (RP 482), 1932.

276 Meggers and Humphreys, Bur. St. Journ. Res. 10, 427 (RP 540), 1933.

277 Meggers and Humphreys, Bur. St. Journ. Res. 13, 293 (RP 710), 1934.

278 Meggers and Humphreys, Bur. St. Journ. Res. 18, 543 (RP 992), 1937.

279 Meggers and Humphreys, Bur. St. Journ. Res. 28, 463 (RP 1464), 1942.

280 Meggers and Kiess, Sci. Papers Bur. St. 14, 637 (No. 324), 1918.

281 Meggers and Kiess, Sci. Papers Bur. St. 19, 373 (No. 479), 1924.

282 Meggers and Kiess, Bur. St. Journ. Res. 9, 309 (RP 473), 1932.

283 Meggers and King, Bur. St. Journ. Res. 16, 385 (RP 881), 1936.

284 Meggers and Moore, Bur. St. Journ. Res. 25, 83 (RP 1317), 1940.

285 Meggers and Russell, Bur. St. Journ. Res. 2, 733 (RP 55), 1929.

286 Meggers and Russell, Bur. St. Journ. Res. 17, 125 (RP 906), 1936.

287 Meggers and Scribner, Bur. St. Journ. Res. 4, 169 (RP 139), 1930

288 Meggers and Scribner, Bur. St. Journ. Res. 5, 73 (RP 187), 1930.

289 Meggers and Scribner, Bur. St. Journ. Res. 13, 625 (RP 732), 1934.

290 Meggers and Scribner, Bur. St. Journ. Res. 14, 629 (RP 793), 1935.

291 Meggers and Scribner, Bur. St. Journ. Res. 19, 651 (RP 1053), 1937.

292 Meggers and Shenstone, Phys. Rev. (2) 35, 868, 1930.

293 Meissner, Zeit. f. Phys. 39, 172, 1926.

294 Meissner, Zeit. f. Phys. 40, 839, 1927.

295 Meissner, Ann. der Phys. (5) 31, 505, 1938.

296 Meissner, Ann. der Phys. (5) 31, 518, 1938.

297 Meissner, Bartelt und Eckstein, Zeit. f. Phys. 86, 54, 1933.

298 Meissner und Luft, Ann. der Phys. (5) 29, 698, 1937.

299 Merrill, Bull. Bur. St. 14, 159, 1918.

300 Merton and Johnson, see Fowler and Selwyn, Proc. Royal Soc. A 118, 34, 1928.

301 Mihul, Annales de Physique (10) 9, 294, 1928.

302 Mihul, Annales de Physique (10) 9, 301, 1928.

303 Millikan and Bowen, Phys. Rev. (2) 25, 600, 1925.

304 Molnar and Hitchcock, Journ. Opt. Soc. Am. 30, 523, 1940.

305 Moore, C. E., Phys. Rev. (2) 55, 710, 1939.

306 Moore, C. E. and King, A. S., Publ. Astr. Soc. Pacific 55, 27 (No. 323), 1943.

307 Narayan, Kodaikanal Obs. Bull. 4, 311 (No. 99), 1932.

308 Offermann, see Kayser und Konen, Handbuch der Sp. 7, Part 1, 1924.

309 Olthoff and Sawyer, Phys. Rev. (2) 42, 766, 1932.

310 Paschen, Ann. der Phys. (4) 29, 642, 1909.

311 Paschen, Ann. der Phys. (4) 60, 405, 1919.

312 Paschen, Ann. der Phys. (4) 71, 142, 1923.

313 Paschen, Sitz. der Preuss. Akad. der Wiss., Phys.-Math. Klasse, 32, 536, 1928.

314 Paschen, Sitz. der Preuss. Akad. der Wiss., Phys.-Math. Klasse, 32, 709, 1931.

315 Paschen, Ann. der Phys. (5) 12, 509, 1932.

316 Paschen und Back, Ann. der Phys. (4) 39, 897, 1912.

317 Paschen und Campbell, Ann. der Phys. (5) 31, 29, 1938.

318 Paschen und Kruger, Ann. der Phys. (5) 8, 1005, 1931.

319 Paschen und Ritschl, Ann. der Phys. (5) 18, 867, 1933.

320 Paul and Polster, Phys. Rev. (2) 59, 424, 1941.

321 Paul and Rense, Phys. Rev. (2) 56, 1110, 1939.

322 Phillips and Kruger, Phys. Rev. (2) 54, 839, 1938.

323 Phillips and Parker, Phys. Rev. (2) 60, 301, 1941.

324 Platt and Sawyer, Phys. Rev. (2) 60, 866, 1941.

325 Price, Phys. Rev. (2) 48, 477, 1935.

326 Puhlmann, Zeit. f. Wiss. Ptg. 17, 97, 1917.

327 Rao, Proc. Royal Soc. A 124, 465, 1929.

328 Rao, Indian Journ. Phys. 7, 561, 1932.

329 Rasmussen, Zeit. f. Phys. 80, 726, 1933.

BIBLIOGRAPHY


330 Rasmussen, Zeit. f. Phys. 83, 404, 1933.

331 Rasmussen, Zeit. f. Phys. 86, 34, 1933.

332 Rasmussen, Zeit. f. Phys. 87, 607, 1934.

333 Rsinheimmer, Ann. der Phys. (4) 71, 162, 1923.

334 Robinson, Nature 137, 992, 1936.

335 Robinson, Phys. Rev. (2) 49, 297, 1936.

336 Robinson, Phys. Rsv. (2) 51, 736, 1937.

337 Robinson, Phys. Rev. (2) 52, 724, 1937.

338 Rood and Sawyer, Ap. J. 87, 68, 1938.

339 Rosen, Harrison and McNally, Jr., Phys. Rev. (2) 60, 722, 1941.

340 Rosenthal, Ann. der Phys. (5) 4, 49, 1930.

341 Ruedy, Phys. Rev. (2) 41, 588, 1932.

342 Ruedy, Phys. Rev. (2) 44, 757, 1933.

343 Ruedy and Gibbs, Phys. Rev. (2) 46, 880, 1934.

344 Russell, Mt. Wilson Contr. No. 286; Ap. J. 61, 223, 1925.

345 Russell, Publ. Astr. Soc. Pacific 38, 236, 1926.

346 Russell, Mt. Wilson Contr. No. 342; Ap. J. 66, 233, 1927.

347 Russell, Mt. Wilson Contr. No. 344; Ap. J. 66, 283, 1927.

348 Russell, Mt. Wilson Contr. No. 345; Ap. J. 66, 347, 1927.

349 Russell, see Russell and Meggers, Sci. Papers Bur. St. 22, 329 (No. 558), 1927.

350 Russell, Phys. Rev. (2) 31, 27, 1928.

351 Russell, see Meggers and Russell, Bur. St. Journ. Res. 2, 733 (RP 55), 1929.

352 Russell, Phys. Rev. (2) 34, 821, 1929.

353 Russell, see Meggers, Bur. St. Journ. Res. 10, 676, 684 (RP 558), 1933.

354 Russell, Phys. Rev. (2) 46, 989, 1934.

355 Russell, Unpublished material, May 1940.

356 Russell, Unpublished material, Nov. 1941.

357 Russell, Mt. Wilson Contr. No. 663; Ap. J. 96, 11, 1942.

358 Russell, Unpublished material, 1943.

359 Russell, Unpublished material.

360 Russell, Albertson and Davis, Phys. Rev. (2) 60, 641, 1941.

361 Russell and King, A. S., Mt. Wilson Contr. No. 611; Ap. J. 90, 155, 1939.

362 Russell, King, R. B. and Lang, Phys. Rev. (2) 52, 456, 1937.

363 Russell, King, R. B. and Moore, Phys. Rev. (2) 58, 407, 1940.

363a Russell, Moore and Wseks, Trans. Am. Phil. Soc. 34, 111 (Part 2), 1944.

364 Russell and Lang, Mt. Wilson Contr. No. 337; Ap. J. 66, 13, 1927.

365 Russell and Meggers, Sci. Papers Bur. St. 22, 329 (No. 558), 1927.

366 Russell and Meggers, Bur. St. Journ. Res. 9, 625 (RP 497), 1932.

367 Russell and Meggers, Unpublished material.

368 Russell or Moore, see Meggers and Russell, Bur. St. Journ. Res. 17, 125 (RP 906) 1936.

369 Russsll and Saunders, Ap. J. 61, 38, 1925.

370 Ryde, Proc. Royal Soc. A 117, 164, 1927.

371 St. John and Babcock, Mt. Wilson Contr. No. 202; Ap. J. 53, 260, 1921.

372 von Salis, Ann. der Phys. (4) 76, 145, 1925.

373 Saunders, Ap. J. 52, 265, 1920.

374 Saunders, Unpublishsd material.

375 Saunders and Russell, Ap. J. 62, 1, 1925.

376 Sawyer and Lang, Phys. Rev. (2) 34, 713, 1929.

377 Sawyer und Paschen, Ann. der Phys. (4) 84, 1, 1927.

378 Schüler, Zeit. f. Phys. 42, 487, 1927.

379 Schumacher, Zeit. f. Wiss. Ptg. 19, 149, 1919.

380 Segrè und Bakker, Zeit. f. Phys. 72, 724, 1931.

381 Shenstone, Phys. Rsv. (2) 28, 449, 1926.

382 Shenstone, Phys. Rev. (2) 30, 255, 1927.

383 Shenstone, Phys. Rev. (2) 31, 317, 1928.

384 Shenstone, Phys. Rev. (2) 32, 30, 1928.

385 Shenstone, Phys. Rev. (2) 36, 669, 1930.

386 Shenstone, Phil. Trans. Royal Soc. A 235, 195 (No. 751), 1936.

387 Shenstone, Phil. Trans. Royal Soc. A 237, 453, 1938.

388 Shenstone, Phys. Rev. (2) 57, 894, 1940.

389 See Shenstone, Phys. Rev. (2) 57, 894, 1940.

390 Shenstone, Unpublished material.

391 Smith, Sinclair, Unpublished material.

392 Smith, Stanley, Proc. Nat. Acad. Sci. 13, 65, 1927.

393 Söderqvist, Nova Acta Regiae Societatis Scientiarum Upsaliensis (IV) 9 (No. 7), 1934.

394 Sommer, Zeit. f. Phys. 37, 1, 1926.

395 Sommer, Zeit. f. Phys. 45, 147, 1927.

396 See Stiles, Ap. J. 30, 48, 1909.

397 Stoy, Lick Bull. 17, 179 (No. 480), 1935.

398 Stüting, see Kayser, Handbuch der Sp. 6, 1912.

399 Sullivan, Univ. Pittsburgh Bull. 35, 1 (No. 1), 1938.

400 Sullivan and Burns, Science Studies 9, 7 (No. 3), 1941.

401 Takahashi, Ann. der Phys. (5) 3, 27, 1929.

402 Uhler and Tanch, Ap. J. 55, 291, 1922.

403 Wagman, Univ. Pittsburgh Bull. 34, 1 (No. 1), 1937.

404 Werner, see Kayser und Konen, Handbuch der Sp. 7, Part 3, 1934.

405 Wheatley and Sawyer, Phys. Rev. (2) 61, 591, 1942.

406 White, Phys. Rev. (2) 33, 538, 1929.

407 White, Phys. Rev. (2) 33, 672, 1929.

408 Whitford, Phys. Rev. (2) 46, 793, 1934.

409 Wright, Publ. Lick Obs. 13, 193, 1918.

410 Zeeman und Dik, see de Bruin, Zeit. f. Phys. 38, 94, 1926.

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|---|---|---|---|---|---|---|

**H I P 13.54 Anal A Liet A June 1942**

| | | | | | | |
|---|---|---|---|---|---|---|
| 6562.817 | A | $H_\alpha$ | 10.15 | 12.04 | — | $2^2P^o$-$3^2D$etc |
| 4861.332 | A | $H_\beta$ | 10.15 | 12.69 | — | (1) $4^2D$etc |
| 4340.468 | A | $H_\gamma$ | 10.15 | 13.00 | — | $5^2D$etc |
| 4101.737 | A | $H_\delta$ | 10.15 | 13.16 | — | $6^2D$etc |
| 3970.074 | A | $H_\epsilon$ | 10.15 | 13.26 | — | $7^2D$etc |
| 3889.051 | A | $H_8$ | 10.15 | 13.33 | — | $2^2P^o$-$8^2D$etc |
| 3835.386 | A | $H_9$ | 10.15 | 13.37 | — | (2) $9^2D$etc |
| 3797.900 | A | $H_{10}$ | 10.15 | 13.40 | — | $10^2D$etc |
| 3770.632 | A | $H_{11}$ | 10.15 | 13.43 | — | $11^2D$etc |
| 3750.154 | A | $H_{12}$ | 10.15 | 13.45 | — | $12^2D$etc |
| 3734.370 | A | $H_{13}$ | 10.15 | 13.46 | — | $2^2P^o$-$13^2D$etc |
| 3721.940 | A | $H_{14}$ | 10.15 | 13.47 | — | (3) $14^2D$etc |
| 3711.973 | A | $H_{15}$ | 10.15 | 13.48 | — | $15^2D$etc |
| 3703.855 | A | $H_{16}$ | 10.15 | 13.49 | — | $16^2D$etc |
| 3697.154 | A | $H_{17}$ | 10.15 | 13.49 | — | $17^2D$etc |
| 3691.557 | A | $H_{18}$ | 10.15 | 13.50 | — | $2^2P^o$-$18^2D$etc |
| 3686.833 | A | $H_{19}$ | 10.15 | 13.50 | — | (4) $19^2D$etc |
| 3682.810 | A | $H_{20}$ | 10.15 | 13.51 | — | $20^2D$etc |
| 3679.355 | A | $H_{21}$ | 10.15 | 13.51 | — | $21^2D$etc |
| 3676.365 | A | $H_{22}$ | 10.15 | 13.51 | — | $22^2D$etc |
| 3673.761 | A | $H_{23}$ | 10.15 | 13.51 | — | $2^2P^o$-$23^2D$etc |
| 3671.478 | A | $H_{24}$ | 10.15 | 13.52 | — | (5) $24^2D$etc |
| 3669.466 | A | $H_{25}$ | 10.15 | 13.52 | — | $25^2D$etc |
| 3667.684 | A | $H_{26}$ | 10.15 | 13.52 | — | $26^2D$etc |
| 3666.097 | A | $H_{27}$ | 10.15 | 13.52 | — | $27^2D$etc |
| 3664.679 | A | $H_{28}$ | 10.15 | 13.52 | — | $2^2P^o$-$28^2D$etc |
| 3663.406 | A | $H_{29}$ | 10.15 | 13.52 | — | (6) $29^2D$etc |
| 3662.258 | A | $H_{30}$ | 10.15 | 13.52 | — | $30^2D$etc |
| 3661.221 | A | $H_{31}$ | 10.15 | 13.53 | — | $31^2D$etc |
| 3660.279 | A | $H_{32}$ | 10.15 | 13.53 | — | $32^2D$etc |
| 3659.423 | A | $H_{33}$ | 10.15 | 13.53 | — | $33^2D$etc |
| 3658.641 | A | $H_{34}$ | 10.15 | 13.53 | — | $2^2P^o$-$34^2D$etc |
| 3657.926 | A | $H_{35}$ | 10.15 | 13.53 | — | (7) $35^2D$etc |
| 3657.269 | A | $H_{36}$ | 10.15 | 13.53 | — | $36^2D$etc |
| 3656.666 | A | $H_{37}$ | 10.15 | 13.53 | — | $37^2D$etc |
| 3656.135 | A | $H_{38}$ | 10.15 | 13.53 | — | $38^2D$etc |
| 3645.981 | A | | 10.15 | 13.54 | | Limit |
| 12818.05 | A | — | 12.04 | 13.00 | — | $3^2D$-$5^2F^o$ etc |
| 10938.09 | A | — | 12.04 | 13.16 | — | (8) $6^2F^o$ etc |
| 10049.38 | A | — | 12.04 | 13.26 | — | $7^2F^o$ etc |
| 9545.974 | A | — | 12.04 | 13.33 | — | $8^2F^o$ etc |
| 9229.017 | A | — | 12.04 | 13.37 | — | $9^2F^o$ etc |
| 9014.911 | A | — | 12.04 | 13.40 | — | $3^2D$-$10^2F^o$ etc |
| 8862.787 | A | — | 12.04 | 13.43 | — | (9) $11^2F^o$ etc |
| 8750.475 | A | — | 12.04 | 13.45 | — | $12^2F^o$ etc |
| 8665.021 | A | — | 12.04 | 13.46 | — | $13^2F^o$ etc |
| 8598.394 | A | — | 12.04 | 13.47 | — | $14^2F^o$ etc |
| 8545.384 | A | — | 12.04 | 13.48 | — | $3^2D$-$15^2F^o$ etc |
| 8502.487 | A | — | 12.04 | 13.49 | — | (10) $16^2F^o$ etc |
| 8467.256 | A | — | 12.04 | 13.49 | — | $17^2F^o$ etc |
| 8437.958 | A | — | 12.04 | 13.50 | — | $18^2F^o$ etc |
| 8413.321 | A | — | 12.04 | 13.50 | — | $19^2F^o$ etc |
| 8392.400 | A | — | 12.04 | 13.51 | — | $3^2D$-$20^2F^o$ etc |
| 8374.478 | A | — | 12.04 | 13.51 | — | (11) $21^2F^o$ etc |
| 8359.006 | A | — | 12.04 | 13.51 | — | $22^2F^o$ etc |
| 8345.553 | A | — | 12.04 | 13.51 | — | $23^2F^o$ etc |
| 8333.785 | A | — | 12.04 | 13.52 | — | $24^2F^o$ etc |
| 8323.428 | A | — | 12.04 | 13.52 | — | $3^2D$-$25^2F^o$ etc |
| 8314.262 | A | — | 12.04 | 13.52 | — | (12) $26^2F^o$ etc |
| 8306.115 | A | — | 12.04 | 13.52 | — | $27^2F^o$ etc |
| 8298.837 | A | — | 12.04 | 13.52 | — | $28^2F^o$ etc |
| 8292.309 | A | — | 12.04 | 13.52 | — | $29^2F^o$ etc |
| 8286.434 | A | — | 12.04 | 13.52 | — | $3^2D$-$30^2F^o$ etc |
| 8281.125 | A | — | 12.04 | 13.53 | — | (13) $31^2F^o$ etc |
| 8276.310 | A | — | 12.04 | 13.53 | — | $32^2F^o$ etc |
| 8271.934 | A | — | 12.04 | 13.53 | — | $33^2F^o$ etc |
| 8267.941 | A | — | 12.04 | 13.53 | — | $34^2F^o$ etc |
| 8264.288 | A | — | 12.04 | 13.53 | — | $3^2D$-$35^2F^o$ etc |
| 8260.938 | A | — | 12.04 | 13.53 | — | (14) $36^2F^o$ etc |
| 8257.859 | A | — | 12.04 | 13.53 | — | $37^2F^o$ etc |
| 8255.153 | A | — | 12.04 | 13.53 | — | $38^2F^o$ etc |
| 8203.572 | A | — | 12.04 | 13.54 | — | Limit |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 6561.032 | A | $D_\alpha$ | 10.16 | 12.04 | — | $2^2P^o$-$3^2D$etc |
| 4860.029 | A | $D_\beta$ | 10.16 | 12.70 | — | (1) $4^2D$etc |
| 4339.287 | A | $D_\gamma$ | 10.16 | 13.00 | — | $5^2D$etc |
| 4100.621 | A | $D_\delta$ | 10.16 | 13.17 | — | $6^2D$etc |
| 3968.995 | A | $D_\epsilon$ | 10.16 | 13.27 | — | $7^2D$etc |
| 3887.993 | A | $D_8$ | 10.16 | 13.33 | — | $8^2D$etc |
| 12814.56 | A | — | 12.04 | 13.00 | — | $3^2D$-$5^2F^o$ etc |
| 10935.11 | A | — | 12.04 | 13.17 | — | (2) $6^2F^o$ etc |
| 10046.84 | A | — | 12.04 | 13.27 | — | $7^2F^o$ etc |
| 9543.376 | A | — | 12.04 | 13.33 | — | $8^2F^o$ etc |

**He I I P 24.48 Anal A Liet B Jan 1943**

| | | | | | | |
|---|---|---|---|---|---|---|
| 10830.341 | A | 2500 | 19.73 | 20.87 | 1-2 | $2^3S$-$3^3P^o$ |
| 10830.250 | A | 1500 | 19.73 | 20.87 | 1-1 | (1) |
| 10829.081 | A | 500 | 19.73 | 20.87 | 1-0 | |
| 3888.646 | B | (10) (7) (3) | 19.73 | 22.91 | 2 / 1-1 / 0 | $3^3S$-$3^3P^o$ (2) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|

**He I continued**

| | | | | | | |
|---|---|---|---|---|---|---|
| 3187.743 | B | (8) | 19.73 | 23.61 | — | $2^3S$-$4^3P^o$ (3) |
| 5015.675 | B | (6) | 20.53 | 22.99 | 0-1 | $2^1S$-$3^1P^o$ (4) |
| 3964.727 | B | (4) | 20.53 | 23.84 | 0-1 | $2^1S$-$4^1P^o$ (5) |
| 3613.641 | B | (3) | 20.53 | 23.94 | 0-1 | $2^1S$-$5^1P^o$ (6) |
| 3447.594 | D | (2) | 20.53 | 24.11 | 0-1 | $2^1S$-$6^1P^o$ (7) |
| 3354.550 | D | (2) | 20.53 | 24.21 | 0-1 | $2^1S$-$7^1P^o$ (8) |
| 3296.788 | D | (1) | 20.53 | 24.27 | 0-1 | $2^1S$-$8^1P^o$ (9) |
| 7065.188 | B | (5) | 20.87 | 22.62 | 2,1-1 | $2^3P^o$-$3^3S$ |
| 7065.719 | D | (1) | 20.87 | 22.62 | 0-1 | (10) |
| 5875.618 | B | (10)$D_3$ | 20.87 | 22.97 | 2- | $2^3P^o$-$3^3D$ |
| 5875.650 | D | | 20.87 | 22.97 | 1- | (11) |
| 5875.989 | D | (1) | 20.87 | 22.97 | 0- | |
| 4713.143 | B | (3) | 20.87 | 23.49 | 2,1-1 | $2^3P^o$-$4^3S$ |
| 4713.373 | D | (1) | 20.87 | 23.49 | 0-1 | (12) |
| 4517.43 | P | Forb | 20.87 | 23.61 | 2- | $2^3P^o$-$4^3P^o$ (13) |
| 4471.477 | B | (6) | 20.87 | 23.63 | 2,1- | $2^3P^o$-$4^3D$ |
| 4471.688 | D | (1) | 20.87 | 23.63 | 0- | (14) |
| 4469.92 | P | Forb | 20.87 | 23.63 | 2- | $2^3P^o$-$4^3F^o$ (15) |
| 4120.812 | B | (3) | 20.87 | 23.87 | 2,1-1 | $2^3P^o$-$5^3S$ |
| 4120.993 | D | (1) | 20.87 | 23.87 | 0-1 | (16) |
| 4045.16 | P | Forb | 20.87 | 23.92 | 2- | $2^3P^o$-$5^3P^o$ (17) |
| 4026.189 | B | (5) | 20.87 | 23.94 | 2,1- | $2^3P^o$-$5^3D$ |
| 4026.362 | D | (1) | 20.87 | 23.94 | 0- | (18) |
| 4025.49 | P | Forb | 20.87 | 23.94 | 2- | $2^3P^o$-$5^3F^o$ (19) |
| 3867.477 | D | (3) | 20.87 | 24.07 | 2,1-1 | $2^3P^o$-$6^3S$ |
| 3867.631 | D | (1) | 20.87 | 24.07 | 0-1 | (20) |
| 3829.47 | P | Forb | 20.87 | 24.10 | 2- | $2^3P^o$-$6^3P^o$ (21) |
| 3819.606 | B | (4) | 20.87 | 24.11 | 2,1- | $2^3P^o$-$6^3D$ |
| 3819.761 | D | (1) | 20.87 | 24.11 | 0- | (22) |
| 3819.25 | P | Forb | 20.87 | 24.11 | 2- | $2^3P^o$-$6^3F^o$ (23) |
| 3732.881 | C | (1) | 20.87 | 24.18 | 2,1-1 | $2^3P^o$-$7^3S$ |
| 3732.992 | D | (1) | 20.87 | 24.18 | 0-1 | (24) |
| 3705.003 | B | (3) | 20.87 | 24.21 | 2,1- | $2^3P^o$-$7^3D$ |
| 3705.140 | C | (1) | 20.87 | 24.21 | 0- | (25) |
| 3704.79 | P | Forb | 20.87 | 24.21 | 2- | $2^3P^o$-$7^3F^o$ (26) |
| 3651.971 | D | (1) | 20.87 | 24.25 | 2,1-1 | $2^3P^o$-$8^3S$ |
| 3652.119 | D | (1) | 20.87 | 24.25 | 0-1 | (27) |
| 3634.235 | D | (3) | 20.87 | 24.27 | 2,1- | $2^3P^o$-$8^3D$ |
| 3634.373 | D | (1) | 20.87 | 24.27 | 0- | (28) |
| 3634.10 | P | Forb | 20.87 | 24.27 | 2- | $2^3P^o$-$8^3F^o$ (29) |
| 3599.304 | D | (1) | 20.87 | 24.30 | 2,1-1 | $2^3P^o$-$9^3S$ |
| 3599.442 | D | (1) | 20.87 | 24.30 | 0-1 | (30) |
| 3587.252 | D | (2) | 20.87 | 24.31 | 2,1- | $2^3P^o$-$9^3D$ |
| 3587.396 | D | — | 20.87 | 24.31 | 0- | (31) |
| 3587.16 | P | Forb | 20.87 | 24.31 | 2- | $2^3P^o$-$9^3F^o$ (32) |
| 3562.950 | D | (1) | 20.87 | 24.34 | — | $2^3P^o$-$10^3S$ (33) |
| 3554.394 | D | (1) | 20.87 | 24.35 | 2,1- | $2^3P^o$-$10^3D$ |
| 3554.524 | D | (1) | 20.87 | 24.35 | 0- | (34) |
| 3536.820 | D | (1) | 20.87 | 24.36 | — | $2^3P^o$-$11^3S$ (35) |
| 3530.487 | D | (1) | 20.87 | 24.37 | — | $2^3P^o$-$11^3D$ (36) |
| 3517.327 | D | (1) | 20.87 | 24.38 | — | $2^3P^o$-$12^3S$ (37) |
| 3512.511 | D | (1) | 20.87 | 24.39 | — | $2^3P^o$-$12^3D$ (38) |
| 3502.381 | D | (1) | 20.87 | 24.40 | — | $2^3P^o$-$13^3S$ (39) |
| 3498.641 | D | (1) | 20.87 | 24.40 | — | $2^3P^o$-$13^3D$ (40) |
| 3490.62 | D | (1) | 20.87 | 24.41 | — | $2^3P^o$-$14^3S$ (41) |
| 3487.721 | D | (1) | 20.87 | 24.41 | — | $2^3P^o$-$14^3D$ (42) |
| 3478.97 | D | (1) | 20.87 | 24.42 | — | $2^3P^o$-$15^3D$ (43) |
| 3471.80 | D | (1) | 20.87 | 24.43 | — | $2^3P^o$-$16^3D$ (44) |
| 7281.349 | B | (3) | 21.13 | 22.82 | 1-0 | $2^1P^o$-$3^1S$ (45) |
| 6678.149 | B | (6) | 21.13 | 22.97 | 1-2 | $2^1P^o$-$3^1D$ (46) |
| 5047.736 | B | (2) | 21.13 | 23.57 | 1-0 | $2^1P^o$-$4^1S$ (47) |
| 4921.929 | B | (4) | 21.13 | 23.63 | 1-2 | $2^1P^o$-$4^1D$ (48) |
| 4920.35 | P | Forb | 21.13 | 23.64 | 1-3 | $2^1P^o$-$4^1F^o$ (49) |
| 4437.549 | B | (1) | 21.13 | 23.91 | 1-0 | $2^1P^o$-$5^1S$ (50) |
| 4387.928 | B | (3) | 21.13 | 23.94 | 1-2 | $2^1P^o$-$5^1D$ (51) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|

**He I continued**

| | | | | | | |
|---|---|---|---|---|---|---|
| 4168.971 | D | (1) | 21.13 | 24.09 | 1-0 | $2^1P^o$-$6^1S$ (52) |
| 4143.759 | B | (2) | 21.13 | 24.11 | 1-2 | $2^1P^o$-$6^1D$ (53) |
| 4023.988 | D | (1) | 21.13 | 24.19 | 1-0 | $2^1P^o$-$7^1S$ (54) |
| 4009.270 | D | (1) | 21.13 | 24.21 | 1-2 | $2^1P^o$-$7^1D$ (55) |
| 4007.81 | P | Forb | 21.13 | 24.21 | 1-1 | $2^1P^o$-$7^1P^o$ (56) |
| 3935.914 | D | (1) | 21.13 | 24.28 | 1-0 | $2^1P^o$-$8^1S$ (57) |
| 3926.530 | D | (1) | 21.13 | 24.27 | 1-2 | $2^1P^o$-$8^1D$ (58) |
| 3878.180 | D | (1) | 21.13 | 24.31 | 1-0 | $2^1P^o$-$9^1S$ (59) |
| 3871.819 | D | (1) | 21.13 | 24.31 | 1-2 | $2^1P^o$-$9^1D$ (60) |
| 3838.094 | D | (1) | 21.13 | 24.34 | 1-0 | $2^1P^o$-$10^1S$ (61) |
| 3833.574 | D | (1) | 21.13 | 24.35 | 1-2 | $2^1P^o$-$10^1D$ (62) |
| 3805.765 | D | (1) | 21.13 | 24.37 | 1-2 | $2^1P^o$-$11^1D$ (63) |
| 3784.886 | D | (1) | 21.13 | 24.39 | 1-2 | $2^1P^o$-$12^1D$ (64) |
| 3768.81 | D | (1) | 21.13 | 24.40 | 1-2 | $2^1P^o$-$13^1D$ (65) |
| 3756.10 | D | (1) | 21.13 | 24.41 | 1-2 | $2^1P^o$-$14^1D$ (66) |
| 9463.57 | C | 60 | 22.62 | 23.92 | — | $3^3S$-$5^3P^o$ (67) |
| 8361.77 | C | (4) | 22.62 | 24.10 | — | $3^3S$-$6^3P^o$ (68) |
| 7816.16 | C | (4) | 22.62 | 24.20 | — | $3^3S$-$7^3P^o$ (69) |
| 11012.97 | A | 30 | 22.82 | 23.94 | 0-1 | $3^1S$-$5^1P^o$ (70) |
| 9603.50 | E | 6 | 22.82 | 24.11 | 0-1 | $3^1S$-$6^1P^o$ (71) |
| 11969.07 | A | 20 | 22.91 | 23.94 | — | $3^3P^o$-$5^3D$ (72) |
| 10667.60 | A | 30 | 22.91 | 24.07 | — | $3^3P^o$-$6^3S$ (73) |
| 10311.18 | C | 40 | 22.91 | 24.11 | — | $3^3P^o$-$6^3D$ |
| 10311.37 | C | | 22.91 | 24.11 | — | (74) |
| 9702.66 | E | 10 | 22.91 | 24.18 | — | $3^3P^o$-$7^3S$ (75) |
| 9516.51 | C | 30 | 22.91 | 24.21 | — | $3^3P^o$-$7^3D$ |
| 9516.66 | C | | 22.91 | 24.21 | — | (76) |
| 9063.40 | E | 6 | 22.91 | 24.27 | — | $3^3P^o$-$8^3D$ (77) |
| 10996.55 | A | 5 | 22.97 | 24.10 | — | $3^3D$-$6^3P^o$ (78) |
| 10912.92 | A | 100 | 22.97 | 24.11 | — | $3^3D$-$6^3F^o$ (79) |
| 10072.10 | E | 2 | 22.97 | 24.20 | — | $3^3D$-$7^3P^o$ (80) |
| 10027.73 | E | 40 | 22.97 | 24.21 | — | $3^3D$-$7^3F^o$ (81) |
| 9526.17 | E | 10 | 22.97 | 24.27 | — | $3^3D$-$8^3F^o$ (82) |
| 9210.28 | E | 6 | 22.97 | 24.31 | — | $3^3D$-$9^3F^o$ (83) |
| 10916.98 | A | 50 | 22.97 | 24.11 | 2-3 | $3^1D$-$6^1F^o$ (84) |
| 10031.16 | E | 15 | 22.97 | 24.21 | 2-3 | $3^1D$-$7^1F^o$ (85) |
| 9529.27 | E | 4 | 22.97 | 24.27 | 2-3 | $3^1D$-$8^1F^o$ (86) |
| 11225.83 | A | 6 | 22.99 | 24.09 | 1-0 | $3^1P^o$-$6^1S$ (87) |
| 11044.95 | A | 40 | 22.99 | 24.11 | 1-2 | $3^1P^o$-$6^1D$ (88) |
| 10138.50 | E | 10 | 22.99 | 24.21 | 1-2 | $3^1P^o$-$7^1D$ (89) |
| 9625.80 | E | 3 | 22.99 | 24.27 | 1-2 | $3^1P^o$-$8^1D$ (90) |

**He II I P 54.17 Anal A List A June 1942**

| | | | | | | |
|---|---|---|---|---|---|---|
| 4685.682 | A | — | 48.16 | 50.80 | — | $3^2D$-$4^2F^o$ etc |
| 3203.104 | A | — | 48.16 | 52.02 | — | (1) $5^2F^o$ etc |
| 10123.61 | A | — | 50.80 | 52.02 | — | $4^2F^o$-$5^2G$etc |
| 6560.099 | A | — | 50.80 | 52.68 | — | (2) $6^2G$etc |
| 5411.524 | A | — | 50.80 | 53.08 | — | $7^2G$etc |
| 4859.323 | A | — | 50.80 | 53.34 | — | $8^2G$etc |
| 4541.59 | A | — | 50.80 | 53.51 | — | $9^2G$etc |
| 4338.67 | A | — | 50.80 | 53.64 | — | $4^2F^o$-$10^2G$etc |
| 4199.83 | A | — | 50.80 | 53.74 | — | (3) $11^2G$etc |
| 4100.04 | A | — | 50.80 | 53.81 | — | $12^2G$etc |
| 4025.60 | A | — | 50.80 | 53.86 | — | $13^2G$etc |
| 3968.43 | A | — | 50.80 | 53.91 | — | $14^2G$etc |
| 3923.48 | A | — | 50.80 | 53.94 | — | $4^2F^o$-$15^2G$etc |
| 3887.44 | A | — | 50.80 | 53.97 | — | (4) $16^2G$etc |
| 3858.07 | A | — | 50.80 | 54.00 | — | $17^2G$etc |
| 3833.80 | A | — | 50.80 | 54.02 | — | $18^2G$etc |
| 3813.50 | A | — | 50.80 | 54.03 | — | $19^2G$etc |
| 3796.33 | A | — | 50.80 | 54.05 | — | $4^2F^o$-$20^2G$etc |
| 3781.68 | A | — | 50.80 | 54.06 | — | (5) $21^2G$etc |
| 3644.47 | A | — | 50.80 | 54.18 | — | Limit |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **He II** continued | | | | | | |
| 11626.40 | A | — | 52.02 | 53.08 | — | $5^2G-7^2H^o$ etc |
| 9344.93 | A | — | 52.02 | 53.34 | — | (8) $8^2H^o$ etc |
| 8236.77 | A | — | 52.02 | 53.51 | — | $9^2H^o$ etc |
| 7592.74 | A | — | 52.02 | 53.84 | — | $10^2H^o$ etc |
| 7177.50 | A | — | 52.02 | 53.74 | — | $11^2H^o$ etc |
| 6890.88 | A | — | 52.02 | 53.81 | — | $5^2G-12^2H^o$ etc |
| 8683.2 | A | — | 52.02 | 53.86 | — | (7) $13^2H^o$ etc |
| 6570.0 | A | — | 52.02 | 53.91 | — | $14^2H^o$ etc |
| 8406.3 | A | — | 52.02 | 53.94 | — | $15^2H^o$ etc |
| 6310.8 | A | — | 52.02 | 53.97 | — | $16^2H^o$ etc |
| 6233.8 | A | — | 52.02 | 54.00 | — | $17^2H^o$ etc |
| 6170.6 | A | — | 52.02 | 54.02 | — | $5^2G-18^2H^o$ etc |
| 8118.2 | A | — | 52.02 | 54.03 | — | (8) $19^2H^o$ etc |
| 6074.1 | A | — | 52.02 | 54.05 | — | $20^2H^o$ etc |
| 6038.7 | A | — | 52.02 | 54.06 | — | $21^2H^o$ etc |
| 5694.46 | A | — | 52.02 | 54.18 | — | Limit |

Wide Fine Structure

**Li I** I P 5.37 Anal A List B Jan 1943

| | | | | | | |
|---|---|---|---|---|---|---|
| 6707.74 // 6707.89 | A A | 1000R | 0.00 0.00 | 1.84 1.84 | ½-1½ ½- ½ | $2^2S-2^2P^o$ (1) |
| 3232.81 | B | 50R | 0.00 | 3.82 | — | $2^2S-3^2P^o$ (2) |
| 8128.52 | B | (500) | 1.84 | 3.36 | — | $2^2P^o-3^2S$ (3) |
| 6103.642 | C | 500R | 1.84 | 3.86 | — | $2^2P^o-3^2D$ (4) |
| 4971.92 | B | 10r | 1.84 | 4.32 | — | $2^2P^o-4^2S$ (5) |
| 4602.99 | B | 100R | 1.84 | 4.52 | — | $2^2P^o-4^2D$ (8) |

**Li II** I P 75.31 Anal A List D Jan 1943

| | | | | | | |
|---|---|---|---|---|---|---|
| 5483.55 to 5485.85 | A | 10 | 58.77 | 61.02 | — | $2^3S-2^3P^o$ (1) |
| 3684.1 | B | 2 | 68.48 | 71.83 | — | $3^3S-4^3P^o$ (2) |
| 4156.3 | B | 0.5 | 68.98 | 71.95 | 0-1 | $3^1S-4^1P^o$ (3) |
| 4881.3 | B | 2.5 | 69.07 | 71.60 | — | $3^3P^o-4^3S$ (4) |
| 4325.7 | B | 3 | 69.07 | 71.92 | — | $3^3P^o-4^3D$ (5) |

Very wide fine structure

**Be I** I P 9.28 Anal A List C Feb 1943

| | | | | | | |
|---|---|---|---|---|---|---|
| 3321.347 | A | 30 | 2.71 | 6.43 | 2-1 | $2^3P^o-3^3S$ |
| 3321.086 | A | 20 | 2.71 | 6.43 | 1-1 | (1) |
| 3321.013 | A | 10 | 2.71 | 6.43 | 0-1 | |
| 8254.10 | B | 10 | 5.25 | 6.75 | 1-0 | $2^1P^o-3^1S$ (2) |
| 4572.871 | C | 15 | 5.25 | 7.95 | 1-2 | $2^1P^o-3^1D$ (3) |
| 4407.911 | B | 10 | 5.25 | 8.05 | 1-0 | $2^1P^o-4^1S$ (4) |
| 3813.402 | B | 15 | 5.25 | 8.49 | 1-2 | $2^1P^o-4^1D$ (5) |
| 3736.280 | B | 10 | 5.25 | 8.56 | 1-0 | $2^1P^o-5^1S$ (6) |
| 3515.538 | B | 12 | 5.25 | 8.77 | 1-2 | $2^1P^o-5^1D$ (7) |

**Be II** I P 18.13 Anal A List D Feb 1943

| | | | | | | |
|---|---|---|---|---|---|---|
| 3130.418// 3131.064 | A A | 50 30 | 0.00 0.00 | 3.94 3.94 | ½-1½ ½- ½ | $2^2S-2^2P^o$ (1) |
| 3274.640 | A | 10 | 10.89 | 14.88 | — | $3^2S-4^2P^o$ (2) |
| 5270.843 | A | 12 | 11.91 | 14.25 | 1½- ½ | $3^2P^o-4^2S$ |
| 5270.332 | A | 10 | 11.91 | 14.25 | ½- ½ | (3) |
| 4381.025 | A | 10 | 11.91 | 14.74 | 1½- | $3^2P^o-4^2D$ |
| 4380.690 | A | 9 | 11.91 | 14.74 | ½- | (4) |
| 3241.835 | A | 10 | 11.91 | 15.72 | 1½- ½ | $3^2P^o-5^2S$† (5) |
| 4873.482 | A | 20 | 12.10 | 14.75 | — | $3^2D-4^2F^o$ (8) |

B I See introduction

**B II** I P 25.02 Anal B List D Feb 1943

| | | | | | | |
|---|---|---|---|---|---|---|
| 3451.41 | A | 10 | 9.06 | 12.84 | 1-2 | $2^1P^o-3p^2\ ^1D$ (1) |
| 4121.95 | A | 7 | 18.60 | 21.59 | — | $3^3D-4^3F^o$ (2) |

**B III** I P 37.77 Anal A List B Feb 1943

| | | | | | | |
|---|---|---|---|---|---|---|
| 4243.60 | A | 3d | 29.98 | 32.89 | — | $4^2P^o-5^2D$ (1) |
| 4487.46 | A | 5d | 30.14 | 32.89 | — | $4^2D-5^2F^o$ (2) |
| 4497.58 | A | 10d | 30.15 | 32.89 | — | $4^2F^o-5^2G$ (3) |

**C I** I P 11.20 Anal B List A March 1943

| | | | | | | |
|---|---|---|---|---|---|---|
| 10691.38 | A | 50 | 7.46 | 8.61 | 2-3 | $3s^3P^o-3p^3D$ (1) |
| 10683.18 | A | 25 | 7.45 | 8.81 | 1-2 | |
| 10685.44 | A | 10 | 7.45 | 8.80 | 0-1 | |
| 10729.59 | A | 8 | 7.48 | 8.61 | 2-2 | |
| 10707.44 | A | 8 | 7.45 | 8.60 | 1-1 | |
| 10754.09 | P | | 7.46 | 8.60 | 2-1 | |
| 9658.49 | A | 2 | 7.46 | 8.73 | 2-1 | $3s^3P^o-3p^3S$ (2) |
| 9820.86 | A | 1 | 7.45 | 8.73 | 1-1 | |
| 9603.09 | A | 0 | 7.45 | 8.73 | 0-1 | |
| 9094.89 | A | 25 | 7.46 | 8.81 | 2-2 | $3s^3P^o-3p^3P$ (3) |
| 9078.32 | A | 6 | 7.45 | 8.81 | 1-1 | |
| 9111.85 | A | 10 | 7.46 | 8.81 | 2-1 | |
| 9088.57 | A | 8 | 7.45 | 8.81 | 1-0 | |
| 9081.48 | A | 15 | 7.45 | 8.81 | 1-2 | |
| 9062.53 | A | 10 | 7.45 | 8.81 | 0-1 | |
| 5041.66 | B | 3 | 7.48 | 9.90 | 2-3 | $3s^3P^o-4p^3D$ (4) |
| *5039.05 | B | 3 | (7.45 | 9.90 | 1-2 | |
| | | | 7.45 | 9.90 | 0-1 | |
| 4828.73 | B | 1 | 7.46 | 10.01 | 2-1 | $3s^3P^o-4p^3S$ (5) |
| 4817.33 | B | 1 | 7.45 | 10.01 | 1-1 | |
| 4812.84 | E | (1) | 7.45 | 10.01 | 0-1 | |
| 4771.72 | B | 4 | 7.46 | 10.04 | 2-2 | $3s^3P^o-4p^3P$ (8) |
| 4766.82 | B | 2 | 7.45 | 10.04 | 1-1 | |
| 4775.87 | B | 3 | 7.48 | 10.04 | 2-1 | |
| 4770.00 | B | 2 | 7.45 | 10.04 | 1-0 | |
| *4763.41 | B | 4 | (7.45 | 10.04 | 1-2 | |
| | | | 7.45 | 10.04 | 0-1 | |
| 4085.1 | C | 2 | 7.48 | 10.49 | 2-3? | $3s^3P^o-5p^3D$ (7) |
| *4084.2 | C | 1 | (7.45 | 10.49 | 1-2? | |
| | | | 7.45 | 10.49 | 0-1? | |
| 10653.8 | D | (50) | 7.85 | 8.81 | 1-1 | $3s^1P^o-3p^3P$ (8) |
| 9405.77 | A | 20 | 7.65 | 8.96 | 1-2 | $3s^1P^o-3p^1D$ (9) |
| 8335.19 | A | 10 | 7.65 | 9.13 | 1-0 | $3s^1P^o-3p^1S$ (10) |
| 5380.242 | B | 8 | 7.65 | 9.95 | 1-1 | $3s^1P^o-4p^1P$ (11) |
| 5052.122 | B | 6 | 7.65 | 10.09 | 1-2 | $3s^1P^o-4p^1D$ (12) |
| 4932.00 | B | 5 | 7.65 | 10.15 | 1-0 | $3s^1P^o-4p^1S$ (13) |
| 4371.33 | C | 4 | 7.65 | 10.47 | 1-1 | $3s^1P^o-5p^1P$ (14) |
| 4352.1 | C | 1 | 7.65 | 10.49 | 1-2? | $3s^1P^o-5p^3D$ (15) |
| 4268.99 | C | 2 | 7.85 | 10.54 | 1-2 | $3s^1P^o-5p^1D$ (16) |
| 4231.35 | C | 1 | 7.65 | 10.57 | 1-0 | $3s^1P^o-5p^1S$ (17) |
| 5793.51 | E | (3) | 7.91 | 10.04 | 3-2 | $2p^3\ ^3D^o-4p^3P$ (18) |
| 5801.17 | E | (2) | 7.91 | 10.04 | 2-1 | |
| 5805.78 | E | (1) | 7.91 | 10.04 | 1-0 | |
| 11330.36 | A | 1 | 8.50 | 9.59 | 1-2 | $3p^1P-3d^1D^o$ (19) |
| 10548.0 | E | (60) | 8.50 | 9.87 | 1-1 | $3p^1P-4s^1P^o$ (20) |
| 6828.5 | C | 0 | 8.50 | 10.31 | 1-2 | $3p^1P-4d^1D^o$ (21) |
| 6587.75 | C | 4 | 8.50 | 10.37 | 1-1 | $3p^1P-4d^1P^o$ (22) |
| *11894.9 | D | (200) | (8.61 | 9.65 | 3-2 | $3p^3D-4s^3P^o$ (23) |
| | | | 8.81 | 9.84 | 2-1 | |
| 11880.4 | D | (15) | 8.60 | 9.84 | 1-0? | |
| 11849.3 | D | (10) | 8.81 | 9.85 | 2-2 | |
| 11883.0 | D | (15) | 8.81 | 9.64 | 1-1 | |
| *11754.0 | D | (600) | (8.81 | 9.66 | 3-4 | $3p^3D-3d^3F^o$ (24) |
| | | | 8.81 | 9.88 | 2-3 | |
| 11747.5 | D | (300) | 8.60 | 9.65 | 1-2 | |
| 11801.8 | D | (10) | 8.61 | 9.66 | 3-3 | |
| *11687.1 | D | (100) | 8.81 | 9.67 | 3-3 | $3p^3D-3d^3D^o$ (25) |
| 11831.59† | P | | 8.81 | 9.87 | 2-2 | |
| 11609.91† | P | | 8.60 | 9.87 | 1-1 | |
| 11878.99† | P | | 8.81 | 9.87 | 3-2 | |
| 11838.60† | P | | 8.61 | 9.87 | 2-1 | |
| 11819.0 | D | (30) | 8.81 | 9.87 | 2-3 | |
| 11602.94† | P | | 8.60 | 9.87 | 1-2 | |
| 7118.5 | E | (6d) | 8.81 | 10.34 | — | $3p^3D-4d^3F^o$ (28) |

**C I** continued

| | | | | | | |
|---|---|---|---|---|---|---|
| 13164.1 | D | (100) | 8.73 | 9.67 | 1-1 | $3p^3S-4s^1P^o$ (27) |
| 12521.0 | D | (30) | 8.73 | 9.72 | 1-1 | $3p^3S-3d^1P^o$ (28) |
| *11667.1 | D | (100) | 8.73 | 9.79 | 1-2 | $3p^3S-3d^3P^o$ |
| 11656.0 | D | (200) | 8.73 | 9.79 | 1-1 | (29) |
| 12814.8 | D | (200) | 8.81 | 9.79 | 2-2 | $3p^3P-3d^3P^o$ |
| *12565.0 | D | (30) | 8.81 | 9.79 | 1-1 | (30) |
| 12802.8 | D | (40) | 8.81 | 9.79 | 2-1 | |
| *12585.0 | D | (30) | 8.81 | 9.79 | 1-0 | |
| 12582.3 | D | (40) | 8.81 | 9.79 | 1-2 | |
| 12551.0 | D | (50) | 8.81 | 9.79 | 0-1 | |
| 8018 | E | (1d) | 8.81 | 10.35 | — | $3p^3P-4d^3D^o$ (31) |
| 7850 | E | (1d) | 8.81 | 10.38 | — | $3p^3P-4d^3P^o$ (32) |

**C II** I P 24.28 Anal A List A Feb 1943

| | | | | | | |
|---|---|---|---|---|---|---|
| 4744.90 | B | 1 | 13.66 | 16.26 | 1½-1½ | $2p^2P-3^2P^o$ |
| 4738.11 | B | 0 | 13.66 | 16.26 | ½- ½ | (1) |
| 6578.03 | A | 10 | 14.39 | 16.26 | ½-1½ | $3^2S-3^2P^o$ |
| 6582.85 | A | 9 | 14.39 | 16.26 | ½- ½ | (2) |
| 7236.19 | A | 8d | 16.26 | 17.97 | 1½-2½ | $3^2P^o-3^2D$ |
| 7231.13 | A | 7d | 16.26 | 17.97 | ½-1½ | (3) |
| 3920.677 | A | 10 | 16.26 | 19.41 | 1½- ½ | $3^2P^o-4^2S$ |
| 3918.977 | A | 9 | 16.26 | 19.41 | ½- ½ | (4) |
| 5889.97 | A | 4 | 17.97 | 20.06 | 2½-1½ | $3^2D-4^2P^o$ |
| 5891.85 | A | 3 | 17.97 | 20.08 | 1½- ½ | (5) |
| 4267.27 | A | 20 | 17.97 | 20.86 | 2½-3½ | $3^2D-4^2F^o$ |
| 4267.02 | A | 19 | 17.97 | 20.86 | 1½-2½ | (6) |
| 3361.09 | A | 3 | 17.97 | 21.64 | 2½-1½ | $3^2D-5^2P^o$ |
| 3361.75 | A | 2 | 17.97 | 21.64 | 1½- ½ | (7) |
| 2992.63 | A | 5d | 17.97 | 22.09 | — | $3^2D-5^2F^o$ (8) |
| 3165.51 | A | 4 | 18.57 | 22.47 | 2½-1½ | $2p^3\ ^2D^o-3p^2P$ |
| 3167.95 | A | 3 | 18.58 | 22.47 | 1½- ½ | (9) |
| 3165.99 | B | 1 | 18.58 | 22.47 | 1½-1½ | |
| 5538.0 | B | 1d | 19.41 | 21.64 | ½- | $4^2S-5^2P^o$ (10) |
| 5338.7 | B | Odd | 20.06 | 22.38 | 1½- ½ | $4^2P^o-6^2S$ (11) |
| 5131.89 | A | 1 | 20.06 | 22.47 | 1½-1½ | $4^2P^o-3p^2P$ (12) |
| 3832.12 | B | 2d | 20.06 | 23.28 | 1½-2½ | $4^2P^o-3p^2D$ |
| 3836.10 | B | 1d | 20.06 | 23.28 | ½-1½ | (13) |
| 6783.75 | A | (6) | 20.62 | 22.44 | 2½-3½ | $3s^4P^o-3p^4D$ |
| 6779.74 | A | (4) | 20.61 | 22.44 | 1½-3½ | (14) |
| 6780.27 | A | (2) | 20.61 | 22.43 | ½-1½ | |
| 6800.50 | A | (3) | 20.62 | 22.44 | 2½-2½ | |
| 6791.30 | A | (3) | 20.61 | 22.43 | 1½-1½ | |
| 6787.09 | A | (2) | 20.61 | 22.43 | ½- ½ | |
| 6812.19 | A | (0) | 20.62 | 22.43 | 2½-1½ | |
| 6798.04 | A | (1) | 20.61 | 22.43 | 1½- ½ | |
| 5662.51 | A | (4) | 20.62 | 22.80 | 2½-1½ | $3s^4P^o-3p^4S$ |
| 5648.08 | A | (3) | 20.61 | 22.80 | 1½-1½ | (15) |
| 5640.50 | A | (2) | 20.61 | 22.80 | ½-1½ | |
| 5145.18 | A | (5) | 20.62 | 23.02 | 2½-2½ | $3s^4P^o-3p^4P$ |
| 5139.31 | A | (1) | 20.61 | 23.02 | 1½-1½ | (16) |
| 5137.26 | A | (0) | 20.61 | 23.01 | ½- ½ | |
| 5151.08 | A | (3d?) | 20.62 | 23.02 | 2½-1½ | |
| 5143.49 | A | (2) | 20.61 | 23.01 | 1½- ½ | |
| 5133.29 | A | (2) | 20.61 | 23.02 | 1½-2½ | |
| 5132.96 | A | (3) | 20.61 | 23.02 | ½-1½ | |
| 5033.2 | B | 1d | 20.83 | 23.28 | 1½-2½ | $2p^3\ ^2P^o-3p^2D$ |
| 5037.0 | B | 0d | 20.83 | 23.28 | ½-1½ | (17) |
| 3871.82 | B | 2 | 20.83 | 24.02 | 1½- ½ | $2p^3\ ^2P^o-3p^2S$ |
| 3868.84 | B | 1 | 20.83 | 24.02 | ½- ½ | (18) |
| 6115.21 | A | 0 | 22.00 | 24.02 | 1½- ½ | $3s^2P^o-3p^2S$ (19) |
| *7119.45 | A | (2) | 22.44 | 24.17 | 3½-4½ | $3p^4D-3d^4F^o$ |
| 7115.13 | A | (2) | 22.44 | 24.17 | 2½-3½ | (20) |
| *7112.36 | A | (1) | (22.43 | 24.17 | 1½-2½ | |
| | | | 22.43 | 24.17 | ½-1½ | |
| 7133.52 | A | (0) | 22.44 | 24.17 | 3½-3½ | |
| 7125.49 | A | (0) | 22.44 | 24.17 | 2½-2½ | |
| *7119.45 | A | (2) | 22.43 | 24.17 | 1½-1½ | |
| 6750.22 | A | (2) | 22.44 | 24.27 | 3½-3½ | $3p^4D-3d^4D^o$ |
| 6738.36 | A | (1) | 22.44 | 24.27 | 2½-2½ | (21) |
| 6730.79 | A | (0) | 22.43 | 24.27 | 1½-1½ | |
| *8726.84 | A | (0) | 22.43 | 24.26 | ½- ½ | |
| 6754.75 | A | (0) | 22.44 | 24.27 | 3½-2½ | |
| 6742.05 | A | (0) | 22.44 | 24.27 | 2½-1½ | |
| *6733.56 | A | (0) | (22.43 | 24.26 | 1½- ½ | |
| | | | 22.44 | 24.27 | 2½-3½ | |
| *6728.84 | A | (0) | 22.43 | 24.27 | 1½-2½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| C II continued | | | | | | |
| 5856.09 | A | (2) | 22.44 | 24.55 | 3½-2½ | $3p^4D-3d^4P^o$ |
| 5836.31 | A | (1) | 22.44 | 24.55 | 2½-1½ | (22) |
| 5823.13 | A | (0) | 22.43 | 24.55 | 1½- ½ | |
| 5843.77 | A | (0) | 22.44 | 24.55 | 2½-2½ | |
| 5827.80 | A | (1) | 22.43 | 24.55 | 1½-1½ | |
| 5817.87 | A | (0) | 22.43 | 24.55 | ½- ½ | |
| 3589.67 | A | (4) | 22.44 | 25.88 | 3½-2½ | $3p^4D-4s^4P^o$ |
| *3590.87 | A | (2) | 22.44 | 25.87 | 2½-1½ | (23) |
| | | | 22.43 | 25.87 | 1½- ½ | |
| 3584.98 | A | (1) | 22.44 | 25.88 | 2½-2½ | |
| 3587.68 | A | (2) | 22.43 | 25.87 | 1½-1½ | |
| 3588.92 | A | (1) | 22.43 | 25.87 | ½- ½ | |
| 3581.80 | B | 0 | 22.43 | 25.88 | 1½-2½ | |
| 3585.83 | A | (2) | 22.43 | 25.87 | ½-1½ | |
| 8098.62 | A | 3 | 22.47 | 24.50 | 1½-2½ | $3p^3P-3d^3D^o$ |
| 6095.37 | A | 2 | 22.47 | 24.50 | ½-1½ | (24) |
| 6102.59 | A | 0 | 22.47 | 24.50 | 1½-1½ | |
| 4964.90 | A | 2 | 22.47 | 24.96 | 1½-1½ | $3p^3P-3d^3P^o$ |
| 4954.16 | B | 1 | 22.47 | 24.96 | ½- ½ | (25) |
| *4959.52 | B | 0d | 22.47 | 24.96 | 1½- ½ | |
| | | | 22.47 | 24.96 | ½-1½ | |
| 7063.4 | A | (1n) | 22.80 | 24.55 | 1½-2½ | $3p^4S-3d^4P^o$ |
| 7052.9 | A | (1n) | 22.80 | 24.55 | 1½-1½ | (26) |
| 7045.8 | A | (0n) | 22.80 | 24.55 | 1½- ½ | |
| 4009.90 | A | (2) | 22.80 | 25.88 | 1½-2½ | $3p^4S-4s^4P^o$ |
| 4017.27 | A | (1) | 22.80 | 25.87 | 1½-1½ | (27) |
| 4031.13 | A | (0) | 22.80 | 25.87 | 1½- ½ | |
| 4317.42 | B | 4 | 23.02 | 25.88 | 2½-2½ | $3p^4P-4s^4P^o$ |
| 4321.95 | B | 0 | 23.02 | 25.87 | 1½-1½ | (28) |
| *4325.88 | B | 2 | 23.02 | 25.87 | 2½-1½ | |
| | | | 23.02 | 25.87 | 1½- ½ | |
| 4313.50 | B | 2 | 23.02 | 25.88 | 1½-2½ | |
| 4318.92 | B | 2 | 23.01 | 25.87 | ½-1½ | |
| 3039.67 | B | 0d | 23.28 | 27.34 | — | $3p^2D-4d^2F^o$ (29) |
| 5257.36 | A | (2) | 24.17 | 26.52 | 4½-3½ | $3d^4F^o-4p^4D$ |
| | | | 24.17 | 26.52 | 3½-2½ | (30) |
| *5259.62 | A | (3) | 24.17 | 26.51 | 2½-1½ | |
| | | | 24.17 | 26.51 | 1½- ½ | |
| 5249.43 | A | (0) | 24.17 | 26.52 | 3½-3½ | |
| *5253.55§§ | A | (1) | 24.17 | 26.52 | 2½-2½ | |
| 3949.45 | C | 0 | 24.17 | 27.29 | 3½-3½ | $3d^4F^o-4f^2F$ |
| 3947.60 | C | 0 | 24.17 | 27.29 | 2½-2½ | (31) |
| *3946.35 | C | 0 | 24.17 | 27.29 | 2½-3½ | |
| 3952.08 | A | 2 | 24.17 | 27.30 | 4½-4½ | $3d^4F^o-4f^4F$ |
| 3948.15 | B | 1 | 24.17 | 27.30 | 3½-3½ | (32) |
| *3946.35 | C | 0 | 24.17 | 27.30 | — | |
| 3945.10 | C | 0 | 24.17 | 27.30 | 2½-3½ | |
| 3876.188 | A | 8 | 24.17 | 27.36 | 4½-5½ | $3d^4F^o-4f^4G$ |
| 3876.409 | A | 7 | 24.17 | 27.35 | 3½-4½ | (33) |
| 3876.670 | A | 6 | 24.17 | 27.35 | 2½-3½ | |
| 3876.051 | A | 6 | 24.17 | 27.35 | 1½-2½ | |
| 3880.59 | B | 1 | 24.17 | 27.35 | 4½-4½ | |
| 3879.60 | B | 1 | 24.17 | 27.35 | 3½-3½ | |
| 3878.22 | B | 1 | 24.17 | 27.35 | 2½-2½ | |
| 5478.6 | A | (0) | 24.27 | 26.52 | 3½-3½ | $3d^4D^o-4p^4D$ (34) |
| 5044.8 | B | 1 | 24.27 | 26.71 | 3½-2½ | $3d^4D^o-4p^4P$ |
| 5047.2 | B | 0 | 24.27 | 26.71 | 2½-1½ | (35) |
| 4078.00 | B | 7 | 24.27 | 27.30 | 3½-4½ | $3d^4D^o-4f^4F$ |
| 4074.53 | A | 6 | 24.27 | 27.30 | 2½-3½ | (36) |
| 4074.89 | A | 5 | 24.27 | 27.30 | — | |
| 3980.35 | A | 3 | 24.27 | 27.37 | 3½-3½ | $3d^4D^o-4f^4D$ |
| 3973.84 | B | 1d | 24.27 | 27.37 | 2½-2½ | (37) |
| 3989.38 | C | 0 | 24.27 | 27.37 | 1½-1½ | |
| 3978.87 | C | 00 | 24.27 | 27.37 | 3½-3½ | |
| 3973.44 | C | 0 | 24.27 | 27.37 | 1½-2½ | |
| 3968.63 | C | 00 | 24.26 | 27.37 | ½-1½ | |
| 3970.20 | C | 0 | 24.27 | 27.38 | 2½-1½ | $3d^4D^o-4f^2D$ |
| 3977.30 | C | 0 | 24.27 | 27.37 | 2½-2½ | (38) |
| 4411.52 | A | 5 | 24.50 | 27.29 | 2½-3½ | $3d^2D^o-4f^2F$ |
| 4411.20 | A | 5 | 24.50 | 27.29 | 1½-2½ | (39) |
| 4410.06 | C | 4 | 24.50 | 27.30 | 2½-3½ | $3d^2D^o-4f^4F$ (40) |
| 4292.00 | C | 1 | 24.50 | 27.37 | 2½-2½ | $3d^2D^o-4f^4D$ (41) |
| 4296.11 | B | 1 | 24.50 | 27.37 | 2½-2½ | $3d^2D^o-4f^2D$ |
| 4285.96 | B | 1 | 24.50 | 27.38 | 1½-1½ | (42) |
| 3049.44 | B | 1d | 24.50 | 28.54 | — | $3d^2D^o-5f^2F$ (43) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| C II continued | | | | | | |
| 5907.36 | A | (1) | 24.55 | 26.64 | 2½-1½ | $3d^4P^o-4p^4S$ |
| 5914.92 | A | (0) | 24.55 | 26.64 | 1½-1½ | (44) |
| 5919.60 | A | (0) | 24.55 | 26.64 | ½-1½ | |
| 4374.28 | A | 5 | 24.55 | 27.37 | 2½-3½ | $3d^4P^o-4f^4D$ |
| 4372.49 | A | 4 | 24.55 | 27.37 | 1½-2½ | (45) |
| 4371.59 | A | 3 | 24.55 | 27.37 | ½-1½ | |
| *4368.14§§ | B | 4d | 24.55 | 27.37 | — | |
| 4376.78 | C | 2d | 24.55 | 27.37 | 1½-2½ | $3d^4P^o-4f^2D$ (46) |
| 3059.24 | B | 0d | 24.55 | 28.58 | 2½-3½ | $3d^4P^o-5f^4D$ (47) |
| 4734.75 | B | 2d | 24.69 | 27.29 | 3½-3½ | $3d^2F^o-4f^2F$ |
| 4727.21 | B | 1d | 24.68 | 27.29 | 2½-2½ | (48) |
| 4630.52 | C | 1d | 24.69 | 27.36 | 3½-4½ | $3d^2F^o-4f^4G$ |
| 4625.71 | C | 1d | 24.68 | 27.35 | 2½-3½ | (49) |
| 4618.85 | A | 5d | 24.69 | 27.36 | — | $3d^2F^o-4f^2G$ (50) |
| 5119.55 | A | 2 | 24.96 | 27.37 | 1½-2½ | $3d^2P^o-4f^2D$ |
| 5114.07 | A | 2 | 24.96 | 27.38 | ½-1½ | (51) |

C III I P 47.67 Anal B List A Feb 1943

| | | | | | | |
|---|---|---|---|---|---|---|
| 4647.40 | A | 20 | 29.39 | 32.05 | 1-2 | $3^3S-3^3P^o$ |
| 4650.18 | A | 19 | 29.39 | 32.05 | 1-1 | (1) |
| 4651.35 | A | 18 | 29.39 | 32.05 | 1-0 | |
| 5696.0 | A | 8 | 31.97 | 34.13 | 1-2 | $3^1P^o-3^1D$ (2) |
| 6744.2 | P | | 38.05 | 39.88 | 2-3 | $3s^3P^o-3p^3D$ |
| 6730.7 | P | | 38.04 | 39.87 | 1-2 | (3) |
| 6727.1 | P | | 38.04 | 39.87 | 0-1 | |
| 5272.56 | B | 2 | 38.05 | 40.39 | 2-1 | $3s^3P^o-3p^3S$ |
| *5253.55§§ | A | 1 | 38.04 | 40.39 | 1-1 | (4) |
| 5244.5 | A | 0 | 38.04 | 40.39 | 0-1 | |
| 4665.90 | A | 6 | 38.05 | 40.69 | 2-2 | $3s^3P^o-3p^3P$ |
| 4673.91 | A | 4 | 38.05 | 40.69 | 2-1 | (5) |
| 4663.53 | A | 4 | 38.05 | 40.69 | 1-0 | |
| 3262.23 | A | 1 | 38.19 | 41.97 | 1-2 | $4^3S-3d^3P^o$ |
| 3259.44 | A | 0 | 38.19 | 41.98 | 1-1 | (6) |
| 3257.90 | A | 0 | 38.19 | 41.98 | 1-0 | |
| 4325.70 | A | 8 | 38.27 | 41.12 | 1-2 | $3s^1P^o-3p^1D$ (7) |
| 3170.16 | A | 1d | 38.48 | 42.37 | 0-1 | $4^1S-5^1P^o$ (8) |
| 4516.93 | A | 4 | 39.22 | 41.95 | 2-1 | $4^3P^o-5^3S$ |
| 4516.02 | A | 3 | 39.22 | 41.95 | 1,0-1 | (9) |
| 3609.61 | A | 5 | 39.22 | 42.64 | 2-3 | $4^3P^o-5^3D$ |
| 3608.96 | A | 4 | 39.22 | 42.64 | — | (10) |
| 4247.56 | A | 1 | 39.47 | 42.37 | 1-1 | $3p^1P-5^1P^o$ (11) |
| 3703.52 | A | 2 | 39.47 | 42.80 | 1-1 | $3p^1P-3d^1P^o$ (12) |
| 6156.6 | P | | 39.67 | 41.67 | 3-3 | $4^3D-3d^3D^o$ |
| 6155.4 | P | | 39.67 | 41.67 | 2-2 | (13) |
| 6154.4 | P | | 39.66 | 41.67 | 1-1 | |
| 4388.24 | A | 2 | 39.67 | 42.48 | 3-2 | $4^3D-5^3P^o$ |
| 4383.24 | A | 1 | 39.67 | 42.48 | 2-1,2 | (14) |
| 4379.97 | A | 0 | 39.66 | 42.48 | 1-0,1 | |
| 3889.18 | B | 4 | 39.67 | 42.84 | 3-4 | $4^3D-5^3P^o$ |
| 3885.99 | B | 3 | 39.67 | 42.84 | 2-3 | (15) |
| 3883.80 | A | 2 | 39.68 | 42.84 | 1-2 | |
| 4070.30 | B | 10 | 39.74 | 42.77 | 4-5 | $4^3F^o-5^3G$ |
| 4068.97 | B | 9 | 39.74 | 42.77 | 3-4 | (16) |
| 4067.87 | A | 9 | 39.74 | 42.77 | 2-3 | |
| 4122.05 | A | 3 | 39.80 | 42.79 | 1-2 | $4^1P^o-5^1D$ (17) |
| 4187.05 | A | 10 | 39.84 | 42.78 | 3-4 | $4^1F^o-5^1G$ (18) |
| 6871.7 | P | | 39.88 | 41.67 | 3-3 | $3p^3D-3d^3D^o$ |
| 6862.9 | P | | 39.87 | 41.67 | 2-2 | (19) |
| 6857.3 | P | | 39.87 | 41.67 | 1-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| C III continued | | | | | | |
| 5894.1 | P | | 39.88 | 41.97 | 3-2 | $3p^3D-3d^3P^o$ |
| 5871.6 | P | | 39.87 | 41.98 | 2-1 | (20) |
| 5857.9 | P | | 39.87 | 41.98 | 1-0 | |
| 4162.80 | A | 5 | 39.88 | 42.84 | 3-4 | $3p^3D-5^3F^o$ |
| 4156.50 | A | 4 | 39.87 | 42.84 | 2-3 | (21) |
| 4152.43 | A | 3 | 39.87 | 42.84 | 1-2 | |
| 5827.1 | A | 1 | 40.02 | 42.14 | 2-3 | $4^1D-3d^1F^o$ (22) |
| 5249.6 | A | 0 | 40.02 | 42.37 | 2-1 | $4^1D-5^1P^o$ (23) |
| 4056.06 | A | 5 | 40.02 | 43.07 | 2-3 | $4^1D-5^1F^o$ (24) |

Lines attributed to C III--Classification dubious

| | | | | | | |
|---|---|---|---|---|---|---|
| 4593.47 | A | 2d | | | | |
| *4368.14§§ | A | 4d | | | | |
| 4361.85 | A | 2 | | | | |
| 4001.56 | A | 0d | | | | |
| 3999.92 | A | 0d | | | | |

C IV I P 64.22 Anal A List A Feb 1943

| | | | | | | |
|---|---|---|---|---|---|---|
| 5801.51 | A | 4 | 37.39 | 39.51 | ½-1½ | $3^2S-3^2P^o$ |
| 5812.14 | A | 3 | 37.39 | 39.51 | ½- ½ | (1) |
| 3936 | P | | 54.98 | 58.12 | ½- | $5^2S-6^2P^o$ (2) |
| 5023 | P | | 55.41 | 57.87 | 1½- ½ | $5^2P^o-6^2S$ |
| 5021 | P | | 55.41 | 57.87 | ½- ½ | (3) |
| 4441.81 | A | 0d | 55.41 | 58.19 | — | $5^2P^o-6^2D$ (4) |
| 4789 | P | | 55.54 | 58.12 | — | $5^2D-6^2P^o$ (5) |
| 4647 | P | | 55.54 | 58.19 | — | $5^2D-6^2F^o$ (6) |
| 4665 | P | | 55.54 | 58.19 | — | $5^2F^o-6^2D$ (7) |
| 4658.64 | A | 5d | 55.54 | 58.20 | — | $5^2F^o-6^2G$ etc (8) |
| 4660 | P | | 55.55 | 58.19 | — | $5^2G-6^2F^o$ (9) |
| 6592 | P | | 57.87 | 59.74 | ½- | $6^2S-7^2P^o$ (10) |
| 4217 | P | | 57.87 | 60.80 | ½- | $6^2S-8^2P^o$ (11) |
| 4737 | P | | 58.19 | 60.80 | — | $6^2D-8^2P^o$ (12) |

N I I P 14.49 Anal B List B Feb 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 8680.24 | A | 10 | 10.29 | 11.71 | 2½-3½ | $3s^4P-3p^4D^o$ |
| 8683.38 | A | 8 | 10.29 | 11.71 | 1½-2½ | (1) |
| 8686.13 | A | 7 | 10.28 | 11.70 | ½-1½ | |
| 8718.82 | A | 6 | 10.29 | 11.71 | 2½-2½ | |
| 8711.69 | A | 7 | 10.29 | 11.70 | 1½-1½ | |
| 8703.24 | A | 6 | 10.28 | 11.70 | ½- ½ | |
| 8747.35 | A | 0 | 10.29 | 11.70 | 2½-1½ | |
| 8728.88 | A | 1 | 10.29 | 11.70 | 1½- ½ | |
| 8216.28 | A | 6 | 10.29 | 11.79 | 2½-2½ | $3s^4P-3p^4P^o$ |
| 8210.64 | A | 2 | 10.29 | 11.79 | 1½-1½ | (2) |
| 8200.31 | A | 1 | 10.28 | 11.79 | ½- ½ | |
| 8242.34 | A | 4 | 10.29 | 11.79 | 2½-1½ | |
| 8223.07 | A | 4 | 10.29 | 11.79 | 1½- ½ | |
| 8184.80 | A | 4 | 10.29 | 11.79 | 1½-2½ | |
| 8187.95 | A | 4 | 10.28 | 11.79 | ½-1½ | |
| 7468.29 | A | 10 | 10.29 | 11.94 | 2½-1½ | $3s^4P-3p^4S^o$ |
| 7442.28 | A | 8 | 10.29 | 11.94 | 1½-1½ | (3) |
| 7423.63 | A | 7 | 10.28 | 11.94 | ½-1½ | |
| 4253.28 | B | 4 | 10.29 | 13.19 | 2½-3½ | $3s^4P-4p^4D^o$ |
| *4254.7 | D | 4 | 10.29 | 13.19 | 1½-2½ | (4) |
| | | | 10.28 | 13.18 | ½-1½ | |
| 4223.04 | B | 5 | 10.29 | 13.21 | 2½-2½ | $3s^4P-4p^4P^o$ |
| 4230.35 | D | 4 | 10.29 | 13.21 | 2½-1½ | (5) |
| 4224.74 | B | 4 | 10.29 | 13.21 | 1½- ½ | |
| 4214.73 | B | 5 | 10.29 | 13.21 | 1½-2½ | |
| 4215.92 | B | 2 | 10.28 | 13.21 | ½-1½ | |
| 4151.46 | B | 12 | 10.29 | 13.26 | 2½-1½ | $3s^4P-4p^4S^o$ |
| 4143.42 | P | | 10.29 | 13.26 | 1½-1½ | (6) |
| 4137.63 | B | 7 | 10.28 | 13.26 | ½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| N I continued | | | | | | |
| 9392.80 | A | 1 | 10.64 | 11.96 | 1½-2½ | $3s^2P-3p^2P^o$ |
| 9386.79 | A | 0 | 10.63 | 11.95 | ½-1½ | (7) |
| 9460.66 | P | (25) | 10.64 | 11.95 | 1½-1½ | |
| 8629.24 | A | 8 | 10.64 | 12.07 | 1½-1½ | $3s^2P-3p^2P^o$ |
| 8594.01 | A | 6 | 10.63 | 12.07 | ½- ½ | (8) |
| 8655.88 | A | 3 | 10.64 | 12.07 | 1½- ½ | |
| 8567.74 | A | 4 | 10.63 | 12.07 | ½-1½ | |
| 4935.03 | B | 10 | 10.64 | 13.14 | 1½- ½ | $3s^2P-4p^2S^o$ |
| 4914.90 | B | 5 | 10.63 | 13.14 | ½- ½ | (9) |
| 4109.98 | B | 12 | 10.64 | 13.65 | 1½-2½ | $3s^2P-3p'\ ^2P^o$ |
| 4099.94 | B | 9 | 10.63 | 13.64 | ½-1½ | (10) |
| 4114.00 | B | 6 | 10.64 | 13.64 | 1½-1½ | |
| 3830.39 | B | 9 | 10.64 | 13.87 | 1½-1½ | $3s^2P-3p'\ ^2P^o$ |
| 3822.07 | B | 6 | 10.63 | 13.86 | ½- ½ | (11) |
| 3834.24 | B | 4 | 10.64 | 13.86 | 1½- ½ | |
| 3818.27 | B | 2 | 10.63 | 13.87 | ½-1½ | |
| 11564.8 | C | (50) | 10.88 | 11.94 | 2½-1½ | $sp^4\ ^4P-3p^4S^o$ |
| 11628.0 | C | (80) | 10.88 | 11.94 | 1½-1½ | (12) |
| 11656.0 | C | (200) | 10.88 | 11.94 | ½-1½ | |
| N I continued | | | | | | |
| 5328.70 | B | 5 | 10.88 | 13.19 | 2½-3½ | $sp^4\ ^4P-4p^4D^o$† |
| 5356.77 | B | 5 | 10.88 | 13.19 | 1½-2½ | (13) |
| 5372.66 | B | 3d | 10.88 | 13.18 | ½-1½ | |
| 5281.18 | B | 3 | 10.88 | 13.21 | 2½-2½ | $sp^4\ ^4P-4p^4P^o$† |
| | | | | | | (14) |
| 9060.6 | C | (350) | 11.55 | 12.91 | ½-1½ | $3p^2S^o-3d^2P$ |
| 9028.9 | C | (50) | 11.55 | 12.92 | ½- ½ | (15) |
| 6008.48 | B | 10 | 11.55 | 13.61 | ½-1½ | $3p^2S^o-4d^2P$ |
| 5999.47 | B | 6 | 11.55 | 13.61 | ½- ½ | (16) |
| 11294.0 | C | (125) | 11.71 | 12.81 | 3½-2½ | $3p^4D^o-4s^4P$ |
| 11313.8 | C | (30) | 11.71 | 12.80 | 2½-1½ | (17) |
| 11329.0 | C | (200) | 11.70 | 12.79 | 1½- ½ | |
| 11287.5 | C | (10) | 11.71 | 12.81 | 2½-2½ | |
| •10113.4 | C | (900) | (11.71 | 12.93 | 3½-4½? | $3p^4D^o-3d^4F$ |
| | | | (11.71 | 12.93 | 2½-3½? | (18) |
| | | | (11.70 | 12.92 | 1½-2½? | |
| | | | (11.70 | 12.92 | ½-1½? | |
| 10164.5 | C | (30) | 11.71 | 12.93 | 3½-3½? | |
| 10147.3 | C | (40) | 11.71 | 12.92 | 2½-2½? | |
| 9862.5 | C | (60) | 11.71 | 12.96 | 3½-3½ | $3p^4D^o-3d^4D$ |
| 9821.8 | C | (10) | 11.71 | 12.96 | 2½-2½ | (19) |
| N I continued | | | | | | |
| 6644.96 | B | 9 | 11.71 | 13.57 | 3½-2½ | $3p^4D^o-5s^4P$† |
| 6653.41 | B | 5 | 11.71 | 13.56 | 2½-1½ | (20) |
| 6656.61 | B | 1 | 11.70 | 13.56 | 1½- ½ | |
| 6628.53 | B | 3 | 11.71 | 13.57 | 2½-2½ | |
| 6637.01 | B | 4 | 11.70 | 13.56 | 1½-1½ | |
| 6646.52 | B | 2 | 11.70 | 13.56 | ½- ½ | |
| 6482.74 | B | 9 | 11.71 | 13.62 | 3½-4½ | $3p^4D^o-4d^4F$ |
| 6484.88 | B | 9 | 11.71 | 13.61 | 2½-3½ | (21) |
| 6483.75 | B | 3 | 11.70 | 13.61 | 1½-2½ | |
| 6481.73 | B | 2 | 11.70 | 13.60 | ½-1½ | |
| 6506.45 | B | 0 | 11.71 | 13.61 | 3½-3½ | |
| 6499.52 | B | 3 | 11.71 | 13.61 | 2½-2½ | |
| 6491.28 | B | 3 | 11.70 | 13.60 | 1½-1½ | |
| •6468.32 | B | 4 | (11.71 | 13.82 | 3½-3½ | $3p^4D^o-4d^4D$† |
| | | | 11.71 | 13.62 | 2½-2½ | (22) |
| 6457.93 | B | 3 | 11.70 | 13.61 | 1½-1½ | |
| 6441.70 | B | 5 | 11.71 | 13.63 | 3½-2½ | $3p^4D^o-4d^4P$† |
| 6437.01 | B | 4 | 11.70 | 13.62 | 1½- ½ | (23) |
| 6420.47 | B | 3 | 11.71 | 13.63 | 2½-2½ | |
| 5616.54 | B | 5 | 11.71 | 13.91 | 3½-2½ | $3p^4D^o-6s^4P$† |
| 5623.20 | B | 4 | 11.71 | 13.90 | 2½-1½ | (24) |
| 5625.43 | B | 2 | 11.70 | 13.90 | 1½- ½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **N I continued** | | | | | | |
| 5560.37 | B | 9 | 11.71 | 13.93 | 3½-4½ | $3p^4P^o-5d^4F$ |
| 5564.37 | B | 9 | 11.71 | 13.98 | 2½-3½ | (25) |
| 5545.11 | B | 3 | 11.71 | 13.94 | 3½-2½ | $3p^4D^o-5d^4P$ (26) |
| 12186.9 | C | (100) | 11.79 | 12.81 | 2½-2½ | $3p^4P^o-4s^4P$ |
| 12232.9 | C | (8) | 11.79 | 12.80 | 1½-1½ | (27) |
| 12288.0 | C | (75) | 11.79 | 12.80 | 2½-1½ | |
| 12188.6 | C | (20) | 11.79 | 12.81 | 1½-2½ | |
| 12203.4 | C | (75) | 11.79 | 12.80 | ½-1½ | |
| 10539.0 | C | (125) | 11.79 | 12.96 | 2½-3½ | $3p^4P^o-3d^4D$ |
| 10506.5 | C | (70) | 11.79 | 12.96 | 1½-2½ | (28) |
| 10548.0 | C | (60) | 11.79 | 12.96 | 2½-2½ | |
| 6945.22 | B | 4 | 11.79 | 13.57 | 2½-2½ | $3p^4P^o-5s^4P$ † |
| 6979.10 | B | 1 | 11.79 | 13.56 | 2½-1½ | (29) |
| 6936.90 | B | 1 | 11.79 | 13.57 | 1½-2½ | |
| 6752.40 | B | 4 | 11.79 | 13.62 | 2½-3½ | $3p^4P^o-4d^4D$ |
| 6758.60 | B | 4 | 11.79 | 13.62 | 1½-2½ | (30) |
| 6723.12 | B | 9 | 11.79 | 13.63 | 2½-2½ | $3p^4P^o-4d^4P$ |
| 6733.48 | B | 6 | 11.79 | 13.62 | ½- ½ | (31) |
| 6706.20 | B | 4 | 11.79 | 13.63 | 1½-2½ | |
| 6741.29 | B | 3 | 11.79 | 13.62 | 1½- ½ | |
| 5829.53 | B | 6 | 11.79 | 13.91 | 2½-2½ | $3p^4P^o-6s^4P$ † |
| 5841.01 | B | 3 | 11.79 | 13.90 | 1½-1½ | (32) |
| 5854.18 | B | 3 | 11.79 | 13.90 | 2½-1½ | |
| 5816.48 | B | 2 | 11.79 | 13.91 | 1½-2½ | |
| 5752.64 | B | 4 | 11.79 | 13.94 | 2½-2½ | $3p^4P^o-5d^4P$ (33) |
| 12186.9 | C | (100) | 11.94 | 12.96 | 1½-2½ | $3p^4s^o-3d^4P$ |
| 12288.0 | C | (75) | 11.94 | 12.95 | 1½-1½ | (34) |
| 12327.7 | C | (150) | 11.94 | 12.95 | 1½- ½ | |
| 5747.36 | B | 2 | 11.94 | 14.09 | 1½-2½ | $3p^4s^o-7s^4P$ (35) |
| 12467.8 | C | (350) | 11.96 | 12.95 | 2½-3½ | $3p^2D^o-3d^2F$ |
| 12461.2 | C | (200) | 11.95 | 12.94 | 1½-2½ | (36) |
| 12582.3 | C | (40) | 11.96 | 12.94 | 2½-2½ | |
| 12074.1 | C | (60) | 11.96 | 12.98 | 2½-2½ | $3p^2D^o-3d^2D$ |
| 11997.9 | C | (30) | 11.95 | 12.98 | 1½-1½ | (37) |
| 12107.4 | C | (10) | 11.96 | 12.98 | 2½-1½ | |
| **Strongest Unclassified Lines Attributed to N I** | | | | | | |
| 6708.81 | B | 4 | | | | |
| 4494.67 | B | 5 | | | | |
| 4492.40 | B | 7 | | | | |
| 4358.27 | B | 10 | | | | |
| 4336.48 | B | 5 | | | | |
| 4317.70 | B | 5 | | | | |
| 4313.11 | B | 4 | | | | |
| 4305.46 | B | 6 | | | | |
| 3999.98 | B | 4 | | | | |
| 3869.10 | B | 4 | | | | |
| 3650.19 | B | 5 | | | | |
| 3532.65 | B | 4 | | | | |

**N II I P 29.49 Anal B List A Oct 1943**

| | | | | | | |
|---|---|---|---|---|---|---|
| 4895.20 | C | 4 | 17.80 | 20.32 | 2-1 | $2p^3\ ^1p^o-3p^1P$ (1) |
| 6379.63 | C | 5 | 18.39 | 20.32 | 1-1 | $3s^3p^o-3p^1P$ |
| 6365.7 | C | 0 | 18.38 | 20.32 | 0-1 | (2) |
| 5879.56 | C | 10 | 18.40 | 20.58 | 2-3 | $3s^3p^o-3p^3D$ |
| 5666.64 | C | 8 | 18.39 | 20.58 | 1-2 | (3) |
| 5678.02 | C | 6 | 18.38 | 20.56 | 0-1 | |
| 5710.76 | C | 6 | 18.40 | 20.56 | 2-2 | |
| 5886.21 | C | 8 | 18.39 | 20.56 | 1-1 | |
| 5730.67 | C | 2 | 18.40 | 20.56 | 2-1 | |
| 5045.098 | C | 8 | 18.40 | 20.85 | 2-1 | $3s^3p^o-3p^3S$ |
| 5010.620 | C | 6 | 18.39 | 20.85 | 1-1 | (4) |
| 5002.692 | C | 2 | 18.38 | 20.85 | 0-1 | |
| 4630.537 | A | 10 | 18.40 | 21.07 | 2-2 | $3s^3p^o-3p^3P$ |
| 4613.868 | A | 6 | 18.39 | 21.06 | 1-1 | (5) |
| 4643.086 | A | 8 | 18.40 | 21.06 | 2-1 | |
| 4621.392 | A | 7 | 18.39 | 21.06 | 1-0 | |
| 4801.478 | A | 8 | 18.39 | 21.07 | 1-2 | |
| 4607.153 | A | 7 | 18.38 | 21.06 | 0-1 | |
| 3955.851 | A | 6 | 18.39 | 21.51 | 1-2 | $3s^3p^o-3p^1D$ (8) |
| 3408.138 | C | 3 | 18.39 | 22.01 | 1-0 | $3s^3p^o-3p^1s$ (7) |
| 6482.07 | C | 8 | 18.42 | 20.32 | 1-1 | $3s^1p^o-3p^1P$ (8) |
| 5747.29 | C | 4 | 18.42 | 20.56 | 1-2 | $3s^1p^o-3p^3D$ |
| 5787.43 | C | 3 | 18.42 | 20.58 | 1-1 | (9) |
| 5073.60 | C | 3 | 18.42 | 20.85 | 1-1 | $3s^1p^o-3p^3S$ (10) |
| 4854.57 | C | 2 | 18.42 | 21.07 | 1-2 | $3s^1p^o-3p^3P$ |
| 4867.28 | C | 2 | 18.42 | 21.08 | 1-1 | (11) |
| 4674.98 | C | 2 | 18.42 | 21.06 | 1-0 | |
| 3994.998 | A | 10 | 18.42 | 21.51 | 1-2 | $3s^1p^o-3p^1D$ (12) |
| 3437.162 | C | 6 | 18.42 | 22.01 | 1-0 | $3s^1p^o-3p^1s$ (13) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **N II continued** | | | | | | |
| 4564.78 | C | 1 | 20.32 | 23.02 | 1-2 | $3p^1P-3d^3F^o$ (14) |
| 4447.033 | A | 10 | 20.32 | 23.10 | 1-2 | $3p^1P-3d^1D^o$ (15) |
| 4375.00 | C | 0 | 20.32 | 23.14 | 1-2 | $3p^1P-3d^3D^o$ (16) |
| 3919.005 | A | 6 | 20.32 | 23.47 | 1-1 | $3p^1P-3d^1P^o$ (17) |
| 3006.86 | C | 7 | 20.32 | 24.43 | 1-1 | $3p^1P-4s^1P^o$ (18) |
| *5005.140 | C | 10 | 20.58 | 23.04 | 3-4 | $3p^3D-3d^3F^o$ |
| 5001.469 | C | 8 | 20.56 | 23.03 | 2-3 | (19) |
| 5001.128 | C | 7 | 20.56 | 23.02 | 1-2 | |
| 5025.665 | C | 6 | 20.58 | 23.03 | 3-3 | |
| 5016.387 | C | 5 | 20.56 | 23.02 | 2-2 | |
| 5040.76 | C | 0 | 20.58 | 23.02 | 3-2 | |
| 4803.272 | C | 8 | 20.58 | 23.15 | 3-3 | $3p^3D-3d^3D^o$ |
| 4788.126 | C | 5 | 20.56 | 23.14 | 2-2 | (20) |
| 4779.710 | C | 4 | 20.56 | 23.14 | 1-1 | |
| 4810.286 | C | 2 | 20.58 | 23.14 | 3-2 | |
| 4793.656 | C | 2 | 20.56 | 23.14 | 2-1 | |
| 4781.168 | C | 2 | 20.56 | 23.15 | 2-3 | |
| 4774.222 | C | 2 | 20.56 | 23.14 | 1-2 | |
| 4507.559 | A | 3 | 20.58 | 23.31 | 3-2 | $3p^3D-3d^3P^o$ |
| 4477.74 | C | 2 | 20.56 | 23.32 | 2-1 | (21) |
| 4459.96 | C | 1 | 20.56 | 23.32 | 1-0 | |
| 4488.15 | C | 0 | 20.56 | 23.31 | 2-2 | |
| 4465.54 | C | 0 | 20.56 | 23.32 | 1-1 | |
| 3328.79 | C | 4 | 20.58 | 24.28 | 3-2 | $3p^3D-4s^3P^o$ |
| 3331.32 | C | 3 | 20.56 | 24.27 | 2-1 | (22) |
| 3330.30 | C | 2 | 20.56 | 24.26 | 1-0 | |
| 3318.14 | C | 2 | 20.56 | 24.28 | 2-2 | |
| 3324.58 | C | 2 | 20.56 | 24.27 | 1-1 | |
| 5383.82 | C | 0 | 20.85 | 23.14 | 1-2 | $3p^3S-3d^3D^o$ (23) |
| 5007.316 | C | 7 | 20.85 | 23.31 | 1-2 | $3p^3S-3d^3P^o$ |
| *4994.358 | C | 6 | 20.85 | 23.32 | 1-1 | (24) |
| 4987.377 | C | 4 | 20.85 | 23.32 | 1-0 | |
| 4709.45 | C | 1 | 20.85 | 23.47 | 1-1 | $3p^3S-3d^1P^o$ (25) |
| 3593.60 | C | 3 | 20.85 | 24.28 | 1-2 | $3p^3S-4s^3P^o$ |
| 3609.09 | C | 2 | 20.85 | 24.27 | 1-1 | (26) |
| 3615.88 | C | 1 | 20.85 | 24.26 | 1-0 | |
| 6065.5 | C | 0 | 21.06 | 23.10 | 1-2 | $3p^3P-3d^1D^o$ (27) |
| 5941.67 | C | 8 | 21.07 | 23.15 | 2-3 | $3p^3P-3d^3D^o$ |
| 5931.79 | C | 7 | 21.08 | 23.14 | 1-2 | (28) |
| 5927.82 | C | 4 | 21.06 | 23.14 | 0-1 | |
| 5952.39 | C | 3 | 21.07 | 23.14 | 2-2 | |
| 5940.25 | C | 2 | 21.06 | 23.14 | 1-1 | |
| 5960.93 | C | 0 | 21.07 | 23.14 | 2-1 | |
| 5495.70 | C | 5 | 21.07 | 23.31 | 2-2 | $3p^3P-3d^3P^o$ |
| 5462.62 | C | 3 | 21.06 | 23.32 | 1-1 | (29) |
| 5480.10 | C | 3 | 21.07 | 23.32 | 2-1 | |
| 5454.26 | C | 2 | 21.06 | 23.32 | 1-0 | |
| 5478.13 | C | 2 | 21.06 | 23.31 | 1-2 | |
| 5452.12 | C | 2 | 21.06 | 23.32 | 0-1 | |
| 3838.39 | C | 5 | 21.07 | 24.28 | 2-2 | $3p^3P-4s^3P^o$ |
| 3847.38 | C | 3 | 21.08 | 24.27 | 1-1 | (30) |
| 3856.07 | C | 3 | 21.07 | 24.27 | 2-1 | |
| 3855.08 | C | 2 | 21.06 | 24.26 | 1-0 | |
| 3829.80 | C | 3 | 21.06 | 24.28 | 1-2 | |
| 3842.20 | C | 3 | 21.06 | 24.27 | 0-1 | |
| 6610.58 | C | 6 | 21.51 | 23.37 | 2-3 | $3p^1D-3d^1F^o$ (31) |
| 6284.30 | C | 3 | 21.51 | 23.47 | 2-1 | $3p^1D-3d^1P^o$ (32) |
| 4227.749 | A | 3n | 21.51 | 24.43 | 2-1 | $3p^1D-4s^1P^o$ (33) |
| 5104.45 | C | 2 | 22.01 | 24.43 | 0-1 | $3p^1S-4s^1P^o$ (34) |
| 3023.80 | C | 2 | 22.01 | 26.09 | 0-1 | $3p^1S-4d^1P^o$ (35) |
| *6167.82 | C | 4 | 23.04 | 25.04 | 4-3 | $3d^3F^o-4p^3D$ |
| 6173.40 | C | 3 | 23.03 | 25.03 | 3-2 | (36) |
| 6170.16 | C | 1 | 23.02 | 25.03 | 2-1 | |
| 6136.9 | C | 0 | 23.03 | 25.04 | 3-3 | |
| 6150.9 | C | 0 | 23.02 | 25.03 | 2-2 | |
| 6114.8 | C | 0 | 23.02 | 25.03 | 2-3 | |
| 4087.35 | C | 0n | 23.03 | 26.05 | 3-3 | $3d^3F^o-4f^1F$ (37) |
| 4095.92 | P | | 23.04 | 26.06 | 4-4 | $3d^3F^o-4f^3F$ |
| 4082.85 | C | 00 | 23.03 | 26.05 | 3-3 | (38) |
| 4076.83 | C | 0n | 23.02 | 26.05 | 2-2 | |
| 4082.280 | A | 2n | 23.03 | 26.06 | 3-4 | |
| 4073.055 | A | 2n | 23.02 | 26.05 | 2-3 | |
| 4041.321 | A | 5n | 23.04 | 26.10 | 4-5 | $3d^3F^o-4f^3G$ |
| 4043.537 | A | 3n | 23.03 | 26.08 | 3-4 | (39) |
| 4035.087 | A | 4n | 23.02 | 26.08 | 2-3 | |
| 4057.00 | C | 1 | 23.04 | 26.08 | 4-4 | |
| 4044.75 | C | 1 | 23.03 | 26.08 | 3-3 | |
| 4026.080 | A | 3n | 23.03 | 26.10 | 3-4 | $3d^3F^o-4f^1G$ (40) |
| 6630.5 | C | 2 | 23.10 | 24.96 | 2-1 | $3d^1D^o-4p^1P$ (41) |
| 4176.164 | A | 3n | 23.10 | 26.05 | 2-3 | $3d^1D^o-4f^1F$ (42) |
| 4171.608 | A | 2n | 23.10 | 26.05 | 2-3 | $3d^1D^o-4f^3F$ (43) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **N II continued** | | | | | | |
| 4110.00 | C | 0n | 23.10 | 26.10 | 2-2 | $3d^1D^o-4f^3D$ (44) |
| 6504.9 | C | 2 | 23.15 | 25.04 | 3-3 | $3d^3D^o-4p^3D$ |
| 6533.0 | C | 1 | 23.14 | 25.03 | 2-2 | (45) |
| *6545.2 | C | 0 | 23.14 | 25.03 | 1-1 | |
| 6492.0 | C | 0 | (23.15 | 25.03 | 3-2 | |
| 6522.3 | C | 0 | 23.14 | 25.04 | 2-3 | |
| 6340.67 | C | 4 | 23.14 | 25.03 | 1-2 | |
| *6357.0 | C | 3 | 23.15 | 25.09 | 3-2 | $3d^3D^o-4p^3P$ |
| 6328.6 | C | 1 | (23.14 | 25.08 | 2-1 | (46) |
| 6347.1 | C | 1 | (23.14 | 25.08 | 1-0 | |
| *4241.787 | A | 8n | 23.14 | 25.09 | 2-2 | |
| *4241.787 | A | 8n | 23.14 | 25.08 | 1-1 | |
| 4237.049 | A | 4 | 23.14 | 26.05 | 2-3 | $3d^3D^o-4f^1F$ (47) |
| 4236.930 | A | 5 | 23.14 | 26.06 | 3-4 | $3d^3D^o-4f^3F$ |
| 4181.17 | C | 0n | 23.14 | 26.05 | 1-2 | (48) |
| 4179.667 | A | 1n | 23.15 | 26.10 | 3-4 | $3d^3D^o-4f^1G$ (49) |
| 4173.51 | C | 0n | 23.15 | 26.10 | 3-3 | $3d^3D^o-4f^3D$ |
| *4156.8 | C | 0nn | 23.14 | 26.10 | 2-2 | (50) |
| *4160.8 | C | 0nn | 23.14 | 26.11 | 1-1 | |
| 4173.75 | C | 0n | 23.14 | 26.11 | 2-1 | |
| *4160.8 | C | 0nn | 23.14 | 26.10 | 2-3 | |
| *4156.8 | C | 0nn | 23.14 | 26.11 | 2-2 | $3d^3D^o-4f^1D$ |
| 7139.8 | B | 3 | 23.14 | 26.11 | 1-2 | (51) |
| 7217.0 | B | 2 | 23.31 | 25.04 | 2-3 | $3d^3p^o-4p^3D$ |
| 7259.3 | B | 2 | 23.32 | 25.03 | 1-2 | (52) |
| 7188.7 | B | 0 | 23.32 | 25.03 | 0-1 | |
| 6942.9 | B | 3 | 23.31 | 25.09 | 2-2 | $3d^3p^o-4p^3P$ |
| 7003.0 | B | 0n | 23.31 | 25.04 | 2-2 | (53) |
| 6976.8 | B | 2 | 23.32 | 25.08 | 1-1 | |
| *7015.3 | B | 1 | 23.31 | 25.08 | 2-1 | |
| 6967.6 | B | 1 | 23.32 | 25.08 | 1-0 | |
| *7015.3 | B | 1 | 23.32 | 25.09 | 1-2 | |
| 6812.26 | C | 2 | 23.32 | 25.08 | 0-1 | |
| 6836.2 | C | 1 | 23.31 | 25.13 | 2-1 | $3d^3p^o-4p^3S$ |
| 4432.739 | A | 6n | 23.32 | 25.13 | 1-1 | (54) |
| 4441.99 | C | 3n | 23.31 | 26.10 | 2-3 | |
| 4433.48 | C | 2n | 23.32 | 26.10 | 1-2 | $3d^3p^o-4f^3D$ |
| 4431.82 | C | 0 | 23.32 | 26.11 | 0-1 | (55) |
| 4427.97 | C | 2 | 23.31 | 26.10 | 2-2 | |
| 4427.21 | C | 2 | 23.33 | 26.11 | 1-1 | |
| 6242.52 | C | 5 | 23.32 | 26.11 | 1-2 | $3d^3p^o-4f^1D$ (56) |
| 4552.536 | A | 4 | 23.37 | 25.35 | 3-2 | $3d^1F^o-4p^1D$ (57) |
| 4530.403 | A | 5 | 23.37 | 26.08 | 3-4 | $3d^1F^o-4f^3G$ (58) |
| *6167.82 | C | 4 | 23.37 | 26.10 | 3-4 | $3d^1F^o-4f^1G$ (59) |
| 4694.55 | C | 3n | 23.47 | 25.47 | 1-0 | $3d^1P^o-4p^1S$ (60) |
| 4677.93 | C | 3n | 23.47 | 26.10 | 1-2 | $3d^1P^o-4f^3D$ (61) |
| | | | 23.47 | 26.11 | 1-2 | $3d^1P^o-4f^1D$ (62) |
| *5535.39 | C | 5 | (25.38 | 27.61) | 3-4 | $3s^5P-3p^5D^o$ |
| 5530.27 | C | 4 | (25.37 | 27.61) | 2-3 | (63) |
| 5526.26 | C | 2 | (25.37 | 27.60) | 1-2 | |
| 5551.95 | C | 3 | (25.38 | 27.61) | 3-3 | |
| 5543.49 | C | 3 | (25.37 | 27.60) | 2-2 | |
| *5535.39 | C | 5 | (25.37 | 27.60) | 1-1 | |
| 5565.30 | C | 0 | (25.37 | 27.60) | 3-2 | |
| 5552.54 | B | 00 | (25.37 | 27.60) | 2-1 | |
| 5540.16 | C | 1 | (25.37 | 27.59) | 1-0 | |
| 5012.026 | C | 2 | (25.38 | 27.84) | 3-3 | $3s^5P-3p^5P^o$ |
| *5005.140 | C | 10 | (25.37 | 27.84) | 2-2 | (64) |
| 4997.23 | C | 0 | (25.37 | 27.84) | 1-1 | |
| 5023.11 | C | 2 | (25.38 | 27.84) | 3-2 | |
| 5011.24 | B | 1 | (25.37 | 27.84) | 2-1 | |
| *4994.358 | C | 6 | (25.37 | 27.84) | 2-3 | |
| 4991.22 | C | 2 | (25.37 | 27.84) | 1-2 | |
| 4145.764 | A | 3 | (25.38 | 28.36) | 3-2 | $3s^5P-3p^5S^o$ |
| 4133.669 | A | 2 | (25.37 | 28.36) | 2-2 | (65) |
| 4124.081 | A | 1 | (25.37 | 28.36) | 1-2 | |
| *5179.50 | C | 5 | (27.61 | 29.99) | 4-5 | $3p^5p^o-3d^5F$ |
| 5175.89 | C | 3 | (27.61 | 29.99) | 3-4 | (66) |
| 5173.37 | C | 2 | (27.60 | 29.99) | 2-3 | |
| *5172.32 | C | 1 | (27.60 | 29.98) | 1-2 | |
| 5190.42 | C | 2 | (27.59 | 29.98) | 0-1 | |
| 5184.97 | C | 2 | (27.61 | 29.99) | 4-4 | |
| 5180.34 | B | 1 | (27.61 | 29.99) | 3-3 | |
| 5199.50 | B | 00 | (27.60 | 29.98) | 2-2 | |
| 4860.35 | C | 2 | (27.61 | 29.99) | 4-3 | |
| 4718.43 | C | 2 | (27.61 | 30.15) | 4-3 | $3p^5p^o-3d^5p$ (67) |
| 4709.45 | C | 1 | (27.61 | 30.23) | 4-4 | $3p^5p^o-3d^5D$ |
| 4702.57 | C | 0 | (27.61 | 30.23) | 3-3 | (68) |
| 4731.59 | C | 0 | (27.60 | 30.22) | 2-2 | |
| 4712.13 | C | 0 | (27.60 | 30.23) | 4-3 | |
| 4704.33 | C | 0 | (27.61 | 30.22) | 3-2 | |
| 4698.62 | B | 0 | (27.60 | 30.22) | 2-1 | |
| 4706.41 | C | 0 | (27.60 | 30.22) | 1-0 | |
| 4700.12 | C | 0 | (27.61 | 30.23) | 3-4 | |
| 4695.91 | C | 1 | (27.60 | 30.23) | 2-3 | |
| | | | (27.60 | 30.22) | 1-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| N II continued | | | | | | |
| 5351.21 | B | 4 | (27.84 | 30.15) | 3-3 | $3p^5P^o-3d^5P$ |
| 5327.45 | B | 0 | (27.84 | 30.16) | 2-2 | (69) |
| 5313.43 | B | 0 | (27.84 | 30.16) | 1-1 | |
| 5340.30 | B | 1 | (27.84 | 30.16) | 3-2 | |
| *5320.96 | B | 3 | (27.84 | 30.16) | 2-1 | |
| 5338.66 | B | 2 | (27.84 | 30.15) | 2-3 | |
| *5320.96 | B | 3 | (27.84 | 30.16) | 1-2 | |
| *5179.50 | C | 5 | (27.84 | 30.23) | 3-4 | $3p^5P^o-3d^5D$ |
| 5171.46 | C | 1 | (27.84 | 30.23) | 2-3 | (70) |
| 5168.24 | C | 1 | (27.84 | 30.22) | 1-2 | |
| 5183.21 | C | 2 | (27.84 | 30.23) | 3-3 | |
| 5174.46 | C | 1 | (27.84 | 30.22) | 2-2 | |
| 5170.08 | C | 1 | (27.84 | 30.22) | 1-1 | |
| 5186.17 | B | 0 | (27.84 | 30.22) | 3-2 | |
| 6888.7 | B | 2 | (28.36 | 30.15) | 2-3 | $3p^5S^o-3d^5P$ |
| 6870.8 | B | 1 | (28.36 | 30.16) | 2-2 | (71) |
| 6857.6 | B | 1 | (28.36 | 30.16) | 2-1 | |

| N III I P 47.24 | Anal A | List A | Apr 1943 | | |
|---|---|---|---|---|---|
| 4097.31 | A | 10 | 27.32 | 30.33 | $\frac{1}{2}$-1$\frac{1}{2}$ | $3^2S-3^2P^o$ |
| 4103.37 | A | 9 | 27.32 | 30.33 | $\frac{1}{2}$- $\frac{1}{2}$ | (1) |
| 4640.64 | A | (10) | 30.33 | 32.99 | 1$\frac{1}{2}$-2$\frac{1}{2}$ | $3^2P^o-3^2D$ |
| 4634.16 | A | (9) | 30.33 | 32.99 | $\frac{1}{2}$-1$\frac{1}{2}$ | (2) |
| 4641.90 | A | (7) | 30.33 | 32.99 | 1$\frac{1}{2}$-1$\frac{1}{2}$ | |
| 4514.89 | A | 7 | 35.52 | 38.25 | 2$\frac{1}{2}$-3$\frac{1}{2}$ | $3s^4P^o-3p^4D$ |
| *4510.92 | A | 6 | (35.50 | 38.24 | 1$\frac{1}{2}$-2$\frac{1}{2}$ | (3) |
| 4534.57 | A | 3 | 35.52 | 38.24 | 2$\frac{1}{2}$-2$\frac{1}{2}$ | |
| 4523.60 | A | 4 | 35.50 | 38.23 | 1$\frac{1}{2}$-1$\frac{1}{2}$ | |
| 4518.18 | A | 3 | 35.50 | 38.23 | $\frac{1}{2}$- $\frac{1}{2}$ | |
| 4547.34 | A | 0 | 35.52 | 38.23 | 2$\frac{1}{2}$-1$\frac{1}{2}$ | |
| 4530.84 | A | 1 | 35.50 | 38.23 | 1$\frac{1}{2}$- $\frac{1}{2}$ | |
| 3771.08 | A | 7 | 35.52 | 38.79 | 2$\frac{1}{2}$-1$\frac{1}{2}$ | $3s^4P^o-3p^4S$ |
| 3754.62 | A | 6 | 35.50 | 38.79 | 1$\frac{1}{2}$-1$\frac{1}{2}$ | (4) |
| 3745.83 | A | 4 | 35.50 | 38.79 | $\frac{1}{2}$-1$\frac{1}{2}$ | |
| 3367.36 | A | 7 | 35.52 | 39.18 | 2$\frac{1}{2}$-2$\frac{1}{2}$ | $3s^4P^o-3p^4P$ |
| 3361.90 | A | 2 | 35.50 | 39.18 | 1$\frac{1}{2}$-1$\frac{1}{2}$ | (5) |
| 3358.72 | A | 1 | 35.50 | 39.17 | $\frac{1}{2}$- $\frac{1}{2}$ | |
| 3374.06 | A | 6 | 35.52 | 39.18 | 2$\frac{1}{2}$-1$\frac{1}{2}$ | |
| 3365.79 | A | 3 | 35.50 | 39.17 | 1$\frac{1}{2}$- $\frac{1}{2}$ | |
| 3354.29 | A | 4 | 35.50 | 39.18 | 1$\frac{1}{2}$-2$\frac{1}{2}$ | |
| 3353.78 | A | 4 | 35.50 | 39.18 | $\frac{1}{2}$-1$\frac{1}{2}$ | |
| 4200.02 | A | 6 | 36.70 | 39.64 | 1$\frac{1}{2}$-2$\frac{1}{2}$ | $3s^2P^o-3p^2D$ |
| 4195.70 | A | 5 | 36.68 | 39.62 | $\frac{1}{2}$-1$\frac{1}{2}$ | (6) |
| 4215.69 | B | (3) | 36.70 | 39.62 | 1$\frac{1}{2}$-1$\frac{1}{2}$ | |
| 3355.47 | B | (2) | 36.70 | 40.38 | 1$\frac{1}{2}$- $\frac{1}{2}$ | $3s^2P^o-3p^2S$ |
| 3342.77 | B | (1) | 36.68 | 40.38 | $\frac{1}{2}$- $\frac{1}{2}$ | (7) |
| 3938.52 | A | 4 | 38.17 | 41.30 | 1$\frac{1}{2}$-2$\frac{1}{2}$ | $3p^2P-3d^2D^o$ |
| 3934.41 | A | 3 | 38.16 | 41.30 | $\frac{1}{2}$-1$\frac{1}{2}$ | (8) |
| 3942.78 | B | (1) | 38.17 | 41.30 | 1$\frac{1}{2}$-1$\frac{1}{2}$ | |
| *4867.18 | A | 5 | 38.25 | 40.79 | 3$\frac{1}{2}$-4$\frac{1}{2}$ | $3p^4D-3d^4F^o$ |
| 4861.33 | A | 4 | 38.24 | 40.78 | 2$\frac{1}{2}$-3$\frac{1}{2}$ | (9) |
| 4858.88 | A | 3 | 38.23 | 40.77 | 1$\frac{1}{2}$-2$\frac{1}{2}$ | |
| 4858.74 | A | 2 | 38.23 | 40.77 | $\frac{1}{2}$-1$\frac{1}{2}$ | |
| 4884.14 | A | 1 | 38.25 | 40.78 | 3$\frac{1}{2}$-3$\frac{1}{2}$ | |
| 4873.58 | A | 2 | 38.24 | 40.77 | 2$\frac{1}{2}$-3$\frac{1}{2}$ | |
| *4867.18 | A | 5 | 38.23 | 40.77 | 1$\frac{1}{2}$-1$\frac{1}{2}$ | |
| 4896.71 | A | 0 | 38.25 | 40.77 | 3$\frac{1}{2}$-2$\frac{1}{2}$ | |
| 4881.81 | A | 0 | 38.24 | 40.77 | 2$\frac{1}{2}$-1$\frac{1}{2}$ | |
| 4348.36 | A | 5 | 38.25 | 41.09 | 3$\frac{1}{2}$-3$\frac{1}{2}$ | $3p^4D-3d^4D^o$ |
| 4335.53 | A | 4 | 38.24 | 41.09 | 2$\frac{1}{2}$-2$\frac{1}{2}$ | (10) |
| 4328.15 | A | 3 | 38.23 | 41.09 | 1$\frac{1}{2}$-1$\frac{1}{2}$ | |
| *4323.93 | A | 2 | 38.23 | 41.08 | $\frac{1}{2}$- $\frac{1}{2}$ | |
| 4353.66 | A | 2 | 38.25 | 41.09 | 3$\frac{1}{2}$-2$\frac{1}{2}$ | |
| 4339.52 | A | 3 | 38.24 | 41.09 | 2$\frac{1}{2}$-1$\frac{1}{2}$ | |
| 4330.44 | A | 2 | 38.23 | 41.08 | 1$\frac{1}{2}$- $\frac{1}{2}$ | |
| 4330.14 | A | 2 | 38.24 | 41.09 | 2$\frac{1}{2}$-3$\frac{1}{2}$ | |
| *4323.93 | A | 2 | 38.23 | 41.09 | 1$\frac{1}{2}$-2$\frac{1}{2}$ | |
| 4321.37 | A | 1 | 38.23 | 41.09 | $\frac{1}{2}$-1$\frac{1}{2}$ | |
| 3792.87 | A | 1 | 38.25 | 41.51 | 3$\frac{1}{2}$-3$\frac{1}{2}$ | $3p^4D-3d^4P^o$ |
| 3771.45 | P | | 38.24 | 41.51 | 2$\frac{1}{2}$-1$\frac{1}{2}$ | (11) |
| 3757.66 | P | | 38.23 | 41.52 | 1$\frac{1}{2}$- $\frac{1}{2}$ | |
| 3779.23 | P | | 38.24 | 41.51 | 2$\frac{1}{2}$-2$\frac{1}{2}$ | |
| 3762.62 | P | | 38.23 | 41.51 | 1$\frac{1}{2}$-1$\frac{1}{2}$ | |
| 3752.65 | P | | 38.23 | 41.52 | $\frac{1}{2}$- $\frac{1}{2}$ | |
| 3770.37 | P | | 38.23 | 41.51 | 1$\frac{1}{2}$-2$\frac{1}{2}$ | |
| 3757.60 | P | | 38.23 | 41.51 | $\frac{1}{2}$-1$\frac{1}{2}$ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| N III continued | | | | | | |
| 4544.80 | B | (0) | 38.48 | 41.20 | 1$\frac{1}{2}$- $\frac{1}{2}$ | $4^2P^o-5^2S$ |
| | | | | | | (12) |
| 4546.36 | A | 3 | 38.79 | 41.51 | 1$\frac{1}{2}$-2$\frac{1}{2}$ | $3p^4S-3d^4P^o$ |
| 4535.11 | A | 2 | 38.79 | 41.51 | 1$\frac{1}{2}$-1$\frac{1}{2}$ | (13) |
| 4527.88 | A | 0 | 38.79 | 41.52 | 1$\frac{1}{2}$- $\frac{1}{2}$ | |
| 6466.86 | A | 4 | 39.18 | 41.09 | 2$\frac{1}{2}$-3$\frac{1}{2}$ | $3p^4P-3d^4D^o$ |
| 6453.95 | A | 3 | 39.18 | 41.09 | 1$\frac{1}{2}$-2$\frac{1}{2}$ | (14) |
| 6445.05 | A | 2 | 39.17 | 41.09 | $\frac{1}{2}$-1$\frac{1}{2}$ | |
| 6478.69 | A | 2 | 39.18 | 41.09 | 2$\frac{1}{2}$-2$\frac{1}{2}$ | |
| 6463.03 | A | 2 | 39.18 | 41.09 | 1$\frac{1}{2}$-1$\frac{1}{2}$ | |
| 6450.78 | A | 2 | 39.17 | 41.08 | $\frac{1}{2}$- $\frac{1}{2}$ | |
| 6487.55 | A | 0 | 39.18 | 41.09 | 2$\frac{1}{2}$-1$\frac{1}{2}$ | |
| 6468.77 | A | 00 | 39.18 | 41.08 | 1$\frac{1}{2}$- $\frac{1}{2}$ | |
| 5314.45 | A | 2 | 39.18 | 41.51 | 2$\frac{1}{2}$-2$\frac{1}{2}$ | $3p^4P-3d^4P^o$ |
| 5282.52 | A | 00 | 39.18 | 41.51 | 1$\frac{1}{2}$-1$\frac{1}{2}$ | (15) |
| 5260.91 | A | 1n | 39.17 | 41.52 | $\frac{1}{2}$- $\frac{1}{2}$ | |
| 5298.93 | A | 1 | 39.18 | 41.51 | 2$\frac{1}{2}$-1$\frac{1}{2}$ | |
| 5272.60 | A | 1 | 39.18 | 41.52 | 1$\frac{1}{2}$- $\frac{1}{2}$ | |
| 5297.86 | A | 1 | 39.18 | 41.51 | 1$\frac{1}{2}$-2$\frac{1}{2}$ | |
| 5270.59 | A | 1 | 39.17 | 41.51 | $\frac{1}{2}$-1$\frac{1}{2}$ | |
| 4003.64 | A | (4d) | 39.23 | 42.31 | 2$\frac{1}{2}$-3$\frac{1}{2}$ | $4^2D-5^2F^o$ |
| 3998.69 | A | (3d) | 39.23 | 42.31 | 1$\frac{1}{2}$-2$\frac{1}{2}$ | (16) |
| 4379.09 | A | (10d) | 39.54 | 42.38 | — | $4^2F^o-5^2G$ |
| | | | | | | (17) |

Unclassified Lines of N III

| | | |
|---|---|---|
| 4294.76 | A | 0n |
| 4290.80 | A | 3n |
| 4290.55 | A | 1n |
| 4288.72 | A | 1n |
| 4288.21 | A | 0n |
| 4284.51 | A | 1n |
| 3172.97 | A | 2 |
| 3171.14 | A | 1 |

| N IV I P 77.09 | Anal B | List A | Feb 1943 | | |
|---|---|---|---|---|---|
| 3478.89 | A | 7 | (46.57 | 50.11) | 1-2 | $3^3S-3^3P^o$ |
| 3482.98 | A | 5 | (46.57 | 50.11) | 1-1 | (1) |
| 3484.90 | A | 3 | (46.57 | 50.11) | 1-0 | |
| 6383 | P | | 48.00 | 49.94 | 0-1 | $3^1S-3^1P^o$ |
| | | | | | | (2) |
| 4057.80 | B | 2 | 49.98 | 52.98 | 1-2 | $3^1P^o-3^1D$ |
| | | | | | | (3) |
| 7123.10 | A | 5 | (50.11 | 51.85) | 2-3 | $3^3P^o-3^3D$ |
| 7109.48 | A | 3 | (50.11 | 51.85) | 1-2 | (4) |
| 7103.28 | A | 1 | (50.11 | 51.85) | 0-1 | |
| 7127.31 | A | 1 | (50.11 | 51.85) | 2-2 | |
| 7111.28 | A | 1 | (50.11 | 51.85) | 1-1 | |
| 7129 | P | | (50.11 | 51.85) | 2-1 | |
| 5245 | P | | (57.48 | 59.81) | 2-3 | $3s^3P^o-3p^3D$ |
| 5236 | P | | (57.44 | 59.80) | 1-2 | (5) |
| 5281 | P | | (57.46 | 59.80) | 2-2 | |
| 4528 | P | | (57.46 | 60.19) | 2-1 | $3s^3P^o-3p^3S$ |
| 4495 | P | | (57.44 | 60.19) | 1-1 | (8) |
| 4479 | P | | (57.43 | 60.19) | 0-1 | |
| 3463.38 | B | 1 | (57.46 | 61.03) | 2-2 | $3s^3P^o-3p^3P$ |
| 3454 | P | | (57.44 | 61.01) | 1-1 | (7) |
| 3474.56 | B | 0 | (57.46 | 61.01) | 2-1 | |
| 3461.34 | B | 0 | (57.44 | 61.01) | 1-0 | |
| 3443 | P | | (57.44 | 61.03) | 1-2 | |
| 3445 | P | | (57.43 | 61.01) | 0-1 | |
| 3747.86 | B | 0 | 58.44 | 61.69 | 1-2 | $3s^1P^o-3p^1D$ |
| | | | | | | (8) |
| 5734 | P | | 59.36 | 61.52 | 1-2 | $3p^1P-3d^1D^o$ |
| | | | | | | (9) |
| 3824 | P | | 59.36 | 62.59 | 1-1 | $3p^1P-4^1P^o$ |
| | | | | | | (10) |
| 4752 | P | | (59.81 | 62.41) | 3-3 | $3p^3D-3d^3D^o$ |
| 4733 | P | | (59.80 | 62.41) | 2-2 | (11) |
| 4762 | P | | (59.81 | 62.41) | 3-2 | |
| 4740 | P | | (59.80 | 62.40) | 2-1 | |
| 4723 | P | | (59.80 | 62.41) | 2-3 | |
| 3714 | P | | (59.81 | 63.14) | 3-2 | $3p^3D-3d^3P^o$ |
| 3689 | P | | (59.80 | 63.14) | 2-1 | (12) |
| 3896 | P | | (59.80 | 83.14) | 2-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| N IV continued | | | | | | |
| 5561 | P | | (60.19 | 62.41) | 1-2 | $3p^3S-3d^3P^o$ |
| 5571 | P | | (60.19 | 62.40) | 1-1 | (13) |
| 4183 | P | | (60.19 | 63.14) | 1-2 | $3p^3S-3d^3P^o$ |
| 4174 | P | | (60.19 | 63.14) | 1-1 | (14) |
| 5846 | P | | (61.03 | 63.14) | 2-2 | $3p^3P-3d^3P^o$ |
| 5794 | P | | (61.01 | 63.14) | 1-1 | (15) |
| 5828 | P | | (61.03 | 63.14) | 2-1 | |
| 5812 | P | | (61.01 | 63.14) | 1-2 | |
| 6125 | P | | 61.52 | 63.53 | 2-2 | $3d^1D^o-4^1D$ |
| | | | | | | (16) |
| 5073 | P | | 61.69 | 64.12 | 2-1 | $3p^1D-3d^1P^o$ |
| | | | | | | (17) |

| N V I P 97.47 | Anal A | List A | Dec 1944 | | |
|---|---|---|---|---|---|
| 4603.8 | P | | 56.31 | 58.99 | $\frac{1}{2}$-1$\frac{1}{2}$ | $3^2S-3^2P^o$ |
| 4619.4 | P | | 56.31 | 58.98 | $\frac{1}{2}$- $\frac{1}{2}$ | (1) |
| 3181 | P | | 83.74 | 87.64 | - $\frac{1}{2}$ | $5^2P^o-6^2S$ |
| | | | | | | (2) |
| 4335 | P | | 87.64 | 90.49 | $\frac{1}{2}$- | $6^2S-7^2P^o$ |
| | | | | | | (3) |
| 5373 | P | | 87.95 | 90.30 | - $\frac{1}{2}$ | $6^2P^o-7^2S$ |
| | | | | | | (4) |
| 4751 | P | | 87.95 | 90.55 | — | $6^2P^o-7^2D$ |
| | | | | | | (5) |
| 5067 | P | | 88.05 | 90.49 | — | $6^2D-7^2P^o$ |
| | | | | | | (8) |
| 4933 | P | | 88.05 | 90.56 | — | $6^2D-7^2F^o$ |
| | | | | | | (7) |
| 4952 | P | | 88.06 | 90.55 | — | $8^2P^o-7^2D$ |
| | | | | | | (8) |
| 4943 | P | | 88.06 | 90.58 | — | $6^2P^o-7^2G$ etc |
| | | | | | | (9) |
| 4945 | P | | 88.06 | 90.56 | — | $6^2G-7^2H^o$ etc |
| | | | | | | (10) |
| 6719 | P | | 90.30 | 92.13 | $\frac{1}{2}$- | $7^2S-8^2P^o$ |
| | | | | | | (11) |
| 7330 | P | | 90.49 | 92.17 | — | $7^2P^o-8^2D$ |
| | | | | | | (12) |

| O I I P 13.58 | Anal A | List B | Apr 1944 | | |
|---|---|---|---|---|---|
| 7771.96 | A | 27 | 9.11 | 10.69 | 2-3 | $3^5S^o-3^5P$ |
| 7774.18 | A | 26 | 9.11 | 10.69 | 2-2 | (1) |
| 7775.40 | A | 25 | 9.11 | 10.69 | 2-1 | |
| 6736.25 | A | 5 | 9.11 | 10.94 | 2-2 | $3^5S^o-3^3P$ |
| 6736.50 | A | 3 | 9.11 | 10.94 | 2-1 | (2) |
| 3947.301 | E | 10 | 9.11 | 12.23 | 2-3 | $3^5S^o-4^5P$ |
| 3947.489 | E | 7 | 9.11 | 12.23 | 2-2 | (3) |
| 3947.594 | E | 4 | 9.11 | 12.23 | 2-1 | |
| *8446.35 | A | 25 | 9.48 | 10.94 | 1-2 | $3^3S^o-3^3P$ |
| 8446.76 | A | 23 | 9.48 | 10.94 | 1-1 | (4) |
| *8446.35 | A | 25 | 9.48 | 10.94 | 1-0 | |
| 4368.30 | D | (10) | 9.48 | 12.31 | 1- | $3^3S^o-4^3P$ |
| | | | | | | (5) |
| 3693.44 | D | (7) | 9.48 | 12.82 | 1- | $3^3S^o-5^3P$ |
| | | | | | | (6) |
| 11302.22 | B | 15 | 10.69 | 11.79 | 3-2 | $3^5P-4^5S^o$ |
| 11297.54 | B | 10 | 10.69 | 11.79 | 2-2 | (7) |
| 11294.97 | B | 5 | 10.69 | 11.79 | 1-2 | |
| 9265.99 | A | 16 | 10.69 | 12.03 | 3- | $3^5P-3^5D^o$ |
| 9262.73 | A | 15 | 10.69 | 12.03 | 2- | (8) |
| 9260.88 | A | 14 | 10.69 | 12.03 | 1- | |
| 6456.01 | A | 17 | 10.89 | 12.61 | 3-2 | $3^5P-5^5S^o$ |
| 6454.48 | A | 16 | 10.69 | 12.61 | 2-2 | (9) |
| 6453.84 | A | 15 | 10.69 | 12.61 | 1-2 | |
| 6158.19 | A | 18 | 10.69 | 12.70 | 3- | $3^5P-4^5D^o$ |
| 8158.78 | A | 17 | 10.69 | 12.70 | 2- | (10) |
| 8155.99 | A | 16 | 10.89 | 12.70 | 1- | |
| 5438.83 | D | (8) | 10.89 | 12.96 | 3-2 | $3^5P-6^5S^o$ |
| 5435.76 | D | (8) | 10.69 | 12.96 | 2-2 | (11) |
| 5435.18 | D | (5) | 10.89 | 12.96 | 1-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| I continued | | | | | | |
| 1330.66 | D | (10) | 10.69 | 13.01 | 3- | $3^5P-5^5D^o$ |
| 1329.59 | D | (7) | 10.69 | 13.01 | 2- | (12) |
| 1328.98 | D | (6) | 10.69 | 13.01 | 1- | |
| 1020.13 | D | (5) | 10.69 | 13.15 | 3-2 | $3^5P-7^5S^o$ |
| 1019.34 | D | (4) | 10.69 | 13.15 | 2-2 | (13) |
| 1018.78 | D | (3) | 10.69 | 13.15 | 1-2 | |
| 988.76 | D | (6) | 10.69 | 13.18 | 3- | $3^5P-6^5D^o$ |
| 987.86 | D | (5) | 10.69 | 13.18 | 2- | (14) |
| 987.40 | D | (4) | 10.69 | 13.18 | 1- | |
| 803.00 | D | (4) | 10.69 | 13.26 | 3-2 | $3^5P-8^5S^o$ |
| 802.20 | D | (3) | 10.69 | 13.26 | 2-2 | (15) |
| 801.80 | D | (2) | 10.69 | 13.26 | 1-2 | |
| 773.76 | D | (5) | 10.69 | 13.28 | 3- | $3^5P-7^5D^o$ |
| 772.89 | D | (4) | 10.69 | 13.28 | 2- | (18) |
| 772.54 | D | (3) | 10.69 | 13.28 | 1- | |
| 873.70 | D | (3) | 10.69 | 13.34 | 3-2 | $3^5P-9^5S^o$ |
| 872.75 | D | (3d) | 10.69 | 13.34 | 2-2 | (17) |
| | | | 10.69 | 13.34 | 1-2 | |
| 855.38 | D | (4) | 10.89 | 13.35 | 3- | $3^5P-8^5D^o$ |
| 854.56 | D | (3) | 10.69 | 13.35 | 2- | (18) |
| 854.23 | D | (2) | 10.69 | 13.35 | 1- | |
| 995.12 | A | 9 | 10.94 | 12.49 | 2-3 | $3^3P-3s'\ ^3D^o$ |
| 987.00 | A | 7 | 10.94 | 12.49 | 1-2 | (19) |
| 982.41 | A | 5 | 10.94 | 12.49 | 0-1 | |
| 987.34 | A | 4 | 10.94 | 12.49 | 2-2 | |
| 981.97 | A | 4 | 10.94 | 12.49 | 1-1 | |
| 254.47 | A | 17 | 10.94 | 12.84 | 2-1 | $3^3P-5^3S^o$ |
| 254.19 | A | 15 | 10.94 | 12.84 | 1-1 | (20) |
| 254.47 | A | 17 | 10.94 | 12.64 | 0-1 | |
| 002.22 | A | 17 | 10.94 | 12.70 | 2- | $3^3P-4^3D^o$ |
| 001.93 | A | 15 | 10.94 | 12.70 | 1- | (21) |
| 002.22 | A | 17 | 10.94 | 12.70 | 0- | |
| 046.46 | A | 10 | 10.94 | 12.98 | 2-1 | $3^3P-6^3S^o$ |
| 046.26 | A | 8 | 10.94 | 12.98 | 1-1 | (22) |
| 046.46 | A | 10 | 10.94 | 12.98 | 0-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| O I continued | | | | | | |
| *5958.63 | A | 9 | 10.94 | 13.01 | 2- | $3^3P-5^3D^o$ |
| 5958.46 | A | 7 | 10.94 | 13.01 | 1- | (23) |
| *5958.63 | A | 9 | 10.94 | 13.01 | 0- | |
| 5554.94 | D | (6d) | 10.94 | 13.16 | 2-1 | $3^3P-7^3S^o$ |
| | | | | | | (24) |
| 5512.71 | D | (5d) | 10.94 | 13.18 | 2- | $3^3P-6^3D^o$ |
| | | | | | | (25) |
| 5299.00 | D | (5) | 10.94 | 13.27 | 2-1 | $3^3P-8^3S^o$ |
| | | | | | | (26) |
| 5275.08 | D | (4) | 10.94 | 13.28 | 2- | $3^3P-7^3D^o$ |
| | | | | | | (27) |
| *5146.06 | D | (5) | 10.94 | 13.34 | 2-1 | $3^3P-9^3S^o$ |
| | | | | | | (28) |
| *5130.53 | D | (3) | 10.94 | 13.35 | 2- | $3^3P-8^3D^o$ |
| | | | | | | (29) |
| 3954.887 | C | 10 | 10.94 | 14.06 | 2-2 | $3^3P-3s''\ ^3P^o$ |
| 3952.982 | C | 1 | 10.94 | 14.06 | 1-1 | (30) |
| *3953.056 | C | 2 | 10.94 | 14.06 | 2-1 | |
| 3951.987 | C | 3 | 10.94 | 14.06 | 1-0 | |
| 3954.596 | C | 5 | 10.94 | 14.06 | 1-2 | |
| *3953.058 | C | 2 | 10.94 | 14.06 | 0-1 | |
| 7025.52 | A | 3 | 12.31 | 14.06 | -2 | $4^3P-3s''\ ^3P^o$ |
| | | | | | | (32) |
| 4233.32 | D | 7 | 12.31 | 15.22 | -2 | $4^3P-3d'\ ^3P^o$ |
| 4222.78 | D | 5 | 12.31 | 15.23 | -1 | (33) |
| 4217.09 | D | 4 | 12.31 | 15.23 | -0 | |
| *8231.84 | A | 15 | 12.49 | 13.99 | 3-3 | $3s'\ ^3D^o-3p'\ ^3D$ |
| *8230.01 | A | 10 | 12.49 | 13.99 | 2-2 | (34) |
| 8232.99 | A | 13 | 12.49 | 13.99 | 1-1 | |
| *8231.84 | A | 15 | 12.49 | 13.99 | 3-2 | |
| 8227.64 | A | 11 | 12.49 | 13.99 | 2-1 | |
| *8230.01 | A | 10 | 12.49 | 13.99 | 2-3 | |
| 8235.31 | A | 5 | 12.49 | 13.99 | 1-2 | |
| 5750.424 | C | 5 | 13.07 | 15.22 | -2 | $6^3P-3d'\ ^3P^o$ |
| 5731.103 | C | 3 | 13.07 | 15.23 | -1 | (40) |
| 5720.613 | C | 1 | 13.07 | 15.23 | -0 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| O I continued | | | | | | |
| 7947.56 | A | 12 | 12.49 | 14.04 | 3-4 | $3s'\ ^3D^o-3p'\ ^3F$ |
| 7950.83 | A | 10 | 12.49 | 14.04 | 2-3 | (35) |
| 7952.18 | A | 9 | 12.49 | 14.04 | 1-2 | |
| 7943.15 | A | 6 | 12.49 | 14.04 | 3-3 | |
| 7947.204 | C | 3 | 12.49 | 14.04 | 2-2 | |
| 7939.49 | A | 1 | 12.49 | 14.04 | 3-2 | |
| 3823.469 | C | 10 | 12.49 | 15.71 | 3-3 | $3s'\ ^3D^o-3p''\ ^3D$ |
| 3824.435 | C | 3 | 12.49 | 15.71 | 2-2 | (36) |
| 3825.090 | C | 3 | 12.49 | 15.71 | 1-1 | |
| 3822.63 | P | | 12.49 | 15.71 | 3-2 | |
| 3825.249 | C | 4 | 12.49 | 15.71 | 2-3 | |
| 3825.530 | C | 1 | 12.49 | 15.71 | 1-2 | |
| 8820.45 | A | 15 | 12.67 | 14.07 | 2-3 | $3s'\ ^1D^o-3p'\ ^1F$ |
| | | | | | | (37) |
| 7156.80 | A | 12 | 12.87 | 14.40 | 2-2 | $3s'\ ^1D^o-3p'\ ^1D$ |
| | | | | | | (38) |
| *5146.06 | D | (5) | 12.82 | 15.22 | -2 | $5^3P-3d'\ ^3P^o$ |
| *5130.53 | D | (3) | 12.82 | 15.23 | -1 | (39) |
| 9156.02 | A | 4 | 13.99 | 15.33 | 3-4 | $3p'\ ^3D-3d'\ ^3F^o$ |
| | | | | | | (41) |
| *7706.77 | A | 5 | 13.99 | 15.59 | 3-2 | $3p'\ ^3D-sp^5\ ^3P^o$ |
| 7863.45 | A | 3 | 13.99 | 15.60 | 2-1 | (42) |
| 7839.99 | A | 1 | 13.99 | 15.60 | 1-0 | |
| *7706.77 | A | 5 | 13.99 | 15.59 | 2-2 | |
| 7665.48 | A | 1 | 13.99 | 15.60 | 1-1 | |
| 6106.25 | A | 4 | 13.99 | 16.01 | 3-4 | $3p'\ ^3D-4d'\ ^3P^o$ |
| | | | | | | (43) |
| *5995.28 | A | 3 | 13.99 | 18.04 | 3-2 | $3p'\ ^3D-4d'\ ^3P^o$ |
| 5991.93 | A | 2 | 13.99 | 16.05 | 2-1 | (44) |
| 5991.34 | A | 1 | 13.99 | 16.05 | 1-0 | |
| *5995.28 | A | 3 | 13.99 | 16.04 | 2-2 | |
| 5993.18 | A | 1 | 13.99 | 16.05 | 1-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **O I** continued | | | | | | |
| 9522.01 | A | 4 | 14.04 | 15.33 | 4-4 | 3p' $^3$F-3d' $^3$F° (45) |
| 9499.39 | A | 0 | 14.04 | 15.34 | 4-4 | 3p' $^3$F-3d' $^1$G° (46) |
| 9505.67 | A | 5 | 14.04 | 15.34 | 3-4 | |
| *9498.04 | A | 8 | 14.04 | 15.34 | 4-5 | 3p' $^3$F-3d' $^3$G°† (47) |
| 9487.49 | A | 6 | 14.04 | 15.34 | 3-4 | |
| *9498.04 | A | 8 | 14.04 | 15.34 | 2-3 | |
| 6266.89 | A | 3 | 14.04 | 16.01 | 4-4 | 3p' $^3$F-4d' $^3$F° (48) |
| 6264.55 | A | 3 | 14.04 | 16.01 | 3-4 | 3p' $^3$F-4d' $^1$G° (49) |
| *6261.55 | A | 6 | 14.04 | 16.01 | 4-5 | 3p' $^3$F-4d' $^3$G°† (50) |
| 6256.84 | A | 4 | 14.04 | 16.01 | 3-4 | |
| *6261.55 | A | 6 | 14.04 | 16.01 | 2-3 | |
| *5410.76 | F | (4) | 14.04 | 16.32 | 4-4 | 3p' $^3$F-5d' $^3$F° (51) |
| *5410.76 | F | (4) | 14.04 | 16.32 | 3-4 | 3p' $^3$F-5d' $^1$G° (52) |
| 5408.59 | D | (4) | 14.04 | 16.32 | 4-5 | 3p' $^3$F-5d' $^3$G° (53) |
| 5404.87 | F | (3) | 14.04 | 16.32 | 3-4 | |
| 8426.326 | C | 4 | 14.06 | 15.53 | 2-3 | 3s" $^3$P°-4p' $^3$D (54) |
| 8428.342 | C | 2 | 14.06 | 15.53 | 1-2 | |
| 8429.128 | C | 1 | 14.06 | 15.53 | 0-1 | |
| 8420.968 | C | 1 | 14.06 | 15.53 | 2-2 | |
| 8424.730 | C | 1 | 14.06 | 15.53 | 1-1 | |
| 7476.45 | A | 12 | 14.06 | 15.71 | 2-3 | 3s" $^3$P°-3p" $^3$D (55) |
| 7479.06 | A | 8 | 14.06 | 15.71 | 1-2 | |
| 7480.66 | A | 8 | 14.06 | 15.71 | 0-1 | |
| 7473.23 | A | 5 | 14.06 | 15.71 | 2-2 | |
| 7477.21 | A | 7 | 14.06 | 15.71 | 1-1 | |
| 7471.36 | A | 2 | 14.06 | 15.71 | 2-1 | |
| 9760.65 | A | 5 | 14.07 | 15.34 | 3-4 | 3p' $^1$F-3d' $^1$G° (56) |
| 9741.49 | A | 4 | 14.07 | 15.34 | 3-4 | 3p' $^1$F-3d' $^3$G° (57) |
| 9677.41 | A | 1 | 14.07 | 15.35 | 3-3 | 3p' $^1$F-3d' $^1$F° (58) |
| 6374.31 | A | 4 | 14.07 | 16.01 | 3-4 | 3p' $^1$F-4d' $^1$G° (59) |
| 6366.33 | A | 3 | 14.07 | 16.01 | 3-4 | 3p' $^1$F-4d' $^3$G° (60) |
| 6351.17 | A | 0 | 14.07 | 16.02 | 3-3 | 3p' $^1$F-4d' $^1$F° (61) |
| 5492.8 | F | (3) | 14.07 | 16.32 | 3-4 | 3p' $^1$F-5d' $^1$G° (62) |
| 5486.6 | F | (3) | 14.07 | 16.32 | 3-4 | 3p' $^1$F-5d' $^3$G° (63) |
| 7886.31 | A | 4 | 14.31 | 15.38 | 1-2 | 3s" $^1$P°-3p" $^1$D (64) |
| 6653.78 | A | 5 | 14.31 | 16.16 | 1-0 | 3s" $^1$P°-3p" $^1$S (65) |

**O II** I P 35.00 Anal A List A Mar 1944

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| 4649.139 | A | 10 | 22.90 | 25.55 | 2½-3½ | 3s$^4$P-3p$^4$D° (1) |
| 4641.811 | A | 9 | 22.88 | 25.54 | 1½-2½ | |
| 4638.854 | A | 6 | 22.87 | 25.53 | ½-1½ | |
| 4676.234 | A | 8 | 22.90 | 25.54 | 2½-2½ | |
| 4661.635 | A | 9 | 22.88 | 25.53 | 1½-1½ | |
| 4650.841 | A | 6 | 22.87 | 25.52 | ½- ½ | |
| 4696.36 | B | 2 | 22.90 | 25.53 | 2½-1½ | |
| 4673.75 | B | 4 | 22.88 | 25.52 | 1½- ½ | |
| 4349.426 | A | 8 | 22.90 | 25.74 | 2½-2½ | 3s$^4$P-3p$^4$p° (2) |
| 4336.865 | A | 6 | 22.88 | 25.73 | 1½-1½ | |
| 4325.77 | B | 3 | 22.87 | 25.72 | ½- ½ | |
| 4366.896 | A | 7 | 22.90 | 25.73 | 2½-1½ | |
| 4345.562 | A | 7 | 22.88 | 25.72 | 1½- ½ | |
| 4319.631 | A | 8 | 22.88 | 25.74 | 1½-2½ | |
| 4317.139 | A | 8 | 22.87 | 25.73 | ½-1½ | |
| 3749.49 | B | 9 | 22.90 | 26.19 | 2½-1½ | 3s$^4$P-3p$^4$8° (3) |
| 3727.33 | B | 8 | 22.88 | 26.19 | 1½-1½ | |
| 3712.75 | B | 7 | 22.87 | 26.19 | ½-1½ | |
| 6721.35 | B | 5 | 23.34 | 25.18 | 1½- ½ | 3s$^3$P-3p$^3$8° (4) |
| 6640.90 | B | 4 | 23.32 | 25.18 | ½- ½ | |
| 4414.909 | A | 10 | 23.34 | 28.14 | 1½-2½ | 3s$^3$P-3p$^2$D° (5) |
| 4416.975 | A | 8 | 23.32 | 26.11 | ½-1½ | |
| 4452.377 | A | 6 | 23.34 | 26.11 | 1½-1½ | |
| 3973.263 | A | 10 | 23.34 | 26.45 | 1½-1½ | 3s$^3$P-3p$^3$P° (8) |
| 3954.372 | A | 7 | 23.32 | 26.44 | ½- ½ | |
| 3982.719 | A | 5 | 23.34 | 28.44 | 1½- ½ | |
| 3945.048 | A | 5 | 23.32 | 28.45 | ½-1½ | |
| 3496.27 | C | 1 | 25.18 | 28.71 | ½-1½ | 3p$^2$8°-3d$^4$P (7) |
| 3488.18 | C | 0 | 25.18 | 28.71 | ½- ½ | |
| 3474.94 | B | 1 | 25.18 | 28.73 | ½- ½ | 3p$^2$8°-3d$^4$D (8) |
| 3390.25 | B | 8 | 25.18 | 28.82 | ½-1½ | 3p$^2$8°-3d$^2$P |
| 3377.20 | B | 7 | 25.18 | 28.83 | ½- ½ | (9) |
| 4075.868 | A | 10 | 25.55 | 28.58 | 3½-4½ | 3p$^4$D°-3d$^4$F (10) |
| 4072.164 | A | 8 | 25.54 | 28.57 | 2½-3½ | |
| 4089.897 | A | 6 | 25.53 | 28.56 | 1½-2½ | |
| 4069.636 | A | 4 | 25.52 | 28.55 | ½-1½ | |
| 4092.940 | A | 5 | 25.55 | 28.57 | 3½-3½ | |
| 4085.124 | A | 3 | 25.54 | 28.56 | 2½-2½ | |
| 4078.862 | A | 4 | 25.53 | 28.55 | 1½-1½ | |
| 4108.03 | B | 0 | 25.55 | 28.58 | 3½-2½ | |
| 4094.18 | B | 0 | 25.54 | 28.55 | 2½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **O II** continued | | | | | | |
| 3926.58 | P | | 25.55 | 28.70 | 3½-2½ | 3p$^4$D°-3d$^4$P (11) |
| 3896.30 | B | 1 | 25.54 | 28.71 | 2½-1½ | |
| 3872.45 | B | 1 | 25.53 | 28.71 | 1½- ½ | |
| 3907.45 | B | 4 | 25.54 | 28.70 | 2½-2½ | |
| 3882.45 | B | 1 | 25.53 | 28.71 | 1½-1½ | |
| 3864.13 | C | 1 | 25.52 | 28.71 | ½- ½ | |
| 3893.53 | B | 2 | 25.53 | 28.70 | 1½-2½ | |
| 3874.10 | B | 2 | 25.52 | 28.71 | ½-1½ | |
| 3882.197 | A | 7 | 25.55 | 28.73 | 3½-3½ | 3p$^4$D°-3d$^4$D (12) |
| 3864.45 | B | 5 | 25.54 | 28.73 | 2½-2½ | |
| 3851.04 | B | 3 | 25.53 | 28.73 | 1½-1½ | |
| 3847.89 | B | 3 | 25.52 | 28.73 | ½- ½ | |
| 3883.15 | B | 3 | 25.55 | 28.73 | 3½-2½ | |
| 3864.68 | B | 1 | 25.54 | 28.73 | 2½-1½ | |
| 3856.16 | B | 5 | 25.53 | 28.73 | 1½- ½ | |
| 3863.50 | B | 2 | 25.54 | 28.73 | 2½-3½ | |
| 3850.81 | B | 2 | 25.53 | 28.73 | 1½-2½ | |
| 3842.82 | B | 3 | 25.52 | 28.73 | ½-1½ | |
| 3851.47 | C | 0 | 25.55 | 28.76 | 3½-3½ | 3p$^4$D°-3d$^2$F (13) |
| 3857.18 | B | 4 | 25.54 | 28.74 | 2½-2½ | |
| 3875.82 | B | 4 | 25.55 | 28.74 | 3½-2½ | |
| 3833.10 | B | 3 | 25.54 | 28.76 | 2½-3½ | |
| 3843.58 | B | 3 | 25.53 | 28.74 | 1½-2½ | |
| 3134.82 | B | 101 | 25.55 | 29.49 | 3½-2½ | 3p$^4$D°-4s$^4$P (14) |
| 3138.44 | B | 81 | 25.54 | 29.47 | 2½-1½ | |
| 3139.77 | B | 41 | 25.53 | 29.46 | 1½- ½ | |
| 3133.62 | B | 61 | 25.54 | 29.49 | 2½-2½ | |
| 3139.44 | B | 71 | 25.53 | 29.47 | 1½-1½ | |
| 3134.32 | B | 31 | 25.52 | 29.46 | ½- ½ | |
| 3113.71 | B | 11 | 25.53 | 29.49 | 1½-2½ | |
| 3134.02 | B | 21 | 25.52 | 29.47 | ½-1½ | |
| 4590.971 | A | 9 | 25.55 | 28.24 | 2½-3½ | 3s' $^2$D-3p' $^2$F° (15) |
| 4596.174 | A | 8 | 25.55 | 28.24 | 1½-2½ | |
| 4351.269 | A | 6 | 25.55 | 28.39 | 2½-2½ | 3s' $^2$D-3p' $^2$P° (16) |
| 4347.425 | A | 5 | 25.55 | 28.39 | 1½-1½ | |
| 3911.960 | A | 10 | 25.55 | 28.71 | 2½-1½ | 3s' $^2$D-3p' $^2$P° (17) |
| 3919.287 | A | 6 | 25.55 | 28.70 | 1½- ½ | |
| 3913.088 | B | 2 | 25.55 | 28.71 | 1½-1½ | |
| *4357.25 | B | 0 | 25.74 | 28.57 | 2½-3½ | 3p$^4$P°-3d$^4$F (18) |
| 4169.230 | A | 4 | 25.74 | 28.70 | 2½-2½ | 3p$^4$P°-3d$^4$P (19) |
| 4140.74 | B | 0 | 25.73 | 28.71 | 1½-1½ | |
| 4131.48 | B | 4 | 25.72 | 28.71 | ½- ½ | |
| 4156.54 | B | 3 | 25.74 | 28.71 | 2½-1½ | |
| 4139.34 | B | 2 | 25.73 | 28.71 | 1½- ½ | |
| 4153.302 | A | 7 | 25.73 | 28.70 | 1½-2½ | |
| 4133.806 | A | 6 | 25.72 | 28.71 | ½-1½ | |
| 4119.221 | A | 8 | 25.74 | 28.73 | 2½-3½ | 3p$^4$P°-3d$^4$D (20) |
| 4104.743 | A | 5 | 25.73 | 28.73 | 1½-2½ | |
| *4097.260 | A | 4n | 25.72 | 28.73 | ½-1½ | |
| 4130.279 | A | 3 | 25.74 | 28.73 | 2½-2½ | |
| 4105.000 | A | 7 | 25.73 | 28.73 | 1½-1½ | |
| 4103.017 | A | 5 | 25.72 | 28.73 | ½- ½ | |
| 4130.554 | A | 2 | 25.74 | 28.73 | 2½-1½ | |
| 4110.795 | A | 3 | 25.73 | 28.73 | 1½- ½ | |
| 4084.66 | B | 1 | 25.74 | 28.76 | 2½-3½ | 3p$^4$P°-3d$^2$F (21) |
| 4098.543 | A | 3 | 25.73 | 28.74 | 1½-2½ | |
| 4113.029 | A | 4 | 25.74 | 28.74 | 2½-2½ | |
| 3967.441 | A | 1 | 25.72 | 28.83 | ½- ½ | 3p$^4$P°-3d$^2$P (22) |
| 3985.46 | C | 0 | 25.72 | 28.82 | ½-1½ | |
| 3287.59 | B | 91 | 25.74 | 29.49 | 2½-2½ | 3p$^4$P°-4s$^4$P (23) |
| 3295.13 | B | 41 | 25.73 | 29.47 | 1½-1½ | |
| 3301.56 | B | 31 | 25.72 | 29.46 | ½- ½ | |
| 3305.15 | B | 61 | 25.74 | 29.47 | 2½-1½ | |
| 3306.60 | B | 61 | 25.73 | 29.46 | 1½- ½ | |
| 3277.89 | B | 71 | 25.73 | 29.49 | 1½-2½ | |
| 3290.13 | B | 51 | 25.72 | 29.47 | ½-1½ | |
| 4751.34 | B | 4 | 26.14 | 28.73 | 2½-3½ | 3p$^2$D°-3d$^4$D (24) |
| 4710.04 | B | 5 | 26.11 | 28.73 | 1½-2½ | |
| 4752.70 | B | 2 | 26.14 | 28.73 | 2½-2½ | |
| 4705.355 | A | 8 | 26.14 | 28.76 | 2½-3½ | 3p$^2$D°-3d$^2$F (25) |
| *4699.21 | B | 7 | 26.11 | 28.74 | 1½-2½ | |
| 4741.71 | B | 3 | 26.14 | 28.74 | 2½-2½ | |
| 4395.95 | B | 7 | 26.14 | 28.94 | 2½-2½ | 3p$^2$D°-3d$^2$D (26) |
| 4369.28 | B | 4 | 26.11 | 28.94 | 1½-1½ | |
| 4406.02 | B | 1 | 26.14 | 28.94 | 2½-1½ | |
| 4359.38 | B | 1 | 26.11 | 28.94 | 1½-2½ | |
| 3470.81 | B | 8 | 26.14 | 29.69 | 2½-1½ | 3p$^2$D°-4s$^2$P (27) |
| 3470.42 | B | 5 | 26.11 | 29.67 | 1½- ½ | |
| 3447.98 | B | 5 | 26.11 | 29.89 | 1½-1½ | |
| 4924.60 | B | 8 | 28.19 | 28.70 | 1½-2½ | 3p$^4$S°-3d$^4$P (28) |
| 4906.88 | B | 5 | 28.19 | 28.71 | 1½-1½ | |
| 4890.93 | B | 4 | 28.19 | 28.71 | 1½- ½ | |
| 4856.49 | B | 2 | 28.19 | 28.73 | 1½-2½ | 3p$^4$8°-3d$^4$D (29) |
| 4856.76 | C | 2 | 28.19 | 28.73 | 1½-1½ | |
| 4884.95 | B | 3 | 28.19 | 28.73 | 1½- ½ | |
| 4845.01 | B | 1 | 28.19 | 28.74 | 1½-2½ | 3p$^4$8°-3d$^2$F (30) |
| 3739.92 | B | 81 | 28.19 | 29.49 | 1½-2½ | 3p$^4$8°-4s$^4$P (31) |
| 3782.83 | B | 51 | 28.19 | 29.47 | 1½-1½ | |
| 3777.60 | B | 41 | 28.19 | 29.46 | 1½- ½ | |
| 5208.73 | B | 5 | 28.45 | 28.82 | 1½-1½ | 3p$^2$P°-3d$^2$P (32) |
| 5160.02 | B | 4 | 28.44 | 28.83 | ½- ½ | |
| 5176.00 | B | 2 | 28.45 | 28.83 | 1½- ½ | |
| 5190.56 | B | 3 | 28.44 | 28.82 | ½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **O II** continued | | | | | | |
| 4943.06 | B | 7 | 26.45 | 28.94 | 1½-2½ | 3p$^2$P°-3d$^2$D (33) |
| 4941.12 | B | 5 | 26.44 | 28.94 | ½-1½ | |
| 4955.78 | B | 3 | 26.45 | 28.94 | 1½-1½ | |
| 3803.14 | B | 61 | 26.45 | 29.69 | 1½-1½ | 3p$^2$P°-4s$^2$P (34) |
| 3821.68 | B | 41 | 26.44 | 29.67 | ½- ½ | |
| 3830.45 | B | 41 | 26.45 | 29.67 | 1½- ½ | |
| 3794.48 | B | 31 | 26.44 | 29.69 | ½-1½ | |
| 4448.21 | B | 6 | 28.24 | 31.01 | 3½-3½ | 3p' $^2$F°-3d' $^2$F (35) |
| 4443.05 | B | 5 | 28.24 | 31.01 | 2½-2½ | |
| 4189.788 | A | 10 | 28.24 | 31.18 | 3½-4½ | 3p' $^2$F°-3d' $^2$G (36) |
| 4185.456 | A | 8 | 28.24 | 31.18 | 2½-3½ | |
| 4113.82 | B | 1 | 28.24 | 31.24 | 3½-2½ | 3p' $^2$F°-3d' $^2$D (37) |
| 4110.20 | B | 1 | 28.24 | 31.24 | 2½-1½ | |
| 3741.69 | C | 0 | 28.24 | 31.54 | 3½-3½ | 3p' $^2$F°-4d$^2$F (38) |
| 3273.52 | B | 71 | 28.24 | 32.01 | 3½-2½ | 3p' $^2$F°-4s' $^2$D (39) |
| 3270.98 | B | 71 | 28.24 | 32.01 | 2½-1½ | |
| *4699.21 | B | 7 | 28.39 | 31.01 | 2½-3½ | 3p' $^2$P°-3d' $^2$F (40) |
| 4703.18 | B | 3 | 28.39 | 31.01 | 1½-2½ | |
| 4698.48 | C | 1 | 28.39 | 31.01 | 2½-2½ | |
| 4327.48 | B | 3 | 28.39 | 31.24 | 2½-2½ | 3p' $^2$P°-3d' $^2$D (41) |
| 4331.89 | B | 2 | 28.39 | 31.24 | 1½-1½ | |
| 4327.89 | B | 0 | 28.39 | 31.24 | 2½-1½ | |
| 4331.47 | B | 0 | 28.39 | 31.24 | 1½-2½ | |
| 4192.50 | B | 2 | 28.39 | 31.33 | 2½-1½ | 3p' $^2$P°-3d' $^2$P (42) |
| 4198.72 | B | 1 | 28.39 | 31.33 | 1½- ½ | |
| 4196.26 | C | 00 | 28.39 | 31.33 | 1½-1½ | |
| 3963.13 | B | 0 | 28.39 | 31.50 | 2½-1½ | 3p' $^2$P°-4d$^2$P (43) |
| 3407.38 | B | 71 | 28.39 | 32.01 | 2½- | 3p' $^2$P°-4s' $^2$D |
| 3409.84 | B | 61 | 28.39 | 32.01 | 1½- | (44) |
| 6895.29 | C | 5 | 28.58 | 30.37 | 4½-3½ | 3d$^4$F-4p$^4$D° (45) |
| 6906.54 | C | 4 | 28.57 | 30.36 | 3½-2½ | |
| 6910.75 | C | 3 | 28.56 | 30.35 | 2½-1½ | |
| 6908.11 | C | 2 | 28.55 | 30.34 | 1½- ½ | |
| 6846.97 | C | 1 | 28.57 | 30.37 | 3½-3½ | |
| 6869.74 | C | 1 | 28.56 | 30.36 | 2½-2½ | |
| 6885.07 | C | 1 | 28.55 | 30.35 | 1½-1½ | |
| 4098.27 | B | 0n | 28.55 | 31.56 | 1½-2½ | 3d$^4$F-4f$^2$D° (46) |
| 4107.07 | B | 1n | 28.56 | 31.57 | 2½-3½ | 3d$^4$F-4f$^4$D° (47) |
| 4089.295 | A | 4n | 28.58 | 31.60 | 4½-5½ | 3d$^4$F-4f$^4$G° (48) |
| *4097.260 | A | 4n | 28.57 | 31.58 | 3½-4½ | |
| 4095.63 | B | 0n | 28.56 | 31.57 | 2½-3½ | |
| 4087.16 | B | 2n | 28.55 | 31.57 | 1½-2½ | |
| 4108.75 | B | 0n | 28.57 | 31.57 | 3½-3½ | |
| 4096.18 | C | 0d | 28.56 | 31.57 | 2½-2½ | |
| 4071.20 | B | 0 | 28.57 | 31.60 | 3½-4½ | 3d$^4$F-4f$^2$G° (49) |
| 4083.907 | A | 2n | 28.56 | 31.58 | 2½-3½ | |
| 4063.90 | B | 1n | 28.58 | 31.62 | 4½-4½ | 3d$^4$F-4f$^4$F° (50) |
| 4048.22 | B | 1n | 28.57 | 31.62 | 3½-3½ | |
| 4041.31 | C | 0d | 28.56 | 31.61 | 2½-2½ | |
| 4033.18 | C | 0d | 28.55 | 31.61 | 1½-1½ | |
| *4054.10 | C | 0d | 28.57 | 31.61 | 3½-2½ | |
| 4046.15 | C | 00d | 28.57 | 31.62 | 3½-4½ | |
| 4044.96 | C | 0d | 28.57 | 31.62 | 3½-3½ | 3d$^4$F-4f$^2$F° (51) |
| 4035.09 | C | 0d | 28.56 | 31.62 | 2½-2½ | |
| 4026.40 | B | 0n | 28.55 | 31.62 | 1½-2½ | |
| 3371.85 | B | 2n | 28.58 | 32.24 | 4½-3½ | 3d$^4$F-5p$^4$D° (52) |
| 3375.77 | B | 0 | 28.57 | 32.23 | 3½-2½ | |
| 3360.15 | B | 00n | 28.57 | 32.24 | 3½-3½ | |
| 3367.00 | B | 00n | 28.56 | 32.23 | 2½-2½ | |
| 3370.23 | B | 00n | 28.55 | 32.22 | 1½-1½ | |
| 4317.65 | C | 0 | 28.71 | 31.56 | 1½-2½ | 3d$^4$P-4f$^2$D° (53) |
| 4307.31 | B | 1n | 28.71 | 31.58 | ½-1½ | |
| 4303.82 | B | 5n | 28.70 | 31.57 | 2½-3½ | 3d$^4$P-4f$^4$D° (54) |
| 4294.82 | B | 3n | 28.71 | 31.58 | 1½-2½ | |
| 4281.40 | B | 0n | 28.70 | 31.58 | 2½-2½ | |
| 4283.82 | C | 2d | 28.71 | 31.59 | 1½-1½ | |
| 4288.83 | B | 1n | 28.71 | 31.59 | ½- ½ | |
| *4276.71 | B | 1n | 28.71 | 31.59 | 1½- ½ | |
| 4291.25 | B | 1n | 28.70 | 31.57 | 2½-3½ | 3d$^4$P-4f$^4$G° (55) |
| 4305.53 | B | 0 | 28.71 | 31.57 | 1½-2½ | |
| 3013.37 | B | 3 | 28.70 | 32.79 | 2½-3½ | 3d$^4$P-5f$^4$D° (56) |
| 4871.58 | B | 5 | 28.71 | 31.24 | 1½-2½ | 3p' $^2$P°-3d' $^2$D (57) |
| 4861.03 | B | 3 | 28.70 | 31.24 | ½-1½ | |
| 4701.33 | B | 2 | 28.71 | 31.33 | 1½-1½ | 3p' $^2$P°-3d' $^2$P (58) |
| 4691.47 | B | 1 | 28.70 | 31.33 | ½- ½ | |
| 4701.76 | B | 0 | 28.71 | 31.33 | 1½- ½ | |
| 4690.97 | B | 0 | 28.70 | 31.33 | ½-1½ | |
| *4469.32 | B | 3 | 28.71 | 31.47 | 1½-2½ | 3p' $^2$P°-4d$^4$D (59) |
| 4414.37 | C | 1 | 28.71 | 31.50 | 1½-1½ | 3p' $^2$P°-4d$^2$P (60) |
| 4328.82 | B | 2 | 28.71 | 31.56 | 1½- ½ | 3p' $^2$P°-3d' $^2$S (61) |
| 4319.93 | B | 1 | 28.70 | 31.58 | ½- ½ | |
| 3735.94 | B | 3 | 28.71 | 32.01 | 1½-2½ | 3p' $^2$P°-4s' $^2$D (62) |
| 3729.34 | B | 2 | 28.70 | 32.01 | ½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **O II** continued | | | | | | |
| 4334.39 | B | 0n | (28.73 | 31.58 | 2½-1½ | $3d^4D-4f^2D^o$ |
| | | | 28.73 | 31.58 | 1½-1½ | (63) |
| 4357.25 | B | 0 | 28.73 | 31.56 | 1½-2½ | |
| 4358.40 | B | 0 | 28.73 | 31.57 | 3½-3½ | $3d^4D-4f^4D^o$ |
| 4334.29 | B | 0n | 28.73 | 31.58 | 2½-2½ | (64) |
| 4308.98 | B | 1n | 28.73 | 31.59 | ½- ½ | |
| 4315.35 | C | 0d | 28.73 | 31.59 | 1½- ½ | |
| 4357.25 | B | 0 | 28.73 | 31.57 | 2½-3½ | |
| 4315.35 | C | 0d | 28.73 | 31.59 | ½-1½ | |
| 4332.78 | B | 1n | 28.73 | 31.58 | 3½-4½ | $3d^4D-4f^4G^o$ |
| 4344.42 | B | 0n | 28.73 | 31.57 | 2½-3½ | (65) |
| 4331.13 | C | 0d | 28.73 | 31.58 | 2½-3½ | $3d^4D-4f^2G^o$ (66) |
| 4275.52 | B | 4n | 28.73 | 31.62 | 3½-4½ | $3d^4D-4f^4F^o$ |
| 4276.71 | B | 1n | 28.73 | 31.62 | 2½-3½ | (87) |
| 4282.98 | B | 1n | 28.73 | 31.61 | 1½-2½ | |
| 4277.40 | B | 1n | 28.73 | 31.81 | ½-1½ | |
| 4277.90 | B | 1n | 28.73 | 31.62 | 3½-3½ | |
| 4283.13 | C | 0d | 28.73 | 31.81 | 2½-2½ | |
| 4283.75 | B | 0n | 28.73 | 31.61 | 1½-1½ | |
| 4274.13 | C | 00d | 28.73 | 31.62 | 3½-3½ | $3d^4D-4f^2F^o$ |
| 4276.21 | C | 0d | 28.73 | 31.62 | 2½-2½ | (68) |
| 4277.40 | B | 1n | 28.73 | 31.62 | 3½-2½ | |
| 4273.17 | B | 0n | 28.73 | 31.62 | 2½-3½ | |
| 4275.90 | C | 0d | 28.73 | 31.62 | 1½-2½ | |
| 3516.92 | B | 0n | 28.73 | 32.24 | 3½-3½ | $3d^4D-5p^4D^o$ |
| 3533.97 | B | 00n | 28.73 | 32.23 | 3½-2½ | (69) |
| 3495.44 | B | 0n | 28.73 | 32.26 | 3½-2½ | $3d^4D-5p^4P^o$ |
| 3506.02 | B | 0n | 28.73 | 32.25 | 2½-1½ | (70) |
| 3494.86 | B | 00n | 28.73 | 32.26 | 2½-2½ | |
| 3501.67 | B | 00n | 28.73 | 32.25 | ½-1½ | |
| 3453.31 | B | 0n | 28.73 | 32.31 | 2½-1½ | $3d^4D-5p^2D^o$ (71) |
| 3039.78 | B | 1 | 28.73 | 32.79 | 3½-3½ | $3d^4D-5f^4D^o$ |
| 3039.51 | B | 1 | 28.73 | 32.79 | 2½-3½ | (72) |
| 3028.82 | B | 1 | 28.73 | 32.81 | 3½-4½ | $3d^4D-5f^4G^o$ (73) |
| 3007.08 | B | 3 | 28.73 | 32.84 | 3½-4½ | $3d^4D-5f^4F^o$ |
| 3007.74 | C | 3dd | 28.73 | 32.84 | 2½-3½ | (74) |
| 3008.28 | B | 1 | 28.73 | 32.84 | 3½-3½ | |
| 4343.36 | C | 0d | 28.74 | 31.58 | 2½-2½ | $3d^2F-4f^4D^o$ |
| 4331.13 | C | 0d | 28.74 | 31.59 | 2½-1½ | (75) |
| 4371.85 | B | 2n | 28.76 | 31.58 | 3½-4½ | $3d^2F-4f^4G^o$ |
| 4353.60 | B | 1n | 28.74 | 31.57 | 2½-3½ | (76) |
| 4342.00 | B | 4n | 28.78 | 31.60 | 3½-4½ | $3d^2F-4f^2G^o$ |
| 4340.36 | B | 2n | 28.74 | 31.58 | 2½-3½ | (77) |
| 4313.43 | B | 1n | 28.76 | 31.62 | 3½-4½ | $3d^2F-4f^4F^o$ |
| 4285.70 | B | 3n | 28.74 | 31.62 | 2½-3½ | (78) |
| 4315.80 | C | 00d | 28.76 | 31.62 | 3½-3½ | |
| 4292.23 | B | 0n | 28.74 | 31.61 | 2½-2½ | |
| 4312.10 | B | 0n | 28.78 | 31.62 | 3½-3½ | $3d^2F-4f^2F^o$ |
| 4315.35 | C | 0d | 28.78 | 31.62 | 3½-2½ | (79) |
| 3500.5 | B | 00n | 28.74 | 32.26 | 2½-2½ | $3d^2F-5p^4P^o$ (80) |
| 3457.99 | B | 1n | 28.76 | 32.33 | 3½-2½ | $3d^2F-5p^2D^o$ |
| 3459.07 | B | 0n | 28.74 | 32.31 | 2½-1½ | (81) |
| 3047.9 | C | 0dd | 28.78 | 32.81 | 3½-4½ | $3d^2F-5f^4G^o$ (82) |
| 3032.08 | B | 2 | 28.78 | 32.83 | 3½-4½ | $3d^2F-5f^2G^o$ |
| 3032.50 | B | 1 | 28.74 | 32.81 | 2½-3½ | (83) |
| 3025.75 | B | 1 | 28.76 | 32.84 | 3½-4½ | $3d^2F-5f^4F^o$ (84) |
| 8627.82 | C | 3 | 28.82 | 30.66 | 1½-1½ | $3d^2P-4p^2P^o$ |
| 6878.19 | C | 0 | 28.83 | 30.68 | ½-1½ | (85) |
| 6666.94 | C | 1 | 28.82 | 30.67 | 1½- ½ | |
| 4491.25 | B | 3n | 28.82 | 31.56 | 1½-2½ | $3d^2P-4f^2D^o$ |
| 4489.48 | B | 1n | 28.83 | 31.58 | ½-1½ | (86) |
| 4468.32 | B | 2n | 28.82 | 31.58 | 1½-2½ | $3d^2P-4f^4D^o$ |
| 4478.08 | C | 0d | 28.83 | 31.59 | ½-1½ | (87) |
| 4477.88 | B | 2n | 28.82 | 31.57 | 1½-2½ | $3d^2P-4f^4G^o$ (88) |
| 4707.80 | C | 0 | 28.94 | 31.56 | 2½-2½ | $3d^2D-4f^2D^o$ |
| 4669.53 | B | 0 | 28.94 | 31.58 | 1½-1½ | (89) |
| 4689.33 | C | 0 | 28.94 | 31.58 | 1½-2½ | $3d^2D-4f^4D^o$ (90) |
| 4677.00 | C | 0 | 28.94 | 31.58 | 2½-3½ | $3d^2D-4f^2G^o$ (91) |
| 4613.87 | C | 1d | 28.94 | 31.62 | 2½-3½ | $3d^2D-4f^4F^o$ |
| 4610.14 | B | 3n | 28.94 | 31.81 | 1½-2½ | (92) |
| 4821.28 | C | 0d | 28.94 | 31.81 | 2½-2½ | |
| 4609.42 | B | 4n | 28.94 | 31.82 | 2½-3½ | $3d^2D-4f^2F^o$ |
| 4603.11 | B | 2n | 28.94 | 31.62 | 1½-2½ | (93) |
| 4813.11 | C | 0d | 28.94 | 31.62 | 2½-2½ | |
| 4485.40 | B | 4 | (30.29 | 33.08) | 2½-3½ | $sp^3 3s 8s^o$- |
| 4467.88 | B | 4 | (30.29 | 33.08) | 2½-2½ | $sp^3 3p^8P$ |
| 4489.32 | B | 3 | (30.29 | 33.06) | 2½-1½ | (94) |
| 3785.01 | B | 0n | 30.88 | 33.94 | 1½-2½ | $4p^3P^o-4d'\ ^2D$ (95) |
| 3374.77 | B | 00 | 30.88 | 34.34 | 1½-2½ | $4p^3P^o-5s'\ ^2D$ (98) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **O II** continued | | | | | | |
| 4060.58 | B | 3n | 31.01 | 34.05 | 3½-4½ | $3d'\ ^2F-4f'\ ^2G^o$ |
| 4060.98 | B | 2n | 31.01 | 34.05 | 2½-3½ | (97) |
| 4054.10 | C | 0d | 31.01 | 34.06 | 3½-3½ | $3d'\ ^2F-4f'\ ^2F^o$ |
| 4054.55 | C | 00d | 31.01 | 34.06 | 2½-2½ | (96) |
| 4024.04 | B | 1n | 31.01 | 34.08 | — | $3d'\ ^2F-4f'\ ^2F^o$ (99) |
| 4302.81 | C | 0d | 31.18 | 34.05 | 4½-4½ | $3d'\ ^2G-4f'\ ^2G^o$ |
| 4303.06 | C | 0d | 31.18 | 34.05 | 3½-3½ | (100) |
| 4253.74 | C | 4d | 31.18 | 34.09 | 4½-5½ | $3d'\ ^2G-4f'\ ^2H^o$ |
| 4253.98 | C | 4d | 31.18 | 34.09 | 3½-4½ | (101) |
| 4378.41 | C | 0 | 31.24 | 34.06 | 2½-3½ | $3d'\ ^2D-4f'\ ^2F^o$ |
| 4378.01 | C | 0 | 31.24 | 34.06 | 1½-2½ | (102) |
| 4343.38 | C | 0d | 31.24 | 34.08 | 2½-2½ | $3d'\ ^2D-4f'\ ^2D^o$ |
| 4342.83 | C | 1d | 31.24 | 34.08 | 1½-1½? | (103) |
| 4488.09 | B | 2n | 31.33 | 34.08 | 1½-2½ | $3d'\ ^2F-4f'\ ^2D^o$ |
| 4487.72 | B | 0n | 31.33 | 34.08 | ½-1½ | (104) |
| 4843.26 | B | 1n | 31.56 | 34.10 | 1½- | $3d'\ ^2G-4f'\ ^2F^o$ (105) |
| 4146.09 | B | 3 | (33.06 | 38.03) | 3½-4½ | $sp^3 3p^6P$- |
| 4143.77 | B | 2 | (33.06 | 36.03) | 2½-3½ | $sp^3 3d^6D^o$ |
| 4142.34 | B | 0 | (33.06 | 36.03) | 1½-2½ | (106) |
| 4145.90 | B | 0 | (33.06 | 38.03) | 3½-3½ | |
| 4143.52 | B | 1 | (33.06 | 36.03) | 2½-2½ | |
| 4141.96 | C | 1 | (33.06 | 38.03) | 1½-1½ | |
| 4142.08 | C | 1 | (33.06 | 38.04) | 1½- ½ | |
| 3218.10 | C | 2 | (33.06 | 36.89) | 3½-2½ | $sp^3 3p^6P$- |
| 3216.76 | C | 1 | (33.08 | 36.89) | 2½-2½ | $sp^3 4s^6g^o$ |
| 3218.08 | C | 0 | (33.06 | 36.89) | 1½-2½ | (107) |

Strongest Unclassified Lines Attributed to **O II**

| | | |
|---|---|---|
| 4506.50 | B | 2n |
| 3430.61 | B | 3n |
| 3419.87 | B | 2n |
| 3081.46 | B | 2n |
| 3006.83 | B | 3 |
| 3006.04 | B | 2 |
| 3005.82 | B | 2 |

**O III** I P 54.71 Anal B List A Sept 1943

| | | | | | | |
|---|---|---|---|---|---|---|
| 4239.5 | A | 00 | 33.01 | 35.92 | 1-1 | $3s^3P^o-3p^1P$ (1) |
| 3759.87 | A | 9 | 33.04 | 36.32 | 2-3 | $3s^3P^o-3p^3D$ |
| 3754.87 | A | 7 | 33.01 | 36.29 | 1-2 | (2) |
| 3757.31 | A | 5 | 32.99 | 36.28 | 0-1 | |
| 3791.26 | A | 6 | 33.04 | 36.29 | 2-2 | |
| 3774.00 | A | 6 | 33.01 | 36.28 | 1-1 | |
| 3810.96 | A | 2 | 33.04 | 36.28 | 2-1 | |
| 3340.74 | A | 6 | 33.04 | 38.73 | 2-1 | $3s^3P^o-3p^3S$ |
| 3313.30 | A | 5 | 33.01 | 38.73 | 1-1 | (3) |
| 3299.36 | A | 3 | 32.99 | 36.73 | 0-1 | |
| 3047.13 | A | 8 | 33.04 | 37.09 | 2-2 | $3s^3P^o-3p^3P$ |
| 3035.43 | A | 4 | 33.01 | 37.07 | 1-1 | (4) |
| 3059.30 | A | 6 | 33.04 | 37.07 | 2-1 | |
| 3043.02 | A | 5 | 33.01 | 37.06 | 1-0 | |
| 3023.45 | A | 5 | 33.01 | 37.09 | 1-2 | |
| 3024.57 | A | 4 | 32.99 | 37.07 | 0-1 | |
| 5592.37 | A | 8 | 33.71 | 35.92 | 1-1 | $3s^1P^o-3p^1P$ (5) |
| 2983.78 | A | 9 | 33.71 | 37.85 | 1-2 | $3s^1P^o-3p^1D$ (6) |
| 2983.66 | A | 1 | 35.92 | 40.05 | 1-2 | $3p^1P-3d^3F^o$ (7) |
| 3385.46 | A | 10 | 36.32 | 40.10 | 3-4 | $3p^3D-3d^3F^o$ |
| 3360.98 | A | 8 | 36.29 | 40.08 | 2-3 | (8) |
| 3367.31 | A | 5 | 38.28 | 40.05 | 1-2 | |
| 3284.57 | A | 4 | 36.32 | 40.08 | 3-3 | |
| 3281.94 | A | 3 | 36.29 | 40.05 | 2-2 | |
| 3305.77 | A | 0 | 36.32 | 40.05 | 3-2 | |
| 3252.94 | A | 2 | 38.29 | 40.09 | 2-2 | $3p^3D-3d^1D^o$ |
| 3238.57 | A | 5 | 36.28 | 40.09 | 1-2 | (9) |
| 3017.63 | A | 5 | 38.32 | 40.41 | 3-3 | $3p^3D-3d^3D^o$ |
| 3004.35 | A | 4 | 36.29 | 40.40 | 2-2 | (10) |
| 2998.51 | A | 3 | 36.28 | 40.40 | 1-1 | |
| 3024.38 | A | 1 | 36.32 | 40.40 | 3-2 | |
| 3008.79 | A | 3 | 36.29 | 40.40 | 2-1 | |
| 2997.71 | A | 2 | 36.29 | 40.41 | 2-3 | |
| 2992.11 | A | 2 | 36.28 | 40.40 | 1-2 | |
| 3363.83 | A | 1 | 38.73 | 40.40 | 1-2 | $3p^3S-3d^3D^o$ |
| 3389.40 | A | 00 | 36.73 | 40.40 | 1-1 | (11) |
| 3132.88 | A | 8 | 38.73 | 40.67 | 1-2 | $3p^3S-3d^3P^o$ |
| 3121.71 | A | 5 | 36.73 | 40.69 | 1-1 | (12) |
| 3115.73 | A | 4 | 36.73 | 40.69 | 1-0 | |
| 3440.39 | A | 4 | 36.82 | 40.41 | 2-3? | $2p^4\ ^1D-3d^3D^o$ (13) |
| 3715.08 | A | 8 | 37.09 | 40.41 | 2-3 | $3p^3P-3d^3D^o$ |
| 3707.24 | A | 6 | 37.07 | 40.40 | 1-2 | (14) |
| 3702.75 | A | 5 | 37.06 | 40.40 | 0-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **O III** continued | | | | | | |
| 3725.30 | A | 3 | 37.09 | 40.40 | 2-2 | $3p^3P-3d^3D^o$ |
| 3714.03 | A | 2 | 37.07 | 40.40 | 1-1 | (14) |
| 3732.13 | A | 1 | 37.09 | 40.40 | 2-1 | cont |
| 3444.10 | A | 5 | 37.09 | 40.67 | 2-2 | $3p^3P-3d^3P^o$ |
| 3415.29 | A | 3 | 37.07 | 40.69 | 1-1 | (15) |
| 3430.60 | A | 4 | 37.09 | 40.89 | 2-1 | |
| 3408.13 | A | 1 | 37.07 | 40.69 | 1-0 | |
| 3428.67 | A | 3 | 37.07 | 40.87 | 1-2 | |
| 3405.74 | A | 2 | 37.06 | 40.69 | 0-1 | |
| 5508.11 | A | 1 | 37.85 | 40.09 | 2-2 | $3p^1D-3d^1D^o$ (16) |
| 3981.59 | A | 8 | 37.85 | 40.98 | 2-3 | $3p^1D-3d^1F^o$ (17) |
| 3816.75 | A | 1 | 37.85 | 41.08 | 2-1 | $3p^1D-3d^1P^o$ (18) |
| 5288.06 | A | 2 | 38.74 | 41.08 | 0-1 | $3p^1S-3d^1P^o$ (19) |
| 3034.32 | A | 0 | 41.08 | 45.15 | 1-1 | $3d^1P^o-4p^1P$ (20) |
| 3703.37 | A | 5 | 41.78 | 45.11 | 3-4 | $3s^5P-3p^5D^o$ |
| 3698.70 | A | 5 | 41.78 | 45.10 | 2-3 | (21) |
| 3695.37 | A | 4 | 41.74 | 45.08 | 1-2 | |
| 3720.86 | A | 3 | 41.78 | 45.10 | 3-3 | |
| 3712.48 | A | 2 | 41.76 | 45.08 | 2-2 | |
| 3704.73 | A | 3 | 41.74 | 45.08 | 1-1 | |
| 3734.80 | A | 1 | 41.78 | 45.08 | 3-2 | |
| 3721.95 | A | 1 | 41.76 | 45.08 | 2-1 | |
| 3709.52 | A | 2 | 41.74 | 45.07 | 1-0 | |
| 3350.98 | A | 4 | 41.78 | 45.46 | 3-3 | $3s^5P-3p^5P^o$ |
| 3344.26 | A | 2 | 41.76 | 45.45 | 2-2 | (22) |
| 3336.78 | A | 3 | 41.74 | 45.44 | 1-1 | |
| 3362.38 | A | 4 | 41.78 | 45.45 | 3-2 | |
| 3350.68 | A | 3 | 41.76 | 45.44 | 2-1 | |
| 3333.00 | A | 4 | 41.76 | 45.46 | 2-3 | |
| 3330.40 | A | 4 | 41.74 | 45.45 | 1-2 | |
| 4081.10 | A | 1 | 43.24 | 46.27 | 2-3 | $3s^3P-3p^3D^o$ |
| 4073.90 | A | 0 | 43.22 | 46.25 | 1-2 | (23) |
| 3556.92 | A | 1 | 43.24 | 46.71 | 2-2 | $3s^3P-3p^3P^o$ (24) |
| 3455.12 | A | 5 | 45.11 | 48.68 | 4-5 | $3p^5D^o-3d^5F$ |
| 3450.94 | A | 4 | 45.10 | 48.67 | 3-4 | (25) |
| 3448.05 | P | 0+ | 45.08 | 48.66 | 2-3 | |
| 3446.73 | A | 2 | 45.08 | 48.66 | 1-2 | |
| 3447.22 | A | 1 | 45.07 | 48.65 | 0-1 | |
| 3466.15 | A | 2 | 45.11 | 48.67 | 4-4 | |
| 3459.98 | A | 2 | 45.10 | 48.66 | 3-3 | |
| 3454.90 | A | 2 | 45.08 | 48.66 | 2-2 | |
| 3451.33 | A | 1 | 45.08 | 48.65 | 1-1 | |
| 3466.90 | A | 0 | 45.10 | 48.68 | 3-2 | |
| 3459.52 | A | 0 | 45.08 | 48.65 | 2-1 | |
| 3088.04 | A | 2 | 45.11 | 49.11 | 4-4 | $3p^5D^o-3d^5D$ |
| 3083.65 | B | 1 | 45.10 | 49.10 | 3-3 | (26) |
| 3075.19 | B | 0 | 45.08 | 49.10 | 2-2 | |
| 3095.81 | B | 00 | 45.11 | 49.10 | 4-3 | |
| 3084.63 | B | 0 | 45.10 | 49.10 | 3-2 | |
| 3074.68 | B | 00 | 45.08 | 49.10 | 2-1 | |
| 3068.06 | B | 00 | 45.08 | 49.10 | 1-0 | |
| 3075.95 | B | 0 | 45.10 | 49.11 | 3-4 | |
| 3074.15 | B | 0 | 45.08 | 49.10 | 2-3 | |
| 3068.68 | B | 0 | 45.08 | 49.10 | 1-2 | |
| 3065.01 | B | 00 | 45.07 | 49.10 | 0-1 | |
| 3384.95 | A | 4 | 45.46 | 49.11 | 3-4 | $3p^5P^o-3d^5D$ |
| 3382.69 | A | 3 | 45.45 | 49.10 | 2-3 | (27) |
| 3394.28 | A | 1 | 45.46 | 49.10 | 3-3 | |
| 3383.85 | A | 2 | 45.45 | 49.10 | 2-2 | |
| 3376.82 | C | (1) | 45.44 | 49.10 | 1-1 | |
| 3355.92 | A | 3 | 45.46 | 49.14 | 3-3 | $3p^5P^o-3d^5P$ |
| 3336.78 | A | 3 | 45.45 | 49.15 | 2-2 | (28) |
| 3326.16 | A | 0 | 45.44 | 49.15 | 1-1 | |
| 3348.05 | A | 2 | 45.46 | 49.15 | 3-2 | |
| 3332.49 | A | 1 | 45.45 | 49.15 | 2-1 | |
| 3344.28 | A | 2 | 45.45 | 49.14 | 2-3 | |
| 3330.40 | A | 4 | 45.44 | 49.15 | 1-2 | |
| 3279.97 | C | (1) | 46.05 | 49.82 | 0-1 | $4p^1S-5d^1P^o$ (29) |
| 3728.82 | C | (1) | 46.27 | 49.58 | 3-4 | $3p^3D^o-3d^3F$ |
| 3738.49 | C | (0) | 46.25 | 49.56 | 2-3 | (30) |
| 3739.70 | A | 1 | 46.24 | 49.55 | 1-2 | |
| 3215.97 | B | 1 | 46.27 | 50.11 | 3-3 | $3p^3D^o-3d^3D$ |
| 3207.12 | P | | 46.25 | 50.10 | 2-2 | (31) |
| 3200.95 | A | 1 | 46.24 | 50.10 | 1-1 | |
| 4539.7 | A | 00 | 46.37 | 49.10 | 2-3 | $3p^5S^o-3d^5D$ (32) |
| 4461.56 | A | 1 | 46.37 | 49.14 | 2-3 | $3p^5S^o-3d^5P$ |
| 4447.82 | P | 0+ | 46.37 | 49.15 | 2-2 | (33) |
| 4440.1 | A | 0 | 46.37 | 49.15 | 2-1 | |
| 4555.30 | A | 0 | 46.71 | 49.42 | 2-2 | $3p^3P^o-3d^3P$ (34) |
| 3638.70 | A | 3 | 48.71 | 50.11 | 2-3 | $3p^3P^o-3d^3D$ |
| 3646.84 | A | 2 | 46.72 | 50.10 | 1-2 | (35) |
| 3653.00 | A | 1 | 46.72 | 50.10 | 0-1 | |
| 3645.20 | A | 1 | 46.71 | 50.10 | 2-2 | |
| 3650.70 | A | 0 | 46.72 | 50.10 | 1-1 | |
| 3649.20 | A | 00 | 46.71 | 50.10 | 2-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| O III continued | | | | | | |
| 4569.50 | A | 1n | 52.63 | 55.33 | 2–3† | $3p^1D^o$–$3d^1F$ (36) |
| 4474.95 | A | 1n | 52.63 | 55.39 | 2–2† | $3p^1D^o$–$3d^1D$ (37) |
| O IV I P 77.08 | Anal B | | List A | | Mar 1943 | |
| 3063.46 | B | 6 | 44.15 | 48.18 | ½–1½ | $3^2S$–$3^2P^o$ (1) |
| 3071.66 | B | 5 | 44.15 | 48.17 | ½– ½ | |
| 3411.76 | B | 4 | 48.18 | 51.79 | 1½–2½ | $3^2P^o$–$3^2D$ (2) |
| 3403.58 | B | 3 | 48.17 | 51.79 | ½–1½ | |
| 3413.71 | A | 1 | 48.18 | 51.79 | 1½–1½ | |
| 3385.55 | B | (6) | 54.19 | 57.84 | 2½–3½ | $3s^4P^o$–$3p^4D$ (3) |
| 3381.28 | B | (4) | 54.16 | 57.81 | 1½–2½ | |
| 3381.33 | P | | 54.14 | 57.79 | ½–1½ | |
| 3409.75 | B | (3) | 54.19 | 57.81 | 2½–2½ | |
| 3396.83 | B | (2) | 54.16 | 57.79 | 1½–1½ | |
| 3390.37 | P | | 54.14 | 57.78 | ½– ½ | |
| 3425.57 | B | (0) | 54.19 | 57.79 | 2½–1½ | |
| 3405.97 | P | | 54.16 | 57.78 | 1½– ½ | |
| 3349.11 | A | 3 | 55.93 | 59.62 | 1½–2½ | $3s^2P^o$–$3p^2D$ (4) |
| 3348.08 | A | 2 | 55.90 | 59.59 | ½–1½ | |
| 3378.09 | A | 0 | 55.93 | 59.59 | 1½–1½ | |
| 3052.54 | A | 1 | 55.93 | 59.97 | 1½– ½ | $3s^2P^o$–$3p^2S$ (5) |
| 3028.04 | A | 0 | 55.90 | 59.97 | ½– ½ | |
| •3736.78 | B | (4) | 57.84 | 61.14 | 3½–4½ | $3p^4D$–$3d^4F^o$ (6) |
| 3729.03 | B | (3) | 57.81 | 61.13 | 2½–3½ | |
| •3725.81 | B | (2) | (57.79 | 61.11 | 1½–2½ | |
| | | | 57.78 | 61.10 | ½–1½ | |
| 3758.45 | B | (0) | 57.84 | 61.13 | 3½–3½ | |
| 3744.73 | B | (0) | 57.81 | 61.11 | 2½–2½ | |
| 3736.78 | B | (4) | 57.79 | 61.10 | 1½–1½ | |
| 3774.38 | P | | 57.84 | 61.11 | 3½–2½ | |
| 3755.82 | P | | 57.81 | 61.10 | 2½–1½ | |
| 3209.64 | B | (3) | 57.84 | 61.68 | 3½–3½ | $3p^4D$–$3d^4D^o$ (7) |
| 3194.75 | B | (1) | 57.81 | 61.67 | 2½–2½ | |
| 3185.72 | B | (0) | 57.79 | 61.67 | 1½–1½ | |
| 3180.72 | B | (0) | 57.78 | 61.66 | ½– ½ | |
| 3216.31 | P | | 57.84 | 61.67 | 3½–2½ | |
| 3199.53 | B | (1) | 57.81 | 61.67 | 2½–1½ | |
| 3188.65 | P | | 57.79 | 61.66 | 1½– ½ | |
| 3188.17 | P | | 57.81 | 61.68 | 2½–3½ | |
| 3180.98 | P | | 57.79 | 61.67 | 1½–2½ | |
| 3177.80 | B | (0) | 57.78 | 61.67 | ½–1½ | |
| 3375.50 | B | (3) | 58.54 | 62.20 | 1½–2½ | $3p^4S$–$3d^4P^o$ (8) |
| 3362.63 | P | | 58.54 | 62.21 | 1½–1½ | |
| 3354.31 | A | — | 58.54 | 62.22 | 1½– ½ | |
| 4798.25 | B | (5) | 59.11 | 61.68 | 2½–3½ | $3p^4P$–$3d^4D^o$ (9) |
| 4783.43 | B | (4) | 59.09 | 61.67 | 1½–2½ | |
| 4772.57 | B | (2) | 59.08 | 61.67 | ½–1½ | |
| 4813.07 | B | (1) | 59.11 | 61.67 | 2½–2½ | |
| 4794.22 | B | (2) | 59.09 | 61.67 | 1½–1½ | |
| 4779.09 | B | (2) | 59.08 | 61.66 | ½– ½ | |
| 4823.93 | P | | 59.11 | 61.67 | 2½–1½ | |
| 4800.77 | P | | 59.09 | 61.66 | 1½– ½ | |
| 3995.17 | B | (2) | 59.11 | 62.20 | 2½–2½ | $3p^4P$–$3d^4P^o$ (10) |
| 3956.82 | P | | 59.09 | 62.21 | 1½–1½ | |
| 3930.63 | P | | 59.08 | 62.22 | ½– ½ | |
| 3977.10 | B | (1) | 59.11 | 62.21 | 2½–1½ | |
| 3945.29 | P | | 59.09 | 62.22 | 1½– ½ | |
| 3974.66 | P | | 59.09 | 62.20 | 1½–2½ | |
| 3942.14 | B | (0) | 59.08 | 62.21 | ½–1½ | |
| 5362.4 | P | | 59.62 | 61.92 | 2½–2½ | $3p^2D$–$3d^2D^o$ (11) |
| 5305.3 | P | | 59.59 | 61.91 | 1½–1½ | |
| 3563.36 | A | 2 | 59.62 | 63.08 | 2½–3½ | $3p^2D$–$3d^2F^o$ (12) |
| 3560.42 | A | 1 | 59.59 | 63.05 | 1½–2½ | |
| 3520.9 | P | | 59.97 | 63.48 | ½–1½ | $3p^2S$–$3d^2P^o$ (13) |
| 3502.2 | P | | 59.97 | 63.50 | ½– ½ | |
| 3489.84 | C | 1 | 64.03 | 67.57 | 1½–2½ | $3s'\ ^2P^o$–$3p'\ ^2D$ (14) |
| 3492.24 | C | 0 | 64.03 | 67.57 | ½–1½ | |
| 4568 | P | | 68.20 | 70.91 | — | $5^2P^o$–$6^2D$ (15) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| O V I P 113.38 | Anal B | | List A | | Feb 1943 | |
| 5114 | P | | 69.29 | 71.70 | 0–1 | $3^1S$–$3^1P^o$ (1) |
| 3144.68 | A | 1 | 71.70 | 75.63 | 1–2 | $3^1P^o$–$3^1D$ (2) |
| 5600 | P | | (71.92 | 74.13) | 2–3 | $3^3P^o$–$3^3D$ (3) |
| 5582 | P | | (71.91 | 74.12) | 1–2 | |
| 5573 | P | | (71.91 | 74.12) | 0–1 | |
| 5606 | P | | (71.92 | 74.12) | 2–2 | |
| 5584 | P | | (71.91 | 74.12) | 1–1 | |
| 5608 | P | | (71.92 | 74.12) | 2–1 | |
| 4123.90 | A | 2 | (80.63 | 83.62) | 2–3 | $3s^3P^o$–$3p^3D$ (4) |
| 4120 | P | | (80.58 | 83.58) | 1–2 | |
| 4123 | P | | (80.56 | 83.56) | 0–1 | |
| 4179 | P | | (80.63 | 83.58) | 2–2 | |
| 4151 | P | | (80.58 | 83.56) | 1–1 | |
| 4211 | P | | (80.63 | 83.56) | 2–1 | |
| 3375.67 | A | 0 | (80.63 | 84.39) | 2–1 | $3s^3P^o$–$3p^3S$ (5) |
| 3239 | P | | (80.58 | 84.39) | 1–1 | |
| 3222 | P | | (80.56 | 84.39) | 0–1 | |
| 3058.68 | A | 0 | 82.03 | 86.07 | 1–2 | $3s^1P^o$–$3p^1D$ (8) |
| 4554.28 | A | 0 | 83.04 | 85.75 | 1–2 | $3p^1P$–$3d^1D^o$ (7) |
| 3747 | P | | (83.62 | 86.91) | 3–3 | $3p^3D$–$3d^3D^o$ (8) |
| 3717 | P | | (83.58 | 86.90) | 2–2 | |
| 3701 | P | | (83.58 | 86.89) | 1–1 | |
| 3762 | P | | (83.62 | 88.90) | 3–2 | |
| 3726 | P | | (83.58 | 86.89) | 2–1 | |
| 3703 | P | | (83.58 | 86.91) | 2–3 | |
| 3692 | P | | (83.58 | 86.90) | 1–2 | |
| 3298 | P | | (83.62 | 87.36) | 3–2 | $3p^3D$–$3d^3P^o$ (9) |
| 3249 | P | | (83.58 | 87.38) | 2–1 | |
| 3222 | P | | (83.56 | 87.39) | 1–0 | |
| 3264 | P | | (83.58 | 87.36) | 2–2 | |
| 3230 | P | | (83.56 | 87.38) | 1–1 | |
| 3245 | P | | (83.56 | 87.36) | 1–2 | |
| 4925 | P | | (84.39 | 86.90) | 1–2 | $3p^3S$–$3d^3D^o$ (10) |
| 4940 | P | | (84.39 | 86.89) | 1–1 | |
| 4158.76 | A | 0 | (84.39 | 87.36) | 1–2 | $3p^3S$–$3d^3P^o$ (11) |
| 4135.9 | P | | (84.39 | 87.38) | 1–1 | |
| 4121.7 | P | | (84.39 | 87.39) | 1–0 | |
| 6830 | P | | (85.11 | 86.91) | 2–3 | $3p^3P$–$3d^3D^o$ (12) |
| 6790 | P | | (85.08 | 86.90) | 1–2 | |
| 6767 | P | | (85.07 | 86.89) | 0–1 | |
| 6878 | P | | (85.11 | 86.90) | 2–2 | |
| 6819 | P | | (85.08 | 86.89) | 1–1 | |
| 6909 | P | | (85.11 | 86.89) | 2–1 | |
| 5473 | P | | (85.11 | 87.36) | 2–2 | $3p^3P$–$3d^3P^o$ (13) |
| 5376 | P | | (85.08 | 87.38) | 1–1 | |
| 5432 | P | | (85.11 | 87.38) | 2–1 | |
| 5352 | P | | (85.08 | 87.39) | 1–0 | |
| 5417 | P | | (85.08 | 87.36) | 1–2 | |
| 5343 | P | | (85.07 | 87.38) | 0–1 | |
| 6329 | P | | 86.07 | 88.02 | 2–3 | $3p^1D$–$3d^1F^o$ (14) |
| 4522 | P | | 86.07 | 88.79 | 2–1 | $3p^1D$–$3d^1P^o$ (15) |
| 3702 | P | | 88.79 | 92.13 | 1–2 | $3d^1P^o$–$4^1D$ (16) |
| 7438 | P | | (89.15 | 90.81) | — | $4^3S$–$4^3P^o$ (17) |
| O VI I P 137.52 | Anal A | | List A | | Feb 1943 | |
| 3811.35 | A | 2 | 79.01 | 82.25 | ½–1½ | $3^2S$–$3^2P^o$ (1) |
| 3834.24 | A | 1 | 79.01 | 82.23 | ½– ½ | |
| 3068 | P | | 123.46 | 127.49 | ½– | $6^2S$–$7^2P^o$ (2) |
| 3622 | P | | 123.84 | 127.25 | — | $6^2P^o$–$7^2S$ (3) |
| 3314 | P | | 123.84 | 127.57 | — | $6^2P^o$–$7^2D$ (4) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| O VI continued | | | | | | |
| 3509 | P | | 123.97 | 127.49 | — | $6^2D$–$7^2P^o$ (5) |
| 3426 | P | | 123.97 | 127.57 | — | $6^2D$–$7^2F^o$ (6) |
| 3438 | P | | 123.98 | 127.57 | — | $6^2F^o$–$7^2D$ (7) |
| 3433 | P | | 123.98 | 127.57 | — | $6^2F^o$–$7^2G$ (8) |
| 3434 | P | | 123.98 | 127.57 | — | $6^2G$–$7^2H^o$ et (9) |
| 4751 | P | | 127.25 | 129.85 | ½– | $7^2S$–$8^2P^o$ (10) |
| 5602 | P | | 127.49 | 129.69 | –½ | $7^2P^o$–$8^2S$ (11) |
| 5112 | P | | 127.49 | 129.90 | — | $7^2P^o$–$8^2D$ (12) |
| 5410 | P | | 127.57 | 129.85 | — | $7^2D$–$8^2P^o$ (13) |
| 5279 | P | | 127.57 | 129.90 | — | $7^2D$–$8^2F^o$ (14) |
| 5298 | P | | 127.57 | 129.90 | — | $7^2F^o$–$8^2D$ (15) |
| 5289 | P | | 127.57 | 129.90 | — | $7^2F^o$–$8^2G$ (16) |
| 5292 | P | | 127.57 | 129.90 | — | $7^2G$–$8^2F^o$ (17) |
| 5291 | P | | 127.57 | 129.90 | — | $7^2G$–$8^2H^o$ etc (18) |
| F I I P 17.35 | Anal C | | List D | | May 1944 | |
| 7398.68 | A | 17 | 12.64 | 14.31 | 2½–2½ | $3s^4P$–$3p^4P^o$ (1) |
| 7482.72 | A | 11 | 12.68 | 14.33 | 1½–1½ | |
| 7514.93 | A | 9 | 12.70 | 14.34 | ½– ½ | |
| 7331.95 | A | 15 | 12.64 | 14.33 | 2½–1½ | |
| 7425.64 | A | 14 | 12.68 | 14.34 | 1½– ½ | |
| 7552.24 | A | 14 | 12.68 | 14.31 | 1½–2½ | |
| 7573.41 | A | 14 | 12.70 | 14.33 | ½–1½ | |
| 8856.02 | A | 16 | 12.64 | 14.44 | 2½–3½ | $3s^4P$–$3p^4D^o$ (2) |
| 6902.46 | A | 15 | 12.68 | 14.46 | 1½–2½ | |
| 6909.82 | A | 13 | 12.70 | 14.48 | ½–1½ | |
| 8773.97 | A | 11 | 12.64 | 14.46 | 2½–2½ | |
| 6834.28 | A | 12 | 12.68 | 14.48 | 1½–1½ | |
| 6870.22 | A | 12 | 12.70 | 14.49 | ½– ½ | |
| 8708.27 | A | 7 | 12.64 | 14.48 | 2½–1½ | |
| 6795.53 | A | 9 | 12.68 | 14.49 | 1½– ½ | |
| 6239.64 | A | 16 | 12.64 | 14.62 | 2½–1½ | $3s^4P$–$3p^4S^o$ (3) |
| 6348.50 | A | 15 | 12.68 | 14.62 | 1½–1½ | |
| 6413.86 | A | 14 | 12.70 | 14.62 | ½–1½ | |
| 7754.70 | A | 19 | 12.93 | 14.52 | 1½–2½ | $3s^2P$–$3p^2P^o$ (4) |
| 7800.22 | A | 18 | 12.97 | 14.55 | ½–1½ | |
| 7607.17 | A | 15 | 12.93 | 14.55 | 1½–1½ | |
| 7311.02 | A | 13 | 12.93 | 14.62 | 1½– ½ | $3s^2P$–$3p^2S^o$ (5) |
| 7489.14 | A | 8 | 12.97 | 14.62 | ½– ½ | |
| 7037.45 | A | 15 | 12.93 | 14.68 | 1½–1½ | $3s^2P$–$3p^2P^o$ (6) |
| 7127.88 | A | 14 | 12.97 | 14.70 | ½– ½ | |
| 6966.35 | A | 10 | 12.93 | 14.70 | 1½– ½ | |
| 7202.37 | A | 13 | 12.97 | 14.68 | ½–1½ | |
| F II I P 34.84 | Anal B | | List D | | May 1944 | |
| 3847.086 | A | 20 | (21.81 | 25.03) | 2–3 | $3s^5S^o$–$3p^5P$ (1) |
| 3849.987 | A | 15 | (21.81 | 25.01) | 2–2 | |
| 3851.667 | A | 10 | (21.81 | 25.01) | 2–1 | |
| 4024.727 | A | 20 | 22.57 | 25.64 | 1–2 | $3s^3S^o$–$3p^3P$ (2) |
| 4025.495 | A | 15 | 22.57 | 25.64 | 1–1 | |
| 4025.010 | A | 10 | 22.57 | 25.64 | 1–0 | |
| 3505.614 | A | 15 | (25.02 | 28.54) | 3–4 | $3p^5P$–$3d^5D^o$† (3) |
| 3503.095 | A | 12 | (25.01 | 28.54) | 2–3 | |
| 3502.954 | A | 8 | (25.01 | 28.54) | 2–2 | |
| 3501.416 | A | 10 | (25.01 | 28.54) | 1–0 | |
| 4103.525 | A | 15 | 25.64 | 28.65 | 2–3 | $3p^3P$–$3d^3D^o$† (4) |
| 4103.085 | A | 10 | 25.64 | 28.65 | 1–2 | |
| 4103.724 | A | 7 | 25.64 | 28.65 | 0–1 | |
| 4103.871 | A | 7 | 25.64 | 28.85 | 2–2 | |

| I A | Laboratory Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| II continued | | | | | | |
| 109.173 | A | 8 | 26.15 | 29.18 | 3-3 | 3s' $^3$P°-3p' $^3$D† |
| 118.547 | A | 7 | 26.16 | 29.16 | 2-2 | (5) |
| 119.219 | A | 7 | 26.16 | 29.16 | 1-1 | |
| 541.785 | A | 9 | 26.15 | 29.64 | 3-2 | 3s' $^3$P°-3p' $^3$P† |
| 536.838 | A | 7 | 26.18 | 29.85 | 2-1 | (8) |
| 399.177 | A | 10 | 26.55 | 29.42 | 2-3 | 3s' $^1$P°-3p' $^1$F (7) |
| 302.740 | A | 10 | 26.55 | 30.40 | 2-2 | 3s' $^1$P°-3p' $^1$D (8) |
| 846.18 | A | 15n | (28.54 | 31.44) | — | 3d$^5$D°-4f$^5$F (9) |
| 447.18 | A | 12n | 28.65 | 31.42 | 3- | 3d$^3$D°-4f$^3$F† |
| 446.71 | A | 10n | 28.65 | 31.42 | 2- | (10) |
| 640.891 | A | 9 | 29.32 | 32.71 | 4-4 | 3p' $^3$F-3d' $^3$F°† |
| 641.985 | A | 8 | 29.32 | 32.71 | -3 | (11) |
| 842.798 | A | 7 | 29.32 | 32.71 | -2 | |

| III | I P 62.39 | | Anal A | | List D | May 1944 |
|---|---|---|---|---|---|---|
| 121.515 | A | 12 | 39.18 | 43.12 | 2½-3½ | 3s$^4$P-3p$^4$D° |
| 115.689 | A | 10 | 39.12 | 43.08 | 1½-2½ | (1) |
| 113.579 | A | 8 | 39.10 | 43.06 | ½-1½ | |
| 146.962 | A | 8 | 39.18 | 43.08 | 2½-2½ | |
| 134.208 | A | 8 | 39.12 | 43.06 | 1½-1½ | |
| 134.762 | A | 8 | 39.10 | 43.05 | ½- ½ | |
| 185.86 | P | | 39.16 | 43.06 | 2½-1½ | |
| 145.536 | A | 4 | 39.12 | 43.05 | 1½- ½ | |
| 174.125 | A | 12 | 40.11 | 43.99 | 1½-2½ | 3s$^2$P-3p$^2$D° |
| 174.725 | A | 10 | 40.06 | 43.95 | ½-1½ | (2) |
| 213.972 | A | 6 | 40.11 | 43.95 | 1½-1½ | |
| 039.254 | A | 7 | 46.94 | 51.00 | 2½-3½ | 3p' $^2$D°-3d' $^2$F |
| 039.746 | A | 8 | 46.95 | 51.01 | 1½-2½ | (3) |
| 034.54 | A | 1.5 | 48.94 | 51.01 | 2½-2½ | |
| 154.387 | A | 4 | 47.46 | 51.38 | 1½-2½ | 3p' $^2$P°-3d' $^2$D |
| 142.777 | A | 3 | 47.45 | 51.38 | ½-1½ | (4) |
| 156.11 | B | 0 | 47.48 | 51.38 | 1½-1½ | |

IV See Introduction

VI See Introduction

| Ne I | I P 21.47 | | Anal A | | List C | May 1944 |
|---|---|---|---|---|---|---|
| 7032.4127 | A | (10) | 16.55 | 18.30 | 2-1 | 3s 1°-3p 1 |
| 6402.2455 | B | (20) | 16.55 | 18.48 | 2-3 | (1) -3p 2 |
| 6334.4279 | A | (10) | 18.55 | 18.50 | 2-2 | -3p 3 |
| 8217.2813 | A | (15) | 16.55 | 18.53 | 2-1 | -3p 4 |
| 6143.0623 | A | (12) | 16.55 | 18.56 | 2-2 | -3p 5 |
| 5975.5340 | A | (12) | 16.55 | 18.81 | 2-1 | -3p 7 |
| 5944.8342 | A | (10) | 16.55 | 18.62 | 2-2 | -3p 8 |
| 5881.8950 | A | (20) | 16.55 | 18.65 | 2-1 | -3p 9 |
| 3472.5711 | C | (10) | 16.55 | 20.10 | 2-3 | 3s 1°-4p 2 |
| 3369.9081 | C | (15) | 16.55 | 20.21 | 2-1 | (2) -4p 9 |
| 3369.8086 | C | (10) | 16.55 | 20.21 | 2-2 | -4p 8 |
| 7245.1668 | B | (10) | 16.60 | 18.30 | 1-1 | 3s 2°-3p 1 |
| 6506.5279 | A | (15) | 16.60 | 18.50 | 1-2 | (3) -3p 3 |
| 6382.9914 | A | (12) | 16.60 | 18.53 | 1-1 | -3p 4 |
| 6074.3377 | A | (10) | 16.60 | 18.63 | 1-0 | -3p 6 |
| 6029.9971 | A | (10) | 16.60 | 18.65 | 1-1 | -3p 9 |
| 5400.5620 | B | (50) | 16.60 | 18.88 | 1-0 | -3p 10 |
| 3417.9036 | C | (10) | 16.60 | 20.21 | 1-2 | 3s 2°-4p 8 (4) |
| 6266.4950 | A | (15) | 16.64 | 18.61 | 0-1 | 3s 3°-3p 7 |
| 6163.5939 | A | (12) | 16.64 | 18.65 | 0-1 | (5) -3p 9 |
| 8082.4580 | B | 200 | 16.78 | 18.30 | 1-1 | 3s 4°-3p 1 |
| 7173.9389 | B | (10) | 16.78 | 18.50 | 1-2 | (6) -3p 3 |
| 7024.0508 | B | (9) | 16.78 | 18.53 | 1-1 | -3p 4 |
| 6929.4678 | B | (10) | 16.78 | 18.56 | 1-2 | -3p 5 |
| 6678.2764 | A | (9) | 16.78 | 18.62 | 1-2 | -3p 8 |
| 6598.9529 | A | (15) | 16.78 | 18.65 | 1-1 | -3p 9 |
| 5852.4878 | A | (50) | 16.78 | 18.88 | 1-0 | -3p 10 |
| 3593.5259 | C | (10) | 16.78 | 20.21 | 1-2 | 3s 4°-4p 8 |
| 3520.4717 | C | (20) | 16.78 | 20.28 | 1-0 | (7) -4p 10 |
| 9665.426 | D | 1000 | 18.30 | 19.58 | 1-2 | 3p 1-4s 1° |
| 9486.680 | B | 500 | 18.30 | 19.60 | 1-1 | (8)-4s 2° |
| 8988.58 | D | 200 | 18.30 | 19.68 | 1-0 | -4s 3° |
| 8865.759 | B | 500 | 18.30 | 19.69 | 1-1 | -4s 4° |
| 5343.284 | B | (12) | 18.30 | 20.61 | 1-0 | 3p 1-4d 1° |
| 5341.096 | B | (20) | 18.30 | 20.61 | 1-1 | (9)-4d 2° |
| 5330.779 | B | (12) | 18.30 | 20.62 | 1-2 | -4d 5° |
| 4827.338 | B | (10) | 18.30 | 20.86 | 1-1 | 3p 1-6s 2° (10) |
| 4710.058 | E | (10) | 18.30 | 20.92 | 1-0 | 3p 1-5d 1° |
| 4708.854 | B | (12) | 18.30 | 20.92 | 1-1 | (11)-5d 2° |
| 4704.395 | B | (15) | 18.30 | 20.93 | 1-2 | -5d 5° |
| 4537.751 | B | (10) | 18.30 | 21.02 | 1-2 | -5d 9° |
| 8377.6068 | B | 800 | 18.48 | 19.95 | 3-4 | 3p 2-3d 3° |
| 8376.41 | D | 200 | 18.48 | 19.95 | 3-3 | (12)-3d 4° |
| 8300.3258 | B | 600 | 18.48 | 19.96 | 3-3 | -3d 8° |

| Ne I | | | | | | |
|---|---|---|---|---|---|---|
| 5784.419 | B | (15) | 18.48 | 20.62 | 3-4 | 3p 2-4d 3° |
| 5748.299 | B | (10) | 18.48 | 20.62 | 3-3 | (13)-4d 8° |
| 5037.7505 | B | (10) | 18.48 | 20.93 | 3-4 | 3p 2-5d 3° (14) |
| 4788.9258 | B | (12) | 18.48 | 21.05 | 3-2 | 3p 2-7s 1° (15) |
| 4715.344 | B | (15) | 18.48 | 21.09 | 3-4 | 3p 2-6d 3° |
| 4712.060 | E | (10) | 18.48 | 21.09 | 3-3 | (16)-6d 8° |
| 4540.376 | B | (10) | 18.48 | 21.19 | 3-4 | 3p 2-7d 3° (17) |
| 8495.3600 | B | 500 | 18.50 | 19.95 | 2-3 | 3p 3-3d 4° |
| 8418.4274 | B | 400 | 18.50 | 19.96 | 2-2 | (18)-3d 7° |
| 7943.1802 | B | 200 | 18.50 | 20.05 | 2-3 | -3d 10° |
| 5820.155 | B | (10) | 18.50 | 20.62 | 2-3 | 3p 3-4d 4° |
| 5804.4488 | B | (10) | 18.50 | 20.62 | 2-2 | (19)-4d 7° |
| 5562.769 | B | (10) | 18.50 | 20.71 | 2-3 | -4d 10° |
| *4884.915 | B | (10) | 18.50 | 21.02 | 2-3 | 3p 3-5d 10° (20) |
| 4752.7313 | B | (10) | 18.50 | 21.09 | 2-3 | 3p 3-6d 4° (21) |
| 10798.12 | F | 150 | 18.53 | 19.68 | 1-0 | 3p 4-4s 3° (22) |
| 8704.15 | D | 200 | 18.53 | 19.95 | 1-2 | 3p 4-3d 5° |
| 8681.920 | B | 500 | 18.53 | 19.95 | 1-1 | (23)-3d 6° |
| 8634.6480 | B | 600 | 18.53 | 19.96 | 1-2 | -3d 7° |
| 8136.4060 | B | 300 | 18.53 | 20.05 | 1-2 | -3d 9° |
| 5656.6585 | B | (10) | 18.53 | 20.71 | 1-2 | 3p 4-4d 9° (24) |
| 4957.0334 | B | (10) | 18.53 | 21.02 | 1-2 | 3p 4-5d 11° (25) |
| 10844.54 | F | 200 | 18.56 | 19.69 | 2-1 | 3p 5-4s 4° (26) |
| 8919.50 | D | 300 | 18.56 | 19.94 | 2-1 | 3p 5-3d 2° |
| 8853.867 | B | 700 | 18.56 | 19.95 | 2-2 | (27)-3d 5° |
| 8780.6223 | B | 1200 | 18.56 | 19.96 | 2-3 | -3d 8° |
| 8266.076 | B | 250 | 18.56 | 20.05 | 2-3 | -3d 10° |
| 5974.828 | B | (10) | 18.56 | 20.62 | 2-3 | 3p 5-4d 8° |
| 5719.2254 | B | (10) | 18.56 | 20.71 | 2-3 | (28)-4d 10° |
| 5005.160 | B | (10) | 18.56 | 21.02 | 2-3 | 3p 5-5d 10° (29) |
| 9226.67 | D | 200 | 18.61 | 19.95 | 1-2 | 3p 7-3d 5° |
| 9201.78 | D | 600 | 18.61 | 19.95 | 1-1 | (30)-3d 6° |
| 9148.68 | D | 600 | 18.61 | 19.96 | 1-2 | -3d 7° |
| 8591.2584 | B | 400 | 18.61 | 20.05 | 1-2 | -3d 9° |
| 5872.828 | B | (10) | 18.61 | 20.71 | 1-2 | 3p 7-4d 9° (31) |
| 4790.218 | B | (10) | 18.61 | 21.19 | 1-2 | 3p 7-6d 11° (32) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ne I** continued | | | | | | |
| 9373.28 | D | 300 | 18.82 | 19.94 | 2-1 | 3p 6-3d 2° |
| 9313.98 | D | 300 | 18.62 | 19.95 | 2-3 | (33)-3d 4° |
| 9300.85 | D | 600 | 18.62 | 19.95 | 2-2 | -3d 5° |
| 9221.59 | D | 200 | 18.62 | 19.96 | 2-2 | -3d 7° |
| 9220.05 | D | 400 | 18.62 | 19.96 | 2-3 | -3d 8° |
| 8654.51 | D | 400 | 18.62 | 20.05 | 2-2 | -3d 9° |
| 8654.3835 | B | 1500 | 18.62 | 20.05 | 2-3 | -3d 10° |
| 8647.05 | D | 300 | 18.62 | 20.05 | 2-2 | -3d 11° |
| 5145.011 | E | (10) | 18.82 | 21.02 | 2-2 | 3p 8-5d 11° |
| 5144.9376 | B | (10) | 18.62 | 21.02 | 2-3 | (34)-5d 10° |
| •4884.915 | B | (10) | 18.62 | 20.57 | 2-1 | 3p 8-5s 4° (35) |
| 9425.38 | D | 500 | 18.63 | 19.94 | 0-1 | 3p 6-3d 2° |
| 9326.52 | D | 600 | 18.63 | 19.95 | 0-1 | (36)-3d 8° |
| 8679.491 | B | 500 | 18.63 | 20.05 | 0-1 | 3p 6-3d 12° (37) |
| 9547.40 | D | 300 | 18.65 | 19.94 | 1-0 | 3p 9-3d 1° |
| 9534.17 | D | 500 | 18.65 | 19.94 | 1-1 | (38)-3d 2° |
| 9459.21 | D | 300 | 18.85 | 19.95 | 1-2 | -3d 5° |
| 8783.755 | B | 1000 | 18.65 | 20.05 | 1-2 | -3d 11° |
| 8771.70 | D | 400 | 16.65 | 20.05 | 1-1 | -3d 12° |
| 5965.474 | B | (10) | 18.65 | 20.71 | 1-2 | 3p 9-4d 11° (39) |
| 10562.43 | F | 200 | 18.86 | 20.05 | 0-1 | 3p 10-3d 12° (40) |

For changes in Paschen's notation see text § 37

**Ne II** I P 40.91 Anal A List A June 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 3694.22 | A | 10 | 27.05 | 30.39 | 2½-2½ | $3s^4P-3p^4P^o$ |
| 3734.94 | A | 7 | 27.12 | 30.42 | 1½-1½ | (1) |
| 3751.26 | A | 5 | 27.15 | 30.44 | ½- ½ | |
| 3664.09 | A | 9 | 27.05 | 30.42 | 2½-1½ | |
| 3709.64 | A | 7 | 27.12 | 30.44 | 1½- ½ | |
| 3766.29 | A | 6 | 27.12 | 30.39 | 1½-2½ | |
| 3777.16 | A | 8 | 27.15 | 30.42 | ½-1½ | |
| 3334.87 | A | 10 | 27.05 | 30.75 | 2½-3½ | $3s^4P-3p^4D^o$ |
| 3355.05 | A | 7 | 27.12 | 30.79 | 1½-2½ | (2) |
| 3360.63 | A | 5 | 27.15 | 30.83 | ½-1½ | |
| 3297.74 | A | 7 | 27.05 | 30.79 | 2½-2½ | |
| 3327.16 | A | 5 | 27.12 | 30.83 | 1½-1½ | |
| 3344.43 | A | 5 | 27.15 | 30.84 | ½- ½ | |
| 3270.79 | A | 2 | 27.05 | 30.83 | 2½-1½ | |
| 3311.30 | A | 3 | 27.12 | 30.84 | 1½- ½ | |
| 3135.82 | A | 1 | 27.05 | 30.99 | 2½-3½ | $3s^4P-3p^2D^o$ |
| 3187.60 | A | 2 | 27.12 | 30.99 | 1½-2½ | (3) |
| 3001.65 | A | 8 | 27.12 | 31.33 | 1½-1½ | $3s^4P-3p^4S^o$ † |
| 3028.84 | A | 4 | 27.15 | 31.33 | ½-1½ | (4) |
| 3713.09 | A | 10 | 27.66 | 30.99 | 1½-2½ | $3s^2P-3p^2D^o$ |
| 3727.08 | A | 9 | 27.74 | 31.05 | ½-1½ | (5) |
| 3643.89 | A | 5 | 27.66 | 31.05 | 1½-1½ | |
| 3481.96 | A | 8 | 27.86 | 31.31 | 1½- ½ | $3s^2P-3p^2S^o$ |
| 3557.84 | A | 4 | 27.74 | 31.31 | ½- ½ | (8) |
| 3323.75 | A | 7 | 27.66 | 31.38 | 1½-1½ | $3s^2P-3p^2P^o$ |
| 3378.28 | A | 5 | 27.74 | 31.39 | ½- ½ | (7) |
| 3309.78 | A | 3 | 27.66 | 31.39 | 1½- ½ | |
| 3392.78 | A | 5 | 27.74 | 31.38 | ½-1½ | |
| 3034.48 | A | 5 | 30.39 | 34.46 | 2½-3½ | $3p^4P^o-3d^4D$ |
| 3047.57 | A | 8 | 30.42 | 34.47 | 1½-2½ | (8) |
| 3054.89 | A | 5 | 30.44 | 34.48 | ½-1½ | |
| 3027.04 | A | 4 | 30.39 | 34.47 | 2½-2½ | |
| 3037.73 | A | 4 | 30.42 | 34.48 | 1½-1½ | |
| 3045.58 | A | 4 | 30.44 | 34.50 | ½- ½ | |
| 3017.34 | A | 3 | 30.39 | 34.48 | 2½-1½ | |
| 3568.53 | A | 8 | 30.42 | 33.88 | 2½-3½ | $3s'\ ^2D-3p'\ ^2F^o$ |
| 3574.64 | A | 5 | 30.42 | 33.87 | 1½-2½ | (9) |
| 3574.23 | A | 0 | 30.42 | 33.87 | 2½-2½ | |
| 3345.49 | A | 3 | 30.42 | 34.11 | 2½-1½ | $3s'\ ^2D-3p'\ ^2P^o$ |
| 3319.75 | A | 3 | 30.42 | 34.14 | 1½- ½ | (10) |
| •3345.88 | A | 1 | 30.42 | 34.11 | 1½-1½ | |
| 3230.18 | A | 5 | 30.42 | 34.24 | 2½-2½ | $3s'\ ^2D-3p'\ ^2D^o$ |
| 3232.38 | A | 3 | 30.42 | 34.24 | 1½-1½ | (11) |
| 3231.97 | A | 0 | 30.42 | 34.24 | 2½-1½ | |
| 3329.20 | A | 4 | 30.75 | 34.48 | 3½-3½ | $3p^4D^o-3d^4D$ |
| 3357.90 | A | 3 | 30.79 | 34.47 | 2½-2½ | (12) |
| 3374.10 | A | 3 | 30.83 | 34.48 | 1½-1½ | |
| 3379.39 | A | 1 | 30.84 | 34.50 | ½- ½ | |
| 3320.29 | A | 2 | 30.75 | 34.47 | 3½-2½ | |
| •3345.88 | A | 1 | 30.79 | 34.48 | 2½-1½ | |
| 3362.89 | A | 2 | 30.83 | 34.50 | 1½- ½ | |
| 3387.05 | P | | 30.79 | 34.48 | 2½-3½ | |
| 3386.24 | A | 2 | 30.83 | 34.47 | 1½-2½ | |
| 3390.58 | A | 2 | 30.84 | 34.48 | ½-1½ | |
| 3218.31 | A | 8 | 30.75 | 34.59 | 3½-4½ | $3p^4D^o-3d^4F$ |
| 3198.82 | A | 5 | 30.79 | 34.65 | 2½-3½ | (13) |
| 3190.88 | A | 2 | 30.83 | 34.69 | 1½-2½ | |
| 3213.70 | A | 3 | 30.84 | 34.68 | ½-1½ | |
| 3184.48 | A | 3 | 30.75 | 34.65 | 3½-3½ | |
| 3165.70 | A | 4 | 30.79 | 34.69 | 2½-2½ | |
| 3198.88 | P | | 30.83 | 34.68 | 1½-1½ | |
| 3132.22 | A | 2 | 30.75 | 34.68 | 2½-2½ | |
| 3173.58 | A | 3 | 30.79 | 34.68 | ½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ne II** continued | | | | | | |
| 3208.99 | A | 2 | 30.75 | 34.60 | 3½-3½ | $3p^4D^o-3d^2F$ |
| 3188.74 | A | 3 | 30.79 | 34.66 | 2½-2½ | (14) |
| 3154.82 | A | 1 | 30.75 | 34.66 | 3½-2½ | |
| 3244.15 | A | 5 | 30.79 | 34.60 | 2½-3½ | |
| 3214.38 | A | 5 | 30.63 | 34.66 | 1½-2½ | |
| 3243.34 | A | 2 | 30.79 | 34.60 | 2½-2½ | $3p^4D^o-3d^2D$ |
| 3248.15 | A | 3dr | 30.83 | 34.62 | 1½-1½ | (15) |
| 3269.86 | A | 3 | 30.83 | 34.80 | 1½-2½ | |
| 3263.43 | A | 3 | 30.84 | 34.62 | ½-1½ | |
| 3118.02 | A | 4 | 30.75 | 34.71 | 3½-2½ | $3p^4D^o-3d^4P$ |
| 3169.30 | A | 0 | 30.79 | 34.69 | 2½-1½ | (16) |
| 3151.16 | A | 2 | 30.79 | 34.71 | 2½-2½ | |
| 3194.61 | A | 4 | 30.83 | 34.69 | 1½-1½ | |
| 3178.16 | A | 3 | 30.83 | 34.71 | 1½-2½ | |
| 3209.38 | A | 3 | 30.84 | 34.89 | ½-1½ | |
| 3039.65 | A | 3 | 30.75 | 34.61 | 3½-2½ | $3p^4D^o-4s^4P$ |
| 3035.96 | A | 3 | 30.79 | 34.86 | 2½-1½ | (17) |
| 3030.85 | A | 2 | 30.83 | 34.90 | 1½- ½ | |
| 3071.08 | A | 2 | 30.79 | 34.61 | 2½-2½ | |
| 3059.16 | A | 3 | 30.83 | 34.66 | 1½-1½ | |
| 3044.16 | A | 2 | 30.84 | 34.90 | ½- ½ | |
| •3072.68 | A | 1d | 30.84 | 34.66 | ½-1½ | |
| 3554.39 | A | 1 | 30.99 | 34.46 | 2½-3½ | $3p^2D^o-3d^4D$ (16) |
| 3367.20 | A | 6 | 30.99 | 34.65 | 2½-3½ | $3p^2D^o-3d^4F$ |
| 3388.46 | A | 6 | 31.05 | 34.69 | 1½-2½ | (19) |
| 3330.78 | A | 2 | 30.99 | 34.89 | 2½-2½ | |
| 3417.71 | A | 5 | 30.99 | 34.60 | 2½-3½ | $3p^2D^o-3d^2F$ |
| 3414.62 | A | 2 | 31.05 | 34.88 | 1½-2½ | (20) |
| 3356.35 | A | 2 | 30.99 | 34.66 | 2½-2½ | |
| 3416.87 | A | 4 | 30.99 | 34.60 | 2½-2½ | $3p^2D^o-3d^2D$ |
| 3453.10 | A | 3 | 31.05 | 34.62 | 1½-1½ | (21) |
| 3477.89 | A | 3 | 31.05 | 34.60 | 1½-2½ | |
| 3314.60 | A | 1 | 30.99 | 34.71 | 2½-2½ | $3p^2D^o-3d^4P$ |
| 3371.87 | A | 4 | 31.05 | 34.71 | 1½-2½ | (22) |
| 3355.39 | A | 2 | 30.99 | 34.76 | 2½-1½ | $3p^2D^o-3d^2P$ |
| 3353.63 | A | 2 | 31.05 | 34.73 | 1½- ½ | (23) |
| 3310.55 | A | 1 | 31.05 | 34.78 | 1½-1½ | |
| 3094.08 | A | 4 | 30.99 | 34.98 | 2½-1½ | $3p^2D^o-4s^2P$ |
| 3088.23 | A | 3 | 31.05 | 35.05 | 1½- ½ | (24) |
| 3143.74 | A | 2 | 31.05 | 34.98 | 1½-1½ | |
| 3551.52 | A | 1 | 31.21 | 34.68 | ½-1½ | $3p^2S^o-3d^4F$ (25) |
| 3612.35 | A | 3 | 31.21 | 34.62 | ½-1½ | $3p^2S^o-3d^2D$ (26) |
| 3546.22 | A | 1 | 31.21 | 34.89 | ½-1½ | $3p^2S^o-3d^4P$ (27) |
| 3456.68 | A | 4dr• | 31.21 | 34.76 | ½-1½ | $3p^2S^o-3d^2P$ |
| 3503.81 | A | 5 | 31.21 | 34.73 | ½- ½ | (28) |
| 3275.20 | A | 2 | 31.21 | 34.96 | ½-1½ | $3p^2S^o-4s^2P$ (29) |
| 3608.30 | A | 2 | 31.23 | 34.47 | 1½-2½ | $3p^4S^o-3d^4D$ |
| 3790.96 | A | 1 | 31.23 | 34.48 | 1½-1½ | (30) |
| 3561.23 | A | 4 | 31.23 | 34.89 | 1½-2½ | $3p^4S^o-3d^4F$ |
| 3571.26 | A | 4 | 31.23 | 34.68 | 1½-1½ | (31) |
| 3590.47 | A | 2 | 31.23 | 34.66 | 1½-2½ | $3p^4S^o-3d^2F$ (32) |
| 3659.93 | A | 3 | 31.23 | 34.60 | 1½-2½ | $3p^4S^o-3d^2D$ |
| 3832.75 | A | 2 | 31.23 | 34.82 | 1½-1½ | (33) |
| 3542.90 | A | 7 | 31.23 | 34.71 | 1½-2½ | $3p^4S^o-3d^4P$ |
| 3585.64 | A | 4 | 31.23 | 34.69 | 1½-1½ | (34) |
| 3594.18 | A | 4 | 31.23 | 34.88 | 1½- ½ | |
| 3475.25 | A | 1 | 31.23 | 34.78 | 1½-1½ | $3p^4S^o-3d^2P$ |
| 3522.72 | A | 1 | 31.23 | 34.73 | 1½- ½ | (35) |
| 3442.12 | A | 1 | 31.23 | 34.61 | 1½-2½ | $3p^4S^o-4s^4P$ |
| 3397.90 | A | 1 | 31.23 | 34.86 | 1½-1½ | (36) |
| 3721.88 | A | 2 | 31.38 | 34.69 | 1½-2½ | $3p^2P^o-3d^4F$ (37) |
| 3753.83 | A | 5 | 31.38 | 34.66 | 1½-2½ | $3p^2P^o-3d^2F$ (38) |
| 3829.77 | A | 7 | 31.38 | 34.60 | 1½-2½ | $3p^2P^o-3d^2D$ |
| 3818.44 | A | 8 | 31.39 | 34.82 | ½-1½ | (39) |
| 3800.02 | A | 5 | 31.38 | 34.82 | 1½-1½ | |
| 3701.81 | A | 4 | 31.38 | 34.71 | 1½-2½ | $3p^2P^o-3d^4P$ |
| 3744.66 | A | 4 | 31.39 | 34.89 | ½-1½ | (40) |
| 3838.06 | A | 4 | 31.36 | 34.76 | 1½-1½ | $3p^2P^o-3d^2P$ |
| 3697.09 | A | 2 | 31.39 | 34.73 | ½- ½ | (41) |
| 3679.80 | A | 2 | 31.38 | 34.73 | 1½- ½ | |
| 3644.88 | A | 4 | 31.39 | 34.78 | ½-1½ | |
| 3428.76 | A | 5 | 31.38 | 34.98 | 1½-1½ | $3p^2P^o-4s^2P$ |
| 3377.23 | A | 2 | 31.39 | 35.05 | ½- ½ | (42) |
| 3443.70 | A | 2 | 31.39 | 34.98 | ½-1½ | |
| 3229.50 | A | 3 | 33.88 | 37.70 | 3½-4½ | $3p'\ ^2P^o-3d'\ ^2G$ |
| 3234.82 | A | 4 | 33.87 | 37.70 | 2½-3½ | (43) |
| 3097.15 | A | 3 | 33.88 | 37.88 | 3½-2½ | $3p'\ ^2P^o-3d'\ ^2D$ |
| 3092.91 | A | 2 | 33.87 | 37.86 | 2½-2½ | (44) |
| 3411.38 | A | 1 | 34.11 | 37.72 | 1½-1½ | $3p'\ ^2P^o-3d'\ ^2P$ |
| 3440.80 | A | 1 | 34.14 | 37.72 | ½- ½ | (45) |
| 3413.13 | A | 3 | 34.11 | 37.72 | 1½- ½ | |
| 3438.97 | A | 2 | 34.14 | 37.72 | ½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ne II** continued | | | | | | |
| 3336.12 | A | 2 | 34.11 | 37.81 | 1½-1½ | $3p'\ ^2P^o-3d'\ ^2F$ (46) |
| 3141.35 | A | 3 | 34.11 | 38.04 | 1½-2½ | $3p'\ ^2P^o-3d'\ ^2F$ (47) |
| 3050.57 | A | 1 | 34.11 | 38.15 | 1½- ½ | $3p'\ ^2P^o-3d'\ ^2G$ |
| •3072.68 | A | 1d | 34.14 | 38.15 | ½- ½ | (48) |
| 3480.75 | A | 2 | 34.18 | 37.70 | ½-1½ | $sp^4(^1S)3s^2S-$ |
| 3479.53 | A | 1 | 34.16 | 37.70 | ½- ½ | $sp^4(^1S)3p^2P^o$ (49) |
| 3542.38 | A | 2 | 34.24 | 37.72 | 2½-1½ | $3p'\ ^2P^o-3d'\ ^2F$ |
| 3537.99 | A | 3 | 34.24 | 37.73 | 1½- ½ | (50) |
| 3539.94 | A | ½ | 34.24 | 37.73 | 1½-1½ | |
| 3408.68 | A | 5 | 34.24 | 37.86 | 2½-2½ | $3p'\ ^2P^o-3d'\ ^2P$ |
| 3457.16 | P | 4dr• | 34.24 | 37.81 | 1½-1½ | (51) |
| 3459.38 | A | 2 | 34.24 | 37.81 | 2½-1½ | |
| 3404.77 | A | 4 | 34.24 | 37.86 | 1½-2½ | |
| 4319.78 | A | 6 | 34.46 | 37.38 | 3½-3½ | $3d^4D-4f^4D^o$ |
| 4331.60 | A | 4 | 34.47 | 37.39 | 2½-2½ | (52) |
| 4339.95 | A | 2 | 34.48 | 37.39 | 1½-1½ | |
| 4342.20 | A | 1 | 34.50 | 37.40 | ½- ½ | |
| 4317.15 | A | 3 | 34.46 | 37.39 | 3½-2½ | |
| 4330.92 | A | 2 | 34.47 | 37.39 | 2½-1½ | |
| 4334.57 | A | 1 | 34.48 | 37.40 | 1½- ½ | |
| 4350.68 | A | 4 | 34.48 | 37.39 | 1½-2½ | |
| 4357.82 | A | 3 | 34.50 | 37.39 | ½-1½ | |
| 4306.43 | A | 2 | 34.46 | 37.39 | 3½-4½ | $3d^4D-4f^4F^o$ |
| 4080.48 | A | 2d | 34.48 | 37.51 | 1½-2½ | (53) |
| 4150.67 | A | 3 | 34.50 | 37.47 | ½-1½ | |
| 4098.77 | A | 4 | 34.46 | 37.47 | 3½-3½ | |
| 4062.90 | A | 3 | 34.47 | 37.51 | 2½-2½ | |
| 4133.65 | A | 3 | 34.48 | 37.47 | 1½-1½ | |
| 4116.10 | A | 0 | 34.48 | 37.48 | 1½-2½ | $3d^4D-4f^4G^o$ |
| 4100.30 | A | 1d | 34.47 | 37.48 | 2½-2½ | (54) |
| 4086.69 | A | 1 | 34.46 | 37.48 | 3½-2½ | |
| 4412.54 | A | 2 | 34.59 | 37.36 | 4½-3½ | $3d^4F-4f^4D^o$ |
| 4514.60 | A | 2 | 34.85 | 37.39 | 3½-2½ | (55) |
| 4535.47 | A | 3 | 34.68 | 37.40 | 1½- ½ | |
| 4517.79 | A | 2 | 34.65 | 37.38 | 3½-3½ | |
| 4553.16 | A | 4 | 34.68 | 37.39 | 1½-1½ | |
| 4565.49 | A | 1 | 34.68 | 37.39 | 1½-2½ | |
| 4397.94 | A | 8 | 34.59 | 37.39 | 4½-4½ | $3d^4F-4f^4F^o$ |
| 4379.50 | A | 6 | 34.65 | 37.47 | 3½-3½ | (56) |
| 4385.00 | A | 2 | 34.89 | 37.51 | 2½-2½ | |
| 4430.90 | A | 4 | 34.68 | 37.47 | 1½-1½ | |
| 4446.46 | A | 3 | 34.69 | 37.47 | 2½-1½ | |
| 4502.52 | A | ½ | 34.85 | 37.39 | 3½-4½ | |
| 4442.67 | A | 3 | 34.69 | 37.47 | 2½-3½ | |
| 4369.77 | A | 5 | 34.66 | 37.51 | 1½-2½ | |
| 4290.40 | A | 8 | 34.59 | 37.48 | 4½-5½ | $3d^4F-4f^4G^o$ |
| 4391.94 | A | 7 | 34.85 | 37.48 | 3½-4½ | (57) |
| 4409.30 | A | 7 | 34.69 | 37.49 | 2½-3½ | |
| •4413.20 | A | 4 | 34.86 | 37.48 | 1½-2½ | |
| •4428.54 | A | 8 | 34.89 | 37.48 | 2½-2½ | |
| 4385.72 | A | 2 | 34.65 | 37.48 | 3½-2½ | |
| 4534.66 | A | 2 | 34.66 | 37.39 | 2½-2½ | $3d^2F-4f^4D^o$ (58) |
| 4341.42 | A | 2 | 34.86 | 37.51 | 2½-2½ | $3d^2F-4f^4F^o$ (59) |
| 4384.06 | A | 1 | 34.66 | 37.48 | 2½-2½ | $3d^2F-4f^4G^o$ (60) |
| 4468.91 | A | 5 | 34.62 | 37.39 | 1½-2½ | $3d^2D-4f^4D^o$ |
| •4426.54 | A | 6 | 34.60 | 37.39 | 2½-2½ | (61) |
| 4456.95 | A | 5 | 34.62 | 37.39 | 1½-1½ | |
| 4416.77 | A | 2 | 34.60 | 37.39 | 2½-1½ | |
| 4439.95 | A | 2 | 34.82 | 37.40 | 1½- ½ | |
| 4244.17 | A | 0 | 34.60 | 37.51 | 2½-2½ | $3d^2D-4f^4F^o$ |
| 4339.78 | A | 1 | 34.82 | 37.47 | 1½-1½ | (82) |
| 4322.66 | A | 1 | 34.62 | 37.48 | 1½-2½ | $3d^2D-4f^4G^o$ (83) |
| •4815.98 | A | 4 | 34.71 | 37.38 | 2½-3½ | $3d^4P-4f^4D^o$ |
| 4574.49 | A | 1 | 34.89 | 37.39 | 1½-2½ | (64) |
| 4812.89 | A | 1 | 34.71 | 37.39 | 2½-2½ | |
| 4562.05 | A | 1 | 34.89 | 37.39 | 1½-1½ | |
| 4498.94 | A | 5 | 34.66 | 37.40 | ½- ½ | |
| 4800.11 | A | 1 | 34.71 | 37.39 | 2½-1½ | |
| 4544.11 | A | 1 | 34.89 | 37.40 | 1½- ½ | |
| 4471.52 | A | 3 | 34.71 | 37.47 | 2½-3½ | $3d^4P-4f^4F^o$ |
| 4377.95 | A | 2 | 34.69 | 37.51 | 1½-2½ | (65) |
| •4413.20 | A | 4 | 34.71 | 37.51 | 2½-2½ | |
| 4439.30 | A | 3 | 34.89 | 37.47 | 1½-1½ | |
| 4475.22 | A | 1 | 34.71 | 37.47 | 2½-1½ | |
| 4421.38 | A | 3 | 34.69 | 37.48 | 1½-2½ | $3d^4P-4f^4G^o$ (66) |
| 4732.53 | A | 1 | 34.78 | 37.39 | 1½-2½ | $3d^2P-4f^4D^o$ |
| 4834.73 | A | 2 | 34.73 | 37.39 | ½-1½ | (87) |
| 4719.37 | A | 1½ | 34.78 | 37.39 | 1½-1½ | |
| •4815.98 | A | 4 | 34.73 | 37.40 | ½- ½ | |
| 4700.1 | A | 0 | 34.78 | 37.40 | 1½- ½ | |
| 4522.66 | A | 4 | 34.76 | 37.51 | 1½-2½ | $3d^2P-4f^4F^o$ |
| 4506.21 | A | 3 | 34.73 | 37.47 | ½-1½ | (88) |
| 4586.13 | A | 3 | 34.78 | 37.47 | 1½-1½ | |
| 4589.01 | A | 5 | 34.76 | 37.48 | 1½-2½ | $3d^2P-4f^4G^o$ (89) |
| 4511.37 | A | 4 | 34.76 | 37.51 | 1½-2½ | $3d^2P-4f^2D^o$ |
| 4511.29 | A | 2 | 34.73 | 37.46 | ½-1½ | (70) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Na II** continued | | | | | | |
| 4795.82 | A | 2 | 34.81 | 37.39 | 2½-2½ | $4s^4P-4f^4D^o$ |
| 4869.8 | A | 0 | 34.86 | 37.39 | 1½-1½ | (71) |
| 4922.3 | A | 0 | 34.90 | 37.40 | ½- ½ | |
| 4781.95 | A | 1 | 34.81 | 37.39 | 2½-1½ | |
| 4849.4 | A | 0 | 34.86 | 37.40 | 1½- ½ | |
| 4580.35 | A | 3 | 34.81 | 37.51 | 2½-2½ | $4s^4P-4f^4F^o$ |
| 4730.24 | A | 1 | 34.86 | 37.47 | 1½-1½ | (72) |
| 4847.34 | A | 2 | 34.81 | 37.47 | 2½-1½ | |
| 4710.04 | A | 2 | 34.86 | 37.48 | 1½-2½ | $4s^4P-4f^4G^o$ |
| 4627.85 | A | 3 | 34.81 | 37.48 | 2½-3½ | (73) |
| 4432.26 | A | 1 | 37.70 | 40.49 | 1½-2½ | $sp^4(^1s)3p^2P^o$ |
| 4431.67 | A | 1 | 37.70 | 40.49 | ½-1½ | $-sp^4(^1s)3d^2D$ |
| 4429.60 | A | 2 | 37.70 | 40.49 | 1½-2½ | (74) |

**Na I** I P 5.12 Anal A List B June 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 5889.953// | A | (10R)$D_2$ | 0.00 | 2.10 | ½-1½ | $3^2S-3^2P^o$ |
| 5895.923 | A | (9R)$D_1$ | 0.00 | 2.09 | ½- ½ | (1) |
| 3302.34 | B | (8R) | 0.00 | 3.74 | ½-1½ | $3^2S-4^2P^o$ |
| 3302.94 | B | (8R) | 0.00 | 3.74 | ½- ½ | (2) |
| 11403.55 | C | 10 | 2.10 | 3.18 | 1½- ½ | $3^2P^o-4^2S$ |
| 11381.21 | C | 8 | 2.09 | 3.18 | ½- ½ | (3) |
| 8194.824 | D | (10R) | 2.10 | 3.60 | 1½-2½ | $3^2P^o-3^2D$ |
| 8183.256 | D | (8R) | 2.09 | 3.60 | ½-1½ | (4) |
| 8194.791 | D | (-) | 2.10 | 3.60 | 1½-1½ | |
| 6160.747 | D | (8r) | 2.10 | 4.10 | 1½- ½ | $3^2P^o-5^2S$ |
| 6154.225 | D | (8r) | 2.09 | 4.10 | ½- ½ | (5) |
| 5688.205 | D | (10) | 2.10 | 4.27 | 1½-2½ | $3^2P^o-4^2D$ |
| 5682.633 | D | (8) | 2.09 | 4.27 | ½-1½ | (6) |
| 5688.193 | D | (-) | 2.10 | 4.27 | 1½-1½ | |
| 5675.3 | P | (3s)Forb | 2.10 | 4.27 | 1½- | $3^2P^o-4^2F^o$ |
| 5669.8 | P | (3s)Forb | 2.09 | 4.27 | ½- | (7) |
| 5153.402 | D | (6n) | 2.10 | 4.49 | 1½- ½ | $3^2P^o-6^2S$ |
| 5148.838 | D | (5n) | 2.09 | 4.49 | ½- ½ | (8) |
| 4982.813 | D | (6r) | 2.10 | 4.57 | 1½-2½ | $3^2P^o-5^2D$ |
| 4978.541 | D | (5r) | 2.09 | 4.57 | ½-1½ | (9) |
| 4977.6 | P | (1s)Forb | 2.10 | 4.57 | 1½- | $3^2P^o-5^2F^o$ |
| 4973.4 | P | (1s)Forb | 2.09 | 4.57 | ½- | (10) |
| 4751.822 | D | (4n) | 2.10 | 4.69 | 1½- ½ | $3^2P^o-7^2S$ |
| 4747.941 | D | (3n) | 2.09 | 4.69 | ½- ½ | (11) |
| 4668.560 | D | (4r) | 2.10 | 4.74 | 1½-2½ | $3^2P^o-6^2D$ |
| 4664.811 | D | (3r) | 2.09 | 4.74 | ½-1½ | (12) |
| 4665.8 | P | (-)Forb | 2.10 | 4.74 | 1½- | $3^2P^o-6^2F^o$ |
| 4663.0 | P | (-)Forb | 2.09 | 4.74 | ½- | (13) |
| 4545.218 | B | (4n) | 2.10 | 4.81 | 1½- ½ | $3^2P^o-8^2S$ |
| 4541.871 | B | (3n) | 2.09 | 4.81 | ½- ½ | (14) |
| 4497.657 | D | (2n) | 2.10 | 4.84 | 1½-2½ | $3^2P^o-7^2D$ |
| 4494.180 | D | (2n) | 2.09 | 4.84 | ½-1½ | (15) |
| 4433.31 | B | (4n) | 2.10 | 4.89 | 1½- ½ | $3^2P^o-9^2S$ |
| 4419.94 | B | (3) | 2.09 | 4.89 | ½- ½ | (16) |
| 4393.45 | B | - | 2.10 | 4.90 | 1½- | $3^2P^o-8^2D$ |
| 4390.14 | B | - | 2.09 | 4.90 | ½-1½ | (17) |
| 10745.9 | E | 4 | 3.18 | 4.33 | ½-1½ | $4^2S-5^2P^o$ |
| 10748.7 | E | 2 | 3.18 | 4.33 | ½- ½ | (18) |
| 8649.6 | F | - | 3.18 | 4.60 | ½- | $4^2S-6^2P^o$ (19) |
| 7809.4 | F | - | 3.18 | 4.76 | ½- | $4^2S-7^2P^o$ (20) |
| 12679.0 | F | - | 3.60 | 4.57 | — | $3^2D-5^2F^o$ (21) |
| 10834.4 | F | - | 3.60 | 4.74 | — | $3^2D-6^2F^o$ (22) |
| 9961.0 | F | - | 3.80 | 4.84 | — | $3^2D-7^2F^o$ (23) |
| 9466.0 | P | - | 3.60 | 4.91 | — | $3^2D-8^2F^o$ (24) |
| 9154.7 | F | - | 3.60 | 4.95 | — | $3^2D-9^2F^o$ (25) |
| 8943.6 | F | - | 3.60 | 4.98 | — | $3^2D-10^2F^o$ (26) |
| 8796 | F | - | 3.60 | 5.00 | — | $3^2D-11^2F^o$ (27) |

**Na II** I P 47.10 Anal A List D Juns 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 3533.043 | A | 10 | 32.71 | 36.20 | 2-1 | 3s $1^o$-3p 1 |
| 3092.729 | A | 10 | 32.71 | 36.70 | 2-3 | (1) -3p 2 |
| 3056.157 | A | 6 | 32.71 | 36.74 | 2-2 | -3p 3 |
| 3007.442 | A | 4 | 32.71 | 36.81 | 2-1 | -3p 4 |
| 3631.266 | A | 8 | 32.80 | 36.20 | 1-1 | 3s $2^o$-3p 1 |
| 3129.388 | A | 6 | 32.80 | 36.74 | 1-2 | (2) -3p 3 |
| *3078.315 | A | 6 | 32.80 | 36.81 | 1-1 | -3p 4 |
| *2984.183 | A | 7 | 32.80 | 36.94 | 1-2 | -3p 5 |
| 3711.074 | A | 6 | 32.87 | 36.20 | 0-1 | 3s $3^o$-3p 1 |
| 3135.483 | A | 5 | 32.87 | 36.81 | 0-1 | (3) -3p 4 |
| 4087.60 | A | 0 | 33.18 | 36.20 | 1-1 | 3s $4^o$-3p 1 |
| 3463.494 | A | 3 | 33.18 | 36.74 | 1-2 | (4) -3p 3 |
| 3400.110 | A | 2 | 33.18 | 36.81 | 1-1 | -3p 4 |
| 3285.603 | A | 8 | 33.18 | 36.94 | 1-2 | -3p 5 |
| 3212.186 | A | 6 | 33.18 | 37.02 | 1-1 | -3p 7 |
| 3189.783 | A | 6 | 33.18 | 37.05 | 1-2 | -3p 8 |
| 3149.267 | A | 5 | 33.18 | 37.10 | 1-1 | -3p 9 |
| 3015.400 | A | 8 | 36.74 | 40.84 | 2-2 | 3p 3-3$d^3P^o$ (5) |
| 3064.372 | A | 4 | 36.81 | 40.84 | 1-2 | 3p 4-3$d^3P^o$ (6) |
| 3179.055 | A | 5 | 38.94 | 40.82 | 2-1 | 3p 5-3$d^3P^o$ |
| 3183.731 | A | 6 | 36.94 | 40.84 | 2-2 | (7) |
| *3078.315 | A | 6 | 36.94 | 40.94 | 2-2 | 3p 5-3$d^3F^o$ (8) |
| 3074.334 | A | 6 | 36.94 | 40.95 | 2-3 | 3p 5-3$d^1F^o$ (9) |
| 3234.928 | A | 4 | 37.02 | 40.84 | 1-2 | 3p 7-3$d^3P^o$ (10) |
| 3045.593 | A | 5 | 37.02 | 41.07 | 1-0 | 3p 7-4$s^3P^o$ (11) |
| 3007.071 | A | 5 | 37.02 | 41.08 | 1-2 | 3p 7-3$d^1D^o$ (12) |
| 3009.138 | A | 4 | 37.02 | 41.12 | 1-1 | 3p 7-4$s^1P^o$ (13) |
| 3274.220 | A | 5 | 37.05 | 40.82 | 2-1 | 3p 8-3$d^3P^o$ |
| 3257.965 | A | 6 | 37.05 | 40.84 | 2-2 | (14) |
| 3053.664 | A | 6 | 37.05 | 41.09 | 2-3 | 3p 8-3$d^3D^o$ (15) |
| 3327.685 | A | 4 | 37.10 | 40.81 | 1-0 | 3p 9-3$d^3P^o$ |
| 3318.032 | A | 4 | 37.10 | 40.82 | 1-1 | (16) |
| 3225.976 | A | 4 | 37.10 | 40.92 | 1-2 | 3p 9-4$s^3P^o$ |
| 3104.398 | A | 4 | 37.10 | 41.07 | 1-0 | (17) |
| 3066.538 | A | 4 | 37.10 | 41.12 | 1-1 | 3p 9-4$s^1P^o$ (18) |
| 4123.069 | A | 3 | 38.13 | 41.12 | 0-1 | 3p 10-4$s^1P^o$ (19) |
| 4114.95 | B | 3 | 38.13 | 41.13 | 0-1 | 3p 10-3$d^3D^o$ (20) |

For changes in Paschen notation see text § 37

**Mg I** I P 7.61 Anal A List B July 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 4571.0956 | A | 5 | 0.00 | 2.70 | 0-1 | $3^1S-3^3P^o$ (1) |
| 5183.6042 | A | 125 | 2.70 | 5.09 | 2-1 | $3^3P^o-4^3S$ |
| 5172.6843 | A | 80 | 2.70 | 5.09 | 1-1 | (2) |
| 5167.3216 | A | 40 | 2.70 | 5.09 | 0-1 | |
| 3838.2918 | A | 100r* | 2.70 | 5.92 | 2-3 | $3^3P^o-3^3D$ |
| 3832.3037 | A | 80r* | 2.70 | 5.92 | 1-2 | (3) |
| 3829.3549 | A | 40 | 2.70 | 5.92 | 0-1 | |
| 3838.2943 | A | 100r* | 2.70 | 5.92 | 2-2 | |
| 3832.2996 | A | 80r* | 2.70 | 5.92 | 1-1 | |
| 3336.69 | B | 20 | 2.70 | 6.40 | 2-1 | $3^3P^o-5^3S$ |
| 3332.17 | B | 15 | 2.70 | 6.40 | 1-1 | (4) |
| 3329.93 | B | 10 | 2.70 | 6.40 | 0-1 | |
| 3098.902 | B | 50 | 2.70 | 6.69 | 2- | $3^3P^o-4^3D$ |
| 3092.997 | B | 40 | 2.70 | 6.69 | 1- | (5) |
| 3091.076 | B | 30 | 2.70 | 6.69 | 0- | |
| 11828.8 | B | (130) | 4.33 | 5.37 | 1-0 | $3^1P^o-4^1S$ (6) |
| 8806.7678 | A | (10) | 4.33 | 5.73 | 1-2 | $3^1P^o-3^1D$ |
| 8806.7358 | A | (2) | | | | (7) |
| 8806.7032 | A | (2) | | | | |
| 5711.0912 | A | (6) | 4.33 | 6.49 | 1-0 | $3^1P^o-5^1S$ |
| 5711.0831 | A | (1) | | | | (8) |
| 5711.0735 | A | (1) | | | | |
| 5528.4094 | A | (10) | 4.33 | 6.56 | 1-2 | $3^1P^o-4^1D$ |
| 5528.3986 | A | (2) | | | | (9) |
| 5528.3876 | A | (2) | | | | |
| 4730.0285 | A | (2) | 4.33 | 6.94 | 1-0 | $3^1P^o-6^1S$ (10) |
| 4702.9909 | A) | 40 | 4.33 | 6.95 | 1-2 | $3^1P^o-5^1D$ |
| 4702.9831 | A) | | | | | (11) |
| 4702.9758 | A) | | | | | |
| 4380.38 | B | (5) | 4.33 | 7.14 | 1-2 | $3^1P^o-3p^2\ ^3P$ (12) |
| 4354.540 | B | (1) | 4.33 | 7.16 | 1-0 | $3^1P^o-7^1S$ (13) |
| 4351.9056 | A) | 30 | 4.33 | 7.16 | 1-2 | $3^1P^o-6^1D$ |
| 4351.8941 | A) | | | | | (14) |
| 4167.2712 | A) | 10n | 4.33 | 7.29 | 1-2 | $3^1P^o-7^1D$ |
| 4167.2604 | A) | | | | | (15) |
| 4057.5052 | A | 5n | 4.33 | 7.37 | 1-2 | $3^1P^o-8^1D$ (16) |

**Mg I** continued

| | | | | | | |
|---|---|---|---|---|---|---|
| 3986.7533 | A | (1) | 4.33 | 7.42 | 1-2 | $3^1P^o-9^1D$ (17) |
| 3938.400 | A | (0) | 4.33 | 7.46 | 1-2 | $3^1P^o-10^1D$ (18) |
| 3904.02 | E | (2r) | 4.33 | 7.49 | 1-2 | $3^1P^o-11^1D$ (19) |
| 3878.58 | B | (1) | 4.33 | 7.51 | 1-2 | $3^1P^o-12^1D$ (20) |
| 3859.24 | B | (1) | 4.33 | 7.52 | 1-2 | $3^1P^o-13^1D$ (21) |
| 7657.60 | B | (35) | 5.09 | 6.70 | 1-2 | $4^3S-5^3P^o$ (22) |
| 6318.23 | B) | (5) | (5.09 | 7.04 | 1-2 | $4^3S-6^3P^o$ |
| 6318.75 | B) | | 5.09 | 7.04 | 1- | (23) |
| 5785.08 | B | (3) | 5.09 | 7.22 | 1-2 | $4^3S-7^3P^o$ (24) |
| 8923.8 | D | 20 | 5.37 | 6.75 | 0-1 | $4^1S-5^1P^o$ (25) |
| 12083.79 | P | (50) | 5.73 | 6.75 | 2-3 | $3^1D-4^1F^o$ (26) |
| 9256.0 | D | 200Nl | 5.73 | 7.06 | 2-3 | $3^1D-5^1F^o$ (27) |
| 8213.02 | P | (-) | 5.73 | 7.23 | 2-3 | $3^1D-6^1F^o$ (28) |
| 7691.57 | P | (-) | 5.73 | 7.33 | 2-3 | $3^1D-7^1F^o$ (29) |
| 7387.70 | P | (-) | 5.73 | 7.40 | 2-3 | $3^1D-8^1F^o$ (30) |
| 7193.20 | P | (-) | 5.73 | 7.44 | 2-3 | $3^1D-9^1F^o$ (31) |
| 7060.43 | P | | 5.73 | 7.48 | 2-3 | $3^1D-10^1F^o$ (32) |
| 6965.42 | P | | 5.73 | 7.50 | 2-3 | $3^1D-11^1F^o$ (33) |
| 6894.92 | P | | 5.73 | 7.52 | 2-3 | $3^1D-12^1F^o$ (34) |
| 10966.1 | P | (20) | 5.91 | 7.03 | 2- | $4^3P^o-5^3D$ |
| 10961.2 | P | (10) | 5.91 | 7.03 | 1,0- | (35) |
| 9993.7 | D | 3nl | 5.91 | 7.14 | 2-1 | $4^3P^o-7^3S$ |
| 9987.0 | D | 2n | 5.91 | 7.14 | 1,0-1 | (36) |
| 10812.8 | D | (30) | 5.92 | 7.06 | — | $3^3D-5^3F^o$ (37) |
| 9415.5 | D | 10nl | 5.92 | 7.23 | — | $3^3D-6^3F^o$ (38) |
| 8736.0 | D | 1n | 5.92 | 7.33 | — | $3^3D-7^3F^o$ (39) |
| 8346.13 | P | | 5.92 | 7.40 | — | $3^3D-8^3F^o$ (40) |
| 8098.72 | P | | 5.92 | 7.44 | — | $3^3D-9^3F^o$ (41) |
| 7930.83 | P | | 5.92 | 7.48 | — | $3^3D-10^3F^o$ (42) |
| 7811.14 | P | | 5.92 | 7.50 | — | $3^3D-11^3F^o$ (43) |
| 7722.60 | P | | 5.92 | 7.52 | — | $3^3D-12^3F^o$ (44) |
| 3637.63 | B | (4) | 6.56 | 9.96 | 2-3 | $4^1D-3p3d^1F^o$ (45) |
| 4099.77 | B | (3) | 6.95 | 9.96 | 2-3 | $5^1D-3p3d^1F^o$ (46) |
| 3895.662 | B | (10) | 7.14 | 10.31 | 2-3 | $3p^2\ ^3P-3p3d^3D^o$ |
| 3891.976 | B | (5) | 7.14 | 10.31 | 1-2 | (47) |
| 3890.241 | B | (3) | 7.14 | 10.31 | 0-1 | |
| 3898.120 | B | (4) | 7.14 | 10.31 | 2-2 | |
| 3893.376 | B | (3) | 7.14 | 10.31 | 1-1 | |
| 4409.84 | B | (1) | 7.16 | 9.96 | 2-3 | $6^1D-3p3d^1F^o$ (48) |

Fine Structure

**Mg II** I P 14.97 Anal A List A June 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 9217.4 | P | | 8.62 | 9.96 | ½-1½ | $4^2S-4^2P^o$ |
| 9243.4 | P | | 8.62 | 9.95 | ½- ½ | (1) |
| 3613.80 | A | 4 | 8.62 | 12.03 | ½-1½ | $4^2S-5^2P^o$ |
| 3615.64 | A | 3 | 8.62 | 12.03 | ½- ½ | (2) |
| 10914.2 | P | | 8.83 | 9.96 | 2½-1½ | $3^2D-4^2P^o$ |
| 10949.4 | P | | 8.83 | 9.95 | 1½- ½ | (3) |
| 4481.327 | A) | 100 | (8.83 | 11.58 | 2½- | $3^2D-4^2F^o$ |
| 4481.129 | A) | | 8.83 | 11.58 | 1½-2½ | (4) |
| 3848.24 | A | 7 | 8.83 | 12.03 | 2½-1½ | $3^2D-5^2P^o$ |
| 3850.40 | A | 6 | 8.83 | 12.03 | 1½- ½ | (5) |
| 3104.805 | A) | 30 | (8.83 | 12.80 | 2½- | $3^2D-5^2F^o$ |
| 3104.713 | A) | | 8.83 | 12.80 | 1½-2½ | (6) |
| 8238.4 | P | | 9.96 | 11.45 | 1½- ½ | $4^2P^o-5^2S$ |
| 8217.8 | P | | 9.95 | 11.45 | ½- ½ | (7) |
| 7896.37 | A | - | 9.96 | 11.52 | 1½- | $4^2P^o-4^2D$ |
| 7877.13 | A | - | 9.95 | 11.52 | ½-1½ | (8) |
| 4433.991 | A | 8 | 9.96 | 12.74 | 1½- ½ | $4^2P^o-6^2S$ |
| 4427.995 | A | 7 | 9.95 | 12.74 | ½- ½ | (9) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Mg II** continued | | | | | | |
| 4390.585 | A | 10 | 9.96 | 12.77 | 1½- ½-1½ | $4^2P^o-5^2D$ (10) |
| 4384.643 | A | 8 | 9.95 | 12.77 | | |
| 3553.51 | A | 5 | 9.96 | 13.43 | 1½- ½- | $4^2P^o-7^2S$ (11) |
| 3549.61 | A | 4 | 9.95 | 13.43 | ½- ½- | |
| 3538.86 | A | 6 | 9.96 | 13.44 | 1½- ½-1½ | $4^2P^o-6^2D$ (12) |
| 3535.04 | A | 5 | 9.95 | 13.44 | | |
| 3175.84 | A | 3 | 9.96 | 13.84 | 1½- ½- | $4^2P^o-8^2S$ (13) |
| 3172.79 | A | 1 | 9.95 | 13.84 | ½- ½- | |
| 3168.98 | A | 3 | 9.96 | 13.85 | 1½- ½-1½ | $4^2P^o-7^2D$ (14) |
| 3165.94 | A | 2 | 9.95 | 13.85 | | |
| 9633.0 | P | | 11.52 | 13.80 | — | $4^2D-5^2F^o$ (15) |
| 6346.67 | A | 5 | 11.52 | 13.46 | — | $4^2D-6^2F^o$ (16) |
| 5264.14 | A | 5 | 11.52 | 13.86 | — | $4^2D-7^2F^o$ (17) |
| 4739.59 | A | 5 | 11.52 | 14.12 | — | $4^2D-8^2F^o$ (18) |
| 4436.48 | A | 5 | 11.52 | 14.30 | — | $4^2D-9^2F^o$ (19) |
| 4242.47 | A | 4 | 11.52 | 14.43 | — | $4^2D-10^2F^o$ (20) |
| 4109.54 | A | 3 | 11.52 | 14.52 | — | $4^2D-11^2F^o$ (21) |
| 4013.80 | A | 2 | 11.52 | 14.59 | — | $4^2D-12^2F^o$ (22) |
| 6545.80 | A | 5 | 11.58 | 13.47 | — | $4^2F^o-6^2G$ (23) |
| 5401.05 | A | 5 | 11.58 | 13.86 | — | $4^2F^o-7^2G$ (24) |
| 4851.10 | A | 5 | 11.58 | 14.12 | — | $4^2F^o-8^2G$ (25) |
| 4534.36 | A | 4 | 11.58 | 14.30 | — | $4^2F^o-9^2G$ (26) |
| 4331.93 | A | 3 | 11.58 | 14.43 | — | $4^2F^o-10^2G$ (27) |
| 4193.44 | A | 2 | 11.58 | 14.53 | — | $4^2F^o-11^2G$ (28) |
| 4093.90 | A | 1 | 11.58 | 14.59 | — | $4^2F^o-12^2G$ (29) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Al I** continued | | | | | | |
| 3931.97 | B | 5 | 5.21 | 8.35 | 2½-2½ ½-1½ | $5^2D-3d'\ ^2P^o$ (18) |
| 3935.77 | B | 4 | 5.21 | 8.35 | | |
| 3087.02 | B | 5 | 5.45 | 9.45 | 2½-1½ | $6^2D-4d'\ ^2P^o\dagger$ (19) |
| 3203.39 | B | 4 | 5.60 | 9.45 | 2½-1½ | $7^2D-4d'\ ^2P^o$ (20) |

**Al II** I P 18.75 Anal A List A July 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 3900.680 | B | 10 | 7.39 | 10.55 | 1-2 | $3^1P^o-3^1D$ (1) |
| 4663.054 | B | 0 | 10.55 | 13.20 | 2-1 | $3^1D-4^1P^o$ (2) |
| 7042.06 | A | 10 | 11.27 | 13.02 | 1-2 | $4^3S-4^3P^o$ (3) |
| 7056.60 | A | 5 | 11.27 | 13.03 | 1-1 | |
| 7063.64 | A | 1 | 11.27 | 13.01 | 1-0 | |
| 8640.70 | A | 8 | 11.77 | 13.20 | 0-1 | $4^1S-4^1P^o$ (4) |
| 3275.776 | B | 4 | 11.77 | 15.54 | 0-1 | $4^1S-5^1P^o$ (5) |
| 10076.29 | A | 6 | 11.80 | 13.02 | 3-3 | $3^3D-4^3P^o$ (6) |
| 10107.19 | A | 4 | 11.80 | 13.03 | 2-1 | |
| 10128.50 | A | 0.5 | 11.80 | 13.01 | 1-0 | |
| 10077.32 | A | 1 | 11.80 | 13.02 | 2-2 | |
| 10077.53 | A | 0.5 | | | | |
| 10108.01 | A | 0.5 | 11.80 | 13.02 | 1-1 | |
| 10108.37 | A | 0.3 | | | | |
| 3586.557 | A | 10 | 11.80 | 15.24 | 3-4 | $3^3D-4^3F^o$ (7) |
| 3587.068 | A | 9 | 11.80 | 15.24 | 2-3 | |
| 3587.450 | A | 8 | 11.80 | 15.24 | 1-2 | |
| 3586.913 | A | 4 | 11.80 | 15.24 | 3-3 | |
| 3586.936 | A | 2 | | | | |
| 3587.309 | A | 2.5 | 11.80 | 15.24 | 2-2 | |
| 3587.342 | A | 3 | | | | |
| 3587.165 | A | 0.5 | 11.80 | 15.24 | 3-3? | |
| *3587.195 | A | 1 | | | | |
| 3586.708 | A | 1.5Forb | 11.80 | 15.24 | 2-4 | |
| 3586.811 | A | 0.2Forb | 11.80 | 15.24 | 1-4 | |
| *3587.195 | A | 1 Forb | 11.80 | 15.24 | 1-3 | |
| 3313.344 | A | 3 | 11.80 | 15.52 | 3-2 | $3^3D-5^3P^o$ (8) |
| 3314.883 | A | 2 | 11.80 | 15.52 | 2-1 | |
| 3315.608 | A | 1 | 11.80 | 15.52 | 1-0 | |
| 3313.470 | A | 0.5 | 11.80 | 15.52 | 2-2 | |
| 3314.981 | A | 0 | 11.80 | 15.52 | 1-1 | |
| 3314.756 | A | 0.5Forb | 11.80 | 15.52 | 3-1 | |
| 3315.516 | A | 0.2Forb | 11.80 | 15.52 | 2-0 | |
| 6837.14 | A | 8 | 13.02 | 14.83 | 2-1 | $4^3P^o-5^3S$ (9) |
| 6823.48 | A | 5 | 13.02 | 14.83 | 1-1 | |
| 6816.69 | A | 1 | 13.01 | 14.83 | 0-1 | |
| 6243.36 | A | 10 | 13.02 | 15.00 | 2-3 | $4^3P^o-4^3D$ (10) |
| 6231.78 | A | 9 | 13.03 | 15.00 | 1-2 | |
| 6226.18 | A | 8 | 13.01 | 15.00 | 0-1 | |
| 3738.003 | B | 3 | 13.02 | 16.32 | 2-1 | $4^3P^o-6^3S$ (11) |
| 3733.910 | B | 2 | 13.02 | 16.33 | 1-1 | |
| 3731.950 | B | 1 | 13.01 | 16.32 | 0-1 | |
| 3654.995 | A | (8) | 13.02 | 16.40 | 2-3 | $4^3P^o-5^3D$ (12) |
| 3651.096 | A | 5 | 13.02 | 16.40 | 1-2 | |
| 3651.065 | A | 7 Forb | 13.02 | 16.40 | 1-3? | |
| 3649.184 | A | 1.5Forb | 13.01 | 16.40 | 0-3? | |
| †3649.232 | A | 1 Forb | 13.01 | 16.40 | 0-3? | |
| 3026.776 | P | 1.5 | 13.02 | 17.10 | 2-1 | $4^3P^o-7^3S$ (13) |
| 3026.781 | P | | | | | |
| 3024.098 | P | 1 | 13.02 | 17.10 | 1-1 | |
| 3024.114 | P | | | | | |
| 3022.804 | P | 0.5 | 13.01 | 17.10 | 0-1 | |
| 2998.158 | P | 2 | 13.02 | 17.14 | 2- | $4^3P^o-6^3D$ (14) |
| 2998.163 | P | | | | | |
| 2995.530 | P | 1.5 | 13.02 | 17.14 | 1- | |
| 2995.546 | P | | | | | |
| 2994.259 | P | 1 | 13.01 | 17.14 | 0-1 | |
| 6919.96 | B | 0.5 | 13.20 | 14.98 | 1-0 | $4^1P^o-5^1S$ (15) |
| 5593.23 | B | 10 | 13.20 | 15.41 | 1-2 | $4^1P^o-5^1D$ (16) |
| 3866.160 | B | 2 | 13.20 | 16.39 | 1-0 | $4^1P^o-6^1S$ (17) |
| 3703.217 | B | 4 | 13.20 | 16.53 | 1-2 | $4^1P^o-6^1D$ (18) |
| 3135.875 | B | 3 | 13.20 | 17.13 | 1-0 | $4^1P^o-7^1S$ (19) |
| 3088.523 | B | 3 | 13.20 | 17.19 | 1-2 | $4^1P^o-7^1D$ (20) |
| 7471.41 | A | 9 | 13.59 | 15.24 | 2-3 | $4^1D-4^1F^o$ (21) |
| 6335.74 | A | 10 | 13.59 | 15.54 | 2-1 | $4^1D-5^1P^o$ (22) |
| 4237.57 | P | | 13.59 | 16.50 | 2-1 | $4^1D-5^1F^o$ (23) |
| 4026.5 | B | 5 | 13.59 | 16.68 | 2-1 | $4^1D-6^1P^o$ (24) |
| 3428.916 | B | 6 | 13.59 | 17.19 | 2-3 | $4^1D-6^1F^o$ (25) |
| 3351.456 | B | 3 | 13.59 | 17.27 | 2-1 | $4^1D-7^1P^o$ (26) |
| 3074.665 | B | 6 | 13.59 | 17.60 | 2-3 | $4^1D-7^1F^o$ (27) |
| 3041.278 | B | 6 | 13.59 | 17.65 | 2-1 | $4^1D-8^1P^o$ (28) |

**Al I** I P 5.96 Anal A List B July 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 3961.523// | A | 10R | 0.01 | 3.13 | 1½- ½- | $3^3P^o-4^3S$ (1) |
| 3944.009 | A | 10R | 0.00 | 3.13 | ½- ½- | |
| 3443.651 | B | 10 | 0.01 | 3.60 | 1½-2½ ½-1½ | $3^3P^o-3p^2\ ^4P$ (2) |
| 3439.352 | B | 8 | 0.00 | 3.59 | | |
| 3452.670 | B | 5 | 0.01 | 3.59 | 1½-1½ ½- ½- | |
| 3444.871 | B | 7 | 0.00 | 3.58 | | |
| 3458.230 | B | 8 | 0.01 | 3.58 | 1½- ½- | |
| 3092.716 | C | 10R | 0.01 | 4.00 | 1½-2½ ½-1½ | $3^3P^o-3^3D$ (3) |
| 3082.159 | C | 10R | 0.00 | 4.00 | | |
| 3092.843 | C | 6R | 0.01 | 4.00 | 1½-1½ | |
| 13123.37 | P | (400) | 3.13 | 4.07 | ½-1½ ½- ½- | $4^2S-4^2P^o$ (4) |
| 13150.68 | P | (200) | 3.13 | 4.07 | | |
| 6695.97 | D | 7 | 3.13 | 4.97 | ½-1½ ½- ½- | $4^2S-5^2P^o$ (5) |
| 6698.63 | D | 6 | 3.13 | 4.97 | | |
| 5557.08 | C | 1n | 3.13 | 5.35 | ½-1½ ½- ½- | $4^2S-6^2P^o$ (6) |
| 5557.95 | C | 1n | 3.13 | 5.35 | | |
| 3057.155 | B | 10 | 3.60 | 7.63 | 2½-2½ ½-1½ | $3p^2\ ^4P-4s'\ ^4P^o\dagger$ (7) |
| 3059.047 | B | 4 | 3.59 | 7.63 | | |
| 3066.158 | B | 5 | 3.60 | 7.63 | 2½-1½ ½- ½- | |
| 3064.302 | B | 5 | 3.59 | 7.63 | | |
| 3050.073 | B | 9 | 3.59 | 7.63 | 1½-2½ ½-1½ | |
| 3054.694 | B | 6 | 3.58 | 7.62 | | |
| 11255.69 | P | (300) | (4.00 | 5.10 | 2½- 1½- | $3^2D-4^2F^o$ (8) |
| 11253.81 | P | | 4.00 | 5.10 | | |
| 8773.91 | D | 20 | 4.00 | 5.41 | 2½- 1½-2½ | $3^2D-5^2F^o$ (9) |
| 8772.88 | D | 15 | 4.00 | 5.41 | | |
| 7836.15 | D | 10 | 4.00 | 5.58 | 2½- 1½-2½ | $3^2D-6^2F^o$ (10) |
| 7835.33 | D | 9 | 4.00 | 5.58 | | |
| 7362.31 | D | 10 | 4.00 | 5.68 | 2½- 1½-2½ | $3^2D-7^2F^o$ (11) |
| 7361.59 | D | 6 | 4.00 | 5.68 | | |
| 10891.21 | P | | 4.07 | 5.20 | 1½- ½- ½- ½- | $4^2P^o-6^2S$ (12) |
| 10872.47 | P | | 4.07 | 5.20 | | |
| 10782.12 | P | | 4.07 | 5.21 | 1½-2½ ½-1½ ½-1½ | $4^2P^o-5^2D$ (13) |
| 10768.39 | P | | 4.07 | 5.21 | | |
| 10786.78 | P | | 4.07 | 5.21 | 1½-1½ | |
| 8923.56 | D | 2 | 4.07 | 5.45 | 1½-2½ ½-1½ | $4^2P^o-6^2D$ (14) |
| 8912.88 | D | 1 | 4.07 | 5.45 | | |
| 8841.26 | D | 3 | 4.07 | 5.47 | 1½-2½ ½-1½ | $4^2P^o-7^2S$ (15) |
| 8828.91 | D | 1 | 4.07 | 5.47 | | |
| 8075.37 | D | 4 | 4.07 | 5.60 | 1½-2½ ½-1½ | $4^2P^o-7^2D$ (16) |
| 8065.99 | D | 3 | 4.07 | 5.60 | | |
| 3479.78 | B | 6 | 4.81 | 8.35 | 2½-2½ ½-1½ | $4^2D-3d'\ ^2D^o$ (17) |
| 3482.58 | B | 5 1 | 4.81 | 8.35 | | |
| 3479.27 | B | 1 | 4.81 | 8.35 | 1½-2½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Al II** continued | | | | | | |
| 6696.39 | B | 0.5 | 14.83 | 16.67 | 1-2 | $5^3S-6^3P^o$ (29) |
| 6699.46 | B | 0 | 14.83 | 16.67 | 1-1 | |
| 4998.43 | P | | 14.83 | 17.29 | — | $5^3S-7^3P^o$ (30) |
| 4332.0 | B | 0.5 | 14.83 | 17.67 | — | $5^3S-8^3P^o$ (31) |
| *3983.7 | B | 0.5 | 14.83 | 17.92 | — | $5^3S-9^3P^o$ (32) |
| 3774.3 | B | 0 | 14.83 | 18.09 | — | $5^3S-10^3P^o$ (33) |
| 5388.48 | B | 1 | 14.98 | 17.27 | 0-1 | $5^1S-7^1P^o$ (34) |
| 4629.7 | B | 1 | 14.98 | 17.65 | 0-1 | $5^1S-8^1P^o$ (35) |
| 4240.75 | B | 3 | 14.98 | 17.89 | 0-1 | $5^1S-9^1P^o$ (36) |
| 4009.58 | B | 1 | 14.98 | 18.06 | 0-1 | $5^1S-10^1P^o$ (37) |
| 3859.33 | B | 3 | 14.98 | 18.18 | 0-1 | $5^1S-11^1P^o$ (38) |
| 3753.10 | B | 1 | 14.98 | 18.27 | 0-1 | $5^1S-12^1P^o$ (39) |
| 8354.35 | A | 10 | 15.00 | 16.47 | 3-4 | $4^3D-5^3F^o$ (40) |
| 8359.57 | A | 9 | 15.00 | 16.47 | 2-3 | |
| 8363.53 | A | 8 | 15.00 | 16.47 | 1-2 | |
| 8359.23 | A | 1 | 15.00 | 16.47 | 3-3 | |
| 8363.30 | A | 1 | 15.00 | 16.47 | 2-2 | |
| 5853.62 | B | 5 | 15.00 | 17.11 | 3-4 | $4^3D-6^3F^o$ (41) |
| 5861.53 | B | 4 | 15.00 | 17.10 | 2-3 | |
| 5867.81 | B | 3 | 15.00 | 17.10 | 1-2 | |
| 5371.84 | B | 6 | 15.00 | 17.39 | 3,2- | $4^3D-7^3P^o$ (42) |
| 5085.02 | B | 4 | 15.00 | 17.42 | 3-4 | $4^3D-7^3F^o$ (43) |
| 5093.65 | B | 3 | 15.00 | 17.42 | 2-3 | |
| 5100.34 | B | 1 | 15.00 | 17.42 | 1-2 | |
| 4609.7 | B | 1 | 15.00 | 17.67 | — | $4^3D-8^3P^o$ (44) |
| 4585.830 | B | 6 | 15.00 | 17.69 | 3-4 | $4^3D-8^3F^o$ (45) |
| 4588.194 | B | 5 | 15.00 | 17.69 | 2-3 | |
| 4589.750 | B | 4 | 15.00 | 17.69 | 1-2 | |
| 4588.082 | B | 0.5 | 15.00 | 17.69 | 3-3 | |
| 4589.689 | B | 1 | 15.00 | 17.69 | 2-2 | |
| 4236.837 | A | 8 | 15.00 | 17.92 | 3-4 | $4^3D-9^3F^o$ (46) |
| *4237.509 | A | 4 | 15.00 | 17.92 | 2-3 | |
| 4237.999 | A | 3 | 15.00 | 17.92 | 1-2 | |
| *4237.509 | A | 4 | 15.00 | 17.92 | 3-3 | |
| 4237.420 | A | 1 | | | | |
| 4237.945 | A | 0.5 | 15.00 | 17.92 | 2-2 | |
| 4237.875 | A | 0 | 15.00 | 17.92 | 3-2 | |
| 4236.918 | A | 0Forb | 15.00 | 17.92 | 2-4 | |
| 4237.545 | A | 0.5Forb | 15.00 | 17.92 | 1-3 | |
| 3995.860 | B | 5 | 15.00 | 18.09 | 3-4 | $4^3D-10^3F^o$ (47) |
| 3996.159 | B | 4 | 15.00 | 18.09 | 2-3 | |
| 3996.381 | B | 3 | 15.00 | 18.09 | 1-2 | |
| 3996.075 | B | 1 | 15.00 | 18.09 | 3-3 | |
| 3996.333 | B | 0.5 | 15.00 | 18.09 | 2-2 | |
| 3996.182 | B | 0.5Forb | 15.00 | 18.09 | 1-3 | |
| *3983.7 | B | 0.5 | 15.00 | 18.09 | — | $4^3D-10^3P^o$ (48) |
| 3843.037 | B | 3 | 15.00 | 18.31 | 3-4 | $4^3D-11^3F^o$ (49) |
| 3842.313 | B | 2 | 15.00 | 18.31 | 2-3 | |
| 3842.317 | B | 1 | 15.00 | 18.31 | 1-2 | |
| 3734.567 | B | 1 | 15.00 | 18.30 | 3-4 | $4^3D-12^3F^o$ (50) |
| 3734.715 | B | 0.5 | 15.00 | 18.30 | 2-3 | |
| 3734.805 | B | 0 | 15.00 | 18.30 | 1-2 | |
| 3656.319 | B | 0.5 | 15.00 | 18.37 | 3-4 | $4^3D-13^3F^o$ (51) |
| 3597.50 | B | 2 | 15.00 | 18.43 | 3-4 | $4^3D-14^3F^o$ (52) |
| 3552.00 | B | 1 | 15.00 | 18.47 | 3- | $4^3D-15^3F^o$ (53) |
| 3516.05 | B | 0.5 | 15.00 | 18.51 | 3- | $4^3D-16^3F^o$ (54) |
| 3463.63 | B | 0 | 15.00 | 18.56 | 3- | $4^3D-18^3F^o$ (55) |
| 9331.546 | A | 3 | 15.24 | 16.56 | 3- | $4^1F^o-5^1G$ (56) |
| 9331.979 | A | 2 | | | | |
| 6201.52 | A | 10 | 15.24 | 17.23 | 3- | $4^1F^o-6^1G$ (57) |
| 6201.70 | A | 9 | | | | |
| 5158.187 | B | 1d | 15.24 | 17.63 | 3- | $4^1F^o-7^1G$ (58) |
| 4650.544 | B | 2 | 15.24 | 17.90 | 4- | $4^1F^o-8^1G$ (59) |
| 4650.646 | B | 1.5 | | | | |
| 4356.711 | B | 2 | 15.24 | 18.07 | 3- | $4^1F^o-9^1G$ (60) |
| 4356.807 | B | 1.5 | | | | |
| 4168.424 | B | 1 | 15.24 | 18.20 | 3-4 | $4^1F^o-10^1G$ (61) |
| 4168.511 | B | 0.5 | | | | |
| 4039.397 | B | 0 | 15.24 | 18.30 | 3-4 | $4^1F^o-11^1G$ (62) |
| 4039.302 | B | 0.5 | | | | |
| 3946.406 | B | 0.5d | 15.24 | 18.37 | 3- | $4^1F^o-12^1G$ (63) |
| 9290.649 | A | 6 | 15.24 | 16.56 | 4- | $4^3F^o-5^3G$ (64) |
| 9290.747 | A | 5 | | | | |
| 9288.145 | A | 3 | 15.24 | 16.56 | 3- | |
| 9288.550 | A | 2 | | | | |
| 9286.578 | A | 1 | 15.24 | 16.56 | 2- | |
| 9286.794 | A | 2 | | | | |
| 6495.45 | B | 0.5 | 15.24 | 17.14 | 4- | $4^3F^o-6^3D$ (65) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Al II** continued | | | | | | |
| 8183.43 | A | 10n | 15.24 | 17.23 | 4– | $4^3F^o$–$6^3G$ (88) |
| 6182.28 | A | 8 | 15.24 | 17.23 | 3– | |
| 6182.45 | A | 7 | | | | |
| 6181.57 | A | 5 | 15.24 | 17.23 | 2– | |
| 6181.68 | A | 8 | | | | |
| 5277.68 | B | 2 | 15.24 | 17.57 | 4– | $4^3F^o$–$7^3D$ (87) |
| 5278.81 | B | 2 | 15.24 | 17.57 | 3– | |
| 5276.42 | B | 2 | 15.24 | 17.57 | 2– | |
| 5145.654 | B | 1.5d | 15.24 | 17.63 | 4– | $4^3F^o$–$7^3G$ (68) |
| 5144.998 | B | 1 | 15.24 | 17.63 | 3– | |
| 5144.875 | B | 0.5 | | | | |
| 5144.413 | B | 0.5d | 15.24 | 17.83 | 2– | |
| 4640.362 | B | 4 | 15.24 | 17.90 | 4– | $4^3F^o$–$8^3G$ (89) |
| 4640.384 | B | 3.5 | | | | |
| 4639.725 | B | 2 | 15.24 | 17.90 | 3– | |
| 4639.833 | B | 1.5 | | | | |
| 4639.384 | B | 1 | 15.24 | 17.90 | 2– | |
| 4639.328 | B | 0.5 | | | | |
| 4347.785 | B | 4 | 15.24 | 18.07 | 4– | $4^3F^o$–$9^3G$ (70) |
| 4347.802 | B | 3.5 | | | | |
| 4347.223 | B | 2.0 | 15.24 | 18.07 | 3– | |
| 4347.316 | B | 1.5 | | | | |
| 4346.918 | B | 1.0 | 15.24 | 18.07 | 2– | |
| 4346.868 | B | 0.5 | | | | |
| 4160.263 | B | 3 | 15.24 | 18.20 | 4– | $4^3F^o$–$10^3G$ (71) |
| 4160.239 | B | 2.5 | | | | |
| 4159.725 | B | 1.5 | 15.24 | 18.20 | 3– | |
| 4159.809 | B | 1 | | | | |
| 4159.450 | B | 1 | 15.24 | 18.20 | 2– | |
| 4159.407 | B | 0.5 | | | | |
| 4031.633 | B | 0.5d | 15.24 | 18.30 | 4– | $4^3F^o$–$11^3G$ (72) |
| 4031.210 | B | 0 | 15.24 | 18.30 | 3– | |
| 4031.135 | B | 0.5 | | | | |
| 4030.867 | B | 0n | 15.24 | 18.30 | 2– | |
| 3939.068 | B | 0.5d | 15.24 | 18.37 | 4– | $4^3F^o$–$12^3G$ (73) |
| 3938.621 | B | 0.5d | 15.24 | 18.37 | 3– | |
| 3870.057 | B | 0.5 | 15.24 | 18.43 | 4– | $4^3F^o$–$13^3G$ (74) |
| 6917.93 | A | 1 | 15.41 | 17.19 | 2–3 | $5^1D$–$8^1F^o$ (75) |
| 8609.64 | A | 0.5 | 15.41 | 17.27 | 2–1 | $5^1D$–$7^1P^o$ (76) |
| 5613.19 | B | 3 | 15.41 | 17.60 | 2–3 | $5^1D$–$7^1F^o$ (77) |
| 5502.88 | B | 3 | 15.41 | 17.65 | 2–1 | $5^1D$–$8^1P^o$ (78) |
| 5000.97 | B | 3 | 15.41 | 17.87 | 2–3 | $5^1D$–$8^1F^o$ (79) |
| 4962.10 | B | 3 | 15.41 | 17.89 | 2–1 | $5^1D$–$9^1P^o$ (80) |
| 4653.0 | B | 0.5 | 15.41 | 18.08 | 2–3 | $5^1D$–$9^1F^o$ (81) |
| 4648.82 | B | 1 | 15.41 | 18.06 | 2–1 | $5^1D$–$10^1P^o$ (82) |
| 4447.8 | B | 3 | 15.41 | 18.18 | 2–1 | $5^1D$–$11^1P^o$ (83) |
| 4432.82 | B | 0.5 | 15.41 | 18.19 | 2–3 | $5^1D$–$10^1F^o$ (84) |
| 4307.20 | B | 3 | 15.41 | 18.27 | 2–1 | $5^1D$–$12^1P^o$ (85) |
| 4282.97 | B | 0.5 | 15.41 | 18.29 | 2–3 | $5^1D$–$11^1F^o$ (86) |
| 4203.4 ? | B | 2 | 15.41 | 18.34 | 2–1 | $5^1D$–$13^1P^o$ (87) |
| 4056.8 | B | 0.5 | 15.41 | 18.45 | 2–1 | $5^1D$–$15^1P^o$ (88) |
| 4005.7 | B | 0 | 15.41 | 18.49 | 2–1 | $5^1D$–$16^1P^o$ (89) |
| 7823.72 | A | 2 | 15.52 | 17.10 | 2–1 | $5^3P^o$–$7^3S$ (90) |
| 7815.83 | A | 1 | 15.52 | 17.10 | 1–1 | |
| 7812.31 | A | 0.5 | 15.52 | 17.10 | 0–1 | |
| 7635.33 | A | 2 | 15.52 | 17.14 | 2– | $5^3P^o$–$8^3D$ (91) |
| 7827.85 | A | 1 | 15.52 | 17.14 | 1– | |
| 7624.48 | A | 0.5 | 15.52 | 17.14 | 0–1 | |
| 6073.23 | A | 10 | 15.52 | 17.55 | 2–1 | $5^3P^o$–$8^3S$ (92) |
| 8068.46 | A | (8) | 15.52 | 17.55 | 1–1 | |
| 6068.32 | A | 3 | 15.52 | 17.55 | 0–1 | |
| 8066.44 | A | 2 | | | | |
| 8006.42 | A | 10 | 15.52 | 17.57 | 2– | $5^3P^o$–$7^3D$ (93) |
| 6001.81 | A | (8) | 15.52 | 17.57 | 1– | |
| 5999.70 | A | 3 | 15.52 | 17.57 | 0–1 | |
| 5999.83 | A | 2 | | | | |
| 5318.07 | B | 7 | 15.52 | 17.84 | 2–1 | $5^3P^o$–$9^3S$ (94) |
| 5312.32 | B | 5 | 15.52 | 17.84 | 1–1 | |
| 5310.76 | B | 2 | 15.52 | 17.84 | 0–1 | |
| 5283.77 | B | 8 | 15.52 | 17.86 | 2– | $5^3P^o$–$8^3D$ (95) |
| 5280.21 | B | 8 | 15.52 | 17.86 | 1– | |
| 5278.82 | B | 3 | 15.52 | 17.86 | 0–1 | |
| 4902.77 | B | 5 | 15.52 | 18.04 | 2–1 | $5^3P^o$–$10^3S$ (96) |
| 4899.84 | B | 3 | 15.52 | 18.04 | 1–1 | |
| 4898.52 | B | 2 | 15.52 | 18.04 | 0–1 | |
| 4635.7 | B | 1 | 15.52 | 18.18 | 2– | $5^3P^o$–$10^3D$ (97) |
| 4633.2 | B | 0.5 | 15.52 | 18.18 | 1– | |
| 4831.5 | B | 0.5 | 15.52 | 18.18 | 0–1 | |
| 7449.43 | A | 5 | 15.54 | 17.19 | 1–2 | $5^1P^o$–$7^1D$ (98) |
| 6061.11 | A | 8 | 15.54 | 17.57 | 1–0 | $5^1P^o$–$8^1S$ (99) |
| 5971.94 | A | 7 | 15.54 | 17.60 | 1–2 | $5^1P^o$–$8^1D$ (100) |
| 5324.61 | B | 4 | 15.54 | 17.86 | 1–0 | $5^1P^o$–$9^1S$ (101) |
| 5285.85 | B | 6 | 15.54 | 17.87 | 1–2 | $5^1P^o$–$9^1D$ (102) |
| 4918.98 | B | 3 | 15.54 | 18.05 | 1–0 | $5^1P^o$–$10^1S$ (103) |
| 4898.76 | B | 5 | 15.54 | 18.08 | 1–2 | $5^1P^o$–$10^1D$ (104) |
| 4666.8 | B | 11 | 15.54 | 18.18 | 1–0 | $5^1P^o$–$11^1S$ (105) |
| 4655.05 | B | 0.5 | 15.54 | 18.19 | 1–2 | $5^1P^o$–$11^1D$ (106) |
| 4489.87 | B | 0.5 | 15.54 | 18.29 | 1–2 | $5^1P^o$–$12^1D$ (107) |
| 9124.27 | A | 0.5 | 16.32 | 17.67 | 1–2 | $6^3S$–$8^3P^o$ (108) |
| 6001.18 | B | 1 | 16.39 | 18.45 | 0–1 | $6^1S$–$15^1P^o$ (109) |
| 8119.72 | A | 1.5 | 16.40 | 17.92 | –4 | $5^3D$–$9^3F^o$ (110) |
| 8122.08 | A | 0.5 | 16.40 | 17.92 | –3 | |
| 8131.89 | A | 0.2 | | | | |
| 8123.52 | A | 0 | 16.40 | 17.92 | –2 | |
| 6775.97 | B | 0.5 | 18.40 | 18.22 | – | $5^3D$–$11^3P^o$ (111) |
| 8680.31 | A | 3 | 16.47 | 17.90 | 4– | $5^3P^o$–$8^3G$ (112) |
| 8674.92 | A | 2 | 16.47 | 17.90 | 3– | |
| 8875.28 | A | 1 | | | | |
| 8671.06 | A | 0.5 | 16.47 | 17.90 | 2– | |
| 8671.28 | A | 1 | | | | |
| 7709.78 | A | 0 | 16.47 | 18.07 | 4– | $5^3F^o$–$9^3G$ (113) |
| 7138.81 | B | 0.5 | 16.47 | 18.20 | 4– | $5^3F^o$–$10^3G$ (114) |
| 7134.66 | B | 0.5 | 16.47 | 18.20 | 3– | |
| 7131.29 | B | 0 | 16.47 | 18.20 | 2– | |
| 8858.39 | A | 1 | 16.50 | 17.90 | 3– | $5^1F^o$–$8^1G$ (115) |
| 8858.77 | A | 0.5 | | | | |
| 8086.91 | A | 0.5 | 16.53 | 18.08 | 2–3 | $6^1D$–$9^1F^o$ (116) |
| 9249.41 | A | 1 | 16.56 | 17.90 | — | $5^1G$–$8^1H^o$ (117) |
| 8160.15 | A | 3 | 16.56 | 18.08 | — | $5^1G$–$9^1H^o$ (118) |
| 7526.2 | A | 0.2 | 16.56 | 18.20 | — | $5^1G$–$10^1H^o$ (119) |

Fine Structure

| Al III I P 28.33 | | | Anal A | List A | July 1944 | |
|---|---|---|---|---|---|---|
| 3601.623 | A | (20) | 14.31 | 17.74 | 2½–1½ | $3^2D$–$4^2P^o$ (1) |
| 3612.352 | A | (15) | 14.31 | 17.73 | 1½– ½ | |
| 3601.916 | A | 1 | 14.31 | 17.74 | 1½–1½ | |
| 5698.47 | A | 8 | 15.57 | 17.74 | ½–1½ | $4^2S$–$4^2P^o$ (2) |
| 5722.65 | A | 6 | 15.57 | 17.73 | ½– ½ | |
| 4589.178 | A | (10) | 17.74 | 20.47 | 1½–2½ | $4^2P^o$–$4^2D$ (3) |
| 4512.535 | A | (8) | 17.73 | 20.47 | ½–1½ | |
| 4528.911 | A | 1 | 17.74 | 20.47 | 1½–1½ | |
| 3713.103 | A | (15) | 17.74 | 21.07 | 1½– ½ | $4^2P^o$–$5^2S$ (4) |
| 3702.086 | A | (10) | 17.73 | 21.07 | ½– ½ | |
| 4149.897 | A | (10) | 20.47 | 23.44 | 2½–3½ | $4^2D$–$5^2F^o$ (5) |
| 4150.138 | A | (8) | 20.47 | 23.44 | 1½–2½ | |
| 4149.917 | A | 1 | 20.47 | 23.44 | 2½–2½ | |
| 4701.65 | A | 8 | 20.69 | 23.32 | — | $4^2F^o$–$5^2D$ (6) |
| 4490.90 | A | 2nn Forb | 20.69 | 23.44 | — | $4^2F^o$–$5^2F^o$ (7) |
| 4479.968 | A | 4 | 20.69 | 23.45 | 3½– | $4^2P^o$–$5^2G$ (8) |
| 4479.891 | A | 3 | 20.69 | 23.45 | 2½–3½ | |
| 4364.59 | A | 2n | 22.03 | 24.86 | 1½– | $5^2P^o$–$6^2D$ (9) |
| 4357.24 | P | | 22.03 | 24.88 | ½–1½ | |
| 3287.37 | A | 1 | 22.03 | 25.79 | 1½– | $5^2P^o$–$7^2D$ (10) |
| 3283.11 | A | 0 5 | 22.03 | 25.79 | ½–1½ | |
| 4903.71 | A | 4 | 23.32 | 25.83 | — | $5^2D$–$7^2F^o$ (11) |
| 3980.58 | A | 2n | 23.32 | 26.42 | — | $5^2D$–$8^2F^o$ (12) |
| 5260.91 | A | 0n | 23.44 | 25.79 | — | $5^2P^o$–$7^2D$ (13) |
| 5150.86 | A | 6n | 23.44 | 25.84 | — | $5^2P^o$–$7^2G$ (14) |
| 4188.88 | A | 0.5 | 23.44 | 26.39 | — | $5^2P^o$–$8^2D$ (15) |
| 4142.15 | A | 2n | 23.44 | 26.42 | — | $5^2P^o$–$8^2G$ (16) |
| 4141.25 | A | 0n Forb | 23.44 | 26.42 | — | $5^2P^o$–$8^2H^o$ (17) |
| 5172.8 | A | 1 | 23.45 | 25.83 | | $5^2G$–$7^2F^o$ (18) |

| Al III continued | | | | | | |
|---|---|---|---|---|---|---|
| 5163.90 | A | 7 | 23.45 | 25.84 | | $5^2G$–$7^2H^o$ (19) |
| 3658.3 | A | (1n) | 23.45 | 26.82 | | $5^2G$–$9^2H^o$ (20) |

| Si I I P 8.11 | | | Anal B | List A | Aug 1944 | |
|---|---|---|---|---|---|---|
| 2970.35 | A | 15 | 0.78 | 4.93 | 2–2 | $3p^2\ ^1D$–$4s^3P^o$ (1) |
| 2987.65 | A | 25 | 0.78 | 4.91 | 2–1 | |
| 4102.926 | A | 25 | 1.90 | 4.91 | 0–1 | $3p^2\ ^1S$–$4s^3P^o$ (2) |
| 3905.527 | A | 100 | 1.90 | 5.06 | 0–1 | $3p^2\ ^1S$–$4s^1P^o$ (3) |
| 12031.49 | A | 25 | 4.93 | 5.96 | 2–3 | $4s^3P^o$–$4p^3D$ (4) |
| 11984.20 | A | 20 | 4.91 | 5.94 | 1–2 | |
| 11991.57 | A | 10 | 4.90 | 5.93 | 0–1 | |
| 12270.50 | A | 2 | 4.93 | 5.94 | 2–2 | |
| 12103.46 | A | 5 | 4.91 | 5.93 | 1–1 | |
| 12395.97 | P | | 4.93 | 5.93 | 2–1 | |
| 10827.09 | A | 100 | 4.93 | 8.07 | 2–2 | $4s^3P^o$–$4p^3P$ (5) |
| 10749.40 | A | 60 | 4.91 | 6.06 | 1–1 | |
| 10979.27 | A | 35 | 4.93 | 6.06 | 2–1 | |
| 10786.86 | A | 50 | 4.91 | 6.05 | 1–0 | |
| 10603.38 | A | 60 | 4.91 | 6.07 | 1–2 | |
| 10660.98 | A | 50 | 4.90 | 6.06 | 0–1 | |
| 10585.12 | A | 100 | 4.93 | 6.10 | 2–1 | $4s^3P^o$–$4p^3S$ (6) |
| 10371.23 | A | 50 | 4.91 | 6.10 | 1–1 | |
| 10288.83 | A | 25 | 4.90 | 6.10 | 0–1 | |
| 9768.27 | A | 5w | 4.93 | 6.20 | 2–2 | $4s^3P^o$–$4p^1D$ (7) |
| 9585.72 | A | 4 | 4.91 | 6.20 | 1–2 | |
| 8435.28 | P | | 4.91 | 6.37 | 1–0 | $4s^3P^o$–$4p^1S$ (8) |
| 5797.912 | A | 40 | 4.93 | 7.06 | 2–3 | $4s^3P^o$–$5p^3D$ (9) |
| 5793.128 | A | 30 | 4.91 | 7.04 | 1–2 | |
| 5780.452 | A | 25 | 4.90 | 7.03 | 0–1 | |
| 5859.23 | P | | 4.93 | 7.04 | 2–2 | |
| 5708.437 | A | 75 | 4.93 | 7.09 | 2–2 | $4s^3P^o$–$5p^3P$ (10) |
| 5690.470 | A | 40 | 4.91 | 7.08 | 1–1 | |
| 5754.258 | A | 8w | 4.93 | 7.08 | 2–1 | |
| 5701.138 | A | 25 | 4.91 | 7.07 | 1–0 | |
| 5645.665 | A | 25 | 4.91 | 7.09 | 1–2 | |
| 5665.601 | A | 25 | 4.90 | 7.08 | 0–1 | |
| 5684.523 | A | 50 | 4.93 | 7.10 | 2–1 | $4s^3P^o$–$5p^3S$ (11) |
| 5622.23 | A | 3 | 4.91 | 7.10 | 1–1 | |
| 11890.44 | P | | 5.06 | 6.10 | 1–1 | $4s^1P^o$–$4p^3S$ (12) |
| 10869.54 | A | 125 | 5.06 | 6.20 | 1–2 | $4s^1P^o$–$4p^1D$ (13) |
| 9413.59 | A | 200 | 5.06 | 6.37 | 1–0 | $4s^1P^o$–$4p^1S$ (14) |
| 6067.62 | P | | 5.06 | 7.09 | 1–2 | $4s^1P^o$–$5p^3P$ (15) |
| 5948.584 | A | 100 | 5.06 | 7.14 | 1–2 | $4s^1P^o$–$5p^1D$ (16) |
| 5772.258 | A | 50 | 5.06 | 7.20 | 1–0 | $4s^1P^o$–$5p^1S$ (17) |
| 8417.89 | P | | 5.59 | 7.06 | 3–3 | $3d^3D^o$–$5p^3D$ (18) |
| 8527.32 | P | | 5.59 | 7.04 | 2–2 | |
| 8397.96 | P | | 5.59 | 7.06 | 2–3 | |
| 8514.64 | P | | 5.59 | 7.04 | 1–2 | |
| 8230.67 | A | 15 | 5.59 | 7.09 | 3–2 | $3d^3D^o$–$5p^3P$ (19) |
| 8306.80 | A | 4w | 5.59 | 7.08 | 2–1 | |
| 8317.45 | A | 2w | 5.59 | 7.07 | 1–0 | |
| 8211.48 | A | 2 | 5.59 | 7.09 | 2–2 | |
| 8150.57 | P | | 5.59 | 7.10 | 1–1 | $3d^3D^o$–$5p^3S$ (20) |
| 7995.00 | P | | 5.59 | 7.14 | 2–2 | $3d^3D^o$–$5p^1D$ (21) |
| 7416.00 | A | 250 | 5.59 | 7.26 | 2–3 | $3d^3D^o$–$4f^1F$ (22) |
| 7423.54 | A | 500 | 5.59 | 7.26 | 3–4 | $3d^3D^o$–$4f^3F$ (23) |
| 7409.11 | A | 100 | 5.59 | 7.26 | 2–3 | |
| 7405.85 | A | 300 | 5.59 | 7.26 | 1–2 | |
| 7424.63 | A | 20 | 5.59 | 7.26 | 3–3 | |
| 7415.37 | A | 15 | 5.59 | 7.26 | 2–2 | |
| 7289.25 | A | 250 | 5.59 | 7.29 | 3–4 | $3d^3D^o$–$4f^3G$ (24) |
| 7275.28 | A | 50 | 5.59 | 7.29 | 2–3 | |
| 7290.21 | A | 10 | 5.59 | 7.29 | 3–3 | |
| 7250.69 | A | 40 | 5.59 | 7.30 | 3–3 | $3d^3D^o$–$4f^3D$ (25) |
| 7193.56 | A | 8 | 5.59 | 7.31 | 2–2 | |
| 7184.89 | A | 10 | 5.59 | 7.31 | 1–1 | |
| 7208.20 | A | 1 | 5.59 | 7.31 | 3–2 | |
| 7193.89 | A | 5 | 5.59 | 7.31 | 2–1 | |
| 7235.86 | A | 10 | 5.59 | 7.30 | 2–3 | |
| 7184.54 | A | 1 | 5.59 | 7.31 | 1–2 | |
| 7235.32 | A | 15 | 5.59 | 7.30 | 2–2 | $3d^3D^o$–$4f^1D$ (26) |
| 7226.20 | A | 20 | 5.59 | 7.30 | 1–2 | |
| 6244.56 | A | 10n | 5.59 | 7.57 | 2–2 | $3d^3D^o$–$5f^1D$ (27) |
| 6237.62 | A | 5n | 5.59 | 7.57 | 1–2 | |
| 6254.25 | A | 25n | 5.59 | 7.57 | 3–4 | $3d^3D^o$–$5f^3F$ (28) |
| 6243.86 | A | 10n | 5.59 | 7.57 | 2–3 | |
| 6237.34 | A | 5n | 5.59 | 7.57 | 1–2 | |
| 6254.96 | A | 2n | 5.59 | 7.57 | 3–3 | |
| 6244.13 | P | | 5.59 | 7.57 | 2–2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Si I continued | | | | | | |
| 6155.22 | A | 20n | 5.59 | 7.60 | 3-4 | $3d^3D^o-5f^3G$ |
| 6145.08 | A | 10n | 5.59 | 7.60 | 3-3 | (29) |
| 6155.73 | A | 2n | 5.59 | 7.60 | 3-3 | |
| 6142.53 | A | 5n | 5.59 | 7.60 | 3-3 | $3d^3D^o-5f^3D$ |
| 6131.54 | A | 4n | 5.59 | 7.60 | 2-2 | (30) |
| 6124.85 | A | 2n | 5.59 | 7.60 | 1-1 | |
| 6131.86 | A | 5n | 5.59 | 7.60 | 2-3 | |
| 6125.03 | A | 4n | 5.59 | 7.60 | 1-2 | |
| 6142.21 | P | | 5.59 | 7.60 | 3-2 | |
| 8131.30 | P | | 5.59 | 7.60 | 2-1 | |
| 10844.02 | A | 25w | 5.84 | 6.98 | 1-2 | $4p^1P-4d^1D^o$ (31) |
| 10627.81 | A | 20w | 5.84 | 7.00 | 1-2 | $4p^1P-4d^3P^o$ (32) |
| 8179.43 | P | | 5.84 | 7.35 | 1-2 | $4p^1P-6s^3P^o$ |
| 8338.43 | A | 5w | 5.84 | 7.32 | 1-1 | (33) |
| 8093.32 | A | 25w | 5.84 | 7.36 | 1-1 | $4p^1P-6s^1P^o$ (34) |
| 7913.47 | A | 10w | 5.84 | 7.40 | 1-2 | $4p^1P-5d^3P^o$ (35) |
| 7680.35 | A | 100w | 5.84 | 7.44 | 1-2 | $4p^1P-5d^1D^o$ (36) |
| 6848.65 | A | 4w | 5.84 | 7.64 | 1-1 | $4p^1P-7s^1P^o$ (37) |
| 6722.67 | A | 2w | 5.84 | 7.67 | 1-2 | $4p^1P-6d^1D^o$ (38) |
| 11018.00 | A | 70 | 5.85 | 6.97 | 2-1? | $3d^1D^o-5p^1P$ (39) |
| 10153.13 | P | | 5.85 | 7.06 | 2-3 | $3d^1D^o-5p^3D$ (40) |
| 10020.16 | A | 1 | 5.85 | 7.08 | 2-1 | $3d^1D^o-5p^3P$ (41) |
| •9570.08 | A | 4 | 5.85 | 7.14 | 2-2 | $3d^1D^o-5p^1D$ (42) |
| 8752.17 | A | 200 | 5.85 | 7.26 | 2-3 | $3d^1D^o-4f^1F$ (43) |
| 8742.60 | A | 100 | 5.85 | 7.26 | 2-3 | $3d^1D^o-4f^3F$ |
| 8751.18 | P | | 5.85 | 7.26 | 2-2 | (44) |
| 8556.64 | A | 100w | 5.85 | 7.29 | 2-3 | $3d^1D^o-4f^3G$ (45) |
| 8502.38 | A | 30w | 5.85 | 7.30 | 2-3 | $3d^1D^o-4f^3D$ |
| 8444.00 | A | 15w | 5.85 | 7.31 | 2-2 | (46) |
| 8444.48 | A | 3w | 5.85 | 7.31 | 2-1 | |
| 8501.50 | A | 20w | 5.85 | 7.30 | 2-2 | $3d^1D^o-4f^1D$ (47) |
| 7165.62 | A | 100w | 5.85 | 7.57 | 2-2 | $3d^1D^o-5f^1D$ (48) |
| •7164.75 | A | | 5.85 | 7.57 | 2-3 | $3d^1D^o-5f^3F$ |
| 7165.09 | P) | 2w | (5.85 | 7.57 | 2-2 | (49) |
| 7034.96 | A | 50w | 5.85 | 7.60 | 2-3 | $3d^1D^o-5f^3G$ (50) |
| 7017.98 | A | 4w | 5.85 | 7.60 | 2-3 | $3d^1D^o-5f^3D$ |
| 7017.68 | A | 10w | 5.85 | 7.60 | 2-2 | (51) |
| 7016.90 | P | | 5.85 | 7.60 | 2-1 | |
| 6527.20 | P | | 5.85 | 7.74 | 2-2 | $3d^1D^o-6f^3F$ (52) |
| 10727.21 | A | 75w | 5.96 | 7.11 | 3-4 | $4p^3D-4d^3F^o$ |
| 10694.14 | A | 50w | 5.94 | 7.09 | 2-3 | (53) |
| 10689.52 | A | 20w | 5.93 | 7.08 | 1-2 | |
| 10682.66 | A | 5w | 5.96 | 7.09 | 3-3 | |
| 10784.33 | A | 5w | 5.94 | 7.08 | 2-2 | |
| 8892.97 | A | 25w | 5.96 | 7.35 | 3-2 | $4p^3D-6s^3P^o$ |
| 8949.33 | A | 15w | 5.94 | 7.32 | 2-1 | (54) |
| 8925.55 | A | 8w | 5.93 | 7.31 | 1-0 | |
| 8766.68 | A | 3w | 5.94 | 7.35 | 2-2 | |
| 8883.84 | A | 4w | 5.93 | 7.32 | 1-1 | |
| 8667.40 | P | | 5.94 | 7.36 | 2-1 | $4p^3D-6s^1P^o$ |
| 8606.43 | A | 1w | 5.93 | 7.36 | 1-1 | (55) |
| 8579.15 | A | 2w | 5.96 | 7.40 | 3-2 | $4p^3D-5d^3P^o$ (56) |
| 7943.94 | A | 500w | 5.96 | 7.51 | 3-4 | $4p^3D-5d^3F^o$ |
| 7932.20 | A | 300w | 5.94 | 7.49 | 2-3 | (57) |
| 7918.38 | A | 200w | 5.93 | 7.49 | 1-2 | |
| 8035.39 | A | 7w | 5.96 | 7.49 | 3-3 | |
| 7970.26 | A | 10w | 5.94 | 7.49 | 2-2 | |
| 7373.02 | A | 10w | 5.96 | 7.63 | 3-2 | $4p^3D-7s^3P^o$ |
| 7285.94 | P | | 5.94 | 7.63 | 2-2 | (58) |
| 7255.28 | P | | 5.94 | 7.64 | 2-1 | $4p^3D-7s^1P^o$ (59) |
| 7005.84 | A | 50w | 5.96 | 7.72 | 3-4 | $4p^3D-6d^3F^o$ |
| 7003.58 | A | 50w | 5.94 | 7.70 | 2-3 | (60) |
| 6976.53 | A | 25w | 5.93 | 7.70 | 1-2 | |
| 7084.33 | A | 2w | 5.98 | 7.70 | 3-3 | |
| 6813.85 | P | | 5.96 | 7.77 | 3-3 | $4p^3D-7d^3D^o$ |
| 6730.38 | P | | 5.93 | 7.76 | 1-1 | (61) |
| 6842.35 | P | | 5.96 | 7.76 | 3-2 | |
| 6729.80 | P | | 5.93 | 7.78 | 1-2 | |
| 6527.49 | A | 3n | 5.96 | 7.85 | 3-4 | $4p^3D-7d^3F^o$ |
| 6555.20 | A | 2n | 5.94 | 7.83 | 2-3 | (62) |
| 6560.68 | A | 2n | 5.93 | 7.81 | 1-2 | |
| 10262.49 | P | | 6.06 | 7.26 | 1-1 | $4p^3P-4d^1P^o$ (63) |
| 10067.84 | A | 4w | 6.07 | 7.30 | 2-3 | $4p^3P-5d^3D^o$ |
| 10025.80 | P | | 6.06 | 7.29 | 1-2 | (64) |
| 9967.46 | A | 1 | 6.05 | 7.29 | 0-1 | |
| 10155.88 | A | 1 | 8.07 | 7.29 | 2-2 | |
| 10001.35 | P | | 8.06 | 7.29 | 1-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Si I continued | | | | | | |
| 9689.41 | A | 8w | 6.07 | 7.35 | 2-2 | $4p^3P-6s^3P^o$ |
| 9789.24 | A | 2n | 6.06 | 7.32 | 1-1 | (65) |
| 9913.16 | A | 1w | 6.07 | 7.32 | 2-1 | |
| 9839.58 | A | 2w | 6.06 | 7.31 | 1-0 | |
| •9570.08 | A | 4 | 6.06 | 7.35 | 1-2 | |
| 9758.08 | A | 2n | 6.05 | 7.32 | 0-1 | |
| 9318.24 | A | 4 | 6.07 | 7.40 | 2-2 | $4p^3P-5d^3P^o$ |
| 9238.60 | A | 2n | 6.07 | 7.41 | 2-1 | (66) |
| •9103.37 | A | 3w | 6.06 | 7.41 | 1-0 | |
| 9208.55 | A | 5w | 6.06 | 7.40 | 1-2 | |
| •9103.37 | A | 3w | 6.05 | 7.41 | 0-1 | |
| 8070.64 | P | | 6.07 | 7.60 | 2-3 | $4p^3P-6d^3D^o$ |
| 8086.18 | P | | 6.06 | 7.58 | 1-2 | (67) |
| 7912.55 | A | 3w | 6.07 | 7.63 | 2-2 | $4p^3P-7s^3P^o$ (68) |
| 7898.38 | P | | 6.07 | 7.63 | 2-2 | $4p^3P-6d^3P^o$ (69) |
| 7105.34 | P | | 6.06 | 7.79 | 1-1 | $4p^3P-8s^1P^o$ |
| 7089.03 | P | | 6.05 | 7.79 | 0-1 | (70) |
| 9891.90 | A | 5w | 6.10 | 7.35 | 1-2 | $4p^3S-6s^3P^o$ (71) |
| 9505.28 | A | 5 | 6.10 | 7.40 | 1-2 | $4p^3S-5d^3P^o$ |
| 9421.82 | A | 4 | 6.10 | 7.41 | 1-1 | (72) |
| 9393.40 | A | 2w | 6.10 | 7.41 | 1-0 | |
| 8046.78 | P | | 6.10 | 7.63 | 1-2 | $4p^3S-7s^3P^o$ (73) |
| 8009.39 | P | | 6.10 | 7.64 | 1-1 | $4p^3S-7s^1P^o$ (74) |
| 7392.18 | P | | 6.10 | 7.77 | 1-2 | $4p^3S-8s^3P^o$ |
| 7455.47 | P | | 6.10 | 7.75 | 1-1 | (75) |
| 11468.54 | A | 1w | 6.18 | 7.26 | 4-4 | $3d^3F^o-4f^3F$ |
| 11202.02 | A | 1w | 6.15 | 7.26 | 2-2 | (76) |
| 11308.45 | A | 2w | 6.16 | 7.26 | 3-2 | |
| 11290.01 | A | 10w | 6.16 | 7.26 | 3-4 | |
| 11187.74 | A | 20w | 6.15 | 7.26 | 2-3 | |
| 11130.37 | A | 7w | 6.18 | 7.29 | 4-5 | $3d^3F^o-4f^3G$ |
| 10982.28 | A | 7w | 6.16 | 7.29 | 3-4 | (77) |
| 10885.16 | A | 10w | 6.15 | 7.29 | 2-3 | |
| 10984.24 | A | 3w | 6.16 | 7.29 | 3-3 | |
| 10893.72 | P | | 6.16 | 7.30 | 3-2 | $3d^3F^o-4f^1D$ |
| 10796.52 | A | 0n | 6.15 | 7.30 | 2-2 | (78) |
| •8898.97 | A | 3w | 6.18 | 7.57 | 4-4 | $3d^3F^o-5f^3F$ |
| •8790.88 | A | 4w | 6.16 | 7.57 | 3-3 | (79) |
| 8729.02 | A | 5w | 6.15 | 7.57 | 2-2 | |
| 8899.50 | A | 3w | 6.18 | 7.57 | 4-3 | |
| 8791.28 | A | 5w | 6.16 | 7.57 | 3-2 | |
| •8790.88 | A | 4w | 6.16 | 7.57 | 3-4 | |
| 8728.38 | A | 10w | 6.15 | 7.57 | 2-3 | |
| 8596.02 | P | | 6.16 | 7.60 | 3-4 | $3d^3F^o-5f^3G$ |
| 8536.38 | A | 3w | 6.15 | 7.60 | 2-3 | (80) |
| 8597.00 | A | 2nl | 6.16 | 7.60 | 3-3 | |
| 7850.5 | A | 2N | 6.16 | 7.74 | 3-2 | $3d^3F^o-6f^3F$ |
| 7800.0 | A | 4N | 6.15 | 7.74 | 2-2 | (81) |
| 11607.42 | A | 0w | 6.20 | 7.26 | 2-1 | $4p^1D-4d^1P^o$ (82) |
| 11485.68 | A | 2w | 6.20 | 7.27 | 2-3 | $4p^1D-4d^1F^o$ (83) |
| 10582.66 | A | 1 | 8.20 | 7.36 | 2-1 | $4p^1D-6s^1P^o$ (84) |
| 9886.92 | A | 2w | 6.20 | 7.44 | 2-2 | $4p^1D-5d^1D^o$ (85) |
| •8898.97 | A | 3w | 6.20 | 7.58 | 2-3 | $4p^1D-5d^1F^o$ (86) |
| 8576.46 | P | | 6.20 | 7.63 | 2-2 | $4p^1D-6d^3P^o$ (87) |
| 8550.34 | P | | 6.20 | 7.64 | 2-1 | $4p^1D-7s^1P^o$ (88) |
| 7431.17 | P | | 6.20 | 7.86 | 2-3 | $4p^1D-7d^1F^o$ (89) |
| 11811.49 | A | 5w | 8.23 | 7.30 | 2-3 | $3d^3P^o-4f^3D$ |
| •11591.98 | A | 4w | 6.24 | 7.31 | 1-2 | (90) |
| 11640.58 | A | 2w | 6.25 | 7.31 | 0-1 | |
| 11502.94 | A | 3w | 6.23 | 7.31 | 2-2 | |
| •11591.98 | A | 4w | 6.24 | 7.31 | 1-1 | |
| •9009.04 | A | 5nl | 6.23 | 7.60 | 2-3 | $3d^3P^o-5f^3D$ |
| 9064.06 | A | 0wl | 6.24 | 7.60 | 1-2 | (91) |
| •9009.04 | A | 5nl | 8.23 | 7.60 | 2-2 | |
| 10015.33 | A | 1 | 6.37 | 7.60 | 0-1 | $4p^1S-7s^3P^o$ (92) |

Strongest Unclassified Lines of Si I

| | | |
|---|---|---|
| 9770.10 | A | 4w |
| 9738.60 | A | 8w |
| 9254.59 | A | 4n |
| 8848.89 | A | 100nl |
| 8503.17 | A | 5 |
| 7743.2 | A | 4n |
| 7742.7 | A | 5n |
| 6721.97 | A | 4w |
| 6415.24 | A | 4w |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Si II I P 16.27 Anal B List A Aug 1944 | | | | | | |
| 3856.021 | A | 8 | 6.83 | 10.03 | 2½-1½ | $3p^2\ ^2D-4^2P^o$ |
| 3862.592 | A | 6 | 6.83 | 10.02 | 1½- ½ | (1) |
| 3853.657 | A | 3 | 6.83 | 10.03 | 1½-1½ | |
| 6347.091 | A | 10 | 8.09 | 10.03 | ½-1½ | $4^2S-4^2P^o$ |
| 6371.359 | A | 8 | 8.09 | 10.02 | ½- ½ | (2) |
| 4130.884 | A | 10 | 9.80 | 12.78 | 2½- | $3^2D-4^2F^o$ |
| 4128.053 | A | 8 | 9.79 | 12.78 | 1½-2½ | (3) |
| 5978.970 | A | 7 | 10.03 | 12.09 | 1½- ½ | $4^2P^o-5^2S$ |
| 5957.612 | A | 5 | 10.02 | 12.09 | ½- ½ | (4) |
| 5056.020 | A | 10 | 10.03 | 12.47 | 1½-2½ | $4^2P^o-4^2D$ |
| 5041.063 | A | 8 | 10.02 | 12.47 | ½-1½ | (5) |
| 5056.353 | A | 2 | 10.03 | 12.47 | 1½-1½ | |
| 3339.84 | A | 3 | 10.03 | 13.73 | 1½- ½ | $4^2P^o-6^2S$ |
| 3333.16 | A | 2 | 10.02 | 13.73 | ½- ½ | (6) |
| 3210.04 | A | 3 | 10.03 | 13.87 | 1½- | $4^2P^o-5^2D$ |
| 3203.89 | A | 2 | 10.02 | 13.87 | ½-1½ | (7) |
| 5868.404 | A | 3 | ? | ? | 2½-2½ | $3p4s4p^o-3p4p'$ |
| 5846.12 | A | 0 | ? | ? | 1½-1½ | (8) |
| 5827.80 | A | 0 | ? | ? | ½- ½ | |
| 5915.266 | A | 1 | ? | ? | 2½-1½ | |
| 5867.497 | A | 1 | ? | ? | 1½- ½ | |
| 5800.48 | A | 1 | ? | ? | 1½-2½ | |
| 5806.75 | A | 2 | ? | ? | ½-1½ | |
| 5639.492 | A | 2 | ? | ? | 2½-1½ | $3p4s4p^o-3p4p^4$ |
| 5576.61 | A | 1 | ? | ? | 1½-1½ | (9) |
| 5540.74 | A | 0 | ? | ? | ½-1½ | |

Strongest Unclassified Lines of Si II

| | | |
|---|---|---|
| 6671.88 | A | 3 |
| 6660.49 | A | 2 |
| 5785.64 | A | 1 |
| 5706.375 | A | 1 |
| 5701.375 | A | 1 |
| 5688.856 | A | 2 |
| 5669.590 | A | 4 |
| 5496.24 | A | 1 |
| 5468.92 | A | 2 |
| 5456.11 | A | 2 |
| 5438.41 | A | 1 |
| 5294.97 | A | 1 |
| 5202.51 | A | 3 |
| 5192.75 | A | 1 |
| 5185.09 | A | 1 |
| 5181.77 | A | 1 |
| 4921.69 | A | 1 |
| 4906.88 | A | 1n |
| 4859.28 | A | 1 |
| 4656.80 | A | 1 |
| 4198.174 | A | 2 |
| 4190.738 | A | 3 |
| 4076.78 | A | 1 |
| 4075.45 | A | 2 |
| 3998.00 | A | 1n |
| 3991.77 | A | 2n |
| 3199.54 | A | 1 |
| 3193.10 | A | 1 |
| 3188.95 | A | 1 |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Si III I P 33.32 Anal B List A Aug 1944 | | | | | | |
| 3086.225 | A | 7 | 17.63 | 21.63 | 3-2 | $3^3D-4^3P^o$ |
| 3093.423 | A | 6 | 17.63 | 21.62 | 2-1 | (1) |
| 3096.786 | A | 4 | 17.64 | 21.62 | 1-0 | |
| 3086.429 | A | 3 | 17.63 | 21.63 | 2-2 | |
| 3093.613 | A | 3 | 17.64 | 21.62 | 1-1 | |
| 3086.620 | A | 1 | 17.64 | 21.63 | 1-2 | |
| 4552.654 | A | 9 | 18.92 | 21.63 | 1-2 | $4^3S-4^3P^o$ |
| 4567.872 | A | 7 | 18.92 | 21.62 | 1-1 | (2) |
| 4574.777 | A | 4 | 18.92 | 21.62 | 1-0 | |
| 4338.52 | A | 1 | 18.94 | 21.79 | 0-1 | $3p^2\ ^1S-4^1P^o$ (3) |
| 5739.762 | A | 8 | 19.64 | 21.79 | 0-1 | $4^1S-4^1P^o$ (4) |
| 3806.56 | A | 5 | 21.63 | 24.88 | 2- | $4^3P^o-4^3D$ |
| 3796.11 | A | 4 | 21.62 | 24.88 | 1- | (5) |
| 3791.41 | A | 3 | 21.62 | 24.88 | 0-1 | |
| 3241.67 | A | 8 | 21.63 | 25.44 | 2-1 | $4^3P^o-5^3S$ |
| 3234.00 | A | 5 | 21.62 | 25.44 | 1-1 | (6) |
| 3230.55 | A | 3 | 21.62 | 25.44 | 0-1 | |
| 3590.46 | A | 8 | 21.79 | 25.32 | 1-2 | $4^1P^o-4^1D$ (7) |
| 3185.16 | A | 3 | 21.79 | 25.66 | 1-0 | $4^1P^o-5^1S$ (8) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Si III** continued | | | | | | |
| 4828.923 | A | 4n | 25.86 | 28.43 | 4- | $4^3F^o$-$5^3G$ |
| 4819.740 | A | 3n | 25.86 | 28.43 | 3- | (9) |
| 4813.290 | A | 2n | 25.85 | 28.43 | 2-3 | |
| 3040.93 | A | 1 | 25.86 | 29.92 | 4- | $4^3F^o$-$6^3G$ |
| 3037.26 | A | 1 | 25.86 | 29.93 | 3- | (10) |
| 3034.74 | A | 1 | 25.85 | 29.92 | 2- | |
| 3126.25 | A | 0 | 26.68 | 30.62 | 2-2 | 3p3d$^3$P$^o$-3p4p$^3$P |
| 3147.38 | A | 0 | 26.68 | 30.60 | 2-1 | (11) |
| 3258.67 | A | 1 | 26.84 | 30.82 | 3-2 | 3p3d$^3$D$^o$-3p4p$^3$P |
| 3276.25 | A | 1 | 26.83 | 30.60 | 2-1 | (12) |
| 3279.25 | A | 0 | 26.82 | 30.59 | 1-0 | |
| 3253.44 | A | 00 | 26.83 | 30.82 | 2-2 | |
| 4683.018 | A | 2 | 27.99 | 30.62 | 2-2 | 3p4s$^3$P$^o$-3p4p$^3$P |
| 4665.87 | A | 0 | 27.95 | 30.60 | 1-1 | (13) |
| 4682.774 | A | 2 | 27.95 | 30.59 | 1-0 | |
| 4638.13 | A | 1 | 27.94 | 30.60 | 0-1 | |
| Unclassified Lines of **Si III** | | | | | | |
| 4716.658 | A | 5 | | | | |
| 3924.44 | A | 4 | | | | |
| 3486.93 | A | 6 | | | | |
| 3482.70 | A | 0n | | | | |
| 3310.52 | A | 3 | | | | |
| 3196.50 | A | 3 | | | | |
| 3186.01 | A | 2 | | | | |

**Si IV** I P 44.95 Anal A List A Aug 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 4088.883 | A | 10 | 23.95 | 26.97 | 1½-1½ | $4^2S$-$4^2P^o$ |
| 4116.104 | A | 8 | 23.95 | 26.95 | ½- ½ | (1) |
| 3165.72 | A | 8 | 26.97 | 30.86 | 1½-2½ | $4^2P^o$-$4^2D$ |
| 3149.58 | A | (7) | 26.95 | 30.86 | ½-1½ | (2) |
| 3762.41 | A | (5) | 30.86 | 34.14 | 2½-1½ | $4^2D$-$5^2P^o$ |
| 3773.13 | A | (4) | 30.86 | 34.13 | 1½- ½ | (3) |
| 4328.22 | B | (4) | 34.14 | 37.00 | 1½- ½ | $5^2P^o$-$6^2S$ |
| 4314.18 | B | (3) | 34.13 | 37.00 | ½- ½ | (4) |
| 4212.44 | A | (4) | 35.99 | 38.92 | — | $5^2D$-$6^2F^o$ |
| | | | | | | (5) |
| 4631.38 | A | (5) | 36.28 | 38.92 | — | $5^2F^o$-$6^2G$ |
| | | | | | | (6) |
| 4654.14 | A | (8) | 36.27 | 38.93 | — | $5^2G$-$6^2H^o$ |
| | | | | | | (7) |

**P I** I P 10.9 Anal C List B Sept 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 10581.52 | A | 8 | 6.98 | 8.12 | 2½-3½ | $4s^4P$-$4p^4D^o$ |
| 10529.45 | A | 5 | 6.92 | 8.10 | 1½-2½ | (1) |
| 10511.45 | A | 3 | 6.91 | 8.08 | ½-1½ | |
| 10813.03 | A | 0 | 6.96 | 8.10 | 2½-2½ | |
| 10681.43 | A | 1 | 8.92 | 8.08 | 1½-1½ | |
| 10596.92 | A | 1 | 6.91 | 8.07 | ½- ½ | |
| 9796.79 | A | 50 | 8.96 | 8.21 | 2½-2½ | $4s^4P$-$4p^4P^o$ |
| 9734.74 | A | 20 | 6.92 | 8.19 | 1½-1½ | (2) |
| 9608.97 | A | 3 | 6.91 | 8.19 | ½- ½ | |
| 9976.65 | A | 5 | 6.96 | 8.19 | 2½-1½ | |
| 9750.73 | A | 25 | 6.92 | 8.19 | 1½- ½ | |
| 9583.45 | A | 12 | 8.92 | 8.21 | 1½-2½ | |
| 9593.54 | A | 25 | 6.91 | 8.19 | ½-1½ | |
| 9525.78 | A | 30 | 8.96 | 8.25 | 2½-1½ | $4s^4P$-$4p^4S^o$ |
| 9304.88 | A | 3 | 8.92 | 8.25 | 1½-1½ | (3) |
| 9175.85 | A | 0 | 8.91 | 8.25 | ½-1½ | |
| 10084.22 | A | 25 | 7.18 | 8.41 | 1½-1½ | $4s^2P$-$4p^2P^o$ |
| 9903.74 | A | 8 | 7.14 | 8.39 | ½- ½ | (4) |
| 10204.72 | A | 2 | 7.18 | 8.39 | 1½- ½ | |
| 9790.08 | A | 3 | 7.14 | 8.41 | ½-1½ | |

**P II** I P 19.57 Anal B List B Aug 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 3715.86 | A | 4 | 9.48 | 13.80 | 2-3 | 3s3p$^3$ $^3P^o$-$4p^3D$ |
| 3768.71 | A | 4 | 9.48 | 13.76 | 1-2 | (1) |
| 3795.10 | A | 3 | 9.48 | 13.74 | 0-1 | |
| 3761.82 | A | 3 | 9.48 | 13.78 | 2-2 | |
| 3793.81 | A | 3 | 9.48 | 13.74 | 1-1 | |
| 3788.70 | A | 2 | 9.48 | 13.74 | 2-1 | |
| 3472.88 | A | 5 | 9.48 | 13.03 | 2-2 | 3s3p$^3$ $^3P^o$-$4p^3P$ |
| 3503.00 | A | 5 | 9.48 | 13.00 | 2-1 | (2) |
| 3518.81 | A | 4nd? | 9.48 | 13.99 | 1-0 | |
| •3478.74 | A | 3 | 9.48 | 13.03 | 1-2 | |
| 3419.25 | A | 6 | 9.48 | 13.09 | 2-1 | 3s3p$^3$ $^3P^o$-$4p^3S$ |
| 3434.88 | A | 6 | 9.48 | 13.09 | 1-1 | (3) |
| 3436.20 | A | 4 | 9.48 | 13.09 | 0-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **P II** continued | | | | | | |
| 3308.86 | A | 6w | 9.59 | 13.32 | 2-2 | 3s3p$^3$ $^1P^o$-$4p^1D$ |
| | | | | | | (4) |
| 6043.10 | B | (5) | 10.76 | 12.80 | 2-3 | $4s^3P^o$-$4p^3D$ |
| 6024.15 | B | (3) | 10.71 | 12.78 | 1-2 | (5) |
| 6034.01 | B | (1) | 10.69 | 12.74 | 0-1 | |
| 6165.56 | B | (1) | 10.78 | 12.76 | 2-2 | |
| 6087.76 | B | (1) | 10.71 | 12.74 | 1-1 | |
| 5425.93 | A | 7w | 10.76 | 13.03 | 2-2 | $4s^3P^o$-$4p^3P$ |
| 5386.87 | A | 7w | 10.71 | 13.00 | 1-1 | (8) |
| 5499.72 | A | 7 | 10.76 | 13.00 | 2-1 | |
| 5409.66 | A | 7w | 10.71 | 12.99 | 1-0 | |
| 5316.07 | A | 7W | 10.71 | 13.03 | 1-2 | |
| 5344.73 | A | 7W | 10.69 | 13.00 | 0-1 | |
| 5296.09 | A | 8W | 10.76 | 13.09 | 2-1 | $4s^3P^o$-$4p^3S$ |
| 5191.41 | A | 6 | 10.71 | 13.09 | 1-1 | (7) |
| 5152.20 | A | 4 | 10.69 | 13.09 | 0-1 | |
| •?4720.26 | A | 3 | 10.71 | 13.32 | 1-2 | $4s^3P^o$-$4p^1D$† |
| | | | | | | (8) |
| 4612.84 | A | 3 | 10.71 | 13.38 | 1-1 | $4s^3P^o$-$4p^1P$ |
| 4581.77 | A | 3n | 10.69 | 13.38 | 0-1 | (9) |
| 5253.49 | A | 8W | 10.97 | 13.32 | 1-2 | $4s^1P^o$-$4p^1D$ |
| | | | | | | (10) |
| 4499.18 | A | 7l | 10.97 | 13.72 | 1-0 | $4s^1P^o$-$4p^1S$ |
| | | | | | | (11) |
| •3551.16 | A | 3n | 12.69 | 16.17 | 1-2 | 3s3p$^3$ $^1P^o$-5 |
| 3470.83 | A | 4 | 12.89 | 16.25 | 1- | (12) -8 |
| •3404.34 | A | 5 | 12.69 | 16.32 | 1-2 | -13 |
| 3377.52 | A | 4n | 12.69 | 16.34 | 1-2 | -18 |
| 4943.42 | A | 7l | 12.80 | 15.29 | 3-2 | $4p^3D$-$5s^3P^o$ |
| 4969.65 | A | 7l | 12.76 | 15.24 | 2-1 | (13) |
| 4954.33 | A | 5l | 12.74 | 15.23 | 1-0 | |
| 4864.38 | A | 4l | 12.76 | 15.29 | 2-2 | |
| 4937.17 | A | 4l | 12.74 | 15.24 | 1-1 | |
| 4823.84 | A | 0 | 12.74 | 15.29 | 1-2 | |
| 4739.49 | A | 3l | 12.76 | 15.36 | 2-1 | $4p^3D$-$5s^1P^o$ |
| 4700.80 | A | 4l | 12.74 | 15.36 | 1-1 | (14) |
| 4601.97 | A | 8Wl? | 12.80 | 15.48 | 3-4 | $4p^3D$-$4d^3F^o$ |
| •4587.91§ | A | 8W | 12.78 | 15.45 | 2-3 | (15) |
| | | | (12.74 | 15.43 | 1-2 | |
| 4658.12 | A | 6l | 12.80 | 15.45 | 3-3 | |
| 4626.61 | A | 5l? | 12.76 | 15.43 | 2-2 | |
| 4224.43 | A | 2 | 12.80 | 15.72 | 3-3 | $4p^3D$-$4d^3D^o$ |
| 4072.13 | A | 3 | 12.76 | 15.79 | 2-2 | (16) |
| 4036.23 | A | 2n | 12.74 | 15.79 | 1-1 | |
| 4127.49 | A | 5lf | 12.80 | 15.79 | 3-2 | |
| 4064.64 | A | 3lf | 12.76 | 15.79 | 2-1 | |
| 4166.73 | A | 2n | 12.76 | 15.72 | 2-3 | |
| 4117.09 | A | 4 | 12.80 | 15.80 | 3-2 | $4p^3D$-$4d^3P^o$ |
| 4120.78 | A | 2n | 12.76 | 15.75 | 2-1 | (17) |
| 4130.77 | A | 3nl? | 12.74 | 15.72 | 1-0 | |
| 4062.08 | A | 2n | 12.76 | 15.80 | 2-2 | |
| 4091.53 | A | 3ld? | 12.74 | 15.75 | 1-1 | |
| 4033.68 | A | 2 | 12.74 | 15.80 | 1-2 | |
| 3664.20 | A | 6w | 12.79 | 16.16 | 2-2 | $3d^3P^o$-4 |
| 3570.34 | A | 3d | 12.79 | 16.25 | 2-2 | (18) -9 |
| 3507.37 | A | 6wd? | 12.79 | 16.31 | 2- | -12 |
| •3478.74 | A | 3 | 12.79 | 16.34 | 2-1 | -17 |
| 3775.03 | A | 3 | 12.81 | 16.08 | 1-2 | $3d^3P^o$-2 |
| 3676.27 | A | 6w | 12.81 | 16.17 | 1-2 | (19) -5 |
| 3490.45 | A | 5 | 12.81 | 16.34 | 1-2 | -18 |
| 3706.06 | A | 7w | 12.83 | 16.16 | 1-2? | $3d^3P^o$-4 |
| 3536.30 | A | 3 | 12.83 | 16.32 | 1-2 | (20) -14 |
| 3559.93 | A | 3 | 12.85 | 16.31 | 2- | $3d^3P^o$-12 |
| 3556.49 | A | 6 | 12.85 | 16.32 | 2-2 | (21) -13 |
| •3551.18 | A | 3n | 12.85 | 16.32 | 2-2 | -14 |
| 3533.67 | A | 2 | 12.85 | 16.34 | 2- | -16 |
| 3530.25 | A | 5 | 12.85 | 16.34 | 2-1 | -17 |
| 3527.11 | A | 3 | 12.85 | 16.34 | 2-2 | -18 |
| •3404.34 | A | 5 | 12.85 | 16.47 | 2-1 | -20 |
| •3728.67§§ | A | 4d | 12.85 | 16.16 | 3-2 | $3d^3D^o$-4 |
| 3723.63 | A | 3 | 12.85 | 16.17 | 3-2 | (22) -5 |
| 3631.41 | A | 4 | 12.85 | 16.25 | 3-2? | -9 |
| 3566.43 | A | 5 | 12.85 | 16.31 | 3- | -12 |
| 3582.48 | A | 3 | 12.85 | 16.32 | 3-2 | -13 |
| 5450.66 | A | 6l | 13.03 | 15.29 | 2-2 | $4p^3P$-$5s^3P^o$ |
| 5507.15 | A | 5l | 13.00 | 15.24 | 1-1 | (23) |
| 5583.33 | A | 5l | 13.03 | 15.24 | 2-1 | |
| 5541.19 | A | 4 | 13.00 | 15.23 | 1-0 | |
| 5378.12 | A | 3l | 13.00 | 15.29 | 1-2 | |
| 5483.58 | A | 5l | 12.99 | 15.24 | 0-1 | |
| •4589.79 | A | 8W | 13.03 | 15.72 | 2-3 | $4p^3P$-$4d^3D^o$ |
| 4425.95 | A | 2 | 13.00 | 15.79 | 1-2 | (24) |
| 4401.97 | A | 1n | 12.99 | 15.79 | 0-1 | |
| 4475.27 | A | 7l | 13.03 | 15.79 | 2-2 | |
| 4417.31 | A | 3 | 13.00 | 15.79 | 1-1 | |
| 4466.11 | A | 3 | 13.03 | 15.79 | 2-1 | |
| 4462.95 | A | 5 | 13.03 | 15.80 | 2-2 | $4p^3P$-$4d^3P^o$ |
| 4483.67 | A | 3 | 13.00 | 15.75 | 1-1 | (25) |
| 4533.81 | A | 2 | 13.03 | 15.75 | 2-1 | |
| •4530.78 | A | 7l | 13.00 | 15.72 | 1-0 | |
| 4414.39 | A | 6 | 13.00 | 15.80 | 1-2 | |
| 4467.98 | A | 4 | 12.99 | 15.75 | 0-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **P II** continued | | | | | | |
| 3827.46 | A | 7l | 13.08 | 16.31 | 2-2 | $3d^1D^o$-11 |
| | | | | | | (26) |
| 5588.25 | A | 5l | 13.09 | 15.29 | 1-2 | $4p^3S$-$5s^3P^o$ |
| 5727.69 | A | 2l | 13.09 | 15.24 | 1-1 | (27) |
| 4554.81 | A | 6l? | 13.09 | 15.80 | 1-2 | $4p^3S$-$4d^3P^o$ |
| 4628.71 | A | 4l? | 13.09 | 15.75 | 1-1 | (28) |
| 4678.95 | A | 6l | 13.09 | 15.72 | 1-0 | |
| 4558.04 | A | 6l | 13.09 | 15.79 | 1-1 | $4p^3S$-$4d^3D^o$ |
| | | | | | | (29) |
| 4244.55 | A | 3 | 13.25 | 16.16 | 3-2 | $3d^1P^o$-4 |
| 4109.19 | A | 5 | 13.25 | 16.25 | 3- | (30) -10 |
| 4044.49 | A | 7w | 13.25 | 16.31 | 3-2 | -11 |
| 4019.45 | A | 4 | 13.25 | 16.32 | 3-3 | -15 |
| 4452.45 | A | 6l | 13.38 | 16.15 | 1- | $3d^1P^o$-3 |
| 4423.9 | A | 3d | 13.38 | 16.17 | 1-1 | (31) -6 |
| 4160.56 | A | 3 | 13.38 | 16.34 | 1-2 | -18 |
| 6460.1 | C | 3 | 13.38 | 15.29 | 1-2 | $4p^1P$-$5s^3P^o$ |
| | | | | | | (32) |
| 4288.53 | A | 4 | 13.38 | 16.26 | 1-1 | $4p^1P$-$4d^1P^o$ |
| | | | | | | (33) |
| 3372.70 | A | 4 | 13.38 | 17.04 | 1-1 | $4p^1P$-$6s^1P^o$ |
| | | | | | | (34) |
| •4587.91 § | A | 8W | 13.62 | 16.31 | 2-2 | $1^o$-11 |
| •4530.78 | A | 7l | 13.62 | 16.34 | 2- | (35)-16 |
| 4792.06 | A | 5l | 13.64 | 16.21 | -2 | $2^o$- 7 |
| 4622.71 | A | 4n | 13.64 | 16.31 | -2 | (36) -11 |
| •4589.79 | A | 8W | 13.64 | 16.32 | -3 | -15 |
| 4565.22 | A | 6l | 13.64 | 16.34 | — | -16 |
| 3710.46 | A | 3n | 13.72 | 17.04 | 0-1 | $4p^1S$-$6s^1P^o$ |
| | | | | | | (37) |

**P III** I P 30.03 Anal B List A Aug 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 4059.27 | A | 6 | 14.43 | 17.47 | 2½-1½ | $3^2D$-$4^2P^o$ |
| 4080.04 | A | 7 | 14.43 | 17.45 | 1½- ½ | (1) |
| 4057.39 | A | 4 | 14.43 | 17.47 | 1½-1½ | |
| 4232.15 | A | 7w | 14.55 | 17.47 | ½-1½ | $4^2S$-$4^2P^o$ |
| 4246.68 | A | 7w | 14.55 | 17.45 | ½- ½ | (3) |
| 3233.62 | A | 6w | 17.47 | 21.29 | 1½- | $4^2P^o$-$4^2D$ |
| 3219.32 | A | 6w | 17.45 | 21.29 | ½-1½ | (4) |
| 3277.82 | A | 3 | 14.43 | 18.19 | 2½-2½ | $3^2D$-$3p^3$ $^2D^o$ |
| 3283.22 | A | 2 | 14.43 | 18.19 | 1½-1½ | (2) |
| 5203.86 | A | 5 | 21.29 | 23.66 | -1½ | $4^2D$-$5^2P^o$ |
| | | | | | | (5) |
| 3280.22 | A | 3n | 21.29 | 25.05 | — | $4^2D$-$5^2F^o$ |
| | | | | | | (6) |
| •4587.91 § | A | 8W | 22.05 | 24.74 | — | $4^2F^o$-$5^2D$ |
| | | | | | | (7) |
| 3978.28 | A | 8W | 22.05 | 25.16 | — | $4^2F^o$-$5^2G$ |
| | | | | | | (8) |
| 3957.64 | A | 6 | ? | ? | 2½-3½ | 3p4s$^4P^o$-3p4p$^4P$ |
| 3933.38 | A | 4 | ? | ? | 1½-1½ | (9) |
| 3922.72 | A | 4 | ? | ? | ½- ½ | |
| 3997.17 | A | 5 | ? | ? | 2½-1½ | |
| 3951.51 | A | 5 | ? | ? | 1½- ½ | |
| 3895.03 | A | 6 | ? | ? | 1½-2½ | |
| 3904.79 | A | 6 | ? | ? | ½-1½ | |
| 3802.08 | A | 6 | ? | ? | 2½-1½ | 3p4s$^4P^o$-3p4p$^4S$ |
| 3744.22 | A | 5 | ? | ? | 1½-1½ | (10) |
| •3717.63§§ | A | 5 | ? | ? | ½-1½? | |

**P IV** I P 51.15 Anal B List B Aug 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 3347.72 | A | 6 | 28.01 | 31.70 | 1-2 | $4^3S$-$4^3P^o$ |
| 3364.44 | A | 6 | 28.01 | 31.68 | 1-1 | (1) |
| 3371.10 | A | 5 | 28.01 | 31.67 | 1-0 | |
| 4249.57 | A | 6 | 28.89 | 31.79 | 0-1 | $4^1S$-$4^1P^o$ |
| | | | | | | (2) |
| •3728.67§§ | A | 4d | 36.20 | 39.51 | 2-1 | $4^3D$-$5^3P^o$ |
| •3717.63§ | A | 5 | 36.20 | 39.52 | 2-2 | (3) |
| 3717.03 | A | 5 | 36.20 | 39.52 | 1-2 | |

**P V** I P 64.74 Anal A List A Aug 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 3175.16 | A | 5 | 33.70 | 37.58 | ½-1½ | $4^2S$-$4^2P^o$ |
| 3204.06 | A | 3 | 33.70 | 37.55 | ½- ½ | (1) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **S I** I P 10.31 Anal B List B Sept 1944 | | | | | | |
| 9213.91 | B | (10) | 6.50 | 7.84 | 2-3 | $4^5S^o-4^5P$ |
| 9228.11 | B | (10) | 6.50 | 7.83 | 2-2 | (1) |
| 9237.49 | B | (10) | 6.50 | 7.83 | 2-1 | |
| 4694.13 | A | 10 | 6.50 | 9.12 | 2-3 | $4^5S^o-5^5P$ |
| 4695.45 | A | 8 | 6.50 | 9.12 | 2-2 | (2) |
| 4696.25 | A | 6 | 6.50 | 9.12 | 2-1 | |
| 10455.47 | B | (8) | 6.83 | 8.01 | 1-2 | $4^3S^o-4^3P$ |
| 10459.46 | B | (8) | 6.83 | 8.01 | 1-1 | (3) |
| 10456.79 | B | (4) | 6.83 | 8.01 | 1-0 | |
| 5278.99 | A | 3 | 6.83 | 9.17 | 1-2 | $4^3S^o-5^3P$ |
| 5378.70 | A | 1 | 6.83 | 9.17 | 1-1 | (4) |
| 5278.10 | A | 0 | 6.83 | 9.17 | 1-0 | |
| 4411.34 | A | 3 | 6.83 | 9.63 | 1- | $4^3S^o-6^3P$ |
| | | | | | | (5) |
| 8694.70 | A | 10 | 7.84 | 9.25 | 3-4 | $4^5P-4^5D^o$ |
| 8680.47 | A | 8 | 7.83 | 9.25 | 2-3 | (6) |
| 8671.37 | A | 1 | 7.83 | 9.26 | 1-2 | |
| 8693.98 | A | 3 | 7.84 | 9.25 | 3-3 | |
| 8679.70 | A | 2 | 7.83 | 9.26 | 2-2 | |
| 8670.65 | A | 2 | 7.83 | 9.26 | 1-1 | |
| 8693.24 | A | 1 | 7.84 | 9.26 | 3-2 | |
| 8679.00 | A | 1 | 7.83 | 9.26 | 2-1 | |
| 8670.19 | A | 1 | 7.83 | 9.26 | 1-0 | |
| 7696.73 | A | 10 | 7.84 | 9.44 | 3-2 | $4^5P-6^5S^o$ |
| 7686.13 | A | 8 | 7.83 | 9.44 | 2-2 | (7) |
| 7679.60 | A | 5 | 7.83 | 9.44 | 1-2 | |
| 6757.16 | A | 10 | 7.84 | 9.66 | 3- | $4^5P-5^5D^o$ |
| 6748.79 | A | 8 | 7.83 | 9.66 | 2- | (8) |
| 6743.58 | A | 6 | 7.83 | 9.66 | 1- | |
| 6415.50 | A | 3 | 7.84 | 9.76 | 3-2 | $4^5P-7^5S^o$ |
| 6408.13 | A | 2 | 7.83 | 9.76 | 2-2 | (9) |
| 6403.58 | A | 1 | 7.83 | 9.76 | 1-2 | |
| 6052.66 | A | 10 | 7.84 | 9.87 | 3- | $4^5P-6^5D^o$ |
| 6046.04 | A | 5 | 7.83 | 9.87 | 2- | (10) |
| 6041.93 | A | 3 | 7.83 | 9.87 | 1- | |
| 5706.11 | A | 6 | 7.84 | 10.00 | 3- | $4^5P-7^5D^o$ |
| 5700.24 | A | 4 | 7.83 | 10.00 | 2- | (11) |
| 5696.63 | A | 2 | 7.83 | 10.00 | 1- | |
| 5507.01 | A | 4 | 7.84 | 10.08 | 3- | $4^5P-8^5D^o$ |
| 5501.54 | A | 3 | 7.83 | 10.08 | 2- | (12) |
| 5498.18 | A | 2 | 7.83 | 10.08 | 1- | |
| 9035.92 | B | (6) | 8.01 | 9.38 | 2-3 | $4^3P-4^3D^o$ |
| 9036.32 | B | (4) | 8.01 | 9.38 | 1-2 | (13) |
| 9038.72 | B | (3) | 8.01 | 9.38 | 0-1 | |
| 9039.27 | B | (3) | 8.01 | 9.38 | 2-2 | |
| 9036.73 | B | (2) | 8.01 | 9.38 | 1-1 | |
| 8452.14 | A | 5 | 8.01 | 9.47 | 2-1 | $4^3P-6^3S^o$ |
| 8449.54 | A | 3 | 8.01 | 9.47 | 1-1 | (14) |
| 8451.55 | A | 1 | 8.01 | 9.47 | 0-1 | |
| *7244.77 | A | 4 | (8.01 8.01 | 9.71 9.71 | 2-3 2-2 | $4^3P-5^3D^o$ † (15) |
| *9949.84 | B | (8) | (8.37 8.37 | 9.62 9.61 | 3-2 1-0 | $3^3D^o-4p'\ ^3P$† (16) |
| 9932.26 | B | (8) | 8.37 | 9.62 | 2-2 | |
| *9633.78 | B | (5) | (8.37 8.37 | 9.66 9.65 | 3-4 2-3 | $3^3D^o-4p'\ ^3F$ (17) |
| 9672.34 | B | (10) | 8.37 | 9.65 | 1-2 | |
| 9649.94 | B | (12) | 8.37 | 9.65 | 3-3 | |
| 9680.80 | B | (10) | 8.37 | 9.65 | 2-2 | |
| 9697.33 | B | (8) | 8.37 | 9.65 | 3-2 | |
| 9413.46 | B | (8) | 8.37 | 9.69 | 3-3 | $3^3D^o-4p'\ ^3D$† |
| 9421.93 | B | (8) | 8.37 | 9.68 | 2-2 | (18) |
| *9437.11 | B | (8) | (8.37 8.37 | 9.68 9.68 | 1-1 3-2 | |
| 11453 | B | (1) | 8.38 | 9.46 | 4- | $3^5D^o-4^5F$ |
| 11472 | B | (1n) | (8.38 | 9.46 | 3- | (19) |
| 11464 | B | | 8.38 | 9.46 | 0- | |
| 9693.68 | B | (10) | 8.38 | 9.70 | 3-3 | $3^5D^o-4p'\ ^3F$† |
| 9739.74 | B | (8) | 8.38 | 9.69 | 2-2 | (20) |
| 9741.93 | B | (5) | 8.38 | 9.69 | 3-2 | |
| 8874.53 | B | (9) | 8.38 | 9.77 | 4- | $3^5D^o-5^5F$ † |
| 8884.23 | B | (7) | 8.38 | 9.77 | 3- | (21) |
| 8882.47 | B | (5) | 8.38 | 9.77 | 2- | |
| 8880.70 | B | (3) | 8.38 | 9.77 | 1- | |
| 7923.95 | A | 15 | 8.38 | 9.94 | 4- | $3^5D^o-8^5F$ † |
| 7931.70 | A | 10 | 8.38 | 9.94 | 3- | (22) |
| 7930.33 | A | 8 | 8.38 | 9.94 | 2- | |
| 7928.84 | A | 6 | 8.38 | 9.94 | 1- | |

Strongest Unclassified Lines of **S I**

| | | |
|---|---|---|
| 9958.90 | B | (8) |
| 8585.60 | A | 10 |
| 7629.82 | A | 10 |
| 7578.96 | A | 10 |
| 4993.51 | A | 8 |
| 3887.56 | A | 8 |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **S II** I P 23.3 Anal B List A Sept 1944 | | | | | | |
| 5027.19 | D | 2 | 13.04 | 15.49 | 1½-½ | $3s3p^4\ ^2P-4p^2S^o$ |
| 5142.33 | D | 1 | 13.09 | 15.49 | ½-½ | (1) |
| 4131.0 | A | 00 | 13.04 | 16.03 | 1½-1½ | $3s3p^4\ ^2P-4p^4P^o$ |
| | | | | | | (2) |
| 3908.95 | A | 1 | 13.04 | 16.20 | 1½-2½ | $3s3p^4\ ^2P-4p^2D^o$ |
| | | | | | | (3) |
| 3595.991 | A | 4 | 13.04 | 16.47 | 1½-1½ | $3s3p^4\ ^2P-4p^2P^o$ |
| 3672.14 | A | 2 | 13.09 | 16.45 | ½- ½ | (4) |
| 3613.03 | A | 0 | 13.04 | 16.45 | 1½- ½ | |
| 3654.51 | A | 1 | 13.09 | 16.47 | ½-1½ | |
| 6388.48 | D | 2 | 13.56 | 15.49 | 1½- ½ | $4s^4P-4p^2S^o$ |
| | | | | | | (5) |
| 5453.81 | C | 15 | 13.81 | 15.88 | 2½-3½ | $4s^4P-4p^4D^o$ |
| 5432.77 | C | 12 | 13.56 | 15.83 | 1½-2½ | (8) |
| 5428.64 | C | 9 | 13.53 | 15.80 | ½-1½ | |
| 5564.94 | C | 8 | 13.61 | 15.83 | 2½-2½ | |
| 5509.87 | C | 15 | 13.58 | 15.80 | 1½-1½ | |
| 5473.59 | C | 15 | 13.53 | 15.78 | ½- ½ | |
| 5645.62 | D | 4 | 13.61 | 15.80 | 2½-1½ | |
| 5556.01 | C | 5 | 13.56 | 15.78 | 1½- ½ | |
| 5032.41 | C | 2 | 13.61 | 18.07 | 2½-2½ | $4s^4P-4p^4P^o$ |
| 4991.94 | C | 1 | 13.58 | 18.03 | 1½-1½ | (7) |
| 4942.47 | C | (1) | 13.53 | 16.02 | ½- ½ | |
| 5103.30 | C | 1 | 13.81 | 16.03 | 2½-1½ | |
| 5009.54 | C | 1 | 13.56 | 18.02 | 1½- ½ | |
| 4924.08 | C | 9 | 13.56 | 16.07 | 1½-2½ | |
| 4925.32 | C | 10 | 13.53 | 16.03 | ½-1½ | |
| 4779.11 | A | 2 | 13.61 | 16.20 | 2½-2½ | $4s^4P-4p^2D^o$ |
| 4804.12 | A | 00 | 13.81 | 18.13 | 1½-1½ | (8) |
| 4681.32 | A | 00 | 13.56 | 16.20 | 1½-2½ | |
| 4742.4 | A | 00 | 13.53 | 18.13 | ½-1½ | |
| 4815.515 | A | 10 | 13.61 | 16.18 | 2½-1½ | $4s^4P-4p^4S^o$ |
| 4716.226 | A | 8 | 13.56 | 16.18 | 1½-1½ | (9) |
| 4656.74 | A | 4 | 13.53 | 16.18 | ½-1½ | |
| 4193.51 | A | 1 | 13.56 | 16.45 | ½-1½ | $4s^4P-4p^2P^o$ |
| | | | | | | (10) |
| 5606.11 | C | 15 | 13.67 | 15.88 | 4½-3½ | $3d^4F-4p^4D^o$ |
| 5640.32 | C | 10 | 13.64 | 15.83 | 3½-2½ | (11) |
| 5659.95 | C | 12 | 13.62 | 15.80 | 2½-1½ | |
| 5664.73 | C | 10 | 13.60 | 15.78 | 1½- ½ | |
| 5526.22 | C | 6 | 13.64 | 15.88 | 3½-3½ | |
| 5578.85 | C | 7 | 13.62 | 15.83 | 2½-2½ | |
| 5616.63 | C | 5 | 13.60 | 15.80 | 1½-1½ | |
| 5466.55 | E | (0) | 13.62 | 15.88 | 2½-3½? | |
| 5536.77 | D | 1 | 13.60 | 15.83 | 1½-2½ | |
| 8314.73 | B | 10 | 14.01 | 15.49 | 1½- ½ | $4s^2P-4p^2S^o$ |
| 7967.43 | B | 10 | 13.94 | 15.49 | ½- ½ | (12) |
| 5996.18 | D | 4 | 14.01 | 18.07 | 1½-2½ | $4s^2P-4p^4P^o$ |
| 5908.25 | D | 2 | 13.94 | 16.03 | ½-1½ | (13) |
| 6097.12 | D | 1 | 14.01 | 16.03 | 1½-1½ | |
| 5932.95 | D | 1 | 13.94 | 18.02 | ½- ½ | |
| 6123.41 | D | 1 | 14.01 | 16.02 | 1½- ½ | |
| 5639.96 | C | 10 | 14.01 | 16.20 | 1½-2½ | $4s^2P-4p^2D^o$ |
| 5646.98 | C | 8 | 13.94 | 16.13 | ½-1½ | (14) |
| 5819.22 | C | 10 | 14.01 | 16.13 | 1½-1½ | |
| 5014.03 | C | 1 | 14.01 | 16.47 | 1½-1½ | $4s^2P-4p^2P^o$ |
| 4917.15 | C | 7 | 13.94 | 16.45 | ½- ½ | (15) |
| 5047.28 | C | (0) | 14.01 | 16.45 | 1½- ½ | |
| 4885.63 | A | 2 | 13.94 | 16.47 | ½-1½ | |
| 3669.049 | A | 5 | 14.01 | 17.37 | 1½-2½ | $4s^2P-4p'\ ^2D^o$ |
| 3594.462 | A | 3 | 13.94 | 17.38 | ½-1½ | (16) |
| 3663.47 | A | 0 | 14.01 | 17.38 | 1½-1½ | |
| 3314.50 | A | 0 | 14.01 | 17.73 | 1½-1½ | $4s^2P-4p'\ ^2P^o$ |
| 3272.25 | D | 3 | 13.94 | 17.71 | ½- ½ | (17) |
| 3329.3 | A | 00 | 14.01 | 17.71 | 1½- ½ | |
| 3257.83 | D | 2 | 13.94 | 17.73 | ½-1½ | |
| 6981.40 | D | 4 | 14.11 | 15.88 | 3½-3½ | $3d^4D-4p^4D^o$ |
| 7139.79 | B | 1 | 14.10 | 15.83 | 2½-2½ | (18) |
| 7256.96 | B | 1 | 14.10 | 15.80 | 1½-1½ | |
| 7317.03 | B | 0 | 14.09 | 15.78 | ½- ½ | |
| 7164.63 | D | 2 | 14.11 | 15.83 | 3½-2½ | |
| 7373.20 | B | 1 | 14.10 | 15.80 | 2½-1½ | |
| 7337.81 | B | 0 | 14.10 | 15.78 | 1½- ½ | |
| 6957.95 | D | 1 | 14.10 | 15.88 | 2½-3½ | |
| 7124.28 | D | 1 | 14.10 | 15.83 | 1½-2½ | |
| 7236.91 | B | 0 | 14.09 | 15.80 | ½-1½ | |
| 6305.51 | D | 10 | 14.11 | 16.07 | 3½-2½ | $3d^4D-4p^4P^o$ |
| 6397.30 | D | 8 | 14.10 | 16.03 | 2½-1½ | (19) |
| 6413.71 | D | 9 | 14.10 | 16.02 | 1½- ½ | |
| 6286.35 | D | 8 | 14.10 | 16.07 | 2½-2½ | |
| 6384.89 | D | 8 | 14.10 | 16.03 | 1½-1½ | |
| 6398.05 | D | 8 | 14.09 | 16.02 | ½- ½ | |
| 6274.34 | D | 3 | 14.10 | 16.07 | 1½-2½ | |
| 6369.34 | D | 4 | 14.09 | 16.03 | ½-1½ | |
| 6092.13 | D | 2 | 14.10 | 16.13 | 2½-1½ | $3d^4D-4p^2D^o$ |
| 5895.89 | D | 0 | 14.10 | 16.20 | 2½-2½ | (20) |
| 6080.85 | D | 1 | 14.10 | 16.13 | 1½-1½ | |
| 5951.30 | D | 3 | 14.10 | 16.18 | 2½-1½ | $3d^4D-4p^4S^o$ |
| 5940.69 | D | 1 | 14.10 | 16.18 | 1½-1½ | (21) |
| 5927.15 | D | 1 | 14.09 | 16.18 | ½-1½ | |
| 3845.21 | A | 00 | 14.10 | 17.31 | 2½-2½ | $3d^4D-4p'\ ^3F^o$ |
| | | | | | | (22) |
| 3782.6 | A | 00 | 14.11 | 17.37 | 3½-2½ | $3d^4D-4p'\ ^2D^o$ |
| | | | | | | (23) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **S II** continued | | | | | | |
| 7509.03 | B | 0 | 14.23 | 15.88 | 3½-3½ | $3d^2F-4p^4D^o$ |
| | | | | | | (24) |
| 6732.88 | D | 0 | 14.23 | 16.07 | 3½-2½ | $3d^2F-4p^4P^o$ |
| 8841.06 | D | 1 | 14.17 | 18.03 | 2½-1½ | (25) |
| 6531.39 | D | 1 | 14.17 | 18.07 | 2½-2½ | |
| 6287.06 | D | 10 | 14.23 | 18.20 | 3½-2½ | $3d^2F-4p^2D^o$ |
| 6312.68 | D | 10 | 14.17 | 18.13 | 2½-1½ | (28) |
| 6102.28 | D | 4 | 14.17 | 16.20 | 2½-2½ | |
| 6161.84 | D | 1 | 14.17 | 16.18 | 2½-1½ | $3d^2F-4p^4S^o$ |
| | | | | | | (27) |
| 6314.29 | D | 1 | 14.23 | 18.19 | 3½- | $3d^2F-Y^o$ |
| 6128.31 | D | 0 | 14.17 | 16.19 | 2½- | (28) |
| 3993.588 | A | 4 | 14.23 | 17.32 | 3½-3½ | $3d^2F-4p'\ ^3J$ |
| 3931.938 | A | 3 | 14.17 | 17.31 | 2½-2½ | (29) |
| 4007.78 | A | 0 | 14.23 | 17.31 | 3½-2½ | |
| 3918.19 | A | 00 | 14.17 | 17.32 | 2½-3½ | |
| 3932.30 | A | 2 | 14.23 | 17.37 | 3½-2½ | $3d^2F-4p'\ ^3I$ |
| 3853.09 | A | 2 | 14.17 | 17.38 | 2½-1½ | (30) |
| 3859.28 | A | 0 | 14.17 | 17.37 | 2½-2½ | |
| 7831.47 | B | 0 | 14.30 | 15.88 | 2½-3½ | $3d^4P-4p^4P^o$ |
| 8086.87 | B | 0 | 14.30 | 15.83 | 1½-2½ | (31) |
| 8273.46 | B | 0 | 14.31 | 15.80 | ½-1½ | |
| 8051.91 | B | 0 | 14.30 | 15.83 | 2½-2½ | |
| 8258.27 | B | 2 | 14.30 | 15.80 | 1½-1½ | |
| 8377.79 | B | 1 | 14.31 | 15.78 | ½- ½ | |
| 8221.63 | B | 0 | 14.30 | 15.80 | 2½-1½ | |
| 8381.95 | B | 1 | 14.30 | 15.78 | 1½- ½ | |
| 4431.02 | A | 1 | 14.59 | 17.37 | 1½-2½ | $3d^2P-4p'\ ^2D$ |
| | | | | | | (32) |
| 3924.05 | A | 00 | 14.59 | 17.73 | 1½-1½ | $3d^2P-4p'\ ^2P$ |
| 3945.06 | E | (0) | 14.59 | 17.71 | 1½- ½? | (33) |
| 8520.23 | B | 1 | 14.73 | 16.18 | 2½-1½ | $3d^2D-4p^4S^o$ |
| | | | | | | (34) |
| 4755.12 | A | 2 | 14.73 | 17.32 | 2½-3½ | $3d^2D-4p'\ ^2F$ |
| 4763.38 | A | 1 | 14.72 | 17.31 | 1½-2½ | (35) |
| 4668.58 | A | 3 | 14.73 | 17.37 | 2½-2½ | $3d^2D-4p'\ ^2D$ |
| 4648.17 | A | 2 | 14.72 | 17.38 | 1½-1½ | (36) |
| 8432.39 | B | 0 | 15.00 | 16.47 | 2½-1½ | $4s'\ ^2D-4p^3P^o$ |
| 8515.48 | B | 0 | 15.00 | 16.45 | 1½- ½ | (37) |
| 5320.70 | C | 3 | 15.00 | 17.32 | 2½-3½ | $4s'\ ^2D-4p'\ ^2F$ |
| 5345.67 | C | 4 | 15.00 | 17.31 | 1½-2½ | (38) |
| 5212.81 | C | 3 | 15.00 | 17.37 | 2½-2½ | $4s'\ ^2D-4p'\ ^2D$ |
| 5201.00 | C | 2 | 15.00 | 17.38 | 1½-1½ | (39) |
| 5201.32 | E | (2) | 15.00 | 17.38 | 2½-1½ | |
| 4524.946 | A | 6 | 15.00 | 17.73 | 2½-1½ | $4s'\ ^2D-4p'\ ^2P$ |
| *4552.378 | A | 7 | 15.00 | 17.71 | 1½- ½ | (40) |
| 4524.68 | A | 2 | 15.00 | 17.73 | 1½-1½ | |
| 3783.16 | A | 2 | 15.49 | 18.75 | ½-1½ | $4p^2S^o-5s^2P$ |
| 3860.15 | A | 2 | 15.49 | 18.69 | ½- ½ | (41) |
| 3317.70 | D | 0 | 15.49 | 19.21 | ½- ½ | $4p^2S^o-4d^2P$ |
| | | | | | | (42) |
| 4463.582 | A | 7 | 15.88 | 18.64 | 3½-2½ | $4p^4D^o-5s^4P$ |
| 4483.424 | A | 6 | 15.83 | 18.58 | 2½-1½ | (43) |
| 4486.66 | A | 3 | 15.80 | 18.55 | 1½- ½ | |
| 4391.84 | A | 3 | 15.83 | 18.64 | 2½-2½ | |
| 4432.41 | A | 3 | 15.80 | 18.58 | 1½-1½ | |
| 4456.43 | A | 2 | 15.78 | 18.55 | ½- ½ | |
| 4342.84 | A | 00 | 15.80 | 18.64 | 1½-2½ | |
| 4402.86 | A | 0 | 15.78 | 18.58 | ½-1½ | |
| *4162.698 | A | 10 | 15.88 | 18.84 | 3½-4½ | $4p^4D^o-4d^4F$ |
| 4153.098 | A | 10 | 15.83 | 18.80 | 2½-3½ | (44) |
| 4145.100 | A | 9 | 15.80 | 18.78 | 1½-2½ | |
| 4142.891 | A | 8 | 15.78 | 18.76 | ½-1½ | |
| 4217.23 | A | 3 | 15.88 | 18.80 | 3½-3½ | |
| *4189.71 | A | 6n | 15.83 | 18.78 | 2½-2½ | |
| 4168.409 | A | 5 | 15.80 | 18.76 | 1½-1½ | |
| 4255.01 | B | 0 | 15.88 | 18.78 | 3½-2½ | |
| 4213.5 | A | 00 | 15.83 | 18.76 | 2½-1½ | |
| 4028.791 | A | 7 | 15.88 | 18.94 | 3½-3½ | $4p^4D^o-4d^4D$ |
| 3990.94 | A | 3 | 15.83 | 18.92 | 2½-2½ | (45) |
| 3963.13 | A | 2 | 15.80 | 18.91 | 1½-1½ | |
| 3946.98 | A | 1 | 15.78 | 18.91 | ½- ½ | |
| 4050.11 | A | 1 | 15.88 | 18.92 | 3½-2½ | |
| 4003.89 | A | 1 | 15.83 | 18.91 | 2½-1½ | |
| *3970.69 | A | 1 | 15.80 | 18.91 | 1½- ½ | |
| 3950.42 | A | 00 | 15.80 | 18.92 | 1½-2½ | |
| 3939.49 | A | 00 | 15.78 | 18.91 | ½-1½ | |
| 4792.02 | A | 3 | 18.07 | 18.64 | 2½-2½ | $4p^4P^o-5s^4P$ |
| 4835.85 | A | 00 | 18.03 | 18.58 | 1½-1½ | (46) |
| 4883.73 | B | 1 | 16.02 | 18.55 | ½- ½ | |
| 4901.30 | C | 1 | 16.07 | 18.58 | 2½-1½ | |
| 4900.47 | C | 2 | 16.03 | 18.55 | 1½- ½ | |
| 4729.45 | A | 0 | 16.03 | 18.84 | 1½-2½ | |
| *4819.80 | A | 2n | 16.02 | 18.58 | ½-1½ | |
| 4590.8 | A | 00 | 16.07 | 18.75 | 2½-1½ | $4p^4P^o-5s^2P$ |
| 4533.3 | A | 00 | 16.03 | 18.75 | 1½-1½ | (47) |
| 4518.9 | A | 00 | 16.02 | 18.75 | ½-1½ | |
| *4552.378 | A | 7 | 16.07 | 18.78 | 2½-2½ | $4p^4P^o-4d^4F$ |
| 4495.9 | A | 00 | 16.03 | 18.78 | 1½-2½ | (48) |
| 4509.0 | A | 00 | 16.02 | 18.78 | ½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **S II** continued | | | | | | |
| 4294.432 | A | 6 | 16.07 | 18.94 | 2½-3½ | $4p^4P^o-4d^4D$ |
| 4267.803 | A | 5 | 18.03 | 18.92 | 1½-2½ | (49) |
| 4269.76 | A | 3 | 16.02 | 18.91 | ½-1½ | |
| 4318.68 | A | 4 | 16.07 | 18.92 | 2½-2½ | |
| 4282.63 | A | 3 | 16.03 | 18.91 | 1½-1½ | |
| 4278.54 | A | 3 | 16.02 | 18.91 | ½- ½ | |
| 4333.84 | A | 0 | 16.07 | 18.91 | 2½-1½ | |
| 4291.45 | A | 1 | 16.03 | 18.91 | 1½- ½ | |
| 3892.321 | A | 5 | 16.07 | 19.24 | 2½-2½ | $4p^4P^o-4d^4P$ |
| 3793.46 | B | 5 | 16.02 | 19.28 | ½- ½ | (50) |
| *3860.64 § | A | 3 | 16.07 | 19.26 | 2½-1½ | |
| 3803.65 | A | 1 | 16.03 | 19.28 | 1½- ½ | |
| 3850.93 | A | 2 | 16.03 | 19.24 | 1½-2½ | |
| 3809.67 | A | 1 | 16.02 | 19.26 | ½-1½ | |
| 3776.80 | A | 00 | 16.07 | 19.33 | 2½-3½ | $4p^4P^o-4d^2F$ (51) |
| 4824.07 | A | 3 | 16.20 | 18.75 | 2½-1½ | $4p^2D^o-5s^2P$ |
| *4819.60 | A | 2n | 16.13 | 18.69 | 1½- ½ | (52) |
| 4700.21 | A | 00 | 16.13 | 18.75 | 1½-1½ | |
| 4497.88 | A | 00 | 16.20 | 18.94 | 2½-3½ | $4p^2D^o-4d^4D$ |
| 4415.37 | D | 00 | 16.13 | 18.92 | 1½-2½ | (53) |
| 4058.7 | A | 00 | 16.20 | 19.24 | 2½-2½ | $4p^2D^o-4d^4P$ |
| *3970.69 | A | 1 | 16.13 | 19.24 | 1½-2½ | (54) |
| 3933.294 | A | 9 | 16.20 | 19.33 | 2½-3½ | $4p^2D^o-4d^2F$ |
| 3923.483 | A | 7 | 16.13 | 19.27 | 1½-2½ | (55) |
| 4009.39 | A | 0 | 16.20 | 19.27 | 2½-2½ | |
| 3616.916 | A | 5 | 16.20 | 19.61 | 2½-2½ | $4p^2D^o-4d^2D$ |
| 3567.171 | A | 3 | 18.13 | 19.59 | 1½-1½ | (56) |
| 5006.71 | C | (2) | 16.18 | 18.64 | 1½-2½ | $4p^4S^o-5s^4P$ |
| 5136.13 | B | 2 | 16.18 | 18.58 | 1½-1½ | (57) |
| 5198.89 | B | 1 | 16.18 | 18.55 | 1½- ½ | |
| 4492.3 | A | 00 | 16.18 | 18.92 | 1½-2½ | $4p^4S^o-4d^4D$ (58) |
| 4032.812 | A | 7 | 16.18 | 19.24 | 1½-2½ | $4p^4S^o-4d^4P$ |
| 3998.79 | A | 3 | 16.18 | 19.26 | 1½-1½ | (59) |
| 3979.86 | A | 3 | 16.18 | 19.28 | 1½- ½ | |
| 3922.63 | A | 00 | 16.19 | 19.33 | -3½† | $^2Y^o-4d^2F$ (60) |
| 5400.67 | E | 0 | 18.47 | 18.75 | 1½-1½ | $4p^2P^o-5s^2P$ |
| 5518.74 | D | 3 | 16.45 | 18.69 | ½-1½ | (61) |
| 5559.06 | D | 2 | 16.47 | 18.69 | 1½- ½ | |
| 5362.69 | B | 1 | 16.45 | 18.75 | ½-1½ | |
| 8425.37 | B | 0 | 17.31 | 18.78 | 2½-2½ | $4p'\ ^2F^o-4d^4F$ |
| 8522.64 | B | 0 | 17.31 | 18.76 | 2½-1½ | (62) |
| 6138.98 | D | 4 | 17.32 | 19.33 | 3½-3½ | $4p'\ ^2F^o-4d^2F$ |
| 6326.43 | D | 00 | 17.32 | 19.27 | 3½-2½ | (63) |
| *4189.71 | A | 6n | 17.32 | 20.27 | 3½-3½ | $4p'\ ^2F^o-4d'\ ^2F$ |
| 4165.11 | A | 1 | 17.31 | 20.27 | 2½-2½ | (64) |
| 4180.7 | A | 00 | 17.32 | 20.27 | 3½-2½ | |
| 4174.042 | A | 4 | 17.31 | 20.27 | 2½-3½ | |
| *4162.698 | A | 10 | 17.32 | 20.29 | 3½-2½ | $4p'\ ^2F^o-4d'\ ^2G$ |
| 4146.94 | A | 3 | 17.31 | 20.29 | 2½-3½ | (65) |
| 4162.39 | A | 2 | 17.32 | 20.29 | 3½-3½ | |
| 4259.18 | A | 2 | 17.37 | 20.27 | 2½-3½ | $4p'\ ^2D^o-4d'\ ^2F$ |
| 4257.42 | A | 3 | 17.38 | 20.27 | 1½-2½ | (66) |
| 4249.92 | A | 0 | 17.37 | 20.27 | 2½-2½ | |
| 4230.98 | A | 4 | 17.37 | 20.29 | 2½-3½ | $4p'\ ^2D^o-4d'\ ^2G$ (67) |
| *8233.16 | B | 1 | 18.84 | 20.34 | 4½-3½ | $4d^4F-5p^4D^o$ |
| 8233.30 | B | 0 | 18.80 | 20.30 | 3½-2½ | (68) |
| *8223.16 | B | 1 | 18.78 | 20.28 | 2½-1½ | |
| 8223.15 | B | 1 | 18.76 | 20.26 | 1½- ½ | |
| 8018.70 | B | 1 | 18.80 | 20.34 | 3½-3½ | |
| 8093.25 | B | 0 | 18.78 | 20.30 | 2½-2½ | |
| 8133.02 | B | 0 | 18.78 | 20.28 | 1½-1½ | |
| 7885.26 | B | 1 | 18.78 | 20.34 | 2½-3½ | |
| 8005.24 | B | 1 | 18.76 | 20.30 | 1½-2½ | |
| 8225.15 | B | 2 | 18.80 | 20.30 | 3½-2½ | $4d^4F-5p^4P^o$ |
| 8179.31 | B | 2 | 18.78 | 20.28 | 2½-1½ | (69) |
| 8114.93 | B | 0 | 18.76 | 20.29 | 1½- ½ | |
| 8085.29 | B | 0 | 18.78 | 20.30 | 2½-2½ | |
| 8089.86 | B | 0 | 18.76 | 20.28 | 1½-1½ | |
| 7997.85 | B | 0 | 18.76 | 20.30 | 1½-2½ | |
| 7745.05 | B | 00 | 18.78 | 20.37 | 2½-1½ | $4d^4F-5p^4S^o$ |
| 7665.02 | B | 0 | 18.76 | 20.37 | 1½-1½ | (70) |

Strongest Unclassified Lines of **S II**

| | | | | | |
|---|---|---|---|---|---|
| 6395.27 | D | 6 | 3911.32 | A | 1 |
| 4624.11 | A | 1 | 3831.41 | A | 3 |
| 4591.05 | A | 3n | 3811.80 | A | 1n |
| 4561.88 | A | 2 | 3730.64 | A | 1 |
| 4549.547 | A | 5 | 3678.13 | A | 1 |
| 4464.435 | A | 6 | 3385.81 | A | 2 |
| 4360.49 | A | 1 | 3371.90 | A | 1 |
| 4185.95 | A | 1 | 3368.09 | A | 1 |
| 4174.300 | A | 6 | 3356.41 | A | 1 |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **S III** I P 34.9 Anal C List A Oct 1944 | | | | | | |
| 3632.022 | A | 6 | 17.87 | 21.07 | 2-3 | $3d^3P^o-4p^3D$ |
| 3709.371 | A | 5 | 17.87 | 20.99 | 1-2 | (1) |
| 3747.90 | A | 3 | 17.67 | 20.96 | 0-1 | |
| 3710.42 | A | 0 | 17.67 | 20.99 | 2-2 | |
| 3750.74 | A | 1 | 17.67 | 20.98 | 1-1 | |
| 3324.87 | A | 4 | 17.67 | 21.38 | 2-2 | $3d^3P^o-4p^3P$ |
| 3369.49 | A | 1 | 17.67 | 21.33 | 1-1 | (2) |
| 3370.38 | A | 2 | 17.67 | 21.33 | 2-1 | |
| 3387.13 | A | 2 | 17.67 | 21.31 | 1-0 | |
| 3324.01 | A | 2 | 17.67 | 21.38 | 1-2 | |
| 3367.18 | A | 2 | 17.67 | 21.33 | 0-1 | |
| 3234.17 | B | (4) | 17.67 | 21.48 | 2-1 | $3d^3P^o-4p^3S$ |
| 3233.24 | B | (3) | 17.67 | 21.48 | 1-1 | (3) |
| 3231.10 | B | (3) | 17.67 | 21.48 | 0-1 | |
| 4253.593 | A | 9 | 18.17 | 21.07 | 2-3 | $4s^3P^o-4p^3D$ |
| 4284.991 | A | 5 | 18.11 | 20.99 | 1-2 | (4) |
| 4332.71 | A | 4 | 18.11 | 20.96 | 0-1 | |
| 4361.53 | A | 2 | 18.17 | 20.99 | 2-2 | |
| 4340.30 | A | 2 | 18.11 | 20.96 | 1-1 | |
| 4418.84 | A | 00 | 18.17 | 20.96 | 2-1 | |
| 3838.316 | A | 6 | 18.17 | 21.38 | 2-2 | $4s^3P^o-4p^3P$ |
| 3837.80 | A | 3 | 18.11 | 21.33 | 1-1 | (5) |
| 3899.09 | P | | 18.17 | 21.33 | 2-1 | |
| *3860.64 § | A | 3 | 18.11 | 21.31 | 1-0 | |
| 3778.90 | A | 1 | 18.11 | 21.38 | 1-2 | |
| 3831.85 | A | 2 | 18.11 | 21.33 | 0-1 | |
| 3717.775 | A | 6 | 18.17 | 21.48 | 2-1 | $4s^3P^o-4p^3S$ |
| 3683.005 | A | 4 | 18.11 | 21.48 | 1-1 | (6) |
| 3656.61 | A | 1 | 18.11 | 21.48 | 0-1 | |
| 4364.73 | A | 1 | 18.24 | 21.07 | 3-3 | $3d^3D^o-4p^3D$ |
| 4467.83 | B | (1) | 18.23 | 20.99 | 2-2 | (7) |
| 4499.29 | B | (0) | 18.22 | 20.96 | 1-1 | |
| 4478.48 | A | 00 | 18.24 | 20.99 | 3-2 | |
| 4527.96 | B | (0) | 18.23 | 20.96 | 2-1 | |
| 4354.56 | A | 2 | 18.23 | 21.07 | 2-3 | |
| 4439.87 | A | 1 | 18.22 | 20.99 | 1-2 | |
| 3928.615 | A | 6 | 18.24 | 21.38 | 3-2 | $3d^3D^o-4p^3P$ |
| 3983.77 | A | 3 | 18.23 | 21.33 | 2-1 | (8) |
| 3985.97 | A | 2 | 18.22 | 21.31 | 1-0 | |
| 3920.37 | B | (0) | 18.23 | 21.38 | 2-2 | |
| 3961.55 | A | 2 | 18.22 | 21.33 | 1-1 | |
| 3794.69 | A | 2 | 10.38 | 21.48 | 2-1 | $3d^3D^o-4p^3S$ |
| 3774.52 | A | 00 | 10.37 | 21.48 | 1-1 | (9) |
| 4613.47 | A | 00 | 18.32 | 20.99 | 1-2 | $4s^1P^o-4p^3D$ |
| 4677.67 | A | 0 | 18.32 | 20.96 | 1-1 | (10) |
| 4099.25 | A | 00 | 18.32 | 21.33 | 1-1 | $4s^1P^o-4p^3P$ |
| 4125.4 | A | 00 | 18.32 | 21.31 | 1-0 | (11) |
| 3899.27 | A | 00 | 18.32 | 21.48 | 1-1 | $4s^1P^o-4p^3S$ (12) |
| 3136.00 | B | (3) | 21.38 | 25.32 | 2-3 | $4p^3P-4d^3F^o$ |
| 3185.16 | B | (3) | 21.38 | 25.26 | 2-2 | (13) |
| 2985.98 | B | (6) | 21.38 | 25.51 | 2-2 | $4p^3P-4d^3D^o$ (14) |

Strongest Unclassified Lines Attributed to **S III**

| | | |
|---|---|---|
| 4802.81 | A | 0 |
| 4283.70 | A | 0 |
| 4164.96 | A | 0 |
| 4148.91 | A | 1 |
| 4127.54 | A | 0 |
| 4111.56 | A | 3 |
| 4099.44 | A | 1 |
| 4095.17 | A | 0 |
| 4064.45 | A | 2 |
| 3997.97 | A | 0 |
| 3748.73 | A | 0 |
| 3699.37 | A | 1 |
| 3697.88 | A | 0 |
| 3638.15 | A | 0 |
| 3626.53 | A | 0 |
| 3549.72 | A | 1 |
| 3497.340 | A | 5 |

| **S IV** I P 47.1 Anal C List A Aug 1944 | | | | | | |
|---|---|---|---|---|---|---|
| 3097.46 | A | 5 | 22.40 | 26.38 | ½-1½ | $4^2S-4^2P^o$ |
| 3117.75 | A | 3 | 22.40 | 26.36 | ½- ½ | (1) |

| **Cl I** I P 12.9 Anal B List C Oct 1944 | | | | | | |
|---|---|---|---|---|---|---|
| 9121.10 | A | 75 | 8.88 | 10.24 | 2½-2½ | $4s^4P-4p^4P^o$ |
| 9393.81 | A | 50 | 8.95 | 10.26 | 1½-1½ | (1) |
| 9486.89 | A | 25 | 8.99 | 10.29 | ½- ½ | |
| 8948.01 | A | 50 | 8.88 | 10.26 | 2½-1½ | |
| 9191.67 | A | 60 | 8.95 | 10.29 | 1½- ½ | |
| 9584.77 | A | 50 | 8.95 | 10.24 | 1½-2½ | |
| 9703.35 | A | 40 | 8.99 | 10.26 | ½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Cl I** continued | | | | | | |
| 8375.95 | A | 150 | 8.88 | 10.36 | 2½-3½ | $4s^4P-4p^4D^o$ |
| 8585.96 | A | 100 | 8.95 | 10.39 | 1½-2½ | (2) |
| 8575.25 | A | 75 | 8.99 | 10.43 | ½-1½ | |
| 8212.00 | A | 100 | 8.88 | 10.39 | 2½-2½ | |
| 8333.29 | A | 100 | 8.95 | 10.43 | 1½-1½ | |
| 8428.25 | A | 100 | 8.99 | 10.45 | ½- ½ | |
| 7980.58 | A | 15 | 8.88 | 10.43 | 2½-1½ | |
| 8194.35 | A | 50 | 8.95 | 10.45 | 1½- ½ | |
| 7878.22 | A | 75 | 8.88 | 10.45 | 2½-2½ | $4s^4P-4p^2D^o$ |
| 7997.80 | A | 50 | 8.95 | 10.49 | 1½-1½ | (3) |
| 7672.44 | A | 25 | 8.88 | 10.49 | 2½-1½ | |
| 8221.73 | A | 75 | 8.95 | 10.45 | 1½-2½ | |
| 8220.40 | A | 60 | 8.99 | 10.49 | ½-1½ | |
| 7414.10 | A | 90 | 8.88 | 10.55 | 2½-1½ | $4s^4P-4p^2P^o$ † |
| 7717.57 | A | 100 | 8.95 | 10.55 | 1½-1½ | (4) |
| 7934.62 | A | 100 | 8.99 | 10.55 | ½-1½ | |
| 7256.63 | A | 125 | 8.88 | 10.58 | 2½-1½ | $4s^4P-4p^4S^o$ |
| 7547.06 | A | 100 | 8.95 | 10.58 | 1½-1½ | (5) |
| 7744.94 | A | 125 | 8.99 | 10.58 | ½-1½ | |
| 4438.48 | A | 20 | 8.88 | 11.66 | 2½-2½ | $4s^4P-5p^4P^o$ † |
| 4403.03 | A | 15 | 8.88 | 11.69 | 2½-1½ | (6) |
| 4389.76 | A | 25 | 8.88 | 11.69 | 2½-3½ | $4s^4P-5p^4D^o$ † |
| 4475.31 | A | 15 | 8.95 | 11.71 | 1½-2½ | (7) |
| 4379.90 | A | 20 | 8.95 | 11.77 | 1½-1½ | |
| 4383.30 | A | 20 | 8.95 | 11.78 | 1½-2½ | $4s^4P-5p^2D^o$ † |
| 4369.52 | A | 15 | 8.99 | 11.81 | ½-1½ | (8) |
| 4226.44 | A | 15 | 8.88 | 11.80 | 2½-1½ | $4s^4P-5p^4S^o$ † |
| 4323.35 | A | 20 | 8.95 | 11.80 | 1½-1½ | (9) |
| 10091.64 | A | 40 | 9.16 | 10.39 | 1½-2½ | $4s^2P-4p^4D^o$ † |
| 10392.45 | A | 5 | 9.24 | 10.43 | ½-1½ | (10) |
| 9744.33 | A | 30 | 9.16 | 10.43 | 1½-1½ | |
| 9592.20 | A | 75 | 9.16 | 10.45 | 1½-2½ | $4s^2P-4p^2D^o$ |
| 9875.95 | A | 50 | 9.24 | 10.49 | ½-1½ | (11) |
| 9288.82 | A | 60 | 9.16 | 10.49 | 1½-1½ | |
| 9073.15 | A | 50 | 9.16 | 10.52 | 1½- ½ | $4s^2P-4p^2S^o$ |
| 9632.37 | A | 20 | 9.24 | 10.52 | ½- ½ | (12) |
| 8912.88 | A | 40 | 9.16 | 10.55 | 1½-1½ | $4s^2P-4p^2P^o$ |
| 9045.40 | A | 40 | 9.24 | 10.61 | ½- ½ | (13) |
| 8550.46 | A | 20 | 9.16 | 10.61 | 1½- ½ | |
| 9452.06 | A | 75 | 9.24 | 10.55 | ½-1½ | |
| 8686.28 | A | 30 | 9.16 | 10.58 | 1½-1½ | $4s^2P-4p^4S^o$ |
| 9197.49 | A | 25 | 9.24 | 10.58 | ½-1½ | (14) |
| 4526.20 | A | 30 | 9.16 | 11.89 | 1½-1½ | $4s^2P-5p^2P^o$ |
| 4601.00 | A | 20 | 9.24 | 11.92 | ½- ½ | (15) |
| 4469.37 | A | 18 | 9.16 | 11.92 | 1½- ½ | |
| 4661.22 | A | 18 | 9.24 | 11.89 | ½-1½ | |

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|---|---|---|---|---|---|---|
| 4794.54 | A | 250 | 13.32 | 15.89 | 2-3 | $4s^5S^o-4p^5P$ |
| 4810.06 | A | 225 | 13.32 | 15.88 | 2-2 | (1) |
| 4819.46 | A | 200 | 13.32 | 15.88 | 2-1 | |
| 5423.25 | A | 150 | 13.62 | 15.89 | 4-3 | $3d^5D^o-4p^5P$ |
| 5443.42 | A | 100 | 13.62 | 15.88 | 3-2 | (2) |
| 5456.27 | A | 50 | 13.62 | 15.88 | 2-1 | |
| 5423.52 | A | 100 | 13.62 | 15.89 | 3-3 | |
| 5444.25 | A | 60 | 13.62 | 15.88 | 2-2 | |
| 5457.02 | A | 75 | 13.62 | 15.88 | 1-1 | |
| 5434.36 | A | 25 | 13.62 | 15.89 | 2-3 | |
| 5444.99 | A | 10 | 13.62 | 15.88 | 1-2 | |
| 5457.47 | A | 30 | 13.62 | 15.88 | 0-1 | |
| *5217.93 | A | 150 | 13.90 | 16.27 | 1-2 | $4s^3S^o-4p^3P$ |
| 5221.34 | A | 75 | 13.90 | 16.27 | 1-1 | (3) |
| *5217.93 | A | 150 | 13.90 | 16.27 | 1-0 | |
| 3353.39 | A | 125 | 14.28 | 17.96 | 1-1 | $3s3p^5\ ^1P^o-4p'\ ^1P$ (4) |
| 8360.63 | A | 15 | 14.79 | 16.27 | 3-2 | $3d^3D^o-4p^3P$ † (5) |
| 3750.00 | A | 30 | 14.79 | 18.08 | 3-3 | $3d^3D^o-4p'\ ^3D$ |
| 3767.57 | A | 30 | 14.79 | 18.06 | 2-2 | (6) |
| 3774.25 | A | 25 | 14.79 | 18.06 | 1-1 | |
| 3769.13 | A | 20 | 14.79 | 18.06 | 3-2 | |
| 3768.13 | A | 18 | 14.79 | 18.06 | 2-1 | |
| 3748.46 | A | 15 | 14.79 | 18.08 | 2-3 | |
| 3773.68 | A | 20 | 14.79 | 18.06 | 1-2 | |
| 3650.13 | A | 30 | 14.79 | 18.17 | 3-4 | $3d^3D^o-4p'\ ^3F$† |
| 3658.38 | A | 20 | 14.79 | 18.16 | 2-3 | (7) |
| 3673.83 | A | 18 | 14.79 | 18.15 | 1-2 | |
| 3659.84 | A | 18 | 14.79 | 18.16 | 3-3 | |
| 3668.03 | A | 20 | 14.79 | 18.15 | 2-2 | |
| 3333.64 | A | 40 | 14.79 | 18.49 | 3-2 | $3d^3D^o-4p'\ ^3P$† |
| *3315.44 | A | 100 | 14.79 | 18.51 | 2-1 | (8) |
| 3312.78 | A | 15 | 14.79 | 18.52 | 1-0 | |
| 3332.42 | A | 15 | 14.79 | 18.49 | 2-2 | |
| 3320.14 | A | 30 | 14.79 | 18.51 | 1-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Cl II** continued | | | | | | |
| 3829.27 | A | 15 | 15.00 | 18.22 | 2-3 | 3d' $^1$P°-4p' $^1$F (9) |
| 3147.86 | A | 30 | 15.00 | 18.93 | 2-2 | 3d' $^1$P°-4p' $^1$D (10) |
| 3161.44 | A | 20 | 15.02 | 18.92 | 3-2 | 3d' $^1$F°-4p' $^1$D (11) |
| 4995.52 | A | 60 | 15.61 | 18.08 | 4-3 | 3d' $^3$F°-4p' $^3$D† |
| 4970.12 | A | 50 | 15.58 | 18.06 | 3-2 | (12) |
| 4925.17 | A | 15 | 15.56 | 18.06 | 2-1 | |
| 4936.99 | A | 25 | 15.58 | 18.08 | 3-3 | |
| 4924.28 | A | 18 | 15.56 | 18.06 | 2-2 | |
| 4819.79 | A | 25 | 15.61 | 18.17 | 4-4 | 3d' $^3$F°-4p' $^3$F (13) |
| 4781.82 | A | 50 | 15.58 | 18.16 | 3-3 | |
| 4755.64 | A | 50 | 15.56 | 18.15 | 2-2 | |
| 4836.79 | A | 20 | 15.61 | 18.16 | 4-3 | |
| 4798.40 | A | 15 | 15.58 | 18.15 | 3-2 | |
| 4765.30 | A | 10 | 15.58 | 18.17 | 3-4 | |
| 4739.42 | A | 10 | 15.56 | 18.16 | 2-3 | |
| 3092.22 | A | 50 | 15.61 | 19.60 | 4-3 | 3d' $^3$F°-4p" $^3$D† |
| 3071.35 | A | 40 | 15.58 | 19.60 | 3-2 | (14) |
| 3058.00 | A | 40 | 15.56 | 19.59 | 2-1 | |
| 3053.74 | A | 10 | 15.56 | 19.60 | 2-2 | |
| 5333.70 | A | 15 | 15.64 | 17.96 | 1-1 | 4s' $^3$P°-4p' $^1$P† (15) |
| 5078.25 | A | 150 | 15.65 | 18.08 | 3-3 | 4s' $^3$P°-4p' $^3$D (16) |
| 5103.04 | A | 125 | 15.65 | 18.06 | 2-2 | |
| 5099.30 | A | 100 | 15.64 | 18.06 | 1-1 | |
| 5113.36 | A | 40 | 15.65 | 18.06 | 3-2 | |
| 5104.08 | A | 25 | 15.65 | 18.06 | 2-1 | |
| 5068.10 | A | 10 | 15.65 | 18.08 | 2-3 | |
| 5098.34 | A | 20 | 15.64 | 18.06 | 1-2 | |
| 4896.77 | A | 200 | 15.65 | 18.17 | 3-4 | 4s' $^3$P°-4p' $^3$F† (17) |
| 4904.76 | A | 135 | 15.65 | 18.16 | 2-3 | |
| 4917.72 | A | 125 | 15.64 | 18.15 | 1-2 | |
| 4914.32 | A | 12 | 15.65 | 18.16 | 3-3 | |
| 4922.14 | A | 20 | 15.65 | 18.15 | 2-2 | |
| 4792.04 | A | 12 | 15.65 | 18.22 | 2-3 | 4s' $^3$P°-4p' $^1$F (18) |
| 4343.62 | A | 100 | 15.65 | 18.49 | 3-2 | 4s' $^3$P°-4p' $^3$P† |
| 4307.42 | A | 75 | 15.65 | 18.51 | 2-1 | (19) |
| 4291.76 | A | 50 | 15.64 | 18.52 | 1-0 | |
| 4336.26 | A | 45 | 15.65 | 18.49 | 2-2 | |
| 4304.07 | A | 40 | 15.64 | 18.51 | 1-1 | |
| 3123.72 | A | 15 | 15.65 | 19.60 | 3-3 | 4s' $^3$P°-4p" $^3$D† |
| 3121.62 | A | 10 | 15.65 | 19.60 | 2-2 | (20) |
| *3119.82 | A | 12 | 15.65 | 19.60 | 2-3 | |
| | | | 15.64 | 19.80 | 1-2 | |
| 3045.00 | A | 10 | 15.65 | 19.70 | 2-2 | 4s' $^3$P°-4p" $^1$D (21) |
| 2996.63 | A | 40 | 15.65 | 19.77 | 3-2 | 4s' $^3$P°- $^3$P† |
| 3006.05 | A | 20 | 15.65 | 19.75 | 2-1 | (22) |
| 3018.82 | A | 12 | 15.64 | 19.73 | 1-0 | |
| 3004.39 | A | 10 | 15.64 | 19.75 | 1-1 | |
| 5634.84 | A | 18 | 15.77 | 17.96 | 1-1 | 3d' $^1$P°-4p' $^1$P (23) |
| 4253.51 | A | 75 | 15.89 | 18.79 | 3-2 | 4p$^5$P-5s$^5$S° (24) |
| 4241.38 | A | 60 | 15.88 | 18.79 | 2-2 | |
| 4234.09 | A | 50 | 15.88 | 18.79 | 1-2 | |
| 3860.80 | A | 150 | 15.89 | 19.09 | 3-4 | 4p$^5$P-4d$^5$D° (25) |
| 3850.97 | A | 100 | 15.88 | 19.09 | 2-3 | |
| 3845.42 | A | 50 | 15.88 | 19.09 | 1-2 | |
| 3860.98 | A | 100 | 15.89 | 19.09 | 3-3 | |
| 3851.38 | A | 75 | 15.88 | 19.09 | 2-2 | |
| 3845.69 | A | 75 | 15.88 | 19.09 | 1-1 | |
| 3861.40 | A | 50 | 15.89 | 19.09 | 3-2 | |
| 3851.69 | A | 30 | 15.88 | 19.09 | 2-1 | |
| 3845.84 | A | 30 | 15.88 | 19.09 | 1-0 | |
| 6094.65 | A | 100 | 15.93 | 17.96 | 2-1 | 4s' $^1$P°-4p' $^1$P (28) |
| 5790.50 | A | 25 | 15.93 | 18.06 | 2-1 | 4s' $^1$P°-4p' $^3$D† (27) |
| 5392.12 | A | 100 | 15.93 | 18.22 | 2-3 | 4s' $^1$P°-4p' $^1$F (28) |
| 4132.48 | A | 200 | 15.93 | 18.92 | 2-2 | 4s' $^1$P°-4p' $^1$D (29) |
| 3276.81 | A | 40 | 15.93 | 19.70 | 2-2 | 4s' $^1$P°-4p" $^1$D (30) |
| 3096.72 | A | 25 | 15.93 | 19.92 | 2-1 | 4s' $^1$P°-4p" $^1$P (31) |
| 5285.48 | A | 30 | 16.27 | 18.60 | 2-2 | 4p$^3$P-3d' $^3$P° † (32) |
| 5173.15 | A | 25 | 16.27 | 18.65 | 2-3 | 4p$^3$P-3d' $^3$D° † |
| 5189.70 | A | 25 | 16.27 | 18.64 | 1-2 | (33) |
| 5162.34 | A | 10 | 16.27 | 18.86 | 0-1 | |
| 5193.03 | A | 10 | 16.27 | 18.84 | 2-2 | |
| 4585.03 | A | 15 | 16.27 | 18.98 | 2-1 | 4p$^3$P-3d' $^3$S° † (34) |
| *4572.13 | A | 100 | 18.27 | 18.97 | 2-1 | 4p$^3$P-5s$^3$S° |
| 4569.42 | A | 50 | 18.27 | 18.97 | 1-1 | (35) |
| *4572.13 | A | 100 | 16.27 | 18.97 | 0-1 | |
| 3949.96 | A | 10 | 16.27 | 19.39 | 2-2 | 4p$^3$P-3p$^5$4s$^3$P° † (36) |
| 3389.12 | A | 150 | 16.27 | 19.97 | 2-3 | 4p$^3$P-4d$^3$D° |
| *3715.44 | A | 100 | 16.27 | 19.99 | 1-2 | (37) |
| 3307.90 | A | 50 | 16.27 | 20.00 | 0-1 | |
| 3316.86 | A | 50 | 16.27 | 19.99 | 2-2 | |
| 3768.45 | A | 40 | 18.27 | 20.00 | 1-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Cl II** continued | | | | | | |
| 6661.68 | A | 75 | 16.32 | 18.17 | 5-4 | 3d' $^3$G°-4p' $^3$F (38) |
| 6686.04 | A | 45 | 16.32 | 18.16 | 4-3 | |
| 6713.43 | A | 40 | 16.32 | 18.15 | 3-2 | |
| 6653.75 | A | 35 | 16.32 | 18.17 | 4-4 | |
| 6681.03 | A | 15 | 16.32 | 18.16 | 3-3 | |
| 4924.83 | A | 10 | 17.02 | 19.53 | 2-1 | 4s" $^3$P°-4p" $^3$S† |
| 4907.17 | A | 15 | 17.01 | 19.53 | 1-1 | (39) |
| 4781.32 | A | 75 | 17.02 | 19.60 | 2-3 | 4s" $^3$P°-4p" $^3$D |
| 4768.68 | A | 150 | 17.01 | 19.60 | 1-2 | (40) |
| 4771.09 | A | 40 | 17.01 | 19.59 | 0-1 | |
| 4785.44 | A | 50 | 17.02 | 19.60 | 2-2 | |
| 4778.93 | A | 45 | 17.01 | 19.59 | 1-1 | |
| 4490.00 | A | 50 | 17.02 | 19.77 | 2-2 | 4s" $^3$P°- $^3$P (41) |
| 4504.27 | A | 20 | 17.01 | 19.75 | 1-1 | |
| 4519.19 | A | 18 | 17.02 | 19.75 | 2-1 | |
| 4536.78 | A | 20 | 17.01 | 19.73 | 1-0 | |
| *4475.28 | A | 20 | 17.01 | 19.77 | 1-2 | |
| *4497.30 | A | 18 | 17.01 | 19.75 | 0-1 | |
| *4259.52 | A | 35 | 17.02 | 19.92 | 2-1 | 4s" $^3$P°-4p" $^1$P (42) |
| 4208.03 | A | 30 | 17.02 | 19.95 | 2-2 | 4s" $^3$P°-4p" $^3$P |
| 4191.59 | A | 15 | 17.01 | 19.96 | 1-1 | (43) |
| 4204.54 | A | 18 | 17.02 | 19.96 | 2-1 | |
| 4188.82 | A | 15 | 17.01 | 19.96 | 1-0 | |
| 4195.11 | A | 18 | 17.01 | 19.95 | 1-2 | |
| 4185.61 | A | 20 | 17.01 | 19.96 | 0-1 | |
| 6831.62 | A | 30 | 17.11 | 18.92 | 1-2 | 4s" $^1$P°-4p' $^1$D (44) |
| 4771.66 | A | 20 | 17.11 | 19.70 | 1-2 | 4s" $^1$P°-4p" $^1$D (45) |
| 4399.14 | A | 15 | 17.11 | 19.92 | 1-1 | 4s" $^1$P°-4p" $^1$P (46) |
| 4943.24 | A | 15 | 17.20 | 19.70 | 1-2 | 3d" $^1$P°-4p" $^1$D (47) |
| 4544.48 | A | 10 | 17.20 | 19.92 | 1-1 | 3d" $^1$P°-4p" $^1$P (48) |
| 3843.26 | A | 100 | 17.20 | 20.41 | 1-0 | 3d" $^1$P°-4p" $^1$S (49) |
| *5175.85 | A | 20 | 17.31 | 19.70 | 2-2 | 3d" $^1$D°-4p" $^1$D (50) |
| 4740.40 | A | 150 | 17.31 | 19.92 | 2-1 | 3d" $^1$D°-4p" $^1$P (51) |
| 4372.91 | A | 80 | 17.45 | 20.27 | 3-2 | 3d" $^3$D°-x' (52) |
| 4309.06 | A | 50 | 17.41 | 20.27 | 2-2 | |
| *4259.52 | A | 35 | 17.37 | 20.27 | 1-2 | |
| 3037.98 | A | 35 | 17.45 | 21.51 | 3-2 | 3d" $^3$D°-x" (53) |
| 3006.98 | A | 20 | 17.41 | 21.51 | 2-2 | |
| 2983.78 | A | 18 | 17.37 | 21.51 | 1-2 | |
| 6759.42 | A | 35 | 17.78 | 19.60 | 4-3 | 3d" $^3$F°-4p" $^3$D† (54) |
| 6850.21 | A | 40 | 17.80 | 19.60 | 3-2 | |
| 6952.13 | A | 25 | 17.82 | 19.59 | 2-1 | |
| 6841.86 | A | 10 | 17.80 | 19.60 | 3-3 | |
| 3883.80 | A | 12 | 17.96 | 21.14 | 1-2 | 4p' $^1$P-5s' $^1$P° (55) |
| 3688.44 | A | 15 | 17.98 | 21.30 | 1-2 | 4p' $^1$P-4d' $^3$F° (58) |
| 3022.93 | A | 30 | 17.96 | 22.04 | 1-2 | 4p' $^1$P-4d' $^1$D° (57) |
| 6399.41 | A | 10 | 18.03 | 19.95 | 2-2 | 3d" $^3$P°-4p" $^3$P† (58) |
| 6522.38 | A | 10 | 18.08 | 19.97 | 3-3 | 4p' $^3$D-4d $^3$D° † (59) |
| 4147.09 | A | 30 | 18.08 | 21.06 | 3-3 | 4p' $^3$D-5s' $^3$P° † |
| 4130.88 | A | 25 | 18.06 | 21.05 | 2-2 | (60) |
| 4133.66 | A | 20 | 18.06 | 21.05 | 1-1 | |
| 4124.00 | A | 12 | 18.08 | 21.06 | 2-3 | |
| 4079.88 | A | 15 | 18.08 | 21.11 | 3-3 | 4p' $^3$D-5d $^3$D° † |
| 4052.22 | A | 12 | 18.08 | 21.11 | 2-2 | (81) |
| 3805.24 | A | 75 | 18.08 | 21.32 | 3-4 | 4p' $^3$D-4d' $^3$F° |
| 3798.80 | A | 50 | 18.06 | 21.31 | 2-3 | (62) |
| 3809.51 | A | 40 | 18.08 | 21.30 | 1-2 | |
| 3818.40 | A | 30 | 18.08 | 21.31 | 3-3 | |
| 3810.10 | A | 30 | 18.06 | 21.30 | 2-2 | |
| 3733.73 | A | 10 | 18.08 | 21.39 | 3-4 | 4p' $^3$D-4d' $^3$G° |
| 3717.94 | A | 15 | 18.06 | 21.38 | 2-3 | (63) |
| 3522.14 | A | 40 | 18.08 | 21.59 | 3-3 | 4p' $^3$D-4d' $^3$D° |
| 3509.39 | A | 40 | 18.08 | 21.58 | 2-2 | (64) |
| 3513.22 | A | 35 | 18.06 | 21.58 | 1-1 | |
| 3526.13 | A | 30 | 18.08 | 21.58 | 3-2 | |
| 3513.69 | A | 12 | 18.08 | 21.58 | 2-1 | |
| 3505.44 | A | 12 | 18.08 | 21.59 | 2-3 | |
| 3508.94 | A | 12 | 18.08 | 21.58 | 1-2 | |
| 3189.04 | A | 20 | 18.08 | 21.95 | 3-2 | 4p' $^3$D-4d' $^3$P° † (65) |
| 4278.51 | A | 30 | 18.17 | 21.06 | 4-3 | 4p' $^3$F-5s' $^3$P° † |
| 4270.81 | A | 25 | 18.18 | 21.05 | 3-2 | (88) |
| 4281.22 | A | 20 | 18.15 | 21.05 | 2-1 | |
| 4205.07 | A | 10 | 18.17 | 21.11 | 4-3 | 4p' $^3$F-5d $^3$D° † (87) |
| 3913.92 | A | 30 | 18.17 | 21.32 | 4-4 | 4p' $^3$F-4d' $^3$F° † |
| 3918.70 | A | 20 | 18.18 | 21.31 | 3-3 | (88) |
| 3917.57 | A | 18 | 18.15 | 21.30 | 2-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Cl II** continued | | | | | | |
| 3833.40 | A | 200 | 18.17 | 21.39 | 4-5 | 4p' $^3$F-4d' $^3$G° (89) |
| 3827.62 | A | 150 | 18.16 | 21.39 | 3-4 | |
| 3820.25 | A | 100 | 18.15 | 21.38 | 2-3 | |
| 3838.37 | A | 20 | 18.17 | 21.39 | 4-4 | |
| 3830.80 | A | 15 | 18.18 | 21.38 | 3-3 | |
| 3615.09 | A | 10 | 18.17 | 21.59 | 4-3 | 4p' $^3$F-4d' $^3$D° † (70) |
| *4235.49 | A | 25 | 18.22 | 21.14 | 3-2 | 4p' $^1$F-5s' $^1$D° (71) |
| 3781.23 | A | 30 | 18.22 | 21.49 | 3-3 | 4p' $^1$F-4d' $^1$F° (72) |
| 3231.75 | A | 12 | 18.22 | 22.04 | 3-2 | 4p' $^1$F-4d' $^1$D° (73) |
| 4811.57 | A | 12 | 18.49 | 21.06 | 2-3 | 4p' $^3$R-5s' $^3$P° |
| 4857.04 | A | 10 | 18.51 | 21.05 | 1-2 | (74) |
| 4721.43 | A | 25 | 18.49 | 21.11 | 2-3 | 4p' $^3$R-5d $^3$D° † |
| 4748.67 | A | 20 | 18.51 | 21.11 | 1-2 | (75) |
| 4738.41 | A | 10 | 18.51 | 21.12 | 1-1 | |
| 3990.19 | A | 20 | 18.49 | 21.59 | 2-3 | 4p' $^3$R-4d' $^3$P° |
| 4020.06 | A | 15 | 18.51 | 21.58 | 1-2 | (76) |
| 4036.53 | A | 10 | 18.52 | 21.58 | 0-1 | |
| 3618.88 | A | 15 | 18.49 | 21.90 | 2-1 | 4p' $^3$P-4d' $^3$S° |
| 3639.19 | A | 18 | 18.51 | 21.90 | 1-1 | (77) |
| 3648.07 | A | 10 | 18.52 | 21.90 | 0-1 | |
| 3568.04 | A | 20 | 18.49 | 21.95 | 2-2 | 4p' $^3$R-4d' $^3$P° |
| 3576.00 | A | 15 | 18.49 | 21.94 | 2-1 | (78) |
| 3603.72 | A | 10 | 18.51 | 21.94 | 1-0 | |
| 3587.78 | A | 12 | 18.51 | 21.95 | 1-2 | |
| 3604.51 | A | 15 | 18.52 | 21.94 | 0-1 | |
| 7578.07 | A | 10 | 18.64 | 20.27 | 2-2 | 3d' $^3$D°-x' † (79) |
| 5568.81 | A | 15 | 18.93 | 21.14 | 2-2 | 4p' $^1$D-5s' $^1$P° (80) |
| *5175.85 | A | 20 | 18.93 | 21.30 | 2-2 | 4p' $^1$D-4d' $^3$F° (81) |
| 3954.21 | A | 20 | 18.92 | 22.04 | 2-2 | 4p' $^1$D-4d' $^1$D° (82) |
| 4224.92 | A | 15 | 19.60 | 22.52 | 3-2 | 4p" $^3$D-5s" $^3$P° † |
| *4235.49 | A | 25 | 19.60 | 22.51 | 2-1 | (83) |
| 3868.62 | A | 40 | 19.60 | 22.79 | 3-4 | 4p" $^3$D-4d" $^3$F° |
| 3861.95 | A | 20 | 19.60 | 22.80 | 2-3 | (84) |
| 3854.75 | A | 15 | 19.59 | 22.80 | 1-2 | |
| 3864.60 | A | 15 | 19.60 | 22.80 | 3-3 | |
| 4482.02 | A | 10 | 19.77 | 22.52 | 2-2 | 3P-5s" $^3$P° † |
| *4497.30 | A | 18 | 19.77 | 22.51 | 2-1 | (85) |
| *4475.28 | A | 20 | 19.75 | 22.51 | 1-0 | |

**Strongest Unclassified Lines of Cl II**

| | | | | | |
|---|---|---|---|---|---|
| 7565.53 | A | 18 | 3610.07 | A | 12 |
| 5356.14 | A | 10 | 3479.82 | A | 30 |
| 4584.28 | A | 20 | 3203.05 | A | 20 |
| 4157.82 | A | 25 | 3173.66 | A | 20 |
| 3981.94 | A | 15 | 3170.23 | A | 15 |
| 3793.75 | A | 25 | 3160.52 | A | 10 |

| Cl III | I P 39.7 | | Anal B | List C | Nov 1944 | |
|---|---|---|---|---|---|---|
| 3602.10 | B | 9 | 21.56 | 24.98 | 2½-3½ | 4s$^4$P-4p$^4$D° † |
| 3812.85 | B | 8 | 21.49 | 24.91 | 1½-2½ | (1) |
| 3623.69 | B | 7 | 21.45 | 24.85 | ½-1½ | |
| 3682.05 | B | 7 | 21.56 | 24.91 | 2½-2½ | |
| 3670.28 | B | 7 | 21.49 | 24.85 | 1½-1½ | |
| 3658.95 | B | 7 | 21.45 | 24.82 | ½- ½ | |
| 3705.45 | B | 6 | 21.49 | 24.82 | 1½- ½ | |
| *3340.42 | B | 9 | 21.56 | 25.25 | 2½-2½ | 4s$^4$P-4p$^4$P° † |
| 3329.06 | B | 8 | 21.49 | 25.20 | 1½-1½ | (2) |
| 3387.60 | B | 8 | 21.56 | 25.20 | 2½-1½ | |
| *3340.42 | B | 9 | 21.49 | 25.19 | 1½- ½ | |
| 3283.41 | B | 8 | 21.49 | 25.25 | 1½-2½ | |
| 3289.80 | B | 7 | 21.45 | 25.20 | ½-1½ | |
| 3191.45 | B | 9 | 21.56 | 25.42 | 2½-1½ | 4s$^4$P-4p$^4$S° |
| 3139.34 | B | 8 | 21.49 | 25.42 | 1½-1½ | (3) |
| 3104.46 | B | 6 | 21.45 | 25.42 | ½-1½ | |
| 3925.87 | A | 5 | 22.11 | 25.25 | 1½-2½ | 4s$^2$P-4p$^4$P° † (4) |
| 3720.45 | A | 8 | 22.11 | 25.42 | 1½-2½ | 4s$^2$P-4p$^2$D° † |
| 3748.81 | A | 8 | 22.02 | 25.31 | ½-1½ | (5) |
| 3320.57 | A | 7 | 22.11 | 27.42 | 1½-1½ | 4s$^2$P-4p$^2$P° |
| 3259.32 | A | 8 | 22.02 | 27.39 | ½- ½ | (8) |
| 3336.18 | A | 5 | 22.11 | 27.39 | 1½- ½ | |
| 3244.44 | A | 5 | 22.02 | 27.42 | ½-1½ | |
| 3991.50 | A | 7 | 22.16 | 25.25 | 2½-2½ | 3d$^4$P-4p$^4$P° † |
| 4059.07 | A | 8 | 22.16 | 25.20 | 2½-1½ | (7) |
| 4104.23 | A | 5 | 22.18 | 25.19 | 1½- ½ | |
| 4018.50 | A | 6 | 22.18 | 25.35 | 1½-2½ | |
| 4106.83 | A | 5 | 22.19 | 25.20 | ½-1½ | |
| 3779.35 | A | 5 | 22.16 | 25.42 | 2½-2½ | 3d$^4$P-4p$^2$D° † (8) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Cl III** continued | | | | | | |
| 3824.47 | A | 4 | 22.60 | 27.42 | 2½-1½ | $3d^2D-4p^2P^o$ † |
| 3707.34 | A | 6 | 22.48 | 27.39 | 1½- ½ | (9) |
| 3530.03 | A | 9 | 23.26 | 26.75 | 2½-3½ | $4s'\ ^2D-4p'\ ^2P^o$ † |
| 3560.68 | A | 8 | 23.26 | 26.73 | 1½-2½ | (10) |
| 3393.45 | A | 8 | 23.26 | 26.89 | 2½-2½ | $4s'\ ^2D-4p'\ ^2D^o$ † |
| 3392.89 | A | 8 | 23.26 | 26.90 | 1½-1½ | (11) |
| 3386.22 | A | 5 | 23.26 | 26.90 | 2½-1½ | |
| 3683.39 | A | 5 | 24.07 | 27.42 | 2½-1½ | $3d'\ ^2D-4p'\ ^2P^o$ † |
| | | | | | | (12) |
| 4608.21 | A | 5 | 24.22 | 26.89 | 3½-2½ | $3d'\ ^2F-4p'\ ^2D^o$ † |
| | | | | | | (13) |

**Cl IV** See introduction

**A I** I P 15.69 Anal A List D June 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 9122.9660 | A | 500 | 11.50 | 12.85 | 2-1 | $4s\ 1^o-4p\ 1$ |
| 8115.3115 | A | 4000 | 11.50 | 13.02 | 2-3 | (1) -4p 2 |
| 8014.7856 | A | 800 | 11.50 | 13.04 | 2-2 | -4p 3 |
| 7723.7597 | A | 300 | 11.50 | 13.10 | 2-1 | -4p 4 |
| 7635.1053 | A | 500 | 11.50 | 13.11 | 2-2 | -4p 5 |
| 7147.0406 | A | (8) | 11.50 | 13.23 | 2-1 | -4p 7 |
| 7067.2170 | A | (20) | 11.50 | 13.24 | 2-2 | -4p 8 |
| 6965.4302 | A | (20) | 11.50 | 13.27 | 2-1 | -4p 9 |
| 4251.1852 | B | (60) | 11.50 | 14.40 | 2-1 | $4s\ 1^o-5p\ 1$ |
| 4200.6751 | B | (100) | 11.50 | 14.44 | 2-3 | (2) -5p 2 |
| 4190.7127 | B | (50) | 11.50 | 14.44 | 2-2 | -5p 3 |
| 4184.1800 | B | (80) | 11.50 | 14.46 | 2-1 | -5p 4 |
| 4158.5906 | B | (100) | 11.50 | 14.47 | 2-2 | -5p 5 |
| 3947.5043 | B | (40) | 11.50 | 14.62 | 2-2 | -5p 8 |
| 3948.9788 | B | (100) | 11.50 | 14.62 | 2-1 | -5p 9 |
| 9657.7841 | A | 1500 | 11.57 | 12.85 | 1-1 | $4s\ 2^o-4p\ 1$ |
| 8434.647 | A | 2500 | 11.57 | 13.04 | 1-2 | (3) -4p 3 |
| 8103.6923 | A | 2000 | 11.57 | 13.10 | 1-1 | -4p 4 |
| 8006.1556 | A | 600 | 11.57 | 13.11 | 1-2 | -4p 5 |
| 4300.1011 | B | (100) | 11.57 | 14.44 | 1-2 | $4s\ 2^o-5p\ 3$ |
| 4272.1690 | B | (100) | 11.57 | 14.46 | 1-1 | (4) -5p 4 |
| 4266.2867 | B | (100) | 11.57 | 14.47 | 1-2 | -5p 5 |
| 4198.3170 | B | (100) | 11.57 | 14.51 | 1-0 | -5p 6 |
| 4044.4182 | B | (100) | 11.57 | 14.62 | 1-2 | -5p 8 |
| 3606.5224 | B | (50) | 11.57 | 15.00 | 1-0 | $4s\ 2^o-6p\ 6$ |
| | | | | | | (5) |
| 10470.051 | A | 500 | 11.67 | 12.85 | 0-1 | $4s\ 3^o-4p\ 1$ |
| 8667.9430 | A | 400 | 11.67 | 13.10 | 0-1 | (6) -4p 4 |
| 7948.1754 | A | 400 | 11.67 | 13.23 | 0-1 | -4p 7 |
| 7724.3064 | A | 200 | 11.67 | 13.27 | 0-1 | -4p 9 |
| 4522.3238 | B | (40) | 11.67 | 14.40 | 0-1 | $4s\ 3^o-5p\ 1$ |
| 4191.0296 | B | (100) | 11.67 | 14.62 | 0-1 | (7) -5p 7 |
| 4181.8838 | B | (80) | 11.67 | 14.62 | 0-1 | -5p 9 |
| 9784.5010 | A | 1000 | 11.78 | 13.04 | 1-2 | $4s\ 4^o-4p\ 3$ |
| 9354.818 | A | 200 | 11.78 | 13.10 | 1-1 | (8) -4p 4 |
| 9234.498 | A | 1000 | 11.78 | 13.11 | 1-2 | -4p 5 |
| 8521.4407 | A | 2000 | 11.78 | 13.23 | 1-1 | -4p 7 |
| 8408.208 | A | 3000 | 11.78 | 13.24 | 1-2 | -4p 8 |
| 8264.5209 | A | 1500 | 11.78 | 13.27 | 1-1 | -4p 9 |
| 7503.8676 | A | (15) | 11.78 | 13.43 | 1-0 | -4p 10 |
| 4702.3164 | B | (100) | 11.78 | 14.40 | 1-1 | $4s\ 4^o-5p\ 1$ |
| 4628.4410 | B | (90) | 11.78 | 14.44 | 1-2 | (9) -5p 3 |
| 4596.0970 | B | (90) | 11.78 | 14.46 | 1-1 | -5p 4 |
| 4510.7333 | B | (80) | 11.78 | 14.51 | 1-0 | -5p 6 |
| 4345.1682 | B | (90) | 11.78 | 14.62 | 1-1 | -5p 7 |
| 4333.5612 | B | (90) | 11.78 | 14.62 | 1-2 | -5p 8 |
| 4335.3380 | B | (70) | 11.78 | 14.62 | 1-1 | -5p 9 |
| 4359.3618 | B | (100) | 11.78 | 14.67 | 1-0 | -5p 10 |
| 10673.55 | C | 500 | 12.85 | 14.01 | 1-2 | 4p 1-5s 1° |
| | | | | | | (10) |
| 6752.832 | A | (20) | 12.85 | 14.68 | 1-2 | 4p 1-4d 3° |
| | | | | | | (11) |
| 5650.7034 | A | (30) | 12.85 | 15.04 | 1-0 | 4p 1-5d 1° |
| | | | | | | (12) |
| 6032.124 | A | (30) | 13.02 | 15.07 | 3-4 | 4p 2-5d 4° |
| | | | | | | (13) |
| 5495.8720 | A | (20) | 13.02 | 15.26 | 3-4 | 4p 2-6d 4° |
| | | | | | | (14) |

For changes in Paschen notation sss text § 37

**A II** I P 27.5 Anal B List A Oct 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 4401.02 | A | 7 | 16.34 | 19.14 | 3½-3½ | $3d^4D-4p^4P^o$ |
| 4371.36 | A | 8 | 16.35 | 19.18 | 2½-1½ | (1) |
| 4332.06 | A | 5 | 16.37 | 19.22 | 1½- ½ | |
| 4431.03 | A | 8 | 16.35 | 19.14 | 2½-2½ | |
| 4400.09 | A | 6 | 16.37 | 19.18 | 1½-1½ | |
| 4352.23 | A | 6 | 16.39 | 19.22 | ½- ½ | |
| 4460.56 | A | 6 | 16.37 | 19.14 | 1½-2½ | |
| 4420.90 | A | 7 | 16.39 | 19.18 | ½-1½ | |
| 4013.87 | A | 10 | 16.34 | 19.41 | 3½-3½ | $3d^4D-4p^4D^o$ |
| 3968.36 | A | 10 | 16.35 | 19.46 | 2½-2½ | (2) |
| 3914.76 | A | 7 | 16.37 | 19.53 | 1½-1½ | |
| 3891.40 | A | 6 | 16.39 | 19.56 | ½- ½ | |
| 3944.27 | A | 8 | 16.34 | 19.46 | 3½-2½ | |
| 3891.97 | A | 7 | 16.35 | 19.53 | 2½-1½ | |
| 3875.26 | A | 7 | 16.37 | 19.56 | 1½- ½ | |
| 4038.83 | A | 7 | 16.35 | 19.41 | 2½-3½ | |
| 3992.06 | A | 7 | 16.37 | 19.46 | 1½-2½ | |
| 3931.34 | A | 6 | 16.39 | 19.53 | ½-1½ | |
| 3786.40 | A | 6 | 16.34 | 19.60 | 3½-2½ | $3d^4D-4p^2D^o$ |
| 3714.74 | A | 3 | 16.35 | 19.68 | 2½-1½ | (3) |
| 3808.61 | A | 5 | 16.35 | 19.60 | 2½-2½ | |
| 3735.49 | A | 4 | 16.37 | 19.68 | 1½-1½ | |
| 3830.43 | A | 5 | 16.37 | 19.60 | 1½-2½ | |
| 3750.50 | A | 4 | 16.39 | 19.68 | ½-1½ | |
| 3601.51 | A | 4 | 16.35 | 19.78 | 2½-1½ | $3d^4D-4p^2P^o$ |
| 3692.33 | A | 0n | 16.37 | 19.72 | 1½- ½ | (4) |
| 3631.06 | A | 0 | 16.37 | 19.78 | 1½-1½ | |
| 3706.94 | A | 4 | 16.39 | 19.72 | ½- ½ | |
| 3635.13 | A | 00n | 16.39 | 19.78 | ½-1½ | |
| 3499.49 | A | 5 | 16.35 | 19.88 | 2½-1½ | $3d^4D-4p^4S^o$ |
| 3517.90 | A | 3 | 16.37 | 19.88 | 1½-1½ | (5) |
| 3531.22 | A | 2 | 16.39 | 19.88 | ½-1½ | |
| 4806.07 | A | 20 | 16.57 | 19.14 | 2½-2½ | $4s^4P-4p^4P^o$ |
| 4933.24 | A | 6 | 16.68 | 19.18 | 1½-1½ | (6) |
| 4972.16 | A | 5 | 16.74 | 19.22 | ½- ½ | |
| 4735.93 | A | 15 | 16.57 | 19.18 | 2½-1½ | |
| 4847.90 | A | 8 | 16.68 | 19.22 | 1½- ½ | |
| 5009.35 | A | 8 | 16.68 | 19.14 | 1½-2½ | |
| 5062.07 | A | 8 | 16.74 | 19.18 | ½-1½ | |
| 4348.11 | A | 20n | 16.57 | 19.41 | 2½-3½ | $4s^4P-4p^4D^o$ |
| 4426.01 | A | 15 | 16.68 | 19.46 | 1½-2½ | (7) |
| 4430.18 | A | 9 | 16.74 | 19.53 | ½-1½ | |
| 4266.53 | A | 10 | 16.57 | 19.48 | 2½-2½ | |
| 4331.25 | A | 10 | 16.68 | 19.53 | 1½-1½ | |
| 4379.74 | A | 8 | 16.74 | 19.56 | ½- ½ | |
| 4178.39 | A | 5 | 16.57 | 19.53 | 2½-1½ | |
| 4282.90 | A | 7 | 16.68 | 19.56 | 1½- ½ | |
| 4082.40 | A | 6 | 16.57 | 19.60 | 2½-2½ | $4s^4P-4p^2D^o$ |
| 4112.83 | A | 5 | 16.68 | 19.68 | 1½-1½ | (8) |
| 3974.76 | A | 6 | 16.57 | 19.68 | 2½-1½ | |
| 4238.18 | A | 7 | 16.68 | 19.60 | 1½-2½ | |
| 4201.99 | A | 5 | 16.74 | 19.68 | ½-1½ | |
| 3845.42 | A | 5 | 16.57 | 19.78 | 2½-1½ | $4s^4P-4p^2P^o$ |
| 3974.48 | A | 5 | 16.68 | 19.78 | 1½-1½ | (9) |
| 4147.43 | A | 1n | 16.74 | 19.72 | ½- ½ | |
| 4057.72 | A | 0n | 16.74 | 19.78 | ½-1½ | |
| 3729.29 | A | 10 | 16.57 | 19.88 | 2½-1½ | $4s^4P-4p^4S^o$ |
| 3850.57 | A | 15 | 16.68 | 19.88 | 1½-1½ | (10) |
| 3928.62 | A | 9 | 16.74 | 19.88 | ½-1½ | |
| 3923.54 | A | 1n | 16.74 | 19.89 | ½- ½ | $4s^4P-4p^2S^o$ |
| | | | | | | (11) |
| 5950.91 | A | 0 | 17.07 | 19.14 | 1½-2½ | $4s^2P-4p^4P^o$ |
| 5843.80 | A | 00n | 17.07 | 19.18 | 1½-1½ | (12) |
| 6077.43 | A | 00 | 17.19 | 19.22 | ½- ½ | |
| 5734.37 | A | 0n | 17.07 | 19.22 | 1½- ½ | |
| 5145.36 | A | 8 | 17.07 | 19.46 | 1½-2½ | $4s^2P-4p^4D^o$ |
| 5286.92 | A | 5 | 17.19 | 19.53 | ½-1½ | (13) |
| 5017.63 | A | 2 | 17.07 | 19.53 | 1½-1½ | |
| 4879.90 | A | 12 | 17.07 | 19.60 | 1½-2½ | $4s^2P-4p^2D^o$ |
| 4965.12 | A | 7 | 17.19 | 19.68 | ½-1½ | (14) |
| 4726.91 | A | 10 | 17.07 | 19.68 | 1½-1½ | |
| 4545.08 | A | 10 | 17.07 | 19.78 | 1½-1½ | $4s^2P-4p^2P^o$ |
| 4889.06 | B | 5 | 17.19 | 19.72 | ½- ½ | (15) |
| 4657.94 | A | 9 | 17.07 | 19.72 | 1½- ½ | |
| 4764.89 | A | 10 | 17.19 | 19.78 | ½-1½ | |
| 4383.79 | A | 4 | 17.07 | 19.88 | 1½-1½ | $4s^2P-4p^4S^o$ |
| 4587.90 | B | 2 | 17.19 | 19.88 | ½-1½ | (16) |
| 4375.96 | A | 5 | 17.07 | 19.89 | 1½- ½ | $4s^2P-4p^2S^o$ |
| 4579.39 | A | 8 | 17.19 | 19.89 | ½- ½ | (17) |
| 3108.82 | A | 000n | 17.07 | 21.04 | 1½-2½ | $4s^2P-4p'\ ^2F^o$ |
| | | | | | | (18) |
| 2979.05 | A | 6 | 17.19 | 21.33 | ½- ½ | $4s^2P-4p'\ ^2P^o$ † |
| 3033.52 | A | 6 | 17.19 | 21.26 | ½-1½ | (19) |

**A II** continued

| | | | | | | |
|---|---|---|---|---|---|---|
| 6643.79 | A | 10 | 17.55 | 19.41 | 4½-3½ | $3d^4F-4p^4D^o$ |
| 6684.36 | A | 8 | 17.62 | 19.46 | 3½-2½ | (20) |
| 6638.34 | A | 8 | 17.67 | 19.53 | 2½-1½ | |
| 6639.72 | A | 7 | 17.70 | 19.56 | 1½- ½ | |
| 6886.57 | B | 6 | 17.62 | 19.41 | 3½-3½ | |
| 6863.52 | B | 6 | 17.67 | 19.46 | 2½-2½ | |
| 6756.61 | A | 5 | 17.70 | 19.53 | 1½-1½ | |
| 7077.03 | A | 1 | 17.67 | 19.41 | 2½-3½ | |
| 6990.16 | A | 2 | 17.70 | 19.46 | 1½-2½ | |
| 6343.13 | A | 6 | 17.62 | 19.60 | 3½-2½ | $3d^4F-4p^2D^o$ |
| 6138.67 | A | 3 | 17.67 | 19.68 | 2½-1½ | (21) |
| 6399.23 | A | 4 | 17.67 | 19.60 | 2½-2½ | |
| 6239.73 | A | 2 | 17.70 | 19.68 | 1½-1½ | |
| 6509.16 | A | 00 | 17.70 | 19.60 | 1½-2½ | |
| 6120.12 | A | 00 | 17.70 | 19.72 | 1½- ½ | $3d^4F-4p^2P^o$ |
| | | | | | | (22) |
| 3594.41 | A | 00n | 17.62 | 21.05 | 3½-3½ | $3d^4F-4p'\ ^2F^o$ |
| | | | | | | (23) |
| 6808.55 | A | 3 | 17.86 | 19.68 | ½-1½ | $3d^2P-4p^2D^o$ |
| 7384.27 | A | 0 | 17.98 | 19.68 | 1½-1½ | (24) |
| 6861.30 | A | 4 | 17.98 | 19.78 | 1½-1½ | $3d^2P-4p^2P^o$ |
| 6666.36 | A | 5 | 17.86 | 19.72 | ½- ½ | (25) |
| 6437.63 | A | 2 | 17.86 | 19.78 | ½-1½ | |
| 6500.25 | A | 3 | 17.98 | 19.88 | 1½-1½ | $3d^2P-4p^4S^o$ |
| | | | | | | (26) |
| 6483.10 | A | 6 | 17.98 | 19.89 | 1½- ½ | $3d^2P-4p^2S^o$ |
| 6103.56 | A | 4 | 17.86 | 19.89 | ½- ½ | (27) |
| 4042.20 | A | 1 | 17.98 | 21.04 | 1½-2½ | $3d^2P-4p'\ ^2F^o$ |
| | | | | | | (28) |
| 3766.13 | A | 5 | 17.98 | 21.26 | 1½-1½ | $3d^2P-4p'\ ^2P^o$ |
| 3556.91 | A | 5 | 17.86 | 21.33 | ½- ½ | (29) |
| 3682.56 | A | 4 | 17.98 | 21.33 | 1½- ½ | |
| 3634.83 | A | 4 | 17.86 | 21.26 | ½-1½ | |
| 3605.89 | A | 6 | 17.98 | 21.41 | 1½-2½ | $3d^2P-4p'\ ^2D^o$ |
| 3490.89 | A | 4 | 17.86 | 21.40 | ½-1½ | (30) |
| 3611.84 | A | 4 | 17.98 | 21.40 | 1½-1½ | |
| 4609.60 | A | 15 | 18.37 | 21.05 | 2½-3½ | $4s'\ ^2D-4p'\ ^2F^o$ |
| 4589.93 | A | 9 | 18.35 | 21.04 | 1½-2½ | (31) |
| 4637.25 | A | 6 | 18.37 | 21.04 | 2½-2½ | |
| 4377.55 | A | 8 | 18.37 | 21.26 | 2½-1½ | $4s'\ ^2D-4p'\ ^2P^o$ |
| 4131.73 | A | 8 | 18.35 | 21.33 | 1½- ½ | (32) |
| 4237.23 | A | 7 | 18.35 | 21.26 | 1½-1½ | |
| 4072.01 | A | 9 | 18.37 | 21.41 | 2½-2½ | $4s'\ ^2D-4p'\ ^2D^o$ |
| 4042.91 | A | 8 | 18.35 | 21.40 | 1½-1½ | (33) |
| 4079.60 | A | 5 | 18.37 | 21.40 | 2½-1½ | |
| 4035.47 | A | 6 | 18.35 | 21.41 | 1½-2½ | |
| 4936.13 | A | 00n | 18.54 | 21.04 | 2½-2½ | $3d^2F-4p'\ ^2F^o$ |
| 4904.75 | A | 6 | 18.54 | 21.05 | 2½-3½ | (34) |
| 4530.57 | A | 4 | 18.54 | 21.26 | 2½-1½ | $3d^2F-4p'\ ^2P^o$ |
| | | | | | | (35) |
| 4182.98 | A | 0 | 18.46 | 21.41 | 3½-2½ | $3d^2F-4p'\ ^2D^o$ |
| 4309.11 | A | 2 | 18.54 | 21.40 | 2½-1½ | (36) |
| 4300.66 | A | 6 | 18.54 | 21.41 | 2½-2½ | |
| 5141.84 | A | 6 | 18.65 | 21.05 | 2½-3½ | $3d^2D-4p'\ ^2F^o$ |
| 5017.16 | A | 6 | 18.58 | 21.04 | 1½-2½ | (37) |
| 5176.28 | A | 3 | 18.65 | 21.04 | 2½-2½ | |
| 4732.08 | B | 5 | 18.65 | 21.26 | 2½-1½ | $3d^2D-4p'\ ^2P^o$ |
| 4474.77 | A | 6 | 18.58 | 21.33 | 1½- ½ | (38) |
| 4598.77 | A | 5 | 18.58 | 21.26 | 1½-1½ | |
| 4481.83 | A | 8 | 18.65 | 21.41 | 2½-2½ | $3d^2D-4p'\ ^2D^o$ |
| 4370.76 | A | 6 | 18.58 | 21.40 | 1½-1½ | (39) |
| 4490.99 | A | 5 | 18.65 | 21.40 | 2½-1½ | |
| 4362.07 | A | 5 | 18.58 | 21.41 | 1½-2½ | |
| 5245.49 | A | 0 | 19.18 | 21.53 | 1½-1½ | $4p^4P^o-3d'\ ^2P$ |
| | | | | | | (40) |
| 4072.40 | A | 7 | 19.14 | 22.17 | 2½-1½ | $4p^4P^o-s^2P$ |
| 4124.09 | A | 0 | 19.18 | 22.17 | 1½-1½ | (41) |
| 4127.09 | B | 00n | 19.22 | 22.21 | ½- ½ | |
| 3765.27 | A | 6 | 19.14 | 22.42 | 2½-2½ | $4p^4P^o-5s^4P$ |
| 3720.43 | A | 5 | 19.18 | 22.50 | 1½-1½ | (42) |
| 3669.62 | A | 5 | 19.22 | 22.59 | ½- ½ | |
| 3678.27 | A | 5 | 19.14 | 22.50 | 2½-1½ | |
| 3623.15 | A | 6 | 19.18 | 22.59 | 1½- ½ | |
| 3809.49 | A | 7 | 19.18 | 22.42 | 1½-2½ | |
| 3770.54 | A | 6 | 19.22 | 22.50 | ½-1½ | |
| 3564.34 § | B | 4 | 19.14 | 22.60 | 2½-1½ | $4p^4P^o-5s^2P$ |
| 3603.91 | B | 3 | 19.18 | 22.60 | 1½-1½ | (43) |
| 3650.90 | A | 4 | 19.22 | 22.60 | ½-1½ | |

# REVISED MULTIPLET TABLE

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **A II** continued | | | | | | |
| 3491.54 | A | 8 | 19.14 | 22.67 | 2½-3½ | $4p^4P^o-4d^4D$ |
| 3514.39 | A | 9 | 19.18 | 22.69 | 1½-2½ | (44) |
| 3535.33 | A | 6 | 19.22 | 22.71 | ½-1½ | |
| 3476.74 | A | 6 | 19.14 | 22.69 | 2½-2½ | |
| 3491.24 | A | 6 | 19.18 | 22.71 | 1½-1½ | |
| 3509.78 | A | 6 | 19.22 | 22.74 | ½- ½ | |
| 3454.10 | A | 5 | 19.14 | 22.71 | 2½-1½ | |
| •3466.34 | A | 5 | 19.18 | 22.74 | 1½- ½ | |
| 3478.24 | A | 4 | 19.18 | 23.73 | 1½- ½ | $4p^4P^o-3d'\ ^2S$ |
| 3521.98 | A | 4 | 19.22 | 22.73 | ½- ½ | (45) |
| 3269.05 | A | 2 | 19.14 | 22.92 | 2½-3½ | $4p^4P^o-4d^4F$ |
| 3254.03 | A | 1 | 19.18 | 22.97 | 1½-2½? | (46) |
| 3263.60 | A | 5 | 19.22 | 23.00 | ½-1½ | |
| 3221.64 | A | 3 | 19.14 | 22.97 | 2½-2½ | |
| 3226.00 | A | 3 | 19.18 | 23.00 | 1½-1½ | |
| 3194.25 | A | 5 | 19.14 | 23.00 | 2½-1½ | |
| 3139.02 | A | 7 | 19.14 | 23.07 | 2½-3½ | $4p^4P^o-4d^4P$ |
| 3212.54 | A | 5 | 19.18 | 23.02 | 1½-1½ | (47) |
| 3281.72 | A | 6 | 19.22 | 22.98 | ½- ½ | |
| 3181.05 | A | 7 | 19.14 | 23.02 | 2½-1½ | |
| 3243.70 | A | 7 | 19.18 | 22.98 | 1½- ½ | |
| 3169.68 | A | 8 | 19.18 | 23.07 | 1½-3½ | |
| 3249.82 | A | 7 | 19.22 | 23.02 | ½-1½ | |
| 3186.19 | A | 3 | 19.18 | 23.05 | 1½-2½ | $4p^4P^o-4d^2D$ (48) |
| 3146.47 | A | 2 | 19.14 | 23.06 | 2½-3½ | $4p^4P^o-4d^2F$ (49) |
| •6818.39 | A | 4 | 19.46 | 21.27 | 2½-2½ | $4p^4D^o-3d'\ ^2D$ |
| | | | 19.53 | 21.34 | 1½-1½ | (50) |
| 4561.03 | A | 4 | 19.46 | 22.17 | 2½-1½ | $4p^4D^o-a^2P$ |
| 4593.44 | A | 2 | 19.53 | 22.21 | 1½- ½ | (51) |
| 4666.28 | B | 2n | 19.53 | 22.17 | 1½-1½ | |
| 4649.06 | B | 0n | 19.56 | 22.21 | ½- ½ | |
| •4103.91 | A | 10 | 19.41 | 22.42 | 3½-2½ | $4p^4D^o-5s^4P$ |
| •4072.40 | A | 7 | 19.46 | 22.50 | 2½-1½ | (52) |
| 4033.83 | A | 6 | 19.53 | 22.59 | 1½- ½ | |
| 4179.31 | A | 5 | 19.46 | 22.42 | 2½-2½ | |
| 4156.11 | A | 5 | 19.53 | 22.50 | 1½-1½ | |
| 4076.64 | A | 5 | 19.56 | 22.59 | ½- ½ | |
| 4267.47 | B | 0 | 19.53 | 22.42 | 1½-2½ | |
| 4201.58 | A | 2 | 19.56 | 22.50 | ½-1½ | |
| 3933.19 | A | 0 | 19.46 | 22.60 | 2½-1½ | $4p^4D^o-5s^2P$ |
| 4011.23 | A | 3 | 19.53 | 22.60 | 1½-1½ | (53) |
| •3922.54 | A | 1n | 19.56 | 22.70 | ½- ½ | |
| 4053.56 | A | 0 | 19.56 | 22.60 | ½-1½ | |
| 3780.84 | A | 8 | 19.41 | 22.67 | 3½-3½ | $4p^4D^o-4d^4D$ |
| 3826.83 | A | 6 | 19.46 | 22.69 | 2½-2½ | (54) |
| 3872.15 | A | 5 | 19.53 | 22.71 | 1½-1½ | |
| 3880.34 | A | 4 | 19.56 | 22.74 | ½- ½ | |
| 3763.52 | A | 5 | 19.41 | 22.69 | 3½-2½ | |
| 3799.39 | A | 6 | 19.46 | 22.71 | 2½-1½ | |
| 3841.54 | A | 3 | 19.53 | 22.74 | 1½-1½ | |
| 3844.75 | A | 4 | 19.46 | 22.67 | 2½-3½ | |
| 3900.63 | A | 5 | 19.53 | 22.69 | 1½-2½ | |
| 3911.58 | A | 5 | 19.56 | 22.71 | ½-1½ | |
| 3856.16 | A | 1 | 19.53 | 22.73 | 1½- ½ | $4p^4D^o-3d'\ ^2S$ |
| 3895.26 | A | 2 | 19.56 | 22.73 | ½- ½ | (55) |
| 3588.44 | A | 10 | 19.41 | 22.85 | 3½-4½ | $4p^4D^o-4d^4F$ |
| 3576.62 | A | 10 | 19.46 | 22.92 | 2½-3½ | (56) |
| 3582.35 | A | 8 | 19.53 | 22.97 | 1½-2½ | |
| 3581.62 | A | 6 | 19.56 | 23.00 | ½-1½ | |
| 3521.27 | A | 5 | 19.41 | 22.92 | 3½-3½ | |
| 3520.00 | A | 6 | 19.46 | 22.97 | 2½-2½ | |
| 3548.51 | A | 7 | 19.53 | 23.00 | 1½-1½ | |
| •3466.34 | A | 5 | 19.41 | 22.97 | 3½-2½ | |
| 3487.33 | A | 3 | 19.46 | 23.00 | 2½-1½ | |
| 3370.97 | A | 5 | 19.41 | 23.07 | 3½-2½ | $4p^4P^o-4d^4P$ |
| 3471.59 | A | 2 | 19.46 | 23.02 | 2½-1½ | (57) |
| 3569.94 | A | 1 | 19.53 | 22.98 | 1½- ½ | |
| 3421.64 | A | 5 | 19.46 | 23.07 | 2½-2½ | |
| 3532.19 | A | 00n | 19.53 | 23.02 | 1½-1½? | |
| 3603.46 | A | 3 | 19.56 | 22.98 | ½- ½ | |
| 3480.52 | A | 5 | 19.53 | 23.07 | 1½-2½ | |
| 3565.02 | A | 5 | 19.56 | 23.02 | ½-1½ | |
| 3438.14 | A | 000n | 19.46 | 23.05 | 2½-1½ | $4p^4D^o-4d^2D$ (58) |
| 3379.48 | A | 2n | 19.41 | 23.06 | 3½-3½ | $4p^4D^o-4d^2F$ |
| 3341.77 | A | 2 | 19.46 | 23.16 | 2½-2½ | (59) |
| 3430.44 | A | 4 | 19.46 | 23.06 | 2½-3½ | |
| •3397.89 ‡ | A | 4 | 19.53 | 23.16 | 1½-2½ | |
| 7348.11 | A | 2 | 19.60 | 21.27 | 2½-2½ | $4p^2D^o-3d'\ ^2D$ |
| 7440.54 | A | 0 | 19.68 | 21.34 | 1½-1½ | (60) |
| 7090.55 | A | 000 | 19.60 | 21.34 | 2½-1½ | |
| 6376.00 | A | 0 | 19.60 | 21.53 | 2½-1½ | $4p^2D^o-3d'\ ^2P$ (61) |
| 4792.12 | A | 5 | 19.60 | 22.17 | 2½-1½ | $4p^2D^o-a^2P$ |
| 4867.59 | A | 3 | 19.68 | 22.21 | 1½- ½ | (62) |
| 4949.45 | A | 2 | 19.68 | 22.17 | 1½-1½ | |
| 4373.50 | A | 0 | 19.60 | 22.42 | 2½-3½ | $4p^2D^o-5s^4P$ |
| 4379.25 | A | 1 | 19.68 | 22.50 | 1½-1½ | (63) |
| 4255.62 | A | 3 | 19.60 | 22.50 | 2½-1½ | |
| •4243.71 | A | 2n | 19.68 | 22.59 | 1½- ½ | |
| 4502.95 | A | 5 | 19.68 | 22.42 | 1½-2½? | |
| •4103.91 | A | 10 | 19.60 | 22.60 | 2½-1½ | $4p^2D^o-5s^2P$ |
| 4076.96 | A | 4 | 19.68 | 22.70 | 1½- ½ | (64) |
| 4218.69 | A | 5 | 19.68 | 22.60 | 1½-1½ | |
| 4007.66 | A | 1 | 19.60 | 22.67 | 2½-3½ | $4p^2D^o-4d^4D$ |
| 4096.47 | A | 000 | 19.68 | 22.69 | 1½-2½ | (65) |
| 3988.18 | A | 4 | 19.60 | 22.69 | 2½-2½ | |
| 4065.14 | B | 3 | 19.68 | 22.71 | 1½-1½ | |
| 3958.39 | A | 5 | 19.60 | 22.71 | 2½-1½ | |
| 4031.41 | B | 2 | 19.68 | 22.74 | 1½- ½? | |
| 4047.51 | A | 3 | 19.68 | 22.73 | 1½- ½ | $4p^2D^o-3d'\ ^2S$ (66) |
| 3717.17 | A | 5 | 19.60 | 22.92 | 2½-3½ | $4p^2D^o-4d^4F$ |
| 3746.92 | A | 4 | 19.68 | 22.97 | 1½-2½ | (67) |
| 3656.05 | A | 5 | 19.60 | 22.97 | 2½-2½ | |
| 3709.90 | A | 4 | 19.68 | 23.00 | 1½-1½ | |
| 3620.82 | A | 0 | 19.60 | 23.00 | 2½-1½ | |
| 3550.03 | A | 4 | 19.60 | 23.07 | 2½-2½ | $4p^2D^o-4d^4P$ |
| 3692.17 | A | 00n | 19.68 | 23.02 | 1½-1½ | (68) |
| •3603.91 | B | 3 | 19.60 | 23.02 | 2½-1½? | |
| 3733.36 | A | 0n | 19.68 | 22.98 | 1½- ½ | |
| 3635.67 | A | 2 | 19.68 | 23.07 | 1½-2½ | |
| 3570.77 | A | 00n | 19.60 | 23.05 | 2½-2½ | $4p^2D^o-4d^2D$ (89) |
| 3559.53 | A | 6 | 19.60 | 23.06 | 2½-3½ | $4p^2D^o-4d^2F$ |
| 3545.58 | A | 10 | 19.68 | 23.16 | 1½-2½ | (70) |
| 3464.14 | A | 6 | 19.60 | 23.16 | 2½-2½ | |
| 3137.66 | A | 4 | 19.60 | 23.53 | 2½-1½ | $4p^2D^o-4d^2P$ |
| 3273.36 | A | 4 | 19.68 | 23.45 | 1½- ½ | (71) |
| 3204.34 | A | 5 | 19.68 | 23.53 | 1½-1½ | |
| 3000.45 | A | 5 | 19.68 | 23.79 | 1½-1½ | $4p^2D^o-3d''\ ^2D?$ |
| 3014.49 | A | 5 | 19.68 | 23.77 | 1½-2½ | (72) |
| 7617.86 | C | 1 | 19.72 | 21.34 | ½-1½ | $4p^2P^o-3d'\ ^2D$ (73) |
| 7055.01 | A | 2 | 19.78 | 21.53 | 1½-1½ | $4p^2P^o-3d'\ ^2P$ |
| 6799.32 | A | 2 | 19.72 | 21.53 | ½-1½ | (74) |
| 5165.82 | A | 5 | 19.78 | 22.17 | 1½-1½ | $4p^2P^o-a^2P$ |
| 4942.96 | A | 4 | 19.72 | 22.21 | ½- ½ | (75) |
| 4681.52 | A | 1 | 19.78 | 22.42 | 1½-2½ | $4p^2P^o-5s^4P$ |
| •4440.09 | A | 3 | 19.72 | 22.50 | ½-1½ | (76) |
| 4547.78 | A | 5 | 19.78 | 22.50 | 1½-1½ | |
| •4300.68 | A | 8 | 19.72 | 22.59 | ½-½ | |
| 4401.74 | A | 1n | 19.78 | 22.59 | 1½- ½ | |
| 4374.87 | A | 3 | 19.78 | 22.60 | 1½-1½ | $4p^2P^o-5s^2P$ |
| 4129.70 | A | 4 | 19.72 | 22.70 | ½- ½ | (77) |
| 4232.67 | A | 5 | 19.78 | 22.70 | ½-½ | |
| 4275.19 | A | 4 | 19.72 | 22.60 | ½-1½ | |
| •4243.71 | A | 2n | 19.78 | 22.69 | 1½-2½ | $4p^2P^o-4d^4D$ |
| 4210.00 | A | 00n | 19.78 | 22.71 | 1½-1½ | (78) |
| 4173.77 | D | 1 | 19.78 | 22.74 | 1½- ½ | |
| 4099.47 | A | 3 | 19.72 | 22.73 | ½- ½ | $4p^2P^o-3d'\ ^2S$ (79) |
| 3869.61 | A | 0 | 19.78 | 22.97 | 1½-2½? | $4p^2P^o-4d^4F$ |
| •3753.53 | A | 4 | 19.72 | 23.00 | ½-1½ | (80) |
| 3751.06 | A | 0 | 19.78 | 23.07 | 1½-2½ | $4p^2P^o-4d^4P$ |
| 3811.22 | A | 1 | 19.78 | 23.02 | ½-1½ | (81) |
| 3777.55 | A | 2 | 19.72 | 22.98 | ½- ½ | |
| 3855.18 | A | 0 | 19.78 | 22.98 | 1½- ½ | |
| 3655.29 | A | 6 | 19.78 | 23.16 | 1½-2½? | $4p^2P^o-4d^2F$ (82) |
| 3293.66 | A | 7 | 19.78 | 23.53 | 1½-1½ | $4p^2P^o-4d^2P$ |
| 3307.24 | A | 6 | 19.72 | 23.45 | ½- ½ | (83) |
| 3366.59 | A | 4 | 19.78 | 23.45 | 1½- ½ | |
| 3236.82 | A | 4 | 19.72 | 23.53 | ½-1½ | |
| 3093.41 | A | 8 | 19.78 | 23.77 | 1½-2½ | $4p^2P^o-3d''\ ^2D$ |
| 3028.93 | A | 6 | 19.72 | 23.79 | ½-1½ | (84) |
| 4865.96 | A | 5 | 19.88 | 22.42 | 1½-2½ | $4p^4S^o-5s^4P$ |
| 4721.62 | B | 4 | 19.88 | 22.50 | 1½-1½ | (85) |
| 4564.43 | A | 5 | 19.88 | 22.59 | 1½- ½ | |
| 4535.51 | A | 4 | 19.88 | 22.60 | 1½-1½ | $4p^4S^o-5s^2P$ |
| 4372.09 | A | 0n | 19.88 | 22.70 | 1½- ½ | (86) |
| 4394.65 | A | 2n | 19.88 | 22.69 | 1½-2½ | $4p^4S^o-4d^4D$ |
| 4358.53 | A | 1 | 19.88 | 22.71 | 1½-1½ | (87) |
| 4319.69 | A | 00n | 19.88 | 22.74 | 1½- ½ | |
| 4338.24 | B | 1 | 19.88 | 22.73 | 1½- ½ | $4p^4S^o-3d'\ ^2S$ (88) |
| •3994.81 | A | 5 | 19.88 | 22.97 | 1½-2½ | $4p^4S^o-4d^4F$ |
| 3952.74 | A | 6 | 19.88 | 23.00 | 1½-1½ | (89) |
| 3868.53 | A | 8 | 19.88 | 23.07 | 1½-2½ | $4p^4S^o-4d^4P$ |
| 3932.55 | A | 7 | 19.88 | 23.02 | 1½-1½ | (90) |
| 3979.36 | A | 7 | 19.88 | 22.98 | 1½- ½ | |
| 3893.14 | A | 00n | 19.88 | 23.05 | 1½-2½ | $4p^4S^o-4d^2D$ (91) |
| 3383.94 | A | 2 | 19.88 | 23.05 | 1½-1½? | $4p^4S^o-4d^2P$ (92) |
| 5305.77 | A | 3 | 19.89 | 22.21 | ½- ½ | $4p^2S^o-a^2P$ (93) |
| 4730.69 | A | 2 | 19.89 | 22.50 | ½-1½ | $4p^2S^o-5s^4P$ |
| 4572.92 | A | 1 | 19.89 | 22.59 | ½- ½ | (94) |
| 4543.91 | A | 1 | 19.89 | 22.60 | ½-1½ | $4p^2S^o-5s^2P$ (95) |
| 3388.54 | A | 7 | 19.89 | 23.53 | ½-1½ | $4p^2S^o-4d^2P$ |
| 3465.80 | A | 3 | 19.89 | 23.45 | ½- ½ | (96) |
| 3161.38 | A | 4 | 19.89 | 23.79 | ½-1½ | $4p^2S^o-3d''\ ^2D$ (97) |
| 4385.08 | B | 4 | 20.65 | 23.47 | ½-1½ | $4s''\ ^2S-5p^2P^o$ |
| 4367.87 | A | 5 | 20.65 | 23.48 | ½- ½ | (98) |
| 4309.25 | A | 3 | 20.65 | 23.52 | ½-1½ | $4s''\ ^2S-5p^2D^o$ (99) |
| 4097.15 | A | 3 | 20.65 | 23.67 | ½- ½ | $4s''\ ^2S-5p^2S^o$ (100) |
| 4052.94 | A | 5 | 20.65 | 23.70 | ½-1½ | $4s''\ ^2S-4p''\ ^2P^o$ |
| •3994.81 | A | 5 | 20.65 | 23.74 | ½- ½ | (101) |
| 8172.28 | A | 7 | 21.05 | 23.05 | 3½-2½ | $4p'\ ^2P^o-4d^2D$ |
| 8114.92 | A | 10 | 21.04 | 23.05 | 2½-1½ | (102) |
| 6123.38 | A | 3 | 21.04 | 23.05 | 2½-2½ | |
| •6138.67 | A | 3 | 21.05 | 23.06 | 3½-3½ | $4p'\ ^2P^o-4d^2F$ (103) |
| 4538.73 | A | 1n | 21.05 | 23.77 | 3½-2½ | $4p'\ ^4P^o-3d''\ ^2D$ |
| 4480.85 | A | 0n | 21.04 | 23.79 | 2½-1½ | (104) |
| 3946.10 | A | 7 | 21.05 | 24.18 | 3½-2½ | $4p'\ ^2P^o-5s'\ ^2P$ |
| 3925.71 | A | 3 | 21.04 | 24.18 | 2½-1½ | (105) |
| 3561.04 | A | 6 | 21.05 | 24.52 | 3½-4½ | $4p'\ ^2P^o-4d'\ ^2D$ |
| 3545.84 | A | 9 | 21.04 | 24.52 | 2½-3½ | (106) |
| 3562.19 | A | 4 | 21.05 | 24.52 | 3½-3½ | |
| 3489.64 | A | 3 | 21.05 | 24.65 | 3½-2½ | $4p'\ ^2P^o-4d'\ ^2D$ |
| 3432.64 | A | 2 | 21.04 | 24.63 | 2½-1½ | (107) |
| 3414.46 | A | 3 | 21.04 | 24.85 | 2½-2½ | |
| 3373.87 | A | 2n | 21.04 | 24.69 | 2½-1½ | $4p'\ ^2P^o-6s^2P$ (108) |
| 3376.46 | A | 7 | 21.05 | 24.71 | 3½-3½ | $4p'\ ^2P^o-4d'\ ^2F$ |
| 3350.94 | A | 6 | 21.04 | 24.72 | 2½-2½ | (109) |
| 3365.54 | A | 4 | 21.05 | 24.73 | 3½-2½ | |
| 3361.73 | A | 3 | 21.04 | 24.71 | 2½-3½ | |
| 5296.48 | A | 00n | 21.12 | 23.45 | 2½-3½ | $3d'\ ^2F-5p^4D^o$ (110) |
| 4205.19 | A | 00n | 21.12 | 24.06 | 2½-3½? | $3d'\ ^2F-4f^2F^o$ (111) |
| 4914.32 | A | 2 | 21.26 | 23.77 | 1½-2½ | $4p'\ ^2P^o-3d''\ ^2D$ |
| 4877.08 | A | 0n | 21.26 | 23.79 | 1½-1½ | (112) |
| 4227.02 | A | 4 | 21.26 | 24.18 | 1½-2½ | $4p'\ ^2P^o-5s'\ ^2D$ |
| 4337.10 | A | 6 | 21.33 | 24.18 | ½-1½ | (113) |
| 4226.65 | A | 2 | 21.26 | 24.18 | 1½-1½ | |
| 3713.03 | A | 2 | 21.26 | 24.58 | 1½-1½ | $4p'\ ^2P^o-6s^4P$ (114) |
| 3600.22 | A | 3 | 21.26 | 24.69 | 1½-1½ | $4p'\ ^2P^o-4d'\ ^2P$ |
| 3754.06 | A | 3 | 21.33 | 24.63 | ½- ½ | (115) |
| 3671.01 | A | 3 | 21.26 | 24.62 | 1½- ½ | |
| 3680.06 | A | 5 | 21.33 | 24.69 | ½-1½ | |
| 3639.85 | A | 7 | 21.26 | 24.65 | 1½-2½ | $4p'\ ^4P^o-4d'\ ^2D$ |
| 3660.44 | A | 6 | 21.26 | 24.63 | 1½-1½ | (116) |
| 3593.76 | A | 00n | 21.26 | 24.69 | 1½-1½ | $4p'\ ^2P^o-6s^2P$ |
| 3673.26 | A | 4 | 21.33 | 24.69 | ½-1½ | (117) |
| 3104.38 | A | 5 | 21.26 | 25.24 | 1½-1½ | $4p'\ ^2P^o-5d^2P$ |
| 3153.80 | A | 4 | 21.33 | 25.25 | ½- ½ | (118) |
| 3094.98 | A | 3 | 21.26 | 25.25 | 1½- ½ | |
| 3163.61 | A | 1 | 21.33 | 25.24 | ½-1½ | |
| 3088.24 | A | 5 | 21.26 | 25.26 | 1½-2½ | $4p'\ ^2P^o-5d^2D$ (119) |
| 3026.75 | A | 4 | 21.26 | 25.34 | 1½- ½ | $4p'\ ^2P^o-4d'\ ^2S$ |
| 3082.99 | A | 4 | 21.33 | 25.34 | ½- ½ | (120) |
| 5625.74 | A | 0n | 21.27 | 23.47 | 2½-1½ | $3d'\ ^2D-5p^2P^o$ (121) |
| 5090.55 | A | 2 | 21.27 | 23.70 | 2½-1½ | $3d'\ ^2D-4p''\ ^2P^o$ |
| 5125.84 | A | 0 | 21.34 | 23.74 | 1½- ½ | (122) |
| 4433.83 | A | 5 | 21.27 | 24.06 | 2½-3½ | $3d'\ ^2D-4f^2F^o$ |
| 4537.67 | B | 4 | 21.34 | 24.06 | 1½-2½ | (123) |
| 4438.12 | A | 1 | 21.27 | 24.06 | 2½-2½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **A II** continued | | | | | | |
| 4114.53 | A | 2 | 21.27 | 24.27 | 2½-2½ | 3d' $^2D$-4f $^2D^o$ |
| •4201.99 | A | 5 | 21.34 | 24.27 | 1½-1½ | (124) |
| 4116.39 | B | 4 | 21.27 | 24.27 | 2½-1½ | |
| 4199.93 | A | 3 | 21.34 | 24.37 | 1½-2½ | |
| 5812.81 | A | 0 | 21.41 | 23.53 | 2½-1½ | 4p' $^2D^o$-4d $^2P$ (125) |
| 5216.84 | A | 3 | 21.41 | 23.77 | 2½-2½ | 4p' $^2D^o$-3d" $^2D$ |
| 5162.80 | A | 1 | 21.40 | 23.79 | 1½-1½ | (126) |
| 5204.46 | B | 0 | 21.40 | 23.77 | 1½-2½ | |
| 4448.88 | A | 6 | 21.41 | 24.18 | 2½-2½ | 4p' $^2D^o$-5s' $^2D$ |
| 4439.45 | A | 3 | 21.40 | 24.18 | 1½-1½ | (127) |
| 4448.47 | A | 1 | 21.41 | 24.18 | 2½-1½ | |
| •4440.09 | A | 3 | 21.40 | 24.18 | 1½-2½ | |
| •3830.43 | A | 5 | 21.40 | 24.62 | 1½- ½ | 4p' $^2D^o$-4d' $^2P$ |
| •3753.53 | A | 4 | 21.40 | 24.69 | 1½-1½ | (128) |
| 3803.19 | A | 6 | 21.41 | 24.65 | 2½-2½ | 4p' $^2D^o$-4d' $^2D$ |
| 3819.04 | A | 4 | 21.40 | 24.63 | 1½-1½ | (129) |
| 3825.70 | A | 5 | 21.41 | 24.63 | 2½-1½ | |
| 3796.60 | A | 4 | 21.40 | 24.65 | 1½-2½ | |
| 3746.46 | A | 4 | 21.40 | 24.69 | 1½-1½ | 4p' $^2D^o$-8s $^2P$ (130) |
| 3737.89 | A | 8 | 21.41 | 24.71 | 2½-3½ | 4p' $^2D^o$-4d' $^2F$ |
| 3718.31 | A | 6 | 21.40 | 24.72 | 1½-2½ | (131) |
| 3734.51 | A | 4 | 21.41 | 24.72 | 2½-2½ | |
| 3233.42 | A | 3 | 21.41 | 25.24 | 2½-1½ | 4p' $^2D^o$-5d $^2P$ |
| 3207.61 | A | 4 | 21.40 | 25.25 | 1½- ½ | (132) |
| 3217.70 | A | 3 | 21.40 | 25.24 | 1½-1½ | |
| 3205.03 | A | 4 | 21.41 | 25.26 | 2½-2½ | 4p' $^2D^o$-5d $^2D$ (133) |
| 5891.71 | B | 1 | 21.53 | 23.70 | 1½-1½ | 3d' $^2R$-4p" $^2P^o$ |
| 5577.70 | A | 2 | 21.53 | 23.74 | 1½- ½ | (134) |
| 4888.29 | A | 0 | 21.53 | 24.06 | 1½-2½ | 3d' $^2P$-4f $^2F^o$ (135) |
| 4498.55 | A | 5 | 21.53 | 24.27 | 1½-2½ | 3d' $^2R$-4f $^2D^o$ (136) |
| 6985.74 | A | 000n | 23.47 | 25.24 | 1½-1½ | 5p $^2P^o$-5d $^2P$ (137) |

Strongest Unclassified Lines Attributed to **A II**

| | | |
|---|---|---|
| 7689.36 | A | 3 |
| 7380.45 | A | 4 |
| 7333.58 | A | 4 |
| 6441.95 | A | 3 |
| 6324.45 | B | 3 |
| 5454.41 | A | 3 |
| 5407.44 | A | 4 |
| 5403.69 | A | 3 |
| 5397.60 | A | 3 |
| 4882.25 | A | 4 |
| 4703.36 | A | 4 |
| 4682.29 | B | 4 |
| 4611.25 | A | 3 |
| 4563.78 | A | 5 |
| 4336.51 | A | 3 |
| 4297.99 | A | 5 |
| 4289.89 | A | 4 |
| 4217.45 | B | 4 |
| 4203.43 | A | 5 |
| 4189.67 | A | 4 |
| 4168.98 | B | 3 |
| 4138.65 | A | 5 |
| 4080.67 | A | 4 |
| 3774.54 | A | 3 |
| 3837.89 | A | 3 |
| 3837.05 | A | 5 |
| 3543.16 | A | 5 |
| 3470.27 | A | 3 |
| 3379.58 | A | 5 |
| 3308.50 | A | 3 |
| 3293.95 | A | 4 |
| 3291.47 | A | 4 |
| 3259.71 | A | 4 |
| 3247.55 | A | 3 |
| 3218.75 | A | 4 |
| 3165.31 | A | 5 |
| 3161.45 | A | 3 |
| 3148.24 | A | 3 |
| 3136.55 | A | 4 |
| 3109.75 | A | 3 |
| 3103.63 | A | 3 |
| 3099.97 | A | 4 |
| 3085.05 | A | 4 |
| 3066.92 | A | 4 |
| 3060.94 | B | 5 |
| 3053.20 | A | 3 |
| 3046.10 | A | 4 |
| 3003.00 | A | 3 |
| 3000.14 | A | 4 |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **A III** I P 40.8 Anal C List D Nov 1944 | | | | | | |
| 3285.85 | A | 25 | 21.53 | 25.28 | 2-3 | $4s\,^5S^o$-$4p\,^5P$ |
| 3301.88 | A | 20 | 21.53 | 25.28 | 2-2 | (1) |
| 3311.25 | A | 15 | 21.53 | 25.25 | 2-1 | |
| 3480.55 | A | 20 | 24.28 | 27.83 | 3-3 | 4s' $^3D^o$-4p' $^3D$† |
| 3503.58 | A | 15 | 24.27 | 27.79 | 2-2 | (2) |
| 3499.67 | A | 12 | 24.27 | 27.80 | 1-1 | |
| 3338.13 | A | 25 | 24.28 | 27.98 | 3-4 | 4s' $^3D^o$-4p' $^3F$† |
| 3344.73 | A | 20 | 24.27 | 27.96 | 2-3 | (3) |
| 3358.49 | A | 15 | 24.27 | 27.94 | 1-2 | |
| 3024.05 | B | 12 | 25.58 | 29.66 | 2-3 | 4s" $^3P^o$-4p" $^3D$† |
| 3054.82 | B | 12 | 25.62 | 29.66 | 1-2 | (4) |
| 3078.15 | B | 10 | 25.64 | 29.65 | 0-1 | |
| 3064.77 | B | 10 | 25.62 | 29.65 | 1-1 | |
| 3795.37 | B | 20 | 28.41 | 29.66 | 2-3 | 3d" $^3P^o$-4p" $^3D$† |
| 3858.32 | B | 10 | 28.46 | 29.66 | 1-2 | (5) |
| 3391.85 | B | 15 | 26.41 | 30.05 | 2-2 | 3d" $^3P^o$-4p" $^3P$† (8) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **K II** continued | | | | | | |
| 4659.38 | A | 15 | 20.36 | 23.01 | 2-3 | 3d 3°-4p 2 |
| 4423.73 | A | 10 | 20.36 | 23.15 | 2-1 | (5) -4p 4 |
| 4305.00 | A | 30 | 20.36 | 23.23 | 2-2 | -4p 5 |
| 3966.72 | A | 15 | 20.36 | 23.47 | 2-1 | -4p 9 |
| 5536.01 | A | (3) | 20.39 | 22.62 | 0-1 | 4s 3°-4p 1 |
| 4466.65 | A | 20 | 20.39 | 23.15 | 0-1 | (6) -4p 4 |
| 4149.19 | A | 30 | 20.39 | 23.36 | 0-1 | -4p 7 |
| 4001.24 | A | 15 | 20.39 | 23.47 | 0-1 | -4p 9 |
| 5969.64 | A | (3) | 20.55 | 22.62 | 1-1 | 4s 4°-4p 1 |
| 4943.24 | A | 5 | 20.55 | 23.05 | 1-2 | (7) -4p 3 |
| 4608.45 | A | 30 | 20.55 | 23.23 | 1-2 | -4p 5 |
| 4388.18 | A | 30 | 20.55 | 23.36 | 1-1 | -4p 7 |
| 4309.10 | A | 30 | 20.55 | 23.41 | 1-2 | -4p 8 |
| 4282.97 | A | 30 | 20.55 | 23.47 | 1-1 | -4p 9 |
| 3530.75 | A | 20 | 20.55 | 24.05 | 1-0 | -4p 10 |

For changes in Paschen notation see text § 37

**A IV** I P 61 Anal B List A Nov 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 3077.40 | A | 8 | 31.77 | 35.78 | 1½-3½ | $4s\,^3P$-$4p\,^4P^o$ |
| 3016.15 | A | 5 | 30.95 | 35.71 | ½-1½ | (1) |
| 3134.90 | A | 3 | 31.77 | 35.71 | 1½-1½ | |
| 3037.98 | A | 6 | 31.77 | 35.83 | 1½-1½ | $4s\,^3P$-$4p\,^3D^o$ † (2) |

**K I** I P 4.32 Anal A List C Nov 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 7664.907// | A | 10R | 0.00 | 1.61 | ½-1½ | $4\,^2S$-$4\,^2P^o$ |
| 7698.979 | A | 10R | 0.00 | 1.60 | ½- ½ | (1) |
| 4642.27\| | H | (2)Forb | 0.00 | 2.66 | ½-3½ | $4\,^2S$-$3\,^2D$ |
| 4641.77 | H | (1)Forb | 0.00 | 2.66 | ½-1½ | (2) |
| 4044.145 | B | 8R | 0.00 | 3.05 | ½-1½ | $4\,^2S$-$5\,^2P^o$ |
| 4047.314 | B | 6R | 0.00 | 3.05 | ½- ½ | (3) |
| 3446.38 | G | 8R | 0.00 | 3.58 | ½-1½ | $4\,^2S$-$6\,^2P^o$ |
| 3447.41 | G | 6R | 0.00 | 3.58 | ½- ½ | (4) |
| 12523.0 | F | (90) | 1.61 | 2.60 | 1½- ½ | $4\,^2P^o$-$5\,^2S$ |
| 12434.3 | F | (100) | 1.60 | 2.60 | ½- ½ | (5) |
| 11772.66 | G | 15r | 1.61 | 2.66 | 1½-2½ | $4\,^2P^o$-$3\,^2D$ |
| 11889.76 | G | 10 | 1.60 | 2.66 | ½-1½ | (6) |
| 11769.41 | D | 3 | 1.61 | 2.66 | 1½-1½ | |
| 6964.69 | E | (1) | 1.61 | 3.38 | 1½-3½ | $4\,^2P^o$-$4\,^2D$ |
| 6936.27 | E | (1) | 1.60 | 3.38 | ½-1½ | (7) |
| 6964.18 | E | (-) | 1.61 | 3.38 | 1½-1½ | |
| 9950.5 | D | 20N | 2.60 | 3.84 | ½-1½ | $5\,^2S$-$7\,^2P^o$ |
| 9955.2 | D | 10N | 2.60 | 3.84 | ½- ½ | (8) |
| 11022.3 | D | 10NW | 2.66 | 3.78 | — | $3\,^2D$-$5\,^2F^o$ (9) |
| 9595.60 | E | 50N1W | 2.66 | 3.94 | 2½- | $3\,^2D$-$6\,^2F^o$ |
| 9597.76 | E | 20N1W | 2.68 | 3.94 | 1½- | (10) |

**K II** I P 31.7 Anal A List D June 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 4829.23 | A | 30 | 20.06 | 22.62 | 2-1 | 4s 1°-4p 1 |
| 4186.24 | A | 30 | 20.08 | 23.01 | 2-3 | (1) -4p 2 |
| 4134.73 | A | 30 | 20.06 | 23.05 | 2-2 | -4p 3 |
| 3995.10 | A | 10 | 20.06 | 23.15 | 2-1 | -4p 4 |
| 3897.92 | A | 15 | 20.06 | 23.23 | 2-2 | -4p 5 |
| 3739.13 | A | 9 | 20.06 | 23.36 | 2-1 | -4p 7 |
| 3681.54 | A | 15 | 20.06 | 23.41 | 2-2 | -4p 8 |
| 3618.49 | A | 15 | 20.06 | 23.47 | 2-1 | -4p 9 |
| 5005.60 | A | 15 | 20.15 | 22.62 | 1-1 | 4s 2°-4p 1 |
| 4363.40 | A | 30 | 20.15 | 23.05 | 1-2 | (2) -4p 3 |
| 4114.99 | A | 30 | 20.15 | 23.15 | 1-1 | -4p 4 |
| 4012.10 | A | 10 | 20.15 | 23.23 | 1-2 | -4p 5 |
| 3783.19 | A | 15 | 20.15 | 23.41 | 1-2 | -4p 8 |
| 3767.36 | A | 15 | 20.15 | 23.43 | 1-0 | -4p 6 |
| 3716.60 | A | 9 | 20.15 | 23.47 | 1-1 | -4p 9 |
| 5056.27 | A | 8 | 20.18 | 22.62 | 0-1 | 3d 1°-4p 1 |
| 3873.74 | A | 10 | 20.18 | 23.36 | 0-1 | (3) -4p 7 |
| 3744.42 | A | 9 | 20.18 | 23.47 | 0-1 | -4p 9 |
| 4505.33 | A | 30 | 20.31 | 23.05 | 1-2 | 3d 2°-4p 3 |
| 4340.03 | A | 30 | 20.31 | 23.15 | 1-1 | (4) -4p 4 |
| 4235.87 | A | 30 | 20.31 | 23.23 | 1-2 | -4p 5 |
| 3972.58 | A | 15 | 20.31 | 23.41 | 1-2 | -4p 8 |

**K III** I P 46 Anal D List D Nov 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 3332.40 | A | 6 | 25.61 | 29.32 | 2½-2½ | $4s\,^4P$-$4p\,^4P^o$ † |
| 3420.82 | A | 6 | 25.76 | 29.37 | 1½-1½ | (1) |
| 3278.79 | A | 6 | 25.61 | 29.37 | 2½-1½ | |
| 3468.32 | A | 6 | 25.76 | 29.32 | 1½-2½ | |
| 3513.88 | A | 5 | 25.86 | 29.37 | ½-1½ | |
| 2992.24 | A | 6 | 25.61 | 29.73 | 2½-3½ | $4s\,^4P$-$4p\,^4D^o$ † |
| 3052.07 | A | 6 | 25.76 | 29.81 | 1½-2½ | (2) |
| 3056.84 | A | 5 | 25.86 | 29.90 | ½-1½ | |
| •3481.11 § | B | 6 | 26.26 | 29.81 | 1½-2½ | $4s\,^2P$-$4p\,^4D^o$ (3) |
| 3289.06 | B | 6 | 26.26 | 30.01 | 1½-2½ | $4s\,^2P$-$4p\,^2D^o$ † |
| 3421.83 | A | 4 | 26.45 | 30.05 | ½-1½ | (4) |
| 3301.95 | A | 6 | 26.26 | 30.12 | 1½-1½ | $4s\,^2P$-$4p\,^2P^o$ † |
| 3309.34 | A | 6 | 26.45 | 30.29 | ½- ½ | (5) |
| 3364.22 | A | 6 | 26.45 | 30.12 | ½-1½ | |

**Ca I** I P 6.09 Anal A List B Mar 1944

| | | | | | | |
|---|---|---|---|---|---|---|
| 6572.781 | A | 50 | 0.00 | 1.88 | 0-1 | $4\,^1S$-$4\,^3P^o$ (1) |
| 4226.728// | A | 500R | 0.00 | 2.92 | 0-1 | $4\,^1S$-$4\,^1P^o$ (2) |
| 6162.173 | A | 150 | 1.89 | 3.89 | 2-1 | $4\,^3P^o$-$5\,^3S$ |
| 6122.219 | A | 100 | 1.88 | 3.89 | 1-1 | (3) |
| 6102.722 | A | 80 | 1.87 | 3.89 | 0-1 | |
| 4454.781 | A | 80 | 1.89 | 4.66 | 2-3 | $4\,^3P^o$-$4\,^3D$ |
| 4434.960 | A | 60r | 1.88 | 4.66 | 1-2 | (4) |
| 4425.441 | A | 50 | 1.87 | 4.66 | 0-1 | |
| 4455.887 | A | 40 | 1.89 | 4.66 | 2-2 | |
| 4435.688 | A | 40 | 1.88 | 4.66 | 1-1 | |
| 4456.612 | B | 10 | 1.89 | 4.66 | 2-1 | |
| 4302.527 | A | 60r | 1.89 | 4.76 | 2-2 | $4\,^3P^o$-$4p^2\ ^3P$ |
| 4298.986 | A | 30 | 1.88 | 4.75 | 1-1 | (5) |
| 4318.652 | A | 45 | 1.89 | 4.75 | 2-1 | |
| 4307.741 | A | 45 | 1.88 | 4.74 | 1-0 | |
| 4283.010 | A | 40 | 1.88 | 4.76 | 1-2 | |
| 4289.364 | A | 40 | 1.87 | 4.75 | 0-1 | |
| 3973.707 | A | 12 | 1.89 | 5.00 | 2-1 | $4\,^3P^o$-$6\,^3S$ |
| 3957.053 | A | 10 | 1.88 | 5.00 | 1-1 | (6) |
| 3948.901 | A | 6 | 1.87 | 5.00 | 0-1 | |
| 3933.50 | D | (0) | 1.88 | 5.02 | 1-0 | $4\,^3P^o$-$4p^2\ ^1S$ (7) |
| 3761.72 | E | (0) | 1.88 | 5.16 | 1-0 | $4\,^3P^o$-$6\,^1S$ (8) |
| 3644.410 | A | 40 | 1.89 | 5.28 | 2-3 | $4\,^3P^o$-$5\,^3D$ |
| 3630.748 | A | 30 | 1.88 | 5.28 | 1-2 | (9) |
| 3624.111 | A | 20 | 1.87 | 5.28 | 0-1 | |
| 3644.765 | A | 15 | 1.89 | 5.28 | 2-2 | |
| 3630.974 | A | 15 | 1.88 | 5.28 | 1-1 | |
| 3644.990 | B | 2 | 1.89 | 5.28 | 2-1 | |
| 3487.598 | A | 12 | 1.89 | 5.43 | 2-1 | $4\,^3P^o$-$7\,^3S$ |
| 3474.763 | A | 8 | 1.88 | 5.43 | 1-1 | (10) |
| 3468.476 | A | 4 | 1.87 | 5.43 | 0-1 | |
| 3361.918 | A | 35n• | 1.89 | 5.56 | 2-3 | $4\,^3P^o$-$6\,^3D$ |
| 3350.209 | A | 25n• | 1.88 | 5.56 | 1-2 | (11) |
| 3344.513 | A | 8n | 1.87 | 5.56 | 0-1 | |
| 3362.131 | B | 35n• | 1.89 | 5.56 | 2-2 | |
| 3350.361 | B | 25n• | 1.88 | 5.56 | 1-1 | |
| 3362.28 | B | (0) | 1.89 | 5.56 | 2-1 | |
| 3286.067 | A | 4 | 1.89 | 5.65 | 2-1 | $4\,^3P^o$-$8\,^3S$ |
| 3274.661 | B | 2 | 1.88 | 5.65 | 1-1 | (12) |
| 3269.090 | B | 1n | 1.87 | 5.65 | 0-1 | |
| 3225.896 | A | 8n• | 1.89 | 5.72 | 2-3 | $4\,^3P^o$-$7\,^3D$ |
| 3215.145 | B | 5n• | 1.88 | 5.72 | 1-2 | (13) |
| 3209.930 | B | 2n | 1.87 | 5.72 | 0-1 | |
| 3226.129 | B | 8n• | 1.89 | 5.72 | 2-2 | |
| 3215.334 | B | 5n• | 1.88 | 5.72 | 1-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Ca I continued | | | | | | |
| 3180.521 | B | 1N | 1.89 | 5.77 | 2-1 | $4^3P^o-9^3S$ |
| 3169.854 | B | 1N | 1.88 | 5.77 | 1-1 | (14) |
| 3164.618 | B | 1N | 1.87 | 5.77 | 0-1 | |
| 3150.738 | A | 4N° | 1.89 | 5.81 | 2-3 | $4^3P^o-8^3D$ |
| 3140.782 | B | 3N° | 1.88 | 5.81 | 1-2 | (15) |
| 3136.003 | B | 1N | 1.87 | 5.81 | 0-1 | |
| 3151.280 | B | 4N° | 1.89 | 5.81 | 2-2 | |
| 3141.164 | B | 3N° | 1.88 | 5.81 | 1-1 | |
| 3117.656 | B | 1N | 1.89 | 5.85 | 2-1 | $4^3P^o-10^3S$ |
| 3107.388 | B | 1N | 1.88 | 5.85 | 1-1 | (16) |
| 3102.36 | B | (0) | 1.87 | 5.85 | 0-1 | |
| 3006.858 | A | 6 | 1.89 | 6.00 | 2-2 | $4^3P^o-3d^2\ ^3P$ |
| 2999.641 | A | 4 | 1.88 | 5.99 | 1-1 | (17) |
| 3009.205 | A | 5 | 1.89 | 5.99 | 2-1 | |
| 3000.863 | A | 5 | 1.88 | 5.99 | 1-0 | |
| 2997.309 | B | 5 | 1.88 | 6.00 | 1-2 | |
| 2994.958 | A | 5 | 1.87 | 5.99 | 0-1 | |
| 6439.073 | A | 150 | 2.51 | 4.43 | 3-4 | $3^3D-3d4p^3F^o$ |
| 6462.566 | A | 125 | 2.51 | 4.42 | 2-3 | (18) |
| 6493.780 | A | 80 | 2.51 | 4.41 | 1-2 | |
| 6471.660 | A | 40 | 2.51 | 4.42 | 3-3 | |
| 6499.649 | A | 30 | 2.51 | 4.41 | 2-2 | |
| 6508.742 | B | (1) | 2.51 | 4.41 | 3-2 | |
| 6464.70 | D | (1) | 2.51 | 4.42 | 3-2 | $3^3D-3d4p^1D^o$ |
| 6455.600 | A | 10 | 2.51 | 4.42 | 2-2 | (19) |
| 6449.810 | A | 50 | 2.51 | 4.42 | 1-2 | |
| 6169.559 | A | 40 | 2.51 | 4.52 | 3-2 | $3^3D-5^3P^o$ |
| 6169.055 | A | 25 | 2.51 | 4.51 | 2-1 | (20) |
| 6166.443 | A | 15 | 2.51 | 4.51 | 1-0 | |
| 6161.289 | A | 10 | 2.51 | 4.52 | 2-2 | |
| 6163.758 | A | 10 | 2.51 | 4.51 | 1-1 | |
| 6156.10 | F | (1) | 2.51 | 4.52 | 1-2 | |
| 5588.757 | A | 80 | 2.51 | 4.72 | 3-3 | $3^3D-3d4p^3P^o$ |
| 5594.468 | A | 60 | 2.51 | 4.72 | 2-2 | (21) |
| 5598.487 | A | 50 | 2.51 | 4.71 | 1-1 | |
| 5601.285 | A | 30 | 2.51 | 4.72 | 3-2 | |
| 5602.846 | A | 25 | 2.51 | 4.71 | 2-1 | |
| 5581.971 | A | 25 | 2.51 | 4.72 | 2-3 | |
| 5590.120 | A | 20 | 2.51 | 4.72 | 1-2 | |
| 5270.270 | A | 60 | 2.51 | 4.86 | 3-2 | $3^3D-3d4p^3P^o$ |
| 5265.557 | A | 40 | 2.51 | 4.86 | 2-1 | (22) |
| 5262.244 | A | 25 | 2.51 | 4.86 | 1-0 | |
| 5264.239 | A | 20 | 2.51 | 4.86 | 2-2 | |
| 5261.706 | A | 20 | 2.51 | 4.86 | 1-1 | |
| 5260.375 | A | 2 | 2.51 | 4.86 | 1-2 | |
| 4585.871 | A | 50 | 2.51 | 5.21 | 3-4 | $3^3D-4^3F^o$ |
| 4581.402 | A | 40 | 2.51 | 5.21 | 2-3 | (23) |
| 4578.558 | A | 30 | 2.51 | 5.21 | 1-2 | |
| 4585.923 | B | (2) | 2.51 | 5.21 | 3-3 | |
| 4512.282 | A | 5 | 2.51 | 5.25 | 3-2 | $3^3D-6^3P^o$ |
| 4509.446 | B | 3 | 2.51 | 5.25 | 2-1 | (24) |
| 4507.417 | B | (1) | 2.51 | 5.25 | 1-0 | |
| 4507.854 | B | 1 | 2.51 | 5.25 | 2-2 | |
| 4506.624 | B | (1) | 2.51 | 5.25 | 1-1 | |
| 4505.00 | E | (0) | 2.51 | 5.25 | 1-2 | |
| 4098.533 | A | 15 | 2.51 | 5.53 | 3-4 | $3^3D-5^3F^o$ |
| 4094.930 | A | 12 | 2.51 | 5.53 | 2-3 | (25) |
| 4092.633 | A | 8 | 2.51 | 5.53 | 1-2 | |
| 3875.807 | B | (4) | 2.51 | 5.70 | 3- | $3^3D-6^3F^o$ |
| 3872.552 | B | (3) | 2.51 | 5.70 | 2- | (26) |
| 3870.506 | B | (2) | 2.51 | 5.70 | 1- | |
| 3753.367 | B | (1) | 2.51 | 5.80 | 3- | $3^3D-7^3F^o$ |
| 3750.349 | B | (1) | 2.51 | 5.80 | 2- | (27) |
| 3748.374 | B | (1) | 2.51 | 5.80 | 1- | |
| 3678.240 | B | 3 | 2.51 | 5.87 | 3- | $3^3D-8^3F^o$ |
| 3675.307 | B | 2 | 2.51 | 5.87 | 2- | (28) |
| 3673.448 | B | 1 | 2.51 | 5.87 | 1- | |
| 7202.194 | A | 200 | 2.70 | 4.41 | 2-2 | $3^1D-3d4p^3F^o$ (29) |
| 7148.147 | A | 500 | 2.70 | 4.42 | 2-2 | $3^1D-3d4p^1D^o$ (30) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Ca I continued | | | | | | |
| 6798.51 | C | 6n | 2.70 | 4.51 | 2-1 | $3^1D-5^3P^o$ † (31) |
| 6717.685 | A | 500n | 2.70 | 4.53 | 2-1 | $3^1D-3d4p^1P^o$ (32) |
| 5349.472 | A | 25 | 2.70 | 5.00 | 2-3 | $3^1D-3d4p^1F^o$ (33) |
| 5041.620 | A | 40 | 2.70 | 5.15 | 2-1 | $3^1D-5^1P^o$ (34) |
| 4878.132 | A | 50 | 2.70 | 5.23 | 2-3 | $3^1D-4^1F^o$ (35) |
| 4526.935 | A | 30 | 2.70 | 5.42 | 2-1 | $3^1D-6^1P^o$ (36) |
| 4355.096 | A | 25 | 2.70 | 5.53 | 2-3 | $3^1D-5^1F^o$ (37) |
| 4240.456 | A | 6 | 2.70 | 5.61 | 2-1 | $3^1D-7^1P^o$ (38) |
| 4108.554 | B | 10W | 2.70 | 5.70 | 2-3 | $3^1D-6^1F^o$ (39) |
| 4058.912 | B | 1n | 2.70 | 5.74 | 2-1 | $3^1D-8^1P^o$ (40) |
| 3972.570 | A | (1) | 2.70 | 5.80 | 2-3 | $3^1D-7^1F^o$ (41) |
| 3889.141 | B | (1) | 2.70 | 5.87 | 2-3 | $3^1D-8^1F^o$ (42) |
| 10343.85 | C | 500 | 2.92 | 4.11 | 1-0 | $4^1P^o-5^1S$ (43) |
| 7326.146 | A | 400 | 2.92 | 4.60 | 1-2 | $4^1P^o-4^1D$ (44) |
| 6709.88 | D | (1) | 2.92 | 4.76 | 1-2 | $4^1P^o-4p^2\ ^3P$ (45) |
| 5867.572 | A | 1 | 2.92 | 5.02 | 1-0 | $4^1P^o-4p^2\ ^1S$ (46) |
| 5857.454 | A | 100 | 2.92 | 5.03 | 1-2 | $4^1P^o-4p^2\ ^1D$ (47) |
| 5512.979 | A | 20n | 2.92 | 5.16 | 1-0 | $4^1P^o-6^1S$ (48) |
| 5188.848 | A | 50 | 2.92 | 5.30 | 1-2 | $4^1P^o-5^1D$ (49) |
| 4847.296 | A | 2 | 2.92 | 5.47 | 1-0 | $4^1P^o-7^1S$ (50) |
| 4685.265 | A | 12 | 2.92 | 5.55 | 1-2 | $4^1P^o-6^1D$ (51) |
| 12816.06 | P) | (50d) | (3.89 | 4.86 | 1-2 | $5^3S-3d4p^3P^o$ |
| 12823.89 | P) | | 3.89 | 4.86 | 1-1 | (52) |
| 12827.09 | P | | 3.89 | 4.86 | 1-0 | |
| 6361.79 | F | (5n) | 4.43 | 6.37 | 4-5 | $3d4p^3F^o-3d4d^3G$ |
| 6343.29 | F | (4n) | 4.42 | 6.37 | 3-4 | (53) |
| 6318.11 | F | (3n) | 4.41 | 6.36 | 2-3 | |
| 5757.69 | F | (4n) | 4.43 | 6.57 | 4-4 | $3d4p^3P^o-3d4d^3F$ |
| 5735.74 | F | (3n) | 4.42 | 6.57 | 3-3 | (54) |
| 5717.99 | F | (4n) | 4.41 | 6.57 | 2-2 | |
| 5761.88 | F | (1n) | 4.43 | 6.57 | 4-3 | |
| 5746.81 | F | (2N) | 4.42 | 6.57 | 3-2 | |
| 5731.70 | F | (1n) | 4.42 | 6.57 | 3-4 | |
| 5707.03 | F | (1n) | 4.41 | 6.57 | 2-3 | |
| 9701.81 | P | 20 | 4.72 | 6.00 | 3-2 | $3d4p^3P^o-3d^2\ ^3P$ |
| 9688.60 | P | 15 | 4.72 | 5.99 | 2-1 | (55) |
| 9676.25 | P | 5 | 4.71 | 5.99 | 1-0 | |
| 9664.29 | P) | 5p† | (4.72 | 6.00 | 2-2 | |
| 9663.58 | P) | | 4.71 | 5.99 | 1-1 | |
| 9639.40 | P | | 4.71 | 6.00 | 1-2 | |
| 10838.77 | C | 10 | 4.86 | 6.00 | 2-2 | $3d4p^3P^o-3d^2\ ^3P$ |
| 10863.72 | C | 2 | 4.86 | 5.99 | 1-1 | (56) |
| 10869.37 | C | 3 | 4.86 | 5.99 | 2-1 | |
| 10879.78 | C | 4 | 4.86 | 5.99 | 1-0 | |
| 10833.12 | C | 4 | 4.86 | 6.00 | 1-2 | |
| 10861.51 | C | 3 | 4.86 | 5.99 | 0-1 | |

Strongest Unclassified Lines of Ca I

| | | |
|---|---|---|
| 7468.41 | F | (3) |
| 6405.89 | F | (3n) |
| 6395.16 | F | (3n) |
| 5764.32 | F | (3n) |
| 5743.28 | F | (3n) |
| 5688.47 | F | (4N) |
| 5682.88 | F | (3n) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Ca II I P 11.82 Anal A List B Apr 1944 | | | | | | |
| 3933.664// | A | 400R(K) | 0.00 | 3.14 | ½-1½ | $4^2S-4^2P^o$ |
| 3968.470 | A | 350R(H) | 0.00 | 3.11 | ½- ½ | (1) |
| 8542.089 | B | 1500 | 1.69 | 3.14 | 2½-1½ | $3^2D-4^2P^o$ |
| 8662.140 | B | 1000 | 1.69 | 3.11 | 1½- ½ | (2) |
| 8498.018 | B | 300 | 1.69 | 3.14 | 1½-1½ | |
| 3736.901 | B | 12 | 3.14 | 6.44 | 1½- ½ | $4^2P^o-5^2S$ |
| 3706.026 | B | 10 | 3.11 | 6.44 | ½- ½ | (3) |
| 3179.332 | B | 15 | 3.14 | 7.02 | 1½-2½ | $4^2P^o-4^2D$ |
| 3158.869 | B | 10 | 3.11 | 7.02 | ½-1½ | (4) |
| 3181.275 | B | 4 | 3.14 | 7.02 | 1½-1½ | |
| 11836.4 | P | | 6.44 | 7.48 | ½-1½ | $5^2S-5^2P^o$ |
| 11947.0 | P | | 6.44 | 7.47 | ½- ½ | (5) |
| 4472.09 | D | (0) | 6.44 | 9.20 | ½-1½ | $5^2S-6^2P^o$ |
| 4479.29 | D | (1) | 6.44 | 9.20 | ½- ½ | (6) |
| 4732.58 | D | (-) | 7.02 | 9.63 | 2½- | $4^2D-5^2F^o$ |
| 4718.16 | D | (-) | 7.02 | 9.63 | 1½- | (7) |
| 3758.36 | E | (8) | 7.02 | 10.30 | 2½- | $4^2D-6^2F^o$ |
| 3755.61 | E | (7) | 7.02 | 10.30 | 1½- | (8) |
| 3346.99 | E | (10) | 7.02 | 10.71 | 2½- | $4^2D-7^2F^o$ (9) |
| 3125.15 | E | (5) | 7.02 | 10.97 | 2½- | $4^2D-8^2F^o$ |
| 3123.29 | E | (3) | 7.02 | 10.97 | 1½- | (10) |
| 2989.42 | E | (1) | 7.02 | 11.15 | 2½- | $4^2D-9^2F^o$ |
| 2987.72 | E | (1) | 7.02 | 11.15 | 1½- | (11) |
| 9933.3 | P | | 7.48 | 8.73 | 1½- ½ | $5^2P^o-6^2S$ |
| 9856.7 | P | | 7.47 | 8.73 | ½- ½ | (12) |
| 8250.2 | P | | 7.48 | 8.98 | 1½-2½ | $5^2P^o-5^2D$ |
| 8203.2 | P | | 7.47 | 8.98 | ½-1½ | (13) |
| 8256.1 | P | | 7.48 | 8.98 | 1½-1½ | |
| 5307.30 | D | (-) | 7.48 | 9.81 | 1½- ½ | $5^2P^o-7^2S$ |
| 5285.34 | D | (-) | 7.47 | 9.81 | ½- ½ | (14) |
| 5019.979 | B | (2) | 7.48 | 9.94 | 1½-2½ | $5^2P^o-6^2D$ |
| 5001.489 | C | (1) | 7.47 | 9.94 | ½-1½ | (15) |
| 5021.141 | C | (0) | 7.48 | 9.94 | 1½-1½ | |
| 4220.13 | D | (-) | 7.48 | 10.41 | 1½- ½ | $5^2P^o-8^2S$ |
| 4206.21 | D | (-) | 7.47 | 10.41 | ½- ½ | (16) |
| 4109.83 | D | (1) | 7.48 | 10.49 | 1½-2½ | $5^2P^o-7^2D$ |
| 4097.12 | D | (1) | 7.47 | 10.49 | ½-1½ | (17) |
| 4110.33 | D | (0) | 7.48 | 10.49 | 1½-1½ | |
| 3694.11 | D | (1) | 7.48 | 10.82 | 1½-2½ | $5^2P^o-8^2D$ |
| 3683.71 | D | (1) | 7.47 | 10.82 | ½-1½ | (18) |
| 3694.31 | D | (0) | 7.48 | 10.82 | 1½-1½ | |
| 6456.907 | C | (-) | 8.40 | 10.31 | — | $4^2F^o-6^2G$ (19) |
| 5339.29 | D | (-) | 8.40 | 10.71 | — | $4^2F^o-7^2G$ (20) |

| Ca III I P 51.00 Anal D List A Apr 1944 | | | | | | |
|---|---|---|---|---|---|---|
| 3372.68 | A | 8 | 29.94 | 33.60 | 2-1 | 4s 1°-4p 1 (1) |
| 3537.75 | A | 7 | 30.11 | 33.60 | 1-1 | 4s 2°-4p 1 |
| 2988.61 | A | 7 | 30.11 | 34.24 | 1-2 | (2) -4p 3 |
| 3761.62 | A | 6 | 30.32 | 33.60 | 0-1 | 4s 3°-4p 1 |
| 3028.66 | A | 6 | 30.32 | 34.40 | 0-1 | (3) -4p 4 |
| 4081.74 | A | 5 | 30.58 | 33.60 | 1-1 | 4s 4°-4p 1 |
| 3367.81 | A | 5l | 30.58 | 34.24 | 1-2 | (4) -4p 3 |
| 3233.02 | A | 4 | 30.58 | 34.40 | 1-1 | -4p 4 |
| 3119.66 | A | 8 | 30.58 | 34.53 | 1-2 | -4p 5 |
| 2989.30 | A | 6 | 30.58 | 34.71 | 1-1 | -4p 7 |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Sc I** I P 6.7 Anal A List C Nov 1940 | | | | | | |
| 6362.386 | A | (2) | 0.02 | 1.96 | 2½-3½ | $a^2D-z^4F^o$ (1) |
| 6344.831 | A | 5 | 0.00 | 1.95 | 1½-2½ | |
| 6413.353 | A | 50 | 0.02 | 1.95 | 2½-2½ | |
| 6378.824 | A | 40 | 0.00 | 1.93 | 1½-1½ | |
| 8448.10 | B | 1 | 0.02 | 1.93 | 2½-1½ | |
| 6305.671 | A | 400 | 0.02 | 1.98 | 2½-2½ | $a^2D-z^2D^o$ (2) |
| 8210.678 | A | 200 | 0.00 | 1.99 | 1½-1½ | |
| 6276.310 | A | 15 | 0.02 | 1.99 | 2½-1½ | |
| 6239.410 | A | 20 | 0.00 | 1.98 | 1½-2½ | |
| 8231.76 | C | (2) | 0.02 | 2.00 | 2½-3½ | $a^2D-z^4D^o$ (3) |
| *8193.672 | A | (2) | 0.00 | 1.99 | 1½-2½ | |
| 6258.962 | A | 100 | 0.02 | 1.99 | 2½-2½ | |
| 6239.778 | A | 100 | 0.00 | 1.98 | 1½-1½ | |
| 6308.047 | A | 20 | 0.02 | 1.98 | 2½-1½ | |
| 6244.51 | C | (1) | 0.00 | 1.98 | 1½- ½ | |
| 5349.702 | A | 15 | 0.02 | 2.33 | 2½-1½ | $a^2D-z^2P^o$ (4) |
| 5342.961 | A | 10 | 0.00 | 2.31 | 1½- ½ | |
| 5301.938 | A | 2 | 0.00 | 2.33 | 1½-1½ | |
| 4779.347 | A | 20 | 0.02 | 2.60 | 2½-3½ | $a^2D-z^2F^o$ (5) |
| 4753.153 | A | 15 | 0.00 | 2.60 | 1½-2½ | |
| 4791.500 | A | 4 | 0.02 | 2.60 | 2½-2½ | |
| 4082.396 | A | 40 | 0.02 | 3.04 | 2½-1½ | $a^2D-y^2P^o$ (6) |
| *4054.555 | A | 35 | 0.00 | 3.04 | (1½-1½ 1½- ½ | |
| 4023.688 | A | 100 | 0.02 | 3.09 | 2½-2½ | $a^2D-y^2D^o$ (7) |
| 4020.399 | A | 75 | 0.00 | 3.07 | 1½-1½ | |
| 4047.793 | A | 25 | 0.02 | 3.07 | 2½-1½ | |
| 3996.607 | A | 30 | 0.00 | 3.09 | 1½-2½ | |
| 3911.810 | A | 100 | 0.02 | 3.18 | 2½-3½ | $a^2D-y^2F^o$ (8) |
| 3907.476 | A | 75 | 0.00 | 3.16 | 1½-2½ | |
| 3933.381 | A | 20 | 0.02 | 3.16 | 2½-2½ | |
| 3273.619 | A | 20 | 0.02 | 3.79 | 2½-1½ | $a^2D-x^2P^o$ (9) |
| 3269.904 | A | 15 | 0.00 | 3.77 | 1½- ½ | |
| 3255.678 | A | 6 | 0.00 | 3.79 | 1½-1½ | |
| 3019.350 | A | 10 | 0.02 | 4.11 | 2½-3½ | $a^2D-x^2F^o$ (10) |
| 3015.364 | A | 8 | 0.00 | 4.09 | 1½-2½ | |
| 3030.769 | A | 3 | 0.02 | 4.09 | 2½-2½ | |
| 2980.752 | A | (6) | 0.02 | 4.16 | 2½-2½ | $a^2D-x^2D^o$ (11) |
| 2974.008 | A | (5) | 0.00 | 4.15 | 1½-1½ | |
| *2988.953§ | A | (10) | 0.02 | 4.15 | 2½-1½ | |
| 2965.86 | B | (2) | 0.00 | 4.16 | 1½-2½ | |
| 5671.805// | A | 200 | 1.44 | 3.62 | 4½-5½ | $a^4F-z^4G^o$ (12) |
| 5686.826 | A | 150 | 1.43 | 3.60 | 3½-4½ | |
| 5700.14 | B | 100 | 1.43 | 3.59 | 2½-3½ | |
| 5711.754 | A | 100 | 1.42 | 3.58 | 1½-2½ | |
| 5708.600 | A | 15 | 1.44 | 3.60 | 4½-4½ | |
| 5717.30 | B | 15 | 1.43 | 3.59 | 3½-3½ | |
| 5724.073 | A | 15 | 1.43 | 3.58 | 2½-2½ | |
| 5739.30 | B | 2 | 1.44 | 3.59 | 4½-3½ | |
| 5741.38 | B | 1 | 1.43 | 3.58 | 3½-2½ | |
| 5081.554 | A | 125 | 1.44 | 3.87 | 4½-4½ | $a^4F-y^4F^o$ (13) |
| 5083.713 | A | 80 | 1.43 | 3.86 | 3½-3½ | |
| 5085.547 | A | 40 | 1.43 | 3.85 | 2½-2½ | |
| 5086.951 | A | 40 | 1.42 | 3.85 | 1½-1½ | |
| 5101.121 | A | 20 | 1.44 | 3.86 | 4½-3½ | |
| *5099.228 | A | 40 | 1.43 | 3.85 | 3½-2½ | |
| 5098.718 | A | 30 | 1.43 | 3.85 | 2½-1½ | |
| 5064.321 | A | 10 | 1.43 | 3.87 | 3½-4½ | |
| 5070.249 | A | 40 | 1.43 | 3.86 | 2½-3½ | |
| 5075.814 | A | 10 | 1.42 | 3.85 | 1½-2½ | |
| 4743.814 | A | 40 | 1.44 | 4.04 | 4½-3½ | $a^4F-y^4D^o$ (14) |
| 4741.018 | A | 30 | 1.43 | 4.04 | 3½-2½ | |
| 4737.642 | A | 20 | 1.43 | 4.03 | 2½-1½ | |
| 4734.094 | A | 15 | 1.42 | 4.03 | 1½- ½ | |
| 4738.769 | A | 5 | 1.43 | 4.04 | 3½-3½ | |
| *4739.226 | A | 30 | 1.43 | 4.04 | 2½-2½ | |
| 4717.031 | A | (1) | 1.43 | 4.03 | 1½-1½ | |
| 4730.830 | A | (0) | 1.42 | 4.04 | 2½-3½ | |
| 5520.496 | A | 100 | 1.86 | 4.09 | 1½-2½ | |
| 5514.315 | A | 80 | 1.84 | 4.08 | 3½-4½ | $a^2F-z^2G^o$ (15) |
| 5549.68 | B | (3) | 1.86 | 4.08 | 2½-3½ | |
| 5481.989 | A | 100 | 1.86 | 4.11 | 3½-3½ | $a^2F-x^2F^o$ † (16) |
| 5484.818 | A | 80 | 1.84 | 4.09 | 2½-2½ | |
| 5356.100 | A | 60 | 1.86 | 4.16 | 3½-2½ | $a^2F-x^2D^o$ † (17) |
| 5349.294 | A | 50 | 1.84 | 4.15 | 2½-1½ | |
| 5591.322 | A | 15 | 1.98 | 4.19 | 4½-4½ | $z^4F^o-e^4F$ † (18) |
| 5564.861 | A | 4 | 1.98 | 4.18 | 3½-3½ | |
| 5541.030 | A | 3 | 1.95 | 4.17 | 2½-2½ | |
| 5538.06 | B | (4) | 1.93 | 4.17 | 1½-1½ | |
| 5392.075 | A | 30 | 1.98 | 4.27 | 4½-3½ | $z^4F^o-e^4D$ † (19) |
| 5375.346 | A | 20 | 1.98 | 4.28 | 3½-2½ | |
| 5355.752 | A | 8 | 1.95 | 4.25 | 2½-1½ | |
| 5341.040 | A | 8 | 1.93 | 4.25 | 1½- ½ | |
| 4185.184 | A | 12 | 1.98 | 4.94 | 4½-5½ | $z^4F^o-s^4G$ † (20) |
| 4152.355 | A | 12 | 1.96 | 4.93 | 3½-4½ | |
| 4140.304 | A | 10 | 1.95 | 4.93 | 2½-3½ | |
| 4133.008 | A | 8 | 1.93 | 4.92 | 1½-2½ | |
| 3435.555 | A | 5 | 1.98 | 5.57 | 4½-4½ | $z^4F^o-h^4F$ (21) |
| 3431.358 | A | 3 | 1.96 | 5.56 | 3½-3½ | |
| 3429.208 | A | 3 | 1.95 | 5.54 | 2½-2½ | |
| 3429.483 | A | 3 | 1.93 | 5.53 | 1½-1½ | |
| 3448.503 | A | 1 | 1.98 | 5.56 | 4½-3½ | |
| 3443.989 | A | 1 | 1.96 | 5.54 | 3½-2½ | |
| 3439.40 | A | 1 | 1.95 | 5.53 | 2½-1½ | |
| 3418.528 | A | (2) | 1.96 | 5.57 | 3½-4½ | |
| 3418.674 | A | 2 | 1.95 | 5.56 | 2½-3½ | |
| 3419.358 | A | (1) | 1.93 | 5.54 | 1½-2½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Sc I** continued | | | | | | |
| 4709.336 | A | 5 | 2.29 | 4.91 | 2½-3½ | $z^4P^o-f^4D$ † (22) |
| 4706.967 | A | (3) | 2.29 | 4.91 | 1½-2½ | |
| 4711.732 | A | (1) | 2.28 | 4.90 | ½-1½ | |
| 5258.333 | A | 15 | 2.50 | 4.85 | 4½-5½ | $a^2G-z^2H^o$ † (23) |
| 5285.752 | A | 10 | 2.50 | 4.83 | 3½-4½ | |
| 6557.87 | B) | 15* | (2.60 | 4.48 | 3½-2½ | $z^2F^o-f^2D$ (24) |
| 6558.05 | B) | | 2.60 | 4.48 | 2½-1½ | |
| Strongest Unclassified Lines of **Sc I** | | | | | | |
| 6835.03 | B | (25) | | | | |
| 6817.08 | A | (10) | | | | |
| 6737.87 | A | (10) | | | | |
| 6036.17 | B | (10nl) | | | | |
| 4573.993 | A | 6 | III | | | |
| 4557.237 | A | 5 | III | | | |
| **Sc II** I P 12.8 Anal A List A Nov 1940 | | | | | | |
| 3859.36 | P | | 0.02 | 3.22 | 3-2 | $a^3D-z^1D^o$ (1) |
| 3843.000 | A | 4 | 0.01 | 3.22 | 2-2 | |
| 3833.059 | A | 3 | 0.00 | 3.22 | 1-2 | |
| 3613.836// | A | 60 | 0.02 | 3.44 | 3-4 | $a^3D-z^3F^o$ (2) |
| 3630.740 | A | 50 | 0.01 | 3.41 | 2-3 | |
| 3643.785 | A | 40 | 0.00 | 3.39 | 1-2 | |
| 3645.311 | A | 30 | 0.02 | 3.41 | 3-3 | |
| 3651.798 | A | 25 | 0.01 | 3.39 | 2-2 | |
| 3686.537 | A | 3 | 0.02 | 3.39 | 3-2 | |
| 3572.523 | A | 50 | 0.02 | 3.48 | 3-3 | $a^3D-z^3D^o$ (3) |
| 3576.340 | A | 35 | 0.01 | 3.46 | 2-2 | |
| 3580.927 | A | 30 | 0.00 | 3.45 | 1-1 | |
| 3590.475 | A | 20 | 0.02 | 3.46 | 3-2 | |
| 3589.635 | A | 20 | 0.01 | 3.45 | 2-1 | |
| 3558.538 | A | 20 | 0.01 | 3.48 | 2-3 | |
| 3567.701 | A | 20 | 0.00 | 3.46 | 1-2 | |
| 3372.151 | A | 20 | 0.02 | 3.68 | 3-2 | $a^3D-z^3P^o$ (4) |
| 3368.946 | A | 15 | 0.01 | 3.67 | 2-1 | |
| 3381.935 | A | 12 | 0.00 | 3.67 | 1-0 | |
| 3359.679 | A | 10 | 0.01 | 3.68 | 2-2 | |
| 3361.270 | A | 10 | 0.00 | 3.67 | 1-1 | |
| 3352.048 | A | 3 | 0.00 | 3.68 | 1-2 | |
| 3251.32 | A | 3 | 0.01 | 3.80 | 2-1 | $a^3D-z^1P^o$ (5) |
| 3244.17 | P | | 0.00 | 3.80 | 1-1 | |
| 3107.387 | A | (1) | 0.02 | 3.99 | 3-3 | $a^3D-z^1F^o$ (6) |
| 3096.77 | P | | 0.01 | 3.99 | 2-3 | |
| 4246.829 | A | 100 | 0.31 | 3.22 | 2-2 | $a^1D-z^1D^o$ (7) |
| 3989.06 | B | 2 | 0.31 | 3.41 | 2-3 | $a^1D-z^3F^o$ (8) |
| 4014.489 | A | 5 | 0.31 | 3.39 | 2-2 | |
| 3902.09 | P | | 0.31 | 3.48 | 2-3 | $a^1D-z^3D^o$ (9) |
| 3923.503 | A | | 0.31 | 3.46 | 2-2 | |
| 3939.51 | P | | 0.31 | 3.45 | 2-1 | |
| 3664.354 | A | 1 | 0.31 | 3.68 | 2-2 | $a^1D-z^3P^o$ (10) |
| 3875.265 | A | 1 | 0.31 | 3.67 | 2-1 | |
| 3535.729 | A | 10 | 0.31 | 3.80 | 2-1 | $a^1D-z^1P^o$ (11) |
| 3353.734 | A | 25 | 0.31 | 3.99 | 2-3 | $a^1D-z^1F^o$ (12) |
| 4716.13 | P | | 0.60 | 3.22 | 3-2 | $a^3F-z^1D^o$ (13) |
| 4698.276 | A | (2) | 0.59 | 3.22 | 2-2 | |
| 4374.455 | A | 40 | 0.62 | 3.44 | 4-4 | $a^3F-z^3F^o$ (14) |
| 4400.355 | A | 30 | 0.60 | 3.41 | 3-3 | |
| 4415.559 | A | 20 | 0.59 | 3.39 | 2-2 | |
| 4420.665 | A | 2 | 0.62 | 3.41 | 4-3 | |
| 4431.369 | A | 3 | 0.60 | 3.39 | 3-2 | |
| 4354.609 | A | 5 | 0.60 | 3.44 | 3-4 | |
| 4384.813 | A | 6 | 0.59 | 3.41 | 2-3 | |
| 4314.084 | A | 60 | 0.62 | 3.48 | 4-3 | $a^3F-z^3D^o$ (15) |
| 4320.745 | A | 50 | 0.60 | 3.46 | 3-2 | |
| 4325.010 | A | 40 | 0.59 | 3.45 | 2-1 | |
| 4294.767 | A | 8 | 0.60 | 3.48 | 3-3 | |
| 4305.715 | A | 10 | 0.59 | 3.46 | 2-2 | |
| 4279.927 | A | 1 | 0.59 | 3.48 | 2-3 | |
| 4008.41 | P | | 0.60 | 3.68 | 3-2 | $a^3F-z^3P^o$ (16) |
| 4008.60 | P | | 0.59 | 3.67 | 2-1 | |
| 3995.49 | P | | 0.59 | 3.68 | 2-2 | |
| 3843.16 | P | | 0.59 | 3.80 | 2-1 | $a^3F-z^1P^o$ (17) |
| 3653.62 | P | | 0.62 | 3.99 | 4-3 | $a^3F-z^1F^o$ (18) |
| 3639.76 | P | | 0.60 | 3.99 | 3-3 | |
| 3629.10 | P | | 0.59 | 3.98 | 2-3 | |
| 6604.60 | B | 10 | 1.35 | 3.22 | 2-2 | $b^1D-z^1D^o$ (19) |
| 6001.53 | P | | 1.35 | 3.41 | 2-3 | $b^1D-z^3F^o$ (20) |
| 6059.25 | P | | 1.35 | 3.39 | 2-2 | |
| 5806.77 | P | | 1.35 | 3.48 | 2-3 | $b^1D-z^3D^o$ (21) |
| 5854.31 | P | | 1.35 | 3.48 | 2-2 | |
| 5890.02 | P | | 1.35 | 3.45 | 2-1 | |
| 5295.30 | P | | 1.35 | 3.68 | 2-2 | $b^1D-z^3P^o$ (22) |
| 5318.337 | A | 3 | 1.35 | 3.67 | 2-1 | |
| 5031.019 | A | 40 | 1.35 | 3.80 | 2-1 | $b^1D-z^1P^o$ (23) |
| 4670.404 | A | 15 | 1.35 | 3.99 | 2-3 | $b^1D-z^1F^o$ (24) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Sc II** continued | | | | | | |
| 5552.25 | B | 3 | 1.45 | 3.67 | 0-1 | $a^1S-z^3P^o$ (25) |
| 5239.823 | A | 15 | 1.45 | 3.80 | 0-1 | $a^1S-z^1P^o$ (26) |
| 7178.33 | P | | 1.50 | 3.22 | 2-2 | $a^3P-z^1D^o$ (27) |
| 7151.18 | P | | 1.49 | 3.22 | 1-2 | |
| 6245.629 | A | 20 | 1.50 | 3.48 | 2-3 | $a^3P-z^3D^o$ (28) |
| 6279.757 | A | 15 | 1.49 | 3.46 | 1-2 | |
| 6309.902 | A | 15 | 1.49 | 3.45 | 0-1 | |
| 6300.697 | A | 6 | 1.50 | 3.46 | 2-2 | |
| 6320.854 | A | 7 | 1.49 | 3.45 | 1-1 | |
| 6342.082 | A | 1 | 1.50 | 3.45 | 2-1 | |
| 5657.870 | A | 25 | 1.50 | 3.68 | 2-2 | $a^3P-z^3P^o$ (29) |
| 5667.164 | A | 10 | 1.49 | 3.67 | 1-1 | |
| 5684.190 | A | 15 | 1.50 | 3.67 | 2-1 | |
| 5669.030 | A | 12 | 1.49 | 3.67 | 1-0 | |
| 5640.971 | A | 15 | 1.49 | 3.68 | 1-2 | |
| 5658.334 | A | 8 | 1.49 | 3.67 | 0-1 | |
| 5357.195 | A | 2 | 1.50 | 3.80 | 2-1 | $a^3P-z^1P^o$ (30) |
| 5342.05 | P | | 1.49 | 3.80 | 1-1 | |
| 5334.228 | A | 2 | 1.49 | 3.80 | 0-1 | |
| 5526.809 | A | 75 | 1.76 | 3.99 | 4-3 | $a^1G-z^1F^o$ (31) |
| 3157.44 | P | | 3.22 | 7.13 | 2-3 | $z^1D^o-e^3D$ (32) |
| 3170.40 | B | 1 | 3.22 | 7.11 | 2-2 | |
| 3176.70 | P | | 3.22 | 7.10 | 2-1 | |
| 3107.529 | A | 6 | 3.22 | 7.19 | 2-2 | $z^1D^o-e^1D$ (33) |
| *2988.953§ | A | 10 | 3.22 | 7.35 | 2-3 | $z^1D^o-e^1F$ (34) |
| 3343.27 | A | 4 | 3.44 | 7.13 | 4-3 | $z^3F^o-e^3D$ (35) |
| 3331.07 | A | 3 | 3.41 | 7.11 | 3-2 | |
| 3320.422 | A | 3 | 3.39 | 7.10 | 2-1 | |
| 3316.79 | B | 1? | 3.41 | 7.13 | 3-3 | |
| 3313.539 | A | 0? | 3.39 | 7.11 | 2-2 | |
| 3299.41 | P | | 3.39 | 7.13 | 2-3 | |
| 3108.511 | A | 3 | 3.44 | 7.41 | 4-3 | $z^3F^o-f^3D$ (36) |
| 3092.519 | A | 2 | 3.41 | 7.40 | 3-2 | |
| 3082.56 | A | 2 | 3.39 | 7.39 | 2-1 | |
| 3065.106 | A | 30 | 3.44 | 7.46 | 4-5 | $z^3F^o-e^3G$ (37) |
| 3052.929 | A | 20 | 3.41 | 7.45 | 3-4 | |
| 3045.714 | A | 15 | 3.39 | 7.44 | 2-3 | |
| 3075.38 | B | 3 | 3.44 | 7.45 | 4-4 | |
| 3060.531 | A | 3 | 3.41 | 7.44 | 3-3 | |
| 3083.07 | P | | 3.44 | 7.44 | 4-3 | |
| 3379.397 | A | 3 | 3.48 | 7.13 | 3-3 | $z^3D^o-e^3D$ (38) |
| 3378.209 | A | 2 | 3.46 | 7.11 | 2-2 | |
| 3373.57 | B | 1? | 3.45 | 7.10 | 1-1 | |
| 3394.29 | B | 1 | 3.48 | 7.11 | 3-2 | |
| 3363.501 | A | 1 | 3.46 | 7.13 | 2-3 | |
| 3366.46 | B | 1 | 3.45 | 7.11 | 1-2 | |
| 3139.729 | A | 10 | 3.48 | 7.41 | 3-3 | $z^3D^o-f^3D$ (39) |
| 3133.096 | A | 8 | 3.46 | 7.40 | 2-2 | |
| 3128.286 | A | 5 | 3.45 | 7.39 | 1-1 | |
| 3146.91 | B | 1 | 3.48 | 7.40 | 3-2 | |
| 3138.46 | B | 1 | 3.46 | 7.39 | 2-1 | |
| 3126.02 | B | 1 | 3.46 | 7.41 | 2-3 | |
| 3122.954 | A | 3 | 3.45 | 7.40 | 1-2 | |
| 3580.71 | P | | 3.68 | 7.13 | 2-3 | $z^3P^o-e^3D$ (40) |
| 3586.83 | P | | 3.67 | 7.11 | 1-2 | |
| 3594.13 | P | | 3.67 | 7.10 | 0-1 | |
| 3597.39 | P | | 3.68 | 7.11 | 2-2 | |
| 3594.89 | P | | 3.67 | 7.10 | 1-1 | |
| 3605.50 | P | | 3.68 | 7.10 | 2-1 | |
| 3312.736 | A | 5 | 3.68 | 7.41 | 2-3 | $z^3P^o-f^3D$ (41) |
| 3311.708 | A | 3 | 3.67 | 7.40 | 1-2 | |
| 3317.038 | A | 1 | 3.67 | 7.39 | 0-1 | |
| 3320.709 | A | 1 | 3.68 | 7.40 | 2-2 | |
| 3317.693 | A | 1 | 3.67 | 7.39 | 1-1 | |
| 3326.74 | P | | 3.68 | 7.39 | 2-1 | |
| 3199.37 | A | 10 | 3.68 | 7.54 | 2-1 | $z^3P^o-e^3S$ (42) |
| 3191.005 | A | 5 | 3.67 | 7.54 | 1-1 | |
| 3190.403 | A | 2 | 3.67 | 7.54 | 0-1 | |
| 3379.18 | A | 2 | 3.80 | 7.46 | 1-1 | $z^1P^o-e^1P$ (43) |
| 2979.683 | A | 5 | 3.80 | 7.95 | 1-2 | $z^1P^o-f^1D$ (44) |
| 3678.342 | A | 2 | 3.99 | 7.35 | 3-3 | $z^1F^o-e^1F$ (45) |
| 3122.542 | A | 1 | 3.99 | 7.95 | 3-2 | $z^1F^o-f^1D$ (46) |
| 3039.92 | A | 10 | 3.99 | 8.05 | 3-4 | $z^1F^o-e^1G$ (47) |
| 4748.12 | P | | 4.86 | 7.46 | 2-1 | $y^3P^o-e^1P$ (48) |
| 4696.71 | P | | 4.83 | 7.46 | 1-1 | |
| 4671.94 | P | | 4.81 | 7.46 | 0-1 | |
| 3995.48 | P | | 4.86 | 7.95 | 2-2 | $y^3P^o-f^1D$ (49) |
| 3959.01 | P | | 4.83 | 7.95 | 1-2 | |
| **Sc III** I P 24.65 Anal C List A Jan 1941 | | | | | | |
| 4068.7 | A | (2n) | 13.86 | 16.90 | 2½-3½ | $4^2D-4^2F^o$ (1) |
| 4061.3 | A | (2n) | 13.86 | 16.90 | 1½-2½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ti I I P 6.81 Anal A List B Nov 1940** | | | | | | |
| •6295.251 | E | (3) | 0.05 | 2.01 | 4-5 | $a^3F$-$z^5G^o$ |
| 6273.389 | E | (6) | 0.02 | 1.99 | 3-4 | (1) |
| 6257.72 | H | (2) | 0.00 | 1.97 | 2-3 | |
| 6359.896 | E | (8) | 0.05 | 1.99 | 4-4 | |
| 8325.22 | H | (10) | 0.02 | 1.97 | 3-3 | |
| 8296.646 | E | (12) | 0.00 | 1.96 | 2-2 | |
| 8413.13 | P | | 0.05 | 1.97 | 4-3 | |
| 6364.92 | H | (2) | 0.02 | 1.96 | 3-2 | |
| 5940.68 | E | - | 0.05 | 2.13 | 4-5 | $a^3F$-$z^5F^o$ |
| 5913.730 | E | - | 0.02 | 2.11 | 3-4 | (2) |
| 6031.68 | E | - | 0.05 | 2.09 | 4-3 | |
| 5984.586 | E | (1) | 0.02 | 2.08 | 3-2 | |
| 5944.65 | P | | 0.00 | 2.08 | 2-1 | |
| 5460.502 | B | 4 | 0.05 | 2.31 | 4-4 | $a^3F$-$z^5D^o$ |
| 5486.256 | B | 3 | 0.02 | 2.30 | 3-3 | (3) |
| •5396.600 | E | 1 | 0.00 | 2.29 | 2-2 | |
| 5490.840 | B | (0) | 0.05 | 2.30 | 4-3 | |
| •5446.593 | B | 2 | 0.02 | 2.29 | 3-2 | |
| 5408.940 | E | (1) | 0.02 | 2.28 | 2-1 | |
| •5396.600 | E | 1 | 0.02 | 2.31 | 3-4 | |
| 5376.59 | P | | 0.00 | 2.30 | 2-3 | |
| 5210.386 | A | 40 | 0.05 | 2.42 | 4-4 | $a^3F$-$z^3F^o$ |
| 5193.971 | A | 35 | 0.02 | 2.40 | 3-3 | (4) |
| 5173.742 | A | 30 | 0.00 | 2.39 | 2-2 | |
| 5252.105 | B | 8 | 0.05 | 2.40 | 4-3 | |
| 5219.697 | B | 8 | 0.02 | 2.39 | 3-2 | |
| 5152.185 | B | 10 | 0.02 | 2.42 | 3-4 | |
| 5147.483 | A | 10 | 0.00 | 2.40 | 2-3 | |
| 5064.654 | A | 25 | 0.05 | 2.48 | 4-3 | $a^3F$-$z^3D^o$ |
| 5039.959 | A | 22 | 0.02 | 2.47 | 3-2 | (5) |
| 5014.185 | A | (25) | 0.00 | 2.46 | 2-1 | |
| 5009.652 | A | 7 | 0.02 | 2.48 | 3-3 | |
| 4997.099 | A | 8 | 0.00 | 2.47 | 2-2 | |
| 4967.30 | H | (1) | 0.00 | 2.48 | 2-3 | |
| 4681.908 | A | 30 | 0.05 | 2.68 | 4-5 | $a^3F$-$z^3G^o$ |
| 4667.585 | A | 25 | 0.02 | 2.67 | 3-4 | (6) |
| 4656.468 | A | 25 | 0.00 | 2.65 | 2-3 | |
| 4715.295 | A | 4 | 0.05 | 2.67 | 4-4 | |
| 4693.670 | B | 5 | 0.02 | 2.65 | 3-3 | |
| 4562.637 | B | 6 | 0.02 | 2.73 | 3-2 | $a^3F$-$z^1D^o$ |
| 4527.455 | E | (4) | 0.00 | 2.73 | 2-2 | (7) |
| 4540.483 | E | 1 | 0.05 | 2.77 | 4-3 | $a^3F$-$z^1F^o$ |
| 4496.245 | E | 2 | 0.02 | 2.77 | 3-3 | (8) |
| 4462.099 | B | (3) | 0.00 | 2.77 | 2-3 | |
| 4113.708 | A | 20 | 0.05 | 3.05 | 4-4 | $a^3F$-$z^1G^o$ |
| 4076.370 | B | 4 | 0.02 | 3.05 | 3-4 | (9) |
| 4011.534 | E | (3) | 0.00 | 3.08 | 2-1 | $a^3F$-$z^3S^o$ (10) |
| 4009.653 | B | 15 | 0.02 | 3.10 | 3-2 | $a^3F$-$z^3S^o$ |
| 3982.478 | B | 30 | 0.00 | 3.10 | 2-2 | (11) |
| 3998.635 | A | 100R | 0.05 | 3.13 | 4-4 | $a^3F$-$y^3F^o$ |
| 3989.758 | A | 80r | 0.02 | 3.11 | 3-3 | (12) |
| 3981.761 | A | 70r | 0.00 | 3.10 | 2-2 | |
| 4024.573 | A | 35 | 0.05 | 3.11 | 4-3 | |
| 4008.928 | A | 35 | 0.02 | 3.10 | 3-2 | |
| 3984.269 | A | 35 | 0.02 | 3.13 | 3-4 | |
| 3982.851 | A | 35 | 0.00 | 3.11 | 2-3 | |
| 3958.206 | A | 80 | 0.05 | 3.17 | 4-3 | $a^3F$-$y^3D^o$ |
| 3958.336 | A | 60 | 0.02 | 3.14 | 3-2 | (13) |
| 3948.870 | A | 60 | 0.00 | 3.13 | 2-1 | |
| 3924.527 | A | 50 | 0.02 | 3.17 | 3-3 | |
| 3929.875 | A | 40 | 0.00 | 3.14 | 2-2 | |
| 3898.487 | B | 8 | 0.00 | 3.17 | 2-3 | |
| 3947.770 | A | 40 | 0.02 | 3.15 | 3-2 | $a^3F$-$z^3P^o$ |
| 3914.751 | B | 5 | 0.00 | 3.15 | 2-1 | (14) |
| 3921.423 | A | 30 | 0.00 | 3.15 | 2-2 | |
| 3914.334 | A | 35 | 0.05 | 3.20 | 4-4 | $a^3F$-$y^5D^o$ |
| 3900.958 | B | 12 | 0.02 | 3.18 | 3-3 | (15) |
| 3889.948 | B | 6 | 0.00 | 3.17 | 2-2 | |
| 3934.228 | B | 9 | 0.05 | 3.18 | 4-3 | |
| 3915.879 | B | 3 | 0.02 | 3.17 | 3-2 | |
| •3899.668 | B | (2) | 0.00 | 3.18 | 2-1 | |
| 3881.399 | E | 4 | 0.02 | 3.20 | 3-4 | |
| •3875.262 | A | 20n | 0.00 | 3.18 | 2-3 | |
| 3788.804 | E | 2 | 0.05 | 3.31 | 4-5 | $a^3F$-$y^5G^o$ |
| 3774.331 | E | 1n | 0.02 | 3.29 | 3-4 | (18) |
| 3752.860 | A | 80r | 0.05 | 3.34 | 4-4 | $a^3F$-$x^3F^o$ |
| 3741.059 | A | 60r | 0.02 | 3.32 | 3-3 | (17) |
| 3729.808 | A | 50r | 0.00 | 3.31 | 2-2 | |
| 3771.852 | A | 35 | 0.05 | 3.32 | 4-3 | |
| 3753.823 | B | 25 | 0.02 | 3.31 | 3-2 | |
| 3732.568 | A | 15? | 0.02 | 3.34 | 3-4 | |
| 3717.393 | A | 20 | 0.00 | 3.32 | 2-3 | |
| 3689.918 | A | 15 | 0.05 | 3.39 | 4-3 | $a^3F$-$x^3D^o$ |
| 3668.985 | A | 15 | 0.02 | 3.38 | 3-2 | (18) |
| 3854.592 | A | 15 | 0.00 | 3.38 | 2-1 | |
| 3860.831 | A | 12 | 0.02 | 3.39 | 3-3 | |
| 3648.198 | A | 12 | 0.00 | 3.38 | 2-2 | |
| 3837.968 | E | 10 | 0.00 | 3.39 | 2-3 | |
| 3853.497 | A | 100r | 0.05 | 3.43 | 4-5 | $a^3F$-$y^3G^o$ |
| 3642.875 | A | 80r | 0.02 | 3.41 | 3-4 | (19) |
| 3835.482 | A | 60r | 0.00 | 3.39 | 2-3 | |
| 3671.872 | A | 20 | 0.05 | 3.41 | 4-4 | |
| 3658.097 | A | 20 | 0.02 | 3.39 | 3-3 | |
| 3687.354 | E | 5 | 0.05 | 3.39 | 4-3 | |
| 3635.203 | E | 8 | 0.05 | 3.44 | 4-3 | $a^3F$-$z^5P^o$ |
| 3628.085 | E | 4 | 0.02 | 3.42 | 3-2 | (20) |
| 3606.788 | E | 4 | 0.02 | 3.44 | 3-3 | |
| 3603.845 | E | 2 | 0.00 | 3.42 | 2-2 | |
| 3604.284 | E | 8 | 0.02 | 3.45 | 3-2 | $a^3F$-$y^1D^o$ (21) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ti I continued** | | | | | | |
| 3506.643 | E | 8 | 0.05 | 3.57 | 4-5 | $a^3F$-$y^5F^o$ |
| 3493.280 | E | 4 | 0.02 | 3.55 | 3-4 | (22) |
| 3483.010 | E | (1) | 0.00 | 3.54 | 2-3 | |
| 3519.939 | E | 1 | 0.05 | 3.55 | 4-4 | |
| 3503.760 | E | 1 | 0.02 | 3.54 | 3-3 | |
| 3490.765 | E | 1 | 0.00 | 3.54 | 2-2 | |
| 3530.580 | E | 1 | 0.05 | 3.54 | 4-3 | |
| 3511.628 | E | 3 | 0.02 | 3.54 | 3-2 | |
| 3495.960 | E | 2 | 0.00 | 3.53 | 2-1 | |
| 3385.944 | A | 40r | 0.05 | 3.69 | 4-3 | $a^3F$-$w^3D^o$ |
| 3377.577 | A | 30r | 0.02 | 3.67 | 3-2 | (23) |
| 3370.436 | A | 40r | 0.00 | 3.66 | 2-1 | |
| 3361.863 | E | 40r | 0.02 | 3.69 | 3-3 | |
| 3358.271 | A | 10 | 0.00 | 3.67 | 2-2 | |
| 3343.151 | E | 6 | 0.00 | 3.69 | 2-3 | |
| 3371.447 | A | 80R | 0.05 | 3.71 | 4-5 | $a^3F$-$x^3G^o$ |
| 3354.834 | A | 60r | 0.02 | 3.70 | 3-4 | (24) |
| •3341.875§ | A | 50r | 0.00 | 3.69 | 2-3 | |
| 3379.216 | E | 15 | 0.05 | 3.70 | 4-4 | |
| 3360.990 | E | 10 | 0.02 | 3.69 | 3-3 | |
| 3385.664 | E | 12 | 0.05 | 3.89 | 4-3 | |
| 3369.054 | E | 1 | 0.05 | 3.71 | 4-4 | $a^3F$-$x^5D^o$ |
| 3352.937 | E | 6 | 0.02 | 3.70 | 3-3 | (25) |
| 3342.707 | E | 2 | 0.00 | 3.69 | 2-2 | |
| 3377.485 | E | 20 | 0.05 | 3.70 | 4-3 | |
| 3361.835 | E | 10 | 0.02 | 3.89 | 3-2 | |
| 3348.535 | E | 5 | 0.00 | 3.89 | 2-1 | |
| 3344.62 | P | | 0.02 | 3.71 | 3-4 | |
| 3333.912 | E | 2 | 0.00 | 3.70 | 2-3 | |
| 3243.803 | E | 4 | 0.05 | 3.85 | 4-3 | $a^3F$-$w^3D^o$ |
| 3222.741 | E | 3 | 0.02 | 3.85 | 3-2 | (26) |
| 3205.848 | E | 5 | 0.00 | 3.85 | 2-1 | |
| 3231.151 | E | 2 | 0.02 | 3.85 | 3-3 | |
| 3205.168 | E | 2 | 0.00 | 3.85 | 2-2 | |
| 3203.58 | G | (2) | 0.00 | 3.85 | 2-3 | |
| 3199.915 | A | 100R | 0.05 | 3.90 | 4-5 | $a^3F$-$w^3G^o$ |
| 3191.994 | A | 80R | 0.02 | 3.89 | 3-4 | (27) |
| 3186.451 | A | 60r | 0.00 | 3.87 | 2-3 | |
| 3214.240 | A | 12 | 0.05 | 3.89 | 4-4 | |
| 3203.828 | E | 15 | 0.02 | 3.87 | 3-3 | |
| 3226.240 | E | 1 | 0.05 | 3.87 | 4-3 | |
| 3160.09 | G | tr | 0.02 | 3.93 | 3-2 | $a^3F$-$y^3P^o$ |
| 3151.11 | G | tr | 0.00 | 3.92 | 2-1 | (28) |
| 3143.16 | P | | 0.00 | 3.93 | 2-2 | |
| 3000.868 | E | 20 | 0.05 | 4.16 | 4-4 | $a^3F$-$w^3F^o$ |
| 2983.308 | E | 20 | 0.02 | 4.18 | 3-3 | (29) |
| 2970.384 | E | 10 | 0.00 | 4.15 | 2-2 | |
| •3002.738 | E | 3 | 0.05 | 4.18 | 4-3 | |
| 2985.477 | E | 3 | 0.02 | 4.15 | 3-2 | |
| 2981.448 | E | (2) | 0.02 | 4.18 | 3-4 | |
| 2968.231 | E | 4 | 0.00 | 4.18 | 2-3 | |
| 2956.133 | A | 70R | 0.05 | 4.22 | 4-4 | $a^3F$-$w^3F^o$ † |
| 2987.225 | E | 25 | 0.05 | 4.21 | 4-3 | (30) |
| 2956.797 | E | 25 | 0.02 | 4.19 | 3-2 | |
| 10398.85 | C | 25 | 0.84 | 2.03 | 5-6 | $a^5F$-$z^5G^o$ |
| 10498.14 | C | 30 | 0.83 | 2.01 | 4-5 | (31) |
| 10584.66 | C | 25 | 0.82 | 1.99 | 3-4 | |
| 10881.81 | C | 20 | 0.81 | 1.97 | 2-3 | |
| 10738.33 | C | 18 | 0.81 | 1.98 | 1-2 | |
| 10807.78 | C | 10 | 0.84 | 2.01 | 5-5 | |
| 10677.04 | C | 10 | 0.83 | 1.99 | 4-4 | |
| 10732.89 | C | 8 | 0.82 | 1.97 | 3-3 | |
| •10774.92 | C | 12 | 0.81 | 1.96 | 2-2 | |
| 10793.59 | P | | 0.84 | 1.99 | 5-4 | |
| 10828.04 | C | 1 | 0.83 | 1.97 | 4-3 | |
| 10847.72 | C | 1 | 0.82 | 1.96 | 3-2 | |
| 9838.28 | D | 100 | 0.84 | 2.13 | 5-5 | $a^5F$-$z^5F^o$ |
| 9675.55 | D | 90 | 0.83 | 2.11 | 4-4 | (32) |
| 9705.64 | D | 80 | 0.82 | 2.09 | 3-3 | |
| 9738.36 | D | 60 | 0.81 | 2.08 | 2-2 | |
| 9743.60 | D | 50 | 0.81 | 2.08 | 1-1 | |
| 9770.28 | D | 40 | 0.84 | 2.11 | 5-4 | |
| 9783.30 | D | 40 | 0.83 | 2.09 | 4-3 | |
| 9787.87 | D | 50 | 0.82 | 2.08 | 3-2 | |
| 9783.59 | D | 20 | 0.81 | 2.08 | 2-1 | |
| 9546.07 | D | 50 | 0.83 | 2.13 | 4-5 | |
| 9599.53 | D | 50 | 0.82 | 2.11 | 3-4 | |
| 9847.40 | D | 50 | 0.81 | 2.09 | 2-3 | |
| 9888.88 | D | 30 | 0.81 | 2.08 | 1-2 | |
| 8434.98 | D | 300 | 0.84 | 2.31 | 5-4 | $a^5F$-$z^5D^o$ |
| 8435.68 | D | 300 | 0.83 | 2.30 | 4-3 | (33) |
| 8436.50 | D | 200 | 0.82 | 2.29 | 3-2 | |
| 8412.38 | D | 150 | 0.81 | 2.28 | 2-1 | |
| 8396.93 | D | 90 | 0.81 | 2.28 | 1-0 | |
| 8384.24 | E | (2) | 0.83 | 2.31 | 4-4 | |
| 8377.90 | D | 100 | 0.82 | 2.30 | 3-3 | |
| 8382.54 | D | 100 | 0.81 | 2.29 | 2-2 | |
| 8382.82 | D | 90 | 0.81 | 2.28 | 1-1 | |
| 8307.41 | E | (1) | 0.82 | 2.31 | 3-4 | |
| 8334.37 | E | (2) | 0.81 | 2.30 | 2-3 | |
| 8353.15 | E | (2) | 0.81 | 2.29 | 1-2 | |
| 7852.74 | P | | 0.84 | 2.42 | 5-4 | $a^5F$-$z^3F^o$ |
| 7885.00 | P | | 0.83 | 2.40 | 4-3 | (34) |
| 7895.50 | P | | 0.82 | 2.39 | 3-2 | |
| 5361.724 | E | (1) | 0.83 | 3.13 | 4-4 | $a^5F$-$y^3F^o$ |
| 5384.834 | E | (1) | 0.82 | 3.11 | 3-3 | (35) |
| 5401.32 | H | (1) | 0.81 | 3.10 | 2-2 | |
| 5338.328 | E | 1 | 0.82 | 3.13 | 3-4 | |
| 5366.851 | B | 2 | 0.81 | 3.11 | 2-3 | |
| 5389.180 | B | 2 | 0.81 | 3.10 | 1-2 | |
| 5289.28 | E | (1) | 0.83 | 3.17 | 4-3 | $a^5F$-$y^3D^o$ |
| 5333.958 | E | (1) | 0.82 | 3.14 | 3-2 | (38) |
| 5340.68 | H | (1) | 0.81 | 3.13 | 2-1 | |
| 5266.49 | P | | 0.82 | 3.17 | 3-3 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ti I continued** | | | | | | |
| •5238.560 | B | 8 | 0.84 | 3.20 | 5-4 | $a^5F$-$y^5D^o$ |
| 5246.574 | E | 3 | 0.83 | 3.18 | 4-3 | (37) |
| 5250.95 | E | 2 | 0.82 | 3.17 | 3-2 | |
| 5251.49 | E | (0) | 0.81 | 3.16 | 2-1 | |
| •5248.402 | E | (1) | 0.81 | 3.16 | 1-0 | |
| 5211.22 | P | (1) | 0.83 | 3.20 | 4-4 | |
| 5234.14 | P | (0) | 0.82 | 3.18 | 3-3 | |
| 5233.817 | E | (1) | 0.81 | 3.17 | 2-2 | |
| 5239.942 | E | (0) | 0.81 | 3.16 | 1-1 | |
| 4981.732// | A | 60 | 0.84 | 3.32 | 5-6 | $a^5F$-$y^5G^o$ |
| 4991.067 | A | 50 | 0.83 | 3.31 | 4-5 | (38) |
| 4999.504 | A | 45 | 0.82 | 3.29 | 3-4 | |
| 5007.209 | A | 40 | 0.81 | 3.28 | 2-3 | |
| 5014.377 | A | (25) | 0.81 | 3.27 | 1-2 | |
| 5016.163 | A | 20 | 0.84 | 3.31 | 5-5 | |
| 5030.028 | A | 25 | 0.83 | 3.29 | 4-4 | |
| 5023.871 | A | 25 | 0.82 | 3.28 | 3-3 | |
| 5034.843 | A | 20 | 0.81 | 3.27 | 2-2 | |
| 5045.400 | B | 5 | 0.84 | 3.29 | 5-4 | |
| 5043.578 | B | 7 | 0.83 | 3.28 | 4-3 | |
| 5040.842 | B | 6 | 0.82 | 3.27 | 3-2 | |
| 4953.37 | P | | 0.84 | 3.34 | 5-4 | $a^5F$-$x^3F^o$ |
| 4928.895 | E | (0) | 0.83 | 3.34 | 4-4 | (39) |
| 4941.323 | E | (1) | 0.82 | 3.32 | 3-3 | |
| 4947.994 | E | 1 | 0.81 | 3.31 | 2-2 | |
| 4909.105 | B | 2 | 0.82 | 3.34 | 3-4 | |
| 4928.148 | B | 4 | 0.81 | 3.32 | 2-3 | |
| 4937.719 | B | 4 | 0.81 | 3.31 | 1-2 | |
| 4801.93 | P | | 0.82 | 3.39 | 3-3 | $a^5F$-$x^3D^o$ |
| 4801.90 | P | | 0.81 | 3.38 | 2-2 | (40) |
| 4806.75 | P | | 0.81 | 3.38 | 1-1 | |
| 4787.64 | P | | 0.81 | 3.39 | 2-3 | |
| 4793.24 | P | | 0.81 | 3.38 | 1-2 | |
| 4818.47 | P | | 0.81 | 3.38 | 2-1 | |
| 4781.718 | B | 8 | 0.84 | 3.43 | 5-5 | $a^5F$-$y^3G^o$ |
| 4789.803 | E | (1) | 0.83 | 3.41 | 4-4 | (41) |
| 4813.906 | E | (0) | 0.84 | 3.41 | 5-4 | |
| 4758.913 | B | 4 | 0.83 | 3.43 | 4-5 | |
| 4771.103 | B | 3 | 0.82 | 3.41 | 3-4 | |
| 4783.306 | E | (2) | 0.81 | 3.39 | 2-3 | |
| 4533.238 | A | 80 | 0.84 | 3.57 | 5-5 | $a^5F$-$y^5F^o$ |
| 4534.782 | B | 60 | 0.83 | 3.55 | 4-4 | (42) |
| 4535.574 | B | 50 | 0.82 | 3.54 | 3-3 | |
| 4535.920 | B | 40 | 0.81 | 3.54 | 2-2 | |
| 4538.051 | B | 40 | 0.81 | 3.53 | 1-1 | |
| 4555.486 | A | 30 | 0.84 | 3.55 | 5-4 | |
| 4553.453 | A | 35 | 0.83 | 3.54 | 4-3 | |
| 4548.764 | A | 35 | 0.82 | 3.54 | 3-2 | |
| 4544.688 | A | 30 | 0.81 | 3.53 | 2-1 | |
| 4513.734 | A | 40 | 0.83 | 3.57 | 4-5 | |
| 4518.032 | A | 50 | 0.82 | 3.55 | 3-4 | |
| 4532.798 | A | 40 | 0.81 | 3.54 | 2-3 | |
| 4527.305 | A | 35 | 0.81 | 3.54 | 1-2 | |
| 4314.801 | A | 25• | 0.83 | 3.89 | 4-3 | $a^5F$-$w^3D^o$ |
| 4336.359 | B | 9 | 0.82 | 3.67 | 3-2 | (43) |
| 4334.840 | B | 2 | 0.81 | 3.66 | 2-1 | |
| 4299.838 | B | 15 | 0.82 | 3.69 | 3-3 | |
| 4314.74 | P | 25• | 0.81 | 3.87 | 2-2 | |
| 4328.988 | B | 2 | 0.81 | 3.86 | 1-1 | |
| •4288.181 | B | 3 | 0.81 | 3.89 | 2-3 | |
| 4308.945 | E | 1 | 0.81 | 3.87 | 1-2 | |
| 4305.910 | A | 60 | 0.84 | 3.71 | 5-4 | $a^5F$-$x^5D^o$ |
| 4301.089 | B | 50 | 0.83 | 3.70 | 4-3 | (44) |
| 4300.566 | B | 50 | 0.82 | 3.89 | 3-2 | |
| 4298.664 | A | 40 | 0.81 | 3.69 | 2-1 | |
| 4295.751 | A | 22 | 0.81 | 3.68 | 1-0 | |
| 4287.405 | A | 22 | 0.83 | 3.71 | 4-4 | |
| 4288.008 | A | 25 | 0.82 | 3.70 | 3-3 | |
| 4289.068 | A | 25 | 0.81 | 3.69 | 2-3 | |
| 4290.933 | B | 22 | 0.81 | 3.89 | 1-1 | |
| 4272.440 | B | 8 | 0.82 | 3.71 | 3-4 | |
| •4274.584 | A | 15 | 0.81 | 3.70 | 2-3 | |
| 4281.371 | A | 10 | 0.81 | 3.89 | 1-2 | |
| •4291.214 | B | 5n | 0.83 | 3.71 | 4-5 | $a^5F$-$x^3G^o$ |
| 4268.78 | P | | 0.82 | 3.70 | 3-4 | (45) |
| 4287.71 | P | | 0.81 | 3.69 | 2-3 | |
| 4314.358 | B | 5 | 0.83 | 3.89 | 4-3 | |
| 4299.17 | P | | 0.82 | 3.89 | 3-3 | |
| 3457.494 | E | 4 | 0.84 | 4.41 | 5-4 | $a^5F$-$w^5D^o$ |
| 3458.030 | E | 3 | 0.83 | 4.40 | 4-3 | (46) |
| 3457.398 | E | 2 | 0.82 | 4.39 | 3-2 | |
| 3455.755 | E | 1 | 0.81 | 4.39 | 2-1 | |
| 3453.854 | E | tr | 0.81 | 4.38 | 1-0 | |
| 3445.568 | E | 1 | 0.83 | 4.41 | 4-4 | |
| 3448.255 | E | 1 | 0.82 | 4.40 | 3-3 | |
| 3449.874 | E | 2 | 0.81 | 4.39 | 2-2 | |
| 3450.735 | E | 1 | 0.81 | 4.39 | 1-1 | |
| 3444.899 | E | tr | 0.81 | 4.39 | 1-2 | |
| 3240.84 | P | | 0.84 | 4.85 | 5-5 | $a^5F$-$w^3G^o$ |
| 3235.95 | P | | 0.82 | 4.64 | 3-3 | (47) |
| 3244.53 | P | | 0.83 | 4.64 | 4-3 | |
| 8743.124 | A | 10 | 0.90 | 2.73 | 2-2 | $a^1D$-$z^1D^o$ (48) |
| 8599.112 | E | 12 | 0.90 | 2.77 | 2-3 | $a^1D$-$z^1F^o$ (49) |
| 5859.104 | E | (3) | 0.90 | 3.08 | 2-1 | $a^1D$-$z^3S^o$ (50) |
| 5438.703 | B | 1 | 0.90 | 3.17 | 2-3 | $a^1D$-$y^3D^o$ |
| 5497.92 | P | | 0.90 | 3.14 | 2-2 | (51) |
| 4943.074 | E | (0) | 0.90 | 3.39 | 2-3 | $a^1D$-$x^3D^o$ |
| 4958.26 | P | 2 | 0.90 | 3.38 | 2-2 | (52) |
| 4840.874 | A | 25 | 0.90 | 3.45 | 2-2 | $a^1D$-$y^1D^o$ (53) |
| 4412.438 | B | 1 | 0.90 | 3.89 | 2-3 | $a^1D$-$w^3D^o$ (54) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Ti I continued | | | | | | |
| *4174.088§ | B | (1) | 0.90 | 3.85 | 2-3 | $a^1D$-$v^3D^o$ (55) |
| 3904.785 | A | 40n | 0.90 | 4.06 | 2-3 | $a^1D$-$y^1F^o$ (56) |
| 3786.043 | A | 20 | 0.90 | 4.16 | 2-1 | $a^1D$-$z^1P^o$ (57) |
| 3810.154 | A | 12 | 0.90 | 4.31 | 2-1 | $a^1D$-$y^1P^o$ (58) |
| 3598.714 | A | 15 | 0.90 | 4.33 | 2-2 | $a^1D$-$x^1D^o$ (59) |
| 3324.61 | G | 1 | 0.90 | 4.61 | 2-2 | $a^1D$-$w^3P^o$ |
| *3341.554 | E | 1 | 0.90 | 4.59 | 2-1 | (60) |
| 3299.413 | E | 10 | 0.90 | 4.64 | 2-3 | $a^1D$-$v^3G^o$ (61) |
| 3292.078 | A | 20 | 0.90 | 4.64 | 2-3 | $a^1D$-$x^1F^o$ (62) |
| *3278.932§ | E | (12) | 0.90 | 4.66 | 2-3 | $a^1D$-$u^3F^o$ |
| m3288.59 | P | Ti+ | 0.90 | 4.65 | 2-2 | (63) |
| 3267.41 | E | tr | 0.90 | 4.67 | 2-1 | $a^1D$-$u^3D^o$ (64) |
| 3172.731 | E | 4 | 0.90 | 4.79 | 2-3 | $a^1D$-$t^3D^o$ |
| 3179.291 | E | 3 | 0.90 | 4.78 | 2-2 | (65) |
| 3141.537 | E | 15 | 0.90 | 4.82 | 2-1 | $a^1D$-$x^1P^o$ (66) |
| 3123.074 | E | 15 | 0.90 | 4.85 | 2-1 | $a^1D$-$w^1P^o$ (67) |
| 8675.38 | D | 150 | 1.06 | 2.48 | 2-3 | $a^3P$-$z^3D^o$ |
| 8883.99 | D | 125 | 1.05 | 2.47 | 1-2 | (68) |
| 8693.34 | D | 100 | 1.04 | 2.46 | 0-1 | |
| 8766.84 | D | 75 | 1.06 | 2.47 | 2-2 | |
| 8734.70 | D | 75 | 1.05 | 2.46 | 1-1 | |
| 8819.39 | D | 8 | 1.08 | 2.46 | 2-1 | |
| 8126.217 | A | 20 | 1.06 | 3.08 | 2-1 | $a^3P$-$z^3S^o$ |
| 6085.228 | A | 20 | 1.05 | 3.08 | 1-1 | (69) |
| 6064.831 | A | 9 | 1.04 | 3.08 | 0-1 | |
| 6058.76 | P | | 1.08 | 3.10 | 2-2 | $a^3P$-$z^5S^o$ |
| 6018.82 | E | (0) | 1.05 | 3.10 | 1-2 | (70) |
| 5918.548 | A | 10 | 1.06 | 3.15 | 2-2 | $a^3P$-$z^3P^o$ |
| 5903.317 | A | 5 | 1.06 | 3.15 | 2-1 | (71) |
| 5880.308 | E | 5 | 1.05 | 3.15 | 1-2 | |
| 5866.453 | A | 35 | 1.06 | 3.17 | 2-3 | $a^3P$-$y^3D^o$ |
| 5899.295 | A | 25 | 1.05 | 3.14 | 1-2 | (72) |
| 5933.113 | A | 18 | 1.04 | 3.13 | 0-1 | |
| 5937.806 | A | 6 | 1.06 | 3.14 | 2-2 | |
| 5941.755 | A | 12 | 1.05 | 3.13 | 1-1 | |
| 5980.89 | H | (1) | 1.06 | 3.13 | 2-1 | |
| 5814.00 | H | (1) | 1.06 | 3.18 | 2-3 | $a^3P$-$y^5D^o$ |
| 5809.75 | H | (0) | 1.05 | 3.17 | 1-2 | (73) |
| 5295.781 | A | 4 | 1.06 | 3.39 | 2-3 | $a^3P$-$x^3D^o$ |
| 5282.378 | B | 3 | 1.05 | 3.38 | 1-2 | (74) |
| 5284.380 | B | 2 | 1.04 | 3.38 | 0-1 | |
| 5313.239 | B | (1) | 1.06 | 3.38 | 2-2 | |
| 5300.012 | B | 1 | 1.05 | 3.38 | 1-1 | |
| 4691.336 | A | 20 | 1.06 | 3.69 | 2-3 | $a^3P$-$w^3D^o$ |
| 4698.766 | A | 20 | 1.05 | 3.67 | 1-2 | (75) |
| *4710.186 | A | 18 | 1.04 | 3.66 | 0-1 | |
| 4723.171 | B | 10 | 1.06 | 3.67 | 2-2 | |
| 4723.603 | B | 10 | 1.05 | 3.66 | 1-1 | |
| 4747.256 | E | 1 | 1.06 | 3.66 | 2-1 | |
| 4690.837 | B | 3 | 1.06 | 3.69 | 2-3 | $a^3P$-$x^3G^o$ (76) |
| 4675.118 | A | 10 | 1.06 | 3.70 | 2-3 | $a^3P$-$x^5D^o$ |
| 4688.357 | E | 2 | 1.05 | 3.69 | 1-2 | (77) |
| m4667.53 | P | Ti | 1.04 | 3.69 | 0-1 | |
| 4692.45 | P | | 1.06 | 3.69 | 2-2 | |
| 4679.73 | P | | 1.05 | 3.89 | 1-1 | |
| 4433.823 | A | 10 | 1.06 | 3.85 | 2-3 | $a^3P$-$w^3D^o$ |
| 4404.397 | B | 5 | 1.05 | 3.85 | 1-2 | (78) |
| 4394.855 | E | (2) | 1.04 | 3.85 | 0-1 | |
| 4435.840 | B | 3 | 1.06 | 3.85 | 2-2 | |
| 4405.694 | B | 2 | 1.05 | 3.85 | 1-1 | |
| m4427.12 | P | Ti | 1.06 | 3.85 | 2-1 | |
| 4308.514 | B | 2 | 1.06 | 3.93 | 2-2 | $a^3P$-$y^3P^o$ |
| 4302.979 | E | 1n | 1.05 | 3.92 | 1-1 | (79) |
| 4333.440 | B | 1 | 1.06 | 3.92 | 2-1 | |
| 4310.373 | B | 1 | 1.05 | 3.91 | 1-0 | |
| *4288.181 | B | 3 | 1.05 | 3.93 | 1-2 | |
| 4292.676 | E | 1 | 1.04 | 3.92 | 0-1 | |
| 4078.471 | A | 30 | 1.06 | 4.09 | 2-2 | $a^3P$-$x^3P^o$ |
| 4064.203 | B | 15 | 1.05 | 4.09 | 1-1 | (80) |
| 4082.456 | A | 20 | 1.06 | 4.09 | 2-1 | |
| 4085.094 | A | 15 | 1.05 | 4.08 | 1-0 | |
| 4060.263 | A | 20 | 1.05 | 4.09 | 1-2 | |
| 4055.011 | A | 20 | 1.04 | 4.09 | 0-1 | |
| 3989.581 | B | (0) | 1.06 | 4.16 | 2-1 | $a^3P$-$z^1P^o$ |
| 3972.130 | E | (0) | 1.05 | 4.16 | 1-1 | (81) |
| 3963.354 | E | (0) | 1.04 | 4.16 | 0-1 | |
| 3782.139 | F | 2 | 1.06 | 4.33 | 2-2 | $a^3P$-$x^1D^o$ |
| 3768.445 | B | 3 | 1.05 | 4.33 | 1-2 | (82) |
| 3725.155 | A | 20 | 1.06 | 4.37 | 2-1 | $a^3P$-$y^3S^o$ |
| 3709.963 | B | 20 | 1.05 | 4.37 | 1-1 | (83) |
| 3702.291 | B | 10 | 1.04 | 4.37 | 0-1 | |
| 3480.525 | A | 12 | 1.06 | 4.61 | 2-2 | $a^3P$-$w^3P^o$ |
| 3485.689 | E | 8 | 1.05 | 4.59 | 1-1 | (84) |
| 3499.099 | E | 8 | 1.06 | 4.59 | 2-1 | |
| 3495.754 | E | 8 | 1.05 | 4.58 | 1-0 | |
| 3467.260 | E | 6 | 1.05 | 4.61 | 1-2 | |
| 3478.918 | E | 6 | 1.04 | 4.59 | 0-1 | |
| 3476.452 | E | 3 | 1.06 | 4.61 | 2-2 | $a^3P$-$y^5S^o$ |
| 3463.305 | E | 1 | 1.05 | 4.61 | 1-2 | (85) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Ti I continued | | | | | | |
| 3382.312 | E | 15 | 1.06 | 4.71 | 2-3 | $a^3P$-$u^3D^o$ |
| 3390.682 | E | 10 | 1.05 | 4.69 | 1-2 | (86) |
| 3398.634 | E | 8 | 1.04 | 4.67 | 0-1 | |
| 3403.369 | E | 4 | 1.06 | 4.69 | 2-2 | |
| 3405.094 | E | 5 | 1.05 | 4.67 | 1-1 | |
| m3417.88 | P | Fe | 1.06 | 4.67 | 2-1 | |
| 3314.422 | A | 10 | 1.06 | 4.79 | 2-3 | $a^3P$-$t^3D^o$ |
| 3309.501 | E | 15 | 1.05 | 4.78 | 1-2 | (87) |
| 3308.391 | E | 10 | 1.04 | 4.77 | 0-1 | |
| 3321.588 | E | 8 | 1.06 | 4.78 | 2-2 | |
| 3314.583 | E | 8 | 1.05 | 4.77 | 1-1 | |
| 3326.639 | E | 2 | 1.06 | 4.77 | 2-1 | |
| 3280.391 | E | 2 | 1.06 | 4.82 | 2-1 | $a^3P$-$x^1P^o$ |
| 3268.61 | E | 1 | 1.05 | 4.82 | 1-1 | (88) |
| 3263.63 | G | 1 | 1.04 | 4.82 | 0-1 | |
| *3260.359§ | E | 3 | 1.06 | 4.85 | 2-1 | $a^3P$-$w^1P^o$ |
| *3248.602§ | E | 15 | 1.05 | 4.85 | 1-1 | (89) |
| *3213.145§ | E | 8 | 1.06 | 4.90 | 2-3 | $a^3P$-$e^3D^o$ |
| 3204.870 | E | 6 | 1.05 | 4.90 | 1-2 | (90) |
| 3201.594 | E | 5 | 1.04 | 4.90 | 0-1 | |
| 3216.203 | E | 3 | 1.06 | 4.90 | 2-2 | |
| 3207.337 | E | 5 | 1.05 | 4.90 | 1-1 | |
| 3218.683 | E | tr | 1.06 | 4.90 | 2-1 | |
| 3137.352 | E | (1) | 1.06 | 5.00 | 2-2 | $a^3P$-$w^3P^o$ |
| 3134.654 | E | 1 | 1.05 | 4.99 | 1-1 | (91) |
| 3145.515 | E | 1 | 1.06 | 4.99 | 2-1 | |
| *3136.038 | E | 2 | 1.05 | 4.98 | 1-0 | |
| *3100.666 | E | 12 | 1.06 | 5.04 | 2-3 | $a^3P$-$r^3D^o$ |
| 3106.806 | E | 8 | 1.05 | 5.02 | 1-2 | (92) |
| 3112.482 | E | 8 | 1.04 | 5.01 | 0-1 | |
| 3117.455 | E | 6 | 1.06 | 5.02 | 2-2 | |
| 3117.899 | E | 5 | 1.05 | 5.01 | 1-1 | |
| *3128.640§ | E | 8 | 1.06 | 5.01 | 2-1 | |
| *3100.866 | E | 12 | 1.06 | 5.04 | 2-1 | $a^3P$-$x^3S^o$ |
| 3090.137 | E | 8 | 1.05 | 5.04 | 1-1 | (93) |
| 3084.819 | E | 4 | 1.04 | 5.04 | 0-1 | |
| 2965.707 | E | 15 | 1.06 | 5.22 | 2-3 | $a^3P$-$q^3D^o$ |
| 2965.231 | E | (6?) | 1.05 | 5.21 | 1-2 | (94) |
| 2965.68 | E | 8 | 1.04 | 5.20 | 0-1 | |
| 2974.934 | E | 4 | 1.06 | 5.21 | 2-2 | |
| 2970.556 | E | 4 | 1.05 | 5.20 | 1-1 | |
| 2980.296 | E | tr | 1.06 | 5.20 | 2-1 | |
| 10034.45 | D | 15 | 1.45 | 2.68 | 4-5 | $b^3F$-$z^3G^o$ |
| 10048.78 | D | 12 | 1.44 | 2.67 | 3-4 | (95) |
| 10059.87 | D | 12 | 1.43 | 2.65 | 2-3 | |
| 10189.26 | C | 3 | 1.45 | 2.67 | 4-4 | |
| 10170.60 | C | 3 | 1.44 | 2.65 | 3-3 | |
| 7366.60 | E | (1) | 1.43 | 3.10 | 2-2 | $b^3F$-$z^5S^o$ (96) |
| 7344.72 | E | 4 | 1.45 | 3.13 | 4-4 | $b^3F$-$y^1F^o$ |
| 7357.74 | E | 3 | 1.44 | 3.11 | 3-3 | (97) |
| 7364.11 | E | 2 | 1.43 | 3.10 | 2-2 | |
| 7433.17 | E | (2) | 1.44 | 3.10 | 3-2 | |
| 7371.41 | E | (0) | 1.44 | 3.13 | 3-4 | |
| 7299.67 | I | (2) | 1.43 | 3.11 | 2-3 | |
| 7216.20 | E | 5 | 1.44 | 3.15 | 3-2 | $b^3F$-$z^3P^o$ |
| 7160.33 | K | (2) | 1.43 | 3.15 | 2-2 | (98) |
| 7138.05 | P | | 1.43 | 3.15 | 2-1 | |
| 7209.44 | E | 20 | 1.45 | 3.17 | 4-3 | $b^3F$-$y^3D^o$ |
| 7244.86 | E | 10 | 1.44 | 3.14 | 3-2 | (99) |
| 7251.74 | I | 8 | 1.43 | 3.13 | 2-1 | |
| 7138.91 | E | (1)Ti? | 1.44 | 3.17 | 3-3 | |
| 7188.55 | E | (0) | 1.43 | 3.14 | 2-2 | |
| 7084.25 | P | | 1.43 | 3.17 | 2-3 | |
| 7065.15? | J | (1) | 1.45 | 3.20 | 4-4 | $b^3F$-$y^5D^o$ |
| 7130.34 | P | | 1.45 | 3.18 | 4-3 | (100) |
| *7007.81 | H | (1) | 1.43 | 3.18 | 2-3 | |
| 6666.548 | E | (2n) | 1.45 | 3.31 | 4-5 | $b^3F$-$y^5G^o$ (101) |
| 6556.066 | A | 25 | 1.45 | 3.34 | 4-4 | $b^3F$-$x^3F^o$ |
| 6554.226 | A | 20 | 1.44 | 3.32 | 3-3 | (102) |
| 6546.276 | A | 20 | 1.43 | 3.31 | 2-2 | |
| m6592.91 | P | Fe | 1.44 | 3.31 | 3-2 | |
| 6497.689 | E | 3 | 1.44 | 3.34 | 3-4 | |
| 6508.135 | E | 3 | 1.43 | 3.32 | 2-3 | |
| 6366.354 | A | 8 | 1.45 | 3.39 | 4-3 | $b^3F$-$x^3D^o$ |
| 8336.104 | A | 8 | 1.44 | 3.38 | 3-2 | (103) |
| 6318.027 | E | 5 | 1.42 | 3.38 | 2-1 | |
| 6311.289 | E | (1) | 1.44 | 3.39 | 3-3 | |
| 6293.00 | P | | 1.43 | 3.38 | 2-2 | |
| 6268.50 | H | (2) | 1.42 | 3.39 | 2-3 | |
| 6258.706 | A | 50 | 1.45 | 3.43 | 4-5 | $b^3F$-$y^3G^o$ |
| 6258.103 | A | 40 | 1.44 | 3.41 | 3-4 | (104) |
| 6261.101 | A | 35 | 1.43 | 3.39 | 2-3 | |
| 6313.240 | A | 10 | 1.45 | 3.41 | 4-4 | |
| 8303.754 | A | 10 | 1.44 | 3.39 | 3-3 | |
| 5839.78 | P | | 1.45 | 3.57 | 4-5 | $b^3F$-$y^5F^o$ |
| 5906.50 | P | | 1.45 | 3.54 | 4-3 | (105) |
| 5513.529 | A | 25 | 1.45 | 3.89 | 4-3 | $b^3F$-$w^3D^o$ |
| 5514.536 | B | 25 | 1.44 | 3.67 | 3-2 | (106) |
| 5514.350 | B | 20 | 1.43 | 3.66 | 2-1 | |
| 5471.198 | B | 5 | 1.44 | 3.69 | 3-3 | |
| 5481.862 | B | 5 | 1.43 | 3.67 | 2-2 | |
| 5449.155 | B | 1 | 1.44 | 3.70 | 3-3 | $b^3F$-$x^5D^o$ |
| 5440.53 | P | | 1.43 | 3.69 | 2-2 | (107) |
| 5490.151 | A | 12 | 1.45 | 3.70 | 4-3 | |
| 5472.898 | B | 2 | 1.44 | 3.89 | 3-2 | |

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| 5474.228 | B | 6 | 1.45 | 3.71 | 4-5 | $b^3F$-$x^3G^o$ |
| 5453.646 | B | 3 | 1.44 | 3.70 | 3-4 | (108) |
| 5438.310 | B | 1 | 1.43 | 3.69 | 2-3 | |
| 5494.736 | B | (1) | 1.45 | 3.70 | 4-4 | |
| 5470.50 | J | (2) | 1.44 | 3.69 | 3-3 | |
| *5511.795 | B | 2 | 1.45 | 3.69 | 4-3 | |
| 5145.465 | A | 12 | 1.45 | 3.85 | 4-3 | $b^3F$-$v^3D^o$ |
| 5113.448 | A | 10 | 1.44 | 3.85 | 3-2 | (109) |
| 5087.055 | A | 8 | 1.43 | 3.85 | 2-1 | |
| 5109.427 | B | 4 | 1.44 | 3.85 | 3-3 | |
| 5085.333 | B | 4 | 1.43 | 3.85 | 2-2 | |
| 5081.39 | P | | 1.43 | 3.85 | 2-3 | |
| 5035.908 | A | 25 | 1.45 | 3.90 | 4-5 | $b^3F$-$w^3G^o$ |
| 5036.468 | A | 25 | 1.44 | 3.89 | 3-4 | (110) |
| 5038.400 | A | 25 | 1.43 | 3.87 | 2-3 | |
| 5071.475 | B | 7 | 1.45 | 3.89 | 4-4 | |
| 5065.985 | B | 7 | 1.44 | 3.87 | 3-3 | |
| 4743.32 | P | | 1.45 | 4.06 | 4-3 | $b^3F$-$y^1F^o$ |
| 4711.68 | P | | 1.44 | 4.06 | 3-3 | (111) |
| 4687.82 | P | | 1.43 | 4.06 | 2-3 | |
| 4559.930 | A | 6 | 1.45 | 4.16 | 4-4 | $b^3F$-$w^3F^o$ |
| 4535.87 | P | | 1.44 | 4.16 | 3-3 | (112) |
| 4518.700 | B | 8 | 1.42 | 4.15 | 2-2 | |
| 4564.816 | E | 1 | 1.45 | 4.16 | 4-3 | |
| 4540.873 | E | 1 | 1.44 | 4.15 | 3-2 | |
| m4531.60 | P | Fe | 1.44 | 4.16 | 3-4 | |
| 4513.715 | E | 1 | 1.42 | 4.16 | 2-3 | |
| 4457.428 | A | 40 | 1.45 | 4.22 | 4-4 | $b^3F$-$v^3F^o$ |
| 4455.321 | A | 30 | 1.44 | 4.21 | 3-3 | (113) |
| 4453.312 | A | 30 | 1.42 | 4.19 | 2-2 | |
| 4483.688 | A | 10 | 1.45 | 4.21 | 4-3 | |
| *4474.853 | A | 8 | 1.44 | 4.19 | 3-2 | |
| 4430.366 | A | 7 | 1.44 | 4.22 | 3-4 | |
| *4434.003 | A | 15 | 1.42 | 4.21 | 2-3 | |
| 4127.09 | P | | 1.45 | 4.44 | 4-4 | $b^3F$-$y^1G^o$ (114) |
| 3789.293 | B | 8 | 1.45 | 4.71 | 4-3 | $b^3F$-$u^3D^o$ |
| 3795.903 | B | 7 | 1.44 | 4.69 | 3-2 | (115) |
| 3798.276 | A | 6 | 1.43 | 4.67 | 2-1 | |
| 3717.259 | E | 1 | 1.45 | 4.77 | 4-4 | $b^3F$-$t^3F^o$ † |
| 3715.795 | E | 1 | 1.44 | 4.76 | 3-3 | (116) |
| 3713.734 | E | 1 | 1.43 | 4.75 | 2-2 | |
| 3738.676 | E | 1 | 1.44 | 4.75 | 3-3 | |
| 3704.295 | B | 15 | 1.45 | 4.79 | 4-3 | $b^3F$-$t^3D^o$ |
| 3694.445 | A | 10 | 1.44 | 4.78 | 3-2 | (117) |
| 3685.964 | B | 2 | 1.43 | 4.77 | 2-1 | |
| 3651.90 | P | | 1.45 | 4.83 | 4-5 | $b^3F$-$x^3H^o$ |
| 3638.49 | P | | 1.44 | 4.83 | 3-4 | (118) |
| 3656.73 | P | | 1.45 | 4.83 | 4-4 | |
| 3487.80 | P | | 1.44 | 4.98 | 3-3 | $b^3F$-$w^1F^o$ (119) |
| 3439.305 | E | 8 | 1.45 | 5.04 | 4-3 | $b^3F$-$r^3D^o$ |
| 3443.644 | E | 5 | 1.44 | 5.02 | 3-2 | (120) |
| 3444.403 | E | 3 | 1.43 | 5.01 | 2-1 | |
| 3423.172 | E | 2 | 1.44 | 5.04 | 3-3 | |
| 3430.874 | E | 2 | 1.43 | 5.02 | 2-2 | |
| 3434.69 | P | | 1.45 | 5.05 | 4-4 | $b^3F$-$w^1G^o$ (121) |
| 3297.68 | P | | 1.45 | 5.20 | 4-4 | $b^3F$-$v^5D^o$ |
| 3309.32 | P | | 1.45 | 5.18 | 4-3 | (122) |
| 3274.047 | E | (5) | 1.45 | 5.22 | 4-3 | $b^3F$-$q^3D^o$ |
| 3270.562 | E | 3 | 1.44 | 5.21 | 3-2 | (123) |
| 3265.480 | E | 2 | 1.43 | 5.20 | 2-1 | |
| 3259.42 | E | 2 | 1.44 | 5.22 | 3-3 | |
| 3259.04 | G | 1 | 1.42 | 5.21 | 2-2 | |
| 9718.96 | D | 25 | 1.50 | 2.77 | 4-3 | $a^1G$-$z^1F^o$ (124) |
| 7949.17 | E | (3) | 1.50 | 3.05 | 4-4 | $a^1G$-$z^1G^o$ (125) |
| 4830.410 | A | 20 | 1.50 | 4.06 | 4-3 | $a^1G$-$y^1F^o$ (126) |
| *4586.374 | E | 1 | 1.50 | 4.22 | 4-4 | $a^1G$-$v^3F^o$ (127) |
| 4437.098 | A | 40 | 1.50 | 4.28 | 4-5 | $a^1G$-$z^1H^o$ (128) |
| 4186.119 | A | 25 | 1.50 | 4.44 | 4-4 | $a^1G$-$y^1G^o$ (129) |
| 3919.822 | B | 5 | 1.50 | 4.64 | 4-3 | $a^1G$-$x^1F^o$ (130) |
| 3724.570 | A | 20 | 1.50 | 4.81 | 4-4 | $a^1G$-$x^1G^o$ (131) |
| 3702.942 | B | 2 | 1.50 | 4.83 | 4-4 | $a^1G$-$x^3H^o$ (132) |
| 3547.029 | A | 15 | 1.50 | 4.98 | 4-3 | $a^1G$-$w^1F^o$ (133) |
| 3456.661 | E | 6 | 1.50 | 5.07 | 4-5 | $a^1G$-$y^1H^o$ (134) |
| 3431.08 | P | | 1.50 | 5.09 | 4-4 | $a^1G$-$u^3G^o$ (135) |
| 3393.713 | E | 10 | 1.50 | 5.13 | 4-3 | $a^1G$-$v^1F^o$ (136) |
| 3119.735 | E | 15 | 1.50 | 5.45 | 4-5 | $a^1G$-$x^1H^o$ (137) |
| 9090.70 | D | 25 | 1.74 | 3.10 | 3-2 | $a^5P$-$z^5S^o$ |
| 9027.33 | D | 15 | 1.73 | 3.10 | 2-2 | (138) |
| 8989.44 | D | 12 | 1.73 | 3.10 | 1-2 | |
| 8821.14 | D | 12 | 1.74 | 3.14 | 3-2 | $a^5P$-$y^3D^o$ |
| 8761.44 | D | 15 | 1.73 | 3.14 | 2-2 | (139) |
| 8725.76 | D | 6 | 1.73 | 3.14 | 1-2 | |
| 8778.66 | D | 30 | 1.74 | 3.15 | 3-2 | $a^5P$-$z^3P^o$ |
| 8719.56 | D | 30 | 1.73 | 3.15 | 2-2 | (140) |

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| 8457.10 | D | 40 | 1.74 | 3.20 | 3-4 | $a^5P-y^5D^o$ |
| 8494.42 | D | 30 | 1.73 | 3.18 | 2-3 | (141) |
| 8531.36 | D | 15 | 1.73 | 3.17 | 1-2 | |
| 8550.54 | D | 25 | 1.74 | 3.18 | 3-3 | |
| 8565.45 | D | 25 | 1.73 | 3.17 | 2-2 | |
| 8578.40 | D | 15 | 1.73 | 3.16 | 1-1 | |
| 8612.91 | D | 7 | 1.73 | 3.16 | 2-1 | |
| *8600.98 | D | 25 | 1.73 | 3.18 | 1-0 | |
| 7474.94 | E | (1p?) | 1.74 | 3.39 | 3-3 | $a^5P-x^3D^o$ |
| 7466.44 | P | | 1.73 | 3.38 | 2-2 | (142) |
| 7431.98 | P | | 1.73 | 3.39 | 2-3 | |
| *7253.76 | I | (1p?) | 1.74 | 3.44 | 3-3 | $a^5P-z^5P^o$ |
| 7291.03 | P | | 1.73 | 3.42 | 2-2 | (143) |
| 7305.87 | H | (1) | 1.73 | 3.42 | 1-1 | |
| 7332.26 | I | (1p?) | 1.74 | 3.43 | 3-2 | |
| 7330.97 | I | (1p?) | 1.73 | 3.42 | 2-1 | |
| 7213.35 | E | (1) | 1.73 | 3.44 | 2-3 | |
| 7266.29 | E | (0) | 1.73 | 3.42 | 1-2 | |
| 6266.021 | E | (1) | 1.74 | 3.71 | 3-4 | $a^5P-x^5D^o$ |
| 6264.825 | E | (0) | 1.73 | 3.70 | 2-3 | (144) |
| 6277.525 | E | (00) | 1.73 | 3.69 | 1-2 | |
| *6295.251 | E | (2) | 1.74 | 3.70 | 3-3 | |
| 6295.949 | E | (0) | 1.73 | 3.69 | 2-2 | |
| 6298.075 | E | (00) | 1.73 | 3.69 | 1-1 | |
| 4617.269 | A | 30 | 1.74 | 4.41 | 3-4 | $a^5P-w^5D^o$ |
| 4623.098 | A | 25 | 1.73 | 4.40 | 2-3 | (145) |
| 4629.336 | A | 15 | 1.73 | 4.39 | 1-2 | |
| 4639.669 | B | 15 | 1.74 | 4.40 | 3-3 | |
| 4639.369 | B | 18 | 1.73 | 4.39 | 2-2 | |
| 4639.944 | B | 15 | 1.73 | 4.39 | 1-1 | |
| 4656.048 | B | 6 | 1.74 | 4.39 | 3-2 | |
| 4650.016 | B | 10 | 1.73 | 4.39 | 2-1 | |
| 4645.193 | A | 12 | 1.73 | 4.38 | 1-0 | |
| 4481.261 | A | 30 | 1.74 | 4.50 | 3-3 | $a^5P-y^5P^o$ |
| 4480.600 | B | 5 | 1.73 | 4.49 | 2-2 | (146) |
| 4479.724 | B | 9 | 1.73 | 4.48 | 1-1 | |
| 4496.146 | A | 20 | 1.74 | 4.49 | 3-2 | |
| 4489.089 | A | 20 | 1.73 | 4.48 | 2-1 | |
| 4465.807 | A | 20 | 1.73 | 4.50 | 2-3 | |
| 4471.238 | A | 20 | 1.73 | 4.49 | 1-2 | |
| 4305.474 | B | 2 | 1.74 | 4.61 | 3-2 | $a^5P-w^3P^o$ |
| *4291.214 | B | 5n | 1.73 | 4.61 | 2-2 | (147) |
| 4299.229 | E | 15 | 1.74 | 4.61 | 3-2 | $a^5P-y^5S^o$ |
| 4284.988 | B | 8 | 1.73 | 4.61 | 2-2 | (148) |
| 4276.441 | B | 8 | 1.73 | 4.61 | 1-2 | |
| 9832.15 | D | 25 | 1.88 | 3.13 | 5-4 | $a^3G-y^3F^o$ |
| 9927.35 | D | 20 | 1.87 | 3.11 | 4-3 | (149) |
| 9997.94 | D | 15 | 1.87 | 3.10 | 3-2 | |
| 9879.41 | D | 3 | 1.87 | 3.11 | 3-3 | |
| 8468.46 | D | 100 | 1.88 | 3.34 | 5-4 | $a^3G-x^3F^o$ |
| 8518.37 | D | 100 | 1.87 | 3.32 | 4-3 | (150) |
| 8548.07 | D | 100 | 1.87 | 3.31 | 3-2 | |
| 8423.10 | D | 20 | 1.87 | 3.34 | 4-4 | |
| 8483.16 | D | 25 | 1.87 | 3.32 | 3-3 | |
| *7978.88 | E | (4) | 1.88 | 3.43 | 5-5 | $a^3G-y^3G^o$ |
| 8024.84 | E | (2) | 1.87 | 3.41 | 4-4 | (151) |
| 8068.24 | E | (2) | 1.87 | 3.39 | 3-3 | |
| 8066.05 | P | | 1.88 | 3.41 | 5-4 | |
| 7938.53 | P | | 1.87 | 3.43 | 4-5 | |
| 6746.433 | E | (1) | 1.88 | 3.71 | 5-5 | $a^3G-x^3G^o$ |
| 6748.43 | H | (1) | 1.87 | 3.70 | 4-4 | (152) |
| 6751.94 | H | (0) | 1.87 | 3.69 | 3-3 | |
| 6092.814 | E | 4 | 1.88 | 3.90 | 5-5 | $a^3G-w^3G^o$ |
| 6121.008 | E | 3 | 1.87 | 3.89 | 4-4 | (153) |
| 6146.225 | E | 3 | 1.87 | 3.87 | 3-3 | |
| 5953.162 | A | 30 | 1.88 | 3.95 | 5-8 | $a^3G-z^3H^o$ |
| 5965.828 | A | 30 | 1.87 | 3.94 | 4-5 | (154) |
| 5978.543 | A | 25 | 1.87 | 3.93 | 3-4 | |
| 5988.560 | E | 2 | 1.88 | 3.94 | 5-5 | |
| 5996.007 | E | 2 | 1.87 | 3.93 | 4-4 | |
| 5409.609 | A | 6 | 1.88 | 4.16 | 5-4 | $a^3G-w^3F^o$ |
| 5397.093 | A | 4 | 1.87 | 4.16 | 4-3 | (155) |
| 5389.996 | A | 3 | 1.87 | 4.15 | 3-2 | |
| 5391.06 | P | | 1.87 | 4.16 | 4-4 | |
| 5382.96 | P | | 1.87 | 4.16 | 3-3 | |
| 5265.967 | A | 10 | 1.88 | 4.22 | 5-4 | $a^3G-v^3F^o$ |
| 5283.441 | A | 8 | 1.87 | 4.21 | 4-3 | (156) |
| 5297.236 | A | 6 | 1.87 | 4.19 | 3-2 | |
| *5248.402 | E | (1) | 1.87 | 4.22 | 4-4 | |
| 5269.93 | H | (1) | 1.87 | 4.21 | 3-3 | |
| 4885.082 | A | 20 | 1.88 | 4.41 | 5-6 | $a^3G-y^3H^o$ |
| 4899.910 | A | 20 | 1.87 | 4.39 | 4-5 | (157) |
| 4913.616 | A | 20 | 1.87 | 4.38 | 3-4 | |
| 4915.236 | B | 5 | 1.88 | 4.39 | 5-5 | |
| 4925.398 | B | 5 | 1.87 | 4.38 | 4-4 | |
| 4811.074 | B | 4 | 1.88 | 4.44 | 5-4 | $a^3G-y^1G^o$ (158) |
| 4449.985 | B | 1 | 1.87 | 4.64 | 4-3 | $a^3G-x^1F^o$ |
| 4440.345 | A | 10 | 1.87 | 4.64 | 3-3 | (159) |
| 4449.143 | A | 30 | 1.88 | 4.65 | 5-5 | $a^3G-v^3G^o$ |
| 4450.898 | A | 25 | 1.87 | 4.64 | 4-4 | (160) |
| 4453.708 | A | 20 | 1.87 | 4.64 | 3-3 | |
| 4463.539 | B | 8 | 1.88 | 4.84 | 5-4 | |
| 4463.391 | B | 8 | 1.87 | 4.64 | 4-3 | |
| 4436.586 | A | 4 | 1.87 | 4.65 | 4-5 | |
| 4441.272 | B | 4 | 1.87 | 4.64 | 3-4 | |
| 4417.274 | A | 15 | 1.88 | 4.67 | 5-4 | $a^3G-u^3F^o$ |
| 4426.054 | A | 10 | 1.87 | 4.66 | 4-3 | (161) |
| *4434.003 | A | 15 | 1.87 | 4.65 | 3-2 | |
| 4404.911 | B | 5 | 1.87 | 4.67 | 4-4 | |
| 4416.535 | B | 4 | 1.87 | 4.66 | 3-3 | |

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|---|---|---|---|---|---|---|
| **Ti I** continued | | | | | | |
| 4263.134 | A | 15 | 1.88 | 4.77 | 5-4 | $a^3G-t^3F^o$ |
| *4274.584 | A | 15 | 1.87 | 4.76 | 4-3 | (162) |
| 4282.708 | A | 12 | 1.87 | 4.75 | 3-2 | |
| 4251.618 | B | 3 | 1.87 | 4.77 | 4-4 | |
| 4265.723 | B | 4 | 1.87 | 4.76 | 3-3 | |
| 4169.330 | B | 7 | 1.88 | 4.84 | 5-8 | $a^3G-x^3H^o$ |
| 4166.311 | B | 6 | 1.87 | 4.83 | 4-5 | (163) |
| 4164.134 | B | 4 | 1.87 | 4.83 | 3-4 | |
| 4177.357 | E | (2) | 1.88 | 4.83 | 5-5 | |
| 4172.609 | E | (2) | 1.87 | 4.83 | 4-4 | |
| 3895.59 | P | | 1.88 | 5.05 | 5-4 | $a^3G-w^1G^o$ |
| 3885.95 | P | | 1.87 | 5.05 | 4-4 | (164) |
| 3878.61 | P | | 1.87 | 5.05 | 3-4 | |
| 3786.353 | B | 3 | 1.88 | 5.14 | 5-4 | $a^3G-s^3F^o$ |
| 3801.093 | B | 3 | 1.87 | 5.12 | 4-3 | (165) |
| 3811.385 | B | 4 | 1.87 | 5.10 | 3-2 | |
| 3733.767 | B | 4n | 1.88 | 5.18 | 5-6 | $a^3G-w^3H^o$ † |
| 3738.901 | E | 5n | 1.87 | 5.17 | 4-5 | (166) |
| 3748.101 | B | 6n | 1.87 | 5.16 | 3-4 | |
| 3504.773 | E | 2 | 1.88 | 5.40 | 5-4 | $a^3G-r^3F^o$ |
| 3516.838 | E | 3 | 1.87 | 5.38 | 4-3 | (167) |
| 3525.161 | E | 3 | 1.87 | 5.37 | 3-2 | |
| 3428.955 | E | 4 | 1.88 | 5.48 | 5-5 | $a^3G-t^3G^o$ |
| 3446.603 | E | 2 | 1.87 | 5.45 | 4-4 | (168) |
| *3454.165 | E | 1 | 1.88 | 5.45 | 5-4 | |
| 3352.43 | P | | 1.88 | 5.56 | 5-4 | $a^3G-q^3F^o$ |
| 3358.56 | P | | 1.87 | 5.55 | 4-3 | (169) |
| 3364.10 | P | | 1.87 | 5.53 | 3-2 | |
| 3010.42 | P | | 1.87 | 5.97 | 4-3 | $a^3G-u^1F^o$ (170) |
| *5054.070 | B | 3 | 1.87 | 4.31 | 0-1 | $a^1S-y^1P^o$ (171) |
| 3601.16 | J | 1 | 1.87 | 5.30 | 0-1 | $a^1S-v^1P^o$ (172) |
| 5025.570 | A | 18 | 2.03 | 4.49 | 6-5 | $z^5G^o-e^5F$ |
| 5013.284 | B | 18 | 2.01 | 4.47 | 5-4 | (173) |
| 5000.991 | B | 10 | 1.99 | 4.46 | 4-3 | |
| 4989.140 | B | 10 | 1.97 | 4.45 | 3-2 | |
| 4978.191 | A | 10 | 1.96 | 4.44 | 2-1 | |
| 4977.731 | B | 5 | 2.01 | 4.49 | 5-5 | |
| 4973.051 | B | 6 | 1.99 | 4.47 | 4-4 | |
| 4968.566 | B | 6 | 1.97 | 4.46 | 3-3 | |
| 4964.713 | B | 5 | 1.96 | 4.45 | 2-2 | |
| 4938.04 | H | (0n) | 1.99 | 4.49 | 4-5 | |
| 4941.015 | E | (1) | 1.97 | 4.47 | 3-4 | |
| 4944.388 | E | (0) | 1.96 | 4.46 | 2-3 | |
| 4355.308 | E | 1 | 2.03 | 4.87 | 6-5 | $z^5G^o-f^5F$ |
| 4340.018 | E | 1 | 2.01 | 4.85 | 5-4 | (174) |
| 3911.185 | B | 8n | 2.03 | 5.19 | 6-8 | $z^5G^o-e^5G$ |
| *3899.668 | B | (2) | 2.01 | 5.17 | 5-5 | (175) |
| 3888.030 | B | 4n | 1.99 | 5.16 | 4-4 | |
| 3877.591 | B | 2n | 1.97 | 5.15 | 3-3 | |
| 3869.275 | B | 5n | 1.96 | 5.15 | 2-2 | |
| 3938.97 | P | | 2.03 | 5.17 | 6-5 | |
| 3912.589 | B | 2 | 2.01 | 5.18 | 5-4 | |
| 3897.290 | B | 1 | 1.99 | 5.15 | 4-3 | |
| 3884.090 | B | (0) | 1.97 | 5.15 | 3-2 | |
| 3882.147 | B | 15n | 2.01 | 5.19 | 5-6 | |
| *3875.262 | A | 20n | 1.99 | 5.17 | 4-5 | |
| 3868.397 | B | 10n | 1.97 | 5.16 | 3-4 | |
| 3862.823 | B | 10n | 1.96 | 5.15 | 2-3 | |
| 3882.892 | B | 20n | 2.03 | 5.21 | 6-7 | $z^5G^o-e^5H$ |
| 3866.446 | A | 15n | 2.01 | 5.20 | 5-6 | (176) - |
| 3858.133 | B | 15n | 1.99 | 5.19 | 4-5 | |
| 3853.719 | B | 10n | 1.97 | 5.17 | 3-4 | |
| 3853.038 | B | 10n | 1.96 | 5.16 | 2-3 | |
| 3895.243 | A | 30n | 2.03 | 5.20 | 6-6 | |
| 3882.313 | B | 10n | 2.01 | 5.19 | 5-5 | |
| 3873.203 | B | 10n | 1.99 | 5.17 | 4-4 | |
| 3867.739 | B | 3 | 1.97 | 5.16 | 3-3 | |
| 3911.362 | E | (2) | 2.03 | 5.19 | 6-5 | |
| 3897.581 | B | 1 | 2.01 | 5.17 | 5-4 | |
| 3887.365 | E | (1n) | 1.99 | 5.18 | 4-3 | |
| 3720.384 | E | 2 | 2.03 | 5.35 | 6-5 | $z^5G^o-g^5F$ |
| 3707.549 | B | 10n | 2.01 | 5.34 | 5-4 | (177) |
| 3696.885 | E | 2 | 1.99 | 5.33 | 4-3 | |
| 3688.27 | P | | 1.97 | 5.32 | 3-2 | |
| 3681.272 | E | 1 | 1.98 | 5.31 | 2-1 | |
| 3694.10 | P | | 2.01 | 5.35 | 5-5 | |
| 3685.47 | P | | 1.99 | 5.34 | 4-4 | |
| 3679.14 | P | | 1.97 | 5.33 | 3-3 | |
| 3674.92 | P | | 1.96 | 5.32 | 2-2 | |
| *3368.176§ | E | 5 | 2.03 | 5.70 | 6-5 | $z^5G^o-h^5F$ |
| 3361.50 | G | 1 | 2.01 | 5.68 | 5-4 | (178) |
| 3358.196 | E | 2 | 1.99 | 5.67 | 4-3 | |
| *3350.548§ | E | 2 | 1.97 | 5.86 | 3-2 | |
| 3344.931 | E | 1 | 1.96 | 5.85 | 2-1 | |
| 3344.630 | E | tr | 2.01 | 5.70 | 5-5 | |
| 3343.379 | E | tr | 1.99 | 5.68 | 4-4 | |
| *3341.554 | E | 1 | 1.97 | 5.87 | 3-3 | |
| 3339.54 | E | 1n | 1.96 | 5.66 | 2-2 | |
| 3228.128 | E | 12 | 2.03 | 5.88 | 6-6 | $z^5G^o-g^5G$ |
| 3223.519 | E | 10 | 2.01 | 5.84 | 5-5 | (179) |
| 3221.381 | E | 10 | 1.99 | 5.83 | 4-4 | |
| 3219.212 | E | 8 | 1.97 | 5.81 | 3-3 | |
| 3217.942 | E | 8 | 1.96 | 5.80 | 2-2 | |
| 3243.513 | E | 3 | 2.03 | 5.84 | 6-5 | |
| 3238.224 | E | 4 | 2.01 | 5.82 | 5-4 | |
| 3232.791 | E | 3 | 1.99 | 5.81 | 4-3 | |
| 3228.183 | E | 2 | 1.97 | 5.80 | 3-2 | |
| 3206.344 | E | 5 | 2.01 | 5.86 | 5-6 | |
| 3206.825 | E | 5 | 1.99 | 5.84 | 4-5 | |
| 3207.897 | E | 5 | 1.97 | 5.82 | 3-4 | |
| 3209.030 | E | 4 | 1.96 | 5.81 | 2-3 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ti I** continued | | | | | | |
| 3143.350 | E | 12N | 2.03 | 5.96 | 6-7 | $z^5G^o-g^5H$ |
| 3139.87 | E | 10N | 2.01 | 5.94 | 5-6 | (180) |
| 3135.069 | E | 8N | 1.99 | 5.92 | 4-5 | |
| 3130.175 | E | 8N | 1.97 | 5.91 | 3-4 | |
| 3127.684 | E | 8N | 1.98 | 5.91 | 2-3 | |
| 3123.769 | E | 20n | 2.03 | 5.98 | 6-5 | $z^5G^o-j^5F$ |
| 3118.130 | E | 15 | 2.01 | 5.97 | 5-4 | (181) |
| 3114.092 | E | 20n | 1.99 | 5.95 | 4-3 | |
| 3111.283 | E | 10n | 1.97 | 5.94 | 3-2 | |
| 3107.468 | E | 12n | 1.96 | 5.93 | 2-1 | |
| 3105.230 | E | 2n | 2.01 | 5.98 | 5-5 | |
| 3102.517 | E | 3n | 1.99 | 5.97 | 4-4 | |
| 3101.528 | E | 4n | 1.97 | 5.95 | 3-3 | |
| 3101.77 | G | 1n | 1.96 | 5.94 | 2-2 | |
| 8518.05 | D | 60 | 2.13 | 3.57 | 5-4 | $z^5F^o-a^5D$ |
| 8467.15 | D | 75 | 2.11 | 3.57 | 4-3 | (182) |
| 8424.41 | D | 50 | 2.09 | 3.56 | 3-2 | |
| 8389.48 | D | 25 | 2.08 | 3.55 | 2-1 | |
| 8417.54 | D | 25 | 2.11 | 3.57 | 4-4 | |
| 8386.34 | P | | 2.09 | 3.57 | 3-3 | |
| 8363.58 | P | | 2.08 | 3.56 | 2-2 | |
| 5234.301 | A | 15 | 2.13 | 4.49 | 5-5 | $z^5F^o-e^5F$ |
| 5234.938 | A | 8 | 2.11 | 4.47 | 4-4 | (183) |
| 5234.558 | B | 6 | 2.09 | 4.46 | 3-3 | |
| 5233.623 | B | 6 | 2.08 | 4.45 | 2-2 | |
| 5232.685 | B | 6 | 2.08 | 4.44 | 1-1 | |
| 5263.483 | B | 3 | 2.13 | 4.47 | 5-4 | |
| 5255.811 | B | 5 | 2.11 | 4.46 | 4-3 | |
| 5247.393 | B | 5 | 2.09 | 4.45 | 3-2 | |
| *5238.560 | B | 6 | 2.08 | 4.44 | 2-1 | |
| 5186.329 | B | 3 | 2.11 | 4.49 | 4-5 | |
| 5194.043 | E | 4 | 2.09 | 4.47 | 3-4 | |
| 5201.096 | E | 4 | 2.08 | 4.46 | 2-3 | |
| 5207.852 | B | 3 | 2.08 | 4.45 | 1-2 | |
| 4503.762 | A | 4n | 2.13 | 4.87 | 5-5 | $z^5F^o-f^5F$ |
| 4497.709 | B | 3 | 2.11 | 4.85 | 4-4 | (184) |
| 4492.540 | B | 3 | 2.09 | 4.84 | 3-3 | |
| m4488.27 | P | Ti+ | 2.08 | 4.83 | 2-2 | |
| 4485.013 | B | 1 | 2.08 | 4.83 | 1-1 | |
| *4526.374 | E | 1 | 2.13 | 4.85 | 5-4 | |
| 4515.610 | B | 1 | 2.11 | 4.84 | 4-3 | |
| 4505.715 | E | 1 | 2.09 | 4.83 | 3-2 | |
| 4496.75 | P | | 2.08 | 4.83 | 2-1 | |
| 4475.518 | E | 1 | 2.11 | 4.87 | 4-5 | |
| *4474.852 | A | 8 | 2.09 | 4.85 | 3-4 | |
| 4475.19 | P | | 2.08 | 4.84 | 2-3 | |
| 4476.61 | P | | 2.08 | 4.83 | 1-2 | |
| 4030.512 | A | 25n | 2.13 | 5.19 | 5-6 | $z^5F^o-e^5G$ |
| 4026.539 | A | 25n | 2.11 | 5.17 | 4-5 | (185) |
| 4021.812 | B | 25n | 2.09 | 5.16 | 3-4 | |
| 4017.771 | A | 15n | 2.08 | 5.15 | 2-3 | |
| 4015.377 | A | 12n | 2.08 | 5.15 | 1-2 | |
| 4049.399 | E | 2n | 2.13 | 5.17 | 5-5 | |
| 4040.310 | B | 4n | 2.11 | 5.16 | 4-4 | |
| 4031.753 | B | 3n | 2.09 | 5.15 | 3-3 | |
| 4016.364 | B | 6 | 2.13 | 5.20 | 5-4 | $z^5F^o-g^3F$ |
| 4012.786 | B | 3 | 2.11 | 5.18 | 4-3 | (186) |
| 4013.24 | P | | 2.09 | 5.17 | 3-2 | |
| 3993.796 | B | 1 | 2.11 | 5.20 | 4-4 | |
| 3994.56 | P | | 2.09 | 5.18 | 3-3 | |
| 3975.69 | P | | 2.09 | 5.20 | 3-4 | |
| 3980.821 | B | (0) | 2.08 | 5.18 | 2-3 | |
| 4013.587 | A | 12n | 2.13 | 5.20 | 5-6 | $z^5F^o-e^5H$ |
| 4008.046 | B | 9n | 2.11 | 5.19 | 4-5 | (187) |
| 4005.952 | B | 6n | 2.09 | 5.17 | 3-4 | |
| 4007.195 | B | 3n | 2.08 | 5.16 | 2-3 | |
| 4003.789 | B | 10n | 2.13 | 5.21 | 5-4 | $z^5F^o-e^5D$ |
| 4002.468 | B | 9n | 2.11 | 5.19 | 4-3 | (188) |
| 3999.336 | B | 7n | 2.09 | 5.18 | 3-2 | |
| 3994.683 | B | 4n | 2.08 | 5.17 | 2-1 | |
| 3990.184 | E | (1n) | 2.08 | 5.17 | 1-0 | |
| 3981.466 | B | (0) | 2.11 | 5.21 | 4-4 | |
| 3984.313 | B | 3 | 2.09 | 5.19 | 3-3 | |
| 3985.580 | B | (1) | 2.08 | 5.18 | 2-2 | |
| 3828.180 | B | 3 | 2.13 | 5.35 | 5-5 | $z^5F^o-g^5F$ † |
| 3822.026 | B | (2) | 2.11 | 5.34 | 4-4 | (189) |
| 3817.639 | B | 5 | 2.09 | 5.33 | 3-3 | |
| 3814.855 | B | 4 | 2.08 | 5.32 | 2-2 | |
| 3813.361 | B | (0) | 2.08 | 5.31 | 1-1 | |
| 3306.879 | E | 10 | 2.13 | 5.86 | 5-6 | $z^5F^o-g^5G$ |
| 3309.730 | E | 6 | 2.11 | 5.84 | 4-5 | (190) |
| 3312.690 | E | 5 | 2.09 | 5.82 | 3-4 | |
| 3315.237 | E | 2 | 2.08 | 5.81 | 2-3 | |
| 3318.362 | E | 4 | 2.08 | 5.80 | 1-2 | |
| 3325.155 | E | 3 | 2.13 | 5.84 | 5-5 | |
| 3325.239 | E | 3 | 2.11 | 5.82 | 4-4 | |
| *3324.754 | E | 4 | 2.08 | 5.80 | (3-3 2-2 | |
| 3340.77 | H | (1) | 2.13 | 5.82 | 5-4 | |
| 3337.40 | G | 1n | 2.11 | 5.81 | 4-3 | |
| 3334.35 | H | (1n) | 2.09 | 5.80 | 3-2 | |
| 3199.43 | G | 1n | 2.13 | 5.98 | 5-5 | $z^5F^o-j^5F$ |
| 3198.728 | E | 1n | 2.11 | 5.97 | 4-4 | (191) |
| 3199.34 | H | (1n) | 2.09 | 5.95 | 3-3 | |
| *3213.145§ | E | 8 | 2.13 | 5.97 | 5-4 | |
| 3211.07 | E | 1n | 2.11 | 5.95 | 4-3 | |
| 3141.670 | E | 10 | 2.13 | 6.05 | 5-4 | $z^5F^o-h^5D$ † |
| 3139.075 | E | 7 | 2.11 | 6.05 | 4-3 | (192) |
| *3138.640§ | E | 8 | 2.09 | 6.04 | 3-2 | |
| 3135.656 | E | (2) | 2.08 | 6.03 | 2-1 | |
| 3135.553 | E | 2 | 2.08 | 6.02 | 1-0 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ti I** continued | | | | | | |
| 10057.69 | D | 25 | 2.17 | 3.39 | 3-3 | $a^3D$-$x^3D^o$ (193) |
| 10003.02 | D | 25 | 2.15 | 3.38 | 2-2 | |
| 10011.72 | D | 15 | 2.14 | 3.38 | 1-1 | |
| 10130.90 | C | 10 | 2.17 | 3.38 | 3-2 | |
| 10066.47 | D | 8 | 2.15 | 3.38 | 2-1 | |
| 9941.33 | D | 8 | 2.15 | 3.39 | 2-3 | |
| 9948.98 | D | 8 | 2.14 | 3.38 | 1-2 | |
| 9661.42 | D | 10 | 2.17 | 3.44 | 3-3 | $a^3D$-$z^5P^o$ (194) |
| 9690.82 | D | 2 | 2.15 | 3.42 | 2-2 | |
| 8080.55 | P | | 2.17 | 3.69 | 3-3 | $a^3D$-$w^3D^o$ (195) |
| 8098.50 | P | | 2.15 | 3.67 | 2-2 | |
| 8133.36 | P | | 2.14 | 3.86 | 1-1 | |
| 6419.15 | H | (2) | 2.17 | 4.09 | 3-2 | $a^3D$-$x^3P^o$ † (198) |
| 8381.418 | E | (1) | 2.15 | 4.09 | 2-1 | |
| 6381.41 | H | (1) | 2.14 | 4.08 | 1-0 | |
| 8188.14 | J | 3 | 2.17 | 4.16 | 3-4 | $a^3D$-$w^3F^o$ † (197) |
| 8149.743 | E | 2 | 2.15 | 4.18 | 2-3 | |
| 8138.38 | I | 1 | 2.14 | 4.15 | 1-2 | |
| 5999.003 | F | 4n | 2.17 | 4.33 | 3-4 | $a^3D$-$v^3F^o$ (198) |
| 6002.640 | E | (0) | 2.15 | 4.31 | 2-3 | |
| 6018.423 | L | (1) | 2.14 | 4.19 | 1-2 | |
| 5053.879 | A | 8 | 2.17 | 4.81 | 3-2 | $a^3D$-$w^3P^o$ (199) |
| 5062.112 | A | 7 | 2.15 | 4.59 | 2-1 | |
| 5069.351 | B | 5 | 2.14 | 4.58 | 1-0 | |
| 5023.39 | H | (2) | 2.15 | 4.81 | 2-2 | |
| 5048.208 | E | (1) | 2.14 | 4.59 | 1-1 | |
| 4921.768 | A | 12 | 2.17 | 4.87 | 3-4 | $a^3D$-$u^3F^o$ (200) |
| 4919.867 | A | 10 | 2.15 | 4.66 | 2-3 | |
| 4928.342 | A | 12 | 2.14 | 4.65 | 1-2 | |
| 4948.183 | B | 3 | 2.17 | 4.86 | 3-3 | |
| 4941.562 | B | 3 | 2.15 | 4.85 | 2-2 | |
| 4848.487 | B | 8 | 2.17 | 4.71 | 3-3 | $a^3D$-$u^3D^o$ (201) |
| 4864.187 | B | 4 | 2.15 | 4.69 | 2-2 | |
| 4880.922 | B | 3 | 2.14 | 4.67 | 1-1 | |
| 4891.828 | B | 1 | 2.17 | 4.69 | 3-2 | |
| 4893.90 | H | (1) | 2.15 | 4.67 | 2-1 | |
| 4821.29 | H | (1p?) | 2.15 | 4.71 | 2-3 | |
| 4731.172 | A | 9 | 2.17 | 4.77 | 3-4 | $a^3D$-$t^3F^o$ (202) |
| 4733.428 | B | 6 | 2.15 | 4.78 | 2-3 | |
| 4742.129 | B | 3 | 2.14 | 4.75 | 1-2 | |
| 4759.74 | H | (1p?) | 2.17 | 4.76 | 3-3 | |
| 4754.38 | H | (1p?) | 2.15 | 4.75 | 2-2 | |
| *4710.186 | A | 18 | 2.17 | 4.79 | 3-3 | $a^3D$-$t^3D^o$ (203) |
| 4698.88 | P | (6?) | 2.15 | 4.78 | 2-2 | |
| 4696.923 | B | 4 | 2.14 | 4.77 | 1-1 | |
| 4724.879 | E | (2) | 2.17 | 4.78 | 3-2 | |
| 4708.976 | E | 1 | 2.15 | 4.77 | 2-1 | |
| 4684.484 | E | 2 | 2.15 | 4.79 | 2-3 | |
| 4688.931 | E | 4 | 2.14 | 4.78 | 1-2 | |
| 4360.487 | A | 4 | 2.17 | 5.00 | 3-2 | $a^3D$-$v^3P^o$ (204) |
| 4354.064 | B | 3 | 2.15 | 4.99 | 2-1 | |
| 4346.810 | E | 1 | 2.14 | 4.98 | 1-0 | |
| 4338.478 | B | 1 | 2.15 | 5.00 | 2-2 | |
| 4343.798 | B | 1 | 2.14 | 4.99 | 1-1 | |
| 4289.919 | B | 3 | 2.17 | 5.04 | 3-3 | $a^3D$-$r^3D^o$ (205) |
| m4300.53 | P | T1 | 2.15 | 5.02 | 2-2 | |
| 4311.854 | B | 2 | 2.14 | 5.01 | 1-1 | |
| 4150.963 | A | 10 | 2.17 | 5.14 | 3-4 | $a^3D$-$s^3F^o$ (206) |
| 4159.834 | A | 9 | 2.15 | 5.12 | 2-3 | |
| 4171.018 | B | 8 | 2.14 | 5.10 | 1-2 | |
| 4179.860 | B | (00) | 2.17 | 5.12 | 3-3 | |
| 4180.498 | B | (00) | 2.15 | 5.10 | 2-3 | |
| 4099.188 | A | 8 | 2.17 | 5.18 | 3-2 | $a^3D$-$u^3P^o$ (207) |
| 4077.148 | B | 4 | 2.15 | 5.18 | 2-1 | |
| 4065.595 | B | (0) | 2.14 | 5.18 | 1-0 | |
| 4079.708 | B | 8 | 2.15 | 5.18 | 2-2 | |
| 4068.144 | E | 3 | 2.14 | 5.18 | 1-1 | |
| 4035.828 | A | 10 | 2.17 | 5.22 | 3-3 | $a^3D$-$q^3D^o$ (208) |
| 4033.883 | B | 8 | 2.15 | 5.21 | 2-2 | |
| 4034.884 | B | 5 | 2.14 | 5.20 | 1-1 | |
| 4052.930 | B | 2 | 2.17 | 5.21 | 3-2 | |
| 4043.775 | E | 2 | 2.15 | 5.20 | 2-1 | |
| 4016.943 | B | 3 | 2.15 | 5.22 | 2-3 | |
| m4025.07 | P | T1+ | 2.14 | 5.21 | 1-2 | |
| *8496.03 | D | 60 | 2.24 | 3.89 | 2-3 | $b^3P$-$w^3D^o$ (209) |
| 8539.36 | D | 60 | 2.23 | 3.87 | 1-2 | |
| 8569.72 | D | 50 | 2.22 | 3.86 | 0-1 | |
| *8800.98 | D | 25 | 2.24 | 3.87 | 2-2 | |
| 8618.44 | D | 20 | 2.23 | 3.86 | 1-1 | |
| 8442.98 | D | 20 | 2.24 | 3.70 | 2-3 | $b^3P$-$x^5D^o$ (210) |
| 8495.51 | D | 15 | 2.23 | 3.88 | 1-0? | |
| 7854.44 | E | (2) | 2.24 | 3.85 | 2-3 | $b^3P$-$w^3D^o$ † (211) |
| 7614.50 | E | (1p?) | 2.23 | 3.85 | 1-2 | |
| 7580.55 | H | (1) | 2.22 | 3.85 | 0-1 | |
| 7318.39 | E | (2) | 2.24 | 3.93 | 2-2 | $b^3P$-$y^3P^o$ (212) |
| 7361.56 | P | | 2.24 | 3.92 | 2-1 | |
| 7337.78 | P | | 2.23 | 3.91 | 1-0 | |
| 7273.77 | E | (0) | 2.23 | 3.93 | 1-2 | |
| 6678.60 | P | | 2.24 | 4.09 | 2-2 | $b^3P$-$x^3P^o$ (213) |
| 5780.778 | B | 2 | 2.24 | 4.37 | 2-1 | $b^3P$-$y^3S^o$ (214) |
| 5752.89 | I | 1 | 2.23 | 4.37 | 1-1 | |
| 5212.371 | B | 3 | 2.24 | 4.61 | 2-2 | $b^3P$-$w^3P^o$ (215) |
| 5230.967 | B | (0) | 2.23 | 4.59 | 1-1 | |
| 5189.61 | P | | 2.23 | 4.81 | 1-2 | |
| 5212.997 | B | (0) | 2.22 | 4.59 | 0-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ti I** continued | | | | | | |
| 4995.062 | B | (0) | 2.24 | 4.71 | 2-3 | $b^3P$-$u^3D^o$ (216) |
| 4848.41 | P | | 2.24 | 4.79 | 2-3 | $b^3P$-$t^3D^o$ (217) |
| 4843.989 | B | 2 | 2.23 | 4.78 | 1-2 | |
| 4839.251 | E | (1) | 2.22 | 4.77 | 0-1 | |
| 4863.75 | P | | 2.24 | 4.78 | 2-2 | |
| 4854.727 | B | (00) | 2.23 | 4.77 | 1-1 | |
| *4404.276 | B | 10 | 2.24 | 5.04 | 2-3 | $b^3P$-$r^3D^o$ (218) |
| 4421.754 | A | 6 | 2.23 | 5.03 | 1-2 | |
| 4431.284 | B | 4 | 2.22 | 5.01 | 0-1 | |
| 4438.232 | B | 2 | 2.24 | 5.03 | 2-2 | |
| 4444.267 | B | (1) | 2.23 | 5.01 | 1-1 | |
| *4404.276 | B | 10 | 2.24 | 5.04 | 2-1 | $b^3P$-$x^3S^o$ (219) |
| 4388.077 | B | 3 | 2.23 | 5.04 | 1-1 | |
| 4375.425 | E | 1 | 2.22 | 5.04 | 0-1 | |
| 4303.465 | B | 8 | 2.24 | 5.18 | 2-2 | $b^3P$-$u^3P^o$ (220) |
| 4186.01 | P | | 2.23 | 5.18 | 1-1 | |
| 4200.752 | B | 6 | 2.24 | 5.18 | 2-1 | |
| 4183.294 | B | 4 | 2.23 | 5.18 | 1-0 | |
| 4188.694 | B | 5 | 2.23 | 5.18 | 1-2 | |
| 4174.472 | B | 3 | 2.22 | 5.18 | 0-1 | |
| 4138.894 | B | (1) | 2.24 | 5.22 | 2-3 | $b^3P$-$q^3D^o$ (221) |
| 4140.43 | P | | 2.23 | 5.21 | 1-2 | |
| 4139.48 | H | (1) | 2.22 | 5.20 | 0-1 | |
| 4154.865 | E | 2 | 2.24 | 5.21 | 2-3 | |
| 4150.809 | B | (0) | 2.23 | 5.20 | 1-1 | |
| 3698.183 | E | 3 | 2.24 | 5.58 | 2-2 | $b^3P$-$t^3P^o$ (222) |
| 3710.186 | E | (0) | 2.24 | 5.57 | 2-1 | |
| 3705.53 | J | (1) | 2.23 | 5.56 | 1-0 | |
| 3686.71 | H | (0) | 2.23 | 5.58 | 1-2 | |
| 3689.871 | E | (0) | 2.22 | 5.57 | 0-1 | |
| 10460.07 | C | 10 | 2.25 | 3.43 | 6-5 | $a^3H$-$y^3G^o$ (223) |
| 10553.02 | C | 8 | 2.24 | 3.41 | 5-4 | |
| 10565.97 | C | 5 | 2.23 | 3.39 | 4-3 | |
| 8438.93 | D | 75 | 2.25 | 3.71 | 6-5 | $a^3H$-$x^3G^o$ (224) |
| 8450.89 | D | 75 | 2.24 | 3.70 | 5-4 | |
| 8418.97 | D | 60 | 2.23 | 3.69 | 4-3 | |
| 8402.54 | D | 5 | 2.24 | 3.71 | 5-5 | |
| 7440.60 | E | (3) | 2.25 | 3.90 | 6-5 | $a^3H$-$w^3G^o$ (225) |
| 7489.81 | E | (2) | 2.24 | 3.89 | 5-4 | |
| 7496.12 | E | (2) | 2.23 | 3.87 | 4-3 | |
| 8745.58 | P | | 2.23 | 4.06 | 4-3 | $a^3H$-$y^1F^o$ (226) |
| 5999.668 | A | 8 | 2.23 | 4.28 | 4-5 | $a^3H$-$z^1H^o$ (227) |
| 5715.123 | A | 9 | 2.25 | 4.41 | 6-6 | $a^3H$-$y^3H^o$ (228) |
| 5739.464 | A | 9 | 2.24 | 4.39 | 5-5 | |
| 5739.975 | B | 4 | 2.23 | 4.38 | 4-4 | |
| 5756.45 | P | | 2.25 | 4.39 | 6-5 | |
| 5597.92 | I | (2n) | 2.24 | 4.44 | 5-4 | $a^3H$-$y^1G^o$ (229) |
| 5565.476 | A | 9 | 2.23 | 4.44 | 4-4 | |
| 5127.367 | E | (1) | 2.25 | 4.65 | 6-5 | $a^3H$-$v^3G^o$ (230) |
| 5133.931 | B | (0) | 2.24 | 4.64 | 5-4 | |
| 5122.082 | B | (00) | 2.23 | 4.84 | 4-3 | |
| 4856.012 | A | 20 | 2.25 | 4.79 | 6-7 | $a^3H$-$z^3I^o$ (231) |
| 4870.129 | A | 20 | 2.24 | 4.77 | 5-8 | |
| 4868.264 | A | 18 | 2.23 | 4.78 | 4-5 | |
| 4883.326 | B | 2 | 2.25 | 4.77 | 6-6 | |
| 4893.065 | B | 2 | 2.24 | 4.78 | 5-5 | |
| 4778.259 | A | 10 | 2.23 | 4.81 | 4-4 | $a^3H$-$x^1G^o$ (232) |
| 4759.272 | A | 25 | 2.25 | 4.84 | 6-6 | $a^3H$-$x^3H^o$ (233) |
| 4758.130 | A | 25 | 2.24 | 4.83 | 5-5 | |
| 4742.791 | A | 20 | 2.23 | 4.83 | 4-4 | |
| 4769.775 | B | 4 | 2.25 | 4.83 | 6-5 | |
| 4766.330 | B | 4 | 2.24 | 4.83 | 5-4 | |
| 4747.680 | B | 3 | 2.24 | 4.84 | 5-6 | |
| 4734.682 | B | 3 | 2.23 | 4.83 | 4-5 | |
| 4346.104 | A | 5 | 2.23 | 5.07 | 4-5 | $a^3H$-$y^1H^o$ (234) |
| 4318.631 | A | 10n | 2.25 | 5.10 | 6-5 | $a^3H$-$u^3G^o$ (235) |
| 4325.134 | A | 9n | 2.24 | 5.09 | 5-4 | |
| 4321.655 | A | 8n | 2.23 | 5.08 | 4-3 | |
| 4309.071 | B | 1 | 2.24 | 6.10 | 5-5 | |
| 8598.18 | D | 60 | 2.26 | 3.69 | 4-3 | $b^1G$-$x^3G^o$ (236) |
| 6861.47 | E | 6 | 2.26 | 4.06 | 4-3 | $b^1G$-$y^1F^o$ (237) |
| 8091.175 | A | 30 | 2.26 | 4.28 | 4-5 | $b^1G$-$z^1H^o$ (238) |
| 5823.879 | B | 3 | 2.26 | 4.38 | 4-4 | $b^1G$-$y^3H^o$ (239) |
| 5644.137 | A | 18 | 2.26 | 4.44 | 4-4 | $b^1G$-$y^1G^o$ (240) |
| 4838.135 | B | 6 | 2.26 | 4.81 | 4-4 | $b^1G$-$x^1G^o$ (241) |
| 4799.797 | A | 12 | 2.26 | 4.83 | 4-4 | $b^1G$-$x^3H^o$ (242) |
| 4424.401 | B | 2 | 2.26 | 5.05 | 4-4 | $b^1G$-$w^1G^o$ (243) |
| 4393.925 | A | 8 | 2.26 | 5.07 | 4-5 | $b^1G$-$y^1H^o$ (244) |
| 4368.941 | B | 2 | 2.26 | 5.08 | 4-3 | $b^1G$-$u^3G^o$ (245) |
| 3938.005 | B | 2n | 2.26 | 5.39 | 4-4 | $b^1G$-$v^1G^o$ (246) |
| 3574.345 | E | 8 | 2.26 | 5.71 | 4-4 | $b^1G$-$u^1G^o$ (247) |
| 9746.86 | D | 15 | 2.31 | 3.57 | 4-4 | $z^5D^o$-$a^5D$ † (248) |
| 9717.00 | D | 10 | 2.30 | 3.57 | 3-3 | |
| 9702.86 | D | 3 | 2.29 | 3.58 | 2-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ti I** continued | | | | | | |
| 5662.154 | A | 12 | 2.31 | 4.49 | 4-5 | $z^5D^o$-$e^5F$ (249) |
| 5675.413 | A | 9 | 2.30 | 4.47 | 3-4 | |
| 5689.465 | A | 10 | 2.29 | 4.46 | 2-3 | |
| 5703.666 | B | 6 | 2.28 | 4.45 | 1-2 | |
| 5713.895 | B | 3 | 2.28 | 4.44 | 0-1 | |
| 5708.199 | B | 3 | 2.31 | 4.47 | 4-4 | |
| 5711.852 | B | 4 | 2.30 | 4.46 | 3-3 | |
| 5716.450 | B | 4 | 2.29 | 4.45 | 2-2 | |
| 5720.445 | B | 3 | 2.28 | 4.44 | 1-1 | |
| 5739.08 | P | | 2.30 | 4.45 | 3-2 | |
| 4825.445 | B | 3 | 2.31 | 4.87 | 4-5 | $z^5D^o$-$f^5F$ (250) |
| 4827.597 | F | 2 | 2.30 | 4.85 | 3-4 | |
| 4832.065 | B | (0) | 2.29 | 4.84 | 2-3 | |
| 4837.42 | P | | 2.28 | 4.83 | 1-2 | |
| 4270.139 | B | 7n | 2.31 | 5.20 | 4-4 | $z^5D^o$-$g^3F$ (251) |
| 4273.312 | B | 2 | 2.30 | 5.18 | 3-3 | |
| 4291.88 | J | (1) | 2.31 | 5.18 | 4-3 | |
| 4251.769 | B | 2n | 2.30 | 5.20 | 3-4 | |
| 4260.738 | B | 2 | 2.29 | 5.18 | 2-3 | |
| 4256.025 | A | 8n | 2.31 | 5.21 | 4-4 | $z^5D^o$-$e^5D$ (252) |
| 4261.609 | B | 5n | 2.30 | 5.19 | 3-3 | |
| 4266.227 | B | 3n | 2.29 | 5.18 | 2-2 | |
| 4268.928 | E | (1n) | 2.28 | 5.17 | 1-1 | |
| 4280.069 | B | 2n | 2.31 | 5.19 | 4-3 | |
| 4278.829 | B | 3n | 2.30 | 5.18 | 3-2 | |
| 4276.657 | B | 2 | 2.29 | 5.17 | 2-1 | |
| 4274.408 | B | (0) | 2.28 | 5.17 | 1-0 | |
| 4237.786 | B | (0) | 2.30 | 5.21 | 3-4 | |
| 4249.114 | A | 5n | 2.29 | 5.19 | 2-3 | |
| 4258.523 | A | 4n | 2.28 | 5.18 | 1-2 | |
| 4265.273 | B | 3n | 2.28 | 5.17 | 0-1 | |
| 4137.284 | A | 10n | 2.31 | 5.29 | 4-3 | $z^5D^o$-$e^5P$ † (253) |
| 4143.048 | B | 7n | 2.30 | 5.27 | 3-2 | |
| 4150.557 | B | 3 | 2.29 | 5.26 | 2-1 | |
| 4130.037 | B | 2 | 2.30 | 5.29 | 3-3 | |
| 4131.244 | B | 4 | 2.29 | 5.27 | 2-2 | |
| 4143.280 | B | 3 | 2.28 | 5.26 | 1-1 | |
| 4058.139 | A | 7 | 2.31 | 5.35 | 4-5 | $z^5D^o$-$g^5F$ (254) |
| 4057.613 | B | 5 | 2.30 | 5.34 | 3-4 | |
| 4060.09 | P | | 2.29 | 5.33 | 2-3 | |
| m4064.22 | P | T1 | 2.28 | 5.32 | 1-2 | |
| 4068.661 | E | (1) | 2.28 | 5.31 | 0-1 | |
| 4074.356 | B | 3 | 2.31 | 5.34 | 4-4 | |
| 4071.469 | E | 2 | 2.30 | 5.33 | 3-3 | |
| 4071.211 | E | 2 | 2.29 | 5.32 | 2-2 | |
| 3323.896 | E | 2 | 2.31 | 6.02 | 4-5 | $z^5D^o$-$k^5F$ † (255) |
| 3323.660 | E | 2n | 2.30 | 6.01 | 3-4 | |
| 3335.365 | E | 1n | 2.29 | 6.00 | 2-3 | |
| 3328.326 | E | 1 | 2.28 | 5.99 | 1-2 | |
| 7038.80 | E | 6 | 2.33 | 4.09 | 2-2 | $c^3P$-$x^3P^o$ (256) |
| 7008.35 | E | (1) | 2.32 | 4.09 | 1-1 | |
| 7050.65 | E | (1) | 2.33 | 4.09 | 2-1 | |
| 7010.94 | I | (1) | 2.32 | 4.08 | 1-0 | |
| 6996.63 | E | (1) | 2.32 | 4.09 | 1-2 | |
| 7004.60 | J | (1) | 2.32 | 4.09 | 0-1 | |
| 6017.52 | P | | 2.32 | 4.37 | 1-1 | $c^3P$-$y^3S^o$ (257) |
| 5419.189 | B | 1 | 2.33 | 4.61 | 2-2 | $c^3P$-$y^5S^o$ (258) |
| 5429.139 | A | 6 | 2.33 | 4.61 | 2-2 | $c^3P$-$w^3P^o$ (259) |
| 5448.882 | B | (0) | 2.32 | 4.59 | 1-1 | |
| 5474.449 | B | (1) | 2.33 | 4.59 | 2-1 | |
| 5473.517 | B | (1) | 2.32 | 4.58 | 1-0 | |
| 5404.023 | E | 2 | 2.32 | 4.61 | 1-2 | |
| *5446.593 | B | 2 | 2.32 | 4.59 | 0-1 | |
| 4805.416 | A | 12 | 2.33 | 4.90 | 2-3 | $c^3P$-$s^3D^o$ (260) |
| 4792.482 | A | 10 | 2.32 | 4.90 | 1-2 | |
| 4796.210 | B | 6 | 2.32 | 4.90 | 0-1 | |
| 4813.240 | B | 5 | 2.33 | 4.90 | 2-2 | |
| 4797.983 | B | 5 | 2.32 | 4.90 | 1-1 | |
| 4637.887 | B | 8 | 2.33 | 5.00 | 2-2 | $c^3P$-$v^3P^o$ (261) |
| 4637.209 | E | 2 | 2.32 | 4.99 | 1-1 | |
| 4655.712 | B | 3 | 2.33 | 4.99 | 2-1 | |
| 4640.431 | E | 2 | 2.32 | 4.98 | 1-0 | |
| 4619.525 | E | 3 | 2.32 | 5.00 | 1-2 | |
| 4635.539 | E | 3 | 2.32 | 4.99 | 0-1 | |
| *4558.092 | B | 2 | 2.33 | 5.04 | 2-3 | $c^3P$-$r^3D^o$ (262) |
| 4576.551 | E | (0) | 2.32 | 5.02 | 1-2 | |
| 4598.99 | P | | 2.32 | 5.01 | 0-1 | |
| 4594.51 | P | | 2.33 | 5.02 | 2-2 | |
| *4558.092 | B | 2 | 2.33 | 5.04 | 2-1 | $c^3P$-$x^3S^o$ (263) |
| 6012.53 | H | (1) | 2.42 | 4.47 | 4-5 | $z^3F^o$-$b^3G$ (264) |
| 5982.52 | H | (0) | 2.40 | 4.46 | 3-4 | |
| 5971.07 | H | (0) | 2.39 | 4.45 | 2-3 | |
| 5477.695 | A | 8 | 2.42 | 4.67 | 4-4 | $z^3F^o$-$e^3F$ (265) |
| 5481.426 | A | 6 | 2.40 | 4.65 | 3-3 | |
| 5488.210 | A | 5 | 2.39 | 4.63 | 2-3 | |
| 5527.606 | B | (1) | 2.42 | 4.65 | 4-3 | |
| 5518.11 | P | | 2.40 | 4.63 | 3-2 | |
| 5432.318 | B | (0) | 2.40 | 4.67 | 3-4 | |
| 5451.965 | B | (1) | 2.39 | 4.65 | 2-3 | |
| 4563.437 | B | 5 | 2.42 | 5.12 | 4-5 | $z^3F^o$-$e^3G$ (266) |
| 4555.069 | B | 3 | 2.40 | 5.11 | 3-4 | |
| 4570.906 | B | 3n | 2.39 | 5.09 | 2-3 | |
| 4586.95 | P | | 2.42 | 5.11 | 4-4 | |
| 4436.64 | H | (1) | 2.42 | 5.30 | 4-4 | $z^3F^o$-$g^3F$ (267) |
| 4430.033 | B | 3 | 2.40 | 5.18 | 3-3 | |
| 4433.578 | B | 3 | 2.39 | 5.17 | 2-2 | |
| 3708.625 | B | 4n | 2.42 | 5.74 | 4-4 | $z^3F^o$-$h^3F$ (268) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ti I** continued | | | | | | |
| 5648.570 | A | 5 | 2.48 | 4.87 | 3-4 | $z^3D^o$-$e^3F$ |
| 5663.891 | B | 4 | 2.47 | 4.65 | 2-3 | (269) |
| 5679.908 | B | 2 | 2.46 | 4.63 | 1-2 | |
| 4548.094 | B | 2 | 2.48 | 5.20 | 3-4 | $z^3D^o$-$g^3F$ |
| 4547.850 | E | 2 | 2.47 | 5.18 | 2-3 | (270) |
| 4557.857 | B | 2 | 2.46 | 5.17 | 1-2 | |
| 3481.675 | E | 3 | 2.48 | 6.03 | 3-3 | $z^3D^o$-$e^3D$ |
| 3481.186 | E | 3 | 2.47 | 6.02 | 2-2 | (271) |
| 3473.793 | E | 2 | 2.46 | 6.02 | 1-1 | |
| 7352.16 | E | (1) | 2.48 | 4.18 | 1-1 | $a^1P$-$z^1P^o$ (272) |
| 6716.679 | E | (1) | 2.48 | 4.31 | 1-1 | $a^1P$-$y^1P^o$ (273) |
| 6677.25 | J | (0) | 2.48 | 4.33 | 1-2 | $a^1P$-$x^1D^o$ (274) |
| •5511.795 | B | 2 | 2.48 | 4.72 | 1-0 | $a^1P$-$z^1S^o$ (275) |
| 5206.059 | B | 5 | 2.48 | 4.85 | 1-1 | $a^1P$-$w^1P^o$ (276) |
| 4372.383 | A | 3 | 2.46 | 5.30 | 1-1 | $a^1P$-$v^1P^o$ (277) |
| 4287.654 | B | 5 | 2.46 | 5.40 | 1-2 | $a^1P$-$w^1D^o$ (278) |
| 4211.729 | E | 4 | 2.48 | 5.41 | 1-2 | $a^1P$-$v^1D^o$ (279) |
| 5741.192 | B | 1 | 2.49 | 4.64 | 2-3 | $b^1D$-$x^1F^o$ (280) |
| 5298.439 | A | 4 | 2.49 | 4.82 | 2-1 | $b^1D$-$x^1P^o$ (281) |
| 5246.143 | B | 2 | 2.49 | 4.85 | 2-1 | $b^1D$-$w^1P^o$ (282) |
| 4975.344 | A | 10 | 2.49 | 4.96 | 2-3 | $b^1D$-$w^1F^o$ (283) |
| 4237.889 | A | 7 | 2.49 | 5.41 | 2-2 | $b^1D$-$v^1D^o$ (284) |
| 7189.89 | E | 2 | 2.57 | 4.28 | 5-5 | $a^1H$-$z^1H^o$ (285) |
| 6575.180 | E | 3 | 2.57 | 4.44 | 5-4 | $a^1H$-$y^1G^o$ (286) |
| 5503.897 | A | 6 | 2.57 | 4.81 | 5-4 | $a^1H$-$x^1G^o$ (287) |
| 5120.420 | A | 12 | 2.57 | 4.98 | 5-8 | $a^1H$-$z^1I^o$ (288) |
| 4938.283 | A | 8 | 2.57 | 5.07 | 5-5 | $a^1H$-$y^1H^o$ (289) |
| 4369.682 | A | 5n | 2.57 | 5.39 | 5-4 | $a^1H$-$v^1G^o$ (290) |
| 4278.231 | B | 7 | 2.57 | 5.45 | 5-5 | $a^1H$-$x^1H^o$ (291) |
| 3926.319 | B | 10 | 2.57 | 5.71 | 5-4 | $a^1H$-$u^1G^o$ (292) |
| 6215.312 | B | 20 | 2.68 | 4.87 | 5-4 | $z^3G^o$-$e^3F$ |
| 6220.460 | B | 12 | 2.87 | 4.65 | 4-3 | (293) |
| 6221.41 | E | 8 | 2.65 | 4.83 | 3-2 | |
| 5064.068 | B | 4 | 2.68 | 5.12 | 5-5 | $z^3G^o$-$e^3G$ |
| •5054.070 | B | 3 | 2.87 | 5.11 | 4-4 | (294) |
| 5068.332 | B | 3 | 2.85 | 5.09 | 3-3 | |
| 4908.46 | P | | 2.68 | 5.20 | 5-4 | $z^3G^o$-$g^3F$ |
| 4900.635 | E | (7) | 2.87 | 5.16 | 4-3 | (295) |
| 4900.03 | P | | 2.85 | 5.17 | 3-2 | |
| 4127.531 | A | 15 | 2.68 | 5.87 | 5-6 | $z^3G^o$-$f^3H$ |
| 4123.559 | B | 10 | 2.67 | 5.86 | 4-5 | (296) |
| 4122.143 | A | 10 | 2.65 | 5.84 | 3-4 | |
| 4149.445 | B | (0) | 2.68 | 5.66 | 5-5 | |
| 4142.480 | B | 2 | 2.67 | 5.84 | 4-4 | |
| 4032.628 | B | 3n | 2.88 | 5.74 | 5-4 | $z^3G^o$-$h^3F$ (297) |
| 5259.976 | B | 3 | 2.73 | 5.07 | 2-3 | $z^1D^o$-$e^1F$ (298) |
| 4068.981 | B | 4n | 2.73 | 5.78 | 2-3 | $z^1D^o$-$f^1F$ (299) |
| 5351.073 | B | 4 | 2.77 | 5.07 | 3-3 | $z^1F^o$-$e^1F$ (300) |
| 4224.795 | B | 5 | 2.77 | 5.89 | 3-4 | $z^1F^o$-$e^1G$ (301) |
| 4123.287 | B | 5n | 2.77 | 5.78 | 3-3 | $z^1F^o$-$f^1F$ (302) |
| 3608.082 | E | 1 | 2.77 | 6.19 | 3-2 | $z^1F^o$-$f^1D$ (303) |
| 6098.855 | B | 7 | 3.05 | 5.07 | 4-3 | $z^1G^o$-$e^1F$ (304) |
| 4808.531 | B | 5 | 3.05 | 5.82 | 4-5 | $z^1G^o$-$e^1H$ (305) |
| 4688.392 | B | 3 | 3.08 | 5.71 | 1-2 | $z^3S^o$-$e^3P$ (306) |
| 7069.11 | I | 2 | 3.17 | 4.91 | 3-4 | $y^3D^o$-$f^3F$ |
| 7039.38 | E | (1) | 3.14 | 4.89 | 2-3 | (307) |
| 7035.88 | E | (2) | 3.13 | 4.88 | 1-2 | |
| 7998.53 | E | (3) | 3.32 | 4.87 | 6-5 | $y^5G^o$-$f^5F$ |
| •7978.88 | E | (4) | 3.31 | 4.85 | 5-4 | (308) |
| 7961.58 | E | (2) | 3.29 | 4.84 | 4-3 | |
| 7943.93 | E | (1n?) | 3.28 | 4.83 | 3-2 | |
| 7926.37 | E | (1) | 3.27 | 4.83 | 2-1 | |
| 7909.34 | P | | 3.30 | 4.87 | 5-5 | |
| 5804.265 | A | 5n | 3.32 | 5.45 | 6-7 | $y^5G^o$-$f^5H$ (309) |
| 5785.979 | A | 5n | 3.31 | 5.44 | 5-8 | |
| 5774.037 | A | 5n | 3.29 | 5.43 | 4-5 | |
| 5786.330 | A | 4n | 3.28 | 5.42 | 3-4 | |
| 5782.295 | B | 4n | 3.27 | 5.41 | 2-3 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ti I** continued | | | | | | |
| 5832.47 | H | (1) | 3.32 | 5.44 | 6-8 | $y^5G^o$-$f^5H$ |
| 5812.827 | B | (1) | 3.31 | 5.43 | 5-5 | cont |
| 5797.445 | B | (1) | 3.29 | 5.42 | 4-4 | |
| 5785.67 | E | (1) | 3.28 | 5.41 | 3-3 | |
| 10896.10 | C | 8 | 3.34 | 4.47 | 4-5 | $x^3F^o$-$b^3G$† |
| 10820.31 | C | 5 | 3.32 | 4.46 | 3-4 | (310) |
| 10793.85 | C | 3 | 3.31 | 4.45 | 2-3 | |
| 5995.685 | E | 2 | 3.45 | 5.50 | 2-2 | $y^1D^o$-$e^1D$ (311) |
| 9506.04 | D | 25 | 3.57 | 4.87 | 5-5 | $y^5F^o$-$f^5F$† |
| 9508.49 | D | 20 | 3.55 | 4.85 | 4-4 | (312) |
| 9510.81 | D | 12 | 3.54 | 4.64 | 3-3 | |
| 9511.60 | D | 8 | 3.54 | 4.83 | 2-2 | |
| 9511.55 | D | 10 | 3.53 | 4.83 | 1-1 | |
| •8496.03 | D | 60 | 3.68 | 5.13 | 3-3 | $a^1F$-$v^1F^o$ (313) |
| 7214.97 | H | (0) | 3.68 | 5.39 | 3-4 | $a^1F$-$v^1G^o$ (314) |
| 10147.09 | C | 4 | 3.90 | 5.12 | 5-5 | $w^3G^o$-$e^3G$ |
| 10119.20 | C | 3 | 3.89 | 5.11 | 4-4 | (315) |
| 10179.92 | C | 3 | 3.87 | 5.09 | 3-3 | |
| 5341.492 | B | 1 | 4.31 | 8.62 | 1-1 | $y^1P^o$-$e^1P$ (316) |

Strongest Unclassified Lines of **Ti I**

| | | | | |
|---|---|---|---|---|
| 11609.41 | C | 3 | | |
| 11539.50 | C | 5 | | |
| 11403.89 | C | 6 | | |
| 11381.53 | C | 7 | | |
| 11230.91 | C | 5 | | |
| 10145.48 | C | 8 | | |
| 9981.18 | D | 5 | | |
| 8841.47 | D | 40 | | |
| 8418.70 | D | 10 | | |
| 8585.62 | E | 4 | V | |
| 5369.635 | A | 4 | III | |
| 4599.226 | A | 5 | IV | |
| 4539.096 | B | 3 | IV | |
| 4511.176 | B | 3 | IV | |
| 4495.006 | B | 4 | III | |
| 4139.186 | B | 4 | III | |
| 4121.637 | B | 4 | III | |
| 4027.426 | B | 4 | IV | |
| 3985.246 | B | 3 | III | |
| 3861.079 | B | 3n | IV? | |
| 3846.438 | B | 6n | IV | |
| 3836.763 | B | 5 | IV | |
| 3833.874 | B | 4 | III | |
| 3833.188 | B | 4 | IV | |
| 3735.660 | B | 4n | IV | |
| 3715.371 | B | 3n | IV | |
| 3700.055 | B | 4n | IV | |
| 3844.699 | E | 4 | IV | |
| 3633.458 | E | 5 | IV | |
| 3631.999 | E | 3 | IV | |
| 3585.852 | E | 4 | III? | |
| 3556.184 | E | 3 | IV | |
| 3507.436 | E | 3 | IV | |
| 3459.431 | E | 3 | III | |
| 3435.432 | E | 3 | III | |
| •3130.804§ | A | 15? | IV | |
| 3007.487 | E | 4N | IV | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ti II** continued | | | | | | |
| 3088.027 | A | 75 | 0.05 | 4.05 | 4½-3½ | $a^4F$-$z^4D^o$ |
| 3078.645 | A | 50 | 0.03 | 4.04 | 3½-2½ | (5) |
| 3075.325 | A | 40 | 0.01 | 4.02 | 2½-1½ | |
| 3072.971 | C | 40 | 0.00 | 4.02 | 1½- ½ | |
| 3072.107 | C | 30 | 0.03 | 4.05 | 3½-3½ | |
| 3066.220 | C | 30 | 0.01 | 4.04 | 2½-2½ | |
| 3066.354 | C | 20 | 0.00 | 4.02 | 1½-1½ | |
| •3059.741 | C | 4 | 0.01 | 4.05 | 2½-3½ | |
| 3057.395 | C | 10 | 0.00 | 4.04 | 1½-2½ | |
| 3444.308 | A | 30 | 0.15 | 3.73 | 4½-5½ | $b^4F$-$z^4G^o$ |
| 3461.496 | A | 20 | 0.13 | 3.70 | 3½-4½ | (6) |
| 3477.181 | A | 15 | 0.12 | 3.87 | 2½-3½ | |
| 3491.053 | A | 10 | 0.11 | 3.65 | 1½-2½ | |
| 3476.982 | C | tr | 0.15 | 3.70 | 4½-4½ | |
| 3489.739 | C | 2 | 0.13 | 3.87 | 3½-3½ | |
| 3500.340 | C | 2 | 0.12 | 3.65 | 2½-2½ | |
| 3505.45 | P | | 0.15 | 3.87 | 4½-3½ | |
| 3513.09 | F | tr | 0.13 | 3.65 | 3½-2½ | |
| 3332.936 | A | 75 | 0.15 | 3.86 | 4½-4½ | $b^4F$-$z^4F^o$ |
| 3329.455 | A | 70 | 0.13 | 3.84 | 3½-3½ | (7) |
| 3335.193 | A | 40 | 0.12 | 3.82 | 2½-2½ | |
| 3340.344 | A | 35 | 0.11 | 3.81 | 1½-1½ | |
| 3343.770 | C | 10 | 0.15 | 3.84 | 4½-3½ | |
| 3346.724 | D | 15 | 0.13 | 3.82 | 3½-2½ | |
| 3348.844 | C | 10? | 0.12 | 3.81 | 2½-1½ | |
| 3308.608 | C | 8 | 0.13 | 3.86 | 3½-4½ | |
| 3316.024 | A | 10 | 0.12 | 3.84 | 2½-3½ | |
| 3326.762 | A | 20 | 0.11 | 3.82 | 1½-2½ | |
| 3302.098 | C | 0 | 0.15 | 3.89 | 4½-3½ | $b^4F$-$z^2F^o$ |
| 3319.083 | C | (1) | 0.13 | 3.85 | 3½-2½ | (8) |
| 3288.142 | C | 0n | 0.13 | 3.89 | 3½-3½ | |
| 3307.717 | C | tr | 0.12 | 3.85 | 2½-2½ | |
| 3276.998 | C | tr | 0.12 | 3.89 | 2½-3½ | |
| m3299.44 | P | Ti | 0.11 | 3.85 | 1½-2½ | |
| 3231.315 | C | 4 | 0.13 | 3.95 | 3½-2½ | $b^4F$-$z^2D^o$ |
| 3248.70 | P | | 0.12 | 3.92 | 2½-1½ | (9) |
| 3220.467 | C | 1 | 0.12 | 3.95 | 2½-2½ | |
| 3240.71 | C | 1 | 0.11 | 3.92 | 1½-1½ | |
| 3212.70 | P | | 0.11 | 3.95 | 1½-2½ | |
| 3168.519 | A | 40 | 0.15 | 4.05 | 4½-3½ | $b^4F$-$z^4D^o$ |
| 3182.570 | C | 35 | 0.13 | 4.04 | 3½-2½ | (10) |
| 3161.755 | A | 30 | 0.12 | 4.02 | 2½-1½ | |
| 3161.305 | C | 25 | 0.11 | 4.02 | 1½- ½ | |
| 3155.670 | C | 12 | 0.13 | 4.05 | 3½-3½ | |
| 3152.351 | C | 15 | 0.12 | 4.04 | 2½-2½ | |
| 3154.195 | C | 12 | 0.11 | 4.03 | 1½-1½ | |
| •3145.402 | C | 0 | 0.12 | 4.05 | 2½-3½? | |
| m3144.74 | P | Ti+ | 0.11 | 4.04 | 1½-2½ | |
| 3987.63 | P | | 0.60 | 3.70 | 3½-4½ | $a^2F$-$z^4G^o$ |
| 3981.996 | B | tr | 0.57 | 3.67 | 2½-3½ | (11) |
| 4025.136 | C | 2 | 0.60 | 3.67 | 3½-3½ | |
| 4012.372 | B | 4 | 0.57 | 3.65 | 2½-2½ | |
| 4056.212 | C | (1) | 0.60 | 3.85 | 3½-2½ | |
| 3786.33 | P | | 0.60 | 3.88 | 3½-4½ | $a^2F$-$z^4F^o$ |
| 3774.650 | C | (3n) | 0.57 | 3.84 | 2½-3½ | (12) |
| 3813.390 | B | 2 | 0.60 | 3.84 | 3½-3½ | |
| 3796.899 | B | 2n | 0.57 | 3.82 | 2½-2½ | |
| 3836.085 | B | 1 | 0.60 | 3.83 | 3½-2½ | |
| 3814.580 | B | 4 | 0.57 | 3.81 | 2½-1½ | |
| 3759.291 | A | 200 | 0.60 | 3.89 | 3½-3½ | $a^2F$-$z^2F^o$ |
| 3761.320 | A | 200 | 0.57 | 3.85 | 2½-2½ | (13) |
| 3799.81 | F | tr | 0.60 | 3.85 | 3½-2½ | |
| 3721.832 | B | 15 | 0.57 | 3.89 | 2½-3½ | |
| •3685.192 | A | 250 | (0.60 | 3.95 | 3½-2½ | $a^2F$-$z^2D^o$ |
| | | | (0.57 | 3.92 | 2½-1½ | (14) |
| 3649.01 | P | | 0.57 | 3.95 | 2½-2½ | |
| 3587.130 | C | 12 | 0.60 | 4.05 | 3½-3½ | $a^2F$-$z^4D^o$ |
| 3561.575 | C | 3 | 0.57 | 4.04 | 2½-2½ | (15) |
| 3596.048 | A | 60 | 0.60 | 4.04 | 3½-2½ | |
| 3573.737 | C | 20 | 0.57 | 4.02 | 2½-1½ | |
| 3552.85 | P | | 0.57 | 4.05 | 2½-3½ | |
| 3349.035 | C | 75 | 0.60 | 4.29 | 3½-4½ | $a^2F$-$z^2G^o$ |
| •3341.675§ | A | 100 | 0.57 | 4.28 | 2½-3½ | (16) |
| 3372.208 | C | 10? | 0.60 | 4.28 | 3½-3½ | |
| 4762.77 | F | (1) | 1.08 | 3.67 | 2½-3½ | $a^2D$-$z^4G^o$ |
| 4798.535 | C | (2) | 1.06 | 3.65 | 1½-2½ | (17) |
| 4808.33 | P | | 1.08 | 3.85 | 2½-2½ | |
| 4469.160 | C | tr | 1.06 | 3.84 | 2½-3½ | $a^2D$-$z^4F^o$ |
| 4493.53 | C | (1) | 1.08 | 3.82 | 1½-2½ | (18) |
| 4500.32 | P | | 1.08 | 3.82 | 2½-2½ | |
| 4518.30 | P | | 1.08 | 3.81 | 1½-1½ | |
| 4525.21 | P | | 1.08 | 3.81 | 2½-1½ | |
| 4395.031 | A | 60 | 1.08 | 3.89 | 2½-3½ | $a^2D$-$z^2F^o$ |
| 4443.602 | A | 50 | 1.08 | 3.85 | 1½-2½ | (19) |
| 4450.467 | B | 10 | 1.08 | 3.85 | 2½-2½ | |
| 4294.101 | A | 40 | 1.08 | 3.95 | 2½-2½ | $a^2D$-$z^2D^o$ |
| 4337.918 | A | 50 | 1.08 | 3.92 | 1½-1½ | (20) |
| 4344.291 | B | 2 | 1.08 | 3.92 | 2½-1½ | |
| 4287.893 | B | 2 | 1.08 | 3.95 | 1½-2½ | |
| 4181.524 | B | 1 | 1.08 | 4.05 | 2½-3½ | $a^2D$-$z^4D^o$ |
| 4187.87 | P | | 1.08 | 4.04 | 1½-2½ | (21) |
| 4173.537 | B | 1 | 1.08 | 4.04 | 2½-2½ | |
| 4184.329 | C | 0 | 1.08 | 4.03 | 1½-1½ | |
| 4190.29 | F | (1) | 1.08 | 4.03 | 2½-1½ | |
| 4198.64 | P | | 1.08 | 4.03 | 1½- ½ | |
| 3480.897 | C | 0 | 1.08 | 4.82 | 1½- ½ | $a^2D$-$z^2S^o$ (22) |

**Ti II** I P 13.8 Anal A Liet A Oct 1940

| | | | | | | |
|---|---|---|---|---|---|---|
| 3349.399// | A | 125 | 0.05 | 3.73 | 4½-5½ | $a^4F$-$z^4G^o$ |
| 3381.213 | A | 125 | 0.03 | 3.70 | 3½-4½ | (1) |
| 3372.800 | C | 100 | 0.01 | 3.87 | 2½-3½ | |
| 3383.781 | A | 125 | 0.00 | 3.65 | 1½-2½ | |
| 3380.278 | A | 30 | 0.05 | 3.70 | 4½-4½ | |
| 3387.834 | A | 50 | 0.03 | 3.87 | 3½-3½ | |
| 3394.574 | A | 40 | 0.01 | 3.85 | 2½-2½ | |
| 3407.205 | C | 3 | 0.05 | 3.87 | 4½-3½ | |
| 3409.809 | C | 4 | 0.03 | 3.85 | 3½-2½ | |
| 3234.517 | A | 75 | 0.05 | 3.88 | 4½-4½ | $a^4F$-$z^4F^o$ |
| 3236.573 | A | 70 | 0.03 | 3.84 | 3½-3½ | (2) |
| 3239.037 | A | 60 | 0.01 | 3.83 | 2½-2½ | |
| 3241.984 | A | 60 | 0.00 | 3.81 | 1½-1½ | |
| 3254.250 | C | 30 | 0.05 | 3.84 | 4½-3½ | |
| 3252.914 | C | 40 | 0.03 | 3.83 | 3½-2½ | |
| 3251.911 | C | 30 | 0.01 | 3.81 | 2½-1½ | |
| 3217.058 | A | 30 | 0.03 | 3.86 | 3½-4½ | |
| 3232.843 | A | 35 | 0.01 | 3.84 | 2½-3½ | |
| 3229.193 | C | 40 | 0.00 | 3.82 | 1½-2½ | |
| 3214.750 | C | 4 | 0.05 | 3.89 | 4½-3½ | $a^4F$-$z^2F^o$ |
| 3228.771 | C | 2 | 0.03 | 3.85 | 3½-2½ | (3) |
| 3197.518 | C | 2 | 0.03 | 3.89 | 3½-3½ | |
| •3213.145§ | C | 1 | 0.01 | 3.85 | 2½-2½ | |
| 3184.09 | C | 2 | 0.01 | 3.89 | 2½-3½ | |
| 3203.435 | C | 3 | 0.00 | 3.85 | 1½-2½ | |
| 3143.756 | C | 10 | 0.03 | 3.95 | 3½-2½ | $a^4F$-$z^2D^o$ |
| 3157.397 | C | 2 | 0.01 | 3.92 | 2½-1½ | (4) |
| •3130.804§ | A | 15 | 0.01 | 3.95 | 2½-2½ | |
| 3148.033 | A | 12 | 0.00 | 3.93 | 1½-1½ | |
| 3121.599 | C | 1 | 0.00 | 3.95 | 1½-2½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ti II** continued | | | | | | |
| 3252.94 | P | Ti+ | 1.08 | 4.87 | 2½-3½ | $a^3D$-$y^3D^o$ |
| 3275.293 | C | 3 | 1.08 | 4.84 | 1½-1½ | (23) |
| 3278.922§ | C | 35 | 1.08 | 4.84 | 2½-1½ | |
| 3249.370 | C | 2 | 1.08 | 4.87 | 1½-2½ | |
| 3239.664 | C | 30 | 1.08 | 4.89 | 2½-1½ | $a^3D$-$z^3P^o$ |
| 3238.605 | C | 30 | 1.08 | 4.90 | 1½- ½ | (24) |
| 3238.122 | C | 20 | 1.08 | 4.89 | 1½-1½ | |
| 3195.717 | C | 3 | 1.08 | 4.94 | 2½-1½ | $a^3D$-$z^4G^o$ |
| 3192.26 | C | 2 | 1.08 | 4.94 | 1½-1½ | (25) |
| 3190.874 | C | 30 | 1.08 | 4.95 | 2½-3½ | $a^3D$-$y^3F^o$ |
| 3202.535 | A | 40 | 1.08 | 4.93 | 1½-2½ | (26) |
| 3205.990 | C | 1 | 1.08 | 4.93 | 2½-2½ | |
| 3118.824 | C | 2 | 1.08 | 5.04 | 2½-3½ | $a^3D$-$y^4D^o$ |
| 3138.77 | F | tr | 1.08 | 5.01 | 1½-2½ | (27) |
| 3140.04 | P | | 1.08 | 5.01 | 2½-2½ | |
| 3152.14 | P | | 1.08 | 4.99 | 1½-1½ | |
| 3155.50 | P | | 1.08 | 4.99 | 2½-1½ | |
| 3181.66 | P | | 1.08 | 4.98 | 1½- ½ | |
| 2987.40 | F | 1 | 1.08 | 5.21 | 2½-3½ | $a^3D$-$z^4P^o$ |
| 2996.88 | P | | 1.08 | 5.19 | 1½-1½ | (28) |
| 2999.92 | P | | 1.08 | 5.19 | 2½-1½ | |
| 3003.37 | P | | 1.08 | 5.18 | 1½- ½ | |
| 2984.35 | P | | 1.08 | 5.21 | 1½-2½ | |
| 4732.98 | P | | 1.13 | 3.73 | 4½-5½ | $a^3G$-$z^4G^o$ |
| 4787.30 | P | | 1.11 | 3.70 | 3½-4½ | (29) |
| 4794.84 | P | | 1.13 | 3.70 | 4½-4½ | |
| 4831.01 | P | | 1.11 | 3.67 | 3½-3½ | |
| 4849.18 | P | | 1.13 | 3.67 | 4½-3½ | |
| 4865.620 | C | tr | 1.11 | 3.85 | 3½-2½ | |
| 4508.74 | P | | 1.13 | 3.88 | 4½-4½ | $a^3G$-$z^4F^o$ |
| 4520.37 | P | | 1.11 | 3.84 | 3½-3½ | (30) |
| 4545.144 | C | tr | 1.13 | 3.84 | 4½-3½ | |
| 4552.25 | P | | 1.11 | 3.82 | 3½-2½ | |
| 4482.40 | P | | 1.11 | 3.88 | 3½-4½ | |
| 4468.493 | A | 50 | 1.13 | 3.89 | 4½-3½ | $a^3G$-$z^2F^o$ |
| 4501.370 | A | 40 | 1.11 | 3.85 | 3½-2½ | (31) |
| 4444.559 | B | 1 | 1.11 | 3.89 | 3½-3½ | |
| 4341.369 | B | 1 | 1.11 | 3.95 | 3½-2½ | $a^3G$-$z^2D^o$ (32) |
| 4237.34 | P | | 1.13 | 4.05 | 4½-3½ | $a^3G$-$z^4D^o$ |
| 4218.18 | P | | 1.11 | 4.04 | 3½-2½ | (33) |
| 4205.92 | P | | 1.11 | 4.05 | 3½-3½ | |
| 3900.546 | A | 70 | 1.13 | 4.29 | 4½-4½ | $a^3G$-$z^2G^o$ |
| 3913.464 | A | 60 | 1.11 | 4.26 | 3½-3½ | (34) |
| 3932.007 | B | 2 | 1.13 | 4.26 | 4½-3½ | |
| 3882.28 | P | | 1.11 | 4.29 | 3½-4½ | |
| 3279.995 | C | 4 | 1.11 | 4.87 | 3½-2½ | $a^3G$-$y^3D^o$ (35) |
| 3329.397 | A | 35 | 1.13 | 4.95 | 4½-3½ | $a^3G$-$y^3F^o$ |
| 3332.280 | C | 30 | 1.11 | 4.93 | 3½-2½ | (36) |
| 3318.88 | P | | 1.11 | 4.95 | 3½-3½ | |
| 3155.63 | P | | 1.13 | 5.04 | 4½-3½ | $a^3G$-$y^4D^o$ |
| 3165.24 | P | | 1.11 | 5.01 | 3½-2½ | (37) |
| 3143.68 | P | | 1.11 | 5.04 | 3½-3½ | |
| m4639.29 | P | Ti | 1.18 | 3.84 | 2½-3½ | $a^4P$-$z^4F^o$ |
| 4636.345 | C | (1) | 1.18 | 3.83 | 1½-2½ | (38) |
| m4655.75 | P | Ti | 1.18 | 3.81 | ½-1½ | |
| 4662.74 | P | | 1.18 | 3.83 | 2½-2½ | |
| 4682.71 | P | | 1.18 | 3.81 | 1½-1½ | |
| 4689.46 | P | | 1.18 | 3.81 | 2½-1½ | |
| 4549.82 | P | | 1.18 | 3.89 | 2½-3½ | $a^4P$-$z^2F^o$ |
| 4583.443 | C | (1) | 1.18 | 3.85 | 1½-2½ | (39) |
| 4609.38 | P | | 1.18 | 3.85 | 2½-2½ | |
| 4441.73 | P | | 1.18 | 3.95 | 2½-2½ | $a^4P$-$z^2D^o$ |
| 4470.864 | B | tr | 1.18 | 3.93 | 1½-1½ | (40) |
| 4495.46 | P | | 1.18 | 3.93 | 2½-1½ | |
| 4417.718 | B | 40 | 1.18 | 3.95 | 1½-2½ | |
| 4464.458 | B | 1 | 1.16 | 3.93 | ½-1½ | |
| 4300.052 | B | 60 | 1.18 | 4.05 | 2½-3½ | $a^4P$-$z^4D^o$ |
| 4290.232 | B | 50 | 1.16 | 4.04 | 1½-2½ | (41) |
| 4301.928 | B | 15 | 1.18 | 4.03 | ½-1½ | |
| 4312.881 | A | 35 | 1.18 | 4.04 | 2½-2½ | |
| 4307.900 | A | 40 | 1.16 | 4.03 | 1½-1½ | |
| 4314.979 | B | 40 | 1.18 | 4.03 | ½- ½ | |
| 4330.708 | B | 0 | 1.18 | 4.03 | 2½-1½ | |
| 4320.985 | B | 1 | 1.16 | 4.03 | 1½- ½ | |
| 3588.00 | F | 8 | 1.18 | 4.62 | 1½- ½ | $a^4P$-$z^2S^o$ |
| 3561.910 | C | 1 | 1.18 | 4.62 | ½- ½ | (42) |
| 3338.998 | C | tr | 1.18 | 4.87 | 2½-2½ | $a^4P$-$y^3D^o$ |
| 3350.548§ | C | 1 | 1.16 | 4.84 | 1½-1½ | (43) |
| 3364.30 | P | | 1.18 | 4.84 | 2½-1½ | |
| 3323.39 | P | | 1.18 | 4.87 | 1½-2½ | |
| 3348.91 | P | | 1.16 | 4.84 | ½-1½ | |
| m3322.98 | P | Ti+ | 1.18 | 4.89 | 2½-1½ | $a^4P$-$z^2P^o$ |
| 3301.71 | F | (2) | 1.16 | 4.90 | 1½- ½ | (44) |
| m3309.53 | P | Ti | 1.16 | 4.89 | 1½-1½ | |
| 3298.31 | F | (1) | 1.18 | 4.90 | ½- ½ | |
| 3308.053 | C | tr | 1.18 | 4.89 | ½-1½ | |
| 3278.774 | C | 5 | 1.18 | 4.94 | 2½-1½ | $a^4P$-$z^4S^o$ |
| 3283.688 | C | 4 | 1.18 | 4.94 | 1½-1½ | (45) |
| 3260.259§ | C | 3 | 1.18 | 4.94 | ½-1½ | |
| 3195.994 | C | tr | 1.18 | 5.04 | 2½-3½ | $a^4P$-$y^4D^o$ |
| 3205.64 | P | | 1.18 | 5.01 | 1½-2½ | (46) |
| 3218.44 | P | | 1.18 | 4.99 | ½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ti II** continued | | | | | | |
| m3218.26 | P | Ti+ | 1.18 | 5.01 | 2½-2½ | $a^4P$-$y^4D^o$ |
| 3221.76 | P | | 1.18 | 4.99 | 1½-1½ | cont |
| 3228.36 | P | | 1.16 | 4.98 | ½- ½ | |
| m3234.50 | P | Ti+ | 1.18 | 4.99 | 2½-1½ | |
| 3231.71 | P | | 1.16 | 4.98 | 1½- ½ | |
| 3058.090 | C | 50 | 1.18 | 5.21 | 2½-3½ | $a^4P$-$z^4P^o$ |
| 3059.741 | C | 6 | 1.16 | 5.19 | 1½-1½ | (47) |
| 3063.502 | C | 4 | 1.16 | 5.18 | ½- ½ | |
| 3071.342 | C | 15 | 1.18 | 5.19 | 2½-1½ | |
| 3066.514 | C | 3 | 1.16 | 5.18 | 1½- ½ | |
| 3046.685 | C | 30 | 1.16 | 5.21 | 1½-2½ | |
| 3056.740 | C | 15 | 1.16 | 5.19 | ½-1½ | |
| 4764.535 | C | (1) | 1.23 | 3.82 | 1½-2½ | $a^2P$-$z^4F^o$ |
| 4783.84 | P | | 1.22 | 3.81 | ½-1½ | (48) |
| 4792.39 | P | | 1.23 | 3.81 | 1½-1½ | |
| 4708.663 | C | tr | 1.23 | 3.85 | 1½-2½ | $a^2P$-$z^2F^o$ (49) |
| 4533.988 | B | 30 | 1.23 | 3.95 | 1½-2½ | $a^2P$-$z^2D^o$ |
| 4583.761 | A | 30 | 1.23 | 3.92 | ½-1½ | (50) |
| 4589.961 | B | 2 | 1.23 | 3.92 | 1½-1½ | |
| 4399.787 | A | 35 | 1.23 | 4.04 | 1½-2½ | $a^2P$-$z^4D^o$ |
| 4394.057 | B | 2 | 1.22 | 4.02 | ½-1½ | (51) |
| 4418.340 | B | 1 | 1.23 | 4.03 | 1½-1½ | |
| 4407.678 | C | 1 | 1.22 | 4.03 | ½- ½ | |
| 4432.089 | C | tr | 1.23 | 4.03 | 1½- ½ | |
| 3841.330 | A | 100 | 1.23 | 4.82 | 1½- ½ | $a^3P$-$z^3S^o$ |
| 3624.836 | A | 70 | 1.22 | 4.82 | ½- ½ | (52) |
| 3388.755 | C | 8 | 1.23 | 4.87 | 1½-2½ | $a^2P$-$y^3D^o$ |
| 3402.422 | C | 8 | 1.22 | 4.84 | ½-1½ | (53) |
| 3416.957 | C | 2 | 1.23 | 4.84 | 1½-1½ | |
| 3374.352 | C | 8 | 1.23 | 4.89 | 1½-1½ | $a^2P$-$z^2P^o$ |
| 3353.071 | C | 5 | 1.22 | 4.90 | ½- ½ | (54) |
| 3368.178§ | C | 8 | 1.23 | 4.90 | 1½- ½ | |
| 3360.16 | P | | 1.22 | 4.89 | ½-1½ | |
| 3337.85 | F | 2 | 1.23 | 4.93 | 1½-2½ | $a^2P$-$y^2F^o$ (55) |
| 3328.68 | P | | 1.23 | 4.94 | 1½-1½ | $a^2P$-$z^4S^o$ |
| 3312.90 | P | | 1.22 | 4.94 | ½-1½ | (56) |
| 3286.43 | F | (1) | 1.23 | 5.01 | 1½-2½ | $a^2P$-$y^4D^o$ |
| 3269.77 | F | (1) | 1.22 | 4.99 | ½-1½ | (57) |
| 3283.14 | P | | 1.23 | 4.99 | 1½-1½ | |
| m3279.97 | P | Ti+ | 1.22 | 4.98 | ½- ½ | |
| 3293.48 | P | | 1.23 | 4.98 | 1½- ½ | |
| m3101.52 | P | Ti | 1.23 | 5.21 | 1½-2½ | $a^2P$-$z^4P^o$ |
| 3102.975 | C | 2 | 1.22 | 5.19 | ½-1½ | (58) |
| 3115.088 | C | 1 | 1.23 | 5.19 | 1½-1½ | |
| 3109.92 | P | | 1.22 | 5.18 | ½- ½ | |
| 3122.065 | C | 2 | 1.23 | 5.18 | 1½- ½ | |
| 4657.210 | C | tr | 1.24 | 3.89 | 2½-3½ | $b^4P$-$z^2F^o$ |
| 4698.67 | P | | 1.23 | 3.85 | 1½-2½ | (59) |
| 4719.515 | C | (1) | 1.24 | 3.85 | 2½-2½ | |
| 4544.009 | C | tr | 1.24 | 3.95 | 2½-2½ | $b^4P$-$z^2D^o$ |
| 4580.458 | C | (1) | 1.23 | 3.93 | 1½-1½ | (60) |
| 4600.28 | P | | 1.24 | 3.92 | 2½-1½ | |
| 4524.732 | C | (1?) | 1.23 | 3.95 | 1½-2½ | |
| 4568.312 | C | (1) | 1.22 | 3.93 | ½-1½ | |
| 4395.848 | B | 2 | 1.24 | 4.05 | 2½-3½ | $b^4P$-$z^4D^o$ |
| 4390.977 | B | tr | 1.23 | 4.04 | 1½-2½ | (61) |
| 4398.314 | C | (1) | 1.22 | 4.02 | ½-1½ | |
| 4409.22 | C | tr | 1.24 | 4.04 | 2½-2½ | |
| 4409.519 | C | tr | 1.23 | 4.02 | 1½-1½ | |
| 4411.938 | C | (1) | 1.22 | 4.02 | ½- ½ | |
| 4427.90 | P | | 1.24 | 4.02 | 2½-1½ | |
| 4423.22 | P | | 1.23 | 4.02 | 1½- ½ | |
| 3635.38 | P | | 1.23 | 4.62 | 1½- ½ | $b^4P$-$z^2S^o$ |
| 3627.71 | C | (1) | 1.22 | 4.62 | ½- ½ | (62) |
| 3394.37 | P | | 1.24 | 4.87 | 2½-2½ | $b^4P$-$y^3D^o$ |
| 3411.88 | P | Ti | 1.23 | 4.84 | 1½-1½ | (63) |
| 3422.661 | C | (1) | 1.24 | 4.84 | 2½-1½ | |
| 3383.57 | P | | 1.23 | 4.87 | 1½-2½ | |
| 3404.97 | C | (1) | 1.22 | 4.84 | ½-1½ | |
| 3379.930 | C | in | 1.24 | 4.89 | 2½-1½ | $b^4P$-$z^2P^o$ |
| 3381.07 | P | Ti | 1.23 | 4.90 | 1½- ½ | (64) |
| 3369.212 | C | 2 | 1.23 | 4.89 | 1½-1½ | |
| 3354.54 | P | | 1.22 | 4.90 | ½- ½ | |
| 3362.853 | C | 1 | 1.22 | 4.89 | ½-1½ | |
| 3332.111 | A | 30 | 1.24 | 4.94 | 2½-1½ | $b^4P$-$z^4S^o$ |
| 3321.700 | C | 25 | 1.23 | 4.94 | 1½-1½ | (65) |
| 3315.324 | C | 10 | 1.22 | 4.94 | ½-1½ | |
| 3348.603§ | C | 50 | 1.24 | 5.04 | 2½-3½ | $b^4P$-$y^4D^o$ |
| 3361.598 | A | 60 | 1.23 | 5.01 | 1½-2½ | (66) |
| 3372.080 | C | 25 | 1.22 | 4.99 | ½-1½ | |
| 3371.652 | C | 25 | 1.24 | 5.01 | 2½-2½ | |
| 3378.290 | C | 30 | 1.23 | 4.99 | 1½-1½ | |
| 3382.329 | C | 25 | 1.22 | 4.98 | ½- ½ | |
| 3388.428 | C | 5 | 1.24 | 4.99 | 2½-1½ | |
| 3388.575 | C | 5 | 1.23 | 4.98 | 1½- ½ | |
| 3108.234 | C | 35 | 1.24 | 5.21 | 2½-2½ | $b^4P$-$z^4P^o$ |
| 3110.820 | C | 20 | 1.23 | 5.19 | 1½-1½ | (67) |
| 3112.050 | C | 10 | 1.22 | 5.18 | ½- ½ | |
| 3119.800 | C | 15 | 1.24 | 5.19 | 2½-1½ | |
| 3117.669 | C | 20 | 1.23 | 5.18 | 1½- ½ | |
| 3097.188 | C | 25 | 1.23 | 5.21 | 1½-2½ | |
| 3105.084 | C | 20 | 1.22 | 5.19 | ½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ti II** continued | | | | | | |
| 5446.46 | P | | 1.57 | 3.84 | 2½-3½ | $b^2D$-$z^4F^o$ |
| 5454.05 | P | | 1.56 | 3.82 | 1½-2½ | (68) |
| 5492.82 | P | | 1.57 | 3.82 | 2½-2½ | |
| 5490.85 | P | | 1.56 | 3.81 | 1½-1½ | |
| 5529.94 | P | | 1.57 | 3.81 | 2½-1½ | |
| 5336.809 | B | 4 | 1.57 | 3.89 | 2½-3½ | $b^2D$-$z^2F^o$ |
| 5381.020 | B | 1 | 1.56 | 3.85 | 1½-2½ | (69) |
| 5418.802 | B | 0 | 1.57 | 3.85 | 2½-2½ | |
| 5188.700 | C | 6 | 1.57 | 3.95 | 2½-2½ | $b^2D$-$z^2D^o$ |
| 5226.534 | B | 5 | 1.56 | 3.92 | 1½-1½ | (70) |
| 5262.104 | C | 0 | 1.57 | 3.92 | 2½-1½ | |
| 5154.061 | B | 0 | 1.56 | 3.95 | 1½-2½ | |
| 4995.89 | P | | 1.57 | 4.05 | 2½-3½ | $b^2D$-$z^4D^o$ |
| 4981.38 | P | | 1.56 | 4.04 | 1½-2½ | (71) |
| 5013.712 | C | tr | 1.57 | 4.04 | 2½-2½ | |
| 5005.18 | P | | 1.56 | 4.02 | 1½-1½ | |
| 5037.81 | P | | 1.57 | 4.02 | 2½-1½ | |
| 5032.82 | P | Ti | 1.56 | 4.02 | 1½- ½ | |
| 3741.833 | B | 50 | 1.57 | 4.87 | 2½-2½ | $b^2D$-$y^2D^o$ |
| 3757.684 | B | 30 | 1.56 | 4.84 | 1½-1½ | (72) |
| 3776.082 | B | 8 | 1.57 | 4.84 | 2½-1½ | |
| 3723.631 | C | tr | 1.56 | 4.87 | 1½-2½ | |
| 3734.106 | C | 1 | 1.57 | 4.89 | 2½-1½ | $b^2D$-$z^2P^o$ |
| 3696.39 | C | (1) | 1.56 | 4.90 | 1½- ½ | (73) |
| 3706.319 | B | 20 | 1.56 | 4.89 | 1½-1½ | |
| 3868.11 | P | | 1.57 | 4.94 | 2½-1½ | $b^2D$-$z^4S^o$ |
| 3848.80 | P | | 1.56 | 4.94 | 1½-1½ | (74) |
| 3659.785 | C | 60 | 1.57 | 4.95 | 2½-3½ | $b^2D$-$y^2F^o$ |
| 3662.237 | C | 40 | 1.56 | 4.93 | 1½-2½ | (75) |
| 3679.673 | C | (3) | 1.57 | 4.93 | 2½-2½ | |
| 3565.326 | C | 3 | 1.57 | 5.04 | 2½-3½ | $b^2D$-$y^4D^o$ |
| 3576.38 | F | (On) | 1.56 | 5.01 | 1½-2½ | (76) |
| 3593.093 | C | 2 | 1.57 | 5.01 | 2½-2½ | |
| 3586.55 | C | tr | 1.56 | 4.99 | 1½-1½ | |
| 3613.30 | P | | 1.57 | 4.99 | 2½-1½ | |
| 3608.89 | P | | 1.56 | 4.98 | 1½- ½ | |
| 3110.095 | C | 8 | 1.57 | 5.54 | 2½-2½ | $b^2D$-$x^2D^o$ |
| 3096.424 | C | 2 | 1.56 | 5.54 | 1½-1½ | (77) |
| 3108.927 | C | 0 | 1.57 | 5.54 | 2½-1½ | |
| 3097.636 | C | 1 | 1.56 | 5.54 | 1½-2½ | |
| 3048.766 | C | 6 | 1.57 | 5.62 | 2½-1½ | $b^2D$-$y^2P^o$ |
| 3043.851 | C | 5 | 1.56 | 5.61 | 1½- ½ | (78) |
| 3036.784 | C | 1 | 1.56 | 5.62 | 1½-1½ | |
| 5723.87 | P | | 1.58 | 3.73 | 5½-5½ | $a^2H$-$z^4G^o$ |
| 5781.73 | P | | 1.56 | 3.70 | 4½-4½ | (79) |
| 5814.62 | P | | 1.58 | 3.70 | 5½-4½ | |
| 5860.92 | P | | 1.56 | 3.67 | 4½-3½ | |
| 5691.99 | P | | 1.58 | 3.73 | 4½-5½ | |
| 5396.3 | F | (1) | 1.58 | 3.86 | 5½-4½ | $a^2H$-$z^4F^o$ |
| 5422.47 | F | (1) | 1.56 | 3.84 | 4½-3½ | (80) |
| 5367.95 | P | | 1.56 | 3.86 | 4½-4½ | |
| 5313.76 | P | | 1.56 | 3.89 | 4½-3½ | $a^2H$-$z^2F^o$ (81) |
| 4549.622 | A | 60n | 1.58 | 4.29 | 5½-4½ | $a^2H$-$z^2G^o$ |
| 4571.971 | A | 50n | 1.56 | 4.26 | 4½-3½ | (82) |
| 4529.465 | C | 1 | 1.56 | 4.29 | 4½-4½ | |
| 3648.86 | C | (0) | 1.56 | 4.95 | 4½-3½ | $a^2H$-$y^2F^o$ (83) |
| 3224.241 | C | 35 | 1.58 | 5.40 | 5½-4½ | $a^2H$-$y^2G^o$ |
| 3218.270 | C | 25 | 1.56 | 5.40 | 4½-3½ | (84) |
| 3214.14 | F | 1 | 1.58 | 5.40 | 4½-4½ | |
| 3017.187 | C | 50 | 1.58 | 5.67 | 5½-5½ | $a^2H$-$z^2H^o$ |
| 3039.730 | C | 35 | 1.56 | 5.64 | 4½-4½ | (85) |
| 3038.706 | C | 6 | 1.58 | 5.64 | 5½-4½ | |
| 3008.332 | C | 2 | 1.58 | 5.67 | 4½-5½ | |
| 5139.143 | B | 1 | 1.88 | 4.29 | 4½-4½ | $b^2G$-$z^2G^o$ |
| 5185.90 | E | 2 | 1.88 | 4.26 | 3½-3½ | (86) |
| 5183.72 | C | tr | 1.88 | 4.26 | 4½-3½ | |
| 5131.28 | P | | 1.88 | 4.29 | 3½-4½ | |
| 4028.332 | B | 7 | 1.88 | 4.95 | 4½-3½ | $b^2G$-$y^2P^o$ |
| 4053.814 | B | 3 | 1.88 | 4.93 | 3½-2½ | (87) |
| 4039.64 | P | | 1.88 | 4.95 | 3½-3½ | |
| 3504.890 | A | 80 | 1.88 | 5.40 | 4½-4½ | $b^2G$-$y^2G^o$ |
| 3510.840 | A | 60 | 1.88 | 5.40 | 3½-3½ | (88) |
| 3509.844 | C | 3 | 1.88 | 5.40 | 4½-3½ | |
| 3505.901 | C | tr | 1.88 | 5.40 | 3½-4½ | |
| 3261.598 | A | 60 | 1.88 | 5.67 | 4½-5½ | $b^2G$-$z^2H^o$ |
| 3287.657 | A | 40 | 1.88 | 5.64 | 3½-4½ | (89) |
| 3286.756 | C | 0 | 1.88 | 5.64 | 4½-4½ | |
| 3103.804 | C | 50 | 1.88 | 5.86 | 4½-3½ | $b^2G$-$x^2F^o$ |
| 3089.401 | C | 15 | 1.88 | 5.88 | 3½-2½ | (90) |
| 3104.593 | C | 3 | 1.88 | 5.86 | 3½-3½ | |
| 6491.61 | P | (2) | 2.05 | 3.95 | 1½-2½ | $b^2P$-$z^2D^o$ |
| 8559.580 | C | (1) | 2.04 | 3.92 | ½-1½ | (91) |
| 6607.02 | P | | 2.05 | 3.92 | 1½-1½ | |
| 4805.105 | B | 2 | 2.05 | 4.62 | 1½- ½ | $b^2P$-$z^2S^o$ |
| 4779.988 | B | 1 | 2.04 | 4.62 | ½- ½ | (92) |
| 4374.825 | B | 1 | 2.05 | 4.87 | 1½-2½ | $b^2P$-$y^2D^o$ |
| m4400.83 | P | Ti | 2.04 | 4.84 | ½-1½ | (93) |
| 4421.949 | B | 1 | 2.05 | 4.84 | 1½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ti II** continued | | | | | | |
| 4350.834 | C | 1 | 2.05 | 4.89 | 1½-1½ | $b^2P-z^2P^o$ |
| 4316.807 | B | 1 | 2.04 | 4.90 | ½- ½ | (94) |
| 4337.33 | C | (1) | 2.05 | 4.90 | 1½- ½ | |
| 4330.264 | B | 0 | 2.04 | 4.89 | ½-1½ | |
| 4271.94 | P | | 2.05 | 4.94 | 1½-1½ | $b^2P-z^4S^o$ |
| 4252.05 | P | | 2.04 | 4.94 | ½-1½ | (95) |
| 4173.05 | P | | 2.05 | 5.01 | 1½-2½ | $b^2P-y^4D^o$ |
| 4181.17 | P | | 2.04 | 4.99 | ½-1½ | (96) |
| 4200.40 | P | | 2.05 | 4.99 | 1½-1½ | |
| 4197.95 | P | | 2.04 | 4.98 | ½- ½ | |
| 4217.34 | P | | 2.05 | 4.98 | 1½- ½ | |
| 3907.65 | P | | 2.05 | 5.21 | 1½-2½ | $b^2P-z^4P^o$ |
| 3912.32 | P | | 2.04 | 5.19 | ½-1½ | (97) |
| 3929.15 | P | | 2.05 | 5.19 | 1½-1½ | |
| 3923.39 | P | | 2.04 | 5.18 | ½- ½ | |
| 3940.32 | P | | 2.05 | 5.18 | 1½- ½ | |
| 3535.408 | A | 40 | 2.05 | 5.54 | 1½-2½ | $b^2P-x^2D^o$ |
| 3520.253 | C | 20 | 2.04 | 5.54 | ½-1½ | (98) |
| 3533.868 | C | 2 | 2.05 | 5.54 | 1½-1½ | |
| 3456.390 | C | 20 | 2.05 | 5.62 | 1½-1½ | $b^2P-y^2P^o$ |
| 3452.470 | C | 4 | 2.04 | 5.61 | ½- ½ | (99) |
| 3465.562 | C | 3 | 2.05 | 5.61 | 1½- ½ | |
| 3443.387 | C | 1 | 2.04 | 5.62 | ½-1½ | |
| 8979.34 | P | | 2.58 | 3.95 | 3½-2½ | $b^2F-z^2D^o$ |
| 9252.67 | P | | 2.59 | 3.92 | 2½-1½ | (100) |
| 9027.90 | P | | 2.59 | 3.95 | 2½-2½ | |
| 7214.78 | P | | 2.58 | 4.29 | 3½-4½ | $b^2F-z^2G^o$ |
| 7355.46 | P | | 2.59 | 4.26 | 2½-3½ | (101) |
| 7323.20 | P | | 2.58 | 4.26 | 3½-3½ | |
| 5379.19 | P | | 2.58 | 4.87 | 3½-2½ | $b^2F-y^2D^o$ |
| 5468.44 | P | | 2.59 | 4.84 | 2½-1½ | (102) |
| 5396.59 | P | | 2.59 | 4.87 | 2½-2½ | |
| 5211.544 | C | 0 | 2.58 | 4.95 | 3½-3½ | $b^2F-y^2F^o$ |
| 5268.62 | C | 1 | 2.59 | 4.93 | 2½-2½ | (103) |
| 5252.04 | P | | 2.58 | 4.93 | 3½-2½ | |
| 5227.87 | P | | 2.59 | 4.95 | 2½-3½ | |
| 4367.657 | B | 15 | 2.58 | 5.40 | 3½-4½ | $b^2F-y^2G^o$ |
| 4386.858 | B | 10 | 2.59 | 5.40 | 2½-3½ | (104) |
| 4375.35 | P | | 2.58 | 5.40 | 3½-3½ | |
| 4163.644 | A | 40 | 2.58 | 5.54 | 3½-2½ | $b^2F-x^2D^o$ |
| 4171.897 | A | 30 | 2.59 | 5.54 | 2½-1½ | (105) |
| *4174.088§ | B | (2) | 2.59 | 5.54 | 2½-2½ | |
| 4064.350 | B | (1) | 2.59 | 5.62 | 2½-1½ | $b^2F-y^2P^o$ (106) |
| 3761.866 | B | 15 | 2.58 | 5.86 | 3½-3½ | $b^2F-x^2F^o$ |
| 3748.010 | B | 10 | 2.59 | 5.88 | 2½-2½ | (107) |
| 3739.6 | F | tr | 2.58 | 5.88 | 3½-2½ | |
| 3770.412 | C | (1) | 2.59 | 5.86 | 2½-3½ | |
| 6212.30 | F | (1) | 2.63 | 4.62 | ½- ½ | $a^2S-z^2S^o$ (108) |
| 5473.517 | B | (1) | 2.63 | 4.89 | ½-1½ | $a^2S-z^2P^o$ |
| 5452.03 | F | (1) | 2.63 | 4.90 | ½- ½ | (109) |
| 4822.39 | P | | 2.63 | 5.19 | ½-1½ | $a^2S-z^4P^o$ |
| 4839.251 | C | (1) | 2.63 | 5.18 | ½- ½ | (110) |
| 3144.730 | C | 1 | 2.63 | 6.56 | ½-1½ | $a^2S-x^2P^o$ |
| *3145.402 | C | 0 | 2.83 | 6.58 | ½- ½ | (111) |
| 6717.911 | C | (1n) | 3.11 | 4.95 | 2½-3½ | $c^2D-y^2F^o$ |
| 6680.26 | F | (1) | 3.08 | 4.93 | 1½-2½ | (112) |
| 6785.25 | P | | 3.11 | 4.93 | 2½-2½ | |
| 5072.30 | E | 2 | 3.11 | 5.54 | 2½-2½ | $c^2D-x^2D^o$ |
| 5010.202 | C | tr | 3.08 | 5.54 | 1½-1½ | (113) |
| 5069.12 | F | tr | 3.11 | 5.54 | 2½-1½ | |
| 5013.38 | P | | 3.08 | 5.54 | 1½-2½ | |
| 4911.205 | B | 0 | 3.11 | 5.62 | 2½-1½ | $c^2D-y^2P^o$ |
| 4874.025 | B | tr | 3.08 | 5.61 | 1½- ½ | (114) |
| 4855.95 | P | | 3.08 | 5.62 | 1½-1½ | |
| 4488.319 | B | 15 | 3.11 | 5.86 | 2½-3½ | $c^2D-x^2F^o$ |
| 4411.080 | B | 15 | 3.08 | 5.88 | 1½-2½ | (115) |
| 4456.650 | C | tr | 3.11 | 5.88 | 2½-2½ | |
| 3644.87 | P | | 3.11 | 8.50 | 2½-3½ | $c^2D-x^4D^o$ |
| 3633.99 | P | | 3.08 | 6.48 | 1½-2½ | (118) |
| 3664.86 | P | | 3.11 | 6.48 | 2½-2½ | |
| 3635.64 | P | | 3.08 | 8.48 | 1½-1½ | |
| 3666.592 | C | (On) | 3.11 | 8.48 | 2½-1½ | |
| 3652.81 | P | | 3.08 | 6.46 | 1½- ½ | |
| 3578.687 | C | (0) | 3.11 | 8.56 | 2½-1½ | $c^2D-x^2P^o$ |
| 3550.19 | P | | 3.08 | 6.56 | 1½- ½ | (117) |
| 3549.27 | P | | 3.08 | 8.56 | 1½-1½ | |
| 3524.87 | C | tr | 3.11 | 8.81 | 2½-2½ | $c^2D-w^2D^o$ |
| 3491.19 | P | | 3.08 | 6.62 | 1½-1½ | (118) |
| 3519.67 | P | | 3.11 | 6.62 | 2½-1½ | |
| 3496.29 | P | | 3.08 | 8.61 | 1½-2½ | |
| 3090.051 | C | 8n | 3.73 | 7.73 | 5½-4½ | $z^4G^o-e^4F$ |
| 3081.575 | C | 5n | 3.70 | 7.70 | 4½-3½ | (119) |
| 3072.54 | E | (On) | 3.67 | 7.69 | 3½-2½ | |
| 3083.280 | C | 2 | 3.85 | 7.68 | 2½-1½ | |
| 3194.56 | C | 8n? | 3.86 | 7.73 | 4½-4½ | $z^4F^o-e^4F$ |
| 3194.26 | C | 5n? | 3.84 | 7.70 | 3½-3½ | (120) |
| 3192.68 | C | 4n | 3.82 | 7.69 | 2½-2½ | |
| 3189.52 | C | 5n | 3.81 | 7.68 | 1½-1½ | |
| 3213.59 | E | tr | 3.88 | 7.70 | 4½-3½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ti II** continued | | | | | | |
| 3208.607 | C | 1n | 3.84 | 7.69 | 3½-2½ | $z^4F^o-e^4F$ |
| 3175.66 | C | 2n | 3.84 | 7.73 | 3½-4½ | cont |
| 3178.830 | C | 3n | 3.82 | 7.70 | 2½-3½ | |
| 3180.225 | C | 2n | 3.81 | 7.69 | 1½-2½ | |
| *3128.640§ | C | 10n | 3.89 | 7.83 | 3½-3½ | $z^2F^o-e^2F$ |
| 3127.883 | C | 10n | 3.85 | 7.80 | 2½-2½ | (121) |
| 3155.91 | P | | 3.89 | 7.80 | 3½-2½ | |
| 3181.84 | C | 8n | 3.95 | 7.83 | 2½-3½ | $z^2D^o-e^2F$ |
| 3182.57 | C | 6n | 3.92 | 7.80 | 1½-2½ | (122) |
| 2990.16 | C | 10 | 3.95 | 8.08 | 2½-3½ | $z^2D^o-f^2F$ |
| 2979.199 | C | 10 | 3.92 | 6.06 | 1½-2½ | (123) |
| 3351.67 | C | 1n | 4.05 | 7.73 | 3½-4½ | $z^4D^o-e^4F$ |
| 3364.9 | F | 1n | 4.04 | 7.70 | 2½-3½ | (124) |
| 3369.67 | E | 0n | 4.02 | 7.69 | 1½-2½ | |
| 3483.80 | C | 4n | 4.29 | 7.83 | 4½-3½ | $z^2G^o-e^2F$ |
| 3492.39 | F | 3n | 4.26 | 7.80 | 3½-2½ | (125) |
| 3459.03 | F | (On) | 4.28 | 7.83 | 3½-3½ | |
| 3022.820 | C | 15 | 4.29 | 8.37 | 4½-4½ | $z^2G^o-e^2G$ |
| 3023.86 | C | 12 | 4.26 | 8.35 | 3½-3½ | (126) |
| 3414.02 | F | (0) | 5.04 | 8.53 | 3½-4½ | $y^4D^o-f^4F$ (127) |

Strongest Unclassified Lines of **Ti II**

| | | |
|---|---|---|
| 3194.78 | C | 6n? |
| 3174.80 | C | 5 |
| 3164.91 | F | 8 V+ ? |
| 3045.085 | C | 5n |

**Ti IV** I P 43.06 Anal A Liet A Dec 1940

| | | | | | | |
|---|---|---|---|---|---|---|
| 5398.82 | A | 8 | 26.22 | 28.51 | ½-1½ | $5^2S-5^2P^o$ |
| 5492.43 | A | 6 | 28.22 | 28.47 | ½- ½ | |
| 3578.44 | A | 4 | 28.51 | 31.98 | 1½-2½ | $5^2P^o-5^2D$ |
| 3541.44 | A | 3 | 28.47 | 31.95 | ½-1½ | |
| 4397.37 | A | 2 | 29.15 | 31.96 | 3½-2½ | $4^2F^o-5^2D$ |
| 4403.54 | A | 2 | 29.15 | 31.95 | 2½-1½ | |
| *4647.40 | A | 3 | (34.38 | 37.04 | 4½-5½) | $5^2G-6^2H^o$ |
| | | | 34.38 | 37.04 | 3½-4½ | |

**V I** I P 8.71 Anal A Liet C Nov 1940

| | | | | | | |
|---|---|---|---|---|---|---|
| 5632.469 | A | 1 | 0.07 | 2.26 | 4½-3½ | $a^4F-z^6D^o$ |
| *5592.962 | A | 1 | 0.04 | 2.25 | 3½-2½ | (1) |
| 5557.453 | A | 1 | 0.03 | 2.24 | 2½-1½ | |
| 5527.72 | A | (1) | 0.00 | 2.23 | 1½- ½ | |
| 5560.548 | C | (3) | 0.04 | 2.28 | 3½-3½ | |
| 5535.382 | A | (1) | 0.03 | 2.25 | 2½-2½ | |
| 5515.371 | B | (4) | 0.00 | 2.24 | 1½-1½ | |
| 5515.083 | A | 1 | 0.07 | 2.31 | 4½-5½ | $a^4F-z^6F^o$ † |
| 5498.020 | B | (3) | 0.04 | 2.29 | 3½-4½ | (2) |
| 5482.471 | B | (1) | 0.02 | 2.27 | 2½-3½ | |
| 4881.554 | A | 50w | 0.07 | 2.80 | 4½-3½ | $a^4F-z^4D^o$ |
| 4875.462 | A | 40w | 0.04 | 2.57 | 3½-2½ | (3) |
| 4864.741 | A | 40w | 0.03 | 2.55 | 2½-1½ | |
| 4851.483 | A | 40w | 0.00 | 2.54 | 1½- ½ | |
| 4827.458 | A | 30 | 0.04 | 2.60 | 3½-3½ | |
| 4831.642 | A | 35 | 0.03 | 2.57 | 2½-2½ | |
| 4833.437 | A | 30 | 0.00 | 2.55 | 1½-1½ | |
| 4784.480 | A | 5 | 0.03 | 2.80 | 2½-3½ | |
| 4799.788 | A | 5 | 0.00 | 2.57 | 1½-2½ | |
| 4594.103 | A | 60w | 0.07 | 2.75 | 4½-5½ | $a^4F-z^4G^o$ |
| 4588.384 | A | 50w | 0.04 | 2.73 | 3½-4½ | (4) |
| 4580.394 | A | 40w | 0.03 | 2.71 | 2½-3½ | |
| 4577.173 | A | 40w | 0.00 | 2.70 | 1½-2½ | |
| 4635.176 | A | 15 | 0.07 | 2.73 | 4½-4½ | |
| 4819.771 | A | 25 | 0.04 | 2.71 | 3½-3½ | |
| 4606.148 | A | 15 | 0.03 | 2.70 | 2½-2½ | |
| 4889.373 | B | (2) | 0.07 | 2.71 | 4½-3½ | |
| 4845.971 | A | 1 | 0.04 | 2.70 | 3½-2½ | |
| 4352.872 | C | 50w | 0.07 | 2.90 | 4½-4½ | $a^4F-z^4F^o$ |
| 4341.013 | C | 40w | 0.04 | 2.68 | 3½-3½ | (5) |
| 4332.823 | C | 30w | 0.02 | 2.87 | 2½-2½ | |
| 4330.024 | C | 30w | 0.00 | 2.85 | 1½-1½ | |
| *4384.722 | C | 125r | 0.07 | 2.88 | 4½-3½ | |
| 4368.042 | C | 10 | 0.04 | 2.87 | 3½-2½ | |
| 4355.943 | C | 10 | 0.02 | 2.85 | 2½-1½ | |
| 4309.795 | C | 20 | 0.04 | 2.90 | 3½-4½ | |
| 4306.214 | C | 15 | 0.02 | 2.88 | 2½-3½ | |
| 4307.184 | C | 12 | 0.00 | 2.87 | 1½-2½ | |
| *4234.000 | C | 12 | 0.04 | 2.95 | 3½-2½ | $a^4F-z^2D^o$ |
| 4259.312 | C | 8 | 0.02 | 2.91 | 2½-1½ | (6) |
| 4200.89 | C | 1 | 0.02 | 2.95 | 2½-2½ | |
| *4234.534§ | C | 8 | 0.00 | 2.91 | 1½-1½ | |
| 4176.793 | B | (3) | 0.00 | 2.95 | 1½-2½ | |
| 3902.250 | C | 50r | 0.07 | 3.23 | 4½-4½ | $a^4F-y^4F^o$ |
| 3875.075 | C | 35 | 0.04 | 3.23 | 3½-3½ | (7) |
| 3864.862 | C | 35 | 0.03 | 3.21 | 2½-2½ | |
| 3855.370 | C | 30 | 0.00 | 3.20 | 1½-1½ | |
| *3909.894 | C | 20 | 0.07 | 3.22 | 4½-3½ | |
| 3892.859 | C | 25 | 0.04 | 3.21 | 3½-2½ | |
| 3875.902 | C | 20 | 0.02 | 3.20 | 2½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **V I** continued | | | | | | |
| 3867.602 | C | 15 | 0.04 | 3.23 | 3½-4½ | $a^4F-y^4F^o$ |
| *3847.323§ | E | 20 | 0.02 | 3.22 | 2½-3½ | cont |
| 3844.438 | C | 20 | 0.00 | 3.21 | 1½-2½ | |
| 3878.086 | C | 20 | 0.07 | 3.25 | 4½-4½ | $a^4F-z^2G^o$ |
| 3890.184 | C | 25 | 0.04 | 3.21 | 3½-3½ | (8) |
| *3925.240 | C | 10 | 0.07 | 3.21 | 4½-3½ | |
| 3841.890 | C | 5 | 0.04 | 3.25 | 3½-4½ | |
| 3862.223 | C | 12 | 0.02 | 3.21 | 2½-3½ | |
| 3855.841 | C | 60r | 0.07 | 3.27 | 4½-3½ | $a^4F-y^4D^o$ |
| 3840.752 | C | 60r | 0.04 | 3.25 | 3½-2½ | (9) |
| 3828.559 | C | 60r | 0.02 | 3.24 | 2½-1½ | |
| 3818.244 | C | 60 | 0.00 | 3.23 | 1½- ½ | |
| 3822.009 | C | 30 | 0.04 | 3.27 | 3½-3½ | |
| 3813.492 | C | 60 | 0.02 | 3.25 | 2½-2½ | |
| 3808.521 | C | 40 | 0.00 | 3.24 | 1½-1½ | |
| *3794.964 | C | 50 | 0.02 | 3.27 | 2½-3½ | |
| 3793.814 | C | 8 | 0.00 | 3.25 | 1½-2½ | |
| 3817.844 | C | 8 | 0.07 | 3.30 | 4½-4½ | $a^4F-y^6D^o$ † |
| 3803.902 | C | 8 | 0.04 | 3.28 | 3½-3½ | (10) |
| 3791.326 | C | 2 | 0.02 | 3.27 | 2½-2½ | |
| *3781.393 | C | 3 | 0.00 | 3.26 | 1½-1½ | |
| 3713.957 | C | 5 | 0.07 | 3.39 | 4½-3½ | $a^4F-z^2P^o$ † |
| 3721.358 | C | 3 | 0.04 | 3.36 | 3½-2½ | (11) |
| 3298.139 | C | 15 | 0.07 | 3.81 | 4½-5½ | $a^4F-y^4G^o$ |
| 3283.311 | C | 15 | 0.04 | 3.80 | 3½-4½ | (12) |
| 3271.637 | C | 12 | 0.02 | 3.79 | 2½-3½ | |
| 3283.238 | C | 15 | 0.00 | 3.78 | 1½-2½ | |
| 3308.248 | C | 3 | 0.07 | 3.80 | 4½-4½ | |
| 3291.878 | C | 4 | 0.04 | 3.79 | 3½-3½ | |
| 3277.939 | C | 5 | 0.02 | 3.78 | 2½-2½ | |
| 3249.568 | C | 10 | 0.07 | 3.87 | 4½-4½ | $a^4F-x^4F^o$ † |
| 3230.646 | C | 6 | 0.04 | 3.88 | 3½-3½ | (13) |
| 3215.375 | C | 4 | 0.02 | 3.86 | 2½-2½ | |
| 3204.198 | C | 3 | 0.00 | 3.85 | 1½-1½ | |
| *3254.773§ | E | 10 | 0.07 | 3.88 | 4½-3½ | |
| 3185.398 | C | 300R | 0.07 | 3.94 | 4½-5½ | $a^4F-x^4G^o$ |
| 3183.96 | F | (125R) | 0.04 | 3.92 | 3½-4½ | (14) |
| 3163.406 | C | 150R | 0.02 | 3.89 | 2½-3½ | |
| 3183.982 | C | (150R) | 0.00 | 3.88 | 1½-2½ | |
| 3207.410 | C | 20 | 0.07 | 3.92 | 4½-4½ | |
| 3203.381 | C | 25 | 0.04 | 3.89 | 3½-3½ | |
| 3198.012 | C | 20 | 0.02 | 3.88 | 2½-2½ | |
| 3236.106 | C | 4 | 0.07 | 3.89 | 4½-3½ | |
| *3217.181§ | E | 10 | 0.04 | 3.88 | 3½-2½ | |
| 3091.437 | C | 20 | 0.07 | 4.08 | 4½-3½ | $a^4F-x^4D^o$ |
| 3091.552 | D | 15 | 0.04 | 4.03 | 3½-2½ | (15) |
| 3093.24 | F | 8? | 0.02 | 4.01 | 2½-1½ | |
| 3090.40 | F | (1) | 0.00 | 3.99 | 1½- ½ | |
| 3089.645 | C | 30r | 0.04 | 4.06 | 3½-3½ | |
| *3073.823 | C | 60r | 0.02 | 4.03 | 2½-2½ | |
| 3080.146 | C | 8 | 0.00 | 4.01 | 1½-1½ | |
| 3052.194 | C | 20 | 0.02 | 4.06 | 2½-3½ | |
| 3060.93 | C | 2 | 0.00 | 4.03 | 1½-2½ | |
| 3063.734 | C | 12 | 0.02 | 4.05 | 2½-1½ | $a^4F-z^2P^o$ |
| 3054.89 | F | 1 | 0.00 | 4.04 | 1½- ½ | (16) |
| 3050.890 | C | 35r | 0.00 | 4.05 | 1½-1½ | |
| 3068.375 | C | 125R | 0.07 | 4.09 | 4½-4½ | $a^4F-w^4F^o$ |
| 3060.460 | C | 125R | 0.04 | 4.07 | 3½-3½ | (17) |
| 3058.334 | C | 100R | 0.02 | 4.06 | 2½-2½ | |
| 3053.65 | F | 80R | 0.00 | 4.04 | 1½-1½ | |
| 3082.109 | B | 50r | 0.07 | 4.07 | 4½-3½ | |
| *3073.823 | C | 60r | 0.04 | 4.06 | 3½-2½ | |
| 3066.51 | F | 20 | 0.02 | 4.04 | 2½-1½ | |
| 3044.938 | C | 50r | 0.04 | 4.09 | 3½-4½ | |
| 3043.124 | C | 50r | 0.02 | 4.07 | 2½-3½ | |
| *3043.555§ | C | 50r | 0.00 | 4.08 | 1½-2½ | |
| 2977.539 | C | 25r | 0.07 | 4.21 | 4½-3½ | $a^4F-w^4D^o$ † |
| 2982.772 | C | 30r | 0.04 | 4.21 | 3½-2½ | (18) |
| 2954.333 | C | 20 | 0.02 | 4.19 | 2½-1½ | |
| 2957.33 | C | 10? | 0.04 | 4.21 | 3½-2½ | |
| 8243.11 | A | 30 | 0.30 | 2.28 | 4½-4½ | $a^6D-z^6D^o$ |
| 8251.83 | A | 30 | 0.29 | 2.28 | 3½-3½ | (19) |
| 8258.908 | A | 8 | 0.27 | 2.25 | 2½-2½ | |
| 6258.595 | A | 8 | 0.26 | 2.23 | 1½- ½ | |
| 6296.518 | A | 15 | 0.30 | 2.28 | 4½-3½ | |
| 6293.858 | A | 20 | 0.29 | 2.25 | 3½-2½ | |
| 8285.185 | A | 20 | 0.27 | 2.24 | 2½-1½ | |
| 8274.670 | A | 15 | 0.27 | 2.23 | 1½- ½ | |
| 8199.202 | A | 30 | 0.29 | 2.28 | 3½-4½ | |
| 6216.368 | A | 30 | 0.27 | 2.28 | 2½-3½ | |
| 8230.738 | A | 30 | 0.27 | 2.25 | 1½-2½ | |
| 6242.80 | A | 15 | 0.26 | 2.24 | ½-1½ | |
| 8150.132 | A | 15 | 0.30 | 2.31 | 4½-5½ | $a^8D-z^8F^o$ |
| 6170.340 | A | 8 | 0.29 | 2.29 | 3½-4½ | (20) |
| 6189.350 | A | 3 | 0.27 | 2.27 | 2½-3½ | |
| 6207.251 | A | (5) | 0.27 | 2.25 | 1½-2½ | |
| 6224.26 | P | | 0.28 | 2.24 | ½-1½ | |
| 6213.874 | A | 15 | 0.30 | 2.29 | 4½-4½ | |
| 8234.507 | A | 15 | 0.29 | 2.27 | 3½-3½ | |
| 6233.187 | A | 12 | 0.27 | 2.25 | 2½-2½ | |
| 6240.137 | A | 8 | 0.27 | 2.24 | 1½-1½ | |
| 6245.214 | A | 2 | 0.28 | 2.24 | ½- ½ | |
| *8288.641 | A | 8 | (0.30 | 2.27 | 4½-3½ | |
| | | | 0.29 | 2.25 | 3½-2½ | |
| 6286.32 | A | 7 | 0.27 | 2.24 | 2½-1½ | |
| 6281.236 | A | 5 | 0.27 | 2.24 | 1½- ½ | |
| 4460.292 | C | 50 | 0.30 | 3.07 | 4½-3½ | $a^6D-z^8P^o$ |
| 4459.760 | C | 30 | 0.29 | 3.05 | 3½-2½ | (21) |
| 4457.479 | C | 15 | 0.27 | 3.04 | 2½-1½ | |
| 4437.837 | C | 20 | 0.29 | 3.07 | 3½-3½ | |
| 4441.683 | C | 25 | 0.27 | 3.05 | 2½-2½ | |
| 4444.207 | C | 20 | 0.27 | 3.04 | 1½-1½ | |
| 4419.935 | C | 12 | 0.27 | 3.07 | 2½-3½ | |
| 4438.515 | C | 15 | 0.27 | 3.05 | 1½-2½ | |
| 4436.138 | C | 15 | 0.28 | 3.04 | ½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| V I continued | | | | | | |
| 4379.238// | C | 150rw | 0.30 | 3.12 | 4½-5½ | $a^6D$-$y^6F^o$ |
| 4384.732 | C | 125r | 0.29 | 3.10 | 3½-4½ | (22) |
| 4389.974 | C | 100 | 0.27 | 3.09 | 2½-3½ | |
| 4395.228 | C | 80 | 0.27 | 3.07 | 1½-2½ | |
| 4400.575 | C | 60 | 0.26 | 3.07 | ½-1½ | |
| 4408.641 | C | 80 | 0.30 | 3.10 | 4½-4½ | |
| 4407.837 | C | 70 | 0.29 | 3.09 | 3½-3½ | |
| 4408.204 | C | 70 | 0.27 | 3.07 | 2½-2½ | |
| 4408.511 | C | 90 | 0.27 | 3.07 | 1½-1½ | |
| | | | 0.28 | 3.08 | ½- ½ | |
| 4429.798 | C | 15 | 0.30 | 3.09 | 4½-3½ | |
| 4428.005 | C | 20 | 0.29 | 3.07 | 3½-2½ | |
| 4421.573 | C | 20 | 0.27 | 3.07 | 2½-1½ | |
| 4416.474 | C | 20 | 0.27 | 3.06 | 1½- ½ | |
| 4381.04 | G | 1 | 0.29 | 3.10 | 3½-2½ | $a^8D$-$z^4P^o$ † |
| 4405.011 | C | 4 | 0.27 | 3.08 | 2½-1½ | (23) |
| 4363.525 | C | 5 | 0.27 | 3.10 | 2½-2½ | |
| 4392.074 | C | 5 | 0.27 | 3.08 | 1½-1½ | |
| 4309.857 | C | 20 | 0.30 | 3.23 | 4½-4½ | $a^6D$-$y^4F^o$ † |
| 4198.611 | C | 4 | 0.29 | 3.22 | 3½-3½ | (24) |
| 4218.710 | C | 4 | 0.30 | 3.22 | 4½-3½ | |
| 4219.51 | G | 3 | 0.29 | 3.21 | 3½-2½ | |
| 4189.841 | C | 12 | 0.29 | 3.23 | 3½-4½ | |
| 4182.591 | C | 10 | 0.27 | 3.22 | 2½-3½ | |
| 4191.558 | C | 10 | 0.27 | 3.21 | 1½-2½ | |
| 4179.419 | C | 15 | 0.30 | 3.25 | 4½-4½ | $a^6D$-$z^2G^o$ † |
| 4159.688 | C | 8 | 0.29 | 3.25 | 3½-4½ | (25) |
| 4138.386 | C | 3 | 0.29 | 3.27 | 3½-3½ | $a^6D$-$y^4D^o$ † |
| 4142.68 | G | 2 | 0.27 | 3.25 | 2½-3½ | (26) |
| 4148.859 | C | 2 | 0.27 | 3.24 | 1½-1½ | |
| 4153.328 | C | 2 | 0.26 | 3.23 | ½- ½ | |
| 4111.785 | C | 100R | 0.30 | 3.30 | 4½-4½ | $a^6D$-$y^8D^o$ |
| 4115.185 | C | 60 | 0.29 | 3.28 | 3½-3½ | (27) |
| 4118.470 | C | 50 | 0.27 | 3.27 | 2½-2½ | |
| 4116.703 | C | 4 | 0.27 | 3.26 | 1½-1½ | |
| 4116.60 | P | | 0.26 | 3.26 | ½- ½ | |
| 4134.488 | C | 60 | 0.30 | 3.28 | 4½-3½ | |
| 4132.017 | C | 60 | 0.29 | 3.27 | 3½-2½ | |
| 4128.071 | C | 60 | 0.27 | 3.26 | 2½-1½ | |
| 4123.568 | C | 60 | 0.27 | 3.26 | 1½- ½ | |
| 4093.894 | C | 50 | 0.29 | 3.30 | 3½-4½ | |
| 4099.796 | C | 60 | 0.27 | 3.28 | 2½-3½ | |
| 4105.167 | C | 60 | 0.27 | 3.27 | 1½-2½ | |
| 4109.786 | C | 50 | 0.28 | 3.26 | ½-1½ | |
| 3794.964 | C | 50 | 0.30 | 3.55 | 4½-4½ | $a^6D$-$x^6D^o$ |
| 3803.474 | C | 25 | 0.29 | 3.53 | 3½-3½ | (28) |
| 3809.597 | C | 15 | 0.27 | 3.51 | 2½-2½ | |
| 3813.45 | P | V | 0.27 | 3.50 | 1½-1½ | |
| 3815.514 | C | 10 | 0.26 | 3.50 | ½- ½ | |
| 3819.963 | C | 15 | 0.30 | 3.53 | 4½-3½ | |
| 3822.888 | C | 15 | 0.29 | 3.51 | 3½-2½ | |
| 3823.213 | C | 15 | 0.27 | 3.50 | 2½-1½ | |
| 3821.487 | C | 15 | 0.27 | 3.50 | 1½- ½ | |
| 3778.684 | C | 25 | 0.29 | 3.55 | 3½-4½ | |
| 3790.324 | C | 20 | 0.27 | 3.53 | 2½-3½ | |
| 3799.912 | C | 25 | 0.27 | 3.51 | 1½-2½ | |
| 3807.505 | C | 20 | 0.26 | 3.50 | ½-1½ | |
| 3703.584 | C | 100 | 0.30 | 3.83 | 4½-3½ | $a^6D$-$y^8P^o$ |
| 3704.899 | C | 60 | 0.29 | 3.82 | 3½-2½ | (29) |
| 3705.035 | C | 30 | 0.27 | 3.61 | 2½-1½ | |
| 3688.089 | C | 50 | 0.29 | 3.83 | 3½-3½ | |
| 3692.225 | C | 50 | 0.27 | 3.62 | 2½-2½ | |
| 3695.885 | C | 40 | 0.27 | 3.61 | 1½-1½ | |
| 3675.700 | C | 20 | 0.27 | 3.83 | 2½-3½ | |
| 3683.126 | C | 30 | 0.27 | 3.82 | 1½-2½ | |
| 3890.281 | C | 40 | 0.26 | 3.61 | ½-1½ | |
| 8118.80 | A | 300W | 1.08 | 2.60 | 3½-3½ | $a^4D$-$z^4D^o$ |
| 8161.08 | A | 150w | 1.06 | 2.57 | 2½-2½ | (30) |
| 8188.73 | A | 100 | 1.05 | 2.55 | 1½-1½ | |
| 8198.87 | A | 80 | 1.04 | 2.54 | ½- ½ | |
| 8253.51 | A | 100w | 1.08 | 2.57 | 3½-2½ | |
| 8255.90 | A | 100 | 1.06 | 2.55 | 2½-1½ | |
| 8241.81 | A | 60 | 1.05 | 2.54 | 1½- ½ | |
| 8027.38 | A | 100w | 1.08 | 2.60 | 2½-3½ | |
| 8093.48 | A | 100w | 1.05 | 2.57 | 1½-2½ | |
| 8144.58 | A | 50 | 1.04 | 2.55 | ½-1½ | |
| 8753.00 | A | 80w | 1.08 | 2.90 | 3½-4½ | $a^4D$-$z^4F^o$ |
| 8766.49 | A | 60 | 1.06 | 2.88 | 2½-3½ | (31) |
| 8784.98 | A | 40 | 1.05 | 2.87 | 1½-2½ | |
| 8812.40 | A | 20 | 1.04 | 2.85 | ½-1½ | |
| 8829.94 | A | 10 | 1.08 | 2.88 | 3½-3½ | |
| 8832.44 | A | 10 | 1.08 | 2.87 | 2½-2½ | |
| 8841.89 | A | 7 | 1.05 | 2.85 | 1½-1½ | |
| 8486.97 | A | 2 | 1.05 | 2.95 | 1½-2½ | $a^4D$-$z^2D^o$ † |
| 8578.98 | A | 2 | 1.04 | 2.91 | ½-1½ | (32) |
| 8097.42 | A | (1) | 1.08 | 3.10 | 3½-4½ | $a^4D$-$y^6F^o$ † |
| 8090.54 | P | | 1.08 | 3.09 | 2½-3½ | (33) |
| 8087.485 | A | 1 | 1.05 | 3.07 | 1½-2½ | |
| 8089.473 | A | (3) | 1.04 | 3.07 | ½-1½ | |
| 8151.509 | B | (1) | 1.06 | 3.07 | 2½-1½ | |
| 8128.30 | A | 2 | 1.05 | 3.08 | 1½- ½ | |
| 8090.164 | A | 50 | 1.08 | 3.10 | 3½-2½ | $a^4D$-$z^4P^o$ |
| 8119.505 | A | 40 | 1.06 | 3.08 | 2½-1½ | (34) |
| 8135.36 | A | 15 | 1.05 | 3.06 | 1½- ½ | |
| 8039.690 | A | 25 | 1.08 | 3.10 | 2½-2½ | |
| 8081.421 | A | 25 | 1.05 | 3.08 | 1½-1½ | |
| 8111.622 | A | 25 | 1.04 | 3.08 | ½- ½ | |
| 8003.601 | A | 4 | 1.05 | 3.10 | 1½-2½ | |
| 8058.113 | A | 5 | 1.04 | 3.08 | ½-1½ | |
| 5737.024 | A | 60 | 1.08 | 3.23 | 3½-4½ | $a^4D$-$y^4F^o$ |
| 5698.509 | A | 60 | 1.06 | 3.22 | 2½-3½ | (35) |
| 5703.562 | A | 40 | 1.05 | 3.21 | 1½-2½ | |
| 5706.973 | A | 30 | 1.04 | 3.20 | ½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| V I continued | | | | | | |
| 5743.438 | A | 18 | 1.08 | 3.22 | 3½-3½ | $a^4D$-$y^4F^o$ |
| 5737.040 | A | 25 | 1.08 | 3.21 | 2½-2½ | cont |
| 5727.662 | A | 20 | 1.05 | 3.20 | 1½-1½ | |
| *5782.601 | A | 2 | 1.08 | 3.21 | 3½-2½ | |
| 5761.411 | A | 2 | 1.06 | 3.20 | 2½-1½ | |
| 5870.827 | A | 30w | 1.08 | 3.25 | 3½-4½ | $a^4D$-$z^2G^o$ |
| 5731.257 | A | 30 | 1.06 | 3.21 | 2½-3½ | (36) |
| 5776.670 | A | 4 | 1.08 | 3.21 | 3½-3½ | |
| 5627.628 | A | 30 | 1.08 | 3.27 | 3½-3½ | $a^4D$-$y^4D^o$ |
| 5824.605 | A | 20 | 1.06 | 3.25 | 2½-2½ | (37) |
| 5624.895 | A | 10 | 1.05 | 3.24 | 1½-1½ | |
| 5626.014 | A | 8 | 1.04 | 3.23 | ½- ½ | |
| 5668.369 | A | 12 | 1.08 | 3.25 | 3½-2½ | |
| 5857.449 | A | 12 | 1.06 | 3.24 | 2½-1½ | |
| 5848.112 | A | 10 | 1.05 | 3.23 | 1½- ½ | |
| 5584.490 | A | 10 | 1.06 | 3.27 | 2½-3½ | |
| 5593.409 | A | 12 | 1.05 | 3.25 | 1½-2½ | |
| 5604.943 | A | 8 | 1.04 | 3.24 | ½-1½ | |
| 4423.212 | C | 8 | 1.08 | 3.87 | 3½-4½ | $a^4D$-$x^4F^o$ † |
| *4406.147 | C | 6 | 1.06 | 3.86 | 2½-3½ | (40) |
| 4393.835 | C | 4 | 1.05 | 3.86 | 1½-2½ | |
| 4387.213 | C | 3 | 1.04 | 3.85 | ½-1½ | |
| 4090.579 | C | 25 | 1.08 | 4.09 | 3½-4½ | $a^4D$-$w^4F^o$ † |
| 4095.486 | C | 25 | 1.06 | 4.07 | 2½-3½ | (41) |
| 4102.159 | C | 20 | 1.05 | 4.06 | 1½-2½ | |
| m4109.81 | P | V | 1.04 | 4.04 | ½-1½ | |
| 4118.843 | C | 8 | 1.08 | 4.07 | 3½-3½ | |
| 4119.457 | C | 8 | 1.06 | 4.06 | 2½-2½ | |
| 4120.538 | C | 8 | 1.05 | 4.04 | 1½-1½ | |
| 3934.013 | C | 20 | 1.08 | 4.21 | 3½-3½ | $a^4D$-$w^4D^o$ |
| 3923.431 | C | 12 | 1.06 | 4.21 | 2½-2½ | (42) |
| 3920.487 | C | 5 | 1.05 | 4.19 | 1½-1½ | |
| *3913.307 | C | 10 | 1.04 | 4.19 | ½- ½ | |
| 3943.864 | C | 12 | 1.08 | 4.21 | 3½-2½ | |
| 3936.282 | C | 5 | 1.06 | 4.19 | 2½-1½ | |
| 3921.905 | C | 6 | 1.05 | 4.19 | 1½- ½ | |
| 3912.888 | C | 4 | 1.06 | 4.21 | 2½-3½ | |
| *3906.748 | C | 6 | 1.05 | 4.21 | 1½-2½ | |
| 3910.790 | C | 5 | 1.04 | 4.19 | ½-1½ | |
| *3872.748 | C | 4n | 1.08 | 4.26 | 3½-4½ | $a^4D$-$v^4F^o$ |
| 3875.426 | C | 3 | 1.06 | 4.24 | 2½-3½ | (43) |
| 3891.227 | B | 2 | 1.05 | 4.23 | 1½-2½ | |
| 3903.558 | C | 3 | 1.04 | 4.20 | ½-1½ | |
| *3896.155§ | E | 6 | 1.08 | 4.24 | 3½-3½ | |
| *3906.748 | C | 6 | 1.08 | 4.23 | 2½-2½ | |
| *3913.307 | C | 10 | 1.05 | 4.20 | 1½-1½ | |
| m3840.44 | P | Fe | 1.08 | 4.29 | 3½-3½ | $a^4D$-$v^4D^o$ |
| 3839.003 | C | 10 | 1.06 | 4.27 | 2½-2½ | (44) |
| 3836.054 | C | 5 | 1.05 | 4.26 | 1½-1½ | |
| 3835.580 | C | 4 | 1.04 | 4.26 | ½- ½ | |
| 3859.341 | C | 6 | 1.08 | 4.27 | 3½-2½ | |
| 3851.171 | C | 5 | 1.06 | 4.26 | 2½-1½ | |
| 3844.893 | C | 4 | 1.05 | 4.28 | 1½- ½ | |
| 3830.299 | B | (4) | 1.06 | 4.29 | 2½-3½ | |
| 3833.990 | C | 5 | 1.05 | 4.27 | 1½-2½ | |
| 3826.774 | C | 6 | 1.04 | 4.26 | ½-1½ | |
| 3583.704 | C | 8 | 1.08 | 4.52 | 3½-2½ | $a^4D$-$x^4P^o$ † |
| 3540.530 | C | 1 | 1.06 | 4.54 | 2½-1½ | (45) |
| 3542.657 | C | 1 | 1.05 | 4.53 | 1½- ½ | |
| *3566.177§ | E | 4 | 1.06 | 4.52 | 2½-2½ | |
| 3400.395 | C | 12 | 1.08 | 4.71 | 3½-3½ | $a^4D$-$t^4D^o$ † |
| 3402.571 | C | 9 | 1.06 | 4.69 | 2½-2½ | (46) |
| 3405.160 | C | 6 | 1.05 | 4.67 | 1½-1½ | |
| 3408.837 | C | 8 | 1.04 | 4.66 | ½- ½ | |
| 3002.65 | C | 8 | 1.08 | 5.19 | 3½-2½ | $a^4D$-$v^4P^o$ † |
| 3004.824 | C | 10 | 1.06 | 5.17 | 2½-1½ | (47) |
| 6531.44 | A | 15 | 1.21 | 3.10 | 2½-2½ | $a^4P$-$z^4P^o$ |
| 6543.51 | A | 5 | 1.19 | 3.08 | 1½-1½ | (48) |
| 8585.88 | A | 3 | 1.18 | 3.06 | ½- ½ | |
| 8624.88 | A | 7 | 1.21 | 3.08 | 2½-1½ | |
| 6605.98 | A | 10 | 1.19 | 3.06 | 1½- ½ | |
| 6452.354 | A | 10 | 1.19 | 3.10 | 1½-2½ | |
| 6504.164 | A | 9 | 1.16 | 3.08 | ½-1½ | |
| 6002.373 | A | 2 | 1.21 | 3.27 | 2½-3½ | $a^4P$-$y^4D^o$ |
| 5980.748 | A | 2 | 1.19 | 3.25 | 1½-2½ | (49) |
| 5984.602 | A | 1 | 1.16 | 3.24 | ½-1½ | |
| 6048.838 | A | tr | 1.21 | 3.25 | 2½-2½ | |
| 6017.90 | A | tr | 1.19 | 3.24 | 1½-1½ | |
| 8008.648 | A | tr | 1.18 | 3.23 | ½- ½ | |
| 6086.55 | A | (2) | 1.21 | 3.24 | 2½-1½ | |
| 4925.657 | A | 10 | 1.21 | 3.72 | 2½-2½ | $a^4P$-$y^4D^o$ |
| 4886.821 | A | 2 | 1.19 | 3.72 | 1½-1½ | (50) |
| 4882.183 | A | 2 | 1.18 | 3.71 | ½- ½ | |
| 4932.029 | A | 4 | 1.21 | 3.72 | 2½-1½ | |
| 4904.385 | A | (8) | 1.19 | 3.71 | 1½- ½ | |
| 4860.560 | A | 8 | 1.19 | 3.72 | 1½-2½ | |
| 4884.83 | P | | 1.18 | 3.72 | ½-1½ | |
| 4758.742 | A | 2 | 1.21 | 3.81 | 2½-2½ | ?$a^4P$-$z^6S^o$ |
| 4716.644 | A | (1-) | 1.19 | 3.61 | 1½-2½ | ↑ (51) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| V I continued | | | | | | |
| 4113.518 | C | 12 | 1.21 | 4.21 | 2½-3½ | $a^4P$-$w^4D^o$ † |
| 4093.407 | C | 8 | 1.19 | 4.21 | 1½-2½ | (52) |
| 4091.945 | C | 3 | 1.18 | 4.19 | ½-1½ | |
| 4124.072 | C | 5 | 1.21 | 4.21 | 2½-2½ | |
| 4107.487 | C | 4 | 1.19 | 4.19 | 1½-1½ | |
| 4093.497 | C | 5 | 1.18 | 4.19 | ½- ½ | |
| 3533.676 | C | 10 | 1.21 | 4.71 | 2½-3½ | $a^4P$-$t^4D^o$ |
| 3529.735 | C | 10 | 1.19 | 4.69 | 1½-2½ | (53) |
| 3533.757 | C | 6 | 1.18 | 4.67 | ½-1½ | |
| 3553.271 | C | 6 | 1.21 | 4.89 | 2½-2½ | |
| 3545.339 | C | 8 | 1.19 | 4.87 | 1½-1½ | |
| 3543.500 | C | 8 | 1.18 | 4.86 | ½- ½ | |
| 3569.083 | C | 1 | 1.21 | 4.87 | 2½-1½ | |
| 3555.143 | C | 3 | 1.19 | 4.66 | 1½- ½ | |
| 3377.825 | C | 15 | 1.21 | 4.87 | 2½-2½ | $a^4P$-$w^4P^o$ |
| 3376.057 | C | 8 | 1.19 | 4.85 | 1½-1½ | (54) |
| 3386.880 | C | 4 | 1.18 | 4.84 | ½- ½ | |
| 3397.580 | C | 6 | 1.21 | 4.85 | 2½-1½ | |
| 3377.394 | C | 10 | 1.19 | 4.84 | 1½- ½ | |
| 3356.352 | C | 10 | 1.19 | 4.87 | 1½-2½ | |
| 3365.553 | C | 10 | 1.18 | 4.85 | ½-1½ | |
| 3329.855 | C | 12 | 1.21 | 4.92 | 2½-1½ | $a^4P$-$x^4S^o$ |
| 3309.176 | C | 8 | 1.19 | 4.92 | 1½-1½ | (55) |
| 3299.086 | C | 3 | 1.18 | 4.92 | ½-1½ | |
| 3106.11 | C | 5 | 1.21 | 5.19 | 2½-3½ | $a^4P$-$v^4P^o$ |
| 3103.60 | F | 1 | 1.19 | 5.17 | 1½-1½ | (56) |
| 3103.994 | C | 6 | 1.18 | 5.15 | ½- ½ | |
| 3121.749 | C | 4 | 1.21 | 5.17 | 2½-1½ | |
| 3113.925 | C | 8 | 1.19 | 5.15 | 1½- ½ | |
| 3088.114 | C | 30 | 1.19 | 5.19 | 1½-2½ | |
| 3094.692 | C | 20 | 1.18 | 5.17 | ½-1½ | |
| 3083.539 | C | 30 | 1.21 | 5.22 | 2½-3½ | $a^4P$-$r^4D^o$ |
| 3075.933 | C | 8 | 1.19 | 5.20 | 1½-2½ | (57) |
| 3080.333 | C | 12 | 1.18 | 5.18 | ½-1½ | |
| 3093.792 | C | 25 | 1.21 | 5.20 | 2½-2½ | |
| 3089.130 | C | 25 | 1.19 | 5.18 | 1½-1½ | |
| 3087.065 | C | 15 | 1.18 | 5.18 | ½- ½ | |
| 3107.142 | B | 5 | 1.21 | 5.18 | 2½-1½ | |
| 3095.902 | C | 5 | 1.19 | 5.18 | 1½- ½ | |
| 3016.16 | C | 20 | 1.21 | 5.30 | 2½-1½ | $a^4P$-$w^4S^o$ |
| 2999.238 | C | 12 | 1.19 | 5.30 | 1½-1½ | (58) |
| 2990.948 | C | 8 | 1.18 | 5.30 | ½-1½ | |
| 6558.02 | A | 5 | 1.37 | 3.25 | 4½-4½ | $a^2G$-$z^2G^o$ |
| 6607.82 | A | 3 | 1.34 | 3.21 | 3½-3½ | (59) |
| 6106.967 | A | 2 | 1.37 | 3.39 | 4½-3½ | $a^2G$-$z^2F^o$ |
| 6135.07 | A | 2 | 1.34 | 3.36 | 3½-2½ | (60) |
| 4609.646 | A | 4 | 1.37 | 4.05 | 4½-4½ | $a^2G$-$z^4H^o$ |
| 4585.94 | G | 2 | 1.34 | 4.04 | 3½-3½ | (61) |
| 4501.973 | A | 8 | 1.37 | 4.11 | 4½-4½ | $a^2G$-$y^2G^o$ |
| 4449.573 | C | 5 | 1.34 | 4.12 | 3½-3½ | (62) |
| 4491.164 | C | 2 | 1.37 | 4.12 | 4½-3½ | |
| m4460.16 | P | V | 1.34 | 4.11 | 3½-4½ | |
| 3930.033 | C | 10 | 1.37 | 4.51 | 4½-4½ | $a^2G$-$x^2G^o$ |
| *3909.894 | C | 20 | 1.34 | 4.50 | 3½-3½ | (63) |
| 3943.006 | C | 6 | 1.37 | 4.50 | 4½-3½ | |
| 3898.143 | B | (4?) | 1.34 | 4.51 | 3½-4½ | |
| 3886.587 | C | 6 | 1.37 | 4.55 | 4½-3½ | $a^2G$-$w^4G^o$ † |
| 3864.300 | B | (3) | 1.34 | 4.54 | 3½-2½ | (64) |
| 3885.770 | C | 2 | 1.37 | 4.55 | 4½-4½ | $a^2G$-$w^2G^o$ † |
| 3884.465 | C | 4 | 1.34 | 4.52 | 3½-3½ | (65) |
| 3871.078 | C | 8 | 1.37 | 4.56 | 4½-3½ | $a^2G$-$x^2F^o$ |
| *3863.866§ | C | 6 | 1.34 | 4.54 | 3½-2½ | (66) |
| 3840.140 | C | 4 | 1.34 | 4.56 | 3½-3½ | |
| 3828.836 | C | 4 | 1.37 | 4.59 | 4½-5½ | $a^2G$-$y^2H^o$ |
| 3802.883 | C | 2 | 1.34 | 4.59 | 3½-4½ | (67) |
| 3833.226 | C | 3 | 1.37 | 4.59 | 4½-4½ | |
| 3806.796 | C | 8 | 1.37 | 4.61 | 4½-4½ | $a^2G$-$v^2G^o$ † |
| 3803.784 | C | 6 | 1.34 | 4.59 | 3½-3½ | (68) |
| 3790.469 | C | 8 | 1.37 | 4.63 | 4½-3½ | $a^2G$-$w^2F^o$ † |
| 3779.648 | C | 4 | 1.34 | 4.61 | 3½-2½ | (69) |
| 3686.362 | C | 8 | 1.37 | 4.72 | 4½-5½ | $a^2G$-$x^2H^o$ |
| 3671.205 | C | 10 | 1.34 | 4.71 | 3½-4½ | (70) |
| 3699.476 | C | 3 | 1.37 | 4.71 | 4½-4½ | |
| 3284.360 | C | 6 | 1.37 | 5.13 | 4½-4½ | $a^2G$-$t^2G^o$ † |
| 3273.027 | C | 7 | 1.34 | 5.12 | 3½-3½ | (71) |
| 3233.190 | C | 6 | 1.37 | 5.19 | 4½-3½ | $a^2G$-$u^2F^o$ † |
| 3218.869 | C | 5 | 1.34 | 5.18 | 3½-2½ | (72) |
| 3213.434 | C | 15 | 1.37 | 5.21 | 4½-5½ | $a^2G$-$u^2H^o$ † |
| 3205.582 | C | 15 | 1.34 | 5.19 | 3½-4½ | (73) |
| 3050.400 | C | 25 | 1.37 | 5.42 | 4½-3½ | $a^2G$-$t^2F^o$ |
| 3031.007 | C | 10† | 1.34 | 5.42 | 3½-2½ | (74) |
| 3021.78 | C | 6 | 1.37 | 5.45 | 4½-5½ | $a^2G$-$t^2H^o$ |
| 3006.35 | C | 6 | 1.34 | 5.45 | 3½-4½ | (75) |
| 9865.44 | A | 10 | 1.70 | 3.95 | 1½-2½ | $a^2P$-$z^2D^o$ |
| 10203.45 | A | 10 | 1.70 | 2.91 | ½-1½ | (76) |
| 10193.66 | A | 5 | 1.70 | 2.91 | 1½-1½ | |
| 5558.752 | A | 3 | 1.70 | 3.92 | 1½- ½ | $a^2P$-$z^2S^o$ |
| 5561.670 | A | 2 | 1.70 | 3.92 | ½- ½ | (77) |
| 4833.037 | A | 3 | 1.70 | 4.26 | 1½-2½ | $a^2P$-$y^2D^o$ † |
| *4848.821 | A | 1 | 1.70 | 4.25 | ½-1½ | (78) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| V I continued | | | | | | |
| 4365.745 | C | 3 | 1.70 | 4.53 | 1½-2½ | $a^3P-x^3D^o$ |
| *4422.477 | C | 2 | 1.70 | 4.50 | ½-1½ | (79) |
| *3798.661 | C | 2 | 1.70 | 4.95 | 1½-2½ | $a^3P-v^3D^o$ |
| m3834.22 | P | Fe | 1.70 | 4.92 | ½-1½ | (80) |
| 3832.835 | C | 4 | 1.70 | 4.93 | 1½-1½ | |
| 3505.690 | C | 6 | 1.70 | 5.22 | 1½-1½ | $a^3P-v^3P^o$ |
| 3487.008 | D | 2 | 1.70 | 5.24 | ½- ½ | (81) |
| 3485.867 | B | 6 | 1.70 | 5.24 | 1½- ½ | |
| 3506.843 | C | 3 | 1.70 | 5.22 | ½-1½ | |
| 4537.663 | A | 6 | 1.80 | 4.52 | 2½-1½ | $a^3D-y^3P^o$ |
| 4551.860 | A | 3 | 1.79 | 4.50 | 1½- ½ | (82) |
| 3639.024 | C | 6 | 1.80 | 5.19 | 2½-3½ | $a^3D-u^3F^o$ † |
| 3643.864 | C | 5 | 1.79 | 5.18 | 1½-2½ | (83) |
| 6326.845 | A | 6 | 1.86 | 3.81 | 6½-5½ | $a^4H-y^4G^o$ † |
| 6339.090 | A | 5 | 1.85 | 3.80 | 5½-4½ | (84) |
| 6349.477 | A | 5 | 1.85 | 3.79 | 4½-3½ | |
| 6357.297 | A | 4 | 1.84 | 3.78 | 3½-2½ | |
| 5584.738 | A | (3) | 1.86 | 4.07 | 6½-6½ | $a^4H-z^4H^o$ † |
| 5586.007 | A | 2 | 1.85 | 4.06 | 5½-5½ | (85) |
| *5604.205 | A | 1 | 1.85 | 4.05 | 4½-4½ | |
| 5622.075 | A | (2) | 1.84 | 4.04 | 3½-3½ | |
| 4501.256 | B | 1 | 1.85 | 4.59 | 5½-5½ | $a^4H-y^3H^o$ |
| 4496.864 | A | 5 | 1.85 | 4.59 | 4½-4½ | (86) |
| 4490.815 | A | 5 | 1.85 | 4.59 | 4½-5½ | |
| *4488.898 | A | 20 | 1.84 | 4.59 | 3½-4½ | |
| 4452.008 | C | 20 | 1.86 | 4.63 | 6½-7½ | $a^4H-z^4I^o$ † |
| 4462.363 | C | 20 | 1.85 | 4.62 | 5½-6½ | (87) |
| 4469.710 | C | 15 | 1.85 | 4.61 | 4½-5½ | |
| 4468.010 | C | 8 | 1.84 | 4.60 | 3½-4½ | |
| 4268.643 | C | 20 | 1.86 | 4.75 | 6½-6½ | $a^4H-x^4H^o$ † |
| 4271.554 | C | 12 | 1.85 | 4.74 | 5½-5½ | (88) |
| 4276.958 | C | 12 | 1.85 | 4.73 | 4½-4½ | |
| 4284.055 | C | 15 | 1.84 | 4.72 | 3½-3½ | |
| 3998.730 | C | 15 | 1.86 | 4.95 | 6½-5½ | $a^4H-u^4G^o$ † |
| 3992.801 | C | 12 | 1.85 | 4.94 | 5½-4½ | (89) |
| *3990.566 | C | 20 | 1.85<br>1.84 | 4.94<br>4.93 | 4½-3½<br>3½-2½ | |
| 3988.833 | C | 5 | 1.85 | 4.95 | 5½-5½ | |
| 3984.600 | C | 6 | 1.85 | 4.94 | 4½-4½ | |
| 3984.335 | C | 6 | 1.84 | 4.94 | 3½-3½ | |
| 3924.658 | C | 10 | 1.86 | 5.00 | 6½-6½ | $a^4H-w^4H^o$ † |
| 3927.926 | C | (3) | 1.85 | 4.99 | 5½-5½ | (90) |
| 3931.340 | C | 5 | 1.85 | 4.98 | 4½-4½ | |
| 3935.141 | C | 6 | 1.84 | 4.98 | 3½-3½ | |
| *3722.601 | C | (3) | 1.86 | 5.17 | 6½-5½ | $a^4H-t^4G^o$ † |
| 3721.998 | C | 4 | 1.85 | 5.17 | 5½-4½ | (91) |
| 3729.035 | C | 4 | 1.85 | 5.16 | 4½-3½ | |
| 3737.992 | C | 5 | 1.84 | 5.14 | 3½-2½ | |
| 5772.402 | A | 6 | 1.92 | 4.06 | 2½-3½ | $b^4P-x^4D^o$ † |
| *5748.860 | A | 4 | 1.89 | 4.03 | 1½-2½ | (92) |
| 5752.711 | A | 3 | 1.86 | 4.01 | ½-1½ | |
| 5850.286 | A | 2 | 1.92 | 4.03 | 2½-2½ | |
| 5817.063 | A | 3 | 1.89 | 4.01 | 1½-1½ | |
| 5788.549 | A | 3 | 1.86 | 3.99 | ½- ½ | |
| 4797.973 | A | 2 | 1.92 | 4.49 | 2½-1½ | $b^4P-y^4S^o$ |
| 4729.544 | A | 6 | 1.89 | 4.49 | 1½-1½ | (93) |
| 4686.926 | A | 6 | 1.86 | 4.49 | ½-1½ | |
| 4751.574 | A | 6 | 1.92 | 4.52 | 2½-2½ | $b^4P-x^4P^o$ |
| 4640.309 | B | (0) | 1.89 | 4.54 | 1½-1½ | (94) |
| 4624.657 | B | (1) | 1.86 | 4.53 | ½- ½ | |
| 4706.178 | A | 8 | 1.92 | 4.54 | 2½-1½ | |
| 4666.149 | A | 4 | 1.89 | 4.53 | 1½- ½ | |
| 4684.457 | A | (3) | 1.89 | 4.52 | 1½-2½ | |
| 4591.991 | B | (0) | 1.92 | 4.61 | 2½-2½ | $b^4P-w^3F^o$ |
| 4529.301 | A | 4 | 1.89 | 4.61 | 1½-2½ | (95) |
| 4071.541 | C | 8 | 1.92 | 4.95 | 2½-3½ | $b^4P-s^4D^o$ † |
| 4042.635 | C | 5 | 1.89 | 4.94 | 1½-2½ | (98) |
| 4021.925 | C | 3 | 1.86 | 4.93 | ½-1½ | |
| *3781.393 | C | 3 | 1.92 | 5.19 | 2½-3½ | $b^4P-v^4P^o$ |
| 3761.442 | C | 3 | 1.89 | 5.17 | 1½-1½ | (97) |
| *3747.982 | C | 8n | 1.86 | 5.15 | ½- ½ | |
| 3804.589 | C | 3 | 1.92 | 5.17 | 2½-1½ | |
| 3775.187 | C | 3 | 1.89 | 5.15 | 1½- ½ | |
| 3738.757 | C | 8 | 1.89 | 5.19 | 1½-2½ | |
| 3734.428 | C | 5 | 1.86 | 5.17 | ½-1½ | |
| *3747.982 | C | 8n | 1.92 | 5.22 | 2½-3½ | $b^4P-r^4D^o$ † |
| 3720.93 | G | 1 | 1.89 | 5.20 | 1½-2½ | (98) |
| 3713.56 | G | 1 | 1.86 | 5.18 | ½-1½ | |
| 3763.141 | C | 6 | 1.92 | 5.20 | 2½-2½ | |
| 3740.241 | C | 6 | 1.89 | 5.18 | 1½-1½ | |
| 3723.324 | C | 3 | 1.86 | 5.18 | ½- ½ | |
| 4524.218 | A | 15 | 1.88 | 4.61 | 5½-4½ | $a^2H-v^2G^o$ † |
| 4529.589 | A | 8 | 1.88 | 4.59 | 4½-3½ | (99) |
| 4515.558 | A | 2 | 1.88 | 4.62 | 5½-6½ | $a^2H-z^4I^o$ |
| 4540.014 | A | 6 | 1.88 | 4.60 | 5½-4½ | (100) |
| 4474.714 | C | 12 | 1.88 | 4.64 | 5½-6½ | $a^2H-z^2I^o$ |
| 4457.759 | C | 8 | 1.86 | 4.63 | 4½-5½ | (101) |
| 4468.759 | C | 4 | 1.86 | 4.63 | 4½-3½ | $a^2H-w^2F^o$ (102) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| V I continued | | | | | | |
| 4354.979 | C | 5 | 1.88 | 4.72 | 5½-5½ | $a^2H-x^2H^o$ |
| 4342.832 | C | 6 | 1.86 | 4.71 | 4½-4½ | (103) |
| 3708.721 | C | 6 | 1.88 | 5.21 | 5½-5½ | $a^2H-u^2H^o$ |
| 3706.035 | C | 4 | 1.86 | 5.19 | 4½-4½ | (104) |
| 3083.010 | B | 6 | 1.88 | 5.89 | 5½-5½ | $a^2H-s^2H^o$ |
| 3075.269 | C | 10 | 1.86 | 5.88 | 4½-4½ | (105) |
| 9611.60 | A | 80 | 1.95 | 3.23 | 4½-4½ | $b^4F-y^4F^o$ |
| 9614.68 | A | 50 | 1.94 | 3.22 | 3½-3½ | (106) |
| 9691.58 | A | 40 | 1.94 | 3.21 | 2½-2½ | |
| 9738.50 | A | 15 | 1.93 | 3.20 | 1½-1½ | |
| 9582.28 | A | 6np | 1.94 | 3.22 | 2½-3½ | |
| 9668.9 | A | 3p† | 1.93 | 3.21 | 1½-2½ | |
| 6430.471 | A | 5 | 1.95 | 3.87 | 4½-4½ | $b^4F-x^4F^o$ † |
| 6431.620 | A | 4 | 1.94 | 3.86 | 3½-3½ | (107) |
| 6433.17 | A | 3 | 1.94 | 3.86 | 2½-2½ | |
| 6435.148 | A | 2 | 1.93 | 3.85 | 1½-1½ | |
| 4722.877 | A | 8 | 1.95 | 4.56 | 4½-5½ | $b^4F-w^4G^o$ † |
| 4721.524 | A | 6 | 1.94 | 4.56 | 3½-4½ | (108) |
| 4730.394 | A | 3 | 1.94 | 4.55 | 2½-3½ | |
| 4545.394 | A | 25 | 1.95 | 4.66 | 4½-5½ | $b^4F-v^4G^o$ |
| 4560.710 | A | 20 | 1.94 | 4.65 | 3½-4½ | (109) |
| 4571.783 | A | 15 | 1.94 | 4.64 | 2½-3½ | |
| 4578.728 | A | 15 | 1.93 | 4.63 | 1½-2½ | |
| 4570.425 | A | 6 | 1.95 | 4.65 | 4½-4½ | |
| 4579.198 | A | 7 | 1.94 | 4.64 | 3½-3½ | |
| 4583.783 | A | 5 | 1.94 | 4.63 | 2½-2½ | |
| 4474.045 | C | 10 | 1.95 | 4.71 | 4½-3½ | $b^4F-t^4D^o$ |
| 4496.062 | A | 8 | 1.94 | 4.69 | 3½-2½ | (110) |
| 4514.191 | A | 6 | 1.94 | 4.67 | 2½-1½ | |
| 4525.168 | A | 5 | 1.93 | 4.66 | 1½- ½ | |
| 4464.747 | C | 2 | 1.94 | 4.71 | 3½-3½ | |
| *4488.898 | A | 20 | 1.94 | 4.69 | 3½-2½ | |
| 4509.287 | A | 3 | 1.93 | 4.67 | 1½-1½ | |
| 4232.460 | C | 15 | 1.95 | 4.86 | 4½-4½ | $b^4F-u^4F^o$ † |
| 4232.952 | C | 12 | 1.94 | 4.86 | 3½-3½ | (111) |
| *4234.000 | C | 12 | 1.94 | 4.85 | 2½-2½ | |
| 4235.756 | C | 10 | 1.93 | 4.85 | 1½-1½ | |
| 4104.778 | C | 15 | 1.95 | 4.95 | 4½-3½ | $b^4F-s^4D^o$ † |
| 4118.182 | C | 8 | 1.94 | 4.94 | 3½-2½ | (112) |
| 4123.188 | C | 6 | 1.94 | 4.93 | 2½-1½ | |
| 4128.858 | C | 5 | 1.93 | 4.92 | 1½- ½ | |
| 4807.537 | A | 25 | 2.12 | 4.68 | 6½-5½ | $z^6G^o-e^6F$ † |
| 4796.930 | A | 20 | 2.09 | 4.66 | 5½-4½ | (113) |
| 4786.515 | A | 20 | 2.07 | 4.64 | 4½-3½ | |
| 4776.364 | A | 10 | 2.05 | 4.63 | 3½-2½ | |
| 4766.635 | A | 10 | 2.03 | 4.62 | 2½-1½ | |
| 4757.50 | A | 8 | 2.02 | 4.61 | 1½- ½ | |
| 4757.37 | A | 4 | 2.09 | 4.68 | 5½-5½ | |
| 4753.957 | A | 7 | 2.07 | 4.66 | 4½-4½ | |
| 4750.990 | A | 8 | 2.05 | 4.64 | 3½-3½ | |
| 4748.525 | A | 7 | 2.03 | 4.63 | 2½-2½ | |
| 4746.638 | A | 5 | 2.02 | 4.62 | 1½-1½ | |
| 3695.335 | C | 30 | 2.12 | 5.46 | 6½-7½ | $z^6G^o-e^6H$ |
| 3687.473 | C | 12? | 2.09 | 5.44 | 5½-6½ | (114) |
| 3680.113 | C | 15 | 2.07 | 5.42 | 4½-5½ | |
| 3673.404 | C | 12 | 2.05 | 5.41 | 3½-4½ | |
| 3667.741 | C | 15 | 2.03 | 5.40 | 2½-3½ | |
| 3663.594 | C | 15 | 2.02 | 5.39 | 1½-2½ | |
| 3717.55 | G | 1 | 2.12 | 5.44 | 6½-6½ | |
| 3705.83 | G | 1 | 2.09 | 5.42 | 5½-5½ | |
| *3694.622 | C | 3 | 2.07 | 5.41 | 4½-4½ | |
| 3684.332 | C | 3 | 2.05 | 5.40 | 3½-3½ | |
| 3675.497 | C | 3 | 2.03 | 5.39 | 2½-2½ | |
| 3676.684 | C | 10 | 2.12 | 5.47 | 6½-6½ | $z^6G^o-f^6G$ † |
| 3672.403 | C | 8 | 2.09 | 5.45 | 5½-5½ | (115) |
| 3665.142 | C | 8 | 2.07 | 5.43 | 4½-4½ | |
| 3656.706 | C | 6 | 2.05 | 5.42 | 3½-3½ | |
| *3648.966 | C | 5 | 2.03 | 5.41 | 2½-2½ | |
| 3641.096 | C | 4 | 2.02 | 5.41 | 1½-1½ | |
| 3014.37 | C | 15N | 2.12 | 6.21 | 6½-7½ | $z^6G^o-f^6H$ |
| 3006.90 | F | 5N | 2.09 | 6.19 | 5½-6½ | (116) |
| 3006.24 | F | 5N | 2.07 | 6.17 | 4½-5½ | |
| 3001.90 | F | 10N | 2.05 | 6.16 | 3½-4½ | |
| 2997.87 | F | 5N | 2.03 | 6.15 | 2½-3½ | |
| 2997.08 | F | 3N | 2.02 | 6.14 | 1½-2½ | |
| 7338.92 | A | 30 | 2.13 | 3.81 | 5½-5½ | $a^4G-y^4G^o$ † |
| 7356.51 | A | 20 | 2.12 | 3.80 | 4½-4½ | (117) |
| 7363.16 | A | 15 | 2.11 | 3.79 | 3½-3½ | |
| 7361.39 | A | 10 | 2.11 | 3.78 | 2½-2½ | |
| 4904.350 | B | (9) | 2.13 | 4.64 | 5½-6½ | $a^4G-y^4H^o$ † |
| 4904.447 | B | (7) | 2.12 | 4.64 | 4½-5½ | (118) |
| 4900.624 | A | 6 | 2.11 | 4.63 | 3½-4½ | |
| 4894.218 | A | 4 | 2.11 | 4.63 | 2½-3½ | |
| 4706.574 | A | 12 | 2.13 | 4.75 | 5½-6½ | $a^4G-x^4H^o$ † |
| 4710.566 | A | 12 | 2.12 | 4.74 | 4½-5½ | (119) |
| 4714.113 | A | 10 | 2.11 | 4.73 | 3½-4½ | |
| 4717.692 | A | 10 | 2.11 | 4.72 | 2½-3½ | |
| 4291.816 | C | 15 | 2.13 | 5.00 | 5½-6½ | $a^4G-w^4H^o$ † |
| 4296.107 | C | 15 | 2.12 | 4.99 | 4½-5½ | (120) |
| 4297.681 | C | 12 | 2.11 | 4.98 | 3½-4½ | |
| 4298.029 | C | 12 | 2.11 | 4.98 | 2½-3½ | |
| *4051.352§ | C | 12 | 2.13 | 5.17 | 5½-5½ | $a^4G-t^4G^o$ † |
| *4050.963§ | C | 10 | 2.12 | 5.17 | 4½-4½ | (121) |
| 4057.074 | C | 10 | 2.11 | 5.16 | 3½-3½ | |
| 4063.931 | C | 10 | 2.11 | 5.14 | 2½-2½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| V I continued | | | | | | |
| 3571.037 | C | 4 | 2.13 | 5.58 | 5½-4½ | $a^4G-q^4F^o$ |
| 3573.516 | C | 5 | 2.12 | 5.57 | 4½-3½ | (122) |
| 3571.653 | C | 5 | 2.11 | 5.57 | 3½-2½ | |
| 3568.940 | C | 3 | 2.11 | 5.56 | 2½-1½ | |
| 5138.530 | A | 7 | 2.28 | 4.68 | 4½-5½ | $z^6D^o-e^6F$ |
| 5138.431 | A | 5 | 2.26 | 4.66 | 3½-4½ | (123) |
| 5148.734 | A | 4 | 2.25 | 4.64 | 2½-3½ | |
| 5159.350 | A | 3 | 2.24 | 4.63 | 1½-2½ | |
| 3741.504 | C | 6 | 2.28 | 5.57 | 4½-4½ | $z^6D^o-g^6D$ |
| *3755.701 | C | 4 | 2.28<br>2.26 | 5.56<br>5.55 | 3½-3½<br>2½-2½ | (124) |
| 5193.004 | A | 7 | 2.31 | 4.68 | 5½-5½ | $z^6F^o-e^6F$ |
| *5194.824 | A | 10 | 2.29 | 4.66 | 4½-4½ | (125) |
| 5195.394 | A | 5 | 2.27 | 4.64 | 3½-3½ | |
| *5194.824 | A | 10 | 2.25 | 4.63 | 2½-2½ | |
| 3898.019 | C | 6 | 2.31 | 5.47 | 5½-6½ | $z^6F^o-f^6G$ |
| 3901.152 | C | 6 | 2.29 | 5.45 | 4½-5½ | (126) |
| 3900.175 | C | 6 | 2.27 | 5.43 | 3½-4½ | |
| 3897.075 | C | 6 | 2.25 | 5.42 | 2½-3½ | |
| 5748.412 | A | (1) | 2.37 | 4.52 | 1½-1½ | $b^2P-y^2P^o$ |
| 5656.895 | A | 1 | 2.32 | 4.50 | ½- ½ | (127) |
| *5782.601 | A | 2 | 2.37 | 4.50 | 1½- ½ | |
| 5624.223 | A | (2) | 2.32 | 4.52 | ½-1½ | |
| 4776.519 | A | 5 | 2.37 | 4.95 | 1½-2½ | $b^2P-v^2P^o$ |
| 4742.631 | A | 5 | 2.32 | 4.92 | ½-1½ | (128) |
| 5487.915 | A | 10 | 2.36 | 4.61 | 5½-4½ | $b^2H-v^2G^o$ |
| 5507.753 | A | 8 | 2.35 | 4.59 | 4½-3½ | (129) |
| 5415.377 | A | 10 | 2.36 | 4.64 | 5½-6½ | $b^2H-z^2I^o$ |
| *5401.945 | A | 8 | 2.35 | 4.63 | 4½-5½ | (130) |
| 5240.878 | A | 9 | 2.36 | 4.72 | 5½-5½ | $b^2H-x^2H^o$ |
| 5234.088 | A | 8 | 2.35 | 4.71 | 4½-4½ | (131) |
| *5014.630 | A | 5 | 2.36 | 4.82 | 5½-6½ | $b^2H-y^2I^o$ |
| 5002.320 | A | 4 | 2.35 | 4.82 | 4½-5½ | (132) |
| 4591.220 | A | 12 | 2.36 | 5.05 | 5½-5½ | $b^2H-w^2H^o$ |
| 4553.056 | A | 7 | 2.35 | 5.06 | 4½-4½ | (133) |
| 3237.409 | C | 4 | 2.36 | 6.19 | 5½-6½ | $b^2H-x^2I^o$ |
| 3229.604 | B | 4 | 2.35 | 6.17 | 4½-5½ | (134) |
| 5725.633 | A | 6 | 2.36 | 4.51 | 3½-4½ | $a^2F-x^2G^o$ |
| 5734.004 | A | 5 | 2.35 | 4.50 | 2½-3½ | (135) |
| 4705.099 | A | 4 | 2.36 | 4.98 | 3½-2½ | $a^2F-u^2D^o$ |
| 4715.900 | A | 5 | 2.35 | 4.97 | 2½-1½ | (136) |
| 3645.596 | C | 3 | 2.36 | 5.74 | 3½-2½ | $a^2F-5^o$ (137) |
| *3265.899§ | C | 5 | 2.36 | 6.13 | 3½-2½ | $a^2F-t^2D^o$ |
| 3256.779 | B | 1 | 2.35 | 6.14 | 2½-1½ | (138) |
| 5266.118 | A | (4) | 2.67 | 5.01 | 4½-3½ | $b^2G-v^2F^o$ |
| *5401.945 | A | 8 | 2.67 | 4.96 | 3½-2½ | (139) |
| 4373.230 | C | 4 | 2.67 | 5.49 | 4½-4½ | $b^2G-s^2G^o$ |
| 4375.304 | C | 4 | 2.67 | 5.49 | 3½-3½ | (140) |
| 5784.360 | A | 5 | 2.75 | 4.89 | 5½-4½ | $z^4G^o-f^4F$ |
| *5786.153 | A | 7 | 2.73<br>2.71 | 4.86<br>4.84 | 4½-3½<br>3½-2½ | (141) |
| 5783.509 | A | 2 | 2.70 | 4.83 | 2½-1½ | |
| 5846.306 | A | 8 | 3.12 | 5.23 | 5½-6½ | $y^6F^o-e^6G$ |
| 5830.719 | A | 7 | 3.10 | 5.22 | 4½-5½ | (142) |
| 5817.532 | A | 5 | 3.09 | 5.21 | 3½-4½ | |
| 5807.14 | A | 3 | 3.07 | 5.20 | 2½-3½ | |
| 5798.905 | A | 2 | 3.07 | 5.19 | 1½-2½ | |
| 5797.352 | A | (1-) | 3.06 | 5.19 | ½-1½ | |

Strongest Unclassified Lines of V I

| | | | |
|---|---|---|---|
| 4619.648 | A | 8 | IV |
| 4549.644 | A | 10 | IV |
| 4527.990 | A | 5 | IV |
| 4265.170 | C | 8n | III |
| *3963.628§ | C | 4 | II |
| 3898.278 | C | 5 | II |
| 3891.119 | C | 4 | II |
| 3849.324 | C | 6 | I |
| 3845.974 | C | 3 | II |
| 3425.070 | C | 6 | II |
| 3261.081 | C | 6 | III |
| 3156.223 | C | 10 | IV |
| 3153.549 | C | 5N | IV |
| 3150.568 | C | 5 | IV |
| 3093.72 | G | 8 | III |
| 3041.86 | C | 8 | IV |
| 3002.442 | C | 6 | IV |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| V II I P 14.1 Anal A List A Jan 1941 | | | | | | |
| 5093.108// | A | 2500R | 0.39 | 4.38 | 5-6 | $a^5F-z^5G^\circ$ (1) |
| 3102.295 | A | 2000R | 0.37 | 4.34 | 4-5 | |
| 3110.706 | A | 1500R | 0.35 | 4.31 | 3-4 | |
| 3118.376 | A | 1000R | 0.33 | 4.29 | 2-3 | |
| 3125.282 | A | 600R | 0.32 | 4.27 | 1-2 | |
| 3131.138 | A | 80 | 0.39 | 4.34 | 5-5 | |
| 3126.215 | A | 150R | 0.37 | 4.31 | 4-4 | |
| 3130.262 | A | 100R | 0.35 | 4.29 | 3-3 | |
| 3133.329 | A | 150r | 0.33 | 4.27 | 2-2 | |
| 3145.337 | A | 30 | 0.39 | 4.31 | 5-4 | |
| 3145.971 | A | 20 | 0.37 | 4.29 | 4-3 | |
| 3145.337 | A | 30 | 0.35 | 4.27 | 3-2 | |
| 3952.07 | A | 150 | 0.35 | 4.53 | 3-2 | $a^5F-z^5F^\circ$ † |
| 3957.520 | A | 100 | 0.33 | 4.50 | 2-1 | (2) |
| 3831.017 | A | 6 | 1.12 | 4.34 | 4-5 | $a^3F-z^5G^\circ$ |
| 3829.655 | A | 5 | 1.09 | 4.31 | 3-4 | (3) |
| 3629.53 | A | 4 | 1.07 | 4.29 | 2-3 | |
| 3852.10 | A | 4 | 1.07 | 4.27 | 2-2 | |
| 3538.238 | A | 50 | 1.12 | 4.61 | 4-5 | $a^3F-z^5F^\circ$ |
| 3531.48 | A | 10 | 1.09 | 4.59 | 3-4 | (4) |
| 3535.18 | P | | 1.07 | 4.56 | 2-3 | |
| 3583.71 | A | 3n | 1.12 | 4.59 | 4-4 | |
| 3560.594 | A | 90 | 1.09 | 4.56 | 3-3 | |
| 3566.177§ | A | 200 | 1.07 | 4.53 | 2-2 | |
| 3593.323 | A | 600 | 1.12 | 4.56 | 4-3 | |
| 3592.012 | A | 800 | 1.09 | 4.53 | 3-2 | |
| 3589.745 | A | 1000 | 1.07 | 4.50 | 2-1 | |
| 3556.800 | A | 1500 | 1.12 | 4.59 | 4-3 | $a^3F-z^3D^\circ$ |
| 3545.190 | A | 1000 | 1.09 | 4.57 | 3-2 | (5) |
| 3530.785 | A | 500 | 1.07 | 4.56 | 2-1 | |
| 3524.713 | A | 200 | 1.09 | 4.59 | 3-3 | |
| 3520.022 | A | 120 | 1.07 | 4.57 | 2-2 | |
| 3499.823 | A | 20 | 1.07 | 4.59 | 2-3 | |
| 3516.00 | A | 5 | 1.12 | 4.63 | 4-4 | $a^3F-z^5D^\circ$ |
| 3485.916 | A | 250 | 1.09 | 4.63 | 3-3 | (6) |
| 3479.837 | A | 80 | 1.07 | 4.61 | 2-2 | |
| 3517.296 | A | 600 | 1.12 | 4.63 | 4-3 | |
| 3504.432 | A | 400 | 1.09 | 4.61 | 3-2 | |
| 3493.163 | A | 150 | 1.07 | 4.60 | 2-1 | |
| 3484.85 | A | 3 | 1.09 | 4.63 | 3-4 | |
| 3481.580 | A | 5 | 1.07 | 4.83 | 2-3 | |
| 3278.12 | A | 1500R | 1.12 | 4.89 | 4-5 | $a^3F-z^3G^\circ$ |
| 3271.124 | A | 1200R | 1.09 | 4.86 | 3-4 | (7) |
| 3267.709 | A | 1000R | 1.07 | 4.84 | 2-3 | |
| 3298.738 | A | 130 | 1.12 | 4.86 | 4-4 | |
| 3289.391 | A | 100 | 1.09 | 4.84 | 3-3 | |
| 3317.295 | A | 3 | 1.12 | 4.84 | 4-3 | |
| 3190.686 | A | 500R | 1.12 | 4.99 | 4-4 | $a^3F-z^3F^\circ$ |
| 3188.522 | A | 300R | 1.09 | 4.96 | 3-3 | (8) |
| 3187.717 | A | 200R | 1.07 | 4.94 | 2-2 | |
| 3214.750 | A | 120 | 1.12 | 4.96 | 4-3 | |
| 3208.345 | A | 100 | 1.09 | 4.94 | 3-2 | |
| 3184.82 | A | 40 | 1.09 | 4.99 | 3-4 | |
| 3168.127 | A | 40 | 1.07 | 4.96 | 2-3 | |
| 3997.126 | A | 300 | 1.47 | 4.56 | 2-3 | $a^3P-z^5F^\circ$ |
| 3973.842 | A | 300 | 1.42 | 4.53 | 1-2 | (9) |
| 3968.11 | A | 150 | 1.39 | 4.50 | 0-1 | |
| 4038.779 | A | 60 | 1.47 | 4.53 | 2-2 | |
| 4002.940 | A | 80 | 1.42 | 4.50 | 1-1 | |
| 4067.03 | A | 5 | 1.47 | 4.50 | 2-1 | |
| 3951.968 | A | 500 | 1.47 | 4.59 | 2-3 | $a^3P-z^3D^\circ$ |
| 3916.418 | A | 200 | 1.42 | 4.57 | 1-2 | (10) |
| 3896.155§ | A | 60 | 1.39 | 4.56 | 0-1 | |
| 3977.732 | A | 60 | 1.47 | 4.57 | 2-2 | |
| 3929.734 | A | 50 | 1.42 | 4.56 | 1-1 | |
| 3991.47 | A | 3 | 1.47 | 4.58 | 2-1 | |
| 3903.37 | A | 250 | 1.47 | 4.63 | 2-3 | $a^3P-z^5D^\circ$ |
| 3868.744 | A | 60 | 1.42 | 4.61 | 1-2 | (11) |
| 3850.409 | A | 7 | 1.39 | 4.60 | 0-1 | |
| 3928.497 | A | 10 | 1.47 | 4.61 | 2-2 | |
| 3883.208 | A | 5 | 1.42 | 4.60 | 1-1 | |
| 3943.48 | P | | 1.47 | 4.60 | 2-1 | |
| 3891.98 | P | | 1.42 | 4.59 | 1-0 | |
| 3534.14 | A | 2 | 1.47 | 4.98 | 2-3 | $a^3P-z^3F^\circ$ (12) |
| 4389.12 | P | | 1.57 | 4.38 | 6-6 | $a^3H-z^5G^\circ$ |
| 4429.11 | P | | 1.56 | 4.34 | 5-5 | (13) |
| 4462.76 | P | | 1.55 | 4.31 | 4-4 | |
| 4445.77 | P | | 1.57 | 4.34 | 6-5 | |
| 4478.03 | P | | 1.56 | 4.31 | 5-4 | |
| 4503.13 | P | | 1.55 | 4.29 | 4-3 | |
| 4372.68 | P | | 1.56 | 4.38 | 5-6 | |
| 4414.17 | P | | 1.55 | 4.34 | 4-5 | |
| 4056.270 | A | 7 | 1.57 | 4.81 | 6-5 | $a^3H-z^5F^\circ$ |
| 4075.66 | A | 3 | 1.56 | 4.59 | 5-4 | (14) |
| 4715.478 | A | 1200 l | 1.57 | 4.69 | 6-5 | $a^3H-z^3G^\circ$ |
| 4732.760 | A | 800 l | 1.58 | 4.88 | 5-4 | (15) |
| 4745.808 | A | 800 | 1.55 | 4.84 | 4-3 | |
| 4703.832 | A | 7 | 1.56 | 4.89 | 5-5 | |
| 4732.18§ | A | 10 | 1.55 | 4.88 | 4-4 | |
| 4737.59 | A | 1 | 1.67 | 4.27 | 2-2 | $b^3F-z^5G^\circ$ (16) |
| 4388.78 | A | 5? | 1.68 | 4.56 | 4-3 | $b^3F-z^5F^\circ$ |
| 4382.02 | A | 4 | 1.67 | 4.53 | 3-2 | (17) |
| 4346.89 | A | 3 | 1.67 | 4.50 | 2-1 | |
| 4338.82 | A | 4 | 1.68 | 4.59 | 4-3 | $b^3F-z^3D^\circ$ |
| 4254.41 | A | 15n | 1.67 | 4.57 | 3-2 | (18) |
| 4260.75 | A | 9n | 1.67 | 4.56 | 2-1 | |
| 4179.062 | A | 3 | 1.68 | 4.63 | 4-4 | $b^3F-z^5D^\circ$ |
| 4160.86 | A | 6? | 1.68 | 4.83 | 4-3 | (19) |
| 4195.83 | A | 1 | 1.67 | 4.61 | 3-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| V II continued | | | | | | |
| m3844.48 | P | V | 1.88 | 4.89 | 4-5 | $b^3F-z^3G^\circ$ |
| 3865.72 | A | 5 | 1.67 | 4.88 | 3-4 | (20) |
| 3883.43 | A | 2 | 1.87 | 4.84 | 2-3 | |
| 3875.67 | A | 5 | 1.68 | 4.86 | 4-4 | |
| 3891.25 | A | 4 | 1.87 | 4.84 | 3-3 | |
| 3901.33 | P | | 1.68 | 4.84 | 4-3 | |
| 3727.351 | A | 1000 l | 1.68 | 4.99 | 4-4 | $b^3F-z^3F^\circ$ |
| 3750.88 | A | 600 | 1.67 | 4.96 | 3-3 | (21) |
| 3770.974 | A | 400 | 1.67 | 4.94 | 2-2 | |
| 3760.24 | A | 140 | 1.68 | 4.96 | 4-3 | |
| 3778.357 | A | 100 | 1.67 | 4.94 | 3-2 | |
| 3718.159 | A | 60 | 1.67 | 4.99 | 3-4 | |
| 3743.810 | A | 40 | 1.87 | 4.96 | 2-3 | |
| *2983.009 | A | 10 | 1.67 | 5.81 | 3-4 | $b^3F-z^3H^\circ$ † (22) |
| 4370.64 | A | 2 | 1.70 | 4.59 | 3-4 | $a^5P-z^5F^\circ$ |
| 4288.13 | A | 3 | 1.88 | 4.56 | 2-3 | (23) |
| 4316.258 | A | 2 | 1.67 | 4.53 | 1-2 | |
| 4313.30 | A | 2 | 1.70 | 4.56 | 3-3 | |
| 4331.79 | A | 2 | 1.88 | 4.53 | 2-2 | |
| *4360.75 | A | 9n | 1.70 | 4.59 | 3-3 | $a^5P-z^3D^\circ$ |
| 4263.838 | A | 4n | 1.68 | 4.57 | 2-2 | (24) |
| 4264.50 | A | 1 | 1.87 | 4.56 | 1-1 | |
| 4234.251 | A | 7 | 1.88 | 4.59 | 2-3 | |
| 4348.830 | A | 4 | 1.67 | 4.57 | 1-2 | |
| 4202.350 | A | 150 | 1.70 | 4.63 | 3-4 | $a^5P-z^5D^\circ$ |
| 4178.390 | A | 60 | 1.68 | 4.63 | 2-3 | (25) |
| 4190.40 | A | 15 | 1.67 | 4.61 | 1-2 | |
| 4204.20 | A | 20 | 1.70 | 4.63 | 3-3 | |
| m4205.05 | P | V+ | 1.68 | 4.61 | 2-2 | |
| 4209.74 | A | 10 | 1.87 | 4.60 | 1-1 | |
| 4231.165 | A | 4 | 1.70 | 4.61 | 3-2 | |
| 4234.51 | A | 10 | 1.68 | 4.60 | 2-1 | |
| 4230.047 | A | 10 | 1.67 | 4.59 | 1-0 | |
| 3029.56 | A | 7 | 1.70 | 5.77 | 3-2 | $a^5P-z^3P^\circ$ |
| 3020.65 | A | 6 | 1.68 | 5.76 | 2-1 | (26) |
| 3022.57 | A | 40 | 1.67 | 5.75 | 1-0 | |
| 3016.14 | A | 15 | 1.68 | 5.77 | 2-2 | |
| 3013.102 | A | 80 | 1.67 | 5.76 | 1-1 | |
| 3008.610 | A | 70 | 1.67 | 5.77 | 1-2 | |
| 3001.203 | A | 200 | 1.70 | 5.81 | 3-3 | $a^5P-z^5P^\circ$ |
| 3003.461 | A | 80 | 1.68 | 5.79 | 2-2 | (27) |
| 3007.296 | A | 15 | 1.67 | 5.77 | 1-1 | |
| 3016.775 | A | 120 | 1.70 | 5.79 | 3-2 | |
| 3014.622 | A | 100 | 1.68 | 5.77 | 2-1 | |
| 2968.027 | A | 80 | 1.68 | 5.81 | 2-3 | |
| 2995.999 | A | 60 | 1.67 | 5.79 | 1-2 | |
| 2968.373 | A | 200 | 1.70 | 5.85 | 3-4 | $a^5P-y^5D^\circ$ |
| 2976.517 | A | 100 | 1.68 | 5.82 | 2-3 | (28) |
| 2976.197 | A | 60 | 1.67 | 5.81 | 1-2 | |
| 2989.594 | A | 40 | 1.70 | 5.82 | 3-3 | |
| 2983.558 | A | 80n | 1.68 | 5.81 | 2-2 | |
| 2975.650 | A | 50 | 1.87 | 5.82 | 1-1 | |
| 2998.70 | A | 3 | 1.70 | 5.81 | 3-2 | |
| *2983.009 | A | 10 | 1.68 | 5.82 | 2-1 | |
| 2982.75 | A | 40 | 1.67 | 5.61 | 1-0 | |
| 4799.94 | P | | 1.61 | 4.38 | 5-8 | $a^3G-z^5G^\circ$ |
| 4844.31 | P | | 1.60 | 4.34 | 4-5 | (29) |
| 4880.30 | P | | 1.79 | 4.31 | 3-4 | |
| 4887.79 | P | | 1.81 | 4.34 | 5-5 | |
| 4902.89 | P | | 1.80 | 4.31 | 4-4 | |
| 4928.62 | P | | 1.79 | 4.29 | 3-3 | |
| 4926.94 | P | | 1.81 | 4.31 | 5-4 | |
| 4951.66 | P | | 1.80 | 4.29 | 4-3 | |
| 4966.08 | P | | 1.79 | 4.27 | 3-2 | |
| 4404.68 | A | 2 | 1.81 | 4.61 | 5-5 | $a^3G-z^5F^\circ$ |
| 4424.62 | P | | 1.80 | 4.59 | 4-4 | (30) |
| 4451.61 | P | | 1.79 | 4.56 | 3-3 | |
| 4444.20 | P | | 1.81 | 4.59 | 5-4 | |
| 4470.39 | P | | 1.80 | 4.58 | 4-3 | |
| 4500.88 | P | | 1.79 | 4.53 | 3-2 | |
| 4385.45 | P | | 1.80 | 4.61 | 4-5 | |
| 4406.22 | P | | 1.79 | 4.59 | 3-4 | |
| 4370.27 | A | 3 | 1.81 | 4.63 | 5-4 | $a^3G-z^5D^\circ$ (31) |
| 4005.712 | A | 800 | 1.81 | 4.89 | 5-5 | $a^3G-z^3G^\circ$ |
| 4023.388 | A | 600 | 1.60 | 4.86 | 4-4 | (32) |
| 4035.831 | A | 400 | 1.79 | 4.84 | 3-3 | |
| 4039.574 | A | 20 | 1.81 | 4.86 | 5-4 | |
| *4051.06§ | A | 30 | 1.60 | 4.84 | 4-3 | |
| 3989.603 | A | 15 | 1.80 | 4.89 | 4-5 | |
| 4008.17 | A | 20 | 1.79 | 4.86 | 3-4 | |
| 3878.715 | A | 300 | 1.81 | 4.99 | 5-4 | $a^3G-z^3F^\circ$ |
| 3899.140 | A | 200 | 1.80 | 4.98 | 4-3 | (33) |
| 3914.333 | A | 250 | 1.79 | 4.94 | 3-2 | |
| *3863.81§ | A | 60 | 1.60 | 4.99 | 4-4 | |
| 3884.847 | A | 50 | 1.79 | 4.96 | 3-3 | |
| 3849.758 | A | 3 | 1.79 | 4.99 | 3-4 | |
| 3033.831 | A | 300 | 1.81 | 5.68 | 5-6 | $a^3G-z^3H^\circ$ |
| 3053.39 | A | 200 | 1.60 | 5.84 | 4-5 | (34) |
| 3067.104 | A | 200 | 1.79 | 5.81 | 3-4 | |
| 3062.702 | A | 20 | 1.81 | 5.84 | 5-5 | |
| 3076.016 | A | 25 | 1.80 | 5.81 | 4-4 | |
| 3085.47 | A | 1 | 1.81 | 5.81 | 5-4 | |
| 4810.17 | A | 1? | 2.03 | 4.59 | 4-3 | $b^3G-z^3D^\circ$ (35) |
| 4331.55 | A | 6n | 2.04 | 4.89 | 5-5 | $b^3G-z^3G^\circ$ |
| 4349.97 | A | 6n | 2.03 | 4.88 | 4-4 | (38) |
| 4366.91 | A | 5n | 2.02 | 4.84 | 3-3 | |
| 4371.17 | P | | 2.04 | 4.88 | 5-4 | |
| 4382.33 | P | | 2.03 | 4.84 | 4-3 | |
| 4310.72 | P | | 2.03 | 4.89 | 4-5 | |
| 4334.77 | P | | 2.02 | 4.88 | 3-4 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| V II continued | | | | | | |
| 4183.435 | A | 250 | 2.04 | 4.99 | 5-4 | $b^3G-z^3F^\circ$ |
| 4205.080 | A | 250 | 2.03 | 4.96 | 4-3 | (37) |
| 4225.228 | A | 120 | 2.02 | 4.94 | 3-2 | |
| 4164.015 | A | 15 | 2.03 | 4.99 | 4-4 | |
| 4190.89 | A | 10 | 2.02 | 4.96 | 3-3 | |
| 4150.08 | P | | 2.02 | 4.99 | 3-4 | |
| *3217.121§ | A | 400 | 2.04 | 5.88 | 5-6 | $b^3G-z^3H^\circ$ |
| 3237.876 | A | 350 | 2.03 | 5.84 | 4-5 | (38) |
| *3254.773§ | A | 300 | 2.02 | 5.81 | 3-4 | |
| 3249.617 | A | 40 | 2.04 | 5.84 | 5-5 | |
| 3263.33 | A | 20 | 2.03 | 5.81 | 4-4 | |
| m3093.16 | P | V+ | 2.04 | 6.03 | 5-5 | $b^3G-y^3G^\circ$ |
| 3094.196 | A | 100 | 2.03 | 6.02 | 4-4 | (39) |
| 3100.938 | A | 100 | 2.02 | 6.00 | 3-3 | |
| 3104.906 | A | 25 | 2.04 | 6.02 | 5-4 | |
| 3108.704 | A | 30 | 2.03 | 6.00 | 4-3 | |
| 3082.524 | A | 40 | 2.03 | 6.03 | 4-5 | |
| 3086.507 | A | 30 | 2.02 | 6.02 | 3-4 | |
| 3053.894 | A | 80 | 2.04 | 6.08 | 5-4 | $b^3G-y^3F^\circ$ |
| 3048.891 | A | 70 | 2.03 | 6.08 | 4-3 | (40) |
| 3042.27 | A | 80 | 2.02 | 6.07 | 3-2 | |
| *3043.54§ | A | 40 | 2.03 | 6.08 | 4-4 | |
| 3041.42 | A | 60 | 2.02 | 6.08 | 3-3 | |
| 3036.07 | A | 2 | 2.02 | 6.08 | 3-4 | |
| 3023.882 | A | 20 | 2.04 | 6.12 | 5-5 | $b^3G-z^1H^\circ$ (41) |
| 3015.98 | A | 10 | 2.03 | 6.12 | 4-3 | $b^3G-z^1F^\circ$ (42) |
| 3012.020 | A | 30 | 2.04 | 6.14 | 5-4 | $b^3G-z^1G^\circ$ |
| 3001.93 | A | 2 | 2.03 | 6.14 | 4-4 | (43) |
| 2979.102 | A | 5 | 2.02 | 6.16 | 3-2 | $b^3G-z^1D^\circ$ (44) |
| 4606.59 | P | | 2.21 | 4.89 | 4-5 | $a^1G-z^3G^\circ$ |
| 4651.42 | P | | 2.21 | 4.86 | 4-4 | (45) |
| 4688.45 | P | | 2.21 | 4.84 | 4-3 | |
| 4439.42 | A | 1 | 2.21 | 4.99 | 4-4 | $a^1G-z^3F^\circ$ (46) |
| 3401.997 | A | 2 | 2.21 | 5.84 | 4-5 | $a^1G-z^3H^\circ$ (47) |
| 3230.919 | A | 4 | 2.21 | 6.03 | 4-5 | $a^1G-y^3G^\circ$ |
| 3243.74 | P | | 2.21 | 6.02 | 4-4 | (48) |
| 3259.684 | A | 3 | 2.21 | 6.00 | 4-3 | |
| 3188.10 | A | 30 | 2.21 | 6.08 | 4-4 | $a^1G-y^3F^\circ$ |
| *3193.97§ | A | 10? | 2.21 | 6.08 | 4-3 | (49) |
| 3157.900 | A | 40 | 2.21 | 6.12 | 4-3 | $a^1G-z^1F^\circ$ (50) |
| 3155.409 | A | 60 | 2.21 | 6.12 | 4-5 | $a^1G-z^1H^\circ$ (51) |
| 3142.484 | A | 150 | 2.21 | 6.14 | 4-4 | $a^1G-z^1G^\circ$ (52) |
| 5318.61 | P | | 2.27 | 4.59 | 3-4 | $a^3D-z^5F^\circ$ |
| 5367.53 | P | | 2.26 | 4.56 | 2-3 | (53) |
| 5432.09 | A | 2 | 2.26 | 4.53 | 1-2 | |
| 5384.89 | A | 6 | 2.27 | 4.58 | 3-3 | |
| 5439.30 | A | 15 | 2.26 | 4.53 | 2-2 | |
| 5487.00 | A | 8 | 2.26 | 4.50 | 1-1 | |
| 5457.10 | A | 4 | 2.27 | 4.53 | 3-2 | |
| 5494.35 | P | | 2.26 | 4.50 | 2-1 | |
| 5303.26 | A | 40 | 2.27 | 4.59 | 3-3 | $a^3D-z^3D^\circ$ |
| 5333.65 | A | 9 | 2.26 | 4.57 | 2-2 | (54) |
| 5350.37 | A | 5 | 2.26 | 4.56 | 1-1 | |
| 5349.75 | A | 3 | 2.27 | 4.57 | 3-2 | |
| 5357.35 | A | 2 | 2.26 | 4.56 | 2-1 | |
| 5286.42 | P | | 2.26 | 4.59 | 2-3 | |
| 5325.71 | P | | 2.26 | 4.57 | 1-2 | |
| 5213.08 | P | | 2.27 | 4.63 | 3-4 | $a^3D-z^5D^\circ$ |
| 5199.68 | A | 4 | 2.26 | 4.63 | 2-3 | (55) |
| 5234.28 | P | | 2.26 | 4.61 | 1-2 | |
| 5215.928 | A | 25 | 2.27 | 4.63 | 3-3 | |
| 5240.97 | P | | 2.26 | 4.61 | 2-2 | |
| 5264.49 | P | | 2.26 | 4.60 | 1-1 | |
| 5257.51 | P | | 2.27 | 4.61 | 3-2 | |
| 5271.28 | P | | 2.26 | 4.60 | 2-1 | |
| 5280.62 | P | | 2.26 | 4.59 | 1-0 | |
| 4528.51 | A | 300 | 2.27 | 4.99 | 3-4 | $a^3D-z^3F^\circ$ |
| 4564.592 | A | 200 | 2.26 | 4.96 | 2-3 | (56) |
| 4600.19 | A | 150 | 2.26 | 4.94 | 1-2 | |
| m4577.13 | P | V | 2.27 | 4.96 | 3-3 | |
| 4605.352 | A | 15 | 2.26 | 4.94 | 2-2 | |
| 4618.12 | P | | 2.27 | 4.94 | 3-2 | |
| 3521.838 | A | 90 | 2.27 | 5.77 | 3-2 | $a^3D-z^3P^\circ$ |
| 3520.547 | A | 15 | 2.26 | 5.76 | 2-1 | (57) |
| 3530.45 | A | 10 | 2.26 | 5.75 | 1-0 | |
| 3514.422 | A | 20 | 2.26 | 5.77 | 2-2 | |
| 3517.53 | P | | 2.26 | 5.76 | 1-1 | |
| 3511.42 | A | 3 | 2.26 | 5.77 | 1-2 | |
| 3477.614 | A | 40 | 2.27 | 5.81 | 3-2 | $a^3D-y^5D^\circ$ |
| 3469.528 | A | 50 | 2.26 | 5.82 | 2-1 | (58) |
| 3476.252 | A | 20 | 2.26 | 5.81 | 1-0 | |
| 3470.263 | A | 20 | 2.26 | 5.81 | 2-2 | |
| 3466.59 | A | 20 | 2.26 | 5.82 | 1-1 | |
| 3467.33 | A | 2 | 2.26 | 5.81 | 1-2 | |
| 3333.608 | A | 2 | 2.26 | 5.96 | 1-0 | $a^3D-z^1S^\circ$ (59) |
| 3291.04 | A | 5 | 2.27 | 6.02 | 3-4 | $a^3D-y^3G^\circ$ |
| 3300.905 | A | 6 | 2.26 | 6.00 | 2-3 | (60) |
| 3307.445 | A | 2 | 2.27 | 6.00 | 3-3 | |
| 3233.772 | A | 80 | 2.27 | 6.08 | 3-4 | $a^3D-y^3F^\circ$ |
| 3233.546 | A | 40 | 2.26 | 6.08 | 2-3 | (61) |
| 3231.952 | A | 80 | 2.26 | 6.07 | 1-2 | |
| 3239.833 | A | 8 | 2.27 | 6.08 | 3-3 | |
| 3234.504 | A | 10 | 2.26 | 6.07 | 2-2 | |
| 3240.785 | A | 1 | 2.27 | 6.07 | 3-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| V II continued | | | | | | |
| 3202.711 | A | 2 | 2.27 | 6.12 | 3-3 | $a^3D-z^1F^o$ (62) |
| 3196.574 | A | 20 | 2.26 | 6.12 | 2-3 | |
| 3186.66 | A | 10 | 2.27 | 6.14 | 3-4 | $a^3D-z^1G^o$ (63) |
| 3186.10 | A | 1 | 2.27 | 6.14 | 3-2 | $a^3D-z^5S^o$ (64) |
| 3169.31 | A | 2 | 2.27 | 6.16 | 3-2? | $a^3D-z^1D^o$ (65) |
| *3160.781 | A | 15 | 2.26 | 6.16 | 1-2 | |
| 3050.735 | A | 15 | 2.27 | 6.31 | 3-2 | $a^3D-y^3P^o$ (66) |
| 3081.254 | A | 25 | 2.26 | 6.26 | 2-1 | |
| 3086.210 | A | 10 | 2.26 | 6.25 | 1-0 | |
| 3078.948 | A | 5 | 2.26 | 6.26 | 1-1 | |
| 3054.24 | A | 7n | 2.27 | 6.31 | 3-3 | $a^3D-y^3D^o$ (67) |
| 3048.65 | A | 4 | 2.26 | 6.31 | 2-3 | |
| 3075.474 | A | 2 | 2.26 | 6.27 | 1-2 | |
| 4968.50 | A | 1 | 2.36 | 4.84 | 4-3 | $b^1G-z^3G^o$ (68) |
| 3547.07 | A | 5 | 2.36 | 5.64 | 4-5 | $b^1G-z^3H^o$ (69) |
| 3577.644 | A | 3 | 2.36 | 5.81 | 4-4 | |
| 3361.506 | A | 60 | 2.36 | 6.03 | 4-5 | $b^1G-y^3G^o$ (70) |
| 3392.659 | A | 50 | 2.36 | 6.00 | 4-3 | |
| 3315.176 | A | 50 | 2.36 | 6.08 | 4-4 | $b^1G-y^3F^o$ (71) |
| 3321.539 | A | 150 | 2.36 | 6.08 | 4-3 | |
| 3282.534 | A | 150 | 2.36 | 6.12 | 4-3 | $b^1G-z^1F^o$ (72) |
| 3279.844 | A | 300 | 2.36 | 6.12 | 4-5 | $b^1G-z^1H^o$ (73) |
| *3265.893§ | A | 100 | 2.36 | 6.14 | 4-4 | $b^1G-z^1G^o$ (74) |
| 3025.68 | A | 1 | 2.36 | 6.44 | 4-5 | $b^1G-y^3H^o$ (75) |
| 3032.187 | A | 3 | 2.36 | 6.43 | 4-4 | |
| 3621.203 | A | 150 | 2.36 | 5.77 | 2-2 | $b^3P-z^3P^o$ (76) |
| 3632.126 | A | 15 | 2.37 | 5.76 | 1-1 | |
| 3627.713 | A | 60 | 2.36 | 5.76 | 2-1 | |
| 3645.905 | A | 30 | 2.37 | 5.75 | 1-0 | |
| 3625.606 | A | 50 | 2.37 | 5.77 | 1-2 | |
| 3631.482 | A | 10 | 2.37 | 5.76 | 0-1 | |
| 3607.30 | A | 1 | 2.37 | 5.79 | 1-2 | $b^3P-z^5P^o$ (77) |
| 3623.03 | A | 1 | 2.37 | 5.77 | 0-1 | |
| 3574.340 | A | 60 | 2.36 | 5.81 | 2-3 | $b^3P-y^5D^o$ (76) |
| *3577.857§ | A | 20 | 2.37 | 5.82 | 1-1 | |
| 3573.557 | A | 50 | 2.36 | 5.82 | 2-1 | |
| 3588.13 | A | 15 | 2.37 | 5.81 | 1-0 | |
| 3578.636 | A | 15 | 2.37 | 5.81 | 1-2 | |
| 3577.220 | A | 10 | 2.37 | 5.82 | 0-1 | |
| 3436.393 | A | 2 | 2.37 | 5.96 | 1-0 | $b^3P-z^1S^o$ (79) |
| 3394.92 | A | 1 | 2.36 | 6.00 | 2-3 | $b^3P-y^3G^o$ (80) |
| 3323.731 | A | 3 | 2.36 | 6.08 | 2-3 | $b^3P-y^3F^o$ (81) |
| 3249.464 | A | 4 | 2.36 | 6.16 | 2-2 | $b^3P-z^1D^o$ (82) |
| 3128.686 | A | 20 | 2.36 | 6.31 | 2-3 | $b^3P-y^3D^o$ (83) |
| 3162.714 | A | 30 | 2.37 | 6.27 | 1-2 | |
| 3192.699 | A | 15 | 2.37 | 6.33 | 0-1 | |
| 3159.365 | A | 20 | 2.36 | 6.27 | 2-2 | |
| 3193.200 | A | 20 | 2.37 | 6.33 | 1-1 | |
| 3189.76 | A | 3 | 2.36 | 6.33 | 2-1 | |
| 3125.01 | A | 20 | 2.36 | 6.31 | 2-2 | $b^3P-y^3P^o$ (84) |
| 3166.39 | A | 6 | 2.37 | 6.26 | 1-1 | |
| 3163.024 | A | 30 | 2.36 | 6.26 | 2-1 | |
| 3174.077 | A | 30 | 2.37 | 6.25 | 1-0 | |
| 3128.286 | A | 10 | 2.37 | 6.31 | 1-2 | |
| 3165.89 | A | 30 | 2.37 | 6.26 | 0-1 | |
| 3024.981 | A | 50 | 2.36 | 6.44 | 2-1 | $b^3P-z^3S^o$ (65) |
| 3028.042 | A | 50 | 2.37 | 6.44 | 1-1 | |
| 3027.600 | A | 15 | 2.37 | 6.44 | 0-1 | |
| 3005.813 | A | 30 | 2.36 | 6.47 | 2-3 | $b^3P-x^3F^o$ (66) |
| 3022.146 | A | 4 | 2.37 | 6.45 | 1-2 | |
| 3019.09 | A | 3 | 2.36 | 6.45 | 2-2 | |
| 2972.263 | A | 80 | 2.36 | 6.51 | 2-3 | $b^3P-x^3D^o$ (87) |
| 2981.200 | A | 70 | 2.37 | 6.51 | 1-2 | |
| 2989.306 | A | 15 | 2.37 | 6.49 | 0-1 | |
| 2978.226 | A | 20 | 2.36 | 6.51 | 2-2 | |
| 2989.74 | A | 10 | 2.37 | 6.49 | 1-1 | |
| 3370.40 | A | 2 | 2.37 | 6.03 | 6-5 | $a^1I-y^3G^o$ (68) |
| 3288.324 | A | 20 | 2.37 | 6.12 | 6-5 | $a^1I-z^1H^o$ (89) |
| 6027.23 | A | 8 | 2.46 | 4.50 | 0-1 | $a^1S-z^5F^o$ (90) |
| 5862.80 | A | 15+p? | 2.46 | 4.56 | 0-1 | $a^1S-z^3D^o$ (91) |
| 3731.983 | A | 20 | 2.46 | 5.76 | 0-1 | $a^1S-y^3P^o$ (92) |
| 3674.691 | A | 30 | 2.46 | 5.82 | 0-1 | $a^1S-y^5D^o$ (93) |
| 3670.115 | A | 10 | 2.46 | 6.23 | 0-1 | $a^1S-y^3D^o$ (94) |
| 3057.08 | A | 2 | 2.46 | 6.49 | 0-1 | $a^1S-x^3D^o$ (95) |
| 3038.520 | A | 30 | 2.46 | 6.52 | 0-1 | $a^1S-z^1P^o$ (96) |
| 6031.07 | A | 40 | 2.51 | 4.56 | 2-3 | $c^3P-z^5F^o$ (97) |
| 6028.26 | A | 40 | 2.48 | 4.53 | 1-2 | |
| 6120.98 | A | 5 | 2.49 | 4.50 | 0-1 | |
| 6095.93 | A | 3 | 2.48 | 4.50 | 1-1 | |
| 5928.86 | A | 100 | 2.51 | 4.59 | 2-3 | $c^3P-z^3D^o$ (96) |
| 5897.54 | A | 50 | 2.48 | 4.57 | 1-2 | |
| 5951.45 | A | 4 | 2.49 | 4.56 | 0-1 | |
| 5819.93 | A | 80 | 2.51 | 4.63 | 2-3 | $c^3P-z^5D^o$ (99) |
| 3787.235 | A | 150 | 2.51 | 5.77 | 2-2 | $c^3P-z^3P^o$ (100) |
| *3758.23§ | A | 40 | 2.48 | 5.76 | 1-1 | |
| 3794.366 | A | 50 | 2.51 | 5.76 | 2-1 | |
| 3772.962 | A | 60 | 2.48 | 5.75 | 1-0 | |
| 3751.222 | A | 150 | 2.48 | 5.77 | 1-2 | |
| 3767.720 | A | 40 | 2.49 | 5.76 | 0-1 | |
| 3731.64 | A | 1 | 2.48 | 5.79 | 1-2 | $c^3P-z^5P^o$ (101) |
| 3724.984 | A | 2 | 2.51 | 5.82 | 2-3 | $c^3P-y^5D^o$ (102) |
| 3700.96 | A | 30 | 2.48 | 5.81 | 1-2 | |
| 3709.335 | A | 40 | 2.49 | 5.82 | 0-1 | |
| 3736.017 | A | 70 | 2.51 | 5.81 | 2-2 | |
| 3700.126 | A | 40 | 2.48 | 5.82 | 1-1 | |
| 3735.158 | A | 30 | 2.51 | 5.82 | 2-1 | |
| 3711.118 | A | 50 | 2.48 | 5.81 | 1-0 | |
| 3549.030 | A | 3 | 2.48 | 5.96 | 1-0 | $c^3P-z^1S^o$ (103) |
| 3483.079 | A | 4 | 2.51 | 6.08 | 2-3 | $c^3P-y^3F^o$ (104) |
| 3434.024 | A | 4 | 2.48 | 6.07 | 1-2 | |
| 3484.17 | A | 6 | 2.51 | 6.07 | 2-2 | |
| 3420.709 | A | 5 | 2.51 | 6.12 | 2-3 | $c^3P-z^1F^o$ (105) |
| 3401.740 | A | 1 | 2.51 | 6.14 | 2-2 | $c^3P-z^5S^o$ (106) |
| 3372.666 | A | 3 | 2.48 | 6.14 | 1-2 | |
| 3382.529 | A | 30 | 2.51 | 6.16 | 2-2 | $c^3P-z^1D^o$ (107) |
| 3353.776 | A | 30 | 2.48 | 6.16 | 1-2 | |
| 3251.669 | A | 200 | 2.51 | 6.31 | 2-3 | $c^3P-y^3D^o$ (108) |
| 3257.893 | A | 100 | 2.48 | 6.27 | 1-2 | |
| 3297.528 | A | 20 | 2.49 | 6.23 | 0-1 | |
| 3285.022 | A | 50 | 2.51 | 6.27 | 2-2 | |
| 3290.240 | A | 50 | 2.48 | 6.23 | 1-1 | |
| 3317.912 | A | 20 | 2.51 | 6.23 | 2-1 | |
| 3247.908 | A | 4 | 2.51 | 6.31 | 2-2 | $c^3P-y^3P^o$ (109) |
| 3261.60 | A | 5 | 2.48 | 6.26 | 1-1 | |
| 3288.985 | A | 7 | 2.51 | 6.26 | 2-1 | |
| 3231.380 | A | 2 | 2.48 | 6.31 | 1-2 | |
| 3119.32 | A | 4 | 2.51 | 6.47 | 2-3 | $c^3P-x^3F^o$ (110) |
| 3115.16 | A | 2 | 2.48 | 6.44 | 1-1 | $c^3P-x^3S^o$ (111) |
| 3083.208 | A | 40 | 2.51 | 6.51 | 2-3 | $c^3P-x^3D^o$ (112) |
| 3065.61 | A | 50 | 2.48 | 6.51 | 1-2 | |
| 3081.01 | A | 20 | 2.49 | 6.49 | 0-1 | |
| 3089.633 | A | 4 | 2.51 | 6.51 | 2-2 | |
| 3074.66 | A | 12 | 2.48 | 6.49 | 1-1 | |
| 3079.75 | A | 1 | 2.51 | 6.52 | 2-1 | $c^3P-z^1P^o$ (113) |
| 3062.178 | A | 3 | 2.49 | 6.52 | 0-1 | |
| 2981.924 | A | 15 | 2.51 | 6.65 | 2-2 | $c^3P-w^3D^o$ † (114) |
| 2992.378 | A | 2 | 2.51 | 6.64 | 2-1 | |
| 5193.43 | P | | 2.51 | 4.89 | 6-5 | $b^3H-z^3G^o$ (115) |
| 5227.70 | A | 20 | 2.50 | 4.86 | 5-4 | |
| 5263.99 | A | 15 | 2.50 | 4.64 | 4-3 | |
| 5171.13 | P | | 2.50 | 4.89 | 5-5 | |
| 5217.36 | P | | 2.50 | 4.86 | 4-4 | |
| 3669.410 | A | 300 | 2.51 | 5.88 | 6-6 | $b^3H-z^3H^o$ (116) |
| 3700.337 | A | 200 | 2.50 | 5.84 | 5-5 | |
| 3728.335 | A | 200 | 2.50 | 5.81 | 4-4 | |
| 3711.751 | A | 10 | 2.51 | 5.84 | 6-5 | |
| 3733.607 | A | 4 | 2.50 | 5.81 | 5-4 | |
| 3658.266 | A | 10 | 2.50 | 5.88 | 5-6 | |
| *3695.158 | A | 8 | 2.50 | 5.84 | 4-5 | |
| 3509.024 | A | 40 | 2.51 | 6.03 | 6-5 | $b^3H-y^3G^o$ (117) |
| 3513.677 | A | 15 | 2.50 | 6.02 | 5-4 | |
| 3527.867 | A | 10 | 2.50 | 6.00 | 4-3 | |
| 3496.63 | P | | 2.50 | 6.03 | 5-5 | |
| 3509.20 | P | | 2.50 | 6.02 | 4-4 | |
| 3446.69 | A | 1 | 2.50 | 6.08 | 5-4 | $b^3H-y^3F^o$ (116) |
| 3451.048 | A | 12 | 2.50 | 6.06 | 4-3 | |
| 3420.15 | A | 2 | 2.51 | 6.12 | 6-5 | $b^3H-z^1H^o$ (119) |
| 3410.48 | A | 1 | 2.50 | 6.12 | 5-5 | |
| 3406.06 | A | 7 | 2.50 | 6.12 | 4-5 | |
| 3408.955 | A | 15 | 2.50 | 6.12 | 4-3 | $b^3H-z^1F^o$ (120) |
| 3391.01 | A | 1 | 2.50 | 6.14 | 4-4 | $b^3H-z^1G^o$ (121) |
| 3134.926 | A | 200 | 2.51 | 6.45 | 6-6 | $b^3H-y^3H^o$ (122) |
| 3136.503 | A | 160 | 2.50 | 6.44 | 5-5 | |
| 3139.733 | A | 160 | 2.50 | 6.43 | 4-4 | |
| 3144.700 | A | 20 | 2.51 | 6.44 | 6-5 | |
| 3143.477 | A | 15 | 2.50 | 6.43 | 5-4 | |
| 3126.79 | A | 2 | 2.50 | 6.45 | 5-6 | |
| 3132.793 | A | 3 | 2.50 | 6.44 | 4-5 | |
| 3033.445 | A | 200 | 2.51 | 6.58 | 6-7 | $b^3H-z^3I^o$ (123) |
| 3048.214 | A | 200 | 2.50 | 6.55 | 5-6 | |
| 3063.247 | A | 200 | 2.50 | 6.53 | 4-5 | |
| 3055.942 | A | 7 | 2.51 | 6.55 | 6-6 | |
| 3066.80 | A | 4 | 2.50 | 6.53 | 5-5 | |
| 6226.29 | A | 10n | 2.55 | 4.53 | 2-2 | $b^3D-z^5F^o$ (124) |
| 6028.96 | A | 20 | 2.55 | 4.59 | 3-3 | $b^3D-z^3D^o$ (125) |
| 6066.93 | A | 15n | 2.55 | 4.57 | 2-2 | |
| 6063.62 | A | 10n | 2.53 | 4.56 | 1-1 | |
| 6026.81 | A | 6 | 2.55 | 4.59 | 2-3 | |
| 5916.364 | A | 15 | 2.55 | 4.63 | 3-3 | $b^3D-z^5D^o$ (126) |
| 5967.77 | A | 6 | 2.55 | 4.61 | 2-2 | |
| 5914.28 | A | 5 | 2.55 | 4.63 | 2-3 | |
| *5047.308§ | A | 10 | 2.55 | 4.99 | 3-4 | $b^3D-z^3P^o$ (127) |
| 5106.233 | A | 5 | 2.55 | 4.96 | 2-3 | |
| 5132.19 | A | 2 | 2.53 | 4.94 | 1-2 | |
| 5157.28 | A | 2? | 2.55 | 4.94 | 2-2 | |
| 3826.968 | A | 30 | 2.55 | 5.77 | 2-2 | $b^3D-z^3P^o$ (128) |
| 3813.12 | A | 3 | 2.53 | 5.77 | 1-2 | |
| 3774.676 | A | 15 | 2.55 | 5.61 | 2-2 | $b^3D-y^5D^o$ (129) |
| 3773.80 | A | 5 | 2.55 | 5.82 | 2-1 | |
| 3761.20 | A | 1 | 2.53 | 5.61 | 1-2 | |
| 3604.375 | A | 4 | 2.53 | 5.96 | 1-0 | $b^3D-z^1g^o$ (130) |
| 3489.947 | A | 20 | 2.55 | 6.06 | 3-4 | $b^3D-y^3F^o$ (131) |
| 3496.27 | P | | 2.55 | 6.06 | 2-3 | |
| m3485.82 | P | V+ | 2.53 | 6.07 | 1-2 | |
| m3497.00 | P | V+ | 2.55 | 6.06 | 3-3 | |
| 3497.39 | A | 4 | 2.55 | 6.07 | 2-2 | |
| 3496.13 | P | | 2.55 | 6.07 | 3-2 | |
| 3453.76 | A | 1 | 2.55 | 6.12 | 3-3 | $b^3D-z^1F^o$ (132) |
| 3453.087 | A | 90 | 2.55 | 6.12 | 2-3 | |
| 3435.38 | A | 7 | 2.55 | 6.14 | 3-4 | $b^3D-z^1G^o$ (133) |
| 3434.48 | A | 1 | 2.55 | 6.14 | 3-2 | $b^3D-z^5S^o$ (134) |
| 3433.767 | A | 3 | 2.55 | 6.14 | 2-2 | |
| 3414.879 | A | 3 | 2.55 | 6.16 | 3-2 | $b^3D-z^1D^o$ (135) |
| *3414.193§ | A | 10 | 2.55 | 6.16 | 2-2 | |
| 3403.159 | A | 3 | 2.53 | 6.16 | 1-2 | |
| 3281.755 | A | 10 | 2.55 | 6.31 | 3-3 | $b^3D-y^3D^o$ (136) |
| 3314.662 | A | 50 | 2.55 | 6.27 | 2-2 | |
| m3337.76 | P | V+ | 2.53 | 6.23 | 1-1 | |
| 3315.53 | A | 5 | 2.55 | 6.27 | 3-2 | |
| 3348.372 | A | 4 | 2.55 | 6.23 | 2-1 | |
| 3261.120 | A | 40 | 2.55 | 6.31 | 2-3 | |
| 3304.474 | A | 40 | 2.53 | 6.27 | 1-2 | |
| 3277.71 | A | 30 | 2.55 | 6.31 | 3-2 | $b^3D-y^3P^o$ (137) |
| 3316.907 | A | 20 | 2.55 | 6.26 | 2-1 | |
| 3316.873 | A | 20 | 2.53 | 6.25 | 1-0 | |
| 3277.082 | A | 10 | 2.55 | 6.31 | 2-2 | |
| 3308.480 | A | 20 | 2.53 | 6.26 | 1-1 | |
| 3266.91 | A | 1? | 2.53 | 6.31 | 1-2 | |
| 3120.726 | A | 50 | 2.55 | 6.50 | 3-4 | $b^3D-x^3F^o$ (138) |
| 3146.226 | A | 40 1 | 2.55 | 6.47 | 2-3 | |
| 3151.319 | A | 100 | 2.53 | 6.45 | 1-2 | |
| 3146.816 | A | 10 | 2.55 | 6.47 | 3-3 | |
| *3160.781 | A | 15 | 2.55 | 6.45 | 2-2 | |
| 3110.07 | A | 3? | 2.55 | 6.51 | 3-3 | $b^3D-x^3D^o$ (139) |
| 3116.03 | A | 3 | 2.55 | 6.51 | 2-2 | |
| 3116.11 | A | 2 | 2.53 | 6.49 | 1-1 | |
| 3106.629 | A | 3 | 2.53 | 6.51 | 1-2 | |
| 3105.973 | A | 5 | 2.55 | 6.52 | 2-1 | $b^3D-z^1P^o$ (140) |
| 3001.754 | A | 30 | 2.55 | 6.66 | 3-3 | $b^3D-w^3D^o$ (141) |
| 3006.502 | A | 20 | 2.55 | 6.65 | 2-2 | |
| 3008.508 | A | 15 | 2.53 | 6.64 | 1-1 | |
| 3007.035 | A | 1 | 2.55 | 6.65 | 3-2 | |
| 2997.945 | A | 6 | 2.53 | 6.65 | 1-2 | |
| 5202.94 | A | 2 | 2.59 | 4.96 | 2-3 | $a^1D-z^3F^o$ (142) |
| 3881.04 | A | 2 | 2.59 | 5.77 | 2-2 | $a^1D-z^3P^o$ (143) |
| 3622.289 | A | 10 | 2.59 | 6.00 | 2-3 | $a^1D-y^3G^o$ (144) |
| 3541.341 | A | 50 | 2.59 | 6.08 | 2-3 | $a^1D-y^3F^o$ (145) |
| 3542.480 | A | 4 | 2.59 | 6.07 | 2-2 | |
| 3497.031 | A | 200 | 2.59 | 6.12 | 2-3 | $a^1D-z^1F^o$ (146) |
| 3457.153 | A | 300 | 2.59 | 6.16 | 2-2 | $a^1D-z^1D^o$ (147) |
| 3359.50 | A | 2 | 2.59 | 6.26 | 2-1 | $a^1D-y^3P^o$ (148) |
| 3320.780 | A | 4 | 2.59 | 6.31 | 2-3 | $a^1D-y^3D^o$ (149) |
| 3355.366 | A | 20 | 2.59 | 6.27 | 2-2 | |
| 3182.674 | A | 20 | 2.59 | 6.47 | 2-3 | $a^1D-x^3F^o$ (150) |
| 3197.574 | A | 7 | 2.59 | 6.45 | 2-2 | |
| 3161.313 | A | 30 | 2.59 | 6.49 | 2-1 | $a^1D-x^3D^o$ (151) |
| 3141.466 | A | 40 | 2.59 | 6.52 | 2-1 | $a^1D-z^1P^o$ (152) |
| 3039.767 | A | 2 | 2.59 | 6.65 | 2-2 | $a^1D-w^3D^o$ (153) |
| 2963.249 | A | 9 | 2.59 | 6.75 | 2-1 | $a^1D-x^3P^o$ (154) |
| 4038.545 | A | 2 | 2.75 | 5.81 | 1-0 | $a^1P-y^5D^o$ (155) |
| *3847.333§ | A | 100 | 2.75 | 5.96 | 1-0 | $a^1P-z^1S^o$ (156) |
| 3712.533 | A | 8 | 2.75 | 6.07 | 1-2 | $a^1P-y^3F^o$ (157) |
| 3618.924 | A | 200 | 2.75 | 6.16 | 1-2 | $a^1P-z^1D^o$ (158) |
| 3507.534 | A | 20 | 2.75 | 6.27 | 1-2 | $a^1P-y^3D^o$ (159) |
| 3485.25 | A | 4 | 2.75 | 6.31 | 1-2 | $a^1P-y^3P^o$ (160) |
| 3335.482 | A | 10 | 2.75 | 6.45 | 1-2 | $a^1P-x^3F^o$ (161) |
| 3285.672 | A | 3 | 2.75 | 6.51 | 1-2 | $a^1P-x^3D^o$ (162) |
| 3296.052 | A | 8 | 2.75 | 6.49 | 1-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| V II continued | | | | | | |
| 3274.50 | A | 10 | 2.75 | 6.52 | 1-1 | $a^1P$-$z^1P^o$ (163) |
| 3061.30 | A | 10 | 2.75 | 6.75 | 1-1 | $a^1P$-$x^3P^o$ (164) |
| 3926.32 | A | 5 | 2.69 | 6.03 | 5-5 | $a^1H$-$y^3G^o$ |
| 3945.27 | P | | 2.69 | 6.02 | 5-4 | (165) |
| 3815.36 | A | 200 | 2.89 | 6.13 | 5-5 | $a^1H$-$z^1H^o$ (166) |
| •3796.48 § | A | 10 | 2.69 | 6.14 | 5-4 | $a^1H$-$z^1G^o$ (167) |
| 3463.631 | A | 4 | 2.69 | 6.45 | 5-6 | $a^1H$-$y^3H^o$ |
| 3484.32 | A | 2 | 2.69 | 6.43 | 5-4 | (168) |
| 3415.91 | A | 2 | 2.69 | 6.50 | 5-4 | $a^1H$-$x^3F^o$ (169) |
| 3367.666 | A | 3 | 2.69 | 6.55 | 5-6 | $a^1H$-$z^3I^o$ (170) |
| 3250.775 | A | 200 | 2.69 | 6.68 | 5-4 | $a^1H$-$y^1G^o$ (171) |
| 3142.163 | A | 20 | 2.69 | 6.82 | 5-5 | $a^1H$-$x^3G^o$ (172) |
| 3133.667 | A | 100 | 2.89 | 6.64 | 5-6 | $a^1H$-$z^1I^o$ (173) |
| 3113.560 | A | 100 | 2.69 | 6.65 | 5-5 | $a^1H$-$y^1H^o$ (174) |
| 4163.072 | A | 2 | 3.11 | 6.06 | 2-3 | $b^1D$-$y^3F^o$ |
| 4163.655 | A | 2 | 3.11 | 6.07 | 2-2 | (175) |
| •4101.00 § | A | 6 | 3.11 | 6.13 | 2-3 | $b^1D$-$z^1F^o$ (176) |
| 4048.369 | A | 50 | 3.11 | 6.16 | 2-2 | $b^1D$-$z^1D^o$ (177) |
| 3907.53 | A | 3 | 3.11 | 6.27 | 2-2 | $b^1D$-$y^3D^o$ (178) |
| •3695.158 | A | 6 | 3.11 | 6.45 | 2-2 | $b^1D$-$x^3F^o$ (179) |
| 3634.13 | A | 1 | 3.11 | 6.51 | 2-2 | $b^1D$-$x^3D^o$ |
| 3648.648 | A | 7 | 3.11 | 6.49 | 2-1 | (160) |
| 3630.496 | A | 20 | 3.11 | 6.53 | 2-1 | $b^1D$-$z^1P^o$ (161) |
| 3476.961 | A | 6 | 3.11 | 6.66 | 2-3 | $b^1D$-$w^3D^o$ (162) |
| 3365.790 | A | 3 | 3.11 | 6.75 | 2-1 | $b^1D$-$x^3P^o$ (163) |
| 3337.645 | A | 200 | 3.11 | 6.81 | 2-3 | $b^1D$-$y^1F^o$ (164) |
| 3226.934 | A | 40 | 3.11 | 6.93 | 2-1 | $b^1D$-$y^1P^o$ (165) |
| 3109.375 | A | 20 | 3.11 | 7.08 | 2-2 | $b^1D$-$y^1D^o$ (186) |
| 4396.52 | A | 4n | 3.31 | 6.13 | 3-3 | $a^1F$-$z^1F^o$ (167) |
| 4368.67 | P | | 3.31 | 6.14 | 3-4 | $a^1F$-$z^1G^o$ (168) |
| 3960.37 | A | 1 | 3.31 | 6.43 | 3-4 | $a^1F$-$y^3H^o$ (189) |
| 3890.70 | A | 1 | 3.31 | 6.66 | 3-3 | $a^1F$-$w^3D^o$ (190) |
| 3661.383 | A | 200 | 3.31 | 6.68 | 3-4 | $a^1F$-$y^1G^o$ (191) |
| 3532.365 | A | 20 | 3.31 | 6.61 | 3-3 | $a^1F$-$y^1F^o$ (192) |
| 3512.13 | A | 3 | 3.31 | 6.63 | 3-4 | $a^1F$-$x^3G^o$ |
| 3506.57 | A | 7 | 3.31 | 6.63 | 3-3 | (193) |
| 3277.448 | A | 15 | 3.31 | 7.06 | 3-2 | $a^1F$-$y^1D^o$ (194) |
| •5275.65 § | A | 10 | 3.74 | 6.06 | 4-4 | $o^3F$-$y^3F^o$ |
| 5266.31 | A | 5 | 3.74 | 6.08 | 3-3 | (195) |
| 5260.00 | A | 3? | 3.74 | 6.07 | 2-2 | |
| 5151.67 | A | 2 | 3.74 | 6.14 | 4-4 | $o^3F$-$z^1G^o$ (196) |
| 4813.953 | A | 50 | 3.74 | 6.31 | 4-3 | $o^3F$-$y^3D^o$ |
| 4864.06 | A | 50 | 3.74 | 6.37 | 3-2 | (197) |
| 4947.58 | A | 40 | 3.74 | 6.33 | 2-1 | |
| 4811.14 | A | 6 | 3.74 | 6.31 | 3-3 | |
| 4874.805 | A | 4 | 3.74 | 6.37 | 2-2 | |
| 4475.24 | A | 1 | 3.74 | 6.50 | 4-4 | $o^3F$-$x^3F^o$ |
| 4529.06 | A | 5? | 3.74 | 6.47 | 4-3 | (198) |
| 4556.765 | A | 4 | 3.74 | 6.45 | 3-2 | |
| 4453.35 | A | 30n | 3.74 | 6.51 | 4-3 | $o^3F$-$x^3D^o$ |
| 4464.32 | A | 40n | 3.74 | 6.51 | 3-2 | (199) |
| 4475.70 | A | 30n | 3.74 | 6.49 | 2-1 | |
| 4456.53 | A | 3n | 3.74 | 6.51 | 2-2 | |
| •4234.55 § | A | 40n | 3.74 | 6.66 | 4-3 | $o^3F$-$w^3D^o$ |
| 4243.694 | A | 30n | 3.74 | 6.65 | 3-2 | (200) |
| 4257.02 | A | 15n | 3.74 | 6.64 | 2-1 | |
| 4027.30 | A | 1 | 3.74 | 6.61 | 4-3 | $o^3F$-$y^1F^o$ |
| 4019.05 | A | 7n | 3.74 | 6.61 | 2-3 | (201) |
| 4016.82 | A | 20n | 3.74 | 6.62 | 4-5 | $o^3F$-$x^3G^o$ |
| 3999.195 | A | 30n | 3.74 | 6.83 | 3-4 | (202) |
| 3985.763 | A | 30 | 3.74 | 6.63 | 2-3 | |
| 4001.17 | A | 2 | 3.74 | 6.83 | 4-4 | |
| •3991.965 | A | 2 | 3.74 | 6.63 | 3-3 | |
| 3970.15 | A | 5 | 3.74 | 6.65 | 4-5 | $o^3F$-$y^1H^o$ (203) |
| 3697.72 | A | 1 | 3.74 | 7.06 | 3-2 | $o^3F$-$y^1D^o$ (204) |
| 3138.05 | A | 20 | 3.74 | 7.66 | 4-4 | $o^3F$-$w^3F^o$ |
| 3141.07 | A | 2 | 3.74 | 7.67 | 3-3 | (205) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| V II continued | | | | | | |
| 6080.11 | A | 6 | 3.76 | 5.81 | 4-4 | $d^3F$-$z^3H^o$ (206) |
| •5290.74 § | A | 6 | 3.79 | 6.12 | 2-3 | $d^3F$-$z^1F^o$ (207) |
| 5191.59 | A | 2 | 3.76 | 6.16 | 3-2 | $d^3F$-$z^1D^o$ (208) |
| 4863.415 | A | 100 | 3.76 | 6.31 | 4-3 | $d^3F$-$y^3D^o$ |
| 4965.40 | A | 40 | 3.76 | 6.27 | 3-2 | (209) |
| 5048.91 | A | 15 | 3.79 | 6.23 | 2-1 | |
| 4973.16 | A | 2 | 3.79 | 6.27 | 2-2 | |
| 4535.315 | A | 3n | 3.76 | 6.50 | 4-4 | $d^3F$-$x^3F^o$ |
| 4596.37 | A | 5n | 3.76 | 6.47 | 3-3 | (210) |
| 4634.31 | A | 3n | 3.79 | 6.45 | 2-2 | |
| 4590.505 | A | 7n | 3.76 | 6.47 | 4-3 | |
| 4627.48 | A | 1 | 3.76 | 6.45 | 3-2 | |
| 4517.35 | A | 3n | 3.79 | 6.52 | 2-1 | $d^3F$-$z^1P^o$ (211) |
| 4512.72 | A | 60n | 3.76 | 6.51 | 4-3 | $d^3F$-$x^3D^o$ |
| 4532.188 | A | 40n | 3.78 | 6.51 | 3-2 | (212) |
| 4558.46 | A | 20 | 3.79 | 6.49 | 2-1 | |
| 4516.36 | A | 2n | 3.76 | 6.51 | 3-3 | |
| 4536.64 | A | 2 | 3.79 | 6.51 | 2-2 | |
| 4524.61 | P | | 3.79 | 6.51 | 2-3 | |
| 4304.15 | A | 2 | 3.76 | 6.65 | 3-2 | $d^3F$-$w^3D^o$ (213) |
| 4080.44 | A | 2 | 3.76 | 6.81 | 3-3 | $d^3F$-$y^1F^o$ |
| 4065.67 | A | 10n | 3.79 | 6.81 | 2-3 | (214) |
| 4065.070 | A | 100 | 3.76 | 6.82 | 4-5 | $d^3F$-$x^3G^o$ |
| 4053.59 | A | 60 l | 3.76 | 6.63 | 3-4 | (215) |
| •4051.34 § | A | 100 | 3.79 | 6.63 | 2-3 | |
| 4049.03 | A | 3 | 3.76 | 6.63 | 4-4 | |
| 4017.29 | A | 15n | 3.76 | 6.65 | 4-5 | $d^3F$-$y^1H^o$ (216) |
| 3167.420 | A | 40 | 3.78 | 7.68 | 4-4 | $d^3F$-$w^3F^o$ |
| 3174.531 | A | 60 | 3.78 | 7.67 | 3-3 | (217) |
| 3163.59 | A | 20 | 3.79 | 7.66 | 2-2 | |
| 3171.739 | A | 9 | 3.76 | 7.67 | 4-3 | |
| 3179.416 | A | 6 | 3.76 | 7.66 | 3-2 | |
| 3170.206 | A | 6 | 3.76 | 7.68 | 3-4 | |
| 3177.696 | A | 6 | 3.79 | 7.67 | 2-3 | |
| 2973.975 | A | 40 | 3.76 | 7.93 | 4-5 | $d^3F$-$w^3G^o$ † |
| 2985.164 | A | 60n | 3.76 | 7.93 | 3-4 | (218) |
| 2994.540 | A | 60 | 3.79 | 7.91 | 2-3 | |
| 6601.16 | A | 5 | 3.96 | 5.77 | 2-2 | $d^3P$-$z^3P^o$ (219) |
| 5249.22 | A | 1? | 3.96 | 6.31 | 2-3 | $d^3P$-$y^3D^o$ (220) |
| 4963.75 | A | 2 | 3.96 | 6.44 | 2-1 | $d^3P$-$z^3S^o$ (221) |
| 4913.36 | A | 2 | 3.96 | 6.47 | 2-3 | $d^3P$-$x^3F^o$ (222) |
| 4833.396 | A | 6 | 3.96 | 6.51 | 2-3 | $d^3P$-$x^3D^o$ |
| 4839.08 | A | 3 | 3.96 | 6.51 | 2-2 | (223) |
| 4406.92 | A | 40N? | 3.96 | 6.75 | 2-2 | $d^3P$-$x^3P^o$ |
| 4440.41 | A | 5n | 3.99 | 6.77 | 1-0 | (224) |
| 4483.50 | A | 2n | 4.00 | 6.75 | 0-1 | |
| 4232.065 | A | 80n | 3.96 | 6.67 | 2-1 | $d^3P$-$y^3S^o$ |
| 4276.693 | A | 60n | 3.99 | 6.67 | 1-1 | (225) |
| 4301.130 | A | 40n | 4.00 | 6.67 | 0-1 | |
| •4143.90 § | A | 6 | 3.96 | 6.93 | 2-1 | $d^3P$-$y^1P^o$ (226) |
| •3991.965 | A | 2 | 3.99 | 7.06 | 1-2 | $d^3P$-$y^1D^o$ (227) |
| 3070.12 | A | 25 l | 3.96 | 7.96 | 2-3 | $d^3P$-$w^3D^o$ |
| 3075.58 | A | 5 | 3.99 | 6.00 | 1-2 | (228) |
| 3075.043 | A | 3 | 4.00 | 6.02 | 0-1 | |
| 3051.306 | A | 3 | 3.96 | 6.00 | 2-2 | |
| 6672.64 | A | 3n | 4.23 | 6.06 | 3-3 | $b^1F$-$y^3F^o$ (229) |
| 6517.27 | A | 15n | 4.23 | 6.12 | 3-3 | $b^1F$-$z^1F^o$ (230) |
| 6360.11 | A | 40n | 4.23 | 6.16 | 3-2 | $b^1F$-$z^1D^o$ (231) |
| 5019.655 | A | 100n | 4.23 | 6.68 | 3-4 | $b^1F$-$y^1G^o$ (232) |
| 4325.22 | A | 9n | 4.23 | 7.06 | 3-2 | $b^1F$-$y^1D^o$ (233) |
| 3343.312 | A | 2 | 4.23 | 7.92 | 3-4 | $b^1F$-$w^3G^o$ |
| 3351.53 | A | 1 | 4.23 | 7.91 | 3-3 | (234) |
| 3293.146 | A | 50 | 4.23 | 7.97 | 3-2 | $b^1F$-$x^1D^o$ (235) |
| 3167.49 | A | 30 | 4.23 | 6.12 | 3-4 | $b^1F$-$x^1G^o$ (236) |
| 3116.76 | A | 40 | 4.23 | 6.19 | 3-3 | $b^1F$-$x^1F^o$ (237) |
| 5642.01 | A | 80n | 4.50 | 6.68 | 4-4 | $c^1G$-$y^1G^o$ (238) |
| 5341.22 | A | 2 | 4.50 | 6.61 | 4-3 | $c^1G$-$y^1F^o$ (239) |
| 5322.61 | A | 5 | 4.50 | 6.62 | 4-5 | $c^1G$-$x^3G^o$ (240) |
| 5241.19 | A | 100n | 4.50 | 6.65 | 4-5 | $c^1G$-$y^1H^o$ (241) |
| 3608.32 | A | 1 | 4.50 | 7.92 | 4-4 | $c^1G$-$w^3G^o$ (242) |
| 3404.43 | A | 60 l | 4.50 | 6.12 | 4-4 | $c^1G$-$x^1G^o$ (243) |
| 3345.699 | A | 70 | 4.50 | 6.19 | 4-3 | $c^1G$-$x^1F^o$ (244) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| V II continued | | | | | | |
| 3035.14 | A | 3N | 4.89 | 8.96 | 5-4 | $z^3G^o$-$e^5H$ (245) |
| 3036.00 | A | 2N? | 4.94 | 9.00 | 2-3 | $z^3F^o$-$e^5P$ (246) |
| 5530.10 | A | 4 | 5.44 | 7.66 | 3-4 | $c^3D$-$w^3F^o$ |
| 5562.02 | A | 4np? | 5.45 | 7.67 | 2-3 | (247) |
| m4875.49 | P | V | 5.44 | 7.98 | 3-3 | $c^3D$-$v^3D^o$ |
| 4842.50 | A | 2n | 5.45 | 6.00 | 2-2 | (248) |
| 4613.00 | A | 1? | 5.45 | 6.02 | 2-1 | |
| 3148.738 | A | 15 | 5.44 | 9.36 | 3-3 | $c^3D$-$t^3D^o$ |
| 3163.76 | A | 10 | 5.45 | 9.35 | 2-2 | (249) |
| 3172.230 | A | 7 | 5.46 | 9.35 | 1-1 | |
| 3154.60 | A | 1 | 5.45 | 9.36 | 2-3 | |
| 3071.77 | A | 2n | 5.44 | 9.46 | 3-4 | $c^3D$-$u^3F^o$ (250) |
| 5016.60 | A | 4 | 5.51 | 7.97 | 2-2 | $c^1D$-$x^1D^o$ (251) |
| 4618.52 | A | 3 | 5.51 | 8.19 | 2-3 | $c^1D$-$x^1F^o$ (252) |

Strongest Unclassified Linee of V II

| | | |
|---|---|---|
| 5791.47 | A | 15 |
| 3611.58 | A | 10n |
| 3301.66 | A | 10 |
| 3306.16 | A | 15Nl |
| 3201.58 | A | 15Nl |
| 3195.50 | A | 15Nl |

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|---|---|---|---|---|---|---|
| 4254.346// | C | 1000R | 0.00 | 2.90 | 3-4 | $a^7S$-$z^7P^o$ |
| 4274.803 | C | 800R | 0.00 | 2.89 | 3-3 | (1) |
| 4269.721 | C | 700R | 0.00 | 2.88 | 3-2 | |
| 3732.032 | C | 50 | 0.00 | 3.31 | 3-3 | $a^7S$-$z^5P^o$ |
| 3730.607 | C | 40 | 0.00 | 3.31 | 3-2 | (2) |
| 3615.645 | C | 30 | 0.00 | 3.41 | 3-4 | $a^7S$-$z^7D^o$ |
| 3635.261 | C | 10 | 0.00 | 3.39 | 3-3 | (3) |
| 3578.687 | C | 1000R | 0.00 | 3.45 | 3-4 | $a^7S$-$y^7P^o$ |
| 3593.466 | C | 900R | 0.00 | 3.43 | 3-3 | (4) |
| 3605.333 | C | 750R | 0.00 | 3.42 | 3-2 | |
| 3351.966 | C | 12 | 0.00 | 3.66 | 3-3 | $a^7S$-$y^5P^o$ |
| 3379.171 | C | 15 | 0.00 | 3.65 | 3-2 | (5) |
| 6330.101 | C | 40 | 0.94 | 2.89 | 2-3 | $a^5S$-$z^7P^o$ |
| 6362.674 | C | 30 | 0.94 | 2.88 | 2-2 | (6) |
| 5206.436 | C | 500R | 0.94 | 3.31 | 2-3 | $a^5S$-$z^5P^o$ |
| 5206.039 | C | 300R | 0.94 | 3.31 | 2-2 | (7) |
| 5204.516 | C | 200R | 0.94 | 3.31 | 2-1 | |
| 5021.903 | C | 25 | 0.94 | 3.39 | 2-3 | $a^5S$-$z^7D^o$ |
| 5051.900 | C | 40 | 0.94 | 3.38 | 2-2 | (8) |
| 5073.920 | C | 60 | 0.94 | 3.37 | 2-1 | |
| 4942.495 | C | 200 | 0.94 | 3.43 | 2-3 | $a^5S$-$y^7P^o$ |
| 4964.926 | C | 100 | 0.94 | 3.42 | 2-2 | (9) |
| 4496.862 | C | 100 | 0.94 | 3.68 | 2-3 | $a^5S$-$y^5P^o$ |
| 4545.956 | C | 50 | 0.94 | 3.65 | 2-2 | (10) |
| 4580.056 | C | 40 | 0.94 | 3.63 | 2-1 | |
| 3633.49 | B | 4 | 0.94 | 4.16 | 2-3 | $a^5S$-$z^5D^o$ |
| 3652.58 | B | 15 | 0.94 | 4.14 | 2-2? | (11) |
| 3670.367 | C | 25n | 0.94 | 4.13 | 2-1 | |
| 3758.72 | B | 4 | 0.94 | 4.22 | 2-2 | $a^5S$-$z^3P^o$ (12) |
| 3192.12 | B | 5 | 0.94 | 4.60 | 2-3 | $a^5S$-$z^3D^o$ |
| 3210.62 | B | 2 | 0.94 | 4.78 | 2-2 | (13) |
| 2968.649 | C | 25r | 0.94 | 5.07 | 2-3 | $a^5S$-$x^5P^o$ |
| 2994.069 | C | 18 | 0.94 | 5.06 | 2-2 | (14) |
| 2996.787 | C | 20 | 0.94 | 5.05 | 2-1 | |
| 2964.82 | B | 6 | 0.94 | 5.07 | 2-3 | $a^5S$-$y^5F^o$ |
| 2995.10 | B | 25 | 0.94 | 5.06 | 2-2 | (15) |
| 6580.96 | B | 6 | 1.03 | 2.90 | 4-4 | $a^5D$-$z^7P^o$ |
| 6537.921 | D | 20 | 1.00 | 2.89 | 3-3 | (16) |
| 6501.213 | D | 15 | 0.98 | 2.88 | 2-2 | |
| 6630.015 | C | 25 | 1.03 | 2.89 | 4-3 | |
| 6572.900 | C | 15 | 1.00 | 2.88 | 3-2 | |
| 5796.46 | B | 25 | 1.03 | 3.15 | 4-5 | $a^5D$-$z^7F^o$ |
| 5790.59 | P | | 1.00 | 3.13 | 3-4 | (17) |
| •5785.66 | F | (5d?) | 0.98 | 3.11 | 2-3 | |
| | | | (0.96 | 3.10 | 1-2 | |
| 5409.791 | C | 500 | 1.03 | 3.31 | 4-3 | $a^5D$-$z^5P^o$ |
| 5345.607 | C | 500 | 1.00 | 3.31 | 3-2 | (16) |
| 5296.686 | C | 100 | 0.96 | 3.31 | 2-1 | |
| 5348.319 | C | 350 | 1.00 | 3.31 | 3-3 | |
| 5298.269 | C | 100 | 0.98 | 3.31 | 2-2 | |
| 5264.152 | C | 200 | 0.96 | 3.31 | 1-1 | |
| 5300.749 | C | 75 | 0.98 | 3.31 | 2-3 | |
| 5265.732 | C | 100 | 0.96 | 3.31 | 1-2 | |
| 5247.564 | C | 150 | 0.96 | 3.31 | 0-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Cr I continued | | | | | | |
| 5123.121 | C | 30 | 1.03 | 3.44 | 4-5 | $a^5D-z^7D^o$ † |
| 5112.490 | C | 25 | 1.00 | 3.41 | 3-4 | (19) |
| 5107.70 | B | 7 | 0.98 | 3.39 | 2-3 | |
| 5168.63 | B | 8 | 1.03 | 3.41 | 4-4 | |
| 5151.83 | B | 12 | 1.00 | 3.39 | 3-3 | |
| 5138.71 | B | 10 | 0.98 | 3.38 | 2-2 | |
| 5183.41 | B | 10 | 1.00 | 3.38 | 3-2 | |
| 5093.41 | B | 7 | 1.03 | 3.45 | 4-4 | $a^5D-y^7P^o$ |
| 5068.290 | C | 35 | 1.00 | 3.43 | 3-3 | (20) |
| 5048.752 | C | 25 | 0.98 | 3.42 | 2-2 | |
| 5133.465 | C | 35 | 1.03 | 3.43 | 4-3 | |
| 5091.890 | C | 30 | 1.00 | 3.42 | 3-2 | |
| 5038.87 | P | | 1.00 | 3.45 | 3-4 | |
| 5025.54 | B | 10 | 0.98 | 3.43 | 2-3 | |
| 5019.20 | B | 20 | 0.96 | 3.42 | 1-2 | |
| 4646.174 | C | 100 | 1.03 | 3.68 | 4-3 | $a^5D-y^5P^o$ |
| 4652.158 | C | 100 | 1.00 | 3.65 | 3-2 | (21) |
| 4651.285 | C | 75 | 0.98 | 3.63 | 2-1 | |
| 4600.753 | C | 75 | 1.00 | 3.88 | 3-3 | |
| 4616.137 | C | 75 | 0.98 | 3.65 | 2-2 | |
| 4626.188 | C | 65 | 0.96 | 3.63 | 1-1 | |
| 4565.513 | C | 50 | 0.98 | 3.68 | 2-3 | |
| 4591.394 | C | 60 | 0.96 | 3.65 | 1-2 | |
| 4613.373 | C | 60 | 0.96 | 3.63 | 0-1 | |
| 4351.770 | C | 100 | 1.03 | 3.86 | 4-5 | $a^5D-z^5F^o$ |
| 4344.507 | C | 100 | 1.00 | 3.84 | 3-4 | (22) |
| 4339.450 | C | 75 | 0.98 | 3.82 | 2-3 | |
| 4337.566 | C | 75 | 0.96 | 3.81 | 1-2 | |
| 4339.718 | C | 60 | 0.96 | 3.80 | 0-1 | |
| 4384.977 | C | 75 | 1.03 | 3.84 | 4-4 | |
| 4371.279 | C | 75 | 1.00 | 3.82 | 3-3 | |
| 4359.631 | C | 75 | 0.98 | 3.81 | 2-2 | |
| 4351.051 | C | 75 | 0.96 | 3.80 | 1-1 | |
| 4412.250 | C | 40 | 1.03 | 3.82 | 4-3 | |
| 4391.753 | C | 40 | 1.00 | 3.81 | 3-2 | |
| 4373.254 | C | 35 | 0.98 | 3.80 | 2-1 | |
| 3919.159 | C | 100 | 1.03 | 4.17 | 4-4 | $a^5D-z^5D^o$ |
| 3908.755 | C | 100 | 1.00 | 4.16 | 3-3 | (23) |
| 3902.915 | C | 50 | 0.98 | 4.14 | 2-2 | |
| 3903.164 | C | 25 | 0.96 | 4.13 | 1-1 | |
| 3941.490 | C | 60 | 1.03 | 4.18 | 4-3 | |
| 3928.636 | C | 60 | 1.00 | 4.14 | 3-2 | |
| 3921.022 | C | 50 | 0.98 | 4.13 | 2-1 | |
| 3916.243 | C | 35 | 0.96 | 4.12 | 1-0 | |
| 3886.789 | C | 50 | 1.00 | 4.17 | 3-4 | |
| 3883.292 | C | 60 | 0.98 | 4.16 | 2-3 | |
| 3885.218 | C | 40 | 0.96 | 4.14 | 1-2 | |
| 3894.035 | C | 40 | 0.96 | 4.13 | 0-1 | |
| 3831.032 | C | 12 | 1.00 | 4.22 | 3-2 | $a^5D-z^3P^o$ |
| 3849.534 | C | 40 | 0.98 | 4.18 | 2-1 | (24) |
| 3852.218 | C | 30 | 0.96 | 4.17 | 1-0 | |
| 3806.55 | B | 5 | 0.98 | 4.22 | 2-2 | |
| 3832.32 | B | 5 | 0.96 | 4.18 | 1-1 | |
| 3789.733 | C | 15 | 0.96 | 4.22 | 1-2 | |
| 3823.522 | C | 12 | 0.86 | 4.18 | 0-1 | |
| 3266.634 | C | 7 | 1.03 | 4.80 | 4-3 | $a^5D-z^3D^o$ |
| 3263.25 | P | | 1.00 | 4.78 | 3-2 | (25) |
| 3259.60 | B | 1 | 0.98 | 4.76 | 2-1 | |
| 3244.115 | C | 7 | 1.00 | 4.80 | 3-3 | |
| 3245.485 | C | 10 | 0.98 | 4.78 | 2-2 | |
| 3247.274 | C | 4 | 0.96 | 4.76 | 1-1 | |
| 3226.55 | B | 4 | 0.98 | 4.80 | 2-3 | |
| 3233.234 | C | 7 | 0.96 | 4.78 | 1-2 | |
| 3240.951 | C | 8 | 0.96 | 4.78 | 0-1 | |
| 3053.880 | C | 50r | 1.03 | 5.07 | 4-3 | $a^5D-x^5P^o$ |
| 3039.780 | C | 7 | 1.00 | 5.06 | 3-2 | (26) |
| 3029.164 | C | 18 | 0.98 | 5.05 | 2-1 | |
| 3034.190 | C | 25 | 1.00 | 5.07 | 3-3 | |
| 3024.350 | C | 40r | 0.98 | 5.06 | 2-2 | |
| 3018.496 | C | 10r | 0.96 | 5.05 | 1-1 | |
| 3018.821 | C | 10r | 0.98 | 5.07 | 2-3 | |
| 3013.713 | C | 20r | 0.96 | 5.06 | 1-2 | |
| 3013.030 | C | 15 | 0.96 | 5.05 | 0-1 | |
| 3021.558 | C | 50r | 1.03 | 5.11 | 4-5 | $a^5D-y^5F^o$ |
| 3017.569 | C | 35r | 1.00 | 5.09 | 3-4 | (27) |
| 3014.915 | C | 20r | 0.98 | 5.07 | 2-3 | |
| 3014.760 | C | 18r | 0.98 | 5.06 | 1-2 | |
| 3015.194 | C | 18r | 0.96 | 5.05 | 0-1 | |
| 3037.044 | C | 15 | 1.03 | 5.09 | 4-4 | |
| 3030.245 | C | 25r | 1.00 | 5.07 | 3-3 | |
| 3025.40 | P | | 0.98 | 5.08 | 2-2 | |
| 3020.673 | C | 8 | 0.96 | 5.05 | 1-1 | |
| 3049.883 | C | 3 | 1.03 | 5.07 | 4-3 | |
| 3040.848 | C | 10r | 1.00 | 5.08 | 3-2 | |
| 3031.353 | C | 7 | 0.98 | 5.05 | 2-1 | |
| 2986.473 | C | 30r | 1.03 | 5.16 | 4-4 | $a^5D-y^5D^o$ |
| 2985.995 | C | 35r | 1.00 | 5.13 | 3-3 | (28) |
| 2985.849 | C | 8r | 0.98 | 5.11 | 2-2 | |
| 2988.137 | C | 3 | 0.96 | 5.10 | 1-1 | |
| 3005.057 | C | 25r | 1.03 | 5.13 | 4-3 | |
| 3000.890 | C | 25r | 1.00 | 5.11 | 3-2 | |
| 2998.580 | C | 15r | 0.98 | 5.10 | 2-1 | |
| 2991.888 | C | 15 | 0.98 | 5.09 | 1-0 | |
| 2967.843 | C | 15 | 1.00 | 5.18 | 3-4 | |
| 2971.113 | C | 20 | 0.88 | 5.13 | 2-3 | |
| 2975.483 | C | 20 | 0.98 | 5.11 | 1-2 | |
| 2980.791 | C | 25 | 0.98 | 5.10 | 0-1 | |
| 9290.44 | A | 50 | 2.53 | 3.86 | 6-5 | $a^5G-z^5F^o$ |
| *9447.00 | A | 50 | 2.53 | 3.84 | 5-4 | (29) |
| 9574.25 | A | 50 | 2.53 | 3.83 | 4-3 | |
| 9670.48 | A | 50 | 2.53 | 3.81 | 3-2 | |
| 9734.52 | A | 50 | 2.53 | 3.80 | 2-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Cr I continued | | | | | | |
| *9294.17 | A | 20 | 2.53 | 3.86 | 5-5 | $a^5G-z^5F^o$ |
| *9447.00 | A | 50 | 2.53 | 3.84 | 4-4 | cont |
| 9571.76 | A | 25 | 2.53 | 3.83 | 3-3 | |
| 9667.20 | A | 25 | 2.53 | 3.81 | 2-2 | |
| *9294.17 | A | 20 | 2.53 | 3.88 | 4-5 | |
| 8444.36 | A | 5 | 2.53 | 3.84 | 3-4 | |
| 9568.58 | A | 4 | 2.53 | 3.82 | 2-3 | |
| 4872.02 | B | 18 | 2.53 | 5.07 | 4-3 | $a^5G-x^5P^o$ † |
| 4885.776 | C | 75 | 2.53 | 5.06 | 3-2 | (30) |
| 4789.354 | D | 75 | 2.53 | 5.11 | 6-5 | $a^5G-y^5F^o$ |
| *4829.376 | C | 100d? | 2.53 | 5.09 | 5-4 | (31) |
| 4861.842 | C | 75 | 2.53 | 5.07 | 4-3 | |
| 4888.530 | C | 40 | 2.53 | 5.06 | 3-2 | |
| 4903.239 | C | 70 | 2.53 | 5.05 | 2-1 | |
| *4790.337 | C | 20 | 2.53 | 5.11 | 5-5 | |
| *4829.376 | C | 100d? | 2.53 | 5.09 | 4-4 | |
| 4861.205 | C | 35 | 2.53 | 5.07 | 3-3 | |
| 4887.73 | B | 25 | 2.53 | 5.08 | 2-2 | |
| *4790.337 | C | 20 | 2.53 | 5.11 | 4-5 | |
| 4828.66 | B | 8 | 2.53 | 5.09 | 3-4 | |
| 4860.37 | B | 7 | 2.53 | 5.07 | 2-3 | |
| 4571.876 | C | 40 | 2.53 | 5.23 | 6-7 | $a^5G-z^5H^o$ |
| 4601.021 | C | 30 | 2.53 | 5.22 | 5-6 | (32) |
| 4631.893 | C | 45* | 2.53 | 5.20 | 4-5 | |
| 4637.182 | C | 40 | 2.53 | 5.19 | 3-4 | |
| 4648.136 | C | 25 | 2.53 | 5.19 | 2-3 | |
| 4600.104 | C | 40 | 2.53 | 5.22 | 6-6 | |
| *4821.983 | C | 45* | 2.53 | 5.20 | 5-5 | |
| *4637.772 | C | 40 | 2.53 | 5.19 | 4-4 | |
| 4648.868 | C | 35 | 2.53 | 5.18 | 3-3 | |
| 4631.00 | B | 4 | 2.53 | 5.20 | 6-5 | |
| *4837.772 | C | 40 | 2.53 | 5.19 | 5-4 | |
| 4649.461 | C | 45 | 2.53 | 5.18 | 4-3 | |
| 4526.466 | C | 75 | 2.53 | 5.26 | 6-8 | $a^5G-z^5G^o$ |
| 4530.755 | D | 100* | 2.53 | 5.26 | 5-5 | (33) |
| *4535.731 | C | 80 | 2.53 | 5.25 | 4-4 | |
| 4540.502 | C | 50 | 2.53 | 5.25 | 3-3 | |
| 4544.819 | C | 50 | 2.53 | 5.25 | 2-2 | |
| 4529.851 | C | 25 | 2.53 | 5.26 | 6-5 | |
| *4535.731 | C | 60 | 2.53 | 5.25 | 5-4 | |
| 4541.071 | C | 30 | 2.53 | 5.25 | 4-3 | |
| 4545.335 | C | 25 | 2.53 | 5.25 | 3-2 | |
| *4527.339 | C | 40 | 2.53 | 5.26 | 5-6 | |
| 4530.688 | D | 100* | 2.53 | 5.26 | 4-5 | |
| 4535.148 | C | 35 | 2.53 | 5.25 | 3-4 | |
| 4539.788 | C | 30 | 2.53 | 5.25 | 2-3 | |
| m4466.13 | P | Cr | 2.53 | 5.30 | 5-4 | $a^5G-x^5D^o$ † |
| *4518.63 | B | 8 | 2.53 | 5.26 | 4-3 | (34) |
| 4581.20 | B | 2 | 2.53 | 5.24 | 3-2 | |
| 4126.531 | C | 20 | 2.53 | 5.52 | 6-6 | $a^5G-y^5G^o$ |
| *4153.816 | C | 25 | 2.53 | 5.50 | 5-5 | (35) |
| *4163.625 | D | 20 | 2.53 | 5.50 | 4-4 | |
| 4191.271 | C | 25 | 2.53 | 5.48 | 3-3 | |
| 4303.590 | C | 18 | 2.53 | 5.47 | 2-2 | |
| 4153.087 | C | 9 | 2.53 | 5.50 | 6-5 | |
| *4183.625 | D | 20 | 2.53 | 5.50 | 5-4 | |
| 4191.750 | C | 10 | 2.53 | 5.48 | 4-3 | |
| 4204.19 | B | 8 | 2.53 | 5.47 | 3-2 | |
| 4127.302 | C | 7 | 2.53 | 5.52 | 5-8 | |
| *4153.816 | C | 25 | 2.53 | 5.50 | 4-5 | |
| 4183.16 | P | | 2.53 | 5.50 | 3-4 | |
| 4190.68 | B | 4 | 2.53 | 5.48 | 2-3 | |
| 4033.263 | C | 6 | 2.53 | 5.59 | 6-5 | $a^5G-x^5F^o$ |
| *4037.294 | C | 10 | 2.53 | 5.59 | 5-4 | (38) |
| 4043.246 | C | 8 | 2.53 | 5.59 | 4-3 | |
| 4046.760 | C | 6 | 2.53 | 5.58 | 3-2 | |
| 4050.02 | B | 4 | 2.53 | 5.58 | 2-1 | |
| *4033.95 | B | 3 | 2.53 | 5.59 | 5-5 | |
| *4037.294 | C | 10 | 2.53 | 5.59 | 4-4 | |
| 4041.79 | B | 6 | 2.53 | 5.59 | 3-3 | |
| 4046.19 | B | 3 | 2.53 | 5.58 | 2-2 | |
| *4033.85 | B | 3 | 2.53 | 5.59 | 4-5 | |
| 4038.80 | B | 1 | 2.53 | 5.59 | 3-4 | |
| 4027.103 | C | 20 | 2.53 | 5.60 | 5-8 | $a^5G-z^3H^o$ |
| *4036.166 | C | 18 | 2.53 | 5.60 | 4-5 | (37) |
| 4025.013 | C | 15 | 2.53 | 5.80 | 3-4 | |
| *4028.166 | C | 18 | 2.53 | 5.80 | 5-5 | |
| *4025.44 | B | 5 | 2.53 | 5.80 | 4-4 | |
| | | | 2.53 | 5.60 | 5-4 | |
| 3983.890 | C | 100 | 2.53 | 5.85 | 6-7 | $a^5G-y^5H^o$ |
| 3988.748 | C | 70 | 2.53 | 5.84 | 5-6 | (38) |
| *3976.665 | C | 100 | 2.53 | 5.84 | 4-5 | |
| 3983.907 | C | 100 | 2.53 | 5.83 | 3-4 | |
| 3991.123 | C | 80 | 2.53 | 5.83 | 2-3 | |
| *3989.081 | C | 18 | 2.53 | 5.84 | 6-8 | |
| *3978.665 | C | 100 | 2.53 | 5.84 | 5-5 | |
| *3984.338 | C | 25 | 2.53 | 5.83 | 4-4 | |
| 3991.873 | C | 25 | 2.53 | 5.83 | 3-3 | |
| 3978.01 | B | 5 | 2.53 | 5.84 | 6-5 | |
| *3984.338 | C | 25 | 2.53 | 5.83 | 5-4 | |
| 3982.11 | B | 4 | 2.53 | 5.83 | 4-3 | |
| *3980.13 | B | 5 | 2.53 | 5.73 | 5-4 | $a^5G-w^5D^o$ |
| | | | 2.53 | 5.73 | 4-4 | (39) |
| 3817.844 | C | 10 | 2.53 | 5.77 | 6-5 | $a^5G-w^5F^o$ |
| *3818.173 | C | 20 | 2.53 | 5.77 | 5-4 | (40) |
| 3820.874 | C | 7 | 2.53 | 5.78 | 4-3 | |
| 3823.10 | B | 5 | 2.53 | 5.76 | 3-2 | |
| *3818.481 | C | 25 | 2.53 | 5.77 | 5-5 | |
| *3818.173 | C | 20 | 2.53 | 5.77 | 4-4 | |
| 3821.582 | C | 8 | 2.53 | 5.76 | 2-2 | |
| *3818.481 | C | 25 | 2.53 | 5.77 | 4-5 | |
| 3818.97 | B | 5 | 2.53 | 5.76 | 2-3 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Cr I continued | | | | | | |
| 3777.32 | B | 5 | 2.53 | 5.80 | 6-5 | $a^5G-z^3G^o$ |
| 3789.49 | B | 2 | 2.53 | 5.78 | 5-4 | (41) |
| *3777.93 | B | 3 | 2.53 | 5.80 | 5-5 | |
| | | | 2.53 | 5.60 | 4-5 | |
| 3796.99 | B | 5 | 2.53 | 5.78 | 2-3 | |
| *3767.431 | C | 12 | 2.53 | 5.81 | 6-5 | $a^5G-y^3G^o$ |
| *3768.08 | B | 18 | 2.53 | 5.81 | 5-4 | (42) |
| 3769.00 | B | 7 | 2.53 | 5.81 | 4-3 | |
| *3768.08 | B | 18 | 2.53 | 5.81 | 5-5 | |
| | | | 2.53 | 5.81 | 4-4 | |
| 3768.62 | B | 7 | 2.53 | 5.81 | 3-3 | |
| *3768.08 | B | 18 | 2.53 | 5.81 | 4-5 | |
| 3743.884 | C | 50 | 2.53 | 5.83 | 6-6 | $a^5G-x^5G^o$ |
| *3743.578 | C | 45 | 2.53 | 5.83 | 5-5 | (43) |
| *3748.998 | C | 50 | 2.53 | 5.83 | 4-4 | |
| 3757.662 | C | 50 | 2.53 | 5.82 | 3-3 | |
| 3768.240 | C | 35 | 2.53 | 5.81 | 2-2 | |
| 3743.968 | C | 18 | 2.53 | 5.83 | 6-5 | |
| *3748.998 | C | 50 | 2.53 | 5.83 | 5-4 | |
| 3758.044 | C | 15 | 2.53 | 5.82 | 4-3 | |
| 3768.734 | C | 15 | 2.53 | 5.81 | 3-2 | |
| 3744.490 | C | 18 | 2.53 | 5.83 | 5-6 | |
| *3743.578 | C | 45 | 2.53 | 5.83 | 4-5 | |
| 3748.614 | C | 12 | 2.53 | 5.83 | 3-4 | |
| 3757.174 | C | 18 | 2.53 | 5.82 | 2-3 | |
| 3685.548 | C | 50w | 2.53 | 5.88 | 6-5 | $a^5G-v^5F^o$ |
| *3688.803 | C | 45w | 2.53 | 5.88 | 5-4 | (44) |
| 3887.252 | C | 50w | 2.53 | 5.88 | 4-3 | |
| *3688.18 | B | 5w | 2.53 | 5.88 | 5-5 | |
| *3886.803 | C | 45w | 2.53 | 5.88 | 4-4 | |
| *3686.18 | B | 5w | 2.53 | 5.88 | 4-5 | |
| 3879.070 | C | 8 | 2.53 | 5.89 | 6-7 | $a^5G-z^3I^o$ |
| 3688.11 | B | 7 | 2.53 | 5.88 | 5-6 | (45) |
| *3694.13 | B | 4 | 2.53 | 5.87 | 4-5 | |
| 3687.545 | C | 30 | 2.53 | 5.88 | 6-6 | |
| *3684.13 | B | 4 | 2.53 | 5.87 | 5-5 | |
| 3683.56 | B | 2 | 2.53 | 5.87 | 6-5 | |
| *3658.261 | C | 50 | 2.53 | 5.91 | 5-4 | $a^5G-v^5D^o$ |
| 3663.206 | C | 40 | 2.53 | 5.90 | 4-3 | (46) |
| 3866.642 | C | 25 | 2.53 | 5.90 | 3-2 | |
| 3668.029 | C | 15 | 2.53 | 5.80 | 2-1 | |
| *3656.261 | C | 50 | 2.53 | 5.91 | 4-4 | |
| 3862.840 | C | 15 | 2.53 | 5.90 | 3-3 | |
| 3688.19 | B | 8 | 2.53 | 5.90 | 2-2 | |
| 3655.92 | P | | 2.53 | 5.91 | 3-4 | |
| 3682.39 | B | 2 | 2.53 | 5.80 | 2-3 | |
| 3639.603 | C | 100 | 2.53 | 5.92 | 6-5 | $a^5G-u^5F^o$ |
| *3836.590 | C | 50 | 2.53 | 5.93 | 5-4 | (47) |
| 3641.830 | C | 50 | 2.53 | 5.92 | 4-3 | |
| 3648.987 | C | 50 | 2.53 | 5.92 | 3-2 | |
| 3653.912 | C | 45 | 2.53 | 5.91 | 2-1 | |
| *3640.39 | B | 20 | 2.53 | 5.92 | 5-5 | |
| *3638.590 | C | 50 | 2.53 | 5.93 | 4-4 | |
| 3641.470 | C | 15 | 2.53 | 5.92 | 3-3 | |
| 3648.534 | C | 15 | 2.53 | 5.92 | 2-2 | |
| *3640.39 | B | 20 | 2.53 | 5.92 | 4-5 | |
| 3636.21 | B | 2 | 2.53 | 5.93 | 3-4 | |
| 3641.01 | B | 3+g? | 2.53 | 5.92 | 2-3 | |
| 3619.460 | C | 10 | 2.53 | 5.94 | 6-7 | $a^5G-x^5H^o$ |
| 3646.161 | C | 12 | 2.53 | 5.92 | 5-6 | (48) |
| *3665.960 | C | 12 | 2.53 | 5.90 | 4-5 | |
| 3879.619 | C | 10 | 2.53 | 5.89 | 3-4 | |
| 3686.457 | C | 10 | 2.53 | 5.88 | 2-3 | |
| 3645.59 | B | 5 | 2.53 | 5.92 | 6-6 | |
| *3665.960 | C | 12 | 2.53 | 5.90 | 5-5 | |
| *3880.19 | B | 7 | 2.53 | 5.89 | 4-4 | |
| 3665.43 | B | 4 | 2.53 | 5.90 | 6-5 | |
| *3680.19 | B | 7 | 2.53 | 5.89 | 5-4 | |
| 3689.302 | C | 8 | 2.53 | 5.88 | 4-3 | |
| *3632.839 | C | 40 | 2.53 | 5.93 | 5-4 | $a^5G-u^{1}\,^5F^o$ |
| m3805.41 | P | Cr | 2.53 | 5.96 | 4-3 | (49) |
| 3609.479 | C | 18 | 2.53 | 5.95 | 3-2 | |
| 3610.053 | C | 10 | 2.53 | 5.95 | 2-1 | |
| *3632.839 | C | 40 | 2.53 | 5.93 | 4-4 | |
| 3605.05 | P | | 2.53 | 5.96 | 3-3 | |
| 3609.04 | B | 4 | 2.53 | 5.85 | 2-2 | |
| 3832.46 | B | 1 | 2.53 | 5.93 | 3-4 | |
| *3604.54 | B | 3 | 2.53 | 5.96 | 2-3 | |
| 3538.89 | B | 1 | 2.53 | 6.02 | 6-5? | $a^5G-x^3G^o$ |
| *3565.55 | B | 2 | 2.53 | 5.99 | 5-4 | (50) |
| *3537.25 | B | 4d? | 2.53 | 6.02 | 5-5 | |
| *3565.55 | B | 2 | 2.53 | 5.89 | 4-4 | |
| *3537.25 | B | 4d? | 2.53 | 6.02 | 4-5 | |
| 3565.15 | B | 3 | 2.53 | 5.99 | 3-4 | |
| 3445.10 | B | 7 | 2.53 | 6.12 | 6-5 | $a^5G-u^3G^o$ |
| *3455.602 | C | 35 | 2.53 | 6.11 | 5-4 | (51) |
| 3465.57 | B | 5 | 2.53 | 6.09 | 4-3 | |
| *3445.818 | C | 40 | 2.53 | 6.12 | 5-5 | |
| *3455.802 | C | 35 | 2.53 | 6.11 | 4-4 | |
| 3485.245 | D | 15 | 2.53 | 6.09 | 3-3 | |
| *3445.818 | C | 40 | 2.53 | 6.12 | 4-5 | |
| 3455.281 | C | 10 | 2.53 | 6.11 | 3-4 | |
| 3464.82 | B | 5 | 2.53 | 8.09 | 2-3 | |
| 3433.598 | C | 50 | 2.53 | 6.13 | 6-6 | $a^5G-w^5G^o$ |
| *3438.187 | C | 50 | 2.53 | 6.13 | 5-5 | (52) |
| *3441.438 | C | 35 | 2.53 | 6.12 | 4-4 | |
| 3447.430 | C | 30 | 2.53 | 6.11 | 3-3 | |
| 3453.328 | C | 35 | 2.53 | 6.11 | 2-2 | |
| 3435.679 | C | 10 | 2.53 | 6.13 | 6-5 | |
| *3441.438 | C | 35 | 2.53 | 6.12 | 5-4 | |
| 3447.760 | C | 20 | 2.53 | 6.11 | 4-3 | |
| 3453.743 | C | 12 | 2.53 | 8.11 | 3-2 | |
| 3434.112 | C | 20 | 2.53 | 6.13 | 5-6 | |
| *3436.187 | C | 50 | 2.53 | 8.13 | 4-5 | |
| 3441.115 | C | 9 | 2.53 | 6.12 | 3-4 | |
| 3447.015 | C | 12 | 2.53 | 6.11 | 2-3 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Cr I continued | | | | | | |
| •3435.819 | C | 6d | 2.53 | 6.13 | 5-4 | $a^5G-x^3F^o$ |
| 3432.31 | B | 8 | 2.53 | 6.13 | 4-3 | (53) |
| 3431.69 | C | 4 | 2.53 | 6.13 | 3-2 | |
| •3435.819 | C | 6d | 2.53 | 6.13 | 4-4 | |
| 3431.995 | D | 7 | 2.53 | 6.13 | 3-3 | |
| 3431.284 | C | 10 | 2.53 | 6.13 | 2-2 | |
| 3435.488 | C | 3 | 2.53 | 6.13 | 3-4 | |
| 3431.59 | C | 3 | 2.53 | 6.13 | 2-3 | |
| 3382.213 | C | 20 | 2.53 | 6.20 | 6-5 | $a^5G-t^5F^o$ |
| •3367.53 | C | 15w | 2.53 | 6.20 | 5-4 | (54) |
| •3379.825§ | C | 8 | 2.53 | 6.19 | 4-3 | |
| 3384.65 | B | 10w | 2.53 | 6.18 | 3-2 | |
| 3388.71 | B | 10 | 2.53 | 6.17 | 2-1 | |
| •3362.70 | B | 8 | 2.53 | 6.20 | 5-5 | |
| •3387.53 | C | 15w | 2.53 | 6.20 | 4-4 | |
| 3379.564 | C | 3w | 2.53 | 6.19 | 3-3 | |
| 3384.24 | B | 3w | 2.53 | 6.18 | 2-2 | |
| •3362.70 | B | 8 | 2.53 | 6.20 | 4-5 | |
| 3081.652 | C | 5 | 2.53 | 6.56 | 6-5 | $a^5G-s^5F^o$ |
| 3067.22 | P | | 2.53 | 6.58 | 5-4 | (55) |
| 3071.69 | P | | 2.53 | 6.55 | 4-3 | |
| 3074.47 | B | 3 | 2.53 | 6.55 | 3-2 | |
| 3076.58 | B | 3 | 2.53 | 6.54 | 2-1 | |
| 8348.28 | A | 20 | 2.70 | 4.17 | 3-4 | $a^5P-z^5D^o$ |
| 8455.34 | A | 12 | 2.70 | 4.18 | 2-3 | (56) |
| 8555.54 | A | 5 | 2.70 | 4.14 | 1-2 | |
| 8450.36 | A | 15 | 2.70 | 4.16 | 3-3 | |
| 8548.83 | A | 12 | 2.70 | 4.14 | 2-2 | |
| 8643.03 | A | 12 | 2.70 | 4.13 | 1-1 | |
| 8543.72 | A | 10 | 2.70 | 4.14 | 3-2 | |
| 8636.26 | A | 10 | 2.70 | 4.13 | 2-1 | |
| 8707.42 | A | 7 | 2.70 | 4.12 | 1-0 | |
| 8296.90 | A | 4 | 2.70 | 4.18 | 2-1 | $a^5P-z^3P^o$ |
| 8397.04 | A | 6 | 2.70 | 4.17 | 1-0 | (57) |
| 8303.19 | A | 6 | 2.70 | 4.18 | 1-1 | |
| 5235.821 | C | 50 | 2.70 | 5.06 | 3-2 | $a^5P-y^5F^o$ |
| 5237.75 | B | 25 | 2.70 | 5.06 | 2-2 | (58) |
| 5230.288 | C | 40 | 2.70 | 5.06 | 1-2 | |
| m5206.15 | P | Cr | 2.70 | 5.07 | 3-3 | $a^5P-x^5P^o$ |
| •5234.541 | C | 45 | 2.70 | 5.06 | 2-2 | (59) |
| 5241.458 | C | 30 | 2.70 | 5.05 | 1-1 | |
| 5232.678 | C | 30 | 2.70 | 5.06 | 3-2 | |
| 5238.971 | C | 65 | 2.70 | 5.05 | 2-1 | |
| m5208.07 | P | Cr | 2.70 | 5.07 | 2-3 | |
| 5237.10 | B | 20 | 2.70 | 5.06 | 1-2 | |
| 5013.316 | C | 100 | 2.70 | 5.18 | 3-4 | $a^5P-y^5D^o$ |
| 5067.714 | C | 75 | 2.70 | 5.13 | 2-3 | (60) |
| 5113.130 | C | 45 | 2.70 | 5.11 | 1-2 | |
| 5065.910 | C | 50 | 2.70 | 5.13 | 3-3 | |
| 5110.751 | C | 40 | 2.70 | 5.11 | 2-2 | |
| 5144.872 | C | 50 | 2.70 | 5.10 | 1-1 | |
| 5108.93 | B | 12 | 2.70 | 5.11 | 3-2 | |
| 5142.263 | C | 20 | 2.70 | 5.10 | 2-1 | |
| 5181.785 | C | 25 | 2.70 | 5.09 | 1-0 | |
| 4745.308 | C | 30 | 2.70 | 5.30 | 3-4 | $a^5P-x^5D^o$ |
| 4808.255 | C | 25 | 2.70 | 5.26 | 2-3 | (81) |
| 4857.34 | B | 18 | 2.70 | 5.24 | 1-2 | |
| 4804.64 | B | 15 | 2.70 | 5.26 | 3-3 | |
| 4855.146 | C | 15 | 2.70 | 5.24 | 2-2 | |
| 4891.97 | B | 18 | 2.70 | 5.22 | 1-1 | |
| 4853.52 | P | | 2.70 | 5.24 | 3-2 | |
| 4889.73 | B | 20 | 2.70 | 5.22 | 2-1† | |
| 4909.87 | B | 8 | 2.70 | 5.21 | 1-0 | |
| 4697.062 | C | 40 | 2.70 | 5.32 | 3-2 | $a^5P-z^5S^o$ |
| •4698.615 | C | 50 | 2.70 | 5.32 | 2-2 | (82) |
| 4700.608 | C | 40 | 2.70 | 5.32 | 1-2 | |
| 4459.34 | B | 18w | 2.70 | 5.46 | 3-3 | $a^5P-w^5P^o$ |
| 4475.20 | P | | 2.70 | 5.45 | 2-2 | (63) |
| 4473.782 | C | 40 | 2.70 | 5.45 | 3-2 | |
| 4487.46 | B | 5w | 2.70 | 5.45 | 2-1 | |
| 4460.789 | C | 18 | 2.70 | 5.46 | 2-3 | |
| 4477.02 | B | 35w | 2.70 | 5.45 | 1-2 | |
| 4295.757 | C | 25 | 2.70 | 5.57 | 3-3 | $a^5P-v^5P^o$ |
| 4341.48 | B | 7 | 2.70 | 5.54 | 2-2 | (64) |
| 4383.853 | C | 20 | 2.70 | 5.51 | 1-1 | |
| 4340.130 | C | 18 | 2.70 | 5.54 | 3-2 | |
| 4381.113 | C | 35 | 2.70 | 5.51 | 2-1 | |
| 4297.050 | C | 15 | 2.70 | 5.57 | 2-3 | |
| 4343.163 | C | 18 | 2.70 | 5.54 | 1-2 | |
| 4108.400 | C | 8 | 2.70 | 5.70 | 3-3 | $a^5P-y^3P^o$ |
| 4120.813 | C | 12 | 2.70 | 5.89 | 2-2 | (85) |
| 4127.843 | C | 8 | 2.70 | 5.69 | 1-1 | |
| 4119.44 | B | 3w | 2.70 | 5.69 | 3-2 | |
| 4128.099 | C | 8 | 2.70 | 5.69 | 2-1 | |
| 4109.584 | C | 8 | 2.70 | 5.70 | 2-3 | |
| 4122.162 | C | 8 | 2.70 | 5.89 | 1-2 | |
| 4066.938 | C | 8 | 2.70 | 5.73 | 3-4 | $a^5P-w^5D^o$ |
| 4077.089 | C | 12 | 2.70 | 5.72 | 2-3 | (66) |
| 4081.737 | C | 5 | 2.70 | 5.72 | 1-2 | |
| 4075.92 | B | 8 | 2.70 | 5.72 | 3-3 | |
| 4080.221 | C | 5 | 2.70 | 5.72 | 2-2 | |
| 4090.305 | C | 6 | 2.70 | 5.72 | 1-1 | |
| 3992.845 | C | 30 | 2.70 | 5.79 | 3-3 | $a^5P-u^5P^o$ |
| 3979.798 | C | 10 | 2.70 | 5.80 | 2-2 | (87) |
| 3972.688 | C | 7 | 2.70 | 5.80 | 1-1 | |
| 3978.877 | C | 18 | 2.70 | 5.80 | 3-2 | |
| 3971.255 | C | 20 | 2.70 | 5.80 | 2-1 | |
| 3993.968 | C | 15 | 2.70 | 5.79 | 2-3 | |
| 3981.333 | C | 15 | 2.70 | 5.80 | 1-2 | |
| 3960.783 | C | 5 | 2.70 | 5.81 | 2-1 | $a^5P-z^3S^o$ |
| 3962.19 | B | 3 | 2.70 | 5.81 | 1-1 | (88) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Cr I continued | | | | | | |
| 3841.277 | C | 50 | 2.70 | 5.91 | 3-4 | $a^5P-v^5D^o$ |
| 3850.042 | C | 50 | 2.70 | 5.90 | 2-3 | (69) |
| 3855.571 | C | 30 | 2.70 | 5.90 | 1-2 | |
| 3848.983 | C | 40 | 2.70 | 5.90 | 3-3 | |
| 3854.220 | C | 50 | 2.70 | 5.90 | 2-2 | |
| 3857.631 | C | 20 | 2.70 | 5.90 | 1-1 | |
| 3853.176 | C | 12 | 2.70 | 5.90 | 3-2 | |
| 3856.281 | C | 15 | 2.70 | 5.90 | 2-1 | |
| 3855.286 | C | 12 | 2.70 | 5.90 | 1-0 | |
| 3819.564 | C | 40 | 2.70 | 5.93 | 3-4 | $a^5P-u^5P^o$ |
| 3826.425 | C | 40 | 2.70 | 5.92 | 2-3 | (70) |
| 3836.070 | C | 12 | 2.70 | 5.92 | 1-2 | |
| 3825.390 | C | 20 | 2.70 | 5.93 | 3-3 | |
| 3834.735 | C | 15 | 2.70 | 5.92 | 2-2 | |
| 3843.03 | B | 10 | 2.70 | 5.91 | 1-1 | |
| 3833.71 | B | 3 | 2.70 | 5.92 | 3-2 | |
| 3840.70 | B | 4 | 2.70 | 5.91 | 2-1 | |
| 3815.433 | C | 30 | 2.70 | 5.93 | 3-4 | $a^5P-u'\,^5F^o$† |
| 3786.22 | B | 8 | 2.70 | 5.96 | 2-3 | (71) |
| 3792.42 | B | 5 | 2.70 | 5.95 | 1-2 | |
| 3755.81 | B | 7 | 2.70 | 5.98 | 3-2 | $a^5P-x^3P^o$† |
| 3756.83 | B | 2 | 2.70 | 5.98 | 2-2 | (72) |
| 3726.85 | B | 4w | 2.70 | 6.01 | 1-1 | $a^5P-x^3D^o$ (73) |
| •3574.039 | C | 15 | 2.70 | 6.15 | 3-3 | $a^5P-t^5P^o$ |
| 3602.574 | C | 12 | 2.70 | 6.12 | 2-2 | (74) |
| 3604.95 | P | | 2.70 | 6.12 | 1-1 | |
| 3601.666 | C | 40 | 2.70 | 6.12 | 3-2 | |
| •3603.745 | C | 12 | 2.70 | 6.12 | 2-1 | |
| 3574.935 | C | 10 | 2.70 | 6.15 | 2-3 | |
| •3603.745 | C | 12 | 2.70 | 6.12 | 1-2 | |
| 3572.748 | C | 12 | 2.70 | 6.15 | 3-2 | $a^5P-y^5S^o$ |
| 3573.643 | C | 18 | 2.70 | 6.15 | 2-2 | (75) |
| 3574.605 | C | 12 | 2.70 | 6.15 | 1-2 | |
| 3548.731 | C | 2 | 2.70 | 6.17 | 2-1 | $a^5P-t^5F^o$ (76) |
| 3481.303 | C | 20 | 2.70 | 6.24 | 3-4 | $a^5P-u^5D^o$ |
| 3473.612 | C | 15 | 2.70 | 6.25 | 2-3 | (77) |
| 3471.49 | B | 7 | 2.70 | 6.25 | 1-2 | |
| 3472.764 | C | 12 | 2.70 | 6.25 | 3-3 | |
| 3470.401 | C | 10 | 2.70 | 6.25 | 2-2 | |
| 3470.529 | C | 7 | 2.70 | 6.25 | 1-1 | |
| 3470.72 | B | 4 | 2.70 | 6.25 | 1-0 | |
| 3307.755 | C | 8 | 2.70 | 6.43 | 3-4 | $a^5P-t^5D^o$† |
| 3312.06 | B | 3 | 2.70 | 6.42 | 2-3 | (78) |
| •3315.19 | B | 1l | 2.70 | 6.42 | 1-2† | |
| 3196.37 | P | | 2.70 | 6.56 | 3-4 | $a^5P-s^5F^o$ |
| 3201.97 | P | | 2.70 | 6.55 | 2-3 | (79) |
| m3201.24 | P | Cr† | 2.70 | 6.55 | 3-3 | |
| 3204.55 | P | | 2.70 | 6.55 | 3-2 | |
| 9900.87 | A | 15 | 2.97 | 4.22 | 2-2 | $a^3P-z^3P^o$ |
| 9826.30 | A | 4 | 2.90 | 4.18 | 1-1 | (80) |
| 10197.05 | A | 3 | 2.97 | 4.18 | 2-1 | |
| 9752.84 | A | 4 | 2.90 | 4.17 | 1-0 | |
| 9362.06 | A | 10 | 2.90 | 4.22 | 1-2 | |
| 9313.55 | A | 8 | 2.86 | 4.18 | 0-1 | |
| 4619.551 | C | 40 | 2.97 | 5.65 | 2-2 | $a^3P-y^3P^o$ |
| 4501.788 | C | 25 | 2.90 | 5.64 | 1-1 | (81) |
| 4622.761 | C | 25 | 2.97 | 5.64 | 2-1 | |
| 4501.112 | C | 35 | 2.90 | 5.64 | 1-0 | |
| 4498.730 | C | 35 | 2.90 | 5.65 | 1-2 | |
| 4433.175 | C | 40 | 2.88 | 5.64 | 0-1 | |
| •4527.339 | C | 40 | 2.97 | 5.70 | 2-3 | $a^3P-y^3D^o$ |
| 4424.075 | C | 10 | 2.90 | 5.69 | 1-2 | (82) |
| •4363.95 § | B | 7 | 2.88 | 5.69 | 0-1 | |
| 4491.858 | C | 35 | 2.97 | 5.72 | 2-2 | $a^3P-w^5D^o$ |
| 4377.549 | C | 30 | 2.90 | 5.72 | 1-2 | (83) |
| 4321.238 | C | 20 | 2.86 | 5.72 | 0-1 | |
| 4387.380 | C | 10 | 2.97 | 5.79 | 2-3 | $a^3P-u^5P^o$ |
| •4262.133 | C | 12 | 2.90 | 5.80 | 1-2 | (84) |
| 4190.18 | B | 15 | 2.88 | 5.80 | 0-1 | |
| 4118.45 | P | | 2.90 | 5.90 | 1-2 | $a^3P-v^5D^o$ (85) |
| 3886.94 | P | | 2.97 | 6.15 | 2-3 | $a^3P-t^3P^o$ (86) |
| 3843.64 | B | 3 | 2.97 | 6.19 | 2-3 | $a^3P-t^5F^o$ (87) |
| m3819.57 | P | Cr | 2.97 | 6.21 | 2-3 | $a^3P-w^3D^o$† |
| 3748.18 | B | 2 | 2.90 | 6.20 | 1-2 | (88) |
| 3710.60 | B | 4 | 2.88 | 6.19 | 0-1 | |
| •3676.33 | B | 18 | 2.97 | 6.33 | 2-2 | $a^3P-w^3P^o$ |
| •3604.54 | B | 3 | 2.90 | 6.33 | 1-1 | (89) |
| •3681.691 | C | 12 | 2.97 | 6.33 | 2-1† | |
| 3613.669 | C | 8 | 2.90 | 6.32 | 1-0 | |
| 3599.395 | C | 10 | 2.90 | 6.33 | 1-2 | |
| 3559.781 | C | 10 | 2.88 | 6.33 | 0-1 | |
| 3450.00 | P | | 2.97 | 8.55 | 2-3 | $a^3P-s^5F^o$ |
| 3453.84 | P | | 2.97 | 8.56 | 2-2 | (90) |
| 3388.88 | B | 1 | 2.90 | 8.54 | 1-1 | |
| 3198.112 | C | 7 | 2.97 | 8.83 | 2-3 | $a^3P-v^3F^o$ (91) |
| 3188.011 | C | 20y | 2.97 | 6.85 | 2-3 | $a^3P-v^3D^o$ |
| 3159.59 | C | 20w | 2.90 | 8.81 | 1-2 | (92) |
| 3144.409 | C | 8w | 2.88 | 6.78 | 0-1 | |
| 3218.70 | B | 5w | 2.97 | 6.81 | 2-2 | |
| 3179.283 | C | 7w | 2.90 | 6.78 | 1-1 | |
| 3239.14 | B | 1 | 2.97 | 6.78 | 2-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Cr I continued | | | | | | |
| 7462.37 | B | 100 | 2.90 | 4.55 | 4-3 | $z^7P^o-e^7S$ |
| 7400.23 | B | 150 | 2.89 | 4.55 | 3-3 | (93) |
| 7355.94 | B | 200 | 2.88 | 4.55 | 2-3 | |
| 5328.339 | C | 200w | 2.90 | 5.22 | 4-5 | $z^7P^o-e^7D$ |
| 5297.360 | C | 60w | 2.89 | 5.22 | 3-4 | (94) |
| 5275.171 | C | 75w | 2.88 | 5.22 | 2-3 | |
| 5329.13 | D | 65w | 2.90 | 5.22 | 4-4 | |
| 5297.976 | C | 40w | 2.89 | 5.22 | 3-3 | |
| 5275.689 | C | 50w | 2.88 | 5.22 | 2-2 | |
| 5329.719 | C | 25w | 2.90 | 5.22 | 4-3 | |
| 5298.44 | P | | 2.89 | 5.22 | 3-2 | |
| 5276.03 | D | 75w | 2.88 | 5.22 | 2-1 | |
| 4514.531 | C | 40 | 2.90 | 5.63 | 4-3 | $z^7P^o-f^7S$ |
| 4491.678 | C | 30 | 2.89 | 5.63 | 3-3 | (95) |
| 4475.345 | C | 50 | 2.88 | 5.63 | 2-3 | |
| 4261.354 | C | 25 | 2.90 | 5.80 | 4-5 | $z^7P^o-f^7D$ |
| 4272.910 | C | 12 | 2.89 | 5.78 | 3-4 | (96) |
| 4284.725 | C | 12 | 2.88 | 5.76 | 2-3 | |
| 4293.565 | C | 20 | 2.90 | 5.78 | 4-4 | |
| 4299.718 | C | 20 | 2.89 | 5.76 | 3-3 | |
| 4305.453 | C | 30 | 2.88 | 5.74 | 2-2 | |
| •4320.592 | C | 30 | 2.90 | 5.76 | 4-3 | |
| | | | 2.89 | 5.74 | 3-2 | |
| 4319.641 | C | 40 | 2.88 | 5.73 | 2-1 | |
| 4129.21 | E | (20n) | 2.90 | 5.89 | 4-5 | $z^7P^o-g^7D$ |
| 4110.87 | E | (8) | 2.89 | 5.89 | 3-4 | (97) |
| 4097.65 | E | (5) | 2.88 | 5.89 | 2-3 | |
| 4129.96 | P | | 2.90 | 5.89 | 4-4 | |
| 4111.36 | E | (6) | 2.89 | 5.89 | 3-3 | |
| 4097.96 | E | (7) | 2.89 | 5.89 | 2-2 | |
| 4130.47 | P | | 2.90 | 5.89 | 4-3 | |
| 4111.67 | E | (3) | 2.89 | 5.89 | 3-2 | |
| 4098.18 | E | (7) | 2.88 | 5.89 | 2-1 | |
| 8224.09 | A | 8 | 2.97 | 4.47 | 5-4 | $a^3H-z^3F^o$, |
| 8261.95 | A | 8 | 2.95 | 4.45 | 4-3 | (98) |
| 4737.153 | C | 40 | 2.99 | 5.60 | 6-6 | $a^3H-z^3H^o$ |
| 4693.949 | C | 45 | 2.97 | 5.60 | 5-5 | (99) |
| 4666.815 | D | 25 | 2.95 | 5.60 | 4-4 | |
| 4725.95 | B | 7 | 2.99 | 5.60 | 6-5 | |
| 4692.97 | B | 10 | 2.97 | 5.60 | 5-4 | |
| 4695.153 | C | 30 | 2.97 | 5.60 | 5-6 | |
| 4667.181 | D | 30 | 2.95 | 5.60 | 4-5 | |
| 4543.74 | C | 20 | 2.97 | 5.69 | 5-4 | $a^3H-y^3F^o$ |
| •4518.63 | B | 6 | 2.95 | 5.69 | 4-4 | (100) |
| 4495.04 | B | 4 | 2.95 | 5.70 | 4-3 | $a^3H-y^3D^o$ (101) |
| 4442.268 | C | 30 | 2.99 | 5.77 | 6-5 | $a^3H-w^5F^o$ |
| 4410.967 | C | 25 | 2.97 | 5.77 | 5-4 | (102) |
| 4393.534 | C | 12 | 2.95 | 5.76 | 4-3 | |
| 4387.496 | C | 30 | 2.99 | 5.80 | 6-5 | $a^3H-z^3G^o$ |
| 4375.333 | C | 30 | 2.97 | 5.79 | 5-4 | (103) |
| 4363.134 | C | 12 | 2.95 | 5.78 | 4-3 | |
| 4374.158 | C | 40 | 2.99 | 5.81 | 6-5 | $a^3H-y^3G^o$ |
| 4346.833 | C | 30 | 2.97 | 5.81 | 5-4 | (104) |
| 4325.075 | C | 40 | 2.95 | 5.81 | 4-3 | |
| 4255.502 | C | 25 | 2.99 | 5.89 | 6-7 | $a^3H-z^3I^o$ |
| •4240.705 | C | 30 | 2.97 | 5.88 | 5-6 | (105) |
| 4226.76 | P | | 2.95 | 5.87 | 4-5 | |
| 4266.82 | B | 8 | 2.99 | 5.88 | 6-6 | |
| 4248.73 | B | 10 | 2.97 | 5.87 | 5-5 | |
| 4175.945 | C | 15 | 2.99 | 5.94 | 6-7 | $a^3H-x^5H^o$ |
| 4185.345 | C | 10 | 2.97 | 5.92 | 5-6 | (106) |
| 4189.96 | B | 5 | 2.95 | 5.90 | 4-5 | |
| 4210.77 | B | 5 | 2.99 | 5.92 | 6-6 | |
| 4237.27 | B | 1 | 2.99 | 5.90 | 6-5 | |
| 4230.29 | B | 4 | 2.97 | 5.89 | 5-4 | |
| 4220.45 | B | 5 | 2.95 | 5.88 | 4-3 | |
| 4167.80 | B | 3 | 2.97 | 5.93 | 5-4 | $a^3H-u'\,^5F^o$ |
| 4146.695 | C | 6 | 2.95 | 5.93 | 4-4 | (107) |
| 4123.387 | C | 10 | 2.99 | 5.98 | 6-6 | $a^3H-y^3H^o$ |
| 4121.817 | C | 10 | 2.97 | 5.96 | 5-5 | (108) |
| 4104.867 | C | 10 | 2.95 | 5.96 | 4-4 | |
| 4146.47 | B | 4 | 2.99 | 5.96 | 6-5 | |
| 4099.016 | C | 6 | 2.97 | 5.98 | 5-6 | |
| 4101.163 | D | 8 | 2.95 | 5.96 | 4-5 | |
| 3510.538 | C | 15 | 2.99 | 6.50 | 6-7 | $a^3H-y^3I^o$ |
| 3494.967 | C | 15 | 2.97 | 6.50 | 5-6 | (109) |
| 3488.453 | C | 10 | 2.95 | 6.49 | 4-5 | |
| 3513.70 | B | 2n | 2.99 | 6.50 | 6-6 | |
| •3503.38 § | B | 1 | 2.97 | 6.49 | 5-5 | |
| 3481.536 | C | 18 | 2.99 | 6.53 | 6-6 | $a^3H-x^3H^o$† |
| 3467.715 | C | 18 | 2.97 | 6.53 | 5-5 | (110) |
| 3443.790 | C | 10 | 2.95 | 6.54 | 4-4 | |
| 3472.906 | C | 10 | 2.95 | 6.51 | 4-4 | $a^3H-1^o$ (111) |
| 3346.018 | C | 12 | 2.99 | 6.68 | 6-5 | $a^3H-v^3G^o$† |
| 3346.71 | B | 10 | 2.97 | 8.66 | 5-4 | (112) |
| 3346.78 | B | 9 | 2.95 | 6.64 | 4-3 | |
| 3257.822 | C | 12 | 2.99 | 6.78 | 6-6 | $a^3H-w^3H^o$† |
| 3251.836 | C | 15 | 2.97 | 6.76 | 5-5 | (113) |
| 3245.542 | C | 12 | 2.95 | 6.76 | 4-4 | |
| 3259.975 | C | 10 | 2.99 | 6.77 | 6-6 | $a^3H-v^3H^o$ |
| 3238.087 | C | 8 | 2.97 | 6.78 | 5-5 | (114) |
| 3237.729 | C | 10 | 2.95 | 6.77 | 4-4 | |
| 3253.28 | B | 4 | 2.99 | 6.78 | 6-5 | |
| 3250.58 | B | 4 | 2.97 | 6.77 | 5-4 | |
| 3244.69 | B | 1 | 2.97 | 6.77 | 5-6 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Cr I** continued | | | | | | |
| 3163.756 | C | 15 | 2.99 | 6.89 | 6–7 | $a^3H$–$x^3I^o$ (115) |
| 3155.149 | C | 12 | 2.97 | 6.88 | 5–6 | |
| 3148.445 | C | 10 | 2.95 | 6.87 | 4–5 | |
| 3169.58 | B | 3 | 2.99 | 6.88 | 6–6 | |
| 3160.61 | B | 4 | 2.97 | 6.87 | 5–5 | |
| 3152.881 | D | 5 | 2.99 | 6.90 | 6–6 | $a^3H$–$u^3H^o$ |
| 3141.891 | D | 5 | 2.97 | 6.90 | 5–5 | (116) |
| m3039.74 | P | Cr | 2.99 | 7.05 | 6–5 | $a^3H$–$u^3G^o$ |
| 3031.486 | C | 4 | 2.97 | 7.04 | 5–4 | (117) |
| 3024.681 | C | 2 | 2.95 | 7.03 | 4–3 | |
| 10486.24 | A | 20 | 3.00 | 4.17 | 4–4 | $b^5D$–$z^5D^o$ |
| 10672.17 | A | 18 | 3.00 | 4.16 | 3–3 | (118) |
| 10816.91 | A | 8 | 3.00 | 4.14 | 2–2 | |
| 10647.66 | A | 12 | 3.00 | 4.16 | 4–3 | |
| 10821.62 | A | 12 | 3.00 | 4.14 | 3–2 | |
| 10957.19 | A | 12 | 3.00 | 4.13 | 2–1 | |
| 11044.64 | A | 5 | 3.00 | 4.12 | 1–0 | |
| 10509.96 | A | 10 | 3.00 | 4.17 | 3–4 | |
| 10667.53 | A | 15 | 3.00 | 4.16 | 2–3 | |
| 10801.37 | A | 12 | 3.00 | 4.14 | 1–2 | |
| 10929.90 | A | 10 | 3.00 | 4.13 | 0–1 | |
| 5712.778 | C | 100 | 3.00 | 5.18 | 4–4 | $b^5D$–$y^5D^o$ |
| 5788.389 | C | 20 | 3.00 | 5.13 | 3–3 | (119) |
| 5843.24 | B | 25 | 3.00 | 5.11 | 2–2 | |
| •5781.195 | C | 40 | 3.00 | 5.13 | 4–3 | |
| 5844.606 | C | 40 | 3.00 | 5.11 | 3–2 | |
| 5884.452 | C | 25 | 3.00 | 5.10 | 2–1 | |
| 5902.182 | C | 25 | 3.00 | 5.09 | 1–0 | |
| 5719.821 | C | 40 | 3.00 | 5.16 | 3–4 | |
| 5787.036 | C | 20 | 3.00 | 5.13 | 2–3 | |
| 5838.66 | B | 25 | 3.00 | 5.11 | 1–2 | |
| 5876.55 | B | 25 | 3.00 | 5.10 | 0–1 | |
| •5556.19 | B | 10 | 3.00 | 5.22 | 4–4 | $b^5D$–$x^7P^o$ |
| 5574.41 | B | 12 | 3.00 | 5.21 | 3–2 | (120) |
| 5512.69 | B | 10 | 3.00 | 5.24 | 3–2 | $b^5D$–$x^5D^o$ |
| •5556.19 | B | 10 | 3.00 | 5.22 | 2–1 | (121) |
| 5004.38 | B | 35w | 3.00 | 5.46 | 4–3 | $b^5D$–$w^5P^o$ † |
| 5028.00 | B | 15w | 3.00 | 5.45 | 3–2 | (122) |
| 4981.30 | P | | 3.00 | 5.48 | 3–3 | $b^5D$–$y^5G^o$ |
| 4998.55 | B | 4 | 3.00 | 5.47 | 2–2 | (123) |
| 4980.30 | P | | 3.00 | 5.48 | 2–3 | |
| 4755.137 | C | 8 | 3.00 | 5.59 | 4–5 | $b^5D$–$x^5F^o$ |
| 4764.643 | C | 20 | 3.00 | 5.59 | 3–4 | (124) |
| 4770.670 | C | 12 | 3.00 | 5.59 | 2–3 | |
| 4774.557 | C | 8 | 3.00 | 5.58 | 1–2 | |
| 4759.74 | B | 8 | 3.00 | 5.59 | 4–4 | |
| 4771.57 | B | 10 | 3.00 | 5.59 | 3–3 | |
| 4777.57 | B | 7 | 3.00 | 5.58 | 2–2 | |
| 4779.87 | B | 3 | 3.00 | 5.58 | 1–1 | |
| m4766.66 | P | Cr | 3.00 | 5.59 | 4–3 | |
| •4778.50 | 8 | 2 | 3.00 | 5.58 | 3–2 | |
| 4566.602 | C | 7 | 3.00 | 5.70 | 4–3 | $b^5D$–$y^3D^o$ |
| 4584.75 | B | 12 | 3.00 | 5.69 | 3–2 | (125) |
| 4590.69 | B | 8 | 3.00 | 5.69 | 2–1 | |
| 4571.105 | C | 25 | 3.00 | 5.70 | 3–3 | |
| 4583.89 | B | 15 | 3.00 | 5.69 | 2–2 | |
| 4587.86 | B | 8 | 3.00 | 5.69 | 1–1 | |
| •4570.30 | B | 6 | 3.00 | 5.70 | 2–3 | |
| 4515.440 | C | 25 | 3.00 | 5.73 | 4–4 | $b^5D$–$w^5D^o$ † |
| 4519.83 | B | 7 | 3.00 | 5.73 | 3–4 | (126) |
| 4530.12 | P | | 3.00 | 5.72 | 2–3 | |
| 4458.538 | C | 45 | 3.00 | 5.77 | 4–5 | $b^5D$–$w^5F^o$ |
| 4459.738 | C | 25 | 3.00 | 5.77 | 3–4 | (127) |
| 4465.357 | C | 35 | 3.00 | 5.76 | 2–3 | |
| 4464.907 | C | 25 | 3.00 | 5.76 | 1–2 | |
| 4462.774 | C | 30 | 3.00 | 5.76 | 0–1 | |
| 4455.45 | B | 7 | 3.00 | 5.77 | 4–4 | |
| 4466.165 | C | 25 | 3.00 | 5.76 | 3–3 | |
| 4467.561 | C | 30 | 3.00 | 5.78 | 2–2 | |
| 4464.669 | C | 25 | 3.00 | 5.76 | 1–1 | |
| 4468.38 | B | 7 | 3.00 | 5.78 | 3–2 | |
| 4403.372 | C | 35 | 3.00 | 5.80 | 4–5 | $b^5D$–$z^3G^o$ |
| 4423.318 | C | 12 | 3.00 | 5.79 | 3–4 | (128) |
| 4433.968 | C | 20 | 3.00 | 5.78 | 2–3 | |
| 4419.10 | B | 10 | 3.00 | 5.79 | 4–4 | |
| 4434.75 | 8 | 10 | 3.00 | 5.78 | 3–3 | |
| m4430.51 | P | Cr | 3.00 | 5.78 | 4–3 | |
| 4424.281 | C | 40 | 3.00 | 5.79 | 4–3 | $b^5D$–$u^5P^o$ |
| 4411.093 | C | 40 | 3.00 | 5.80 | 3–2 | (129) |
| 4399.823 | C | 30 | 3.00 | 5.80 | 2–1 | |
| 4428.501 | C | 35 | 3.00 | 5.79 | 3–3 | |
| 4410.304 | C | 40 | 3.00 | 5.80 | 2–2 | |
| 4397.251 | C | 30 | 3.00 | 5.80 | 1–1 | |
| 4427.71 | B | 10 | 3.00 | 5.79 | 2–3 | |
| 4407.72 | B | 40d? | 3.00 | 5.80 | 1–2 | |
| 4395.417 | C | 18 | 3.00 | 5.80 | 0–1 | |
| 4356.760 | C | 20 | 3.00 | 5.83 | 4–5 | $b^5D$–$x^5G^o$ |
| 4368.252 | C | 20 | 3.00 | 5.83 | 3–4 | (130) |
| 4379.782 | C | 20 | 3.00 | 5.82 | 2–3 | |
| 4392.26 | 8 | 10 | 3.00 | 5.81 | 1–2 | |
| 4364.14 | B | 10 | 3.00 | 5.83 | 4–4 | |
| 4380.55 | 8 | 10 | 3.00 | 5.82 | 3–3 | |
| 4394.63 | B | 8 | 3.00 | 5.81 | 2–2 | |
| 4238.957 | C | 35 | 3.00 | 5.91 | 4–4 | $b^5D$–$w^5D^o$ |
| 4252.243 | C | 10 | 3.00 | 5.90 | 3–3 | (131) |
| 4256.620 | C | 8 | 3.00 | 5.90 | 2–2 | |
| 4248.344 | C | 12 | 3.00 | 5.90 | 4–3 | |
| 4257.368 | C | 12 | 3.00 | 5.90 | 3–2 | |
| 4253.15 | 8 | 10 | 3.00 | 5.90 | 2–1 | |
| 4242.82 | B | 10 | 3.00 | 5.91 | 3–4 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Cr I** continued | | | | | | |
| 4217.626 | C | 30 | 3.00 | 5.92 | 4–5 | $b^5D$–$u^5F^o$ |
| 4216.365 | C | 15 | 3.00 | 5.93 | 3–4 | (132) |
| 4222.732 | C | 20 | 3.00 | 5.92 | 2–3 | |
| 4230.481 | C | 25 | 3.00 | 5.92 | 1–2 | |
| 4235.98 | B | 15 | 3.00 | 5.91 | 0–1 | |
| 4223.47 | B | 7 | 3.00 | 5.92 | 3–3 | |
| 4232.866 | C | 10 | 3.00 | 5.92 | 2–2 | |
| 4237.710 | C | 12 | 3.00 | 5.91 | 1–1 | |
| 4211.349 | C | 15 | 3.00 | 5.93 | 3–4 | $b^5D$–$u'\,^5F^o$ |
| 4177.17 | B | 3 | 3.00 | 5.95 | 0–1 | (133) |
| 4207.51 | B | 2 | 3.00 | 5.93 | 4–4 | |
| 3945.968 | C | 10 | 3.00 | 6.13 | 4–5 | $b^5D$–$w^5G^o$ (134) |
| 3945.495 | C | 9 | 3.00 | 6.13 | 4–4 | $b^5D$–$x^3F^o$ † |
| 3944.25 | B | 2 | 3.00 | 6.13 | 3–3 | (135) |
| 3943.21 | B | 3 | 3.00 | 6.13 | 2–2 | |
| 3915.843 | C | 40 | 3.00 | 6.15 | 4–3 | $b^5D$–$t^5P^o$ |
| 3952.399 | C | 15 | 3.00 | 6.12 | 3–2 | (138) |
| 3953.163 | C | 18 | 3.00 | 6.12 | 2–1 | |
| m3919.15 | P | Cr | 3.00 | 6.15 | 3–3 | |
| 3951.765 | C | 8 | 3.00 | 6.12 | 2–2 | |
| 3951.097 | C | 10 | 3.00 | 6.12 | 1–1 | |
| 3918.54 | P | | 3.00 | 6.15 | 2–3 | |
| •3949.64 | B | 8 | (3.00 | 6.12 | 1–2 | |
| | | | 3.00 | 6.12 | 0–1 | |
| 3917.596 | C | 15 | 3.00 | 6.15 | 3–2 | $b^5D$–$y^5G^o$ |
| 3918.980 | C | 10 | 3.00 | 6.15 | 2–2 | (137) |
| 3914.96 | B | 4 | 3.00 | 6.15 | 1–2 | |
| 3849.365 | C | 50 | 3.00 | 6.20 | 4–5 | $b^5D$–$t^5F^o$ |
| 3858.90 | B | 15w | 3.00 | 6.20 | 3–4 | (138) |
| 3874.570 | D | 40w | 3.00 | 6.19 | 2–3 | |
| 3879.222 | C | 50 | 3.00 | 8.18 | 1–2 | |
| 3883.680 | C | 20 | 3.00 | 6.17 | 0–1 | |
| m3855.65 | P | Cr | 3.00 | 6.20 | 4–4 | |
| 3875.14 | B | 10n | 3.00 | 6.19 | 3–3 | |
| 3881.214 | C | 40 | 3.00 | 6.18 | 2–2 | |
| 3885.084 | C | 20 | 3.00 | 6.17 | 1–1 | |
| 3861.656 | C | 10 | 3.00 | 6.18 | 3–2 | |
| 3804.798 | C | 50 | 3.00 | 6.24 | 4–4 | $b^5D$–$u^5D^o$ |
| 3797.716 | C | 40 | 3.00 | 6.25 | 3–3 | (139) |
| 3793.269 | C | 30 | 3.00 | 6.25 | 2–2 | |
| 3790.228 | C | 6 | 3.00 | 6.25 | 1–1 | |
| 3794.608 | C | 25 | 3.00 | 6.25 | 4–3 | |
| 3793.879 | C | 30 | 3.00 | 6.25 | 3–2 | |
| 3792.137 | C | 30 | 3.00 | 6.25 | 2–1 | |
| 3790.454 | C | 18 | 3.00 | 6.25 | 1–0 | |
| 3807.926 | C | 15 | 3.00 | 6.24 | 3–4 | |
| 3797.126 | C | 20 | 3.00 | 6.25 | 2–3 | |
| 3791.376 | C | 30 | 3.00 | 6.25 | 1–2 | |
| 3788.864 | C | 20 | 3.00 | 6.25 | 0–1 | |
| m3602.61 | P | Cr | 3.00 | 6.42 | 4–3 | $b^5D$–$t^5D^o$ |
| 3807.92 | P | | 3.00 | 8.42 | 3–2 | (140) |
| 3608.58 | P | | 3.00 | 8.42 | 2–1 | |
| 3607.25 | P | | 3.00 | 8.42 | 1–0 | |
| 3460.430 | C | 25 | 3.00 | 8.56 | 4–5 | $b^5D$–$s^5F^o$ † |
| 3469.590 | C | 15 | 3.00 | 6.56 | 3–4 | (141) |
| 3474.87 | B | 8 | 3.00 | 6.55 | 2–3 | |
| 3477.181 | C | 7 | 3.00 | 6.55 | 1–2 | |
| 3479.14 | B | 5 | 3.00 | 6.54 | 0–1 | |
| •3467.022 | C | 12 | 3.00 | 8.58 | 4–4 | |
| 3475.38 | P | | 3.00 | 6.55 | 3–3 | |
| 3478.77 | B | 7 | 3.00 | 6.55 | 2–2 | |
| 3480.28 | B | 4 | 3.00 | 6.54 | 1–1 | |
| 8947.20 | A | 35 | 3.09 | 4.47 | 5–4 | $a^3G$–$z^3F^o$ |
| 8976.88 | A | 25 | 3.07 | 4.45 | 4–3 | (142) |
| 9035.88 | A | 20 | 3.07 | 4.43 | 3–2 | |
| 8835.87 | A | 10 | 3.07 | 4.47 | 4–4 | |
| 8925.75 | A | 10 | 3.07 | 4.45 | 3–3 | |
| 8788.28 | P | | 3.07 | 4.47 | 3–4 | |
| 4922.287 | C | 300 | 3.09 | 5.60 | 5–8 | $a^3G$–$z^3H^o$ |
| 4887.013 | C | 150 | 3.07 | 5.60 | 4–5 | (143) |
| 4870.798 | C | 100 | 3.07 | 5.60 | 3–4 | |
| 4920.945 | C | 50 | 3.09 | 5.60 | 5–5 | |
| 4885.957 | C | 50 | 3.07 | 5.60 | 4–4 | |
| 4838.857 | C | 40 | 3.09 | 5.84 | 5–8 | $a^3G$–$y^5H^o$ |
| 4814.285 | C | 35 | 3.07 | 5.84 | 4–5 | (144) |
| 4810.733 | C | 35 | 3.07 | 5.63 | 3–4 | |
| 4847.177 | C | 18 | 3.09 | 5.64 | 5–5 | |
| 4825.51 | B | 10 | 3.07 | 5.63 | 4–4 | |
| 4822.08 | B | 5 | 3.07 | 5.83 | 3–3 | |
| 4756.113 | C | 100 | 3.09 | 5.89 | 5–4 | $a^3G$–$y^3F^o$ |
| 4737.350 | C | 75 | 3.07 | 5.88 | 4–3 | (145) |
| 4730.711 | C | 50 | 3.07 | 5.67 | 3–2 | |
| 4734.416 | C | 35 | 3.07 | 5.69 | 4–4 | |
| 4723.03 | B | 15 | 3.07 | 5.68 | 3–3 | |
| 4710.24 | B | 8 | 3.07 | 5.89 | 3–4 | |
| •4698.615 | C | 50 | 3.07 | 5.70 | 4–3 | $a^3G$–$y^3D^o$ |
| 4698.947 | C | 20 | 3.07 | 5.89 | 3–2 | (146) |
| 4684.605 | C | 12 | 3.07 | 5.70 | 3–3 | |
| 4656.189 | C | 30 | 3.07 | 5.72 | 4–3 | $a^3G$–$w^5P^o$ † |
| 4646.495 | C | 15 | 3.07 | 5.72 | 3–2 | (147) |
| 4814.15 | B | 12 | 3.09 | 5.77 | 5–5 | $a^3G$–$w^5F^o$ |
| 4581.063 | C | 10 | 3.07 | 5.77 | 4–4 | (148) |
| 4574.45 | B | 8 | 3.07 | 5.78 | 3–3 | |
| 4576.76 | B | 8 | 3.07 | 5.78 | 3–2 | |
| 4555.09 | B | (10?) | 3.09 | 5.80 | 5–5 | $a^3G$–$z^3G^o$ |
| •4542.821 | C | 35 | 3.07 | 5.79 | 4–4 | (149) |
| 4541.513 | C | 25 | 3.07 | 5.78 | 3–3 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Cr I** continued | | | | | | |
| 4540.719 | C | 50 | 3.09 | 5.81 | 5–5 | $a^3G$–$y^3G^o$ |
| 4511.903 | C | 60 | 3.07 | 5.81 | 4–4 | (150) |
| 4500.295 | C | 40 | 3.07 | 5.81 | 3–3 | |
| 4513.21 | B | 8+g | 3.07 | 5.81 | 4–3 | |
| 4505.22 | B | 1 | 3.09 | 5.83 | 5–5 | $a^3G$–$x^5G^o$ |
| 4484.68 | B | 8 | 3.07 | 5.82 | 3–3 | (151) |
| 4425.129 | C | 12 | 3.09 | 5.86 | 5–6 | $a^3G$–$z^3I^o$ |
| 4406.26 | B | 18 | 3.07 | 5.87 | 4–5 | (152) |
| 4364.87 | B | 10 | 3.09 | 5.92 | 5–8 | $a^3G$–$x^5H^o$ † |
| 4366.33 | B | 4 | 3.07 | 5.90 | 4–5 | (153) |
| 4271.081 | C | 15 | 3.09 | 5.98 | 5–8 | $a^3G$–$y^3H^o$ |
| 4289.951 | C | 12 | 3.07 | 5.96 | 4–5 | (154) |
| 4262.38 | B | 6 | 3.07 | 5.96 | 3–4 | |
| 4209.758 | C | 15 | 3.09 | 6.02 | 5–5 | $a^3G$–$x^3G^o$ |
| 4224.514 | C | 18 | 3.07 | 5.99 | 4–4 | (155) |
| •4221.572 | C | 25 | 3.07 | 5.99 | 3–3 | |
| 4249.81 | P | | 3.09 | 5.99 | 5–4 | |
| 4184.895 | C | 12 | 3.07 | 6.02 | 4–5 | |
| 4213.179 | C | 10 | 3.07 | 5.99 | 3–4 | |
| 4080.56 | B | 2 | 3.09 | 6.12 | 5–5 | $a^3G$–$w^3G^o$ † |
| 4057.19 | B | 3 | 3.07 | 6.12 | 4–5 | (156) |
| 4060.62 | B | 8d? | 3.07 | 6.11 | 3–4 | |
| 3586.23 | B | 4 | 3.09 | 6.53 | 5–6 | $a^3G$–$x^3H^o$ |
| 3571.97 | P | | 3.07 | 6.53 | 4–5 | (157) |
| 3553.968 | C | 5 | 3.07 | 8.54 | 3–4 | |
| 3442.58 | B | 1 | 3.09 | 6.68 | 5–5 | $a^3G$–$v^3G^o$ |
| 3425.96 | B | 4 | 3.07 | 6.68 | 4–5 | (158) |
| •3349.322§ | C | 8 | 3.09 | 6.76 | 5–8 | $a^3G$–$w^3H^o$ † |
| 3343.342 | C | 5 | 3.07 | 6.78 | 4–5 | (159) |
| 3343.227 | C | 5 | 3.07 | 6.78 | 3–4 | |
| 3351.598 | C | 8 | 3.09 | 6.77 | 5–6 | $a^3G$–$v^3H^o$ |
| 3328.80 | B | 4 | 3.07 | 6.78 | 4–5 | (160) |
| 3334.925 | C | 6 | 3.07 | 6.77 | 3–4 | |
| 3344.50 | B | 4 | 3.09 | 8.78 | 5–5 | |
| 3313.721 | C | 3 | 3.09 | 6.82 | 5–4 | $a^3G$–$w^3F^o$ |
| 3309.82 | B | 4 | 3.07 | 6.80 | 4–3 | (161) |
| 3298.318 | C | 7 | 3.07 | 6.82 | 4–4 | |
| 3302.86 | B | 6 | 3.07 | 6.80 | 3–3 | |
| 3238.50 | B | 4 | 3.09 | 6.90 | 5–6 | $a^3G$–$u^3H^o$ |
| 3237.23 | B | 2 | 3.07 | 6.90 | 4–5 | (162) |
| 3119.246 | C | 5 | 3.09 | 7.05 | 5–5 | $a^3G$–$u^3G^o$ |
| 3110.860 | C | 5 | 3.07 | 7.04 | 4–4 | (163) |
| 3109.336 | C | 8 | 3.07 | 7.03 | 3–3 | |
| 3115.51 | B | 1 | 3.07 | 7.03 | 4–3 | |
| 3105.57 | B | 2 | 3.07 | 7.05 | 4–5 | |
| 3104.70 | B | 2 | 3.07 | 7.04 | 3–4 | |
| •3060.83 | B | 2 | 3.09 | 7.12 | 5–5 | $a^3G$–$t^3G^o$ † |
| 3058.17 | B | 3 | 3.07 | 7.11 | 4–4 | (164) |
| 3047.455 | C | 4 | 3.07 | 7.12 | 4–5 | |
| 3052.229 | C | 8 | 3.07 | 7.11 | 3–4 | |
| 9059.74 | A | 5 | 3.11 | 4.47 | 4–4 | $a^3F$–$z^3F^o$ |
| 9148.45 | A | 6 | 3.10 | 4.45 | 3–3 | (165) |
| 9206.29 | A | 25 | 3.11 | 4.45 | 4–3 | |
| 9283.97 | A | 20 | 3.10 | 4.43 | 3–2 | |
| 4954.811 | C | 80 | 3.11 | 5.80 | 4–5 | $a^3F$–$z^3H^o$ |
| 4936.334 | C | 150 | 3.10 | 5.80 | 3–4 | (166) |
| 4953.714 | D | 25 | 3.11 | 5.60 | 4–4 | |
| 4860.06 | B | 25 | 3.11 | 5.84 | 4–5 | $a^3F$–$y^5H^o$ |
| 4874.851 | C | 20 | 3.10 | 5.63 | 3–4 | (167) |
| 4787.74 | B | 5 | 3.11 | 5.89 | 4–4 | $a^3F$–$y^3F^o$ |
| 4764.70 | P | | 3.10 | 5.68 | 3–3 | (168) |
| 4754.743 | C | 20 | 3.08 | 5.67 | 2–2 | |
| 4801.030 | C | 75 | 3.11 | 5.68 | 4–3 | |
| 4792.513 | C | 75 | 3.10 | 5.67 | 3–2 | |
| 4747.00 | B | 4 | 3.08 | 5.88 | 2–3 | |
| 4781.242 | C | 10 | 3.11 | 5.70 | 4–3 | $a^3F$–$y^3D^o$ |
| 4759.907 | C | 10 | 3.10 | 5.69 | 3–2 | (169) |
| 4739.723 | C | 35 | 3.08 | 5.89 | 2–1? | |
| 4717.888 | C | 10 | 3.11 | 5.72 | 4–3 | $a^3F$–$w^5D^o$ |
| 4706.102 | C | 25 | 3.10 | 5.72 | 3–2 | (170) |
| 4680.870 | C | 35 | 3.08 | 5.72 | 2–1 | |
| 4701.92 | B | 5 | 3.10 | 5.72 | 3–3 | |
| 4689.87 | B | 10 | 3.06 | 5.72 | 2–2 | |
| 4640.55 | B | 4 | 3.11 | 5.77 | 4–4 | $a^3F$–$w^5F^o$ |
| 4632.160 | C | 35 | 3.10 | 5.78 | 3–3 | (171) |
| 4599.25 | B | 1 | 3.08 | 5.78 | 2–2 | |
| 4834.59 | B | 5 | 3.10 | 5.78 | 3–2 | |
| 4599.00 | B | 8 | 3.06 | 5.78 | 2–1 | |
| 4625.30 | B | 3 | 3.10 | 5.77 | 3–4 | |
| 4598.90 | B | 3 | 3.08 | 5.78 | 2–3 | |
| 4584.095 | C | 20 | 3.11 | 5.60 | 4–5 | $a^3F$–$z^3G^o$ |
| 4588.136 | C | 20 | 3.10 | 5.79 | 3–4 | (172) |
| 4563.857 | C | 25 | 3.08 | 5.78 | 2–3 | |
| 4601.15 | B | 20 | 3.11 | 5.79 | 4–4 | |
| 4596.441 | C | 20 | 3.10 | 5.78 | 3–3 | |
| 4589.530 | C | 20 | 3.11 | 5.61 | 4–5 | $a^3F$–$y^3G^o$ |
| 4554.630 | C | 25 | 3.10 | 5.81 | 3–4 | (173) |
| 4582.00 | B | 12 | 3.08 | 5.81 | 2–3 | |
| 4589.844 | C | 30 | 3.11 | 5.81 | 4–4 | |
| 4556.189 | C | 40 | 3.10 | 5.81 | 3–3 | |
| 4570.98 | B | 20 | 3.11 | 5.81 | 4–3 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Cr I continued | | | | | | |
| 4527.471 | C | 30 | 3.08 | 5.80 | 2-1? | $a^3F$-$u^5P^o$ (174) |
| 4513.89 | B | 3 | 3.08 | 5.81 | 2-1 | $a^3F$-$z^3G^o$ (175) |
| 4332.569 | C | 15 | 3.11 | 5.98 | 4-3 | $a^3F$-$u'^5F^o$ (178) |
| 4325.65 | B | 8 | 3.10 | 5.95 | 3-2 | |
| 4298.30 | B | 8 | 3.08 | 5.95 | 2-1 | |
| 4358.68 | B | 10 | 3.10 | 5.93 | 3-4 | |
| 4321.617 | C | 8 | 3.11 | 5.98 | 4-5 | $a^3F$-$y^3H^o$ |
| 4312.469 | C | 5 | 3.10 | 5.96 | 3-4 | (177) |
| 4234.515 | C | 12 | 3.11 | 8.03 | 4-5 | $a^3F$-$x^3G^o$ |
| •4262.133 | C | 12 | 3.10 | 5.99 | 3-4 | (178) |
| •4240.705 | C | 30 | 3.08 | 5.99 | 2-3 | |
| 4142.47 | B | 5 | 3.11 | 6.09 | 4-3 | $a^3F$-$x^3D^o$ |
| •4179.257 | C | 30 | 3.10 | 6.05 | 3-2 | (179) |
| 4103.85 † | B | 4 | 3.11 | 8.12 | 4-5 | $a^3F$-$w^3G^o$ † |
| 4108.05 | B | 4 | 3.10 | 8.11 | 3-4 | (180) |
| 4092.174 | C | 6 | 3.08 | 6.09 | 2-3 | |
| 3374.93 | B | 4 | 3.11 | 6.76 | 4-5 | $a^3F$-$w^3H^o$ |
| 3373.96 | B | 2 | 3.10 | 6.78 | 3-4 | (181) |
| 3382.07 | B | 3 | 3.11 | 6.76 | 4-4 | |
| 3329.053 | C | 8 | 3.11 | 6.82 | 4-4 | $a^3F$-$w^3F^o$ |
| 3332.879 | C | 7 | 3.10 | 8.80 | 3-3 | (182) |
| 3328.590 | C | 10 | 3.08 | 6.79 | 2-2 | |
| 3321.19 | B | 2 | 3.10 | 6.82 | 3-4 | |
| m3314.56 | P | Cr+ | 3.08 | 6.80 | 2-3 | |
| 3132.820 | C | 8 | 3.11 | 7.05 | 4-5 | $a^3F$-$u^3G^o$ |
| 3131.211 | C | 8 | 3.10 | 7.04 | 3-4 | (183) |
| 3119.706 | C | 5 | 3.08 | 7.03 | 2-3 | |
| 3138.203 | C | 4 | 3.11 | 7.04 | 4-4 | |
| 3135.91 | B | 3 | 3.10 | 7.03 | 3-3 | |
| 3073.679 | C | 10 | 3.11 | 7.12 | 4-5 | $a^3F$-$t^3G^o$ |
| 3077.831 | C | 10 | 3.10 | 7.11 | 3-4 | (184) |
| 3065.087 | C | 10 | 3.08 | 7.11 | 2-3 | |
| 3084.59 | B | 4 | 3.11 | 7.11 | 4-4 | |
| 3080.72 | B | 5 | 3.10 | 7.11 | 3-3 | |
| 6062.75 | B | 50 | 3.18 | 5.22 | 6-5 | $z^7F^o$-$e^7D$ |
| 5982.84 | B | 40 | 3.15 | 5.22 | 5-4 | (185) |
| 5916.73 | B | 30 | 3.13 | 5.22 | 4-3 | |
| 5863.96 | B | 25 | 3.11 | 5.22 | 3-2 | |
| 5981.96 | B | 25 | 3.15 | 5.22 | 5-5 | |
| 5915.93 | B | 25 | 3.13 | 5.22 | 4-4 | |
| 5796.00 | P | | 3.09 | 5.22 | 1-1 | |
| 5797.53 | P | | 3.09 | 5.22 | 1-2 | |
| 4718.429 | C | 75 | 3.18 | 5.80 | 6-5 | $z^7F^o$-$f^7D$ |
| 4708.040 | C | 60 | 3.15 | 5.78 | 5-4 | (186) |
| 4696.458 | C | 60 | 3.13 | 5.78 | 4-3 | |
| 4689.374 | C | 65 | 3.11 | 5.74 | 3-2 | |
| 4680.49 | B | 50 | 3.10 | 5.73 | 2-1 | |
| 4669.336 | C | 50 | 3.15 | 5.60 | 5-5 | |
| 4666.512 | C | 55 | 3.13 | 5.78 | 4-4 | |
| 4664.798 | C | 60 | 3.11 | 5.76 | 3-3 | |
| 4663.832 | C | 55 | 3.10 | 5.74 | 2-2 | |
| 4663.328 | C | 40 | 3.09 | 5.73 | 1-1 | |
| 4628.473 | C | 10 | 3.13 | 5.80 | 4-5 | |
| 4633.286 | C | 30 | 3.11 | 5.78 | 3-4 | |
| 4639.536 | D | 35 | 3.10 | 5.76 | 2-3 | |
| 4646.808 | C | 20 | 3.09 | 5.74 | 1-2 | |
| 4654.736 | C | 35 | 3.08 | 5.73 | 0-1 | |
| 9009.95 | A | 100 | 3.31 | 4.68 | 3-2 | $z^5P^o$-$e^5S$ |
| 9017.10 | A | 75 | 3.31 | 4.88 | 2-2 | (187) |
| 9021.69 | A | 50 | 3.31 | 4.68 | 1-2 | |
| 5791.005 | C | 100 | 3.31 | 5.44 | 3-4 | $z^5P^o$-$e^5D$ |
| 5787.99 | C | 75 | 3.31 | 5.44 | 2-3 | (188) |
| 5785.820 | C | 50 | 3.31 | 5.44 | 1-2 | |
| 5785.002 | C | 50 | 3.31 | 5.44 | 3-3 | |
| 5783.932 | C | 50 | 3.31 | 5.44 | 2-2 | |
| 5783.112 | C | 50 | 3.31 | 5.44 | 1-1 | |
| 5780.97 | B | 10 | 3.31 | 5.44 | 3-2 | |
| •5781.195 | C | 40 | 3.31 | 5.44 | 2-1 | |
| 5781.808 | C | 40 | 3.31 | 5.44 | 1-0 | |
| 5212.27 | B | 18w | 3.31 | 5.87 | 3-2 | $z^5P^o$-$f^5S$ |
| 5214.64 | B | 15w | 3.31 | 5.67 | 2-2 | (189) |
| 5216.17 | B | 12w | 3.31 | 5.67 | 1-2 | |
| 4536.55 | B | 4 | 3.31 | 6.03 | 3-4 | $z^5P^o$-$f^5D$ |
| •4572.18 | B | 7w | 3.31 | 6.01 | 2-3 | (190) |
| •4595.05 | B | 5w | 3.31 | 5.99 | 1-2 | |
| •4570.30 | B | 6 | 3.31 | 6.01 | 3-3 | |
| 4593.84 | B | 8v | 3.31 | 5.99 | 2-2 | |
| 4604.58 | B | 5w | 3.31 | 5.99 | 2-1 | |
| 5400.608 | C | 50 | 3.36 | 5.65 | 2-2 | $b^3P$-$y^3P^o$ |
| •5391.350 | C | 35 | 3.35 | 5.84 | 1-1 | (191) |
| 5405.004 | C | 35 | 3.38 | 5.64 | 2-1 | |
| 5390.394 | C | 40 | 3.35 | 5.64 | 1-0 | |
| 5388.978 | C | 75 | 3.35 | 5.65 | 1-2 | |
| 5387.573 | C | 35 | 3.35 | 5.84 | 0-1 | |
| m5275.11 | P | Cr | 3.38 | 5.70 | 2-3 | $b^3P$-$y^3D^o$ |
| 5280.289 | C | 30 | 3.35 | 5.89 | 1-2 | (192) |
| 5285.83 | B | 15 | 3.35 | 5.89 | 0-1 | |
| 5293.383 | C | 15 | 3.38 | 5.89 | 2-2 | |
| 5289.27 | B | 10 | 3.35 | 5.89 | 1-1 | |
| 5221.753 | C | 50 | 3.38 | 5.72 | 2-3 | $b^3P$-$w^5D^o$ |
| 5214.127 | C | 30 | 3.35 | 5.72 | 1-2 | (193) |
| •5224.541 | C | 45 | 3.35 | 5.72 | 0-1 | |
| 5228.891 | C | 50 | 3.38 | 5.72 | 2-2 | |
| 5228.082 | C | 50 | 3.35 | 5.72 | 1-1 | |
| 5240.94 | B | 20 | 3.38 | 5.72 | 2-1 | |
| 4781.73 | B | 5 | 3.38 | 5.95 | 2-2 | $b^3P$-$u'^5F^o$ † |
| 4752.87 | B | 10 | 3.35 | 5.95 | 1-1 | (194) |
| 4707.754 | C | 15 | 3.36 | 5.98 | 2-2 | $b^3P$-$x^3P^o$ |
| 4725.87 | B | 5 | 3.35 | 5.97 | 1-1 | (195) |
| 4736.13 | B | 5 | 3.38 | 5.97 | 2-1 | |
| 4749.25 | B | 1w | 3.35 | 5.95 | 1-0 | |
| 4697.395 | C | 15 | 3.35 | 5.98 | 1-2 | |
| 4722.741 | D | 10 | 3.35 | 5.97 | 0-1 | |
| 4528.108 | C | 40 | 3.38 | 8.09 | 2-3 | $b^3P$-$x^3D^o$ |
| 4575.121 | C | 25 | 3.35 | 6.05 | 1-2 | (196) |
| 4584.934 | C | 15 | 3.38 | 8.05 | 2-2 | |
| 4492.312 | C | 40 | 3.36 | 6.11 | 2-1 | $b^3P$-$y^3g^o$ |
| 4482.878 | C | 40 | 3.35 | 6.11 | 1-1 | (197) |
| 4480.263 | C | 30 | 3.35 | 8.11 | 0-1 | |
| 4338.799 | C | 15 | 3.38 | 8.21 | 2-3 | $b^3P$-$w^3D^o$ |
| 4345.085 | C | 15 | 3.35 | 8.20 | 1-2 | (198) |
| 4357.525 | C | 15 | 3.35 | 8.19 | 0-1 | |
| 4353.983 | D | 15 | 3.36 | 6.20 | 2-2 | |
| 4359.992 | C | 20 | 3.35 | 6.19 | 1-1 | |
| 4368.89 | B | 8 | 3.36 | 6.19 | 2-1 | |
| 4266.44 | B | 2w | 3.36 | 6.25 | 2-2 | $b^3P$-$u^5D^o$ (199) |
| 3153.54 | B | 5 | 3.38 | 7.27 | 2-2 | $b^3P$-$t^3P^o$ |
| 3184.08 | B | 1 | 3.35 | 7.28 | 1-1 | (200) |
| 5224.941 | C | | 3.44 | 5.80 | 5-5 | $z^7D^o$-$f^7D$ |
| 5225.032 | C) | 150• | (3.41 | 5.78 | 4-4 | (201) |
| 5224.082 | C | 40 | 3.39 | 5.78 | 3-3 | |
| 5220.912 | C | 40 | 3.37 | 5.73 | 1-1 | |
| 5273.439 | C | 25 | 3.44 | 5.78 | 5-4 | |
| 5265.160 | C | 60 | 3.41 | 5.76 | 4-3 | |
| 5254.918 | C | 100 | 3.39 | 5.74 | 3-2 | |
| 5243.395 | C | 75 | 3.38 | 5.73 | 2-1 | |
| 5177.430 | C | 75 | 3.41 | 5.80 | 4-5 | |
| 5184.590 | C | 100 | 3.39 | 5.78 | 3-4 | |
| 5192.000 | C | 100 | 3.38 | 5.78 | 2-3 | |
| 5200.188 | C | 50 | 3.37 | 5.74 | 1-2 | |
| 5027.88 | P | | 3.44 | 5.89 | 5-5 | $z^7D^o$-$g^7D$ |
| 4948.84 | P | | 3.39 | 5.89 | 3-3 | (202) |
| 4900.83 | P | | 3.37 | 5.89 | 1-1 | |
| 4983.63 | P | | 3.41 | 5.89 | 4-5 | |
| 4947.91 | P | | 3.39 | 5.89 | 3-4 | |
| 4900.50 | P | | 3.37 | 5.89 | 1-2 | |
| 5702.307 | C | 60 | 3.43 | 5.60 | 5-8 | $b^3G$-$z^3H^o$ |
| 5684.040 | C | 40 | 3.42 | 5.80 | 4-5 | (203) |
| 5628.645 | C | 50 | 3.41 | 5.60 | 3-4 | |
| •5700.514 | C | 40 | 3.43 | 5.60 | 5-5 | |
| 5480.502 | C | 45 | 3.43 | 5.69 | 5-4 | $b^3G$-$y^3F^o$ |
| 5463.974 | C | 40 | 3.42 | 5.68 | 4-3 | (204) |
| 5442.413 | C | 35 | 3.41 | 5.67 | 3-2 | |
| 5448.76 | B | 25 | 3.42 | 5.69 | 4-4 | |
| 5432.347 | C | 25 | 3.41 | 5.68 | 3-3 | |
| 5292.865 | C | 10 | 3.43 | 5.77 | 5-5 | $b^3G$-$w^5P^o$ |
| 5257.07 | B | 10 | 3.42 | 5.77 | 4-4 | (205) |
| 5236.83 | B | 10 | 3.41 | 5.76 | 3-3 | |
| 5215.29 | B | 20 | 3.43 | 5.80 | 5-5 | $b^3G$-$z^3G^o$ |
| 5208.52 | P | | 3.42 | 5.79 | 4-4 | (206) |
| 5193.486 | C | 35 | 3.41 | 5.78 | 3-3 | |
| •5237.35§ | B | 2 | 3.43 | 5.79 | 5-4 | |
| 5222.39 | B | 10 | 3.42 | 5.78 | 4-3 | |
| •5177.83 | B | 10 | 3.41 | 5.79 | 3-4 | |
| 5198.443 | C | 100• | 3.43 | 5.81 | 5-5 | $b^3G$-$y^3G^o$ |
| 5166.227 | C | 150 | 3.42 | 5.81 | 4-4 | (207) |
| 5139.654 | C | 100 | 3.41 | 5.81 | 3-3 | |
| 5196.57 | B | 100• | 3.43 | 5.81 | 5-4 | |
| 5167.96 | B | 30 | 3.42 | 5.81 | 4-3 | |
| 5137.94 | B | 12 | 3.41 | 5.81 | 3-4 | |
| 4046.29 | B | 40 | 3.43 | 5.98 | 5-6 | $b^3G$-$y^3H^o$ |
| 4851.465 | C | 25 | 3.42 | 5.96 | 4-5 | (208) |
| 4831.627 | C | 15 | 3.41 | 5.98 | 3-4 | |
| 4826.81 | B | 8 | 3.42 | 6.09 | 4-3 | $b^3G$-$x^3D^o$ (209) |
| 4602.51 | B | 7 | 3.43 | 6.12 | 5-5 | $b^3G$-$w^3G^o$ † |
| 4596.38 | B | 6 | 3.42 | 6.11 | 4-4 | (210) |
| 4585.72 | B | 3 | 3.43 | 8.13 | 5-5 | $b^3G$-$w^5G^o$ |
| 4560.28 | B | 1 | 3.41 | 6.11 | 3-3 | (211) |
| •4595.05 | B | 5w | 3.43 | 6.12 | 5-4 | |
| 4585.088 | C | 18 | 3.43 | 6.13 | 5-4 | $b^3G$-$x^3F^o$ |
| 4555.30 | B | 15 | 3.42 | 6.13 | 4-3? | (212) |
| 4532.75 | B | 10 | 3.41 | 6.13 | 3-2 | |
| 3983.237 | C | 7 | 3.43 | 6.53 | 5-6 | $b^3G$-$x^3H^o$ † |
| 3970.07 | B | 7 | 3.42 | 6.53 | 4-5 | (213) |
| •3941.15 | B | 3 | 3.41 | 6.54 | 3-4 | |
| 3808.829 | C | 10 | 3.43 | 6.68 | 5-5 | $b^3G$-$v^3G^o$ † |
| 3813.250 | C | 12 | 3.42 | 6.88 | 4-4 | (214) |
| 3814.822 | C | 12 | 3.41 | 6.64 | 3-3 | |
| 3736.45 | B | 4 | 3.43 | 6.74 | 5-4 | $b^3G$-$q^5F^o$ † (215) |
| 3693.09 | B | 5 | 3.43 | 6.78 | 5-6 | $b^3G$-$w^3H^o$ † |
| 3689.63 | B | 6 | 3.42 | 6.76 | 4-5 | (218) |
| 3863.87 | B | 4n | 3.41 | 8.78 | 3-4 | |
| 3695.86 | B | 5 | 3.43 | 8.77 | 5-6 | $b^3G$-$v^3H^o$ |
| 3871.94 | B | 1 | 3.42 | 6.78 | 4-5 | (217) |
| 3673.59 | B | 2 | 3.41 | 6.77 | 3-4 | |
| 3345.14 | B | 5 | 3.43 | 7.12 | 5-5 | $b^3G$-$t^3G^o$ † |
| 3345.36 | B | 4 | 3.42 | 7.11 | 4-4 | (218) |
| 3293.81 | B | 5 | 3.43 | 7.18 | 5-4 | $b^3G$-$u^3F^o$ |
| 3277.88 | B | 4 | 3.42 | 7.19 | 4-3 | (219) |
| 3270.70 | B | 3 | 3.41 | 7.18 | 3-2 | |
| 3229.304 | C | 10 | 3.43 | 7.26 | 5-6 | $b^3G$-$t^3H^o$ † |
| 3219.618 | D | 8 | 3.42 | 7.25 | 4-5 | (220) |
| 3211.309 | C | 8 | 3.41 | 7.25 | 3-4 | |
| 11157.03 | A | 25 | 3.45 | 4.55 | 4-3 | $y^7P^o$-$e^7S$ |
| 11015.63 | A | 30 | 3.43 | 4.55 | 3-3 | (221) |
| 11905.83 | A | 25 | 3.42 | 4.55 | 2-3 | |
| 8978.46 | B | 300 | 3.45 | 5.22 | 4-5 | $y^7P^o$-$e^7D$ |
| 8924.13 | C | 200 | 3.43 | 5.22 | 3-4 | (222) |
| 6881.64 | B | 100 | 3.42 | 5.22 | 2-3 | |
| 6979.82 | C | 150 | 3.45 | 5.22 | 4-4 | |
| 6925.24 | D | 150 | 3.43 | 5.22 | 3-3 | |
| 6883.48 | D | 75 | 3.42 | 5.22 | 2-2 | |
| 6980.91 | B | 50 | 3.45 | 5.22 | 4-3 | |
| 6926.04 | B | 100 | 3.43 | 5.22 | 3-2 | |
| 6883.04 | D | 150 | 3.42 | 5.22 | 2-1 | |
| 5609.19 | B | 35 | 3.43 | 5.63 | 3-3 | $y^7P^o$-$f^7S$ |
| 5580.51 | B | 25 | 3.42 | 5.63 | 2-3 | (223) |
| 5508.88 | P | | 3.43 | 5.67 | 3-2 | $y^7P^o$-$f^5S$ (224) |
| 5255.132 | C | 125 | 3.45 | 5.80 | 4-5 | $y^7P^o$-$f^7D$ |
| 5273.010 | C | 50 | 3.43 | 5.78 | 3-4 | (225) |
| 5287.188 | C | 40 | 3.42 | 5.76 | 2-3 | |
| 5304.211 | C | 40 | 3.45 | 5.78 | 4-4 | |
| 5312.878 | C | 50 | 3.43 | 5.76 | 3-3 | |
| 5318.775 | C | 40 | 3.42 | 5.74 | 2-2 | |
| m5345.81 | P | Cr | 3.45 | 5.76 | 4-3 | |
| 5344.761 | C | 20 | 3.43 | 5.74 | 3-2 | |
| 5340.437 | C | 35 | 3.42 | 5.73 | 2-1 | |
| 9730.32 | A | 25 | 3.54 | 4.80 | 3-3 | $a^3D$-$z^3D^o$ † |
| 9949.08 | A | 20 | 3.54 | 4.78 | 2-2 | (226) |
| 10080.32 | A | 15 | 3.54 | 4.76 | 1-1 | |
| 5738.554 | C | 30 | 3.54 | 5.69 | 3-4 | $a^3D$-$y^3F^o$ |
| 5772.676 | C | 25 | 3.54 | 5.68 | 2-3 | (227) |
| m5783.15 | P | Cr | 3.54 | 5.67 | 1-2 | |
| •5700.514 | C | 40 | 3.54 | 5.70 | 3-3 | $a^3D$-$y^3D^o$ |
| 5736.632 | C | 15 | 3.54 | 5.69 | 2-2 | (228) |
| m5748.32 | P | Cr | 3.54 | 5.69 | 1-1 | |
| 4835.68 | B | 10 | 3.54 | 6.09 | 3-3 | $a^3D$-$x^3D^o$ (229) |
| 4775.141 | C | 10 | 3.54 | 6.12 | 3-4? | $a^3D$-$w^5G^o$ † |
| 4797.69 | B | 15 | 3.54 | 6.11 | 2-3 | (230) |
| 4809.32 | B | 10 | 3.54 | 6.11 | 1-2 | |
| 4784.294 | C | 50 | 3.54 | 6.13 | 3-4 | $a^3D$-$x^3F^o$ |
| 4767.860 | C | 30 | 3.54 | 6.13 | 2-3 | (231) |
| 4766.83 | B | 35 | 3.54 | 6.13 | 1-2 | |
| 4757.591 | C | 18 | 3.54 | 6.13 | 3-3 | |
| 4767.260 | D | 25 | 3.54 | 8.13 | 2-2 | |
| 4731.14 | B | 8w | 3.54 | 6.15 | 3-3 | $a^3D$-$t^5P^o$ (232) |
| 4622.491 | C | 35 | 3.54 | 6.21 | 3-3 | $a^3D$-$w^3D^o$ |
| m4649.54 | P | Cr | 3.54 | 6.20 | 2-2 | (233) |
| 4665.902 | C | 35 | 3.54 | 6.19 | 1-1 | |
| 4413.866 | C | 40 | 3.54 | 6.33 | 3-2 | $a^3D$-$w^3P^o$ |
| 4430.486 | C | 30 | 3.54 | 6.33 | 2-1 | (234) |
| 4443.707 | C | 30 | 3.54 | 6.32 | 1-0 | |
| 4422.697 | C | 10 | 3.54 | 6.33 | 2-2 | |
| 4429.938 | C | 20 | 3.54 | 6.33 | 1-1 | |
| 3520.55 | B | 0 | 3.54 | 7.04 | 3-4 | $a^3D$-$u^3G^o$ (235) |
| 3385.31 | B | 8 | 3.54 | 7.18 | 3-4 | $a^3D$-$u^3F^o$ |
| 3386.50 | B | 5 | 3.54 | 7.19 | 2-3 | (236) |
| 3390.77 | B | 5 | 3.54 | 7.18 | 1-2 | |
| 3391.11 | B | 1 | 3.54 | 7.18 | 2-2 | |
| 5261.754 | C | 50 | 3.68 | 6.03 | 3-4 | $y^5P^o$-$f^5D$ † |
| 5240.468 | C | 60 | 3.65 | 6.01 | 2-3 | (237) |
| 5307.281 | C | 30 | 3.68 | 6.01 | 3-3 | |
| 3902.108 | C | 10 | 3.65 | 6.82 | 2-3 | $y^5P^o$-$e^3D$ (238) |
| 5698.330 | C | 100 | 3.86 | 6.03 | 5-4 | $z^5F^o$-$f^5D$ |
| 5694.730 | C | 75 | 3.84 | 6.01 | 4-3 | (239) |
| 5682.483 | C | 75 | 3.82 | 5.99 | 3-2 | |
| 5643.362 | C | 50 | 3.84 | 6.03 | 4-4 | |
| 5649.371 | C | 50 | 3.82 | 6.01 | 3-3 | |
| 5648.18 | F | (1) | 3.81 | 5.99 | 2-2 | |
| 5597.87 | B | 18 | 3.82 | 6.03 | 3-4 | |
| 5615.54 | P | | 3.81 | 6.01 | 2-3 | |
| 4275.973 | C | 15 | 3.86 | 6.75 | 5-5 | $z^5F^o$-$e^5F$ † |
| 4260.19 | B | 5w | 3.84 | 6.74 | 4-4 | (240) |
| 4291.964 | C | 15 | 3.86 | 6.74 | 5-4 | |
| •4269.02 | B· | 5w | 3.82 | 6.71 | 3-3 | |
| 4244.33 | B | 3w | 3.84 | 6.75 | 4-5 | |
| 4148.52 | B | 2 | 3.84 | 6.82 | 4-3 | $z^5F^o$-$e^3D$ † |
| 4163.94 | B | 2 | 3.82 | 6.79 | 3-2 | (241) |
| 4174.795 | C | 10 | 3.81 | 6.77 | 2-1? | |
| 6029.28 | B | 18 | 3.83 | 5.88 | 6-6 | $a^3I$-$z^3I^o$ |
| 6047.665 | D | 18 | 3.83 | 5.87 | 5-5 | (242) |
| 5746.432 | C | 25 | 3.83 | 5.98 | 7-6 | $a^3I$-$y^3H^o$ |
| 5791.781 | C | 20 | 3.83 | 5.98 | 6-5 | (243) |
| 5801.14 | B | 30 | 3.83 | 5.96 | 5-4 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Cr I** continued | | | | | | |
| •4621.963 | C | 45• | 3.83 | 6.50 | 7-7 | $a^3I$-$y^3I^\circ$ |
| 4625.925 | C | 20 | 3.83 | 6.50 | 6-6 | (244) |
| 4643.011 | C | 10 | 3.83 | 6.49 | 5-5 | |
| 4625.65 | B | 1 | 3.83 | 6.50 | 7-6 | |
| 4640.67 | B | 1 | 3.83 | 6.49 | 6-5 | |
| 4614.523 | C | 12 | 3.83 | 6.51 | 5-4 | $a^3I$-$i^1$ (245) |
| 4571.83 | B | 12 | 3.83 | 6.53 | 7-6 | $a^3I$-$x^3H^\circ$ |
| 4578.334 | C | 12 | 3.83 | 6.53 | 6-5 | (246) |
| 4563.245 | C | 15 | 3.83 | 6.54 | 5-4 | |
| •4572.16 | B | 7w | 3.83 | 6.53 | 6-6 | |
| 4579.59 | B | 2 | 3.83 | 6.53 | 5-5 | |
| 4573.38 | B | 1gn? | 3.83 | 6.53 | 5-6 | |
| 4263.141 | C | 35 | 3.83 | 6.73 | 7-8 | $a^3I$-$z^3K^\circ$ † |
| 4280.405 | C | 25 | 3.83 | 6.72 | 6-7 | (247) |
| 4297.738 | C | 30 | 3.83 | 6.71 | 5-6 | |
| 4193.662 | C | 40 | 3.83 | 6.78 | 7-6 | $a^3I$-$w^3H^\circ$ |
| 4209.368 | C | 20 | 3.83 | 6.76 | 6-5 | (248) |
| •4231.572 | C | 25 | 3.83 | 6.76 | 5-4 | |
| 4193.89 | B | 3 | 3.83 | 6.78 | 6-6 | |
| 4194.951 | C | 20 | 3.83 | 6.78 | 5-6 | |
| 4197.234 | C | 20 | 3.83 | 6.77 | 7-6 | $a^3I$-$v^3H^\circ$ |
| •4186.359 | C | 15 | 3.83 | 6.78 | 6-5 | (249) |
| 4208.357 | C | 15 | 3.83 | 6.77 | 5-4 | |
| 4197.47 | B | 2 | 3.83 | 6.77 | 6-6 | |
| 4198.525 | C | 35 | 3.83 | 6.77 | 5-6 | |
| 4179.05 | B | 7 | 3.83 | 6.79 | 7-7 | $a^3I$-$z^1K^\circ$ |
| •4179.257 | C | 30 | 3.83 | 6.79 | 6-7 | (250) |
| 4039.100 | C | 20 | 3.83 | 6.89 | 7-7 | $a^3I$-$x^3I^\circ$ |
| 4048.780 | C | 20 | 3.83 | 6.88 | 6-6 | (251) |
| 4058.772 | C | 20 | 3.83 | 6.87 | 5-5 | |
| 4048.56 | P | | 3.83 | 6.88 | 7-6 | |
| 4057.81 | B | 8 | 3.83 | 6.87 | 6-5 | |
| 4039.30 | B | 5 | 3.83 | 6.89 | 6-7 | |
| 4049.783 | C | 5 | 3.83 | 6.88 | 5-6 | |
| m3605.52 | P | Cr | 3.83 | 7.26 | 7-6 | $a^3I$-$t^3H^\circ$ |
| 3608.401 | C | 10 | 3.83 | 7.25 | 6-5 | (252) |
| 3613.609 | C | 4 | 3.83 | 7.25 | 5-4 | |
| 3458.090 | C | 10 | 3.83 | 7.40 | 7-7 | $a^3I$-$w^3I^\circ$ |
| •3467.022 | C | 12 | 3.83 | 7.39 | 6-6 | (253) |
| 3453.23 | B | 10 | 3.83 | 7.41 | 5-5 | |
| 3376.397 | C | 10 | 3.83 | 7.49 | 7-7 | $a^3I$-$v^3I^\circ$ |
| 3391.373 | C | 10 | 3.83 | 7.47 | 6-8 | (254) |
| 3403.59 | B | 8 | 3.83 | 7.46 | 5-5 | |
| 3316.503 | C | 5 | 3.83 | 7.55 | 7-6 | $a^3I$-$s^3H^\circ$ |
| 3336.97 | B | 4 | 3.83 | 7.53 | 6-5 | (255) |
| 3353.026 | C | 6 | 3.83 | 7.51 | 5-4 | |
| 6643.023 | C | 15 | 3.83 | 5.69 | 3-4 | $b^3D$-$y^3F^\circ$ |
| 6677.24 | B | 10 | 3.83 | 5.68 | 2-3 | (256) |
| 6701.64 | B | 10 | 3.83 | 5.67 | 1-2 | |
| 5729.203 | C | 20 | 3.83 | 5.98 | 3-2 | $b^3D$-$x^3P^\circ$ |
| 5777.77 | B | 25 | 3.83 | 5.97 | 2-1 | (257) |
| 5371.48 | B | 50 | 3.83 | 6.13 | 3-4 | $b^3D$-$x^3F^\circ$ |
| 5368.546 | C | 35 | 3.83 | 6.13 | 2-3 | (258) |
| •5373.715 | C | 30 | 3.83 | 6.13 | 1-2 | |
| 5362.98 | B | 25 | 3.83 | 6.13 | 3-3 | |
| 5367.78 | B | 10 | 3.83 | 6.13 | 2-2 | |
| 4930.183 | C | 30 | 3.83 | 6.33 | 3-2 | $b^3D$-$w^3P^\circ$ |
| 4944.59 | B | 22 | 3.83 | 6.33 | 2-1 | (259) |
| 4966.80 | B | 25 | 3.83 | 6.32 | 1-0 | |
| 4934.89 | B | 15 | 3.83 | 6.33 | 2-2 | |
| 4949.58 | B | 12 | 3.83 | 6.33 | 1-1 | |
| 4146.20 | B | 6 | 3.83 | 6.80 | 3-4 | $b^3D$-$v^3F^\circ$ |
| 4109.98 | B | 1 | 3.83 | 6.83 | 2-3 | (260) |
| 4093.06 | B | 4 | 3.83 | 6.85 | 1-2 | |
| 4106.71 | B | 0 | 3.83 | 6.83 | 3-3 | |
| 4089.63 | B | 2 | 3.83 | 6.85 | 2-2 | |
| 4131.360 | C | 10 | 3.83 | 6.82 | 3-4 | $b^3D$-$w^3F^\circ$ |
| 4152.775 | C | 10 | 3.83 | 6.80 | 2-3 | (261) |
| 4175.227 | C | 8 | 3.83 | 8.79 | 1-2 | |
| 4149.45 | B | 5 | 3.83 | 6.80 | 3-3 | |
| 4171.675 | C | 12 | 3.83 | 8.79 | 2-2 | |
| 4168.31 | B | 2 | 3.83 | 6.79 | 3-2 | |
| 3907.778 | C | 7 | 3.83 | 6.99 | 3-2 | $b^3D$-$v^3P^\circ$ |
| 3890.82 | B | 4 | 3.83 | 7.00 | 2-1 | (262) |
| 3510.40 | B | 5 | 3.83 | 7.34 | 3-4 | $b^3D$-$t^3F^\circ$ |
| 3521.53 | B | 3 | 3.83 | 7.34 | 2-3 | (263) |
| 3531.44 | B | 4 | 3.83 | 7.33 | 1-2 | |
| 7185.50 | B | 20 | 3.88 | 5.59 | 5-5 | $a^5F$-$x^5F^\circ$ † |
| 7188.06 | B | 18 | 3.87 | 5.59 | 4-4 | (264) |
| 7198.83 | B | 18 | 3.87 | 5.59 | 3-3 | |
| 7207.85 | B | 10 | 3.87 | 5.58 | 2-2 | |
| 7218.57 | B | 9 | 3.87 | 5.58 | 1-1 | |
| 8528.197 | D | 18 | 3.88 | 5.77 | 5-5 | $a^5F$-$w^5F^\circ$ |
| 8518.028 | D | 12 | 3.87 | 5.77 | 4-4 | (265) |
| m4836.18 | P | Cr+ | 3.88 | 6.43 | 5-4 | $a^5F$-$t^5D^\circ$ |
| 4840.22 | F | (1) | 3.87 | 6.43 | 4-3 | (266) |
| 4841.52 | P | | 3.87 | 6.42 | 3-2 | |
| 4841.73 | B | 12 | 3.87 | 6.42 | 1-0† | |
| 4838.54 | P | | 3.87 | 6.43 | 4-4 | |
| 4485.15 | B | 20 | 3.88 | 6.84 | 5-4 | $a^5F$-$s^5D^\circ$ † |
| 4490.58 | B | 8w | 3.87 | 6.82 | 4-3 | (267) |
| 4507.95 | B | 4N | 3.87 | 6.61 | 3-2 | |
| 3989.986 | C | 15 | 3.88 | 6.97 | 5-8 | $a^5F$-$v^5G^\circ$ † |
| 4001.444 | C | 25 | 3.87 | 6.96 | 4-5 | (268) |
| •4012.49 § | B | 20 | 3.87 | 6.95 | 3-4 | |
| 4022.263 | C | 18 | 3.87 | 6.94 | 2-3 | |
| 4031.130 | D | 7 | 3.87 | 6.93 | 1-2 | |
| 4003.931 | D | 7 | 3.88 | 6.96 | 5-5 | |
| 4014.668 | C | 10 | 3.87 | 6.95 | 4-4 | |
| 4023.739 | C | 8 | 3.87 | 6.94 | 3-3 | |
| 3716.531 | C | 10w | 3.88 | 7.20 | 5-4 | $a^5F$-$r^5D^\circ$ † |
| 3714.39 | B | 4w | 3.87 | 7.20 | 4-4 | (269) |
| 3712.50 | B | 1w | 3.87 | 7.20 | 3-4 | |
| 4481.44 | B | 18 | 3.96 | 6.72 | 6-7 | $a^1I$-$z^3K^\circ$ † (270) |
| 4268.798 | C | 10 | 3.96 | 6.85 | 6-6 | $a^1I$-$z^1I^\circ$ (271) |
| 4204.471 | C | 12 | 3.96 | 6.90 | 6-5 | $a^1I$-$u^3H^\circ$ (272) |
| 4192.103 | C | 15 | 3.98 | 6.91 | 6-5 | $a^1I$-$z^1H^\circ$ (273) |
| 3527.08 | B | 3N | 3.96 | 7.46 | 6-6 | $a^1I$-$y^1I^\circ$ (274) |
| •4542.621 | C | 35 | 4.09 | 6.80 | 4-4 | $b^3F$-$v^3F^\circ$ |
| 4495.275 | C | 12 | 4.09 | 6.83 | 4-3 | (275) |
| 4531.82 | B | 2 | 4.08 | 6.80 | 3-4 | |
| 4524.841 | C | 15 | 4.09 | 6.83 | 4-4 | $b^3F$-$w^3F^\circ$ † |
| •4535.731 | C | 60 | 4.08 | 6.80 | 3-3 | (276) |
| 4553.949 | C | 18 | 4.08 | 8.79 | 2-2 | |
| •4531.141 | C | 25 | 4.08 | 6.81 | 2-2 | $b^3F$-$v^3D^\circ$ |
| 4561.54 | B | 10w | 4.08 | 6.78 | 2-1 | (277) |
| 4169.838 | C | 1 | 4.09 | 7.05 | 4-5 | $b^3F$-$u^3G^\circ$ † |
| 4170.202 | C | 15 | 4.08 | 7.04 | 3-4 | (278) |
| 4174.941 | C | 8 | 4.08 | 7.03 | 2-3 | |
| 4065.716 | C | 12 | 4.09 | 7.12 | 4-5 | $b^3F$-$t^3G^\circ$ |
| 4076.061 | C | 10 | 4.08 | 7.11 | 3-4 | (279) |
| 4077.677 | C | 10 | 4.08 | 7.11 | 2-3 | |
| 3990.16 | B | 8 | 4.09 | 7.18 | 4-4 | $b^3F$-$u^3F^\circ$ † |
| 3978.30 | B | 5 | 4.08 | 7.19 | 3-3 | (280) |
| 3979.324 | C | 7 | 4.08 | 7.18 | 2-2 | |
| 3564.30 | B | 7 | 4.09 | 7.55 | 4-5 | $b^3F$-$s^3G^\circ$ |
| 3562.48 | B | 4 | 4.08 | 7.55 | 3-4 | (281) |
| •3565.55 | B | 2 | 4.08 | 7.54 | 2-3 | |
| 3569.14 | B | 5 | 4.09 | 7.55 | 4-4 | |
| 6661.076 | C | 50 | 4.17 | 6.03 | 4-4 | $z^5D^\circ$-$f^5D$ |
| 6669.257 | C | 40 | 4.18 | 6.01 | 3-3 | (282) |
| 6657.54 | B | 20w | 4.14 | 5.99 | 2-2 | |
| 6734.16 | B | 30 | 4.17 | 6.01 | 4-3 | |
| 6715.38 | B | 35 | 4.16 | 5.99 | 3-2 | |
| 6880.19 | B | 25w | 4.14 | 5.99 | 2-1 | |
| 6597.556 | C | 40 | 4.16 | 6.03 | 3-4 | |
| 6613.17 | B | 40 | 4.14 | 6.01 | 2-3 | |
| 4796.169 | 0 | 40w | 4.17 | 6.75 | 4-5 | $z^5D^\circ$-$e^5F$ † |
| 4783.06 | B | 15w | 4.16 | 6.74 | 3-4 | (283) |
| 4775.53 | B | 10w | 4.14 | 6.73 | 2-3 | |
| •4789.80 | B | 4w | 4.13 / 4.12 | 6.71 / 6.70 | 1-2 / 0-1 | |
| 4816.41 | B | 10w | 4.17 | 6.74 | 4-4 | |
| 4805.24 | B | 15w | 4.16 | 6.73 | 3-3 | |
| 4796.84 | B | 12w | 4.14 | 6.71 | 2-2 | |
| 3566.10 | B | 25n | 4.17 | 7.64 | 4-3 | $z^5D^\circ$-$f^5P$ |
| 3568.38 | B | 3w | 4.16 | 7.62 | 3-2 | (284) |
| 5385.38 | B | 7 | 4.17 | 6.50 | 6-7 | $b^1I$-$y^3I^\circ$ |
| 5309.47 | B | 8 | 4.17 | 6.49 | 6-5 | (285) |
| 4595.590 | C | 45 | 4.17 | 6.85 | 6-8 | $b^1I$-$z^1I^\circ$ (286) |
| 4514.373 | C | 20 | 4.17 | 6.90 | 6-6 | $b^1I$-$u^3H^\circ$ |
| •4521.141 | C | 25 | 4.17 | 6.90 | 6-5 | (287) |
| 4508.853 | C | 30 | 4.17 | 6.91 | 6-5 | $b^1I$-$z^1H^\circ$ (288) |
| 3747.384 | C | 7 | 4.17 | 7.46 | 6-6 | $b^1I$-$y^1I^\circ$ (289) |
| 4757.328 | C | 15 | 4.22 | 6.82 | 2-3 | $z^3P^\circ$-$e^3D$ † |
| 4743.112 | C | 12w | 4.18 | 6.79 | 1-2 | (290) |
| •4751.04 | B | 5w | 4.17 | 6.77 | 0-1 | |
| 8167.94 | A | 4 | 4.19 | 5.70 | 3-3 | $o^3D$-$y^3D^\circ$ (291) |
| 4699.589 | C | 25 | 4.19 | 6.82 | 3-4 | $o^3D$-$w^3F^\circ$ † |
| 4723.18 | B | 8 | 4.19 | 6.80 | 2-3 | (292) |
| 4741.089 | D | 12 | 4.19 | 6.79 | 1-2 | |
| 4488.051 | C | 30 | 4.19 | 6.94 | 3-3 | $c^3D$-$v^5G^\circ$ (293) |
| 4232.223 | C | 15 | 4.19 | 7.11 | 2-3 | $c^3D$-$t^3G^\circ$ (294) |
| 4000.59 | B | 4 | 4.19 | 7.27 | 3-2 | $c^3D$-$t^3P^\circ$ (295) |
| 8707.95 | A | 12 | 4.37 | 5.79 | 4-3 | $o^5D$-$u^5P^\circ$ † |
| 8718.70 | A | 8 | 4.38 | 5.80 | 3-2 | (296) |
| 8732.17 | A | 3 | 4.39 | 5.80 | 2-1 | |
| 8788.98 | A | 4 | 4.38 | 5.79 | 3-3 | |
| 8773.56 | A | 5 | 4.39 | 5.80 | 2-2 | |
| 8297.58 | A | 3 | 4.39 | 5.88 | 2-3 | $o^5D$-$x^5H^\circ$ (297) |
| 8183.22 | A | 35 | 4.37 | 5.88 | 4-5 | $o^5D$-$v^5F^\circ$ |
| 8235.89 | A | 30 | 4.38 | 5.88 | 3-4 | (298) |
| 8287.38 | A | 25 | 4.39 | 5.88 | 2-3 | |
| 8323.06 | A | 20 | 4.40 | 5.88 | 1-2 | |
| 8338.83 | A | 5 | 4.40 | 5.88 | 0-1 | |
| •8166.66 | A | 7 | 4.37 | 5.88 | 4-4 | |
| 8238.29 | A | 12 | 4.38 | 5.88 | 3-3 | |
| 8290.62 | A | 10 | 4.39 | 5.88 | 2-2 | |
| 8323.44 | A | 5 | 4.40 | 5.88 | 1-1 | |
| 8018.04 | A | 3 | 4.37 | 5.91 | 4-4 | $c^5D$-$v^5D^\circ$ † |
| 8119.13 | A | 3 | 4.38 | 5.90 | 3-3 | (299) |
| 8185.69 | A | 5 | 4.39 | 5.90 | 2-2 | |
| 8225.67 | A | 3 | 4.40 | 5.90 | 1-1 | |
| 8084.98 | A | 10 | 4.38 | 5.91 | 3-4 | |
| •8166.68 | A | 7 | 4.39 | 5.90 | 2-3 | |
| 8216.28 | A | 5 | 4.40 | 5.90 | 1-2 | |
| 7942.03 | A | 25 | 4.37 | 5.92 | 4-5 | $o^5D$-$u^5F^\circ$ † |
| 7989.38 | A | 12 | 4.38 | 5.93 | 3-4 | (300) |
| 8061.27 | A | 10 | 4.39 | 5.92 | 2-3 | |
| 8128.28 | A | 8 | 4.40 | 5.92 | 1-2 | |
| 8169.80 | A | 5 | 4.40 | 5.91 | 0-1 | |
| 6729.72 | B | 40 | 4.37 | 6.20 | 4-5 | $o^5D$-$t^5F^\circ$ (301) |
| •5373.715 | C | 30 | 4.44 | 6.73 | 6-5 | $b^3H$-$r^5F^\circ$ |
| •5391.350 | C | 35 | 4.43 | 6.72 | 5-4 | (302) |
| 4592.54 | B | 15 | 4.44 | 7.13 | 6-5 | $b^3H$-$t^3G^\circ$ † |
| 4606.375 | C | 15 | 4.43 | 7.11 | 5-4 | (303) |
| 4609.894 | C | 8 | 4.43 | 7.11 | 4-3 | |
| 4376.798 | C | 25 | 4.44 | 7.26 | 6-6 | $b^3H$-$t^3H^\circ$ † |
| m4371.28 | P | Cr | 4.43 | 7.25 | 5-5 | (304) |
| 4373.656 | C | 15 | 4.43 | 7.25 | 4-4 | |
| 4161.415 | C | 15 | 4.44 | 7.40 | 6-7 | $b^3H$-$w^3I^\circ$ |
| 4165.519 | C | 15 | 4.43 | 7.39 | 5-6 | (305) |
| 4142.193 | C | 7 | 4.43 | 7.41 | 4-5 | |
| 4174.15 | B | 3 | 4.44 | 7.39 | 6-6 | |
| 4043.696 | C | 7 | 4.44 | 7.49 | 6-7 | $b^3H$-$v^3I^\circ$ † |
| 4056.793 | C | 5 | 4.43 | 7.47 | 5-6 | (306) |
| 4071.000 | C | 5 | 4.43 | 7.48 | 4-5 | |
| 3958.08 | B | 5 | 4.44 | 7.55 | 6-6 | $b^3H$-$s^3H^\circ$ |
| 3979.23 | B | 6 | 4.43 | 7.53 | 5-5? | (307) |
| 3998.85 | B | 4 | 4.43 | 7.51 | 4-4 | |
| 3562.29 | B | 5 | 4.44 | 7.90 | 6-6 | $b^3H$-$q^3H^\circ$ |
| 3564.953 | C | 5 | 4.43 | 7.89 | 5-5 | (308) |
| •3574.039 | C | 15 | 4.43 | 7.88 | 4-4 | |
| 5263.750 | D | 40 | 4.47 | 6.82 | 4-3 | $z^3F^\circ$-$e^3D$ |
| 5278.262 | C | 40 | 4.45 | 6.79 | 3-2 | (309) |
| 5287.62 | B | 10w | 4.43 | 6.77 | 2-1 | |
| 4503.05 | B | 12 | 4.68 | 7.42 | 2-1 | $e^5S$-$x^3G^\circ$ (310) |
| 4656.837 | D | 10 | 4.76 | 7.41 | 3-5 | $a^1H$-$w^3I^\circ$ (311) |
| 4564.166 | C | 40 | 4.76 | 7.46 | 5-6 | $a^1H$-$y^1I^\circ$ (312) |
| 3926.649 | C | 10 | 4.76 | 7.90 | 5-6 | $a^1H$-$q^3H^\circ$ (313) |
| 6135.759 | C | 25 | 4.80 | 6.82 | 3-3 | $z^3D^\circ$-$e^3D$ (314) |
| •6762.41 | C | 40 | 5.26 | 7.08 | 6-6 | $z^5G^\circ$-$e^5G$ † |
| 6757.78 | B | 25 | 5.26 | 7.08 | 5-5 | (315) |
| 6751.28 | B | 40 | 5.25 | 7.08 | 4-4 | |
| 6744.66 | B | 15 | 5.25 | 7.08 | 3-3 | |
| 6738.81 | B | 18 | 5.25 | 7.08 | 2-2 | |
| 7908.30 | A | 20 | 5.60 | 7.16 | 6-5 | $z^3H^\circ$-$e^3G$ |
| 7910.50 | A | 18 | 5.60 | 7.16 | 5-4 | (318) |
| 7917.85 | A | 18 | 5.60 | 7.16 | 4-3 | |

**Strongest Unclassified Lines of Cr I**

| | | | |
|---|---|---|---|
| 7771.74 | A | 15 | |
| 6789.17 | C | 18 | |
| 5854.27 | B | 75 | |
| 5796.757 | C | 40 | |
| 5753.693 | C | 25 | V |
| 5712.635 | C | 10 | V |
| 5681.198 | C | 60 | V |
| 5385.28 | B | 20v | |
| 5370.356 | C | 40 | |
| 5078.711 | C | 40 | |
| 4884.949 | C | 25 | IIIA |
| 4752.084 | C | 50 | IV |
| 4614.73 | B | 10 | |
| 4611.968 | C | 15 | |
| 4594.403 | C | 8 | |
| 4588.99 | B | 8 | |
| 4489.471 | C | 5w | IV |
| 4403.498 | C | 40 | IV |
| 4323.523 | C | 30 | IV |
| 4301.178 | C | 25 | IV |
| 4281.615 | C | 12 | IV |
| 4206.899 | C | 10 | V |
| 4200.103 | 0 | 12 | III |
| 4126.925 | C | 8 | III |
| 3999.679 | C | 7 | |

| Laboratory I | A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|---|
| **Cr I** continued | | | | | | | |
| 3911.95 | B | | (10n)• | (III | | | |
| | | | | III | | | |
| 3830.032 | C | | 50w | V | | | |
| 3584.366 | D | | 30w | V | | | |
| 3574.38 | B | | 3N | III | | | |
| 3559.21 | C | | 2N | IV† | | | |
| 3558.60 | B | | 7w | III | | | |
| 3552.953 | C | | 4w | IV | | | |
| 3550.635 | C | | 10w | V | | | |
| 3547.98 | B | | 3n | III | | | |
| 3532.868 | C | | 5 | V | | | |
| 3525.44 | B | | 4N | IV | | | |
| 3508.81 | B | | 5n | III | | | |
| 3508.09 | B | | 5 | III | | | |
| 3474.379 | C | | 12 | III | | | |
| 3411.01 | B | | 8n | IV | | | |
| 3409.36 | B | | 7n | IV | | | |
| 3408.01 | B | | 4n | IV | | | |
| 3407.22 | B | | 5n | IV | | | |
| 3376.18 | E | | 3n | V | | | |
| 3349.072 | C | | 20w | III | | | |
| 3346.09 | E | | 5w | III | | | |
| 3334.690 | C | | 20w | III | | | |
| 3333.605 | C | | 15w | III | | | |
| 3287.70 | B | | 2N | V | | | |
| 3254.95 | B | | 2N | V | | | |
| •3180.701§ | C | | ? | III | | | |
| 3096.531 | C | | 5w | III | | | |
| 3095.859 | C | | 7w | III | | | |
| 2963.73 | B | | 3w | III | | | |
| 2957.28 | B | | 3w | V | | | |

**Cr II** I P 16.6 Anal B List A April 1941

| | | | | | | |
|---|---|---|---|---|---|---|
| 3643.22 | A | 10 | 2.47 | 5.86 | 3½-4½ | a⁴D-z⁶F° |
| 3644.70 | A | 10 | 2.44 | 5.83 | 2½-3½ | (1) |
| 3647.40 | A | 8 | 2.42 | 5.81 | 1½-2½ | |
| 3651.68 | A | 12 | 2.41 | 5.79 | ½-1½ | |
| 3675.00 | P | | 2.47 | 5.83 | 3½-3½ | |
| 3669.69 | P | | 2.44 | 5.81 | 2½-2½ | |
| 3665.48 | P | | 2.42 | 5.79 | 1½-1½ | |
| 3662.62 | P | | 2.41 | 5.78 | ½- ½ | |
| 3700.42 | P | | 2.47 | 5.81 | 3½-2½ | |
| 3688.01 | P | | 2.44 | 5.79 | 2½-1½ | |
| 3676.50 | P | | 2.42 | 5.78 | 1½- ½ | |
| 3494.52 | A | 4 | 2.47 | 6.00 | 3½-3½ | a⁴D-z⁶P° |
| 3484.15 | A | 20 | 2.44 | 5.99 | 2½-2½ | (2) |
| •3475.13 § | A | 20 | 2.42 | 5.97 | 1½-1½ | |
| 3511.84 | A | 35 | 2.47 | 5.99 | 3½-2½ | |
| 3495.37 | A | 25 | 2.44 | 5.97 | 2½-1½ | |
| 3467.09 | P | | 2.44 | 6.00 | 2½-3½ | |
| 3464.02 | A | 4 | 2.42 | 5.99 | 1½-2½ | |
| 3462.73 | A | 6 | 2.41 | 5.97 | ½-1½ | |
| 3406.765 | B | 150 | 2.47 | 6.09 | 3½-2½ | a⁴D-z⁴P° |
| 3428.739 | B | 125 | 2.44 | 6.05 | 2½-1½ | (3) |
| 3433.30 | A | 75 | 2.42 | 6.02 | 1½- ½ | |
| 3382.683 | B | 60 | 2.44 | 6.09 | 2½-2½ | |
| 3403.328 | B | 100 | 2.42 | 6.05 | 1½-1½ | |
| 3421.20 | A | 75 | 2.41 | 6.02 | ½- ½ | |
| 3363.71 | A | 12 | 2.42 | 6.09 | 1½-2½ | |
| 3391.434 | B | 35 | 2.41 | 6.05 | ½-1½ | |
| 3353.12 | A | 20 | 2.47 | 6.15 | 3½-4½ | a⁴D-z⁶D° |
| •3349.34 § | A | 6 | 2.44 | 6.13 | 2½-3½ | (4) |
| 3324.060 | B | 25 | 2.42 | 6.14 | 1½-2½ | |
| 3328.351 | B | 20 | 2.41 | 6.12 | ½-1½ | |
| 3374.95 | A | 3 | 2.47 | 6.13 | 3½-3½? | |
| 3342.51 | A | 50 | 2.44 | 6.14 | 2½-2½ | |
| 3339.804 | B | 50 | 2.42 | 6.13 | 1½-1½ | |
| 3336.330 | B | 40 | 2.41 | 6.11 | ½- ½ | |
| 3368.054 | B | 150 | 2.47 | 6.14 | 3½-2½ | |
| 3358.501 | B | 75 | 2.44 | 6.12 | 2½-1½ | |
| 3347.837 | B | 40 | 2.42 | 6.11 | 1½- ½ | |
| 3132.058 | B | 125 | 2.47 | 6.41 | 3½-4½ | a⁴D-z⁴F° |
| 3124.978 | B | 100 | 2.44 | 6.39 | 2½-3½ | (5) |
| 3120.371 | B | 75 | 2.42 | 6.38 | 1½-2½ | |
| 3118.652 | B | 60 | 2.41 | 6.37 | ½-1½ | |
| 3147.227 | B | 50 | 2.47 | 6.39 | 3½-3½ | |
| 3136.680 | B | 40 | 2.44 | 6.38 | 2½-2½ | |
| 3128.699 | B | 40 | 2.42 | 6.37 | 1½-1½ | |
| 3159.10 | A | 5 | 2.47 | 6.36 | 3½-2½ | |
| 3145.10 | A | 10 | 2.44 | 6.37 | 2½-1½ | |
| 3670.16 | P | | 2.53 | 5.89 | 5½-5½ | a⁴G-z⁶F° |
| 3710.22 | P | | 2.53 | 5.86 | 4½-4½ | (6) |
| 3742.99 | P | | 2.53 | 5.83 | 3½-3½ | |
| 3768.57 | P | | 2.53 | 5.81 | 2½-2½ | |
| 3709.25 | P | | 2.53 | 5.86 | 5½-4½ | |
| 3743.20 | P | | 2.53 | 5.63 | 4½-3½ | |
| 3769.37 | P | | 2.53 | 5.81 | 3½-2½ | |
| 3787.89 | P | | 2.53 | 5.79 | 2½-1½ | |
| 3671.12 | P | | 2.53 | 5.69 | 4½-5½ | |
| 3710.01 | P | | 2.53 | 5.66 | 3½-4½ | |
| 3762.20 | P | | 2.53 | 5.83 | 2½-3½ | |
| 3556.130 | B | (1) | 2.53 | 6.00 | 4½-3½ | a⁴G-z⁶P° |
| | | | | | | (7) |
| 3408.96 | P | | 2.53 | 6.15 | 5½-4½ | a⁴G-z⁶D° |
| 3432.32 | A | 2 | 2.53 | 6.13 | 4½-3½ | (8) |
| 3425.09 | P | | 2.53 | 6.14 | 3½-2½ | |
| 3441.14 | P | | 2.53 | 6.12 | 2½-1½ | |
| 3409.79 | P | | 2.53 | 6.15 | 4½-4½ | |
| 3432.12 | P | | 2.53 | 6.13 | 3½-3½ | |
| 3434.43 | P | | 2.53 | 6.14 | 2½-2½ | |
| 3409.60 | P | | 2.53 | 6.15 | 3½-4½ | |
| 3431.45 | P | | 2.53 | 6.13 | 2½-3½ | |

| Laboratory I | A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|---|
| **Cr II** continued | | | | | | | |
| •3180.73 § | A | | 75 | 2.53 | 6.41 | 5½-4½ | a⁴G-z⁴F° |
| 3197.12 | A | | 75 | 2.53 | 6.39 | 4½-3½ | (9) |
| 3209.21 | A | | 50 | 2.53 | 6.38 | 3½-2½ | |
| 3217.44 | A | | 50 | 2.53 | 6.37 | 2½-1½ | |
| 3181.428 | B | | 20 | 2.53 | 6.41 | 4½-4½ | |
| 3196.96 | A | | 20 | 2.53 | 6.39 | 3½-3½ | |
| 3208.62 | A | | 20 | 2.53 | 6.38 | 2½-2½ | |
| •3196.40 | A | | 3 | 2.53 | 6.39 | 2½-3½ | |
| 3935.18 | P | | | 2.69 | 5.83 | 2½-3½ | a⁴P-z⁶F° |
| 3964.64 | P | | | 2.69 | 5.81 | 1½-2½ | (10) |
| 3985.96 | P | | | 2.69 | 5.79 | ½-1½ | |
| 3964.35 | P | | | 2.69 | 5.81 | 2½-2½ | |
| 3986.03 | P | | | 2.69 | 5.79 | 1½-1½ | |
| 3999.00 | P | | | 2.69 | 5.78 | ½- ½ | |
| 3985.74 | P | | | 2.69 | 5.79 | 2½-1½ | |
| 3999.07 | P | | | 2.69 | 5.78 | 1½- ½ | |
| 3748.68 | A | | 7 | 2.69 | 5.99 | 2½-2½ | a⁴P-z⁶P° |
| •3761.90 | A | | 8 | 2.69 | 5.97 | 1½-1½ | (11) |
| 3761.69 | A | | 7 | 2.69 | 5.97 | 2½-1½ | |
| •3761.90 | A | | 8 | 2.69 | 5.97 | ½-1½ | |
| 3631.49 | A | | 50 | 2.69 | 6.09 | 2½-2½ | a⁴P-z⁴P° |
| 3677.93 | A | | 30 | 2.69 | 6.05 | 1½-1½ | (12) |
| 3712.97 | A | | 35 | 2.69 | 6.02 | ½- ½ | |
| 3677.69 | A | | 40 | 2.69 | 6.05 | 2½-1½ | |
| 3713.04 | A | | 15 | 2.69 | 6.02 | 1½- ½ | |
| 3631.72 | A | | 40 | 2.69 | 6.09 | 1½-2½ | |
| 3677.86 | A | | 50 | 2.69 | 6.05 | ½-1½ | |
| 3593.02 | P | | | 2.69 | 6.13 | 2½-3½ | a⁴P-z⁶P° |
| 3585.54 | A | | 40 | 2.69 | 6.14 | 1½-2½ | (13) |
| 3603.80 | A | | 40 | 2.69 | 6.12 | ½-1½ | |
| 3585.31 | A | | 60 | 2.69 | 6.14 | 2½-2½ | |
| 3803.86 | A | | 20 | 2.69 | 6.12 | 1½-1½ | |
| 3613.21 | A | | 20 | 2.69 | 6.11 | ½- ½ | |
| 3603.61 | A | | 20 | 2.69 | 6.12 | 2½-1½ | |
| 3613.26 | A | | 15 | 2.69 | 6.11 | 1½- ½ | |
| 3336.16 | A | | 3 | 2.69 | 6.39 | 2½-3½ | a⁴P-z⁴F° |
| 3349.68 | P | | | 2.69 | 6.38 | 1½-2½ | (14) |
| 3032.927 | B | | 30 | 2.69 | 6.76 | 2½-3½ | a⁴P-z⁴D° |
| 3047.76 | A | | 25 | 2.69 | 6.74 | 1½-2½ | (15) |
| •3059.521 | B | | 25 | 2.69 | 6.73 | ½-1½ | |
| 3047.63 | A | | 20 | 2.69 | 6.74 | 2½-2½ | |
| •3059.521 | B | | 25 | 2.69 | 6.73 | 1½-1½ | |
| 3067.18 | A | | 20 | 2.69 | 6.72 | ½- ½ | |
| 3059.41 | A | | 10 | 2.69 | 6.73 | 2½-1½ | |
| m3067.23 | P | | Cr+ | 2.69 | 6.72 | 1½- ½ | |
| 4458.84 | P | | | 3.09 | 5.86 | 3½-4½ | b⁴D-z⁶F° |
| 4507.19 | P | | | 3.09 | 5.83 | 2½-3½ | (16) |
| 4544.70 | P | | | 3.09 | 5.61 | 1½-2½ | |
| 4571.24 | P | | | 3.09 | 5.79 | ½-1½ | |
| 4504.52 | P | | | 3.09 | 5.83 | 3½-3½ | |
| 4545.49 | P | | | 3.09 | 5.81 | 2½-2½ | |
| 4572.83 | P | | | 3.09 | 5.79 | 1½-1½ | |
| 4588.40 | P | | | 3.09 | 5.78 | ½- ½ | |
| 4542.77 | P | | | 3.09 | 5.81 | 3½-2½ | |
| 4573.63 | P | | | 3.09 | 5.79 | 2½-1½ | |
| 4590.00 | P | | | 3.09 | 5.76 | 1½- ½ | |
| 4236.33 | P | | | 3.09 | 6.00 | 3½-3½ | b⁴D-z⁶P° |
| 4264.19 | P | | | 3.09 | 5.99 | 2½-2½ | (17) |
| 4280.33 | P | | | 3.09 | 5.97 | 1½-1½ | |
| 4261.80 | P | | | 3.09 | 5.98 | 3½-2½ | |
| 4281.03 | P | | | 3.09 | 5.97 | 2½-1½ | |
| 4238.69 | P | | | 3.09 | 6.00 | 2½-3½ | |
| 4263.49 | P | | | 3.09 | 5.99 | 1½-2½ | |
| 4278.94 | P | | | 3.09 | 5.97 | ½-1½ | |
| •4111.01 | A | | 18 | 3.09 | 6.09 | 3½-2½ | b⁴D-z⁴P° |
| 4172.60 | A | | 2 | 3.09 | 6.05 | 2½-1½ | (18) |
| 4217.07 | A | | 1 | 3.09 | 6.02 | 1½- ½ | |
| 4113.24 | A | | 5 | 3.09 | 6.09 | 3½-2½ | |
| 4171.92 | A | | 3 | 3.09 | 6.05 | 1½-1½ | |
| 4215.77 | A | | 2 | 3.09 | 6.02 | ½- ½ | |
| 4112.59 | A | | 1 | 3.09 | 6.09 | 1½-2½ | |
| 4170.58 | P | | | 3.09 | 6.05 | ½-1½ | |
| 4030.28 | P | | | 3.09 | 6.15 | 3½-4½ | b⁴D-z⁶D° |
| 4063.94 | P | | | 3.09 | 6.13 | 2½-3½ | (19) |
| 4053.45 | A | | 1 | 3.09 | 6.14 | 1½-2½ | |
| 4075.63 | P | | | 3.09 | 8.12 | ½-1½ | |
| 4061.77 | P | | | 3.09 | 8.13 | 3½-3½ | |
| 4054.11 | A | | 6 | 3.09 | 6.14 | 2½-2½ | |
| 4076.87 | A | | 3 | 3.09 | 6.12 | 1½-1½ | |
| 4067.63 | A | | 2 | 3.09 | 6.11 | ½- ½ | |
| 4051.97 | A | | 12 | 3.09 | 6.14 | 3½-2½ | |
| 4077.50 | A | | 4 | 3.09 | 8.12 | 2½-1½ | |
| 4088.90 | A | | 1 | 3.09 | 6.11 | 1½- ½ | |
| 3715.19 | A | | 20 | 3.09 | 6.41 | 3½-4½ | b⁴D-z⁴F° |
| 3738.38 | A | | 25 | 3.09 | 6.39 | 2½-3½ | (20) |
| 3754.59 | A | | 20 | 3.09 | 6.38 | 1½-2½ | |
| 3765.62 | A | | 6 | 3.09 | 6.37 | ½-1½ | |
| 3736.56 | A | | 1 | 3.09 | 6.39 | 3½-3½ | |
| 3755.13 | A | | 2 | 3.09 | 6.38 | 2½-2½ | |
| 3766.65 | A | | 4 | 3.09 | 6.37 | 1½-1½ | |
| 3753.26 | P | | | 3.09 | 6.38 | 3½-2½ | |
| 3767.16 | P | | | 3.09 | 6.37 | 2½-1½ | |
| 3360.295 | B | | 100 | 3.09 | 6.76 | 3½-3½ | b⁴D-z⁴D° |
| •3379.825§ | B | | 60 | 3.09 | 6.74 | 2½-2½ | (21) |
| 3393.86 | A | | 30 | 3.09 | 6.73 | 1½-1½ | |
| 3403.43 | A | | 25 | 3.09 | 6.72 | ½- ½ | |
| 3378.337 | B | | 25 | 3.09 | 6.74 | 3½-2½ | |
| 3394.32 | A | | 35 | 3.09 | 6.73 | 2½-1½ | |
| m3403.29 | P | | Cr+ | 3.09 | 6.72 | 1½- ½ | |
| 3361.770 | B | | 30 | 3.09 | 6.76 | 2½-3½ | |
| 3379.371 | B | | 30 | 3.09 | 6.74 | 1½-2½ | |
| 3393.00 | A | | 35 | 3.09 | 6.73 | ½-1½ | |

| Laboratory I | A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|---|
| **Cr II** continued | | | | | | | |
| 5626.60 | P | | | 3.81 | 6.00 | 2½-3½ | b⁴P-z⁶P° |
| 5497.86 | P | | | 3.74 | 5.99 | 1½-2½ | (22) |
| •5419.36 | A | | 1 | 3.70 | 5.97 | ½-1½ | |
| 5671.62 | P | | | 3.81 | 5.99 | 2½-2½ | |
| 5525.90 | P | | | 3.74 | 5.97 | 1½-1½ | |
| 5701.46 | P | | | 3.81 | 5.97 | 2½-1½ | |
| 5407.62 | A | | 10 | 3.81 | 6.09 | 2½-2½ | b⁴P-z⁴P° |
| 5346.54 | A | | 5 | 3.74 | 6.05 | 1½-1½ | (23) |
| 5318.41 | A | | 4 | 3.70 | 6.02 | ½- ½ | |
| 5510.68 | A | | 7 | 3.81 | 6.05 | 2½-1½ | |
| 5420.90 | A | | 10 | 3.74 | 6.02 | 1½- ½ | |
| 5249.40 | A | | 10 | 3.74 | 6.09 | 1½-2½ | |
| 5246.75 | A | | 15 | 3.70 | 6.05 | ½-1½ | |
| 5322.78 | P | | | 3.81 | 6.13 | 2½-3½ | b⁴P-z⁶D° |
| 5153.49 | A | | 15 | 3.74 | 6.14 | 1½-2½ | (24) |
| 5097.29 | A | | 7 | 3.70 | 6.13 | ½-1½ | |
| 5305.85 | A | | 25 | 3.81 | 6.14 | 2½-2½ | |
| 5191.46 | A | | 2 | 3.74 | 6.13 | 1½-1½ | |
| 5116.06 | A | | 2 | 3.70 | 6.11 | ½- ½ | |
| 5346.12 | P | | | 3.81 | 6.12 | 2½-1½ | |
| 5210.87 | A | | 7 | 3.74 | 6.11 | 1½- ½ | |
| 4777.78 | P | | | 3.81 | 6.39 | 2½-3½ | b⁴P-z⁴F° |
| 4679.87 | P | | | 3.74 | 6.38 | 1½-2½ | (25) |
| 4621.41 | P | | | 3.70 | 6.37 | ½-1½ | |
| 4805.18 | P | | | 3.81 | 6.38 | 2½-2½ | |
| 4698.64 | P | | | 3.74 | 6.37 | 1½-1½ | |
| 4824.97 | P | | | 3.81 | 6.37 | 2½-1½ | |
| 4179.43 | A | | 12 | 3.81 | 6.76 | 2½-3½ | b⁴P-z⁴D° |
| •4111.01 | A | | 18 | 3.74 | 6.74 | 1½-2½ | (26) |
| 4073.56 | A | | 4 | 3.70 | 6.73 | ½-1½ | |
| 4207.35 | A | | 4 | 3.81 | 6.74 | 2½-2½ | |
| 4132.41 | A | | 7 | 3.74 | 6.73 | 1½-1½ | |
| 4086.14 | A | | 8 | 3.70 | 6.72 | ½- ½ | |
| 4239.81 | A | | 1 | 3.81 | 6.73 | 2½-1½ | |
| 2976.718 | B | | 35 | 3.81 | 7.96 | 2½-2½ | b⁴P-y⁴D° † |
| •2961.732 | B | | 50 | 3.74 | 7.91 | 1½-1½ | (27) |
| 2953.358 | B | | 35 | 3.70 | 7.88 | ½- ½ | |
| 3011.42 | A | | 7 | 3.81 | 7.91 | 2½-1½ | |
| 2984.69 | A | | 10 | 3.74 | 7.88 | 1½- ½ | |
| 2971.906 | B | | 75 | 3.75 | 7.90 | 6½-6½ | a⁴H-z⁴H° |
| 2979.741 | B | | 80 | 3.74 | 7.88 | 5½-5½ | (28) |
| 2985.325 | B | | 75 | 3.73 | 7.86 | 4½-4½ | |
| 2989.194 | B | | 70 | 3.73 | 7.85 | 3½-3½ | |
| 2988.056 | C | | 12 | 3.75 | 7.88 | 6½-5½ | |
| 2992.40 | A | | 10 | 3.74 | 7.86 | 5½-4½? | |
| 2994.737 | B | | 20 | 3.73 | 7.85 | 4½-3½ | |
| 2973.64 | A | | 10 | 3.73 | 7.88 | 4½-5½ | |
| 5369.25 | P | | | 3.85 | 6.15 | 4½-4½ | a⁴F-z⁶P° |
| 5410.39 | P | | | 3.85 | 6.13 | 3½-3½ | (29) |
| 5378.07 | P | | | 3.84 | 6.14 | 2½-2½ | |
| 5409.28 | P | | | 3.84 | 6.12 | 1½-1½ | |
| 5425.29 | P | | | 3.85 | 6.13 | 4½-3½ | |
| 5392.95 | P | | | 3.85 | 6.14 | 3½-2½ | |
| •5419.36 | A | | 1 | 3.84 | 6.12 | 2½-1½ | |
| 5430.41 | P | | | 3.84 | 6.11 | 1½- ½ | |
| 5354.66 | P | | | 3.85 | 6.15 | 3½-4½ | |
| 5395.41 | P | | | 3.84 | 6.13 | 2½-3½ | |
| 5368.10 | P | | | 3.84 | 6.14 | 1½-2½ | |
| 4824.13 | A | | 75 | 3.85 | 6.41 | 4½-4½ | a⁴F-z⁴F° |
| 4848.24 | A | | 60 | 3.85 | 6.39 | 3½-3½ | (30) |
| 4864.32 | A | | 50 | 3.84 | 6.38 | 2½-2½ | |
| 4876.41 | A | | 50 | 3.84 | 6.37 | 1½-1½ | |
| 4860.20 | A | | 20 | 3.85 | 6.39 | 4½-3½ | |
| 4878.48 | P | | | 3.85 | 6.38 | 3½-2½ | |
| 4884.57 | A | | 10 | 3.84 | 6.37 | 2½-1½ | |
| 4812.35 | A | | 25 | 3.85 | 6.41 | 3½-4½ | |
| 4836.22 | A | | 25 | 3.84 | 6.39 | 2½-3½ | |
| 4856.19 | A | | 20 | 3.84 | 6.38 | 1½-2½ | |
| 4242.38 | A | | 30 | 3.85 | 6.76 | 4½-3½ | a⁴F-z⁴D° |
| 4261.92 | A | | 20 | 3.85 | 6.74 | 3½-2½ | (31) |
| 4275.57 | A | | 30 | 3.84 | 6.73 | 2½-1½ | |
| 4284.31 | A | | 20 | 3.84 | 6.72 | 1½- ½ | |
| 4233.25 | A | | 10 | 3.85 | 6.76 | 3½-3½ | |
| 4252.62 | A | | 10 | 3.84 | 6.74 | 2½-2½ | |
| 4269.28 | A | | 10 | 3.84 | 6.73 | 1½-1½ | |
| 4224.09 | P | | | 3.84 | 6.76 | 2½-3½ | |
| 4246.41 | A | | 2 | 3.84 | 6.74 | 1½-2½ | |
| 3063.84 | A | | 7 | 3.85 | 7.88 | 4½-5½ | a⁴F-z⁴H° |
| •3072.47 | A | | 6 | 3.85 | 7.86 | 3½-4½ | (32) |
| 2966.051 | B | | 40 | 3.85 | 8.01 | 4½-3½ | a⁴F-y⁴D° |
| 3003.924 | B | | 35 | 3.85 | 7.96 | 3½-2½ | (33) |
| 3034.54 | A | | 15 | 3.84 | 7.91 | 2½-1½ | |
| 3055.44 | A | | 12 | 3.84 | 7.88 | 1½- ½ | |
| 2999.30 | A | | 8 | 3.84 | 7.96 | 2½-2½ | |
| 5553.81 | P | | | 3.87 | 6.09 | 2½-2½ | a²D-z⁴P° |
| 5721.03 | P | | | 3.89 | 6.05 | 1½-1½ | (34) |
| 5862.58 | P | | | 3.87 | 6.05 | 2½-1½ | |
| 5806.31 | P | | | 3.89 | 6.03 | 1½- ½ | |
| 5610.01 | P | | | 3.89 | 6.09 | 1½-2½ | |
| 5464.36 | P | | | 3.67 | 6.13 | 2½-3½ | a²D-z⁶P° |
| 5500.61 | P | | | 3.89 | 6.14 | 1½-2½ | (35) |
| 5446.57 | P | | | 3.87 | 6.14 | 2½-2½ | |
| 5543.86 | P | | | 3.89 | 6.13 | 1½-1½ | |
| 5488.97 | P | | | 3.87 | 6.13 | 2½-1½ | |
| 5566.06 | P | | | 3.89 | 6.11 | 1½- ½ | |
| 4891.55 | P | | | 3.87 | 6.39 | 2½-3½ | a²D-z⁴F° |
| 4964.34 | P | | | 3.69 | 6.38 | 1½-2½ | (36) |
| 4930.26 | P | | | 3.67 | 6.38 | 2½-2½ | |
| 4985.46 | P | | | 3.89 | 6.37 | 1½-1½ | |
| 4941.03 | P | | | 3.87 | 6.37 | 2½-1½ | |

| Laboratory I | A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|---|
| Cr II continued | | | | | | | |
| 4266.23 | P | | | 3.87 | 6.76 | 2½-3½ | $a^3D$-$z^4D^o$ |
| 4328.91 | P | | | 3.89 | 6.74 | 1½-2½ | (37) |
| 4295.37 | P | | | 3.87 | 6.74 | 2½-2½ | |
| 4352.68 | P | | | 3.89 | 6.73 | 1½-1½ | |
| 4318.77 | P | | | 3.87 | 6.73 | 2½-1½ | |
| 4368.20 | P | | | 3.89 | 6.72 | 1½- ½ | |
| 5104.03 | P | | | 3.99 | 6.41 | 3½-4½ | $a^3F$-$z^4F^o$ |
| m5210.88 | P | Cr+ | | 4.02 | 6.39 | 2½-3½ | (38) |
| 5144.47 | P | | | 3.99 | 6.39 | 3½-3½ | |
| 5243.50 | P | | | 4.02 | 6.38 | 2½-2½ | |
| 5176.26 | P | | | 3.99 | 6.38 | 3½-2½ | |
| 5267.10 | A | 4 | | 4.02 | 6.37 | 2½-1½ | |
| 4539.62 | A | 2 | | 4.02 | 6.74 | 2½-2½ | $a^3F$-$z^4D^o$ |
| 4565.78 | A | 10 | | 4.02 | 6.73 | 2½-1½ | (39) |
| 3177.90 | A | 1 | | 4.02 | 7.91 | 2½-1½ | $a^3F$-$y^4D^o$ (40) |
| 3026.85 | A | 20 | | 3.99 | 8.07 | 3½-4½ | $a^3F$-$z^4G^o$ |
| 3061.59 | A | 8 | | 4.02 | 8.06 | 2½-3½ | (41) |
| 3038.52 | A | 3 | | 3.99 | 8.06 | 3½-3½ | |
| 3071.03 | A | 2 | | 4.02 | 8.04 | 2½-2½ | |
| 2999.96 | A | 25 | | 3.99 | 8.11 | 3½-4½ | $a^3F$-$z^2G^o$ |
| 3034.99 | A | 10 | | 4.02 | 8.09 | 2½-3½ | (42) |
| 3012.34 | A | 2 | | 3.99 | 8.09 | 3½-3½ | |
| 5237.34 | A | 75 | | 4.06 | 6.41 | 4½-4½ | $b^4F$-$z^4F^o$ |
| 5274.99 | A | 20 | | 4.05 | 6.39 | 3½-3½ | (43) |
| 5313.59 | A | 25 | | 4.06 | 6.38 | 2½-2½ | |
| 5334.88 | A | 40 | | 4.05 | 6.37 | 1½-1½ | |
| 5279.92 | A | 15 | | 4.06 | 6.39 | 4½-3½ | |
| 5308.44 | A | 20 | | 4.05 | 6.38 | 3½-2½ | |
| 5337.79 | A | 12 | | 4.06 | 6.37 | 2½-1½ | |
| 5232.50 | A | 15 | | 4.05 | 6.41 | 3½-4½ | |
| 5280.08 | A | 10 | | 4.06 | 6.39 | 2½-3½ | |
| 5310.70 | A | 12 | | 4.05 | 6.38 | 1½-2½ | |
| 4558.659 | B | 100 | | 4.06 | 6.76 | 4½-3½ | $b^4F$-$z^4D^o$ |
| 4588.217 | B | 75 | | 4.05 | 6.74 | 3½-2½ | (44) |
| 4618.83 | A | 35 | | 4.06 | 6.73 | 2½-1½ | |
| 4634.11 | A | 25 | | 4.05 | 6.72 | 1½- ½ | |
| 4555.02 | A | 20 | | 4.05 | 6.76 | 3½-3½ | |
| 4592.09 | A | 20 | | 4.06 | 6.74 | 2½-2½ | |
| 4616.64 | A | 18 | | 4.05 | 6.73 | 1½-1½ | |
| 4558.83 | P | | | 4.06 | 6.76 | 2½-3½ | |
| 4589.89 | A | 3 | | 4.05 | 6.74 | 1½-2½ | |
| 3225.44 | A | 8 | | 4.06 | 7.88 | 4½-5½ | $b^4F$-$z^4H^o$ (45) |
| 3117.28 | A | 15 | | 4.06 | 8.01 | 4½-3½ | $b^4F$-$y^4D^o$ |
| 3162.46 | A | 10 | | 4.05 | 7.96 | 3½-2½ | (46) |
| 3203.53 | A | 15 | | 4.06 | 7.91 | 2½-1½ | |
| 3229.38 | A | 8 | | 4.05 | 7.88 | 1½- ½? | |
| 3115.65 | A | 20 | | 4.05 | 8.01 | 3½-3½ | |
| 3164.28 | A | 4 | | 4.06 | 7.96 | 2½-2½ | |
| 3042.79 | A | 25 | | 4.06 | 8.11 | 4½-5½ | $b^4F$-$z^4G^o$ |
| 3071.58 | A | 7 | | 4.05 | 8.07 | 3½-4½ | (47) |
| 3065.36 | A | 10 | | 4.06 | 8.06 | 2½-3½ | |
| 3093.97 | A | 15 | | 4.05 | 8.04 | 1½-2½ | |
| 3073.25 | A | 15 | | 4.06 | 8.07 | 4½-4½ | |
| 3083.62 | A | 10 | | 4.05 | 8.06 | 3½-3½ | |
| •3094.94 | A | 10 | | 4.06 | 8.04 | 2½-2½ | |
| 3045.53 | A | 4 | | 4.06 | 8.11 | 4½-4½ | $b^4F$-$z^2G^o$ |
| 3056.68 | A | 8w | | 4.05 | 8.09 | 3½-3½ | (48) |
| 3043.90 | A | 18 | | 4.05 | 8.11 | 3½-4½ | |
| 3058.38 | A | 12 | | 4.06 | 8.09 | 2½-3½ | |
| 2958.20 | A | 1 | | 4.06 | 8.23 | 2½-1½ | $b^4F$-$z^2D^o$ (49) |
| 5478.35 | A | 15 | | 4.16 | 6.41 | 5½-4½ | $b^4G$-$z^4F^o$ |
| 5502.05 | A | 12 | | 4.15 | 6.39 | 4½-3½ | (50) |
| 5508.60 | A | 8 | | 4.14 | 6.38 | 3½-2½ | |
| 5503.18 | A | 8 | | 4.13 | 6.37 | 2½-1½ | |
| 5455.80 | A | 1 | | 4.15 | 6.41 | 4½-4½ | |
| 5472.63 | A | 3 | | 4.14 | 6.39 | 3½-3½ | |
| 5477.45 | P | | | 4.13 | 6.38 | 2½-2½ | |
| 3895.427 | B | 50 | | 4.16 | 7.90 | 5½-6½ | $b^4G$-$z^4H^o$ |
| 3307.044 | C | 50 | | 4.15 | 7.88 | 4½-5½ | (51) |
| 3311.929 | B | 40 | | 4.14 | 7.86 | 3½-4½ | |
| 3312.18 | A | 40 | | 4.13 | 7.85 | 2½-3½ | |
| 3315.29 | A | 12 | | 4.16 | 7.88 | 5½-5½ | |
| 3322.69 | A | 12 | | 4.15 | 7.86 | 4½-4½ | |
| 3323.53 | A | 8 | | 4.14 | 7.85 | 3½-3½ | |
| 3193.41 | A | 2 | | 4.15 | 8.01 | 4½-3½ | $b^4G$-$y^4D^o$ (52) |
| •3131.54 | A | 5 | | 4.16 | 8.10 | 5½-6½ | $b^4G$-$z^4I^o$ |
| •3143.68 § | A | 7 | | 4.15 | 8.08 | 4½-5½ | (53) |
| 3154.04 | A | 5d | | 4.14 | 8.05 | 3½-4½ | |
| 3122.596 | B | 30 | | 4.16 | 8.11 | 5½-5½ | $b^4G$-$z^4G^o$ |
| m3147.19 | P | Cr+ | | 4.15 | 8.07 | 4½-4½ | (54) |
| 3150.11 | A | 20 | | 4.14 | 8.08 | 3½-3½ | |
| 3149.83 | A | 20 | | 4.13 | 8.04 | 2½-2½ | |
| 3154.66 | P | | | 4.18 | 8.07 | 5½-4½ | |
| 3159.88 | A | 5 | | 4.15 | 8.06 | 4½-3½ | |
| 3160.11 | A | 3 | | 4.14 | 8.04 | 3½-2½ | |
| 3115.28 | A | 12 | | 4.15 | 8.11 | 4½-5½ | |
| 3137.55 | A | 8 | | 4.14 | 8.07 | 3½-4½ | |
| 3139.91 | A | 8 | | 4.13 | 8.06 | 2½-3½ | |
| 3125.46 | A | 7 | | 4.18 | 8.11 | 5½-4½ | $b^4G$-$z^2G^o$ |
| •3131.54 | A | 5 | | 4.15 | 8.09 | 4½-3½ | (55) |
| 3118.14 | A | 10 | | 4.15 | 8.11 | 4½-4½ | |
| 3121.37 | A | 7 | | 4.14 | 8.09 | 3½-3½ | |
| 3108.66 | A | 10 | | 4.14 | 8.11 | 3½-4½ | |
| 3111.95 | A | 15 | | 4.13 | 8.09 | 2½-3½ | |
| 2985.02 | A | 7 | | 4.14 | 8.27 | 3½-2½ | $b^4G$-$z^2D^o$ (56) |
| 2970.66 | A | 2 | | 4.13 | 8.28 | 2½-1½ | $b^4G$-$z^2P^o$ (57) |
| 2968.67 | A | 15 | | 4.16 | 8.32 | 5½-5½ | $b^4G$-$y^4G^o$ |
| 2963.46 | A | 20 | | 4.15 | 8.31 | 4½-4½ | (58) |
| 2956.60 | A | 10 | | 4.14 | 8.31 | 3½-3½ | |
| •2965.19 | A | 2 | | 4.15 | 8.31 | 4½-3½ | |
| 2955.71 | A | 2 | | 4.14 | 8.31 | 3½-2½ | |
| •2961.732 | B | 50 | | 4.16 | 8.33 | 5½-4½ | $b^4G$-$y^4F^o$ † (59) |
| 2959.97 | A | 18 | | 4.15 | 8.32 | 4½-3½ | |
| 2951.95 | A | 10 | | 4.14 | 8.32 | 3½-2½ | |
| 2955.12 | A | 10 | | 4.15 | 8.33 | 4½-4½† | |
| 2951.40 | A | 10 | | 4.14 | 8.32 | 3½-3½ | |
| •3421.62 | A | 4 | | 4.30<br>4.28 | 7.90<br>7.88 | 5½-6½<br>4½-5½ | $a^3H$-$z^4H^o$ (60) |
| 3460.03 | A | 1 | | 4.30 | 7.86 | 5½-4½ | |
| 3450.84 | A | 3 | | 4.28 | 7.85 | 4½-3½ | |
| 3270.14 | A | 40 | | 4.30 | 8.07 | 5½-4½ | $a^3H$-$z^4G^o$ |
| 3264.26 | A | 35 | | 4.28 | 8.06 | 4½-3½ | (61) |
| 3250.79 | A | 10 | | 4.28 | 8.07 | 4½-4½ | |
| 3245.31 | A | 5 | | 4.30 | 8.10 | 5½-6½ | $a^3H$-$z^4I^o$ |
| 3247.01 | A | 4 | | 4.28 | 8.08 | 4½-5½ | (62) |
| 3268.48 | A | 10 | | 4.28 | 8.05 | 4½-4½ | |
| 3288.04 | A | 15 | | 4.30 | 8.05 | 5½-4½ | |
| 3238.77 | A | 50 | | 4.30 | 8.11 | 5½-4½ | $a^3H$-$z^2G^o$ |
| 3234.06 | A | 50 | | 4.28 | 8.09 | 4½-3½ | (63) |
| 3219.79 | A | 10 | | 4.28 | 8.11 | 4½-4½ | |
| 3053.65 | A | 10 | | 4.28 | 8.32 | 4½-5½ | $a^3H$-$y^4G^o$ (64) |
| 3050.137 | B | 100 | | 4.30 | 8.34 | 5½-6½ | $a^3H$-$z^2I^o$ |
| 3040.92 | A | 70 | | 4.28 | 8.33 | 4½-5½ | (65) |
| 3057.86 | A | 12 | | 4.30 | 8.33 | 5½-5½ | |
| 2953.706 | B | 45 | | 4.28 | 8.45 | 4½-4½ | $a^3H$-$z^2H^o$ † |
| 2969.67 | A | 15 | | 4.30 | 8.45 | 5½-4½ | (66) |
| 3400.08 | A | 2 | | 4.28 | 7.91 | ½-1½ | $a^2P$-$y^4D^o$ |
| 3482.58 | A | 12 | | 4.36 | 7.91 | 1½-1½ | (67) |
| 3430.42 | A | 3 | | 4.28 | 7.88 | ½- ½ | |
| 3369.05 | A | 18 | | 4.36 | 8.03 | 1½- ½ | $a^2P$-$z^2S^o$ |
| 3291.75 | A | 40 | | 4.28 | 8.03 | ½- ½ | (68) |
| 3186.75 | A | 18 | | 4.36 | 8.24 | 1½-2½ | $a^2P$-$y^4P^o$ |
| 3154.10 | A | 2 | | 4.28 | 8.19 | ½-1½ | (69) |
| 3163.93 | A | 10 | | 4.28 | 8.18 | ½- ½ | |
| 3158.03 | A | 20 | | 4.36 | 8.27 | 1½-2½ | $a^2P$-$z^2D^o$ |
| 3185.02 | A | 15 | | 4.28 | 8.23 | ½-1½? | (70) |
| 3194.63 | A | 10 | | 4.36 | 8.23 | 1½-1½ | |
| 3152.21 | A | 40 | | 4.36 | 8.28 | 1½-1½ | $a^2P$-$z^2P^o$ |
| 3103.46 | A | 30 | | 4.28 | 8.26 | ½- ½ | (71) |
| 3172.08 | A | 40 | | 4.36 | 8.26 | 1½- ½ | |
| 3084.46 | A | 15 | | 4.28 | 8.28 | ½-1½ | |
| 3121.05 | A | 8 | | 4.36 | 8.32 | 1½-2½ | $a^2P$-$y^4F^o$ |
| 3121.84 | A | 10 | | 4.36 | 8.32 | 1½-1½ | (72) |
| 3074.91 | A | 3 | | 4.36 | 8.38 | 1½-2½ | $a^2P$-$x^4D^o$ |
| 3074.67 | A | 3 | | 4.36 | 8.38 | 1½-1½ | (73) |
| 3034.05 | A | 5 | | 4.36 | 8.43 | 1½-1½ | $a^2P$-$z^4S^o$ (74) |
| 3008.67 | A | 3 | | 4.36 | 8.47 | 1½-2½ | $a^2P$-$z^2F^o$ (75) |
| 3557.85 | P | | | 4.40 | 7.86 | 3½-4½ | $b^2F$-$z^4H^o$ |
| 3566.37 | A | 1 | | 4.39 | 7.85 | 2½-3½ | (76) |
| •3466.25 | A | 2 | | 4.40 | 7.96 | 3½-2½ | $b^2F$-$y^4D^o$ |
| 3508.67 | P | | | 4.39 | 7.91 | 2½-1½ | (77) |
| 3376.27 | A | 10 | | 4.40 | 8.05 | 3½-4½ | $b^2F$-$z^4I^o$ (78) |
| 3357.40 | A | 40 | | 4.40 | 8.07 | 3½-4½ | $b^2F$-$z^4G^o$ |
| 3387.42 | A | 12 | | 4.39 | 8.06 | 2½-3½ | (79) |
| 3324.346 | B | 50 | | 4.40 | 8.11 | 3½-4½ | $b^2F$-$z^2G^o$ |
| 3335.28 | A | 40 | | 4.39 | 8.09 | 2½-3½ | (80) |
| 3213.53 | A | 20 | | 4.40 | 8.24 | 3½-2½ | $b^2F$-$y^4P^o$ |
| 3247.33 | A | 8 | | 4.39 | 8.19 | 2½-1½ | (81) |
| 3183.325 | B | 40 | | 4.40 | 8.27 | 3½-2½ | $b^2F$-$z^2D^o$ |
| 3216.55 | A | 20 | | 4.39 | 8.23 | 2½-1½ | (82) |
| 3179.45 | A | 8 | | 4.39 | 8.27 | 2½-2½ | |
| 3173.58 | A | 15 | | 4.39 | 8.28 | 2½-1½? | $b^2F$-$z^2P^o$ (83) |
| 3149.12 | A | 4 | | 4.40 | 8.31 | 3½-4½ | $b^2F$-$y^4G^o$ (84) |
| 3145.77 | A | 15 | | 4.40 | 8.32 | 3½-2½ | $b^2F$-$y^4F^o$ |
| 3142.74 | A | 10 | | 4.39 | 8.32 | 2½-1½ | (85) |
| 3098.16 | A | 18 | | 4.40 | 8.38 | 3½-3½ | $b^2F$-$x^4D^o$ |
| 3095.22 | A | 3 | | 4.39 | 8.38 | 2½-2½ | (86) |
| 3098.88 | A | 3 | | 4.40 | 8.38 | 3½-2½ | |
| •3094.94 | A | 10 | | 4.39 | 8.38 | 2½-1½ | |
| 3015.510 | B | 50 | | 4.40 | 8.49 | 3½-3½ | $b^2F$-$z^2F^o$ |
| 3028.125 | B | 40 | | 4.39 | 8.47 | 2½-2½ | (87) |
| 3031.63 | A | 1 | | 4.40 | 8.47 | 3½-2½ | |
| 3012.01 | A | 1 | | 4.39 | 8.49 | 2½-3½ | |
| 3004.47 | A | 3 | | 4.39 | 8.50 | 2½-3½ | $b^2F$-$y^4H^o$ (88) |
| 3589.73 | A | 2 | | 4.41 | 7.90 | 5½-6½ | $b^2H$-$z^4H^o$ |
| 3540.28 | P | | | 4.40 | 7.88 | 4½-5½ | (89) |
| 3553.50 | P | | | 4.41 | 7.86 | 5½-5½ | |
| 3558.22 | P | | | 4.40 | 7.86 | 4½-4½ | |
| 3570.57 | P | | | 4.41 | 7.86 | 5½-4½ | |
| 3571.64 | P | | | 4.40 | 7.85 | 4½-3½ | |
| 3387.73 | A | 5 | | 4.41 | 8.05 | 5½-4½ | $b^2H$-$z^4I^o$ (90) |
| 3357.72 | A | 0 | | 4.40 | 8.07 | 4½-4½ | $b^2H$-$z^4G^o$ |
| 3368.73 | A | 10 | | 4.41 | 8.07 | 5½-4½ | (91) |
| 3372.13 | A | 15 | | 4.40 | 8.06 | 4½-3½ | |
| 3335.46 | A | 30 | | 4.41 | 8.11 | 5½-4½ | $b^2H$-$z^2G^o$ |
| 3339.90 | A | 20 | | 4.40 | 8.09 | 4½-3½ | (92) |
| 3334.67 | P | | | 4.40 | 8.11 | 4½-4½ | |
| 3157.52 | A | 1 | | 4.41 | 8.32 | 5½-5½ | $b^2H$-$y^4G^o$ |
| 3147.84 | A | 1 | | 4.40 | 8.32 | 4½-5½ | (93) |
| 3135.74 | A | 30 | | 4.41 | 8.34 | 5½-6½ | $b^2H$-$z^2I^o$ |
| 3134.33 | A | 25 | | 4.40 | 8.33 | 4½-5½ | (94) |
| 3143.91 | A | 7 | | 4.41 | 8.33 | 5½-5½ | |
| 3026.647 | B | 80 | | 4.41 | 8.49 | 5½-5½ | $b^2H$-$z^2H^o$ |
| 3041.74 | A | 50 | | 4.40 | 8.45 | 4½-4½ | (95) |
| 3050.75 | D | 4 | | 4.41 | 8.45 | 5½-4½ | |
| 3017.80 | A | 5 | | 4.40 | 8.49 | 4½-5½ | |
| •2968.21 § | A | 3 | | 4.41 | 8.57 | 5½-6½ | $b^2H$-$y^4H^o$ (96) |
| 2958.54 | A | 2 | | 4.41 | 8.58 | 5½-4½ | $b^2H$-$x^4F^o$ (97) |
| 3625.30 | P | | | 4.46 | 7.88 | 4½-5½ | $a^2G$-$z^4H^o$ |
| 3621.51 | D | (1) | | 4.46 | 7.86 | 3½-4½ | (98) |
| 3644.12 | P | | | 4.48 | 7.86 | 4½-4½ | |
| 3635.43 | P | | | 4.46 | 7.85 | 3½-3½ | |
| •3658.19 | A | 20 | | 4.48 | 7.85 | 4½-3½? | |
| 3428.94 | A | 7 | | 4.46 | 8.06 | 3½-3½ | $a^2G$-$z^4G^o$ (99) |
| 3399.54 | A | 16 | | 4.48 | 8.11 | 4½-4½ | $a^2G$-$z^2G^o$ |
| 3395.62 | A | 20 | | 4.46 | 8.09 | 3½-3½ | (100) |
| 3415.47 | D | 1 | | 4.48 | 8.09 | 4½-3½ | |
| 3199.87 | A | 10 | | 4.46 | 8.31 | 3½-2½ | $a^2G$-$y^4G^o$ (101) |
| 3079.34 | A | 15 | | 4.48 | 8.49 | 4½-5½ | $a^2G$-$z^2H^o$ |
| 3087.90 | A | 20 | | 4.46 | 8.45 | 3½-4½ | (102) |
| 3104.29 | A | 3 | | 4.48 | 8.45 | 4½-4½ | |
| 3077.24 | A | 16 | | 4.46 | 8.49 | 4½-3½ | $a^2G$-$z^2F^o$ |
| 3077.79 | A | 25 | | 4.46 | 8.47 | 3½-2½ | (103) |
| 3061.14 | P | | | 4.46 | 8.49 | 3½-3½ | |
| 2954.67 | D | 10 | | 4.46 | 8.65 | 4½-4½ | $a^2G$-$y^2G^o$ |
| •2957.56 | A | 5 | | 4.46 | 8.63 | 3½-3½ | (104) |
| 6053.46 | A | 10 | | 4.72 | 6.76 | 3½-3½ | $c^4D$-$z^4D^o$ |
| 6139.23 | A | 7 | | 4.73 | 6.74 | 2½-2½ | (105) |
| 6195.18 | A | 3 | | 4.74 | 6.73 | 1½-1½ | |
| 6239.77 | A | 1 | | 4.74 | 6.72 | ½- ½ | |
| 6112.26 | A | 2 | | 4.72 | 6.74 | 3½-2½ | |
| 6176.95 | A | 2 | | 4.73 | 6.73 | 2½-1½ | |
| 6226.66 | A | 1 | | 4.74 | 6.72 | 1½- ½ | |
| 6070.08 | A | 2 | | 4.73 | 6.76 | 2½-3½ | |
| 6147.15 | A | 3 | | 4.74 | 6.74 | 1½-2½ | |
| 6208.18 | A | 2 | | 4.74 | 6.73 | ½-1½ | |
| 3895.16 | A | 2 | | 4.74 | 7.91 | ½-1½ | $c^4D$-$y^4D^o$ (106) |
| 3513.03 | A | 10 | | 4.72 | 8.24 | 3½-2½ | $c^4D$-$y^4P^o$ |
| 3565.31 | A | 5 | | 4.73 | 8.19 | 2½-1½ | (107) |
| 3584.01 | P | | | 4.74 | 8.18 | 1½- ½ | |
| 3518.62 | A | 3 | | 4.73 | 8.24 | 2½-2½ | |
| 3571.37 | A | 3 | | 4.74 | 8.19 | 1½-1½ | |
| 3588.30 | A | 2 | | 4.74 | 8.18 | ½- ½ | |
| 3524.54 | P | | | 4.74 | 8.24 | 1½-2½ | |
| 3575.69 | P | | | 4.74 | 8.19 | ½-1½ | |
| •3506.61 | A | 1 | | 4.74 | 8.26 | 1½- ½ | $c^4D$-$z^2P^o$ (108) |
| 3476.17 | A | 3 | | 4.72 | 8.27 | 3½-2½ | $c^4D$-$z^2D^o$ |
| 3528.23 | A | 1 | | 4.73 | 8.23 | 2½-1½ | (109) |
| •3489.45 | A | 2 | | 4.74 | 8.27 | 1½-2½ | |
| 3438.46 | A | 0 | | 4.72 | 8.31 | 3½-2½ | $c^4D$-$y^4G^o$ |
| 3445.04 | A | 5 | | 4.73 | 8.31 | 2½-3½ | (110) |
| 3426.13 | D | 6 | | 4.72 | 8.33 | 3½-4½ | $c^4D$-$y^4F^o$ |
| 3437.93 | A | 2 | | 4.73 | 8.32 | 2½-3½ | (111) |
| 3444.34 | A | 4 | | 4.74 | 8.32 | 1½-2½ | |
| 3449.28 | A | 2 | | 4.74 | 8.32 | ½-1½ | |
| •3376.72 | A | 5 | | 4.72 | 8.38 | 3½-3½ | $c^4D$-$x^4D^o$ |
| 3382.79 | P | | | 4.73 | 8.38 | 2½-2½ | (112) |
| 3387.96 | A | 3 | | 4.74 | 8.38 | 1½-1½ | |
| 3278.79 | A | 2 | | 4.72 | 8.49 | 3½-3½ | $c^4D$-$z^2F^o$ (113) |
| 3201.26 | A | 25 | | 4.72 | 8.58 | 3½-4½ | $c^4D$-$x^4F^o$ |
| 3205.11 | A | 25 | | 4.73 | 8.58 | 2½-3½ | (114) |
| 3213.91 | A | 18 | | 4.74 | 8.58 | 1½-2½ | |
| 3229.89 | A | 10 | | 4.74 | 8.56 | ½-1½ | |
| 3200.45 | A | 10 | | 4.72 | 8.58 | 3½-3½ | |
| 3208.02 | A | 8 | | 4.73 | 8.58 | 2½-2½ | |
| 3226.36 | A | 4 | | 4.74 | 8.56 | 1½-1½ | |
| 3184.48 | A | 1 | | 4.74 | 8.64 | 1½-2½ | $c^4D$-$y^2D^o$ |
| •3196.40 | A | 3 | | 4.74 | 8.60 | 1½-1½ | (115) |
| •3072.47 | A | 8 | | 4.73 | 8.75 | 2½-3½ | $c^4D$-$y^2F^o$ |
| 3102.58 | A | 2 | | 4.74 | 8.71 | 1½-2½ | (116) |

| Laboratory I A | Ref | Int | E P Low | High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Cr II** continued | | | | | | |
| 3727.37 | A | 40 | 4.78 | 8.07 | 4½-4½ | $b^2G-z^4G^o$ |
| 3737.55 | A | 10 | 4.75 | 8.06 | 3½-3½ | (117) |
| 3751.60 | A | 3 Zr? | 4.75 | 8.04 | 3½-2½ | |
| 3688.87 | A | 20 | 4.76 | 8.11 | 4½-4½ | $b^2G-z^2G^o$ |
| 3698.00 | A | 35 | 4.75 | 8.09 | 3½-3½ | (118) |
| 3705.40 | P | | 4.78 | 8.09 | 4½-3½ | |
| 3879.34 | P | | 4.75 | 8.11 | 3½-4½ | |
| 3313.08 | A | 20 | 4.78 | 8.49 | 4½-5½ | $b^2G-z^2H^o$ |
| 3335.93 | A | 4 | 4.75 | 8.45 | 3½-4½ | (119) |
| 3341.98 | A | 5 | 4.78 | 8.45 | 4½-4½ | |
| *3310.65 | A | 35 | 4.78 | 8.49 | 4½-3½ | $b^2G-z^2F^o$ |
| 3384.10 | A | 20 | 4.75 | 8.47 | 3½-2½ | (120) |
| 3304.73 | A | 5 | 4.75 | 8.49 | 3½-3½ | |
| 3286.25 | A | 8 | 4.76 | 8.54 | 4½-5½ | $b^2G-y^4H^o$ |
| 3279.54 | A | 5 | 4.75 | 8.52 | 3½-4½ | (121) |
| 3231.84 | A | 8 | 4.76 | 8.58 | 4½-4½ | $b^2G-x^4F^o$ (122) |
| 3169.20 | A | 25 | 4.76 | 8.65 | 4½-4½ | $b^2G-y^2G^o$ |
| 3184.36 | A | 15 | 4.75 | 8.63 | 3½-3½ | (123) |
| 3189.85 | A | 12 | 4.76 | 8.63 | 4½-3½ | |
| m3163.77 | P | Cr | 4.75 | 8.65 | 3½-4½ | |
| 3140.21 | A | 25 | 4.76 | 8.69 | 4½-5½ | $b^2G-y^2H^o$ |
| 3135.35 | A | 20 | 4.75 | 8.69 | 3½-4½ | (124) |
| 3140.67 | A | 1 | 4.76 | 8.69 | 4½-4½ | |
| 3093.48 | A | 40 | 4.76 | 8.75 | 4½-5½ | $b^2G-x^4G^o$ |
| 3107.58 | A | 50 | 4.75 | 8.73 | 3½-4½ | (125) |
| 3112.81 | P | | 4.76 | 8.73 | 4½-4½ | |
| m3132.12 | P | Cr+ | 4.75 | 8.69 | 3½-3½ | |
| 3142.97 | A | 8 | 4.75 | 8.68 | 3½-2½ | |
| 3096.11 | A | 35 | 4.76 | 8.75 | 4½-3½ | $b^2G-y^2F^o$ |
| 3118.78 | A | 20 | 4.75 | 8.71 | 3½-2½ | (126) |
| 3090.94 | A | 2w | 4.75 | 8.75 | 3½-3½ | |
| 4161.27 | P | | 4.92 | 7.88 | 4½-5½ | $c^2G-z^4H^o$ |
| 4181.56 | P | | 4.90 | 7.86 | 3½-4½ | (127) |
| 4188.08 | P | | 4.92 | 7.86 | 4½-4½ | |
| 4179.92 | P | | 4.90 | 7.85 | 5½-3½ | |
| 4204.66 | P | | 4.92 | 7.85 | 4½-3½ | |
| 3905.88 | P | | 4.92 | 8.08 | 4½-5½ | $c^2G-z^4I^o$ |
| 3915.30 | P | | 4.90 | 8.05 | 3½-4½ | (128) |
| 3936.95 | A | 1 | 4.92 | 8.05 | 4½-4½ | |
| 3863.17 | P | | 4.92 | 8.11 | 4½-5½ | $c^2G-z^4G^o$ |
| 3889.90 | P | | 4.90 | 8.07 | 3½-4½ | (129) |
| 3911.32 | A | 3 | 4.92 | 8.07 | 4½-4½ | |
| 3909.25 | P | | 4.90 | 8.08 | 3½-3½ | |
| 3930.88 | P | | 4.92 | 8.06 | 4½-3½ | |
| 3924.65 | P | | 4.90 | 8.04 | 3½-2½ | |
| 3866.54 | A | 7 | 4.92 | 8.11 | 4½-4½ | $c^2G-z^2G^o$ |
| 3866.01 | A | 5 | 4.90 | 8.09 | 3½-3½ | (130) |
| 3696.78 | A | 8 | 4.90 | 8.24 | 3½-2½ | $c^2G-y^4F^o$ (131) |
| 3814.26 | A | 2 | 4.90 | 8.31 | 3½-2½ | $c^2G-y^4G^o$ (132) |
| 3608.66 | A | 3 | 4.90 | 8.32 | 3½-3½ | $c^2G-y^4F^o$ (133) |
| 3583.92 | A | 5 | 4.92 | 8.38 | 4½-3½ | $c^2G-x^4D^o$ |
| 3547.10 | A | 3 | 4.90 | 8.38 | 3½-2½ | (134) |
| 3546.15 | P | | 4.90 | 8.38 | 3½-3½ | |
| 3457.62 | A | 30 | 4.92 | 8.49 | 4½-5½ | $c^2G-z^2H^o$ |
| 3472.07 | A | 25 | 4.90 | 8.45 | 3½-4½ | (135) |
| 3489.07 | A | 2 | 4.92 | 8.45 | 4½-4½ | |
| 3454.98 | A | 35 | 4.92 | 8.49 | 4½-3½ | $c^2G-z^2F^o$ |
| 3459.29 | A | 25 | 4.90 | 8.47 | 3½-2½ | (136) |
| 3301.21 | A | 18 | 4.92 | 8.65 | 4½-4½ | $c^2G-y^2G^o$ |
| 3308.15 | A | 18 | 4.90 | 8.63 | 3½-3½ | (137) |
| 3285.96 | A | 20 | 4.90 | 8.65 | 3½-4½ | |
| 3289.77 | A | 15 | 4.92 | 8.69 | 4½-5½ | $c^2G-y^2H^o$ |
| 3255.30 | A | 15 | 4.90 | 8.69 | 3½-4½ | (138) |
| 3235.26 | A | 4 | 4.90 | 8.71 | 3½-2½ | $c^2G-y^2F^o$ (139) |
| 3219.13 | A | 18 | 4.92 | 8.75 | 4½-5½ | $c^2G-x^2G^o$ |
| 3225.39 | A | 12 | 4.90 | 8.73 | 3½-4½ | (140) |
| 3240.07 | A | 7 | 4.92 | 8.73 | 4½-4½ | |
| *2957.56 | A | 5 | 4.90 | 9.07 | 3½-3½ | $c^2G-w^4D^o$ (141) |
| 3945.11 | D | (1) | 4.92 | 8.05 | 3½-4½ | $c^2F-z^4I^o$ (142) |
| 3874.41 | P | | 4.92 | 8.11 | 3½-4½ | $c^2F-z^2G^o$ |
| 3874.78 | P | | 4.91 | 8.09 | 2½-3½ | (143) |
| 3895.12 | A | 1 | 4.92 | 8.09 | 3½-3½ | |
| 3723.40 | A | 15 | 4.92 | 8.24 | 3½-3½ | $c^2F-y^4P^o$ |
| 3756.55 | A | 3 | 4.91 | 8.19 | 2½-1½ | (144) |
| 3684.25 | A | 25 | 4.92 | 8.27 | 3½-3½ | $c^2F-z^2D^o$ |
| 3715.45 | A | 20 | 4.91 | 8.23 | 2½-1½ | (145) |
| 3668.02 | P | | 4.91 | 8.27 | 2½-2½ | |
| *3858.19 | A | 20 | 4.91 | 8.28 | 2½-1½? | $c^2F-z^2P^o$ (146) |
| 3825.92 | P | | 4.92 | 8.33 | 3½-4½ | $c^2F-y^4F^o$ |
| 3815.45 | P | | 4.91 | 8.32 | 2½-3½ | (147) |
| 3833.18 | P | | 4.92 | 8.32 | 3½-3½ | |
| 3818.29 | P | | 4.91 | 8.32 | 2½-2½ | |
| 3834.04 | A | 10 | 4.92 | 8.32 | 3½-2½ | |
| 3817.32 | A | 7 | 4.91 | 8.32 | 2½-1½ | |

| Laboratory I A | Ref | Int | E P Low | High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Cr II** continued | | | | | | |
| 3461.28 | A | 3 | 4.92 | 8.49 | 3½-3½ | $c^2F-z^2F^o$ |
| *3468.25 | A | 2 | 4.91 | 8.47 | 2½-2½ | (148) |
| m3482.56 | P | Cr+ | 4.92 | 8.47 | 3½-2½ | |
| 3445.20 | P | | 4.91 | 8.49 | 2½-3½ | |
| 3374.99 | A | 8 | 4.92 | 8.58 | 3½-4½ | $c^2F-x^4F^o$ |
| 3377.36 | A | 5 | 4.92 | 8.58 | 3½-2½ | (149) |
| *3376.72 | A | 5 | 4.91 | 8.56 | 2½-1½ | |
| 3308.95 | A | 50 | 4.92 | 8.65 | 3½-4½ | $c^2F-y^2G^o$ |
| 3314.57 | A | 35 | 4.91 | 8.63 | 2½-3½ | (150) |
| 3329.45 | A | 4 | 4.92 | 8.83 | 3½-3½ | |
| 3275.92 | A | 10 | 4.92 | 8.69 | 3½-4½ | $c^2F-y^2H^o$ (151) |
| 3258.01 | A | 3 | 4.91 | 8.69 | 2½-3½ | $c^2F-x^4G^o$ |
| m3269.75 | P | Cr+ | 4.91 | 8.68 | 2½-2½ | (152) |
| 3227.48 | A | 3 | 4.92 | 8.75 | 3½-3½ | $c^2F-y^2F^o$ |
| 3241.38 | A | 4 | 4.91 | 8.71 | 2½-2½ | (153) |
| 3255.62 | A | 3 | 4.92 | 8.71 | 3½-2½ | |
| 3213.46 | A | 3 | 4.91 | 8.75 | 2½-3½ | |
| 3044.24 | A | 10 | 4.92 | 8.98 | 3½-4½ | $c^2F-x^2G^o$ |
| 3038.04 | A | 6 | 4.91 | 8.97 | 2½-3½ | (154) |
| 4227.73 | A | 1 | 4.96 | 7.88 | 6½-5½ | $b^2I-z^4H^o$ (155) |
| 3650.37 | A | 40 | 4.96 | 8.34 | 6½-6½ | $b^2I-z^2I^o$ |
| 3664.95 | A | 30 | 4.97 | 8.33 | 5½-5½ | (156) |
| 3661.44 | A | 3 | 4.96 | 8.33 | 6½-5½ | |
| 3653.85 | P | | 4.97 | 8.34 | 5½-6½ | |
| *3503.36 § | A | 3 | 4.96 | 8.49 | 6½-5½ | $b^2I-z^2H^o$ |
| 3539.00 | A | 4 | 4.97 | 8.45 | 5½-4½ | (157) |
| *3508.81 | A | 1 | 4.97 | 8.49 | 5½-5½ | |
| *3310.65 | A | 35 | 4.96 | 8.69 | 6½-5½ | $b^2I-y^2H^o$ |
| 3314.06 | A | 18 | 4.97 | 8.69 | 5½-4½ | (158) |
| 3258.77 | A | 30 | 4.98 | 8.75 | 6½-5½ | $b^2I-x^4G^o$ |
| 3283.04 | A | 20 | 4.97 | 8.73 | 5½-4½ | (159) |
| 3261.56 | A | 4 | 4.97 | 8.75 | 5½-5½ | |
| *2965.19 | A | 2 | 4.96 | 9.13 | 6½-6½ | $b^2I-1^o$ (160) |
| 4195.41 | A | 10 | 5.30 | 8.24 | 2½-2½ | $b^2D-y^4P^o$ |
| 4278.10 | A | 1 | 5.31 | 8.19 | 1½-1½ | (161) |
| 4145.77 | A | 25 | 5.30 | 8.27 | 2½-2½ | $b^2D-z^2D^o$ |
| 4234.85 | A | 20 | 5.31 | 8.23 | 1½-1½ | (162) |
| 4209.02 | A | 3 | 5.30 | 8.23 | 2½-1½ | |
| 4161.05 | A | 2 | 5.31 | 8.27 | 1½-2½ | |
| 4135.77 | P | | 5.30 | 8.28 | 2½-1½ | $b^2D-z^2P^o$ |
| 4185.50 | P | | 5.31 | 8.26 | 1½- ½ | (163) |
| 4151.00 | A | 5 | 5.31 | 8.28 | 1½-1½ | |
| 4089.49 | A | 2 | 5.30 | 8.31 | 2½-2½ | $b^2D-y^4G^o$ (184) |
| 4081.21 | A | 1 | 5.30 | 8.32 | 2½-3½ | $b^2D-y^4F^o$ |
| 4082.30 | A | 10 | 5.30 | 8.32 | 3½-2½ | (165) |
| 4098.44 | A | 8 | 5.31 | 8.32 | 1½-1½ | |
| 4002.48 | A | 5 | 5.30 | 8.38 | 2½-3½ | $b^2D-x^4D^o$ |
| 4017.98 | A | 3 | 5.31 | 8.38 | 1½-2½ | (166) |
| 3865.59 | A | 75 | 5.30 | 8.49 | 2½-3½ | $b^2D-z^2F^o$ |
| 3905.84 | A | 25 | 5.31 | 8.47 | 1½-2½ | (167) |
| 3892.14 | A | 4 | 5.30 | 8.47 | 2½-2½ | |
| 3701.90 | A | 4 | 5.30 | 8.63 | 2½-3½ | $b^2D-y^2G^o$ (168) |
| 3694.98 | A | 4 | 5.30 | 8.64 | 2½-2½ | $b^2D-y^2D^o$ |
| 3707.13 | A | 3 | 5.31 | 8.64 | 1½-2½ | (169) |
| m3631.48 | P | Cr+ | 5.30 | 8.69 | 2½-3½ | $b^2D-x^4G^o$ |
| 3657.94 | A | 1 | 5.31 | 8.68 | 1½-2½ | (170) |
| 3576.23 | P | | 5.30 | 8.75 | 2½-3½ | $b^2D-y^2F^o$ |
| 3622.45 | A | 1 | 5.31 | 8.71 | 1½-2½ | (171) |
| 3610.85 | P | | 5.30 | 8.71 | 2½-2½ | |
| 3276.28 | A | 1 | 5.30 | 9.06 | 2½-1½ | $b^2D-w^4D^o$ |
| *3286.34 § | A | 0 | 5.31 | 9.06 | 1½- ½ | (172) |
| 3202.52 | A | 15 | 5.30 | 9.15 | 2½-3½ | $b^2D-x^2F^o$ |
| 3178.79 | A | 7 | 5.31 | 9.19 | 1½-2½ | (173) |
| 3169.85 | A | 2w | 5.30 | 9.19 | 2½-2½ | |
| 3190.69 | A | 6 | 5.31 | 9.17 | 1½-2½ | $b^2D-w^4F^o$ (174) |
| 3141.80 | A | 4 | 5.30 | 9.22 | 2½-1½ | $b^2D-x^4P^o$ (175) |
| 4761.42 | A | 1 | 5.65 | 8.24 | 2½-2½ | $c^2D-y^4P^o$ |
| 4832.97 | P | | 5.64 | 8.19 | 1½-1½ | (176) |
| 4697.62 | A | 2 | 5.65 | 8.27 | 2½-2½ | $c^2D-z^2D^o$ (177) |
| 4884.77 | A | 1 | 5.65 | 8.28 | 2½-1½ | $c^2D-z^2P^o$ |
| 4715.12 | D | 1 | 5.84 | 8.26 | 1½- ½ | (178) |
| 4671.36 | P | | 5.64 | 8.28 | 1½-1½ | |
| 4341.09 | A | 7 | 5.65 | 8.49 | 2½-3½ | $c^2D-z^2P^o$ |
| *4382.93 § | A | 3 | 5.64 | 8.47 | 1½-2½ | (179) |
| 4374.61 | P | | 5.65 | 8.47 | 2½-2½ | |
| 4204.83 | P | | 5.65 | 8.58 | 2½-3½ | $c^2D-x^4F^o$ |
| 4199.02 | P | | 5.64 | 8.58 | 1½-2½ | (180) |
| 4209.84 | P | | 5.65 | 8.58 | 2½-2½ | |
| 4222.00 | A | 1 | 5.64 | 8.56 | 1½-1½ | |
| 4232.98 | P | | 5.65 | 8.56 | 2½-1½ | |

| Laboratory I A | Ref | Int | E P Low | High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Cr II** continued | | | | | | |
| 4127.08 | A | 3 | 5.65 | 8.64 | 2½-2½ | $c^2D-y^2D^o$ |
| 4170.86 | A | 1 | 5.64 | 8.60 | 1½-1½ | (181) |
| 4181.50 | A | 1 | 5.65 | 8.60 | 2½-1½ | |
| 4116.66 | A | 2 | 5.64 | 8.64 | 1½-2½ | |
| 4048.02 | P | | 5.65 | 8.69 | 2½-3½ | $c^2D-x^4G^o$ |
| 4056.07 | A | 4 | 5.64 | 8.68 | 1½-2½ | (182) |
| 4066.16 | P | | 5.65 | 8.68 | 2½-2½ | |
| 3979.51 | A | 20 | 5.65 | 8.75 | 2½-3½ | $c^2D-y^2F^o$ |
| *4012.50 § | A | 30 | 5.64 | 8.71 | 1½-2½ | (183) |
| 4022.36 | A | 3 | 5.85 | 8.71 | 2½-2½ | |
| 3522.13 | A | 7 | 5.65 | 9.15 | 2½-3½ | $c^2D-x^2F^o$ (184) |
| m3484.16 | P | Cr+ | 5.65 | 9.19 | 2½-3½ | $c^2D-w^4F^o$ |
| *3489.45 | A | 2 | 5.64 | 9.17 | 1½-2½ | (185) |
| 3125.79 | A | 5 | 5.65 | 9.59 | 2½-1½ | $c^2D-y^2P^o$ |
| 3113.59 | A | 5 | 5.64 | 9.60 | 1½- ½ | (186) |
| 6089.69 | A | 15 | 6.46 | 8.49 | 4½-5½ | $d^2G-z^2H^o$ |
| 6179.17 | A | 10 | 6.46 | 8.45 | 3½-4½ | (187) |
| 6188.00 | P | | 6.46 | 8.45 | 4½-4½ | |
| 6081.51 | A | 3 | 6.46 | 8.49 | 4½-3½ | $d^2G-z^2F^o$ |
| 6138.77 | A | 2 | 6.46 | 8.47 | 3½-2½ | (188) |
| 5620.63 | A | 12 | 6.46 | 8.65 | 4½-4½ | $d^2G-y^2G^o$ |
| 5678.42 | A | 10 | 6.46 | 8.63 | 3½-3½ | (189) |
| 4901.65 | A | 15 | 6.46 | 8.98 | 4½-4½ | $d^2G-x^2G^o$ |
| 4912.49 | A | 12 | 6.46 | 8.97 | 3½-3½ | (190) |
| 4465.78 | A | 4 | 6.46 | 9.22 | 4½-5½ | $d^2G-x^2H^o$ |
| 4511.82 | P | | 6.46 | 9.19 | 3½-4½ | (191) |
| 4516.56 | P | | 6.46 | 9.19 | 4½-4½ | |
| 4256.16 | A | 5 | 6.46 | 9.36 | 4½-4½ | $d^2G-w^2G^o$ |
| 4268.93 | A | 1 | 6.46 | 9.35 | 3½-3½ | (192) |
| 4070.90 | A | 10 | 6.46 | 9.49 | 4½-3½ | $d^2G-w^2F^o$ |
| 4049.14 | A | 18 | 6.46 | 9.50 | 3½-2½ | (193) |
| 4067.05 | P | | 6.46 | 9.49 | 3½-3½ | |
| 4038.03 | A | 25 | 6.46 | 9.52 | 4½-5½ | $d^2G-w^2H^o$ |
| 4003.33 | A | 25 | 6.46 | 9.54 | 3½-4½ | (194) |
| 4007.04 | P | | 6.46 | 9.54 | 4½-4½ | |
| 3089.75 | A | 1 | 6.46 | 10.45 | 4½-3½ | $d^2G-u^2F^o$ (195) |
| 6418.87 | A | 7 | 6.66 | 8.58 | 4½-4½ | $c^4F-x^4F^o$ |
| 6271.83 | A | 5 | 6.61 | 8.58 | 3½-3½ | (196) |
| 6168.46 | A | 2 | 6.58 | 8.58 | 2½-2½ | |
| 6415.59 | A | 1 | 6.66 | 8.58 | 4½-3½ | |
| 6282.92 | A | 2 | 6.61 | 8.58 | 3½-2½ | |
| 6274.94 | A | 1 | 6.61 | 8.58 | 3½-4½ | |
| 6088.00 | A | 7 | 6.66 | 8.69 | 4½-5½ | $c^4F-y^2H^o$ |
| 6069.69 | A | 1 | 6.66 | 8.69 | 4½-4½ | (197) |
| 5895.90 | A | 4 | 6.66 | 8.75 | 4½-5½ | $c^4F-x^4G^o$ |
| 5841.86 | A | 5 | 6.61 | 8.73 | 3½-4½ | (198) |
| 5827.24 | A | 5 | 6.58 | 8.69 | 2½-3½ | |
| 5110.43 | A | 2 | 6.66 | 9.07 | 4½-3½ | $c^4F-w^4D^o$ (199) |
| 4857.60 | A | 2 | 6.66 | 9.20 | 4½-4½ | $c^4F-w^4F^o$ (200) |
| 5137.09 | A | 7 | 6.79 | 9.20 | 2½-2½ | $c^4P-x^4P^o$ |
| 5091.14 | A | 2 | 6.80 | 9.22 | 1½-1½ | (201) |
| 5076.15 | A | 4 | 6.79 | 9.22 | 2½-1½ | |

Strongest Unclassified Lines of **Cr II**

| | | | |
|---|---|---|---|
| 6305.60 | A | 4 | |
| 5913.87 | A | 3 | |
| 4952.78 | A | 10 | |
| 3814.00 | A | 12 | |
| 3801.21 | A | 10 | Cr II? |
| 3778.69 | A | 6 | |
| 3750.56 | A | 12 | |
| 3711.29 | A | 7 | |
| 3495.56 | A | 20 | |
| 3198.00 | A | 15 | |

| Mn I | I P | 7.40 | Anal B | List B | May 1941 | |
|---|---|---|---|---|---|---|
| 5394.674 | B | 10 | 0.00 | 2.29 | 2½-3½ | $a^6S-z^8P^o$ |
| 5432.548 | B | 4 | 0.00 | 2.27 | 2½-2½ | (1) |
| 4030.755 // | B | 200R | 0.00 | 3.06 | 2½-3½ | $a^6S-z^6P^o$ |
| 4033.073 | B | 150R | 0.00 | 3.06 | 2½-2½ | (2) |
| 4034.490 | B | 100R | 0.00 | 3.06 | 2½-1½ | |
| 3224.761 | B | 10 | 0.00 | 3.83 | 2½-2½ | $a^6S-z^4P^o$ |
| 3216.946 | B | 8 | 0.00 | 3.84 | 2½-1½ | (3) |
| 5341.065 | B | 20 | 2.11 | 4.42 | 4½-3½ | $a^6D-y^6P^o$ |
| 5420.362 | B | 10 | 2.13 | 4.41 | 3½-2½ | (4) |
| *5481.396 | B | 4 | 2.15 | 4.41 | 2½-1½ | |
| 5407.424 | B | 5 | 2.13 | 4.42 | 3½-3½ | |
| 5470.638 | B | 8 | 2.15 | 4.41 | 2½-2½ | |
| 5516.771 | B | 7 | 2.17 | 4.41 | 1½-1½ | |
| 5457.471 | B | 1 | 2.15 | 4.42 | 2½-3½ | |
| 5505.889 | B | 2 | 2.17 | 4.41 | 1½-2½ | |
| 5537.756 | B | 5 | 2.18 | 4.41 | ½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Mn I** continued | | | | | | |
| 4041.361 | B | 50r | 2.11 | 5.18 | 4½-4½ | $a^6D-z^6D^o$ |
| 4055.543 | B | 20 | 2.13 | 5.18 | 3½-3½ | (5) |
| 4063.528 | B | 8 | 2.15 | 5.19 | 2½-2½ | |
| 4068.003 | B | (2) | 2.17 | 5.20 | 1½-1½ | |
| 4070.379 | B | 5 | 2.18 | 5.21 | ½- ½ | |
| 4018.102 | B | 20 | 2.11 | 5.18 | 4½-3½ | |
| 4035.728 | B | 15 | 2.13 | 5.19 | 3½-2½ | |
| 4048.755 | B | 15 | 2.15 | 5.20 | 2½-1½ | |
| 4058.930 | B | 10 | 2.17 | 5.21 | 1½- ½ | |
| 4079.241 | B | 12 | 2.13 | 5.18 | 3½-4½ | |
| 4083.628 | B | 12 | 2.15 | 5.18 | 2½-3½ | |
| 4082.944 | B | 12 | 2.17 | 5.19 | 1½-2½ | |
| 4079.422 | B | 10 | 2.18 | 5.20 | ½-1½ | |
| 3806.719 | B | 20r | 2.11 | 5.35 | 4½-5½ | $a^6D-z^6F^o$ |
| 3823.513 | B | 20r | 2.13 | 5.36 | 3½-4½ | (6) |
| 3834.364 | B | 12 | 2.15 | 5.37 | 2½-3½ | |
| 3841.082 | B | 10 | 2.17 | 5.38 | 1½-2½ | |
| 3843.983 | B | 7 | 2.18 | 5.39 | ½-1½ | |
| 3790.215 | B | 10 | 2.11 | 5.36 | 4½-4½ | |
| 3809.592 | B | 10 | 2.13 | 5.37 | 3½-3½ | |
| 3823.893 | B | 10 | 2.15 | 5.38 | 2½-2½ | |
| 3833.862 | B | 8 | 2.17 | 5.39 | 1½-1½ | |
| 3839.777 | B | 8 | 2.18 | 5.39 | ½- ½ | |
| 3776.527 | B | (1) | 2.11 | 5.37 | 4½-3½ | |
| 3799.259 | B | 4 | 2.13 | 5.38 | 3½-2½ | |
| 3816.753 | B | 5 | 2.15 | 5.39 | 2½-1½ | |
| 3829.680 | B | 5 | 2.17 | 5.39 | 1½- ½ | |
| 3670.517 | B | 5 | 2.11 | 5.47 | 4½-4½ | $a^6D-z^4F^o$ |
| 3669.838 | B | 4 | 2.13 | 5.50 | 3½-3½ | (7) |
| 3669.399 | B | (1) | 2.15 | 5.52 | 2½-2½ | |
| 3639.14 | P | | 2.11 | 5.50 | 4½-3½ | |
| 3701.730 | B | 4 | 2.13 | 5.47 | 3½-4½ | |
| 3692.812 | B | (1) | 2.15 | 5.50 | 2½-3½ | |
| 3685.212 | B | (1) | 2.17 | 5.52 | 1½-2½ | |
| 3678.46 | P | | 2.18 | 5.53 | ½-1½ | |
| 3577.880 | B | 40 | 2.11 | 5.55 | 4½-3½ | $a^6D-x^6P^o$ |
| 3586.543 | B | 30 | 2.13 | 5.57 | 3½-2½ | (8) |
| 3595.119 | B | 20 | 2.15 | 5.59 | 2½-1½ | |
| 3607.537 | B | 20 | 2.13 | 5.55 | 3½-3½ | |
| 3608.494 | B | 20 | 2.15 | 5.57 | 2½-2½ | |
| 3610.299 | B | 20 | 2.17 | 5.59 | 1½-1½ | |
| 3629.741 | B | 12 | 2.15 | 5.55 | 2½-3½ | |
| 3623.792 | B | 15 | 2.17 | 5.57 | 1½-2½ | |
| 3619.284 | B | 15 | 2.18 | 5.59 | ½-1½ | |
| 3330.668 | B | 8 | 2.15 | 5.88 | 2½-1½ | $a^6D-1^o$ |
| 3343.731 | B | 4 | 2.17 | 5.86 | 1½-1½ | (9) |
| 3351.424 | C | (1) | 2.18 | 5.86 | ½-1½ | |
| 3280.756 | B | 5 | 2.13 | 5.89 | 3½-2½ | $a^8D-2^o$ |
| 3311.905 | B | 8 | 2.17 | 5.89 | 1½-2½ | (10) |
| 3296.027 | B | 4 | 2.15 | 5.90 | 2½-1½ | $a^6D-4^o$ |
| 3308.785 | B | (3) | 2.17 | 5.90 | 1½-1½ | (11) |
| 3316.324 | B | 4 | 2.18 | 5.90 | ½-1½ | |
| 3254.039 | B | 5 | 2.11 | 5.90 | 4½-3½ | $a^6D-3^o$ |
| 3278.553 | B | 5 | 2.13 | 5.90 | 3½-2½ | (12) |
| 3296.882 | B | 8 | 2.15 | 5.90 | 2½-3½ | |
| 3240.399 | B | 7 | 2.11 | 5.91 | 4½- | $a^8D-5^o$ |
| 3264.711 | B | 10 | 2.13 | 5.91 | 3½- | (13) |
| 3228.090 | B | 30 | 2.11 | 5.93 | 4½-5½ | $a^8D-y^6F^o$ |
| 3236.778 | B | 20 | 2.13 | 5.95 | 3½-4½ | (14) |
| 3248.516 | B | 15 | 2.15 | 5.95 | 2½-3½ | |
| 3256.137 | B | 12 | 2.17 | 5.98 | 1½-2½ | |
| 3260.231 | B | 10 | 2.18 | 5.98 | ½-1½ | |
| 3212.884 | B | 15 | 2.11 | 5.95 | 4½-4½ | |
| 3230.719 | B | 12 | 2.13 | 5.95 | 3½-3½ | |
| 3243.780 | B | 12 | 2.15 | 5.98 | 2½-2½ | |
| 3252.948 | B | 12 | 2.17 | 5.96 | 1½-1½ | |
| 3258.413 | 8 | 10 | 2.18 | 5.96 | ½- ½ | |
| 3206.908 | B | 5 | 2.11 | 5.95 | 4½-3½ | |
| 3226.034 | B | 6 | 2.13 | 5.96 | 3½-2½ | |
| 3240.616 | B | 5 | 2.15 | 5.96 | 2½-1½ | |
| 3251.135 | B | 5 | 2.17 | 5.96 | 1½- ½ | |
| 3044.567 | B | 50 | 2.11 | 6.16 | 4½-3½ | $a^6D-w^6P^o$ |
| 3054.362 | B | 40 | 2.13 | 6.17 | 3½-2½ | (15) |
| 3062.119 | B | 20 | 2.15 | 6.18 | 2½-1½ | |
| 3066.019 | 8 | 20 | 2.13 | 6.16 | 3½-3½ | |
| 3070.266 | 8 | 20 | 2.15 | 6.17 | 2½-2½ | |
| 3073.126 | B | 20 | 2.17 | 6.18 | 1½-1½ | |
| 3082.052 | 8 | (2) | 2.15 | 6.16 | 2½-3½ | |
| 3081.330 | 8 | 10 | 2.17 | 6.17 | 1½-2½ | |
| 3079.627 | B | 15 | 2.18 | 6.18 | ½-1½ | |
| 4823.516 | B | 50 | 2.31 | 4.87 | 4½-3½ | $z^8P^o-e^8S$ |
| 4783.420 | 8 | 50 | 2.29 | 4.87 | 3½-3½ | (18) |
| 4754.042 | 8 | 50 | 2.27 | 4.87 | 2½-3½ | |
| 4370.875 | B | (1) | 2.29 | 5.11 | 3½-2½ | $z^8P^o-e^8S$ † (17) |
| 3569.493 | B | 60 | 2.31 | 5.77 | 4½-5½ | $z^8P^o-e^8D$ |
| 3547.802 | B | 50 | 2.29 | 5.77 | 3½-4½ | (18) |
| 3531.848 | B | 30 | 2.27 | 5.77 | 2½-3½ | |
| 3569.804 | B | 40 | 2.31 | 5.77 | 4½-4½ | |
| 3548.029 | B | 40 | 2.29 | 5.77 | 3½-3½ | |
| 3531.898 | 8 | 50 | 2.27 | 5.77 | 2½-2½ | |
| 3570.041 | B | 20 | 2.31 | 5.77 | 4½-3½ | |
| 3548.202 | B | 30 | 2.29 | 5.77 | 3½-2½ | |
| 3532.121 | B | 50 | 2.27 | 5.77 | 2½-1½ | |
| 3178.495 | B | 15 | 2.31 | 8.19 | 4½-3½ | $z^8P^o-f^8S$ |
| 3161.039 | B | 15 | 2.29 | 8.19 | 3½-3½ | (19) |
| 3148.179 | 8 | 15 | 2.27 | 8.19 | 2½-3½ | |
| 4965.861 | 8 | 3 | 2.88 | 5.38 | 3½-4½ | $a^4D-z^8F^o$ |
| 5004.907 | B | 3 | 2.91 | 5.37 | 2½-3½ | (20) |
| 5029.812 | 8 | (1) | 2.93 | 5.38 | 1½-2½ | |
| 5043.589 | 8 | (1) | 2.94 | 5.39 | ½-1½ | |
| 4942.418 | B | (2) | 2.88 | 5.37 | 3½-3½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Mn I** continued | | | | | | |
| 4762.376 | B | 30 | 2.88 | 5.47 | 3½-4½ | $a^4D-z^4F^o$ |
| 4766.430 | B | 20 | 2.91 | 5.50 | 2½-3½ | (21) |
| 4765.859 | B | 10 | 2.93 | 5.52 | 1½-2½ | |
| 4761.526 | B | 10 | 2.94 | 5.53 | ½-1½ | |
| 4709.715 | B | 10 | 2.88 | 5.50 | 3½-3½ | |
| 4727.478 | B | 10 | 2.91 | 5.52 | 2½-3½ | |
| 4739.108 | B | 8 | 2.93 | 5.53 | 1½-1½ | |
| 4671.688 | B | 3 | 2.88 | 5.52 | 3½-2½ | |
| 4701.159 | B | 3 | 2.91 | 5.53 | 2½-1½ | |
| 4451.586 | B | 15 | 2.88 | 5.85 | 3½-3½ | $a^4D-z^4D^o$ |
| 4464.677 | B | 8 | 2.91 | 5.67 | 2½-2½ | (22) |
| 4470.138 | B | 6 | 2.93 | 5.89 | 1½-1½ | |
| 4472.792 | B | 5 | 2.94 | 5.70 | ½- ½ | |
| 4414.879 | B | 10 | 2.88 | 5.87 | 3½-2½ | |
| 4436.352 | B | 8 | 2.91 | 5.69 | 2½-1½ | |
| 4453.005 | B | 6 | 2.93 | 5.70 | 1½- ½ | |
| 4503.220 | B | 7 | 2.91 | 5.65 | 2½-3½ | |
| 4498.897 | B | 7 | 2.93 | 5.67 | 1½-2½ | |
| 4490.081 | B | 5 | 2.94 | 5.69 | ½-1½ | |
| 4235.290 | B | 8 | 2.88 | 5.79 | 3½-2½ | $a^4D-y^4P^o$ |
| 4235.140 | B | 6 | 2.91 | 5.82 | 2½-1½ | (23) |
| 4239.725 | B | 5 | 2.93 | 5.84 | 1½- ½ | |
| 4281.099 | B | 8 | 2.91 | 5.79 | 2½-2½ | |
| 4285.924 | B | 8 | 2.93 | 5.82 | 1½-1½ | |
| 4257.859 | B | 5 | 2.94 | 5.84 | ½- ½ | |
| 4318.550 | B | 3 | 2.93 | 5.79 | 1½-2½ | |
| 4284.084 | B | (4) | 2.94 | 5.82 | ½-1½ | |
| 3696.568 | B | 8 | 2.88 | 6.21 | 3½-4½ | $a^4D-y^4P^o$ |
| 3728.889 | B | (1) | 2.91 | 6.22 | 2½-3½ | (24) |
| 3750.763 | B | (2) | 2.93 | 6.22 | 1½-2½ | |
| 3763.377 | B | (2) | 2.94 | 6.22 | ½-1½ | |
| 3694.115 | B | (1) | 2.88 | 6.22 | 3½-3½ | |
| 3726.931 | B | (1) | 2.91 | 6.22 | 2½-2½ | |
| 3601.782 | C | (1) | 2.91 | 6.33 | 2½-2½ | $a^4D-x^4P^o$ |
| 3605.691 | B | (1) | 2.93 | 6.35 | 1½-1½ | (25) |
| 3583.876 | B | (2) | 2.91 | 8.35 | 2½-1½ | |
| 3589.973 | C | (1) | 2.93 | 6.37 | 1½- ½ | |
| 3407.960 | C | (1) | 2.91 | 6.53 | 2½-2½ | $a^4D-v^6P^o$ (28) |
| 6021.802 | C | 50 | 3.08 | 5.11 | 3½-2½ | $z^8P^o-e^6S$ |
| 6016.637 | C | 40 | 3.06 | 5.11 | 2½-2½ | (27) |
| 6013.498 | B | 30 | 3.06 | 5.11 | 1½-2½ | |
| 4462.022 | B | 20 | 3.06 | 5.83 | 3½-4½ | $z^6P^o-e^6D$ |
| 4458.262 | B | 12 | 3.08 | 5.83 | 2½-3½ | (28) |
| 4455.821 | B | 8 | 3.06 | 5.83 | 1½-2½ | |
| 4461.085 | B | 8 | 3.06 | 5.83 | 3½-3½ | |
| 4457.549 | B | 8 | 3.06 | 5.83 | 2½-2½ | |
| 4455.318 | B | 8 | 3.08 | 5.83 | 1½-1½ | |
| 4460.377 | B | 3 | 3.06 | 5.83 | 3½-2½ | |
| 4457.045 | B | 5 | 3.08 | 5.83 | 2½-1½ | |
| 4455.012 | B | 5 | 3.08 | 5.83 | 1½- ½ | |
| 4081.742 | B | 5 | 3.06 | 8.10 | 3½-2½ | $z^8P^o-f^6S$ |
| 4059.392 | B | 5 | 3.06 | 8.10 | 2½-2½ | (29) |
| 4057.950 | B | 4 | 3.08 | 8.10 | 1½-2½ | |
| 3317.305 | B | 10n | 3.06 | 6.78 | 3½-4½ | $z^8P^o-g^6D$ |
| 3314.878 | C | 6n | 3.06 | 8.78 | 2½-3½ | (30) |
| *3313.534 | B | (4/4) | 3.06 | 6.78 | 1½-2½ | |
| 3318.440 | C | 5n | 3.06 | 6.78 | 3½-3½ | |
| 3314.393 | C | 6n | 3.06 | 6.78 | 2½-2½ | |
| 5504.21 | B | (2) | 3.12 | 5.36 | 5½-4½ | $a^4G-z^6P^o$ |
| *5481.396 | B | 4 | 3.12 | 5.37 | 4½-3½ | (31) |
| 5460.844 | C | (1) | 3.12 | 5.38 | 3½-2½ | |
| 5444.096 | C | (1n) | 3.12 | 5.39 | 2½-1½ | |
| 5510.174 | C | (1) | 3.12 | 5.36 | 4½-4½ | |
| 5255.325 | B | 4 | 3.12 | 5.47 | 5½-4½ | $a^4G-z^4F^o$ |
| 5196.591 | B | 3 | 3.12 | 5.50 | 4½-3½ | (32) |
| 5150.890 | B | 3 | 3.12 | 5.52 | 3½-2½ | |
| *5117.937 | B | 3 | 3.12 | 5.53 | 2½-1½ | |
| 5260.771 | B | (3) | 3.12 | 5.47 | 4½-4½ | |
| 5197.318 | B | 1 | 3.12 | 5.50 | 3½-3½ | |
| 5149.13 | B | (1) | 3.12 | 5.52 | 2½-2½ | |
| 3988.828 | B | 3 | 3.12 | 6.21 | 5½-4½ | $a^4G-y^4F^o$ |
| 3987.098 | B | (1) | 3.12 | 6.22 | 4½-3½ | (33) |
| 3985.241 | B | 3 | 3.12 | 6.22 | 3½-2½ | |
| 3983.583 | B | (2) | 3.12 | 6.22 | 2½-1½ | |
| 3989.958 | C | (1) | 3.12 | 6.21 | 4½-4½ | |
| 3987.464 | B | (2) | 3.12 | 6.22 | 3½-3½ | |
| 3984.177 | B | (1) | 3.12 | 6.22 | 2½-2½ | |
| 3986.395 | C | (2) | 3.12 | 6.22 | 2½-3½ | |
| 3047.035 | B | 15 | 3.12 | 7.17 | 5½-5½ | $a^4G-z^4G^o$ |
| 3045.593 | B | 12 | 3.12 | 7.17 | 4½-4½ | (34) |
| 3043.356 | B | 9 | 3.12 | 7.18 | 3½-3½ | |
| 3040.603 | B | 12 | 3.12 | 7.18 | 2½-2½ | |
| 3043.770 | B | (3) | 3.12 | 7.17 | 5½-4½ | |
| 3043.143 | B | (3) | 3.12 | 7.18 | 4½-3½ | |
| 3041.224 | B | 4 | 3.12 | 7.18 | 3½-2½ | |
| 3048.864 | B | 5 | 3.12 | 7.17 | 4½-5½ | |
| 3045.808 | B | 5 | 3.12 | 7.17 | 3½-4½ | |
| 3042.733 | B | 4 | 3.12 | 7.18 | 2½-3½ | |
| 3022.749 | B | 10 | 3.12 | 7.30 | 5½-6½ | $a^4G-z^4H^o$ |
| 3018.454 | B | 8 | 3.12 | 7.21 | 4½-5½ | (35) |
| 3011.378 | B | 7 | 3.12 | 7.23 | 3½-4½ | |
| 3007.855 | B | 8 | 3.12 | 7.22 | 2½-3½ | |
| 3014.868 | B | 5 | 3.12 | 7.21 | 5½-5½ | |
| 3011.182 | B | 5 | 3.12 | 7.22 | 4½-4½ | |
| 3008.285 | B | 4 | 3.12 | 7.22 | 3½-3½ | |
| 5388.521 | B | (3) | 3.38 | 5.85 | 2½-3½ | $a^4P-z^4D^o$ |
| 5348.089 | B | (1) | 3.38 | 5.87 | 1½-2½ | (36) |
| 5317.095 | B | (2) | 3.37 | 5.89 | ½-1½ | |
| 5334.804 | C | (1) | 3.38 | 5.67 | 2½-2½ | |
| 5307.53 | P | | 3.36 | 5.89 | 1½-1½ | |
| 5292.861 | C | (1) | 3.37 | 5.70 | ½- ½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Mn I** continued | | | | | | |
| 4147.532 | B | (3) | 3.36 | 6.33 | 2½-3½ | $a^4P-x^4P^o$ |
| 4131.430 | B | (1) | 3.36 | 8.35 | 1½-1½ | (37) |
| 4123.543 | B | (1) | 3.36 | 6.35 | 2½-1½ | |
| *4110.903 | B | (2) | 3.36 | 6.37 | 1½- ½ | |
| 4155.525 | B | (2) | 3.36 | 6.33 | 1½-2½ | |
| 4137.257 | B | (3) | 3.37 | 6.35 | ½-1½ | |
| 3115.465 | B | 6 | 3.36 | 7.32 | 2½-3½ | $a^4P-x^4F^o$ |
| 3108.635 | B | (1) | 3.36 | 7.33 | 2½-2½ | (38) |
| 3107.774 | B | (1) | 3.36 | 7.33 | 1½-1½ | |
| 6491.712 | B | 15 | 3.75 | 5.85 | 3½-3½ | $b^4D-z^4D^o$ |
| 6440.974 | B | 8 | 3.76 | 5.67 | 2½-2½ | (39) |
| 6384.669 | B | 4 | 3.76 | 5.69 | 1½-1½ | |
| 6356.057 | C | (2) | 3.76 | 5.70 | ½- ½ | |
| 6413.92 | C | (3) | 3.75 | 5.67 | 3½-2½ | |
| 6382.169 | B | (3) | 3.76 | 5.69 | 2½-1½ | |
| 6349.748 | C | (1) | 3.76 | 5.70 | 1½- ½ | |
| 6519.371 | B | (3) | 3.76 | 5.85 | 2½-3½ | |
| 6443.492 | B | (2) | 3.76 | 5.67 | 1½-2½ | |
| 6391.214 | C | (1) | 3.76 | 5.69 | ½-1½ | |
| 4431.922 | B | (1) | 3.76 | 6.54 | 1½-1½ | $b^4D-y^6P^o$ |
| 4436.025 | B | (2n) | 3.76 | 6.54 | ½-1½ | (40) |
| 3463.748 | C | (1) | 3.76 | 7.32 | 2½-3½ | $b^4D-x^4F^o$ |
| 3455.04 | C | (2) | 3.76 | 7.33 | 1½-2½ | (41) |
| 5377.628 | B | 6 | 3.83 | 6.12 | 2½-1½ | $z^4P^o-e^4S$ |
| 5399.489 | B | 4 | 3.84 | 6.12 | 1½-1½ | (42) |
| 5413.687 | B | 2 | 3.84 | 6.12 | ½-1½ | |
| 4844.315 | B | (2) | 3.83 | 6.37 | 2½-2½ | $z^4P^o-e^4P$ |
| 4843.19 | B | (1n) | 3.84 | 6.38 | 1½-1½ | (43) |
| 4838.344 | B | (1) | 3.84 | 8.39 | ½- ½ | |
| 4825.593 | B | (1) | 3.83 | 6.38 | 2½-1½ | |
| 4826.898 | B | (2) | 3.84 | 6.39 | 1½- ½ | |
| 4862.054 | B | (3) | 3.84 | 6.37 | 1½-2½ | |
| 4854.604 | B | (2) | 3.84 | 8.38 | ½-1½ | |
| 3926.467 | B | 10 | 3.83 | 6.97 | 2½-2½ | $z^4P^o-1$ (44) |
| 3600.552 | B | 4 | 3.83 | 7.07 | 2½-3½ | $z^4P^o-e^4D$ |
| 3785.431 | B | (1) | 3.84 | 7.10 | 1½-2½ | (45) |
| 3774.845 | B | (1) | 3.83 | 7.10 | 2½-3½ | |
| 9243.29 | A | 150 | 4.31 | 5.65 | 4½-3½ | $a^4F-z^4D^o$ |
| 9172.09 | A | 100 | 4.33 | 5.67 | 3½-2½ | (46) |
| 9114.02 | A | 50 | 4.33 | 5.69 | 2½-1½ | |
| 9084.29 | A | 30 | 4.34 | 5.70 | 1½- ½ | |
| *4110.903 | B | (2) | 4.31 | 7.32 | 4½-4½ | $a^4F-x^4F^o$ |
| 4122.757 | C | (1) | 4.33 | 7.32 | 3½-3½ | (47) |
| 4123.279 | B | (1) | 4.33 | 7.33 | 2½-2½ | |
| 4105.365 | B | (3) | 4.31 | 7.32 | 4½-3½ | |
| 4113.876 | B | (2) | 4.33 | 7.33 | 3½-1½ | |
| 4045.133 | B | 4* | 4.31 | 7.36 | 4½-5½ | $a^4F-y^4G^o$ |
| 4048.999 | C | (2) | 4.33 | 7.37 | 3½-4½ | (48) |
| 4052.472 | B | (2) | 4.33 | 7.38 | 2½-3½ | |
| 4055.214 | B | (1) | 4.34 | 7.38 | 1½-2½ | |
| 8740.93 | A | 1000w | 4.42 | 5.83 | 3½-4½ | $y^6P^o-e^6D$ |
| 8703.78 | A | 500w | 4.41 | 5.83 | 2½-3½ | (49) |
| 8873.97 | A | 200w | 4.41 | 5.83 | 1½-2½ | |
| 8737.32 | A | 300w | 4.42 | 5.83 | 3½-3½ | |
| 8701.05 | A | 300w | 4.41 | 5.83 | 2½-2½ | |
| 8672.06 | A | 300w | 4.41 | 5.83 | 1½-1½ | |
| 8734.60 | A | 30w | 4.42 | 5.83 | 3½-2½ | |
| 8699.13 | A | 100w | 4.41 | 5.83 | 2½-1½ | |
| 8670.92 | A | 200w | 4.41 | 5.83 | 1½- ½ | |
| 7326.51 | A | 400 l | 4.42 | 6.10 | 3½-2½ | $y^6P^o-f^6S$ |
| 7302.89 | A | 300 l | 4.41 | 6.10 | 2½-2½ | (50) |
| 7283.80 | A | 250 l | 4.41 | 6.10 | 1½-2½ | |
| 6605.546 | D | 6n | 4.42 | 6.28 | 3½-2½ | $y^6P^o-g^8S$ |
| 6586.343 | B | (1) | 4.41 | 6.28 | 2½-2½ | (51) |
| 6570.834 | B | (1) | 4.41 | 6.28 | 1½-2½ | |
| 4565.73 | B | (1n) | 4.41 | 7.11 | 2½-1½ | $y^6P^o-e^4D$ (52) |
| 8431.20 | A | 20Ns | 5.11 | 6.58 | 2½-3½ | $e^6S-u^6P^o$ |
| 8409.88 | A | 15Ns | 5.11 | 6.58 | 2½-2½ | (53) |
| 8395.87 | A | 10Ns | 5.11 | 6.58 | 2½-1½ | |
| 7764.72 | A | 250nl | 5.35 | 6.94 | 5½-4½ | $z^6F^o-f^6D$ † |
| 7733.34 | A | 150nl | 5.36 | 6.96 | 4½-3½ | (54) |
| 7709.98 | A | 40Nl | 5.37 | 6.97 | 3½-2½ | |
| 7708.52 | A | 10Nl | 5.38 | 6.98 | 2½-1½ | |
| 7677.46 | A | 2Nl | 5.39 | 7.00 | 1½- ½† | |
| 7680.22 | A | 200 | 5.47 | 7.07 | 4½-3½ | $z^4F^o-e^4D$ † |
| 7712.42 | A | 100n | 5.50 | 7.10 | 3½-2½ | (55) |
| 7734.43 | A | 50n | 5.52 | 7.11 | 2½-1½ | |
| 7755.15 | A | 20Nl | 5.53 | 7.12 | 1½- ½ | |
| 8929.72 | A | 60n | 5.55 | 6.94 | 3½-4½ | $x^6P^o-f^8D$ † |
| 8926.08 | A | 15n | 5.57 | 6.96 | 2½-3½ | (58) |
| 8901.0 | A | 2p† | 5.59 | 6.97 | 1½-2½ | |
| 9439.58 | A | 30n | 5.85 | 6.96 | 3½-3½ | $z^4D^o-f^8D$ † |
| 9478.57 | A | 4n | 5.87 | 6.97 | 2½-2½ | (57) |
| 9535.72 | A | 5n | 5.89 | 6.98 | 1½-1½ | |
| 9338.47 | A | 40n | 5.65 | 6.97 | 3½-2½ | $z^4D^o-1$ |
| 9502.12 | A | 8n | 5.87 | 6.97 | 2½-2½ | (58) |
| 9633.02 | A | 4p† | 5.69 | 6.97 | 1½-2½ | |
| 8654.83 | A | 40n | 5.65 | 7.07 | 3½-3½ | $z^4D^o-e^4D$ † |
| 8659.38 | A | 10n | 5.67 | 7.10 | 2½-2½ | (59) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Mn I** continued | | | | | | |
| 9608.56 | A | 100n | 5.79 | 7.07 | 2½–3½ | $y^4P^o - e^4D$ † |
| 9876.50 | A | 40 | 5.82 | 7.10 | 1½–2½ | (60) |
| 9684.9 | A | 15 | 5.84 | 7.11 | ½–1½ | |
| **Strongest Unclassified Lines of Mn I** | | | | | | |
| 9686.3 | A | 15 | | | | |
| 8380.77 | A | 40 | | | | |
| 8212.43 | A | 40nl | | | | |
| 7942.91 | A | 25 | | | | |
| 7247.82 | A | 15 | | | | |
| 5818.844 | B | (5) | | | | |
| 5780.189 | B | (6) | | | | |
| 5738.286 | B | (6) | | | | |
| 5551.985 | B | (3) | | | | |
| 4626.544 | B | 4 | III | | | |
| 4605.363 | B | 4 | V | | | |
| 4411.878 | B | 3 | IV | | | |
| 4045.206 | B | 4* | V | | | |
| 4026.435 | B | 4 | V | | | |
| 3924.075 | B | 3 | IV | | | |
| 3801.907 | B | 4 | V | | | |
| 3731.932 | B | 5 | V | | | |
| 3718.930 | B | 5 | V | | | |
| 3693.667 | B | 6 | V | | | |
| 3676.959 | B | 4 | V | | | |
| 3660.404 | B | 5 | V | | | |
| 3420.795 | B | 4 | V | | | |
| 3345.352 | B | 4 | IV | | | |
| 3320.693 | B | 4 | IV | | | |
| 3303.278 | B | 3 | V | | | |
| 3298.224 | B | 5 | IV | | | |
| 3270.351 | B | 3 | V | | | |
| 3288.722 | B | 3 | V | | | |
| 3267.794 | B | 4 | V | | | |
| 3237.414 | B | 20n | IV | | | |
| 3235.003 | B | 10n<br>15n | IV<br>IV | | | |
| 3233.968 | B | 15n | IV | | | |
| 3142.670 | B | 4 | V | | | |
| 3101.557 | B | 5 | III† | | | |
| 3097.063 | B | 8 | IV | | | |

**Mn II** I P 15.6 Anal C Liet A Aug 1941

| | | | | | | |
|---|---|---|---|---|---|---|
| 3438.978 | A | 20 | 1.17 | 4.76 | 2–3 | $a^5S - z^7P^o$ |
| 3460.039 | A | 8 | 1.17 | 4.74 | 2–2 | (1) |
| 4083.87 | P | | 1.77 | 4.79 | 4–4 | $a^5D - z^7P^o$ |
| 4174.31 | P | | 1.80 | 4.76 | 3–3 | (2) |
| 4238.79 | P | | 1.82 | 4.74 | 2–2 | |
| 4128.14 | B | (2?) | 1.77 | 4.76 | 4–3 | |
| 4205.37 | P | | 1.80 | 4.74 | 3–2 | |
| 4128.87 | P | | 1.80 | 4.79 | 3–4 | |
| 4207.23 | P | | 1.82 | 4.76 | 2–3 | |
| 4260.47 | P | | 1.84 | 4.74 | 1–2 | |
| 3441.983 | A | 100 | 1.77 | 5.35 | 4–3 | $a^5D - z^5P^o$ |
| 3480.312 | A | 75 | 1.80 | 5.37 | 3–2 | (3) |
| 3474.124 | A | 40 | 1.82 | 5.38 | 2–1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Mn II** continued | | | | | | |
| 3474.037 | A | 50 | 1.80 | 5.35 | 3–3 | $a^5D - z^5P^o$ |
| 3482.905 | A | 40 | 1.82 | 5.37 | 2–2 | cont |
| 3488.676 | A | 40 | 1.84 | 5.38 | 1–1 | |
| 3498.814 | A | 20 | 1.82 | 5.35 | 2–3 | |
| 3497.536 | A | 25 | 1.84 | 5.37 | 1–2 | |
| 3495.831 | A | 40 | 1.85 | 5.38 | 0–1 | |
| 7415.78 | P | | 3.89 | 5.35 | 3–3 | $a^5P - z^5P^o$ |
| 7369.73 | P | | 3.69 | 5.37 | 2–2 | (4) |
| 7347.72 | P | | 3.70 | 5.38 | 1–1 | |
| 7353.52 | P | | 3.69 | 5.37 | 3–2 | |
| 7330.54 | P | | 3.69 | 5.38 | 2–1 | |
| 7432.27 | P | | 3.69 | 5.35 | 2–3 | |
| 7387.10 | P | | 3.70 | 5.37 | 1–2 | |
| 4755.728 | A | 0n | 5.37 | 7.97 | 5–6 | $a^5F - z^5G^o$ |
| 4764.7 | P | | 5.37 | 7.96 | 4–5 | (5) |
| 4738.29 | B | — | 5.36 | 7.96 | 3–4 | |
| 4730.361 | B | — | 5.35 | 7.96 | 2–3 | |
| 4727.9 | P | | 5.35 | 7.96 | 1–2 | |
| 4343.987 | A | 2N | 5.37 | 8.21 | 5–5 | $a^5F - z^5F^o$ |
| 4326.756 | B | (3) | 5.37 | 8.23 | 4–4 | (6) |
| 4292.246 | A | 0N | 5.36 | 8.23 | 3–3 | |
| 4283.772 | A | 0 | 5.35 | 8.23 | 2–2 | |
| 4284.425 | A | 0 | 5.35 | 8.23 | 1–1 | |
| 4325.1 | P | | 5.37 | 8.23 | 5–4 | |
| 4345.6 | P | | 5.37 | 8.21 | 4–5 | |
| 4300.197 | B | (1) | 5.36 | 8.23 | 3–4 | |
| 4206.375 | A | 0N | 5.37 | 8.31 | 5–4 | $a^5F - z^5D^o$ |
| 4259.203 | A | 0n | 5.37 | 8.27 | 4–3 | (7) |
| 4253.02 | C | (2) | 5.36 | 8.26 | 3–2 | |
| 4244.26 | C | (1) | 5.35 | 8.26 | 2–1 | |
| 3685.049 | A | -1N | 5.37 | 8.72 | 5–5 | $a^5F - y^5F^o$ |
| 3708.06 | C | (1) | 5.37 | 8.70 | 4–4 | (8) |
| 3709.88 | C | (1) | 5.36 | 8.68 | 3–3 | |
| 3717.53 | C | (1) | 5.35 | 8.67 | 2–2 | |
| 3724.81 | C | (1) | 5.35 | 8.66 | 1–1 | |
| 3706.91 | C | (1) | 5.37 | 8.70 | 5–4 | |
| 3729.49 | C | (1) | 5.37 | 8.68 | 4–3 | |
| 3725.29 | C | (1) | 5.36 | 8.87 | 3–2 | |
| 3686.20 | C | (1) | 5.37 | 8.72 | 4–5 | |
| *3509.971 | A | 0 | 5.37 | 8.89 | 5–4 | $a^5F - y^5D^o$ |
| 3482.06 | C | (1) | 5.37 | 8.92 | 4–3 | (9) |
| 3457.809 | A | 0n | 5.36 | 8.93 | 3–2 | |
| 3449.5 | P | | 5.35 | 8.93 | 2–1 | |
| 3446.0 | P | | 5.35 | 8.93 | 1–0 | |
| 3029.041 | A | 50 | 5.35 | 9.43 | 3–2 | $z^5P^o - e^5S$ |
| 3039.551 | A | 40 | 5.37 | 9.43 | 2–2 | (10) |
| 3046.266 | A | 30 | 5.38 | 9.43 | 1–2 | |
| 5302.320 | A | 30 | 9.82 | 12.15 | 5– | $e^7D - z^7F^o$ |
| 5299.278 | A | 25 | 9.82 | 12.15 | 4– | (11) |
| 5296.968 | A | 20 | 9.82 | 12.15 | 3– | |
| 5295.292 | A | 15 | 9.82 | 12.15 | 2– | |
| 5294.216 | A | 10 | 9.82 | 12.15 | 1– | |
| 3466.336 | A | 9 | 9.82 | 13.38 | 5– | $e^7D - y^7F^o$ |
| 3465.037 | A | 8 | 9.82 | 13.38 | 4– | (12) |
| 3464.043 | A | 7 | 9.82 | 13.38 | 3– | |
| 3463.330 | A | 6 | 9.82 | 13.38 | 2– | |
| 3462.878 | A | 5 | 9.82 | 13.38 | 1– | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Mn II** continued | | | | | | |
| 6122.438 | A | 40 | 10.14 | 12.16 | 4–5 | $e^5D - x^5P^o$ |
| 6125.855 | A | 25 | 10.14 | 12.16 | 3–4 | (13) |
| 6128.725 | A | 20 | 10.14 | 12.16 | 2–3 | |
| 6130.794 | A | 15 | 10.14 | 12.16 | 1–2 | |
| 6131.917 | A | 15 | 10.14 | 12.16 | 0–1 | |
| 6122.799 | A | 8 | 10.14 | 12.16 | 4–4 | |
| 6126.210 | A | 10 | 10.14 | 12.16 | 3–3 | |
| 6129.022 | A | 10 | 10.14 | 12.16 | 2–2 | |
| 6131.005 | A | 5 | 10.14 | 12.16 | 1–1 | |
| 6123.164 | A | -1 | 10.14 | 12.16 | 4–3 | |
| 6126.516 | A | 0 | 10.14 | 12.16 | 3–2 | |
| 6129.255 | A | 0 | 10.14 | 12.16 | 2–1 | |
| 3800.240 | A | 2 | 10.14 | 13.39 | 4–5 | $e^5D - v^5P^o$ |
| 3801.633 | A | 3 | 10.14 | 13.39 | 3–4 | (14) |
| 3802.958 | A | 0 | 10.14 | 13.39 | 2–3 | |
| 3803.881 | A | 0 | 10.14 | 13.39 | 1–2 | |
| 3804.476 | A | 0 | 10.14 | 13.39 | 0–1 | |
| 3134.819 | A | 1 | 10.14 | 14.08 | 4–5 | $e^5D - r^5F^o$ |
| 3135.507 | A | 0 | 10.14 | 14.08 | 3–4 | (15) |
| 3136.315 | A | 0 | 10.14 | 14.08 | 2–3 | |
| 6105.381 | A | 5 | 10.31 | 12.33 | 4–5 | $y^7P^o - f^7D$ |
| 6050.446 | A | 3 | 10.29 | 12.33 | 3–4 | (16) |
| 6008.295 | A | 0 | 10.28 | 12.33 | 2–3 | |
| 6107.293 | A | 1 | 10.31 | 12.33 | 4–4 | |
| 6051.860 | A | 1 | 10.29 | 12.33 | 3–3 | |
| 6009.298 | A | 1 | 10.28 | 12.33 | 2–2 | |
| 6108.8 | P | | 10.31 | 12.33 | 4–3 | |
| 6052.892 | A | 0 | 10.29 | 12.33 | 3–2 | |
| 6009.962 | A | 1 | 10.28 | 12.33 | 2–1 | |
| 4530.034 | A | 5 | 10.62 | 13.35 | 4–3 | $x^7P^o - g^7S$ |
| 4510.210 | A | 3 | 10.61 | 13.35 | 3–3 | (17) |
| 4496.989 | A | 2 | 10.60 | 13.35 | 2–3 | |
| 4639.150 | A | 3 | 10.73 | 13.39 | 3–2 | $w^5P^o - g^5S$ |
| 4647.585 | A | 2 | 10.73 | 13.39 | 2–2 | (18) |
| 4652.816 | A | 1 | 10.74 | 13.39 | 1–2 | |
| 6446.281 | A | 50N | 12.15 | 14.06 | 6– | $z^7P^o - f^7G$ |
| | | | | | | (19) |
| 6463.637 | A | 12 | 12.16 | 14.06 | 5–6 | $x^5P^o - f^5G$ |
| 6463.195 | A | 10 | 12.16 | 14.06 | 4–5 | (20) |
| 6462.799 | A | 7 | 12.16 | 14.06 | 3–4 | |
| 6462.454 | A | 5 | 12.16 | 14.06 | 2–3 | |
| 6462.210 | A | 3 | 12.16 | 14.06 | 1–2 | |
| 3050.661 | A | 25 | ? | ? | 2–2 | $^3P - ^3P^o$ |
| 3043.132 | A | 6 | ? | ? | 1–1 | (21) |
| 3034.810 | A | 6 | ? | ? | 2–1 | |
| 3033.591 | A | 4 | ? | ? | 1–0 | |
| 3059.064 | A | 10 | ? | ? | 1–2 | |
| 3049.027 | A | 8 | ? | ? | 0–1 | |

Measuree inadequate for preparation of list of etrongeet unclaeeified linee of Mn II.

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** I P 7.858 | Anal A | | List A | Feb 1943 | | |
| 5166.286 | J | 4 | 0.00 | 2.39 | 4-5 | $a^5D-z^7D^o$ |
| 5221.43 | P | | 0.05 | 2.41 | 3-4 | (1) |
| 5247.052 | V | 1 | 0.09 | 2.44 | 2-3 | |
| 5254.956 | V | 1 | 0.11 | 2.46 | 1-2 | |
| 5250.312 | V | 1 | 0.12 | 2.47 | 0-1 | |
| 5110.414 | B | 10 | 0.00 | 2.41 | 4-4 | |
| 5168.901 | B | 4 | 0.05 | 2.44 | 3-3 | |
| 5204.582 | J | 2 | 0.09 | 2.46 | 2-2 | |
| 5225.533 | V | 1 | 0.11 | 2.47 | 1-1 | |
| •5060.079 | T | (1) | 0.00 | 2.44 | 4-3 | |
| 5127.68 | P | ⊙ | 0.05 | 2.46 | 3-2 | |
| 5175.71 | P | | 0.09 | 2.46 | 2-1 | |
| 4375.932 | B | 9 | 0.00 | 2.82 | 4-5 | $a^5D-z^7F^o$ |
| 4427.312 | B | 10 | 0.05 | 2.84 | 3-4 | (2) |
| 4461.654 | B | 8 | 0.09 | 2.85 | 2-3 | |
| 4482.171 | J | 4 | 0.11 | 2.86 | 1-2 | |
| 4489.741 | B | 3 | 0.12 | 2.87 | 0-1 | |
| 4347.239 | V | (1) | 0.00 | 2.84 | 4-4 | |
| 4405.02 | P | ⊙ | 0.05 | 2.85 | 3-3 | |
| 4445.48 | U | (1) | 0.09 | 2.86 | 2-2 | |
| 4471.68 | P | (1) | 0.11 | 2.87 | 1-1 | |
| m4325.74 | P | Fe | 0.00 | 2.85 | 4-3 | |
| 4389.244 | J | 2 | 0.05 | 2.86 | 3-2 | |
| 4435.151 | J | 2 | 0.09 | 2.87 | 2-1 | |
| m4466.57 | P | Fe | 0.11 | 2.87 | 1-0 | |
| 4216.186 | B | 8 | 0.00 | 2.93 | 4-4 | $a^5D-z^7P^o$ |
| 4206.702 | J | 3 | 0.05 | 2.99 | 3-3 | (3) |
| 4199.97 | W | 1 | 0.09 | 3.03 | 2-2 | R |
| 4134.343 | V | (1) | 0.00 | 2.99 | 4-3 | |
| 4149.76 | P | (1) | 0.05 | 3.03 | 3-2 | |
| *4291.466 | I | 4 | 0.05 | 2.93 | 3-4 | |
| 4258.320 | J | 2 | 0.09 | 2.99 | 2-3 | |
| 3859.913 | B | 300R | 0.00 | 3.20 | 4-4 | $a^5D-z^5D^o$ |
| 3886.284 | B | 40R | 0.05 | 3.23 | 3-3 | (4) |
| 3899.709 | B | 30R | 0.09 | 3.25 | 2-2 | |
| 3906.482 | B | 8 | 0.11 | 3.27 | 1-1 | |
| 3824.444 | B | 50r | 0.00 | 3.23 | 4-3 | |
| 3856.373 | B | 50r | 0.05 | 3.25 | 3-2 | |
| 3878.575 | B | 100r | 0.09 | 3.27 | 2-1 | |
| 3895.658 | B | 25r | 0.11 | 3.28 | 1-0 | |
| 3922.914 | B | 25R | 0.05 | 3.20 | 3-4 | |
| 3930.299 | B | 25R | 0.09 | 3.23 | 2-3 | |
| 3927.922 | B | 30R | 0.11 | 3.25 | 1-2 | |
| 3920.260 | B | 20r | 0.12 | 3.27 | 0-1 | |
| 3719.935 | B | 250R | 0.00 | 3.32 | 4-5 | $a^5D-z^5F^o$ |
| 3737.133 | B | 150R | 0.05 | 3.35 | 3-4 | (5) |
| 3745.561 | J | 100R | 0.09 | 3.38 | 2-3 | |
| 3748.264 | B | 60R | 0.11 | 3.40 | 1-2 | |
| 3745.901 | J | 40r | 0.12 | 3.42 | 0-1 | |
| 3679.915 | B | 40r | 0.00 | 3.35 | 4-4 | |
| 3705.567 | B | 100r | 0.05 | 3.38 | 3-3 | |
| 3722.564 | B | 50r | 0.09 | 3.40 | 2-2 | |
| 3733.319 | B | 40r | 0.11 | 3.42 | 1-1 | |
| 3649.304 | J | 5 | 0.00 | 3.38 | 4-3 | |
| 3683.054 | G | 10 | 0.05 | 3.40 | 3-2 | |
| 3707.828 | V | 20 | 0.09 | 3.42 | 2-1 | |
| 3440.610 | J | 150R | 0.00 | 3.59 | 4-3 | $a^5D-z^5P^o$ |
| 3440.989 | J | 75R | 0.05 | 3.64 | 3-2 | (6) |
| 3443.878 | A | 50r | 0.09 | 3.67 | 2-1 | |
| 3490.575 | A | 100r | 0.05 | 3.59 | 3-3 | |
| 3475.450 | G | 70r | 0.09 | 3.64 | 2-2 | |
| 3465.863 | A | 60r | 0.11 | 3.67 | 1-1 | |
| 3526.039 | J | 20 | 0.09 | 3.59 | 2-3 | |
| 3497.843 | A | 40 | 0.11 | 3.64 | 1-2 | |
| 3476.704 | A | 40 | 0.12 | 3.67 | 0-1 | |
| 3193.214 | V | 10 | 0.00 | 3.86 | 4-4 | $a^5D-z^3F^o$ |
| 3184.896 | A | 7 | 0.05 | 3.93 | 3-3 | (7) |
| 3180.756 | G | 5 | 0.09 | 3.97 | 2-2 | R |
| 3143.242 | V | 2 | 0.00 | 3.93 | 4-3 | |
| 3151.867 | V | (1) | 0.05 | 3.97 | 3-2 | |
| 3236.223 | A | 8 | 0.05 | 3.86 | 3-4 | |
| 3214.396 | G | 8 | 0.09 | 3.93 | 2-3 | |
| 3191.659 | A | 7 | 0.00 | 3.87 | 4-3 | $a^5D-z^3D^o$ |
| 3197.00 | V | (2) | 0.05 | 3.91 | 3-2 | (8) |
| 3200.790 | V | 2 | 0.09 | 3.94 | 2-1 | |
| 3234.614 | G | 7 | 0.05 | 3.87 | 3-3 | |
| 3226.727 | V | 2 | 0.09 | 3.91 | 2-2 | |
| m3219.77 | P | Fe | 0.11 | 3.94 | 1-1 | |
| 3265.046 | G | 8 | 0.09 | 3.87 | 2-3 | |
| 3246.005 | G | 8 | 0.11 | 3.91 | 1-2 | |
| 3229.123 | G | 4 | 0.12 | 3.94 | 0-1 | |
| 3020.643 | V | 200R | 0.00 | 4.09 | 4-4 | $a^5D-y^5D^o$ |
| 3021.074 | G | 150R | 0.05 | 4.14 | 3-3 | (9) |
| 3020.495 | V | 100R | 0.09 | 4.17 | 2-2 | |
| 3017.628 | G | 15r | 0.11 | 4.20 | 1-1 | |
| 2983.574 | G | 125R | 0.00 | 4.14 | 4-3 | |
| 2994.427 | G | 100R• | 0.05 | 4.17 | 3-2 | |
| 3000.950 | G | 100R | 0.09 | 4.20 | 2-1 | |
| 3008.139 | G | 80R | 0.11 | 4.21 | 1-0 | |
| 3059.086 | A | 100R | 0.05 | 4.09 | 3-4 | |
| 3047.605 | A | 100R | 0.09 | 4.14 | 2-3 | |
| 3037.388 | A | 80R | 0.11 | 4.17 | 1-2 | |
| 3025.843 | K | 50R | 0.12 | 4.20 | 0-1 | |
| 2988.901 | G | 125R | 0.00 | 4.18 | 4-5 | $a^5D-y^5F^o$ † |
| 2973.236 | V | 80R | 0.05 | 4.20 | 3-4 | (10) |
| 2973.137 | V | 60R | 0.09 | 4.24 | 2-3 | |
| •2970.106 | G | 40R | 0.11 | 4.28 | 1-2 | |
| 2965.255 | A | 20 | 0.12 | 4.28 | 0-1 | |
| 2953.940 | A | 50R | 0.09 | 4.28 | 2-2 | |
| 2957.365 | A | 30R | 0.11 | 4.28 | 1-1 | |
| 2981.446 | A | 20r | 0.05 | 4.19 | 3-2 | $a^5D-z^3P^o$ |
| •2970.106 | G | 40R | 0.09 | 4.24 | 2-1 | (11) |
| 2969.364 | V | 5 | 0.11 | 4.27 | 1-0 | |
| 3007.284 | V | 12r | 0.09 | 4.19 | 2-2 | |
| 2986.456 | G | 3 | 0.11 | 4.24 | 1-1 | |
| 3024.033 | C | 15r | 0.11 | 4.19 | 1-2 | |
| 2994.50 | V | 100R• | 0.12 | 4.24 | 0-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 8047.60 | O | 15 | 0.88 | 2.39 | 5-5 | $a^5F-z^7D^o$ |
| 8204.10 | P | ⊙ | 0.91 | 2.41 | 4-4 | (12) |
| 8310.98 | P | | 0.95 | 2.44 | 3-3 | |
| 8383.23 | P | ⊙ | 0.99 | 2.46 | 2-2 | |
| 8425.89 | P | ⊙ | 1.01 | 2.47 | 1-1 | |
| 7912.868 | E | 6 | 0.86 | 2.41 | 5-4 | |
| 8075.13 | O | 4 | 0.91 | 2.44 | 4-3 | |
| 8204.93 | P | ⊙ | 0.95 | 2.46 | 3-2 | |
| 8307.61 | P | ⊙ | 0.99 | 2.47 | 2-1 | |
| 8349.05 | P | ⊙ | 0.91 | 2.39 | 4-5 | |
| 8447.63 | P | ⊙ | 0.95 | 2.41 | 3-4 | |
| 6358.692 | I | 3 | 0.86 | 2.80 | 5-6 | $a^5F-z^7F^o$ |
| m6462.72 | P | Fe | 0.91 | 2.82 | 4-5 | (13) |
| 6547.58 | P | | 0.95 | 2.84 | 3-4 | |
| 6609.68 | P | ⊙ | 0.99 | 2.85 | 2-3 | |
| 6648.08 | P | ⊙ | 1.01 | 2.86 | 1-2 | |
| 6280.625 | I | 2 | 0.88 | 2.82 | 5-5 | |
| 6400.335 | V | (2) | 0.91 | 2.84 | 4-4 | |
| 6498.950 | V | 5 | 0.95 | 2.85 | 3-3 | |
| 6574.238 | V | 3 | 0.99 | 2.86 | 2-2 | |
| 6625.04 | V | 1 | 1.01 | 2.87 | 1-1 | |
| 6221.661 | U | (-) | 0.86 | 2.84 | 5-4 | |
| 6353.84 | P | ⊙ | 0.91 | 2.85 | 4-3 | |
| 6464.87 | P | | 0.95 | 2.86 | 3-2 | |
| 6551.68 | P | ⊙ | 0.99 | 2.87 | 2-1 | |
| 6613.83 | P | 1 | 1.01 | 2.87 | 1-0 | |
| 5956.702 | J | (3) | 0.88 | 2.93 | 5-4 | $a^5F-z^7P^o$ |
| •5949.35 | V | (2) | 0.91 | 2.99 | 4-3 | (14) |
| •5958.23 | P | (2) | 0.95 | 3.03 | 3-2 | |
| 6120.25 | P | ⊙ | 0.91 | 2.93 | 4-4 | |
| 5269.541 | I | 60 | 0.86 | 3.20 | 5-4 | $a^5F-z^5D^o$ |
| 5328.042 | I | 50 | 0.91 | 3.23 | 4-3 | (15) |
| 5371.493 | B | 50 | 0.95 | 3.25 | 3-2 | |
| 5405.778 | B | 40 | 0.99 | 3.27 | 2-1 | |
| 5434.527 | B | 30 | 1.01 | 3.28 | 1-0 | |
| 5397.131 | B | 40 | 0.91 | 3.20 | 4-4 | |
| 5429.699 | B | 40 | 0.95 | 3.23 | 3-3 | |
| 5446.920 | B | 40 | 0.99 | 3.25 | 2-2 | |
| 5455.613 | B | 40 | 1.01 | 3.27 | 1-1 | |
| 5501.469 | B | 12 | 0.95 | 3.20 | 3-4 | |
| 5506.782 | B | 18 | 0.99 | 3.23 | 2-3 | |
| 5497.519 | B | 15 | 1.01 | 3.25 | 1-2 | |
| 5012.071 | B | 12 | 0.86 | 3.32 | 5-5 | $a^5F-z^5F^o$ |
| 5051.636 | B | 10 | 0.91 | 3.35 | 4-4 | (16) |
| 5083.342 | B | 7 | 0.95 | 3.38 | 3-3 | |
| 5107.452 | J | 6 | 0.99 | 3.40 | 2-2 | |
| 5123.733 | B | 8 | 1.01 | 3.42 | 1-1 | |
| 4939.690 | B | 4 | 0.86 | 3.35 | 5-4 | |
| 4994.133 | B | 8 | 0.91 | 3.38 | 4-3 | |
| 5041.074 | J | 7 | 0.95 | 3.40 | 3-2 | |
| 5079.742 | J | 4 | 0.99 | 3.42 | 2-1 | |
| 5127.363 | B | 5 | 0.91 | 3.32 | 4-5 | |
| 5142.932 | J | 6 | 0.95 | 3.35 | 3-4 | |
| 5150.843 | B | 8 | 0.99 | 3.38 | 2-3 | |
| 5151.915 | J | 4 | 1.01 | 3.40 | 1-2 | |
| m4611.35 | P | Fe | 0.91 | 3.59 | 4-3 | $a^5F-z^5P^o$ |
| 4598.33 | P | ⊙ | 0.95 | 3.64 | 3-2 | (17) |
| 4597.08 | P | ⊙ | 0.99 | 3.67 | 2-1 | |
| 4687.30 | P | ⊙ | 0.95 | 3.59 | 3-3 | |
| 4653.49 | P | ⊙ | 0.99 | 3.64 | 2-2 | |
| 4633.05 | P | | 1.01 | 3.67 | 1-1 | |
| 4744.84 | P | ⊙ | 0.99 | 3.59 | 2-3 | |
| 4690.38 | P | ⊙ | 1.01 | 3.84 | 1-2 | |
| 4100.745 | J | 3 | 0.88 | 3.88 | 5-4 | $a^5F-z^3F^o$ |
| 4092.512 | V | (1) | 0.91 | 3.93 | 4-3 | (18) |
| 4096.21 | P | ⊙ | 0.95 | 3.97 | 3-2 | |
| 4177.597 | J | 4 | 0.91 | 3.86 | 4-4 | |
| 4152.172 | J | 4 | 0.95 | 3.93 | 3-3 | |
| 4139.933 | J | 2 | 0.99 | 3.97 | 2-2 | |
| •4239.847 | J | 2 | 0.95 | 3.86 | 3-4 | |
| 4197.10 | P | ⊙ | 0.99 | 3.93 | 2-3 | |
| 4189.09 | P | ⊙ | 1.01 | 3.97 | 1-2 | |
| 4174.917 | J | 5 | 0.91 | 3.87 | 4-3 | $a^5F-z^3D^o$ |
| 4173.749 | J | 4 | 0.95 | 3.91 | 3-2 | (19) |
| 4173.938 | J | 2 | 0.99 | 3.94 | 2-1 | |
| 4237.085 | M | (2) | 0.95 | 3.87 | 3-3 | |
| 4218.12 | P | | 0.99 | 3.91 | 2-2 | |
| 4203.570 | V | (1) | 1.01 | 3.94 | 1-1 | |
| 4283.87 | P | ⊙? | 0.99 | 3.87 | 2-3 | |
| 4248.40 | P | ⊙ | 1.01 | 3.91 | 1-2 | |
| 3820.428 | I | 250R | 0.86 | 4.09 | 5-4 | $a^5F-y^5D^o$ |
| 3825.884 | B | 200R | 0.91 | 4.14 | 4-3 | (20) |
| 3834.225 | B | 100r | 0.95 | 4.17 | 3-2 | |
| 3840.439 | B | 80r | 0.99 | 4.20 | 2-1 | |
| 3849.989 | B | 40 | 1.01 | 4.21 | 1-0 | |
| 3887.051 | B | 15 | 0.91 | 4.09 | 4-4 | |
| 3878.031 | B | 60 | 0.95 | 4.14 | 3-3 | |
| 3873.504 | B | 60 | 0.99 | 4.17 | 2-2 | |
| 3885.528 | B | 30 | 1.01 | 4.20 | 1-1 | |
| 3940.882 | B | 5 | 0.95 | 4.09 | 3-4 | |
| 3917.185 | B | 8 | 0.99 | 4.14 | 2-3 | |
| 3898.013 | K | 10 | 1.01 | 4.17 | 1-2 | |
| 3734.867 | B | 300r | 0.88 | 4.18 | 5-5 | $a^5F-y^5F^o$ |
| 3749.487 | B | 200R | 0.91 | 4.20 | 4-4 | (21) |
| 3758.235 | B | 150R | 0.95 | 4.24 | 3-3 | |
| 3783.790 | B | 100r | 0.99 | 4.28 | 2-2 | |
| 3767.194 | B | 80r | 1.01 | 4.28 | 1-1 | |
| 3887.458 | B | 40r | 0.88 | 4.20 | 5-4 | |
| 3709.246 | G | 75r | 0.91 | 4.24 | 4-3 | |
| 3727.821 | B | 50r | 0.95 | 4.28 | 3-2 | |
| 3743.364 | G | 20 | 0.99 | 4.28 | 2-1 | |
| 3798.513 | B | 40 | 0.91 | 4.18 | 4-5 | |
| 3799.549 | B | 50 | 0.95 | 4.20 | 3-4 | |
| 3795.004 | B | 60 | 0.99 | 4.24 | 2-3 | |
| 3787.883 | B | 50 | 1.01 | 4.28 | 1-2 | |
| 3812.964 | G | 40 | 0.95 | 4.19 | 3-2 | $a^5F-z^3P^o$ |
| 3790.095 | B | 12 | 0.99 | 4.24 | 2-1 | (22) |
| 3786.678 | J | 8 | 1.01 | 4.27 | 1-0 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 3850.820 | B | 12 | 0.99 | 4.19 | 2-2 | $a^5F-z^3P^o$ |
| 3814.526 | J | 5 | 1.01 | 4.24 | 1-1 | cont |
| 3876.043 | J | 4 | 1.01 | 4.19 | 1-2 | |
| 3581.195// | B | 250R | 0.86 | 4.30 | 5-8 | $a^5F-z^5G^o$ |
| 3647.844 | B | 100R | 0.91 | 4.29 | 4-5 | (23) |
| 3631.464 | B | 125R | 0.95 | 4.35 | 3-4 | |
| 3618.769 | B | 125R | 0.99 | 4.40 | 2-3 | |
| 3608.861 | B | 100r | 1.01 | 4.43 | 1-2 | |
| 3589.107 | B | 8 | 0.86 | 4.29 | 5-5 | |
| 3585.708 | J | 20 | 0.91 | 4.35 | 4-4 | |
| 3585.320 | B | 30 | 0.95 | 4.40 | 3-3 | |
| 3586.985 | G | 30 | 0.99 | 4.43 | 2-2 | |
| 3528.94 | P | | 0.88 | 4.35 | 5-4 | |
| 3540.709 | J | 3 | 0.91 | 4.40 | 4-3 | |
| 3554.122 | J | 4 | 0.95 | 4.43 | 3-2 | |
| 3513.820 | B | 30 | 0.86 | 4.37 | 5-5 | $a^5F-z^3G^o$ |
| 3521.264 | B | 25 | 0.91 | 4.42 | 4-4 | (24) |
| 3536.167 | J | 15 | 0.95 | 4.45 | 3-3 | |
| 3466.501 | V | 3 | 0.88 | 4.42 | 5-4 | |
| 3483.008 | G | 3 | 0.91 | 4.45 | 4-3 | |
| 3570.100 | G | 100R | 0.91 | 4.37 | 4-5 | |
| 3565.381 | B | 60r | 0.95 | 4.42 | 3-4 | |
| 3558.518 | B | 30 | 0.99 | 4.45 | 2-3 | |
| 3359.496 | V | 2 | 0.86 | 4.53 | 5-4 | $a^5F-y^3F^o$ |
| 3356.332 | V | 1 | 0.91 | 4.59 | 4-3 | (25) |
| 3355.517 | V | (1) | 0.95 | 4.63 | 3-2 | |
| 3410.905 | V | (1) | 0.91 | 4.53 | 4-4 | |
| 3396.386 | V | (1) | 0.95 | 4.59 | 3-3 | |
| 3384.80 | P | ⊙? | 0.99 | 4.63 | 2-2 | |
| 3452.273 | G | 10 | 0.95 | 4.53 | 3-4 | |
| •3426.383 | J | 5 | 0.99 | 4.59 | 2-3 | |
| •3404.301 | V | 3 | 1.01 | 4.63 | 1-2 | |
| 3401.521 | A | 6 | 0.91 | 4.54 | 4-3 | $a^5F-y^5P^o$ |
| 3398.978 | A | 4 | 0.95 | 4.59 | 3-2 | (26) |
| 3397.642 | V | 2 | 0.99 | 4.62 | 2-1 | |
| 3442.672 | J | 3 | 0.95 | 4.54 | 3-3 | |
| 3437.002 | J | 2 | 0.99 | 4.59 | 2-2 | |
| 3417.273 | J | (1gn) | 1.01 | 4.62 | 1-1 | |
| 3473.497 | V | (1) | 0.99 | 4.54 | 2-3 | |
| 3446.947 | U | (1) | 1.01 | 4.59 | 1-2 | |
| 3245.984 | V | (2) | 0.91 | 4.71 | 4-3 | $a^5F-y^3D^o$ |
| 3230.09 | P | ⊙ | 0.95 | 4.77 | 3-2 | (27) |
| 3223.853 | V | (1) | 0.99 | 4.81 | 2-1 | |
| 3283.430 | V | (1) | 0.95 | 4.71 | 3-3 | |
| •3257.244 | V | 2 | 0.99 | 4.77 | 2-2 | |
| 3241.50 | P | (1) | 1.01 | 4.81 | 1-1 | |
| 3311.451 | V | (1) | 0.99 | 4.71 | 2-3 | |
| 3275.24 | P | | 1.01 | 4.77 | 1-2 | |
| 3057.448 | A | 40R | 0.86 | 4.89 | 5-4 | $a^5F-x^5D^o$ |
| 3067.244 | A | 30r | 0.91 | 4.93 | 4-3 | (28) |
| 3075.721 | A | 25r | 0.95 | 4.97 | 3-2 | |
| 3083.742 | A | 20 | 0.99 | 4.99 | 2-1 | |
| 3091.578 | A | 20 | 1.01 | 5.00 | 1-0 | |
| 3099.968 | V | 15 | 0.91 | 4.89 | 4-4 | |
| 3100.888 | G | 20 | 0.95 | 4.93 | 3-3 | |
| 3100.304 | G | 20 | 0.99 | 4.97 | 2-2 | |
| 3099.898 | V | 20 | 1.01 | 4.99 | 1-1 | |
| 3134.111 | A | 10 | 0.95 | 4.89 | 3-4 | |
| •3125.653 | C | 15 | 0.99 | 4.93 | 2-3 | |
| •3116.833§ | A | 12 | 1.01 | 4.97 | 1-2 | |
| •2984.785§ | V | 10 | 0.88 | 4.99 | 5-4 | $a^5F-y^7P^o$ |
| 3045.077 | G | 5 | 0.91 | 4.96 | 4-3 | (29) |
| 3092.785 | V | 2 | 0.95 | 4.94 | 3-2 | |
| 3025.283 | V | 3 | 0.91 | 4.99 | 4-4 | |
| 3078.014 | G | 4 | 0.95 | 4.96 | 3-3 | |
| 3117.63 | W | 1 | 0.99 | 4.94 | 2-2 | |
| 3057.80 | P | ⊙ | 0.95 | 4.99 | 3-4 | |
| 3102.64 | P | ⊙ | 0.99 | 4.96 | 2-3 | |
| m3134.15 | P | Fe | 1.01 | 4.94 | 1-2 | |
| 2999.512 | A | 30R | 0.88 | 4.97 | 5-5 | $a^5F-x^5F^o$ |
| 3009.570 | C | 25r | 0.91 | 5.01 | 4-4 | (30) |
| 3018.983 | G | 15r | 0.95 | 5.04 | 3-3 | |
| 3028.462 | G | 15 | 0.99 | 5.08 | 2-2 | |
| 3031.838 | G | 15 | 1.01 | 5.08 | 1-1 | |
| 2969.474 | G | 10 | 0.86 | 5.01 | 5-4 | |
| 2987.293 | A | 10 | 0.91 | 5.04 | 4-3 | |
| 3003.031 | C | 10 | 0.95 | 5.06 | 3-2 | |
| 3018.188 | G | 12 | 0.99 | 5.08 | 2-1 | |
| 3040.428 | C | 15 | 0.91 | 4.97 | 4-5 | |
| 3041.745 | V | 15 | 0.95 | 5.01 | 3-4 | |
| 3043.868 | G | 15 | 0.99 | 5.04 | 2-3 | |
| 3043.020 | G | 15 | 1.01 | 5.08 | 1-2 | |
| 3014.176 | V | 3 | 0.95 | 5.05 | 3-2 | $a^5F-z^5G^o$ |
| 3037.782 | V | 2 | 0.99 | 5.05 | 2-2 | (31) |
| •3053.443 | U | (2) | 1.01 | 5.05 | 1-2 | |
| 8916.28 | F | 1 | 1.80 | 2.99 | 2-3 | $a^3F-z^7P^o$ |
| | | | | | | (32) |
| 7180.020 | V | 1 | 1.48 | 3.20 | 4-4 | $a^3F-z^5D^o$ |
| 7494.72 | P | ⊙ | 1.55 | 3.20 | 3-4 | (33) |
| 8710.31 | V | 2 | 1.48 | 3.32 | 4-5 | $a^3F-z^5F^o$ |
| 6844.67 | P | 1 | 1.55 | 3.35 | 3-4 | (34) |
| 6929.98 | P | | 1.60 | 3.38 | 2-3 | |
| 6581.22 | V | 2 | 1.48 | 3.35 | 4-4 | |
| 6739.54 | V | 1 | 1.55 | 3.38 | 3-3 | |
| 6851.64 | P | 1 | 1.80 | 3.40 | 2-2 | |
| 6483.95 | P | ⊙ | 1.48 | 3.38 | 4-3 | |
| 6885.43 | P | ⊙ | 1.55 | 3.40 | 3-2 | |
| 6801.87 | P | ⊙ | 1.80 | 3.42 | 2-1 | |
| 5853.18 | V | (1) | 1.48 | 3.59 | 4-3 | $a^3F-z^5P^o$ |
| | | | | | | (35) |
| 5171.599 | B | 20 | 1.48 | 3.88 | 4-4 | $a^3F-z^3F^o$ |
| 5194.943 | I | 10 | 1.55 | 3.93 | 3-3 | (38) |
| 5218.378 | B | 10 | 1.60 | 3.97 | 2-2 | |
| 5041.759 | B | 10 | 1.48 | 3.93 | 4-3 | |
| 5107.845 | J | 8 | 1.55 | 3.97 | 3-2 | |
| 5333.903 | J | 4 | 1.55 | 3.88 | 3-4 | |
| 5307.385 | B | 2 | 1.60 | 3.93 | 2-3 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 5167.491 | B | 40 | 1.48 | 3.87 | 4-3 | $a^3F$-$z^3D^o$ (37) |
| 5227.192 | B | 40 | 1.55 | 3.91 | 3-2 | |
| 5270.360 | B | 30 | 1.60 | 3.94 | 2-1 | |
| 5328.534 | B | 15 | 1.55 | 3.87 | 3-3 | |
| 5341.026 | B | 20 | 1.60 | 3.91 | 2-2 | |
| m5446.87 | P | Fe | 1.60 | 3.87 | 2-3 | |
| 4733.596 | B | 4 | 1.48 | 4.09 | 4-4 | $a^3F$-$y^5D^o$ (38) |
| •4772.817 | B | 3 | 1.55 | 4.14 | 3-3 | |
| 4798.736 | V | (1) | 1.60 | 4.17 | 2-2 | |
| 4643.20 | P | ⊙ | 1.48 | 4.14 | 4-3 | |
| 4868.38 | P | ⊙ | 1.55 | 4.09 | 3-4 | |
| 4867.53 | P | ⊙ | 1.60 | 4.14 | 2-3 | |
| 4602.944 | B | 9 | 1.48 | 4.16 | 4-5 | $a^3F$-$y^5F^o$ (39) |
| 4654.501 | J | 5 | 1.55 | 4.20 | 3-4 | |
| 4680.297 | J | (2) | 1.60 | 4.24 | 2-3 | |
| 4531.152 | B | 8 | 1.48 | 4.20 | 4-4 | |
| 4592.655 | B | 5 | 1.55 | 4.24 | 3-3 | |
| 4632.915 | J | 2 | 1.60 | 4.26 | 2-2 | |
| 4472.52 | P | ⊙ | 1.48 | 4.24 | 4-3 | |
| 4547.022 | J | (2) | 1.55 | 4.26 | 3-2 | |
| 4602.005 | J | (2) | 1.60 | 4.28 | 2-1 | |
| 4674.65 | P | ⊙ | 1.55 | 4.19 | 3-2 | $a^3F$-$z^3P^o$ (40) |
| 4672.83 | P | ⊙ | 1.60 | 4.24 | 2-1 | |
| 4765.485 | V | (1) | 1.60 | 4.19 | 2-2 | |
| 4383.547 | B | 45r | 1.48 | 4.29 | 4-5 | $a^3F$-$z^5G^o$ (41) |
| 4404.752 | B | 30 | 1.55 | 4.35 | 3-4 | |
| 4415.125 | B | 20 | 1.60 | 4.40 | 2-3 | |
| 4294.128 | B | 15 | 1.48 | 4.35 | 4-4 | |
| 4337.049 | B | 10 | 1.55 | 4.40 | 3-3 | |
| 4367.906 | J | 2 | 1.60 | 4.43 | 2-2 | |
| 4289.760 | J | (1) | 1.48 | 4.40 | 4-3 | |
| •4291.466 | I | 4 | 1.55 | 4.43 | 3-2 | |
| 4271.764 | B | 35 | 1.48 | 4.37 | 4-5 | $a^3F$-$z^3G^o$ (42) |
| 4307.906 | B | 35 | 1.55 | 4.42 | 3-4 | |
| 4325.765 | B | 35 | 1.60 | 4.45 | 2-3 | |
| 4202.031 | B | 30 | 1.48 | 4.42 | 4-4 | |
| 4250.790 | B | 25 | 1.55 | 4.45 | 3-3 | |
| 4147.673 | B | 10 | 1.48 | 4.45 | 4-3 | |
| 4045.815 | B | 60r | 1.48 | 4.53 | 4-4 | $a^3F$-$y^3F^o$ (43) |
| 4063.597 | H | 45 | 1.55 | 4.59 | 3-3 | |
| 4071.740 | H | 40 | 1.60 | 4.63 | 2-2 | |
| 3969.261 | B | 30 | 1.48 | 4.59 | 4-3 | |
| 4005.246 | B | 25 | 1.55 | 4.63 | 3-2 | |
| 4143.871 | B | 30 | 1.55 | 4.53 | 3-4 | |
| 4132.060 | B | 25 | 1.60 | 4.59 | 2-3 | |
| 4033.636 | V | 4 | 1.48 | 4.54 | 4-3 | $a^3F$-$y^5P^o$ (44) |
| 4064.46 | W | (2) | 1.55 | 4.59 | 3-2 | |
| 4090.34 | P | ⊙ | 1.60 | 4.62 | 2-1 | |
| •4130.035 | U | (1) | 1.55 | 4.54 | 3-3 | |
| m4132.94 | P | Fe | 1.60 | 4.59 | 2-2 | |
| 4200.78 | P | ⊙ | 1.60 | 4.54 | 2-3 | |
| 3815.842 | B | 100r | 1.48 | 4.71 | 4-3 | $a^3F$-$y^3D^o$ (45) |
| 3827.825 | B | 75r | 1.55 | 4.77 | 3-2 | |
| 3841.051 | B | 80r | 1.60 | 4.81 | 2-1 | |
| 3902.948 | B | 20 | 1.55 | 4.71 | 3-3 | |
| 3888.517 | B | 20 | 1.60 | 4.77 | 2-2 | |
| 3966.066 | B | 10 | 1.60 | 4.71 | 2-3 | |
| 3615.66 | W | (1) | 1.48 | 4.89 | 4-4 | $a^3F$-$x^5D^o$ (46) |
| 3647.427 | J | 3 | 1.55 | 4.93 | 3-3 | |
| 3666.944 | U | (1) | 1.60 | 4.97 | 2-2 | |
| 3571.228 | V | 2 | 1.48 | 4.93 | 4-3 | |
| •3612.940 | J | 1 | 1.55 | 4.97 | 3-2 | |
| 3643.82 | P | (1) | 1.60 | 4.99 | 2-1 | |
| 3693.78 | P | ⊙ | 1.55 | 4.89 | 3-4 | |
| •3702.500 | J | 1 | 1.60 | 4.93 | 2-3 | |
| 3514.48 | P | ⊙ | 1.48 | 4.99 | 4-4 | $a^3F$-$y^7P^o$ (47) |
| 3541.22 | P | ⊙ | 1.48 | 4.96 | 4-3 | |
| 3636.50 | P | ⊙ | 1.55 | 4.94 | 3-2 | |
| 3588.23 | P | ⊙ | 1.55 | 4.99 | 3-4 | |
| 3670.23 | P | ⊙ | 1.60 | 4.96 | 2-3 | |
| •3534.914 | U | (1) | 1.48 | 4.97 | 4-5 | $a^3F$-$x^5F^o$ (48) |
| 3493.29 | W | (1) | 1.48 | 5.01 | 4-4 | |
| •3534.914 | U | (1) | 1.55 | 5.04 | 3-3 | |
| 3564.11 | W | (1) | 1.60 | 5.06 | 2-2 | |
| 3463.305 | V | 2 | 1.48 | 5.04 | 4-3 | |
| 3513.065 | U | (1) | 1.55 | 5.06 | 3-2 | |
| 3549.868 | J | 4 | 1.60 | 5.08 | 2-1 | |
| 3271.693 | V | (2) | 1.48 | 5.25 | 4-3 | $a^3F$-$x^5P^o$ (49) |
| 3299.511 | V | (1) | 1.55 | 5.29 | 3-2 | |
| 3335.513 | V | (1) | 1.55 | 5.25 | 3-3 | |
| 3231.599 | V | (1) | 1.48 | 5.30 | 4-5 | $a^3F$-$y^5G^o$ (50) |
| 3281.83 | P | | 1.55 | 5.31 | 3-4 | |
| 3313.723 | V | (1) | 1.60 | 5.33 | 2-3 | |
| 3223.273 | V | (1) | 1.48 | 5.31 | 4-5 | $a^3F$-$z^5H^o$ (51) |
| 3272.60 | P | ⊙ | 1.55 | 5.32 | 3-4 | |
| 3293.146 | V | (1) | 1.60 | 5.35 | 2-3 | |
| •3171.353 | V | 5 | 1.48 | 5.37 | 4-4 | $a^3F$-$w^5D^o$ (52) |
| 3187.68 | P | | 1.55 | 5.42 | 3-3 | |
| 3202.68 | P | ⊙ | 1.60 | 5.45 | 2-2 | |
| 3129.334 | V | 5 | 1.48 | 5.42 | 4-3 | |
| 3161.370 | V | 4 | 1.55 | 5.45 | 3-2 | |
| •3179.479§ | U | (1) | 1.60 | 5.48 | 2-1 | |
| 3068.927 | 8 | (-) | 1.48 | 5.50 | 4-3 | $a^3F$-$v^5D^o$ (53) |
| 3138.40 | P | ⊙ | 1.55 | 5.48 | 3-4 | |
| 3081.83 | P | ⊙ | 1.48 | 5.48 | 4-4 | |
| 3125.03 | P | ⊙ | 1.55 | 5.50 | 3-3 | |
| 3154.11 | P | ⊙ | 1.60 | 5.51 | 2-2 | |
| 3128.901 | U | 1 | 1.55 | 5.49 | 3-2 | $a^3F$-$y^5S^o$ (54) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 3007.146 | V | 8 | 1.48 | 5.58 | 4-3 | $a^3F$-$x^3D^o$ (55) |
| 3055.263 | C | 12 | 1.55 | 5.59 | 3-2 | |
| 3068.175 | G | 8 | 1.60 | 5.62 | 2-1 | |
| 3060.984 | G | 4 | 1.55 | 5.58 | 3-3 | |
| 3093.806 | V | 3 | 1.60 | 5.59 | 2-2 | |
| 3000.452 | G | 8 | 1.48 | 5.59 | 4-5 | $a^3F$-$y^3G^o$ (56) |
| 3041.639 | V | 10 | 1.55 | 5.61 | 3-4 | |
| 3067.123 | V | 8 | 1.60 | 5.62 | 2-3 | |
| 2988.468 | G | 2 | 1.48 | 5.61 | 4-4 | |
| 3029.237 | V | 3 | 1.55 | 5.62 | 3-3 | |
| 2976.50 | P | (1) | 1.48 | 5.62 | 4-3 | |
| 2962.11 | W | (2) | 1.48 | 5.64 | 4-5 | $a^3F$-$x^5G^o$ (57) |
| 3004.62 | W | (1) | 1.55 | 5.66 | 3-4 | |
| 3034.51 | W | (2n) | 1.60 | 5.67 | 2-3? | |
| 11973.01 | D | 8 | 2.17 | 3.20 | 3-4 | $a^5P$-$z^5D^o$ (58) |
| 11882.80 | D | 7 | 2.19 | 3.23 | 2-3 | |
| 11884.12 | D | 3 | 2.21 | 3.25 | 1-2 | |
| 11638.25 | D | 7 | 2.17 | 3.23 | 3-3 | |
| 11607.57 | D | 12 | 2.19 | 3.25 | 2-2 | |
| 11689.98 | D | 8 | 2.21 | 3.27 | 1-1 | |
| 11374.02 | D | 3 | 2.17 | 3.25 | 3-2 | |
| 11422.30 | D | 6 | 2.19 | 3.27 | 2-1 | |
| 11593.55 | D | 5 | 2.21 | 3.28 | 1-0 | |
| 10395.75 | F | 8 | 2.17 | 3.35 | 3-4 | $a^5P$-$z^5F^o$ (59) |
| 10340.77 | F | 4 | 2.19 | 3.38 | 2-3 | |
| 10379.01 | P | ⊙ | 2.21 | 3.40 | 1-2 | |
| 10155.18 | P | ⊙ | 2.17 | 3.38 | 3-3 | |
| 10167.4 | F | 1 | 2.19 | 3.40 | 2-2 | |
| 10265.23 | P | ⊙ | 2.21 | 3.42 | 1-1 | |
| 9987.88 | P | | 2.17 | 3.40 | 3-2 | |
| 10058.28 | P | ⊙ | 2.19 | 3.42 | 2-1 | |
| 8688.633 | E | 1500 | 2.17 | 3.59 | 3-3 | $a^5P$-$z^5P^o$ (60) |
| 8514.075 | E | 150 | 2.19 | 3.64 | 2-2 | |
| 8468.413 | E | 300 | 2.21 | 3.67 | 1-1 | |
| 8387.781 | E | 1200 | 2.17 | 3.64 | 3-2 | |
| 8387.063 | E | 1200 | 2.19 | 3.67 | 2-1 | |
| 8824.227 | E | 250 | 2.19 | 3.59 | 2-3 | |
| 8661.908 | E | 600 | 2.21 | 3.64 | 1-2 | |
| 7267.00 | P | ⊙ | 2.17 | 3.86 | 3-4 | $a^5P$-$z^3F^o$ (61) |
| 7101.28 | P | ⊙ | 2.19 | 3.93 | 2-3 | |
| 7037.04 | P | ⊙? | 2.21 | 3.97 | 1-2 | |
| 6430.851 | B | 300 | 2.17 | 4.09 | 3-4 | $a^5P$-$y^5D^o$ (62) |
| 6335.335 | B | 10 | 2.19 | 4.14 | 2-3 | |
| 6297.800 | I | 5 | 2.21 | 4.17 | 1-2 | |
| 6265.140 | B | 6 | 2.17 | 4.14 | 3-3 | |
| 6219.290 | I | 6 | 2.19 | 4.17 | 2-2 | |
| 6213.438 | I | 5 | 2.21 | 4.20 | 1-1 | |
| 6151.624 | L | (2) | 2.17 | 4.17 | 3-2 | |
| 6136.999 | J | (2) | 2.19 | 4.20 | 2-1 | |
| 6173.343 | J | 3 | 2.21 | 4.21 | 1-0 | |
| 6062.89 | V | (1) | 2.17 | 4.20 | 3-4 | $a^5P$-$y^5F^o$ (63) |
| •6081.82 | W | (2n) | 2.19 | 4.24 | 2-3 | |
| 6015.25 | P | ⊙ | 2.21 | 4.26 | 1-2 | |
| 5958.34 | P | ⊙ | 2.17 | 4.24 | 3-3 | |
| 5943.58 | P | ⊙ | 2.19 | 4.26 | 2-2 | |
| 5963.25 | V | (1) | 2.21 | 4.28 | 1-1 | |
| 5881.76 | P | ⊙ | 2.17 | 4.26 | 3-2 | |
| 5892.80 | P | | 2.19 | 4.28 | 2-1 | |
| 6097.08 | P | ⊙ | 2.17 | 4.19 | 3-2 | $a^5P$-$z^3P^o$ (64) |
| 6009.45 | P | | 2.19 | 4.24 | 2-1 | |
| m6012.21 | P | N1 | 2.21 | 4.27 | 1-0 | |
| 6163.560 | V | (1) | 2.19 | 4.19 | 2-2 | |
| 6082.718 | V | (1) | 2.21 | 4.24 | 1-1 | |
| 6240.656 | I | (2) | 2.21 | 4.19 | 1-2 | |
| m5224.30 | P | T1 | 2.17 | 4.53 | 3-4 | $a^5P$-$y^3F^o$ (65) |
| 5143.73 | P | ⊙ | 2.19 | 4.59 | 2-3 | |
| 5102.24 | P | | 2.21 | 4.63 | 1-2 | |
| 5202.339 | B | 8 | 2.17 | 4.54 | 3-3 | $a^5P$-$y^5P^o$ (66) |
| 5145.105 | T | (-) | 2.19 | 4.59 | 2-2 | |
| 5131.475 | J | (2) | 2.21 | 4.62 | 1-1 | |
| 5098.703 | J | 8 | 2.17 | 4.59 | 3-2 | |
| 5079.226 | J | 6 | 2.19 | 4.62 | 2-1 | |
| 5250.650 | B | 6 | 2.19 | 4.54 | 2-3 | |
| 5198.714 | B | 4 | 2.21 | 4.59 | 1-2 | |
| 4847.09 | P | | 2.17 | 4.71 | 3-3 | $a^5P$-$y^3D^o$ (67) |
| 4771.702 | J | (1) | 2.19 | 4.77 | 2-2 | |
| 4745.129 | U | (1) | 2.21 | 4.81 | 1-1 | |
| 4731.77 | P | | 2.17 | 4.77 | 3-2 | |
| 4700.42 | P | ⊙ | 2.19 | 4.81 | 2-1 | |
| •4889.009 | U | (1) | 2.19 | 4.71 | 2-3 | |
| 4817.773 | U | (1) | 2.21 | 4.77 | 1-2 | |
| 4528.619 | B | 18 | 2.17 | 4.89 | 3-4 | $a^5P$-$x^5D^o$ (68) |
| 4494.568 | B | 12 | 2.19 | 4.93 | 2-3 | |
| 4482.257 | J | 6 | 2.21 | 4.97 | 1-2 | |
| 4459.121 | B | 10 | 2.17 | 4.93 | 3-3 | |
| 4442.343 | B | 12 | 2.19 | 4.97 | 2-2 | |
| 4447.722 | B | 9 | 2.21 | 4.99 | 1-1 | |
| 4407.714 | J | 5 | 2.17 | 4.97 | 3-2 | |
| 4408.419 | B | 6 | 2.19 | 4.99 | 2-1 | |
| 4430.618 | B | 6 | 2.21 | 5.00 | 1-0 | |
| 4371.00 | P | | 2.17 | 4.99 | 3-4 | $a^5P$-$y^7P^o$ (69) |
| 4447.134 | J | (2)Mn? | 2.19 | 4.96 | 2-3 | |
| 4518.58 | P | ⊙ | 2.21 | 4.94 | 1-2 | |
| 4412.43 | P | ⊙ | 2.17 | 4.96 | 3-3 | |
| 4478.040 | U | (1) | 2.19 | 4.94 | 2-2 | |
| 4442.835 | J | (2) | 2.17 | 4.94 | 3-2 | |
| 4338.260 | J | (2) | 2.17 | 5.01 | 3-4 | $a^5P$-$x^5F^o$ (70) |
| 4324.961 | V | (1) | 2.19 | 5.04 | 2-3 | |
| 4329.54 | P | ⊙ | 2.21 | 5.06 | 1-2 | |
| 4292.13 | P | ⊙ | 2.17 | 5.04 | 3-3 | |
| 4292.293 | V | (1) | 2.19 | 5.06 | 2-2 | |
| 4308.54 | P | | 2.21 | 5.08 | 1-1 | |
| m4259.95 | P | Fe | 2.17 | 5.06 | 3-2 | |
| 4271.65 | P | ⊙ | 2.19 | 5.08 | 2-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 4282.406 | B | 12 | 2.17 | 5.05 | 3-2 | $a^5P$-$z^5S^o$ (71) |
| 4315.087 | B | 10 | 2.19 | 5.05 | 2-2 | |
| 4352.737 | B | 9 | 2.21 | 5.05 | 1-2 | |
| 4001.666 | J | 5 | 2.17 | 5.25 | 3-3 | $a^5P$-$x^5P^o$ (72) |
| 3977.743 | I | 12 | 2.19 | 5.29 | 2-2 | |
| 3974.766 | V | (1) | 2.21 | 5.32 | 1-1 | |
| 3949.954 | I | 10 | 2.17 | 5.29 | 3-2 | |
| 3943.339 | J | 2 | 2.19 | 5.32 | 2-1 | |
| 4030.194 | V | (3) | 2.19 | 5.25 | 2-3 | |
| 4009.714 | I | 10 | 2.21 | 5.29 | 1-2 | |
| 3852.574 | I | 6 | 2.17 | 5.37 | 3-4 | $a^5P$-$w^5D^o$ (73) |
| 3816.340 | J | 4 | 2.19 | 5.42 | 2-3 | |
| 3807.534 | G | 7 | 2.21 | 5.45 | 1-2 | |
| •3790.756 | J | 1 | 2.17 | 5.42 | 3-3 | |
| 3778.697 | J | (1) | 2.19 | 5.45 | 2-2 | |
| 3774.823 | G | 5 | 2.21 | 5.48 | 1-1 | |
| 3753.610 | G | 8 | 2.17 | 5.45 | 3-2 | |
| 3746.486 | J | 1 | 2.19 | 5.48 | 2-1 | |
| 3768.030 | J | 3 | 2.21 | 5.49 | 1-0 | |
| 3776.454 | G | 6 | 2.17 | 5.43 | 3-4 | $a^5P$-$w^5F^o$ (74) |
| 3781.188 | J | (1) | 2.19 | 5.45 | 2-3 | |
| 3792.834 | V | 1 | 2.21 | 5.47 | 1-2 | |
| 3756.069 | J | 1 | 2.17 | 5.45 | 3-3 | |
| 3764.21 | P | ⊙ | 2.19 | 5.47 | 2-2 | |
| 3779.486 | J | 2 | 2.21 | 5.48 | 1-1 | |
| 3739.317 | V | 1 | 2.17 | 5.47 | 3-2 | |
| 3751.09 | P | ⊙ | 2.19 | 5.48 | 2-1 | |
| •3721.278 | V | 2 | 2.17 | 5.48 | 3-4 | $a^5P$-$v^5D^o$ (75) |
| m3726.89 | P | Fe | 2.19 | 5.50 | 2-3 | |
| 3739.120 | J | 1 | 2.21 | 5.51 | 1-2 | |
| •3702.500 | J | 1 | 2.17 | 5.50 | 3-3 | |
| 3711.30 | P | | 2.19 | 5.51 | 2-2 | |
| 3725.65 | P | | 2.21 | 5.53 | 1-1 | |
| 3687.100 | J | 2 | 2.17 | 5.51 | 3-2 | |
| 3698.03 | P | ⊙ | 2.19 | 5.53 | 2-1 | |
| 3707.918 | G | 8 | 2.17 | 5.49 | 3-2 | $a^5P$-$y^5S^o$ (76) |
| 3732.399 | B | 10 | 2.19 | 5.49 | 2-2 | |
| 3760.534 | G | 6 | 2.21 | 5.49 | 1-2 | |
| •3612.940 | J | 1 | 2.17 | 5.58 | 3-3 | $a^5P$-$x^3D^o$ (77) |
| 3628.094 | V | 1 | 2.19 | 5.59 | 2-2 | |
| 3618.96 | P | | 2.21 | 5.62 | 1-1 | |
| 3604.96 | P | | 2.17 | 5.59 | 3-2 | |
| 3592.881 | U | (1) | 2.19 | 5.62 | 2-1 | |
| •3636.186 | V | 2 | 2.19 | 5.58 | 2-3 | |
| 3654.66 | W | (1) | 2.21 | 5.59 | 1-2 | |
| 3497.110 | J | 10 | 2.17 | 5.70 | 3-3 | $a^5P$-$w^5P^o$ (78) |
| 3497.15 | P | (1) | 2.19 | 5.72 | 2-2 | |
| 3509.870 | U | (1) | 2.21 | 5.73 | 1-1 | |
| 3475.651 | J | 6 | 2.17 | 5.72 | 3-2 | |
| 3485.342 | A | 7 | 2.19 | 5.73 | 2-1 | |
| 3518.86 | W | (2) | 2.19 | 5.70 | 2-3 | |
| 3521.833 | J | 2 | 2.21 | 5.72 | 1-2 | |
| 3462.353 | J | 2 | 2.19 | 5.75 | 2-1 | $a^5P$-$z^3S^o$ (79) |
| 3486.556 | U | (1) | 2.21 | 5.75 | 1-1 | |
| 3427.121 | A | 20 | 2.17 | 5.77 | 3-4 | $a^5P$-$u^5D^o$ (81) |
| 3445.151 | A | 20 | 2.19 | 5.77 | 2-3 | |
| 3451.915 | G | 10 | 2.21 | 5.79 | 1-2 | |
| 3424.284 | G | 10 | 2.17 | 5.77 | 3-3 | |
| 3428.192 | G | 8 | 2.19 | 5.79 | 2-2 | |
| 3417.843 | G | 12 | 2.21 | 5.82 | 1-1 | |
| 3407.53 | P | ⊙ | 2.17 | 5.79 | 3-2 | |
| 3394.583 | G | 5 | 2.19 | 5.82 | 2-1 | |
| •3426.383 | J | 5d | 2.17 | 5.77 | 3-2 | $a^5P$-$y^3P^o$ (82) |
| 3426.637 | J | 5 | 2.19 | 5.79 | 2-1 | |
| 3477.850 | V | (2) | 2.21 | 5.76 | 1-0 | |
| 3447.278 | G | 8 | 2.19 | 5.77 | 2-2 | |
| 3450.328 | G | 10 | 2.21 | 5.79 | 1-1 | |
| 3471.27 | V | 5 | 2.21 | 5.77 | 1-2 | |
| 3407.461 | A | 20d | 2.17 | 5.79 | 3-4 | $a^5P$-$x^3F^o$ (83) |
| 3404.357 | G | 6 | 2.19 | 5.81 | 2-3 | |
| 3415.530 | G | 4 | 2.21 | 5.83 | 1-2 | |
| 3383.981 | C | 8 | 2.17 | 5.81 | 3-3 | |
| 3392.304 | G | 8 | 2.19 | 5.83 | 2-2 | |
| 3372.070 | G | 3 | 2.17 | 5.83 | 3-2 | |
| 3382.403 | G | 3 | 2.17 | 5.82 | 3-4 | $a^5P$-$z^3H^o$ (84) |
| 3392.652 | G | 15 | 2.17 | 5.80 | 3-3 | $a^5P$-$w^3D^o$ (85) |
| 3399.336 | A | 15 | 2.19 | 5.82 | 2-2 | |
| 3406.803 | J | 6 | 2.21 | 5.84 | 1-1 | |
| 3379.017 | G | 6 | 2.17 | 5.82 | 3-2 | |
| •3383.692 | G | 5 | 2.19 | 5.84 | 2-1 | |
| 3413.135 | A | 15 | 2.19 | 5.80 | 2-3 | |
| 3422.656 | G | 7 | 2.21 | 5.82 | 1-2 | |
| 3327.961 | V | (1) | 2.17 | 5.87 | 3-4 | $a^5P$-$w^5G^o$ (86) |
| 3346.942 | V | 1 | 2.17 | 5.85 | 3-2 | $a^5P$-$1^o$ (87) |
| 3366.870 | V | 5 | 2.19 | 5.85 | 2-2 | |
| 3389.748 | V | 2 | 2.21 | 5.85 | 1-2 | |
| 3343.243 | V | (1) | 2.17 | 5.86 | 3-4 | $a^5P$-$z^1G^o$ (88) |
| 3351.529 | V | 2 | 2.19 | 5.87 | 2-1 | $a^5P$-$y^3S^o$ (89) |
| 3374.221 | V | (1) | 2.21 | 5.87 | 1-1 | |
| 3286.755 | A | 20 | 2.17 | 5.92 | 3-3 | $a^5P$-$v^5P^o$ (91) |
| 3284.588 | A | 5 | 2.19 | 5.95 | 2-2 | |
| 3292.590 | G | 8 | 2.21 | 5.96 | 1-1 | |
| 3265.616 | G | 15 | 2.17 | 5.95 | 3-2 | |
| 3271.002 | A | 15 | 2.19 | 5.96 | 2-1 | |
| 3305.971 | C | 20 | 2.19 | 5.92 | 2-3 | |
| 3306.356 | C | 20 | 2.21 | 5.95 | 1-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 3290.722 | V | (2) | 2.17 | 5.93 | 3-4 | $a^5P$-$v^5F^o$ (90) |
| 3288.972 | V | 2 | 2.19 | 5.94 | 2-3 | |
| 3298.133 | A | 6 | 2.21 | 5.96 | 1-2 | |
| 3269.964 | V | (1) | 2.17 | 5.94 | 3-3 | |
| 3276.477 | V | 4 | 2.19 | 5.96 | 2-2 | |
| 3286.026 | V | 2 | 2.21 | 5.97 | 1-1 | |
| 3257.594 | A | 8 | 2.17 | 5.96 | 3-2 | |
| 3264.532 | V | 5 | 2.19 | 5.97 | 2-1 | |
| 3251.236 | G | 8 | 2.19 | 5.98 | 2-3 | $a^5P$-$w^3G^o$ (93) |
| 3250.634 | V | 4 | 2.17 | 5.96 | 3-2 | $a^5P$-$x^3P^o$ (95) |
| 3246.973 | V | 6 | 2.19 | 5.99 | 2-1 | |
| 3274.24 | P | ⊙ | 2.21 | 5.98 | 1-0 | |
| 3269.42 | P | ⊙ | 2.19 | 5.98 | 2-2 | |
| 3268.234 | G | 5 | 2.21 | 5.99 | 1-1 | |
| 3290.988 | G | 5 | 2.21 | 5.96 | 1-2 | |
| 3209.115 | V | (1) | 2.17 | 6.01 | 3-4 | $a^5P$-$y^1G^o$ (97) |
| •3211.872 | V | 4 | 2.21 | 6.06 | 1-2 | $a^5P$-$z^o$ (98) |
| 3167.78 | P | ⊙ | 2.17 | 6.06 | 3-4 | $a^5P$-$w^3F^o$ (99) |
| •3172.067 | V | 2 | 2.19 | 6.08 | 2-3 | |
| •3153.064 | S | (-) | 2.19 | 6.10 | 2-2 | |
| 3165.16 | P | ⊙ | 2.17 | 6.07 | 3-3 | $a^5P$-$v^3D^o$ (100) |
| m3172.11 | P | Fe | 2.19 | 6.08 | 2-2 | |
| 3186.82 | P | | 2.21 | 6.09 | 1-1 | |
| 3154.41 | P | (1) | 2.17 | 6.08 | 3-2 | |
| 3166.59 | P | ⊙ | 2.19 | 6.09 | 2-1 | |
| 3182.970 | G | 3 | 2.19 | 6.07 | 2-3 | |
| •3192.417 | U | (1) | 2.21 | 6.08 | 1-2 | |
| 3173.663 | V | (3r) | 2.19 | 6.08 | 2-3 | $a^5P$-$z^o$ (101) |
| 3063.149 | S | (1) | 2.17 | 6.20 | 3-2 | $a^5P$-$w^3P^o$ (102) |
| 3093.53 | P | | 2.19 | 6.18 | 2-1 | |
| 3121.76 | W | (1) | 2.21 | 6.17 | 1-0 | |
| 3079.84 | P | ⊙ | 2.19 | 6.20 | 2-2 | |
| 3023.583 | S | (-) | 2.17 | 6.25 | 3-4 | $a^5P$-$x^1G^o$ (103) |
| 2981.852 | G | 6 | 2.17 | 6.31 | 3-4 | $a^5P$-$t^5D^o$ † |
| 2972.277 | G | 3 | 2.19 | 6.34 | 2-3 | (104) |
| 2966.26 | U | (2) | 2.21 | 6.37 | 1-2 | |
| 3004.48 | P | ⊙ | 2.21 | 6.32 | 1-2 | $a^5P$-$v^3F^o$† (105) |
| 9362.370 | E | 4 | 2.27 | 3.59 | 2-3 | $a^3P$-$z^5P^o$ (106) |
| 10081.40 | P | ⊙ | 2.41 | 3.64 | 1-2 | |
| 10311.88 | P | ⊙ | 2.47 | 3.67 | 0-1 | |
| 9013.90 | F | 1 | 2.27 | 3.64 | 2-2 | |
| 9820.24 | P | | 2.41 | 3.67 | 1-1 | |
| 8804.624 | E | 10 | 2.27 | 3.67 | 2-1 | |
| m7445.70 | P | Fe | 2.27 | 3.93 | 2-3 | $a^3P$-$z^3F^o$ (107) |
| m7945.98 | P | Fe | 2.41 | 3.97 | 1-2 | |
| 7723.20 | O | 4 | 2.27 | 3.87 | 2-3 | $a^3P$-$z^3D^o$ (108) |
| 8239.130 | E | 8 | 2.41 | 3.91 | 1-2 | |
| 8401.42 | O | 2 | 2.47 | 3.94 | 0-1 | |
| 7512.12 | P | ⊙ | 2.27 | 3.91 | 2-2 | |
| 8072.16 | P | ⊙ | 2.41 | 3.94 | 1-1 | |
| 7373.07 | P | ⊙ | 2.27 | 3.94 | 2-1 | |
| 6608.03 | V | 2 | 2.27 | 4.14 | 2-3 | $a^3P$-$y^5D^o$ (109) |
| 7016.075 | V | 20 | 2.41 | 4.17 | 1-2 | |
| 7151.495 | V | 1 | 2.47 | 4.20 | 0-1 | |
| 8481.878 | I | 20 | 2.27 | 4.17 | 2-2 | |
| 6911.52 | V | 1 | 2.41 | 4.20 | 1-1 | |
| 6392.534 | V | (1) | 2.27 | 4.20 | 2-1 | |
| 6861.93 | V | 2 | 2.41 | 4.21 | 1-0 | |
| 6267.64 | P | | 2.27 | 4.24 | 2-3 | $a^3P$-$y^5F^o$ (110) |
| 6667.17 | P | ⊙? | 2.41 | 4.26 | 1-2 | |
| 6822.05 | P | 1 | 2.47 | 4.28 | 0-1 | |
| 6421.355 | B | 200 | 2.27 | 4.19 | 2-2 | $a^3P$-$z^3P^o$ (111) |
| 6750.152 | I | 100 | 2.41 | 4.24 | 1-1 | |
| 6254.262 | I | 6 | 2.27 | 4.24 | 2-1 | |
| 6663.446 | B | 80 | 2.41 | 4.27 | 1-0 | |
| 6945.208 | I | 150 | 2.41 | 4.19 | 1-2 | |
| 6978.855 | I | 100 | 2.47 | 4.24 | 0-1 | |
| 5322.049 | V | (2) | 2.27 | 4.59 | 2-3 | $a^3P$-$y^3F^o$ (112) |
| 5563.69 | P | ⊙ | 2.41 | 4.83 | 1-2 | |
| 5222.40 | P | ⊙ | 2.27 | 4.63 | 2-2 | |
| 5438.594 | V | (2) | 2.27 | 4.54 | 2-3 | $a^3P$-$y^5P^o$ (113) |
| 5678.60 | P | ⊙ | 2.41 | 4.59 | 1-2 | |
| 5754.89 | P | ⊙ | 2.47 | 4.62 | 0-1 | |
| 5323.51 | P | (1) | 2.27 | 4.59 | 2-2 | |
| 5598.47 | P | | 2.41 | 4.62 | 1-1 | |
| 5253.03 | P | ⊙ | 2.27 | 4.82 | 2-1 | |
| 5049.825 | B | 15 | 2.27 | 4.71 | 2-3 | $a^3P$-$y^3D^o$ (114) |
| m5227.15 | P | Fe | 2.41 | 4.77 | 1-2 | |
| 5273.379 | J | 4 | 2.47 | 4.81 | 0-1 | |
| 4924.776 | B | 3 | 2.27 | 4.77 | 2-2 | |
| 5141.750 | V | (2) | 2.41 | 4.81 | 1-1 | |
| 4848.898 | V | (1) | 2.27 | 4.81 | 2-1 | |
| 4830.125 | J | (2) | 2.27 | 4.93 | 2-3 | $a^3P$-$x^5D^o$ (115) |
| 4834.511 | V | (1) | 2.41 | 4.97 | 1-2 | |
| 4908.61 | P | ⊙ | 2.47 | 4.99 | 0-1 | |
| 4574.724 | J | (2) | 2.27 | 4.97 | 2-2 | |
| 4794.36 | P | ⊙ | 2.41 | 4.99 | 1-1 | |
| 4538.784 | V | (1) | 2.27 | 4.99 | 2-1 | |
| 4439.883 | J | (2) | 2.27 | 5.05 | 2-2 | $a^3P$-$z^5S^o$ (116) |
| 4138.84 | U | (1) | 2.27 | 5.25 | 2-3 | $a^3P$-$x^5P^o$ |
| 4289.29 | P | | 2.41 | 5.29 | 1-2 | (117) |
| 4338.84 | P | ⊙ | 2.47 | 5.32 | 0-1 | |
| 4083.554 | V | (1) | 2.27 | 5.29 | 2-2 | |
| 4249.32 | P | ⊙ | 2.41 | 5.32 | 1-1 | |
| •4047.315 | V | (1) | 2.27 | 5.32 | 2-1 | |
| 4037.725 | V | (1) | 2.27 | 5.33 | 2-3 | $a^3P$-$y^5G^o$ (118) |
| 4225.79 | P | ⊙ | 2.41 | 5.33 | 1-2 | |
| 4007.233 | V | (1gn) | 2.27 | 5.35 | 2-3 | $a^3P$-$z^5H^o$ (119) |
| 3913.635 | J | 4 | 2.27 | 5.42 | 2-3 | $a^3P$-$w^5D^o$ (120) |
| 4058.766 | V | 3 | 2.41 | 5.45 | 1-2 | |
| 4101.684 | V | (1) | 2.47 | 5.48 | 0-1 | |
| 3874.053 | V | (1) | 2.27 | 5.45 | 2-2 | |
| •4021.622 | V | (1) | 2.41 | 5.48 | 1-1 | |
| 3840.20 | P | ⊙ | 2.27 | 5.48 | 2-1 | |
| 4013.89 | P | | 2.41 | 5.49 | 1-0 | |
| 3876.671 | U | (1) | 2.27 | 5.45 | 2-3 | $a^3P$-$w^5F^o$ (121) |
| 3819.62 | P | | 2.27 | 5.50 | 2-3 | $a^3P$-$v^5D^o$ (122) |
| 3981.106 | V | (1) | 2.41 | 5.51 | 1-2 | |
| 4043.69 | P | ⊙ | 2.47 | 5.53 | 0-1 | |
| 3803.24 | P | ⊙ | 2.27 | 5.51 | 2-2 | |
| 3965.83 | P | ⊙ | 2.41 | 5.53 | 1-1 | |
| 3825.404 | J | (1gn) | 2.27 | 5.49 | 2-2 | $a^3P$-$y^5S^o$ (123) |
| 4005.38 | P | ⊙ | 2.41 | 5.49 | 1-2 | |
| 3724.380 | B | 8 | 2.27 | 5.58 | 2-3 | $a^3P$-$x^3D^o$ (124) |
| 3885.512 | I | 5 | 2.41 | 5.59 | 1-2 | |
| 3918.319 | J | 3 | 2.47 | 5.62 | 0-1 | |
| 3715.911 | G | 4 | 2.27 | 5.59 | 2-2 | |
| 3845.170 | K | (5) | 2.41 | 5.62 | 1-1 | |
| 3678.98 | W | (1) | 2.27 | 5.62 | 2-1 | |
| 3677.477 | V | (2) | 2.27 | 5.62 | 2-3 | $a^3P$-$y^3G^o$ (125) |
| 3630.67 | P | ⊙? | 2.27 | 5.67 | 2-3 | $a^3P$-$x^5G^o$ (126) |
| 3601.42 | P | ⊙ | 2.27 | 5.70 | 2-3 | $a^3P$-$w^5P^o$ (127) |
| 3735.71 | P | ⊙ | 2.41 | 5.72 | 1-2 | |
| •3790.756 | J | 1 | 2.47 | 5.73 | 0-1 | |
| m3578.67 | P | Cr | 2.27 | 5.72 | 2-2 | |
| 3722.24 | P | ⊙ | 2.41 | 5.73 | 1-1 | |
| 3566.31 | P | ⊙ | 2.27 | 5.73 | 2-1 | |
| 3542.243 | V | 1 | 2.27 | 5.75 | 2-1 | $a^3P$-$z^3S^o$ (128) |
| 3696.03 | W | (1) | 2.41 | 5.75 | 1-1 | |
| 3763.57 | P | ⊙ | 2.47 | 5.75 | 0-1 | |
| 3524.236 | G | 4 | 2.27 | 5.77 | 2-3 | $a^3P$-$u^5D^o$ (130) |
| 3657.143 | V | 1 | 2.41 | 5.79 | 1-2 | |
| •3683.616 | V | (1) | 2.47 | 5.82 | 0-1 | |
| 3506.498 | G | 6 | 2.27 | 5.79 | 2-2 | |
| 3618.91 | P | ⊙ | 2.41 | 5.82 | 1-1 | |
| 3471.350 | U | 6 | 2.27 | 5.82 | 2-1 | |
| 3619.66 | P | ⊙ | 2.41 | 5.82 | 1-0 | |
| 3526.465 | J | 4 | 2.27 | 5.77 | 2-2 | $a^3P$-$y^3P^o$ (131) |
| 3655.35 | P | ⊙ | 2.41 | 5.79 | 1-1 | |
| 3504.866 | V | 2 | 2.27 | 5.79 | 2-1 | |
| 3686.260 | J | 2 | 2.41 | 5.76 | 1-0 | |
| 3678.863 | J | 3 | 2.41 | 5.77 | 1-2 | |
| 3721.396 | V | 1 | 2.47 | 5.79 | 0-1 | |
| 3481.558 | V | (1) | 2.27 | 5.81 | 2-3 | $a^3P$-$x^3F^o$ (132) |
| 3616.326 | U | (1) | 2.41 | 5.83 | 1-2 | |
| m3490.74 | P | Co | 2.27 | 5.80 | 2-3 | $a^3P$-$w^3D^o$ (133) |
| 3624.30 | W | (1) | 2.41 | 5.82 | 1-2 | |
| 3670.810 | V | 1 | 2.47 | 5.84 | 0-1 | |
| •3476.336 | V | (2w) | 2.27 | 5.82 | 2-2 | |
| 3606.53 | P | ⊙ | 2.41 | 5.84 | 1-1 | |
| m3459.95 | P | Fe | 2.27 | 5.84 | 2-1 | |
| 3442.364 | V | 5 | 2.27 | 5.85 | 2-2 | $a^3P$-$1^o$ (134) |
| 3587.424 | J | 2 | 2.41 | 5.85 | 1-2 | |
| 3426.337 | U | (2) | 2.27 | 5.87 | 2-1 | $a^3P$-$y^3S^o$ (135) |
| 3569.99 | W | (1) | 2.41 | 5.87 | 1-1 | |
| 3632.979 | J | 3 | 2.47 | 5.87 | 0-1 | |
| 3393.915 | V | (1) | 2.27 | 5.91 | 2-3 | $a^3P$-$x^3G^o$ (136) |
| m3378.73 | P | Fe | 2.27 | 5.92 | 2-3 | $a^3P$-$v^5P^o$ (137) |
| 3494.15 | W | (1) | 2.41 | 5.95 | 1-2 | |
| 3538.55 | W | (1) | 2.47 | 5.96 | 0-1 | |
| 3356.407 | H | 3 | 2.27 | 5.95 | 2-2 | |
| 3478.788 | V | (1) | 2.41 | 5.96 | 1-1 | |
| 3342.225 | V | 5 | 2.27 | 5.96 | 2-1 | |
| 3347.927 | A | 8 | 2.27 | 5.96 | 2-2 | $a^3P$-$v^5F^o$ (138) |
| 3484.97 | W | (1) | 2.41 | 5.96 | 1-2 | |
| 3340.566 | A | 6 | 2.27 | 5.96 | 2-2 | $a^3P$-$x^3P^o$ (139) |
| 3451.628 | J | 2 | 2.41 | 5.99 | 1-1 | |
| 3317.121 | G | 3 | 2.27 | 5.99 | 2-1 | |
| 3458.304 | J | 4 | 2.41 | 5.98 | 1-0 | |
| 3477.007 | V | (1) | 2.41 | 5.96 | 1-2 | |
| 3510.443 | V | (2) | 2.47 | 5.99 | 0-1 | |
| 3388.81 | P | (1) | 2.41 | 6.06 | 1-2 | $a^3P$-$2^o$ (140) |
| •3239.029 | V | (1) | 2.27 | 6.08 | 2-3 | $a^3P$-$w^3F^o$ (141) |
| 3345.679 | V | (1) | 2.41 | 6.10 | 1-2 | |
| •3250.400 | V | (2) | 2.27 | 6.07 | 2-3 | $a^3P$-$v^3D^o$ (142) |
| 3367.161 | V | (1) | 2.41 | 6.08 | 1-2 | |
| 3418.688 | V | (1) | 2.47 | 6.09 | 0-1 | |
| •3239.029 | V | (1) | 2.27 | 6.08 | 2-2 | |
| 3380.935 | V | (1) | 2.41 | 6.09 | 1-1 | |
| 3233.304 | V | (1) | 2.27 | 6.09 | 2-1? | |
| 3214.624 | V | (1) | 2.27 | 8.11 | 2-2 | $a^3P$-$z^1D^o$ (143) |
| 3142.888 | V | 5 | 2.27 | 6.20 | 2-2 | $a^3P$-$w^3P^o$ (144) |
| •3278.741 | V | 4 | 2.41 | 8.18 | 1-1 | |
| 3157.15 | P | ⊙ | 2.27 | 6.18 | 2-1 | |
| 3288.860 | V | (2) | 2.41 | 6.17 | 1-0 | |
| 3283.378 | V | (2) | 2.41 | 6.20 | 1-2 | |
| 3331.778 | V | (2) | 2.47 | 6.18 | 0-1 | |
| 3030.61 | P | ⊙ | 2.27 | 6.34 | 2-3 | $a^3P$-$v^3F^o$ (145) |
| 2976.126 | G | 5 | 2.27 | 6.42 | 2-3 | $a^3P$-$u^3D^o$ |
| 3053.065 | G | 5 | 2.41 | 6.46 | 1-2 | (146) |
| 3078.436 | V | 3 | 2.47 | 6.48 | 0-1 | |
| 3033.104 | V | (1) | 2.41 | 6.48 | 1-1 | |
| 3063.939 | V | (2) | 2.41 | 6.44 | 1-1 | $a^3P$-$t^3D^o$ (147) |
| 2996.386 | G | 5 | 2.41 | 6.53 | 1-2 | $a^3P$-$v^3P^o$ |
| 2960.303 | V | 1 | 2.47 | 6.64 | 0-1 | (148) |
| 10191.51 | P | ⊙? | 2.41 | 3.63 | 4-3 | $z^7D^o$-$b^3D$ (149) |
| 5871.04 | V | (1) | 2.46 | 4.56 | 2-2 | $z^7D^o$-$d^3F$ |
| 5908.24 | V | (2) | 2.47 | 4.56 | 1-2 | (150) |
| 4260.479 | H | 35 | 2.39 | 5.29 | 5-5 | $z^7D^o$-$e^7D$ |
| 4235.942 | I | 25 | 2.41 | 5.33 | 4-4 | (152) |
| 4232.219 | J | 12 | 2.44 | 5.36 | 3-3 | |
| 4210.358 | J | 15 | 2.47 | 5.40 | 1-1 | |
| 4198.310 | J | 20 | 2.39 | 5.33 | 5-4 | |
| 4187.802 | J | 30 | 2.41 | 5.36 | 4-3 | |
| 4187.044 | J | 20 | 2.44 | 5.39 | 3-2 | |
| 4191.436 | J | 15 | 2.46 | 5.40 | 2-1 | |
| 4299.242 | I | 18 | 2.41 | 5.29 | 4-5 | |
| 4271.159 | J | 20 | 2.44 | 5.33 | 3-4 | |
| 4250.125 | J | 25 | 2.46 | 5.36 | 2-3 | |
| 4233.608 | I | 18 | 2.47 | 5.39 | 1-2 | |
| 3947.393 | V | (1) | 2.39 | 5.52 | 5-4 | $z^7D^o$-$e^5D$ |
| 3920.645 | U | (1) | 2.41 | 5.56 | 4-3 | (153) |
| 3908.68 | P | ⊙ | 2.44 | 5.60 | 3-2 | |
| 3905.86 | P | ⊙ | 2.46 | 5.62 | 2-1 | |
| 3908.90 | P | | 2.47 | 5.63 | 1-0 | |
| 3980.65 | W | (1) | 2.41 | 5.52 | 4-4 | |
| 3950.78 | P | ⊙ | 2.44 | 5.56 | 3-3 | |
| m3932.59 | P | Fe | 2.46 | 5.60 | 2-2 | |
| 3932.08 | P | ⊙ | 2.47 | 5.62 | 1-1 | |
| 4011.71 | W | (1) | 2.44 | 5.52 | 3-4 | |
| 3975.21 | W | (1) | 2.46 | 5.56 | 2-3 | |
| 3949.23 | P | ⊙ | 2.47 | 5.60 | 1-2 | |
| 3615.01 | P | ⊙ | 2.39 | 5.80 | 5-5 | $z^7D^o$-$e^5F$ |
| 3594.10 | P | ⊙ | 2.41 | 5.85 | 4-4 | (154) |
| 3570.60 | P | ⊙ | 2.44 | 5.90 | 3-3 | |
| 3554.65 | P | ⊙ | 2.46 | 5.93 | 2-2 | |
| 3544.88 | P | ⊙ | 2.47 | 5.95 | 1-1 | |
| 3225.789 | A | 25 | 2.39 | 6.21 | 5-6 | $z^7D^o$-$e^7F$ |
| 3196.930 | A | 20 | 2.41 | 6.28 | 4-5 | (155) |
| 3180.223 | G | 20 | 2.44 | 6.32 | 3-4 | |
| •3200.475 | A | 15 | 2.46 | 8.31 | 2-3 | |
| 3192.799 | G | 8 | 2.47 | 6.34 | 1-2 | |
| 3175.447 | A | 12 | 2.39 | 6.28 | 5-5 | |
| 3160.658 | A | 10 | 2.41 | 6.32 | 4-4 | |
| •3184.631 | V | 3 | 2.44 | 6.31 | 3-3 | |
| •3181.932 | U | (2) | 2.46 | 6.34 | 2-2 | |
| 3205.400 | A | 15 | 2.47 | 6.32 | 1-1 | |
| 3139.661 | U | (1) | 2.39 | 6.32 | 5-4 | |
| 3165.005 | V | 3 | 2.41 | 6.31 | 4-3 | |
| 3166.24 | P | ⊙ | 2.44 | 6.34 | 3-2 | |
| 3194.422 | V | 3 | 2.46 | 8.32 | 2-1 | |
| 3222.069 | A | 20 | 2.39 | 6.22 | 5-5 | $z^7D^o$-$f^7D$ |
| 3199.530 | G | 15 | 2.41 | 6.27 | 4-4 | (156) |
| •3214.044 | V | 20 | 2.44 | 6.28 | 3-3 | |
| 3215.940 | A | 12 | 2.46 | 6.30 | 2-2 | |
| 3221.936 | V | 2 | 2.47 | 6.30 | 1-1 | |
| 3178.015 | A | 10 | 2.39 | 6.27 | 5-4 | |
| 3194.03 | P | | 2.41 | 6.28 | 4-3 | |
| 3199.93 | P | | 2.44 | 6.30 | 3-2 | |
| 3210.830 | G | 10 | 2.46 | 6.30 | 2-1 | |
| 3244.190 | A | 15 | 2.41 | 6.22 | 4-5 | |
| 3219.581 | G | 12 | 2.44 | 6.27 | 3-4 | |
| 3230.16 | P | | 2.46 | 6.28 | 2-3 | |
| 3227.067 | V | 3 | 2.47 | 6.30 | 1-2 | |
| 3217.380 | A | 10 | 2.39 | 6.22 | 5-4 | $z^7D^o$-$f^5D$ |
| 3227.798 | G | 15 | 2.41 | 6.24 | 4-3 | (157) |
| 3230.963 | G | 10 | 2.44 | 6.26 | 3-2 | |
| 3228.262 | V | 5 | 2.46 | 6.28 | 2-1 | |
| 3228.900 | G | 3 | 2.47 | 6.29 | 1-0 | |
| 3239.436 | A | 15 | 2.41 | 6.22 | 4-4 | |
| 3248.206 | G | 10 | 2.44 | 6.24 | 3-3 | |
| 3247.297 | V | 3 | 2.46 | 6.26 | 2-2 | |
| m3239.46 | P | Fe | 2.47 | 6.28 | 1-1 | |
| 3259.991 | G | 6 | 2.44 | 6.22 | 3-4 | |
| 3264.716 | V | (2) | 2.46 | 6.24 | 2-3 | |
| 3258.62 | P | ⊙ | 2.47 | 6.26 | 1-2 | |
| 3211.989 | G | 10 | 2.39 | 6.23 | 5-4 | $z^7D^o$-$e^7P$ |
| 3219.806 | G | 10 | 2.41 | 6.25 | 4-3 | (158) |
| m3214.07 | P | Fe | 2.44 | 6.28 | 3-2 | |
| 3233.987 | G | 12 | 2.41 | 6.23 | 4-4 | |
| 3240.11 | P | ⊙ | 2.44 | 6.25 | 3-3 | |
| 3230.210 | V | 6 | 2.46 | 6.28 | 2-2 | |
| 3254.46 | P | ⊙ | 2.44 | 6.23 | 3-4 | |
| 3256.52 | P | ⊙ | 2.46 | 6.25 | 2-3 | |
| 3241.43 | P | | 2.47 | 6.28 | 1-2 | |
| 3207.092 | V | 2 | 2.39 | 6.24 | 5-6 | $z^7D^o$-$e^5G$ |
| 3210.230 | G | 8 | 2.41 | 6.26 | 4-5 | (159) |
| 3201.891 | S | (-) | 2.44 | 6.29 | 3-4 | |
| 3193.314 | V | 8 | 2.46 | 6.32 | 2-3 | |
| 3188.819 | G | 7 | 2.47 | 6.34 | 1-2 | |
| 3188.567 | G | 4 | 2.39 | 6.26 | 5-5 | |
| •3182.078 | V | 3 | 2.41 | 6.29 | 4-4 | |
| m3177.52 | P | Fe+ | 2.44 | 6.32 | 3-3 | |
| m3177.96 | P | Fe | 2.46 | 6.34 | 2-2 | |
| 3160.77 | P | | 2.39 | 6.29 | 5-4 | |
| 3157.992 | U | (2) | 2.41 | 6.32 | 4-3 | |
| •3162.335 | U | 2n | 2.44 | 6.34 | 3-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 3161.949 | G | 8 | 2.39 | 6.29 | 5-8 | $z^7D^o$-$e^7G$ |
| 3157.040 | A | 8 | 2.41 | 6.33 | 4-5 | (160) |
| 3165.860 | G | 4 | 2.44 | 6.34 | 3-4 | |
| 3168.86 | W | 2 | 2.46 | 6.35 | 2-3 | |
| 3171.659 | V | 2 | 2.47 | 6.36 | 1-2 | |
| 3136.08 | P | ⊙ | 2.39 | 6.32 | 5-5 | |
| 3146.475 | U | (1) | 2.41 | 6.34 | 4-4 | |
| 3153.322 | U | (1) | 2.44 | 6.35 | 3-3 | |
| 3160.92 | P | ⊙ | 2.46 | 6.36 | 2-2 | |
| 3168.94 | P | | 2.47 | 6.37 | 1-1 | |
| *3125.653 | C | 15 | 2.39 | 6.34 | 5-4 | |
| m3134.08 | P | Fe | 2.41 | 6.35 | 4-3 | |
| 3145.46 | P | | 2.44 | 6.36 | 3-2 | |
| 3158.21 | P | | 2.46 | 6.37 | 2-1 | |
| 3148.46 | P | | 2.39 | 6.31 | 5-5 | $z^7D^o$-$f^5F$ |
| 3133.96 | P | ⊙ | 2.41 | 6.35 | 4-4 | (161) |
| 3139.10 | P | ⊙ | 2.44 | 6.37 | 3-3 | |
| 3144.488 | V | 6n | 2.46 | 6.38 | 2-2 | |
| 3150.20 | P | | 2.47 | 6.39 | 1-1 | |
| 3113.31 | P | | 2.39 | 6.35 | 5-4 | |
| 3120.03 | P | | 2.41 | 6.37 | 4-3 | |
| 3129.18 | P | (1) | 2.44 | 6.38 | 3-2 | |
| 3139.60 | P | | 2.46 | 6.39 | 2-1 | |
| 3169.58 | P | | 2.41 | 6.31 | 4-5 | |
| 3153.200 | G | 5 | 2.44 | 6.35 | 3-4 | |
| 3154.510 | V | 2 | 2.46 | 6.37 | 2-3 | |
| 3155.12 | P | (1) | 2.47 | 6.38 | 1-2 | |
| *3164.631 | V | 3 | 2.44 | 6.31 | 3-2 | $z^7D^o$-$e^5S$ |
| *3200.475 | A | 15 | 2.46 | 6.31 | 2-2 | (162) |
| 3211.494 | V | 4 | 2.47 | 6.31 | 1-2 | |
| 3164.308 | U | (1) | 2.44 | 6.34 | 3-4 | $z^7D^o$-$g^5D$ (163) |
| 3123.353 | U | (1) | 2.41 | 6.37 | 4-3 | $z^7D^o$-$e^7S$ |
| 3142.445 | V | 6 | 2.44 | 6.37 | 3-3 | (164) |
| 3157.68 | K | 6 | 2.46 | 6.37 | 2-3 | |
| 3097.49 | P | ⊙ | 2.41 | 6.40 | 4-3 | $z^7D^o$-$e^5P$ |
| 3094.08 | P | ⊙ | 2.44 | 6.43 | 3-2 | (165) |
| 3113.67 | P | ⊙ | 2.46 | 6.42 | 2-1 | |
| 3116.250 | U | (1) | 2.44 | 6.40 | 3-3? | |
| 3109.05 | U | (1) | 2.46 | 6.43 | 2-2 | |
| 3124.08 | W | (1) | 2.47 | 6.42 | 1-1 | |
| 8667.37 | P | ⊙? | 2.44 | 3.87 | 4-3 | $a^3H$-$z^3D^o$ (166) |
| 6988.530 | I | 5 | 2.39 | 4.16 | 6-5 | $a^3H$-$y^5F^o$ |
| *6933.628 | L | 6 | 2.42 | 4.20 | 5-4 | (167) |
| 6875.45 | V | 1 | 2.44 | 4.24 | 4-3 | |
| 7103.15 | P | ⊙ | 2.42 | 4.16 | 5-5 | |
| 7014.99 | O | (1) | 2.44 | 4.20 | 4-4 | |
| m6469.12 | P | Fe | 2.39 | 4.30 | 6-6 | $a^3H$-$z^5G^o$ |
| 6593.878 | I | 60 | 2.42 | 4.29 | 5-5 | (166) |
| 6462.731 | I | 30 | 2.44 | 4.35 | 4-4 | |
| 6494.985 | B | 1000 | 2.39 | 4.29 | 6-5 | |
| 6393.605 | B | 400 | 2.42 | 4.35 | 5-4 | |
| 6318.022 | B | 10 | 2.44 | 4.40 | 4-3 | |
| 6567.22 | P | | 2.42 | 4.30 | 5-6 | |
| 6667.42 | P | 1 | 2.44 | 4.29 | 4-5 | |
| 6252.561 | B | 20 | 2.39 | 4.37 | 6-5 | $a^3H$-$z^3G^o$ |
| 6191.562 | B | 20 | 2.42 | 4.42 | 5-4 | (169) |
| 6136.630 | B | 20 | 2.44 | 4.45 | 4-3 | |
| 6344.154 | I | 2 | 2.42 | 4.37 | 5-5 | |
| 6256.370 | I | 4 | 2.44 | 4.42 | 4-4 | |
| 6412.20 | P | ⊙? | 2.44 | 4.37 | 4-5 | |
| 5858.27 | P | ⊙ | 2.42 | 4.53 | 5-4 | $a^3H$-$y^3F^o$ |
| 5753.97 | P | ⊙ | 2.44 | 4.59 | 4-3 | (170) |
| 5916.250 | V | (3) | 2.44 | 4.53 | 4-4 | |
| 4315.95 | P | ⊙ | 2.42 | 5.28 | 5-6 | $a^3H$-$y^5G^o$ |
| 4323.37 | P | ⊙ | 2.44 | 5.30 | 4-5 | (171) |
| 4271.95 | P | ⊙ | 2.42 | 5.31 | 5-4 | |
| 4261.80 | P | ⊙ | 2.44 | 5.33 | 4-3 | |
| 4177.52 | P | | 2.39 | 5.35 | 6-6 | $a^3H$-$z^5H^o$ |
| 4277.68 | U | (1) | 2.42 | 5.31 | 5-5 | (172) |
| 4235.84 | P | ⊙ | 2.39 | 5.31 | 6-5 | |
| 4258.32 | P | ⊙ | 2.42 | 5.32 | 5-4 | |
| 4247.31 | P | ⊙ | 2.44 | 5.35 | 4-3 | |
| 4216.21 | P | ⊙ | 2.42 | 5.35 | 5-6 | |
| 4022.45 | W | (1) | 2.39 | 5.46 | 6-5 | $a^3H$-$w^5F^o$ |
| 4096.96 | P | ⊙ | 2.42 | 5.43 | 5-4 | (173) |
| 4100.91 | P | ⊙ | 2.44 | 5.45 | 4-3 | |
| 4135.23 | P | ⊙ | 2.44 | 5.43 | 4-4 | |
| 3859.314 | I | 10 | 2.39 | 5.59 | 6-5 | $a^3H$-$y^3G^o$ |
| 3873.763 | B | 8 | 2.42 | 5.61 | 5-4 | (175) |
| 3876.663 | V | (8) | 2.44 | 5.62 | 4-3 | |
| 3893.934 | J | (2) | 2.42 | 5.59 | 5-5 | |
| 3899.037 | J | 2 | 2.44 | 5.61 | 4-4 | |
| m3813.07 | P | Fe | 2.39 | 5.63 | 6-6 | $a^3H$-$x^5G^o$ |
| 3796.00 | U | (1) | 2.39 | 5.64 | 6-5 | (176) |
| 3813.94 | P | ⊙ | 2.42 | 5.66 | 5-4 | |
| 3826.63 | P | ⊙ | 2.44 | 5.67 | 4-3 | |
| 3846.949 | V | (1) | 2.42 | 5.63 | 5-6 | |
| 3760.052 | B | 8 | 2.39 | 5.68 | 6-7 | $a^3H$-$z^3I^o$ |
| 3765.950 | G | 6 | 2.42 | 5.68 | 5-6 | (177) |
| 3794.340 | J | 8 | 2.44 | 5.70 | 4-5 | |
| 3753.154 | J | (1gn) | 2.39 | 5.68 | 6-6 | |
| 3770.405 | V | (1) | 2.42 | 5.70 | 5-5 | |
| 3689.02 | P | ⊙ | 2.42 | 5.77 | 5-4 | $a^3H$-$u^5D^o$ |
| *3708.602 | V | (1) | 2.44 | 5.77 | 4-3 | (178) |
| 3711.92 | P | ⊙ | 2.44 | 5.77 | 4-4 | |
| *3668.24 | W | 1 | 2.42 | 5.79 | 5-4 | $a^3H$-$x^3F^o$ |
| 3681.36 | W | (1) | 2.44 | 5.81 | 4-3 | (179) |
| 3688.677 | V | (1) | 2.44 | 5.79? | 4-4 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 3823.187 | G | 6 | 2.39 | 5.80 | 6-8 | $a^3H$-$z^3H^o$ |
| 3650.280 | J | 5 | 2.42 | 5.80 | 5-5 | (180) |
| 3659.516 | G | 8 | 2.44 | 5.82 | 4-4 | |
| 3619.76 | W | (1) | 2.39 | 5.80 | 6-5 | |
| 3637.251 | V | 1 | 2.42 | 5.82 | 5-4 | |
| 3653.763 | V | 1 | 2.42 | 5.80 | 5-6 | |
| 3672.89 | W | 1 | 2.44 | 5.80 | 4-5 | |
| 3573.842 | V | 3 | 2.39 | 5.85 | 6-6 | $a^3H$-$w^5G^o$ |
| 3596.20 | W | 1 | 2.42 | 5.85 | 5-5 | (181) |
| 3595.87 | W | (1) | 2.44 | 5.67 | 4-4 | |
| 3566.59 | W | (1) | 2.39 | 5.85 | 6-5 | |
| 3574.37 | P | | 2.42 | 5.87 | 5-4 | |
| 3582.56 | W | (1) | 2.44 | 5.89 | 4-3 | |
| 3603.572 | U | (1) | 2.42 | 5.85 | 5-6 | |
| 3617.97 | P | ⊙ | 2.44 | 5.85 | 4-5 | |
| 3543.09 | P | ⊙ | 2.39 | 5.88 | 6-5 | $a^3H$-$w^5F^o$ |
| 3531.43 | W | (1) | 2.42 | 5.92 | 5-4 | (182) |
| 3528.24 | P | ⊙ | 2.44 | 5.94 | 4-3 | |
| 3572.32 | P | ⊙ | 2.42 | 5.88 | 5-5 | |
| 3552.42 | U | (1) | 2.44 | 5.92 | 4-4 | |
| 3593.80 | P | ⊙ | 2.44 | 5.88 | 4-5 | |
| 3514.62 | W | (1) | 2.39 | 5.91 | 6-5 | $a^3H$-$x^3G^o$ |
| 3546.21 | U | (1) | 2.42 | 5.90 | 5-4 | (183) |
| 3564.56 | P | ⊙ | 2.44 | 5.91 | 4-3 | |
| 3543.39 | W | (1) | 2.42 | 5.91 | 5-5 | |
| 3567.36 | W | (1) | 2.44 | 5.90 | 4-4 | |
| 3564.51 | P | ⊙ | 2.44 | 5.91 | 4-5 | |
| 3466.279 | V | (1) | 2.39 | 5.95 | 6-5 | $a^3H$-$w^3G^o$ |
| 3478.382 | V | (1gn) | 2.42 | 5.97 | 5-4 | (185) |
| 3484.84 | W | (1) | 2.44 | 5.98 | 4-3 | |
| 3494.25 | P | ⊙ | 2.42 | 5.95 | 5-5 | |
| 3448.19 | P | ⊙ | 2.39 | 5.97 | 6-5 | $a^3H$-$z^1H^o$ |
| *3475.867 | V | (1) | 2.42 | 5.97 | 5-5 | (186) |
| 3496.19 | U | (1) | 2.44 | 5.97 | 4-5 | |
| 3437.631 | V | (1) | 2.42 | 6.01 | 5-4 | $a^3H$-$y^1G^o$ |
| 3457.512 | V | (1) | 2.44 | 6.01 | 4-4 | (187) |
| 3390.25 | P | ⊙? | 2.42 | 6.06 | 5-4 | $a^3H$-$w^3F^o$ |
| 3394.085 | V | (1) | 2.44 | 6.08 | 4-3 | (188) |
| 3395.90 | P | ⊙? | 2.44 | 6.08 | 4-3 | $a^3H$-3° (189) |
| 3327.498 | V | (2) | 2.39 | 6.10 | 6-6 | $a^3H$-$y^3H^o$ |
| 3334.223 | V | (3) | 2.42 | 6.12 | 5-5 | (190) |
| *3339.202 | V | 2 | 2.44 | 6.14 | 4-4 | |
| 3308.75 | P | ⊙ | 2.39 | 6.12 | 6-5 | |
| 3320.650 | V | (2) | 2.42 | 6.14 | 5-4 | |
| 3353.268 | V | (1) | 2.42 | 6.10 | 5-6 | |
| 3352.929 | V | (1) | 2.44 | 6.12 | 4-5 | |
| 3324.541 | V | 4 | 2.39 | 6.11 | 6-5 | $a^3H$-$v^3G^o$ |
| 3331.616 | V | 3 | 2.42 | 6.13 | 5-4 | (191) |
| 3325.468 | V | 4 | 2.44 | 6.15 | 4-3 | |
| *3350.264 | V | (3) | 2.42 | 6.11 | 5-5 | |
| | | | 2.44 | 6.13 | 4-4 | |
| 3369.14 | P | ⊙ | 2.44 | 6.11 | 4-5 | |
| *3325.607 | U | (1) | 2.42 | 6.25 | 5-4 | $a^3H$-$x^1G^o$ |
| 3343.118 | V | (1) | 2.44 | 6.25 | 4-4 | (192) |
| 3160.342 | V | (2) | 2.39 | 6.30 | 6-6 | $a^3H$-$x^3H^o$ |
| 3178.970 | V | 3 | 2.42 | 6.30 | 5-5 | (192a) |
| 3155.80 | P | ⊙ | 2.39 | 6.30 | 6-5 | |
| 3183.58 | P | ⊙ | 2.42 | 6.30 | 5-6 | |
| 3155.293 | V | 2 | 2.42 | 6.33 | 5-4 | $a^3H$-$w^3F^o$ |
| *3172.067 | V | 2 | 2.44 | 6.33 | 4-4 | (193) |
| m3185.68 | P | Fe | 2.39 | 6.34 | 6-5 | $a^3H$-$u^3G^o$ |
| 3119.495 | G | 6 | 2.42 | 6.38 | 5-4 | (194) |
| 3180.435 | G | 6 | 2.44 | 6.40 | 4-3 | |
| 3148.420 | U | (2) | 2.42 | 6.34 | 5-5 | |
| 3135.863 | U | (1) | 2.44 | 6.38 | 4-4 | |
| 3165.08 | P | ⊙ | 2.44 | 6.34 | 4-5 | |
| 3144.92 | P | ⊙ | 2.42 | 6.35 | 5-4 | $a^3H$-4° |
| 3161.55 | P | ⊙ | 2.44 | 6.35 | 4-4 | (195) |
| 3100.638 | V | (2) | 2.39 | 6.37 | 6-5 | $a^3H$-6° (196a) |
| *3106.542§ | U | (1) | 2.44 | 6.42 | 4-3 | $a^3H$-$u^3D^o$ (196) |
| 3083.152 | U | (1) | 2.44 | 6.45 | 4-3 | $a^3H$-$t^3D^o$ (197) |
| 3025.638 | V | 15 | 2.39 | 6.47 | 6-6 | $a^3H$-$w^3H^o$ |
| 3030.149 | C | 15 | 2.42 | 6.50 | 5-5 | (198) |
| 3031.313 | G | 12 | 2.44 | 6.51 | 4-4 | |
| 3009.098 | V | 3 | 2.39 | 6.50 | 6-5 | |
| 3015.913 | C | 4 | 2.42 | 6.51 | 5-4 | |
| 3046.929 | V | (1) | 2.42 | 6.47 | 5-6 | |
| 3045.594 | V | (1) | 2.44 | 6.50 | 4-5 | |
| 3005.302 | G | 3 | 2.39 | 6.50 | 6-7 | $a^3H$-$y^3I^o$ |
| 3039.322 | V | (2) | 2.42 | 6.48 | 5-6 | (199) |
| 3019.291 | V | (1) | 2.44 | 6.53 | 4-5 | |
| 3018.134 | U | (1) | 2.39 | 6.48 | 6-6 | |
| 3004.119 | V | (2) | 2.42 | 6.53 | 5-5 | |
| *2986.655§ | V | (1) | 2.42 | 6.55 | 5-6 | $a^3H$-$z^1I^o$ (200) |
| 2960.60 | P | ⊙ | 2.44 | 6.58 | 4-4 | $a^3H$-9° † (201) |
| 9372.900 | E | 6 | 2.55 | 3.86 | 4-4 | $b^3F$-$z^3F^o$ |
| 9148.11 | F | 3 | 2.58 | 3.93 | 3-3 | (202) |
| 9010.55 | F | 2 | 2.60 | 3.97 | 2-2 | |
| 9359.420 | E | 3 | 2.55 | 3.87 | 4-3 | $b^3F$-$z^3D^o$ |
| 9246.54 | F | 2 | 2.58 | 3.91 | 3-2 | (203) |
| 9173.20 | P | ⊙ | 2.60 | 3.94 | 2-1 | |
| 7461.534 | V | (1) | 2.55 | 4.20 | 4-4 | $b^3F$-$y^5F^o$ |
| 7430.58 | M | 1 | 2.58 | 4.24 | 3-3 | (204) |
| 7400.87 | P | ⊙ | 2.60 | 4.26 | 2-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 7089.54 | P | 1 | 2.55 | 4.29 | 4-5 | $b^3F$-$z^5G^o$ |
| 6950.82 | P | | 2.58 | 4.35 | 3-4 | (205) |
| 6860.29 | V | 1 | 2.60 | 4.40 | 2-3 | |
| 6839.828 | V | 4 | 2.55 | 4.35 | 4-4 | |
| 6783.71 | V | 3 | 2.58 | 4.40 | 3-3 | |
| 6746.96 | P | ⊙ | 2.60 | 4.43 | 2-2 | |
| m6677.96 | P | Fe | 2.55 | 4.40 | 4-3 | |
| 6672.88 | P | | 2.58 | 4.43 | 3-2 | |
| 6783.27 | P | ⊙ | 2.55 | 4.37 | 4-5 | $b^3F$-$z^3G^o$ |
| 6712.68 | P | | 2.58 | 4.42 | 3-4 | (206) |
| 6646.98 | V | (1) | 2.60 | 4.45 | 2-3 | |
| 6609.116 | I | 30 | 2.55 | 4.42 | 4-4 | |
| 6575.022 | I | 30 | 2.58 | 4.45 | 3-3 | |
| 8475.632 | I | 12 | 2.55 | 4.45 | 4-3 | |
| 6230.728 | B | 25 | 2.55 | 4.53 | 4-4 | $b^3F$-$y^3F^o$ |
| 6137.696 | B | 18 | 2.58 | 4.59 | 3-3 | (207) |
| 8065.487 | B | 15 | 2.60 | 4.63 | 2-2 | |
| 8051.00 | P | ⊙ | 2.55 | 4.59 | 4-3 | |
| *6005.53 | V | (1) | 2.58 | 4.63 | 3-2 | |
| 8322.693 | I | 5 | 2.58 | 4.53 | 3-4 | |
| 6200.323 | J | 4 | 2.60 | 4.59 | 2-3 | |
| 8199.475 | U | (1) | 2.55 | 4.54 | 4-3 | $b^3F$-$y^5P^o$ |
| 6139.65 | P | ⊙ | 2.58 | 4.59 | 3-2 | (208) |
| 6106.84 | P | ⊙ | 2.60 | 4.62 | 2-1 | |
| 6290.55 | P | ⊙ | 2.58 | 4.54 | 3-3 | |
| 6202.31 | P | | 2.60 | 4.59 | 2-2 | |
| 6356.293 | U | (1) | 2.60 | 4.54 | 2-3 | |
| 5701.553 | J | 7 | 2.55 | 4.71 | 4-3 | $b^3F$-$y^3D^o$ |
| 5615.308 | V | (2) | 2.58 | 4.77 | 3-2 | (209) |
| 5567.401 | V | (2) | 2.60 | 4.81 | 2-1 | |
| 5778.47 | V | (1) | 2.58 | 4.71 | 3-3 | |
| 5667.67 | P | | 2.60 | 4.77 | 2-2 | |
| 5833.93 | P | ⊙ | 2.60 | 4.71 | 2-3 | |
| 5265.94 | P | | 2.55 | 4.89 | 4-4 | $b^3F$-$x^5D^o$ |
| *5235.392 | V | (2) | 2.58 | 4.93 | 3-3 | (210) |
| 5172.21 | P | ⊙ | 2.55 | 4.93 | 4-3 | |
| 5164.70 | P | ⊙ | 2.58 | 4.97 | 3-2 | |
| m5162.38 | P | Fe | 2.60 | 4.99 | 2-1 | |
| 5331.48 | P | | 2.58 | 4.89 | 3-4 | |
| 5280.91 | P | | 2.60 | 4.93 | 2-3 | |
| 5069.60 | P | ⊙ | 2.58 | 5.01 | 3-4 | $b^3F$-$x^5F^o$ |
| 5010.30 | P | ⊙ | 2.55 | 5.01 | 4-4 | (211) |
| 5008.72 | P | ⊙ | 2.58 | 5.04 | 3-3 | |
| 5003.85 | P | ⊙ | 2.60 | 5.06 | 2-2 | |
| 4586.68 | P | ⊙ | 2.55 | 5.25 | 4-3 | $b^3F$-$x^5P^o$ (212) |
| *4488.917 | J | (2) | 2.55 | 5.30 | 4-5 | $b^3F$-$y^5G^o$ |
| 4513.72 | P | ⊙ | 2.58 | 5.31 | 3-4 | (213) |
| 4509.13 | P | ⊙ | 2.60 | 5.33 | 2-2 | |
| *4373.563 | J | (2) | 2.55 | 5.37 | 4-4 | $b^3F$-$w^5D^o$ |
| 4337.52 | P | | 2.58 | 5.42 | 3-3 | (214) |
| 4319.45 | P | ⊙ | 2.60 | 5.45 | 2-2 | |
| 4294.04 | P | | 2.55 | 5.42 | 4-3 | |
| 4288.962 | V | (1) | 2.58 | 5.45 | 3-2 | |
| 4277.41 | P | | 2.60 | 5.48 | 2-1 | |
| 4235.65 | P | ⊙ | 2.55 | 5.46 | 4-5 | $b^3F$-$w^5F^o$ |
| 4318.81 | P | ⊙ | 2.58 | 5.43 | 3-4 | (215) |
| 4322.70 | P | ⊙ | 2.60 | 5.45 | 2-3 | |
| 4275.72 | U | (1) | 2.55 | 5.43 | 4-4 | |
| 4270.31 | P | ⊙ | 2.58 | 5.47 | 3-2 | |
| 4283.40 | P | ⊙ | 2.60 | 5.48 | 2-1 | |
| 4246.79 | P | | 2.58 | 5.48 | 3-4 | $b^3F$-$w^5D^o$ |
| 4251.88 | P | ⊙ | 2.60 | 5.50 | 2-3 | (216) |
| 4067.275 | B | 4 | 2.55 | 5.58 | 4-3 | $b^3F$-$x^3D^o$ |
| 4095.975 | I | 4 | 2.58 | 5.59 | 3-2 | (217) |
| 4078.365 | J | 4 | 2.60 | 5.62 | 2-1 | |
| 4106.266 | V | (1) | 2.58 | 5.58 | 3-3 | |
| *4123.748 | J | (1) | 2.60 | 5.59 | 2-2 | |
| 4134.19 | P | ⊙ | 2.60 | 5.58 | 2-3 | |
| 4055.046 | V | 3 | 2.55 | 5.59 | 4-5 | $b^3F$-$y^3G^o$ |
| 4071.52 | U | (1) | 2.58 | 5.61 | 3-4 | (218) |
| 4076.498 | V | (1) | 2.60 | 5.62 | 2-3 | |
| 4033.19 | P | (1) | 2.55 | 5.61 | 4-4 | |
| 4049.336 | V | (1) | 2.58 | 5.62 | 3-3 | |
| 4011.416 | V | (1) | 2.55 | 5.62 | 4-3 | |
| 3985.32 | P | ⊙ | 2.55 | 5.64 | 4-5 | $b^3F$-$x^5G^o$ |
| 4005.49 | P | ⊙ | 2.58 | 5.66 | 3-4 | (219) |
| 4019.05 | U | (1) | 2.60 | 5.67 | 2-3 | |
| 3968.38 | P | | 2.55 | 5.66 | 4-4 | |
| 3992.64 | P | ⊙ | 2.58 | 5.67 | 3-3 | |
| *4010.77 | W | (1) | 2.60 | 5.67 | 2-2 | |
| 3955.77 | P | ⊙ | 2.55 | 5.67 | 4-3 | |
| 3984.48 | P | ⊙ | 2.58 | 5.67 | 3-2 | |
| 3921.27 | U | (1) | 2.55 | 5.70 | 4-5 | $b^3F$-$z^3I^o$ (220) |
| 3833.311 | J | 5 | 2.55 | 5.77 | 4-4 | $b^3F$-$u^5D^o$ |
| 3864.31 | P | ⊙ | 2.58 | 5.77 | 3-3 | (221) |
| 3867.45 | P | ⊙ | 2.60 | 5.79 | 2-2 | |
| 3829.771 | U | (2) | 2.55 | 5.77 | 4-3 | |
| 3843.975 | U | (1) | 2.58 | 5.79 | 3-2 | |
| 3824.73 | P | | 2.60 | 5.82 | 2-1 | |
| 3867.925 | V | 1 | 2.58 | 5.77 | 3-4 | |
| 3808.731 | J | 4 | 2.55 | 5.79 | 4-4 | $b^3F$-$x^3F^o$ |
| 3813.059 | J | 5? | 2.58 | 5.81 | 3-3 | (222) |
| 3821.834 | J | 3 | 2.60 | 5.83 | 2-2 | |
| 3779.424 | V | 3* | 2.55 | 5.81 | 4-3 | |
| 3797.948 | J | (1) | 2.58 | 5.83 | 3-2 | |
| 3843.90 | P | ⊙ | 2.58 | 5.79 | 3-4 | |
| 3837.132 | J | 1 | 2.60 | 5.81 | 2-3 | |
| 3791.504 | J | (1) | 2.55 | 5.80 | 4-5 | $b^3F$-$z^3H^o$ |
| *3811.05 | U | (1) | 2.58 | 5.82 | 3-4 | (223) |
| 3777.448 | J | 2 | 2.55 | 5.82 | 4-4 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| m3790.24 | P | Fe | 2.55 | 5.80 | 4-3 | $b^3F\text{-}w^3D^o$ |
| m3806.76 | P | Fe | 2.58 | 5.82 | 3-2 | (224) |
| 3810.90 | P | ⊙ | 2.60 | 5.84 | 2-1 | |
| 3824.074 | J | 1 | 2.58 | 5.80 | 3-3 | |
| 3830.757 | J | 1 | 2.60 | 5.82 | 2-2 | |
| 3848.29 | P | ⊙ | 2.60 | 5.80 | 2-3 | |
| 3733.20 | P | ⊙ | 2.55 | 5.85 | 4-5 | $b^3F\text{-}w^5G^o$ |
| 3742.07 | W | (1) | 2.58 | 5.87 | 3-4 | (225) |
| 3750.677 | V | (1) | 2.60 | 5.89 | 2-3 | |
| 3709.665 | U | (1) | 2.55 | 5.87 | 4-4 | |
| 3787.67 | P | ⊙ | 2.58 | 5.89 | 3-3 | |
| 3731.374 | J | 2 | 2.60 | 5.90 | 2-2 | |
| *3695.507 | V | (1) | 2.55 | 5.89 | 4-3 | |
| *3708.603 | V | (1) | 2.58 | 5.90 | 3-2 | |
| 3766.092 | V | (1) | 2.58 | 5.85 | 3-2 | $b^3F\text{-}i^o$ |
| 3789.570 | J | (1) | 2.60 | 5.85 | 2-2 | (226) |
| 3728.668 | J | 1 | 2.55 | 5.86 | 4-4 | $b^3F\text{-}z^1G^o$ |
| 3761.416 | J | 1 | 2.58 | 5.86 | 3-4 | (227) |
| 3676.314 | B | 6 | 2.55 | 5.91 | 4-5 | $b^3F\text{-}x^3G^o$ |
| 3711.225 | J | 3 | 2.58 | 5.90 | 3-4 | (228) |
| 3730.945 | J | 2 | 2.60 | 5.91 | 2-3 | |
| 3679.33 | W | (1) | 2.55 | 5.90 | 4-4 | |
| 3708.18 | P | ⊙ | 2.58 | 5.91 | 3-3 | |
| *3663.458 | V | 1 | 2.55 | 5.92 | 4-4 | $b^3F\text{-}v^5F^o$ |
| 3668.893 | U | (1) | 2.58 | 5.94 | 3-3 | (229) |
| 3675.44 | P | ⊙ | 2.60 | 5.96 | 2-2 | |
| 3637.73 | W | (1) | 2.55 | 5.94 | 4-3 | |
| 3653.35 | P | ⊙ | 2.58 | 5.96 | 3-2 | |
| 3660.41 | P | ⊙ | 2.60 | 5.97 | 2-1 | |
| *3695.054 | B | 8 | 2.58 | 5.92 | 3-4 | |
| 3691.18 | P | ⊙ | 2.60 | 5.94 | 2-3 | |
| 3658.55 | U | (1) | 2.55 | 5.92 | 4-3 | $b^3F\text{-}v^5D^o$ |
| *3663.458 | V | 1 | 2.58 | 5.95 | 3-2 | (231) |
| 3668.58 | P | (1) | 2.60 | 5.96 | 2-1? | |
| 3690.095 | S | (-) | 2.58 | 5.92 | 3-3 | |
| 3685.66 | P | ⊙ | 2.60 | 5.95 | 2-2 | |
| *3623.440 | G | 1 | 2.55 | 5.95 | 4-5 | $b^3F\text{-}w^3G^o$ |
| 3636.995 | J | 2 | 2.58 | 5.97 | 3-4 | (233) |
| 3643.716 | V | 1 | 2.60 | 5.98 | 2-3 | |
| 3606.38 | P | ⊙ | 2.55 | 5.97 | 4-4 | |
| m3622.00 | P | Fe | 2.58 | 5.98 | 3-3 | |
| 3644.58 | P | ⊙ | 2.58 | 5.96 | 3-2 | $b^3F\text{-}x^3P^o$ (235) |
| 3562.60 | P | ⊙ | 2.55 | 6.01 | 4-4 | $b^3F\text{-}y^1G^o$ |
| 3592.486 | U | (1) | 2.58 | 6.01 | 3-4 | (237) |
| 3511.748 | U | (1) | 2.55 | 6.06 | 4-4 | $b^3F\text{-}w^3F^o$ |
| m3524.04 | P | Fe | 2.58 | 6.08 | 3-3 | (238) |
| 3520.85 | W | (1) | 2.60 | 6.10 | 2-2 | |
| 3495.285 | G | 8 | 2.55 | 6.08 | 4-3 | |
| 3500.564 | G | 2 | 2.58 | 6.10 | 3-2 | |
| 3508.52 | W | (1) | 2.55 | 6.07 | 4-3 | $b^3F\text{-}v^3D^o$ |
| 3524.075 | J | 3 | 2.58 | 6.08 | 3-2 | (239) |
| 3537.729 | J | 3 | 2.60 | 6.09 | 2-1 | |
| *3537.491§ | J | 1 | 2.58 | 6.07 | 3-3 | |
| 3544.631 | U | (2) | 2.60 | 6.08 | 2-2 | |
| 3558.21 | P | ⊙ | 2.60 | 8.07 | 2-3 | |
| 3526.016 | V | 1 | 2.58 | 6.08 | 3-3 | $b^3F\text{-}3^o$ (240) |
| m3451.66 | P | Fe | 2.55 | 6.12 | 4-5 | $b^3F\text{-}y^3H^o$ |
| 3464.914 | V | (1) | 2.58 | 6.14 | 3-4 | (241) |
| 3468.849 | V | 4 | 2.55 | 8.11 | 4-5 | $b^3F\text{-}v^3G^o$ |
| 3478.853 | J | (2) | 2.58 | 6.13 | 3-4 | (242) |
| 3469.834 | V | 2 | 2.60 | 6.15 | 2-3 | |
| 3448.889 | V | (1) | 2.55 | 6.13 | 4-4 | |
| 3450.14 | P | ⊙ | 2.58 | 6.15 | 3-3 | |
| 3515.41 | P | ⊙ | 2.60 | 6.11 | 2-2 | $b^3F\text{-}z^1D^o$ (243) |
| 3410.56 | P | ⊙ | 2.58 | 8.20 | 3-2 | $b^3F\text{-}w^3P^o$ |
| 3446.791 | V | (1) | 2.80 | 6.18 | 2-1 | (244) |
| 3429.80 | P | ⊙ | 2.60 | 6.20 | 2-2 | |
| 3384.839 | V | (1) | 2.58 | 6.24 | 3-3 | $b^3F\text{-}z^1F^o$ |
| 3383.387 | V | (1) | 2.60 | 6.24 | 2-3? | (245) |
| 3335.403 | V | (1) | 2.55 | 8.25 | 4-4 | $b^3F\text{-}x^1G^o$ (246) |
| 3252.12 | P | ⊙ | 2.55 | 8.34 | 4-4 | $b^3F\text{-}u^5F^o$ |
| 3227.17 | P | ⊙ | 2.55 | 8.37 | 4-3 | (247) |
| 3229.78 ? | W | (1) | 2.58 | 6.40 | 3-2 | |
| 3285.54 | P | ⊙ | 2.55 | 8.30 | 4-5 | $b^3F\text{-}x^3H^o$ (248) |
| 3254.281 | V | (1) | 2.55 | 8.34 | 4-3 | $b^3F\text{-}t^5D^o$ (249) |
| 3260.276 | V | 4 | 2.55 | 8.33 | 4-4 | $b^3F\text{-}v^5F^o$ |
| *3278.741 | V | 4 | 2.58 | 8.34 | 3-3 | (250) |
| 3314.450 | V | (2) | 2.80 | 8.32 | 2-2 | |
| 3253.839 | V | (1) | 2.55 | 8.34 | 4-3 | |
| 3298.467 | U | (1) | 2.58 | 6.32 | 3-2 | |
| 3252.928 | V | 4 | 2.55 | 6.34 | 4-5 | $b^3F\text{-}u^3G^o$ |
| 3246.492 | V | 3 | 2.58 | 8.38 | 3-4 | (252) |
| 3249.204 | V | 3 | 2.55 | 8.35 | 4-4 | $b^3F\text{-}4^o$ (253) |
| m3219.60 | P | Fe | 2.55 | 8.38 | 4-3 | $b^3F\text{-}u^5P^o$ |
| 3217.53 | P | ⊙ | 2.58 | 8.41 | 3-2 | (254) |
| 3242.268 | V | (1) | 2.58 | 8.38 | 3-2 | $b^3F\text{-}y^1D^o$ (255) |
| 3237.234 | V | (1) | 2.58 | 8.39 | 3-2 | $b^3F\text{-}7^o$ (258) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 3253.954 | V | (2) | 2.60 | 6.39 | 2-2 | $b^3F\text{-}x^1D^o$ (257) |
| 3191.11 | W | (1) | 2.55 | 6.42 | 4-3 | $b^3F\text{-}u^3D^o$ |
| 3181.522 | G | 4 | 2.58 | 6.46 | 3-2 | (258) |
| 3176.366 | V | 2 | 2.60 | 6.48 | 2-1 | |
| 3198.266 | U | (1) | 2.60 | 6.46 | 2-2 | |
| 3232.16 | P | ⊙ | 2.60 | 6.42 | 2-3 | |
| 3166.435 | G | 6 | 2.55 | 6.45 | 4-3 | $b^3F\text{-}t^3D^o$ |
| 3190.02 | W | (1) | 2.58 | 6.45 | 3-3 | (259) |
| 3159.85 | P | ⊙ | 2.60 | 6.50 | 2-2 | |
| 3126.84 | P | ⊙ | 2.55 | 6.50 | 4-5 | $b^3F\text{-}w^3H^o$ |
| 3111.688 | U | (2) | 2.55 | 6.51 | 4-4 | (260) |
| 3093.888 | V | (2 1d) | 2.55 | 6.54 | 4-3 | $b^3F\text{-}s^3D^o$ |
| 3116.39 | P | ⊙ | 2.58 | 6.54 | 3-3 | (261) |
| 3053.78 | P | ⊙ | 2.55 | 6.59 | 4-3 | $b^3F\text{-}t^5P^o$ |
| 3007.75 | P | ⊙ | 2.58 | 6.68 | 3-2 | (262) |
| 3018.25 | P | ⊙ | 2.55 | 6.64 | 4-3 | $b^3F\text{-}x^1F^o$ |
| 3054.949 | S | (-) | 2.60 | 6.64 | 2-3 | (263) |
| 10432.99 | D | 0 | 2.68 | 3.86 | 5-4 | $a^3G\text{-}z^3F^o$ |
| 10195.11 | F | 2 | 2.72 | 3.93 | 4-3 | (264) |
| 10113.86 | F | 2 | 2.75 | 3.97 | 3-2 | |
| 8345.20 | P | ⊙ | 2.68 | 4.16 | 5-5 | $a^3G\text{-}y^5F^o$ |
| 8303.11 | P | ⊙ | 2.72 | 4.20 | 4-4 | (265) |
| 8112.17 | P | ⊙ | 2.68 | 4.20 | 5-4 | |
| 8108.33 | P | ⊙ | 2.72 | 4.24 | 4-3 | |
| 8129.32 | P | ⊙ | 2.75 | 4.26 | 3-2 | |
| 7650.95 | P | | 2.68 | 4.29 | 5-5 | $a^3G\text{-}z^5G^o$ |
| 7540.44 | P | ⊙ | 2.72 | 4.35 | 4-4 | (266) |
| 7481.74 | P | ⊙ | 2.75 | 4.40 | 3-3 | |
| 7383.63 | P | ⊙ | 2.68 | 4.35 | 5-4 | |
| 7344.18 | P | ⊙ | 2.72 | 4.40 | 4-3 | |
| 7347.16 | P | ⊙ | 2.75 | 4.43 | 3-2 | |
| 7316.77 | P | ⊙ | 2.68 | 4.37 | 5-5 | $a^3G\text{-}z^3G^o$ |
| 7261.00 | P | ⊙ | 2.72 | 4.42 | 4-4 | (267) |
| 7238.70 | O | 1 | 2.75 | 4.45 | 3-3 | |
| 7114.55 | P | ⊙ | 2.68 | 4.42 | 5-4 | |
| 7100.20 | P | ⊙? | 2.72 | 4.45 | 4-3 | |
| 7471.75 | P | ⊙ | 2.72 | 4.37 | 4-5 | |
| 6677.993 | B | 600 | 2.68 | 4.53 | 5-4 | $a^3G\text{-}y^3F^o$ |
| 6592.919 | B | 300 | 2.72 | 4.59 | 4-3 | (268) |
| 6546.245 | B | 200 | 2.75 | 4.63 | 3-2 | |
| 6806.851 | L | 10 | 2.72 | 4.53 | 4-4 | |
| 6703.573 | L | 10 | 2.75 | 4.59 | 3-3 | |
| 6180.216 | V | (2) | 2.72 | 4.71 | 4-3 | $a^3G\text{-}y^3D^o$ |
| 6085.267 | V | (1) | 2.75 | 4.77 | 3-2 | (269) |
| 5391.78 | P | ⊙ | 2.68 | 4.97 | 5-5 | $a^3G\text{-}x^5F^o$ (270) |
| 4432.90 | P | ⊙ | 2.72 | 5.50 | 4-3 | $a^3G\text{-}v^5D^o$ |
| 4460.12 | P | ⊙ | 2.75 | 5.51 | 3-2 | (271) |
| 4305.13 | P | ⊙ | 2.72 | 5.58 | 4-3 | $a^3G\text{-}x^3D^o$ |
| *4340.49 | P | (1) | 2.75 | 5.59 | 3-2 | (272) |
| *4239.847 | J | 2 | 2.68 | 5.59 | 5-5 | $a^3G\text{-}y^3G^o$ |
| 4266.968 | J | 3 | 2.72 | 5.61 | 4-4 | (273) |
| 4288.148 | J | (2) | 2.75 | 5.82 | 3-3 | |
| 4215.975 | V | (1) | 2.68 | 5.61 | 5-4 | |
| 4242.588 | V | (1) | 2.72 | 5.62 | 4-3 | |
| m4291.44 | P | Fe | 2.72 | 5.59 | 4-5 | |
| 4313.04 | P | ⊙ | 2.75 | 5.61 | 3-4 | |
| 4184.22 | U | (1) | 2.68 | 5.63 | 5-8 | $a^3G\text{-}x^5G^o$ |
| 4213.42 | P | ⊙ | 2.72 | 5.64 | 4-5 | (274) |
| 4239.01 | P | ⊙ | 2.75 | 5.68 | 3-4 | |
| *4163.676 | V | (1) | 2.68 | 5.64 | 5-5 | |
| 4194.50 | P | ⊙ | 2.72 | 5.68 | 4-4 | |
| 4224.83 | P | ⊙ | 2.75 | 5.87 | 3-3 | |
| 4145.309 | V | (1) | 2.68 | 5.66 | 5-4 | |
| 4180.41 | P | ⊙ | 2.72 | 5.87 | 4-3 | |
| *4215.430 | J | 2 | 2.75 | 5.67 | 3-2 | |
| 4113.17 | P | ⊙ | 2.68 | 5.68 | 5-6 | $a^3G\text{-}z^3I^o$ (275) |
| 3998.054 | I | 10 | 2.68 | 5.77 | 5-4 | $a^3G\text{-}u^5D^o$ |
| 4039.94 | W | (1) | 2.72 | 5.77 | 4-3 | (276) |
| *4043.901 | V | 5n | 2.72 | 5.77 | 4-4 | |
| 4085.28 | P | ⊙ | 2.75 | 5.77 | 3-4 | |
| 3971.325 | I | 9 | 2.68 | 5.79 | 5-4 | $a^3G\text{-}x^3F^o$ |
| 3983.980 | I | 10 | 2.72 | 5.81 | 4-3 | (277) |
| 4007.277 | J | 6 | 2.75 | 5.83 | 3-2 | |
| 4016.54 | W | (1) | 2.72 | 5.79 | 4-4 | |
| 4024.109 | J | (1) | 2.75 | 5.81 | 3-3 | |
| 4057.358 | V | 2 | 2.75 | 5.79 | 3-4 | |
| 3958.681 | B | 12 | 2.88 | 5.80 | 5-8 | $a^3G\text{-}z^3H^o$ |
| 3997.394 | I | 15 | 2.72 | 5.80 | 4-5 | (278) |
| 4021.869 | I | 12 | 2.75 | 5.82 | 3-4 | |
| 3952.606 | I | 8 | 2.68 | 5.80 | 5-5 | |
| 3981.775 | J | 7 | 2.72 | 5.82 | 4-4 | |
| 3937.329 | J | 3 | 2.88 | 5.82 | 5-4 | |
| 3995.998 | J | 4 | 2.72 | 5.80 | 4-3 | $a^3G\text{-}w^3D^o$ |
| 4017.096 | V | (1) | 2.75 | 5.82 | 3-2 | (279) |
| 4038.37 | P | ⊙ | 2.75 | 5.80 | 3-3 | |
| 3897.896 | J | 8 | 2.68 | 5.85 | 5-8 | $a^3G\text{-}w^5G^o$ |
| *3932.829 | J | 4 | 2.72 | 5.85 | 4-5 | (280) |
| 3945.119 | J | 4 | 2.75 | 5.87 | 3-4 | |
| 3929.114 | J | (1) | 2.75 | 5.89 | 3-3 | |
| 3883.745 | V | 2 | 2.68 | 5.87 | 5-4 | |
| 3890.844 | J | 2 | 2.72 | 5.89 | 4-3 | |
| 3907.937 | B | 4 | 2.75 | 5.90 | 3-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 3971.82 | W | (1) | 2.75 | 5.85 | 3-2 | $a^3G\text{-}i^o$ (281) |
| 3884.359 | J | 3 | 2.68 | 5.86 | 5-4 | $a^3G\text{-}z^1G^o$ |
| 3927.61 | P | ⊙ | 2.72 | 5.86 | 4-4 | (282) |
| *3966.630 | J | 10n | 2.75 | 5.86 | 3-4 | |
| *3861.341 | J | 2 | 2.68 | 5.88 | 5-5 | $a^3G\text{-}v^5F^o$ |
| 3855.329 | V | (1w) | 2.72 | 5.92 | 4-4 | (283) |
| 3813.638 | J | 2 | 2.68 | 5.92 | 5-4 | |
| 3826.836 | J | 1 | 2.72 | 5.94 | 4-3 | |
| 3892.898 | V | (1) | 2.75 | 5.92 | 3-4 | |
| 3827.572 | J | 1 | 2.68 | 5.91 | 5-5 | $a^3G\text{-}x^3G^o$ |
| 3872.923 | V | 1 | 2.72 | 5.90 | 4-4 | (284) |
| 3907.464 | J | (1) | 2.75 | 5.91 | 3-3 | |
| 3830.850 | J | 1 | 2.68 | 5.90 | 5-4 | |
| 3869.590 | V | 3• | 2.72 | 5.91 | 4-3 | |
| 3869.562 | K | 3• | 2.72 | 5.91 | 4-5 | |
| 3910.845 | J | (3) | 2.75 | 5.90 | 3-4 | |
| 3770.305 | V | 3• | 2.68 | 5.95 | 5-5 | $a^3G\text{-}w^3G^o$ |
| 3792.156 | J | 2 | 2.72 | 5.97 | 4-4 | (287) |
| 3811.892 | J | 2 | 2.75 | 5.98 | 3-3 | |
| 3751.820 | J | (1) | 2.68 | 5.97 | 5-4 | |
| 3775.860 | J | (1) | 2.72 | 5.98 | 4-3 | |
| *3811.05 | U | (1) | 2.72 | 5.95 | 4-5 | |
| 3828.510 | V | (1n) | 2.75 | 5.97 | 3-4 | |
| 3748.91 | P | ⊙ | 2.68 | 5.97 | 5-5 | $a^3G\text{-}z^1H^o$ |
| 3789.178 | J | 3 | 2.72 | 5.97 | 4-5 | (289) |
| 3704.463 | B | 10 | 2.68 | 6.01 | 5-4 | $a^3G\text{-}y^1G^o$ |
| 3743.78 | P | (0) | 2.72 | 6.01 | 4-4 | (290) |
| 3779.213 | U | (1) | 2.75 | 6.01 | 3-4 | |
| 3649.508 | B | 12 | 2.68 | 6.06 | 5-4 | $a^3G\text{-}w^3F^o$ |
| 3669.523 | B | 10 | 2.72 | 6.08 | 4-3 | (291) |
| 3677.630 | B | 12 | 2.75 | 6.10 | 3-2 | |
| 3687.656 | J | 4 | 2.72 | 6.06 | 4-4 | |
| *3703.556 | J | 5 | 2.75 | 6.08 | 3-3 | |
| 3722.028 | J | (1) | 2.75 | 6.06 | 3-4 | |
| 3684.108 | G | 15 | 2.72 | 6.07 | 4-3 | $a^3G\text{-}v^3D^o$ |
| *3703.556 | J | 5 | 2.75 | 6.08 | 3-2 | (293) |
| 3718.407 | J | 3 | 2.75 | 6.07 | 3-3 | |
| 3705.71 | P | ⊙ | 2.75 | 6.08 | 3-3 | $a^3G\text{-}3^o$ (293) |
| 3606.679 | G | 20 | 2.68 | 6.10 | 5-6 | $a^3G\text{-}y^3H^o$ |
| 3621.463 | B | 15 | 2.72 | 6.12 | 4-5 | (294) |
| 3638.296 | G | 12 | 2.75 | 6.14 | 3-4 | |
| 3584.663 | B | 8 | 2.68 | 6.12 | 5-5 | |
| 3605.450 | G | 15 | 2.72 | 6.14 | 4-4 | |
| 3568.977 | J | 4 | 2.68 | 6.14 | 5-4 | |
| 3603.205 | G | 10 | 2.68 | 6.11 | 5-5 | $a^3G\text{-}v^3G^o$ |
| *3618.393 | J | 2 | 2.72 | 6.13 | 4-4 | (295) |
| 3623.001 | G | 12 | 2.75 | 6.15 | 3-3 | |
| 3581.645 | J | 1 | 2.68 | 6.13 | 5-4 | |
| 3589.456 | G | 3 | 2.72 | 6.15 | 4-3 | |
| 3640.388 | G | 15 | 2.72 | 6.11 | 4-5 | |
| 3651.469 | B | 20 | 2.75 | 6.13 | 3-4 | |
| 3527.90 | P | ⊙ | 2.75 | 6.24 | 3-3 | $a^3G\text{-}z^1F^o$ (296) |
| 3459.429 | V | (2) | 2.68 | 6.25 | 5-4 | $a^3G\text{-}x^1G^o$ |
| 3493.69 | W | (2) | 2.72 | 6.25 | 4-4 | (297) |
| 3411.88 | P | ⊙ | 2.68 | 6.30 | 5-5 | $a^3G\text{-}u^5F^o$ (298) |
| 3411.134 | V | (1) | 2.68 | 6.30 | 5-6 | $a^3G\text{-}x^3H^o$ |
| 3439.050 | V | (1) | 2.72 | 6.30 | 4-5 | (299) |
| 3405.83 | W | (2) | 2.68 | 6.30 | 5-5 | |
| 3404.923 | U | (1) | 2.68 | 6.31 | 5-4 | $a^3G\text{-}t^5D^o$ |
| 3404.755 | V | (1) | 2.72 | 6.34 | 4-3 | (300) |
| 3438.10 | P | ⊙ | 2.72 | 6.31 | 4-4 | |
| 3434.039 | V | (1w) | 2.75 | 6.34 | 3-3 | |
| 3378.678 | G | 6 | 2.68 | 6.33 | 5-4 | $a^3G\text{-}v^3F^o$ |
| *3404.301 | V | 3 | 2.72 | 6.34 | 4-3 | (301) |
| 3453.022 | J | (2) | 2.75 | 6.32 | 3-2 | |
| 3411.353 | G | 3 | 2.72 | 6.33 | 4-4 | |
| 3440.74 | P | ⊙ | 2.75 | 6.33 | 3-4 | |
| 3366.790 | V | 5 | 2.68 | 6.35 | 5-4 | $a^3G\text{-}4^o$ |
| 3399.230 | V | (1) | 2.72 | 6.35 | 4-4 | (302) |
| 3428.41 | P | ⊙? | 2.75 | 6.35 | 3-4 | |
| 3341.906 | G | 5 | 2.68 | 6.37 | 5-5 | $a^3G\text{-}6^o$ |
| 3373.874 | V | (1) | 2.72 | 6.37 | 4-5 | (303) |
| 3370.786 | A | 10 | 2.68 | 6.34 | 5-5 | $a^3G\text{-}u^3G^o$ |
| 3389.549 | G | 8 | 2.72 | 6.38 | 4-4 | (304) |
| 3380.111 | C | 8 | 2.75 | 6.40 | 3-3 | |
| 3337.866 | C | 6 | 2.68 | 6.38 | 5-4 | |
| 3351.750 | V | 3 | 2.72 | 6.40 | 4-3 | |
| 3403.299 | U | (2) | 2.72 | 6.34 | 4-5 | |
| 3398.226 | V | (1) | 2.75 | 6.38 | 3-4 | |
| *3393.609 | V | (1w) | 2.75 | 8.38 | 3-2 | $a^3G\text{-}y^1D^o$ (305) |
| 3387.410 | V | 2 | 2.75 | 6.39 | 3-2 | $a^3G\text{-}x^1D^o$ (306) |
| 3335.72 | P | ⊙? | 2.72 | 8.42 | 4-3 | $a^3G\text{-}u^3D^o$ |
| 3363.815 | V | (1) | 2.75 | 6.42 | 3-3 | (307) |
| 3254.734 | V | (2) | 2.68 | 6.47 | 5-6 | $a^3G\text{-}w^3H^o$ |
| 3265.55 | P | ⊙ | 2.72 | 6.50 | 4-5 | (308) |
| 3275.685 | V | (1) | 2.75 | 6.51 | 3-4 | |
| 3235.592 | U | (1) | 2.68 | 6.50 | 5-5 | |
| 3249.037 | V | (1) | 2.72 | 8.51 | 4-4 | |
| 3219.37 | P | ⊙ | 2.68 | 8.51 | 5-4 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| m3246.05 | P | Fe | 2.68 | 6.48 | 5-6 | $a^3G$-$y^3I^o$ |
| 3235.33 | P | ⊙ | 2.72 | 6.53 | 4-5 | (309) |
| •3162.335 | U | 2n | 2.68 | 6.58 | 5-4 | $a^3G$-$9^o$ (310) |
| 3151.353 | G | 10 | 2.72 | 6.63 | 4-5 | $a^3G$-$y^1H^o$ (311) |
| 3172.30 | P | ⊙ | 2.75 | 6.64 | 3-3 | $a^3G$-$x^1F^o$ (312) |
| 3098.191 | V | 6 | 2.68 | 6.66 | 5-5 | $a^3G$-$t^3G^o$ |
| 3101.003 | V | (2) | 2.72 | 6.70 | 4-4 | (313) |
| 3090.209 | V | (1) | 2.75 | 8.74 | 3-3 | |
| 3073.982 | V | (1) | 2.68 | 6.70 | 5-4 | |
| 3066.487 | V | 3 | 2.72 | 6.74 | 4-3 | |
| 3095.270 | V | (2) | 2.68 | 6.67 | 5-5 | $a^3G$-$12^o$ |
| 3122.665 | R | (-) | 2.72 | 6.67 | 4-5 | (314) |
| 3067.952 | V | (1) | 2.68 | 6.70 | 5-4 | $a^3G$-$13^o$ |
| 3094.870 | U | (1) | 2.72 | 6.70 | 4-4 | (315a) |
| 3119.04 | P | ⊙ | 2.75 | 6.70 | 3-4 | |
| 3046.819 | S | (-) | 2.72 | 6.77 | 4-4 | $a^3G$-$w^1G^o$ (315) |
| 2959.992 | C | 10 | 2.68 | 6.85 | 5-6 | $a^3G$-$v^3H^o$ |
| 2990.392 | C | 6 | 2.72 | 6.84 | 4-5 | (316) |
| 3011.482 | G | 7 | 2.75 | 6.84 | 3-4 | |
| m2965.25 | P | Fe | 2.68 | 6.84 | 5-5 | |
| 2988.942 | S | (-) | 2.72 | 6.84 | 4-4 | |
| 2980.532 | G | 5 | 2.75 | 6.89 | 3-3 | $a^3G$-$w^1F^o$ (317) |
| 4957.603 | I | 60 | 2.80 | 5.29 | 6-5 | $z^7F^o$-$e^7D$ |
| 4920.509 | I | 60 | 2.82 | 5.33 | 5-4 | (318) |
| 4891.496 | I | 50 | 2.84 | 5.36 | 4-3 | |
| 4871.323 | I | 25 | 2.85 | 5.39 | 3-2 | |
| 4859.748 | B | 15 | 2.86 | 5.40 | 2-1 | |
| 5006.126 | I | 20 | 2.82 | 5.29 | 5-5 | |
| 4957.302 | J | 20 | 2.84 | 5.33 | 4-4 | |
| 4918.999 | B | 30 | 2.85 | 5.36 | 3-3 | |
| 4890.782 | J | 25 | 2.88 | 5.39 | 2-2 | |
| 4872.144 | I | 20 | 2.87 | 5.40 | 1-1 | |
| 5044.221 | T | (2) | 2.84 | 5.29 | 4-5 | |
| 4985.553 | J | 7 | 2.85 | 5.33 | 3-4 | |
| 4938.820 | J | 10 | 2.86 | 5.36 | 2-3 | |
| 4903.317 | B | 12 | 2.87 | 5.39 | 1-2 | |
| 4878.218 | B | 12 | 2.87 | 5.40 | 0-1 | |
| •4579.344 | V | (1) | 2.82 | 5.52 | 5-4 | $z^7F^o$-$e^5D$ |
| 4611.19 | P | ⊙ | 2.84 | 5.52 | 4-4 | (319) |
| 4554.467 | V | (1) | 2.85 | 5.56 | 3-3 | |
| 4515.17 | P | (1) | 2.86 | 5.60 | 2-2 | |
| 4490.24 | P | ⊙ | 2.87 | 5.62 | 1-1 | |
| 4635.62 | P | ⊙ | 2.85 | 5.52 | 3-4 | |
| 4571.44 | P | ⊙ | 2.86 | 5.56 | 2-3 | |
| 4525.875 | V | (1) | 2.87 | 5.60 | 1-2 | |
| •4495.386 | V | (1) | 2.87 | 5.62 | 0-1 | |
| 4104.77 | P | | 2.80 | 5.80 | 6-5 | $z^7F^o$-$e^5F$ |
| •4010.77 | W | (1) | 2.85 | 5.93 | 3-2 | (320) |
| 3994.27 | P | ⊙ | 2.86 | 5.95 | 2-1 | |
| 4137.97 | P | ⊙ | 2.82 | 5.80 | 5-5 | |
| 4100.35 | P | ⊙ | 2.84 | 5.85 | 4-4 | |
| 4056.53 | U | (1) | 2.85 | 5.90 | 3-3 | |
| •4002.665 | V | (1) | 2.87 | 5.95 | 1-1 | |
| 4119.86 | P | ⊙ | 2.85 | 5.85 | 3-4 | |
| 4032.46 | W | (1) | 2.87 | 5.93 | 1-2 | |
| 4008.768 | V | (1w) | 2.87 | 5.95 | 0-1 | |
| 3610.159 | G | 20 | 2.80 | 6.21 | 6-6 | $z^7F^o$-$e^7F$ |
| 3571.995 | G | 6 | 2.82 | 6.28 | 5-5 | (321) |
| 3545.639 | G | 5 | 2.84 | 6.32 | 4-4 | |
| •3565.583 | J | 3 | 2.85 | 6.31 | 3-3 | |
| 3552.828 | G | 3 | 2.86 | 6.34 | 2-2 | |
| 3575.11 | W | (1) | 2.87 | 6.32 | 1-1 | |
| •3547.203 | J | (2) | 2.80 | 6.28 | 6-5 | |
| 3528.78 | P | | 2.82 | 6.32 | 5-4 | |
| 3551.11 | P | ⊙ | 2.84 | 6.31 | 4-3 | |
| 3542.56 | P | ⊙ | 2.85 | 6.34 | 3-2 | |
| 3568.423 | U | (1) | 2.86 | 6.32 | 2-1 | |
| 3635.82 | P | ⊙ | 2.82 | 6.21 | 5-6 | |
| 3591.345 | U | (1) | 2.84 | 6.28 | 4-5 | |
| 3580.07 | P | ⊙ | 2.85 | 6.32 | 3-4 | |
| •3575.978 | G | 2 | 2.86 | 6.31 | 2-3 | |
| 3559.45 | P | ⊙ | 2.87 | 8.34 | 1-2 | |
| 3578.380 | U | (1) | 2.87 | 8.32 | 0-1 | |
| m3605.50 | P | Fe | 2.80 | 8.22 | 6-5 | $z^7F^o$-$f^7D$ |
| 3575.249 | J | 2 | 2.82 | 6.27 | 5-4 | (322) |
| 3587.69 | P | | 2.84 | 6.28 | 4-3 | |
| 3584.790 | J | 1 | 2.85 | 6.30 | 3-2 | |
| 3588.918 | J | 2 | 2.86 | 8.30 | 2-1 | |
| 3631.103 | J | 7 | 2.82 | 6.22 | 5-5 | |
| 3594.632 | G | 8 | 2.84 | 6.27 | 4-4 | |
| 3602.46 | W | 2 | 2.85 | 6.28 | 3-3 | |
| 3595.294 | V | 2 | 2.88 | 6.30 | 2-2 | |
| 3595.66 | U | (1) | 2.87 | 6.30 | 1-1 | |
| •3851.10 | W | (1) | 2.84 | 8.22 | 4-5 | |
| 3809.46 | P | ⊙ | 2.85 | 6.27 | 3-4 | |
| 3813.08 | P | ⊙? | 2.88 | 8.28 | 2-3 | |
| 3602.10 | W | 1 | 2.87 | 8.30 | 1-2 | |
| 3598.98 | W | (1) | 2.87 | 6.30 | 0-1 | |
| 3825.140 | G | 6 | 2.82 | 6.22 | 5-4 | $z^7F^o$-$f^5D$ |
| 3830.353 | J | 4 | 2.84 | 6.24 | 4-3 | (323) |
| 3823.772 | U | 2 | 2.85 | 8.26 | 3-2 | |
| 3810.703 | J | 2 | 2.88 | 6.28 | 2-1 | |
| 3604.383 | U | (1) | 2.87 | 8.29 | 1-0 | |
| •3845.090 | V | 2 | 2.84 | 8.22 | 4-4 | |
| •3845.494 | V | 1 | 2.85 | 6.24 | 3-3 | |
| 3834.52 | P | ⊙ | 2.86 | 6.26 | 2-2 | |
| 3817.53 | P | | 2.87 | 8.28 | 1-1 | |
| 3860.33 | W | (1) | 2.85 | 8.22 | 3-4 | |
| 3858.35 | P | ⊙ | 2.86 | 6.24 | 2-3 | |
| 3841.45 | P | ⊙ | 2.87 | 8.26 | 1-2 | |
| 3820.33 | P | ⊙ | 2.87 | 8.28 | 0-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 3618.30 | P | ⊙ | 2.82 | 6.23 | 5-4 | $z^7F^o$-$e^7P$ |
| 3620.23 | W | (1) | 2.84 | 6.25 | 4-3 | (324) |
| •3602.534 | G | 3 | 2.85 | 6.28 | 3-2 | |
| 3638.16 | P | ⊙ | 2.84 | 6.23 | 4-4 | |
| 3635.28 | P | | 2.85 | 6.25 | 3-3 | |
| 3613.15 | W | (1) | 2.88 | 6.28 | 2-2 | |
| 3653.35 | P | ⊙ | 2.85 | 6.23 | 3-4 | |
| 3646.10 | P | ⊙ | 2.86 | 6.25 | 2-3 | |
| 3620.00 | P | | 2.87 | 8.28 | 1-2 | |
| 3586.75 | P | (2) | 2.80 | 6.24 | 6-6 | $z^7F^o$-$e^5G$ |
| 3588.615 | G | 3 | 2.82 | 8.26 | 5-5 | (325) |
| 3572.60 | U | (1) | 2.84 | 6.29 | 4-4 | |
| 3558.68 | W | (1) | 2.85 | 6.32 | 3-3 | |
| 3563.61 | P | ⊙ | 2.80 | 6.26 | 6-5 | |
| 3612.068 | G | 8 | 2.82 | 6.24 | 5-6 | |
| •3608.146 | J | 3 | 2.84 | 6.26 | 4-5 | |
| 3587.253 | V | 2 | 2.85 | 6.29 | 3-4 | |
| 3567.045 | V | 2 | 2.86 | 8.32 | 2-3 | |
| 3554.50 | W | 2 | 2.87 | 6.34 | 1-2 | |
| 3570.243 | V | 20 | 2.80 | 6.25 | 6-7 | $z^7F^o$-$e^7G$ |
| 3554.922 | G | 40 | 2.82 | 6.29 | 5-6 | (328) |
| 3541.083 | G | 15 | 2.84 | 6.32 | 4-5 | |
| 3542.076 | G | 15 | 2.85 | 6.34 | 3-4 | |
| 3536.556 | G | 15 | 2.86 | 6.35 | 2-3 | |
| 3533.201 | G | 10 | 2.87 | 8.36 | 1-2 | |
| 3533.008 | J | 5 | 2.87 | 6.37 | 0-1 | |
| 3530.385 | G | 2 | 2.80 | 6.29 | 6-6 | |
| 3522.268 | G | (3) | 2.82 | 6.32 | 5-5 | |
| 3527.792 | G | 4 | 2.84 | 6.34 | 4-4 | |
| 3526.377 | J | 4 | 2.85 | 6.35 | 3-3 | |
| 3526.673 | J | 5 | 2.86 | 6.36 | 2-2 | |
| 3529.818 | G | 6 | 2.87 | 6.37 | 1-1 | |
| 3498.18 | P | ⊙ | 2.80 | 6.32 | 6-5 | |
| 3509.12 | W | (1) | 2.82 | 6.34 | 5-4 | |
| 3512.339 | U | (1) | 2.84 | 6.35 | 4-3 | |
| 3516.55 | W | (1) | 2.85 | 6.36 | 3-2 | |
| 3523.30 | W | (1) | 2.86 | 6.37 | 2-1 | |
| 3513.59 | P | ⊙ | 2.80 | 6.31 | 6-5 | $z^7F^o$-$f^5F$ |
| 3493.57 | P | ⊙ | 2.82 | 6.35 | 5-4 | (327) |
| 3537.898 | J | 4 | 2.82 | 6.31 | 5-5 | |
| 3512.08 | W | (1) | 2.84 | 6.35 | 4-4 | |
| 3506.23 | W | (1) | 2.86 | 6.38 | 2-2 | |
| 3506.58 | P | ⊙ | 2.87 | 6.39 | 1-1 | |
| 3556.877 | G | 7 | 2.84 | 6.31 | 4-5 | |
| 3526.23 | W | (3) | 2.85 | 6.35 | 3-4 | |
| 3518.68 | W | (1) | 2.86 | 6.37 | 2-3 | |
| m3512.68 | P | Co | 2.87 | 6.38 | 1-2 | |
| 3509.73 | P | ⊙ | 2.87 | 6.39 | 0-1 | |
| •3565.583 | J | 3 | 2.85 | 6.31 | 3-2 | $z^7F^o$-$e^5S$ |
| •3575.976 | G | 2 | 2.86 | 6.31 | 2-2 | (328) |
| 3582.69 | W | (2) | 2.87 | 6.31 | 1-2 | |
| 3525.856 | U | (1) | 2.84 | 6.34 | 4-4 | $z^7F^o$-$g^5D$ |
| 3540.121 | G | 3 | 2.85 | 6.34 | 3-4 | (329) |
| 3512.80 | P | ⊙ | 2.85 | 6.37 | 3-3 | $z^7F^o$-$e^7S$ |
| 3522.896 | U | (1) | 2.86 | 6.37 | 2-3 | (330) |
| 3490.04 | P | ⊙? | 2.86 | 6.40 | 2-3 | $z^7F^o$-$e^5P$ (331) |
| 3215.637 | V | (3) | 2.82 | 6.63 | 5-5 | $z^7F^o$-$e^3G$ (332) |
| •3209.297 | G | 6 | 2.80 | 6.64 | 6-5 | $z^7F^o$-$g^7D$ |
| 3196.147 | V | 2 | 2.82 | 6.68 | 5-4 | (333) |
| •3182.076 | V | 3 | 2.84 | 6.72 | 4-3 | |
| 3173.608 | U | (1) | 2.85 | 6.74 | 3-2 | |
| 3181.85 | W | (3) | 2.88 | 6.74 | 2-2 | |
| 3173.40 | W | (1) | 2.87 | 6.76 | 1-1 | |
| 3187.16 | P | ⊙ | 2.87 | 6.74 | 1-2 | |
| 3175.97 | W | (1) | 2.87 | 6.76 | 0-1 | |
| 2976.922 | U | (1) | 2.82 | 6.97 | 5-5 | $z^7F^o$-1 † |
| 2990.33 | P | ⊙ | 2.84 | 6.97 | 4-5 | (334) |
| 2974.78 | W | (1) | 2.82 | 6.97 | 5- | $z^7F^o$-2 (335) |
| 11149.34 | D | 2 | 2.82 | 3.93 | 2-3 | $b^3P$-$z^3F^o$ |
| 10881.85 | D | 1 | 2.83 | 3.97 | 1-2 | (338) |
| 11783.28 | D | 6 | 2.82 | 3.87 | 2-3 | $b^3P$-$z^3D^o$ |
| 11439.06 | D | 15 | 2.83 | 3.91 | 1-2 | (337) |
| 11251.09 | D | 3 | 2.85 | 3.94 | 0-1 | |
| 11298.83 | D | 3 | 2.82 | 3.91 | 2-2 | |
| 11119.80 | D | 10 | 2.83 | 3.94 | 1-1 | |
| 10987.22 | P | ⊙ | 2.82 | 3.94 | 2-1 | |
| 9370.57 | P | | 2.82 | 4.14 | 2-3 | $b^3P$-$y^5D^o$ |
| 9210.030 | E | 6 | 2.83 | 4.17 | 1-2 | (338) |
| 9117.10 | F | 2 | 2.85 | 4.20 | 0-1 | |
| 9118.888 | E | 25 | 2.82 | 4.17 | 2-2 | |
| 9030.67 | F | 1 | 2.83 | 4.20 | 1-1 | |
| 8943.00 | F | 2 | 2.82 | 4.20 | 2-1 | |
| 8946.25 | F | 1 | 2.83 | 4.21 | 1-0 | |
| 8999.561 | E | 200 | 2.82 | 4.19 | 2-2 | $b^3P$-$z^3P^o$ |
| 8757.192 | E | 25 | 2.83 | 4.24 | 1-1 | (339) |
| 8874.751 | E | 80 | 2.82 | 4.24 | 2-1 | |
| 8611.807 | E | 40 | 2.83 | 4.27 | 1-0 | |
| 9088.326 | E | 50 | 2.83 | 4.19 | 1-2 | |
| 8838.433 | E | 30 | 2.85 | 4.24 | 0-1 | |
| 6979.17 | P | ⊙ | 2.82 | 4.59 | 2-3 | $b^3P$-$y^3F^o$ |
| 6859.49 | P | ⊙ | 2.83 | 4.63 | 1-2 | (340) |
| 6808.80 | P | ⊙ | 2.82 | 4.63 | 2-2 | |
| 6912.43 | P | ⊙ | 2.83 | 4.62 | 1-1 | $b^3P$-$y^5P^o$ |
| 6860.96 | P | 1 | 2.82 | 4.62 | 2-1 | (341) |
| 6518.376 | I | 20 | 2.82 | 4.71 | 2-3 | $b^3P$-$y^3D^o$ |
| 6355.039 | I | 4 | 2.83 | 4.77 | 1-2 | (342) |
| 6370.338 | J | (2) | 2.85 | 4.81 | 0-1 | |
| 6311.508 | V | (1) | 2.82 | 4.77 | 2-2 | |
| 6239.234 | V | (1) | 2.83 | 4.81 | 1-1 | |
| 6187.41 | P | ⊙ | 2.82 | 4.81 | 2-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 5835.58 | P | ⊙ | 2.82 | 4.93 | 2-3 | $b^3P$-$x^5D^o$ |
| 5747.85 | P | ⊙ | 2.82 | 4.97 | 2-2 | (343) |
| 5552.85 | P | ⊙ | 2.82 | 5.04 | 2-3 | $b^3P$-$x^5F^o$ |
| 5532.13 | P | | 2.83 | 5.06 | 1-2 | (344) |
| 5529.80 | P | ⊙ | 2.85 | 5.08 | 0-1 | |
| 5536.59 | P | ⊙ | 2.82 | 5.05 | 2-2 | $b^3P$-$z^5S^o$ |
| 5570.06 | P | ⊙ | 2.83 | 5.05 | 1-2 | (345) |
| 4741.533 | B | 3 | 2.82 | 5.42 | 2-3 | $b^3P$-$w^5D^o$ |
| 4707.487 | J | (2) | 2.83 | 5.45 | 1-2 | (346) |
| 4680.475 | V | (1) | 2.85 | 5.48 | 0-1 | |
| 4683.565 | J | (2) | 2.82 | 5.45 | 2-2 | |
| 4657.598 | V | (1) | 2.83 | 5.48 | 1-1 | |
| 4687.387 | J | (1) | 2.82 | 5.45 | 2-3 | $b^3P$-$w^5F^o$ |
| 4885.03 | P | ⊙ | 2.83 | 5.47 | 1-2 | (347) |
| 4687.67 | P | ⊙ | 2.85 | 5.48 | 0-1 | |
| 4661.33 | P | ⊙ | 2.82 | 5.47 | 2-2 | |
| 4664.71 | P | | 2.83 | 5.48 | 1-1 | |
| 4641.22 | P | ⊙ | 2.82 | 5.48 | 2-1 | |
| 4604.23 | P | ⊙ | 2.82 | 5.50 | 2-3 | $b^3P$-$v^5D^o$ |
| 4603.34 | P | ⊙ | 2.83 | 5.51 | 1-2 | (348) |
| 4605.10 | P | ⊙ | 2.85 | 5.53 | 0-1 | |
| 4580.46 | P | | 2.82 | 5.51 | 2-2 | |
| 4582.941 | U | (1) | 2.83 | 5.53 | 1-1 | |
| 4612.64 | P | ⊙ | 2.82 | 5.49 | 2-2 | $b^3P$-$y^5S^o$ |
| 4635.846 | J | (1) | 2.83 | 5.49 | 1-2 | (349) |
| 4466.554 | B | 12 | 2.82 | 5.58 | 2-3 | $b^3P$-$x^3D^o$ |
| 4476.021 | I | 10 | 2.83 | 5.59 | 1-2 | (350) |
| 4443.197 | B | 7 | 2.85 | 5.62 | 0-1 | |
| 4454.383 | B | 5 | 2.82 | 5.59 | 2-2 | |
| 4422.570 | B | 6 | 2.83 | 5.62 | 1-1 | |
| 4401.447 | V | (2) | 2.82 | 5.62 | 2-1 | |
| 4290.870 | J | (1) | 2.82 | 5.70 | 2-3 | $b^3P$-$w^5P^o$ |
| 4278.38 | P | | 2.83 | 5.72 | 1-2 | (351) |
| 4279.864 | J | (1) | 2.85 | 5.73 | 0-1 | |
| 4258.619 | J | (1) | 2.82 | 5.72 | 2-2 | |
| 4260.73 | P | ⊙ | 2.83 | 5.73 | 1-1 | |
| 4241.112 | V | (1) | 2.82 | 5.73 | 2-1 | |
| 4207.130 | J | 4 | 2.82 | 5.75 | 2-1 | $b^3P$-$z^3S^o$ |
| 4226.426 | J | 3 | 2.83 | 5.75 | 1-1 | (352) |
| 4245.258 | I | 6 | 2.85 | 5.75 | 0-1 | |
| 4181.758 | J | 15 | 2.82 | 5.77 | 2-3 | $b^3P$-$u^5D^o$ |
| 4175.640 | B | 10 | 2.83 | 5.79 | 1-2 | (354) |
| m4143.83 | P | Fe | 2.85 | 5.82 | 0-1 | |
| 4156.803 | B | 12 | 2.82 | 5.79 | 2-2 | |
| 4125.884 | J | (2) | 2.83 | 5.82 | 1-1 | |
| 4107.492 | B | 12 | 2.82 | 5.82 | 2-1 | |
| 4126.88 | U | (1) | 2.83 | 5.82 | 1-0 | |
| 4184.895 | B | 10 | 2.82 | 5.77 | 2-2 | $b^3P$-$y^3P^o$ |
| 4173.322 | J | 2 | 2.83 | 5.79 | 1-1 | (355) |
| 4154.502 | J | 12 | 2.82 | 5.79 | 2-1 | |
| 4213.650 | B | 5 | 2.83 | 5.76 | 1-0 | |
| 4203.987 | B | 10 | 2.83 | 5.77 | 1-2 | |
| 4191.685 | J | (2) | 2.85 | 5.79 | 0-1 | |
| 4121.806 | B | 5 | 2.82 | 5.81 | 2-3 | $b^3P$-$x^3F^o$ |
| 4122.522 | J | 4 | 2.83 | 5.83 | 1-2 | (356) |
| •4104.132 | K | 3 | 2.82 | 5.83 | 2-2 | |
| 4134.681 | B | 12 | 2.82 | 5.80 | 2-3 | $b^3P$-$w^3D^o$ |
| 4132.903 | J | 8 | 2.83 | 5.82 | 1-2 | (357) |
| 4127.612 | B | 7 | 2.85 | 5.84 | 0-1 | |
| 4114.449 | B | 5 | 2.82 | 5.82 | 2-2 | |
| 4109.808 | J | 9 | 2.83 | 5.84 | 1-1 | |
| 4091.561 | J | (1) | 2.82 | 5.84 | 2-1 | |
| 4066.979 | B | 6 | 2.82 | 5.85 | 2-2 | $b^3P$-$1^o$ |
| 4085.011 | J | 4 | 2.83 | 5.85 | 1-2 | (358) |
| 4044.614 | J | 6 | 2.82 | 5.87 | 2-1 | $b^3P$-$y^3S^o$ |
| 4062.446 | J | 10 | 2.83 | 5.87 | 1-1 | (359) |
| 4079.848 | J | 4 | 2.85 | 5.87 | 0-1 | |
| 4000.02 | W | (1) | 2.82 | 5.90 | 2-2 | $b^3P$-$w^5G^o$ (360) |
| 3978.466 | V | (1) | 2.82 | 5.92 | 2-3 | $b^3P$-$v^5P^o$ |
| 3964.522 | J | 3 | 2.83 | 5.95 | 1-2 | (361) |
| 3961.147 | J | (2) | 2.85 | 5.96 | 0-1 | |
| •3947.533 | J | 5 | 2.82 | 5.95 | 2-2 | |
| 3944.748 | J | (2) | 2.83 | 5.96 | 1-1 | |
| m3927.93 | P | Fe | 2.82 | 5.96 | 2-1 | |
| 3953.863 | V | (1) | 2.82 | 5.94 | 2-3 | $b^3P$-$v^5F^o$ |
| 3952.704 | V | (1) | 2.83 | 5.96 | 1-2 | (362) |
| 3935.815 | B | 8 | 2.82 | 5.96 | 2-2 | |
| 3935.31 | W | (2) | 2.83 | 5.97 | 1-1 | |
| 3918.58 | P | ⊙ | 2.82 | 5.97 | 2-1 | |
| 3925.646 | J | 4 | 2.82 | 5.96 | 2-2 | $b^3P$-$x^3P^o$ |
| 3909.830 | J | 3 | 2.83 | 5.99 | 1-1 | (364) |
| 3893.316 | V | (1) | 2.82 | 5.99 | 2-1 | |
| 3918.418 | J | 4 | 2.83 | 5.98 | 1-0 | |
| 3942.443 | B | 6 | 2.83 | 5.96 | 1-2 | |
| 3925.946 | J | 6 | 2.85 | 5.99 | 0-1 | |
| •3829.458 | V | 1 | 2.83 | 6.06 | 1-2 | $b^3P$-$2^o$ (366) |
| 3801.681 | J | 3 | 2.82 | 6.07 | 2-3 | $b^3P$-$v^3D^o$ |
| 3801.804 | J | 1 | 2.83 | 6.08 | 1-2 | (367) |
| 3809.043 | V | (1) | 2.85 | 6.09 | 0-1 | |
| 3786.176 | J | 4 | 2.82 | 6.08 | 2-2 | |
| 3793.872 | J | 1 | 2.83 | 6.09 | 1-1 | |
| 3778.320 | U | (1) | 2.82 | 6.09 | 2-1 | |
| 3768.23 | W | (1) | 2.83 | 6.11 | 1-2 | $b^3P$-$z^1D^o$ (368) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 3655.465 | J | 4 | 2.62 | 6.20 | 2-2 | $b^3P$-$w^3P^o$ |
| *3689.457 | G | 12 | 2.63 | 6.18 | 1-1 | (369) |
| 3674.766 | J | 2 | 2.82 | 6.16 | 2-1 | |
| 3702.033 | J | 3 | 2.63 | 6.17 | 1-0 | |
| 3670.035 | V | 3 | 2.63 | 6.20 | 1-2 | |
| 3703.824 | J | 3 | 2.65 | 6.18 | 0-1 | |
| 3602.77 | P | ⊙? | 2.62 | 6.24 | 2-3 | $b^3P$-$z^1F^o$ (370) |
| 3504.455 | U | (1) | 2.62 | 6.34 | 2-3 | $b^3P$-$v^3F^o$ (371) |
| 3448.766 | V | (1) | 2.62 | 6.40 | 2-3 | $b^3P$-$u^3G^o$ (372) |
| 3462.608 | V | (1) | 2.62 | 6.36 | 2-2 | $b^3P$-$y^1D^o$ |
| *3475.667 | V | (1) | 2.83 | 6.36 | 1-2 | (373) |
| *3457.090 | V | (3w) | 2.62 | 6.39 | 2-2 | $b^3P$-$7^o$ (374) |
| 3469.390 | V | (1) | 2.63 | 6.39 | 1-2 | $b^3P$-$x^1D^o$ (375) |
| *3431.615 | J | 3 | 2.62 | 6.42 | 2-3 | $b^3P$-$u^3D^o$ |
| 3406.17 | P | ⊙ | 2.63 | 6.46 | 1-2 | (376) |
| 3393.362 | V | (1) | 2.85 | 6.48 | 0-1 | |
| *3393.609 | V | (1w) | 2.82 | 6.46 | 2-2 | |
| *3381.340 | V | (2) | 2.83 | 6.48 | 1-1 | |
| 3368.983 | V | (1) | 2.62 | 6.46 | 2-1 | |
| 3403.29 | P | | 2.62 | 6.45 | 2-3 | $b^3P$-$t^3D^o$ |
| 3361.959 | V | (1) | 2.63 | 6.50 | 1-2 | (377) |
| 3432.023 | V | (1) | 2.85 | 6.44 | 0-1? | |
| 3349.739 | V | (1) | 2.62 | 6.50 | 2-2 | |
| 3419.706 | V | (1) | 2.83 | 6.44 | 1-1? | |
| 3407.06 | P | ⊙? | 2.62 | 6.44 | 2-1? | |
| 3342.298 | V | 4 | 2.83 | 6.53 | 1-1 | $b^3P$-$6^o$ |
| 3354.068 | V | 3 | 2.85 | 6.53 | 0-1 | (376) |
| 3323.737 | C | 7 | 2.62 | 6.53 | 2-2 | $b^3P$-$v^3P^o$ |
| 3239.35 | P | | 2.63 | 6.64 | 1-1 | (379) |
| 3228.003 | V | (2) | 2.62 | 6.64 | 2-1 | |
| 3335.776 | V | 4 | 2.83 | 6.53 | 1-2 | |
| *3250.400 | V | (2) | 2.65 | 6.64 | 0-1 | |
| 3289.442 | V | (2) | 2.82 | 6.57 | 2-1 | $b^3P$-$z^1P^o$ |
| 3301.227 | V | (2) | 2.63 | 6.57 | 1-1 | (360) |
| *3243.406 | V | 3 | 2.82 | 6.62 | 2-3 | $b^3P$-$y^1F^o$ (361) |
| 3207.649 | V | (1w) | 2.82 | 6.67 | 2-3 | $b^3P$-$11^o$ (382) |
| 3047.301 | S | (-) | 2.63 | 6.68 | 1-2 | $b^3P$-$w^1D^o$ (382a) |
| 5232.946 | I | 40 | 2.93 | 5.29 | 4-5 | $z^7P^o$-$e^7D$ |
| 5266.562 | I | 30 | 2.99 | 5.33 | 3-4 | (363) |
| 5261.796 | I | 10 | 3.03 | 5.36 | 2-3 | |
| 5139.468 | J | 20 | 2.93 | 5.33 | 4-4 | |
| 5192.350 | I | 30 | 2.99 | 5.36 | 3-3 | |
| 5226.666 | J | 15 | 3.03 | 5.39 | 2-2 | |
| 5068.774 | J | 10 | 2.93 | 5.36 | 4-3 | |
| 5139.260 | J | 10 | 2.99 | 5.39 | 3-2 | |
| 5191.460 | J | 20 | 3.03 | 5.40 | 2-1 | |
| 4768.397 | V | 3n | 2.93 | 5.52 | 4-4 | $z^7P^o$-$e^5D$ |
| 4787.84 | V | (1) | 2.99 | 5.56 | 3-3 | (364) |
| 4800.14 | V | (1) | 3.03 | 5.60 | 2-2 | |
| 4682.58 | W | (1) | 2.93 | 5.56 | 4-3 | |
| 4726.165 | V | (1) | 2.99 | 5.60 | 3-2 | |
| 4760.07 | P | ⊙ | 3.03 | 5.62 | 2-1 | |
| 4677.61 | P | ⊙ | 2.99 | 5.52 | 3-4 | |
| 4863.76 | P | ⊙ | 3.03 | 5.56 | 2-3 | |
| 3685.998 | G | 15n | 2.93 | 6.28 | 4-5 | $z^7P^o$-$e^7F$ |
| 3701.086 | G | 20 | 2.99 | 8.32 | 3-4 | (385) |
| *3752.420 | J | 1w | 3.03 | 6.31 | 2-3 | |
| 3637.662 | J | 3n | 2.93 | 6.32 | 4-4 | |
| *3707.048 | I | 8 | 2.99 | 6.31 | 3-3 | |
| 3726.927 | J | 6 | 3.03 | 6.34 | 2-2 | |
| 3643.627 | J | 2 | 2.93 | 6.31 | 4-3 | |
| 3882.17 | P | ⊙ | 2.99 | 6.34 | 3-2 | |
| 3744.105 | J | 4 | 3.03 | 6.32 | 2-1 | |
| 3748.969 | J | 5 | 2.93 | 6.22 | 4-5 | $z^7P^o$-$f^7D$ |
| 3754.506 | J | 1 | 2.99 | 6.27 | 3-4 | (366) |
| 3793.28 | P | | 3.03 | 6.28 | 2-3 | |
| *3689.457 | G | 12 | 2.93 | 6.27 | 4-4 | |
| 3746.931 | J | 6 | 2.99 | 6.26 | 3-3 | |
| 3773.899 | J | 1 | 3.03 | 6.30 | 2-2 | |
| 3682.15 | P | ⊙ | 2.93 | 6.26 | 4-3 | |
| 3727.609 | J | 3 | 2.99 | 6.30 | 3-2 | |
| 3768.665 | V | 1 | 3.03 | 6.30 | 2-1 | |
| 3742.821 | J | 4 | 2.93 | 6.22 | 4-4 | $z^7P^o$-$f^5D$ |
| 3793.478 | J | (1) | 2.99 | 6.24 | 3-3 | (367) |
| 3816.93 | P | ⊙ | 3.03 | 6.26 | 2-2 | |
| 3727.096 | J | 4 | 2.93 | 6.24 | 4-3 | |
| 3769.995 | V | 4 | 2.99 | 6.26 | 3-2 | |
| 3790.858 | J | (1) | 3.03 | 6.28 | 2-1 | |
| 3735.325 | J | 6 | 2.93 | 6.23 | 4-4 | $z^7P^o$-$e^7P$ |
| 3782.450 | J | 1 | 2.99 | 6.25 | 3-3 | (368) |
| 3793.354 | V | 1 | 3.03 | 6.28 | 2-2 | |
| *3716.443 | G | 12 | 2.93 | 6.25 | 4-3 | |
| 3747.00 | P | ⊙ | 2.99 | 6.28 | 3-2 | |
| 3703.697 | J | 3 | 2.93 | 6.26 | 4-5 | $z^7P^o$-$e^5G$ |
| ≡3730.46 | P | Co | 2.99 | 6.29 | 3-4 | (389) |
| 3742.56 | P | ⊙ | 3.03 | 6.32 | 2-3 | |
| *3668.24 | W | 1 | 2.93 | 6.29 | 4-4 | |
| 3697.428 | G | 6n | 2.99 | 6.32 | 3-3 | |
| 3731.513 | V | 2 | 3.03 | 6.34 | 2-2 | |
| 3634.326 | G | 6n | 2.93 | 6.32 | 4-3 | |
| 3678.879 | V | (1) | 2.99 | 6.34 | 3-2 | |
| 3633.07 | P | (1) | 2.93 | 6.32 | 4-5 | $z^7P^o$-$e^7G$ |
| 3681.64 | W | (1) | 2.99 | 6.34 | 3-4 | (390) |
| 3709.03 | P | ⊙ | 3.03 | 6.35 | 2-3 | |
| 3664.69 | W | (1) | 2.99 | 6.35 | 3-3 | |
| 3603.70 | P | ⊙ | 2.93 | 6.35 | 4-3 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 3649.70 | P | ⊙ | 2.93 | 6.31 | 4-5 | $z^7P^o$-$f^5F$ |
| 3664.537 | G | 2 | 2.99 | 6.35 | 3-4 | (391) |
| 3669.37 | P | ⊙ | 3.03 | 6.37 | 2-3 | |
| *3602.534 | G | 3 | 2.93 | 6.35 | 4-4 | |
| *3645.494 | V | 1 | 2.99 | 6.37 | 3-3 | |
| *3707.048 | I | 6 | 2.99 | 6.31 | 3-2 | $z^7P^o$-$e^5S$ |
| *3752.420 | J | (1w) | 3.03 | 6.31 | 2-2 | (392) |
| 3623.51 | P | ⊙ | 2.99 | 6.39 | 3-3 | $z^7P^o$-$g^5D$ |
| *3679.53 | W | (1) | 2.99 | 6.34 | 3-4 | (393) |
| 3666.85 | P | ⊙ | 3.03 | 6.39 | 2-3 | |
| 3586.52 | P | ⊙ | 2.93 | 6.37 | 4-3 | $z^7P^o$-$e^7S$ |
| 3650.031 | J | 4 | 2.99 | 6.37 | 3-3 | (394) |
| 3694.005 | G | 20 | 3.03 | 6.37 | 2-3 | |
| 3554.44 | P | ⊙ | 2.93 | 6.40 | 4-3 | $z^7P^o$-$e^5P$ |
| *3564.960 | J | 4 | 2.99 | 6.43 | 3-2 | (395) |
| 3633.64 | P | ⊙ | 3.03 | 6.42 | 2-1 | |
| 3614.77 | P | | 2.99 | 6.40 | 3-3 | |
| 3627.35 | P | ⊙ | 3.03 | 6.43 | 2-2 | |
| 3657.69 | W | 1 | 3.03 | 6.40 | 2-3 | |
| 3322.474 | G | 5n | 2.93 | 6.64 | 4-5 | $z^7P^o$-$g^7D$ |
| 3336.643 | V | (3w) | 2.99 | 6.68 | 3-4 | (396) |
| 3342.76 | P | ⊙ | 3.03 | 6.72 | 2-3 | |
| 3267.117 | V | (1w) | 2.93 | 6.68 | 4-4 | |
| 3306.703 | S | (-) | 2.99 | 6.72 | 3-3 | |
| 3320.600 | V | (2n,gn) | 3.03 | 6.74 | 2-2 | |
| 3285.20 | U | (1) | 2.99 | 6.74 | 3-2 | |
| 3256.52 | P | ⊙ | 2.99 | 6.77 | 3-2 | $z^7P^o$-$e^3P$ |
| 3238.535 | S | (-) | 3.03 | 6.64 | 2-1 | (397) |
| *3053.443 | U | (2) | 2.93 | 6.97 | 4- | $z^7P^o$-2 (396) |
| 10066.37 | P | ⊙? | 2.94 | 4.16 | 5-5 | $b^3G$-$y^5F^o$ (399) |
| 9036.64 | P | ⊙ | 2.94 | 4.30 | 5-6 | $b^3G$-$z^5G^o$ |
| 9375.14 | P | | 2.96 | 4.29 | 4-5 | (400) |
| 9156.23 | P | ⊙ | 3.00 | 4.35 | 3-4 | |
| 9089.413 | E | 30 | 2.94 | 4.29 | 5-5 | |
| 6975.408 | E | 10 | 2.96 | 4.35 | 4-4 | |
| 6666.42 | F | 3 | 3.00 | 4.40 | 3-3 | |
| *8713.19 | F | (10) | 2.94 | 4.35 | 5-4 | |
| 6696.71 | P | ⊙ | 2.96 | 4.40 | 4-3 | |
| 6621.612 | E | 10 | 2.94 | 4.37 | 5-5 | $b^3G$-$z^3G^o$ |
| 6562.867 | E | 15 | 2.96 | 4.42 | 4-4 | (401) |
| 6515.06 | O | 20 | 3.00 | 4.45 | 3-3 | |
| 8342.31 | P | ⊙? | 2.94 | 4.42 | 5-4 | |
| 6356.53 | P | ⊙ | 2.96 | 4.45 | 4-3 | |
| 6676.26 | P | ⊙ | 2.96 | 4.37 | 4-5 | |
| 6747.32 | F | 2 | 3.00 | 4.42 | 3-4 | |
| 7748.281 | E | 125 | 2.94 | 4.53 | 5-4 | $b^3G$-$y^3F^o$ |
| 7664.302 | E | 60 | 2.98 | 4.59 | 4-3 | (402) |
| 7583.796 | E | 50 | 3.00 | 4.63 | 3-2 | |
| 7954.94 | P | ⊙ | 2.96 | 4.53 | 4-4 | |
| 7904.12 | P | ⊙ | 2.96 | 4.54 | 4-3 | $b^3G$-$y^5P^o$ |
| 7796.90 | P | ⊙ | 3.00 | 4.59 | 3-2 | (403) |
| 7112.176 | I | 3 | 2.96 | 4.71 | 4-3 | $b^3G$-$y^3D^o$ |
| 6971.95 | V | 1 | 3.00 | 4.77 | 3-2 | (404) |
| 6310.543 | U | (1) | 2.94 | 4.69 | 5-4 | $b^3G$-$x^5D^o$ |
| 6539.72 | W | (2) | 3.00 | 4.69 | 3-4? | (405) |
| 5261.49 | P | ⊙ | 2.94 | 5.26 | 5-6 | $b^3G$-$y^5G^o$ |
| 5226.42 | P | ⊙ | 2.94 | 5.30 | 5-5 | (406) |
| 5266.38 | P | ⊙ | 2.96 | 5.31 | 4-4 | |
| 5316.04 | P | ⊙ | 3.00 | 5.33 | 3-3 | |
| 5196.24 | P | ⊙ | 2.94 | 5.31 | 5-4 | |
| *5326.154 | V | (1) | 3.00 | 5.32 | 3-4 | $b^3G$-$z^5H^o$ |
| 5265.25 | P | ⊙? | 3.00 | 5.35 | 3-3 | (407) |
| 5304.95 | P | ⊙? | 2.98 | 5.35 | 4-3 | |
| 4773.52 | P | ⊙? | 3.00 | 5.59 | 3-2 | $b^3G$-$x^3D^o$ |
| 4767.50 | P | ⊙? | 3.00 | 5.56 | 3-3 | (408) |
| 4647.437 | B | 6 | 2.94 | 5.59 | 5-5 | $b^3G$-$y^3G^o$ |
| 4691.414 | B | 6 | 2.96 | 5.61 | 4-4 | (409) |
| 4710.386 | B | 5 | 3.00 | 5.62 | 3-3 | |
| 4816.765 | J | (2) | 2.94 | 5.61 | 5-4 | |
| 4861.975 | J | (2) | 2.96 | 5.62 | 4-3 | |
| *4720.997 | J | (1) | 2.98 | 5.59 | 4-5 | |
| 4740.343 | J | (1) | 3.00 | 5.61 | 3-4 | |
| 4626.758 | S | (-) | 2.96 | 5.64 | 4-5 | $b^3G$-$x^5G^o$ |
| *4556.139 | J | 4n | 2.94 | 5.64 | 5-5 | (410) |
| 4603.956 | V | (1) | 2.96 | 5.66 | 4-4 | |
| 4633.764 | U | (1) | 3.00 | 5.67 | 3-3 | |
| 4494.47 | P | ⊙ | 2.94 | 5.88 | 5-6 | $b^3G$-$z^3I^o$ |
| 4472.57 | P | ⊙ | 2.94 | 5.70 | 5-5 | (411) |
| 4358.505 | B | 3 | 2.94 | 5.77 | 5-4 | $b^3G$-$u^5D^o$ |
| 4418.432 | V | (1) | 2.98 | 5.77 | 4-3 | (412) |
| 4433.39 | P | ⊙ | 3.00 | 5.79 | 3-2 | |
| 4423.145 | V | (1) | 2.98 | 5.77 | 4-4 | |
| 4461.80 | P | ⊙ | 3.00 | 5.77 | 3-3 | |
| 4326.782 | V | (2) | 2.94 | 5.79 | 5-4 | $b^3G$-$x^3F^o$ |
| 4351.549 | J | 3 | 2.98 | 5.81 | 4-3 | (413) |
| *4373.563 | J | (2) | 3.00 | 5.83 | 3-2 | |
| 4390.460 | V | (1) | 2.98 | 5.79 | 4-4 | |
| 4309.382 | V | 4 | 2.94 | 5.60 | 5-6 | $b^3G$-$z^3H^o$ |
| 4367.561 | J | 5 | 2.96 | 5.60 | 4-5 | (414) |
| 4390.954 | B | 4 | 3.00 | 5.62 | 3-4 | |
| 4304.552 | J | (1) | 2.94 | 5.80 | 5-5 | |
| 4348.939 | J | (1) | 2.96 | 5.62 | 4-4 | |
| 4366.440 | V | (1) | 2.94 | 5.82 | 5-4 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiple |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 4365.902 | V | (1) | 2.96 | 5.60 | 4-3 | $b^3G$-$w^3D^o$ |
| 4385.860 | V | (1) | 3.00 | 5.62 | 3-2 | (415) |
| 4239.735 | U | 3 | 2.94 | 5.65 | 5-6 | $b^3G$-$w^5G^o$ |
| 4290.362 | J | (2) | 2.96 | 5.65 | 4-5 | (416) |
| 4299.65 | W | (1) | 3.00 | 5.67 | 3-4 | |
| *4229.516 | J | (1gn) | 2.94 | 5.65 | 5-5 | |
| 4259.34 | P | ⊙? | 2.96 | 5.67 | 4-4 | |
| 4280.63 | P | ⊙ | 3.00 | 5.69 | 3-3 | |
| 4199.37 | P | ⊙ | 2.94 | 5.67 | 5-4 | |
| 4255.499 | V | (1) | 3.00 | 5.90 | 3-2 | |
| 4233.73 | P | ⊙ | 2.94 | 5.66 | 5-4 | $b^3G$-$z^1G^o$ |
| 4284.415 | U | (1) | 2.98 | 5.66 | 4-4 | (417) |
| 4196.533 | V | (1) | 2.94 | 5.68 | 5-5 | $b^3G$-$w^5F^o$ |
| 4203.30 | U | (1) | 3.00 | 5.94 | 3-3 | (416) |
| 4140.24 | P | ⊙? | 2.94 | 5.92 | 5-4 | |
| 4164.60 | U | (1) | 2.96 | 5.94 | 4-3 | |
| 4237.67 | P | ⊙ | 3.00 | 5.92 | 3-4 | |
| 4156.670 | V | (1) | 2.94 | 5.91 | 5-5 | $b^3G$-$x^3G^o$ |
| 4219.41 | P | ⊙ | 2.98 | 5.90 | 4-4 | (419) |
| *4254.938 | V | (1) | 3.00 | 5.91 | 3-3 | |
| 4160.561 | V | (1) | 2.94 | 5.90 | 5-4 | |
| *4215.430 | J | 2 | 2.96 | 5.91 | 4-5 | |
| 4258.956 | J | (1) | 3.00 | 5.90 | 3-4 | |
| 4089.325 | J | (1) | 2.94 | 5.95 | 5-5 | $b^3G$-$w^3G^o$ |
| *4123.748 | J | (1) | 2.96 | 5.97 | 4-4 | (418) |
| 4141.662 | V | (1) | 3.00 | 5.98 | 3-3 | |
| 4067.49 | P | ⊙ | 2.94 | 5.97 | 5-4 | |
| 4104.46 | P | ⊙ | 2.98 | 5.96 | 4-3 | |
| 4146.071 | V | (2) | 2.96 | 5.95 | 4-5 | |
| 4161.466 | V | (1) | 3.00 | 5.97 | 3-4 | |
| 4064.07 | P | ⊙ | 2.94 | 5.97 | 5-5 | $b^3G$-$z^1H^o$ |
| 4120.811 | J | 5 | 2.98 | 5.97 | 4-5 | (423) |
| 4011.69 | P | ⊙ | 2.94 | 6.01 | 5-4 | $b^3G$-$y^1G^o$ |
| 4066.597 | V | (1) | 2.96 | 6.01 | 4-4 | (424) |
| 4045.139 | V | (1) | 3.00 | 6.06 | 3-2 | $b^3G$-$2^o$ (425) |
| *3947.533 | J | 5 | 2.94 | 6.06 | 5-4 | $b^3G$-$w^3F^o$ |
| 3979.12 | P | ⊙ | 2.96 | 6.06 | 4-3 | (426) |
| 3963.63 | P | ⊙ | 3.00 | 6.10 | 3-2 | |
| 4000.466 | J | 2 | 2.96 | 6.06 | 4-4 | |
| *4014.26 | W | (1) | 3.00 | 6.06 | 3-3 | |
| 4035.96 | P | ⊙ | 3.00 | 6.06 | 3-4 | |
| 3996.28 | P | ⊙ | 2.96 | 6.07 | 4-3 | $b^3G$-$w^3D^o$ |
| *4014.28 | W | (1) | 3.00 | 6.08 | 3-2 | (427) |
| 4031.73 | P | ⊙ | 3.00 | 6.07 | 3-3 | |
| 3961.62 | P | ⊙? | 2.96 | 6.06 | 4-3 | $b^3G$-$3^o$ |
| 4016.81 | P | | 3.00 | 6.06 | 3-3 | (426) |
| 3897.449 | J | (2) | 2.94 | 6.10 | 5-6 | $b^3G$-$y^3H^o$ |
| 3922.66 | P | ⊙ | 2.96 | 6.12 | 4-5 | (429) |
| 3671.750 | J | 4 | 2.94 | 6.12 | 5-5 | |
| 3903.902 | J | 5 | 2.96 | 6.14 | 4-4 | |
| 3653.462 | V | (1) | 2.94 | 6.14 | 5-4 | |
| 3893.391 | I | 7 | 2.94 | 6.11 | 5-5 | $b^3G$-$v^3G^o$ |
| 3919.069 | J | 3 | 2.96 | 6.13 | 4-4 | (430) |
| 3916.644 | J | 6 | 3.00 | 6.15 | 3-3 | |
| 3666.343 | V | (1) | 2.94 | 6.13 | 5-4 | |
| 3665.154 | V | (1) | 2.96 | 6.15 | 4-3 | |
| 3944.690 | J | 3 | 2.96 | 6.11 | 4-5 | |
| 3953.156 | J | 4 | 3.00 | 6.13 | 3-4 | |
| *3976.665 | J | (1) | 3.00 | 6.11 | 3-2 | $b^3G$-$z^1D^o$ (431) |
| 3777.061 | J | (1) | 2.96 | 6.24 | 4-3 | $b^3G$-$z^1F^o$ (432) |
| 3726.06 | P | ⊙ | 2.94 | 6.25 | 5-4 | $b^3G$-$x^1G^o$ (433) |
| 3716.71 | P | ⊙ | 2.98 | 6.30 | 4-5 | $b^3G$-$u^5F^o$ |
| 3696.61 | P | ⊙ | 3.00 | 6.34 | 3-4 | (434) |
| 3670.071 | J | 3 | 2.94 | 6.30 | 5-6 | $b^3G$-$x^3H^o$ |
| 3709.535 | J | (1) | 2.96 | 6.30 | 4-5 | (435) |
| 3663.95 | W | (1) | 2.94 | 6.30 | 5-5 | |
| 3662.90 | P | | 2.94 | 6.31 | 5-4 | $b^3G$-$t^5D^o$ |
| 3669.68 | P | ⊙ | 2.96 | 6.34 | 4-3 | (436) |
| 3706.45 | P | ⊙ | 2.96 | 6.31 | 4-4 | |
| 3699.55 | P | ⊙ | 3.00 | 6.34 | 3-3 | |
| 3632.558 | J | 3 | 2.94 | 6.33 | 5-4 | $b^3G$-$v^3F^o$ |
| 3669.151 | J | 3 | 2.98 | 6.34 | 4-3 | (437) |
| 3721.606 | V | (1) | 3.00 | 6.32 | 3-2 | |
| *3623.440 | G | 1 | 2.94 | 6.34 | 5-5 | $b^3G$-$u^3G^o$ |
| 3626.62 | P | ⊙ | 2.96 | 6.38 | 4-4 | (436) |
| 3637.05 | P | ⊙ | 3.00 | 6.40 | 3-3 | |
| 3565.193 | V | (2) | 2.94 | 6.36 | 5-4 | |
| *3606.148 | J | 3 | 2.98 | 6.40 | 4-3 | |
| *3667.999 | V | 1 | 2.98 | 6.34 | 4-5 | |
| 3658.02 | P | ⊙ | 3.00 | 6.36 | 3-4 | |
| 3663.25 | W | (1) | 2.96 | 6.35 | 4-4 | $b^3G$-$4^o$ |
| 3693.006 | J | 1 | 3.00 | 6.35 | 3-4 | (439) |
| 3590.08 | W | (1) | 2.94 | 6.37 | 5-5 | $b^3G$-$6^o$ |
| 3633.637 | V | 1 | 2.96 | 6.37 | 4-5 | (440) |
| *3845.494 | V | 1 | 3.00 | 6.39 | 3-2 | $b^3G$-$x^1D^o$ (441) |
| 3469.670 | J | 4 | 2.94 | 6.47 | 5-6 | $b^3G$-$w^3H^o$ |
| 3508.494 | J | 5 | 2.96 | 6.50 | 4-5 | (442) |
| 3516.403 | G | 5 | 3.00 | 6.51 | 3-4 | |
| 3449.06 | P | ⊙ | 2.94 | 6.51 | 5-4 | |
| *3479.683 | V | (1) | 2.94 | 6.46 | 5-6 | $b^3G$-$y^3I^o$ (443) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| *3383.692 | G | 5 | 2.94 | 6.58 | 5-4 | $b^3G-9^\circ$ |
| 3422.499 | J | 3 | 2.98 | 6.58 | 4-4 | (444) |
| 3448.478 | V | (1) | 3.00 | 6.58 | 3-4 | |
| 3409.40 | P | ⊙ | 3.00 | 6.62 | 3-3 | $b^3G-y^1F^\circ$ (445) |
| *3339.202 | V | 2 | 2.94 | 6.63 | 5-5 | $b^3G-y^1H^\circ$ (446) |
| 3372.359 | V | (1) | 2.98 | 6.84 | 4-3 | $b^3G-x^1F^\circ$ |
| 3397.560 | V | (1) | 3.00 | 6.64 | 3-3 | (447) |
| 3357.82 | P | ⊙ | 2.98 | 6.65 | 4-3 | $b^3G-10^\circ$ (448) |
| 3310.347 | V | 4 | 2.94 | 6.66 | 5-5 | $b^3G-t^3G^\circ$ |
| 3319.258 | V | 2 | 2.98 | 6.70 | 4-4 | (449) |
| 3303.574 | V | (2) | 3.00 | 6.74 | 3-3 | |
| 3282.735 | V | (1) | 2.94 | 6.70 | 5-4 | |
| 3279.743 | V | (2 1) | 2.98 | 6.74 | 4-3 | |
| 3347.507 | V | (1) | 2.98 | 6.66 | 4-5 | |
| 3343.678 | V | (1) | 3.00 | 6.70 | 3-4 | |
| 3307.015 | V | (1) | 2.94 | 6.67 | 5-5 | $b^3G-13^\circ$ |
| 3344.09 | P | ⊙ | 2.98 | 6.67 | 4-5 | (450) |
| 3275.848 | V | (1) | 2.94 | 6.70 | 5-4 | $b^3G-13^\circ$ |
| 3312.232 | V | (1) | 2.98 | 6.70 | 4-4 | (450a) |
| 3336.54 | P | ⊙ | 3.00 | 6.70 | 3-4 | |
| m3222.05 | P | Fe | 2.94 | 6.77 | 5-4 | $b^3G-w^1G^\circ$ |
| *3257.244 | V | 2 | 2.98 | 6.77 | 4-4 | (451) |
| 3280.763 | V | (1) | 3.00 | 6.77 | 3-4 | |
| *3153.064 | S | (-) | 2.94 | 6.85 | 5-6 | $b^3G-v^3H^\circ$ |
| m3192.84 | P | Fe | 2.98 | 6.84 | 4-5 | (452) |
| 3213.771 | V | (1) | 3.00 | 6.84 | 3-4 | |
| 3158.99 | W | (2) | 2.94 | 6.84 | 5-5? | |
| 3191.180 | S | (-) | 2.98 | 6.84 | 4-4 | |
| 3149.50 | P | ⊙ | 2.94 | 6.85 | 5-5 | $b^3G-x^1H^\circ$ (453) |
| 3156.464 | U | (1) | 2.98 | 6.89 | 4-3 | $b^3G-w^1F^\circ$ |
| 3178.545 | V | 2 | 3.00 | 6.89 | 3-3 | (454) |
| 3112.079 | V | 3 | 2.94 | 6.90 | 5-5 | $b^3G-s^3G^\circ$ |
| 3145.057 | V | (2) | 2.98 | 6.90 | 4-4 | (455) |
| 3147.792 | V | (1) | 3.00 | 6.93 | 3-3 | |
| 3166.98 | P | ⊙? | 3.00 | 6.90 | 3-4 | |
| 3066.69 | P | ⊙? | 2.94 | 6.96 | 5-5 | $b^3G-u^3H^\circ$ |
| 3062.872 | S | (1) | 2.94 | 6.97 | 5-4 | (456) |
| 3047.047 | V | (1) | 2.94 | 6.99 | 5-4 | $b^3G-u^3F^\circ$ |
| 3060.545 | V | (1) | 2.98 | 7.01 | 4-3 | (457) |
| 3074.157 | V | (2) | 3.00 | 7.02 | 3-2 | |
| 3014.120? | S | (-) | 2.94 | 7.03 | 5-4 | $b^3G-v^1G^\circ$ (458) |
| 3030.757 | S | (-) | 2.98 | 7.05 | 4-5 | $b^3G-x^3I^\circ$ (459) |
| *2982.234§ | U | (1) | 2.98 | 7.12 | 4-3 | $b^3G-t^3P^\circ$ † |
| 2995.838 | U | (1) | 3.00 | 7.13 | 3-2 | (460) |
| 2990.34 | P | ⊙ | 2.98 | 7.10 | 4-4 | |
| 10401.72 | P | | 3.00 | 4.19 | 2-2 | $c^3P-z^3P^\circ$ |
| 10433.65 | D | 3 | 3.06 | 4.24 | 1-1 | (461) |
| 9970.26 | P | ⊙ | 3.00 | 4.24 | 2-1 | |
| 10818.36 | F | 3 | 3.06 | 4.27 | 1-0 | |
| 10896.30 | D | 3 | 3.06 | 4.19 | 1-2 | |
| 10783.09 | D | 3 | 3.10 | 4.24 | 0-1 | |
| 8512.95 | P | ⊙ | 3.00 | 4.45 | 2-3? | $c^3P-z^3G^\circ$ (462) |
| 7233.668 | I | 12 | 3.00 | 4.71 | 2-3 | $c^3P-y^3D^\circ$ |
| 7189.17 | V | 3 | 3.06 | 4.77 | 1-2 | (463) |
| 7190.12 | P | ⊙ | 3.10 | 4.81 | 0-1 | |
| 6970.48 | P | ⊙ | 3.00 | 4.77 | 2-3 | |
| 7028.58 | P | ⊙ | 3.06 | 4.81 | 1-1 | |
| 6819.42 | P | ⊙ | 3.00 | 4.81 | 2-1 | |
| *5493.850 | T | (0) | 3.00 | 5.25 | 2-3 | $c^3P-x^5P^\circ$ |
| 5527.07 | P | | 3.06 | 5.29 | 1-2 | (464) |
| 5557.90 | P | ⊙ | 3.10 | 5.32 | 0-1 | |
| 5396.90 | P | ⊙ | 3.00 | 5.29 | 2-2 | |
| 5460.909 | U | (1) | 3.06 | 5.32 | 1-1 | |
| 5333.77 | P | ⊙ | 3.00 | 5.32 | 2-1 | |
| 5104.038 | T | (-) | 3.00 | 5.42 | 2-3 | $c^3P-w^5P^\circ$ |
| *5036.931§ | R | 2 | 3.00 | 5.45 | 2-2 | (465) |
| 4979.84 | P | ⊙ | 3.00 | 5.48 | 2-1 | |
| 4945.39 | P | ⊙ | 3.00 | 5.50 | 2-3 | $c^3P-v^5D^\circ$ |
| 5025.73 | P | | 3.06 | 5.51 | 1-2 | (466) |
| 5082.68 | P | ⊙ | 3.10 | 5.53 | 0-1 | |
| 4786.810 | B | 5 | 3.00 | 5.58 | 2-3 | $c^3P-x^3D^\circ$ |
| 4874.35 | P | ⊙ | 3.06 | 5.59 | 1-2 | (467) |
| 4886.17 | P | ⊙ | 3.10 | 5.62 | 0-1 | |
| *4772.817 | B | 3 | 3.00 | 5.59 | 2-2 | |
| 4811.04 | V | (1) | 3.06 | 5.62 | 1-1 | |
| 4712.104 | V | (1) | 3.00 | 5.62 | 2-1 | |
| 4585.59 | P | ⊙ | 3.00 | 5.70 | 2-3 | $c^3P-w^5P^\circ$ |
| 4620.13 | P | ⊙ | 3.06 | 5.73 | 1-1 | (468) |
| 4528.82 | P | ⊙ | 3.00 | 5.73 | 2-1 | |
| 4490.084 | J | (2) | 3.00 | 5.75 | 2-1 | $c^3P-z^3S^\circ$ |
| 4579.825 | V | (1) | 3.06 | 5.75 | 1-1 | (469) |
| 4461.305 | V | (2) | 3.00 | 5.77 | 2-3 | $c^3P-u^5D^\circ$ |
| *4520.24 § | P | (1) | 3.06 | 5.79 | 1-2 | (471) |
| 4526.563 | J | (2) | 3.10 | 5.82 | 0-1 | |
| 4432.80 | P | | 3.00 | 5.79 | 2-2 | |
| *4461.989 | J | (4) | 3.06 | 5.82 | 1-1 | |
| *4376.782 | V | (1) | 3.00 | 5.82 | 2-1 | |
| 4463.14 | P | ⊙ | 3.06 | 5.82 | 1-0 | |
| 4464.773 | V | (2) | 3.00 | 5.77 | 2-2 | $c^3P-y^3P^\circ$ |
| 4517.530 | B | (2) | 3.06 | 5.79 | 1-1 | (472) |
| 4430.197 | V | (2) | 3.00 | 5.79 | 2-1 | |
| 4564.832 | V | (1) | 3.06 | 5.76 | 1-0 | |
| 4553.48 | P | | 3.06 | 5.77 | 1-2 | |
| 4583.72 | P | ⊙ | 3.10 | 5.79 | 0-1 | |
| 4393.03 | P | ⊙ | 3.00 | 5.81 | 2-3 | $c^3P-x^3F^\circ$ |
| 4372.994 | V | (1) | 3.00 | 5.83 | 2-2 | (473) |
| 4384.682 | V | (1) | 3.00 | 5.82 | 2-2 | $c^3P-w^3D^\circ$ (474) |
| 4330.81 | P | ⊙ | 3.00 | 5.85 | 2-2 | $c^3P-1^\circ$ |
| 4414.23 | P | ⊙ | 3.06 | 5.85 | 1-2 | (475) |
| 4305.455 | B | 3 | 3.00 | 5.87 | 2-1 | $c^3P-y^3S^\circ$ |
| 4387.897 | J | 3 | 3.06 | 5.87 | 1-1 | (476) |
| 4450.320 | J | (3) | 3.10 | 5.87 | 0-1 | |
| *4202.755 | V | (1) | 3.00 | 5.94 | 2-3 | $c^3P-v^5F^\circ$ |
| 4260.135 | V | (1) | 3.06 | 5.96 | 1-2 | (476a) |
| 4298.21 | P | ⊙ | 3.10 | 5.97 | 0-1 | |
| 4183.384 | J | 4 | 3.00 | 5.96 | 2-2 | |
| 4239.95 | P | ⊙ | 3.06 | 5.97 | 1-1 | |
| 4162.93 | P | ⊙ | 3.00 | 5.97 | 2-1 | |
| *4254.938 | V | (1) | 3.00 | 5.90 | 2-2 | $c^3P-w^5G^\circ$ |
| 4335.46 | P | ⊙ | 3.06 | 5.90 | 1-2 | (477) |
| 4230.584 | U | (1) | 3.00 | 5.92 | 2-3 | $c^3P-v^5P^\circ$ |
| 4273.87 | W | (1) | 3.06 | 5.95 | 1-2 | (478) |
| 4309.46 | P | ⊙ | 3.10 | 5.96 | 0-1 | |
| 4195.615 | J | (3) | 3.00 | 5.95 | 2-2 | |
| 4250.90 | P | ⊙ | 3.06 | 5.96 | 1-1 | |
| 4141.352 | U | (1) | 3.00 | 5.98 | 2-3 | $c^3P-w^3G^\circ$ (480) |
| 4170.906 | B | 5 | 3.00 | 5.96 | 2-2 | $c^3P-x^3P^\circ$ |
| 4210.39 | P | ⊙ | 3.06 | 5.99 | 1-1 | (482) |
| *4134.433 | V | (1) | 3.00 | 5.99 | 2-1 | |
| 4220.347 | J | 4 | 3.06 | 5.98 | 1-0 | |
| 4248.228 | J | 4 | 3.06 | 5.96 | 1-2 | |
| 4267.830 | B | 5 | 3.10 | 5.99 | 0-1 | |
| m4044.64 | P | Fe | 3.00 | 6.06 | 2-2 | $c^3P-2^\circ$ |
| 4117.32 | U | (1) | 3.06 | 6.06 | 1-2 | (484) |
| 4013.798 | V | (1) | 3.00 | 6.08 | 2-3 | $c^3P-w^3F^\circ$ |
| 4053.82 | W | (1) | 3.06 | 6.10 | 1-2 | (485) |
| 3983.35 | U | (1) | 3.00 | 6.10 | 2-2 | |
| 4031.243 | V | (2) | 3.00 | 6.07 | 2-3 | $c^3P-w^3D^\circ$ |
| 4085.38 | P | | 3.06 | 6.08 | 1-2 | (486) |
| *4130.035 | U | (1) | 3.10 | 6.09 | 0-1 | |
| 4013.822 | J | 2 | 3.00 | 6.08 | 2-2 | |
| 4076.332 | J | (1) | 3.06 | 6.09 | 1-1 | |
| *4004.976 | J | (1) | 3.00 | 6.09 | 2-1 | |
| 3976.392 | V | (1) | 3.00 | 6.11 | 2-2 | $c^3P-z^1D^\circ$ |
| 4048.629 | V | (1) | 3.06 | 6.11 | 1-2 | (487) |
| 3867.219 | B | 7 | 3.00 | 6.20 | 2-2 | $c^3P-w^3P^\circ$ |
| 3955.956 | J | 2 | 3.06 | 6.18 | 1-1 | (488) |
| 3888.825 | V | 3 | 3.00 | 6.18 | 2-1 | |
| 3970.391 | J | 4 | 3.06 | 6.17 | 1-0 | |
| *3933.606 | J | (2) | 3.06 | 6.20 | 1-2 | |
| 4006.631 | J | 2 | 3.10 | 6.18 | 0-1 | |
| 3808.286 | J | (1) | 3.00 | 6.24 | 2-3 | $c^3P-z^1F^\circ$ (489) |
| 3699.147 | J | 1 | 3.00 | 6.34 | 2-3 | $c^3P-t^3D^\circ$ |
| 3723.23 | P | ⊙ | 3.06 | 6.37 | 1-2 | (490) |
| 3662.73 | P | ⊙ | 3.00 | 6.37 | 2-2 | |
| 3693.79 | P | ⊙ | 3.06 | 6.40 | 1-1 | |
| 3635.19 | W | 2 | 3.00 | 6.40 | 2-1 | |
| *3679.53 | W | (1) | 3.06 | 6.41 | 1-0 | |
| 3698.611 | J | 2 | 3.00 | 6.34 | 2-3 | $c^3P-v^3F^\circ$ |
| 3782.608 | J | (1) | 3.06 | 6.32 | 1-2 | (491) |
| 3721.189 | V | (1) | 3.00 | 6.32 | 2-2 | |
| 3636.650 | V | 1 | 3.00 | 6.40 | 2-3 | $c^3P-u^3G^\circ$ (493) |
| 3652.26 | P | ⊙ | 3.00 | 6.38 | 2-2 | $c^3P-y^1D^\circ$ |
| 3711.411 | J | 2 | 3.06 | 6.38 | 1-2 | (494) |
| *3645.090 | V | 2 | 3.00 | 6.39 | 2-2 | $c^3P-x^1D^\circ$ |
| 3704.010 | V | (1) | 3.06 | 6.39 | 1-2 | (495) |
| 3617.788 | B | 12 | 3.00 | 8.42 | 2-3 | $c^3P-u^3D^\circ$ |
| 3633.042 | J | 10 | 3.06 | 6.46 | 1-2 | (496) |
| 3645.822 | J | 6 | 3.10 | 6.48 | 0-1 | |
| 3575.374 | J | 4 | 3.00 | 6.46 | 2-2 | |
| 3603.628 | J | 1 | 3.06 | 6.48 | 1-1 | |
| 3548.037 | U | (2) | 3.00 | 6.48 | 2-1 | |
| m3586.10 | P | Fe | 3.00 | 6.45 | 2-3 | $c^3P-t^3D^\circ$ |
| 3581.916 | U | (1) | 3.06 | 6.50 | 1-2 | (497) |
| *3690.450 | V | (1) | 3.10 | 6.44 | 0-1? | |
| m3526.69 | P | Fe | 3.00 | 6.50 | 2-2 | |
| m3647.43 | P | Fe | 3.06 | 6.44 | 1-1? | |
| 3590.29 | P | ⊙? | 3.00 | 6.44 | 2-1? | |
| 3505.065 | V | 2 | 3.00 | 6.53 | 2-1 | $c^3P-8^\circ$ |
| 3559.506 | J | 2 | 3.06 | 6.53 | 1-1 | (498) |
| 3600.48 | P | ⊙? | 3.10 | 6.53 | 0-1 | |
| m3497.89 | P | Fe | 3.00 | 6.53 | 2-2 | $c^3P-v^3P^\circ$ |
| *3442.979 | V | (1) | 3.06 | 6.64 | 1-1 | (499) |
| 3392.016 | V | 2 | 3.00 | 6.64 | 2-1 | |
| 3553.112 | V | 1 | 3.06 | 6.53 | 1-2 | |
| *3507.39 § | W | (1) | 3.06 | 6.58 | 1-2 | $c^3P-s^3D^\circ$ (500) |
| 3459.911 | G | 4 | 3.00 | 6.57 | 2-1 | $c^3P-z^1P^\circ$ |
| 3512.95 | W | (1) | 3.06 | 6.57 | 1-1 | (501) |
| 3426.09 | P | ⊙ | 3.10 | 6.70 | 0-1 | $c^3P-t^5P^\circ$ |
| 3388.966 | V | (1w) | 3.06 | 6.70 | 1-1 | (502) |
| 3339.588 | V | (1w) | 3.00 | 6.70 | 2-1 | |
| 3397.221 | V | (1) | 3.00 | 6.64 | 2-3 | $c^3P-x^1F^\circ$ (503) |
| *3181.922 | U | (2) | 3.00 | 6.88 | 2-2 | $c^3P-w^1D^\circ$ (505) |
| 3001.66 | P | (1) | 3.00 | 7.12 | 2-3 | $c^3P-t^3F^\circ$ |
| 3035.25 | P | ⊙ | 3.06 | 7.12 | 1-2 | (506) |
| 8931.78 | P | ⊙ | 3.03 | 4.42 | 4-4 | $a^1G-z^3G^\circ$ |
| 8689.71 | P | ⊙ | 3.03 | 4.45 | 4-3 | (507) |
| 8254.34 | P | ⊙ | 3.03 | 4.53 | 4-4 | $a^1G-y^3F^\circ$ |
| 7941.84 | P | ⊙ | 3.03 | 4.59 | 4-3 | (508) |
| 7350.55 | P | ⊙ | 3.03 | 4.71 | 4-3 | $a^1G-y^3D^\circ$ (509) |
| 5038.81 | P | ⊙? | 3.03 | 5.48 | 4-4 | $a^1G-v^5D^\circ$ (510) |
| 4842.19 | P | ⊙? | 3.03 | 5.58 | 4-3 | $a^1G-x^3D^\circ$ (511) |
| 4793.96 | P | (1) | 3.03 | 5.61 | 4-4 | $a^1G-y^3G^\circ$ (512) |
| 4636.66 | P | ⊙ | 3.03 | 5.70 | 4-5 | $a^1G-z^3I^\circ$ (513) |
| 4514.189 | J | (2) | 3.03 | 5.77 | 4-4 | $a^1G-u^5D^\circ$ |
| *4509.306 | U | (1) | 3.03 | 5.77 | 4-3 | (514) |
| 4480.142 | J | (3) | 3.03 | 5.79 | 4-4 | $a^1G-x^3F^\circ$ |
| 4439.643 | V | (1) | 3.03 | 5.81 | 4-3 | (515) |
| 4456.331 | J | (1) | 3.03 | 5.80 | 4-5 | $a^1G-z^3H^\circ$ |
| 4436.931 | V | (2) | 3.03 | 5.82 | 4-4 | (516) |
| 4343.699 | J | (2) | 3.03 | 5.87 | 4-4 | $a^1G-w^5G^\circ$ (517) |
| 4369.774 | B | 7 | 3.03 | 5.86 | 4-4 | $a^1G-z^1G^\circ$ (518) |
| 4298.040 | B | (2) | 3.03 | 5.91 | 4-5 | $a^1G-x^3G^\circ$ |
| 4302.191 | J | (2) | 3.03 | 5.90 | 4-4 | (520) |
| 4225.956 | J | 3 | 3.03 | 5.95 | 4-5 | $a^1G-w^3G^\circ$ |
| *4202.755 | V | (1) | 3.03 | 5.97 | 4-4 | (521) |
| 4199.098 | J | 20 | 3.03 | 5.97 | 4-5 | $a^1G-z^1H^\circ$ (522) |
| 4143.418 | J | 15 | 3.03 | 6.01 | 4-4 | $a^1G-y^1G^\circ$ (523) |
| 4074.794 | J | 5 | 3.03 | 6.06 | 4-4 | $a^1G-w^3F^\circ$ |
| 4052.664 | V | (1) | 3.03 | 6.08 | 4-3 | (524) |
| 4070.45 | P | ⊙? | 3.03 | 6.07 | 4-3 | $a^1G-v^3D^\circ$ (525) |
| 3994.117 | J | 2 | 3.03 | 6.12 | 4-5 | $a^1G-y^3H^\circ$ |
| 3974.65 | P | ⊙ | 3.03 | 6.14 | 4-4 | (526) |
| 4017.156 | J | 6 | 3.03 | 6.11 | 4-5 | $a^1G-v^3G^\circ$ |
| 3990.379 | J | 2 | 3.03 | 6.13 | 4-4 | (527) |
| 3955.22 | P | ⊙ | 3.03 | 6.15 | 4-3 | |
| 3843.359 | B | 8 | 3.03 | 6.24 | 4-3 | $a^1G-z^1F^\circ$ (528) |
| 3839.359 | B | 7 | 3.03 | 6.25 | 4-4 | $a^1G-x^1G^\circ$ (529) |
| 3739.34 | P | ⊙ | 3.03 | 6.34 | 4-4 | $a^1G-u^5F^\circ$ (530) |
| 3773.364 | V | (1) | 3.03 | 6.30 | 4-5 | $a^1G-x^3H^\circ$ (531) |
| 3732.13 | P | ⊙? | 3.03 | 6.34 | 4-3 | $a^1G-t^5D^\circ$ (532) |
| *3740.061 | V | (1) | 3.03 | 6.33 | 4-4 | $a^1G-v^3F^\circ$ (532a) |
| 3730.386 | G | 3 | 3.03 | 6.34 | 4-5 | $a^1G-u^3G^\circ$ |
| 3689.897 | V | (1w) | 3.03 | 6.38 | 4-4 | (533) |
| 3725.498 | J | (1) | 3.03 | 6.35 | 4-4 | $a^1G-4^\circ$ (534) |
| *3895.054 | B | 8 | 3.03 | 6.37 | 4-5 | $a^1G-6^\circ$ (534a) |
| 3617.09 | W | (1) | 3.03 | 6.45 | 4-3 | $a^1G-t^3D^\circ$ (535) |
| 3545.832 | U | (1) | 3.03 | 6.51 | 4-4 | $a^1G-w^3H^\circ$ (536) |
| 3529.531 | U | (1) | 3.03 | 6.53 | 4-5 | $a^1G-y^3I^\circ$ (537) |
| 3522.73 | P | ⊙ | 3.03 | 6.54 | 4-3 | $a^1G-s^3D^\circ$ (538) |
| 3437.046 | G | 3 | 3.03 | 6.62 | 4-3 | $a^1G-y^1F^\circ$ (539) |
| 3429.82 | P | ⊙ | 3.03 | 6.63 | 4-5 | $a^1G-y^1H^\circ$ (540) |
| 3425.009 | G | 4 | 3.03 | 6.64 | 4-3 | $a^1G-x^1F^\circ$ (541) |
| 3410.031 | U | (1) | 3.03 | 6.65 | 4-3 | $a^1G-10^\circ$ (542) |
| 3329.532 | V | (2) | 3.03 | 6.74 | 4-3 | $a^1G-t^3G^\circ$ (542a) |
| 3395.67 | P | ⊙ | 3.03 | 6.67 | 4-5 | $a^1G-12^\circ$ (543) |
| m3306.35 | P | Fe | 3.03 | 6.77 | 4-4 | $a^1G-w^1G^\circ$ (544) |
| 3240.013 | U | (1) | 3.03 | 6.84 | 4-5 | $a^1G-v^3H^\circ$ |
| 3238.32 | P | ⊙ | 3.03 | 6.84 | 4-4 | (545) |
| 3229.994 | U | (3) | 3.03 | 6.85 | 4-5 | $a^1G-x^1H^\circ$ (546) |
| 3202.562 | V | 2 | 3.03 | 6.89 | 4-3 | $a^1G-w^1F^\circ$ (547) |
| 3190.651 | U | (2) | 3.03 | 6.90 | 4-5 | $a^1G-s^3G^\circ$ |
| 3190.825 | V | (2) | 3.03 | 6.90 | 4-4 | (548) |
| *3171.353 | V | 5 | 3.03 | 6.93 | 4-3 | |
| 3073.244 | S | (-) | 3.03 | 7.05 | 4-5 | $a^1G-x^3I^\circ$ (549) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Fe I continued | | | | | | |
| 6831.44 | P | ⊙? | 3.20 | 5.00 | 4-3 | $z^5D^o$-$a^1F$ (550) |
| 6677.54 | P | ⊙ | 3.20 | 5.05 | 4-3 | $z^5D^o$-X |
| 6647.90 | P | ⊙ | 3.23 | 5.08 | 3-2 | (551) |
| 6786.41 | P | ⊙ | 3.23 | 5.05 | 3-3 | |
| 6737.29 | P | ⊙ | 3.25 | 5.08 | 2-2 | |
| 6879.59 | P | ⊙ | 3.25 | 5.05 | 2-3 | |
| 6801.31 | P | ⊙? | 3.27 | 5.08 | 1-2 | |
| 5909.99 | W | (3) | 3.20 | 5.29 | 4-5 | $z^5D^o$-$e^7D$ |
| 5872.73 | P | | 3.23 | 5.33 | 3-4 | (552) |
| •5848.09 | W | (2n) | 3.25 | 5.36 | 2-3 | |
| 5827.89 | P | ⊙ | 3.27 | 5.39 | 1-2 | |
| 5807.79 | P | ⊙ | 3.28 | 5.40 | 0-1 | |
| 5791.044 | V | (2) | 3.20 | 5.33 | 4-4 | |
| 5780.621 | V | (2) | 3.23 | 5.36 | 3-3 | |
| •5780.83 | V | (1) | 3.25 | 5.39 | 2-2 | |
| 5714.88 | P | ⊙ | 3.23 | 5.39 | 3-2 | |
| 5324.185 | I | 30 | 3.20 | 5.52 | 4-4 | $z^5D^o$-$e^5D$ |
| 5283.628 | I | 18 | 3.23 | 5.56 | 3-3 | (553) |
| 5263.314 | J | 8 | 3.25 | 5.60 | 2-2 | |
| 5253.479 | V | (2) | 3.27 | 5.62 | 1-1 | |
| 5217.395 | J | 5 | 3.20 | 5.56 | 4-3 | |
| 5208.601 | J | 7 | 3.23 | 5.60 | 3-2 | |
| 5215.185 | J | 6 | 3.25 | 5.62 | 2-1 | |
| •5229.857 | J | 5n | 3.27 | 5.63 | 1-0 | |
| 5393.174 | I | 10 | 3.23 | 5.52 | 3-4 | |
| 5339.935 | I | 12 | 3.25 | 5.56 | 2-3 | |
| 5302.307 | I | 10 | 3.27 | 5.60 | 1-2 | |
| 5273.176 | K | (5) | 3.28 | 5.62 | 0-1 | |
| 4736.780 | I | 12 | 3.20 | 5.80 | 4-5 | $z^5D^o$-$e^5F$ |
| 4707.281 | B | 8 | 3.23 | 5.65 | 3-4 | (554) |
| 4668.142 | J | 6 | 3.25 | 5.90 | 2-3 | |
| 4637.512 | J | 3 | 3.27 | 5.93 | 1-2 | |
| 4613.210 | J | 2n | 3.28 | 5.95 | 0-1 | |
| •4654.628 | J | 5 | 3.20 | 5.85 | 4-4 | |
| 4625.052 | I | 3 | 3.23 | 5.90 | 3-3 | |
| •4607.655 | J | 3n | 3.25 | 5.93 | 2-2 | |
| 4598.122 | J | (2n) | 3.27 | 5.95 | 1-1 | |
| 4574.240 | V | (1) | 3.20 | 5.90 | 4-3 | |
| 4565.684 | V | (2) | 3.23 | 5.93 | 3-2 | |
| 4568.789 | V | (1) | 3.25 | 5.95 | 2-1 | |
| •4531.633 | J | (2) | 3.20 | 5.92 | 4-4 | $z^5D^o$-$e^3F$ |
| 4464.69 | P | | 3.23 | 5.99 | 3-3 | (555) |
| 4425.75 | P | ⊙ | 3.25 | 6.04 | 2-2 | |
| 4581.517 | J | (2) | 3.23 | 5.92 | 3-4 | |
| 4504.838 | J | (2) | 3.25 | 5.99 | 2-3 | |
| 4009.54 | P | ⊙ | 3.20 | 6.28 | 4-5 | $z^5D^o$-$e^7F$ |
| 3990.55 | P | ⊙ | 3.23 | 6.32 | 3-4 | (556) |
| •4029.640 | V | 3n | 3.25 | 6.31 | 2-3 | |
| •4022.744 | U | (1) | 3.27 | 6.34 | 1-2 | |
| 3997.49 | P | ⊙ | 3.23 | 6.31 | 3-3 | |
| 4000.266 | J | (1) | 3.25 | 6.34 | 2-2 | |
| 4042.75 | P | ⊙ | 3.27 | 6.32 | 1-1 | |
| 3959.46 | P | ⊙ | 3.20 | 6.31 | 4-3 | |
| 4020.05 | P | ⊙ | 3.25 | 6.32 | 2-1 | |
| 4084.17 | P | ⊙ | 3.20 | 6.22 | 4-5 | $z^5D^o$-$f^7D$ |
| 4052.72 | P | ⊙ | 3.23 | 6.27 | 3-4 | (557) |
| 4076.810 | J | (1w) | 3.25 | 6.28 | 2-3 | |
| 4080.888 | V | (1w) | 3.28 | 6.30 | 0-1 | |
| 4013.641 | J | (2) | 3.20 | 6.27 | 4-4 | |
| •4043.901 | V | 5n | 3.23 | 6.26 | 3-3 | |
| 4054.18 | W | (1) | 3.25 | 6.30 | 2-2 | |
| 4069.08 | U | (1) | 3.27 | 6.30 | 1-1 | |
| •4004.978 | J | (1) | 3.20 | 6.28 | 4-3 | |
| •4021.622 | V | (1) | 3.23 | 6.30 | 3-2 | |
| 4046.07 | P | ⊙ | 3.25 | 6.30 | 2-1 | |
| 4078.636 | J | 8n | 3.20 | 6.22 | 4-4 | $z^5D^o$-$f^5D$ |
| 4098.183 | J | 4n | 3.23 | 6.24 | 3-3 | (558) |
| •4104.132 | K | 3 | 3.25 | 6.26 | 2-2 | |
| 4097.099 | J | (1) | 3.27 | 6.28 | 1-1 | |
| 4058.227 | K | 4n | 3.20 | 6.24 | 4-3 | |
| 4070.786 | J | 5n | 3.23 | 6.26 | 3-2 | |
| 4073.760 | K | 4n | 3.25 | 6.28 | 2-1 | |
| 4080.226 | J | 2n | 3.27 | 6.29 | 1-0 | |
| 4116.97 | U | (1) | 3.23 | 6.28 | 3-4 | |
| 4131.97 | P | ⊙ | 3.25 | 6.24 | 2-3 | |
| •4127.807 | J | 3n | 3.27 | 6.26 | 1-2 | |
| 4109.070 | J | (1) | 3.28 | 6.28 | 0-1 | |
| 4067.984 | J | 8n | 3.20 | 6.23 | 4-4 | $z^5D^o$-$e^7P$ |
| 4085.312 | J | 4 | 3.23 | 6.25 | 3-3 | (559) |
| 4078.89 | P | (1) | 3.25 | 6.28 | 2-2 | |
| 4045.59 | P | ⊙ | 3.20 | 6.25 | 4-3 | |
| 4043.98 | P | ⊙ | 3.23 | 6.28 | 3-2 | |
| 4108.13 | P | ⊙ | 3.23 | 6.23 | 3-4 | |
| 4118.904 | V | (1) | 3.25 | 6.25 | 2-3 | |
| 4030.499 | J | (6) | 3.20 | 6.26 | 4-5 | $z^5D^o$-$e^5G$ |
| 4024.735 | J | 6n | 3.23 | 6.29 | 3-4 | (560) |
| 4018.282 | J | (4) | 3.25 | 6.32 | 2-3 | |
| 4016.432 | V | (2) | 3.27 | 6.34 | 1-2 | |
| m3988.18 | P | Fe | 3.20 | 6.29 | 4-4 | |
| 3986.30 | P | ⊙ | 3.23 | 6.32 | 3-3 | |
| 3994.00 | P | | 3.25 | 6.34 | 2-2 | |
| 3948.48 | P | ⊙ | 3.20 | 6.32 | 4-3 | |
| 3962.42 | P | ⊙ | 3.23 | 6.34 | 3-2 | |
| 3947.002 | J | 4n | 3.20 | 6.32 | 4-5 | $z^5D^o$-$e^7G$ |
| 3967.964 | J | 4n | 3.23 | 6.34 | 3-4 | (561) |
| 3979.65 | W | (1) | 3.25 | 6.35 | 2-3 | |
| 3989.24 | P | ⊙ | 3.27 | 6.36 | 1-2 | |
| 3986.26 | P | ⊙ | 3.26 | 6.37 | 0-1 | |
| 3948.28 | P | ⊙ | 3.23 | 6.35 | 3-3 | |
| 3984.93 | P | ⊙ | 3.27 | 6.37 | 1-1 | |
| •3966.630 | J | 10n | 3.20 | 6.31 | 4-5 | $z^5D^o$-$f^5F$ |
| 3948.105 | J | 6n | 3.23 | 6.35 | 3-4 | (562) |
| 3957.027 | J | 4n | 3.25 | 6.37 | 2-3 | |
| 3963.108 | J | 6n | 3.27 | 6.36 | 1-2 | |
| •3966.532 | V | (1n) | 3.28 | 6.39 | 0-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Fe I continued | | | | | | |
| 3911.00 | P | (1) | 3.20 | 6.35 | 4-4 | $z^5D^o$-$f^5F$ |
| 3926.001 | V | (1) | 3.23 | 6.37 | 3-3 | (562) |
| 3941.283 | J | (3) | 3.25 | 6.38 | 2-2 | cont |
| 3955.352 | J | (3) | 3.27 | 6.39 | 1-1 | |
| 3689.33 | P | | 3.20 | 6.37 | 4-3 | |
| 3910.52 | P | ⊙ | 3.23 | 6.38 | 3-2 | |
| •3933.606 | J | (2) | 3.25 | 6.39 | 2-1 | |
| 3997.48 | P | ⊙ | 3.23 | 6.31 | 3-2 | $z^5D^o$-$e^5S$ |
| •4029.640 | V | 3n | 3.25 | 6.31 | 2-2 | (563) |
| 4052.466 | V | (1) | 3.27 | 6.31 | 1-2 | |
| 3936.79 | P | ⊙ | 3.20 | 6.33 | 4-3 | $z^5D^o$-$e^3D$ |
| 3905.18 | P | ⊙ | 3.23 | 6.39 | 3-2 | (564) |
| 3889.92 | P | (1) | 3.25 | 6.42 | 2-1 | |
| 3974.397 | J | (1) | 3.23 | 6.33 | 3-3 | |
| m3935.86 | P | Fe | 3.25 | 6.39 | 2-2 | |
| 3911.18 | P | | 3.27 | 6.42 | 1-1 | |
| 4006.16 | P | ⊙ | 3.25 | 6.33 | 2-3 | |
| 3957.62 | W | (1) | 3.27 | 6.39 | 1-2 | |
| 3922.09 | P | ⊙ | 3.28 | 6.42 | 0-1 | |
| 3928.065 | J | (1) | 3.20 | 6.34 | 4-4 | $z^5D^o$-$g^5D$ |
| 3900.519 | J | 2 | 3.23 | 6.39 | 3-3 | (565) |
| 3888.42 | P | (1) | 3.25 | 6.43 | 2-2 | |
| 3864.66 | W | (1) | 3.27 | 6.45 | 1-1 | |
| 3864.30 | P | ⊙ | 3.20 | 6.39 | 4-3 | |
| 3858.48 | P | ⊙ | 3.23 | 6.43 | 3-2 | |
| 3863.70 | P | ⊙ | 3.25 | 6.45 | 2-1 | |
| 3878.19 | P | ⊙ | 3.27 | 6.45 | 1-0 | |
| 3965.511 | J | (1) | 3.23 | 6.34 | 3-4 | |
| 3931.122 | J | (3) | 3.25 | 6.39 | 2-3 | |
| 3909.664 | J | (1) | 3.27 | 6.43 | 1-2 | |
| 3895.44 | P | (1) | 3.28 | 6.45 | 0-1 | |
| 3894.49 | U | (1) | 3.20 | 6.37 | 4-3 | $z^5D^o$-$e^7S$ |
| 3962.353 | V | (2) | 3.25 | 6.37 | 2-3 | (566) |
| 3854.375 | U | (1) | 3.20 | 6.40 | 4-3 | $z^5D^o$-$e^5P$ |
| 3855.846 | J | (1w) | 3.23 | 6.43 | 3-2 | (567) |
| 3892.98 | U | (1) | 3.25 | 6.42 | 2-1 | |
| 3890.39 | U | (1) | 3.23 | 6.40 | 3-3 | |
| 3885.76 | P | ⊙ | 3.25 | 6.43 | 2-2 | |
| 3914.273 | V | (1) | 3.27 | 6.42 | 1-1 | |
| 3920.839 | J | (1) | 3.25 | 6.40 | 2-3 | |
| 3906.97 | P | ⊙ | 3.27 | 6.43 | 1-2 | |
| 3925.201 | V | (1) | 3.28 | 6.42 | 0-1 | |
| 3680.675 | U | 2n | 3.20 | 6.55 | 4-5 | $z^5D^o$-$g^5F$ |
| 3668.214 | U | (1) | 3.23 | 6.59 | 3-4 | (568) |
| 3636.49 | P | ⊙ | 3.25 | 6.65 | 2-3 | |
| 3598.93 ? | W | (1) | 3.27 | 6.70 | 1-2 | |
| 3591.485 | U | (1) | 3.28 | 6.71 | 0-1 | |
| •3636.186 | V | 2 | 3.20 | 6.59 | 4-4 | |
| 3582.34 | P | ⊙ | 3.27 | 6.71 | 1-1 | |
| •3667.999 | V | 1 | 3.20 | 6.56 | 4-4 | $z^5D^o$-$h^5D$ |
| m3647.84 | P | Fe | 3.23 | 6.61 | 3-3 | (569) |
| 3618.62 | P | ⊙ | 3.25 | 6.66 | 2-2 | |
| 3615.19 | W | (1) | 3.27 | 6.68 | 1-1 | |
| 3616.15 | P | (1) | 3.20 | 6.61 | 4-3 | |
| 3592.68 | W | (1) | 3.23 | 6.66 | 3-2 | |
| 3597.05 | W | 3n | 3.25 | 6.68 | 2-1 | |
| 3700.61 | P | ⊙ | 3.23 | 6.56 | 3-4 | |
| 3667.252 | G | 3n | 3.20 | 6.56 | 4-3 | $z^5D^o$-$f^5P$ |
| 3644.798 | U | (1) | 3.23 | 6.61 | 3-2 | (570) |
| 3624.06 | P | ⊙ | 3.25 | 6.66 | 2-1 | |
| 3671.51 | W | (1) | 3.25 | 6.61 | 2-2 | |
| •3690.450 | V | (1) | 3.27 | 6.61 | 1-2 | |
| 3651.03 | P | ⊙ | 3.20 | 6.58 | 4-5 | $z^5D^o$-$f^5G$ |
| •3618.392 | J | 2 | 3.23 | 6.64 | 3-4 | (571) |
| 3593.33 | W | (1) | 3.25 | 6.69 | 2-3 | |
| 3565.63 | P | ⊙ | 3.25 | 6.71 | 2-2 | |
| 3558.08 | P | ⊙ | 3.23 | 6.70 | 3-4 | $z^5D^o$-$e^5H$ |
| 3496.60 | P | ⊙ | 3.20 | 6.73 | 4-3 | (572) |
| 3590.99 | W | (1) | 3.20 | 6.63 | 4-5 | $z^5D^o$-$e^3G$ |
| 3579.83 | P | ⊙ | 3.23 | 6.67 | 3-4 | (573) |
| 3621.19 | P | ⊙ | 3.23 | 6.64 | 3-3 | $z^5D^o$-$f^3D$ |
| 3647.56 | P | ⊙ | 3.25 | 6.64 | 2-3 | (574) |
| 3583.337 | J | 2 | 3.28 | 6.72 | 0-1? | |
| 3518.23 | P | ⊙ | 3.23 | 6.73 | 3-4 | $z^5D^o$-$e^3H$ (575) |
| 3473.23 | P | ⊙ | 3.20 | 6.75 | 4-4 | $z^5D^o$-$f^3F$ |
| 3419.157 | V | (1) | 3.23 | 6.84 | 3-2 | (576) |
| 3502.46 | P | ⊙ | 3.23 | 6.75 | 3-4 | |
| 3473.01 | P | ⊙ | 3.25 | 6.81 | 2-3 | |
| 3459.29 | P | ⊙ | 3.27 | 6.84 | 1-2 | |
| 3418.176 | U | (2w) | 3.27 | 6.88 | 1-0 | $z^5D^o$-$e^3P$ |
| 3502.65 | P | ⊙ | 3.25 | 6.77 | 2-2 | (577) |
| 3459.61 | P | ⊙ | 3.27 | 6.84 | 1-1 | |
| 3143.990 | C | 6 | 3.20 | 7.12 | 4-4 | $z^5D^o$-$i^5D$ |
| 3156.275 | G | 5n | 3.23 | 7.14 | 3-3 | (578) |
| 3160.200 | V | (2n) | 3.25 | 7.16 | 2-2 | |
| 3132.514 | V | 4n | 3.20 | 7.14 | 4-3 | |
| 3140.385 | V | 5n | 3.23 | 7.16 | 3-2 | |
| 3167.907 | V | (1) | 3.23 | 7.12 | 3-4 | |
| 3174.22 | P | ⊙ | 3.27 | 7.16 | 1-2 | |
| 3150.301 | V | (2n) | 3.27 | 7.19 | 1-2 | $z^5D^o$-4 (578a) |
| 10780.71 | P | ⊙ | 3.22 | 4.37 | 6-5 | $b^3H$-$z^3G^o$ |
| 10616.75 | P | ⊙ | 3.25 | 4.42 | 5-4 | (579) |
| 10577.14 | P | ⊙ | 3.29 | 4.45 | 4-3 | |
| 9673.16 | F | 1n | 3.25 | 4.53 | 5-4 | $b^3H$-$y^3F^o$ (560) |
| 5807.22 | P | ⊙ | 3.22 | 5.35 | 6-6 | $b^3H$-$z^5H^o$ |
| 6007.75 | P | ⊙ | 3.25 | 5.31 | 5-5 | (581) |
| 6065.61 | P | ⊙ | 3.29 | 5.32 | 4-4 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Fe I continued | | | | | | |
| 5930.520 | V | (2) | 3.22 | 5.31 | 6-5 | $b^3H$-$z^5H^o$ |
| 5891.12 | U | (1) | 3.25 | 5.35 | 5-6 | (581) |
| 6109.318 | V | (1) | 3.29 | 5.31 | 4-5 | cont |
| 5587.36 | P | ⊙? | 3.25 | 5.46 | 5-5 | $b^3H$-$w^5F^o$ |
| 5675.08 | P | ⊙? | 3.29 | 5.46 | 4-5 | (583) |
| 5209.90 | P | ⊙ | 3.22 | 5.59 | 6-5 | $b^3H$-$y^3G^o$ |
| 5240.36 | P | ⊙ | 3.25 | 5.61 | 5-4 | (584) |
| 5279.65 | P | ⊙ | 3.29 | 5.62 | 4-3 | |
| 5277.32 | P | ⊙ | 3.25 | 5.59 | 5-5 | |
| 5317.394 | V | (1) | 3.29 | 5.61 | 4-4 | |
| •5030.784§ | R | 5 | 3.22 | 5.66 | 6-7 | $b^3H$-$z^3I^o$ |
| 5080.95 | P | ⊙ | 3.25 | 5.66 | 5-6 | (585) |
| 5124.60 | P | ⊙ | 3.29 | 5.70 | 4-5 | |
| m5018.43 | P | Fe+ | 3.22 | 5.68 | 6-6 | |
| 5052.97 | P | ⊙ | 3.25 | 5.70 | 5-5 | |
| 4975.415 | U | (1) | 3.29 | 5.77 | 4-4 | $b^3H$-$u^5D^o$ (586) |
| 4867.64 | P | ⊙ | 3.25 | 5.79 | 5-4 | $b^3H$-$x^3F^o$ (587) |
| 4788.757 | J | (4) | 3.22 | 5.60 | 6-6 | $b^3H$-$z^3H^o$ |
| 4839.549 | J | (3) | 3.25 | 5.80 | 5-5 | (588) |
| •4881.726 | J | (2) | 3.29 | 5.82 | 4-4 | |
| 4782.79 | P | ⊙ | 3.22 | 5.80 | 6-5 | |
| 4816.67 | P | ⊙ | 3.25 | 5.82 | 5-4 | |
| •4845.656 | V | (2) | 3.25 | 5.60 | 5-6 | |
| 4903.10 | P | ⊙? | 3.29 | 5.80 | 4-3 | $b^3H$-$w^3D^o$ (589) |
| 4737.633 | J | (1) | 3.25 | 5.86 | 5-4 | $b^3H$-$z^1G^o$ |
| 4800.55 | P | ⊙ | 3.29 | 5.86 | 4-4 | (590) |
| 4600.937 | J | (1) | 3.22 | 5.91 | 6-5 | $b^3H$-$x^3G^o$ |
| 4658.29 | U | (1) | 3.25 | 5.90 | 5-4 | (591) |
| 4714.182 | V | (1n) | 3.29 | 5.91 | 4-3 | |
| 4649.828 | U | (1) | 3.22 | 5.88 | 6-5 | $b^3H$-$v^5F^o$ (592) |
| 4518.45 | U | (1) | 3.22 | 5.95 | 6-5 | $b^3H$-$w^3G^o$ |
| 4541.953 | U | (1) | 3.25 | 5.97 | 5-4 | (593) |
| •4575.60 | U | (1) | 3.29 | 5.98 | 4-3 | |
| 4569.06 | P | ⊙ | 3.25 | 5.95 | 5-5 | |
| 4487.74 | P | ⊙ | 3.22 | 5.97 | 6-5 | $b^3H$-$z^1H^o$ |
| 4537.677 | J | (1n) | 3.25 | 5.97 | 5-5 | (594) |
| 4595.363 | J | (2) | 3.29 | 5.97 | 4-5 | |
| •4472.721 | J | (2) | 3.25 | 6.01 | 5-4 | $b^3H$-$y^1G^o$ |
| 4528.76 | P | ⊙ | 3.29 | 6.01 | 4-4 | (595) |
| 4446.90 | P | ⊙ | 3.29 | 6.06 | 4-4 | $b^3H$-$w^3F^o$ (596) |
| 4285.445 | B | 3 | 3.22 | 6.10 | 6-6 | $b^3H$-$y^3H^o$ |
| m4299.25 | P | Fe | 3.25 | 6.12 | 5-5 | (597) |
| 4327.92 | W | (2) | 3.29 | 6.14 | 4-4 | |
| 4330.962 | V | (1) | 3.25 | 6.10 | 5-6 | |
| 4280.53 | U | (1) | 3.22 | 6.11 | 6-5 | $b^3H$-$v^3G^o$ |
| 4294.939 | V | (1w) | 3.25 | 6.13 | 5-4? | (598) |
| 4304.87 | P | ⊙ | 3.29 | 6.15 | 4-3 | |
| 4325.95 | P | ⊙ | 3.25 | 6.11 | 5-5 | |
| 4346.558 | J | (2) | 3.29 | 6.13 | 4-4 | |
| 4167.862 | V | (2) | 3.29 | 6.25 | 4-4 | $b^3H$-$x^1G^o$ (599) |
| •4038.622 | Q | (-) | 3.29 | 6.34 | 4-4 | $b^3H$-$u^5F^o$ |
| •4099.08 | U | (1) | 3.29 | 6.30 | 4-5? | (600) |
| 4013.16 | W | (1) | 3.22 | 6.30 | 6-6 | $b^3H$-$x^3H^o$ |
| 4004.632 | J | (1) | 3.22 | 6.30 | 6-5 | (601) |
| 4041.911 | S | (-) | 3.29 | 6.34 | 4-3 | $b^3H$-$t^5D^o$ (602) |
| 4006.314 | J | 3 | 3.25 | 6.33 | 5-4 | $b^3H$-$v^3F^o$ |
| •4041.288 | V | (1) | 3.29 | 6.34 | 4-3 | (603) |
| 3956.459 | J | 9 | 3.22 | 6.34 | 6-5 | $b^3H$-$u^3G^o$ |
| 3948.779 | B | 10 | 3.25 | 6.38 | 5-4 | (604) |
| 3967.423 | B | 8 | 3.29 | 6.40 | 4-3 | |
| 3995.199 | J | (1w) | 3.25 | 6.34 | 5-5 | |
| 3992.395 | U | (1) | 3.29 | 8.38 | 4-4 | |
| 3989.60 | P | ⊙ | 3.25 | 6.35 | 5-4 | $b^3H$-4° (605) |
| 3916.733 | I | 6 | 3.22 | 6.37 | 6-5 | $b^3H$-6° |
| 3954.715 | U | (1) | 3.25 | 6.37 | 5-5 | (606) |
| 3998.46 | P | ⊙ | 3.29 | 6.37 | 4-5 | |
| 3797.517 | B | 12 | 3.22 | 6.47 | 6-6 | $b^3H$-$w^3H^o$ |
| 3606.697 | G | 10 | 3.25 | 6.50 | 5-5 | (607) |
| 3624.306 | V | 2 | 3.29 | 6.51 | 4-4 | |
| 3771.50 | P | ⊙ | 3.22 | 6.50 | 6-5 | |
| 3764.27 | P | ⊙ | 3.25 | 6.51 | 5-4 | |
| 3765.542 | B | 20 | 3.22 | 6.50 | 6-7 | $b^3H$-$y^3I^o$ |
| 3621.161 | I | 10 | 3.25 | 6.48 | 5-6 | (608) |
| 3605.345 | B | 12 | 3.29 | 6.53 | 4-5 | |
| 3765.706 | J | (1) | 3.22 | 6.46 | 6-6 | |
| 3765.70 | W | (1) | 3.25 | 6.53 | 5-5 | |
| 3704.336 | V | (1) | 3.22 | 6.55 | 6-6 | $b^3H$-$z^1I^o$ |
| 3736.306 | B | 10 | 3.25 | 6.55 | 5-6 | (609) |
| 3705.70 | P | ⊙ | 3.25 | 6.58 | 5-4 | $b^3H$-9° (610) |
| 3566.114 | B | 10 | 3.22 | 6.66 | 6-5 | $b^3H$-$t^3G^o$ |
| •3564.960 | J | 4 | 3.25 | 6.70 | 5-4 | (611) |
| 3573.896 | G | 4 | 3.29 | 6.74 | 4-3 | |
| 3620.67 | P | ⊙ | 3.29 | 6.70 | 4-4 | |
| 3582.201 | J | 5 | 3.22 | 6.67 | 6-5 | $b^3H$-13° |
| 3613.95 | P | ⊙ | 3.25 | 6.67 | 5-5 | (612) |
| 3576.760 | B | 2 | 3.25 | 6.70 | 5-4 | $b^3H$-13° |
| 3612.51 | P | ⊙ | 3.29 | 6.70 | 4-4 | (613a) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 3513.74 | P | ⊙ | 3.25 | 8.77 | 5-4 | $b^3H$-$w^1G^o$ |
| *3547.303 | J | (2) | 3.29 | 6.77 | 4-4 | (613) |
| 3402.356 | G | 5 | 3.22 | 8.85 | 6-8 | $b^3H$-$w^3H^o$ |
| 3437.958 | V | (2) | 3.25 | 8.84 | 5-5 | (614) |
| 3469.012 | V | (2) | 3.29 | 6.84 | 4-4 | |
| 3409.20 | W | (2) | 3.22 | 6.84 | 6-5 | |
| 3436.045 | V | (1) | 3.25 | 6.84 | 5-4 | |
| 3430.88 | P | ⊙ | 3.25 | 6.85 | 5-8 | |
| 3398.12 | P | ⊙ | 3.22 | 6.85 | 6-5 | $b^3H$-$x^1H^o$ |
| 3426.67 | P | ⊙ | 3.25 | 6.85 | 5-5 | (815) |
| 3428.01 | P | ⊙ | 3.29 | 6.89 | 4-3 | $b^3H$-$w^1F^o$ (818) |
| 3307.234 | G | 5 | 3.22 | 8.95 | 6-8 | $b^3H$-$u^3H^o$ |
| 3328.867 | C | 5 | 3.25 | 6.96 | 5-5 | (817) |
| 3355.228 | C | 6 | 3.29 | 6.97 | 4-4 | |
| 3301.927 | V | (1) | 3.22 | 8.96 | 6-5 | |
| 3324.372 | V | (2) | 3.25 | 6.97 | 5-4 | |
| 3334.278 | V | (1) | 3.25 | 6.95 | 5-6 | |
| 3359.814 | V | (2) | 3.29 | 6.98 | 4-5 | |
| 3305.75 | P | ⊙ | 3.25 | 6.99 | 5-4 | $b^3H$-$u^3F^o$ |
| 3315.17 | P | ⊙ | 3.29 | 7.01 | 4-3 | (618) |
| 3336.262 | V | (3) | 3.29 | 6.99 | 4-4 | |
| *3296.806§ | V | (1) | 3.29 | 7.03 | 4-4 | $b^3H$-$v^1G^o$ (819) |
| 3233.053 | G | 8 | 3.22 | 7.04 | 6-7 | $b^3H$-$x^3I^o$ |
| 3254.363 | C | 10 | 3.25 | 7.05 | 5-6 | (620) |
| 3280.261 | C | 8 | 3.29 | 7.05 | 4-5 | |
| 10145.00 | P | ⊙? | 3.24 | 4.45 | 3-3 | $a^3D$-$z^3G^o$ (821) |
| 9556.56 | F | 1 | 3.24 | 4.53 | 3-4 | $a^3D$-$y^3F^o$ |
| 9485.93 | P | | 3.29 | 4.59 | 2-3 | (622) |
| 8994.62 | P | ⊙ | 3.26 | 4.63 | 1-2 | |
| 9140.15 | P | ⊙ | 3.24 | 4.59 | 3-3 | |
| 9173.83 | U | (1) | 3.29 | 4.63 | 2-2 | |
| 8365.642 | E | 25 | 3.24 | 4.71 | 3-3 | $a^3D$-$y^3D^o$ |
| 8293.537 | E | 20 | 3.29 | 4.77 | 2-2 | (623) |
| 7941.09 | O | 10 | 3.26 | 4.81 | 1-1 | |
| 8027.96 | P | ⊙ | 3.24 | 4.77 | 3-2 | |
| 8080.668 | E | 10nd? | 3.29 | 4.81 | 2-1 | |
| 8654.40 | P | ⊙ | 3.29 | 4.71 | 2-3 | |
| 8146.87 | P | ⊙ | 3.26 | 4.77 | 1-2 | |
| 6130.37 | P | (1) | 3.24 | 5.25 | 3-3 | $a^3D$-$x^5D^o$ |
| 8157.41 | P | ⊙ | 3.29 | 5.29 | 2-2 | (624) |
| 5996.22 | P | ⊙ | 3.28 | 5.32 | 1-1 | |
| 8009.83 | P | ⊙ | 3.24 | 5.29 | 3-2 | |
| 6284.00 | P | ⊙ | 3.29 | 5.25 | 2-3 | |
| 5787.27 | P | ⊙ | 3.24 | 5.37 | 3-4 | $a^3D$-$w^5D^o$ |
| 5623.64 | P | ⊙ | 3.26 | 5.45 | 1-2 | (625) |
| 5648.90 | P | ⊙ | 3.24 | 5.42 | 3-3 | |
| 5588.82 | P | ⊙ | 3.24 | 5.45 | 3-2 | |
| 5817.22 | W | (1) | 3.24 | 5.43 | 3-4 | $a^3D$-$w^5F^o$ |
| *5562.712 | V | (2) | 3.28 | 5.48 | 1-1 | (828) |
| *5535.419 | J | (2) | 3.24 | 5.47 | 3-2 | |
| 5455.09 | P | ⊙ | 3.24 | 5.50 | 3-3 | $a^3D$-$w^5D^o$ |
| 5541.58 | P | ⊙ | 3.29 | 5.51 | 2-2 | (627) |
| 5282.89 | P | ⊙ | 3.24 | 5.58 | 3-3 | $a^3D$-$x^3D^o$ |
| 5358.10 | P | ⊙ | 3.29 | 5.59 | 2-2 | (628) |
| 5231.75 | P | (1) | 3.26 | 5.62 | 1-1 | |
| 5246.00 | P | ⊙ | 3.24 | 5.59 | 3-2 | |
| 5020.87 | P | ⊙ | 3.24 | 5.70 | 3-3 | $a^3D$-$w^5P^o$ |
| 5021.894 | V | (1) | 3.26 | 5.72 | 1-2 | (829) |
| 4871.94 | P | ⊙ | 3.24 | 5.77 | 3-3 | $a^3D$-$u^5D^o$ |
| 4813.11 | V | (1) | 3.26 | 5.82 | 1-1 | (630) |
| 4838.09 | P | ⊙ | 3.24 | 5.79 | 3-2 | |
| 4878.19 | P | ⊙ | 3.24 | 5.77 | 3-2 | $a^3D$-$y^3P^o$ |
| 4930.04 | P | ⊙ | 3.29 | 5.79 | 2-1 | (631) |
| 4972.90 | P | ⊙ | 3.29 | 5.77 | 2-2 | |
| 4919.73 | P | ⊙ | 3.26 | 5.77 | 1-2 | |
| 4790.75 | P | ⊙ | 3.24 | 5.81 | 3-3 | $a^3D$-$x^3F^o$ |
| 4859.31 | P | ⊙ | 3.29 | 5.83 | 2-2 | (632) |
| 4808.155 | V | (1) | 3.24 | 5.80 | 3-3 | $a^3D$-$w^3D^o$ |
| 4873.74 | P | ⊙ | 3.29 | 5.82 | 2-2 | (633) |
| 4791.250 | V | (1) | 3.26 | 5.84 | 1-1 | |
| 4780.81 | P | ⊙ | 3.24 | 5.82 | 3-2 | |
| 4841.65 | P | ⊙ | 3.29 | 5.84 | 2-1 | |
| 4822.66 | P | ⊙ | 3.28 | 5.82 | 1-2 | |
| 4718.85 | P | ⊙ | 3.24 | 5.85 | 3-2 | $a^3D$-$1^o$ |
| *4807.243 | S | (-) | 3.29 | 5.85 | 2-2 | (634) |
| *4757.582 | J | (2) | 3.28 | 5.85 | 1-2 | |
| 4778.075 | V | (1) | 3.29 | 5.87 | 2-1 | $a^3D$-$y^3G^o$ |
| 4737.01 | P | ⊙ | 3.28 | 5.87 | 1-1 | (835) |
| 4828.38 | P | ⊙ | 3.24 | 5.91 | 3-3 | $a^3D$-$x^3G^o$ (838) |
| 4827.02 | P | ⊙ | 3.24 | 5.90 | 3-2 | $a^3D$-$w^5G^o$ (837) |
| 4558.939 | J | (1) | 3.24 | 5.95 | 3-2 | $a^3D$-$v^5P^o$ |
| 4814.216 | J | (1) | 3.29 | 5.96 | 2-1 | (838) |
| 4594.959 | V | (2,g?) | 3.28 | 5.95 | 1-2 | |
| 4518.08 | P | ⊙ | 3.24 | 5.97 | 3-4 | $a^3D$-$w^3G^o$ |
| 4492.98 | P | ⊙ | 3.24 | 5.98 | 3-3 | (839) |
| 4579.07 | P | ⊙ | 3.28 | 5.98 | 1-2 | $a^3D$-$v^5F^o$ |
| 4555.75 | P | ⊙ | 3.28 | 5.97 | 1-1 | (840) |
| 4527.796 | V | (1) | 3.24 | 5.98 | 3-2 | $a^3D$-$x^3P^o$ |
| 4568.520 | J | (2) | 3.29 | 5.99 | 2-1 | (841) |
| 4533.143 | V | (1n,g?) | 3.28 | 5.98 | 1-0 | |
| 4811.05 | P | ⊙ | 3.29 | 5.98 | 2-3 | $a^3D$-$x^3P^o$ |
| 4531.85 | P | ⊙ | 3.28 | 5.99 | 1-1 | (841) |
| 4565.324 | V | (2n) | 3.28 | 5.98 | 1-2 | cont |
| 4414.47 | P | (1) | 3.28 | 6.08 | 1-2 | $a^3D$-$2^o$ (843) |
| 4368.66 | P | ⊙ | 3.24 | 8.08 | 3-4 | $a^3D$-$w^3F^o$ |
| 4419.78 | P | ⊙ | 3.29 | 6.08 | 2-3 | (644) |
| 4341.57 | P | ⊙ | 3.26 | 6.10 | 1-2 | |
| 4343.22 | P | ⊙ | 3.24 | 8.08 | 3-3 | |
| 4343.257 | J | (2) | 3.24 | 6.08 | 3-2 | $a^3D$-$v^3D^o$ |
| 4409.123 | J | (2l) | 3.29 | 6.09 | 2-1 | (645) |
| 4440.972 | V | (2) | 3.29 | 8.07 | 2-3 | |
| 4377.798 | V | (1) | 3.26 | 8.08 | 1-2 | |
| 4422.882 | V | (1n) | 3.29 | 8.08 | 2-3 | $a^3D$-$3^o$ (646) |
| 4304.15 | P | ⊙ | 3.29 | 8.15 | 2-3 | $a^3D$-$v^3G^o$ |
| 4231.525 | V | (1gn) | 3.24 | 6.15 | 3-3 | (647) |
| 4299.49 | P | ⊙ | 3.24 | 6.11 | 3-2 | $a^3D$-$z^1D^o$ |
| 4374.495 | V | (1) | 3.29 | 6.11 | 2-2 | (848) |
| 4172.126 | J | 5 | 3.24 | 6.20 | 3-2 | $a^3D$-$w^3P^o$ |
| 4268.744 | J | 2 | 3.29 | 6.18 | 2-1 | (649) |
| 4246.02 | P | ⊙ | 3.26 | 6.17 | 1-0 | |
| 4242.730 | J | (2) | 3.29 | 6.20 | 2-2 | |
| *4239.516 | J | (1gn) | 3.26 | 6.18 | 1-1 | |
| 4103.62 | P | ⊙ | 3.24 | 8.24 | 3-3 | $a^3D$-$z^1F^o$ |
| 4171.904 | V | (2) | 3.29 | 6.24 | 2-3 | (650) |
| *4099.08 | U | (1) | 3.24 | 6.25 | 3-4 | $a^3D$-$x^1G^o$ (651) |
| *3932.629 | J | 4 | 3.28 | 8.40 | 1-2 | $a^3D$-$u^5F^o$ |
| *3966.532 | V | (1n) | 3.29 | 6.40 | 2-2 | (652) |
| 3914.42 | P | ⊙ | 3.28 | 8.41 | 1-1 | |
| 3948.00 | P | ⊙ | 3.29 | 8.41 | 2-1 | |
| *4032.744 | U | (1) | 3.24 | 6.31 | 3-4 | $a^3D$-$t^5D^o$ |
| *4041.288 | V | (1) | 3.29 | 6.34 | 2-3 | (654) |
| 3963.43 | P | ⊙ | 3.26 | 6.37 | 1-2 | |
| 3986.176 | J | 5 | 3.24 | 6.33 | 3-4 | $a^3D$-$v^3F^o$ |
| 4040.650 | J | 4 | 3.29 | 6.34 | 2-3 | (655) |
| 4031.968 | V | 4 | 3.26 | 8.32 | 1-2 | |
| 3976.564 | V | (1) | 3.24 | 6.34 | 3-3 | |
| 4067.60 | P | ⊙ | 3.29 | 6.32 | 2-2 | |
| *4002.665 | V | (1) | 3.24 | 8.32 | 3-2 | |
| 3969.628 | J | (1) | 3.24 | 6.35 | 3-4 | $a^3D$-$4^o$ (657) |
| 3965.446 | V | (1) | 3.24 | 6.35 | 3- | $a^3D$-$5^o$ (658) |
| 3929.208 | J | (1) | 3.24 | 8.38 | 3-4 | $a^3D$-$u^3G^o$ |
| 3966.824 | J | (1) | 3.29 | 8.40 | 2-3 | (859) |
| 3925.55 | P | ⊙ | 3.24 | 6.38 | 3-3 | $a^3D$-$u^5P^o$ |
| 3889.38 | P | ⊙ | 3.28 | 6.43 | 1-1 | (880) |
| 3914.50 | P | ⊙ | 3.26 | 8.41 | 1-2 | |
| 3923.03 | P | ⊙ | 3.24 | 8.38 | 3-2 | $a^3D$-$y^1D^o$ |
| 3985.393 | J | 3 | 3.29 | 8.38 | 2-2 | (881) |
| 3951.184 | I | 9 | 3.26 | 6.38 | 1-2 | |
| 3914.73 | W | (1) | 3.24 | 8.39 | 3-2 | $a^3D$-$x^1D^o$ |
| *3978.885 | J | (1) | 3.29 | 8.39 | 2-2 | (682) |
| 3883.282 | J | (4) | 3.24 | 6.42 | 3-3 | $a^3D$-$u^3D^o$ |
| 3894.005 | J | (2) | 3.29 | 8.48 | 2-2 | (683) |
| *3829.458 | V | 1 | 3.26 | 6.48 | 1-1 | |
| 3834.46 | P | ⊙ | 3.24 | 6.46 | 3-2 | |
| 3881.60 | U | (1) | 3.29 | 6.48 | 2-1 | |
| *3861.341 | J | 2 | 3.28 | 8.46 | 1-2 | |
| 3846.803 | B | 8 | 3.24 | 6.45 | 3-3 | $a^3D$-$t^3D^o$ |
| 3836.332 | I | 4 | 3.29 | 8.50 | 2-2 | (864) |
| 3878.726 | V | (2) | 3.26 | 6.44 | 1-1? | |
| 3778.509 | J | 4 | 3.24 | 6.50 | 3-2 | |
| 3911.899 | U | (1) | 3.29 | 6.44 | 2-1? | |
| 3906.748 | J | 2 | 3.29 | 6.45 | 2-3 | |
| 3810.759 | J | 2 | 3.29 | 8.53 | 2-1 | $a^3D$-$8^o$ |
| 3779.444 | V | 3* | 3.28 | 8.53 | 1-1 | (665) |
| 3802.283 | J | (1) | 3.29 | 6.53 | 2-2 | $a^3D$-$w^3P^o$ (868) |
| 3740.247 | J | 3 | 3.24 | 8.54 | 3-3 | $a^3D$-$s^3D^o$ |
| 3751.059 | J | (1) | 3.29 | 8.58 | 2-2 | (887) |
| 3796.90 | U | (1) | 3.29 | 6.54 | 2-3 | |
| 3757.459 | J | 1 | 3.29 | 8.57 | 2-1 | $a^3D$-$z^1P^o$ |
| 3727.03 | P | ⊙ | 3.26 | 8.57 | 1-1 | (888) |
| 3688.478 | V | (1w) | 3.24 | 6.58 | 3-4 | $a^3D$-$9^o$ (889) |
| 3643.80 | P | (1) | 3.24 | 8.62 | 3-3 | $a^3D$-$y^1F^o$ |
| 3897.510 | V | (1w) | 3.29 | 8.62 | 2-3 | (870) |
| *3883.618 | V | (1) | 3.29 | 8.64 | 2-3 | $a^3D$-$x^1F^o$ (871) |
| 3613.45 | P | ⊙ | 3.24 | 8.85 | 3-3 | $a^3D$-$10^o$ |
| 3888.29 | P | ⊙ | 3.29 | 8.85 | 2-3 | (872) |
| 3568.828 | V | (2) | 3.24 | 8.70 | 3-4 | $a^3D$-$t^3G^o$ |
| 3573.403 | V | 2 | 3.29 | 8.74 | 2-3 | (873) |
| 3583.18 | P | ⊙ | 3.24 | 8.74 | 3-3 | |
| 3598.71 | W | 1 | 3.24 | 8.87 | 3-3 | $a^3D$-$11^o$ |
| *3851.10 | W | (1) | 3.29 | 8.87 | 2-3 | (874) |
| 3580.705 | V | 5 | 3.24 | 8.70 | 3-4 | $a^3D$-$13^o$ (875) |
| *3431.815 | J | 3 | 3.29 | 8.88 | 2-2 | $a^3D$-$w^1D^o$ |
| 3406.442 | J | 3 | 3.28 | 8.88 | 1-2 | (878) |
| *3381.340 | V | (2) | 3.24 | 8.89 | 3-3 | $a^3D$-$w^1F^o$ (877) |
| 3388.25 | P | ⊙ | 3.24 | 8.90 | 3-4 | $a^3D$-$s^3G^o$ |
| 3391.84 | P | ⊙ | 3.29 | 6.93 | 2-3 | (878) |
| 3310.498 | V | (3) | 3.24 | 8.97 | 3-4 | $a^3D$-$u^3H^o$ (879) |
| 3292.022 | G | 8 | 3.24 | 6.99 | 3-4 | $a^3D$-$u^3F^o$ |
| 3314.742 | C | 7 | 3.29 | 7.01 | 2-3 | (880) |
| 3282.891 | G | (2) | 3.26 | 7.02 | 1-2 | |
| 3271.498 | V | (2) | 3.24 | 7.01 | 3-3 | |
| 3308.495 | V | (1) | 3.29 | 7.02 | 2-2 | |
| 3283.45 | P | ⊙ | 3.24 | 7.02 | 3-2 | |
| 3253.610 | V | 4 | 3.24 | 7.03 | 3-4 | $a^3D$-$v^1G^o$ (881) |
| 3191.41 | P | ⊙ | 3.24 | 7.10 | 3-4 | $a^3D$-$t^3F^o$ |
| 3223.08 | P | ⊙ | 3.29 | 7.12 | 2-3 | (882) |
| 3193.74 | P | ⊙ | 3.26 | 7.12 | 1-2 | |
| 3216.08 | P | ⊙ | 3.29 | 7.12 | 2-2 | |
| 7478.87 | P | ⊙ | 3.35 | 5.00 | 4-3 | $z^5F^o$-$a^1F$ (683) |
| 7340.78 | P | ⊙ | 3.40 | 5.08 | 2-2 | $z^5F^o$-X |
| 7398.78 | P | ⊙ | 3.42 | 5.08 | 1-2 | (684) |
| 6371.289 | U | (1) | 3.32 | 5.29 | 5-5 | $z^5F^o$-$e^7D$ |
| 6249.65 | P | ⊙ | 3.35 | 5.33 | 4-4 | (685) |
| 6238.735 | Q | (-) | 3.38 | 5.36 | 3-3 | |
| 6219.54 | P | ⊙ | 3.40 | 5.39 | 2-2 | |
| 6137.51 | P | ⊙ | 3.32 | 5.33 | 5-4 | |
| 6145.42 | P | ⊙ | 3.35 | 5.36 | 4-3 | |
| 6388.41 | P | ⊙ | 3.35 | 5.29 | 4-5 | |
| 8339.98 | P | ⊙ | 3.38 | 5.33 | 3-4 | |
| 5615.652 | B | 50 | 3.32 | 5.52 | 5-4 | $z^5F^o$-$e^5D$ |
| 5588.763 | B | 40 | 3.35 | 5.56 | 4-3 | (686) |
| 5572.849 | B | 30 | 3.38 | 5.60 | 3-2 | |
| 5589.625 | B | 20 | 3.40 | 5.82 | 2-1 | |
| 5576.097 | J | 10 | 3.42 | 5.63 | 1-0 | |
| 5709.378 | K | 10 | 3.35 | 5.52 | 4-4 | |
| 5658.826 | B | 10 | 3.38 | 5.56 | 3-3 | |
| 5624.549 | B | 10 | 3.40 | 5.60 | 2-2 | |
| 5602.955 | J | 10 | 3.42 | 5.62 | 1-1 | |
| 5784.69 | V | (1) | 3.38 | 5.52 | 3-4 | |
| 5712.150 | V | (2) | 3.40 | 5.56 | 2-3 | |
| 5658.542 | V | (1) | 3.42 | 5.60 | 1-2 | |
| 4966.096 | B | 8 | 3.32 | 5.80 | 5-5 | $z^5F^o$-$e^5F$ |
| 4946.394 | J | 4 | 3.35 | 5.85 | 4-4 | (687) |
| 4910.027 | J | (2) | 3.38 | 5.90 | 3-3 | |
| 4883.151 | J | (2) | 3.40 | 5.93 | 2-2 | |
| 4883.653 | J | (2) | 3.42 | 5.95 | 1-1 | |
| 4875.89 | W | (1) | 3.32 | 5.85 | 5-4 | |
| 4855.883 | J | (3) | 3.35 | 5.90 | 4-3 | |
| 4843.155 | J | (3) | 3.38 | 5.93 | 3-2 | |
| 4838.519 | J | (2n) | 3.40 | 5.95 | 2-1 | |
| 5039.266 | V | (2) | 3.35 | 5.80 | 4-5 | |
| 5002.800 | J | (6) | 3.38 | 5.85 | 3-4 | |
| 4950.112 | J | (2) | 3.40 | 5.90 | 2-3 | |
| 4907.743 | K | (1) | 3.42 | 5.93 | 1-2 | |
| 4741.081 | J | (1) | 3.32 | 5.92 | 5-4 | $z^5F^o$-$e^3F$ |
| 4879.229 | V | (1) | 3.35 | 5.99 | 4-3 | (688) |
| 4642.58 | P | ⊙ | 3.38 | 6.04 | 3-2 | |
| 4807.725 | K | (2) | 3.35 | 5.92 | 4-4 | |
| 4729.899 | V | (1) | 3.38 | 5.99 | 3-3 | |
| 4678.41 | P | ⊙ | 3.40 | 6.04 | 2-2 | |
| 4860.98 | P | (1) | 3.38 | 5.92 | 3-4 | |
| 4788.87 | P | ⊙ | 3.40 | 5.99 | 2-3 | |
| 4701.90 | P | ⊙ | 3.42 | 6.04 | 1-2 | |
| 4259.988 | V | (2) | 3.32 | 6.21 | 5-6 | $z^5F^o$-$e^7F$ |
| 4224.176 | J | 6n | 3.35 | 6.28 | 4-5 | (689) |
| 4200.930 | J | 3n | 3.38 | 6.32 | 3-4 | |
| *4238.027 | J | 4 | 3.40 | 6.31 | 2-3 | |
| 4224.509 | V | 3n | 3.42 | 6.34 | 1-2 | |
| 4173.641 | V | (1) | 3.32 | 6.28 | 5-5 | |
| 4161.080 | V | (1) | 3.35 | 6.32 | 4-4 | |
| *4208.610 | J | 3n | 3.38 | 6.31 | 3-3 | |
| 4205.548 | J | (2) | 3.40 | 6.34 | 2-2 | |
| 4246.59 | P | (1) | 3.42 | 6.32 | 1-1 | |
| 4111.06 | P | (1) | 3.32 | 6.32 | 5-4 | |
| 4168.625 | V | (1w) | 3.35 | 6.31 | 4-3 | |
| m4176.57 | P | Fe | 3.38 | 6.34 | 3-2 | |
| m4227.42 | P | Fe | 3.40 | 6.32 | 2-1 | |
| 4253.52 | P | ⊙ | 3.32 | 6.22 | 5-5 | $z^5F^o$-$f^7D$ |
| 4228.71 | P | ⊙ | 3.35 | 6.27 | 4-4 | (690) |
| 4177.07 | P | (1) | 3.32 | 6.27 | 5-4 | |
| 4256.212 | V | (3) | 3.40 | 6.30 | 3-1 | |
| 4307.08 | P | ⊙ | 3.35 | 6.22 | 4-5 | |
| 4289.87 | P | ⊙ | 3.38 | 6.27 | 3-4 | |
| 4245.358 | M | tr? | 3.32 | 6.22 | 5-4 | $z^5F^o$-$f^5D$ |
| 4278.234 | J | (1) | 3.35 | 6.24 | 4-3 | (691) |
| 4320.38 | P | (1) | 3.38 | 6.24 | 3-3 | |
| 4320.52 | U | (1) | 3.40 | 6.26 | 2-2 | |
| 4306.58 | P | (1) | 3.42 | 6.28 | 1-1 | |
| 4341.23 | P | ⊙ | 3.38 | 6.22 | 3-4 | |
| 4351.37 | P | ⊙ | 3.40 | 6.24 | 2-3 | |
| *4340.51 | P | (1) | 3.42 | 6.26 | 1-2 | |
| m4235.96 | P | Fe | 3.32 | 6.23 | 5-4 | $z^5F^o$-$e^7P$ |
| 4264.209 | J | (2) | 3.35 | 6.25 | 4-3 | (692) |
| 4336.86 | P | ⊙ | 3.40 | 6.25 | 2-3 | |
| 4227.434 | J | 30 | 3.32 | 6.24 | 5-6 | $z^5F^o$-$e^5G$ |
| 4247.432 | I | 12 | 3.35 | 8.26 | 4-5 | (693) |
| 4238.816 | I | 10n | 3.38 | 6.29 | 3-4 | |
| 4225.460 | J | 6n | 3.40 | 6.32 | 2-3 | |
| 4217.551 | J | 7n | 3.42 | 6.34 | 1-2 | |
| 4195.337 | J | 5 | 3.32 | 6.26 | 5-5 | |
| 4198.268 | V | (1) | 3.35 | 8.29 | 4-4 | |
| 4198.218 | J | 4 | 3.38 | 6.32 | 3-3 | |
| 4198.645 | J | 4n | 3.40 | 8.34 | 2-2 | |
| 4147.34 | P | ⊙ | 3.32 | 8.29 | 5-4 | |
| 4158.460 | V | (1) | 3.35 | 6.32 | 4-3 | |
| 4189.777 | V | (1) | 3.38 | 8.34 | 3-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 4149.372 | J | 5n | 3.32 | 6.29 | 5-6 | $z^5F^o$-$e^7G$ |
| 4154.812 | J | 9n | 3.35 | 6.32 | 4-5 | (894) |
| 4175.89 | P | ⊙ | 3.38 | 6.34 | 3-4 | |
| 4182.790 | V | (2b,gn) | 3.40 | 8.35 | 2-3 | |
| 4187.59 | W | (1) | 3.42 | 6.36 | 1-2 | |
| 4104.97 | U | (1) | 3.32 | 6.32 | 5-5 | |
| 4136.512 | J | (1) | 3.35 | 6.34 | 4-4 | |
| 4154.109 | J | (1) | 3.38 | 6.35 | 3-3 | |
| 4168.942 | V | (1w) | 3.40 | 6.36 | 2-2 | |
| 4087.099 | J | (1) | 3.32 | 6.34 | 5-4 | |
| •4140.441 | V | (1) | 3.38 | 6.36 | 3-2 | |
| 4164.24 | P | ⊙ | 3.40 | 6.37 | 2-1 | |
| 4126.192 | J | 3n | 3.32 | 6.31 | 5-5 | $z^5F^o$-$f^5F$ |
| 4114.957 | J | (1w) | 3.35 | 8.35 | 4-4 | (695) |
| 4129.46 | P | ⊙ | 3.36 | 6.37 | 3-3 | |
| •4140.441 | V | (1) | 3.40 | 6.38 | 2-2 | |
| 4150.358 | J | (4) | 3.42 | 6.39 | 1-1 | |
| 4066.02 | P | ⊙ | 3.32 | 8.35 | 5-4 | |
| 4090.984 | V | (1w) | 3.35 | 6.37 | 4-3 | |
| 4112.35 | V | (1) | 3.38 | 6.38 | 3-2 | |
| 4131.94 | P | ⊙ | 3.40 | 6.39 | 2-1 | |
| 4176.571 | J | 7n | 3.35 | 6.31 | 4-5 | |
| 4153.906 | J | 10n | 3.38 | 6.35 | 3-4 | |
| 4157.788 | J | 8n | 3.40 | 6.37 | 2-3 | |
| 4158.798 | J | 5n | 3.42 | 6.38 | 1-2 | |
| •4208.610 | J | 3n | 3.38 | 6.31 | 3-2 | $z^5F^o$-$e^5S$ |
| •4238.057 | J | 4 | 3.40 | 8.31 | 2-2 | (696) |
| 4143.50 | P | ⊙ | 3.35 | 8.33 | 4-3 | $z^5F^o$-$e^3D$ |
| 4106.437 | V | (1) | 3.38 | 8.39 | 3-2 | (697) |
| 4083.780 | J | (1) | 3.40 | 6.42 | 2-1 | |
| 4183.025 | V | (1) | 3.38 | 6.33 | 3-3 | |
| •4134.433 | V | (1) | 3.40 | 6.39 | 2-2 | |
| 4212.06 | P | ⊙ | 3.40 | 6.33 | 2-3 | |
| 4084.498 | J | 6 | 3.32 | 6.22 | 5-4 | $z^5F^o$-$g^5D$ |
| 4063.286 | J | (3) | 3.35 | 6.24 | 4-3 | (698) |
| 4054.833 | V | (1) | 3.38 | 6.26 | 3-2 | |
| 4054.883 | V | 3 | 3.40 | 8.28 | 2-1 | |
| 4065.402 | V | (2) | 3.42 | 6.29 | 1-0 | |
| 4133.869 | J | (2) | 3.35 | 6.22 | 4-4 | |
| 4101.272 | J | (1) | 3.38 | 8.24 | 3-3 | |
| 4082.125 | J | (1) | 3.40 | 6.28 | 2-2 | |
| 4072.518 | V | (2) | 3.42 | 6.28 | 1-1 | |
| 4173.18 | P | ⊙ | 3.38 | 6.22 | 3-4 | |
| 4129.22 | U | (1) | 3.40 | 6.24 | 2-3 | |
| 4099.99 | P | ⊙ | 3.42 | 6.26 | 1-2 | |
| •4163.678 | V | (1) | 3.40 | 6.37 | 2-3 | $z^5F^o$-$e^7S$ (899) |
| •4052.312 | J | (1) | 3.35 | 8.40 | 4-3 | $z^5F^o$-$e^5P$ |
| 4051.923 | J | (2) | 3.38 | 6.43 | 3-2 | (700) |
| 4090.085 | V | (1) | 3.38 | 8.40 | 3-3 | |
| 4079.18 | P | ⊙ | 3.40 | 6.43 | 2-2 | |
| 4105.08 | P | ⊙ | 3.42 | 8.42 | 1-1 | |
| •4117.872 | V | (1) | 3.40 | 6.40 | 2-3 | |
| 4097.02 | P | ⊙ | 3.42 | 8.43 | 1-2 | |
| 3817.84 | W | 3n | 3.32 | 8.55 | 5-5 | $z^5F^o$-$g^5F$ |
| 3811.80 | P | ⊙ | 3.35 | 8.59 | 4-4 | (701) |
| 3860.74 | P | ⊙ | 3.35 | 8.55 | 4-5 | |
| 3845.21 | P | ⊙ | 3.38 | 8.59 | 3-4 | |
| 3804.013 | J | (2) | 3.32 | 6.58 | 5-4 | $z^5F^o$-$h^5D$ |
| 3789.82 | P | ⊙ | 3.35 | 6.61 | 4-3 | (702) |
| 3846.001 | V | (1w) | 3.35 | 6.56 | 4-3 | $z^5F^o$-$f^5P$ |
| 3819.50 | P | ⊙ | 3.38 | 6.61 | 3-2 | (703) |
| 3791.73 | U | (1) | 3.40 | 6.86 | 2-1 | |
| 3843.72 | P | ⊙ | 3.40 | 6.81 | 2-2 | |
| 3905.01 | P | ⊙ | 3.40 | 8.56 | 2-3 | |
| 3801.975 | J | (2w) | 3.32 | 6.56 | 5-8 | $z^5F^o$-$f^5G$ |
| 3758.11 | P | ⊙ | 3.40 | 6.89 | 2-3 | (704) |
| 3742.937 | V | (0) | 3.42 | 6.71 | 1-2 | |
| 3785.78 | P | ⊙ | 3.32 | 6.58 | 5-5 | |
| 3717.19 | P | ⊙ | 3.32 | 8.64 | 5-4 | |
| 3703.43 | P | ⊙ | 3.35 | 6.69 | 4-3 | |
| 3705.28 | P | ⊙ | 3.38 | 8.71 | 3-2 | |
| •3731.276 | V | 2 | 3.32 | 6.83 | 5-5 | $z^5F^o$-$e^3G$ |
| •3716.442 | G | 12 | 3.35 | 6.87 | 4-4 | (705) |
| 3762.205 | V | (1) | 3.35 | 6.83 | 4-5 | |
| 3727.53 | P | ⊙ | 3.40 | 6.71 | 2-3 | |
| 3761.06 | P | ⊙ | 3.35 | 6.84 | 4-3 | $z^5F^o$-$f^3D$ |
| 3717.84 | P | ⊙ | 3.40 | 8.72 | 2-1 | (706) |
| •3895.507 | V | (1) | 3.40 | 6.74 | 2-2 | $z^5F^o$-$g^7D$ |
| 3891.53 | P | ⊙ | 3.42 | 8.76 | 1-1 | (707) |
| •3740.061 | V | (1) | 3.38 | 6.88 | 3-4 | |
| 3722.77 | P | ⊙ | 3.40 | 6.72 | 2-3 | |
| 3416.52 | P | ⊙ | 3.35 | 6.97 | 4-5 | $z^5F^o$-1 (708) |
| 3380.004 | V | (1) | 3.32 | 6.97 | 5- | $z^5F^o$-2 (709) |
| •3243.406 | V | 3 | 3.32 | 7.12 | 5-4 | $z^5F^o$-$i^5D$ |
| 3262.009 | V | (2) | 3.35 | 7.14 | 4-3 | (710) |
| 3269.240 | V | (1w) | 3.38 | 7.16 | 3-2 | |
| 3274.452 | V | (2w) | 3.35 | 7.12 | 4-4 | |
| 3286.463 | V | (2w) | 3.38 | 7.14 | 3-3 | |
| 3299.079 | V | (1w) | 3.38 | 7.12 | 3-4 | |
| 3304.36 | P | ⊙ | 3.40 | 7.14 | 2-3 | |
| 3211.693 | V | 6 | 3.32 | 7.16 | 5-6 | $z^5F^o$-$g^5G$ |
| •3214.044 | V | 20 | 3.35 | 7.19 | 4-5 | (711) |
| •3211.872 | V | 4 | 3.38 | 7.22 | 3-4 | |
| •3209.297 | G | 6 | 3.40 | 7.25 | 2-3 | |
| 3208.470 | G | 4 | 3.42 | 7.26 | 1-2 | |
| •3192.417 | U | (1) | 3.38 | 7.25 | 3-3 | |
| 3197.53 | W | (1) | 3.40 | 7.26 | 2-2 | |
| 3281.332 | V | (2) | 3.40 | 7.19 | 2-2 | $z^5F^o$-4 |
| 3272.71 | U | (1) | 3.42 | 7.19 | 1-2 | (712) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 8978.17 | P | ⊙ | 3.40 | 4.77 | 1-2 | $a^1P$-$y^3D^o$ |
| 8729.12 | P | 2 | 3.40 | 4.61 | 1-1 | (713) |
| 5551.29 | P | ⊙ | 3.40 | 5.82 | 1-1 | $a^1P$-$x^3D^o$ (714) |
| 5245.72 | P | ⊙ | 3.40 | 5.75 | 1-1 | $a^1P$-$z^3S^o$ (715) |
| 5228.08 | P | (1) | 3.40 | 5.78 | 1-0 | $a^1P$-$y^3P^o$ (716) |
| 5167.70 | P | ⊙ | 3.40 | 5.79 | 1-2 | $a^1P$-$u^5D^o$ |
| 5091.73 | P | ⊙ | 3.40 | 5.82 | 1-1 | (717) |
| 5029.823 | V | (1) | 3.40 | 5.85 | 1-2 | $a^1P$-1° (718) |
| 4818.88 | P | ⊙ | 3.40 | 5.98 | 1-1 | $a^1P$-$v^5P^o$ (719) |
| 4815.22 | P | ⊙ | 3.40 | 5.96 | 1-2 | $a^1P$-$x^3P^o$ |
| 4779.444 | J | (1) | 3.40 | 5.98 | 1-0 | (720) |
| 4804.59 | P | (1) | 3.40 | 5.97 | 1-1 | $a^1P$-$v^5F^o$ (721) |
| 4647.72 | P | ⊙ | 3.40 | 6.08 | 1-2 | $a^1P$-2° (722) |
| 4566.990 | V | (1) | 3.40 | 6.10 | 1-2 | $a^1P$-$w^3F^o$ (723) |
| 4607.08 | P | ⊙ | 3.40 | 6.08 | 1-2 | $a^1P$-$v^3D^o$ (724) |
| 4461.37 | W | (1) | 3.40 | 6.17 | 1-0 | $a^1P$-$w^3P^o$ (725) |
| 4137.002 | J | 7 | 3.40 | 8.38 | 1-2 | $a^1P$-$y^1D^o$ (726) |
| •4127.807 | J | 3n | 3.40 | 8.39 | 1-2 | $a^1P$-$x^1D^o$ (727) |
| •4038.622 | Q | (-) | 3.40 | 6.46 | 1-2 | $a^1P$-$u^3D^o$ |
| 4003.764 | J | 2 | 3.40 | 6.48 | 1-1 | (728) |
| 3978.615 | J | 4 | 3.40 | 8.50 | 1-2 | $a^1P$-$t^3P^o$ |
| 4057.66 | P | ⊙ | 3.40 | 6.44 | 1-1? | (729) |
| 3949.14 | W | (1) | 3.40 | 6.53 | 1-1 | $a^1P$-8° (730) |
| 3940.044 | V | (1) | 3.40 | 6.53 | 1-2 | $a^1P$-$v^3P^o$ |
| 3806.203 | J | 2 | 3.40 | 6.64 | 1-1 | (731) |
| 3885.07 | P | ⊙? | 3.40 | 6.58 | 1-2 | $a^1P$-$s^3D^o$ (732) |
| 3891.928 | J | 3 | 3.40 | 6.57 | 1-1 | $a^1P$-$z^1P^o$ (733) |
| 3543.869 | J | (4) | 3.40 | 6.88 | 1-2 | $a^1P$-$w^1D^o$ (734) |
| 3410.171 | G | 3 | 3.40 | 7.02 | 1-2 | $a^1P$-$u^3F^o$ (735) |
| •3314.070§ | V | (1) | 3.40 | 7.12 | 1-2 | $a^1P$-$t^3F^o$ (738) |
| 9924.35 | P | ⊙ | 3.53 | 4.77 | 2-2 | $a^1D$-$y^3D^o$ |
| 9820.93 | P | ⊙ | 3.53 | 4.81 | 2-1 | (737) |
| 6018.66 | W | (2) | 3.53 | 5.58 | 2-3 | $a^1D$-$x^3D^o$ (738) |
| 5814.58 | P | ⊙? | 3.53 | 5.73 | 2-1 | $a^1D$-$w^5P^o$ (739) |
| 5555.17 | P | ⊙ | 3.53 | 5.75 | 2-1 | $a^1D$-$z^3S^o$ (740) |
| 5487.78 | P | ⊙ | 3.53 | 5.79 | 2-2 | $a^1D$-$u^5D^o$ |
| 5382.750 | T | (-) | 3.53 | 5.82 | 2-1 | (741) |
| 5275.30 | P | ⊙ | 3.53 | 5.87 | 2-1 | $a^1D$-$y^3S^o$ (742) |
| 5198.843 | V | (1) | 3.53 | 5.91 | 2-3 | $a^1D$-$x^3G^o$ (743) |
| 5078.53 | P | ⊙? | 3.53 | 5.96 | 2-1 | $a^1D$-$v^5P^o$ (744) |
| 5121.96 | P | ⊙? | 3.53 | 5.94 | 2-3 | $a^1D$-$v^5F^o$ |
| 5091.72 | P | ⊙ | 3.53 | 5.96 | 2-2 | (745) |
| •5031.030 | R | 2 | 3.53 | 5.98 | 2-3 | $a^1D$-$w^3G^o$ (746) |
| 5020.819 | U | (1) | 3.53 | 5.99 | 2-1 | $a^1D$-$x^3P^o$ (748) |
| •4889.009 | U | (1) | 3.53 | 6.08 | 2-2 | $a^1D$-2° (749) |
| 4844.018 | V | (2) | 3.53 | 6.08 | 2-3 | $a^1D$-$w^3F^o$ (750) |
| 4869.45 | P | ⊙ | 3.53 | 8.07 | 2-3 | $a^1D$-$v^3D^o$ (751) |
| 4705.464 | J | (1) | 3.53 | 6.15 | 2-3 | $a^1D$-$v^3G^o$ (758) |
| 4789.654 | B | 7 | 3.53 | 6.11 | 2-2 | $a^1D$-$z^1D^o$ (753) |
| 4632.14 | P | ⊙ | 3.53 | 6.20 | 2-2 | $a^1D$-$w^3P^o$ |
| 4683.183 | J | (1) | 3.53 | 6.16 | 2-1 | (754) |
| 4547.651 | B | 4 | 3.53 | 6.24 | 2-3 | $a^1D$-$z^1F^o$ (755) |
| 4343.68 | P | ⊙ | 3.53 | 8.37 | 2-3 | $a^1D$-$u^5F^o$ |
| 4304.87 | P | ⊙ | 3.53 | 6.40 | 2-2 | (758) |
| 4393.31 | P | ⊙ | 3.53 | 8.34 | 2-3 | $a^1D$-$v^3F^o$ |
| 4424.194 | V | (1) | 3.53 | 6.32 | 2-2 | (757) |
| 4378.73 | P | ⊙ | 3.53 | 6.35 | 2- | $a^1D$-5° (759) |
| 4305.80 | U | (1) | 3.53 | 6.40 | 2-3 | $a^1D$-$u^3G^o$ (760) |
| 4327.100 | J | 3 | 3.53 | 8.36 | 2-2 | $a^1D$-$y^1D^o$ (781) |
| 4317.04 | P | (1) | 3.53 | 8.39 | 2-2 | $a^1D$-$x^1D^o$ (762) |
| 4219.59 | P | ⊙ | 3.53 | 6.48 | 2-2 | $a^1D$-$u^3D^o$ |
| 4161.55 | P | ⊙ | 3.53 | 6.48 | 2-1 | (763) |
| 4151.957 | V | (1) | 3.53 | 6.50 | 2-2 | $a^1D$-$t^3D^o$ |
| 4240.372 | J | (2) | 3.53 | 6.44 | 2-1? | (764) |
| 4122.00 | P | ⊙ | 3.53 | 6.53 | 2-1 | $a^1D$-6° (765) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 4112.09 | P | ⊙ | 3.53 | 8.53 | 2-2 | $a^1D$-$v^3P^o$ |
| •3966.532 | V | (1n) | 3.53 | 8.64 | 2-1 | (766) |
| 4059.728 | V | 3 | 3.53 | 8.57 | 2-1 | $a^1D$-$z^1P^o$ (787) |
| 3989.859 | J | (2d) | 3.53 | 8.82 | 2-3 | $a^1D$-$y^1F^o$ (768) |
| 3973.855 | J | 3 | 3.53 | 8.84 | 2-3 | $a^1D$-$x^1F^o$ (789) |
| 3953.50 | P | ⊙ | 3.53 | 6.65 | 2-3 | $a^1D$-10° (770) |
| 3645.692 | J | (1) | 3.53 | 8.74 | 2-3 | $a^1D$-$t^3G^o$ (771) |
| 3682.228 | J | 20 | 3.53 | 6.88 | 2-2 | $a^1D$-$w^1D^o$ (772) |
| 3677.309 | J | 2 | 3.53 | 8.89 | 2-3 | $a^1D$-$w^1F^o$ (773) |
| 3636.23 | W | (1) | 3.53 | 8.93 | 2-3 | $a^1D$-$e^3G^o$ (774) |
| 3538.31 | W | (1) | 3.53 | 7.02 | 2-2 | $a^1D$-$u^3F^o$ (775) |
| •3442.979 | V | (1) | 3.53 | 7.12 | 2-3 | $a^1D$-$t^3F^o$ |
| 3434.95 | P | ⊙ | 3.53 | 7.12 | 2-2 | (778) |
| 7094.30 | P | ⊙ | 3.56 | 5.30 | 5-5 | $a^1H$-$y^5G^o$ (778) |
| 6019.38 | P | ⊙ | 3.58 | 5.61 | 5-4 | $a^1H$-$y^3G^o$ (780) |
| 5913.35 | P | ⊙ | 3.58 | 5.64 | 5-5 | $a^1H$-$x^5G^o$ (781) |
| 5584.788 | V | (1) | 3.56 | 5.77 | 5-4 | $a^1H$-$u^5D^o$ (782) |
| 5532.752 | V | (1) | 3.56 | 5.79 | 5-4 | $a^1H$-$x^5F^o$ (783) |
| •5466.993 | V | (1) | 3.56 | 5.82 | 5-4 | $a^1H$-$z^3H^o$ (784) |
| 5374.78 | P | ⊙ | 3.56 | 5.85 | 5-5 | $a^1H$-$w^5G^o$ |
| •5336.154 | V | (1) | 3.56 | 5.87 | 5-4 | (785) |
| 5365.403 | J | 3 | 3.56 | 5.86 | 5-4 | $a^1H$-$z^1G^o$ (786) |
| 5231.41 | U | (1) | 3.56 | 5.92 | 5-4 | $a^1H$-$v^5F^o$ (787) |
| 5257.65 | P | ⊙ | 3.56 | 5.91 | 5-5 | $a^1H$-$x^3G^o$ |
| 5263.874 | V | (1) | 3.56 | 5.90 | 5-4 | (788) |
| 5150.19 | P | ⊙ | 3.56 | 5.95 | 5-5 | $a^1H$-$w^3G^o$ |
| 5115.788 | T | (1) | 3.56 | 5.97 | 5-4 | (789) |
| m5110.38 | P | Fe | 3.56 | 5.97 | 5-5 | $a^1H$-$z^1H^o$ (790) |
| 5028.129 | J | 4 | 3.56 | 6.01 | 5-4 | $a^1H$-$y^1G^o$ (791) |
| 4927.42 | W | (1) | 3.56 | 6.06 | 5-4 | $a^1H$-$w^3F^o$ (792) |
| 4849.87 | P | ⊙ | 3.56 | 6.10 | 5-6 | $a^1H$-$y^3H^o$ |
| 4809.94 | V | (1) | 3.56 | 6.12 | 5-5 | (793) |
| 4843.39 | P | ⊙ | 3.56 | 6.11 | 5-5 | $a^1H$-$v^3G^o$ |
| 4804.539 | V | (1) | 3.56 | 6.13 | 5-4 | (794) |
| 4587.132 | J | (2) | 3.56 | 6.25 | 5-4 | $a^1H$-$x^1G^o$ (795) |
| 4502.592 | V | (1) | 3.56 | 6.30 | 5-6 | $a^1H$-$x^3H^o$ |
| 4493.37 | P | (1) | 3.58 | 6.30 | 5-5 | (796) |
| 4432.572 | J | (3) | 3.56 | 6.34 | 5-5 | $a^1H$-$u^3G^o$ |
| 4375.48 | P | ⊙ | 3.56 | 6.38 | 5-4 | (797) |
| 4425.662 | V | (1) | 3.56 | 6.35 | 5-4 | $a^1H$-4° (798) |
| 4382.777 | V | (2) | 3.56 | 6.37 | 5-5 | $a^1H$-6° (799a) |
| 4201.73 | W | (1) | 3.56 | 6.50 | 5-5 | $a^1H$-$w^3H^o$ |
| 4174.419 | U | (1) | 3.56 | 6.51 | 5-4 | (799) |
| 4219.364 | B | 12 | 3.56 | 6.48 | 5-6 | $a^1H$-$y^3I^o$ (800) |
| 4118.549 | B | 15 | 3.58 | 6.55 | 5-6 | $a^1H$-$z^1I^o$ (801) |
| 4014.534 | B | 10 | 3.56 | 6.63 | 5-5 | $a^1H$-$y^1H^o$ (802) |
| 3972.920 | V | (1) | 3.56 | 6.66 | 5-5 | $a^1H$-$t^3G^o$ (803) |
| 3848.412 | J | 2 | 3.56 | 8.77 | 5-4 | $a^1H$-$w^1G^o$ (804) |
| •3748.492§ | V | 7 | 3.56 | 6.85 | 5-6 | $a^1H$-$v^3H^o$ |
| 3758.939 | J | 4 | 3.56 | 6.84 | 5-5 | (605) |
| 3743.468 | J | 6 | 3.56 | 6.85 | 5-5 | $a^1H$-$x^1H^o$ (808) |
| 3690.730 | J | 4 | 3.56 | 6.90 | 5-5 | $a^1H$-$s^3G^o$ (807) |
| 3627.05 | W | (1) | 3.58 | 6.96 | 5-5 | $a^1H$-$u^3H^o$ |
| 3621.718 | V | (2) | 3.56 | 6.97 | 5-4 | (606) |
| 3599.824 | G | 3 | 3.56 | 8.99 | 5-4 | $a^1H$-$u^3F^o$ (809) |
| 3553.741 | G | 8 | 3.58 | 7.03 | 5-4 | $a^1H$-$v^1G^o$ (610) |
| 3538.77 | W | (1) | 3.56 | 7.05 | 5-8 | $a^1H$-$x^3I^o$ |
| 3534.52 | W | (1) | 3.56 | 7.05 | 5-5 | (811) |
| •3479.883 | V | (1) | 3.56 | 7.10 | 5-4 | $a^1H$-$t^3F^o$ (812) |
| 3169.09 | P | ⊙ | 3.56 | 7.45 | 5-6 | $a^1H$-$t^3H^o$ (813) |
| 8461.41 | P | ⊙ | 3.59 | 5.05 | 3-3 | $z^5P^o$-X |
| 8767.65 | P | ⊙ | 3.84 | 5.05 | 2-3 | (614) |
| •7088.76 | V | 2 | 3.59 | 5.33 | 3-4 | $z^5P^o$-$e^7I$ |
| 7156.502 | V | 1 | 3.64 | 5.36 | 2-3 | (615) |
| 6953.01 | P | ⊙ | 3.59 | 5.36 | 3-3 | |
| 7057.96 | P | ⊙ | 3.84 | 5.39 | 2-2 | |
| 7125.00 | P | ⊙? | 3.67 | 5.40 | 1-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 6400.010 | I | 600 | 3.59 | 5.52 | 3-4 | $z^5p^o$-$e^5D$ |
| 6411.656 | I | 400 | 3.64 | 5.56 | 2-3 | (616) |
| 6406.031 | I | 60 | 3.67 | 5.60 | 1-2 | |
| 6246.334 | K | 15 | 3.59 | 5.56 | 3-3 | |
| 6301.515 | K | 15 | 3.64 | 5.60 | 2-2 | |
| 6336.835 | K | 12 | 3.67 | 5.62 | 1-1 | |
| 6141.734 | K | 4 | 3.59 | 5.60 | 3-2 | |
| 6232.661 | K | 5 | 3.64 | 5.62 | 2-1 | |
| 6302.507 | K | 6 | 3.67 | 5.63 | 1-0 | |
| 5456.48 | W | (1) | 3.59 | 5.65 | 3-4 | $z^5p^o$-$e^5F$ |
| *5466.993 | V | (1) | 3.64 | 5.90 | 2-3 | (617) |
| 5461.60 | P | ⊙ | 3.67 | 5.93 | 1-2 | |
| 5346.34 | P | ⊙ | 3.59 | 5.90 | 3-3 | |
| 5364.22 | P | ⊙ | 3.64 | 5.93 | 2-2 | |
| 5331.20 | P | ⊙ | 3.64 | 5.95 | 2-1 | |
| 5266.24 | P | ⊙ | 3.59 | 5.92 | 3-4 | $z^5p^o$-$e^3F$ |
| 5133.22 | P | ⊙ | 3.59 | 5.99 | 3-3 | (616) |
| 4516.27 | P | ⊙ | 3.59 | 6.32 | 3-4 | $z^5p^o$-$e^7F$ |
| m4611.29 | P | Fe | 3.64 | 6.31 | 2-3 | (619) |
| 4626.69 | P | ⊙ | 3.67 | 6.34 | 1-2 | |
| m4525.15 | P | Fe | 3.59 | 6.31 | 3-3 | |
| 4573.66 | P | (1) | 3.64 | 6.34 | 2-2 | |
| 4486.140 | J | (2n) | 3.59 | 6.34 | 3-2 | |
| 4596.74 | P | ⊙ | 3.64 | 6.32 | 2-1 | |
| 4596.059 | K | (2n) | 3.59 | 6.27 | 3-4 | $z^5p^o$-$f^7D$ |
| 4673.169 | J | (4) | 3.64 | 6.26 | 2-3 | (620) |
| 4701.052 | J | (1) | 3.67 | 6.30 | 1-2 | |
| 4584.733 | V | (1) | 3.59 | 6.26 | 3-3 | |
| 4643.468 | J | (2) | 3.64 | 6.30 | 2-2 | |
| 4690.146 | J | (3) | 3.67 | 6.30 | 1-1 | |
| *4556.139 | J | 4n | 3.59 | 6.30 | 3-2 | |
| 4632.63 | P | ⊙ | 3.64 | 6.30 | 2-1 | |
| 4676.852 | B | 7 | 3.59 | 6.22 | 3-4 | $z^5p^o$-$f^5D$ |
| *4745.606 | B | 3n | 3.64 | 6.24 | 2-3 | (621) |
| 4766.334 | V | (1) | 3.67 | 6.26 | 1-2 | |
| *4654.626 | J | 5 | 3.59 | 6.24 | 3-3 | |
| 4709.092 | J | (3) | 3.64 | 6.26 | 2-2 | |
| 4727.405 | J | 3n | 3.67 | 6.26 | 1-1 | |
| 4619.294 | J | 3n | 3.59 | 6.26 | 3-2 | |
| 4669.174 | J | (4) | 3.64 | 6.26 | 2-1 | |
| 4704.958 | J | (5) | 3.67 | 6.29 | 1-0 | |
| 4667.459 | B | 6 | 3.59 | 6.23 | 3-4 | $z^5p^o$-$e^7P$ |
| 4726.555 | J | 3n | 3.64 | 6.25 | 2-3 | (622) |
| 4636.016 | J | 3 | 3.59 | 6.25 | 3-3 | |
| 4673.26 | P | ⊙ | 3.64 | 6.26 | 2-2 | |
| 4564.624 | K | (2) | 3.59 | 6.26 | 3-2 | |
| 4560.096 | J | (2) | 3.59 | 6.29 | 3-4 | $z^5p^o$-$e^5G$ |
| 4596.433 | U | (1) | 3.64 | 6.32 | 2-3 | (623) |
| 4510.62 | P | ⊙ | 3.59 | 6.32 | 3-3 | |
| 4564.715 | V | (1) | 3.64 | 6.34 | 2-2 | |
| 4480.27 | P | ⊙ | 3.59 | 6.34 | 3-2 | |
| 4487.36 | P | ⊙ | 3.59 | 6.34 | 3-4 | $z^5p^o$-$e^7G$ |
| 4482.20 | P | ⊙ | 3.59 | 6.35 | 3-3 | (624) |
| *4461.989 | J | (4) | 3.59 | 6.35 | 3-4 | $z^5p^o$-$f^5F$ |
| 4516.45 | P | ⊙ | 3.64 | 6.37 | 2-3 | (625) |
| 4433.793 | J | (3n) | 3.59 | 6.37 | 3-3 | |
| 4495.966 | J | (1) | 3.64 | 6.36 | 2-2 | |
| 4414.03 | P | ⊙ | 3.59 | 6.36 | 3-2 | |
| 4485.97 | P | ⊙ | 3.64 | 6.39 | 2-1 | |
| 4525.142 | I | 5n | 3.59 | 6.31 | 3-2 | $z^5p^o$-$e^5G$ |
| 4611.265 | I | 5n | 3.64 | 6.31 | 2-2 | (626) |
| 4666.07 | P | ⊙ | 3.67 | 6.31 | 1-2 | |
| 4495.566 | J | (1) | 3.59 | 6.33 | 3-3 | $z^5p^o$-$e^3D$ |
| *4486.917 | J | (2) | 3.64 | 6.39 | 2-2 | (627) |
| 4481.631 | J | (2) | 3.67 | 6.42 | 1-1 | |
| 4580.600 | K | (2) | 3.64 | 6.33 | 2-3 | |
| 4542.730 | V | (1) | 3.67 | 6.39 | 1-2 | |
| 4484.227 | I | 4 | 3.59 | 6.34 | 3-4 | $z^5p^o$-$g^5D$ |
| 4462.750 | V | (2) | 3.64 | 6.39 | 2-3 | (628) |
| *4479.613 | J | (3) | 3.67 | 6.43 | 1-2 | |
| 4401.293 | J | (5) | 3.59 | 6.39 | 3-3 | |
| m4427.30 | P | Fe | 3.64 | 6.43 | 2-2 | |
| 4446.642 | J | (2) | 3.67 | 6.45 | 1-1 | |
| 4347.654 | V | (1) | 3.59 | 6.43 | 3-2 | |
| 4395.266 | V | (2) | 3.64 | 6.45 | 2-1 | |
| 4436.353 | K | (2) | 3.67 | 6.45 | 1-0 | |
| 4440.479 | V | (1) | 3.59 | 6.37 | 3-3 | $z^5p^o$-$e^7G$ |
| 4523.403 | J | (2) | 3.64 | 6.37 | 2-3 | (629) |
| 4366.412 | J | 4n | 3.59 | 6.40 | 3-3 | $z^5p^o$-$e^5P$ |
| 4423.656 | V | (21) | 3.64 | 6.43 | 2-2 | (630) |
| 4485.679 | J | (2) | 3.67 | 6.42 | 1-1 | |
| 4433.223 | J | 3n | 3.64 | 6.42 | 2-1 | |
| 4469.381 | I | 5n | 3.64 | 6.40 | 2-3 | |
| 4476.062 | Q | (4) | 3.67 | 6.43 | 1-2 | |
| 4107.75 | P | ⊙ | 3.59 | 6.59 | 3-4 | $z^5p^o$-$g^5F$ |
| 4103.61 | P | ⊙ | 3.64 | 6.65 | 2-3 | (631) |
| 4035.25 | P | ⊙ | 3.59 | 6.65 | 3-3 | |
| 4147.49 | P | ⊙ | 3.59 | 6.56 | 3-3 | $z^5p^o$-$f^5P$ |
| 4148.27 | P | ⊙ | 3.64 | 6.61 | 2-2 | (632) |
| 4087.79 | P | ⊙ | 3.64 | 6.66 | 2-1 | |
| 4219.74 | P | ⊙ | 3.64 | 6.56 | 2-3 | |
| 4117.71 | U | (1) | 3.64 | 6.64 | 2-3 | $z^5p^o$-$f^3D$ |
| 4106.31 | P | ⊙ | 3.67 | 6.67 | 1-2 | (633) |
| 3901.03 | P | ⊙? | 3.59 | 6.75 | 3-4 | $z^5p^o$-$f^3F$ |
| 3696.63 | P | ⊙ | 3.64 | 6.61 | 2-3 | (634) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 3490.47 | P | ⊙ | 3.59 | 7.12 | 3-4 | $z^5p^o$-$i^5D$ |
| 3526.96 | P | ⊙ | 3.64 | 7.14 | 2-3 | (635) |
| *3476.336 | V | (2w) | 3.59 | 7.14 | 3-3 | |
| 3507.14 | P | ⊙ | 3.64 | 7.16 | 2-2 | |
| *3457.090 | V | (3w) | 3.59 | 7.16 | 3-2 | |
| 3426.746 | V | (2) | 3.59 | 7.19 | 3-2 | $z^5p^o$-4 |
| 3477.96 | P | ⊙ | 3.64 | 7.19 | 2-2 | (636) |
| 3510.16 | P | ⊙ | 3.67 | 7.19 | 1-2 | |
| 5961.36 | P | ⊙ | 3.62 | 5.66 | 6-6 | $a^1I$-$z^3I^o$ (637) |
| 5649.66 | V | (1) | 3.62 | 5.60 | 6-5 | $a^1I$-$z^3H^o$ (636) |
| *5536.54 | V | (1) | 3.62 | 5.65 | 6-6 | $a^1I$-$w^5G^o$ |
| 5521.14 | P | (1) | 3.62 | 5.65 | 6-5 | (639) |
| 5465.04 | P | (1) | 3.62 | 5.66 | 6-5 | $a^1I$-$v^5F^o$ (640) |
| 5397.60 | P | (1) | 3.62 | 5.91 | 6-5 | $a^1I$-$x^3G^o$ (641) |
| 5264.416 | T | (-) | 3.62 | 5.95 | 6-5 | $a^1I$-$w^3G^o$ (642) |
| 5242.495 | B | 4 | 3.62 | 5.97 | 6-5 | $a^1I$-$z^1H^o$ (643) |
| 4926.62 | P | ⊙ | 3.62 | 6.12 | 6-5 | $a^1I$-$y^3H^o$ (644) |
| 4961.906 | U | (1) | 3.62 | 6.11 | 6-5 | $a^1I$-$v^3G^o$ (645) |
| 4804.65 | P | ⊙ | 3.62 | 6.30 | 6-6 | $a^1I$-$x^3H^o$ |
| 4595.21 | P | ⊙ | 3.62 | 6.30 | 6-5 | (646) |
| *4531.633 | J | (2) | 3.62 | 6.34 | 6-5 | $a^1I$-$u^3G^o$ (647) |
| *4479.612 | J | (3) | 3.62 | 6.37 | 6-5 | $a^1I$-$6^o$ (648) |
| 4309.036 | J | (2) | 3.62 | 6.48 | 6-6 | $a^1I$-$y^3I^o$ |
| 4238.61 | P | ⊙ | 3.62 | 6.53 | 6-5 | (649) |
| 4203.953 | V | (1) | 3.62 | 6.55 | 6-6 | $a^1I$-$z^1I^o$ (650) |
| 4095.63 | P | ⊙ | 3.62 | 6.63 | 6-5 | $a^1I$-$y^1H^o$ (651) |
| *4053.312 | J | (1) | 3.62 | 6.66 | 6-5 | $a^1I$-$t^3G^o$ (652) |
| *4047.315 | V | (1) | 3.62 | 6.67 | 6-5 | $a^1I$-$12^o$ (653) |
| 3613.891 | V | 2 | 3.62 | 6.85 | 6-5 | $a^1I$-$x^1H^o$ (654) |
| 3759.155 | V | (1) | 3.62 | 6.90 | 6-5 | $a^1I$-$s^3G^o$ (655) |
| 3597.24 | P | ⊙ | 3.62 | 7.05 | 6-5 | $a^1I$-$x^3I^o$ (656) |
| 11355.97 | D | 1 | 3.63 | 4.71 | 3-3 | $b^3D$-$y^3D^o$ |
| 10725.19 | P | ⊙ | 3.62 | 4.77 | 2-3 | (656) |
| 10332.33 | P | ⊙ | 3.63 | 4.81 | 1-1 | |
| 7323.38 | P | ⊙? | 3.63 | 5.31 | 3-4 | $b^3D$-$y^5G^o$ |
| 7282.46 | P | ⊙? | 3.63 | 5.33 | 3-3 | (659) |
| 6749.52 | P | ⊙ | 3.63 | 5.45 | 3-2 | $b^3D$-$w^5D^o$ |
| 6603.67 | P | ⊙ | 3.62 | 5.49 | 1-0 | (660) |
| 6474.61 | V | (1) | 3.62 | 5.53 | 1-1 | $b^3D$-$w^5D^o$ (661) |
| 6603.20 | P | ⊙ | 3.63 | 5.49 | 3-2 | $b^3D$-$y^5G^o$ (662) |
| 6307.65 | P | ⊙ | 3.63 | 5.58 | 3-3 | $b^3D$-$x^3D^o$ |
| 6301.66 | P | ⊙ | 3.62 | 5.56 | 2-3 | (663) |
| 6043.736 | U | (1) | 3.63 | 5.67 | 3-3 | $b^3D$-$x^5G^o$ (664) |
| 5782.434 | V | (1) | 3.63 | 5.77 | 3-4 | $b^3D$-$u^5D^o$ |
| 5754.41 | V | (1) | 3.63 | 5.77 | 3-3 | (666) |
| 5702.434 | U | (1) | 3.62 | 5.79 | 2-2? | |
| 5707.25 | P | ⊙ | 3.63 | 5.79 | 3-2 | |
| 5609.97 | P | ⊙ | 3.62 | 5.62 | 2-1 | |
| *5600.242 | V | (1) | 3.62 | 5.62 | 1-0 | |
| 5780.351 | V | (1) | 3.63 | 5.77 | 3-2 | $b^3D$-$y^3P^o$ |
| 5698.05 | W | (1) | 3.62 | 5.79 | 2-1 | (667) |
| 5761.27 | W | (1) | 3.62 | 5.76 | 1-0 | |
| 5707.068 | V | (1) | 3.63 | 5.79 | 3-4 | $b^3D$-$x^3F^o$ |
| 5636.708 | V | (1) | 3.63 | 5.81 | 2-3 | (668) |
| 5566.61 | U | (1) | 3.62 | 5.64 | 1-1 | $b^3D$-$w^3D^o$ |
| 5660.79 | W | (1) | 3.62 | 5.60 | 2-3 | (669) |
| 5611.35 | P | ⊙ | 3.62 | 5.62 | 1-2 | |
| 5487.49 | P | ⊙ | 3.63 | 5.67 | 3-4 | $b^3D$-$w^5G^o$ |
| 5452.119 | U | (1) | 3.62 | 5.69 | 2-3 | (670) |
| 5411.39 | P | ⊙ | 3.62 | 5.90 | 2-2 | |
| 5539.28 | W | (1) | 3.63 | 5.65 | 3-2 | $b^3D$-$1^o$ |
| *5534.68 | W | (1) | 3.63 | 5.65 | 2-2 | (671) |
| 5529.15 | W | (2) | 3.63 | 5.66 | 3-4 | $b^3D$-$z^1G^o$ (672) |
| 5493.33 | P | ⊙ | 3.62 | 5.67 | 2-1 | $b^3D$-$y^3S^o$ |
| 5483.36 | P | ⊙ | 3.62 | 5.67 | 1-1 | (673) |
| 5431.40 | P | ⊙ | 3.63 | 5.90 | 3-4 | $b^3D$-$x^3G^o$ |
| 5414.91 | P | ⊙ | 3.63 | 5.91 | 3-3 | (674) |
| 5366.956 | T | (1) | 3.63 | 5.92 | 3-4 | $b^3D$-$v^5F^o$ |
| 5327.25 | P | ⊙ | 3.62 | 5.94 | 2-3 | (675) |
| 5284.27 | P | ⊙ | 3.62 | 5.96 | 1-2 | |
| 5394.555 | T | (-) | 3.62 | 5.96 | 2-2 | |
| 5253.25 | P | ⊙ | 3.62 | 5.97 | 1-1 | |
| 5396.769 | V | (1) | 3.63 | 5.96 | 3-2 | |
| 5315.76 | P | ⊙ | 3.62 | 5.95 | 2-2 | $b^3D$-$v^5P^o$ |
| 5270.06 | P | ⊙ | 3.62 | 5.96 | 1-1 | (677) |
| 5320.048 | V | (1) | 3.63 | 5.95 | 3-2 | |
| 5305.41 | P | ⊙ | 3.62 | 5.95 | 1-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 5260.364 | V | (1) | 3.63 | 5.96 | 3-2 | $b^3D$-$x^3P^o$ |
| 5217.927 | T | (2) | 3.62 | 5.99 | 2-1 | (860) |
| 5233.191 | V | (1) | 3.62 | 5.96 | 1-0 | |
| 5207.95 | P | (1) | 3.62 | 5.99 | 1-1 | |
| 5066.26 | P | ⊙ | 3.62 | 6.06 | 1-2 | $b^3D$-$2^o$ (662) |
| 5065.201 | V | (2) | 3.63 | 6.06 | 3-4 | $b^3D$-$w^3F^o$ |
| 5027.212 | V | (1) | 3.62 | 6.06 | 2-3 | (663) |
| 4970.496 | V | (2) | 3.63 | 6.10 | 1-2 | |
| *5031.030 | R | 2 | 3.63 | 6.06 | 3-3 | |
| 4979.56 | W | (1) | 3.62 | 6.10 | 2-2 | |
| 5056.50 | W | (1) | 3.63 | 6.07 | 3-3 | $b^3D$-$v^3D^o$ |
| 5054.647 | T | 1 | 3.62 | 6.07 | 2-3 | (664) |
| 5016.02 | P | ⊙ | 3.62 | 6.06 | 1-2 | |
| 5035.025 | R | 3 | 3.63 | 6.06 | 3-3 | $b^3D$-$3^o$ (665) |
| 4935.42 | P | ⊙ | 3.63 | 6.13 | 3-4 | $b^3D$-$v^3G^o$ (666) |
| 4968.709 | V | (1) | 3.62 | 6.11 | 2-2 | $b^3D$-$z^1D^o$ (667) |
| *4802.883 | J | (3) | 3.63 | 6.20 | 3-2 | $b^3D$-$w^3P^o$ |
| *4832.734 | J | (2) | 3.62 | 6.16 | 2-1 | (666) |
| *4845.656 | V | (2) | 3.62 | 6.17 | 1-0 | |
| 4799.413 | V | (1) | 3.63 | 6.20 | 2-2 | |
| 4824.162 | V | (1) | 3.62 | 6.16 | 1-1 | |
| 4706.972 | V | (1) | 3.62 | 6.24 | 2-3 | $b^3D$-$z^1P^o$ (669) |
| 4706.31 | P | ⊙ | 3.63 | 6.25 | 3-4 | $b^3D$-$x^1G^o$ (690) |
| 4490.63 | P | ⊙ | 3.62 | 6.37 | 2-3 | $b^3D$-$u^3F^o$ |
| 4448.97 | P | ⊙ | 3.62 | 6.40 | 2-2 | (691) |
| 4605.99 | P | ⊙ | 3.63 | 6.31 | 3-4 | $b^3D$-$t^5D^o$ |
| 4543.22 | P | ⊙ | 3.62 | 6.34 | 2-3 | (693) |
| 4481.04 | P | ⊙ | 3.62 | 6.37 | 1-2 | |
| 4419.30 | P | ⊙ | 3.62 | 6.41 | 1-0 | |
| *4556.106 | J | (1) | 3.63 | 6.33 | 3-4 | $b^3D$-$v^3P^o$ |
| 4542.422 | V | (2) | 3.62 | 6.34 | 2-3 | (694) |
| 4566.642 | V | (1) | 3.62 | 6.32 | 1-2 | |
| 4545.54 | P | ⊙ | 3.63 | 6.34 | 3-3 | |
| 4579.68 | P | ⊙ | 3.63 | 6.32 | 3-2 | |
| 4536.509 | U | (1) | 3.63 | 6.35 | 3-4 | $b^3D$-$4^o$ (696) |
| 4537.90 | P | (1) | 3.62 | 6.35 | 2- | $b^3D$-$5^o$ (697) |
| 4483.76 | P | ⊙ | 3.63 | 6.36 | 3-4 | $b^3D$-$u^3G^o$ |
| 4452.32 | P | ⊙ | 3.63 | 6.40 | 3-3 | (696) |
| 4479.01 | P | ⊙ | 3.63 | 6.36 | 3-3 | $b^3D$-$u^5P^o$ |
| 4425.79 | P | ⊙ | 3.62 | 6.41 | 2-2 | (699) |
| 4366.6 | W | (1w) | 3.62 | 6.43 | 1-1 | |
| 4426.74 | P | ⊙ | 3.63 | 6.41 | 3-2 | |
| 4393.70 | P | ⊙ | 3.62 | 6.43 | 2-1 | |
| m4475.99 | P | Fe | 3.62 | 6.36 | 2-3 | |
| 4416.60 | P | ⊙ | 3.62 | 6.41 | 1-2 | |
| *4472.721 | J | (2) | 3.62 | 6.36 | 2-2 | $b^3D$-$y^1D^o$ (900) |
| 4466.163 | V | (1) | 3.63 | 6.39 | 3-2 | $b^3D$-$7^o$ |
| 4463.16 | P | ⊙ | 3.62 | 6.39 | 2-2 | (901) |
| *4461.989 | J | (4) | 3.62 | 6.39 | 2-2 | $b^3D$-$x^1D^o$ |
| 4454.655 | J | (1) | 3.62 | 6.39 | 1-2 | (902) |
| 4360.613 | V | (1) | 3.63 | 6.46 | 3-2 | $b^3D$-$u^3D^o$ (903) |
| *4376.762 | V | (1) | 3.63 | 6.45 | 3-3 | $b^3D$-$t^3D^o$ |
| 4365.632 | V | (1) | 3.62 | 6.50 | 2-2 | (904) |
| 4373.90 | P | ⊙ | 3.62 | 6.45 | 2-3 | |
| 4353.93 | P | ⊙ | 3.62 | 6.53 | 2-1 | $b^3D$-$6^o$ |
| 4347.39 | P | ⊙ | 3.62 | 6.53 | 1-1 | (905) |
| 4346.090 | J | 3 | 3.63 | 6.53 | 3-2 | $b^3D$-$v^3P^o$ |
| 4066.567 | V | (1) | 3.62 | 6.64 | 2-1 | (906) |
| 4343.366 | V | (2) | 3.62 | 6.53 | 2-2 | |
| 4062.44 | W | (2) | 3.63 | 6.64 | 1-1 | |
| 4336.76 | U | (1) | 3.62 | 6.53 | 1-2 | |
| 4239.36 | P | ⊙ | 3.63 | 6.54 | 3-3 | $b^3D$-$e^3D^o$ |
| 4236.68 | P | ⊙ | 3.62 | 6.54 | 2-3 | (907) |
| 4161.20 | P | ⊙ | 3.62 | 6.57 | 1-1 | $b^3D$-$z^1P^o$ (906) |
| 4172.97 | P | ⊙ | 3.63 | 6.58 | 3-4 | $b^3D$-$9^o$ (909) |
| 4115.69 | P | ⊙ | 3.63 | 6.62 | 3-3 | $b^3D$-$y^1F^o$ (910) |
| 4096.116 | V | (1) | 3.62 | 6.64 | 2-3 | $b^3D$-$x^1F^o$ (911) |
| 4074.70 | P | ⊙ | 3.62 | 6.65 | 2-3 | $b^3D$-$10^o$ (912) |
| 4030.490 | V | (1) | 3.63 | 6.70 | 3-4 | $b^3D$-$t^3G^o$ |
| 3960.264 | J | (1) | 3.62 | 6.74 | 2-3 | (913) |
| 3962.65 | P | ⊙ | 3.63 | 6.74 | 3-3 | |
| 4058.48 | P | ⊙ | 3.63 | 6.67 | 3-3 | $b^3D$-$11^o$ |
| 4055.96 | W | (1) | 3.62 | 6.67 | 2-3 | (914) |
| 4010.16 | W | (1) | 3.63 | 6.70 | 3-4 | $b^3D$-$13^o$ (915) |
| 3767.164 | J | (1) | 3.62 | 6.66 | 2-2 | $b^3D$-$w^1D^o$ (916) |
| 3761.936 | J | (1) | 3.62 | 6.69 | 2-3 | $b^3D$-$w^1F^o$ (917) |
| 3767.73 | P | ⊙ | 3.63 | 6.90 | 3-4 | $b^3D$-$e^3G^o$ |
| 3736.51 | P | ⊙ | 3.62 | 6.93 | 2-3 | (916) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Fe I continued | | | | | | |
| 3635.08 | P | ⊙? | 3.62 | 7.02 | 2-2 | $b^3$D-$u^3$F° (919) |
| 3245.80 | P | ⊙ | 3.63 | 7.43 | 3-4 | $b^3$D-$r^3$G° |
| 3234.05 | P | ⊙ | 3.62 | 7.45 | 2-3 | (920) |
| •3225.607 | U | (1) | 3.63 | 7.45 | 3-3 | |
| 6451.58 | V | (2) | 3.68 | 5.59 | 4-5 | $b^1$G-$y^3$G° |
| 6396.39 | P | ⊙ | 3.68 | 5.61 | 4-4 | (921) |
| 5849.67 | P | ⊙ | 3.68 | 5.79 | 4-4 | $b^1$G-$x^3$F° |
| •5780.83 | V | (1) | 3.68 | 5.81 | 4-3 | (922) |
| 5619.23 | P | ⊙? | 3.68 | 5.87 | 4-4 | $b^1$G-$w^5$G° (923) |
| 5662.94 | V | (1) | 3.68 | 5.86 | 4-4 | $b^1$G-$z^1$G° (924) |
| 5513.86 | P | ⊙ | 3.68 | 5.92 | 4-4 | $b^1$G-$v^5$F° (925) |
| 5543.04 | P | ⊙ | 3.68 | 5.91 | 4-5 | $b^1$G-$x^3$G° |
| 5549.94 | U | (2) | 3.68 | 5.90 | 4-4 | (926) |
| 5543.184 | V | (2) | 3.68 | 5.91 | 4-3 | |
| 5423.73 | P | ⊙ | 3.68 | 5.95 | 4-5 | $b^1$G-$w^3$G° |
| 5385.58 | P | ⊙ | 3.68 | 5.97 | 4-4 | (927) |
| 5379.580 | J | (2) | 3.68 | 5.97 | 4-5 | $b^1$G-$z^1$H° (928) |
| 5288.533 | V | (2) | 3.68 | 6.01 | 4-4 | $b^1$G-$y^1$G° (929) |
| 5177.230 | T | (-) | 3.68 | 6.06 | 4-4 | $b^1$G-$w^3$F° |
| 5141.55 | P | ⊙ | 3.68 | 6.08 | 4-3 | (930) |
| 5145.73 | P | ⊙ | 3.68 | 6.08 | 4-3 | $b^1$G-3° (931) |
| 5084.55 | P | ⊙ | 3.68 | 6.11 | 4-5 | $b^1$G-$v^3$G° (932) |
| 4809.14 | V | (1) | 3.68 | 6.24 | 4-3 | $b^1$G-$z^1$F° (933) |
| •4802.883 | J | (3) | 3.68 | 6.25 | 4-4 | $b^1$G-$x^1$G° (934) |
| 4700.171 | J | (2n) | 3.68 | 6.30 | 4-5 | $b^1$G-$x^3$H° (935) |
| •4579.344 | V | (1) | 3.68 | 6.37 | 4-5 | $b^1$G-6° (936) |
| •4509.306 | U | (1) | 3.68 | 6.42 | 4-3 | $b^1$G-$u^3$D° (937) |
| 4382.02 | P | ⊙ | 3.68 | 6.50 | 4-5 | $b^1$G-$w^3$H° (938) |
| 4248.72 | P | ⊙? | 3.68 | 6.58 | 4-4 | $b^1$G-9° (939) |
| 4189.564 | U | (2) | 3.68 | 6.62 | 4-3 | $b^1$G-$y^1$F° (940) |
| 4171.696 | J | (2) | 3.68 | 6.64 | 4-3 | $b^1$G-$x^1$F° (941) |
| 4149.49 | P | ⊙ | 3.68 | 6.65 | 4-3 | $b^1$G-10° (942) |
| 4090.75 | P | ⊙ | 3.68 | 6.70 | 4-4 | $b^1$G-$t^3$G° |
| 4030.90 | P | ⊙ | 3.68 | 6.74 | 4-3 | (943) |
| 4080.08 | P | ⊙ | 3.68 | 6.70 | 4-4 | $b^1$G-13° (944) |
| 3996.968 | J | 2 | 3.68 | 6.77 | 4-4 | $b^1$G-$w^1$G° (945) |
| 3885.93 | P | ⊙ | 3.68 | 6.85 | 4-5 | $b^1$G-$x^1$H° (946) |
| 3846.29 | P | ⊙ | 3.68 | 6.89 | 4-3 | $b^1$G-$w^1$F° (947) |
| 3829.125 | J | (1) | 3.68 | 6.90 | 4-5 | $b^1$G-$s^3$G° (948) |
| 3754.89 | P | ⊙ | 3.68 | 6.97 | 4-4 | $b^1$G-$u^3$H° (949) |
| 3731.15 | P | ⊙ | 3.68 | 6.99 | 4-4 | $b^1$G-$u^3$F° |
| 3704.80 | P | ⊙ | 3.68 | 7.01 | 4-3 | (950) |
| 3681.87 | W | (1) | 3.68 | 7.03 | 4-4 | $b^1$G-$v^1$G° (951) |
| 3661.25 | P | ⊙ | 3.68 | 7.05 | 4-5 | $b^1$G-$x^3$I° (952) |
| 3590.66 | W | (1) | 3.68 | 7.12 | 4-3 | $b^1$G-$t^3$F° (953) |
| 3291.44 | P | ⊙ | 3.68 | 7.43 | 4-4 | $b^1$G-$r^3$G° |
| 3270.69 | P | ⊙ | 3.68 | 7.45 | 4-3 | (954) |
| 10452.70 | D | 5 | 3.86 | 5.05 | 4-3 | $z^3$F°-X (955) |
| 8686.79 | P | ⊙ | 3.88 | 5.29 | 4-5 | $z^3$F°-$e^7$D |
| 8801.78 | P | | 3.93 | 5.33 | 3-4 | (956) |
| 7477.52 | P | ⊙ | 3.86 | 5.52 | 4-4 | $z^3$F°-$e^5$D |
| 7541.61 | U | (1) | 3.93 | 5.56 | 3-3 | (957) |
| 7573.76 | P | ⊙ | 3.97 | 5.60 | 2-2 | |
| 7288.58 | P | ⊙ | 3.86 | 5.56 | 4-3 | |
| 7474.50 | P | ⊙ | 3.97 | 5.62 | 2-1 | |
| 7766.72 | P | ⊙ | 3.93 | 5.52 | 3-4 | |
| 6220.78 | V | (1) | 3.88 | 5.85 | 4-4 | $z^3$F°-$e^5$F |
| 6419.65 | P | ⊙ | 3.93 | 5.85 | 3-4 | (958) |
| 6003.033 | K | 8 | 3.88 | 5.92 | 4-4 | $z^3$F°-$e^3$F |
| 5978.799 | K | 5 | 3.93 | 5.99 | 3-3 | (959) |
| 5952.749 | V | 3 | 3.97 | 6.04 | 2-2 | |
| 5804.06 | V | (1) | 3.88 | 5.99 | 4-3 | |
| 5838.418 | U | (1) | 3.93 | 8.04 | 3-2 | |
| 8188.037 | V | (3 1d) | 3.93 | 5.92 | 3-4 | |
| 8096.889 | V | (1) | 3.97 | 5.99 | 2-3 | |
| 5119.90 | P | ⊙ | 3.88 | 6.28 | 4-5 | $z^3$F°-$e^7$F |
| 5027.51 | P | ⊙ | 3.88 | 6.32 | 4-4 | (960) |
| 5168.19 | P | ⊙ | 3.93 | 6.31 | 3-3 | |
| 5126.598 | U | (1) | 3.86 | 6.27 | 4-4 | $z^3$F°-$f^7$D |
| 5285.60 | P | (1) | 3.97 | 8.30 | 2-1 | (981) |
| 5213.80 | P | ⊙ | 3.93 | 8.29 | 3-4 | $z^3$F°-$e^5$G |
| 5238.25 | P | ⊙ | 3.97 | 8.32 | 2-3 | (982) |
| 5081.88 | P | ⊙ | 3.86 | 8.29 | 4-4 | |
| 5050.13 | P | ⊙ | 3.86 | 6.31 | 4-5 | $z^3$F°-$f^5$F |
| 5085.93 | P | ⊙ | 3.93 | 6.35 | 3-4 | (963) |
| 5168.18 | P | ⊙ | 3.93 | 6.31 | 3-2 | $z^3$F°-$e^5$S (964) |
| 5001.871 | B | 12 | 3.86 | 6.33 | 4-3 | $z^3$F°-$e^3$D |
| 5014.950 | J | 10 | 3.93 | 6.39 | 3-2 | (965) |
| 5022.244 | J | 6 | 3.97 | 6.42 | 2-1 | |
| 5129.658 | T | (1) | 3.93 | 6.33 | 3-3 | |
| 5099.091 | T | (1) | 3.97 | 6.39 | 2-2 | |
| 5217.69 | P | ⊙ | 3.97 | 6.33 | 2-3 | |
| 4987.83 | P | ⊙ | 3.86 | 6.34 | 4-4 | $z^3$F°-$g^5$D |
| •5007.289 | J | (3n) | 3.93 | 6.39 | 3-3 | (966) |
| 5019.74 | P | ⊙ | 3.97 | 6.43 | 2-2 | |
| 4885.435 | J | 2 | 3.86 | 6.39 | 4-3 | |
| 4938.183 | K | (2) | 3.93 | 6.43 | 3-2 | |
| 4978.606 | J | 2 | 3.97 | 6.45 | 2-1 | |
| 5058.00 | W | (1) | 3.93 | 6.37 | 3-3 | $z^3$F°-$e^7$8 (967) |
| 4933.878 | Q | (1) | 3.93 | 6.43 | 3-3 | $z^3$F°-$e^5$P |
| 5037.34 | P | ⊙ | 3.97 | 6.42 | 2-1 | (968) |
| 5015.30 | P | ⊙ | 3.97 | 6.43 | 2-2 | |
| 4630.785 | U | (1) | 3.93 | 6.59 | 3-4 | $z^3$F°-$g^5$F |
| •4607.655 | J | 3n | 3.97 | 6.65 | 2-3 | (969) |
| 4586.40 | P | ⊙ | 3.86 | 6.59 | 4-4 | |
| 4538.84 | W | (2) | 3.93 | 6.65 | 3-3 | |
| 4438.53 | P | ⊙ | 3.86 | 6.65 | 4-3 | |
| 4452.62 | P | ⊙ | 3.93 | 6.70 | 3-2 | |
| 4492.693 | V | (1n) | 3.97 | 6.71 | 2-1 | |
| •4575.80 | U | (1) | 3.86 | 6.56 | 4-4 | $z^3$F°-$h^5$D |
| 4598.37 | P | ⊙ | 3.93 | 6.61 | 3-3 | (970) |
| •4495.386 | V | (1) | 3.86 | 8.81 | 4-3 | |
| 4511.04 | P | ⊙ | 3.93 | 6.66 | 3-2 | |
| 4544.50 | P | ⊙ | 3.97 | 6.68 | 2-1 | |
| 4593.544 | U | (1) | 3.93 | 6.61 | 3-2 | $z^3$F°-$f^5$P |
| 4587.72 | P | ⊙ | 3.97 | 6.66 | 2-1 | (971) |
| 4551.667 | U | (1) | 3.93 | 6.64 | 3-4 | $z^3$F°-$f^5$G |
| 4538.58 | P | ⊙ | 3.97 | 6.69 | 2-3 | (972) |
| 4450.77 | P | ⊙ | 3.86 | 6.64 | 4-4 | |
| 4471.81 | P | (1) | 3.93 | 6.69 | 3-3 | |
| 4429.32 | U | (1) | 3.93 | 6.71 | 3-2 | |
| 4456.63 | P | | 3.86 | 6.63 | 4-5 | $z^3$F°-$e^3$G |
| •4490.773 | J | (2n) | 3.93 | 6.67 | 3-4 | (973) |
| 4494.05 | P | ⊙ | 3.97 | 6.71 | 2-3 | |
| 4392.58 | U | (1) | 3.86 | 6.67 | 4-4 | |
| 4428.57 | P | ⊙ | 3.93 | 6.71 | 3-3 | |
| 4455.032 | J | (2) | 3.86 | 6.64 | 4-3 | $z^3$F°-$f^3$D |
| •4490.773 | J | (2n) | 3.93 | 6.67 | 3-2 | (974) |
| 4479.97 | P | ⊙ | 3.97 | 6.72 | 2-1 | |
| •4556.129 | J | 4n | 3.93 | 6.64 | 3-3 | |
| •4558.108 | J | (1) | 3.97 | 6.67 | 2-2 | |
| 4625.44 | P | ⊙ | 3.97 | 6.64 | 2-3 | |
| 4354.28 | P | ⊙ | 3.86 | 6.70 | 4-5 | $z^3$F°-$e^3$H |
| 4394.31 | P | ⊙ | 3.93 | 6.73 | 3-4 | (975) |
| 4300.21 | P | ⊙ | 3.86 | 6.73 | 4-4 | |
| 4276.684 | J | (1) | 3.86 | 8.75 | 4-4 | $z^3$F°-$f^3$F |
| 4286.976 | V | (1) | 3.93 | 6.81 | 3-3 | (976) |
| 4300.828 | V | (1) | 3.97 | 6.84 | 2-2 | |
| 4197.38 | P | ⊙ | 3.86 | 6.81 | 4-3 | |
| 4369.73 | P | ⊙ | 3.93 | 6.75 | 3-4 | |
| 3975.85 | W | (1) | 3.86 | 6.97 | 4- | $z^3$F°-2 (977) |
| 3742.14 | P | ⊙ | 3.93 | 7.22 | 3-4 | $z^3$F°-$g^5$G |
| 3873.68 | P | ⊙ | 3.86 | 7.22 | 4-4 | (978) |
| 3848.22 | P | ⊙ | 3.86 | 7.25 | 4-3 | |
| 10469.59 | D | 30 | 3.87 | 5.05 | 3-3 | $z^3$D°-X |
| 10532.21 | D | 10 | 3.91 | 5.08 | 2-2 | (979) |
| 10143.59 | P | ⊙ | 3.87 | 5.08 | 3-2 | |
| 10884.30 | D | 3 | 3.91 | 5.05 | 2-3 | |
| 10818.36 | D | 3 | 3.94 | 5.08 | 1-2 | |
| 7488.13 | P | ⊙ | 3.87 | 5.52 | 3-4 | $z^3$D°-$e^5$D |
| 7474.80 | P | ⊙ | 3.91 | 5.58 | 2-3 | (980) |
| 7325.33 | P | ⊙ | 3.91 | 5.60 | 2-2 | |
| 6228.77 | V | (1) | 3.87 | 5.85 | 3-4 | $z^3$D°-$e^5$F |
| 6231.40 | V | (1) | 3.91 | 5.80 | 2-3 | (981) |
| 6209.73 | P | ⊙ | 3.94 | 5.93 | 1-2 | |
| 6083.67 | P | ⊙ | 3.87 | 5.90 | 3-3 | |
| 6114.41 | P | ⊙ | 3.91 | 5.93 | 2-2 | |
| 6008.577 | K | 9 | 3.87 | 5.92 | 3-4 | $z^3$D°-$e^3$F |
| 5934.658 | K | 5 | 3.91 | 5.99 | 2-3 | (982) |
| 5883.838 | K | 4 | 3.94 | 6.04 | 1-2 | |
| 5809.249 | V | (2) | 3.87 | 5.99 | 3-3 | |
| 5798.194 | V | (2) | 3.91 | 6.04 | 2-2 | |
| 5878.38 | P | ⊙ | 3.87 | 8.04 | 3-2 | |
| 5304.11 | P | (1) | 3.91 | 8.24 | 2-3 | $z^3$D°-$f^5$D |
| 5277.59 | P | (1) | 3.94 | 8.28 | 1-1 | (983) |
| 5005.720 | J | 10 | 3.87 | 6.33 | 3-3 | $z^3$D°-$e^3$D |
| 4985.261 | J | 7 | 3.91 | 8.39 | 2-2 | (984) |
| 4973.108 | J | 3 | 3.94 | 6.42 | 1-1 | |
| 4898.437 | U | (1) | 3.87 | 8.39 | 3-2 | |
| 4911.788 | U | (1) | 3.91 | 6.42 | 2-1 | |
| 5098.594 | K | (3) | 3.91 | 6.33 | 2-3 | |
| 5048.454 | V | (2) | 3.94 | 6.39 | 1-2 | |
| 4977.653 | U | (1) | 3.91 | 6.39 | 2-3 | $z^3$D°-$g^5$D |
| 4970.88 | P | ⊙ | 3.94 | 6.43 | 1-2 | (985) |
| 4889.113 | U | (2) | 3.87 | 8.39 | 3-3 | |
| 4909.387 | J | (1) | 3.91 | 6.43 | 2-2 | |
| 4930.331 | K | (2) | 3.94 | 8.45 | 1-1 | |
| 4870.05 | P | ⊙ | 3.91 | 8.45 | 2-1 | |
| 4905.15 | W | (1) | 3.91 | 6.43 | 2-2 | $z^3$D°-$e^5$P |
| 4978.11 | P | ⊙ | 3.94 | 6.42 | 1-1 | (986) |
| 4916.67 | P | ⊙ | 3.91 | 6.42 | 2-1 | |
| 4966.30 | P | ⊙ | 3.94 | 6.43 | 1-2 | |
| 4529.563 | V | (1) | 3.87 | 6.59 | 3-4 | $z^3$D°-$g^5$F |
| 4479.00 | P | ⊙ | 3.94 | 6.70 | 1-2 | (987) |
| 4441.56 | P | ⊙ | 3.87 | 6.65 | 3-3 | |
| 4429.20 | P | ⊙ | 3.91 | 6.70 | 2-2 | |
| 4358.95 | P | ⊙ | 3.87 | 6.70 | 3-2 | |
| 4404.10 | P | ⊙ | 3.91 | 6.71 | 2-1 | |
| 4579.05 | P | ⊙ | 3.87 | 6.56 | 3-4 | $z^3$D°-$h^5$D |
| 4498.54 | P | ⊙ | 3.87 | 6.61 | 3-3 | (988) |
| 4487.01 | P | ⊙ | 3.91 | 6.66 | 2-2 | |
| 4504.23 | P | ⊙ | 3.94 | 6.68 | 1-1 | |
| 4568.62 | P | ⊙ | 3.91 | 6.61 | 2-2 | $z^3$D°-$f^5$P |
| 4546.68 | P | ⊙ | 3.94 | 6.66 | 1-1 | (989) |
| 4621.63 | P | ⊙ | 3.94 | 6.61 | 1-2 | |
| 4377.330 | U | (1) | 3.87 | 6.69 | 3-3 | $z^3$D°-$f^5$G |
| 4336.60 | P | ⊙ | 3.87 | 6.71 | 3-2 | (990) |
| •4395.514 | V | (1w) | 3.87 | 6.67 | 3-4 | $z^3$D°-$e^3$G |
| 4405.40 | P | ⊙ | 3.91 | 6.71 | 2-3 | (991) |
| 4335.89 | U | (1) | 3.87 | 6.71 | 3-3 | |
| 4458.101 | V | (3) | 3.87 | 8.64 | 3-3 | $z^3$D°-$f^3$D |
| 4466.939 | V | (2) | 3.91 | 6.67 | 2-2 | (992) |
| 4440.840 | V | (1) | 3.94 | 6.72 | 1-1 | |
| •4395.514 | V | (1w) | 3.87 | 6.67 | 3-2 | |
| 4391.87 | P | ⊙ | 3.91 | 6.72 | 2-1 | |
| •4531.633 | J | (2) | 3.91 | 6.64 | 2-3 | |
| 4517.60 | P | ⊙ | 3.94 | 6.67 | 1-2 | |
| 4279.480 | V | (1) | 3.87 | 6.75 | 3-4 | $z^3$D°-$f^3$F |
| •4265.260 | J | (2) | 3.91 | 6.81 | 2-3 | (993) |
| 4264.743 | U | (1) | 3.94 | 6.84 | 1-2 | |
| 4200.09 | P | ⊙ | 3.87 | 6.81 | 3-3 | |
| 4243.786 | V | (1w) | 3.87 | 6.77 | 3-2 | $z^3$D°-$e^3$P |
| 4220.05 | P | ⊙ | 3.91 | 6.84 | 2-1 | (994) |
| 4310.37 | P | ⊙ | 3.91 | 6.77 | 2-2 | |
| •4265.260 | J | (2) | 3.94 | 6.84 | 1-1 | |
| 4357.53 | P | ⊙ | 3.94 | 6.77 | 1-2 | |
| 3839.614 | V | (2w) | 3.94 | 7.16 | 1-2 | $z^3$D°-$i^5$D (995) |
| 3675.76 | P | ⊙ | 3.87 | 7.22 | 3-4 | $z^3$D°-$g^5$G |
| 3699.41 | P | ⊙ | 3.91 | 7.25 | 2-3 | (996) |
| 3683.77 | P | ⊙ | 3.91 | 7.26 | 2-2 | |
| 3717.73 | P | ⊙ | 3.87 | 7.19 | 3-2 | $z^3$D°-4 (997) |
| 9959.18 | P | ⊙ | 4.06 | 5.30 | 4-5 | $c^3$F-$y^5$G° (998) |
| 8096.874 | E | 10 | 4.06 | 5.58 | 4-3 | $c^3$F-$x^3$D° |
| 8423.95 | O | 2 | 4.12 | 5.59 | 3-2 | (999) |
| 8481.96 | P | ⊙ | 4.17 | 5.62 | 2-1 | |
| 8466.54 | P | ⊙ | 4.12 | 5.58 | 3-3 | |
| 8680.77 | P | ⊙ | 4.17 | 5.59 | 2-2 | |
| 8727.10 | P | ⊙ | 4.17 | 5.58 | 2-3 | |
| 7537.44 | P | ⊙? | 4.06 | 5.70 | 4-3 | $o^3$F-$w^5$P° |
| 7967.03 | P | ⊙? | 4.17 | 5.72 | 2-2 | (1000) |
| 7219.686 | I | 5 | 4.08 | 5.77 | 4-4 | $c^3$F-$u^5$D° |
| 7498.56 | V | 1 | 4.12 | 5.77 | 3-3 | (1001) |
| 7617.97 | P | ⊙ | 4.17 | 5.79 | 2-2 | |
| 7207.123 | V | 6 | 4.06 | 5.77 | 4-3 | |
| 7418.674 | E | 5 | 4.12 | 5.79 | 3-2 | |
| 7454.02 | V | (1) | 4.17 | 5.82 | 2-1 | |
| 7513.17 | P | ⊙ | 4.12 | 5.77 | 3-4 | |
| 7132.989 | I | 8 | 4.06 | 5.79 | 4-4 | $c^3$F-$x^3$F° |
| •7307.938§ | L | 8 | 4.12 | 5.81 | 3-3 | (1002) |
| 7443.031 | L | 2 | 4.17 | 5.83 | 2-2 | |
| 7418.32 | P | ⊙ | 4.12 | 5.79 | 3-4 | |
| 7501.25 | P | ⊙ | 4.17 | 5.81 | 2-3 | |
| 7072.82 | P | ⊙ | 4.06 | 5.80 | 4-5 | $o^3$F-$z^3$H° |
| 7300.59 | P | ⊙ | 4.12 | 5.82 | 3-4 | (1003) |
| 7024.084 | V | 5 | 4.06 | 5.82 | 4-4 | |
| 7068.415 | I | 40 | 4.06 | 5.80 | 4-3 | $c^3$F-$w^3$D° |
| 7284.843 | L | 4 | 4.12 | 5.82 | 3-2 | (1004) |
| 7401.689 | E | 4 | 4.17 | 5.84 | 2-1 | |
| 7348.51 | P | ⊙ | 4.12 | 5.80 | 3-3 | |
| 7476.92 | P | ⊙ | 4.17 | 5.82 | 2-2 | |
| 6793.26 | V | 2 | 4.08 | 5.87 | 4-4 | $c^3$F-$w^5$G° |
| 7000.633 | V | 3 | 4.12 | 5.89 | 3-3 | (1005) |
| 7107.481 | I | 4 | 4.17 | 5.90 | 2-2 | |
| 6745.96 | P | ⊙ | 4.08 | 5.89 | 4-3 | |
| •6933.628 | L | 6 | 4.12 | 5.90 | 3-2 | |
| 6857.25 | V | 4 | 4.08 | 5.88 | 4-4 | $c^3$F-$z^1$G° |
| 7120.56 | P | ⊙ | 4.12 | 5.88 | 3-4 | (1006) |
| 6785.88 | P | ⊙ | 4.08 | 5.88 | 4-5 | $o^3$F-$v^5$P° |
| 6963.02 | P | ⊙ | 4.17 | 5.94 | 2-3 | (1007) |
| 6839.90 | P | (2) | 4.06 | 5.92 | 4-4 | |
| 8796.11 | V | 2 | 4.12 | 5.94 | 3-3 | |
| 6555.87 | P | ⊙ | 4.06 | 5.94 | 4-3 | |
| 6682.23 | P | ⊙ | 4.06 | 5.91 | 4-5 | $o^3$F-$x^3$G° |
| 6942.82 | P | ⊙ | 4.12 | 5.90 | 3-4 | (1008) |
| 7105.90 | P | ⊙ | 4.17 | 5.91 | 2-3 | |
| 6623.78 | P | ⊙ | 4.06 | 5.92 | 4-3 | $o^3$F-$v^5$P° |
| •6777.44 | V | 1 | 4.12 | 5.95 | 3-2 | (1010) |
| 8509.58 | V | (1) | 4.08 | 5.95 | 4-5 | $o^3$F-$w^3$G° (1012) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Fe I continued | | | | | | |
| 8713.14 | V | 6d | 4.12 | 5.96 | 3-2 | $c^3F\text{-}x^3P^o$ |
| 8777.44 | V | 1 | 4.17 | 5.99 | 2-1 | (1013) |
| 6875.98 | V | 1 | 4.17 | 5.96 | 2-2 | |
| 6315.814 | V | (2) | 4.06 | 6.01 | 4-4 | $c^3F\text{-}y^1G^o$ (1014) |
| 6157.734 | J | 4 | 4.06 | 6.06 | 4-4 | $c^3F\text{-}w^3F^o$ |
| 6315.318 | J | (3) | 4.12 | 6.08 | 3-3 | (1015) |
| 6380.748 | I | 3 | 4.17 | 8.10 | 2-2 | |
| 6107.32 | P | ⊙ | 4.06 | 6.08 | 4-3 | |
| 8240.366 | U | (1) | 4.12 | 6.10 | 3-2 | |
| 6147.85 | V | (-) | 4.06 | 6.07 | 4-3 | $c^3F\text{-}v^3D^o$ |
| 8315.42 | P | ⊙ | 4.12 | 8.08 | 3-2 | (1016) |
| 6436.43 | V | (1) | 4.17 | 6.09 | 2-1 | |
| •5975.355 | J | 4 | 4.06 | 6.12 | 4-5 | $c^3F\text{-}y^3H^o$ |
| •6137.913 | J | (2) | 4.12 | 6.14 | 3-4 | (1017) |
| 5931.89 | P | ⊙ | 4.08 | 8.14 | 4-4 | |
| 6027.057 | B | 4 | 4.08 | 6.11 | 4-5 | $c^3F\text{-}v^3G^o$ |
| 6185.366 | J | (2) | 4.12 | 6.13 | 3-4 | (1018) |
| 6215.152 | J | (2) | 4.17 | 6.15 | 2-3 | |
| 6081.85 | P | ⊙ | 4.12 | 6.15 | 3-3 | |
| 6362.889 | V | (2) | 4.17 | 6.11 | 2-2 | $c^3F\text{-}z^1D^o$ (1019) |
| 5959.878 | U | (1) | 4.12 | 6.20 | 3-2 | $c^3F\text{-}w^3P^o$ (1020) |
| 5643.94 | P | ⊙ | 4.06 | 6.24 | 4-3 | $c^3F\text{-}z^1F^o$ |
| 5943.11 | P | ⊙ | 4.17 | 6.24 | 2-3 | (1021) |
| 5811.93 | V | (1) | 4.12 | 6.25 | 3-4 | $c^3F\text{-}x^1G^o$ (1022) |
| 5510.23 | P | ⊙ | 4.06 | 6.30 | 4-5 | $c^3F\text{-}u^3F^o$ |
| 5563.69 | P | ⊙ | 4.12 | 6.34 | 3-4 | (1023) |
| 5333.15 | P | ⊙ | 4.06 | 6.37 | 4-3 | |
| 5494.468 | V | (1) | 4.06 | 6.30 | 4-5 | $c^3F\text{-}x^3H^o$ (1024) |
| 5487.747 | K | (8) | 4.12 | 6.37 | 3-2 | $c^3F\text{-}t^3D^o$ (1025) |
| m5434.15 | P | Fe | 4.06 | 6.33 | 4-4 | $c^3F\text{-}v^3F^o$ |
| 5568.71 | P | ⊙ | 4.12 | 6.34 | 3-3 | (1026) |
| 5408.38 | P | ⊙ | 4.06 | 6.34 | 4-3 | |
| •5830.04 | W | (1) | 4.12 | 6.32 | 3-2 | |
| 5587.583 | V | (1) | 4.12 | 6.33 | 3-4 | |
| 5680.26 | W | (1) | 4.17 | 6.34 | 2-3 | |
| 5329.994 | J | (2) | 4.06 | 6.37 | 4-5 | $c^3F\text{-}6^o$ (1028) |
| 5403.823 | V | (1) | 4.06 | 6.34 | 4-5 | $c^3F\text{-}u^3G^o$ |
| 5476.298 | J | (2) | 4.12 | 6.38 | 3-4 | (1029) |
| •5535.419 | J | (2) | 4.17 | 6.40 | 2-3 | |
| 5319.22 | P | ⊙ | 4.06 | 6.38 | 4-4 | |
| 5429.43 | P | ⊙ | 4.12 | 8.40 | 3-3 | |
| 5275.00 | W | (1n) | 4.06 | 6.40 | 4-3 | |
| 5464.286 | V | (1) | 4.12 | 6.38 | 3-2 | $c^3F\text{-}y^1D^o$ (1030) |
| •5235.392 | V | (2) | 4.06 | 6.42 | 4-3 | $c^3F\text{-}u^3D^o$ |
| 5293.973 | V | (1) | 4.12 | 6.46 | 3-2 | (1031) |
| 5332.673 | V | (1) | 4.17 | 6.48 | 2-1 | |
| 5387.51 | R | 3 | 4.12 | 6.42 | 3-3 | |
| 5394.682 | T | (-) | 4.17 | 6.46 | 2-2 | |
| 5491.84 | W | (2) | 4.17 | 6.42 | 2-3 | |
| 5169.30 | P | ⊙ | 4.06 | 6.45 | 4-3 | $c^3F\text{-}t^3D^o$ |
| 5187.932 | V | (2) | 4.12 | 6.50 | 3-2 | (1032) |
| 5428.71 | P | ⊙ | 4.17 | 6.44 | 2-1? | |
| 5317.53 | P | ⊙ | 4.12 | 6.45 | 3-3 | |
| 5284.62 | P | ⊙ | 4.17 | 6.50 | 2-2 | |
| 5164.922 | 8 | (-) | 4.12 | 6.51 | 3-4 | $c^3F\text{-}w^3H^o$ (1033) |
| 5236.189 | V | (1) | 4.17 | 6.53 | 2-1 | $c^3F\text{-}8^o$ (1034) |
| 4978.70 | P | ⊙ | 4.06 | 6.54 | 4-3 | $c^3F\text{-}s^3D^o$ |
| 5124.17 | P | (1) | 4.17 | 6.58 | 2-2 | (1035) |
| 5136.09 | W | (1) | 4.17 | 6.57 | 2-1 | $c^3F\text{-}z^1P^o$ (1036) |
| 4887.37 | P | ⊙ | 4.06 | 6.58 | 4-4 | $c^3F\text{-}9^o$ (1037) |
| 4829.68 | P | ⊙? | 4.12 | 6.68 | 3-2 | $c^3F\text{-}t^5P^o$ |
| 4875.32 | P | ⊙ | 4.17 | 6.70 | 2-1 | (1038) |
| 4809.26 | P | (1) | 4.06 | 6.62 | 4-3 | $c^3F\text{-}y^1F^o$ (1039) |
| 4913.52 | P | ⊙? | 4.12 | 6.64 | 3-3 | $c^3F\text{-}x^1F^o$ |
| 4999.114 | T | (1) | 4.17 | 6.64 | 2-3 | (1040) |
| •4881.726 | J | (2) | 4.12 | 6.65 | 3-3 | $c^3F\text{-}10^o$ (1041) |
| 4735.846 | J | (2) | 4.06 | 6.66 | 4-5 | $c^3F\text{-}t^3G^o$ |
| 4800.652 | J | (2) | 4.12 | 6.70 | 3-4 | (1042) |
| 4798.269 | V | (1) | 4.17 | 6.74 | 2-3 | |
| 4854.89 | V | (1n) | 4.12 | 6.67 | 3-3 | $c^3F\text{-}11^o$ |
| 4939.46 | P | ⊙ | 4.17 | 6.67 | 2-3 | (1043) |
| 4729.028 | J | (1) | 4.06 | 6.67 | 4-5 | $c^3F\text{-}12^o$ (1043a) |
| 4785.963 | V | (1) | 4.12 | 6.70 | 3-4 | $c^3F\text{-}13^o$ |
| 4665.56 | P | ⊙ | 4.06 | 6.70 | 4-4 | (1044) |
| 4672.02 | P | ⊙ | 4.12 | 6.77 | 3-4 | $c^3F\text{-}w^1G^o$ (1045) |
| 4413.40 | P | ⊙ | 4.06 | 6.85 | 4-5 | $c^3F\text{-}x^1H^o$ (1046) |
| 4546.47 | P | ⊙ | 4.17 | 6.88 | 2-2 | $c^3F\text{-}w^1D^o$ (1047) |
| 4467.446 | U | (1) | 4.12 | 6.89 | 3-3 | $c^3F\text{-}w^1F^o$ |
| 4538.95 | P | ⊙ | 4.17 | 6.89 | 2-3 | (1048) |
| 4152.07 | P | ⊙ | 4.06 | 7.03 | 4-4 | $c^3F\text{-}v^1G^o$ (1049) |
| 8632.42 | P | ⊙ | 4.09 | 5.52 | 4-4 | $y^5D^o\text{-}e^5D$ |
| 8652.50 | P | ⊙ | 4.14 | 5.56 | 3-3 | (1050) |
| 8355.16 | P | ⊙ | 4.09 | 5.56 | 4-3 | |
| 8950.20 | P | ⊙ | 4.14 | 5.52 | 3-4 | |
| 8878.76 | P | ⊙ | 4.17 | 5.56 | 2-3 | |
| 8834.04 | P | ⊙ | 4.20 | 5.60 | 1-2 | |
| 8779.13 | P | ⊙ | 4.21 | 5.62 | 0-1 | |
| 7187.341 | E | 800 | 4.09 | 5.80 | 4-5 | $y^5D^o\text{-}e^5F$ |
| 7207.406 | E | 500 | 4.14 | 5.85 | 3-4 | (1051) |
| 7164.469 | E | 250 | 4.17 | 5.90 | 2-3 | |
| 7130.942 | I | 150 | 4.20 | 5.93 | 1-2 | |
| 7090.404 | I | 40 | 4.21 | 5.95 | 0-1 | |
| 6999.902 | I | 30 | 4.09 | 5.85 | 4-4 | |
| 7016.436 | V | 60 | 4.14 | 5.90 | 3-3 | |
| 7022.976 | L | 50 | 4.17 | 5.93 | 2-2 | |
| 7038.251 | I | 40 | 4.20 | 5.95 | 1-1 | |
| 6819.60 | P | (1) | 4.09 | 5.90 | 4-3 | |
| 6880.65 | V | 2 | 4.14 | 5.93 | 3-2 | |
| 8933.04 | U | 1 | 4.17 | 5.95 | 2-1 | |
| 6725.39 | V | 2 | 4.09 | 5.92 | 4-4 | $y^5D^o\text{-}e^3F$ |
| 6653.88 | V | (1) | 4.14 | 5.99 | 3-3 | (1052) |
| 8916.702 | I | 60 | 4.14 | 5.92 | 3-4 | |
| 6786.88 | V | 5 | 4.17 | 5.99 | 2-3 | |
| 6704.48 | P | (1) | 4.20 | 6.04 | 1-2 | |
| •5668.837 | U | (1) | 4.14 | 6.31 | 3-3 | $y^5D^o\text{-}e^7F$ |
| 5703.09 | P | ⊙ | 4.17 | 6.34 | 2-2 | (1053) |
| 5815.42 | P | ⊙ | 4.20 | 6.32 | 1-1 | |
| 5737.71 ? | W | (1) | 4.09 | 6.31 | 4-3 | |
| 5859.96 | P | ⊙ | 4.17 | 6.28 | 2-3 | $y^5D^o\text{-}f^7D$ |
| 5760.53 | P | ⊙ | 4.14 | 6.28 | 3-3 | (1054) |
| 5813.33 | P | ⊙ | 4.17 | 6.30 | 2-2 | |
| 5715.47 | P | ⊙ | 4.14 | 6.30 | 3-2 | |
| 5796.67 | P | ⊙ | 4.17 | 6.30 | 2-1 | |
| 5871.289 | U | (1) | 4.14 | 6.24 | 3-3 | $y^5D^o\text{-}f^5D$ |
| 5928.50 | P | ⊙ | 4.20 | 6.28 | 1-1 | (1055) |
| 5732.86 | P | ⊙ | 4.09 | 6.24 | 4-3 | |
| 5815.16 | V | (1) | 4.14 | 6.26 | 3-2? | |
| 5893.24 | P | ⊙ | 4.20 | 6.29 | 1-0 | |
| 5974.62 | P | ⊙ | 4.17 | 6.24 | 2-3 | |
| 5844.879 | U | (1) | 4.14 | 6.25 | 3-3 | $y^5D^o\text{-}e^7P$ |
| 5707.70 | P | ⊙ | 4.09 | 6.25 | 4-3 | (1056) |
| 5760.71 | P | ⊙ | 4.14 | 6.28 | 3-2 | |
| 5947.30 | P | ⊙ | 4.17 | 6.25 | 2-3 | |
| 5677.68 | P | ⊙ | 4.09 | 6.26 | 4-5 | $y^5D^o\text{-}e^5G$ |
| 5721.70 | P | ⊙ | 4.14 | 6.29 | 3-4 | (1057) |
| 5739.78 | P | ⊙ | 4.17 | 6.32 | 2-3 | |
| 5761.08 | P | ⊙ | 4.20 | 6.34 | 1-2 | |
| 5644.35 | P | ⊙ | 4.14 | 6.32 | 3-3 | |
| 5516.29 | P | ⊙ | 4.09 | 6.32 | 4-3 | |
| 5607.66 | P | ⊙ | 4.14 | 6.34 | 3-4 | $y^5D^o\text{-}e^7G$ |
| 5705.32 | P | ⊙ | 4.20 | 6.36 | 1-2 | (1058) |
| 5481.252 | V | (2) | 4.09 | 6.34 | 4-4 | |
| 5568.44 | P | ⊙ | 4.14 | 6.35 | 3-3 | |
| 5636.00 | P | ⊙ | 4.17 | 6.36 | 2-2 | |
| 5551.77 | P | ⊙ | 4.09 | 6.31 | 4-5 | $y^5D^o\text{-}f^5F$ |
| 5568.07 | P | ⊙ | 4.14 | 6.35 | 3-4 | (1059) |
| 5652.01 | P | ⊙ | 4.20 | 6.38 | 1-2 | |
| 5443.41 | P | ⊙ | 4.09 | 6.35 | 4-4 | |
| 5524.25 | P | (1) | 4.14 | 6.37 | 3-3 | |
| 5583.97 | P | ⊙ | 4.17 | 6.38 | 2-2 | |
| •5666.837 | U | (1) | 4.14 | 6.31 | 3-2 | $y^5D^o\text{-}e^5S$ (1060) |
| 5493.508 | V | (1) | 4.09 | 6.33 | 4-3 | $y^5D^o\text{-}e^3D$ |
| 5483.111 | V | (1) | 4.14 | 6.39 | 3-2 | (1061) |
| 5481.451 | T | (3) | 4.17 | 6.42 | 2-1 | |
| 5620.527 | V | (1) | 4.14 | 6.33 | 3-3 | |
| 5573.10 | V | (1) | 4.17 | 6.39 | 2-2 | |
| 5547.00 | W | (2) | 4.20 | 6.42 | 1-1 | |
| •5715.107 | V | (1) | 4.17 | 6.33 | 2-3 | |
| 5579.34 | P | ⊙ | 4.21 | 6.42 | 0-1 | |
| 5476.571 | J | 10 | 4.09 | 6.34 | 4-4 | $y^5D^o\text{-}g^5D$ |
| 5473.908 | J | (3) | 4.14 | 6.39 | 3-3 | (1062) |
| 5478.48 | V | (1) | 4.17 | 6.43 | 2-2 | |
| •5493.850 | T | (0) | 4.20 | 6.45 | 1-1 | |
| 5353.386 | V | (2) | 4.09 | 6.39 | 4-3 | |
| 5391.493 | V | (1) | 4.14 | 6.43 | 3-2 | |
| 5429.52 | P | ⊙ | 4.17 | 6.45 | 2-1 | |
| 5480.872 | V | (2) | 4.20 | 6.45 | 1-0 | |
| 5602.788 | V | (2) | 4.14 | 6.34 | 3-4 | |
| 5563.604 | I | 3 | 4.17 | 6.39 | 2-3 | |
| 5543.930 | J | (3) | 4.20 | 6.43 | 1-2 | |
| 5525.552 | V | (3) | 4.21 | 6.45 | 0-1 | |
| •5534.68 | W | (1) | 4.14 | 6.37 | 3-3 | $y^5D^o\text{-}e^7S$ (1063) |
| 5334.32 | P | ⊙ | 4.09 | 6.40 | 4-3 | $y^5D^o\text{-}e^5P$ |
| 5386.341 | V | (1) | 4.14 | 6.43 | 3-2 | (1064) |
| 5487.52 | P | ⊙ | 4.17 | 6.42 | 2-1 | |
| 5453.98 | P | ⊙ | 4.14 | 6.40 | 3-3 | |
| 5473.18 | P | ⊙ | 4.17 | 6.43 | 2-2 | |
| 5553.22 | P | ⊙ | 4.20 | 6.42 | 1-1 | |
| 5543.03 | P | ⊙ | 4.17 | 6.40 | 2-3 | |
| •5538.54 | V | (1) | 4.20 | 6.43 | 1-2 | |
| •5007.289 | J | (3n) | 4.09 | 6.55 | 4-5 | $y^5D^o\text{-}g^5F$ |
| 5027.136 | J | 5n | 4.14 | 6.59 | 3-4 | (1065) |
| 4991.277 | J | (3) | 4.17 | 6.65 | 2-3 | |
| •4939.244 | J | (2) | 4.20 | 6.70 | 1-2 | |
| 4933.348 | K | (2n) | 4.21 | 6.71 | 0-1 | |
| 4925.28 | W | (1) | 4.09 | 6.59 | 4-4 | |
| 4887.189 | K | (-) | 4.17 | 6.70 | 2-2 | |
| 4983.855 | J | 6n | 4.09 | 6.56 | 4-4 | $y^5D^o\text{-}h^5D$ |
| 4988.963 | J | (6) | 4.14 | 6.61 | 3-3 | (1066) |
| 4957.68 | P | ⊙ | 4.17 | 6.66 | 2-2 | |
| 4969.927 | J | (3) | 4.20 | 6.68 | 1-1 | |
| 4888.651 | V | (1) | 4.09 | 6.61 | 4-3 | |
| 4886.335 | J | (1) | 4.14 | 6.66 | 3-2 | |
| 4917.25 | W | (1) | 4.17 | 6.68 | 2-1 | |
| 5088.16 | P | (1) | 4.14 | 6.56 | 3-4 | $y^5D^o\text{-}h^5D$ |
| 5063.296 | T | (-) | 4.17 | 6.61 | 2-3? | (1066) |
| 5011.24 | P | ⊙ | 4.20 | 6.66 | 1-2 | cont |
| 4982.507 | J | 8n | 4.09 | 6.56 | 4-3 | $y^5D^o\text{-}f^5P$ |
| 4983.258 | J | 5n | 4.14 | 6.61 | 3-2 | (1067) |
| 4967.899 | J | (3) | 4.17 | 6.66 | 2-1 | |
| 5086.77 | P | ⊙ | 4.14 | 6.56 | 3-3 | |
| •5057.49 | W | (1) | 4.17 | 6.61 | 2-2 | |
| 5021.68 | P | ⊙ | 4.20 | 6.66 | 1-1 | |
| •4952.646 | V | (1n) | 4.09 | 6.58 | 4-5 | $y^5D^o\text{-}f^5G$ |
| 4934.023 | K | (2n) | 4.14 | 6.64 | 3-4 | (1068) |
| 4910.328 | J | (1w) | 4.17 | 6.69 | 2-3 | |
| 4910.570 | J | (1w) | 4.20 | 6.71 | 1-2 | |
| 4835.862 | K | (3) | 4.09 | 6.64 | 4-4 | |
| 4840.329 | V | (1n) | 4.14 | 6.89 | 3-3 | |
| 4859.12 | W | (1) | 4.17 | 6.71 | 2-2 | |
| •4745.806 | B | 3n | 4.09 | 6.69 | 4-3 | |
| 4790.56 | P | ⊙ | 4.14 | 6.71 | 3-2 | |
| 4842.78 | V | (1) | 4.09 | 6.63 | 4-5 | $y^5D^o\text{-}e^3G$ |
| 4862.60 | P | ⊙ | 4.14 | 6.67 | 3-4 | (1069) |
| 4858.24 | P | ⊙ | 4.17 | 8.71 | 2-3 | |
| m4840.89 | P | T1 | 4.09 | 6.64 | 4-3 | $y^5D^o\text{-}f^3D$ |
| 4862.54 | P | ⊙ | 4.14 | 6.67 | 3-2 | (1070) |
| 4841.80 | W | (1) | 4.17 | 6.72 | 2-1 | |
| •4939.244 | J | (2) | 4.14 | 6.64 | 3-3 | |
| 4933.19 | P | ⊙ | 4.17 | 6.67 | 2-2 | |
| 4892.86 | W | (1) | 4.20 | 6.72 | 1-1 | |
| 5012.16 | P | ⊙ | 4.17 | 6.64 | 2-3 | |
| 4986.24 | W | (1) | 4.20 | 6.67 | 1-2 | |
| 4918.03 | W | (1) | 4.21 | 6.72 | 0-1 | |
| 4631.03 | P | ⊙ | 4.09 | 6.75 | 4-4 | $y^5D^o\text{-}f^3F$ |
| 4538.20 | P | ⊙ | 4.09 | 6.81 | 4-3 | (1071) |
| •4720.997 | J | (1) | 4.14 | 6.75 | 3-4 | |
| 4688.38 | P | ⊙ | 4.17 | 6.81 | 2-3 | |
| 4679.96 | P | ⊙ | 4.20 | 6.84 | 1-2 | |
| 4677.59 | P | ⊙ | 4.14 | 6.77 | 3-2 | $y^5D^o\text{-}e^3P$ |
| 4743.93 | P | ⊙ | 4.17 | 6.77 | 2-2 | (1072) |
| 4135.77 | U | (1) | 4.17 | 7.16 | 2-2 | $y^5D^o\text{-}i^5D$ |
| 4044.49 | P | ⊙ | 4.09 | 7.14 | 4-3 | (1073) |
| 4085.98 | W | (1) | 4.14 | 7.16 | 3-2 | |
| 4163.35 | P | ⊙ | 4.17 | 7.14 | 2-3 | |
| 4172.97 | P | ⊙ | 4.20 | 7.16 | 1-2 | |
| 3970.99 | P | ⊙ | 4.09 | 7.19 | 4-5 | $y^5D^o\text{-}g^5G$ |
| 3996.79 | P | ⊙ | 4.14 | 7.22 | 3-4 | (1074) |
| 4046.46 | P | ⊙ | 4.14 | 7.19 | 3-2 | $y^5D^o\text{-}4$ |
| 4095.27 | P | ⊙ | 4.17 | 7.19 | 2-2 | (1075) |
| 4131.75 | P | ⊙ | 4.20 | 7.19 | 1-2 | |
| 9103.64 | F | 1 | 4.16 | 5.52 | 5-4 | $y^5F^o\text{-}e^5D$ |
| •9070.42 | F | 2 | 4.20 | 5.56 | 4-3 | (1076) |
| 9084.20 | P | 1 | 4.24 | 5.60 | 3-2 | |
| 7511.045 | E | 800 | 4.16 | 5.80 | 5-5 | $y^5F^o\text{-}e^5F$ |
| 7495.088 | E | 400 | 4.20 | 5.85 | 4-4 | (1077) |
| 7445.776 | E | 200 | 4.24 | 5.90 | 3-3 | |
| 7411.178 | E | 100 | 4.26 | 5.93 | 2-2 | |
| 7389.425 | E | 80 | 4.28 | 5.95 | 1-1 | |
| 7306.61 | V | 3 | 4.16 | 5.85 | 5-4 | |
| 7288.760 | I | 10 | 4.20 | 5.90 | 4-3 | |
| 7293.068 | I | 15 | 4.24 | 5.93 | 3-2 | |
| 7311.101 | I | 12 | 4.26 | 5.95 | 2-1 | |
| 7710.390 | E | 25 | 4.20 | 5.80 | 4-5 | |
| 7661.223 | E | 30 | 4.24 | 5.85 | 3-4 | |
| 7568.925 | E | 30 | 4.26 | 5.90 | 2-3 | |
| 7491.678 | L | 12 | 4.28 | 5.93 | 1-2 | |
| 7008.014 | V | 5 | 4.16 | 5.92 | 5-4 | $y^5F^o\text{-}e^3F$ |
| 6898.31 | V | 3 | 4.20 | 5.99 | 4-3 | (1078) |
| 6847.60 | P | (1) | 4.24 | 6.04 | 3-2 | |
| 7181.222 | L | 10 | 4.20 | 5.92 | 4-4 | |
| 7038.818 | V | 2 | 4.24 | 5.99 | 3-3 | |
| 6951.62 | P | (1) | 4.26 | 6.04 | 2-2 | |
| 7333.62 | V | 1n | 4.24 | 5.92 | 3-4 | |
| •7148.69 | R | (-) | 4.26 | 5.99 | 2-3 | |
| 7022.39 | P | ⊙ | 4.28 | 6.04 | 1-2 | |
| •6005.53 | V | (1) | 4.16 | 6.21 | 5-6 | $y^5F^o\text{-}e^7F$ |
| •6021.82 | W | (2n) | 4.26 | 6.31 | 3-3 | (1079) |
| 6008.35 | P | ⊙ | 4.28 | 6.34 | 1-2 | |
| 5992.65 | P | ⊙? | 4.16 | 6.22 | 5-5 | $y^5F^o\text{-}f^7D$ |
| 5961.91 | P | ⊙ | 4.20 | 6.27 | 4-4 | (1080) |
| 6060.81 | P | ⊙ | 4.20 | 6.24 | 4-3 | $y^5F^o\text{-}f^5D$ |
| 6107.09 | P | (1) | 4.24 | 6.26 | 3-2 | (1081) |
| 6032.67 | V | (1) | 4.20 | 6.25 | 4-3 | $y^5F^o\text{-}e^7P$ |
| •6127.913 | J | (2) | 4.26 | 6.28 | 2-2 | (1082) |
| 5940.972 | V | (2) | 4.16 | 6.24 | 5-6 | $y^5F^o\text{-}e^5G$ |
| 5996.49 | P | ⊙ | 4.26 | 6.32 | 2-3 | (1083) |
| 5877.770 | U | (1) | 4.16 | 6.26 | 5-5 | |
| 5901.53 | P | ⊙ | 4.20 | 6.29 | 4-4 | |
| 5918.93 | P | (1) | 4.24 | 6.32 | 3-3 | |
| 5742.95 | P | (1) | 4.16 | 6.31 | 5-5 | $y^5F^o\text{-}f^5F$ |
| 5738.22 | P | ⊙ | 4.20 | 6.35 | 4-4 | (1084) |
| 5786.99 | P | ⊙ | 4.24 | 6.37 | 3-3 | |
| 5826.64 | P | ⊙ | 4.26 | 6.38 | 2-2 | |
| 5859.20 | V | (1) | 4.28 | 6.39 | 1-1 | |
| 5627.08 | P | ⊙ | 4.16 | 6.35 | 5-4 | |
| 5691.69 | P | ⊙ | 4.20 | 6.37 | 4-3 | |
| 5753.38 | P | ⊙ | 4.24 | 6.38 | 3-2 | |
| 5809.88 | P | ⊙ | 4.26 | 6.39 | 2-1 | |
| 5858.77 | P | ⊙ | 4.20 | 6.31 | 4-5 | |
| 5835.10 | P | ⊙ | 4.24 | 6.35 | 3-4 | |
| 5861.11 | P | ⊙ | 4.26 | 6.37 | 2-3 | |
| 5876.27 | P | ⊙ | 4.28 | 6.38 | 1-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 5943.62 | P | ⊙ | 4.24 | 6.31 | 3-2 | $y^5F^o$-$e^5S$ |
| *6031.82 | W | (2n) | 4.26 | 6.31 | 2-2 | (1085) |
| 5793.932 | V | (2) | 4.20 | 6.33 | 4-3 | $y^5F^o$-$e^3D$ |
| 5741.861 | V | (2) | 4.24 | 6.39 | 3-2 | (1086) |
| *5715.107 | V | (1) | 4.26 | 6.42 | 2-1 | |
| 5892.71 | W | (2) | 4.24 | 6.33 | 3-3 | |
| 5814.80 | V | (1) | 4.26 | 6.39 | 2-2 | |
| 5762.84 | P | ⊙ | 4.28 | 6.42 | 1-1 | |
| 5969.554 | U | (2) | 4.26 | 6.33 | 2-3 | |
| 5864.24 | P | (1) | 4.28 | 6.39 | 1-2 | |
| 5662.525 | B | 6 | 4.16 | 6.34 | 5-4 | $y^5F^o$-$g^5D$ |
| 5638.266 | I | 3 | 4.20 | 6.39 | 4-3 | (1087) |
| 5641.464 | V | (2) | 4.24 | 6.43 | 3-2 | |
| 5658.67 | P | ⊙ | 4.26 | 6.45 | 2-1 | |
| 5691.509 | V | (1) | 4.28 | 6.45 | 1-0 | |
| 5775.090 | J | (5) | 4.20 | 6.34 | 4-4 | |
| 5731.771 | J | (3) | 4.24 | 6.39 | 3-3 | |
| 5711.867 | V | (2) | 4.26 | 6.43 | 2-2 | |
| 5705.48 | V | (1) | 4.28 | 6.45 | 1-1 | |
| 5873.211 | V | (2) | 4.24 | 6.34 | 3-4 | |
| 5804.478 | U | (1) | 4.26 | 6.39 | 2-3 | |
| *5759.56 | P | (2) | 4.28 | 6.43 | 1-2 | |
| 5617.14 | P | ⊙ | 4.20 | 6.40 | 4-3 | $y^5F^o$-$e^5P$ |
| 5635.85 | V | (1) | 4.24 | 6.43 | 3-2 | (1088) |
| 5731.71 | P | ⊙ | 4.26 | 6.42 | 2-1 | |
| 5709.93 | P | ⊙ | 4.24 | 6.40 | 3-3 | |
| 5706.11 | P | ⊙ | 4.26 | 6.43 | 2-2 | |
| 5162.288 | J | 10n | 4.16 | 6.55 | 5-5 | $y^5F^o$-$g^5F$ |
| 5165.422 | J | (4) | 4.20 | 6.59 | 4-4 | (1089) |
| 5126.218 | T | (1) | 4.24 | 6.65 | 3-3 | |
| 5072.077 | K | (1) | 4.26 | 6.70 | 2-2 | |
| 5076.288 | T | (2) | 4.28 | 6.71 | 1-1 | |
| 5075.17 | P | ⊙ | 4.16 | 6.59 | 5-4 | |
| 5051.29 | P | ⊙ | 4.20 | 6.65 | 4-3 | |
| 5016.48 | P | ⊙ | 4.24 | 6.70 | 3-2 | |
| 5255.68 | P | ⊙ | 4.20 | 6.55 | 4-5 | |
| 5243.798 | V | (1) | 4.24 | 6.59 | 3-4 | |
| 5184.292 | U | (3n) | 4.26 | 6.65 | 2-3 | |
| 5109.662 | V | (2) | 4.28 | 6.70 | 1-2 | |
| 5137.388 | J | 6n | 4.16 | 6.56 | 5-4 | $y^5F^o$-$h^5D$ |
| 5125.130 | J | 6n | 4.20 | 6.61 | 4-3 | (1090) |
| 5090.787 | K | (6n) | 4.24 | 6.66 | 3-2 | |
| 5104.47 | P | (1) | 4.26 | 6.68 | 2-1 | |
| *5229.857 | J | 5n | 4.20 | 6.56 | 4-4 | |
| 5202.27 ? | W | (1) | 4.24 | 6.61 | 3-3 | |
| 5148.061 | V | (3) | 4.26 | 6.66 | 2-2 | |
| *5142.541 | J | (3w) | 4.28 | 6.68 | 1-1 | |
| 5228.408 | V | (1n) | 4.20 | 6.56 | 4-3 | $y^5F^o$-$f^5P$ |
| 5196.100 | V | (2w) | 4.24 | 6.61 | 3-2 | (1091) |
| 5159.066 | V | (2w) | 4.26 | 6.66 | 2-1 | |
| 5308.71 | P | ⊙ | 4.24 | 6.56 | 3-3 | |
| 5255.76 | P | ⊙ | 4.26 | 6.61 | 2-2 | |
| 5197.93 | P | ⊙ | 4.28 | 6.66 | 1-1 | |
| 5133.692 | J | 20n | 4.16 | 6.56 | 5-6 | $y^5F^o$-$f^5G$ |
| 5195.471 | K | (8) | 4.20 | 6.58 | 4-5 | (1092) |
| *5142.541 | J | (3w) | 4.24 | 6.64 | 3-4 | |
| 5096.998 | J | (6) | 4.26 | 6.69 | 2-3 | |
| 5079.002 | V | (1n) | 4.28 | 6.71 | 1-2 | |
| 5104.21 | U | (1) | 4.16 | 6.58 | 5-5 | |
| 5067.162 | V | (1) | 4.20 | 6.64 | 4-4 | |
| *5040.902 | V | (2) | 4.24 | 6.69 | 3-3 | |
| 4986.90 | P | ⊙ | 4.24 | 6.71 | 3-2 | |
| 5085.68 | P | ⊙ | 4.16 | 6.59 | 5-6 | $y^5F^o$-$e^5H$ |
| 5040.25 | P | ⊙ | 4.20 | 6.65 | 4-5 | (1093) |
| 5021.60 | P | ⊙ | 4.24 | 6.70 | 3-4 | |
| 5012.68 | P | ⊙ | 4.26 | 6.73 | 2-3 | |
| 4954.30 | P | ⊙ | 4.16 | 6.65 | 5-5 | |
| 4866.77 | P | ⊙? | 4.16 | 6.70 | 5-4 | |
| 4987.62 | P | ⊙ | 4.18 | 6.63 | 5-5 | $y^5F^o$-$e^3G$ |
| 4991.86 | P | ⊙ | 4.20 | 6.67 | 4-4 | (1094) |
| 4985.98 | P | ⊙ | 4.24 | 6.71 | 3-3 | |
| 5074.757 | J | 10n | 4.20 | 6.63 | 4-5 | |
| 5065.020 | J | 6n | 4.24 | 6.67 | 3-4 | |
| *5040.902 | V | (2) | 4.26 | 6.71 | 2-3 | |
| 5072.690 | T | (1) | 4.20 | 6.64 | 4-3 | $y^5F^o$-$f^3D$ |
| 5064.95 | P | ⊙ | 4.24 | 6.67 | 3-2 | (1095) |
| 5023.226 | T | (-) | 4.26 | 6.72 | 2-1 | |
| 5148.234 | U | (3) | 4.24 | 6.64 | 3-3 | |
| 5121.646 | V | (2n) | 4.26 | 6.67 | 2-2 | |
| *5060.079 | T | (1) | 4.28 | 6.72 | 1-1 | |
| 5206.80 | P | ⊙ | 4.26 | 6.64 | 2-3 | |
| 5159.95 | P | ⊙ | 4.28 | 6.67 | 1-2 | |
| 4972.39 | P | (1) | 4.16 | 6.64 | 5-5 | $y^5F^o$-$g^7D$ |
| 4893.59 | P | ⊙ | 4.16 | 6.68 | 5-4 | (1096) |
| 4906.80 | P | ⊙ | 4.20 | 6.72 | 4-3 | |
| 4962.564 | U | (1) | 4.16 | 6.65 | 5-6 | $y^5F^o$-$e^3H$ |
| 4942.59 | P | ⊙ | 4.24 | 6.73 | 3-4 | (1097) |
| 4872.91 | P | ⊙ | 4.20 | 6.73 | 4-4 | |
| 4749.25 | P | ⊙ | 4.24 | 6.84 | 3-2 | $y^5F^o$-$f^3F$ |
| 4842.71 | P | ⊙ | 4.20 | 6.75 | 4-4 | (1098) |
| *4807.343 | S | (-) | 4.24 | 6.81 | 3-3 | |
| 4799.06 | P | ⊙ | 4.26 | 6.84 | 2-2 | |
| 4911.52 | P | ⊙ | 4.24 | 6.75 | 3-4 | |
| 4858.27 | P | ⊙ | 4.26 | 6.81 | 2-3 | |
| *4832.734 | J | (2) | 4.28 | 6.84 | 1-2 | |
| 4465.33 | P | (1) | 4.20 | 6.97 | 4-5 | $y^5F^o$-1 (1099) |
| 4460.55 | P | ⊙? | 4.20 | 6.97 | 4- | $y^5F^o$-2 (1100) |
| 4384.13 | P | ⊙? | 4.20 | 7.02 | 4-4 | $y^5F^o$-3 (1101) |
| 4285.71 | P | ⊙ | 4.20 | 7.12 | 4-4 | $y^5F^o$-$1^5D$ |
| 4256.79 | U | (1) | 4.24 | 7.14 | 3-3 | (1102) |
| 4278.01 | P | ⊙ | 4.24 | 7.12 | 3-4 | |
| **Fe I** continued | | | | | | |
| 4113.972 | J | 3n | 4.16 | 7.16 | 5-6 | $y^5F^o$-$g^5G$ |
| 4125.622 | J | (1) | 4.20 | 7.19 | 4-5 | (1103) |
| 4133.54 | P | ⊙ | 4.24 | 7.22 | 3-4 | |
| 4137.42 | P | ⊙ | 4.26 | 7.25 | 2-3 | |
| 4142.628 | V | (1N) | 4.28 | 7.26 | 1-2 | |
| 4067.85 | P | ⊙ | 4.16 | 7.19 | 5-5 | |
| 4083.71 | P | | 4.20 | 7.22 | 4-4 | |
| 4100.35 | P | ⊙ | 4.24 | 7.25 | 3-3 | |
| *4117.872 | V | (1) | 4.26 | 7.26 | 2-2 | |
| 4185.66 | P | ⊙ | 4.24 | 7.19 | 3-3 | $y^5F^o$-4 |
| 4224.30 | P | ⊙ | 4.26 | 7.19 | 2-2 | (1104) |
| 7239.885 | I | 6 | 4.19 | 5.90 | 2-3 | $z^3P^o$-$e^5F$ |
| 7311.26 | P | ⊙ | 4.24 | 5.93 | 1-2 | (1105) |
| 7095.425 | I | 3 | 4.19 | 5.93 | 2-2 | |
| 7213.84 | P | ⊙ | 4.24 | 5.95 | 1-1 | |
| 5955.682 | U | (1) | 4.24 | 6.31 | 1-2 | $z^3P^o$-$e^5S$ (1106) |
| 5762.992 | K | 10 | 4.19 | 6.33 | 2-3 | $z^3P^o$-$e^3D$ |
| 5753.136 | J | 5 | 4.24 | 6.39 | 1-2 | (1107) |
| 5717.845 | L | (3) | 4.27 | 8.42 | 0-1 | |
| 5618.646 | V | (1) | 4.19 | 6.39 | 2-2 | |
| *5655.506 | V | 4 | 4.24 | 6.42 | 1-1 | |
| m5525.48 | P | Fe | 4.19 | 6.42 | 2-1 | |
| 5608.98 | P | ⊙ | 4.19 | 6.39 | 2-3 | $z^3P^o$-$g^5D$ |
| 5652.32 | V | (1) | 4.24 | 6.43 | 1-2 | (1108) |
| 5661.36 | W | (1) | 4.27 | 6.45 | 0-1 | |
| 5522.46 | V | (2) | 4.19 | 6.43 | 2-2 | |
| *5600.242 | V | (1) | 4.24 | 6.45 | 1-1 | |
| 5473.730 | V | (1) | 4.19 | 6.45 | 2-1 | |
| 5588.07 | P | | 4.19 | 6.40 | 2-3 | $z^3P^o$-$e^5P$ |
| 5646.70 | P | ⊙ | 4.24 | 6.43 | 1-2 | (1109) |
| 5734.445 | U | (1) | 4.27 | 6.42 | 0-1 | |
| 5517.08 | W | (1n) | 4.19 | 6.43 | 2-2 | |
| 5661.97 | P | ⊙ | 4.24 | 6.42 | 1-1 | |
| 5027.785 | T | (-) | 4.19 | 6.65 | 2-3 | $z^3P^o$-$g^5F$ |
| 5025.08 | P | ⊙ | 4.24 | 6.70 | 1-2 | (1110) |
| 5041.33 | P | ⊙ | 4.27 | 6.71 | 0-1 | |
| 4922.18 | P | ⊙ | 4.19 | 6.70 | 2-2 | |
| 4992.80 | P | ⊙ | 4.24 | 6.71 | 1-1 | |
| 4993.687 | U | (1) | 4.19 | 6.66 | 2-2 | $z^3P^o$-$h^5D$ |
| 5056.856 | U | (1) | 4.24 | 6.68 | 1-1 | (1111) |
| *4952.846 | V | (1n) | 4.19 | 6.68 | 2-1 | |
| 5205.31 | P | ⊙ | 4.24 | 6.61 | 1-2 | $z^3P^o$-$f^5P$ |
| 5004.034 | T | (1) | 4.19 | 6.66 | 2-1 | (1112) |
| 4945.65 | W | (1) | 4.19 | 6.69 | 2-3 | $z^3P^o$-$f^5G$ |
| 4995.41 | P | ⊙ | 4.24 | 6.71 | 1-2 | (1113) |
| 4893.70 | P | ⊙ | 4.19 | 6.71 | 2-2 | |
| 4730.56 | P | ⊙? | 4.19 | 6.81 | 2-3 | $z^3P^o$-$f^3F$ (1114) |
| 4775.87 | P | | 4.19 | 6.77 | 2-2 | $z^3P^o$-$e^3P$ |
| *4757.582 | J | (2) | 4.24 | 6.84 | 1-1 | (1115) |
| 4665.24 | P | ⊙ | 4.19 | 6.84 | 2-1 | |
| 4873.69 | P | ⊙ | 4.24 | 6.77 | 1-2 | |
| 4801.63 | P | ⊙ | 4.27 | 6.84 | 0-1 | |
| 4160.78 | P | ⊙ | 4.19 | 7.16 | 2-2 | $z^3P^o$-$1^5D$ (1116) |
| 8356.07 | P | ⊙ | 4.28 | 5.75 | 2-1 | $b^1D$-$z^3S^o$ (1117) |
| 7820.80 | P | ⊙ | 4.28 | 5.85 | 2-2 | $b^1D$-$1^o$ (1118) |
| 6756.56 | P | ⊙ | 4.28 | 6.10 | 2-2 | $b^1D$-$w^3F^o$ (1120) |
| 6571.22 | U | (1) | 4.28 | 6.15 | 2-3 | $b^1D$-$v^3G^o$ (1121) |
| 6736.56 | P | ⊙ | 4.28 | 6.11 | 2-2 | $b^1D$-$z^1D^o$ (1122) |
| 6267.845 | U | (1) | 4.28 | 6.24 | 2-3 | $b^1D$-$z^1F^o$ (1123) |
| 5883.06 | P | ⊙? | 4.28 | 6.37 | 2-2 | $b^1D$-$t^5D^o$ (1124) |
| 6035.34 | P | ⊙? | 4.28 | 6.32 | 2-2 | $b^1D$-$v^3F^o$ |
| 5976.18 | P | ⊙ | 4.28 | 6.34 | 2-3 | (1125) |
| 5816.07 | P | ⊙? | 4.28 | 6.40 | 2-3 | $b^1D$-$u^3G^o$ (1127) |
| 5856.084 | V | (2) | 4.28 | 6.38 | 2-2 | $b^1D$-$y^1D^o$ (1128) |
| 5837.709 | V | (1) | 4.28 | 6.39 | 2-2 | $b^1D$-$x^1D^o$ (1129) |
| 5539.831 | U | (1) | 4.28 | 6.50 | 2-2 | $b^1D$-$t^3D^o$ |
| 5698.37 | W | (2) | 4.28 | 6.44 | 2-1 | (1130) |
| 5469.09 | P | ⊙ | 4.28 | 6.53 | 2-2 | $b^1D$-$v^3P^o$ (1131) |
| 5376.849 | U | (2) | 4.28 | 6.57 | 2-1 | $b^1D$-$z^1P^o$ (1132) |
| 4734.100 | J | (1) | 4.28 | 6.88 | 2-2 | $b^1D$-$w^1D^o$ (1133) |
| 4725.94 | V | (1n) | 4.28 | 6.89 | 2-3 | $b^1D$-$w^1F^o$ (1134) |
| 4333.06 | P | ⊙ | 4.28 | 7.12 | 2-2 | $b^1D$-$t^3F^o$ (1135) |
| 8220.406 | E | 1500 | 4.30 | 5.80 | 6-5 | $z^5G^o$-$e^5F$ |
| 7937.186 | E | 700 | 4.29 | 5.85 | 5-4 | (1136) |
| 7998.972 | E | 700 | 4.35 | 5.90 | 4-3 | |
| 8046.073 | E | 600 | 4.40 | 5.93 | 3-2 | |
| 8085.200 | E | 500 | 4.43 | 5.95 | 2-1 | |
| 8179.03 | O | (1) | 4.29 | 5.80 | 5-5 | |
| 8248.151 | E | 30 | 4.35 | 5.85 | 4-4 | |
| 8232.347 | E | 50 | 4.40 | 5.90 | 3-3 | |
| 8207.787 | E | 40 | 4.43 | 5.93 | 2-2 | |
| **Fe I** continued | | | | | | |
| 8509.63 | P | ⊙ | 4.35 | 5.80 | 4-5 | $z^5G^o$-$e^5F$ |
| 8496.51 | P | ⊙ | 4.40 | 5.85 | 3-4 | (1136) |
| 8401.68 | P | ⊙ | 4.43 | 5.90 | 2-3 | cont |
| 7586.044 | E | 150 | 4.29 | 5.92 | 5-4 | $z^5G^o$-$e^3F$ |
| 7531.171 | E | 60 | 4.35 | 5.99 | 4-3 | (1137) |
| 7507.300 | L | 8 | 4.40 | 6.04 | 3-2 | |
| 7869.65 | O | 4 | 4.35 | 5.92 | 4-4 | |
| 7737.67 | P | ⊙ | 4.40 | 5.99 | 3-3 | |
| 7647.83 | P | ⊙ | 4.43 | 6.04 | 2-2 | |
| 6428.80 | V | (1) | 4.35 | 6.27 | 4-4 | $z^5G^o$-$f^7D$ (1138) |
| 6543.98 | U | (1) | 4.35 | 6.24 | 4-3 | $z^5G^o$-$f^5D$ (1139) |
| 6378.22 | P | ⊙ | 4.30 | 6.24 | 6-6 | $z^5G^o$-$e^5G$ |
| 6303.46 | V | (1n) | 4.30 | 6.26 | 6-5 | (1140) |
| 6351.29 | P | ⊙ | 4.29 | 6.24 | 5-6 | |
| 6472.15 | P | ⊙? | 4.35 | 6.26 | 4-5 | |
| 6148.65 | P | ⊙ | 4.30 | 6.31 | 6-5 | $z^5G^o$-$f^5F$ (1141) |
| 6034.04 | P | (2) | 4.29 | 6.34 | 5-4 | $z^5G^o$-$g^5D$ |
| 6054.100 | U | (2) | 4.35 | 6.39 | 4-3 | (1142) |
| 6081.72 | P | ⊙ | 4.40 | 6.43 | 3-2 | |
| 6212.04 | V | (1) | 4.35 | 6.34 | 4-4 | |
| 5381.637 | U | (1) | 4.40 | 6.70 | 3-2 | $z^5G^o$-$g^5F$ |
| 5395.25 | W | (1n) | 4.43 | 6.71 | 2-1 | (1143) |
| 5469.29 | P | ⊙ | 4.29 | 6.55 | 5-5 | |
| 5512.277 | V | (1) | 4.35 | 6.59 | 4-4 | |
| 5487.16 | V | (1) | 4.40 | 6.65 | 3-3 | |
| 5432.950 | U | (2n) | 4.43 | 6.70 | 2-2 | |
| 5615.18 | P | ⊙ | 4.35 | 6.55 | 4-5 | |
| 5441.321 | U | (1) | 4.29 | 6.56 | 5-4 | $z^5G^o$-$h^5D$ |
| 5466.404 | J | (3) | 4.35 | 6.61 | 4-3 | (1144) |
| 5446.58 | P | | 4.40 | 6.66 | 3-2 | |
| 5470.17 | W | (1) | 4.43 | 6.68 | 2-1 | |
| 5520.19 | P | ⊙? | 4.43 | 6.66 | 2-2 | |
| 5455.433 | K | (5) | 4.30 | 6.56 | 6-6 | $z^5G^o$-$f^5G$ |
| m5404.12 | P | Fe | 4.29 | 6.58 | 5-5 | (1145) |
| 5400.509 | J | (5) | 4.35 | 6.64 | 4-4 | |
| 5389.461 | K | (5) | 4.40 | 6.69 | 3-3 | |
| 5398.285 | V | (1) | 4.43 | 6.71 | 2-2 | |
| 5422.15 | P | ⊙ | 4.30 | 6.58 | 6-5 | |
| 5265.42 | P | ⊙ | 4.29 | 6.64 | 5-4 | |
| 5327.86 | P | ⊙? | 4.40 | 6.71 | 3-2 | |
| 5437.19 | P | ⊙ | 4.29 | 6.56 | 5-6 | |
| 5546.512 | V | (1) | 4.35 | 6.58 | 4-5 | |
| 5505.893 | T | (-) | 4.40 | 6.64 | 3-4 | |
| 5461.54 | W | (1n) | 4.43 | 6.69 | 2-3 | |
| 5424.072 | I | 45n | 4.30 | 6.58 | 6-7 | $z^5G^o$-$e^5H$ |
| 5383.374 | I | 35n | 4.29 | 6.59 | 5-6 | (1146) |
| 5369.965 | I | 25n | 4.35 | 6.65 | 4-5 | |
| 5367.470 | I | 20n | 4.40 | 6.70 | 3-4 | |
| 5364.874 | I | 15n | 4.43 | 6.73 | 2-3 | |
| 5401.27 | P | ⊙ | 4.30 | 6.59 | 6-6 | |
| 5236.38 | P | ⊙ | 4.29 | 6.65 | 5-5 | |
| 5267.28 | P | ⊙ | 4.35 | 6.70 | 4-4 | |
| 5295.316 | U | (1) | 4.40 | 6.73 | 3-3 | |
| 5290.79 | P | | 4.30 | 6.63 | 6-5 | $z^5G^o$-$e^3G$ |
| 5184.17 | P | ⊙ | 4.29 | 6.67 | 5-4 | (1147) |
| 5273.62 | P | ⊙ | 4.29 | 6.63 | 5-5 | |
| 5315.07 | W | (1) | 4.35 | 6.67 | 4-4 | |
| 5326.793 | T | (-) | 4.40 | 6.71 | 3-3 | |
| 5409.125 | V | (1) | 4.35 | 6.63 | 4-5 | |
| 5406.77 | P | ⊙ | 4.35 | 6.64 | 4-3 | $z^5G^o$-$f^3D$ |
| 5417.03 | W | (1) | 4.40 | 6.67 | 3-2 | (1148) |
| 5512.40 | P | ⊙ | 4.40 | 6.64 | 3-3 | |
| 5489.85 | P | ⊙ | 4.43 | 6.67 | 2-2 | |
| 5262.61 | P | ⊙ | 4.30 | 6.65 | 6-6 | $z^5G^o$-$e^3H$ |
| 5130.91 | P | ⊙ | 4.29 | 6.70 | 5-5 | (1149) |
| 5056.00 | W | (1) | 4.29 | 6.73 | 5-4 | |
| 5245.62 | P | ⊙ | 4.29 | 6.65 | 5-6 | |
| 5259.09 | P | ⊙ | 4.35 | 6.70 | 4-5 | |
| 5277.31 | P | ⊙ | 4.40 | 6.73 | 3-4 | |
| 5023.476 | T | (-) | 4.29 | 6.75 | 5-4 | $z^5G^o$-$f^3F$ |
| 5031.901 | R | 8 | 4.35 | 6.81 | 4-3 | (1150) |
| *5057.49 | W | (1) | 4.40 | 6.84 | 3-2 | |
| 5146.30 | P | ⊙ | 4.35 | 6.75 | 4-4 | |
| 5123.28 | P | ⊙ | 4.40 | 6.81 | 3-3 | |
| 5120.89 | P | ⊙ | 4.43 | 6.84 | 2-2 | |
| 5241.90 | P | (1) | 4.40 | 6.75 | 3-4 | |
| 4618.568 | V | (2w) | 4.29 | 6.97 | 5-5 | $z^5G^o$-1 (1151) |
| 4631.49 | W | (1) | 4.35 | 7.02 | 4-4 | $z^5G^o$-3 (1152) |
| 8598.79 | O | 4 | 4.37 | 5.80 | 5-5 | $z^3G^o$-$e^5F$ |
| 8610.62 | P | ⊙ | 4.42 | 5.85 | 4-4 | (1153) |
| 8562.13 | P | ⊙ | 4.45 | 5.90 | 3-3 | |
| 8331.941 | E | 200 | 4.37 | 5.85 | 5-4 | |
| 8339.431 | E | 80 | 4.42 | 5.90 | 4-3 | |
| 8360.822 | E | 8 | 4.45 | 5.93 | 3-2 | |
| 8896.00 | P | ⊙ | 4.42 | 5.80 | 4-5 | |
| 8848.25 | P | | 4.45 | 5.85 | 3-4 | |
| 7945.878 | E | 600 | 4.37 | 5.92 | 5-4 | $z^3G^o$-$e^3F$ |
| 7832.224 | E | 400 | 4.42 | 5.99 | 4-3 | (1154) |
| 7780.586 | E | 300 | 4.45 | 6.04 | 3-2 | |
| 8198.951 | E | 80 | 4.42 | 5.93 | 4-4 | |
| 8028.341 | E | 50 | 4.45 | 5.99 | 3-3 | |
| 8414.08 | P | ⊙ | 4.45 | 5.92 | 3-4 | |
| 6681.34 | P | ⊙ | 4.37 | 6.31 | 5-6 | $z^3G^o$-$e^7F$ |
| 6635.68 | P | ⊙ | 4.42 | 6.28 | 4-5 | (1155) |
| 6615.03 | P | ⊙ | 4.45 | 6.32 | 3-4 | |
| 6665.42 | P | ⊙ | 4.37 | 6.22 | 5-5 | $z^3G^o$-$f^7D$ |
| m6646.90 | P | Fe | 4.42 | 6.27 | 4-4 | (1156) |
| 6700.89 | P | ⊙ | 4.45 | 6.30 | 3-2 | |
| 6787.61 | P | ⊙ | 4.45 | 6.27 | 3-4 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Fe I continued | | | | | | |
| 3623.41 | P | ⊙ | 4.37 | 6.23 | 5-4 | $z^3G^o$-$e^7P$ |
| 3735.00 | P | ⊙ | 4.42 | 6.25 | 4-3 | (1157) |
| 3879.51 | P | ⊙ | 4.45 | 6.25 | 3-3 | |
| 3438.775 | U | (1) | 4.42 | 6.33 | 4-3 | $z^3G^o$-$e^3D$ (1158) |
| 3653.889 | U | (1w) | 4.37 | 6.55 | 5-5 | $z^3G^o$-$g^5F$ |
| 3631.72 | U | (2) | 4.45 | 6.65 | 3-3 | (1159) |
| 3549.55 | P | ⊙ | 4.37 | 6.59 | 5-4 | |
| 3499.60 | P | ⊙ | 4.45 | 6.70 | 3-2 | |
| 3780.83 | V | (1) | 4.42 | 6.55 | 4-5 | |
| 3634.056 | V | (1) | 4.37 | 6.56 | 5-4 | $z^3G^o$-$h^5D$ |
| 3589.00 | P | ⊙? | 4.45 | 6.66 | 3-2 | (1160) |
| 3749.65 | P | ⊙ | 4.42 | 6.56 | 4-4 | |
| 3733.66 | P | (1) | 4.45 | 6.61 | 3-3 | |
| 3619.60 | V | (1) | 4.37 | 6.56 | 5-6 | $z^3G^o$-$f^5G$ |
| 3708.109 | V | (1) | 4.42 | 6.58 | 4-5 | (1161) |
| 3651.47 | P | ⊙ | 4.45 | 6.64 | 3-4 | |
| 3553.586 | V | (1) | 4.42 | 6.64 | 4-4 | |
| 3528.89 | P | ⊙ | 4.45 | 6.69 | 3-3 | |
| 3436.299 | U | (1) | 4.37 | 6.64 | 5-4 | |
| 3435.17 | P | ⊙ | 4.42 | 6.69 | 4-3 | |
| 3562.12 | P | ⊙ | 4.37 | 6.59 | 5-6 | $z^3G^o$-$e^5H$ |
| 3521.28 | P | ⊙ | 4.42 | 6.65 | 4-5 | (1162) |
| 3505.75 | P | ⊙ | 4.45 | 6.70 | 3-4 | |
| 3405.35 | P | ⊙ | 4.37 | 6.65 | 5-5 | |
| 3412.80 | P | ⊙ | 4.42 | 6.70 | 4-4 | |
| 3429.83 | P | ⊙ | 4.45 | 6.73 | 3-3 | |
| 3301.33 | P | ⊙ | 4.37 | 6.70 | 5-4 | |
| 3339.40 | P | ⊙ | 4.42 | 6.73 | 4-3 | |
| 3445.045 | J | 15n | 4.37 | 6.63 | 5-5 | $z^3G^o$-$e^3G$ |
| 3463.282 | J | 10n | 4.42 | 6.67 | 4-4 | (1163) |
| 3462.970 | J | (2) | 4.45 | 6.71 | 3-3 | |
| 3349.742 | T | (3) | 4.37 | 6.67 | 5-4 | |
| 3371.43 | P | Fe | 4.42 | 6.71 | 4-3 | |
| 3362.713 | V | (2) | 4.42 | 6.63 | 4-5 | |
| 3357.954 | V | (1) | 4.45 | 6.67 | 3-4 | |
| 3360.230 | V | (1) | 4.42 | 6.64 | 4-3 | $z^3G^o$-$f^3D$ |
| 3357.90 | P | ⊙ | 4.45 | 6.87 | 3-2 | (1164) |
| 3415.201 | I | 35n | 4.37 | 6.65 | 5-6 | $z^3G^o$-$e^3H$ |
| 3404.144 | I | 30n | 4.42 | 6.70 | 4-5 | (1165) |
| 3410.913 | I | 15n | 4.45 | 6.73 | 3-4 | |
| 3293.03 | P | ⊙ | 4.37 | 6.70 | 5-5 | |
| 3321.106 | V | (1) | 4.42 | 6.73 | 4-4 | |
| 3313.036 | P | ⊙ | 4.37 | 6.73 | 5-4 | |
| 3178.798 | U | (1n) | 4.37 | 6.75 | 5-4 | $z^3G^o$-$f^3F$ |
| 3164.56 | W | (1) | 4.42 | 6.81 | 4-3 | (1166) |
| 3180.065 | T | (-) | 4.45 | 6.84 | 3-2 | |
| 3285.12 | P | ⊙ | 4.42 | 6.75 | 4-4 | |
| 3249.099 | U | (1n) | 4.45 | 6.81 | 3-3 | |
| 3373.704 | V | (1) | 4.45 | 6.75 | 3-4 | |
| 4838.81 | P | ⊙? | 4.42 | 6.97 | 4-5 | $z^3G^o$-1 (1167) |
| 4744.13 | P | ⊙? | 4.37 | 6.97 | 5- | $z^3G^o$-2 (1168) |
| 4534.62 | P | ⊙ | 4.42 | 7.14 | 4-3 | $z^3G^o$-$1^5D$ |
| 4566.03 | P | ⊙ | 4.45 | 7.16 | 3-2 | (1169) |
| 4367.07 | P | ⊙ | 4.37 | 7.19 | 5-5 | $z^3G^o$-$g^5G$ |
| 4320.13 | P | ⊙? | 4.37 | 7.22 | 5-4 | (1170) |
| 4357.50 | P | ⊙ | 4.42 | 7.25 | 4-3 | |
| 9786.62 | F | 2 | 4.59 | 5.85 | 3-4 | $y^3F^o$-$e^5F$ |
| 9350.46 | E | 10 | 4.53 | 5.85 | 4-4 | (1171) |
| 9437.91 | F | 2 | 4.59 | 5.90 | 3-3 | |
| 8866.961 | E | 150 | 4.53 | 5.92 | 4-4 | $y^3F^o$-$e^3F$ |
| 8793.376 | E | 120 | 4.59 | 5.99 | 3-3 | (1172) |
| 8764.000 | E | 100 | 4.63 | 6.04 | 2-2 | |
| 8439.603 | E | 20 | 4.53 | 5.99 | 4-3 | |
| 8497.00 | O | 8 | 4.59 | 6.04 | 3-2 | |
| 9258.30 | E | 20 | 4.59 | 5.92 | 3-4 | |
| 9079.599 | E | 8 | 4.63 | 5.99 | 2-3 | |
| 6843.671 | I | 60 | 4.53 | 6.33 | 4-3 | $y^3F^o$-$e^3D$ |
| 6858.164 | K | 40 | 4.59 | 6.39 | 3-2 | (1173) |
| 6885.772 | L | 20 | 4.63 | 6.42 | 2-1 | |
| 7074.45 | P | ⊙ | 4.59 | 6.33 | 3-3 | |
| 7031.02 | P | ⊙ | 4.63 | 6.39 | 2-2 | |
| 6881.07 | P | ⊙ | 4.63 | 6.43 | 2-2 | $y^3F^o$-$g^5D$ |
| 6827.558 | L | 5 | 4.53 | 6.39 | 4-3 | (1174) |
| 6715.410 | V | 5 | 4.59 | 6.43 | 3-2 | |
| 6804.020 | V | 5 | 4.63 | 6.45 | 2-1 | |
| 6105.15 | P | ⊙ | 4.53 | 6.55 | 4-5 | $y^3F^o$-$g^5F$ |
| 6159.409 | U | (1n) | 4.59 | 6.59 | 3-4 | (1175) |
| 5983.704 | K | 8 | 4.53 | 6.59 | 4-4 | |
| 5997.808 | V | (1) | 4.59 | 6.65 | 3-3 | |
| 5973.37 | P | ⊙ | 4.63 | 6.70 | 2-2 | |
| 5848.09 | W | (2n) | 4.59 | 6.70 | 3-2 | |
| 5927.798 | V | (2w,d) | 4.63 | 6.71 | 2-1 | |
| 6079.02 | V | (1) | 4.63 | 6.86 | 2-2 | $y^3F^o$-$h^5D$ |
| 5929.700 | U | (1) | 4.53 | 6.61 | 4-3 | (1176) |
| 5949.35 | V | (2) | 4.59 | 6.66 | 3-2 | |
| 6018.34 | P | ⊙ | 4.63 | 6.68 | 2-1 | |
| 8251.26 | P | ⊙ | 4.59 | 6.56 | 3-4 | |
| 6093.66 | V | (1) | 4.59 | 6.61 | 3-2 | $y^3F^o$-$f^5P$ |
| 6094.419 | U | (1) | 4.63 | 6.66 | 2-1 | (1177) |
| 6024.066 | K | 15 | 4.53 | 6.58 | 4-5 | $y^3F^o$-$f^5G$ |
| 6020.173 | K | 10n | 4.59 | 6.64 | 3-4 | (1178) |
| 6007.961 | K | (3n) | 4.63 | 6.69 | 2-3 | |
| 5852.19 | W | (2n) | 4.53 | 6.64 | 4-4 | |
| 5881.28 | P | ⊙ | 4.59 | 6.69 | 3-3 | |
| 5720.89 | P | ⊙ | 4.53 | 6.69 | 4-3 | |
| 5807.97 | P | ⊙ | 4.59 | 6.71 | 3-2 | |
| 5816.36 | V | (3d) | 4.53 | 6.65 | 4-5 | $y^3F^o$-$e^5H$ |
| 5855.126 | V | (1) | 4.59 | 6.70 | 3-4 | (1179) |
| 5891.16 | P | ⊙ | 4.63 | 6.73 | 2-3 | |
| 5696.10 | P | ⊙ | 4.53 | 6.70 | 4-4 | |
| 5769.31 | P | (1) | 4.59 | 6.73 | 3-3 | |
| 5862.357 | K | 8 | 4.53 | 6.63 | 4-5 | $y^3F^o$-$e^3G$ |
| 5914.16 | V | 8 | 4.59 | 6.67 | 3-4 | (1180) |
| 5930.173 | K | 8 | 4.63 | 6.71 | 2-3 | |
| 5752.043 | J | (3) | 4.53 | 6.67 | 4-4 | |
| 5806.727 | V | (3) | 4.59 | 6.71 | 3-3 | |
| 5650.31 | P | ⊙ | 4.53 | 6.71 | 4-3 | |
| 5859.608 | K | 5 | 4.53 | 6.64 | 4-3 | $y^3F^o$-$f^3D$ |
| 5914.16 | V | 8 | 4.59 | 6.67 | 3-2 | (1181) |
| 5905.673 | K | 3n | 4.63 | 6.72 | 2-1 | |
| 5686.532 | V | (3) | 4.53 | 6.70 | 4-5 | $y^3F^o$-$e^3H$ |
| 5747.95 | V | (1) | 4.59 | 6.73 | 3-4 | (1182) |
| 5594.661 | V | (2) | 4.53 | 6.73 | 4-4 | |
| 5554.895 | I | 4 | 4.53 | 6.75 | 4-4 | $y^3F^o$-$f^3F$ |
| 5565.708 | I | 4 | 4.59 | 6.81 | 3-3 | (1183) |
| 5598.303 | J | 4 | 4.63 | 6.84 | 2-2 | |
| 5421.85 | P | ⊙ | 4.53 | 6.81 | 4-3 | |
| 5488.14 | P | ⊙ | 4.59 | 6.84 | 3-2 | |
| 5705.988 | V | (2) | 4.59 | 6.75 | 3-4 | |
| 5679.023 | V | (2) | 4.63 | 6.81 | 2-3 | |
| 5642.75 | P | ⊙ | 4.59 | 6.77 | 3-2 | $y^3F^o$-$e^3P$ |
| 5759.270 | U | (1) | 4.63 | 6.77 | 2-2 | (1184) |
| 5057.83 | P | ⊙ | 4.53 | 6.97 | 4- | $y^3F^o$-2 (1185) |
| 6930.35 | P | ⊙ | 4.54 | 6.32 | 3-4 | $y^5P^o$-$e^7F$ |
| 7145.317 | V | 5 | 4.59 | 6.31 | 2-3 | (1186) |
| 6951.261 | I | 25 | 4.54 | 6.31 | 3-3 | |
| 7053.48 | P | | 4.59 | 6.34 | 2-2 | |
| 6864.31 | P | ⊙ | 4.54 | 6.34 | 3-2 | |
| 7115.25 | P | ⊙? | 4.59 | 6.32 | 2-1 | |
| 7120.01 | P | ⊙ | 4.54 | 6.27 | 3-4 | $y^5P^o$-$f^7D$ |
| 7395.00 | V | 1 | 4.59 | 6.28 | 2-3 | (1187) |
| 7356.81 | P | ⊙ | 4.62 | 6.30 | 1-2 | |
| 7223.88 | V | (1) | 4.59 | 6.30 | 2-2 | |
| 7330.16 | P | ⊙ | 4.62 | 6.30 | 1-1 | |
| 7024.649 | V | 10n | 4.54 | 6.30 | 3-2 | |
| 7320.694§ | L | 5n | 4.54 | 6.22 | 3-4 | $y^5P^o$-$f^5D$ |
| 7473.56 | O | (1) | 4.59 | 6.24 | 2-3 | (1188) |
| 7361.54 | V | 3n | 4.54 | 6.24 | 3-3 | |
| 7382.99 | V | 1n | 4.59 | 6.26 | 2-2 | |
| 7421.60 | O | 1 | 4.62 | 6.28 | 1-1 | |
| 7175.937 | V | 3 | 4.54 | 6.26 | 3-2 | |
| 7385.286 | V | 1 | 4.59 | 6.28 | 2-1 | |
| 7366.37 | O | 1 | 4.62 | 6.29 | 1-0 | |
| 7292.856 | V | 3n | 4.54 | 6.23 | 3-4 | $y^5P^o$-$e^7P$ |
| 7430.90 | M | 1 | 4.59 | 6.25 | 2-3 | (1189) |
| 7431.94 | P | ⊙ | 4.62 | 6.28 | 1-2 | |
| 7231.22 | V | 2n | 4.54 | 6.25 | 3-3 | |
| 7295.27 | P | ⊙ | 4.59 | 6.28 | 2-2 | |
| 7093.10 | P | ⊙ | 4.54 | 6.28 | 3-2 | |
| 7034.06 | P | ⊙ | 4.54 | 6.29 | 3-4 | $y^5P^o$-$e^5G$ |
| 7109.67 | P | ⊙ | 4.59 | 6.32 | 2-3 | (1190) |
| 7161.04 | P | ⊙ | 4.62 | 6.34 | 1-2 | |
| 6917.52 | P | | 4.54 | 6.32 | 3-3 | |
| 7034.08 | P | ⊙ | 4.59 | 6.34 | 2-2 | |
| 6845.93 | P | ⊙ | 4.54 | 6.34 | 3-2 | |
| 6862.481 | V | 4n | 4.54 | 6.34 | 3-4 | $y^5P^o$-$e^7G$ |
| 6989.64 | P | ⊙ | 4.59 | 6.35 | 2-3 | (1191) |
| 6803.84 | P | ⊙ | 4.54 | 6.35 | 3-3 | |
| 6803.30 | P | ⊙ | 4.54 | 6.35 | 3-4 | $y^5P^o$-$f^5F$ |
| 6920.16 | P | ⊙ | 4.59 | 6.37 | 2-3 | (1192) |
| 6838.08 | V | 4nl | 4.54 | 6.37 | 3-3 | |
| 6692.47 | P | 1 | 4.54 | 6.38 | 3-2 | |
| 6848.86 | P | ⊙ | 4.59 | 6.39 | 2-1 | |
| 6951.261 | I | 25 | 4.54 | 6.31 | 3-2 | $y^5P^o$-$e^5S$ |
| 7145.317 | V | 5 | 4.59 | 6.31 | 2-2 | (1193) |
| 6881.74 | M | 1 | 4.54 | 6.33 | 3-3 | $y^5P^o$-$e^3D$ |
| 6855.74 | V | 2 | 4.59 | 6.39 | 2-2 | (1194) |
| 6833.24 | V | 1 | 4.62 | 6.42 | 1-1 | |
| 6676.86 | P | ⊙ | 4.54 | 6.39 | 3-2 | |
| 6717.556 | V | 3 | 4.59 | 6.42 | 2-1 | |
| 7071.88 | V | 1 | 4.59 | 6.33 | 2-3 | |
| 6976.308 | V | 1 | 4.62 | 6.39 | 1-2 | |
| 6855.176 | I | 150 | 4.54 | 6.34 | 3-4 | $y^5P^o$-$g^5D$ |
| 6841.349 | I | 80 | 4.59 | 6.39 | 2-3 | (1195) |
| 6828.610 | I | 50 | 4.62 | 6.43 | 1-2 | |
| 6663.26 | V | (1) | 4.54 | 6.39 | 3-3 | |
| 6713.14 | V | 6d | 4.59 | 6.43 | 2-2 | |
| 6752.724 | L | 10 | 4.62 | 6.45 | 1-1 | |
| 6541.49 | P | | 4.54 | 6.43 | 3-2 | |
| 6639.71 | P | 4 | 4.59 | 6.45 | 2-1 | |
| 6733.164 | L | 6 | 4.62 | 6.45 | 1-0 | |
| 6753.45 | P | ⊙ | 4.54 | 6.37 | 3-3 | $y^5P^o$-$e^7S$ |
| 6936.48 | P | ⊙ | 4.59 | 6.37 | 2-3 | (1196) |
| 6633.764 | K | 50 | 4.54 | 6.40 | 3-3 | $y^5P^o$-$e^5P$ |
| 6705.117 | I | 15n | 4.59 | 6.43 | 2-2 | (1197) |
| 6843.668 | V | 6n | 4.62 | 6.42 | 1-1 | |
| 6533.97 | V | 8n | 4.54 | 6.43 | 3-2 | |
| 6726.668 | V | 20n | 4.59 | 6.42 | 2-1 | |
| 6810.28 | V | 30n | 4.59 | 6.40 | 2-3 | |
| 6820.43 | O | 8n | 4.62 | 6.43 | 1-2 | |
| 6012.75 | P | ⊙ | 4.54 | 6.59 | 3-4 | $y^5P^o$-$g^5F$ |
| 5995.93 | P | ⊙ | 4.59 | 6.65 | 2-3 | (1198) |
| 5933.80 | P | ⊙ | 4.62 | 6.70 | 1-2 | |
| 5715.80 | P | ⊙ | 4.54 | 6.70 | 3-2 | |
| 6100.29 | P | (1) | 4.54 | 6.56 | 3-4 | $y^5P^o$-$h^5D$ |
| 6100.33 | P | (1) | 4.59 | 6.61 | 2-3 | (1199) |
| 5958.22 | P | (2) | 4.54 | 6.61 | 3-3 | |
| 5947.50 | P | (1) | 4.59 | 6.66 | 2-2 | |
| 5978.17 | P | ⊙ | 4.62 | 6.68 | 1-1 | |
| 6098.28 | P | ⊙ | 4.54 | 6.56 | 3-3 | $y^5P^o$-$f^5P$ |
| 6091.74 | P | ⊙ | 4.59 | 6.61 | 2-2 | (1200) |
| 5950.13 | P | ⊙ | 4.54 | 6.61 | 3-2 | |
| 5880.00 | V | (2wd) | 4.54 | 6.64 | 3-4 | $y^5P^o$-$f^5G$ |
| 5879.49 | P | ⊙ | 4.59 | 6.69 | 2-3 | (1201) |
| 5893.46 | P | ⊙ | 4.62 | 6.71 | 1-2 | |
| 5640.46 | W | (1n) | 4.54 | 6.73 | 3-3 | $y^5P^o$-$e^5H$ (1202) |
| 5887.46 | P | ⊙ | 4.54 | 6.64 | 3-3 | $y^5P^o$-$f^3D$ |
| 5867.01 | P | ⊙ | 4.62 | 6.72 | 1-1 | (1203) |
| 5778.81 | P | ⊙ | 4.54 | 6.67 | 3-2 | |
| 5759.57 | P | (2) | 4.54 | 6.68 | 3-4 | $y^5P^o$-$g^7D$ |
| 5727.75 | U | (1) | 4.59 | 6.74 | 2-2 | (1204) |
| 5620.04 | W | (1) | 4.54 | 6.73 | 3-4 | $y^5P^o$-$e^3H$ (1205) |
| 4776.34 | V | (1n) | 4.54 | 7.12 | 3-4 | $y^5P^o$-$1^5D$ |
| 4839.77 | P | ⊙ | 4.59 | 7.14 | 2-3 | (1206) |
| 4749.93 | V | (1) | 4.54 | 7.14 | 3-3 | |
| 4802.53 | P | ⊙ | 4.59 | 7.16 | 2-2 | |
| 4714.074 | V | (1n) | 4.54 | 7.16 | 3-2 | |
| 4661.538 | J | (2n) | 4.54 | 7.19 | 3-2 | $y^5P^o$-4 (1207) |
| 10333.24 | P | ⊙ | 4.57 | 5.77 | 4-4 | $d^3F$-$u^5D^o$ |
| 10307.48 | P | ⊙ | 4.57 | 5.77 | 4-3 | (1208) |
| 10156.50 | P | ⊙ | 4.57 | 5.79 | 4-4 | $d^3F$-$x^3F^o$ |
| 9881.51 | P | 1 | 4.56 | 5.81 | 3-3 | (1209) |
| 9747.24 | F | 2 | 4.56 | 5.83 | 2-2 | |
| 9950.70 | P | ⊙ | 4.57 | 5.81 | 4-3 | |
| 10084.42 | P | ⊙ | 4.56 | 5.79 | 3-4 | |
| 9937.10 | P | ⊙ | 4.57 | 5.82 | 4-4 | $d^3F$-$z^3H^o$ (1210) |
| 10026.10 | P | | 4.57 | 5.80 | 4-3 | $d^3F$-$w^3D^o$ |
| 9839.38 | F | 1 | 4.56 | 5.82 | 3-2 | (1211) |
| 9771.06 | P | ⊙ | 4.56 | 5.84 | 2-1 | |
| 9955.85 | P | ⊙ | 4.56 | 5.80 | 3-3 | |
| 9636.69 | Y | (1) | 4.57 | 5.85 | 4-5 | $d^3F$-$w^5G^o$ (1213) |
| 9225.55 | O | (1) | 4.56 | 5.90 | 3-4 | $d^3F$-$x^3G^o$ (1213) |
| 8848.46 | P | ⊙ | 4.56 | 5.96 | 2-2 | $d^3F$-$v^5P^o$ (1214) |
| 8576.50 | P | ⊙ | 4.57 | 6.01 | 4-4 | $d^3F$-$y^1G^o$ |
| 8525.04 | P | ⊙ | 4.56 | 6.01 | 3-4 | (1215) |
| 8253.78 | P | ⊙ | 4.56 | 6.06 | 2-2 | $d^3F$-$2^o$ (1216) |
| 8149.59 | O | 3 | 4.56 | 6.08 | 3-3 | $d^3F$-$w^3F^o$ |
| 8002.55 | P | ⊙ | 4.56 | 6.10 | 2-2 | (1217) |
| 8196.52 | P | ⊙ | 4.57 | 6.08 | 4-3 | |
| 8269.66 | P | ⊙ | 4.57 | 6.07 | 4-3 | $d^3F$-$v^3D^o$ |
| 8149.59 | O | 3 | 4.56 | 6.08 | 3-2 | (1218) |
| 7129.30 | P | ⊙ | 4.57 | 6.30 | 4-5 | $d^3F$-$x^3H^o$ (1219) |
| 7125.28 | P | ⊙ | 4.57 | 6.31 | 4-4 | $d^3F$-$t^5D^o$ |
| 6949.37 | P | | 4.56 | 6.34 | 3-3 | (1220) |
| 6805.72 | P | ⊙ | 4.56 | 6.37 | 2-2 | |
| 6983.53 | P | ⊙ | 4.57 | 6.34 | 4-3 | |
| 6822.00 | P | 1 | 4.56 | 6.37 | 3-2 | |
| 6711.24 | P | ⊙ | 4.56 | 6.40 | 2-1 | |
| 7089.73 | P | ⊙ | 4.56 | 6.31 | 3-4 | |
| 6932.49 | P | ⊙ | 4.56 | 6.34 | 2-3 | |
| 7011.364 | V | 3 | 4.57 | 6.33 | 4-4 | $d^3F$-$v^3F^o$ |
| 6947.501 | V | 3 | 4.56 | 6.34 | 3-3 | (1221) |
| 7010.362 | V | 2 | 4.56 | 6.32 | 2-2 | |
| 7027.60 | V | (1) | 4.56 | 6.32 | 3-2 | |
| 6976.934 | V | 3 | 4.56 | 6.33 | 3-4 | |
| 6930.64 | V | 1 | 4.56 | 6.34 | 2-3 | |
| 6960.334 | V | 2 | 4.57 | 6.35 | 4-4 | $d^3F$-$4^o$ |
| 6926.40 | P | ⊙ | 4.56 | 6.35 | 3-4 | (1222) |
| 6947.501 | V | 3 | 4.57 | 6.35 | 4- | $d^3F$-$5^o$ (1224) |
| 6854.82 | V | 2 | 4.57 | 6.37 | 4-5 | $d^3F$-$6^o$ (1224a) |
| 6977.445 | V | 4 | 4.57 | 6.34 | 4-5 | $d^3F$-$u^3G^o$ |
| 6804.27 | V | 3 | 4.56 | 6.38 | 3-4 | (1225) |
| 6716.24 | V | 3 | 4.56 | 6.40 | 2-3 | |
| 6837.00 | O | 3 | 4.57 | 6.38 | 4-4 | |
| 6732.06 | V | 1 | 4.56 | 6.40 | 3-3 | |
| 6764.13 | P | ⊙ | 4.57 | 6.40 | 4-3 | |
| 6785.76 | P | ⊙ | 4.56 | 6.38 | 3-2 | $d^3F$-$y^1D^o$ |
| 6769.66 | P | ⊙ | 4.56 | 6.38 | 2-2 | (1226) |
| 6761.07 | P | ⊙ | 4.56 | 6.39 | 3-2 | $d^3F$-$x^1D^o$ |
| 6745.11 | V | 1 | 4.56 | 6.39 | 2-2 | (1227) |
| 6699.14 | V | 2 | 4.57 | 6.42 | 4-3 | $d^3F$-$u^3D^o$ |
| 6667.73 | V | (1) | 4.56 | 6.42 | 3-3 | (1228) |
| 6591.32 | V | 2 | 4.57 | 6.45 | 4-3 | $d^3F$-$t^3D^o$ |
| 6364.717 | V | (1) | 4.56 | 6.50 | 3-2 | (1229) |
| 6306.19 | P | ⊙ | 4.57 | 6.53 | 4-5 | $d^3F$-$y^3I^o$ (1230) |
| 6271.52 | P | ⊙ | 4.56 | 6.53 | 3-2 | $d^3F$-$v^3P^o$ |
| 5926.83 | P | ⊙ | 4.56 | 6.64 | 2-1 | (1231) |
| 6016.95 | P | ⊙ | 4.57 | 6.62 | 4-3 | $d^3F$-$y^1F^o$ |
| 5991.58 | P | ⊙ | 4.56 | 6.62 | 3-3 | (1232) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 5955.12 | P | ⊙ | 4.56 | 6.64 | 3-3 | $d^3F-x^1F^o$ |
| 5942.71 | P | ⊙ | 4.56 | 6.64 | 2-3 | (1233) |
| 5902.52 | V | (1) | 4.57 | 6.66 | 4-5 | $d^3F-t^3G^o$ |
| 5791.53 | P | ⊙ | 4.56 | 6.70 | 3-4 | (1234) |
| 5661.03 | P | ⊙ | 4.56 | 6.74 | 2-3 | |
| 5815.23 | P | (1) | 4.57 | 6.70 | 4-4 | |
| 5672.28 | P | (1) | 4.56 | 6.74 | 3-3 | |
| 5895.007 | U | (1) | 4.57 | 6.67 | 4-3 | $d^3F-11^o$ |
| 5870.65 | P | ⊙ | 4.56 | 6.67 | 3-3 | (1235) |
| 5891.89 | P | (1) | 4.57 | 6.67 | 4-5 | $d^3F-12^o$ (1236) |
| 5793.70 | P | ⊙ | 4.57 | 6.70 | 4-4 | $d^3F-13^o$ |
| 5770.17 | P | ⊙ | 4.56 | 6.70 | 3-4 | (1236a) |
| 5438.04 | P | ⊙ | 4.57 | 6.84 | 4-5 | $d^3F-v^3H^o$ |
| 5412.56 | P | ⊙ | 4.56 | 6.84 | 3-4 | (1237) |
| 5313.839 | T | (-) | 4.56 | 6.88 | 2-2 | $d^3F-w^1D^o$ (1238) |
| 5313.41 | P | ⊙ | 4.56 | 6.89 | 3-3 | $d^3F-w^1F^o$ (1239) |
| 5300.41 | P | ⊙ | 4.57 | 6.90 | 4-5 | $d^3F-s^3G^o$ |
| 5281.18 | P | ⊙ | 4.56 | 6.90 | 3-4 | (1240) |
| 5218.51 | P | ⊙ | 4.56 | 6.93 | 2-3 | |
| 5170.08 | P | ⊙ | 4.57 | 6.96 | 4-5 | $d^3F-u^3H^o$ (1241) |
| 5114.52 | P | ⊙ | 4.57 | 6.99 | 4-4 | $d^3F-u^3F^o$ |
| 5047.14 | P | ⊙ | 4.56 | 7.01 | 3-3 | (1242) |
| 5019.18 | P | ⊙ | 4.56 | 7.02 | 2-2 | |
| 5096.17 | P | ⊙ | 4.56 | 6.99 | 3-4 | |
| 4875.72 | P | ⊙ | 4.57 | 7.10 | 4-4 | $d^3F-t^3F^o$ |
| 4837.65 | P | ⊙ | 4.56 | 7.12 | 3-3 | (1243) |
| 4813.72 | P | ⊙ | 4.56 | 7.12 | 2-2 | |
| 4854.18 | P | ⊙ | 4.57 | 7.12 | 4-3 | |
| 4369.29 | P | ⊙ | 4.57 | 7.40 | 4-5 | $d^3F-r^3G^o$ (1244) |
| 4253.55 | P | ⊙ | 4.57 | 7.47 | 4-5 | $d^3F-t^3H^o$ |
| 4203.67 | P | ⊙ | 4.56 | 7.50 | 3-4 | (1245) |
| 10863.60 | D | 5 | 4.71 | 5.85 | 3-4 | $y^3D^o-e^5F$ |
| 11013.27 | D | 1 | 4.77 | 5.90 | 2-3 | (1246) |
| 10435.38 | P | ⊙ | 4.71 | 5.90 | 3-3 | |
| 10216.351 | E | 100 | 4.71 | 5.92 | 3-4 | $y^3D^o-e^3F$ |
| 10145.601 | E | 80 | 4.77 | 5.99 | 2-3 | (1247) |
| 10065.080 | E | 60 | 4.81 | 6.04 | 1-2 | |
| 9653.143 | E | 20 | 4.71 | 5.99 | 3-3 | |
| 9753.129 | E | 10 | 4.77 | 6.04 | 2-2 | |
| 9297.14 | P | ⊙ | 4.71 | 6.04 | 3-2 | |
| 8016.51 | P | ⊙ | 4.77 | 6.31 | 2-2 | $y^3D^o-e^5S$ (1249) |
| 7620.538 | E | 25 | 4.71 | 6.33 | 3-3 | $y^3D^o-e^3D$ |
| 7653.783 | L | 6 | 4.77 | 6.39 | 2-2 | (1250) |
| 7664.15 | P | ⊙ | 4.81 | 6.42 | 1-1 | |
| 7370.16 | O | 1 | 4.71 | 6.39 | 3-2 | |
| 7481.93 | P | (1) | 4.77 | 6.42 | 2-1 | |
| 7924.14 | P | ⊙ | 4.77 | 6.33 | 2-3 | |
| 7844.55 | P | 2 | 4.81 | 6.39 | 1-2 | |
| 7353.528 | V | 1 | 4.71 | 6.39 | 3-3 | $y^3D^o-g^5D$ |
| 7476.40 | P | (1) | 4.77 | 6.43 | 2-2 | (1251) |
| 7562.03 | O | 1n | 4.81 | 6.45 | 1-1 | |
| 7205.51 | P | ⊙ | 4.71 | 6.43 | 3-2 | |
| 7385.54 | P | ⊙ | 4.77 | 6.45 | 2-1 | |
| 7196.37 | P | ⊙ | 4.71 | 6.43 | 3-2 | $y^3D^o-e^5P$ (1252) |
| 6569.231 | I | 50n | 4.71 | 6.59 | 3-4 | $y^3D^o-g^5F$ |
| 6597.607 | V | 15n | 4.77 | 6.65 | 2-3 | (1253) |
| 6385.74 | P | ⊙ | 4.71 | 6.65 | 3-3 | |
| m6416.94 | P | Fe+ | 4.77 | 6.70 | 2-2 | |
| 6495.779 | U | 3 | 4.81 | 6.71 | 1-1 | |
| 6364.384 | V | (1) | 4.77 | 6.71 | 2-1 | |
| 6673.84 | P | ⊙ | 4.71 | 6.56 | 3-4 | $y^3D^o-h^5D$ |
| 6604.67 | V | (1) | 4.81 | 6.68 | 1-1 | (1254) |
| 6330.856 | U | (1n) | 4.71 | 6.66 | 3-2 | |
| 6468.86 | P | ⊙ | 4.77 | 6.68 | 2-1 | |
| 6671.43 | P | | 4.71 | 6.56 | 3-3 | $y^3D^o-f^5P$ |
| 6713.76 | V | 3n | 4.77 | 6.61 | 2-2 | (1255) |
| 6696.30 | P | ⊙ | 4.81 | 6.66 | 1-1 | |
| 6494.52 | P | ⊙ | 4.71 | 6.61 | 3-2 | |
| 6556.79 | U | (1) | 4.77 | 6.66 | 2-1 | |
| 6860.13 | P | ⊙ | 4.81 | 6.61 | 1-2 | |
| 6411.10 | P | 1n | 4.71 | 6.64 | 3-4 | $y^3D^o-f^5G$ |
| 6456.87 | P | ⊙ | 4.77 | 6.69 | 2-3 | (1256) |
| 6253.82 | P | ⊙ | 4.71 | 6.69 | 3-3 | |
| 6171.01 | P | ⊙ | 4.71 | 6.71 | 3-2 | |
| 6224.23 | P | ⊙? | 4.71 | 6.70 | 3-4 | $y^3D^o-e^5H$ (1257) |
| 6419.982 | K | 30n | 4.71 | 6.64 | 3-3 | $y^3D^o-f^3D$ |
| 6496.456 | K | 20n | 4.77 | 6.67 | 2-2 | (1258) |
| 6469.214 | I | 15n | 4.81 | 6.72 | 1-1 | |
| 6290.968 | I | 3n | 4.71 | 6.67 | 3-2 | |
| 6338.896 | V | (1n) | 4.77 | 6.72 | 2-1 | |
| 6634.10 | P | 4n | 4.77 | 6.64 | 2-3 | |
| 6633.44 | M | 4n | 4.81 | 6.67 | 1-2 | |
| 6055.987 | K | 4 | 4.71 | 6.75 | 3-4 | $y^3D^o-f^3F$ |
| 6078.496 | K | 4n | 4.77 | 6.81 | 2-3 | (1259) |
| 6102.178 | K | 5 | 4.81 | 6.84 | 1-2 | |
| 5896.212 | U | (1) | 4.71 | 6.81 | 3-3 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 5984.805 | K | 8 | 4.71 | 6.77 | 3-2 | $y^3D^o-e^3P$ |
| 5987.057 | K | 6 | 4.77 | 6.84 | 2-1 | (1260) |
| •5975.355 | J | 4 | 4.81 | 6.88 | 1-0 | |
| 6170.492 | K | 4n | 4.77 | 6.77 | 2-2 | |
| 6103.190 | K | 3 | 4.81 | 6.84 | 1-1 | |
| 6293.92 | P | ⊙ | 4.81 | 6.77 | 1-2 | |
| m8920.02 | P | Fe | 4.89 | 6.28 | 4-5 | $x^5D^o-e^7F$ |
| •9157.08 | P | (2) | 4.97 | 6.31 | 2-3 | (1261) |
| 9328.64 | P | ⊙ | 5.00 | 6.32 | 0-1 | |
| 8643.29 | P | ⊙ | 4.89 | 6.32 | 4-4 | |
| 9006.72 | F | 1 | 4.97 | 6.34 | 2-2 | |
| 9253.72 | P | ⊙ | 4.99 | 6.32 | 1-1 | |
| 9298.05 | P | ⊙ | 4.89 | 6.22 | 4-5 | $x^5D^o-f^7D$ |
| 9178.57 | F | 1n | 4.93 | 6.28 | 3-3 | (1262) |
| 9392.77 | P | ⊙ | 4.99 | 6.30 | 1-1 | |
| 9242.32 | F | 2 | 4.97 | 6.30 | 2-1 | |
| 9259.05 | F | 15 | 4.89 | 6.22 | 4-4 | $x^5D^o-f^5D$ |
| 9462.97 | F | 2 | 4.93 | 6.24 | 3-3 | (1263) |
| 9550.90 | F | 2 | 4.97 | 6.26 | 2-2 | |
| 9164.51 | U | (1) | 4.89 | 6.24 | 4-3 | |
| 9318.13 | F | 3 | 4.93 | 6.26 | 3-2 | |
| 9388.28 | F | 3n | 4.97 | 6.28 | 2-1 | |
| •9452.45 | F | 2 | 4.99 | 6.29 | 1-0 | |
| 9214.45 | F | 6 | 4.89 | 6.23 | 4-4 | $x^5D^o-e^7P$ |
| 9394.71 | F | 3n | 4.93 | 6.25 | 3-3 | (1264) |
| 9404.80 | P | ⊙? | 4.97 | 6.28 | 2-2 | |
| 9100.50 | F | 5n | 4.89 | 6.25 | 4-3 | |
| 9024.47 | F | 15 | 4.89 | 6.26 | 4-5 | $x^5D^o-e^5G$ |
| •9080.48 | F | 3n | 4.93 | 6.29 | 3-4 | (1265) |
| 9116.89 | P | ⊙ | 4.99 | 6.34 | 1-2 | |
| 8805.21 | P | ⊙ | 4.89 | 6.29 | 4-4 | |
| 8887.10 | P | ⊙ | 4.93 | 6.32 | 3-3 | |
| 8616.27 | P | ⊙ | 4.89 | 6.32 | 4-5 | $x^5D^o-e^7G$ |
| 8796.42 | F | 2 | 4.93 | 6.34 | 3-4 | (1266) |
| 8902.94 | P | ⊙ | 4.97 | 6.35 | 2-3 | |
| 8978.04 | P | ⊙ | 4.99 | 6.36 | 1-2 | |
| 8538.02 | P | ⊙ | 4.89 | 6.34 | 4-4 | |
| 8700.34 | P | ⊙ | 4.93 | 6.35 | 3-3 | |
| 8956.26 | P | ⊙ | 4.99 | 6.37 | 1-1 | |
| 8447.41 | P | ⊙ | 4.89 | 6.35 | 4-3 | |
| 8819.42 | P | ⊙ | 4.97 | 6.37 | 2-1 | |
| 8710.29 | F | 20n | 4.89 | 6.31 | 4-5 | $x^5D^o-f^5F$ |
| 8699.43 | O | (4n) | 4.93 | 6.35 | 3-4 | (1267) |
| 8790.62 | F | 10n | 4.97 | 6.37 | 2-3 | |
| 8846.82 | F | 5 | 4.99 | 6.38 | 1-2 | |
| 8876.13 | F | 2 | 5.00 | 6.39 | 0-1 | |
| 8446.56 | P | | 4.89 | 6.35 | 4-4 | |
| 8592.97 | O | (2n) | 4.93 | 6.37 | 3-3 | |
| •8713.19 | F | 10 | 4.97 | 6.38 | 2-2 | |
| 8808.17 | P | 4n | 4.99 | 6.39 | 1-1 | |
| 8519.05 | P | ⊙ | 4.93 | 6.38 | 3-2 | |
| •9157.07 | P | (2) | 4.97 | 6.31 | 2-2 | $x^5D^o-e^5S$ (1268) |
| 8567.78 | P | ⊙ | 4.89 | 6.33 | 4-3 | $x^5D^o-e^3D$ |
| 8493.79 | P | ⊙ | 4.93 | 6.39 | 3-2 | (1269) |
| 8466.10 | P | ⊙ | 4.97 | 6.42 | 2-1 | |
| 8828.08 | P | ⊙ | 4.93 | 6.33 | 3-3 | |
| 8686.77 | P | ⊙ | 4.97 | 6.39 | 2-2 | |
| 8592.10 | P | ⊙ | 4.99 | 6.42 | 1-1 | |
| 9036.74 | P | (1) | 4.97 | 6.33 | 2-3 | |
| 8819.48 | P | ⊙ | 4.99 | 6.39 | 1-2 | |
| 8656.67 | P | ⊙ | 5.00 | 6.42 | 0-1 | |
| 8526.685 | E | 8 | 4.89 | 6.34 | 4-4 | $x^5D^o-g^5D$ |
| 8471.75 | O | 2 | 4.93 | 6.39 | 3-3 | (1270) |
| 8459.01 | P | ⊙ | 4.97 | 6.43 | 2-2 | |
| 8465.23 | P | ⊙ | 4.99 | 6.45 | 1-1 | |
| 8275.91 | O | 4n | 4.93 | 6.43 | 3-2 | |
| 8342.95 | R | (-) | 4.97 | 6.45 | 2-1 | |
| 8434.51 | P | ⊙ | 4.99 | 6.45 | 1-0 | |
| 8784.44 | F | 5 | 4.93 | 6.34 | 3-4 | |
| 8663.73 | P | ⊙ | 4.97 | 6.39 | 2-3 | |
| 8584.82 | P | ⊙ | 4.99 | 6.43 | 1-2 | |
| 8527.88 | P | ⊙ | 5.00 | 6.45 | 0-1 | |
| 8369.87 | P | ⊙ | 4.89 | 6.37 | 4-3 | $x^5D^o-e^7S$ |
| 8816.86 | P | ⊙ | 4.97 | 6.37 | 2-3 | (1271) |
| 8186.80 | O | 10nd? | 4.89 | 6.40 | 4-3 | $x^5D^o-e^5P$ |
| 8263.86 | P | ⊙ | 4.93 | 6.43 | 3-2 | (1272) |
| 8480.63 | P | ⊙ | 4.97 | 6.42 | 2-1 | |
| 8424.14 | O | 2n | 4.93 | 6.40 | 3-3 | |
| 8446.42 | P | | 4.97 | 6.43 | 2-2 | |
| 8607.08 | P | ⊙ | 4.99 | 6.42 | 1-1 | |
| 8613.93 | P | ⊙ | 4.97 | 6.40 | 2-3 | |
| 8571.84 | P | ⊙ | 4.99 | 6.43 | 1-2 | |
| 8671.86 | P | ⊙ | 5.00 | 6.42 | 0-1 | |
| 7440.98 | V | 2n | 4.89 | 6.55 | 4-5 | $x^5D^o-g^5F$ |
| 7447.43 | V | 1 | 4.93 | 6.59 | 3-4 | (1273) |
| 7351.160 | V | 2n | 4.97 | 6.65 | 2-3 | |
| 7216.68 | P | ⊙ | 4.99 | 6.70 | 1-2 | |
| 7194.92 | O | 1 | 5.00 | 6.71 | 0-1 | |
| 7261.29 | P | ⊙ | 4.89 | 6.59 | 4-4 | |
| 7212.47 | V | 1n | 4.93 | 6.65 | 3-3 | |
| 7127.58 | P | ⊙ | 4.97 | 6.70 | 2-2 | |
| 6997.13 | P | ⊙ | 4.93 | 6.70 | 3-2 | |
| 7062.80 | P | ⊙ | 4.97 | 6.71 | 2-1 | |
| 7389.34 | P | | 4.89 | 6.56 | 4-4 | $x^5D^o-h^5D$ |
| 7363.96 | O | 1n | 4.93 | 6.61 | 3-3 | (1274) |
| 7278.48 | P | ⊙ | 4.97 | 6.66 | 2-2 | |
| 7282.39 | V | 1n | 4.99 | 6.68 | 1-1 | |
| 7181.93 | V | 1n | 4.89 | 6.61 | 4-3 | |
| 7142.522 | V | 4n | 4.93 | 6.66 | 3-2 | |
| 7191.66 | O | (1) | 4.97 | 6.68 | 2-1 | |
| 7582.15 | P | ⊙ | 4.93 | 6.56 | 3-4 | |
| 7508.53 | P | ⊙ | 4.97 | 6.61 | 2-3 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe I** continued | | | | | | |
| 7386.394 | L | 8n | 4.89 | 6.56 | 4-3 | $x^5D^o-f^5P$ |
| 7351.56 | V | 4 | 4.93 | 6.61 | 3-2 | (1275) |
| 7300.47 | O | 1n | 4.97 | 6.66 | 2-1 | |
| 7495.67 | P | ⊙ | 4.97 | 6.61 | 2-2 | |
| §7320.694§ | L | 5n | 4.89 | 6.58 | 4-5 | $x^5D^o-f^5G$ |
| 7244.86 | V | 2n | 4.93 | 6.64 | 3-4 | (1276) |
| 7176.886 | V | 2n | 4.97 | 6.69 | 2-3 | |
| 7155.64 | V | 3n | 4.99 | 6.71 | 1-2 | |
| 7068.60 | P | ⊙ | 4.89 | 6.64 | 4-4 | |
| 7044.60 | O | (1) | 4.93 | 6.69 | 3-3 | |
| 7068.02 | P | ⊙ | 4.97 | 6.71 | 2-2 | |
| 7083.396 | V | 1n | 4.89 | 6.63 | 4-5 | $x^5D^o-e^3G$ |
| 7091.91 | P | (1) | 4.93 | 6.67 | 3-4 | (1277) |
| 7066.15 | P | ⊙ | 4.97 | 6.71 | 2-3 | |
| 7079.32 | P | ⊙ | 4.89 | 6.64 | 4-3 | $x^5D^o-f^3D$ |
| 7091.83 | O | (1) | 4.93 | 6.67 | 3-2 | (1278) |
| 7031.42 | P | ⊙ | 4.97 | 6.72 | 2-1 | |
| 7256.13 | P | (1) | 4.93 | 6.64 | 3-3 | |
| 7225.82 | P | ⊙ | 4.97 | 6.67 | 2-2 | |
| 7118.12 | P | ⊙ | 4.99 | 6.72 | 1-1 | |
| 7396.50 | P | ⊙ | 4.97 | 6.64 | 2-3 | |
| 7317.40 | P | ⊙ | 4.99 | 6.67 | 1-2 | |
| 7162.37 | P | ⊙ | 5.00 | 6.72 | 0-1 | |
| 6639.35 | P | ⊙ | 4.89 | 6.75 | 4-4 | $x^5D^o-f^3F$ |
| 6794.60 | P | ⊙ | 4.93 | 6.75 | 3-4 | (1279) |
| 6712.44 | P | ⊙ | 4.97 | 6.81 | 2-3 | |
| m6705.13 | P | Fe | 4.93 | 6.77 | 3-2 | $x^5D^o-e^3P$ |
| 6601.13 | P | ⊙ | 4.97 | 6.84 | 2-1 | (1280) |
| 6524.76 | P | ⊙ | 4.99 | 6.88 | 1-0 | |
| 6824.82 | P | ⊙ | 4.97 | 6.77 | 2-2 | |
| 6677.49 | P | ⊙ | 4.99 | 6.84 | 1-1 | |
| 5531.949 | U | (1) | 4.89 | 7.12 | 4-4 | $x^5D^o-i^5D$ |
| 5602.54 | P | ⊙ | 4.93 | 7.14 | 3-3 | (1281) |
| 5634.53 | P | ⊙ | 4.97 | 7.16 | 2-2 | |
| 5496.57 | P | ⊙ | 4.89 | 7.14 | 4-3 | |
| 5552.70 | P | ⊙ | 4.93 | 7.16 | 3-2 | |
| 5685.86 | P | ⊙ | 4.97 | 7.14 | 2-3 | |
| 5690.07 | P | ⊙ | 4.99 | 7.16 | 1-2 | |
| 5479.95 | P | ⊙ | 4.93 | 7.19 | 3-2 | $x^5D^o-4$ |
| 5559.64 | P | ⊙ | 4.97 | 7.19 | 2-2 | (1282) |
| 5613.70 | P | ⊙ | 4.99 | 7.19 | 1-2 | |
| 9602.07 | F | 2 | 4.99 | 6.28 | 4-5 | $y^7P^o-e^7F$ |
| 8863.64 | F | 1p† | 4.94 | 6.34 | 2-2 | (1283) |
| 9382.93 | P | 3n | 4.96 | 6.28 | 3-3 | $y^7P^o-f^7D$ (1284) |
| 9944.13 | F | 3n | 4.99 | 6.23 | 4-4 | $y^7P^o-e^7P$ |
| 9608.89 | P | ⊙? | 4.96 | 6.25 | 3-3 | (1285) |
| 9248.80 | P | ⊙ | 4.94 | 6.28 | 2-2 | |
| 9811.36 | F | 2 | 4.99 | 6.25 | 4-3 | |
| 9383.40 | P | ⊙ | 4.96 | 6.28 | 3-2 | |
| 8967.53 | P | ⊙ | 4.99 | 6.37 | 4-3 | $y^7P^o-e^7S$ |
| 8798.05 | P | ⊙ | 4.96 | 6.37 | 3-3 | (1286) |
| 8679.61 | P | ⊙ | 4.94 | 6.37 | 2-3 | |
| 7909.60 | P | ⊙? | 4.99 | 6.55 | 4-5 | $y^7P^o-g^5F$ (1287) |
| 6813.55 | P | ⊙? | 4.96 | 6.77 | 3-2 | $y^7P^o-e^3P$ (1288) |
| 6245.84 | V | (1) | 4.99 | 6.97 | 4-5 | $y^7P^o-1$ (1289) |
| 5678.04 | P | ⊙? | 4.96 | 7.14 | 3-3 | $y^7P^o-i^5D$ |
| 5748.15 | P | ⊙? | 4.99 | 7.14 | 4-3 | (1290) |
| 5720.79 | P | (1n) | 4.99 | 7.15 | 4-5 | $y^7P^o-h^7D$ (1291) |
| 9913.19 | P | ⊙ | 4.97 | 6.21 | 5-6 | $x^5P^o-e^7F$ |
| 9763.913 | E | 15 | 5.01 | 6.28 | 4-5 | (1292) |
| 9658.94 | F | 3 | 5.04 | 6.32 | 3-4 | |
| •9868.09 | F | 3 | 5.06 | 6.31 | 2-3 | |
| 9800.79 | P | ⊙ | 5.08 | 6.34 | 1-2 | |
| •9452.45 | F | 2 | 4.97 | 6.28 | 5-5 | |
| 9433.29 | P | ⊙ | 5.01 | 6.32 | 4-4 | |
| •9699.70 | F | 6n | 5.04 | 6.31 | 3-3 | |
| 9693.69 | F | 1 | 5.06 | 6.34 | 2-2 | |
| 9920.46 | P | ⊙ | 5.08 | 6.32 | 1-1 | |
| 9531.22 | P | ⊙ | 5.04 | 6.34 | 3-2 | |
| 9878.18 | P | ⊙ | 4.97 | 6.22 | 5-5 | $x^5P^o-f^7D$ |
| 9977.52 | F | 1 | 5.04 | 6.28 | 3-3 | (1293) |
| 10016.67 | P | ⊙ | 5.06 | 6.30 | 2-2 | |
| 10080.44 | P | ⊙ | 5.08 | 6.30 | 1-1 | |
| 9967.32 | P | ⊙ | 5.06 | 6.30 | 2-1 | |
| 9834.04 | F | 3n | 4.97 | 6.22 | 5-4 | $x^5F^o-f^5D$ |
| 10057.64 | F | 3 | 5.01 | 6.24 | 4-3 | (1294) |
| 10142.82 | F | 2 | 5.04 | 6.26 | 3-2 | |
| 10137.06 | P | ⊙ | 5.06 | 6.28 | 2-1 | |
| 10149.09 | P | ⊙ | 5.08 | 6.29 | 1-0 | |
| 9783.96 | F | 3 | 4.97 | 6.23 | 5-4 | $x^5F^o-e^7P$ |
| 9980.55 | F | 2n | 5.01 | 6.25 | 4-3 | (1295) |
| 10117.81 | P | ⊙ | 5.01 | 6.23 | 4-4 | |
| 9738.624 | E | 200 | 4.97 | 6.24 | 5-6 | $x^5F^o-e^5G$ |
| 9889.082 | E | 40 | 5.01 | 6.26 | 4-5 | (1296) |
| 9861.793 | E | 30 | 5.04 | 6.29 | 3-4 | |
| 9800.335 | E | 20 | 5.06 | 6.32 | 2-3 | |
| 9763.450 | E | 15 | 5.08 | 6.34 | 1-2 | |
| 9569.960 | E | 40n | 4.97 | 6.26 | 5-5 | |
| 9626.562 | E | 30n | 5.01 | 6.29 | 4-4 | |
| 9634.22 | F | 5 | 5.04 | 6.32 | 3-3 | |
| 9657.30 | F | 4 | 5.06 | 6.34 | 2-2 | |
| 9409.55 | P | ⊙ | 5.01 | 6.32 | 4-3 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Fe I continued | | | | | | |
| 9333.94 | F | 2 | 4.97 | 6.29 | 5-6 | $x^5F^o-e^7G$ |
| 9401.09 | F | 10n | 5.01 | 6.32 | 4-5 | (1297) |
| 9537.73 | P | 1 | 5.04 | 6.34 | 3-4 | |
| 9573.65 | P | ⊙ | 5.06 | 6.35 | 2-3 | |
| 9112.25 | P | ⊙ | 4.97 | 6.32 | 5-5 | |
| 9307.94 | F | 2 | 5.01 | 6.34 | 4-4 | |
| 9415.04 | P | | 5.04 | 6.35 | 3-3 | |
| 9024.78 | P | ⊙ | 4.97 | 6.34 | 5-4 | |
| 9317.54 | F | 5n | 4.97 | 6.31 | 5-5 | $x^5F^o-f^5F$ |
| 9199.52 | F | 2n | 5.01 | 6.35 | 4-4 | (1298) |
| 9289.39 | P | ⊙ | 5.04 | 6.37 | 3-3 | |
| 9410.15 | P | 1n | 5.08 | 6.39 | 1-1 | |
| 9322.66 | P | ⊙ | 4.97 | 6.35 | 5-4 | |
| 9080.48 | F | 3n | 5.01 | 6.37 | 4-3 | |
| 9203.10 | P | ⊙ | 5.04 | 6.38 | 3-2 | |
| 9513.24 | E | 10n | 5.01 | 6.31 | 4-5 | |
| 9414.14 | F | 30n | 5.04 | 6.35 | 3-4 | |
| 9443.98 | F | 10n | 5.06 | 6.37 | 2-3 | |
| 9454.24 | F | 4n | 5.08 | 8.38 | 1-2 | |
| 9699.70 | F | 6n | 5.04 | 6.31 | 3-2 | $x^5F^o-e^5S$ |
| 9868.09 | F | 3 | 5.06 | 6.31 | 2-2 | (1299) |
| 9343.40 | F | 3 | 5.01 | 6.33 | 4-3 | $x^5F^o-e^3D$ |
| 9173.63 | P | 4nd | 5.04 | 6.39 | 3-2 | (1300) |
| 9070.43 | F | 2 | 5.06 | 6.42 | 2-1 | |
| 9324.07 | O | (1) | 5.06 | 8.39 | 2-2 | |
| 9423.07 | P | ⊙ | 5.08 | 6.39 | 1-2 | |
| 9013.098 | E | 30 | 4.97 | 6.34 | 5-4 | $x^5F^o-g^5D$ |
| 8945.204 | E | 20 | 5.01 | 6.39 | 4-3 | (1301) |
| 8919.95 | F | 10 | 5.04 | 6.43 | 3-2 | |
| 8939.04 | F | 5 | 5.06 | 6.45 | 2-1 | |
| 8984.87 | F | 3 | 5.08 | 6.45 | 1-0 | |
| 9294.66 | F | 2 | 5.01 | 8.34 | 4-4 | |
| 9147.800 | E | 5n | 5.04 | 6.39 | 3-3 | |
| 9063.24 | F | 2 | 5.06 | 6.43 | 2-2 | |
| 9019.84 | F | 2 | 5.08 | 6.45 | 1-1 | |
| 9155.67 | P | 1 | 5.08 | 6.43 | 1-2 | |
| 8893.13 | P | ⊙ | 5.01 | 6.40 | 4-3 | $x^5F^o-e^5P$ |
| 8905.99 | P | ⊙ | 5.04 | 6.43 | 3-2 | (1302) |
| 7807.97 | P | ⊙ | 4.97 | 6.55 | 5-5 | $x^5F^o-g^5F$ |
| 7810.81 | P | ⊙ | 5.01 | 6.59 | 4-4 | (1303) |
| 7551.10 | P | ⊙ | 5.06 | 6.70 | 2-2 | |
| 7552.79 | P | ⊙ | 5.01 | 6.65 | 4-3 | |
| 7452.08 | P | ⊙ | 5.04 | 6.70 | 3-2 | |
| 7964.93 | P | ⊙ | 5.04 | 6.59 | 3-4 | |
| 7803.49 | P | ⊙ | 5.06 | 6.65 | 2-3 | |
| 7751.18 | O | 5n | 4.97 | 6.56 | 5-4 | $x^5F^o-h^5D$ |
| 7719.05 | P | ⊙ | 5.01 | 6.61 | 4-3 | (1304) |
| 7817.19 | P | ⊙ | 5.04 | 6.66 | 3-2 | |
| 7959.21 | O | (1) | 5.01 | 6.56 | 4-4 | |
| 7730.88 | P | ⊙ | 5.06 | 6.66 | 2-2 | |
| 7689.10 | P | ⊙ | 5.08 | 6.68 | 1-1 | |
| 7980.04 | P | ⊙? | 5.06 | 6.61 | 2-3 | |
| 7955.81 | O | (1) | 5.01 | 6.56 | 4-3 | $x^5F^o-f^5P$ |
| 7855.41 | P | 4n | 5.04 | 6.61 | 3-2 | (1305) |
| 7745.48 | P | ⊙ | 5.06 | 6.66 | 2-1 | |
| 7965.52 | P | ⊙ | 5.06 | 6.61 | 2-2 | |
| 7813.62 | P | ⊙ | 5.08 | 6.66 | 1-1 | |
| 7743.71 | O | 4n | 4.97 | 6.56 | 5-6 | $x^5F^o-f^5G$ |
| 7879.75 | P | 1 | 5.01 | 6.58 | 4-5 | (1308) |
| 7733.68 | P | ⊙ | 5.04 | 6.64 | 3-4 | |
| 7547.89 | P | ⊙ | 5.08 | 6.71 | 1-2 | |
| 7588.30 | P | ⊙ | 5.01 | 6.64 | 4-4 | |
| 7505.98 | P | ⊙ | 5.04 | 6.69 | 3-3 | |
| 7484.28 | P | ⊙ | 5.06 | 6.71 | 2-2 | |
| 7398.98 | P | ⊙ | 4.97 | 6.64 | 5-4 | |
| 7528.15 | P | ⊙ | 5.01 | 6.65 | 4-5 | $x^5F^o-e^5H$ |
| 7463.38 | P | ⊙ | 5.04 | 6.70 | 3-4 | (1307) |
| 7420.20 | P | ⊙ | 5.06 | 6.73 | 2-3 | |
| 7341.78 | P | ⊙ | 4.97 | 6.65 | 5-5 | |
| 7194.02 | P | ⊙ | 5.01 | 6.73 | 4-3 | |
| 7415.19 | P | ⊙ | 4.97 | 6.63 | 5-5 | $x^5F^o-e^3G$ |
| 7384.96 | P | ⊙ | 5.04 | 6.71 | 3-3 | (1308) |
| 7605.32 | O | 2n | 5.01 | 6.63 | 4-5 | |
| 7559.68 | O | 1n | 5.04 | 6.67 | 3-4 | |
| 7483.20 | P | ⊙ | 5.06 | 6.71 | 2-3 | |
| 7443.26 | P | ⊙ | 5.06 | 6.72 | 2-1 | $x^5F^o-f^3D$ |
| 7746.56 | P | ⊙ | 5.04 | 6.64 | 3-3 | (1309) |
| 7681.46 | P | ⊙ | 5.06 | 6.67 | 2-2 | |
| 7359.95 | P | ⊙ | 4.97 | 6.65 | 5-6 | $x^5F^o-e^3H$ |
| 7313.05 | P | ⊙ | 5.01 | 6.70 | 4-5 | (1310) |
| 7160.85 | P | ⊙ | 5.01 | 6.73 | 4-4 | |
| •7222.88 | V | (1) | 5.04 | 6.75 | 3-4 | $x^5F^o-f^3F$ |
| •7086.76 | V | 2 | 5.06 | 6.81 | 2-3 | (1311) |
| 6027.76 | P | ⊙ | 4.97 | 7.02 | 5-4 | $x^5F^o-3$ |
| 6153.82 | P | ⊙? | 5.01 | 7.02 | 4-4 | (1312) |
| 5732.29 | P | ⊙ | 4.97 | 7.12 | 5-4 | $x^5F^o-i^5D$ |
| 5805.76 | P | (1) | 5.01 | 7.14 | 4-3 | (1313) |
| 5835.41 | P | ⊙ | 5.04 | 7.16 | 3-2 | |
| 5845.27 | P | ⊙ | 5.01 | 7.12 | 4-4 | |
| 5890.48 | P | ⊙ | 5.04 | 7.14 | 3-3 | |
| 5952.19 | P | ⊙ | 5.06 | 7.14 | 2-3 | |
| 5633.970 | V | (2) | 4.97 | 7.16 | 5-6 | $x^5F^o-g^5G$ |
| •5655.506 | V | 4 | 5.01 | 7.19 | 4-5 | (1314) |
| 5655.179 | V | (2) | 5.04 | 7.22 | 3-4 | |
| 5650.71 | V | (1) | 5.06 | 7.25 | 2-3 | |
| 5650.01 | V | (1) | 5.08 | 7.26 | 1-2 | |
| 5549.66 | P | ⊙ | 4.97 | 7.19 | 5-5 | |
| 5577.03 | P | ⊙ | 5.01 | 7.22 | 4-4 | |
| 5595.06 | P | ⊙ | 5.04 | 7.25 | 3-3 | |
| 5614.29 | P | ⊙ | 5.06 | 7.26 | 2-2 | |
| 5474.09 | P | ⊙ | 4.97 | 7.22 | 5-4 | |
| 5518.57 | P | ⊙ | 5.01 | 7.25 | 4-3 | |
| 11479.87 | P | ⊙? | 5.00 | 6.08 | 3-2 | $a^1F-v^3D^o$ (1315) |
| 10875.00 | P | ⊙ | 5.00 | 6.14 | 3-4 | $a^1F-y^3H^o$ (1316) |
| 9917.93 | F | 2 | 5.00 | 6.25 | 3-4 | $a^1F-x^1G^o$ (1317) |
| 8852.30 | P | ⊙? | 5.00 | 6.40 | 3-2 | $a^1F-u^5F^o$ (1318) |
| 9482.82 | P | ⊙? | 5.00 | 6.31 | 3-4 | $a^1F-t^5D^o$ (1319) |
| 8959.88 | P | ⊙? | 5.00 | 6.38 | 3-3 | $a^1F-u^5P^o$ (1320) |
| 8559.98 | W | (1) | 5.00 | 6.45 | 3-3 | $a^1F-t^3D^o$ (1321) |
| 8171.30 | P | ⊙ | 5.00 | 6.51 | 3-4 | $a^1F-w^3H^o$ (1322) |
| 7846.47 | P | ⊙? | 5.00 | 6.58 | 3-2 | $a^1F-s^3D^o$ (1323) |
| 7107.30 | P | ⊙ | 5.00 | 6.74 | 3-3 | $a^1F-t^3G^o$ (1324) |
| 6552.77 | W | (2) | 5.00 | 6.89 | 3-3 | $a^1F-w^1F^o$ (1325) |
| 6124.08 | P | ⊙ | 5.00 | 7.02 | 3-2 | $a^1F-u^3F^o$ (1326) |
| 6089.566 | L | (1) | 5.00 | 7.03 | 3-4 | $a^1F-v^1G^o$ (1327) |
| 5041.32 | P | ⊙ | 5.00 | 7.45 | 3-3 | $a^1F-r^3G^o$ (1328) |
| 9008.37 | F | 2 | 5.05 | 6.42 | 3-3 | $X-u^3D^o$ (1329) |
| 8814.50 | P | 2 | 5.05 | 6.45 | 3-3 | $X-t^3D^o$ |
| 8689.83 | P | ⊙ | 5.08 | 6.50 | 2-2 | (1330) |
| 8464.02 | P | ⊙ | 5.05 | 6.50 | 3-2 | |
| 8300.01 | P | ⊙ | 5.05 | 6.53 | 3-2 | $X-v^3P^o$ (1331) |
| 8274.28 | O | 6 | 5.05 | 6.54 | 3-3 | $X-s^3D^o$ |
| 8264.27 | M | 3 | 5.08 | 6.58 | 2-2 | (1332) |
| 6700.90 | P | ⊙ | 5.05 | 6.89 | 3-3 | $X-w^1F^o$ |
| 6841.65 | P | ⊙ | 5.08 | 6.89 | 2-3 | (1333) |
| 6406.42 | W | (1) | 5.08 | 7.01 | 2-3 | $X-u^3F^o$ (1334) |
| 6217.288 | V | (1) | 5.05 | 7.03 | 3-4 | $X-v^1G^o$ (1335) |
| 10013.15 | P | ⊙ | 5.05 | 6.28 | 2-1 | $z^5S^o-f^5D$ (1336) |
| 9683.57 | F | 1 | 5.05 | 6.32 | 2-3 | $z^5S^o-e^5G$ (1337) |
| 9335.27 | P | ⊙ | 5.05 | 6.37 | 2-3 | $z^5S^o-f^5F$ |
| 9248.13 | P | ⊙ | 5.05 | 6.38 | 2-2 | (1338) |
| •7148.69 | R | (-) | 5.05 | 6.77 | 2-2 | $z^5S^o-e^3P$ (1339) |
| 5853.48 | P | ⊙? | 5.05 | 7.16 | 2-2 | $z^5S^o-i^5D$ (1340) |
| 10890.13 | P | ⊙? | 5.29 | 6.42 | 2-1 | $x^5P^o-e^3D$ |
| 11542.96 | P | ⊙? | 5.32 | 6.39 | 1-2 | (1341) |
| 9233.15 | P | (1) | 5.30 | 6.63 | 5-5 | $y^5G^o-e^3G$ |
| 9052.56 | P | (1) | 5.31 | 6.67 | 4-4 | (1342) |
| 6671.36 | W | (2) | 5.30 | 7.15 | 5-5 | $y^5G^o-h^7D$ (1343) |
| 6450.99 | V | (1) | 5.31 | 7.22 | 4-4 | $y^5G^o-g^5G$ |
| 6402.43 | P | (1) | 5.33 | 7.26 | 2-2? | (1344) |
| 10555.63 | P | ⊙ | 5.42 | 6.59 | 3-4 | $w^5D^o-g^5F$ |
| 10362.73 | P | ⊙ | 5.45 | 6.65 | 2-3 | (1345) |
| 10070.58 | P | ⊙ | 5.49 | 6.71 | 0-1 | |
| 10022.34 | P | ⊙ | 5.48 | 6.71 | 1-1 | |
| 9676.42 | F | 1 | 5.37 | 6.65 | 4-3 | |
| 10353.85 | P | (2n) | 5.37 | 6.56 | 4-4 | $w^5D^o-h^5D$ |
| 10388.73 | P | ⊙ | 5.42 | 6.61 | 3-3 | (1346) |
| 10283.87 | P | ⊙ | 5.48 | 6.68 | 1-1 | |
| 9951.15 | P | ⊙ | 5.37 | 6.61 | 4-3 | |
| 9953.45 | P | ⊙ | 5.42 | 6.66 | 3-2 | |
| 10348.16 | F | 4n | 5.37 | 6.56 | 4-3 | $w^5D^o-f^5P$ |
| 10364.13 | P | ⊙ | 5.42 | 6.61 | 3-2 | (1347) |
| 10153.30 | P | | 5.42 | 6.64 | 3-4 | $w^5D^o-f^5G$ |
| 10019.77 | P | ⊙ | 5.45 | 6.69 | 2-3 | (1348) |
| 10032.84 | P | ⊙ | 5.48 | 6.71 | 1-2 | |
| 9764.40 | P | ⊙ | 5.42 | 6.69 | 3-3 | |
| 6943.67 | P | ⊙? | 5.37 | 7.15 | 4-5 | $w^5D^o-h^7D$ (1349) |
| 10925.80 | D | 1 | 5.46 | 6.59 | 5-4 | $w^5F^o-g^5F$ (1350) |
| 7430.73 | O | (1) | 5.46 | 7.12 | 5-4 | $w^5F^o-i^5D$ (1351) |
| 7526.72 | P | ⊙ | 5.48 | 7.12 | 4-4 | $v^5D^o-i^5D$ |
| 7537.97 | P | ⊙ | 5.50 | 7.14 | 3-3 | (1352) |
| 7461.28 | P | ⊙ | 5.48 | 7.14 | 4-3 | |
| 7448.00 | P | ⊙ | 5.50 | 7.16 | 3-2 | |

Additions to Multiplets of Fe I

| | | | | | | |
|---|---|---|---|---|---|---|
| 4232.724 | V | 1 | 0.11 | 2.99 | 1-2 | $a^5D-z^7P^o$ (3) |
| m3199.50 | P | Fe | 0.11 | 3.97 | 1-2 | $a^5D-z^3F^o$ (7) |
| 3418.507 | G | 10 | 2.21 | 5.82 | 1-0 | $a^5P-u^5D^o$ (81) |

Strongest Unclassified Lines of Fe I

| | | | |
|---|---|---|---|
| 9666.59 | F | 2 | V |
| 9637.55 | F | 2 | V |
| 9529.31 | F | 2n | V |
| 9430.08 | E | 3 | IV• |
| 8145.47 | O | 4 | V |
| 8024.50 | O | 3n | V |
| 7994.473 | E | 20 | IV• |
| 7808.04 | O | 6n | V |
| 7573.53 | O | 2n | V |
| 7546.177 | L | 4 | IV• |
| •7376.434§ | R | 3n | V |
| 7254.649 | V | 2 | IV• |
| 6975.46 | V | 3n | V |
| 6902.80 | V | 3n | V |
| 6881.46 | M | 1 | V |
| 6838.86 | V | 3n | V |
| 6793.62 | M | 1 | V |
| 6755.609 | V | 3 | IV• |
| 6726.78 | D | (3) | |
| 6609.56 | V | 1 | V |
| 6528.53 | V | 2 | V |
| 6501.681 | V | 4 | IV• |
| 6042.093 | J | 2 | V |
| 5036.294 | R | 6 | |
| 4552.544 | J | (3) | |
| 4237.162 | J | 2 | V |
| 4100.17 | W | (3) | |
| 3851.58 | W | (4) | |
| 3739.527 | J | 3 | IV |
| 3681.774 | V | 1 | IV |
| 3680.801 | V | 1 | IV |
| 3656.227 | V | 3n | IV |
| 3634.698 | G | 4n | IV |
| 3617.317 | J | 2 | IV |
| 3616.572 | J | 3n | IV |
| 3614.550 | G | 2n | IV |
| 3587.752 | J | 3 | IV |
| 3506.40 | W | (3) | |
| 3438.306 | V | (3w) | |
| 3262.284 | V | 4 | IV |
| 3179.538 | V | 3 | IV |
| 3139.908 | V | 4n | V |
| 3136.17 | W | (3) | |
| 3126.175 | G | 8n | IV |
| 3108.71 | W | (4) | |
| 2991.632 | G | 5n | IV |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe II** I P 16.16 | | | Anal A | List A | July 1941 | |
| 3277.347 | A | 9 | 0.98 | 4.75 | 3½-4½ | $a^4D-z^6D^o$ |
| 3302.861 | A | 4 | 1.04 | 4.77 | 2½-3½ | (1) |
| 3313.707 | C | (1) | 1.07 | 4.80 | 1½-2½ | |
| 3313.996 | A | 1 | 1.09 | 4.82 | ½-1½ | |
| 3255.884 | A | 8 | 0.98 | 4.77 | 3½-3½ | |
| 3281.293 | A | 7 | 1.04 | 4.80 | 2½-2½ | |
| 3295.814 | A | 6 | 1.07 | 4.82 | 1½-1½ | |
| 3303.466 | A | 4 | 1.09 | 4.83 | ½- ½ | |
| 3234.923 | A | 0 | 0.98 | 4.80 | 3½-2½ | |
| 3264.76 | P | | 1.04 | 4.82 | 2½-1½ | |
| 3285.425 | C | (3) | 1.07 | 4.83 | 1½- ½ | |
| 2953.774 | A | 11 | 1.04 | 5.21 | 2½-3½ | $a^4D-z^6F^o$ † |
| 2970.510 | A | 10 | 1.07 | 5.23 | 1½-2½ | (2) |
| *2979.349 | A | 8 | 1.09 | 5.23 | ½-1½ | |
| 2975.938 | A | 5 | 1.09 | 5.24 | ½- ½ | |
| 2961.272 | A | 5 | 1.07 | 5.24 | 1½- ½ | |
| 3969.40 | P | | 1.66 | 4.77 | 2½-3½ | $a^4P-z^6D^o$ |
| 3969.38 | P | | 1.69 | 4.80 | 1½-2½ | (3) |
| 3981.61 | P | | 1.72 | 4.82 | ½-1½ | |
| 3938.289 | A | 2 | 1.66 | 4.80 | 2½-2½ | |
| 3945.21 | P | | 1.69 | 4.82 | 1½-1½ | |
| 3966.43 | P | | 1.72 | 4.83 | ½- ½ | |
| 3914.480 | A | 2 | 1.66 | 4.82 | 2½-1½ | |
| 3930.31 | P | | 1.69 | 4.83 | 1½- ½ | |
| 3475.74 | P | | 1.66 | 5.21 | 2½-3½ | $a^4P-z^6F^o$ |
| 3487.990 | A | 3 | 1.69 | 5.23 | 1½-2½ | (4) |
| 3508.213 | A | 1 | 1.72 | 5.23 | ½-1½ | |
| 3463.974 | A | 1 | 1.66 | 5.23 | 2½-2½ | |
| 3479.914 | A | 2 | 1.69 | 5.23 | 1½-1½ | |
| 3503.474 | A | 2 | 1.72 | 5.24 | ½- ½ | |
| 3456.00 | P | | 1.66 | 5.23 | 2½-1½ | |
| 3475.25 | P | | 1.69 | 5.24 | 1½- ½ | |
| 3425.582 | A | 3 | 1.66 | 5.27 | 2½-3½ | $a^4P-z^6P^o$ |
| 3381.36 | P | | 1.69 | 5.34 | 1½-2½ | (5) |
| 3364.22 | P | | 1.72 | 5.39 | ½-1½ | |
| 3358.78 | P | | 1.66 | 5.34 | 2½-2½ | |
| 3338.19 | P | | 1.69 | 5.39 | 1½-1½ | |
| 3316.18 | P | | 1.66 | 5.39 | 2½-1½ | |
| *3227.732§ | A | 13 | 1.66 | 5.49 | 2½-3½ | $a^4P-z^4D^o$ |
| 3213.311 | A | 13 | 1.69 | 5.53 | 1½-2½ | (6) |
| 3210.449 | A | 10 | 1.72 | 5.56 | ½-1½ | |
| 3192.917 | A | 9 | 1.66 | 5.53 | 2½-2½ | |
| 3186.740 | A | 11 | 1.69 | 5.56 | 1½-1½ | |
| 3193.809 | A | 11 | 1.72 | 5.58 | ½- ½ | |
| 3166.670 | A | 4 | 1.66 | 5.56 | 2½-1½ | |
| 3170.337 | A | 6 | 1.69 | 5.58 | 1½- ½ | |
| 3196.070 | A | 10 | 1.66 | 5.52 | 2½-3½ | $a^4P-z^4F^o$ |
| 3183.115 | A | 8 | 1.69 | 5.57 | 1½-2½ | (7) |
| 3185.315 | A | 5 | 1.72 | 5.59 | ½-1½ | |
| 3163.091 | A | 5 | 1.66 | 5.57 | 2½-2½ | |
| *3161.945§ | C | (5) | 1.69 | 5.59 | 1½-1½ | |
| 3142.220 | A | 0 | 1.66 | 5.59 | 2½-1½ | |
| 2984.831 | A | 15 | 1.66 | 5.80 | 2½-2½ | $a^4P-z^4P^o$ † |
| 2965.036 | A | 10 | 1.69 | 5.85 | 1½-1½ | (8) |
| 2964.629 | A | 9 | 1.73 | 5.88 | ½- ½ | |
| 3002.650 | A | 13 | 1.69 | 5.80 | 1½-2½ | |
| 2985.545 | A | 13 | 1.72 | 5.85 | ½-1½ | |
| 4420.75 | P | | 1.98 | 4.75 | 4½-4½ | $a^2G-z^6D^o$ |
| 4484.93 | P | | 2.02 | 4.77 | 3½-3½ | (9) |
| 4381.79 | P | | 1.96 | 4.77 | 4½-3½ | |
| 4445.26 | P | | 2.03 | 4.80 | 3½-2½ | |
| 4525.75 | P | | 2.02 | 4.75 | 3½-4½ | |
| 3521.64 | P | | 1.96 | 5.46 | 4½-4½ | $a^2G-z^4F^o$ |
| 3522.05 | P | | 2.02 | 5.52 | 3½-3½ | (10) |
| 3458.13 | P | | 1.96 | 5.52 | 4½-3½ | |
| 3482.05 | P | | 2.02 | 5.57 | 3½-2½ | |
| 3587.95 | P | | 2.03 | 5.46 | 3½-4½ | |
| 4818.26 | P | | 2.27 | 4.83 | 1½- ½ | $a^2P-z^6D^o$ (11) |
| 4169.98 | P | | 2.27 | 5.23 | 1½-2½ | $a^2P-z^6F^o$ |
| 4251.49 | P | | 2.33 | 5.23 | ½-1½ | (12) |
| 4158.45 | P | | 2.27 | 5.23 | 1½-1½ | |
| 4244.53 | P | | 2.33 | 5.24 | ½- ½ | |
| 4151.79 | P | | 2.27 | 5.24 | 1½- ½ | |
| 4018.49 | P | | 2.27 | 5.34 | 1½-2½ | $a^2P-z^6P^o$ |
| 4041.84 | P | | 2.33 | 5.39 | ½-1½ | (13) |
| 3957.66 | P | | 2.27 | 5.39 | 1½-1½ | |
| 3783.347 | A | 4 | 2.27 | 5.53 | 1½-2½ | $a^2P-z^4D^o$ |
| 3821.92 | P | | 2.33 | 5.58 | ½-1½ | (14) |
| 3746.56 | P | | 2.27 | 5.56 | 1½-1½ | |
| 3798.36 | P | | 2.33 | 5.58 | ½- ½ | |
| 3723.92 | P | | 2.27 | 5.58 | 1½- ½ | |
| 3741.56 | P | | 2.27 | 5.57 | 1½-2½ | $a^2P-z^4F^o$ |
| 3786.37 | P | | 2.33 | 5.59 | ½-1½ | (15) |
| 3718.39 | P | | 2.27 | 5.59 | 1½-1½ | |
| 3494.672 | A | 5 | 2.27 | 5.80 | 1½-2½ | $a^2P-z^4P^o$ |
| 3507.387 | A | 3 | 2.33 | 5.85 | ½-1½ | (16) |
| 3442.82 | P | | 2.27 | 5.85 | 1½-1½ | |
| 3478.55 | P | | 2.33 | 5.88 | ½- ½ | |
| 3416.021 | A | 5 | 2.27 | 5.88 | 1½- ½ | |
| 4622.40 | P | | 2.51 | 5.18 | 5½-5½ | $a^2H-z^8F^o$ |
| 4691.55 | P | | 2.57 | 5.20 | 4½-4½ | (17) |
| 4591.26 | P | | 2.51 | 5.20 | 5½-4½ | |
| 4664.79 | P | | 2.57 | 5.21 | 4½-3½ | |
| 4724.07 | P | | 2.57 | 5.18 | 4½-5½ | |
| 5696.11 | P | | 2.83 | 4.80 | 1½-2½ | $a^2D-z^6D^o$ (18) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe II** continued | | | | | | |
| 4603.75 | P | | 2.53 | 5.21 | 2½-3½ | $a^2D-z^6F^o$ |
| 4582.12 | P | | 2.53 | 5.23 | 2½-2½ | (19) |
| 4515.19 | P | | 2.53 | 5.27 | 2½-3½ | $a^2D-z^6P^o$ |
| 4558.58 | P | | 2.63 | 5.34 | 1½-2½ | (20) |
| 4399.86 | P | | 2.53 | 5.34 | 2½-2½ | |
| 4480.46 | P | | 2.63 | 5.39 | 1½-1½ | |
| 4327.04 | P | | 2.53 | 5.39 | 2½-1½ | |
| 4177.70 | P | | 2.53 | 5.49 | 2½-3½ | $a^2D-z^4D^o$ |
| 4258.35 | P | | 2.63 | 5.53 | 1½-2½ | (21) |
| 4119.53 | P | | 2.53 | 5.53 | 2½-2½ | |
| 4211.80 | P | | 2.63 | 5.56 | 1½-1½ | |
| 4075.95 | P | | 2.53 | 5.56 | 2½-1½ | |
| 4183.20 | P | | 2.63 | 5.58 | 1½- ½ | |
| 4124.793 | A | 1 | 2.53 | 5.52 | 2½-3½ | $a^2D-z^4F^o$ |
| 4205.48 | P | | 2.63 | 5.57 | 1½-2½ | (22) |
| 4070.03 | P | | 2.53 | 5.57 | 2½-2½ | |
| 4168.66 | P | | 2.63 | 5.59 | 1½-1½ | |
| 4035.54 | P | | 2.53 | 5.59 | 2½-1½ | |
| 3779.58 | P | | 2.53 | 5.80 | 2½-2½ | $a^2D-z^4P^o$ |
| 3833.02 | P | | 2.63 | 5.85 | 1½-1½ | (23) |
| 3730.17 | P | | 2.53 | 5.85 | 2½-1½ | |
| 3798.60 | P | | 2.63 | 5.88 | 1½- ½ | |
| 3896.11 | P | | 2.63 | 5.80 | 1½-2½ | |
| 5607.12 | P | | 2.57 | 4.77 | 2½-3½ | $b^4P-z^8D^o$ |
| 5864.54 | P | | 2.69 | 4.80 | 1½-2½ | (24) |
| 6021.18 | P | | 2.77 | 4.82 | ½-1½ | |
| 5545.86 | P | | 2.57 | 4.80 | 2½-2½ | |
| 5811.93 | P | | 2.69 | 4.83 | 1½-1½ | |
| 5986.54 | P | | 2.77 | 4.83 | ½- ½ | |
| 5498.19 | P | | 2.57 | 4.82 | 2½-1½ | |
| 5779.65 | P | | 2.69 | 4.83 | 1½- ½ | |
| 4670.170 | A | 0 | 2.57 | 5.21 | 2½-3½ | $b^4P-z^6F^o$ |
| 4871.27 | P | | 2.69 | 5.23 | 1½-2½ | (25) |
| 5000.73 | P | | 2.77 | 5.23 | ½-1½ | |
| 4648.933 | A | ?0 | 2.57 | 5.83 | 2½-2½ | |
| 4855.54 | P | | 2.69 | 5.23 | 1½-1½ | |
| 4991.11 | P | | 2.77 | 5.24 | ½- ½ | |
| 4634.60 | P | | 2.57 | 5.23 | 2½-1½ | |
| 4846.47 | P | | 2.69 | 5.24 | 1½- ½ | |
| 4580.055 | A | 1 | 2.57 | 5.27 | 2½-3½ | $b^4P-z^6P^o$ |
| 4665.60 | P | | 2.69 | 5.34 | 1½-2½ | (26) |
| 4713.18 | P | | 2.77 | 5.39 | ½-1½ | |
| 4461.43 | P | | 2.57 | 5.34 | 2½-2½ | |
| 4583.99 | P | | 2.69 | 5.39 | 1½-1½ | |
| 4386.57 | P | | 2.57 | 5.39 | 2½-1½ | |
| 4233.167 | A | 11 | 2.57 | 5.49 | 2½-3½ | $b^4P-z^4D^o$ |
| 4351.764 | A | 9 | 2.69 | 5.53 | 1½-2½ | (27) |
| 4416.817 | A | 7 | 2.77 | 5.56 | ½-1½ | |
| 4173.450 | A | 8 | 2.57 | 5.53 | 2½-2½ | |
| 4303.166 | A | 8 | 2.69 | 5.58 | 1½-1½ | |
| 4385.381 | A | 7 | 2.77 | 5.58 | ½- ½ | |
| 4138.735 | A | 3 | 2.57 | 5.56 | 2½-1½ | |
| 4273.317 | A | 3 | 2.69 | 5.58 | 1½- ½ | |
| 4178.855 | A | 8 | 2.57 | 5.53 | 2½-3½ | $b^4P-z^4F^o$ |
| 4296.587 | A | 6 | 2.69 | 5.57 | 1½-2½ | (28) |
| 4369.404 | A | 3 | 2.77 | 5.59 | ½-1½ | |
| 4132.638 | A | 4 | 2.57 | 5.57 | 2½-2½ | |
| 4258.155 | A | 3 | 2.69 | 5.59 | 1½-1½ | |
| 4087.27 | P | | 2.57 | 5.59 | 2½-1½ | |
| 3824.913 | A | 4 | 2.57 | 5.80 | 2½-2½ | $b^4P-z^4P^o$ |
| 3908.54 | P | | 2.69 | 5.85 | 1½-1½ | (29) |
| 3964.57 | P | | 2.77 | 5.88 | ½- ½ | |
| m3784.09 | P | Fe | 2.57 | 5.85 | 2½-1½ | |
| 3872.76 | P | | 2.69 | 5.88 | 1½- ½ | |
| 3974.160 | A | 3 | 2.69 | 5.80 | 1½-2½ | |
| 4002.073 | A | 3 | 2.77 | 5.85 | ½-1½ | |
| 4825.71 | P | | 2.82 | 5.18 | 6½-5½ | $a^4H-z^8F^o$ |
| 4833.21 | P | | 2.85 | 5.20 | 5½-4½ | (30) |
| 4840.00 | P | | 2.66 | 5.21 | 4½-3½ | |
| 4847.81 | P | | 2.68 | 5.23 | 3½-2½ | |
| 4887.73 | P | | 2.65 | 5.18 | 5½-5½ | |
| 4868.82 | P | | 2.66 | 5.20 | 4½-4½ | |
| 4870.71 | P | | 2.68 | 5.21 | 3½-3½ | |
| 4903.85 | P | | 2.86 | 5.18 | 4½-5½ | |
| 4899.90 | P | | 2.68 | 5.20 | 3½-4½ | |
| 4743.28 | P | | 2.66 | 5.27 | 4½-3½ | $a^4H-z^6P^o$ |
| 4844.09 | P | | 2.68 | 5.34 | 3½-2½ | (31) |
| 4772.77 | P | | 2.68 | 5.27 | 3½-3½ | |
| 4384.33 | P | | 2.85 | 5.46 | 5½-4½ | $a^4H-z^4F^o$ |
| *4314.289§ | A | 4 | 2.66 | 5.52 | 4½-3½ | (32) |
| 4278.128 | C | (1) | 2.88 | 5.57 | 3½-2½ | |
| 4413.600 | A | 0 | 2.66 | 5.46 | 4½-4½ | |
| 4338.70 | P | | 2.68 | 5.52 | 3½-3½ | |
| 4439.13 | P | | 2.68 | 5.46 | 3½-4½ | |
| 4372.22 | P | | 2.66 | 5.49 | 4½-3½ | $a^4H-z^4D^o$ |
| 4332.88 | P | | 2.68 | 5.53 | 3½-2½ | (33) |
| 4397.27 | P | | 2.68 | 5.49 | 3½-3½ | |
| 6239.36 | P | | 2.79 | 4.77 | 4½-3½ | $b^4F-z^6D^o$ † |
| 6229.34 | P | | 2.82 | 4.80 | 3½-2½ | (34) |
| 6219.54 | P | | 2.83 | 4.82 | 2½-1½ | |
| 8217.95 | P | | 2.84 | 4.83 | 1½- ½ | |
| 5171.82 | P | | 2.79 | 5.18 | 4½-5½ | $b^4F-z^6P^o$ |
| 5178.71 | P | | 2.82 | 5.20 | 3½-4½ | (35) |
| 5180.53 | P | | 2.83 | 5.21 | 2½-3½ | |
| 5178.95 | P | | 2.84 | 5.23 | 1½-2½ | |
| 5132.87 | P | | 2.79 | 5.20 | 4½-4½ | |
| 5146.12 | P | | 2.82 | 5.21 | 3½-3½ | |
| 5154.40 | P | | 2.83 | 5.23 | 2½-2½ | |
| 5181.18 | P | | 2.84 | 5.23 | 1½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe II** continued | | | | | | |
| 5100.66 | P | | 2.79 | 5.21 | 4½-3½ | $b^4F-z^6P^o$ |
| 5120.34 | P | | 2.82 | 5.23 | 3½-2½ | cont |
| 5136.788 | A | tr | 2.83 | 5.23 | 2½-1½ | |
| 5150.93 | P | | 2.84 | 5.24 | 1½- ½ | |
| 4993.355 | A | 1 | 2.79 | 5.27 | 4½-3½ | $b^4F-z^6P^o$ |
| 4893.780 | A | 0n | 2.82 | 5.34 | 3½-2½ | (36) |
| *5036.92 § | B | 2 | 2.82 | 5.27 | 3½-3½ | |
| 4629.336 | A | 7 | 2.79 | 5.46 | 4½-4½ | $b^4F-z^4P^o$ |
| 4555.890 | A | 8 | 2.82 | 5.52 | 3½-3½ | (37) |
| 4515.337 | A | 7 | 2.83 | 5.57 | 2½-2½ | |
| 4491.401 | A | 5 | 2.84 | 5.59 | 1½-1½ | |
| 4530.235 | A | 7 | 2.79 | 5.52 | 4½-3½ | |
| 4489.185 | A | 4 | 2.82 | 5.57 | 3½-2½ | |
| 4472.921 | A | 3 | 2.83 | 5.59 | 2½-1½ | |
| 4866.750 | A | 2 | 2.82 | 5.46 | 3½-4½ | |
| 4582.835 | A | 3 | 2.83 | 5.52 | 2½-3½ | |
| 4534.166 | A | 2 | 2.84 | 5.57 | 1½-2½ | |
| 4563.829 | A | 11 | 2.79 | 5.49 | 4½-3½ | $b^4F-z^4D^o$ |
| 4549.467 | A | 10 | 2.82 | 5.53 | 3½-2½ | (38) |
| 4522.634 | A | 9 | 2.83 | 5.56 | 2½-1½ | |
| 4508.283 | A | 8 | 2.84 | 5.58 | 1½- ½ | |
| 4620.513 | A | 3 | 2.82 | 5.49 | 3½-3½ | |
| 4576.331 | A | 4 | 2.83 | 5.53 | 2½-2½ | |
| 4541.523 | A | 4 | 2.84 | 5.56 | 1½-1½ | |
| 4648.33 | P | | 2.83 | 5.49 | 2½-3½ | |
| 4595.68 | P | | 2.84 | 5.53 | 1½-2½ | |
| 4138.40 | P | | 2.82 | 5.80 | 3½-2½ | $b^4F-z^4P^o$ † |
| 4086.75 | P | | 2.83 | 5.85 | 2½-1½ | (39) |
| 4064.75 | P | | 2.84 | 5.86 | 1½- ½ | |
| 4160.62 | P | | 2.83 | 5.80 | 2½-2½ | |
| 4104.18 | P | | 2.84 | 5.85 | 1½-1½ | |
| 6516.053 | B | 20 | 2.68 | 4.77 | 2½-3½ | $a^6S-z^6D^o$ |
| 6432.654 | B | 6 | 2.88 | 4.80 | 2½-2½ | (40) |
| 6369.45 | B | 4 | 2.88 | 4.82 | 2½-1½ | |
| 5284.092 | A | 3 | 2.88 | 5.21 | 2½-3½ | $a^6S-z^6F^o$ |
| 5256.89 | P | 1 | 2.88 | 5.23 | 2½-2½ | (41) |
| 5238.58 | P | | 2.88 | 5.23 | 2½-1½ | |
| 5169.030 | A | 12 | 2.68 | 5.27 | 2½-3½ | $a^6S-z^6P^o$ |
| 5018.434 | A | 12 | 2.88 | 5.34 | 2½-2½ | (42) |
| 4923.921 | A | 12 | 2.68 | 5.39 | 2½-1½ | |
| *4731.439§ | A | 3 | 2.88 | 5.49 | 2½-3½ | $a^6S-z^4D^o$ |
| 4656.974 | A | 1 | 2.88 | 5.53 | 2½-2½ | (43) |
| 4601.34 | P | | 2.88 | 5.58 | 2½-1½ | |
| 4663.700 | A | 0 | 2.88 | 5.52 | 2½-3½ | $a^6S-z^4F^o$ (44) |
| 4227.14 | P | | 2.68 | 5.80 | 2½-3½ | $a^6S-z^4P^o$ |
| 4152.98 | P | | 2.88 | 5.85 | 2½-1½ | (45) |
| 6044.53 | P | | 3.14 | 5.18 | 5½-5½ | $a^4G-z^6F^o$ |
| 6129.71 | P | | 3.19 | 5.20 | 4½-4½ | (46) |
| 6150.10 | P | | 3.21 | 5.21 | 3½-3½ | |
| 6141.01 | P | | 3.22 | 5.23 | 2½-2½ | |
| 5991.383 | B | 10 | 3.14 | 5.30 | 5½-4½ | |
| 6084.11 | B | 5 | 3.19 | 5.21 | 4½-3½ | |
| 6113.33 | B | 2 | 3.21 | 5.23 | 3½-2½ | |
| 6116.04 | P | | 3.22 | 5.23 | 2½-1½ | |
| 6185.34 | P | | 3.19 | 5.18 | 4½-5½ | |
| 6196.71 | P | | 3.21 | 5.20 | 3½-4½ | |
| 8178.13 | P | | 3.22 | 5.21 | 2½-3½ | |
| 5932.05 | P | | 3.19 | 5.27 | 4½-3½ | $a^4G-z^6P^o$ † |
| 5793.16 | P | | 3.21 | 5.34 | 3½-2½ | (47) |
| 5691.38 | P | | 3.22 | 5.39 | 2½-1½ | |
| 5362.864 | A | 5 | 3.19 | 5.49 | 4½-3½ | $a^4G-z^4D^o$ |
| 5316.777 | A | 4 | 3.21 | 5.53 | 3½-2½ | (48) |
| 5264.601 | A | 3 | 3.22 | 5.56 | 2½-1½ | |
| 5414.089 | A | 3 | 3.21 | 5.49 | 3½-3½ | |
| 5337.713 | A | 0 | 3.22 | 5.53 | 2½-2½ | |
| 5435.79 | P | | 3.22 | 5.49 | 2½-3½ | |
| 5316.609 | A | 8 | 3.14 | 5.46 | 5½-4½ | $a^4G-z^4F^o$ |
| 5275.994 | A | 7 | 3.19 | 5.52 | 4½-3½ | (49) |
| 5234.620 | A | 7 | 3.21 | 5.57 | 3½-2½ | |
| 5197.569 | A | 6 | 3.22 | 5.59 | 2½-1½ | |
| 5425.269 | A | 2 | 3.19 | 5.46 | 4½-4½ | |
| 5325.559 | A | 2 | 3.21 | 5.52 | 3½-3½ | |
| 5254.92 | P | | 3.22 | 5.57 | 2½-2½ | |
| 5477.67 | P | | 3.21 | 5.46 | 3½-4½ | |
| 5346.56 | P | 1 | 3.22 | 5.52 | 2½-3½ | |
| 4763.79 | P | | 3.21 | 5.80 | 3½-2½ | $a^4G-z^4P^o$ |
| 4780.60 | P | | 3.22 | 5.80 | 2½-2½ | (50) |
| 4885.95 | P | | 3.22 | 5.85 | 2½-1½ | |
| 5728.74 | P | | 3.18 | 5.34 | 1½-2½ | $b^2P-z^6P^o$ |
| 5605.91 | P | | 3.18 | 5.39 | 1½-1½ | (51) |
| 5990.59 | P | | 3.32 | 5.39 | ½-1½ | |
| 5262.48 | P | | 3.18 | 5.53 | 1½-2½ | $b^2P-z^4D^o$ |
| 5519.83 | P | | 3.32 | 5.56 | ½-1½ | (52) |
| 5191.58 | P | | 3.18 | 5.58 | 1½-1½ | |
| 5470.81 | P | | 3.32 | 5.58 | ½- ½ | |
| 5148.19 | P | | 3.18 | 5.58 | 1½- ½ | |
| 5181.97 | P | | 3.18 | 5.57 | 1½-2½ | $b^2P-z^4P^o$ |
| 5445.97 | P | | 3.32 | 5.59 | ½-1½ | (53) |
| 5128.19 | P | | 3.18 | 5.59 | 1½-1½ | |
| 4730.15 | P | | 3.18 | 5.80 | 1½-2½ | $b^2P-z^4P^o$ |
| 4886.92 | P | | 3.32 | 5.85 | ½-1½ | (54) |
| 4627.88 | P | | 3.18 | 5.85 | 1½-1½ | |
| 4831.11 | P | | 3.32 | 5.88 | ½- ½ | |
| 4577.78 | P | | 3.18 | 5.88 | 1½- ½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe II** continued | | | | | | |
| 5534.860 | A | 4 | 3.23 | 5.46 | 5½-4½ | $b^3H-z^4F^o$ |
| 5432.98 | P | | 3.25 | 5.53 | 4½-3½ | (55) |
| 5591.38 | P | | 3.25 | 5.46 | 4½-4½ | |
| 5525.14 | P | | 3.25 | 5.49 | 4½-3½ | $b^3H-z^4D^o$ |
| | | | | | | (56) |
| 5909.38 | P | | 3.37 | 5.46 | 3½-4½ | $a^2F-z^4F^o$ |
| 5834.93 | P | | 3.41 | 5.52 | 2½-3½ | (57) |
| 5732.72 | P | | 3.37 | 5.53 | 3½-3½ | |
| 5725.95 | P | | 3.41 | 5.57 | 2½-2½ | |
| 5627.49 | P | | 3.37 | 5.57 | 3½-2½ | |
| 5657.92 | P | | 3.41 | 5.59 | 2½-1½ | |
| 5835.43 | P | | 3.37 | 5.49 | 3½-3½ | $a^2F-z^4D^o$ |
| 5824.40 | P | | 3.41 | 5.53 | 2½-2½ | (58) |
| 5732.56 | P | | 3.37 | 5.53 | 3½-2½ | |
| 5737.68 | P | | 3.41 | 5.56 | 2½-1½ | |
| 5941.36 | P | | 3.41 | 5.49 | 2½-3½ | |
| 3021.407 | A | 1 | 3.37 | 7.46 | 3½-3½ | $a^2F-y^4P^o$ |
| 2985.395 | A | 2 | 3.41 | 7.57 | 2½-1½ | (59) |
| 2984.89 | P | | 3.37 | 7.51 | 3½-4½ | $a^2F-z^4G^o$ |
| 2998.855 | A | 2 | 3.41 | 7.53 | 2½-3½ | (60) |
| 2971.818 | A | 1 | 3.37 | 7.53 | 3½-3½ | |
| 2991.244 | A | 0 | 3.41 | 7.54 | 2½-2½ | |
| 2984.131 | A | 7 | 3.37 | 7.54 | 3½-2½ | |
| 2968.738 | A | 2 | 3.37 | 7.53 | 3½-4½ | $a^2F-z^4H^o$ |
| •2980.963 | A | 4 | 3.41 | 7.55 | 2½-3½ | (61) |
| 2954.050 | A | 4 | 3.37 | 7.55 | 3½-3½ | |
| 2959.601 | A | 7 | 3.37 | 7.54 | 3½-2½ | $a^2F-z^2D^o$ † |
| •2988.817§ | A | 4 | 3.41 | 7.54 | 2½-2½ | (62) |
| 6983.54 | P | | 3.80 | 5.57 | 3½-2½ | $b^3G-z^4F^o$ |
| | | | | | | (63) |
| 3327.83 | P | | 3.80 | 7.51 | 3½-4½ | $b^3G-z^4G^o$ |
| | | | | | | (64) |
| 3277.853 | A | 0 | 3.75 | 7.52 | 4½-5½ | $b^3G-z^4H^o$ |
| 3307.57 | P | | 3.80 | 7.53 | 3½-4½ | (65) |
| 3266.938 | A | 4 | 3.75 | 7.53 | 4½-4½ | |
| 3289.347 | A | 7 | 3.80 | 7.55 | 3½-3½ | |
| 3249.16 | P | | 3.75 | 7.55 | 4½-3½ | |
| 3154.201 | A | 12 | 3.75 | 7.86 | 4½-4½ | $b^3G-z^2G^o$ |
| 3187.853 | A | 11 | 3.80 | 7.89 | 3½-3½ | (66) |
| 3130.561 | A | 2 | 3.75 | 7.69 | 4½-3½ | |
| 3192.059 | A | 3 | 3.80 | 7.66 | 3½-4½ | |
| 3146.748 | A | 2 | 3.75 | 7.67 | 4½-4½ | $b^3G-y^4F^o$ |
| ■3193.85 | P | Fe+ | 3.79 | 7.86 | 3½-3½ | (67) |
| 3155.950 | A | 2 | 3.75 | 7.66 | 4½-3½ | |
| 3185.095 | A | 1 | 3.80 | 7.67 | 3½-3½ | |
| 3184.43 | P | | 3.80 | 7.87 | 3½-4½ | |
| 3070.692 | A | 4 | 3.75 | 7.77 | 4½-3½ | $b^3G-x^4D^o$ |
| 3075.228 | A | 2 | 3.80 | 7.81 | 3½-2½ | (68) |
| 3106.559 | A | 4 | 3.80 | 7.77 | 3½-3½ | |
| 2985.29 | P | | 3.75 | 7.89 | 4½-5½ | $b^3G-y^4G^o$ |
| 3012.59 | P | | 3.80 | 7.89 | 3½-4½ | (69) |
| 2978.850 | A | 2 | 3.75 | 7.89 | 4½-4½ | |
| 3004.249 | A | 2 | 3.80 | 7.91 | 3½-3½ | |
| 2970.682 | A | 5 | 3.75 | 7.91 | 4½-3½ | |
| 3000.059 | A | 5 | 3.80 | 7.91 | 3½-2½ | |
| 2969.934 | A | 8 | 3.80 | 7.95 | 3½-2½ | $b^3G-z^2F^o$ † |
| 2982.239 | A | 3 | 3.80 | 7.94 | 3½-3½ | (70) |
| 9403.38 | P | | 3.89 | 5.20 | 3½-4½ | $b^4D-z^6F^o$ † |
| 9214.85 | P | | 3.87 | 5.21 | 2½-3½ | (71) |
| 9112.95 | P | | 3.87 | 5.23 | 1½-2½ | |
| 9061.33 | P | | 3.87 | 5.23 | ½-1½ | |
| 7841.40 | P | | 3.89 | 5.46 | 3½-4½ | $b^4D-z^4F^o$ † |
| 7479.70 | P | | 3.87 | 5.52 | 2½-3½ | (72) |
| 7289.05 | P | | 3.87 | 5.57 | 1½-2½ | |
| 7181.21 | P | | 3.87 | 5.59 | ½-1½ | |
| 7533.42 | B | 2 | 3.89 | 5.52 | 3½-3½ | |
| 7301.57 | P | 2 | 3.87 | 5.57 | 2½-2½ | |
| 7179.18 | P | | 3.87 | 5.59 | 1½-1½ | |
| 7711.71 | B | 15 | 3.89 | 5.49 | 3½-3½ | $b^4D-z^4D^o$ |
| 7462.38 | B | 20 | 3.87 | 5.53 | 2½-2½ | (73) |
| •7307.97 § | B | 50 | 3.87 | 5.58 | 1½-1½ | |
| 7234.51 | B | 12 | 3.87 | 5.58 | ½- ½ | |
| 7515.68 | B | 8 | 3.89 | 5.53 | 3½-2½ | |
| •7320.70 § | B | 40 | 3.87 | 5.56 | 2½-1½ | |
| 7232.39 | B | 8 | 3.87 | 5.58 | 1½- ½ | |
| 7655.47 | B | 1 | 3.87 | 5.49 | 2½-3½ | |
| 7449.34 | B | 8 | 3.87 | 5.53 | 1½-2½ | |
| 7310.24 | B | 8 | 3.87 | 5.56 | ½-1½ | |
| 8458.378 | A | 200 | 3.89 | 5.80 | 3½-2½ | $b^4D-z^4P^o$ |
| 8247.562 | A | 80 | 3.87 | 5.85 | 2½-1½ | (74) |
| •8147.735§ | A | 30? | 3.87 | 5.88 | 1½- ½ | |
| 8418.905 | A | 20 | 3.87 | 5.80 | 2½-2½ | |
| 8238.375 | A | 20 | 3.87 | 5.85 | 1½-1½ | |
| 8149.238 | A | 20 | 3.87 | 5.88 | ½- ½ | |
| 6407.30 | B | 1 | 3.87 | 5.80 | 1½-2½ | |
| 6239.95 | P | 2n | 3.87 | 5.85 | ½-1½ | |
| 3535.628 | A | 2 | 3.87 | 7.37 | 2½-1½ | $b^4D-z^4S^o$ |
| 3532.69 | P | | 3.87 | 7.37 | 1½-1½ | (75) |
| 3533.19 | P | | 3.87 | 7.37 | ½-1½ | |
| 3456.928 | A | 5 | 3.89 | 7.46 | 3½-2½ | $b^4D-y^4P^o$ |
| 3338.522 | A | 3 | 3.87 | 7.57 | 2½-1½ | (78) |
| 3369.349 | A | 3 | 3.87 | 7.53 | 1½- ½ | |
| 3445.58 | P | | 3.87 | 7.46 | 2½-2½ | |
| 3335.90 | P | | 3.87 | 7.57 | 1½-1½ | |
| 3369.80 | P | | 3.87 | 7.53 | ½- ½ | |
| 3442.79 | P | | 3.87 | 7.46 | 1½-2½ | |
| 3338.34 | P | | 3.87 | 7.57 | ½-1½ | |
| 3388.134 | A | ?2 | 3.89 | 7.53 | 3½-4½ | $b^4D-z^4H^o$ |
| 3358.252 | A | 3 | 3.87 | 7.55 | 2½-3½ | (77) |
| 3376.24 | P | | 3.89 | 7.54 | 3½-2½ | $b^4D-z^2D^o$ |
| 3252.40 | P | | 3.87 | 7.67 | 2½-1½ | (78) |
| 3250.34 | P | | 3.87 | 7.67 | ½-1½ | |
| 3365.413 | A | 1 | 3.87 | 7.54 | 2½-2½ | |
| 3249.911 | A | 1 | 3.87 | 7.67 | 1½-1½ | |
| 3362.764 | A | 0 | 3.87 | 7.54 | 1½-2½ | |
| 3305.634 | A | 1 | 3.89 | 7.62 | 3½-3½ | $b^4D-y^4D^o$ |
| 3193.76 | P | | 3.87 | 7.74 | 2½-2½ | (79) |
| 3163.86 | P | | 3.87 | 7.77 | 1½-1½ | |
| 3177.65 | P | | 3.87 | 7.76 | ½- ½ | |
| 3303.509 | A | 1 | 3.89 | 7.74 | 3½-2½ | |
| 3166.22 | P | | 3.87 | 7.77 | 2½-1½ | |
| 3177.260 | A | 1 | 3.87 | 7.76 | 1½- ½ | |
| •3295.240 § | A | 4 | 3.87 | 7.62 | 2½-3½ | |
| 3191.374 | A | 1 | 3.87 | 7.74 | 1½-2½ | |
| 3164.26 | P | | 3.87 | 7.77 | ½-1½ | |
| 3267.035 | A | 3 | 3.89 | 7.66 | 3½-4½ | $b^4D-z^2G^o$ |
| 3231.702 | A | 5 | 3.87 | 7.69 | 2½-3½ | (80) |
| 3241.685 | A | 2 | 3.89 | 7.69 | 3½-3½ | |
| 3259.048 | A | 10 | 3.89 | 7.67 | 3½-4½ | $b^4D-y^4F^o$ |
| 3258.773 | A | 10 | 3.87 | 7.66 | 2½-3½ | (81) |
| 3247.171 | A | 9 | 3.87 | 7.67 | 1½-2½ | |
| 3237.815 | A | 8 | 3.87 | 7.68 | ½-1½ | |
| 3268.92 | P | | 3.89 | 7.66 | 3½-3½ | |
| 3249.657 | A | 4 | 3.87 | 7.67 | 2½-2½ | |
| 3237.402 | A | 5 | 3.87 | 7.68 | 1½-1½ | |
| 3259.75 | P | | 3.89 | 7.67 | 3½-2½ | |
| 3239.87 | P | | 3.87 | 7.68 | 2½-1½ | |
| 3177.531 | A | 10 | 3.89 | 7.77 | 3½-3½ | $b^4D-x^4D^o$ |
| 3135.360 | A | 9 | 3.87 | 7.81 | 2½-2½ | (82) |
| 3114.295 | A | 7 | 3.87 | 7.83 | 1½-1½ | |
| 3105.548 | A | 5 | 3.87 | 7.85 | ½- ½ | |
| 3144.751 | A | 5 | 3.89 | 7.81 | 3½-2½ | |
| •3116.590§ | A | 6 | 3.87 | 7.83 | 2½-1½ | |
| •3105.166 | A | 5 | 3.87 | 7.85 | 1½- ½ | |
| 3167.94 | P | | 3.87 | 7.77 | 2½-3½ | |
| 3133.048 | A | 4 | 3.87 | 7.81 | 1½-2½ | |
| 3114.680 | A | 4 | 3.87 | 7.83 | ½-1½ | |
| 3070.591 | A | tr | 3.89 | 7.91 | 3½-3½ | $b^4D-y^4G^o$ |
| | | | | | | (83) |
| 3047.60 | P | | 3.89 | 7.94 | 3½-3½ | $b^4D-z^2F^o$ |
| 3025.99 | P | | 3.87 | 7.95 | 2½-2½ | (84) |
| 3034.712 | A | 0 | 3.89 | 7.95 | 3½-2½ | |
| 3038.777 | A | 3 | 3.87 | 7.94 | 2½-3½ | |
| 3023.859 | A | 1 | 3.87 | 7.95 | 1½-2½ | |
| 2997.749 | A | tr d | 3.89 | 8.00 | 3½-4½ | $b^4D-y^2G^o$ |
| | | | | | | (85) |
| 2989.01 | P | | 3.87 | 8.00 | 2½-1½ | $b^4D-z^2P^o$ |
| 2989.367 | A | tr | 3.87 | 8.00 | 1½- ½ | (86) |
| 2986.91 | P | | 3.87 | 8.00 | 1½-1½ | |
| 2989.731 | A | 0 | 3.87 | 8.00 | ½- ½ | |
| 2987.27 | P | | 3.87 | 8.00 | ½-1½ | |
| 7838.09 | P | | 3.95 | 5.52 | 3½-3½ | $b^2F-z^4F^o$ † |
| 7534.83 | P | | 3.93 | 5.57 | 2½-2½ | (87) |
| 3519.72 | P | | 3.95 | 7.46 | 3½-2½ | $b^2F-y^4P^o$ |
| 3388.452 | A | 1 | 3.93 | 7.57 | 2½-1½ | (88) |
| 3496.67 | P | | 3.93 | 7.46 | 2½-2½ | |
| 3470.242 | A | in | 3.95 | 7.51 | 3½-4½ | $b^2F-z^4G^o$ |
| 3430.15 | P | | 3.93 | 7.53 | 2½-3½ | (89) |
| 3452.33 | P | | 3.95 | 7.53 | 3½-3½ | |
| 3420.184 | A | 0 | 3.93 | 7.54 | 2½-2½ | |
| 3442.239 | A | 3 | 3.95 | 7.54 | 3½-2½ | |
| 3448.433 | A | 1 | 3.95 | 7.53 | 3½-4½ | $b^2F-z^4H^o$ |
| 3406.78 | P | | 3.93 | 7.55 | 2½-3½ | (90) |
| 3428.84 | P | | 3.95 | 7.55 | 3½-3½ | |
| 3436.112 | A | 5 | 3.95 | 7.54 | 3½-2½ | $b^2F-z^2D^o$ |
| 3397.888 | A | 5 | 3.93 | 7.67 | 2½-1½ | (91) |
| 3414.144 | A | 2 | 3.93 | 7.54 | 2½-2½ | |
| 3323.066 | A | 8 | 3.95 | 7.86 | 3½-4½ | $b^2F-z^2G^o$ |
| 3278.808 | A | 5 | 3.93 | 7.69 | 2½-3½ | (92) |
| •3298.826§ | A | 2 | 3.95 | 7.69 | 3½-3½ | |
| 3314.80 | P | | 3.95 | 7.67 | 3½-4½ | $b^2F-y^4F^o$ |
| 3304.433 | A | 1 | 3.93 | 7.66 | 2½-3½ | (93) |
| 3325.012 | A | 1 | 3.95 | 7.66 | 3½-3½ | |
| 3295.06 | P | | 3.93 | 7.87 | 2½-2½ | |
| 3315.53 | P | | 3.95 | 7.67 | 3½-2½ | |
| 3284.996 | A | 0 | 3.93 | 7.68 | 2½-1½ | |
| 3257.358 | A | 1 | 3.95 | 7.74 | 3½-2½ | $b^2F-y^4D^o$ |
| | | | | | | (94) |
| 3230.496 | A | 1 | 3.95 | 7.77 | 3½-3½ | $b^2F-x^4D^o$ |
| 3177.81 | P | | 3.93 | 7.81 | 2½-2½ | (95) |
| 3196.63 | P | | 3.95 | 7.81 | 3½-2½ | |
| 3158.32 | P | | 3.93 | 7.83 | 2½-1½ | |
| 3211.073 | A | 1 | 3.93 | 7.77 | 2½-3½ | |
| 3129.013 | A | 1 | 3.95 | 7.89 | 3½-4½ | $b^2F-y^4G^o$ |
| 3120.023 | A | 1 | 3.95 | 7.91 | 3½-3½ | (96) |
| 3097.415 | A | 2 | 3.93 | 7.91 | 2½-2½ | |
| 3115.492 | A | 1 | 3.95 | 7.91 | 3½-2½ | |
| 3098.296 | A | 5 | 3.95 | 7.94 | 3½-3½ | $b^2F-z^2F^o$ |
| 3065.315 | A | 6 | 3.93 | 7.95 | 2½-2½ | (97) |
| 3083.024 | A | 3 | 3.95 | 7.95 | 3½-2½ | |
| m3078.44 | P | Fe | 3.93 | 7.94 | 2½-3½ | |
| 3044.843 | A | 5 | 3.95 | 8.00 | 3½-4½ | $b^2F-y^2G^o$ |
| 3002.330 | A | 5 | 3.93 | 8.04 | 2½-3½ | (98) |
| 3027.38 | P | | 3.93 | 8.00 | 2½-1½ | $b^2F-z^2P^o$ |
| | | | | | | (99) |
| •2979.096 | A | 3 | 3.95 | 8.09 | 3½-4½ | $b^2F-z^2H^o$ |
| | | | | | | (100) |
| 3602.60 | P | | 4.06 | 7.48 | 6½-5½ | $a^2I-z^4G^o$ |
| 3583.54 | P | | 4.06 | 7.51 | 5½-4½ | (101) |
| 3607.05 | P | | 4.06 | 7.48 | 5½-5½ | |
| 3511.35 | P | | 4.06 | 7.57 | 6½-7½ | $a^2I-z^4I^o$ |
| 3493.34 | P | | 4.06 | 7.60 | 5½-6½ | (102) |
| 3489.17 | P | | 4.06 | 7.60 | 6½-6½ | |
| 3486.08 | P | | 4.06 | 7.60 | 5½-5½ | |
| 3481.92 | P | | 4.06 | 7.60 | 6½-5½ | |
| 3495.16 | P | | 4.06 | 7.59 | 5½-4½ | |
| 3426.81 | P | | 4.06 | 7.66 | 5½-4½ | $a^2I-z^2G^o$ |
| | | | | | | (103) |
| 3418.02 | P | | 4.06 | 7.67 | 5½-4½ | $a^2I-y^4F^o$ |
| | | | | | | (104) |
| 3398.355 | A | 4 | 4.06 | 7.69 | 6½-6½ | $a^2I-z^2I^o$ |
| 3360.103 | A | 3 | 4.06 | 7.74 | 5½-5½ | (105) |
| m3356.84 | P | Fe+ | 4.06 | 7.74 | 6½-5½ | |
| 3403.32 | P | | 4.06 | 7.69 | 5½-6½ | |
| 3280.835 | A | 0 | 4.06 | 7.89 | 5½-4½ | $a^2I-y^4G^o$ |
| | | | | | | (106) |
| 3131.719 | A | 4 | 4.06 | 8.00 | 5½-4½ | $a^2I-y^2G^o$ |
| | | | | | | (107) |
| 3077.168 | A | 10 | 4.06 | 8.07 | 6½-5½ | $a^2I-z^2H^o$ |
| 3062.234 | A | 9 | 4.06 | 8.09 | 5½-4½ | (108) |
| 3080.405 | A | 2 | 4.06 | 8.07 | 5½-5½ | |
| 3056.802 | A | 5 | 4.06 | 8.10 | 6½-5½ | $a^2I-x^4G^o$ |
| 3049.18 | P | | 4.06 | 8.11 | 5½-4½ | (109) |
| 3060.023 | A | 0 | 4.06 | 8.10 | 5½-5½ | |
| 3020.001 | A | ?0 | 4.06 | 8.15 | 5½-4½ | $a^2I-x^4F^o$ |
| | | | | | | (110) |
| 3680.98 | P | | 4.13 | 7.48 | 4½-5½ | $c^2G-z^4G^o$ |
| 3661.17 | P | | 4.14 | 7.51 | 3½-4½ | (111) |
| 3656.50 | P | | 4.13 | 7.51 | 4½-4½ | |
| 3641.22 | P | | 4.14 | 7.53 | 3½-3½ | |
| 3636.61 | P | | 4.13 | 7.53 | 4½-3½ | |
| 3629.99 | P | | 4.14 | 7.54 | 3½-2½ | |
| 3645.78 | P | | 4.13 | 7.52 | 4½-5½ | $c^2G-z^4H^o$ |
| 3636.90 | P | | 4.14 | 7.53 | 3½-4½ | (112) |
| 3632.292 | A | 3 | 4.13 | 7.53 | 4½-4½ | |
| 3614.873 | A | 5 | 4.14 | 7.55 | 3½-3½ | |
| 3610.33 | P | | 4.13 | 7.55 | 4½-3½ | |
| 3555.08 | P | | 4.13 | 7.60 | 4½-5½ | $c^2G-z^4I^o$ |
| 3568.97 | P | | 4.14 | 7.59 | 3½-4½ | (113) |
| 3564.54 | P | | 4.13 | 7.59 | 4½-4½ | |
| 3493.468 | A | 10 | 4.13 | 7.66 | 4½-4½ | $c^2G-z^2G^o$ |
| 3468.680 | A | 8 | 4.14 | 7.69 | 3½-3½ | (114) |
| 3464.497 | A | 3 | 4.13 | 7.69 | 4½-3½ | |
| 3497.73 | P | | 4.14 | 7.66 | 3½-4½ | |
| •3484.348§ | A | 1 | 4.13 | 7.67 | 4½-4½ | $c^2G-y^4F^o$ |
| 3499.877 | A | 4 | 4.14 | 7.66 | 3½-3½ | (115) |
| 3495.616 | A | 4 | 4.13 | 7.66 | 4½-3½ | |
| 3434.17 | P | | 4.13 | 7.74 | 4½-5½ | $c^2G-z^2I^o$ |
| | | | | | | (116) |
| 3391.303 | A | 1 | 4.13 | 7.77 | 4½-3½ | $c^2G-x^4D^o$ |
| 3357.965 | A | 0 | 4.14 | 7.81 | 3½-2½ | (117) |
| 3395.336 | A | 4 | 4.14 | 7.77 | 3½-3½ | |
| 3287.468 | A | 1 | 4.13 | 7.89 | 4½-5½ | $c^2G-y^4G^o$ |
| 3283.40 | P | | 4.14 | 7.89 | 3½-4½ | (118) |
| 3279.649 | A | 2 | 4.13 | 7.89 | 4½-4½ | |
| 3273.499 | A | 3 | 4.14 | 7.91 | 3½-3½ | |
| 3269.772 | A | 2 | 4.13 | 7.91 | 4½-3½ | |
| 3268.512 | A | 3 | 4.14 | 7.91 | 3½-2½ | |
| 3243.733 | A | 8 | 4.13 | 7.94 | 4½-3½ | $c^2G-z^2F^o$ |
| 3232.791 | A | 7 | 4.14 | 7.95 | 3½-2½ | (119) |
| 3247.392 | A | 3 | 4.14 | 7.94 | 3½-3½ | |
| 3187.294 | A | 8 | 4.13 | 8.00 | 4½-4½ | $c^2G-y^2G^o$ |
| 3162.799 | A | 8 | 4.14 | 8.04 | 3½-3½ | (120) |
| 3159.32 | P | | 4.13 | 8.04 | 4½-3½ | |
| 3190.84 | P | | 4.14 | 8.00 | 3½-4½ | |
| 3134.17 | P | | 4.13 | 8.07 | 4½-5½ | $c^2G-z^2H^o$ † |
| 3118.74 | P | | 4.14 | 8.09 | 3½-4½ | (121) |
| 3079.356 | A | 0 | 4.13 | 8.14 | 4½-3½ | $c^2G-x^4G^o$ |
| 3068.757 | A | 2 | 4.14 | 8.16 | 3½-2½ | (122) |
| •3105.166 | A | 5 | 4.14 | 8.11 | 3½-4½ | |
| 3071.653 | A | 2 | 4.13 | 8.15 | 4½-4½ | $c^2G-x^4F^o$ |
| 3040.829 | A | 0 | 4.14 | 8.19 | 3½-3½ | (123) |
| 3029.681 | A | 0 | 4.13 | 8.20 | 4½-5½ | $c^2G-y^4H^o$ |
| 3013.802 | A | 0 | 4.14 | 8.23 | 3½-3½ | (124) |
| 4270.39 | P | | 4.48 | 7.36 | 2½-1½ | $b^2D-z^4S^o$ |
| 4247.43 | P | | 4.46 | 7.36 | 1½-1½ | (125) |
| 4046.81 | P | | 4.48 | 7.53 | 2½-3½ | $b^2D-z^4G^o$ |
| 4012.467 | A | 1 | 4.46 | 7.54 | 1½-2½ | (126) |
| 4032.946 | A | 3 | 4.48 | 7.54 | 2½-2½ | |
| 4024.552 | A | 5 | 4.48 | 7.54 | 2½-2½ | $b^2D-z^2D^o$ |
| m3845.18 | P | Fe | 4.46 | 7.67 | 1½-1½ | (127) |
| •3863.953 | A | 1 | 4.48 | 7.67 | 2½-1½ | |
| 4004.15 | P | | 4.46 | 7.54 | 1½-2½ | |
| 3872.98 | P | | 4.48 | 7.66 | 2½-3½ | $b^2D-y^4F^o$ |
| 3841.35 | P | | 4.46 | 7.67 | 1½-2½ | (128) |
| 3860.12 | P | | 4.48 | 7.67 | 2½-2½ | |
| 3827.67 | P | | 4.46 | 7.68 | 1½-1½ | |
| 3846.31 | P | | 4.48 | 7.68 | 2½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe II** continued | | | | | | |
| 3834.81 | P | | 4.48 | 7.69 | 2½-3½ | $b^2D-z^2G^o$ (129) |
| 3781.510 | A | 1 | 4.48 | 7.74 | 2½-2½ | $b^2D-y^2D^o$ |
| 3725.304 | A | 3 | 4.46 | 7.77 | 1½-1½ | (130) |
| 3745.36 | P | | 4.48 | 7.77 | 2½-3½ | $b^2D-x^4D^o$ |
| 3682.66 | P | | 4.46 | 7.81 | 1½-2½ | (131) |
| 3699.90 | P | | 4.48 | 7.81 | 2½-3½ | |
| 3655.77 | P | | 4.46 | 7.83 | 1½-1½ | |
| 3873.77 | P | | 4.48 | 7.83 | 2½-1½ | |
| 3644.19 | P | | 4.46 | 7.85 | 1½- ½ | |
| 3566.148 | A | 3 | 4.48 | 7.94 | 2½-3½ | $b^2D-z^2F^o$ |
| 3532.647 | A | 2 | 4.46 | 7.95 | 1½-2½ | (132) |
| 3548.55 | P | | 4.48 | 7.95 | 2½-2½ | |
| m3497.81 | P | Fe | 4.48 | 8.00 | 2½-1½ | $b^2D-z^2P^o$ |
| 3485.728 | A | 1 | 4.46 | 8.00 | 1½- ½ | (133) |
| 3482.39 | P | | 4.46 | 8.00 | 1½-1½ | |
| 3388.447 | A | tr | 4.48 | 8.14 | 2½-3½ | $b^2D-x^4G^o$ (134) |
| 3318.862 | A | 0 | 4.46 | 8.18 | 1½- ½ | $b^2D-z^2S^o$ (135) |
| 3318.62 | P | | 4.48 | 8.19 | 2½-3½ | $b^2D-x^4F^o$ |
| 3292.89 | P | | 4.48 | 8.22 | 2½-1½ | (136) |
| m3251.34 | P | Fe | 4.48 | 8.27 | 2½-2½ | $b^2D-y^2D^o$ |
| 3209.603 | A | 1 | 4.46 | 8.30 | 1½-1½ | (137) |
| 3043.31 | P | | 4.48 | 8.53 | 2½-2½ | $b^2D-x^4P^o$ |
| 3013.38 | P | | 4.46 | 8.56 | 1½-1½ | (138) |
| 3024.92 | P | | 4.48 | 8.56 | 2½-1½ | |
| 3002.09 | P | | 4.46 | 8.57 | 1½- ½ | |
| 3031.63 | P | | 4.46 | 8.53 | 1½-2½ | |
| 2997.298 | A | 7 | 4.48 | 8.59 | 2½-3½ | $b^2D-y^2F^o$ |
| 2982.059 | A | 8 | 4.46 | 8.60 | 1½-2½ | (139) |
| 2993.366 | A | 1n | 4.48 | 8.60 | 2½-2½ | |
| 4455.85 | P | | 4.60 | 7.37 | ½-1½ | $a^2S-z^45^o$ (140) |
| 4147.26 | P | | 4.60 | 7.57 | ½-1½ | $a^2S-y^4P^o$ |
| 4199.09 | P | | 4.60 | 7.53 | ½- ½ | (141) |
| 4015.20 | P | | 4.60 | 7.67 | ½-1½ | $a^2S-z^2D^o$ (142) |
| 3810.21 | P | | 4.60 | 7.83 | ½-1½ | $a^2S-x^4D^o$ |
| 3796.55 | P | | 4.60 | 7.85 | ½- ½ | (143) |
| 3621.273 | A | 6 | 4.60 | 8.00 | ½-1½ | $a^2S-z^2P^o$ |
| 3624.890 | A | 5 | 4.60 | 8.00 | ½- ½ | (144) |
| 3444.76 | P | | 4.60 | 8.18 | ½- ½ | $a^2S-z^2S^o$ (145) |
| 4650.04 | P | | 4.71 | 7.37 | 2½-1½ | $c^2D-z^4S^o$ |
| 4660.93 | P | | 4.72 | 7.37 | 1½-1½ | (146) |
| 4495.52 | P | | 4.71 | 7.46 | 2½-2½ | $c^2D-y^4P^o$† |
| 4324.36 | P | | 4.72 | 7.57 | 1½-1½ | (147) |
| 4360.03 | P | | 4.71 | 7.54 | 2½-2½ | $c^2D-z^2D^o$ |
| 4180.97 | P | | 4.72 | 7.67 | 1½-1½ | (148) |
| 4172.20 | P | | 4.71 | 7.67 | 2½-1½ | |
| 4262.61 | P | | 4.72 | 7.54 | 1½-2½ | |
| 4182.69 | P | | 4.71 | 7.66 | 2½-3½ | $c^2D-y^4F^o$ |
| 4176.44 | P | | 4.72 | 7.67 | 1½-2½ | (149) |
| 4167.69 | P | | 4.71 | 7.67 | 2½-2½ | |
| 4160.28 | P | | 4.72 | 7.68 | 1½-1½ | |
| 4151.60 | P | | 4.71 | 7.68 | 2½-1½ | |
| 4138.21 | P | | 4.71 | 7.69 | 2½-3½ | $c^2D-z^2G^o$ (150) |
| 4031.486 | A | 1 | 4.71 | 7.77 | 2½-1½ | $c^2D-y^4D^o$ |
| 4084.58 | P | | 4.72 | 7.74 | 1½-2½ | (151) |
| 3863.413 | A | 1 | 4.71 | 7.91 | 2½-3½ | $c^2D-y^4G^o$ |
| *3863.953 | A | 1 | 4.72 | 7.91 | 1½-2½ | (152) |
| 3827.079 | A | 4 | 4.71 | 7.94 | 2½-3½ | $c^2D-z^2F^o$ |
| 3814.121 | A | 4 | 4.72 | 7.95 | 1½-2½ | (153) |
| 3806.82 | P | | 4.71 | 7.95 | 2½-2½ | |
| *3748.489§ | A | 8 | 4.71 | 8.00 | 2½-1½ | $c^2D-z^2P^o$ |
| 3759.460 | A | 6 | 4.72 | 8.00 | 1½- ½ | (154) |
| 3755.563 | A | 4 | 4.72 | 8.00 | 1½-1½ | |
| 3566.052 | A | 2 | 4.72 | 8.18 | 1½- ½ | $c^2D-z^2S^o$ (155) |
| m3466.85 | P | Fe | 4.71 | 8.27 | 2½-2½ | $c^2D-y^2D^o$ |
| 3440.25 | P | | 4.72 | 8.30 | 1½-1½ | (156) |
| 3472.886 | A | 0 | 4.72 | 8.27 | 1½-2½ | |
| *3179.504§ | A | 8 | 4.71 | 8.59 | 2½-3½ | $c^2D-y^2F^o$ |
| *3180.164§ | A | 7 | 4.72 | 8.60 | 1½-2½ | (157) |
| 3175.077 | A | 4 | 4.71 | 8.60 | 2½-2½ | |
| 3089.388 | A | 4 | 4.71 | 8.71 | 2½-3½ | $c^2D-x^2G^o$ (158) |
| 2972.769 | A | 1 | 5.46 | 9.61 | 4½-4½ | $z^4F^o-e^6D$ |
| 2989.079 | A | tr n | 5.57 | 9.69 | 2½-2½ | (159) |
| 2991.817 | A | 2n | 5.49 | 9.61 | 3½-4½ | $z^4D^o-e^6D$ |
| 2998.528 | A | 1n | 5.49 | 9.86 | 3½-3½ | (160) |
| 2962.936 | A | 1n | 5.53 | 9.69 | 2½-2½ | |
| 2988.119 | A | 0 | 5.56 | 9.72 | 1½-1½ | |
| *2972.016§ | A | 0 | 5.58 | 9.73 | ½- ½ | |
| 6219.35 | P | | 5.54 | 7.53 | 3½-4½ | $c^2F-z^4H^o$ |
| 6160.75 | P | | 5.55 | 7.55 | 2½-3½ | (161) |
| 6155.24 | P | | 5.54 | 7.55 | 3½-3½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe II** continued | | | | | | |
| 6199.16 | B | 2 | 5.54 | 7.54 | 3½-2½ | $c^2F-z^4G^o$ (162) |
| 6179.378 | A | 5 | 5.54 | 7.54 | 3½-2½ | $c^2F-z^2D^o$ |
| 5813.67 | B | 3 | 5.55 | 7.67 | 2½-1½ | (163) |
| 3184.94 | P | | 5.55 | 7.54 | 2½-2½ | |
| 5823.17 | B | 3 | 5.54 | 7.66 | 3½-4½ | $c^2F-x^2G^o$ |
| 5747.88 | P | | 5.55 | 7.69 | 2½-3½ | (164) |
| 5797.81 | P | | 5.54 | 7.67 | 3½-4½ | $c^2F-y^4F^o$ |
| 5834.06 | P | | 5.55 | 7.66 | 2½-3½ | (165) |
| 5829.12 | P | | 5.54 | 7.66 | 3½-3½ | |
| 5804.91 | P | | 5.55 | 7.67 | 2½-2½ | |
| 5800.02 | P | | 5.54 | 7.67 | 3½-2½ | |
| 5773.75 | P | | 5.55 | 7.68 | 2½-1½ | |
| 5544.76 | P | | 5.54 | 7.77 | 3½-3½ | $c^2F-x^4D^o$ (166) |
| 5160.824 | A | 1 | 5.54 | 7.94 | 3½-3½ | $c^2F-z^2F^o$ |
| 5127.866 | A | 1 | 5.55 | 7.95 | 2½-2½ | (167) |
| 5124.05 | P | | 5.54 | 7.95 | 3½-2½ | |
| 5164.69 | P | | 5.55 | 7.94 | 2½-3½ | |
| 5019.478 | A | 0 | 5.54 | 8.00 | 3½-4½ | $c^2F-y^2G^o$ |
| 4953.979 | A | 0 | 5.55 | 8.04 | 2½-3½ | (168) |
| 4810.760 | A | 0 | 5.54 | 8.11 | 3½-4½ | $c^2F-x^4G^o$ |
| 4760.15 | P | | 5.55 | 8.14 | 2½-3½ | (169) |
| 4738.52 | P | | 5.54 | 8.15 | 3½-4½ | $c^2F-x^4F^o$ |
| 4661.19 | P | | 5.55 | 8.19 | 2½-3½ | (170) |
| 4658.03 | P | | 5.54 | 8.19 | 3½-3½ | |
| 4629.90 | P | | 5.55 | 8.21 | 2½-2½ | |
| 4626.78 | P | | 5.54 | 8.21 | 3½-2½ | |
| 4610.59 | P | | 5.55 | 8.22 | 2½-1½ | |
| m4526.58 | P | Fe | 5.54 | 8.27 | 3½-2½ | $c^2F-y^2D^o$ |
| 4474.194 | A | 0n | 5.55 | 8.30 | 2½-1½ | (171) |
| 4529.56 | P | | 5.55 | 8.27 | 2½-2½ | |
| 4048.831 | A | 3 | 5.54 | 8.59 | 3½-3½ | $c^2F-y^2F^o$ |
| m4044.01 | P | Fe | 5.55 | 8.60 | 2½-2½ | (172) |
| 4041.64 | P | | 5.54 | 8.60 | 3½-2½ | |
| 4051.21 | P | | 5.55 | 8.59 | 2½-3½ | |
| 3935.942 | A | 6 | 5.54 | 8.68 | 3½-4½ | $c^2F-x^2G^o$ |
| 3906.037 | A | 5 | 5.55 | 8.71 | 2½-3½ | (173) |
| 3673.35 | P | | 5.54 | 8.90 | 3½-4½ | $c^2F-x^2H^o$ (174) |
| 3604.21 | P | | 5.54 | 8.97 | 3½-3½ | $c^2F-w^4D^o$ |
| 3610.38 | P | | 5.55 | 8.96 | 2½-2½ | (175) |
| 3608.49 | P | | 5.54 | 8.96 | 3½-2½ | |
| 3622.81 | P | | 5.55 | 8.95 | 2½-1½ | |
| 3606.18 | P | | 5.55 | 8.97 | 2½-3½ | |
| 3557.548 | A | 2 | 5.54 | 9.01 | 3½-3½ | $c^2F-x^2F^o$ |
| m3554.50 | P | Fe | 5.55 | 9.02 | 2½-2½ | (176) |
| 3366.960 | A | 3 | 5.54 | 9.21 | 3½-2½ | $c^2F-x^2D^o$ |
| 3381.003 | A | 4 | 5.55 | 9.20 | 2½-1½ | (177) |
| 3368.626 | A | 0 | 5.55 | 9.21 | 2½-2½ | |
| 3257.894 | A | 3 | 5.54 | 9.33 | 3½-3½ | $c^2F-w^2F^o$ |
| 3226.378 | A | 2 | 5.55 | 9.37 | 2½-2½ | (178) |
| 3224.86 | P | | 5.54 | 9.37 | 3½-2½ | |
| 3259.44 | P | | 5.55 | 9.33 | 2½-3½ | |
| 3045.313 | A | 0 | 5.54 | 9.60 | 3½-2½ | $c^2F-v^2F^o$ |
| 3046.675 | A | 1 | 5.55 | 9.60 | 2½-2½ | (179) |
| 2959.841 | A | 4 | 5.54 | 9.71 | 3½-2½ | $c^2F-w^2D^o$ |
| *2979.096 | A | 3 | 5.55 | 9.69 | 2½-1½ | (180) |
| 2961.119 | A | tr | 5.55 | 9.71 | 2½-2½ | |
| 3078.698 | A | 8n | 5.80 | 9.81 | 2½-3½ | $z^4p^o-e^4D$ |
| 3076.455 | A | 6n | 5.85 | 9.86 | 1½-2½ | (181) |
| 3071.141 | A | 4n | 5.88 | 9.90 | ½-1½ | |
| 3036.986 | A | 5n | 5.80 | 9.86 | 2½-2½ | |
| 3049.011 | A | 5n | 5.85 | 9.90 | 1½-1½ | |
| 3055.368 | A | 4n | 5.88 | 9.92 | ½- ½ | |
| *3010.220§ | A | 1 | 5.80 | 9.90 | 2½-1½ | |
| 3033.445 | A | 2n | 5.85 | 9.92 | 1½- ½ | |
| 5952.55 | P | | 5.93 | 8.00 | 2½-1½ | $d^2D-z^2P^o$ |
| 5835.50 | P | | 5.89 | 8.00 | 1½- ½ | (182) |
| 5826.12 | P | | 5.89 | 8.00 | 1½-1½ | |
| 5856.45 | P | | 5.93 | 8.04 | 2½-3½ | $d^2D-y^2G^o$ (183) |
| 5451.60 | P | | 5.93 | 8.19 | 2½-3½ | $d^2D-x^4F^o$ |
| 5304.26 | P | | 5.89 | 8.21 | 1½-2½ | (184) |
| 5408.842 | A | 1 | 5.93 | 8.21 | 2½-2½ | |
| 5278.955 | A | 0n | 5.89 | 8.22 | 1½-1½ | |
| 5382.52 | P | | 5.93 | 8.22 | 2½-1½ | |
| 5272.413 | A | 2 | 5.93 | 8.27 | 2½-2½ | $d^2D-y^2D^o$ |
| 5100.840 | A | 4n | 5.89 | 8.30 | 1½-1½ | (185) |
| 5173.002 | A | 0 | 5.89 | 8.27 | 1½-2½ | |
| 4635.328 | A | 5 | 5.93 | 8.59 | 2½-3½ | $d^2D-y^2F^o$ |
| 4549.214 | A | 4 | 5.89 | 8.60 | 1½-2½ | (186) |
| 4625.911 | A | 1 | 5.93 | 8.60 | 2½-2½ | |
| 4448.248 | A | 1n | 5.93 | 8.71 | 2½-3½ | $d^2D-x^2G^o$ (187) |
| 4111.902 | A | 1 | 5.93 | 8.93 | 2½-3½ | $d^2D-w^4F^o$ |
| 4069.883 | A | 1 | 5.89 | 8.92 | 1½-2½ | (188) |
| 4131.17 | P | | 5.93 | 8.92 | 2½-2½ | |
| 4081.42 | P | | 5.89 | 8.91 | 1½-1½ | |
| 4143.07 | P | | 5.93 | 8.91 | 2½-1½ | |
| 4061.787 | A | 1 | 5.93 | 8.97 | 2½-3½ | $d^2D-w^4D^o$ |
| 4007.72 | P | | 5.89 | 8.96 | 1½-2½ | (189) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe II** continued | | | | | | |
| 4002.549 | A | 3 | 5.93 | 9.01 | 2½-3½ | $d^2D-x^2F^o$ |
| 3938.969 | A | 4 | 5.89 | 9.02 | 1½-2½ | (190) |
| 3996.36 | P | | 5.93 | 9.02 | 2½-2½ | |
| 3975.029 | A | 2 | 5.93 | 9.04 | 2½-1½ | $d^2D-y^2P^o$ |
| 3918.51 | P | | 5.89 | 9.03 | 1½- ½ | (191) |
| 3762.894 | A | 5 | 5.93 | 9.21 | 2½-2½ | $d^2D-x^2D^o$ |
| m3727.04 | P | Fe | 5.89 | 9.20 | 1½-1½ | (192) |
| 3778.37 | P | | 5.93 | 9.20 | 2½-1½ | |
| 3711.974 | A | 1 | 5.89 | 9.21 | 1½-2½ | |
| 3627.168 | A | 1 | 5.93 | 9.33 | 2½-3½ | $d^2D-w^2F^o$ (193) |
| 3321.491 | A | 1 | 5.93 | 9.65 | 2½-3½ | $d^2D-v^2F^o$ |
| 3324.838 | A | 1 | 5.89 | 9.60 | 1½-2½ | (194) |
| 3365.640 | A | 0 | 5.93 | 9.60 | 2½-2½ | |
| 3261.509 | A | 1 | 5.93 | 9.71 | 2½-2½ | $d^2D-w^2D^o$ (195) |
| 3203.741 | A | 0 | 5.93 | 9.78 | 2½-1½ | $d^2D-w^2P^o$ (196) |
| 7287.36 | B | 6 | 6.19 | 7.89 | 4½-5½ | $c^4F-y^4G^o$ |
| 7264.99 | B | 10 | 6.20 | 7.89 | 3½-4½ | (197) |
| 7193.23 | B | 8 | 6.19 | 7.91 | 2½-3½ | |
| 7134.99 | B | 5 | 6.18 | 7.91 | 1½-2½ | |
| 6966.9 | B | 2 | 6.18 | 7.95 | 1½-2½ | $c^4F-z^2F^o$ (198) |
| 6482.205 | A | 1 | 6.19 | 8.10 | 4½-5½ | $c^4F-x^4G^o$ |
| 6446.43 | B | 20 | 6.20 | 8.11 | 3½-4½ | (199) |
| 6331.969 | B | 12 | 6.19 | 8.14 | 2½-3½ | |
| 6433.85 | B | 3 | 6.19 | 8.11 | 4½-4½ | |
| 6305.318 | B | 15 | 6.19 | 8.15 | 4½-4½ | $c^4F-x^4F^o$ |
| 6175.158 | B | 15 | 6.20 | 8.19 | 3½-3½ | (200) |
| 6103.54 | B | 8 | 6.19 | 8.21 | 2½-2½ | |
| 6045.497 | B | 6 | 6.18 | 8.22 | 1½-1½ | |
| 4444.563 | A | 1 | 6.19 | 8.97 | 4½-4½ | $c^4F-w^4F^o$ (201) |
| 4359.12 | P | | 6.19 | 9.02 | 4½-4½ | $c^4F-w^2G^o$ |
| 4355.03 | P | | 6.20 | 9.03 | 3½-3½ | (202) |
| 4349.28 | P | | 6.19 | 9.03 | 4½-3½ | |
| 4364.89 | P | | 6.20 | 9.02 | 3½-4½ | |
| 4346.50 | P | | 6.19 | 9.03 | 2½-3½ | |
| 8487.43 | B | 4 | 6.78 | 8.68 | 3½-4½ | $d^2F-x^2G^o$ |
| 6386.75 | B | 2 | 6.77 | 8.71 | 2½-3½ | (203) |
| 5519.72 | P | | 6.78 | 9.01 | 3½-3½ | $d^2F-x^2F^o$ |
| 5497.70 | P | | 6.77 | 9.02 | 2½-2½ | (204) |
| 5074.063 | A | 1 | 6.78 | 9.21 | 3½-2½ | $d^2F-x^2D^o$ |
| 5093.470 | A | 1 | 6.77 | 9.20 | 2½-1½ | (205) |
| 4830.40 | P | | 6.78 | 9.33 | 3½-3½ | $d^2F-w^2F^o$ |
| 4750.49 | P | | 6.77 | 9.37 | 2½-2½ | (206) |
| *3451.614§ | A | 2 | 6.78 | 10.35 | 3½-2½ | $d^2F-v^2D^o$ |
| 3390.082 | A | 2 | 6.77 | 10.41 | 2½-1½ | (207) |
| 3451.228 | A | 2 | 6.78 | 10.35 | 3½-4½ | $d^2F-v^2G^o$ |
| 3515.818 | A | 2 | 6.77 | 10.28 | 2½-3½ | (208) |
| 7334.66 | B | 8 | 7.24 | 8.92 | 4½-5½ | $d^2G-x^2H^o$ |
| 7425.12 | P | | 7.24 | 8.90 | 3½-4½ | (209) |
| 6677.33 | B | 3 | 7.24 | 9.09 | 4½-5½ | $d^2G-w^2H^o$ |
| 6627.28 | B | 5 | 7.24 | 9.10 | 3½-4½ | (210) |
| 5891.36 | B | 8 | 7.24 | 9.33 | 4½-3½ | $d^2G-w^2F^o$ |
| 5795.87 | B | 4n | 7.24 | 9.37 | 3½-2½ | (211) |
| 3960.895 | A | 3 | 7.24 | 10.35 | 4½-4½ | $d^2G-v^2G^o$ |
| 4057.457 | A | 2 | 7.24 | 10.28 | 3½-3½ | (212) |
| 4354.358 | A | 2n | 7.62 | 10.45 | 3½-3½ | $y^4D^o-f^4D$ |
| 4507.195 | A | 0n | 7.74 | 10.48 | 2½-2½ | (213) |
| 4066.328 | A | ?2 | 7.87 | 10.70 | 1½-1½ | $z^2D^o-e^4F$ (214) |
| 5785.0 | B | 5N | 7.67 | 9.81 | 4½-3½ | $y^4F^o-e^4D$ (215) |
| 4366.165 | A | tr | 7.67 | 10.50 | 2½-1½ | $y^4F^o-f^4D$ (216) |
| 6061.04 | B | 3n | 7.77 | 9.81 | 3½-3½ | $x^4D^o-e^4D$ (217) |
| 4913.368 | A | 1 | 7.83 | 10.35 | 1½-2½ | $x^4D^o-32$ (218) |
| 4598.528 | A | 1n | 7.77 | 10.45 | 3½-3½ | $x^4D^o-f^4D$ |
| 4628.821 | A | 0n | 7.81 | 10.48 | 2½-2½ | (219) |
| 4631.895 | A | 0n | 7.83 | 10.50 | 1½-1½ | |
| 4625.549 | A | tr | 7.85 | 10.51 | ½- ½ | |
| 4652.280 | A | tr | 7.85 | 10.50 | ½-1½ | |
| 4313.034 | A | 1n | 7.77 | 10.63 | 3½-4½ | $x^4D^o-e^4F$ |
| 4319.717 | A | 1n | 7.81 | 10.67 | 2½-3½ | (220) |
| 4321.341 | A | 1n | 7.83 | 10.69 | 1½-2½ | |
| 4318.216 | A | 0N | 7.85 | 10.70 | ½-1½ | |
| 5081.920 | A | tr | 7.91 | 10.33 | 3½-3½? | $y^4G^o-30$ (221) |
| 4493.579 | A | 1n | 7.89 | 10.63 | 5½-4½ | $y^4G^o-e^4F$ |
| 4449.663 | A | 1n | 7.89 | 10.67 | 4½-3½ | (222) |
| 4431.626 | A | 1n | 7.91 | 10.69 | 3½-2½ | |
| m4508.26 | P | Fe+ | 7.89 | 10.63 | 4½-4½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe II** continued | | | | | | |
| 2987.542 | A | 1n | 8.00 | 12.13 | 4½-5½ | $y^2G^o$-$e^4H$ (223) |
| 5529.940 | A | 2 | 8.18 | 10.41 | ½-1½ | $z^2S^o$-$e^6P$ (224) |
| 5303.419 | A | 0n | 8.15 | 10.48 | 4½-5½ | $x^4F^o$-$e^4G$ |
| 5315.618 | A | 0n | 8.19 | 10.52 | 3½-4½ | (225) |
| 5278.265 | A | 0n | 8.21 | 10.55 | 2½-3½ | |
| 3117.505 | A | 0 | 8.19 | 12.15 | 3½-4½ | $x^4F^o$-$e^4H$ (226) |
| *3140.692§ | A | 1 | 8.20 | 12.13 | 5½-5½ | $y^4H^o$-$e^4H$ |
| 3138.207 | A | 1n | 8.22 | 12.15 | 4½-4½ | (227) |
| 3300.056 | A | tr | 8.40 | 12.13 | 4½-5½ | ?$y^2H^o$-$e^4H$ (228) |

Strongest Unclassified Lines of **Fe II**

| | | | | | |
|---|---|---|---|---|---|
| *7376.46 § | B | 20 | 5070.957 | A | 2 |
| 7067.44 | B | 20 | 5061.794 | A | 1 |
| 6586.69 | B | 5 | 5035.773 | A | 3 |
| 6517.01 | 8 | 5 | 5032.794 | A | 1 |
| 6506.33 | B | 5 | *5030.740§§ | A | 3 |
| 6493.05 | B | 8 | 5022.874 | A | 1 |
| 6491.28 | B | 4 | 5004.264 | A | 3 |
| 6442.97 | B | 6 | 4948.848 | A | 1 |
| 6385.473 | B | 5 | 4579.523 | A | 1 |
| 6383.753 | B | 15 | 4480.687 | A | 1 |
| 6375.96 | B | 4n | 4455.258 | A | 3 |
| 6248.916 | B | 4 | 4451.545 | A | 4 |
| 6233.52 | B | 3 | 4402.875 | A | 2 |
| | | | 4368.262 | A | 1 |
| 5962.4 | B | 30N | 4361.249 | A | 2 |
| 5956.5 | B | 4N | 4357.574 | A | 4 |
| 5903.6 | B | 8N | 4331.529 | A | 3 |
| 5891.9 | B | 3 | 4286.311 | A | 1 |
| 5835.61 | B | 3n | 4263.895 | A | 1 |
| 5567.815 | B | 10 | 3860.915 | A | 3 |
| 5506.268 | A | 3 | 3822.737 | A | 3 |
| *5503.397§ | A | 1 | 3725.901 | A | ?2 |
| | | | 3652.748 | A | 1 |
| *5466.94 § | B | 30 | 3624.688 | A | 2 |
| 5466.021 | A | 2 | *3482.426§§ | A | 2 |
| 5427.832 | B | 30 | *3473.825§§ | A | 2 |
| 5403.113 | A | 2 | 3453.595 | A | 2 |
| 5387.136 | A | 2 | 3451.318 | A | 2 |
| 5318.267 | A | 0 | 3386.724 | A | 2 |
| 5318.025 | A | 1 | 3356.265 | A | 2 |
| 5248.028 | A | 2 | *3329.070§ | A | 2 |
| 5169.733 | A | 1 | *3299.771§§ | A | 1 |
| 5159.93 | B | 4 | | | |
| 5156.10 | B | 6 | *3228.600§ | A | ?3 |
| 5149.538 | A | 3 | 3223.444 | A | 1 |
| 5147.09 | B | 2 | 3171.016 | A | 1 |
| 5117.107 | A | 0 | 3165.957 | A | 3n |
| 5101.48 | B | 2N | | | |
| 5100.95 | B | 15 | 3123.715 | A | 1 |
| 5100.704 | A | 2 | 3119.660 | A | ?1 |
| 5097.375 | A | ?1 | 3115.352 | A | 2 |
| 5093.646 | A | 1 | | | |
| 5089.278 | A | 0 | 3071.270 | A | 2 |
| 5087.25 | B | 3 | *3063.814§§ | A | 1 |
| 5075.829 | A | 1 | 2968.906 | A | 2 |
| | | | 2963.897 | A | 3n |

| **Fe III** | I P 30.48 | | Anal B | List A | | June 1942 |
|---|---|---|---|---|---|---|
| 3069.335 | B | 4 | 6.21 | 10.23 | 4-4 | $b^3F$-$z^7P^o$ (1) |
| 3120.24 | B | 1 | 6.21 | 10.16 | 3-3 | |
| *3142.22 § | B | 2 | 6.20 | 10.12 | 2-2 | |
| 3071.238 | 8 | 5 | 6.21 | 10.23 | 3-4 | |
| 3109.59 | B | 1 | 6.20 | 10.16 | 2-3 | |
| 5163.74 | B | 1 | 7.84 | 10.23 | 4-4? | $a^5G$-$z^7P^o$ (2) |
| 6102.59 | P | | 8.21 | 10.23 | 3-4 | $a^5P$-$z^7P^o$ |
| 6322.98 | P | | 8.21 | 10.16 | 2-3 | (3) |
| 6487.48 | P | | 8.22 | 10.12 | 1-2 | |
| 6299.74 | P | | 8.21 | 10.16 | 3-3 | |
| 6458.68 | P | | 8.21 | 10.12 | 2-2 | |
| 6434.44 | P | | 8.21 | 10.12 | 3-2 | |
| 4419.59 | A | 10 | 8.21 | 11.00 | 3-3 | $a^5P$-$z^5P^o$ |
| 4382.31 | B | 1 | 8.21 | 11.03 | 2-2 | (4) |
| 4365.56 | B | 3 | 8.22 | 11.05 | 1-1 | |
| 4371.10 | B | 1 | 8.21 | 11.03 | 3-2 | |
| 4352.70 | B | 4 | 8.21 | 11.05 | 2-1 | |
| 4430.95 | A | 7 | 8.21 | 11.00 | 2-3 | |
| 4395.78 | A | 6 | 8.22 | 11.03 | 1-2 | |
| 5156.0 | A | 4 | 8.60 | 11.00 | 4-3 | $b^5D$-$z^5P^o$ |
| *5127.32 | B | 6 | 8.62 | 11.03 | 3-2 | (5) |
| 5086.69 | B | 3 | 8.62 | 11.05 | 2-1 | |
| 5193.89 | B | 4 | 8.62 | 11.00 | 3-3 | |
| *5127.32 | B | 6 | 8.62 | 11.03 | 2-2 | |
| 5073.78 | B | 3 | 8.62 | 11.05 | 1-1 | |
| 5194.43 | B | 4 | 8.62 | 11.00 | 2-3 | |
| 5114.10 | B | 1 | 8.62 | 11.03 | 1-2 | |
| 5063.30 | B | 2 | 8.61 | 11.05 | 0-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe III** continued | | | | | | |
| 3198.81 | A | 5 | 10.17 | 14.03 | 3-4 | $c^3D$-$z^5G^o$ |
| 3204.76 | A | 6 | 10.17 | 14.02 | 2-3 | (6) |
| 3215.60 | A | 8 | 10.18 | 14.02 | 1-2 | |
| 3201.90 | A | 1 | 10.17 | 14.02 | 3-3 | |
| 3206.98 | A | 4 | 10.17 | 14.02 | 2-2 | |
| 3266.88 | A | 20 | 10.26 | 14.04 | 5-6 | $a^5F$-$z^5G^o$ |
| 3276.08 | A | 15 | 10.27 | 14.03 | 4-5 | (7) |
| 3288.81 | A | 15 | 10.28 | 14.03 | 3-4 | |
| 3305.22 | A | 10 | 10.29 | 14.02 | 2-3 | |
| 3339.36 | A | 10 | 10.33 | 14.02 | 1-2 | |
| *3273.53 § | A | 6 | 10.26 | 14.03 | 5-5 | |
| 3280.58 | A | 6 | 10.27 | 14.03 | 4-4 | |
| *3292.04§§ | A | 8 | 10.28 | 14.02 | 3-3 | |
| 3307.53 | A | 5 | 10.29 | 14.02 | 2-2 | |
| 3278.04 | B | 1d | 10.26 | 14.03 | 5-4 | |
| 3283.75 | A | 2 | 10.27 | 14.02 | 4-3 | |
| 3109.32 | B | 1 | 10.26 | 14.23 | 5-5 | $a^5F$-$z^5H^o$ |
| *3129.04 § | B | 5 | 10.27 | 14.21 | 4-4? | (8) |
| 3111.609 | A | 8 | 10.27 | 14.23 | 4-5 | |
| 3164.67 | A | 3 | 10.29 | 14.19 | 2-3 | |
| 3013.125 | A | 20 | 10.26 | 14.36 | 5-5 | $a^5F$-$z^5F^o$ † |
| 3001.589 | A | 12 | 10.27 | 14.38 | 4-4 | (9) |
| 3002.99 | A | 5 | 10.33 | 14.44 | 1-1 | |
| 3015.230 | A | 7 | 10.27 | 14.36 | 4-5 | |
| 3008.506 | A | 5 | 10.28 | 14.38 | 3-4 | |
| 3000.836 | B | tr | 10.27 | 14.38 | 4-3 | $a^5F$-$z^5D^o$ † |
| 3012.847 | B | 2 | 10.28 | 14.37 | 3-2 | (10) |
| 3027.46 | A | 3 | 10.29 | 14.37 | 2-1 | |
| 3055.55 | A | 5 | 10.33 | 14.37 | 1-0 | |
| 3007.802 | A | 6 | 10.28 | 14.38 | 3-3 | |
| 3023.85 | A | 8 | 10.29 | 14.37 | 2-2 | |
| 3054.134 | A | 7 | 10.33 | 14.37 | 1-1 | |
| 3018.744 | A | 6 | 10.29 | 14.38 | 2-3 | |
| 3050.463 | A | 5 | 10.33 | 14.37 | 1-2 | |
| *3419.49 | A | 3 | 10.42 | 14.02 | 2-3 | $c^3F$-$z^5G^o$ |
| 3421.97 | A | 3 | 10.42 | 14.02 | 2-2 | (11) |
| 3108.85 | A | 3 | 10.39 | 14.36 | 4-5 | $c^3F$-$z^5F^o$ (12) |
| 3143.36 | A | 2 | 10.45 | 14.38 | 3-3 | $c^3F$-$z^5D^o$ (13) |
| 3283.30 | A | 2 | 10.85 | 14.61 | 3-4 | $b^1F$-$z^3F^o$ |
| 3294.50 | A | 4 | 10.85 | 14.60 | 3-3 | (14) |
| 4003.41 | A | 4 | 10.95 | 14.03 | 4-4 | $b^3H$-$z^5G^o$ (15) |
| 3464.27 | B | 1 | 10.95 | 14.51 | 4-4 | $b^3H$-$z^5D^o$ (16) |
| 3367.54 | A | 3 | 10.95 | 14.61 | 4-4 | $b^3H$-$z^3F^o$ (17) |
| 3396.71 | A | 7 | 10.98 | 14.61 | 6-6 | $b^3H$-$z^3H^o$ |
| 3347.70 | A | 8 | 10.95 | 14.64 | 5-5 | (18) |
| 3329.89 | A | 7 | 10.95 | 14.65 | 4-4 | |
| 3373.51 | A | 2 | 10.98 | 14.64 | 6-5 | |
| *3333.27 | A | 3 | 10.95 | 14.65 | 5-4 | |
| 3357.07 | B | tr | 10.95 | 14.62 | 4-3 | $b^3H$-$y^5P^o$ (19) |
| 3090.772 | B | 1 | 10.95 | 14.94 | 4-3 | $b^3H$-$y^5F^o$ (20) |
| 3026.985 | A | 6 | 10.98 | 15.05 | 6-5 | $b^3H$-$z^3G^o$ |
| m3006.95 | P | Fe III | 10.95 | 15.05 | 5-4 | (21) |
| 3006.122 | A | 4 | 10.95 | 15.05 | 4-3 | |
| *3004.109 | B | 3 | 10.95 | 15.05 | 4-4 | |
| 4205.92 | A | 2 | 11.10 | 14.03 | 5-5 | $c^3G$-$z^5G^o$ |
| 4184.09 | A | 4 | 11.08 | 14.03 | 4-5 | (22) |
| 4196.69 | B | 1 | 11.08 | 14.03 | 4-3 | |
| *3947.10 | A | 4 | 11.08 | 14.21 | 4-4 | $c^3G$-$z^5H^o$ (23) |
| 3663.98 | B | tr | 11.08 | 14.45 | 4-3 | $c^3G$-$z^5F^o$ |
| 3664.98 | B | 1 | 11.07 | 14.44 | 3-2 | (24) |
| 3620.37 | A | 3 | 11.10 | 14.51 | 5-4 | $c^3G$-$z^5D^o$ (25) |
| 3514.87 | A | 2 | 11.10 | 14.61 | 5-4 | $c^3G$-$z^3F^o$ |
| 3512.34 | P | | 11.08 | 14.60 | 4-3 | (26) |
| 3511.93 | B | tr | 11.07 | 14.59 | 3-2? | |
| 3499.57 | A | 7 | 11.08 | 14.61 | 4-4 | |
| *3501.75 | A | 8 | 11.07 | 14.60 | 3-3 | |
| 3489.07 | P | | 11.07 | 14.61 | 3-4 | |
| 3514.39 | P | | 11.10 | 14.61 | 5-6 | $c^3G$-$z^3H^o$ |
| 3474.41 | P | | 11.08 | 14.64 | 4-5 | (27) |
| 3448.63 | P | | 11.07 | 14.65 | 3-4 | |
| 3489.48 | P | | 11.10 | 14.64 | 5-5 | |
| 3458.91 | B | 2 | 11.08 | 14.65 | 4-4 | |
| *3473.82 § | B | 5 | 11.10 | 14.65 | 5-4 | |
| 3167.54 | B | 1 | 11.10 | 15.00 | 5-5 | $c^3G$-$y^5F^o$ (28) |
| *3120.03 § | A | 3 | 11.10 | 15.05 | 5-5 | $c^3G$-$z^3G^o$ |
| 3108.78 | P | | 11.08 | 15.05 | 4-4 | (29) |
| 3102.55 | P | | 11.07 | 15.05 | 3-3 | |
| 3120.84 | A | 2 | 11.10 | 15.05 | 5-4 | |
| 3110.85 | A | 3 | 11.08 | 15.05 | 4-3 | |
| 3107.950 | A | 8 | 11.08 | 15.05 | 4-5 | |
| 3100.48 | P | | 11.07 | 15.05 | 3-4 | |
| 3070.072 | A | 5 | 11.08 | 15.10 | 4-3 | $c^3G$-$z^3D^o$ |
| 3035.802 | A | 3 | 11.07 | 15.14 | 3-2 | (30) |
| 3011.060 | B | 1 | 11.07 | 15.17 | 3-2 | $c^3G$-$y^5D^o$ (31) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Fe III** continued | | | | | | |
| 4323.81 | B | 2 | 11.17 | 14.02 | 3-3 | $d^3F$-$z^5G^o$ (32) |
| 4057.51 | B | 4 | 11.17 | 14.21 | 4-4 | $d^3F$-$z^5H^o$ (33) |
| 3773.80 | B | tr | 11.17 | 14.44 | 3-2 | $d^3F$-$z^5F^o$ (34) |
| *3697.45§§ | B | 3 | 11.17 | 14.51 | 3-4 | $d^3F$-$z^5D^o$ |
| 3845.68 | 8 | 1 | 11.16 | 14.37 | 2-2 | (35) |
| 3586.12 | A | 9 | 11.17 | 14.61 | 4-4 | $d^3F$-$z^3F^o$ |
| 3600.93 | A | 10 | 11.17 | 14.60 | 3-3 | (36) |
| 3603.88 | A | 9 | 11.16 | 14.59 | 2-2 | |
| 3599.49 | A | 3 | 11.17 | 14.60 | 4-3 | |
| 3611.72 | A | 3 | 11.17 | 14.59 | 3-2 | |
| 3587.53 | A | 3 | 11.17 | 14.61 | 3-4 | |
| 3593.15 | A | 4 | 11.16 | 14.60 | 2-3 | |
| 3250.27 | B | 1 | 11.17 | 14.97 | 3-4 | $d^3F$-$y^5F^o$ |
| 3294.85 | 8 | 1 | 11.17 | 14.92 | 3-2 | (37) |
| 3302.19 | B | 1 | 11.16 | 14.90 | 2-1 | |
| 3176.00 | A | 10 | 11.17 | 15.05 | 4-5 | $d^3F$-$z^3G^o$ |
| 3178.03 | A | 10 | 11.17 | 15.05 | 3-4 | (38) |
| 3174.09 | A | 10 | 11.16 | 15.05 | 2-3 | |
| 3176.86 | 8 | 2 | 11.17 | 15.05 | 4-4 | |
| 3180.17 | P | | 11.17 | 15.05 | 3-3 | |
| 3179.08 | B | 1 | 11.17 | 15.05 | 4-3 | |
| 3136.43 | A | 10 | 11.17 | 15.10 | 4-3 | $d^3F$-$z^3D^o$ |
| 3110.052 | A | 10 | 11.17 | 15.14 | 3-2 | (39) |
| m3083.68 | P | Fe I | 11.16 | 15.16 | 2-1 | |
| 3089.649 | B | 1 | 11.17 | 15.16 | 4-3 | $d^3F$-$y^5D^o$ |
| 3084.09 | A | 6 | 11.17 | 15.17 | 3-2 | (40) |
| *3004.109 | B | 3 | 11.17 | 15.28 | 4-3 | $d^3F$-$x^5P^o$ |
| 3009.998 | B | 1 | 11.17 | 15.27 | 3-2 | (41) |
| 3004.490 | 8 | 1 | 11.16 | 15.27 | 2-2 | |
| 4391.26 | B | 1 | 11.42 | 14.23 | 5-5 | $a^1H$-$z^5H^o$ (42) |
| 4927.56 | A | 2 | 11.53 | 14.03 | 4-5 | $e^3F$-$z^5G^o$ (43) |
| 4226.14 | 8 | 2 | 11.53 | 14.45 | 2-3 | $e^3F$-$z^5F^o$ (44) |
| m4005.04 | P | Fe I | 11.53 | 14.61 | 4-4 | $e^3F$-$z^3F^o$ |
| 4022.36 | A | 4 | 11.53 | 14.60 | 3-3 | (45) |
| 4039.12 | A | 3 | 11.53 | 14.59 | 2-2 | |
| 4021.75 | P | | 11.53 | 14.60 | 4-3 | |
| 4035.82 | P | | 11.53 | 14.59 | 3-2 | |
| 4005.64 | P | | 11.53 | 14.61 | 3-4 | |
| 4025.67 | P | | 11.53 | 14.60 | 2-3 | |
| 3990.81 | B | tr | 11.53 | 14.62 | 3-3 | $e^3F$-$y^5P^o$ (46) |
| 3800.43 | 8 | 1 | 11.53 | 14.78 | 3-2? | $e^3F$-$z^5P^o$ (47) |
| 3500.29 | A | 7 | 11.53 | 15.05 | 4-5 | $e^3F$-$z^3G^o$ |
| *3501.75 | A | 8 | 11.53 | 15.05 | 3-4 | (48) |
| 3506.93 | A | 5 | 11.53 | 15.05 | 2-3 | |
| 3501.32 | P | | 11.53 | 15.05 | 4-4 | |
| 3504.40 | A | 2 | 11.53 | 15.05 | 3-3 | |
| 3503.96 | P | | 11.53 | 15.05 | 4-3 | |
| m3452.31 | P | Fe I | 11.53 | 15.10 | 4-3 | $e^3F$-$z^3D^o$ |
| *3419.49 | A | 3 | 11.53 | 15.14 | 3-2 | (49) |
| 3301.09 | B | tr | 11.53 | 15.27 | 2-2 | $e^3F$-$x^5P^o$ (50) |
| *3118.75 § | A | 5 | 11.53 | 15.49 | 4-4 | $e^3F$-$y^3F^o$ |
| 3100.31 | P | | 11.53 | 15.51 | 3-3 | (51) |
| 3098.93 | P | | 11.53 | 15.51 | 2-2 | |
| 4590.68 | 8 | tr | 11.54 | 14.23 | 4-5 | $c^1G$-$z^5H^o$ |
| 4663.78 | B | 1 | 11.54 | 14.19 | 4-3 | (52) |
| 4025.07 | A | 3 | 11.54 | 14.61 | 4-4 | $c^1G$-$z^3F^o$ (53) |
| 3515.57 | A | 5 | 11.54 | 15.05 | 4-5 | $c^1G$-$z^3G^o$ |
| 3516.58 | P | | 11.54 | 15.05 | 4-4 | (54) |
| 3519.25 | B | 1 | 11.54 | 15.05 | 4-3 | |
| 3189.74 | A | 3 | 11.54 | 15.41 | 4-3 | $c^1G$-$y^3D^o$ (55) |
| 5532.65 | B | 1 | 11.98 | 14.21 | 3-4 | $c^1F$-$z^5H^o$ (56) |
| 4714.53 | B | 1 | 11.98 | 14.60 | 3-3 | $c^1F$-$z^3F^o$ (57) |
| 4671.25 | B | tr | 11.98 | 14.62 | 3-3 | $c^1F$-$y^5P^o$ (58) |
| 3519.85 | B | 1 | 11.98 | 15.49 | 3-4 | $c^1F$-$y^3F^o$ (59) |
| 3525.17 | A | 3 | 13.07 | 16.58 | 2-2 | $d^3D$-$x^3P^o$ |
| 3488.92 | A | 3 | 13.07 | 16.61 | 1-1 | (60) |
| 3403.51 | A | 2 | 13.07 | 16.70 | 2-2 | $d^3D$-$x^3D^o$ |
| 3406.18 | A | 2 | 13.08 | 16.70 | 3-2 | (61) |
| *3410.74 | A | 3 | 13.07 | 16.69 | 2-1 | |
| *3410.74 | A | 3 | 13.08 | 16.70 | 3-4 | $d^3D$-$y^5G^o$ (62) |
| *3357.40 | A | 4 | 13.08 | 16.75 | 3-3 | $d^3D$-$w^3D^o$ |
| 3270.23 | A | 2n | 13.07 | 16.85 | 1-1 | (63) |
| *3239.04§§ | A | 2 | 13.08 | 16.89 | 3-2 | |
| 3263.04 | A | 1 | 13.07 | 16.85 | 1-2 | $d^3D$-$w^3F^o$ |
| 3238.74 | A | 2 | 13.08 | 16.89 | 3-3 | (64) |
| 3264.22 | A | 2 | 13.07 | 16.85 | 2-2 | |
| 3096.86 | A | 2 | 13.08 | 17.06 | 2-3 | $d^3D$-$x^3G^o$ |
| 3099.05 | A | 2 | 13.08 | 17.06 | 3-3 | (65) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Fe III continued | | | | | | |
| 4570.34 | A | 4 | 13.53 | 16.23 | 2-2 | $c^1D$-$z^1D^o$ (66) |
| 3432.97 | A | 3 | 13.53 | 17.12 | 2-1 | $c^1D$-$z^1P^o$ (67) |
| 5573.3 | A | 4 | 14.11 | 16.33 | 5-6 | $d^3G$-$y^3H^o$ |
| 5485.6 | A | 3 | 14.12 | 16.37 | 4-5 | (68) |
| 5460.8 | A | 3 | 14.12 | 16.38 | 3-4 | |
| 3976.88 | A | 4 | 14.11 | 17.22 | 5-5 | $d^3G$-$w^3G^o$ |
| m3953.76 | P | Fe III | 14.12 | 17.24 | 4-4 | (69) |
| *3947.10 | A | 4 | 14.12 | 17.24 | 3-3 | |
| 3945.08 | A | 3 | 14.12 | 17.24 | 4-3 | |
| *3828.44 | A | 2 | 14.12 | 17.34 | 4-3 | $d^3G$-$y^1F^o$ (70) |
| m3747.40 | P | Fe II | 14.11 | 17.41 | 5-4 | $d^3G$-$v^3F^o$ |
| 3793.52 | A | 3 | 14.12 | 17.37 | 4-3 | (71) |
| 3786.94 | A | 4 | 14.12 | 17.38 | 3-2 | |
| 3382.19 | A | 6 | 14.11 | 17.76 | 5-5 | $d^3G$-$v^3G^o$ |
| 3360.84 | A | 6 | 14.12 | 17.79 | 4-4 | (72) |
| 3358.74 | A | 4 | 14.12 | 17.79 | 3-3 | |
| 3359.18 | A | 3 | 14.11 | 17.79 | 5-4 | |
| *3357.40 | A | 4 | 14.12 | 17.79 | 4-3 | |
| 3331.62 | A | 5 | 14.11 | 17.82 | 5-4 | $d^3G$-$t^3F^o$ |
| 3306.94 | A | 4 | 14.12 | 17.85 | 4-3 | (73) |
| 3315.80 | A | 3 | 14.12 | 17.84 | 3-2 | |
| *3333.27 | A | 3 | 14.12 | 17.82 | 4-4 | |
| 3362.44 | A | 6 | 14.11 | 17.90 | 5-4 | $d^3G$-$x^1G^o$ (74) |
| 3256.54 | A | 2 | 14.12 | 17.91 | 4-3 | $d^3G$-$x^1F^o$ (75) |
| 3022.00 | A | 3 | 14.11 | 18.20 | 5-5 | $d^3G$-$u^3G^o$ |
| 3045.877 | A | 3 | 14.12 | 18.17 | 4-4 | (76) |
| 3135.80 | B | 1 | 14.26 | 18.19 | 6-5 | $z^5H^o$-$e^7D$ |
| 3087.659 | B | 1 | 14.19 | 18.19 | 3-4 | (77) |
| 3046.399 | B | tr | 14.38 | 18.43 | 4-3 | $z^5F^o$-$e^7S$ |
| 3094.156 | B | 1 | 14.44 | 18.43 | 2-3? | (78) |
| 3238.31 | B | 1 | 14.37 | 18.18 | 2-2 | $z^5D^o$-$e^7D$ (79) |
| 3047.119 | B | 1 | 14.38 | 18.43 | 3-3 | $z^5D^o$-$e^7S$ (80) |
| 3086.880 | B | tr | 14.43 | 18.43 | 2-3 | $z^5S^o$-$e^7S$ (81) |
| 4569.82 | A | 4 | 14.56 | 17.26 | 4-4 | $d^1G$-$y^1G^o$ (82) |
| 3753.18 | A | 3 | 14.56 | 17.85 | 4-5 | $d^1G$-$y^1H^o$ (83) |
| 3700.14 | A | 2 | 14.56 | 17.90 | 4-4 | $d^1G$-$x^1G^o$ (84) |
| 3690.60 | A | 4 | 14.56 | 17.91 | 4-3 | $d^1G$-$x^1F^o$ (85) |
| 3454.35 | A | 2 | 14.56 | 18.13 | 4-3 | $d^1G$-$u^3G^o$ (86) |
| 3218.34 | A | 6 | 14.56 | 18.40 | 4-4 | $d^1G$-$w^1G^o$ (87) |
| 3446.77 | B | tr | 14.61 | 18.19 | 4-5 | $z^3F^o$-$e^7D$ |
| 3452.55 | B | tr | 14.61 | 18.18 | 4-3 | (88) |
| 3003.282 | B | 1 | 14.60 | 18.71 | 3-3 | $z^3F^o$-$e^5D$† (89) |
| 3474.94 | B | 1 | 14.64 | 18.19 | 5-4 | $z^3H^o$-$e^7D$ |
| 3487.11 | B | tr | 14.65 | 18.19 | 4-5 | (90) |
| 3043.067 | B | 2 | 14.65 | 18.71 | 4-4 | $z^3H^o$-$e^5D$ |
| 3043.439 | B | 1 | 14.65 | 18.71 | 4-3 | (91) |
| 3048.714 | B | 4 | 14.66 | 18.71 | 2-3 | $y^5P^o$-$e^5D$ |
| 3060.162 | B | 3 | 14.67 | 18.71 | 1-2 | (92) |
| 3624.25 | B | 1 | 14.78 | 18.18 | 2-1 | $z^3P^o$-$e^7D$ |
| 3660.85 | B | 3 | 14.81 | 18.18 | 1-2 | (93) |
| 3688.71 | B | tr | 14.84 | 18.18 | 0-1 | |
| 3140.08 | B | 3 | 14.78 | 18.71 | 2-3 | $z^3P^o$-$e^5D$ |
| 3168.21 | B | 1 | 14.81 | 18.71 | 1-2 | (94) |
| *3828.44 | B | 2 | 14.97 | 18.19 | 4-5 | $y^5F^o$-$e^7D$ |
| 3777.43 | B | 1 | 14.92 | 18.18 | 2-2 | (95) |
| 3324.72 | A | 3 | 15.00 | 18.71 | 5-4 | $y^5F^o$-$e^5D$ |
| 3300.20 | A | 4 | 14.97 | 18.71 | 4-3 | (96) |
| 3274.95 | A | 3 | 14.94 | 18.71 | 3-2 | |
| *3299.77 § | B | 4 | 14.97 | 18.71 | 4-4 | |
| 3255.49 | A | 2 | 14.93 | 18.71 | 2-2 | |
| 3274.65 | B | 1 | 14.94 | 18.71 | 3-4 | |
| 3377.77 | B | tr | 15.05 | 18.71 | 4-4 | $z^3G^o$-$e^5D$ (97) |
| 4051.08 | B | 2 | 15.14 | 18.18 | 2-3 | $z^3D^o$-$e^7D$ |
| 4053.59 | B | 1 | 15.14 | 18.18 | 2-2 | (98) |
| 3711.32 | B | 3 | 15.10 | 18.43 | 3-3 | $z^3D^o$-$e^7S$ (99) |
| 3458.18 | B | tr | 15.14 | 18.71 | 2-2 | $z^3D^o$-$e^5D$ |
| 3484.18 | B | 1 | 15.18 | 18.71 | 1-2 | (100) |
| 4098.54 | B | 1 | 15.17 | 18.18 | 2-2 | $y^5D^o$-$e^7D$ (101) |
| 3788.91 | B | tr | 15.17 | 18.43 | 2-3 | $y^5D^o$-$e^7S$ (102) |
| 3496.29 | A | 4 | 15.18 | 18.71 | 4-4 | $y^5D^o$-$e^5D$ |
| *3482.36 § | B | 4d | 15.16 | 18.71 | 3-4 | (103) |
| 3491.16 | B | 2 | 15.17 | 18.71 | 2-3 | |
| 4237.21 | B | 2 | 15.27 | 18.18 | 2-2 | $x^5P^o$-$e^7D$ |
| *4238.78§§ | B | 5 | 15.27 | 18.18 | 2-1 | (104) |
| 4211.51 | B | 2 | 15.25 | 18.18 | 1-2 | |
| 3598.32 | B | 2 | 15.28 | 18.71 | 3-3 | $x^5P^o$-$e^5D$ |
| 3572.46 | B | 1 | 15.25 | 18.71 | 1-2 | (105) |
| 4463.90 | B | 3 | 15.43 | 18.18 | 2-3? | $y^3D^o$-$e^7D$ |
| 4467.36 | B | 1 | 15.42 | 18.18 | 2-1? | (106) |
| 4100.52 | B | 3 | 15.43 | 18.43 | 2-3 | $y^3D^o$-$e^7S$ (107) |
| 4621.39 | B | 3 | 15.51 | 18.18 | 2-3 | $y^3F^o$-$e^7D$ |
| 4616.95 | B | 1 | 15.51 | 18.18 | 3-2 | (108) |
| 4626.53 | B | 1 | 15.51 | 18.18 | 2-1 | |
| 4624.42 | B | tr | 15.51 | 18.18 | 2-2 | |
| 3831.75 | B | tr | 15.49 | 18.71 | 4-3 | $y^3F^o$-$e^5D$ |
| 3860.46 | B | 1 | 15.51 | 18.71 | 3-3 | (109) |
| 5436.80 | B | 1 | 15.91 | 18.18 | 2-3 | $y^3P^o$-$e^7D$ |
| 5286.74 | B | tr | 15.85 | 18.18 | 0-1 | (110) |
| 5443.88 | B | 2 | 15.91 | 18.18 | 2-1 | |
| 4908.74 | B | 1 | 15.91 | 18.43 | 2-3 | $y^3P^o$-$e^7S$ (111) |
| 5269.15 | B | 4 | 16.37 | 18.71 | 5-4 | $y^3H^o$-$e^5D$ (112) |
| 5243.3 | A | 10 | 18.19 | 20.54 | 5-4 | $e^7D$-$y^7P^o$ |
| 5282.1 | A | 7 | 18.19 | 20.52 | 4-3 | (113) |
| 5306.6 | A | 4 | 18.18 | 20.51 | 3-2 | |
| *5235.3 § | A | 5 | 18.19 | 20.54 | 4-4 | |
| *5276.2 § | A | 7 | 18.18 | 20.52 | 3-3 | |
| 5302.5 | A | 6 | 18.18 | 20.51 | 2-2 | |
| 5229.57 | B | 2 | 18.18 | 20.54 | 3-4 | |
| 5272.0 | A | 3 | 18.18 | 20.52 | 2-3 | |
| 5299.9 | A | 5 | 18.18 | 20.51 | 1-2 | |
| 5833.65 | C | 10 | 18.43 | 20.54 | 3-4 | $e^7S$-$y^7P^o$ |
| 5891.5 | C | 6 | 18.43 | 20.52 | 3-3 | (114) |
| 5929.5 | A | 5 | 18.43 | 20.51 | 3-2 | |
| 5953.65 | C | 6 | 18.71 | 20.78 | 4-3 | $e^5D$-$w^5P^o$ |
| 5920.0 | C | 7w | 18.71 | 20.79 | -2 | (115) |
| 5901.0 | A | 3 | 18.71 | 20.80 | -1 | |
| 3007.2 | A | 20wn | 18.71 | 22.81 | | $e^5D$-$w^5F^o$ (116) |
| 6032.30 | C | 7 | 18.73 | 20.78 | 2-3 | $e^5S$-$w^5P^o$ |
| 5999.30 | C | 5 | 18.73 | 20.79 | 2-2 | (117) |
| 5978.90 | C | 5n | 18.73 | 20.80 | 2-1 | |
| 4164.79 | A | 20 | 20.54 | 23.51 | 4-5 | $y^7P^o$-$f^7D$ |
| 4137.93 | A | 10 | 20.52 | 23.51 | 3-4 | (118) |
| 4120.97 | A | 8 | 20.51 | 23.50 | 2-3 | |
| 4166.86 | A | 9 | 20.54 | 23.51 | 4-4 | |
| 4139.37 | A | 8 | 20.52 | 23.51 | 3-3 | |
| 4122.06 | A | 8 | 20.51 | 23.50 | 2-2 | |
| 4168.41 | A | 4 | 20.54 | 23.51 | 4-3 | |
| 4140.51 | A | 6 | 20.52 | 23.50 | 3-2 | |
| 4123.98 | A | 8 | 20.51 | 23.50 | 2-1 | |
| 4081.19 | A | 7 | 20.54 | 23.57 | 4-3 | $y^7P^o$-$f^7S$ |
| 4053.28 | A | 5 | 20.52 | 23.57 | 3-3 | (119) |
| 4035.54 | A | 4 | 20.51 | 23.57 | 2-3 | |
| *3954.38 | A | 12 | 20.78 | 23.90 | 3-4 | $w^5P^o$-$f^5D$ |
| 3968.78 | A | 8 | 20.79 | 23.90 | 2-3 | (120) |
| 3978.43 | A | 4 | 20.80 | 23.90 | 1-2 | |
| *3954.38 | A | 12 | 20.78 | 23.90 | 3-3 | |
| m3969.43 | P | Fe I | 20.79 | 23.90 | 2-2 | |
| 3979.42 | A | 5 | 20.80 | 23.90 | 1-1 | |
| 3980.14 | A | 3 | 20.80 | 23.90 | 1-0 | |
| 4310.37 | A | 12n | 22.77 | 25.63 | 6-7 | $z^7F^o$-$e^7G$ |
| 4304.81 | A | 10n | 22.77 | 25.63 | 5-6 | (121) |
| 4296.88 | A | 10n | 22.76 | 25.63 | 4-5 | |
| 4286.13 | A | 10n | 22.75 | 25.63 | 3-4 | |
| 4273.42 | A | 7n | 22.75 | 25.63 | 2-3 | |
| 4372.4 | A | 20wn | 22.81 | 25.63 | | $w^5F^o$-$e^5G$ (122) |

Strongest Unclassified Lines of Fe III (Some possibly Fe II)

| | | | | | |
|---|---|---|---|---|---|
| 6185.1 | B | 5 | 5353.78 | B | 5 |
| 5875.8 | B | 5 | 5340.92 | B | 5 |
| 5854.1 | B | 5 | 5339.92 | B | 7 |
| 5587.9 | B | 5 | 5291.78 | B | 5 |
| 5466.46 | B | 5 | 5284.85 | B | 5 |
| 5430.14 | B | 5 | 5273.86 | B | 6 |
| 5402.27 | B | 5 | 5260.25 | B | 10 |
| 5387.35 | B | 5 | 5237.53 | B | 6 |
| 5375.68 | B | 5 | 5216.99 | B | 8 |
| 5363.80 | B | 6 | 5177.73 | B | 5 |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Fe III continued | | | | | | |
| 5149.33 | B | 7 | 4143.87 | B | 7 | |
| 5100.706 | B | 10 | 4131.31 | B | 6 | |
| *5030.75§ | B | 6 | 4113.45 | B | 7 | |
| 5002.02 | B | 8 | 4113.23 | B | 7 | |
| 4948.54 | B | 5 | 4109.95 | B | 5 | |
| 4596.09 | B | 5 | 4008.81 | B | 5 | |
| 4573.14 | B | 5 | 3964.11 | B | 5 | |
| 4559.09 | B | 6 | 3743.40 | B | 8 | |
| 4535.50 | B | 5 | 3652.65 | B | 6 | |
| 4271.47 | B | 6 | 3589.77 | B | 5 | |
| 4266.88 | B | 5 | 3367.02 | B | 6 | |
| 4255.20 | B | 5 | 3338.72 | B | 7 | |
| 4249.95 | B | 7 | 3309.40 | B | 6 | |
| 4243.85 | B | 8 | 3304.31 | B | 9 | |
| 4235.54 | B | 10 | *3295.24§ | B | 6 | |
| 4222.39 | B | 8 | 3190.81 | B | 8 | |
| 4220.32 | B | 5 | 3151.86 | B | 5 | |
| 4210.87 | B | 10 | 3123.18 | B | 10 | |
| 4200.38 | B | 6 | 3121.08 | B | 10 | |
| 4200.06 | B | 6 | 3086.311 | B | 6 | |
| | | | 3044.438 | B | 5 | |
| 4189.10 | B | 7 | | | | |
| 4179.25 | B | 5 | | | | |
| 4174.27 | B | 10 | | | | |
| 4154.98 | B | 8 | | | | |
| 4145.74 | B | 5 | | | | |

Co I I P 7.84 Anal A Liet B Feb 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 4233.996 | E | 2 | 0.00 | 2.91 | 4½-5½ | $a^4F$-$z^6F^o$ |
| 4339.13 | P | | 0.10 | 2.94 | 3½-4½ | (1) |
| 4361.913 | A | (1N) | 0.17 | 3.00 | 2½-3½ | |
| 4361.031 | C | (1n) | 0.22 | 3.05 | 1½-2½ | |
| 4190.712 | A | 20 | 0.00 | 2.94 | 4½-4½ | |
| 4252.302 | A | 12 | 0.10 | 3.00 | 3½-3½ | |
| 4285.782 | A | 6 | 0.17 | 3.05 | 2½-2½ | |
| 4303.235 | A | 3 | 0.22 | 3.09 | 1½-1½ | |
| *4109.706 | E | (1d) | 0.00 | 3.00 | 4½-3½ | |
| 4179.90 | P | | 0.10 | 3.05 | 3½-2½ | |
| 4229.955 | A | (2n) | 0.17 | 3.09 | 2½-1½ | |
| 4268.032 | C | (1n) | 0.22 | 3.11 | 1½- ½ | |
| 4059.321 | G | (1) | 0.00 | 3.04 | 4½-4½ | $a^4F$-$z^6D^o$ |
| 4088.291 | A | 1 | 0.10 | 3.12 | 3½-3½ | (2) |
| 4108.488 | F | (1) | 0.17 | 3.18 | 2½-2½ | |
| 3956.270 | A | (2) | 0.00 | 3.12 | 4½-3½ | |
| 4011.089 | A | 2 | 0.10 | 3.18 | 3½-2½ | |
| 4054.618 | A | (2) | 0.17 | 3.22 | 2½-1½ | |
| 4198.425 | C | (2) | 0.10 | 3.04 | 3½-4½ | |
| 4189.50 | H | (1) | 0.17 | 3.13 | 2½-3½ | |
| 4177.59 | H | (1) | 0.22 | 3.18 | 1½-2½ | |
| 3909.933 | A | 15 | 0.00 | 3.16 | 4½-5½ | $a^4F$-$z^6G^o$ † |
| 3979.518 | A | 10 | 0.10 | 3.20 | 3½-4½ | (3) |
| 4027.032 | A | 10 | 0.17 | 3.24 | 2½-3½ | |
| 4057.195 | A | 5 | 0.22 | 3.27 | 1½-2½ | |
| 3993.014 | G | (1) | 0.17 | 3.26 | 2½-3½ | |
| 3526.847 | A | 100R | 0.00 | 3.50 | 4½-4½ | $a^4F$-$z^4F^o$ |
| 3575.361 | A | 60r | 0.10 | 3.55 | 3½-3½ | (4) |
| 3594.870 | A | 50R | 0.17 | 3.61 | 2½-2½ | |
| 3602.079 | A | 40R | 0.22 | 3.65 | 1½-1½ | |
| *3474.018 | F | 100R | 0.00 | 3.55 | 4½-3½ | |
| 3520.075 | A | 15 | 0.10 | 3.61 | 3½-2½ | |
| 3550.592 | A | 20r | 0.17 | 3.65 | 2½-1½ | |
| 3631.390 | A | 20r | 0.10 | 3.50 | 3½-4½ | |
| 3652.541 | A | 15 | 0.17 | 3.55 | 2½-3½ | |
| 3647.658 | A | 12 | 0.22 | 3.61 | 1½-2½ | |
| 3465.792 | A | 100R | 0.00 | 3.56 | 4½-5½ | $a^4F$-$z^4G^o$ † |
| 3513.478 | A | 50R | 0.10 | 3.61 | 3½-4½ | (5) |
| 3529.032 | A | 30r | 0.17 | 3.67 | 2½-3½ | |
| 3533.356 | A | 25r | 0.22 | 3.72 | 1½-2½ | |
| 3415.519 | A | 5 | 0.00 | 3.61 | 4½-4½ | |
| 3456.924 | A | 9 | 0.10 | 3.67 | 3½-3½ | |
| 3483.80 | A | (6) | 0.17 | 3.72 | 2½-2½ | |
| 3412.633 | C | 80R | 0.00 | 3.62 | 4½-3½ | $a^4F$-$z^4D^o$ |
| 3431.582 | A | 50r | 0.10 | 3.70 | 3½-2½ | (6) |
| 3442.918 | A | 40r | 0.17 | 3.76 | 2½-1½ | |
| 3455.237 | A | 25r | 0.22 | 3.80 | 1½- ½ | |
| 3510.426 | A | 30r | 0.10 | 3.62 | 3½-3½ | |
| 3502.63 | A | 20r | 0.17 | 3.70 | 2½-2½ | |
| 3491.316 | A | 15 | 0.22 | 3.76 | 1½-1½ | |
| 3584.801 | C | 15 | 0.17 | 3.62 | 2½-3½ | |
| 3552.720 | A | 8 | 0.22 | 3.70 | 1½-2½ | |
| 3153.692 | E | (1) | 0.00 | 3.91 | 4½-4½ | $a^4F$-$z^2G^o$ † |
| 3132.218 | A | 4 | 0.10 | 4.04 | 3½-3½ | (7) |
| 3237.028 | A | 8 | 0.10 | 3.91 | 3½-4½ | |
| 3191.297 | A | 4 | 0.17 | 4.04 | 2½-3½ | |
| 3136.726 | A | 5 | 0.00 | 3.93 | 4½-3½ | $a^4F$-$z^2F^o$ |
| 3219.150 | A | 5 | 0.10 | 3.93 | 3½-3½ | (8) |
| 3186.350 | A | 5 | 0.17 | 4.05 | 2½-2½ | |
| 3281.585 | A | 2 | 0.17 | 3.93 | 2½-3½ | |
| 3227.752 | A | 2 | 0.22 | 4.05 | 1½-2½ | |
| 3121.415 | C | 10 | 0.00 | 3.95 | 4½-3½ | $a^4F$-$y^4D^o$ |
| 3139.947 | A | 12 | 0.10 | 4.03 | 3½-2½ | (9) |
| 3149.310 | A | 10 | 0.17 | 4.09 | 2½-1½ | |
| *3159.662 | A | 10 | 0.22 | 4.13 | 1½- ½ | |
| 3203.026 | A | 4 | 0.10 | 3.95 | 3½-3½ | |
| 3199.322 | A | 4 | 0.17 | 4.03 | 2½-2½ | |
| 3189.752 | A | 5 | 0.22 | 4.09 | 1½-1½ | |
| m3264.83 | P | Co | 0.17 | 3.95 | 2½-3½ | |
| 3241.05 | A | (3) | 0.22 | 4.03 | 1½-2½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Co I** continued | | | | | | |
| 3082.614 | A | 12r | 0.00 | 4.00 | 4½-5½ | a⁴F-y⁴G° |
| 3158.772 | A | 12 | 0.10 | 4.01 | 3½-4½ | (10) |
| 3147.060 | A | 15r | 0.17 | 4.10 | 2½-3½ | |
| 3137.328 | A | 10 | 0.22 | 4.16 | 1½-2½ | |
| •3079.394 | A | 5 | 0.00 | 4.01 | 4½-4½ | |
| 3089.596 | A | 10 | 0.10 | 4.10 | 3½-3½ | |
| 3098.194 | A | 10 | 0.17 | 4.16 | 2½-2½ | |
| 3013.593 | A | 8 | 0.00 | 4.10 | 4½-3½ | |
| 3042.481 | A | 8 | 0.10 | 4.16 | 3½-2½ | |
| 3044.004 | A | 30R | 0.00 | 4.05 | 4½-4½ | a⁴F-y⁴F° |
| 3081.822 | A | 20r | 0.10 | 4.13 | 3½-3½ | (11) |
| 3072.341 | A | 15r | 0.17 | 4.19 | 2½-2½ | |
| 3086.777 | A | 15r | 0.22 | 4.22 | 1½-1½ | |
| 2987.166 | A | 15r | 0.00 | 4.13 | 4½-3½ | |
| 3017.548 | A | 15r | 0.10 | 4.19 | 3½-2½ | |
| 3048.888 | A | 12r | 0.17 | 4.22 | 2½-1½ | |
| 3121.566 | C | 10 | 0.10 | 4.05 | 3½-4½ | |
| 3118.249 | A | 5 | 0.17 | 4.13 | 2½-3½ | |
| 3110.821 | A | 5 | 0.22 | 4.19 | 1½-2½ | |
| 3082.199 | A | 5 | 0.10 | 4.13 | 3½-2½ | a⁴F-z²D° |
| 3034.432 | A | 6 | 0.17 | 4.24 | 2½-1½ | (12) |
| 3118.638 | A | 1 | 0.17 | 4.13 | 2½-2½ | |
| 3071.957 | A | 8 | 0.22 | 4.24 | 1½-1½ | |
| 3158.293 | E | (1) | 0.22 | 4.13 | 1½-2½ | |
| 2989.580 | A | 15r | 0.00 | 4.13 | 4½-4½ | a⁴F-y³G° † |
| 3000.545 | A | 7 | 0.10 | 4.21 | 3½-3½ | (13) |
| 3064.370 | A | 5 | 0.10 | 4.13 | 3½-4½ | |
| 3054.724 | C | 4 | 0.17 | 4.21 | 2½-3½ | |
| 4966.581 | A | 2 | 0.43 | 3.91 | 4½-5½ | b⁴F-z⁶F° |
| 5071.40 | P | | 0.51 | 3.94 | 3½-4½ | (14) |
| 5091.282 | G | (1) | 0.58 | 3.10 | 2½-3½ | |
| 5065.695 | G | (1) | 0.83 | 3.05 | 1½-2½ | |
| 4907.135 | C | (2) | 0.43 | 2.94 | 4½-4½ | |
| 4953.179 | A | 2 | 0.51 | 3.00 | 3½-3½ | |
| 4987.853 | A | 2 | 0.58 | 3.05 | 2½-2½ | |
| 5007.286 | A | (2) | 0.63 | 3.09 | 1½-1½ | |
| 4798.378 | A | 1 | 0.43 | 3.00 | 4½-3½ | |
| 4855.235 | A | (1) | 0.51 | 3.05 | 3½-2½ | |
| 4913.399 | A | 1 | 0.58 | 3.09 | 2½-1½ | |
| 4959.682 | A | (1) | 0.63 | 3.11 | 1½- ½ | |
| 4727.936 | A | 3 | 0.43 | 3.04 | 4½-4½ | b⁴F-z⁶D° |
| 4732.051 | A | (5) | 0.51 | 3.12 | 3½-3½ | (15) |
| 4586.730 | A | 1 | 0.43 | 3.12 | 4½-3½ | |
| 4628.908 | A | (1) | 0.51 | 3.18 | 3½-2½ | |
| 4677.526 | F | (1) | 0.58 | 3.22 | 2½-1½ | |
| 4880.25 | H | (2) | 0.51 | 3.04 | 3½-4½ | |
| 4857.938 | G | (1) | 0.58 | 3.12 | 2½-3½ | |
| 4837.948 | G | (2) | 0.63 | 3.18 | 1½-2½ | |
| 4020.896 | A | 20 | 0.43 | 3.50 | 4½-4½ | b⁴F-z⁴F° |
| 4056.183 | A | 6 | 0.51 | 3.55 | 3½-3½ | (18) |
| 4078.124 | A | 3 | 0.58 | 3.61 | 2½-2½ | |
| 4082.593 | A | 2 | 0.83 | 3.85 | 1½-1½ | |
| 3952.338 | C | 8 | 0.43 | 3.55 | 4½-3½ | |
| 3967.117 | A | 6 | 0.51 | 3.61 | 3½-2½ | |
| 4019.268 | A | 5 | 0.58 | 3.65 | 2½-1½ | |
| 4130.538 | E | (1n) | 0.51 | 3.50 | 3½-4½ | |
| 4150.439 | A | 2 | 0.58 | 3.55 | 2½-3½ | |
| 3941.728 | A | 20 | 0.43 | 3.56 | 4½-5½ | b⁴F-z⁴G° |
| 3978.850 | A | 10 | 0.51 | 3.81 | 3½-4½ | (17) |
| 3991.684 | A | 6 | 0.58 | 3.67 | 2½-3½ | |
| 3994.542 | A | 6 | 0.63 | 3.72 | 1½-2½ | |
| •3878.631 | A | 20 | 0.43 | 3.61 | 4½-4½ | |
| 3908.287 | A | 10 | 0.51 | 3.87 | 3½-3½ | |
| 3933.918 | A | 8 | 0.58 | 3.72 | 2½-2½ | |
| 3808.103 | A | 10 | 0.43 | 3.87 | 4½-3½ | |
| 3850.945 | A | 4 | 0.51 | 3.72 | 3½-2½ | |
| 3873.120 | A | 60 | 0.43 | 3.82 | 4½-3½ | b⁴F-z⁴D° |
| 3873.953 | A | 40 | 0.51 | 3.70 | 3½-2½ | (16) |
| 3881.889 | A | 25 | 0.58 | 3.76 | 2½-1½ | |
| 3894.978 | A | 20 | 0.63 | 3.80 | 1½- ½ | |
| 3974.728 | A | 10 | 0.51 | 3.82 | 3½-3½ | |
| 3957.928 | A | 15 | 0.58 | 3.70 | 2½-2½ | |
| 3940.887 | A | 12 | 0.83 | 3.78 | 1½-1½ | |
| •4063.174 | A | (0) | 0.58 | 3.82 | 2½-3½ | |
| m4019.30 | P | Co | 0.63 | 3.70 | 1½-2½ | |
| 3543.976 | E | 2 | 0.43 | 3.91 | 4½-4½ | b⁴F-z²G° |
| 3496.681 | C | 15 | 0.51 | 4.04 | 3½-3½ | (19) |
| 3417.795 | C | 6 | 0.43 | 4.04 | 4½-3½ | |
| 3827.808 | A | 25r | 0.51 | 3.91 | 3½-4½ | |
| 3564.947 | A | 25r | 0.58 | 4.04 | 2½-3½ | |
| 3531.567 | C | 30r | 0.43 | 3.93 | 4½-3½ | b⁴F-z²F° |
| 3490.738 | A | 10 | 0.51 | 4.05 | 3½-2½ | (20) |
| 3805.370 | A | 20r | 0.51 | 3.93 | 3½-3½ | |
| 3558.772 | A | 12 | 0.58 | 4.05 | 2½-2½ | |
| 3877.980 | F | (1) | 0.58 | 3.93 | 2½-3½ | |
| 3606.307 | C | 3 | 0.63 | 4.05 | 1½-2½ | |
| 3502.278 | A | 100R | 0.43 | 3.95 | 4½-3½ | b⁴F-y⁴D° |
| 3508.310 | A | 80R | 0.51 | 4.03 | 3½-2½ | (21) |
| 3512.640 | A | 60R | 0.58 | 4.09 | 2½-1½ | |
| 3523.423 | A | 25r | 0.83 | 4.13 | 1½- ½ | |
| 3585.154 | A | 25R | 0.51 | 3.95 | 3½-3½ | |
| 3574.987 | A | 25r | 0.58 | 4.03 | 2½-2½ | |
| 3560.891 | A | 20r | 0.83 | 4.09 | 1½-1½ | |
| 3856.982 | A | 7 | 0.58 | 3.95 | 2½-3½ | |
| 3824.955 | A | 8 | 0.83 | 4.03 | 1½-2½ | |
| 3453.514 | A | 200R | 0.43 | 4.00 | 4½-5½ | b⁴F-y⁴G° |
| 3529.816 | A | 80R | 0.51 | 4.01 | 3½-4½ | (22) |
| 3509.843 | A | 50r | 0.58 | 4.10 | 2½-3½ | |
| 3495.682 | A | 50r | 0.83 | 4.18 | 1½-2½ | |
| 3449.441 | C | 80R | 0.43 | 4.01 | 4½-4½ | |
| 3443.844 | A | 80R | 0.51 | 4.10 | 3½-3½ | |
| 3449.170 | C | 60R | 0.58 | 4.16 | 2½-2½ | |
| 3387.111 | A | 30r | 0.43 | 4.10 | 4½-3½ | |
| 3385.219 | A | 25r | 0.51 | 4.16 | 3½-2½ | |
| 3405.120 | C | 150R | 0.43 | 4.05 | 4½-4½ | b⁴F-y⁴F° |
| 3409.177 | C | 60r | 0.51 | 4.13 | 3½-3½ | (23) |
| 3417.154 | A | 50r | 0.58 | 4.19 | 2½-2½ | |
| 3433.045 | A | 60R | 0.83 | 4.22 | 1½-1½ | |
| 3334.146 | A | 30r | 0.43 | 4.13 | 4½-3½ | |
| 3354.374 | A | 20 | 0.51 | 4.19 | 3½-2½ | |
| •3388.163§ | A | 30r | 0.58 | 4.22 | 2½-1½ | |
| 3483.410 | A | 20r | 0.51 | 4.05 | 3½-4½ | |
| •3474.018 | F | 100R | 0.58 | 4.13 | 2½-3½ | |
| 3462.804 | A | 60r | 0.63 | 4.19 | 1½-2½ | |
| 3409.646 | C | (2) | 0.51 | 4.13 | 3½-2½ | b⁴F-z²D° † |
| 3370.322 | A | 10 | 0.58 | 4.24 | 2½-1½ | (24) |
| 3474.530 | A | 6 | 0.58 | 4.13 | 2½-2½ | |
| •3521.731 | C | 5 | 0.63 | 4.13 | 1½-2½ | |
| 3337.171 | A | 8 | 0.43 | 4.13 | 4½-4½ | b⁴F-y²G° |
| 3333.388 | A | 10 | 0.51 | 4.21 | 3½-3½ | (25) |
| 3412.339 | C | 80R | 0.51 | 4.13 | 3½-4½ | |
| 3395.370 | A | 40r | 0.58 | 4.21 | 2½-3½ | |
| 3127.252 | A | 7 | 0.43 | 4.38 | 4½-3½ | b⁴F-y²F° |
| 3105.929 | A | 3 | 0.51 | 4.48 | 3½-2½ | (28) |
| 3193.164 | A | 5 | 0.51 | 4.38 | 3½-3½ | |
| •3159.662 | A | 10 | 0.58 | 4.48 | 2½-2½ | |
| 3249.995 | A | 6 | 0.58 | 4.38 | 2½-3½ | |
| 3198.660 | A | 5 | 0.63 | 4.48 | 1½-2½ | |
| 4580.139 | A | 4 | 0.92 | 3.61 | 3½-4½ | a²F-z⁴G° |
| 4699.180 | A | (0) | 1.04 | 3.67 | 2½-3½ | (27) |
| 4484.513 | A | (2) | 0.92 | 3.87 | 3½-3½ | |
| 4619.329 | G | (1) | 1.04 | 3.72 | 2½-2½ | |
| 4411.786 | E | (1) | 0.92 | 3.72 | 3½-2½ | |
| 4131.318 | A | 60 | 0.92 | 3.91 | 3½-4½ | a²F-z²G° |
| 4118.774 | A | 50 | 1.04 | 4.04 | 2½-3½ | (28) |
| 3952.917 | C | 25 | 0.92 | 4.04 | 3½-3½ | |
| 4092.386 | A | 25 | 0.92 | 3.93 | 3½-3½ | a²F-z²F° |
| 4110.532 | A | 25 | 1.04 | 4.05 | 2½-2½ | (29) |
| 3945.326 | A | 15 | 0.92 | 4.05 | 3½-2½ | |
| 4270.427 | A | (1n) | 1.04 | 3.93 | 2½-3½ | |
| 4066.365 | A | 15 | 0.92 | 3.95 | 3½-3½ | a²F-y⁴D° |
| 4132.155 | C | 4 | 1.04 | 4.03 | 2½-2½ | (30) |
| 3965.236 | A | 2 | 0.92 | 4.03 | 3½-2½ | |
| 3995.306 | A | 60 | 0.92 | 4.01 | 3½-4½ | a²F-y⁴G° |
| 4045.386 | A | 20 | 1.04 | 4.10 | 2½-3½ | (31) |
| 3885.275 | A | 6 | 0.92 | 4.10 | 3½-3½ | |
| 3965.011 | E | 1 | 1.04 | 4.16 | 2½-2½ | |
| 3811.065 | A | 5 | 0.92 | 4.16 | 3½-2½ | |
| 3935.964 | A | 30 | 0.92 | 4.05 | 3½-4½ | a²F-y⁴F° |
| 3997.901 | A | 40 | 1.04 | 4.13 | 2½-3½ | (32) |
| 3841.458 | A | 5 | 0.92 | 4.13 | 3½-3½ | |
| 3923.755 | A | 7 | 1.04 | 4.19 | 2½-2½ | |
| 3884.601 | A | 10 | 1.04 | 4.22 | 2½-1½ | |
| 3843.047 | A | 30 | 0.92 | 4.13 | 3½-3½ | a²F-z²D° |
| 3861.164 | A | 20 | 1.04 | 4.24 | 2½-1½ | (33) |
| 3998.554 | E | (1n) | 1.04 | 4.13 | 2½-2½ | |
| 3845.468 | A | 60 | 0.92 | 4.13 | 3½-4½ | a²F-y²G° |
| 3894.073 | A | 60 | 1.04 | 4.21 | 2½-3½ | (34) |
| 3745.491 | A | 25 | 0.92 | 4.21 | 3½-3½ | |
| 3589.370 | A | 80R | 0.92 | 4.38 | 3½-3½ | a²F-y²F° |
| 3587.186 | A | 70R | 1.04 | 4.48 | 2½-2½ | (35) |
| 3460.719 | C | 4 | 0.92 | 4.48 | 3½-2½ | |
| 3704.060 | A | 25 | 1.04 | 4.38 | 2½-3½ | |
| 3489.399 | A | 60r | 0.92 | 4.46 | 3½-2½ | a²F-y²D° |
| 3518.340 | A | 50R | 1.04 | 4.55 | 2½-1½ | (38) |
| 3618.010 | A | 4 | 1.04 | 4.46 | 2½-2½ | |
| 8450.230 | A | 80 | 1.70 | 3.62 | 2½-3½ | a⁴P-z⁴D° |
| 8282.836 | A | 40 | 1.73 | 3.70 | 1½-2½ | (37) |
| 6230.968 | C | 10 | 1.78 | 3.76 | ½-1½ | |
| 8169.005 | A | 10 | 1.70 | 3.70 | 2½-2½ | |
| 6093.144 | A | 10 | 1.73 | 3.76 | 1½-1½ | |
| 8118.994 | A | 8 | 1.78 | 3.80 | ½- ½ | |
| 6005.030 | A | (3) | 1.70 | 3.78 | 2½-1½ | |
| 5984.092 | A | 3 | 1.73 | 3.80 | 1½- ½ | |
| 5530.780 | A | 10 | 1.70 | 3.93 | 2½-3½ | a⁴P-z²F° |
| •5285.523 | F | (1) | 1.70 | 4.05 | 2½-2½ | (38) |
| 5483.354 | A | 40 | 1.70 | 3.95 | 2½-3½ | a⁴P-y⁴D° |
| 5369.591 | A | 20 | 1.73 | 4.03 | 1½-2½ | (39) |
| 5331.458 | A | 15 | 1.78 | 4.09 | ½-1½ | |
| 5301.042 | A | 15 | 1.70 | 4.03 | 2½-2½ | |
| 5230.210 | A | 25 | 1.73 | 4.09 | 1½-1½ | |
| 5247.931 | A | 15 | 1.78 | 4.13 | ½- ½ | |
| 5165.158 | A | 3 | 1.70 | 4.09 | 2½-1½ | |
| 5149.796 | A | 4 | 1.73 | 4.13 | 1½- ½ | |
| 3728.853 | A | 5 | 1.70 | 5.01 | 2½-1½ | a⁴P-z⁴S° |
| 3760.401 | A | 4 | 1.73 | 5.01 | 1½-1½ | (40) |
| 3813.470 | C | 4 | 1.78 | 5.01 | ½-1½ | |
| 3548.438 | A | 7 | 1.70 | 5.18 | 2½-2½ | a⁴P-z⁴P° |
| 3577.260 | A | 3 | 1.73 | 5.18 | 1½-1½ | (41) |
| 3628.020 | A | 2 | 1.78 | 5.18 | ½- ½ | |
| 3546.707 | A | 6 | 1.70 | 5.18 | 2½-1½ | |
| 3578.903 | C | 6 | 1.73 | 5.18 | 1½- ½ | |
| 3579.029 | C | 8 | 1.73 | 5.18 | 1½-2½ | |
| 3824.337 | A | 5 | 1.78 | 5.18 | ½-1½ | |
| 3377.060 | A | 5 | 1.70 | 5.38 | 2½-3½ | a⁴P-w⁴D° |
| 3423.900 | A | 4 | 1.73 | 5.34 | 1½-2½ | (42) |
| 3463.499 | C | 3 | 1.78 | 5.34 | ½-1½ | |
| 3394.916 | C | 2 | 1.70 | 5.34 | 2½-2½ | |
| 3430.474 | A | 5 | 1.73 | 5.34 | 1½-1½ | |
| m3443.98 | P | Co | 1.78 | 5.38 | ½- ½ | |
| 3400.471 | A | 1 | 1.73 | 5.36 | 1½- ½ | |
| 3326.564 | C | 2 | 1.70 | 5.41 | 2½-3½ | a⁴P-w⁴F° |
| •3314.073 | A | 8 | 1.73 | 5.46 | 1½-2½ | (43) |
| 3287.827 | C | (2) | 1.70 | 5.46 | 2½-2½ | |
| 3275.66 | A | (1) | 1.73 | 5.50 | 1½-1½ | |
| 3359.284 | A | 6 | 1.70 | 5.38 | 2½-3½ | a⁴P-x²F° |
| 3401.617 | C | 2 | 1.73 | 5.36 | 1½-2½ | (44) |
| 3373.969 | A | 4 | 1.70 | 5.36 | 2½-2½ | |
| 3318.398 | A | 4 | 1.70 | 5.42 | 2½-2½ | a⁴P-x²D° |
| 3346.310 | C | 1 | 1.73 | 5.42 | 1½-1½ | (45) |
| 3319.561 | C | (2) | 1.70 | 5.42 | 2½-1½ | |
| 3345.146 | E | (1) | 1.73 | 5.42 | 1½-2½ | |
| 3387.47 | A | 1 | 1.78 | 5.42 | ½-1½ | |
| 3286.545 | C | 1 | 1.73 | 5.49 | 1½- ½ | a⁴P-z²S° |
| •3326.27 | A | (1) | 1.78 | 5.49 | ½- ½ | (46) |
| 3258.035 | A | 4 | 1.70 | 5.49 | 2½-2½ | a⁴P-y⁴P° |
| 3284.719 | E | (3) | 1.73 | 5.51 | 1½-1½ | (47) |
| 3282.332 | C | 1 | 1.78 | 5.54 | ½- ½ | |
| 3239.258 | E | (1) | 1.70 | 5.51 | 2½-1½ | |
| 3243.579 | C | 2 | 1.73 | 5.54 | 1½- ½ | |
| 3283.777 | C | 3 | 1.73 | 5.49 | 1½-2½ | |
| 3303.881 | A | 4 | 1.78 | 5.51 | ½-1½ | |
| 3103.983 | C | 5 | 1.70 | 5.68 | 2½-2½ | a⁴P-x⁴P° |
| 3136.999 | C | 1 | 1.73 | 5.67 | 1½-1½ | (48) |
| 3113.473 | A | 6 | 1.70 | 5.67 | 2½-1½ | |
| 3131.829 | A | 1 | 1.73 | 5.67 | 1½- ½ | |
| 3173.140 | A | 1 | 1.78 | 5.67 | ½-1½ | |
| 3107.044 | C | 3 | 1.70 | 5.68 | 2½-3½ | a⁴P-v⁴D° |
| 3095.716 | A | 3 | 1.73 | 5.72 | 1½-2½ | (49) |
| 3137.755 | A | 4 | 1.78 | 5.71 | ½-1½ | |
| 3102.405 | A | 4 | 1.73 | 5.71 | 1½-1½ | |
| 3114.118 | A | (10)N1? | 1.78 | 5.74 | ½- ½ | |
| •3079.394 | A | 5 | 1.70 | 5.71 | 2½-1½ | |
| 3040.813 | A | 1 | 1.70 | 5.76 | 2½-2½ | a⁴P-v²D° |
| 3109.506 | A | 4 | 1.73 | 5.70 | 1½-1½ | (50) |
| 3088.393 | A | 4 | 1.70 | 5.70 | 2½-1½ | |
| 3063.25 | A | (1) | 1.73 | 5.76 | 1½-2½ | |
| 3145.022 | A | 3 | 1.78 | 5.70 | ½-1½ | |
| 3050.932 | C | (3) | 1.70 | 5.75 | 2½-1½ | a⁴P-y⁴S° † |
| 3073.520 | A | 3 | 1.73 | 5.75 | 1½-1½ | (51) |
| 3039.563 | A | 3 | 1.70 | 5.76 | 2½-1½ | a⁴P-y³P° |
| •3034.400 | A | (1) | 1.73 | 5.81 | 1½- ½ | (52) |
| 3061.983 | E | (1) | 1.73 | 5.76 | 1½-1½ | |
| 3096.402 | A | 3 | 1.78 | 5.78 | ½-1½ | |
| 7354.579 | A | 3 | 1.87 | 3.55 | 2½-3½ | b⁴P-z⁴F° |
| 7437.16 | C | 1 | 1.95 | 3.61 | 1½-2½ | (53) |
| 7478.77 | C | (1) | 2.00 | 3.65 | ½-1½ | |
| 7124.47 | C | 1 | 1.87 | 3.61 | 2½-2½ | |
| 7250.12 | C | 1 | 1.95 | 3.65 | 1½-1½ | |
| 7084.974 | A | 100 | 1.87 | 3.62 | 2½-3½ | b⁴P-z⁴D° |
| 7052.872 | A | 60 | 1.95 | 3.70 | 1½-2½ | (54) |
| 7018.603 | A | 35 | 2.00 | 3.76 | ½-1½ | |
| 6771.040 | A | 50 | 1.87 | 3.70 | 2½-2½ | |
| 6814.950 | A | 40 | 1.95 | 3.76 | 1½-1½ | |
| 6872.32 | A | 40 | 2.00 | 3.80 | ½- ½ | |
| 6551.466 | A | 3 | 1.87 | 3.76 | 2½-1½ | |
| 6678.818 | A | 5 | 1.95 | 3.80 | 1½- ½ | |
| 5935.391 | A | 6 | 1.87 | 3.95 | 2½-3½ | b⁴P-y⁴D° |
| 5922.365 | C | (1n) | 1.95 | 4.03 | 1½-2½ | (55) |
| 5469.305 | C | 4 | 1.87 | 4.13 | 2½-2½ | b⁴P-z²D° |
| 5381.105 | C | 5 | 1.95 | 4.24 | 1½-1½ | (56) |
| •5651.734 | C | (1n) | 1.95 | 4.13 | 1½-2½ | |
| 4781.432 | A | 3 | 1.87 | 4.46 | 2½-2½ | b⁴P-y²D° |
| 4737.769 | A | 2 | 1.95 | 4.55 | 1½-1½ | (57) |
| 4608.908 | A | (0) | 1.87 | 4.55 | 2½-1½ | |
| 4920.272 | A | 1 | 1.95 | 4.46 | 1½-2½ | |
| 4834.359 | G | — | 2.00 | 4.55 | ½-1½ | |
| 4086.300 | A | 15 | 1.87 | 4.89 | 2½-3½ | b⁴P-x⁴D° |
| 4068.541 | A | 8 | 1.95 | 4.98 | 1½-2½ | (58) |
| 4058.600 | A | 6 | 2.00 | 5.04 | ½-1½ | |
| 3973.144 | A | 10 | 1.87 | 4.98 | 2½-2½ | |
| 3990.299 | A | 6 | 1.95 | 5.04 | 1½-1½ | |
| 4013.942 | A | 7 | 2.00 | 5.07 | ½- ½ | |
| 3898.485 | A | 4 | 1.87 | 5.04 | 2½-1½ | |
| 3947.125 | A | 3 | 1.95 | 5.07 | 1½- ½ | |
| 3930.076 | G | (1) | 1.87 | 5.01 | 2½-1½ | b⁴P-z⁴S° |
| 4023.399 | A | 4 | 1.95 | 5.01 | 1½-1½ | (59) |
| 4092.848 | C | 3 | 2.00 | 5.01 | ½-1½ | |
| 3856.796 | A | 4 | 1.87 | 5.07 | 2½-2½ | b⁴P-2° |
| 3946.633 | A | 2 | 1.95 | 5.07 | 1½-2½ | (60) |
| 3568.436 | C | 2 | 1.87 | 5.33 | 2½-2½ | b⁴P-x⁴G° |
| 3645.190 | A | 5 | 1.95 | 5.33 | 1½-2½ | (61) |
| 3732.390 | A | 20 | 1.87 | 5.18 | 2½-2½ | b⁴P-z⁴P° |
| 3814.457 | A | 5 | 1.95 | 5.18 | 1½-1½ | (62) |
| 3878.750 | A | (4) | 2.00 | 5.18 | ½- ½ | |
| 3730.476 | A | 20 | 1.87 | 5.18 | 2½-1½ | |
| 3818.318 | A | 15 | 1.95 | 5.18 | 1½- ½ | |
| 3816.458 | A | 15 | 1.95 | 5.18 | 1½-2½ | |
| •3876.831 | A | 20 | 2.00 | 5.18 | ½-1½ | |
| 3525.873 | C | 3 | 1.87 | 5.37 | 2½-1½ | b⁴P-z²P° † |
| 3854.441 | A | 5 | 1.95 | 5.32 | 1½- ½ | (63) |
| 3600.803 | A | 3 | 1.95 | 5.37 | 1½-1½ | |
| 3711.846 | A | 3 | 2.00 | 5.32 | ½- ½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Co I continued | | | | | | |
| 3543.256 | A | 15 | 1.87 | 5.36 | 2½-3½ | b⁴P-w⁴D° |
| 3639.443 | A | 10 | 1.95 | 5.34 | 1½-2½ | (64) |
| 3693.364 | C | 2 | 2.00 | 5.34 | ½-1½ | |
| 3562.912 | A | 7 | 1.87 | 5.34 | 2½-2½ | |
| 3636.713 | A | 6 | 1.95 | 5.34 | 1½-1½ | |
| 3670.041 | A | 3 | 2.00 | 5.36 | ½- ½ | |
| 3560.306 | C | 5 | 1.87 | 5.34 | 2½-1½ | |
| 3614.10 | A | (0) | 1.95 | 5.36 | 1½- ½ | |
| 3487.712 | A | 8 | 1.87 | 5.41 | 2½-3½ | b⁴P-w⁴F° † |
| 3516.675 | C | 1 | 1.95 | 5.46 | 1½-2½ | (65) |
| 3523.701 | C | 7 | 1.87 | 5.38 | 2½-3½ | b⁴P-x²F° |
| 3615.387 | A | 6 | 1.95 | 5.36 | 1½-2½ | (66) |
| 3478.744 | C | 7 | 1.87 | 5.42 | 2½-3½ | b⁴P-x²D° |
| 3552.989 | A | 8 | 1.95 | 5.42 | 1½-1½ | (67) |
| 3480.012 | A | 6 | 1.87 | 5.42 | 2½-1½ | |
| 3551.666 | C | 2 | 1.95 | 5.42 | 1½-2½ | |
| 3607.04 | A | (0) | 2.00 | 5.42 | ½-1½ | |
| 3485.700 | A | 4 | 1.95 | 5.49 | 1½- ½ | b⁴P-z²g° |
| 3537.707 | A | 1 | 2.00 | 5.49 | ½- ½ | (68) |
| 3243.840 | A | 8 | 1.87 | 5.68 | 2½-2½ | b⁴P-x⁴D° |
| 3317.93 | A | (0) | 1.95 | 5.67 | 1½-1½ | (69) |
| 3359.066 | A | 3 | 2.00 | 5.67 | ½- ½ | |
| 3254.202 | A | 12 | 1.87 | 5.67 | 2½-1½ | |
| 3312.148 | C | 7 | 1.95 | 5.67 | 1½- ½ | |
| 3307.156 | A | 7 | 1.95 | 5.68 | 1½-2½ | |
| 3365.014 | C | 2 | 2.00 | 5.67 | ½-1½ | |
| 3247.170 | A | 8 | 1.87 | 5.68 | 2½-3½ | b⁴P-v⁴D° |
| 3271.778 | A | 8 | 1.95 | 5.72 | 1½-2½ | (70) |
| 3325.240 | A | 10 | 2.00 | 5.71 | ½-1½ | |
| 3209.80 | A | (1) | 1.87 | 5.72 | 2½-2½ | |
| 3279.254 | A | 5 | 1.95 | 5.71 | 1½-1½ | |
| 3298.680 | A | 6 | 2.00 | 5.74 | ½- ½ | |
| 3216.996 | C | 1 | 1.87 | 5.71 | 2½-1½ | |
| 3253.416 | E | 1 | 1.95 | 5.74 | 1½- ½ | |
| 3174.905 | A | 4 | 1.87 | 5.76 | 2½-2½ | b⁴P-v²D° |
| 3287.192 | A | 7 | 1.95 | 5.70 | 1½-1½ | (71) |
| 3224.632 | A | 4 | 1.87 | 5.70 | 2½-1½ | |
| *3235.532 | A | 6 | 1.95 | 5.76 | 1½-2½ | |
| m3333.41 | P | Co | 2.00 | 5.70 | ½-1½ | |
| 3173.56 | A | (1) | 1.87 | 5.76 | 2½-1½ | b⁴P-y²P° |
| 3192.220 | A | 3 | 1.95 | 5.81 | 1½- ½ | (72) |
| 3234.119 | C | 1 | 1.95 | 5.76 | 1½-1½ | |
| 3235.783 | C | (2) | 2.00 | 5.81 | ½- ½ | |
| 3278.842 | A | 6 | 2.00 | 5.76 | ½-1½ | |
| 3154.794 | A | 10 | 1.87 | 5.79 | 2½-3½ | b⁴P-u⁴D° |
| 3161.652 | A | 5 | 1.95 | 5.85 | 1½-2½ | (73) |
| 3182.118 | A | 7 | 2.00 | 5.88 | ½-1½ | |
| 3103.735 | A | 5 | 1.87 | 5.85 | 2½-2½ | |
| m3139.98 | P | Co | 1.95 | 5.88 | 1½-1½ | |
| 3152.707 | A | 6 | 2.00 | 5.91 | ½- ½ | |
| 3082.844 | C | 2 | 1.87 | 5.88 | 2½-1½ | |
| 3111.339 | C | 2 | 1.95 | 5.91 | 1½- ½ | |
| 3120.10 | A | (3) | 1.87 | 5.83 | 2½-3½ | b⁴P-w²F° |
| 3188.377 | A | 7 | 1.95 | 5.82 | 1½-2½ | (74) |
| 3129.481 | A | 3 | 1.87 | 5.82 | 2½-2½ | |
| 3099.667 | A | 2 | 1.95 | 5.93 | 1½- ½ | b⁴P-x²S° |
| 3140.715 | A | 2 | 2.00 | 5.93 | ½- ½ | (75) |
| 3015.686 | A | 3 | 1.87 | 5.97 | 2½-1½ | b⁴P-x²P° † |
| 3086.83 ? | A | (1?) | 1.95 | 5.93 | 1½- ½ | (76) |
| 3026.373 | A | 6 | 1.87 | 5.95 | 2½-3½ | b⁴P-t⁴D° |
| 3060.048 | A | 5 | 1.95 | 5.98 | 1½-2½ | (77) |
| 3090.251 | A | 4 | 2.00 | 5.99 | ½-1½ | |
| 3005.766 | A | 3 | 1.87 | 5.98 | 2½-2½ | |
| 3050.496 | A | 3 | 1.95 | 5.99 | 1½-1½ | |
| 3087.806 | A | 3 | 2.00 | 6.00 | ½- ½ | |
| 2996.549 | A | 1 | 1.87 | 5.99 | 2½-1½ | |
| 3048.108 | A | 2 | 1.95 | 6.00 | 1½- ½ | |
| 3017.254 | A | 3 | 1.87 | 5.96 | 2½-3½ | b⁴P-y²F° |
| m3044.04 | P | Co | 1.95 | 6.00 | 1½-2½ | (78) |
| 7809.24 | C | (1) | 2.03 | 3.61 | 4½-4½ | a²G-z⁴G° |
| *7996.80 | C | (1) | 2.13 | 3.67 | 3½-3½ | (79) |
| 6563.403 | A | 40 | 2.03 | 3.91 | 4½-4½ | a²G-z²G° |
| m8450.09 | P | Co | 2.13 | 4.04 | 3½-3½ | (80) |
| 6146.38 | D | (3) | 2.03 | 4.04 | 4½-3½ | |
| 6910.84 | C | (2) | 2.13 | 3.91 | 3½-4½ | |
| 6490.344 | A | 6 | 2.03 | 3.93 | 4½-3½ | a²G-z²F° |
| 6429.913 | A | 4 | 2.13 | 4.05 | 3½-2½ | (81) |
| 6829.92 | D | (1) | 2.13 | 3.93 | 3½-3½ | |
| 5890.487 | A | 12 | 2.03 | 4.13 | 4½-4½ | a²G-y³G° |
| 5915.551 | A | 10 | 2.13 | 4.21 | 3½-3½ | (82) |
| 5659.121 | A | 3 | 2.03 | 4.21 | 4½-3½ | |
| 6168.86 | D | (1) | 2.13 | 4.13 | 3½-4½ | |
| 5266.508 | A | 25 | 2.03 | 4.38 | 4½-3½ | a²G-y²F° |
| 5235.188 | A | 15 | 2.13 | 4.48 | 3½-2½ | (83) |
| 3712.177 | A | 8 | 2.03 | 5.38 | 4½-3½ | a²G-w⁴D° |
| 3843.692 | A | 4 | 2.13 | 5.34 | 3½-2½ | (84) |
| 3651.254 | A | 4 | 2.03 | 5.41 | 4½-3½ | a²G-w⁴F° † |
| 3707.01 | G | — | 2.13 | 5.46 | 3½-2½ | (85) |
| 3690.715 | A | 7 | 2.03 | 5.38 | 4½-3½ | a²G-x²F° |
| 3816.878 | A | 5 | 2.13 | 5.38 | 3½-2½ | (88) |
| 3438.713 | C | 4 | 2.03 | 5.62 | 4½-5½ | a²G-z²H° |
| 3588.082 | E | 3 | 2.13 | 5.57 | 3½-4½ | (87) |
| 3381.498 | C | 4 | 2.03 | 5.68 | 4½-4½ | a²G-x²G° |
| 3503.717 | C | 3 | 2.13 | 5.85 | 3½-3½ | (88) |
| 7987.36 | A | 5 | 2.07 | 3.62 | 2½-3½ | a²D-z⁴D° |
| 7417.38 | A | 10 | 2.03 | 3.70 | 1½-2½ | (89) |
| 7590.57 | C | 3 | 2.07 | 3.70 | 2½-2½ | |
| 7154.688 | A | 8 | 2.03 | 3.76 | 1½-1½ | |
| 7315.73 | C | (3) | 2.07 | 3.76 | 2½-1½ | |
| 7004.81 | C | 3 | 2.03 | 3.80 | 1½- ½ | |
| 5991.890 | A | 20 | 2.07 | 4.13 | 2½-2½ | a²D-z²D° |
| 5590.744 | A | 10 | 2.03 | 4.24 | 1½-1½ | (90) |
| 5688.593 | C | 2 | 2.07 | 4.24 | 2½-1½ | |
| 5883.421 | A | (3) | 2.03 | 4.13 | 1½-2½ | |
| m5354.01 | P | Co | 2.07 | 4.38 | 2½-3½ | a²D-y³F° |
| 5034.06 | H | (3) | 2.03 | 4.48 | 1½-2½ | (91) |
| 5113.232 | C | 6 | 2.07 | 4.48 | 2½-2½ | |
| 5176.085 | A | 20 | 2.07 | 4.48 | 2½-2½ | a²D-y³D° |
| 4899.520 | A | 2 | 2.03 | 4.55 | 1½-1½ | (92) |
| 4974.47 | G | (1) | 2.07 | 4.55 | 2½-1½ | |
| 5094.955 | A | 8 | 2.03 | 4.46 | 1½-2½ | |
| 4371.130 | A | 5 | 2.07 | 4.89 | 2½-3½ | a²D-x⁴D° † |
| 4187.246 | A | 4 | 2.03 | 4.98 | 1½-2½ | (93) |
| 4192.856 | A | (2N) | 2.07 | 5.01 | 2½-1½ | a²D-z⁴S° |
| 4139.452 | A | 3 | 2.03 | 5.01 | 1½-1½ | (94) |
| 3735.928 | C | 12 | 2.07 | 5.37 | 2½-1½ | a²D-z²P° |
| 3749.930 | A | 9 | 2.03 | 5.38 | 1½- ½ | (95) |
| 3693.476 | A | 8 | 2.03 | 5.37 | 1½-1½ | |
| 3755.447 | A | 10 | 2.07 | 5.36 | 2½-3½ | a²D-w⁴D° |
| 3734.139 | A | 7 | 2.03 | 5.34 | 1½-2½ | (96) |
| 3777.543 | A | 6 | 2.07 | 5.34 | 2½-2½ | |
| 3731.868 | A | 2 | 2.03 | 5.34 | 1½-1½ | |
| 3774.599 | A | 8 | 2.07 | 5.34 | 2½-1½ | |
| 3707.465 | A | 6 | 2.03 | 5.36 | 1½- ½ | |
| 3693.106 | A | 8 | 2.07 | 5.41 | 2½-3½ | a²D-w⁴F° |
| 3605.015 | C | 5 | 2.03 | 5.46 | 1½-2½ | (97) |
| 3645.440 | E | 3 | 2.07 | 5.46 | 2½-2½ | |
| 3559.597 | E | 1 | 2.03 | 5.50 | 1½-1½ | |
| 3733.483 | A | 12 | 2.07 | 5.38 | 2½-3½ | a²D-x²F° |
| 3708.823 | A | 12 | 2.03 | 5.36 | 1½-2½ | (98) |
| 3751.625 | A | 5 | 2.07 | 5.36 | 2½-2½ | |
| 3683.047 | A | 20 | 2.07 | 5.42 | 2½-2½ | a²D-x²D° |
| 3643.181 | A | 9 | 2.03 | 5.42 | 1½-1½ | (99) |
| 3684.479 | C | 10 | 2.07 | 5.42 | 2½-1½ | |
| 3641.784 | A | 6 | 2.03 | 5.42 | 1½-2½ | |
| 3585.808 | C | 4 | 2.07 | 5.51 | 2½-1½ | a²D-y⁴P° † |
| *3521.731 | C | 5 | 2.03 | 5.54 | 1½- ½ | (100) |
| 3458.028 | C | 3 | 2.07 | 5.64 | 2½-2½ | a²D-w²D° |
| m3334.12 | P | Co | 2.03 | 5.73 | 1½-1½ | (101) |
| 3368.67 | G | (1) | 2.07 | 5.73 | 2½-1½ | |
| 3421.628 | A | 3 | 2.03 | 5.64 | 1½-2½ | |
| 3420.790 | A | 7 | 2.07 | 5.68 | 2½-2½ | a²D-x⁴P° |
| 3396.457 | C | 1 | 2.03 | 5.67 | 1½-1½ | (102) |
| 3432.318 | C | 3 | 2.07 | 5.67 | 2½-1½ | |
| 3390.396 | A | 5 | 2.03 | 5.67 | 1½- ½ | |
| 3424.500 | A | 10 | 2.07 | 5.68 | 2½-3½ | a²D-v⁴D° † |
| 3348.112 | A | 8 | 2.03 | 5.72 | 1½-2½ | (103) |
| 3355.940 | A | 2 | 2.03 | 5.71 | 1½-1½ | |
| 3356.464 | A | 6 | 2.07 | 5.75 | 2½-1½ | a²D-y⁴S° |
| *3323.198 | A | 8 | 2.03 | 5.75 | 1½-1½ | (104) |
| 3342.734 | C | 8 | 2.07 | 5.76 | 2½-1½ | a²D-y²P° |
| 3264.842 | A | 5 | 2.03 | 5.81 | 1½- ½ | (105) |
| 3308.688 | E | (1) | 2.03 | 5.76 | 1½-1½ | |
| 3321.912 | C | 3 | 2.07 | 5.79 | 2½-3½ | a²D-u⁴D° |
| 3232.874 | A | (9) | 2.03 | 5.85 | 1½-2½ | (106) |
| 3265.352 | A | 3 | 2.07 | 5.85 | 2½-2½ | |
| 3210.219 | A | 5 | 2.03 | 5.88 | 1½-1½ | |
| 3180.390 | A | 2 | 2.03 | 5.91 | 1½- ½ | |
| 3283.466 | A | 9 | 2.07 | 5.83 | 2½-3½ | a²D-w³F° |
| 3260.814 | A | 9 | 2.03 | 5.82 | 1½-2½ | (107) |
| 3293.861 | C | 2 | 2.07 | 5.82 | 2½-2½ | |
| 3168.060 | C | 8 | 2.07 | 5.97 | 2½-1½ | a²D-x²P° |
| 3154.878 | C | 5 | 2.03 | 5.95 | 1½- ½ | (108) |
| 3137.454 | E | 3 | 2.03 | 5.97 | 1½-1½ | |
| 3169.766 | A | 9 | 2.07 | 5.96 | 2½-3½ | a²D-v²F° |
| 3110.021 | C | 5 | 2.03 | 6.00 | 1½-2½ | (109) |
| 8946.31 | C | (2) | 2.27 | 4.05 | 1½-2½ | a²P-z²F° (110) |
| 6632.438 | A | 15 | 2.27 | 4.13 | 1½-2½ | a²P-z²D° † |
| 8417.324 | C | 15 | 2.32 | 4.24 | ½-1½ | (111) |
| 5647.234 | A | 12 | 2.27 | 4.46 | 1½-2½ | a²P-y²D° |
| 5523.310 | A | 8 | 2.32 | 4.55 | ½-1½ | (112) |
| 5408.119 | C | 2 | 2.27 | 4.55 | 1½-1½ | |
| 3915.503 | A | (2) | 2.27 | 5.42 | 1½-2½ | a²P-x²D° |
| 3977.184 | A | 3 | 2.32 | 5.42 | ½-1½ | (113) |
| 3917.115 | A | 8 | 2.27 | 5.42 | 1½-1½ | |
| 3835.497 | C | (2) | 2.27 | 5.49 | 1½- ½ | a²P-z²S° |
| 3893.067 | E | 2 | 2.32 | 5.49 | ½- ½ | (114) |
| 3682.158 | A | 12 | 2.27 | 5.64 | 1½-2½ | a²P-w²D° |
| 3811.701 | A | 10 | 2.32 | 5.73 | ½-1½ | (115) |
| 3582.097 | A | 6 | 2.27 | 5.73 | 1½-1½ | |
| 3820.422 | A | 5 | 2.27 | 5.68 | 1½-2½ | a²P-x⁴P° |
| 3684.960 | A | 2 | 2.32 | 5.87 | ½-1½ | (118) |
| 3833.340 | A | 2 | 2.27 | 5.87 | 1½-1½ | |
| 3677.835 | G | (1) | 2.32 | 5.67 | ½- ½ | |
| 3578.076 | A | 6 | 2.27 | 5.72 | 1½-2½ | a²P-v⁴D° |
| 3637.319 | A | 4 | 2.32 | 5.71 | ½-1½ | (117) |
| 3556.120 | G | (1) | 2.27 | 5.74 | 1½- ½ | |
| 3534.769 | A | 4 | 2.27 | 5.76 | 1½-2½ | a²P-v²D° |
| 3647.081 | A | 5 | 2.32 | 5.70 | ½-1½ | (118) |
| 3596.510 | A | 5 | 2.27 | 5.70 | 1½-1½ | |
| 3421.029 | E | (1) | 2.27 | 5.88 | 1½-1½ | a²P-u⁴D° |
| 3387.061 | C | 1 | 2.27 | 5.91 | 1½- ½ | (119) |
| 3478.555 | C | 8 | 2.27 | 5.82 | 1½-2½ | a²P-w²F° (120) |
| 3378.736 | A | 5 | 2.27 | 5.92 | 1½- ½ | a²P-y²S° |
| 3423.35 | A | (1) | 2.32 | 5.92 | ½- ½ | (121) |
| 3373.226 | A | 7 | 2.27 | 5.93 | 1½- ½ | a²P-x²S° |
| 3417.673 | C | 5 | 2.32 | 5.93 | ½- ½ | (122) |
| 3338.519 | C | 1 | 2.27 | 5.97 | 1½-1½ | a²P-x²P° |
| 3402.064 | C | 4 | 2.32 | 5.95 | ½- ½ | (123) |
| *3358.003 | A | 3 | 2.27 | 5.95 | 1½- ½ | |
| 3382.071 | E | 2 | 2.32 | 5.97 | ½-1½ | |
| 3263.213 | A | 4 | 2.27 | 6.05 | 1½-1½ | a²P-w²P° |
| 3226.986 | A | 4 | 2.32 | 6.14 | ½- ½ | (124) |
| 3072.664 | C | (1) | 2.27 | 6.29 | 1½-1½ | a²P-v²P° |
| 3107.540 | A | 1 | 2.32 | 6.29 | ½- ½ | (125) |
| 7712.661 | A | 6 | 2.53 | 4.13 | 1½-2½ | b²P-z²D° |
| 7610.24 | C | 2 | 2.62 | 4.24 | ½-1½ | (126) |
| 7217.34 | C | (2) | 2.53 | 4.24 | 1½-1½ | |
| 4268.446 | A | 2 | 2.53 | 5.42 | 1½-2½ | b²P-x²D° |
| 4404.932 | A | 3 | 2.62 | 5.42 | ½-1½ | (127) |
| 3969.116 | A | 8 | 2.53 | 5.64 | 1½-2½ | b²P-w²D° |
| 3960.997 | A | 6 | 2.62 | 5.73 | ½-1½ | (128) |
| 3851.848 | A | 2 | 2.53 | 5.73 | 1½-1½ | |
| 3870.534 | A | 4 | 2.53 | 5.72 | 1½-2½ | b²P-v⁴D° |
| 3991.831 | C | (2) | 2.62 | 5.71 | ½-1½ | (129) |
| 3819.908 | A | 4 | 2.53 | 5.76 | 1½-2½ | b²P-w²D° |
| 4003.596 | A | 2 | 2.62 | 5.70 | ½-1½ | (130) |
| 3892.118 | A | 3 | 2.53 | 5.70 | 1½-1½ | |
| 3817.940 | A | (4) | 2.53 | 5.76 | 1½-1½ | b²P-y²P° |
| 3863.607 | C | 2 | 2.62 | 5.81 | ½- ½ | (131) |
| 3759.684 | A | 3 | 2.53 | 5.81 | 1½- ½ | |
| 3925.151 | A | 3 | 2.62 | 5.76 | ½-1½ | |
| 3754.346 | A | 4 | 2.53 | 5.82 | 1½-2½ | b²P-w²F° (132) |
| 3631.948 | C | 2 | 2.53 | 5.93 | 1½- ½ | b²P-x²S° |
| 3728.840 | A | 3 | 2.62 | 5.93 | ½- ½ | (133) |
| 3591.746 | A | 4 | 2.53 | 5.97 | 1½-1½ | b²P-x²P° |
| 3614.34 | A | (1) | 2.53 | 5.95 | 1½- ½ | (134) |
| 3686.477 | A | 2 | 2.62 | 5.97 | ½-1½ | |
| 3504.728 | A | 5 | 2.53 | 6.05 | 1½-1½ | b²P-w²P° |
| 3502.998 | E | (2d) | 2.62 | 6.14 | ½- ½ | (135) |
| 3417.353 | E | (1d) | 2.53 | 6.14 | 1½- ½ | |
| m3594.87 | P | Co | 2.62 | 6.05 | ½-1½ | |
| 3496.070 | C | 3 | 2.69 | 6.22 | 5½-5½ | a²H-y²H° |
| 3604.469 | A | 4 | 2.77 | 6.20 | 4½-4½ | (136) |
| 3469.683 | E | (2n) | 2.69 | 6.25 | 5½-4½ | a²H-w²G° |
| 3553.161 | C | 2 | 2.77 | 6.25 | 4½-3½ | (137) |
| 3174.140 | A | 2 | 2.69 | 6.58 | 5½-4½ | a²H-v²G° |
| *3235.532 | A | 6 | 2.77 | 6.59 | 4½-3½ | (138) |
| 3245.750 | A | (1) | 2.77 | 6.58 | 4½-4½ | |
| 7388.689 | A | 5 | 2.71 | 4.38 | 2½-3½ | b²D-y²F° |
| 7586.72 | C | (4) | 2.86 | 4.48 | 1½-2½ | (139) |
| 6937.81 | C | 4 | 2.71 | 4.48 | 2½-2½ | |
| 7054.042 | A | 10 | 2.71 | 4.46 | 2½-2½ | b²D-y²D° † |
| 7285.28 | C | 4 | 2.86 | 4.55 | 1½-1½ | (140) |
| 4824.561 | A | (0) | 2.71 | 5.37 | 2½-1½ | b²D-z²P° |
| 5004.187 | G | (1) | 2.86 | 5.32 | 1½- ½ | (141) |
| 4904.172 | A | 1 | 2.86 | 5.37 | 1½-1½ | |
| 4543.810 | A | 6 | 2.71 | 5.42 | 2½-2½ | b²D-x²D° |
| 4815.900 | A | 1 | 2.86 | 5.42 | 1½-1½ | (142) |
| 4545.985 | A | 1 | 2.71 | 5.42 | 2½-1½ | |
| m4813.45 | P | Co | 2.86 | 5.42 | 1½-2½ | |
| 4375.540 | A | 2 | 2.86 | 5.68 | 4½-4½ | b²G-x²G° |
| 4431.608 | A | 3 | 2.86 | 5.85 | 3½-3½ | (143) |
| 4158.420 | A | 4 | 2.86 | 5.83 | 4½-3½ | b²G-w²F° |
| 4179.226 | A | 2 | 2.86 | 5.82 | 3½-2½ | (144) |
| 3676.552 | A | 12 | 2.86 | 6.22 | 4½-5½ | b²G-y²H° |
| 3702.237 | A | 12 | 2.86 | 6.20 | 3½-4½ | (145) |
| 3699.017 | C | 2n | 2.88 | 6.20 | 4½-4½ | |
| 3649.329 | A | 8 | 2.88 | 6.24 | 4½-3½ | b²G-u²F° |
| 3634.713 | A | 7 | 2.88 | 8.26 | 3½-2½ | (146) |
| 3832.839 | A | 7 | 2.86 | 6.26 | 4½-5½ | b²G-x²H° † |
| 3609.752 | A | 4 | 2.86 | 6.28 | 3½-4½ | (147) |
| 3341.341 | A | 5 | 2.86 | 6.56 | 4½-3½ | b²G-s²F° |
| 3339.15 | A | (4) | 2.86 | 6.56 | 3½-2½ | (148) |
| *3322.198 | A | 8 | 2.86 | 6.58 | 4½-4½ | b²G-w²G° † |
| *3314.073 | A | 8 | 2.86 | 6.59 | 3½-3½ | (149) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Co I continued | | | | | | |
| 4530.949 | A | 30 | 2.91 | 5.64 | 5½-5½ | $z^6F^o$-$e^6F$ (150) |
| 4469.547 | A | 15 | 2.94 | 5.71 | 4½-4½ | |
| 4466.881 | A | 10 | 3.00 | 5.77 | 3½-3½ | |
| 4471.550 | A | 5 | 3.05 | 5.81 | 2½-2½ | |
| 4478.319 | A | 4 | 3.09 | 5.85 | 1½-1½ | |
| 4483.918 | A | 3 | 3.11 | 5.87 | ½- ½ | |
| 4421.337 | A | 4 | 2.91 | 5.71 | 5½-4½ | |
| 4374.918 | A | 3 | 2.94 | 5.77 | 4½-3½ | |
| 4391.568 | A | 4 | 3.00 | 5.81 | 3½-2½ | |
| 4417.398 | A | 5 | 3.05 | 5.85 | 2½-1½ | |
| 4445.711 | A | 4 | 3.09 | 5.87 | 1½- ½ | |
| 4581.596 | A | 20 | 2.94 | 5.64 | 4½-5½ | |
| 4565.578 | A | 15 | 3.00 | 5.71 | 3½-4½ | |
| 4549.658 | A | 10 | 3.05 | 5.77 | 2½-3½ | |
| 4533.985 | A | 7 | 3.09 | 5.81 | 1½-2½ | |
| 4517.094 | A | 4 | 3.11 | 5.85 | ½-1½ | |
| 4343.530 | E | (1) | 2.91 | 6.61 | 5½-5½ | $z^6F^o$-$f^4G$ |
| 4299.11 | A | (0) | 2.94 | 6.69 | 4½-4½ | (151) |
| 4272.76 | A | (1) | 2.92 | 6.89 | 5½-4½ | |
| 4371.015 | C | (2) | 2.94 | 6.61 | 4½-5½ | |
| 4351.138 | A | 1 | 3.00 | 6.69 | 3½-4½ | |
| 4356.843 | A | 3 | 3.05 | 6.73 | 2½-3½ | |
| 4318.60 | A | (1) | 3.09 | 6.81 | 1½-2½ | |
| 4326.991 | C | 8 | 2.91 | 6.62 | 5½-5½ | $z^6F^o$-$f^6F$ |
| 4277.662 | A | 3 | 2.94 | 6.71 | 4½-4½ | (152) |
| 4270.198 | C | 2 | 3.00 | 6.78 | 3½-3½ | |
| 4272.405 | C | (2) | 3.05 | 6.82 | 2½-2½ | |
| 4251.856 | A | (2) | 2.91 | 6.71 | 5½-4½ | |
| 4220.62 | A | (4) | 2.94 | 6.78 | 4½-3½ | |
| 4229.36 | A | (3) | 3.00 | 6.82 | 3½-2½ | |
| 4354.213 | C | 4 | 2.94 | 6.62 | 4½-5½ | |
| 4329.013 | A | 2 | 3.00 | 6.71 | 3½-4½ | |
| 4314.345 | C | 2 | 3.05 | 8.78 | 2½-3½ | |
| 4305.730 | A | 2 | 3.09 | 6.82 | 1½-2½ | |
| 4294.536 | C | 2 | 3.11 | 6.86 | ½-1½ | |
| 4319.822 | A | 4 | 2.91 | 6.63 | 5½-4½ | $z^6F^o$-$e^6D$ |
| 4278.105 | A | 2 | 2.94 | 6.71 | 4½-3½ | (153) |
| 4284.82 | P | Co | 3.00 | 6.78 | 3½-2½ | |
| 4259.20 | A | (6) | 3.05 | 6.84 | 2½-1½ | |
| 4346.932 | A | 8 | 2.94 | 6.83 | 4½-4½ | |
| 4329.466 | A | 5 | 3.00 | 6.71 | 3½-3½ | |
| 4308.814 | A | 4 | 3.05 | 6.78 | 2½-2½ | |
| 4292.22 | A | (1) | 3.09 | 6.84 | 1½-1½ | |
| 4375.238 | E | (1) | 3.05 | 6.71 | 2½-3½ | |
| 4313.116 | A | 2 | 3.11 | 6.84 | ½-1½ | |
| 4319.478 | C | 8 | 2.91 | 6.63 | 5½-6½ | $z^6F^o$-$e^6G$ |
| 4276.483 | A | 4 | 2.94 | 6.71 | 4½-5½ | (154) |
| 4293.210 | A | 3 | 3.00 | 6.75 | 3½-4½ | |
| 4304.119 | A | 3 | 3.05 | 6.79 | 2½-3½ | |
| 4287.575 | A | 2 | 3.09 | 6.85 | 1½-2½ | |
| 4315.035 | C | 3 | 3.11 | 6.85 | ½-1½ | |
| 4250.51 | A | (5w) | 2.91 | 6.71 | 5½-5½ | |
| 4260.286 | C | (2) | 3.00 | 6.79 | 3½-3½ | |
| 4254.63 | A | (9) | 3.05 | 6.85 | 2½-2½ | |
| 4294.098 | C | (2) | 3.09 | 6.85 | 1½-1½ | |
| 4311.01 | A | (4) | 2.94 | 6.79 | 4½-3½ | |
| 4339.780 | A | 8 | 2.94 | 6.64 | 4½-3½ | $z^6F^o$-$e^6P$ |
| 4319.156 | C | 4 | 3.00 | 6.72 | 3½-2½ | (155) |
| 4308.482 | A | 4 | 3.05 | 6.78 | 2½-1½ | |
| 4749.68 | A | 10 | 3.04 | 5.64 | 4½-5½ | $z^6D^o$-$e^6F$ |
| 4771.108 | C | 8 | 3.12 | 5.71 | 3½-4½ | (156) |
| 4788.072 | A | 5 | 3.18 | 5.77 | 2½-3½ | |
| 4754.358 | A | 3 | 3.22 | 5.81 | 1½-2½ | |
| 4734.828 | A | 2 | 3.24 | 5.85 | ½-1½ | |
| 4629.359 | A | 15 | 3.04 | 5.71 | 4½-4½ | |
| 4663.403 | A | 12 | 3.12 | 5.77 | 3½-3½ | |
| 4682.361 | A | 9 | 3.18 | 5.81 | 2½-2½ | |
| 4693.190 | A | 6 | 3.22 | 5.85 | 1½-1½ | |
| 4698.389 | A | 3 | 3.24 | 5.87 | ½- ½ | |
| 4527.919 | A | 2 | 3.04 | 5.77 | 4½-3½ | |
| 4581.380 | F | (1) | 3.12 | 5.81 | 3½-2½ | |
| 4623.020 | A | (2N) | 3.18 | 5.85 | 2½-1½ | |
| 4657.390 | A | (1) | 3.22 | 5.67 | 1½- ½ | |
| 4361.553 | A | 5† | 3.04 | 6.71 | 4½-5½ | $z^6D^o$-$e^6G$† |
| 4398.811 | A | 3 | 3.12 | 6.75 | 3½-4½ | (157) |
| 4401.913 | C | (2n) | 3.22 | 6.85 | 1½-2½ | |
| 4867.870 | A | 25 | 3.10 | 5.64 | 6½-5½ | $z^6G^o$-$e^6F$† |
| 4840.253 | A | 25 | 3.16 | 5.71 | 5½-4½ | (158) |
| 4813.478 | A | 20 | 3.20 | 5.77 | 4½-3½ | |
| 4792.655 | A | 15 | 3.24 | 5.81 | 3½-2½ | |
| 4779.979 | A | 10 | 3.27 | 5.65 | 2½-1½ | |
| 4778.311 | A | 6 | 3.26 | 5.67 | 1½- ½ | |
| 4971.935 | A | 2 | 3.16 | 5.64 | 5½-5½ | |
| 4936.390 | A | 2 | 3.20 | 5.71 | 4½-4½ | |
| 4882.704 | A | 2 | 3.24 | 5.77 | 3½-3½ | |
| 4843.454 | A | 3 | 3.27 | 5.81 | 2½-2½ | |
| 4813.968 | A | 2 | 3.28 | 5.85 | 1½-1½ | |
| 4564.115 | A | 4 | 3.16 | 6.82 | 5½-6½ | $z^6G^o$-$f^4H$† |
| 4522.856 | E | 4 | 3.20 | 6.71 | 4½-5½ | (159) |
| 4491.987 | C | 3 | 3.24 | 6.77 | 3½-4½ | |
| 4468.973 | A | 3 | 3.27 | 6.82 | 2½-3½ | |
| 4505.133 | A | 3 | 3.10 | 6.82 | 6½-5½ | $z^6G^o$-$f^6F$† |
| 4472.707 | C | (1n) | 3.16 | 6.71 | 5½-4½ | (160) |
| 4452.18 | A | (2) | 3.20 | 6.78 | 4½-3½ | |
| 4496.794 | C | 8 | 3.10 | 6.83 | 6½-6½ | $z^6G^o$-$e^6G$† |
| 4471.382 | A | 7 | 3.18 | 6.71 | 5½-5½ | (161) |
| 4477.838 | A | 4 | 3.20 | 6.75 | 4½-4½ | |
| 4478.360 | C | 5n | 3.24 | 8.79 | 3½-3½ | |
| 4447.381 | C | 3 | 3.27 | 6.65 | 2½-2½ | |
| 4472.196 | E | 1 | 3.28 | 8.85 | 1½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Co I continued | | | | | | |
| 3485.368 | A | 15 | 3.10 | 6.64 | 6½-7½ | $z^6G^o$-$e^6H$† |
| 3461.173 | A | 15 | 3.16 | 6.72 | 5½-6½ | (162) |
| 3446.088 | C | 12 | 3.20 | 6.78 | 4½-5½ | |
| 3437.680 | A | 6n | 3.24 | 8.83 | 3½-4½ | |
| 3448.358 | C | 4 | 3.24 | 6.82 | 3½-3½ | $z^6G^o$-3 (163) |
| 6908.08 | C | (5) | 3.39 | 5.18 | 2½-2½ | $c^2D$-$z^4P^o$ |
| 7398.72 | D | (1) | 3.51 | 5.18 | 1½-1½ | (164) |
| 6901.52 | C | (2) | 3.39 | 5.18 | 2½-1½ | |
| 7406.23 | D | (1) | 3.51 | 5.18 | 1½-2½ | |
| 6086.663 | A | 7 | 3.39 | 5.42 | 2½-2½ | $c^2D$-$x^2D^o$† |
| 6474.558 | A | (3) | 3.51 | 5.42 | 1½-1½ | (165) |
| 5495.682 | A | 2 | 3.39 | 5.64 | 2½-2½ | $c^2D$-$w^2D^o$† |
| 5558.825 | A | 2 | 3.51 | 5.73 | 1½-1½ | (166) |
| 5210.042 | A | 3 | 3.39 | 5.76 | 2½-1½ | $c^2D$-$y^2P^o$ |
| 5368.904 | A | (2) | 3.51 | 5.81 | 1½- ½ | (167) |
| 4331.231 | A | 3 | 3.39 | 6.24 | 2½-3½ | $c^2D$-$u^2F^o$ |
| 4494.746 | A | 2 | 3.51 | 6.26 | 1½-2½ | (168) |
| 6082.431 | A | 15 | 3.50 | 5.53 | 4½-4½ | $z^4F^o$-$e^4F$† |
| 6122.640 | A | 8 | 3.55 | 5.57 | 3½-3½ | (169) |
| *6000.668 | A | 5 | 3.81 | 5.66 | 2½-2½? | |
| 5946.484 | A | 5 | 3.85 | 5.73 | 1½-1½ | |
| 5965.040 | F | (2) | 3.50 | 5.57 | 4½-3½ | |
| 5846.575 | A | 2 | 3.55 | 5.66 | 3½-2½ | |
| 5828.399 | A | (2) | 3.61 | 5.73 | 2½-1½ | |
| 5212.699 | A | 25 | 3.50 | 5.67 | 4½-4½ | $z^4F^o$-$f^4F$† |
| 5146.753 | A | 15 | 3.55 | 5.95 | 3½-3½ | (170) |
| 5126.201 | A | 10 | 3.61 | 6.01 | 2½-2½ | |
| 5122.767 | A | 8 | 3.85 | 6.06 | 1½-1½ | |
| 5332.852 | A | 5 | 3.55 | 5.87 | 3½-4½ | |
| 5265.786 | A | 4 | 3.61 | 5.95 | 2½-3½ | |
| 5219.008 | A | 2 | 3.85 | 6.01 | 1½-2½ | |
| 3973.506 | A | 8 | 3.50 | 6.81 | 4½-5½ | $z^4F^o$-$f^4G$ |
| 3938.856 | A | 3 | 3.55 | 8.89 | 3½-4½ | (171) |
| 3951.717 | A | (1n) | 3.61 | 6.73 | 2½-3½ | |
| 3904.790 | E | 3 | 3.85 | 8.81 | 1½-2½ | |
| 5352.046 | A | 20 | 3.56 | 5.87 | 5½-4½ | $z^4G^o$-$f^4F$† |
| 5280.631 | A | 20 | 3.61 | 5.95 | 4½-3½ | (172) |
| 5266.302 | A | 10 | 3.67 | 6.01 | 3½-2½ | |
| 5268.498 | A | 10 | 3.72 | 6.08 | 2½-1½ | |
| 4035.542 | A | 6 | 3.56 | 6.62 | 5½-6½ | $z^4G^o$-$f^4H$ |
| 3991.528 | A | 4 | 3.61 | 8.71 | 4½-5½ | (173) |
| 3978.864 | C | 4 | 3.87 | 8.77 | 3½-4½ | |
| m3973.53 | P | Co | 3.72 | 8.82 | 2½-3½ | |
| 6454.998 | A | 40 | 3.62 | 5.53 | 3½-4½ | $z^4D^o$-$e^4F$† |
| 6595.869 | A | 12 | 3.70 | 5.57 | 2½-3½ | (174) |
| 6477.861 | A | 10 | 3.76 | 5.66 | 1½-2½ | |
| 6395.158 | A | 8 | 3.80 | 5.73 | ½-1½ | |
| 5483.962 | A | 10 | 3.62 | 5.67 | 3½-4½ | $z^4D^o$-$f^4F$† |
| 5477.089 | A | 5 | 3.70 | 5.95 | 2½-3½ | (175) |
| 5470.460 | A | 4 | 3.76 | 6.01 | 1½-2½ | |
| 5452.305 | A | 3 | 3.80 | 6.08 | ½-1½ | |
| 5287.574 | C | 3 | 3.62 | 5.95 | 3½-3½ | |
| 5328.247 | C | 3 | 3.70 | 6.01 | 2½-2½ | |
| 4594.633 | A | 4 | 3.82 | 6.30 | 3½-3½ | $z^4D^o$-$e^4D$† |
| 4625.767 | A | 2 | 3.70 | 6.37 | 2½-2½ | (176) |
| 4598.903 | A | 5 | 3.82 | 6.30 | 3½-2½ | $z^4D^o$-$e^4P$† |
| 4526.794 | A | 2 | 3.70 | 6.42 | 2½-1½ | (177) |
| 4570.024 | A | 2 | 3.62 | 6.32 | 3½-4½ | $z^4D^o$-$g^4F$† |
| 4704.388 | A | (2) | 3.70 | 6.32 | 2½-3½ | (178) |
| 7037.797 | A | 6 | 3.91 | 5.67 | 4½-3½ | $z^2G^o$-$e^2F$† |
| 7134.390 | A | 5 | 4.04 | 5.77 | 3½-2½ | (179) |
| 5133.467 | A | 15 | 3.91 | 6.32 | 4½-5½ | $z^2G^o$-$e^4H$ |
| 5156.366 | A | 10 | 4.04 | 6.43 | 3½-4½ | (180) |
| 4756.732 | A | (1) | 3.91 | 6.51 | 4½-3½ | |
| 5135.715 | A | 7 | 3.91 | 6.32 | 4½-5½ | $z^2G^o$-$e^4G$† |
| 5108.903 | A | 10 | 3.91 | 6.33 | 4½-4½ | (181) |
| 4746.115 | A | (1) | 3.91 | 6.51 | 4½-3½ | $z^2G^o$-$g^2F$ |
| 4767.142 | A | (2) | 4.04 | 6.63 | 3½-2½ | (182) |
| 7743.27 | C | (5) | 3.93 | 5.53 | 3½-4½ | $z^2F^o$-$e^4F$ |
| 6112.13 | D | (1) | 4.05 | 5.57 | 2½-3½ | (183) |
| 7553.970 | A | 4 | 3.93 | 5.57 | 3½-3½ | |
| 7834.50 | C | (5) | 4.05 | 5.66 | 2½-2½ | |
| 5211.632 | A | 3 | 3.93 | 6.30 | 3½-3½ | $z^2F^o$-$e^4D$ |
| 5077.410 | A | 3 | 3.93 | 6.36 | 3½-2½ | (184) |
| 4795.853 | A | 2 | 3.93 | 6.51 | 3½-3½ | $z^2F^o$-$e^4H$ (185) |
| 4765.070 | A | (1) | 3.93 | 6.51 | 3½-3½ | $z^2F^o$-$g^2F$ |
| 4778.233 | A | 2 | 4.05 | 6.63 | 2½-2½ | (186) |
| 5254.852 | A | 8 | 3.95 | 6.30 | 3½-3½ | $y^4D^o$-$e^4D$† |
| 5267.785 | A | 5 | 4.03 | 6.37 | 2½-2½ | (187) |
| 5230.363 | G | (1) | 4.09 | 6.45 | 1½-1½ | |
| 5210.834 | A | 3 | 4.13 | 8.50 | ½- ½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Co I continued | | | | | | |
| 5257.821 | A | 10 | 3.95 | 6.30 | 3½-2½ | $y^4D^o$-$e^4P$† |
| 5158.854 | A | 2 | 4.03 | 6.42 | 2½-1½ | (188) |
| 8093.932 | A | 8 | 4.00 | 5.53 | 5½-4½ | $y^4G^o$-$e^4F$† |
| 7908.679 | A | 6 | 4.01 | 5.57 | 4½-3½ | (189) |
| 7869.868 | A | 2 | 4.10 | 5.66 | 3½-2½ | |
| 7871.370 | A | 2 | 4.16 | 5.73 | 2½-1½ | |
| 5342.703 | A | 50 | 4.00 | 6.31 | 5½-6½ | $y^4G^o$-$e^4H$† |
| 5343.383 | A | 20 | 4.01 | 6.32 | 4½-5½ | (190) |
| 5276.183 | A | 8 | 4.10 | 6.43 | 3½-4½ | |
| 5250.003 | A | 7 | 4.16 | 6.51 | 2½-3½ | |
| 5333.647 | A | 5 | 4.00 | 6.32 | 5½-5½ | |
| 5334.821 | A | 6 | 4.00 | 6.32 | 5½-4½ | $y^4G^o$-$g^4F$† |
| 5336.163 | A | 3 | 4.01 | 6.32 | 4½-3½ | (191) |
| 5344.570 | A | (1n) | 4.01 | 6.32 | 4½-4½ | |
| 5545.937 | A | 2 | 4.10 | 6.32 | 3½-3½ | |
| 5325.278 | A | 10 | 4.00 | 6.32 | 5½-5½ | $y^4G^o$-$e^4G$† |
| 5316.772 | A | 7 | 4.01 | 6.33 | 4½-4½ | (192) |
| 5324.990 | A | 4 | 4.10 | 6.33 | 3½-4½ | |
| 5407.520 | A | 5 | 4.16 | 6.44 | 2½-3½ | |
| 8372.79 | A | (10) | 4.05 | 5.53 | 4½-4½ | $y^4F^o$-$e^4F$† |
| *8589.78 | A | (3) | 4.13 | 5.57 | 3½-3½ | (193) |
| 8379.44 | A | (3) | 4.19 | 5.66 | 2½-2½ | |
| 8208.57 | A | (8) | 4.22 | 5.73 | 1½-1½ | |
| 8151.95 | A | (8) | 4.05 | 5.57 | 4½-3½ | |
| 8055.996 | A | 2 | 4.13 | 5.66 | 3½-2½ | |
| 8043.306 | A | 2 | 4.19 | 5.73 | 2½-1½ | |
| 5453.338 | A | (1) | 4.05 | 6.32 | 4½-5½ | $y^4F^o$-$e^4H$ |
| 5359.200 | A | 6 | 4.13 | 6.43 | 3½-4½ | (194) |
| 5325.949 | A | 4 | 4.19 | 6.51 | 2½-3½ | |
| 5454.573 | A | 20 | 4.05 | 6.32 | 4½-4½ | $y^4F^o$-$g^4F$† |
| 5637.734 | A | 3 | 4.13 | 6.32 | 3½-3½ | (195) |
| 5515.990 | A | (1) | 4.19 | 6.43 | 2½-2½ | |
| 5402.000 | A | 3 | 4.22 | 6.51 | 1½-1½ | |
| 5444.585 | A | 20 | 4.05 | 6.32 | 4½-5½ | $y^4F^o$-$e^4G$† |
| 5381.776 | A | 6 | 4.22 | 6.51 | 1½-2½ | (196) |
| 5425.621 | A | (2) | 4.05 | 6.33 | 4½-4½ | |
| 5347.499 | A | 4 | 4.13 | 6.44 | 3½-3½ | |
| 5310.219 | A | (1n) | 4.19 | 6.51 | 2½-2½ | |
| 5312.650 | A | 8 | 4.19 | 6.51 | 2½-3½ | $y^4F^o$-$g^2F$† |
| 5124.718 | A | 2 | 4.22 | 6.63 | 1½-2½ | (197) |
| 5353.500 | A | 25 | 4.13 | 6.43 | 4½-5½ | $y^2G^o$-$e^2H$ |
| 5362.781 | A | 15 | 4.21 | 6.52 | 3½-4½ | (198) |
| 5341.338 | A | 7 | 4.13 | 6.44 | 4½-4½ | $y^2G^o$-$e^2G$† |
| 5339.538 | C | 4 | 4.21 | 6.53 | 3½-3½ | (199) |
| 6347.843 | A | 10 | 4.38 | 6.32 | 3½-3½ | $y^2F^o$-$g^4F$† |
| 6351.448 | A | 2 | 4.48 | 6.43 | 2½-2½ | (200) |
| 5984.253 | A | 3 | 4.38 | 6.44 | 3½-4½ | $y^2F^o$-$e^2G$ |
| 6049.110 | A | 6 | 4.48 | 6.53 | 2½-3½ | (201) |
| 6617.126 | A | 6n | 4.46 | 6.32 | 2½-1½ | $y^2D^o$-$e^2P$ |
| 6591.834 | E | (1) | 4.55 | 6.42 | 1½- ½ | (202) |
| 8819.11 | A | 100 | 5.13 | 6.53 | 5½-4½ | $x^4G^o$-$h^4F$† |
| 8750.13 | B | 60 | 5.22 | 6.63 | 4½-3½ | (203) |

Strongest Unclassified Lines of Co I

| | | | |
|---|---|---|---|
| 3443.203 | C | 5 | III† |
| 3177.266 | A | 6 | III |

Co II I P 17.1 Anal C List A Mar 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3621.22 | A | 100 | 2.19 | 5.60 | 3-4 | $4e^5P$-$4p^5F^o$ |
| 3578.03 | A | 30 | 2.23 | 5.68 | 2-3 | (1) |
| 3555.93 | A | 10 | 2.26 | 5.73 | 1-2 | |
| 3545.03 | A | 25 | 2.19 | 5.68 | 3-3 | |
| 3517.48 | A | 10 | 2.23 | 5.73 | 2-2 | |
| 3514.31 | A | 5 | 2.26 | 5.78 | 1-1 | |
| 3501.73 | A | 200 | 2.19 | 5.72 | 3-4 | $4s^5P$-$4p^5D^o$ |
| 3446.40 | A | 100 | 2.23 | 5.81 | 2-3 | (2) |
| 3423.65 | A | 75 | 2.26 | 5.67 | 1-2 | |
| 3415.78 | A | 75 | 2.19 | 5.81 | 3-3 | |
| *3386.18 § | A | 50 | 2.23 | 5.87 | 2-2 | |
| 3387.72 | A | 60 | 2.26 | 5.91 | 1-1 | |
| 3358.59 | A | 10 | 2.19 | 5.87 | 3-2 | |
| 3352.80 | A | 30 | 2.23 | 5.91 | 2-1 | |
| 3370.94 | A | 50 | 2.26 | 5.92 | 1-0 | |

Measures inadequate for preparation of list of stronger unclassified lines of Co II.

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ni I** I P 7.61 Anal A List B March 1942 | | | | | | |
| 3946.18 | P | | 0.16 | 3.29 | 3-3 | $a^3F-z^5D^o$ |
| 3749.045 | B | 8 | 0.00 | 3.29 | 4-3 | (1) |
| 3832.873 | B | 5 | 0.16 | 3.38 | 3-2 | |
| 3885.87 | P | | 0.27 | 3.45 | 2-1 | |
| 4093.62 | P | | 0.16 | 3.18 | 3-4 | |
| 3624.733 | B | 15 | 0.00 | 3.40 | 4-5 | $a^3F-z^5G^o$ |
| 3739.229 | B | 10 | 0.16 | 3.47 | 3-4 | (2) |
| 3792.337 | B | 5 | 0.27 | 3.53 | 2-3 | |
| 3561.751 | B | 10 | 0.00 | 3.47 | 4-4 | |
| 3669.241 | B | 12 | 0.16 | 3.53 | 3-3 | |
| 3730.751 | B | 4 | 0.27 | 3.58 | 2-2 | |
| 3498.19 | P | | 0.00 | 3.53 | 4-3 | |
| 3611.54 | P | | 0.16 | 3.58 | 3-2 | |
| 3503.595 | B | 8 | 0.00 | 3.52 | 4-5 | $a^3F-z^5F^o$ |
| 3602.281 | B | 15 | 0.16 | 3.59 | 3-4 | (3) |
| 3437.280 | B | 30R | 0.00 | 3.59 | 4-4 | |
| 3507.694 | B | 8 | 0.16 | 3.68 | 3-3 | |
| 3577.240 | B | 2 | 0.27 | 3.72 | 2-2 | |
| 3351.06 | P | | 0.00 | 3.68 | 4-3 | |
| 3467.502 | B | 12 | 0.16 | 3.72 | 3-2 | |
| *3548.185 | B | 20r | 0.27 | 3.75 | 2-1 | |
| 3670.427 | B | 20 | 0.16 | 3.53 | 3-2 | $a^3F-z^3P^o$ |
| 3664.095 | B | 20 | 0.27 | 3.64 | 2-1 | (4) |
| 3793.608 | B | 8 | 0.27 | 3.53 | 2-2 | |
| 3391.050 | B | 50R | 0.00 | 3.64 | 4-4 | $a^3F-z^3F^o$ |
| 3571.869 | B | 50R | 0.16 | 3.62 | 3-3 | (5) |
| 3519.766 | B | 20R | 0.27 | 3.78 | 2-2 | |
| 3409.578 | B | 8 | 0.00 | 3.82 | 4-3 | |
| 3413.478 | B | 25R | 0.16 | 3.78 | 3-2 | |
| 3551.534 | B | 8 | 0.16 | 3.64 | 3-4 | |
| 3688.415 | B | 15 | 0.27 | 3.82 | 2-3 | |
| 3369.573 | B | 80R | 0.00 | 3.66 | 4-3 | $a^3F-z^3D^o$ |
| 3500.852 | B | 25R | 0.16 | 3.69 | 3-2 | (8) |
| 3483.774 | B | 25R | 0.27 | 3.82 | 2-1 | |
| 3537.982 | B | 15 | 0.16 | 3.66 | 3-3 | |
| 3612.741 | B | 30R | 0.27 | 3.69 | 2-2 | |
| 3641.641 | B | 4 | 0.27 | 3.66 | 2-3 | |
| 3232.963 | B | 25R | 0.00 | 3.82 | 4-5 | $a^3F-z^3G^o$ |
| 3371.993 | B | 15r | 0.16 | 3.82 | 3-4 | (7) |
| 3380.885 | B | 15r | 0.27 | 3.92 | 2-3 | |
| 3226.984 | B | 5 | 0.00 | 3.82 | 4-4 | |
| 3282.696 | B | 6 | 0.18 | 3.92 | 3-3 | |
| 3145.121 | B | 3 | 0.00 | 3.92 | 4-3 | |
| 3221.652 | B | 10r | 0.00 | 3.83 | 4-3 | $a^3F-z^1F^o$ |
| 3366.168 | B | 20R | 0.16 | 3.83 | 3-3 | (8) |
| 3469.486 | B | 15 | 0.27 | 3.83 | 2-3 | |
| 3320.257 | B | 20R | 0.16 | 3.88 | 3-2 | $a^3F-z^1D^o$ |
| 3420.741 | B | 5 | 0.27 | 3.88 | 2-2 | (9) |
| 3249.440 | B | 8 | 0.27 | 4.07 | 2-1 | $a^3F-z^1P^o$ (10) |
| 3031.870 | B | 10r | 0.00 | 4.07 | 4-4 | $a^3F-y^3F^o$ |
| 3145.719 | B | 8 | 0.18 | 4.09 | 3-3 | (11) |
| 3164.387 | B | 8 | 0.27 | 4.15 | 2-2 | |
| 3019.143 | B | 20R | 0.00 | 4.09 | 4-3 | |
| 3097.118 | B | 15r | 0.16 | 4.15 | 3-2 | |
| 3159.521 | B | 3 | 0.16 | 4.07 | 3-4 | |
| 3235.753 | B | 4 | 0.27 | 4.09 | 2-3 | |
| 2984.131 | B | 12R | 0.00 | 4.14 | 4-3 | $a^3F-y^3D^o$ |
| 3045.006 | B | 10r | 0.16 | 4.22 | 3-2 | (12) |
| 3105.469 | B | 15r | 0.27 | 4.25 | 2-1 | |
| 3107.714 | B | 4 | 0.16 | 4.14 | 3-3 | |
| 3129.314 | B | 7 | 0.27 | 4.22 | 2-2 | |
| 3195.573 | B | 6 | 0.27 | 4.14 | 2-3 | |
| 3099.115 | B | 12r | 0.16 | 4.15 | 3-4 | $a^3F-z^1G^o$ (13) |
| *2991.095 | B | 4 | 0.27 | 4.40 | 2-3 | $a^3F-y^1F^o$ † (14) |
| 3913.979 | B | 5 | 0.03 | 3.18 | 3-4 | $a^3D-z^5D^o$ |
| 3889.671 | B | 15 | 0.21 | 3.38 | 1-2 | (15) |
| 3778.063 | B | 5 | 0.03 | 3.29 | 3-3 | |
| 3811.32 | F | (2) | 0.21 | 3.45 | 1-1 | |
| *3874.06 | P | 10 | 0.03 | 3.36 | 3-2 | |
| 3693.932 | B | 8 | 0.11 | 3.45 | 2-1 | |
| 3772.530 | B | 6 | 0.21 | 3.48 | 1-0 | |
| 3587.931 | B | 12 | 0.03 | 3.47 | 3-4 | $a^3D-z^5G^o$ |
| 3609.314 | B | 15 | 0.11 | 3.53 | 2-3 | (18) |
| 3881.951 | B | 8 | 0.21 | 3.58 | 1-2 | |
| 3523.444 | B | 10 | 0.03 | 3.53 | 3-3 | |
| 3553.483 | B | 7 | 0.11 | 3.58 | 2-2 | |
| 3481.852 | B | 125R | 0.03 | 3.59 | 3-4 | $a^3D-z^5F^o$ |
| 3452.890 | B | 40R | 0.11 | 3.68 | 2-3 | (17) |
| *3513.933§ | B | 15 | 0.21 | 3.72 | 1-2 | |
| 3374.221 | B | 15r | 0.03 | 3.68 | 3-3 | |
| 3413.939 | B | 12r | 0.11 | 3.72 | 2-2 | |
| 3485.888 | B | 10 | 0.21 | 3.75 | 1-1 | |
| 3337.014 | B | 4 | 0.03 | 3.72 | 3-2 | |
| 3387.468 | B | 3 | 0.11 | 3.75 | 2-1 | |
| 3524.541 | B | 200R | 0.03 | 3.53 | 3-2 | $a^3D-z^3P^o$ |
| 3492.956 | B | 150R | 0.11 | 3.64 | 2-1 | (18) |
| 3510.338 | B | 80R | 0.21 | 3.73 | 1-0 | |
| 3610.482 | B | 60R | 0.11 | 3.53 | 2-2 | |
| 3597.705 | B | 50R | 0.21 | 3.64 | 1-1 | |
| 3722.484 | B | 15 | 0.21 | 3.53 | 1-2 | |
| 3414.765// | B | 150R | 0.03 | 3.64 | 3-4 | $a^3D-z^3F^o$ |
| 3515.054 | B | 150R | 0.11 | 3.62 | 2-3 | (19) |
| 3458.474 | B | 125R | 0.21 | 3.78 | 1-2 | |
| 3433.556 | B | 70R | 0.03 | 3.62 | 3-3 | |
| 3361.556 | B | 30R | 0.11 | 3.78 | 2-2 | |
| 3386.948 | B | 8 | 0.03 | 3.78 | 3-2 | |
| **Ni I** continued | | | | | | |
| 3392.992 | B | 100R | 0.03 | 3.66 | 3-3 | $a^3D-z^3D^o$ |
| 3446.263 | B | 100R | 0.11 | 3.69 | 2-2 | (20) |
| 3423.711 | B | 50R | 0.21 | 3.82 | 1-1 | |
| 3367.892 | B | 8 | 0.03 | 3.69 | 3-2 | |
| 3338.714 | B | 5 | 0.11 | 3.82 | 2-1 | |
| 3472.545 | B | 70R | 0.11 | 3.66 | 2-3 | |
| *3548.185 | B | 20r | 0.21 | 3.69 | 1-2 | |
| 3248.457 | B | 8 | 0.03 | 3.82 | 3-4 | $a^3D-z^3G^o$ |
| 3234.649 | B | 10r | 0.11 | 3.92 | 2-3 | (21) |
| 3165.508 | B | 3 | 0.03 | 3.92 | 3-3 | |
| 3343.058 | B | 25R | 0.03 | 3.83 | 3-3 | $a^3D-z^1F^o$ |
| 3315.663 | B | 30R | 0.11 | 3.83 | 2-3 | (22) |
| 3200.423 | B | 5 | 0.03 | 3.88 | 3-2 | $a^3D-z^1D^o$ |
| 3271.118 | B | 10 | 0.11 | 3.88 | 2-2 | (23) |
| 3362.806 | B | 6 | 0.21 | 3.88 | 1-2 | |
| 3114.124 | B | 20R | 0.11 | 4.07 | 2-1 | $a^3D-z^1P^o$ |
| 3197.113 | B | 10r | 0.21 | 4.07 | 1-1 | (24) |
| 3050.819 | B | 100R | 0.03 | 4.07 | 3-4 | $a^3D-y^3F^o$ |
| 3101.554 | B | 100R | 0.11 | 4.09 | 2-3 | (25) |
| 3134.108 | B | 60R | 0.21 | 4.15 | 1-2 | |
| 3037.935 | B | 60R | 0.03 | 4.09 | 3-3 | |
| 3054.316 | B | 50R | 0.11 | 4.15 | 2-2 | |
| 2992.595 | B | 20R | 0.03 | 4.15 | 3-2 | |
| 3002.491 | B | 100R | 0.03 | 4.14 | 3-3 | $a^3D-y^3D^o$ † |
| 3003.629 | B | 60R | 0.11 | 4.22 | 2-2 | (26) |
| 3057.638 | B | 50R | 0.21 | 4.25 | 1-1 | |
| 2981.851 | B | 20R | 0.11 | 4.25 | 2-1 | |
| 3084.623 | B | 25R | 0.11 | 4.14 | 2-3 | |
| 3080.755 | B | 20R | 0.21 | 4.22 | 1-2 | |
| 2994.460 | B | 25R | 0.03 | 4.15 | 3-4 | $a^3D-z^1G^o$ (27) |
| 4298.767 | B | (2) | 0.42 | 3.29 | 2-3 | $a^1D-z^5D^o$ |
| 4164.636 | D | 1 | 0.42 | 3.38 | 2-2 | (28) |
| 4074.897 | B | 2 | 0.42 | 3.45 | 2-1 | |
| 3972.171 | B | 10 | 0.42 | 3.53 | 2-3 | $a^1D-z^5G^o$ |
| 3904.84 | P | | 0.42 | 3.58 | 2-2 | (29) |
| 3783.530 | B | 30r | 0.42 | 3.68 | 2-3 | $a^1D-z^5F^o$ |
| 3736.813 | B | 15 | 0.42 | 3.72 | 2-2 | (30) |
| 3705.12 | P | | 0.42 | 3.75 | 2-1 | |
| 3973.562 | B | 25 | 0.42 | 3.53 | 2-2 | $a^1D-z^3P^o$ |
| 3831.690 | B | 20 | 0.42 | 3.64 | 2-1 | (31) |
| 3858.301 | B | 40r | 0.42 | 3.62 | 2-3 | $a^1D-z^3F^o$ |
| *3874.15 | P | 15 | 0.42 | 3.78 | 2-2 | (32) |
| 3807.144 | B | 35r | 0.42 | 3.86 | 2-3 | $a^1D-z^3D^o$ |
| 3775.572 | B | 30r | 0.42 | 3.69 | 2-2 | (33) |
| 3634.941 | B | 12 | 0.42 | 3.82 | 2-1 | |
| 3523.074 | B | 4 | 0.42 | 3.92 | 2-3 | $a^1D-z^3G^o$ (34) |
| 3619.392 | B | 150R | 0.42 | 3.83 | 2-3 | $a^1D-z^1F^o$ (35) |
| 3566.372 | B | 100R | 0.42 | 3.88 | 2-2 | $a^1D-z^1D^o$ (36) |
| 3380.574 | B | 80R | 0.42 | 4.07 | 2-1 | $a^1D-z^1P^o$ (37) |
| 3365.788 | B | 15r | 0.42 | 4.09 | 2-3 | $a^1D-y^3F^o$ |
| 3310.202 | B | 5 | 0.42 | 4.15 | 2-2 | (38) |
| 3322.310 | B | 15r | 0.42 | 4.14 | 2-3 | $a^1D-y^3D^o$ |
| 3250.743 | B | 9 | 0.42 | 4.22 | 2-2 | (39) |
| 3225.020 | B | 10r | 0.42 | 4.25 | 2-1 | |
| 3101.879 | B | 40R | 0.42 | 4.40 | 2-3 | $a^1D-y^1F^o$ (40) |
| 3012.004 | B | 75R | 0.42 | 4.52 | 2-2 | $a^1D-y^1D^o$ (41) |
| 6126.990 | B | (3) | 1.87 | 3.68 | 2-3 | $b^1D-z^5F^o$ |
| 6007.313 | D | 3 | 1.67 | 3.72 | 2-2 | (42) |
| 5925.81 | P | | 1.67 | 3.75 | 2-1 | |
| 6643.641 | C | 20 | 1.67 | 3.53 | 2-2 | $b^1D-z^3P^o$ |
| 6256.365 | C | 15 | 1.67 | 3.64 | 2-1 | (43) |
| 6327.603 | B | 5 | 1.67 | 3.62 | 2-3 | $b^1D-z^3F^o$ |
| 5647.010 | B | (3) | 1.87 | 3.78 | 2-2 | (44) |
| 6191.166 | B | 12 | 1.87 | 3.86 | 2-3 | $b^1D-z^3D^o$ |
| 6106.121 | C | 6 | 1.67 | 3.89 | 2-2 | (45) |
| 5748.343 | B | 2 | 1.67 | 3.62 | 2-1 | |
| 5709.559 | B | 12 | 1.67 | 3.83 | 2-3 | $b^1D-z^1F^o$ (46) |
| 5576.734 | B | 5 | 1.87 | 3.88 | 2-2 | $b^1D-z^1D^o$ (47) |
| 5137.075 | B | 8 | 1.67 | 4.07 | 2-1 | $b^1D-z^1P^o$ (48) |
| 5102.971 | B | (4) | 1.67 | 4.09 | 2-3 | $b^1D-y^3F^o$ |
| 4976.345 | B | (2) | 1.67 | 4.15 | 2-2 | (49) |
| 5003.751 | B | (2) | 1.87 | 4.14 | 2-3 | $b^1D-y^3D^o$ |
| 4843.165 | B | (2) | 1.87 | 4.22 | 2-2 | (50) |
| 4766.293 | B | (2) | 1.87 | 4.25 | 2-1 | |
| 4519.988 | B | 4 | 1.87 | 4.40 | 2-3 | $b^1D-y^1F^o$ (51) |
| 4331.845 | B | 12 | 1.87 | 4.52 | 2-2 | $b^1D-y^1D^o$ (52) |
| 3435.489 | B | 2 | 1.87 | 5.38 | 2-3 | $b^1D-x^3D^o$ (53) |
| 3338.758 | B | 3 | 1.87 | 5.37 | 2-1 | $b^1D-y^1P^o$ (54) |
| **Ni I** continued | | | | | | |
| 3387.221 | B | 2 | 1.67 | 5.42 | 2-2 | $b^1D-x^1D^o$ (55) |
| *3039.297 | B | 3 | 1.67 | 5.74 | 2-2 | $b^1D-x^3P^o$ (56) |
| 8767.778 | C | 20 | 1.82 | 3.64 | 0-1 | $a^1S-z^3P^o$ (57) |
| 6177.258 | B | (3) | 1.82 | 3.82 | 0-1 | $a^1S-z^3D^o$ (58) |
| 5476.906 | B | 50 | 1.82 | 4.07 | 0-1 | $a^1S-z^1P^o$ (59) |
| 5079.961 | B | (3) | 1.82 | 4.25 | 0-1 | $a^1S-y^3D^o$ (60) |
| 7028.95 | P | | 1.93 | 3.68 | 2-3 | $a^3P-z^5F^o$ |
| 6928.52 | P | | 1.94 | 3.72 | 1-2 | (61) |
| 7714.27 | G | 3 | 1.93 | 3.53 | 2-2 | $a^3P-z^3P^o$ |
| 7261.94 | G | 3 | 1.94 | 3.64 | 1-1 | (62) |
| 7197.07 | G | 5 | 1.93 | 3.64 | 2-1 | |
| 6914.562 | D | 50 | 1.94 | 3.73 | 1-0 | |
| 7788.95 | G | 2 | 1.94 | 3.53 | 1-2 | |
| 7414.51 | G | 2 | 1.98 | 3.64 | 0-1 | |
| 7291.48 | B | (8) | 1.93 | 3.62 | 2-3 | $a^3P-z^3F^o$ (63) |
| 7110.91 | B | (6) | 1.93 | 3.66 | 2-3 | $a^3P-z^3D^o$ |
| 7062.97 | B | (4) | 1.94 | 3.69 | 1-2 | (64) |
| 7001.57 | B | (4) | 1.93 | 3.69 | 2-2 | |
| 6586.328 | B | 6 | 1.94 | 3.82 | 1-1 | |
| 6532.891 | B | (3) | 1.93 | 3.82 | 2-1 | |
| *6180.093 | B | (1n) | 1.93 | 3.92 | 2-3 | $a^3P-z^3G^o$ (65) |
| 6482.811 | B | 5 | 1.93 | 3.83 | 2-3 | $a^3P-z^1F^o$ (66) |
| 6314.666 | C | 15 | 1.93 | 3.88 | 2-2 | $a^3P-z^1D^o$ |
| 6384.597 | D | (1) | 1.94 | 3.88 | 1-2 | (67) |
| 5754.675 | B | 10 | 1.93 | 4.07 | 2-1 | $a^3P-z^1P^o$ |
| 5796.078 | B | (2)Fe? | 1.94 | 4.07 | 1-1 | (68) |
| 5893.878 | C | 12 | 1.98 | 4.07 | 0-1 | |
| 5711.905 | B | 5 | 1.93 | 4.09 | 2-3 | $a^3P-y^3F^o$ |
| 5592.283 | B | 8 | 1.94 | 4.15 | 1-2 | (69) |
| 5553.693 | B | 2 | 1.93 | 4.15 | 2-2 | |
| 5587.865 | B | 5 | 1.93 | 4.14 | 2-3 | $a^3P-y^3D^o$ |
| 5424.654 | B | 4 | 1.94 | 4.22 | 1-2 | (70) |
| 5435.671 | B | 5 | 1.98 | 4.25 | 0-1 | |
| 5388.350 | B | (2) | 1.93 | 4.22 | 2-2 | |
| 5353.415 | B | 3 | 1.94 | 4.25 | 1-1 | |
| 4762.627 | B | 3 | 1.93 | 4.52 | 2-2 | $a^3P-y^1D^o$ |
| 4791.00 | E | (1) | 1.94 | 4.52 | 1-2 | (71) |
| 4019.055 | D | (3) | 1.93 | 5.00 | 2-2 | $a^3P-2^o$ (72) |
| 3564.67 | P | | 1.93 | 5.39 | 2-3 | $a^3P-x^3F^o$ (73) |
| 3896.65 | P | | 1.93 | 5.27 | 2-2 | $a^3P-y^3P^o$ |
| 3713.338 | D | (2) | 1.94 | 5.27 | 1-1 | (74) |
| 3698.29 | P | | 1.93 | 5.27 | 2-1 | |
| 3713.698 | D | 1 | 1.94 | 5.27 | 1-2 | |
| 3843.387 | B | 2 | 1.98 | 5.37 | 0-1 | $a^3P-y^1P^o$ (75) |
| 3539.625 | D | (1) | 1.93 | 5.42 | 2-2 | $a^3P-x^1D^o$ |
| 3545.16 | E | (1) | 1.94 | 5.42 | 1-2 | (78) |
| 3176.392 | B | 2 | 1.94 | 5.83 | 1-1? | $a^3P-x^3P^o$ (77) |
| 3161.740 | B | 5 | 1.93 | 5.81 | 2-3 | $a^3P-y^3D^o$ |
| 3183.351 | B | 4 | 1.94 | 5.82 | 1-2 | (78) |
| 3163.038 | B | 3 | 1.98 | 5.85 | 0-1 | |
| 3170.715 | B | 2 | 1.93 | 5.82 | 2-2 | |
| 3154.565 | B | 2 | 1.94 | 5.85 | 1-1 | |
| 3164.166 | B | 2 | 1.94 | 5.84 | 1-2 | $a^3P-4^o$ (79) |
| *2991.095 | B | 4 | 1.93 | 6.05 | 2-3 | $a^3P-8^o$ (80) |
| 11196.70 | P | | 2.73 | 3.83 | 4-3 | $a^1G-z^1F^o$ (81) |
| 8770.68 | A | 10 | 2.73 | 4.14 | 4-3 | $a^1G-y^3D^o$ (82) |
| 8702.49 | A | 6 | 2.73 | 4.15 | 4-4 | $a^1G-z^1G^o$ (83) |
| 7365.24 | B | 1 | 2.73 | 4.40 | 4-3 | $a^1G-y^1F^o$ (84) |
| 4837.65 | P | | 2.73 | 5.28 | 4-3 | $a^1G-w^3D^o$ (85) |
| 4401.547 | B | 30 | 3.18 | 5.96 | 4-5 | $z^5D^o-e^5F$ |
| 4459.037 | B | 20 | 3.29 | 6.06 | 3-4 | (86) |
| 4470.483 | B | 15 | 3.38 | 6.15 | 2-3 | |
| 4462.460 | B | 10 | 3.45 | 8.32 | 1-2 | |
| 4436.981 | B | 5 | 3.48 | 6.36 | 0-1 | |
| 4384.683 | B | 8 | 3.18 | 6.06 | 4-4 | |
| 4335.607 | B | 8 | 3.29 | 6.15 | 3-3 | |
| 4359.585 | B | 10 | 3.38 | 6.22 | 2-2 | |
| 4384.543 | B | 5 | 3.45 | 6.36 | 1-1 | |
| 4161.34 | P | | 3.18 | 6.15 | 4-3 | |
| 4231.696 | B | (2) | 3.29 | 6.22 | 3-2 | |
| 4285.19 | P | | 3.38 | 6.36 | 2-1 | |
| 4389.870 | B | 3 | 3.45 | 6.36 | 1-1 | $z^5D^o-f^3D$ |
| 4574.03 | E | (1) | 3.38 | 6.08 | 2-3 | (87) |
| 4442.441 | B | (4) | 3.48 | 6.36 | 0-1 | |
| 4414.20 | P | | 3.29 | 6.09 | 3-3 | $z^5D^o-e^3F$ |
| 4410.516 | B | 4 | 3.29 | 6.09 | 3-4 | (88) |
| 4585.13 | P | | 3.38 | 6.09 | 2-3 | |
| 4387.36 | P | (1) | 3.45 | 6.38 | 1-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **I I** continued | | | | | | |
| 057.347 | B | (2) | 3.29 | 6.33 | 3-3 | $z^5D^o-f^3F$ |
| 300.464 | B | 5 | 3.29 | 6.33 | 3-4 | (89) |
| 184.475 | B | (4) | 3.38 | 6.33 | 2-3 | |
| 148.75 | P | | 3.45 | 6.42 | 1-2 | |
| 337.392 | B | 4 | 3.29 | 7.00 | 3-2 | $z^5D^o-f^3P$ |
| 293.674 | D | (1) | 3.38 | 7.13 | 2-1 | (90) |
| 377.23 | E | (1) | 3.45 | 7.22 | 1-0 | |
| 412.47 | P | | 3.28 | 7.00 | 2-2 | |
| 317.830 | B | 8 | 3.18 | 7.01 | 4-3 | $z^5D^o-e^5P$ |
| 233.174 | B | 4 | 3.29 | 7.11 | 3-2 | (91) |
| 313.423 | B | 5n | 3.38 | 7.22 | 2-1 | |
| 268.971 | B | 2n | 3.45 | 7.22 | 1-1 | |
| 298.02 | P | | 3.48 | 7.22 | 0-1 | |
| 233.534 | B | 3 | 3.18 | 7.01 | 4-4 | $z^5D^o-i^3F$ |
| 193.75 | P | | 3.29 | 7.16 | 3-3 | (92) |
| 321.242 | B | 2 | 3.29 | 7.01 | 3-4 | |
| 214.059 | B | 7 | 3.18 | 7.02 | 4-4 | $z^5D^o-e^5D$ † |
| 216.821 | B | 5 | 3.29 | 7.13 | 3-3 | (93) |
| 302.142 | B | 5 | 3.18 | 7.03 | 4-5 | $z^5D^o-f^5F$ |
| 209.912 | B | 5 | 3.29 | 7.14 | 3-4 | (94) |
| 206.952 | B | 4n | 3.38 | 7.23 | 2-3 | |
| 219.811 | B | 3 | 3.45 | 7.28 | 1-2 | |
| 223.534 | B | 3 | 3.48 | 7.31 | 0-1 | |
| 118.56 | P | | 3.18 | 7.14 | 4-4 | |
| 118.714 | B | 2 | 3.18 | 7.14 | 4-5 | $z^5D^o-e^5G$ (95) |
| 284.432 | D | 4 | 3.29 | 7.05 | 3-3 | $z^5D^o-i^3D$ |
| 367.29 | P | | 3.38 | 7.05 | 2-3 | (96) |
| 878.71 | B | 2 | 3.47 | 5.26 | 4-3 | $z^5G^o-e^3D$ |
| 034.42 | B | 1 | 3.53 | 5.28 | 3-2 | (97) |
| 621.24 | G | (1) | 3.58 | 5.45 | 2-1 | |
| 128.71 | B | (2) | 3.53 | 5.26 | 3-3 | |
| 256.72 | G | (1) | 3.58 | 5.28 | 2-2 | |
| 714.421 | B | 25 | 3.37 | 5.98 | 6-5 | $z^5G^o-e^5F$ |
| 648.659 | B | 15 | 3.40 | 6.08 | 5-4 | (98) |
| 604.994 | B | 12 | 3.47 | 6.15 | 4-3 | |
| 592.529 | B | 10 | 3.53 | 6.22 | 3-2 | |
| 600.372 | B | 6 | 3.58 | 6.26 | 2-1 | |
| 786.541 | B | 15 | 3.40 | 5.98 | 5-5 | |
| 756.519 | B | 10 | 3.47 | 6.08 | 4-4 | |
| 715.778 | B | 8 | 3.53 | 6.15 | 3-3 | |
| 686.218 | B | 5 | 3.58 | 6.22 | 2-2 | |
| 900.97 | E | (1) | 3.47 | 5.98 | 4-5 | |
| 874.809 | B | (2) | 3.53 | 6.06 | 3-4 | |
| 814.617 | B | (2) | 3.58 | 8.15 | 2-3 | |
| 565.45 | P | | 3.37 | 6.07 | 6-5 | $z^5G^o-e^3G$ |
| 736.50 | E | (1) | 3.47 | 6.07 | 4-4 | (99) |
| 523.74 | P | | 3.53 | 8.26 | 3-3 | |
| 740.165 | B | (2) | 3.47 | 6.07 | 4-5 | |
| 853.74 | E | (1) | 3.53 | 6.07 | 3-4 | |
| 614.58 | E | (1) | 3.58 | 8.28 | 2-3 | |
| 606.231 | B | 3 | 3.58 | 6.26 | 2-1 | $z^5G^o-f^3D$ |
| 831.15 | P | N1 | 3.53 | 8.08 | 3-3 | (100) |
| 931.18 | P | | 3.58 | 8.09 | 2-2 | |
| 595.951 | B | (4n) | 3.40 | 6.09 | 5-4 | $z^5G^o-e^3F$ |
| 705.50 | B | (1) | 3.47 | 6.09 | 4-3 | (101) |
| 701.338 | B | (2) | 3.47 | 8.09 | 4-4 | |
| 368.312 | B | 2 | 3.40 | 6.23 | 5-4 | $z^5G^o-f^3F$ |
| 302.12 | P | | 3.47 | 6.33 | 4-3 | (102) |
| 463.427 | B | (3) | 3.47 | 6.23 | 4-4 | |
| 398.825 | B | 3 | 3.53 | 8.33 | 3-3 | |
| 587.415 | D | (1) | 3.53 | 8.23 | 3-4 | |
| 484.54 | E | (1) | 3.58 | 6.33 | 2-3 | |
| 517.81 | E | (1) | 3.53 | 8.26 | 3-4 | $z^5G^o-e^1G$ (103) |
| 442.044 | B | 5 | 3.40 | 8.99 | 5-8 | $z^5G^o-e^3H$ |
| 378.331 | B | 4 | 3.47 | 7.12 | 4-5 | (104) |
| 339.050 | B | 4n | 3.53 | 7.22 | 3-4 | |
| 309.32 | P | | 3.40 | 7.13 | 5-4 | $z^5G^o-g^3G$ |
| 421.22 | P | | 3.40 | 7.01 | 5-5 | (105) |
| 363.813 | B | 4 | 3.47 | 7.13 | 4-4 | |
| 479.264 | B | 3 | 3.47 | 7.01 | 4-5 | |
| 422.332 | B | 4 | 3.53 | 7.13 | 3-4 | |
| 374.642 | B | 15 | 3.37 | 7.02 | 6-7 | $z^5G^o-e^5H$ |
| 312.330 | B | 10 | 3.40 | 7.13 | 5-8 | (108) |
| 283.827 | B | 5 | 3.47 | 7.22 | 4-5 | |
| 281.880 | B | 5 | 3.53 | 7.29 | 3-4 | |
| 312.992 | B | 4 | 3.58 | 7.31 | 2-3 | |
| 231.09 | P | | 3.40 | 7.22 | 5-5 | |
| 364.591 | B | 5 | 3.37 | 7.03 | 6-5 | $z^5G^o-f^5F$ |
| 307.013 | B | 2 | 3.40 | 7.14 | 5-4 | (107) |
| 275.60 | P | | 3.47 | 7.23 | 4-3 | |
| 288.98 | P | N1 | 3.53 | 7.28 | 3-2 | |
| 308.91 | P | | 3.58 | 7.31 | 2-1 | |
| 401.186 | B | 8 | 3.40 | 7.03 | 5-5 | |
| 381.241 | B | 5 | 3.47 | 7.14 | 4-4 | |
| 331.28 | P | | 3.53 | 7.23 | 3-3 | |
| 388.807 | B | 10 | 3.37 | 7.03 | 6-8 | $z^5G^o-e^5G$ |
| 304.950 | B | 8 | 3.40 | 7.14 | 5-5 | (108) |
| 245.370 | B | 4n | 3.47 | 7.27 | 4-4 | |
| 328.870 | B | 4 | 3.53 | 7.24 | 3-3 | |
| 320.779 | B | 8 | 3.58 | 7.30 | 2-2 | |
| 194.78 | P | | 3.40 | 7.27 | 5-4 | |
| 271.17 | P | N1 | 3.47 | 7.24 | 4-3 | |
| 373.50 | E | (1) | 3.53 | 7.30 | 3-2 | |
| 403.432 | B | 8 | 3.40 | 7.03 | 5-8 | |
| 359.108 | B | 8 | 3.47 | 7.14 | 4-5 | |
| 375.561 | B | 2n | 3.58 | 7.24 | 2-3 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ni I** continued | | | | | | |
| 7393.63 | B | 10 | 3.59 | 5.26 | 4-3 | $z^5F^o-e^3D$ |
| 7715.63 | B | (7) | 3.68 | 5.28 | 3-2 | (109) |
| 7167.01 | B | (4) | 3.73 | 5.45 | 2-1 | |
| 7828.81 | B | (4) | 3.68 | 5.26 | 3-3 | |
| 7917.48 | B | (7) | 3.73 | 5.28 | 2-2 | |
| 7286.56 | B | (2) | 3.75 | 5.45 | 1-1 | |
| 8034.56 | B | (1) | 3.73 | 5.26 | 2-3 | |
| 6928.25 | B | (2) | 3.68 | 5.46 | 3-2 | $z^5F^o-e^1D$ (110) |
| 5017.591 | B | 10 | 3.52 | 5.98 | 5-5 | $z^5F^o-e^5F$ |
| 4998.233 | B | 2 | 3.59 | 6.06 | 4-4 | (111) |
| 5012.464 | B | 2 | 3.68 | 6.15 | 3-3 | |
| 4953.204 | B | 3 | 3.72 | 6.22 | 2-2 | |
| 4912.030 | B | 2 | 3.75 | 6.26 | 1-1 | |
| 4866.267 | B | 10 | 3.52 | 6.06 | 5-4 | |
| 4831.183 | B | 10 | 3.59 | 6.15 | 4-3 | |
| 4873.437 | B | 4 | 3.68 | 6.22 | 3-2 | |
| 4857.392 | B | 2 | 3.72 | 8.26 | 2-1 | |
| 5157.993 | B | (2) | 3.59 | 5.98 | 4-5 | |
| 5192.524 | B | 2 | 3.68 | 6.06 | 3-4 | |
| 5096.874 | B | 2 | 3.72 | 6.15 | 2-3 | |
| 5010.045 | B | (2) | 3.75 | 6.22 | 1-2 | |
| 4849.12 | P | | 3.52 | 6.07 | 5-5 | $z^5F^o-e^3G$ |
| 4978.155 | B | (1n) | 3.59 | 6.07 | 4-4 | (112) |
| 4980.161 | B | 12 | 3.59 | 6.07 | 4-5 | |
| 5168.680 | B | 6 | 3.88 | 6.07 | 3-4 | |
| 4873.27 | P | | 3.72 | 6.26 | 2-3 | |
| 4953.334 | D | (1n) | 3.59 | 6.08 | 4-3 | $z^5F^o-f^3D$ |
| 5128.03 | E | (1) | 3.68 | 6.09 | 3-2 | (113) |
| 4863.931 | B | (2n) | 3.72 | 6.26 | 2-1 | |
| m5142.98 | P | N1 | 3.68 | 6.08 | 3-3 | |
| 5216.512 | D | 2 | 3.72 | 6.09 | 2-2 | |
| 4918.712 | B | (2) | 3.75 | 6.26 | 1-1 | |
| 4808.52 | E | (1) | 3.52 | 6.09 | 5-4 | $z^5F^o-e^3F$ |
| 4941.920 | B | (2) | 3.59 | 8.09 | 4-3 | (114) |
| 4760.23 | P | | 3.68 | 6.28 | 3-2 | |
| 4937.337 | B | 4 | 3.59 | 6.09 | 4-4 | |
| 5131.770 | D | 3 | 3.88 | 6.09 | 3-3 | |
| 4836.27 | E | (1) | 3.72 | 6.28 | 2-2 | |
| 5220.307 | B | 2 | 3.72 | 6.09 | 2-3 | |
| 4890.45 | P | | 3.75 | 6.28 | 1-2 | |
| 4559.945 | B | (3) | 3.52 | 8.23 | 5-4 | $z^5F^o-f^3F$ |
| 4501.892 | D | (1) | 3.68 | 6.42 | 3-2 | (115) |
| 4675.839 | B | (2) | 3.59 | 6.23 | 4-4 | |
| 4655.681 | B | (2) | 3.68 | 6.33 | 3-3 | |
| 4845.17 | E | (1) | 3.68 | 6.23 | 3-4 | |
| 4728.42 | E | (1) | 3.72 | 6.33 | 2-3 | |
| 4617.94 | E | (1) | 3.75 | 6.42 | 1-2 | |
| 4325.361 | B | 2 | 3.59 | 6.44 | 4-3 | $z^5F^o-g^3D$ |
| 4521.934 | D | (1) | 3.72 | 6.45 | 2-2 | (116) |
| 3908.931 | B | 8n | 3.59 | 6.75 | 4-5 | $z^5F^o-f^3G$ |
| 4025.44 | D | (1N) | 3.68 | 6.75 | 3-4 | (117) |
| 3559.930 | B | 2 | 3.52 | 6.99 | 5-6 | $z^5F^o-e^3H$ |
| 3496.350 | B | 5 | 3.59 | 7.12 | 4-5 | (118) |
| 3485.110 | B | 2n | 3.88 | 7.22 | 3-4 | |
| 3396.50 | P | | 3.59 | 7.22 | 4-4 | |
| 3543.00 | E | (1) | 3.52 | 7.01 | 5-4 | $z^5F^o-i^3F$ |
| 3611.418 | D | (1) | 3.59 | 7.01 | 4-4 | (119) |
| 3537.834 | D | (1) | 3.52 | 7.01 | 5-5 | $z^5F^o-g^3G$ |
| 3482.73 | E | (1) | 3.59 | 7.13 | 4-4 | (120) |
| 3483.82 | P | | 3.68 | 7.23 | 3-3 | |
| *3606.852 | B | 4 | 3.59 | 7.01 | 4-5 | |
| 3575.952 | B | 2 | 3.68 | 7.13 | 3-4 | |
| 3530.595 | B | 4 | 3.52 | 7.02 | 5-4 | $z^5F^o-e^5D$ |
| 3488.293 | B | 2 | 3.59 | 7.13 | 4-3 | (121) |
| 3599.530 | D | (1) | 3.59 | 7.02 | 4-4 | |
| m3624.72 | P | N1 | 3.72 | 7.13 | 2-3 | |
| 3421.342 | B | 7 | 3.52 | 7.13 | 5-6 | $z^5F^o-e^5H$ |
| 3398.184 | B | 8 | 3.59 | 7.22 | 4-5 | (122) |
| 3422.878 | B | 4 | 3.68 | 7.29 | 3-4 | |
| 3444.251 | B | 5 | 3.72 | 7.31 | 2-3 | |
| 3337.36 | P | | 3.59 | 7.29 | 4-4 | |
| 3405.50 | P | | 3.88 | 7.31 | 3-3 | |
| 3516.234 | B | 8 | 3.52 | 7.03 | 5-5 | $z^5F^o-f^5F$ |
| *3480.183 | B | 4 | 3.59 | 7.14 | 4-4 | (123) |
| 3476.63 | B | 2n | 3.68 | 7.23 | 3-3 | |
| 3467.732 | B | 4 | 3.72 | 7.28 | 2-2 | |
| 3467.12 | E | (1) | 3.75 | 7.31 | 1-1 | |
| 3415.87 | P | | 3.52 | 7.14 | 5-4 | |
| 3428.42 | P | | 3.68 | 7.28 | 3-2 | |
| 3573.27 | P | | 3.68 | 7.14 | 3-4 | |
| 3517.03 | P | | 3.72 | 7.23 | 2-3 | |
| 3518.834 | B | 8 | 3.52 | 7.03 | 5-6 | $z^5F^o-e^5G$ |
| 3477.884 | B | 2 | 3.59 | 7.14 | 4-5 | (124) |
| 3442.559 | B | 4n | 3.68 | 7.27 | 3-4 | |
| 3511.94 | E | (1) | 3.72 | 7.24 | 2-3 | |
| *3480.183 | B | 4 | 3.75 | 7.30 | 1-2 | |
| m3413.46 | P | N1 | 3.52 | 7.14 | 5-5 | |
| 3471.63 | P | | 3.68 | 7.24 | 3-3 | |
| 3191.875 | B | 2 | 3.52 | 7.39 | 5-5 | $z^5F^o-g^5F$ (125) |
| 7122.24 | B | 100 | 3.53 | 5.26 | 2-3 | $z^3P^o-e^3D$ |
| 7523.78 | B | 3 | 3.64 | 5.28 | 1-2 | (126) |
| 7183.00 | B | 8 | 3.73 | 5.45 | 0-1 | |
| 7030.08 | B | 3 | 3.53 | 5.28 | 2-2 | |
| 8843.07 | B | 8 | 3.84 | 5.45 | 1-1 | |
| 6432.08 | G | (1) | 3.53 | 5.45 | 2-1 | |
| 8370.383 | B | (4) | 3.53 | 5.46 | 2-2 | $z^3P^o-e^1D$ |
| 8773.38 | B | 5 | 3.84 | 5.46 | 1-2 | (127) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ni I** continued | | | | | | |
| 4713.84 | P | | 3.53 | 6.15 | 2-3 | $z^3P^o-e^5F$ |
| 4795.84 | E | (1) | 3.64 | 6.22 | 1-2 | (128) |
| 4864.282 | B | (2n) | 3.73 | 6.26 | 0-1 | |
| 4705.93 | E | (1) | 3.64 | 6.26 | 1-1 | |
| 4904.413 | B | 10 | 3.53 | 6.04 | 2-1 | $z^3P^o-e^3S$ |
| 5139.255 | B | 3 | 3.64 | 6.04 | 1-1 | (129) |
| 5328.70 | P | | 3.73 | 6.04 | 0-1 | |
| 4855.414 | B | 15 | 3.53 | 6.07 | 2-2 | $z^3P^o-e^3P$ |
| 5082.354 | B | (4) | 3.64 | 6.07 | 1-1 | (130) |
| 4852.560 | B | (2n) | 3.53 | 6.07 | 2-1 | |
| 4811.999 | B | (2) | 3.64 | 8.21 | 1-0 | |
| 5085.479 | B | (2) | 3.64 | 6.07 | 1-2 | |
| 4829.038 | B | 15 | 3.53 | 6.08 | 2-3 | $z^3P^o-f^3D$ |
| 5042.195 | B | 4 | 3.64 | 6.09 | 1-2 | (131) |
| 4870.845 | B | 2 | 3.73 | 6.26 | 0-1 | |
| 4815.93 | E | (1) | 3.53 | 6.09 | 2-2 | |
| 4712.069 | B | (2) | 3.64 | 6.26 | 1-1 | |
| 4513.90 | P | | 3.53 | 6.26 | 2-1 | |
| 4752.428 | B | 4 | 3.64 | 6.24 | 1-1 | $z^3P^o-e^1P$ |
| 4913.970 | B | 3 | 3.73 | 6.24 | 0-1 | (132) |
| 4506.302 | D | (1) | 3.53 | 6.27 | 2-2 | $z^3P^o-f^1D$ |
| 4703.808 | B | 4 | 3.64 | 6.27 | 1-2 | (133) |
| *4490.541 | B | (3) | 3.53 | 6.28 | 2-3 | $z^3P^o-e^1F$ (134) |
| 4553.175 | B | (3) | 3.64 | 6.35 | 1-0 | $z^3P^o-e^1S$ (135) |
| 4231.040 | B | 5 | 3.53 | 6.44 | 2-3 | $z^3P^o-g^3D$ |
| 4390.322 | B | (2n) | 3.64 | 6.45 | 1-2 | (136) |
| 4252.107 | B | (2) | 3.73 | 6.63 | 0-1 | |
| 3844.276 | B | (3N) | 3.53 | 6.74 | 2-1 | $z^3P^o-f^3S$ |
| 3987.090 | D | (2) | 3.64 | 6.74 | 1-1 | (137) |
| 3701.63 | P | | 3.53 | 6.86 | 2-3 | $z^3P^o-f^1F$ (138) |
| 7617.00 | B | 5 | 3.64 | 5.26 | 4-3 | $z^3F^o-e^3D$ |
| 7433.30 | B | 15 | 3.62 | 5.28 | 3-2 | (139) |
| 7409.39 | B | 8 | 3.78 | 5.45 | 2-1 | |
| 7525.14 | B | 2 | 3.62 | 5.26 | 3-3 | |
| 6890.80 | B | (2) | 3.62 | 5.46 | 3-2 | $z^3F^o-e^1D$ |
| 7327.87 | B | (4) | 3.78 | 5.48 | 2-2 | (140) |
| 5265.748 | B | (2) | 3.64 | 5.98 | 4-5 | $z^3F^o-e^5F$ |
| 5058.03 | B | (2) | 3.62 | 6.06 | 3-4 | (141) |
| 5099.322 | B | 5 | 3.64 | 6.06 | 4-4 | |
| 4886.992 | B | (3) | 3.62 | 6.15 | 3-3 | |
| 5067.82 | E | (1) | 3.78 | 6.22 | 2-2 | |
| 4935.578 | B | 2 | 3.64 | 6.15 | 4-3 | |
| 4754.768 | B | 3 | 3.62 | 6.22 | 3-2 | |
| 4967.551 | D | (1) | 3.78 | 6.26 | 2-1 | |
| 5039.259 | B | (2r) | 3.62 | 6.07 | 3-2 | $z^3F^o-e^3P$ (142) |
| 5080.523 | B | 30 | 3.64 | 6.07 | 4-5 | $z^3F^o-e^3G$ |
| 5035.374 | B | 12 | 3.62 | 6.07 | 3-4 | (143) |
| 4984.126 | B | 10 | 3.78 | 6.26 | 2-3 | |
| 5076.321 | B | (2) | 3.64 | 6.07 | 4-4 | |
| 4681.05 | P | | 3.62 | 6.26 | 3-3 | |
| 5051.527 | B | (2N) | 3.64 | 6.08 | 4-3 | $z^3F^o-f^3D$ |
| 4996.850 | B | (2n) | 3.62 | 6.09 | 3-2 | (144) |
| 5010.961 | B | (3n) | 3.62 | 6.08 | 3-3 | |
| 5035.961 | B | (3N) | 3.64 | 6.09 | 4-4 | $z^3F^o-e^3F$ |
| 5000.335 | B | 4 | 3.62 | 6.09 | 3-3 | (145) |
| 4945.458 | B | 2 | 3.78 | 6.28 | 2-2 | |
| 4646.94 | P | | 3.62 | 6.28 | 3-2 | |
| 4995.65 | P | | 3.62 | 6.09 | 3-4 | |
| 5347.71 | P | | 3.78 | 6.09 | 2-3 | |
| 4763.950 | B | 4 | 3.64 | 6.23 | 4-4 | $z^3F^o-f^3F$ |
| 4547.334 | B | 3 | 3.62 | 6.33 | 3-3 | (146) |
| 4688.994 | B | 2 | 3.78 | 6.42 | 2-2 | |
| 4580.619 | B | (3) | 3.64 | 6.33 | 4-3 | |
| 4400.26 | E | (1) | 3.62 | 6.42 | 3-2 | |
| 4727.851 | B | (2) | 3.62 | 6.23 | 3-4 | |
| 4832.704 | B | 2 | 3.78 | 6.33 | 2-3 | |
| 4664.32 | P | | 3.62 | 6.27 | 3-2 | $z^3F^o-f^1D$ |
| 4965.14 | E | (1) | 3.78 | 6.27 | 2-2 | (147) |
| 4647.42 | P | (1) | 3.62 | 6.28 | 3-3 | $z^3F^o-e^1F$ |
| 4946.037 | B | (3) | 3.78 | 6.28 | 2-3 | (148) |
| 4400.870 | B | 3 | 3.64 | 6.44 | 4-3 | $z^3F^o-g^3D$ |
| 4355.911 | B | 3 | 3.62 | 6.45 | 3-2 | (149) |
| 4330.720 | B | 2 | 3.78 | 6.63 | 2-1 | |
| 4370.041 | B | (3) | 3.62 | 6.44 | 3-3 | |
| 4038.27 | P | | 3.64 | 6.70 | 4-4 | $z^3F^o-g^3F$ |
| 4009.984 | B | (3) | 3.62 | 6.76 | 3-3 | (150) |
| 3958.60 | P | | 3.78 | 6.90 | 2-2 | |
| 4035.98 | P | | 3.64 | 6.70 | 4-3 | |
| 4230.39 | P | | 3.78 | 6.70 | 2-3 | |
| 3970.503 | B | 10n | 3.64 | 6.75 | 4-5 | $z^3F^o-f^3G$ |
| 3944.128 | B | 12n | 3.62 | 6.75 | 3-4 | (151) |
| 3912.310 | B | 8n | 3.78 | 6.93 | 2-3 | |
| 3511.813 | D | 2 | 3.62 | 7.13 | 3-4? | $z^3F^o-g^3G$ (152) |
| 3651.67 | P | | 3.64 | 7.02 | 4-4 | $z^3F^o-e^5D$ |
| 3537.243 | D | (1) | 3.64 | 7.13 | 4-3 | (153) |
| 3528.891 | B | (3) | 3.64 | 7.14 | 4-4 | $z^3F^o-f^5F$ |
| m3523.47 | P | N1 | 3.78 | 7.28 | 2-2 | (154) |
| 3494.703 | D | (1) | 3.78 | 7.31 | 2-1 | |
| 3528.540 | B | 3 | 3.64 | 7.14 | 4-5 | $z^3F^o-e^5G$ (155) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Ni I continued | | | | | | |
| 7727.66 | B | (10) | 3.66 | 5.26 | 3-3 | $z^3D^o$-$e^3D$ |
| 7748.93 | B | (10) | 3.69 | 5.28 | 2-2 | (156) |
| 7574.08 | B | (7) | 3.82 | 5.45 | 1-1 | |
| 7619.21 | B | (9) | 3.66 | 5.28 | 3-2 | |
| 7028.60 | P | | 3.69 | 5.45 | 2-1 | |
| 7861.10 | B | (4) | 3.69 | 5.26 | 2-3 | |
| 8417.24 | B | (2) | 3.82 | 5.28 | 1-2 | |
| 6850.48 | B | (2) | 3.66 | 5.46 | 3-2 | $z^3D^o$-$e^1D$ |
| 6955.06 | B | 3 | 3.69 | 5.46 | 2-2 | (157) |
| 7488.73 | B | (2) | 3.82 | 5.46 | 1-2 | |
| 5148.65 | E | (1) | 3.66 | 6.06 | 3-4 | $z^3D^o$-$e^5F$ |
| 5026.50 | E | (1) | 3.69 | 6.15 | 2-3 | (158) |
| 4886.725 | B | (2) | 3.69 | 6.32 | 2-2 | |
| 5041.077 | B | (2) | 3.82 | 6.26 | 1-1 | |
| 4834.82 | P | | 3.66 | 6.22 | 3-2 | |
| 4793.47 | E | (1) | 3.69 | 6.26 | 2-1 | |
| 5129.383 | B | 5 | 3.66 | 6.07 | 3-2 | $z^3D^o$-$e^3P$ |
| 5184.585 | B | 4 | 3.69 | 6.07 | 2-1 | (159) |
| 5162.93 | P | | 3.82 | 6.21 | 1-0 | |
| 5187.86 | E | (1) | 3.69 | 6.07 | 2-2 | |
| 5475.57 | E | (1) | 3.82 | 6.07 | 1-1 | |
| 5125.211 | B | 4 | 3.66 | 6.07 | 3-4 | $z^3D^o$-$e^3G$ |
| 4808.864 | B | (2) | 3.69 | 6.26 | 2-3 | (160) |
| 5099.946 | B | 10 | 3.66 | 6.08 | 3-3 | $z^3D^o$-$f^3D$ |
| 5142.771 | B | 10 | 3.69 | 6.09 | 2-2 | (161) |
| 5048.082 | B | (1) | 3.82 | 6.26 | 1-1 | |
| 4799.83 | E | (1) | 3.69 | 6.26 | 2-1 | |
| 5428.85 | E | (1) | 3.82 | 6.09 | 1-2 | |
| 5084.081 | B | 15 | 3.66 | 6.09 | 3-4 | $z^3D^o$-$e^3F$ |
| 5146.478 | B | 12 | 3.69 | 6.09 | 2-3 | (162) |
| 5018.294 | B | 3 | 3.82 | 6.28 | 1-2 | |
| 5088.956 | B | (2) | 3.66 | 6.09 | 3-3 | |
| 4772.89 | E | (1) | 3.69 | 6.28 | 2-2 | |
| 4723.37 | P | | 3.66 | 6.28 | 3-2 | |
| 4806.996 | B | 4 | 3.66 | 6.23 | 3-4 | $z^3D^o$-$f^3F$ |
| 4667.766 | B | 3 | 3.69 | 6.33 | 2-3 | (163) |
| 4731.809 | B | 3 | 3.82 | 6.42 | 1-2 | |
| 4620.38 | E | (1) | 3.66 | 6.33 | 3-3 | |
| 4512.995 | B | (3) | 3.69 | 6.42 | 2-2 | |
| 4841.67 | P | | 3.69 | 6.24 | 2-1 | $z^3D^o$-$e^1P$ |
| 5094.416 | B | (2) | 3.82 | 6.24 | 1-1 | (164) |
| 4752.124 | B | (3) | 3.66 | 6.26 | 3-4 | $z^3D^o$-$e^1G$ (165) |
| 4741.34 | P | | 3.66 | 6.27 | 3-2 | $z^3D^o$-$f^1D$ |
| 5038.599 | B | (4) | 3.82 | 6.27 | 1-2 | (166) |
| 4723.88 | P | (1) | 3.66 | 6.28 | 3-3 | $z^3D^o$-$e^1F$ |
| 4773.412 | B | (2) | 3.69 | 6.28 | 2-3 | (167) |
| 4437.570 | B | 2 | 3.66 | 6.44 | 3-3 | $z^3D^o$-$g^3D$ |
| 4466.394 | B | (3) | 3.69 | 6.45 | 2-2 | (168) |
| 4386.461 | B | (2n) | 3.82 | 6.63 | 1-1 | |
| 4423.000 | B | (3) | 3.66 | 6.45 | 3-2 | |
| 4481.23 | E | (2n) | 3.69 | 6.44 | 2-3 | |
| 4049.71 | P | | 3.69 | 6.74 | 2-1 | $z^3D^o$-$f^3S$ |
| 4225.02 | P | | 3.82 | 6.74 | 1-1 | (169) |
| 3993.952 | B | 3n | 3.68 | 6.75 | 3-3 | $z^3D^o$-$h^3D$ |
| 4023.99 | D | (1n) | 3.69 | 6.76 | 2-2? | (170) |
| 4029.32 | P | | 3.69 | 6.75 | 2-3 | |
| 3984.140 | B | 8n | 3.66 | 6.76 | 3-4 | $z^3D^o$-$h^3F$ |
| 4017.56 | D | 6n | 3.69 | 6.76 | 2-3 | (171) |
| 3941.86 | E | (1) | 3.82 | 6.95 | 1-2 | |
| 3696.913 | B | 3 | 3.66 | 7.00 | 3-2 | $z^3D^o$-$f^3P$ (172) |
| 3689.305 | B | 2 | 3.66 | 7.01 | 3-4 | $z^3D^o$-$i^3F$ |
| *3606.852 | B | 4 | 3.82 | 7.24 | 1-2 | (173) |
| 3478.292 | B | 3 | 3.89 | 7.24 | 2-2 | |
| 3643.941 | B | 2n | 3.66 | 7.05 | 3-3 | $z^3D^o$-$i^3D$ (174) |
| 5521.44 | G | (1) | 3.82 | 8.08 | 4-4 | $z^3G^o$-$e^5F$ |
| 5504.120 | B | (2) | 3.82 | 8.08 | 5-4 | (175) |
| 5499.39 | P | (1) | 3.82 | 6.07 | 4-5 | $z^3G^o$-$e^3G$ |
| 5749.28 | G | (1) | 3.92 | 8.07 | 3-4 | (176) |
| 5115.397 | B | 8 | 3.82 | 8.23 | 5-4 | $z^3G^o$-$f^3F$ |
| 4918.363 | B | 4 | 3.82 | 8.33 | 4-3 | (177) |
| 4935.830 | B | 4 | 3.92 | 8.42 | 3-2 | |
| 5130.389 | D | (2) | 3.82 | 8.23 | 4-4 | |
| 5121.570 | B | (3) | 3.92 | 8.33 | 3-3 | |
| 5351.65 | P | | 3.92 | 8.23 | 3-4 | |
| 4288.005 | B | 15 | 3.82 | 8.70 | 5-4 | $z^3G^o$-$g^3F$ |
| 4295.888 | B | 8 | 3.82 | 8.70 | 4-3 | (178) |
| 4150.368 | B | (2n) | 3.92 | 8.90 | 3-2 | |
| 4298.515 | B | (3) | 3.82 | 8.70 | 4-4 | |
| 4450.13 | F | (2) | 3.92 | 8.70 | 3-3 | |
| 4064.374 | B | 2 | 3.82 | 8.88 | 4-3 | $z^3G^o$-$f^1F$ |
| 4202.154 | B | (2) | 3.92 | 8.88 | 3-3 | (179) |
| m3889.65 | P | Ni | 3.82 | 8.99 | 5-6 | $z^3G^o$-$e^3H$ |
| 3744.562 | B | 5 | 3.82 | 7.12 | 4-5 | (180) |
| 3739.782 | B | 3n | 3.92 | 7.22 | 3-4 | |
| 3830.28 | P | | 3.82 | 7.22 | 4-4 | |
| 3883.072 | B | (5) | 3.82 | 7.01 | 5-5 | $z^3G^o$-$g^3G$ |
| 3728.933 | B | (2) | 3.82 | 7.13 | 4-4 | (181) |
| 3721.03 | P | | 3.82 | 7.13 | 5-4 | |
| 3871.60 | F | (3) | 3.82 | 7.01 | 4-5 | |
| 3744.56 | F | (3) | 3.92 | 7.13 | 3-4 | |
| Ni I continued | | | | | | |
| 3724.827 | B | 4 | 3.82 | 7.13 | 5-6 | $z^3G^o$-$e^5H$ |
| 3629.906 | B | 5 | 3.82 | 7.22 | 4-5 | (182) |
| 3668.216 | B | 3 | 3.92 | 7.29 | 3-4 | |
| 3723.38 | P | | 3.82 | 7.14 | 4-5 | $z^3G^o$-$e^5G$ |
| 3715.499 | B | 2 | 3.82 | 7.14 | 5-5 | (183) |
| 3724.86 | P | | 3.92 | 7.24 | 3-3 | |
| 3657.698 | D | 2 | 3.92 | 7.30 | 3-2 | |
| *3233.174 | B | 4 | 3.82 | 7.63 | 5-5 | $z^3G^o$-$h^3G$ (184) |
| 3221.373 | B | 5 | 3.82 | 7.65 | 5-6? | $z^3G^o$-$f^3H$ (185) |
| 8637.04 | A | 15 | 3.83 | 5.26 | 3-3 | $z^1F^o$-$e^3D$ |
| 8501.81 | G | (2) | 3.83 | 5.28 | 3-2 | (186) |
| 7555.60 | B | 5 | 3.83 | 5.46 | 3-2 | $z^1F^o$-$e^1D$ (187) |
| 5537.11 | G | (1) | 3.83 | 6.06 | 3-4 | $z^1F^o$-$e^5F$ |
| 5175.78 | P | | 3.83 | 6.22 | 3-2 | (188) |
| 5514.80 | G | (1) | 3.83 | 6.07 | 3-2 | $z^1F^o$-$e^3P$ (189) |
| 5510.001 | B | 4 | 3.83 | 6.07 | 3-4 | $z^1F^o$-$e^3G$ |
| 5088.534 | B | (2) | 3.83 | 6.26 | 3-3 | (190) |
| 5480.893 | B | (2) | 3.83 | 6.08 | 3-3 | $z^1F^o$-$f^3D$ (191) |
| 5462.487 | B | 4 | 3.83 | 6.09 | 3-4 | $z^1F^o$-$e^3F$ |
| 5468.101 | B | (2) | 3.83 | 6.09 | 3-3 | (192) |
| 4930.821 | D | (1) | 3.83 | 6.33 | 3-3 | $z^1F^o$-$f^3F$ |
| 4758.42 | E | (1) | 3.83 | 6.42 | 3-2 | (193) |
| 5081.111 | B | 25 | 3.83 | 6.26 | 3-4 | $z^1F^o$-$e^1G$ (194) |
| 5048.851 | B | 4 | 3.83 | 6.28 | 3-3 | $z^1F^o$-$e^1F$ (195) |
| 4399.607 | B | 3 | 3.83 | 6.64 | 3-2 | $z^1F^o$-$g^1D$ (196) |
| 4072.913 | B | (2) | 3.83 | 6.86 | 3-3 | $z^1F^o$-$f^1F$ (197) |
| 3974.650 | B | 10n | 3.83 | 6.94 | 3-4 | $z^1F^o$-$f^1G$ (198) |
| 3962.12 | B | 3n | 3.83 | 6.95 | 3-3 | $z^1F^o$-$g^1F$ (199) |
| 8954.65 | A | 2 | 3.88 | 5.26 | 2-3 | $z^1D^o$-$e^3D$ |
| 8809.47 | A | 30 | 3.88 | 5.28 | 2-2 | (200) |
| *7890.22 | B | (3) | 3.88 | 5.45 | 2-1 | |
| 7797.62 | B | 3 | 3.88 | 5.46 | 2-2 | $z^1D^o$-$e^1D$ (201) |
| 5288.21 | P | | 3.88 | 6.22 | 2-2 | $z^1D^o$-$e^5F$ |
| 5179.136 | B | (2) | 3.88 | 6.26 | 2-1 | (202) |
| 5642.660 | B | (1) | 3.88 | 6.07 | 2-2 | $z^1D^o$-$e^3P$ |
| 5638.82 | G | (1) | 3.88 | 6.07 | 2-1 | (203) |
| 5197.165 | B | 2 | 3.88 | 6.26 | 2-3 | $z^1D^o$-$e^3G$ (204) |
| 5607.05 | G | (1) | 3.88 | 6.08 | 2-3 | $z^1D^o$-$f^3D$ |
| 5589.384 | B | 2 | 3.88 | 6.09 | 2-2 | (205) |
| 5186.592 | B | (2) | 3.88 | 6.26 | 2-1 | |
| 5593.735 | B | 4 | 3.88 | 6.09 | 2-3 | $z^1D^o$-$e^3F$ |
| 5155.140 | B | 4 | 3.88 | 6.28 | 2-2 | (206) |
| 5032.748 | B | (1n) | 3.86 | 6.33 | 2-3 | $z^1D^o$-$f^3F$ |
| 4853.30 | P | | 3.88 | 6.42 | 2-2 | (207) |
| 5235.45 | E | 2 | 3.86 | 6.24 | 2-1 | $z^1D^o$-$e^1P$ (208) |
| 5176.565 | B | 5 | 3.88 | 6.27 | 2-2 | $z^1D^o$-$f^1D$ (209) |
| 5155.764 | B | 9 | 3.88 | 6.28 | 2-3 | $z^1D^o$-$e^1F$ (210) |
| 4480.570 | B | (3) | 3.88 | 6.64 | 2-2 | $z^1D^o$-$g^1D$ (211) |
| 4142.184 | B | (2) | 3.88 | 6.66 | 2-3 | $z^1D^o$-$f^1F$ (212) |
| 10193.25 | A | 100 | 4.07 | 5.26 | 1-2 | $z^1P^o$-$e^3D$ |
| 8982.35 | A | 2 | 4.07 | 5.45 | 1-1 | (213) |
| 8862.59 | A | 100 | 4.07 | 5.46 | 1-2 | $z^1P^o$-$e^1D$ (214) |
| 5628.347 | B | (3) | 4.07 | 6.26 | 1-1 | $z^1P^o$-$e^5F$ (215) |
| 6259.615 | B | 2 | 4.07 | 6.04 | 1-1 | $z^1P^o$-$e^3S$ (216) |
| *8180.093 | B | (1n) | 4.07 | 6.07 | 1-2 | $z^1P^o$-$e^3P$ |
| 8175.424 | B | 6 | 4.07 | 6.07 | 1-1 | (217) |
| 5780.77 | G | (1) | 4.07 | 8.21 | 1-0 | |
| *8116.181 | B | 8n | 4.07 | 6.09 | 1-2 | $z^1P^o$-$f^3D$ |
| 5637.121 | B | 2 | 4.07 | 6.26 | 1-1 | (218) |
| 5600.036 | B | (4) | 4.07 | 6.26 | 1-2 | $z^1P^o$-$e^3F$ (219) |
| 5694.998 | B | 6 | 4.07 | 6.24 | 1-1 | $z^1P^o$-$e^1P$ (220) |
| 5625.328 | B | 4 | 4.07 | 6.27 | 1-2 | $z^1P^o$-$f^1D$ (221) |
| 5411.227 | B | 4 | 4.07 | 6.35 | 1-0 | $z^1P^o$-$e^1S$ (222) |
| 4829.98 | P | | 4.07 | 6.74 | 1-1 | $z^1P^o$-$f^3S$ (223) |
| 10378.62 | A | 100 | 4.07 | 5.26 | 4-3 | $y^3F^o$-$e^3D$ |
| 10330.23 | A | 50 | 4.09 | 5.28 | 3-2 | (224) |
| 9520.06 | A | 100 | 4.15 | 5.45 | 2-1 | |
| 10530.53 | A | 20 | 4.09 | 5.26 | 3-3 | |
| 10891.25 | A | 2 | 4.15 | 5.28 | 2-2 | |
| 8965.94 | A | 50 | 4.09 | 5.46 | 3-2 | $y^3F^o$-$e^1D$ |
| 9385.62 | A | 10 | 4.15 | 5.46 | 2-2 | (225) |
| Ni I continued | | | | | | |
| 6452.77 | G | (1) | 4.07 | 5.98 | 4-5 | $y^3F^o$-$e^5F$ |
| 6258.591 | B | 2 | 4.09 | 6.06 | 3-4 | (226) |
| 6183.892 | D | (1) | 4.15 | 6.15 | 2-3 | |
| 6204.640 | B | 2 | 4.07 | 6.06 | 4-4 | |
| 5998.86 | G | (1) | 4.09 | 6.15 | 3-3 | |
| 5973.66 | G | (1) | 4.15 | 6.22 | 2-2 | |
| 6230.115 | B | 2 | 4.09 | 6.07 | 3-2 | $y^3F^o$-$e^3F$ |
| 6424.905 | B | (2n) | 4.15 | 6.07 | 2-1 | (227) |
| 6176.813 | C | 12 | 4.07 | 6.07 | 4-5 | $y^3F^o$-$e^3G$ |
| 6223.994 | B | 3 | 4.09 | 6.07 | 3-4 | (228) |
| 5857.755 | B | 7 | 4.15 | 6.26 | 2-3 | |
| *6170.568 | B | (3) | 4.07 | 6.07 | 4-4 | |
| 5691.52 | G | (1)Fe? | 4.09 | 6.26 | 3-3 | |
| 6133.948 | H | (1n) | 4.07 | 6.08 | 4-3 | $y^3F^o$-$f^3F$ |
| 6165.18 | P | | 4.09 | 6.09 | 3-2 | (229) |
| 6186.740 | B | 2 | 4.09 | 6.08 | 3-3 | |
| 6360.798 | B | (5) | 4.15 | 6.09 | 2-2 | |
| 6111.06 | B | 2n | 4.07 | 6.09 | 4-4 | $y^3F^o$-$e^3F$ |
| *6170.568 | B | (3) | 4.09 | 6.09 | 3-3 | (230) |
| 6118.06 | G | (1) | 4.07 | 6.09 | 4-3 | |
| 5641.112 | D | (1) | 4.09 | 6.28 | 3-2 | |
| 6163.42 | B | 5n | 4.09 | 6.09 | 3-4 | |
| 6366.483 | B | 4 | 4.15 | 6.09 | 2-3 | |
| 5715.086 | B | 6 | 4.07 | 6.23 | 4-4 | $y^3F^o$-$f^3F$ |
| 5494.890 | B | 2 | 4.09 | 6.33 | 3-3 | (231) |
| m5424.56 | P | Ni | 4.15 | 6.42 | 2-2 | |
| 5453.255 | B | (2) | 4.07 | 6.33 | 4-3 | |
| 5281.692 | B | (2) | 4.09 | 6.42 | 3-2 | |
| 5760.847 | B | 4 | 4.09 | 6.23 | 3-4 | |
| 5649.697 | B | 2 | 4.15 | 6.33 | 2-3 | |
| 5682.204 | B | 8 | 4.09 | 6.26 | 3-4 | $y^3F^o$-$e^1G$ (232) |
| 5666.78 | P | | 4.09 | 6.27 | 3-2 | $y^3F^o$-$f^1F$ |
| *5831.624 | B | 2 | 4.15 | 6.27 | 2-2 | (233) |
| 5641.880 | B | (4) | 4.09 | 6.28 | 3-3 | $y^3F^o$-$e^1F$ |
| 5805.233 | B | 5 | 4.15 | 6.28 | 2-3 | (234) |
| 4701.536 | B | 3 | 4.07 | 6.70 | 4-4 | $y^3F^o$-$g^3F$ |
| 4729.291 | B | (2) | 4.09 | 6.70 | 3-3 | (235) |
| *4490.541 | B | (3) | 4.15 | 6.90 | 2-2 | |
| 4698.408 | B | (2) | 4.07 | 6.70 | 4-3 | |
| 4732.465 | B | 3 | 4.09 | 6.70 | 3-4 | |
| 4843.53 | P | | 4.15 | 6.70 | 2-3 | |
| 4450.301 | B | (2) | 4.09 | 6.86 | 3-3 | $y^3F^o$-$f^1F$ |
| 4551.236 | B | (3) | 4.15 | 6.86 | 2-3 | (236) |
| 4236.372 | B | (2) | 4.09 | 7.00 | 3-2 | $y^3F^o$-$f^3F$ |
| 4138.52 | F | (2) | 4.15 | 7.13 | 2-1 | (237) |
| 4201.723 | B | 5 | 4.07 | 7.01 | 4-4 | $y^3F^o$-$i^3F$ |
| *4022.052 | B | (2) | 4.09 | 7.16 | 3-3 | (238) |
| 3995.83 | P | | 4.15 | 7.24 | 2-2 | |
| 4195.531 | B | 4 | 4.07 | 7.01 | 4-5 | $y^3F^o$-$g^3G$ |
| 4051.18 | P | | 4.09 | 7.13 | 3-4 | (239) |
| 4025.114 | B | (3) | 4.07 | 7.14 | 4-4 | $y^3F^o$-$f^5F$ |
| 3924.16 | P | | 4.09 | 7.23 | 3-3 | (240) |
| 3938.76 | P | | 4.15 | 7.28 | 2-2 | |
| *4022.052 | B | (2) | 4.07 | 7.14 | 4-5 | $y^3F^o$-$e^5G$ (241) |
| 10979.87 | A | 5 | 4.14 | 5.26 | 3-3 | $y^3D^o$-$e^3D$ |
| 11586.73 | P | | 4.22 | 5.26 | 2-2 | (242) |
| 10302.61 | A | 50 | 4.25 | 5.45 | 1-1 | |
| 10762.24 | A | 2 | 4.14 | 5.28 | 3-2 | |
| 10048.60 | A | 10 | 4.22 | 5.45 | 2-1 | |
| 11927.89 | P | | 4.25 | 5.26 | 1-2 | |
| 9696.90 | A | 40 | 4.22 | 5.46 | 2-2 | $y^3D^o$-$e^1D$ |
| 10145.37 | A | 20 | 4.25 | 5.46 | 1-2 | (243) |
| 6414.603 | B | (5) | 4.14 | 6.06 | 3-4 | $y^3D^o$-$e^5F$ |
| 6272.650 | D | (1) | 4.25 | 6.22 | 1-2 | (244) |
| 6142.047 | D | (1) | 4.14 | 6.15 | 3-3 | |
| 6177.49 | E | (1) | 4.22 | 6.22 | 2-2 | |
| 6119.780 | B | (2) | 4.25 | 6.26 | 1-1 | |
| 6759.41 | G | (1) | 4.22 | 6.04 | 2-1 | $y^3D^o$-$e^3S$ (245) |
| 6364.697 | B | (5n) | 4.14 | 6.07 | 3-2 | $y^3D^o$-$e^3P$ |
| 6661.39 | B | (3) | 4.22 | 6.07 | 2-1 | (246) |
| 6300.363 | D | (1) | 4.25 | 6.21 | 1-0 | |
| 6378.263 | B | 5 | 4.14 | 6.07 | 3-4 | $y^3D^o$-$e^3G$ |
| 6053.680 | B | 2 | 4.22 | 6.26 | 2-3 | (247) |
| 6339.148 | B | 7 | 4.14 | 6.08 | 3-3 | $y^3D^o$-$f^3D$ |
| 6592.472 | D | (3) | 4.22 | 6.09 | 2-2 | (248) |
| 6130.174 | B | (3) | 4.25 | 6.26 | 1-1 | |
| 6316.61 | G | (1g?) | 4.14 | 6.09 | 3-2 | |
| 6039.312 | H | (1n) | 4.22 | 6.26 | 2-1 | |
| 8617.14 | P | | 4.22 | 6.08 | 2-3 | |
| 6700.90 | G | (1) | 4.25 | 6.09 | 1-2 | |
| m6314.67 | P | Ni | 4.14 | 6.09 | 3-4 | $y^3D^o$-$e^3F$ |
| 6596.594 | B | (4) | 4.22 | 6.09 | 2-3 | (249) |
| 6066.290 | B | 5n | 4.25 | 6.26 | 1-2 | |
| 6322.165 | B | (3) | 4.14 | 6.09 | 3-3 | |
| 5996.74 | B | 3n | 4.22 | 6.28 | 2-2 | |
| m5892.76 | P | Ni | 4.14 | 6.23 | 3-4 | $y^3D^o$-$f^3F$ |
| *5631.624 | B | 2 | 4.22 | 6.33 | 2-3? | (250) |
| 5669.945 | B | (3) | 4.25 | 6.42 | 1-2 | |
| 5614.790 | B | 5 | 4.14 | 6.33 | 3-3 | |
| 5592.146 | D | (1) | 4.22 | 6.42 | 2-2 | |
| 5392.371 | B | (2) | 4.14 | 6.42 | 3-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ni I** continued | | | | | | |
| 6025.73 | G | (1) | 4.22 | 6.27 | 2-2 | $y^3D^o-f^1D$ |
| •6116.181 | B | 6n | 4.25 | 6.27 | 1-2 | (251) |
| 5997.610 | B | 2n | 4.22 | 6.28 | 2-3 | $y^3D^o-e^1F$ (252) |
| 5863.97 | G | (2) | 4.25 | 6.35 | 1-0 | $y^3D^o-e^1S$ (253) |
| 4821.143 | B | (2) | 4.14 | 6.70 | 3-4 | $y^3D^o-g^3F$ |
| 4976.71 | P | | 4.22 | 6.70 | 2-3 | (254) |
| 4657.38 | E | (1) | 4.25 | 6.90 | 1-2 | |
| 4817.847 | B | (2) | 4.14 | 6.70 | 3-3 | |
| 4815.982 | B | (3) | 4.14 | 7.13 | 3-4 | $y^3D^o-g^3G$ |
| 4102.74 | P | | 4.22 | 7.23 | 2-3 | (255) |
| 4235.54 | P | | 4.14 | 7.05 | 3-3 | $y^3D^o-i^3D$ |
| 4357.85 | P | (1) | 4.22 | 7.05 | 2-3 | (256) |
| 6451.580 | B | (2)Fe? | 4.15 | 6.06 | 4-4 | $z^1G^o-e^5F$ (257) |
| 6421.507 | B | (5n) | 4.15 | 6.07 | 4-5 | $z^1G^o-e^3G$ (258) |
| 5923.930 | B | (1) | 4.15 | 6.23 | 4-4 | $z^1G^o-f^3F$ |
| 5843.099 | B | (2) | 4.15 | 6.33 | 4-3 | (259) |
| 4842.01 | E | (1) | 4.15 | 6.70 | 4-4 | $z^1G^o-g^3F$ |
| 4838.651 | B | 2 | 4.15 | 6.70 | 4-3 | (260) |
| 4546.930 | B | 5 | 4.15 | 6.86 | 4-3 | $z^1G^o-f^1F$ (261) |
| 4424.84 | E | (1) | 4.15 | 6.94 | 4-4 | $z^1G^o-f^1G$ (262) |
| 7333.49 | B | (2)Fe? | 4.40 | 6.08 | 3-3 | $y^1F^o-f^3D$ (263) |
| 6635.15 | B | 3 | 4.40 | 6.26 | 3-4 | $y^1F^o-e^1G$ (264) |
| 6580.23 | B | (2n) | 4.40 | 6.28 | 3-3 | $y^1F^o-e^1F$ (265) |
| 7953.11 | B | (1) | 4.52 | 6.07 | 2-1 | $y^1D^o-e^3P$ (266) |
| 7890.32 | B | (3) | 4.52 | 6.08 | 2-3 | $y^1D^o-f^3D$ |
| 7855.12 | B | (3) | 4.52 | 6.09 | 2-2 | (267) |
| 7082.22 | G | (1) | 4.52 | 6.26 | 2-1 | |
| 7863.79 | B | (5) | 4.52 | 6.09 | 2-3 | $y^1D^o-e^3F$ (268) |
| 7173.73 | B | (2) | 4.52 | 6.24 | 2-1 | $y^1D^o-e^1P$ (269) |
| 7063.57 | B | (2) | 4.52 | 6.27 | 2-2 | $y^1D^o-f^1D$ (270) |
| 7024.86 | B | 3 | 4.52 | 6.28 | 2-3 | $y^1D^o-e^1F$ (271) |
| 5664.017 | B | 3 | 4.52 | 6.70 | 2-3 | $y^1D^o-g^3F$ (272) |
| 5268.348 | B | 2 | 4.52 | 6.86 | 2-3 | $y^1D^o-f^1F$ (273) |
| 4971.354 | B | 2 | 4.52 | 7.00 | 2-2? | $y^1D^o-f^3P$ (274) |
| 8606.45 | A | 10 | 5.26 | 6.70 | 3-4 | $x^3D^o-g^3F$ (275) |
| 7095.40 | B | (4)Fe? | 5.26 | 7.00 | 3-2 | $x^3D^o-f^3P$ (276) |
| 7067.50 | B | (2) | 5.26 | 7.01 | 3-4 | $x^3D^o-i^3F$ (277) |
| 7657.30 | B | (3) | 5.39 | 7.00 | 3-2 | $x^3F^o-f^3P$ (278) |
| 7032.16 | G | (1) | 5.26 | 7.01 | 4-5 | $x^3F^o-g^3G$ (279) |
| 7433.48 | B | (3) | 5.39 | 7.05 | 3-3 | $x^3F^o-i^3D$ (280) |
| 7735.99 | G | (1) | 5.27 | 6.86 | 2-3 | $y^3P^o-f^1F$ (281) |
| 7170.14 | B | (2) | 5.28 | 7.00 | 3-2 | $w^3D^o-f^3P$ |
| 7521.09 | G | (2) | 5.49 | 7.13 | 2-1 | (282) |
| 7501.81 | G | (1) | 5.57 | 7.22 | 1-0 | |
| 6141.62 | B | (1) | 5.28 | 7.01 | 3-4 | $w^3D^o-i^3F$ |
| 7409.17 | P | | 5.49 | 7.16 | 2-3 | (283) |
| m7401.17 | P | N1 | 5.57 | 7.24 | 1-2 | |
| 6576.95 | P | | 5.28 | 7.16 | 3-3 | |
| 8968.20 | A | 30 | 5.32 | 6.70 | 5-4 | $y^3G^o-g^3F$ |
| 10061.29 | A | 10 | 5.47 | 6.70 | 4-3 | (284) |
| 8877.07 | A | 10 | 5.47 | 6.86 | 4-3 | $y^3G^o-f^1F$ |
| 9710.21 | P | 1 | 5.59 | 6.86 | 3-3 | (285) |
| 7386.21 | B | (7) | 5.32 | 6.99 | 5-6 | $y^3G^o-e^3H$ |
| 7481.49 | G | (5) | 5.47 | 7.12 | 4-5 | (286) |
| 7552.52 | P | | 5.59 | 7.22 | 3-4 | |
| 7290.87 | B | (1) | 5.32 | 7.01 | 5-5 | $y^3G^o-g^3G$ |
| 7419.35 | B | (2) | 5.47 | 7.13 | 4-4 | (287) |
| 7545.69 | G | (2) | 5.59 | 7.23 | 3-3 | |
| 6813.598 | B | (3) | 5.32 | 7.13 | 5-6 | $y^3G^o-e^5H$ |
| 7037.37 | B | (2) | 5.47 | 7.22 | 4-5 | (288) |
| 7266.22 | B | (4) | 5.59 | 7.29 | 3-4 | |
| 9106.40 | A | 30 | 5.34 | 6.70 | 4-4 | $w^3F^o-g^3F$ |
| 10321.10 | A | 5 | 5.50 | 6.70 | 3-3 | (289) |
| 8095.93 | G | (1) | 5.61 | 7.13 | 2-1 | $w^3F^o-f^3P$ (290) |
| 7401.13 | B | (4) | 5.34 | 7.01 | 4-4 | $w^3F^o-i^3F$ |
| 7458.92 | G | (1) | 5.50 | 7.16 | 3-3 | (291) |
| 7567.35 | G | (1) | 5.61 | 7.24 | 2-2 | |
| 7381.94 | B | (5) | 5.34 | 7.01 | 4-5 | $w^3F^o-g^3G$ |
| 7559.62 | B | (3) | 5.50 | 7.13 | 3-4 | (292) |
| 7624.75 | G | (2) | 5.61 | 7.23 | 2-3 | |
| 6861.24 | B | (3) | 5.34 | 7.14 | 4-5 | $w^3F^o-e^5G$ |
| 7297.75 | B | (3) | 5.61 | 7.30 | 2-2 | (293) |
| 7220.79 | B | (3) | 5.34 | 7.05 | 4-3 | $w^3F^o-i^3D$ (294) |
| 9689.35 | A | 3 | 5.42 | 6.70 | 2-3 | $x^1D^o-g^3F$ (295) |
| 8586.20 | P | 1 | 5.42 | 6.86 | 2-3 | $x^1D^o-f^1F$ (296) |

8trongest Unclassified Lines of Ni I

| | | | | |
|---|---|---|---|---|
| 10295.05 | A | 5 | | |
| 9396.57 | A | 20 | | |
| 6362.414 | D | (5) | | |
| 6012.251 | B | (5) | | |
| 4594.908 | B | (5n) | | |
| 4142.320 | B | (4) | | |
| 4006.136 | B | 3 | V | |
| 3762.618 | B | (3) | | |
| 3665.924 | B | 2 | III | |
| 3647.71 | E | 2 | II | |
| 3335.59 | E | 2n | V | |
| 3332.180 | B | 6n | V | |
| 3309.428 | B | 2n | V | |
| 3268.064 | B | 4n | V | |
| 3264.44 | E | 2n | V | |
| 3233.88 | E | 2 | V | |
| 3199.342 | B | 3n | V | |
| 3151.259 | B | 4n | V | |

**Ni II** I P 18.4 Anal C List A Apr 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| •3513.933§ | B | 8 | 2.85 | 6.36 | $2\frac{1}{2}$-$3\frac{1}{2}$ | $b^2D-z^4D^o$ |
| 3454.16 | A | 5 | 2.94 | 6.51 | $1\frac{1}{2}$-$2\frac{1}{2}$ | (1) |
| 3373.98 | A | 4 | 2.85 | 6.51 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 3350.42 | A | 5 | 2.94 | 6.62 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 3274.90 | A | 3 | 2.85 | 6.62 | $2\frac{1}{2}$-$1\frac{1}{2}$ | |
| 3290.69 | A | 1 | 2.94 | 6.69 | $1\frac{1}{2}$-$\frac{1}{2}$ | |
| 3208.91 | A | 1 | 2.85 | 6.70 | $2\frac{1}{2}$-$3\frac{1}{2}$ | $b^2D-z^4G^o$ (2) |
| 3032.44 | A | 2 | 2.85 | 6.92 | $2\frac{1}{2}$-$2\frac{1}{2}$ | $b^2D-z^4F^o$ |
| 3063.93 | A | 2 | 2.94 | 6.97 | $1\frac{1}{2}$-$1\frac{1}{2}$ | (3) |
| 3769.455 | B | 5 | 3.09 | 6.36 | $2\frac{1}{2}$-$3\frac{1}{2}$ | $a^4P-z^4D^o$ |
| 3576.762 | B | 3 | 3.06 | 6.51 | $1\frac{1}{2}$-$2\frac{1}{2}$ | (4) |
| 3471.35 | C | 2 | 3.07 | 6.62 | $\frac{1}{2}$-$1\frac{1}{2}$ | |
| 3608.7 | P | | 3.09 | 6.51 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 3465.62 | C | 1 | 3.06 | 6.62 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 3407.30 | A | 8 | 3.07 | 6.69 | $\frac{1}{2}$-$\frac{1}{2}$ | |
| 3495.6 | P | | 3.09 | 6.62 | $2\frac{1}{2}$-$1\frac{1}{2}$ | |
| 3401.76 | A | 2 | 3.06 | 6.69 | $1\frac{1}{2}$-$\frac{1}{2}$ | |
| 3290.54 | A | 1? | 3.09 | 6.84 | $2\frac{1}{2}$-$3\frac{1}{2}$ | $a^4P-z^4F^o$ (5) |
| 2988.05 | A | 5 | 3.09 | 7.22 | $2\frac{1}{2}$-$2\frac{1}{2}$ | $a^4P-z^2F^o$ (6) |
| 3087.07 | A | 20 | 3.09 | 7.09 | $2\frac{1}{2}$-$2\frac{1}{2}$ | $a^4P-z^2D^o$ † (7) |
| 3397.82 | A | 1 | 3.59 | 7.22 | $1\frac{1}{2}$-$2\frac{1}{2}$ | $a^2P-z^2F^o$ (8) |
| 4362.10 | C | 1 | 4.01 | 6.84 | $4\frac{1}{2}$-$3\frac{1}{2}$ | $a^2G-z^4F^o$ |
| 4244.80 | C | 1 | 4.01 | 6.92 | $3\frac{1}{2}$-$2\frac{1}{2}$ | (9) |
| 4384.6 | P | | 4.01 | 6.83 | $4\frac{1}{2}$-$4\frac{1}{2}$ | $a^2G-z^2G^o$ |
| 4192.07 | C | 1 | 4.01 | 6.96 | $3\frac{1}{2}$-$3\frac{1}{2}$ | (10) |
| 4067.051 | B | 3 | 4.01 | 7.05 | $4\frac{1}{2}$-$3\frac{1}{2}$ | $a^2G-z^2F^o$ |
| 3849.58 | B | 2 | 4.01 | 7.22 | $3\frac{1}{2}$-$2\frac{1}{2}$ | (11) |
| 4071.0 | P | | 4.01 | 7.05 | $3\frac{1}{2}$-$3\frac{1}{2}$ | |
| 4015.50 | C | 1 | 4.01 | 7.09 | $3\frac{1}{2}$-$2\frac{1}{2}$ | $a^2G-z^2D^o$ (12) |
| 3881.92 | C | 1 | 8.22 | 11.40 | $2\frac{1}{2}$-$3\frac{1}{2}$ | $z^4P^o-e^4F$ (13) |

Measures inadequate for preparation of list of stronger unclassified lines of Ni II

**Cu I** I P 7.69 Anal A List D Apr 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3247.540// | A | 1000 | 0.00 | 3.80 | $\frac{1}{2}$-$1\frac{1}{2}$ | $4^2S-4^2P^o$ |
| 3273.957 | A | 600 | 0.00 | 3.77 | $\frac{1}{2}$-$\frac{1}{2}$ | (1) |
| 5105.541 | A | 300 | 1.38 | 3.80 | $2\frac{1}{2}$-$1\frac{1}{2}$ | $4s^2\ ^2D-4^2P^o$ |
| 5782.132 | A | 200 | 1.64 | 3.77 | $1\frac{1}{2}$-$\frac{1}{2}$ | (2) |
| 5700.240 | A | 30 | 1.64 | 3.80 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 3093.989 | A | 40 | 1.38 | 5.37 | $2\frac{1}{2}$-$3\frac{1}{2}$ | $4s^2\ ^2D-4s4p^4D^o$ † |
| 3208.231 | A | 60 | 1.64 | 5.48 | $1\frac{1}{2}$-$2\frac{1}{2}$ | (3) |
| 3010.838 | A | 100 | 1.38 | 5.48 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 3194.099 | A | 100 | 1.64 | 5.50 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 3063.411 | A | 80 | 1.64 | 5.66 | $1\frac{1}{2}$-$1\frac{1}{2}$ | $4s^2\ ^2D-4s4p^2P^o$ † (4) |
| 2997.364 | A | 80 | 1.64 | 5.75 | $1\frac{1}{2}$-$2\frac{1}{2}$ | $4s^2\ ^2D-4s4p^2D^o$ † |
| 3036.101 | A | 100 | 1.64 | 5.70 | $1\frac{1}{2}$-$1\frac{1}{2}$ | (5) |
| 8092.634 | A | 300 | 3.80 | 5.33 | $1\frac{1}{2}$-$\frac{1}{2}$ | $4^2P^o-5^2S$ |
| 7933.130 | A | 160 | 3.77 | 5.33 | $\frac{1}{2}$-$\frac{1}{2}$ | (6) |
| 5218.202 | A | 80 | 3.80 | 6.17 | $1\frac{1}{2}$-$2\frac{1}{2}$ | $4^2P^o-4^2D$ |
| 5153.235 | A | 100 | 3.77 | 6.16 | $\frac{1}{2}$-$1\frac{1}{2}$ | (7) |
| 5220.070 | A | 25 | 3.80 | 6.16 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 4530.785 | A | 110 | 3.80 | 6.52 | $1\frac{1}{2}$-$\frac{1}{2}$ | $4^2P^o-6^2S$ |
| 4480.350 | A | 100 | 3.77 | 6.52 | $\frac{1}{2}$-$\frac{1}{2}$ | (8) |

**Cu II** I P 20.18 Anal A List D May 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 4555.922 | A | (100) | 8.20 | 10.91 | 2-2 | $4p^3P^o-s^2\ ^3P$ |
| 4832.236 | A | 30 | 8.38 | 10.94 | 1-1 | (1) |
| 4505.997 | A | (75) | 8.20 | 10.94 | 2-1 | |
| 4758.421 | A | 30 | 8.38 | 10.98 | 1-0 | |
| 4889.690 | A | 30 | 8.38 | 10.91 | 1-2 | |
| 5060.635 | A | 30 | 8.50 | 10.94 | 0-1 | |
| 3686.555 | A | (100) | 8.45 | 11.80 | 3-4 | $4p^3F^o-s^2\ ^1G$ (2) |
| 4043.502 | A | 75 | 8.75 | 11.80 | 3-4 | $4p^3D^o-s^2\ ^1G$ (3) |
| 4671.686 | A | 40 | 14.14 | 16.78 | 1-2 | $4d^3S-4f^3P^o$ |
| 4681.990 | A | 50 | 14.14 | 16.77 | 1-1 | (4) |
| 4673.555 | A | 30 | 14.14 | 16.78 | 1-0 | |
| 4909.726 | A | 100 | 14.27 | 16.78 | 5-6 | $4d^3G-4f^3H^o$ † |
| 4931.653 | A | 100 | 14.28 | 16.78 | 4-5 | (5) |
| 4918.373 | A | 30 | 14.54 | 17.05 | 3-4 | |
| 4985.503 | A | 40 | 14.33 | 16.81 | 3-4 | $4d^3D-4f^3F^o$ † |
| 5088.260 | A | 30 | 14.37 | 16.79 | 2-3 | (6) |
| 4937.196 | A | 20 | 14.56 | 17.06 | 1-2 | |
| 5051.778 | A | 60 | 14.37 | 16.81 | 4-5 | $4d^3F-4f^3G^o$ † |
| 5012.611 | A | 20 | 14.36 | 16.82 | 3-4 | (7) |
| 5067.082 | A | 30 | 14.63 | 17.07 | 2-3 | |
| 4812.940 | A | 40 | 14.47 | 17.04 | 1-2 | $4d^1P-4f^1D^o$ (8) |
| 4953.733 | A | 50 | 14.55 | 17.04 | 4-5 | $4d^1G-4f^1H^o$ (9) |
| 5006.787 | A | 30 | 14.59 | 17.05 | 2-3 | $4d^1D-4f^1F^o$ (10) |
| 5065.448 | A | 40 | 14.63 | 17.06 | 3-4 | $4d^1F-4f^1G^o$ (11) |

**Zn I** I P 9.35 Anal A List B May 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3075.901 | A | 90 | 0.00 | 4.01 | 0-1 | $4^1S-4^3P^o$ (1) |
| 4810.534 | A | 65 | 4.06 | 6.63 | 2-1 | $4^3P^o-5^3S$ |
| 4722.159 | A | 75 | 4.01 | 6.63 | 1-1 | (2) |
| 4680.138 | A | 45 | 3.99 | 6.63 | 0-1 | |
| 4292.885 | A | 8 | 4.01 | 6.89 | 1-0 | $4^3P^o-5^1S$ (3) |
| 3345.020 | A | 150 | 4.06 | 7.75 | 2-3 | $4^3P^o-4^3D$ |
| 3302.588 | A | 150 | 4.01 | 7.75 | 1-2 | (4) |
| 3282.333 | A | 100 | 3.99 | 7.75 | 0-1 | |
| 3345.572 | A | 100 | 4.06 | 7.75 | 2-2 | |
| 3302.941 | A | 125 | 4.01 | 7.75 | 1-1 | |
| 3345.934 | A | 30 | 4.06 | 7.75 | 2-1 | |
| 3072.062 | A | 70 | 4.06 | 8.08 | 2-1 | $4^3P^o-6^3S$ |
| 3035.781 | A | 35 | 4.01 | 8.08 | 1-1 | (5) |
| 3018.352 | A | 30 | 3.99 | 8.08 | 0-1 | |
| 6362.347 | A | 100 | 5.77 | 7.71 | 1-2 | $4^1P^o-4^1D$ (6) |
| 5181.995 | A | 30 | 5.77 | 8.15 | 1-0 | $4^1P^o-6^1S$ (7) |
| 4629.814 | A | 12 | 5.77 | 8.44 | 1-2 | $4^1P^o-5^1D$ (8) |
| 4113.210 | A | 12 | 5.77 | 8.77 | 1-2 | $4^1P^o-6^1D$ (9) |
| 6928.319 | A | 10 | 6.63 | 8.41 | 1-2 | $5^3S-6^3P^o$ |
| 6938.472 | A | 6 | 6.63 | 8.40 | 1-1 | (10) |
| 6943.202 | A | 2 | 6.63 | 8.40 | 1-0 | |

**Zn II** I P 17.89 Anal A List C May 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 7478.79 | B | 20 | 3.09 | 7.74 | $1\frac{1}{2}$-$3\frac{1}{2}$ | $4^2P^o-d^9s^2\ ^2D$ |
| 5894.351 | A | 20 | 5.98 | 8.08 | $\frac{1}{2}$-$1\frac{1}{2}$ | (1) |
| 6214.58 | B | 12 | 6.09 | 8.08 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 7588.48 | B | 15 | 10.92 | 12.54 | $\frac{1}{2}$-$1\frac{1}{2}$ | $5^2S-5^2P^o$ |
| 7732.50 | B | 10 | 10.92 | 12.51 | $\frac{1}{2}$-$\frac{1}{2}$ | (2) |
| 4911.664 | A | 25 | 11.96 | 14.48 | $2\frac{1}{2}$-$3\frac{1}{2}$ | $4^2D-4^2P^o$ |
| 4924.043 | A | 30 | 11.97 | 14.48 | $1\frac{1}{2}$-$2\frac{1}{2}$ | (3) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ga I** I P 5.97 Anal A List 8 May 1942 | | | | | | |
| 4172.048// | A | 10R | 0.10 | 3.06 | 1½- ½ | $4^2P^o-5^2S$ |
| 4033.975 | A | 10R | 0.00 | 3.06 | ½- ½ | (1) |
| **Ga II** See introduction | | | | | | |
| **Ge I** I P 8.09 Anal A List 8 June 1942 | | | | | | |
| 3124.817 | B | (20) | 0.88 | 4.83 | 2-2 | $4p^1D-5s^3P^o$ |
| 3269.494 | B | (40) | 0.88 | 4.65 | 2-1 | (1) |
| 3039.064 | 8 | (60) | 0.88 | 4.94 | 2-1 | $4p^1D-5s^1P^o$ (2) |
| 4685.837 | B | (20) | 2.02 | 4.85 | 0-1 | $4p^1S-5s^3P^o$ (3) |
| 4238.570 | 8 | (50) | 2.02 | 4.94 | 0-1 | $4p^1S-5s^1P^o$ (4) |
| 3067.132 | 8 | (10) | 2.02 | 8.04 | 0-1 | $4p^1S-4d^3D^o$ (5) |
| 11125.28 | A | 25 | 4.83 | 5.94 | 2-3 | $5s^3P^o-5p^3D$ † |
| 10947.51 | A | 30 | 4.65 | 5.78 | 1-2 | (6) |
| 10734.14 | A | 25 | 4.62 | 5.77 | 0-1 | |
| 10405.05 | A | 40 | 4.83 | 8.02 | 2-2 | $5s^3P^o-5p^3P$ † |
| 9625.72 | A | 35 | 4.85 | 5.94 | 1-1 | (7) |
| **Ge II** I P 15.9 Anal A List B May 1942 | | | | | | |
| 5893.42 | A | 25 | 7.70 | 9.80 | ½-1½ | $5^2S-5^2P^o$ |
| *6031.09 | A | 20 | 7.70 | 9.75 | ½- ½ | (1) |
| 4814.80 | B | (200) | 9.80 | 12.36 | 1½-2½ | $5^2P^o-5^2D$ |
| 4742.00 | 8 | (50) | 9.75 | 12.36 | ½-1½ | (2) |
| 4834.20 | B | (10) | 9.80 | 12.36 | 1½-1½ | |
| **As I** I P 10 Anal B List 8 May 1943 | | | | | | |
| 3032.85 | A | 40 | 2.30 | 6.37 | 1½-1½ | $4p^2P^o-5s^4P$ † |
| 3075.32 | A | 20 | 2.24 | 8.28 | ½- ½ | (1) |
| 3119.80 | A | 50 | 2.30 | 8.26 | 1½- ½ | |
| 9923.03 | A | (150) | 6.53 | 7.77 | 2½-2½ | $5s^4P-5p^4P^o$ |
| 10023.98 | A | (100) | 6.37 | 7.80 | 1½-1½ | (2) |
| 9833.78 | A | (80) | 6.26 | 7.51 | ½- ½ | |
| 8854.16 | A | 100 | 8.53 | 7.98 | 2½-3½ | $5e^4P-5p^4D^o$ |
| 8564.71 | A | 100 | 8.37 | 7.81 | 1½-2½ | (3) |
| 8541.65 | A | 50 | 8.26 | 7.70 | ½-1½ | |
| 9828.69 | A | (140) | 8.53 | 7.81 | 2½-3½ | |
| 9287.39 | A | 25 | 8.37 | 7.70 | 1½-1½ | |
| 8821.78 | A | 150 | 8.28 | 7.68 | ½- ½ | |
| 9597.94 | A | (100) | 8.37 | 7.68 | 1½- ½ | |
| 8889.89 | A | 100 | 6.53 | 7.92 | 2½-2½ | $5s^4P-5p^2D^o$ † |
| 8428.94 | A | 100 | 8.26 | 7.73 | ½-1½ | (4) |
| 9300.62 | A | 50 | 8.53 | 7.88 | 2½-1½ | $5e^4P-5p^4S^o$ |
| 8305.62 | A | 50 | 6.37 | 7.88 | 1½-1½ | (5) |
| **As II** I P 19.78 Anal 8 List C June 1943 | | | | | | |
| 6170.47 | A | 10 | 9.77 | 11.77 | 1-1 | $5s^3P^o-5p^1P$ |
| 6023.81 | A | 10 | 9.73 | 11.77 | 0-1 | (1) |
| 5651.53 | A | 10 | 10.06 | 12.25 | 2-3 | $5s^3P^o-5p^3D$ † |
| 5558.31 | A | 10 | 9.77 | 11.99 | 1-2 | (2) |
| 5331.54 | A | 10 | 10.08 | 12.38 | 2-2 | $5s^3P^o-5p^3P$ † |
| 4985.60 | A | 8 | 9.77 | 12.24 | 1-1 | (3) |
| 4730.92 | A | 10 | 9.77 | 12.38 | 1-2 | |
| 5105.80 | A | 10 | 10.08 | 12.48 | 2-1 | $5s^3P^o-5p^3S$ † |
| 4552.37 | A | 8 | 9.77 | 12.48 | 1-1 | (4) |
| 8110.30 | A | 10 | 10.22 | 12.24 | 1-1 | $5s^1P^o-5p^3P$ † (5) |
| 5107.80 | A | 10 | 10.22 | 12.84 | 1-2 | $5s^1P^o-5p^1D$ (8) |
| 4352.25 | A | 10 | 10.22 | 13.06 | 1-0 | $5s^1P^o-5p^1S$ (7) |
| **Se I** I P 9.71 Anal 8 List C June 1942 | | | | | | |
| 8918.88 | A | 25 | 5.95 | 7.33 | 2-3 | $5^3S^o-5^5P$ |
| 9002.00 | A | 15 | 5.95 | 7.32 | 2-2 | (1) |
| 9036.65 | A | 10 | 5.95 | 7.31 | 2-1 | |
| 10327.30 | A | 3 | 8.30 | 7.49 | 1-2 | $5^3S^o-5^3P$ |
| 10386.45 | A | 2 | 8.30 | 7.48 | 1-1 | (2) |
| 10307.60 | A | 1 | 6.30 | 7.49 | 1-0 | |
| **Se II** See introduction | | | | | | |
| **Br I** See introduction | | | | | | |
| **Br II** See introduction | | | | | | |
| **Kr I** See introduction | | | | | | |
| **Kr II** See introduction | | | | | | |
| **Rb I** I P 4.16 Anal A List C May 1942 | | | | | | |
| 7800.237// | A | 10R | 0.00 | 1.58 | ½-1½ | $5^2S-5^2P^o$ |
| 7947.60 | A | 10R | 0.00 | 1.55 | ½- ½ | (1) |
| 4201.851 | 8 | 8R | 0.00 | 2.94 | ½-1½ | $5^2S-8^2P^o$ |
| 4215.556 | B | 7R | 0.00 | 2.93 | ½- ½ | (2) |
| **Rb II** See introduction | | | | | | |
| **Sr I** I P 5.87 Anal A List C May 1942 | | | | | | |
| 8892.585 | A | 200 | 0.00 | 1.79 | 0-1 | $5^1S-5^3P^o$ (1) |
| 4607.331// | A | 800R | 0.00 | 2.68 | 0-1 | $5^1S-5^1P^o$ (2) |
| 7070.071 | A | 2000 | 1.84 | 3.58 | 2-1 | $5^3P^o-8^3S$ |
| 6878.313 | A | 1000 | 1.79 | 3.58 | 1-1 | (3) |
| 6791.022 | A | 500 | 1.77 | 3.58 | 0-1 | |
| 4962.263 | A | 40 | 1.84 | 4.33 | 2-3 | $5^3P^o-5^3D$ |
| 4872.493 | A | 40 | 1.79 | 4.32 | 1-2 | (4) |
| *4832.075 | B | 50 | 1.77 | 4.32 | 0-1 | |
| 4967.944 | A | 20 | 1.84 | 4.32 | 2-2 | |
| 4876.06 | C | 15 | 1.79 | 4.32 | 1-1 | |
| 4971.668 | A | 2 | 1.84 | 4.32 | 2-1 | |
| 4811.881 | A | 40 | 1.84 | 4.40 | 2-2 | $5^3P^o-5p^2\ ^3p$ |
| 4784.320 | A | 30 | 1.79 | 4.37 | 1-1 | (5) |
| 4876.325 | B | 20 | 1.84 | 4.37 | 2-1 | |
| *4832.075 | B | 50 | 1.79 | 4.34 | 1-0 | |
| 4732.278 | A | 30 | 1.79 | 4.40 | 1-2 | |
| 4741.922 | A | 30 | 1.77 | 4.37 | 0-1 | |
| 4438.044 | A | 25 | 1.84 | 4.82 | 2-1 | $5^3P^o-7^3S$ |
| 4361.710 | A | 20 | 1.79 | 4.82 | 1-1 | (8) |
| 4326.445 | A | 8 | 1.77 | 4.62 | 0-1 | |
| 3351.246 | A | 150 | 1.84 | 5.52 | 2-2 | $5^3P^o-4d^2\ ^3p$ |
| 3322.231 | A | 30 | 1.79 | 5.51 | 1-1 | (7) |
| 3366.333 | A | 50 | 1.84 | 5.51 | 2-1 | |
| 3329.988 | A | 30 | 1.79 | 5.50 | 1-0 | |
| 3307.534 | A | 50n | 1.79 | 5.52 | 1-2 | |
| 3301.734 | A | 50 | 1.77 | 5.51 | 0-1 | |
| 6408.463 | A | 100 | 2.26 | 4.19 | 3-4 | $4^3D-4d5p^3P^o$ |
| 8503.989 | A | 80 | 2.25 | 4.15 | 2-3 | (8) |
| 6817.266 | A | 50 | 2.24 | 4.11 | 1-2 | |
| 6546.791 | A | 20 | 2.28 | 4.15 | 3-3 | |
| 8843.538 | A | 20 | 2.25 | 4.11 | 2-2 | |
| 5480.865 | A | 40 | 2.26 | 4.51 | 3-3 | $4^3D-4d5p^3D^o$ |
| 5504.184 | A | 30 | 2.25 | 4.49 | 2-2 | (9) |
| 5521.785 | A | 25 | 2.24 | 4.48 | 1-1 | |
| 5534.794 | A | 15 | 2.26 | 4.49 | 3-2 | |
| 5540.051 | A | 15 | 2.25 | 4.48 | 2-1 | |
| 5450.838 | A | 15 | 2.25 | 4.51 | 2-3 | |
| 5488.138 | A | 15 | 2.24 | 4.49 | 1-2 | |
| 4891.980 | A | 25 | 2.28 | 4.78 | 3-4 | $4^3D-4^3F^o$ |
| 4868.700 | A | 20 | 2.25 | 4.78 | 2-3 | (10) |
| 4855.045 | A | 20 | 2.24 | 4.78 | 1-2 | |
| 5158.040 | A | 8 | 2.49 | 4.88 | 2-3 | $4^1D-4^1F^o$ (11) |
| 8550.244 | A | 60 | 2.88 | 4.56 | 1-2 | $5^1P^o-5p^2\ ^1D$ (12) |
| **Sr II** I P 10.98 Anal E List A May 1943 | | | | | | |
| 4077.714// | A | 400r | 0.00 | 3.03 | ½-1½ | $5^2S-5^2P^o$ |
| 4215.524 | A | 300r | 0.00 | 2.93 | ½- ½ | (1) |
| 10327.314 | A | 1000 | 1.83 | 3.03 | 2½-1½ | $4^2D-5^2P^o$ |
| 10914.877 | A | 200 | 1.80 | 2.93 | 1½- ½ | (2) |
| 10038.858 | A | 300 | 1.80 | 3.03 | 1½-1½ | |
| 4305.447 | A | 40 | 3.03 | 5.89 | 1½- ½ | $5^2P^o-8^2S$ |
| 4181.798 | A | 30 | 2.93 | 5.89 | ½- ½ | (3) |
| 3464.457 | A | 50 | 3.03 | 8.59 | 1½-2½ | $5^2P^o-5^2D$ |
| 3380.711 | A | 50 | 2.93 | 6.58 | ½-1½ | (4) |
| 3474.687 | A | 10 | 3.03 | 8.58 | 1½-1½ | |
| **Y I** I P 8.5 Anal A List C June 1943 | | | | | | |
| 8584.89 | A | 5 | 0.07 | 1.94 | 2½-3½ | $a^2D-z^4P^o$ (1) |
| 8557.40 | A | 30 | 0.00 | 1.88 | 1½-2½ | |
| 8793.71 | A | 80 | 0.07 | 1.88 | 2½-2½ | |
| 8687.57 | A | 80 | 0.00 | 1.85 | 1½-1½ | |
| 8933.55 | A | 8 | 0.07 | 1.85 | 2½-1½ | |
| **Y I** continued | | | | | | |
| 6435.02 | A | 500 | 0.07 | 1.98 | 2½-2½ | $a^2D-z^2F^o$ |
| 6191.73 | A | 100† | 0.00 | 1.99 | 1½-1½ | (2) |
| 6402.005 | B | 50 | 0.07 | 1.99 | 2½-1½ | |
| 6222.59 | A | 50† | 0.00 | 1.98 | 1½-2½ | |
| 6138.44 | A | 15† | 0.07 | 2.08 | 2½-2½ | $a^2D-z^4I$ |
| 8023.41 | A | 20† | 0.00 | 2.05 | 1½-1½ | (3) |
| 4674.84 | A | 125 | 0.07 | 2.71 | 2½-3½ | $a^2D-z^2D^o$ |
| 4643.69 | A | 150 | 0.00 | 2.66 | 1½-2½ | (4) |
| 4760.98 | A | 40 | 0.07 | 2.66 | 2½-2½ | |
| 4128.31 | A | 300 | 0.07 | 3.05 | 2½-2½ | $a^2D-y^2F$ |
| 4142.88 | A | 200 | 0.00 | 2.98 | 1½-1½ | (5) |
| 4235.94 | A | 100 | 0.07 | 2.98 | 2½-1½ | |
| 4039.83 | A | 80 | 0.00 | 3.05 | 1½-2½ | |
| 4174.14 | A | 100 | 0.07 | 3.02 | 2½-1½ | $a^2D-y^2F$ |
| 4047.84 | A | 80 | 0.00 | 3.05 | 1½- ½ | (8) |
| 4083.71 | A | 100 | 0.00 | 3.02 | 1½-1½ | |
| 4102.38 | A | 350 | 0.07 | 3.07 | 2½-3½ | $a^2D-y^2F$ |
| 4077.38 | A | 300 | 0.00 | 3.03 | 1½-2½ | (7) |
| 4167.52 | A | 100 | 0.07 | 3.03 | 2½-2½ | |
| 3820.95 | A | 400 | 0.07 | 3.47 | 2½-1½ | $a^2D-x^2P$ |
| 3593.92 | A | 200 | 0.00 | 3.43 | 1½- ½ | (8) |
| 3552.70 | A | 40 | 0.00 | 3.47 | 1½-1½ | |
| 3021.74 | A | 15 | 0.07 | 4.15 | 2½-3½ | $a^2D-y^4D$ |
| 2996.94 | A | 20 | 0.00 | 4.13 | 1½-2½ | (9) |
| 3045.36 | A | 20 | 0.07 | 4.13 | 2½-2½ | |
| 3005.28 | A | 12 | 0.00 | 4.11 | 1½-1½ | |
| 2984.25 | A | 50 | 0.07 | 4.20 | 2½-3½ | $a^2D-x^2F$ |
| 2974.59 | A | 35 | 0.00 | 4.15 | 1½-2½ | (10) |
| 3022.28 | A | 12 | 0.07 | 4.15 | 2½-2½ | |
| 2984.98 | A | 30 | 0.07 | 4.23 | 2½-2½ | $a^2D-x^2D$ |
| 2995.28 | A | 10 | 0.07 | 4.19 | 2½-1½ | (11) |
| *5468.46// | A | 300 | 1.42 | 3.88 | 4½-5½ | $a^4F-z^4G^o$ |
| 5527.54 | A | 250 | 1.39 | 3.63 | 3½-4½ | (12) |
| 5581.87 | A | 150 | 1.37 | 3.58 | 2½-3½ | |
| 5630.14 | A | 100 | 1.35 | 3.54 | 1½-2½ | |
| 4839.87 | A | 60 | 1.42 | 3.97 | 4½-4½ | $a^4F-y^4F^o$ |
| 4845.67 | A | 50 | 1.39 | 3.94 | 3½-3½ | (13) |
| 4853.89 | A | 50 | 1.37 | 3.91 | 2½-2½ | |
| 4859.84 | A | 40 | 1.35 | 3.89 | 1½-1½ | |
| 4906.11 | A | 6 | 1.42 | 3.94 | 4½-3½ | |
| 4893.44 | A | 6 | 1.37 | 3.89 | 2½-1½ | |
| 4781.04 | A | 10 | 1.39 | 3.97 | 3½-4½ | |
| 4799.30 | A | 15 | 1.37 | 3.94 | 2½-3½ | |
| 4819.64 | A | 10 | 1.35 | 3.91 | 1½-2½ | |
| 4527.25 | A | 80 | 1.42 | 4.15 | 4½-3½ | $a^4F-y^4D^o$ |
| 4527.80 | A | 50 | 1.39 | 4.12 | 3½-2½ | (14) |
| 4505.95 | A | 50 | 1.37 | 4.11 | 2½-1½ | |
| 4487.47 | A | 40 | 1.35 | 4.10 | 1½- ½ | |
| 4475.72 | A | 20 | 1.39 | 4.15 | 3½-3½ | |
| 4487.28 | A | 20 | 1.37 | 4.12 | 2½-2½ | |
| 4477.45 | A | 25 | 1.35 | 4.11 | 1½-1½ | |
| 4513.58 | A | 4 | 1.89 | 4.63 | 2½-2½ | $a^2F-y^4D^o$ |
| 4581.32 | A | 6 | 1.89 | 4.59 | 2½-1½ | (15) |
| 6845.24 | A | 10 | 2.38 | 4.17 | 2½-3½ | $z^4P^o-e^4I$ |
| 8950.32 | A | 8 | 2.35 | 4.12 | 1½-2½ | (18) |

Strongest Unclassified Lines of Y I

| | | | |
|---|---|---|---|
| 3587.75 | A | 20 | III |
| 3424.16 | A | 7 | IIIA |
| 3278.43 | A | 5 | IIIA |
| 3091.70 | A | 15 | III |

| **Y II** I P 12.3 Anal A List A June 1943 | | | | | | |
|---|---|---|---|---|---|---|
| 4204.69 | A | 10 | 0.00 | 2.94 | 0-1 | $a^1S-z^3P^o$ (1) |
| 3833.13 | A | 200 | 0.00 | 3.40 | 0-1 | $a^1S-z^1P^o$ (2) |
| 3498.08 | A | 80 | 0.00 | 3.53 | 0-1 | $a^1S-z^3P^o$ (3) |
| 3112.05 | A | 4 | 0.00 | 3.97 | 0-1 | $a^1S-y^3P^o$ (4) |
| 4309.62 | A | 50 | 0.18 | 3.04 | 3-2 | $a^3D-z^3P^o$ |
| 4398.03 | A | 50 | 0.13 | 2.94 | 2-1 | (5) |
| 4422.59 | A | 40 | 0.10 | 2.89 | 1-0 | |
| 4235.73 | A | 20 | 0.13 | 3.04 | 2-2 | |
| 4358.73 | A | 30 | 0.10 | 2.94 | 1-1 | |
| 4199.27 | A | 5 | 0.10 | 3.04 | 1-2 | |
| 4047.88 | P | | 0.18 | 3.23 | 3-2 | $a^3D-z^1D^o$ |
| 3982.59 | A | 150 | 0.13 | 3.23 | 2-2 | (8) |
| 3950.35 | A | 200 | 0.10 | 3.23 | 1-2 | |
| 3710.30// | A | 500 | 0.18 | 3.51 | 3-4 | $a^3D-z^3F^o$ |
| 3774.33 | A | 300 | 0.13 | 3.40 | 2-3 | (7) |
| 3788.70 | A | 200 | 0.10 | 3.38 | 1-2 | |
| 3832.89 | A | 100 | 0.18 | 3.40 | 3-3 | |
| 3818.34 | A | 80 | 0.13 | 3.36 | 2-2 | |
| 3878.28 | A | 20 | 0.18 | 3.36 | 3-2 | |
| 3778.56 | A | 75 | 0.13 | 3.40 | 2-1 | $a^3D-z^1P^o$ |
| 3747.55 | A | 40 | 0.10 | 3.40 | 1-1 | (8) |

| Laboratory I A | Ref | Int | E P Low | High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Y II** continued | | | | | | |
| 3600.74 | A | 300 | 0.18 | 3.61 | 3-3 | $a^3D$-$z^3D^o$ (9) |
| 3611.06 | A | 200 | 0.13 | 3.55 | 2-2 | |
| 3601.93 | A | 100 | 0.10 | 3.53 | 1-1 | |
| 3664.62 | A | 150 | 0.18 | 3.55 | 3-2 | |
| 3628.71 | A | 100 | 0.13 | 3.53 | 2-1 | |
| 3549.02 | A | 100 | 0.13 | 3.61 | 2-3 | |
| 3584.53 | A | 100 | 0.10 | 3.55 | 1-2 | |
| 3243.30 | A | 150 | 0.18 | 3.99 | 3-2 | $a^3D$-$y^3P^o$ (10) |
| 3216.70 | A | 100 | 0.13 | 3.97 | 2-1 | |
| 3203.33 | A | 60 | 0.10 | 3.96 | 1-0 | |
| 3200.28 | A | 50 | 0.13 | 3.99 | 2-2 | |
| 3195.62 | A | 50 | 0.10 | 3.97 | 1-1 | |
| 3179.42 | A | 10 | 0.10 | 3.99 | 1-2 | |
| 3135.17 | A | 5 | 0.18 | 4.12 | 3-3 | $a^3D$-$z^1F^o$ (11) |
| 3095.88 | A | 5 | 0.13 | 4.12 | 2-3 | |
| 4682.32 | A | 20 | 0.41 | 3.04 | 2-2 | $a^1D$-$z^3P^o$ (12) |
| 4881.44 | A | 2 | 0.41 | 2.94 | 2-1 | |
| 4374.94 | A | 300 | 0.41 | 3.23 | 2-2 | $a^1D$-$z^1D^o$ (13) |
| 4324.91 | A | 15 | 0.41 | 3.40 | 2-3 | $a^1D$-$z^3F^o$ (14) |
| 4177.54 | A | 125 | 0.41 | 3.36 | 2-2 | |
| 4127.57 | A | 2 | 0.41 | 3.40 | 2-1 | $a^1D$-$z^1P^o$ (15) |
| 3857.26 | P | | 0.41 | 3.61 | 2-3 | $a^1D$-$z^3D^o$ (16) |
| 3930.66 | A | 15 | 0.41 | 3.55 | 2-2 | |
| 3951.59 | A | 5 | 0.41 | 3.53 | 2-1 | |
| 3448.82 | A | 10 | 0.41 | 3.99 | 2-2 | $a^1D$-$y^3P^o$ (17) |
| 3467.88 | A | 5 | 0.41 | 3.97 | 2-1 | |
| 3327.89 | A | 100 | 0.41 | 4.12 | 2-3 | $a^1D$-$z^1F^o$ (18) |
| 5610.36 | A | 2 | 1.03 | 3.23 | 3-2 | $a^3F$-$z^1D^o$ (19) |
| 5509.91 | A | 30 l | 0.99 | 3.23 | 2-2 | |
| 5087.42 | A | 100 l | 1.08 | 3.51 | 4-4 | $a^3F$-$z^3F^o$ (20) |
| 5205.73 | A | 80 | 1.03 | 3.40 | 3-3 | |
| 5200.42 | A | 60 | 0.99 | 3.36 | 2-2 | |
| 5320.78 | A | 4 l | 1.08 | 3.40 | 4-3 | |
| 5289.82 | A | 5 l | 1.03 | 3.36 | 3-2 | |
| 4982.13 | A | 15 l | 1.03 | 3.51 | 3-4 | |
| 5119.12 | A | 20 l | 0.99 | 3.40 | 2-3 | |
| 5123.21 | A | 50 l | 0.99 | 3.40 | 2-1 | $a^3F$-$z^1P^o$ (21) |
| 4883.69 | A | 200 | 1.08 | 3.61 | 4-3 | $a^3F$-$z^3D^o$ (22) |
| 4900.13 | A | 150 | 1.03 | 3.55 | 3-2 | |
| 4854.87 | A | 150 | 0.99 | 3.53 | 2-1 | |
| 4786.58 | A | 20 | 1.03 | 3.61 | 3-3 | |
| 4823.31 | A | 30 | 0.99 | 3.55 | 2-2 | |
| 4713.26 | B | (1) | 0.99 | 3.61 | 2-3 | |
| 4173.78 | A | ? | 1.03 | 3.99 | 3-2 | $a^3F$-$y^3P^o$ (23) |
| 4084.99 | A | 2 | 1.08 | 4.12 | 4-3 | $a^3F$-$z^1F^o$ (24) |
| 3997.43 | A | 1 | 1.03 | 4.12 | 3-3 | |
| 3946.21 | A | 2 | 0.99 | 4.12 | 2-3 | |
| 7450.32 | A | 5 | 1.74 | 3.40 | 2-1 | $a^3P$-$z^1P^o$ (25) |
| 7406.23 | A | 2 | 1.73 | 3.40 | 1-1 | |
| 7332.97 | A | 2 | 1.71 | 3.40 | 0-1 | |
| 6613.74 | A | 20 | 1.74 | 3.61 | 2-3 | $a^3P$-$z^3D^o$ (26) |
| *6795.41 | A | 30 | (1.73 | 3.55 | 1-2 | |
| | | | 1.71 | 3.53 | 0-1 | |
| 6832.49 | A | 4 | 1.74 | 3.55 | 2-2 | |
| 6858.25 | A | 5 | 1.73 | 3.53 | 1-1 | |
| 6896.00 | A | 10 | 1.74 | 3.53 | 2-1 | |
| 5497.42 | A | 50 | 1.74 | 3.99 | 2-2 | $a^3P$-$y^3P^o$ (27) |
| *5521.56 § | P | 20 | 1.73 | 3.97 | 1-1 | |
| 5546.02 | A | 10 l | 1.74 | 3.97 | 2-1 | |
| *5544.61 § | A | 10 l | 1.73 | 3.96 | 1-0 | |
| 5473.40 | A | 20 l | 1.73 | 3.99 | 1-2 | |
| 5480.75 | A | 15 l | 1.71 | 3.97 | 0-1 | |
| 5196.43 | A | 10 l | 1.74 | 4.12 | 2-3 | $a^3P$-$z^1F^o$ (28) |
| 3280.91 | A | ? Ag | 1.74 | 5.50 | 2-1 | $a^3P$-$y^1P^o$ (29) |
| 8835.85 | A | ? | 1.83 | 3.23 | 2-2 | $b^1D$-$z^1D^o$ (30) |
| 8088.20 | A | ? | 1.83 | 3.36 | 2-2 | $b^1D$-$z^3F^o$ (31) |
| 7881.90 | A | 10 | 1.83 | 3.40 | 2-1 | $b^1D$-$z^1P^o$ (32) |
| 6951.68 | A | 3 | 1.83 | 3.61 | 2-3 | $b^1D$-$z^3D^o$ (33) |
| 7193.74 | A | 1 | 1.83 | 3.55 | 2-2 | |
| 7264.19 | A | 10 | 1.83 | 3.53 | 2-1 | |
| 5728.91 | A | 10 l | 1.83 | 3.99 | 2-2 | $b^1D$-$y^3P^o$ (34) |
| 5781.69 | A | 5 l | 1.83 | 3.97 | 2-1 | |
| 5402.78 | A | 50 l | 1.83 | 4.12 | 2-3 | $b^1D$-$z^1F^o$ (35) |
| 3362.00 | A | 30nl | 1.83 | 5.50 | 2-1 | $b^1D$-$y^1P^o$ (36) |
| 7388.46 | A | 1 | 1.94 | 3.61 | 4-3 | $a^1G$-$z^3D^o$ (37) |
| 5662.95 | A | 200 | 1.94 | 4.12 | 4-3 | $a^1G$-$z^1F^o$ (38) |
| 3225.17 | A | 5nl | 3.04 | 6.87 | 2-3 | $z^3P^o$-$e^3D$ (39) |
| 3198.42 | C | 2n | 2.94 | 6.79 | 1-2 | |

| Laboratory I A | Ref | Int | E P Low | High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Y II** continued | | | | | | |
| 3461.0 | A | 20nl | 3.23 | 6.79 | 2-2 | $z^1D^o$-$e^3D$ (40) |
| 3470.18 | C | 5nl | 3.23 | 6.78 | 2-1 | |
| 3380.114 | C | 5nl | 3.23 | 6.88 | 2-2 | $z^1D^o$-$e^1D$ (41) |
| 3086.858 | C | 30nl | 3.23 | 7.23 | 2-3 | $z^1D^o$-$e^1F$ (42) |
| 3069.26 | A | 5n | 3.23 | 7.25 | 2-1 | $z^1D^o$-$f^3D$ (43) |
| 3026.47 | C | 10nl | 3.23 | 7.31 | 2-3 | $z^1D^o$-$e^3G$ (44) |
| 2978.18 | A | 3n | 3.23 | 7.37 | 2-1 | $z^1D^o$-$e^1P$ (45) |
| 3668.489 | C | 50nl | 3.51 | 6.87 | 4-3 | $z^3F^o$-$e^3D$ (46) |
| 3635.334 | C | 20nl | 3.40 | 6.79 | 3-2 | |
| 3805.46 | C | 10nl | 3.36 | 6.78 | 2-1 | |
| 3556.083 | C | 5nl | 3.40 | 6.87 | 3-3 | |
| 3507.964 | C | 8nl | 3.36 | 6.88 | 2-2 | $z^3F^o$-$e^1D$ (47) |
| 3193.48 | A | 2nl | 3.36 | 7.23 | 2-3 | $z^3F^o$-$e^1F$ (48) |
| 3232.00 | A | 3n | 3.51 | 7.32 | 4-3 | $z^3F^o$-$f^3D$ (49) |
| 3182.42 | A | 3nl | 3.40 | 7.28 | 3-2 | |
| 3144.37 | A | 2n | 3.40 | 7.32 | 3-3 | |
| *3114.45 | A | 10n | 3.36 | 7.32 | 2-3? | |
| *3110.65 | A | 2n | 3.40 | 7.37 | 3-2? | $z^3F^o$-$e^3P$ (50) |
| 3081.800 | C | 2n | 3.36 | 7.37 | 2-2 | |
| 3173.07 | A | 100nl | 3.51 | 7.39 | 4-5 | $z^3F^o$-$e^3G$ (51) |
| 3129.933 | C | 40nl | 3.40 | 7.34 | 3-4 | |
| 3128.789 | C | 20nl | 3.36 | 7.31 | 2-3 | |
| 3077.14 | A | 4n | 3.36 | 7.37 | 2-1 | $z^3F^o$-$e^1P$ (52) |
| 3001.42 | A | 2 | 3.36 | 7.47 | 2-2 | $z^3F^o$-$f^1D$ (53) |
| 2980.69 | C | 20nl | 3.51 | 7.65 | 4-4 | $z^3F^o$-$e^3F$ † (54) |
| 3006.0 | A | 2nl | 3.51 | 7.61 | 4-3 | |
| 3643.4 | A | 3nl | 3.40 | 6.78 | 1-1 | $z^1P^o$-$e^3D$ (55) |
| 3544.001 | C | 3nl | 3.40 | 6.88 | 1-2 | $z^1P^o$-$e^1D$ (56) |
| 3109.3 | A | 1 | 3.40 | 7.37 | 1-2 | $z^1P^o$-$e^3P$ (57) |
| 3160.60 | A | 1n | 3.40 | 7.30 | 1-1 | |
| *3114.45 | A | 10n | 3.40 | 7.36 | 1-0? | $z^1P^o$-$e^1S$ (58) |
| 3104.82 | A | 4n | 3.40 | 7.37 | 1-1 | $z^1P^o$-$e^1P$ (59) |
| 3027.75 | A | 3 | 3.40 | 7.47 | 1-2 | $z^1P^o$-$f^1D$ (60) |
| 3782.302 | C | 50nl | 3.61 | 6.87 | 3-3 | $z^3P^o$-$e^3D$ (61) |
| 3800.883 | C | 15nl | 3.55 | 6.79 | 2-2 | |
| 3792.56 | C | 10nl | 3.53 | 6.78 | 1-1 | |
| 3872.308 | C | 5nl | 3.81 | 6.79 | 3-2 | |
| 3812.18 | C | 5nl | 3.55 | 6.78 | 2-1 | |
| 3714.3 | A | 5nl | 3.55 | 6.87 | 2-3 | |
| 3703.323 | C | 5nl | 3.55 | 6.88 | 2-2 | $z^3P^o$-$e^1D$ (62) |
| 3684.903 | C | 5nl | 3.53 | 6.88 | 1-2 | |
| 3409.87 | C | 4nl | 3.61 | 7.23 | 3-3 | $z^3P^o$-$e^1F$ (63) |
| 3319.78 | C | 15nl | 3.61 | 7.32 | 3-3 | $z^3P^o$-$f^3D$ (64) |
| 3308.4 | A | 20nl | 3.55 | 7.28 | 2-2 | |
| 3318.6 | A | 4nl | 3.53 | 7.25 | 1-1 | |
| 3333.606 | C | 2n | 3.55 | 7.25 | 2-1 | |
| 3293.9 | A | 3n | 3.53 | 7.28 | 1-2? | |
| 3282.51 | A | 2 | 3.61 | 7.37 | 3-2 | $z^3P^o$-$e^3P$ (65) |
| 3286.71 | A | 3n | 3.55 | 7.30 | 2-1 | |
| 3312.39 | C | 4nl | 3.53 | 7.26 | 1-0 | |
| 3231.20 | A | 2n | 3.55 | 7.37 | 2-2 | |
| 3304.01 | C | 2n | 3.61 | 7.34 | 3-4 | $z^3P^o$-$e^3G$ (66) |
| 3336.25 | C | 4nl | 3.61 | 7.31 | 3-3 | |
| 3212.40 | A | 5nl | 3.53 | 7.37 | 1-1 | $z^3D^o$-$e^1P$ (67) |
| 3055.3 | A | 50nl | 3.61 | 7.65 | 3-4 | $z^3D^o$-$e^3F$ (68) |
| 3036.59 | C | 25nl | 3.55 | 7.61 | 2-3 | |
| 3053.27 | C | 15nl | 3.53 | 7.57 | 1-2 | |
| 3082.16 | A | 3n | 3.61 | 7.61 | 3-3 | |
| 3066.02 | A | 4n | 3.55 | 7.57 | 2-2 | |
| 3050.5 | A | 1n | 3.53 | 7.58 | 1-0 | $z^3D^o$-$f^1S$ (69) |
| 4279.3 | A | 5nl | 3.99 | 6.87 | 2-3 | $y^3P^o$-$e^3D$ (70) |
| 4364.01 | A | ? | 3.97 | 6.79 | 1-2 | |
| 4364.17 | A | ? | 3.96 | 6.78 | 0-1 | |
| 4264.88 | A | 1n | 3.99 | 6.88 | 2-2 | $y^3P^o$-$e^1D$ (71) |
| 3848.194 | C | 8nl | 3.99 | 7.19 | 2-1 | $y^3P^o$-$e^3S$ (72) |
| 3824.78 | C | 5nl | 3.97 | 7.19 | 1-1 | |
| 3813.8 | A | 2nl | 3.96 | 7.19 | 0-1 | |
| 3808.7 | A | 1n | 3.99 | 7.23 | 2-3 | $y^3P^o$-$e^1F$ (73) |
| 3696.6 | A | 25nl | 3.99 | 7.32 | 2-3 | $y^3P^o$-$f^3D$ (74) |
| 3727.09 | C | 20nl | 3.97 | 7.28 | 1-2 | |
| 3758.9 | A | 3nl | 3.97 | 7.25 | 1-1 | |
| 3650.45 | A | 2n | 3.99 | 7.37 | 2-2 | $y^3P^o$-$e^3P$ (75) |
| *3721.398§ | C | 4 | 3.99 | 7.30 | 2-1 | |
| 3689.2 | A | 2n | 3.96 | 7.30 | 0-1 | |
| 3716.91 | C | 7nl | 3.99 | 7.31 | 2-3 | $y^3P^o$-$e^3G$ (76) |

| Laboratory I A | Ref | Int | E P Low | High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Y II** continued | | | | | | |
| 3457.088 | C | 4nl | 3.99 | 7.56 | 2-1 | $y^3P^o$-$f^3S$ (77) |
| 3429.42 | C | 3n | 3.96 | 7.56 | 0-1 | |
| 3093.76 | A | 10n | 3.99 | 7.97 | 2-2 | $y^3P^o$-$f^3P$ (78) |
| *3110.65 | A | 2n | 3.97 | 7.93 | 1-1 | |
| *3126.16 | A | 4n | (3.99 | 7.93 | 2-1 | |
| | | | 3.97 | 7.91 | 1-0 | |
| 3078.64 | A | 4n | 3.97 | 7.97 | 1-2 | |
| 3103.3 | A | 2n | 3.96 | 7.93 | 0-1 | |
| 3030.214 | C | 4n | 3.99 | 8.06 | 2-3 | $y^3P^o$-$g^3D$ (79) |
| 3023.50 | A | 2n | 3.97 | 8.05 | 1-2 | |
| 4607.94 | A | — | 4.12 | 6.79 | 3-2? | $z^1F^o$-$e^3D$ (80) |
| 4465.4 | A | 10nl | 4.12 | 6.88 | 3-2 | $z^1F^o$-$e^1D$ (81) |
| 3967.69 | C | 15nl | 4.12 | 7.23 | 3-3 | $z^1F^o$-$e^1F$ (82) |
| 3846.516 | C | 3n | 4.12 | 7.32 | 3-3 | $z^1F^o$-$f^3D$ (83) |
| 3675.64 | C | 5nl | 4.12 | 7.47 | 3-2 | $z^1F^o$-$f^1D$ (84) |
| 3330.880 | C | 20nl | 4.12 | 7.82 | 3-4 | $z^1F^o$-$e^1G$ (85) |
| 3896.804 | C | 10nl | 5.50 | 8.67 | 1-2 | $y^1P^o$-$h^1D$ (86) |

Strongest Unclassified Lines of **Y II**

| | | |
|---|---|---|
| 8429.36 | A | 10n |
| 4734.52 | A | 5n |
| 3407.7 | A | 3n |

**Zr I** I P 6.92 Anal A Liet C June 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 6832.93 | A | 12 | 0.07 | 1.88 | 3-3 | $a^3F$-$z^5G^o$ † (1) |
| 6762.38 | A | 30 | 0.00 | 1.83 | 2-2 | |
| 6127.49 | A | 200 | 0.15 | 2.17 | 4-4 | $a^3F$-$z^3F^o$ (2) |
| 6143.23 | A | 150 | 0.07 | 2.08 | 3-3 | |
| 6134.58 | A | 125 | 0.00 | 2.01 | 2-2 | |
| 6407.03 | A | 4 | 0.15 | 2.08 | 4-3 | |
| 6357.10 | P | | 0.07 | 2.01 | 3-2 | |
| 5885.61 | A | 8 | 0.07 | 2.17 | 3-4 | |
| 5935.23 | A | 10 | 0.00 | 2.08 | 2-3 | |
| 6062.88 | A | 12 | 0.07 | 2.11 | 3-2 | $a^3F$-$z^5F^o$ † (3) |
| 5955.37 | A | 12 | 0.00 | 2.07 | 2-1 | |
| 5879.79 | A | 40 | 0.15 | 2.25 | 4-3 | $a^3F$-$z^3D^o$ † (4) |
| 5797.76 | A | 25 | 0.07 | 2.20 | 3-2 | |
| 5735.70 | A | 20 | 0.00 | 2.15 | 2-1 | |
| 4688.45 | A | 40 | 0.15 | 2.79 | 4-5 | $a^3F$-$z^3G^o$ † (5) |
| 4633.99 | A | 50 | 0.07 | 2.73 | 3-4 | |
| 4575.52 | A | 40 | 0.00 | 2.70 | 2-3 | |
| 3916.64 | A | 10 | 0.15 | 3.30 | 4-5 | $a^3F$-$y^5G^o$ (6) |
| 3879.04 | A | 10 | 0.07 | 3.25 | 3-4 | |
| 3849.26 | A | 30 | 0.00 | 3.21 | 2-3 | |
| 3900.51 | A | (10) | 0.00 | 3.16 | 2-2 | |
| 3989.29 | A | 7 | 0.07 | 3.16 | 3-2 | |
| 3968.25 | A | 80 | 0.15 | 3.26 | 4-5 | $a^3F$-$y^3G^o$ † (7) |
| *3929.53§ | A | 150 | 0.07 | 3.21 | 3-4 | |
| 3885.41 | A | 100 | 0.00 | 3.18 | 2-3 | |
| 3890.32 | A | 125 | 0.15 | 3.33 | 4-4 | $a^3F$-$x^3F^o$ (8) |
| 3863.88 | A | 100 | 0.07 | 3.26 | 3-3 | |
| 3835.96 | A | 100 | 0.00 | 3.22 | 2-2 | |
| 3966.65 | A | 50 | 0.15 | 3.26 | 4-3 | |
| 3921.80 | A | 100 | 0.07 | 3.22 | 3-2 | |
| 3791.39 | A | 80 | 0.07 | 3.33 | 3-4 | |
| 3780.53 | A | 100 | 0.00 | 3.26 | 2-3 | |
| 3896.53 | A | 10 | 0.07 | 3.24 | 3-3 | $a^3F$-$x^1F^o$ † (9) |
| 3864.33 | A | 40 | 0.15 | 3.35 | 4-3 | $a^3F$-$x^3D^o$ (10) |
| 3847.01 | A | 30 | 0.07 | 3.28 | 3-2 | |
| 3822.41 | A | 40 | 0.00 | 3.23 | 2-1 | |
| 3766.71 | A | 60 | 0.07 | 3.35 | 3-3 | |
| 3764.38 | A | 80 | 0.00 | 3.28 | 2-2 | |
| 3891.39 | A | 100 | 0.15 | 3.32 | 4-4 | $a^3F$-$z^1G^o$ † (11) |
| 3663.64 | A | 300 | 0.15 | 3.52 | 4-4 | $a^3F$-$w^3F^o$ (12) |
| 3623.87 | A | 300 | 0.07 | 3.48 | 3-3 | |
| 3586.28 | A | 100 | 0.00 | 3.44 | 2-2 | |
| 3714.13 | A | 30 | 0.15 | 3.48 | 4-3 | |
| 3661.20 | A | 30 | 0.07 | 3.44 | 3-2 | |
| 3575.79 | A | 100 | 0.07 | 3.52 | 3-4 | |
| 3550.46 | A | 30 | 0.00 | 3.48 | 2-3 | |
| 3601.18 | A | 400 | 0.15 | 3.58 | 4-5 | $a^3F$-$x^3G^o$ † (13) |
| 3547.69 | A | 100 | 0.07 | 3.55 | 3-4 | |
| 3519.60 | A | 125 | 0.00 | 3.51 | 2-3 | |
| 3533.22 | A | 60 | 0.15 | 3.65 | 4-5 | $a^3F$-$y^5F^o$ † (14) |
| 3501.33 | A | 15 | 0.07 | 3.60 | 3-4 | |
| 3566.10 | A | 100 | 0.15 | 3.61 | 4-3 | $a^3F$-$v^3D^o$ † (15) |
| 3509.32 | A | 100 | 0.07 | 3.59 | 3-2 | |
| *3471.18 § | A | 100 | 0.00 | 3.56 | 2-1 | |
| 3447.36 | A | 100 | 0.00 | 3.58 | 2-1 | $a^3F$-$z^1P^o$ (16) |
| 3430.29 | A | 8 | 0.15 | 3.75 | 4-4 | $a^3F$-$x^5D^o$ † (17) |
| 3465.63 | A | 10 | 0.15 | 3.71 | 4-3 | |
| *3414.66 § | A | 20 | 0.07 | 3.68 | 3-2 | |
| 3368.63 | A | 5 | 0.00 | 3.66 | 2-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Zr I** continued | | | | | | |
| 3353.65 | A | 20 | 0.15 | 3.83 | 4-4 | $a^3F$-$y^1G^o$ (18) |
| 3234.12 | A | 100 | 0.15 | 3.97 | 4-5 | $a^3F$-$w^3G^o$ (19) |
| 3218.02 | A | 100 | 0.07 | 3.91 | 3-4 | |
| 3191.23 | A | 100 | 0.00 | 3.87 | 2-3 | |
| 3282.73 | A | 15 | 0.15 | 3.91 | 4-4 | |
| •3250.42§ | A | 35 | 0.07 | 3.87 | 3-3 | |
| 3085.34 | A | 12 | 0.07 | 4.07 | 3-2 | $a^3F$-$v^3F^o$ (20) |
| 3014.44 | A | 15 | 0.00 | 4.09 | 2-2 | $a^3F$-$u^3F^o$ † (21) |
| 3029.52 | A | 300 | 0.15 | 4.23 | 4-3 | $a^3F$-$u^3D^o$ † |
| 3011.73 | A | 250 | 0.07 | 4.17 | 3-2 | (22) |
| 2985.36 | A | 200 | 0.00 | 4.13 | 2-1 | |
| 7111.71 | A | 20 | 0.52 | 2.25 | 2-3 | $a^3P$-$z^3D^o$ † |
| 7439.89 | A | 10 | 0.54 | 2.20 | 1-2 | (23) |
| 7554.73 | A | 5 | 0.52 | 2.15 | 0-1 | |
| 7336.03 | A | 4 | 0.52 | 2.20 | 2-2 | |
| 6140.50 | A | 15 | 0.52 | 2.53 | 2-2 | $a^3P$-$z^3P^o$ |
| 6192.96 | A | 5 | 0.54 | 2.53 | 1-1 | (24) |
| 6120.86 | A | (5) | 0.52 | 2.53 | 2-1 | |
| •6304.35 | A | (3) | 0.54 | 2.50 | 1-0 | |
| 6213.06 | A | 8 | 0.54 | 2.53 | 1-2 | |
| 8124.86 | A | 5 | 0.52 | 2.53 | 0-1 | |
| 5620.16 | A | 15 | 0.52 | 2.71 | 2-1 | $a^3P$-$z^3S^o$ † |
| •5680.93 | A | 15 | 0.54 | 2.71 | 1-1 | (25) |
| 5385.14 | A | 40 | 0.52 | 2.81 | 2-2 | $a^3P$-$y^1D^o$ (26) |
| 5133.42 | A | 6 | 0.52 | 2.92 | 2-3 | $a^3P$-$y^3D^o$ † |
| 5277.40 | A | 8 | 0.54 | 2.88 | 1-2 | (27) |
| 5311.42 | A | 6 | 0.52 | 2.84 | 0-1 | |
| 5224.94 | A | 6 | 0.52 | 2.88 | 2-2 | |
| 5362.56 | A | 6 | 0.54 | 2.84 | 1-1 | |
| 4948.77 | A | 2 | 0.52 | 3.01 | 2-3 | $a^3P$-$y^1F^o$ (28) |
| 4604.42 | A | 8 | 0.52 | 3.20 | 2-3 | $a^3P$-$z^5P^o$ † (29) |
| 4535.75 | A | 30 | 0.52 | 3.24 | 2-3 | $a^3P$-$x^1F^o$ (30) |
| 4360.80 | A | 15 | 0.52 | 3.35 | 2-3 | $a^3P$-$x^3D^o$ † |
| 4507.11 | A | 30 | 0.54 | 3.28 | 1-2 | (31) |
| 4553.01 | A | 12 | 0.52 | 3.23 | 0-1 | |
| 4043.57 | A | 30 | 0.52 | 3.57 | 2-2 | $a^3P$-$x^3P^o$ † |
| 4108.39 | A | 15 | 0.54 | 3.54 | 1-1 | (32) |
| 4121.45 | A | 30 | 0.54 | 3.53 | 1-0 | |
| 3613.70 | A | 15 | 0.52 | 3.93 | 2-1 | $a^3P$-$y^3S^o$ † (33) |
| 3269.66 | A | 40 | 0.52 | 4.29 | 2-2 | $a^3P$-$y^5P^o$ † (34) |
| 3260.11 | A | 40 | 0.52 | 4.30 | 2-2 | $a^3P$-$w^1D^o$ † (35) |
| 3045.82 | A | 10 | 0.52 | 4.57 | 2-2 | $a^3P$-$v^3P^o$ |
| 3094.79 | A | 15 | 0.52 | 4.50 | 2-1 | (36) |
| •3157.82 | A | 50 | 0.54 | 4.45 | 1-0 | |
| •3063.58§ | A | 8 | 0.54 | 4.57 | 1-2 | |
| 3095.82 | A | 12 | 0.52 | 4.50 | 0-1 | |
| 3120.74 | A | 125 | 0.52 | 4.47 | 2-3 | $a^3P$-$t^3D^o$ |
| 3132.06 | A | 50 | 0.54 | 4.48 | 1-2 | (37) |
| 3131.11 | A | 25 | 0.52 | 4.46 | 0-1 | |
| 3113.50 | A | 8 | 0.52 | 4.48 | 2-2 | |
| 3148.81 | A | 25 | 0.54 | 4.46 | 1-1 | |
| 3130.05 | A | 8 | 0.52 | 4.48 | 2-1 | |
| 3005.36 | A | 40 | 0.52 | 4.62 | 2-2 | $a^3P$-$u^3P^o$ † |
| 3108.36 | A | 10 | 0.54 | 4.51 | 1-0 | (38) |
| 9015.16 | B | 20 | 0.73 | 2.10 | 5-6 | $a^5F$-$z^5G^o$ † |
| 9276.89 | B | 25 | 0.88 | 2.01 | 4-5 | (39) |
| 9547.26 | B | 25 | 0.65 | 1.94 | 3-4 | |
| 9822.30 | B | 20 | 0.82 | 1.88 | 2-3 | |
| 10084.70 | B | 12 | 0.60 | 1.83 | 1-2 | |
| 8070.12 | A | (25) | 0.73 | 2.26 | 5-5 | $a^5F$-$z^5F^o$ |
| 8133.00 | A | (20) | 0.68 | 2.20 | 4-4 | (40) |
| 8212.59 | A | (18) | 0.65 | 2.15 | 3-3 | |
| 8305.94 | A | (15) | 0.62 | 2.11 | 2-2 | |
| 8389.42 | A | (8) | 0.60 | 2.07 | 1-1 | |
| 8370.21 | A | (10) | 0.73 | 2.20 | 5-4 | |
| 8414.00 | A | (7) | 0.88 | 2.15 | 4-3 | |
| 8464.65 | A | (10) | 0.65 | 2.11 | 3-2 | |
| 8498.44 | A | (10) | 0.62 | 2.07 | 2-1 | |
| 7849.38 | A | (15) | 0.68 | 2.26 | 4-5 | |
| 7944.65 | A | (15) | 0.65 | 2.20 | 3-4 | |
| 8083.10 | A | (10) | 0.62 | 2.15 | 2-3 | |
| 8201.73 | A | (10) | 0.60 | 2.11 | 1-2 | |
| 7870.90 | A | (12) | 0.88 | 2.25 | 4-3 | $a^5F$-$z^3D^o$ † |
| 7956.69 | A | (7) | 0.85 | 2.20 | 3-2 | (41) |
| 8058.14 | A | (7) | 0.62 | 2.15 | 2-1 | |
| 7189.14 | A | 150 | 0.73 | 2.45 | 5-4 | $a^5F$-$z^5D^o$ † |
| 7097.76 | A | 150 | 0.88 | 2.42 | 4-3 | (42) |
| 7162.95 | A | 80 | 0.85 | 2.39 | 3-2 | |
| 7103.77 | A | 40 | 0.82 | 2.38 | 2-1 | |
| 7087.35 | A | 20 | 0.60 | 2.34 | 1-0 | |
| 4687.80 // | A | 150 | 0.73 | 3.36 | 5-6 | $a^5F$-$y^5G^o$ |
| 4710.08 | A | 100 | 0.68 | 3.30 | 4-5 | (43) |
| 4739.48 | A | 100 | 0.65 | 3.25 | 3-4 | |
| 4772.32 | A | 80 | 0.82 | 3.21 | 2-3 | |
| 4815.62 | A | 60 | 0.60 | 3.16 | 1-2 | |
| 4788.69 | A | 8 | 0.73 | 3.30 | 5-5 | |
| 4805.88 | A | 15 | 0.68 | 3.25 | 4-4 | |
| 4824.29 | A | 12 | 0.85 | 3.21 | 3-3 | |
| 4851.36 | A | 12 | 0.82 | 3.16 | 2-2 | |
| 4887.72 | A | (2) | 0.73 | 3.25 | 5-4 | |
| •4891.12 | A | 2 | 0.68 | 3.21 | 4-3 | |
| 4905.09 | A | (4) | 0.85 | 3.18 | 3-2 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Zr I** continued | | | | | | |
| 4866.07 | A | 5 | 0.73 | 3.26 | 5-5 | $a^5P$-$y^3G^o$ † |
| 4883.61 | A | 5 | 0.68 | 3.21 | 4-4 | (44) |
| 4881.25 | A | 4 | 0.65 | 3.18 | 3-3 | |
| 4784.94 | A | 12 | 0.68 | 3.26 | 4-5 | |
| 4815.05 | A | 12 | 0.65 | 3.21 | 3-4 | |
| 4828.05 | A | 10 | 0.62 | 3.18 | 2-3 | |
| 4227.76 | A | 200 | 0.73 | 3.65 | 5-5 | $a^5P$-$y^5F^o$ |
| 4239.31 | A | 150 | 0.68 | 3.60 | 4-4 | (45) |
| 4241.68 | A | 80 | 0.65 | 3.56 | 3-3 | |
| 4241.20 | A | 50 | 0.62 | 3.53 | 2-2 | |
| 4240.35 | A | 50 | 0.60 | 3.51 | 1-1 | |
| 4302.88 | A | 15 | 0.73 | 3.60 | 5-4 | |
| 4294.78 | A | 20 | 0.68 | 3.56 | 4-3 | |
| •4282.20 § | A | 20 | 0.65 | 3.53 | 3-2 | |
| 4268.01 | A | 20 | 0.62 | 3.51 | 2-1 | |
| 4166.37 | A | 20 | 0.68 | 3.65 | 4-5 | |
| 4187.56 | A | 20 | 0.65 | 3.60 | 3-4 | |
| 4201.45 | A | 20 | 0.62 | 3.56 | 2-3 | |
| 4213.86 | A | 15 | 0.60 | 3.53 | 1-2 | |
| 4081.22 | A | 100 | 0.73 | 3.75 | 5-4 | $a^5F$-$x^5D^o$ |
| 4072.71 | A | 100 | 0.68 | 3.71 | 4-3 | (46) |
| 4064.16 | A | 100 | 0.65 | 3.68 | 3-2 | |
| 4055.03 | A | 60 | 0.62 | 3.66 | 2-1 | |
| 4044.57 | A | 25 | 0.60 | 3.65 | 1-0 | |
| 4023.99 | A | 30 | 0.68 | 3.75 | 4-4 | |
| 4034.92 | A | 40 | 0.65 | 3.71 | 3-3 | |
| 4037.20 | A | 40 | 0.62 | 3.68 | 2-2 | |
| 4030.03 | A | 30 | 0.60 | 3.68 | 1-1 | |
| 3977.32 | A | 3 | 0.65 | 3.75 | 3-4 | |
| •3988.68 | A | 10 | 0.62 | 3.71 | 2-3 | |
| 4002.55 | A | 8 | 0.60 | 3.68 | 1-2 | |
| 5664.55 | A | 25 | 0.63 | 2.81 | 2-2 | $a^1D$-$y^1D^o$ (47) |
| 4732.34 | A | 15 | 0.63 | 3.24 | 2-3 | $a^1D$-$x^1F^o$ (48) |
| 4542.22 | A | 20 | 0.63 | 3.35 | 2-3 | $a^1D$-$x^3D^o$ † (49) |
| 4135.68 | A | 10 | 0.63 | 3.61 | 2-3 | $a^1D$-$v^3D^o$ † (50) |
| 4183.31 | A | 10 | 0.63 | 3.58 | 2-1 | $a^1D$-$z^1P^o$ (51) |
| 3530.22 | A | 15 | 0.63 | 4.13 | 2-3 | $a^1D$-$u^3F^o$ † (52) |
| 3360.45 | A | 25 | 0.63 | 4.30 | 2-2 | $a^1D$-$w^1D^o$ (53) |
| 3090.44 | A | 6 | 0.63 | 4.62 | 2-2 | $a^1D$-$u^3P^o$ |
| 3136.95 | A | 30 | 0.63 | 4.56 | 2-1 | (54) |
| •3157.82 | A | 50 | 0.63 | 4.54 | 2-3 | $a^1D$-$w^1F^o$ (55) |
| 3139.79 | A | 20 | 0.63 | 4.56 | 2-3 | $a^1D$-$v^3G^o$ (56) |
| 6445.76 | A | 10 | 0.99 | 2.91 | 4-3 | $a^1G$-$y^3F^o$ (57) |
| 3877.60 | A | 40 | 0.99 | 4.18 | 4-5 | $a^1G$-$z^1H^o$ (58) |
| 3535.16 | A | 20 | 0.99 | 4.49 | 4-4 | $a^1G$-$x^1G^o$ (59) |
| 3005.50 | A | 60 | 0.99 | 5.10 | 4-4 | $a^1G$-$w^1G^o$ (60) |
| 4341.13 | A | 20 | 1.39 | 4.23 | 3-4 | $a^5P$-$w^5D^o$ † |
| 4386.45 | A | 15 | 1.36 | 4.19 | 2-3 | (61) |
| 4394.94 | A | 8 | 1.34 | 4.15 | 1-2 | |
| 4413.04 | A | 12 | 1.39 | 4.19 | 3-3 | |
| 4420.45 | A | 12 | 1.36 | 4.15 | 2-2 | |
| 4431.48 | A | 10 | 1.34 | 4.13 | 1-1 | |
| 5046.61 | A | 10 | 1.52 | 3.97 | 4-5 | $b^3F$-$w^3G^o$ † |
| 5084.92 | A | 15 | 1.48 | 3.91 | 3-4 | (62) |
| 5078.28 | A | 20 | 1.44 | 3.87 | 2-3 | |
| 4883.43 | A | 15 | 1.52 | 4.16 | 4-4 | $b^3F$-$v^3F^o$ † |
| 4707.78 | A | 4 | 1.48 | 4.10 | 3-3 | (63) |
| 4711.91 | A | 8 | 1.52 | 4.14 | 4-4 | $b^3F$-$u^3F^o$ † |
| 4657.84 | A | 7 | 1.48 | 4.13 | 3-3 | (64) |
| •4644.82 | A | 8 | 1.44 | 4.09 | 2-2 | |
| 6313.05 | A | 50 | 1.58 | 3.53 | 5-6 | $a^3G$-$z^3H^o$ † |
| 6470.25 | A | 15 | 1.58 | 3.48 | 4-5 | (65) |
| 6489.66 | A | 25 | 1.54 | 3.45 | 3-4 | |
| 4753.06 | A | 3 | 1.87 | 4.46 | 6-7 | $a^3H$-$z^3I^o$ |
| 4719.12 | A | 10 | 1.65 | 4.47 | 5-6 | (66) |
| 4782.76 | A | 8 | 1.63 | 4.42 | 4-5 | |

**Zr II** I P 13.97 Anal A Liet A July 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3391.96 // | A | 100 | 0.18 | 3.80 | 4½-5½ | $a^4F$-$z^4G^o$ (1) |
| 3438.23 | A | 100 | 0.09 | 3.68 | 3½-4½ | |
| 3496.18 | A | 50 | 0.04 | 3.57 | 2½-3½ | |
| 3572.47 | A | 30 | 0.00 | 3.45 | 1½-2½ | |
| 3505.67 | A | 12 | 0.16 | 3.68 | 4½-4½ | |
| 3551.94 | A | 16 | 0.09 | 3.57 | 3½-3½ | |
| 3613.08 | A | 12 | 0.04 | 3.45 | 2½-2½ | |
| 3872.85 | A | 2 | 0.09 | 3.45 | 3½-2½ | |
| 3419.10 | A | 5 | 0.16 | 3.77 | 4½-3½ | $a^4F$-$z^2F^o$ |
| 3478.29 | A | 4 | 0.09 | 3.64 | 3½-2½ | (2) |
| 3434.82 | A | 7 | 0.04 | 3.84 | 2½-2½ | |
| 3305.15 | A | 15 | 0.04 | 3.77 | 2½-3½ | |
| 3388.29 | A | 15 | 0.00 | 3.64 | 1½-2½ | |
| 3273.04 | A | 75 | 0.16 | 3.93 | 4½-4½ | $a^4F$-$z^4F^o$ |
| 3279.28 | A | 65 | 0.09 | 3.86 | 3½-3½ | (3) |
| 3306.27 | A | 25 | 0.04 | 3.77 | 2½-2½ | |
| 3357.26 | A | 15 | 0.00 | 3.68 | 1½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multipl (No) |
|---|---|---|---|---|---|---|
| **Zr II** continued | | | | | | |
| 3340.55 | A | 15 | 0.16 | 3.86 | 4½-3½ | $a^4F$-$z^4$ cont |
| 3356.08 | A | 18 | 0.09 | 3.77 | 3½-2½ | |
| 3393.12 | A | 10 | 0.04 | 3.88 | 2½-1½ | |
| 3214.19 | A | 40 | 0.09 | 3.93 | 3½-4½ | |
| 3231.69 | A | 30 | 0.04 | 3.86 | 2½-3½ | |
| 3272.21 | A | 6 | 0.00 | 3.77 | 1½-2½ | |
| •3288.81 | A | 10 | 0.09 | 3.85 | 3½-2½ | $a^4F$-$z^2D$ |
| 3319.03 | A | 8 | 0.04 | 3.76 | 2½-1½ | (4) |
| 3241.01 | A | 25 | 0.04 | 3.85 | 2½-2½ | |
| 3284.72 | A | 20 | 0.00 | 3.76 | 1½-1½ | |
| 3208.32 | A | 4 | 0.00 | 3.85 | 1½-2½ | |
| 3165.98 | A | 10 | 0.16 | 4.06 | 4½-3½ | $a^4F$-$z^4D$ |
| 3136.86 | A | 25 | 0.09 | 4.03 | 3½-2½ | (5) |
| 3139.76 | A | 12 | 0.04 | 3.98 | 2½-1½ | |
| 3125.92 | A | 12 | 0.00 | 3.95 | 1½- ½ | |
| 3110.87 | A | 8 | 0.09 | 4.06 | 3½-3½ | |
| 3095.07 | A | 12 | 0.04 | 4.03 | 2½-2½ | |
| 3099.22 | A | 10 | 0.00 | 3.98 | 1½-1½ | |
| 3068.02 | A | 2 | 0.04 | 4.06 | 2½-3½ | |
| 3065.20 | A | 2 | 0.00 | 4.03 | 1½-2½ | |
| 3061.33 | A | 3 | 0.09 | 4.13 | 3½-2½ | $a^4F$-$y^2D$ |
| 3060.11 | A | 3 | 0.04 | 4.07 | 2½-1½ | (6) |
| 3019.84 | A | 3 | 0.04 | 4.13 | 2½-2½ | |
| 3030.91 | A | 10 | 0.00 | 4.07 | 1½-1½ | |
| 2991.40 | A | 5 | 0.00 | 4.13 | 1½-2½ | |
| 3697.49 | A | 20 | 0.48 | 3.80 | 4½-5½ | $b^4F$-$z^4G^o$ |
| 3766.83 | A | 25 | 0.41 | 3.68 | 3½-4½ | (7) |
| 3843.03 | A | 30 | 0.38 | 3.57 | 2½-3½ | |
| 3934.14 | A | 20 | 0.32 | 3.45 | 1½-2½ | |
| 3832.94 | A | 1 | 0.46 | 3.68 | 4½-4½ | |
| 3903.77 | A | 1 | 0.41 | 3.57 | 3½-3½ | |
| 3984.76 | A | 4 | 0.36 | 3.45 | 2½-2½ | |
| 3729.74 | A | 5 | 0.46 | 3.77 | 4½-3½ | $b^4F$-$z^2F^o$ |
| 3814.97 | A | 2 | 0.41 | 3.64 | 3½-2½ | (8) |
| 3667.06 | A | 3 | 0.41 | 3.77 | 3½-3½ | |
| 3758.96 | A | 1 | 0.36 | 3.64 | 2½-2½ | |
| •3613.43 | A | 2 | 0.38 | 3.77 | 2½-3½ | |
| 3711.95 | A | 1 | 0.32 | 3.64 | 1½-2½ | |
| 3556.81 | A | 30 | 0.48 | 3.93 | 4½-4½ | $b^4F$-$z^4F^o$ |
| 3576.88 | A | 20 | 0.41 | 3.86 | 3½-3½ | (9) |
| 3614.79 | A | 18 | 0.36 | 3.77 | 2½-2½ | |
| 3674.74 | A | 40 | 0.32 | 3.68 | 1½-1½ | |
| 3636.46 | A | 8 | 0.46 | 3.86 | 4½-3½ | |
| 3668.46 | A | 8 | 0.41 | 3.77 | 3½-2½ | |
| 3718.86 | A | 6 | 0.36 | 3.88 | 2½-1½ | |
| 3499.58 | A | 8 | 0.41 | 3.93 | 3½-4½ | |
| 3525.81 | A | 8 | 0.36 | 3.86 | 2½-3½ | |
| 3573.09 | A | 8 | 0.32 | 3.77 | 1½-2½ | |
| 3588.32 | A | 6 | 0.41 | 3.85 | 3½-2½ | $b^4F$-$z^2D^o$ |
| 3630.03 | A | 10 | 0.36 | 3.78 | 2½-1½ | (10) |
| 3536.94 | A | 5 | 0.38 | 3.85 | 2½-2½ | |
| 3587.98 | A | 7 | 0.32 | 3.76 | 1½-1½ | |
| 3497.00 | A | 2 | 0.32 | 3.65 | 1½-2½ | |
| 3430.53 | A | 30 | 0.48 | 4.06 | 4½-3½ | $b^4F$-$z^4D^o$ |
| 3410.26 | A | 20 | 0.41 | 4.03 | 3½-2½ | (11) |
| 3404.84 | A | 12 | 0.36 | 3.98 | 2½-1½ | |
| 3399.36 | A | 10 | 0.32 | 3.95 | 1½- ½ | |
| 3377.45 | A | 8 | 0.41 | 4.06 | 3½-3½ | |
| 3363.81 | A | 5 | 0.36 | 4.03 | 2½-2½ | |
| 3367.81 | A | 5 | 0.32 | 3.98 | 1½-1½ | |
| 3331.90 | A | 2 | 0.36 | 4.06 | 2½-3½ | |
| 3327.67 | A | 2 | 0.32 | 4.03 | 1½-2½ | |
| 3275.15 | A | 2 | 0.38 | 4.13 | 2½-2½ | $b^4F$-$y^2D^o$ |
| 3287.31 | A | 3 | 0.32 | 4.07 | 1½-1½ | (12) |
| 3240.85 | P | | 0.32 | 4.13 | 1½-2½ | |
| 2998.34 | A | 1 | 0.32 | 4.43 | 1½-1½ | $b^4F$-$z^2P^o$ (13) |
| 2968.95 | A | 12 | 0.46 | 4.62 | 4½-3½ | $b^4F$-$y^4F^o$ |
| 2978.07 | A | 12 | 0.41 | 4.55 | 3½-2½ | (14) |
| 2979.18 | A | 12 | 0.36 | 4.50 | 2½-1½ | |
| 4096.63 | A | 4 | 0.56 | 3.57 | 2½-3½ | $a^2D$-$z^4G^o$ |
| 4211.88 | A | 12 | 0.52 | 3.45 | 1½-2½ | (15) |
| 4258.05 | A | 12 | 0.56 | 3.45 | 2½-2½ | |
| 3636.76 | A | 60 | 0.56 | 3.77 | 2½-3½ | $a^2D$-$z^2F^o$ |
| 3958.34 | A | 50 | 0.52 | 3.64 | 1½-2½ | (16) |
| 3996.96 | A | 30 | 0.56 | 3.64 | 2½-2½ | |
| 3738.13 | A | 5 | 0.56 | 3.86 | 2½-3½ | $a^2D$-$z^4F^o$ |
| 3800.73 | A | 5 | 0.52 | 3.77 | 1½-2½ | (17) |
| 3638.26 | A | 5 | 0.56 | 3.77 | 2½-2½ | |
| 3915.94 | A | 25 | 0.52 | 3.68 | 1½-1½ | |
| 3955.62 | P | | 0.56 | 3.68 | 2½-1½ | |
| 3750.65 | A | 6 | 0.56 | 3.85 | 2½-2½ | $a^2D$-$z^2D^o$ |
| 3817.59 | A | 12 | 0.52 | 3.76 | 1½-1½ | (16) |
| 3855.43 | A | 3 | 0.56 | 3.76 | 2½-1½ | |
| 3714.77 | A | 15 | 0.52 | 3.85 | 1½-2½ | |
| 3520.67 | A | 5 | 0.56 | 4.06 | 2½-3½ | $a^2D$-$z^4D^o$ |
| m3558.54 | P | Zr+ | 0.56 | 4.03 | 2½-2½ | (19) |
| 3457.56 | A | 12 | 0.56 | 4.13 | 2½-2½ | $a^2D$-$y^2D^o$ |
| 3479.02 | A | 5 | 0.52 | 4.07 | 1½-1½ | (20) |
| 3510.46 | A | 7 | 0.56 | 4.07 | 2½-1½ | |
| 3334.62 | A | 9 | 0.56 | 4.26 | 2½-3½ | $a^2D$-$z^2G^o$ (21) |
| 3271.13 | A | 7 | 0.52 | 4.30 | 1½- ½ | $a^2D$-$z^2S^o$ (22) |
| 3162.86 | A | 35 | 0.56 | 4.43 | 2½-1½ | $a^2D$-$z^2P^o$ |
| 3129.18 | A | 10 | 0.52 | 4.47 | 1½- ½ | (23) |
| 3157.00 | A | 10 | 0.52 | 4.43 | 1½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Zr II** continued | | | | | | |
| 2981.02 | A | 12 | 0.56 | 4.70 | 2½-3½ | $a^3D$-$y^4D^o$ |
| 3036.50 | A | 7 | 0.52 | 4.59 | 1½-2½ | (24) |
| 3088.44 | A | 2 | 0.52 | 4.52 | ½-1½ | |
| 3111.15 | A | 2 | 0.56 | 4.52 | 2½-1½ | |
| 3125.31 | A | 4 | 0.52 | 4.47 | 1½- ½ | |
| 3038.39 | A | 15 | 0.56 | 4.62 | 2½-3½ | $a^3D$-$y^4F^o$ |
| 3064.84 | A | 3 | 0.52 | 4.55 | 1½-2½ | (25) |
| 3089.00 | A | 1 | 0.56 | 4.55 | 2½-2½ | |
| 3003.73 | A | 15 | 0.56 | 4.68 | 2½-3½ | $a^3D$-$y^3F^o$ |
| 3020.45 | A | 5 | 0.52 | 4.61 | 1½-2½ | (26) |
| 3044.12 | A | 4 | 0.56 | 4.61 | 2½-2½ | |
| 3013.32 | A | 8 | 0.56 | 4.65 | 2½-1½ | $a^2D$-$z^4S^o$ |
| 2990.10 | A | 3 | 0.52 | 4.65 | 1½-1½ | (27) |
| 4373.52 | A | 4 | 0.75 | 3.64 | 1½-2½ | $a^2P$-$z^2F^o$ |
| | | | | | | (28) |
| 4090.52 | A | 10 | 0.75 | 3.77 | 1½-2½ | $a^2P$-$z^4F^o$ |
| 4156.24 | A | 15 | 0.71 | 3.68 | ½-1½ | (29) |
| 4224.27 | A | 3 | 0.75 | 3.68 | 1½-1½ | |
| 3991.14 | A | 40 | 0.75 | 3.85 | 1½-2½ | $a^2P$-$z^2D^o$ |
| 4045.63 | A | 15 | 0.71 | 3.76 | ½-1½ | (30) |
| 4110.05 | A | 3 | 0.75 | 3.76 | 1½-1½ | |
| 3772.06 | A | 4 | 0.75 | 4.03 | 1½-2½ | $a^2P$-$z^4D^o$ |
| 3767.89 | A | 5 | 0.71 | 3.98 | ½-1½ | (31) |
| 3823.72 | A | 1 | 0.75 | 3.98 | 1½-1½ | |
| 3807.41 | A | 2 | 0.71 | 3.95 | ½- ½ | |
| 3660.92 | A | 3 | 0.75 | 4.13 | 1½-2½ | $a^2P$-$y^2D^o$ |
| 3667.40 | A | 1 | 0.71 | 4.07 | ½-1½ | (32) |
| 3720.29 | P | | 0.75 | 4.07 | 1½-1½ | |
| 3483.54 | A | 12 | 0.75 | 4.30 | 1½- ½ | $a^2P$-$z^2S^o$ |
| 3437.18 | A | 10 | 0.71 | 4.30 | ½- ½ | (33) |
| 3354.39 | A | 7 | 0.75 | 4.43 | 1½-1½ | $a^2P$-$z^2P^o$ |
| 3280.75 | A | 3 | 0.71 | 4.47 | ½- ½ | (34) |
| 3322.99 | A | 10 | 0.75 | 4.47 | 1½- ½ | |
| 3311.34 | A | 4 | 0.71 | 4.43 | ½-1½ | |
| 3218.68 | A | 1 | 0.75 | 4.59 | 1½-2½ | $a^2P$-$y^4D^o$ |
| 3318.52 | A | 7 | 0.75 | 4.47 | 1½- ½ | (35) |
| 3278.37 | A | 1 | 0.71 | 4.47 | ½- ½ | |
| 3295.03 | A | 1 | 0.75 | 4.50 | 1½-1½ | $a^2P$-$y^4F^o$ |
| | | | | | | (36) |
| 3200.87 | A | 2 | 0.75 | 4.61 | 1½-2½ | $a^2P$-$y^2F^o$ |
| | | | | | | (37) |
| 3088.28 | A | 1 | 0.75 | 4.75 | 1½-2½ | $a^2P$-$z^4P^o$ |
| 3128.79 | A | 1 | 0.75 | 4.70 | 1½- ½ | (38) |
| 3091.30 | A | 1 | 0.71 | 4.70 | ½- ½ | |
| 3021.97 | A | 1 | 0.75 | 4.84 | 1½-1½ | $a^2P$-$x^4D^o$ |
| 3010.28 | A | 2wl | 0.71 | 4.81 | ½- ½ | (39) |
| 4377.37 | A | 4 | 0.80 | 3.68 | 3½-4½ | $a^2F$-$z^4G^o$ |
| 4317.32 | A | 12 | 0.71 | 3.57 | 2½-3½ | (40) |
| 4454.80 | A | 10 | 0.80 | 3.57 | 3½-3½ | |
| 4496.98 | A | 15 | 0.71 | 3.45 | 2½-2½ | |
| 4149.22 | A | 75 | 0.80 | 3.77 | 3½-3½ | $a^2F$-$z^2F^o$ |
| 4208.99 | A | 30 | 0.71 | 3.64 | 2½-2½ | (41) |
| 4339.56 | A | 3 | 0.80 | 3.64 | 3½-2½ | |
| 4039.68 | A | 20 | 0.71 | 3.77 | 2½-3½ | |
| 3936.07 | A | 7 | 0.80 | 3.93 | 3½-4½ | $a^2F$-$z^4F^o$ |
| 3921.02 | P | | 0.71 | 3.86 | 2½-3½ | (42) |
| 4034.10 | A | 5 | 0.80 | 3.86 | 3½-3½ | |
| 4031.35 | A | 2 | 0.71 | 3.77 | 2½-2½ | |
| 4150.97 | A | 10 | 0.80 | 3.77 | 3½-2½ | |
| 4161.20 | A | 20 | 0.71 | 3.68 | 2½-1½ | |
| 4048.68 | A | 25 | 0.80 | 3.85 | 3½-2½ | $a^2F$-$z^2D^o$ |
| 4050.32 | A | 15 | 0.71 | 3.76 | 2½-1½ | (43) |
| 3934.80 | A | 20 | 0.71 | 3.85 | 2½-2½ | |
| 3782.24 | A | 4 | 0.80 | 4.06 | 3½-3½ | $a^2F$-$z^4D^o$ |
| 3721.69 | A | 2 | 0.71 | 4.03 | 2½-2½ | (44) |
| 3823.41 | A | 3 | 0.80 | 4.03 | 3½-2½ | |
| 3771.98 | A | 2 | 0.71 | 3.98 | 2½-1½ | |
| 3682.67 | A | 2 | 0.71 | 4.06 | 2½-3½ | |
| 3709.27 | A | 60 | 0.80 | 4.13 | 3½-2½ | $a^2F$-$y^2D^o$ |
| 3871.28 | A | 20 | 0.71 | 4.07 | 2½-1½ | (45) |
| *3613.43 | A | 2 | 0.71 | 4.13 | 2½-2½ | |
| 3481.14 | A | 35 | 0.80 | 4.34 | 3½-4½ | $a^2F$-$z^2G^o$ |
| 3479.39 | A | 30 | 0.71 | 4.26 | 2½-3½ | (46) |
| 3568.14 | A | 4 | 0.80 | 4.26 | 3½-3½ | |
| 3514.49 | A | 10 | 0.71 | 4.43 | 2½-1½ | $a^2F$-$z^2P^o$ |
| | | | | | | (47) |
| 3166.29 | A | 8 | 0.80 | 4.70 | 3½-3½ | $a^2F$-$y^4D^o$ |
| 3181.94 | A | 7 | 0.71 | 4.59 | 2½-2½ | (48) |
| 3228.81 | A | 15 | 0.80 | 4.62 | 3½-3½ | $a^2F$-$y^4F^o$ |
| 3213.85 | A | 6 | 0.71 | 4.55 | 2½-2½ | (49) |
| 3256.53 | A | 1 | 0.71 | 4.50 | 2½-1½ | |
| 3155.95 | A | 1 | 0.71 | 4.62 | 2½-3½ | |
| 3191.93 | A | 12 | 0.80 | 4.66 | 3½-3½ | $a^2F$-$y^2F^o$ |
| 3184.32 | A | 20 | 0.71 | 4.81 | 2½-2½ | (50) |
| 3237.54 | A | 1 | 0.80 | 4.61 | 3½-2½ | |
| m3120.72 | P | Zr | 0.71 | 4.68 | 2½-3½ | |
| 3123.81 | A | 1 | 0.80 | 4.75 | 3½-2½ | $a^2F$-$z^4P^o$ |
| 3054.39 | A | 3 | 0.71 | 4.75 | 2½-2½ | (51) |
| 3013.88 | A | 0 | 0.80 | 4.89 | 3½-2½ | $a^2F$-$x^4D^o$ |
| | | | | | | (52) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Zr II** continued | | | | | | |
| 4448.50 | A | 2 | 0.99 | 3.77 | 2½-3½ | $a^4P$-$z^2F^o$ |
| | | | | | | (53) |
| 4024.45 | A | 12 | 0.99 | 4.06 | 2½-3½ | $a^4P$-$z^4D^o$ |
| 4018.38 | A | 10 | 0.96 | 4.03 | 1½-2½ | (54) |
| 4040.24 | A | 4 | 0.93 | 3.98 | ½-1½ | |
| 4071.09 | A | 4 | 0.99 | 4.03 | 2½-2½ | |
| 4077.05 | A | 3 | 0.96 | 3.98 | 1½-1½ | |
| 4085.88 | A | 5 | 0.93 | 3.95 | ½- ½ | |
| 4131.31 | A | 1 | 0.99 | 3.98 | 2½-1½ | |
| 4123.38 | A | 1 | 0.96 | 3.95 | 1½- ½ | |
| 3941.92 | A | 3 | 0.99 | 4.13 | 2½-2½ | $a^4P$-$y^3D^o$ |
| | | | | | | (55) |
| 3692.60 | A | 1 | 0.96 | 4.30 | 1½- ½ | $a^4P$-$z^2S^o$ |
| | | | | | | (56) |
| 3588.80 | A | 2 | 0.99 | 4.43 | 2½-1½ | $a^4P$-$z^2P^o$ |
| 3513.87 | A | 3 | 0.96 | 4.47 | 1½- ½ | (57) |
| 3485.31 | A | 5 | 0.93 | 4.47 | ½- ½ | |
| 3334.25 | A | 10 | 0.99 | 4.70 | 2½-3½ | $a^4P$-$y^4D^o$ |
| 3396.34 | A | 7 | 0.96 | 4.59 | 1½-2½ | (58) |
| 3432.41 | A | 7 | 0.93 | 4.52 | ½-1½ | |
| 3433.90 | A | 8 | 0.99 | 4.59 | 2½-2½ | |
| 3458.93 | A | 10 | 0.96 | 4.52 | 1½-1½ | |
| 3480.40 | A | 5 | 0.93 | 4.47 | ½- ½ | |
| *3497.90 | A | 12 | 0.99 | 4.52 | 2½-1½ | |
| 3507.66 | A | 4 | 0.96 | 4.47 | 1½- ½ | |
| 3403.69 | A | 8 | 0.99 | 4.62 | 2½-3½ | $a^4P$-$y^4F^o$ |
| 3431.57 | A | 6 | 0.96 | 4.55 | 1½-2½ | (59) |
| 3454.57 | A | 4 | 0.93 | 4.50 | ½-1½ | |
| 3469.94 | A | 4 | 0.99 | 4.55 | 2½-2½ | |
| 3481.44 | A | 2 | 0.96 | 4.50 | 1½-1½ | |
| m3520.91 | P | Zr+ | 0.99 | 4.50 | 2½-1½ | |
| 3362.70 | A | 4 | 0.99 | 4.66 | 2½-3½ | $a^4P$-$y^3F^o$ |
| 3376.25 | A | 7 | 0.96 | 4.61 | 1½-2½ | (60) |
| 3413.39 | A | 5 | 0.99 | 4.61 | 2½-2½ | |
| 3374.71 | A | 15 | 0.99 | 4.65 | 2½-1½ | $a^4P$-$z^4S^o$ |
| 3338.41 | A | 10 | 0.96 | 4.65 | 1½-1½ | (61) |
| 3313.70 | A | 8 | 0.93 | 4.65 | ½-1½ | |
| 3285.89 | A | 4 | 0.99 | 4.75 | 2½-2½ | $a^4P$-$z^4P^o$ |
| *3288.81 | A | 10 | 0.96 | 4.71 | 1½-1½ | (62) |
| 3272.30 | P | | 0.93 | 4.70 | ½- ½ | |
| 3324.03 | P | | 0.99 | 4.71 | 2½-1½ | |
| 3296.41 | A | 7 | 0.96 | 4.70 | 1½- ½ | |
| 3251.46 | P | | 0.96 | 4.75 | 1½-2½ | |
| 3264.81 | A | 6 | 0.93 | 4.71 | ½-1½ | |
| 3106.58 | A | 35 | 0.99 | 4.97 | 2½-3½ | $a^4P$-$x^4D^o$ |
| 3133.49 | A | 25 | 0.96 | 4.89 | 1½-2½ | (63) |
| 3155.68 | A | 10 | 0.93 | 4.84 | ½-1½ | |
| 3165.45 | A | 7 | 0.99 | 4.89 | 2½-2½ | |
| 3178.10 | A | 15 | 0.96 | 4.84 | 1½-1½ | |
| 3181.58 | A | 8 | 0.93 | 4.81 | ½- ½ | |
| 3210.98 | A | 3 | 0.99 | 4.84 | 2½-1½ | |
| 3204.36 | A | 4 | 0.96 | 4.81 | 1½- ½ | |
| 2975.16 | A | 1 | 0.96 | 5.10 | 1½-1½ | $a^4P$-$y^2P^o$ † |
| 3009.85 | A | 2 | 0.93 | 5.03 | ½- ½ | (64) |
| 3048.42 | A | 2 | 0.99 | 5.04 | 2½-3½ | $a^4P$-$y^2G^o$ |
| | | | | | | (65) |
| 4818.47 | A | 1 | 1.01 | 3.57 | 4½-3½ | $a^2G$-$z^4G^o$ |
| | | | | | | (66) |
| 4461.22 | A | 10 | 1.01 | 3.77 | 4½-3½ | $a^2G$-$z^2F^o$ |
| 4613.95 | A | 5 | 0.97 | 3.64 | 3½-2½ | (67) |
| 4399.44 | A | 2 | 0.97 | 3.77 | 3½-3½ | |
| 4215.76 | A | 1 | 1.01 | 3.93 | 4½-4½ | $a^2G$-$z^4F^o$ |
| 4401.35 | A | 2 | 0.97 | 3.77 | 3½-2½ | (68) |
| 4286.51 | A | 5 | 0.97 | 3.85 | 3½-2½ | $a^2G$-$z^2D^o$ |
| | | | | | | (69) |
| 4034.84 | A | 0 | 0.97 | 4.03 | 3½-3½ | $a^2G$-$z^4D^o$ |
| | | | | | | (70) |
| 3698.17 | A | 100 | 1.01 | 4.34 | 4½-4½ | $a^2G$-$z^2G^o$ |
| 3751.60 | A | 75 | 0.97 | 4.26 | 3½-3½ | (71) |
| 3796.47 | A | 20 | 1.01 | 4.26 | 4½-3½ | |
| 3655.56 | A | 7 | 0.97 | 4.34 | 3½-4½ | |
| 3344.80 | A | 15 | 1.01 | 4.70 | 4½-3½ | $a^2G$-$y^4D^o$ |
| 3408.09 | A | 10 | 0.97 | 4.59 | 3½-2½ | (72) |
| 3309.90 | A | 4 | 0.97 | 4.70 | 3½-3½ | |
| *3414.65 § | A | 12 | 1.01 | 4.62 | 4½-3½ | $a^2G$-$y^4F^o$ |
| 3443.57 | A | 7 | 0.97 | 4.55 | 3½-2½ | (73) |
| 3378.30 | A | 5 | 0.97 | 4.62 | 3½-3½ | |
| 3373.42 | A | 8 | 1.01 | 4.66 | 4½-3½ | $a^2G$-$y^2F^o$ |
| 3387.87 | A | 12 | 0.97 | 4.61 | 3½-2½ | (74) |
| 3337.93 | A | 2 | 0.97 | 4.66 | 3½-3½ | |
| 3115.73 | A | 2 | 1.01 | 4.97 | 4½-3½ | $a^2G$-$x^4D^o$ |
| | | | | | | (75) |
| 3054.84 | A | 30 | 1.01 | 5.05 | 4½-4½ | $a^2G$-$y^2G^o$ |
| 3028.05 | A | 20 | 0.97 | 5.04 | 3½-3½ | (76) |
| 3057.22 | A | 5 | 1.01 | 5.04 | 4½-3½ | |
| 3025.70 | A | 2 | 0.97 | 5.05 | 3½-4½ | |
| 2976.61 | A | 10 | 1.01 | 5.15 | 4½-4½ | $a^2G$-$z^2H^o$ † |
| | | | | | | (77) |
| 4854.65 | A | 0 | 1.23 | 3.77 | 2½-3½ | $b^4P$-$z^2F^o$ |
| | | | | | | (78) |
| 4359.74 | A | 10 | 1.23 | 4.06 | 2½-3½ | $b^4P$-$z^4D^o$ |
| 4370.96 | A | 8 | 1.20 | 4.03 | 1½-2½ | (79) |
| 4403.35 | A | 8 | 1.18 | 3.98 | ½-1½ | |
| 4414.54 | A | 5 | 1.23 | 4.03 | 2½-2½ | |
| 4440.45 | A | 10 | 1.20 | 3.98 | 1½-1½ | |
| *4457.42 § | A | 8 | 1.18 | 3.95 | ½- ½ | |
| 4485.44 | A | 2 | 1.23 | 3.98 | 2½-1½ | |
| 4495.44 | A | 3 | 1.20 | 3.95 | 1½- ½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Zr II** continued | | | | | | |
| 4222.41 | A | 3 | 1.20 | 4.13 | 1½-2½ | $b^4P$-$y^2D^o$ |
| 4266.72 | A | 1 | 1.18 | 4.07 | ½-1½ | (80) |
| 3853.07 | A | 2 | 1.23 | 4.43 | 2½-1½ | $b^4P$-$z^2P^o$ |
| 3819.84 | A | 2 | 1.20 | 4.43 | 1½-1½ | (81) |
| 3792.32 | A | 2 | 1.18 | 4.43 | ½-1½ | |
| 3717.02 | A | 2 | 1.20 | 4.52 | 1½-1½ | $b^4P$-$y^4D^o$ |
| 3561.11 | A | 1 | 1.23 | 4.70 | 2½-3½ | (82) |
| 3690.98 | P | | 1.18 | 4.52 | ½-1½ | |
| 3607.39 | A | 7 | 1.23 | 4.65 | 2½-1½ | $b^4P$-$z^4S^o$ |
| 3578.22 | A | 7 | 1.20 | 4.65 | 1½-1½ | (83) |
| 3554.09 | A | 7 | 1.18 | 4.65 | ½-1½ | |
| 3506.04 | A | 4 | 1.23 | 4.75 | 2½-2½ | $b^4P$-$z^4P^o$ |
| 3521.28 | P | | 1.20 | 4.71 | 1½-1½ | (84) |
| 3506.48 | A | 2 | 1.18 | 4.70 | ½- ½ | |
| 3549.51 | A | 10 | 1.23 | 4.71 | 2½-1½ | |
| 3529.99 | A | 5 | 1.20 | 4.70 | 1½- ½ | |
| 3478.50 | A | 3 | 1.20 | 4.75 | 1½-2½ | |
| *3497.90 | A | 12 | 1.18 | 4.71 | ½-1½ | |
| 3302.66 | A | 7 l | 1.23 | 4.97 | 2½-3½ | $b^4P$-$x^4D^o$ |
| 3343.81 | A | 4 | 1.20 | 4.89 | 1½-2½ | (85) |
| 3369.27 | A | 3 | 1.23 | 4.89 | 2½-2½ | |
| 3394.63 | A | 3 | 1.20 | 4.84 | 1½-1½ | |
| 3402.52 | A | 1 | 1.18 | 4.81 | ½- ½ | |
| 3424.64 | A | 1 | 1.20 | 4.81 | 1½- ½ | |
| 3008.13 | A | 3 | 1.23 | 5.33 | 2½-2½ | $b^4P$-$y^4P^o$ |
| 3015.67 | A | 1 | 1.20 | 5.30 | 1½-1½ | (86) |
| m3036.33 | P | Zr+ | 1.23 | 5.30 | 2½-1½ | |
| 3025.16 | A | 3w | 1.20 | 5.28 | 1½- ½ | |
| 2987.80 | A | 5 | 1.20 | 5.33 | 1½-2½ | |
| 2998.49 | A | 2 | 1.18 | 5.30 | ½-1½ | |
| 5124.98 | A | 2 | 1.53 | 3.93 | 5½-4½ | $a^2H$-$z^4F^o$ |
| | | | | | | (87) |
| 4379.78 | A | 9 | 1.53 | 4.34 | 5½-4½ | $a^2H$-$z^2G^o$ |
| 4442.99 | A | 25 | 1.48 | 4.26 | 4½-3½ | (88) |
| 4308.94 | A | 4 | 1.48 | 4.34 | 4½-4½ | |
| 3874.37 | A | 1 | 1.48 | 4.66 | 4½-3½ | $a^2H$-$y^2F^o$ |
| | | | | | | (89) |
| 3505.47 | A | 15 | 1.53 | 5.05 | 5½-4½ | $a^2H$-$y^2G^o$ |
| 3463.02 | A | 35 | 1.48 | 5.04 | 4½-3½ | (90) |
| 3459.95 | A | 3 | 1.48 | 5.05 | 4½-4½ | |
| 3326.81 | A | 15 | 1.53 | 5.24 | 5½-5½ | $a^2H$-$z^2H^o$ |
| 3359.96 | A | 12 | 1.48 | 5.15 | 4½-4½ | (91) |
| 3402.87 | A | 7 | 1.53 | 5.15 | 5½-4½ | |
| 3285.77 | A | 3 | 1.48 | 5.24 | 4½-5½ | |
| 3275.65 | A | 1 | 1.48 | 5.25 | 4½-3½ | $a^2H$-$x^2F^o$ |
| | | | | | | (92) |
| 6100.04 | A | 2 | 1.75 | 3.77 | 2½-3½ | $b^2D$-$z^4F^o$ |
| 6114.78 | A | 2 | 1.66 | 3.68 | 1½-1½ | (93) |
| 5418.01 | A | 1 | 1.75 | 4.03 | 2½-2½ | $b^2D$-$z^4D^o$ |
| | | | | | | (94) |
| 5191.60 | A | 7 | 1.75 | 4.13 | 2½-2½ | $b^2D$-$y^2D^o$ |
| 5112.28 | A | 7 | 1.66 | 4.07 | 1½-1½ | (95) |
| 5311.78 | A | 2 | 1.75 | 4.07 | 2½-1½ | |
| 5000.91 | A | 3 | 1.66 | 4.13 | 1½-2½ | |
| 4445.88 | A | 1 | 1.66 | 4.43 | 1½-1½ | $b^2D$-$z^2P^o$ |
| | | | | | | (96) |
| 4186.70 | A | 12 | 1.75 | 4.70 | 2½-3½ | $b^2D$-$y^4D^o$ |
| 4310.62 | A | 5 | 1.66 | 4.59 | 1½-2½ | (97) |
| 4383.10 | A | 1 | 1.66 | 4.47 | 1½- ½ | |
| 4296.74 | A | 8 | 1.75 | 4.62 | 2½-3½ | $b^2D$-$y^4F^o$ |
| 4264.91 | A | 4 | 1.66 | 4.55 | 1½-2½ | (98) |
| 4342.23 | A | 1 | 1.66 | 4.50 | 1½-1½ | |
| 4231.64 | A | 8 | 1.75 | 4.66 | 2½-3½ | $b^2D$-$y^2F^o$ |
| 4179.81 | A | 15 | 1.66 | 4.61 | 1½-2½ | (99) |
| 4312.23 | A | 3 | 1.75 | 4.61 | 2½-2½ | |
| 3833.87 | A | 2 | 1.75 | 4.97 | 2½-3½ | $b^2D$-$x^4D^o$ |
| 3813.98 | A | 0 | 1.66 | 4.89 | 1½-2½ | (100) |
| 3923.92 | A | 1 | 1.75 | 4.89 | 2½-2½ | |
| 3678.91 | A | 10 | 1.75 | 5.10 | 2½-1½ | $b^2D$-$y^2P^o$ |
| 3662.14 | A | 8 | 1.66 | 5.03 | 1½- ½ | (101) |
| 3582.08 | A | 2 | 1.66 | 5.10 | 1½-1½ | |
| 3633.49 | A | 10 | 1.75 | 5.15 | 2½-2½ | $b^2D$-$x^2D^o$ |
| 3565.41 | A | 5 | 1.66 | 5.12 | 1½-1½ | (102) |
| 3661.33 | A | 4 | 1.75 | 5.12 | 2½-1½ | |
| 3539.05 | A | 4 | 1.66 | 5.15 | 1½-2½ | |
| 3527.42 | A | 7 | 1.75 | 5.25 | 2½-3½ | $b^2D$-$x^2F^o$ |
| 3396.66 | A | 6 | 1.66 | 5.29 | 1½-2½ | (103) |
| m3483.59 | P | Zr+ | 1.75 | 5.29 | 2½-2½ | |
| 3222.48 | A | 15 | 1.75 | 5.58 | 2½-3½ | $b^2D$-$w^2D^o$ |
| 3161.01 | A | 2 | 1.66 | 5.56 | 1½-1½ | (104) |
| 3236.17 | A | 1 | 1.75 | 5.56 | 2½-1½ | |
| 3183.26 | P | | 1.75 | 5.63 | 2½-1½ | $b^2D$-$x^2P^o$ |
| 3074.55 | A | 1 | 1.66 | 5.67 | 1½- ½ | (105) |
| 3110.52 | A | 1 | 1.66 | 5.63 | 1½-1½ | |
| *6106.47 | A | 2 | 1.75 | 3.77 | 4½-3½ | $b^2G$-$z^2F^o$ |
| | | | | | | (106) |
| 4761.67 | A | 1 | 1.75 | 4.34 | 4½-4½ | $b^2G$-$z^2G^o$ |
| 4894.43 | A | 0 | 1.74 | 4.26 | 3½-3½ | (107) |
| 4925.90 | A | 1 | 1.75 | 4.26 | 4½-3½ | |
| 4191.50 | A | 6 | 1.75 | 4.70 | 4½-3½ | $b^2G$-$y^4D^o$ |
| 4325.64 | A | 3 | 1.74 | 4.59 | 3½-2½ | (108) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Zr II** continued | | | | | | |
| 4301.81 | A | 5 | 1.75 | 4.62 | 4½-3½ | $b^2G-y^4F^o$ |
| 4382.95 | A | 1 | 1.74 | 4.55 | 3½-2½ | (109) |
| 4236.56 | A | 5 | 1.75 | 4.66 | 4½-3½ | $b^2G-y^2F^o$ |
| 4293.14 | A | 7 | 1.74 | 4.61 | 3½-2½ | (110) |
| 3818.78 | A | 1 | 1.74 | 4.97 | 3½-3½ | $b^2G-x^4D^o$ (111) |
| 3745.97 | A | 40 | 1.75 | 5.05 | 4½-4½ | $b^2G-y^2G^o$ |
| 3731.26 | A | 35 | 1.74 | 5.04 | 3½-3½ | (112) |
| 3749.55 | P | | 1.75 | 5.04 | 4½-3½ | |
| 3727.72 | A | 10 | 1.74 | 5.05 | 3½-4½ | |
| 3542.65 | A | 25 | 1.75 | 5.24 | 4½-5½ | $b^2G-z^2H^o$ |
| 3611.90 | A | 15 | 1.74 | 5.15 | 3½-4½ | (113) |
| 3629.12 | A | 1 | 1.75 | 5.15 | 4½-4½ | |
| 3530.85 | A | 6 | 1.75 | 5.25 | 4½-3½ | $b^2G-x^2F^o$ |
| •3471.14 § | A | 8 | 1.74 | 5.29 | 3½-2½ | (114) |
| 3514.64 | A | 4 | 1.74 | 5.25 | 3½-3½ | |
| 5350.10 | A | 5 | 1.82 | 4.13 | 2½-2½ | $c^2D-y^2D^o$ |
| 5350.36 | A | 5 | 1.77 | 4.07 | 1½-1½ | (115) |
| 5477.82 | A | 2 | 1.82 | 4.07 | 2½-1½ | |
| 4719.80 | A | 1 | 1.82 | 4.43 | 2½-1½ | $c^2D-z^2P^o$ |
| 4565.43 | A | 3 | 1.77 | 4.47 | 1½- ½ | (116) |
| 4624.86 | A | 1 | 1.77 | 4.43 | 1½-1½ | |
| 4289.18 | A | 2 | 1.82 | 4.70 | 2½-3½ | $c^2D-y^4D^o$ (117) |
| 4404.81 | A | 2 | 1.82 | 4.62 | 2½-3½ | $c^2D-y^4F^o$ |
| 4429.34 | A | 2 | 1.77 | 4.55 | 1½-2½ | (118) |
| 4336.36 | A | 2 | 1.82 | 4.66 | 2½-3½ | $c^2D-y^2F^o$ |
| 4337.63 | A | 5 | 1.77 | 4.61 | 1½-2½ | (119) |
| 3757.80 | A | 8 | 1.82 | 5.10 | 2½-1½ | $c^2D-y^2P^o$ |
| 3782.72 | A | 5 | 1.77 | 5.03 | 1½- ½ | (120) |
| 3827.51 | A | 1 | 1.82 | 5.04 | 2½-3½ | $c^2D-y^2G^o$ (121) |
| 3710.47 | A | 1 | 1.82 | 5.15 | 2½-2½ | $c^2D-x^2D^o$ |
| 3679.64 | A | 1 | 1.77 | 5.12 | 1½-1½ | (122) |
| 3651.50 | A | 2 | 1.77 | 5.15 | 1½-2½ | |
| 3599.91 | A | 7 | 1.82 | 5.25 | 2½-3½ | $c^2D-x^2F^o$ |
| 3500.15 | A | 4 | 1.77 | 5.29 | 1½-2½ | (123) |
| 3511.55 | A | 2 | 1.82 | 5.33 | 2½-2½ | $c^2D-y^4P^o$ |
| 3550.11 | P | | 1.82 | 5.30 | 2½-1½ | (124) |
| 3282.84 | A | 12 | 1.82 | 5.58 | 2½-2½ | $c^2D-w^2D^o$ |
| •3250.44 § | A | 20 | 1.77 | 5.56 | 1½-1½ | (125) |
| 3236.61 | A | 4 | 1.77 | 5.58 | 1½-2½ | |
| 3242.18 | A | 3 | 1.82 | 5.63 | 2½-1½ | $c^2D-x^2P^o$ |
| 3159.12 | A | 5 | 1.77 | 5.67 | 1½- ½ | (126) |
| 3197.08 | A | 3 | 1.77 | 5.63 | 1½-1½ | |
| 3015.88 | A | 2 | 1.82 | 5.91 | 2½-2½ | $c^2D-w^2F^o$ (127) |
| 6348.54 | A | 1 | 2.40 | 4.34 | 3½-4½ | $b^2F-z^2G^o$ |
| 6678.03 | A | 3 | 2.41 | 4.26 | 2½-3½ | (128) |
| 4661.78 | A | 5 | 2.40 | 5.05 | 3½-4½ | $b^2F-y^2G^o$ |
| 4885.19 | A | 4 | 2.41 | 5.04 | 2½-3½ | (129) |
| 4494.41 | A | 8 | 2.40 | 5.15 | 3½-2½ | $b^2F-x^2D^o$ |
| 4553.96 | A | 12 | 2.41 | 5.12 | 2½-1½ | (130) |
| 4482.04 | A | 3 | 2.40 | 5.15 | 3½-4½ | $b^2F-z^2H^o$ (131) |
| 4333.28 | A | 15 | 2.40 | 5.25 | 3½-3½ | $b^2F-x^2F^o$ |
| •4282.21 § | A | 6 | 2.41 | 5.29 | 2½-2½ | (132) |
| 4267.30 | P | | 2.40 | 5.29 | 3½-2½ | |
| 4348.64 | D | | 2.41 | 5.25 | 2½-3½ | |
| 4205.91 | A | 2 | 2.40 | 5.33 | 3½-2½ | $b^2F-y^4P^o$ (133) |
| 3881.97 | A | 7 | 2.40 | 5.58 | 3½-2½ | $b^2F-w^2D^o$ |
| 3914.36 | A | 7 | 2.41 | 5.58 | 2½-1½ | (134) |
| 6787.15 | A | 2 | 2.48 | 4.30 | 1½- ½ | $b^2P-z^2S^o$ (135) |
| 6313.57 | A | 1 | 2.48 | 4.43 | 1½-1½ | $b^2P-z^2P^o$ |
| 6028.64 | A | 2 | 2.42 | 4.47 | ½- ½ | (136) |
| •8106.47 | A | 2 | 2.48 | 4.50 | 1½-1½ | $b^2P-y^4F^o$ (137) |
| 4703.03 | A | 5 | 2.48 | 5.10 | 1½-1½ | $b^2P-y^2P^o$ |
| 4734.94 | A | 1 | 2.42 | 5.03 | ½- ½ | (138) |
| 4841.98 | A | 0 | 2.48 | 5.03 | 1½- ½ | |
| 4601.97 | A | 2 | 2.42 | 5.10 | ½-1½ | |
| 4629.07 | A | 5 | 2.48 | 5.15 | 1½-2½ | $b^2P-x^2D^o$ |
| 4574.49 | A | 8 | 2.42 | 5.12 | ½-1½ | (139) |
| 4674.41 | A | 1 | 2.48 | 5.12 | 1½-1½ | |
| 4388.50 | A | 2 | 2.48 | 5.29 | 1½-2½ | $b^2P-x^2F^o$ (140) |
| 4323.62 | A | 2 | 2.48 | 5.33 | 1½-2½ | $b^2P-y^4P^o$ (141) |
| 3982.01 | A | 3 | 2.48 | 5.56 | 1½-2½ | $b^2P-w^2D^o$ |
| •3929.54 § | A | 8 | 2.42 | 5.56 | ½-1½ | (142) |
| 4002.95 | A | 2 | 2.48 | 5.56 | 1½-1½ | |
| 3923.38 | A | 1 | 2.48 | 5.63 | 1½-1½ | $b^2P-x^2P^o$ (143) |
| 3048.28 | A | 5 | 2.48 | 6.53 | 1½-1½ | $b^2P-w^2P^o$ |
| 3038.00 | A | 3 | 2.42 | 6.49 | ½- ½ | (144) |
| 3075.55 | A | 1 | 2.48 | 6.49 | 1½- ½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Zr II** continued | | | | | | |
| 4908.67 | A | 1 | 3.11 | 5.63 | ½-1½ | $a^2S-x^2P^o$ (145) |
| 3612.34 | A | 3 | 3.11 | 6.53 | ½-1½ | $a^2S-w^2P^o$ |
| 3650.73 | A | 7 | 3.11 | 6.49 | ½- ½ | (146) |
| 3026.18 | A | 3wl | 3.93 | 8.01 | 4½-4½ | $z^4F^o-e^4F$ † |
| 3018.53 | A | 3w | 3.86 | 7.95 | 3½-3½ | (147) |
| 3000.59 | A | 3w | 3.77 | 7.88 | 2½-2½ | |
| 3024.72 | A | 3w | 3.77 | 7.85 | 2½-1½ | |
| 2988.74 | A | 4w | 4.13 | 8.25 | 2½-2½ | $y^2D^o-e^2D$ |
| 2966.27 | A | 2w | 4.07 | 8.23 | 1½-1½ | (148) |
| 3229.73 | A | 1l | 4.43 | 8.25 | 1½-2½ | $z^2P^o-e^2D$ |
| 3278.89 | A | 2 | 4.47 | 8.23 | ½-1½ | (149) |

**Strongest Unclassified Lines of Zr II**

| | | | |
|---|---|---|---|
| 3827.27 | A | 1 | |
| 3423.82 | A | 3 l | |
| 3068.32 | A | 2 w | |
| •3063.63 § | A | 3 wl | |
| 3038.59 | A | 2 | |
| 3018.08 | A | 2 w | |
| 2994.05 | A | 4 w | |

**Cb I** I P ? Anal C List D July 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 4058.933// | A | 2000w | 0.13 | 3.17 | 4½-5½ | $a^6D-y^6F^o$ † |
| 4079.726 | A | 1000w | 0.09 | 3.11 | 3½-4½ | (1) |
| 4100.918 | A | 600w | 0.05 | 3.06 | 2½-3½ | |
| 4123.812 | A | 400 | 0.02 | 3.01 | 1½-2½ | |
| 4137.090 | A | 200 | 0.00 | 2.98 | ½-1½ | |
| 4139.702 | A | 400w | 0.13 | 3.11 | 4½-4½ | |
| 4152.575 | A | 500 | 0.09 | 3.06 | 3½-3½ | |
| 4164.661 | A | 300 | 0.05 | 3.01 | 2½-2½ | |
| 4163.658 | A | 250 | 0.02 | 2.98 | 1½-1½ | |
| 4168.122 | A | 250w | 0.00 | 2.96 | ½- ½ | |
| 3791.209 | A | 300r | 0.13 | 3.38 | 4½-4½ | $a^6D-y^6D^o$ † |
| 3824.882 | A | 100 | 0.09 | 3.31 | 3½-3½ | (2) |
| 3713.018 | A | 300r | 0.13 | 3.45 | 4½-4½ | $a^6D-x^6D^o$ † |
| 3739.80 | A | 300r | 0.09 | 3.39 | 3½-3½ | (3) |
| 3759.556 | A | 200r | 0.05 | 3.33 | 2½-2½ | |
| 3790.138 | A | 200r | 0.13 | 3.39 | 4½-3½ | |
| 3802.928 | A | 400r | 0.09 | 3.33 | 3½-2½ | |
| 3798.127 | A | 300r | 0.05 | 3.30 | 2½-1½ | |
| 3787.064 | A | 150 | 0.02 | 3.28 | 1½- ½ | |
| 3697.850 | A | 200 | 0.05 | 3.39 | 2½-3½ | |
| 3728.235 | A | 250 | 0.02 | 3.33 | 1½-2½ | |
| 3742.393 | A | 200r | 0.00 | 3.30 | ½-1½ | |
| 3580.277 | A | 400r | 0.13 | 3.58 | 4½-3½ | $a^6D-y^6D^o$ † |
| 3575.850 | A | 200 | 0.09 | 3.54 | 3½-2½ | (4) |
| •3535.304 | A | 400w | 0.09 | 3.58 | 3½-3½ | |

**Cb II** I P ? Anal C List C July 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3094.172// | A | 2000wR | 0.51 | 4.50 | 5-6 | $a^5F-z^5G^o$ † |
| 3130.780 | A | 1500wR | 0.44 | 4.38 | 4-5 | (1) |
| 3163.403 | A | 1000R | 0.37 | 4.28 | 3-4 | |
| 3194.983 | A | 700R | 0.32 | 4.19 | 2-3 | |
| 3225.478 | A | 500wR | 0.29 | 4.12 | 1-2 | |
| 3191.096 | A | 200w | 0.51 | 4.38 | 5-5 | |
| 3215.595 | A | 300wr | 0.44 | 4.28 | 4-4 | |
| 3236.403 | A | 300r | 0.37 | 4.19 | 3-3 | |
| 3254.070 | A | 200r | 0.32 | 4.12 | 2-2 | |
| 3028.436 | A | 300w | 0.44 | 4.51 | 4-3 | $a^5F-z^3D^o$ † |
| 3076.864 | A | 200 | 0.37 | 4.39 | 3-2 | (2) |
| 3099.180 | A | 100 | 0.32 | 4.31 | 2-1 | |
| 2982.100 | A | 100 | 0.37 | 4.51 | 3-3 | |
| 3412.934 | A | 150 | 0.90 | 4.51 | 2-3 | $a^3P-z^3D^o$ † |
| 3408.678 | A | 100 | 0.76 | 4.39 | 1-2 | (3) |
| 3409.191 | A | 100 | 0.69 | 4.31 | 0-1 | |
| 3540.961 | A | 200 | 1.03 | 4.51 | 4-3 | $a^3F-z^3D^o$ † |
| 3819.514 | A | 200 | 0.98 | 4.39 | 3-2 | (4) |
| 3651.182 | A | 300 | 0.93 | 4.31 | 2-1 | |
| 3145.405 | A | 500rs | 1.03 | 4.95 | 4-5 | $a^3F-z^3G^o$ † |
| 3180.290 | A | 400 | 0.98 | 4.88 | 3-4 | (5) |
| 3206.350 | A | 300rs | 0.93 | 4.76 | 2-3 | |
| 3223.332 | A | 100 | 1.03 | 4.86 | 4-4 | |
| 3247.478 | A | 150w | 0.96 | 4.78 | 3-3 | |
| 3440.589 | A | 200 | 1.38 | 4.95 | 5-5 | $a^3G-z^3G^o$ † |
| 3479.567 | A | 150 | 1.31 | 4.86 | 4-4 | (6) |
| 3515.421 | A | 200w | 1.27 | 4.76 | 3-3 | |
| 3425.432 | A | 300w | 1.36 | 4.97 | 5-4 | $a^3G-z^3F^o$ † |
| 3426.562 | A | 250w | 1.31 | 4.91 | 4-3 | (7) |
| 3476.79 | A | 100 | 1.27 | 4.61 | 3-2 | |
| 4367.966 | A | 100n | 1.69 | 4.51 | 4-3 | $b^3F-z^3D^o$ † |
| 4579.448 | A | 150n | 1.69 | 4.39 | 3-2 | (6) |
| 4527.646 | A | 50n | 1.56 | 4.31 | 2-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Cb II** continued | | | | | | |
| 3781.379 | A | 200 | 1.89 | 4.95 | 4-5 | $b^3F-z^3G^o$ |
| 3898.292 | A | 200 | 1.69 | 4.86 | 3-4 | (9) |
| 3863.056 | A | 150 | 1.58 | 4.78 | 2-3 | |
| 3763.13 | A | 8n | 1.69 | 4.97 | 4-4 | $b^3F-z^3F^o$ |
| 3831.840 | A | 200 | 1.69 | 4.91 | 3-3 | (10) |
| 3818.862 | A | 200 | 1.58 | 4.81 | 2-2 | |
| 3952.367 | A | 100n | 1.69 | 4.81 | 3-2 | |

**Strongest Unclassified Lines of Cb II**

| | | | |
|---|---|---|---|
| 3717.06 | A | 300 | |
| 3659.602 | A | 300 | |
| 3510.262 | A | 400 | |
| 3432.708 | A | 400 | |
| 3283.463 | A | 400 | |
| 3263.365 | A | 300 | |
| 3260.564 | A | 350w | |
| 3127.526 | A | 500 | |
| 3064.530 | A | 250r | |
| 3034.95 | A | 200wR | |
| 3032.767 | A | 400rs | |
| 2994.735 | A | 300w | |

**Mo I** I P 7.06 Anal C List D July 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3798.259 // | A | 50R | 0.00 | 3.25 | 3-4 | $a^7S-z^7P^o$ |
| 3864.115 | A | 50R | 0.00 | 3.19 | 3-3 | (1) |
| 3902.968 | A | 50R | 0.00 | 3.16 | 3-2 | |
| 3113.125 | A | 5n | 0.00 | 3.97 | 3-4 | $a^7S-z^7D^o$ |
| 3158.156 | A | 5R | 0.00 | 3.91 | 3-3 | (2) |
| 3208.838 | A | 10n | 0.00 | 3.85 | 3-2 | |
| 3132.591 | A | 10R | 0.00 | 3.94 | 3-4 | $a^7S-y^7P^o$ |
| 3170.333 | A | 10R | 0.00 | 3.89 | 3-3 | (3) |
| 3193.969 | A | 10R | 0.00 | 3.86 | 3-2 | |
| 5506.51 | B | 40R | 1.33 | 3.57 | 2-3 | $a^5S-z^5P^o$ |
| 5533.01 | B | 30R | 1.33 | 3.56 | 2-2 | (4) |
| 5570.46 | B | 25R | 1.33 | 3.54 | 2-1 | |
| 6030.66 | B | 9 | 1.52 | 3.57 | 4-3 | $a^5D-z^5P^o$ |
| 5888.32 | B | 6 | 1.46 | 3.56 | 3-2 | (5) |
| 5791.86 | B | 6 | 1.41 | 3.54 | 2-1 | |
| 5858.28 | B | 7 | 1.46 | 3.57 | 3-3 | |
| 5751.41 | B | 6 | 1.41 | 3.56 | 2-2 | |
| 5689.22 | B | 7 | 1.38 | 3.54 | 1-1 | |
| 4626.467 | A | 10 | 1.52 | 4.19 | 4-3 | $a^5D-y^5P^o$ |
| 4662.767 | A | 5 | 1.46 | 4.11 | 3-2 | (6) |
| 4661.933 | A | 5 | 1.41 | 4.06 | 2-1 | |
| 4524.344 | A | 10 | 1.46 | 4.19 | 3-3 | |
| 4576.500 | A | 10 | 1.41 | 4.11 | 2-2 | |
| 4595.160 | A | 10 | 1.38 | 4.06 | 1-1 | |
| 4277.246 | A | 12 | 1.52 | 4.41 | 4-5 | $a^5D-z^5F^o$ |
| 4288.85 | A | 5n | 1.46 | 4.34 | 3-4 | (7) |
| 4293.228 | A | 10 | 1.41 | 4.29 | 2-3 | |
| 3833.757 | A | 10n | 1.52 | 4.74 | 4-4 | $a^5D-z^5D^o$ |
| 3828.883 | A | 10 | 1.46 | 4.69 | 3-3 | (8) |
| 3826.701 | A | 10 | 1.41 | 4.64 | 2-2 | |
| 3822.987 | A | 5 | 1.38 | 4.60 | 1-1 | |
| 3901.775 | A | 10 | 1.52 | 4.69 | 4-3 | |
| 3886.335 | A | (3) | 1.46 | 4.64 | 3-2 | |
| 3869.085 | A | 10 | 1.41 | 4.60 | 2-1 | |
| 3847.252 | A | 10 | 1.38 | 4.58 | 1-0 | |
| 3763.356 | A | 5 | 1.46 | 4.74 | 3-4 | |
| 3770.517 | A | 8 | 1.41 | 4.69 | 2-3 | |
| 3761.597 | A | 10 | 1.38 | 4.64 | 1-2 | |
| 3405.934 | A | 10r | 1.52 | 5.15 | 4-5 | $a^5D-y^5F^o$ |
| 3384.617 | A | 10n | 1.46 | 5.11 | 3-4 | (9) |
| 3358.130 | A | 10 | 1.41 | 5.09 | 2-3 | |
| 3344.750 | A | 10 | 1.38 | 5.07 | 1-2 | |
| 3327.308 | A | 10r | 1.35 | 5.06 | 0-1 | |
| 3361.371 | A | 10r | 1.52 | 5.20 | 4-4 | $a^5D-8^o$ † (10) |
| 3289.016 | A | 10r | 1.41 | 5.17 | 2-3 | $a^5D-7^o$ † (11) |
| 4013.51 | C | (1) | 2.07 | 5.15 | 6-5 | $a^5G-y^5F^o$ |
| 4062.09 | A | 5Nr | 2.07 | 5.11 | 5-4 | (12) |
| 4064.391 | A | 10n | 2.07 | 5.09 | 4-3 | |
| 4107.477 | A | 8r | 2.06 | 5.07 | 3-2 | |
| 4103.158 | A | 10 | 2.05 | 5.06 | 2-1 | |
| 4056.027 | A | 10 | 2.07 | 5.11 | 4-4 | |

**Mo II** I P ? Anal D List D Aug 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3446.085 | A | 6 | 2.94 | 6.52 | 4½-4½ | $^4F-\ ^4F^o$ |
| 3524.646 | A | 8 | 2.94 | 6.45 | 3½-3½ | (1) |
| 3596.351 | A | 4 | 2.95 | 6.39 | 2½-2½ | |
| 3670.868 | A | 3 | 2.98 | 6.34 | 1½-1½ | |
| 3532.063 | A | 2 | 2.94 | 6.45 | 4½-3½ | |
| 3585.91 | B | 2n | 2.94 | 6.39 | 3½-2½ | |
| 3643.47 | A | 2 | 2.95 | 6.34 | 2½-1½ | |
| 3448.542 | A | 2 | 2.94 | 6.52 | 3½-4½ | |
| 3534.888 | A | 3 | 2.95 | 6.45 | 2½-3½ | |
| 3622.850 | A | 2 | 2.96 | 6.39 | 1½-2½ | |
| 3136.465 | A | 4 | 2.94 | 6.88 | 4½-3½ | $^4F-\ ^4D^o$ † |
| 3167.592 | A | 4 | 2.94 | 6.62 | 3½-2½ | (2) |
| 3250.747 | A | 3 | 2.95 | 6.75 | 2½-1½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Mo II** continued | | | | | | |
| 4250.689 | A | 10 | 3.13 | 6.03 | 3½-2½ | $^4D_-$ $^4P^o$ † |
| 4363.644 | A | 10 | 3.10 | 5.93 | 2½-1½ | (3) |
| 4433.501 | A | 8 | 3.04 | 5.83 | 1½- ½ | |
| 4209.649 | A | 5 | 3.10 | 6.03 | 2½-2½ | |
| 4279.023 | A | 10 | 3.04 | 5.93 | 1½-1½ | |
| 4377.765 | A | 10 | 3.01 | 5.83 | ½- ½ | |
| 3941.478 | A | 10 | 3.13 | 6.26 | 3½-4½ | $^4D_-$ $^6P^o$ † |
| 3961.503 | A | 15 | 3.13 | 6.24 | 3½-3½ | (4) |
| 3986.201 | A | 6 | 3.10 | 6.20 | 2½-1½ | |
| 3635.144 | A | 20 | 3.13 | 6.52 | 3½-4½ | $^4D_-$ $^4F^o$ † |
| 3668.307 | A | 15 | 3.10 | 6.45 | 2½-3½ | (5) |
| 3692.645 | A | 10 | 3.04 | 6.39 | 1½-2½ | |
| 3702.553 | A | 8 | 3.01 | 6.34 | ½-1½ | |
| 3719.74 | A | 3 | 3.13 | 6.45 | 3½-3½ | |
| 3755.54 | A | 5 | 3.10 | 6.39 | 2½-2½ | |
| 3742.34 | A | 6 | 3.04 | 6.34 | 1½-1½ | |
| 3293.312 | A | 12 | 3.13 | 6.88 | 3½-3½ | $^4D_-$ $^4P^o$ |
| 3320.902 | A | 5 | 3.10 | 6.82 | 2½-2½ | (6) |
| 3329.315 | A | 5 | 3.04 | 6.75 | 1½-1½ | |
| 3347.369 | A | 3 | 3.01 | 6.70 | ½- ½ | |
| 3346.403 | A | 4 | 3.13 | 6.83 | 3½-2½ | |
| 3320.315 | A | 3 | 3.10 | 6.75 | 2½-1½ | |
| 3379.762 | A | 3 | 3.04 | 6.70 | 1½- ½ | |
| 3267.639 | A | 3 | 3.10 | 6.88 | 2½-3½ | |
| 3271.686 | A | 4 | 3.04 | 6.82 | 1½-2½ | |
| 3297.684 | A | 3 | 3.01 | 6.75 | ½-1½ | |

**Ru I** I P 7.5 Anal C List D Aug 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3799.347 | A | (8) | 0.00 | 3.25 | 5-4 | $a^5F-z^5D^o$ † |
| 3798.901 | A | (8) | 0.15 | 3.40 | 4-3† | (1) |
| 3728.030 | A | (10R) | 0.00 | 3.31 | 5-5 | $a^5F-z^5F^o$ † |
| 3726.926 | A | (10R) | 0.15 | 3.46 | 4-4 | (2) |
| 3730.433 | A | (4) | 0.26 | 3.57 | 3-3 | |
| 3742.280 | A | (10) | 0.33 | 3.63 | 2-2 | |
| 3760.031 | A | (4) | 0.38 | 3.67 | 1-1 | |
| 3661.353 | A | (6) | 0.15 | 3.52 | 4-5 | $a^5F-z^3G^o$ † |
| 3417.353 | A | (20) | 0.26 | 3.87 | 3-4 | (3) |
| 3430.772 | A | (7) | 0.33 | 3.93 | 2-3 | |
| 3498.942// | A | (50R) | 0.00 | 3.53 | 5-6 | $a^5F-z^5G^o$ † |
| 3436.737 | A | (30R) | 0.15 | 3.74 | 4-5 | (4) |
| 3596.179 | A | (20) | 0.26 | 3.69 | 3-4 | |
| 3593.022 | A | (20) | 0.33 | 3.77 | 2-3 | |
| 3589.315 | A | (5) | 0.38 | 3.82 | 1-2 | |
| 3301.587 | A | (8) | 0.00 | 3.74 | 5-5 | |
| 4554.509 | A | (10R) | 0.81 | 3.52 | 4-5 | $a^3F-z^3G^o$ † |
| 4297.711 | A | (10) | 1.00 | 3.87 | 3-4 | (5) |
| 4410.026 | A | (8) | 1.13 | 3.93 | 2-3 | |
| 4212.063 | A | (10) | 0.81 | 3.74 | 4-5 | $a^3F-z^5G^o$ † |
| 4584.445 | A | 30 | 1.00 | 3.69 | 3-4 | (6) |
| 4681.786 | A | 10 | 1.13 | 3.77 | 2-3 | |
| 4080.600 | A | (20) | 0.81 | 3.83 | 4-3 | $a^3F-y^5F^o$ † |
| 4144.164 | A | (10) | 1.00 | 3.98 | 3-2 | (7) |
| 4199.902 | A | (10) | 0.81 | 3.75 | 4-4 | $a^3F-z^3F^o$ † (8) |
| 3867.839 | A | (8) | 0.81 | 4.00 | 4-3 | $a^3F-z^3D^o$ † |
| 3984.858 | A | (10) | 1.00 | 4.10 | 3-2 | (9) |
| 4097.791 | A | (10) | 1.13 | 4.15 | 2-1 | |
| 5309.267 | A | 20 | 0.92 | 3.25 | 4-4 | $a^5D-z^5D^o$ † |
| 5636.235 | A | 35 | 1.06 | 3.25 | 3-4 | (10) |
| 5155.136 | A | 12 | 1.12 | 3.51 | 1-2 | |
| 5171.028 | A | 40 | 0.92 | 3.31 | 4-5 | $a^5D-z^5F^o$ † |
| 5142.763 | A | 8 | 1.06 | 3.46 | 3-4 | (11) |
| 5040.744 | A | 6 | 1.12 | 3.57 | 2-3 | |
| 4911.593 | A | 3 | 1.12 | 3.63 | 1-2 | |
| 4869.153 | A | 25 | 0.92 | 3.46 | 4-4 | |
| 4931.074 | A | 12 | 1.06 | 3.57 | 3-3 | |
| 4907.888 | A | 8 | 1.12 | 3.63 | 2-2 | |
| 4669.977 | A | 8 | 0.92 | 3.57 | 4-3 | |
| 4757.841 | A | 20 | 0.92 | 3.52 | 4-5 | $a^5D-z^3G^o$ † (12) |
| 4372.308 | A | (10) | 0.92 | 3.75 | 4-4 | $a^5D-z^3F^o$ † (13) |
| 4709.484 | A | 35 | 1.13 | 3.75 | 4-4 | $b^3F-z^3F^o$ † (14) |

**Ru II** I P † Anal D List C Sept 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3690.032 | A | 80 | 2.39 | 5.74 | 3½-4½ | $^4D_-$ $^6P^o$ † |
| 3657.574 | A | 50 | 2.39 | 5.77 | 3½-3½ | (1) |
| 3734.454 | A | 25 | 2.53 | 5.84 | 2½-3½ | |
| 3777.919 | A | 10 | 2.62 | 5.89 | 1½-1½ | |
| 3177.060 | A | 100 | 2.39 | 6.28 | 3½-4½ | $^4D_-$ $^6F^o$ † |
| 3294.220 | A | 80 | 2.53 | 6.28 | 2½-3½ | (2) |
| 3339.810 | A | 50 | 2.62 | 6.32 | 1½-2½ | |
| 3369.295 | A | 25 | 2.67 | 6.34 | ½-1½ | |
| 3175.317 | A | 10 | 2.39 | 6.28 | 3½-3½ | |
| 3143.657 | A | 15 | 2.39 | 6.32 | 3½-2½ | |
| 3107.586 | A | 10 | 2.39 | 6.36 | 3½-3½ | $^4D_-$ $^6P^o$ † |
| 3094.555 | A | 8 | 2.53 | 6.52 | 2½-2½ | (3) |
| 3231.378 | A | 15 | 2.53 | 6.36 | 2½-3½ | |
| 2976.593 | A | 100 | 2.39 | 6.54 | 3½-4½ | $^4D_-$ $^4F^o$ † |
| 2965.564 | A | 100 | 2.53 | 6.69 | 2½-3½ | (4) |
| 2979.957 | A | 60 | 2.62 | 6.76 | 1½-2½ | |
| 2977.226 | A | 30 | 2.67 | 6.82 | ½-1½ | |
| 2979.726 | A | 40 | 2.53 | 6.67 | 2½-2½ | $^4D_-$ $^4P^o$ † |
| 2991.626 | A | 40 | 2.62 | 6.75 | 1½-1½ | (5) |
| 2998.896 | A | 20 | 2.67 | 6.79 | ½- ½ | |
| 3259.007† | A | 20 | 2.75 | 6.54 | 3½-4½ | $^2F_-$ $^4F^o$ † |
| 3060.252 | A | 8 | 2.66 | 6.69 | 2½-3½ | (6) |
| 3221.978 | A | 20 | 2.75 | 6.58 | 3½-3½ | $^2F_-$ $^4P^o$ † |
| 3075.336 | A | 6 | 2.66 | 6.67 | 2½-2½ | (7) |

**Rh I** I P 7.7 Anal C List D Aug 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3692.357 | A | 50 | 0.00 | 3.34 | 4½-3½ | $a^4F-z^4D^o$ † |
| 3657.987 | A | 50 | 0.19 | 3.56 | 3½-2½ | (1) |
| 3596.194 | A | 20 | 0.32 | 3.75 | 2½-1½ | |
| 3612.470 | A | 15 | 0.43 | 3.85 | 1½- ½ | |
| 3434.893// | A | 200R | 0.00 | 3.59 | 4½-5½ | $a^4F-z^4G^o$ † |
| 3700.909 | A | 30 | 0.19 | 3.52 | 3½-4½ | (2) |
| 3507.316 | A | 20 | 0.32 | 3.84 | 2½-3½ | |
| 3474.780 | A | 20 | 0.43 | 3.98 | 1½-2½ | |
| 3502.524 | A | 50 | 0.00 | 3.52 | 4½-4½ | |
| 3396.85 | A | 100R | 0.00 | 3.83 | 4½-4½ | $a^4F-z^4F^o$ † |
| 3528.024 | A | 30 | 0.19 | 3.69 | 3½-3½ | (3) |
| 3462.040 | A | 30 | 0.32 | 3.89 | 2½-2½ | |
| 3470.657 | A | 20 | 0.43 | 3.98 | 1½-1½ | |
| 3583.098 | A | 10 | 0.19 | 3.63 | 3½-4½ | |
| 3666.315 | A | 15 | 0.32 | 3.69 | 2½-3½ | |
| 3323.092 | A | 50R | 0.19 | 3.90 | 3½-4½ | $a^4F-z^2G^o$ † |
| 3283.573 | A | 20R | 0.32 | 4.08 | 2½-3½ | (4) |
| 3597.147 | A | 20 | 0.41 | 3.84 | 2½-3½ | $a^2D-z^4G^o$ † (5) |
| 3478.906 | A | 15 | 0.41 | 3.96 | 2½-2½ | $a^2D-z^2D^o$ |
| 3543.948 | A | 10 | 0.70 | 4.18 | 1½-1½ | (6) |
| 3271.612 | A | 10 | 0.41 | 4.18 | 2½-1½ | |
| 3788.474 | A | 15 | 0.70 | 3.96 | 1½-2½ | |
| 3856.515 | A | 10 | 0.70 | 3.90 | 3½-4½ | $a^2F-z^2G^o$ † |
| 3958.865 | A | 30 | 0.96 | 4.08 | 2½-3½ | (7) |
| 3799.311 | A | 20 | 0.70 | 3.95 | 3½-3½ | $a^2F-z^2F^o$ |
| 3823.262 | A | 15 | 0.96 | 4.19 | 2½-2½ | (8) |
| 4128.870 | A | 20 | 0.96 | 3.95 | 2½-3½ | |
| 3538.142 | A | 4 | 0.70 | 4.19 | 3½-2½ | |
| 3793.217 | A | 15 | 0.70 | 3.96 | 3½-2½ | $a^2F-z^2D^o$ |
| 3833.889 | A | 10 | 0.96 | 4.18 | 2½-1½ | (9) |
| 4121.682 | A | 15 | 0.96 | 3.96 | 2½-2½ | |

**Rh II** I P † Anal C List D Nov 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3207.297 | A | 250 | 3.13 | 6.98 | 4-4 | $^3F_-$ $^5P^o$ † |
| 3028.608 | A | 75 | 3.39 | 7.46 | 3-3 | (1) |
| 3074.061 | A | 50 | 3.56 | 7.57 | 2-2 | |
| 3434.57 | P | | 3.39 | 6.98 | 3-4 | |
| 3162.284 | A | 100 | 3.56 | 7.46 | 2-3 | |
| 3159.254 | A | 200 | 3.13 | 7.04 | 4-5 | $^3F_-$ $^5F^o$ † |
| 3151.500 | A | 75 | 3.39 | 7.30 | 3-4 | (2) |
| 3386.139 | A | 2 | 3.56 | 7.20 | 2-3 | |
| 3233.324 | A | 250 | 3.39 | 7.20 | 3-3 | |
| 3239.101 | A | 30 | 3.56 | 7.37 | 2-2 | |
| 3019.819 | A | 150 | 3.56 | 7.65 | 2-3 | $^3F_-$ $^5G^o$ † |
| 2988.367 | A | 50 | 3.56 | 7.69 | 2-2 | (3) |

**Rh II** continued

| | | | | | | |
|---|---|---|---|---|---|---|
| 3477.828 | A | 200 | 3.43 | 6.98 | 3-4 | $^5P_-$ $^5D^o$ |
| 3093.481 | A | 200 | 3.47 | 7.46 | 2-3 | (4) |
| 3096.740 | A | 150 | 3.59 | 7.57 | 1-2 | |
| 3062.201 | A | 100 | 3.43 | 7.46 | 3-3 | |
| 3008.996 | A | 200 | 3.47 | 7.57 | 2-2 | |
| 3047.160 | A | 200 | 3.59 | 7.64 | 1-1 | |
| 2979.382 | A | 2 | 3.43 | 7.57 | 3-2 | |
| 2962.167 | A | 75 | 3.47 | 7.64 | 2-1 | |
| 3035.013 | A | 200 | 3.59 | 7.66 | 1-0 | |
| 3187.889 | A | 200 | 3.43 | 7.30 | 3-4 | $^5P_-$ $^5F^o$ |
| 3307.362 | A | 200 | 3.47 | 7.20 | 2-3 | (5) |
| 3264.291 | A | 75 | 3.59 | 7.37 | 1-2 | |
| 3166.948 | A | 200 | 3.47 | 7.37 | 2-2 | |
| 3173.678 | A | 100 | 3.59 | 7.48 | 1-1 | |
| 3081.585 | A | 100 | 3.47 | 7.48 | 2-1 | |
| 3267.480 | A | 250 | 3.92 | 7.69 | 5-4 | $^3G_-$ $^3F^o$ |
| 3240.516 | A | 150 | 4.03 | 7.83 | 4-3 | (8) |
| 3211.947 | A | 150 | 4.18 | 8.02 | 3-2 | |
| 3815.012 | A | 100 | 4.23 | 7.46 | 2-3 | $^3P_-$ $^5D^o$ |
| 3754.12 | P | | 4.29 | 7.57 | 1-2 | (7) |
| 3720.69 | P | | 4.32 | 7.64 | 0-1 | |
| 3269.60 | P | | 4.23 | 8.00 | 2-3 | $^3P_-$ $^3D^o$ |
| 3188.603 | A | 150 | 4.29 | 8.16 | 1-2 | (8) |
| 3147.931 | A | 8 | 4.32 | 8.24 | 0-1 | |
| 3140.272 | A | 50 | 4.23 | 8.16 | 2-2 | |
| 3119.837 | A | 5 | 4.29 | 8.24 | 1-1 | |

**Pd I** I P 8.30 Anal A List D Aug 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3634.71 | B | 700R | 0.81 | 4.21 | 3-2 | $5s^3D-5p^3P^o$ |
| 3518.95 | A | 500r | 0.96 | 4.47 | 2-1 | (1) |
| 3571.16 | A | 200 | 1.25 | 4.70 | 1-0 | |
| 3799.17 | B | 75 | 0.96 | 4.21 | 2-2 | |
| 3832.31 | B | 75 | 1.25 | 4.47 | 1-1 | |
| 3404.60 // | A | 1000R | 0.81 | 4.44 | 3-4 | $5s^3D-5p^3F^o$ |
| 3609.56 | A | 600R | 0.96 | 4.38 | 2-3 | (2) |
| 3481.17 | A | 400r | 1.25 | 4.79 | 1-2 | |
| 3460.76 | A | 300r | 0.81 | 4.38 | 3-3 | |
| 3218.98 | A | 20 | 0.96 | 4.79 | 2-2 | |
| 3242.72 | A | 1000R | 0.81 | 4.62 | 3-3 | $5s^3D-5p^3D^o$ |
| 3421.24 | A | 500 | 0.96 | 4.56 | 2-2 | (3) |
| 3302.15 | A | 400 | 1.25 | 4.98 | 1-1 | |
| 3287.26 | A | 50 | 0.81 | 4.56 | 3-2 | |
| 3065.30 | A | 100 | 0.96 | 4.98 | 2-1 | |
| 3373.02 | A | 300 | 0.96 | 4.62 | 2-3 | |
| 3718.92 | B | 100 | 1.25 | 4.56 | 1-2 | |
| 3002.86 | A | 50 | 0.81 | 4.92 | 3-3 | $5s^3D-5p^1F^o$ |
| 3114.05 | A | 200 | 0.96 | 4.92 | 2-3 | (4) |
| 3027.92 | A | 100 | 0.96 | 5.03 | 2-2 | $5s^3D-5p^1D^o$ † |
| 3258.80 | A | 300 | 1.25 | 5.03 | 1-2 | (5) |
| 3031.74 | A | 10 | 0.96 | 5.04 | 2-1 | $5s^3D-5p^1P^o$ |
| 3251.66 | A | 200 | 1.25 | 5.04 | 1-1 | (6) |
| 4212.95 | B | 200 | 1.45 | 4.38 | 2-3 | $5s^1D-5p^3F^o$ |
| 3690.35 | B | 200 | 1.45 | 4.79 | 2-2 | (7) |
| 3894.19 | B | 200 | 1.45 | 4.62 | 2-3 | $5s^1D-5p^3D^o$ |
| 3958.66 | B | 200 | 1.45 | 4.56 | 2-2 | (8) |
| 3489.79 | A | 200r | 1.45 | 4.98 | 2-1 | |
| 3553.10 | A | 500r | 1.45 | 4.92 | 2-3 | $5s^1D-5p^1F^o$ (9) |
| 3441.40 | A | 300 | 1.45 | 5.03 | 2-2 | $5s^1D-5p^1D^o$ (10) |
| 3433.44 | A | 250 | 1.45 | 5.04 | 2-1 | $5s^1D-5p^1P^o$ (11) |

**Pd II** See introduction

**Ag I** I P 7.54 Anal A List C May 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3280.682// | A | 1000R | 0.00 | 3.76 | ½-1½ | $5^2S-5^2P^o$ |
| 3382.890 | A | 1000R | 0.00 | 3.65 | ½- ½ | (1) |
| 8273.519 | A | 1000 | 3.76 | 5.25 | 1½- ½ | $5^2P^o-6^2S$ |
| 7687.779 | A | 500 | 3.65 | 5.25 | ½- ½ | (2) |

**Ag II** See introduction

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Cd I** I P 8.96 Anal A List D Aug 1942 | | | | | | |
| 3261.050 | A | 10R | 0.00 | 3.78 | 0-1 | $5^1S-5^3P^o$ (1) |
| 5085.824 | A | 100R | 3.93 | 6.36 | 2-1 | $5^3P^o-6^3S$ |
| 4799.918 | A | 100R | 3.78 | 6.36 | 1-1 | (2) |
| 4678.160 | A | 50 | 3.72 | 6.36 | 0-1 | |
| 6438.4696 | B | 100 | 5.39 | 7.31 | 1-2 | $5^1P^o-5^1D$ (3) |
| **Cd II** See introduction | | | | | | |
| **In I** I P 5.76 Anal A List D Aug 1942 | | | | | | |
| 4511.310// | A | 10 | 0.27 | 3.01 | 1½-½ | $5^2P^o-6^2S$ |
| 4101.764 | A | 10 | 0.00 | 3.01 | ½-½ | (1) |
| **In II** See introduction | | | | | | |
| **Sn I** I P 7.30 Anal A List D Aug 1942 | | | | | | |
| 3009.136 | A | 700R | 0.21 | 4.31 | 1-1 | $5p^3P-6s^3P^o$ † |
| 3175.046// | A | 2000R | 0.42 | 4.31 | 2-1 | (1) |
| 3034.120 | A | 900R | 0.21 | 4.28 | 1-0 | |
| 3330.620 | A | 500r | 1.06 | 4.77 | 2-2 | $5p^1D-6s^3P^o$ |
| 3801.022 | A | 2000R | 1.06 | 4.31 | 2-1 | (2) |
| 3262.340 | A | 2500R | 1.06 | 4.85 | 2-1 | $5p^1D-6s^1P^o$ (3) |
| 5631.707 | A | 500 | 2.12 | 4.31 | 0-1 | $5p^1S-6s^3P^o$ (4) |
| 4524.744 | A | 1000 | 2.12 | 4.85 | 0-1 | $5p^1S-6s^1P^o$ (5) |
| **Sn II** I P 14.57 Anal A List D Aug 1942 | | | | | | |
| 6453.50 | A | 70 | 7.02 | 8.93 | ½-1½ | $6^2S-6^2P^o$ |
| 6844.05 | A | 25 | 7.02 | 8.83 | ½-½ | (1) |
| 3351.97 | A | 60 | 7.34 | 11.02 | 2½-3½ | $p^2\ ^2D-4^2F^o$ |
| 3283.21 | A | 50 | 7.26 | 11.02 | 1½-2½ | (2) |
| **Sb I** I P 8.64 Anal A List D Sept 1942 | | | | | | |
| 3347.10 | A | 5 | 2.28 | 5.97 | 1½-2½ | $5p^2P^o-6s^4P$ |
| 3363.15 | A | 100 | 2.02 | 5.67 | ½-1½ | (1) |
| 3637.83 | A | 250 | 2.28 | 5.67 | 1½-1½ | |
| 3722.79 | A | 200r | 2.02 | 5.34 | ½- ½ | |
| 4033.55 | A | 200 | 2.28 | 5.34 | 1½- ½ | |
| 3232.52 | A | 600r | 2.28 | 6.10 | 1½-1½ | $5p^2P^o-6s^2P$ |
| 3267.51 | A | 700r | 2.02 | 5.80 | ½- ½ | (2) |
| 3504.48 | A | 50 | 2.28 | 5.80 | 1½- ½ | |
| 3029.83 | A | 500r | 2.02 | 6.10 | ½-1½ | |
| **Sb II** See introduction | | | | | | |
| **Te I** I P 8.96 Anal B List D June 1942 | | | | | | |
| 9722.68 | A | 100 | 5.46 | 6.73 | 2-3 | $6^5S^o-6^5P$ |
| 10051.55 | A | 50 | 5.46 | 6.69 | 2-2 | (1) |
| 10091.12 | A | 25 | 5.46 | 6.69 | 2-1 | |
| **I I** See introduction | | | | | | |
| **I II** See introduction | | | | | | |
| **Xe I** See introduction | | | | | | |
| **Xe II** See introduction | | | | | | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Cs I** I P 3.88 Anal A List D Nov 1942 | | | | | | |
| 8521.10 // | A | 4000R | 0.00 | 1.45 | ½-1½ | $6^2S-6^2P^o$ |
| 8943.50 | A | 2000R | 0.00 | 1.38 | ½- ½ | (1) |
| 4555.421 | B | (2000R) | 0.00 | 2.71 | ½-1½ | $6^2S-7^2P^o$ |
| 4593.195 | B | (1000R) | 0.00 | 2.69 | ½- ½ | (2) |
| **Cs II** See introduction | | | | | | |
| **Ba I** I P 5.19 Anal A List C Nov 1942 | | | | | | |
| 7911.338 | A | (200) | 0.00 | 1.56 | 0-1 | $6^1S-6^3P^o$ (1) |
| 5535.484// | A | 1000R | 0.00 | 2.23 | 0-1 | $6^1S-6^1P^o$ (2) |
| 3501.107 | A | 200R | 0.00 | 3.53 | 0-1 | $6^1S-5d6p^1P^o$ (3) |
| 3071.583 | A | 100R | 0.00 | 4.02 | 0-1 | $6^1S-7^1P^o$ (4) |
| 7059.941 | A | (2000) | 1.18 | 2.93 | 3-4 | $5^3D-5d6p^3F^o$ † |
| 7280.298 | A | (1000) | 1.14 | 2.83 | 2-3 | (5) |
| 7673.092 | A | (600) | 1.12 | 2.72 | 1-2 | |
| 7488.083 | A | (200) | 1.18 | 2.83 | 3-3 | |
| 7780.479 | A | (400) | 1.14 | 2.72 | 2-2 | |
| 6498.759 | A | 300r | 1.18 | 3.08 | 3-3 | $5^3D-5d6p^3D^o$ |
| 6527.312 | A | 250 | 1.14 | 3.03 | 2-2 | (6) |
| 6595.326 | A | 200 | 1.12 | 2.99 | 1-1 | |
| 6693.842 | A | 70 | 1.18 | 3.03 | 3-2 | |
| 6675.271 | A | 80 | 1.14 | 2.99 | 2-1 | |
| 6341.682 | A | 150 | 1.14 | 3.08 | 2-3 | |
| 6450.854 | A | 125 | 1.12 | 3.03 | 1-2 | |
| 6110.784 | A | 300r | 1.18 | 3.20 | 3-2 | $5^3D-5d6p^3P^o$ † |
| 6063.117 | A | 200 | 1.14 | 3.17 | 2-1 | (7) |
| 6019.470 | A | 100 | 1.12 | 3.17 | 1-0 | |
| 5971.699 | A | 100 | 1.14 | 3.20 | 2-2 | |
| 5997.088 | A | 100 | 1.12 | 3.17 | 1-1 | |
| 3993.401 | A | 80 | 1.18 | 4.28 | 3-4 | $5^3D-4^3F^o$ |
| 3935.717 | A | 50 | 1.14 | 4.27 | 2-3 | (8) |
| 3909.910 | A | 40 | 1.12 | 4.27 | 1-2 | |
| 3995.656 | A | 30 | 1.18 | 4.27 | 3-3 | |
| 3937.870 | A | 20 | 1.14 | 4.27 | 2-2 | |
| 5777.622 | A | 400r | 1.67 | 3.80 | 2-3 | $6^3P^o-6^3D$ † |
| 5519.047 | A | 200 | 1.56 | 3.80 | 1-2 | (9) |
| 5424.551 | A | 100 | 1.51 | 3.79 | 0-1 | |
| 5800.229 | A | 100 | 1.67 | 3.80 | 2-2 | |
| 7905.751 | A | 500 | 1.67 | 3.23 | 2-1 | $6^3P^o-7^3S$ |
| 7392.411 | A | 400 | 1.56 | 3.23 | 1-1 | (10) |
| 7195.235 | A | 200 | 1.51 | 3.23 | 0-1 | |
| **Ba II** I P 9.96 Anal A List B Nov 1942 | | | | | | |
| 4554.033// | A | 1000R | 0.00 | 2.71 | ½-1½ | $6^2S-6^2P^o$ |
| 4934.086 | B | 700R | 0.00 | 2.50 | ½- ½ | (1) |
| 6141.718 | A | 600r | 0.70 | 2.71 | 2½-1½ | $5^2D-6^2P^o$ |
| 6496.896 | A | 600r | 0.60 | 2.50 | 1½- ½ | (2) |
| 5853.675 | A | 200 | 0.60 | 2.71 | 1½-1½ | |
| 4899.934 | A | 35 | 2.71 | 5.23 | 1½- ½ | $6^2P^o-7^2S$ |
| 4524.928 | A | 35 | 2.50 | 5.23 | ½- ½ | (3) |
| 4130.648 | A | 80 | 2.71 | 5.70 | 1½-2½ | $6^2P^o-6^2D$ |
| 3891.781 | A | 50 | 2.50 | 5.67 | ½-1½ | (4) |
| 4166.003 | A | 20 | 2.71 | 5.67 | 1½-1½ | |
| 8710.82 | C | (3n) | 5.70 | 7.11 | 2½-3½ | $6^2D-5^2F^o$ |
| 8737.74 | C | (3n) | 5.67 | 7.08 | 1½-2½ | (5) |
| 5391.60 | D | (10) | 5.70 | 7.99 | 2½-3½ | $6^2D-6^2F^o$ |
| 5361.35 | D | (8) | 5.67 | 7.97 | 1½-2½ | (6) |
| 5421.05 | D | (2) | 5.70 | 7.97 | 2½-2½ | |
| 4326.74 | D | (2) | 5.70 | 8.55 | 2½-3½ | $6^2D-7^2F^o$ |
| 4297.80 | D | (2) | 5.87 | 8.54 | 1½-2½ | (7) |
| 6874.09 | D | (10) | 5.99 | 7.78 | 3½- | $4^2F^o-5^2G$ |
| 6769.62 | D | (10) | 5.96 | 7.78 | 2½- | (8) |
| 5480.30 | D | (3) | 5.99 | 8.24 | 3½-2½ | $4^2F^o-8^2D$ |
| 5428.79 | D | (2) | 5.96 | 8.23 | 2½-1½ | (9) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multip (No) |
|---|---|---|---|---|---|---|
| **Ba II** continued | | | | | | |
| 5013.00 | D | (10) | 5.99 | 8.45 | 3½- | $4^2F^o-6$ |
| 4957.15 | D | (10) | 5.96 | 8.45 | 2½- | (10) |
| 4309.32 | D | (8) | 5.99 | 8.85 | 3½- | $4^2F^o-7$ |
| 4267.95 | D | (8) | 5.96 | 8.85 | 2½- | (11) |
| 6378.91 | D | (5) | 6.17 | 8.11 | 1½- ½ | $7^2P^o-9$ |
| 6135.83 | D | (4) | 6.10 | 8.11 | ½- ½ | (12) |
| 5981.25 | D | (8) | 6.17 | 8.24 | 1½-2½ | $7^2P^o-8$ |
| 5784.18 | D | (8) | 6.10 | 8.23 | ½-1½ | (13) |
| 5999.85 | D | (3) | 6.17 | 8.23 | 1½-1½ | |
| 4997.81 | D | (3) | 6.17 | 8.64 | 1½- ½ | $7^2P^o-1$ |
| 4847.14 | D | (3) | 6.10 | 8.64 | ½- ½ | (14) |
| 4843.46 | D | (8) | 6.17 | 8.72 | 1½-2½ | $7^2P^o-9$ |
| 4708.94 | D | (8) | 6.10 | 8.72 | ½-1½ | (15) |
| 4850.84 | D | (2) | 6.17 | 8.72 | 1½-1½ | |
| 4405.23 | D | (4) | 6.17 | 8.98 | 1½- ½ | $7^2P^o-1$ |
| 4287.80 | D | (3) | 6.10 | 8.98 | ½- ½ | (16) |
| 4325.73 | D | (6) | 6.17 | 9.03 | 1½-2½ | $7^2P^o-1$ |
| 4216.04 | D | (5) | 6.10 | 9.02 | ½-1½ | (17) |
| 4329.62 | D | (3) | 6.17 | 9.02 | 1½-1½ | |
| **La I** I P 5.59 Anal A List C Nov 1942 | | | | | | |
| 6455.99 | A | 300 | 0.13 | 2.04 | 2½-3½ | $a^2D-z^2$ |
| 6578.51 | A | 400 | 0.00 | 1.88 | 1½-2½ | (1) |
| 7068.37 | A | 100 | 0.13 | 1.88 | 2½-2½ | |
| 5930.61 | A | (200) | 0.13 | 2.21 | 2½-3½ | $a^2D-y^2$ |
| 5930.68 | A | (100) | 0.00 | 2.08 | 1½-2½ | (2) |
| 6325.90 | A | 150 | 0.13 | 2.08 | 2½-2½ | |
| 5455.14 | A | 400 | 0.13 | 2.39 | 2½-2½ | $a^2D-y^2$ |
| 5501.34 | A | 300 | 0.00 | 2.24 | 1½-1½ | (3) |
| 5271.18 | A | 150 | 0.13 | 2.47 | 2½-1½ | $a^2D-y^2$ |
| 4949.76 | A | 200 | 0.00 | 2.49 | 1½- ½ | (4) |
| 4280.27 | A | 100 | 0.13 | 3.01 | 2½-3½ | $a^3D-w^3$ |
| 4187.31 | A | 125 | 0.00 | 2.95 | 1½-2½ | (5) |
| 6709.49 | A | 200 | 0.37 | 2.21 | 2½-3½ | $a^4F-y^2$ |
| 7045.96 | A | 300d? | 0.33 | 2.08 | 1½-2½ | (6) |
| 6249.92 // | A | 500 | 0.51 | 2.48 | 4½-5½ | $a^4F-z^4$ |
| 6394.23 | A | 600 | 0.43 | 2.36 | 3½-4½ | (7) |
| 6410.98 | A | 300 | 0.37 | 2.30 | 2½-3½ | |
| 6543.17 | A | 500d | 0.33 | 2.22 | 1½-2½ | |
| 5791.32 | A | 400d? | 0.51 | 2.64 | 4½-4½ | $a^4F-y^4$ |
| 5789.22 | A | 250d? | 0.43 | 2.56 | 3½-3½ | (8) |
| 5769.32 | A | 80 | 0.37 | 2.51 | 2½-2½ | |
| 5740.65 | A | 100 | 0.33 | 2.48 | 1½-1½ | |
| 5211.85 | A | 300d | 0.51 | 2.88 | 4½-3½ | $a^4F-y^4$ |
| 5177.30 | A | 300d | 0.43 | 2.82 | 3½-2½ | (9) |
| 5145.42 | A | 200 | 0.37 | 2.77 | 2½-1½ | |
| 5106.23 | A | 150d | 0.33 | 2.75 | 1½- ½ | |
| 5234.27 | A | 300d | 0.51 | 2.87 | 4½-3½ | $a^4F-1^o$ † (10) |
| 4570.02 | A | 250 | 0.51 | 3.21 | 4½-4½ | $a^4F-x^4F$ |
| 4567.90 | A | 200 | 0.43 | 3.13 | 3½-3½ | (11) |
| 4549.50 | A | 50 | 0.37 | 3.08 | 2½-2½ | |
| 4494.71 | A | 30 | 0.33 | 3.08 | 1½-1½ | |
| **La II** I P 11.38 Anal A List B Nov 1942 | | | | | | |
| 7282.36 | A | 150 | 0.24 | 1.94 | 4-4 | $a^3F-z^3F$ |
| 7483.48 | A | 30 | 0.13 | 1.77 | 3-3 | (1) |
| 7066.24 | A | 300 | 0.00 | 1.75 | 2-2 | |
| 6808.88 | A | 30 | 0.13 | 1.94 | 3-4 | |
| 6954.54 | A | 20 | 0.00 | 1.77 | 2-3 | |
| 6774.28 | A | 100 | 0.13 | 1.95 | 3-3 | $a^3F-z^1F$ (2) |
| 6834.07 | A | 20 | 0.24 | 2.05 | 4-4 | $a^3F-z^1G$ (3) |
| 5797.57 | A | 150 | 0.24 | 2.37 | 4-4 | $a^3F-y^3F$ |
| 5805.77 | A | 120 | 0.13 | 2.25 | 3-3 | (4) |
| 5808.31 | A | 80 | 0.00 | 2.12 | 2-2 | |
| 6146.53 | A | 15 | 0.24 | 2.25 | 4-3 | |
| 6172.72 | A | 10 | 0.13 | 2.12 | 3-2 | |
| 5493.45 | A | 30 | 0.13 | 2.37 | 3-4 | |
| 5482.37 | A | 40 | 0.00 | 2.25 | 2-3 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| La II continued | | | | | | |
| 6305.46 | A | 10 | 0.24 | 2.20 | 4-4 | $a^3F$-$z^3H^o$ (5) |
| 5290.83 | A | 50 | 0.00 | 2.33 | 2-2 | $a^3F$-$z^1D^o$ † (6) |
| 4921.80 | A | 300 | 0.24 | 2.75 | 4-5 | $a^3F$-$z^3G^o$ |
| 4920.98 | A | 300 | 0.13 | 2.63 | 3-4 | (7) |
| 4899.92 | A | 200 | 0.00 | 2.52 | 2-3 | |
| 5163.61 | A | 40 | 0.24 | 2.63 | 4-4 | |
| 5156.74 | A | 40 | 0.13 | 2.52 | 3-3 | |
| 5423.82 | A | 4 | 0.24 | 2.52 | 4-3 | |
| 4860.90 | A | 80 | 0.24 | 2.78 | 4-3 | $a^3F$-$z^3D^o$ |
| 4740.27 | A | 120 | 0.13 | 2.73 | 3-2 | (8) |
| 4662.51 | A | 200 | 0.00 | 2.65 | 2-1 | |
| 4645.28 | A | 100 | 0.13 | 2.78 | 3-3 | |
| *4522.37 | A | 400 | 0.00 | 2.73 | 2-2 | |
| 4435.84 | A | 10 | 0.00 | 2.78 | 2-3 | |
| 4300.44 | A | 60 | 0.00 | 2.87 | 2-2 | $a^3F$-$z^3P^o$ † (9) |
| 4086.72 | A | 300 | 0.00 | 3.02 | 2-2 | $a^3F$-$y^1D^o$ (10) |
| 4432.95 | A | 20? | 0.24 | 3.03 | 4-3 | $a^3F$-$y^1F^o$ † |
| 4076.71 | A | 40 | 0.00 | 3.03 | 2-3 | (11) |
| 3794.78 | A | 400 | 0.24 | 3.50 | 4-3 | $a^3F$-$y^3D^o$ |
| 3790.83 | A | 300 | 0.13 | 3.38 | 3-2 | (12) |
| 3849.02 | A | 100 | 0.00 | 3.31 | 2-1 | |
| 3662.08 | A | 30 | 0.13 | 3.50 | 3-3 | |
| 3650.19 | A | 80 | 0.00 | 3.38 | 2-2 | |
| 3530.67 | A | 8 | 0.00 | 3.50 | 2-3 | |
| 3759.08 | A | 300 | 0.24 | 3.53 | 4-4 | $a^3F$-$x^3F^o$ |
| 3871.64 | A | 200 | 0.13 | 3.31 | 3-3 | (13) |
| 3784.81 | A | 15 | 0.00 | 3.26 | 2-2 | |
| 3936.22 | A | 50 | 0.13 | 3.26 | 3-2 | |
| 3628.83 | A | 60 | 0.13 | 3.53 | 3-4 | |
| 3725.05 | A | 20 | 0.00 | 3.31 | 2-3 | |
| 3645.43 | A | 200 | 0.00 | 3.39 | 2-1 | $a^3F$-$z^1P^o$ (14) |
| 3510.00 | A | 15 | 0.13 | 3.64 | 3-2 | $a^3F$-$y^3P^o$ |
| 3550.82 | A | 6 | 0.00 | 3.48 | 2-1 | (15) |
| 3108.46 | A | 8 | 0.00 | 3.97 | 2-1 | $a^3F$-$x^3P^o$ (16) |
| 3306.98 | A | 8 | 0.24 | 3.98 | 4-3 | $a^3F$-$x^1F^o$ † |
| 3104.58 | A | 50 | 0.00 | 3.98 | 2-3 | (17) |
| 6952.52 | A | 10 | 0.17 | 1.95 | 2-3 | $a^1D$-$z^1F^o$ (18) |
| 5936.22 | A | 20 | 0.17 | 2.25 | 2-3 | $a^1D$-$y^3F^o$ |
| 6320.39 | A | 200 | 0.17 | 2.12 | 2-2 | (19) |
| 5712.39 | A | 20 | 0.17 | 2.33 | 2-2 | $a^1D$-$z^1D^o$ (20) |
| 5259.38 | A | 50 | 0.17 | 2.52 | 2-3 | $a^1D$-$z^3G^o$ (21) |
| 4728.41 | A | 100 | 0.17 | 2.78 | 2-3 | $a^1D$-$z^3D^o$ |
| 4828.87 | A | 20 | 0.17 | 2.73 | 2-2 | (22) |
| 4986.82 | A | 100 | 0.17 | 2.65 | 2-1 | |
| 4574.87 | A | 200 | 0.17 | 2.87 | 2-2 | $a^1D$-$z^3P^o$ |
| 4691.17 | A | 50 | 0.17 | 2.80 | 2-1 | (23) |
| 4333.76 | A | 500 | 0.17 | 3.02 | 2-2 | $a^1D$-$y^1D^o$ (24) |
| 4322.51 | A | 100 | 0.17 | 3.03 | 2-3 | $a^1D$-$y^1F^o$ (25) |
| 3713.54 | A | 100 | 0.17 | 3.50 | 2-3 | $a^1D$-$y^3D^o$ |
| 3846.00 | A | 20 | 0.17 | 3.38 | 2-2 | (26) |
| 4067.39 | A | 100 | 0.17 | 3.21 | 2-1 | |
| 3929.22 | A | 300 | 0.17 | 3.31 | 2-3 | $a^1D$-$x^3F^o$ |
| 3995.74 | A | 400 | 0.17 | 3.26 | 2-2 | (27) |
| 3840.72 | A | 60 | 0.17 | 3.39 | 2-1 | $a^1D$-$z^1P^o$ (28) |
| 3557.26 | A | 8 | 0.17 | 3.64 | 2-2 | $a^1D$-$y^3P^o$ |
| 3735.85 | A | 10 | 0.17 | 3.48 | 2-1 | (29) |
| 3452.18 | A | 40 | 0.17 | 3.75 | 2-1 | $a^1D$-$y^1P^o$ (30) |
| 3142.76 | A | 40 | 0.17 | 4.10 | 2-2 | $a^1D$-$x^3P^o$ |
| 3249.35 | A | 80 | 0.17 | 3.97 | 2-1 | (31) |
| 3245.13 | A | 150 | 0.17 | 3.98 | 2-3 | $a^1D$-$x^1F^o$ (32) |
| 6262.30 | A | 300 | 0.40 | 2.37 | 3-4 | $a^3D$-$y^3F^o$ |
| 6390.48 | A | 200 | 0.32 | 2.25 | 2-3 | (33) |
| 6526.99 | A | 200 | 0.23 | 2.12 | 1-2 | |
| 6671.41 | A | 40 | 0.40 | 2.25 | 3-3 | |
| 6837.91 | A | 15 | 0.32 | 2.12 | 2-2 | |
| 6859.03 | A | 5 | 0.40 | 2.20 | 3-4 | $a^3D$-$z^3H^o$ (34) |
| 5880.63 | A | 50 | 0.23 | 2.33 | 1-2 | $a^3D$-$z^1D^o$ † (35) |
| 5183.42 | A | 400 | 0.40 | 2.78 | 3-3 | $a^3D$-$z^3D^o$ |
| 5122.99 | A | 200 | 0.32 | 2.73 | 2-2 | (36) |
| 5114.55 | A | 200 | 0.23 | 2.65 | 1-1 | |
| 5301.97 | A | 200 | 0.40 | 2.73 | 3-2 | |
| 5303.54 | A | 100 | 0.32 | 2.65 | 2-1 | |
| 4946.47 | A | 50 | 0.23 | 2.73 | 1-2 | |
| 4999.46 | A | 200 | 0.40 | 2.87 | 3-2 | $a^3D$-$z^3P^o$ |
| 4970.39 | A | 100 | 0.32 | 2.80 | 2-1 | (37) |
| 4809.00 | A | 100 | 0.23 | 2.80 | 1-0 | |
| 4840.02 | A | 30 | 0.32 | 2.87 | 2-2 | |
| 4804.04 | A | 80 | 0.23 | 2.80 | 1-1 | |
| 4682.12 | A | 5 | 0.23 | 2.87 | 1-2 | |
| 4712.92 | A | 40 | 0.40 | 3.02 | 3-2 | $a^3D$-$y^1D^o$ |
| 4570.97 | A | 10 | 0.32 | 3.02 | 2-2 | (38) |
| 4429.90 | A | 400 | 0.23 | 3.02 | 1-2 | |
| 4699.62 | A | 50 | 0.40 | 3.03 | 3-3 | $a^3D$-$y^1F^o$ |
| 4558.46 | A | 200 | 0.32 | 3.03 | 2-3 | (39) |
| 3988.51 | A | 500 | 0.40 | 3.50 | 3-3 | $a^3D$-$y^3D^o$ |
| 4031.68 | A | 300 | 0.32 | 3.38 | 2-2 | (40) |
| 4151.98 | A | 250 | 0.23 | 3.21 | 1-1 | |
| 4141.73 | A | 200 | 0.40 | 3.38 | 3-2 | |
| 4275.64 | A | 100 | 0.32 | 3.21 | 2-1 | |
| 3886.37 | A | 150 | 0.32 | 3.50 | 2-3 | |
| 3921.54 | A | 200 | 0.23 | 3.38 | 1-2 | |
| 3949.10 // | A | 600 | 0.40 | 3.53 | 3-4 | $a^3D$-$x^3F^o$ |
| 4123.23 | A | 400 | 0.32 | 3.31 | 2-3 | (41) |
| 4077.35 | A | 300 | 0.23 | 3.26 | 1-2 | |
| 4238.38 | A | 400 | 0.40 | 3.31 | 3-3 | |
| 4196.55 | A | 250 | 0.32 | 3.26 | 2-2 | |
| 4315.90 | A | 30 | 0.40 | 3.26 | 3-2 | |
| 4025.87 | A | 50 | 0.32 | 3.39 | 2-1 | $a^3D$-$z^1P^o$ |
| 3916.05 | A | 300 | 0.23 | 3.39 | 1-1 | (42) |
| 3808.79 | A | 15 | 0.40 | 3.64 | 3-2 | $a^3D$-$y^3P^o$ † |
| 3910.81 | A | 10 l | 0.32 | 3.48 | 2-1 | (43) |
| 3715.53 | A | 50 | 0.32 | 3.64 | 2-2 | |
| 3601.07 | A | 20nl | 0.32 | 3.75 | 2-1 | $a^3D$-$y^1P^o$ |
| 3512.93 | A | 10 | 0.23 | 3.75 | 1-1 | (44) |
| 3337.49 | A | 300 | 0.40 | 4.10 | 3-2 | $a^3D$-$x^3P^o$ |
| 3380.91 | A | 300 | 0.32 | 3.97 | 2-1 | (45) |
| 3344.56 | A | 200 | 0.23 | 3.92 | 1-0 | |
| 3265.67 | A | 600 | 0.32 | 4.10 | 2-2 | |
| 3303.11 | A | 150 | 0.23 | 3.97 | 1-1 | |
| 3193.02 | A | 25 | 0.23 | 4.10 | 1-2 | |
| 3453.17 | A | 50 | 0.40 | 3.98 | 3-3 | $a^3D$-$x^1F^o$ |
| 3376.33 | A | 50 | 0.32 | 3.98 | 2-3 | (46) |
| 6129.57 | A | 50 | 0.77 | 2.78 | 2-3 | $a^3P$-$z^3D^o$ |
| 6100.37 | A | 30 | 0.71 | 2.73 | 1-2 | (47) |
| 6174.15 | A | 6 | 0.65 | 2.65 | 0-1 | |
| *6296.08 | A | 300 | 0.77 | 2.73 | 2-2 | |
| 6358.12 | A | 30 | 0.71 | 2.65 | 1-1 | |
| 6570.96 | A | ? | 0.77 | 2.65 | 2-1 | |
| 5874.00 | A | 6 | 0.77 | 2.87 | 2-2 | $a^3P$-$z^3P^o$ † |
| 6067.13 | A | 6 | 0.77 | 2.80 | 2-1 | (48) |
| 5892.66 | A | 4 | 0.71 | 2.80 | 1-0 | |
| 5703.32 | A | 20 | 0.71 | 2.87 | 1-2 | |
| 5727.29 | A | 20 | 0.65 | 2.80 | 0-1 | |
| 5464.37 | A | 25 | 0.77 | 3.03 | 2-3 | $a^3P$-$y^1F^o$ (49) |
| 4526.12 | A | 200 | 0.77 | 3.50 | 2-3 | $a^3P$-$y^3D^o$ |
| 4613.38 | A | 200 | 0.71 | 3.38 | 1-2 | (50) |
| 4824.05 | A | 100 | 0.65 | 3.21 | 0-1 | |
| 4724.42 | A | 40 | 0.77 | 3.38 | 2-2 | |
| 4935.61 | A | 10 | 0.71 | 3.21 | 1-1 | |
| 5062.91 | A | 20 | 0.77 | 3.21 | 2-1 | |
| *4850.58 | A | 30 | 0.77 | 3.31 | 2-3 | $a^3P$-$x^3F^o$ |
| 4830.51 | A | 10 | 0.71 | 3.26 | 1-2 | (51) |
| 4716.44 | A | 80 | 0.77 | 3.39 | 2-1 | $a^3P$-$z^1P^o$ |
| 4605.78 | A | 100 | 0.71 | 3.39 | 1-1 | (52) |
| 4508.48 | A | 10 | 0.65 | 3.39 | 0-1 | |
| 4296.05 | A | 300 | 0.77 | 3.64 | 2-2 | $a^3P$-$y^3P^o$ |
| 4455.79 | A | 50 | 0.71 | 3.48 | 1-1 | (53) |
| 4559.28 | A | 100 | 0.77 | 3.48 | 2-1 | |
| 4580.05 | A | 150 | 0.71 | 3.40 | 1-0 | |
| 4204.03 | A | 100 | 0.71 | 3.64 | 1-2 | |
| 4364.66 | A | 100 | 0.65 | 3.48 | 0-1 | |
| 4143.77 | A | 15 | 0.77 | 3.75 | 2-1 | $a^3P$-$y^1P^o$ |
| 4058.08 | A | 5 | 0.71 | 3.75 | 1-1 | (54) |
| 3705.81 | A | 80 | 0.77 | 4.10 | 2-2 | $a^3P$-$x^3P^o$ |
| 3780.67 | A | 50? | 0.71 | 3.97 | 1-1 | (55) |
| 3854.91 | A | 30 | 0.77 | 3.97 | 2-1 | |
| 3835.09 | A | 50 | 0.71 | 3.92 | 1-0 | |
| 3637.15 | A | 40 | 0.71 | 4.10 | 1-2 | |
| 3714.87 | A | 40 | 0.65 | 3.97 | 0-1 | |
| 5380.97 | A | 100 | 0.91 | 3.21 | 0-1 | $a^1S$-$y^3D^o$ (58) |
| 4991.27 | A | 80 | 0.91 | 3.39 | 0-1 | $a^1S$-$z^1P^o$ (57) |
| 4354.40 | A | 200 | 0.91 | 3.75 | 0-1 | $a^1S$-$y^1P^o$ (58) |
| 4036.59 | A | 15d | 0.91 | 3.97 | 0-1 | $a^1S$-$x^3P^o$ (59) |
| 9657.00 | A | 20 | 0.92 | 2.20 | 4-4 | $a^1G$-$z^3H^o$ (60) |
| 6636.53 | A | 5 | 0.92 | 2.78 | 4-3 | $a^1G$-$z^3D^o$ (61) |
| 5863.70 | A | 80 | 0.92 | 3.03 | 4-3 | $a^1G$-$y^1F^o$ (62) |
| 4796.67 | A | 25 | 0.92 | 3.50 | 4-3 | $a^1G$-$y^3D^o$ (63) |
| 4739.80 | A | 15 | 0.92 | 3.53 | 4-4 | $a^1G$-$x^3F^o$ † (64) |
| 4748.73 | A | 150 | 0.92 | 3.52 | 4-5 | $a^1G$-$z^1H^o$ (65) |
| 4042.91 | A | 300 | 0.92 | 3.98 | 4-3 | $a^1G$-$x^1F^o$ (66) |
| 6958.11 | A | 100 | 1.25 | 3.02 | 2-2 | $b^1D$-$y^1D^o$ (67) |
| 5486.86 | A | 5 | 1.25 | 3.50 | 2-3 | $b^1D$-$y^3D^o$ † |
| *6296.08 | A | 300 | 1.25 | 3.21 | 2-1 | (68) |
| 5971.09 | A | 8 | 1.25 | 3.31 | 2-3 | $b^1D$-$x^3F^o$ |
| 6126.09 | A | 50 | 1.25 | 3.26 | 2-2 | (69) |
| 5769.06 | A | 60 | 1.25 | 3.39 | 2-1 | $b^1D$-$z^1P^o$ (70) |
| 5535.66 | A | 80 | 1.25 | 3.48 | 2-1 | $b^1D$-$y^3P^o$ † (71) |
| 4934.83 | A | 100 | 1.25 | 3.75 | 2-1 | $b^1D$-$y^1P^o$ (72) |
| 4530.54 | A | 15 | 1.25 | 3.97 | 2-1 | $b^1D$-$x^3P^o$ (73) |
| *4522.37 | A | 400 | 1.25 | 3.98 | 2-3 | $b^1D$-$x^1F^o$ (74) |
| 4286.97 | A | 300 | 1.94 | 4.82 | 4-5 | $z^3F^o$-$e^3G$ † |
| 4385.20 | A | 40 | 1.77 | 4.59 | 3-4 | (75) |
| 4692.50 | A | 200 | 1.75 | 4.38 | 2-3 | |
| 4655.49 | A | 400 | 1.94 | 4.59 | 4-4 | |
| 4743.08 | A | 250 | 1.77 | 4.38 | 3-3 | |
| 4525.31 | A | 100 | 1.94 | 4.67 | 4-4 | $z^3F^o$-$e^3F$ |
| 4427.52 | A | 100 | 1.77 | 4.56 | 3-3 | (76) |
| 4619.87 | A | 300 | 1.75 | 4.42 | 2-2 | |
| 4703.27 | A | 150 | 1.94 | 4.56 | 4-3 | |
| 4668.91 | A | 250 | 1.77 | 4.42 | 3-2 | |
| 4269.50 | A | 300 | 1.77 | 4.67 | 3-4 | |
| 4383.44 | A | 100 | 1.75 | 4.56 | 2-3 | |
| 4647.50 | A | 100 | 1.94 | 4.59 | 4-3 | $z^3F^o$-$e^1F$ |
| 4378.10 | A | 50 | 1.77 | 4.59 | 3-3 | (77) |
| 4334.96 | A | 100 | 1.75 | 4.59 | 2-3 | |
| 4317.56 | A | 200 | 1.94 | 4.86 | 4-3 | $z^3F^o$-$e^3D$ † |
| 4192.35 | A | 100 | 1.77 | 4.72 | 3-2 | (78) |
| 4099.54 | A | 150 | 1.75 | 4.76 | 2-1 | |
| 3994.50 | A | 10 | 1.77 | 4.86 | 3-3 | |
| 4152.78 | A | 100 | 1.75 | 4.72 | 2-2 | |
| 4249.99 | A | 100 | 1.94 | 4.84 | 4-4 | $z^3F^o$-$e^1G$ |
| 4023.58 | A | 40 | 1.77 | 4.84 | 3-4 | (79) |
| 4671.82 | A | 200 | 1.95 | 4.59 | 3-4 | $z^1F^o$-$e^3G$ |
| 5080.21 | A | 40 | 1.95 | 4.38 | 3-3 | (80) |
| 4540.71 | A | 10 | 1.95 | 4.67 | 3-4 | $z^1F^o$-$e^3F$ † |
| 4719.93 | A | 150 | 1.95 | 4.56 | 3-3 | (81) |
| 4663.76 | A | 300 | 1.95 | 4.59 | 3-3 | $z^1F^o$-$e^1F$ (82) |
| 4230.95 | A | 150 | 1.95 | 4.86 | 3-3 | $z^1F^o$-$e^3D$ (83) |
| 4263.59 | A | 200 | 1.95 | 4.84 | 3-4 | $z^1F^o$-$e^1G$ (84) |
| 4050.08 | A | 200 | 1.95 | 4.99 | 3-2 | $z^1F^o$-$e^1D$ (85) |
| 4859.18 | A | 5n | 2.05 | 4.59 | 4-4 | $z^1G^o$-$e^3G$ † |
| 5302.62 | A | 150 | 2.05 | 4.38 | 4-3 | (86) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| La II continued | | | | | | |
| 4717.58 | A | 50 | 2.05 | 4.67 | 4-4 | $z^1G^o$-$e^3F$ |
| 4911.34 | A | 10 | 2.05 | 4.56 | 4-3 | (87) |
| •4850.58 | A | 30 | 2.05 | 4.59 | 4-3 | $z^1G^o$-$e^1F$ (88) |
| 4419.16 | A | 30 | 2.05 | 4.84 | 4-4 | $z^1G^o$-$e^1G$ (89) |
| 5048.04 | A | 30 l | 2.37 | 4.82 | 4-5 | $y^3F^o$-$e^3G$ |
| 5279.11 | A | 40 | 2.25 | 4.59 | 3-4 | (90) |
| 5480.72 | A | 25 | 2.12 | 4.38 | 2-3 | |
| 5566.92 | A | 40 | 2.37 | 4.59 | 4-4 | |
| 5806.56 | A | 8 | 2.25 | 4.38 | 3-3 | |
| 5381.77 | A | 50 | 2.37 | 4.67 | 4-4 | $y^3F^o$-$e^3F$† |
| 5340.66 | A | 100 | 2.25 | 4.56 | 3-3 | (91) |
| 5381.91 | A | 100 | 2.12 | 4.42 | 2-2 | |
| 4952.06 | A | 40 | 2.37 | 4.86 | 4-3 | $y^3F^o$-$e^3D$† |
| 5003.12 | A | 40 | 2.25 | 4.72 | 3-2 | (92) |
| 4688.65 | A | 40 | 2.12 | 4.76 | 2-1 | |
| 4996.82 | A | 50 | 2.37 | 4.84 | 4-4 | $y^3F^o$-$e^1G$ (93) |
| 4498.76 | A | 10 | 2.25 | 4.99 | 3-2 | $y^3F^o$-$e^1D$ (94) |
| 5188.21 | A | 500 | 2.44 | 4.82 | 6-5 | $z^3H^o$-$e^3G$ |
| 5377.08 | A | 200 | 2.39 | 4.59 | 5-4 | (95) |
| 5671.54 | A | 100 | 2.20 | 4.38 | 4-3 | |
| 4891.43 | A | 10 | 2.29 | 4.82 | 5-5 | |
| 5167.28 | A | 10 | 2.20 | 4.59 | 4-4 | |
| 5204.14 | A | 300 | 2.29 | 4.67 | 5-4 | $z^3H^o$-$e^3F$ |
| 5226.20 | A | 40 l | 2.20 | 4.56 | 4-3 | (96) |
| 5157.43 | A | 150 | 2.20 | 4.59 | 4-3 | $z^3H^o$-$e^1F$ (97) |
| 4843.29 | A | 5 | 2.29 | 4.84 | 5-4 | $z^3H^o$-$e^1G$ (98) |
| 5458.68 | A | 50 | 2.33 | 4.59 | 2-3 | $z^1D^o$-$e^1F$ (99) |
| 5172.89 | A | 20 l | 2.33 | 4.72 | 2-2 | $z^1D^o$-$e^3D$† |
| 5090.56 | A | 20 l | 2.33 | 4.76 | 2-1 | (100) |
| 4636.42 | A | 80 | 2.33 | 4.99 | 2-2 | $z^1D^o$-$e^1D$ (101) |
| 3007.32 | A | 5 | 2.33 | 6.44 | 2-3 | $z^1D^o$-$f^1F$ (102) |
| 5973.52 | A | 120 l | 2.75 | 4.82 | 5-5 | $z^3G^o$-$e^3G$† |
| 6310.91 | A | 200 | 2.63 | 4.59 | 4-4 | (103) |
| 6642.79 | A | 100 | 2.52 | 4.38 | 3-3 | |
| 6714.08 | A | 80 | 2.75 | 4.59 | 5-4 | |
| 5652.3 | A | 10 n | 2.63 | 4.82 | 4-5 | |
| 6446.62 | A | 200 | 2.75 | 4.87 | 5-4 | $z^3G^o$-$e^3F$† |
| 6399.04 | A | 400 | 2.63 | 4.56 | 4-3 | (104) |
| 6498.19 | A | 250 | 2.52 | 4.42 | 3-2 | |
| 5948.30 | A | 20 | 2.52 | 4.59 | 3-3 | $z^3G^o$-$e^1F$ (105) |
| 5532.17 | A | 10 | 2.63 | 4.86 | 4-3 | $z^3G^o$-$e^3D$ |
| 5610.53 | A | 20 | 2.52 | 4.72 | 3-2 | (106) |
| 5901.95 | A | 40 l | 2.75 | 4.84 | 5-4 | $z^3G^o$-$e^1G$ (107) |
| 6830.83 | A | 6 | 2.78 | 4.59 | 3-4 | $z^3D^o$-$e^3G$† (108) |
| 6554.18 | A | ? | 2.78 | 4.67 | 3-4 | $z^3D^o$-$e^3F$ |
| 6732.80 | A | 40 | 2.73 | 4.56 | 2-3 | (109) |
| 6968.78 | A | 25 | 2.65 | 4.42 | 1-2 | |
| 6813.68 | A | 50 | 2.78 | 4.59 | 3-3 | $z^3D^o$-$e^1F$† (110) |
| 5927.71 | A | 30 | 2.78 | 4.86 | 3-3 | $z^3D^o$-$e^3D$† |
| 6203.51 | A | 50 l | 2.73 | 4.72 | 2-2 | (111) |
| 5848.95 | A | 20 | 2.65 | 4.76 | 1-1 | |
| 6374.08 | A | 30 | 2.78 | 4.72 | 3-2 | |
| 6085.43 | A | 10 | 2.73 | 4.76 | 2-1 | |
| 5447.59 | A | 10 | 2.73 | 4.99 | 2-2 | $z^3D^o$-$e^1D$† (112) |
| 3484.39 | A | 10 l | 2.78 | 6.32 | 3-3 | $z^3D^o$-$f^3D$† |
| 3432.81 | A | 5 | 2.73 | 8.32 | 2-3 | (113) |
| 3209.13 | A | 6 | 2.78 | 6.63 | 3-3 | $z^3D^o$-$g^3D$† |
| 3283.98 | A | 5 | 2.73 | 6.51 | 2-2 | (114) |
| 3253.41 | A | 10n | 2.85 | 6.44 | 1-1 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| La II continued | | | | | | |
| 3049.39 | A | 5 | 2.78 | 6.83 | 3-4 | $z^3D^o$-$f^3F$† |
| 3054.02 | A | 6 | 2.73 | 6.77 | 2-3 | (115) |
| 3081.42 | A | 6n | 2.65 | 6.65 | 1-2 | |
| 3022.26 | A | 5nl | 2.73 | 6.81 | 2-2 | $z^3D^o$-$g^1D$ (116) |
| 6188.09 | A | 100 l | 2.87 | 4.86 | 2-3 | $z^3P^o$-$e^3D$† |
| 6443.05 | A | 50 n | 2.80 | 4.72 | 1-2 | (117) |
| 6307.25 | A | 20 n | 2.80 | 4.76 | 0-1 | |
| 6315.79 | A | 50 | 2.80 | 4.76 | 1-1 | |
| 5808.63 | A | 8 | 2.87 | 4.99 | 2-2 | $z^3P^o$-$e^1D$ (118) |
| 3460.31 | A | 5 l | 2.87 | 6.44 | 2-3 | $z^3P^o$-$f^1F$ (119) |
| 3283.95 | A | 8 n | 2.87 | 6.63 | 2-3 | $z^3P^o$-$g^3D$† |
| 3329.07 | A | 8 | 2.80 | 6.51 | 1-2 | (120) |
| 3326.21 | A | 5 | 2.87 | 6.58 | 2-1 | $z^3P^o$-$e^1P$† (121) |
| 3212.56 | A | 5 | 2.87 | 6.71 | 2-1 | $z^3P^o$-$e^3S$† (122) |
| 3932.53 | A | 10 l | 3.02 | 6.16 | 2-2 | $y^1D^o$-$f^3D$† (123) |
| 3694.27 | A | 7 n | 3.02 | 6.36 | 2-2 | $y^1D^o$-$f^1D$ (124) |
| 3612.34 | A | 50 | 3.02 | 6.44 | 2-3 | $y^1D^o$-$f^1F$ (125) |
| 3420.54 | A | 5 n | 3.02 | 6.63 | 2-3 | $y^1D^o$-$g^3D$† (126) |
| 3520.72 | A | 10 nl | 3.02 | 6.53 | 2-3 | $y^1D^o$-$f^3G$ (127) |
| 3397.77 | A | 40 nl | 3.02 | 6.65 | 2-2 | $y^1D^o$-$f^3F$ (128) |
| 6718.68 | A | 60 | 3.03 | 4.88 | 3-3 | $y^1F^o$-$e^3D$† (129) |
| 6801.38 | A | 5 | 3.03 | 4.84 | 3-4 | $y^1F^o$-$e^1G$ (130) |
| 6273.76 | A | 100 | 3.03 | 4.99 | 3-2 | $y^1F^o$-$e^1D$ (131) |
| 3427.57 | A | 8 | 3.03 | 6.63 | 3-3 | $y^1F^o$-$g^3D$ (132) |
| 4363.05 | A | 50 l | 3.50 | 6.32 | 3-3 | $y^3D^o$-$f^3D$ |
| 4443.94 | A | 20 nl | 3.38 | 6.16 | 2-2 | (133) |
| 4207.61 | A | 10 l | 3.21 | 6.14 | 1-1 | |
| 4634.95 | A | 25 l | 3.50 | 6.16 | 3-2 | |
| 4474.03 | A | 10 | 3.38 | 6.14 | 2-1 | |
| m4193.37 | P | La* | 3.38 | 6.32 | 2-3 | |
| 4180.97 | A | 12 l | 3.21 | 6.16 | 1-2 | |
| 3939.85 | A | 20 l | 3.50 | 6.63 | 3-3 | $y^3D^o$-$g^3D$† |
| 3816.25 | A | 10 n | 3.21 | 6.44 | 1-1 | (134) |
| 3925.09 | A | 5 | 3.38 | 6.53 | 2-3 | $y^3D^o$-$f^3G$ (135) |
| 3701.81 | A | 40 l | 3.50 | 6.83 | 3-4 | $y^3D^o$-$f^3F$† |
| 3641.66 | A | 50 l | 3.38 | 6.77 | 2-3 | (136) |
| 3581.68 | A | 20 nl | 3.21 | 6.65 | 1-2 | |
| 3731.42 | A | 8 n | 3.50 | 6.80 | 3-4 | $y^3D^o$-$e^3H$ (137) |
| 4411.21 | A | 25 nl | 3.53 | 6.32 | 4-3 | $x^3F^o$-$f^3D$† |
| 4337.78 | A | 10 l | 3.31 | 6.16 | 3-2 | (138) |
| 4098.73 | A | 5 | 3.31 | 6.32 | 3-3 | |
| 3981.36 | A | 10 l | 3.26 | 6.36 | 2-2 | $x^3F^o$-$f^1D$ (139) |
| 3979.08 | A | 8 l | 3.53 | 6.63 | 4-3 | $x^3F^o$-$g^3D$† (140) |
| 3864.49 | A | 100 l | 3.53 | 6.72 | 4-5 | $x^3F^o$-$f^3G$† |
| 3773.12 | A | 150 l | 3.31 | 8.58 | 3-4 | (141) |
| 3780.53 | A | 50 ? | 3.26 | 6.53 | 2-3 | |
| 3736.41 | A | 15 l | 3.53 | 6.83 | 4-4 | $x^3F^o$-$f^3F$† |
| 3570.10 | A | 30 nl | 3.31 | 6.77 | 3-3 | (142) |
| 3474.84 | A | 8 l | 3.26 | 6.81 | 2-2 | $x^3F^o$-$g^1D$† (143) |
| 3423.9 | A | 5 | 3.31 | 6.92 | 3-4 | $x^3F^o$-$f^1G$† (144) |
| 2985.43 | A | 5 | 3.28 | 7.39 | 2-2 | $x^3F^o$-$h^1D$ (145) |
| 4481.21 | A | 25 nl | 3.39 | 6.14 | 1-1 | $z^1P^o$-$f^3D$ (146) |
| 3059.91 | A | 8 | 3.39 | 7.42 | 1-0 | $z^1P^o$-$f^3P$† (147) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| La II continued | | | | | | |
| •4600.59 | A | 5n | (3.64 3.48 | 6.32 6.16 | 2-3 1-2 | $y^3P^o$-$f^3D$ (148) |
| 4538.87 | A | 8nl | 3.64 | 6.36 | 2-2 | $y^3P^o$-$f^1D$ (149) |
| 4132.50 | A | 10nl | 3.64 | 6.63 | 2-3 | $y^3P^o$-$g^3D$ (150) |
| 3767.05 | A | 5n | 3.64 | 6.92 | 2-2 | $y^3P^o$-$e^3P$ |
| 3885.09 | A | 4 | 3.64 | 6.82 | 2-1 | (151) |
| 9346.69 | A | 15 | 3.52 | 4.84 | 5-4 | $z^1H^o$-$e^1G$ (152) |
| 4880.20 | A | 10n | 4.10 | 6.63 | 2-3 | $x^3P^o$-$g^3D$ (153) |
| 4502.16 | A | 10nl | 3.97 | 6.71 | 1-1 | $x^3P^o$-$e^3S$ (154) |
| 3411.76 | A | 20nl | 4.10 | 7.73 | 2-2 | $x^3P^o$-$f^3P$ |
| 3580.10 | A | 8n | 4.10 | 7.55 | 2-1 | (155) |
| 3578.89 | A | 5n | 3.97 | 7.42 | 1-0 | |
| 3294.44 | A | 10 | 3.97 | 7.72 | 1-2 | |
| 3407.00 | A | 8nl | 3.92 | 7.55 | 0-1 | |
| 3217.12 | A | 8n | 4.10 | 7.94 | 2-2 | $x^3P^o$-$g^3P$ |
| 3112.63 | A | 8n | 3.97 | 7.94 | 1-2 | (156) |
| 3174.88 | A | 10nl | 4.10 | 7.99 | 2-3 | $x^3P^o$-$h^3D$ |
| 3191.39 | A | 10n | 4.10 | 7.97 | 2-2 | (157) |
| 5173.83 | A | 25 l | 3.98 | 6.36 | 3-2 | $x^1F^o$-$f^1D$ (158) |
| 5014.45 | A | 30nl | 3.98 | 6.44 | 3-3 | $x^1F^o$-$f^1F$ (159) |
| 4194.36 | A | 30n | 3.98 | 6.92 | 3-4 | $x^1F^o$-$f^1G$ (160) |
| 4562.5 | A | 5n | 4.38 | 7.08 | 3-3 | $e^3G$-$1^o$ (161) |
| 5066.99 | A | 20n | 4.82 | 7.35 | 5-4 | $e^3G$-$2^o$ (162) |
| 4241.20 | A | 15nl | 4.59 | 7.50 | 4-4 | $e^3G$-$4^o$† (163) |
| 5107.54 | A | 6n | 4.67 | 7.08 | 4-3 | $e^3F$-$1^o$ (164) |
| 4304.11 | A | 10nl | 4.67 | 7.53 | 4- | $e^3F$-$5^o$† (165) |
| 4113.28 | A | 40 l | 4.59 | 7.59 | 3- | $e^1F$-$6^o$ (166) |
| 4131.74 | A | 5n | 4.86 | 7.85 | 3- | $e^3D$-$7^o$ (167) |
| 3817.24 | A | 8n | 4.72 | 7.95 | 2-3 | $e^3D$-$8^o$ (168) |

Strongest Unclaseified Linee of La II
(Some may be La III)

| | | |
|---|---|---|
| 5217.83 | A | 10n |
| 4516.38 | A | 5nl |
| 4310.22 | A | 50nl |
| 4201.50 | A | 6n |
| 4193.34 | A | 5 |
| 4161.94 | A | 8n |
| 4133.33 | A | 6nl |
| 4007.64 | A | 7n |
| 3963.04 | A | 5 l |
| 3962.03 | A | 10 l |
| 3747.96 | A | 5 l |
| 3665.22 | A | 10 l |
| 3610.25 | A | 30 l |
| 3298.72 | A | 5 n |
| 3208.13 | A | 6 |
| 3018.95 | A | 6nl |
| 3004.68 | A | 5n |

La III I P 19.1 Anal C Liet A Nov 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3171.68 | A | 300 | 1.68 | 5.57 | $\frac{1}{2}$-$1\frac{1}{2}$ | $6^2S$-$6^2P^o$ |
| 3517.14 | A | 200 | 1.68 | 5.19 | $\frac{1}{2}$- $\frac{1}{2}$ | (1) |

Ce I No analyeis May 1942 (Temperature Class)

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ce II** I P ? Anal B List B Dec 1941 | | | | | | |
| Group I | | | | | | |
| 4186.599 | C | 600 | 0.38 | 3.33 | 6½-7½ | a⁴H-z⁴I° |
| 4248.676 | C | 200 | 0.20 | 3.11 | 5½-6½ | (1) |
| 4306.724 | C | 100 | 0.04 | 2.90 | 4½-5½ | |
| 4562.360 | A | 400 | 0.00 | 2.71 | 3½-4½ | |
| 4528.472 | A | 150 | 0.38 | 3.11 | 6½-6½ | |
| 4572.277 | A | 250 | 0.20 | 2.90 | 5½-5½ | |
| 4628.160 | A | 500 | 0.04 | 2.71 | 4½-4½ | |
| 4418.784 | A | 200 | 0.38 | 3.18 | 6½-6½ | a⁴H-z⁴H° |
| 4382.167 | A | 200 | 0.20 | 3.02 | 5½-5½ | (2) |
| 4396.680 | A | 200 | 0.04 | 2.91 | 4½-4½ | |
| 4460.213 | A | 400 | 0.00 | 2.77 | 3½-3½ | |
| 4680.458 | C | (2) | 0.38 | 3.02 | 6½-5½ | |
| 4560.959 | C | 60 | 0.20 | 2.91 | 5½-4½ | |
| 4523.077 | A | 125 | 0.04 | 2.77 | 4½-3½ | |
| 4151.970 | C | 200 | 0.20 | 3.18 | 5½-6½ | |
| 4137.646 | C | 400 | 0.04 | 3.02 | 4½-5½ | |
| 4239.912 | A | 200 | 0.00 | 2.91 | 3½-4½ | |
| 4483.900 | A | 100 | 0.38 | 3.14 | 6½-5½ | a⁴H-z²H° |
| 4450.732 | A | 75 | 0.20 | 2.98 | 5½-4½ | (3) |
| *4209.409§ | A | (25) | 0.20 | 3.14 | 5½-5½ | |
| 4198.724 | A | 60 | 0.04 | 2.98 | 4½-4½ | |
| 3934.46 | P | | 0.04 | 3.14 | 4½-5½ | |
| 4144.492 | A | (10) | 0.00 | 2.98 | 3½-4½ | |
| *4133.800 | C | 500 | 0.38 | 3.37 | 6½-5½ | a⁴H-z⁴G° |
| 4127.367 | C | 150 | 0.20 | 3.20 | 5½-4½ | (4) |
| *4133.800 | C | 500 | 0.04 | 3.02 | 4½-3½ | |
| 4073.477 | C | 200 | 0.00 | 3.03 | 3½-2½ | |
| 4081.222 | A | 150 | 0.00 | 3.02 | 3½-3½ | |
| 4101.772 | A | 125 | 0.38 | 3.39 | 6½-6½ | a⁴H-z²I° |
| 4388.007 | A | (8) | 0.38 | 3.20 | 6½-5½ | (5) |
| 4606.402 | A | 50 | 0.43 | 3.11 | 5½-6½ | a²H-z⁴I° |
| 4593.932 | A | 200 | 0.22 | 2.90 | 4½-5½ | (6) |
| 4198.669 | A | 75 | 0.43 | 3.02 | 5½-5½ | a²H-z⁴H° |
| 4582.502 | A | (10) | 0.22 | 2.91 | 4½-4½ | (7) |
| 4560.280 | A | 125 | 0.43 | 3.14 | 5½-5½ | a²H-z²H° |
| 4471.240 | A | 200 | 0.22 | 2.98 | 4½-4½ | (8) |
| 4844.87 | P | | 0.43 | 2.98 | 5½-4½ | |
| 4227.746 | A | 100 | 0.22 | 3.14 | 4½-5½ | |
| 4144.995 | A | 60 | 0.22 | 3.20 | 4½-4½ | a²H-z⁴G° (9) |
| 4165.606 | C | 200 | 0.43 | 3.39 | 5½-6½ | a²H-z²I° |
| 4142.398 | A | 150 | 0.22 | 3.20 | 4½-5½ | (10) |
| 4461.138 | A | 50 | 0.43 | 3.20 | 5½-5½ | |
| 4285.366 | A | 30 | 0.43 | 3.31 | 5½-4½ | a²H-z²G° |
| 4118.144 | C | 200 | 0.22 | 3.21 | 4½-3½ | (11) |
| 3993.822 | C | 200 | 0.43 | 3.52 | 5½-4½ | a²H-y²G° |
| *3918.276 | C | 200 | 0.22 | 3.37 | 4½-3½ | (12) |
| 5330.582 | A | 25 | 0.39 | 2.71 | 4½-4½ | b²H-z⁴I° (13) |
| 5075.304 | C | 20 | 0.55 | 2.98 | 5½-4½ | b²H-z²H° (14) |
| 5079.681 | C | 75 | 0.90 | 3.33 | 8½-7½ | a⁴K-z⁴I° |
| 5187.452 | C | 60 | 0.73 | 3.11 | 7½-6½ | (15) |
| 5274.244 | A | 75 | 0.56 | 2.90 | 6½-5½ | |
| 5353.534 | A | 50 | 0.40 | 2.71 | 5½-4½ | |
| 5044.008 | A | 25 | 0.73 | 3.18 | 7½-6½ | a⁴K-z⁴H° |
| 5022.871 | C | 20 | 0.56 | 3.02 | 6½-5½ | (16) |
| 4467.537 | A | (5) | 0.61 | 3.37 | 4½-5½ | a⁴F-z⁴G° |
| 4714.83 | A | — | 0.58 | 3.20 | 3½-4½ | (17) |
| 4846.574 | C | (8) | 0.48 | 3.02 | 2½-3½ | |
| 4773.942 | C | 50 | 0.44 | 3.03 | 1½-2½ | |
| 4680.127 | C | 25 | 0.58 | 3.21 | 3½-3½ | a⁴F-z²G° (18) |
| 4429.270 | C | 100 | 0.61 | 3.39 | 4½-5½ | a⁴F-y⁴G° |
| 4442.72 | P | | 0.58 | 3.36 | 3½-4½ | (19) |
| 4078.321 | A | 60 | 0.48 | 3.50 | 2½-3½ | |
| 4444.393 | A | 60 | 0.44 | 3.22 | 1½-2½ | |
| 4491.10 | P | | 0.61 | 3.36 | 4½-4½ | |
| 4217.591 | A | 30 | 0.58 | 3.50 | 3½-3½ | |
| 4497.849 | A | 25 | 0.48 | 3.22 | 2½-2½ | |
| 4261.164 | A | (18) | 0.61 | 3.50 | 4½-3½ | |
| 4463.410 | A | 60 | 0.48 | 3.24 | 2½-1½ | a⁴F-z⁴D° (20) |
| 4565.842 | A | 50 | 0.61 | 3.52 | 4½-4½ | a⁴F-y²G° |
| 4423.878 | A | (25) | 0.58 | 3.37 | 3½-3½ | (21) |
| 4270.716 | C | 50 | 0.48 | 3.37 | 2½-3½ | |
| 4119.784 | A | (20) | 0.61 | 3.60 | 4½-4½ | a⁴F-z⁴F° |
| 4067.279 | A | 50 | 0.58 | 3.61 | 3½-3½ | (22) |
| 4123.488 | C | (20) | 0.48 | 3.47 | 2½-2½ | |
| 4115.374 | A | 150 | 0.44 | 3.44 | 1½-1½ | |
| 4161.175 | A | (18) | 0.48 | 3.44 | 2½-1½ | |
| 5117.175 | A | 15 | 0.92 | 3.33 | 7½-7½ | a⁴I-z⁴I° |
| 5265.710 | A | 15 | 0.77 | 3.11 | 6½-6½ | (23) |
| 5409.224 | A | 80 | 0.62 | 2.90 | 5½-5½ | |
| 5888.901 | A | 40 | 0.53 | 2.71 | 4½-4½ | |
| ≡5488.37 | P | Ce I | 0.92 | 3.18 | 7½-6½ | a⁴I-z⁴H° |
| 5472.297 | C | 30 | 0.77 | 3.02 | 6½-5½ | (24) |
| 5393.391 | A | 100 | 0.82 | 2.91 | 5½-4½ | |
| 5512.085 | C | 150 | 0.53 | 2.77 | 4½-3½ | |
| 3360.541 | A | 75 | 0.92 | 4.59 | 7½-7½ | a⁴I-y⁴I° |
| 3334.455 | A | 60 | 0.77 | 4.47 | 6½-6½ | (25) |
| 3312.215 | A | 50 | 0.82 | 4.35 | 5½-5½ | |
| 3325.389 | A | 50 | 0.53 | 4.24 | 4½-4½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ce II** continued | | | | | | |
| 5518.491 | A | 10 | 0.67 | 2.91 | 3½-4½ | a⁴G-z⁴H° |
| 5610.257 | C | 20 | 0.57 | 2.77 | 2½-3½ | (26) |
| 4624.899 | A | 60 | 0.64 | 3.31 | 3½-4½ | a²F-z²G° (27) |
| 4148.901 | A | (25) | 0.61 | 3.58 | 2½-2½ | a²F-z⁴D° (28) |
| 4167.804 | A | (12) | 0.64 | 3.60 | 3½-4½ | a²F-z⁴F° |
| 4110.381 | A | 60 | 0.61 | 3.61 | 2½-3½ | (29) |
| 4155.532 | A | (6) | 0.64 | 3.61 | 3½-3½ | |
| 6035.487 | C | (4) | 1.13 | 3.18 | 6½-6½ | b⁴H-z⁴H° † |
| 6034.204 | C | (4) | 0.98 | 3.02 | 5½-5½ | (30) |
| 5975.830 | A | 20 | 0.85 | 2.91 | 4½-4½ | |
| 6043.386 | A | 60 | 0.72 | 2.77 | 3½-3½ | |
| 4893.968 | C | 15 | 0.85 | 3.37 | 4½-3½ | b⁴H-y²G° (31) |
| 5613.698 | A | (5) | 0.94 | 3.14 | 6½-5½ | a²I-z²H° |
| 5768.895 | C | 20 | 0.84 | 2.98 | 5½-4½ | (32) |
| 4410.641 | C | 30 | 0.87 | 3.66 | 4½-3½ | a²G-y²F° (33) |
| 4339.317 | A | 30 | 0.87 | 3.71 | 4½-4½ | a²G-x²G° |
| 4062.223 | A | 60 | 0.88 | 3.92 | 3½-3½ | (34) |
| 4117.013 | C | 75 | 0.87 | 3.86 | 4½-5½ | a²G-y²H° |
| 4163.516 | A | (20) | 0.88 | 3.85 | 3½-4½ | (35) |
| **Ce II** Group II See Introduction | | | | | | |
| 3562.091 | A | (6) | (0.52 | 3.98) | 6½-7½ | a⁴H°-z⁴I † |
| 4053.506 | A | 100 | (0.00 | 3.04) | 3½-4½ | (36) |
| 3848.597 | C | 150 | (0.52 | 3.73) | 6½-6½ | |
| 4080.435 | B | (5) | (0.36 | 3.38) | 5½-5½ | |
| 4222.599 | A | 300 | (0.12 | 3.04) | 4½-4½ | |
| 3718.380 | C | 200 | (0.52 | 3.84) | 6½-5½ | a⁴H°-z⁴G † |
| 3803.097 | A | 200 | (0.36 | 3.60) | 5½-4½ | (37) |
| 3815.831 | C | 250 | (0.12 | 3.36) | 4½-3½ | |
| 3942.151 | B | 125 | (0.00 | 3.13) | 3½-2½ | |
| 3653.108 | A | 125 | (0.36 | 3.73) | 5½-4½ | a⁴H°-z⁴F |
| 3668.719 | A | (12) | (0.00 | 3.36) | 3½-2½ | (38) |
| 3853.164 | A | 125 | (0.00 | 3.20) | 3½-3½ | a⁴H°-z²G (39) |
| 3709.286 | A | 400 | (0.52 | 3.85) | 6½-6½ | a⁴H°-z⁴H † |
| 3667.981 | A | 400 | (0.36 | 3.72) | 5½-5½ | (40) |
| 3709.933 | A | 500 | (0.12 | 3.45) | 4½-4½ | |
| 3716.365 | A | 600 | (0.00 | 3.32) | 3½-3½ | |
| 3764.117 | A | 150 | (0.36 | 3.63) | 5½-5½ | a⁴H°-y²H (41) |
| 3660.641 | C | 250 | (0.12 | 3.49) | 4½-3½ | a⁴H°-116 † (42) |
| 3927.383 | B | (4) | (0.36 | 3.50) | 5½-4½ | a⁴H°-x²H (43) |
| 3534.051 | C | 300 | (0.52 | 4.01) | 6½-5½ | a⁴H°-y⁴G |
| 3545.603 | B | (3) | (0.36 | 3.84) | 5½-4½ | (44) |
| 3426.208 | C | 250 | (0.12 | 3.72) | 4½-3½ | |
| 3485.054 | C | 400 | (0.00 | 3.54) | 3½-2½ | |
| 3441.210 | C | 150 | (0.36 | 3.94) | 5½-4½ | a⁴H°-159 (45) |
| 3393.920 | C | 50 | (0.52 | 4.16) | 6½-6½ | a⁴H°-z²I |
| 3142.312 | A | (25) | (0.12 | 4.05) | 4½-5½ | (46) |
| 3728.423 | A | 250 | (0.67 | 3.98) | 7½-7½ | a⁴I°-z⁴I † |
| 3788.753 | A | 75 | (0.47 | 3.73) | 6½-6½ | (47) |
| 4028.411 | A | 150 | (0.32 | 3.38) | 5½-5½ | |
| 4299.362 | B | 60 | (0.17 | 3.04) | 4½-4½ | |
| 3757.862 | A | (15) | (0.32 | 3.60) | 5½-4½ | a⁴I°-z⁴G |
| 3878.372 | A | 150 | (0.17 | 3.36) | 4½-3½ | (48) |
| 4024.491 | C | 60 | (0.47 | 3.53) | 6½-5½ | a⁴I°-z²H |
| 3834.556 | B | 100 | (0.32 | 3.53) | 5½-5½ | (49) |
| 3931.088 | A | 125 | (0.17 | 3.31) | 4½-4½ | |
| •3672.166§ | B | (5d) | (0.17 | 3.53) | 4½-5½ | |
| 3889.990 | C | 300 | (0.67 | 3.85) | 7½-6½ | a⁴I°-z⁴H |
| 3795.256 | C | (5) | (0.47 | 3.72) | 6½-5½ | (50) |
| 3940.338 | B | 100 | (0.32 | 3.45) | 5½-4½ | |
| 3923.005 | C | (2s) | (0.17 | 3.32) | 4½-3½ | |
| 3653.670 | C | 250 | (0.47 | 3.85) | 6½-6½ | |
| 3769.046 | B | (5) | (0.17 | 3.45) | 4½-4½ | |
| 3560.798 | C | 500 | (0.67 | 4.14) | 7½-6½ | a⁴I°-y⁴H |
| 3577.458 | C | 500 | (0.47 | 3.92) | 6½-5½ | (51) |
| 3698.650 | B | (5) | (0.32 | 3.69) | 5½-4½ | |
| 3786.632 | B | 150 | (0.17 | 3.43) | 4½-3½ | |
| 3426.583 | B | (4) | (0.32 | 3.92) | 5½-5½ | |
| 3507.945 | A | 125 | (0.17 | 3.69) | 4½-4½ | |
| 3655.851 | A | 500 | (0.32 | 3.69) | 5½-4½ | |
| 3898.273 | C | 100 | (0.47 | 3.63) | 6½-5½ | a⁴I°-y²H † |
| 3719.797 | A | (15) | (0.32 | 3.63) | 5½-5½ | (52) |
| 3718.190 | B | 150 | (0.17 | 3.49) | 4½-3½ | a⁴I°-116 (53) |
| 3659.227 | A | 125 | (0.17 | 3.55) | 4½-3½ | a⁴I°-123 (54) |
| 3520.522 | A | 150 | (0.17 | 3.68) | 4½-3½ | a⁴I°-132 (55) |
| 3448.721 | A | (15) | (0.32 | 3.90) | 5½-4½ | a⁴I°-156 (58) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ce II** continued | | | | | | |
| 3942.746 | C | 150 | (0.85 | 3.98) | 6½-7½ | b⁴H°-z⁴I |
| 4075.714 | C | 150 | (0.70 | 3.73) | 5½-6½ | (57) |
| 3999.242 | B | 500 | (0.29 | 3.38) | 4½-5½ | |
| 4386.835 | A | (15) | (0.23 | 3.04) | 3½-4½ | |
| 4296.786 | A | (5) | (0.85 | 3.73) | 6½-6½ | |
| 4486.909 | A | 150 | (0.29 | 3.04) | 4½-4½ | |
| 4242.723 | A | (15) | (0.29 | 3.20) | 4½-3½ | b⁴H°-z²G (58) |
| 4349.789 | A | 100 | (0.70 | 3.53) | 5½-5½ | b⁴H°-z²H |
| 4087.297 | B | (4) | (0.29 | 3.31) | 4½-4½ | (59) |
| 3808.124 | B | 300 | (0.29 | 3.53) | 4½-5½ | |
| 4133.872 | A | 150 | (0.85 | 3.85) | 6½-6½ | b⁴H°-z⁴H |
| 4083.233 | A | 200 | (0.70 | 3.72) | 5½-5½ | (60) |
| 3912.424 | B | 300 | (0.29 | 3.45) | 4½-4½ | |
| 4077.470 | B | 75 | (0.29 | 3.32) | 4½-3½ | |
| 3919.813 | A | 100 | (0.70 | 3.85) | 5½-6½ | |
| 3836.112 | A | (15) | (0.23 | 3.45) | 3½-4½ | |
| 3931.369 | B | 100 | (0.29 | 3.43) | 4½-3½ | b⁴H°-y⁴H |
| 3854.322 | B | 100 | (0.23 | 3.43) | 3½-3½ | (61) |
| 3854.187 | B | 100 | (0.23 | 3.43) | 3½-2½ | b⁴H°-112 (62) |
| 3694.911 | A | 60 | (0.29 | 3.63) | 4½-5½ | b⁴H°-y²H (63) |
| 4407.278 | A | (40) | (0.70 | 3.50) | 5½-4½ | b⁴H°-x²H † (64) |
| 3908.408 | A | 125 | (0.85 | 4.01) | 6½-5½ | b⁴H°-y⁴G (65) |
| 3646.965 | C | 200 | (0.29 | 3.68) | 4½-3½ | b⁴H°-131 † (66) |
| 3501.453 | B | 60 | (0.23 | 3.76) | 3½-2½ | b⁴H°-141 (67) |
| 3279.842 | B | 125 | (0.29 | 4.06) | 4½-3½ | b⁴H°-171 † (68) |
| 3164.154 | A | 200 | (0.29 | 4.19) | 4½-3½ | b⁴H°-186 † (69) |
| 3146.407 | B | 200 | (0.29 | 4.22) | 4½-3½ | b⁴H°-188 † (70) |
| 3622.145 | A | 100 | (0.85 | 4.26) | 6½-6½ | b⁴H°-y²I (71) |
| 2990.873 | A | 80 | (0.29 | 4.42) | 4½-4½ | b⁴H°-209 (72) |
| 3272.253 | A | 250 | (0.70 | 4.47) | 5½-4½ | b⁴H°-213 (73) |
| 3169.183 | C | 150 | (0.70 | 4.59) | 5½-4½ | b⁴H°-221 (74) |
| 3218.944 | C | 200 | (0.85 | 4.69) | 6½-5½ | b⁴H°-229 (75) |
| 3201.714 | C | 300 | (0.85 | 4.71) | 6½-5½ | b⁴H°-232 (76) |
| 4117.288 | A | (20) | (0.74 | 3.73) | 3½-4½ | a⁴D°-z⁴F |
| 4253.356 | A | 50 | (0.46 | 3.36) | 1½-2½ | (77) |
| 4246.711 | A | (30) | (0.46 | 3.17) | 1½-1½ | |
| 3914.949 | A | (18) | (0.46 | 3.61) | 1½-2½ | a⁴D°-126 (78) |
| 4193.094 | C | 50 | (0.74 | 3.68) | 3½-3½ | a⁴D°-132 (79) |
| 3234.274 | C | 300 | (0.26 | 4.08) | ½-1½ | a⁴D°-173 (80) |
| 3933.731 | C | (60) | (0.70 | 3.84) | 4½-5½ | a⁴F°-z⁴G |
| 4046.341 | B | 100 | (0.55 | 3.60) | 3½-4½ | (81) |
| 4071.814 | C | 150 | (0.33 | 3.36) | 2½-3½ | |
| 4391.661 | A | 250 | (0.32 | 3.13) | 1½-2½ | |
| 4255.784 | A | 60 | (0.70 | 3.60) | 4½-4½ | |
| 4398.787 | A | (20) | (0.55 | 3.36) | 3½-3½ | |
| 4399.203 | A | 60 | (0.33 | 3.13) | 2½-2½ | |
| 4068.836 | A | 75 | (0.70 | 3.73) | 4½-4½ | a⁴F°-z⁴F † |
| 4330.445 | A | 30 | (0.32 | 3.17) | 1½-1½ | (82) |
| 4337.777 | A | 125 | (0.33 | 3.17) | 2½-1½ | |
| 3876.974 | A | (15) | (0.55 | 3.73) | 3½-4½ | |
| 4054.991 | A | 50 | (0.32 | 3.36) | 1½-2½ | |
| 4119.877 | A | (20) | (0.33 | 3.32) | 2½-3½ | a⁴F°-z⁴H † (83) |
| 3967.048 | A | 100 | (0.33 | 3.44) | 2½-1½ | a⁴F°-z²D |
| 3960.914 | A | 125 | (0.32 | 3.44) | 1½-1½ | (84) |
| 4193.874 | A | (35) | (0.55 | 3.49) | 3½-3½ | a⁴F°-116 (85) |
| 4187.323 | A | (35) | (0.55 | 3.50) | 3½-4½ | a⁴F°-x²H (86) |
| 3882.446 | A | 75 | (0.32 | 3.50) | 1½- ½ | a⁴F°-z⁴D (87) |
| 3631.194 | B | 125 | (0.33 | 3.72) | 2½-3½ | a⁴F°-y⁴G (88) |
| 4336.255 | A | 50 | (0.70 | 3.55) | 4½-3½ | a⁴F°-123 |
| 4119.015 | A | (25) | (0.55 | 3.55) | 3½-3½ | (89) |
| 3722.759 | A | (12) | (0.32 | 3.64) | 1½-1½ | a⁴F°-129 (90) |
| 4098.981 | A | (15) | (0.70 | 3.71) | 4½-3½ | a⁴F°-136 † |
| 2904.340 | B | (5) | (0.55 | 3.71) | 3½-3½ | (91) |
| 3760.694 | A | (6) | (0.55 | 3.83) | 3½-2½ | a⁴F°-148 |
| 3519.077 | A | (25) | (0.33 | 3.83) | 2½-2½ | (92) |
| 3276.251 | A | (18) | (0.33 | 4.09) | 2½-2½ | a⁴F°-175 (93) |
| 3436.304 | A | (15) | (0.55 | 4.14) | 3½-2½ | a⁴F°-180 † |
| 3229.363 | A | (25) | (0.32 | 4.14) | 1½-2½ | (94) |
| •3227.114§ | A | 300 | (0.32 | 4.14) | 1½-1½ | a⁴F°-181 (95) |
| 3405.977 | C | 100 | (0.55 | 4.17) | 3½-4½ | a⁴F°-184 (96) |
| 3189.638 | A | (30) | (0.33 | 4.19) | 2½-3½ | a⁴F°-186 (97) |
| 3379.172 | C | 100 | (0.55 | 4.20) | 3½-4½ | a⁴F°-187 (98) |
| 3366.554 | B | 150 | (0.55 | 4.22) | 3½-3½ | a⁴F°-188 (99) |
| 3171.815 | B | 200 | (0.33 | 4.22) | 2½-3½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ce II** continued | | | | | | |
| 3417.450 | A | 125 | (0.70 | 4.31) | 4½-4½ | $a^4F^o$-199 (100) |
| 3236.735 | A | 150 | (0.55 | 4.36) | 3½-3½ | $a^4F^o$-205 (101) |
| 3317.797 | A | 30 | (0.70 | 4.42) | 4½-4½ | $a^4F^o$-209 (102) |
| 3304.836 | A | 60 | (0.70 | 4.44) | 4½-3½ | $a^4F^o$-210 |
| 3177.137 | A | (20) | (0.55 | 4.44) | 3½-3½ | (103) |
| 3274.864 | C | 150 | (0.70 | 4.47) | 4½-4½ | $a^4F^o$-213 (104) |
| 3082.304 | A | (20) | (0.55 | 4.55) | 3½-3½ | $a^4F^o$-217 (105) |
| 3199.279 | A | (25) | (0.70 | 4.56) | 4½-4½ | $a^4F^o$-218 (106) |
| 3017.195 | A | 80 | (0.70 | 4.79) | 4½-3½ | $a^4F^o$-237 (107) |
| 4031.339 | B | 150 | (0.32 | 3.38) | 4½-5½ | $a^2G^o$-$z^4I$ |
| 4539.755 | B | 200 | (0.33 | 3.04) | 3½-4½ | (108) |
| 4527.348 | A | 200 | (0.32 | 3.04) | 4½-4½ | |
| 3760.404 | B | (2) | (0.32 | 3.60) | 4½-4½ | $a^2G^o$-$z^4G$† |
| 4072.917 | A | (20) | (0.33 | 3.36) | 3½-3½ | (109) |
| 3613.701 | A | 150 | (0.32 | 3.73) | 4½-4½ | $a^2G^o$-$z^4F$ (110) |
| 4278.866 | A | (20) | (0.32 | 3.20) | 4½-3½ | $a^2G^o$-$z^2G$ |
| 4289.938 | A | 300 | (0.33 | 3.20) | 3½-3½ | (111) |
| 3637.210 | B | (3) | (0.32 | 3.53) | 4½-5½ | $a^2G^o$-$z^2H$ |
| 4131.099 | B | 100 | (0.33 | 3.31) | 3½-4½ | (112) |
| 4120.829 | A | 150 | (0.32 | 3.31) | 4½-4½ | |
| 3628.247 | A | (10) | (0.32 | 3.72) | 4½-5½ | $a^2G^o$-$z^4H$† |
| •3952.573 | B | 125 | (0.33 | 3.45) | 3½-4½ | (113) |
| 3943.141 | B | (5) | (0.32 | 3.45) | 4½-4½ | |
| 3508.470 | B | (4) | (0.32 | 3.84) | 4½-4½ | $a^2G^o$-$y^4G$ |
| 3632.106 | A | (10) | (0.33 | 3.72) | 3½-3½ | (114) |
| 3838.542 | A | 150 | (0.33 | 3.54) | 3½-2½ | |
| 3823.903 | A | 50 | (0.32 | 3.55) | 4½-4½ | $a^2G^o$-132 |
| 3832.745 | B | (4) | (0.33 | 3.55) | 3½-4½ | (115) |
| 3598.196 | B | 50 | (0.33 | 3.76) | 3½-2½ | $a^2G^o$-141 (116) |
| 3554.993 | A | 150 | (0.32 | 3.79) | 4½-4½ | $a^2G^o$-$y^2G$ (117) |
| 3539.086 | A | 300 | (0.32 | 3.81) | 4½-3½ | $a^2G^o$-145† (118) |
| 3234.165 | B | 300 | (0.33 | 4.14) | 3½-2½ | $a^2G^o$-180 (119) |
| 3145.283 | A | 150 | (0.33 | 4.25) | 3½-2½ | $a^2G^o$-193 (120) |
| 3056.775 | B | 200 | (0.33 | 4.36) | 3½-3½ | $a^2G^o$-205† (121) |
| 3008.789 | A | 125 | (0.32 | 4.42) | 4½-4½ | $a^2G^o$-209 (122) |
| 4196.335 | B | 75 | (0.42 | 3.36) | 2½-3½ | $a^2F^o$-$z^4G$† |
| 4257.121 | A | (20) | (0.46 | 3.36) | 3½-3½ | (123) |
| •4544.961 | B | (5) | (0.42 | 3.13) | 2½-2½ | |
| 3766.514 | B | (4n) | (0.46 | 3.73) | 3½-4½ | $a^2F^o$-$z^4F$ |
| 4185.334 | B | (5) | (0.42 | 3.36) | 2½-2½ | (124) |
| 4479.432 | A | 30 | (0.42 | 3.17) | 2½-1½ | |
| 4320.723 | A | 60 | (0.46 | 3.31) | 3½-4½ | $a^2F^o$-$z^2H$ (125) |
| 4125.776 | B | (2) | (0.46 | 3.45) | 3½-4½ | $a^2F^o$-$z^4H$ |
| 4309.739 | A | 50 | (0.46 | 3.32) | 3½-3½ | (126) |
| 3857.240 | B | (4) | (0.42 | 3.61) | 2½-2½ | $a^2F^o$-128 |
| 3908.543 | B | 100 | (0.46 | 3.61) | 3½-2½ | (127) |
| 3755.425 | A | 75 | (0.42 | 3.70) | 2½-1½ | $a^2F^o$-134 (128) |
| 3792.326 | A | 50 | (0.46 | 3.71) | 3½-3½ | $a^2F^o$-136† (129) |
| 3246.674 | A | 60 | (0.42 | 4.22) | 2½-3½ | $a^2F^o$-188 (130) |
| 3548.190 | A | 150 | (1.31 | 4.79) | 2½-2½ | $a^4P^o$-238 |
| 3423.853 | A | (20) | (1.19 | 4.79) | 1½-2½ | (131) |
| 3476.842 | A | 150 | (1.31 | 4.86) | 2½-3½ | $a^4P^o$-244 (132) |
| 3909.313 | A | (35) | (0.44 | 3.60) | 4½-4½ | $b^2G^o$-$z^4G$ |
| 4310.699 | A | (30) | (0.49 | 3.38) | 3½-3½ | (133) |
| 3971.684 | A | 100 | (0.49 | 3.60) | 3½-4½ | |
| 3993.368 | A | 125 | (0.44 | 3.53) | 4½-5½ | $b^2G^o$-$z^2H$ |
| 4375.918 | A | 60 | (0.49 | 3.31) | 3½-4½ | (134) |
| 4300.331 | A | 60 | (0.44 | 3.31) | 4½-4½ | |
| 4289.454 | A | (25) | (0.44 | 3.32) | 4½-3½ | $b^2G^o$-$z^4H$ |
| 4176.080 | A | (12) | (0.49 | 3.45) | 3½-4½ | (135) |
| 4364.658 | A | 125 | (0.49 | 3.32) | 3½-3½ | |
| 3799.038 | A | (4) | (0.44 | 3.69) | 4½-4½ | $b^2G^o$-$y^4H$† |
| 4128.067 | B | (4) | (0.44 | 3.43) | 4½-3½ | (136) |
| 4197.668 | B | (4) | (0.49 | 3.43) | 3½-3½ | |
| 4113.728 | A | (30) | (0.49 | 3.49) | 3½-3½ | $b^2G^o$-118 (137) |
| 3112.262 | C | (15) | (0.44 | 4.41) | 4½-5½ | $b^2G^o$-$x^2H$ |
| 4107.488 | B | 200 | (0.49 | 3.50) | 3½-4½ | (138) |
| 4040.762 | A | 300 | (0.44 | 3.50) | 4½-4½ | |
| 4106.881 | B | (5d) | (0.49 | 3.50) | 3½-3½ | $b^2G^o$-118 (139) |
| 4042.584 | A | 200 | (0.49 | 3.55) | 3½-4½ | $b^2G^o$-122 (140) |
| 3987.580 | A | (12) | (0.49 | 3.81) | 3½-3½ | $b^2G^o$-128 (141) |
| 3782.524 | B | 75 | (0.49 | 3.76) | 3½-2½ | $b^2G^o$-141 (142) |
| 3687.802 | A | 30 | (0.44 | 3.79) | 4½-4½ | $b^2G^o$-$y^2G$ (143) |
| 3423.708 | C | 300 | (0.44 | 4.05) | 4½-5½ | $b^2G^o$-$z^2I$ (144) |
| 3390.515 | A | (20) | (0.44 | 4.08) | 4½-3½ | $b^2G^o$-174 (145) |
| 3271.151 | A | (18) | (0.44 | 4.22) | 4½-3½ | $b^2G^o$-188 |
| 3314.721 | A | 100 | (0.49 | 4.22) | 3½-3½ | (146) |
| 3295.289 | A | 80 | (0.49 | 4.24) | 3½-2½ | $b^2G^o$-192 (147) |
| 3285.224 | A | 125 | (0.49 | 4.25) | 3½-2½ | $b^2G^o$-193 (148) |
| 3231.236 | A | 200 | (0.49 | 4.31) | 3½-2½ | $b^2G^o$-200 (149) |
| 3137.530 | A | 80 | (0.44 | 4.39) | 4½-3½ | $b^2G^o$-207† (150) |
| 3103.377 | A | 125 | (0.44 | 4.42) | 4½-4½ | $b^2G^o$-209 (151) |
| 3110.278 | A | 100 | (0.49 | 4.46) | 3½-2½ | $b^2G^o$-212 (152) |
| 4678.94 | P | | (1.20 | 3.84) | 4½-5½ | $b^4F^o$-$z^4G$ |
| 4696.12 | P | | (0.97 | 3.60) | 3½-4½ | (153) |
| 4508.083 | A | (8) | (0.62 | 3.36) | 2½-3½ | |
| 4725.090 | C | 20 | (0.52 | 3.13) | 1½-2½ | |
| 4495.389 | A | (4) | (0.62 | 3.36) | 2½-2½ | $b^4F^o$-$z^4F$ |
| 4654.286 | A | 30 | (0.52 | 3.17) | 1½-1½ | (154) |
| 4380.060 | A | (30) | (0.62 | 3.44) | 2½-1½ | $b^4F^o$-$z^2D$ (155) |
| 4104.996 | C | 50 | (0.62 | 3.63) | 2½-3½ | $b^4F^o$-127 (156) |
| 4361.661 | A | (18) | (0.53 | 3.36) | 3½-3½ | $c^2G^o$-$z^4G$† |
| 4739.49 | B | 25 | (0.53 | 3.13) | 3½-2½ | (157) |
| 4014.899 | A | 125 | (0.53 | 3.60) | 3½-4½ | |
| 3857.032 | B | (5) | (0.72 | 3.92) | 4½-5½ | $c^2G^o$-$y^4H$† |
| •4149.936 | B | 50 | (0.72 | 3.69) | 4½-4½ | (158) |
| 4245.976 | B | (6) | (0.53 | 3.43) | 3½-3½ | |
| 3343.861 | C | 200 | (0.72 | 4.41) | 4½-5½ | $c^2G^o$-$x^2H$† |
| 4153.67 | P | | (0.53 | 3.50) | 3½-4½ | (159) |
| 3748.056 | C | 150 | (0.72 | 4.01) | 4½-5½ | $c^2G^o$-$y^4G$ |
| 3958.366 | B | (6) | (0.72 | 3.84) | 4½-4½ | (160) |
| 4106.134 | A | (30) | (0.72 | 3.72) | 4½-3½ | |
| 4093.955 | A | 30 | (0.53 | 3.54) | 3½-2½ | |
| 4169.773 | A | (12) | (0.72 | 3.68) | 4½-3½ | $c^2G^o$-131 (161) |
| 4123.230 | B | (5) | (0.72 | 3.71) | 4½-3½ | $c^2G^o$-136 |
| 3875.036 | B | (6d) | (0.53 | 3.71) | 3½-3½ | (162) |
| 4017.596 | A | (10s) | (0.72 | 3.79) | 4½-4½ | $c^2G^o$-$y^2G$ |
| 3781.620 | A | 150 | (0.53 | 3.79) | 3½-4½ | (163) |
| 3357.215 | A | 125 | (0.53 | 4.20) | 3½-4½ | $c^2G^o$-187 (164) |
| 3344.761 | A | 300 | (0.53 | 4.22) | 3½-3½ | $c^2G^o$-188† (165) |
| 3300.152 | C | 60 | (0.72 | 4.46) | 4½-3½ | $c^2G^o$-211 (166) |
| 3186.126 | C | 125 | (0.72 | 4.59) | 4½-4½ | $c^2G^o$-221 (167) |
| 2976.905 | A | 100 | (0.53 | 4.67) | 3½-2½ | $c^2G^o$-228 (168) |
| 4190.626 | C | (30) | (0.89 | 3.84) | 5½-5½ | $a^4G^o$-$z^4G$† |
| 4437.612 | B | (4) | (0.82 | 3.60) | 4½-4½ | (169) |
| 4313.036 | A | (15) | (0.67 | 3.60) | 3½-4½ | |
| 4373.401 | A | (35) | (0.53 | 3.38) | 2½-3½ | |
| 4234.727 | A | (12) | (0.82 | 3.73) | 4½-4½ | $a^4G^o$-$z^4F$† (170) |
| 4443.743 | A | (18) | (0.87 | 3.45) | 3½-4½ | $a^4G^o$-$z^4H$† |
| 4437.917 | B | (6) | (0.53 | 3.32) | 2½-3½ | (171) |
| 3801.529 | C | 500 | (0.89 | 4.14) | 5½-6½ | $a^4G^o$-$y^4H$ |
| 3982.901 | B | 60 | (0.82 | 3.92) | 4½-5½ | (172) |
| 4085.233 | B | 100 | (0.67 | 3.69) | 3½-4½ | |
| 4256.156 | B | (5) | (0.53 | 3.43) | 2½-3½ | |
| 4298.089 | B | (6) | (0.82 | 3.69) | 4½-4½ | |
| 4169.878 | B | 30 | (0.53 | 3.49) | 2½-3½ | $a^4G^o$-116† (173) |
| 4090.947 | A | (6) | (0.82 | 3.84) | 4½-4½ | $a^4G^o$-$y^4G$ (174) |
| 3978.650 | C | 125 | (0.53 | 3.64) | 3½-1½ | $a^4G^o$-129 (175) |
| 4259.748 | A | (15) | (0.89 | 3.79) | 5½-4½ | $a^4G^o$-$y^2G$ |
| •3956.901 | B | (4) | (0.87 | 3.79) | 3½-4½ | (176) |
| •3952.573 | B | 125 | (0.82 | 3.94) | 4½-4½ | $a^4G^o$-159 (177) |
| 3807.635 | A | 200 | (0.67 | 4.09) | 3½-2½ | $a^4G^o$-175 |
| •3468.113§ | A | 6 | (0.53 | 4.09) | 2½-3½ | (178) |
| 3609.687 | C | 250 | (0.89 | 4.31) | 5½-4½ | $a^4G^o$-199 (179) |
| 3051.975 | C | 60• | (0.53 | 4.58) | 2½-1½ | $a^4G^o$-220 (180) |
| 3037.731 | C | 80 | (0.53 | 4.80) | 2½-1½ | $a^4G^o$-232 (181) |
| 3252.483 | C | 30 | (0.89 | 4.69) | 5½-5½ | $a^4G^o$-229 (182) |
| 2995.644 | A | 80 | (0.87 | 4.79) | 3½-3½ | $a^4G^o$-237 (183) |
| 3051.924 | C | 60• | (0.82 | 4.88) | 4½-3½ | $a^4G^o$-244 (184) |
| 3063.010 | C | 400 | (0.89 | 4.92) | 5½-4½ | $a^4G^o$-248 (185) |
| 4202.944 | A | 150 | (0.56 | 3.49) | 2½-3½ | $b^4G^o$-11( (186) |
| 3488.553 | A | 75 | (0.87 | 4.41) | 4½-5½ | $b^4G^o$-$x^2$I (187) |
| 4003.771 | C | 100 | (0.93 | 4.01) | 5½-5½ | $b^4G^o$-$y^4$( |
| 4135.443 | A | (20) | (0.56 | 3.54) | 2½-2½ | (188) |
| 3896.804 | A | 100 | (0.56 | 3.72) | 2½-3½ | |
| •4149.936 | B | 60 | (0.71 | 3.68) | 3½-3½ | $b^4G^o$-13( (189) |
| 3924.644 | B | 60 | (0.56 | 3.70) | 2½-1½ | $b^4G^o$-13( (190) |
| 3923.109 | C | 125 | (0.56 | 3.70) | 2½-2½ | $b^4G^o$-13( (191) |
| 3912.191 | B | (5) | (0.56 | 3.71) | 2½-3½ | $b^4G^o$-13( (192) |
| 4001.049 | B | (4) | (0.71 | 3.79) | 3½-4½ | $b^4G^o$-$y^2$( (193) |
| 3980.895 | B | 100 | (0.71 | 3.81) | 3½-3½ | $b^4G^o$-14( (194) |
| 3921.731 | B | 100 | (0.71 | 3.85) | 3½-3½ | $b^4G^o$-15( (195) |
| 3442.380 | A | 75 | (0.56 | 4.14) | 2½-2½ | $b^4G^o$-18( (196) |
| 3439.831 | C | 60 | (0.56 | 4.14) | 2½-1½ | $b^4G^o$-18( (197) |
| 3341.868 | A | 100 | (0.56 | 4.25) | 2½-2½ | $b^4G^o$-19( (198) |
| •3286.029§ | A | (18) | (0.56 | 4.31) | 2½-2½ | $b^4G^o$-200 (199) |
| 3349.967 | A | (30) | (0.71 | 4.39) | 3½-3½ | $b^4G^o$-207 (200) |
| 3055.243 | C | 150 | (0.56 | 4.60) | 2½-1½ | $b^4G^o$-232 (201) |
| 3956.284 | C | 150 | (0.61 | 3.73) | 5½-6½ | $a^2H^o$-$z^4I$ |
| 4373.818 | A | 50 | (0.56 | 3.38) | 4½-5½ | (202) |
| 4449.336 | A | 200 | (0.61 | 3.38) | 5½-5½ | |
| 4214.041 | B | 50 | (0.61 | 3.53) | 5½-5½ | $a^2H^o$-$z^2H$ |
| 4479.359 | A | 50 | (0.56 | 3.31) | 4½-4½ | (203) |
| 4146.234 | A | 75 | (0.56 | 3.53) | 4½-5½ | |
| 3809.324 | A | (25) | (0.61 | 3.85) | 5½-6½ | $a^2H^o$-$z^4H$ |
| 4270.189 | A | 60 | (0.56 | 3.45) | 4½-4½ | (204) |
| 3938.086 | B | (7) | (0.56 | 3.69) | 4½-4½ | $a^2H^o$-$y^4H$ |
| 4292.767 | B | (4) | (0.56 | 3.43) | 4½-3½ | (205) |
| 4075.853 | B | 125 | (0.61 | 3.63) | 5½-5½ | $a^2H^o$-$y^2H$ |
| 4275.561 | C | (25) | (0.56 | 3.44) | 4½-4½ | (206) |
| 4012.389 | B | 300 | (0.56 | 3.63) | 4½-5½ | |
| 4198.431 | B | (4) | (0.56 | 3.50) | 4½-4½ | $a^2H^o$-$x^2H$ (207) |
| 3820.871 | B | (5) | (0.61 | 3.84) | 5½-4½ | $a^2H^o$-$y^4G$ |
| 3765.044 | A | (12) | (0.56 | 3.84) | 4½-4½ | (208) |
| •4197.998§ | B | (5) | (0.61 | 3.55) | 5½-4½ | $a^2H^o$-132 |
| 4130.706 | A | 100 | (0.56 | 3.55) | 4½-4½ | (209) |
| 3895.114 | B | 125 | (0.61 | 3.77) | 5½-4½ | $a^2H^o$-142 (210) |
| 3581.880 | C | 200 | (0.61 | 4.11) | 5½-4½ | $a^2H^o$-177 (211) |
| 3373.739 | B | 125 | (0.56 | 4.22) | 4½-3½ | $a^2H^o$-188 (212) |
| 3377.127 | C | 300 | (0.61 | 4.26) | 5½-6½ | $a^2H^o$-$y^2I$ (213) |
| 3243.370 | A | 200 | (0.56 | 4.36) | 4½-3½ | $a^2H^o$-205 (214) |
| 3231.171 | A | 250 | (0.56 | 4.39) | 4½-3½ | $a^2H^o$-207 (215) |
| 3183.523 | A | 250 | (0.56 | 4.44) | 4½-3½ | $a^2H^o$-210 (218) |
| 3194.825 | C | 200 | (0.61 | 4.47) | 5½-4½ | $a^2H^o$-213 |
| 3155.704 | A | (20) | (0.56 | 4.47) | 4½-4½ | (217) |
| 4037.865 | A | (25) | (0.73 | 3.79) | 3½-4½ | $b^2F^o$-$y^2G$ (218) |
| 3599.974 | A | (10) | (0.58 | 4.01) | 2½-1½ | $b^2F^o$-167 (219) |
| 4353.733 | B | 75 | (0.60 | 3.43) | 1½-2½ | $a^2D^o$-112 (220) |
| 4007.589 | A | (15) | (0.60 | 3.68) | 1½-1½ | $a^2D^o$-130 (221) |
| 3817.455 | A | (25) | (0.60 | 3.83) | 1½- ½ | $a^2D^o$-147 (222) |
| 3699.920 | B | 50 | (0.63 | 3.97) | 2½-2½ | $a^2D^o$-161 (223) |
| 4326.826 | A | (15) | (0.73 | 3.58) | 1½-1½ | $a^2P^o$-124 (224) |
| 4280.141 | A | (15) | (0.73 | 3.61) | 1½-2½ | $a^2P^o$-126 (225) |
| 3993.913 | A | (15) | (0.73 | 3.82) | 1½-1½ | $a^2P^o$-146 (226) |
| 4368.234 | A | (8) | (0.90 | 3.73) | 6½-6½ | $a^2I^o$-$z^4I$ |
| 4189.176 | A | (5) | (0.74 | 3.73) | 5½-6½ | (227) |
| •5347.806§ | A | (8) | (0.74 | 3.04) | 5½-4½ | |
| 4684.605 | A | 30 | (0.90 | 3.53) | 6½-5½ | $a^2I^o$-$z^2H$ |
| 4789.68 | P | | (0.74 | 3.31) | 5½-4½ | (228) |
| 4551.397 | A | (20) | (0.74 | 3.45) | 5½-4½ | $a^2I^o$-$z^4H$ (229) |
| 3517.380 | C | 300 | (0.90 | 4.41) | 6½-5½ | $a^2I^o$-$x^2H$ |
| 4489.850 | C | (4) | (0.74 | 3.50) | 5½-4½ | (230) |
| 3725.675 | A | (40) | (0.74 | 4.05) | 5½-5½ | $a^2I^o$-$z^2I$ (231) |
| 3590.598 | A | 125 | (0.74 | 4.17) | 5½-4½ | $a^2I^o$-184 (232) |
| 3673.789 | A | 60 | (0.90 | 4.26) | 6½-6½ | $a^2I^o$-$y^2I$ (233) |

| Laboratory I A | Rsf | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ce II** continued | | | | | | |
| 3943.888 | B | 100 | (0.79 | 3.92) | 4½-5½ | $d^2G^o$-$y^4H$ (334) |
| •3623.837 | B | 200 | (0.79 | 4.19) | 4½-3½ | $d^2G^o$-186 (335) |
| 3600.583 | B | 60 | (0.79 | 4.22) | 4½-3½ | $d^2G^o$-188 (336) |
| 3083.670 | C | 100 | (0.79 | 4.79) | 4½-3½ | $d^2G^o$-237 (337) |
| 4440.883 | A | (20) | (0.80 | 3.58) | 2½-1½ | $c^2F^o$-134 (338) |
| 4264.370 | A | (10) | (0.90 | 3.79) | 3½-4½ | $c^2F^o$-$y^2G$ (339) |
| 3989.444 | B | 30 | (0.90 | 3.99) | 3½-3½ | $c^2F^o$-164 (340) |
| 3741.727 | A | (10) | (0.90 | 4.19) | 3½-3½ | $c^2F^o$-186 (341) |
| 3716.930 | A | (10) | (0.90 | 4.22) | 3½-3½ | $c^2F^o$-188 (342) |
| 3559.328 | A | (6) | (0.90 | 4.36) | 3½-3½ | $c^2F^o$-205 (343) |
| 3373.455 | C | 100 | (0.90 | 4.55) | 3½-3½ | $c^2F^o$-217 (344) |
| 4360.16 | A | (25) | (0.81 | 3.64) | 1½-1½ | $b^2D^o$-129 (245) |
| 4159.033 | B | 50 | (1.02 | 3.99) | 2½-3½ | $b^2D^o$-164 (246) |
| 3296.883 | A | 40 | (0.81 | 4.55) | 1½-2½ | $b^2D^o$-216 (247) |
| •3918.276 | C | 200 | (0.89 | 4.04) | 2½-2½ | $c^4F^o$-169 (248) |
| 3433.091 | A | 50 | (1.27 | 4.86) | 3½-3½ | $c^4F^o$-244 (249) |
| 4713.996 | A | 30 | (1.10 | 3.72) | 5½-5½ | $b^2H^o$-$z^4H$ (250) |
| 4345.963 | A | (6) | (1.10 | 3.94) | 5½-4½ | $b^2H^o$-159 (251) |
| 4042.135 | C | (8) | (1.10 | 4.16) | 5½-6½ | $b^2H^o$-$z^2I$ |
| 3984.675 | A | 100 | (0.95 | 4.05) | 4½-5½ | (252) |
| 3907.289 | A | 125 | (1.10 | 4.26) | 5½-6½ | $b^2H^o$-$y^2I$ (253) |
| 4263.427 | A | (40) | (1.04 | 3.93) | 3½-2½ | $b^4D^o$-158 (254) |
| 3946.681 | A | (20) | (0.97 | 4.09) | 1½-2½ | $b^4D^o$-175 (255) |
| 4015.877 | A | (20) | (1.04 | 4.11) | 3½-4½ | $b^4D^o$-177 (256) |
| 3679.424 | A | 50 | (1.01 | 4.36) | 2½-3½ | $b^4D^o$-205 (257) |
| 3260.975 | C | 60 | (1.01 | 4.79) | 2½-2½ | $b^4D^o$-238 (258) |
| 4394.779 | A | (30) | (1.25 | 4.06) | 2½-3½ | $e^2F^o$-171 (259) |

**Strongest Unclassified Lines of Ce II**

| | | | |
|---|---|---|---|
| 6343.963 | C | 20 | V |
| 4971.475 | C | 20 | V |
| 4882.462 | C | 40 | V |
| 4757.842 | C | 15 | V |
| 4747.143 | C | 20 | V |
| 4737.282 | C | 60 | V |
| 4669.502 | C | 20 | V |
| 4444.704 | C | 75 | V |
| 4231.745 | C | 30 | V |
| 4111.394 | C | 60 | V |
| 4070.094 | C | 15 | V |
| •3623.837 | B | 60 | V |

**Ce III** I P 19.5 Anal A List B Jan 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3055.585 | A | 600 | (2.25 | 6.29) | 4-5 | $fs^3F^o$-$fp^3G$ (1) |
| 3031.559 | A | 500 | (2.00 | 6.07) | 3-4 | |
| 3443.609 | A | 150 | (1.97 | 5.55) | 2-3 | |
| 3228.564 | A | 400 | (2.25 | 6.07) | 4-4 | |
| 3470.894 | A | 300 | (2.00 | 5.55) | 3-3 | |
| 3353.262 | A | 150 | (2.25 | 5.93) | 4-4 | $fs^3F^o$-$fp^3F$ (2) |
| 3143.956 | A | 200 | (2.00 | 5.92) | 3-3 | |
| 3427.332 | A | 125 | (1.97 | 5.57) | 2-2 | |
| m3356.35 | P | $Cs^+$ | (2.25 | 5.92) | 4-3 | |
| 3454.368 | A | 150 | (2.00 | 5.57) | 3-2 | |
| 3141.247 | A | 250 | (2.00 | 5.93) | 3-4 | |
| 3121.548 | A | 400 | (1.97 | 5.92) | 2-3 | |
| •3459.374 | A | 200 | (2.25 | 5.81) | 4-3 | $fs^3F^o$-$fp^1F$† (3) |
| 3110.516 | A | 200 | (2.25 | 6.21) | 4-3 | $fs^3F^o$-$fp^3D$† (4) |
| 3106.974 | A | 200 | (2.00 | 5.97) | 3-2 | |
| 3057.575 | A | 100 | (1.97 | 6.01) | 2-1 | |
| 3085.089 | A | 200 | (1.97 | 5.97) | 2-2 | |
| 3032.736 | A | 200 | (2.25 | 6.33) | 4-4 | $fs^3F^o$-$fp^1G$ (5) |
| 3504.596 | A | 100 | (2.29 | 5.81) | 3-3 | $fs^1F^o$-$fp^1F$ (6) |
| 3147.05 | A | 300 | (2.29 | 6.21) | 3-3 | $fs^1F^o$-$fp^3D$ (7) |
| 3057.214 | A | 200 | (2.29 | 6.33) | 3-4 | $fs^1F^o$-$fp^1G$ (8) |
| 3056.556 | A | 125 | (2.29 | 6.33) | 3-2 | $fs^1F^o$-$fp^1D$ (9) |

**Pr I** No analysis May 1942 (Temperature Class)

**Pr II** I P ? Anal C List B Dec 1941

| | | | | | | |
|---|---|---|---|---|---|---|
| 4628.751 | A | 100 | 0.05 | 2.72 | 5-5 | $a^5I^o$-3 |
| 4535.931 | A | 60 | 0.00 | 2.73 | 4-5 | (1) |
| 4517.595 | A | 40 | 0.05 | 2.79 | 5-5 | $a^5I^o$-3† |
| •4429.238 | A | 60 | 0.00 | 2.79 | 4-5 | (2) |
| 4744.925 | A | 40 | 0.20 | 2.80 | 6-6 | $a^5I^o$-4 |
| 4487.821 | A | 20 | 0.05 | 2.80 | 5-6 | (3) |
| 4100.746// | A | 150 | 0.55 | 3.56 | 8-9 | $a^5I^o$-$z^5K$ |
| 4143.136 | A | 150 | 0.37 | 3.35 | 7-8 | (4) |
| 4179.422 | A | 150 | 0.20 | 3.16 | 6-7 | |
| 4222.98 | A | 150 | 0.05 | 2.98 | 5-6 | |
| 4408.844 | A | 200 | 0.00 | 2.80 | 4-5 | |
| 4405.849 | A | 80 | 0.55 | 3.35 | 8-8 | |
| •4429.238 | A | 100 | 0.37 | 3.16 | 7-7 | |
| 4449.867 | A | 150 | 0.20 | 2.98 | 6-6 | |
| •4496.429 | A | 250 | 0.05 | 2.80 | 5-5 | |
| 4734.177 | A | 25 | 0.37 | 2.98 | 7-6 | |
| 4754.635 | A | (15) | 0.20 | 2.80 | 6-5 | |
| 4707.541 | A | 20 | 0.20 | 2.83 | 6-5 | $a^5I^o$-5 |
| 4454.382 | A | 30 | 0.05 | 2.83 | 5-5 | (5) |
| 4368.327 | A | 150 | 0.00 | 2.83 | 4-5 | |
| 4651.517 | A | 75 | 0.20 | 2.86 | 6-6 | $a^5I^o$-6 (6) |
| 4297.764 | A | 80 | 0.00 | 2.87 | 4-5 | $a^5I^o$-7 (7) |
| 4206.739 | A | 100 | 0.55 | 3.48 | 8-8 | $a^5I^o$-$z^5I$ |
| 4189.518 | A | 125 | 0.37 | 3.32 | 7-7 | (8) |
| 4164.192 | A | 100 | 0.20 | 3.17 | 6-6 | |
| 4118.481 | A | 200 | 0.05 | 3.05 | 5-5 | |
| 4225.327 | A | 150 | 0.00 | 2.92 | 4-4 | |
| 4458.336 | A | 25 | 0.55 | 3.32 | 8-7 | |
| 4412.155 | A | 20 | 0.37 | 3.17 | 7-6 | |
| 4333.913 | A | 100 | 0.20 | 3.05 | 6-5 | |
| 4305.763 | A | 100 | 0.05 | 2.92 | 5-4 | |
| 3966.573 | A | 80 | 0.37 | 3.48 | 7-8 | |
| 3965.263 | A | 150 | 0.20 | 3.32 | 6-7 | |
| 3964.825 | A | 250 | 0.05 | 3.17 | 5-6 | |
| 4044.818 | A | 60 | 0.00 | 3.05 | 4-5 | |
| 3953.516 | A | 125 | 0.55 | 3.67 | 8-8 | $a^5I^o$-$z^3K$† |
| 3997.054 | A | 40 | 0.37 | 3.46 | 7-7 | (9) |
| 4241.019 | A | 60 | 0.55 | 3.46 | 8-7 | |
| 4141.257 | A | 80 | 0.55 | 3.53 | 8-7 | $a^5I^o$-$z^3I$ |
| 4578.139 | A | 25 | 0.37 | 3.07 | 7-6 | (10) |
| 3908.033 | A | 150 | 0.55 | 3.71 | 8-7 | $a^5I^o$-$z^5H$ |
| 3918.856 | A | 150 | 0.37 | 3.52 | 7-6 | (11) |
| 3947.633 | A | 100 | 0.20 | 3.33 | 6-5 | |
| 3994.834 | A | 200 | 0.05 | 3.14 | 5-4 | |
| 3908.431 | B | 200 | 0.00 | 3.16 | 4-3 | |
| 3699.952 | A | (12) | 0.37 | 3.71 | 7-7 | |
| 3925.456 | A | 75 | 0.00 | 3.14 | 4-4 | |
| 4191.615 | A | 20 | 0.20 | 3.15 | 6-5 | $a^5I^o$-16 |
| 3989.718 | A | 100 | 0.05 | 3.15 | 5-5 | (12) |
| 3920.524 | A | 15 | 0.00 | 3.15 | 4-5 | |
| 4421.231 | A | 40 | 0.37 | 3.16 | 7-6 | $a^5I^o$-17 |
| 4172.273 | A | 50 | 0.20 | 3.16 | 6-6 | (13) |
| 3972.164 | A | 100 | 0.05 | 3.16 | 5-6 | |
| 4081.018 | A | 50 | 0.20 | 3.23 | 6-5 | $a^5I^o$-19 |
| 3889.330 | A | 75 | 0.05 | 3.23 | 5-5 | (14) |
| 3823.571 | A | (10) | 0.00 | 3.23 | 4-5 | |
| 4273.271 | A | 80 | 0.37 | 3.26 | 7-6 | $a^5I^o$-22 |
| 4039.357 | A | 30 | 0.20 | 3.26 | 6-6 | (15) |
| 4171.824 | A | 40 | 0.37 | 3.33 | 7-6 | $a^5I^o$-$z^3H$ |
| 3949.438 | A | 125 | 0.20 | 3.33 | 6-6 | (16) |
| 3769.695 | A | 30 | 0.05 | 3.33 | 5-6 | |
| 3912.898 | A | 125 | 0.20 | 3.36 | 6-5 | $a^5I^o$-26 (17) |
| 3885.190 | A | 75 | 0.20 | 3.38 | 6-6 | $a^5I^o$-27† |
| •3711.099 | A | (25/25) | 0.05 | 3.38 | 5-6 | (18) |
| 4282.440 | A | 60 | 0.55 | 3.43 | 8-8 | $a^5I^o$-30 |
| 4033.857 | A | 75 | 0.37 | 3.43 | 7-8 | (19) |
| 4534.154 | A | 60 | 0.63 | 3.35 | 7-8 | $a^3I^o$-$z^5K$ |
| 4510.160 | A | 100 | 0.42 | 3.16 | 6-7 | (20) |
| 4468.712 | A | 150 | 0.22 | 2.98 | 5-6 | |
| 4879.121 | A | (30) | 0.63 | 3.16 | 7-7 | |
| 4826.649 | A | (40) | 0.42 | 2.98 | 6-6 | |
| 5251.738 | A | 12 | 0.63 | 2.98 | 7-6 | |
| 4672.081 | A | 40 | 0.22 | 2.86 | 5-6 | $a^3I^o$-6† (21) |
| 4646.059 | A | 30 | 0.22 | 2.87 | 5-5 | $a^3I^o$-7 (22) |
| 4323.551 | A | 25 | 0.63 | 3.48 | 7-8 | $a^3I^o$-$z^5I$ |
| 4261.796 | A | 15 | 0.42 | 3.32 | 6-7 | (23) |
| 4180.68 | A | (8) | 0.22 | 3.17 | 5-6 | |
| 4589.76 | A | (5d) | 0.63 | 3.32 | 7-7 | |
| 4492.427 | A | 15 | 0.42 | 3.17 | 6-6 | |
| 4351.849 | A | 50 | 0.22 | 3.05 | 5-5 | |
| 4561.461 | A | (6) | 0.22 | 2.92 | 5-4 | |
| 5292.10 | A | 60• | 0.63 | 2.96 | 7-8 | $a^3I^o$-10 (24) |
| 4859.038 | A | 12 | 0.42 | 2.96 | 6-6 | $a^3I^o$-11† |
| •4496.429 | A | 250 | 0.22 | 2.96 | 5-6 | (25) |
| 4056.543 | A | 80 | 0.63 | 3.67 | 7-8 | $a^3I^o$-$z^3K$ |
| 4062.817 | A | 125 | 0.42 | 3.46 | 6-7 | (26) |
| 4413.765 | A | 50 | 0.22 | 3.01 | 5-6 | |
| 4359.795 | A | 30 | 0.63 | 3.46 | 7-7 | |
| 4762.737 | A | 20 | 0.42 | 3.01 | 6-6 | |

**Pr II** continued

| | | | | | | |
|---|---|---|---|---|---|---|
| 4254.420 | A | 20 | 0.63 | 3.53 | 7-7 | $a^3I^o$-$z^3I$† |
| 4664.647 | A | 20 | 0.42 | 3.07 | 6-8 | (27) |
| 3971.164 | A | 40 | 0.42 | 3.53 | 6-7 | |
| 4329.415 | A | 25 | 0.22 | 3.07 | 5-8 | |
| 4008.714 | A | 75 | 0.63 | 3.71 | 7-7 | $a^3I^o$-$z^5H$† |
| 3982.063 | A | 150 | 0.42 | 3.52 | 6-6 | (28) |
| 3962.445 | A | 40 | 0.22 | 3.33 | 5-5 | |
| 4395.788 | A | 30 | 0.42 | 3.23 | 6-5 | $a^3I^o$-19 |
| 4096.822 | A | 25 | 0.22 | 3.23 | 5-5 | (29) |
| 4347.490 | A | 30 | 0.42 | 3.26 | 6-6 | $a^3I^o$-22† |
| 4054.845 | A | 80 | 0.22 | 3.26 | 5-6 | (30) |
| 4338.694 | A | 25 | 0.42 | 3.26 | 6-7 | $a^3I^o$-23† (31) |
| 4302.100 | A | (60) | 0.42 | 3.29 | 6-5 | $a^3I^o$-25 |
| 4015.389 | A | 40 | 0.22 | 3.29 | 5-5 | (32) |
| 4568.545 | A | (30) | 0.63 | 3.33 | 7-6 | $a^3I^o$-$z^3H$ |
| 4243.528 | A | 20 | 0.42 | 3.33 | 6-6 | (33) |
| 3964.261 | A | 40 | 0.22 | 3.33 | 5-6 | |
| 4403.605 | A | 25 | 0.63 | 3.43 | 7-8 | $a^3I^o$-30 (34) |
| 5110.768 | A | 60 | 1.14 | 3.56 | 10-9 | $a^5L^o$-$z^5K$† |
| 5173.898 | A | 60 | 0.96 | 3.35 | 9-8 | (35) |
| 5220.113 | A | 50 | 0.79 | 3.16 | 8-7 | |
| 5259.743 | A | 80 | 0.63 | 2.98 | 7-6 | |
| 5322.778 | A | 60 | 0.48 | 2.80 | 6-5 | |
| 4801.150 | A | 15 | 0.48 | 3.05 | 6-5 | $a^5L^o$-$z^5I$† (36) |
| 5034.415 | A | 20 | 1.11 | 3.56 | 9-9 | $a^5K^o$-$z^5K$† |
| 5135.125 | A | 20 | 0.95 | 3.35 | 8-8 | (37) |
| 5219.053 | A | 20 | 0.79 | 3.16 | 7-7 | |
| 5292.630 | A | 30 | 0.65 | 2.98 | 6-6 | |
| 5381.262 | A | 60 | 0.51 | 2.80 | 5-5 | |
| 5195.110 | A | 20 | 1.11 | 3.48 | 9-8 | $a^5K^o$-$z^5I$ |
| 5206.562 | A | 20 | 0.95 | 3.32 | 8-7 | (38) |
| 5195.307 | A | 30 | 0.79 | 3.17 | 7-6 | |
| 5129.520 | A | 40 | 0.65 | 3.05 | 6-5 | |
| 5110.382 | A | 60 | 0.51 | 2.92 | 5-4 | |
| 6025.723 | A | 20 | 1.43 | 3.48 | 8-8 | $b^5I^o$-$z^5I$† |
| 6305.262 | A | 4 | 1.36 | 3.32 | 7-7 | (39) |
| 6244.344 | A | 5 | 1.19 | 3.17 | 6-6 | |
| 6161.194 | A | 50 | 1.05 | 3.05 | 5-5 | |
| 6165.945 | A | 60 | 0.92 | 2.92 | 4-4 | |

**Strongest Unclassified Lines of Pr II**

| | | | |
|---|---|---|---|
| 3880.466 | B | 100 | V |
| 3877.225 | B | 200 | V |
| 3865.458 | B | 100 | V |
| 3854.905 | B | 100 | V |
| 3852.805 | B | 150 | V |
| 3851.617 | B | 200 | V |
| 3850.825 | B | 150 | V |
| 3846.605 | B | 125 | V |
| 3830.719 | B | 125 | V |
| 3826.292 | B | 100 | V |
| 3818.281 | B | 125 | V |
| 3816.166 | B | 125 | V |
| 3800.303 | B | 200 | V |
| 3792.524 | B | 100 | V |
| 3773.854 | B | 100 | V |
| 3764.811 | B | 125 | IV |
| 3761.867 | B | 250 | V |
| 3739.193 | B | 100 | IV |
| 3687.039 | B | 125 | IV |
| 3668.830 | B | 150 | IV |

**Nd I** No analysis May 1942 (Temperature Class)

**Nd II** I P ? Anal C List B Apr 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| •4959.130§ | A | 60 | 0.06 | 2.55 | 4½-4½ | $a^6I$-1° |
| 4835.982 | A | 15 | 0.00 | 2.55 | 3½-4½ | (1) |
| 4920.692 | A | 60 | 0.06 | 2.57 | 4½-3½ | $a^6I$-20830 |
| 4799.423 | A | 10 | 0.00 | 2.57 | 3½-3½ | (2) |
| 4859.030 | A | 100 | 0.32 | 2.86 | 6½-5½ | $a^6I$-$z^6H^o$ |
| 4825.482 | A | 150 | 0.18 | 2.74 | 5½-4½ | (3) |
| 4811.343 | A | 100 | 0.06 | 2.63 | 4½-3½ | |
| •4706.543§ | A | 100 | 0.00 | 2.62 | 3½-2½ | |
| 4609.148 | A | (1) | 0.18 | 2.86 | 5½-5½ | |
| 4612.473 | A | 4 | 0.06 | 2.74 | 4½-4½ | |
| 4414.432 | A | 8 | 0.06 | 2.86 | 4½-5½ | |
| 4505.75 | A | (8) | 0.00 | 2.74 | 3½-4½ | |
| 4680.734 | A | 30 | 0.06 | 2.70 | 4½-3½ | $a^6I$-21871 (4) |
| 4569.849 | A | 2 | 0.06 | 2.76 | 4½-3½ | $a^6I$-3° |
| 4465.075 | A | 10 | 0.00 | 2.76 | 3½-3½ | (5) |
| 4763.865 | A | 20 | 0.18 | 2.77 | 5½-4½ | $a^6I$-4° |
| 4556.136 | A | 12 | 0.06 | 2.77 | 4½-4½ | (6) |
| 4451.978 | A | 50 | 0.00 | 2.77 | 3½-4½ | |
| 4709.714 | A | 20 | 0.18 | 2.80 | 5½-5½ | $a^6I$-5°† |
| 4506.582 | A | 30 | 0.06 | 2.80 | 4½-5½ | (7) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Nd II** continued | | | | | | |
| 4411.052 | A | 150 | 0.18 | 2.98 | 5½-5½ | $a^6I-z^6I^\circ$ † (8) |
| 4342.071 | A | 20 | 0.06 | 2.91 | 4½-4½ | |
| 4375.039 | A | 30 | 0.00 | 2.82 | 3½-3½ | |
| 4232.378 | A | 150 | 0.06 | 2.98 | 4½-5½ | |
| 4247.367 | A | 200 | 0.00 | 2.91 | 3½-4½ | |
| 4418.265 | A | 20 | 0.06 | 2.86 | 4½-4½ | $a^6I-23171$ |
| 4314.511 | A | 50 | 0.00 | 2.86 | 3½-4½ | (9) |
| 4012.250 | A | 300 | 0.63 | 3.70 | 8½-9½ | $a^6I-z^6K^\circ$ |
| 4061.085 | A | 200 | 0.47 | 3.51 | 7½-8½ | (10) |
| 4109.455 | A | 300 | 0.32 | 3.32 | 6½-7½ | |
| 4156.083 | A | 350 | 0.18 | 3.15 | 5½-6½ | |
| 4177.331 | A | 200 | 0.06 | 3.02 | 4½-5½ | |
| 4303.573 | A | 400 | 0.00 | 2.87 | 3½-4½ | |
| 4284.518 | A | 100 | 0.63 | 3.51 | 8½-8½ | |
| 4325.766 | A | 150 | 0.47 | 3.32 | 7½-7½ | |
| 4358.169 | A | 200 | 0.32 | 3.15 | 6½-6½ | |
| 4351.295 | A | 40 | 0.18 | 3.02 | 5½-5½ | |
| 4400.828 | A | 100 | 0.06 | 2.87 | 4½-4½ | |
| 4368.632 | A | 60 | 0.06 | 2.89 | 4½-3½ | $a^6I-6^\circ$ |
| 4272.789 | A | 30 | 0.00 | 2.89 | 3½-3½ | (11) |
| 4556.735 | A | 12 | 0.18 | 2.89 | 5½-4½ | $a^6I-7^\circ$ |
| 4366.315 | A | 12 | 0.06 | 2.89 | 4½-4½ | (12) |
| 4270.565 | A | 25 | 0.00 | 2.89 | 3½-4½ | |
| 4465.601 | A | 10 | 0.18 | 2.95 | 5½-5½ | $a^6I-8^\circ$ † |
| 4282.570 | A | 15 | 0.06 | 2.95 | 4½-5½ | (13) |
| 4246.879 | A | (10) | 0.06 | 2.97 | 4½-4½ | $a^6I-9^\circ$ † |
| 4156.265 | A | 30 | 0.00 | 2.97 | 3½-4½ | (14) |
| 4374.923 | A | 20 | 0.18 | 3.00 | 5½-4½ | $a^6I-10^\circ$ |
| 4199.099 | A | 10 | 0.06 | 3.00 | 4½-4½ | (15) |
| 4110.472 | A | 40 | 0.00 | 3.00 | 3½-4½ | |
| 4173.379 | A | 8 | 0.06 | 3.02 | 4½-3½ | $a^6I-11^\circ$ |
| 4085.815 | A | 30 | 0.00 | 3.02 | 3½-3½ | (16) |
| 4277.279 | A | 6 | 0.18 | 3.07 | 5½-5½ | $a^6I-12^\circ$ † |
| 4109.073 | A | 100 | 0.06 | 3.07 | 4½-5½ | (17) |
| 4457.179 | A | (5) | 0.32 | 3.09 | 6½-5½ | $a^6I-25014$ |
| 4080.227 | A | 50 | 0.06 | 3.09 | 4½-5½ | (18) |
| 3973.269 | A | 80 | 0.63 | 3.73 | 9½-8½ | $a^6I-y^6I^\circ$ |
| 3990.103 | A | 60 | 0.47 | 3.56 | 7½-7½ | (19) |
| 4020.872 | A | 60 | 0.32 | 3.39 | 6½-6½ | |
| 3951.154 | A | 150 | 0.18 | 3.31 | 5½-5½ | |
| 4018.826 | A | 30 | 0.06 | 3.13 | 4½-4½ | |
| 3991.743 | A | 80 | 0.00 | 3.09 | 3½-3½ | |
| 4205.595 | A | 40 | 0.63 | 3.56 | 8½-7½ | |
| 4227.719 | A | 30 | 0.47 | 3.39 | 7½-6½ | |
| 4133.361 | A | 50 | 0.32 | 3.31 | 6½-5½ | |
| 4179.585 | A | 30 | 0.18 | 3.13 | 5½-4½ | |
| 4075.272 | A | 50 | 0.08 | 3.09 | 4½-3½ | |
| 3780.391 | A | 20 | 0.47 | 3.73 | 7½-8½ | |
| 3805.359 | A | 100 | 0.32 | 3.56 | 6½-7½ | |
| 3848.233 | A | 50 | 0.18 | 3.39 | 5½-6½ | |
| 3807.237 | A | (15) | 0.06 | 3.31 | 4½-5½ | |
| *3937.575§ | A | 5 | 0.00 | 3.13 | 3½-4½ | |
| 4234.196 | A | 6 | 0.18 | 3.10 | 5½-5½ | $a^6I-13^\circ$ † |
| 4069.267 | A | 80 | 0.06 | 3.10 | 4½-5½ | (20) |
| *3976.836§ | A | 60 | 0.00 | 3.10 | 3½-3½ | $a^6I-25138$ (21) |
| 4961.396 | A | 10 | 0.63 | 3.12 | 8½-7½ | $a^6I-25235$ |
| 4413.784 | A | (5) | 0.32 | 3.12 | 6½-7½ | (22) |
| 4034.012 | A | (4) | 0.06 | 3.12 | 4½-3½ | $a^6I-14^\circ$ |
| 3952.195 | A | 100 | 0.00 | 3.12 | 3½-3½ | (23) |
| 4391.110 | A | 10 | 0.32 | 3.13 | 6½-5½ | $a^6I-15^\circ$ |
| 4188.033 | A | 8 | 0.18 | 3.13 | 5½-5½ | (24) |
| 4024.785 | A | 30 | 0.06 | 3.13 | 4½-5½ | |
| 4113.826 | A | 20 | 0.18 | 3.18 | 5½-4½ | $a^6I-16^\circ$ |
| 3958.001 | A | 40 | 0.06 | 3.18 | 4½-4½ | (25) |
| 3863.409 | A | 60 | 0.00 | 3.19 | 3½-2½ | $a^8I-y^6H^\circ$ (26) |
| 3941.512 | A | 150 | 0.08 | 3.19 | 4½-4½ | $a^6I-17^\circ$ † |
| 3863.327 | A | 20 | 0.00 | 3.19 | 3½-4½ | (27) |
| 3838.981 | A | 80 | 0.00 | 3.21 | 3½-2½ | $a^6I-26041$ (28) |
| 3894.627 | A | 40 | 0.06 | 3.23 | 4½-5½ | $a^6I-26182$ (29) |
| 4040.798 | A | 100 | 0.18 | 3.24 | 5½-6½ | $a^6I-18^\circ$ (30) |
| 4038.124 | A | 20 | 0.18 | 3.24 | 5½-4½ | $a^6I-19^\circ$ |
| *3887.866§ | A | 30 | 0.06 | 3.24 | 4½-4½ | (31) |
| 3811.774 | A | 20 | 0.00 | 3.24 | 3½-4½ | |
| 4220.258 | A | 20 | 0.32 | 3.24 | 6½-5½ | $a^6I-21^\circ$ |
| 4030.470 | A | 25 | 0.18 | 3.24 | 5½-5½ | (32) |
| 3880.779 | A | 40 | 0.06 | 3.24 | 4½-5½ | |
| 3828.416 | A | 60 | 0.08 | 3.29 | 4½-3½ | $a^6I-20^\circ$ |
| 3752.879 | A | 30 | 0.00 | 3.29 | 3½-3½ | (33) |
| 4043.596 | A | 15 | 0.32 | 3.37 | 6½-6½ | $a^6I-22^\circ$ |
| 3869.045 | A | 30 | 0.18 | 3.37 | 5½-6½ | (34) |
| 3851.748 | A | 60 | 0.18 | 3.39 | 5½-4½ | $a^8I-23^\circ$ |
| 3714.808 | A | 20 | 0.08 | 3.39 | 4½-4½ | (35) |
| 4228.200 | A | 8 | 0.47 | 3.39 | 7½-7½ | $a^8I-24^\circ$ † |
| 4021.330 | A | 80 | 0.32 | 3.39 | 6½-7½ | (36) |
| 3973.850 | A | 60 | 0.32 | 3.43 | 6½-6½ | $a^8I-27744$ (37) |
| 3814.873 | A | (8) | 0.08 | 3.48 | 4½-4½ | $a^6I-28170$ (38) |
| 4175.606 | A | 50 | 0.83 | 3.58 | 8½-8½ | $a^6I-29027$ |
| 3983.114 | A | 60 | 0.47 | 3.58 | 7½-8½ | (39) |
| 3328.270 | A | 80 | 0.00 | 3.71 | 3½-2½ | $a^6I-30037$ (40) |
| 3339.063 | A | 60 | 0.06 | 3.76 | 4½-3½ | $a^6I-30453$ |
| 3382.777 | A | 8 | 0.00 | 3.76 | 3½-3½ | (41) |
| 3334.471 | A | 50 | 0.18 | 3.88 | 5½-4½ | $a^6I-25^\circ$ |
| *3231.349§ | A | (8) | 0.06 | 3.88 | 4½-4½ | (42) |
| 5255.510 | A | 50 | 0.20 | 2.55 | 4½-4½ | $a^4I-1^\circ$ (43) |
| 5213.365 | A | 30 | 0.20 | 2.57 | 4½-3½ | $a^4I-20830$ (44) |
| 5603.651 | A | 5 | 0.38 | 2.58 | 5½-5½ | $a^4I-2^\circ$ |
| *5191.448§ | A | 100 | 0.20 | 2.58 | 4½-5½ | (45) |
| 5361.174 | A | 3 | 0.56 | 2.86 | 6½-5½ | $a^4I-z^6H^\circ$ |
| 5228.427 | A | 6 | 0.38 | 2.74 | 5½-4½ | (46) |
| 5089.837 | A | 8 | 0.20 | 2.63 | 4½-3½ | |
| *4867.839§ | A | 3 | 0.20 | 2.74 | 4½-4½? | |
| 4647.759 | A | 3 | 0.20 | 2.86 | 4½-5½ | |
| 4820.336 | A | 30 | 0.20 | 2.76 | 4½-3½ | $a^4I-3^\circ$ (47) |
| 5093.797 | A | 30 | 0.38 | 2.80 | 5½-5½ | $a^4I-5^\circ$ † (48) |
| 4446.387 | A | 300 | 0.20 | 2.98 | 4½-5½ | $a^4I-z^6I^\circ$ |
| 4567.606 | A | 12 | 0.20 | 2.91 | 4½-4½ | (49) |
| 4715.589 | A | 25 | 0.20 | 2.82 | 4½-3½ | |
| 4456.394 | A | 40 | 0.74 | 3.51 | 7½-8½ | $a^4I-z^6K^\circ$ † |
| 4462.985 | A | 250 | 0.56 | 3.32 | 6½-7½ | (50) |
| 4451.566 | A | 400 | 0.38 | 3.15 | 5½-6½ | |
| 4385.663 | A | 150 | 0.20 | 3.02 | 4½-5½ | |
| 4597.013 | A | 20 | 0.20 | 2.89 | 4½-3½ | $a^4I-6^\circ$ (51) |
| 4914.385 | A | 15 | 0.38 | 2.89 | 5½-4½ | $a^4I-7^\circ$ |
| 4594.447 | A | 6 | 0.20 | 2.89 | 4½-4½ | (52) |
| 4501.808 | A | 50 | 0.20 | 2.95 | 4½-5½ | $a^4I-8^\circ$ † (53) |
| 4763.624 | A | 5 | 0.38 | 2.97 | 5½-4½ | $a^4I-9^\circ$ |
| 4462.407 | A | 30 | 0.20 | 2.97 | 4½-4½ | (54) |
| 4703.578 | A | 15 | 0.38 | 3.00 | 5½-4½ | $a^4I-10^\circ$ (55) |
| 4381.290 | A | (10) | 0.20 | 3.02 | 4½-3½ | $a^4I-11^\circ$ (56) |
| 4120.654 | A | 6 | 0.74 | 3.73 | 7½-8½ | $a^4I-y^6I^\circ$ |
| 4106.582 | A | 8 | 0.56 | 3.56 | 6½-7½ | (57) |
| 4100.340 | A | 15 | 0.38 | 3.39 | 5½-6½ | |
| 3979.479 | A | 60 | 0.20 | 3.31 | 4½-5½ | |
| 4371.069 | A | (10) | 0.74 | 3.56 | 7½-7½ | |
| 4358.699 | A | 15 | 0.56 | 3.39 | 6½-6½ | |
| 4217.282 | A | 5 | 0.38 | 3.31 | 5½-5½ | |
| 4211.286 | A | 40 | 0.20 | 3.13 | 4½-4½ | |
| 4541.289 | A | 50 | 0.38 | 3.10 | 5½-5½ | $a^4I-13^\circ$ |
| 4266.716 | A | 30 | 0.20 | 3.10 | 4½-5½ | (58) |
| 4256.239 | A | 8 | 0.20 | 3.10 | 4½-3½ | $a^4I-25138$ (59) |
| 4797.157 | A | 20 | 0.56 | 3.13 | 6½-5½ | $a^4I-15^\circ$ † (60) |
| 4144.553 | A | 20 | 0.20 | 3.18 | 4½-4½ | $a^4I-16^\circ$ (61) |
| 4075.116 | A | 60 | 0.20 | 3.23 | 4½-5½ | $a^4I-36182$ † (62) |
| 4307.778 | A | 15 | 0.38 | 3.24 | 5½-5½ | $a^4I-21^\circ$ |
| 4059.961 | A | 50 | 0.20 | 3.24 | 4½-5½ | (63) |
| 4000.493 | A | 30 | 0.20 | 3.29 | 4½-3½ | $a^4I-30^\circ$ (64) |
| 4123.881 | A | 40 | 0.38 | 3.37 | 5½-6½ | $a^4I-22^\circ$ (65) |
| 4051.145 | A | 60 | 0.38 | 3.43 | 5½-6½ | $a^4I-27744$ † (66) |
| 3982.355 | A | 20 | 0.38 | 3.48 | 5½-4½ | $a^4I-28170$ |
| 3769.644 | A | 40 | 0.20 | 3.48 | 4½-4½ | (67) |
| 4338.697 | A | 80 | 0.74 | 3.58 | 7½-8½ | $a^4I-29027$ (68) |
| 3811.073 | A | 20 | 0.38 | 3.62 | 5½-4½ | $a^4I-29398$ |
| 3615.817 | A | 30 | 0.20 | 3.62 | 4½-4½ | (69) |
| 3470.866 | A | 20 | 0.20 | 3.76 | 4½-3½ | $a^4I-30453$ (70) |
| 3522.044 | A | 25 | 0.38 | 3.88 | 5½-4½ | $a^4I-25^\circ$ |
| 3354.621 | A | 10 | 0.20 | 3.88 | 4½-4½ | (71) |
| 6257.834 | A | (25) | 0.55 | 2.55 | 5½-4½ | $a^6L-1^\circ$ (72) |
| 5548.474 | A | 8 | 0.55 | 2.77 | 5½-4½ | $a^6L-4^\circ$ (73) |
| 5361.474 | A | 60 | 0.68 | 2.98 | 6½-5½ | $a^6L-z^6I^\circ$ |
| 5234.195 | A | 50 | 0.55 | 2.91 | 5½-4½ | (74) |
| 5130.596 | A | 40 | 1.30 | 3.70 | 10½-9½ | $a^6L-z^6K^\circ$ † |
| 5192.621 | A | 80 | 1.13 | 3.51 | 9½-8½ | (75) |
| 5249.585 | A | 100 | 0.97 | 3.32 | 8½-7½ | |
| 5293.168 | A | 100 | 0.82 | 3.15 | 7½-6½ | |
| 5273.431 | A | 50 | 0.68 | 3.02 | 6½-5½ | |
| 5319.818 | A | 125 | 0.55 | 2.87 | 5½-4½ | |
| 5442.274 | A | 40 | 0.68 | 2.95 | 6½-5½ | $a^6L-8^\circ$ (76) |
| 5165.140 | A | 10 | 0.68 | 3.07 | 6½-5½ | $a^6L-12^\circ$ (77) |
| 5934.747 | A | (10) | 0.74 | 2.82 | 4½-3½ | $a^6K-z^6I^\circ$ |
| 5811.572 | A | 12 | 0.88 | 2.98 | 5½-5½ | (78) |
| 5702.244 | A | 20 | 0.74 | 2.91 | 4½-4½ | |
| 5371.935 | A | 20 | 1.41 | 3.70 | 9½-9½ | $a^6K-z^6K^\circ$ † |
| 5485.899 | A | 80 | 1.26 | 3.51 | 8½-8½ | (79) |
| 5594.425 | A | 150 | 1.12 | 3.32 | 7½-7½ | |
| 5688.525 | A | 150 | 0.98 | 3.15 | 6½-6½ | |
| 5708.280 | A | 40 | 0.86 | 3.02 | 5½-5½ | $a^6K-z^6K^\circ$ cont |
| 5804.020 | A | 60 | 0.74 | 2.87 | 4½-4½ | |
| 5421.559 | A | 20 | 0.74 | 3.02 | 4½-5½? | |
| 5302.279 | A | 6 | 1.41 | 3.73 | 9½-8½ | $a^6K-y^6I^\circ$ |
| *5356.976§ | A | 15 | 1.26 | 3.56 | 8½-7½ | (80) |
| 5431.526 | A | 40 | 1.12 | 3.39 | 7½-6½ | |
| 5311.461 | A | 12 | 0.98 | 3.31 | 6½-5½ | |
| 5416.381 | A | 15 | 0.86 | 3.13 | 5½-4½ | |
| 5250.816 | A | 8 | 0.74 | 3.09 | 4½-3½ | |
| 5276.879 | A | 8 | 0.86 | 3.19 | 5½-4½ | $a^6K-17^\circ$ (81) |
| 5474.734 | A | 10 | 0.98 | 3.24 | 6½-6½ | $a^6K-18^\circ$ (82) |
| 5455.815 | A | 20 | 0.98 | 3.24 | 6½-5½ | $a^6K-21^\circ$ (83) |
| 5668.868 | A | 15 | 1.41 | 3.58 | 9½-8½ | $a^6K-29023$ (84) |
| *6385.196§ | A | 150 | 1.16 | 3.09 | 5½-5½? | $b^6I-25014$ (85) |
| *5620.62 § | P | 500 | 1.54 | 3.73 | 8½-8½ | $b^6I-y^6I^\circ$ |
| 5718.120 | A | 12 | 1.40 | 3.56 | 7½-7½ | (86) |
| 5842.391 | A | 8 | 1.28 | 3.39 | 6½-6½ | |
| 5740.862 | A | 15 | 1.16 | 3.31 | 5½-5½ | |
| 5891.528 | A | 15 | 1.04 | 3.13 | 4½-4½ | |
| 5706.206 | A | 15 | 0.93 | 3.09 | 3½-3½ | |
| 5614.303 | A | (10) | 1.04 | 3.24 | 4½-4½ | $b^6I-19^\circ$ (87) |

**Strongest Unclassified Lines of Nd II**

| | | | |
|---|---|---|---|
| 5451.115 | B | 100 | IV |
| 4632.276 | B | 20 | III |
| 4542.603 | B | 60 | IV |
| 4282.443 | B | 50 | IV |
| *4135.325 | B | 50 | IV |
| 4031.807 | B | 100 | IV |
| 4023.002 | B | 80 | IV |
| 4012.704 | B | 50 | III |
| 4007.435 | B | 50 | IV |
| 4004.010 | B | 60 | III |
| 3994.684 | B | 80 | III |
| 3953.525 | B | 60 | IV |
| 3934.823 | B | 50 | IV |
| 3920.965 | B | 100 | III |
| 3911.169 | B | 60 | IV |
| 3905.886 | B | 100 | III |
| 3901.850 | B | 50 | IV |
| 3900.226 | B | 60 | III |
| 3890.940 | B | 60 | III |
| 3890.580 | B | 50 | IV |
| 3889.929 | B | 50 | IV |
| 3878.582 | C | 50 | IV |
| 3848.524 | B | 80 | IV |
| 3836.541 | B | 60 | IV |
| 3814.735 | B | 60 | III |
| 3808.772 | B | 30 | III |
| 3803.474 | B | 40 | III |
| 3784.250 | B | 80 | III |
| 3763.475 | B | 60 | III |
| 3758.944 | B | 40 | III |
| 3741.427 | B | 50 | III |
| 3728.130 | B | 50 | III |
| 3723.506 | B | 50 | III |
| 3685.804 | C | 60 | IV |
| 3673.542 | C | 50 | V |
| 3672.363 | C | 50 | V |
| 3665.180 | B | 50 | IV |
| 3609.788 | B | 40 | III |
| 3592.595 | B | 60 | IV |
| 3587.504 | B | 50 | IV |
| 3543.352 | B | 50 | IV |
| 3393.641 | B | 60 | IV |
| 3364.950 | B | 50 | IV |
| 3300.148 | B | 70 | IV |
| 3285.093 | B | 50 | IV |
| 3275.318 | B | 60 | IV |
| 3134.897 | B | 50 | V |
| 3133.603 | B | 100 | V |
| 3118.141 | B | 60 | V |
| 3115.172 | B | 100 | V |
| 3098.476 | B | 50 | V |
| 3092.915 | B | 60 | V |
| 3075.380 | B | 50d | V |
| 3014.165 | B | 60 | V |
| 3007.975 | B | 50 | V |

| 8m I | I P 5.6? | Anal C | List D | Apr 1942 | |
|---|---|---|---|---|---|
| 6671.51 | A 800 | 0.50 | 2.35 | 6-7 | $a^7F-z^9G^\circ$ |
| 6588.91 | A 500 | 0.39 | 2.26 | 5-6 | (1) |
| 5659.86 | B 400 | 0.10 | 2.28 | 2-1 | $a^7F-38^\circ$ |
| *5516.09 | B 500d | (0.04 | 2.27 | 1-2 | (2) 37°) |
| | | 0.28 | 2.52 | 4- | 59°) |
| 4841.701 | B 400 | 0.50 | 3.05 | 6-5 | 102° |
| 3925.216 | B 400 | 0.10 | 3.24 | 2-1 | 118° |
| *3756.411§ | B 600 | 0.10 | 3.39 | 2-3 | 127° |
| 4296.743// | B 300 | 0.50 | 3.37 | 6-7 | $a^7F-z^7G^\circ$ (3) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Sm II I P 11.4 Anal B List C Mar 1942 | | | | | | |
| 4704.397 | A | 500 | 0.00 | 2.62 | 1/2 - 1/2 | a8F-1° |
| 4648.160 | A | 100 | 0.00 | 2.66 | 1/2-1 1/2 | (1) 2° |
| 4606.514 | A | 100 | 0.00 | 2.68 | 1/2-1 1/2 | 5° |
| 4092.266 | A | 400 | 0.00 | 3.02 | 1/2-1 1/2 | 23° |
| 3970.528 | A | 200 | 0.00 | 3.11 | 1/2-1 1/2 | 35° |
| 3941.874 | A | 300 | 0.00 | 3.13 | 1/2-1 1/2 | 37° |
| 3745.605 | A | 200d | 0.00 | 3.29 | 1/2 - 1/2 | a8F-z8G° |
| *3693.989§ | A | 1200 | 0.00 | 3.34 | 1/2-1 1/2 | (2) z8G° |
| 3304.523 | A | 200 | 0.00 | 3.73 | 1/2 - 1/2 | 124° |
| 3250.372 | A | 200d | 0.00 | 3.80 | 1/2-1 1/2 | 129° |
| 3207.185 | A | 400 | 0.00 | 3.85 | 1/2-1 1/2 | 134° |
| 4777.846 | A | 200 | 0.04 | 2.62 | 1 1/2 - 1/2 | a8F-1° |
| 4719.838 | A | 200 | 0.04 | 2.66 | 1 1/2-1 1/2 | (3) 2° |
| 4687.183 | A | 400 | 0.04 | 2.67 | 1 1/2 - 1/2 | 4° |
| 4676.911 | A | 500 | 0.04 | 2.68 | 1 1/2-1 1/2 | 5° |
| 4523.037 | A | 150 | 0.04 | 2.77 | 1 1/2-2 1/2 | 9° |
| 4229.704 | A | 300 | 0.04 | 2.96 | 1 1/2-1 1/2 | a8F-18° |
| 4183.764 | A | 150 | 0.04 | 2.99 | 1 1/2 - 1/2 | (4) 20° |
| 4042.723 | A | 200 | 0.04 | 3.09 | 1 1/2-1 1/2 | 33° |
| 4023.231 | A | 300 | 0.04 | 3.11 | 1 1/2-2 1/2 | 34° |
| 3993.308 | A | 200 | 0.04 | 3.13 | 1 1/2-1 1/2 | 37° |
| 3896.977 | A | 600 | 0.04 | 3.21 | 1 1/2-2 1/2 | a8F-47° |
| 3792.025 | A | 150 | 0.04 | 3.29 | 1 1/2 - 1/2 | (5) z8G° |
| 3787.203 | A | 100 | 0.04 | 3.30 | 1 1/2-1 1/2 | 61° |
| 3739.197 | A | 200 | 0.04 | 3.34 | 1 1/2-1 1/2 | z8G° |
| 3724.902 | A | 200 | 0.04 | 3.35 | 1 1/2-2 1/2 | 72° |
| 3708.410 | A | 200 | 0.04 | 3.37 | 1 1/2-2 1/2 | 76° |
| 3661.365 | A | 1000 | 0.04 | 3.41 | 1 1/2-2 1/2 | a8F-z8G° |
| 3634.928 | A | 200 | 0.04 | 3.44 | 1 1/2-1 1/2 | (6) 85° |
| 3622.504 | A | 100 | 0.04 | 3.45 | 1 1/2-2 1/2 | 86° |
| 3340.579 | A | 800 | 0.04 | 3.73 | 1 1/2 - 1/2 | 124° |
| 3254.377 | A | 500 | 0.04 | 3.83 | 1 1/2-2 1/2 | 133° |
| 3241.161 | A | 500 | 0.04 | 3.85 | 1 1/2-1 1/2 | 134° |
| 4791.584 | A | 200 | 0.10 | 2.68 | 2 1/2-1 1/2 | a8F-5° |
| 4745.680 | A | 500 | 0.10 | 2.70 | 2 1/2-1 1/2 | (7) 6° |
| 4669.396 | A | 500 | 0.10 | 2.75 | 2 1/2-2 1/2 | 8° |
| 4458.517 | A | 400 | 0.10 | 2.87 | 2 1/2-3 1/2 | 14° |
| 4345.858 | A | 150 | 0.10 | 2.94 | 2 1/2-2 1/2 | 17° |
| 4323.284 | A | 200 | 0.10 | 2.96 | 2 1/2-1 1/2 | a8F-18° |
| 4237.663 | A | 200 | 0.10 | 3.02 | 2 1/2-1 1/2 | (8) 23° |
| 4210.352 | A | 150 | 0.10 | 3.03 | 2 1/2-2 1/2 | 24° |
| *4155.217 | A | 100 | 0.10 | 3.07 | 2 1/2-3 1/2 | 30° |
| 4149.831 | A | 200 | 0.10 | 3.08 | 2 1/2-2 1/2 | 32° |
| 4042.905 | A | 250 | 0.10 | 3.16 | 2 1/2-3 1/2 | a8F-42° |
| 3976.270 | A | 200 | 0.10 | 3.21 | 2 1/2-2 1/2 | (9) 47° |
| 3948.113 | A | 300 | 0.10 | 3.23 | 2 1/2-3 1/2 | 50° |
| 3943.239 | A | 200 | 0.10 | 3.23 | 2 1/2-2 1/2 | 51° |
| 3917.442 | A | 200 | 0.10 | 3.25 | 2 1/2-2 1/2 | 54° |
| 3880.766 | A | 150 | 0.10 | 3.28 | 2 1/2-1 1/2 | a8F-59° |
| 3862.054 | A | 150 | 0.10 | 3.30 | 2 1/2-1 1/2 | (10) 61° |
| 3830.293 | A | 200 | 0.10 | 3.33 | 2 1/2-3 1/2 | 66° |
| 3812.067 | A | 150 | 0.10 | 3.34 | 2 1/2-1 1/2 | z8G° |
| 3805.626 | A | 200 | 0.10 | 3.35 | 2 1/2-3 1/2 | 71° |
| 3797.283 | A | 150 | 0.10 | 3.35 | 2 1/2-2 1/2 | a8F-72° |
| 3793.971 | A | 500 | 0.10 | 3.36 | 2 1/2-3 1/2 | (11) 73° |
| 3731.258 | A | 600 | 0.10 | 3.41 | 2 1/2-2 1/2 | z8G° |
| 3688.418 | A | 100 | 0.10 | 3.45 | 2 1/2-1 1/2 | 87° |
| 3670.840 | A | 1000 | 0.10 | 3.47 | 2 1/2-3 1/2 | z8G° |
| 3627.971 | A | 100 | 0.10 | 3.51 | 2 1/2-2 1/2 | a8F-95° |
| 3623.316 | A | 200 | 0.10 | 3.51 | 2 1/2-2 1/2 | (12) 96° |
| 3621.229 | A | 600 | 0.10 | 3.51 | 2 1/2-3 1/2 | 97° |
| 3584.259 | A | 100 | 0.10 | 3.55 | 2 1/2-3 1/2 | 103° |
| 3511.227 | A | 150 | 0.10 | 3.62 | 2 1/2- | 108° |
| 3295.813 | A | 300 | 0.10 | 3.85 | 2 1/2-1 1/2 | a8F-134° |
| 3231.528 | A | 200 | 0.10 | 3.92 | 2 1/2-3 1/2 | (13) 139° |
| 3216.850 | A | 300 | 0.10 | 3.94 | 2 1/2-3 1/2 | 141° |
| *3187.216 | A | 300 | 0.10 | 3.98 | 2 1/2-3 1/2 | 144° |
| 4815.808 | A | 400 | 0.18 | 2.75 | 3 1/2-2 1/2 | a8F- 8° |
| 4693.628 | A | 150 | 0.18 | 2.81 | 3 1/2-3 1/2 | (14) 11° |
| 4674.599 | A | 600 | 0.18 | 2.82 | 3 1/2-3 1/2 | 13° |
| 4591.818 | A | 100 | 0.18 | 2.87 | 3 1/2-3 1/2 | 14° |
| 4511.829 | A | 200 | 0.18 | 2.92 | 3 1/2-4 1/2 | 15° |
| 4390.858 | A | 600 | 0.18 | 2.99 | 3 1/2-4 1/2 | a8F-21° |
| 4329.016 | A | 400 | 0.18 | 3.03 | 3 1/2-2 1/2 | (15) 24° |
| 4309.012 | A | 200 | 0.18 | 3.05 | 3 1/2-3 1/2 | 27° |
| 4265.075 | A | 100d | 0.18 | 3.08 | 3 1/2-2 1/2 | 32° |
| *4220.659 | A | 200 | 0.18 | 3.11 | 3 1/2-2 1/2 | 34° |
| *4178.019 | A | 100d | 0.18 | 3.14 | 3 1/2-2 1/2 | a8F-39° |
| 4152.309 | A | 200 | 0.18 | 3.16 | 3 1/2-3 1/2 | (16) 42° |
| 4113.902 | A | 100 | 0.18 | 3.18 | 3 1/2-3 1/2 | 45° |
| 4047.160 | A | 80 | 0.18 | 3.23 | 3 1/2-2 1/2 | 51° |
| 4019.982 | A | 80 | 0.18 | 3.25 | 3 1/2-2 1/2 | 54° |
| 3986.682 | A | 150 | 0.18 | 3.28 | 3 1/2-4 1/2 | a8F-58° |
| 3946.511 | A | 200 | 0.18 | 3.31 | 3 1/2-4 1/2 | (17) 63° |
| 3928.279 | A | 400 | 0.18 | 3.33 | 3 1/2-3 1/2 | 66° |
| 3890.080 | A | 200 | 0.18 | 3.36 | 3 1/2-3 1/2 | 73° |
| 3875.545 | A | 200 | 0.18 | 3.37 | 3 1/2-2 1/2 | 76° |
| 3871.778 | A | 300 | 0.18 | 3.37 | 3 1/2-4 1/2 | a8F-77° |
| 3835.725 | A | 100d | 0.18 | 3.40 | 3 1/2- | (18) 81° |
| 3824.175 | A | 200 | 0.18 | 3.41 | 3 1/2-2 1/2 | z8G° |
| *3760.694 | A | 500 | 0.18 | 3.47 | 3 1/2-3 1/2 | z8G° |
| *3743.868 | A | 500 | 0.18 | 3.48 | 3 1/2-4 1/2 | 92° |
| 3738.805 | A | 100 | 0.18 | 3.50 | 3 1/2-4 1/2 | a8F-94° |
| 3710.869 | A | 100 | 0.18 | 3.51 | 3 1/2-2 1/2 | (19) 96° |
| 3708.654 | A | 300 | 0.18 | 3.51 | 3 1/2-3 1/2 | 97° |
| 3845.290 | A | 300 | 0.18 | 3.57 | 3 1/2-4 1/2 | 103° |
| 3834.290 | A | 1500d? | 0.18 | 3.58 | 3 1/2-4 1/2 | z8G° |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Sm II continued | | | | | | |
| 3601.692 | A | 200 | 0.18 | 3.61 | 3 1/2-3 1/2 | a8F-107° |
| 3583.394 | A | 150 | 0.18 | 3.63 | 3 1/2-4 1/2 | (20) 110° |
| 3530.600 | A | 150 | 0.18 | 3.68 | 3 1/2-4 1/2 | 118° |
| 3382.399 | A | 600 | 0.18 | 3.83 | 3 1/2-3 1/2 | 133° |
| 3320.155 | A | 600d | 0.18 | 3.90 | 3 1/2-2 1/2 | 136° |
| 3313.415 | A | 400 | 0.18 | 3.91 | 3 1/2-2 1/2 | a8F-137° |
| *3301.678 | A | 100 | 0.18 | 3.92 | 3 1/2-4 1/2 | (21) 138° |
| 3285.664 | A | 200 | 0.18 | 3.94 | 3 1/2-3 1/2 | 141° |
| 3230.559 | A | 400 | 0.18 | 4.00 | 3 1/2-4 1/2 | 146° |
| 3187.006 | A | 200 | 0.18 | 4.06 | 3 1/2-4 1/2 | 149° |
| 3178.125 | A | 200 | 0.18 | 4.07 | 3 1/2-4 1/2 | 151° |
| 4615.690 | A | 300 | 0.19 | 2.86 | 1/2-1 1/2 | a6F-13° |
| 4403.360 | A | 100 | 0.19 | 2.99 | 1/2 - 1/2 | (22) 20° |
| 4225.328 | A | 400 | 0.19 | 3.11 | 1/2-1 1/2 | 35° |
| 4041.675 | A | 200 | 0.19 | 3.24 | 1/2 - 1 | 53° |
| 3891.210 | A | 100 | 0.19 | 3.36 | 1/2 - 1 | 74° |
| 3799.542 | A | 300 | 0.19 | 3.44 | 1/2-1 1/2 | 85° |
| 3241.586 | A | 100 | 0.19 | 3.99 | 1/2-1 1/2 | 145° |
| 4938.100 | A | 100 | 0.25 | 2.75 | 1 1/2-2 1/2 | a6F-8° |
| 4577.690 | A | 250 | 0.25 | 2.94 | 1 1/2-2 1/2 | (23) 17° |
| 4552.659 | A | 150 | 0.25 | 2.96 | 1 1/2-1 1/2 | 18° |
| 4499.475 | A | 125 | 0.25 | 2.99 | 1 1/2 - 1/2 | 20° |
| 4360.730 | A | 150 | 0.25 | 3.08 | 1 1/2-2 1/2 | 32° |
| 4169.478 | A | 200 | 0.25 | 3.21 | 1 1/2-2 1/2 | a6F-47° |
| 4129.231 | A | 100 | 0.25 | 3.24 | 1 1/2-2 1/2 | (24) 52° |
| 4083.584 | A | 100 | 0.25 | 3.27 | 1 1/2-1 1/2 | 55° |
| *4064.576 | A | 300 | 0.25 | 3.28 | 1 1/2-1 1/2 | 59° |
| 3966.045 | A | 150 | 0.25 | 3.36 | 1 1/2 - 1/2 | 74° |
| 3788.125 | A | 400 | 0.25 | 3.51 | 1 1/2-2 1/2 | a6F-95° |
| 3762.588 | A | 200 | 0.25 | 3.53 | 1 1/2-2 1/2 | (25) 99° |
| 3712.764 | A | 200 | 0.25 | 3.57 | 1 1/2-2 1/2 | 104° |
| 3711.543 | A | 200 | 0.25 | 3.57 | 1 1/2-1 1/2 | 105° |
| 3650.188 | A | 200 | 0.25 | 3.63 | 1 1/2-2 1/2 | 111° |
| 3214.125 | A | 150 | 0.25 | 4.09 | 1 1/2-2 1/2 | 152° |
| 4844.208 | A | 300 | 0.28 | 2.82 | 4 1/2-3 1/2 | a8F-12° |
| 4669.650 | A | 500 | 0.28 | 2.92 | 4 1/2-4 1/2 | (26) 15° |
| 4646.684 | A | 200 | 0.28 | 2.93 | 4 1/2-4 1/2 | 16° |
| 4473.015 | A | 150 | 0.28 | 3.04 | 4 1/2-5 1/2 | 25° |
| 4452.727 | A | 250 | 0.28 | 3.05 | 4 1/2-3 1/2 | 27° |
| 4334.153 | A | 400 | 0.28 | 3.12 | 4 1/2-3 1/2 | a8F-36° |
| 4318.936 | A | 500 | 0.28 | 3.13 | 4 1/2-5 1/2 | (27) 38° |
| 4285.496 | A | 200 | 0.28 | 3.16 | 4 1/2-3 1/2 | 42° |
| 4279.678 | A | 200 | 0.28 | 3.16 | 4 1/2-4 1/2 | 43° |
| 4244.702 | A | 200 | 0.28 | 3.18 | 4 1/2-3 1/2 | 45° |
| 4109.405 | A | 150 | 0.28 | 3.28 | 4 1/2-4 1/2 | a8F-58° |
| 4066.737 | A | 200 | 0.28 | 3.31 | 4 1/2-4 1/2 | (28) 63° |
| 3987.428 | A | 80 | 0.28 | 3.37 | 4 1/2-4 1/2 | 77° |
| 3935.764 | A | 150 | 0.28 | 3.41 | 4 1/2-5 1/2 | 83° |
| 3857.912 | A | 100 | 0.28 | 3.48 | 4 1/2-5 1/2 | 91° |
| 3851.880 | A | 150 | 0.28 | 3.48 | 4 1/2-4 1/2 | a8F-92° |
| 3833.828 | A | 200 | 0.28 | 3.50 | 4 1/2-4 1/2 | (29) 94° |
| 3800.887 | A | 400 | 0.28 | 3.52 | 4 1/2-5 1/2 | 98° |
| 3735.980 | A | 500 | 0.28 | 3.58 | 4 1/2-4 1/2 | z8G° |
| 3692.221 | A | 150 | 0.28 | 3.62 | 4 1/2-5 1/2 | 109° |
| *3667.932§ | A | 150d | 0.28 | 3.64 | 4 1/2-5 1/2 | a8F-112° |
| 3627.014 | A | 400 | 0.28 | 3.68 | 4 1/2-5 1/2 | (30) 117° |
| 3609.491 | A | 1200 | 0.28 | 3.70 | 4 1/2-5 1/2 | z8G° |
| *3384.658 | A | 300 | 0.28 | 3.92 | 4 1/2-3 1/2 | 139° |
| 3368.568 | A | 200 | 0.28 | 3.94 | 4 1/2-3 1/2 | 141° |
| 3336.124 | A | 200 | 0.28 | 3.98 | 4 1/2-3 1/2 | a8F-144° |
| 3310.661 | A | 500 | 0.28 | 4.00 | 4 1/2-4 1/2 | (31) 146° |
| 3187.787 | A | 200 | 0.28 | 4.15 | 4 1/2-5 1/2 | 155° |
| 3169.875 | A | 250 | 0.28 | 4.17 | 4 1/2-5 1/2 | 157° |
| 4952.371 | A | 150 | 0.33 | 2.82 | 2 1/2-3 1/2 | a6F-12° |
| 4566.306 | A | 200 | 0.33 | 3.03 | 2 1/2-2 1/2 | (32) 24° |
| 4543.948 | A | 250 | 0.33 | 3.05 | 2 1/2-3 1/2 | 27° |
| 4420.526 | A | 200 | 0.33 | 3.12 | 2 1/2-3 1/2 | 36° |
| 4292.182 | A | 150 | 0.33 | 3.21 | 2 1/2-2 1/2 | 47° |
| *4064.576 | A | 300 | 0.33 | 3.37 | 2 1/2-2 1/2 | a6F-76° |
| 4035.110 | A | 250 | 0.33 | 3.39 | 2 1/2- | (33) 79° |
| 3976.430 | A | 200 | 0.33 | 3.44 | 2 1/2-1 1/2 | 85° |
| 3947.838 | A | 100 | 0.33 | 3.46 | 2 1/2-1 1/2 | 88° |
| 3881.383 | A | 100 | 0.33 | 3.51 | 2 1/2-3 1/2 | 97° |
| 3847.511 | A | 150 | 0.33 | 3.54 | 2 1/2-3 1/2 | a6F-100° |
| 3838.941 | A | 200 | 0.33 | 3.55 | 2 1/2-2 1/2 | (34) 102° |
| 3764.370 | A | 300 | 0.33 | 3.61 | 2 1/2-3 1/2 | 107° |
| 3755.276 | A | 200 | 0.33 | 3.62 | 2 1/2- | 108° |
| *3743.868 | A | 500 | 0.33 | 3.63 | 2 1/2-2 1/2 | 111° |
| *3707.167§ | A | 100d | 0.33 | 3.66 | 2 1/2-1 1/2 | a6F-116° |
| 3645.387 | A | 200 | 0.33 | 3.72 | 2 1/2-3 1/2 | (35) 123° |
| 3369.455 | A | 200 | 0.33 | 3.99 | 2 1/2-1 1/2 | 145° |
| 3305.185 | A | 200 | 0.33 | 4.07 | 2 1/2-2 1/2 | 150° |
| 4854.365 | A | 150 | 0.38 | 2.92 | 5 1/2-4 1/2 | a8F-15° |
| 4829.568 | A | 250 | 0.38 | 2.93 | 5 1/2-4 1/2 | (36) 16° |
| 4643.235 | A | 500 | 0.38 | 3.04 | 5 1/2-5 1/2 | 25° |
| 4593.544 | A | 150 | 0.38 | 3.06 | 5 1/2-5 1/2 | 28° |
| 4434.323 | A | 400 | 0.38 | 3.16 | 5 1/2-4 1/2 | 43° |
| 4421.138 | A | 200 | 0.38 | 3.17 | 5 1/2-6 1/2 | a8F-44° |
| 4388.031 | A | 150d | 0.38 | 3.20 | 5 1/2-6 1/2 | (37) 46° |
| 4347.801 | A | 400 | 0.38 | 3.22 | 5 1/2-4 1/2 | 49° |
| 4262.677 | A | 300 | 0.38 | 3.27 | 5 1/2-5 1/2 | 56° |
| 4256.393 | A | 400 | 0.38 | 3.28 | 5 1/2-6 1/2 | 57° |
| 4206.128 | A | 100 | 0.38 | 3.31 | 5 1/2-4 1/2 | a8F-63° |
| 3983.138 | A | 200 | 0.38 | 3.48 | 5 1/2-5 1/2 | (38) 91° |
| 3923.397 | A | 800 | 0.38 | 3.52 | 5 1/2-5 1/2 | 98° |
| 3780.927 | A | 150 | 0.38 | 3.64 | 5 1/2-5 1/2 | 112° |
| 3718.877 | A | 500 | 0.38 | 3.70 | 5 1/2-5 1/2 | z8G° |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Sm II continued | | | | | | |
| 3662.905 | A | 200 | 0.38 | 3.75 | 5 1/2-4 1/2 | a8F-125° |
| 3592.603 | A | 1500 | 0.38 | 3.81 | 5 1/2-6 1/2 | (39) z8G° |
| 3402.464 | A | 500 | 0.38 | 4.00 | 5 1/2-4 1/2 | 146° |
| *3384.658 | A | 300 | 0.38 | 4.02 | 5 1/2-5 1/2 | 147° |
| 3354.185 | A | 150 | 0.38 | 4.06 | 5 1/2-4 1/2 | 149° |
| 3344.353 | A | 200 | 0.38 | 4.07 | 5 1/2-4 1/2 | 151° |
| 3321.179 | A | 800 | 0.38 | 4.09 | 5 1/2-5 1/2 | a8F-153° |
| 3272.807 | A | 200 | 0.38 | 4.15 | 5 1/2-5 1/2 | (40) 155° |
| 3253.943 | A | 200 | 0.38 | 4.17 | 5 1/2-5 1/2 | 157° |
| 3215.262 | A | 200 | 0.38 | 4.22 | 5 1/2-6 1/2 | 162° |
| 3196.182 | A | 150 | 0.38 | 4.24 | 5 1/2-5 1/2 | 164° |
| *3187.216 | A | 300 | 0.38 | 4.25 | 5 1/2-5 1/2 | 166° |
| 4961.936 | A | 250 | 0.43 | 2.92 | 3 1/2-4 1/2 | a6F-15° |
| 4816.012 | A | 100 | 0.43 | 2.99 | 3 1/2-4 1/2 | (41) 21° |
| 4717.718 | A | 150 | 0.43 | 3.05 | 3 1/2-3 1/2 | 27° |
| 4523.912 | A | 250 | 0.43 | 3.16 | 3 1/2-4 1/2 | 43° |
| 4433.885 | A | 300 | 0.43 | 3.22 | 3 1/2-4 1/2 | 49° |
| 4373.462 | A | 100 | 0.43 | 3.25 | 3 1/2-2 1/2 | a6F-54° |
| 4286.640 | A | 100 | 0.43 | 3.31 | 3 1/2-4 1/2 | (42) 63° |
| 4234.573 | A | 200 | 0.43 | 3.35 | 3 1/2-3 1/2 | 71° |
| 4203.051 | A | 125 | 0.43 | 3.37 | 3 1/2-2 1/2 | 76° |
| 4068.334 | A | 100 | 0.43 | 3.47 | 3 1/2-3 1/2 | z8G° |
| 3971.397 | A | 300 | 0.43 | 3.54 | 3 1/2-2 1/2 | a6F-100° |
| 3843.500 | A | 200 | 0.43 | 3.64 | 3 1/2-3 1/2 | (43) 113° |
| 3831.501 | A | 400 | 0.43 | 3.65 | 3 1/2-4 1/2 | 114° |
| 3800.370 | A | 100 | 0.43 | 3.68 | 3 1/2-4 1/2 | 118° |
| *3774.294 | A | 150 | 0.43 | 3.70 | 3 1/2-2 1/2 | 122° |
| *3756.411§ | A | 600 | 0.43 | 3.72 | 3 1/2-3 1/2 | a6F-123° |
| 3535.653 | A | 150 | 0.43 | 3.92 | 3 1/2-3 1/2 | (44) 139° |
| 3396.187 | A | 250 | 0.43 | 4.07 | 3 1/2-2 1/2 | 150° |
| 4834.618 | A | 100 | 0.48 | 3.04 | 6 1/2-5 1/2 | a8F-25° |
| 4595.291 | A | 250 | 0.48 | 3.17 | 6 1/2-6 1/2 | (45) 44° |
| 4537.952 | A | 200 | 0.48 | 3.20 | 6 1/2-6 1/2 | 46° |
| 4424.339 | A | 600 | 0.48 | 3.27 | 6 1/2-5 1/2 | 56° |
| 4362.040 | A | 300 | 0.48 | 3.31 | 6 1/2-5 1/2 | 64° |
| 4350.465 | A | 300d | 0.48 | 3.32 | 6 1/2-7 1/2 | a8F-65° |
| 4280.789 | A | 400 | 0.48 | 3.37 | 6 1/2-7 1/2 | (46) 75° |
| 4123.956 | A | 150 | 0.48 | 3.48 | 6 1/2-5 1/2 | 91° |
| 3885.286 | A | 1000 | 0.48 | 3.66 | 6 1/2-6 1/2 | 115° |
| 3767.358 | A | 200 | 0.48 | 3.76 | 6 1/2-6 1/2 | 126° |
| 3706.752 | A | 300 | 0.48 | 3.81 | 6 1/2-6 1/2 | a8F-z8G° |
| 3649.527 | A | 500 | 0.48 | 3.76 | 6 1/2-6 1/2 | (47) 126° |
| 3604.285 | A | 800 | 0.48 | 3.91 | 6 1/2-7 1/2 | 128° |
| 3568.271 | A | 1500 | 0.48 | 3.94 | 6 1/2-7 1/2 | z8G° |
| 3418.514 | A | 500 | 0.48 | 4.09 | 6 1/2-5 1/2 | 153° |
| 3347.298 | A | 150 | 0.48 | 4.17 | 6 1/2-5 1/2 | a8F-157° |
| *3306.388 | A | 500 | 0.48 | 4.22 | 6 1/2-6 1/2 | (48) 162° |
| *3301.678 | A | 100 | 0.48 | 4.22 | 6 1/2-6 1/2 | 183° |
| 3286.229 | A | 300 | 0.48 | 4.24 | 6 1/2-5 1/2 | 164° |
| 3276.747 | A | 200 | 0.48 | 4.25 | 6 1/2-5 1/2 | 166° |
| 3239.657 | A | 300 | 0.48 | 4.29 | 6 1/2-6 1/2 | 168° |
| 4948.627 | A | 150 | 0.54 | 3.04 | 4 1/2-5 1/2 | a6F-25° |
| 4713.057 | A | 150 | 0.54 | 3.16 | 4 1/2-4 1/2 | (49) 43° |
| 4615.441 | A | 150 | 0.54 | 3.22 | 4 1/2-4 1/2 | 49° |
| 4519.633 | A | 200 | 0.54 | 3.27 | 4 1/2-5 1/2 | 56° |
| 4454.629 | A | 200 | 0.54 | 3.31 | 4 1/2-5 1/2 | 64° |
| *4220.659 | A | 200 | 0.54 | 3.47 | 4 1/2-3 1/2 | a6F-z8G° |
| 4188.128 | A | 200 | 0.54 | 3.49 | 4 1/2-3 1/2 | (50) 93° |
| *4178.019 | A | 100d | 0.54 | 3.50 | 4 1/2-4 1/2 | 94° |
| *4155.217 | A | 100 | 0.54 | 3.51 | 4 1/2-3 1/2 | 97° |
| 4107.387 | A | 200 | 0.54 | 3.55 | 4 1/2-4 1/2 | 101° |
| 4075.845 | A | 250 | 0.54 | 3.57 | 4 1/2-4 1/2 | a6F-103° |
| 3979.200 | A | 150 | 0.54 | 3.64 | 4 1/2-3 1/2 | (51) 113° |
| 3826.202 | A | 400 | 0.54 | 3.77 | 4 1/2-4 1/2 | 127° |
| *3760.694 | A | 500 | 0.54 | 3.82 | 4 1/2-4 1/2 | 173° |
| 3650.998 | A | 150 | 0.54 | 3.92 | 4 1/2-4 1/2 | 138° |
| 3389.325 | A | 200 | 0.54 | 4.18 | 4 1/2-3 1/2 | a6F-159° |
| 3371.209 | A | 150 | 0.54 | 4.20 | 4 1/2-3 1/2 | (52) 161° |
| 3333.635 | A | 150 | 0.54 | 4.24 | 4 1/2-4 1/2 | 165° |
| 3228.784 | A | 200 | 0.54 | 4.36 | 4 1/2- | 171° |
| 4913.248 | A | 150 | 0.66 | 3.17 | 5 1/2-6 1/2 | a6F-44° |
| 4847.760 | A | 200 | 0.66 | 3.20 | 5 1/2-6 1/2 | (53) 46° |
| 4718.329 | A | 150 | 0.66 | 3.27 | 5 1/2-5 1/2 | 56° |
| 4467.342 | A | 500 | 0.66 | 3.42 | 5 1/2-6 1/2 | 84° |
| 4378.236 | A | 150 | 0.66 | 3.48 | 5 1/2-5 1/2 | 91° |
| 4236.745 | A | 250 | 0.66 | 3.57 | 5 1/2-4 1/2 | 103° |
| 4153.332 | A | 100 | 0.66 | 3.63 | 5 1/2-4 1/2 | a6F-110° |
| 4118.551 | A | 400 | 0.66 | 3.65 | 5 1/2-4 1/2 | (54) 114° |
| 4082.600 | A | 100d | 0.66 | 3.68 | 5 1/2-4 1/2 | 118° |
| 3728.469 | A | 400 | 0.66 | 3.97 | 5 1/2-6 1/2 | 143° |
| 3467.874 | A | 100 | 0.66 | 4.22 | 5 1/2-6 1/2 | 162° |
| 3440.502 | A | 100 | 0.66 | 4.24 | 5 1/2-4 1/2 | 165° |
| 7082.37 | A | 400d | 0.88 | 2.62 | 1 1/2 - 1/2 | a8H-1° |
| 6862.82 | A | 150d | 0.88 | 2.68 | 1 1/2-1 1/2 | (55) 5° |
| 6790.00 | A | 200d | 0.93 | 2.75 | 2 1/2-2 1/2 | a8H-8° |
| 5116.700 | A | 100d | 0.93 | 3.34 | 2 1/2-1 1/2 | (56) z8G° |
| *7039.22 | A | 600d | 0.99 | 2.75 | 3 1/2-2 1/2 | a8H-8° (57) |
| 7042.24 | A | 500d | 1.07 | 2.82 | 4 1/2-3 1/2 | a8H-13° |
| 6856.03 | A | 400d | 1.07 | 2.87 | 4 1/2-3 1/2 | (58) 14° |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Sm II** continued | | | | | | |
| 7020.44 | A | 800d | 1.16 | 2.92 | 5½-4½ | $a^8H$-15° |
| 6731.84 | A | 500d | 1.16 | 2.99 | 5½-4½ | (59) 21° |
| 6472.34 | A | 300d | 1.37 | 3.28 | 7½-6½ | $a^8H$-57° (60) |
| 8033.03 | A | 250d | 1.41 | 2.94 | 3½-2½ | $a^8G$-17° |
| *7039.28 | A | 600d | 1.41 | 3.16 | 3½-4½ | (61) 43° |
| 6569.31 | A | 1000d | 1.49 | 3.37 | 8½-7½ | $a^8H$-75° (63) |
| 8035.13 | A | 400 | 1.51 | 3.05 | 3½-3½ | $b^8F$-27° (63) |
| 8510.90 | A | 200d | 1.59 | 3.04 | 4½-5½ | b F-25° |
| 8348.68 | A | 150d | 1.59 | 3.06 | 4½-5½ | (64) 28° |
| 7837.37 | A | 400 | 1.59 | 3.16 | 4½-4½ | 43° |
| 7928.14 | A | 800 | 1.60 | 3.16 | 3½-4½ | $a^8P$-43° (65) |
| 8485.99 | A | 400d | 1.68 | 3.13 | 6½-5½ | $a^8G$-38° (66) |
| 8048.70 | A | 400d | 1.74 | 3.27 | 6½-5½ | $b^8F$-56° |
| 8026.32 | A | 500d | 1.74 | 3.28 | 6½-6½ | (67) 57° |
| 8062.46 | A | 800 | 1.74 | 3.27 | 4½-5½ | $a^8P$-56° (68) |
| 8305.79 | A | 500d | 1.79 | 3.28 | 7½-6½ | $a^8G$-57° |
| 7835.08 | A | 400d | 1.79 | 3.37 | 7½-7½ | (69) 75° |

Strongest Unclassified Lines of Sm II

| | | | |
|---|---|---|---|
| 4515.094 | A | 150 | III |
| 4478.657 | A | 125 | IV |
| 4444.259 | A | 150 | IV |
| 4352.101 | A | 200 | IV |
| 4281.009 | A | 100 | III |
| 3962.995 | A | 200d | III |
| 3959.527 | A | 100 | III |
| 3903.417 | A | 500 | III |
| 3875.193 | A | 100 | III |
| 3854.209 | A | 300 | III |
| 3848.779 | A | 200d | IV |
| 3797.730 | A | 600 | III |
| 3780.763 | A | 200 | III |
| 3778.136 | A | 400 | III |
| 3767.755 | A | 150 | III |
| 3758.968 | A | 200 | III |
| 3757.529 | A | 300 | III |
| 3741.288 | A | 300 | III |
| 3739.117 | A | 300 | III |
| 3737.141 | A | 200 | III |
| 3721.847 | A | 400 | III |
| 3712.109 | A | 100 | III |
| 3706.979 | A | 200 | IV |
| 3700.922 | A | 150 | IV |
| 3677.793 | A | 200 | III |
| 3670.677 | A | 150 | III |
| 3662.693 | A | 200 | IV |
| 3656.221 | A | 200 | IV |
| 3838.767 | A | 400 | IV |
| 3831.126 | A | 400 | III |
| 3580.941 | A | 200 | III |
| 3566.838 | A | 150 | III |
| 3559.101 | A | 300d | III |
| 3418.151 | A | 300 | IV |
| 3408.676 | A | 400 | IV |
| 3365.863 | A | 400 | III |
| 3350.875 | A | 200 | IV |
| 3348.683 | A | 200 | IV |
| 3343.494 | A | 200 | IV |
| 3325.258 | A | 300 | IV |
| 3316.579 | A | 300 | IV |
| 3307.017 | A | 500 | IV |
| 3298.104 | A | 500 | III |
| 3273.483 | A | 500 | III |
| 3253.401 | A | 300 | IV |
| 3236.638 | A | 500 | IV |
| 3218.614 | A | 300 | IV |
| 3211.734 | A | 400 | IV |
| 3193.014 | A | 300 | IV |
| 3183.916 | A | 400 | IV |
| 3152.525 | A | 300 | IV |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Eu I** I P 5.64 Anal A List D Apr 1943 | | | | | | |
| 4594.03// | A | 10000R | 0.00 | 2.69 | 3½-4½ | $a^8S°$-$y^8P$ |
| 4627.23 | A | 8000R | 0.00 | 2.67 | 3½-3½ | (1) |
| 4661.88 | A | 7000R | 0.00 | 2.65 | 3½-2½ | |
| **Eu II** I P 11.21 Anal B List C May 1943 | | | | | | |
| 3819.67// | A | 6000R | 0.00 | 3.23 | 4-5 | $a^9S°$-$z^9P$ |
| 4129.73 | A | 5000r | 0.00 | 2.99 | 4-4 | (1) |
| 4205.05 | A | 6000r | 0.00 | 2.93 | 4-3 | |
| 3724.94 | A | 4000 | 0.00 | 3.31 | 4-4 | $a^9G°$-$z^7P$ |
| 3688.42 | A | 1500 | 0.00 | 3.35 | 4-3 | (2) |
| 2991.33 | A | 300 | 0.00 | 4.13 | 4-5 | $a^9S°$-$z^9D$ |
| 3077.358 | A | 200 | 0.00 | 4.01 | 4-4 | (3) |
| 3173.607 | A | 100 | 0.00 | 3.89 | 4-3 | |
| 4435.58 | A | 3000 | 0.21 | 2.99 | 3-4 | $a^7S°$-$z^9P$ |
| 4533.59 | A | 2000 | 0.21 | 2.93 | 3-3 | (4) |
| 3971.98 | A | 4000r | 0.21 | 3.31 | 3-4 | $a^7S°$-$z^7P$ |
| 3930.50 | A | 4000r | 0.21 | 3.35 | 3-3 | (5) |
| 3907.10 | A | 3000r | 0.21 | 3.36 | 3-2 | |
| 3097.45 | A | 100 | 0.21 | 4.19 | 3-2 | $a^7S°$-103 (6) |
| 3054.94 | A | 600 | 0.21 | 4.25 | 3-3 | $a^7S°$-$y^9P$† (7) |
| 6645.11 | A | 8000 | 1.37 | 3.23 | 6-5 | $a^9D°$-$z^9P$ |
| 7370.33 | A | 2500 | 1.31 | 2.99 | 5-4 | (8) |
| 7436.57 | A | 1500 | 1.27 | 2.93 | 4-3 | |
| 6437.64 | A | 4000 | 1.31 | 3.23 | 5-5 | |
| 7194.81 | A | 1500 | 1.27 | 2.99 | 4-4 | |
| 7301.17 | A | 2500 | 1.24 | 2.93 | 3-3 | |
| 6303.41 | A | 2000 | 1.27 | 3.23 | 4-5 | |
| 7077.10 | A | 3000 | 1.24 | 2.99 | 3-4 | |
| 7217.55 | A | 1500 | 1.23 | 2.93 | 2-3 | |
| 6173.05 | A | 2000 | 1.31 | 3.31 | 5-4 | $a^9D°$-$z^7P$† |
| 6049.51 | A | 2000 | 1.27 | 3.31 | 4-4 | (9) |
| 5872.98 | A | 500 | 1.24 | 3.35 | 3-3 | |
| 5966.07 | A | 1200 | 1.24 | 3.31 | 3-4 | |
| 5818.74 | A | 1000 | 1.23 | 3.35 | 2-3 | |
| *3917.29 § | A | 60 | 1.37 | 4.53 | 6-5 | $a^9D°$-$y^9P$† |
| 4017.58 | A | 100 | 1.31 | 4.39 | 5-4 | (10) |
| 4151.52 | A | 30 | 1.27 | 4.25 | 4-3 | |
| *3964.90 § | A | 60 | 1.27 | 4.39 | 4-4 | |
| 4112.04 | A | 30 | 1.24 | 4.25 | 3-3 | |
| 3928.87 | A | 15 | 1.24 | 4.39 | 3-4 | |
| 4085.38 | A | 40 | 1.23 | 4.25 | 2-3 | |
| 3741.31 | A | 400 | 1.37 | 4.67 | 6-5 | $a^9D°$-$x^9P$† |
| 3761.13 | A | 300 | 1.31 | 4.60 | 5-4 | (11) |
| 3799.009 | A | 100 | 1.27 | 4.53 | 4-3 | |
| 3674.634 | A | 50 | 1.31 | 4.67 | 5-5 | |
| 3714.904 | A | 100 | 1.27 | 4.60 | 4-4 | |
| 3765.93 | A | 150 | 1.24 | 4.53 | 3-3 | |
| 3683.267 | A | 40 | 1.24 | 4.60 | 3-4 | |
| 3743.556 | A | 100 | 1.23 | 4.53 | 2-3 | |
| 3713.45 | A | 125 | 1.24 | 4.57 | 3-2 | $a^9D°$-115 (12) |
| 3508.852 | A | 20 | 1.31 | 4.83 | 5-4 | $a^9D°$-$y^7P$ |
| 3508.731 | A | 10 | 1.27 | 4.79 | 4-3 | (13) |
| 3646.75 | A | 35 | 1.23 | 4.61 | 3-2 | |
| 3440.999 | A | 80 | 1.24 | 4.83 | 3-4 | |
| 3461.38 | A | 80 | 1.23 | 4.79 | 2-3 | |
| 3710.870 | A | 80 | 1.31 | 4.64 | 5-6 | $a^9D°$-118† (14) |
| 3811.57 | A | 100 | 1.27 | 4.69 | 4-4 | $a^9D°$-121† (15) |
| 3603.20 | A | 200 | 1.27 | 4.70 | 4-4 | $a^9D°$-122† (16) |
| 3391.989 | A | 100 | 1.24 | 4.88 | 3-4 | $a^9D°$-$x^7P$† |
| 3543.152 | A | 80 | 1.23 | 4.71 | 2-3 | (17) |
| 3623.54 | A | 150 | 1.37 | 4.78 | 6-7 | $a^9D°$-125 (18) |
| 3553.516 | A | 100 | 1.31 | 4.79 | 5-5 | $a^9D°$-126† (19) |
| 3369.055 | A | 200 | 1.31 | 4.98 | 5-6 | $a^9D°$-131 |
| 3435.023 | A | 80 | 1.37 | 4.98 | 6-6 | (20) |
| 3321.857 | A | 100 | 1.37 | 5.09 | 6-5 | $a^9D°$-134 (21) |
| 4355.09 | A | 300 | 3.23 | 6.06 | 5-4 | $z^9P$-$e^9S°$ |
| 4011.89 | A | 100 | 2.99 | 6.06 | 4-4 | (22) |
| 3943.08 | A | 40 | 2.93 | 6.06 | 3-4 | |
| 3380.25 | A | 100 | 2.99 | 8.84 | 4-4 | $z^9P$-1° (23) |
| 3531.09 | A | 100 | 3.23 | 8.74 | 5-6 | $z^9P$-$e^9D°$† |
| 3301.95 | A | 150 | 2.99 | 6.73 | 4-5 | (24) |
| 3268.39 | A | 200 | 2.93 | 6.71 | 3-4 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Eu II** continued | | | | | | |
| 3531.151 | A | 60 | 3.23 | 6.73 | 5-5 | $z^9P$-$e^9D°$† |
| 3313.33 | A | 400 | 2.99 | 6.71 | 4-4 | (24) |
| 3272.77 | A | 400 | 2.93 | 6.71 | 3-3 | cont |
| 3319.89 | A | 80 | 2.99 | 6.71 | 4-3 | |
| 3277.78 | A | 600 | 2.93 | 6.70 | 3-3 | |
| 3308.02 | A | 200 | 2.99 | 6.73 | 4-5 | $z^9P$-$e^7D°$† (25) |
| 4485.15 | A | 100 | 3.31 | 6.06 | 4-4 | $z^7P$-$e^9S°$† (26) |
| 4383.17 | A | 200 | 3.31 | 6.13 | 4-3 | $z^7P$-$e^7S°$† |
| 4464.97 | A | 200 | 3.36 | 6.13 | 2-3 | (27) |
| 3616.152 | A | 100 | 3.31 | 6.73 | 4-5 | $z^7P$-$e^9D°$† |
| 3673.19 | A | 80 | 3.35 | 6.71 | 3-3 | (28) |
| 3678.259 | A | 100 | 3.36 | 6.72 | 2-1 | $z^7P$-$e^7D°$† (29) |
| 3396.58 | A | 200 | 3.31 | 6.95 | 4-5 | $z^7P$-$f^7D°$† (30) |

Strongest Unclassified Lines of Eu II

| | | | |
|---|---|---|---|
| 3861.18 | A | 80 | V |
| 3815.495 | A | 80 | V |
| 3738.08 | A | 80 | V |
| 3717.69 | A | 80 | V |
| 3687.78 | A | 80 | V |
| 3679.500 | A | 80 | V |
| 3390.783 | A | 80 | V |
| 3130.73 | A | 80 | V |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Gd I** I P 6.16 Anal C List D June 1943 | | | | | | |
| 7168.37 | A | 3000 | 0.21 | 1.93 | 6-5 | $a^9D°$-$z^9P$† |
| 7733.50 | A | 1500 | 0.12 | 1.72 | 5-4 | (1) |
| 6730.73 | A | 1500 | 0.13 | 1.96 | 5-6 | $a^9D°$-$z^{11}F$† |
| 6828.35 | A | 1500 | 0.07 | 1.87 | 4-5 | (2) |
| 6916.57 | A | 2000 | 0.03 | 1.81 | 3-4 | |
| 6991.93 | A | 1500 | 0.00 | 1.77 | 2-3 | |
| 5856.22 | A | 4000 | 0.13 | 2.23 | 5-6 | $a^9D°$-$z^9F$† |
| 5696.22 | A | 8000 | 0.07 | 2.23 | 4-5 | (3) |
| 5643.24 | A | 6000 | 0.03 | 2.21 | 3-4 | |
| 5617.91 | A | 4000 | 0.00 | 2.20 | 2-3 | |
| 6114.07 | A | 2000 | 0.21 | 2.23 | 6-6 | |
| 5851.63 | A | 5000 | 0.13 | 2.23 | 5-5 | |
| 5632.25 | A | 2500 | 0.00 | 2.19 | 2-2 | |
| 5791.38 | A | 4000 | 0.07 | 2.20 | 4-3 | |
| 5701.35 | A | 2500 | 0.03 | 2.19 | 3-2 | |
| 4235.850// | A | 3000 | 0.21 | 3.13 | 6-7 | $a^9D°$-$y^9F$† |
| 4346.458 | A | 1500 | 0.12 | 2.96 | 5-5 | (4) |
| 4313.845 | A | 2000 | 0.03 | 2.89 | 3-3 | |
| 4308.340 | A | 1500 | 0.00 | 2.87 | 2-2 | |
| 4175.538 | A | 2000 | 0.21 | 3.17 | 6-6 | $a^9D°$-$y^9D$† |
| 4053.643 | A | 2500 | 0.13 | 3.17 | 5-6 | (5) |
| 4078.700 | A | 3000 | 0.07 | 3.09 | 4-5 | |
| 4058.219 | A | 2500 | 0.03 | 3.07 | 3-4 | |
| 5015.04 | A | 1500 | 1.05 | 3.51 | 8-9 | $a^{11}F°$-$z^{11}G$ |
| 5103.45 | A | 2000 | 0.98 | 3.40 | 7-8 | (6) |
| 5155.845 | A | 1500 | 0.92 | 3.32 | 6-7 | |
| 5197.768 | A | 1200 | 0.88 | 3.25 | 5-8 | |
| 5219.40 | A | 2000 | 0.84 | 3.20 | 4-5 | |
| 5255.805 | A | 1500 | 0.81 | 3.16 | 3-4 | |
| 5251.180 | A | 2000 | 1.05 | 3.40 | 8-8 | |
| 5283.076 | A | 3000 | 0.98 | 3.33 | 7-7 | |
| 5301.87 | A | 4000 | 0.92 | 3.25 | 6-6 | |
| 5307.30 | A | 4000 | 0.88 | 3.20 | 5-5 | |
| 5331.777 | A | 4000 | 0.84 | 3.16 | 4-4 | |
| 5302.76 | A | 3000 | 0.81 | 3.14 | 3-3 | |
| 5321.496 | A | 2000 | 0.79 | 3.11 | 2-2 | |
| 5348.67 | A | 2000 | 0.79 | 3.09 | 2-1 | |
| 5350.38 | A | 4000 | 1.54 | 3.85 | 7-8 | $a^9F°$-$z^9G$† |
| 5353.36 | A | 3000 | 1.46 | 3.77 | 6-7 | (7) |
| 5343.00 | A | 3000 | 1.39 | 3.70 | 5-6 | |
| 5333.30 | A | 2000 | 1.34 | 3.66 | 4-5 | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Gd II** I P ? Anal C List B Sept 1943 | | | | | | |
| 3783.00 | A | 50 | 0.24 | 3.53 | 6½-5½ | $a^{10}D°$-$z^{10}P$ |
| 3953.00 | A | 300 | 0.14 | 3.27 | 5½-4½ | (1) |
| 3993.313 | A | 200 | 0.08 | 3.17 | 4½-3½ | |
| 3656.152 | A | 1500 | 0.14 | 3.53 | 5½-5½ | |
| 3871.54 | A | 80 | 0.08 | 3.27 | 4½-4½ | |
| 3934.824 | A | 300? | 0.03 | 3.17 | 3½-3½ | |
| 3587.186 | A | 40 | 0.08 | 3.53 | 4½-5½ | |
| 3816.64 | A | 250 | 0.03 | 3.27 | 3½-4½ | |
| 3894.696 | A | 2000 | 0.00 | 3.17 | 2½-3½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Gd II** continued | | | | | | |
| 3422.466 | A | 10000 | 0.24 | 3.84 | 6½-7½ | $a^{10}D^o-z^{10}F$ (2) |
| 3545.797 | A | 3000 | 0.14 | 3.62 | 5½-6½ | |
| 3671.20 | A | 1500 | 0.08 | 3.44 | 4½-5½ | |
| 3716.36 | A | 1000 | 0.03 | 3.35 | 3½-4½ | |
| 3759.00 | A | 300 | 0.00 | 3.28 | 2½-3½ | |
| 3846.19 | A | 3000 | 0.24 | 3.62 | 6½-6½ | |
| 3743.47 | A | 2000 | 0.14 | 3.44 | 5½-5½ | |
| 3768.39 | A | 2000 | 0.08 | 3.35 | 4½-4½ | |
| 3796.37 | A | 2500 | 0.03 | 3.28 | 3½-3½ | |
| 3813.97 | A | 2000 | 0.00 | 3.24 | 2½-2½ | |
| 3855.56 | A | 200 | 0.24 | 3.44 | 6½-5½ | |
| 3844.579 | A | 500 | 0.14 | 3.35 | 5½-4½ | |
| 3850.69 | A | 800 | 0.08 | 3.28 | 4½-3½ | |
| 3852.45 | A | 1000 | 0.03 | 3.24 | 3½-2½ | |
| 3850.97 | A | 1200 | 0.00 | 3.20 | 2½-1½ | |
| 3968.261 | A | 60 | 0.14 | 3.25 | 5½-4½ | $a^{10}D^o-2$ (3) |
| 3887.157 | A | 40 | 0.08 | 3.25 | 4½-4½ | |
| 3831.80 | A | 100 | 0.03 | 3.25 | 3½-4½ | |
| 3367.093 | A | 100 | 0.14 | 3.81 | 5½-4½ | $a^{10}D^o-z^8P$ (4) |
| 3654.62 | A | 2000d | 0.08 | 3.46 | 4½-3½ | |
| 3697.73 | A | 1000 | 0.03 | 3.37 | 3½-2½ | |
| 3308.517 | A | 80 | 0.08 | 3.81 | 4½-4½ | |
| 3605.665 | A | 100 | 0.03 | 3.46 | 3½-3½ | |
| 3662.26 | A | 800 | 0.00 | 3.37 | 2½-2½ | |
| 3268.335 | A | 400 | 0.03 | 3.81 | 3½-4½ | |
| 3571.933 | A | 300 | 0.00 | 3.46 | 2½-3½ | |
| 3732.45 | A | 100 | 0.08 | 3.38 | 4½-3½ | $a^{10}D^o-3$ (5) |
| 3524.198 | A | 1000 | 0.03 | 3.53 | 3½-2½ | $a^{10}D^o-4$ (6) |
| 3491.954 | A | 2000 | 0.00 | 3.53 | 2½-2½ | |
| 3439.990 | A | 8000 | 0.24 | 3.83 | 6½-8½ | $a^{10}D^o-z^{10}D$ (7) |
| 3454.145 | A | 1500 | 0.14 | 3.72 | 5½-5½ | |
| 3518.632 | A | 30 | 0.08 | 3.59 | 4½-4½ | |
| 3449.616 | A | 800 | 0.03 | 3.61 | 3½-3½ | |
| *3423.92 § | A | 1500 | 0.00 | 3.60 | 2½-2½ | |
| 3549.365 | A | 3000 | 0.24 | 3.72 | 6½-5½ | |
| 3584.962 | A | 3000 | 0.14 | 3.59 | 5½-4½ | |
| 3494.404 | A | 3000 | 0.08 | 3.61 | 4½-3½ | |
| 3454.904 | A | 2000 | 0.03 | 3.60 | 3½-2½ | |
| 3350.474 | A | 10000 | 0.14 | 3.83 | 5½-8½ | |
| 3392.530 | A | 2000 | 0.08 | 3.72 | 4½-5½ | |
| 3473.819 | A | 2000 | 0.03 | 3.59 | 3½-4½ | |
| 3418.733 | A | 2000 | 0.00 | 3.61 | 2½-3½ | |
| 3462.997 | A | 200 | 0.14 | 3.71 | 5½-4½ | $a^{10}D^o-z^8D$ † (8) |
| 3365.591 | A | 400 | 0.03 | 3.70 | 3½-2½ | |
| 3345.985 | A | 2000 | 0.00 | 3.69 | 2½-1½ | |
| 3422.751 | A | 500 | 0.14 | 3.75 | 5½-5½ | |
| 3401.067 | A | 300 | 0.08 | 3.71 | 4½-4½ | |
| 3360.711 | A | 1000 | 0.03 | 3.70 | 3½-3½ | |
| 3336.180 | A | 2500 | 0.00 | 3.70 | 2½-3½ | |
| 3362.333 | A | 10000 | 0.08 | 3.75 | 4½-5½ | |
| 3358.820 | A | 8000 | 0.03 | 3.71 | 3½-4½ | |
| 3331.383 | A | 4000 | 0.00 | 3.70 | 2½-3½ | |
| 3196.532 | A | 150 | 0.08 | 3.94 | 4½-3½ | $a^{10}D^o-z^6P$ † (9) |
| 3052.511 | A | 50 | 0.00 | 4.04 | 2½-2½ | |
| 3133.094 | A | 150 | 0.00 | 3.94 | 2½-3½ | |
| 3161.369 | A | 250Q | 0.24 | 4.14 | 6½-6½ | $a^{10}D^o-z^8F$ (10) |
| 3145.00 | A | 2500 | 0.14 | 4.07 | 5½-5½ | |
| 3119.08 | A | 60 | 0.08 | 4.03 | 4½-4½ | |
| 3101.911 | A | 250d | 0.03 | 4.01 | 3½-3½ | |
| 3098.899 | A | 300 | 0.00 | 3.98 | 2½-2½ | |
| 3233.740 | A | 1000? | 0.24 | 4.07 | 6½-5½ | |
| 3171.09 | A | 125 | 0.14 | 4.03 | 5½-4½ | |
| 3138.094 | A | 80 | 0.08 | 4.01 | 4½-3½ | |
| 3124.250 | A | 150 | 0.03 | 3.98 | 3½-2½ | |
| 3119.336 | A | 25 | 0.00 | 3.98 | 2½-1½ | |
| 3085.621 | A | 60 | 0.14 | 4.14 | 5½-6½ | |
| 3093.846 | A | 25 | 0.08 | 4.07 | 4½-5½ | |
| 3083.350 | A | 200 | 0.03 | 4.03 | 3½-4½ | |
| 3076.925 | A | 2000 | 0.00 | 4.01 | 2½-3½ | |
| *3160.69 § | A | 200 | 0.08 | 3.98 | 4½-3½ | $a^{10}D^o-y$ P † (11) |
| 3135.034 | A | 200 | 0.03 | 3.97 | 3½-2½ | |
| 3156.532 | A | 2000 | 0.08 | 3.99 | 4½-4½ | |
| 3123.989 | A | 1000 | 0.03 | 3.98 | 3½-3½ | |
| 3119.941 | A | 800 | 0.03 | 3.99 | 3½-4½ | |
| 3098.644 | A | 800 | 0.00 | 3.98 | 2½-3½ | |
| 3100.504 | A | 10000 | 0.24 | 4.22 | 6½-5½ | $a^{10}D^o-y^{10}P$ (12) |
| 3081.993 | A | 8000 | 0.14 | 4.15 | 5½-4½ | |
| 3088.643 | A | 4000 | 0.08 | 4.10 | 4½-3½ | |
| 3027.602 | A | 8000 | 0.14 | 4.22 | 5½-5½ | |
| 3032.845 | A | 10000 | 0.08 | 4.15 | 4½-4½ | |
| 3034.051 | A | 8000 | 0.03 | 4.10 | 3½-3½ | |
| 2980.154 | A | 8000 | 0.08 | 4.22 | 4½-5½ | |
| 2999.045 | A | 8000 | 0.03 | 4.15 | 3½-4½ | |
| 3010.129 | A | 8000 | 0.00 | 4.10 | 2½-3½ | |
| 4508.931 | A | 80 | 0.42 | 3.16 | 3½-4½ | $a^8D^o-1$ † (13) |
| 4225.148 | A | 100 | 0.80 | 3.52 | 5½-5½ | $a^8D^o-z^{10}P$ † (14) |
| 4446.487 | A | 250 | 0.49 | 3.37 | 4½-4½ | |
| 4494.853 | A | 25 | 0.42 | 3.17 | 3½-3½ | |
| 4341.382 | A | 600 | 0.42 | 3.27 | 3½-4½ | |
| 4428.151 | A | 80 | 0.38 | 3.17 | 2½-3½ | |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Gd II** continued | | | | | | |
| 4078.444 | A | 1200 | 0.60 | 3.62 | 5½-6½ | $a^8D^o-z^{10}F$ (15) |
| 4184.252 | A | 2000 | 0.49 | 3.44 | 4½-5½ | |
| 4313.001 | A | 800 | 0.42 | 3.35 | 3½-4½ | |
| 4251.733 | A | 2000 | 0.38 | 3.28 | 2½-3½ | |
| 4280.490 | A | 1500 | 0.35 | 3.24 | 1½-2½ | |
| 4342.179 | A | 1500 | 0.80 | 3.44 | 5½-5½ | |
| 4310.981 | A | 200 | 0.49 | 3.35 | 4½-4½ | |
| 4322.195 | A | 125 | 0.38 | 3.24 | 2½-2½ | |
| *4327.125§ | A | 1500 | 0.35 | 3.20 | 1½-1½ | |
| 4478.795 | A | 250 | 0.60 | 3.35 | 5½-4½ | |
| 4419.032 | A | 800 | 0.49 | 3.28 | 4½-3½ | |
| 4387.674 | A | 300 | 0.42 | 3.24 | 3½-2½ | |
| 4369.771 | A | 500 | 0.38 | 3.20 | 2½-1½ | |
| 4360.917 | A | 250 | 0.42 | 3.25 | 3½-4½ | $a^8D^o-3$ (16) |
| 3843.80 | A | 25 | 0.60 | 3.81 | 5½-4½ | $a^8D^o-z^8P$ † (17) |
| 4162.732 | A | 500 | 0.49 | 3.46 | 4½-3½ | |
| 4188.099 | A | 60 | 0.42 | 3.37 | 3½-2½ | |
| 3719.53 | A | 300 | 0.49 | 3.81 | 4½-4½ | |
| 4070.390 | A | 200 | 0.42 | 3.46 | 3½-3½ | |
| 3645.62 | A | 300 | 0.42 | 3.81 | 3½-4½ | |
| 4013.953 | A | 60 | 0.38 | 3.46 | 2½-3½ | |
| 4187.159 | A | 40 | 0.42 | 3.38 | 3½-3½ | $a^8D^o-3$ † (18) |
| 3822.17 | A | 80 | 0.60 | 3.83 | 5½-6½ | $a^8D^o-z^{10}D$ † (19) |
| 3826.05 | A | 200 | 0.49 | 3.72 | 4½-5½ | |
| 3902.398 | A | 1000 | 0.42 | 3.59 | 3½-4½ | |
| 3957.672 | A | 1000 | 0.60 | 3.72 | 5½-5½ | |
| 3987.214 | A | 600 | 0.49 | 3.59 | 4½-4½ | |
| 3872.82 | A | 60 | 0.42 | 3.61 | 3½-3½ | |
| *4130.372 | A | 3000 | 0.60 | 3.59 | 5½-4½ | |
| 3916.508 | A | 3000 | 0.60 | 3.75 | 5½-5½ | $a^8D^o-z^8D$ † (20) |
| 3836.91 | A | 300 | 0.49 | 3.71 | 4½-4½ | |
| 3760.92 | A | 100 | 0.42 | 3.70 | 3½-3½ | |
| 3699.73 | A | 800 | 0.35 | 3.69 | 1½-1½ | |
| 3969.293 | A | 300 | 0.60 | 3.71 | 5½-4½ | |
| 3839.64 | A | 300 | 0.49 | 3.70 | 4½-3½ | |
| 3767.04 | A | 500 | 0.42 | 3.70 | 3½-2½ | |
| 3730.84 | A | 1000 | 0.38 | 3.69 | 2½-1½ | |
| 3787.56 | A | 400 | 0.49 | 3.75 | 4½-5½ | |
| 3758.31 | A | 200 | 0.42 | 3.71 | 3½-4½ | |
| 3712.70 | A | 2000 | 0.38 | 3.70 | 2½-3½ | |
| 3687.74 | A | 800 | 0.35 | 3.70 | 1½-2½ | |
| 3578.596 | A | 30 | 0.49 | 3.94 | 4½-3½ | $a^8D^o-z^6P$ † (21) |
| 3409.297 | A | 500 | 0.42 | 4.04 | 3½-2½ | |
| 3331.348 | A | 30 | 0.38 | 4.10 | 2½-1½ | |
| 3510.133 | A | 30 | 0.42 | 3.94 | 3½-3½ | |
| *3369.818 | A | 400 | 0.38 | 4.04 | 2½-2½ | |
| 3296.688 | A | 30 | 0.35 | 4.10 | 1½-1½ | |
| 3488.083 | A | 200 | 0.38 | 3.94 | 2½-3½ | |
| 3481.275 | A | 5000 | 0.50 | 4.14 | 5½-6½ | $a^8D^o-z^8F$ † (22) |
| 3450.376 | A | 4000 | 0.49 | 4.07 | 4½-5½ | |
| 3416.948 | A | 2500 | 0.42 | 4.03 | 3½-4½ | |
| 3399.406 | A | 500 | 0.38 | 4.01 | 2½-3½ | |
| 3399.991 | A | 1200 | 0.35 | 3.98 | 1½-2½ | |
| 3557.053 | A | 1000 | 0.60 | 4.07 | 5½-5½ | |
| 3481.797 | A | 3000 | 0.49 | 4.03 | 4½-4½ | |
| 3439.784 | A | 1500 | 0.42 | 4.01 | 3½-3½ | |
| 3434.592 | A | 1200 | 0.35 | 3.96 | 1½-1½ | |
| 3590.468 | A | 100 | 0.60 | 4.03 | 5½-4½ | |
| 3505.512 | A | 2000 | 0.49 | 4.01 | 4½-3½ | |
| 3467.267 | A | 3500 | 0.42 | 3.98 | 3½-2½ | |
| 3451.233 | A | 2000 | 0.38 | 3.96 | 2½-1½ | |
| 3432.994 | A | 1500 | 0.35 | 3.95 | 1½- ½ | |
| *3640.18 § | A | 50 | 0.60 | 3.99 | 5½-4½ | $a^8D^o-y^8P$ † (23) |
| 3480.547 | A | 60 | 0.42 | 3.97 | 3½-2½ | |
| 3528.545 | A | 300 | 0.49 | 3.99 | 4½-4½ | |
| 3466.952 | A | 600 | 0.42 | 3.98 | 3½-3½ | |
| 3439.208 | A | 3000 | 0.38 | 3.97 | 2½-2½ | |
| *3461.952§ | A | 300 | 0.42 | 3.99 | 3½-4½ | |
| 3425.930 | A | 600 | 0.38 | 3.98 | 2½-3½ | |
| 3412.753 | A | 80 | 0.35 | 3.97 | 1½-2½ | |
| 3407.61 | A | 1500? | 0.60 | 4.22 | 5½-5½ | $a^8D^o-y^{10}P$ (24) |
| 3374.688 | A | 300 | 0.49 | 4.15 | 4½-4½ | |
| 3356.513 | A | 80 | 0.42 | 4.10 | 3½-3½ | |
| 3419.069 | A | 50 | 0.49 | 4.10 | 4½-3½ | |
| 3309.582 | A | 60 | 0.49 | 4.22 | 4½-5½ | |
| 3313.731 | A | 600 | 0.42 | 4.15 | 3½-4½ | |
| 3318.055 | A | 100 | 0.38 | 4.10 | 2½-3½ | |
| 3161.638 | A | 40 | 0.60 | 4.50 | 5½-5½ | $a^8D^o-y^8D$ † (25) |
| 3003.583 | A | 150 | 0.42 | 4.53 | 3½-3½ | |
| 2960.926 | A | 500 | 0.38 | 4.55 | 2½-2½ | |
| 3143.131 | A | 400 | 0.80 | 4.52 | 5½-4½ | |
| 3053.570 | A | 600 | 0.49 | 4.53 | 4½-3½ | |
| 2991.520 | A | 150 | 0.42 | 4.55 | 3½-2½ | |
| 3077.077 | A | 800 | 0.49 | 4.50 | 4½-5½ | |
| 3009.366 | A | 60 | 0.42 | 4.52 | 3½-4½ | |
| 2972.742 | A | 150 | 0.38 | 4.53 | 2½-3½ | |
| 3028.981 | A | 200 | 0.60 | 4.67 | 5½-4½ | $a^8D^o-7$ † (26) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Gd II** continued | | | | | | |
| 3009.650 | A | 150 | 0.60 | 4.70 | 5½-4½ | $a^8D^o-8$ † (27) |
| 2969.267 | A | 50 | 0.60 | 4.75 | 5½-5½ | $a^8D^o-9$ (28) |
| 2965.428 | A | 400 | 0.60 | 4.76 | 5½-5½ | $a^8D^o-z^8F$ † |
| 3012.190 | A | 600 | 0.60 | 4.69 | 5½-4½ | (29) |
| 4510.380 | A | 30d? | 0.43 | 3.16 | 3½-4½ | $a^8S^o-1$ (30) |
| 4344.487 | A | 40 | 0.43 | 3.27 | 3½-4½ | $a^8S^o-z^{10}P$ |
| 4498.276 | A | 300 | 0.43 | 3.17 | 3½-3½ | (31) |
| 4215.023 | A | 600 | 0.43 | 3.35 | 3½-4½ | $a^8S^o-z^{10}F$ |
| 4390.953 | A | 300 | 0.43 | 3.24 | 3½-2½ | (32) |
| 4364.140 | A | 25 | 0.43 | 3.25 | 3½-4½ | $a^8S^o-2$ (33) |
| 4073.195 | A | 400 | 0.43 | 3.46 | 3½-3½ | $a^8S^o-z^8P$ † |
| 4191.067 | A | 800 | 0.43 | 3.37 | 3½-2½ | (34) |
| *4170.108§ | A | 150 | 0.43 | 3.38 | 3½-3½ | $a^8S^o-3$ (35) |
| 3881.84 | A | 50 | 0.43 | 3.60 | 3½-2½ | $a^8S^o-z^{10}D$ † (36) |
| 3780.71 | A | 200 | 0.43 | 3.71 | 3½-4½ | $a^8S^o-z^8D$ |
| 3763.33 | A | 60 | 0.43 | 3.70 | 3½-3½ | (37) |
| 3769.45 | A | 100 | 0.43 | 3.70 | 3½-2½ | |
| 3512.219 | A | 800 | 0.43 | 3.94 | 3½-3½ | $a^8S^o-z^6P$ † (38) |
| 3441.790 | A | 400 | 0.43 | 4.01 | 3½-3½ | $a^8S^o-z^8F$ † |
| 3469.307 | A | 100 | 0.43 | 3.98 | 3½-2½ | (39) |
| 3463.984 | A | 5000 | 0.43 | 3.99 | 3½-4½ | $a^8S^o-y^8P$ |
| 3468.989 | A | 3000 | 0.43 | 3.98 | 3½-3½ | (40) |
| 3482.602 | A | 800 | 0.43 | 3.97 | 3½-2½ | |
| 3315.590 | A | 400 | 0.43 | 4.15 | 3½-4½ | $a^8S^o-y^{10}P$ |
| 3358.434 | A | 300 | 0.43 | 4.10 | 3½-3½ | (41) |
| 3010.899 | A | 250 | 0.43 | 4.52 | 3½-4½ | $a^8S^o-y^8D$ |
| 2993.038 | A | 500 | 0.43 | 4.55 | 3½-2½ | (42) |
| 4734.427 | A | 100 | 0.66 | 3.27 | 5½-4½ | $a^{10}F^o-z^{10}P$ † |
| 4802.575 | A | 80 | 0.60 | 3.17 | 4½-3½ | (43) |
| 4316.052 | A | 600 | 0.66 | 3.52 | 5½-5½ | |
| 4627.66 | A | 40 | 0.60 | 3.27 | 4½-4½ | |
| 4719.040 | A | 60 | 0.55 | 3.17 | 3½-3½ | |
| 4327.140 | A | 200 | 0.60 | 3.52 | 4½-5½ | |
| 4073.759 | A | 1500 | 0.82 | 3.84 | 7½-7½ | $a^{10}F^o-z^{10}F$ † |
| *4262.092§ | A | 2500 | 0.73 | 3.52 | 6½-6½ | (44) |
| 4438.266 | A | 150 | 0.66 | 3.44 | 5½-5½ | |
| 4481.058 | A | 300 | 0.60 | 3.35 | 4½-4½ | |
| 4521.296 | A | 100 | 0.55 | 3.28 | 3½-3½ | |
| 4558.080 | A | 250 | 0.50 | 3.20 | 1½-1½ | |
| 4394.719 | A | 25 | 0.82 | 3.62 | 7½-6½ | |
| 4550.954 | A | 150 | 0.73 | 3.44 | 6½-5½ | |
| 4581.086 | A | 200 | 0.66 | 3.35 | 5½-4½ | |
| *4597.91 § | A | 500 | 0.60 | 3.28 | 4½-3½ | |
| 4601.05 | A | 500 | 0.55 | 3.24 | 3½-2½ | |
| 4596.978 | A | 400 | 0.52 | 3.20 | 2½-1½ | |
| 3959.523 | A | 500? | 0.73 | 3.84 | 6½-7½ | |
| *4163.092§ | A | 250 | 0.86 | 3.62 | 5½-6½ | |
| 4344.300 | A | 100 | 0.60 | 3.44 | 4½-5½ | |
| 4408.248 | A | 400 | 0.55 | 3.35 | 3½-4½ | |
| *4466.547§ | A | 500 | 0.52 | 3.28 | 2½-3½ | |
| 4506.333 | A | 200 | 0.50 | 3.24 | 1½-2½ | |
| 4757.791 | A | 80 | 0.66 | 3.25 | 5½-4½ | $a^{10}F^o-2$ † (45) |
| 4321.110 | A | 200 | 0.60 | 3.46 | 4½-3½ | $a^{10}F^o-z^8P$ † |
| 4382.061 | A | 60 | 0.55 | 3.37 | 3½-2½ | (46) |
| 4253.366 | A | 800 | 0.55 | 3.46 | 3½-3½ | |
| 4330.606 | A | 600 | 0.52 | 3.37 | 2½-2½ | |
| 3791.72 | A | 30 | 0.55 | 3.81 | 3½-4½ | |
| 4204.857 | A | 300 | 0.52 | 3.46 | 2½-3½ | |
| 4296.076 | A | 1000 | 0.50 | 3.37 | 1½-2½ | |
| *4359.152 | A | 40 | 0.55 | 3.38 | 3½-3½ | $a^{10}F^o-3$ † |
| 4308.233 | A | 40 | 0.52 | 3.38 | 2½-3½ | (47) |
| 4140.450 | A | 100 | 0.55 | 3.53 | 3½-2½ | $a^{10}F^o-4$ |
| 4094.478 | A | 300 | 0.52 | 3.53 | 2½-2½ | (48) |
| 4063.59 | A | 200 | 0.50 | 3.53 | 1½-2½ | |
| 4098.606 | A | 3000 | 0.82 | 3.83 | 7½-6½ | $a^{10}F^o-z^{10}D$ † |
| *4130.372 | A | 3000 | 0.73 | 3.72 | 6½-5½ | (49) |
| 4217.195 | A | 500 | 0.66 | 3.59 | 5½-4½ | |
| 4098.900 | A | 400 | 0.60 | 3.61 | 4½-3½ | |
| 4045.148 | A | 100 | 0.55 | 3.60 | 3½-2½ | |
| 3983.008 | A | 80 | 0.73 | 3.83 | 6½-6½ | |
| 4037.332 | A | 1500 | 0.66 | 3.72 | 5½-5½ | |
| 4132.275 | A | 2000 | 0.60 | 3.59 | 4½-4½ | |
| 4037.897 | A | 1200 | 0.55 | 3.61 | 3½-3½ | |
| 4001.257 | A | 600 | 0.52 | 3.60 | 2½-2½ | |
| 3959.436 | A | 300? | 0.60 | 3.72 | 4½-5½ | |
| 4070.388 | A | 600 | 0.55 | 3.59 | 3½-4½ | |
| 3994.165 | A | 800 | 0.52 | 3.61 | 2½-3½ | |
| 3971.754 | A | 300 | 0.50 | 3.60 | 1½-2½ | |

| Laboratory I A | Ref | Int | E P Low | High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Gd II** continued | | | | | | |
| 4085.564 | A | 2000 | 0.73 | 3.75 | 6½-5½ | $a^{10}F^o$-$z^8D$ † |
| 4049.429 | A | 1200 | 0.66 | 3.71 | 5½-4½ | (50) |
| 3973.981 | A | 500 | 0.60 | 3.70 | 4½-3½ | |
| 3923.246 | A | 300 | 0.55 | 3.70 | 3½-2½ | |
| 3895.230 | A | 200 | 0.52 | 3.69 | 2½-1½ | |
| 3971.062 | A | 100 | 0.60 | 3.71 | 4½-4½ | |
| m3916.61 | P | Gd+ | 0.55 | 3.70 | 3½-3½ | |
| 3881.94 | A | 30 | 0.52 | 3.70 | 2½-2½ | |
| 3867.26 | A | 60 | 0.50 | 3.69 | 1½-1½ | |
| 3918.236 | A | 150 | 0.80 | 3.75 | 4½-5½ | |
| 3875.46 | A | 100 | 0.52 | 3.70 | 2½-3½ | |
| 3854.177 | A | 50 | 0.50 | 3.70 | 1½-2½ | |
| 3709.13 | A | 50 | 0.82 | 4.14 | 7½-6½ | $a^{10}F^o$-$z^8F$ † |
| 3576.772 | A | 25 | 0.50 | 3.95 | 1½- ½ | (51) |
| *3614.21 § | A | 100 | 0.73 | 4.14 | 6½-8½ | |
| 3591.912 | A | 30 | 0.60 | 4.03 | 4½-4½ | |
| 3569.566 | A | 40 | 0.55 | 4.01 | 3½-3½ | |
| 3567.654 | A | 40 | 0.50 | 3.96 | 1½-1½ | |
| 3543.768 | A | 500 | 0.66 | 4.14 | 5½-6½ | |
| 3558.468 | A | 250 | 0.60 | 4.07 | 4½-5½ | |
| 3544.985 | A | 60 | 0.55 | 4.03 | 3½-4½ | |
| 3593.445 | A | 60 | 0.55 | 3.99 | 3½-4½ | $a^{10}F^o$-$y^8P$ † |
| 3564.046 | A | 60 | 0.52 | 3.98 | 2½-3½ | (52) |
| 3554.802 | A | 30 | 0.50 | 3.97 | 1½-2½ | |
| 3466.498 | A | 150 | 0.66 | 4.22 | 5½-5½ | $a^{10}F^o$-$y^{10}P$ † |
| 3193.174 | A | 200 | 0.66 | 4.52 | 5½-4½ | $a^{10}F^o$-$y^8D$ † |
| 3137.940 | A | 80 | 0.60 | 4.53 | 4½-3½ | (53) |
| 3089.204 | A | 30 | 0.55 | 4.55 | 3½-2½ | (54) |
| 3212.274 | A | 50 | 0.66 | 4.50 | 5½-5½ | |
| 3162.764 | A | 25 | 0.60 | 4.50 | 4½-5½ | |
| 3108.230 | A | 30 | 0.55 | 4.52 | 3½-4½ | |
| 3040.34 | A | 150 | 0.60 | 4.66 | 4½-3½ | $a^{10}F^o$-6 |
| 3075.422 | A | 30 | 0.66 | 4.67 | 5½-4½ | (55) $a^{10}F^o$-7 † |
| 3058.119 | A | 80 | 0.66 | 4.69 | 5½-4½ | (56) $a^{10}F^o$-$z^6F$ † |
| 2987.074 | A | 80 | 0.60 | 4.73 | 4½-3½ | (57) |
| 5860.73 | A | 1000 | 1.06 | 3.16 | 5½-4½ | $b^8D^o$-1 † |
| 5010.821 | A | 400 | 1.06 | 3.52 | 5½-5½ | (58) $b^8D^o$-$z^{10}P$ † |
| 6049.50 | A | 80 | 1.13 | 3.17 | 3½-3½ | (59) |
| 5583.68 | A | 800 | 1.06 | 3.27 | 5½-4½ | |
| 5956.48 | A | 200 | 1.10 | 3.17 | 4½-3½ | |
| 5096.063 | A | 200 | 1.10 | 3.52 | 4½-5½ | |
| 4805.817 | A | 100 | 1.06 | 3.62 | 5½-6½ | $b^8D^o$-$z^{10}F$ † |
| 5267.322 | A | 40 | 1.10 | 3.44 | 4½-5½ | (60) |
| 5176.285 | A | 800 | 1.06 | 3.44 | 5½-5½ | |
| *5469.72 § | A | 800 | 1.10 | 3.35 | 4½-4½ | |
| 5728.32 | A | 60 | 1.13 | 3.28 | 3½-3½ | |
| 5371.621 | A | 40 | 1.06 | 3.35 | 5½-4½ | |
| 5644.84 | A | 300 | 1.10 | 3.28 | 4½-3½ | |
| 5856.96 | A | 150 | 1.13 | 3.24 | 3½-2½ | |
| 6011.12 | A | 30 | 1.15 | 3.20 | 2½-1½ | |
| 5616.21 | A | 300 | 1.06 | 3.25 | 5½-4½ | $b^8D^o$-2 (61) |
| 4483.328 | A | 300 | 1.06 | 3.81 | 5½-4½ | $b^8D^o$-$z^8P$ † |
| 4551.455 | A | 30 | 1.10 | 3.81 | 4½-4½ | (62) |
| 5304.923 | A | 25 | 1.13 | 3.46 | 3½-3½ | |
| 5357.790 | A | 50 | 1.15 | 3.46 | 2½-3½ | |
| 5394.321 | A | 125 | 1.10 | 3.38 | 4½-3½ | $b^8D^o$-3 † |
| 5470.53 | A | 50 | 1.13 | 3.38 | 3½-3½ | (63) |
| 4453.931 | A | 60 | 1.06 | 3.83 | 5½-6½ | $b^8D^o$-$z^{10}D$ |
| 4711.975 | A | 80 | 1.10 | 3.72 | 4½-5½ | (64) |
| 5023.133 | A | 200 | 1.13 | 3.59 | 3½-4½ | |
| *5020.368§ | A | 80 | 1.15 | 3.61 | 2½-3½ | |
| 5062.862 | A | 150 | 1.17 | 3.60 | 1½-2½ | |
| *4639.001 | A | 200 | 1.06 | 3.72 | 5½-5½ | |
| *4958.788§ | A | 800 | 1.10 | 3.59 | 4½-4½ | |
| 4973.896 | A | 30 | 1.13 | 3.61 | 3½-3½ | |
| 5031.562 | A | 80 | 1.15 | 3.60 | 2½-2½ | |
| 4878.049 | A | 30 | 1.06 | 3.59 | 5½-4½ | |
| 4910.838 | A | 50 | 1.10 | 3.61 | 4½-3½ | |
| 4984.905 | A | 60 | 1.13 | 3.80 | 3½-2½ | |
| 4582.53 | A | 400 | 1.06 | 3.75 | 5½-5½ | $b^8D^o$-$z^8D$ † |
| 4728.468 | A | 300 | 1.10 | 3.71 | 4½-4½ | (65) |
| 4791.150 | A | 40 | 1.13 | 3.70 | 3½-3½ | |
| 4894.30 | A | 600 | 1.17 | 3.69 | 1½-1½ | |
| 4654.986 | A | 100 | 1.06 | 3.71 | 5½-4½ | |
| 4732.60 | A | 800 | 1.10 | 3.70 | 4½-3½ | |
| 4801.05 | A | 500 | 1.13 | 3.70 | 3½-2½ | |
| 4865.02 | A | 400 | 1.15 | 3.89 | 2½-1½ | |
| 4786.908 | A | 150 | 1.13 | 3.71 | 3½-4½ | |
| 4834.232 | A | 300 | 1.15 | 3.70 | 2½-3½ | |
| 4873.339 | A | 150 | 1.17 | 3.70 | 1½-2½ | |
| **Gd II** continued | | | | | | |
| 4427.606 | A | 60 | 1.15 | 3.94 | 2½-3½ | $b^8D^o$-$z^6P$ † |
| 3997.764 | A | 300 | 1.06 | 4.14 | 5½-6½ | (66) $b^8D^o$-$z^8F$ † |
| 4154.862 | A | 250 | 1.10 | 4.07 | 4½-5½ | (67) |
| 4246.568 | A | 150 | 1.13 | 4.03 | 3½-4½ | |
| *4316.266 | A | 150 | 1.15 | 4.01 | 2½-3½ | |
| 4383.119 | A | 150 | 1.17 | 3.98 | 1½-2½ | |
| 4359.636 | A | 30 | 1.15 | 3.98 | 2½-2½ | |
| 4424.102 | A | 40 | 1.17 | 3.96 | 1½-1½ | |
| 4400.18 | A | 25 | 1.15 | 3.96 | 2½-1½ | |
| 4438.13 | A | 30 | 1.17 | 3.95 | 1½- ½ | |
| 4268.731 | A | 150 | 1.10 | 3.99 | 4½-4½ | $b^8D^o$-$y^8P$ † |
| 4324.064 | A | 150 | 1.13 | 3.98 | 3½-3½ | (68) |
| 4380.642 | A | 100 | 1.15 | 3.97 | 2½-2½ | |
| *4316.266 | A | 150 | 1.13 | 3.99 | 3½-4½ | |
| *4359.152 | A | 40 | 1.15 | 3.98 | 2½-3½ | |
| 3581.91 | A | 200 | 1.06 | 4.50 | 5½-5½ | $b^8D^o$-$y^8D$ |
| 3600.963 | A | 200 | 1.10 | 4.52 | 4½-4½ | (69) |
| 3626.32 | A | 40 | 1.13 | 4.53 | 3½-3½ | |
| 3639.51 | A | 80 | 1.17 | 4.57 | 1½-1½ | |
| 3558.189 | A | 400 | 1.06 | 4.52 | 5½-4½ | |
| *3592.709 | A | 1500d | 1.10 | 4.53 | 4½-3½ | |
| 3608.753 | A | 200 | 1.13 | 4.55 | 3½-2½ | |
| 3613.392 | A | 150 | 1.15 | 4.57 | 2½-1½ | |
| 3625.26 | A | 60 | 1.10 | 4.50 | 4½-5½ | |
| 3634.757 | A | 100 | 1.13 | 4.52 | 3½-4½ | |
| 3650.95 | A | 100 | 1.15 | 4.53 | 2½-3½ | |
| 3649.44 | A | 80 | 1.17 | 4.55 | 1½-2½ | |
| 3412.583 | A | 60 | 1.06 | 4.67 | 5½-4½ | $b^8D^o$-7 † |
| *3451.914§ | A | 25 | 1.10 | 4.67 | 4½-4½ | (70) |
| 3388.065 | A | 40 | 1.06 | 4.70 | 5½-4½ | $b^8D^o$-8 † |
| 3336.984 | A | 200 | 1.06 | 4.75 | 5½-5½ | (71) $b^8D^o$-9 |
| 3374.584 | A | 50 | 1.10 | 4.75 | 4½-5½ | (72) |
| 3332.133 | A | 1000 | 1.06 | 4.76 | 5½-5½ | $b^8D^o$-$z^6F$ † |
| 3426.342 | A | 50 | 1.13 | 4.73 | 3½-3½ | (73) |
| 3412.020 | A | 200 | 1.15 | 4.77 | 2½-2½ | |
| 3403.081 | A | 150 | 1.17 | 4.79 | 1½-1½ | |
| 3391.294 | A | 150 | 1.06 | 4.69 | 5½-4½ | |
| 3390.498 | A | 30 | 1.13 | 4.77 | 3½-2½ | |
| 3388.912 | A | 100 | 1.15 | 4.79 | 2½-1½ | |
| 3390.878 | A | 200 | 1.17 | 4.81 | 1½- ½ | |
| *3369.618 | A | 400 | 1.10 | 4.76 | 4½-5½ | |
| 3460.776 | A | 30 | 1.13 | 4.69 | 3½-4½ | |
| 3300.976 | A | 60 | 1.10 | 4.84 | 4½-3½ | $b^8D^o$-$x^8P$ † |
| 3292.210 | A | 800 | 1.10 | 4.85 | 4½-4½ | (74) |
| 3329.345 | A | 400 | 1.13 | 4.84 | 3½-3½ | |
| 3366.532 | A | 50 | 1.15 | 4.83 | 2½-2½ | |
| 3320.438 | A | 300 | 1.13 | 4.85 | 3½-4½ | |
| 3350.097 | A | 400 | 1.15 | 4.84 | 2½-3½ | |
| 3380.515 | A | 300 | 1.17 | 4.82 | 1½-2½ | |
| 3226.318 | A | 1000 | 1.06 | 4.88 | 5½-4½ | $b^8D^o$-$z^6D$ † |
| 3236.106 | A | 150 | 1.10 | 4.91 | 4½-3½ | (75) |
| 3242.834 | A | 50 | 1.13 | 4.93 | 3½-2½ | |
| 3249.747 | A | 40 | 1.15 | 4.95 | 2½-1½ | |
| *3262.515 | A | 80 | 1.10 | 4.88 | 4½-4½ | |
| 3283.373 | A | 125 | 1.13 | 4.91 | 3½-3½ | |
| *3262.515 | A | 80 | 1.15 | 4.93 | 2½-2½ | |
| 3289.150 | A | 100 | 1.13 | 4.88 | 3½-4½ | |
| 3102.551 | A | 1000 | 1.06 | 5.03 | 5½-6½ | $b^8D^o$-$y^8F$ † |
| 3133.852 | A | 1000 | 1.10 | 5.03 | 4½-5½ | (78) |
| 3145.516 | A | 800 | 1.13 | 5.05 | 3½-4½ | |
| 3146.878 | A | 250 | 1.15 | 5.07 | 2½-3½ | |
| 3142.900 | A | 300 | 1.17 | 5.09 | 1½-2½ | |
| 3101.407 | A | 50 | 1.08 | 5.03 | 5½-5½ | |
| 3120.181 | A | 125 | 1.10 | 5.05 | 4½-4½ | |
| 3128.560 | A | 200 | 1.13 | 5.07 | 3½-3½ | |
| 3130.812 | A | 200 | 1.15 | 5.09 | 2½-2½ | |
| 3129.955 | A | 100 | 1.17 | 5.11 | 1½-1½ | |
| 3117.974 | A | 40 | 1.15 | 5.11 | 2½-1½ | |
| 3121.760 | A | 80 | 1.17 | 5.12 | 1½- ½ | |
| 2975.110 | A | 30 | 1.13 | 5.28 | 3½-2½ | $b^8D^o$-$y^6P$ |
| 2972.17 | A | 100 | 1.15 | 5.30 | 2½-1½ | (77) |
| 2985.521 | A | 100 | 1.13 | 5.26 | 3½-3½ | |
| 2983.060 | A | 60 | 1.17 | 5.30 | 1½-1½ | |
| 3002.197 | A | 50 | 1.15 | 5.26 | 2½-3½ | |
| 3002.710 | A | 60 | 1.17 | 5.28 | 1½-2½ | |
| 5588.16 | A | 100 | 1.25 | 3.48 | 4½-3½ | $a^8D^o$-$z^8P$ (78) |
| 5871.81 | A | 30 | 1.28 | 3.38 | 3½-3½ | $a^6D^o$-3 † (79) |
| 5303.43 | A | 30 | 1.28 | 3.61 | 3½-3½ | $a^6D^o$-$z^{10}D$ † |
| 5220.297 | A | 300 | 1.31 | 3.61 | 2½-3½ | (80) |
| 5019.361 | A | 100 | 1.25 | 3.70 | 4½-3½ | $a^8D^o$-$z^8D$ † |
| 5107.408 | A | 80 | 1.28 | 3.70 | 3½-2½ | (81) |
| **Gd II** continued | | | | | | |
| 4582.38 | A | 300 | 1.25 | 3.94 | 4½-3½ | $a^6D^o$-$z^6P$ † |
| 4471.89 | A | 200 | 1.28 | 4.04 | 3½-2½ | (82) |
| 4433.635 | A | 60 | 1.31 | 4.10 | 2½-1½ | |
| 4646.326 | A | 40 | 1.28 | 3.94 | 3½-3½ | |
| 4520.070 | A | 150 | 1.31 | 4.04 | 2½-2½ | |
| 4467.327 | A | 80 | 1.33 | 4.10 | 1½-1½ | |
| 4554.989 | A | 50 | 1.33 | 4.04 | 1½-2½ | |
| 4488.401 | A | 80 | 1.35 | 4.10 | ½-1½ | |
| 4374.243 | A | 30 | 1.25 | 4.07 | 4½-5½ | $a^6D^o$-$z^8F$ † |
| 4463.347 | A | 80 | 1.25 | 4.01 | 4½-3½ | (83) |
| 4731.273 | A | 50 | 1.33 | 3.95 | 1½- ½ | |
| 4570.977 | A | 40 | 1.28 | 3.98 | 3½-3½ | $a^6D^o$-$y^8P$ † |
| 4509.082 | A | 50 | 1.25 | 3.98 | 4½-3½ | (84) |
| 3791.17 | A | 300 | 1.25 | 4.50 | 4½-5½ | $a^6D^o$-$y^8D$ † |
| 3807.65 | A | 25 | 1.28 | 4.52 | 3½-4½ | (85) |
| 3764.60 | A | 50 | 1.25 | 4.52 | 4½-4½ | |
| 3755.56 | A | 40 | 1.25 | 4.53 | 4½-3½ | |
| 3641.39 | A | 125 | 1.28 | 4.87 | 3½-4½ | $a^6D^o$-7 † (88) |
| 3613.490 | A | 80 | 1.28 | 4.70 | 3½-4½ | $a^6D^o$-8 (87) |
| 3517.890 | A | 80 | 1.25 | 4.75 | 4½-5½ | $a^6D^o$-9 (88) |
| 3512.496 | A | 800 | 1.25 | 4.78 | 4½-5½ | $a^6D^o$-$z^6F$ † |
| 3617.164 | A | 200 | 1.28 | 4.69 | 3½-4½ | (89) |
| 3610.76 | A | 200 | 1.31 | 4.73 | 2½-3½ | |
| *3592.709 | A | 1500d | 1.33 | 4.77 | 1½-2½ | |
| 3580.618 | A | 40 | 1.35 | 4.79 | ½-1½ | |
| 3579.549 | A | 25 | 1.28 | 4.73 | 3½-3½ | |
| *3587.118 | A | 30 | 1.33 | 4.79 | 1½-1½ | |
| | | | 1.35 | 4.81 | ½- ½ | |
| 3553.716 | A | 40 | 1.33 | 4.81 | 1½- ½ | |
| 3428.487 | A | 500 | 1.25 | 4.85 | 4½-4½ | $a^6D^o$-$x^8P$ † |
| 3464.132 | A | 100? | 1.28 | 4.85 | 3½-4½ | (90) |
| 3503.208 | A | 60 | 1.31 | 4.84 | 2½-3½ | |
| 3395.130 | A | 1000 | 1.25 | 4.88 | 4½-4½ | $a^6D^o$-$z^8D$ |
| *3402.072 | A | 1000 | 1.28 | 4.91 | 3½-3½ | (91) |
| 3407.56 | A | 800? | 1.31 | 4.93 | 2½-2½ | |
| 3413.273 | A | 400 | 1.33 | 4.95 | 1½-1½ | |
| 3417.330 | A | 150 | 1.35 | 4.98 | ½- ½ | |
| 3367.661 | A | 150 | 1.25 | 4.91 | 4½-3½ | |
| 3379.756 | A | 400 | 1.28 | 4.93 | 3½-2½ | |
| 3393.630 | A | 400 | 1.31 | 4.95 | 2½-1½ | |
| 3405.038 | A | 150 | 1.33 | 4.96 | 1½- ½ | |
| 3430.238 | A | 40 | 1.31 | 4.91 | 2½-3½ | |
| 3427.362 | A | 80 | 1.33 | 4.93 | 1½-2½ | |
| 3425.624 | A | 50 | 1.35 | 4.95 | ½-1½ | |
| 3257.072 | A | 100 | 1.25 | 5.03 | 4½-5½ | $a^6D^o$-$y^8F$ † |
| 3274.183 | A | 300 | 1.28 | 5.05 | 3½-4½ | (92) |
| 3281.607 | A | 200 | 1.31 | 5.07 | 2½-3½ | |
| 3282.305 | A | 400? | 1.33 | 5.09 | 1½-2½ | |
| 3279.529 | A | 200 | 1.35 | 5.11 | ½-1½ | |
| 3242.304 | A | 150 | 1.25 | 5.05 | 4½-4½ | |
| 3255.819 | A | 150 | 1.28 | 5.07 | 3½-3½ | |
| 3264.137 | A | 80 | 1.31 | 5.09 | 2½-2½ | |
| 3270.515 | A | 100 | 1.35 | 5.12 | ½- ½ | |
| 3224.297 | A | 60 | 1.25 | 5.07 | 4½-3½ | |
| 3238.621 | A | 300 | 1.28 | 5.09 | 3½-2½ | |
| 3250.187 | A | 300 | 1.31 | 5.11 | 2½-1½ | |
| 3259.250 | A | 250 | 1.33 | 5.12 | 1½- ½ | |
| 3072.565 | A | 1000 | 1.25 | 5.26 | 4½-3½ | $a^6D^o$-$y^6P$ † |
| 3089.954 | A | 400 | 1.28 | 5.28 | 3½-2½ | (93) |
| 3092.058 | A | 150 | 1.31 | 5.30 | 2½-1½ | |
| 3101.185 | A | 125 | 1.28 | 5.26 | 3½-3½ | |
| 3113.172 | A | 250 | 1.31 | 5.28 | 2½-2½ | |
| 3108.360 | A | 150 | 1.33 | 5.30 | 1½-1½ | |
| 3129.696 | A | 80 | 1.33 | 5.28 | 1½-2½ | |
| 3118.600 | A | 150 | 1.35 | 5.30 | ½-1½ | |
| 5877.28 | A | 1000 | 1.42 | 3.52 | 5½-5½ | $a^{10}P^o$-$z^{10}P$ |
| 6634.36 | A | 1500 | 1.31 | 3.17 | 3½-3½ | (94) |
| 6681.23 | A | 1000 | 1.42 | 3.27 | 5½-4½ | |
| 6848.80 | A | 1200 | 1.37 | 3.17 | 4½-3½ | |
| 5733.86 | A | 4000 | 1.37 | 3.52 | 4½-5½ | |
| 8305.15 | A | 1500 | 1.31 | 3.27 | 3½-4½ | |
| 5597.21 | A | 200 | 1.42 | 3.62 | 5½-8½ | $a^{10}P^o$-$z^{10}F$ † |
| 5951.60 | A | 80 | 1.37 | 3.44 | 4½-5½ | (95) |
| 6108.19 | A | 100 | 1.42 | 3.44 | 5½-5½ | |
| 6727.83 | A | 125 | 1.42 | 3.25 | 5½-4½ | $a^{10}P^o$-2 |
| 8346.65 | A | 400 | 1.31 | 3.25 | 3½-4½ | (98) |
| 5164.542 | A | 150 | 1.42 | 3.81 | 5½-4½ | $a^{10}P^o$-$z^8P$ † |
| 5987.11 | A | 150 | 1.31 | 3.37 | 3½-2½ | (97) |
| 5749.41 | A | 500 | 1.31 | 3.48 | 3½-3½ | |
| 5545.01 | A | 250 | 1.31 | 3.53 | 3½-2½ | $a^{10}P^o$-4 (98) |

| Laboratory I A | Ref | Int | E P Low | High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Gd II** continued | | | | | | |
| 5125.56 | A | 400 | 1.42 | 3.83 | 5½-6½ | $a^{10}P^o-z^{10}D$ † |
| *5252.14 § | A | 500 | 1.37 | 3.72 | 4½-5½ | (99) |
| 5419.876 | A | 150 | 1.31 | 3.59 | 3½-4½ | |
| 5372.216 | A | 300 | 1.42 | 3.72 | 5½-5½ | |
| 5560.69 | A | 600 | 1.37 | 3.59 | 4½-4½ | |
| 5500.43 | A | 600 | 1.37 | 3.61 | 4½-3½ | |
| 5375.393 | A | 100 | 1.31 | 3.60 | 3½-2½ | |
| 5393.659 | A | 100 | 1.42 | 3.71 | 5½-4½ | $a^{10}P^o-z^8D$ † |
| 5179.919 | A | 125 | 1.37 | 3.75 | 4½-5½ | (100) |
| *4666.448§ | A | 40 | 1.37 | 4.01 | 4½-3½ | $a^{10}P^o-z^8F$ † (101) |
| 4803.536 | A | 80 | 1.42 | 3.99 | 5½-4½ | $a^{10}P^o-y^8P$ † |
| 4716.576 | A | 30 | 1.37 | 3.98 | 4½-3½ | (102) |
| *4639.001 | A | 200 | 1.31 | 3.97 | 3½-2½ | |
| 4406.67 | A | 400 | 1.42 | 4.22 | 5½-5½ | $a^{10}P^o-y^{10}P$ † |
| 4421.24 | A | 200 | 1.31 | 4.10 | 3½-3½ | (103) |
| *4523.82 § | A | 250 | 1.42 | 4.15 | 5½-4½ | |
| 4514.505 | A | 200 | 1.37 | 4.10 | 4½-3½ | |
| 4325.566 | A | 200 | 1.37 | 4.22 | 4½-5½ | |
| 4347.310 | A | 400 | 1.31 | 4.15 | 3½-4½ | |
| 4003.850 | A | 30 | 1.42 | 4.50 | 5½-5½ | $a^{10}P^o-y^8D$ † (104) |
| 3748.88 | A | 50 | 1.37 | 4.68 | 4½-3½ | $a^{10}P^o-6$ (105) |
| 3489.281 | A | 40 | 1.31 | 4.85 | 3½-4½ | $a^{10}P^o-x^8P$ (106) |
| 3414.207 | A | 60 | 1.42 | 5.03 | 5½-6½ | $a^{10}P^o-y^8F$ † |
| 3363.974 | A | 30 | 1.37 | 5.03 | 4½-5½ | (107) |
| 6610.04 | A | 80 | 1.85 | 3.52 | 5½-5½ | $a^8F^o-z^{10}P$ † (108) |
| 8480.11 | A | 200 | 1.72 | 3.82 | 6½-8½ | $a^8F^o-z^{10}F$ † |
| 7172.26 | A | 600 | 1.72 | 3.44 | 6½-5½ | (109) |
| 7252.70 | A | 400 | 1.65 | 3.35 | 5½-4½ | |
| 7394.90 | A | 150 | 1.61 | 3.28 | 4½-3½ | |
| 7505.35 | A | 80 | 1.59 | 3.24 | 3½-2½ | |
| 5721.99 | A | 200 | 1.65 | 3.81 | 5½-4½ | $a^8F^o-z^8P$ † |
| 8704.18 | A | 60 | 1.81 | 3.46 | 4½-3½ | (110) |
| 6623.28 | A | 50 | 1.59 | 3.46 | 3½-3½ | |
| 6260.31 | A | 40 | 1.61 | 3.59 | 4½-4½ | $a^8F^o-z^{10}D$ |
| *6180.42 § | A | 300 | 1.72 | 3.72 | 6½-5½ | (111) |
| 6380.95 | A | 600 | 1.65 | 3.59 | 5½-4½ | |
| 6080.65 | A | 300 | 1.72 | 3.75 | 6½-5½ | $a^8F^o-z^8D$ |
| 6004.57 | A | 500 | 1.65 | 3.71 | 5½-4½ | (112) |
| 5904.07 | A | 800 | 1.61 | 3.70 | 4½-3½ | |
| 5855.24 | A | 300 | 1.59 | 3.70 | 3½-2½ | |
| 5845.71 | A | 80 | 1.58 | 3.69 | 2½-1½ | |
| 5884.59 | A | 30 | 1.65 | 3.75 | 5½-5½ | |
| 5897.62 | A | 200 | 1.61 | 3.71 | 4½-4½ | |
| 5840.47 | A | 200 | 1.59 | 3.70 | 3½-3½ | |
| 5815.85 | A | 250 | 1.58 | 3.70 | 2½-2½ | |
| 5820.99 | A | 200 | 1.57 | 3.89 | 1½-1½ | |
| 5801.30 | A | 40 | 1.58 | 3.70 | 2½-3½ | |
| 5807.05 | A | 100 | 1.58 | 3.69 | ½-1½ | |
| *4881.935 | A | 200 | 1.57 | 4.10 | 1½-1½ | ?$a^8F^o-z^6P$ † (113) |
| 5092.251 | A | 600 | 1.72 | 4.14 | 6½-8½ | $a^8F^o-z^8F$ † |
| 5108.91 | A | 500 | 1.65 | 4.07 | 5½-5½ | (114) |
| 5098.38 | A | 400 | 1.61 | 4.03 | 4½-4½ | |
| 5100.937 | A | 100 | 1.59 | 4.01 | 3½-3½ | |
| 5175.839 | A | 50 | 1.56 | 3.95 | ½- ½ | |
| 5256.030 | A | 50 | 1.72 | 4.07 | 8½-5½ | |
| 5178.104 | A | 100 | 1.65 | 4.03 | 5½-4½ | |
| 5187.237 | A | 250 | 1.58 | 3.96 | 2½-1½ | |
| 5188.915 | A | 200 | 1.57 | 3.95 | 1½- ½ | |
| 4954.025 | A | 50 | 1.65 | 4.14 | 5½-6½ | |
| 5031.290 | A | 250 | 1.61 | 4.07 | 4½-5½ | |
| 5050.878 | A | 300 | 1.59 | 4.03 | 3½-4½ | |
| 5071.023 | A | 200 | 1.58 | 4.01 | 2½-3½ | |
| 5111.930 | A | 30 | 1.57 | 3.98 | 1½-2½ | |
| 5156.76 | A | 200 | 1.56 | 3.96 | ½-1½ | |
| 5210.488 | A | 200 | 1.81 | 3.98 | 4½-3½ | $a^8F^o-y^8P$ † |
| 5191.081 | A | 250 | 1.59 | 3.97 | 3½-2½ | (115) |
| 5199.311 | A | 60 | 1.61 | 3.99 | 4½-4½ | |
| 5160.898 | A | 100 | 1.59 | 3.98 | 3½-3½ | |
| 5180.105 | A | 40 | 1.58 | 3.97 | 2½-2½ | |
| 5149.841 | A | 50 | 1.59 | 3.99 | 3½-4½ | |
| 5130.28 | A | 200 | 1.58 | 3.98 | 2½-3½ | |
| 5140.839 | A | 400 | 1.57 | 3.97 | 1½-2½ | |
| 4936.155 | A | 50 | 1.72 | 4.22 | 6½-5½ | $a^8F^o-y^{10}P$ † |
| 4808.165 | A | 40 | 1.65 | 4.22 | 5½-5½ | (118) |
| 4892.11 | A | 30 | 1.58 | 4.10 | 2½-3½ | |
| 4438.225 | A | 200 | 1.72 | 4.50 | 6½-5½ | $a^8F^o-y^8D$ † |
| 4298.30 | A | 400 | 1.85 | 4.52 | 5½-4½ | (117) |
| 4239.803 | A | 200 | 1.81 | 4.53 | 4½-3½ | |
| 4173.558 | A | 100 | 1.59 | 4.55 | 3½-2½ | |
| 4137.721 | A | 25 | 1.58 | 4.57 | 2½-1½ | |

| Laboratory I A | Ref | Int | E P Low | High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Gd II** continued | | | | | | |
| 4241.276 | A | 80 | 1.61 | 4.52 | 4½-4½ | $a^8F^o-y^8D$ † |
| 4197.069 | A | 150 | 1.59 | 4.53 | 3½-3½ | (117) |
| 4153.510 | A | 125 | 1.58 | 4.55 | 2½-2½ | cont |
| 4115.376 | A | 80 | 1.57 | 4.57 | 1½-1½ | |
| 4141.017 | A | 25 | 1.57 | 4.55 | 1½-2½ | |
| 4108.401 | A | 50 | 1.56 | 4.57 | ½-1½ | |
| 4059.370 | A | 80 | 1.72 | 4.76 | 6½-5½ | $a^8F^o-z^6F$ † (118) |
| 3722.068 | A | 100 | 1.72 | 5.03 | 6½-5½ | $a^8F^o-y^8F$ † (119) |
| 7908.06 | A | 40d? | 2.19 | 3.75 | 5½-5½ | $c^8D^o-z^8D$ † (120) |
| 6314.22 | A | 50 | 2.19 | 4.14 | 5½-6½ | $c^8D^o-z^8F$ † |
| 7197.08 | A | 80 | 2.27 | 3.98 | 1½-2½ | (121) |
| 6568.00 | A | 100 | 2.19 | 4.07 | 5½-5½ | |
| 6996.76 | A | 1500 | 2.22 | 3.98 | 2½-2½ | |
| 6857.13 | A | 600 | 2.19 | 3.99 | 5½-4½ | $c^8D^o-y^8P$ |
| 6920.62 | A | 250 | 2.20 | 3.98 | 4½-3½ | (122) |
| 7000.75 | A | 200 | 2.21 | 3.97 | 3½-2½ | |
| 6900.73 | A | 200 | 2.20 | 3.99 | 4½-4½ | |
| 6945.98 | A | 150 | 2.21 | 3.98 | 3½-3½ | |
| 7051.00 | A | 200 | 2.22 | 3.97 | 2½-2½ | |
| 6299.07 | A | 40 | 2.19 | 4.15 | 5½-4½ | $c^8D^o-y^{10}P$ |
| 6494.11 | A | 80 | 2.20 | 4.10 | 4½-3½ | (123) |
| 4968.575 | A | 50 | 2.19 | 4.67 | 5½-4½ | $c^8D^o-7$ (124) |
| 4916.78 | A | 25 | 2.19 | 4.70 | 5½-4½ | $c^8D^o-8$ (125) |
| 4799.859 | A | 60 | 2.19 | 4.76 | 5½-5½ | $c^8D^o-z^6F$ † |
| 4888.542 | A | 40 | 2.21 | 4.73 | 3½-3½ | (126) |
| 4839.816 | A | 40 | 2.22 | 4.77 | 2½-2½ | |
| 4923.578 | A | 60 | 2.19 | 4.69 | 5½-4½ | |
| 4875.986 | A | 50 | 2.20 | 4.73 | 4½-3½ | |
| 4664.272 | A | 30 | 2.20 | 4.85 | 4½-4½ | $c^8D^o-x^8P$ † (127) |
| *4337.510§ | A | 80 | 2.19 | 5.03 | 5½-6½ | $c^8D^o-y^8F$ † |
| 4335.390 | A | 25 | 2.19 | 5.03 | 5½-5½ | (128) |
| 4304.087 | A | 25 | 2.21 | 5.07 | 3½-3½ | |
| 4293.747 | A | 25 | 2.22 | 5.09 | 2½-2½ | |
| 3191.044 | A | 125 | 2.19 | 6.08 | 5½-4½ | $c^8D^o-w^8P$ † |
| 3173.169 | A | 30 | 2.20 | 6.09 | 4½-3½ | (129) |
| 3200.454 | A | 60 | 2.20 | 6.06 | 4½-4½ | |
| 3177.490 | A | 30 | 2.21 | 6.09 | 3½-3½ | |
| 3206.466 | A | 400 | 2.27 | 6.12 | 1½-2½ | |
| 6753.67 | A | 2000 | 2.32 | 4.14 | 7½-6½ | $a^8G^o-z^8F$ † |
| 7006.16 | A | 1000 | 2.31 | 4.07 | 6½-5½ | (130) |
| 7118.86 | A | 800 | 2.30 | 4.03 | 5½-4½ | |
| 7054.62 | A | 200 | 2.26 | 4.01 | 4½-3½ | |
| 7085.52 | A | 50 | 2.24 | 3.98 | 3½-2½ | |
| 7164.90 | A | 25 | 2.23 | 3.96 | 2½-1½ | |
| 8718.14 | A | 150 | 2.31 | 4.14 | 8½-8½ | |
| 6988.75 | A | 100 | 2.30 | 4.07 | 5½-5½ | |
| 6959.24 | A | 150 | 2.26 | 4.03 | 4½-4½ | |
| 6971.68 | A | 100 | 2.24 | 4.01 | 3½-3½ | |
| 7058.02 | A | 80 | 2.23 | 3.98 | 2½-2½ | |
| 7116.77 | A | 150 | 2.22 | 3.96 | 1½-1½ | |
| 7146.13 | A | 40 | 2.22 | 3.95 | ½- ½ | |
| 8702.13 | A | 40 | 2.30 | 4.14 | 5½-6½ | |
| 7141.17 | A | 25 | 2.24 | 3.97 | 3½-2½ | $a^8G^o-y^8P$ † (131) |
| 5621.43 | A | 100 | 2.31 | 4.50 | 6½-5½ | $a^8G^o-y^8D$ † |
| 5510.58 | A | 80 | 2.26 | 4.50 | 4½-5½ | (132) |
| 4998.373 | A | 200 | 2.26 | 4.73 | 4½-3½ | $a^8G^o-z^6F$ † |
| *4881.925 | A | 200 | 2.24 | 4.77 | 3½-2½ | (133) |
| 4821.955 | A | 60 | 2.23 | 4.79 | 2½-1½ | |
| 4800.100 | A | 60 | 2.22 | 4.79 | 1½-1½ | |
| 4772.728 | A | 30 | 2.22 | 4.81 | ½- ½ | |
| 4755.347 | A | 30 | 2.22 | 4.82 | 1½-2½ | $a^8G^o-x^8P$ † (134) |
| 4540.016 | A | 200 | 2.32 | 5.03 | 7½-6½ | $a^8G^o-y^8F$ † |
| 4521.94 | A | 150 | 2.31 | 5.03 | 6½-5½ | (135) |
| 4486.352 | A | 100 | 2.30 | 5.05 | 5½-4½ | |
| 4517.10 | A | 30 | 2.30 | 5.03 | 5½-6½ | |
| 3287.192 | A | 40 | 2.30 | 6.08 | 5½-4½ | $a^8G^o-w^8P$ † |
| 3252.743 | A | 30 | 2.26 | 6.06 | 4½-4½ | (136) |
| 7017.73 | A | 80 | 2.25 | 4.01 | 2½-3½ | $1^o-z^8F$ |
| 7133.16 | A | 100 | 2.25 | 3.98 | 2½-2½ | (137) |
| 7242.24 | A | 60 | 2.25 | 3.98 | 2½-1½ | |
| 7189.57 | A | 800 | 2.25 | 3.97 | 2½-2½ | $1^o-y^8P$ (138) |

| Laboratory I A | Ref | Int | E P Low | High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Gd II** continued | | | | | | |
| 7385.97 | A | 80 | 2.34 | 4.01 | 2½-3½ | $2^o-z^8F$ (139) |
| 5162.47 | A | 50d | 2.34 | 4.73 | 2½-3½ | $2^o-z^6F$ † (140) |
| 4223.020 | A | 60 | 2.34 | 5.26 | 2½-3½ | $2^o-y^6P$ (141) |
| 7748.37 | A | 40 | 2.40 | 3.99 | 4½-4½ | $3^o-y^8P$ † (142) |
| 4965.047 | A | 60 | 2.40 | 4.88 | 4½-4½ | $3^o-z^6D$ (143) |
| 4608.030 | A | 40 | 2.40 | 5.07 | 4½-3½ | $3^o-y^8F$ † (144) |
| 8089.96 | A | 60 | 2.46 | 3.99 | 3½-4½ | $4^o-y^8P$ † (145) |
| 5441.17 | A | 40 | 2.46 | 4.73 | 3½-3½ | $4^o-z^6F$ (146) |
| *5178.843§ | A | 100 | 2.46 | 4.85 | 3½-4½ | $4^o-x^8P$ |
| 5200.549 | A | 30 | 2.46 | 4.84 | 3½-3½ | (147) |
| 4726.725 | A | 40 | 2.46 | 5.07 | 3½-3½ | $4^o-y^8F$ † (148) |
| *3402.072 | A | 1000 | 2.46 | 6.09 | 3½-3½ | $4^o-w^8P$ † (149) |

Strongest Unclassified Lines of **Gd II**

| | | | |
|---|---|---|---|
| 8442.58 | A | 300 | V |
| 8316.38 | A | 500 | V |
| 7963.25 | A | 500 | V |
| 7930.25 | A | 2000 | V |
| 7846.35 | A | 3000 | V |
| *7844.87 § | A | 300 | V |
| 7324.89 | A | 400 | V |
| 7147.31 | A | 500 | V |
| 7135.73 | A | 250 | V |
| 7037.26 | A | 600 | V |
| 6985.89 | A | 1500 | V |
| *6980.86 § | A | 250 | V |
| 6887.63 | A | 300 | V |
| 5913.55 | A | 800 | V |
| *5911.45 § | A | 500 | V |
| *5754.17 § | A | 250 | V |
| 5538.32 | A | 300 | V |
| 4397.51 | A | 300 | IV |
| 4304.895 | A | 400 | V |
| 4297.173 | A | 400 | V |
| 4253.612 | A | 800 | V |
| 4238.782 | A | 500 | V |
| 4197.681 | A | 800 | V |
| 4137.104 | A | 500 | V |
| 4111.438 | A | 500 | V |
| 4063.390 | A | 1500 | IV |
| 4062.590 | A | 500 | V |
| 4053.294 | A | 1000 | V |
| 4049.858 | A | 2000 | IV |
| 4022.333 | A | 300 | V |
| 4013.798 | A | 250 | V |
| 4008.913 | A | 400 | V |
| 3996.320 | A | 800 | IV |
| 3895.791 | A | 400 | V |
| 3842.20 | A | 400 | IV |
| 3801.29 | A | 400 | V |
| 3782.34 | A | 300 | V |
| 3770.69 | A | 300 | V |
| 3733.08 | A | 300 | V |
| 3719.45 | A | 800 | V |
| 3664.60 | A | 2000 | IV |
| *3457.047§ | A | 300 | V |
| 3364.241 | A | 500 | V |
| 3330.340 | A | 800 | V |
| 3225.460 | A | 600 | V |
| 3084.007 | A | 250 | V |
| 3005.092 | A | 300 | V |
| 3002.860 | A | 1000 | V |
| 2963.605 | A | 400 | V |

Tb I No analysis May 1942 (Temperature Class)

Tb II No analysis May 1942 (Temperature Class)

| Laboratory I A | Ref | Int | E P Low | High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| Dy I | No analysis | | May 1942 | | (Temperature Class) | |
| Dy II | No analysis | | May 1942 | | (Temperature Class) | |
| Ho I | No analysis | | May 1942 | | (Temperature Class) | |
| Ho II | No analysis | | May 1942 | | (Temperature Class) | |
| Er | Not separated | | May 1942 | | | |

| Tm I | I P ? | Anal D | List D | | Jan 1943 | |
|---|---|---|---|---|---|---|
| 4386.434 | A | 200 | 0.00 | 2.81 | 3½- | $a^2F°-2$ |
| 4359.929 | A | 300 | 0.00 | 2.83 | 3½- | (1) 3 |
| 3887.347 | A | 200 | 0.00 | 3.17 | 3½- | 5 |
| 3949.275 | A | 100 | 1.08 | 4.21 | 2½- | $a^2F°-15$ |
| 3916.476 | A | 200 | 1.08 | 4.23 | 2½- | (2) 16 |

Strongest Unclassified Lines of Tm I

| | | | |
|---|---|---|---|
| 5971.28 | A | 200 | I |
| 5895.646 | A | 300 | I |
| 5764.300 | A | 200 | I |
| 5675.853 | A | 400 | I |
| 5631.404 | A | 150 | I |
| 5307.121 | A | 200 | I |
| 4203.730 | A | 300 | I |
| 4187.616 | A | 500 | I |
| 4105.843 | A | 600 | I |
| 4094.188 | A | 700 | I |
| 3883.132 | A | 400 | I |
| 3751.812 | A | 100 | I |
| 3744.066 | A | 300 | I |
| 3717.915 | A | 500 | I |

| Tm II | I P ? | Anal B | List B | | Jan 1942 | |
|---|---|---|---|---|---|---|
| 4526.565 | A | 80 | 0.00 | 2.67 | 4- | $a^3F°-1$ |
| 4481.273 | A | 200 | 0.00 | 2.75 | 4- | (1) 2 |
| 4199.918 | A | 100 | 0.00 | 2.94 | 4-4 | 3 |
| 3958.101 | A | 200 | 0.00 | 3.12 | 4-4? | 4 |
| 3890.528 | A | 60 | 0.00 | 3.17 | 4- | 5 |
| 3848.023 | A | 1000 | 0.00 | 3.21 | 4- | $a^3F°-6$ |
| 3761.913 | A | 600 | 0.00 | 3.28 | 4-4 | (2) 7 |
| 3761.331 | A | 800 | 0.00 | 3.28 | 4-3 | 8 |
| 3701.364 | A | 250 | 0.00 | 3.33 | 4-4 | 9 |
| 3668.088 | A | 120 | 0.00 | 3.36 | 4-4 | 10 |
| 3608.766 | A | 200 | 0.00 | 3.42 | 4-3 | $a^3F°-11$ |
| 3536.576 | A | 80 | 0.00 | 3.49 | 4-3 | (3) 12 |
| 3425.630 | A | 150 | 0.00 | 3.60 | 4-4 | 13 |
| 3397.499 | A | 100 | 0.00 | 3.63 | 4-3 | 14 |
| 3291.001 | A | 120 | 0.00 | 3.75 | 4-4 | 15 |
| 3276.811 | A | 50 | 0.00 | 3.77 | 4-4 | $a^3F°-16$ |
| 3258.048 | A | 150 | 0.00 | 3.79 | 4-3 | (4) 17 |
| 3241.530 | A | 200 | 0.00 | 3.81 | 4-4 | 18 |
| 3210.825 | A | 50 | 0.00 | 3.84 | 4-4 | 20 |
| 3133.886 | A | 250 | 0.00 | 3.94 | 4-4 | 22 |
| 4677.858 | A | 40 | 0.03 | 2.67 | 3- | $a^3F°-1$ |
| 4529.376 | A | 80 | 0.03 | 2.75 | 3- | (5) 2 |
| 4242.153 | A | 300 | 0.03 | 2.94 | 3-4 | 3 |
| 3995.586 | A | 80 | 0.03 | 3.12 | 3-4? | 4 |
| 3883.437 | A | 200 | 0.03 | 3.21 | 3- | 6 |
| 3795.759 | A | 600 | 0.03 | 3.28 | 3-4 | $a^3F°-7$ |
| 3795.169 | A | 80 | 0.03 | 3.28 | 3-3 | (6) 8 |
| 3734.124 | A | 300 | 0.03 | 3.33 | 3-4 | 9 |
| 3700.256 | A | 300 | 0.03 | 3.36 | 3-4 | 10 |
| 3566.472 | A | 100 | 0.03 | 3.49 | 3-3 | 12 |
| 3453.665 | A | 200 | 0.03 | 3.60 | 3-4 | $a^3F°-13$ |
| 3425.082 | A | 300 | 0.03 | 3.63 | 3-3 | (7) 14 |
| 3316.875 | A | 60 | 0.03 | 3.75 | 3-4 | 15 |
| 3302.454 | A | 150 | 0.03 | 3.77 | 3-4 | 16 |
| 3283.400 | A | 50 | 0.03 | 3.79 | 3-3 | 17 |
| 3266.633 | A | 80 | 0.03 | 3.81 | 3-4 | $a^3F°-16$ |
| 3235.448 | A | 90 | 0.03 | 3.84 | 3-4 | (6) 20 |
| 3172.828 | A | 200 | 0.03 | 3.92 | 3-3 | 21 |
| 3157.344 | A | 180 | 0.03 | 3.94 | 3-4 | 22 |
| 3098.597 | A | 100 | 0.03 | 4.01 | 3-2? | 24 |
| 3015.298 | A | 100 | 0.03 | 4.12 | 3-4 | 27 |
| 3900.790 | A | 90 | 1.08 | 4.25 | 2-2? | $a^3F°-33$ |
| 3810.724 | A | 50 | 1.08 | 4.32 | 2-2 | (9) 37 |
| 3756.860 | A | 100 | 1.08 | 4.37 | 2- | 40 |
| 3704.848 | A | 50 | 1.08 | 4.41 | 2-3 | 41 |
| 3685.812 | A | 60 | 1.08 | 4.45 | 2-3 | $a^3F°-44$ |
| 3653.814 | A | 80 | 1.08 | 4.46 | 2-3 | (10) 45 |
| 3557.796 | A | 80 | 1.08 | 4.55 | 2-3 | 47 |
| 3481.750 | A | 30 | 1.08 | 4.63 | 2-2 | 48 |
| 3285.609 | A | 60 | 1.08 | 4.84 | 2-2 | 56 |
| 3929.583 | A | 100 | 1.11 | 4.25 | 3-2? | $a^1F°-33$ |
| 3838.198 | A | 200 | 1.11 | 4.32 | 3-2 | (11) 37 |
| 3798.752 | A | 80 | 1.11 | 4.35 | 3-2 | 39 |
| 3783.561 | A | 60 | 1.11 | 4.37 | 3- | 40 |
| 3730.810 | A | 40 | 1.11 | 4.41 | 3-3 | 41 |

| Tm II continued | | | | | | |
|---|---|---|---|---|---|---|
| 3678.862 | A | 80 | 1.11 | 4.46 | 3-3 | $a^1F°-45$ |
| 3431.195 | A | 100 | 1.11 | 4.70 | 3-4 | (12) 52 |
| 3399.951 | A | 70 | 1.11 | 4.74 | 3-4? | 53 |
| 3374.513 | A | 100 | 1.11 | 4.76 | 3-2 | 54 |
| 3327.578 | A | 40 | 1.11 | 4.81 | 3- | 55 |
| 3267.401 | A | 80 | 1.11 | 4.88 | 3-3 | $a^1F°-57$ |
| 3236.806 | A | 150 | 1.11 | 4.93 | 3-4 | (13) 58 |
| 3231.509 | A | 60 | 1.11 | 4.92 | 3-3 | 59 |

Strongest Unclassified Lines of Tm II

| | | | |
|---|---|---|---|
| 5782.356 | B | 100 | V |
| 5709.976 | B | 100 | IV |
| 4626.565 | B | 80 | IV |
| 3996.518 | B | 200 | III |
| 3817.395 | B | 100 | III |
| 3725.061 | B | 200 | III |
| 3535.522 | B | 100 | III |
| 3462.198 | B | 300 | III |
| 3441.505 | B | 200 | III |
| 3362.619 | B | 300 | III |
| 3309.804 | B | 100 | IV |
| 3240.230 | B | 125 | IV |
| 3151.036 | B | 200 | IV |
| 3131.257 | B | 400 | IV |

| Yb I | I P 6.23 | Anal B | List D | | May 1942 | |
|---|---|---|---|---|---|---|
| 5556.48 | A | 1500 | 0.00 | 2.22 | 0-1 | $6^1S-6^3P°$ (1) |
| 3987.98// | A | 2000 | 0.00 | 3.09 | 0-1 | $6^1S-6^1P°$ (2) |
| 7699.49 | A | 1500 | 2.43 | 4.04 | 2-1 | $6^3P°-7^3S$ |
| 6799.61 | A | 1000 | 2.22 | 4.04 | 1-1 | (3) |
| 6489.10 | A | 800 | 2.13 | 4.04 | 0-1 | |

| Yb II | I P 12.05 | Anal D | List D | | May 1942 | |
|---|---|---|---|---|---|---|
| 3289.36 | A | 800 | 0.00 | 3.75 | ½-1½ | $6^2S-6^2P°$ |
| 3694.19// | A | 1000 | 0.00 | 3.34 | ½- ½ | (1) |

| Lu I | I P 5? | Anal B | List D | | May 1943 | |
|---|---|---|---|---|---|---|
| 6004.53 | A | 100 | 0.25 | 2.30 | 2½-3½ | $a^2D-\ ^2F°?$ † |
| 5736.55 | A | 40 | 0.00 | 2.15 | 1½-2½ | (1) |
| 5135.10 | A | 100 | 0.25 | 2.65 | 2½-2½ | $a^2D-\ ^2D°?$ † |
| 5402.57 | A | 50 | 0.00 | 2.28 | 1½-1½ | (2) |
| 4658.03 | A | 50 | 0.00 | 2.65 | 1½-2½ | |
| 3841.17 | A | 100 | 0.25 | 3.46 | 2½-1½ | $a^2D-\ ^2P°?$ |
| 4124.73 | A | 100 | 0.00 | 2.99 | 1½- ½ | (3) |
| 3567.84 | A | 80 | 0.00 | 3.46 | 1½-1½ | |

Strongest Unclassified Lines of Lu I

| | | | |
|---|---|---|---|
| 5001.15 | A | 100 | III |
| 4518.58 | A | 200 | II |
| 3647.77 | A | 50 | III |

| Lu II | I P ? | Anal A | List B | | May 1943 | |
|---|---|---|---|---|---|---|
| 3507.39 | A | 100 | 0.00 | 3.52 | 0-1 | $a^1S-z^3P°$ (1) |
| 5476.69 | A | 200 | 1.75 | 4.01 | 3-2 | $a^3D-z^3P°$ |
| 6221.88 | A | 200 | 1.54 | 3.52 | 2-1 | (2) |
| 6463.11 | A | 200 | 1.46 | 3.37 | 1-0 | |
| 4994.14 | A | 120 | 1.54 | 4.01 | 2-2 | |
| 5983.90 | A | 100d | 1.48 | 3.52 | 1-1 | |
| 4639.62 | A | 30d | 1.46 | 4.01 | 1-2 | |
| 3876.65 | A | 100 | 1.54 | 4.72 | 2-1 | $a^3D-z^1P°$ (3) |
| 3077.59 | A | 150 | 1.54 | 5.55 | 2-3 | $a^3D-z^3F°$ † |
| 3397.07 | A | 150 | 1.48 | 5.09 | 1-2 | (4) |
| 3254.32 | A | 90 | 1.75 | 5.55 | 3-3 | |
| 3472.48 | A | 120 | 1.54 | 5.09 | 2-2 | |
| 4785.42 | A | 60 | 2.14 | 4.72 | 2-1 | $a^1D-z^1P°$ (5) |
| 3623.96 | A | 40 | 2.14 | 5.55 | 2-3 | $a^1D-z^3F°$ |
| 4184.26 | A | 120 | 2.14 | 5.09 | 2-2 | (6) |
| 3554.43 | A | 200 | 2.14 | 5.81 | 2-2 | $a^1D-z^1D°$ (7) |

| Hf I | I P ? | Anal D | List D | | Dec 1942 | |
|---|---|---|---|---|---|---|
| 5550.60 | A | 50 | 0.00 | 2.22 | 2-2 | $a^3F-\ 2°$ |
| 5181.66 | A | 40 | 0.00 | 2.38 | 2-3 | (1) 5° |
| 3777.84 | A | 50 | 0.00 | 3.27 | 2-1 | 17° |
| 3682.25 | A | 200 | 0.00 | 3.35 | 2-2 | 18° |
| 3497.49 | A | 150 | 0.00 | 3.53 | 2-3 | 24° |
| 3472.36 | A | 100 | 0.00 | 3.55 | 2-1 | 25° |

| Hf I continued | | | | | | |
|---|---|---|---|---|---|---|
| 3332.73 | A | 200 | 0.00 | 3.70 | 2-3 | $a^3F-29°$ |
| 3162.57 | A | 80 | 0.00 | 3.90 | 2-2 | (2) 32° |
| 3072.88 | A | 300 | 0.00 | 4.02 | 2-3 | 34° |
| 3018.32 | A | 80 | 0.00 | 4.09 | 2-2 | 35° |
| 2980.82 | A | 100 | 0.00 | 4.14 | 2-2 | 37° |
| 4174.33 | A | 50 | 0.29 | 3.25 | 3-3 | $a^3F-16°$ |
| 3583.02 | A | 60 | 0.29 | 3.79 | 3-4 | (3) 30° |
| 3312.87 | A | 100 | 0.29 | 4.02 | 3-3 | 34° |
| 3131.81 | A | 150 | 0.29 | 4.23 | 3-3 | 41° |
| 3080.84 | A | 80 | 0.29 | 4.30 | 3-4 | $a^3F-43°$ |
| 3067.41 | A | 80 | 0.29 | 4.31 | 3-3 | (4) 45° |
| 3020.54 | A | 100 | 0.29 | 4.38 | 3-3 | 46° |
| 2964.88 | A | 150 | 0.29 | 4.45 | 3-4 | 47° |
| 3820.74 | A | 50 | 0.56 | 3.79 | 4-4 | $a^3F-30°$ |
| 3172.94 | A | 100 | 0.56 | 4.45 | 4-4 | (5) 47° |
| 3156.68 | A | 50 | 0.56 | 4.47 | 4-3 | 48° |
| 5719.18 | A | 40 | 1.11 | 3.27 | 2-1 | $a^3P-17°$ (6) |
| 5552.12 | A | 40 | 0.70 | 2.92 | 2-3 | $a^1D-11°$ (7) |

| Hf II | I P 14.8 | Anal B | List B | | Nov 1942 | |
|---|---|---|---|---|---|---|
| 3253.70 | A | 80 | 0.38 | 4.17 | 2½-3½ | $a^2D-z^4F°$ |
| 3399.80 | A | 150 | 0.00 | 3.63 | 1½-2½ | (1) |
| 3793.37 | A | 60 | 0.38 | 3.63 | 2½-2½ | |
| 3561.65 | A | 80 | 0.00 | 3.47 | 1½-1½ | |
| 3193.53 | A | 40 | 0.38 | 4.24 | 2½-2½ | $a^2D-z^4D°$ † |
| 3145.32 | A | 25 | 0.00 | 3.92 | 1½-1½ | (2) |
| 3479.29 | A | 40 | 0.38 | 3.92 | 2½-1½ | |
| 3428.37 | A | 20 | 0.00 | 3.60 | 1½- ½ | |
| 3000.09 | A | 40 | 0.38 | 4.49 | 2½-1½ | $a^2D-z^2P°$ † |
| 3016.94 | A | 6 | 0.00 | 4.09 | 1½- ½ | (3) |
| 3317.99 | A | 20 | 0.38 | 4.10 | 2½-2½ | $a^2D-z^2D°$ † |
| 3217.30 | A | 25 | 0.38 | 4.21 | 2½-1½ | (4) |
| 3012.90 | A | 100 | 0.00 | 4.10 | 1½-2½ | |
| 3134.72 | A | 150 | 0.38 | 4.31 | 2½-2½ | $a^2D-z^4G°$ † (5) |
| 3352.06 | A | 80 | 1.03 | 4.71 | 4½-4½ | $a^4F-z^4F°$ |
| 3644.35 | A | 60 | 0.78 | 4.17 | 3½-3½ | (6) |
| 4080.44 | A | 60 | 0.61 | 3.63 | 2½-2½ | |
| 4093.16 | A | 150 | 0.45 | 3.47 | 1½-1½ | |
| 3933.65 | A | 40 | 1.03 | 4.17 | 4½-3½ | |
| 4335.15 | A | 5 | 0.78 | 3.63 | 3½-2½ | |
| 3139.67 | A | 15 | 0.78 | 4.71 | 3½-4½ | |
| 3462.65 | A | 15 | 0.61 | 4.17 | 2½-3½ | |
| 3880.82 | A | 40 | 0.45 | 3.63 | 1½-2½ | |
| 3505.32 | A | 150 | 1.03 | 4.55 | 4½-3½ | $a^4F-z^4D°$ |
| 3569.03 | A | 80 | 0.78 | 4.24 | 3½-2½ | (7) |
| 3719.37 | A | 70 | 0.61 | 3.92 | 2½-1½ | |
| 3918.10 | A | 100 | 0.45 | 3.60 | 1½- ½ | |
| 3273.66 | A | 6 | 0.78 | 4.55 | 3½-3½ | |
| 3394.58 | A | 25 | 0.61 | 4.24 | 2½-2½ | |
| 3552.70 | A | 40 | 0.45 | 3.92 | 1½-1½ | |
| 3126.27 | A | 6 | 0.61 | 4.55 | 2½-3½ | |
| 3255.28 | A | 25 | 0.45 | 4.24 | 1½-2½ | |
| 3176.85 | A | 50 | 0.61 | 4.49 | 2½-1½ | $a^4F-z^2P°$ |
| 3389.83 | A | 70 | 0.45 | 4.09 | 1½- ½ | (8) |
| 3054.52 | A | 15 | 0.45 | 4.49 | 1½-1½ | |
| 3535.54 | A | 80 | 0.61 | 4.10 | 2½-2½ | $a^4F-z^2D°$ † |
| 3279.98 | A | 20 | 0.45 | 4.21 | 1½-1½ | (9) |
| 3364.70 | A | 20 | 0.45 | 4.10 | 1½-2½ | |
| 2975.89 | A | 150 | 0.61 | 4.75 | 2½-3½ | $a^4F-z^4G°$ † |
| 3194.19 | A | 100 | 0.45 | 4.31 | 1½-2½ | (10) |
| 3109.11 | A | 150 | 0.76 | 4.75 | 3½-3½ | |
| 3328.21 | A | 20 | 0.61 | 4.31 | 2½-2½ | |
| 3495.75 | A | 20 | 0.78 | 4.31 | 3½-2½ | |
| 3031.16 | A | 120 | 0.61 | 4.68 | 2½-1½ | $a^4F-y^2D°$ † (11) |
| 3025.29 | A | 20 | 1.03 | 5.11 | 4½-3½ | $a^4F-z^2F°$ † |
| 3101.39 | A | 100 | 0.76 | 4.76 | 3½-2½ | (12) |
| 2968.82 | A | 120 | 0.81 | 4.76 | 2½-2½ | |
| 4928.99 | A | 8 | 1.68 | 4.17 | 2½-3½ | $a^4P-z^4F°$ † |
| 6279.64 | A | 20 | 1.66 | 3.63 | 2½-2½ | (13) |
| 8635.29 | A | 50 | 1.66 | 3.47 | 2½-1½ | |
| 4272.65 | A | 80 | 1.66 | 4.55 | 2½-3½ | $a^4P-z^4D°$ † |
| 4684.14 | A | 150 | 1.60 | 4.24 | 1½-2½ | (14) |
| 5040.62 | A | 150 | 1.48 | 3.92 | ½-1½ | |
| 5299.85 | A | 10 | 1.60 | 3.92 | 1½-1½ | |
| 5809.50 | A | 30 | 1.48 | 3.60 | ½- ½ | |
| 5463.38 | A | 10 | 1.66 | 3.92 | 2½-1½ | |
| 4387.90 | A | 40 | 1.66 | 4.49 | 2½-1½ | $a^4P-z^2P°$ |
| 4945.36 | A | 10 | 1.60 | 4.09 | 1½- ½ | (15) |
| 4263.72 | A | 10 | 1.60 | 4.49 | 1½-1½ | |
| 4719.10 | A | 30 | 1.48 | 4.09 | ½- ½ | |
| 5075.92 | A | 20 | 1.68 | 4.10 | 2½-2½ | $a^4P-z^2D°$ † |
| 4844.00 | A | 15 | 1.66 | 4.21 | 2½-1½ | (18) |
| 4934.46 | A | 60 | 1.60 | 4.10 | 1½-2½ | |
| 4097.21 | A | 8 | 1.88 | 4.66 | 2½-1½ | $a^4P-y^2D°$ (17) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **f II** continued | | | | | | |
| 699.73 | A | 25 | 1.66 | 5.00 | 2½-2½ | $a^4P-z^4P^o$ (18) |
| 800.39 | A | 5 | 1.60 | 4.84 | 1½-1½ | |
| 780.09 | A | 7 | 1.48 | 4.74 | ½- ½ | |
| 883.77 | A | 20 | 1.66 | 4.84 | 2½-1½ | |
| 923.91 | A | 40 | 1.60 | 4.74 | 1½- ½ | |
| 624.00 | A | 10 | 1.80 | 5.00 | 1½-2½ | |
| 865.35 | A | 20 | 1.48 | 4.84 | ½-1½ | |
| 984.03 | A | 8 | 1.66 | 4.76 | 2½-2½ | $a^4P-z^2F^o$ † (19) |
| 413.74 | A | 8 | 1.86 | 5.38 | 2½-1½ | $a^4P-y^2P^o$ † |
| 349.17 | A | 5 | 1.60 | 5.38 | 1½-1½ | (20) |
| 203.87 | A | 10 | 1.66 | 5.52 | 2½-3½ | $a^4P-y^2F^o$ † (21) |
| 805.79 | A | 30 | 1.49 | 4.17 | 2½-3½ | $a^2P-z^4F^o$ † |
| 348.40 | A | 15 | 1.86 | 4.17 | 3½-3½ | (22) |
| 787.18 | A | 30 | 1.49 | 3.63 | 2½-2½ | |
| 980.91 | A | 200 | 1.88 | 3.63 | 3½-2½ | |
| 248.95 | A | 100 | 1.49 | 3.47 | 2½-1½ | |
| 588.25 | A | 10 | 1.86 | 4.55 | 3½-3½ | $a^2F-z^4D^o$ |
| 486.14 | A | 30 | 1.49 | 4.24 | 2½-2½ | (23) |
| 187.75 | A | 30 | 1.86 | 4.24 | 3½-2½ | |
| 071.23 | A | 8 | 1.49 | 3.92 | 2½-1½ | |
| 029.16 | A | 10 | 1.49 | 4.55 | 2½-3½ | |
| 113.58 | A | 20 | 1.49 | 4.49 | 2½-1½ | $a^2F-z^2P^o$ (24) |
| 524.35 | A | 50 | 1.86 | 4.10 | 3½-2½ | $a^2F-z^2D^o$ |
| 533.18 | A | 40 | 1.49 | 4.21 | 2½-1½ | (25) |
| 735.67 | A | 20 | 1.49 | 4.10 | 2½-2½ | |
| 861.05 | A | 12 | 1.86 | 5.23 | 3½-4½ | $a^2F-z^4G^o$ |
| 783.78 | A | 8 | 1.49 | 4.75 | 2½-3½ | (26) |
| 289.67 | A | 20 | 1.88 | 4.75 | 3½-3½ | |
| 370.95 | A | 100 | 1.49 | 4.31 | 2½-2½ | |
| 034.33 | A | 8 | 1.86 | 4.31 | 3½-2½ | |
| 747.48 | A | 7 | 1.88 | 5.16 | 3½-2½ | $a^2F-y^2D^o$ † |
| 873.55 | A | 20 | 1.49 | 4.68 | 2½-1½ | (27) |
| 932.40 | A | 10 | 1.86 | 5.00 | 3½-2½ | $a^2F-z^4P^o$ † (28) |
| 797.95 | A | 10 | 1.86 | 5.11 | 3½-3½ | $a^2F-z^2F^o$ |
| 771.38 | A | 8 | 1.49 | 4.78 | 2½-2½ | (29) |
| 407.78 | A | 15 | 1.49 | 5.11 | 2½-3½ | |
| 230.66 | A | 50 | 1.88 | 5.69 | 3½-4½ | $a^2F-y^4F^o$ |
| 092.26 | A | 20 | 1.49 | 5.48 | 2½-3½ | (30) |
| 410.18 | A | 40 | 1.86 | 5.48 | 3½-3½ | |
| 182.61 | A | 40 | 1.49 | 5.39 | 2½-2½ | |
| 495.94 | A | 10 | 1.88 | 5.39 | 3½-2½ | |
| 283.39 | A | 6 | 1.49 | 5.25 | 2½-1½ | |
| 378.88 | A | 4 | 1.86 | 5.52 | 3½-3½ | $a^2F-y^2F^o$ † |
| 140.77 | A | 15 | 1.49 | 5.42 | 2½-2½ | (31) |
| 064.66 | A | 20 | 1.49 | 5.52 | 2½-3½ | |
| 048.03 | A | 20 | 1.86 | 5.91 | 3½-2½ | $a^2F-y^4D^o$ † (32) |
| 118.95 | A | 8 | 1.86 | 5.82 | 3½-3½ | $a^2F-z^2G^o$ † (33) |
| 644.60 | A | 200 | 1.77 | 3.63 | 1½-2½ | $b^2D-z^4F^o$ † (34) |
| 999.89 | A | 40 | 1.77 | 4.24 | 1½-2½ | $b^2D-z^2D^o$ † |
| 935.16 | A | 50 | 2.14 | 3.92 | 2½-1½ | (35) |
| 754.61 | A | 100 | 1.77 | 3.60 | 1½- ½ | |
| 260.44 | A | 40 | 2.14 | 4.49 | 2½-1½ | $b^2D-z^2P^o$ |
| 324.26 | A | 30 | 1.77 | 4.09 | 1½- ½ | (36) |
| 541.31 | A | 20 | 1.77 | 4.49 | 1½-1½ | |
| 058.18 | A | 10 | 1.77 | 4.21 | 1½-1½ | $b^2D-z^2D^o$ |
| 311.80 | A | 150 | 1.77 | 4.10 | 1½-2½ | (37) |
| 731.36 | A | 40 | 2.14 | 4.75 | 2½-3½ | $b^2D-z^4G^o$ (38) |
| 249.33 | A | 30 | 1.77 | 4.68 | 1½-1½ | $b^2D-y^2D^o$ |
| 648.35 | A | 6 | 1.77 | 5.16 | 1½-2½ | (39) |
| 330.89 | A | 40 | 2.14 | 5.00 | 2½-2½ | $b^2D-z^4P^o$ |
| 020.25 | A | 5 | 1.77 | 4.84 | 1½-1½ | (40) |
| 573.81 | A | 20 | 2.14 | 4.84 | 2½-1½ | |
| 158.90 | A | 30 | 2.14 | 5.11 | 2½-3½ | $b^2D-z^2F^o$ † |
| 137.80 | A | 40 | 1.77 | 4.78 | 1½-2½ | (41) |
| 898.39 | A | 10 | 2.14 | 5.48 | 2½-3½ | $b^2D-y^4F^o$ † (42) |
| 935.64 | A | 20 | 2.14 | 5.28 | 2½-1½ | $b^2D-y^2P^o$ |
| 485.16 | A | 3 | 1.77 | 5.31 | 1½- ½ | (43) |
| 518.75 | A | 15 | 1.77 | 5.28 | 1½-1½ | |
| 659.02 | A | 4 | 2.14 | 5.52 | 2½-3½ | $b^2D-y^2F^o$ |
| 384.14 | A | 10 | 1.77 | 5.42 | 1½-2½ | (44) |
| 195.63 | A | 8 | 1.77 | 5.63 | 1½- ½ | $b^2D-y^4D^o$ † (45) |
| 110.87 | A | 40 | 1.77 | 5.74 | 1½- ½ | $b^2D-z^2S^o$ (46) |
| 024.78 | A | 15 | 2.14 | 6.22 | 2½-1½ | $b^2D-y^4P^o$ † (47) |
| 391.36 | A | 10 | 2.20 | 4.49 | 1½-1½ | $a^2P-z^2P^o$ † |
| 590.73 | A | 5 | 1.88 | 4.09 | ½- ½ | (48) |
| 531.66 | A | 30 | 2.20 | 4.09 | 1½- ½ | |
| 512.61 | A | 10 | 2.20 | 4.10 | 1½-2½ | $a^2P-z^2D^o$ † |
| 298.06 | A | 100 | 1.88 | 4.21 | ½-1½ | (49) |
| 842.23 | A | 80 | 2.20 | 4.31 | 1½-2½ | $a^2P-z^4G^o$ (50) |
| 177.50 | A | 20 | 2.20 | 5.18 | 1½-2½ | $a^2P-y^2D^o$ † |
| 417.37 | A | 100 | 1.88 | 4.68 | ½-1½ | (51) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Hf II** continued | | | | | | |
| 4319.51 | A | 8 | 1.88 | 4.74 | ½- ½ | $a^2P-z^4P^o$ † (52) |
| 3867.32 | A | 15 | 2.20 | 5.39 | 1½-2½ | $a^2P-y^4F^o$ † |
| 4049.44 | A | 10 | 2.20 | 5.25 | 1½-1½ | (53) |
| 4008.46 | A | 8 | 2.20 | 5.28 | 1½-1½ | $a^2P-y^2P^o$ † |
| 3597.42 | A | 10 | 1.88 | 5.31 | ½- ½ | (54) |
| 3964.96 | A | 15 | 2.20 | 5.31 | 1½- ½ | |
| 3487.57 | A | 8 | 2.20 | 5.74 | 1½- ½ | $a^2P-z^2S^o$ |
| 3199.99 | A | 30 | 1.88 | 5.74 | ½- ½ | (55) |
| 3206.77 | A | 4 | 2.20 | 6.05 | 1½-2½ | $a^2P-x^2D^o$ |
| 3055.43 | A | 9 | 1.88 | 5.92 | ½-1½ | (56) |
| 4807.14 | A | 20 | 2.15 | 4.71 | 4½-4½ | $a^2G-z^4F^o$ |
| 6222.81 | A | 10 | 2.19 | 4.17 | 3½-3½ | (57) |
| 5138.53 | A | 20 | 2.15 | 4.55 | 4½-3½ | $a^2G-z^4D^o$ † (58) |
| 4050.67 | A | 7 | 2.19 | 5.23 | 3½-4½ | $a^2G-z^4G^o$ † |
| 3998.51 | A | 6d | 2.15 | 5.23 | 4½-4½ | (59) |
| 4809.18 | A | 6 | 2.19 | 4.75 | 3½-3½ | |
| 4735.75 | A | 10 | 2.15 | 4.75 | 4½-3½ | |
| 5801.71 | A | 15 | 2.19 | 4.31 | 3½-2½ | |
| 4182.40 | A | 50 | 2.15 | 5.11 | 4½-3½ | $a^2G-z^2F^o$ † |
| 4790.72 | A | 40 | 2.19 | 4.76 | 3½-2½ | (60) |
| 3478.98 | A | 30 | 2.15 | 5.69 | 4½-4½ | $a^2G-y^4F^o$ † |
| 3701.15 | A | 40 | 2.15 | 5.48 | 4½-3½ | (61) |
| 3849.52 | A | 25 | 2.19 | 5.39 | 3½-2½ | |
| 3661.73 | A | 2 | 2.15 | 5.52 | 4½-3½ | $a^2G-y^2F^o$ |
| 3817.20 | A | 20 | 2.19 | 5.42 | 3½-2½ | (62) |
| 3705.40 | A | 15 | 2.19 | 5.52 | 3½-3½ | |
| 3080.64 | A | 100 | 2.15 | 6.15 | 4½-4½ | $a^2G-z^2G^o$ † |
| 3394.99 | A | 30 | 2.19 | 5.82 | 3½-3½ | (63) |
| 3358.30 | A | 8 | 2.15 | 5.82 | 4½-3½ | |
| 3011.24 | A | 20 | 2.19 | 6.28 | 3½-2½ | $a^2G-x^2F^o$ † (64) |
| 6647.06 | A | 100 | 2.86 | 4.71 | 4½-4½ | $b^4F-z^4F^o$ |
| 8236.13 | A | 10 | 2.67 | 4.17 | 3½-3½ | (65) |
| 6041.44 | A | 6 | 2.67 | 4.71 | 3½-4½ | |
| 7328.64 | A | 30 | 2.49 | 4.17 | 2½-3½ | |
| 7277.67 | A | 50 | 2.86 | 4.55 | 4½-3½ | $b^4F-z^4D^o$ † |
| 7861.22 | A | 8 | 2.67 | 4.24 | 3½-2½ | (66) |
| 8581.88 | A | 5? | 2.49 | 3.93 | 2½-1½ | |
| 9742.28 | A | ? | 2.33 | 3.60 | 1½- ½ | |
| 6557.91 | A | 100 | 2.67 | 4.55 | 3½-3½ | |
| 7030.33 | A | 150 | 2.49 | 4.24 | 2½-2½ | |
| 7757.89 | A | 15 | 2.33 | 3.92 | 1½-1½ | |
| 5969.38 | A | 5 | 2.49 | 4.55 | 2½-3½ | |
| *6156.25 | A | 3d | 2.49 | 4.49 | 2½-1½ | $b^4F-z^2P^o$ |
| 7021.23 | A | 30 | 2.33 | 4.09 | 1½- ½ | (67) |
| 7663.09 | A | 30 | 2.49 | 4.10 | 2½-2½ | $b^4F-z^2D^o$ † (68) |
| 4334.65 | A | 30 | 2.86 | 5.70 | 4½-5½ | $b^4F-z^4G^o$ |
| 4817.32 | A | 80 | 2.67 | 5.23 | 3½-4½ | (69) |
| 5444.07 | A | 30 | 2.49 | 4.75 | 2½-3½ | |
| 6230.84 | A | 20 | 2.33 | 4.31 | 1½-2½ | |
| 5194.57 | A | 6 | 2.86 | 5.23 | 4½-4½ | |
| 5929.35 | A | 5 | 2.67 | 4.75 | 3½-3½ | |
| 6511.62 | A | 6 | 2.86 | 4.75 | 4½-3½ | |
| 4622.71 | A | 100 | 2.49 | 5.16 | 2½-2½ | $b^4F-y^2D^o$ |
| 5264.95 | A | 80 | 2.33 | 4.68 | 1½-1½ | (70) |
| 5057.03 | A | 30 | 2.67 | 5.11 | 3½-3½ | $b^4F-z^2F^o$ † |
| 4699.72 | A | 40 | 2.49 | 5.11 | 2½-3½ | (71) |
| 5079.65 | A | 60 | 2.33 | 4.76 | 1½-2½ | |
| 4350.52 | A | 150 | 2.86 | 5.69 | 4½-4½ | $b^4F-y^4F^o$ † |
| 4245.84 | A | 20 | 2.49 | 5.39 | 2½-2½ | (72) |
| 4232.43 | A | 60 | 2.33 | 5.25 | 1½-1½ | |
| 4703.62 | A | 10 | 2.86 | 5.48 | 4½-3½ | |
| 4535.38 | A | 30 | 2.67 | 5.39 | 3½-2½ | |
| 4466.41 | A | 30 | 2.49 | 5.25 | 2½-1½ | |
| 4187.68 | A | 8 | 2.33 | 5.28 | 1½-1½ | $b^4F-y^2P^o$ † (73) |
| 4640.14 | A | 20 | 2.86 | 5.52 | 4½-3½ | $b^4F-y^2F^o$ |
| 4490.60 | A | 20 | 2.67 | 5.42 | 3½-2½ | (74) |
| 4336.66 | A | 200 | 2.67 | 5.52 | 3½-3½ | |
| 4206.59 | A | 80 | 2.49 | 5.42 | 2½-2½ | |
| 4071.22 | A | 6 | 2.49 | 5.52 | 2½-3½ | |
| 3877.11 | A | 40 | 2.86 | 6.04 | 4½-3½ | $b^4F-y^4D^o$ † |
| 3806.07 | A | 40 | 2.67 | 5.91 | 3½-2½ | (75) |
| 3766.92 | A | 50 | 2.49 | 5.76 | 2½-1½ | |
| 3737.88 | A | 15 | 2.33 | 5.63 | 1½- ½ | |
| 3744.98 | A | 15 | 2.86 | 6.15 | 4½-4½ | $b^4F-z^2G^o$ † |
| 3917.47 | A | 20 | 2.67 | 5.82 | 3½-3½ | (76) |
| 3438.24 | A | 15 | 2.33 | 5.92 | 1½-1½ | $b^4F-x^2D^o$ † (77) |
| 3218.20 | A | 8 | 2.67 | 6.51 | 3½-2½ | $b^4F-w^2D^o$ † (78) |
| 3323.35 | A | 20 | 2.86 | 6.57 | 4½-3½ | $b^4F-w^2F^o$ (79) |
| 7561.08 | A | 10 | 3.37 | 5.00 | 1½-2½ | $b^4P-z^4P^o$ (80) |
| 6306.17 | A | 5 | 3.52 | 5.48 | 2½-3½ | $b^4P-y^4F^o$ † |
| 6563.86 | A | 10 | 3.37 | 5.25 | 1½-1½ | (81) |
| 6455.85 | A | 20 | 3.37 | 5.28 | 1½-1½ | $b^4P-y^2P^o$ † (82) |

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Hf II** continued | | | | | | |
| 4904.51 | A | 30 | 3.52 | 6.04 | 2½-3½ | $b^4P-y^4D^o$ † |
| 4848.46 | A | 20 | 3.37 | 5.91 | 1½-2½ | (83) |
| 5080.44 | A | 10 | 3.33 | 5.76 | ½-1½ | |
| 5164.56 | A | 8 | 3.52 | 5.91 | 2½-2½ | |
| 5156.06 | A | 5 | 3.37 | 5.76 | 1½-1½ | |
| 4765.78 | A | 12 | 3.33 | 5.92 | ½-1½ | $b^4P-x^2D^o$ (84) |
| 4760.59 | A | 20 | 3.33 | 5.93 | ½-1½ | $b^4P-z^4S^o$ (85) |
| 4570.70 | A | 30 | 3.52 | 6.22 | 2½-1½ | $b^4P-y^4P^o$ |
| 4321.36 | A | 30 | 3.37 | 6.22 | 1½-1½ | (86) |
| 4268.10 | A | 5 | 3.33 | 6.22 | ½-1½ | |
| 4426.18 | A | 9 | 3.52 | 6.31 | 2½-1½ | $b^4P-w^2D^o$ † |
| 4141.84 | A | 5 | 3.33 | 6.31 | ½-1½ | (87) |
| 4007.36 | A | 10 | 3.52 | 6.60 | 2½-1½ | $b^4P-x^4P^o$ † (88) |
| 6997.83 | A | 20 | 3.47 | 5.23 | 4½-4½ | $b^2G-z^4G^o$ (89) |
| 6135.10 | A | 20 | 3.47 | 5.48 | 4½-3½ | $b^2G-y^4F^o$ † |
| 6567.39 | A | 60 | 3.51 | 5.39 | 3½-2½ | (90) |
| 6027.57 | A | 20 | 3.47 | 5.52 | 4½-3½ | $b^2G-y^2F^o$ † |
| 6473.89 | A | 20 | 3.51 | 5.42 | 3½-2½ | (91) |
| 4599.46 | A | 40 | 3.47 | 6.15 | 4½-4½ | $b^2G-z^2G^o$ |
| 5346.30 | A | 40 | 3.51 | 5.82 | 3½-3½ | (92) |
| 5247.10 | A | 60 | 3.47 | 5.82 | 4½-3½ | |
| 4675.45 | A | 10 | 3.51 | 6.15 | 3½-4½ | |
| 4865.43 | A | 10 | 3.51 | 6.05 | 3½-2½ | $b^2G-x^2D^o$ (93) |
| 4125.10 | A | 5 | 3.47 | 6.46 | 4½-3½ | $b^2G-x^2F^o$ |
| 4452.70 | A | 10 | 3.51 | 6.28 | 3½-2½ | (94) |
| 4123.54 | A | 10 | 3.51 | 6.51 | 3½-2½ | $b^2G-w^2D^o$ (95) |
| 3810.59 | A | 10 | 3.51 | 6.75 | 3½-2½ | $b^2G-x^4D^o$ † (96) |
| 3979.40 | A | 40 | 3.47 | 6.57 | 4½-3½ | $b^2G-w^2F^o$ (97) |
| 3864.75 | A | 20 | 3.47 | 6.66 | 4½-3½ | $b^2G-y^2G^o$ † (98) |
| 6584.53 | A | 40 | 3.82 | 5.69 | 5½-4½ | $a^2H-y^4F^o$ |
| 7983.66 | A | 5 | 3.94 | 5.48 | 4½-3½ | (99) |
| 7016.99 | A | 6 | 3.94 | 5.69 | 4½-4½ | |
| 5289.98 | A | 10 | 3.82 | 6.15 | 5½-4½ | $a^2H-z^2G^o$ |
| 6542.80 | A | 50 | 3.94 | 5.82 | 4½-3½ | (100) |
| 5565.56 | A | 5 | 3.94 | 6.15 | 4½-4½ | |
| 3762.51 | A | 25 | 3.94 | 7.22 | 4½-3½ | $a^2H-x^4D^o$ (101) |
| 4682.68 | A | 8 | 3.94 | 6.57 | 4½-3½ | $a^2H-w^2F^o$ (102) |
| 3900.64 | A | 20 | 3.82 | 6.98 | 5½-5½ | $a^2H-z^2H^o$ † |
| 4613.74 | A | 50 | 3.94 | 6.61 | 4½-4½ | (103) |
| 4422.76 | A | 150 | 3.82 | 6.61 | 5½-4½ | |
| 4047.96 | A | 50 | 3.82 | 6.87 | 5½-4½ | $a^2H-y^2G^o$ † |
| 4524.74 | A | 30 | 3.94 | 6.66 | 4½-3½ | (104) |
| 6609.20 | A | 8 | 4.05 | 5.91 | 2½-2½ | $c^2D-y^4D^o$ (105) |
| 5110.61 | A | 7 | 4.05 | 6.46 | 2½-3½ | $c^2D-x^2F^o$ (106) |
| 4486.65 | A | 20 | 4.05 | 6.80 | 2½-2½ | $c^2D-x^4P^o$ (107) |
| 4241.93 | A | 7 | 4.05 | 6.96 | 2½-1½ | $c^2D-w^2P^o$ (108) |
| 3945.36 | A | 10n | 4.05 | 7.17 | 2½-2½ | $c^2D-y^2D^o$ (109) |
| 6719.40 | A | 50 | 4.62 | 6.46 | 3½-3½ | $b^2F-x^2F^o$ |
| 7398.96 | A | 10 | 4.62 | 6.28 | 2½-2½ | (110) |
| 6550.01 | A | 10 | 4.62 | 6.51 | 3½-2½ | $b^2F-w^2D^o$ |
| 7278.72 | A | 6 | 4.62 | 6.31 | 2½-1½ | (111) |
| 5673.58 | A | 10 | 4.62 | 6.80 | 3½-2½ | $b^2F-x^4P^o$ † (112) |
| 5493.22 | A | 6 | 4.62 | 6.87 | 3½-4½ | $b^2F-y^2G^o$ † (113) |
| 4179.55 | A | 10 | 4.62 | 7.57 | 2½-1½ | $b^2F-u^2D^o$ (114) |
| 3946.00 | A | 7n | 4.62 | 7.75 | 3½-2½ | $b^2F-y^2F^o$ † (115) |

Strongest Unclassified Lines of Hf II

| | | |
|---|---|---|
| 7061.90 | A | 30? |
| 6850.07 | A | 60? |
| 6548.72 | A | 10 |
| 4519.02 | A | 10n |
| 4443.07 | A | 20 |

| Ta I | I P ? | Anal C | List D | Dec 1942 | |
|---|---|---|---|---|---|
| 5402.51 | A | 40w | 0.00 | 2.28 | 1½- ½ $a^4F-1^o$ |
| 5212.75 | A | 35w | 0.00 | 2.37 | 1½-2½ (1) 2° |
| 4574.32 | A | 15 | 0.00 | 2.70 | ½-1½ 8° |
| 3970.10 | A | 15 | 0.00 | 3.11 | 1½-2½ 17° |
| 3077.24 | A | 15d? | 0.00 | 4.01 | 1½-2½ 52° |
| 5328.38 | A | 20w | 0.25 | 2.56 | 2½-1½ $a^4F-4^o$ |
| 5037.65 | A | 30 | 0.25 | 2.70 | 2½-1½ (2) 8° |
| 2965.54 | A | 20r | 0.25 | 4.41 | 2½-1½ 62° |

| I A | Laboratory Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ta I** continued | | | | | | |
| 5811.10 | A | 20d? | 0.49 | 2.61 | 3½-2½ | $a^4F$-6° (3) |
| 5461.31 | A | 25 | 0.69 | 2.95 | 4½-3½ | $a^4F$-12° |
| 3063.56 | A | 18r | 0.69 | 4.72 | 4½-3½ | (4)78° |
| *6995.35 | A | 20d? | 0.75 | 2.51 | ½- ½ | $a^4P$- 3° |
| 5776.76 | A | 20 | 0.75 | 2.88 | ½- ½ | (5)10° |
| 5413.47 | A | 20w | 0.75 | 3.03 | ½- ½ | 14° |
| 5349.08 | A | 25w | 0.75 | 3.05 | ½-1½ | 15° |
| 5136.47 | A | 30w | 0.75 | 3.15 | ½- ½ | 18° |
| 4921.29 | A | 25 | 0.75 | 3.25 | ½-1½ | 21° |
| 5419.19 | A | 30w | 0.75 | 3.03 | 1½- ½ | $a^4P$?-14° |
| 5354.67 | A | 30w | 0.75 | 3.05 | 1½-1½ | (6) 15° |
| *5141.63 | A | 30w | 0.75 | 3.15 | 1½- ½ | 18° |
| 4926.02 | A | 35 | 0.75 | 3.25 | 1½-1½ | 21° |
| 5939.75 | A | 20w | 1.20 | 3.28 | ½-1½ | $a^6D$-23° (7) |
| 5944.01 | A | 30d? | 1.23 | 3.31 | 1½-2½ | 3-24° (8) |
| 5435.27 | A | 30 | 1.35 | 3.62 | 1½-2½ | $a^6D$?-35° (9) |
| 6045.38 | A | 30 | 1.39 | 3.43 | 2½-3½ | $a^6D$-28° (10) |
| 7148.61 | A | 30 | 1.51 | 3.24 | 3½-2½ | $a^6D$-20° |
| 6430.76 | A | 30 | 1.51 | 3.43 | 3½-3½ | (11)28° |
| 4936.41 | A | 30 | 1.51 | 4.01 | 3½-2½ | 52° |
| 7346.37 | A | 30 | 1.65 | 3.33 | 4½-3½ | $a^6D$-26° |
| 6485.36 | A | 30 | 1.65 | 3.55 | 4½-4½ | (12)32° |
| 5997.24 | A | 35w | 1.65 | 3.71 | 4½-4½ | 39° |
| 5037.33 | A | 30w | 1.65 | 4.10 | 4½-3½ | 53° |
| 5404.95 | A | 35w | 2.13 | 4.41 | 2½-1½ | 9-62° (13) |

**Ta II** See introduction

**W I** I P 7.94 Anal A Liet D June 1941

| | | | | | | |
|---|---|---|---|---|---|---|
| 4244.374 | A | 200 | 0.77 | 3.68 | 4-5 | $d^4s^2\ ^5D$-$d^4sp^7D^o$† |
| 4680.539 | A | 400 | 0.60 | 3.23 | 3-3 | (1) |
| 4843.829 | A | 500 | 0.41 | 2.96 | 2-2 | |
| 5053.300 | A | 500 | 0.21 | 2.65 | 1-1 | |
| 5006.169 | A | 400 | 0.77 | 3.23 | 4-3 | |
| 5224.680 | A | 400 | 0.60 | 2.96 | 3-2 | |
| 5514.712 | A | 500 | 0.41 | 2.65 | 2-1 | |
| 4102.713 | A | 150 | 0.77 | 3.78 | 4-3 | $d^4s^2\ ^5D$-$d^4sp^5P^o$† |
| 3881.402 | A | 100 | 0.60 | 3.76 | 3-3 | (2) |
| 3835.058 | A | (5) | 0.41 | 3.83 | 2-2 | |
| *3757.093 | A | (3) | 0.77 | 4.05 | 4-4 | $d^4s^2\ ^5D$-$d^4sp^5D^o$† |
| 3884.335 | A | (3) | 0.41 | 3.60 | 2-2 | (3) |
| 3829.133 | A | (3) | 0.21 | 3.43 | 1-1 | |
| 4219.383 | A | (5) | 0.77 | 3.69 | 4-3 | |
| *3570.662 | A | (6) | 0.60 | 4.05 | 3-4 | |
| 3760.133 | A | (4) | 0.41 | 3.69 | 2-3 | |
| 3631.959 | A | (5) | 0.21 | 3.60 | 1-2 | |
| 3682.101 | A | (5) | 0.77 | 4.12 | 4-5 | $d^4s^2\ ^5D$-$d^4sp^5F^o$† |
| *3757.929 | A | (3) | 0.60 | 3.88 | 3-4 | (4) |
| *3872.835 | A | (4) | 0.41 | 3.60 | 2-3 | |
| 4047.948 | A | (2) | 0.21 | 3.26 | 1-2 | |
| 3847.501 | A | (3) | 0.00 | 3.21 | 0-1 | |
| *3570.662 | A | (8) | 0.41 | 3.87 | 2-1 | $d^4s^2\ ^5D$-313° |
| 3326.194 | A | 60 | 0.77 | 4.48 | 4-5 | (5)362° |
| 3300.819 | A | 150 | 0.60 | 4.34 | 3-4 | 351° |
| 3215.578 | A | 150 | 0.77 | 4.61 | 4-5 | 373° |
| 3191.577 | A | 60 | 0.00 | 3.87 | 0-1 | 313° |
| 3176.602 | A | 30 | 0.21 | 4.09 | 1-2 | 331° |
| 3046.452 | A | 50 | 0.21 | 4.26 | 1-2 | 344° |
| 3041.876 | A | 25 | 0.41 | 4.47 | 2-1 | 361° |
| 4008.769 | A | 1000 | 0.36 | 3.44 | 3-4 | $d^5e^7S$-$d^4s_p{}^7P^o$ |
| 4074.374 | A | 500 | 0.38 | 3.39 | 3-3 | (6) |
| 4294.623 | A | 1000 | 0.36 | 3.24 | 3-2 | |
| 3887.988 | A | 300 | 0.36 | 3.56 | 3-4 | $d^5s\ ^7S$-$d^4ep^7D^o$ |
| 4302.123 | A | 500 | 0.36 | 3.23 | 3-3 | (7) |
| *4757.565 | A | 200 | 0.38 | 2.98 | 3-2 | |
| 3617.522 | A | 800 | 0.38 | 3.78 | 3-3 | $d^5e^7S$-$d^4ep^5P^o$ |
| 3780.770 | A | 300 | 0.36 | 3.63 | 3-2 | (8) |
| 3207.248 | A | 80 | 0.36 | 4.21 | 3-4 | $d^5s\ ^7S$- 341° |
| *3049.694 | A | 60 | 0.36 | 4.41 | 3-2 | (9)357° |
| 3017.447 | A | 80 | 0.38 | 4.45 | 3-4 | 380° |

**W II** I P ? Anal D List D Dec 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3841.42 | A | 150 | 1.08 | 4.48 | 1½- ½ | $^4F$-1° |
| 3288.57 | A | 100 | 1.08 | 4.83 | 1½-1½ | (1)3° |

| I A | Laboratory Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **W II** continued | | | | | | |
| 3657.59 | A | 120 | 1.09 | 4.46 | ½- ½ | 1-1° |
| 3361.11 | A | 100 | 1.09 | 4.76 | ½- ½ | (2)2° |
| 3572.48 | A | 200 | 1.31 | 4.76 | 1½- ½ | 2-3° (3) |
| 3024.51 | A | 300 | 1.40 | 5.48 | 2½-2½ | 3-7° (4) |
| 3149.87 | A | 500 | 1.63 | 5.54 | ½-1½ | 4-11° (5) |
| *3189.24 | A | 100 l | 1.66 | 5.53 | 3½-4½ | 5- 9° |
| 3177.22 | A | 150 | 1.66 | 5.54 | 3½-3½ | (6)10° |
| 3051.30 | A | 400 | 1.66 | 5.70 | 3½-3½ | 13° |
| 3021.96 | A | 100 | 1.66 | 5.74 | 3½-4½ | 15° |
| 3463.52 | A | 200 | 1.66 | 5.22 | 2½-1½ | 6- 5° |
| 3179.44 | A | 150 | 1.66 | 5.54 | 2½-3½ | (7)10° |
| 3175.97 | A | 200 | 1.66 | 5.54 | 2½-1½ | 11° |
| 3036.68 | A | 100 | 1.66 | 5.72 | 2½-2½ | 14° |
| 3343.40 | A | 120 | 1.63 | 5.53 | 4½-4½ | 6- 9° |
| 3160.03 | A | 300 | 1.63 | 5.74 | 4½-4½ | (8)15° |
| 3401.90 | A | 150 | 1.85 | 5.48 | 2½-2½ | 9- 7° |
| 3342.46 | A | 300 | 1.85 | 5.54 | 2½-3½ | (9)10° |
| 3376.17 | A | 400 | 1.87 | 5.53 | 3½-4½ | 10- 9° |
| *3189.24 | A | 100 l | 1.87 | 5.74 | 3½-4½ | (10)15° |
| 3555.18 | A | 120 | 2.00 | 5.48 | 2½-2½ | 11- 7° |
| 3486.14 | A | 100 | 2.00 | 5.54 | 2½-1½ | (11)11° |
| 3529.57 | A | 100 | 2.04 | 5.54 | 4½-3½ | 12-10° (12) |
| 3549.06 | A | 150 | 2.05 | 5.53 | 3½-4½ | 13- 9° |
| 3358.62 | A | 200 | 2.05 | 5.72 | 3½-3½ | (13)14° |
| 3343.09 | A | 100 | 2.05 | 5.74 | 3½-4½ | 15° |
| *3343.36 | A | 100 | 2.05 | 5.65 | 3½-2½ | 17° |
| 3010.76 | A | 100 | 2.35 | 6.45 | 4½-3½ | 15-27° (14) |
| *3343.36 | A | 100 | 2.47 | 6.28 | 3½-4½ | 16-23° (15) |
| 3151.31 | A | 300 | 2.87 | 6.78 | 4½-5½ | 19-38° (16) |
| 3345.86 | A | 200w | 2.89 | 6.58 | 2½-1½ | 20-31° (17) |

**Re I** I P 7.85 Anal B Liet D May 1943

| | | | | | | |
|---|---|---|---|---|---|---|
| 4689.15 | A | 2000 | 0.00 | 2.52 | 2½-3½ | $a^6S$-$z^8P^o$ |
| 5275.54 | A | 1000 | 0.00 | 2.34 | 2½-2½ | (1) |
| 3460.47 // | A | 1000 | 0.00 | 3.57 | 2½-3½ | $a^6S$-$z^6P^o$ |
| 3464.72 | A | 800 | 0.00 | 3.56 | 2½-2½ | (2) |
| 3451.88 | A | 600 | 0.00 | 3.58 | 2½-1½ | |

**Oe I** I P 8.7 Anal C List D Dec 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 4420.468 | A | 400R | 0.00 | 2.79 | 4-4 | 1-26° |
| 4260.854 | A | 200 | 0.00 | 2.90 | 4-5 | (1)27° |
| 3528.602 | A | 400R | 0.00 | 3.50 | 4-4 | 32° |
| 3301.559 | A | 500R | 0.00 | 3.74 | 4-5 | 37° |
| 3267.945 | A | 400R | 0.00 | 3.78 | 4-4 | 39° |
| *3058.66 | A | 500R | 0.00 | 4.03 | 4-4 | 41° |
| 3752.524 | A | 400R | 0.34 | 3.63 | 2-3 | 2-35° (2) |
| 4135.784 | A | 200 | 0.51 | 3.50 | 3-4 | 3-32° |
| 3963.688 | A | 500 | 0.51 | 3.63 | 3-3 | (3)35° |
| 3783.195 | A | 400R | 0.51 | 3.78 | 3-4 | 39° |
| 3336.150 | A | 200R | 0.51 | 4.21 | 3-3 | 43° |
| 3262.290 | A | 500R | 0.51 | 4.30 | 3-4 | 45° |
| 3232.055 | A | 500R | 0.51 | 4.33 | 3-2 | 46° |
| 4173.234 | A | 100 | 0.64 | 3.59 | 5-6 | 4-34° |
| 3977.231 | A | 300 | 0.64 | 3.74 | 5-5 | (4)37° |
| 3370.588 | A | 300R | 0.64 | 4.30 | 5-4 | 45° |
| 3156.248 | A | 500R | 0.64 | 4.55 | 5-5 | 53° |
| 4112.018 | A | 150 | 0.71 | 3.71 | 1-2 | 5-36° (5) |
| 3580.855 | A | 150R | 1.08 | 4.55 | 4-5 | 7-53° (8) |

| I A | Laboratory Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Ir I** I P 9.2 Anal B List D Dec 1942 | | | | | | |
| 3800.122 | A | 60r | 0.00 | 3.25 | 4½-4½ | $a^4F$-$z^6D^o$ |
| 3448.967 | A | 60 | 0.50 | 4.08 | 1½-2½ | (1) |
| 3513.636 | A | 60r | 0.00 | 3.51 | 4½-5½ | $a^4F$-$z^6F^o$ |
| 3266.446 | A | 60 | 0.71 | 4.49 | 2½-1½ | (2) |
| 3437.006 | A | 80 | 0.78 | 4.37 | 3½-3½ | $a^4F$-$z^6G^o$ (3) |
| 4268.096 | A | 80 | 0.88 | 3.77 | 3½-3½ | $b^4F$-$z^6D^o$ (4) |
| 3368.472 | A | 60 | 0.35 | 4.01 | 4½-4½ | $b^4F$-$z^6F^o$ |
| 3992.114 | A | 80 | 1.22 | 4.31 | 2½-2½ | (5) |
| 3220.772 | A | 100r | 0.35 | 4.18 | 4½-3½ | |
| 3915.384 | A | 60 | 1.22 | 4.37 | 2½-3½ | $b^4F$-$z^6G^o$ |
| 3068.897 | A | 60 | 0.35 | 4.37 | 4½-3½ | (6) |
| 3196.917 | A | 60 | 0.66 | 4.74 | 3½-2½ | $b^4F$-$z^4D^o$ (7) |
| 3212.121 | A | 60 | 0.66 | 4.72 | 3½-4½ | $b^4F$-$z^4G^o$ (6) |

**Pt I** I P 9.2 Anal B Liet D Dec 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3315.05 | A | 8 | 0.00 | 3.72 | 3-4 | $a^3D$-$z^5D^o$ |
| 3290.23 | A | 6 | 1.25 | 5.00 | 1-2 | (1) |
| 3064.71 | A | 50 | 0.00 | 4.03 | 3-2 | $a^3D$-$z^3D^o$ |
| 3139.39 | A | 10 | 0.10 | 4.03 | 2-2 | (2) |
| 3156.59 | A | 10 | 1.25 | 5.16 | 1-1 | |
| 2997.97 | A | 30 | 0.10 | 4.21 | 2-3 | $a^3D$-$z^3F^o$ (3) |
| 3408.14 | A | 15 | 0.10 | 3.72 | 4-4 | $a^3F$-$z^5D^o$ |
| 3968.37 | A | 6 | 1.25 | 4.36 | 3-3 | (4) |
| 3042.65 | A | 20 | 0.10 | 4.16 | 4-5 | $a^3F$-$z^5G^o$ (5) |
| 4164.54 | A | 5 | 1.25 | 4.21 | 3-3 | $a^3F$-$z^3F^o$ |
| 3638.80 | A | 8 | 1.25 | 4.64 | 3-4 | (6) |
| 5368.97 | A | 3 | 1.91 | 4.21 | 2-3 | |
| 3301.87 | A | 10 | 0.81 | 4.55 | 2-2 | $a^3P$-5° (7) |

**Pt II** See introduction

**Au I** I P 9.2 Anal A Liet D Dec 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 3122.782 | B | (150) | 1.13 | 5.08 | 2½-1½ | $a^3D$-$6^3P^o$ |
| 6278.30 | A | 35n | 2.65 | 4.61 | 1½- ½ | (1) |
| *5064.69 | A | 15 | 2.65 | 5.08 | 1½-1½ | |
| 7510.74 | A | 200 | 5.06 | 6.73 | 1½- ½ | $6^2P^o$-$7^2S$ |
| 5837.29 | A | 40 | 4.61 | 6.73 | ½- ½ | (2) |
| 4792.63 | A | 100 | 5.08 | 7.66 | 1½-2½ | $6^2P^o$-$6^2D$ |
| 4065.09 | A | 45 | 4.61 | 7.65 | ½-1½ | (3) |
| 4811.61 | A | 60 | 5.08 | 7.65 | 1½-1½ | |

**Au II** See introduction

**Hg I** I P 10.39 Anal A Liet D Dec 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 5460.742 | A | 500R | 5.44 | 7.70 | 2-1 | $6^3P^o$-$7^3S$ |
| 4358.343 | A | 300 | 4.87 | 7.70 | 1-1 | (1) |
| 4046.557 | A | 100 | 4.65 | 7.70 | 0-1 | |
| 3663.274 | A | 50R | 5.44 | 8.81 | 2-2 | $6^3P^o$-$6^1D$ |
| 3131.845 | A | 100 | 4.87 | 8.81 | 1-2 | (2) |
| 3650.144 | A | 100R | 5.44 | 8.82 | 2-3 | $6^3P^o$-$6^3D$† |
| 3125.668 | B | 200R | 4.87 | 8.81 | 1-2 | (3) |
| 5790.659 | A | 300 | 6.67 | 8.81 | 1-2 | $6^1P^o$-$6^1D$ (4) |
| 5769.598 | A | 300 | 6.67 | 8.81 | 1-2 | $6^1P^o$-$6^3D$† (5) |

Many lines show fine structure

**Hg II** See introduction

**Tl I** I P 6.08 Anal A Liet D Dec 1942

| | | | | | | |
|---|---|---|---|---|---|---|
| 5350.527// | A | 500R | 0.96 | 3.27 | 1½- ½ | $6^2P^o$-$7^2S$ |
| 3775.734 | A | 500R | 0.00 | 3.27 | ½- ½ | (1) |
| 3519.24 | B | 500R | 0.96 | 4.47 | 1½-2½ | $6^2P^o$-$6^2D$† |
| 3529.38 | B | 100R | 0.98 | 4.46 | 1½-1½ | (2) |

Many lines show fine structure

**Tl II** See introduction

| Laboratory I A | Ref | Int | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|---|---|
| **Pb I** I P 7.38 Anal A List D Dec 1942 | | | | | | |
| 3639.568 | A | 500R | 0.97 | 4.36 | 1-1 | $6p^3P-7s^3P^o$ † |
| 3057.812// | A | 1000R | 1.31 | 4.36 | 2-1 | (1) |
| 3683.469 | A | 1000R | 0.97 | 4.32 | 1-0 | |
| 3739.940 | A | 200 | 2.65 | 5.95 | 2-2 | $6p^1D-7s^3P^o$ |
| 7228.974 | B | (2000) | 2.65 | 4.36 | 2-1 | (2) |
| 3572.734 | A | 200R | 2.65 | 6.10 | 2-1 | $6p^1D-7s^1P^o$ (3) |
| **Pb II** See introduction | | | | | | |
| **Bi I** I P ? Anal B List D Dec 1942 | | | | | | |
| 3067.712// | A | 9R | 0.00 | 4.02 | $1\frac{1}{2}-\frac{1}{2}$ | $6p^4S^o-1$ (1) |
| 4722.852 to 4723.333 | B | (8) (10) | 1.41 | 4.02 | $1\frac{1}{2}-\frac{1}{2}$ | $6p^2D^o-1$ (2) |
| Wide fine structure | | | | | | |
| **Bi II** See introduction | | | | | | |
| **Rn I** See introduction | | | | | | |
| **Ra I** I P 5.25 Anal A List D May 1942 | | | | | | |
| 4825.91 // | A | 100 | 0.00 | 2.56 | 0-1 | $7^1S-7^1P^o$ (1) |
| **Ra II** I P 10.10 Anal A List D May 1942 | | | | | | |
| 3814.42 // | A | 200 | 0.00 | 3.24 | $\frac{1}{2}-1\frac{1}{2}$ | $7^2S-7^2P^o$ |
| 4682.28 | A | 100 | 0.00 | 2.64 | $\frac{1}{2}-\frac{1}{2}$ | (1) |
| **Th I** No analysis Dec 1942 | | | | | | |
| **Th II** I P ? Anal C List D July 1944 | | | | | | |
| 3539.589 | A | 400 | 0.00 | 3.49 | $1\frac{1}{2}-2\frac{1}{2}$ | $a^2D-z^4P^o$ † (1) |
| 4277.322 | A | 400 | 0.00 | 2.89 | $1\frac{1}{2}-1\frac{1}{2}$ | $a^2D-y^2P^o$ † (2) |
| 3610.794 | A | 30 | 0.51 | 3.93 | $2\frac{1}{2}-3\frac{1}{2}$ | $a^2D-y^2F^o$ † |
| 4019.137// | A | 1500 | 0.00 | 3.07 | $1\frac{1}{2}-2\frac{1}{2}$ | (3) |
| 3180.199 | A | 400 | 0.19 | 4.07 | $2\frac{1}{2}-3\frac{1}{2}$ | $a^4F-z^4F^o$ † (4) |
| 3392.040 | A | 300 | 0.19 | 3.83 | $2\frac{1}{2}-3\frac{1}{2}$ | $a^4F-y^2G^o$ † (5) |
| 4391.114 | A | 600 | 0.55 | 3.36 | $2\frac{1}{2}-3\frac{1}{2}$ | $a^2F^o-z^4G$ † (8) |
| 4919.814 | A | 500 | 0.76 | 3.27 | $3\frac{1}{2}-2\frac{1}{2}$ | $a^4H^o-z^4G$ † (7) |
| **Th III** See introduction | | | | | | |
| **U** Not separated Dec 1942 | | | | | | |

FORBIDDEN LINES

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Be I** I P 9.28 | | | | |
| 4548.3 | 0.00 | (2.71) | 0-1 | $2s^2\ ^1S-2s2p^3P^o$ (1F) |
| **C I** I P 11.20 | | | | |
| 9849.5 | 0.01 | 1.26 | 2-2 | $2p^2\ ^3P-2p^2\ ^1D$ (1F) |
| 9823.4 | 0.00 | 1.26 | 1-2 | |
| 9808.9 | 0.00 | 1.26 | 0-2 | |
| 4627.3 | 0.01 | 2.67 | 2-0 | $2p^2\ ^3P-2p^2\ ^1S$ (2F) |
| 4621.5 | 0.00 | 2.67 | 1-0 | |
| 8727.4 | 1.26 | 2.67 | 2-0 | $2p^2\ ^1D-2p^2\ ^1S$ (3F) |
| **N I** I P 14.49 | | | | |
| 5200.7 | 0.00 | 2.37 | $1\frac{1}{2}$-$2\frac{1}{2}$ | $2p^3\ ^4S^o-2p^3\ ^2P^o$ (1F) |
| 5198.5 | 0.00 | 2.37 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 3466.4 | 0.00 | 3.56 | $1\frac{1}{2}$- | $2p^3\ ^4S^o-2p^3\ ^2P^o$ (2F) |
| 10395.4 | 2.37 | 3.56 | $2\frac{1}{2}$- | $2p^3\ ^2D^o-2p^3\ ^2P^o$ (3F) |
| 10404.1 | 2.37 | 3.56 | $1\frac{1}{2}$- | |
| **N II** I P 29.49 | | | | |
| 6583.6 N | 0.02 | 1.89 | 2-2 | $2p^2\ ^3P-2p^2\ ^1D$ (1F) |
| 6548.1 N | 0.01 | 1.89 | 1-2 | |
| 6527.4 | 0.00 | 1.89 | 0-2 | |
| 3070.8 | 0.02 | 4.04 | 2-0 | $2p^2\ ^3P-2p^2\ ^1S$ (2F) |
| 3063.0 | 0.01 | 4.04 | 1-0 | |
| 5754.8 N | 1.89 | 4.04 | 2-0 | $2p^2\ ^1D-3p^2\ ^1S$ (3F) |
| **O I** I P 13.56 | | | | |
| 6300.23 L | 0.00 | 1.96 | 2-2 | $2p^4\ ^3P-2p^4\ ^1D$ (1F) |
| 6363.88 L | 0.02 | 1.96 | 1-2 | |
| 2972.3 | 0.02 | 4.17 | 1-0 | $2p^4\ ^3P-2p^4\ ^1S$ (2F) |
| 5577.350A | 1.96 | 4.17 | 2-0 | $2p^4\ ^1D-2p^4\ ^1S$ (3F) |
| **O II** I P 35.00 | | | | |
| 3728.91 N | 0.00 | 3.31 | $1\frac{1}{2}$-$2\frac{1}{2}$ | $2p^3\ ^4S^o-2p^3\ ^2D^o$ (1F) |
| 3726.16 N | 0.00 | 3.31 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 7319.4 | 3.31 | 5.00 | $2\frac{1}{2}$-$1\frac{1}{2}$ | $2p^3\ ^2P^o-2p^3\ ^2P^o$ (2F) |
| 7329.9 | 3.31 | 5.00 | $1\frac{1}{2}$- $\frac{1}{2}$ | |
| 7318.6 | 3.31 | 5.00 | $2\frac{1}{2}$- $\frac{1}{2}$ | |
| 7330.7 | 3.31 | 5.00 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| **O III** I P 54.71 | | | | |
| 5006.84 N | 0.04 | 2.50 | 2-2 | $2p^2\ ^3P-2p^2\ ^1D$ (1F) |
| 4958.91 N | 0.01 | 2.50 | 1-2 | |
| 1931.8 | 0.00 | 2.50 | 0-2 | |
| 4383.21 N | 2.50 | 5.33 | 2-0 | $2p^2\ ^1D-3p^2\ ^1S$ (2F) |
| **F II** I P 34.84 | | | | |
| 4789.5 | 0.00 | 2.58 | 2-2 | $2p^4\ ^3P-2p^4\ ^1D$ (1F) |
| 4869.3 | 0.04 | 2.58 | 1-2 | |
| 4157.5 | 2.58 | 5.55 | 2-0 | $2p^4\ ^1D-3p^4\ ^1S$ (2F) |
| **F III** I P 62.39 | | | | |
| 5721.2 | 4.21 | 6.36 | $2\frac{1}{2}$- | $2p^3\ ^2D^o-2p^3\ ^2P^o$ (1F) |
| 5733.0 | 4.21 | 6.36 | $1\frac{1}{2}$- | |
| **F IV** I P 86.88 | | | | |
| 4059.3 | 0.08 | 3.12 | 2-2 | $2p^2\ ^3P-2p^2\ ^1D$ (1F) |
| 3996.3 | 0.03 | 3.12 | 1-2 | |
| 3532.2 | 3.12 | 6.61 | 2-0 | $2p^2\ ^1D-2p^2\ ^1S$ (2F) |
| **Ne III** I P 63.3 | | | | |
| 3868.74 N | 0.00 | 3.19 | 2-2 | $2p^4\ ^3P-2p^4\ ^1D$ (1F) |
| 3967.51 N | 0.08 | 3.19 | 1-2 | |
| 3342.9 | 3.19 | 6.88 | 2-0 | $2p^4\ ^1D-2p^4\ ^1S$ (2F) |
| **Ne IV** I P 96 | | | | |
| 4716 ? | (4.76 | 7.38) | $2\frac{1}{2}$-$1\frac{1}{2}$ | $2p^3\ ^2D^o-2p^3\ ^2P^o$ (1F) |
| 4720 ? | (4.76 | 7.38) | $1\frac{1}{2}$- $\frac{1}{2}$ | |
| 4714 ? | (4.76 | 7.38) | $2\frac{1}{2}$- $\frac{1}{2}$ | |
| 4717 ? | (4.76 | 7.38) | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| **Ne V** I P 126 | | | | |
| 3425.8 N | 0.10 | (3.74) | 2-2 | $2p^2\ ^3P-2p^2\ ^1D$ (1F) |
| 3345.9 N | 0.05 | (3.74) | 1-2 | |
| 2972 ? | (3.74 | 7.89) | 2-0 | $2p^2\ ^1D-2p^2\ ^1S$ (2F) |
| **Na IV** I P 98.5 | | | | |
| 3319.3 | 0.00 | 3.72 | 2-2 | $2p^4\ ^3P-2p^4\ ^1D$ (1F) |
| 3445.9 | 0.14 | 3.72 | 1-2 | |
| **Na V** I P 138.0 | | | | |
| 4011.2 | 5.83 | 8.90 | $2\frac{1}{2}$-$1\frac{1}{2}$ | $2p^3\ ^2P^o-2p^3\ ^2P^o$ (1F) |
| 4021.6 | 5.83 | 8.90 | $1\frac{1}{2}$- $\frac{1}{2}$ | |
| 4017.5 | 5.83 | 8.90 | $2\frac{1}{2}$- $\frac{1}{2}$ | |
| 4015.3 | 5.83 | 8.90 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| **Mg VI** I P 188.1 | | | | |
| 3485.5 | 6.70 | 10.24 | $2\frac{1}{2}$-$1\frac{1}{2}$ | $2p^3\ ^2P^o-2p^3\ ^2P^o$ (1F) |
| 3503.0 | 6.70 | 10.23 | $1\frac{1}{2}$- $\frac{1}{2}$ | |
| 3500.4 | 6.70 | 10.23 | $2\frac{1}{2}$- $\frac{1}{2}$ | |
| 3488.1 | 6.70 | 10.24 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| **Al VII** I P 241.1 | | | | |
| 3074.0 | 7.59 | 11.61 | $2\frac{1}{2}$-$1\frac{1}{2}$ | $2p^3\ ^2P^o-2p^3\ ^2P^o$ (1F) |
| 3093.4 | 7.59 | 11.58 | $1\frac{1}{2}$- $\frac{1}{2}$ | |
| 3098.7 | 7.59 | 11.58 | $2\frac{1}{2}$- $\frac{1}{2}$ | |
| 3068.8 | 7.59 | 11.61 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| **Si I** I P 8.12 | | | | |
| 6589.74 | 0.03 | 1.90 | 2-0 | $3p^2\ ^3P-3p^2\ ^1S$ (1F) |
| 6526.85 | 0.01 | 1.90 | 1-0 | |
| 10991.52 | 0.78 | 1.90 | 2-0 | $3p^2\ ^1D-3p^2\ ^1S$ (2F) |
| **P I** I P 10.9 | | | | |
| 8787.6 | 0.00 | 1.40 | $1\frac{1}{2}$-$2\frac{1}{2}$ | $3p^3\ ^4S^o-3p^3\ ^2D^o$ (1F) |
| 8799.1 | 0.00 | 1.40 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 5332.4 | 0.00 | 2.31 | $1\frac{1}{2}$-$1\frac{1}{2}$ | $3p^3\ ^4S^o-3p^3\ ^2P^o$ (2F) |
| 5339.7 | 0.00 | 2.31 | $1\frac{1}{2}$- $\frac{1}{2}$ | |
| **P II** I P 19.57 | | | | |
| 11898.2 | 0.08 | 1.10 | 2-2 | $3p^2\ ^3P-3p^2\ ^1D$ (1F) |
| 11483.2 | 0.02 | 1.10 | 1-2 | |
| 4736.6 | 0.06 | 2.66 | 2-0 | $3p^2\ ^3P-3p^2\ ^1S$ (2F) |
| 4669.5 | 0.02 | 2.66 | 1-0 | |
| **P II** continued | | | | |
| 7869.5 | 1.10 | 2.86 | 2-0 | $3p^2\ ^1D-3p^2\ ^1S$ (3F) |
| **S I** I P 10.31 | | | | |
| 10819.8 | 0.00 | 1.14 | 2-2 | $3p^4\ ^3P-3p^4\ ^1D$ (1F) |
| 11305.8 | 0.05 | 1.14 | 1-2 | |
| 4506.9 | 0.00 | 2.74 | 2-0 | $3p^4\ ^3P-3p^4\ ^1S$ (2F) |
| 4589.0 | 0.05 | 2.74 | 1-0 | |
| 7724.7 | 1.14 | 2.74 | 2-0 | $3p^4\ ^1D-3p^4\ ^1S$ (3F) |
| **S II** I P 23.3 | | | | |
| 4068.62 N | 0.00 | 3.03 | $1\frac{1}{2}$-$1\frac{1}{2}$ | $3p^3\ ^4S^o-3p^3\ ^2P^o$ (1F) |
| 4076.22 N | 0.00 | 3.03 | $1\frac{1}{2}$- $\frac{1}{2}$ | |
| 6717.0 | 0.00 | 1.84 | $1\frac{1}{2}$-$2\frac{1}{2}$ | $3p^3\ ^4S^o-3p^3\ ^2D^o$ (2F) |
| 6731.3 | 0.00 | 1.83 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 10317.7 | 1.84 | 3.03 | $2\frac{1}{2}$-$1\frac{1}{2}$ | $3p^3\ ^2D^o-3p^3\ ^2P^o$ (3F) |
| 10336.0 | 1.83 | 3.03 | $1\frac{1}{2}$- $\frac{1}{2}$ | |
| 10369.7 | 1.84 | 3.03 | $2\frac{1}{2}$- $\frac{1}{2}$ | |
| 10284.3 | 1.83 | 3.03 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| **S III** I P 34.9 | | | | |
| 9532.1 | 0.10 | 1.40 | 2-2 | $3p^2\ ^3P-3p^2\ ^1D$ (1F) |
| 9069.4 | 0.04 | 1.40 | 1-2 | |
| 3796.7 | 0.10 | 3.35 | 2-0 | $3p^2\ ^3P-3p^2\ ^1S$ (2F) |
| 3721.1 | 0.04 | 3.35 | 1-0 | |
| 6310.2 | 1.40 | 3.35 | 2-0 | $3p^2\ ^1D-3p^2\ ^1S$ (3F) |
| **S VIII** I P ? | | | | |
| 9917.9 | 0.00 | 1.24 | $1\frac{1}{2}$- $\frac{1}{2}$ | $2p^5\ ^2P^o-2p^5\ ^2P^o$ (1F) |
| **S XII** I P ? | | | | |
| 7536 | 0.00 | 1.64 | $\frac{1}{2}$-$1\frac{1}{2}$ | $2p^2P-2p^2P$ (1F) |
| **Cl II** I P 23.70 | | | | |
| 8579.5 | 0.00 | 1.44 | 2-2 | $3p^4\ ^3P-3p^4\ ^1D$ (1F) |
| 9125.8 | 0.09 | 1.44 | 1-2 | |
| 3583.2 | 0.00 | (3.44) | 2-0 | $3p^4\ ^3P-3p^4\ ^1S$ (2F) |
| 3675.0 | 0.09 | (3.44) | 1-0 | |
| 6152.9 | 1.44 | (3.44) | 2-0 | $3p^4\ ^1D-3p^4\ ^1S$ (3F) |
| **Cl III** I P 39.7 | | | | |
| 3342.7 | 0.00 | 3.69 | $1\frac{1}{2}$-$1\frac{1}{2}$ | $3p^3\ ^4S^o-3p^3\ ^2P^o$ (2F) |
| 3353.4 | 0.00 | 3.68 | $1\frac{1}{2}$- $\frac{1}{2}$ | |
| 5517.2 | 0.00 | 2.24 | $1\frac{1}{2}$-$2\frac{1}{2}$ | $3p^3\ ^4S^o-3p^3\ ^2D^o$ (1F) |
| 5537.7 | 0.00 | 2.23 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 8481.6 | 2.24 | 3.69 | $2\frac{1}{2}$-$1\frac{1}{2}$ | $3p^3\ ^2D^o-3p^3\ ^2P^o$ (3F) |
| 8501.8 | 2.23 | 3.68 | $1\frac{1}{2}$- $\frac{1}{2}$ | |
| 8550.5 | 2.24 | 3.68 | $2\frac{1}{2}$- $\frac{1}{2}$ | |
| 8433.7 | 2.23 | 3.69 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| **Cl IV** I P 53.2 | | | | |
| 8046.1 | 0.17 | 1.70 | 2-2 | $3p^2\ ^3P-3p^2\ ^1D$ (1F) |
| 7530.9 | 0.06 | 1.70 | 1-2 | |
| 3203.3 | 0.17 | 4.02 | 2-0 | $3p^2\ ^3P-3p^2\ ^1S$ (2F) |
| 3118.3 | 0.06 | 4.02 | 1-0 | |
| 5322.2 | 1.70 | 4.02 | 2-0 | $3p^2\ ^1D-3p^2\ ^1S$ (3F) |

FORBIDDEN LINES

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **A III** I P 40.8 | | | | |
| 7135.8 | 0.00 | 1.73 | 2-2 | $3p^4\ ^3P-3p^4\ ^1D$ (1F) |
| 7751.0 | 0.14 | 1.73 | 1-2 | |
| 3005.1 | 0.00 | (4.11) | 2-0 | $3p^4\ ^3P-3p^4\ ^1S$ (2F) |
| 3109.0 | 0.14 | (4.11) | 1-0 | |
| 5191.4 N | 1.73 | (4.11) | 2-0 | $3p^4\ ^1D-3p^4\ ^1S$ (3F) |
| **A IV** I P 61 | | | | |
| 4711.4 | 0.00 | 2.62 | 1½-2½ | $3p^3\ ^4S^o-3p^3\ ^2D^o$ (1F) |
| 4740.3 | 0.00 | 2.60 | 1½-1½ | |
| 7236.0 | 2.62 | 4.33 | 2½-1½ | $3p^3\ ^2D^o-3p^3\ ^2P^o$ (2F) |
| 7263.3 | 2.60 | 4.30 | 1½- ½ | |
| 7332.0 | 2.62 | 4.30 | 2½- ½ | |
| 7169.0 | 2.60 | 4.33 | 1½-1½ | |
| **A V** I P 78 | | | | |
| 7006.3 | 0.25 | 2.01 | 2-2 | $3p^2\ ^3P-3p^2\ ^1D$ (1F) |
| 6434.9 | 0.09 | 2.01 | 1-2 | |
| 4610 ? | 2.01 | (4.69) | 2-0 | $3p^2\ ^1D-3p^2\ ^1S$ (2F) |
| **A X** I P ? | | | | |
| 5534.6 | 0.00 | 2.23 | 1½- ½ | $2p^5\ ^2P^o-2p^5\ ^2P^o$ (1F) |
| **A XI** I P ? | | | | |
| 6919 | 0.00 | 1.78 | 2-1 | $2p^4\ ^3P-2p^4\ ^3P$ (1F) |
| **A XIV** I P ? | | | | |
| 4359 ? | 0.00 | 2.83 | ½-1½ | $2p^2P^o-2p^2P^o$ (1F) |
| **K IV** I P 62.5 | | | | |
| 6101.1 | 0.00 | 2.02 | 2-2 | $3p^4\ ^3P-3p^4\ ^1D$ (1F) |
| 6794.8 | 0.21 | 2.02 | 1-2 | |
| 4511.0 | 2.02 | 4.76 | 2-0 | $3p^4\ ^1D-3p^4\ ^1S$ (2F) |
| **K V** I P ? | | | | |
| 4125 ? | 0.00 | (2.99) | 1½-2½ | $3p^3\ ^4S^o-3p^3\ ^2D^o$ (1F) |
| 4166 ? | 0.00 | (2.96) | 1½-1½ | |
| 6316.6 | (2.99 | 4.95) | 2½-1½ | $3p^3\ ^2D^o-3p^3\ ^2P^o$ (2F) |
| 6349.5 | (2.96 | 4.91) | 1½- ½ | |
| 6446.5 | (2.99 | 4.91) | 2½- ½ | |
| 6223.4 | (2.96 | 4.95) | 1½-1½ | |
| **K VI** I P ? | | | | |
| 6229.2 | 0.36 | 2.34 | 2-2 | $3p^2\ ^3P-3p^2\ ^1D$ (1F) |
| 5603.2 | 0.14 | 2.34 | 1-2 | |
| 4097 ? | 2.34 | (5.35) | 2-0 | $3p^2\ ^1D-3p^2\ ^1S$ (2F) |
| **Ca I** I P 6.09 | | | | |
| 4912.82 | 0.00 | 2.51 | 0-2 | $4^1S-3^3D$ (1F) |
| 4916.18 | 0.00 | 2.51 | 0-1 | |
| 4575.46 | 0.00 | 2.70 | 0-2 | $4^1S-3^1D$ (2F) |
| **Ca II** I P 11.82 | | | | |
| 7291.46 | 0.00 | 1.69 | ½-2½ | $4^2S-3^2D$ (1F) |
| 7323.88 | 0.00 | 1.69 | ½-1½ | |
| **Ca V** I P 84 | | | | |
| 5308.9 | 0.00 | 2.32 | 2-2 | $3p^4\ ^3P-3p^4\ ^1D$ (1F) |
| 6085.9 | 0.30 | 2.32 | 1-2 | |
| 3996.3 | 2.32 | 5.41 | 2-0 | $3p^4\ ^1D-3p^4\ ^1S$ (2F) |
| **Ca VI** I P ? | | | | |
| 3646.3 | 0.00 | 3.38 | 1½-2½ | $3p^3\ ^4S^o-3p^3\ ^2D^o$ (1F) |
| 3702.7 | 0.00 | 3.33 | 1½-1½ | |
| 5587.3 | 3.38 | 5.59 | 2½-1½ | $3p^3\ ^2D^o-3p^3\ ^2P^o$ (2F) |
| 5631.0 | 3.33 | 5.52 | 1½- ½ | |
| 5766.4 | 3.38 | 5.52 | 2½- ½ | |
| 5460.0 | 3.33 | 5.59 | 1½-1½ | |
| **Ca VII** I P ? | | | | |
| 5615.8 | 0.50 | 2.70 | 2-2 | $3p^2\ ^3P-3p^2\ ^1D$ (1F) |
| 4938.6 | 0.20 | 2.70 | 1-2 | |
| 3688 ? | 2.70 | (6.05) | 2-0 | $3p^2\ ^1D-3p^2\ ^1S$ (2F) |
| **Ca XII** I P 655 | | | | |
| 3329.3 | 0.00 | 3.71 | 1½- ½ | $2p^5\ ^2P^o-2p^5\ ^2P^o$ (1F) |
| **Ca XIII** I P ? | | | | |
| 4086.5 | 0.00 | 3.02 | 2-1 | $2p^4\ ^2P-2p^4\ ^2P$ (1F) |
| **Ca XV** I P ? | | | | |
| 5648 ? | 0.00 | (2.19) | 0-1 | $2p^2\ ^3P-2p^2\ ^3P$ (1F) |
| **Sc II** I P 12.8 | | | | |
| 9285.20 | 0.02 | 1.35 | 3-2 | $a^3D-b^1D$ (1F) |
| 9191.34 | 0.01 | 1.35 | 2-2 | |
| 9134.50 | 0.00 | 1.35 | 1-2 | |
| 8649.11 | 0.02 | 1.45 | 3-0 | $a^3D-a^1S$ (2F) |
| 8567.60 | 0.01 | 1.45 | 2-0 | |
| 8518.20 | 0.00 | 1.45 | 1-0 | |
| 8347.24 | 0.02 | 1.50 | 3-2 | $a^3D-a^3P$ (3F) |
| 8307.67 | 0.01 | 1.49 | 2-1 | |
| 8279.99 | 0.00 | 1.49 | 1-0 | |
| 8384.28 | 0.02 | 1.49 | 3-1 | |
| 8326.66 | 0.01 | 1.49 | 2-0 | |
| 8271.32 | 0.01 | 1.50 | 2-2 | |
| 8261.21 | 0.00 | 1.49 | 1-1 | |
| 8403.62 | 0.02 | 1.49 | 3-0 | |
| 8225.25 | 0.00 | 1.50 | 1-2 | |
| 11896.48 | 0.31 | 1.35 | 2-2 | $a^1D-b^1D$ (4F) |
| 10872.05 | 0.31 | 1.45 | 2-0 | $a^1D-a^1S$ (5F) |
| 10399.33 | 0.31 | 1.50 | 2-2 | $a^1D-a^3P$ (6F) |
| 10456.86 | 0.31 | 1.49 | 2-1 | |
| 10486.97 | 0.31 | 1.49 | 2-0 | |
| 10780.17 | 0.62 | 1.76 | 4-4 | $a^3F-a^1G$ (7F) |
| 10660.35 | 0.60 | 1.76 | 3-4 | |
| 10569.44 | 0.59 | 1.76 | 2-4 | |
| **Sc III** I P 24.65 | | | | |
| 3945.34 | 0.02 | 3.15 | 2½- ½ | $3^2D-4^2S$ (1F) |
| 3914.83 | 0.00 | 3.15 | 1½- ½ | |
| **Sc VI** I P 111? | | | | |
| 4672.2 | 0.00 | 2.64 | 2-2 | $3p^4\ ^3P-3p^4\ ^1D$ (1F) |
| 5539.6 | 0.41 | 2.64 | 1-2 | |
| 3590.8 | 2.64 | 6.08 | 2-0 | $3p^4\ ^1D-3p^4\ ^1S$ (2F) |
| **Sc VII** I P ? | | | | |
| 4987 ? | (0.08 | 2.56) | 2½-1½ | $3p^3\ ^2P^o-3p^3\ ^2P^o$ (1F) |
| 5045 ? | (0.00 | 2.45) | 1½- ½ | |
| 5224 ? | (0.08 | 2.45) | 2½- ½ | |
| 4824 ? | (0.00 | 2.56) | 1½-1½ | |
| **Tl I** I P 6.81 | | | | |
| 12168.80 | 0.05 | 1.06 | 4-2 | $a^3F-a^3P$ (1F) |
| 12012.60 | 0.02 | 1.05 | 3-1 | |
| 11849.83 | 0.00 | 1.04 | 2-0 | |
| 11856.02 | 0.02 | 1.06 | 3-2 | |
| 11771.95 | 0.00 | 1.05 | 2-1 | |
| 11621.54 | 0.00 | 1.06 | 2-2 | |
| 8777.26 | 0.05 | 1.45 | 4-4 | $a^3F-b^3F$ (2F) |
| 8716.24 | 0.02 | 1.44 | 3-3 | |
| 8669.28 | 0.00 | 1.42 | 2-2 | |
| 8884.12 | 0.05 | 1.44 | 4-3 | |
| 8799.09 | 0.02 | 1.42 | 3-2 | |
| 8613.35 | 0.02 | 1.45 | 3-4 | |
| 8588.84 | 0.00 | 1.44 | 2-3 | |
| 8970.23 | 0.05 | 1.42 | 4-2 | |
| 8488.93 | 0.00 | 1.45 | 2-4 | |
| 8521.66 | 0.05 | 1.50 | 4-4 | $a^3F-a^1G$ (3F) |
| 8367.07 | 0.02 | 1.50 | 3-4 | |
| 8249.61 | 0.00 | 1.50 | 2-4 | |
| 7287.25 | 0.05 | 1.74 | 4-3 | $a^3F-a^5P$ (4F) |
| 7313.88 | 0.02 | 1.73 | 3-2 | |
| 7150.21 | 0.00 | 1.73 | 2-1 | |
| 7328.50 | 0.05 | 1.73 | 4-2 | |
| 7238.29 | 0.02 | 1.73 | 3-1 | |
| 7173.93 | 0.02 | 1.74 | 3-3 | |
| 7126.40 | 0.00 | 1.73 | 2-2 | |
| 7087.39 | 0.00 | 1.74 | 2-3 | |
| 6739.63 | 0.05 | 1.88 | 4-5 | $a^3F-a^3G$ (5F) |
| 6670.76 | 0.02 | 1.87 | 3-4 | |
| 6617.12 | 0.00 | 1.87 | 2-3 | |
| 6768.65 | 0.05 | 1.87 | 4-4 | |
| 6692.48 | 0.02 | 1.87 | 3-3 | |
| 6791.02 | 0.05 | 1.87 | 4-3 | |
| 6642.57 | 0.02 | 1.88 | 3-5 | |
| 6595.88 | 0.00 | 1.87 | 2-4 | |
| 5828.12 | 0.05 | 2.17 | 4-3 | $a^3F-a^3D$ (6F) |
| 5794.16 | 0.02 | 2.15 | 3-2 | |
| 5755.60 | 0.00 | 2.14 | 2-1 | |
| 5867.87 | 0.05 | 2.15 | 4-2 | |
| 5812.53 | 0.02 | 2.14 | 3-1 | |
| 5755.39 | 0.02 | 2.17 | 3-3 | |
| 5737.59 | 0.00 | 2.15 | 2-2 | |
| 5699.57 | 0.00 | 2.17 | 2-3 | |
| 5629.54 | 0.05 | 2.24 | 4-2 | $a^3F-b^3P$ (7F) |
| 5587.73 | 0.02 | 2.23 | 3-1 | |
| 5555.33 | 0.00 | 2.22 | 2-0 | |
| 5561.66 | 0.02 | 2.24 | 3-2 | |
| 5535.09 | 0.00 | 2.23 | 2-1 | |
| 5509.51 | 0.00 | 2.24 | 2-2 | |
| 5614.62 | 0.05 | 2.25 | 4-6 | $a^3F-a^3H$ (8F) |
| 5562.94 | 0.02 | 2.24 | 3-5 | |
| 5542.54 | 0.00 | 2.23 | 2-4 | |
| 5630.85 | 0.05 | 2.24 | 4-5 | |
| 5595.31 | 0.02 | 2.23 | 3-4 | |
| 5664.02 | 0.05 | 2.23 | 4-4 | |
| 5584.81 | 0.05 | 2.26 | 4-4 | $a^3F-b^1G$ (9F) |
| 5518.00 | 0.02 | 2.26 | 3-4 | |
| 5466.67 | 0.00 | 2.26 | 2-4 | |
| 5396.71 | 0.05 | 2.33 | 4-2 | $a^3F-c^3P$ (10F) |
| 5358.79 | 0.02 | 2.32 | 3-1 | |
| 5312.52 | 0.00 | 2.32 | 2-0 | |
| 5334.30 | 0.02 | 2.33 | 3-2 | |
| 5310.36 | 0.00 | 2.32 | 2-1 | |
| 5286.31 | 0.00 | 2.33 | 2-2 | |
| 5025.53 | 0.02 | 2.48 | 3-1 | $a^3F-a^1P$ (11F) |
| 4982.92 | 0.00 | 2.48 | 2-1 | |
| 5043.30 | 0.05 | 2.49 | 4-2 | $a^3F-b^1D$ (12F) |
| 4988.75 | 0.02 | 2.49 | 3-2 | |
| 4946.76 | 0.00 | 2.49 | 2-2 | |
| 4898.49 | 0.05 | 2.57 | 4-5 | $a^3F-a^1H$ (13F) |
| 4847.01 | 0.02 | 2.57 | 3-5 | |
| 11933.60 | 0.84 | 1.88 | 5-5 | $a^5F-a^3G$ (14F) |
| 11881.68 | 0.83 | 1.87 | 4-4 | |
| 11835.06 | 0.82 | 1.87 | 3-3 | |
| 12024.89 | 0.84 | 1.87 | 5-4 | |
| 11950.77 | 0.83 | 1.87 | 4-3 | |
| 11792.55 | 0.83 | 1.88 | 4-5 | |
| 11767.30 | 0.82 | 1.67 | 3-4 | |
| 11748.60 | 0.81 | 1.87 | 2-3 | |
| 12095.67 | 0.84 | 1.87 | 5-3 | |
| 11679.85 | 0.82 | 1.88 | 3-5 | |
| 11681.81 | 0.81 | 1.87 | 2-4 | |
| 11690.94 | 0.81 | 1.87 | 1-3 | |
| 9258.83 | 0.83 | 2.17 | 4-3 | $a^5F-a^3D$ (15F) |
| 9288.45 | 0.82 | 2.15 | 3-2 | |
| 9281.86 | 0.81 | 2.14 | 2-1 | |
| 9189.22 | 0.82 | 2.17 | 3-3 | |
| 9235.10 | 0.81 | 2.15 | 2-3 | |
| 9245.82 | 0.81 | 2.14 | 1-1 | |
| 9137.01 | 0.81 | 2.17 | 2-3 | |
| 9199.44 | 0.81 | 2.15 | 1-2 | |

FORBIDDEN LINES

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Ti I** continued | | | | |
| 8705.08 | 0.82 | 2.24 | 3-2 | $a^5F$-$b^3P$ |
| 8721.54 | 0.81 | 2.23 | 2-1 | (16F) |
| 8739.71 | 0.81 | 2.22 | 1-0 | |
| 8658.20 | 0.81 | 2.24 | 2-2 | |
| 8689.73 | 0.81 | 2.23 | 1-1 | |
| 8626.85 | 0.81 | 2.24 | 1-2 | |
| 8808.47 | 0.84 | 2.25 | 5-6 | $a^5F$-$a^3H$ |
| 8770.71 | 0.83 | 2.24 | 4-5 | (17F) |
| 8787.81 | 0.82 | 2.23 | 3-4 | |
| 8848.50 | 0.84 | 2.24 | 5-5 | |
| 8851.45 | 0.83 | 2.23 | 4-4 | |
| 8930.70 | 0.84 | 2.23 | 5-4 | |
| 8731.38 | 0.83 | 2.25 | 4-6 | |
| 8708.23 | 0.82 | 2.24 | 3-5 | |
| 8740.05 | 0.81 | 2.23 | 2-4 | |
| 8160.66 | 0.82 | 2.33 | 3-2 | $a^5F$-$c^3P$ |
| 8176.33 | 0.81 | 2.32 | 2-1 | (18F) |
| 8153.46 | 0.81 | 2.32 | 1-0 | |
| 8119.46 | 0.81 | 2.33 | 2-2 | |
| 8148.37 | 0.81 | 2.32 | 1-1 | |
| 8091.87 | 0.81 | 2.33 | 1-2 | |
| 4521.76 | 0.84 | 3.57 | 5-4 | $a^5F$-$a^5D$ |
| 4515.52 | 0.83 | 3.57 | 4-3 | (19F) |
| 4509.85 | 0.82 | 3.56 | 3-2 | |
| 4504.71 | 0.81 | 3.55 | 2-1 | |
| 4500.00 | 0.81 | 3.55 | 1-0 | |
| 4536.05 | 0.84 | 3.57 | 5-3 | |
| 4526.55 | 0.83 | 3.56 | 4-2 | |
| 4517.36 | 0.82 | 3.55 | 3-1 | |
| 4508.52 | 0.81 | 3.55 | 2-0 | |
| 4501.36 | 0.83 | 3.57 | 4-4 | |
| 4498.90 | 0.82 | 3.57 | 3-3 | |
| 4497.23 | 0.81 | 3.56 | 2-2 | |
| 4496.21 | 0.81 | 3.55 | 1-1 | |
| 4484.84 | 0.82 | 3.57 | 3-4 | |
| 4486.35 | 0.81 | 3.57 | 2-3 | |
| 4488.76 | 0.81 | 3.56 | 1-2 | |
| 4472.37 | 0.81 | 3.57 | 2-4 | |
| 4477.91 | 0.81 | 3.57 | 1-3 | |
| 9720.20 | 0.90 | 2.17 | 2-3 | $a^1D$-$a^3D$ |
| 9831.29 | 0.90 | 2.15 | 2-2 | (20F) |
| 9884.29 | 0.90 | 2.14 | 2-1 | |
| 9180.13 | 0.90 | 2.24 | 2-2 | $a^1D$-$b^3P$ |
| 9251.37 | 0.90 | 2.23 | 2-1 | (21F) |
| 9308.03 | 0.90 | 2.22 | 2-0 | |
| 8576.73 | 0.90 | 2.33 | 2-2 | $a^1D$-$c^3P$ |
| 8640.22 | 0.90 | 2.32 | 2-1 | (22F) |
| 8645.95 | 0.90 | 2.32 | 2-0 | |
| 7805.66 | 0.90 | 2.48 | 2-1 | $a^1D$-$a^1P$ (23F) |
| 7717.29 | 0.90 | 2.49 | 2-2 | $a^1D$-$b^1D$ (24F) |
| 4430.79 | 0.90 | 3.68 | 2-3 | $a^1D$-$a^1F$ (25F) |
| 11185.14 | 1.06 | 2.17 | 2-3 | $a^3P$-$a^3D$ |
| 11193.04 | 1.05 | 2.15 | 1-2 | (26F) |
| 11191.43 | 1.04 | 2.14 | 0-1 | |
| 11332.50 | 1.06 | 2.15 | 2-2 | |
| 11261.79 | 1.05 | 2.14 | 1-1 | |
| 11402.97 | 1.06 | 2.14 | 2-1 | |
| 11049.28 | 1.05 | 2.17 | 1-3 | |
| 11123.53 | 1.04 | 2.15 | 0-2 | |
| 10475.96 | 1.06 | 2.24 | 2-2 | $a^3P$-$b^3P$ |
| 10447.44 | 1.05 | 2.23 | 1-1 | (27F) |
| 10568.84 | 1.06 | 2.23 | 2-1 | |
| 10519.77 | 1.05 | 2.22 | 1-0 | |
| 10356.68 | 1.05 | 2.24 | 1-2 | |
| 10386.86 | 1.04 | 2.23 | 0-1 | |
| 10642.86 | 1.06 | 2.22 | 2-0 | |
| 10297.14 | 1.04 | 2.24 | 0-2 | |
| 9697.42 | 1.06 | 2.33 | 2-2 | $a^3P$-$c^3P$ |
| 9674.66 | 1.05 | 2.32 | 1-1 | (28F) |
| 9778.67 | 1.06 | 2.32 | 2-1 | |
| 9681.84 | 1.05 | 2.32 | 1-0 | |
| 9595.12 | 1.05 | 2.33 | 1-2 | |
| 9622.68 | 1.04 | 2.32 | 0-1 | |
| 9786.00 | 1.06 | 2.32 | 2-0 | |
| 9544.00 | 1.04 | 2.33 | 0-2 | |
| 8723.13 | 1.06 | 2.48 | 2-1 | $a^3P$-$a^1P$ |
| 8640.27 | 1.05 | 2.48 | 1-1 | (29F) |
| 8598.79 | 1.04 | 2.48 | 0-1 | |
| 8612.91 | 1.06 | 2.49 | 2-2 | $a^3P$-$b^1D$ |
| 8532.12 | 1.05 | 2.49 | 1-2 | (30F) |
| 11665.66 | 1.44 | 2.49 | 3-2 | $b^3F$-$b^1D$ |
| 11520.46 | 1.42 | 2.49 | 2-2 | (31F) |
| 11084.87 | 1.45 | 2.57 | 4-5 | $b^3F$-$a^1H$ (32F) |
| 11521.31 | 1.50 | 2.57 | 4-5 | $a^1G$-$a^1H$ (33F) |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Ti II** I P 13.6 | | | | |
| 11971.26 | 0.05 | 1.08 | $4\frac{1}{2}$-$3\frac{1}{2}$ | $a^4F$-$a^2D$ |
| 11782.27 | 0.03 | 1.08 | $3\frac{1}{2}$-$2\frac{1}{2}$ | (1F) |
| 11735.52 | 0.03 | 1.08 | $3\frac{1}{2}$-$2\frac{1}{2}$ | |
| 11602.41 | 0.01 | 1.08 | $2\frac{1}{2}$-$1\frac{1}{2}$ | |
| 11557.08 | 0.01 | 1.08 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 11477.29 | 0.00 | 1.08 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 11432.93 | 0.00 | 1.08 | $1\frac{1}{2}$-$2\frac{1}{2}$ | |
| 11458.27 | 0.05 | 1.13 | $4\frac{1}{2}$-$4\frac{1}{2}$ | $a^4F$-$a^2G$ |
| 11396.50 | 0.03 | 1.11 | $3\frac{1}{2}$-$3\frac{1}{2}$ | (2F) |
| 11618.68 | 0.05 | 1.11 | $4\frac{1}{2}$-$3\frac{1}{2}$ | |
| 11242.12 | 0.03 | 1.13 | $3\frac{1}{2}$-$4\frac{1}{2}$ | |
| 11228.14 | 0.01 | 1.11 | $2\frac{1}{2}$-$3\frac{1}{2}$ | |
| 11078.26 | 0.01 | 1.13 | $2\frac{1}{2}$-$4\frac{1}{2}$ | |
| 11110.92 | 0.00 | 1.11 | $1\frac{1}{2}$-$3\frac{1}{2}$ | |
| 10956.10 | 0.05 | 1.18 | $4\frac{1}{2}$-$2\frac{1}{2}$ | $a^4F$-$a^4P$ |
| 10901.79 | 0.03 | 1.16 | $3\frac{1}{2}$-$1\frac{1}{2}$ | (3F) |
| 10784.80 | 0.01 | 1.16 | $2\frac{1}{2}$- $\frac{1}{2}$ | |
| 10758.32 | 0.03 | 1.18 | $3\frac{1}{2}$-$2\frac{1}{2}$ | |
| 10747.64 | 0.01 | 1.16 | $2\frac{1}{2}$-$1\frac{1}{2}$ | |
| 10676.61 | 0.00 | 1.16 | $1\frac{1}{2}$- $\frac{1}{2}$ | |
| 10608.18 | 0.01 | 1.18 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 10640.19 | 0.00 | 1.16 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 10503.47 | 0.00 | 1.18 | $1\frac{1}{2}$-$2\frac{1}{2}$ | |
| 10116.66 | 0.01 | 1.23 | $2\frac{1}{2}$-$1\frac{1}{2}$ | $a^4F$-$a^2P$ |
| 10148.57 | 0.00 | 1.22 | $1\frac{1}{2}$- $\frac{1}{2}$ | (4F) |
| 10031.39 | 0.00 | 1.23 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 10379.73 | 0.05 | 1.24 | $4\frac{1}{2}$-$2\frac{1}{2}$ | $a^4F$-$b^4P$ |
| 10300.86 | 0.03 | 1.23 | $3\frac{1}{2}$-$1\frac{1}{2}$ | (5F) |
| 10223.27 | 0.01 | 1.22 | $2\frac{1}{2}$- $\frac{1}{2}$ | |
| 10203.05 | 0.03 | 1.24 | $3\frac{1}{2}$-$2\frac{1}{2}$ | |
| 10163.13 | 0.01 | 1.23 | $2\frac{1}{2}$-$1\frac{1}{2}$ | |
| 10125.99 | 0.00 | 1.22 | $1\frac{1}{2}$- $\frac{1}{2}$ | |
| 10066.92 | 0.01 | 1.24 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 10066.98 | 0.00 | 1.23 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 9972.59 | 0.00 | 1.24 | $1\frac{1}{2}$-$2\frac{1}{2}$ | |
| 8085.17 | 0.05 | 1.57 | $4\frac{1}{2}$-$2\frac{1}{2}$ | $a^4F$-$b^2D$ |
| 8060.16 | 0.03 | 1.56 | $3\frac{1}{2}$-$1\frac{1}{2}$ | (6F) |
| 7976.95 | 0.03 | 1.57 | $3\frac{1}{2}$-$2\frac{1}{2}$ | |
| 7975.58 | 0.01 | 1.56 | $2\frac{1}{2}$-$1\frac{1}{2}$ | |
| 7894.10 | 0.01 | 1.57 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 7916.25 | 0.00 | 1.56 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 7835.98 | 0.00 | 1.57 | $1\frac{1}{2}$-$2\frac{1}{2}$ | |
| 8074.29 | 0.05 | 1.58 | $4\frac{1}{2}$-$5\frac{1}{2}$ | $a^4F$-$a^2H$ |
| 8028.94 | 0.03 | 1.56 | $3\frac{1}{2}$-$4\frac{1}{2}$ | (7F) |
| 8138.59 | 0.05 | 1.56 | $4\frac{1}{2}$-$4\frac{1}{2}$ | |
| 7966.36 | 0.03 | 1.58 | $3\frac{1}{2}$-$5\frac{1}{2}$ | |
| 7945.02 | 0.01 | 1.56 | $2\frac{1}{2}$-$4\frac{1}{2}$ | |
| 6725.67 | 0.05 | 1.88 | $4\frac{1}{2}$-$4\frac{1}{2}$ | $a^4F$-$b^2G$ |
| 6647.05 | 0.03 | 1.88 | $3\frac{1}{2}$-$3\frac{1}{2}$ | (8F) |
| 6722.02 | 0.05 | 1.88 | $4\frac{1}{2}$-$3\frac{1}{2}$ | |
| 6650.61 | 0.03 | 1.88 | $3\frac{1}{2}$-$4\frac{1}{2}$ | |
| 6589.42 | 0.01 | 1.88 | $2\frac{1}{2}$-$3\frac{1}{2}$ | |
| 6592.93 | 0.01 | 1.88 | $2\frac{1}{2}$-$4\frac{1}{2}$ | |
| 6548.87 | 0.00 | 1.88 | $1\frac{1}{2}$-$3\frac{1}{2}$ | |
| 6095.96 | 0.03 | 2.05 | $3\frac{1}{2}$-$1\frac{1}{2}$ | $a^4F$-$b^2P$ |
| 6087.77 | 0.01 | 2.04 | $2\frac{1}{2}$- $\frac{1}{2}$ | (9F) |
| 6047.46 | 0.01 | 2.05 | $2\frac{1}{2}$-$1\frac{1}{2}$ | |
| 6053.14 | 0.00 | 2.04 | $1\frac{1}{2}$- $\frac{1}{2}$ | |
| 6013.28 | 0.00 | 2.05 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 4877.01 | 0.05 | 2.58 | $4\frac{1}{2}$-$3\frac{1}{2}$ | $a^4F$-$b^2F$ |
| 4823.44 | 0.03 | 2.59 | $3\frac{1}{2}$-$2\frac{1}{2}$ | (10F) |
| 4862.80 | 0.05 | 2.59 | $4\frac{1}{2}$-$2\frac{1}{2}$ | |
| 4837.42 | 0.03 | 2.58 | $3\frac{1}{2}$-$3\frac{1}{2}$ | |
| 4793.03 | 0.01 | 2.59 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 4806.83 | 0.01 | 2.58 | $2\frac{1}{2}$-$3\frac{1}{2}$ | |
| 4771.54 | 0.00 | 2.59 | $1\frac{1}{2}$-$2\frac{1}{2}$ | |
| 4785.21 | 0.00 | 2.58 | $1\frac{1}{2}$-$3\frac{1}{2}$ | |
| 4031.15 | 0.05 | 3.11 | $4\frac{1}{2}$-$3\frac{1}{2}$ | $a^4F$-$c^2D$ |
| 4041.57 | 0.03 | 3.08 | $3\frac{1}{2}$-$1\frac{1}{2}$ | (11F) |
| 4004.07 | 0.03 | 3.11 | $3\frac{1}{2}$-$2\frac{1}{2}$ | |
| 4020.20 | 0.01 | 3.08 | $2\frac{1}{2}$-$1\frac{1}{2}$ | |
| 3983.08 | 0.01 | 3.11 | $2\frac{1}{2}$-$3\frac{1}{2}$ | |
| 4005.07 | 0.00 | 3.08 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 3968.23 | 0.00 | 3.11 | $1\frac{1}{2}$-$3\frac{1}{2}$ | |
| 11857.96 | 0.13 | 1.18 | $3\frac{1}{2}$-$2\frac{1}{2}$ | $b^4F$-$a^4P$ |
| 11884.57 | 0.12 | 1.16 | $2\frac{1}{2}$-$1\frac{1}{2}$ | (12F) |
| 11823.03 | 0.11 | 1.16 | $1\frac{1}{2}$- $\frac{1}{2}$ | |
| 11714.28 | 0.12 | 1.18 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 11778.39 | 0.11 | 1.16 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 11611.10 | 0.11 | 1.18 | $1\frac{1}{2}$-$2\frac{1}{2}$ | |
| 11117.80 | 0.12 | 1.23 | $2\frac{1}{2}$-$1\frac{1}{2}$ | $b^4F$-$a^2P$ |
| 11178.94 | 0.11 | 1.22 | $1\frac{1}{2}$- $\frac{1}{2}$ | (13F) |
| 11024.82 | 0.11 | 1.23 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 11185.70 | 0.13 | 1.24 | $3\frac{1}{2}$-$2\frac{1}{2}$ | $b^4F$-$b^4P$ |
| 11173.94 | 0.12 | 1.23 | $2\frac{1}{2}$-$1\frac{1}{2}$ | (14F) |
| 11151.54 | 0.11 | 1.22 | $1\frac{1}{2}$- $\frac{1}{2}$ | |
| 11057.76 | 0.12 | 1.24 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 11080.02 | 0.11 | 1.23 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 10965.77 | 0.11 | 1.24 | $1\frac{1}{2}$-$2\frac{1}{2}$ | |
| 8661.20 | 0.15 | 1.57 | $4\frac{1}{2}$-$2\frac{1}{2}$ | $b^4F$-$b^2D$ |
| 8661.96 | 0.13 | 1.56 | $3\frac{1}{2}$-$1\frac{1}{2}$ | (15F) |
| 8565.94 | 0.13 | 1.57 | $3\frac{1}{2}$-$2\frac{1}{2}$ | |
| 8585.04 | 0.12 | 1.56 | $2\frac{1}{2}$-$1\frac{1}{2}$ | |
| 8490.71 | 0.12 | 1.57 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 8529.50 | 0.11 | 1.56 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 8436.37 | 0.11 | 1.57 | $1\frac{1}{2}$-$2\frac{1}{2}$ | |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Ti II** continued | | | | |
| 8648.72 | 0.15 | 1.58 | $4\frac{1}{2}$-$5\frac{1}{2}$ | $b^4F$-$a^2H$ |
| 8625.93 | 0.13 | 1.56 | $3\frac{1}{2}$-$4\frac{1}{2}$ | (16F) |
| 8722.54 | 0.15 | 1.56 | $4\frac{1}{2}$-$4\frac{1}{2}$ | |
| 8553.73 | 0.13 | 1.58 | $3\frac{1}{2}$-$5\frac{1}{2}$ | |
| 8549.64 | 0.12 | 1.56 | $2\frac{1}{2}$-$4\frac{1}{2}$ | |
| 7119.56 | 0.15 | 1.88 | $4\frac{1}{2}$-$4\frac{1}{2}$ | $b^4F$-$b^2G$ |
| 7051.04 | 0.13 | 1.88 | $3\frac{1}{2}$-$3\frac{1}{2}$ | (17F) |
| 7115.47 | 0.15 | 1.88 | $4\frac{1}{2}$-$3\frac{1}{2}$ | |
| 7055.06 | 0.13 | 1.88 | $3\frac{1}{2}$-$4\frac{1}{2}$ | |
| 6999.99 | 0.12 | 1.88 | $2\frac{1}{2}$-$3\frac{1}{2}$ | |
| 7003.95 | 0.12 | 1.88 | $2\frac{1}{2}$-$4\frac{1}{2}$ | |
| 6963.02 | 0.11 | 1.88 | $1\frac{1}{2}$-$3\frac{1}{2}$ | |
| 6434.04 | 0.13 | 2.05 | $3\frac{1}{2}$-$1\frac{1}{2}$ | $b^4F$-$b^2P$ |
| 6436.55 | 0.12 | 2.04 | $2\frac{1}{2}$- $\frac{1}{2}$ | (18F) |
| 6391.51 | 0.13 | 2.05 | $2\frac{1}{2}$-$1\frac{1}{2}$ | |
| 6405.27 | 0.11 | 2.04 | $1\frac{1}{2}$- $\frac{1}{2}$ | |
| 6360.66 | 0.11 | 2.05 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 5080.84 | 0.15 | 2.58 | $4\frac{1}{2}$-$3\frac{1}{2}$ | $b^4F$-$b^2F$ |
| 5032.69 | 0.13 | 2.59 | $3\frac{1}{2}$-$2\frac{1}{2}$ | (19F) |
| 5065.43 | 0.15 | 2.59 | $4\frac{1}{2}$-$2\frac{1}{2}$ | |
| 5047.91 | 0.13 | 2.58 | $3\frac{1}{2}$-$3\frac{1}{2}$ | |
| 5006.63 | 0.12 | 2.59 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 5021.69 | 0.12 | 2.58 | $2\frac{1}{2}$-$3\frac{1}{2}$ | |
| 4987.68 | 0.11 | 2.59 | $1\frac{1}{2}$-$2\frac{1}{2}$ | |
| 5002.63 | 0.11 | 2.58 | $1\frac{1}{2}$-$3\frac{1}{2}$ | |
| 4169.41 | 0.15 | 3.11 | $4\frac{1}{2}$-$2\frac{1}{2}$ | $b^4F$-$c^2D$ |
| 4187.46 | 0.13 | 3.08 | $3\frac{1}{2}$-$1\frac{1}{2}$ | (20F) |
| 4147.21 | 0.13 | 3.11 | $3\frac{1}{2}$-$2\frac{1}{2}$ | |
| 4169.40 | 0.12 | 3.08 | $2\frac{1}{2}$-$1\frac{1}{2}$ | |
| 4129.49 | 0.12 | 3.11 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 4156.25 | 0.11 | 3.08 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 4116.60 | 0.11 | 3.11 | $1\frac{1}{2}$-$2\frac{1}{2}$ | |
| 9649.94 | 0.60 | 1.88 | $3\frac{1}{2}$-$4\frac{1}{2}$ | $a^3F$-$b^2G$ |
| 9398.59 | 0.57 | 1.88 | $2\frac{1}{2}$-$3\frac{1}{2}$ | (21F) |
| 9642.42 | 0.60 | 1.88 | $3\frac{1}{2}$-$3\frac{1}{2}$ | |
| 9405.71 | 0.57 | 1.88 | $2\frac{1}{2}$-$4\frac{1}{2}$ | |
| 6250.51 | 0.60 | 2.58 | $3\frac{1}{2}$-$3\frac{1}{2}$ | $a^3F$-$b^3F$ |
| 6124.57 | 0.57 | 2.59 | $2\frac{1}{2}$-$2\frac{1}{2}$ | (22F) |
| 6227.19 | 0.60 | 2.59 | $3\frac{1}{2}$-$2\frac{1}{2}$ | |
| 6147.13 | 0.57 | 2.58 | $2\frac{1}{2}$-$3\frac{1}{2}$ | |
| 4925.84 | 0.60 | 3.11 | $3\frac{1}{2}$-$2\frac{1}{2}$ | $a^3F$-$c^2D$ |
| 4916.81 | 0.57 | 3.08 | $2\frac{1}{2}$-$1\frac{1}{2}$ | (23F) |
| 4982.73 | 0.60 | 3.08 | $3\frac{1}{2}$-$1\frac{1}{2}$ | |
| 4861.41 | 0.57 | 3.11 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 8229.81 | 1.08 | 2.58 | $2\frac{1}{2}$-$3\frac{1}{2}$ | $a^2D$-$b^2F$ |
| 8166.83 | 1.08 | 2.59 | $1\frac{1}{2}$-$2\frac{1}{2}$ | (24F) |
| 8189.44 | 1.08 | 2.59 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 7917.03 | 1.08 | 2.63 | $1\frac{1}{2}$- $\frac{1}{2}$ | $a^2D$-$a^2S$ (25F) |
| 6077.80 | 1.08 | 3.11 | $2\frac{1}{2}$-$2\frac{1}{2}$ | $a^2D$-$c^2D$ |
| 6151.82 | 1.08 | 3.08 | $1\frac{1}{2}$-$1\frac{1}{2}$ | (26F) |
| 6164.64 | 1.08 | 3.08 | $2\frac{1}{2}$-$1\frac{1}{2}$ | |
| 6065.34 | 1.08 | 3.11 | $1\frac{1}{2}$-$2\frac{1}{2}$ | |
| 8491.16 | 1.13 | 2.58 | $4\frac{1}{2}$-$3\frac{1}{2}$ | $a^2G$-$b^2F$ |
| 8363.05 | 1.11 | 2.59 | $3\frac{1}{2}$-$2\frac{1}{2}$ | (27F) |
| 8405.16 | 1.11 | 2.58 | $3\frac{1}{2}$-$3\frac{1}{2}$ | |
| 6172.91 | 1.11 | 3.11 | $3\frac{1}{2}$-$2\frac{1}{2}$ | $a^2G$-$c^2D$ (28F) |
| 8789.70 | 1.18 | 2.58 | $2\frac{1}{2}$-$3\frac{1}{2}$ | $a^4P$-$b^2F$ |
| 8651.14 | 1.16 | 2.59 | $1\frac{1}{2}$-$2\frac{1}{2}$ | (29F) |
| 8743.66 | 1.18 | 2.59 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 8371.34 | 1.16 | 2.63 | $1\frac{1}{2}$- $\frac{1}{2}$ | $a^4P$-$a^2S$ |
| 8348.93 | 1.16 | 2.63 | $\frac{1}{2}$- $\frac{1}{2}$ | (30F) |
| 6377.83 | 1.18 | 3.11 | $2\frac{1}{2}$-$2\frac{1}{2}$ | $a^4P$-$c^2D$ |
| 6422.66 | 1.16 | 3.08 | $1\frac{1}{2}$-$1\frac{1}{2}$ | (31F) |
| 6473.52 | 1.18 | 3.08 | $2\frac{1}{2}$-$1\frac{1}{2}$ | |
| 6328.46 | 1.16 | 3.11 | $1\frac{1}{2}$-$2\frac{1}{2}$ | |
| 6409.46 | 1.16 | 3.08 | $\frac{1}{2}$-$1\frac{1}{2}$ | |
| 9108.42 | 1.23 | 2.59 | $1\frac{1}{2}$-$2\frac{1}{2}$ | $a^2P$-$b^2F$ (32F) |
| 8798.79 | 1.23 | 2.63 | $1\frac{1}{2}$- $\frac{1}{2}$ | $a^2P$-$a^2S$ |
| 8703.03 | 1.22 | 2.63 | $\frac{1}{2}$- $\frac{1}{2}$ | (33F) |
| 6569.73 | 1.23 | 3.11 | $1\frac{1}{2}$-$2\frac{1}{2}$ | $a^2P$-$c^2D$ |
| 6616.12 | 1.22 | 3.08 | $\frac{1}{2}$-$1\frac{1}{2}$ | (34F) |
| 6671.31 | 1.23 | 3.08 | $1\frac{1}{2}$-$1\frac{1}{2}$ | |
| 9199.54 | 1.24 | 2.58 | $2\frac{1}{2}$-$3\frac{1}{2}$ | $b^4P$-$b^2F$ |
| 9071.07 | 1.23 | 2.59 | $1\frac{1}{2}$-$2\frac{1}{2}$ | (35F) |
| 9149.11 | 1.24 | 2.59 | $2\frac{1}{2}$-$2\frac{1}{2}$ | |
| 8763.95 | 1.23 | 2.63 | $1\frac{1}{2}$- $\frac{1}{2}$ | $b^4P$-$a^2S$ |
| 8719.70 | 1.22 | 2.63 | $\frac{1}{2}$- $\frac{1}{2}$ | (36F) |
| 6590.88 | 1.24 | 3.11 | $2\frac{1}{2}$-$2\frac{1}{2}$ | $b^4P$-$c^2D$ |
| 6651.26 | 1.23 | 3.08 | $1\frac{1}{2}$-$1\frac{1}{2}$ | (37F) |
| 6693.12 | 1.24 | 3.08 | $2\frac{1}{2}$-$1\frac{1}{2}$ | |
| 6550.29 | 1.23 | 3.11 | $1\frac{1}{2}$-$2\frac{1}{2}$ | |
| 6625.75 | 1.22 | 3.08 | $\frac{1}{2}$-$1\frac{1}{2}$ | |

FORBIDDEN LINES

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Ti II** continued | | | | |
| 11478.92 | 1.56 | 2.63 | 1½- ½ | $b^2D-a^2S$ (38F) |
| 8039.68 | 1.57 | 3.11 | 2½-2½ | $b^2D-c^2D$ |
| 8106.38 | 1.56 | 3.08 | 1½-1½ | (39F) |
| 8192.33 | 1.57 | 3.08 | 2½-1½ | |
| 7956.90 | 1.56 | 3.11 | 1½-2½ | |
| **Ti III** I P 27.6 | | | | |
| 12417.8 | 0.05 | 1.05 | 4-2 | $a^3F-a^1D$ |
| 12061.0 | 0.02 | 1.05 | 3-2 | (1F) |
| 11799.5 | 0.00 | 1.05 | 2-2 | |
| 9706.8 | 0.05 | 1.32 | 4-2 | $a^3F-a^3P$ |
| 9594.5 | 0.02 | 1.31 | 3-1 | (2F) |
| 9488.3 | 0.00 | 1.30 | 2-0 | |
| 9487.4 | 0.02 | 1.32 | 3-2 | |
| 9428.3 | 0.00 | 1.31 | 2-1 | |
| 9324.8 | 0.00 | 1.32 | 2-2 | |
| 7152.8 | 0.05 | 1.78 | 4-4 | $a^3F-a^1G$ |
| 7033.0 | 0.02 | 1.78 | 3-4 | (3F) |
| 6991.8 | 0.00 | 1.78 | 2-4 | |
| 3337.7 | 1.05 | 4.74 | 2-3 | $a^1D-a^3D$ |
| 3363.2 | 1.05 | 4.72 | 2-2 | (4F) |
| 3378.4 | 1.05 | 4.70 | 2-1 | |
| 3008.4 | 1.05 | 5.15 | 2-2 | $a^1D-b^1D$ (5F) |
| 3608.5 | 1.32 | 4.74 | 2-3 | $a^3P-a^3D$ |
| 3628.9 | 1.31 | 4.72 | 1-2 | (6F) |
| 3631.8 | 1.30 | 4.70 | 0-1 | |
| 3638.4 | 1.32 | 4.72 | 2-2 | |
| 3640.6 | 1.31 | 4.70 | 1-1 | |
| 3656.3 | 1.32 | 4.70 | 2-1 | |
| 3593.3 | 1.31 | 4.74 | 1-3 | |
| 3226.7 | 1.32 | 5.15 | 2-2 | $a^3P-b^1D$ |
| 3214.5 | 1.31 | 5.15 | 1-2 | (7F) |
| 3207.6 | 1.30 | 5.15 | 0-2 | |
| 4140.4 ? | 1.73 | 4.72 | 0-2? | $a^1S-a^3D$ |
| 4163.6 ? | 1.73 | 4.70 | 0-1? | (8F) |
| 3815.5 | 1.73 | 5.15 | 0-2 | $a^1S-b^1D$ (9F) |
| 4160.9 | 1.78 | 4.74 | 4-3 | $a^1G-a^3D$ |
| 4200.6 | 1.78 | 4.72 | 4-2 | (10F) |
| 3661.3 | 1.78 | 5.15 | 4-2 | $a^1G-b^1D$ (11F) |
| **Ti VII** I P 140 | | | | |
| 4144.8 | 0.00 | 2.98 | 2-2 | $3p^4\ ^3P-3p^4\ ^1D$ |
| 5104.5 | 0.56 | 2.98 | 1-2 | (1F) |
| 3263.1 | 2.98 | 6.76 | 2-0 | $3p^4\ ^1D-3p^4\ ^1S$ (2F) |
| **Ti VIII** I P ? | | | | |
| 4468 ? | (0.13 | 2.90) | 2½-1½ | $3p^3\ ^2D^o-3p^3\ ^2P^o$ |
| 4545 ? | (0.00 | 2.72) | 1½- ½ | (1F) |
| 4779 ? | (0.13 | 2.72) | 2½- ½ | |
| 4263 ? | (0.00 | 2.90) | 1½-1½ | |
| **V II** I P 14.1 | | | | |
| 11414.22 | 0.04 | 1.12 | 4-4 | $a^5D-a^3F$ |
| 11580.17 | 0.03 | 1.09 | 3-3 | (1F) |
| 11715.20 | 0.01 | 1.07 | 2-2 | |
| 11757.66 | 0.04 | 1.09 | 4-3 | |
| 11857.28 | 0.03 | 1.07 | 3-2 | |
| 11246.87 | 0.03 | 1.12 | 3-4 | |
| 11444.61 | 0.01 | 1.09 | 2-3 | |
| 11619.10 | 0.00 | 1.07 | 1-2 | |
| 8545.12 | 0.03 | 1.47 | 3-2 | $a^5D-a^3P$ |
| 8763.38 | 0.01 | 1.42 | 2-1 | (2F) |
| 8878.98 | 0.00 | 1.39 | 1-0 | |
| 8471.07 | 0.01 | 1.47 | 2-2 | |
| 8709.38 | 0.00 | 1.42 | 1-1 | |
| 8430.72 | 0.00 | 1.47 | 1-2 | |
| 8682.13 | 0.00 | 1.42 | 0-1 | |
| 7533.84 | 0.04 | 1.68 | 4-4 | $a^5D-b^3F$ |
| 7497.68 | 0.03 | 1.67 | 3-3 | (3F) |
| 7469.44 | 0.01 | 1.67 | 2-2 | |
| 7571.69 | 0.04 | 1.87 | 4-3 | |
| 7526.94 | 0.03 | 1.67 | 3-2 | |
| 7460.57 | 0.03 | 1.68 | 3-4 | |
| 7440.62 | 0.01 | 1.67 | 2-3 | |
| 7430.26 | 0.00 | 1.67 | 1-2 | |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **V II** continued | | | | |
| 7459.30 | 0.04 | 1.70 | 4-3 | $a^5D-a^5P$ |
| 7468.52 | 0.03 | 1.68 | 3-2 | (4F) |
| 7457.80 | 0.01 | 1.67 | 2-1 | |
| 7541.95 | 0.04 | 1.68 | 4-2 | |
| 7515.13 | 0.03 | 1.67 | 3-1 | |
| 7387.47 | 0.03 | 1.70 | 3-3 | |
| 7411.90 | 0.01 | 1.68 | 2-2 | |
| 7418.75 | 0.00 | 1.67 | 1-1 | |
| 7332.06 | 0.01 | 1.70 | 2-3 | |
| 7373.32 | 0.00 | 1.68 | 1-2 | |
| 7398.95 | 0.00 | 1.67 | 0-1 | |
| 7294.30 | 0.00 | 1.70 | 1-3 | |
| 7353.77 | 0.00 | 1.68 | 0-2 | |
| 5549.49 | 0.04 | 2.27 | 4-3 | $a^5D-a^3D$ |
| 5537.92 | 0.03 | 2.26 | 3-2 | (5F) |
| 5504.22 | 0.01 | 2.26 | 2-1 | |
| 5509.63 | 0.03 | 2.27 | 3-3 | |
| 5496.84 | 0.01 | 2.26 | 2-2 | |
| 5482.91 | 0.00 | 2.26 | 1-1 | |
| 5478.76 | 0.01 | 2.27 | 2-3 | |
| 5475.59 | 0.00 | 2.26 | 1-2 | |
| 5473.09 | 0.00 | 2.26 | 0-1 | |
| 5282.88 | 0.03 | 2.36 | 3-2 | $a^5D-b^3P$ |
| 5245.25 | 0.01 | 2.37 | 2-1 | (6F) |
| 5227.25 | 0.00 | 2.37 | 1-0 | |
| 5254.49 | 0.01 | 2.36 | 2-2 | |
| 5225.90 | 0.00 | 2.37 | 1-1 | |
| 5235.07 | 0.00 | 2.36 | 1-2 | |
| 5216.07 | 0.00 | 2.37 | 0-1 | |
| 4965.31 | 0.03 | 2.51 | 3-2 | $a^5D-c^3P$ |
| 5002.88 | 0.01 | 2.48 | 2-1 | (7F) |
| 4968.65 | 0.00 | 2.49 | 1-0 | |
| 4940.22 | 0.01 | 2.51 | 2-2 | |
| 4985.27 | 0.00 | 2.48 | 1-1 | |
| 4923.05 | 0.00 | 2.51 | 1-2 | |
| 4976.33 | 0.00 | 2.48 | 0-1 | |
| 4928.68 | 0.04 | 2.55 | 4-3 | $a^5D-b^3D$ |
| 4898.64 | 0.03 | 2.55 | 3-2 | (8F) |
| 4896.87 | 0.01 | 2.53 | 2-1 | |
| 4897.21 | 0.03 | 2.55 | 3-3 | |
| 4874.21 | 0.01 | 2.55 | 2-2 | |
| 4880.00 | 0.00 | 2.53 | 1-1 | |
| 4873.80 | 0.01 | 2.55 | 2-3 | |
| 4857.50 | 0.00 | 2.55 | 1-2 | |
| 4871.43 | 0.00 | 2.53 | 0-1 | |
| 9570.24 | 0.39 | 1.68 | 5-4 | $a^5F-b^3F$ |
| 9454.15 | 0.37 | 1.67 | 4-3 | (9F) |
| 9358.90 | 0.35 | 1.67 | 3-2 | |
| 9395.23 | 0.37 | 1.88 | 4-4 | |
| 9313.72 | 0.35 | 1.67 | 3-3 | |
| 9253.44 | 0.33 | 1.67 | 2-2 | |
| 9256.51 | 0.35 | 1.68 | 3-4 | |
| 9209.25 | 0.33 | 1.67 | 2-3 | |
| 9183.58 | 0.32 | 1.87 | 1-2 | |
| 9279.59 | 0.37 | 1.70 | 4-3 | $a^5F-a^5P$ |
| 9268.77 | 0.35 | 1.68 | 3-2 | (10F) |
| 9235.60 | 0.33 | 1.67 | 2-1 | |
| 9144.25 | 0.35 | 1.70 | 3-3 | |
| 9165.30 | 0.33 | 1.68 | 2-2 | |
| 9156.00 | 0.32 | 1.67 | 1-1 | |
| 9043.52 | 0.33 | 1.70 | 2-3 | |
| 9096.76 | 0.32 | 1.68 | 1-2 | |
| 8698.69 | 0.39 | 1.81 | 5-5 | $a^5F-a^3G$ |
| 8627.35 | 0.37 | 1.80 | 4-4 | (11F) |
| 8579.15 | 0.35 | 1.79 | 3-3 | |
| 8774.69 | 0.39 | 1.80 | 5-4 | |
| 8698.18 | 0.37 | 1.79 | 4-3 | |
| 8553.87 | 0.37 | 1.81 | 4-5 | |
| 8510.24 | 0.35 | 1.80 | 3-4 | |
| 8490.44 | 0.33 | 1.79 | 2-3 | |
| 7477.26 | 0.39 | 2.04 | 5-5 | $a^5F-b^3G$ |
| 7431.08 | 0.37 | 2.03 | 4-4 | (12F) |
| 7387.74 | 0.35 | 2.02 | 3-3 | |
| 7540.14 | 0.39 | 2.03 | 5-4 | |
| 7475.84 | 0.37 | 2.02 | 4-3 | |
| 7370.00 | 0.37 | 2.04 | 4-5 | |
| 7344.03 | 0.35 | 2.03 | 3-4 | |
| 7321.87 | 0.33 | 2.02 | 2-3 | |
| 6497.76 | 0.37 | 2.27 | 4-3 | $a^5F-a^3D$ |
| 6456.04 | 0.35 | 2.26 | 3-2 | (13F) |
| 6415.69 | 0.33 | 2.26 | 2-1 | |
| 6431.11 | 0.35 | 2.27 | 3-3 | |
| 6405.67 | 0.33 | 2.26 | 2-2 | |
| 6383.03 | 0.32 | 2.26 | 1-1 | |
| 6381.13 | 0.33 | 2.27 | 2-3 | |
| 6372.11 | 0.32 | 2.26 | 1-2 | |
| 5662.62 | 0.37 | 2.55 | 4-3 | $a^5F-b^3D$ |
| 5613.81 | 0.35 | 2.55 | 3-2 | (14F) |
| 5605.36 | 0.33 | 2.53 | 2-1 | |
| 5611.94 | 0.35 | 2.55 | 3-3 | |
| 5575.69 | 0.33 | 2.55 | 2-2 | |
| 5579.65 | 0.32 | 2.53 | 1-1 | |
| 5573.84 | 0.33 | 2.55 | 2-3 | |
| 5550.25 | 0.32 | 2.55 | 1-2 | |
| 10800.75 | 1.12 | 2.27 | 4-3 | $a^3F-a^3D$ |
| 10576.98 | 1.09 | 2.26 | 3-2 | (15F) |
| 10382.14 | 1.07 | 2.26 | 2-1 | |
| 10510.25 | 1.09 | 2.27 | 3-3 | |
| 10355.93 | 1.07 | 2.26 | 2-2 | |
| 10291.94 | 1.07 | 2.27 | 2-3 | |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **V II** continued | | | | |
| 9982.17 | 1.12 | 2.36 | 4-4 | $a^3F-b^1G$ |
| 9733.52 | 1.09 | 2.36 | 3-4 | (16F) |
| 8674.37 | 1.12 | 2.55 | 4-3 | $a^3F-b^3D$ |
| 8490.18 | 1.09 | 2.55 | 3-2 | (17F) |
| 8413.83 | 1.07 | 2.53 | 2-1 | |
| 8485.90 | 1.09 | 2.55 | 3-3 | |
| 8347.16 | 1.07 | 2.55 | 2-2 | |
| 8343.02 | 1.07 | 2.55 | 2-3 | |
| 8235.69 | 1.09 | 2.59 | 3-2 | $a^3F-a^1D$ |
| 8101.03 | 1.07 | 2.59 | 2-2 | (18F) |
| 8114.85 | 1.09 | 3.11 | 3-2 | $a^3F-b^1D$ |
| 6040.31 | 1.07 | 3.11 | 2-2 | (19F) |
| 5634.78 | 1.12 | 3.31 | 4-3 | $a^3F-a^1F$ |
| 5554.68 | 1.09 | 3.31 | 3-3 | (20F) |
| 5493.10 | 1.07 | 3.31 | 2-3 | |
| 11918.75 | 1.42 | 2.46 | 1-0 | $a^3P-a^1S$ (21F) |
| 11852.49 | 1.47 | 2.51 | 2-2 | $a^3P-c^3P$ |
| 11658.88 | 1.42 | 2.48 | 1-1 | (22F) |
| 12219.66 | 1.47 | 2.48 | 2-1 | |
| 11568.38 | 1.42 | 2.49 | 1-0 | |
| 11324.18 | 1.42 | 2.51 | 1-2 | |
| 11368.21 | 1.39 | 2.48 | 0-1 | |
| 11471.69 | 1.47 | 2.55 | 2-3 | $a^3P-b^3D$ |
| 10983.23 | 1.42 | 2.55 | 1-2 | (23F) |
| 10835.22 | 1.39 | 2.53 | 0-1 | |
| 11479.51 | 1.47 | 2.55 | 2-2 | |
| 11098.96 | 1.42 | 2.53 | 1-1 | |
| 11606.00 | 1.47 | 2.53 | 2-1 | |
| 11019.11 | 1.47 | 2.59 | 2-2 | $a^3P-a^1D$ |
| 10561.05 | 1.42 | 2.59 | 1-2 | (24F) |
| 9644.96 | 1.47 | 2.75 | 2-1 | $a^3P-a^1P$ |
| 9392.19 | 1.42 | 2.75 | 1-1 | (25F) |
| 9106.60 | 1.39 | 2.75 | 0-1 | |
| 7526.46 | 1.47 | 3.11 | 2-2 | $a^3P-b^1D$ |
| 7309.90 | 1.42 | 3.11 | 1-2 | (26F) |
| 9356.40 | 1.57 | 2.89 | 6-5 | $a^3H-a^1H$ |
| 9282.92 | 1.56 | 2.89 | 5-5 | (27F) |
| 9317.51 | 1.55 | 2.89 | 4-5 | |
| 8582.52 | 1.67 | 3.11 | 3-2 | $b^3F-b^1D$ |
| 8544.49 | 1.67 | 3.11 | 2-2 | (28F) |
| 7556.03 | 1.68 | 3.31 | 4-3 | $b^3F-a^1F$ |
| 7518.35 | 1.67 | 3.31 | 3-3 | (29F) |
| 7489.15 | 1.67 | 3.31 | 2-3 | |
| 11444.66 | 1.81 | 2.89 | 5-5 | $a^3G-a^1H$ |
| 11315.52 | 1.80 | 2.89 | 4-5 | (30F) |
| 8138.62 | 1.80 | 3.31 | 4-3 | $a^3G-a^1F$ |
| 8076.58 | 1.79 | 3.31 | 3-3 | (31F) |
| 9595.85 | 2.03 | 3.31 | 4-3 | $b^3G-a^1F$ |
| 9522.24 | 2.02 | 3.31 | 3-3 | (32F) |
| **V III** I P 29.6 | | | | |
| 8745.0 | 0.04 | 1.45 | 3½-2½ | $3d^3\ ^4F-3d^3\ ^4P$ |
| 8735.0 | 0.02 | 1.43 | 2½-1½ | (1F) |
| 8683.4 | 0.00 | 1.42 | 1½- ½ | |
| 8599.1 | 0.02 | 1.45 | 2½-2½ | |
| 8625.8 | 0.00 | 1.43 | 1½-1½ | |
| 8493.1 | 0.00 | 1.45 | 1½-2½ | |
| 8615.4 | 0.07 | 1.50 | 4½-4½ | $3d^3\ ^4F-3d^3\ ^2G$ |
| 8598.3 | 0.04 | 1.48 | 3½-3½ | (2F) |
| 8782.6 | 0.07 | 1.48 | 4½-3½ | |
| 8437.9 | 0.04 | 1.50 | 3½-4½ | |
| 8457.2 | 0.02 | 1.48 | 2½-3½ | |
| 6233.9 | 0.04 | 2.02 | 3½-2½ | $3d^3\ ^4F-3d^3\ ^2D$ |
| 6215.6 | 0.02 | 2.00 | 2½-1½ | (3F) |
| 6159.3 | 0.02 | 2.02 | 2½-2½ | |
| 6160.1 | 0.00 | 2.00 | 1½-1½ | |
| 6104.8 | 0.00 | 2.02 | 1½-2½ | |
| 6098.1 | 0.07 | 2.10 | 4½-5½ | $3d^3\ ^4F-3d^3\ ^2H$ |
| 6065.2 | 0.04 | 2.08 | 3½-4½ | (4F) |
| **V IV** I P 48.3 | | | | |
| 8815.9 | 0.04 | 1.44 | 3-2 | $3d^2\ ^3F-3d^2\ ^1D$ |
| 8575.4 | 0.00 | 1.44 | 2-2 | (1F) |
| 7611.2 | 0.04 | 1.66 | 3-2 | $3d^2\ ^3F-3d^2\ ^3P$ |
| 7551.9 | 0.00 | 1.63 | 2-1 | (2F) |
| 7431.2 | 0.00 | 1.66 | 2-2 | |
| 5446.0 | 0.09 | 2.36 | 4-4 | $3d^2\ ^3F-3d^2\ ^1G$ |
| 5326.5 | 0.04 | 2.36 | 3-4 | (3F) |
| 5237.7 | 0.00 | 2.36 | 2-4 | |
| **V VIII** I P 173? | | | | |
| 3686 | 0.00 | 3.35 | 2-2 | $3p^4\ ^3P-3p^4\ ^1D$ |
| 4734 | 0.74 | 3.35 | 1-2 | (1F) |

FORBIDDEN LINES

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Cr I** I P 6.74 | | | | |
| 4577.32 | 0.00 | 2.70 | 3-3 | $a^7S-a^5P$ |
| 4575.84 | 0.00 | 2.70 | 3-2 | (1F) |
| 4573.93 | 0.00 | 2.70 | 3-1 | |
| 4149.52 | 0.00 | 2.97 | 3-2 | $a^7S-a^3P$ |
| 4251.99 | 0.00 | 2.90 | 3-1 | (2F) |
| 4117.09 | 0.00 | 3.00 | 3-4 | $a^7S-b^5D$ |
| 4113.42 | 0.00 | 3.00 | 3-3 | (3F) |
| 4114.10 | 0.00 | 3.00 | 3-2 | |
| 4116.36 | 0.00 | 3.00 | 3-1 | |
| 3672.37 | 0.00 | 3.36 | 3-2 | $a^7S-b^3P$ |
| 3678.71 | 0.00 | 3.35 | 3-1 | (4F) |
| 7016.80 | 0.94 | 2.70 | 2-3 | $a^5S-a^5P$ |
| 7013.33 | 0.94 | 2.70 | 2-2 | (5F) |
| 7008.84 | 0.94 | 2.70 | 2-1 | |
| 6059.21 | 0.94 | 2.97 | 2-2 | $a^5S-a^3P$ |
| 6280.22 | 0.94 | 2.90 | 2-1 | (6F) |
| 6420.88 | 0.94 | 2.86 | 2-0 | |
| 5990.31 | 0.94 | 3.00 | 2-4 | $a^5S-b^5D$ |
| 5982.55 | 0.94 | 3.00 | 2-3 | (7F) |
| 5983.99 | 0.94 | 3.00 | 2-2 | |
| 5988.76 | 0.94 | 3.00 | 2-1 | |
| 5992.15 | 0.94 | 3.00 | 2-0 | |
| 5092.97 | 0.94 | 3.36 | 2-2 | $a^5S-b^3P$ |
| 5105.16 | 0.94 | 3.35 | 2-1 | (8F) |
| 5108.53 | 0.94 | 3.35 | 2-0 | |
| 8251.14 | 1.03 | 2.53 | 4-5 | $a^5D-a^5G$ |
| 8043.80 | 1.00 | 2.53 | 3-4 | (9F) |
| 7938.41 | 0.98 | 2.53 | 2-3 | |
| 7867.83 | 0.96 | 2.53 | 1-2 | |
| 8183.69 | 1.03 | 2.53 | 4-4 | |
| 8045.57 | 1.00 | 2.53 | 3-3 | |
| 7940.71 | 0.98 | 2.53 | 2-2 | |
| 8185.52 | 1.03 | 2.53 | 4-3 | |
| 8047.93 | 1.00 | 2.53 | 3-2 | |
| 7387.23 | 1.03 | 2.70 | 4-3 | $a^5D-a^5P$ |
| 7269.33 | 1.00 | 2.70 | 3-2 | (10F) |
| 7177.04 | 0.98 | 2.70 | 2-1 | |
| 7383.38 | 1.03 | 2.70 | 4-2 | |
| 7264.51 | 1.00 | 2.70 | 3-1 | |
| 7273.06 | 1.00 | 2.70 | 3-3 | |
| 7181.74 | 0.98 | 2.70 | 2-2 | |
| 7117.45 | 0.96 | 2.70 | 1-1 | |
| 7185.39 | 0.98 | 2.70 | 2-3 | |
| 7122.07 | 0.96 | 2.70 | 1-2 | |
| 7087.10 | 0.96 | 2.70 | 0-1 | |
| 7125.65 | 0.96 | 2.70 | 1-3 | |
| 7091.68 | 0.98 | 2.70 | 0-2 | |
| 6333.46 | 1.03 | 2.97 | 4-2 | $a^5D-a^3P$ |
| 6484.72 | 1.00 | 2.90 | 3-1 | (11F) |
| 6561.75 | 0.98 | 2.86 | 2-0 | |
| 6249.35 | 1.00 | 2.97 | 3-2 | |
| 6414.93 | 0.98 | 2.90 | 2-1 | |
| 6511.90 | 0.96 | 2.86 | 1-0 | |
| 6184.51 | 0.98 | 2.97 | 2-2 | |
| 6367.28 | 0.98 | 2.90 | 1-1 | |
| 6140.20 | 0.96 | 2.97 | 1-2 | |
| 6342.98 | 0.96 | 2.90 | 0-1 | |
| 6117.60 | 0.96 | 2.97 | 0-2 | |
| 6258.22 | 1.03 | 3.00 | 4-4 | $a^5D-b^5D$ |
| 6167.84 | 1.00 | 3.00 | 3-3 | (12F) |
| 6106.17 | 0.98 | 3.00 | 2-2 | |
| 6067.88 | 0.96 | 3.00 | 1-1 | |
| 6249.75 | 1.03 | 3.00 | 4-3 | |
| 6169.37 | 1.00 | 3.00 | 3-2 | |
| 6111.14 | 0.98 | 3.00 | 2-1 | |
| 6071.35 | 0.96 | 3.00 | 1-0 | |
| 6176.08 | 1.00 | 3.00 | 3-4 | |
| 6104.67 | 0.98 | 3.00 | 2-3 | |
| 6062.98 | 0.96 | 3.00 | 1-2 | |
| 6045.80 | 0.96 | 3.00 | 0-1 | |
| 6251.33 | 1.03 | 3.00 | 4-2 | |
| 6174.44 | 1.00 | 3.00 | 3-1 | |
| 6114.66 | 0.98 | 3.00 | 2-0 | |
| 6112.75 | 0.98 | 3.00 | 2-4 | |
| 6061.50 | 0.96 | 3.00 | 1-3 | |
| 6040.94 | 0.96 | 3.00 | 0-2 | |
| 5975.39 | 1.03 | 3.09 | 4-5 | $a^5D-a^3G$ |
| 5949.99 | 1.00 | 3.07 | 3-4 | (13F) |
| 5913.34 | 0.98 | 3.07 | 2-3 | |
| 6026.18 | 1.03 | 3.07 | 4-4 | |
| 5972.59 | 1.00 | 3.07 | 3-3 | |
| 6042.37 | 1.03 | 3.07 | 4-3 | |
| 5926.18 | 1.03 | 3.11 | 4-4 | $a^5D-a^3F$ |
| 5876.92 | 1.00 | 3.10 | 3-3 | (14F) |
| 5876.23 | 0.98 | 3.08 | 2-2 | |
| 5951.24 | 1.03 | 3.10 | 4-3 | |
| 5934.73 | 1.00 | 3.08 | 3-2 | |
| 5852.48 | 1.00 | 3.11 | 3-4 | |
| 5819.54 | 0.98 | 3.10 | 2-3 | |
| 5836.21 | 0.96 | 3.08 | 1-2 | |
| 6010.53 | 1.03 | 3.08 | 4-2 | |
| 5795.58 | 0.98 | 3.11 | 2-4 | |
| 5780.29 | 0.96 | 3.10 | 1-3 | |
| 5815.79 | 0.96 | 3.08 | 0-2 | |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Cr I** continued | | | | |
| 5285.34 | 1.03 | 3.36 | 4-2 | $a^5D-b^3P$ |
| 5239.47 | 1.00 | 3.35 | 3-1 | (15F) |
| 5197.31 | 0.98 | 3.35 | 2-0 | |
| 5226.64 | 1.00 | 3.36 | 3-2 | |
| 5193.82 | 0.98 | 3.35 | 2-1 | |
| 5185.98 | 0.96 | 3.35 | 1-0 | |
| 5181.21 | 0.98 | 3.38 | 2-2 | |
| 5162.53 | 0.96 | 3.35 | 1-1 | |
| 5150.07 | 0.96 | 3.36 | 1-2 | |
| 5148.55 | 0.98 | 3.35 | 0-1 | |
| 5134.16 | 0.96 | 3.38 | 0-2 | |
| 5124.41 | 1.03 | 3.43 | 4-5 | $a^5D-b^3G$ |
| 5098.44 | 1.00 | 3.42 | 3-4 | (16F) |
| 5082.54 | 0.98 | 3.41 | 2-3 | |
| 5154.28 | 1.03 | 3.42 | 4-4 | |
| 5126.25 | 1.00 | 3.41 | 3-3 | |
| 5182.71 | 1.03 | 3.41 | 4-3 | |
| **Cr II** I P 16.8 | | | | |
| 8000.12 | 0.00 | 1.54 | 2½-4½ | $a^6S-a^6D$ |
| 8125.50 | 0.00 | 1.52 | 2½-3½ | (1F) |
| 8229.81 | 0.00 | 1.50 | 2½-2½ | |
| 8308.68 | 0.00 | 1.49 | 2½-1½ | |
| 8357.78 | 0.00 | 1.48 | 2½- ½ | |
| 4992.68 | 0.00 | 2.47 | 2½-3½ | $a^6S-a^4D$ |
| 5049.73 | 0.00 | 2.44 | 2½-2½ | (2F) |
| 5092.60 | 0.00 | 2.42 | 2½-1½ | |
| 5119.47 | 0.00 | 2.41 | 2½- ½ | |
| 4581.18 | 0.00 | 2.69 | 2½-2½ | $a^6S-a^4P$ |
| 4580.80 | 0.00 | 2.69 | 2½-1½ | (3F) |
| 4580.88 | 0.00 | 2.69 | 2½- ½ | |
| 3993.57 | 0.00 | 3.09 | 2½-3½ | $a^6S-b^4D$ |
| 3991.47 | 0.00 | 3.09 | 2½-2½ | (4F) |
| 3992.08 | 0.00 | 3.09 | 2½-1½ | |
| 3993.29 | 0.00 | 3.09 | 2½- ½ | |
| 3239.07 | 0.00 | 3.81 | 2½-2½ | $a^6S-b^4P$ |
| 3298.61 | 0.00 | 3.74 | 2½-1½ | (5F) |
| 3337.77 | 0.00 | 3.70 | 2½- ½ | |
| 3202.25 | 0.00 | 3.85 | 2½-4½ | $a^6S-a^4F$ |
| 3207.46 | 0.00 | 3.85 | 2½-3½ | (6F) |
| 3212.75 | 0.00 | 3.84 | 2½-2½ | |
| 3216.32 | 0.00 | 3.84 | 2½-1½ | |
| 3188.79 | 0.00 | 3.87 | 2½-2½ | $a^6S-a^2D$ |
| 3170.55 | 0.00 | 3.89 | 2½-1½ | (7F) |
| 3089.76 | 0.00 | 3.99 | 2½-3½ | $a^6S-a^2F$ |
| 3066.29 | 0.00 | 4.02 | 2½-2½ | (8F) |
| 12471.70 | 1.54 | 2.53 | 4½-5½ | $a^6D-a^4G$ |
| 12168.18 | 1.52 | 2.53 | 3½-4½ | (9F) |
| 11943.75 | 1.50 | 2.53 | 2½-3½ | |
| 11789.27 | 1.49 | 2.53 | 1½-2½ | |
| 12460.65 | 1.54 | 2.53 | 4½-4½ | |
| 12170.50 | 1.52 | 2.53 | 3½-3½ | |
| 11951.78 | 1.50 | 2.53 | 2½-2½ | |
| 12463.08 | 1.54 | 2.53 | 4½-3½ | |
| 12178.83 | 1.52 | 2.53 | 3½-2½ | |
| 10719.84 | 1.54 | 2.69 | 4½-2½ | $a^6D-a^4P$ |
| 10500.65 | 1.52 | 2.69 | 3½-1½ | (10F) |
| 10331.86 | 1.50 | 2.69 | 2½- ½ | |
| 10502.67 | 1.52 | 2.69 | 3½-2½ | |
| 10331.43 | 1.50 | 2.69 | 2½-1½ | |
| 10210.20 | 1.49 | 2.69 | 1½- ½ | |
| 10333.39 | 1.50 | 2.69 | 2½-2½ | |
| 10209.78 | 1.49 | 2.69 | 1½-1½ | |
| 10137.00 | 1.48 | 2.69 | ½- ½ | |
| 10211.69 | 1.49 | 2.69 | 1½-2½ | |
| 10136.59 | 1.48 | 2.69 | ½-1½ | |
| 10138.47 | 1.48 | 2.69 | ½-2½ | |
| 7974.31 | 1.54 | 3.09 | 4½-3½ | $a^6D-b^4D$ |
| 7845.41 | 1.52 | 3.09 | 3½-2½ | (11F) |
| 7752.86 | 1.50 | 3.09 | 2½-1½ | |
| 7688.64 | 1.49 | 3.09 | 1½- ½ | |
| 7965.96 | 1.54 | 3.09 | 4½-2½ | |
| 7847.76 | 1.52 | 3.09 | 3½-1½ | |
| 7757.43 | 1.50 | 3.09 | 2½- ½ | |
| 7853.51 | 1.52 | 3.09 | 3½-3½ | |
| 7750.56 | 1.50 | 3.09 | 2½-2½ | |
| 7684.16 | 1.49 | 3.09 | 1½-1½ | |
| 7647.06 | 1.48 | 3.09 | ½- ½ | |
| 7758.47 | 1.50 | 3.09 | 2½-3½ | |
| 7681.89 | 1.49 | 3.09 | 1½-2½ | |
| 7642.61 | 1.48 | 3.09 | ½-1½ | |
| 7689.65 | 1.49 | 3.09 | 1½-3½ | |
| 7640.39 | 1.48 | 3.09 | ½-2½ | |
| 5442.82 | 1.54 | 3.81 | 4½-2½ | $a^6D-b^4P$ |
| 5552.93 | 1.52 | 3.74 | 3½-1½ | (12F) |
| 5615.19 | 1.50 | 3.70 | 2½- ½ | |
| 5386.27 | 1.52 | 3.81 | 3½-2½ | |
| 5505.25 | 1.50 | 3.74 | 2½-1½ | |
| 5579.06 | 1.49 | 3.70 | 1½- ½ | |
| 5341.39 | 1.50 | 3.81 | 2½-2½ | |
| 5470.51 | 1.49 | 3.74 | 1½-1½ | |
| 5557.14 | 1.48 | 3.70 | ½- ½ | |
| 5308.68 | 1.49 | 3.81 | 1½-2½ | |
| 5449.43 | 1.48 | 3.74 | ½-1½ | |
| 5288.83 | 1.48 | 3.81 | ½-2½ | |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Cr II** continued | | | | |
| 5339.65 | 1.54 | 3.85 | 4½-4½ | $a^6D-a^4F$ |
| 5299.42 | 1.52 | 3.85 | 3½-3½ | (13F) |
| 5270.19 | 1.50 | 3.84 | 2½-2½ | |
| 5247.84 | 1.49 | 3.84 | 1½-1½ | |
| 5354.15 | 1.54 | 3.85 | 4½-3½ | |
| 5313.88 | 1.52 | 3.84 | 3½-2½ | |
| 5279.80 | 1.50 | 3.84 | 2½-1½ | |
| 5285.31 | 1.52 | 3.85 | 3½-4½ | |
| 5255.97 | 1.50 | 3.85 | 2½-3½ | |
| 5238.35 | 1.49 | 3.84 | 1½-2½ | |
| 5228.44 | 1.48 | 3.84 | ½-1½ | |
| 5368.91 | 1.54 | 3.84 | 4½-2½ | |
| 5323.64 | 1.52 | 3.84 | 3½-1½ | |
| 5242.00 | 1.50 | 3.85 | 2½-1½ | |
| 5224.30 | 1.49 | 3.85 | 1½-3½ | |
| 5219.02 | 1.48 | 3.84 | ½-2½ | |
| 5248.64 | 1.52 | 3.87 | 3½-2½ | $a^6D-a^2D$ |
| 5157.59 | 1.50 | 3.89 | 2½-1½ | (14F) |
| 5206.02 | 1.50 | 3.87 | 2½-2½ | |
| 5127.09 | 1.49 | 3.89 | 1½-1½ | |
| 5174.95 | 1.49 | 3.87 | 1½-2½ | |
| 5108.57 | 1.48 | 3.89 | ½-1½ | |
| 5034.05 | 1.54 | 3.99 | 4½-3½ | $a^6D-a^2F$ |
| 4924.81 | 1.52 | 4.02 | 3½-2½ | (15F) |
| 4985.64 | 1.52 | 3.99 | 3½-3½ | |
| 4887.27 | 1.50 | 4.02 | 2½-2½ | |
| 4947.17 | 1.50 | 3.99 | 2½-3½ | |
| 4859.87 | 1.49 | 4.02 | 1½-2½ | |
| 9222.25 | 2.47 | 3.81 | 3½-2½ | $a^4D-b^4P$ |
| 9512.58 | 2.44 | 3.74 | 2½-1½ | (16F) |
| 9686.70 | 2.42 | 3.70 | 1½- ½ | |
| 9033.73 | 2.44 | 3.81 | 2½-2½ | |
| 9364.08 | 2.42 | 3.74 | 1½-1½ | |
| 9590.94 | 2.41 | 3.70 | ½- ½ | |
| 8899.71 | 2.42 | 3.81 | 1½-2½ | |
| 9274.58 | 2.41 | 3.74 | ½-1½ | |
| 9806.20 | 2.47 | 3.73 | 3½-4½ | $a^4D-a^4H$ |
| 9651.02 | 2.44 | 3.72 | 2½-3½ | (17F) |
| 9866.49 | 2.47 | 3.72 | 3½-3½ | |
| 8929.91 | 2.47 | 3.85 | 3½-4½ | $a^4D-a^4F$ |
| 8792.09 | 2.44 | 3.85 | 2½-3½ | (18F) |
| 8703.79 | 2.42 | 3.84 | 1½-2½ | |
| 8652.17 | 2.41 | 3.84 | ½-1½ | |
| 8970.56 | 2.47 | 3.85 | 3½-3½ | |
| 8831.94 | 2.44 | 3.84 | 2½-2½ | |
| 8730.02 | 2.42 | 3.84 | 1½-1½ | |
| 9012.04 | 2.47 | 3.84 | 3½-2½ | |
| 8858.94 | 2.44 | 3.84 | 2½-1½ | |
| 8826.02 | 2.47 | 3.87 | 3½-2½ | $a^4D-a^2D$ |
| 8520.22 | 2.44 | 3.89 | 2½-1½ | (19F) |
| 8653.20 | 2.44 | 3.87 | 2½-2½ | |
| 8400.89 | 2.42 | 3.89 | 1½-1½ | |
| 8530.15 | 2.42 | 3.87 | 1½-2½ | |
| 8328.78 | 2.41 | 3.89 | ½-1½ | |
| 8106.88 | 2.47 | 3.99 | 3½-3½ | $a^4D-a^2F$ |
| 7806.88 | 2.44 | 4.02 | 2½-2½ | (20F) |
| 7947.28 | 2.47 | 4.02 | 3½-2½ | |
| 7960.85 | 2.44 | 3.99 | 2½-3½ | |
| 7706.58 | 2.42 | 4.02 | 1½-2½ | |
| 10373.30 | 2.53 | 3.72 | 5½-6½ | $a^4G-a^2I$ |
| 10388.07 | 2.53 | 3.72 | 4½-5½ | (21F) |
| 10380.40 | 2.53 | 3.72 | 5½-5½ | |
| 10119.57 | 2.53 | 3.75 | 5½-6½ | $a^4G-a^4H$ |
| 10223.27 | 2.53 | 3.74 | 4½-5½ | (22F) |
| 10305.67 | 2.53 | 3.73 | 3½-4½ | |
| 10366.26 | 2.53 | 3.72 | 2½-3½ | |
| 10215.85 | 2.53 | 3.74 | 5½-5½ | |
| 10307.34 | 2.53 | 3.73 | 4½-4½ | |
| 10372.30 | 2.53 | 3.72 | 3½-3½ | |
| 10299.79 | 2.53 | 3.73 | 5½-4½ | |
| 10373.98 | 2.53 | 3.72 | 4½-3½ | |
| 9337.40 | 2.53 | 3.85 | 5½-4½ | $a^4G-a^4F$ |
| 9388.12 | 2.53 | 3.85 | 4½-3½ | (23F) |
| 9432.18 | 2.53 | 3.84 | 3½-2½ | |
| 9457.95 | 2.53 | 3.84 | 2½-1½ | |
| 9343.81 | 2.53 | 3.85 | 4½-4½ | |
| 9386.74 | 2.53 | 3.85 | 3½-3½ | |
| 9427.18 | 2.53 | 3.84 | 2½-2½ | |
| 9342.24 | 2.53 | 3.85 | 3½-4½ | |
| 9381.78 | 2.53 | 3.85 | 2½-3½ | |
| 9228.60 | 2.53 | 3.87 | 3½-2½ | $a^4G-a^2D$ |
| 9072.86 | 2.53 | 3.89 | 2½-1½ | (24F) |
| 9223.81 | 2.53 | 3.87 | 2½-2½ | |
| 8446.39 | 2.53 | 3.99 | 4½-3½ | $a^4G-a^2F$ |
| 8272.21 | 2.53 | 4.02 | 3½-2½ | (25F) |
| 8445.28 | 2.53 | 3.99 | 3½-3½ | |
| 8268.36 | 2.53 | 4.02 | 2½-2½ | |
| 8441.27 | 2.53 | 3.99 | 2½-3½ | |
| 11056.70 | 2.69 | 3.81 | 2½-2½ | $a^4P-b^4P$ |
| 11785.17 | 2.69 | 3.74 | 1½-1½ | (26F) |
| 12300.16 | 2.69 | 3.70 | ½- ½ | |
| 11782.63 | 2.69 | 3.74 | 2½-1½ | |
| 12300.77 | 2.69 | 3.70 | 1½- ½ | |
| 11058.94 | 2.69 | 3.81 | 1½-2½ | |
| 11784.62 | 2.69 | 3.74 | ½-1½ | |

FORBIDDEN LINES

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Cr II** continued | | | | |
| 10696.87 | 2.69 | 3.85 | 2½-3½ | $a^4P-a^4F$ |
| 10758.04 | 2.69 | 3.84 | 1½-2½ | (27F) |
| 10797.66 | 2.69 | 3.84 | ½-1½ | |
| 10755.91 | 2.69 | 3.84 | 2½-2½ | |
| 10798.14 | 2.69 | 3.84 | 1½-1½ | |
| 10796.00 | 2.69 | 3.84 | 2½-1½ | |
| 10491.99 | 2.69 | 3.87 | 2½-2½ | $a^4P-a^2D$ |
| 10299.05 | 2.69 | 3.89 | 1½-1½ | (28F) |
| 10297.11 | 2.69 | 3.89 | 2½-1½ | |
| 10494.00 | 2.69 | 3.87 | 1½-2½ | |
| 10298.63 | 2.69 | 3.89 | ½-1½ | |
| 9491.15 | 2.69 | 3.99 | 2½-3½ | $a^4P-a^2F$ |
| 9274.68 | 2.69 | 4.02 | 1½-2½ | (29F) |
| 9273.10 | 2.69 | 4.02 | 2½-2½ | |
| **Cr III** I P 31 | | | | |
| 5785.4 | 0.07 | 2.20 | 4-2 | $3d^4\ ^5D-3d^4\ ^3P$ |
| 5945.1 | 0.04 | 2.13 | 3-1 | (1F) |
| 5712.7 | 0.04 | 2.20 | 3-2 | |
| 5884.9 | 0.02 | 2.13 | 2-1 | |
| 5689.3 | 0.02 | 2.20 | 2-2 | |
| 5843.6 | 0.01 | 2.13 | 1-1 | |
| 5618.9 | 0.01 | 2.20 | 1-2 | |
| 5823.8 | 0.00 | 2.13 | 0-1 | |
| 5600.1 | 0.00 | 2.20 | 0-2 | |
| 5550.3 | 0.07 | 2.29 | 4-4 | $3d^4\ ^5D-3d^4\ ^3F$ |
| 5505.1 | 0.04 | 2.29 | 3-3 | (2F) |
| 5471.3 | 0.02 | 2.28 | 2-2 | |
| 5572.6 | 0.07 | 2.29 | 4-3 | |
| 5523.3 | 0.04 | 2.28 | 3-2 | |
| 5483.3 | 0.04 | 2.29 | 3-4 | |
| 5453.4 | 0.02 | 2.29 | 2-3 | |
| 5435.6 | 0.01 | 2.28 | 1-2 | |
| 5591.3 | 0.07 | 2.28 | 4-2 | |
| 5432.1 | 0.02 | 2.29 | 2-4 | |
| *5418.0 | 0.01 | 2.29 | 1-3 | |
| | 0.00 | 2.28 | 0-2 | |
| 4894.1 | 0.07 | 2.59 | 4-5 | $3d^4\ ^5D-3d^4\ ^3G$ |
| 4876.0 | 0.04 | 2.57 | 3-4 | (3F) |
| 4870.8 | 0.02 | 2.56 | 2-3 | |
| 4928.9 | 0.07 | 2.57 | 4-4 | |
| 4911.9 | 0.04 | 2.56 | 3-3 | |
| *4843.4 | 0.04 | 2.59 | 3-5 | |
| 4835.4 | 0.02 | 2.57 | 2-4 | |
| *4842.4 | 0.01 | 2.56 | 1-3 | |
| 4965.6 | 0.07 | 2.56 | 4-3 | |
| **Cr IV** I P 50.4 | | | | |
| 7390.6 | 0.12 | 1.79 | 4½-2½ | $3d^3\ ^4F-3d^3\ ^4P$ |
| 7338.0 | 0.07 | 1.75 | 3½-1½ | (1F) |
| 7333.4 | 0.03 | 1.74 | 2½- ½ | |
| 7180.4 | 0.07 | 1.79 | 3½-2½ | |
| 7171.6 | 0.03 | 1.75 | 2½-1½ | |
| 7111.4 | 0.00 | 1.74 | 1½- ½ | |
| 7021.0 | 0.03 | 1.79 | 2½-2½ | |
| 7051.7 | 0.00 | 1.75 | 1½-1½ | |
| 6906.1 | 0.00 | 1.79 | 1½-2½ | |
| 6915.6 | 0.12 | 1.90 | 4½-4½ | $3d^3\ ^4F-3d^3\ ^2G$ |
| 6893.2 | 0.07 | 1.86 | 3½-3½ | (2F) |
| 7086.7 | 0.12 | 1.88 | 4½-3½ | |
| 6731.2 | 0.07 | 1.90 | 3½-4½ | |
| 6746.2 | 0.03 | 1.86 | 2½-3½ | |
| 6591.0 | 0.03 | 1.90 | 2½-4½ | |
| 6640.0 | 0.00 | 1.86 | 1½-3½ | |
| 5296.3 | 0.07 | 2.40 | 3½-1½ | $3d^3\ ^4F-3d^3\ ^2P$ |
| 5209.1 | 0.03 | 2.40 | 2½-1½ | (3F) |
| 5145.5 | 0.00 | 2.40 | 1½-1½ | |
| 5071.8 | 0.12 | 2.55 | 4½-2½ | $3d^3\ ^4F-3d^3\ ^2D$ |
| 4976.5 | 0.07 | 2.55 | 3½-1½ | (4F) |
| 4971.8 | 0.07 | 2.55 | 3½-2½ | |
| 4899.4 | 0.03 | 2.55 | 2½-1½ | |
| 4894.8 | 0.03 | 2.55 | 2½-2½ | |
| 4843.1 | 0.00 | 2.55 | 1½-1½ | |
| 4838.7 | 0.00 | 2.55 | 1½-3½ | |
| 4907.6 | 0.12 | 2.63 | 4½-5½ | $3d^3\ ^4F-3d^3\ ^2H$ |
| 4873.4 | 0.07 | 2.60 | 3½-4½ | (5F) |
| 4969.3 | 0.12 | 2.60 | 4½-4½ | |
| 4814.0 | 0.07 | 2.63 | 3½-5½ | |
| 4799.4 | 0.03 | 2.60 | 2½-4½ | |
| **Cr V** I P 72.8 | | | | |
| 7252.8 | 0.14 | 1.84 | 4-2 | $3d^2\ ^3F-3d^2\ ^1D$ |
| 6932.4 | 0.06 | 1.84 | 3-2 | (1F) |
| 6700.1 | 0.00 | 1.84 | 2-2 | |
| 6705.5 | 0.14 | 1.98 | 4-2 | $3d^2\ ^3F-3d^2\ ^3P$ |
| 6586.7 | 0.06 | 1.94 | 3-1 | (2F) |
| 6462.3 | 0.00 | 1.91 | 2-0 | |
| 6430.7 | 0.06 | 1.98 | 3-2 | |
| 6376.6 | 0.00 | 1.94 | 2-1 | |
| 6230.4 | 0.00 | 1.98 | 2-2 | |
| 4523.8 | 0.14 | 2.87 | 4-4 | $3d^2\ ^3F-3d^2\ ^1G$ |
| 4396.9 | 0.06 | 2.87 | 3-4 | (3F) |
| 4302.3 | 0.00 | 2.87 | 2-4 | |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Cr V** continued | | | | |
| 9635.9 | 1.84 | 3.12 | 2-0 | $3d^2\ ^1D-3d^2\ ^1S$ (4F) |
| 10807.8 | 1.98 | 3.12 | 2-0 | $3d^2\ ^3P-3d^2\ ^1S$ |
| 10394.3 | 1.94 | 3.12 | 1-0 | (5F) |
| **Cr VIII** I P 184? | | | | |
| 10098.2 | 0.00 | 1.22 | 1½- ½ | $3p^5\ ^2P°-3p^5\ ^2P°$ (1F) |
| **Cr IX** I P 209? | | | | |
| 3273.5 | 0.00 | 3.77 | 2-2 | $3p^4\ ^3P-3p^4\ ^1D$ |
| 4407.9 | 0.97 | 3.77 | 1-2 | (1F) |
| **Mn II** I P 15.57 | | | | |
| 10553.58 | 0.00 | 1.17 | 3-2 | $a^7S-a^5S$ (1F) |
| 6978.57 | 0.00 | 1.77 | 3-4 | $a^7S-a^5D$ |
| 6850.42 | 0.00 | 1.80 | 3-3 | (2F) |
| 6763.56 | 0.00 | 1.82 | 3-2 | |
| 6709.08 | 0.00 | 1.84 | 3-1 | |
| 3344.73 | 0.00 | 3.69 | 3-3 | $a^7S-a^5P$ |
| 3341.38 | 0.00 | 3.69 | 3-2 | (3F) |
| 3337.82 | 0.00 | 3.70 | 3-1 | |
| 3049.05 | 0.00 | 4.05 | 3-4 | $a^7S-b^5D$ |
| 3042.61 | 0.00 | 4.06 | 3-3 | (4F) |
| 3042.44 | 0.00 | 4.06 | 3-2 | |
| 3044.52 | 0.00 | 4.05 | 3-1 | |
| 4896.65 | 1.17 | 3.69 | 2-3 | $a^5S-a^5P$ |
| 4889.49 | 1.17 | 3.69 | 2-2 | (5F) |
| 4881.87 | 1.17 | 3.70 | 2-1 | |
| 4275.21 | 1.17 | 4.06 | 2-3 | $a^5S-b^5D$ |
| 4274.87 | 1.17 | 4.06 | 2-2 | (6F) |
| 4278.97 | 1.17 | 4.05 | 2-1 | |
| 7547.77 | 1.77 | 3.40 | 4-5 | $a^5D-a^5G$ |
| 7696.30 | 1.80 | 3.41 | 3-4 | (7F) |
| 7805.96 | 1.82 | 3.41 | 2-3 | |
| 7879.32 | 1.84 | 3.41 | 1-2 | |
| 7540.74 | 1.77 | 3.41 | 4-4 | |
| 7693.38 | 1.80 | 3.41 | 3-3 | |
| 7805.47 | 1.82 | 3.41 | 2-2 | |
| 7537.93 | 1.77 | 3.41 | 4-3 | |
| 7692.91 | 1.80 | 3.41 | 3-2 | |
| 6423.45 | 1.77 | 3.69 | 4-3 | $a^5D-a^5P$ |
| 6523.23 | 1.80 | 3.69 | 3-2 | (8F) |
| 6590.10 | 1.82 | 3.70 | 2-1 | |
| 6535.99 | 1.80 | 3.69 | 3-3 | |
| 6603.99 | 1.82 | 3.69 | 2-2 | |
| 6642.66 | 1.84 | 3.70 | 1-1 | |
| 6617.06 | 1.82 | 3.69 | 2-3 | |
| 6656.77 | 1.84 | 3.69 | 1-2 | |
| 6668.63 | 1.85 | 3.70 | 0-1 | |
| 5415.04 | 1.77 | 4.05 | 4-4 | $a^5D-b^5D$ |
| 5473.94 | 1.80 | 4.06 | 3-3 | (9F) |
| 5530.11 | 1.82 | 4.06 | 2-2 | |
| 5574.04 | 1.84 | 4.05 | 1-1 | |
| 5394.78 | 1.77 | 4.06 | 4-3 | |
| 5473.37 | 1.80 | 4.06 | 3-2 | |
| 5536.98 | 1.82 | 4.05 | 2-1 | |
| 5579.73 | 1.84 | 4.05 | 1-0 | |
| 5494.80 | 1.80 | 4.05 | 3-4 | |
| 5530.69 | 1.82 | 4.06 | 2-3 | |
| 5567.08 | 1.84 | 4.06 | 1-2 | |
| 5561.21 | 1.85 | 4.05 | 0-1 | |
| **Mn IV** I P 52 | | | | |
| 4662.7 | 0.11 | 2.76 | 4-2 | $3d^4\ ^5D-3d^4\ ^3P$ |
| 4823.3 | 0.07 | 2.63 | 3-1 | (1F) |
| 4908.8 | 0.03 | 2.55 | 2-0 | |
| 4591.4 | 0.07 | 2.76 | 3-2 | |
| 4761.9 | 0.03 | 2.63 | 2-1 | |
| 4863.9 | 0.01 | 2.55 | 1-0 | |
| 4535.7 | 0.03 | 2.76 | 2-2 | |
| 4719.7 | 0.01 | 2.63 | 1-1 | |
| 4497.4 | 0.01 | 2.76 | 1-2 | |
| 4699.3 | 0.00 | 2.63 | 0-1 | |
| 4478.8 | 0.00 | 2.76 | 0-2 | |
| 4528.3 | 0.11 | 2.83 | 4-4 | $3d^4\ ^5D-3d^4\ ^3F$ |
| 4480.6 | 0.07 | 2.82 | 3-3 | (2F) |
| 4442.0 | 0.03 | 2.81 | 2-2 | |
| 4548.5 | 0.11 | 2.82 | 4-3 | |
| 4495.3 | 0.07 | 2.81 | 3-2 | |
| 4461.0 | 0.07 | 2.83 | 3-4 | |
| 4427.7 | 0.03 | 2.82 | 2-3 | |
| 4405.2 | 0.01 | 2.81 | 1-2 | |
| 4563.7 | 0.11 | 2.81 | 4-2 | |
| 4408.5 | 0.03 | 2.83 | 2-4 | |
| 4391.1 | 0.01 | 2.82 | 1-3 | |
| 4387.4 | 0.00 | 2.81 | 0-2 | |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Mn V** I P 75.7 | | | | |
| 6396.2 | 0.17 | 2.10 | 4½-2½ | $3d^3\ ^4F-3d^3\ ^4P$ |
| 6346.2 | 0.10 | 2.05 | 3½-1½ | (1F) |
| 6220.7 | 0.04 | 2.03 | 2½- ½ | |
| 8167.7 | 0.10 | 2.10 | 3½-2½ | |
| 6159.3 | 0.04 | 2.05 | 2½-1½ | |
| 6088.5 | 0.00 | 2.03 | 1½- ½ | |
| 5991.0 | 0.04 | 2.10 | 2½-2½ | |
| 6029.7 | 0.00 | 2.05 | 1½-1½ | |
| 5868.3 | 0.00 | 2.10 | 1½-2½ | |
| 5889.0 | 0.17 | 2.27 | 4½-4½ | $3d^3\ ^4F-3d^3\ ^2G$ |
| 5863.1 | 0.10 | 2.21 | 3½-3½ | (2F) |
| 6000.2 | 0.17 | 2.21 | 4½-3½ | |
| 5894.8 | 0.10 | 2.27 | 3½-4½ | |
| 5703.3 | 0.04 | 2.21 | 2½-3½ | |
| 5543.9 | 0.04 | 2.27 | 2½-4½ | |
| 5591.9 | 0.00 | 2.21 | 1½-3½ | |
| 4528.7 | 0.10 | 2.83 | 3½-1½ | $3d^3\ ^4F-3d^3\ ^2P$ |
| 4398.4 | 0.04 | 2.85 | 2½- ½ | (3F) |
| 4432.8 | 0.04 | 2.83 | 2½-1½ | |
| 4331.9 | 0.00 | 2.85 | 1½- ½ | |
| 4365.2 | 0.00 | 2.83 | 1½-1½ | |
| 4308.4 | 0.17 | 3.04 | 4½-2½ | $3d^3\ ^4F-3d^3\ ^2D$ |
| 4196.3 | 0.10 | 3.04 | 3½-1½ | (4F) |
| 4203.5 | 0.10 | 3.04 | 3½-2½ | |
| 4113.7 | 0.04 | 3.04 | 2½-1½ | |
| 4120.7 | 0.04 | 3.04 | 2½-2½ | |
| 4055.5 | 0.00 | 3.04 | 1½-1½ | |
| 4062.2 | 0.00 | 3.04 | 1½-2½ | |
| **Mn VI** I P ? | | | | |
| 6277.3 | 0.21 | 2.17 | 4-2 | $3d^2\ ^3F-3d^2\ ^1D$ |
| 5933.4 | 0.09 | 2.17 | 3-2 | (1F) |
| 5679.3 | 0.00 | 2.17 | 2-2 | |
| 5907.1 | 0.21 | 2.30 | 4-2 | $3d^2\ ^3F-3d^2\ ^3P$ |
| 5783.4 | 0.09 | 2.23 | 3-1 | (2F) |
| 5625.0 | 0.00 | 2.19 | 2-0 | |
| 5601.6 | 0.09 | 2.30 | 3-2 | |
| 5541.7 | 0.00 | 2.23 | 2-1 | |
| 5374.6 | 0.00 | 2.30 | 2-2 | |
| 3866.9 | 0.21 | 3.40 | 4-4? | $3d^2\ ^3F-3d^2\ ^1G$? |
| 3733.6 | 0.09 | 3.40 | 3-4? | (3F) |
| 3631.4 | 0.00 | 3.40 | 2-4? | |
| **Mn IX** I P 231? | | | | |
| 7978.7 | 0.00 | 1.55 | 1½- ½ | $3p^5\ ^2P°-3p^5\ ^2P°$ (1F) |
| **Mn X** I P 247? | | | | |
| 9997.3 | 0.00 | 1.23 | 2-1 | $3p^4\ ^3P-3p^4\ ^3P$ (1F) |
| 4122.6 | 1.23 | 4.23 | 1-2 | $3p^4\ ^3P-3p^4\ ^1D$ (2F) |
| **Fe I** I P 7.858 | | | | |
| 8347.55 | 0.00 | 1.48 | 4-4 | $a^5D-a^3F$ |
| 8231.57 | 0.05 | 1.55 | 3-3 | (1F) |
| 8151.33 | 0.09 | 1.60 | 2-2 | |
| 7959.00 | 0.00 | 1.55 | 4-3 | |
| 7964.27 | 0.05 | 1.60 | 3-2 | |
| 8647.89 | 0.05 | 1.48 | 3-4 | |
| 8431.56 | 0.09 | 1.55 | 2-3 | |
| 8275.57 | 0.11 | 1.60 | 1-2 | |
| 7708.83 | 0.00 | 1.60 | 4-2 | |
| 8868.91 | 0.09 | 1.48 | 2-4 | |
| 8564.56 | 0.11 | 1.55 | 1-3 | |
| 8337.65 | 0.12 | 1.60 | 0-2 | |
| 5696.36 | 0.00 | 2.17 | 4-3 | $a^5D-a^5P$ |
| 5775.05 | 0.05 | 2.19 | 3-3 | (2F) |
| 5804.45 | 0.09 | 2.21 | 2-1 | |
| 5639.55 | 0.00 | 2.19 | 4-2 | |
| 5708.96 | 0.05 | 2.21 | 3-1 | |
| 5834.64 | 0.05 | 2.17 | 3-3 | |
| 5872.77 | 0.09 | 2.19 | 2-2 | |
| 5867.17 | 0.11 | 2.21 | 1-1 | |
| 5934.41 | 0.09 | 2.17 | 2-3 | |
| 5936.99 | 0.11 | 2.19 | 1-2 | |
| 5898.30 | 0.12 | 2.21 | 0-1 | |
| 5999.99 | 0.11 | 2.17 | 1-3 | |
| 5968.87 | 0.12 | 2.19 | 0-2 | |
| 5439.72 | 0.00 | 2.27 | 4-3 | $a^5D-a^3P$ |
| 5224.15 | 0.05 | 2.41 | 3-1 | (3F) |
| 5170.84 | 0.09 | 2.47 | 2-0 | |
| 5565.68 | 0.05 | 2.27 | 3-2 | |
| 5303.99 | 0.09 | 2.41 | 2-1 | |
| 5220.56 | 0.11 | 2.47 | 1-0 | |
| 5656.39 | 0.09 | 2.27 | 2-2 | |
| 5356.32 | 0.11 | 2.41 | 1-1 | |
| 5715.94 | 0.11 | 2.27 | 1-2 | |
| 5382.26 | 0.12 | 2.41 | 0-1 | |
| 5745.49 | 0.12 | 2.27 | 0-2 | |

FORBIDDEN LINES

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| Fe I continued | | | | |
| 4843.34 | 0.00 | 2.55 | 4-4 | $a^5D$-$b^3F$ |
| 4886.56 | 0.05 | 2.58 | 3-3 | (4F) |
| 4916.26 | 0.09 | 2.60 | 2-2 | |
| 4789.19 | 0.00 | 2.58 | 4-3 | |
| 4847.58 | 0.05 | 2.60 | 3-2 | |
| 4942.95 | 0.05 | 2.55 | 3-4 | |
| 4956.35 | 0.09 | 2.58 | 2-3 | |
| 4961.18 | 0.11 | 2.60 | 1-2 | |
| 4751.75 | 0.00 | 2.60 | 4-2 | |
| 5014.37 | 0.09 | 2.55 | 2-4 | |
| 5002.01 | 0.11 | 2.58 | 1-3 | |
| 4983.42 | 0.12 | 2.60 | 0-2 | |
| 4603.66 | 0.00 | 2.68 | 4-5 | $a^5D$-$a^3G$ |
| 4631.93 | 0.05 | 2.72 | 3-4 | (5F) |
| 4640.05 | 0.09 | 2.75 | 2-3 | |
| 4544.36 | 0.00 | 2.72 | 4-4 | |
| 4578.83 | 0.05 | 2.75 | 3-3 | |
| 4693.56 | 0.05 | 2.68 | 3-5 | |
| 4694.59 | 0.09 | 2.72 | 2-4 | |
| 4680.05 | 0.11 | 2.75 | 1-3 | |
| 4493.23 | 0.00 | 2.75 | 4-3 | |
| 4377.37 | 0.00 | 2.82 | 4-2 | $a^5D$-$b^3P$ |
| 4437.10 | 0.05 | 2.83 | 3-1 | (6F) |
| 4473.46 | 0.09 | 2.85 | 2-0 | |
| 4458.57 | 0.05 | 2.82 | 3-2 | |
| 4494.57 | 0.09 | 2.83 | 2-1 | |
| 4510.63 | 0.11 | 2.85 | 1-0 | |
| 4516.60 | 0.09 | 2.82 | 2-2 | |
| 4532.09 | 0.11 | 2.83 | 1-1 | |
| 4554.49 | 0.11 | 2.82 | 1-2 | |
| 4550.64 | 0.12 | 2.83 | 0-1 | |
| 4573.23 | 0.12 | 2.82 | 0-2 | |
| 4203.39 | 0.00 | 2.94 | 4-5 | $a^5D$-$b^3G$ |
| 4217.71 | 0.05 | 2.98 | 3-4 | (7F) |
| 4229.86 | 0.09 | 3.00 | 2-3 | |
| 4144.97 | 0.00 | 2.98 | 4-4 | |
| 4178.93 | 0.05 | 3.00 | 3-3 | |
| 4278.21 | 0.05 | 2.94 | 3-5 | |
| 4269.60 | 0.09 | 2.98 | 2-4 | |
| 4263.07 | 0.11 | 3.00 | 1-3 | |
| 4107.51 | 0.00 | 3.00 | 4-3 | |
| 4108.02 | 0.00 | 3.00 | 4-2 | $a^5D$-$c^3P$ |
| 4104.59 | 0.05 | 3.06 | 3-1 | (8F) |
| 4099.29 | 0.09 | 3.10 | 2-0 | |
| 4179.45 | 0.05 | 3.00 | 3-2 | |
| 4153.72 | 0.09 | 3.06 | 2-1 | |
| 4130.47 | 0.11 | 3.10 | 1-0 | |
| 4230.40 | 0.09 | 3.00 | 2-2 | |
| 4185.74 | 0.11 | 3.06 | 1-1 | |
| 4263.62 | 0.11 | 3.00 | 1-2 | |
| 4201.56 | 0.12 | 3.06 | 0-1 | |
| 4280.04 | 0.12 | 3.00 | 0-2 | |
| 3812.07 | 0.00 | 3.24 | 4-3 | $a^5D$-$a^3D$ |
| 3814.58 | 0.05 | 3.29 | 3-2 | (9F) |
| 3889.58 | 0.09 | 3.26 | 2-1 | |
| 3754.98 | 0.00 | 3.29 | 4-2 | |
| 3846.46 | 0.05 | 3.26 | 3-1 | |
| 3873.51 | 0.05 | 3.24 | 3-3 | |
| 3856.98 | 0.09 | 3.29 | 2-2 | |
| 3917.64 | 0.11 | 3.26 | 1-1 | |
| 3917.23 | 0.09 | 3.24 | 2-3 | |
| 3884.57 | 0.11 | 3.29 | 1-2 | |
| 3931.50 | 0.12 | 3.26 | 0-1 | |
| 3945.70 | 0.11 | 3.24 | 1-3 | |
| 3898.19 | 0.12 | 3.29 | 0-2 | |
| 3403.65 | 0.00 | 3.63 | 4-3 | $a^5D$-$b^3D$ |
| 3454.34 | 0.05 | 3.82 | 3-2 | (10F) |
| 3493.55 | 0.09 | 3.62 | 2-1 | |
| 3405.39 | 0.00 | 3.62 | 4-2 | |
| 3458.73 | 0.05 | 3.82 | 3-1 | |
| 3452.54 | 0.05 | 3.83 | 3-3 | |
| 3489.07 | 0.09 | 3.82 | 2-2 | |
| 3518.17 | 0.11 | 3.62 | 1-1 | |
| 3487.23 | 0.09 | 3.63 | 2-3 | |
| 3511.64 | 0.11 | 3.82 | 1-2 | |
| 3527.33 | 0.12 | 3.62 | 0-1 | |
| 3509.78 | 0.11 | 3.83 | 1-3 | |
| 3532.78 | 0.12 | 3.82 | 0-2 | |
| 9828.83 | 0.91 | 2.17 | 4-3 | $a^5F$-$a^5P$ |
| 9998.31 | 0.95 | 2.19 | 3-2 | (11F) |
| 10055.97 | 0.99 | 2.21 | 2-1 | |
| 10178.29 | 0.95 | 2.17 | 3-3 | |
| 10282.84 | 0.99 | 2.19 | 2-2 | |
| 10329.79 | 1.01 | 2.21 | 1-1 | |
| 10452.56 | 0.99 | 2.17 | 2-3 | |
| 10443.95 | 1.01 | 2.19 | 1-2 | |
| 9386.96 | 0.95 | 2.27 | 3-2 | $a^5F$-$a^3P$ |
| 8843.14 | 0.99 | 2.41 | 2-1 | (12F) |
| 8412.97 | 1.01 | 2.47 | 1-0 | |
| 9819.74 | 0.99 | 2.27 | 2-2 | |
| 8771.24 | 1.01 | 2.41 | 1-1 | |
| 9778.70 | 1.01 | 2.27 | 1-2 | |
| 8022.25 | 0.86 | 2.39 | 5-6 | $a^5F$-$a^3H$ |
| 8164.85 | 0.91 | 2.42 | 4-5 | (13F) |
| 8289.45 | 0.95 | 2.44 | 3-4 | |
| 7876.34 | 0.86 | 2.42 | 5-5 | |
| 8054.83 | 0.91 | 2.44 | 4-4 | |
| 7773.91 | 0.86 | 2.44 | 5-4 | |
| 7290.42 | 0.86 | 2.55 | 5-4 | $a^5F$-$b^3F$ |
| 7406.61 | 0.91 | 2.58 | 4-3 | (14F) |
| 7510.54 | 0.95 | 2.60 | 3-2 | |
| 7168.42 | 0.86 | 2.58 | 5-3 | |
| 7317.43 | 0.91 | 2.60 | 4-2 | |
| 7536.93 | 0.91 | 2.55 | 4-4 | |
| 7604.53 | 0.95 | 2.58 | 3-3 | |
| 7658.84 | 0.99 | 2.60 | 2-2 | |
| 7741.96 | 0.95 | 2.55 | 3-4 | |
| 7756.59 | 0.99 | 2.58 | 2-3 | |
| 7759.25 | 1.01 | 2.60 | 1-2 | |
| 7899.63 | 0.99 | 2.55 | 2-4 | |
| 7859.60 | 1.01 | 2.58 | 1-3 | |
| 6760.61 | 0.86 | 2.68 | 5-5 | $a^5F$-$a^3G$ |
| 6836.94 | 0.91 | 2.72 | 4-4 | (15F) |
| 6884.50 | 0.95 | 2.75 | 3-3 | |
| 6633.48 | 0.86 | 2.72 | 5-4 | |
| 6721.89 | 0.91 | 2.75 | 4-3 | |
| 6972.07 | 0.91 | 2.68 | 4-5 | |
| 7005.23 | 0.95 | 2.72 | 3-4 | |
| 7008.89 | 0.99 | 2.75 | 2-3 | |
| 6525.11 | 0.86 | 2.75 | 5-3 | |
| 7147.16 | 0.95 | 2.68 | 3-5 | |
| 7134.08 | 0.99 | 2.72 | 2-4 | |
| 7092.89 | 1.01 | 2.75 | 1-3 | |
| 6616.18 | 0.95 | 2.82 | 3-2 | $a^5F$-$b^3P$ |
| 6682.18 | 0.99 | 2.83 | 2-1 | (16F) |
| 6710.88 | 1.01 | 2.85 | 1-0 | |
| 6730.99 | 0.99 | 2.82 | 2-2 | |
| 6758.48 | 1.01 | 2.83 | 1-1 | |
| 6808.42 | 1.01 | 2.82 | 1-2 | |
| 5931.19 | 0.86 | 2.94 | 5-5 | $a^5F$-$b^3G$ |
| 5971.33 | 0.91 | 2.98 | 4-4 | (17F) |
| 6018.54 | 0.95 | 3.00 | 3-3 | |
| 5815.53 | 0.86 | 2.98 | 5-4 | |
| 5893.89 | 0.91 | 3.00 | 4-3 | |
| 6093.32 | 0.91 | 2.94 | 4-5 | |
| 6099.31 | 0.95 | 2.98 | 3-4 | |
| 6113.40 | 0.99 | 3.00 | 2-3 | |
| 5742.07 | 0.86 | 3.00 | 5-3 | |
| 6238.64 | 0.95 | 2.94 | 3-5 | |
| 6196.75 | 0.99 | 2.98 | 2-4 | |
| 6177.21 | 1.01 | 3.00 | 1-3 | |
| 6019.63 | 0.95 | 3.00 | 3-2 | $a^5F$-$c^3P$ |
| 5955.61 | 0.99 | 3.06 | 2-1 | (18F) |
| 5902.64 | 1.01 | 3.10 | 1-0 | |
| 8114.52 | 0.99 | 3.00 | 2-2 | |
| 6016.15 | 1.01 | 3.06 | 1-1 | |
| 8178.35 | 1.01 | 3.00 | 1-2 | |
| 5212.95 | 0.86 | 3.22 | 5-8 | $a^5F$-$b^3H$ |
| 5268.82 | 0.91 | 3.25 | 4-5 | (19F) |
| 5289.68 | 0.95 | 3.29 | 3-4 | |
| 5147.18 | 0.86 | 3.25 | 5-5 | |
| 5193.13 | 0.91 | 3.29 | 4-4 | |
| 5074.90 | 0.86 | 3.29 | 5-4 | |
| 5180.78 | 0.86 | 3.24 | 5-3 | $a^5F$-$a^3D$ |
| 5194.19 | 0.91 | 3.29 | 4-2 | (20F) |
| 5352.29 | 0.95 | 3.26 | 3-1 | |
| 5304.06 | 0.91 | 3.24 | 4-3 | |
| 5290.75 | 0.95 | 3.29 | 3-2 | |
| 5427.17 | 0.99 | 3.28 | 2-1 | |
| 5404.80 | 0.95 | 3.24 | 3-3 | |
| 5363.91 | 0.99 | 3.29 | 2-2 | |
| 5477.40 | 1.01 | 3.26 | 1-1 | |
| 5481.17 | 0.99 | 3.24 | 2-3 | |
| 5412.97 | 1.01 | 3.29 | 1-2 | |
| 5532.41 | 1.01 | 3.24 | 1-3 | |
| 4454.37 | 0.88 | 3.83 | 5-3 | $a^5F$-$b^3D$ |
| 4548.32 | 0.91 | 3.82 | 4-2 | (21F) |
| 4630.06 | 0.95 | 3.62 | 3-1 | |
| 4545.20 | 0.91 | 3.83 | 4-3 | |
| 4622.19 | 0.95 | 3.62 | 3-2 | |
| 4685.99 | 0.99 | 3.82 | 2-1 | |
| 4618.97 | 0.95 | 3.63 | 3-3 | |
| 4677.94 | 0.99 | 3.82 | 2-2 | |
| 4723.39 | 1.01 | 3.82 | 1-1 | |
| 4674.64 | 0.99 | 3.63 | 2-3 | |
| 4715.21 | 1.01 | 3.62 | 1-2 | |
| 4711.86 | 1.01 | 3.63 | 1-3 | |
| 11537.63 | 1.48 | 2.55 | 4-4 | $a^3F$-$b^3F$ |
| 13025.23 | 1.55 | 2.58 | 3-3 | (22F) |
| 13387.48 | 1.60 | 2.60 | 2-2 | |
| 11333.80 | 1.48 | 2.58 | 4-3 | |
| 11791.90 | 1.55 | 2.60 | 3-2 | |
| 13372.55 | 1.55 | 2.55 | 3-4 | |
| 13845.23 | 1.60 | 2.58 | 2-3 | |
| 10364.65 | 1.48 | 2.68 | 4-5 | $a^3F$-$a^3G$ |
| 10593.32 | 1.55 | 2.72 | 3-4 | (23F) |
| 10771.88 | 1.60 | 2.75 | 2-3 | |
| 9974.41 | 1.48 | 2.72 | 4-4 | |
| 10318.68 | 1.55 | 2.75 | 3-3 | |
| 9731.40 | 1.48 | 2.75 | 4-3 | |
| 8466.95 | 1.48 | 2.94 | 4-5 | $a^3F$-$b^3G$ |
| 8649.72 | 1.55 | 2.98 | 3-4 | (24F) |
| 8792.49 | 1.60 | 3.00 | 2-3 | |
| 8233.22 | 1.48 | 2.98 | 4-4 | |
| 8488.19 | 1.55 | 3.00 | 3-3 | |
| 8086.73 | 1.48 | 3.00 | 4-3 | |
| 8490.34 | 1.55 | 3.00 | 3-2 | $a^3F$-$c^3P$ |
| 8469.75 | 1.60 | 3.06 | 2-1 | (25F) |
| 8794.80 | 1.60 | 3.00 | 2-2 | |
| 7935.32 | 1.48 | 3.03 | 4-4 | $a^3F$-$a^1G$ |
| 8321.51 | 1.55 | 3.03 | 3-4 | (26F) |
| 6954.69 | 1.48 | 3.25 | 4-5 | $a^3F$-$b^3H$ |
| 7107.04 | 1.55 | 3.29 | 3-4 | (27F) |
| 6823.42 | 1.48 | 3.29 | 4-4 | |
| 7018.21 | 1.48 | 3.24 | 4-3 | $a^3F$-$a^3D$ |
| 7109.01 | 1.55 | 3.29 | 3-2 | (28F) |
| 7439.58 | 1.60 | 3.26 | 2-1 | |
| 7316.44 | 1.55 | 3.24 | 3-3 | |
| 7321.23 | 1.60 | 3.29 | 2-2 | |
| 7541.42 | 1.60 | 3.24 | 2-3 | |
| 6231.27 | 1.55 | 3.53 | 3-2 | $a^3F$-$a^1D$ |
| 6393.72 | 1.60 | 3.53 | 2-2 | (29F) |
| 5746.99 | 1.48 | 3.63 | 4-3 | $a^3F$-$b^3D$ |
| 5952.21 | 1.55 | 3.62 | 3-2 | (30F) |
| 6113.97 | 1.60 | 3.62 | 2-1 | |
| 5946.87 | 1.55 | 3.63 | 3-3 | |
| 6100.26 | 1.60 | 3.62 | 2-2 | |
| 6094.65 | 1.60 | 3.63 | 2-3 | |
| 5609.27 | 1.48 | 3.68 | 4-4 | $a^3F$-$b^1G$ |
| 5799.53 | 1.55 | 3.68 | 3-4 | (31F) |
| 11524.46 | 2.17 | 3.24 | 3-3 | $a^5P$-$a^3D$ |
| 11237.04 | 2.19 | 3.29 | 2-2 | (32F) |
| 11790.50 | 2.21 | 3.26 | 1-1 | |
| 11018.07 | 2.17 | 3.29 | 3-2 | |
| 11518.28 | 2.19 | 3.26 | 2-1 | |
| 11764.23 | 2.19 | 3.24 | 2-3 | |
| 11495.96 | 2.21 | 3.29 | 1-2 | |
| 8456.74 | 2.17 | 3.63 | 3-3 | $a^5P$-$b^3D$ |
| 8596.27 | 2.19 | 3.62 | 2-2 | (33F) |
| 8775.19 | 2.21 | 3.62 | 1-1 | |
| 8467.54 | 2.17 | 3.62 | 3-2 | |
| 8623.51 | 2.19 | 3.62 | 2-1 | |
| 8585.14 | 2.19 | 3.63 | 2-3 | |
| 8746.99 | 2.21 | 3.62 | 1-2 | |
| 10908.34 | 2.27 | 3.40 | 2-1 | $a^3P$-$a^1P$ (34F) |
| 9775.94 | 2.27 | 3.53 | 2-2 | $a^3P$-$a^1D$ |
| 11044.11 | 2.41 | 3.53 | 1-2 | (35F) |
| 9093.67 | 2.27 | 3.83 | 2-3 | $a^3P$-$b^3D$ |
| 10196.82 | 2.41 | 3.62 | 1-2 | (36F) |
| 10770.38 | 2.47 | 3.62 | 0-1 | |
| 9106.17 | 2.27 | 3.62 | 2-2 | |
| 10235.17 | 2.41 | 3.62 | 1-1 | |
| 9136.73 | 2.27 | 3.62 | 2-1 | |
| 10601.80 | 2.39 | 3.56 | 6-5 | $a^3H$-$a^1H$ |
| 10887.84 | 2.43 | 3.58 | 5-5 | (37F) |
| 11069.08 | 2.44 | 3.56 | 4-5 | |
| 10075.00 | 2.39 | 3.62 | 6-8 | $a^3H$-$a^1I$ |
| 10314.96 | 2.43 | 3.62 | 5-8 | (38F) |
| 9822.50 | 2.43 | 3.68 | 5-4 | $a^3H$-$b^1G$ |
| 9986.60 | 2.44 | 3.68 | 4-4 | (39F) |
| 11450.86 | 2.55 | 3.63 | 4-3 | $b^3F$-$b^3D$ |
| 11786.08 | 2.58 | 3.82 | 3-2 | (40F) |
| 12072.48 | 2.80 | 3.82 | 2-1 | |
| 11765.16 | 2.58 | 3.83 | 3-3 | |
| 12019.17 | 2.60 | 3.82 | 2-2 | |
| 11997.42 | 2.60 | 3.63 | 2-3 | |
| 10918.84 | 2.55 | 3.68 | 4-4 | $b^3F$-$b^1G$ |
| 11202.11 | 2.58 | 3.68 | 3-4 | (41F) |

FORBIDDEN LINES

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Fe II** I P 18.16 | | | | |
| 7419.42 | 0.00 | 1.86 | 4½-3½ | $a^8D$-$a^4P$ (1F) |
| 7523.27 | 0.05 | 1.89 | 3½-2½ | |
| 7552.38 | 0.08 | 1.72 | 3½- ½ | |
| 7637.52 | 0.05 | 1.66 | 3½-2½ | |
| 7686.90 | 0.08 | 1.69 | 3½-1½ | |
| 7685.29 | 0.11 | 1.72 | 1½- ½ | |
| 7806.22 | 0.08 | 1.66 | 2½-2½ | |
| 7803.90 | 0.11 | 1.69 | 1½-1½ | |
| 7733.12 | 0.12 | 1.72 | ½- ½ | |
| 7938.90 | 0.11 | 1.66 | 1½-2½ | |
| 7874.33 | 0.12 | 1.69 | ½-1½ | |
| 7999.47 | 0.12 | 1.68 | ½-2½ | |
| 5650.39 | 0.08 | 2.27 | 3½-1½ | $a^6D$-$a^2P$ (2F) |
| 5546.59 | 0.11 | 2.33 | 1½- ½ | |
| 5713.35 | 0.11 | 2.27 | 1½-1½ | |
| 5582.01 | 0.12 | 2.33 | ½- ½ | |
| 5750.95 | 0.12 | 2.27 | ½-1½ | |
| 4965.78 | 0.05 | 2.53 | 3½-2½ | $a^6D$-$a^2D$ (3F) |
| 4843.51 | 0.08 | 2.63 | 2½-1½ | |
| 5038.55 | 0.08 | 2.53 | 2½-2½ | |
| 4889.70 | 0.11 | 2.63 | 1½-1½ | |
| 5088.52 | 0.11 | 2.53 | 1½-2½ | |
| 4917.22 | 0.12 | 2.83 | ½-1½ | |
| 4799.31 | 0.00 | 2.57 | 4½-2½ | $a^8D$-$b^4P$ (4F) |
| 4865.65 | 0.05 | 2.69 | 3½-1½ | |
| 4598.07 | 0.08 | 2.77 | 2½- ½ | |
| 4889.63 | 0.05 | 2.57 | 3½-2½ | |
| 4728.07 | 0.08 | 2.69 | 2½-1½ | |
| 4639.68 | 0.11 | 2.77 | 1½- ½ | |
| 4958.23 | 0.08 | 2.57 | 2½-2½ | |
| 4772.07 | 0.11 | 2.69 | 1½-1½ | |
| 4664.45 | 0.12 | 2.77 | ½- ½ | |
| 5006.65 | 0.11 | 2.57 | 1½-2½ | |
| 4798.28 | 0.12 | 2.69 | ½-1½ | |
| 5035.50 | 0.12 | 2.57 | ½-2½ | |
| 4664.97 | 0.00 | 2.85 | 4½-5½ | $a^6D$-$a^4H$ (5F) |
| 4716.36 | 0.05 | 2.66 | 3½-4½ | |
| 4750.57 | 0.08 | 2.68 | 2½-3½ | |
| 4632.27 | 0.00 | 2.66 | 4½-4½ | |
| 4687.56 | 0.05 | 2.68 | 3½-3½ | |
| 4604.48 | 0.00 | 2.68 | 4½-3½ | |
| 4416.27 | 0.00 | 2.79 | 4½-4½ | $a^6D$-$b^4F$ (6F) |
| 4457.95 | 0.05 | 2.82 | 3½-3½ | |
| 4488.75 | 0.08 | 2.83 | 2½-2½ | |
| 4509.61 | 0.11 | 2.84 | 1½-1½ | |
| 4382.75 | 0.00 | 2.82 | 4½-3½ | |
| 4432.45 | 0.05 | 2.83 | 3½-2½ | |
| 4470.29 | 0.08 | 2.84 | 2½-1½ | |
| 4492.84 | 0.05 | 2.79 | 3½-4½ | |
| 4514.90 | 0.08 | 2.82 | 2½-3½ | |
| 4528.39 | 0.11 | 2.83 | 1½-2½ | |
| 4533.00 | 0.12 | 2.84 | ½-1½ | |
| 4358.10 | 0.00 | 2.83 | 4½-2½ | |
| 4414.45 | 0.05 | 2.84 | 3½-1½ | |
| 4550.48 | 0.08 | 2.79 | 2½-4½ | |
| 4555.01 | 0.11 | 2.82 | 1½-3½ | |
| 4551.98 | 0.12 | 2.83 | ½-2½ | |
| 4287.40 | 0.00 | 2.88 | 4½-2½ | $a^6D$-$a^8S$ (7F) |
| 4359.34 | 0.05 | 2.88 | 3½-2½ | |
| 4413.78 | 0.08 | 2.88 | 2½-2½ | |
| 4452.11 | 0.11 | 2.88 | 1½-2½ | |
| 4474.91 | 0.12 | 2.88 | ½-2½ | |
| 3931.44 | 0.00 | 3.14 | 4½-5½ | $a^6D$-$a^4G$ (8F) |
| 3932.72 | 0.05 | 3.19 | 3½-4½ | |
| 3949.27 | 0.08 | 3.21 | 2½-3½ | |
| 3968.27 | 0.11 | 3.22 | 1½-2½ | |
| 3874.07 | 0.00 | 3.19 | 4½-4½ | |
| 3905.82 | 0.05 | 3.21 | 3½-3½ | |
| 3937.80 | 0.08 | 3.22 | 2½-2½ | |
| 3847.78 | 0.00 | 3.21 | 4½-3½ | |
| 3894.40 | 0.05 | 3.22 | 3½-2½ | |
| 3836.89 | 0.00 | 3.22 | 4½-3½ | |
| 3991.84 | 0.05 | 3.14 | 3½-5½ | |
| 3978.97 | 0.08 | 3.19 | 2½-4½ | |
| 3979.93 | 0.11 | 3.21 | 1½-3½ | |
| 3986.38 | 0.12 | 3.22 | ½-2½ | |
| 3979.78 | 0.08 | 3.18 | 2½-1½ | $a^6D$-$b^2P$ (9F) |
| 3834.73 | 0.11 | 3.32 | 1½- ½ | |
| 4010.91 | 0.11 | 3.18 | 1½-1½ | |
| 3851.83 | 0.12 | 3.32 | ½- ½ | |
| 4029.41 | 0.12 | 3.18 | ½-1½ | |
| 3659.98 | 0.00 | 3.37 | 4½-3½ | $a^6D$-$a^2F$ (10F) |
| 3670.62 | 0.05 | 3.41 | 3½-2½ | |
| 3712.28 | 0.05 | 3.37 | 3½-3½ | |
| 3709.14 | 0.08 | 3.41 | 2½-2½ | |
| 3751.66 | 0.08 | 3.37 | 2½-3½ | |
| 3736.17 | 0.11 | 3.41 | 1½-2½ | |
| 3175.38 | 0.00 | 3.89 | 4½-3½ | $a^6D$-$b^4D$ (11F) |
| 3224.54 | 0.05 | 3.87 | 3½-2½ | |
| 3256.73 | 0.08 | 3.87 | 2½-1½ | |
| 3277.13 | 0.11 | 3.87 | 1½- ½ | |
| 3185.01 | 0.00 | 3.87 | 4½-3½ | |
| 3228.99 | 0.05 | 3.87 | 3½-2½ | |
| 3256.31 | 0.08 | 3.87 | 2½- ½ | |
| 3214.87 | 0.05 | 3.89 | 3½-3½ | |
| 3254.24 | 0.08 | 3.87 | 2½-2½ | |
| 3277.55 | 0.11 | 3.87 | 1½-1½ | |
| 3289.46 | 0.12 | 3.87 | ½- ½ | |
| 3244.18 | 0.08 | 3.89 | 2½-3½ | |
| 3275.02 | 0.11 | 3.87 | 1½-2½ | |
| 3289.89 | 0.12 | 3.87 | ½-1½ | |
| 3264.84 | 0.11 | 3.89 | 1½-3½ | |
| 3287.35 | 0.12 | 3.87 | ½-2½ | |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Fe II** continued | | | | |
| 3124.18 | 0.00 | 3.95 | 4½-3½ | $a^6D$-$b^2F$ (12F) |
| 3181.05 | 0.05 | 3.93 | 3½-2½ | |
| 3182.21 | 0.05 | 3.95 | 3½-3½ | |
| 3209.94 | 0.08 | 3.93 | 2½-2½ | |
| 3190.76 | 0.08 | 3.95 | 2½-3½ | |
| 3230.17 | 0.11 | 3.93 | 1½-2½ | |
| 8616.96 | 0.23 | 1.66 | 4½-3½ | $a^4F$-$a^4P$ (13F) |
| 8891.88 | 0.30 | 1.89 | 3½-1½ | |
| 9033.45 | 0.35 | 1.72 | 2½- ½ | |
| 9051.92 | 0.30 | 1.88 | 3½-2½ | |
| 9226.60 | 0.35 | 1.89 | 2½-1½ | |
| 9267.54 | 0.38 | 1.72 | 1½- ½ | |
| 9399.02 | 0.35 | 1.86 | 2½-2½ | |
| 9470.93 | 0.38 | 1.69 | 1½-1½ | |
| 9852.70 | 0.38 | 1.66 | 1½-2½ | |
| 7155.14 | 0.23 | 1.98 | 4½-4½ | $a^4F$-$a^2G$ (14F) |
| 7171.98 | 0.30 | 2.02 | 3½-3½ | |
| 6898.18 | 0.23 | 2.02 | 4½-3½ | |
| 7452.50 | 0.30 | 1.98 | 3½-4½ | |
| 7388.16 | 0.35 | 2.02 | 2½-3½ | |
| 7686.19 | 0.35 | 1.98 | 2½-4½ | |
| 7544.00 | 0.38 | 2.02 | 1½-3½ | |
| 6440.40 | 0.35 | 2.27 | 2½-1½ | $a^4F$-$a^2P$ (15F) |
| 6339.70 | 0.38 | 2.33 | 1½- ½ | |
| 6558.51 | 0.38 | 2.27 | 1½-1½ | |
| 5413.34 | 0.23 | 2.51 | 4½-5½ | $a^4F$-$a^2H$ (16F) |
| 5440.45 | 0.30 | 2.57 | 3½-4½ | |
| 5380.25 | 0.23 | 2.57 | 4½-4½ | |
| 5362.06 | 0.23 | 2.53 | 4½-3½ | $a^4F$-$a^2D$ (17F) |
| 5295.70 | 0.30 | 2.63 | 3½-1½ | |
| 5527.33 | 0.30 | 2.53 | 3½-2½ | |
| 5412.64 | 0.35 | 2.83 | 2½-1½ | |
| 5654.85 | 0.35 | 2.53 | 2½-2½ | |
| 5495.82 | 0.38 | 2.83 | 1½-1½ | |
| 5745.70 | 0.38 | 2.53 | 1½-2½ | |
| 5273.38 | 0.23 | 2.57 | 4½-3½ | $a^4F$-$b^4P$ (18F) |
| 5158.00 | 0.30 | 2.89 | 3½-1½ | |
| 5107.95 | 0.35 | 2.77 | 2½- ½ | |
| 5433.15 | 0.30 | 2.57 | 3½-2½ | |
| 5268.68 | 0.35 | 2.69 | 2½-1½ | |
| 5181.97 | 0.38 | 2.77 | 1½- ½ | |
| 5556.31 | 0.35 | 2.57 | 2½-2½ | |
| 5347.67 | 0.38 | 2.89 | 1½-1½ | |
| 5644.00 | 0.38 | 2.57 | 1½-2½ | |
| 5158.81 | 0.23 | 2.82 | 4½-6½ | $a^4F$-$a^4H$ (19F) |
| 5281.81 | 0.30 | 2.85 | 3½-5½ | |
| 5333.65 | 0.35 | 2.88 | 2½-4½ | |
| 5378.47 | 0.38 | 2.88 | 1½-3½ | |
| 5111.83 | 0.23 | 2.65 | 4½-5½ | |
| 5220.06 | 0.30 | 2.88 | 3½-4½ | |
| 5298.84 | 0.35 | 2.68 | 2½-3½ | |
| 5072.40 | 0.23 | 2.88 | 4½-4½ | |
| 5184.80 | 0.30 | 2.68 | 3½-3½ | |
| 5039.10 | 0.23 | 2.68 | 4½-3½ | |
| 4814.55 | 0.23 | 2.79 | 4½-4½ | $a^4F$-$b^4F$ (20F) |
| 4905.35 | 0.30 | 2.82 | 3½-3½ | |
| 4973.39 | 0.35 | 2.83 | 2½-2½ | |
| 5020.24 | 0.38 | 2.84 | 1½-1½ | |
| 4774.74 | 0.23 | 2.82 | 4½-3½ | |
| 4874.49 | 0.30 | 2.83 | 3½-2½ | |
| 4950.74 | 0.35 | 2.84 | 2½-1½ | |
| 4947.38 | 0.30 | 2.79 | 3½-4½ | |
| 5005.52 | 0.35 | 2.82 | 2½-3½ | |
| 5043.53 | 0.38 | 2.83 | 1½-2½ | |
| 4745.49 | 0.23 | 2.83 | 4½-2½ | |
| 4852.73 | 0.30 | 2.84 | 3½-1½ | |
| 5049.29 | 0.35 | 2.79 | 2½-4½ | |
| 5078.57 | 0.38 | 2.82 | 1½-3½ | |
| 4243.98 | 0.23 | 3.14 | 4½-5½ | $a^4F$-$a^4G$ (21F) |
| 4276.83 | 0.30 | 3.19 | 3½-4½ | |
| 4319.62 | 0.35 | 3.21 | 2½-3½ | |
| 4358.37 | 0.38 | 3.22 | 1½-2½ | |
| 4177.21 | 0.23 | 3.19 | 4½-4½ | |
| 4244.81 | 0.30 | 3.21 | 3½-3½ | |
| 4305.90 | 0.35 | 3.22 | 2½-2½ | |
| 4146.65 | 0.23 | 3.21 | 4½-3½ | |
| 4231.56 | 0.30 | 3.22 | 3½-2½ | |
| 4134.01 | 0.23 | 3.22 | 4½-2½ | |
| 4346.85 | 0.30 | 3.14 | 3½-5½ | |
| 4352.78 | 0.35 | 3.19 | 2½-4½ | |
| 4372.43 | 0.38 | 3.21 | 1½-3½ | |
| 4358.14 | 0.35 | 3.18 | 2½-1½ | $a^4F$-$b^2P$ (22F) |
| 4197.81 | 0.38 | 3.32 | 1½- ½ | |
| 4409.88 | 0.38 | 3.18 | 1½-1½ | |
| 4114.48 | 0.23 | 3.23 | 4½-5½ | $a^4F$-$b^2H$ (23F) |
| 4178.95 | 0.30 | 3.25 | 3½-4½ | |
| 4083.78 | 0.23 | 3.25 | 4½-4½ | |
| 3929.35 | 0.23 | 3.37 | 4½-3½ | $a^4F$-$a^2F$ (24F) |
| 3968.66 | 0.30 | 3.41 | 3½-2½ | |
| 3882.73 | 0.23 | 3.41 | 4½-2½ | |
| 4017.38 | 0.30 | 3.37 | 3½-3½ | |
| 4033.98 | 0.35 | 3.41 | 2½-2½ | |
| 4084.32 | 0.35 | 3.37 | 2½-3½ | |
| 4080.00 | 0.38 | 3.41 | 1½-2½ | |
| 4131.51 | 0.38 | 3.37 | 1½-3½ | |
| 3505.81 | 0.23 | 3.75 | 4½-4½ | $a^4F$-$b^2G$ (25F) |
| 3528.28 | 0.30 | 3.80 | 3½-3½ | |
| 3460.20 | 0.23 | 3.80 | 4½-3½ | |
| 3575.72 | 0.30 | 3.75 | 3½-4½ | |
| 3579.81 | 0.35 | 3.80 | 2½-3½ | |
| 3628.65 | 0.35 | 3.75 | 2½-4½ | |
| 3616.00 | 0.38 | 3.80 | 1½-3½ | |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Fe II** continued | | | | |
| 3376.80 | 0.23 | 3.89 | 4½-3½ | $a^4F$-$b^4D$ (26F) |
| 3452.30 | 0.30 | 3.87 | 3½-2½ | |
| 3504.51 | 0.35 | 3.87 | 2½-1½ | |
| 3538.69 | 0.38 | 3.87 | 1½- ½ | |
| 3387.10 | 0.23 | 3.87 | 4½-2½ | |
| 3455.11 | 0.30 | 3.87 | 3½-1½ | |
| 3504.02 | 0.35 | 3.87 | 2½- ½ | |
| 3440.99 | 0.30 | 3.89 | 3½-3½ | |
| 3501.62 | 0.35 | 3.87 | 2½-2½ | |
| 3539.19 | 0.38 | 3.87 | 1½-1½ | |
| 3489.98 | 0.35 | 3.89 | 2½-3½ | |
| 3536.85 | 0.38 | 3.87 | 1½-2½ | |
| 3524.38 | 0.38 | 3.89 | 1½-3½ | |
| 3318.38 | 0.23 | 3.95 | 4½-3½ | $a^4F$-$b^2F$ (27F) |
| 3402.50 | 0.30 | 3.93 | 3½-2½ | |
| 3339.14 | 0.23 | 3.93 | 4½-2½ | |
| 3380.95 | 0.30 | 3.95 | 3½-3½ | |
| 3450.39 | 0.35 | 3.93 | 2½-2½ | |
| 3428.34 | 0.35 | 3.95 | 2½-3½ | |
| 3484.01 | 0.38 | 3.93 | 1½-2½ | |
| 3461.42 | 0.38 | 3.95 | 1½-3½ | |
| 10038.82 | 1.04 | 2.27 | 2½-1½ | $a^4D$-$a^2P$ (28F) |
| 9795.21 | 1.07 | 2.33 | 1½- ½ | |
| 10327.56 | 1.07 | 2.27 | 1½-1½ | |
| 9957.44 | 1.09 | 2.33 | ½- ½ | |
| 10508.07 | 1.09 | 2.27 | ½-1½ | |
| 7958.50 | 0.98 | 2.53 | 3½-2½ | $a^4D$-$a^2D$ (29F) |
| 7740.11 | 1.04 | 2.63 | 2½-1½ | |
| 8245.12 | 1.04 | 2.53 | 2½-2½ | |
| 7916.98 | 1.07 | 2.63 | 1½-1½ | |
| 8446.11 | 1.07 | 2.53 | 1½-2½ | |
| 8022.63 | 1.09 | 2.63 | ½-1½ | |
| 7764.69 | 0.98 | 2.57 | 3½-2½ | $a^4D$-$b^4P$ (30F) |
| 7449.45 | 1.04 | 2.89 | 2½-1½ | |
| 7281.87 | 1.07 | 2.77 | 1½- ½ | |
| 7214.69 | 0.98 | 2.69 | 3½-1½ | |
| 7131.77 | 1.04 | 2.77 | 2½- ½ | |
| 8037.29 | 1.04 | 2.57 | 2½-2½ | |
| 7613.15 | 1.07 | 2.89 | 1½-1½ | |
| 7370.94 | 1.09 | 2.77 | ½- ½ | |
| 8238.16 | 1.07 | 2.57 | 1½-2½ | |
| 7710.79 | 1.09 | 2.69 | ½-1½ | |
| 8342.34 | 1.09 | 2.57 | ½-2½ | |
| 6809.21 | 0.98 | 2.79 | 3½-4½ | $a^4D$-$b^4F$ (31F) |
| 6933.87 | 1.04 | 2.82 | 2½-3½ | |
| 7011.24 | 1.07 | 2.83 | 1½-2½ | |
| 7047.99 | 1.09 | 2.84 | ½-1½ | |
| 8789.85 | 0.98 | 2.82 | 3½-3½ | |
| 6872.17 | 1.04 | 2.83 | 2½-2½ | |
| 8986.32 | 1.07 | 2.84 | 1½-1½ | |
| 8671.90 | 0.98 | 2.83 | 3½-2½ | |
| 6829.01 | 1.04 | 2.84 | 2½-1½ | |
| 7017.94 | 1.04 | 2.79 | 2½-4½ | |
| 7075.26 | 1.07 | 2.82 | 1½-3½ | |
| 7093.98 | 1.09 | 2.83 | ½-2½ | |
| 6631.20 | 0.98 | 2.84 | 3½-1½ | |
| 6507.62 | 0.98 | 2.88 | 3½-2½ | $a^4D$-$a^6S$ (32F) |
| 6698.02 | 1.04 | 2.88 | 2½-2½ | |
| 6830.06 | 1.07 | 2.88 | 1½-2½ | |
| 5721.35 | 0.98 | 3.14 | 3½-5½ | $a^4D$-$a^4G$ (33F) |
| 5741.11 | 1.04 | 3.19 | 2½-4½ | |
| 5778.35 | 1.07 | 3.21 | 1½-3½ | |
| 5809.43 | 1.09 | 3.22 | ½-2½ | |
| 5600.66 | 0.98 | 3.19 | 3½-4½ | |
| 5883.56 | 1.04 | 3.21 | 2½-3½ | |
| 5753.83 | 1.07 | 3.22 | 1½-2½ | |
| 5545.68 | 0.98 | 3.21 | 3½-3½ | |
| 5659.83 | 1.04 | 3.22 | 2½-2½ | |
| 5523.28 | 0.98 | 3.22 | 3½-2½ | |
| 5746.96 | 1.04 | 3.18 | 2½-1½ | $a^4D$-$b^2P$ (34F) |
| 5477.25 | 1.07 | 3.32 | 1½- ½ | |
| 5843.90 | 1.07 | 3.18 | 1½-1½ | |
| 5527.61 | 1.09 | 3.32 | ½- ½ | |
| 5901.26 | 1.09 | 3.18 | ½-1½ | |
| 5183.94 | 0.98 | 3.37 | 3½-3½ | $a^4D$-$a^2F$ (35F) |
| 5199.18 | 1.04 | 3.41 | 2½-2½ | |
| 5083.72 | 0.98 | 3.41 | 3½-2½ | |
| 5283.11 | 1.04 | 3.37 | 2½-3½ | |
| 5278.39 | 1.07 | 3.41 | 1½-2½ | |
| 4249.07 | 0.98 | 3.89 | 3½-3½ | $a^4D$-$b^4D$ (36F) |
| 4347.35 | 1.04 | 3.87 | 2½-2½ | |
| 4407.16 | 1.07 | 3.87 | 1½-1½ | |
| 4438.92 | 1.09 | 3.87 | ½- ½ | |
| 4266.34 | 0.98 | 3.87 | 3½-2½ | |
| 4351.80 | 1.04 | 3.87 | 2½-1½ | |
| 4406.39 | 1.07 | 3.87 | 1½- ½ | |
| 4329.43 | 1.04 | 3.89 | 2½-3½ | |
| 4402.60 | 1.07 | 3.87 | 1½-2½ | |
| 4439.73 | 1.09 | 3.87 | ½-1½ | |
| 4270.62 | 0.98 | 3.87 | 3½-1½ | |
| 4351.05 | 1.04 | 3.87 | 2½- ½ | |
| 4384.21 | 1.07 | 3.89 | 1½-3½ | |
| 4435.08 | 1.09 | 3.87 | ½-2½ | |
| 4157.89 | 0.98 | 3.95 | 3½-3½ | $a^4D$-$b^2F$ (37F) |
| 4268.67 | 1.04 | 3.93 | 2½-2½ | |
| 4190.53 | 0.98 | 3.93 | 3½-2½ | |
| 4234.81 | 1.04 | 3.95 | 2½-3½ | |
| 4331.93 | 1.07 | 3.93 | 1½-2½ | |
| 8119.16 | 1.66 | 3.18 | 2½-1½ | $a^4P$-$b^2P$ (38F) |
| 7539.67 | 1.69 | 3.32 | 1½- ½ | |
| 8252.38 | 1.89 | 3.18 | 1½-1½ | |
| 7673.74 | 1.72 | 3.32 | ½- ½ | |
| 8413.28 | 1.72 | 3.18 | ½-1½ | |

FORBIDDEN LINES

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Fe II** continued | | | | |
| 5551.31 | 1.66 | 3.89 | 2½-3½ | $a^4P$-$b^4D$ (39F) |
| 5643.44 | 1.69 | 3.87 | 1½-2½ | |
| 5725.92 | 1.72 | 3.87 | ½-1½ | |
| 5580.82 | 1.66 | 3.87 | 2½-2½ | |
| 5650.94 | 1.69 | 3.87 | 1½-1½ | |
| 5724.62 | 1.72 | 3.87 | ½- ½ | |
| 5588.15 | 1.66 | 3.87 | 2½-1½ | |
| 5649.67 | 1.69 | 3.87 | 1½- ½ | |
| 10431.10 | 1.96 | 3.14 | 4½-5½ | $a^2G$-$a^4G$ (40F) |
| 10594.89 | 2.02 | 3.19 | 3½-4½ | |
| 10036.79 | 1.96 | 3.19 | 4½-4½ | |
| 10400.53 | 2.02 | 3.21 | 3½-3½ | |
| 9862.21 | 1.96 | 3.21 | 4½-3½ | |
| 10321.34 | 2.02 | 3.22 | 3½-2½ | |
| 9682.13 | 1.96 | 3.23 | 4½-5½ | $a^2G$-$b^2H$ (41F) |
| 10013.68 | 2.02 | 3.25 | 3½-4½ | |
| 9513.87 | 1.96 | 3.25 | 4½-4½ | |
| 8715.84 | 1.96 | 3.37 | 4½-3½ | $a^2G$-$a^2F$ (42F) |
| 8885.66 | 2.02 | 3.41 | 3½-2½ | |
| 9133.63 | 2.02 | 3.37 | 3½-3½ | |
| 6873.87 | 1.96 | 3.75 | 4½-4½ | $a^2G$-$b^2G$ (43F) |
| 6944.91 | 2.02 | 3.80 | 3½-3½ | |
| 6700.68 | 1.96 | 3.80 | 4½-3½ | |
| 7131.13 | 2.02 | 3.75 | 3½-4½ | |
| 6188.55 | 1.96 | 3.95 | 4½-3½ | $a^2G$-$b^2F$ (44F) |
| 6473.86 | 2.02 | 3.93 | 3½-2½ | |
| 6396.30 | 2.02 | 3.95 | 3½-3½ | |
| 10796.48 | 2.27 | 3.41 | 1½-2½ | $a^2P$-$a^2F$ (45F) |
| 7674.06 | 2.27 | 3.87 | 1½-2½ | $a^2P$-$b^4D$ (46F) |
| 8012.08 | 2.33 | 3.87 | ½-1½ | |
| 7687.94 | 2.27 | 3.87 | 1½-1½ | |
| 8009.53 | 2.33 | 3.87 | ½- ½ | |
| 7685.58 | 2.27 | 3.87 | 1½- ½ | |
| 7432.23 | 2.27 | 3.93 | 1½-2½ | $a^2P$-$b^2F$ (47F) |
| 9949.32 | 2.51 | 3.75 | 5½-4½ | $a^2H$-$b^2G$ (48F) |
| 10038.79 | 2.57 | 3.80 | 4½-3½ | |
| 10432.60 | 2.57 | 3.75 | 4½-4½ | |
| 8931.47 | 2.57 | 3.95 | 4½-3½ | $a^2H$-$b^2F$ (49F) |
| 9755.81 | 2.53 | 3.80 | 2½-3½ | $a^2D$-$b^2G$ (50F) |
| 9116.41 | 2.53 | 3.89 | 2½-3½ | $a^2D$-$b^4D$ (51F) |
| 9918.01 | 2.63 | 3.87 | 1½-2½ | |
| 9196.26 | 2.53 | 3.87 | 2½-2½ | |
| 9941.20 | 2.63 | 3.87 | 1½-1½ | |
| 9216.20 | 2.53 | 3.87 | 2½-1½ | |
| 9937.27 | 2.63 | 3.87 | 1½- ½ | |
| 8706.79 | 2.53 | 3.95 | 2½-3½ | $a^2D$-$b^2F$ (52F) |
| 9517.76 | 2.63 | 3.93 | 1½-2½ | |
| 8851.13 | 2.53 | 3.93 | 2½-2½ | |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Fe III** I P 30.48 | | | | |
| 5151.9 | 0.00 | 2.40 | 4-3 | $a^5D$-$a^3P$ (1F) |
| 4936.4 | 0.05 | 2.55 | 3-1 | |
| 4883.9 | 0.09 | 2.62 | 2-0 | |
| 5270.4 | 0.05 | 2.40 | 3-2 | |
| 5011.3 | 0.09 | 2.55 | 2-1 | |
| 4930.5 | 0.12 | 2.62 | 1-0 | |
| 5355.9 | 0.09 | 2.40 | 2-2 | |
| 5060.3 | 0.12 | 2.55 | 1-1 | |
| 5412.0 | 0.12 | 2.40 | 1-2 | |
| 5084.8 | 0.13 | 2.55 | 0-1 | |
| 5439.9 | 0.13 | 2.40 | 0-2 | |
| 4985.9 | 0.00 | 2.48 | 4-6 | $a^5D$-$a^3H$ (2F) |
| 5032.7 | 0.05 | 2.51 | 3-5 | |
| 5063.7 | 0.09 | 2.53 | 2-4 | |
| 4924.5 | 0.00 | 2.51 | 4-5 | |
| 4987.2 | 0.05 | 2.53 | 3-4 | |
| 4881.0 | 0.00 | 2.53 | 4-4 | |
| 4658.1 | 0.00 | 2.65 | 4-4 | $a^5D$-$a^3F$ (3F) |
| 4701.5 | 0.05 | 2.68 | 3-3 | |
| 4733.9 | 0.09 | 2.70 | 2-2 | |
| 4607.0 | 0.00 | 2.68 | 4-3 | |
| 4667.0 | 0.05 | 2.70 | 3-2 | |
| 4754.7 | 0.05 | 2.65 | 3-4 | |
| 4769.4 | 0.09 | 2.68 | 2-3 | |
| 4777.7 | 0.12 | 2.70 | 1-2 | |
| 4573.9 | 0.00 | 2.70 | 4-2 | |
| 4824.1 | 0.09 | 2.65 | 2-4 | |
| 4813.9 | 0.12 | 2.68 | 1-3 | |
| 4799.5 | 0.13 | 2.70 | 0-2 | |
| 4070.7 | 0.00 | 3.03 | 4-5 | $a^5D$-$a^3G$ (4F) |
| 4072.7 | 0.05 | 3.08 | 3-4 | |
| 4098.6 | 0.09 | 3.10 | 2-3 | |
| 4008.3 | 0.00 | 3.08 | 4-4 | |
| 4046.4 | 0.05 | 3.10 | 3-3 | |
| 3976.2 | 0.00 | 3.10 | 4-3 | $a^5D$-$a^3G$ (4F) |
| 4144.3 | 0.05 | 3.03 | 3-5 | |
| 4130.7 | 0.09 | 3.08 | 2-4 | cont |
| 4129.4 | 0.12 | 3.10 | 1-3 | |
| 3322.54 | 0.00 | 3.71 | 4-3 | $a^5D$-$a^7S$ (5F) |
| 3371.4 | 0.05 | 3.71 | 3-3 | |
| 3406.2 | 0.09 | 3.71 | 2-3 | |
| 3428.8 | 0.12 | 3.71 | 1-3 | |
| 3239.7 | 0.00 | 3.81 | 4-3 | $a^5D$-$a^3D$ (6F) |
| 3301.6 | 0.05 | 3.79 | 3-2 | |
| 3333.8 | 0.09 | 3.79 | 2-1 | |
| 3254.7 | 0.00 | 3.79 | 4-2 | |
| 3300.5 | 0.05 | 3.79 | 3-1 | |
| 3286.2 | 0.05 | 3.81 | 3-3 | |
| 3334.9 | 0.09 | 3.79 | 2-2 | |
| 3355.5 | 0.12 | 3.79 | 1-1 | |
| 3319.2 | 0.09 | 3.81 | 2-3 | |
| 3356.6 | 0.12 | 3.79 | 1-2 | |
| 3366.2 | 0.13 | 3.79 | 0-1 | |
| 3340.7 | 0.12 | 3.81 | 1-3 | |
| 3367.3 | 0.13 | 3.79 | 0-2 | |
| 3236.7 | 0.00 | 3.81 | 4-4 | $a^5D$-$a^1G$ (7F) |
| 3283.1 | 0.05 | 3.81 | 3-4 | |
| 3316.1 | 0.09 | 3.81 | 2-4 | |
| 8728.9 | 2.40 | 3.81 | 2-3 | $a^3P$-$a^3D$ (8F) |
| 9969.6 | 2.55 | 3.79 | 1-2 | |
| 10504.3 | 2.62 | 3.79 | 0-1 | |
| 8838.2 | 2.40 | 3.79 | 2-2 | |
| 9960.0 | 2.55 | 3.79 | 1-1 | |
| 8830.7 | 2.40 | 3.79 | 2-1 | |
| 7078.2 | 2.55 | 4.30 | 1-0 | $a^3P$-$a^1S$ (9F) |
| 6096.3 | 2.40 | 4.42 | 2-2 | $a^3P$-$a^1D$ |
| 6614.0 | 2.55 | 4.42 | 1-2 | (10F) |
| 9701.3 | 2.48 | 3.75 | 6-6 | $a^3H$-$a^1I$ (11F) |
| 9943.2 | 2.51 | 3.75 | 5-6 | |
| 9444.2 | 2.51 | 3.81 | 5-4 | $a^3H$-$a^1G$ (12F) |
| 9608.6 | 2.53 | 3.81 | 4-4 | |
| 10640.4 | 2.65 | 3.81 | 4-3 | $a^3F$-$a^3D$ (13F) |
| 11088.0 | 2.68 | 3.79 | 3-2 | |
| 11272.6 | 2.70 | 3.79 | 2-1 | |
| 10916.5 | 2.68 | 3.81 | 3-3 | |
| 11284.9 | 2.70 | 3.79 | 2-2 | |
| 11107.3 | 2.70 | 3.81 | 2-3 | |
| 10608.1 | 2.65 | 3.81 | 4-4 | $a^3F$-$a^1G$ (14F) |
| 10682.6 | 2.68 | 3.81 | 3-4 | |
| 7088.3 | 2.68 | 4.42 | 3-2 | $a^3F$-$a^1D$ (15F) |
| 7220.0 | 2.70 | 4.42 | 2-2 | |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Fe V** I P ? | | | | |
| 3970.1 | 0.16 | 3.27 | 4-2 | $3d^4\ ^5D$-$3d^4\ ^3P$ (1F) |
| 4136.4 | 0.10 | 3.08 | 3-1 | |
| 4229.8 | 0.05 | 2.97 | 2-0 | |
| 3895.7 | 0.10 | 3.27 | 3-2 | |
| 4071.5 | 0.05 | 3.08 | 2-1 | |
| 4181.3 | 0.02 | 2.97 | 1-0 | |
| 3838.1 | 0.05 | 3.27 | 2-2 | |
| 4026.6 | 0.02 | 3.08 | 1-1 | |
| 3798.2 | 0.02 | 3.27 | 1-2 | |
| 4003.2 | 0.00 | 3.08 | 0-1 | |
| 3777.4 | 0.00 | 3.27 | 0-2 | |
| 4123.9 | 0.16 | 3.15 | 4-6 | $3d^4\ ^5D$-$3d^4\ ^3H$ (2F) |
| 4093.0 | 0.10 | 3.11 | 3-5 | |
| 4077.5 | 0.05 | 3.08 | 2-4 | |
| 4175.2 | 0.16 | 3.11 | 4-5 | |
| 4142.5 | 0.10 | 3.08 | 3-4 | |
| 4226.8 | 0.16 | 3.08 | 4-4 | |
| 3891.8 | 0.16 | 3.33 | 4-4 | $3d^4\ ^5D$-$3d^4\ ^3F$ (3F) |
| 3838.9 | 0.10 | 3.31 | 3-3 | |
| 3794.6 | 0.05 | 3.30 | 2-2 | |
| 3911.1 | 0.16 | 3.31 | 4-3 | |
| 3850.8 | 0.10 | 3.30 | 3-2 | |
| 3820.2 | 0.10 | 3.33 | 3-4 | |
| 3782.9 | 0.05 | 3.31 | 2-3 | |
| 3755.5 | 0.02 | 3.30 | 1-2 | |
| 3923.5 | 0.16 | 3.30 | 4-2 | |
| 3764.8 | 0.05 | 3.33 | 2-4 | |
| 3744.1 | 0.02 | 3.31 | 1-3 | |
| 3735.2 | 0.00 | 3.30 | 0-2 | |
| 3430.3 | 0.16 | 3.76 | 4-5 | $3d^4\ ^5D$-$3d^4\ ^3G$ (4F) |
| 3406.6 | 0.10 | 3.73 | 3-4 | |
| 3400.3 | 0.05 | 3.68 | 2-3 | |
| 3463.4 | 0.16 | 3.73 | 4-4 | |
| 3445.4 | 0.10 | 3.68 | 3-3 | |
| 3374.6 | 0.10 | 3.76 | 3-5 | |
| 3382.5 | 0.05 | 3.73 | 2-4 | |
| 3368.9 | 0.02 | 3.68 | 1-3 | |
| 3503.5 | 0.16 | 3.68 | 4-3 | |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Fe VI** I P ? | | | | |
| 5678.0 | 0.25 | 2.42 | 4½-3½ | $3d^3\ ^4F$-$3d^3\ ^4P$ (1F) |
| 5631.6 | 0.15 | 2.34 | 3½-1½ | |
| 5485.7 | 0.06 | 2.31 | 2½- ½ | |
| 5428.6 | 0.15 | 2.43 | 3½-2½ | |
| 5425.3 | 0.06 | 2.34 | 2½-1½ | |
| 5336.4 | 0.00 | 2.31 | 1½- ½ | |
| 5236.6 | 0.06 | 2.43 | 2½-2½ | |
| 5279.2 | 0.00 | 2.34 | 1½-1½ | |
| 5100.4 | 0.00 | 2.43 | 1½-2½ | |
| 5177.0 | 0.25 | 2.63 | 4½-4½ | $3d^3\ ^4F$-$3d^3\ ^2G$ (2F) |
| 5146.8 | 0.15 | 2.54 | 3½-3½ | |
| 5370.5 | 0.25 | 2.54 | 4½-3½ | |
| 4968.8 | 0.15 | 2.63 | 3½-4½ | |
| 4974.0 | 0.06 | 2.54 | 2½-3½ | |
| 4807.5 | 0.06 | 2.63 | 2½-4½ | |
| 4850.9 | 0.00 | 2.54 | 1½-3½ | |
| 3995.8 | 0.15 | 3.23 | 3½-1½ | $3d^3\ ^4F$-$3d^3\ ^2P$ (3F) |
| 3849.1 | 0.06 | 3.27 | 2½- ½ | |
| 3890.9 | 0.06 | 3.23 | 2½-1½ | |
| 3774.9 | 0.00 | 3.27 | 1½- ½ | |
| 3815.1 | 0.00 | 3.23 | 1½-1½ | |
| 3776.1 | 0.25 | 3.51 | 4½-3½ | $3d^3\ ^4F$-$3d^3\ ^2D$ (4F) |
| 3645.7 | 0.15 | 3.53 | 3½-1½ | |
| 3664.1 | 0.15 | 3.51 | 3½-2½ | |
| 3558.1 | 0.06 | 3.53 | 2½-1½ | |
| 3575.6 | 0.06 | 3.51 | 2½-2½ | |
| 3494.7 | 0.00 | 3.53 | 1½-1½ | |
| 3511.6 | 0.00 | 3.51 | 1½-2½ | |
| 3675.2 | 0.25 | 3.60 | 4½-5½ | $3d^3\ ^4F$-$3d^3\ ^2H$ (5F) |
| 3630.3 | 0.15 | 3.55 | 3½-4½ | |
| 3740.2 | 0.25 | 3.55 | 4½-4½ | |
| 3569.0 | 0.15 | 3.60 | 3½-5½ | |
| 3543.5 | 0.06 | 3.55 | 2½-4½ | |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Fe VII** I P ? | | | | |
| 6599.7 | 0.29 | 2.16 | 4-3 | $3d^2\ ^3F$-$3d^2\ ^1D$ (1F) |
| 6085.5 | 0.13 | 2.16 | 3-2 | |
| 5720.9 | 0.00 | 2.16 | 2-2 | |
| 5276.1 | 0.29 | 2.63 | 4-2 | $3d^2\ ^3P$-$3d^2\ ^3P$ (2F) |
| 5158.3 | 0.13 | 2.52 | 3-1 | |
| 4989.4 | 0.00 | 2.47 | 2-0 | |
| 4942.3 | 0.13 | 2.63 | 3-2 | |
| 4893.9 | 0.00 | 2.52 | 2-1 | |
| 4699.0 | 0.00 | 2.63 | 2-2 | |
| 3759.9 | 0.29 | 3.57 | 4-4 | $3d^2\ ^3F$-$3d^2\ ^1G$ (3F) |
| 3587.2 | 0.13 | 3.57 | 3-4 | |
| 3457.3 | 0.00 | 3.57 | 2-4 | |
| 8738.1 | 2.16 | 3.57 | 2-4 | $3d^2\ ^1D$-$3d^2\ ^1G$ (4F) |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Fe X** I P 261? | | | | |
| 6372.9 C) 6374.51 C) | 0.00 | 1.94 | 1½- ½ | $3p^5\ ^2P^o$-$3p^5\ ^2P^o$ (1F) |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Fe XI** I P 289? | | | | |
| 7888.6 C) 7891.94 C) | 0.00 | 1.56 | 2-1 | $3p^4\ ^3P$-$3p^4\ ^3P$ ? (1F) |
| 3986.1 | 1.56 | 4.66 | 1-2 | $3p^4\ ^3P$-$3p^4\ ^1D$ ? (2F) |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Fe XIII** I P 355? | | | | |
| 10796.2 C) 10797.95 C) | 1.15 | 2.29 | 1-2 | $3p^2\ ^3P$-$3p^2\ ^3P$ (1F) |
| 10749.7 C) 10746.80 C) | 0.00 | 1.15 | 0-1 | |
| 3387.7 | 2.29 | 5.93 | 2-2 | $3p^2\ ^3P$-$3p^2\ ^1D$ (2F) |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Fe XIV** I P 390? | | | | |
| 5303.6 C) 5302.86 C) | 0.00 | 2.33 | ½-1½ | $3p^2P^o$-$3p^2P^o$ (1F) |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Fe XV** I P 454? | | | | |
| 7080.2 C) 7059.62 C) | (29.8 | 31.6) | 1-2 | $3p^3P^o$-$3p^3P^o$ (1F) |

FORBIDDEN LINES

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Co II** I P 17.1 | | | | |
| 10188.1 | 0.00 | 1.21 | 4-4 | $3d^8\ ^3F\text{-}4s^3F$ (1F) |
| 10345.4 | 0.12 | 1.32 | 3-3 | |
| 10280.7 | 0.20 | 1.40 | 2-2 | |
| 9336.2 | 0.00 | 1.32 | 4-3 | |
| 9639.4 | 0.12 | 1.40 | 3-2 | |
| 11280.5 | 0.12 | 1.21 | 3-4 | |
| 10972.9 | 0.20 | 1.32 | 2-3 | |
| 8830.3 | 0.00 | 1.40 | 4-3 | |
| 12168.8 | 0.20 | 1.21 | 2-4 | |
| 6825.4 | 0.00 | 2.19 | 4-3 | $3d^8\ ^3F\text{-}4s^5P$ (2F) |
| 5852.8 | 0.12 | 2.33 | 3-2 | |
| 5971.6 | 0.20 | 2.26 | 2-1 | |
| 5943.2 | 0.12 | 2.19 | 3-3 | |
| 6083.2 | 0.20 | 2.33 | 2-2 | |
| 6180.9 | 0.20 | 2.19 | 2-3 | |
| 7274.6 | 0.50 | 2.19 | 4-3 | $4s^5F\text{-}4s^5P$ (3F) |
| 7421.5 | 0.56 | 2.33 | 3-2 | |
| 7467.0 | 0.61 | 2.26 | 2-1 | |
| 7567.6 | 0.56 | 2.19 | 3-3 | |
| 7642.3 | 0.61 | 2.33 | 2-2 | |
| 7611.7 | 0.64 | 2.26 | 1-1 | |
| 7797.2 | 0.61 | 2.19 | 2-3 | |
| 7793.9 | 0.64 | 2.33 | 1-2 | |
| **Co VI** I P ? | | | | |
| 3481.5 | 0.22 | 3.77 | 4-2 | $3d^4\ ^5D\text{-}3d^4\ ^3P$ (1F) |
| 3658.1 | 0.14 | 3.51 | 3-1 | |
| 3761.0 | 0.07 | 3.35 | 2-0 | |
| 3403.3 | 0.14 | 3.77 | 3-2 | |
| 3586.8 | 0.07 | 3.51 | 2-1 | |
| 3708.3 | 0.03 | 3.35 | 1-0 | |
| 3341.5 | 0.07 | 3.77 | 2-2 | |
| 3538.8 | 0.03 | 3.51 | 1-1 | |
| 3299.8 | 0.03 | 3.77 | 1-2 | |
| 3512.9 | 0.00 | 3.51 | 0-1 | |
| 3277.3 | 0.00 | 3.77 | 0-2 | |
| 3444.1 | 0.22 | 3.80 | 4-4 | $3d^4\ ^5D\text{-}3d^4\ ^3F$ (2F) |
| 3388.2 | 0.14 | 3.78 | 3-3 | |
| 3336.9 | 0.07 | 3.77 | 2-2 | |
| 3465.7 | 0.22 | 3.78 | 4-3 | |
| 3398.5 | 0.14 | 3.77 | 3-2 | |
| 3367.5 | 0.14 | 3.80 | 3-4 | |
| 3326.9 | 0.07 | 3.78 | 2-3 | |
| 3295.4 | 0.03 | 3.77 | 1-2 | |
| 3476.5 | 0.22 | 3.77 | 4-2 | |
| 3307.0 | 0.07 | 3.80 | 2-4 | |
| 3285.6 | 0.03 | 3.78 | 1-3 | |
| 3272.9 | 0.00 | 3.77 | 0-2 | |
| **Co VII** I P ? | | | | |
| 5136.3 | 0.34 | 2.74 | 4½-2½ | $3d^3\ ^4F\text{-}3d^3\ ^4P$ (1F) |
| 5076.3 | 0.20 | 2.63 | 3½-1½ | |
| 4901.1 | 0.09 | 2.60 | 2½- ½ | |
| 4858.4 | 0.20 | 2.74 | 3½-2½ | |
| 4851.6 | 0.09 | 2.63 | 2½-1½ | |
| 4738.9 | 0.00 | 2.60 | 1½- ½ | |
| 4652.2 | 0.09 | 2.74 | 2½-2½ | |
| 4693.6 | 0.00 | 2.63 | 1½-1½ | |
| 4505.9 | 0.00 | 2.74 | 1½-2½ | |
| 4475.0 | 0.34 | 3.09 | 4½-4½ | $3d^3\ ^4F\text{-}3d^3\ ^2G$ (2F) |
| 4435.1 | 0.20 | 2.98 | 3½-3½ | |
| 4665.5 | 0.34 | 2.98 | 4½-3½ | |
| *4262.7 | 0.20 | 3.09 | 3½-4½ | |
| | 0.09 | 2.98 | 2½-3½ | |
| 4103.1 | 0.09 | 3.09 | 2½-4½ | |
| 4139.5 | 0.00 | 2.98 | 1½-3½ | |
| 3492.5 | 0.34 | 3.87 | 4½-3½ | $3d^3\ ^4F\text{-}3d^3\ ^2D$ (3F) |
| 3338.5 | 0.20 | 3.90 | 3½-1½ | |
| 3361.7 | 0.20 | 3.87 | 3½-2½ | |
| 3239.8 | 0.09 | 3.90 | 2½-1½ | |
| 3261.7 | 0.09 | 3.87 | 2½-2½ | |
| 3168.2 | 0.00 | 3.90 | 1½-1½ | |
| 3189.1 | 0.00 | 3.87 | 1½-2½ | |
| 3309.3 | 0.34 | 4.18 | 4½-5½ | $3d^3\ ^4F\text{-}3d^3\ ^2H$ (4F) |
| 3159.5 | 0.20 | 4.10 | 3½-4½ | |
| 3274.7 | 0.34 | 4.10 | 4½-4½ | |
| 3098.6 | 0.20 | 4.18 | 3½-5½ | |
| 3071.0 | 0.09 | 4.10 | 2½-4½ | |
| 10913.8 | 2.74 | 3.87 | 2½-2½ | $3d^3\ ^4P\text{-}3d^3\ ^2D$ (5F) |
| 9752.5 | 2.63 | 3.90 | 1½-1½ | |
| 10671.7 | 2.74 | 3.90 | 2½-1½ | |
| 9953.5 | 2.63 | 3.87 | 1½-2½ | |
| 9558.5 | 2.60 | 3.90 | ½-1½ | |
| 11347.6 | 3.09 | 4.18 | 4½-5½ | $3d^3\ ^2G\text{-}3d^3\ ^2H$ (6F) |
| 10988.0 | 2.98 | 4.10 | 3½-4½ | |
| 12309.6 | 3.09 | 4.10 | 4½-4½ | |
| **Co VIII** I P ? | | | | |
| 5268.4 | 0.42 | 2.77 | 4-2 | $3d^2\ ^3F\text{-}3d^2\ ^1D$ (1F) |
| 4785.9 | 0.19 | 2.77 | 3-2 | |
| 4481.0 | 0.00 | 2.77 | 2-2 | |
| **Co VIII** continued | | | | |
| 4564.7 | 0.42 | 3.13 | 4-2 | $3d^2\ ^3F\text{-}3d^2\ ^3P$ (2F) |
| 4493.3 | 0.19 | 2.94 | 3-1 | |
| 4433.4 | 0.00 | 2.79 | 2-0 | |
| 4198.0 | 0.19 | 3.13 | 3-2 | |
| 4304.9 | 0.00 | 2.94 | 2-1 | |
| 3946.0 | 0.00 | 3.13 | 2-2 | |
| **Co XI** I P 304? | | | | |
| 5185 | 0.00 | 2.38 | 1½- ½ | $3p^5\ ^2P^o\text{-}3p^5\ ^2P^o$ (1F) |
| **N1 I** I P 7.61 | | | | |
| 7393.71 | 0.00 | 1.67 | 4-2 | $a^3F\text{-}b^1D$ (1F) |
| 8201.77 | 0.16 | 1.67 | 3-2 | |
| 8843.42 | 0.27 | 1.67 | 2-2 | |
| 6404.46 | 0.00 | 1.93 | 4-3 | $a^3F\text{-}a^3P$ (2F) |
| 6941.63 | 0.16 | 1.94 | 3-1 | |
| 7243.99 | 0.27 | 1.98 | 2-0 | |
| 7002.03 | 0.16 | 1.93 | 3-2 | |
| 7395.79 | 0.27 | 1.94 | 2-1 | |
| 7464.39 | 0.27 | 1.93 | 2-2 | |
| 4533.18 | 0.00 | 2.73 | 4-4 | $a^3F\text{-}a^1G$ (3F) |
| 4813.37 | 0.16 | 2.73 | 3-4 | |
| 5027.34 | 0.27 | 2.73 | 2-4 | |
| 7507.44 | 0.03 | 1.67 | 3-2 | $a^3D\text{-}b^1D$ (4F) |
| 7908.30 | 0.11 | 1.67 | 2-2 | |
| 8466.38 | 0.21 | 1.67 | 1-2 | |
| 6489.61 | 0.03 | 1.93 | 3-3 | $a^3D\text{-}a^3P$ (5F) |
| 6730.25 | 0.11 | 1.94 | 2-1 | |
| 6989.04 | 0.21 | 1.98 | 1-0 | |
| 6437.70 | 0.03 | 1.94 | 3-1 | |
| 6604.30 | 0.11 | 1.98 | 2-0 | |
| 6787.00 | 0.11 | 1.93 | 2-2 | |
| 7130.24 | 0.21 | 1.94 | 1-1 | |
| 7193.97 | 0.21 | 1.93 | 1-2 | |
| 9887.18 | 0.42 | 1.67 | 2-2 | $a^1D\text{-}b^1D$ (6F) |
| 8832.31 | 0.42 | 1.82 | 2-0 | $a^1D\text{-}a^1S$ (7F) |
| 8194.57 | 0.42 | 1.93 | 2-2 | $a^1D\text{-}a^3P$ (8F) |
| 8111.97 | 0.42 | 1.94 | 2-1 | |
| 7929.70 | 0.42 | 1.98 | 2-0 | |
| **N1 II** I P 18.4 | | | | |
| 10718.16 | 0.00 | 1.15 | 2½-3½ | $a^2D\text{-}a^4F$ (1F) |
| 11616.88 | 0.19 | 1.25 | 1½-2½ | |
| 9885.74 | 0.00 | 1.25 | 2½-2½ | |
| 10931.07 | 0.19 | 1.32 | 1½-1½ | |
| 9377.33 | 0.00 | 1.32 | 2½-1½ | |
| 7379.57 | 0.00 | 1.67 | 2½-3½ | $a^2D\text{-}a^2F$ (2F) |
| 7413.33 | 0.19 | 1.85 | 1½-2½ | |
| 6668.16 | 0.00 | 1.85 | 2½-2½ | |
| 8303.23 | 0.19 | 1.67 | 1½-3½ | |
| 4326.85 | 0.00 | 2.85 | 2½-2½ | $a^2D\text{-}b^2D$ (3F) |
| 4485.87 | 0.19 | 2.94 | 1½-1½ | |
| 4201.74 | 0.00 | 2.94 | 2½-1½ | |
| 4628.77 | 0.19 | 2.85 | 1½-2½ | |
| 3993.65 | 0.00 | 3.09 | 2½-2½ | $a^2D\text{-}a^4P$ (4F) |
| 4294.70 | 0.19 | 3.06 | 1½-1½ | |
| 4033.56 | 0.00 | 3.06 | 2½-1½ | |
| 4285.90 | 0.19 | 3.07 | 1½- ½ | |
| 4249.48 | 0.19 | 3.09 | 1½-2½ | |
| 4035.80 | 0.00 | 3.07 | 2½- ½ | |
| 3439.29 | 0.00 | 3.59 | 2½-1½ | $a^2D\text{-}a^2P$ (5F) |
| 3559.86 | 0.19 | 3.65 | 1½- ½ | |
| 3378.55 | 0.00 | 3.65 | 2½- ½ | |
| 3627.35 | 0.19 | 3.59 | 1½-1½ | |
| 3074.11 | 0.00 | 4.01 | 2½-3½ | $a^2D\text{-}a^2G$ (6F) |
| 6794.37 | 1.04 | 2.85 | 4½-2½ | $a^4F\text{-}b^2D$ (7F) |
| 6911.05 | 1.15 | 2.94 | 3½-1½ | |
| 7256.16 | 1.15 | 2.85 | 3½-2½ | |
| 7307.82 | 1.25 | 2.94 | 2½-1½ | |
| 7694.82 | 1.25 | 2.85 | 2½-2½ | |
| 7612.96 | 1.32 | 2.94 | 1½-1½ | |
| 8033.86 | 1.32 | 2.85 | 1½-2½ | |
| 8007.34 | 1.04 | 3.09 | 4½-2½ | $a^4F\text{-}a^4P$ (8F) |
| 6467.52 | 1.15 | 3.06 | 3½-1½ | |
| 6791.61 | 1.25 | 3.07 | 2½- ½ | |
| 6385.52 | 1.15 | 3.09 | 3½-2½ | |
| 6813.73 | 1.25 | 3.06 | 2½-1½ | |
| 7054.37 | 1.32 | 3.07 | 1½- ½ | |
| 6700.61 | 1.25 | 3.09 | 2½-2½ | |
| 7078.25 | 1.32 | 3.06 | 1½-1½ | |
| 6956.25 | 1.32 | 3.09 | 1½-2½ | |
| 5274.37 | 1.25 | 3.59 | 2½-1½ | $a^4F\text{-}a^2P$ (9F) |
| 5281.46 | 1.32 | 3.65 | 1½- ½ | |
| 5431.39 | 1.32 | 3.59 | 1½-1½ | |
| **N1 II** continued | | | | |
| 4147.30 | 1.04 | 4.01 | 4½-4½ | $a^4F\text{-}a^2G$ (10F) |
| 4310.46 | 1.15 | 4.01 | 3½-3½ | |
| 4143.17 | 1.04 | 4.01 | 4½-3½ | |
| 4314.92 | 1.15 | 4.01 | 3½-4½ | |
| 4461.54 | 1.25 | 4.01 | 2½-3½ | |
| 4466.33 | 1.25 | 4.01 | 2½-4½ | |
| 4573.45 | 1.32 | 4.01 | 1½-3½ | |
| 10459.79 | 1.67 | 2.85 | 3½-2½ | $a^2F\text{-}b^2D$ (11F) |
| 11359.87 | 1.85 | 2.94 | 2½-1½ | |
| 12323.27 | 1.85 | 2.85 | 2½-2½ | |
| 8704.34 | 1.67 | 3.09 | 3½-2½ | $a^2F\text{-}a^4P$ (12F) |
| 10209.10 | 1.85 | 3.06 | 2½-1½ | |
| 9957.23 | 1.85 | 3.09 | 2½-2½ | |
| 7102.84 | 1.85 | 3.59 | 2½-1½ | $a^2F\text{-}a^2P$ (13F) |
| 5275.83 | 1.67 | 4.01 | 3½-4½ | $a^2F\text{-}a^2G$ (14F) |
| 5703.64 | 1.85 | 4.01 | 2½-3½ | |
| 5269.16 | 1.67 | 4.01 | 3½-3½ | |
| 5711.46 | 1.85 | 4.01 | 2½-4½ | |
| **N1 VII** I P ? | | | | |
| 3191.2 | 0.29 | 4.16 | 4-2 | $3d^4\ ^5D\text{-}3d^4\ ^3P$ (1F) |
| 3379.7 | 0.19 | 3.84 | 3-1 | |
| 3503.8 | 0.10 | 3.62 | 2-0 | |
| 3106.0 | 0.19 | 4.16 | 3-2 | |
| 3299.6 | 0.10 | 3.84 | 2-1 | |
| 3440.3 | 0.03 | 3.62 | 1-0 | |
| 3038.3 | 0.10 | 4.16 | 2-2 | |
| 3243.3 | 0.03 | 3.84 | 1-1 | |
| 2990.4 | 0.03 | 4.16 | 1-2 | |
| 3214.5 | 0.00 | 3.84 | 0-1 | |
| 3413.3 | 0.29 | 3.91 | 4-5 | $3d^4\ ^5D\text{-}3d^4\ ^3H$ (2F) |
| 3396.7 | 0.19 | 3.83 | 3-4 | |
| 3486.6 | 0.29 | 3.83 | 4-4 | |
| 3165.4 | 0.29 | 4.19 | 4-4 | $3d^4\ ^5D\text{-}3d^4\ ^3F$ (3F) |
| 3106.1 | 0.19 | 4.16 | 3-3 | |
| 3048.8 | 0.10 | 4.15 | 2-2 | |
| 3191.3 | 0.29 | 4.16 | 4-3 | |
| 3117.1 | 0.19 | 4.15 | 3-2 | |
| 3081.6 | 0.19 | 4.19 | 3-4 | |
| 3038.4 | 0.10 | 4.16 | 2-3 | |
| 3000.6 | 0.03 | 4.15 | 1-2 | |
| **N1 VIII** I P ? | | | | |
| 4772.4 | 0.46 | 3.05 | 4½-2½ | $3d^3\ ^4F\text{-}3d^3\ ^4P$ (1F) |
| 4644.2 | 0.27 | 2.93 | 3½-1½ | |
| 4493.3 | 0.13 | 2.87 | 2½- ½ | |
| 4446.2 | 0.27 | 3.05 | 3½-2½ | |
| 4404.4 | 0.13 | 2.93 | 2½-1½ | |
| 4297.8 | 0.00 | 2.87 | 1½- ½ | |
| 4225.9 | 0.13 | 3.05 | 2½-2½ | |
| 4216.4 | 0.00 | 2.93 | 1½-1½ | |
| 4052.5 | 0.00 | 3.05 | 1½-2½ | |
| 4106.1 | 0.46 | 3.46 | 4½-4½ | $3d^3\ ^4F\text{-}3d^3\ ^2G$ (2F) |
| 4032.3 | 0.27 | 3.33 | 3½-3½ | |
| 4298.8 | 0.46 | 3.33 | 4½-3½ | |
| 3862.3 | 0.27 | 3.46 | 3½-4½ | |
| 3850.3 | 0.13 | 3.33 | 2½-3½ | |
| 3695.0 | 0.13 | 3.46 | 2½-4½ | |
| 3705.8 | 0.00 | 3.33 | 1½-3½ | |
| 3228.2 | 0.46 | 4.28 | 4½-2½ | $3d^3\ ^4F\text{-}3d^3\ ^2D$ (3F) |
| 3035.3 | 0.27 | 4.34 | 3½-1½ | |
| 3075.6 | 0.27 | 4.28 | 3½-2½ | |
| 3086.4 | 0.46 | 4.54 | 4½-4½ | $3d^3\ ^4F\text{-}3d^3\ ^2H$ (4F) |
| 9977.1 | 3.05 | 4.28 | 2½-2½ | $3d^3\ ^4P\text{-}3d^3\ ^2D$ (5F) |
| 8761.8 | 2.93 | 4.34 | 1½-1½ | |
| 9565.8 | 3.05 | 4.34 | 2½-1½ | |
| 9105.8 | 2.93 | 4.28 | 1½-2½ | |
| 8430.1 | 2.87 | 4.34 | ½-1½ | |
| 10627.5 | 3.46 | 4.63 | 4½-5½ | $3d^3\ ^2G\text{-}3d^3\ ^2H$ (6F) |
| 10225.3 | 3.33 | 4.54 | 3½-4½ | |
| 11509.6 | 3.46 | 4.54 | 4½-4½ | |
| **N1 IX** I P ? | | | | |
| 5056.5 | 0.61 | 3.05 | 4-2 | $3d^2\ ^3F\text{-}3d^2\ ^1D$ (1F) |
| 4331.7 | 0.20 | 3.05 | 3-2 | |
| 4043.4 | 0.00 | 3.05 | 2-2 | |
| 4190.6 | 0.61 | 3.56 | 4-2 | $3d^2\ ^3F\text{-}3d^2\ ^3P$ (2F) |
| 4065.7 | 0.20 | 3.24 | 3-1 | |
| 4112.7 | 0.00 | 3.00 | 2-0 | |
| 3680.3 | 0.20 | 3.56 | 3-2 | |
| 3810.6 | 0.00 | 3.24 | 2-1 | |
| 3470.0 | 0.00 | 3.56 | 2-2 | |
| **N1 XII** I P ? | | | | |
| 4231.4 | 0.00 | (2.93) | 1½- ½ | $3p^5\ ^2P^o\text{-}3p^5\ ^2P^o$ (1F) |

## FORBIDDEN LINES

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Ni XIII** I P 350? | | | | |
| 5116.3 | 0.00 | (2.41) | 2-1 | $3p^4\ ^3P-3p^4\ ^3P$ (1F) |
| 5116.03 C) | | | | |
| 3643.3 | (2.41 | 5.80) | 1-2 | $3p^4\ ^3P-3p^4\ ^1D$ (2F) |
| **Ni XV** I P 455? | | | | |
| 8024 | (1.84 | 3.38) | 1-2 | $3p^2\ ^3P-3p^2\ ^3P$ (1F) |
| 8024.21 C) | | | | |
| 6700.6 | 0.00 | (1.84) | 0-1 | |
| 6701.83 C) | | | | |
| **Ni XVI** I P ? | | | | |
| 3601.3 | 0.00 | 3.43 | ½-1½ | $3p^2p^o-3p^2p^o$ (1F) |
| **Cu II** I P 20.18 | | | | |
| 4375.71 | 0.00 | 2.82 | 0-2 | $3d^{10}\ ^1S-4s^3D$ |
| 4165.79 | 0.00 | 2.96 | 0-1 | (1F) |
| 3806.34 | 0.00 | 3.24 | 0-2 | $3d^{10}\ ^1S-4s^1D$ (2F) |
| **Kr III** I P 36.8 | | | | |
| 6826.9 | 0.00 | 1.81 | 2-2 | $4p^4\ ^3P-4p^4\ ^1D$ |
| 9903.2 | 0.56 | 1.81 | 1-2 | (1F) |
| **Sr II** I P 10.98 | | | | |
| 6738.40 | 0.00 | 1.83 | ½-2½ | $5^2S-4^2D$ |
| 6868.18 | 0.00 | 1.80 | ½-1½ | (1F) |
| **Y II** I P 12.3 | | | | |
| 7091.17 | 0.00 | 1.74 | 0-2 | $a^1S-a^3P$ |
| 7131.55 | 0.00 | 1.73 | 0-1 | (1F) |
| 6739.91 | 0.00 | 1.83 | 0-2 | $a^1S-b^1D$ (2F) |
| 7904.04 | 0.18 | 1.74 | 3-2 | $a^3D-a^3P$ |
| 7706.06 | 0.13 | 1.73 | 2-1 | (3F) |
| 7664.67 | 0.10 | 1.71 | 1-0 | |
| 7954.24 | 0.18 | 1.73 | 3-1 | |
| 7787.00 | 0.13 | 1.71 | 2-0 | |
| 7658.92 | 0.13 | 1.74 | 2-2 | |
| 7586.23 | 0.10 | 1.73 | 1-1 | |
| 7540.54 | 0.10 | 1.74 | 1-2 | |
| 7470.10 | 0.18 | 1.83 | 3-2 | $a^3D-b^1D$ |
| 7250.78 | 0.13 | 1.83 | 2-2 | (4F) |
| 7144.60 | 0.10 | 1.83 | 1-2 | |
| 9255.10 | 0.41 | 1.74 | 2-2 | $a^1D-a^3P$ |
| 9324.01 | 0.41 | 1.73 | 2-1 | (5F) |
| 9442.77 | 0.41 | 1.71 | 2-0 | |
| 8665.66 | 0.41 | 1.83 | 2-2 | $a^1D-b^1D$ (6F) |
| **Y V** I P 77 | | | | |
| 8284.1 | 0.00 | 1.49 | 1½- ½ | $4p^5\ ^2p^o-4p^5\ ^2p^o$ (1F) |
| **Zr II** I P 13.97 | | | | |
| 10860.44 | 0.09 | 1.23 | 3½-2½ | $a^4F-b^4P$ |
| 10603.65 | 0.04 | 1.20 | 2½-1½ | (1F) |
| 10464.94 | 0.00 | 1.18 | 1½- ½ | |
| 10355.58 | 0.04 | 1.23 | 2½-2½ | |
| 10261.18 | 0.00 | 1.20 | 1½-1½ | |
| 10028.71 | 0.00 | 1.23 | ½-2½ | |
| 9058.16 | 0.16 | 1.53 | 4½-5½ | $a^4F-a^2H$ |
| 8909.40 | 0.09 | 1.48 | 3½-4½ | (2F) |
| 9376.93 | 0.16 | 1.48 | 4½-4½ | |
| 7786.03 | 0.16 | 1.75 | 4½-2½ | $a^4F-b^2D$ |
| 7893.57 | 0.09 | 1.66 | 3½-1½ | (3F) |
| 7460.93 | 0.09 | 1.75 | 3½-2½ | |
| 7623.44 | 0.04 | 1.66 | 2½-1½ | |
| 7219.15 | 0.04 | 1.75 | 2½-2½ | |
| 7444.80 | 0.00 | 1.66 | 1½-1½ | |
| 7058.76 | 0.00 | 1.75 | ½-2½ | |
| 7769.35 | 0.16 | 1.75 | 4½-4½ | $a^4F-b^2G$ |
| 7518.81 | 0.09 | 1.74 | 3½-3½ | (4F) |
| 7849.08 | 0.16 | 1.74 | 4½-3½ | |
| 7445.63 | 0.09 | 1.75 | 3½-4½ | |
| 7273.33 | 0.04 | 1.74 | 2½-3½ | |
| 7204.82 | 0.04 | 1.75 | 2½-4½ | |
| 7110.54 | 0.00 | 1.74 | ½-3½ | |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Zr II** continued | | | | |
| 7454.82 | 0.16 | 1.82 | 4½-2½ | $a^4F-c^2D$ |
| 7386.11 | 0.09 | 1.77 | 3½-1½ | (5F) |
| 7156.26 | 0.09 | 1.82 | 3½-2½ | |
| 7149.08 | 0.04 | 1.77 | 2½-1½ | |
| 6933.53 | 0.04 | 1.82 | 2½-2½ | |
| 6991.75 | 0.00 | 1.77 | 1½-1½ | |
| 6785.44 | 0.00 | 1.82 | ½-2½ | |
| 5855.37 | 0.16 | 2.27 | 4½-2½ | $a^4F-d^2D$ |
| 5932.88 | 0.09 | 2.17 | 3½-1½ | (6F) |
| 5669.58 | 0.09 | 2.27 | 3½-2½ | |
| 5778.97 | 0.04 | 2.17 | 2½-1½ | |
| 5528.87 | 0.04 | 2.27 | 2½-2½ | |
| 5675.73 | 0.00 | 2.17 | ½-1½ | |
| 5434.30 | 0.00 | 2.27 | ½-2½ | |
| 5520.18 | 0.16 | 2.40 | 4½-3½ | $a^4F-b^2F$ |
| 5331.46 | 0.09 | 2.41 | 3½-2½ | (7F) |
| 5495.42 | 0.16 | 2.41 | 4½-2½ | |
| 5354.76 | 0.09 | 2.40 | 3½-3½ | |
| 5206.84 | 0.04 | 2.41 | 2½-2½ | |
| 5229.06 | 0.04 | 2.40 | 2½-3½ | |
| 5122.88 | 0.00 | 2.41 | ½-2½ | |
| 5144.39 | 0.00 | 2.40 | ½-3½ | |
| 9607.90 | 0.46 | 1.75 | 4½-2½ | $b^4F-b^2D$ |
| 9870.08 | 0.41 | 1.66 | 3½-1½ | (8F) |
| 9202.81 | 0.41 | 1.75 | 3½-2½ | |
| 9490.96 | 0.36 | 1.66 | 2½-1½ | |
| 8873.37 | 0.36 | 1.75 | 2½-2½ | |
| 9208.72 | 0.32 | 1.66 | 1½-1½ | |
| 8625.25 | 0.32 | 1.75 | 1½-2½ | |
| 9582.55 | 0.46 | 1.75 | 4½-4½ | $b^4F-b^2G$ |
| 9291.03 | 0.41 | 1.74 | 3½-3½ | (9F) |
| 9704.10 | 0.46 | 1.74 | 4½-3½ | |
| 9179.54 | 0.41 | 1.75 | 3½-4½ | |
| 8954.34 | 0.36 | 1.74 | 2½-3½ | |
| 8850.73 | 0.36 | 1.75 | 2½-4½ | |
| 8702.70 | 0.32 | 1.74 | ½-3½ | |
| 9108.53 | 0.46 | 1.82 | 4½-2½ | $b^4F-c^2D$ |
| 9089.24 | 0.41 | 1.77 | 3½-1½ | (10F) |
| 8743.65 | 0.41 | 1.82 | 3½-2½ | |
| 8766.76 | 0.36 | 1.77 | 2½-1½ | |
| 8444.83 | 0.36 | 1.82 | 2½-2½ | |
| 8525.41 | 0.32 | 1.77 | 1½-1½ | |
| 8220.84 | 0.32 | 1.82 | ½-2½ | |
| 6829.24 | 0.46 | 2.27 | 4½-2½ | $b^4F-d^2D$ |
| 8984.07 | 0.41 | 2.17 | 3½-1½ | (11F) |
| 6622.05 | 0.41 | 2.27 | 3½-2½ | |
| 6793.01 | 0.36 | 2.17 | 2½-1½ | |
| 6449.21 | 0.36 | 2.27 | 2½-2½ | |
| 6646.31 | 0.32 | 2.17 | 1½-1½ | |
| 6317.64 | 0.32 | 2.27 | ½-2½ | |
| 6377.59 | 0.46 | 2.40 | 4½-3½ | $b^4F-b^2F$ |
| 6165.35 | 0.41 | 2.41 | 3½-2½ | (12F) |
| 6344.56 | 0.46 | 2.41 | 4½-2½ | |
| 6196.53 | 0.41 | 2.40 | 3½-3½ | |
| 6015.26 | 0.36 | 2.41 | 2½-2½ | |
| 6044.94 | 0.36 | 2.40 | 2½-3½ | |
| 5900.64 | 0.32 | 2.41 | ½-2½ | |
| 5929.20 | 0.32 | 2.40 | ½-3½ | |
| 10351.92 | 0.56 | 1.75 | 2½-2½ | $a^2D-b^2D$ |
| 10890.02 | 0.52 | 1.66 | 1½-1½ | (13F) |
| 11203.92 | 0.56 | 1.66 | 2½-1½ | |
| 10083.37 | 0.52 | 1.75 | ½-2½ | |
| 9774.53 | 0.56 | 1.82 | 2½-2½ | $a^2D-c^2D$ |
| 9947.19 | 0.52 | 1.77 | 1½-1½ | (14F) |
| 10208.43 | 0.56 | 1.77 | 2½-1½ | |
| 9534.75 | 0.52 | 1.82 | ½-2½ | |
| 7196.91 | 0.56 | 2.27 | 2½-2½ | $a^2D-d^2D$ |
| 7479.79 | 0.52 | 2.17 | 1½-1½ | (15F) |
| 7626.54 | 0.56 | 2.17 | 2½-1½ | |
| 7068.07 | 0.52 | 2.27 | ½-2½ | |
| 6697.09 | 0.56 | 2.40 | 2½-3½ | $a^2D-b^2F$ |
| 6548.47 | 0.52 | 2.41 | 1½-2½ | (16F) |
| 6660.68 | 0.56 | 2.41 | 2½-2½ | |
| 6583.66 | 0.52 | 2.40 | ½-3½ | |
| 6418.86 | 0.56 | 2.48 | 2½-1½ | $a^2D-b^2P$ |
| 6508.40 | 0.52 | 2.42 | 1½- ½ | (17F) |
| 8617.17 | 0.58 | 2.42 | 2½- ½ | |
| 6314.58 | 0.52 | 2.48 | ½-1½ | |
| 11595.50 | 0.75 | 1.82 | 1½-2½ | $a^2P-c^2D$ |
| 11659.62 | 0.71 | 1.77 | ½-1½ | (18F) |
| 12211.22 | 0.75 | 1.77 | 1½-1½ | |
| 11096.98 | 0.71 | 1.82 | ½-2½ | |
| 8137.88 | 0.75 | 2.27 | 1½-2½ | $a^2P-d^2D$ |
| 8408.39 | 0.71 | 2.17 | ½-1½ | (19F) |
| 8691.53 | 0.75 | 2.17 | 1½-1½ | |
| 7889.15 | 0.71 | 2.27 | ½-2½ | |
| 7156.94 | 0.75 | 2.48 | 1½-1½ | $a^2P-b^2P$ |
| 7197.88 | 0.71 | 2.42 | ½- ½ | (20F) |
| 7404.36 | 0.75 | 2.43 | 1½- ½ | |
| 6963.85 | 0.71 | 2.48 | ½-1½ | |
| 13094.78 | 0.80 | 1.82 | 3½-2½ | $a^2F-c^2D$ |
| 11698.62 | 0.71 | 1.77 | 2½-1½ | (21F) |
| 11132.24 | 0.71 | 1.82 | 2½-2½ | |
| 8380.68 | 0.80 | 2.27 | 3½-2½ | $a^2F-d^2D$ |
| 8428.62 | 0.71 | 2.17 | 2½-1½ | (22F) |
| 8969.06 | 0.80 | 2.17 | 3½-1½ | |
| 7906.95 | 0.71 | 2.27 | 2½-2½ | |

| I A | E P Low | E P High | J | Multiplet (No) |
|---|---|---|---|---|
| **Zr II** continued | | | | |
| 7710.58 | 0.80 | 2.40 | 3½-3½ | $a^2F-b^2F$ |
| 7264.43 | 0.71 | 2.41 | 2½-2½ | (23F) |
| 7662.36 | 0.80 | 2.41 | 3½-2½ | |
| 7307.76 | 0.71 | 2.40 | 2½-3½ | |
| 9670.04 | 0.99 | 2.27 | 2½-3½ | $a^4P-d^2D$ |
| 10130.75 | 0.96 | 2.17 | 1½-1½ | (24F) |
| 10461.95 | 0.99 | 2.17 | 2½-1½ | |
| 9377.83 | 0.96 | 2.27 | 1½-2½ | |
| 8315.71 | 0.99 | 2.48 | 2½-1½ | $a^4P-b^2P$ |
| 8416.96 | 0.96 | 2.42 | 1½- ½ | (25F) |
| 8098.70 | 0.96 | 2.48 | 1½-1½ | |
| 8361.59 | 0.93 | 2.42 | ½- ½ | |
| 7954.76 | 0.93 | 2.48 | ½-1½ | |
| 8882.47 | 1.01 | 2.40 | 4½-3½ | $a^2G-b^2F$ |
| 8561.42 | 0.97 | 2.41 | 3½-2½ | (28F) |
| 8798.82 | 1.01 | 2.41 | 4½-2½ | |
| 8621.67 | 0.97 | 2.40 | 3½-3½ | |
| 9886.87 | 1.23 | 2.48 | 2½-1½ | $b^4P-b^2P$ |
| 10138.19 | 1.20 | 2.42 | 1½- ½ | (27F) |
| 9670.87 | 1.20 | 2.48 | 1½-1½ | |
| 9937.20 | 1.18 | 2.42 | ½- ½ | |
| 9496.60 | 1.18 | 2.48 | ½-1½ | |
| **Zr III** I P 24.0 | | | | |
| 5539.74 | 0.18 | 2.41 | 4-3 | $4d^2\ ^3F-5s^3D$ |
| 5517.24 | 0.08 | 2.32 | 3-2 | (1F) |
| 5433.89 | 0.00 | 2.27 | 2-1 | |
| 5773.51 | 0.18 | 2.32 | 4-3 | |
| 5643.02 | 0.08 | 2.27 | 3-1 | |
| 5303.37 | 0.08 | 2.41 | 3-3 | |
| 5316.97 | 0.00 | 2.32 | 2-2 | |
| 5118.07 | 0.00 | 2.41 | 2-3 | |
| 7853.3 | 0.42 | 1.99 | 2-2 | $4d^2\ ^1D-5s^1D$ (2F) |
| 6193.7 | 0.42 | 2.41 | 2-3 | $4d^2\ ^1D-5s^3D$ |
| 6487.5 | 0.42 | 2.32 | 2-2 | (3F) |
| 6661.7 | 0.42 | 2.27 | 2-1 | |
| 6864.4 | 0.47 | 2.27 | 0-1 | $4d^2\ ^1S-5s^3D$ (4F) |
| 9349.2 | 1.09 | 2.41 | 2-3 | $4d^2\ ^3P-5s^3D$ |
| 9543.3 | 1.03 | 2.32 | 1-2 | (5F) |
| 9671.2 | 1.00 | 2.27 | 0-1 | |
| 10034.9 | 1.09 | 2.32 | 2-2 | |
| 9926.0 | 1.03 | 2.27 | 1-1 | |
| 8921.0 | 1.03 | 2.41 | 1-3 | |
| 9307.5 | 1.00 | 2.32 | 0-2 | |
| 10458.9 | 1.09 | 2.27 | 2-1 | |
| **Zr VI** I P 99 | | | | |
| 6408.5 | 0.00 | 1.93 | 1½- ½ | $4p^5\ 2p^o-4p^5\ 2p^o$ (1F) |
| **Xe II** I P 21.1 | | | | |
| 9487.5 | 0.00 | 1.30 | 1½- ½ | $5p^5\ 2p^o-5p^5\ 2p^o$ (1F) |
| **Xe III** I P 32.0 | | | | |
| 10306.5 | 0.00 | 1.21 | 2-1 | $5p^4\ ^3P-5p^4\ ^3P$ (1F) |
| 5846.3 | 0.00 | 2.11 | 2-2 | $5p^4\ ^3P-5p^4\ ^1D$ (2F) |
| **La II** I P 11.38 | | | | |
| 11011.70 | 0.13 | 1.25 | 3-2 | $a^3F-b^1D$ |
| 9903.31 | 0.00 | 1.25 | 2-2 | (1F) |
| 11490.57 | 0.17 | 1.25 | 2-2 | $a^1D-b^1D$ (2F) |
| **La III** I P 19.1 | | | | |
| 8339.72 | 0.20 | 1.68 | 2½- ½ | $5^2D-6^2S$ |
| 7355.92 | 0.00 | 1.68 | 1½- ½ | (1F) |
| **Eu II** I P 11.21 | | | | |
| 8983.71 | 0.00 | 1.37 | 4-6 | $a^9S-a^9D^o$ |
| 9392.85 | 0.00 | 1.31 | 4-5 | (1F) |
| 9694.01 | 0.00 | 1.27 | 4-4 | |
| 9918.30 | 0.00 | 1.24 | 4-3 | |
| 10074.84 | 0.00 | 1.22 | 4-2 | |
| 5929.31 | 0.00 | 2.08 | 4-5 | $a^9S-a^7D^o$ |
| 5879.32 | 0.00 | 2.10 | 4-4 | (2F) |
| 5832.40 | 0.00 | 2.13 | 4-3 | |
| 5796.28 | 0.00 | 2.13 | 4-2 | |

# Part II—Finding List of All Lines in the Table of Multiplets

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### Part II. Finding List


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# A MULTIPLET TABLE OF ASTROPHYSICAL INTEREST

## PART II

## Finding List of All Lines in the Table of Multiplets

### 1. Introduction

Any arrangement of the wave-lengths in a given spectrum, by multiplets makes it inconvenient to locate a given line. The difficulty is greatly increased when many spectra are involved. Consequently a "Finding List" containing *all* lines in the Revised Multiplet Table has been included as Part II of this Contribution. As in the R M T the Finding List is in two parts. The first contains permitted lines observed in the laboratory, permitted predicted lines, and a few forbidden lines observed in the laboratory when a strong electric field is present. The second contains only forbidden lines of the nebular, auroral and coronal type. See §5.

### 2. Part A—Observed and Permitted Predicted Lines

The lines are listed in order of increasing wave-length and cover the range λλ2951–13164. At the violet end of this long range, the proportion of known lines included is smaller than in the main body of the list, due to the masking by the ozone in our atmosphere of all but the strongest lines. The number of lines in the same wave-length interval decreases from the violet to the red. The incompleteness of laboratory material accentuates this in the infra-red. The total number of lines in this section is approximately 23,200.

Three entries are given for each line and a fourth if the line is predicted or forbidden. All entries are copied directly from Part I of this Contribution. The first is the laboratory wave-length. The source from which the wave-length is taken can be found from the references A, B, C etc. in the R M T and Table 7.

The second entry headed "Type" is blank for all lines observed in the laboratory, except the selected forbidden ones that appear under special conditions, (due to Stark effect). These are marked "Forb" and include 11 lines of *He* I, 6 of *Na* I, 11 of *Al* II, 2 of *Al* III and 2 of *K* I.

Predicted Lines. These fall into three classes. (a) For some faint lines observed in the laboratory but not well-measured, a predicted wave-length obtained from the spectroscopic term values is preferable to the observed value. (b) It is well-known that many predicted lines not yet observed in the laboratory are important astrophysically, and an attempt has been made to include these in the R M T. (c) If a line that would otherwise be included is masked by a strong line in the laboratory, the predicted position of the masked line is entered. Such cases are carefully noted and explained in the R M T. In every case where a predicted wave-length is used, the entry "P" occurs in the column headed "Type" in the Finding List. This column contains only the two entries "Forb" and "P". All other lines are observed laboratory wave-lengths in the usual sense of the word "observed".

The third entry for each line is the spectrum to which the line belongs. Here the chemical symbols of the elements are used and Roman numerals denote arc spectra (I) and spark spectra in successive stages of ionization, i.e. first spark spectrum (II), second spark spectrum (III) etc.

Finally the number of the multiplet to which the line of a given spectrum belongs, is given under the heading "Multiplet No." This number appears under the "Multiplet Designation" of each multiplet in the R M T and the numbers start with 1 for each spectrum. All lines of a given multiplet have the same multiplet number. A blank in this column indicates that the line is unclassified. In the R M T, under a given spectrum, unclassified lines follow the multiplets.

When two or more numbers appear in this column, the line is a blend and occurs in each of the multiplets indicated.

Examples: λ2957.56 is due to *Cr* II and appears in Multiplets 104 and 141 of *Cr* II (See pp. 44 and 45 of the R M T).

λ2984.89 is a predicted wave-length. The line is in Multiplet No. 60 of *Fe* II (See p. 67 of the R M T).

λ2991.632 is an unclassified line of *Fe* I (See p. 65 of the R M T).

3. Blends

Reference has been made above to a line appearing in two multiplets of a given spectrum, for example λ2957.56. Such blends can be readily detected in the Finding List by the presence of more than one multiplet number. In the R M T they are noted by an asterisk. This applies to blended lines in the same spectrum.

If, however, an arc and spark line of an element are blended the wave-length is repeated in the Finding List; or nearly identical wave-lengths are entered, if different measures were used in the two instances. For example λ2988.952 appears in Multiplet No. 11 of *Sc* I and in Multiplet No. 34 of *Sc* II. In the R M T such lines have an asterisk preceding the wave-length and the symbol "§" following it.

A careful examination of close pairs of lines of a given element in the Finding List will doubtless reveal more blends than have been noted in the R M T. Similarly, it is probable that erroneous identifications of lines due to impurities that have not heretofore been suspected, can be detected.

The predicted wave-lengths of masked lines (§2) fall close to observed lines. For example λ2965.25 is the predicted position of the line of *Fe* I in Multiplet No. 316, masked by the strong *Fe* I line at λ2965.255, which occurs in Multiplet No. 10.

All predicted lines have separate entries in the Finding List, regardless of how close the pairs in a given spectrum may be—for example, λλ2990.33 and 2990.34 are both predicted lines of *Fe* I. If observed in the laboratory these lines would undoubtedly be blended.

When identical wave-lengths appear in spectra of different elements, the lines are arranged in the alphabetical order of the chemical symbol. When similar wave-lengths occur in spectra of different stages of ionization of a given element, the arc spectrum comes first, then the spark spectra, in order of increasing ionization.

4. Scope of the Finding List

The users of this Finding List are emphatically warned that the list is *not complete*. The range is that useful to the astrophysicist, having the violet limit λ2951. Within the range covered, the elements to be included have been selected according to their astrophysical importance. For a given element, the spectra for different degrees of ionization and the lines of each have been similarly selected. It is fairly complete for the first spark spectra through the first long period. It lists only the leading arc lines for many elements, but includes all observed classified lines of *Fe* I. For any element, the List grading in the R M T can be used as a guide to the completeness of selection. On account of these restrictions this book is not a list of "Hauptlinien" or a compendium of wave-lengths of elements in general. On the other hand it does contain a large number of predicted lines which invite the attention of the laboratory worker in spectroscopy.

5. Part B. Forbidden Lines—Nebular, Auroral, Coronal etc.

The second part of the Finding List contains only forbidden lines. Here the word "forbidden" applies in the general sense—i.e. lines due to downward transitions from metastable states in the atoms. The number of lines listed is roughly 2550.

The arrangement is similar to Part A of the Finding List, with the exception that in Part B the great majority of lines are predicted. Consequently no column headed "Type" is given. The wave-lengths that are *not* predicted are noted by the following letters:

N Nebular Wave-length

L Laboratory Wave-length

A Auroral Wave-length

C Coronal Wave-length

Column two contains the chemical symbol and stage of ionization of the spectrum as in Part A, and column three the Multiplet Number. In order to avoid confusion with Multiplet Numbers in Part A, all Multiplets of forbidden lines have the letter "F" accompanying the Multiplet Number.

6. Contents

A complete list of all possible forbidden lines in the region useful to the astrophysicist would be prohibitively long. For simple spectra the lines are few, but for the complex spectra, particularly in the first long period, fairly rigid selection has been made. Anyone desiring to construct complete lists is advised to consult the references to the analysis of the various spectra.

7. Index of The Finding Lists

In order to facilitate the work of transferring from the Multiplet Number of the Finding List to the Multiplet in the R M T, a separate card is enclosed in the Finding List, containing an index of the R M T. The elements are in order of increasing atomic number. This index gives the multiplets of each element contained on each page of the R M T.

For example, λ2980.296 is in Multiplet No. 94 of *Ti* I. On the index card hunt *Ti* I and then this Multiplet Number. It is to be found on page 27 of the R M T, which contains Multiplets of *Ti* I from No. 55 through No. 140.

8. Errata

After the tabular material in the Finding List had been completed for publication, four errors were detected, as follows:

| I A | Element | Multiplet No. | | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|
| 3497.137 | Fe I | 78 | should read | 3497.15 | P | Fe I | 78 |
| 4618.568 | Fe I | 1151 | Reject—Wave-length erroneous | | | | |
| 4061.3 | *Sc* III | | should read | 4061.3 | | Sc III | 1 |
| 4068.7 | Sc III | | should read | 4068.7 | | Sc III | 1 |

The writer will be grateful to those who use this Table if they will call to her attention any errors they detect, so that a list of errata may be published. In the compilation of a list containing about 25,750 lines, doubtless there are a number of mistakes in spite of the care that has been taken to avoid errors.

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2951.40 | | Cr II | 59 | 2972.277 | | Fe I | 104 | 2985.849 | | Cr I | 28 |
| 2951.95 | | Cr II | 59 | 2972.64 | | Cr II | 28 | 2985.98 | | S III | 14 |
| 2952.07 | | V II | 2 | 2972.742 | | Gd II | 25 | 2985.995 | | Cr I | 28 |
| 2953.358 | | Cr II | 27 | 2972.769 | | Fe II | 159 | 2986.137 | | Cr I | 28 |
| 2953.706 | | Cr II | 66 | 2973.137 | | Fe I | 10 | 2986.456 | | Fe I | 11 |
| 2953.774 | | Fe II | 2 | 2973.236 | | Fe I | 10 | 2986.473 | | Cr I | 28 |
| 2953.940 | | Fe I | 10 | 2973.975 | | V II | 218 | 2986.617 | | Fe II | 62 |
| 2954.050 | | Fe II | 61 | 2974.006 | | Sc I | 11 | 2986.655 | | Fe I | 200 |
| 2954.332 | | V I | 18 | 2974.59 | | Y I | 10 | 2986.91 | P | Fe II | 86 |
| 2954.67 | | Cr II | 104 | 2974.78 | | Fe I | 335 | 2987.074 | | Gd II | 57 |
| 2955.12 | | Cr II | 59 | 2974.934 | | Ti I | 94 | 2987.166 | | Co I | 11 |
| 2955.71 | | Cr II | 58 | 2975.110 | | Gd II | 77 | 2987.27 | P | Fe II | 86 |
| 2956.133 | | Ti I | 30 | 2975.16 | | Zr II | 64 | 2987.292 | | Fe I | 30 |
| 2956.60 | | Cr II | 58 | 2975.483 | | Cr I | 28 | 2987.40 | | Ti II | 28 |
| 2956.797 | | Ti I | 30 | 2975.650 | | V II | 28 | 2987.542 | | Fe II | 223 |
| 2957.28 | | Cr I | | 2975.89 | | Hf II | 10 | 2987.65 | | Si I | 1 |
| 2957.33 | | V I | 18 | 2975.938 | | Fe II | 2 | 2987.72 | | Ca II | 11 |
| 2957.365 | | Fe I | 10 | 2976.126 | | Fe I | 146 | 2987.80 | | Zr II | 86 |
| 2957.520 | | V II | 2 | 2976.197 | | V II | 28 | 2988.027 | | V II | 27 |
| 2957.56 | | Cr II | 104,141 | 2976.50 | P | Fe I | 56 | 2988.05 | | Ni II | 6 |
| 2958.20 | | Cr II | 49 | 2976.517 | | V II | 28 | 2988.056 | | Cr II | 28 |
| 2958.528 | | Fe II | 160 | 2976.593 | | Ru II | 4 | 2988.367 | | Rh II | 3 |
| 2958.54 | | Cr II | 97 | 2976.61 | | Zr II | 77 | 2988.468 | | Fe I | 56 |
| 2959.601 | | Fe II | 62 | 2976.718 | | Cr II | 27 | 2988.61 | | Ca III | 2 |
| 2959.841 | | Fe II | 180 | 2976.905 | | Ce II | 168 | 2988.649 | | Cr I | 14 |
| 2959.97 | | Cr II | 59 | 2976.922 | | Fe I | 334 | 2988.74 | | Zr II | 148 |
| 2959.992 | | Fe I | 316 | 2977.226 | | Ru II | 4 | 2988.942 | | Fe I | 316 |
| 2960.303 | | Fe I | 148 | 2977.539 | | V I | 18 | 2988.952 | | Sc I | 11 |
| 2960.926 | | Gd II | 25 | 2978.07 | | Zr II | 14 | 2988.952 | | Sc II | 34 |
| 2961.119 | | Fe II | 180 | 2978.18 | | Y II | 45 | 2989.01 | P | Fe II | 86 |
| 2961.272 | | Fe II | 2 | 2978.226 | | V II | 87 | 2989.079 | | Fe II | 159 |
| 2961.732 | | Cr II | 27,59 | 2978.850 | | Fe II | 69 | 2989.194 | | Cr II | 28 |
| 2962.11 | | Fe I | 57 | 2979.05 | | A II | 19 | 2989.30 | | Ca III | 4 |
| 2962.167 | | Rh II | 4 | 2979.096 | | Fe II | 100,180 | 2989.306 | | V II | 87 |
| 2962.772 | | V I | 18 | 2979.102 | | V II | 44 | 2989.367 | | Fe II | 86 |
| 2962.936 | | Fe II | 160 | 2979.18 | | Zr II | 14 | 2989.42 | | Ca II | 11 |
| 2963.249 | | V II | 154 | 2979.199 | | Ti II | 123 | 2989.590 | | Co I | 13 |
| 2963.46 | | Cr II | 58 | 2979.349 | | Fe II | 2 | 2989.594 | | V II | 28 |
| 2963.605 | | Gd II | | 2979.382 | | Rh II | 4 | 2989.731 | | Fe II | 86 |
| 2963.73 | | Cr I | | 2979.683 | | Sc II | 44 | 2989.74 | | V II | 87 |
| 2963.897 | | Fe II | | 2979.726 | | Ru II | 5 | 2990.10 | | Zr II | 27 |
| 2964.131 | | Fe II | 60 | 2979.741 | | Cr II | 28 | 2990.16 | | Ti II | 123 |
| 2964.629 | | Fe II | 8 | 2979.957 | | Ru II | 4 | 2990.33 | P | Fe I | 334 |
| 2964.88 | | Hf I | 4 | 2980.154 | | Gd II | 12 | 2990.34 | P | Fe I | 460 |
| 2964.96 | | Y I | 11 | 2980.296 | | Ti I | 94 | 2990.392 | | Fe I | 316 |
| 2965.036 | | Fe II | 8 | 2980.532 | | Fe I | 317 | 2990.873 | | Ce II | 72 |
| 2965.19 | | Cr II | 58,160 | 2980.60 | P | Fe I | 201 | 2990.948 | | V I | 58 |
| 2965.231 | | Ti I | 94 | 2980.69 | | Y II | 54 | 2991.095 | | Ni I | 14,80 |
| 2965.25 | P | Fe I | 316 | 2980.752 | | Sc I | 11 | 2991.244 | | Fe II | 60 |
| 2965.255 | | Fe I | 10 | 2980.791 | | Cr I | 28 | 2991.33 | | Eu II | 3 |
| 2965.395 | | Fe II | 59 | 2980.82 | | Hf I | 2 | 2991.40 | | Zr II | 6 |
| 2965.428 | | Gd II | 29 | 2980.963 | | Fe II | 61 | 2991.520 | | Gd II | 25 |
| 2965.54 | | Ta I | 2 | 2981.02 | | Zr II | 24 | 2991.626 | | Ru II | 5 |
| 2965.564 | | Ru II | 4 | 2981.200 | | V II | 87 | 2991.632 | | Fe I | |
| 2965.68 | | Ti I | 94 | 2981.446 | | Fe I | 11 | 2991.817 | | Fe II | 160 |
| 2965.707 | | Ti I | 94 | 2981.448 | | Ti I | 29 | 2991.886 | | Cr I | 28 |
| 2965.86 | | Sc I | 11 | 2981.651 | | Ni I | 26 | 2992.11 | | O III | 10 |
| 2966.051 | | Cr II | 33 | 2981.852 | | Fe I | 104 | 2992.24 | | K III | 2 |
| 2966.26 | | Fe I | 104 | 2981.924 | | V II | 114 | 2992.378 | | V II | 114 |
| 2966.27 | | Zr II | 148 | 2982.059 | | Fe II | 139 | 2992.40 | | Cr II | 28 |
| 2966.901 | | Fe I | 10 | 2982.100 | | Cb II | 2 | 2992.595 | | Ni I | 25 |
| 2967.225 | | Ti I | 30 | 2982.234 | | Fe I | 460 | 2992.63 | | C II | 8 |
| 2967.642 | | Cr I | 28 | 2982.239 | | Fe II | 70 | 2993.038 | | Gd II | 42 |
| 2968.119 | | Fe II | 160 | 2982.75 | | V II | 28 | 2993.366 | | Fe II | 139 |
| 2968.21 | | Cr II | 96 | 2982.78 | | Cl II | 53 | 2994.05 | | Zr II | |
| 2968.231 | | Ti I | 29 | 2983.009 | | V II | 22,28 | 2994.069 | | Cr I | 14 |
| 2968.373 | | V II | 28 | 2983.060 | | Gd II | 77 | 2994.259 | P | Al II | 14 |
| 2968.67 | | Cr II | 58 | 2983.306 | | Ti I | 29 | 2994.427 | | Fe I | 9 |
| 2968.738 | | Fe II | 61 | 2983.558 | | V II | 28 | 2994.460 | | Ni I | 27 |
| 2968.82 | | Hf II | 12 | 2983.574 | | Fe I | 9 | 2994.50 | | Fe I | 11 |
| 2968.906 | | Fe II | | 2983.66 | | O III | 7 | 2994.540 | | V II | 218 |
| 2968.95 | | Zr II | 14 | 2983.78 | | O III | 6 | 2994.725 | | Cb II | |
| 2969.267 | | Gd II | 28 | 2984.131 | | Ni I | 12 | 2994.737 | | Cr II | 28 |
| 2969.364 | | Fe I | 11 | 2984.183 | | Na II | 2 | 2994.958 | | Ca I | 17 |
| 2969.474 | | Fe I | 30 | 2984.25 | | Y I | 10 | 2995.10 | | Cr I | 15 |
| 2969.67 | | Cr II | 66 | 2984.35 | P | Ti II | 28 | 2995.26 | | Y I | 11 |
| 2969.934 | | Fe II | 70 | 2984.69 | | Cr II | 27 | 2995.530 | P | Al II | 14 |
| 2970.106 | | Fe I | 10,11 | 2984.785 | | Fe I | 29 | 2995.546 | P | Al II | 14 |
| 2970.35 | | Si I | 1 | 2984.82 | | Cr I | 15 | 2995.644 | | Ce II | 183 |
| 2970.384 | | Ti I | 29 | 2984.831 | | Fe II | 8 | 2995.838 | | Fe I | 460 |
| 2970.510 | | Fe II | 2 | 2984.89 | P | Fe II | 60 | 2995.999 | | V II | 27 |
| 2970.556 | | Ti I | 94 | 2985.02 | | Cr II | 56 | 2996.386 | | Fe I | 148 |
| 2970.66 | | Cr II | 57 | 2985.184 | | V II | 218 | 2996.51 | | O III | 10 |
| 2970.682 | | Fe II | 69 | 2985.29 | P | Fe II | 69 | 2996.549 | | Co I | 77 |
| 2971.112 | | Cr I | 28 | 2985.325 | | Cr II | 28 | 2996.580 | | Cr I | 28 |
| 2971.616 | | Fe II | 60 | 2985.36 | | Zr I | 22 | 2996.63 | | Cl II | 22 |
| 2971.906 | | Cr II | 28 | 2985.43 | | La II | 145 | 2996.70 | | V II | 28 |
| 2972.016 | | Fe II | 160 | 2985.477 | | Ti I | 29 | 2996.88 | P | Ti II | 28 |
| 2972.17 | | Gd II | 77 | 2985.521 | | Gd II | 77 | 2996.94 | | Y I | 9 |
| 2972.263 | | V II | 87 | 2985.545 | | Fe II | 8 | 2997.08 | | V I | 116 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2997.298 | | Fe II | 139 | 3006.82 | | O II | | 3015.67 | | Zr II | 86 |
| 2997.309 | | Ca I | 17 | 3006.858 | | Ca I | 17 | 3015.686 | | Co I | 76 |
| 2997.364 | | Cu I | 5 | 3006.86 | | N II | 18 | 3015.86 | | Zr II | 127 |
| 2997.749 | | Fe II | 85 | 3006.90 | | V I | 116 | 3015.913 | | Fe I | 198 |
| 2997.71 | | O III | 10 | 3006.95 | P | Fe III | 21 | 3015.98 | | V II | 42 |
| 2997.87 | | V I | 116 | 3006.98 | | Cl II | 53 | 3016.14 | | V II | 26 |
| 2997.945 | | V II | 141 | 3007.035 | | V II | 141 | 3016.15 | | A IV | 1 |
| 2997.97 | | Pt I | 3 | 3007.071 | | Na II | 12 | 3016.16 | | V I | 58 |
| 2998.158 | P | Al II | 14 | 3007.08 | | O II | 74 | 3016.186 | | Fe I | 30 |
| 2998.163 | P | Al II | 14 | 3007.146 | | Fe I | 55 | 3016.454 | | Mn I | 35 |
| 2998.34 | | Zr II | 13 | 3007.2 | | Fe III | 116 | 3016.775 | | V II | 27 |
| 2998.49 | | Zr II | 86 | 3007.284 | | Fe I | 11 | 3016.94 | | Hf II | 3 |
| 2998.787 | | Cr I | 14 | 3007.296 | | V II | 27 | 3017.187 | | Ti II | 85 |
| 2998.855 | | Fe II | 60 | 3007.32 | | La II | 102 | 3017.195 | | Ce II | 107 |
| 2998.896 | | Ru II | 5 | 3007.442 | | Na II | 1 | 3017.254 | | Co I | 78 |
| 2999.045 | | Gd II | 12 | 3007.487 | | Ti I | | 3017.34 | | Ne II | 8 |
| 2999.238 | | V I | 58 | 3007.655 | | Mn I | 35 | 3017.447 | | W I | 9 |
| 2999.30 | | Cr II | 33 | 3007.74 | | O II | 74 | 3017.548 | | Co I | 11 |
| 2999.512 | | Fe I | 30 | 3007.75 | P | Fe I | 262 | 3017.569 | | Cr I | 27 |
| 2999.641 | | Ca I | 17 | 3007.802 | | Fe III | 10 | 3017.628 | | Fe I | 9 |
| 2999.92 | P | Ti II | 28 | 3007.975 | | Nd II | | 3017.63 | | O III | 10 |
| 2999.96 | | Cr II | 42 | 3008.13 | | Zr II | 86 | 3017.80 | | Cr II | 95 |
| 3000.059 | | Fe II | 69 | 3008.139 | | Fe I | 9 | 3018.08 | | Zr II | |
| 3000.09 | | Hf II | 3 | 3008.265 | | Mn I | 35 | 3018.134 | | Fe I | 199 |
| 3000.14 | | A II | | 3008.28 | | O II | 74 | 3018.25 | P | Fe I | 263 |
| 3000.45 | | A II | 72 | 3008.322 | | Ti II | 85 | 3018.32 | | Hf I | 2 |
| 3000.452 | | Fe I | 56 | 3008.506 | | Fe III | 9 | 3018.352 | | Zn I | 5 |
| 3000.545 | | Co I | 13 | 3008.508 | | V II | 141 | 3018.496 | | Cr I | 26 |
| 3000.59 | | Zr II | 147 | 3008.610 | | V II | 26 | 3018.53 | | Zr II | 147 |
| 3000.836 | | Fe III | 10 | 3008.67 | | Cr II | 75 | 3018.744 | | Fe III | 10 |
| 3000.863 | | Ca I | 17 | 3008.789 | | Ce II | 122 | 3018.82 | | Cl II | 22 |
| 3000.868 | | Ti I | 29 | 3008.79 | | O III | 10 | 3018.821 | | Cr I | 26 |
| 3000.890 | | Cr I | 28 | 3008.996 | | Rh II | 4 | 3018.95 | | La II | |
| 3000.950 | | Fe I | 9 | 3009.098 | | Fe I | 198 | 3018.983 | | Fe I | 30 |
| 3001.203 | | V II | 27 | 3009.136 | | Sn I | 1 | 3019.09 | | V II | 86 |
| 3001.42 | | Y II | 53 | 3009.138 | | Na II | 13 | 3019.143 | | Ni I | 11 |
| 3001.589 | | Fe III | 9 | 3009.205 | | Ca I | 17 | 3019.291 | | Fe I | 199 |
| 3001.65 | | Ne II | 4 | 3009.366 | | Gd II | 25 | 3019.350 | | Sc I | 10 |
| 3001.66 | P | Fe I | 506 | 3009.570 | | Fe I | 30 | 3019.819 | | Rh II | 3 |
| 3001.754 | | V II | 141 | 3009.650 | | Gd II | 27 | 3019.84 | | Zr II | 6 |
| 3001.90 | | V I | 116 | 3009.85 | | Zr II | 64 | 3020.001 | | Fe II | 110 |
| 3001.93 | | V II | 43 | 3009.998 | | Fe III | 41 | 3020.45 | | Zr II | 26 |
| 3002.09 | P | Fe II | 138 | 3010.129 | | Gd II | 12 | 3020.495 | | Fe I | 9 |
| 3002.197 | | Gd II | 77 | 3010.220 | | Fe II | 181 | 3020.54 | | Hf I | 4 |
| 3002.330 | | Fe II | 98 | 3010.28 | | Zr II | 39 | 3020.643 | | Fe I | 9 |
| 3002.442 | | V I | | 3010.42 | P | Ti I | 170 | 3020.65 | | V II | 26 |
| 3002.491 | | Ni I | 26 | 3010.76 | | W II | 14 | 3020.673 | | Cr I | 27 |
| 3002.65 | | V I | 47 | 3010.838 | | Cu I | 3 | 3021.074 | | Fe I | 9 |
| 3002.650 | | Fe II | 8 | 3010.899 | | Gd II | 42 | 3021.407 | | Fe II | 59 |
| 3002.66 | | Pd I | 4 | 3011.060 | | Fe III | 31 | 3021.558 | | Cr I | 27 |
| 3002.710 | | Gd II | 77 | 3011.162 | | Mn I | 35 | 3021.74 | | Pd I | 6 |
| 3002.728 | | Ti I | 29 | 3011.24 | | Hf II | 64 | 3021.74 | | Y I | 9 |
| 3002.860 | | Gd II | | 3011.376 | | Mn I | 35 | 3021.78 | | V I | 75 |
| 3002.99 | | Fe III | 9 | 3011.42 | | Cr II | 27 | 3021.97 | | Zr II | 39 |
| 3003.00 | | A II | | 3011.482 | | Fe I | 316 | 3021.98 | | W II | 6 |
| 3003.031 | | Fe I | 30 | 3011.73 | | Zr I | 22 | 3022.00 | | Fe III | 76 |
| 3003.282 | | Fe III | 89 | 3012.004 | | Ni I | 41 | 3022.146 | | V II | 86 |
| 3003.37 | P | Ti II | 28 | 3012.01 | | Cr II | 87 | 3022.26 | | La II | 116 |
| 3003.461 | | V II | 27 | 3012.020 | | V II | 43 | 3022.28 | | Y I | 10 |
| 3003.583 | | Gd II | 25 | 3012.190 | | Gd II | 29 | 3022.57 | | V II | 26 |
| 3003.629 | | Ni I | 26 | 3012.34 | | Cr II | 42 | 3022.736 | | Ce III | 5 |
| 3003.73 | | Zr II | 26 | 3012.59 | P | Fe II | 69 | 3022.749 | | Mn I | 35 |
| 3003.924 | | Cr II | 33 | 3012.847 | | Fe III | 10 | 3022.804 | P | Al II | 13 |
| 3004.109 | | Fe III | 21,41 | 3012.90 | | Hf II | 4 | 3022.820 | | Ti II | 126 |
| 3004.119 | | Fe I | 199 | 3013.030 | | Cr I | 26 | 3022.93 | | Cl II | 57 |
| 3004.249 | | Fe II | 69 | 3013.102 | | V II | 26 | 3023.45 | | O III | 4 |
| 3004.35 | | O III | 10 | 3013.125 | | Fe III | 9 | 3023.50 | | Y II | 79 |
| 3004.39 | | Cl II | 22 | 3013.32 | | Zr II | 27 | 3023.583 | | Fe I | 103 |
| 3004.47 | | Cr II | 88 | 3013.37 | | O II | 56 | 3023.80 | | N II | 35 |
| 3004.48 | P | Fe I | 105 | 3013.38 | P | Fe II | 138 | 3023.85 | | Fe III | 10 |
| 3004.490 | | Fe III | 41 | 3013.592 | | Co I | 10 | 3023.859 | | Fe II | 84 |
| 3004.62 | | Fe I | 57 | 3013.66 | | Zr II | 52 | 3023.86 | | Ti II | 126 |
| 3004.68 | | La II | | 3013.713 | | Cr I | 26 | 3023.882 | | V II | 41 |
| 3004.824 | | V I | 47 | 3013.802 | | Fe II | 124 | 3024.033 | | Fe I | 11 |
| 3005.057 | | Cr I | 28 | 3014.120 | | Fe I | 458 | 3024.05 | | A III | 4 |
| 3005.092 | | Gd II | | 3014.165 | | Nd II | | 3024.098 | P | Al II | 13 |
| 3005.26 | | Y I | 9 | 3014.176 | | Fe I | 31 | 3024.114 | P | Al II | 13 |
| 3005.302 | | Fe I | 199 | 3014.37 | | V I | 116 | 3024.350 | | Cr I | 26 |
| 3005.36 | | Zr I | 38 | 3014.44 | | Zr I | 21 | 3024.36 | | O III | 10 |
| 3005.50 | | Zr I | 60 | 3014.49 | | A II | 72 | 3024.400 | | Co I | 52 |
| 3005.62 | | O II | | 3014.668 | | Mn I | 35 | 3024.51 | | W II | 4 |
| 3005.766 | | Co I | 77 | 3014.760 | | Cr I | 27 | 3024.57 | | O III | 4 |
| 3005.813 | | V II | 86 | 3014.822 | | V II | 27 | 3024.681 | | Cr I | 117 |
| 3006.0 | | Y II | 54 | 3014.915 | | Cr I | 27 | 3024.72 | | Zr II | 147 |
| 3006.04 | | O II | | 3015.194 | | Cr I | 27 | 3024.78 | | Hf II | 47 |
| 3006.05 | | Cl II | 22 | 3015.230 | | Fe III | 9 | 3024.92 | P | Fe II | 138 |
| 3006.122 | | Fe III | 21 | 3015.296 | | Tm II | 8 | 3024.981 | | V II | 85 |
| 3006.24 | | V I | 116 | 3015.364 | | Sc I | 10 | 3025.16 | | Zr II | 86 |
| 3006.35 | | V I | 75 | 3015.400 | | Na II | 5 | 3025.283 | | Fe I | 29 |
| 3006.502 | | V II | 141 | 3015.510 | | Cr II | 87 | 3025.29 | | Hf II | 12 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3025.40 | P | Cr I | 27 | 3034.95 | | Cb II | | 3044.567 | | Mn I | 15 |
| 3025.638 | | Fe I | 198 | 3034.99 | | Cr II | 42 | 3044.843 | | Fe II | 98 |
| 3025.68 | | V II | 75 | 3035.013 | | Rh II | 4 | 3044.936 | | V I | 17 |
| 3025.70 | | Zr II | 76 | 3035.14 | | V II | 245 | 3045.00 | | Cl II | 21 |
| 3025.75 | | O II | 84 | 3035.25 | P | Fe I | 506 | 3045.006 | | Ni I | 12 |
| 3025.843 | | Fe I | 9 | 3035.43 | | O III | 4 | 3045.077 | | Fe I | 29 |
| 3025.99 | P | Fe II | 84 | 3035.781 | | Zn I | 5 | 3045.085 | | Ti II | |
| 3026.18 | | Zr II | 147 | 3035.802 | | Fe III | 30 | 3045.313 | | Fe II | 179 |
| 3026.373 | | Co I | 77 | 3035.98 | | Ne II | 17 | 3045.36 | | Y I | 9 |
| 3026.462 | | Fe I | 30 | 3036.07 | | V II | 40 | 3045.53 | | Cr II | 48 |
| 3026.47 | | Y II | 44 | 3036.101 | | Cu I | 5 | 3045.58 | | Ne II | 8 |
| 3026.647 | | Cr II | 95 | 3036.33 | P | Zr II | 86 | 3045.593 | | Mn I | 34 |
| 3026.75 | | A II | 120 | 3036.39 | | Zr II | 25 | 3045.593 | | Na II | 11 |
| 3026.776 | P | Al II | 13 | 3036.50 | | Zr II | 24 | 3045.594 | | Fe I | 198 |
| 3026.781 | P | Al II | 13 | 3036.59 | | Y II | 68 | 3045.714 | | Sc II | 37 |
| 3026.85 | | Cr II | 41 | 3036.68 | | W II | 7 | 3045.808 | | Mn I | 34 |
| 3026.985 | | Fe III | 21 | 3036.784 | | Ti II | 78 | 3045.82 | | Zr I | 36 |
| 3027.04 | | Ne II | 8 | 3036.986 | | Fe II | 181 | 3045.877 | | Fe III | 76 |
| 3027.38 | P | Fe II | 99 | 3037.044 | | Cr I | 27 | 3046.03 | | Hf II | 32 |
| 3027.46 | | Fe III | 10 | 3037.26 | | Si III | 10 | 3046.10 | | A II | |
| 3027.600 | | V II | 85 | 3037.388 | | Fe I | 9 | 3046.266 | | Mn II | 10 |
| 3027.602 | | Gd II | 12 | 3037.73 | | Ne II | 8 | 3046.399 | | Fe III | 78 |
| 3027.75 | | Y II | 60 | 3037.731 | | Ce II | 181 | 3046.452 | | W I | 5 |
| 3027.92 | | Pd I | 5 | 3037.782 | | Fe I | 31 | 3046.675 | | Fe II | 179 |
| 3028.04 | | O IV | 5 | 3037.935 | | Ni I | 25 | 3046.685 | | Ti II | 47 |
| 3028.042 | | V II | 85 | 3037.98 | | A IV | 2 | 3046.714 | | Fe III | 92 |
| 3028.05 | | Zr II | 76 | 3037.98 | | Cl II | 53 | 3046.819 | | Fe I | 315 |
| 3028.125 | | Cr II | 87 | 3038.00 | | V II | 246 | 3046.929 | | Fe I | 198 |
| 3028.436 | | Cb II | 2 | 3038.04 | | Cr II | 154 | 3047.035 | | Mn I | 34 |
| 3028.608 | | Rh II | 1 | 3038.52 | | Cr II | 41 | 3047.047 | | Fe I | 457 |
| 3028.66 | | Ca III | 3 | 3038.520 | | V II | 96 | 3047.119 | | Fe III | 80 |
| 3028.82 | | O II | 73 | 3038.59 | | Zr II | | 3047.13 | | O III | 4 |
| 3028.84 | | Ne II | 4 | 3038.706 | | Ti II | 85 | 3047.160 | | Rh II | 4 |
| 3028.93 | | A II | 84 | 3038.777 | | Fe II | 84 | 3047.201 | | Fe I | 382 |
| 3028.981 | | Gd II | 26 | 3039.064 | | Ge I | 2 | 3047.455 | | Cr I | 164 |
| 3029.041 | | Mn II | 10 | 3039.254 | | F III | 3 | 3047.57 | | Ne II | 8 |
| 3029.164 | | Cr I | 26 | 3039.322 | | Fe I | 199 | 3047.60 | P | Fe II | 84 |
| 3029.237 | | Fe I | 56 | 3039.51 | | O II | 72 | 3047.605 | | Fe I | 9 |
| 3029.297 | | Ni I | 56 | 3039.551 | | Mn II | 10 | 3047.63 | | Cr II | 15 |
| 3029.52 | | Zr I | 22 | 3039.563 | | Co I | 52 | 3047.76 | | Cr II | 15 |
| 3029.56 | | V II | 26 | 3039.65 | | Ne II | 17 | 3047.9 | | O II | 82 |
| 3029.681 | | Fe II | 124 | 3039.67 | | C II | 29 | 3048.108 | | Co I | 77 |
| 3029.730 | | Ti II | 85 | 3039.74 | P | Cr I | 117 | 3048.214 | | V II | 123 |
| 3029.83 | | Sb I | 2 | 3039.746 | | F III | 3 | 3048.28 | | Zr II | 144 |
| 3030.149 | | Fe I | 198 | 3039.76 | | O II | 72 | 3048.42 | | Zr II | 65 |
| 3030.214 | | Y II | 79 | 3039.767 | | V II | 153 | 3048.65 | | V II | 67 |
| 3030.245 | | Cr I | 27 | 3039.780 | | Cr I | 26 | 3048.766 | | Ti II | 78 |
| 3030.61 | P | Fe I | 145 | 3039.92 | | Sc II | 47 | 3048.864 | | Mn I | 34 |
| 3030.757 | | Fe I | 459 | 3040.34 | | Gd II | 55 | 3048.888 | | Co I | 11 |
| 3030.769 | | Sc I | 10 | 3040.428 | | Fe I | 30 | 3048.891 | | V II | 40 |
| 3030.85 | | Ne II | 17 | 3040.603 | | Mn I | 34 | 3049.011 | | Fe II | 181 |
| 3030.91 | | Zr II | 6 | 3040.812 | | Co I | 50 | 3049.027 | | Mn II | 21 |
| 3031.007 | | V I | 74 | 3040.829 | | Fe II | 123 | 3049.18 | P | Fe II | 109 |
| 3031.16 | | Hf II | 11 | 3040.846 | | Cr I | 27 | 3049.39 | | La II | 115 |
| 3031.213 | | Fe I | 198 | 3040.92 | | Cr II | 65 | 3049.44 | | C II | 43 |
| 3031.353 | | Cr I | 27 | 3040.93 | | Si III | 10 | 3049.694 | | W I | 9 |
| 3031.486 | | Cr I | 117 | 3041.224 | | Mn I | 34 | 3049.883 | | Cr I | 27 |
| 3031.559 | | Ce III | 1 | 3041.278 | | Al II | 28 | 3050.073 | | Al I | 7 |
| 3031.63 | | Cr II | 87 | 3041.42 | | V II | 40 | 3050.137 | | Cr II | 65 |
| 3031.63 | P | Fe II | 138 | 3041.639 | | Fe I | 56 | 3050.400 | | V I | 74 |
| 3031.638 | | Fe I | 30 | 3041.74 | | Cr II | 95 | 3050.463 | | Fe III | 10 |
| 3031.870 | | Ni I | 11 | 3041.745 | | Fe I | 30 | 3050.496 | | Co I | 77 |
| 3032.00 | | Zr II | 144 | 3041.86 | | V I | | 3050.5 | | Y II | 69 |
| 3032.08 | | O II | 83 | 3041.876 | | W I | 5 | 3050.57 | | Ne II | 48 |
| 3032.187 | | V II | 75 | 3042.020 | | Fe I | 30 | 3050.661 | | Mn II | 21 |
| 3032.44 | | Ni II | 3 | 3042.27 | | V II | 40 | 3050.735 | | V II | 66 |
| 3032.50 | | O II | 83 | 3042.481 | | Co I | 10 | 3050.75 | | Cr II | 95 |
| 3032.767 | | Cb II | | 3042.65 | | Pt I | 5 | 3050.819 | | Ni I | 25 |
| 3032.845 | | Gd II | 12 | 3042.666 | | Fe I | 30 | 3050.890 | | V I | 16 |
| 3032.85 | | As I | 1 | 3042.733 | | Mn I | 34 | 3050.932 | | Co I | 51 |
| 3032.927 | | Cr II | 15 | 3042.79 | | Cr II | 47 | 3051.30 | | W II | 6 |
| 3033.104 | | Fe I | 146 | 3043.02 | | O III | 4 | 3051.308 | | V II | 228 |
| 3033.445 | | Fe II | 181 | 3043.067 | | Fe III | 91 | 3051.924 | | Ce II | 184 |
| 3033.445 | | V II | 123 | 3043.124 | | V I | 17 | 3051.975 | | Ce II | 180 |
| 3033.52 | | A II | 19 | 3043.132 | | Mn II | 21 | 3052.07 | | K III | 2 |
| 3033.591 | | Mn II | 21 | 3043.143 | | Mn I | 34 | 3052.194 | | V I | 15 |
| 3033.821 | | V II | 34 | 3043.31 | P | Fe II | 138 | 3052.229 | | Cr I | 164 |
| 3034.05 | | Cr II | 74 | 3043.356 | | Mn I | 34 | 3052.511 | | Gd II | 9 |
| 3034.051 | | Gd II | 12 | 3043.439 | | Fe III | 91 | 3052.54 | | O IV | 5 |
| 3034.120 | | Sn I | 1 | 3043.54 | | V II | 40 | 3052.78 | P | Fe I | 262 |
| 3034.190 | | Cr I | 26 | 3043.555 | | V I | 17 | 3052.929 | | Sc II | 37 |
| 3034.32 | | O III | 20 | 3043.770 | | Mn I | 34 | 3053.065 | | Fe I | 146 |
| 3034.432 | | Co I | 12 | 3043.851 | | Ti II | 78 | 3053.20 | | A II | |
| 3034.48 | | Ne II | 8 | 3043.90 | | Cr II | 48 | 3053.27 | | Y II | 68 |
| 3034.51 | | Fe I | 57 | 3044.004 | | Co I | 11 | 3053.39 | | V II | 34 |
| 3034.54 | | Cr II | 33 | 3044.04 | P | Co I | 78 | 3053.443 | | Fe I | 31,398 |
| 3034.54 | | F III | 3 | 3044.12 | | Zr II | 26 | 3053.570 | | Gd II | 25 |
| 3034.712 | | Fe II | 84 | 3044.16 | | Ne II | 17 | 3053.65 | | Cr II | 64 |
| 3034.74 | | Si III | 10 | 3044.24 | | Cr II | 154 | 3053.65 | | V I | 17 |
| 3034.810 | | Mn II | 21 | 3044.438 | | Fe III | | 3053.664 | | Na II | 15 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 3053.74 | | Cl II | 14 |
| 3053.880 | | Cr I | 26 |
| 3053.894 | | V II | 40 |
| 3054.02 | | La II | 115 |
| 3054.134 | | Fe III | 10 |
| 3054.24 | | V II | 67 |
| 3054.316 | | Ni I | 25 |
| 3054.362 | | Mn I | 15 |
| 3054.39 | | Zr II | 51 |
| 3054.52 | | Hf II | 8 |
| 3054.69 | | Ne II | 8 |
| 3054.694 | | Al I | 7 |
| 3054.724 | | Co I | 13 |
| 3054.82 | | A III | 4 |
| 3054.84 | | Zr II | 76 |
| 3054.89 | | V I | 16 |
| 3054.94 | | Eu II | 7 |
| 3054.949 | | Fe I | 263 |
| 3055.243 | | Ce II | 201 |
| 3055.263 | | Fe I | 55 |
| 3055.3 | | Y II | 68 |
| 3055.368 | | Fe II | 181 |
| 3055.43 | | Hf II | 56 |
| 3055.44 | | Cr II | 33 |
| 3055.55 | | Fe III | 10 |
| 3055.585 | | Ce III | 1 |
| 3055.942 | | V II | 123 |
| 3056.157 | | Na II | 1 |
| 3056.334 | | V I | 17 |
| 3056.556 | | Ce III | 9 |
| 3056.68 | | Cr II | 48 |
| 3056.740 | | Ti II | 47 |
| 3056.775 | | Ce II | 121 |
| 3056.802 | | Fe II | 109 |
| 3056.84 | | K III | 2 |
| 3057.08 | | V II | 95 |
| 3057.155 | | Al I | 7 |
| 3057.214 | | Ce III | 8 |
| 3057.22 | | Zr II | 76 |
| 3057.395 | | Ti II | 5 |
| 3057.446 | | Fe I | 28 |
| 3057.575 | | Ce III | 4 |
| 3057.638 | | Ni I | 26 |
| 3057.80 | P | Fe I | 29 |
| 3057.86 | | Cr II | 65 |
| 3058.00 | | Cl II | 14 |
| 3058.090 | | Ti II | 47 |
| 3058.119 | | Gd II | 57 |
| 3058.17 | | Cr I | 164 |
| 3058.38 | | Cr II | 48 |
| 3058.66 | | Os I | 1 |
| 3058.68 | | O V | 6 |
| 3059.047 | | Al I | 7 |
| 3059.064 | | Mn II | 21 |
| 3059.086 | | Fe I | 9 |
| 3059.16 | | Ne II | 17 |
| 3059.24 | | C II | 47 |
| 3059.30 | | O III | 4 |
| 3059.41 | | Cr II | 15 |
| 3059.521 | | Cr II | 15 |
| 3059.741 | | Ti II | 5,47 |
| 3059.91 | | La II | 147 |
| 3060.023 | | Fe II | 109 |
| 3060.048 | | Co I | 77 |
| 3060.11 | | Zr II | 6 |
| 3060.162 | | Fe III | 32 |
| 3060.252 | | Ru II | 6 |
| 3060.460 | | V I | 17 |
| 3060.531 | | Sc II | 37 |
| 3060.545 | | Fe I | 457 |
| 3060.63 | | Cr I | 164 |
| 3060.93 | | V I | 15 |
| 3060.94 | | A II | |
| 3060.984 | | Fe I | 55 |
| 3061.14 | P | Cr II | 103 |
| 3061.33 | | Zr II | 6 |
| 3061.59 | | Cr II | 41 |
| 3061.652 | | Cr I | 55 |
| 3061.822 | | Co I | 11 |
| 3061.983 | | Co I | 52 |
| 3062.119 | | Mn I | 15 |
| 3062.178 | | V II | 113 |
| 3062.199 | | Co I | 12 |
| 3062.201 | | Rh II | 4 |
| 3062.234 | | Fe II | 108 |
| 3062.702 | | V II | 34 |
| 3062.872 | | Fe I | 456 |
| 3063.010 | | Ce II | 185 |
| 3063.149 | | Fe I | 102 |
| 3063.247 | | V II | 123 |
| 3063.25 | | Co I | 50 |
| 3063.280 | | Ti II | 119 |
| 3063.411 | | Cu I | 4 |
| 3063.46 | | O IV | 1 |
| 3063.502 | | Ti II | 47 |
| 3063.56 | | Ta I | 4 |
| 3063.58 | | Zr I | 36 |
| 3063.63 | | Zr II | |
| 3063.734 | | V I | 16 |
| 3063.814 | | Fe II | |
| 3063.84 | | Cr II | 32 |
| 3063.93 | | Ni II | 3 |
| 3063.939 | | Fe I | 147 |
| 3064.302 | | Al I | 7 |
| 3064.370 | | Co I | 13 |
| 3064.372 | | Na II | 6 |
| 3064.530 | | Cb II | |
| 3064.623 | | Ni I | 26 |
| 3064.64 | | Zr II | 25 |
| 3064.68 | | Hf II | 31 |
| 3064.71 | | Pt I | 2 |
| 3064.77 | | A III | 4 |
| 3065.01 | | O III | 26 |
| 3065.067 | | Cr I | 184 |
| 3065.106 | | Sc II | 37 |
| 3065.20 | | Zr II | 5 |
| 3065.30 | | Pd I | 3 |
| 3065.315 | | Fe II | 97 |
| 3065.61 | | V II | 112 |
| 3066.019 | | Mn I | 15 |
| 3066.02 | | Y II | 68 |
| 3066.158 | | Al I | 7 |
| 3066.220 | | Ti II | 5 |
| 3066.354 | | Ti II | 5 |
| 3066.375 | | V I | 17 |
| 3066.487 | | Fe I | 313 |
| 3066.51 | | V I | 17 |
| 3066.514 | | Ti II | 47 |
| 3066.536 | | Na II | 18 |
| 3066.69 | P | Fe I | 456 |
| 3066.80 | | V II | 123 |
| 3066.92 | | A II | |
| 3067.104 | | V II | 34 |
| 3067.123 | | Fe I | 56 |
| 3067.132 | | Ge I | 5 |
| 3067.18 | | Cr II | 15 |
| 3067.22 | P | Cr I | 55 |
| 3067.23 | P | Cr II | 15 |
| 3067.244 | | Fe I | 28 |
| 3067.41 | | Hf I | 4 |
| 3067.712 | | Bi I | 1 |
| 3067.952 | | Fe I | 315a |
| 3068 | P | O VI | 2 |
| 3068.02 | | Zr II | 5 |
| 3068.06 | | O II | 26 |
| 3068.175 | | Fe I | 55 |
| 3068.32 | | Zr II | |
| 3068.643 | | Gd II | 12 |
| 3068.68 | | O III | 26 |
| 3068.757 | | Fe II | 122 |
| 3068.897 | | Ir I | 6 |
| 3068.927 | | Fe I | 53 |
| 3069.26 | | Y II | 43 |
| 3069.335 | | Fe III | 1 |
| 3069.645 | | V I | 15 |
| 3070.072 | | Fe III | 30 |
| 3070.12 | | V II | 228 |
| 3070.266 | | Mn I | 15 |
| 3070.591 | | Fe II | 83 |
| 3070.692 | | Fe II | 68 |
| 3071.03 | | Cr II | 41 |
| 3071.08 | | Ne II | 17 |
| 3071.141 | | Fe II | 181 |
| 3071.238 | | Fe III | 1 |
| 3071.242 | | Ti II | 47 |
| 3071.270 | | Fe II | |
| 3071.35 | | Cl II | 14 |
| 3071.58 | | Cr II | 47 |
| 3071.583 | | Ba I | 4 |
| 3071.653 | | Fe II | 123 |
| 3071.66 | | O IV | 1 |
| 3071.69 | P | Cr I | 55 |
| 3071.77 | | V II | 250 |
| 3071.957 | | Co I | 12 |
| 3072.062 | | Zn I | 5 |
| 3072.107 | | Ti II | 5 |
| 3072.341 | | Co I | 11 |
| 3072.47 | | Cr II | 32,116 |
| 3072.54 | | Ti II | 119 |
| 3072.565 | | Gd II | 93 |
| 3072.664 | | Co I | 125 |
| 3072.68 | | Ne II | 17,48 |
| 3072.88 | | Hf I | 2 |
| 3072.971 | | Ti II | 5 |
| 3073.126 | | Mn I | 15 |
| 3073.244 | | Fe I | 549 |
| 3073.25 | | Cr II | 47 |
| 3073.520 | | Co I | 51 |
| 3073.679 | | Cr I | 184 |
| 3073.823 | | V I | 15,17 |
| 3073.982 | | Fe I | 313 |
| 3074.061 | | Rh II | 1 |
| 3074.15 | | O III | 26 |
| 3074.157 | | Fe I | 457 |
| 3074.334 | | Na II | 9 |
| 3074.47 | | Cr I | 55 |
| 3074.55 | | Zr II | 105 |
| 3074.66 | | V II | 112 |
| 3074.665 | | Al II | 27 |
| 3074.67 | | Cr II | 73 |
| 3074.68 | | O III | 26 |
| 3074.91 | | Cr II | 73 |
| 3075.043 | | V II | 228 |
| 3075.19 | | O III | 26 |
| 3075.225 | | Ti II | 5 |
| 3075.228 | | Fe II | 68 |
| 3075.269 | | V I | 105 |
| 3075.32 | | As I | 1 |
| 3075.336 | | Ru II | 7 |
| 3075.38 | | Sc II | 37 |
| 3075.380 | | Nd II | |
| 3075.422 | | Gd II | 56 |
| 3075.474 | | V II | 67 |
| 3075.55 | | Zr II | 144 |
| 3075.58 | | V II | 228 |
| 3075.721 | | Fe I | 28 |
| 3075.901 | | Zn I | 1 |
| 3075.933 | | V I | 57 |
| 3075.95 | | O III | 26 |
| 3076.016 | | V II | 34 |
| 3076.455 | | Fe II | 181 |
| 3076.58 | | Cr I | 55 |
| 3076.864 | | Cb II | 2 |
| 3076.925 | | Gd II | 10 |
| 3077.077 | | Gd II | 25 |
| 3077.14 | | Y II | 52 |
| 3077.168 | | Fe II | 108 |
| 3077.24 | | Cr II | 103 |
| 3077.24 | | Ta I | 1 |
| 3077.358 | | Eu II | 3 |
| 3077.40 | | A IV | 1 |
| 3077.59 | | Lu II | 4 |
| 3077.79 | | Cr II | 103 |
| 3077.831 | | Cr I | 184 |
| 3078.014 | | Fe I | 29 |
| 3078.15 | | A III | 4 |
| 3078.315 | | Na II | 2,8 |
| 3078.436 | | Fe I | 146 |
| 3078.44 | P | Fe II | 97 |
| 3078.64 | | Y II | 78 |
| 3078.645 | | Ti II | 5 |
| 3078.698 | | Fe II | 181 |
| 3078.948 | | V II | 66 |
| 3079.34 | | Cr II | 102 |
| 3079.356 | | Fe II | 122 |
| 3079.394 | | Co I | 10,49 |
| 3079.627 | | Mn I | 15 |
| 3079.75 | | V II | 113 |
| 3079.84 | P | Fe I | 102 |
| 3080.146 | | V I | 15 |
| 3080.333 | | V I | 57 |
| 3080.405 | | Fe II | 108 |
| 3080.64 | | Hf II | 63 |
| 3080.72 | | Cr I | 184 |
| 3080.755 | | Ni I | 26 |
| 3080.84 | | Hf I | 4 |
| 3081.01 | | V II | 112 |
| 3081.254 | | V II | 66 |
| 3081.30 | | V II | 164 |
| 3081.330 | | Mn I | 15 |
| 3081.42 | | La II | 115 |
| 3081.46 | | O II | |
| 3081.575 | | Ti II | 119 |
| 3081.585 | | Rh II | 5 |
| 3081.600 | | Y II | 50 |
| 3081.83 | P | Fe I | 53 |
| 3081.993 | | Gd II | 12 |
| 3082.010 | | V I | 105 |
| 3082.052 | | Mn I | 15 |
| 3082.109 | | V I | 17 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 3082.159 | | Al I | 3 |
| 3082.16 | | Y II | 68 |
| 3082.304 | | Ce II | 105 |
| 3082.524 | | V II | 39 |
| 3082.56 | | Sc II | 36 |
| 3082.614 | | Co I | 10 |
| 3082.844 | | Co I | 73 |
| 3082.99 | | A II | 120 |
| 3083.024 | | Fe II | 97 |
| 3083.07 | P | Sc II | 37 |
| 3083.152 | | Fe I | 197 |
| 3083.208 | | V II | 112 |
| 3083.350 | | Gd II | 10 |
| 3083.539 | | V I | 57 |
| 3083.62 | | Cr II | 47 |
| 3083.65 | | O III | 26 |
| 3083.670 | | Ce II | 237 |
| 3083.68 | P | Fe III | 39 |
| 3083.742 | | Fe I | 28 |
| 3084.007 | | Gd II | |
| 3084.09 | | Fe III | 40 |
| 3084.46 | | Cr II | 71 |
| 3084.59 | | Cr I | 184 |
| 3084.63 | | O III | 26 |
| 3084.819 | | Ti I | 93 |
| 3085.05 | | A II | |
| 3085.089 | | Ce III | 4 |
| 3085.34 | | Zr I | 20 |
| 3085.36 | | Cr II | 47 |
| 3085.47 | | V II | 34 |
| 3085.621 | | Gd II | 10 |
| 3086.210 | | V II | 66 |
| 3086.225 | | Si III | 1 |
| 3086.311 | | Fe III | |
| 3086.393 | | Co I | 50 |
| 3086.429 | | Si III | 1 |
| 3086.44 | | Zr II | 24 |
| 3086.507 | | V II | 39 |
| 3086.620 | | Si III | 1 |
| 3086.777 | | Co I | 11 |
| 3086.83 | | Co I | 76 |
| 3086.858 | | Y II | 42 |
| 3086.880 | | Fe III | 81 |
| 3087.02 | | Al I | 19 |
| 3087.065 | | V I | 57 |
| 3087.07 | | Ni II | 7 |
| 3087.659 | | Fe III | 77 |
| 3087.806 | | Co I | 77 |
| 3087.90 | | Cr II | 102 |
| 3088.027 | | Ti II | 5 |
| 3088.04 | | O III | 26 |
| 3088.114 | | V I | 56 |
| 3088.23 | | Ne II | 24 |
| 3088.24 | | A II | 119 |
| 3088.28 | | Zr II | 38 |
| 3088.523 | | Al II | 20 |
| 3089.00 | | Zr II | 25 |
| 3089.130 | | V I | 37 |
| 3089.204 | | Gd II | 54 |
| 3089.388 | | Fe II | 158 |
| 3089.401 | | Ti II | 90 |
| 3089.596 | | Co I | 10 |
| 3089.633 | | V II | 112 |
| 3089.649 | | Fe III | 40 |
| 3089.75 | | Cr II | 195 |
| 3089.954 | | Gd II | 93 |
| 3090.051 | | Ti II | 119 |
| 3090.137 | | Ti I | 93 |
| 3090.209 | | Fe I | 313 |
| 3090.251 | | Co I | 77 |
| 3090.40 | | V I | 15 |
| 3090.44 | | Zr I | 54 |
| 3090.772 | | Fe III | 20 |
| 3090.94 | | Cr II | 128 |
| 3091.076 | | Mg I | 5 |
| 3091.30 | | Zr II | 38 |
| 3091.437 | | V I | 15 |
| 3091.552 | | V I | 15 |
| 3091.578 | | Fe I | 28 |
| 3091.70 | | Y I | |
| 3092.058 | | Gd II | 93 |
| 3092.22 | | Cl II | 14 |
| 3092.26 | | Hf II | 30 |
| 3092.519 | | Sc II | 36 |
| 3092.716 | | Al I | 3 |
| 3092.72 | | V I | |
| 3092.729 | | Na II | 1 |
| 3092.785 | | Fe I | 29 |
| 3092.843 | | Al I | 3 |
| 3092.91 | | Ne II | 44 |
| 3092.915 | | Nd II | |
| 3092.997 | | Mg I | 5 |
| 3093.108 | | V II | 1 |
| 3093.16 | P | V II | 39 |
| 3093.24 | | V I | 15 |
| 3093.41 | | A II | 84 |
| 3093.423 | | Si III | 1 |
| 3093.48 | | Cr II | 125 |
| 3093.481 | | Rh II | 4 |
| 3093.53 | P | Fe I | 102 |
| 3093.613 | | Si III | 1 |
| 3093.76 | | Y II | 78 |
| 3093.792 | | V I | 57 |
| 3093.806 | | Fe I | 55 |
| 3093.846 | | Gd II | 10 |
| 3093.888 | | Fe I | 261 |
| 3093.97 | | Cr II | 47 |
| 3093.989 | | Cu I | 3 |
| 3094.08 | P | Fe I | 165 |
| 3094.08 | | Ne II | 24 |
| 3094.156 | | Fe III | 78 |
| 3094.172 | | Cb II | 1 |
| 3094.196 | | V II | 39 |
| 3094.555 | | Ru II | 3 |
| 3094.692 | | V I | 56 |
| 3094.79 | | Zr I | 36 |
| 3094.870 | | Fe I | 315a |
| 3094.94 | | Cr II | 47,86 |
| 3094.98 | | A II | 118 |
| 3095.07 | | Zr II | 5 |
| 3095.22 | | Cr II | 86 |
| 3095.270 | | Fe I | 314 |
| 3095.716 | | Co I | 49 |
| 3095.81 | | O III | 26 |
| 3095.82 | | Zr I | 36 |
| 3095.859 | | Cr I | |
| 3095.88 | | Y II | 11 |
| 3095.902 | | V I | 57 |
| 3096.11 | | Cr II | 126 |
| 3096.296 | | Fe II | 97 |
| 3096.402 | | Co I | 52 |
| 3096.424 | | Ti II | 77 |
| 3096.531 | | Cr I | |
| 3096.72 | | Cl II | 31 |
| 3096.740 | | Rh II | 4 |
| 3096.77 | P | Sc II | 6 |
| 3096.786 | | Si III | 1 |
| 3096.86 | | Fe III | 65 |
| 3096.902 | | Mg I | 5 |
| 3097.063 | | Mn I | |
| 3097.118 | | Ni I | 11 |
| 3097.15 | | Ne II | 44 |
| 3097.186 | | Ti II | 67 |
| 3097.415 | | Fe II | 96 |
| 3097.45 | | Eu II | 6 |
| 3097.46 | | S IV | 1 |
| 3097.49 | P | Fe I | 165 |
| 3097.626 | | Ti II | 77 |
| 3098.16 | | Cr II | 86 |
| 3098.191 | | Fe I | 313 |
| 3098.194 | | Co I | 10 |
| 3098.476 | | Nd II | |
| 3098.597 | | Tm II | 8 |
| 3098.644 | | Gd II | 11 |
| 3098.88 | | Cr II | 86 |
| 3098.899 | | Gd II | 10 |
| 3098.93 | P | Fe III | 51 |
| 3099.05 | | Fe III | 65 |
| 3099.115 | | Ni I | 13 |
| 3099.180 | | Cb II | 2 |
| 3099.22 | | Zr II | 5 |
| 3099.667 | | Co I | 75 |
| 3099.898 | | Fe I | 28 |
| 3099.968 | | Fe I | 28 |
| 3099.97 | | A II | |
| 3100.304 | | Fe I | 28 |
| 3100.31 | P | Fe III | 51 |
| 3100.48 | P | Fe III | 29 |
| 3100.504 | | Gd II | 12 |
| 3100.666 | | Fe I | 28 |
| 3100.666 | | Ti I | 92,93 |
| 3100.838 | | Fe I | 196a |
| 3100.938 | | V II | 39 |
| 3101.003 | | Fe I | 313 |
| 3101.185 | | Gd II | 93 |
| 3101.39 | | Hf II | 12 |
| 3101.407 | | Gd II | 76 |
| 3101.52 | P | Ti II | 58 |
| 3101.526 | | Ti I | 181 |
| 3101.554 | | Ni I | 25 |
| 3101.557 | | Mn I | |
| 3101.77 | | Ti I | 181 |
| 3101.879 | | Ni I | 40 |
| 3101.911 | | Gd II | 10 |
| 3102.295 | | V II | 1 |
| 3102.36 | | Ca I | 16 |
| 3102.405 | | Co I | 49 |
| 3102.517 | | Ti I | 181 |
| 3102.55 | P | Fe III | 29 |
| 3102.551 | | Gd II | 76 |
| 3102.58 | | Cr II | 116 |
| 3102.63 | | A II | |
| 3102.64 | P | Fe I | 29 |
| 3102.71 | | Fe I | |
| 3102.975 | | Ti II | 58 |
| 3103.3 | | Y II | 78 |
| 3103.377 | | Ce II | 151 |
| 3103.48 | | Cr II | 71 |
| 3103.60 | | V I | 56 |
| 3103.735 | | Co I | 73 |
| 3103.804 | | Ti II | 90 |
| 3103.983 | | Co I | 48 |
| 3103.994 | | V I | 56 |
| 3104.29 | | Cr II | 102 |
| 3104.38 | | A II | 118 |
| 3104.396 | | Na II | 17 |
| 3104.46 | | Cl III | 3 |
| 3104.58 | | La II | 17 |
| 3104.593 | | Ti II | 90 |
| 3104.70 | | Cr I | 163 |
| 3104.713 | | Mg II | 6 |
| 3104.805 | | Mg II | 6 |
| 3104.82 | | Y II | 59 |
| 3104.906 | | V II | 39 |
| 3105.084 | | Ti II | 67 |
| 3105.166 | | Fe II | 82,122 |
| 3105.220 | | Ti I | 181 |
| 3105.469 | | Ni I | 12 |
| 3105.548 | | Fe II | 82 |
| 3105.57 | | Cr I | 163 |
| 3105.929 | | Co I | 2[illegible] |
| 3105.973 | | V II | 140 |
| 3106.11 | | V I | 56 |
| 3106.234 | | Ti II | 67 |
| 3106.542 | | Fe I | 196 |
| 3106.559 | | Fe II | 68 |
| 3106.58 | | Zr II | 63 |
| 3106.806 | | Ti I | 92 |
| 3106.829 | | V II | 139 |
| 3106.974 | | Ce III | 4 |
| 3107.044 | | Co I | 49 |
| 3107.142 | | V I | 57 |
| 3107.387 | | Sc II | 6 |
| 3107.388 | | Ca I | 16 |
| 3107.468 | | Ti I | 181 |
| 3107.529 | | Sc II | 33 |
| 3107.540 | | Co I | 125 |
| 3107.58 | | Cr II | 125 |
| 3107.586 | | Ru II | 3 |
| 3107.714 | | Ni I | 12 |
| 3107.774 | | Mn I | 38 |
| 3107.950 | | Fe III | 29 |
| 3108.230 | | Gd II | 54 |
| 3108.36 | | Zr I | 38 |
| 3108.360 | | Gd II | 93 |
| 3108.46 | | La II | 16 |
| 3108.511 | | Sc II | 36 |
| 3108.635 | | Mn I | 38 |
| 3108.66 | | Cr II | 55 |
| 3108.704 | | V II | 39 |
| 3108.78 | P | Fe III | 29 |
| 3108.82 | | A II | 18 |
| 3108.85 | | Fe III | 12 |
| 3108.927 | | Ti II | 77 |
| 3109.05 | | Fe I | 165 |
| 3109.11 | | Hf II | 10 |
| 3109.3 | | Y II | 57 |
| 3109.32 | | Fe III | 8 |
| 3109.336 | | Cr I | 163 |
| 3109.375 | | V II | 186 |
| 3109.506 | | Co I | 50 |
| 3109.59 | | Fe III | 1 |
| 3109.75 | | A II | |
| 3109.92 | P | Ti II | 58 |
| 3110.021 | | Co I | 109 |
| 3110.052 | | Fe III | 39 |
| 3110.07 | | V II | 139 |
| 3110.095 | | Ti II | 77 |
| 3110.278 | | Ce II | 152 |
| 3110.516 | | Ce III | 4 |

# FINDING LIST

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3110.52 | | Zr II | 105 | 3119.60 | | As I | 1 | 3128.640 | | Ti II | 121 |
| 3110.620 | | Ti II | 67 | 3119.66 | | Ca III | 4 | 3128.686 | | V II | 83 |
| 3110.65 | | Y II | 50,78 | 3119.660 | | Fe II | | 3128.699 | | Cr II | 5 |
| 3110.708 | | V II | 1 | 3119.706 | | Cr I | 183 | 3128.789 | | Y II | 51 |
| 3110.821 | | Co I | 11 | 3119.725 | | Ti I | 137 | 3128.79 | | Zr II | 38 |
| 3110.85 | | Fe III | 29 | 3119.800 | | Ti II | 67 | 3128.901 | | Fe I | 54 |
| 3110.860 | | Cr I | 163 | 3119.82 | | Cl II | 20 | 3129.013 | | Fe II | 96 |
| 3110.87 | | Hf II | 46 | 3119.837 | | Rh II | 8 | 3129.04 | | Fe III | 8 |
| 3110.87 | | Zr II | 5 | 3119.941 | | Gd II | 11 | 3129.075 | | Ti I | 192 |
| 3111.15 | | Zr II | 24 | 3120.023 | | Fe II | 96 | 3129.16 | | Zr II | 23 |
| 3111.283 | | Ti I | 181 | 3120.03 | P | Fe I | 161 | 3129.18 | P | Fe I | 161 |
| 3111.339 | | Co I | 73 | 3120.03 | | Fe III | 29 | 3129.314 | | Ni I | 12 |
| 3111.609 | | Fe III | 8 | 3120.10 | | Co I | 74 | 3129.334 | | Fe I | 52 |
| 3111.686 | | Fe I | 260 | 3120.181 | | Gd II | 76 | 3129.368 | | Na II | 2 |
| 3111.95 | | Cr II | 55 | 3120.24 | | Fe III | 1 | 3129.44 | | O II | 14 |
| 3112.05 | | Y II | 4 | 3120.371 | | Cr II | 5 | 3129.481 | | Co I | 74 |
| 3112.050 | | Ti II | 67 | 3120.435 | | Fe I | 194 | 3129.696 | | Gd II | 93 |
| 3112.079 | | Fe I | 455 | 3120.72 | P | Zr II | 50 | 3129.76 | | Zr II | 5 |
| 3112.125 | | Mo I | 2 | 3120.726 | | V II | 138 | 3129.933 | | Y II | 51 |
| 3112.202 | | Ce II | 138 | 3120.74 | | Zr I | 37 | 3129.955 | | Gd II | 76 |
| 3112.482 | | Ti I | 92 | 3120.84 | | Fe III | 29 | 3130.05 | | Zr I | 37 |
| 3112.63 | | La II | 156 | 3121.05 | | Cr II | 72 | 3130.175 | | Ti I | 180 |
| 3112.81 | P | Cr II | 125 | 3121.08 | | Fe III | | 3130.262 | | V II | 1 |
| 3112.925 | | V I | 56 | 3121.138 | | V II | 1 | 3130.416 | | Be II | 1 |
| 3113.172 | | Gd II | 93 | 3121.415 | | Co I | 9 | 3130.561 | | Fe II | 66 |
| 3113.31 | P | Fe I | 161 | 3121.515 | | F III | 1 | 3130.73 | | Eu II | |
| 3113.473 | | Co I | 48 | 3121.548 | | Ce III | 2 | 3130.780 | | Cb II | 1 |
| 3113.50 | | Zr I | 37 | 3121.566 | | Co I | 11 | 3130.804 | | Ti I | |
| 3113.560 | | V II | 174 | 3121.599 | | Ti II | 4 | 3130.804 | | Ti II | 4 |
| 3113.579 | | F III | 1 | 3121.62 | | Cl II | 20 | 3130.812 | | Gd II | 76 |
| 3113.59 | | Cr II | 186 | 3121.71 | | O III | 12 | 3131.064 | | Be II | 1 |
| 3113.67 | P | Fe I | 165 | 3121.749 | | V I | 56 | 3131.11 | | Zr I | 37 |
| 3113.71 | | O II | 14 | 3121.76 | | Fe I | 102 | 3131.211 | | Cr I | 183 |
| 3114.05 | | Pd I | 4 | 3121.760 | | Gd II | 76 | 3131.257 | | Tm II | |
| 3114.092 | | Ti I | 181 | 3121.84 | | Cr II | 72 | 3131.54 | | Cr II | 53,55 |
| 3114.118 | | Co I | 49 | 3121.97 | | Cr II | 55 | 3131.719 | | Fe II | 107 |
| 3114.124 | | Ni I | 24 | 3122.065 | | Ti II | 58 | 3131.81 | | Hf I | 3 |
| 3114.295 | | Fe II | 82 | 3122.542 | | Sc II | 46 | 3131.829 | | Co I | 48 |
| 3114.45 | | Y II | 49,58 | 3122.596 | | Cr II | 54 | 3131.845 | | Hg I | 2 |
| 3114.680 | | Fe II | 82 | 3122.61 | | Zr II | 51 | 3132.058 | | Cr II | 5 |
| 3115.088 | | Ti II | 58 | 3122.62 | | O II | 14 | 3132.06 | | Zr I | 37 |
| 3115.16 | | V II | 111 | 3122.665 | | Fe I | 314 | 3132.12 | P | Cr II | 125 |
| 3115.172 | | Nd II | | 3122.782 | | Au I | 1 | 3132.218 | | Co I | 7 |
| 3115.28 | | Cr II | 54 | 3122.887 | | V II | 173 | 3132.22 | | Ne II | 13 |
| 3115.352 | | Fe II | | 3122.954 | | Sc II | 39 | 3132.514 | | Fe I | 578 |
| 3115.465 | | Mn I | 38 | 3123.074 | | Ti I | 67 | 3132.591 | | Mo I | 3 |
| 3115.492 | | Fe II | 96 | 3123.18 | | Fe III | | 3132.793 | | V II | 122 |
| 3115.51 | | Cr I | 163 | 3123.29 | | Ca II | 10 | 3132.820 | | Cr I | 183 |
| 3115.65 | | Cr II | 46 | 3123.353 | | Fe I | 164 | 3132.86 | | O III | 12 |
| 3115.669 | | F III | 1 | 3123.715 | | Fe II | | 3133.048 | | Fe II | 82 |
| 3115.73 | | O III | 12 | 3123.72 | | Cl II | 20 | 3133.094 | | Gd II | 9 |
| 3115.73 | | Zr II | 75 | 3123.769 | | Ti I | 181 | 3133.096 | | Sc II | 39 |
| 3116.02 | | V II | 139 | 3123.989 | | Gd II | 11 | 3133.329 | | V II | 1 |
| 3116.11 | | V II | 139 | 3124.02 | | O II | 14 | 3133.49 | | Zr II | 63 |
| 3116.141 | | Nd II | | 3124.08 | | Fe I | 165 | 3133.603 | | Nd II | |
| 3116.250 | | Fe I | 165 | 3124.250 | | Gd II | 10 | 3133.852 | | Gd II | 76 |
| 3116.39 | P | Fe I | 261 | 3124.762 | | F III | 1 | 3133.886 | | Tm II | 4 |
| 3116.590 | | Fe II | 82 | 3124.817 | | Ge I | 1 | 3133.96 | P | Fe I | 161 |
| 3116.633 | | Fe I | 28 | 3124.978 | | Cr II | 5 | 3134.08 | P | Fe I | 160 |
| 3116.711 | | Ni I | 95 | 3125.01 | | V II | 84 | 3134.108 | | Ni I | 25 |
| 3116.76 | | Cr II | 126 | 3125.02 | | Cr II | 70 | 3134.111 | | Fe I | 28 |
| 3116.78 | | V II | 237 | 3125.03 | P | Fe I | 53 | 3134.15 | P | Fe I | 29 |
| 3116.95 | | Hf II | 33 | 3125.15 | | Ca II | 10 | 3134.17 | P | Fe II | 121 |
| 3117.28 | | Cr II | 46 | 3125.21 | | Zr II | 24 | 3134.208 | | F III | 1 |
| 3117.455 | | Ti I | 92 | 3125.282 | | V II | 1 | 3134.32 | | O II | 14 |
| 3117.505 | | Fe II | 226 | 3125.46 | | Cr II | 55 | 3134.33 | | Cr II | 94 |
| 3117.63 | | Fe I | 29 | 3125.553 | | Ti I | 192 | 3134.654 | | Ti I | 91 |
| 3117.656 | | Ca I | 16 | 3125.653 | | Fe I | 28,160 | 3134.72 | | Hf II | 5 |
| 3117.669 | | Ti II | 67 | 3125.656 | | Ti I | 192 | 3134.819 | | Mn II | 15 |
| 3117.75 | | S IV | 1 | 3125.668 | | Hg I | 3 | 3134.82 | | O II | 14 |
| 3117.899 | | Ti I | 92 | 3125.68 | P | Fe I | 194 | 3134.897 | | Nd II | |
| 3117.974 | | Gd II | 76 | 3125.79 | | Cr II | 186 | 3134.90 | | A IV | 1 |
| 3118.02 | | Ne II | 16 | 3125.92 | | Zr II | 5 | 3134.928 | | V II | 122 |
| 3118.130 | | Ti I | 181 | 3126.02 | | Sc II | 39 | 3135.034 | | Gd II | 11 |
| 3118.14 | | Cr II | 55 | 3126.16 | | Y II | 78 | 3135.069 | | Ti I | 180 |
| 3118.249 | | Co I | 11 | 3126.175 | | Fe I | | 3135.17 | | Y II | 11 |
| 3118.376 | | V II | 1 | 3126.215 | | V II | 1 | 3135.35 | | Cr II | 124 |
| 3118.56 | P | Ni I | 94 | 3126.25 | | Si III | 11 | 3135.360 | | Fe II | 82 |
| 3118.600 | | Gd II | 93 | 3126.27 | | Hf II | 7 | 3135.483 | | Na II | 3 |
| 3118.636 | | Co I | 12 | 3126.79 | | V II | 122 | 3135.507 | | Mn II | 15 |
| 3118.652 | | Cr II | 5 | 3126.84 | P | Fe I | 260 | 3135.74 | | Cr II | 94 |
| 3118.74 | P | Fe II | 121 | 3127.252 | | Co I | 26 | 3135.80 | | Fe III | 77 |
| 3118.75 | | Fe III | 51 | 3127.526 | | Cb II | | 3135.82 | | Ne II | 3 |
| 3118.824 | | Ti II | 27 | 3127.530 | | Ce II | 150 | 3135.863 | | Fe I | 194 |
| 3119.04 | P | Fe I | 315a | 3127.684 | | Ti I | 180 | 3135.875 | | Al II | 19 |
| 3119.08 | | Gd II | 10 | 3127.883 | | Ti II | 121 | 3135.91 | | Cr I | 183 |
| 3119.246 | | Cr I | 163 | 3128.286 | | Sc II | 39 | 3136.00 | | S III | 13 |
| 3119.32 | | V II | 110 | 3128.288 | | V II | 84 | 3136.003 | | Ca I | 15 |
| 3119.336 | | Gd II | 10 | 3128.560 | | Gd II | 76 | 3136.028 | | Ti I | 91 |
| 3119.495 | | Fe I | 194 | 3128.640 | | Ti I | 92,192 | 3136.08 | P | Fe I | 160 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 3136.17 | | Fe I | |
| 3136.315 | | Mn II | 15 |
| 3136.43 | | Fe III | 39 |
| 3136.465 | | Mo II | 2 |
| 3136.503 | | V II | 122 |
| 3136.55 | | A II | |
| 3136.680 | | Cr II | 5 |
| 3136.726 | | Co I | 8 |
| 3136.77 | | Ti II | 27 |
| 3136.95 | | Zr I | 54 |
| 3136.999 | | Co I | 48 |
| 3137.328 | | Co I | 10 |
| 3137.352 | | Ti I | 91 |
| 3137.454 | | Co I | 108 |
| 3137.55 | | Cr II | 54 |
| 3137.66 | | A II | 71 |
| 3137.755 | | Co I | 49 |
| 3137.940 | | Gd II | 54 |
| 3138.05 | | V II | 205 |
| 3138.094 | | Gd II | 10 |
| 3138.203 | | Cr I | 183 |
| 3138.207 | | Fe II | 227 |
| 3138.40 | P | Fe I | 53 |
| 3138.44 | | O II | 14 |
| 3138.46 | | Sc II | 39 |
| 3138.66 | | Zr II | 5 |
| 3139.02 | | A II | 47 |
| 3139.10 | P | Fe I | 161 |
| 3139.34 | | Cl III | 3 |
| 3139.39 | | Pt I | 2 |
| 3139.60 | P | Fe I | 161 |
| 3139.661 | | Fe I | 155 |
| 3139.67 | | Hf II | 6 |
| 3139.729 | | Sc II | 39 |
| 3139.733 | | V II | 122 |
| 3139.77 | | O II | 14 |
| 3139.79 | | Zr I | 56 |
| 3139.87 | | Ti I | 180 |
| 3139.908 | | Fe I | |
| 3139.91 | | Cr II | 54 |
| 3139.947 | | Co I | 9 |
| 3139.98 | P | Co I | 73 |
| 3140.04 | P | Ti II | 27 |
| 3140.08 | | Fe III | 94 |
| 3140.21 | | Cr II | 124 |
| 3140.272 | | Rh II | 8 |
| 3140.385 | | Fe I | 578 |
| 3140.67 | | Cr II | 124 |
| 3140.692 | | Fe II | 227 |
| 3140.715 | | Co I | 75 |
| 3140.77 | | Hf II | 31 |
| 3140.782 | | Ca I | 15 |
| 3141.07 | | V II | 205 |
| 3141.164 | | Ca I | 15 |
| 3141.247 | | Ce III | 2 |
| 3141.35 | | Ne II | 47 |
| 3141.486 | | V II | 152 |
| 3141.537 | | Ti I | 66 |
| 3141.670 | | Ti I | 192 |
| 3141.80 | | Cr II | 175 |
| 3141.891 | | Cr I | 116 |
| 3142.183 | | V II | 172 |
| 3142.22 | | Fe III | 1 |
| 3142.220 | | Fe II | 7 |
| 3142.312 | | Ce II | 46 |
| 3142.445 | | Fe I | 164 |
| 3142.484 | | V II | 52 |
| 3142.670 | | Mn I | |
| 3142.74 | | Cr II | 85 |
| 3142.76 | | La II | 31 |
| 3142.777 | | F III | 4 |
| 3142.888 | | Fe I | 144 |
| 3142.900 | | Gd II | 76 |
| 3142.97 | | Cr II | 125 |
| 3143.131 | | Gd II | 25 |
| 3143.16 | P | Ti I | 28 |
| 3143.242 | | Fe I | 7 |
| 3143.350 | | Ti I | 180 |
| 3143.36 | | Fe III | 13 |
| 3143.477 | | V II | 122 |
| 3143.657 | | Ru II | 2 |
| 3143.68 | | Cr II | 53 |
| 3143.68 | P | Ti II | 37 |
| 3143.74 | | Ne II | 24 |
| 3143.756 | | Ti II | 4 |
| 3143.91 | | Cr II | 94 |
| 3143.956 | | Ce III | 2 |
| 3143.990 | | Fe I | 578 |
| 3144.37 | | Y II | 49 |
| 3144.409 | | Cr I | 92 |
| 3144.488 | | Fe I | 161 |
| 3144.68 | | O V | 2 |
| 3144.700 | | V II | 122 |
| 3144.730 | | Ti II | 111 |
| 3144.74 | P | Ti II | 10 |
| 3144.751 | | Fe II | 82 |
| 3144.92 | P | Fe I | 195 |
| 3145.00 | | Gd II | 10 |
| 3145.022 | | Co I | 50 |
| 3145.057 | | Fe I | 455 |
| 3145.10 | | Cr II | 5 |
| 3145.121 | | Ni I | 7 |
| 3145.283 | | Ce II | 120 |
| 3145.32 | | Hf II | 2 |
| 3145.337 | | V II | 1 |
| 3145.402 | | Ti II | 10,111 |
| 3145.405 | | Cb II | 5 |
| 3145.46 | P | Fe I | 160 |
| 3145.515 | | Ti I | 91 |
| 3145.516 | | Gd II | 76 |
| 3145.536 | | F III | 1 |
| 3145.719 | | Ni I | 11 |
| 3145.77 | | Cr II | 85 |
| 3145.971 | | V II | 1 |
| 3146.226 | | V II | 138 |
| 3146.407 | | Ce II | 70 |
| 3146.47 | | A II | 49 |
| 3146.475 | | Fe I | 160 |
| 3146.748 | | Fe II | 67 |
| 3146.818 | | V II | 138 |
| 3146.878 | | Gd II | 76 |
| 3146.91 | | Sc II | 39 |
| 3146.962 | | F III | 1 |
| 3147.05 | | Ce III | 7 |
| 3147.060 | | Co I | 10 |
| 3147.19 | P | Cr II | 54 |
| 3147.227 | | Cr II | 5 |
| 3147.38 | | Si III | 11 |
| 3147.792 | | Fe I | 455 |
| 3147.84 | | Cr II | 93 |
| 3147.86 | | Cl II | 10 |
| 3147.931 | | Rh II | 8 |
| 3148.033 | | Ti II | 4 |
| 3148.179 | | Mn I | 19 |
| 3148.24 | | A II | |
| 3148.420 | | Fe I | 194 |
| 3148.445 | | Cr I | 115 |
| 3148.46 | P | Fe I | 161 |
| 3148.738 | | V II | 249 |
| 3148.81 | | Zr I | 37 |
| 3149.12 | | Cr II | 84 |
| 3149.267 | | Na II | 4 |
| 3149.310 | | Co I | 9 |
| 3149.50 | P | Fe I | 453 |
| 3149.56 | | Si IV | 2 |
| 3149.83 | | Cr II | 54 |
| 3149.87 | | W II | 5 |
| 3150.11 | | Cr II | 54 |
| 3150.20 | P | Fe I | 161 |
| 3150.301 | | Fe I | 578a |
| 3150.568 | | V I | |
| 3150.738 | | Ca I | 15 |
| 3151.036 | | Tm II | |
| 3151.11 | | Ti I | 28 |
| 3151.16 | | Ne II | 16 |
| 3151.259 | | Ni I | |
| 3151.280 | | Ca I | 15 |
| 3151.31 | | W II | 16 |
| 3151.319 | | V II | 138 |
| 3151.353 | | Fe I | 311 |
| 3151.500 | | Rh II | 2 |
| 3151.86 | | Fe III | |
| 3151.867 | | Fe I | 7 |
| 3152.14 | P | Ti II | 27 |
| 3152.21 | | Cr II | 71 |
| 3152.251 | | Ti II | 10 |
| 3152.525 | | Sm II | |
| 3152.707 | | Co I | 73 |
| 3152.881 | | Cr I | 116 |
| 3153.064 | | Fe I | 99,452 |
| 3153.200 | | Fe I | 161 |
| 3153.322 | | Fe I | 160 |
| 3153.54 | | Cr I | 200 |
| 3153.549 | | V I | |
| 3153.692 | | Co I | 7 |
| 3153.80 | | A II | 118 |
| 3154.04 | | Cr II | 53 |
| 3154.10 | | Cr II | 69 |
| 3154.11 | P | Fe I | 53 |
| 3154.195 | | Ti II | 10 |
| 3154.201 | | Fe II | 66 |
| 3154.387 | | F III | 4 |
| 3154.41 | P | Fe I | 100 |
| 3154.510 | | Fe I | 161 |
| 3154.585 | | Ni I | 78 |
| 3154.66 | P | Cr II | 54 |
| 3154.678 | | Co I | 108 |
| 3154.794 | | Co I | 73 |
| 3154.80 | | V II | 249 |
| 3154.82 | | Ne II | 14 |
| 3155.12 | P | Fe I | 161 |
| 3155.149 | | Cr I | 115 |
| 3155.293 | | Fe I | 193 |
| 3155.409 | | V II | 51 |
| 3155.50 | P | Ti II | 27 |
| 3155.63 | P | Ti II | 37 |
| 3155.670 | | Ti II | 10 |
| 3155.68 | | Zr II | 63 |
| 3155.704 | | Ce II | 217 |
| 3155.80 | P | Fe I | 192a |
| 3155.91 | P | Ti II | 121 |
| 3155.95 | | Zr II | 49 |
| 3155.950 | | Fe II | 67 |
| 3156.11 | | F III | 4 |
| 3156.222 | | V I | |
| 3156.248 | | Os I | 4 |
| 3156.275 | | Fe I | 578 |
| 3156.464 | | Fe I | 454 |
| 3156.532 | | Gd II | 11 |
| 3156.59 | | Pt I | 2 |
| 3156.68 | | Hf I | 5 |
| 3157.00 | | Zr II | 23 |
| 3157.040 | | Fe I | 160 |
| 3157.15 | P | Fe I | 144 |
| 3157.344 | | Tm II | 8 |
| 3157.397 | | Ti II | 4 |
| 3157.44 | P | Sc II | 32 |
| 3157.52 | | Cr II | 93 |
| 3157.82 | | Zr I | 36,55 |
| 3157.88 | | Fe I | 164 |
| 3157.900 | | V II | 50 |
| 3157.992 | | Fe I | 159 |
| 3158.03 | | Cr II | 70 |
| 3158.156 | | Mo I | 2 |
| 3158.21 | P | Fe I | 160 |
| 3158.293 | | Co I | 12 |
| 3158.32 | P | Fe II | 95 |
| 3158.772 | | Co I | 10 |
| 3158.869 | | Ca II | 4 |
| 3158.99 | | Fe I | 452 |
| 3159.10 | | Cr II | 5 |
| 3159.12 | | Zr II | 126 |
| 3159.25 | P | Fe I | 259 |
| 3159.254 | | Rh II | 2 |
| 3159.32 | P | Fe II | 120 |
| 3159.365 | | V II | 83 |
| 3159.521 | | Ni I | 11 |
| 3159.59 | | Cr I | 92 |
| 3159.662 | | Co I | 9,26 |
| 3159.86 | | Cr II | 54 |
| 3160.03 | | W II | 8 |
| 3160.09 | | Ti I | 28 |
| 3160.11 | | Cr II | 54 |
| 3160.200 | | Fe I | 578 |
| 3160.342 | | Fe I | 192a |
| 3160.52 | | Cl II | |
| 3160.60 | | Y II | 57 |
| 3160.61 | | Cr I | 115 |
| 3160.658 | | Fe I | 155 |
| 3160.69 | | Gd II | 11 |
| 3160.77 | P | Fe I | 159 |
| 3160.781 | | V II | 65,138 |
| 3160.92 | P | Fe I | 160 |
| 3161 | P | N V | 2 |
| 3161.01 | | Zr II | 104 |
| 3161.039 | | Mn I | 19 |
| 3161.205 | | Ti II | 10 |
| 3161.313 | | V II | 151 |
| 3161.369 | | Gd II | 10 |
| 3161.370 | | Fe I | 52 |
| 3161.38 | | A II | 97 |
| 3161.44 | | Cl II | 11 |
| 3161.45 | | A II | |
| 3161.55 | P | Fe I | 195 |
| 3161.638 | | Gd II | 25 |
| 3161.652 | | Co I | 73 |
| 3161.66 | P | Ti II | 27 |
| 3161.755 | | Ti II | 10 |
| 3161.945 | | Fe II | 7 |

# FINDING LIST

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 3161.949 | | Fe I | 160 |
| 3162.284 | | Rh II | 1 |
| 3162.335 | | Fe I | 159,310 |
| 3162.46 | | Cr II | 46 |
| 3162.57 | | Hf I | 2 |
| 3162.570 | | Ti II | 10 |
| 3162.61 | | Hf II | 30 |
| 3162.714 | | V II | 83 |
| 3162.764 | | Gd II | 54 |
| 3162.799 | | Fe II | 120 |
| 3163.024 | | V II | 84 |
| 3163.091 | | Fe II | 7 |
| 3163.403 | | Cb II | 1 |
| 3163.61 | | A II | 118 |
| 3163.731 | | Na II | 7 |
| 3163.756 | | Cr I | 115 |
| 3163.76 | | V II | 249 |
| 3163.77 | P | Cr II | 123 |
| 3163.86 | P | Fe II | 79 |
| 3163.93 | | Cr II | 69 |
| 3164.06 | | Cr I | 200 |
| 3164.154 | | Ce II | 69 |
| 3164.166 | | Ni I | 79 |
| 3164.26 | | Fe II | 79 |
| 3164.28 | | Cr II | 46 |
| 3164.308 | | Fe I | 163 |
| 3164.32 | | Zr II | 50 |
| 3164.46 | | Ne II | 13 |
| 3164.48 | | Cr II | 115 |
| 3164.618 | | Ca I | 14 |
| 3164.67 | | Fe III | 8 |
| 3164.82 | | V II | 8 |
| 3164.91 | | Ti II | |
| 3165.005 | | Fe I | 155 |
| 3165.08 | P | Fe I | 194 |
| 3165.16 | P | Fe I | 100 |
| 3165.24 | P | Ti II | 37 |
| 3165.31 | | A II | |
| 3165.45 | | Zr II | 63 |
| 3165.508 | | Ni I | 21 |
| 3165.51 | | C II | 9 |
| 3165.70 | | Ne II | 13 |
| 3165.72 | | Si IV | 2 |
| 3165.86 | P | F III | 1 |
| 3165.860 | | Fe I | 160 |
| 3165.89 | | V II | 84 |
| 3165.94 | | Mg II | 14 |
| 3165.957 | | Fe II | |
| 3165.98 | | Zr II | 5 |
| 3165.99 | | C II | 9 |
| 3166.22 | P | Fe II | 79 |
| 3166.24 | P | Fe I | 155 |
| 3166.29 | | Zr II | 48 |
| 3166.39 | | V II | 84 |
| 3166.435 | | Fe I | 259 |
| 3166.59 | P | Fe I | 100 |
| 3166.670 | | Fe II | 6 |
| 3166.948 | | Rh II | 5 |
| 3166.98 | P | Fe I | 455 |
| 3167.420 | | V II | 217 |
| 3167.49 | | V II | 236 |
| 3167.54 | | Fe III | 28 |
| 3167.78 | P | Fe I | 99 |
| 3167.853 | | Fe II | 66 |
| 3167.907 | | Fe I | 578 |
| 3167.94 | P | Fe II | 82 |
| 3167.95 | | C II | 9 |
| 3168.060 | | Co I | 108 |
| 3168.127 | | V II | 8 |
| 3168.21 | | Fe III | 94 |
| 3168.519 | | Ti II | 10 |
| 3168.86 | | Fe I | 160 |
| 3168.94 | P | Fe I | 160 |
| 3168.98 | | Mg II | 14 |
| 3169.09 | P | Fe I | 813 |
| 3169.183 | | Ce II | 74 |
| 3169.20 | | Cr II | 123 |
| 3169.21 | | V II | 65 |
| 3169.30 | | Ne II | 16 |
| 3169.58 | | Cr I | 115 |
| 3169.58 | P | Fe I | 161 |
| 3169.68 | | A II | 47 |
| 3169.766 | | Co I | 109 |
| 3169.85 | | Cr II | 173 |
| 3169.854 | | Ca I | 14 |
| 3169.875 | | Sm II | 31 |
| 3170.16 | | C III | 8 |
| 3170.208 | | V II | 217 |
| 3170.23 | | Cl II | |
| 3170.333 | | Mo I | 3 |
| 3170.337 | | Fe II | 6 |
| 3170.40 | | Sc II | 32 |
| 3170.715 | | Ni I | 78 |
| 3171.016 | | Fe II | |
| 3171.09 | | Gd II | 10 |
| 3171.14 | | ? III | |
| 3171.353 | | Fe I | 52,548 |
| 3171.615 | | Ce II | 99 |
| 3171.659 | | Fe I | 160 |
| 3171.68 | | La III | 1 |
| 3171.739 | | V II | 217 |
| 3172.067 | | Fe I | 99,193 |
| 3172.08 | | Cr II | 71 |
| 3172.11 | P | Fe I | 100 |
| 3172.169 | | Gd II | 129 |
| 3172.230 | | V II | 249 |
| 3172.30 | P | Fe I | 312 |
| 3172.731 | | Ti I | 65 |
| 3172.79 | | Mg II | 13 |
| 3172.828 | | Tm II | 8 |
| 3172.94 | | Hf I | 5 |
| 3172.97 | | N III | |
| 3173.07 | | Y II | 51 |
| 3173.140 | | Co I | 48 |
| 3173.40 | | Fe I | 333 |
| 3173.56 | | Co I | 72 |
| 3173.58 | | Cr II | 83 |
| 3173.58 | | Ne II | 13 |
| 3173.607 | | Eu II | 3 |
| 3173.608 | | Fe I | 333 |
| 3173.66 | | Cl II | |
| 3173.663 | | Fe I | 101 |
| 3173.678 | | Rh II | 5 |
| 3174.077 | | V II | 84 |
| 3174.09 | | Fe III | 38 |
| 3174.125 | | F III | 2 |
| 3174.140 | | Co I | 138 |
| 3174.22 | P | Fe I | 578 |
| 3174.531 | | V II | 217 |
| 3174.725 | | F III | 2 |
| 3174.80 | | Ti II | |
| 3174.88 | | La II | 157 |
| 3174.905 | | Co I | 71 |
| 3175.046 | | Sn I | 1 |
| 3175.077 | | Fe II | 157 |
| 3175.16 | | P V | 1 |
| 3175.317 | | Ru II | 2 |
| 3175.447 | | Fe I | 155 |
| 3175.66 | | Ti II | 120 |
| 3175.84 | | Mg II | 13 |
| 3175.97 | | Fe I | 333 |
| 3175.97 | | W II | 7 |
| 3176.00 | | Fe III | 38 |
| 3176.16 | | Ne II | 16 |
| 3176.292 | | Ni I | 77 |
| 3176.366 | | Fe I | 258 |
| 3176.602 | | W I | 5 |
| 3176.70 | P | Sc II | 32 |
| 3176.85 | | Hf II | 8 |
| 3176.86 | | Fe III | 38 |
| 3177.060 | | Ru II | 2 |
| 3177.137 | | Ce II | 103 |
| 3177.22 | | W II | 6 |
| 3177.260 | | Fe II | 79 |
| 3177.266 | | Co I | |
| 3177.490 | | Gd II | 129 |
| 3177.52 | P | Fe I | 159 |
| 3177.531 | | Fe II | 82 |
| 3177.61 | P | Fe II | 95 |
| 3177.65 | P | Fe II | 79 |
| 3177.696 | | V II | 217 |
| 3177.80 | | O IV | 7 |
| 3177.90 | | Cr II | 40 |
| 3177.96 | P | Fe I | 159 |
| 3178.015 | | Fe I | 156 |
| 3178.03 | | Fe III | 38 |
| 3178.10 | | Zr II | 63 |
| 3178.125 | | Sm II | 21 |
| 3178.495 | | Mn I | 19 |
| 3178.545 | | Fe I | 454 |
| 3178.630 | | Ti II | 120 |
| 3178.79 | | Cr II | 173 |
| 3178.970 | | Fe I | 192a |
| 3179.055 | | Na II | 7 |
| 3179.08 | | Fe III | 38 |
| 3179.283 | | Cr I | 92 |
| 3179.291 | | Ti I | 65 |
| 3179.332 | | Ca II | 4 |
| 3179.415 | | V II | 217 |
| 3179.42 | | Y II | 10 |
| 3179.44 | | W II | 7 |
| 3179.45 | | Cr II | 82 |
| 3179.479 | | Fe I | 52 |
| 3179.504 | | Fe II | 157 |
| 3179.538 | | Fe I | |
| 3180.164 | | Fe II | 157 |
| 3180.17 | P | Fe III | 38 |
| 3180.199 | | Th II | 4 |
| 3180.223 | | Fe I | 155 |
| 3180.225 | | Ti II | 120 |
| 3180.290 | | Cb II | 5 |
| 3180.290 | | Co I | 106 |
| 3180.521 | | Ca I | 14 |
| 3180.701 | | Cr I | |
| 3180.72 | | O IV | 7 |
| 3180.73 | | Cr II | 9 |
| 3180.756 | | Fe I | 7 |
| 3180.98 | P | O IV | 7 |
| 3181.05 | | A II | 47 |
| 3181.275 | | Ca II | 4 |
| 3181.428 | | Cr II | 9 |
| 3181.522 | | Fe I | 258 |
| 3181.58 | | Zr II | 63 |
| 3181.740 | | Ni I | 78 |
| 3181.84 | | Ti II | 122 |
| 3181.85 | | Fe I | 333 |
| 3181.922 | | Fe I | 155,505 |
| 3181.94 | | Zr II | 48 |
| 3182.076 | | Fe I | 159,333 |
| 3182.118 | | Co I | 73 |
| 3182.42 | | Y II | 49 |
| 3182.57 | | Ti II | 122 |
| 3182.59 | | V II | 217 |
| 3182.674 | | V II | 150 |
| 3182.86 | | Zr II | 23 |
| 3182.970 | | Fe I | 100 |
| 3183.038 | | Ni I | 78 |
| 3183.115 | | Fe II | 7 |
| 3183.251 | | Ni I | 78 |
| 3183.26 | P | Zr II | 105 |
| 3183.325 | | Cr II | 82 |
| 3183.406 | | V I | 14 |
| 3183.523 | | Ce II | 216 |
| 3183.58 | P | Fe I | 192a |
| 3183.916 | | Sm II | |
| 3183.96 | | V I | 14 |
| 3183.982 | | V I | 14 |
| 3184.09 | | Ti II | 3 |
| 3184.36 | | Cr II | 123 |
| 3184.367 | | Ni I | 11 |
| 3184.43 | P | Fe II | 67 |
| 3184.631 | | Fe I | 155,162 |
| 3184.896 | | Fe I | 7 |
| 3185.095 | | Fe II | 67 |
| 3185.16 | | S III | 13 |
| 3185.16 | | Si III | 8 |
| 3185.315 | | Fe II | 7 |
| 3185.396 | | V I | 14 |
| 3185.72 | | O IV | 7 |
| 3186.01 | | Si III | |
| 3186.10 | | V II | 64 |
| 3186.126 | | Ce II | 167 |
| 3186.19 | | A II | 48 |
| 3186.350 | | Co I | 8 |
| 3186.451 | | Ti I | 27 |
| 3186.740 | | Fe II | 6 |
| 3186.75 | | Cr II | 69 |
| 3186.82 | P | Fe I | 100 |
| 3186.86 | | V II | 63 |
| 3187.006 | | Sm II | 21 |
| 3187.16 | P | Fe I | 333 |
| 3187.216 | | Sm II | 13,40 |
| 3187.294 | | Fe II | 120 |
| 3187.592 | | Mo II | 2 |
| 3187.60 | | Ne II | 3 |
| 3187.68 | P | Fe I | 52 |
| 3187.717 | | V II | 8 |
| 3187.743 | | He I | 3 |
| 3187.787 | | Sm II | 31 |
| 3187.889 | | Rh II | 5 |
| 3188.011 | | Cr I | 92 |
| 3188.10 | | V II | 49 |
| 3188.17 | P | O IV | 7 |
| 3188.377 | | Co I | 74 |
| 3188.522 | | V II | 8 |
| 3188.567 | | Fe I | 159 |
| 3188.603 | | Rh II | 8 |
| 3188.65 | P | O IV | 7 |
| 3188.74 | | Ne II | 14 |
| 3188.819 | | Fe I | 159 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 3188.95 | | Si II | |
| 3189.04 | | Cl II | 65 |
| 3189.24 | | W II | 6,10 |
| 3189.52 | | Ti II | 120 |
| 3189.638 | | Ce II | 97 |
| 3189.74 | | Fe III | 55 |
| 3189.752 | | Co I | 9 |
| 3189.76 | | V II | 83 |
| 3189.783 | | Na II | 4 |
| 3189.85 | | Cr II | 123 |
| 3190.02 | | Fe I | 259 |
| 3190.403 | | Sc II | 42 |
| 3190.651 | | Fe I | 548 |
| 3190.686 | | V II | 8 |
| 3190.69 | | Cr II | 174 |
| 3190.81 | | Fe II | |
| 3190.825 | | Fe I | 548 |
| 3190.84 | P | Fe II | 120 |
| 3190.86 | | Ne II | 13 |
| 3190.874 | | Ti II | 26 |
| 3191.005 | | Sc II | 42 |
| 3191.044 | | Gd II | 129 |
| 3191.096 | | Cb II | 1 |
| 3191.11 | | Fe I | 258 |
| 3191.180 | | Fe I | 452 |
| 3191.23 | | Zr I | 19 |
| 3191.297 | | Co I | 7 |
| 3191.374 | | Fe II | 79 |
| 3191.39 | | La II | 157 |
| 3191.41 | P | Fe I | 682 |
| 3191.45 | | Cl III | 3 |
| 3191.577 | | W I | 5 |
| 3191.659 | | Fe I | 8 |
| 3191.875 | | Ni I | 125 |
| 3191.93 | | Zr II | 50 |
| 3191.994 | | Ti I | 27 |
| 3192.059 | | Fe II | 66 |
| 3192.12 | | Cr I | 13 |
| 3192.220 | | Co I | 72 |
| 3192.26 | | Ti II | 25 |
| 3192.417 | | Fe I | 100,711 |
| 3192.68 | | Ti II | 120 |
| 3192.699 | | V II | 83 |
| 3192.799 | | Fe I | 155 |
| 3192.84 | P | Fe I | 452 |
| 3192.917 | | Fe II | 6 |
| 3193.014 | | Sm II | |
| 3193.02 | | La II | 45 |
| 3193.10 | | Si II | |
| 3193.164 | | Co I | 26 |
| 3193.174 | | Gd II | 54 |
| 3193.200 | | V II | 83 |
| 3193.214 | | Fe I | 7 |
| 3193.314 | | Fe I | 159 |
| 3193.41 | | Cr II | 52 |
| 3193.48 | | Y II | 48 |
| 3193.53 | | Hf II | 2 |
| 3193.74 | P | Fe I | 682 |
| 3193.75 | P | Ni I | 92 |
| 3193.76 | P | Fe II | 79 |
| 3193.809 | | Fe II | 6 |
| 3193.85 | P | Fe II | 67 |
| 3193.969 | | Mo I | 3 |
| 3193.97 | | V II | 49 |
| 3194.03 | P | Fe I | 156 |
| 3194.099 | | Cu I | 3 |
| 3194.19 | | Hf II | 10 |
| 3194.25 | | A II | 46 |
| 3194.26 | | Ti II | 120 |
| 3194.422 | | Fe I | 155 |
| 3194.56 | | Ti II | 120 |
| 3194.61 | | Ne II | 16 |
| 3194.63 | | Cr II | 70 |
| 3194.75 | | O IV | 7 |
| 3194.76 | P | Ni I | 108 |
| 3194.76 | | Ti II | |
| 3194.825 | | Ce II | 217 |
| 3194.983 | | Cb II | 1 |
| 3195.50 | | V II | |
| 3195.573 | | Ni I | 12 |
| 3195.62 | | Y II | 10 |
| 3195.63 | | Hf II | 45 |
| 3195.717 | | Ti II | 25 |
| 3195.994 | | Ti II | 46 |
| 3196.070 | | Fe II | 7 |
| 3196.147 | | Fe I | 333 |
| 3196.182 | | Sm II | 40 |
| 3196.37 | P | Cr I | 79 |
| 3196.40 | | Cr II | 9,115 |
| 3196.50 | | Si III | |
| 3196.532 | | Gd II | 9 |
| 3196.574 | | V II | 62 |
| 3196.63 | P | Fe II | 95 |
| 3196.930 | | Fe I | 155 |
| 3196.96 | | Cr II | 9 |
| 3197.00 | | Fe I | 8 |
| 3197.08 | | Zr II | 126 |
| 3197.113 | | Ni I | 24 |
| 3197.12 | | Cr II | 9 |
| 3197.518 | | Ti II | 3 |
| 3197.53 | | Fe I | 711 |
| 3197.574 | | V II | 150 |
| 3198.00 | | Cr II | |
| 3198.012 | | V I | 14 |
| 3198.112 | | Cr I | 91 |
| 3198.266 | | Fe I | 258 |
| 3198.42 | | Y II | 39 |
| 3198.62 | | Ne II | 13 |
| 3198.660 | | Co I | 26 |
| 3198.726 | | Ti I | 191 |
| 3198.81 | | Fe III | 6 |
| 3198.88 | P | Ne II | 13 |
| 3198.917 | | Ir I | 7 |
| 3199.279 | | Ce II | 106 |
| 3199.322 | | Co I | 9 |
| 3199.34 | | Ti I | 191 |
| 3199.342 | | Ni I | |
| 3199.37 | | Sc II | 42 |
| 3199.43 | | Ti I | 191 |
| 3199.50 | P | Fe I | 7 |
| 3199.53 | | O IV | 7 |
| 3199.530 | | Fe I | 156 |
| 3199.54 | | Si II | |
| 3199.87 | | Cr II | 101 |
| 3199.915 | | Ti I | 27 |
| 3199.93 | P | Fe I | 156 |
| 3199.99 | | Hf II | 55 |
| 3200.28 | | Y II | 10 |
| 3200.423 | | Ni I | 23 |
| 3200.45 | | Cr II | 114 |
| 3200.454 | | Gd II | 129 |
| 3200.475 | | Fe I | 155,162 |
| 3200.67 | | Zr II | 37 |
| 3200.790 | | Fe I | 8 |
| 3200.95 | | O III | 31 |
| 3201.24 | P | Cr I | 79 |
| 3201.26 | | Cr II | 114 |
| 3201.58 | | V II | |
| 3201.594 | | Ti I | 90 |
| 3201.714 | | Ce II | 76 |
| 3201.891 | | Fe I | 159 |
| 3201.90 | | Fe III | 6 |
| 3201.95 | | K III | 5 |
| 3201.97 | P | Cr I | 79 |
| 3202.142 | | Ni I | 94 |
| 3202.381 | | V I | 14 |
| 3202.52 | | Cr II | 173 |
| 3202.535 | | Ti II | 26 |
| 3202.562 | | Fe I | 547 |
| 3202.66 | P | Fe I | 52 |
| 3202.711 | | V II | 62 |
| 3202.740 | | F II | 8 |
| 3203.026 | | Co I | 9 |
| 3203.05 | | Cl II | |
| 3203.104 | | He II | 1 |
| 3203.33 | | Y II | 10 |
| 3203.39 | | Al I | 20 |
| 3203.435 | | Ti II | 3 |
| 3203.509 | | Fe II | 79 |
| 3203.53 | | Cr II | 46 |
| 3203.58 | | Ti I | 26 |
| 3203.67 | | Hf II | 21 |
| 3203.741 | | Fe II | 196 |
| 3203.828 | | Ti I | 27 |
| 3203.89 | | Si II | 7 |
| 3204.06 | | P V | 1 |
| 3204.196 | | V I | 13 |
| 3204.34 | | A II | 71 |
| 3204.36 | | Zr II | 63 |
| 3204.55 | P | Cr I | 79 |
| 3204.76 | | Fe III | 6 |
| 3204.870 | | Ti I | 90 |
| 3205.03 | | A II | 133 |
| 3205.11 | | Cr II | 114 |
| 3205.168 | | Ti I | 26 |
| 3205.400 | | Fe I | 155 |
| 3205.582 | | V I | 73 |
| 3205.64 | P | Ti II | 46 |
| 3205.848 | | Ti I | 26 |
| 3205.990 | | Ti II | 26 |
| 3206.16 | | V II | |
| 3206.344 | | Ti I | 179 |
| 3206.350 | | Cb II | 5 |
| 3206.466 | | Gd II | 129 |
| 3206.77 | | Hf II | 56 |
| 3206.825 | | Ti I | 179 |
| 3206.908 | | Mn I | 14 |
| 3206.952 | | Ni I | 94 |
| 3206.98 | | Fe III | 6 |
| 3207.092 | | Fe I | 159 |
| 3207.12 | P | O III | 31 |
| 3207.185 | | Sm II | 2 |
| 3207.248 | | W I | 9 |
| 3207.297 | | Rh II | 1 |
| 3207.337 | | Ti I | 90 |
| 3207.410 | | V I | 14 |
| 3207.61 | | A II | 132 |
| 3207.649 | | Fe I | 382 |
| 3207.897 | | Ti I | 179 |
| 3208.02 | | Cr II | 114 |
| 3208.13 | | La II | |
| 3208.231 | | Cu I | 3 |
| 3208.32 | | Zr II | 4 |
| 3208.345 | | V II | 8 |
| 3208.470 | | Fe I | 711 |
| 3208.607 | | Ti II | 120 |
| 3208.62 | | Cr II | 9 |
| 3208.838 | | Mo I | 2 |
| 3208.91 | | Ni II | 2 |
| 3208.99 | | Ne II | 14 |
| 3209.030 | | Ti I | 179 |
| 3209.115 | | Fe I | 97 |
| 3209.13 | | La II | 114 |
| 3209.21 | | Cr II | 9 |
| 3209.297 | | Fe I | 333,711 |
| 3209.34 | | K III | 5 |
| 3209.38 | | Ne II | 16 |
| 3209.603 | | Fe II | 137 |
| 3209.64 | | O IV | 7 |
| 3209.80 | | Co I | 70 |
| 3209.912 | | Ni I | 94 |
| 3209.930 | | Ca I | 13 |
| 3210.04 | | Si II | 7 |
| 3210.219 | | Co I | 106 |
| 3210.230 | | Fe I | 159 |
| 3210.449 | | Fe II | 6 |
| 3210.52 | | Si III | |
| 3210.62 | | Cr I | 13 |
| 3210.825 | | Tm II | 4 |
| 3210.830 | | Fe I | 156 |
| 3210.98 | | Zr II | 63 |
| 3211.01 | | Co I | 154 |
| 3211.07 | | Ti I | 191 |
| 3211.072 | | Fe II | 95 |
| 3211.309 | | Cr I | 220 |
| 3211.494 | | Fe I | 162 |
| 3211.693 | | Fe I | 711 |
| 3211.734 | | Sm II | |
| 3211.872 | | Fe I | 98,711 |
| 3211.947 | | Rh II | 6 |
| 3211.989 | | Fe I | 158 |
| 3212.02 | | Zr I | 19 |
| 3212.121 | | Ir I | 8 |
| 3212.186 | | Na II | 4 |
| 3212.274 | | Gd II | 54 |
| 3212.40 | | Y II | 67 |
| 3212.434 | | V I | 73 |
| 3212.53 | | Cr II | 81 |
| 3212.54 | | A II | 47 |
| 3212.56 | | La II | 122 |
| 3212.70 | P | Ti II | 9 |
| 3212.85 | | Zr II | 49 |
| 3212.884 | | Mn I | 14 |
| 3212.91 | | Cr II | 114 |
| 3213.145 | | Ti I | 90,191 |
| 3213.145 | | Ti II | 3 |
| 3213.311 | | Fe II | 6 |
| 3213.423 | | Ni I | 91 |
| 3213.46 | | Cr II | 153 |
| 3213.59 | | Ti II | 120 |
| 3213.70 | | Ne II | 13 |
| 3213.771 | | Fe I | 452 |
| 3213.972 | | F III | 2 |
| 3214.044 | | Fe I | 156,711 |
| 3214.059 | | Ni I | 93 |
| 3214.07 | P | Fe I | 158 |
| 3214.125 | | Sm II | 25 |
| 3214.14 | | Ti II | 84 |
| 3214.19 | | Zr II | 3 |
| 3214.240 | | Ti I | 27 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3214.38 | | Ne II | 14 | 3223.332 | | Cb II | 5 | 3231.528 | | Sm II | 13 |
| 3214.396 | | Fe I | 7 | 3223.444 | | Fe II | | 3231.599 | | Fe I | 50 |
| 3214.624 | | Fe I | 143 | 3223.519 | | Ti I | 179 | 3231.64 | | Cr II | 122 |
| 3214.750 | | Ti II | 3 | 3223.534 | | Ni I | 92,94 | 3231.69 | | Zr II | 3 |
| 3214.750 | | V II | 8 | 3223.740 | | Gd II | 10 | 3231.702 | | Fe II | 80 |
| 3215.145 | | Ca I | 13 | 3223.853 | | Fe I | 27 | 3231.71 | P | Ti II | 46 |
| 3215.262 | | Sm II | 40 | 3224.05 | P | Fe I | 920 | 3231.75 | | Cl II | 73 |
| 3215.334 | | Ca I | 13 | 3224.241 | | Ti II | 84 | 3231.952 | | V II | 61 |
| 3215.375 | | V I | 13 | 3224.297 | | Gd II | 92 | 3231.97 | | Ne II | 11 |
| 3215.578 | | W I | 5 | 3224.632 | | Co I | 71 | 3232.00 | | Y II | 49 |
| 3215.595 | | Cb II | 1 | 3224.761 | | Mn I | 3 | 3232.055 | | Os I | 3 |
| 3215.60 | | Fe III | 6 | 3224.82 | | Ne II | 43 | 3232.16 | P | Fe I | 258 |
| 3215.637 | | Fe I | 332 | 3224.86 | P | Fe II | 178 | 3232.280 | | Ti II | 36 |
| 3215.940 | | Fe I | 156 | 3225.020 | | Ni I | 39 | 3232.38 | | Ne II | 11 |
| 3215.97 | | O III | 31 | 3225.17 | | Y II | 39 | 3232.52 | | Sb I | 2 |
| 3216.06 | P | Fe I | 682 | 3225.39 | | Cr II | 140 | 3232.61 | | Li I | 2 |
| 3216.08 | | O II | 107 | 3225.44 | | Cr II | 45 | 3232.791 | | Fe II | 119 |
| 3216.203 | | Ti I | 90 | 3225.460 | | Gd II | | 3232.791 | | Ti I | 179 |
| 3216.31 | P | O IV | 7 | 3225.478 | | Cb II | 1 | 3232.874 | | Co I | 106 |
| 3216.55 | | Cr II | 82 | 3225.607 | | Fe I | 192,920 | 3232.963 | | Ni I | 7 |
| 3216.70 | | Y II | 10 | 3225.789 | | Fe I | 155 | 3233.02 | | Ca III | 4 |
| 3216.75 | | A II | | 3225.896 | | Ca I | 13 | 3233.053 | | Fe I | 620 |
| 3216.76 | | O II | 107 | 3225.976 | | Na II | 17 | 3233.174 | | Ni I | 91,184 |
| 3216.821 | | Ni I | 93 | 3226.00 | | A II | 46 | 3233.190 | | V I | 72 |
| 3216.850 | | Sm II | 13 | 3226.034 | | Mn I | 14 | 3233.234 | | Cr I | 25 |
| 3216.88 | P | Ti II | 36 | 3226.106 | | V I | 14 | 3233.24 | | S III | 3 |
| 3216.946 | | Mn I | 3 | 3226.128 | | Ti I | 179 | 3233.304 | | Fe I | 142 |
| 3216.996 | | Co I | 70 | 3226.129 | | Ca I | 13 | 3233.324 | | Rh II | 2 |
| 3217.056 | | Ti II | 2 | 3226.240 | | Ti I | 27 | 3233.546 | | V II | 61 |
| 3217.12 | | La II | 156 | 3226.318 | | Gd II | 75 | 3233.62 | | P III | 4 |
| 3217.121 | | V I | 14 | 3226.36 | | Cr II | 114 | 3233.772 | | V II | 61 |
| 3217.121 | | W II | 38 | 3226.378 | | Fe II | 178 | 3233.88 | | Ni I | |
| 3217.30 | | Hf II | 4 | 3226.55 | | Cr I | 25 | 3233.967 | | Fe I | 158 |
| 3217.380 | | Fe I | 157 | 3226.727 | | Fe I | 8 | 3233.968 | | Mn I | |
| 3217.44 | | Cr II | 9 | 3226.771 | | Ti II | 3 | 3234.00 | | Si III | 6 |
| 3217.53 | P | Fe I | 254 | 3226.924 | | V II | 185 | 3234.06 | | Cr II | 63 |
| 3217.70 | | A II | 132 | 3226.984 | | Ni I | 7 | 3234.119 | | Co I | 72 |
| 3217.830 | | Ni I | 91 | 3226.986 | | Co I | 124 | 3234.12 | | Zr I | 19 |
| 3217.942 | | Ti I | 179 | 3227.067 | | Fe I | 156 | 3234.165 | | Ce II | 119 |
| 3218.10 | | O II | 107 | 3227.114 | | Ce II | 95 | 3234.17 | | S III | 3 |
| 3218.20 | | Hf II | 78 | 3227.17 | P | Fe I | 247 | 3234.274 | | Ce II | 80 |
| 3218.21 | | Ne II | 13 | 3227.23 | | Cr I | 162 | 3234.50 | P | Ti II | 46 |
| 3218.26 | P | Ti II | 46 | 3227.409 | | V I | 134 | 3234.504 | | V II | 61 |
| 3218.270 | | Ti II | 84 | 3227.48 | | Cr II | 153 | 3234.517 | | Ti II | 2 |
| 3218.34 | | Fe III | 87 | 3227.732 | | Fe II | 6 | 3234.614 | | Fe I | 8 |
| 3218.44 | P | Ti II | 46 | 3227.752 | | Co I | 8 | 3234.649 | | Ni I | 21 |
| 3218.614 | | Sm II | | 3227.798 | | Fe I | 157 | 3234.923 | | Fe II | 1 |
| 3218.68 | | Zr II | 35 | 3228.003 | | Fe I | 379 | 3234.926 | | Na II | 10 |
| 3218.683 | | Ti I | 90 | 3228.090 | | Mn I | 14 | 3235.003 | | Mn I | |
| 3218.70 | | Cr I | 92 | 3228.183 | | Ti I | 179 | 3235.26 | | Cr II | 139 |
| 3218.869 | | V I | 72 | 3228.262 | | Fe I | 157 | 3235.33 | P | Fe I | 309 |
| 3218.944 | | Ce II | 75 | 3228.36 | P | Ti II | 46 | 3235.448 | | Tm II | 8 |
| 3218.98 | | Pd I | 2 | 3228.564 | | Ce III | 1 | 3235.532 | | Co I | 71,138 |
| 3219.13 | | Cr II | 140 | 3228.600 | | Fe II | | 3235.592 | | Fe I | 308 |
| 3219.150 | | Co I | 8 | 3228.605 | | Ti II | 24 | 3235.753 | | Ni I | 11 |
| 3219.212 | | Ti I | 179 | 3228.784 | | Sm II | 52 | 3235.783 | | Co I | 72 |
| 3219.32 | | P III | 4 | 3228.81 | | Zr II | 49 | 3235.95 | P | Ti I | 47 |
| 3219.37 | P | Fe I | 308 | 3228.900 | | Fe I | 157 | 3236.106 | | Gd II | 75 |
| 3219.58 | | Fe I | 156 | 3229.123 | | Fe I | 8 | 3236.122 | | Ti II | 24 |
| 3219.60 | P | Fe I | 254 | 3229.193 | | Ti II | 2 | 3236.17 | | Zr II | 104 |
| 3219.616 | | Cr I | 220 | 3229.204 | | Cr I | 220 | 3236.223 | | Fe I | 7 |
| 3219.77 | P | Fe I | 8 | 3229.36 | | Co I | 152 | 3236.403 | | Cb II | 1 |
| 3219.79 | | Cr II | 63 | 3229.363 | | Ce II | 94 | 3236.573 | | Ti II | 2 |
| 3219.806 | | Fe I | 158 | 3229.38 | | Cr II | 46 | 3236.61 | | Zr II | 125 |
| 3219.811 | | Ni I | 94 | 3229.397 | | Ti II | 36 | 3236.638 | | Sm II | |
| 3220.467 | | Ti II | 9 | 3229.50 | | Ne II | 43 | 3236.735 | | Ce II | 101 |
| 3220.62 | | Co I | 152 | 3229.604 | | V I | 134 | 3236.778 | | Mn I | 14 |
| 3220.66 | | Hf II | 30 | 3229.73 | | Zr II | 149 | 3236.806 | | Tm II | 13 |
| 3220.772 | | Ir I | 5 | 3229.78 | | Fe I | 247 | 3236.82 | | A II | 83 |
| 3220.835 | | Fe II | 106 | 3229.89 | | Cr II | 114 | 3237.028 | | Co I | 7 |
| 3221.151 | | Ti I | 26 | 3229.994 | | Fe I | 546 | 3237.234 | | Fe I | 256 |
| 3221.171 | | Ce II | 215 | 3230 | P | O V | 9 | 3237.402 | | Fe II | 81 |
| 3221.273 | | Ni I | 185 | 3230.09 | P | Fe I | 27 | 3237.414 | | Mn I | |
| 3221.378 | | Ru II | 3 | 3230.16 | P | Fe I | 156 | 3237.54 | | Zr II | 50 |
| 3221.380 | | V II | 109 | 3230.16 | | Ne II | 11 | 3237.729 | | Cr I | 114 |
| 3221.381 | | Ti I | 179 | 3230.210 | | Fe I | 158 | 3237.815 | | Fe II | 81 |
| 3221.64 | | A II | 46 | 3230.496 | | Fe II | 95 | 3237.876 | | V II | 38 |
| 3221.652 | | Ni I | 8 | 3230.55 | | Si III | 6 | 3238.087 | | Cr I | 114 |
| 3221.76 | P | Ti II | 46 | 3230.559 | | Sm II | 21 | 3238.224 | | Ti I | 179 |
| 3221.936 | | Fe I | 156 | 3230.646 | | V I | 13 | 3238.31 | | Fe III | 79 |
| 3221.978 | | Ru II | 7 | 3230.719 | | Mn I | 14 | 3238.32 | P | Fe I | 545 |
| 3222 | P | O V | 5,9 | 3230.919 | | V II | 48 | 3238.50 | | Cr I | 162 |
| 3222.05 | P | Fe I | 451 | 3230.963 | | Fe I | 157 | 3238.535 | | Fe I | 397 |
| 3222.069 | | Fe I | 156 | 3231.09 | P | Ni I | 106 | 3238.57 | | O III | 9 |
| 3222.42 | | A II | 132 | 3231.10 | | Si III | 3 | 3238.621 | | Gd II | 92 |
| 3222.48 | | Zr II | 104 | 3231.20 | | Y II | 65 | 3238.74 | | Fe III | 64 |
| 3222.741 | | Ti I | 26 | 3231.236 | | Ce II | 149 | 3238.77 | | Cr II | 63 |
| 3222.843 | | Ti II | 2 | 3231.315 | | Ti II | 9 | 3239 | P | O V | 5 |
| 3223.08 | P | Fe I | 682 | 3231.349 | | Nd II | 42 | 3239.029 | | Fe I | 141,142 |
| 3223.273 | | Fe I | 51 | 3231.509 | | Tm II | 13 | 3239.037 | | Ti I | 2 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 3239.04 | | Fe III | 63 |
| 3239.101 | | Rh II | 2 |
| 3239.14 | | Cr I | 92 |
| 3239.256 | | Co I | 47 |
| 3239.35 | P | Fe I | 379 |
| 3239.436 | | Fe I | 157 |
| 3239.46 | P | Fe I | 157 |
| 3239.657 | | Sm II | 48 |
| 3239.664 | | Ti II | 24 |
| 3239.833 | | V II | 61 |
| 3239.87 | P | Fe II | 81 |
| 3240.013 | | Fe I | 545 |
| 3240.07 | | Cr II | 140 |
| 3240.11 | P | Fe I | 158 |
| 3240.230 | | Tm II | |
| 3240.399 | | Mn I | 13 |
| 3240.516 | | Rh II | 6 |
| 3240.616 | | Mn I | 14 |
| 3240.71 | | Ti II | 9 |
| 3240.785 | | V II | 61 |
| 3240.84 | P | Ti I | 47 |
| 3240.85 | P | Zr II | 12 |
| 3240.951 | | Cr I | 25 |
| 3241.01 | | Zr II | 4 |
| 3241.05 | | Co I | 9 |
| 3241.161 | | Sm II | 6 |
| 3241.38 | | Cr II | 153 |
| 3241.43 | P | Fe I | 158 |
| 3241.50 | P | Fe I | 27 |
| 3241.530 | | Tm II | 4 |
| 3241.586 | | Sm II | 22 |
| 3241.67 | | Si III | 6 |
| 3241.685 | | Fe II | 80 |
| 3241.835 | | Be II | 5 |
| 3241.984 | | Ti II | 2 |
| 3242.18 | | Zr II | 126 |
| 3242.268 | | Fe I | 255 |
| 3242.30 | | Y II | 10 |
| 3242.304 | | Gd II | 92 |
| 3242.72 | | Pd I | 3 |
| 3242.834 | | Gd II | 75 |
| 3243.058 | | Ni I | 22 |
| 3243.118 | | Fe I | 192 |
| 3243.34 | | Ne II | 15 |
| 3243.36 | | W II | 13,15 |
| 3243.370 | | Ce II | 214 |
| 3243.406 | | Fe I | 381,710 |
| 3243.513 | | Ti I | 179 |
| 3243.579 | | Co I | 47 |
| 3243.70 | | A II | 47 |
| 3243.723 | | Fe II | 119 |
| 3243.74 | P | V II | 48 |
| 3243.780 | | Mn I | 14 |
| 3243.803 | | Ti I | 26 |
| 3243.840 | | Co I | 69 |
| 3244.115 | | Cr I | 25 |
| 3244.15 | | Ne II | 14 |
| 3244.17 | P | Sc II | 5 |
| 3244.190 | | Fe I | 156 |
| 3244.44 | | Cl III | 6 |
| 3244.53 | P | Ti I | 47 |
| 3244.69 | | Cr I | 114 |
| 3245 | P | O V | 9 |
| 3245.13 | | La II | 32 |
| 3245.31 | | Cr II | 62 |
| 3245.370 | | Ni I | 108 |
| 3245.485 | | Cr I | 25 |
| 3245.542 | | Cr I | 113 |
| 3245.750 | | Co I | 138 |
| 3245.80 | P | Fe I | 920 |
| 3245.984 | | Fe I | 27 |
| 3246.005 | | Fe I | 8 |
| 3246.05 | P | Fe I | 309 |
| 3246.492 | | Fe I | 252 |
| 3246.674 | | Ce II | 130 |
| 3246.973 | | Fe I | 95 |
| 3247.01 | | Cr II | 62 |
| 3247.170 | | Co I | 70 |
| 3247.171 | | Fe II | 81 |
| 3247.274 | | Cr I | 25 |
| 3247.297 | | Fe I | 157 |
| 3247.33 | | Cr II | 81 |
| 3247.392 | | Fe II | 119 |
| 3247.478 | | Cb II | 5 |
| 3247.540 | | Cu I | 1 |
| 3247.55 | | A II | |
| 3247.908 | | V II | 109 |
| 3248.15 | | Ne II | 15 |
| 3248.206 | | Fe I | 157 |
| 3248.457 | | Ni I | 21 |
| 3248.516 | | Mn I | 14 |
| 3248.602 | | Ti I | 89 |
| 3248.602 | | Ti II | 66 |
| 3248.70 | | Ti II | 9 |
| 3249 | P | O V | 9 |
| 3249.037 | | Fe I | 308 |
| 3249.16 | P | Fe II | 65 |
| 3249.204 | | Fe I | 253 |
| 3249.35 | | La II | 31 |
| 3249.370 | | Ti II | 23 |
| 3249.440 | | Ni I | 10 |
| 3249.464 | | V II | 82 |
| 3249.566 | | V I | 13 |
| 3249.617 | | V II | 38 |
| 3249.657 | | Fe II | 81 |
| 3249.742 | | Gd II | 75 |
| 3249.82 | | A II | 47 |
| 3249.911 | | Fe II | 78 |
| 3249.995 | | Co I | 26 |
| 3250.187 | | Gd II | 92 |
| 3250.27 | | Fe III | 37 |
| 3250.34 | P | Fe II | 78 |
| 3250.372 | | Sm II | 2 |
| 3250.400 | | Fe I | 142,379 |
| 3250.42 | | Zr I | 19 |
| 3250.44 | | Zr II | 125 |
| 3250.51 | | Co I | 154 |
| 3250.58 | | Cr I | 114 |
| 3250.634 | | Fe I | 95 |
| 3250.743 | | Ni I | 39 |
| 3250.747 | | Mo II | 2 |
| 3250.775 | | V II | 171 |
| 3250.79 | | Cr II | 61 |
| 3251.135 | | Mn I | 14 |
| 3251.236 | | Fe I | 93 |
| 3251.32 | | Sc II | 5 |
| 3251.34 | P | Fe II | 137 |
| 3251.46 | P | Zr II | 62 |
| 3251.656 | | Co I | 152 |
| 3251.66 | | Pd I | 6 |
| 3251.836 | | Cr I | 113 |
| 3251.869 | | V II | 108 |
| 3251.911 | | Ti II | 2 |
| 3252.12 | P | Fe I | 247 |
| 3252.40 | P | Fe II | 78 |
| 3252.483 | | Ce II | 182 |
| 3252.743 | | Gd II | 136 |
| 3252.914 | | Ti II | 2 |
| 3252.928 | | Fe I | 252 |
| 3252.94 | | O III | 9 |
| 3252.94 | P | Ti II | 23 |
| 3252.948 | | Mn I | 14 |
| 3253.26 | | Cr I | 114 |
| 3253.401 | | Sm II | |
| 3253.41 | | La II | 114 |
| 3253.416 | | Co I | 70 |
| 3253.44 | | Si III | 12 |
| 3253.610 | | Fe I | 681 |
| 3253.70 | | Hf II | 1 |
| 3253.839 | | Fe I | 250 |
| 3253.943 | | Sm II | 40 |
| 3253.954 | | Fe I | 257 |
| 3254.03 | | A II | 46 |
| 3254.039 | | Mn I | 12 |
| 3254.070 | | Cb II | 1 |
| 3254.202 | | Co I | 69 |
| 3254.250 | | Ti II | 2 |
| 3254.261 | | Fe I | 249 |
| 3254.32 | | Lu II | 4 |
| 3254.363 | | Fe I | 620 |
| 3254.377 | | Sm II | 6 |
| 3254.46 | P | Fe I | 158 |
| 3254.63 | | Co I | 154 |
| 3254.734 | | Fe I | 308 |
| 3254.773 | | V I | 13 |
| 3254.773 | | V II | 38 |
| 3254.95 | | Cr I | |
| 3255.28 | | Hf II | 7 |
| 3255.30 | | Cr II | 138 |
| 3255.39 | | Ne II | 23 |
| 3255.49 | | Fe III | 96 |
| 3255.62 | | Cr II | 153 |
| 3255.678 | | Sc I | 9 |
| 3255.819 | | Gd II | 92 |
| 3255.884 | | Fe II | 1 |
| 3256.137 | | Mn I | 14 |
| 3256.52 | | Fe I | 158 |
| 3256.52 | P | Fe I | 397 |
| 3256.53 | | Zr II | 49 |
| 3256.54 | | Fe III | 75 |
| 3256.779 | | V I | 138 |
| 3257.072 | | Gd II | 92 |
| 3257.244 | | Fe I | 27,451 |
| 3257.358 | | Fe II | 94 |
| 3257.594 | | Fe I | 90 |
| 3257.822 | | Cr I | 113 |
| 3257.83 | | S II | 17 |
| 3257.893 | | V II | 108 |
| 3257.894 | | Fe II | 178 |
| 3257.90 | | C III | 6 |
| 3257.965 | | Na II | 14 |
| 3258.01 | | Cr II | 152 |
| 3258.035 | | Co I | 47 |
| 3258.048 | | Tm II | 4 |
| 3258.413 | | Mn I | 14 |
| 3258.62 | P | Fe I | 157 |
| 3258.67 | | Si III | 12 |
| 3258.77 | | Cr II | 159 |
| 3258.773 | | Fe II | 81 |
| 3258.80 | | Pd I | 5 |
| 3259.007 | | Ru II | 6 |
| 3259.04 | | Ti I | 123 |
| 3259.048 | | Fe II | 81 |
| 3259.20 | | Co I | 153 |
| 3259.250 | | Gd II | 92 |
| 3259.32 | | Cl III | 6 |
| 3259.42 | | Ti I | 123 |
| 3259.44 | | C III | 6 |
| 3259.44 | P | Fe II | 178 |
| 3259.60 | | Cr I | 25 |
| 3259.684 | | V II | 48 |
| 3259.71 | | A II | |
| 3259.75 | P | Fe II | 81 |
| 3259.975 | | Cr I | 114 |
| 3259.991 | | Fe I | 157 |
| 3260.11 | | Zr I | 35 |
| 3260.231 | | Mn I | 14 |
| 3260.259 | | Ti I | 89 |
| 3260.259 | | Ti II | 45 |
| 3260.276 | | Fe I | 250 |
| 3260.286 | | Co I | 154 |
| 3260.564 | | Cb II | |
| 3260.814 | | Co I | 107 |
| 3260.975 | | Ce II | 258 |
| 3260.98 | | O III | 8 |
| 3261.050 | | Cd I | 1 |
| 3261.081 | | V I | |
| 3261.332 | | Fe I | 712 |
| 3261.509 | | Fe II | 195 |
| 3261.56 | | Cr II | 159 |
| 3261.596 | | Ti II | 66,89 |
| 3261.80 | | V II | 109 |
| 3262.009 | | Fe I | 710 |
| 3262.23 | | C III | 6 |
| 3262.284 | | Fe I | |
| 3262.290 | | Os I | 3 |
| 3262.340 | | Sn I | 3 |
| 3262.44 | | Fe III | 74 |
| 3262.515 | | Gd II | 75 |
| 3262.63 | | Ti I | 88 |
| 3263.04 | | Fe III | 64 |
| 3263.213 | | Co I | 124 |
| 3263.238 | | V I | 12 |
| 3263.25 | P | Cr I | 25 |
| 3263.33 | | V II | 38 |
| 3263.365 | | Cb II | |
| 3263.373 | | Gd II | 75 |
| 3263.378 | | Fe I | 144 |
| 3263.43 | | Ne II | 15 |
| 3263.45 | P | Fe I | 680 |
| 3263.60 | | A II | 46 |
| 3263.686 | | Ti II | 45 |
| 3263.98 | | La II | 114 |
| 3264 | P | O V | 9 |
| 3264.137 | | Gd II | 92 |
| 3264.22 | | Fe III | 64 |
| 3264.26 | | Cr II | 61 |
| 3264.291 | | Rh II | 5 |
| 3264.44 | | Ni I | |
| 3264.522 | | Fe I | 90 |
| 3264.711 | | Mn I | 13 |
| 3264.716 | | Fe I | 157 |
| 3264.718 | | Co I | 47 |
| 3264.76 | P | Fe II | 1 |
| 3264.81 | | Zr II | 62 |
| 3264.82 | P | Co I | 153 |
| 3264.83 | P | Co I | 9 |
| 3264.842 | | Co I | 105 |
| 3265.046 | | Fe I | 8 |
| 3265.352 | | Co I | 106 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3265.46 | | O III | 8 | 3273.50 | | Ni I | 108 | 3280.91 | | Y II | 29 |
| 3265.480 | | Ti I | 123 | 3273.52 | | O II | 39 | 3281.120 | | V II | 136 |
| 3265.55 | P | Fe I | 308 | 3273.53 | | Fe III | 7 | 3281.293 | | Fe II | 1 |
| 3265.616 | | Fe I | 91 | 3273.619 | | Sc I | 9 | 3281.585 | | Co I | 8 |
| 3265.67 | | La II | 45 | 3273.66 | | Hf II | 7 | 3281.607 | | Gd II | 92 |
| 3265.893 | | V II | 74 | 3273.957 | | Cu I | 1 | 3281.72 | | A II | 47 |
| 3265.899 | | V I | 138 | 3274.047 | | Ti I | 123 | 3281.755 | | V II | 136 |
| 3266.25 | | Cr II | 121 | 3274.183 | | Gd II | 92 | 3281.83 | P | Fe I | 50 |
| 3266.39 | | Eu II | 24 | 3274.220 | | Na II | 14 | 3281.880 | | Ni I | 106 |
| 3266.43 | | Ti II | 57 | 3274.24 | P | Fe I | 95 | 3281.94 | | O III | 8 |
| 3266.446 | | Ir I | 2 | 3274.452 | | Fe I | 710 | 3282.232 | | Co I | 47 |
| 3266.633 | | Tm II | 8 | 3274.50 | | V II | 163 | 3282.305 | | Gd II | 92 |
| 3266.634 | | Cr I | 25 | 3274.640 | | Be II | 2 | 3282.329 | | Ti II | 66 |
| 3266.88 | | Fe III | 7 | 3274.65 | | Fe III | 96 | 3282.333 | | Zn I | 4 |
| 3266.91 | | V II | 137 | 3274.661 | | Ca I | 12 | 3282.51 | | Y II | 65 |
| 3266.938 | | Fe II | 65 | 3274.864 | | Ce II | 104 | 3282.534 | | V II | 72 |
| 3267.035 | | Fe II | 80 | 3274.90 | | Ni II | 1 | 3282.696 | | Ni I | 7 |
| 3267.31 | | O III | 8 | 3274.95 | | Fe III | 96 | 3282.725 | | Fe I | 449 |
| 3267.401 | | Tm II | 13 | 3275.15 | | Zr II | 12 | 3282.73 | | Zr I | 19 |
| 3267.41 | | Ti I | 64 | 3275.20 | | Ne II | 29 | 3282.777 | | Nd II | 41 |
| 3267.480 | | Rh II | 6 | 3275.218 | | Nd II | | 3282.827 | | Ni I | 106 |
| 3267.51 | | Sb I | 2 | 3275.24 | P | Fe I | 27 | 3282.84 | | Zr II | 125 |
| 3267.639 | | Mo II | 6 | 3275.293 | | Ti II | 23 | 3282.891 | | Fe I | 680 |
| 3267.709 | | V II | 7 | 3275.60 | P | Ni I | 107 | 3283.04 | | Cr II | 159 |
| 3267.794 | | Mn I | | 3275.65 | | Zr II | 92 | 3283.11 | | Al III | 10 |
| 3267.945 | | Os I | 1 | 3275.66 | | Co I | 43 | 3283.14 | P | Ti II | 57 |
| 3268.064 | | Ni I | | 3275.67 | | O V | 5 | 3283.21 | | Sn II | 2 |
| 3268.234 | | Fe I | 95 | 3275.685 | | Fe I | 308 | 3283.22 | | P III | 2 |
| 3268.335 | | Gd II | 4 | 3275.776 | | Al II | 5 | 3283.30 | | Fe III | 14 |
| 3268.48 | | Cr II | 62 | 3275.848 | | Fe I | 450a | 3283.311 | | V I | 12 |
| 3268.512 | | Fe II | 118 | 3275.92 | | Cr II | 151 | 3283.39 | | Hf II | 30 |
| 3268.61 | | Ti I | 88 | 3276.08 | | Fe III | 7 | 3283.40 | P | Fe II | 118 |
| 3268.722 | | Mn I | | 3276.12 | | V II | 7 | 3283.400 | | Tm II | 7 |
| 3268.92 | P | Fe II | 81 | 3276.25 | | Si III | 12 | 3283.41 | | Cl III | 2 |
| 3268.971 | | Ni I | 91 | 3276.251 | | Ce II | 93 | 3283.430 | | Fe I | 27 |
| 3269.05 | | A II | 46 | 3276.28 | | Cr II | 172 | 3283.463 | | Cb II | |
| 3269.090 | | Ca I | 12 | 3276.37 | | Zr II | 35 | 3283.466 | | Co I | 107 |
| 3269.240 | | Fe I | 710 | 3276.477 | | Fe I | 90 | 3283.573 | | Rh I | 4 |
| 3269.42 | P | Fe I | 95 | 3276.483 | | Co I | 154 | 3283.75 | | Fe III | 7 |
| 3269.494 | | Ge I | 1 | 3276.606 | | Fe II | 92 | 3283.777 | | Co I | 47 |
| 3269.60 | P | Rh II | 8 | 3276.747 | | Sm II | 48 | 3283.95 | | La II | 120 |
| 3269.66 | | Zr I | 34 | 3276.774 | | Ti II | 45 | 3284.360 | | V I | 71 |
| 3269.75 | P | Cr II | 152 | 3276.81 | | Cl II | 30 | 3284.432 | | Ni I | 96 |
| 3269.77 | | Cr II | 138 | 3276.811 | | Tm II | 4 | 3284.57 | | O III | 8 |
| 3269.77 | | Ti II | 57 | 3276.998 | | Ti II | 8 | 3284.588 | | Fe I | 91 |
| 3269.772 | | Fe II | 118 | 3277.082 | | V II | 137 | 3284.72 | | Zr II | 4 |
| 3269.86 | | Ne II | 15 | 3277.23 | | Ni I | 90 | 3284.996 | | Fe II | 93 |
| 3269.904 | | Sc I | 9 | 3277.347 | | Fe II | 1 | 3285.022 | | V II | 108 |
| 3269.964 | | Fe I | 90 | 3277.448 | | V II | 194 | 3285.093 | | Nd II | |
| 3270.115 | | V II | 94 | 3277.662 | | Co I | 152 | 3285.20 | | Fe I | 396 |
| 3270.14 | | Cr II | 61 | 3277.69 | | O II | 23 | 3285.224 | | Ce II | 148 |
| 3270.198 | | Co I | 152 | 3277.71 | | V II | 137 | 3285.425 | | Fe II | 1 |
| 3270.23 | | Fe III | 63 | 3277.78 | | Eu II | 24 | 3285.54 | P | Fe I | 248 |
| 3270.351 | | Mn I | | 3277.82 | | P III | 2 | 3285.603 | | Na II | 4 |
| 3270.515 | | Gd II | 92 | 3277.853 | | Fe II | 65 | 3285.609 | | Tm II | 10 |
| 3270.562 | | Ti I | 123 | 3277.86 | | Cr I | 219 | 3285.664 | | Sm II | 21 |
| 3270.69 | P | Fe I | 954 | 3277.939 | | V I | 12 | 3285.672 | | V II | 162 |
| 3270.70 | | Cr I | 219 | 3278.04 | | Fe III | 7 | 3285.77 | | Zr II | 91 |
| 3270.79 | | Ne II | 2 | 3278.105 | | Co I | 153 | 3285.85 | | A III | 1 |
| 3270.98 | | O II | 39 | 3278.290 | | Ti II | 66 | 3285.89 | | Zr II | 62 |
| 3271.002 | | Fe I | 91 | 3278.43 | | Y I | | 3285.96 | | Cr II | 137 |
| 3271.118 | | Ni I | 23 | 3278.553 | | Mn I | 12 | 3286.026 | | Fe I | 90 |
| 3271.124 | | V II | 7 | 3278.741 | | Fe I | 144,250 | 3286.029 | | Ce II | 199 |
| 3271.13 | | Zr II | 22 | 3278.79 | | Cr II | 113 | 3286.067 | | Ca I | 12 |
| 3271.151 | | Ce II | 146 | 3278.79 | | K III | 1 | 3286.229 | | Sm II | 48 |
| 3271.17 | P | Ni I | 108 | 3278.842 | | Co I | 72 | 3286.34 | | Cr II | 172 |
| 3271.498 | | Fe I | 680 | 3278.89 | | Zr II | 149 | 3286.463 | | Fe I | 710 |
| 3271.61 | | Rh II | 2 | 3278.922 | | Ti I | 63 | 3286.545 | | Co I | 46 |
| 3271.612 | | Rh I | 6 | 3278.922 | | Ti II | 23 | 3286.57 | | W II | 1 |
| 3271.637 | | V I | 12 | 3279.25 | | Si III | 12 | 3286.71 | | Y II | 65 |
| 3271.652 | | Ti II | 66 | 3279.254 | | Co I | 70 | 3286.755 | | Fe I | 91 |
| 3271.666 | | Mo II | 6 | 3279.26 | | Zr II | 3 | 3286.756 | | Ti II | 89 |
| 3271.693 | | Fe I | 49 | 3279.529 | | Gd II | 92 | 3286.946 | | Ni I | 19 |
| 3271.778 | | Co I | 70 | 3279.54 | | Cr II | 121 | 3286.98 | P | Ni I | 107 |
| 3272.080 | | Ti II | 66 | 3279.649 | | Fe II | 118 | 3287.117 | | Fe I | 396 |
| 3272.21 | | Zr II | 3 | 3279.743 | | Fe I | 449 | 3287.192 | | Co I | 71 |
| 3272.25 | | S II | 17 | 3279.842 | | Ce II | 68 | 3287.192 | | Gd II | 136 |
| 3272.253 | | Ce II | 73 | 3279.844 | | V II | 73 | 3287.221 | | Ni I | 55 |
| 3272.30 | P | Zr II | 62 | 3279.97 | | O III | 29 | 3287.26 | | Pd I | 3 |
| 3272.405 | | Co I | 152 | 3279.97 | P | Ti II | 57 | 3287.31 | | Zr II | 12 |
| 3272.60 | | Fe I | 51 | 3279.98 | | Hf II | 9 | 3287.37 | | Al III | 10 |
| 3272.71 | | Fe I | 712 | 3279.995 | | Ti II | 35 | 3287.468 | | Fe II | 118 |
| 3272.76 | | Co I | 151 | 3280.22 | | P III | 6 | 3287.575 | | Co I | 154 |
| 3272.77 | | Eu II | 24 | 3280.261 | | Fe I | 620 | 3287.59 | | O II | 23 |
| 3272.807 | | Sm II | 40 | 3280.391 | | Ti I | 88 | 3287.657 | | Ti II | 89 |
| 3273.027 | | V I | 71 | 3280.58 | | Fe III | 7 | 3287.70 | | Cr I | |
| 3273.04 | | Zr II | 3 | 3280.682 | | Ag I | 1 | 3287.827 | | Co I | 43 |
| 3273.36 | | A II | 71 | 3280.75 | | Zr II | 34 | 3288.04 | | Cr II | 62 |
| 3273.483 | | Sm II | | 3280.756 | | Mn I | 10 | 3288.142 | | Ti II | 8 |
| 3273.499 | | Fe II | 118 | 3280.763 | | Fe I | 451 | 3288.324 | | V II | 89 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3288.428 | | Ti II | 66 | 3299.11 | | Co I | 151 | 3307.717 | | Ti II | 8 |
| 3288.575 | | Ti II | 66 | 3299.36 | | O III | 3 | 3307.755 | | Cr I | 78 |
| 3288.59 | P | Ti I | 63 | 3299.41 | P | Sc II | 35 | 3307.90 | | Cl II | 37 |
| 3288.660 | | Fe I | 144 | 3299.413 | | Ti I | 61 | 3308.02 | | Eu II | 25 |
| 3288.81 | | Fe III | 7 | 3299.44 | P | Ti II | 8 | 3308.15 | | Cr II | 137 |
| 3288.81 | | Zr II | 4,62 | 3299.511 | | Fe I | 49 | 3308.246 | | V I | 12 |
| 3288.972 | | Fe I | 90 | 3299.77 | | Fe III | 96 | 3308.391 | | Tf I | 87 |
| 3288.985 | | V II | 109 | 3299.771 | | Fe II | | 3308.4 | | Y II | 64 |
| 3289.016 | | Mo I | 11 | 3300.056 | | Fe II | 228 | 3308.480 | | V II | 137 |
| 3289.06 | | K III | 4 | 3300.148 | | Nd II | | 3308.482 | | Co I | 155 |
| 3289.150 | | Gd II | 75 | 3300.152 | | Ce II | 166 | 3308.517 | | Gd II | 4 |
| 3289.347 | | Fe II | 65 | 3300.20 | | Fe III | 96 | 3308.688 | | Co I | 105 |
| 3289.36 | | Yb II | 1 | 3300.819 | | W I | 5 | 3308.75 | P | Fe I | 190 |
| 3289.391 | | V II | 7 | 3300.905 | | V II | 60 | 3308.785 | | Mn I | 11 |
| 3289.442 | | Fe I | 380 | 3300.976 | | Gd II | 74 | 3308.806 | | Ti II | 7 |
| 3289.80 | | Cl III | 2 | 3301.09 | | Fe III | 50 | 3308.814 | | Co I | 153 |
| 3290.13 | | O II | 23 | 3301.21 | | Cr II | 137 | 3308.86 | | P II | 4 |
| 3290.23 | | Pt I | 1 | 3301.227 | | Fe I | 380 | 3308.91 | P | Ni I | 107 |
| 3290.240 | | V II | 108 | 3301.559 | | Os I | 1 | 3309.176 | | V I | 55 |
| 3290.54 | | Ni II | 5 | 3301.56 | | O II | 23 | 3309.32 | P | Ni I | 105 |
| 3290.69 | | Ni II | 1 | 3301.587 | | Ru I | 4 | 3309.32 | P | Ti I | 122 |
| 3290.722 | | Fe I | 90 | 3301.66 | | V II | | 3309.40 | | Fe III | |
| 3290.988 | | Fe I | 95 | 3301.678 | | Sm II | 21,48 | 3309.428 | | Ni I | |
| 3291.001 | | Tm II | 3 | 3301.71 | | Ti II | 44 | 3309.501 | | Ti I | 87 |
| 3291.04 | | V II | 60 | 3301.734 | | Sr I | 7 | 3309.53 | P | Ti II | 44 |
| 3291.44 | P | Fe I | 954 | 3301.87 | | Pt I | 7 | 3309.582 | | Gd II | 24 |
| 3291.47 | | A II | | 3301.88 | | A III | 1 | 3309.730 | | Ti I | 190 |
| 3291.676 | | V I | 12 | 3301.927 | | Fe I | 617 | 3309.78 | | Ne II | 7 |
| 3291.75 | | Cr II | 68 | 3301.95 | | Eu II | 24 | 3309.804 | | Tm II | |
| 3292.022 | | Fe I | 680 | 3302.096 | | Ti II | 8 | 3309.82 | | Cr I | 161 |
| 3292.04 | | Fe III | 7 | 3302.15 | | Pd I | 3 | 3309.90 | | Zr II | 72 |
| 3292.078 | | Ti I | 62 | 3302.19 | | Fe III | 37 | 3310.202 | | Ni I | 38 |
| 3292.210 | | Gd II | 74 | 3302.34 | | Na I | 2 | 3310.347 | | Fe I | 449 |
| 3292.22 | | Co I | 153 | 3302.454 | | Tm II | 7 | 3310.496 | | Fe I | 679 |
| 3292.312 | | Mo II | 6 | 3302.588 | | Zn I | 4 | 3310.55 | | Ne II | 23 |
| 3292.590 | | Fe I | 91 | 3302.66 | | Zr II | 85 | 3310.65 | | Cr II | 120,158 |
| 3292.89 | P | Fe II | 136 | 3302.86 | | Cr I | 161 | 3310.661 | | Sm II | 31 |
| 3293.146 | | Fe I | 51 | 3302.861 | | Fe II | 1 | 3311.25 | | A III | 1 |
| 3293.146 | | V II | 235 | 3302.94 | | Na I | 2 | 3311.30 | | Ne II | 2 |
| 3293.210 | | Co I | 154 | 3302.941 | | Zn I | 4 | 3311.34 | | Zr II | 34 |
| 3293.48 | P | Ti II | 57 | 3303.11 | | La II | 45 | 3311.451 | | Fe I | 27 |
| 3293.66 | | A II | 83 | 3303.278 | | Mn I | | 3311.708 | | Sc II | 41 |
| 3293.674 | | Ni I | 90 | 3303.466 | | Fe II | 1 | 3311.905 | | Mn I | 10 |
| 3293.81 | | Cr I | 219 | 3303.574 | | Fe I | 449 | 3311.929 | | Cr II | 51 |
| 3293.861 | | Co I | 107 | 3303.881 | | Co I | 47 | 3312.06 | | Cr I | 78 |
| 3293.9 | | Y II | 64 | 3304.01 | | Y II | 66 | 3312.148 | | Co I | 69 |
| 3293.95 | | A II | | 3304.119 | | Co I | 154 | 3312.18 | | Cr II | 51 |
| 3294.098 | | Co I | 154 | 3304.31 | | Fe III | | 3312.215 | | Ce II | 25 |
| 3294.220 | | Ru II | 2 | 3304.36 | P | Fe I | 710 | 3312.232 | | Fe I | 450a |
| 3294.44 | | La II | 155 | 3304.433 | | Fe II | 93 | 3312.30 | | O III | 3 |
| 3294.50 | | Fe III | 14 | 3304.474 | | V II | 136 | 3312.320 | | Ni I | 106 |
| 3294.536 | | Co I | 152 | 3304.523 | | Sm II | 2 | 3312.39 | | Y II | 65 |
| 3294.85 | | Fe III | 37 | 3304.73 | | Cr II | 120 | 3312.415 | | Sm II | 21 |
| 3295.03 | | Zr II | 36 | 3304.836 | | Ce II | 103 | 3312.690 | | Ti I | 190 |
| 3295.06 | P | Fe II | 93 | 3304.950 | | Ni I | 108 | 3312.707 | | Fe II | 1 |
| 3295.13 | | O II | 23 | 3305.15 | | O II | 23 | 3312.736 | | Sc II | 41 |
| 3295.24 | | Fe III | | 3305.15 | | Zr II | 2 | 3312.78 | | Cl II | 8 |
| 3295.240 | | Fe II | 79 | 3305.185 | | Sm II | 35 | 3312.87 | | Hf I | 3 |
| 3295.289 | | Ce II | 147 | 3305.22 | | Fe III | 7 | 3312.90 | P | Ti II | 56 |
| 3295.427 | | Cr II | 51 | 3305.634 | | Fe II | 79 | 3312.992 | | Ni I | 106 |
| 3295.813 | | Sm II | 13 | 3305.730 | | Co I | 152 | 3313.08 | | Cr II | 119 |
| 3295.814 | | Fe II | 1 | 3305.75 | P | Fe I | 618 | 3313.116 | | Co I | 153 |
| 3296.027 | | Mn I | 11 | 3305.77 | | O III | 8 | 3313.33 | | Eu II | 24 |
| 3296.052 | | V II | 162 | 3305.971 | | Fe I | 91 | 3313.344 | | Al II | 8 |
| 3296.41 | | Zr II | 62 | 3306.053 | | Ti II | 44 | 3313.470 | | Al II | 8 |
| 3296.467 | | Fe I | 250 | 3306.27 | | Zr II | 3 | 3313.524 | | Mn I | 30 |
| 3296.668 | | Gd II | 21 | 3306.35 | P | Fe I | 544 | 3313.539 | | Sc II | 35 |
| 3296.786 | | He I | 9 | 3306.356 | | Fe I | 91 | 3313.70 | | Zr II | 61 |
| 3296.806 | | Fe I | 619 | 3306.388 | | Sm II | 48 | 3313.721 | | Cr I | 161 |
| 3296.826 | | Fe II | 92 | 3306.45 | | Cl II | 37 | 3313.723 | | Fe I | 50 |
| 3296.882 | | Mn I | 12 | 3306.495 | | Fe I | 680 | 3313.731 | | Gd II | 24 |
| 3296.883 | | Ce II | 247 | 3306.50 | | A II | | 3313.996 | | Fe II | 1 |
| 3297.528 | | V II | 108 | 3306.60 | | O II | 23 | 3314 | P | O VI | 4 |
| 3297.68 | P | Ti I | 122 | 3306.703 | | Fe I | 396 | 3314.06 | | Cr II | 158 |
| 3297.684 | | Mo II | 6 | 3306.879 | | Ti I | 190 | 3314.070 | | Fe I | 736 |
| 3297.74 | | Ne II | 2 | 3306.94 | | Fe III | 73 | 3314.073 | | Co I | 43,149 |
| 3297.888 | | Fe II | 91 | 3306.95 | | Cr II | 150 | 3314.345 | | Co I | 152 |
| 3298 | P | O V | 9 | 3306.98 | | La II | 17 | 3314.393 | | Mn I | 30 |
| 3298.02 | P | Ni I | 91 | 3307.013 | | Ni I | 107 | 3314.422 | | Ti I | 87 |
| 3298.104 | | Sm II | | 3307.015 | | Fe I | 450 | 3314.450 | | Fe I | 250 |
| 3298.133 | | Fe I | 90 | 3307.017 | | Sm II | | 3314.49 | | Zr II | 47 |
| 3298.139 | | V I | 12 | 3307.044 | | Cr II | 51 | 3314.50 | | S II | 17 |
| 3298.21 | | Ti II | 44 | 3307.156 | | Co I | 69 | 3314.523 | | Ti I | 87 |
| 3298.224 | | Mn I | | 3307.234 | | Fe I | 617 | 3314.56 | P | Cr I | 182 |
| 3298.318 | | Cr I | 161 | 3307.24 | | A II | 83 | 3314.57 | | Cr II | 150 |
| 3298.680 | | Co I | 70 | 3307.362 | | Rh II | 5 | 3314.60 | | Ne II | 22 |
| 3298.72 | | La II | | 3307.445 | | V II | 60 | 3314.721 | | Ce II | 146 |
| 3298.738 | | V II | 7 | 3307.53 | | Fe III | 7 | 3314.742 | | Fe I | 680 |
| 3299.079 | | Fe I | 710 | 3307.534 | | Sr I | 7 | 3314.756 | Forb | Al II | 8 |
| 3299.086 | | V I | 55 | 3307.57 | P | Fe II | 65 | 3314.80 | P | Fe II | 93 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3314.862 | | V II | 136 | 3322.310 | | Ni I | 39 | 3330.40 | | O III | 22,28 |
| 3314.876 | | Mn I | 30 | 3322.40 | | K III | 1 | 3330.620 | | Sn I | 2 |
| 3314.883 | | Al II | 8 | 3322.474 | | Fe I | 396 | 3330.668 | | Mn I | 9 |
| 3314.981 | | Al II | 8 | 3322.69 | | Cr II | 51 | 3330.78 | | Ne II | 19 |
| 3315.035 | | Co I | 154 | 3322.936 | | Ti II | 7 | 3330.880 | | Y II | 85 |
| 3315.05 | | Pt I | 1 | 3322.98 | P | Ti II | 44 | 3331.07 | | Sc II | 35 |
| 3315.17 | P | Fe I | 618 | 3322.99 | | Zr II | 34 | 3331.26 | P | Ni I | 107 |
| 3315.176 | | V II | 71 | 3323.066 | | Fe II | 92 | 3331.32 | | N II | 22 |
| 3315.19 | | Cr I | 78 | 3323.092 | | Rh I | 4 | 3331.382 | | Gd II | 8 |
| 3315.237 | | Ti I | 190 | 3323.35 | | Hf II | 79 | 3331.616 | | Fe I | 191 |
| 3315.29 | | Cr II | 51 | 3323.39 | P | Ti II | 43 | 3331.62 | | Fe III | 73 |
| 3315.324 | | Ti II | 65 | 3323.53 | | Cr II | 51 | 3331.778 | | Fe I | 144 |
| 3315.44 | | Cl II | 8,37 | 3323.660 | | Ti I | 255 | 3331.90 | | Zr II | 11 |
| 3315.516 | Forb | Al II | 8 | 3323.731 | | V II | 81 | 3332.111 | | Ti II | 65 |
| 3315.53 | P | Fe II | 93 | 3323.737 | | Fe I | 379 | 3332.133 | | Gd II | 73 |
| 3315.53 | | V II | 136 | 3323.75 | | Ne II | 7 | 3332.17 | | Mg I | 4 |
| 3315.590 | | Gd II | 41 | 3323.896 | | Ti I | 255 | 3332.180 | | Ni I | |
| 3315.608 | | Al II | 8 | 3324.01 | | S III | 2 | 3332.42 | | Cl II | 8 |
| 3315.663 | | Ni I | 22 | 3324.03 | P | Zr II | 62 | 3332.49 | | O III | 28 |
| 3315.80 | | Fe III | 73 | 3324.060 | | Cr II | 4 | 3332.73 | | Hf I | 2 |
| 3316.18 | P | Fe II | 5 | 3324.10 | | Cr II | 120 | 3332.879 | | Cr I | 182 |
| 3316.324 | | Mn I | 11 | 3324.346 | | Cr II | 80 | 3333.00 | | O III | 22 |
| 3316.440 | | Mn I | 30 | 3324.372 | | Fe I | 617 | 3333.16 | | Si II | 6 |
| 3316.503 | | Cr I | 255 | 3324.541 | | Fe I | 191 | 3333.27 | | Fe III | 18,73 |
| 3316.579 | | Sm II | | 3324.58 | | N II | 22 | 3333.388 | | Co I | 25 |
| 3316.79 | | Sc II | 35 | 3324.61 | | Ti I | 60 | 3333.41 | P | Co I | 71 |
| 3316.86 | | Cl II | 37 | 3324.67 | P | Cr II | 92 | 3333.605 | | Cr I | |
| 3316.873 | | V II | 137 | 3324.72 | | Fe III | 96 | 3333.606 | | Y II | 64 |
| 3316.875 | | Tm II | 7 | 3324.754 | | Ti I | 190 | 3333.608 | | V II | 59 |
| 3317.038 | | Sc II | 41 | 3324.838 | | Fe II | 194 | 3333.635 | | Sm II | 52 |
| 3317.121 | | Fe I | 139 | 3324.87 | | S III | 2 | 3333.64 | | Cl II | 8 |
| 3317.295 | | V II | 7 | 3325.012 | | Fe II | 93 | 3333.912 | | Ti I | 25 |
| 3317.305 | | Mn I | 30 | 3325.155 | | Ti I | 190 | 3334.12 | P | Co I | 101 |
| 3317.693 | | Sc II | 41 | 3325.229 | | Ti I | 190 | 3334.146 | | Co I | 23 |
| 3317.70 | | S II | 42 | 3325.240 | | Co I | 70 | 3334.223 | | Fe I | 190 |
| 3317.797 | | Ce II | 102 | 3325.258 | | Sm II | | 3334.25 | | Zr II | 58 |
| 3317.912 | | V II | 108 | 3325.329 | | Ce II | 25 | 3334.278 | | Fe I | 617 |
| 3317.93 | | Co I | 69 | 3325.365 | | Ti I | 255 | 3334.35 | | Ti I | 190 |
| 3317.99 | | Hf II | 4 | 3325.468 | | Fe I | 191 | 3334.455 | | Ce II | 25 |
| 3318.024 | | Ti II | 7 | 3326.16 | | O III | 28 | 3334.471 | | Nd II | 42 |
| 3318.032 | | Na II | 16 | 3326.194 | | W I | 5 | 3334.62 | | Zr II | 21 |
| 3318.055 | | Gd II | 24 | 3326.21 | | La II | 121 | 3334.690 | | Cr I | |
| 3318.14 | | N II | 22 | 3326.27 | | Co I | 46 | 3334.87 | | Ne II | 2 |
| 3318.362 | | Ti I | 190 | 3326.564 | | Co I | 43 | 3334.925 | | Cr I | 160 |
| 3318.398 | | Co I | 45 | 3326.590 | | Cr I | 182 | 3335.192 | | Ti II | 7 |
| 3318.52 | | Zr II | 35 | 3326.639 | | Ti I | 87 | 3335.28 | | Cr II | 80 |
| 3318.6 | | Y II | 64 | 3326.670 | | Ni I | 108 | 3335.403 | | Fe I | 246 |
| 3318.60 | | Co I | 151 | 3326.68 | P | Ti II | 56 | 3335.46 | | Cr II | 92 |
| 3318.62 | P | Fe II | 136 | 3326.74 | P | Sc II | 41 | 3335.482 | | V II | 161 |
| 3318.862 | | Fe II | 135 | 3326.762 | | Ti II | 7 | 3335.513 | | Fe I | 49 |
| 3318.907 | | V II | 137 | 3326.81 | | Zr II | 91 | 3335.59 | | Ni I | |
| 3319.03 | | Zr II | 4 | 3326.991 | | Co I | 152 | 3335.72 | P | Fe I | 307 |
| 3319.083 | | Ti II | 8 | 3327.16 | | Ne II | 2 | 3335.776 | | Fe I | 379 |
| 3319.156 | | Co I | 155 | 3327.308 | | Mo I | 9 | 3335.90 | P | Fe II | 76 |
| 3319.258 | | Fe I | 449 | 3327.392 | | Ni I | 90 | 3335.93 | | Cr II | 119 |
| 3319.478 | | Co I | 154 | 3327.498 | | Fe I | 190 | 3336.12 | | Ne II | 46 |
| 3319.561 | | Co I | 45 | 3327.578 | | Tm II | 12 | 3336.124 | | Sm II | 31 |
| 3319.75 | | Ne II | 10 | 3327.63 | | Fe II | 64 | 3336.13 | | A III | 3 |
| 3319.78 | | Y II | 64 | 3327.67 | | Zr II | 11 | 3336.150 | | Os I | 3 |
| 3319.822 | | Co I | 153 | 3327.685 | | Na II | 16 | 3336.16 | | Cl III | 6 |
| 3319.89 | | Eu II | 24 | 3327.89 | | Y II | 18 | 3336.16 | | Cr II | 14 |
| 3320.14 | | Cl II | 8 | 3327.961 | | Fe I | 86 | 3336.180 | | Gd II | 8 |
| 3320.155 | | Sm II | 20 | 3328.21 | | Hf II | 10 | 3336.25 | | Y II | 66 |
| 3320.257 | | Ni I | 9 | 3328.270 | | Nd II | 40 | 3336.262 | | Fe I | 618 |
| 3320.29 | | Ne II | 12 | 3328.326 | | Ti I | 255 | 3336.330 | | Cr II | 4 |
| 3320.422 | | Sc II | 35 | 3328.351 | | Cr II | 4 | 3336.34 | P | Fe II | 76 |
| 3320.438 | | Gd II | 74 | 3328.714 | | Ni I | 20 | 3336.54 | P | Fe I | 450a |
| 3320.57 | | Cl III | 6 | 3328.79 | | N II | 22 | 3336.69 | | Mg I | 4 |
| 3320.650 | | Fe I | 190 | 3328.80 | | Cr I | 160 | 3336.78 | | O III | 22,28 |
| 3320.693 | | Mn I | | 3328.867 | | Fe I | 617 | 3336.97 | | Cr I | 255 |
| 3320.709 | | Sc II | 41 | 3329.013 | | Co I | 152 | 3336.984 | | Gd II | 72 |
| 3320.779 | | Ni I | 108 | 3329.053 | | Cr I | 182 | 3336.998 | | Ti II | 43 |
| 3320.780 | | V II | 149 | 3329.06 | | Cl III | 2 | 3337.014 | | Ni I | 17 |
| 3320.800 | | Fe I | 396 | 3329.07 | | La II | 120 | 3337.171 | | Co I | 25 |
| 3320.902 | | Mo II | 6 | 3329.070 | | Fe II | | 3337.36 | P | Ni I | 122 |
| 3321.013 | | Be I | 1 | 3329.12 | | Cl II | 37 | 3337.40 | | Ti I | 190 |
| 3321.086 | | Be I | 1 | 3329.20 | | Ne II | 12 | 3337.49 | | La II | 45 |
| 3321.179 | | Sm II | 40 | 3329.215 | | Mo II | 6 | 3337.666 | | Fe I | 304 |
| 3321.19 | | Cr I | 182 | 3329.3 | | S II | 17 | 3337.76 | P | V II | 136 |
| 3321.242 | | Ni I | 92 | 3329.345 | | Gd II | 74 | 3337.845 | | V II | 184 |
| 3321.347 | | Be I | 1 | 3329.45 | | Cr II | 150 | 3337.85 | | Ti II | 55 |
| 3321.348 | | Gd II | 21 | 3329.455 | | Ti II | 7 | 3337.93 | | Zr II | 74 |
| 3321.491 | | Fe II | 194 | 3329.466 | | Co I | 153 | 3338.19 | P | Fe II | 5 |
| 3321.539 | | V II | 71 | 3329.532 | | Fe I | 542a | 3338.41 | | Zr II | 61 |
| 3321.588 | | Ti I | 87 | 3329.855 | | V I | 55 | 3338.519 | | Co I | 123 |
| 3321.700 | | Ti II | 65 | 3329.89 | | Fe III | 18 | 3338.522 | | Fe II | 76 |
| 3321.857 | | Eu II | 21 | 3329.93 | | Mg I | 4 | 3338.643 | | Fe I | 396 |
| 3321.912 | | Co I | 106 | 3329.988 | | Sr I | 7 | 3338.72 | | Fe III | |
| 3322.198 | | Co I | 104,149 | 3330.30 | | N II | 22 | 3338.758 | | Ni I | 54 |
| 3322.231 | | Sr I | 7 | 3330.340 | | Gd II | | 3339.050 | | Ni I | 104 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 3339.063 | | Nd II | 41 |
| 3339.15 | | Co I | 148 |
| 3339.202 | | Fe I | 190,446 |
| 3339.36 | | Fe III | 7 |
| 3339.54 | | Ti I | 178 |
| 3339.588 | | Fe I | 502 |
| 3339.780 | | Co I | 155 |
| 3339.804 | | Cr II | 4 |
| 3339.810 | | Ru II | 2 |
| 3339.84 | | Si II | 6 |
| 3339.90 | | Cr II | 92 |
| 3340.344 | | Ti II | 7 |
| 3340.42 | | Cl III | 2 |
| 3340.55 | | Zr II | 3 |
| 3340.566 | | Fe I | 139 |
| 3340.579 | | Sm II | 6 |
| 3340.74 | | O III | 3 |
| 3340.77 | | Ti I | 190 |
| 3341.341 | | Co I | 148 |
| 3341.554 | | Ti I | 60,178 |
| 3341.77 | | A II | 59 |
| 3341.868 | | Ce II | 198 |
| 3341.875 | | Ti I | 24 |
| 3341.875 | | Ti II | 16 |
| 3341.906 | | Fe I | 303 |
| 3341.98 | | Cr II | 119 |
| 3342.151 | | Ti I | 23 |
| 3342.225 | | Fe I | 137 |
| 3342.298 | | Fe I | 378 |
| 3342.46 | | W II | 9 |
| 3342.51 | | Cr II | 4 |
| 3342.707 | | Ti I | 25 |
| 3342.734 | | Co I | 105 |
| 3342.76 | P | Fe I | 396 |
| 3342.77 | | N III | 7 |
| 3343.09 | | W II | 13 |
| 3343.227 | | Cr I | 159 |
| 3343.243 | | Fe I | 88 |
| 3343.27 | | Sc II | 35 |
| 3343.312 | | V II | 234 |
| 3343.342 | | Cr I | 159 |
| 3343.379 | | Ti I | 178 |
| 3343.40 | | W II | 8 |
| 3343.494 | | Sm II | |
| 3343.530 | | Co I | 151 |
| 3343.678 | | Fe I | 449 |
| 3343.731 | | Mn I | 9 |
| 3343.770 | | Ti II | 7 |
| 3343.81 | | Zr II | 85 |
| 3343.861 | | Ce II | 159 |
| 3344.09 | P | Fe I | 450 |
| 3344.26 | | O III | 22,28 |
| 3344.353 | | Sm II | 39 |
| 3344.43 | | Ne II | 2 |
| 3344.50 | | Cr I | 160 |
| 3344.513 | | Ca I | 11 |
| 3344.56 | | La II | 45 |
| 3344.62 | P | Ti I | 25 |
| 3344.630 | | Ti I | 178 |
| 3344.72 | | A III | 3 |
| 3344.750 | | Mo I | 9 |
| 3344.761 | | Ce II | 165 |
| 3344.80 | | Zr II | 72 |
| 3344.931 | | Ti I | 178 |
| 3345.020 | | Zn I | 4 |
| 3345.14 | | Cr I | 218 |
| 3345.146 | | Co I | 45 |
| 3345.352 | | Mn I | |
| 3345.36 | | Cr I | 218 |
| 3345.49 | | Ne II | 10 |
| 3345.572 | | Zn I | 4 |
| 3345.679 | | Fe I | 141 |
| 3345.86 | | W II | 17 |
| 3345.88 | | Ne II | 10,12 |
| 3345.899 | | V II | 244 |
| 3345.934 | | Zn I | 4 |
| 3345.985 | | Gd II | 8 |
| 3346.018 | | Cr I | 112 |
| 3346.09 | | Cr I | |
| 3346.310 | | Co I | 45 |
| 3346.403 | | Mo II | 6 |
| 3346.71 | | Cr I | 112 |
| 3346.724 | | Ti II | 7 |
| 3346.78 | | Cr I | 112 |
| 3346.91 | P | Ti II | 43 |
| 3346.932 | | Co I | 153 |
| 3346.942 | | Fe I | 87 |
| 3346.99 | | Ca II | 9 |
| 3347.10 | | Sb I | 1 |
| 3347.269 | | Mo II | 6 |
| 3347.298 | | Sm II | 48 |
| 3347.507 | | Fe I | 449 |
| 3347.70 | | Fe III | 18 |
| 3347.72 | | P IV | 1 |
| 3347.837 | | Cr II | 4 |
| 3347.927 | | Fe I | 138 |
| 3348.05 | | O III | 28 |
| 3348.08 | | O IV | 4 |
| 3348.112 | | Co I | 103 |
| 3348.372 | | V II | 136 |
| 3348.535 | | Ti I | 25 |
| 3348.683 | | Sm II | |
| 3348.844 | | Ti II | 7 |
| 3349.035 | | Ti II | 16 |
| 3349.072 | | Cr I | |
| 3349.11 | | O IV | 4 |
| 3349.17 | | Hf II | 20 |
| 3349.322 | | Cr I | 159 |
| 3349.34 | | Cr II | 4 |
| 3349.399 | | Ti II | 1 |
| 3349.68 | P | Cr II | 14 |
| 3349.739 | | Fe I | 377 |
| 3349.967 | | Ce II | 200 |
| 3350.097 | | Gd II | 74 |
| 3350.209 | | Ca I | 11 |
| 3350.284 | | Fe I | 191 |
| 3350.361 | | Ca I | 11 |
| 3350.42 | | Ni II | 1 |
| 3350.474 | | Gd II | 7 |
| 3350.548 | | Ti I | 178 |
| 3350.548 | | Ti II | 43 |
| 3350.68 | | O III | 22 |
| 3350.875 | | Sm II | |
| 3350.94 | | A II | 109 |
| 3350.99 | | O III | 22 |
| 3351.06 | P | Ni I | 3 |
| 3351.138 | | Co I | 151 |
| 3351.246 | | Sr I | 7 |
| 3351.424 | | Mn I | 9 |
| 3351.456 | | Al II | 26 |
| 3351.529 | | Fe I | 89 |
| 3351.53 | | V II | 234 |
| 3351.596 | | Cr I | 160 |
| 3351.67 | | Ti II | 124 |
| 3351.750 | | Fe I | 304 |
| 3351.966 | | Cr I | 5 |
| 3351.97 | | Sn II | 2 |
| 3352.048 | | Sc II | 4 |
| 3352.06 | | Hf II | 6 |
| 3352.071 | | Ti II | 54 |
| 3352.43 | P | Ti I | 169 |
| 3352.80 | | Co II | 2 |
| 3352.929 | | Fe I | 190 |
| 3352.937 | | Ti I | 25 |
| 3353.026 | | Cr I | 255 |
| 3353.12 | | Cr II | 4 |
| 3353.262 | | Ce III | 2 |
| 3353.268 | | Fe I | 190 |
| 3353.39 | | Cl II | 4 |
| 3353.63 | | Ne II | 23 |
| 3353.65 | | Zr I | 18 |
| 3353.734 | | Sc II | 12 |
| 3353.776 | | V II | 107 |
| 3353.78 | | N III | 5 |
| 3354.068 | | Fe I | 378 |
| 3354.185 | | Sm II | 39 |
| 3354.213 | | Co I | 152 |
| 3354.29 | | N III | 5 |
| 3354.31 | | O IV | 8 |
| 3354.374 | | Co I | 23 |
| 3354.39 | | Zr II | 34 |
| 3354.54 | P | Ti II | 64 |
| 3354.550 | | He I | 8 |
| 3354.621 | | Nd II | 71 |
| 3354.634 | | Ti I | 24 |
| 3355.05 | | Ne II | 2 |
| 3355.228 | | Fe I | 617 |
| 3355.366 | | V II | 149 |
| 3355.47 | | N III | 7 |
| 3355.517 | | Fe I | 25 |
| 3355.92 | | O III | 28 |
| 3355.940 | | Co I | 103 |
| 3356.08 | | Zr II | 3 |
| 3356.196 | | Ti I | 178 |
| 3356.24 | P | Fe II | 105 |
| 3356.265 | | Fe II | |
| 3356.332 | | Fe I | 25 |
| 3356.35 | P | Ce III | 2 |
| 3356.35 | | Ne II | 20 |
| 3356.352 | | V I | 54 |
| 3356.407 | | Fe I | 137 |
| 3356.464 | | Co I | 104 |
| 3356.513 | | Gd II | 24 |
| 3356.842 | | Co I | 151 |
| 3357.07 | | Fe III | 19 |
| 3357.215 | | Ce II | 164 |
| 3357.26 | | Zr II | 3 |
| 3357.40 | | Cr II | 79 |
| 3357.40 | | Fe III | 63,72 |
| 3357.72 | | Cr II | 91 |
| 3357.82 | P | Fe I | 448 |
| 3357.90 | | Ne II | 12 |
| 3357.965 | | Fe II | 117 |
| 3358.003 | | Co I | 123 |
| 3358.130 | | Mo I | 9 |
| 3358.252 | | Fe II | 77 |
| 3358.271 | | Ti I | 23 |
| 3358.30 | | Hf II | 63 |
| 3358.434 | | Gd II | 41 |
| 3358.49 | | A III | 3 |
| 3358.501 | | Cr II | 4 |
| 3358.56 | P | Ti I | 169 |
| 3358.59 | | Co II | 2 |
| 3358.62 | | W II | 13 |
| 3358.620 | | Gd II | 8 |
| 3358.72 | | N III | 5 |
| 3358.74 | | Fe III | 72 |
| 3358.78 | P | Fe II | 5 |
| 3359.066 | | Co I | 69 |
| 3359.106 | | Ni I | 108 |
| 3359.18 | | Fe III | 72 |
| 3359.284 | | Co I | 44 |
| 3359.496 | | Fe I | 25 |
| 3359.50 | | V II | 148 |
| 3359.679 | | Sc II | 4 |
| 3359.814 | | Fe I | 617 |
| 3359.96 | | Zr II | 91 |
| 3360.103 | | Fe II | 105 |
| 3360.15 | | O II | 52 |
| 3360.16 | P | Ti II | 54 |
| 3360.295 | | Cr II | 21 |
| 3360.45 | | Zr I | 53 |
| 3360.541 | | Ce II | 25 |
| 3360.63 | | Ne II | 2 |
| 3360.711 | | Gd II | 8 |
| 3360.84 | | Fe III | 72 |
| 3360.935 | | Fe I | 142 |
| 3360.990 | | Ti I | 24 |
| 3361.07 | P | Ti II | 64 |
| 3361.09 | | C II | 7 |
| 3361.11 | | W II | 2 |
| 3361.213 | | Ti II | 1 |
| 3361.241 | | Ni I | 107 |
| 3361.263 | | Ti I | 23 |
| 3361.270 | | Sc II | 4 |
| 3361.371 | | Mo I | 10 |
| 3361.50 | | Ti I | 178 |
| 3361.506 | | V II | 70 |
| 3361.553 | | Co I | 157 |
| 3361.556 | | Ni I | 19 |
| 3361.73 | | A II | 109 |
| 3361.75 | | C II | 7 |
| 3361.770 | | Cr II | 21 |
| 3361.835 | | Ti I | 25 |
| 3361.90 | | N III | 5 |
| 3361.918 | | Ca I | 11 |
| 3361.935 | | Sc II | 4 |
| 3361.959 | | Fe I | 377 |
| 3362.00 | | Y II | 36 |
| 3362.131 | | Ca I | 11 |
| 3362.213 | | Cr I | 54 |
| 3362.233 | | Gd II | 8 |
| 3362.28 | | Ca I | 11 |
| 3362.38 | | O III | 22 |
| 3362.619 | | Tm II | |
| 3362.63 | P | O IV | 8 |
| 3362.653 | | Ti II | 64 |
| 3362.70 | | Cr I | 54 |
| 3362.70 | | Zr II | 60 |
| 3362.764 | | Fe II | 78 |
| 3362.806 | | Ni I | 23 |
| 3362.89 | | Ne II | 12 |
| 3363.501 | | Sc II | 38 |
| 3363.613 | | Ni I | 105 |
| 3363.71 | | Cr II | 3 |
| 3363.81 | | Zr II | 11 |
| 3363.815 | | Fe I | 307 |
| 3363.83 | | O III | 11 |
| 3363.974 | | Gd II | 107 |
| 3364.10 | P | Ti I | 169 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3364.22 | P | Fe II | 5 | 3371.209 | | Sm II | 52 | 3379.762 | | Mo II | 6 |
| 3364.22 | | K III | 5 | 3371.447 | | Ti I | 24 | 3379.825 | | Cr I | 54 |
| 3364.241 | | Gd II | | 3371.85 | | O II | 52 | 3379.825 | | Cr II | 21 |
| 3364.30 | P | Ti II | 43 | 3371.87 | | Ne II | 22 | 3379.930 | | Ti II | 64 |
| 3364.44 | | P IV | 1 | 3371.90 | | S II | | 3380.004 | | Fe I | 709 |
| 3364.591 | | Ni I | 107 | 3371.993 | | Ni I | 7 | 3380.111 | | Fe I | 304 |
| 3364.639 | | Fe I | 245 | 3372.070 | | Fe I | 83 | 3380.114 | | Y II | 41 |
| 3364.9 | | Ti II | 124 | 3372.13 | | Cr II | 91 | 3380.215 | | Mo II | 6 |
| 3364.950 | | Nd II | | 3372.151 | | Sc II | 4 | 3380.25 | | Eu II | 23 |
| 3365.014 | | Co I | 69 | 3372.208 | | Ti II | 16 | 3380.278 | | Ti II | 1 |
| 3365.413 | | Fe II | 78 | 3372.359 | | Fe I | 447 | 3380.515 | | Gd II | 74 |
| 3365.54 | | A II | 109 | 3372.666 | | V II | 106 | 3380.574 | | Ni I | 37 |
| 3365.553 | | V I | 54 | 3372.68 | | Ca III | 1 | 3380.711 | | Sr II | 4 |
| 3365.591 | | Gd II | 8 | 3372.70 | | P II | 34 | 3380.885 | | Ni I | 7 |
| 3365.640 | | Fe II | 194 | 3372.800 | | Ti II | 1 | 3380.91 | | La II | 45 |
| 3365.766 | | Ni I | 38 | 3373.02 | | Pd I | 3 | 3381.003 | | Fe II | 177 |
| 3365.79 | | N III | 5 | 3373.226 | | Co I | 122 | 3381.28 | | O IV | 3 |
| 3365.863 | | Sm II | | 3373.42 | | Zr II | 74 | 3381.33 | P | O IV | 3 |
| 3366.168 | | Ni I | 8 | 3373.455 | | Ce II | 244 | 3381.340 | | Fe I | 376,677 |
| 3366.176 | | Ti I | 178 | 3373.51 | | Fe III | 18 | 3381.36 | P | Fe II | 5 |
| 3366.176 | | Ti II | 54 | 3373.57 | | Sc II | 38 | 3381.49 | | Co I | 88 |
| 3366.333 | | Sr I | 7 | 3373.729 | | Ce II | 212 | 3382.07 | | Cr I | 181 |
| 3366.46 | | Sc II | 38 | 3373.87 | | A II | 108 | 3382.071 | | Co I | 123 |
| 3366.532 | | Gd II | 74 | 3373.874 | | Fe I | 303 | 3382.19 | | Fe III | 72 |
| 3366.554 | | Ce II | 99 | 3373.96 | | Cr I | 181 | 3382.312 | | Ti I | 86 |
| 3366.59 | | A II | 83 | 3373.969 | | Co I | 44 | 3382.399 | | Sm II | 20 |
| 3366.790 | | Fe I | 302 | 3373.98 | | Ni II | 1 | 3382.403 | | Fe I | 84 |
| 3366.807 | | Ni I | 108 | 3374.06 | | N III | 5 | 3382.529 | | V II | 107 |
| 3366.870 | | Fe I | 87 | 3374.10 | | Ne II | 12 | 3382.683 | | Cr II | 3 |
| 3366.880 | | V I | 54 | 3374.221 | | Fe I | 89 | 3382.69 | | O III | 27 |
| 3366.960 | | Fe II | 177 | 3374.221 | | Ni I | 17 | 3382.79 | P | Cr II | 112 |
| 3367.00 | | O II | 52 | 3374.352 | | Ti II | 54 | 3382.890 | | Ag I | 1 |
| 3367.02 | | Fe III | | 3374.512 | | Tm II | 12 | 3383.15 | | Sb I | 1 |
| 3367.05 | P | Ne II | 12 | 3374.584 | | Gd II | 72 | 3383.387 | | Fe I | 245 |
| 3367.093 | | Gd II | 4 | 3374.642 | | Ni I | 106 | 3383.57 | P | Ti II | 63 |
| 3367.111 | | Co I | 22 | 3374.688 | | Gd II | 24 | 3383.692 | | Fe I | 85,444 |
| 3367.161 | | Fe I | 142 | 3374.71 | | Zr II | 61 | 3383.761 | | Ti II | 1 |
| 3367.18 | | S III | 2 | 3374.77 | | O II | 96 | 3383.85 | | O III | 27 |
| 3367.20 | | Ne II | 19 | 3374.93 | | Cr I | 181 | 3383.94 | | A II | 92 |
| 3367.29 | P | Ni I | 96 | 3374.95 | | Cr II | 4 | 3383.981 | | Fe I | 83 |
| 3367.36 | | N III | 5 | 3374.99 | | Cr II | 149 | 3384.14 | | Hf II | 44 |
| 3367.42 | | Cr II | 79 | 3375.238 | | Co I | 153 | 3384.24 | | Cr I | 54 |
| 3367.53 | | Cr I | 54 | 3375.50 | | O IV | 8 | 3384.617 | | Mo I | 9 |
| 3367.54 | | Fe III | 17 | 3375.561 | | Ni I | 108 | 3384.65 | | Cr I | 54 |
| 3367.661 | | Gd II | 91 | 3375.77 | | O II | 52 | 3384.658 | | Sm II | 30,39 |
| 3367.666 | | V II | 170 | 3376.057 | | V I | 54 | 3384.70 | | Hf II | 9 |
| 3367.81 | | Ca III | 4 | 3376.17 | | W II | 10 | 3384.80 | P | Fe I | 25 |
| 3367.81 | | Zr II | 11 | 3376.18 | | Cr I | | 3384.95 | | O III | 27 |
| 3367.892 | | Ni I | 20 | 3376.24 | P | Fe II | 78 | 3385.219 | | Co I | 22 |
| 3368.054 | | Cr II | 4 | 3376.25 | | Zr II | 60 | 3385.31 | | Cr I | 236 |
| 3368.09 | | S II | | 3376.27 | | Cr II | 78 | 3385.55 | | O IV | 3 |
| 3368.25 | P | Fe I | 678 | 3376.33 | | La II | 46 | 3385.664 | | Ti I | 24 |
| 3368.447 | | Fe II | 134 | 3376.331 | | Ni I | 104 | 3385.790 | | V II | 183 |
| 3368.472 | | Ir I | 5 | 3376.397 | | Cr I | 254 | 3385.81 | | S II | |
| 3368.568 | | Sm II | 30 | 3376.46 | | A II | 109 | 3385.944 | | Ti I | 23 |
| 3368.626 | | Fe II | 177 | 3376.68 | | Hf II | 31 | 3386.129 | | Rh II | 2 |
| 3368.63 | | Zr I | 17 | 3376.72 | | Cr II | 12,148 | 3386.22 | | Cl III | 11 |
| 3368.67 | | Co I | 101 | 3376.82 | | O III | 27 | 3386.24 | | Ne II | 12 |
| 3368.73 | | Cr II | 91 | 3377.060 | | Co I | 42 | 3386.452 | | Fe II | 88 |
| 3368.946 | | Sc II | 4 | 3377.127 | | Ce II | 213 | 3386.50 | | Cr I | 236 |
| 3368.983 | | Fe I | 376 | 3377.20 | | O II | 9 | 3386.724 | | Fe II | |
| 3369.05 | | Cr II | 68 | 3377.23 | | Ne II | 42 | 3387.061 | | Co I | 119 |
| 3369.054 | | Ti I | 25 | 3377.36 | | Cr II | 149 | 3387.13 | | S III | 2 |
| 3369.055 | | Eu II | 20 | 3377.394 | | V I | 54 | 3387.410 | | Fe I | 306 |
| 3369.14 | P | Fe I | 191 | 3377.45 | | Zr II | 11 | 3387.466 | | Ni I | 17 |
| 3369.212 | | Ti II | 64 | 3377.485 | | Ti I | 25 | 3387.47 | | Co I | 45 |
| 3369.27 | | Zr II | 85 | 3377.52 | | P II | 12 | 3387.60 | | Cl III | 2 |
| 3369.295 | | Ru II | 2 | 3377.577 | | Ti I | 23 | 3387.72 | | Co II | 2 |
| 3369.349 | | Fe II | 76 | 3377.625 | | V I | 54 | 3387.73 | | Cr II | 90 |
| 3369.40 | | O III | 11 | 3377.77 | | Fe III | 97 | 3387.834 | | Ti II | 1 |
| 3369.455 | | Sm II | 35 | 3378.09 | | O IV | 4 | 3387.87 | | Zr II | 74 |
| 3369.49 | | S III | 2 | 3378.209 | | Sc II | 38 | 3387.96 | | Cr II | 112 |
| 3369.549 | | Fe I | 304 | 3378.28 | | Ne II | 7 | 3388.065 | | Gd II | 71 |
| 3369.573 | | Ni I | 6 | 3378.30 | | Zr II | 73 | 3388.134 | | Fe II | 77 |
| 3369.618 | | Gd II | 21,73 | 3378.337 | | Cr II | 21 | 3388.163 | | Co I | 23 |
| 3369.67 | | Ti II | 124 | 3378.676 | | Fe I | 301 | 3388.18 | | Co II | 2 |
| 3369.80 | P | Fe II | 76 | 3378.73 | P | Fe I | 137 | 3388.29 | | Zr II | 2 |
| 3369.8086 | | Ne I | 2 | 3378.736 | | Co I | 121 | 3388.46 | | Ne II | 19 |
| 3369.9081 | | Ne I | 2 | 3379.017 | | Fe I | 85 | 3388.54 | | A II | 96 |
| 3370.23 | | O II | 52 | 3379.171 | | Cr I | 5 | 3388.71 | | Cr I | 54 |
| 3370.322 | | Co I | 24 | 3379.172 | | Ce II | 98 | 3388.755 | | Ti II | 53 |
| 3370.38 | | S III | 2 | 3379.18 | | Sc II | 43 | 3388.81 | P | Fe I | 140 |
| 3370.40 | | V II | 88 | 3379.216 | | Ti I | 24 | 3388.88 | | Cr I | 90 |
| 3370.436 | | Ti I | 23 | 3379.371 | | Cr II | 21 | 3388.912 | | Gd II | 73 |
| 3370.588 | | Os I | 4 | 3379.39 | | Ne II | 12 | 3388.966 | | Fe I | 502 |
| 3370.786 | | Fe I | 304 | 3379.397 | | Sc II | 38 | 3389.325 | | Sm II | 52 |
| 3370.94 | | Co II | 2 | 3379.48 | | A II | 59 | 3389.748 | | Fe I | 87 |
| 3370.97 | | A II | 57 | 3379.564 | | Cr I | 54 | 3389.83 | | Hf II | 8 |
| 3371.015 | | Co I | 151 | 3379.58 | | A II | | 3390.082 | | Fe II | 207 |
| 3371.10 | | P IV | 1 | 3379.756 | | Gd II | 91 | 3390.25 | P | Fe I | 188 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 3390.25 | | O II | 9 |
| 3390.37 | P | O IV | 3 |
| 3390.396 | | Co I | 102 |
| 3390.498 | | Gd II | 73 |
| 3390.515 | | Ce II | 145 |
| 3390.56 | | Ne II | 12 |
| 3390.682 | | Ti I | 86 |
| 3390.77 | | Cr I | 236 |
| 3390.783 | | Eu II | |
| 3390.878 | | Gd II | 73 |
| 3391.01 | | V II | 121 |
| 3391.050 | | Ni I | 5 |
| 3391.11 | | Cr I | 236 |
| 3391.294 | | Gd II | 73 |
| 3391.303 | | Fe II | 117 |
| 3391.372 | | Cr I | 254 |
| 3391.434 | | Cr II | 3 |
| 3391.84 | P | Fe I | 678 |
| 3391.85 | | A III | 6 |
| 3391.96 | | Zr II | 1 |
| 3391.989 | | Eu II | 17 |
| 3392.018 | | Fe I | 499 |
| 3392.040 | | Th II | 5 |
| 3392.304 | | Fe I | 83 |
| 3392.530 | | Gd II | 7 |
| 3392.652 | | Fe I | 85 |
| 3392.659 | | V II | 70 |
| 3392.713 | | Ti I | 136 |
| 3392.78 | | Ne II | 7 |
| 3392.89 | | Cl II | 11 |
| 3392.992 | | Ni I | 20 |
| 3393.00 | | Cr II | 21 |
| 3393.12 | | Zr II | 3 |
| 3393.382 | | Fe I | 376 |
| 3393.45 | | Cl III | 11 |
| 3393.609 | | Fe I | 305,376 |
| 3393.630 | | Gd II | 91 |
| 3393.641 | | Nd II | |
| 3393.86 | | Cr II | 21 |
| 3393.915 | | Fe I | 136 |
| 3393.920 | | Ce II | 48 |
| 3394.085 | | Fe I | 188 |
| 3394.26 | | O III | 27 |
| 3394.29 | | Sc II | 38 |
| 3394.32 | | Cr II | 21 |
| 3394.37 | P | Ti II | 63 |
| 3394.574 | | Ti II | 1 |
| 3394.58 | | Hf II | 7 |
| 3394.583 | | Fe I | 81 |
| 3394.63 | | Zr II | 85 |
| 3394.916 | | Co I | 42 |
| 3394.92 | | V II | 80 |
| 3394.99 | | Hf II | 63 |
| 3395.120 | | Gd II | 91 |
| 3395.336 | | Fe II | 117 |
| 3395.370 | | Co I | 25 |
| 3395.62 | | Cr II | 100 |
| 3395.87 | P | Fe I | 543 |
| 3395.90 | P | Fe I | 189 |
| 3396.184 | | Ni I | 122 |
| 3396.187 | | Sm II | 44 |
| 3396.34 | | Zr II | 58 |
| 3396.386 | | Fe I | 25 |
| 3396.457 | | Co I | 102 |
| 3396.50 | P | Ni I | 118 |
| 3396.58 | | Eu II | 30 |
| 3396.66 | | Zr II | 103 |
| 3396.71 | | Fe III | 18 |
| 3396.83 | | O IV | 3 |
| 3396.85 | | Rh I | 3 |
| 3396.978 | | Fe I | 26 |
| 3397.07 | | Lu II | 4 |
| 3397.221 | | Fe I | 503 |
| 3397.499 | | Tm II | 3 |
| 3397.560 | | Fe I | 447 |
| 3397.580 | | V I | 54 |
| 3397.642 | | Fe I | 26 |
| 3397.77 | | La II | 128 |
| 3397.82 | | Ni II | 8 |
| 3397.89 | | A II | 59 |
| 3397.90 | | Ne II | 36 |
| 3398.12 | P | Fe I | 615 |
| 3398.226 | | Fe I | 304 |
| 3398.355 | | Fe II | 105 |
| 3398.634 | | Ti I | 86 |
| 3398.811 | | Co I | 157 |
| 3399.230 | | Fe I | 302 |
| 3399.336 | | Fe I | 85 |
| 3399.36 | | Zr II | 11 |
| 3399.406 | | Gd II | 22 |
| 3399.54 | | Cr II | 100 |
| 3399.80 | | Hf II | 1 |
| 3399.951 | | Tm II | 12 |
| 3399.991 | | Gd II | 22 |
| 3400.08 | | Cr II | 67 |
| 3400.110 | | Na II | 4 |
| 3400.395 | | V I | 46 |
| 3400.471 | | Co I | 42 |
| 3401.067 | | Gd II | 8 |
| 3401.166 | | Ni I | 107 |
| 3401.521 | | Fe I | 26 |
| 3401.617 | | Co I | 44 |
| 3401.740 | | V II | 106 |
| 3401.76 | | Ni II | 4 |
| 3401.90 | | W II | 9 |
| 3401.913 | | Co I | 157 |
| 3401.997 | | V II | 47 |
| 3402.064 | | Co I | 123 |
| 3402.072 | | Gd II | 91,149 |
| 3402.256 | | Fe I | 614 |
| 3402.32 | P | Fe II | 105 |
| 3402.422 | | Ti II | 53 |
| 3402.43 | | Cr II | 21 |
| 3402.464 | | Sm II | 39 |
| 3402.52 | | Zr II | 85 |
| 3402.571 | | V I | 46 |
| 3402.87 | | Zr II | 91 |
| 3403.081 | | Gd II | 73 |
| 3403.159 | | V II | 135 |
| 3403.29 | P | Cr II | 21 |
| 3403.29 | P | Fe I | 377 |
| 3403.299 | | Fe I | 304 |
| 3403.322 | | Cr II | 3 |
| 3403.369 | | Ti I | 86 |
| 3403.432 | | Ni I | 108 |
| 3403.51 | | Fe III | 61 |
| 3403.58 | | O IV | 2 |
| 3403.59 | | Cr I | 254 |
| 3403.69 | | Zr II | 59 |
| 3404.301 | | Fe I | 25,301 |
| 3404.34 | | P II | 12,21 |
| 3404.357 | | Fe I | 83 |
| 3404.43 | | V II | 243 |
| 3404.60 | | Pd I | 2 |
| 3404.755 | | Fe I | 300 |
| 3404.77 | | Ne II | 51 |
| 3404.84 | | Zr II | 11 |
| 3404.923 | | Fe I | 300 |
| 3404.97 | | Ti II | 63 |
| 3405.038 | | Gd II | 91 |
| 3405.094 | | Ti I | 86 |
| 3405.120 | | Co I | 23 |
| 3405.160 | | V I | 46 |
| 3405.50 | P | Ni I | 122 |
| 3405.74 | | O III | 15 |
| 3405.83 | | Fe I | 299 |
| 3405.934 | | Mo I | 9 |
| 3405.97 | P | O IV | 3 |
| 3405.977 | | Ce II | 96 |
| 3406.06 | | V II | 119 |
| 3406.17 | P | Fe I | 376 |
| 3406.18 | | Fe III | 61 |
| 3406.442 | | Fe I | 676 |
| 3406.76 | P | Fe II | 90 |
| 3406.803 | | Fe I | 85 |
| 3406.837 | | V I | 46 |
| 3406.88 | | Ne II | 51 |
| 3407.00 | | La II | 155 |
| 3407.06 | P | Fe I | 377 |
| 3407.205 | | Ti II | 1 |
| 3407.22 | | Cr I | |
| 3407.30 | | Ni II | 4 |
| 3407.38 | | O II | 44 |
| 3407.461 | | Fe I | 83 |
| 3407.53 | P | Fe I | 81 |
| 3407.56 | | Gd II | 91 |
| 3407.61 | | Gd II | 24 |
| 3407.7 | | Y II | |
| 3407.76 | | Hf II | 29 |
| 3407.960 | | Mn I | 26 |
| 3408.01 | | Cr I | |
| 3408.09 | | Zr II | 72 |
| 3408.13 | | O III | 15 |
| 3408.136 | | N II | 7 |
| 3408.14 | | Pt I | 4 |
| 3408.676 | | Sm II | |
| 3408.678 | | Cb II | 3 |
| 3408.765 | | Cr II | 3 |
| 3408.955 | | V II | 120 |
| 3408.96 | P | Cr II | 8 |
| 3409.177 | | Co I | 23 |
| 3409.191 | | Cb II | 3 |
| 3409.20 | | Fe I | 614 |
| 3409.297 | | Gd II | 21 |
| 3409.36 | | Cr I | |
| 3409.40 | P | Fe I | 445 |
| 3409.578 | | Ni I | 5 |
| 3409.60 | P | Cr II | 8 |
| 3409.646 | | Co I | 24 |
| 3409.75 | | O IV | 3 |
| 3409.79 | P | Cr II | 8 |
| 3409.809 | | Ti II | 1 |
| 3409.84 | | O II | 44 |
| 3409.87 | | Y II | 63 |
| 3410.031 | | Fe I | 542 |
| 3410.171 | | Fe I | 735 |
| 3410.18 | | Hf II | 30 |
| 3410.26 | | Zr II | 11 |
| 3410.46 | | V II | 119 |
| 3410.56 | P | Fe I | 244 |
| 3410.74 | | Fe III | 61,62 |
| 3410.905 | | Fe I | 25 |
| 3411.01 | | Cr I | |
| 3411.134 | | Fe I | 299 |
| 3411.353 | | Fe I | 301 |
| 3411.38 | | Ne II | 45 |
| 3411.68 | P | Ti II | 63 |
| 3411.76 | | La II | 155 |
| 3411.76 | | O IV | 2 |
| 3411.88 | P | Fe I | 298 |
| 3412.020 | | Gd II | 73 |
| 3412.339 | | Co I | 25 |
| 3412.47 | P | Ni I | 90 |
| 3412.583 | | Gd II | 70 |
| 3412.633 | | Co I | 6 |
| 3412.753 | | Gd II | 23 |
| 3412.934 | | Cb II | 3 |
| 3413.13 | | Ne II | 45 |
| 3413.135 | | Fe I | 85 |
| 3413.273 | | Gd II | 91 |
| 3413.39 | | Zr II | 60 |
| 3413.46 | P | Ni I | 124 |
| 3413.478 | | Ni I | 5 |
| 3413.71 | | O IV | 2 |
| 3413.74 | | Hf II | 20 |
| 3413.939 | | Ni I | 17 |
| 3414.02 | | Ti II | 127 |
| 3414.144 | | Fe II | 91 |
| 3414.192 | | V II | 135 |
| 3414.207 | | Gd II | 107 |
| 3414.46 | | A II | 107 |
| 3414.65 | | Zr II | 73 |
| 3414.66 | | Zr I | 17 |
| 3414.765 | | Ni I | 19 |
| 3414.82 | | Ne II | 20 |
| 3414.879 | | V II | 135 |
| 3415.29 | | O III | 15 |
| 3415.47 | | Cr II | 100 |
| 3415.519 | | Co I | 5 |
| 3415.530 | | Fe I | 83 |
| 3415.67 | P | Ni I | 123 |
| 3415.78 | | Co II | 2 |
| 3415.91 | | V II | 169 |
| 3416.021 | | Fe II | 16 |
| 3416.52 | P | Fe I | 708 |
| 3416.674 | | Sc I | 21 |
| 3416.688 | | Fe I | 142 |
| 3416.87 | | Ne II | 21 |
| 3416.948 | | Gd II | 22 |
| 3416.957 | | Ti II | 53 |
| 3417.154 | | Co I | 23 |
| 3417.273 | | Fe I | 26 |
| 3417.330 | | Gd II | 91 |
| 3417.353 | | Co I | 135 |
| 3417.353 | | Ru I | 3 |
| 3417.450 | | Ce II | 100 |
| 3417.673 | | Co I | 122 |
| 3417.71 | | Ne II | 20 |
| 3417.795 | | Co I | 19 |
| 3417.842 | | Fe I | 81 |
| 3417.88 | P | Ti I | 86 |
| 3417.9036 | | Ne I | 4 |
| 3418.02 | P | Fe II | 104 |
| 3418.151 | | Sm II | |
| 3418.176 | | Fe I | 577 |
| 3418.507 | | Fe I | 81 |
| 3418.514 | | Sm II | 47 |
| 3418.528 | | Sc I | 21 |
| 3418.733 | | Gd II | 7 |
| 3419.069 | | Gd II | 24 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 3419.10 | | Zr II | 2 |
| 3419.157 | | Fe I | 576 |
| 3419.25 | | P II | 3 |
| 3419.358 | | Sc I | 21 |
| 3419.49 | | Fe III | 11,49 |
| 3419.706 | | Fe I | 377 |
| 3419.87 | | O II | |
| 3420.15 | | V II | 119 |
| 3420.184 | | Fe II | 89 |
| 3420.474 | | Co I | 42 |
| 3420.54 | | La II | 126 |
| 3420.61 | | O II | |
| 3420.709 | | V II | 105 |
| 3420.741 | | Ni I | 9 |
| 3420.790 | | Co I | 102 |
| 3420.795 | | Mn I | |
| 3420.82 | | K III | 1 |
| 3421.029 | | Co I | 119 |
| 3421.20 | | Cr II | 3 |
| 3421.22 | P | Ni I | 105 |
| 3421.24 | | Pd I | 3 |
| 3421.342 | | Ni I | 122 |
| 3421.62 | | Cr II | 60 |
| 3421.628 | | Co I | 101 |
| 3421.64 | | A II | 57 |
| 3421.83 | | K III | 4 |
| 3421.97 | | Fe III | 11 |
| 3422.332 | | Ni I | 105 |
| 3422.466 | | Gd II | 2 |
| 3422.499 | | Fe I | 444 |
| 3422.656 | | Fe I | 85 |
| 3422.661 | | Ti II | 63 |
| 3422.708 | | Ce II | 144 |
| 3422.739 | | Cr II | 3 |
| 3422.751 | | Gd II | 8 |
| 3422.878 | | Ni I | 122 |
| 3422.900 | | Co I | 42 |
| 3423.172 | | Ti I | 120 |
| 3423.35 | | Co I | 121 |
| 3423.711 | | Ni I | 20 |
| 3423.82 | | Zr II | |
| 3423.85 | | Co II | 2 |
| 3423.853 | | Ce II | 131 |
| 3423.9 | | La II | 144 |
| 3423.92 | | Gd II | 7 |
| 3424.16 | | Y I | |
| 3424.17 | P | Fe II | 116 |
| 3424.284 | | Fe I | 81 |
| 3424.43 | P | Cr II | 8 |
| 3424.500 | | Co I | 103 |
| 3424.592 | | Gd II | 22 |
| 3424.64 | | Zr II | 85 |
| 3424.82 | | Zr II | 2 |
| 3424.88 | | P II | 3 |
| 3425.009 | | Fe I | 541 |
| 3425.022 | | Eu II | 20 |
| 3425.070 | | V I | |
| 3425.082 | | Tm II | 7 |
| 3425.09 | P | Cr II | 8 |
| 3425.432 | | Cb II | 7 |
| 3425.57 | | O IV | 3 |
| 3425.582 | | Fe II | 5 |
| 3425.624 | | Gd II | 91 |
| 3425.630 | | Tm II | 3 |
| 3425.930 | | Gd II | 23 |
| 3425.96 | | Cr I | 158 |
| 3426 | P | O VI | 6 |
| 3426.09 | P | Fe I | 502 |
| 3426.13 | | Cr II | 111 |
| 3426.20 | | P II | 3 |
| 3426.208 | | Ce II | 44 |
| 3426.337 | | Fe I | 135 |
| 3426.342 | | Gd II | 73 |
| 3426.383 | | Fe I | 25,82 |
| 3426.562 | | Cb II | 7 |
| 3426.583 | | Ce II | 51 |
| 3426.637 | | Fe I | 82 |
| 3426.67 | P | Fe I | 615 |
| 3426.81 | P | Fe II | 103 |
| 3427.002 | | Fe I | 26 |
| 3427.121 | | Fe I | 81 |
| 3427.332 | | Ce III | 2 |
| 3427.362 | | Gd II | 91 |
| 3427.57 | | La II | 132 |
| 3428.01 | P | Fe I | 616 |
| 3428.192 | | Fe I | 81 |
| 3428.37 | | Hf II | 2 |
| 3428.41 | P | Fe I | 302 |
| 3428.42 | P | Ni I | 123 |
| 3428.467 | | Gd II | 90 |
| 3428.64 | P | Fe II | 90 |
| 3428.67 | | O III | 15 |
| 3428.746 | | Fe I | 836 |
| 3428.76 | | Ne II | 42 |
| 3428.916 | | Al II | 25 |
| 3428.94 | | Cr II | 99 |
| 3428.955 | | Ti I | 168 |
| 3429.206 | | Sc I | 21 |
| 3429.42 | | Y II | 77 |
| 3429.483 | | Sc I | 21 |
| 3429.64 | | A II | 107 |
| 3429.80 | P | Fe I | 244 |
| 3429.82 | P | Fe I | 540 |
| 3430.15 | P | Fe II | 89 |
| 3430.238 | | Gd II | 91 |
| 3430.29 | | Zr I | 17 |
| 3430.42 | | Cr II | 67 |
| 3430.44 | | A II | 59 |
| 3430.53 | | Zr II | 11 |
| 3430.60 | | O III | 15 |
| 3430.772 | | Ru I | 3 |
| 3430.874 | | Ti I | 120 |
| 3430.88 | P | Fe I | 614 |
| 3431.08 | P | Ti I | 135 |
| 3431.195 | | Tm II | 12 |
| 3431.284 | | Cr I | 53 |
| 3431.358 | | Sc I | 21 |
| 3431.45 | P | Cr II | 8 |
| 3431.57 | | Zr II | 59 |
| 3431.582 | | Co I | 6 |
| 3431.59 | | Cr I | 53 |
| 3431.69 | | Cr I | 53 |
| 3431.815 | | Fe I | 376,676 |
| 3431.995 | | Cr I | 53 |
| 3432.023 | | Fe I | 377 |
| 3432.12 | P | Cr II | 8 |
| 3432.31 | | Cr I | 53 |
| 3432.318 | | Co I | 102 |
| 3432.32 | | Cr II | 8 |
| 3432.41 | | Zr II | 58 |
| 3432.64 | | A II | 107 |
| 3432.708 | | Cb II | |
| 3432.81 | | La II | 113 |
| 3432.97 | | Fe III | 67 |
| 3432.994 | | Gd II | 22 |
| 3433 | P | O VI | 8 |
| 3433.045 | | Co I | 23 |
| 3433.091 | | Ce II | 249 |
| 3433.30 | | Cr II | 3 |
| 3433.44 | | Pd I | 11 |
| 3433.558 | | Ni I | 19 |
| 3433.598 | | Cr I | 52 |
| 3433.767 | | V II | 134 |
| 3433.90 | | Zr II | 58 |
| 3434 | P | O VI | 9 |
| 3434.024 | | V II | 104 |
| 3434.029 | | Fe I | 300 |
| 3434.112 | | Cr I | 52 |
| 3434.46 | | V II | 134 |
| 3434.57 | P | Rh II | 1 |
| 3434.69 | P | Ti I | 121 |
| 3434.893 | | Rh I | 2 |
| 3434.95 | P | Fe I | 776 |
| 3435.38 | | V II | 133 |
| 3435.408 | | Ti II | 98 |
| 3435.432 | | Ti I | |
| 3435.488 | | Cr I | 53 |
| 3435.489 | | Ni I | 53 |
| 3435.555 | | Sc I | 21 |
| 3435.679 | | Cr I | 52 |
| 3435.819 | | Cr I | 53 |
| 3436.045 | | Fe I | 614 |
| 3436.112 | | Fe II | 91 |
| 3436.187 | | Cr I | 52 |
| 3436.304 | | Ce II | 94 |
| 3436.393 | | V II | 79 |
| 3436.737 | | Ru I | 4 |
| 3437.006 | | Ir I | 3 |
| 3437.046 | | Fe I | 539 |
| 3437.16 | | Zr II | 33 |
| 3437.162 | | N II | 13 |
| 3437.280 | | Ni I | 3 |
| 3437.631 | | Fe I | 187 |
| 3437.680 | | Co I | 162 |
| 3437.93 | | Cr II | 111 |
| 3437.958 | | Fe I | 614 |
| 3438 | P | O VI | 7 |
| 3438.10 | P | Fe I | 300 |
| 3438.14 | | A II | 58 |
| 3438.23 | | Zr II | 1 |
| 3438.24 | | Hf II | 77 |
| 3438.306 | | Fe I | |
| 3438.46 | | Cr II | 110 |
| 3438.713 | | Co I | 87 |
| 3438.97 | | Ne II | 45 |
| 3438.978 | | Mn II | 1 |
| 3439.050 | | Fe I | 299 |
| 3439.208 | | Gd II | 23 |
| 3439.305 | | Ti I | 120 |
| 3439.352 | | Al I | 2 |
| 3439.40 | | Sc I | 21 |
| 3439.784 | | Gd II | 22 |
| 3439.831 | | Ce II | 197 |
| 3439.990 | | Gd II | 7 |
| 3440.25 | P | Fe II | 156 |
| 3440.39 | | O III | 13 |
| 3440.502 | | Sm II | 54 |
| 3440.589 | | Cb II | 6 |
| 3440.610 | | Fe I | 6 |
| 3440.74 | P | Fe I | 301 |
| 3440.80 | | Ne II | 45 |
| 3440.989 | | Fe I | 6 |
| 3440.999 | | Eu II | 13 |
| 3441.115 | | Cr I | 52 |
| 3441.14 | P | Cr II | 8 |
| 3441.210 | | Ce II | 45 |
| 3441.40 | | Pd I | 10 |
| 3441.439 | | Cr I | 52 |
| 3441.505 | | Tm II | |
| 3441.790 | | Gd II | 39 |
| 3441.983 | | Mn II | 3 |
| 3442.044 | | Ni I | 104 |
| 3442.12 | | Ne II | 36 |
| 3442.239 | | Fe II | 89 |
| 3442.364 | | Fe I | 134 |
| 3442.380 | | Ce II | 196 |
| 3442.559 | | Ni I | 124 |
| 3442.58 | | Cr I | 158 |
| 3442.672 | | Fe I | 26 |
| 3442.79 | P | Fe II | 76 |
| 3442.918 | | Co I | 6 |
| 3442.979 | | Fe I | 499,776 |
| 3442.98 | P | Co I | 42 |
| 3443 | P | N IV | 7 |
| 3443.203 | | Ca I | |
| 3443.387 | | Ti II | 99 |
| 3443.57 | | Zr II | 73 |
| 3443.609 | | Ce III | 1 |
| 3443.644 | | Co I | 22 |
| 3443.644 | | Ti I | 120 |
| 3443.651 | | Al I | 2 |
| 3443.70 | | Ne II | 42 |
| 3443.790 | | Cr I | 110 |
| 3443.83 | P | Fe II | 16 |
| 3443.878 | | Fe I | 6 |
| 3443.989 | | Sc I | 21 |
| 3444.10 | | O III | 15 |
| 3444.251 | | Ni I | 122 |
| 3444.306 | | Ti II | 6 |
| 3444.34 | | Cr II | 111 |
| 3444.403 | | Ti I | 120 |
| 3444.76 | P | Fe II | 145 |
| 3444.871 | | Al I | 2 |
| 3444.899 | | Ti I | 46 |
| 3445 | P | N IV | 7 |
| 3445.04 | | Cr II | 110 |
| 3445.10 | | Cr I | 51 |
| 3445.151 | | Fe I | 81 |
| 3445.20 | P | Cr II | 148 |
| 3445.566 | | Ti I | 46 |
| 3445.58 | P | Fe II | 76 |
| 3445.618 | | Cr I | 51 |
| 3446.0 | P | Mn II | 9 |
| 3446.085 | | Mo II | 1 |
| 3446.088 | | Co I | 162 |
| 3446.263 | | Ni I | 20 |
| 3446.38 | | K I | 4 |
| 3446.40 | | Co II | 2 |
| 3446.603 | | Ti I | 168 |
| 3446.721 | | Ce II | 56 |
| 3446.73 | | O III | 25 |
| 3446.77 | | Fe III | 88 |
| 3446.791 | | Fe I | 244 |
| 3446.947 | | Fe I | 26 |
| 3447.015 | | Cr I | 52 |
| 3447.22 | | O III | 25 |
| 3447.278 | | Fe I | 82 |
| 3447.281 | | Co I | 161 |
| 3447.36 | | Zr I | 16 |
| 3447.41 | | K I | 4 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3447.430 | | Cr I | 52 | 3457.047 | | Gd II | | 3465.25 | | V II | 160 |
| 3447.594 | | He I | 7 | 3457.088 | | Y II | 77 | 3465.562 | | Ti II | 99 |
| 3447.760 | | Cr I | 52 | 3457.090 | | Fe I | 374,835 | 3465.57 | | Cr I | 51 |
| 3447.98 | | O II | 27 | 3457.153 | | V II | 147 | 3465.62 | | Ni II | 4 |
| 3448.05 | P | O III | 25 | 3457.16 | P | Ne II | 51 | 3465.63 | | Zr I | 17 |
| 3448.19 | P | Fe I | 186 | 3457.298 | | Ti I | 46 | 3465.792 | | Co I | 5 |
| 3448.255 | | Ti I | 46 | 3457.494 | | Ti I | 46 | 3465.80 | | A II | 96 |
| 3448.358 | | Co I | 163 | 3457.512 | | Fe I | 187 | 3465.863 | | Fe I | 6 |
| 3448.433 | | Fe II | 90 | 3457.56 | | Zr II | 20 | 3466.15 | | O III | 25 |
| 3448.478 | | Fe I | 444 | 3457.62 | | Cr II | 135 | 3466.25 | | Cr II | 77,148 |
| 3448.503 | | Sc I | 21 | 3457.809 | | Mn II | 9 | 3466.279 | | Fe I | 185 |
| 3448.542 | | Mo II | 1 | 3457.99 | | O II | 81 | 3466.336 | | Mn II | 12 |
| 3448.63 | P | Fe III | 27 | 3458.020 | | Ti I | 46 | 3466.34 | | A II | 44,56 |
| 3448.69 | | V II | 118 | 3458.028 | | Co I | 101 | 3466.466 | | Gd II | 53 |
| 3448.786 | | Fe I | 372 | 3458.090 | | Cr I | 253 | 3466.501 | | Fe I | 24 |
| 3448.82 | | Y II | 17 | 3458.13 | P | Fe II | 10 | 3466.58 | | V II | 58 |
| 3448.869 | | Fe I | 242 | 3458.18 | | Fe III | 100 | 3466.85 | P | Fe II | 156 |
| 3448.967 | | Ir I | 1 | 3458.230 | | Al I | 2 | 3466.90 | | O III | 25 |
| 3449.06 | P | Fe I | 442 | 3458.304 | | Fe I | 139 | 3466.952 | | Gd II | 23 |
| 3449.170 | | Co I | 22 | 3458.474 | | Ni I | 19 | 3467.022 | | Cr I | 141,253 |
| 3449.28 | | Cr II | 111 | 3458.91 | | Fe III | 27 | 3467.09 | P | Cr II | 2 |
| 3449.441 | | Co I | 22 | 3458.93 | | Zr II | 58 | 3467.12 | | Ni I | 123 |
| 3449.5 | P | Mn II | 9 | 3459.03 | | Ti II | 125 | 3467.280 | | Ti I | 84 |
| 3449.616 | | Gd II | 7 | 3459.07 | | O II | 81 | 3467.267 | | Gd II | 22 |
| 3449.874 | | Ti I | 46 | 3459.29 | | Cr II | 136 | 3467.33 | | V II | 58 |
| 3450.00 | P | Cr I | 90 | 3459.29 | P | Fe I | 576 | 3467.502 | | Ni I | 3 |
| 3450.14 | P | Fe I | 242 | 3459.374 | | Ce III | 3 | 3467.715 | | Cr I | 110 |
| 3450.328 | | Fe I | 82 | 3459.38 | | Ne II | 51 | 3467.732 | | Ni I | 123 |
| 3450.376 | | Gd II | 22 | 3459.429 | | Fe I | 297 | 3467.874 | | Sm II | 54 |
| 3450.735 | | Ti I | 46 | 3459.431 | | Ti I | | 3467.88 | | Y II | 17 |
| 3450.84 | | Cr II | 60 | 3459.52 | | O III | 25 | 3468.083 | | Gd II | 21 |
| 3450.94 | | O III | 25 | 3459.61 | P | Fe I | 577 | 3468.113 | | Ce II | 178 |
| 3451.046 | | V II | 118 | 3459.911 | | Fe I | 501 | 3468.32 | | K II | 1 |
| 3451.228 | | Fe II | 208 | 3459.95 | P | Fe I | 133 | 3468.476 | | Ca I | 10 |
| 3451.233 | | Gd II | 22 | 3459.95 | | Zr II | 90 | 3468.680 | | Fe II | 114 |
| 3451.318 | | Fe II | | 3459.98 | | O II | 25 | 3468.849 | | Fe I | 242 |
| 3451.33 | | O III | 25 | 3460.03 | | Cr II | 60 | 3468.973 | | Co I | 159 |
| 3451.41 | | B II | 1 | 3460.038 | | Mn II | 1 | 3468.989 | | Gd II | 40 |
| 3451.614 | | Fe II | 207 | 3460.31 | | La II | 119 | 3469.012 | | Fe I | 614 |
| 3451.628 | | Fe I | 139 | 3460.312 | | Mn II | 3 | 3469.307 | | Gd II | 39 |
| 3451.66 | P | Fe I | 241 | 3460.430 | | Cr I | 141 | 3469.390 | | Fe I | 375 |
| 3451.88 | | Re I | 2 | 3460.47 | | Re I | 2 | 3469.486 | | Ni I | 8 |
| 3451.914 | | Gd II | 70 | 3460.719 | | Co I | 35 | 3469.528 | | V II | 58 |
| 3451.915 | | Fe I | 81 | 3460.76 | | Pd I | 2 | 3469.590 | | Cr I | 141 |
| 3452.18 | | Co I | 160 | 3460.776 | | Gd II | 73 | 3469.683 | | Co I | 137 |
| 3452.18 | | La II | 30 | 3461.0 | | Y II | 40 | 3469.834 | | Fe I | 242 |
| 3452.273 | | Fe I | 25 | 3461.173 | | Co I | 162 | 3469.94 | | Zr II | 59 |
| 3452.31 | P | Fe III | 49 | 3461.28 | | Cr II | 148 | 3470.18 | | Y II | 40 |
| 3452.33 | P | Fe II | 89 | 3461.34 | | N IV | 7 | 3470.242 | | Fe II | 89 |
| 3452.470 | | Ti II | 99 | 3461.38 | | Eu II | 13 | 3470.263 | | V II | 58 |
| 3452.55 | | Fe III | 88 | 3461.496 | | Ti II | 6 | 3470.27 | | A II | |
| 3452.670 | | Al I | 2 | 3461.580 | | V II | 6 | 3470.401 | | Cr I | 77 |
| 3452.890 | | Ni I | 17 | 3461.652 | | Ni I | 17 | 3470.42 | | O II | 27 |
| 3453.022 | | Fe I | 301 | 3461.952 | | Gd II | 23 | 3470.529 | | Cr I | 77 |
| 3453.087 | | V II | 132 | 3462.040 | | Rh I | 3 | 3470.657 | | Rh I | 3 |
| 3453.10 | | Ne II | 21 | 3462.108 | | Tm II | | 3470.72 | | Cr I | 77 |
| 3453.17 | | La II | 46 | 3462.353 | | Fe I | 79 | 3470.81 | | O II | 27 |
| 3453.23 | | Cr I | 253 | 3462.494 | | Na II | 4 | 3470.83 | | P II | 12 |
| 3453.31 | | O II | 71 | 3462.65 | | Hf II | 6 | 3470.866 | | Nd II | 70 |
| 3453.328 | | Cr I | 52 | 3462.73 | | Cr II | 2 | 3470.894 | | Ce III | 1 |
| 3453.514 | | Co I | 22 | 3462.748 | | Mn I | 41 | 3471.14 | | Zr II | 114 |
| 3453.595 | | Fe II | | 3462.804 | | Co I | 23 | 3471.18 | | Zr I | 15 |
| 3453.654 | | Ti I | 46 | 3462.808 | | Fe I | 373 | 3471.27 | | Fe I | 82 |
| 3453.665 | | Tm II | 7 | 3462.878 | | Mn II | 12 | 3471.35 | | Ni II | 4 |
| 3453.743 | | Cr I | 52 | 3462.997 | | Gd II | 8 | 3471.350 | | Fe I | 130 |
| 3453.78 | | V II | 132 | 3463.02 | | Zr II | 90 | 3471.382 | | Co I | 161 |
| 3453.84 | P | Cr I | 90 | 3463.079 | | V II | 104 | 3471.49 | | Cr I | 77 |
| 3454 | P | N IV | 7 | 3463.205 | | Ti I | 85 | 3471.59 | | A II | 57 |
| 3454.10 | | A II | 44 | 3463.305 | | Fe I | 48 | 3471.63 | P | Ni I | 124 |
| 3454.145 | | Gd II | 7 | 3463.330 | | Mn II | 12 | 3471.80 | | He I | 44 |
| 3454.16 | | Ni II | 1 | 3463.36 | | N IV | 7 | 3472.07 | | Cr II | 135 |
| 3454.165 | | Ti I | 168 | 3463.499 | | Co I | 42 | 3472.196 | | Co I | 161 |
| 3454.35 | | Fe III | 86 | 3463.52 | | W II | 7 | 3472.38 | | Hf I | 1 |
| 3454.368 | | Ce III | 2 | 3463.63 | | Al II | 55 | 3472.48 | | Lu II | 4 |
| 3454.57 | | Zr II | 59 | 3463.831 | | V II | 168 | 3472.545 | | Ni I | 20 |
| 3454.90 | | O III | 25 | 3463.974 | | Fe II | 4 | 3472.5711 | | Ne I | 2 |
| 3454.904 | | Gd II | 7 | 3463.984 | | Gd II | 40 | 3472.707 | | Co I | 160 |
| 3454.98 | | Cr II | 136 | 3464.02 | | Cr II | 2 | 3472.764 | | Cr I | 77 |
| 3455.04 | | Mn I | 41 | 3464.043 | | Mn II | 12 | 3472.793 | | Ti I | 271 |
| 3455.12 | | O III | 25 | 3464.132 | | Gd II | 90 | 3472.88 | | P II | 2 |
| 3455.237 | | Co I | 6 | 3464.14 | | A II | 70 | 3472.886 | | Fe II | 156 |
| 3455.281 | | Cr I | 51 | 3464.17 | | V II | 104 | 3472.906 | | Cr I | 111 |
| 3455.602 | | Cr I | 51 | 3464.27 | | Fe III | 16 | 3473.01 | P | Fe I | 576 |
| 3455.755 | | Ti I | 46 | 3464.457 | | Sr II | 4 | 3473.219 | | Gd II | 7 |
| 3456.00 | P | Fe II | 4 | 3464.497 | | Fe II | 114 | 3473.23 | P | Fe I | 576 |
| 3456.390 | | Ti II | 99 | 3464.72 | | Re I | 2 | 3473.497 | | Fe I | 26 |
| 3456.661 | | Ti I | 134 | 3464.82 | | Cr I | 51 | 3473.612 | | Cr I | 77 |
| 3456.68 | | Ne II | 28 | 3464.914 | | Fe I | 241 | 3473.82 | | Fe III | 27 |
| 3456.924 | | Co I | 5 | 3465.037 | | Mn II | 12 | 3473.825 | | Fe II | |
| 3456.928 | | Fe II | 76 | 3465.245 | | Cr I | 51 | 3474.018 | | Co I | 4,23 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3474.037 | | Mn II | 3 | 3481.536 | | Cr I | 110 | 3490.765 | | Ti I | 22 |
| 3474.124 | | Mn II | 3 | 3481.558 | | Fe I | 132 | 3490.89 | | A II | 30 |
| 3474.379 | | Cr I | | 3481.675 | | Ti I | 271 | 3491.053 | | Ti II | 6 |
| 3474.41 | P | Fe III | 27 | 3481.750 | | Tm II | 10 | 3491.16 | | Fe III | 103 |
| 3474.530 | | Co I | 24 | 3481.797 | | Gd II | 22 | 3491.19 | P | Ti II | 118 |
| 3474.56 | | N IV | 7 | 3481.92 | P | Fe II | 102 | 3491.24 | | A II | 44 |
| 3474.763 | | Ca I | 10 | 3481.96 | | Ne II | 6 | 3491.316 | | Co I | 6 |
| 3474.780 | | Rh I | 2 | 3482.05 | P | Fe II | 10 | 3491.52 | | A II | 44 |
| 3474.84 | | La II | 143 | 3482.06 | | Mn II | 9 | 3491.954 | | Gd II | 6 |
| 3474.87 | | Cr I | 141 | 3482.36 | | Fe III | 103 | 3491.987 | | Co I | 159 |
| 3474.887 | | Sr II | 4 | 3482.39 | P | Fe II | 133 | 3492.24 | | O IV | 14 |
| 3474.94 | | Fe III | 90 | 3482.426 | | Fe II | | 3492.39 | | Ti II | 125 |
| 3474.94 | | O II | 8 | 3482.56 | P | Cr II | 148 | 3492.956 | | Ni I | 18 |
| 3475.13 | | Cr II | 2 | 3482.58 | | Al I | 17 | 3493.163 | | V II | 6 |
| 3475.25 | P | Fe II | 4 | 3482.58 | | Cr II | 67 | 3493.280 | | Ti I | 22 |
| 3475.25 | | Ne II | 35 | 3482.602 | | Gd II | 40 | 3493.29 | | Fe I | 48 |
| 3475.36 | P | Cr I | 141 | 3482.70 | | Si III | | 3493.34 | P | Fe II | 102 |
| 3475.450 | | Fe I | 6 | 3482.73 | | Ni I | 120 | 3493.468 | | Fe II | 114 |
| 3475.651 | | Fe I | 78 | 3482.905 | | Mn II | 3 | 3493.57 | P | Fe I | 327 |
| 3475.74 | P | Fe II | 4 | 3482.98 | | N IV | 1 | 3493.69 | | Fe I | 297 |
| 3475.867 | | Fe I | 186,373 | 3483.006 | | Fe I | 24 | 3494.15 | | Fe I | 137 |
| 3476.252 | | V II | 58 | 3483.010 | | Ti I | 22 | 3494.25 | P | Fe I | 185 |
| 3476.336 | | Fe I | 133,835 | 3483.410 | | Co I | 23 | 3494.404 | | Gd II | 7 |
| 3476.360 | | Co I | 161 | 3483.54 | | Zr II | 33 | 3494.52 | | Cr II | 2 |
| 3476.452 | | Ti I | 85 | 3483.59 | P | Zr II | 103 | 3494.66 | | O II | 70 |
| 3476.63 | | Ni I | 123 | 3483.62 | P | Ni I | 120 | 3494.672 | | Fe II | 16 |
| 3476.704 | | Fe I | 6 | 3483.774 | | Ni I | 6 | 3494.703 | | Ni I | 154 |
| 3476.74 | | A II | 44 | 3483.80 | | Co I | 5 | 3494.967 | | Cr I | 109 |
| 3476.842 | | Ce II | 132 | 3483.80 | | Ti II | 125 | 3495.16 | P | Fe I | 102 |
| 3476.853 | | Fe I | 242 | 3484.15 | | Cr II | 2 | 3495.285 | | Fe I | 238 |
| 3476.982 | | Ti II | 6 | 3484.16 | P | Cr II | 185 | 3495.37 | | Cr II | 2 |
| 3477.007 | | Fe I | 139 | 3484.18 | | Fe III | 100 | 3495.44 | | O II | 70 |
| 3477.161 | | Cr I | 141 | 3484.32 | | V II | 168 | 3495.56 | | Cr II | |
| 3477.181 | | Ti II | 6 | 3484.348 | | Fe II | 115 | 3495.6 | P | Ni II | 4 |
| 3477.514 | | V II | 58 | 3484.39 | | La II | 113 | 3495.616 | | Fe II | 115 |
| 3477.69 | | Ne II | 21 | 3484.65 | | V II | 6 | 3495.682 | | Co I | 22 |
| 3477.828 | | Rh II | 4 | 3484.84 | | Fe I | 185 | 3495.75 | | Hf II | 10 |
| 3477.836 | | Co I | 161 | 3484.90 | | N IV | 1 | 3495.754 | | Ti I | 84 |
| 3477.850 | | Fe I | 82 | 3484.97 | | Fe I | 138 | 3495.831 | | Mn II | 3 |
| 3477.864 | | Ni I | 124 | 3485.054 | | Ce II | 44 | 3495.94 | | Hf II | 30 |
| 3477.98 | P | Fe I | 836 | 3485.110 | | Ni I | 118 | 3495.960 | | Ti I | 22 |
| 3478.17 | | Cr II | 109 | 3485.16 | | Hf II | 43 | 3496.070 | | Co I | 136 |
| 3478.24 | | A II | 45 | 3485.31 | | Zr II | 57 | 3496.08 | | Y II | 3 |
| 3478.29 | | Zr II | 2 | 3485.342 | | Fe I | 78 | 3496.18 | | Zr II | 1 |
| 3478.292 | | Ni I | 173 | 3485.368 | | Co I | 162 | 3496.19 | | Fe I | 186 |
| 3478.382 | | Fe I | 185 | 3485.689 | | Ti I | 84 | 3496.27 | | O II | 7 |
| 3478.50 | | Zr II | 84 | 3485.700 | | Co I | 68 | 3496.27 | P | V II | 131 |
| 3478.55 | P | Fe II | 16 | 3485.728 | | Fe II | 133 | 3496.29 | | Fe III | 103 |
| 3478.555 | | Co I | 120 | 3485.82 | P | V II | 131 | 3496.29 | P | Ti II | 118 |
| 3478.69 | | N IV | 1 | 3485.867 | | V I | 81 | 3496.350 | | Ni I | 118 |
| 3478.74 | | P II | 2,18 | 3485.888 | | Ni I | 17 | 3496.60 | P | Fe I | 572 |
| 3478.744 | | Co I | 67 | 3485.916 | | V II | 6 | 3496.67 | P | Fe II | 88 |
| 3478.77 | | Cr I | 141 | 3486.08 | P | Fe II | 102 | 3496.681 | | Co I | 19 |
| 3478.788 | | Fe I | 137 | 3486.14 | | W II | 11 | 3496.794 | | Co I | 161 |
| 3478.79 | | Cb II | 7 | 3486.556 | | Fe I | 79 | 3496.814 | | Mn II | 3 |
| 3478.906 | | Rh I | 6 | 3486.93 | | Si III | | 3497.00 | P | V II | 131 |
| 3478.918 | | Ti I | 84 | 3487.008 | | V I | 81 | 3497.00 | | Zr II | 10 |
| 3478.961 | | V II | 182 | 3487.11 | | Fe III | 90 | 3497.031 | | V II | 146 |
| 3478.97 | | He I | 43 | 3487.33 | | A II | 56 | 3497.115 | P | Fe I | 78 |
| 3478.98 | | Hf II | 61 | 3487.57 | | Hf II | 55 | 3497.137 | | Fe I | 78 |
| 3479.02 | | Zr II | 20 | 3487.598 | | Ca I | 10 | 3497.340 | | S III | |
| 3479.14 | | Cr I | 141 | 3487.712 | | Co I | 65 | 3497.39 | | V II | 131 |
| 3479.264 | | Ni I | 105 | 3487.721 | | He I | 42 | 3497.49 | | Hf I | 1 |
| 3479.27 | | Al I | 17 | 3487.80 | P | Ti I | 119 | 3497.536 | | Mn II | 3 |
| 3479.29 | | Hf II | 2 | 3487.990 | | Fe II | 4 | 3497.73 | P | Fe II | 114 |
| 3479.39 | | Zr II | 46 | 3488.18 | | O II | 7 | 3497.81 | P | Fe II | 133 |
| 3479.53 | | Ne II | 49 | 3488.293 | | Ni I | 121 | 3497.843 | | Fe I | 6 |
| 3479.567 | | Cb II | 6 | 3488.453 | | Cr I | 109 | 3497.89 | P | Fe I | 499 |
| 3479.683 | | Fe I | 443,812 | 3488.553 | | Ce II | 187 | 3497.90 | | Zr II | 58,84 |
| 3479.78 | | Al I | 17 | 3488.676 | | Mn II | 3 | 3498.12 | P | V II | 131 |
| 3479.82 | | Cl II | | 3488.92 | | Fe III | 60 | 3498.18 | P | Fe I | 326 |
| 3479.837 | | V II | 6 | 3489.07 | | Cr II | 135 | 3498.19 | P | Ni I | 2 |
| 3479.914 | | Fe II | 4 | 3489.07 | P | Fe III | 26 | 3498.641 | | He I | 40 |
| 3480.012 | | Co I | 67 | 3489.17 | P | Fe II | 102 | 3498.83 | P | V II | 117 |
| 3480.183 | | Ni I | 123,124 | 3489.281 | | Gd II | 106 | 3498.942 | | Ru I | 4 |
| 3480.28 | | Cr I | 141 | 3489.399 | | Co I | 36 | 3499.099 | | Ti I | 84 |
| 3480.40 | | Zr II | 58 | 3489.45 | | Cr II | 109,185 | 3499.49 | | A II | 5 |
| 3480.52 | | A II | 57 | 3489.48 | P | Fe III | 27 | 3499.57 | | Fe III | 26 |
| 3480.525 | | Ti I | 84 | 3489.670 | | Fe I | 442 | 3499.58 | | Zr II | 9 |
| 3480.547 | | Gd II | 23 | 3489.739 | | Ti II | 6 | 3499.67 | | A III | 2 |
| 3480.55 | | A III | 2 | 3489.79 | | Pd I | 8 | 3499.823 | | V II | 5 |
| 3480.75 | | Ne II | 49 | 3489.84 | | O IV | 14 | 3499.877 | | Fe II | 115 |
| 3480.897 | | Ti II | 22 | 3489.947 | | V II | 131 | 3500.15 | | Zr II | 123 |
| 3481.11 | | K III | 3 | 3490.04 | P | Fe I | 331 | 3500.29 | | Fe III | 48 |
| 3481.126 | | Ti I | 271 | 3490.45 | | P II | 19 | 3500.340 | | Ti II | 6 |
| 3481.14 | | Zr II | 46 | 3490.47 | P | Fe I | 835 | 3500.5 | | O II | 80 |
| 3481.17 | | Pd I | 2 | 3490.575 | | Fe I | 6 | 3500.564 | | Fe I | 238 |
| 3481.275 | | Gd II | 22 | 3490.62 | | He I | 41 | 3500.852 | | Ni I | 6 |
| 3481.303 | | Cr I | 77 | 3490.736 | | Co I | 20 | 3501.107 | | Ba I | 3 |
| 3481.44 | | Zr II | 59 | 3490.74 | P | Fe I | 133 | 3501.32 | P | Fe III | 48 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3501.33 | | Zr I | 14 | 3509.843 | | Co I | 22 | 3518.632 | | Gd II | 7 |
| 3501.416 | | F II | 3 | 3509.844 | | Ti II | 88 | 3518.634 | | Ni I | 124 |
| 3501.453 | | Ce II | 67 | 3509.870 | | Fe I | 78 | 3518.68 | | Fe I | 327 |
| 3501.67 | | O II | 70 | 3509.971 | | Mn II | 9 | 3518.75 | | Hf II | 43 |
| 3501.73 | | Co II | 2 | 3510.00 | | La II | 15 | 3518.86 | | Fe I | 78 |
| 3501.75 | | Fe III | 26,48 | 3510.133 | | Gd II | 21 | 3519.077 | | Ce II | 92 |
| 3502.2 | P | O IV | 13 | 3510.18 | P | Fe I | 836 | 3519.24 | | Tl I | 2 |
| 3502.278 | | Co I | 21 | 3510.262 | | Cb II | | 3519.25 | | Fe III | 54 |
| 3502.381 | | He I | 39 | 3510.338 | | Ni I | 18 | 3519.60 | | Zr I | 13 |
| 3502.46 | P | Fe I | 576 | 3510.40 | | Cr I | 263 | 3519.67 | P | Ti II | 118 |
| 3502.524 | | Rh I | 2 | 3510.426 | | Co I | 6 | 3519.72 | P | Fe II | 88 |
| 3502.595 | | Ni I | 3 | 3510.443 | | Fe I | 139 | 3519.766 | | Ni I | 5 |
| 3502.63 | | Co I | 6 | 3510.46 | | Zr II | 20 | 3519.85 | | Fe III | 59 |
| 3502.85 | P | Fe I | 577 | 3510.538 | | Cr I | 109 | 3519.939 | | Ti I | 22 |
| 3502.954 | | F II | 3 | 3510.840 | | Ti II | 88 | 3520.00 | | A II | 56 |
| 3502.998 | | Co I | 135 | 3511.227 | | Sm II | 12 | 3520.022 | | V II | 5 |
| 3503.00 | | P II | 2 | 3511.25 | P | Fe II | 102 | 3520.075 | | Co I | 4 |
| 3503.095 | | F II | 3 | 3511.42 | | V II | 57 | 3520.253 | | Ti II | 98 |
| 3503.206 | | Gd II | 90 | 3511.55 | | Zr II | 124 | 3520.4717 | | Ne I | 7 |
| 3503.36 | | Cr II | 157 | 3511.613 | | Ni I | 152 | 3520.522 | | Ce II | 55 |
| 3503.38 | | Cr I | 109 | 3511.626 | | Ti I | 22 | 3520.547 | | V II | 57 |
| 3503.474 | | Fe II | 4 | 3511.748 | | Fe I | 238 | 3520.55 | | Cr I | 235 |
| 3503.58 | | A III | 2 | 3511.84 | | Cr II | 2 | 3520.72 | | La II | 127 |
| 3503.61 | | Ne II | 28 | 3511.93 | | Fe III | 26 | 3520.85 | | Fe I | 238 |
| 3503.717 | | Co I | 88 | 3511.94 | | Ni I | 124 | 3520.87 | | Zr II | 19 |
| 3503.760 | | Ti I | 22 | 3512.08 | | Fe I | 327 | 3520.9 | P | O IV | 13 |
| 3503.96 | F | Fe III | 48 | 3512.13 | | V II | 193 | 3520.91 | P | Zr II | 59 |
| 3504.40 | | Fe III | 48 | 3512.219 | | Gd II | 38 | 3521.09 | | Eu II | 24 |
| 3504.432 | | V II | 6 | 3512.239 | | Fe I | 326 | 3521.264 | | Fe I | 24 |
| 3504.455 | | Fe I | 371 | 3512.34 | P | Fe III | 26 | 3521.27 | | A II | 56 |
| 3504.48 | | Sb I | 2 | 3512.496 | | Gd II | 89 | 3521.28 | P | Zr II | 84 |
| 3504.596 | | Ce III | 6 | 3512.511 | | He I | 38 | 3521.53 | | Cr I | 263 |
| 3504.728 | | Co I | 135 | 3512.640 | | Co I | 21 | 3521.567 | | Co I | 20 |
| 3504.773 | | Ti I | 167 | 3512.67 | | Zr II | 57 | 3521.64 | P | Fe II | 10 |
| 3504.866 | | Fe I | 131 | 3512.68 | P | Fe I | 327 | 3521.731 | | Co I | 24,100 |
| 3504.890 | | Ti II | 88 | 3512.70 | | Cr I | 109 | 3521.833 | | Fe I | 78 |
| 3505.065 | | Fe I | 498 | 3512.74 | P | Fe I | 613 | 3521.836 | | V II | 57 |
| 3505.133 | | Co I | 160 | 3512.80 | P | Fe I | 330 | 3521.880 | | Ce II | 211 |
| 3505.22 | | Hf II | 7 | 3512.93 | | La II | 44 | 3521.98 | | A II | 45 |
| 3505.44 | | Cl II | 64 | 3512.95 | | Fe I | 501 | 3522.044 | | Nd II | 71 |
| 3505.45 | P | Ti II | 6 | 3513.03 | | Cr II | 107 | 3522.05 | P | Fe II | 10 |
| 3505.47 | | Zr II | 90 | 3513.065 | | Fe I | 48 | 3522.063 | | Mo II | 1 |
| 3505.512 | | Gd II | 22 | 3513.09 | | Ti II | 6 | 3522.13 | | Cr II | 184 |
| 3505.614 | | F II | 3 | 3513.22 | | Cl II | 64 | 3522.14 | | Cl II | 64 |
| 3505.67 | | Zr II | 1 | 3513.478 | | Co I | 5 | 3522.268 | | Fe I | 326 |
| 3505.690 | | V I | 81 | 3513.59 | P | Fe I | 327 | 3522.72 | | Ne II | 35 |
| 3505.901 | | Ti II | 88 | 3513.638 | | Ir I | 2 | 3522.73 | P | Fe I | 538 |
| 3506.02 | | O II | 70 | 3513.69 | | Cl II | 64 | 3522.856 | | Co I | 159 |
| 3506.04 | | Zr II | 84 | 3513.820 | | Fe I | 24 | 3522.896 | | Fe I | 330 |
| 3506.23 | | Fe I | 327 | 3513.877 | | V II | 117 | 3523.02 | | Hf I | 3 |
| 3506.310 | | Co I | 21 | 3513.88 | | K III | 1 | 3523.074 | | Ni I | 34 |
| 3506.40 | | Fe I | | 3513.933 | | Ni I | 17 | 3523.18 | P | Fe I | 673 |
| 3506.48 | | Zr II | 84 | 3513.933 | | Ni II | 1 | 3523.30 | | Fe I | 326 |
| 3506.498 | | Fe I | 130 | 3514.21 | | Co II | 1 | 3523.423 | | Co I | 21 |
| 3506.57 | | V II | 193 | 3514.29 | P | Fe III | 27 | 3523.444 | | Ni I | 16 |
| 3506.58 | P | Fe I | 327 | 3514.39 | | A II | 44 | 3523.47 | P | Ni I | 154 |
| 3506.61 | | Cr II | 108,157 | 3514.422 | | V II | 57 | 3523.701 | | Co I | 66 |
| 3506.643 | | Ti I | 22 | 3514.48 | P | Fe I | 47 | 3524.04 | P | Fe I | 238 |
| 3506.843 | | V I | 81 | 3514.62 | | Fe I | 183 | 3524.075 | | Fe I | 239 |
| 3506.93 | | Fe III | 48 | 3514.64 | | Zr II | 114 | 3524.196 | | Gd II | 6 |
| 3507.14 | P | Fe I | 835 | 3514.87 | | Fe III | 26 | 3524.236 | | Fe I | 130 |
| 3507.316 | | Rh I | 2 | 3515.054 | | Ni I | 19 | 3524.54 | P | Cr II | 107 |
| 3507.37 | | P II | 18 | 3515.41 | P | Fe I | 243 | 3524.541 | | Ni I | 18 |
| 3507.387 | | Fe II | 16 | 3515.421 | | Cb II | 6 | 3524.646 | | Mo II | 1 |
| 3507.39 | | Fe I | 500 | 3515.538 | | Be I | 7 | 3524.713 | | V II | 5 |
| 3507.39 | | Lu II | 1 | 3515.57 | | Fe III | 54 | 3524.87 | | Ti II | 118 |
| 3507.426 | | Ti I | | 3515.818 | | Fe II | 208 | 3525.161 | | Ti I | 167 |
| 3507.534 | | V II | 159 | 3516.00 | | V II | 6 | 3525.17 | | Fe III | 60 |
| 3507.66 | | Zr II | 58 | 3516.05 | | Al II | 54 | 3525.44 | | Cr I | |
| 3507.694 | | Ni I | 3 | 3516.234 | | Ni I | 123 | 3525.81 | | Zr II | 9 |
| 3507.945 | | Ce II | 51 | 3516.403 | | Fe I | 442 | 3525.856 | | Fe I | 329 |
| 3507.964 | | Y II | 47 | 3516.55 | | Fe I | 326 | 3525.872 | | Co I | 63 |
| 3508.09 | | Cr I | | 3516.58 | P | Fe III | 54 | 3526.016 | | Fe I | 240 |
| 3508.213 | | Fe II | 4 | 3516.675 | | Co I | 65 | 3526.039 | | Fe I | 6 |
| 3508.470 | | Ce II | 114 | 3516.838 | | Ti I | 167 | 3526.13 | | Cl II | 64 |
| 3508.494 | | Fe I | 442 | 3516.92 | | O II | 69 | 3526.167 | | Fe I | 24 |
| 3508.52 | | Fe I | 239 | 3516.95 | | Pd I | 1 | 3526.23 | | Fe I | 327 |
| 3508.67 | P | Cr II | 77 | 3517.03 | P | Ni I | 123 | 3526.377 | | Fe I | 326 |
| 3508.731 | | Eu II | 13 | 3517.14 | | La III | 1 | 3526.465 | | Fe I | 131 |
| 3508.81 | | Cr I | | 3517.298 | | V II | 6 | 3526.540 | | Ni I | 155 |
| 3508.852 | | Eu II | 13 | 3517.327 | | He I | 37 | 3526.673 | | Fe I | 326 |
| 3508.94 | | Cl II | 64 | 3517.380 | | Ce II | 230 | 3526.69 | P | Fe I | 497 |
| 3509 | P | O VI | 5 | 3517.48 | | Co II | 1 | 3526.78 | P | Fe I | 321 |
| 3509.024 | | V II | 117 | 3517.53 | P | V II | 57 | 3526.847 | | Co I | 4 |
| 3509.12 | | Fe I | 326 | 3517.890 | | Gd II | 88 | 3526.96 | P | Fe I | 835 |
| 3509.20 | P | V II | 117 | 3517.90 | | A II | 5 | 3527.08 | | Cr I | 274 |
| 3509.32 | | Zr I | 15 | 3518.23 | P | Fe I | 575 | 3527.11 | | P II | 21 |
| 3509.39 | | Cl II | 64 | 3518.340 | | Co I | 36 | 3527.42 | | Zr II | 103 |
| 3509.73 | P | Fe I | 327 | 3518.61 | | P II | 2 | 3527.792 | | Fe I | 326 |
| 3509.78 | | A II | 44 | 3518.62 | | Cr II | 107 | 3527.867 | | V II | 117 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3527.90 | P | Fe I | 296 | 3538.142 | | Rh I | 8 | 3550.82 | | La II | 15 |
| 3527.982 | | Ni I | 6 | 3538.238 | | V II | 4 | 3551.11 | P | Fe I | 321 |
| 3528.024 | | Rh I | 3 | 3538.31 | | Fe I | 775 | 3551.16 | | P II | 12,21 |
| 3528.23 | | Cr II | 109 | 3538.55 | | Fe I | 137 | 3551.52 | | Ne II | 25 |
| 3528.24 | P | Fe I | 182 | 3538.77 | | Fe I | 811 | 3551.534 | | Ni I | 5 |
| 3528.545 | | Gd II | 23 | 3538.86 | | Mg II | 12 | 3551.666 | | Co I | 67 |
| 3528.602 | | Os I | 1 | 3539.00 | | Cr II | 157 | 3551.94 | | Zr II | 1 |
| 3528.891 | | Ni I | 154 | 3539.05 | | Zr II | 102 | 3552.00 | | Al II | 53 |
| 3528.94 | P | Fe I | 23 | 3539.086 | | Ce II | 118 | 3552.112 | | Fe I | 499 |
| 3529.032 | | Co I | 5 | 3539.589 | | Th II | 1 | 3552.42 | P | Fe I | 182 |
| 3529.38 | | Tl I | 2 | 3539.94 | | Ne II | 50 | 3552.50 | P | Cr II | 89 |
| 3529.531 | | Fe I | 537 | 3540.121 | | Fe I | 329 | 3552.516 | | Eu II | 19 |
| 3529.57 | | W II | 12 | 3540.28 | P | Cr II | 89 | 3552.70 | | Hf II | 7 |
| 3529.625 | | Ni I | 76 | 3540.530 | | V I | 45 | 3552.70 | | Y I | 8 |
| 3529.73 | | Cr II | 89 | 3540.709 | | Fe I | 23 | 3552.720 | | Co I | 6 |
| 3529.735 | | V I | 53 | 3540.961 | | Cb II | 4 | 3552.828 | | Fe I | 321 |
| 3529.816 | | Co I | 22 | 3541.083 | | Fe I | 326 | 3552.85 | P | Ti II | 15 |
| 3529.818 | | Fe I | 326 | 3541.22 | P | Fe I | 47 | 3552.953 | | Cr I | |
| 3529.99 | | Zr II | 84 | 3541.341 | | V II | 145 | 3552.989 | | Co I | 67 |
| 3530.03 | | Cl III | 10 | 3541.44 | | Ti IV | | 3553.10 | | Pd I | 9 |
| 3530.22 | | Zr I | 52 | 3541.765 | | F II | 6 | 3553.161 | | Co I | 137 |
| 3530.25 | | P II | 21 | 3542.00 | | Ni I | 119 | 3553.271 | | V I | 53 |
| 3530.385 | | Fe I | 326 | 3542.076 | | Fe I | 326 | 3553.483 | | Ni I | 16 |
| 3530.45 | | V II | 57 | 3542.152 | | Eu II | 17 | 3553.51 | | Mg II | 11 |
| 3530.487 | | He I | 36 | 3542.243 | | Fe I | 128 | 3553.716 | | Gd II | 89 |
| 3530.580 | | Ti I | 22 | 3542.28 | | Ne II | 50 | 3553.741 | | Fe I | 810 |
| 3530.595 | | Ni I | 121 | 3542.480 | | V II | 145 | 3553.968 | | Cr I | 157 |
| 3530.600 | | Sm II | 20 | 3542.56 | P | Fe I | 321 | 3554.09 | | Zr II | 83 |
| 3530.67 | | La II | 12 | 3542.65 | | Zr II | 113 | 3554.122 | | Fe I | 23 |
| 3530.75 | | K II | 7 | 3542.657 | | V I | 45 | 3554.39 | | Ne II | 18 |
| 3530.765 | | V II | 5 | 3542.768 | | Gd II | 51 | 3554.394 | | He I | 34 |
| 3530.85 | | Zr II | 114 | 3542.90 | | Ne II | 34 | 3554.43 | | Lu II | 7 |
| 3531.151 | | Eu II | 24 | 3542.976 | | Co I | 19 | 3554.44 | P | Fe I | 395 |
| 3531.22 | | A II | 5 | 3543.09 | P | Fe I | 182 | 3554.50 | | Fe I | 325 |
| 3531.43 | | Fe I | 182 | 3543.16 | | A II | | 3554.50 | P | Fe II | 176 |
| 3531.44 | | Cr I | 263 | 3543.256 | | Co I | 64 | 3554.524 | | He I | 34 |
| 3531.48 | | V II | 4 | 3543.352 | | Nd II | | 3554.65 | P | Fe I | 154 |
| 3531.848 | | Mn I | 18 | 3543.39 | | Fe I | 183 | 3554.802 | | Gd II | 52 |
| 3531.998 | | Mn I | 18 | 3543.500 | | V I | 53 | 3554.922 | | Fe I | 326 |
| 3532.121 | | Mn I | 18 | 3543.669 | | Fe I | 734 | 3554.993 | | Ce II | 117 |
| 3532.19 | | A II | 57 | 3543.948 | | Rh I | 6 | 3555.08 | P | Fe II | 113 |
| 3532.285 | | V II | 192 | 3544.001 | | Y II | 56 | 3555.142 | | V I | 53 |
| 3532.647 | | Fe II | 132 | 3544.631 | | Fe I | 239 | 3555.18 | | W II | 11 |
| 3532.65 | | N I | | 3544.88 | P | Fe I | 154 | 3555.93 | | Co II | 1 |
| 3532.69 | P | Fe II | 75 | 3544.985 | | Gd II | 51 | 3556.083 | | Y II | 46 |
| 3532.888 | | Cr I | | 3545.03 | | Co II | 1 | 3556.120 | | Co I | 117 |
| 3533.008 | | Fe I | 326 | 3545.16 | | Ni I | 76 | 3556.130 | | Cr II | 7 |
| 3533.043 | | Na II | 1 | 3545.190 | | V II | 5 | 3556.184 | | Ti I | |
| 3533.19 | P | Fe II | 75 | 3545.339 | | V I | 53 | 3556.49 | | P II | 21 |
| 3533.201 | | Fe I | 326 | 3545.58 | | A II | 70 | 3556.54 | P | Zr II | 19 |
| 3533.22 | | Zr I | 14 | 3545.603 | | Ce II | 44 | 3556.61 | | Zr II | 9 |
| 3533.356 | | Co I | 5 | 3545.639 | | Fe I | 321 | 3556.68 | | Fe I | 325 |
| 3533.67 | | P II | 21 | 3545.797 | | Gd II | 2 | 3556.800 | | V II | 5 |
| 3533.676 | | V I | 53 | 3545.832 | | Fe I | 536 | 3556.877 | | Fe I | 327 |
| 3533.757 | | V I | 53 | 3545.84 | | A II | 106 | 3556.91 | | A II | 29 |
| 3533.868 | | Ti II | 98 | 3546.15 | P | Cr II | 134 | 3556.92 | | O III | 24 |
| 3533.97 | | O II | 69 | 3546.190 | | Ce II | 131 | 3557.053 | | Gd II | 22 |
| 3534.051 | | Ce II | 44 | 3546.21 | | Fe I | 183 | 3557.26 | | La II | 29 |
| 3534.14 | | V II | 12 | 3546.22 | | Ne II | 27 | 3557.548 | | Fe II | 176 |
| 3534.52 | | Fe I | 811 | 3546.707 | | Co I | 41 | 3557.796 | | Tm II | 10 |
| 3534.688 | | Mo II | 1 | 3547.029 | | Ti I | 133 | 3557.84 | | Ne II | 6 |
| 3534.769 | | Co I | 118 | 3547.07 | | V II | 69 | 3557.85 | P | Cr II | 76 |
| 3534.914 | | Fe I | 48 | 3547.10 | | Cr II | 134 | 3558.08 | P | Fe I | 572 |
| 3535.04 | | Mg II | 12 | 3547.203 | | Fe I | 321,613 | 3558.189 | | Gd II | 69 |
| 3535.16 | | Zr I | 59 | 3547.69 | | Zr I | 13 | 3558.21 | P | Fe I | 239 |
| 3535.18 | P | V II | 4 | 3547.802 | | Mn I | 18 | 3558.22 | P | Cr II | 89 |
| 3535.304 | | Cb I | 4 | 3547.98 | | Cr I | | 3558.468 | | Gd II | 51 |
| 3535.33 | | A II | 44 | 3548.029 | | Mn I | 18 | 3558.518 | | Fe I | 24 |
| 3535.408 | | Ti II | 98 | 3548.037 | | Fe I | 496 | 3558.538 | | Sc II | 3 |
| 3535.522 | | Tm II | | 3548.185 | | Ni I | 3,20 | 3558.60 | | Cr I | |
| 3535.54 | | Hf II | 9 | 3548.202 | | Mn I | 18 | 3558.772 | | Co I | 20 |
| 3535.628 | | Fe II | 75 | 3548.438 | | Co I | 41 | 3559.101 | | Sm II | |
| 3535.653 | | Sm II | 44 | 3548.51 | | A II | 56 | 3559.21 | | Cr I | |
| 3535.729 | | Sc II | 11 | 3548.55 | P | Fe II | 132 | 3559.328 | | Ce II | 243 |
| 3536.30 | | P II | 20 | 3548.731 | | Cr I | 76 | 3559.45 | P | Fe I | 321 |
| 3536.556 | | Fe I | 326 | 3549.02 | | Y II | 9 | 3559.506 | | Fe I | 498 |
| 3536.576 | | Tm II | 3 | 3549.030 | | V II | 103 | 3559.53 | | A II | 70 |
| 3536.820 | | He I | 35 | 3549.08 | | W II | 13 | 3559.597 | | Co I | 97 |
| 3536.838 | | F II | 6 | 3549.27 | P | Ti II | 117 | 3559.781 | | Cr I | 89 |
| 3536.89 | | Cr I | 50 | 3549.365 | | Gd II | 7 | 3559.93 | | P II | 21 |
| 3536.94 | | Zr II | 10 | 3549.51 | | Zr II | 84 | 3559.930 | | Ni I | 118 |
| 3537.243 | | Ni I | 153 | 3549.61 | | Mg II | 11 | 3560.07 | P | Fe I | 321 |
| 3537.25 | | Cr I | 50 | 3549.72 | | S III | | 3560.306 | | Co I | 64 |
| 3537.491 | | Fe I | 239 | 3549.868 | | Fe I | 48 | 3560.42 | | O IV | 12 |
| 3537.634 | | Ni I | 120 | 3550.03 | | A II | 68 | 3560.594 | | V II | 4 |
| 3537.707 | | Co I | 68 | 3550.11 | P | Zr II | 124 | 3560.68 | | Cl III | 10 |
| 3537.729 | | Fe I | 239 | 3550.19 | P | Ti II | 117 | 3560.705 | | Fe I | 675 |
| 3537.75 | | Ca III | 2 | 3550.46 | | Zr I | 12 | 3560.798 | | Ce II | 51 |
| 3537.896 | | Fe I | 327 | 3550.592 | | Co I | 4 | 3560.855 | | Os I | 6 |
| 3537.99 | | Ne II | 50 | 3550.635 | | Cr I | | 3560.891 | | Co I | 21 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 3561.04 | | A II | 106 |
| 3561.11 | | Zr II | 82 |
| 3561.23 | | Ne II | 31 |
| 3561.575 | | Ti II | 15 |
| 3561.65 | | Hf II | 1 |
| 3561.751 | | Ni I | 2 |
| 3561.910 | | Ti II | 42 |
| 3562.091 | | Ce II | 36 |
| 3562.097 | | Co I | 115 |
| 3562.19 | | A II | 106 |
| 3562.29 | | Cr I | 308 |
| 3562.48 | | Cr I | 281 |
| 3562.48 | | P II | 22 |
| 3562.60 | P | Fe I | 237 |
| 3562.912 | | Co I | 64 |
| 3562.950 | | He I | 33 |
| 3563.36 | | O IV | 12 |
| 3563.61 | P | Fe I | 325 |
| 3563.71 | | V II | 4 |
| 3563.92 | | Cr II | 134 |
| 3564.046 | | Gd II | 52 |
| 3564.11 | | Fe I | 48 |
| 3564.115 | | Co I | 159 |
| 3564.30 | | Cr I | 281 |
| 3564.34 | | A II | 43 |
| 3564.51 | P | Fe I | 183 |
| 3564.54 | P | Fe II | 113 |
| 3564.56 | P | Fe I | 183 |
| 3564.67 | P | Ni I | 73 |
| 3564.947 | | Co I | 19 |
| 3564.953 | | Cr I | 308 |
| 3565.02 | | A II | 57 |
| 3565.15 | | Cr I | 50 |
| 3565.31 | | Cr II | 107 |
| 3565.326 | | Ti II | 76 |
| 3565.381 | | Fe I | 24 |
| 3565.41 | | Zr II | 102 |
| 3565.55 | | Cr I | 50,281 |
| 3565.583 | | Fe I | 321,328 |
| 3565.83 | P | Fe I | 571 |
| 3565.84 | | Ne II | 34 |
| 3566.00 | | Ti II | 42 |
| 3566.052 | | Fe II | 155 |
| 3566.10 | | Cr I | 284 |
| 3566.10 | | Zr I | 15 |
| 3566.148 | | Fe II | 132 |
| 3566.177 | | V I | 45 |
| 3566.177 | | V II | 4 |
| 3566.31 | P | Fe I | 127 |
| 3566.37 | | Cr II | 76 |
| 3566.372 | | Ni I | 36 |
| 3566.43 | | P II | 22 |
| 3566.472 | | Tm II | 6 |
| 3566.59 | | Fe I | 181 |
| 3566.836 | | Sm II | |
| 3567.045 | | Fe I | 325 |
| 3567.116 | | Gd II | 89 |
| 3567.171 | | S II | 56 |
| 3567.36 | | Fe I | 183 |
| 3567.654 | | Gd II | 51 |
| 3567.701 | | Sc II | 3 |
| 3567.84 | | Lu I | 3 |
| 3568.04 | | Cl II | 78 |
| 3568.14 | | Zr II | 46 |
| 3568.271 | | Sm II | 47 |
| 3568.36 | | Cr I | 284 |
| 3568.423 | | Fe I | 321 |
| 3568.426 | | Co I | 61 |
| 3568.53 | | Ne II | 9 |
| 3568.828 | | Fe I | 673 |
| 3568.940 | | V I | 122 |
| 3568.97 | P | Fe II | 113 |
| 3568.977 | | Fe I | 294 |
| 3569.03 | | Hf II | 7 |
| 3569.083 | | V I | 53 |
| 3569.14 | | Cr I | 281 |
| 3569.370 | | Co I | 35 |
| 3569.493 | | Mn I | 18 |
| 3569.566 | | Gd II | 51 |
| 3569.804 | | Mn I | 18 |
| 3569.94 | | A II | 57 |
| 3569.99 | | Fe I | 135 |
| 3570.047 | | Mn I | 18 |
| 3570.10 | | La II | 142 |
| 3570.100 | | Fe I | 24 |
| 3570.243 | | Fe I | 326 |
| 3570.34 | | P II | 18 |
| 3570.57 | P | Cr II | 89 |
| 3570.60 | P | Fe I | 164 |
| 3570.662 | | W I | 3,5 |
| 3570.77 | | A II | 69 |
| 3571.037 | | V I | 122 |
| 3571.16 | | Pd I | 1 |
| 3571.228 | | Fe I | 46 |
| 3571.26 | | Ne II | 31 |
| 3571.37 | | Cr II | 107 |
| 3571.64 | P | Cr II | 89 |
| 3571.653 | | V I | 122 |
| 3571.869 | | Ni I | 5 |
| 3571.933 | | Gd II | 4 |
| 3571.97 | P | Cr I | 157 |
| 3571.995 | | Fe I | 321 |
| 3572.32 | P | Fe I | 182 |
| 3572.46 | | Fe III | 105 |
| 3572.47 | | Zr II | 1 |
| 3572.48 | | W II | 3 |
| 3572.523 | | Sc II | 3 |
| 3572.60 | | Fe I | 325 |
| 3572.734 | | Pb I | 3 |
| 3572.748 | | Cr I | 75 |
| 3573.09 | | Zr II | 9 |
| 3573.27 | P | Ni I | 123 |
| 3573.403 | | Fe I | 673 |
| 3573.516 | | V I | 122 |
| 3573.557 | | V II | 78 |
| 3573.643 | | Cr I | 75 |
| 3573.737 | | Ti II | 15 |
| 3573.842 | | Fe I | 181 |
| 3573.896 | | Fe I | 611 |
| 3574.039 | | Cr I | 74,308 |
| 3574.23 | | Ne II | 9 |
| 3574.245 | | Ti I | 247 |
| 3574.340 | | V II | 78 |
| 3574.37 | P | Fe I | 181 |
| 3574.38 | | Cr I | |
| 3574.64 | | Ne II | 9 |
| 3574.805 | | Cr I | 75 |
| 3574.935 | | Cr I | 74 |
| 3574.967 | | Co I | 21 |
| 3575.11 | | Fe I | 321 |
| 3575.249 | | Fe I | 322 |
| 3575.361 | | Co I | 4 |
| 3575.374 | | Fe I | 496 |
| 3575.69 | P | Cr II | 107 |
| 3575.79 | | Zr I | 12 |
| 3575.850 | | Cb I | 4 |
| 3575.952 | | Ni I | 120 |
| 3575.976 | | Fe I | 321,328 |
| 3576.00 | | Cl II | 78 |
| 3576.23 | P | Cr II | 171 |
| 3576.340 | | Sc II | 3 |
| 3576.38 | | Ti II | 76 |
| 3576.44 | | Ti IV | |
| 3576.62 | | A II | 56 |
| 3576.760 | | Fe I | 613a |
| 3576.762 | | Ni II | 4 |
| 3576.772 | | Gd II | 51 |
| 3576.88 | | Zr II | 9 |
| 3577.220 | | V II | 78 |
| 3577.240 | | Ni I | 3 |
| 3577.260 | | Co I | 41 |
| 3577.458 | | Ce II | 51 |
| 3577.644 | | V II | 69 |
| 3577.857 | | V II | 78 |
| 3577.880 | | Mn I | 8 |
| 3578.03 | | Co II | 1 |
| 3578.076 | | Co I | 117 |
| 3578.22 | | Zr II | 83 |
| 3578.380 | | Fe I | 321 |
| 3578.596 | | Gd II | 21 |
| 3578.636 | | V II | 78 |
| 3578.67 | P | Fe I | 127 |
| 3578.687 | | Cr I | 4 |
| 3578.687 | | Ti II | 117 |
| 3578.89 | | La II | 155 |
| 3578.903 | | Co I | 41 |
| 3579.029 | | Co I | 41 |
| 3579.549 | | Gd II | 89 |
| 3579.83 | P | Fe I | 573 |
| 3580.10 | | La II | 155 |
| 3580.277 | | Cb I | 4 |
| 3580.618 | | Gd II | 89 |
| 3580.71 | P | Sc II | 40 |
| 3580.927 | | Sc II | 3 |
| 3580.941 | | Sm II | |
| 3581.195 | | Fe I | 23 |
| 3581.62 | | A II | 56 |
| 3581.645 | | Fe I | 295 |
| 3581.68 | | La II | 136 |
| 3581.80 | | C II | 23 |
| 3581.91 | | Gd II | 69 |
| 3581.916 | | Fe I | 497 |
| 3582.08 | | Zr II | 101 |
| 3582.201 | | Fe I | 612 |
| 3582.34 | P | Fe I | 568 |
| 3582.35 | | A II | 56 |
| 3582.56 | | Fe I | 181 |
| 3582.69 | | Fe I | 328 |
| 3583.098 | | Rh I | 3 |
| 3583.337 | | Fe I | 574 |
| 3583.394 | | Sm II | 20 |
| 3583.54 | P | Fe II | 101 |
| 3583.676 | | Mn I | 25 |
| 3583.704 | | V I | 45 |
| 3584.01 | P | Cr II | 107 |
| 3584.259 | | Sm II | 12 |
| 3584.366 | | Cr I | |
| 3584.53 | | Y II | 9 |
| 3584.663 | | Fe I | 294 |
| 3584.790 | | Fe I | 322 |
| 3584.801 | | Co I | 6 |
| 3584.960 | | Fe I | 395,611 |
| 3584.962 | | Gd II | 7 |
| 3584.98 | | C II | 23 |
| 3585.154 | | Co I | 21 |
| 3585.193 | | Fe I | 438 |
| 3585.31 | | Cr II | 13 |
| 3585.320 | | Fe I | 23 |
| 3585.54 | | Cr II | 13 |
| 3585.708 | | Fe I | 23 |
| 3585.808 | | Co I | 100 |
| 3585.83 | | C II | 23 |
| 3585.852 | | Ti I | |
| 3585.91 | | Mo II | 1 |
| 3586.082 | | Co I | 87 |
| 3586.10 | P | Fe I | 497 |
| 3586.114 | | Fe I | 611 |
| 3586.12 | | Fe III | 36 |
| 3586.23 | | Cr I | 157 |
| 3586.28 | | Zr I | 12 |
| 3586.543 | | Mn I | 8 |
| 3586.557 | | Al II | 7 |
| 3586.708 | Forb | Al II | 7 |
| 3586.75 | P | Fe I | 325 |
| 3586.811 | Forb | Al II | 7 |
| 3586.83 | P | Sc II | 40 |
| 3586.912 | | Al II | 7 |
| 3586.936 | | Al II | 7 |
| 3586.985 | | Fe I | 23 |
| 3587.068 | | Al II | 7 |
| 3587.130 | | Ti II | 15 |
| 3587.16 | P Forb | He I | 32 |
| 3587.165 | | Al II | 7 |
| 3587.186 | | Co I | 35 |
| 3587.186 | | Gd II | 1 |
| 3587.195 | Forb | Al II | 7 |
| 3587.252 | | He I | 31 |
| 3587.253 | | Fe I | 325 |
| 3587.309 | | Al II | 7 |
| 3587.342 | | Al II | 7 |
| 3587.396 | | He I | 31 |
| 3587.424 | | Fe I | 134 |
| 3587.450 | | Al II | 7 |
| 3587.504 | | Nd II | |
| 3587.53 | | Fe III | 36 |
| 3587.68 | | C II | 23 |
| 3587.69 | P | Fe I | 322 |
| 3587.75 | | Y I | |
| 3587.752 | | Fe I | |
| 3587.78 | | Cl II | 78 |
| 3587.931 | | Ni I | 16 |
| 3587.95 | P | Fe II | 10 |
| 3587.98 | | Zr II | 10 |
| 3588.13 | | V II | 78 |
| 3588.23 | P | Fe I | 47 |
| 3588.30 | | Cr II | 107 |
| 3588.32 | | Zr II | 10 |
| 3588.44 | | A II | 56 |
| 3588.52 | P | Fe I | 394 |
| 3588.615 | | Fe I | 325 |
| 3588.80 | | Zr II | 57 |
| 3588.918 | | Fe I | 322 |
| 3588.92 | | C II | 23 |
| 3589.107 | | Fe I | 23 |
| 3589.215 | | Ru I | 4 |
| 3589.456 | | Fe I | 295 |
| 3589.635 | | Sc II | 3 |
| 3589.67 | | C II | 23 |
| 3589.745 | | V II | 4 |
| 3589.77 | | Fe III | |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3589.973 | | Mn I | 25 | 3601.666 | | Cr I | 74 | 3609.687 | | Ce II | 179 |
| 3590.08 | | Fe I | 440 | 3601.692 | | Sm II | 20 | 3609.752 | | Co I | 147 |
| 3590.29 | P | Fe I | 497 | 3601.782 | | Mn I | 25 | 3609.788 | | Nd II | |
| 3590.46 | | Si III | 7 | 3601.916 | | Al III | 1 | 3610.052 | | Cr I | 49 |
| 3590.468 | | Gd II | 22 | 3601.93 | | Y II | 9 | 3610.07 | | Cl II | |
| 3590.47 | | Ne II | 32 | 3602.079 | | Co I | 4 | 3610.154 | | Ti I | 58 |
| 3590.475 | | Sc II | 3 | 3602.10 | | Cl III | 1 | 3610.159 | | Fe I | 321 |
| 3590.598 | | Ce II | 232 | 3602.10 | | Fe I | 322 | 3610.25 | | La II | |
| 3590.66 | | Fe I | 953 | 3602.281 | | Ni I | 3 | 3610.299 | | Mn I | 8 |
| 3590.87 | | C II | 23 | 3602.46 | | Fe I | 322 | 3610.33 | P | Fe II | 112 |
| 3590.99 | | Fe I | 573 | 3602.534 | | Fe I | 324,391 | 3610.38 | P | Fe II | 175 |
| 3591.345 | | Fe I | 321 | 3602.574 | | Cr I | 74 | 3610.462 | | Ni I | 18 |
| 3591.485 | | Fe I | 568 | 3602.60 | P | Fe II | 101 | 3610.703 | | Fe I | 323 |
| 3591.746 | | Co I | 134 | 3602.61 | P | Cr I | 140 | 3610.76 | | Gd II | 89 |
| 3591.912 | | Gd II | 51 | 3602.70 | P | Fe I | 390 | 3610.794 | | Th II | 3 |
| 3592.012 | | V II | 4 | 3602.77 | P | Fe I | 370 | 3610.85 | P | Cr II | 171 |
| 3592.486 | | Fe I | 237 | 3603.20 | | Eu II | 16 | 3611.06 | | Y II | 9 |
| 3592.595 | | Nd II | | 3603.205 | | Fe I | 295 | 3611.418 | | Ni I | 119 |
| 3592.603 | | Sm II | 39 | 3603.46 | | A II | 57 | 3611.54 | P | Ni I | 2 |
| 3592.68 | | Fe I | 569 | 3603.572 | | Fe I | 181 | 3611.57 | | Eu II | 15 |
| 3592.709 | | Gd II | 69,89 | 3603.61 | | Cr II | 13 | 3611.58 | | V II | |
| 3592.881 | | Fe I | 77 | 3603.72 | | Cl II | 78 | 3611.701 | | Co I | 115 |
| 3592.92 | | Y I | 8 | 3603.745 | | Cr I | 74 | 3611.72 | | Fe III | 36 |
| 3593.02 | P | Cr II | 13 | 3603.80 | | Cr II | 13 | 3611.84 | | A II | 30 |
| 3593.022 | | Ru I | 4 | 3603.828 | | Fe I | 496 | 3611.90 | | Zr II | 113 |
| 3593.093 | | Ti II | 76 | 3603.845 | | Ti I | 20 | 3612.068 | | Fe I | 325 |
| 3593.15 | | Fe III | 36 | 3603.86 | | Cr II | 13 | 3612.34 | | La II | 125 |
| 3593.323 | | V II | 4 | 3603.88 | | Fe III | 36 | 3612.34 | | Zr II | 146 |
| 3593.33 | | Fe I | 571 | 3603.91 | | A II | 43,68 | 3612.35 | | Ne II | 26 |
| 3593.445 | | Gd II | 52 | 3604.21 | P | Fe II | 175 | 3612.352 | | Al III | 1 |
| 3593.488 | | Cr I | 4 | 3604.284 | | Ti I | 21 | 3612.470 | | Rh I | 1 |
| 3593.5259 | | Ne I | 7 | 3604.285 | | Sm II | 47 | 3612.51 | P | Fe I | 613a |
| 3593.60 | | N II | 26 | 3604.375 | | V II | 130 | 3612.609 | | Cr I | 252 |
| 3593.76 | | A II | 117 | 3604.383 | | Fe I | 323 | 3612.741 | | Nf I | 6 |
| 3593.80 | P | Fe I | 182 | 3604.469 | | Co I | 136 | 3612.85 | | Cl III | 1 |
| 3594.10 | P | Fe I | 154 | 3604.51 | | Cl II | 78 | 3612.940 | | Fe I | 46,77 |
| 3594.13 | P | Sc II | 40 | 3604.54 | | Cr I | 49,89 | 3613.03 | | S II | 4 |
| 3594.18 | | Ne II | 34 | 3604.95 | P | Cr I | 74 | 3613.08 | P | Fe I | 322 |
| 3594.41 | | A II | 23 | 3604.96 | P | Fe I | 77 | 3613.08 | | Zr II | 1 |
| 3594.462 | | S II | 16 | 3605.018 | | Co I | 97 | 3613.15 | | Fe I | 324 |
| 3594.632 | | Fe I | 322 | 3605.05 | P | Cr I | 49 | 3613.21 | | Cr II | 13 |
| 3594.87 | P | Co I | 135 | 3605.333 | | Cr I | 4 | 3613.26 | | Cr II | 13 |
| 3594.870 | | Co I | 4 | 3605.370 | | Co I | 20 | 3613.30 | P | Ti II | 76 |
| 3594.89 | P | Sc II | 40 | 3605.41 | P | Cr I | 49 | 3613.392 | | Gd II | 69 |
| 3595.119 | | Mn I | 8 | 3605.450 | | Fe I | 294 | 3613.43 | | Zr II | 8,45 |
| 3595.294 | | Fe I | 322 | 3605.46 | | Y II | 46 | 3613.45 | P | Fe I | 672 |
| 3595.66 | | Fe I | 322 | 3605.50 | P | Fe I | 322 | 3613.490 | | Gd II | 87 |
| 3595.87 | | Fe I | 181 | 3605.50 | P | Sc II | 40 | 3613.641 | | He I | 6 |
| 3595.991 | | S II | 4 | 3605.52 | P | Cr I | 252 | 3613.669 | | Cr I | 89 |
| 3596.048 | | Ti II | 15 | 3605.665 | | Gd II | 4 | 3613.70 | | Zr I | 33 |
| 3596.179 | | Ru I | 4 | 3605.691 | | Mn I | 25 | 3613.701 | | Ce II | 110 |
| 3596.194 | | Rh I | 1 | 3605.89 | | A II | 30 | 3613.80 | | Mg II | 2 |
| 3596.20 | | Fe I | 181 | 3606.062 | | Ti I | 303 | 3613.836 | | Sc II | 2 |
| 3596.351 | | Mo II | 1 | 3606.18 | P | Fe II | 175 | 3613.95 | P | Fe I | 612 |
| 3596.510 | | Co I | 118 | 3606.38 | P | Fe I | 233 | 3614.10 | | Co I | 64 |
| 3596.55 | | Ti II | 76 | 3606.5224 | | A I | 5 | 3614.21 | | Gd II | 51 |
| 3597.05 | | Fe I | 569 | 3606.53 | P | Fe I | 133 | 3614.26 | | Cr II | 132 |
| 3597.147 | | Rh I | 5 | 3606.679 | | Fe I | 294 | 3614.34 | | Co I | 134 |
| 3597.24 | P | Fe I | 856 | 3606.786 | | Ti I | 20 | 3614.550 | | Fe I | |
| 3597.39 | P | Sc II | 40 | 3606.852 | | Ni I | 120,173 | 3614.673 | | Nd II | 38 |
| 3597.42 | | Hf II | 54 | 3607.04 | | Co I | 67 | 3614.77 | P | Fe I | 395 |
| 3597.50 | | Al II | 52 | 3607.05 | P | Fe II | 101 | 3614.79 | | Zr II | 9 |
| 3597.705 | | Ni I | 18 | 3607.25 | P | Cr I | 140 | 3614.873 | | Fe II | 112 |
| 3598.196 | | Ce II | 116 | 3607.30 | | V II | 77 | 3615.01 | P | Fe I | 154 |
| 3598.22 | | Fe III | 105 | 3607.39 | | Zr II | 83 | 3615.09 | | Cl II | 70 |
| 3598.71 | | Fe I | 674 | 3607.537 | | Mn I | 8 | 3615.19 | | Fe I | 569 |
| 3598.714 | | Ti I | 59 | 3607.625 | | Ce II | 178 | 3615.387 | | Co I | 66 |
| 3598.93 | | Fe I | 568 | 3607.92 | P | Cr I | 140 | 3615.45 | P | Cr II | 147 |
| 3598.98 | | Fe I | 322 | 3608.146 | | Fe I | 325,438 | 3615.64 | | Mg II | 2 |
| 3599.304 | | He I | 30 | 3608.307 | | Co I | 20 | 3615.645 | | Cr I | 3 |
| 3599.395 | | Cr I | 89 | 3608.32 | | V II | 242 | 3615.66 | | Fe I | 46 |
| 3599.442 | | He I | 30 | 3608.401 | | Cr I | 252 | 3615.817 | | Nd II | 69 |
| 3599.49 | | Fe III | 36 | 3608.49 | P | Fe II | 171 | 3615.88 | | N II | 26 |
| 3599.530 | | Ni I | 121 | 3608.494 | | Mn I | 8 | 3616.15 | P | Fe I | 569 |
| 3599.624 | | Fe I | 609 | 3608.58 | P | Cr I | 140 | 3616.152 | | Eu II | 28 |
| 3599.91 | | Zr II | 123 | 3608.66 | | Cr II | 133 | 3616.29 | F | Cr II | 147 |
| 3599.974 | | Ce II | 219 | 3608.7 | P | Ni II | 4 | 3616.326 | | Fe I | 132 |
| 3600.22 | | A II | 115 | 3608.753 | | Gd II | 69 | 3616.572 | | Fe I | |
| 3600.48 | P | Fe I | 498 | 3608.766 | | Tm II | 3 | 3616.916 | | S II | 56 |
| 3600.583 | | Ce II | 236 | 3608.861 | | Fe I | 23 | 3617.09 | | Fe I | 535 |
| 3600.74 | | Y II | 9 | 3608.89 | P | Ti II | 76 | 3617.164 | | Gd II | 89 |
| 3600.803 | | Co I | 63 | 3608.96 | | C III | 10 | 3617.317 | | Fe I | |
| 3600.93 | | Fe III | 36 | 3609.04 | | Cr I | 49 | 3617.32 | | Cr II | 147 |
| 3600.963 | | Gd II | 69 | 3609.09 | | N II | 26 | 3617.522 | | W I | 8 |
| 3601.07 | | La II | 44 | 3609.314 | | Ni I | 16 | 3617.53 | P | Fe I | 323 |
| 3601.16 | | Ti I | 172 | 3609.46 | P | Fe I | 322 | 3617.788 | | Fe I | 496 |
| 3601.18 | | Zr I | 13 | 3609.479 | | Cr I | 49 | 3617.97 | P | Fe I | 181 |
| 3601.42 | P | Fe I | 127 | 3609.491 | | Sm II | 30 | 3618.010 | | Co I | 36 |
| 3601.51 | | A II | 4 | 3609.56 | | Pd I | 2 | 3618.30 | P | Fe I | 324 |
| 3601.623 | | Al III | 1 | 3609.61 | | C III | 10 | 3618.392 | | Fe I | 295,571 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3618.49 | | K II | 1 | 3629.10 | P | Sc II | 18 | 3637.15 | | La II | 55 |
| 3618.62 | P | Fe I | 569 | 3629.12 | | Zr II | 113 | 3637.251 | | Fe I | 180 |
| 3618.769 | | Fe I | 23 | 3629.51 | | Gd II | 69 | 3637.319 | | Co I | 117 |
| 3618.88 | | Cl II | 77 | 3629.741 | | Mn I | 8 | 3637.73 | | Fe I | 229 |
| 3618.91 | P | Fe I | 130 | 3629.906 | | Ni I | 182 | 3637.83 | | Sb I | 1 |
| 3618.924 | | V II | 158 | 3629.99 | P | Fe II | 111 | 3637.862 | | Fe I | 385 |
| 3618.96 | P | Fe I | 77 | 3630.03 | | Zr II | 10 | 3637.89 | | A II | |
| 3619.284 | | Mn I | 8 | 3630.26 | P | Ni I | 180 | 3637.966 | | Ti I | 18 |
| 3619.392 | | Ni I | 35 | 3630.353 | | Fe I | 323 | 3638.15 | | S III | |
| 3619.460 | | Cr I | 48 | 3630.67 | P | Fe I | 126 | 3638.16 | P | Fe I | 324 |
| 3619.514 | | Cb II | 4 | 3630.740 | | Sc II | 2 | 3638.296 | | Fe I | 294 |
| 3619.66 | P | Fe I | 130 | 3630.748 | | Ca I | 9 | 3638.49 | P | Ti I | 118 |
| 3619.76 | | Fe I | 180 | 3630.974 | | Ca I | 9 | 3638.70 | | O III | 35 |
| 3620.00 | P | Fe I | 324 | 3631.103 | | Fe I | 322 | 3638.767 | | Sm II | |
| 3620.23 | | Fe I | 324 | 3631.126 | | Sm II | | 3638.80 | | Pt I | 6 |
| 3620.27 | | Fe III | 25 | 3631.194 | | Ce II | 88 | 3639.024 | | V I | 83 |
| 3620.422 | | Co I | 116 | 3631.266 | | Na II | 2 | 3639.14 | P | Mn I | 7 |
| 3620.496 | | V II | 181 | 3631.390 | | Co I | 4 | 3639.19 | | Cl II | 77 |
| 3620.82 | | A II | 67 | 3631.41 | | P II | 22 | 3639.443 | | Co I | 64 |
| 3620.87 | P | Fe I | 611 | 3631.464 | | Fe I | 23 | 3639.568 | | Pb I | 1 |
| 3620.88 | P | Fe I | 323 | 3631.48 | P | Cr II | 170 | 3639.76 | P | Sc II | 18 |
| 3620.95 | | Y I | 8 | 3631.482 | | V II | 76 | 3639.802 | | Cr I | 47 |
| 3621.06 | | A II | 4 | 3631.49 | | Cr II | 12 | 3639.85 | | A II | 116 |
| 3621.19 | P | Fe I | 574 | 3631.72 | | Cr II | 12 | 3640.18 | | Gd II | 23 |
| 3621.203 | | V II | 76 | 3631.948 | | Co I | 133 | 3640.388 | | Fe I | 295 |
| 3621.22 | | Co II | 1 | 3631.959 | | W I | 3 | 3640.39 | | Cr I | 47 |
| 3621.229 | | Sm II | 12 | 3631.999 | | Ti I | | 3640.891 | | F II | 11 |
| 3621.273 | | Fe II | 144 | 3632.022 | | S III | 1 | 3641.01 | | Cr I | 47 |
| 3621.463 | | Fe I | 294 | 3632.042 | | Fe I | 496 | 3641.096 | | V I | 115 |
| 3621.51 | | Cr II | 98 | 3632.106 | | Ce II | 114 | 3641.22 | P | Fe II | 111 |
| 3621.718 | | Fe I | 808 | 3632.126 | | V II | 76 | 3641.330 | | Ti II | 52 |
| 3622 | P | O VI | 3 | 3632.292 | | Fe II | 112 | 3641.39 | | Gd II | 86 |
| 3622.00 | P | Fe I | 233 | 3632.46 | | Cr I | 49 | 3641.42 | | W II | 1 |
| 3622.001 | | Fe I | 295 | 3632.558 | | Fe I | 437 | 3641.45 | P | Fe I | 323 |
| 3622.145 | | Ce II | 71 | 3632.75 | | Ne II | 33 | 3641.470 | | Cr I | 47 |
| 3622.15 | | A II | 42 | 3632.839 | | Co I | 147 | 3641.641 | | Ni I | 6 |
| 3622.289 | | V. II | 144 | 3632.839 | | Cr I | 49 | 3641.66 | | La II | 136 |
| 3622.45 | | Cr II | 171 | 3632.979 | | Fe I | 135 | 3641.784 | | Co I | 99 |
| 3622.504 | | Sm II | 6 | 3633.07 | P | Fe I | 390 | 3641.830 | | Cr I | 47 |
| 3622.54 | | Eu II | 18 | 3633.13 | | Y II | 2 | 3641.985 | | F II | 11 |
| 3622.69 | | Cl III | 1 | 3633.16 | P | Cr II | 147 | 3642.387 | | Ni I | 75 |
| 3622.81 | P | Fe II | 175 | 3633.340 | | Co I | 116 | 3642.675 | | Ti I | 19 |
| 3622.850 | | Mo II | 1 | 3633.458 | | Ti I | | 3642.785 | | Sc II | 2 |
| 3623.03 | | V II | 77 | 3633.49 | | Zr II | 102 | 3642.798 | | F II | 11 |
| 3623.187 | | Fe I | 180 | 3633.64 | P | Fe I | 395 | 3643.181 | | Co I | 99 |
| 3623.316 | | Sm II | 12 | 3633.837 | | Fe I | 440 | 3643.22 | | Cr II | 1 |
| 3623.440 | | Fe I | 233,438 | 3633.99 | P | Ti II | 116 | 3643.4 | | Y II | 55 |
| 3623.51 | P | Fe I | 393 | 3634.04 | | Cr II | 147 | 3643.47 | | Mo II | 1 |
| 3623.772 | | Fe I | 323 | 3634.10 | P Forb | He I | 29 | 3643.627 | | Fe I | 385 |
| 3623.792 | | Mn I | 8 | 3634.13 | | V II | 180 | 3643.716 | | Fe I | 233 |
| 3623.837 | | Ce II | 235 | 3634.235 | | He I | 28 | 3643.80 | P | Fe I | 670 |
| 3623.837 | | Ce II | | 3634.290 | | Sm II | 19 | 3643.82 | P | Fe I | 46 |
| 3623.87 | | Zr I | 12 | 3634.326 | | Fe I | 389 | 3643.864 | | V I | 83 |
| 3623.98 | | Lu II | 6 | 3634.373 | | He I | 28 | 3643.89 | | Ne II | 5 |
| 3624.00 | | Hf II | 18 | 3634.52 | P | Fe I | 323 | 3643.941 | | Ni I | 174 |
| 3624.06 | P | Fe I | 570 | 3634.698 | | Fe I | | 3644.12 | P | Cr II | 98 |
| 3624.111 | | Ca I | 9 | 3634.71 | | Pd I | 1 | 3644.19 | P | Fe II | 131 |
| 3624.25 | | Fe III | 93 | 3634.713 | | Co I | 146 | 3644.35 | | Hf II | 6 |
| 3624.30 | | Fe I | 133 | 3634.757 | | Gd II | 69 | 3644.410 | | Ca I | 9 |
| 3624.337 | | Co I | 41 | 3634.83 | | A II | 29 | 3644.47 | | He II | 5 |
| 3624.688 | | Fe II | | 3634.928 | | Sm II | 6 | 3644.58 | P | Fe I | 235 |
| 3624.72 | P | Ni I | 121 | 3634.941 | | Ni I | 33 | 3644.699 | | Ti I | |
| 3624.733 | | Ni I | 2 | 3635.08 | P | Fe I | 919 | 3644.70 | | Cr II | 1 |
| 3624.828 | | Ti II | 52 | 3635.13 | | A II | 4 | 3644.765 | | Ca I | 9 |
| 3624.890 | | Fe II | 144 | 3635.144 | | Mo II | 5 | 3644.798 | | Fe I | 570 |
| 3624.955 | | Co I | 21 | 3635.19 | | Fe I | 490 | 3644.86 | | Ne II | 41 |
| 3625.140 | | Fe I | 323 | 3635.202 | | Ti I | 20 | 3644.87 | P | Ti II | 116 |
| 3625.26 | | Gd II | 69 | 3635.28 | P | Fe I | 324 | 3644.990 | | Ca I | 9 |
| 3625.30 | P | Cr II | 98 | 3635.281 | | Cr I | 3 | 3645.090 | | Fe I | 323,495 |
| 3625.608 | | V II | 76 | 3635.334 | | Y II | 46 | 3645.190 | | Co I | 61 |
| 3625.92 | P | Cr II | 147 | 3635.36 | P | Ti II | 62 | 3645.20 | | O III | 35 |
| 3626.020 | | Co I | 41 | 3635.43 | P | Cr II | 98 | 3645.290 | | Sm II | 19 |
| 3626.085 | | Ti I | 20 | 3635.462 | | Ti I | 19 | 3645.311 | | Sc II | 2 |
| 3626.32 | | Gd II | 69 | 3635.64 | P | Ti II | 116 | 3645.387 | | Sm II | 35 |
| 3626.53 | | S III | | 3635.67 | | A II | 68 | 3645.43 | | La II | 14 |
| 3627.014 | | Sm II | 30 | 3635.82 | P | Fe I | 321 | 3645.440 | | Co I | 97 |
| 3627.05 | | Fe I | 808 | 3636.186 | | Fe I | 77,568 | 3645.494 | | Fe I | 323,391,441 |
| 3627.168 | | Fe II | 193 | 3636.21 | | Cr I | 47 | 3645.59 | | Cr I | 48 |
| 3627.35 | P | Fe I | 395 | 3636.23 | | Fe I | 774 | 3645.596 | | V I | 137 |
| 3627.63 | | Mg I | 45 | 3636.46 | | Zr II | 9 | 3645.62 | | Gd II | 17 |
| 3627.71 | | Ti II | 62 | 3636.49 | P | Fe I | 568 | 3645.78 | P | Fe II | 112 |
| 3627.718 | | V II | 76 | 3636.50 | P | Fe I | 47 | 3645.822 | | Fe I | 496 |
| 3627.806 | | Co I | 19 | 3636.590 | | Cr I | 47 | 3645.905 | | V II | 76 |
| 3627.971 | | Sm II | 12 | 3636.61 | P | Fe II | 111 | 3645.981 | | H | 7 |
| 3628.06 | | Ne II | 41 | 3636.650 | | Fe I | 493 | 3646.10 | P | Fe I | 324 |
| 3628.094 | | Fe I | 77 | 3636.713 | | Co I | 64 | 3646.161 | | Cr I | 48 |
| 3628.247 | | Ce II | 113 | 3636.90 | P | Fe II | 112 | 3646.19 | | Gd II | 2 |
| 3628.71 | | Y II | 9 | 3636.995 | | Fe I | 233 | 3646.198 | | Ti I | 18 |
| 3628.82 | P | Fe I | 438 | 3637.05 | | A II | | 3646.75 | | Eu II | 13 |
| 3628.83 | | La II | 19 | 3637.05 | P | Fe I | 438 | 3646.84 | | O III | 35 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 3646.848 | | V II | 180 |
| 3646.965 | | Ce II | 66 |
| 3647.081 | | Co I | 118 |
| 3647.40 | | Cr II | 1 |
| 3647.427 | | Fe I | 46 |
| 3647.43 | P | Fe I | 497 |
| 3647.56 | P | Fe I | 574 |
| 3647.658 | | Co I | 4 |
| 3647.71 | | Ni I | |
| 3647.77 | | Lu I | |
| 3647.84 | P | Fe I | 569 |
| 3647.844 | | Fe I | 23 |
| 3648.07 | | Cl II | 77 |
| 3648.22 | P | Fe I | 978 |
| 3648.35 | | Hf II | 39 |
| 3648.534 | | Cr I | 47 |
| 3648.80 | P | Ti II | 74 |
| 3648.86 | | Ti II | 83 |
| 3648.966 | | V I | 115 |
| 3648.997 | | Cr I | 47 |
| 3649.01 | P | Ti II | 14 |
| 3649.184 | Forb | Al II | 12 |
| 3649.20 | | O III | 35 |
| 3649.232 | Forb | Al II | 12 |
| 3649.304 | | Fe I | 5 |
| 3649.329 | | Co I | 146 |
| 3649.44 | | Gd II | 69 |
| 3649.508 | | Fe I | 291 |
| 3649.527 | | Sm II | 47 |
| 3649.70 | P | Fe I | 391 |
| 3650.031 | | Fe I | 394 |
| 3650.13 | | Cl II | 7 |
| 3650.144 | | Hg I | 3 |
| 3650.188 | | Sm II | 25 |
| 3650.19 | | La II | 12 |
| 3650.19 | | N I | |
| 3650.280 | | Fe I | 180 |
| 3650.37 | | Cr II | 156 |
| 3650.45 | | Y II | 75 |
| 3650.70 | | O III | 35 |
| 3650.73 | | Zr II | 146 |
| 3650.90 | | A II | 43 |
| 3650.95 | | Gd II | 69 |
| 3650.998 | | Sm II | 51 |
| 3651.03 | P | Fe I | 571 |
| 3651.065 | Forb | Al II | 12 |
| 3651.096 | | Al II | 12 |
| 3651.10 | | Fe I | 322,674 |
| 3651.182 | | Cb II | 4 |
| 3651.254 | | Co I | 85 |
| 3651.469 | | Fe I | 295 |
| 3651.50 | | Zr II | 122 |
| 3651.67 | P | Ni I | 153 |
| 3651.68 | | Cr II | 1 |
| 3651.798 | | Sc II | 2 |
| 3651.90 | P | Ti I | 118 |
| 3651.971 | | He I | 27 |
| 3652.119 | | He I | 27 |
| 3652.26 | P | Fe I | 494 |
| 3652.541 | | Co I | 4 |
| 3652.65 | | Fe III | |
| 3652.748 | | Fe II | |
| 3652.81 | P | Ti II | 116 |
| 3653.00 | | O III | 35 |
| 3653.108 | | Ce II | 38 |
| 3653.35 | P | Fe I | 229,324 |
| 3653.497 | | Ti I | 19 |
| 3653.614 | | Tm II | 10 |
| 3653.62 | P | Sc II | 18 |
| 3653.670 | | Ce II | 50 |
| 3653.763 | | Fe I | 180 |
| 3653.85 | P | Cr II | 156 |
| 3653.912 | | Cr I | 47 |
| 3654.441 | | Co I | 63 |
| 3654.51 | | S II | 4 |
| 3654.592 | | Ti I | 18 |
| 3654.62 | | Gd II | 4 |
| 3654.66 | | Fe I | 77 |
| 3654.995 | | Al II | 12 |
| 3655.29 | | A II | 82 |
| 3655.35 | P | Fe I | 131 |
| 3655.465 | | Fe I | 369 |
| 3655.56 | | Zr II | 71 |
| 3655.851 | | Ce II | 51 |
| 3655.92 | P | Cr I | 46 |
| 3656.05 | | A II | 67 |
| 3656.135 | | H | 7 |
| 3656.152 | | Gd II | 1 |
| 3656.221 | | Sm II | |
| 3656.227 | | Fe I | |
| 3656.261 | | Cr I | 46 |
| 3656.319 | | Al II | 51 |
| 3656.35 | P | Fe I | 323 |
| 3656.50 | P | Fe II | 111 |
| 3656.61 | | S III | 6 |
| 3656.666 | | H | 7 |
| 3656.706 | | V I | 115 |
| 3656.73 | P | Ti I | 118 |
| 3656.77 | P | Fe II | 131 |
| 3656.95 | | Cl III | 1 |
| 3656.962 | | Co I | 21 |
| 3657.143 | | Fe I | 130 |
| 3657.269 | | H | 7 |
| 3657.574 | | Ru II | 1 |
| 3657.59 | | W II | 2 |
| 3657.698 | | Ni I | 183 |
| 3657.89 | | Fe I | 395 |
| 3657.926 | | H | 7 |
| 3657.94 | | Cr II | 170 |
| 3657.987 | | Rh I | 1 |
| 3658.02 | P | Fe I | 438 |
| 3658.097 | | Ti I | 19 |
| 3658.19 | | Cr II | 98,146 |
| 3658.266 | | V II | 116 |
| 3658.3 | | Al III | 20 |
| 3658.38 | | Cl II | 7 |
| 3658.55 | | Fe I | 231 |
| 3658.641 | | H | 7 |
| 3659.02 | | Hf II | 44 |
| 3659.227 | | Ce II | 54 |
| 3659.423 | | H | 6 |
| 3659.516 | | Fe I | 180 |
| 3659.602 | | Cb II | |
| 3659.765 | | Ti II | 75 |
| 3659.84 | | Cl II | 7 |
| 3659.93 | | Ne II | 33 |
| 3660.279 | | H | 6 |
| 3660.33 | | Fe I | 323 |
| 3660.404 | | Mn I | |
| 3660.41 | P | Fe I | 229 |
| 3660.44 | | A II | 116 |
| 3660.631 | | Ti I | 18 |
| 3660.641 | | Ce II | 42 |
| 3660.85 | | Fe III | 93 |
| 3660.92 | | Zr II | 32 |
| 3661.05 | | Hf II | 26 |
| 3661.17 | P | Fe II | 111 |
| 3661.20 | | Zr I | 12 |
| 3661.221 | | H | 6 |
| 3661.25 | P | Fe I | 952 |
| 3661.33 | | Zr II | 102 |
| 3661.353 | | Ru I | 2 |
| 3661.36 | | Fe I | 179 |
| 3661.365 | | Sm II | 6 |
| 3661.383 | | V II | 191 |
| 3661.44 | | Cr II | 156 |
| 3661.73 | | Hf II | 62 |
| 3661.951 | | Ni I | 16 |
| 3662.005 | | S III | 6 |
| 3662.08 | | La II | 12 |
| 3662.14 | | Zr II | 101 |
| 3662.158 | | Co I | 115 |
| 3662.237 | | Ti II | 75 |
| 3662.258 | | H | 6 |
| 3662.26 | | Gd II | 4 |
| 3662.39 | | Cr I | 46 |
| 3662.62 | P | Cr II | 1 |
| 3662.693 | | Sm II | |
| 3662.73 | P | Fe I | 490 |
| 3662.840 | | Cr I | 46 |
| 3662.90 | P | Fe I | 436 |
| 3662.905 | | Sm II | 39 |
| 3663.206 | | Cr I | 46 |
| 3663.25 | | Fe I | 439 |
| 3663.274 | | Hg I | 2 |
| 3663.406 | | H | 6 |
| 3663.458 | | Fe I | 229,231 |
| 3663.47 | | S II | 16 |
| 3663.594 | | V I | 114 |
| 3663.64 | | Zr I | 12 |
| 3663.95 | | Fe I | 435 |
| 3663.98 | | Fe III | 24 |
| 3664.09 | | Ne II | 1 |
| 3664.095 | | Ni I | 4 |
| 3664.20 | | P II | 18 |
| 3664.254 | | Sc II | 10 |
| 3664.537 | | Fe I | 391 |
| 3664.60 | | Gd II | |
| 3664.62 | | Y II | 9 |
| 3664.679 | | H | 6 |
| 3664.69 | | Fe I | 390 |
| 3664.86 | P | Ti II | 116 |
| 3664.95 | | Cr II | 156 |
| 3664.98 | | Fe III | 24 |
| 3665.142 | | V I | 115 |
| 3665.180 | | Nd II | |
| 3665.22 | | La II | |
| 3665.35 | | Hf II | 18 |
| 3665.43 | | Cr I | 48 |
| 3665.48 | P | Cr II | 1 |
| 3665.812 | | Tm II | 10 |
| 3665.924 | | Ni I | |
| 3665.980 | | Cr I | 48 |
| 3666.02 | P | Cr II | 145 |
| 3666.097 | | H | 5 |
| 3666.11 | P | Ti II | 74 |
| 3666.19 | | Cr I | 46 |
| 3666.218 | | Rh I | 3 |
| 3666.24 | | Fe I | 179,389 |
| 3666.29 | P | Fe I | 672 |
| 3666.537 | | Sc II | 2 |
| 3666.592 | | Ti II | 116 |
| 3666.642 | | Cr I | 46 |
| 3666.85 | P | Fe I | 393 |
| 3666.944 | | Fe I | 46 |
| 3667.06 | | Zr II | 8 |
| 3667.252 | | Fe I | 570 |
| 3667.40 | | Zr II | 32 |
| 3667.684 | | H | 5 |
| 3667.741 | | V I | 114 |
| 3667.932 | | Sm II | 30 |
| 3667.981 | | Ce II | 40 |
| 3667.999 | | Fe I | 438,569 |
| 3668.029 | | Cr I | 46 |
| 3668.03 | | Cl II | 7 |
| 3668.088 | | Tm II | 2 |
| 3668.214 | | Fe I | 568 |
| 3668.216 | | Ni I | 182 |
| 3668.46 | | Zr II | 9 |
| 3668.489 | | Y II | 46 |
| 3668.58 | P | Fe I | 231 |
| 3668.719 | | Ce II | 38 |
| 3668.830 | | Pr II | |
| 3668.893 | | Fe I | 229 |
| 3668.965 | | Ti I | 18 |
| 3669.049 | | S II | 16 |
| 3669.151 | | Fe I | 437 |
| 3669.241 | | Ni I | 2 |
| 3669.399 | | Mn I | 7 |
| 3669.410 | | V II | 116 |
| 3669.466 | | H | 5 |
| 3669.523 | | Fe I | 291 |
| 3669.62 | | A II | 42 |
| 3669.68 | P | Fe I | 436 |
| 3669.69 | P | Cr II | 1 |
| 3669.838 | | Mn I | 7 |
| 3670.035 | | Fe I | 369 |
| 3670.041 | | Co I | 64 |
| 3670.071 | | Fe I | 435 |
| 3670.16 | P | Cr II | 6 |
| 3670.23 | P | Fe I | 47 |
| 3670.28 | | Cl III | 1 |
| 3670.427 | | Ni I | 4 |
| 3670.517 | | Mn I | 7 |
| 3670.668 | | Mo II | 1 |
| 3670.677 | | Sm II | |
| 3670.810 | | Fe I | 133 |
| 3670.840 | | Sm II | 11 |
| 3671.01 | | A II | 115 |
| 3671.12 | P | Cr II | 6 |
| 3671.20 | | Gd II | 2 |
| 3671.205 | | V I | 70 |
| 3671.28 | | Zr II | 45 |
| 3671.478 | | H | 5 |
| 3671.51 | | Fe I | 570 |
| 3671.672 | | Ti I | 19 |
| 3671.94 | | Cr I | 217 |
| 3672.14 | | S II | 4 |
| 3672.166 | | Ce II | 49 |
| 3672.363 | | Nd II | |
| 3672.403 | | V I | 115 |
| 3672.65 | | Zr II | 1 |
| 3672.69 | | Fe I | 180 |
| 3672.789 | | Ce II | 233 |
| 3673.19 | | Eu II | 28 |
| 3673.26 | | A II | 117 |
| 3673.35 | P | Fe II | 174 |
| 3673.404 | | V I | 114 |
| 3673.448 | | Ca I | 28 |
| 3673.542 | | Nd II | |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3673.59 | | Cr I | 217 | 3683.67 | | Cr I | 216 | 3693.364 | | Co I | 64 |
| 3673.68 | P | Fe I | 978 | 3683.71 | | Ca II | 18 | 3693.476 | | Co I | 95 |
| 3673.761 | | H | 5 | 3683.77 | P | Fe I | 996 | 3693.56 | | Cr I | 45 |
| 3673.77 | P | Fe II | 131 | 3684.1 | | Li II | 2 | 3693.667 | | Mn I | |
| 3673.83 | | Cl II | 7 | 3684.108 | | Fe I | 292 | 3693.78 | P | Fe I | 46 |
| 3674.06 | P | Ni I | 15 | 3684.25 | | Cr II | 145 | 3693.79 | P | Fe I | 490 |
| 3674.15 | P | Ni I | 32 | 3684.332 | | V I | 114 | 3693.932 | | Ni I | 15 |
| 3674.634 | | Eu II | 11 | 3684.479 | | Co I | 99 | 3693.989 | | Sm II | 2 |
| 3674.691 | | V II | 93 | 3684.903 | | Y II | 62 | 3694.005 | | Fe I | 394 |
| 3674.74 | | Zr II | 9 | 3684.960 | | Co I | 116 | 3694.10 | P | Ti I | 177 |
| 3674.766 | | Fe I | 369 | 3685.049 | | Mn II | 8 | 3694.11 | | Ca II | 18 |
| 3674.92 | P | Ti I | 177 | 3685.192 | | Ti II | 14 | 3694.115 | | Mn I | 24 |
| 3675.00 | P | Cr II | 1 | 3685.212 | | Mn I | 7 | 3694.12 | | Cr I | 45 |
| 3675.265 | | Sc II | 10 | 3685.47 | P | Ti I | 177 | 3694.19 | | Yb II | 1 |
| 3675.307 | | Ca I | 28 | 3685.548 | | Cr I | 44 | 3694.22 | | Ne II | 1 |
| 3675.44 | P | Fe I | 229 | 3685.66 | P | Fe I | 231 | 3694.27 | | La II | 124 |
| 3675.497 | | V I | 114 | 3685.804 | | Nd II | | 3694.31 | | Ca II | 18 |
| 3675.64 | | Y II | 84 | 3685.964 | | Ti I | 117 | 3694.445 | | Ti I | 117 |
| 3675.700 | | V I | 29 | 3685.998 | | Fe I | 385 | 3694.622 | | V I | 114 |
| 3675.76 | P | Fe I | 996 | 3686.18 | | Cr I | 44 | 3694.911 | | Ce II | 63 |
| 3676.27 | | P II | 19 | 3686.20 | | Mn II | 8 | 3694.98 | | Cr II | 169 |
| 3676.314 | | Fe I | 228 | 3686.260 | | Fe I | 131 | 3695.054 | | Fe I | 229,534a |
| 3676.33 | | Cr I | 89 | 3686.262 | | V I | 70 | 3695.158 | | V II | 116,179 |
| 3676.365 | | H | 4 | 3686.477 | | Co I | 134 | 3695.335 | | V I | 114 |
| 3676.50 | P | Cr II | 1 | 3686.555 | | Cu II | 2 | 3695.37 | | O III | 21 |
| 3676.552 | | Co I | 145 | 3686.67 | | Cr II | 118 | 3695.507 | | Fe I | 225,707 |
| 3676.684 | | V I | 115 | 3686.71 | | Ti I | 222 | 3695.86 | | Cr I | 217 |
| 3676.879 | | Fe I | 389 | 3686.803 | | Cr I | 44 | 3695.865 | | V I | 29 |
| 3676.959 | | Mn I | | 3686.833 | | H | 4 | 3696 | P | N IV | 12 |
| 3677.309 | | Fe I | 773 | 3687.039 | | Pr II | | 3696.03 | | Fe I | 128 |
| 3677.477 | | Fe I | 125 | 3687.100 | | Fe I | 75 | 3696.29 | P | Ni I | 74 |
| 3677.630 | | Fe I | 291 | 3687.252 | | Cr I | 44 | 3696.39 | | Ti II | 73 |
| 3677.69 | | Cr II | 12 | 3687.354 | | Ti I | 19 | 3696.568 | | Mn I | 24 |
| 3677.793 | | Sm II | | 3687.458 | | Fe I | 21 | 3696.6 | | Y II | 74 |
| 3677.835 | | Co I | 116 | 3687.473 | | V I | 114 | 3696.65 | P | Ni I | 74 |
| 3677.86 | | Cr II | 12 | 3687.545 | | Cr I | 45 | 3696.78 | | Cr II | 131 |
| 3677.93 | | Cr II | 12 | 3687.656 | | Fe I | 291 | 3696.81 | P | Fe I | 434 |
| 3677.980 | | Co I | 20 | 3687.74 | | Gd II | 20 | 3696.885 | | Ti I | 177 |
| 3678.13 | | S II | | 3687.78 | | Eu II | | 3696.913 | | Ni I | 172 |
| 3678.240 | | Ca I | 28 | 3687.802 | | Ce II | 143 | 3697.09 | | Ne II | 41 |
| 3678.259 | | Eu II | 29 | 3688.01 | P | Cr II | 1 | 3697.154 | | H | 3 |
| 3678.27 | | A II | 42 | 3688.069 | | V I | 29 | 3697.426 | | Fe I | 389 |
| 3678.342 | | Sc II | 45 | 3688.11 | | Cr I | 45 | 3697.45 | | Fe III | 35 |
| 3678.46 | P | Mn I | 7 | 3688.27 | P | Ti I | 177 | 3697.49 | | Zr II | 7 |
| 3678.862 | | Tm II | 12 | 3688.307 | | Mo II | 5 | 3697.510 | | Fe I | 670 |
| 3678.863 | | Fe I | 131 | 3688.415 | | Ni I | 5 | 3697.72 | | V II | 204 |
| 3678.91 | | Zr II | 101 | 3688.418 | | Sm II | 11 | 3697.73 | | Gd II | 4 |
| 3678.98 | | Fe I | 124 | 3688.42 | | Eu II | 2 | 3697.850 | | Cb I | 3 |
| 3679.070 | | Cr I | 45 | 3688.44 | | Cl II | 56 | 3697.88 | | S III | |
| 3679.14 | P | Ti I | 177 | 3688.457 | | Cr I | 48 | 3698.00 | | Cr II | 118 |
| 3679.33 | | Fe I | 228 | 3688.476 | | Fe I | 669 | 3698.03 | P | Fe I | 75 |
| 3679.34 | P | Cr II | 118 | 3688.71 | | Fe III | 93 | 3698.17 | | Zr II | 71 |
| 3679.355 | | H | 4 | 3688.877 | | Fe I | 179 | 3698.183 | | Ti I | 222 |
| 3679.424 | | Ce II | 257 | 3689 | P | N IV | 12 | 3698.39 | | Hf II | 42 |
| 3679.500 | | Eu II | | 3689.02 | P | Fe I | 178 | 3698.611 | | Fe I | 491 |
| 3679.53 | | Fe I | 393,490 | 3689.2 | | Y II | 75 | 3698.650 | | Ce II | 51 |
| 3679.64 | | Zr II | 122 | 3689.302 | | Cr I | 48 | 3698.70 | | O III | 21 |
| 3679.673 | | Ti II | 75 | 3689.305 | | Ni I | 173 | 3699.017 | | Co I | 145 |
| 3679.80 | | Ne II | 41 | 3689.37 | P | Fe I | 391 | 3699.147 | | Fe I | 490 |
| 3679.819 | | Cr I | 48 | 3689.457 | | Fe I | 369,386 | 3699.37 | | S III | |
| 3679.915 | | Fe I | 5 | 3689.63 | | Cr I | 216 | 3699.41 | P | Fe I | 996 |
| 3680.06 | | A II | 115 | 3689.671 | | Ti I | 222 | 3699.476 | | V I | 70 |
| 3680.113 | | V I | 114 | 3689.897 | | Fe I | 533 | 3699.55 | P | Fe I | 436 |
| 3680.19 | | Cr I | 48 | 3689.916 | | Ti I | 18 | 3699.72 | | Hf II | 18 |
| 3680.675 | | Fe I | 568 | 3690.032 | | Ru II | 1 | 3699.73 | | Gd II | 20 |
| 3680.801 | | Fe I | | 3690.095 | | Fe I | 231 | 3699.90 | P | Fe II | 131 |
| 3680.98 | P | Fe II | 111 | 3690.281 | | V I | 29 | 3699.920 | | Ce II | 223 |
| 3681.272 | | Ti I | 177 | 3690.35 | | Pd I | 7 | 3699.952 | | Pr II | 11 |
| 3681.54 | | K II | 1 | 3690.450 | | Fe I | 497,570 | 3700.055 | | Ti I | |
| 3681.64 | | Fe I | 390 | 3690.60 | | Fe III | 85 | 3700.126 | | V II | 102 |
| 3681.691 | | Cr I | 89 | 3690.70 | | V II | 190 | 3700.14 | | Fe III | 84 |
| 3681.774 | | Fe I | | 3690.715 | | Co I | 86 | 3700.256 | | Tm II | 6 |
| 3681.87 | | Fe I | 951 | 3690.730 | | Fe I | 807 | 3700.337 | | V II | 116 |
| 3682.05 | | Cl III | 1 | 3690.98 | P | Zr II | 82 | 3700.42 | P | Cr II | 1 |
| 3682.101 | | W I | 4 | 3691.18 | P | Fe I | 229 | 3700.61 | P | Fe I | 569 |
| 3682.15 | P | Fe I | 386 | 3691.53 | P | Fe I | 707 | 3700.909 | | Rh I | 2 |
| 3682.17 | P | Fe I | 385 | 3691.557 | | H | 4 | 3700.922 | | Sm II | |
| 3682.226 | | Fe I | 772 | 3692 | P | O V | 8 | 3700.96 | | V II | 102 |
| 3682.25 | | Hf I | 1 | 3692.17 | | A II | 68 | 3701 | P | O V | 8 |
| 3682.56 | | A II | 29 | 3692.221 | | Sm II | 29 | 3701.086 | | Fe I | 385 |
| 3682.66 | P | Fe II | 131 | 3692.225 | | V I | 29 | 3701.15 | | Hf II | 61 |
| 3682.67 | | Zr II | 44 | 3692.33 | | A II | 4 | 3701.364 | | Tm II | 2 |
| 3682.810 | | H | 4 | 3692.357 | | Rh I | 1 | 3701.63 | P | Ni I | 138 |
| 3683.047 | | Co I | 99 | 3692.44 | | O I | 6 | 3701.730 | | Mn I | 7 |
| 3683.054 | | Fe I | 5 | 3692.60 | | Zr II | 56 | 3701.81 | | La II | 136 |
| 3683.126 | | V I | 29 | 3692.645 | | Mo II | 5 | 3701.81 | | Ne II | 40 |
| 3683.267 | | Eu II | 11 | 3692.812 | | Mn I | 7 | 3701.90 | | Cr II | 168 |
| 3683.39 | | Cl III | 12 | 3693.008 | | Fe I | 439 | 3702 | P | O V | 16 |
| 3683.469 | | Pb I | 1 | 3693.09 | | Cr I | 216 | 3702.033 | | Fe I | 369 |
| 3683.616 | | Fe I | 130,671 | 3693.106 | | Co I | 97 | 3702.086 | | Al III | 4 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3702.237 | | Co I | 145 | 3710.46 | | P II | 37 | 3718.21 | | A II | 131 |
| 3702.291 | | Ti I | 83 | 3710.47 | | Zr II | 122 | 3718.380 | | Ce II | 37 |
| 3702.500 | | Fe I | 46,75 | 3710.60 | | Cr I | 88 | 3718.407 | | Fe I | 292 |
| 3702.553 | | Mo II | 5 | 3710.869 | | Sm II | 19 | 3718.86 | | Zr II | 9 |
| 3702.75 | | O III | 14 | 3710.870 | | Eu II | 14 | 3718.877 | | Sm II | 38 |
| 3702.942 | | Ti I | 132 | 3711.074 | | Na II | 3 | 3718.92 | | Pd I | 3 |
| 3703 | P | O V | 8 | 3711.099 | | Pr II | 18 | 3718.930 | | Mn I | |
| 3703.217 | | Al II | 18 | 3711.118 | | V II | 102 | 3719.27 | | Hf II | 7 |
| 3703.323 | | Y II | 62 | 3711.225 | | Fe I | 228 | 3719.45 | | Gd II | |
| 3703.37 | | O III | 21 | 3711.29 | | Cr II | | 3719.53 | | Gd II | 17 |
| 3703.43 | P | Fe I | 704 | 3711.30 | P | Fe I | 75 | 3719.74 | | Mo II | 5 |
| 3703.52 | | C III | 12 | 3711.32 | | Fe III | 99 | 3719.797 | | Ce II | 52 |
| 3703.556 | | Fe I | 291,292 | 3711.411 | | Fe I | 494 | 3719.935 | | Fe I | 5 |
| 3703.584 | | V I | 29 | 3711.543 | | Sm II | 25 | 3720.17 | P | Fe II | 23 |
| 3703.697 | | Fe I | 389 | 3711.646 | | Co I | 63 | 3720.29 | P | Zr II | 32 |
| 3703.824 | | Fe I | 369 | 3711.751 | | V II | 116 | 3720.384 | | Ti I | 177 |
| 3703.832 | | V II | 15 | 3711.92 | P | Fe I | 178 | 3720.43 | | A II | 42 |
| 3703.855 | | H | 3 | 3711.95 | | Zr II | 8 | 3720.45 | | Cl III | 5 |
| 3704.010 | | Fe I | 495 | 3711.973 | | H | 3 | 3720.69 | P | Rh II | 7 |
| 3704.060 | | Co I | 35 | 3711.974 | | Fe II | 192 | 3720.86 | | O III | 21 |
| 3704.295 | | Ti I | 117 | 3712.109 | | Sm II | | 3720.93 | | V I | 98 |
| 3704.336 | | Fe I | 609 | 3712.177 | | Co I | 84 | 3721.03 | P | Ni I | 181 |
| 3704.463 | | Fe I | 290 | 3712.39 | P | Fe II | 15 | 3721.189 | | Fe I | 491 |
| 3704.699 | | V I | 29 | 3712.48 | | O III | 21 | 3721.278 | | Fe I | 75,705 |
| 3704.73 | | O III | 21 | 3712.50 | | Cr I | 269 | 3721.358 | | V I | 11 |
| 3704.79 | P Forb | He I | 26 | 3712.533 | | V II | 157 | 3721.396 | | Fe I | 131 |
| 3704.80 | P | Fe I | 950 | 3712.70 | | Gd II | 20 | 3721.398 | | Y II | 75 |
| 3704.848 | | Tm II | 9 | 3712.75 | | O II | 3 | 3721.512 | | Fe I | 389 |
| 3705.003 | | He I | 25 | 3712.764 | | Sm II | 25 | 3721.606 | | Fe I | 437 |
| 3705.035 | | V I | 29 | 3712.97 | | Cr II | 12 | 3721.632 | | Ti II | 13 |
| 3705.12 | P | Ni I | 30 | 3713.018 | | Cb I | 3 | 3721.69 | | Zr II | 44 |
| 3705.140 | | He I | 25 | 3713.03 | | A II | 114 | 3721.847 | | Sm II | |
| 3705.26 | P | Fe I | 704 | 3713.04 | | Cr II | 12 | 3721.86 | | Ne II | 37 |
| 3705.40 | P | Cr II | 118 | 3713.09 | | Ne II | 5 | 3721.940 | | H | 3 |
| 3705.40 | | Hf II | 62 | 3713.103 | | Al III | 4 | 3721.95 | | O III | 21 |
| 3705.45 | | Cl III | 1 | 3713.336 | | Ni I | 74 | 3721.998 | | V I | 91 |
| 3705.53 | | Ti I | 222 | 3713.45 | | Eu II | 12 | 3722.028 | | Fe I | 291 |
| 3705.567 | | Fe I | 5 | 3713.54 | | La II | 26 | 3722.068 | | Gd II | 119 |
| 3705.70 | P | Fe I | 610 | 3713.56 | | V I | 98 | 3722.16 | | V II | 15 |
| 3705.71 | P | Fe I | 293 | 3713.696 | | Ni I | 74 | 3722.23 | P | Fe I | 490 |
| 3705.81 | | La II | 55 | 3713.734 | | Ti I | 116 | 3722.24 | P | Fe I | 127 |
| 3705.83 | | V I | 114 | 3713.957 | | V I | 11 | 3722.484 | | Ni I | 18 |
| 3706.026 | | Ca II | 3 | 3714 | P | N IV | 12 | 3722.564 | | Fe I | 5 |
| 3706.035 | | V I | 104 | 3714.03 | | O III | 14 | 3722.568 | | Ti I | 17 |
| 3706.06 | | P II | 20 | 3714.13 | | Zr I | 12 | 3722.601 | | V I | 91 |
| 3706.219 | | Ti II | 73 | 3714.3 | | Y II | 61 | 3722.759 | | Ce II | 90 |
| 3706.752 | | Sm II | 47 | 3714.39 | | Cr I | 269 | 3722.77 | P | Fe I | 707 |
| 3706.91 | | Mn II | 8 | 3714.74 | | A II | 3 | 3722.79 | | Sb I | 1 |
| 3706.94 | | A II | 4 | 3714.77 | | Zr II | 18 | 3723.324 | | V I | 98 |
| 3706.979 | | Sm II | | 3714.808 | | Nd II | 35 | 3723.38 | P | Ni I | 183 |
| 3707.01 | | Co I | 85 | 3714.87 | | La II | 55 | 3723.40 | | Cr II | 144 |
| 3707.048 | | Fe I | 385,392 | 3714.904 | | Eu II | 11 | 3723.506 | | Nd II | |
| 3707.13 | | Cr II | 169 | 3715.08 | | O III | 14 | 3723.63 | | P II | 22 |
| 3707.167 | | Sm II | 35 | 3715.19 | | Cr II | 20 | 3723.631 | | Ti II | 72 |
| 3707.24 | | O III | 14 | 3715.371 | | Ti I | | 3723.92 | P | Fe II | 14 |
| 3707.34 | | Cl III | 9 | 3715.45 | | Cr II | 145 | 3724.106 | | Ti II | 73 |
| 3707.465 | | Co I | 96 | 3715.476 | | V II | 15 | 3724.26 | P | Ni I | 183 |
| 3707.549 | | Ti I | 177 | 3715.499 | | Ni I | 183 | 3724.380 | | Fe I | 124 |
| 3707.828 | | Fe I | 5 | 3715.53 | | La II | 43 | 3724.51 | | A II | 131 |
| 3707.918 | | Fe I | 76 | 3715.795 | | Ti I | 116 | 3724.570 | | Ti I | 131 |
| 3708.06 | | Mn II | 8 | 3715.86 | | P II | 1 | 3724.81 | | Mn II | 8 |
| 3708.18 | P | Fe I | 228 | 3715.911 | | Fe I | 124 | 3724.827 | | Ni I | 182 |
| 3708.410 | | Sm II | 5 | 3716.36 | | Gd II | 2 | 3724.902 | | Sm II | 5 |
| 3708.45 | P | Fe I | 436 | 3716.365 | | Ce II | 40 | 3724.94 | | Eu II | 2 |
| 3708.602 | | Fe I | 178,225 | 3716.442 | | Fe I | 388,705 | 3724.984 | | V II | 102 |
| 3708.625 | | Ti I | 268 | 3716.531 | | Cr I | 269 | 3725.05 | | La II | 13 |
| 3708.654 | | Sm II | 19 | 3716.60 | | K II | 2 | 3725.061 | | Tm II | |
| 3708.721 | | V I | 104 | 3716.71 | P | Fe I | 434 | 3725.155 | | Ti I | 83 |
| 3708.823 | | Co I | 98 | 3716.91 | | Y II | 76 | 3725.29 | | Mn II | 8 |
| 3709.03 | P | Fe I | 390 | 3716.930 | | Ce II | 242 | 3725.30 | | O III | 14 |
| 3709.13 | | Gd II | 51 | 3717 | P | O V | 8 | 3725.304 | | Fe II | 130 |
| 3709.246 | | Fe I | 21 | 3717.02 | | Zr II | 82 | 3725.498 | | Fe I | 534 |
| 3709.25 | P | Cr II | 6 | 3717.03 | | P IV | 3 | 3725.65 | P | Fe I | 75 |
| 3709.27 | | Zr II | 45 | 3717.06 | | Cb II | | 3725.675 | | Ce II | 231 |
| 3709.286 | | Ce II | 40 | 3717.17 | | A II | 67 | 3725.81 | | O IV | 6 |
| 3709.335 | | V II | 102 | 3717.19 | P | Fe I | 704 | 3725.901 | | Fe II | |
| 3709.371 | | S III | 1 | 3717.259 | | Ti I | 116 | 3726 | P | O V | 8 |
| 3709.52 | | O III | 21 | 3717.393 | | Ti I | 17 | 3726.06 | P | Fe I | 433 |
| 3709.535 | | Fe I | 435 | 3717.53 | | Mn II | 8 | 3726.235 | | Cb I | 3 |
| 3709.64 | | Ne II | 1 | 3717.55 | | V I | 114 | 3726.653 | | Co I | 40 |
| 3709.665 | | Fe I | 225 | 3717.63 | | P III | 10 | 3726.805 | | Sm II | 19 |
| 3709.88 | | Mn II | 8 | 3717.63 | | P IV | 3 | 3726.85 | | Cr I | 73 |
| 3709.90 | | A II | 67 | 3717.69 | | Eu II | | 3726.89 | P | Fe I | 75 |
| 3709.933 | | Ce II | 40 | 3717.73 | P | Fe I | 997 | 3726.926 | | Ru I | 2 |
| 3709.963 | | Ti I | 83 | 3717.775 | | S III | 6 | 3726.927 | | Fe I | 385 |
| 3710.01 | P | Cr II | 6 | 3717.84 | P | Fe I | 706 | 3726.931 | | Mn I | 24 |
| 3710.186 | | Ti I | 222 | 3717.915 | | Tm I | | 3727.03 | P | Fe I | 668 |
| 3710.22 | P | Cr II | 6 | 3717.94 | | Cl II | 63 | 3727.04 | P | Fe II | 192 |
| 3710.30 | | Y II | 7 | 3718.159 | | V II | 21 | 3727.08 | | Ne II | 5 |
| 3710.42 | | S III | 1 | 3718.190 | | Ce II | 53 | 3727.09 | | Y II | 74 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 3727.096 | | Fe I | 387 |
| 3727.33 | | O II | 3 |
| 3727.351 | | V II | 21 |
| 3727.37 | | Cr II | 117 |
| 3727.53 | P | Fe I | 705 |
| 3727.621 | | Fe I | 21 |
| 3727.67 | P | Fe I | 225 |
| 3727.72 | | Zr II | 112 |
| 3727.809 | | Fe I | 386 |
| 3728.030 | | Ru I | 2 |
| 3728.130 | | Nd II | |
| 3728.335 | | V II | 116 |
| 3728.423 | | Ce II | 47 |
| 3728.469 | | Sm II | 54 |
| 3728.49 | | O III | 30 |
| 3728.668 | | Fe I | 227 |
| 3728.67 | | P II | 22 |
| 3728.67 | | P IV | 3 |
| 3728.676 | | Ti I | 116 |
| 3728.82 | | O III | 30 |
| 3728.840 | | Co I | 133 |
| 3728.889 | | Mn I | 24 |
| 3728.933 | | Ni I | 181 |
| 3729.03 | | O IV | 6 |
| 3729.035 | | V I | 91 |
| 3729.29 | | A II | 10 |
| 3729.34 | P | Fe I | 530 |
| 3729.34 | | O II | 62 |
| 3729.49 | | Mn II | 8 |
| 3729.70 | | O III | 30 |
| 3729.74 | | Zr II | 8 |
| 3729.806 | | Ti I | 17 |
| 3730.386 | | Fe I | 533 |
| 3730.433 | | Ru I | 2 |
| 3730.46 | P | Fe I | 389 |
| 3730.476 | | Co I | 62 |
| 3730.64 | | S II | |
| 3730.751 | | Ni I | 2 |
| 3730.807 | | Cr I | 2 |
| 3730.810 | | Tm II | 11 |
| 3730.84 | | Gd II | 20 |
| 3730.945 | | Fe I | 228 |
| 3731.15 | P | Fe I | 950 |
| 3731.258 | | Sm II | 11 |
| 3731.26 | | Zr II | 112 |
| 3731.268 | | Co I | 96 |
| 3731.374 | | Fe I | 225 |
| 3731.42 | | La II | 137 |
| 3731.64 | | V II | 101 |
| 3731.932 | | Mn I | |
| 3731.950 | | Al II | 11 |
| 3731.983 | | V II | 92 |
| 3732.032 | | Cr I | 2 |
| 3732.13 | P | Fe I | 532 |
| 3732.13 | | O III | 14 |
| 3732.390 | | Co I | 62 |
| 3732.399 | | Fe I | 76 |
| 3732.45 | | Gd II | 5 |
| 3732.760 | | V II | 15 |
| 3732.861 | | He I | 24 |
| 3732.992 | | Re I | 24 |
| 3733.08 | | Gd II | |
| 3733.20 | P | Fe I | 225 |
| 3733.319 | | Fe I | 5 |
| 3733.36 | | A II | 68 |
| 3733.483 | | Co I | 98 |
| 3733.607 | | V II | 116 |
| 3733.73 | | Cl II | 63 |
| 3733.767 | | Ti I | 166 |
| 3733.910 | | Al II | 11 |
| 3734.124 | | Tm II | 6 |
| 3734.139 | | Co I | 96 |
| 3734.370 | | H | 3 |
| 3734.428 | | V I | 97 |
| 3734.454 | | Ru II | 1 |
| 3734.567 | | Al II | 50 |
| 3734.715 | | Al II | 50 |
| 3734.80 | | O III | 21 |
| 3734.805 | | Al II | 50 |
| 3734.867 | | Fe I | 21 |
| 3734.94 | | Ne II | 1 |
| 3735.158 | | V II | 102 |
| 3735.325 | | Fe I | 388 |
| 3735.49 | | A II | 3 |
| 3735.660 | | Ti I | |
| 3735.71 | P | Fe I | 127 |
| 3735.85 | | La II | 29 |
| 3735.928 | | Co I | 95 |
| 3735.94 | | O II | 62 |
| 3735.980 | | Sm II | 29 |
| 3736.017 | | V II | 102 |
| 3736.280 | | Be I | 6 |
| 3736.41 | | La II | 142 |
| 3736.45 | | Cr I | 215 |
| 3736.56 | | Cr II | 20 |
| 3736.78 | | O IV | 6 |
| 3736.813 | | Ni I | 30 |
| 3736.901 | | Ca II | 3 |
| 3737.133 | | Fe I | 5 |
| 3737.141 | | Sm II | |
| 3737.55 | | Cr II | 117 |
| 3737.88 | | Hf II | 75 |
| 3737.89 | | A II | 131 |
| 3737.992 | | V I | 91 |
| 3738.003 | | Al II | 11 |
| 3738.08 | | Eu II | |
| 3738.13 | | Zr II | 17 |
| 3738.306 | | Fe I | 609 |
| 3738.38 | | Cr II | 20. |
| 3738.51 | P | Fe I | 918 |
| 3738.757 | | V I | 97 |
| 3738.901 | | Ti I | 166 |
| 3739.117 | | Sm II | |
| 3739.120 | | Fe I | 75 |
| 3739.13 | | K II | 1 |
| 3739.193 | | Pr II | |
| 3739.197 | | Sm II | 5 |
| 3739.229 | | Ni I | 2 |
| 3739.317 | | Fe I | 74 |
| 3739.527 | | Fe I | |
| 3739.6 | | Ti II | 107 |
| 3739.782 | | Ni I | 180 |
| 3739.80 | | Cb I | 3 |
| 3739.92 | | O II | 31 |
| 3739.940 | | Pb I | 2 |
| 3740.061 | | Fe I | 532a, 707 |
| 3740.241 | | V I | 98 |
| 3740.247 | | Fe I | 667 |
| 3741.059 | | Ti I | 17 |
| 3741.288 | | Sm II | |
| 3741.31 | | Eu II | 11 |
| 3741.427 | | Nd II | |
| 3741.504 | | V I | 124 |
| 3741.56 | P | Fe II | 15 |
| 3741.633 | | Ti II | 72 |
| 3741.69 | | O II | 38 |
| 3741.727 | | Ce II | 241 |
| 3742.07 | | Fe I | 225 |
| 3742.14 | P | Fe I | 978 |
| 3742.20 | P | Cr II | 6 |
| 3742.280 | | Ru I | 2 |
| 3742.34 | | Mo II | 5 |
| 3742.393 | | Cb I | 3 |
| 3742.56 | P | Fe I | 389 |
| 3742.621 | | Fe I | 387 |
| 3742.937 | | Fe I | 704 |
| 3742.968 | | Cr I | 43 |
| 3742.99 | P | Cr II | 6 |
| 3743.20 | P | Cr II | 6 |
| 3743.364 | | Fe I | 21 |
| 3743.40 | | Fe III | |
| 3743.468 | | Fe I | 806 |
| 3743.47 | | Gd II | 2 |
| 3743.556 | | Eu II | 11 |
| 3743.578 | | Cr I | 43 |
| 3743.610 | | V II | 21 |
| 3743.78 | P | Fe I | 290 |
| 3743.868 | | Sm II | 18,34 |
| 3743.884 | | Cr I | 43 |
| 3744.066 | | Tm I | |
| 3744.105 | | Fe I | 385 |
| 3744.22 | | P III | 10 |
| 3744.42 | | K II | 3 |
| 3744.490 | | Cr I | 43 |
| 3744.562 | | Ni I | 180 |
| 3744.66 | | Ne II | 40 |
| 3744.73 | | O IV | 6 |
| 3744.98 | | Hf II | 76 |
| 3745.36 | P | Fe II | 131 |
| 3745.491 | | Co I | 34 |
| 3745.561 | | Fe I | 5 |
| 3745.605 | | Sm II | 2 |
| 3745.806 | | V II | 15 |
| 3745.83 | | N III | 4 |
| 3745.901 | | Fe I | 5 |
| 3745.97 | | Zr II | 112 |
| 3746.46 | | A II | 130 |
| 3746.486 | | Fe I | 73 |
| 3746.56 | P | Fe II | 14 |
| 3746.92 | | A II | 67 |
| 3746.931 | | Fe I | 386 |
| 3747 | P | O V | 8 |
| 3747.00 | P | Fe I | 388 |
| 3747.264 | | Cr I | 289 |
| 3747.40 | P | Fe III | 71 |
| 3747.48 | | Hf II | 27 |
| 3747.55 | | Y II | 8 |
| 3747.66 | | N IV | 8 |
| 3747.90 | | S III | 1 |
| 3747.96 | | La II | |
| 3747.982 | | V I | 97,98 |
| 3748.010 | | Ti II | 107 |
| 3748.056 | | Ce II | 160 |
| 3748.101 | | Ti I | 166 |
| 3748.18 | | Cr I | 88 |
| 3748.264 | | Fe I | 5 |
| 3748.374 | | Ca I | 27 |
| 3748.46 | | Cl II | 6 |
| 3748.489 | | Fe II | 154 |
| 3748.492 | | Fe I | 805 |
| 3748.614 | | Cr I | 43 |
| 3748.68 | | Cr II | 11 |
| 3748.73 | | S III | |
| 3748.81 | | Cl III | 5 |
| 3748.88 | | Gd II | 105 |
| 3748.91 | P | Fe I | 289 |
| 3748.969 | | Fe I | 386 |
| 3748.998 | | Cr I | 43 |
| 3749.045 | | Ni I | 1 |
| 3749.487 | | Fe I | 21 |
| 3749.49 | | O II | 3 |
| 3749.55 | P | Zr II | 112 |
| 3749.930 | | Co I | 95 |
| 3750.00 | | Cl II | 6 |
| 3750.154 | | H | 2 |
| 3750.349 | | Ca I | 27 |
| 3750.50 | | A II | 3 |
| 3750.56 | | Cr II | |
| 3750.65 | | Zr II | 18 |
| 3750.677 | | Fe I | 225 |
| 3750.74 | | S III | 1 |
| 3750.763 | | Mn I | 24 |
| 3750.88 | | V II | 21 |
| 3751.059 | | Fe I | 667 |
| 3751.06 | | A II | 81 |
| 3751.09 | P | Fe I | 74 |
| 3751.222 | | V II | 100 |
| 3751.26 | | Ne II | 1 |
| 3751.60 | | Cr II | 117 |
| 3751.60 | | Zr II | 71 |
| 3751.625 | | Co I | 98 |
| 3751.812 | | Tm I | |
| 3751.820 | | Fe I | 287 |
| 3752.420 | | Fe I | 385,392 |
| 3752.524 | | Os I | 2 |
| 3752.65 | P | N III | 11 |
| 3752.679 | | Nd II | 33 |
| 3752.860 | | Ti I | 17 |
| 3753.10 | | Al II | 39 |
| 3753.154 | | Fe I | 177 |
| 3753.18 | | Fe III | 83 |
| 3753.26 | P | Cr II | 20 |
| 3753.367 | | Ca I | 27 |
| 3753.53 | | A II | 80,128 |
| 3753.610 | | Fe I | 73 |
| 3753.623 | | Ti I | 17 |
| 3753.83 | | Ne II | 38 |
| 3754.06 | | A II | 115 |
| 3754.12 | P | Rh II | 7 |
| 3754.346 | | Co I | 132 |
| 3754.506 | | Fe I | 386 |
| 3754.59 | | Cr II | 20 |
| 3754.62 | | N III | 4 |
| 3754.67 | | O III | 2 |
| 3754.89 | P | Fe I | 949 |
| 3755.13 | | Cr II | 20 |
| 3755.276 | | Sm II | 34 |
| 3755.425 | | Ce II | 128 |
| 3755.447 | | Co I | 96 |
| 3755.54 | | Mo II | 5 |
| 3755.56 | | Gd II | 85 |
| 3755.563 | | Fe II | 154 |
| 3755.61 | | Ca II | 8 |
| 3755.701 | | V I | 124 |
| 3755.81 | | Cr I | 72 |
| 3755.82 | P | O IV | 6 |
| 3756.069 | | Fe I | 74 |
| 3756.10 | | He I | 66 |
| 3756.411 | | Sm I | 2 |
| 3756.411 | | Sm II | 44 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3756.55 | | Cr II | 144 | 3765.542 | | Fe I | 608 | 3775.860 | | Fe I | 287 |
| 3756.83 | | Cr I | 72 | 3765.62 | | Cr II | 20 | 3776.062 | | Ti II | 72 |
| 3756.860 | | Tm II | 9 | 3765.70 | | Fe I | 608 | 3776.454 | | Fe I | 74 |
| 3756.939 | | Fe I | 805 | 3765.93 | | Eu II | 11 | 3776.527 | | Mn I | 6 |
| 3756.96 | | Zr II | 8 | 3766.092 | | Fe I | 226 | 3776.56 | | Y II | 8 |
| 3757.093 | | W I | 3 | 3766.13 | | A II | 29 | 3776.80 | | S II | 51 |
| 3757.174 | | Cr I | 43 | 3766.29 | | Ne II | 1 | 3777.061 | | Fe I | 432 |
| 3757.21 | | O III | 2 | 3766.445 | | Ti I | 82 | 3777.16 | | Ne II | 1 |
| 3757.459 | | Fe I | 668 | 3766.514 | | Ce II | 124 | 3777.32 | | Cr I | 41 |
| 3757.529 | | Sm II | | 3766.65 | | Cr II | 20 | 3777.43 | | Fe III | 95 |
| 3757.60 | P | N III | 11 | 3766.665 | | Fe I | 386 | 3777.448 | | Fe I | 223 |
| 3757.66 | P | N III | 11 | 3766.71 | | Zr I | 10 | 3777.543 | | Co I | 96 |
| 3757.662 | | Cr I | 43 | 3766.83 | | Zr II | 7 | 3777.55 | | A II | 81 |
| 3757.684 | | Ti II | 72 | 3766.92 | | Hf II | 75 | 3777.60 | | O II | 31 |
| 3757.80 | | Zr II | 120 | 3767.04 | | Gd II | 20 | 3777.64 | | Hf I | 1 |
| 3757.862 | | Ce II | 48 | 3767.05 | | La II | 151 | 3777.919 | | Ru II | 1 |
| 3757.929 | | W I | 4 | 3767.18 | P | Cr II | 20 | 3777.93 | | Cr I | 41 |
| 3758.044 | | Cr I | 43 | 3767.194 | | Fe I | 21 | 3778.063 | | Ni I | 15 |
| 3758.11 | P | Fe I | 704 | 3767.358 | | Sm II | 46 | 3778.136 | | Sm II | |
| 3758.22 | | V II | 100 | 3767.36 | | K II | 2 | 3778.320 | | Fe I | 367 |
| 3758.235 | | Fe I | 21 | 3767.431 | | Cr I | 42 | 3778.357 | | V II | 21 |
| 3758.31 | | Gd II | 20 | 3767.57 | | Cl II | 6 | 3778.37 | P | Fe II | 192 |
| 3758.36 | | Ca II | 8 | 3767.720 | | V II | 100 | 3778.509 | | Fe I | 664 |
| 3758.45 | | O IV | 6 | 3767.73 | P | Fe I | 918 | 3778.684 | | V I | 28 |
| 3758.72 | | Cr I | 12 | 3767.755 | | Sm II | | 3778.69 | | Cr II | |
| 3758.9 | | Y II | 74 | 3767.89 | | Zr II | 31 | 3778.697 | | Fe I | 73 |
| 3758.944 | | Nd II | | 3768.030 | | Fe I | 73 | 3778.90 | | S III | 5 |
| 3758.968 | | Sm II | | 3768.08 | | Cr I | 42 | 3779.213 | | Fe I | 290 |
| 3759.00 | | Gd II | 2 | 3768.13 | | Cl II | 6 | 3779.23 | P | N III | 11 |
| 3759.08 | | La II | 13 | 3768.23 | | Fe I | 368 | 3779.35 | | Cl III | 8 |
| 3759.155 | | Fe I | 855 | 3768.240 | | Cr I | 43 | 3779.424 | | Fe I | 222 |
| 3759.291 | | Ti II | 13 | 3768.39 | | Gd II | 2 | 3779.444 | | Fe I | 665 |
| 3759.460 | | Fe II | 154 | 3768.57 | P | Cr II | 6 | 3779.486 | | Fe I | 74 |
| 3759.556 | | Cb I | 3 | 3768.62 | | Cr I | 42 | 3779.58 | P | Fe II | 23 |
| 3759.684 | | Co I | 131 | 3768.71 | | P II | 1 | 3779.648 | | V I | 69 |
| 3759.87 | | O III | 2 | 3768.734 | | Cr I | 43 | 3780.09 | | Hf II | 18 |
| 3760.031 | | Ru I | 2 | 3768.81 | | He I | 65 | 3780.391 | | Nd II | 19 |
| 3760.052 | | Fe I | 177 | 3769.00 | | Cr I | 42 | 3780.53 | | La II | 141 |
| 3760.133 | | W I | 3 | 3769.046 | | Ce II | 50 | 3780.53 | | Zr I | 8 |
| 3760.24 | | V II | 21 | 3769.13 | | Cl II | 6 | 3780.67 | | La II | 55 |
| 3760.401 | | Co I | 40 | 3769.37 | P | Cr II | 6 | 3780.763 | | Sm II | |
| 3760.404 | | Ce II | 109 | 3769.45 | | Gd II | 37 | 3780.770 | | W I | 8 |
| 3760.534 | | Fe I | 76 | 3769.455 | | Ni II | 4 | 3780.84 | | A II | 54 |
| 3760.694 | | Ce II | 92 | 3769.644 | | Nd II | 67 | 3780.927 | | Sm II | 38 |
| 3760.694 | | Sm II | 18,51 | 3769.695 | | Pr II | 16 | 3781.188 | | Fe I | 74 |
| 3760.71 | | Gd II | 37 | 3769.995 | | Fe I | 387 | 3781.23 | | Cl II | 72 |
| 3760.92 | | Gd II | 20 | 3770.305 | | Fe I | 287 | 3781.379 | | Cb II | 9 |
| 3761.06 | P | Fe I | 706 | 3770.37 | P | N III | 11 | 3781.393 | | V I | 10,97 |
| 3761.12 | | Eu II | 11 | 3770.405 | | Fe I | 177 | 3781.510 | | Fe II | 130 |
| 3761.20 | | V II | 129 | 3770.412 | | Ti II | 107 | 3781.597 | | Mo I | 8 |
| 3761.320 | | Ti II | 13 | 3770.517 | | Mo I | 8 | 3781.620 | | Ce II | 163 |
| 3761.331 | | Tm II | 2 | 3770.54 | | A II | 42 | 3781.68 | | He II | 5 |
| 3761.416 | | Fe I | 227 | 3770.632 | | H | 2 | 3781.938 | | Fe I | 917 |
| 3761.442 | | V I | 97 | 3770.69 | | Gd II | | 3782.139 | | Ti I | 82 |
| 3761.62 | | Ca III | 3 | 3770.974 | | V II | 21 | 3782.195 | | Os I | 3 |
| 3761.69 | | Cr II | 11 | 3771.08 | | N III | 4 | 3782.24 | | Zr II | 44 |
| 3761.72 | | Ca I | 8 | 3771.36 | | Hf II | 29 | 3782.302 | | Y II | 61 |
| 3761.82 | | P II | 1 | 3771.45 | P | N III | 11 | 3782.34 | | Gd II | |
| 3761.866 | | Ti II | 107 | 3771.50 | P | Fe I | 607 | 3782.450 | | Fe I | 388 |
| 3761.867 | | Pr II | | 3771.652 | | Ti I | 17 | 3782.524 | | Ce II | 142 |
| 3761.90 | | Cr II | 11 | 3771.98 | | Zr II | 44 | 3782.6 | | S II | 23 |
| 3761.913 | | Tm II | 2 | 3772.06 | | Zr II | 31 | 3782.608 | | Fe I | 491 |
| 3762 | P | O V | 8 | 3772.530 | | Ni I | 15 | 3782.72 | | Zr II | 120 |
| 3762.205 | | Fe I | 705 | 3772.854 | | Pr II | | 3782.78 | | Hf II | 26 |
| 3762.41 | | Si IV | 3 | 3772.962 | | V II | 100 | 3783.16 | | S II | 41 |
| 3762.51 | | Hf II | 101 | 3773.12 | | La II | 141 | 3783.19 | | K II | 2 |
| 3762.588 | | Sm II | 25 | 3773.13 | | Si IV | 3 | 3783.347 | | Fe II | 14 |
| 3762.618 | | Ni I | | 3773.364 | | Fe I | 531 | 3783.530 | | Ni I | 30 |
| 3762.62 | P | N III | 11 | 3773.68 | | Cl II | 6 | 3783.561 | | Tm II | 11 |
| 3762.63 | | O II | 31 | 3773.699 | | Fe I | 386 | 3784.250 | | Nd II | |
| 3762.894 | | Fe II | 192 | 3773.80 | | Fe III | 34 | 3784.27 | P | Fe I | 607 |
| 3763.00 | | Gd II | 1 | 3773.80 | | V II | 129 | 3784.81 | | La II | 13 |
| 3763.13 | | Cb II | 10 | 3774.00 | | O III | 2 | 3784.886 | | He I | 64 |
| 3763.141 | | V I | 98 | 3774.25 | | Cl II | 6 | 3785.01 | | O II | 95 |
| 3763.33 | | Gd II | 37 | 3774.294 | | Sm II | 43 | 3785.421 | | Mn I | 45 |
| 3763.356 | | Mo I | 8 | 3774.3 | | Al II | 33 | 3785.706 | | Fe I | 608 |
| 3763.377 | | Mn I | 24 | 3774.33 | | Y II | 7 | 3785.78 | P | Fe I | 704 |
| 3763.475 | | Nd II | | 3774.331 | | Ti I | 16 | 3785.950 | | Fe I | 177 |
| 3763.52 | | A II | 54 | 3774.38 | P | O IV | 6 | 3786.043 | | Ti I | 57 |
| 3763.57 | P | Fe I | 128 | 3774.52 | | S III | 10 | 3786.176 | | Fe I | 367 |
| 3763.790 | | Fe I | 21 | 3774.54 | | A II | | 3786.22 | | Cr I | 71 |
| 3764.09 | | Fe II | 29 | 3774.599 | | Co I | 96 | 3786.253 | | Ti I | 165 |
| 3764.117 | | Ce II | 41 | 3774.645 | | Mn I | 45 | 3786.33 | P | Ti II | 12 |
| 3764.21 | P | Fe I | 74 | 3774.650 | | Ti II | 12 | 3786.37 | P | Fe II | 15 |
| 3764.370 | | Sm II | 34 | 3774.678 | | V II | 129 | 3786.40 | | A II | 3 |
| 3764.38 | | Zr I | 10 | 3774.823 | | Fe I | 73 | 3786.632 | | Ce II | 51 |
| 3764.60 | | Gd II | 85 | 3775.03 | | P II | 19 | 3786.678 | | Fe I | 22 |
| 3764.811 | | Pr II | | 3775.187 | | V I | 97 | 3786.70 | | P II | 1 |
| 3765.044 | | Ce II | 208 | 3775.572 | | Ni I | 33 | 3786.94 | | Fe III | 71 |
| 3765.27 | | A II | 42 | 3775.724 | | TI I | 1 | 3787.064 | | Cb I | 3 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3787.164 | | Fe I | 916 | 3796.90 | | Fe I | 667 | 3807.505 | | V I | 28 |
| 3787.203 | | Sm II | 5 | 3796.99 | | Cr I | 41 | 3807.534 | | Fe I | 73 |
| 3787.235 | | V II | 100 | 3797.126 | | Cr I | 139 | 3807.65 | | Gd II | 85 |
| 3787.56 | | Gd II | 20 | 3797.283 | | Sm II | 11 | 3807.926 | | Cr I | 139 |
| 3787.883 | | Fe I | 21 | 3797.517 | | Fe I | 607 | 3808.102 | | Co I | 17 |
| 3787.89 | P | Cr II | 6 | 3797.716 | | Cr I | 139 | 3808.124 | | Ce II | 59 |
| 3788.125 | | Sm II | 25 | 3797.730 | | Sm II | | 3808.286 | | Fe I | 489 |
| 3788.474 | | Rh I | 6 | 3797.900 | | H | 2 | 3808.521 | | V I | 9 |
| 3788.70 | | Y II | 7 | 3797.948 | | Fe I | 222 | 3808.61 | | A II | 3 |
| 3788.753 | | Ce II | 47 | 3797.95 | | Hf II | 29 | 3808.7 | | Y II | 73 |
| 3788.804 | | Ti I | 16 | 3798.127 | | Cb I | 3 | 3808.731 | | Fe I | 222 |
| 3788.864 | | Cr I | 139 | 3798.259 | | Mo I | 1 | 3808.772 | | Nd II | |
| 3788.91 | | Fe III | 102 | 3798.276 | | Ti I | 115 | 3808.79 | | La II | 43 |
| 3789.178 | | Fe I | 289 | 3798.36 | P | Fe II | 14 | 3809.043 | | Fe I | 367 |
| 3789.293 | | Ti I | 115 | 3798.513 | | Fe I | 21 | 3809.224 | | Ce II | 204 |
| 3789.49 | | Cr I | 41 | 3798.60 | P | Fe II | 23 | 3809.49 | | A II | 42 |
| 3789.570 | | Fe I | 226 | 3798.661 | | V I | 80 | 3809.51 | | CI II | 62 |
| 3789.723 | | Cr I | 24 | 3798.752 | | Tm II | 11 | 3809.592 | | Mn I | 6 |
| 3789.82 | P | Fe I | 702 | 3798.80 | | CI II | 62 | 3809.597 | | V I | 28 |
| 3790.095 | | Fe I | 22 | 3798.901 | | Ru I | 1 | 3809.67 | | S II | 50 |
| 3790.138 | | Cb I | 3 | 3799.009 | | Eu II | 11 | 3810.10 | | CI II | 62 |
| 3790.215 | | Mn I | 6 | 3799.038 | | Ce II | 136 | 3810.21 | P | Fe II | 143 |
| 3790.228 | | Cr I | 139 | 3799.17 | | Pd I | 1 | 3810.59 | | Hf II | 96 |
| 3790.24 | P | Fe I | 224 | 3799.259 | | Mn I | 6 | 3810.724 | | Tm II | 9 |
| 3790.324 | | V I | 28 | 3799.311 | | Rh I | 8 | 3810.759 | | Fe I | 665 |
| 3790.454 | | Cr I | 139 | 3799.347 | | Ru I | 1 | 3810.90 | P | Fe I | 224 |
| 3790.469 | | V I | 69 | 3799.39 | | A II | 54 | 3810.96 | | O III | 2 |
| 3790.656 | | Fe I | 387 | 3799.542 | | Sm II | 22 | 3811.05 | | Fe I | 223,287 |
| 3790.756 | | Fe I | 73,127 | 3799.549 | | Fe I | 21 | 3811.065 | | Co I | 31 |
| 3790.83 | | La II | 12 | 3799.81 | | Ti II | 13 | 3811.073 | | Nd II | 69 |
| 3790.96 | | Ne II | 30 | 3799.912 | | V I | 28 | 3811.22 | | A II | 81 |
| 3791.17 | | Gd II | 85 | 3800.02 | | Ne II | 39 | 3811.32 | | Ni I | 15 |
| 3791.209 | | Cb I | 2 | 3800.122 | | Ir I | 1 | 3811.35 | | O VI | 1 |
| 3791.26 | | O III | 2 | 3800.240 | | Mn II | 14 | 3811.385 | | Ti I | 165 |
| 3791.326 | | V I | 10 | 3800.303 | | Pr II | | 3811.774 | | Nd II | 31 |
| 3791.376 | | Cr I | 139 | 3800.370 | | Sm II | 43 | 3811.80 | P | Fe I | 701 |
| 3791.39 | | Zr I | 8 | 3800.39 | | Hf II | 18 | 3811.80 | | S II | |
| 3791.41 | | Si III | 5 | 3800.43 | | Fe III | 47 | 3811.892 | | Fe I | 287 |
| 3791.504 | | Fe I | 223 | 3800.552 | | Mn I | 45 | 3812.067 | | Sm II | 10 |
| 3791.72 | | Gd II | 46 | 3800.73 | | Zr II | 17 | 3812.18 | | Y II | 61 |
| 3791.73 | | Fe I | 703 | 3800.883 | | Y II | 61 | 3812.250 | | Cr I | 214 |
| 3792.025 | | Sm II | 5 | 3800.887 | | Sm II | 29 | 3812.470 | | Co I | 40 |
| 3792.137 | | Cr I | 139 | 3801.022 | | Sn I | 2 | 3812.964 | | Fe I | 22 |
| 3792.156 | | Fe I | 287 | 3801.093 | | Ti I | 165 | 3813.059 | | Fe I | 222 |
| 3792.32 | | Zr II | 81 | 3801.21 | | Cr II | | 3813.07 | P | Fe I | 176 |
| 3792.326 | | Ce II | 129 | 3801.29 | | Gd II | | 3813.12 | | V II | 128 |
| 3792.337 | | Ni I | 2 | 3801.529 | | Ce II | 172 | 3813.261 | | Ti I | 189 |
| 3792.42 | | Cr I | 71 | 3801.633 | | Mn II | 14 | 3813.390 | | Ti II | 12 |
| 3792.46 | | S II | 50 | 3801.681 | | Fe I | 367 | 3813.402 | | Be I | 5 |
| 3792.524 | | Pr II | | 3801.804 | | Fe I | 367 | 3813.45 | P | V I | 28 |
| 3792.56 | | Y II | 61 | 3801.907 | | Mn I | | 3813.492 | | V I | 9 |
| 3792.834 | | Fe I | 74 | 3801.975 | | Fe I | 704 | 3813.50 | | He II | 4 |
| 3792.87 | | N III | 11 | 3802.08 | | P III | 10 | 3813.638 | | Fe I | 283 |
| 3793.217 | | Rh I | 9 | 3802.283 | | Fe I | 666 | 3813.8 | | Y II | 72 |
| 3793.28 | P | Fe I | 386 | 3802.65 | | S II | 50 | 3813.891 | | Fe I | 854 |
| 3793.289 | | Cr I | 139 | 3802.883 | | V I | 67 | 3813.94 | P | Fe I | 176 |
| 3793.354 | | Fe I | 388 | 3802.928 | | Cb I | 3 | 3813.97 | | Gd II | 2 |
| 3793.37 | | Hf II | 1 | 3802.958 | | Mn II | 14 | 3813.98 | | Zr II | 100 |
| 3793.478 | | Fe I | 387 | 3803.097 | | Ce II | 37 | 3814.00 | | Cr II | |
| 3793.52 | | Fe III | 71 | 3803.14 | | O II | 34 | 3814.121 | | Fe II | 153 |
| 3793.608 | | Ni I | 4 | 3803.19 | | A II | 129 | 3814.42 | | Ra II | 1 |
| 3793.61 | | P II | 1 | 3803.24 | P | Fe I | 122 | 3814.457 | | Co I | 62 |
| 3793.614 | | V I | 9 | 3803.474 | | Nd II | | 3814.526 | | Fe I | 22 |
| 3793.75 | | CI II | | 3803.474 | | V I | 28 | 3814.580 | | Ti II | 12 |
| 3793.872 | | Fe I | 367 | 3803.784 | | V I | 68 | 3814.622 | | Cr I | 214 |
| 3793.879 | | Cr I | 139 | 3803.881 | | Mn II | 14 | 3814.725 | | Nd II | |
| 3793.971 | | Sm II | 11 | 3803.902 | | V I | 10 | 3814.855 | | Ti I | 189 |
| 3794.340 | | Fe I | 177 | 3804.013 | | Fe I | 702 | 3814.97 | | Zr II | 8 |
| 3794.366 | | V II | 100 | 3804.476 | | Mn II | 14 | 3815.012 | | Rh II | 7 |
| 3794.48 | | O II | 34 | 3804.589 | | V I | 97 | 3815.38 | | V II | 166 |
| 3794.608 | | Cr I | 139 | 3804.798 | | Cr I | 139 | 3815.433 | | Cr I | 71 |
| 3794.69 | | S III | 10 | 3805.24 | | CI II | 62 | 3815.495 | | Eu II | |
| 3794.78 | | La II | 12 | 3805.345 | | Fe I | 608 | 3815.514 | | V I | 28 |
| 3794.964 | | V I | 9,28 | 3805.359 | | Nd II | 19 | 3815.831 | | Ce II | 37 |
| 3795.004 | | Fe I | 21 | 3805.626 | | Sm II | 10 | 3815.842 | | Fe I | 45 |
| 3795.10 | | P II | 1 | 3805.765 | | He I | 63 | 3816.166 | | Pr II | |
| 3795.169 | | Tm II | 6 | 3806.07 | | Hf II | 75 | 3816.173 | | Cr I | 40 |
| 3795.256 | | Ce II | 50 | 3806.203 | | Fe I | 731 | 3816.25 | | La II | 134 |
| 3795.37 | | A III | 5 | 3806.30 | | Ne II | 30 | 3816.318 | | Co I | 62 |
| 3795.759 | | Tm II | 6 | 3806.55 | | Cr I | 24 | 3816.340 | | Fe I | 73 |
| 3795.903 | | Ti I | 115 | 3806.56 | | Si III | 5 | 3816.458 | | Co I | 62 |
| 3796.00 | | Fe I | 176 | 3806.697 | | Fe I | 607 | 3816.64 | | Gd II | 1 |
| 3796.11 | | Si III | 5 | 3806.719 | | Mn I | 6 | 3816.75 | | O III | 18 |
| 3796.33 | | He II | 5 | 3806.76 | P | Fe I | 224 | 3816.753 | | Mn I | 6 |
| 3796.37 | | Gd II | 2 | 3806.796 | | V I | 68 | 3816.876 | | Co I | 86 |
| 3796.47 | | Zr II | 71 | 3806.82 | P | Fe II | 153 | 3816.92 | P | Fe I | 387 |
| 3796.48 | | V II | 167 | 3806.829 | | Cr I | 214 | 3817.20 | | Hf II | 62 |
| 3796.55 | P | Fe II | 143 | 3807.144 | | Ni I | 33 | 3817.24 | | La II | 168 |
| 3796.60 | | A II | 129 | 3807.227 | | Nd II | 19 | 3817.395 | | Tm II | |
| 3796.899 | | Ti II | 12 | 3807.41 | | Zr II | 31 | 3817.455 | | Ce II | 222 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3817.59 | | Zr II | 18 | 3827.079 | | Fe II | 153 | 3836.10 | | C II | 13 |
| 3817.639 | | Ti I | 189 | 3827.27 | | Zr II | | 3836.112 | | Ce II | 60 |
| 3817.64 | | Fe I | 701 | 3827.46 | | P II | 26 | 3836.332 | | Fe I | 664 |
| 3817.844 | | Cr I | 40 | 3827.51 | | Zr II | 121 | 3836.541 | | Nd II | |
| 3817.844 | | V I | 10 | 3827.572 | | Fe I | 284 | 3836.76 | | Zr II | 16 |
| 3817.940 | | Co I | 131 | 3827.62 | | Cl II | 69 | 3836.763 | | Ti I | |
| 3818.244 | | V I | 9 | 3827.67 | P | Fe II | 128 | 3836.91 | | Gd II | 20 |
| 3818.27 | | N I | 11 | 3827.825 | | Fe I | 45 | 3837.132 | | Fe I | 222 |
| 3818.281 | | Pr II | | 3828.180 | | Ti I | 189 | 3837.210 | | Ce II | 112 |
| 3818.34 | | Y II | 7 | 3828.44 | | Fe III | 70,95 | 3837.80 | | S III | 5 |
| 3818.40 | | Cl II | 62 | 3828.510 | | Fe I | 287 | 3838.094 | | He I | 61 |
| 3818.44 | | Ne II | 39 | 3828.559 | | V I | 9 | 3838.198 | | Tm II | 11 |
| 3818.481 | | Cr I | 40 | 3828.836 | | V I | 67 | 3838.28 | | Zr II | 17 |
| 3818.78 | | Zr II | 111 | 3828.883 | | Mo I | 8 | 3838.2918 | | Mg I | 3 |
| 3818.862 | | Cb II | 10 | 3829.125 | | Fe I | 948 | 3838.2943 | | Mg I | 3 |
| 3819.04 | | A II | 129 | 3829.133 | | W I | 3 | 3838.316 | | S III | 5 |
| 3819.25 | P Forb | He I | 23 | 3829.27 | | Cl II | 9 | 3838.37 | | Cl II | 69 |
| 3819.50 | P | Fe I | 703 | 3829.3549 | | Mg I | 3 | 3838.39 | | N II | 30 |
| 3819.564 | | Cr I | 70 | 3829.458 | | Fe I | 366,663 | 3838.542 | | Ce II | 114 |
| 3819.57 | P | Cr I | 88 | 3829.47 | P Forb | He I | 21 | 3838.941 | | Sm II | 34 |
| 3819.606 | | He I | 22 | 3829.53 | | V II | 3 | 3838.981 | | Nd II | 28 |
| 3819.62 | P | Fe I | 122 | 3829.655 | | V II | 3 | 3839.002 | | V I | 44 |
| 3819.67 | | Eu II | 1 | 3829.680 | | Mn I | 6 | 3839.259 | | Fe I | 529 |
| 3819.761 | | He I | 22 | 3829.77 | | Ne II | 39 | 3839.614 | | Fe I | 995 |
| 3819.84 | | Zr II | 81 | 3829.771 | | Fe I | 221 | 3839.64 | | Gd II | 20 |
| 3819.908 | | Co I | 130 | 3829.80 | | N II | 30 | 3839.777 | | Mn I | 6 |
| 3819.963 | | V I | 28 | 3830.032 | | Cr I | | 3840.140 | | V I | 66 |
| 3819.97 | | Cr I | 40 | 3830.293 | | Sm II | 10 | 3840.20 | P | Fe I | 120 |
| 3820.25 | | Cl II | 69 | 3830.39 | | N I | 11 | 3840.439 | | Fe I | 20 |
| 3820.299 | | V I | 44 | 3830.43 | | A II | 3,128 | 3840.44 | P | V I | 44 |
| 3820.428 | | Fe I | 20 | 3830.45 | | O II | 34 | 3840.70 | | Cr I | 70 |
| 3820.74 | | Hf I | 5 | 3830.719 | | Pr II | | 3840.72 | | La II | 28 |
| 3820.871 | | Ce II | 208 | 3830.757 | | Fe I | 224 | 3840.752 | | V I | 9 |
| 3820.874 | | Cr I | 40 | 3830.80 | | Cl II | 69 | 3841.051 | | Fe I | 45 |
| 3821.181 | | Fe I | 608 | 3830.850 | | Fe I | 284 | 3841.082 | | Mn I | 6 |
| 3821.487 | | V I | 28 | 3831.017 | | V II | 3 | 3841.17 | | Lu I | 3 |
| 3821.582 | | Cr I | 40 | 3831.032 | | Cr I | 24 | 3841.277 | | Cr I | 69 |
| 3821.68 | | O II | 34 | 3831.41 | | S II | | 3841.35 | P | Fe II | 128 |
| 3821.834 | | Fe I | 222 | 3831.501 | | Sm II | 43 | 3841.458 | | Co I | 32 |
| 3821.92 | P | Fe II | 14 | 3831.690 | | Ni I | 31 | 3841.54 | | A II | 54 |
| 3822.009 | | V I | 9 | 3831.75 | | Fe III | 109 | 3841.890 | | V I | 8 |
| 3822.026 | | Ti I | 189 | 3831.80 | | Gd II | 3 | 3842.03 | | Cr I | 70 |
| 3822.07 | | N I | 11 | 3831.840 | | Cb II | 10 | 3842.037 | | Al II | 49 |
| 3822.10 | | Cr I | 40 | 3831.85 | | S III | 5 | 3842.047 | | Co I | 33 |
| 3822.17 | | Gd II | 19 | 3832.12 | | C II | 13 | 3842.20 | | Gd II | |
| 3822.262 | | Rh I | 8 | 3832.2996 | | Mg I | 3 | 3842.20 | | N II | 30 |
| 3822.41 | | Zr I | 10 | 3832.3037 | | Mg I | 3 | 3842.213 | | Al II | 49 |
| 3822.63 | P | O I | 36 | 3832.31 | | Pd I | 1 | 3842.317 | | Al II | 49 |
| 3822.737 | | Fe II | | 3832.32 | | Cr I | 24 | 3842.82 | | O II | 12 |
| 3822.888 | | V I | 28 | 3832.745 | | Ce II | 115 | 3842.90 | P | Fe I | 222 |
| 3822.987 | | Mo I | 8 | 3832.835 | | V I | 80 | 3842.975 | | Fe I | 221 |
| 3823.213 | | V I | 28 | 3832.873 | | Ni I | 1 | 3843.000 | | Sc II | 1 |
| 3823.41 | | Zr II | 44 | 3832.89 | | Y II | 7 | 3843.03 | | Zr II | 7 |
| 3823.469 | | O I | 36 | 3832.94 | | Zr II | 7 | 3843.16 | P | Sc II | 17 |
| 3823.513 | | Mn I | 6 | 3833.02 | P | Fe II | 23 | 3843.259 | | Fe I | 528 |
| 3823.522 | | Cr I | 24 | 3833.059 | | Sc II | 1 | 3843.26 | | Cl II | 49 |
| 3823.571 | | Pr II | 14 | 3833.10 | | O II | 13 | 3843.500 | | Sm II | 43 |
| 3823.72 | | Zr II | 31 | 3833.186 | | Ti I | | 3843.58 | | O II | 13 |
| 3823.893 | | Mn I | 6 | 3833.226 | | V I | 67 | 3843.64 | | Cr I | 87 |
| 3823.903 | | Ce II | 115 | 3833.311 | | Fe I | 221 | 3843.692 | | Co I | 84 |
| 3823.990 | | V I | 44 | 3833.40 | | Cl II | 69 | 3843.72 | P | Fe I | 703 |
| 3824 | P | N IV | 10 | 3833.49 | | Cr I | 11 | 3843.80 | | Gd II | 17 |
| 3824.074 | | Fe I | 224 | 3833.574 | | He I | 62 | 3843.983 | | Mn I | 6 |
| 3824.175 | | Sm II | 18 | 3833.674 | | Ti I | | 3844.276 | | Ni I | 137 |
| 3824.306 | | Fe I | 607 | 3833.71 | | Cr I | 70 | 3844.438 | | V I | 7 |
| 3824.425 | | O I | 36 | 3833.757 | | Mo I | 8 | 3844.48 | P | V II | 20 |
| 3824.444 | | Fe I | 4 | 3833.80 | | He II | 4 | 3844.579 | | Gd II | 2 |
| 3824.47 | | Cl III | 9 | 3833.828 | | Sm II | 29 | 3844.58 | | Ni I | 181 |
| 3824.73 | P | Fe I | 221 | 3833.862 | | Mn I | 6 | 3844.75 | | A II | 54 |
| 3824.78 | | Y II | 72 | 3833.87 | | Zr II | 100 | 3844.892 | | V I | 44 |
| 3824.882 | | Cb I | 2 | 3833.889 | | Rh I | 9 | 3845.170 | | Fe I | 124 |
| 3824.913 | | Fe II | 29 | 3834.22 | P | V I | 80 | 3845.18 | P | Fe II | 127 |
| 3825.090 | | O I | 36 | 3834.225 | | Fe I | 20 | 3845.21 | P | Fe I | 701 |
| 3825.249 | | O I | 36 | 3834.24 | | N I | 11 | 3845.21 | | S II | 22 |
| 3825.390 | | Cr I | 70 | 3834.24 | | O VI | 1 | 3845.42 | | A II | 9 |
| 3825.404 | | Fe I | 123 | 3834.364 | | Mn I | 6 | 3845.42 | | Cl II | 25 |
| 3825.530 | | O I | 36 | 3834.46 | P | Fe I | 663 | 3845.468 | | Co I | 34 |
| 3825.70 | | A II | 129 | 3834.556 | | Ce II | 49 | 3845.68 | | Fe III | 35 |
| 3825.884 | | Fe I | 20 | 3834.735 | | Cr I | 70 | 3845.69 | | Cl II | 25 |
| 3826.05 | | Gd II | 19 | 3834.81 | P | Fe II | 129 | 3845.692 | | Fe I | 771 |
| 3826.202 | | Sm II | 51 | 3835.058 | | W I | 2 | 3845.84 | | Cl II | 25 |
| 3826.292 | | Pr II | | 3835.09 | | La II | 55 | 3845.974 | | V I | |
| 3826.416 | | Nd II | 33 | 3835.386 | | H | 2 | 3846.00 | | La II | 26 |
| 3826.425 | | Cr I | 70 | 3835.497 | | Co I | 114 | 3846.001 | | Fe I | 703 |
| 3826.63 | P | Fe I | 176 | 3835.560 | | V I | 44 | 3846.29 | P | Fe I | 947 |
| 3826.701 | | Mo I | 8 | 3835.725 | | Sm II | 18 | 3846.31 | P | Fe II | 128 |
| 3826.774 | | V I | 44 | 3835.96 | | Zr I | 8 | 3846.412 | | Fe I | 804 |
| 3826.83 | | A II | 54 | 3836.054 | | V I | 44 | 3846.438 | | Ti I | |
| 3826.836 | | Fe I | 283 | 3836.070 | | Cr I | 70 | 3846.516 | | Y II | 83 |
| 3826.968 | | V II | 128 | 3836.085 | | Ti II | 12 | 3846.605 | | Pr II | |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 3846.803 | | Fe I | 664 |
| 3846.949 | | Fe I | 176 |
| 3847.01 | | Zr I | 10 |
| 3847.086 | | F II | 1 |
| 3847.252 | | Mo I | 8 |
| 3847.323 | | V I | 7 |
| 3847.323 | | V II | 156 |
| 3847.38 | | N II | 30 |
| 3847.501 | | W I | 4 |
| 3847.511 | | Sm II | 34 |
| 3847.89 | | O II | 12 |
| 3848.023 | | Tm II | 2 |
| 3848.194 | | Y II | 72 |
| 3848.233 | | Nd II | 19 |
| 3848.24 | | Mg II | 5 |
| 3848.29 | P | Fe I | 224 |
| 3848.524 | | Nd II | |
| 3848.597 | | Ce II | 36 |
| 3848.779 | | Sm II | |
| 3848.983 | | Cr I | 69 |
| 3849.02 | | La II | 12 |
| 3849.26 | | Zr I | 6 |
| 3849.324 | | V I | |
| 3849.365 | | Cr I | 138 |
| 3849.52 | | Hf II | 61 |
| 3849.534 | | Cr I | 24 |
| 3849.58 | | Ni II | 11 |
| 3849.758 | | V II | 33 |
| 3849.969 | | Fe I | 20 |
| 3849.987 | | F II | 1 |
| 3850.042 | | Cr I | 69 |
| 3850.40 | | Mg II | 5 |
| 3850.409 | | V II | 11 |
| 3850.57 | | A II | 10 |
| 3850.69 | | Gd II | 2 |
| 3850.81 | | O II | 12 |
| 3850.820 | | Fe I | 22 |
| 3850.825 | | Pr II | |
| 3850.93 | | S II | 50 |
| 3850.945 | | Co I | 17 |
| 3850.97 | | Cl II | 25 |
| 3850.97 | | Gd II | 2 |
| 3851.04 | | O II | 12 |
| 3851.171 | | V I | 44 |
| 3851.38 | | Cl II | 25 |
| 3851.47 | | O II | 13 |
| 3851.58 | | Fe I | |
| 3851.617 | | Pr II | |
| 3851.667 | | F II | 1 |
| 3851.69 | | Cl II | 25 |
| 3851.748 | | Nd II | 35 |
| 3851.848 | | Co I | 128 |
| 3851.880 | | Sm II | 29 |
| 3852.10 | | V II | 3 |
| 3852.218 | | Cr I | 24 |
| 3852.45 | | Gd II | 2 |
| 3852.574 | | Fe I | 73 |
| 3852.58 | | Cr I | 11 |
| 3852.805 | | Pr II | |
| 3853.038 | | Ti I | 176 |
| 3853.07 | | Zr II | 81 |
| 3853.09 | | S II | 30 |
| 3853.164 | | Ce II | 39 |
| 3853.176 | | Cr I | 69 |
| 3853.462 | | Fe I | 429 |
| 3853.657 | | Si II | 1 |
| 3853.719 | | Ti I | 176 |
| 3854.177 | | Gd II | 50 |
| 3854.187 | | Ce II | 62 |
| 3854.209 | | Sm II | |
| 3854.220 | | Cr I | 69 |
| 3854.322 | | Ce II | 61 |
| 3854.375 | | Fe I | 567 |
| 3854.75 | | Cl II | 84 |
| 3854.905 | | Pr II | |
| 3854.91 | | La II | 55 |
| 3855.08 | | N II | 30 |
| 3855.18 | | A II | 81 |
| 3855.286 | | Cr I | 69 |
| 3855.329 | | Fe I | 283 |
| 3855.370 | | V I | 7 |
| 3855.43 | | Zr II | 18 |
| 3855.56 | | Gd II | 2 |
| 3855.571 | | Cr I | 69 |
| 3855.65 | P | Cr I | 138 |
| 3855.841 | | V I | 9 |
| 3855.846 | | Fe I | 567 |
| 3856.021 | | Si II | 1 |
| 3856.07 | | N II | 30 |
| 3856.16 | | A II | 55 |
| 3856.16 | | O II | 12 |
| 3856.281 | | Cr I | 69 |
| 3856.373 | | Fe I | 4 |
| 3856.515 | | Rh I | 7 |
| 3856.796 | | Co I | 60 |
| 3857.032 | | Ce II | 158 |
| 3857.18 | | O II | 13 |
| 3857.240 | | Ce II | 127 |
| 3857.26 | P | Y II | 16 |
| 3857.631 | | Cr I | 69 |
| 3857.912 | | Sm II | 28 |
| 3858.07 | | He II | 4 |
| 3858.133 | | Ti I | 176 |
| 3858.301 | | Ni I | 32 |
| 3858.32 | | A III | 5 |
| 3858.48 | P | Fe I | 565 |
| 3858.90 | | Cr I | 138 |
| 3859.21 | | Fe I | 175 |
| 3859.24 | | Mg I | 21 |
| 3859.26 | | S II | 30 |
| 3859.33 | | Al II | 38 |
| 3859.341 | | V I | 44 |
| 3859.36 | P | Sc II | 1 |
| 3859.913 | | Fe I | 4 |
| 3860.12 | P | Fe II | 128 |
| 3860.13 | | Cr I | 39 |
| 3860.15 | | S II | 41 |
| 3860.46 | | Fe III | 109 |
| 3860.64 | | S II | 50 |
| 3860.64 | | S III | 5 |
| 3860.74 | P | Fe I | 701 |
| 3860.80 | | Cl II | 25 |
| 3860.915 | | Fe II | |
| 3860.98 | | Cl II | 25 |
| 3861.079 | | Ti I | |
| 3861.164 | | Co I | 33 |
| 3861.18 | | Eu II | |
| 3861.341 | | Fe I | 283,663 |
| 3861.40 | | Cl II | 25 |
| 3861.60 | | Fe I | 663 |
| 3861.95 | | Cl II | 84 |
| 3862.054 | | Sm II | 10 |
| 3862.17 | P | Cr II | 129 |
| 3862.223 | | V I | 8 |
| 3862.592 | | Si II | 1 |
| 3862.823 | | Ti I | 175 |
| 3863.056 | | Cb II | 9 |
| 3863.072 | | Ni I | 181 |
| 3863.327 | | Nd II | 27 |
| 3863.409 | | Nd II | 26 |
| 3863.413 | | Fe II | 152 |
| 3863.50 | | O II | 12 |
| 3863.607 | | Co I | 131 |
| 3863.70 | P | Fe I | 565 |
| 3863.745 | | Fe I | 280 |
| 3863.81 | | V II | 33 |
| 3863.866 | | V I | 66 |
| 3863.88 | | Zr I | 8 |
| 3863.953 | | Fe II | 127,152 |
| 3864.115 | | Mo I | 1 |
| 3864.13 | | O II | 11 |
| 3864.30 | P | Fe I | 565 |
| 3864.300 | | V I | 64 |
| 3864.31 | P | Fe I | 221 |
| 3864.33 | | Zr I | 10 |
| 3864.335 | | W I | 3 |
| 3864.45 | | O II | 12 |
| 3864.49 | | La II | 141 |
| 3864.60 | | Cl II | 84 |
| 3864.68 | | O II | 12 |
| 3864.75 | | Hf II | 98 |
| 3864.862 | | V I | 7 |
| 3865.458 | | Pr II | |
| 3865.526 | | Fe I | 20 |
| 3865.59 | | Cr II | 167 |
| 3865.72 | | V II | 20 |
| 3866.01 | | Cr II | 130 |
| 3866.160 | | Al II | 17 |
| 3866.446 | | Ti I | 176 |
| 3866.54 | | Cr II | 130 |
| 3866.744 | | V II | 11 |
| 3867.219 | | Fe I | 488 |
| 3867.26 | | Gd II | 50 |
| 3867.32 | | Hf II | 53 |
| 3867.45 | P | Fe I | 221 |
| 3867.477 | | He I | 20 |
| 3867.56 | | S I | |
| 3867.602 | | V I | 7 |
| 3867.631 | | He I | 20 |
| 3867.739 | | Ti I | 176 |
| 3867.839 | | Ru I | 9 |
| 3867.925 | | Fe I | 221 |
| 3867.986 | | W I | 7 |
| 3868.243 | | Fe I | 430 |
| 3868.397 | | Ti I | 175 |
| 3868.53 | | A II | 90 |
| 3868.62 | | Cl II | 84 |
| 3868.84 | | C II | 18 |
| 3869.045 | | Nd II | 34 |
| 3869.085 | | Mo I | 8 |
| 3869.10 | | N I | |
| 3869.275 | | Ti I | 175 |
| 3869.562 | | Fe I | 284 |
| 3869.590 | | Fe I | 284 |
| 3869.61 | | A II | 80 |
| 3870.057 | | Al II | 74 |
| 3870.267 | | Cr I | 11 |
| 3870.506 | | Ca I | 26 |
| 3870.534 | | Co I | 129 |
| 3871.078 | | V I | 66 |
| 3871.54 | | Gd II | 1 |
| 3871.60 | | Ni I | 181 |
| 3871.62 | | C II | 18 |
| 3871.64 | | La II | 13 |
| 3871.750 | | Fe I | 429 |
| 3871.778 | | Sm II | 18 |
| 3871.819 | | He I | 60 |
| 3872.15 | | A II | 54 |
| 3872.308 | | Y II | 61 |
| 3872.45 | | O II | 11 |
| 3872.504 | | Fe I | 20 |
| 3872.55 | | Hf II | 27 |
| 3872.552 | | Ca I | 26 |
| 3872.62 | | Gd II | 19 |
| 3872.748 | | V I | 43 |
| 3872.76 | P | Fe II | 29 |
| 3872.835 | | W I | 4 |
| 3872.923 | | Fe I | 284 |
| 3872.98 | P | Fe II | 128 |
| 3873.120 | | Co I | 18 |
| 3873.203 | | Ti I | 176 |
| 3873.74 | | K II | 3 |
| 3873.763 | | Fe I | 175 |
| 3873.953 | | Co I | 18 |
| 3874.053 | | Fe I | 120 |
| 3874.10 | | O II | 11 |
| 3874.37 | | Zr II | 89 |
| 3874.41 | P | Cr II | 143 |
| 3874.570 | | Cr I | 138 |
| 3874.76 | P | Cr II | 143 |
| 3875.036 | | Ce II | 162 |
| 3875.075 | | V I | 7 |
| 3875.14 | | Cr I | 138 |
| 3875.193 | | Sm II | |
| 3875.26 | | A II | 2 |
| 3875.262 | | Ti I | 15,175 |
| 3875.426 | | V I | 43 |
| 3875.46 | | Gd II | 50 |
| 3875.545 | | Sm II | 17 |
| 3875.67 | | V II | 20 |
| 3875.807 | | Ca I | 26 |
| 3875.82 | | O II | 13 |
| 3875.902 | | V I | 7 |
| 3876.043 | | Fe I | 22 |
| 3876.051 | | C II | 33 |
| 3876.086 | | V I | 8 |
| 3876.188 | | C II | 33 |
| 3876.409 | | C II | 33 |
| 3876.65 | | Lu II | 3 |
| 3876.670 | | C II | 33 |
| 3876.671 | | Fe I | 121 |
| 3876.831 | | Co I | 17,62 |
| 3876.974 | | Ce II | 82 |
| 3877.11 | | Hf II | 75 |
| 3877.225 | | Pr II | |
| 3877.591 | | Ti I | 175 |
| 3877.60 | | Zr I | 58 |
| 3878.021 | | Fe I | 20 |
| 3878.180 | | He I | 59 |
| 3878.19 | P | Fe I | 565 |
| 3878.22 | | C II | 33 |
| 3878.28 | | Y II | 7 |
| 3878.372 | | Ce II | 48 |
| 3878.575 | | Fe I | 4 |
| 3878.58 | | Mg I | 20 |
| 3878.582 | | Nd II | |
| 3878.61 | P | Ti I | 164 |
| 3878.663 | | Fe I | 175 |
| 3878.715 | | V II | 33 |
| 3878.726 | | Fe I | 664 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3878.750 | | Co I | 62 | 3889.948 | | Ti I | 15 | 3900.546 | | Ti II | 34 |
| 3879.04 | | Zr I | 6 | 3889.990 | | Ce II | 50 | 3900.63 | | A II | 54 |
| 3879.222 | | Cr I | 138 | 3890.080 | | Sm I | 17 | 3900.64 | | Hf II | 103 |
| 3879.60 | | C II | 33 | 3890.184 | | V I | 8 | 3900.680 | | Al II | 1 |
| 3880.34 | | A II | 54 | 3890.241 | | Mg I | 47 | 3900.790 | | Tm II | 9 |
| 3880.466 | | Pr II | | 3890.32 | | Zr I | 8 | 3900.958 | | Ti I | 15 |
| 3880.59 | | C II | 33 | 3890.39 | | Fe I | 567 | 3901.03 | P | Fe I | 834 |
| 3880.766 | | Sm II | 10 | 3890.528 | | Tm II | 1 | 3901.152 | | V I | 126 |
| 3880.779 | | Nd II | 32 | 3890.580 | | Nd II | | 3901.33 | P | V II | 20 |
| 3880.82 | | Hf II | 6 | 3890.82 | | Cr I | 262 | 3901.775 | | Mo I | 8 |
| 3881.04 | | V II | 143 | 3890.844 | | Fe I | 280 | 3901.850 | | Nd II | |
| 3881.214 | | Cr I | 138 | 3890.940 | | Nd II | | 3902.09 | P | Sc II | 9 |
| 3881.383 | | Sm II | 33 | 3891.119 | | V I | | 3902.108 | | Cr I | 238 |
| 3881.399 | | Ti I | 15 | 3891.210 | | Sm II | 22 | 3902.250 | | V I | 7 |
| 3881.402 | | W I | 2 | 3891.227 | | V I | 43 | 3902.398 | | Gd II | 19 |
| 3881.84 | | Gd II | 36 | 3891.25 | | V II | 20 | 3902.558 | | V I | 43 |
| 3881.856 | | Cr I | 138 | 3891.39 | | Zr I | 11 | 3902.915 | | Cr I | 23 |
| 3881.869 | | Co I | 18 | 3891.40 | | A II | 2 | 3902.948 | | Fe I | 45 |
| 3881.92 | | Ni II | 13 | 3891.781 | | Ba II | 4 | 3902.968 | | Mo I | 1 |
| 3881.94 | | Gd II | 50 | 3891.928 | | Fe I | 733 | 3903.164 | | Cr I | 23 |
| 3881.97 | | Zr II | 134 | 3891.97 | | A II | 2 | 3903.27 | | V II | 11 |
| 3882.147 | | Ti I | 175 | 3891.976 | | Mg I | 47 | 3903.417 | | Sm II | |
| 3882.197 | | O II | 12 | 3891.98 | P | V II | 11 | 3903.77 | | Zr II | 7 |
| 3882.28 | P | Ti II | 34 | 3892.118 | | Co I | 130 | 3903.902 | | Fe I | 429 |
| 3882.313 | | Ti I | 176 | 3892.14 | | Cr II | 167 | 3904.02 | | Mg I | 19 |
| 3882.446 | | Ce II | 87 | 3892.321 | | S II | 50 | 3904.340 | | Ce II | 91 |
| 3882.45 | | O II | 11 | 3892.859 | | V I | 7 | 3904.64 | P | Ni I | 29 |
| 3882.892 | | Ti I | 176 | 3892.898 | | Fe I | 283 | 3904.785 | | Ti I | 56 |
| 3883.132 | | Tm I | | 3892.98 | | Fe I | 567 | 3904.79 | | P III | 9 |
| 3883.15 | | O II | 12 | 3893.067 | | Co I | 114 | 3904.790 | | Co I | 171 |
| 3883.208 | | V II | 11 | 3893.14 | | A II | 91 | 3905.01 | P | Fe I | 703 |
| 3883.282 | | Fe I | 663 | 3893.316 | | Fe I | 364 | 3905.18 | P | Fe I | 564 |
| 3883.292 | | Cr I | 23 | 3893.376 | | Mg I | 47 | 3905.527 | | Si I | 3 |
| 3883.43 | | V II | 20 | 3893.391 | | Fe I | 430 | 3905.64 | | Cr II | 167 |
| 3883.437 | | Tm II | 5 | 3893.53 | | O II | 11 | 3905.66 | P | Fe I | 153 |
| 3883.660 | | Cr I | 138 | 3893.924 | | Fe I | 175 | 3905.88 | P | Cr II | 128 |
| 3883.77 | | Hf II | 18 | 3894.005 | | Fe I | 663 | 3905.886 | | Nd II | |
| 3883.80 | | C III | 15 | 3894.035 | | Cr I | 23 | 3906.037 | | Fe II | 173 |
| 3883.80 | | Cl II | 55 | 3894.073 | | Co I | 34 | 3906.287 | | Co I | 17 |
| 3884.090 | | Ti I | 175 | 3894.19 | | Pd I | 8 | 3906.482 | | Fe I | 4 |
| 3884.359 | | Fe I | 282 | 3894.49 | | Fe I | 566 | 3906.748 | | Fe I | 664 |
| 3884.465 | | V I | 65 | 3894.627 | | Nd II | 29 | 3906.748 | | V I | 42,43 |
| 3884.601 | | Co I | 32 | 3894.696 | | Gd II | 1 | 3906.95 | | S II | 3 |
| 3884.66 | | Fe I | 565 | 3894.976 | | Co I | 18 | 3906.97 | P | Fe I | 567 |
| 3884.847 | | V II | 33 | 3895.03 | | P III | 9 | 3907.10 | | Eu II | 5 |
| 3885.07 | P | Fe I | 732 | 3895.114 | | Ce II | 210 | 3907.289 | | Ce II | 253 |
| 3885.084 | | Cr I | 138 | 3895.12 | | Cr II | 143 | 3907.45 | | O II | 11 |
| 3885.09 | | La II | 151 | 3895.16 | | Cr II | 106 | 3907.464 | | Fe I | 284 |
| 3885.154 | | Fe I | 430 | 3895.230 | | Gd II | 50 | 3907.476 | | Sc I | 8 |
| 3885.190 | | Pr II | 18 | 3895.243 | | Ti I | 176 | 3907.52 | | V II | 178 |
| 3885.218 | | Cr I | 23 | 3895.26 | | A II | 55 | 3907.65 | P | Ti II | 97 |
| 3885.275 | | Co I | 31 | 3895.44 | P | Fe I | 565 | 3907.778 | | Cr I | 262 |
| 3885.286 | | Sm II | 46 | 3895.59 | P | Ti I | 164 | 3907.937 | | Fe I | 280 |
| 3885.41 | | Zr I | 7 | 3895.658 | | Fe I | 4 | 3908.033 | | Pr II | 11 |
| 3885.512 | | Fe I | 124 | 3895.662 | | Mg I | 47 | 3908.408 | | Ce II | 65 |
| 3885.76 | P | Fe I | 567 | 3895.791 | | Gd II | | 3908.431 | | Pr II | 11 |
| 3885.770 | | V I | 65 | 3896.11 | P | Fe II | 23 | 3908.54 | P | Fe II | 29 |
| 3885.87 | P | Ni I | 1 | 3896.155 | | V I | 43 | 3908.543 | | Ce II | 127 |
| 3885.93 | P | Fe I | 946 | 3896.155 | | V II | 10 | 3908.68 | P | Fe I | 153 |
| 3885.95 | P | Ti I | 164 | 3896.30 | | O II | 11 | 3908.755 | | Cr I | 23 |
| 3885.99 | | C III | 15 | 3896.53 | | Zr I | 9 | 3908.90 | P | Fe I | 153 |
| 3886.284 | | Fe I | 4 | 3896.63 | P | Fe I | 834 | 3908.931 | | Ni I | 117 |
| 3886.37 | | La II | 40 | 3896.804 | | Ce II | 188 | 3909.25 | P | Cr II | 129 |
| 3886.587 | | V I | 64 | 3896.804 | | Y II | 86 | 3909.313 | | Ce II | 133 |
| 3886.789 | | Cr I | 23 | 3896.977 | | Sm II | 5 | 3909.664 | | Fe I | 565 |
| 3886.825 | | Mo I | 8 | 3897.075 | | V I | 126 | 3909.830 | | Fe I | 364 |
| 3886.94 | P | Cr I | 66 | 3897.290 | | Ti I | 175 | 3909.894 | | V I | 7,63 |
| 3887.051 | | Fe I | 20 | 3897.449 | | Fe I | 429 | 3909.910 | | Ba I | 8 |
| 3887.157 | | Gd II | 3 | 3897.581 | | Ti I | 176 | 3909.933 | | Co I | 3 |
| 3887.347 | | Tm I | 1 | 3897.896 | | Fe I | 280 | 3910.52 | P | Fe I | 562 |
| 3887.365 | | Ti I | 176 | 3897.92 | | K II | 1 | 3910.790 | | V I | 42 |
| 3887.44 | | He II | 4 | 3898.012 | | Fe I | 20 | 3910.81 | | La II | 43 |
| 3887.866 | | Nd II | 31 | 3898.019 | | V I | 126 | 3910.845 | | Fe I | 284 |
| 3887.993 | | D | 1 | 3898.120 | | Mg I | 47 | 3911.00 | P | Fe I | 562 |
| 3888.020 | | Ti I | 175 | 3898.143 | | V I | 63 | 3911.169 | | Nd II | |
| 3888.42 | | Fe I | 565 | 3898.273 | | Ce II | 52 | 3911.18 | P | Fe I | 564 |
| 3888.517 | | Fe I | 45 | 3898.278 | | V I | | 3911.185 | | Ti I | 175 |
| 3888.646 | | He I | 2 | 3898.292 | | Cb II | 9 | 3911.32 | | Cr II | 129 |
| 3888.825 | | Fe I | 488 | 3898.485 | | Co I | 58 | 3911.32 | | S II | |
| 3889.051 | | H | 2 | 3898.487 | | Ti I | 13 | 3911.362 | | Ti I | 176 |
| 3889.141 | | Ca I | 42 | 3899.037 | | Fe I | 175 | 3911.58 | | A II | 54 |
| 3889.18 | | C III | 15 | 3899.09 | P | S III | 5 | 3911.699 | | Fe I | 664 |
| 3889.33 | P | Fe I | 562 | 3899.140 | | V II | 33 | 3911.810 | | Sc I | 8 |
| 3889.330 | | Pr II | 14 | 3899.27 | | S III | 12 | 3911.95 | | Cr I | |
| 3889.38 | P | Fe I | 660 | 3899.668 | | Ti I | 15,175 | 3911.960 | | O II | 17 |
| 3889.65 | P | Ni I | 180 | 3899.709 | | Fe I | 4 | 3912.088 | | O II | 17 |
| 3889.671 | | Ni I | 15 | 3900.175 | | V I | 126 | 3912.191 | | Ce II | 192 |
| 3889.90 | P | Cr II | 129 | 3900.226 | | Nd II | | 3912.207 | | V I | 42,43 |
| 3889.92 | P | Fe I | 564 | 3900.51 | | Zr I | 6 | 3912.310 | | Ni I | 151 |
| 3889.929 | | Nd II | | 3900.519 | | Fe I | 565 | 3912.32 | P | Ti II | 97 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3912.424 | | Ce II | 60 | 3923.03 | P | Fe I | 661 | 3934.14 | | Zr II | 7 |
| 3912.589 | | Ti I | 175 | 3923.109 | | Ce II | 191 | 3934.228 | | Ti I | 15 |
| 3912.886 | | V I | 42 | 3923.246 | | Gd II | 50 | 3934.41 | | N III | 8 |
| 3912.898 | | Pr II | 17 | 3923.39 | P | Ti II | 97 | 3934.46 | P | Ce II | 3 |
| 3912.979 | | Ni I | 1 | 3923.48 | | He II | 4 | 3934.80 | | Zr II | 43 |
| 3913.464 | | Ti II | 34 | 3923.483 | | S II | 55 | 3934.823 | | Nd II | |
| 3913.635 | | Fe I | 120 | 3923.50 | | Ca I | 7 | 3934.824 | | Gd II | 1 |
| 3913.92 | | Cl II | 68 | 3923.503 | | Sc II | 9 | 3935.141 | | V I | 90 |
| 3914.273 | | Fe I | 567 | 3923.91 | | Hf II | 18 | 3935.18 | P | Cr II | 10 |
| 3914.333 | | V II | 33 | 3923.92 | | Zr II | 100 | 3935.31 | | Fe I | 362 |
| 3914.334 | | Ti I | 15 | 3924.05 | | S II | 3 | 3935.64 | | Hf II | 43 |
| 3914.36 | | Zr II | 134 | 3924.075 | | Mn I | | 3935.717 | | Ba I | 8 |
| 3914.42 | P | Fe I | 652 | 3924.18 | P | Ni I | 240 | 3935.764 | | Sm II | 28 |
| 3914.480 | | Fe II | 3 | 3924.44 | | Si III | | 3935.77 | | Al I | 18 |
| 3914.50 | P | Fe I | 660 | 3924.527 | | Ti I | 13 | 3935.815 | | Fe I | 362 |
| 3914.73 | | Fe I | 662 | 3924.644 | | Ce II | 190 | 3935.86 | P | Fe I | 564 |
| 3914.751 | | Ti I | 14 | 3924.65 | P | Cr II | 129 | 3935.914 | | He I | 57 |
| 3914.76 | | A II | 2 | 3924.658 | | V I | 90 | 3935.942 | | Fe II | 173 |
| 3914.949 | | Ce II | 78 | 3925.09 | | La II | 135 | 3935.964 | | Co I | 32 |
| 3914.96 | | Cr I | 137 | 3925.151 | | Co I | 131 | 3936 | P | C IV | 2 |
| 3915.30 | P | Cr II | 128 | 3925.201 | | Fe I | 567 | 3936.07 | | Zr II | 42 |
| 3915.384 | | Ir I | 6 | 3925.216 | | Sm I | 2 | 3936.22 | | La II | 13 |
| 3915.503 | | Co I | 113 | 3925.240 | | V I | 8 | 3936.282 | | V I | 42 |
| 3915.843 | | Cr I | 136 | 3925.456 | | Pr II | 11 | 3936.79 | P | Fe I | 564 |
| 3915.879 | | Ti I | 15 | 3925.55 | P | Fe I | 660 | 3936.95 | | Cr II | 128 |
| 3915.94 | | Zr II | 17 | 3925.646 | | Fe I | 364 | 3937.329 | | Fe I | 278 |
| 3916.05 | | La II | 42 | 3925.71 | | A II | 105 | 3937.575 | | Nd II | 19 |
| 3916.243 | | Cr I | 23 | 3925.87 | | Cl III | 4 | 3937.870 | | Ba I | 8 |
| 3916.418 | | V II | 10 | 3925.946 | | Fe I | 364 | 3938.005 | | Ti I | 246 |
| 3916.476 | | Tm I | 2 | 3926.001 | | Fe I | 562 | 3938.086 | | Ce II | 205 |
| 3916.508 | | Gd II | 20 | 3926.319 | | Ti I | 292 | 3938.289 | | Fe II | 3 |
| 3916.61 | P | Gd II | 50 | 3926.32 | | V II | 165 | 3938.400 | | Mg I | 18 |
| 3916.64 | | Zr I | 6 | 3926.467 | | Mn I | 44 | 3938.52 | | N III | 8 |
| 3916.70 | | Cl II | 68 | 3926.497 | | V II | 11 | 3938.621 | | Al II | 73 |
| 3916.733 | | Fe I | 806 | 3926.530 | | He I | 58 | 3938.76 | P | Ni I | 240 |
| 3916.980 | | Cr I | 137 | 3926.58 | P | O II | 11 | 3938.856 | | Co I | 171 |
| 3917.115 | | Co I | 113 | 3926.649 | | Cr I | 313 | 3938.969 | | Fe II | 190 |
| 3917.185 | | Fe I | 20 | 3927.383 | | Ce II | 43 | 3939.066 | | Al II | 73 |
| 3917.29 | | Eu II | 10 | 3927.61 | P | Fe I | 282 | 3939.49 | | S II | 45 |
| 3917.442 | | Sm II | 9 | 3927.922 | | Fe I | 4 | 3939.51 | P | Sc II | 9 |
| 3917.47 | | Hf II | 76 | 3927.926 | | V I | 90 | 3939.85 | | La II | 134 |
| 3917.57 | | Cl II | 68 | 3927.93 | P | Fe I | 361 | 3940.044 | | Fe I | 731 |
| 3917.596 | | Cr I | 137 | 3928.085 | | Fe I | 565 | 3940.32 | P | Ti II | 97 |
| 3918.10 | | Hf II | 7 | 3928.279 | | Sm II | 17 | 3940.338 | | Ce II | 50 |
| 3918.19 | | S II | 29 | 3928.615 | | S III | 8 | 3940.882 | | Fe I | 20 |
| 3918.236 | | Gd II | 50 | 3928.62 | | A II | 10 | 3940.887 | | Co I | 18 |
| 3918.276 | | Ce II | 12,248 | 3928.636 | | Cr I | 23 | 3941.15 | | Cr I | 213 |
| 3918.319 | | Fe I | 124 | 3928.87 | | Eu II | 10 | 3941.283 | | Fe I | 562 |
| 3918.418 | | Fe I | 364 | 3928.97 | P | Ti I | 175 | 3941.478 | | Mo II | 4 |
| 3918.51 | P | Fe II | 191 | 3929.114 | | Fe I | 280 | 3941.490 | | Cr I | 23 |
| 3918.54 | P | Cr I | 136 | 3929.15 | P | Ti II | 97 | 3941.512 | | Nd II | 27 |
| 3918.58 | P | Fe I | 362 | 3929.208 | | Fe I | 659 | 3941.728 | | Co I | 17 |
| 3918.644 | | Fe I | 430 | 3929.22 | | La II | 27 | 3941.86 | | Ni I | 171 |
| 3918.856 | | Pr II | 11 | 3929.53 | | Zr I | 7 | 3941.874 | | Sm II | 1 |
| 3918.977 | | C II | 4 | 3929.54 | | Zr II | 142 | 3941.92 | | Zr II | 55 |
| 3919.005 | | N II | 17 | 3929.583 | | Tm II | 11 | 3942.006 | | V I | 63 |
| 3919.069 | | Fe I | 430 | 3929.734 | | V II | 10 | 3942.14 | | O IV | 10 |
| 3919.15 | P | Cr I | 136 | 3929.875 | | Ti I | 13 | 3942.151 | | Ce II | 37 |
| 3919.159 | | Cr I | 23 | 3930.023 | | V I | 63 | 3942.443 | | Fe I | 364 |
| 3919.287 | | O II | 17 | 3930.076 | | Co I | 59 | 3942.746 | | Ce II | 57 |
| 3919.813 | | Ce II | 60 | 3930.299 | | Fe I | 4 | 3942.78 | | N III | 8 |
| 3919.822 | | Ti I | 130 | 3930.31 | P | Fe II | 3 | 3943.08 | | Eu II | 22 |
| 3920.260 | | Fe I | 4 | 3930.50 | | Eu II | 5 | 3943.141 | | Ce II | 113 |
| 3920.37 | | S III | 8 | 3930.63 | P | O IV | 10 | 3943.21 | | Cr I | 135 |
| 3920.487 | | V I | 42 | 3930.66 | | Y II | 16 | 3943.239 | | Sm II | 9 |
| 3920.524 | | Pr II | 12 | 3930.88 | P | Cr II | 129 | 3943.339 | | Fe I | 72 |
| 3920.645 | | Fe I | 153 | 3931.088 | | Ce II | 49 | 3943.48 | P | V II | 11 |
| 3920.677 | | C II | 4 | 3931.122 | | Fe I | 565 | 3943.664 | | V I | 42 |
| 3920.839 | | Fe I | 567 | 3931.24 | | A II | 2 | 3943.888 | | Ce II | 234 |
| 3920.965 | | Nd II | | 3931.340 | | V I | 90 | 3944.009 | | Al I | 1 |
| 3921.02 | P | Zr II | 42 | 3931.369 | | Ce II | 61 | 3944.126 | | Ni I | 151 |
| 3921.022 | | Cr I | 23 | 3931.938 | | S II | 29 | 3944.25 | | Cr I | 135 |
| 3921.27 | | Fe I | 220 | 3931.97 | | Al I | 18 | 3944.27 | | A II | 2 |
| 3921.423 | | Ti I | 14 | 3932.007 | | Ti II | 34 | 3944.748 | | Fe I | 361 |
| 3921.54 | | La II | 40 | 3932.30 | | S II | 30 | 3944.890 | | Fe I | 430 |
| 3921.731 | | Ce II | 195 | 3932.40 | | Hf II | 28 | 3945.048 | | O II | 6 |
| 3921.80 | | Zr I | 8 | 3932.53 | | La II | 123 | 3945.06 | | S II | 33 |
| 3921.905 | | V I | 42 | 3932.55 | | A II | 90 | 3945.08 | | Fe III | 69 |
| 3922.005 | | Ce II | 50 | 3932.59 | P | Fe I | 153 | 3945.10 | | C II | 32 |
| 3922.08 | P | Fe I | 153 | 3932.629 | | Fe I | 280,652 | 3945.11 | | Cr II | 142 |
| 3922.09 | P | Fe I | 564 | 3933.19 | | A II | 53 | 3945.119 | | Fe I | 280 |
| 3922.36 | | Zr II | 143 | 3933.294 | | S II | 55 | 3945.21 | P | Fe II | 3 |
| 3922.397 | | Sm II | 38 | 3933.38 | | P III | 9 | 3945.27 | P | V II | 165 |
| 3922.431 | | V I | 42 | 3933.38 | | Sc I | 8 | 3945.29 | P | O IV | 10 |
| 3922.54 | | A II | 11,53 | 3933.606 | | Fe I | 488,562 | 3945.326 | | Co I | 29 |
| 3922.63 | | S II | 60 | 3933.65 | | Hf II | 6 | 3945.36 | | Hf II | 109 |
| 3922.68 | P | Fe I | 429 | 3933.664 | | Ca II | 1 | 3945.495 | | Cr I | 135 |
| 3922.72 | | P III | 9 | 3933.731 | | Ce II | 81 | 3945.968 | | Cr I | 134 |
| 3922.755 | | Co I | 32 | 3933.918 | | Co I | 17 | 3946.00 | | Hf II | 115 |
| 3922.914 | | Fe I | 4 | 3934.013 | | V I | 42 | 3946.10 | | A II | 105 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 3946.18 | P | Ni I | 1 |
| 3946.21 | | Y II | 24 |
| 3946.35 | | C II | 31,32 |
| 3946.406 | | Al II | 63 |
| 3946.511 | | Sm II | 17 |
| 3946.633 | | Co I | 60 |
| 3946.681 | | Ce II | 355 |
| 3946.98 | | S II | 45 |
| 3947.002 | | Fe I | 561 |
| 3947.10 | | Fe III | 23,69 |
| 3947.125 | | Co I | 8 |
| 3947.301 | | O I | 3 |
| 3947.393 | | Fe I | 153 |
| 3947.489 | | O I | 3 |
| 3947.5043 | | A I | 2 |
| 3947.533 | | Fe I | 361,426 |
| 3947.594 | | O I | 3 |
| 3947.60 | | C II | 31 |
| 3947.633 | | Pr II | 11 |
| 3947.770 | | Ti I | 14 |
| 3947.838 | | Sm II | 33 |
| 3948.00 | P | Fe I | 652 |
| 3948.105 | | Fe I | 562 |
| 3948.113 | | Sm II | 9 |
| 3948.15 | | C II | 32 |
| 3948.28 | P | Fe I | 561 |
| 3948.48 | P | Fe I | 560 |
| 3948.670 | | Ti I | 13 |
| 3948.779 | | Fe I | 604 |
| 3948.901 | | Ca I | 6 |
| 3948.9788 | | A I | 2 |
| 3949.10 | | La II | 41 |
| 3949.14 | | Fe I | 730 |
| 3949.23 | P | Fe I | 153 |
| 3949.275 | | Tm I | 2 |
| 3949.438 | | Pr II | 16 |
| 3949.45 | | C II | 31 |
| 3949.64 | | Cr I | 136 |
| 3949.954 | | Fe I | 72 |
| 3949.96 | | Cl II | 36 |
| 3950.35 | | Y II | 6 |
| 3950.42 | | S II | 45 |
| 3950.78 | P | Fe I | 153 |
| 3951.097 | | Cr I | 136 |
| 3951.154 | | Nd II | 19 |
| 3951.164 | | Fe I | 661 |
| 3951.51 | | P III | 9 |
| 3951.59 | | Y II | 16 |
| 3951.717 | | Co I | 171 |
| 3951.765 | | Cr I | 136 |
| 3951.968 | | V II | 10 |
| 3951.987 | | O I | 30 |
| 3952.00 | | Gd II | 1 |
| 3952.08 | | C II | 32 |
| 3952.195 | | Nd II | 23 |
| 3952.326 | | Co I | 16 |
| 3952.367 | | Cb II | 10 |
| 3952.399 | | Cr I | 136 |
| 3952.573 | | Ce II | 113,177 |
| 3952.606 | | Fe I | 278 |
| 3952.704 | | Fe I | 362 |
| 3952.74 | | A II | 89 |
| 3952.917 | | Co I | 28 |
| 3952.982 | | O I | 30 |
| 3953.056 | | O I | 30 |
| 3953.156 | | Fe I | 430 |
| 3953.163 | | Cr I | 136 |
| 3953.50 | P | Fe I | 770 |
| 3953.516 | | Pr II | 9 |
| 3953.525 | | Nd II | |
| 3953.660 | | Ce II | 141 |
| 3953.76 | P | Fe III | 69 |
| 3953.863 | | Fe I | 362 |
| 3954.21 | | Cl II | 82 |
| 3954.372 | | O II | 6 |
| 3954.38 | | Fe III | 120 |
| 3954.596 | | O I | 30 |
| 3954.687 | | O I | 30 |
| 3954.715 | | Fe I | 606 |
| 3955.22 | P | Fe I | 527 |
| 3955.352 | | Fe I | 562 |
| 3955.77 | P | Fe I | 219 |
| 3955.82 | P | Zr II | 17 |
| 3955.851 | | N II | 6 |
| 3955.956 | | Fe I | 488 |
| 3956.270 | | Co I | 2 |
| 3956.284 | | Ce II | 202 |
| 3956.336 | | Ti I | 13 |
| 3956.459 | | Fe I | 604 |
| 3956.681 | | Fe I | 278 |
| 3956.82 | P | O IV | 10 |
| 3956.901 | | Ce II | 176 |
| 3957.027 | | Fe I | 562 |
| 3957.053 | | Ca I | 6 |
| 3957.62 | | Fe I | 564 |
| 3957.64 | | P III | 9 |
| 3957.66 | P | Fe II | 13 |
| 3957.672 | | Gd II | 19 |
| 3957.928 | | Co I | 18 |
| 3958.001 | | Nd II | 25 |
| 3958.08 | | Cr I | 307 |
| 3958.101 | | Tm II | 1 |
| 3958.206 | | Ti I | 13 |
| 3958.24 | | Zr II | 16 |
| 3958.266 | | Ce II | 160 |
| 3958.39 | | A II | 65 |
| 3958.60 | P | Ni I | 150 |
| 3958.66 | | Pd I | 8 |
| 3958.865 | | Rh I | 7 |
| 3959.01 | P | Sc II | 49 |
| 3959.436 | | Gd II | 49 |
| 3959.46 | P | Fe I | 556 |
| 3959.523 | | Gd II | 44 |
| 3959.527 | | Sm II | |
| 3960.284 | | Fe I | 913 |
| 3960.37 | | V II | 189 |
| 3960.763 | | Cr I | 68 |
| 3960.895 | | Fe II | 212 |
| 3960.914 | | Ce II | 84 |
| 3960.997 | | Co I | 128 |
| 3961.147 | | Fe I | 361 |
| 3961.503 | | Mo II | 4 |
| 3961.523 | | Al I | 1 |
| 3961.55 | | S III | 8 |
| 3961.59 | | O III | 17 |
| 3962.03 | | La II | |
| 3962.12 | | Ni I | 199 |
| 3962.19 | | Cr I | 68 |
| 3962.353 | | Fe I | 566 |
| 3962.42 | P | Fe I | 560 |
| 3962.445 | | Pr II | 28 |
| 3962.65 | P | Fe I | 913 |
| 3962.851 | | Ti I | 12 |
| 3962.995 | | Sm II | |
| 3963.04 | | La II | |
| 3963.108 | | Fe I | 562 |
| 3963.114 | | Nd II | 39 |
| 3963.13 | | O II | 43 |
| 3963.13 | | S II | 45 |
| 3963.354 | | Ti I | 81 |
| 3963.43 | P | Fe I | 654 |
| 3963.626 | | V I | |
| 3963.628 | | Os I | 3 |
| 3963.690 | | Cr I | 38 |
| 3964.09 | P | Fe II | 29 |
| 3964.11 | | Fe III | |
| 3964.261 | | Pr II | 33 |
| 3964.269 | | Ti I | 12 |
| 3964.35 | P | Cr II | 10 |
| 3964.522 | | Fe I | 361 |
| 3964.57 | P | Fe I | 29 |
| 3964.64 | P | Cr II | 10 |
| 3964.727 | | He I | 5 |
| 3964.825 | | Pr II | 8 |
| 3964.90 | | Eu II | 10 |
| 3964.96 | | Hf II | 54 |
| 3965.011 | | Co I | 31 |
| 3965.236 | | Co I | 30 |
| 3965.263 | | Pr II | 8 |
| 3965.446 | | Fe I | 658 |
| 3965.511 | | Fe I | 565 |
| 3965.83 | P | Fe I | 122 |
| 3966.045 | | Sm II | 24 |
| 3966.066 | | Fe I | 45 |
| 3966.37 | | Pt I | 4 |
| 3966.43 | P | Fe II | 3 |
| 3966.532 | | Fe I | 562,652,766 |
| 3966.573 | | Pr II | 8 |
| 3966.630 | | Fe I | 282,562 |
| 3966.65 | | Zr I | 8 |
| 3966.72 | | S II | 5 |
| 3966.824 | | Fe I | 659 |
| 3967.048 | | Ce II | 84 |
| 3967.423 | | Fe I | 804 |
| 3967.441 | | O II | 22 |
| 3967.69 | | Y II | 82 |
| 3967.964 | | Fe I | 561 |
| 3968.11 | | V II | 9 |
| 3968.25 | | Zr I | 7 |
| 3968.261 | | Gd II | 3 |
| 3968.36 | | A II | 2 |
| 3968.38 | P | Fe I | 219 |
| 3968.43 | | He II | 3 |
| 3968.470 | | Ca II | 1 |
| 3968.63 | | C II | 37 |
| 3968.78 | | Fe III | 120 |
| 3968.995 | | D | 1 |
| 3969.061 | | Cr I | 38 |
| 3969.116 | | Co I | 128 |
| 3969.261 | | Fe I | 43 |
| 3969.293 | | Gd II | 20 |
| 3969.38 | | C II | 37 |
| 3969.38 | P | Fe II | 3 |
| 3969.40 | P | Fe II | 3 |
| 3969.43 | P | Fe III | 120 |
| 3969.628 | | Fe I | 657 |
| 3969.748 | | Cr I | 38 |
| 3970.07 | | Cr I | 213 |
| 3970.074 | | H | 1 |
| 3970.10 | | Ta I | 1 |
| 3970.15 | | V II | 203 |
| 3970.20 | | C II | 38 |
| 3970.391 | | Fe I | 488 |
| 3970.503 | | Ni I | 151 |
| 3970.528 | | Sm II | 1 |
| 3970.69 | | S II | 45,54 |
| 3970.99 | P | Fe I | 1074 |
| 3971.062 | | Gd II | 50 |
| 3971.164 | | Pr II | 27 |
| 3971.255 | | Cr I | 67 |
| 3971.325 | | Fe I | 277 |
| 3971.397 | | Sm II | 43 |
| 3971.684 | | Ce II | 133 |
| 3971.754 | | Gd II | 49 |
| 3971.82 | | Fe I | 281 |
| 3971.98 | | Eu II | 5 |
| 3972.130 | | Ti I | 81 |
| 3972.164 | | Pr II | 13 |
| 3972.171 | | Ni I | 29 |
| 3972.44 | | C II | 37 |
| 3972.506 | | Co I | 171 |
| 3972.53 | P | Co I | 173 |
| 3972.570 | | Ca I | 41 |
| 3972.58 | | K II | 4 |
| 3972.688 | | Cr I | 67 |
| 3972.920 | | Fe I | 803 |
| 3973.144 | | Co I | 58 |
| 3973.263 | | O II | 6 |
| 3973.269 | | Nd II | 19 |
| 3973.562 | | Ni I | 31 |
| 3973.642 | | V II | 9 |
| 3973.650 | | Nd II | 37 |
| 3973.655 | | Fe I | 769 |
| 3973.707 | | Ca I | 6 |
| 3973.84 | | C II | 37 |
| 3973.981 | | Gd II | 50 |
| 3974.160 | | Fe II | 29 |
| 3974.397 | | Fe I | 564 |
| 3974.48 | | A II | 9 |
| 3974.65 | P | Fe I | 526 |
| 3974.650 | | Ni I | 198 |
| 3974.66 | P | O IV | 10 |
| 3974.726 | | Co I | 18 |
| 3974.76 | | A II | 8 |
| 3974.766 | | Fe I | 72 |
| 3975.029 | | Fe II | 191 |
| 3975.21 | | Fe I | 153 |
| 3975.69 | P | Ti I | 186 |
| 3975.85 | | Fe I | 977 |
| 3976.01 | | Cr I | 38 |
| 3976.270 | | Sm II | 9 |
| 3976.30 | | Cr I | 280 |
| 3976.392 | | Fe I | 487 |
| 3976.430 | | Sm II | 33 |
| 3976.564 | | Fe I | 655 |
| 3976.615 | | Fe I | 729 |
| 3976.665 | | Cr I | 38 |
| 3976.836 | | Nd II | 21 |
| 3976.865 | | Fe I | 431,662 |
| 3976.88 | | Fe III | 69 |
| 3977.10 | | O IV | 10 |
| 3977.184 | | Co I | 113 |
| 3977.231 | | Os I | 4 |
| 3977.30 | | C II | 38 |
| 3977.32 | | Zr I | 46 |
| 3977.732 | | V II | 10 |
| 3977.743 | | Fe I | 72 |
| 3978.28 | | P III | 8 |
| 3978.43 | | Fe III | 120 |
| 3978.466 | | Fe I | 361 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3978.650 | | Ce II | 175 | 3987.98 | | Yb I | 2 | 3996.607 | | Sc I | 7 |
| 3978.650 | | Co I | 17 | 3988.18 | | A II | 65 | 3996.79 | P | Fe I | 1074 |
| 3978.677 | | Cr I | 67 | 3988.51 | | La II | 40 | 3996.968 | | Fe I | 945 |
| 3978.864 | | Co I | 173 | 3988.68 | | Zr I | 46 | 3997.054 | | Pr II | 9 |
| 3978.87 | | C II | 37 | 3988.833 | | V I | 89 | 3997.126 | | V II | 9 |
| 3979.08 | | La II | 140 | 3989.06 | | Sc II | 8 | 3997.17 | | P III | 9 |
| 3979.12 | P | Fe I | 426 | 3989.24 | P | Fe I | 561 | 3997.394 | | Fe I | 278 |
| 3979.200 | | Sm II | 51 | 3989.29 | | Zr I | 6 | 3997.43 | | Y II | 24 |
| 3979.22 | | Cr I | 307 | 3989.444 | | Ce II | 240 | 3997.48 | P | Fe I | 563 |
| 3979.324 | | Cr I | 280 | 3989.581 | | Ti I | 81 | 3997.49 | P | Fe I | 556 |
| 3979.36 | | A II | 90 | 3989.60 | P | Fe I | 605 | 3997.764 | | Gd II | 67 |
| 3979.40 | | Hf II | 97 | 3989.718 | | Pr II | 12 | 3997.901 | | Co I | 32 |
| 3979.42 | | Fe III | 120 | 3989.758 | | Ti I | 12 | 3997.97 | | S III | |
| 3979.479 | | Nd II | 57 | 3989.803 | | V II | 32 | 3998.00 | | Si II | |
| 3979.51 | | Cr II | 183 | 3989.859 | | Fe I | 768 | 3998.054 | | Fe I | 276 |
| 3979.518 | | Co I | 3 | 3989.958 | | Mn I | 33 | 3998.46 | P | Fe I | 606 |
| 3979.65 | | Fe I | 561 | 3989.986 | | Cr I | 268 | 3998.51 | | Hf II | 59 |
| 3979.798 | | Cr I | 67 | 3990.103 | | Nd II | 19 | 3998.554 | | Co I | 33 |
| 3979.86 | | S II | 59 | 3990.16 | | Cr I | 280 | 3998.635 | | Ti I | 12 |
| 3980.14 | | Fe III | 120 | 3990.184 | | Ti I | 185 | 3998.69 | | N III | 16 |
| 3980.35 | | C II | 37 | 3990.19 | | Cl II | 76 | 3998.730 | | V I | 89 |
| 3980.56 | | Al III | 12 | 3990.299 | | Co I | 58 | 3998.79 | | S II | 59 |
| 3980.65 | | Fe I | 153 | 3990.379 | | Fe I | 527 | 3998.85 | | Cr I | 307 |
| 3980.821 | | Ti I | 186 | 3990.55 | P | Fe I | 556 | 3998.98 | | Zr II | 16 |
| 3980.895 | | Ce II | 194 | 3990.566 | | V I | 89 | 3999.00 | P | Cr II | 10 |
| 3981.106 | | Fe I | 22 | 3990.81 | | Fe III | 46 | 3999.07 | P | Cr II | 10 |
| 3981.233 | | Cr I | 67 | 3990.94 | | S II | 45 | 3999.195 | | V II | 202 |
| 3981.36 | | La II | 139 | 3991.123 | | Cr I | 38 | 3999.242 | | Ce II | 57 |
| 3981.466 | | Ti I | 188 | 3991.14 | | Zr II | 30 | 3999.336 | | Ti I | 188 |
| 3981.61 | P | Fe II | 3 | 3991.47 | | V II | 10 | 3999.679 | | Cr I | |
| 3981.62 | P | Fe I | 428 | 3991.50 | | Cl III | 7 | 3999.92 | | C III | |
| 3981.761 | | Ti I | 12 | 3991.528 | | Co I | 173 | 3999.98 | | N I | |
| 3981.775 | | Fe I | 278 | 3991.673 | | Cr I | 38 | 4000.02 | | Fe I | 360 |
| 3981.94 | | Cl II | | 3991.684 | | Co I | 17 | 4000.266 | | Fe I | 556 |
| 3981.998 | | Ti II | 11 | 3991.743 | | Nd II | 19 | 4000.466 | | Fe I | 426 |
| 3982.01 | | Zr II | 142 | 3991.77 | | Si II | | 4000.493 | | Nd II | 64 |
| 3982.063 | | Pr II | 28 | 3991.831 | | Co I | 129 | 4000.59 | | Cr I | 295 |
| 3982.355 | | Nd II | 67 | 3991.965 | | V II | 202,227 | 4001.049 | | Ce II | 193 |
| 3982.478 | | Ti I | 11 | 3992.014 | | Co I | 3 | 4001.17 | | V II | 202 |
| 3982.583 | | Mn I | 33 | 3992.06 | | A II | 2 | 4001.24 | | K II | 6 |
| 3982.59 | | Y II | 6 | 3992.11 | | Cr I | 38 | 4001.257 | | Gd II | 49 |
| 3982.719 | | O II | 6 | 3992.114 | | Ir I | 5 | 4001.444 | | Cr I | 268 |
| 3982.901 | | Ce II | 172 | 3992.386 | | Ce II | 134 | 4001.56 | | C III | |
| 3983.008 | | Gd II | 49 | 3992.395 | | Fe I | 604 | 4001.666 | | Fe I | 72 |
| 3983.138 | | Sm II | 38 | 3992.64 | P | Fe I | 219 | 4002.073 | | Fe II | 29 |
| 3983.237 | | Cr I | 213 | 3992.801 | | V I | 89 | 4002.466 | | Ti I | 188 |
| 3983.35 | | Fe I | 485 | 3992.845 | | Cr I | 67 | 4002.48 | | Cr II | 166 |
| 3983.7 | | Al II | 32,48 | 3992.913 | | Ce II | 226 | 4002.549 | | Fe II | 190 |
| 3983.77 | | S III | 8 | 3993.213 | | Gd II | 1 | 4002.55 | | Zr I | 46 |
| 3983.83 | P | Fe I | 426 | 3993.308 | | Sm II | 4 | 4002.665 | | Fe I | 320,655 |
| 3983.907 | | Cr I | 38 | 3993.401 | | Ba I | 8 | 4002.940 | | V II | 9 |
| 3983.960 | | Fe I | 277 | 3993.526 | | S II | 29 | 4002.95 | | Zr II | 142 |
| 3984.03 | | Hf II | 19 | 3993.796 | | Ti I | 186 | 4003.33 | | Cr II | 194 |
| 3984.140 | | Ni I | 171 | 3993.822 | | Ce II | 12 | 4003.41 | | Fe III | 15 |
| 3984.177 | | Mn I | 33 | 3993.952 | | Ni I | 170 | 4003.596 | | Co I | 130 |
| 3984.313 | | Ti I | 186 | 3993.968 | | Cr I | 67 | 4003.64 | | N III | 16 |
| 3984.335 | | V I | 89 | 3994.00 | P | Fe I | 560 | 4003.764 | | Fe I | 728 |
| 3984.338 | | Cr I | 38 | 3994.117 | | Fe I | 526 | 4003.771 | | Ce II | 188 |
| 3984.46 | P | Fe I | 219 | 3994.165 | | Gd II | 49 | 4003.789 | | Ti I | 188 |
| 3984.600 | | V I | 89 | 3994.27 | P | Fe I | 320 | 4003.850 | | Gd II | 104 |
| 3984.675 | | Ce II | 252 | 3994.50 | | La II | 78 | 4003.89 | | S II | 45 |
| 3984.76 | | Zr II | 7 | 3994.542 | | Co I | 17 | 4003.921 | | Cr I | 268 |
| 3984.858 | | Ru I | 9 | 3994.56 | P | Ti I | 186 | 4004.010 | | Nd II | |
| 3984.93 | P | Fe I | 561 | 3994.683 | | Ti I | 188 | 4004.15 | P | Fe II | 127 |
| 3985.241 | | Mn I | 33 | 3994.684 | | Nd II | | 4004.832 | | Fe I | 601 |
| 3985.246 | | Ti I | | 3994.81 | | A II | 89,101 | 4004.976 | | Fe I | 486,557 |
| 3985.32 | P | Fe I | 219 | 3994.834 | | Pr II | 11 | 4005.04 | P | Fe III | 45 |
| 3985.393 | | Fe I | 661 | 3994.996 | | N II | 12 | 4005.246 | | Fe I | 43 |
| 3985.46 | | O II | 22 | 3995.10 | | K II | 1 | 4005.38 | P | Fe I | 123 |
| 3985.580 | | Ti I | 188 | 3995.17 | | O IV | 10 | 4005.49 | P | Fe I | 219 |
| 3985.74 | P | Cr II | 10 | 3995.199 | | Fe I | 604 | 4005.64 | P | Fe III | 45 |
| 3985.783 | | V II | 202 | 3995.306 | | Co I | 31 | 4005.7 | | Al II | 89 |
| 3985.96 | P | Cr II | 10 | 3995.48 | P | Sc II | 49 | 4005.712 | | V II | 32 |
| 3985.97 | | S III | 8 | 3995.49 | P | Sc II | 16 | 4005.952 | | Ti I | 187 |
| 3986.03 | P | Cr II | 10 | 3995.586 | | Tm II | 5 | 4006.136 | | Ni I | |
| 3986.176 | | Fe I | 655 | 3995.656 | | Ba I | 8 | 4006.16 | P | Fe I | 564 |
| 3986.18 | P | Fe I | 560 | 3995.74 | | La II | 27 | 4006.314 | | Fe I | 603 |
| 3986.201 | | Mo II | 4 | 3995.83 | P | Ni I | 238 | 4006.631 | | Fe I | 488 |
| 3986.30 | P | Fe I | 560 | 3995.860 | | Al II | 47 | 4006.768 | | Fe I | 320 |
| 3986.395 | | Mn I | 33 | 3995.996 | | Fe I | 279 | 4007.04 | P | Cr II | 194 |
| 3986.682 | | Sm II | 17 | 3996.075 | | Al II | 47 | 4007.195 | | Ti I | 187 |
| 3986.7533 | | Mg I | 17 | 3996.159 | | Al II | 47 | 4007.233 | | Fe I | 119 |
| 3986.826 | | Mn I | 33 | 3996.182 | Forb | Al II | 47 | 4007.277 | | Fe I | 277 |
| 3987.090 | | Ni I | 137 | 3996.26 | P | Fe I | 561 | 4007.36 | | Hf II | 88 |
| 3987.098 | | Mn I | 33 | 3996.28 | P | Fe I | 427 | 4007.435 | | Nd II | |
| 3987.117 | | Co I | 16 | 3996.320 | | Gd II | | 4007.589 | | Ce II | 221 |
| 3987.214 | | Gd II | 19 | 3996.323 | | Al II | 47 | 4007.64 | | La II | |
| 3987.428 | | Sm II | 28 | 3996.36 | P | Fe II | 190 | 4007.66 | | A II | 65 |
| 3987.464 | | Mn I | 33 | 3996.381 | | Al II | 47 | 4007.72 | P | Fe II | 189 |
| 3987.63 | P | Ti II | 11 | 3996.518 | | Tm II | | 4007.78 | | S II | 29 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4007.81 | P Forb | He I | 56 | 4020.06 | | Cl II | 76 | 4031.456 | | Fe II | 151 |
| 4008.046 | | Ti I | 187 | 4020.25 | | Hf II | 40 | 4031.633 | | Al II | 72 |
| 4008.17 | | V II | 32 | 4020.399 | | Sc I | 7 | 4031.68 | | La II | 40 |
| 4008.41 | P | Sc II | 16 | 4020.490 | | Fe I | 913 | 4031.73 | P | Fe I | 427 |
| 4008.46 | | Hf II | 54 | 4020.872 | | Nd II | 19 | 4031.753 | | Ti I | 185 |
| 4008.60 | P | Sc II | 16 | 4020.898 | | Co I | 16 | 4031.807 | | Nd II | |
| 4008.714 | | Pr II | 28 | 4021.13 | | C II | 27 | 4031.968 | | Fe I | 655 |
| 4008.769 | | W I | 6 | 4021.330 | | Nd II | 36 | 4032.46 | | Fe I | 320 |
| 4008.81 | | Fe III | | 4021.622 | | Fe I | 120,557 | 4032.628 | | Ti I | 297 |
| 4008.913 | | Gd II | | 4021.75 | P | Fe III | 45 | 4032.636 | | Fe I | 44 |
| 4008.926 | | Ti I | 12 | 4021.812 | | Ti I | 185 | 4032.812 | | S II | 59 |
| 4009.270 | | He I | 55 | 4021.869 | | Fe I | 278 | 4032.946 | | Fe II | 126 |
| 4009.39 | | S II | 55 | 4021.925 | | V I | 96 | 4032.975 | | Ga I | 1 |
| 4009.54 | P | Fe I | 556 | 4022.052 | | Ni I | 238,241 | 4033.073 | | Mn I | 2 |
| 4009.58 | | Al II | 37 | 4022.263 | | Cr I | 268 | 4033.18 | | O II | 50 |
| 4009.653 | | Ti I | 11 | 4022.333 | | Gd II | | 4033.19 | P | Fe I | 218 |
| 4009.714 | | Fe I | 72 | 4022.36 | | Cr II | 183 | 4033.263 | | Cr I | 36 |
| 4009.90 | | C II | 27 | 4022.36 | | Fe III | 45 | 4033.55 | | Sb I | 1 |
| 4009.984 | | Ni I | 150 | 4022.45 | | Fe I | 173 | 4033.68 | | P II | 17 |
| 4010.18 | | Fe I | 915 | 4022.744 | | Fe I | 556,654 | 4033.83 | | A II | 52 |
| 4010.77 | | Fe I | 219,320 | 4023.002 | | Nd II | | 4033.857 | | Pr II | 19 |
| 4011.089 | | Co I | 2 | 4023.231 | | Sm II | 4 | 4033.883 | | Ti I | 208 |
| 4011.23 | | A II | 53 | 4023.388 | | V II | 32 | 4033.95 | | Cr I | 36 |
| 4011.416 | | Fe I | 218 | 4023.399 | | Co I | 59 | 4034.012 | | Nd II | 23 |
| 4011.534 | | Ti I | 10 | 4023.58 | | La II | 79 | 4034.10 | | Zr II | 42 |
| 4011.69 | | Eu II | 22 | 4023.688 | | Sc I | 7 | 4034.490 | | Mn I | 2 |
| 4011.71 | | Fe I | 153 | 4023.739 | | Cr I | 268 | 4034.84 | | Zr II | 70 |
| 4011.89 | P | Fe I | 424 | 4023.986 | | He I | 54 | 4034.884 | | Ti I | 208 |
| 4012.10 | | K II | 2 | 4023.99 | | Ni I | 170 | 4035.087 | | N II | 39 |
| 4012.16 | | Fe I | 601 | 4023.99 | | Zr I | 46 | 4035.09 | | O II | 51 |
| 4012.250 | | Nd II | 10 | 4024.04 | | O II | 99 | 4035.110 | | Sm II | 33 |
| 4012.372 | | Ti II | 11 | 4024.109 | | Fe I | 277 | 4035.25 | P | Fe I | 831 |
| 4012.389 | | Ce II | 206 | 4024.45 | | Zr II | 54 | 4035.47 | | A II | 33 |
| 4012.467 | | Fe II | 126 | 4024.491 | | Ce II | 49 | 4035.54 | P | Fe II | 22 |
| 4012.49 | | Cr I | 268 | 4024.552 | | Fe II | 127 | 4035.54 | | Fe III | 119 |
| 4012.50 | | Cr II | 183 | 4024.573 | | Ti I | 12 | 4035.542 | | Co I | 173 |
| 4012.51 | | Mo I | 12 | 4024.727 | | F II | 2 | 4035.631 | | V II | 32 |
| 4012.704 | | Nd II | | 4024.735 | | Fe I | 560 | 4035.728 | | Mn I | 5 |
| 4012.786 | | Ti I | 186 | 4024.785 | | Nd II | 24 | 4035.82 | P | Fe III | 45 |
| 4013.24 | P | Ti I | 186 | 4024.92 | | Zr I | 46 | 4035.828 | | Ti I | 208 |
| 4013.587 | | Ti I | 187 | 4025.010 | | F II | 2 | 4035.96 | P | Ni I | 150 |
| 4013.641 | | Fe I | 557 | 4025.012 | | Cr I | 37 | 4035.98 | P | Fe I | 426 |
| 4013.798 | | Fe I | 485 | 4025.07 | | Fe III | 53 | 4036.23 | | P II | 16 |
| 4013.798 | | Gd II | | 4025.07 | P | Ti I | 208 | 4036.37 | P | Fe I | 279 |
| 4013.80 | | Mg II | 22 | 4025.114 | | Ni I | 240 | 4036.53 | | Cl II | 76 |
| 4013.822 | | Fe I | 486 | 4025.136 | | Ti II | 11 | 4036.59 | | La II | 59 |
| 4013.87 | | A II | 2 | 4025.44 | | Cr I | 37 | 4036.779 | | V II | 9 |
| 4013.89 | P | Fe I | 120 | 4025.44 | | Ni I | 117 | 4036.80 | | Cr I | 36 |
| 4013.942 | | Co I | 58 | 4025.49 | P Forb | He I | 19 | 4037.294 | | Cr I | 36 |
| 4013.953 | | Gd II | 17 | 4025.495 | | F II | 2 | 4037.332 | | Gd II | 49 |
| 4014.28 | | Fe I | 426,427 | 4025.60 | | He II | 3 | 4037.665 | | Ce II | 218 |
| 4014.489 | | Sc II | 8 | 4025.67 | P | Fe III | 45 | 4037.725 | | Fe I | 118 |
| 4014.534 | | Fe I | 802 | 4025.87 | | La II | 42 | 4037.897 | | Gd II | 49 |
| 4014.668 | | Cr I | 268 | 4026.080 | | N II | 40 | 4038.03 | | Cr II | 194 |
| 4014.899 | | Ce II | 157 | 4026.166 | | Cr I | 37 | 4038.124 | | Nd II | 31 |
| 4015.20 | P | Fe II | 142 | 4026.189 | | He I | 18 | 4038.27 | P | Ni I | 150 |
| 4015.377 | | Ti I | 185 | 4026.362 | | He I | 18 | 4038.545 | | V II | 155 |
| 4015.389 | | Pr II | 32 | 4026.40 | | O II | 51 | 4038.622 | | Fe I | 600,728 |
| 4015.50 | | Ni II | 12 | 4026.435 | | Mn I | | 4038.82 | | A II | 2 |
| 4015.877 | | Ce II | 256 | 4026.5 | | Al II | 24 | 4039.100 | | Cr I | 251 |
| 4016.264 | | Ti I | 186 | 4026.539 | | Ti I | 185 | 4039.12 | | Fe III | 45 |
| 4016.432 | | Fe I | 560 | 4027.032 | | Co I | 3 | 4039.30 | | Cr I | 251 |
| 4016.54 | | Fe I | 277 | 4027.103 | | Cr I | 37 | 4039.302 | | Al II | 62 |
| 4016.81 | P | Fe I | 428 | 4027.20 | | Zr I | 46 | 4039.357 | | Pr II | 15 |
| 4016.82 | | V II | 202 | 4027.30 | | V II | 201 | 4039.397 | | AI II | 62 |
| 4016.943 | | Ti I | 208 | 4027.426 | | Ti I | | 4039.574 | | V II | 32 |
| 4017.096 | | Fe I | 279 | 4028.332 | | Ti II | 87 | 4039.83 | | Y I | 5 |
| 4017.156 | | Fe I | 527 | 4028.411 | | Ce II | 47 | 4039.94 | | Fe I | 276 |
| 4017.27 | | C II | 27 | 4028.791 | | S II | 45 | 4040.24 | | Zr II | 54 |
| 4017.29 | | V II | 216 | 4029.16 | | Hf II | 23 | 4040.310 | | Ti I | 185 |
| 4017.56 | | Ni I | 171 | 4029.32 | P | Ni I | 170 | 4040.650 | | Fe I | 655 |
| 4017.58 | | Eu II | 10 | 4029.64 | P | Ti II | 87 | 4040.762 | | Ce II | 138 |
| 4017.596 | | Ce II | 163 | 4029.640 | | Fe I | 556,563 | 4040.796 | | Nd II | 30 |
| 4017.771 | | Ti I | 185 | 4029.68 | | Zr II | 41 | 4041.288 | | Fe I | 603,654 |
| 4017.96 | | Cr II | 166 | 4030.03 | | Zr I | 46 | 4041.31 | | O II | 50 |
| 4018.102 | | Mn I | 5 | 4030.194 | | Fe I | 72 | 4041.321 | | N II | 39 |
| 4018.282 | | Fe I | 560 | 4030.28 | P | Cr II | 19 | 4041.361 | | Mn I | 5 |
| 4018.38 | | Zr II | 54 | 4030.470 | | Nd II | 32 | 4041.64 | P | Fe II | 172 |
| 4018.49 | P | Fe II | 13 | 4030.499 | | Fe I | 560 | 4041.675 | | Sm II | 22 |
| 4018.50 | | Cl III | 7 | 4030.512 | | Ti I | 185 | 4041.79 | | Cr I | 36 |
| 4018.826 | | Nd II | 19 | 4030.755 | | Mn I | 2 | 4041.84 | P | Fe II | 13 |
| 4019.05 | | Fe I | 219 | 4030.867 | | AI II | 72 | 4041.911 | | Fe I | 602 |
| 4019.05 | | V II | 201 | 4030.90 | P | Fe I | 943 | 4042.135 | | Ce II | 252 |
| 4019.055 | | Ni I | 72 | 4031.130 | | Cr I | 268 | 4042.20 | | A II | 28 |
| 4019.137 | | Th II | 3 | 4031.135 | | AI II | 72 | 4042.246 | | Cr I | 36 |
| 4019.288 | | Co I | 16 | 4031.210 | | Al II | 72 | 4042.584 | | Ce II | 140 |
| 4019.30 | P | Co I | 18 | 4031.243 | | Fe I | 486 | 4042.635 | | V I | 96 |
| 4019.45 | | P II | 30 | 4031.339 | | Ce II | 108 | 4042.723 | | Sm II | 4 |
| 4019.982 | | Sm II | 16 | 4031.35 | | Zr II | 42 | 4042.75 | P | Fe I | 556 |
| 4020.05 | P | Fe I | 556 | 4031.41 | | A II | 65 | 4042.905 | | Sm II | 9 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 4042.91 | | A II | 33 |
| 4042.91 | | La II | 66 |
| 4043.502 | | Cu II | 3 |
| 4043.537 | | N II | 39 |
| 4043.57 | | Zr I | 32 |
| 4043.596 | | Nd II | 34 |
| 4043.69 | P | Fe I | 122 |
| 4043.696 | | Cr I | 306 |
| 4043.775 | | Ti I | 208 |
| 4043.901 | | Fe I | 276,557 |
| 4043.98 | P | Fe I | 559 |
| 4044.01 | P | Fe II | 172 |
| 4044.145 | | K I | 3 |
| 4044.4182 | | A I | 4 |
| 4044.49 | P | Fe I | 1073 |
| 4044.49 | | P II | 30 |
| 4044.57 | | Zr I | 46 |
| 4044.614 | | Fe I | 359 |
| 4044.64 | P | Fe I | 484 |
| 4044.75 | | N II | 39 |
| 4044.818 | | Pr II | 8 |
| 4044.96 | | O II | 51 |
| 4045.133 | | Mn I | 48 |
| 4045.139 | | Fe I | 125 |
| 4045.148 | | Gd II | 49 |
| 4045.16 | P Forb | He I | 17 |
| 4045.206 | | Mn I | |
| 4045.386 | | Co I | 31 |
| 4045.59 | P | Fe I | 559 |
| 4045.63 | | Zr II | 30 |
| 4045.815 | | Fe I | 43 |
| 4046.07 | P | Fe I | 557 |
| 4046.15 | | O II | 50 |
| 4046.19 | | Cr I | 36 |
| 4046.269 | | V II | 177 |
| 4046.341 | | Ce II | 81 |
| 4046.46 | P | Fe I | 1075 |
| 4046.557 | | Hg I | 1 |
| 4046.629 | | Fe I | 487 |
| 4046.760 | | Cr I | 36 |
| 4046.81 | P | Fe II | 126 |
| 4047.160 | | Sm II | 16 |
| 4047.214 | | K I | 3 |
| 4047.315 | | Fe I | 117,853 |
| 4047.51 | | A II | 66 |
| 4047.64 | | Y I | 6 |
| 4047.792 | | Sc I | 7 |
| 4047.88 | P | Y II | 6 |
| 4047.948 | | W I | 4 |
| 4047.96 | | Hf II | 104 |
| 4048.02 | P | Cr II | 182 |
| 4048.22 | | O II | 50 |
| 4048.56 | P | Cr I | 251 |
| 4048.68 | | Zr II | 43 |
| 4048.755 | | Mn I | 5 |
| 4048.780 | | Cr I | 251 |
| 4048.831 | | Fe II | 172 |
| 4048.999 | | Mn I | 48 |
| 4049.03 | | V II | 215 |
| 4049.14 | | Cr II | 193 |
| 4049.336 | | Fe I | 218 |
| 4049.399 | | Ti I | 185 |
| 4049.429 | | Gd II | 50 |
| 4049.44 | | Hf II | 53 |
| 4049.71 | P | Ni I | 169 |
| 4049.783 | | Cr I | 251 |
| 4049.858 | | Gd II | |
| 4050.02 | | Cr I | 36 |
| 4050.08 | | La II | 85 |
| 4050.11 | | S II | 45 |
| 4050.32 | | Zr II | 43 |
| 4050.67 | | Hf II | 59 |
| 4050.963 | | V I | 121 |
| 4051.06 | | V II | 32 |
| 4051.08 | | Fe II | 98 |
| 4051.145 | | Nd II | 66 |
| 4051.18 | P | Ni I | 239 |
| 4051.21 | P | Fe II | 172 |
| 4051.34 | | V II | 215 |
| 4051.352 | | V I | 121 |
| 4051.923 | | Fe I | 700 |
| 4051.97 | | Cr II | 19 |
| 4052.22 | | Cl II | 61 |
| 4052.312 | | Fe I | 00,852 |
| 4052.466 | | Fe I | 563 |
| 4052.472 | | Mn I | 48 |
| 4052.664 | | Fe I | 524 |
| 4052.72 | P | Fe I | 557 |
| 4052.930 | | Ti I | 208 |
| 4052.94 | | A II | 101 |
| 4053.28 | | Fe III | 119 |
| 4053.294 | | Gd II | |
| 4053.45 | | Cr II | 19 |
| 4053.506 | | Ce II | 36 |
| 4053.56 | | A II | 53 |
| 4053.59 | | Fe III | 98 |
| 4053.59 | | V II | 215 |
| 4053.642 | | Gd I | 5 |
| 4053.814 | | Ti II | 87 |
| 4053.82 | | Fe I | 485 |
| 4054.10 | | O II | 50,98 |
| 4054.11 | | Cr II | 19 |
| 4054.18 | | Fe I | 557 |
| 4054.55 | | O II | 98 |
| 4054.555 | | Sc I | 6 |
| 4054.618 | | Co I | 2 |
| 4054.833 | | Fe I | 698 |
| 4054.845 | | Pr II | 30 |
| 4054.883 | | Fe I | 698 |
| 4054.991 | | Ce II | 82 |
| 4055.011 | | Ti I | 80 |
| 4055.03 | | Zr I | 46 |
| 4055.046 | | Fe I | 218 |
| 4055.214 | | Mn I | 48 |
| 4055.543 | | Mn I | 5 |
| 4055.98 | | Fe I | 914 |
| 4056.027 | | Mo I | 12 |
| 4056.06 | | C III | 24 |
| 4056.07 | | Cr II | 182 |
| 4056.212 | | Ti II | 11 |
| 4056.270 | | V II | 14 |
| 4056.53 | | Fe I | 320 |
| 4056.543 | | Pr II | 26 |
| 4056.793 | | Cr I | 306 |
| 4056.8 | | Al II | 88 |
| 4057.00 | | N II | 39 |
| 4057.074 | | V I | 121 |
| 4057.19 | | Cr I | 156 |
| 4057.195 | | Co I | 3 |
| 4057.347 | | Ni I | 89 |
| 4057.356 | | Fe I | 277 |
| 4057.39 | | P III | 1 |
| 4057.457 | | Fe II | 212 |
| 4057.5052 | | Mg I | 16 |
| 4057.51 | | Fe III | 33 |
| 4057.612 | | Ti I | 254 |
| 4057.66 | P | Fe I | 729 |
| 4057.72 | | A II | 9 |
| 4057.80 | | N IV | 3 |
| 4057.81 | | Cr I | 251 |
| 4057.812 | | Pb I | 1 |
| 4057.950 | | Mn I | 29 |
| 4058.08 | | La II | 54 |
| 4058.139 | | Ti I | 254 |
| 4058.183 | | Co I | 16 |
| 4058.219 | | Gd I | 5 |
| 4058.227 | | Fe I | 558 |
| 4058.46 | P | Fe I | 914 |
| 4058.600 | | Co I | 58 |
| 4058.7 | | S II | 54 |
| 4058.766 | | Fe I | 120 |
| 4058.77 | | S II | 52 |
| 4058.772 | | Cr I | 251 |
| 4058.912 | | Ca I | 40 |
| 4058.930 | | Mn I | 5 |
| 4058.933 | | Cb I | 1 |
| 4059.07 | | Cl III | 7 |
| 4059.27 | | P III | 1 |
| 4059.321 | | Co I | 2 |
| 4059.370 | | Gd II | 118 |
| 4059.392 | | Mn I | 29 |
| 4059.726 | | Fe I | 767 |
| 4059.961 | | Nd II | 63 |
| 4060.09 | P | Ti I | 254 |
| 4060.263 | | Ti I | 80 |
| 4060.58 | | O II | 97 |
| 4060.62 | | Cr I | 156 |
| 4060.98 | | O II | 97 |
| 4061.085 | | Nd II | 10 |
| 4061.3 | | Sc III | |
| 4061.742 | | Mn I | 29 |
| 4061.77 | P | Cr II | 19 |
| 4061.787 | | Fe II | 189 |
| 4062.08 | | P II | 17 |
| 4062.09 | | Mo I | 12 |
| 4062.223 | | Ce II | 34 |
| 4062.446 | | Fe I | 359 |
| 4062.590 | | Gd II | |
| 4062.817 | | Pr II | 26 |
| 4062.90 | | Ne II | 53 |
| 4062.90 | | O II | 50 |
| 4063.174 | | Co I | 18 |
| 4063.286 | | Fe I | 698 |
| 4063.390 | | Gd II | |
| 4063.528 | | Mn I | 5 |
| 4063.59 | | Gd II | 48 |
| 4063.597 | | Fe I | 43 |
| 4063.931 | | V I | 121 |
| 4063.94 | P | Cr II | 19 |
| 4064.07 | P | Fe I | 423 |
| 4064.16 | | Zr I | 46 |
| 4064.2 | | C I | 7 |
| 4064.203 | | Ti I | 80 |
| 4064.22 | P | Ti I | 254 |
| 4064.350 | | Ti II | 106 |
| 4064.374 | | Ni I | 179 |
| 4064.45 | | S III | |
| 4064.46 | | Fe I | 44 |
| 4064.576 | | Sm II | 24,33 |
| 4064.64 | | P II | 16 |
| 4064.75 | P | Fe II | 39 |
| 4064.99 | | Y II | 24 |
| 4065.070 | | V II | 215 |
| 4065.09 | | Au I | 3 |
| 4065.094 | | Ti I | 80 |
| 4065.1 | | C I | 7 |
| 4065.14 | | A II | 65 |
| 4065.402 | | Fe I | 698 |
| 4065.595 | | Ti I | 207 |
| 4065.716 | | Cr I | 279 |
| 4066.02 | P | Fe I | 695 |
| 4066.16 | P | Cr II | 182 |
| 4066.328 | | Fe II | 214 |
| 4066.365 | | Co I | 30 |
| 4066.597 | | Fe I | 424 |
| 4066.737 | | Sm II | 28 |
| 4066.938 | | Cr I | 66 |
| 4066.979 | | Fe I | 358 |
| 4067.03 | | V II | 9 |
| 4067.05 | P | Cr II | 193 |
| 4067.051 | | Ni II | 11 |
| 4067.275 | | Fe I | 217 |
| 4067.279 | | Ce II | 22 |
| 4067.39 | | La II | 26 |
| 4067.49 | P | Fe I | 422 |
| 4067.60 | P | Fe I | 655 |
| 4067.85 | P | Fe I | 1103 |
| 4067.87 | | C III | 16 |
| 4067.984 | | Fe I | 559 |
| 4068.003 | | Mn I | 5 |
| 4068.144 | | Ti I | 207 |
| 4068.334 | | Sm II | 42 |
| 4068.541 | | Co I | 58 |
| 4068.661 | | Ti I | 254 |
| 4068.7 | | Sc III | |
| 4068.836 | | Ce II | 82 |
| 4068.97 | | C III | 16 |
| 4068.981 | | Ti I | 299 |
| 4069.08 | | Fe I | 557 |
| 4069.267 | | Nd II | 20 |
| 4069.636 | | O II | 10 |
| 4069.883 | | Fe II | 188 |
| 4069.897 | | O II | 10 |
| 4070.03 | P | Fe II | 22 |
| 4070.094 | | Ce II | |
| 4070.279 | | Mn I | 5 |
| 4070.288 | | Gd II | 49 |
| 4070.30 | | C III | 16 |
| 4070.390 | | Gd II | 17 |
| 4070.45 | P | Fe I | 525 |
| 4070.766 | | Fe I | 558 |
| 4070.90 | | Cr II | 193 |
| 4071.0 | P | Ni II | 11 |
| 4071.000 | | Cr I | 306 |
| 4071.09 | | Zr II | 54 |
| 4071.20 | | O II | 49 |
| 4071.211 | | Ti I | 254 |
| 4071.22 | | Hf II | 74 |
| 4071.469 | | Ti I | 254 |
| 4071.52 | | Fe I | 218 |
| 4071.541 | | V I | 96 |
| 4071.740 | | Fe I | 43 |
| 4071.814 | | Ce II | 81 |
| 4072.01 | | A II | 33 |
| 4072.13 | | P II | 16 |
| 4072.164 | | O II | 10 |
| 4072.40 | | A II | 41,52 |
| 4072.518 | | Fe I | 698 |
| 4072.56 | | Cr II | 26 |
| 4072.71 | | Zr I | 46 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4072.913 | | Ni I | 197 | 4082.40 | | A II | 8 | 4095.975 | | Fe I | 217 |
| 4072.917 | | Ce II | 109 | 4082.44 | | Fe I | 906 | 4096.118 | | Fe I | 911 |
| 4073.195 | | Gd II | 34 | 4082.456 | | Ti L | 80 | 4096.18 | | O II | 48 |
| 4073.055 | | N II | 38 | 4082.593 | | Co I | 16 | 4096.21 | P | Fe I | 18 |
| 4073.477 | | Ce II | 4 | 4082.600 | | Sm II | 54 | 4096.47 | | A II | 65 |
| 4073.759 | | Gd II | 44 | 4082.85 | | N II | 38 | 4096.543 | | O II | 21 |
| 4073.760 | | Fe I | 558 | 4082.944 | | Mn I | 5 | 4096.63 | | Zr II | 15 |
| 4073.90 | | O III | 23 | 4083.233 | | Ce II | 60 | 4096.822 | | Pr II | 29 |
| 4074.356 | | Ti I | 254 | 4083.554 | | Fe I | 117 | 4096.96 | P | Fe I | 173 |
| 4074.374 | | W I | 6 | 4083.584 | | Sm II | 24 | 4097.02 | P | Fe I | 700 |
| 4074.53 | | C II | 36 | 4083.628 | | Mn I | 5 | 4097.099 | | Fe I | 558 |
| 4074.70 | P | Fe I | 912 | 4083.67 | P | Mn II | 2 | 4097.12 | | Ca II | 17 |
| 4074.794 | | Fe I | 524 | 4083.71 | P | Fe I | 1103 | 4097.15 | | A II | 100 |
| 4074.89 | | C II | 36 | 4083.71 | | Y I | 6 | 4097.21 | | Hf II | 17 |
| 4074.897 | | Ni I | 28 | 4083.780 | | Fe I | 697 | 4097.260 | | O II | 20,48 |
| 4075.116 | | Nd II | 62 | 4083.907 | | O II | 49 | 4097.31 | | N III | 1 |
| 4075.272 | | Nd II | 19 | 4084.17 | P | Fe I | 557 | 4097.65 | | Cr I | 97 |
| 4075.45 | | Si II | | 4084.391 | | Mo I | 12 | 4097.791 | | Ru I | 9 |
| 4075.63 | P | Cr II | 19 | 4084.498 | | Fe I | 698 | 4097.96 | | Cr I | 97 |
| 4075.66 | | V II | 14 | 4084.58 | P | Fe II | 151 | 4098.18 | | Cr I | 97 |
| 4075.714 | | Ce II | 57 | 4084.66 | | O II | 21 | 4098.183 | | Fe I | 558 |
| 4075.845 | | Sm II | 51 | 4085.011 | | Fe I | 358 | 4098.27 | | O II | 46 |
| 4075.853 | | Ce II | 206 | 4085.124 | | O II | 10 | 4098.44 | | Cr II | 165 |
| 4075.868 | | O II | 10 | 4085.232 | | Ce II | 172 | 4098.533 | | Ca I | 25 |
| 4075.92 | | Cr I | 66 | 4085.26 | P | Fe I | 276 | 4098.54 | | Fe III | 101 |
| 4075.95 | P | Fe II | 21 | 4085.312 | | Fe I | 559 | 4098.606 | | Gd II | 49 |
| 4076.00 | | C II | 36 | 4085.38 | | Eu II | 10 | 4098.73 | | La II | 138 |
| 4076.061 | | Cr I | 279 | 4085.38 | P | Fe I | 486 | 4098.77 | | Ne II | 53 |
| 4076.124 | | Co I | 16 | 4085.564 | | Gd II | 50 | 4098.900 | | Gd II | 49 |
| 4076.232 | | Fe I | 486 | 4085.67 | | V II | 214 | 4098.981 | | Ce II | 91 |
| 4076.370 | | Ti I | 9 | 4085.68 | | Zr II | 54 | 4099.016 | | Cr I | 108 |
| 4076.498 | | Fe I | 218 | 4085.815 | | Nd II | 16 | 4099.08 | | Fe I | 600,651 |
| 4076.636 | | Fe I | 558 | 4085.98 | | Fe I | 1073 | 4099.166 | | Ti I | 207 |
| 4076.64 | | A II | 52 | 4086.14 | | Cr II | 26 | 4099.25 | | S III | 11 |
| 4076.71 | | La II | 11 | 4086.300 | | Co I | 58 | 4099.44 | | S III | |
| 4076.78 | | Si II | | 4086.69 | | Ne II | 54 | 4099.47 | | A II | 79 |
| 4076.810 | | Fe I | 557 | 4086.72 | | La II | 10 | 4099.54 | | La II | 78 |
| 4076.83 | | N II | 38 | 4087.099 | | Fe I | 694 | 4099.77 | | Mg I | 46 |
| 4076.87 | | Cr II | 19 | 4087.16 | | O II | 48 | 4099.796 | | V I | 27 |
| 4076.89 | P | Fe I | 559 | 4087.27 | P | Fe II | 28 | 4099.94 | | N I | 10 |
| 4076.96 | | A II | 64 | 4087.297 | | Ce II | 59 | 4099.99 | P | Fe I | 698 |
| 4077.05 | | Zr II | 54 | 4087.35 | | N II | 37 | 4100.04 | | He II | 3 |
| 4077.089 | | Cr I | 66 | 4087.60 | | Na II | 4 | 4100.17 | | Fe I | |
| 4077.148 | | Ti I | 207 | 4087.63 | | Cr II | 19 | 4100.240 | | Nd II | 57 |
| 4077.35 | | La II | 41 | 4087.79 | P | Fe I | 832 | 4100.30 | | Ne II | 54 |
| 4077.38 | | Y I | 7 | 4088.291 | | Co I | 2 | 4100.35 | | Fe I | 320 |
| 4077.470 | | Ce II | 60 | 4088.567 | | Fe I | 906 | 4100.35 | P | Fe I | 1103 |
| 4077.50 | | Cr II | 19 | 4088.75 | P | Fe II | 39 | 4100.52 | | Fe III | 107 |
| 4077.677 | | Cr I | 279 | 4088.863 | | Si IV | 1 | 4100.621 | | D | 1 |
| 4077.714 | | Sr II | 1 | 4088.90 | | Cr II | 19 | 4100.745 | | Fe I | 18 |
| 4078.321 | | Ce II | 19 | 4089.225 | | Fe I | 422 | 4100.746 | | Pr II | 4 |
| 4078.365 | | Fe I | 217 | 4089.295 | | O II | 48 | 4100.91 | P | Fe I | 173 |
| 4078.444 | | Gd II | 15 | 4089.49 | | Cr II | 164 | 4100.918 | | Cb I | 1 |
| 4078.471 | | Ti I | 80 | 4089.63 | | Cr I | 260 | 4101.00 | | V II | 176 |
| 4078.700 | | Gd I | 5 | 4090.085 | | Fe I | 700 | 4101.163 | | Cr I | 108 |
| 4078.862 | | O II | 10 | 4090.305 | | Cr I | 66 | 4101.272 | | Fe I | 698 |
| 4079.18 | P | Fe I | 700 | 4090.34 | P | Fe I | 44 | 4101.684 | | Fe I | 120 |
| 4079.241 | | Mn I | 5 | 4090.52 | | Zr II | 29 | 4101.737 | | H | 1 |
| 4079.422 | | Mn I | 5 | 4090.579 | | V I | 41 | 4101.764 | | In I | 1 |
| 4079.60 | | A II | 33 | 4090.75 | P | Fe I | 943 | 4101.772 | | Ce II | 5 |
| 4079.708 | | Ti I | 207 | 4090.947 | | Ce II | 174 | 4102.158 | | Mo I | 12 |
| 4079.726 | | Cb I | 1 | 4090.984 | | Fe I | 695 | 4102.159 | | V I | 41 |
| 4079.848 | | Fe I | 359 | 4091.53 | | P II | 17 | 4102.38 | | Y I | 7 |
| 4079.88 | | Cl II | 61 | 4091.561 | | Fe I | 357 | 4102.713 | | W I | 2 |
| 4080.04 | | P III | 1 | 4091.945 | | V I | 52 | 4102.74 | P | Ni I | 255 |
| 4080.08 | P | Fe I | 944 | 4092.174 | | Cr I | 180 | 4102.926 | | Si I | 2 |
| 4080.221 | | Cr I | 66 | 4092.266 | | Sm II | 1 | 4103.017 | | O II | 20 |
| 4080.226 | | Fe I | 558 | 4092.386 | | Co I | 29 | 4103.085 | | F II | 4 |
| 4080.227 | | Nd II | 18 | 4092.407 | | V I | 52 | 4103.37 | | N III | 1 |
| 4080.435 | | Ce II | 36 | 4092.512 | | Fe I | 18 | 4103.525 | | F II | 4 |
| 4080.44 | | Hf II | 6 | 4092.633 | | Ca I | 25 | 4103.61 | P | Fe I | 831 |
| 4080.44 | | V II | 214 | 4092.694 | | V I | 27 | 4103.62 | P | Fe I | 650 |
| 4080.48 | | Ne II | 53 | 4092.848 | | Co I | 59 | 4103.724 | | F II | 4 |
| 4080.56 | | Cr I | 156 | 4092.940 | | O II | 10 | 4103.85 | | Cr I | 180 |
| 4080.600 | | Ru I | 7 | 4093.06 | | Cr I | 260 | 4103.871 | | F II | 4 |
| 4080.67 | | A II | | 4093.16 | | Hf II | 6 | 4103.91 | | A II | 52,64 |
| 4080.886 | | Fe I | 557 | 4093.497 | | V I | 52 | 4104.132 | | Fe I | 356,558 |
| 4081.018 | | Pr II | 14 | 4093.62 | P | Ni I | 1 | 4104.18 | P | Fe II | 39 |
| 4081.10 | | O III | 23 | 4093.90 | | Mg II | 29 | 4104.23 | | Cl III | 7 |
| 4081.19 | | Fe III | 119 | 4093.955 | | Ce II | 160 | 4104.46 | P | Fe I | 422 |
| 4081.21 | | Cr II | 165 | 4094.18 | | O II | 10 | 4104.743 | | O II | 20 |
| 4081.22 | | Zr I | 46 | 4094.188 | | Tm I | | 4104.77 | P | Fe I | 320 |
| 4081.222 | | Ce II | 4 | 4094.478 | | Gd II | 48 | 4104.778 | | V I | 112 |
| 4081.42 | P | Fe II | 188 | 4094.930 | | Ca I | 25 | 4104.867 | | Cr I | 108 |
| 4081.737 | | Cr I | 66 | 4095.17 | | S III | | 4104.97 | | Fe I | 694 |
| 4081.74 | | Ca III | 4 | 4095.27 | P | Fe I | 1075 | 4104.996 | | Ce II | 156 |
| 4082.125 | | Fe I | 698 | 4095.486 | | V I | 41 | 4105.000 | | O II | 20 |
| 4082.280 | | N II | 38 | 4095.63 | P | Fe I | 851 | 4105.06 | P | Fe I | 700 |
| 4082.30 | | Cr II | 165 | 4095.63 | | O II | 48 | 4105.167 | | V I | 27 |
| 4082.396 | | Sc I | 6 | 4095.92 | P | N II | 38 | 4105.365 | | Mn I | 47 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4105.843 | | Tm I | | 4115.376 | | Gd II | 117 | 4124.072 | | V I | 52 |
| 4106.03 | | O II | 10 | 4115.89 | P | Fe I | 910 | 4124.081 | | N II | 65 |
| 4106.05 | | Cr I | 180 | 4115.982 | | Ni I | 255 | 4124.09 | | A II | 41 |
| 4106.134 | | Ce II | 160 | 4116.104 | | Si IV | 1 | 4124.73 | | Lu I | 3 |
| 4106.266 | | Fe I | 217 | 4116.39 | | A II | 124 | 4124.793 | | Fe II | 22 |
| 4106.437 | | Fe I | 697 | 4116.470 | | V I | 27 | 4124.91 | | Y II | 14 |
| 4106.582 | | Nd II | 57 | 4116.547 | | F II | 5 | 4125.10 | | Hf II | 94 |
| 4106.71 | | Cr I | 260 | 4116.60 | P | V I | 27 | 4125.23 | P | Fe I | 173 |
| 4106.83 | | Cl III | 7 | 4116.66 | | Cr II | 181 | 4125.4 | | S III | 11 |
| 4106.881 | | Ce II | 139 | 4116.703 | | V I | 27 | 4125.622 | | Fe I | 1103 |
| 4107.07 | | O II | 47 | 4116.97 | | Fe I | 558 | 4125.776 | | Ce II | 126 |
| 4107.387 | | Sm II | 50 | 4117.013 | | Ce II | 35 | 4125.884 | | Fe I | 354 |
| 4107.426 | | Ce II | 138 | 4117.09 | | P II | 17 | 4126.099 | | Cr I | 65 |
| 4107.477 | | Mo I | 12 | 4117.288 | | Ce II | 77 | 4126.192 | | Fe I | 695 |
| 4107.487 | | V I | 52 | 4117.32 | | Fe I | 484 | 4126.521 | | Cr I | 35 |
| 4107.492 | | Fe I | 354 | 4117.71 | | Fe I | 833 | 4126.88 | | Fe I | 354 |
| 4107.75 | P | Fe I | 831 | 4117.872 | | Fe I | 700,1103 | 4126.925 | | Cr I | |
| 4108.13 | P | Fe I | 559 | 4118.10 | | Ne II | 54 | 4127.08 | | Cr II | 181 |
| 4108.31 | P | Fe I | 833 | 4118.144 | | Ce II | 11 | 4127.09 | | A II | 41 |
| 4108.39 | | Zr I | 32 | 4118.182 | | V I | 112 | 4127.09 | P | Ti I | 114 |
| 4108.400 | | Cr I | 65 | 4118.45 | P | Cr I | 85 | 4127.302 | | Cr I | 35 |
| 4108.401 | | Gd II | 117 | 4118.481 | | Pr II | 8 | 4127.367 | | Ce II | 4 |
| 4108.488 | | Co I | 2 | 4118.549 | | Fe I | 801 | 4127.49 | | P II | 16 |
| 4108.554 | | Ca I | 39 | 4118.551 | | Sm II | 54 | 4127.531 | | Ti I | 296 |
| 4108.75 | | O II | 48 | 4118.643 | | V I | 41 | 4127.54 | | S III | |
| 4109.070 | | Fe I | 558 | 4118.774 | | Co I | 28 | 4127.57 | | Y II | 15 |
| 4109.073 | | Nd II | 17 | 4118.904 | | Fe I | 559 | 4127.612 | | Fe I | 357 |
| 4109.173 | | F II | 5 | 4119.015 | | Ce II | 89 | 4127.643 | | Cr I | 65 |
| 4109.19 | | P II | 30 | 4119.219 | | F II | 5 | 4127.721 | | Gd II | 117 |
| 4109.405 | | Sm II | 28 | 4119.221 | | O II | 20 | 4127.80 | | Hf II | 41 |
| 4109.455 | | Nd II | 10 | 4119.44 | | Cr I | 65 | 4127.807 | | Fe I | 558,727 |
| 4109.54 | | Mg II | 21 | 4119.457 | | V I | 41 | 4128.053 | | Si II | 3 |
| 4109.584 | | Cr I | 65 | 4119.53 | P | Fe II | 21 | 4128.067 | | Ce II | 136 |
| 4109.706 | | Co I | 1 | 4119.66 | P | Fe I | 320 | 4128.071 | | V I | 27 |
| 4109.786 | | V I | 27 | 4119.784 | | Ce II | 22 | 4128.14 | | Mn II | 2 |
| 4109.808 | | Fe I | 357 | 4119.877 | | Ce II | 83 | 4128.31 | | Y I | 5 |
| 4109.81 | P | V I | 41 | 4120 | P | O V | 4 | 4128.65 | | A II | |
| 4109.83 | | Ca II | 17 | 4120.037 | | Ti I | 253 | 4128.735 | | Fe II | 27 |
| 4109.95 | | Fe III | | 4120.211 | | Fe I | 423 | 4128.858 | | V I | 112 |
| 4109.98 | | Cr I | 260 | 4120.279 | | O II | 20 | 4128.87 | P | Mn II | 2 |
| 4109.98 | | N I | 10 | 4120.538 | | V I | 41 | 4128.870 | | Rh I | 8 |
| 4110.00 | | N II | 44 | 4120.554 | | O II | 20 | 4129.166 | | Ti I | |
| 4110.05 | | Zr II | 30 | 4120.613 | | Cr I | 65 | 4129.176 | | Ce II | 227 |
| 4110.20 | | O II | 37 | 4120.654 | | Nd II | 57 | 4129.21 | | Cr I | 97 |
| 4110.33 | | Ca II | 17 | 4120.78 | | P II | 17 | 4129.22 | | Fe I | 698 |
| 4110.381 | | Ce II | 28 | 4120.812 | | He I | 16 | 4129.231 | | Sm II | 24 |
| 4110.472 | | Nd II | 15 | 4120.829 | | Ce II | 112 | 4129.34 | | O II | 19 |
| 4110.532 | | Co I | 29 | 4120.97 | | Fe III | 118 | 4129.46 | P | Fe I | 695 |
| 4110.795 | | O II | 20 | 4120.993 | | He I | 16 | 4129.70 | | A II | 77 |
| 4110.87 | | Cr I | 97 | 4121.0 | | S II | 2 | 4129.73 | | Eu II | 1 |
| 4110.903 | | Mn I | 37,47 | 4121.31 | | Fe III | | 4129.96 | P | Cr I | 97 |
| 4111.01 | | Cr II | 18,26 | 4121.318 | | Co I | 28 | 4130.035 | | Fe I | 44,486 |
| 4111.06 | P | Fe I | 689 | 4121.45 | | Zr I | 32 | 4130.372 | | Gd II | 19,49 |
| 4111.36 | | Cr I | 97 | 4121.48 | | O II | 19 | 4130.47 | P | Cr I | 97 |
| 4111.394 | | Ce II | | 4121.637 | | Ti I | | 4130.538 | | Co I | 16 |
| 4111.438 | | Gd II | | 4121.682 | | Rh I | 9 | 4130.648 | | Ba II | 4 |
| 4111.56 | | S III | | 4121.7 | P | O V | 11 | 4130.706 | | Ce II | 209 |
| 4111.67 | | Cr I | 97 | 4121.806 | | Fe I | 356 | 4130.77 | | P II | 17 |
| 4111.785 | | V I | 27 | 4121.817 | | Cr I | 108 | 4130.86 | | Cl II | 60 |
| 4111.902 | | Fe II | 188 | 4121.95 | | B II | 2 | 4130.884 | | Si II | 3 |
| 4112.018 | | Os I | 5 | 4122.00 | P | Fe I | 765 | 4131.099 | | Ce II | 112 |
| 4112.029 | | O II | 21 | 4122.05 | | C III | 17 | 4131.17 | P | Fe II | 188 |
| 4112.04 | | Eu II | 10 | 4122.06 | | Fe III | 118 | 4131.244 | | Ti I | 253 |
| 4112.09 | P | Fe I | 766 | 4122.143 | | Ti I | 296 | 4131.31 | | Zr II | 54 |
| 4112.17 | P | Fe I | 275 | 4122.162 | | Cr I | 65 | 4131.360 | | Cr I | 261 |
| 4112.35 | | Fe I | 695 | 4122.522 | | Fe I | 356 | 4131.430 | | Mn I | 37 |
| 4112.59 | | Cr II | 18 | 4122.638 | | Fe II | 28 | 4131.73 | | A II | 32 |
| 4112.708 | | Ti I | 9 | 4122.757 | | Mn I | 47 | 4131.74 | | La II | 167 |
| 4112.83 | | A II | 8 | 4122.98 | | Fe III | 118 | 4131.75 | P | Fe I | 1075 |
| 4112.972 | | Fe I | 1103 | 4123 | P | O V | 4 | 4131.94 | P | Fe I | 695 |
| 4113.210 | | Zn I | 9 | 4123.069 | | Na II | 19 | 4131.97 | P | Fe I | 558 |
| 4113.23 | | Fe III | | 4123.188 | | V I | 112 | 4132.017 | | V I | 27 |
| 4113.24 | | Cr II | 18 | 4123.23 | | La II | 41 | 4132.060 | | Fe I | 43 |
| 4113.28 | | La II | 166 | 4123.230 | | Ce II | 162 | 4132.155 | | Co I | 30 |
| 4113.45 | | Fe III | | 4123.279 | | Mn I | 47 | 4132.275 | | Gd II | 49 |
| 4113.518 | | V I | 52 | 4123.287 | | Ti I | 302 | 4132.41 | | Cr II | 26 |
| 4113.58 | | Hf II | 24 | 4123.38 | | Zr II | 54 | 4132.48 | | Cl II | 29 |
| 4113.726 | | Ce II | 137 | 4123.387 | | Cr I | 108 | 4132.50 | | La II | 150 |
| 4113.82 | | O II | 37 | 4123.488 | | Ce II | 22 | 4132.54 | P | Fe I | 1103 |
| 4113.826 | | Nd II | 25 | 4123.54 | | Hf II | 95 | 4132.806 | | O II | 19 |
| 4113.876 | | Mn I | 47 | 4123.543 | | Mn I | 37 | 4132.903 | | Fe I | 357 |
| 4113.902 | | Sm II | 16 | 4123.559 | | Ti I | 296 | 4132.94 | P | Fe I | 44 |
| 4114.00 | | N I | 10 | 4123.566 | | V I | 27 | 4133.006 | | Sc I | 20 |
| 4114.449 | | Fe I | 357 | 4123.748 | | Fe I | 217,422 | 4133.33 | | La II | |
| 4114.52 | | A II | 124 | 4123.812 | | Cb I | 1 | 4133.361 | | Nd II | 19 |
| 4114.95 | | Na II | 20 | 4123.872 | | Ce II | 60 | 4133.65 | | Ne II | 53 |
| 4114.957 | | Fe I | 695 | 4123.881 | | Nd II | 65 | 4133.66 | | Cl II | 60 |
| 4114.99 | | K II | 2 | 4123.90 | | O V | 4 | 4133.669 | | N II | 65 |
| 4115.185 | | V I | 27 | 4123.956 | | Sm II | 46 | 4133.800 | | Ce II | 4 |
| 4115.374 | | Ce II | 22 | 4124.00 | | Cl II | 60 | 4133.869 | | Fe I | 698 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4134.19 | P | Fe I | 217 | 4146.20 | | Cr I | 260 | 4158.5906 | | A I | 2 |
| 4134.343 | | Fe I | 3 | 4146.234 | | Ce II | 203 | 4158.76 | | O V | 11 |
| 4134.433 | | Fe I | 482,697 | 4146.47 | | Cr I | 108 | 4158.798 | | Fe I | 695 |
| 4134.488 | | V I | 27 | 4146.[illegible]5 | | Cr I | 107 | 4158.90 | | Hf II | 41 |
| 4134.681 | | Fe I | 357 | 4146.94 | | S II | 65 | 4159.033 | | Ce II | 246 |
| 4134.72 | | K II | 1 | 4147.09 | | Cl II | 60 | 4159.407 | | Al II | 71 |
| 4135.325 | | Nd II | | 4147.26 | P | Fe II | 141 | 4159.450 | | Al II | 71 |
| 4135.443 | | Ce II | 188 | 4147.34 | P | Fe I | 693 | 4159.634 | | Ti I | 206 |
| 4135.68 | | Zr I | 50 | 4147.43 | | A II | 9 | 4159.686 | | V I | 25 |
| 4135.77 | P | Cr II | 163 | 4147.49 | P | Fe I | 832 | 4159.725 | | Al II | 71 |
| 4135.77 | | Fe I | 1073 | 4147.532 | | Mn I | 37 | 4159.809 | | Al II | 71 |
| 4135.784 | | Os I | 3 | 4147.673 | | Fe I | 42 | 4160.239 | | Al II | 71 |
| 4135.9 | P | O V | 11 | 4148.27 | P | Fe I | 832 | 4160.263 | | Al II | 71 |
| 4136.386 | | V I | 26 | 4148.52 | | Cr I | 241 | 4160.28 | P | Fe II | 149 |
| 4136.512 | | Fe I | 694 | 4148.75 | P | Ni I | 89 | 4160.56 | | P II | 31 |
| 4136.894 | | Ti I | 221 | 4148.859 | | V I | 26 | 4160.561 | | Fe I | 419 |
| 4137.002 | | Fe I | 726 | 4148.901 | | Ce II | 28 | 4160.62 | P | Fe II | 39 |
| 4137.090 | | Cb I | 1 | 4148.91 | | S III | | 4160.78 | P | Fe I | 1116 |
| 4137.104 | | Gd II | | 4149.19 | | K II | 6 | 4160.8 | | N II | 50,51 |
| 4137.257 | | Mn I | 37 | 4149.22 | | Zr II | 41 | 4161.05 | | Cr II | 162 |
| 4137.284 | | Ti I | 253 | 4149.372 | | Fe I | 694 | 4161.080 | | Fe I | 689 |
| 4137.42 | P | Fe I | 1103 | 4149.445 | | Ti I | 296 | 4161.175 | | Ce II | 22 |
| 4137.63 | | N I | 6 | 4149.45 | | Cr I | 261 | 4161.20 | | Zr II | 42 |
| 4137.646 | | Ce II | 2 | 4149.49 | P | Fe I | 942 | 4161.27 | P | Cr II | 127 |
| 4137.93 | | Fe III | 118 | 4149.76 | P | Fe I | 3 | 4161.34 | P | Ni I | 86 |
| 4137.97 | P | Fe I | 320 | 4149.831 | | Sm II | 8 | 4161.415 | | Cr I | 305 |
| 4138.21 | P | Fe II | 150 | 4149.897 | | Al III | 5 | 4161.488 | | Fe I | 422 |
| 4138.40 | P | Fe II | 39 | 4149.917 | | Al III | 5 | 4161.524 | | Ti II | 21 |
| 4138.52 | | Ni I | 237 | 4149.936 | | Ce II | 158,189 | 4161.56 | P | Cr II | 127 |
| 4138.84 | | Fe I | 117 | 4150.08 | P | V II | 37 | 4161.796 | | Sr II | 3 |
| 4139.37 | | Fe III | 118 | 4150.138 | | Al III | 5 | 4161.94 | | La II | |
| 4139.452 | | Co I | 94 | 4150.258 | | Fe I | 695 | 4162.072 | | V II | 175 |
| 4139.48 | | Ti I | 221 | 4150.366 | | Ni I | 178 | 4162.39 | | S II | 65 |
| 4139.702 | | Cb I | 1 | 4150.429 | | Co I | 16 | 4162.40 | | Hf II | 60 |
| 4139.933 | | Fe I | 18 | 4150.557 | | Ti I | 253 | 4162.698 | | S II | 44,65 |
| 4140.24 | P | Fe I | 418 | 4150.67 | | Ne II | 53 | 4162.732 | | Gd II | 17 |
| 4140.304 | | Sc I | 20 | 4150.809 | | Ti I | 221 | 4162.80 | | C III | 21 |
| 4140.42 | P | Ti I | 221 | 4150.963 | | Ti I | 206 | 4162.93 | P | Fe I | 476a |
| 4140.441 | | Fe I | 694,695 | 4150.97 | | Zr II | 42 | 4163.092 | | Gd II | 44 |
| 4140.450 | | Gd II | 48 | 4151 | P | O V | 4 | 4163.16 | P | Cr I | 35 |
| 4140.51 | | Fe III | 118 | 4151.00 | | Cr II | 163 | 4163.35 | P | Fe I | 1073 |
| 4140.74 | | O II | 19 | 4151.46 | | N I | 6 | 4163.516 | | Ce II | 35 |
| 4141.017 | | Gd II | 117 | 4151.52 | | Eu II | 10 | 4163.625 | | Cr I | 35 |
| 4141.25 | Forb | Al III | 17 | 4151.60 | P | Fe II | 149 | 4163.644 | | Ti II | 105 |
| 4141.257 | | Pr II | 10 | 4151.79 | P | Fe II | 12 | 4163.655 | | V II | 175 |
| 4141.352 | | Fe I | 480 | 4151.957 | | Fe I | 764 | 4163.658 | | Cb I | 1 |
| 4141.73 | | La II | 40 | 4151.970 | | Ce II | 2 | 4163.676 | | Fe I | 274,699 |
| 4141.84 | | Hf II | 87 | 4151.98 | | La II | 40 | 4163.94 | | Cr I | 241 |
| 4141.862 | | Fe I | 422 | 4152.07 | P | Fe I | 1049 | 4164.015 | | V II | 37 |
| 4141.96 | | O II | 106 | 4152.172 | | Fe I | 18 | 4164.134 | | Ti I | 163 |
| 4142.08 | | O II | 106 | 4152.209 | | Sm II | 16 | 4164.1800 | | A I | 2 |
| 4142.15 | | Al III | 16 | 4152.355 | | Sc I | 20 | 4164.192 | | Pr II | 8 |
| 4142.184 | | Ni I | 212 | 4152.43 | | C III | 21 | 4164.24 | P | Fe I | 694 |
| 4142.193 | | Cr I | 305 | 4152.575 | | Cb I | 1 | 4164.54 | | Pt I | 6 |
| 4142.24 | | O II | 106 | 4152.775 | | Cr I | 261 | 4164.636 | | Ni I | 28 |
| 4142.291 | | S II | 44 | 4152.78 | | La II | 78 | 4164.661 | | Cb I | 1 |
| 4142.320 | | Ni I | | 4152.98 | P | Fe II | 45 | 4164.79 | | Fe III | 118 |
| 4142.398 | | Ce II | 10 | 4153.067 | | Cr I | 35 | 4164.80 | | Fe I | 418 |
| 4142.47 | | Cr I | 179 | 4153.098 | | S II | 44 | 4164.96 | | S III | |
| 4142.480 | | Ti I | 296 | 4153.302 | | O II | 19 | 4165.11 | | S II | 64 |
| 4142.628 | | Fe I | 1103 | 4153.328 | | V I | 26 | 4165.184 | | Sc I | 20 |
| 4142.66 | | V I | 26 | 4153.332 | | Sm II | 54 | 4165.519 | | Cr I | 305 |
| 4142.86 | | Y I | 5 | 4153.510 | | Gd II | 117 | 4165.606 | | Ce II | 10 |
| 4142.90 | | V II | 226 | 4153.67 | P | Ce II | 159 | 4166.003 | | Ba II | 4 |
| 4143.048 | | Ti I | 253 | 4153.816 | | Cr I | 35 | 4166.311 | | Ti I | 163 |
| 4143.07 | P | Fe II | 188 | 4153.906 | | Fe I | 695 | 4166.37 | | Zr I | 45 |
| 4143.136 | | Pr II | 4 | 4154.109 | | Fe I | 694 | 4166.73 | | P II | 16 |
| 4143.280 | | Ti I | 253 | 4154.502 | | Fe I | 355 | 4166.86 | | Fe III | 118 |
| 4143.418 | | Fe I | 523 | 4154.812 | | Fe I | 694 | 4167.159 | | Gd II | 18 |
| 4143.42 | P | N I | 6 | 4154.862 | | Gd II | 67 | 4167.2604 | | Mg I | 15 |
| 4143.50 | P | Fe I | 697 | 4154.865 | | Ti I | 221 | 4167.2712 | | Mg I | 15 |
| 4143.52 | | O II | 106 | 4154.98 | | Fe III | | 4167.52 | | Y I | 7 |
| 4143.759 | | He I | 53 | 4155.217 | | Sm II | 8,50 | 4167.67 | P | Ti II | 21 |
| 4143.77 | | La II | 54 | 4155.525 | | Mn I | 37 | 4167.69 | P | Fe II | 149 |
| 4143.77 | | O II | 106 | 4155.532 | | Ce II | 29 | 4167.80 | | Cr I | 107 |
| 4143.83 | P | Fe I | 354 | 4156.083 | | Nd II | 10 | 4167.804 | | Ce II | 29 |
| 4143.87 | | Fe III | | 4156.11 | | A II | 52 | 4167.862 | | Fe I | 599 |
| 4143.871 | | Fe I | 43 | 4156.24 | | Zr II | 29 | 4168.122 | | Cb I | 1 |
| 4144.164 | | Ru I | 7 | 4156.265 | | Nd II | 14 | 4168.31 | | Cr I | 261 |
| 4144.492 | | Ce II | 3 | 4156.3 | | Li II | 3 | 4168.409 | | S II | 44 |
| 4144.553 | | Nd II | 61 | 4156.460 | | Fe I | 693 | 4168.41 | | Fe III | 118 |
| 4144.995 | | Ce II | 9 | 4156.50 | | C III | 21 | 4168.424 | | Al II | 61 |
| 4145.100 | | S II | 44 | 4156.54 | | O II | 19 | 4168.511 | | Al II | 61 |
| 4145.209 | | Fe I | 274 | 4156.670 | | Fe I | 419 | 4168.625 | | Fe I | 689 |
| 4145.74 | | Fe III | | 4156.8 | | N II | 50,51 | 4168.66 | P | Fe II | 22 |
| 4145.764 | | N II | 65 | 4156.803 | | Fe I | 354 | 4168.942 | | Fe I | 694 |
| 4145.77 | | Cr II | 162 | 4157.788 | | Fe I | 695 | 4168.971 | | He I | 52 |
| 4145.90 | | O II | 106 | 4157.82 | | Cl II | | 4168.98 | | A II | |
| 4146.071 | | Fe I | 422 | 4158.420 | | Co I | 144 | 4169.09 | P | Fe I | 18 |
| 4146.09 | | O II | 106 | 4158.45 | P | Fe II | 12 | 4169.230 | | O II | 19 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4169.330 | | Ti I | 163 | 4179.419 | | V I | 25 | 4190.738 | | Si II | |
| 4169.478 | | Sm II | 24 | 4179.422 | | Pr II | 4 | 4190.89 | | V II | 37 |
| 4169.773 | | Ce II | 161 | 4179.43 | | Cr II | 26 | 4191.0296 | | A I | 7 |
| 4169.777 | | Fe I | 693 | 4179.55 | | Hf II | 114 | 4191.067 | | Gd II | 34 |
| 4169.838 | | Cr I | 278 | 4179.585 | | Nd II | 19 | 4191.271 | | Cr I | 35 |
| 4169.878 | | Ce II | 173 | 4179.667 | | N II | 50 | 4191.436 | | Fe I | 152 |
| 4169.98 | P | Fe II | 12 | 4179.81 | | Zr II | 99 | 4191.50 | | Zr I | 108 |
| 4170.108 | | Gd II | 35 | 4179.860 | | Ti I | 206 | 4191.558 | | V I | 24 |
| 4170.202 | | Cr I | 278 | 4179.90 | P | Co I | 1 | 4191.59 | | Cl II | 43 |
| 4170.58 | P | Cr II | 18 | 4179.92 | P | Cr II | 127 | 4191.615 | | Pr II | 12 |
| 4170.86 | | Cr II | 181 | 4180.41 | P | Fe I | 274 | 4191.685 | | Fe I | 355 |
| 4170.906 | | Fe I | 482 | 4180.498 | | Ti I | 206 | 4191.750 | | Cr I | 35 |
| 4171.018 | | Ti I | 206 | 4180.68 | | Pr II | 23 | 4192.07 | | Ni II | 10 |
| 4171.608 | | N II | 43 | 4180.7 | | S II | 64 | 4192.103 | | Cr I | 273 |
| 4171.675 | | Cr I | 261 | 4180.86 | | V II | 19 | 4192.35 | | La II | 78 |
| 4171.696 | | Fe I | 941 | 4180.97 | P | Fe II | 148 | 4192.50 | | O II | 42 |
| 4171.824 | | Pr II | 16 | 4180.97 | | La II | 133 | 4192.856 | | Co I | 94 |
| 4171.897 | | Ti II | 105 | 4181.17 | | N II | 49 | 4193.094 | | Ce II | 79 |
| 4171.904 | | Fe I | 650 | 4181.17 | P | Ti II | 96 | 4193.34 | | La II | |
| 4171.92 | | Cr II | 18 | 4181.20 | P | Fe I | 908 | 4193.37 | P | La II | 133 |
| 4172.048 | | Ga I | 1 | 4181.50 | | Cr II | 181 | 4193.44 | | Mg II | 28 |
| 4172.126 | | Fe I | 649 | 4181.55 | P | Fe I | 763 | 4193.51 | | S II | 10 |
| 4172.20 | P | Fe II | 148 | 4181.758 | | Fe I | 354 | 4193.662 | | Cr I | 248 |
| 4172.273 | | Pr II | 13 | 4181.8838 | | A I | 7 | 4193.874 | | Ce II | 85 |
| 4172.60 | | Cr II | 18 | 4182.384 | | Fe I | 476a | 4193.89 | | Cr I | 248 |
| 4172.609 | | Ti I | 163 | 4182.591 | | V I | 24 | 4194.36 | | La II | 160 |
| 4172.641 | | Fe I | 689 | 4182.69 | P | Fe II | 149 | 4194.50 | P | Fe I | 274 |
| 4172.749 | | Fe I | 19 | 4182.790 | | Fe I | 694 | 4194.951 | | Cr I | 248 |
| 4172.97 | P | Fe I | 909,1073 | 4182.98 | | A II | 36 | 4195.11 | | Cl II | 43 |
| 4173.05 | P | Ti II | 96 | 4183 | P | N IV | 14 | 4195.337 | | Fe I | 693 |
| 4173.18 | P | Fe I | 698 | 4183.025 | | Fe I | 697 | 4195.41 | | Cr II | 161 |
| 4173.234 | | Os I | 4 | 4183.20 | P | Fe II | 21 | 4195.531 | | Ni I | 239 |
| 4173.322 | | Fe I | 355 | 4183.294 | | Ti I | 220 | 4195.615 | | Fe I | 478 |
| 4173.379 | | Nd II | 16 | 4183.31 | | Zr I | 51 | 4195.70 | | N III | 6 |
| 4173.450 | | Fe II | 27 | 4183.435 | | V II | 37 | 4195.83 | | V II | 19 |
| 4173.51 | | N II | 50 | 4183.764 | | Sm II | 4 | 4196.218 | | Fe I | 693 |
| 4173.537 | | Ti II | 21 | 4184.09 | | Fe III | 22 | 4196.26 | | O II | 42 |
| 4173.556 | | Gd II | 117 | 4184.22 | | Fe I | 274 | 4196.335 | | Ce II | 123 |
| 4173.75 | | N II | 50 | 4184.252 | | Gd II | 15 | 4196.533 | | Fe I | 418 |
| 4173.76 | | Y II | 23 | 4184.26 | | Lu II | 6 | 4196.55 | | La II | 41 |
| 4173.77 | | A II | 78 | 4184.329 | | Ti II | 21 | 4196.64 | P | Ti II | 21 |
| 4173.926 | | Fe I | 19 | 4184.475 | | Ni I | 89 | 4196.69 | | Fe III | 22 |
| 4174 | P | N IV | 14 | 4184.895 | | Cr I | 155 | 4196.72 | | O II | 42 |
| 4174.042 | | S II | 64 | 4184.895 | | Fe I | 355 | 4197.069 | | Gd II | 117 |
| 4174.088 | | Ti I | 55 | 4185.334 | | Ce II | 124 | 4197.10 | P | Fe I | 18 |
| 4174.088 | | Ti II | 105 | 4185.345 | | Cr I | 106 | 4197.234 | | Cr I | 249 |
| 4174.14 | | Y I | 6 | 4185.456 | | O II | 36 | 4197.38 | P | Fe I | 976 |
| 4174.15 | | Cr I | 305 | 4185.50 | P | Cr II | 163 | 4197.47 | | Cr I | 249 |
| 4174.27 | | Fe III | | 4185.61 | | Cl II | 43 | 4197.668 | | Ce II | 136 |
| 4174.300 | | S II | | 4185.66 | P | Fe I | 1104 | 4197.681 | | Gd II | |
| 4174.31 | P | Mn II | 2 | 4185.95 | | S II | | 4197.95 | P | Ti II | 96 |
| 4174.33 | | Hf I | 3 | 4186.01 | P | Ti I | 220 | 4197.998 | | Ce II | 209 |
| 4174.419 | | Fe I | 799 | 4186.033 | | Nd II | 24 | 4198.174 | | Si II | |
| 4174.472 | | Ti I | 220 | 4186.08 | P | Cr II | 127 | 4198.268 | | Fe I | 693 |
| 4174.795 | | Cr I | 241 | 4186.119 | | Ti I | 129 | 4198.310 | | Fe I | 152 |
| 4174.917 | | Fe I | 19 | 4186.24 | | K II | 1 | 4198.3170 | | A I | 4 |
| 4174.941 | | Cr I | 278 | 4186.359 | | Cr I | 249 | 4198.425 | | Co I | 2 |
| 4175.227 | | Cr I | 261 | 4186.599 | | Ce II | 1 | 4198.431 | | Ce II | 207 |
| 4175.538 | | Gd I | 5 | 4186.70 | | Zr II | 97 | 4198.525 | | Cr I | 249 |
| 4175.606 | | Nd II | 39 | 4187.044 | | Fe I | 152 | 4198.611 | | V I | 24 |
| 4175.640 | | Fe I | 354 | 4187.05 | | C III | 18 | 4198.645 | | Fe I | 693 |
| 4175.89 | P | Fe I | 694 | 4187.246 | | Co I | 93 | 4198.669 | | Ce II | 7 |
| 4175.945 | | Cr I | 106 | 4187.31 | | La I | 5 | 4198.724 | | Ce II | 3 |
| 4176.080 | | Ce II | 135 | 4187.323 | | Ce II | 86 | 4199.02 | P | Cr II | 180 |
| 4176.164 | | N II | 42 | 4187.56 | | Zr I | 45 | 4199.09 | P | Fe II | 141 |
| 4176.44 | P | Fe II | 149 | 4187.59 | | Fe I | 694 | 4199.098 | | Fe I | 522 |
| 4176.57 | P | Fe I | 689 | 4187.616 | | Tm I | | 4199.099 | | Nd II | 15 |
| 4176.571 | | Fe I | 695 | 4187.68 | | Hf II | 73 | 4199.27 | | Y II | 5 |
| 4176.793 | | V I | 6 | 4187.802 | | Fe I | 152 | 4199.37 | P | Fe I | 416 |
| 4177.07 | P | Fe I | 690 | 4188.099 | | Gd II | 17 | 4199.83 | | He II | 3 |
| 4177.17 | | Cr I | 133 | 4188.128 | | Sm II | 50 | 4199.902 | | Ru I | 8 |
| 4177.321 | | Nd II | 10 | 4188.694 | | Ti I | 220 | 4199.918 | | Tm II | 1 |
| 4177.357 | | Ti I | 163 | 4188.82 | | Cl II | 43 | 4199.93 | | A II | 124 |
| 4177.50 | | Hf II | 51 | 4188.88 | | Al III | 15 | 4199.97 | | Fe I | 3 |
| 4177.52 | P | Fe I | 172 | 4189.10 | | Fe III | | 4200.02 | | N III | 6 |
| 4177.54 | | Y II | 14 | 4189.50 | | Co I | 2 | 4200.06 | | Fe III | |
| 4177.59 | | Co I | 2 | 4189.518 | | Pr II | 8 | 4200.09 | P | Fe I | 993 |
| 4177.597 | | Fe I | 18 | 4189.564 | | Fe I | 940 | 4200.103 | | Cr I | |
| 4177.70 | P | Fe II | 21 | 4189.67 | | A II | | 4200.38 | | Fe III | |
| 4178.019 | | Sm II | 16,50 | 4189.71 | | S II | 44,64 | 4200.40 | P | Ti II | 96 |
| 4178.39 | | A II | 7 | 4189.788 | | O II | 36 | 4200.464 | | Ni I | 89 |
| 4178.390 | | V II | 25 | 4189.841 | | V I | 24 | 4200.6751 | | A I | 2 |
| 4178.855 | | Fe II | 28 | 4189.96 | | Cr I | 106 | 4200.752 | | Ti I | 220 |
| 4179 | P | O V | 4 | 4190.16 | | Cr I | 84 | 4200.78 | P | Fe I | 44 |
| 4179.05 | | Cr I | 250 | 4190.29 | | Ti II | 21 | 4200.89 | | V I | 6 |
| 4179.062 | | V II | 19 | 4190.40 | | V II | 25 | 4200.930 | | Fe I | 689 |
| 4179.226 | | Co I | 144 | 4190.626 | | Ce II | 169 | 4201.45 | | Zr I | 45 |
| 4179.25 | | Fe III | | 4190.66 | | Cr I | 35 | 4201.50 | | La II | |
| 4179.257 | | Cr I | 179,250 | 4190.712 | | Co I | 1 | 4201.58 | | A II | 52 |
| 4179.31 | | A II | 52 | 4190.7127 | | A I | 2 | 4201.723 | | Ni I | 238 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4201.73 | | Fe I | 799 | 4213.86 | | Zr I | 45 | 4225.956 | | Fe I | 521 |
| 4201.851 | | Rb I | 2 | 4214.041 | | Ce II | 203 | 4226.14 | | Fe III | 44 |
| 4201.99 | | A II | 8,124 | 4214.73 | | N I | 5 | 4226.426 | | Fe I | 352 |
| 4202.031 | | Fe I | 42 | 4215.023 | | Gd II | 32 | 4226.44 | | Cl I | 9 |
| 4202.154 | | Ni I | 179 | 4215.430 | | Fe I | 274,419 | 4226.570 | | Ge I | 4 |
| 4202.350 | | V II | 25 | 4215.524 | | Sr II | 1 | 4226.65 | | A II | 113 |
| 4202.4 | | Al II | 87 | 4215.556 | | Rb I | 2 | 4226.728 | | Ca I | 2 |
| 4202.755 | | Fe I | 476a,521 | 4215.69 | | N III | 6 | 4226.76 | P | Cr I | 105 |
| 4202.944 | | Ce II | 186 | 4215.76 | | Zr II | 68 | 4226.827 | | Al II | 46 |
| 4203.051 | | Sm II | 42 | 4215.77 | | Cr II | 18 | 4226.918 | Forb | Al II | 46 |
| 4203.30 | | Fe I | 418 | 4215.92 | | N I | 5 | 4227.02 | | A II | 113 |
| 4203.43 | | A II | | 4215.975 | | Fe I | 273 | 4227.14 | P | Fe II | 45 |
| 4203.465 | | Ti I | 220 | 4216.04 | | Ba II | 17 | 4227.140 | | Gd II | 43 |
| 4203.570 | | Fe I | 19 | 4216.186 | | Fe I | 3 | 4227.34 | P | Ti II | 33 |
| 4203.590 | | Cr I | 35 | 4216.365 | | Cr I | 132 | 4227.42 | P | Fe I | 689 |
| 4203.67 | P | Fe I | 1245 | 4217 | P | C IV | 11 | 4227.420 | | Al II | 46 |
| 4203.730 | | Tm I | | 4217.07 | | Cr II | 18 | 4227.434 | | Fe I | 693 |
| 4203.953 | | Fe I | 850 | 4217.09 | | O I | 33 | 4227.509 | | Al II | 46 |
| 4203.987 | | Fe I | 355 | 4217.15 | | Ne II | 52 | 4227.545 | Forb | Al II | 46 |
| 4204.03 | | La II | 53 | 4217.195 | | Gd II | 49 | 4227.654 | | Ti I | 278 |
| 4204.19 | | Cr I | 35 | 4217.23 | | S II | 44 | 4227.719 | | Nd II | 19 |
| 4204.20 | | V II | 25 | 4217.282 | | Nd II | 57 | 4227.73 | | Cr II | 155 |
| 4204.471 | | Cr I | 272 | 4217.34 | P | Ti II | 96 | 4227.746 | | Ce II | 8 |
| 4204.54 | | Cl II | 43 | 4217.45 | | A II | | 4227.749 | | N II | 33 |
| 4204.66 | P | Cr II | 127 | 4217.551 | | Fe I | 693 | 4227.76 | | Zr I | 45 |
| 4204.69 | | Y II | 1 | 4217.56 | | La II | 78 | 4227.875 | | Al II | 46 |
| 4204.83 | P | Cr II | 180 | 4217.591 | | Ce II | 19 | 4227.945 | | Al II | 46 |
| 4204.857 | | Gd II | 46 | 4217.626 | | Cr I | 132 | 4227.999 | | Al II | 46 |
| 4205.05 | | Eu II | 1 | 4218.12 | P | Fe I | 19 | 4228.18 | | A II | 8 |
| 4205.05 | P | V II | 25 | 4218.18 | P | Ti II | 33 | 4228.200 | | Nd II | 36 |
| 4205.07 | | Cl II | 67 | 4218.21 | P | Fe I | 172 | 4228.71 | P | Fe I | 690 |
| 4205.080 | | V II | 37 | 4218.69 | | A II | 64 | 4229.516 | | Fe I | 416,649 |
| 4205.19 | | A II | 111 | 4218.710 | | V I | 24 | 4229.704 | | Sm II | 4 |
| 4205.37 | P | Mn II | 2 | 4219.364 | | Fe I | 800 | 4229.760 | | Fe I | 41 |
| 4205.48 | P | Fe II | 22 | 4219.383 | | W I | 3 | 4229.803 | | Gd II | 117 |
| 4205.546 | | Fe I | 689 | 4219.41 | P | Fe I | 419 | 4229.81 | | Cr II | 26 |
| 4205.595 | | Nd II | 19 | 4219.51 | | V I | 24 | 4229.89 | | A II | |
| 4205.91 | | Zr II | 133 | 4219.59 | P | Fe I | 763 | 4229.955 | | Co I | 1 |
| 4205.92 | | Fe III | 22 | 4219.74 | P | Fe I | 832 | 4230.29 | | Cr I | 106 |
| 4205.92 | P | Ti II | 33 | 4219.76 | | Ne II | 52 | 4230.35 | | N I | 5 |
| 4206.128 | | Sm II | 38 | 4220.047 | | V II | 25 | 4230.39 | P | Ni I | 150 |
| 4206.21 | | Ca II | 16 | 4220.05 | P | Fe I | 994 | 4230.481 | | Cr I | 132 |
| 4206.375 | | Mn II | 7 | 4220.13 | | Ca II | 16 | 4230.584 | | Fe I | 478 |
| 4206.43 | | Ne II | 53 | 4220.258 | | Nd II | 32 | 4230.95 | | La II | 83 |
| 4206.59 | | Hf II | 74 | 4220.32 | | Fe III | | 4230.98 | | S II | 67 |
| 4206.702 | | Fe I | 3 | 4220.347 | | Fe I | 482 | 4231.040 | | Ni I | 136 |
| 4206.739 | | Pr II | 8 | 4220.45 | | Cr I | 106 | 4231.165 | | V II | 25 |
| 4206.899 | | Cr I | | 4220.659 | | Sm II | 15,50 | 4231.35 | | C I | 17 |
| 4207.130 | | Fe I | 352 | 4220.92 | | Ne II | 52 | 4231.525 | | Fe I | 647 |
| 4207.23 | P | Mn II | 2 | 4221.572 | | Cr I | 155,248 | 4231.60 | | Ne II | 52 |
| 4207.35 | | Cr II | 26 | 4221.696 | | Ni I | 86 | 4231.64 | | Zr II | 99 |
| 4207.51 | | Cr I | 133 | 4222.00 | | Cr II | 180 | 4231.745 | | Ce II | |
| 4207.61 | | La II | 133 | 4222.15 | | P III | 3 | 4232.065 | | V II | 225 |
| 4208.03 | | Cl II | 43 | 4222.219 | | Fe I | 152 | 4232.222 | | Cr I | 294 |
| 4208.357 | | Cr I | 249 | 4222.39 | | Fe III | | 4232.378 | | Nd II | 8 |
| 4208.610 | | Fe I | 689,696 | 4222.41 | | Zr II | 80 | 4232.43 | | Hf II | 72 |
| 4208.99 | | Zr II | 41 | 4222.599 | | Ce II | 36 | 4232.460 | | V I | 111 |
| 4209.02 | | Cr II | 162 | 4222.67 | | A II | 77 | 4232.724 | | Fe I | 3 |
| 4209.368 | | Cr I | 248 | 4222.732 | | Cr I | 132 | 4232.866 | | Cr I | 132 |
| 4209.409 | | Ce II | 3 | 4222.78 | | O I | 33 | 4232.952 | | V I | 111 |
| 4209.649 | | Mo II | 3 | 4222.97 | | K II | 7 | 4232.96 | P | Cr II | 180 |
| 4209.74 | | V II | 25 | 4222.98 | | Pr II | 4 | 4233.167 | | Fe II | 27 |
| 4209.756 | | Cr I | 155 | 4223.020 | | Gd II | 141 | 4233.25 | | Cr II | 31 |
| 4209.84 | P | Cr II | 180 | 4223.04 | | N I | 5 | 4233.32 | | O I | 33 |
| 4209.857 | | V I | 24 | 4223.47 | | Cr I | 132 | 4233.608 | | Fe I | 152 |
| 4210.00 | | A II | 78 | 4223.73 | P | Fe I | 417 | 4233.996 | | Co I | 1 |
| 4210.22 | | La II | | 4224.09 | P | Cr II | 31 | 4234.000 | | V I | 6,111 |
| 4210.352 | | Fe I | 152 | 4224.176 | | Fe I | 689 | 4234.09 | | Cl II | 24 |
| 4210.352 | | Sm II | 8 | 4224.27 | | Zr II | 29 | 4234.196 | | Nd II | 20 |
| 4210.39 | P | Fe I | 482 | 4224.30 | P | Fe I | 1104 | 4234.251 | | V II | 24 |
| 4210.62 | | Zr II | 97 | 4224.43 | | P II | 16 | 4234.515 | | Cr I | 178 |
| 4210.77 | | Cr I | 106 | 4224.509 | | Fe I | 689 | 4234.524 | | V I | 6 |
| 4210.87 | | Fe III | | 4224.51 | | V II | 25 | 4234.55 | | V II | 200 |
| 4211 | P | O V | 4 | 4224.514 | | Cr I | 155 | 4234.573 | | Sm II | 42 |
| 4211.286 | | Nd II | 57 | 4224.57 | | Ne II | 52 | 4234.727 | | Ce II | 170 |
| 4211.349 | | Cr I | 133 | 4224.63 | P | Fe I | 274 | 4235.140 | | Mn I | 23 |
| 4211.51 | | Fe III | 104 | 4224.74 | | N I | 5 | 4235.290 | | Mn I | 23 |
| 4211.729 | | Ti I | 279 | 4224.795 | | Ti I | 301 | 4235.49 | | Cl II | 71,83 |
| 4211.80 | P | Fe II | 21 | 4224.85 | | Cr II | 162 | 4235.54 | | Fe III | |
| 4211.88 | | Zr II | 15 | 4224.92 | | Cl II | 83 | 4235.54 | P | Ni I | 256 |
| 4212.001 | | Gd II | 15 | 4225.02 | P | Ni I | 169 | 4235.65 | P | Fe I | 215 |
| 4212.06 | P | Fe I | 697 | 4225.148 | | Gd II | 14 | 4235.73 | | Y II | 5 |
| 4212.063 | | Ru I | 6 | 4225.228 | | V II | 37 | 4235.756 | | V I | 111 |
| 4212.44 | | Si IV | 5 | 4225.327 | | Pr II | 8 | 4235.84 | P | Fe I | 172 |
| 4212.95 | | Pd I | 7 | 4225.328 | | Sm II | 22 | 4235.94 | | Y I | 5 |
| 4213.036 | | Ce II | 169 | 4225.460 | | Fe I | 693 | 4235.942 | | Fe I | 152 |
| 4213.179 | | Cr I | 155 | 4225.67 | | K II | 4 | 4235.96 | P | Fe I | 692 |
| 4213.42 | P | Fe I | 274 | 4225.71 | P | Fe I | 1102 | 4235.98 | | Cr I | 132 |
| 4213.5 | | S II | 44 | 4225.79 | P | Fe I | 118 | 4236.33 | P | Cr II | 17 |
| 4213.650 | | Fe I | 355 | 4225.850 | | Gd I | 4 | 4236.372 | | Ni I | 237 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4236.56 | | Zr II | 110 | 4247.31 | P | Fe I | 172 | 4259.988 | | Fe I | 689 |
| 4236.66 | P | Fe I | 907 | 4247.367 | | Nd II | 8 | 4260.135 | | Fe I | 476a |
| 4236.745 | | Sm II | 53 | 4247.43 | P | Fe II | 125 | 4260.19 | | Cr I | 240 |
| 4236.76 | | Fe I | 906 | 4247.432 | | Fe I | 693 | 4260.47 | P | Mn II | 2 |
| 4236.82 | | V II | 18 | 4247.56 | | C III | 11 | 4260.479 | | Fe I | 152 |
| 4236.930 | | N II | 48 | 4248.228 | | Fe I | 482 | 4260.73 | P | Fe I | 351 |
| 4237.049 | | N II | 48 | 4248.344 | | Cr I | 131 | 4260.738 | | Ti I | 251 |
| 4237.085 | | Fe I | 19 | 4248.40 | P | Fe I | 19 | 4260.75 | | V II | 18,24 |
| 4237.162 | | Fe I | | 4248.676 | | Ce II | 1 | 4260.854 | | Os I | 1 |
| 4237.21 | | Fe III | 104 | 4248.72 | P | Fe I | 939 | 4261.164 | | Ce II | 19 |
| 4237.23 | | A II | 32 | 4248.73 | | Cr I | 105 | 4261.22 | | Cl II | 66 |
| 4237.27 | | Cr I | 106 | 4248.820 | | V II | 24 | 4261.354 | | Cr I | 96 |
| 4237.57 | P | Al II | 23 | 4249.114 | | Ti I | 252 | 4261.609 | | Ti I | 252 |
| 4237.663 | | Sm II | 8 | 4249.32 | P | Fe I | 117 | 4261.615 | | Cr I | |
| 4237.67 | P | Fe I | 418 | 4249.33 | | Hf II | 39 | 4261.796 | | Pr II | 23 |
| 4237.710 | | Cr I | 132 | 4249.57 | | P IV | 2 | 4261.80 | P | Cr II | 17 |
| 4237.786 | | Ti I | 252 | 4249.81 | P | Cr I | 155 | 4261.92 | | Cr II | 31 |
| 4237.889 | | Ti I | 284 | 4249.92 | | S II | 66 | 4262.092 | | Gd II | 44 |
| 4238.027 | | Fe I | 689,696 | 4249.95 | | Fe III | | 4262.133 | | Cr I | 84,178 |
| 4238.38 | | La II | 41 | 4249.99 | | La II | 79 | 4262.38 | | Cr I | 154 |
| 4238.61 | P | Fe I | 849 | 4250.125 | | Fe I | 152 | 4262.677 | | Sm II | 37 |
| 4238.69 | P | Cr II | 17 | 4250.68 | | Ne II | 52 | 4262.72 | | Hf II | 15 |
| 4238.78 | | Fe III | 104 | 4250.689 | | Mo II | 3 | 4263.134 | | Ti I | 162 |
| 4238.782 | | Gd II | | 4250.790 | | Fe I | 42 | 4263.141 | | Cr I | 247 |
| 4238.79 | P | Mn II | 2 | 4250.90 | P | Fe I | 478 | 4263.40 | | K II | 2 |
| 4238.816 | | Fe I | 693 | 4251.1852 | | A I | 2 | 4263.427 | | Ce II | 254 |
| 4238.957 | | Cr I | 131 | 4251.49 | P | Fe II | 12 | 4263.49 | P | Cr II | 17 |
| 4239.01 | P | Fe I | 274 | 4251.618 | | Ti I | 162 | 4263.59 | | La II | 84 |
| 4239.31 | | Zr I | 45 | 4251.733 | | Gd II | 15 | 4263.836 | | V II | 24 |
| 4239.36 | P | Fe I | 907 | 4251.769 | | Ti I | 251 | 4263.895 | | Fe II | |
| 4239.5 | | O III | 1 | 4251.88 | P | Fe I | 216 | 4264.19 | P | Cr II | 17 |
| 4239.725 | | Mn I | 23 | 4252.05 | P | Ti II | 95 | 4264.209 | | Fe I | 692 |
| 4239.735 | | Fe I | 416 | 4252.107 | | Ni I | 136 | 4264.370 | | Ce II | 239 |
| 4239.847 | | Fe I | 18,273 | 4252.243 | | Cr I | 131 | 4264.50 | | V II | 24 |
| 4239.912 | | Ce II | 2 | 4252.302 | | Co I | 1 | 4264.743 | | Fe I | 993 |
| 4239.95 | P | Fe I | 476a | 4252.62 | | Cr II | 31 | 4264.88 | | Y II | 71 |
| 4239.95 | | Ne II | 52 | 4253.02 | | Mn II | 7 | 4264.91 | | Zr II | 98 |
| 4240.35 | | Zr I | 45 | 4253.28 | | N I | 4 | 4265.075 | | Sm II | 15 |
| 4240.372 | | Fe I | 764 | 4253.356 | | Ce II | 77 | 4265.170 | | V I | |
| 4240.456 | | Ca I | 38 | 4253.366 | | Gd II | 46 | 4265.260 | | Fe I | 993,994 |
| 4240.705 | | Cr I | 105,178 | 4253.51 | | Cl II | 24 | 4265.273 | | Ti I | 252 |
| 4240.75 | | Al II | 36 | 4253.52 | P | Fe I | 690 | 4265.723 | | Ti I | 162 |
| 4241.019 | | Pr II | 9 | 4253.55 | P | Fe I | 1245 | 4265.924 | | Mn I | 23 |
| 4241.112 | | Fe I | 351 | 4253.593 | | S III | 4 | 4266.227 | | Ti I | 252 |
| 4241.20 | | La II | 163 | 4253.612 | | Gd II | | 4266.23 | P | Cr II | 37 |
| 4241.20 | | Zr I | 45 | 4253.74 | | O II | 101 | 4266.2867 | | A I | 4 |
| 4241.276 | | Gd II | 117 | 4253.93 | P | Fe I | 905 | 4266.44 | | Cr I | 199 |
| 4241.38 | | Cl II | 24 | 4253.98 | | O II | 101 | 4266.53 | | A II | 7 |
| 4241.68 | | Zr I | 45 | 4254.346 | | Cr I | 1 | 4266.716 | | Nd II | 58 |
| 4241.787 | | N II | 47,48 | 4254.41 | | V II | 18 | 4266.72 | | Zr II | 80 |
| 4241.93 | | Hf II | 108 | 4254.420 | | Pr II | 27 | 4266.82 | | Cr I | 105 |
| 4242.153 | | Tm II | 5 | 4254.7 | | N I | 4 | 4266.88 | | Fe III | |
| 4242.20 | | Ne II | 52 | 4254.938 | | Fe I | 419,477 | 4266.968 | | Fe I | 273 |
| 4242.38 | | Cr II | 31 | 4255.01 | | S II | 44 | 4267.02 | | C II | 6 |
| 4242.47 | | Mg II | 20 | 4255.20 | | Fe III | | 4267.27 | | C II | 6 |
| 4242.588 | | Fe I | 273 | 4255.499 | | Fe I | 416 | 4267.30 | P | Zr II | 132 |
| 4242.723 | | Ce II | 58 | 4255.502 | | Cr I | 105 | 4267.47 | | A II | 52 |
| 4242.730 | | Fe I | 649 | 4255.62 | | A II | 63 | 4267.802 | | S II | 49 |
| 4242.82 | | Cr I | 131 | 4255.784 | | Ce II | 81 | 4267.830 | | Fe I | 482 |
| 4242.894 | | V II | 200 | 4256.025 | | Ti I | 252 | 4267.95 | | Ba II | 11 |
| 4243.368 | | Fe I | 906 | 4256.156 | | Ce II | 172 | 4268.01 | | Zr I | 45 |
| 4243.528 | | Pr II | 33 | 4256.16 | | Cr II | 192 | 4268.032 | | Co I | 1 |
| 4243.60 | | B III | 1 | 4256.212 | | Fe I | 690 | 4268.096 | | Ir I | 4 |
| 4243.71 | | A II | 63,78 | 4256.239 | | Nd II | 59 | 4268.10 | | Hf II | 86 |
| 4243.786 | | Fe I | 994 | 4256.32 | P | Fe I | 172 | 4268.446 | | Co I | 127 |
| 4243.85 | | Fe III | | 4256.393 | | Sm II | 37 | 4268.643 | | V I | 88 |
| 4244.17 | | Ne II | 62 | 4256.620 | | Cr I | 131 | 4268.731 | | Gd II | 68 |
| 4244.26 | | Mn II | 7 | 4256.79 | | Fe I | 1102 | 4268.744 | | Fe I | 649 |
| 4244.33 | | Cr I | 240 | 4257.02 | | V II | 200 | 4268.788 | | Cr I | 271 |
| 4244.374 | | W I | 1 | 4257.121 | | Ce II | 123 | 4268.928 | | Ti I | 252 |
| 4244.53 | P | Fe II | 12 | 4257.368 | | Cr I | 131 | 4268.93 | | Cr II | 192 |
| 4244.55 | | P II | 30 | 4257.42 | | S II | 66 | 4268.99 | | C I | 16 |
| 4244.702 | | Sm II | 27 | 4257.659 | | Mn I | 23 | 4269.02 | | Cr I | 240 |
| 4244.80 | | Ni II | 9 | 4257.82 | | Ne II | 52 | 4269.28 | | Cr II | 31 |
| 4245.258 | | Fe I | 352 | 4258.05 | | Zr II | 15 | 4269.50 | | La II | 76 |
| 4245.358 | | Fe I | 691 | 4258.155 | | Fe II | 28 | 4269.67 | | Hf II | 26 |
| 4245.84 | | Hf II | 72 | 4258.320 | | Fe I | 3 | 4269.76 | | S II | 49 |
| 4245.976 | | Ce II | 158 | 4258.35 | P | Fe II | 21 | 4269.87 | P | Fe I | 690 |
| 4246.02 | P | Fe I | 649 | 4258.523 | | Ti I | 252 | 4269.951 | | Cr I | 154 |
| 4246.090 | | Fe I | 906 | 4258.619 | | Fe I | 351 | 4270.139 | | Ti I | 251 |
| 4246.16 | | F II | 9 | 4258.956 | | Fe I | 419 | 4270.189 | | Ce II | 204 |
| 4246.41 | | Cr II | 31 | 4259.15 | | Cr I | 131 | 4270.31 | P | Fe I | 215 |
| 4246.568 | | Gd II | 67 | 4259.18 | | S II | 66 | 4270.39 | P | Fe II | 125 |
| 4246.59 | P | Fe I | 689 | 4259.203 | | Mn II | 7 | 4270.427 | | Co I | 29 |
| 4246.68 | | P III | 3 | 4259.312 | | V I | 6 | 4270.565 | | Nd II | 12 |
| 4246.711 | | Ce II | 77 | 4259.34 | P | Fe I | 416 | 4270.61 | | Cl II | 66 |
| 4246.79 | P | Fe I | 216 | 4259.3618 | | A I | 9 | 4270.64 | | V II | 23 |
| 4246.829 | | Sc II | 7 | 4259.52 | | Cl II | 42,52 | 4270.716 | | Ce II | 21 |
| 4246.879 | | Nd II | 14 | 4259.748 | | Ce II | 176 | 4271.061 | | Cr I | 154 |
| 4247.29 | P | Fe I | 905 | 4259.95 | P | Fe I | 70 | 4271.159 | | Fe I | 152 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4271.47 | | Fe III | | 4283.010 | | Ca I | 5 | 4294.432 | | S II | 49 |
| 4271.554 | | V I | 88 | 4283.13 | | O II | 67 | 4294.623 | | W I | 6 |
| 4271.65 | P | Fe I | 70 | 4283.40 | P | Fe I | 215 | 4294.76 | | N III | |
| 4271.764 | | Fe I | 42 | 4283.70 | | S III | | 4294.767 | | Sc II | 15 |
| 4271.94 | P | Ti II | 95 | 4283.75 | | O II | 67 | 4294.78 | | Zr I | 45 |
| 4271.95 | P | Fe I | 171 | 4283.772 | | Mn II | 6 | 4294.82 | | O II | 54 |
| 4272.1690 | | A I | 4 | 4283.87 | P | Fe I | 19 | 4294.939 | | Fe I | 598 |
| 4272.271 | | Pr II | 15 | 4284.055 | | V I | 88 | 4295.37 | P | Cr II | 37 |
| 4272.440 | | Ti I | 44 | 4284.084 | | Mn I | 23 | 4295.751 | | Ti I | 44 |
| 4272.789 | | Nd II | 11 | 4284.21 | | Cr II | 31 | 4295.757 | | Cr I | 64 |
| 4272.85 | | Hf II | 14 | 4284.415 | | Fe I | 417 | 4295.888 | | Ni I | 178 |
| 4272.910 | | Cr I | 96 | 4284.425 | | Mn II | 6 | 4296.05 | | La II | 53 |
| 4273.17 | | O II | 68 | 4284.51 | | N III | | 4296.069 | | Ce II | 172 |
| 4273.312 | | Ti I | 251 | 4284.518 | | Nd II | 10 | 4296.076 | | Gd II | 46 |
| 4273.317 | | Fe II | 27 | 4284.683 | | Ni I | 86 | 4296.107 | | V I | 120 |
| 4273.42 | | Fe III | 121 | 4284.725 | | Cr I | 96 | 4296.11 | | C II | 42 |
| 4273.52 | | Zr II | 28 | 4284.988 | | Ti I | 148 | 4296.30 | | Cr I | 176 |
| 4273.87 | | Fe I | 478 | 4284.991 | | S III | 4 | 4296.30 | | Gd II | 117 |
| 4274.13 | | O II | 68 | 4285.19 | P | Ni I | 86 | 4296.567 | | Fe II | 28 |
| 4274.408 | | Ti I | 252 | 4285.366 | | Ce II | 11 | 4296.680 | | Ce II | 2 |
| 4274.584 | | Ti I | 44,162 | 4285.445 | | Fe I | 597 | 4296.74 | | Zr II | 98 |
| 4274.803 | | Cr I | 1 | 4285.496 | | Sm II | 27 | 4296.743 | | Sm I | 3 |
| 4275.19 | | A II | 77 | 4285.70 | | O II | 78 | 4296.786 | | Ce II | 57 |
| 4275.52 | | O II | 67 | 4285.782 | | Co I | 1 | 4296.86 | | Fe III | 121 |
| 4275.561 | | Ce II | 206 | 4285.832 | | Fe I | 904 | 4297.050 | | Cr I | 64 |
| 4275.57 | | Cr II | 31 | 4285.96 | | C II | 42 | 4297.173 | | Gd II | |
| 4275.64 | | La II | 40 | 4286.006 | | Ti I | 44 | 4297.60 | | Ba II | 7 |
| 4275.72 | | Fe I | 215 | 4286.13 | | Fe III | 121 | 4297.681 | | V I | 120 |
| 4275.90 | | O II | 68 | 4286.13 | | V II | 23 | 4297.711 | | Ru I | 5 |
| 4275.973 | | Cr I | 240 | 4286.311 | | Fe II | | 4297.738 | | Cr I | 247 |
| 4276.21 | | O II | 68 | 4286.440 | | Fe I | 414 | 4297.764 | | Pr II | 7 |
| 4276.441 | | Ti I | 148 | 4286.51 | | Zr II | 69 | 4297.99 | | A II | |
| 4276.51 | | Cl II | 66 | 4286.640 | | Sm II | 42 | 4298.029 | | V I | 120 |
| 4276.657 | | Ti I | 252 | 4286.97 | | La II | 75 | 4298.040 | | Fe I | 520 |
| 4276.684 | | Fe I | 976 | 4286.976 | | Fe I | 976 | 4298.21 | P | Fe I | 476a |
| 4276.71 | | O II | 54,67 | 4287.405 | | Ti I | 44 | 4298.515 | | Ni I | 178 |
| 4276.958 | | V I | 88 | 4287.71 | P | Ti I | 45 | 4298.664 | | Ti I | 44 |
| 4277.246 | | Mo I | 7 | 4287.80 | | Ba II | 16 | 4298.767 | | Ni I | 28 |
| 4277.279 | | Nd II | 17 | 4287.893 | | Ti II | 20 | 4298.986 | | Ca I | 5 |
| 4277.322 | | Th II | 2 | 4288.005 | | Ni I | 178 | 4299.17 | P | Ti I | 45 |
| 4277.37 | | Zr II | 40 | 4288.148 | | Fe I | 273 | 4299.177 | | F II | 7 |
| 4277.40 | | O II | 67,68 | 4288.161 | | Ti I | 43,79 | 4299.229 | | Ti I | 148 |
| 4277.41 | P | Fe I | 214 | 4288.21 | | N III | | 4299.242 | | Fe I | 152 |
| 4277.55 | | A II | 32 | 4288.53 | | P II | 33 | 4299.25 | P | Fe I | 597 |
| 4277.68 | | Fe I | 172 | 4288.65 | | Mo I | 7 | 4299.362 | | Ce II | 47 |
| 4277.90 | | O II | 67 | 4288.72 | | N III | | 4299.49 | P | Fe I | 648 |
| 4278.01 | P | Fe I | 1102 | 4288.78 | P | Ti I | 45 | 4299.636 | | Ti I | 43 |
| 4278.10 | | Cr II | 161 | 4288.78 | | V II | 17 | 4299.65 | | Fe I | 416 |
| 4278.128 | | Fe II | 32 | 4288.83 | | O II | 54 | 4299.718 | | Cr I | 96 |
| 4278.231 | | Ti I | 291 | 4288.962 | | Fe I | 214 | 4300.052 | | Ti II | 41 |
| 4278.234 | | Fe I | 691 | 4289.068 | | Ti I | 44 | 4300.1011 | | A I | 4 |
| 4278.38 | P | Fe I | 351 | 4289.18 | | Zr II | 117 | 4300.197 | | Mn II | 6 |
| 4278.54 | | S II | 49 | 4289.29 | P | Fe I | 117 | 4300.21 | P | Fe I | 975 |
| 4278.829 | | Ti I | 252 | 4289.364 | | Ca I | 5 | 4300.331 | | Ce II | 134 |
| 4278.866 | | Ce II | 111 | 4289.454 | | Ce II | 135 | 4300.44 | | La II | 9 |
| 4278.893 | | V II | 225 | 4289.721 | | Cr I | 1 | 4300.52 | P | Ti I | 205 |
| 4278.94 | P | Cr II | 17 | 4289.919 | | Ti I | 205 | 4300.566 | | Ti I | 44 |
| 4279.023 | | Mo II | 3 | 4289.938 | | Ce II | 111 | 4300.66 | | A II | 36,76 |
| 4279.3 | | Y II | 70 | 4290.222 | | Ti II | 41 | 4300.828 | | Fe I | 976 |
| 4279.480 | | Fe I | 993 | 4290.382 | | Fe I | 416 | 4301.089 | | Ti I | 44 |
| 4279.678 | | Sm II | 27 | 4290.40 | | Ne II | 57 | 4301.130 | | V II | 225 |
| 4279.864 | | Fe I | 351 | 4290.55 | | N III | | 4301.178 | | Cr I | |
| 4279.927 | | Sc II | 15 | 4290.80 | | N III | | 4301.81 | | Zr II | 109 |
| 4280.069 | | Ti I | 252 | 4290.870 | | Fe I | 351 | 4301.928 | | Ti II | 41 |
| 4280.141 | | Ce II | 225 | 4290.933 | | Ti I | 44 | 4302.100 | | Pr II | 32 |
| 4280.27 | | La I | 5 | 4291.214 | | Ti I | 45,147 | 4302.12 | P | Ni I | 102 |
| 4280.33 | P | Cr II | 17 | 4291.25 | | O II | 55 | 4302.123 | | W I | 7 |
| 4280.405 | | Cr I | 247 | 4291.44 | P | Fe I | 273 | 4302.191 | | Fe I | 520 |
| 4280.490 | | Gd II | 15 | 4291.46 | | S II | 49 | 4302.527 | | Ca I | 5 |
| 4280.53 | | Fe I | 598 | 4291.466 | | Fe I | 3,41 | 4302.81 | | O II | 100 |
| 4280.63 | P | Fe I | 416 | 4291.76 | | Cl II | 19 | 4302.88 | | Zr I | 45 |
| 4280.789 | | Sm II | 46 | 4291.816 | | V I | 120 | 4302.979 | | Ti I | 79 |
| 4281.009 | | Sm II | | 4291.88 | | Ti I | 251 | 4303.06 | | O II | 100 |
| 4281.03 | P | Cr II | 17 | 4291.964 | | Cr I | 240 | 4303.166 | | Fe II | 27 |
| 4281.099 | | Mn I | 23 | 4292.00 | | C II | 41 | 4303.235 | | Co I | 1 |
| 4281.371 | | Ti I | 44 | 4292.13 | P | Fe I | 70 | 4303.573 | | Nd II | 10 |
| 4281.40 | | O II | 54 | 4292.182 | | Sm II | 32 | 4303.82 | | O II | 54 |
| 4281.60 | P | Fe I | 171 | 4292.23 | | O II | 78 | 4304.07 | | Cl II | 19 |
| 4282.20 | | Zr I | 45 | 4292.246 | | Mn II | 6 | 4304.087 | | Gd II | 128 |
| 4282.21 | | Zr II | 132 | 4292.293 | | Fe I | 70 | 4304.11 | | La II | 165 |
| 4282.406 | | Fe I | 71 | 4292.676 | | Ti I | 79 | 4304.15 | P | Fe I | 647 |
| 4282.440 | | Pr II | 19 | 4292.747 | | Gd II | 128 | 4304.15 | | V II | 213 |
| 4282.443 | | Nd II | | 4292.767 | | Ce II | 205 | 4304.552 | | Fe I | 414 |
| 4282.570 | | Nd II | 13 | 4292.885 | | Zn I | 3 | 4304.81 | | Fe III | 121 |
| 4282.63 | | S II | 49 | 4293.14 | | Zr II | 110 | 4304.87 | P | Fe I | 598,756 |
| 4282.702 | | Ti I | 162 | 4293.228 | | Mo I | 7 | 4304.895 | | Gd II | |
| 4282.82 | | O II | 54 | 4293.565 | | Cr I | 96 | 4305.00 | | K II | 5 |
| 4282.90 | | A II | 7 | 4294.04 | P | Fe I | 214 | 4305.13 | P | Fe I | 272 |
| 4282.96 | | O II | 67 | 4294.101 | | Ti II | 20 | 4305.20 | | Fe I | 760 |
| 4282.97 | | Al II | 86 | 4294.128 | | Fe I | 41 | 4305.447 | | Sr II | 3 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 4305.453 | | Cr I | 96 |
| 4305.455 | | Fe I | 476 |
| 4305.46 | | N I | |
| 4305.474 | | Ti I | 147 |
| 4305.53 | | O II | 55 |
| 4305.715 | | Sc II | 15 |
| 4305.763 | | Pr II | 8 |
| 4305.910 | | Ti I | 44 |
| 4306.214 | | V I | 5 |
| 4306.340 | | Gd I | 4 |
| 4306.58 | P | Fe I | 691 |
| 4306.724 | | Ce II | 1 |
| 4306.945 | | Ti I | 43 |
| 4307.08 | P | Fe I | 690 |
| 4307.184 | | V I | 5 |
| 4307.20 | | Al II | 85 |
| 4307.31 | | O II | 53 |
| 4307.42 | | Cl II | 19 |
| 4307.741 | | Ca I | 5 |
| 4307.778 | | Nd II | 63 |
| 4307.900 | | Ti II | 41 |
| 4307.906 | | Fe I | 42 |
| 4308.233 | | Gd II | 47 |
| 4308.514 | | Ti I | 79 |
| 4308.54 | P | Fe I | 70 |
| 4308.94 | | Zr II | 88 |
| 4308.96 | | O II | 64 |
| 4309.012 | | Sm II | 1? |
| 4309.036 | | Fe I | 849 |
| 4309.06 | | Cl II | 52 |
| 4309.071 | | Ti I | 235 |
| 4309.10 | | K II | 7 |
| 4309.11 | | A II | 36 |
| 4309.25 | | A II | 99 |
| 4309.32 | | Ba II | 11 |
| 4309.382 | | Fe I | 414 |
| 4309.46 | P | Fe I | 471 |
| 4309.62 | | Y II | 5 |
| 4309.739 | | Ce II | 126 |
| 4309.795 | | V I | 5 |
| 4310.37 | P | Fe I | 994 |
| 4310.37 | | Fe III | 121 |
| 4310.373 | | Ti I | 79 |
| 4310.699 | | Ce II | 133 |
| 4310.72 | P | V II | 36 |
| 4310.981 | | Gd II | 15 |
| 4311.654 | | Ti I | 205 |
| 4312.10 | | O II | 79 |
| 4312.23 | | Zr II | 99 |
| 4312.469 | | Cr I | 177 |
| 4312.550 | | Mn I | 23 |
| 4312.861 | | Ti I | 41 |
| 4313.034 | | Fe II | 220 |
| 4313.04 | P | Fe I | 273 |
| 4313.11 | | N I | |
| 4313.30 | | V II | 23 |
| 4313.43 | | O II | 78 |
| 4313.50 | | C II | 28 |
| 4313.845 | | Gd I | 4 |
| 4314.084 | | Sc II | 15 |
| 4314.18 | | Si IV | 4 |
| 4314.289 | | Fe II | 32 |
| 4314.356 | | Ti I | 45 |
| 4314.511 | | Nd II | 9 |
| 4314.74 | P | Ti I | 43 |
| 4314.801 | | Ti I | 43 |
| 4314.979 | | Ti II | 41 |
| 4315.087 | | Fe I | 71 |
| 4315.35 | | O II | 64,79 |
| 4315.80 | | O II | 78 |
| 4315.90 | | La II | 41 |
| 4315.95 | P | Fe I | 171 |
| 4316.052 | | Gd II | 43 |
| 4316.258 | | V II | 23 |
| 4316.266 | | Gd II | 67,6 |
| 4316.807 | | Ti II | 94 |
| 4317.04 | | Fe I | 762 |
| 4317.139 | | O II | 2 |
| 4317.32 | | Zr II | 40 |
| 4317.42 | | C II | 28 |
| 4317.65 | | O II | 53 |
| 4317.70 | | N I | |
| 4318.216 | | Fe II | 220 |
| 4318.631 | | Ti I | 235 |
| 4318.652 | | Ca I | 5 |
| 4318.68 | | S II | 49 |
| 4318.77 | r | Cr II | 37 |
| 4318.81 | P | Fe I | 215 |
| 4318.92 | | C II | 28 |
| 4318.936 | | Sm II | 27 |
| 4319.45 | P | Fe I | 214 |
| 4319.51 | | Hf II | 52 |
| 4319.631 | | O II | 2 |
| 4319.641 | | Cr I | 96 |
| 4319.69 | | A II | 87 |
| 4319.717 | | Fe II | 220 |
| 4319.93 | | O II | 61 |
| 4320.13 | P | Fe I | 1170 |
| 4320.36 | P | Fe I | 691 |
| 4320.52 | | Fe I | 691 |
| 4320.592 | | Cr I | 96 |
| 4320.69 | | Hf II | 40 |
| 4320.723 | | Ce II | 125 |
| 4320.745 | | Sc II | 15 |
| 4320.965 | | Ti II | 41 |
| 4321.110 | | Gd II | 46 |
| 4321.238 | | Cr I | 83 |
| 4321.341 | | Fe II | 220 |
| 4321.36 | | Hf II | 86 |
| 4321.37 | | N III | 10 |
| 4321.617 | | Cr I | 177 |
| 4321.655 | | Ti I | 235 |
| 4321.95 | | C II | 28 |
| 4322.02 | | V II | 17 |
| 4322.195 | | Gd II | 15 |
| 4322.51 | | La II | 25 |
| 4322.66 | | Ne II | 63 |
| 4322.70 | P | Fe I | 215 |
| 4323.284 | | Sm II | 8 |
| 4323.35 | | Cl I | 9 |
| 4323.37 | P | Fe I | 171 |
| 4323.440 | | Ti I | 79 |
| 4323.523 | | Cr I | |
| 4323.551 | | Pr II | 23 |
| 4323.62 | | Zr II | 141 |
| 4323.81 | | Fe III | 32 |
| 4323.93 | | N III | 10 |
| 4324.064 | | Gd II | 68 |
| 4324.36 | P | Fe II | 147 |
| 4324.961 | | Fe I | 70 |
| 4325.010 | | Sc II | 15 |
| 4325.075 | | Cr I | 104 |
| 4325.1 | P | Mn II | 6 |
| 4325.134 | | Ti I | 235 |
| 4325.22 | | V II | 233 |
| 4325.361 | | Ni I | 116 |
| 4325.566 | | Gd II | 103 |
| 4325.607 | | Ni I | 86 |
| 4325.64 | | Zr II | 108 |
| 4325.65 | | Cr I | 176 |
| 4325.7 | | Li II | 5 |
| 4325.70 | | C III | 7 |
| 4325.73 | | Ba II | 17 |
| 4325.74 | P | Fe I | 2 |
| 4325.765 | | Fe I | 42 |
| 4325.766 | | Nd II | 10 |
| 4325.77 | | O II | 2 |
| 4325.88 | | C II | 28 |
| 4325.95 | P | Fe I | 598 |
| 4326.359 | | Ti I | 43 |
| 4326.445 | | Sr I | 6 |
| 4326.74 | | Ba II | 7 |
| 4326.756 | | Mn II | 6 |
| 4326.762 | | Fe I | 413 |
| 4326.826 | | Ce II | 224 |
| 4326.986 | | Ti I | 43 |
| 4327.04 | P | Fe II | 20 |
| 4327.100 | | Fe I | 761 |
| 4327.125 | | Gd II | 15 |
| 4327.48 | | O II | 41 |
| 4327.89 | | O II | 41 |
| 4327.92 | | Fe I | 597 |
| 4328.15 | | N III | 10 |
| 4328.22 | | Si IV | 4 |
| 4328.62 | | O II | 61 |
| 4328.91 | P | Cr II | 37 |
| 4329.016 | | Sm II | 15 |
| 4329.415 | | Pr II | 27 |
| 4329.54 | P | Fe I | 70 |
| 4329.62 | | Ba II | 17 |
| 4330.024 | | V I | 5 |
| 4330.14 | | N III | 10 |
| 4330.264 | | Ti II | 94 |
| 4330.44 | | N III | 10 |
| 4330.445 | | Ce II | 82 |
| 4330.606 | | Gd II | 46 |
| 4330.708 | | Ti II | 41 |
| 4330.720 | | Ni I | 149 |
| 4330.81 | P | Fe I | 475 |
| 4330.962 | | Fe I | 597 |
| 4331.13 | | O II | 66,75 |
| 4331.231 | | Co I | 168 |
| 4331.25 | | A II | 7 |
| 4331.47 | | O II | 41 |
| 4331.529 | | Fe II | |
| 4331.55 | | V II | 36 |
| 4331.645 | | Ni I | 52 |
| 4331.79 | | V II | 23 |
| 4331.89 | | O II | 41 |
| 4331.93 | | Mg II | 27 |
| 4332.0 | | Al II | 31 |
| 4332.06 | | A II | 1 |
| 4332.569 | | Cr I | 176 |
| 4332.71 | | S III | 4 |
| 4332.76 | | O II | 65 |
| 4332.823 | | V I | 5 |
| 4332.88 | P | Fe II | 33 |
| 4333.06 | P | Fe I | 1135 |
| 4333.28 | | Zr II | 132 |
| 4333.5612 | | A I | 9 |
| 4333.76 | | La II | 24 |
| 4333.84 | | S II | 49 |
| 4333.913 | | Pr II | 8 |
| 4334.153 | | Sm II | 27 |
| 4334.29 | | O II | 63,64 |
| 4334.65 | | Hf II | 69 |
| 4334.77 | P | V II | 36 |
| 4334.840 | | Ti I | 43 |
| 4334.96 | | La II | 77 |
| 4335 | P | N V | 3 |
| 4335.15 | | Hf II | 6 |
| 4335.290 | | Gd II | 128 |
| 4335.3380 | | A I | 9 |
| 4335.46 | P | Fe I | 477 |
| 4335.53 | | N III | 10 |
| 4335.89 | | Fe I | 991 |
| 4336.255 | | Ce II | 89 |
| 4336.26 | | Cl II | 19 |
| 4336.36 | | Zr II | 119 |
| 4336.48 | | N I | |
| 4336.51 | | A II | |
| 4336.60 | P | Fe I | 990 |
| 4336.66 | | Hf II | 74 |
| 4336.86 | P | Fe I | 692 |
| 4336.865 | | O II | 2 |
| 4337.049 | | Fe I | 41 |
| 4337.10 | | A II | 113 |
| 4337.33 | | Ti II | 94 |
| 4337.510 | | Gd II | 128 |
| 4337.52 | P | Fe I | 214 |
| 4337.566 | | Cr I | 22 |
| 4337.63 | | Zr II | 119 |
| 4337.777 | | Ce II | 82 |
| 4337.78 | | La II | 138 |
| 4337.916 | | Ti II | 20 |
| 4338.24 | | A II | 88 |
| 4338.260 | | Fe I | 70 |
| 4338.476 | | Ti I | 204 |
| 4338.52 | | Si III | 3 |
| 4338.67 | | He II | 3 |
| 4338.694 | | Pr II | 31 |
| 4338.697 | | Nd II | 68 |
| 4338.70 | P | Fe II | 32 |
| 4338.799 | | Cr I | 198 |
| 4338.84 | P | Fe I | 117 |
| 4339.13 | P | Co I | 1 |
| 4339.287 | | D | 1 |
| 4339.317 | | Ce II | 34 |
| 4339.450 | | Cr I | 22 |
| 4339.52 | | N III | 10 |
| 4339.56 | | Zr II | 41 |
| 4339.718 | | Cr I | 22 |
| 4339.78 | | Ne II | 62 |
| 4340.018 | | Ti I | 174 |
| 4340.03 | | K II | 4 |
| 4340.130 | | Cr I | 64 |
| 4340.30 | | S III | 4 |
| 4340.36 | | O II | 77 |
| 4340.468 | | H | 1 |
| 4340.49 | P | Fe I | 272 |
| 4340.51 | P | Fe I | 691 |
| 4341.013 | | V I | 5 |
| 4341.09 | | Cr II | 179 |
| 4341.13 | | Zr I | 61 |
| 4341.23 | P | Fe I | 691 |
| 4341.282 | | Gd II | 14 |
| 4341.369 | | Ti II | 32 |
| 4341.42 | | Ne II | 59 |
| 4341.48 | | Cr I | 64 |
| 4341.57 | P | Fe I | 644 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 4342.00 | | O II | 77 |
| 4342.071 | | Nd II | 8 |
| 4342.179 | | Gd II | 15 |
| 4342.23 | | Zr II | 98 |
| 4342.83 | | O II | 103 |
| 4342.832 | | V I | 103 |
| 4342.84 | | S II | 43 |
| 4343.163 | | Cr I | 64 |
| 4343.22 | P | Fe I | 644 |
| 4343.257 | | Fe I | 645 |
| 4343.36 | | O II | 75,103 |
| 4343.62 | | Cl II | 19 |
| 4343.699 | | Fe I | 517 |
| 4343.798 | | Ti I | 204 |
| 4343.86 | P | Fe I | 756 |
| 4343.987 | | Mn II | 6 |
| 4344.291 | | Ti II | 20 |
| 4344.300 | | Gd II | 44 |
| 4344.42 | | O II | 65 |
| 4344.487 | | Gd II | 31 |
| 4344.507 | | Cr I | 22 |
| 4345.085 | | Cr I | 198 |
| 4345.1682 | | A I | 9 |
| 4345.562 | | O II | 2 |
| 4345.6 | P | Mn II | 6 |
| 4345.858 | | Sm II | 7 |
| 4345.963 | | Ce II | 251 |
| 4346.104 | | Ti I | 234 |
| 4346.458 | | Gd I | 4 |
| 4346.50 | P | Fe II | 202 |
| 4346.558 | | Fe I | 598 |
| 4346.610 | | Ti I | 204 |
| 4346.833 | | Cr I | 104 |
| 4346.866 | | Al II | 70 |
| 4346.89 | | V II | 17 |
| 4346.918 | | Al II | 70 |
| 4347.223 | | Al II | 70 |
| 4347.239 | | Fe I | 2 |
| 4347.310 | | Gd II | 103 |
| 4347.316 | | Al II | 70 |
| 4347.425 | | O II | 16 |
| 4347.490 | | Pr II | 30 |
| 4347.785 | | Al II | 70 |
| 4347.801 | | Sm II | 37 |
| 4347.802 | | Al II | 70 |
| 4347.854 | | Fe I | 828 |
| 4348.11 | | A II | 7 |
| 4348.36 | | N III | 10 |
| 4348.64 | P | Zr II | 132 |
| 4348.939 | | Fe I | 414 |
| 4349.28 | P | Fe II | 202 |
| 4349.426 | | O II | 2 |
| 4349.789 | | Ce II | 59 |
| 4349.97 | | V II | 36 |
| 4350.465 | | Sm II | 46 |
| 4350.52 | | Hf II | 72 |
| 4350.834 | | Ti II | 94 |
| 4351.051 | | Cr I | 22 |
| 4351.269 | | O II | 16 |
| 4351.295 | | Nd II | 10 |
| 4351.37 | P | Fe I | 691 |
| 4351.549 | | Fe I | 413 |
| 4351.764 | | Fe II | 27 |
| 4351.770 | | Cr I | 22 |
| 4351.849 | | Pr II | 23 |
| 4351.8941 | | Mg I | 14 |
| 4351.9056 | | Mg I | 14 |
| 4352.1 | | C I | 15 |
| 4352.101 | | Sm II | |
| 4352.23 | | A II | 1 |
| 4352.25 | | As II | 7 |
| 4352.68 | P | Cr II | 37 |
| 4352.70 | | Fe III | 4 |
| 4352.733 | | Ce II | 220 |
| 4352.737 | | Fe I | 71 |
| 4352.872 | | V I | 5 |
| 4353.60 | | O II | 76 |
| 4353.66 | | N III | 10 |
| 4353.983 | | Cr I | 198 |
| 4354.064 | | Ti I | 204 |
| 4354.28 | P | Fe I | 975 |
| 4354.358 | | Fe II | 213 |
| 4354.40 | | La II | 58 |
| 4354.540 | | Mg I | 13 |
| 4354.56 | | S III | 7 |
| 4354.609 | | Sc II | 14 |
| 4354.979 | | V I | 103 |
| 4355.03 | P | Fe II | 202 |
| 4355.09 | | Eu II | 22 |
| 4355.096 | | Ca I | 37 |
| 4355.308 | | Ti I | 174 |
| 4355.911 | | Ni I | 149 |
| 4355.943 | | V I | 5 |
| 4356.711 | | Al II | 60 |
| 4356.760 | | Cr I | 130 |
| 4356.807 | | Al II | 60 |
| 4357.24 | P | Al III | 9 |
| 4357.25 | | O II | 18,63,64 |
| 4357.50 | P | Fe I | 1170 |
| 4357.525 | | Cr I | 198 |
| 4357.53 | P | Fe I | 994 |
| 4357.574 | | Fe II | |
| 4357.85 | P | Ni I | 256 |
| 4358.169 | | Nd II | 10 |
| 4358.27 | | N I | |
| 4358.343 | | Hg I | 1 |
| 4358.40 | | O II | 64 |
| 4358.505 | | Fe I | 412 |
| 4358.53 | | A II | 87 |
| 4358.66 | | Cr I | 176 |
| 4358.699 | | Nd II | 57 |
| 4358.73 | | Y II | 5 |
| 4358.95 | P | Fe I | 987 |
| 4359.12 | P | Fe II | 202 |
| 4359.152 | | Gd II | 47,68 |
| 4359.38 | | O II | 26 |
| 4359.585 | | Ni I | 86 |
| 4359.631 | | Cr I | 22 |
| 4359.636 | | Cl II | 67 |
| 4359.74 | | Zr II | 79 |
| 4359.795 | | Pr II | 28 |
| 4359.929 | | Tm I | 1 |
| 4359.992 | | Cr I | 198 |
| 4360.03 | P | Fe II | 148 |
| 4360.16 | | Ce II | 245 |
| 4360.487 | | Ti I | 204 |
| 4360.49 | | S II | |
| 4360.690 | | Be II | 4 |
| 4360.720 | | Sm II | 23 |
| 4360.80 | | Zr I | 31 |
| 4360.813 | | Fe I | 903 |
| 4360.917 | | Gd II | 16 |
| 4361.025 | | Be II | 4 |
| 4361.031 | | Co I | 1 |
| 4361.249 | | Fe II | |
| 4361.53 | | S III | 4 |
| 4361.661 | | Ce II | 157 |
| 4361.710 | | Sr I | 6 |
| 4361.85 | | C III | |
| 4361.913 | | Co I | 1 |
| 4362.040 | | Sm II | 45 |
| 4362.07 | | A II | 39 |
| 4362.10 | | Ni II | 9 |
| 4362.93 | | Cr II | 179 |
| 4362.95 | | Cr I | 82 |
| 4363.05 | | La II | 133 |
| 4363.134 | | Cr I | 103 |
| 4363.30 | | Cl I | 8 |
| 4363.525 | | V I | 23 |
| 4363.644 | | Mo II | 3 |
| 4364.01 | | Y II | 70 |
| 4364.14 | | Cr I | 130 |
| 4364.140 | | Gd II | 33 |
| 4364.17 | | Y II | 70 |
| 4364.59 | | Al III | 9 |
| 4364.658 | | Ce II | 135 |
| 4364.66 | | La II | 53 |
| 4364.73 | | S III | 7 |
| 4364.87 | | Cr I | 153 |
| 4364.89 | P | Fe II | 202 |
| 4365.56 | | Fe III | 4 |
| 4365.72 | | Ne II | 57 |
| 4365.745 | | V I | 79 |
| 4365.902 | | Fe I | 415 |
| 4366.165 | | Fe II | 216 |
| 4366.315 | | Nd II | 12 |
| 4366.33 | | Cr I | 153 |
| 4366.45 | | Zr I | 61 |
| 4366.896 | | O II | 2 |
| 4366.91 | | V II | 36 |
| 4367.07 | P | Fe I | 1170 |
| 4367.36 | P | Ni I | 88 |
| 4367.581 | | Fe I | 414 |
| 4367.657 | | Ti II | 104 |
| 4367.87 | | A II | 98 |
| 4367.90 | | Hf II | 15 |
| 4367.906 | | Fe I | 41 |
| 4367.966 | | Cb II | 8 |
| 4368.031 | | Sm II | 37 |
| 4368.042 | | V I | 5 |
| 4368.14 | | C II | 45 |
| 4368.14 | | C III | |
| 4368.20 | P | Cr II | 37 |
| 4368.234 | | Ce II | 227 |
| 4368.252 | | Cr I | 130 |
| 4368.262 | | Fe II | |
| 4368.30 | | O I | 5 |
| 4368.312 | | Ni I | 102 |
| 4368.327 | | Pr II | 5 |
| 4368.632 | | Nd II | 11 |
| 4368.66 | P | Fe I | 644 |
| 4368.67 | P | V II | 188 |
| 4368.89 | | Cr I | 198 |
| 4368.941 | | Ti I | 245 |
| 4369.28 | | O II | 26 |
| 4369.29 | P | Fe I | 1244 |
| 4369.404 | | Fe II | 28 |
| 4369.52 | | Cl I | 8 |
| 4369.61 | P | Fe II | 148 |
| 4369.682 | | Ti I | 290 |
| 4369.73 | P | Fe I | 976 |
| 4369.77 | | Ne II | 56 |
| 4369.771 | | Gd II | 15 |
| 4369.774 | | Fe I | 518 |
| 4370.041 | | Ni I | 149 |
| 4370.27 | | V II | 31 |
| 4370.76 | | A II | 39 |
| 4370.875 | | Mn I | 17 |
| 4370.95 | | Hf II | 26 |
| 4370.96 | | Zr II | 79 |
| 4371.00 | P | Fe I | 69 |
| 4371.069 | | Nd II | 57 |
| 4371.10 | | Fe III | 4 |
| 4371.130 | | Co I | 93 |
| 4371.17 | P | V II | 36 |
| 4371.279 | | Cr I | 22 |
| 4371.28 | P | Cr I | 304 |
| 4371.33 | | C I | 14 |
| 4371.36 | | A II | 1 |
| 4371.59 | | C II | 45 |
| 4371.65 | | O II | 76 |
| 4372.09 | | A II | 86 |
| 4372.208 | | Ru I | 13 |
| 4372.22 | P | Fe II | 33 |
| 4372.383 | | Ti I | 277 |
| 4372.4 | | Fe III | 122 |
| 4372.401 | | Ce II | 169 |
| 4372.49 | | C II | 45 |
| 4372.50 | | A II | 63 |
| 4372.88 | P | V II | 13 |
| 4372.91 | | Cl II | 52 |
| 4372.994 | | Fe I | 473 |
| 4373.230 | | V I | 140 |
| 4373.254 | | Cr I | 22 |
| 4373.462 | | Sm II | 42 |
| 4373.563 | | Fe I | 214,413 |
| 4373.656 | | Cr I | 304 |
| 4373.818 | | Ce II | 202 |
| 4373.90 | P | Fe I | 904 |
| 4374.158 | | Cr I | 104 |
| 4374.243 | | Gd II | 83 |
| 4374.28 | | C II | 45 |
| 4374.455 | | Sc II | 14 |
| 4374.495 | | Fe I | 648 |
| 4374.61 | P | Cr II | 179 |
| 4374.825 | | Ti II | 93 |
| 4374.87 | | A II | 77 |
| 4374.918 | | Co I | 150 |
| 4374.923 | | Nd II | 15 |
| 4374.94 | | Y II | 13 |
| 4375.00 | | N II | 16 |
| 4375.039 | | Nd II | 8 |
| 4375.304 | | V I | 140 |
| 4375.333 | | Cr I | 103 |
| 4375.35 | P | Ti II | 104 |
| 4375.425 | | Ti I | 219 |
| 4375.48 | P | Fe I | 797 |
| 4375.540 | | Co I | 143 |
| 4375.918 | | Ce II | 134 |
| 4375.932 | | Fe I | 2 |
| 4375.96 | | A II | 17 |
| 4376.78 | | C II | 46 |
| 4376.782 | | Fe I | 471,904 |
| 4376.798 | | Cr I | 304 |
| 4377.330 | | Fe I | 990 |
| 4377.549 | | Cr I | 83 |
| 4377.765 | | Mo II | 3 |
| 4377.796 | | Fe I | 645 |
| 4377.95 | | Ne II | 65 |
| 4378.01 | | O II | 102 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4378.10 | | La II | 77 | 4391.84 | | S II | 43 | 4406.67 | | Gd II | 103 |
| 4378.236 | | Sm II | 53 | 4391.87 | P | Fe I | 992 | 4407.278 | | Ce II | 64 |
| 4378.41 | | O II | 102 | 4391.94 | | Ne II | 57 | 4407.637 | | V I | 22 |
| 4378.73 | P | Fe I | 759 | 4392.074 | | V I | 23 | 4407.678 | | Ti II | 51 |
| 4379.09 | | N III | 17 | 4392.26 | | Cr I | 130 | 4407.714 | | Fe I | 68 |
| 4379.238 | | V I | 22 | 4392.31 | P | Fe I | 757 | 4407.72 | | Cr I | 129 |
| 4379.25 | | A II | 63 | 4392.58 | | Fe I | 973 | 4407.911 | | Be I | 4 |
| 4379.50 | | Ne II | 56 | 4393.03 | P | Fe I | 473 | 4408.204 | | V I | 22 |
| 4379.74 | | A II | 7 | 4393.45 | | Na I | 17 | 4408.248 | | Gd II | 44 |
| 4379.78 | | Zr II | 88 | 4393.534 | | Cr I | 102 | 4408.419 | | Fe I | 68 |
| 4379.782 | | Cr I | 130 | 4393.70 | P | Fe I | 899 | 4408.511 | | V I | 22 |
| 4379.90 | | Cl I | 7 | 4393.835 | | V I | 40 | 4408.844 | | Pr II | 4 |
| 4379.97 | | C III | 14 | 4393.925 | | Ti I | 244 | 4408.92 | | V II | 224 |
| 4380.060 | | Ce II | 155 | 4394.057 | | Ti II | 51 | 4409.123 | | Fe I | 645 |
| 4380.38 | | Mg I | 12 | 4394.31 | P | Fe I | 975 | 4409.22 | | Ti II | 61 |
| 4380.55 | | Cr I | 130 | 4394.65 | | A II | 87 | 4409.30 | | Ne II | 57 |
| 4380.642 | | Gd II | 68 | 4394.719 | | Gd II | 44 | 4409.519 | | Ti II | 61 |
| 4381.04 | | V I | 23 | 4394.779 | | Ce II | 259 | 4409.84 | | Mg I | 48 |
| 4381.112 | | Cr I | 64 | 4394.83 | | Cr I | 130 | 4410.026 | | Ru I | 5 |
| 4381.290 | | Nd II | 56 | 4394.855 | | Ti I | 78 | 4410.06 | | C II | 40 |
| 4381.79 | P | Fe II | 9 | 4394.94 | | Zr I | 61 | 4410.304 | | Cr I | 129 |
| 4382.02 | P | Fe I | 938 | 4395.031 | | Ti II | 19 | 4410.516 | | Ni I | 88 |
| 4382.061 | | Gd II | 46 | 4395.228 | | V I | 22 | 4410.641 | | Ce II | 33 |
| 4382.167 | | Ce II | 2 | 4395.288 | | Fe I | 828 | 4410.967 | | Cr I | 102 |
| 4382.31 | | Fe III | 4 | 4395.417 | | Cr I | 129 | 4411.052 | | Nd II | 8 |
| 4382.33 | P | V II | 36 | 4395.514 | | Fe I | 991,992 | 4411.080 | | Ti II | 115 |
| 4382.777 | | Fe I | 799a | 4395.78 | | Fe III | 4 | 4411.093 | | Cr I | 129 |
| 4382.853 | | Cr I | 64 | 4395.788 | | Pr II | 29 | 4411.20 | | C II | 39 |
| 4382.95 | | Zr II | 109 | 4395.848 | | Ti II | 61 | 4411.21 | | La II | 138 |
| 4383.10 | | Zr II | 97 | 4395.95 | | O II | 26 | 4411.34 | | S I | 5 |
| 4383.119 | | Gd II | 67 | 4397.251 | | Cr I | 129 | 4411.52 | | C II | 39 |
| 4383.17 | | Eu II | 27 | 4397.27 | P | Fe II | 33 | 4411.786 | | Co I | 27 |
| 4383.24 | | C III | 14 | 4397.37 | | Ti IV | | 4411.878 | | Mn I | |
| 4383.44 | | La II | 76 | 4397.51 | | Gd II | | 4411.936 | | Ti II | 61 |
| 4383.547 | | Fe I | 41 | 4397.94 | | Ne II | 56 | 4412.155 | | Pr II | 8 |
| 4383.79 | | A II | 16 | 4398.02 | | Y II | 5 | 4412.250 | | Cr I | 22 |
| 4384.08 | | Ne II | 60 | 4398.314 | | Ti II | 61 | 4412.265 | | Nd II | 9 |
| 4384.13 | P | Fe I | 1101 | 4398.52 | | V II | 187 | 4412.43 | P | Fe I | 69 |
| 4384.33 | P | Fe II | 32 | 4398.625 | | Ni I | 102 | 4412.436 | | Ti I | 54 |
| 4384.543 | | Ni I | 86 | 4398.787 | | Ce II | 81 | 4412.54 | | Ne II | 55 |
| 4384.6 | P | Ni II | 10 | 4399.14 | | Cl II | 46 | 4413.04 | | Zr I | 61 |
| 4384.643 | | Mg II | 10 | 4399.203 | | Ce II | 81 | 4413.20 | | Ne II | 57,65 |
| 4384.682 | | Fe I | 474 | 4399.44 | | Zr II | 67 | 4413.40 | P | Fe I | 1046 |
| 4384.722 | | V I | 5,22 | 4399.607 | | Ni I | 196 | 4413.600 | | Fe II | 32 |
| 4384.813 | | Sc II | 14 | 4399.767 | | Ti II | 51 | 4413.765 | | Pr II | 26 |
| 4384.977 | | Cr I | 22 | 4399.823 | | Cr I | 129 | 4413.784 | | Nd II | 22 |
| 4385.00 | | Ne II | 56 | 4399.86 | P | Fe II | 20 | 4413.866 | | Cr I | 234 |
| 4385.08 | | A II | 98 | 4400.09 | | A II | 1 | 4414.03 | P | Fe I | 825 |
| 4385.20 | | La II | 75 | 4400.18 | | Gd II | 67 | 4414.17 | P | V II | 13 |
| 4385.260 | | Fe I | 415 | 4400.26 | | Ni I | 146 | 4414.20 | P | Ni I | 88 |
| 4385.381 | | Fe II | 27 | 4400.355 | | Sc II | 14 | 4414.23 | P | Fe I | 475 |
| 4385.45 | P | V II | 30 | 4400.575 | | V I | 22 | 4414.29 | | P II | 25 |
| 4385.663 | | Nd II | 50 | 4400.63 | P | Ti II | 93 | 4414.37 | | O II | 60 |
| 4386.434 | | Tm I | 1 | 4400.828 | | Nd II | 10 | 4414.432 | | Nd II | 3 |
| 4386.461 | | Ni I | 168 | 4400.870 | | Ni I | 149 | 4414.47 | P | Fe I | 643 |
| 4386.57 | P | Fe II | 26 | 4401.02 | | A II | 1 | 4414.54 | | Zr II | 79 |
| 4386.6 | | Fe I | 899 | 4401.293 | | Fe I | 828 | 4414.879 | | Mn I | 22 |
| 4386.835 | | Ce II | 57 | 4401.35 | | Zr II | 68 | 4414.909 | | O II | 5 |
| 4386.858 | | Ti II | 104 | 4401.447 | | Fe I | 350 | 4415.125 | | Fe I | 41 |
| 4387.213 | | V I | 40 | 4401.547 | | Ni I | 86 | 4415.37 | | S II | 53 |
| 4387.380 | | Cr I | 84 | 4401.74 | | A II | 76 | 4415.559 | | Sc II | 14 |
| 4387.496 | | Cr I | 103 | 4401.97 | | P II | 24 | 4416.474 | | V I | 22 |
| 4387.674 | | Gd II | 15 | 4402.86 | | S II | 43 | 4416.535 | | Ti I | 161 |
| 4387.897 | | Fe I | 476 | 4402.875 | | Fe II | | 4416.77 | | Ne II | 61 |
| 4387.928 | | He I | 51 | 4403.03 | | Cl I | 6 | 4416.817 | | Fe II | 27 |
| 4388.007 | | Ce II | 5 | 4403.35 | | Zr II | 79 | 4416.975 | | O II | 5 |
| 4388.077 | | Ti I | 219 | 4403.360 | | Sm II | 22 | 4417.274 | | Ti I | 161 |
| 4388.16 | | K II | 7 | 4403.372 | | Cr I | 128 | 4417.31 | | P II | 24 |
| 4388.24 | | C III | 14 | 4403.498 | | Cr I | | 4417.37 | | Hf II | 51 |
| 4388.412 | | Fe I | 830 | 4403.54 | | Ti IV | | 4417.398 | | Co I | 150 |
| 4388.50 | | Zr II | 140 | 4403.605 | | Pr II | 34 | 4417.718 | | Ti II | 40 |
| 4389.12 | P | V II | 13 | 4404.10 | P | Fe I | 987 | 4418.340 | | Ti II | 51 |
| 4389.244 | | Fe I | 2 | 4404.276 | | Ti I | 218,219 | 4418.432 | | Fe I | 412 |
| 4389.76 | | Cl I | 7 | 4404.397 | | Ti I | 78 | 4418.60 | P | Fe I | 899 |
| 4389.870 | | Ni I | 87 | 4404.68 | | V II | 30 | 4418.784 | | Ce II | 2 |
| 4389.974 | | V I | 22 | 4404.752 | | Fe I | 41 | 4418.84 | | S III | 4 |
| 4390.14 | | Na I | 17 | 4404.81 | | Zr II | 118 | 4419.032 | | Gd II | 15 |
| 4390.322 | | Ni I | 136 | 4404.911 | | Ti I | 161 | 4419.10 | | Cr I | 128 |
| 4390.460 | | Fe I | 413 | 4404.932 | | Co I | 127 | 4419.16 | | La II | 89 |
| 4390.585 | | Mg II | 10 | 4405.011 | | V I | 23 | 4419.30 | P | Fe I | 893 |
| 4390.858 | | Sm II | 15 | 4405.02 | P | Fe I | 2 | 4419.59 | | Fe III | 4 |
| 4390.953 | | Gd II | 32 | 4405.23 | | Ba II | 16 | 4419.78 | P | Fe I | 644 |
| 4390.954 | | Fe I | 414 | 4405.40 | P | Fe I | 991 | 4419.935 | | V I | 21 |
| 4390.977 | | Ti II | 61 | 4405.694 | | Ti I | 78 | 4419.94 | | Na I | 16 |
| 4391.110 | | Nd II | 24 | 4405.849 | | Pr II | 4 | 4420.45 | | Zr I | 61 |
| 4391.114 | | Th II | 6 | 4406.02 | | O II | 26 | 4420.468 | | Os I | 1 |
| 4391.26 | | Fe III | 42 | 4406.147 | | V I | 40 | 4420.526 | | Sm II | 32 |
| 4391.568 | | Co I | 150 | 4406.22 | P | V II | 30 | 4420.665 | | Sc II | 14 |
| 4391.661 | | Ce II | 81 | 4406.26 | | Cr I | 152 | 4420.75 | P | Fe II | 9 |
| 4391.753 | | Cr I | 22 | 4406.641 | | V I | 22 | 4420.90 | | A II | 1 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4421.138 | | Sm II | 37 | 4431.922 | | Mn I | 40 | 4444.207 | | V I | 21 |
| 4421.231 | | Pr II | 13 | 4432.089 | | Ti II | 51 | 4444.259 | | Sm II | |
| 4421.24 | | Gd II | 103 | 4432.175 | | Cr I | 81 | 4444.267 | | Ti I | 218 |
| 4421.337 | | Co I | 150 | 4432.26 | | Ne II | 74 | 4444.393 | | Ce II | 19 |
| 4421.38 | | Ne II | 66 | 4432.41 | | S II | 43 | 4444.559 | | Ti II | 31 |
| 4421.573 | | V I | 22 | 4432.572 | | Fe I | 797 | 4444.563 | | Fe II | 201 |
| 4421.754 | | Ti I | 218 | 4432.739 | | N II | 55 | 4444.704 | | Ce II | |
| 4421.949 | | Ti II | 93 | 4432.80 | P | Fe I | 471 | 4445.26 | P | Fe II | 9 |
| 4422.477 | | V I | 79 | 4432.82 | | Al II | 84 | 4445.48 | | Fe I | 2 |
| 4422.570 | | Fe I | 350 | 4432.90 | P | Fe I | 271 | 4445.711 | | Co I | 150 |
| 4422.59 | | Y II | 5 | 4432.95 | | La II | 11 | 4445.77 | P | V II | 13 |
| 4422.697 | | Cr I | 234 | 4433.223 | | Fe I | 830 | 4445.88 | | Zr II | 96 |
| 4422.76 | | Hf II | 103 | 4433.39 | P | Fe I | 412 | 4446.248 | | Fe II | 187 |
| 4422.823 | | Ti I | 78 | 4433.48 | | N II | 55 | 4446.387 | | Nd II | 49 |
| 4422.882 | | Fe I | 646 | 4433.501 | | Mo II | 3 | 4446.46 | | Ne II | 56 |
| 4423.000 | | Ni I | 168 | 4433.578 | | Ti I | 267 | 4446.487 | | Gd II | 14 |
| 4423.145 | | Fe I | 412 | 4433.635 | | Gd II | 82 | 4446.71 | | F II | 10 |
| 4423.212 | | V I | 40 | 4433.793 | | Fe I | 825 | 4446.842 | | Fe I | 828 |
| 4423.22 | P | Ti II | 61 | 4433.83 | | A II | 123 | 4446.90 | P | Fe I | 596 |
| 4423.31 | | Na I | 16 | 4433.885 | | Sm II | 41 | 4447.033 | | N II | 15 |
| 4423.318 | | Cr I | 128 | 4433.968 | | Cr I | 128 | 4447.134 | | Fe I | 69 |
| 4423.678 | | Ce II | 21 | 4433.991 | | Mg II | 9 | 4447.18 | | F II | 10 |
| 4423.73 | | K II | 5 | 4434.003 | | Ti I | 113,161 | 4447.722 | | Fe I | 68 |
| 4423.858 | | Fe I | 830 | 4434.323 | | Sm II | 36 | 4447.8 | | Al II | 83 |
| 4423.9 | | P II | 31 | 4434.75 | | Cr I | 128 | 4447.82 | P | O III | 33 |
| 4424.075 | | Cr I | 82 | 4434.960 | | Ca I | 4 | 4448.21 | | O II | 35 |
| 4424.102 | | Gd II | 67 | 4435.151 | | Fe I | 2 | 4448.47 | | A II | 127 |
| 4424.194 | | Fe I | 757 | 4435.58 | | Eu II | 4 | 4448.88 | | A II | 127 |
| 4424.281 | | Cr I | 129 | 4435.688 | | Ca I | 4 | 4448.97 | P | Fe I | 891 |
| 4424.339 | | Sm II | 45 | 4435.84 | | La II | 8 | 4449.143 | | Ti I | 160 |
| 4424.401 | | Ti I | 243 | 4436.025 | | Mn I | 40 | 4449.336 | | Ce II | 202 |
| 4424.62 | P | V II | 30 | 4436.138 | | V I | 21 | 4449.573 | | V I | 62 |
| 4424.84 | | Ni I | 262 | 4436.225 | | Gd II | 117 | 4449.663 | | Fe II | 222 |
| 4425.129 | | Cr I | 152 | 4436.352 | | Mn I | 22 | 4449.867 | | Pr II | 4 |
| 4425.441 | | Ca I | 4 | 4436.48 | | Mg II | 19 | 4449.985 | | Ti I | 159 |
| 4425.662 | | Fe I | 798 | 4436.586 | | Ti I | 160 | 4450.13 | | Ni I | 178 |
| 4425.75 | P | Fe I | 555 | 4436.64 | | Ti I | 267 | 4450.301 | | Ni I | 236 |
| 4425.79 | P | Fe I | 899 | 4436.931 | | Fe I | 516 | 4450.320 | | Fe I | 476 |
| 4425.840 | | Ti I | 78 | 4436.981 | | Ni I | 86 | 4450.487 | | Ti II | 19 |
| 4425.95 | | P II | 24 | 4437.549 | | He I | 50 | 4450.732 | | Ce II | 3 |
| 4426.005 | | V I | 22 | 4437.570 | | Ni I | 168 | 4450.77 | P | Fe I | 972 |
| 4426.01 | | A II | 7 | 4437.612 | | Ce II | 169 | 4450.896 | | Ti I | 160 |
| 4426.054 | | Ti I | 161 | 4437.837 | | V I | 21 | 4451.545 | | Fe II | |
| 4426.151 | | Gd II | 14 | 4438.044 | | Sr I | 6 | 4451.566 | | Nd II | 50 |
| 4426.18 | | Hf II | 87 | 4438.12 | | A II | 123 | 4451.586 | | Mn I | 22 |
| 4427.098 | | Ti I | 128 | 4438.13 | | Gd II | 67 | 4451.61 | P | V II | 30 |
| 4427.12 | P | Ti I | 78 | 4438.232 | | Ti I | 218 | 4451.978 | | Nd II | 6 |
| 4427.21 | | N II | 56 | 4438.266 | | Gd II | 44 | 4452.008 | | V I | 87 |
| 4427.30 | P | Fe I | 828 | 4438.353 | | Fe I | 828 | 4452.32 | P | Fe I | 898 |
| 4427.312 | | Fe I | 2 | 4438.48 | | Cl I | 6 | 4452.377 | | O II | 5 |
| 4427.52 | | La II | 76 | 4438.53 | P | Fe I | 969 | 4452.45 | | P II | 31 |
| 4427.606 | | Gd II | 66 | 4439.13 | P | Fe II | 32 | 4452.62 | P | Fe I | 969 |
| 4427.71 | | Cr I | 129 | 4439.30 | | Ne II | 65 | 4452.70 | | Hf II | 94 |
| 4427.90 | P | Ti II | 61 | 4439.42 | | V II | 46 | 4452.727 | | Sm II | 26 |
| 4427.917 | | Ce II | 171 | 4439.45 | | A II | 127 | 4453.005 | | Mn I | 22 |
| 4427.97 | | N II | 55 | 4439.643 | | Fe I | 515 | 4453.312 | | Ti I | 113 |
| 4427.995 | | Mg II | 9 | 4439.87 | | S III | 7 | 4453.35 | | V II | 199 |
| 4428.501 | | Cr I | 129 | 4439.883 | | Fe I | 116 | 4453.708 | | Ti I | 160 |
| 4428.515 | | V I | 21 | 4439.95 | | Ne II | 61 | 4453.931 | | Gd II | 64 |
| 4428.54 | | Ne II | 57,61 | 4440.09 | | A II | 76,127 | 4454.382 | | Pr II | 5 |
| 4428.57 | P | Fe I | 973 | 4440.1 | | O III | 33 | 4454.383 | | Fe I | 350 |
| 4428.74 | P | Fe I | 899 | 4440.345 | | Ti I | 159 | 4454.629 | | Sm II | 49 |
| 4429.11 | P | V II | 13 | 4440.41 | | V II | 224 | 4454.655 | | Fe I | 902 |
| 4429.20 | P | Fe I | 987 | 4440.45 | | Zr II | 79 | 4454.781 | | Ca I | 4 |
| 4429.238 | | Pr II | 2,4 | 4440.479 | | Fe I | 829 | 4454.80 | | Zr II | 40 |
| 4429.270 | | Ce II | 19 | 4440.840 | | Fe I | 992 | 4455.012 | | Mn I | 28 |
| 4429.32 | | Fe I | 972 | 4440.883 | | Ce II | 238 | 4455.032 | | Fe I | 974 |
| 4429.34 | | Zr II | 118 | 4440.972 | | Fe I | 645 | 4455.258 | | Fe II | |
| 4429.60 | | Ne II | 74 | 4441.272 | | Ti I | 160 | 4455.318 | | Mn I | 28 |
| 4429.796 | | V I | 22 | 4441.56 | P | Fe I | 987 | 4455.321 | | Ti I | 113 |
| 4429.90 | | La II | 38 | 4441.683 | | V I | 21 | 4455.45 | | Cr I | 127 |
| 4429.938 | | Cr I | 234 | 4441.73 | P | Ti II | 40 | 4455.79 | | La II | 53 |
| 4430.023 | | Ti I | 267 | 4441.81 | | C IV | 4 | 4455.821 | | Mn I | 28 |
| 4430.18 | | A II | 7 | 4441.99 | | N II | 55 | 4455.85 | P | Fe II | 140 |
| 4430.197 | | Fe I | 472 | 4442.268 | | Cr I | 102 | 4455.887 | | Ca I | 4 |
| 4430.366 | | Ti I | 113 | 4442.343 | | Fe I | 68 | 4456.331 | | Fe I | 516 |
| 4430.486 | | Cr I | 234 | 4442.441 | | Ni I | 87 | 4456.394 | | Nd II | 50 |
| 4430.51 | P | Cr I | 128 | 4442.50 | | Zr II | 53 | 4456.43 | | S II | 43 |
| 4430.618 | | Fe I | 68 | 4442.67 | | Ne II | 56 | 4456.53 | | V II | 199 |
| 4430.90 | | Ne II | 56 | 4442.72 | P | Ce II | 19 | 4456.612 | | Ca I | 4 |
| 4430.95 | | Fe III | 4 | 4442.835 | | Fe I | 69 | 4456.63 | P | Fe I | 973 |
| 4431.02 | | A II | 1 | 4442.99 | | Zr II | 88 | 4456.650 | | Ti II | 115 |
| 4431.02 | | S II | 32 | 4443.05 | | O II | 35 | 4456.84 | P | Cr II | 16 |
| 4431.284 | | Ti I | 218 | 4443.07 | | Hf II | | 4456.95 | | Ne II | 61 |
| 4431.369 | | Sc II | 14 | 4443.197 | | Fe I | 350 | 4457.045 | | Mn I | 28 |
| 4431.48 | | Zr I | 61 | 4443.707 | | Cr I | 234 | 4457.179 | | Nd II | 18 |
| 4431.608 | | Co I | 143 | 4443.743 | | Ce II | 171 | 4457.42 | | Zr II | 79 |
| 4431.626 | | Fe II | 222 | 4443.802 | | Ti II | 19 | 4457.428 | | Ti I | 113 |
| 4431.67 | | Ne II | 74 | 4443.94 | | La II | 133 | 4457.479 | | V I | 21 |
| 4431.82 | | N II | 55 | 4444.20 | P | V II | 30 | 4457.549 | | Mn I | 28 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 4457.759 | | V I | 101 |
| 4458.101 | | Fe I | 992 |
| 4458.262 | | Mn I | 28 |
| 4458.336 | | Pr II | 8 |
| 4458.517 | | Sm II | 7 |
| 4458.538 | | Cr I | 127 |
| 4459.037 | | Ni I | 86 |
| 4459.121 | | Fe I | 68 |
| 4459.34 | | Cr I | 63 |
| 4459.738 | | Cr I | 127 |
| 4459.760 | | V I | 21 |
| 4459.96 | | N II | 21 |
| 4460.12 | P | Fe I | 271 |
| 4460.16 | P | V I | 62 |
| 4460.213 | | Ce II | 2 |
| 4460.292 | | V I | 21 |
| 4460.377 | | Mn I | 28 |
| 4460.55 | P | Fe I | 1100 |
| 4460.56 | | A II | 1 |
| 4460.769 | | Cr I | 63 |
| 4461.085 | | Mn I | 28 |
| 4461.138 | | Ce II | 10 |
| 4461.205 | | Fe I | 471 |
| 4461.22 | | Zr II | 67 |
| 4461.37 | | Fe I | 725 |
| 4461.43 | P | Fe II | 26 |
| 4461.56 | | O III | 33 |
| 4461.654 | | Fe I | 2 |
| 4461.80 | P | Fe I | 412 |
| 4461.989 | | Fe I | 471,825,902 |
| 4462.022 | | Mn I | 28 |
| 4462.099 | | Ti I | 8 |
| 4462.20 | P | Fe I | 824 |
| 4462.363 | | V I | 87 |
| 4462.407 | | Nd II | 54 |
| 4462.460 | | Ni I | 86 |
| 4462.76 | P | V II | 13 |
| 4462.774 | | Cr I | 127 |
| 4462.90 | | Fe III | 106 |
| 4462.95 | | P II | 25 |
| 4462.985 | | Nd II | 50 |
| 4463.14 | P | Fe I | 471 |
| 4463.16 | P | Fe I | 901 |
| 4463.247 | | Gd II | 83 |
| 4463.391 | | Ti I | 160 |
| 4463.410 | | Ce II | 20 |
| 4463.427 | | Ni I | 102 |
| 4463.539 | | Ti I | 160 |
| 4463.582 | | S II | 43 |
| 4464.32 | | V II | 199 |
| 4464.425 | | S II | |
| 4464.458 | | Ti II | 40 |
| 4464.669 | | Cr I | 127 |
| 4464.677 | | Mn I | 22 |
| 4464.69 | P | Fe I | 555 |
| 4464.747 | | V I | 110 |
| 4464.773 | | Fe I | 472 |
| 4464.907 | | Cr I | 127 |
| 4464.97 | | Eu II | 27 |
| 4465.075 | | Nd II | 5 |
| 4465.15 | | Cr I | 267 |
| 4465.33 | P | Fe I | 1099 |
| 4465.357 | | Cr I | 127 |
| 4465.4 | | Y II | 81 |
| 4465.40 | | O II | 94 |
| 4465.54 | | N II | 21 |
| 4465.601 | | Nd II | 13 |
| 4465.78 | | Cr II | 191 |
| 4465.807 | | Ti I | 146 |
| 4466.11 | | P II | 24 |
| 4466.13 | P | Cr I | 34 |
| 4466.165 | | Cr I | 127 |
| 4466.183 | | Fe I | 901 |
| 4466.32 | | O II | 87 |
| 4466.394 | | Ni I | 168 |
| 4466.41 | | Hf II | 72 |
| 4466.547 | | Gd II | 44 |
| 4466.554 | | Fe I | 350 |
| 4466.57 | P | Fe I | 2 |
| 4466.65 | | K II | 6 |
| 4466.881 | | Co I | 150 |
| 4466.939 | | Fe I | 992 |
| 4467.227 | | Gd II | 82 |
| 4467.342 | | Sm II | 53 |
| 4467.36 | | Fe III | 106 |
| 4467.446 | | Fe I | 1048 |
| 4467.537 | | Ce II | 17 |
| 4467.561 | | Cr I | 127 |
| 4467.83 | | S III | 7 |
| 4467.88 | | O II | 94 |
| 4467.98 | | P II | 25 |
| 4468.010 | | V I | 87 |
| 4468.38 | | Cr I | 127 |
| 4468.493 | | Ti II | 31 |
| 4468.712 | | Pr II | 28 |
| 4468.759 | | V I | 102 |
| 4468.91 | | Ne II | 61 |
| 4469.160 | | Ti II | 18 |
| 4469.32 | | O II | 59,94 |
| 4469.37 | | Cl I | 15 |
| 4469.381 | | Fe I | 830 |
| 4469.547 | | Co I | 150 |
| 4469.710 | | V I | 87 |
| 4469.850 | | Ce II | 230 |
| 4469.92 | P Forb | He I | 15 |
| 4470.138 | | Mn I | 22 |
| 4470.39 | P | V II | 30 |
| 4470.483 | | Ni I | 86 |
| 4470.864 | | Ti II | 40 |
| 4471.238 | | Ti I | 146 |
| 4471.240 | | Ce II | 8 |
| 4471.29 | | Gd II | 82 |
| 4471.477 | | He I | 14 |
| 4471.52 | | Ne II | 65 |
| 4471.550 | | Co I | 150 |
| 4471.68 | P | Fe I | 2 |
| 4471.688 | | He I | 14 |
| 4471.81 | P | Fe I | 972 |
| 4472.09 | | Ca II | 6 |
| 4472.52 | P | Fe I | 39 |
| 4472.57 | P | Fe I | 411 |
| 4472.721 | | Fe I | 595,900 |
| 4472.792 | | Mn I | 22 |
| 4472.921 | | Fe II | 37 |
| 4473.015 | | Sm II | 26 |
| 4473.782 | | Cr I | 63 |
| 4474.03 | | La II | 133 |
| 4474.045 | | V I | 110 |
| 4474.194 | | Fe II | 171 |
| 4474.714 | | V I | 101 |
| 4474.77 | | A II | 38 |
| 4474.852 | | Ti I | 113,184 |
| 4474.95 | | O III | 37 |
| 4475.19 | P | Ti I | 184 |
| 4475.20 | P | Cr I | 63 |
| 4475.22 | | Ne II | 65 |
| 4475.24 | | V II | 198 |
| 4475.27 | | P II | 24 |
| 4475.28 | | Cl II | 41,85 |
| 4475.31 | | Cl I | 7 |
| 4475.345 | | Cr I | 95 |
| 4475.518 | | Ti I | 184 |
| 4475.70 | | V II | 199 |
| 4475.72 | | Y I | 14 |
| 4475.99 | P | Fe I | 899 |
| 4476.021 | | Fe I | 350 |
| 4476.08 | | O II | 87 |
| 4476.082 | | Fe I | 830 |
| 4476.61 | P | Ti I | 184 |
| 4477.02 | | Cr I | 63 |
| 4477.45 | | Y I | 14 |
| 4477.74 | | N II | 21 |
| 4477.88 | | O II | 88 |
| 4478.03 | P | V II | 13 |
| 4478.040 | | Fe I | 69 |
| 4478.319 | | Co I | 150 |
| 4478.48 | | S III | 7 |
| 4478.657 | | Sm II | |
| 4478.795 | | Gd II | 15 |
| 4479 | P | N IV | 6 |
| 4479.00 | P | Fe I | 987 |
| 4479.01 | P | Fe I | 899 |
| 4479.29 | | Ca II | 6 |
| 4479.359 | | Ce II | 203 |
| 4479.432 | | Ce II | 124 |
| 4479.612 | | Fe I | 828,848 |
| 4479.724 | | Ti I | 146 |
| 4479.891 | | Al III | 8 |
| 4479.968 | | Al III | 8 |
| 4479.97 | P | Fe I | 974 |
| 4480.142 | | Fe I | 515 |
| 4480.263 | | Cr I | 197 |
| 4480.27 | P | Fe I | 823 |
| 4480.350 | | Cu I | 8 |
| 4480.46 | P | Fe II | 20 |
| 4480.570 | | Ni I | 211 |
| 4480.600 | | Ti I | 146 |
| 4480.687 | | Fe II | |
| 4480.85 | | A II | 104 |
| 4481.04 | P | Fe I | 893 |
| 4481.056 | | Gd II | 44 |
| 4481.129 | | Mg II | 4 |
| 4481.21 | | La II | 146 |
| 4481.23 | | Ni I | 168 |
| 4481.261 | | Ti I | 146 |
| 4481.273 | | Tm II | 1 |
| 4481.327 | | Mg II | 4 |
| 4481.44 | | Cr I | 270 |
| 4481.621 | | Fe I | 827 |
| 4481.83 | | A II | 39 |
| 4482.02 | | Cl II | 85 |
| 4482.04 | | Zr II | 131 |
| 4482.171 | | Fe I | 2 |
| 4482.257 | | Fe I | 68 |
| 4482.40 | P | Ti II | 30 |
| 4482.688 | | Ti I | 113 |
| 4482.750 | | Fe I | 828 |
| 4482.878 | | Cr I | 197 |
| 4483.329 | | Gd II | 62 |
| 4483.424 | | S II | 43 |
| 4483.50 | | V II | 224 |
| 4483.67 | | P II | 25 |
| 4483.78 | P | Fe I | 898 |
| 4483.900 | | Ce II | 3 |
| 4483.918 | | Co I | 150 |
| 4484.227 | | Fe I | 828 |
| 4484.513 | | Co I | 27 |
| 4484.54 | | Ni I | 102 |
| 4484.66 | | Cr I | 151 |
| 4484.93 | P | Fe II | 9 |
| 4485.013 | | Ti I | 184 |
| 4485.15 | | Eu II | 26 |
| 4485.44 | | Zr II | 79 |
| 4485.679 | | Fe I | 830 |
| 4485.97 | P | Fe I | 825 |
| 4486.14 | | Hf II | 23 |
| 4486.352 | | Gd II | 135 |
| 4486.65 | | Hf II | 107 |
| 4486.66 | | S II | 43 |
| 4486.909 | | Ce II | 57 |
| 4487.01 | P | Fe I | 988 |
| 4487.28 | | Y I | 14 |
| 4487.36 | P | Fe I | 824 |
| 4487.46 | | B III | 2 |
| 4487.46 | | Cr I | 63 |
| 4487.47 | | Y I | 14 |
| 4487.72 | | O II | 104 |
| 4487.74 | P | Fe I | 594 |
| 4487.821 | | Pr II | 3 |
| 4488.051 | | Cr I | 293 |
| 4488.09 | | O II | 104 |
| 4488.140 | | Fe I | 819 |
| 4488.15 | | N II | 21 |
| 4488.27 | P | Ti I | 184 |
| 4488.319 | | Ti II | 115 |
| 4488.401 | | Gd II | 82 |
| 4488.898 | | V I | 86,110 |
| 4488.917 | | Fe I | 213,827 |
| 4489.089 | | Ti I | 146 |
| 4489.185 | | Fe II | 37 |
| 4489.471 | | Cr I | |
| 4489.48 | | O II | 86 |
| 4489.741 | | Fe I | 2 |
| 4489.87 | | Al II | 107 |
| 4490.00 | | Cl II | 41 |
| 4490.081 | | Mn I | 22 |
| 4490.084 | | Fe I | 469 |
| 4490.24 | P | Fe I | 319 |
| 4490.541 | | Ni I | 134,235 |
| 4490.56 | | Cr I | 267 |
| 4490.60 | | Hf II | 74 |
| 4490.63 | P | Fe I | 891 |
| 4490.773 | | Fe I | 974,974 |
| 4490.815 | | V I | 86 |
| 4490.90 | Forb | Al III | 7 |
| 4490.99 | | A II | 39 |
| 4491.10 | P | Ce II | 19 |
| 4491.164 | | V I | 62 |
| 4491.25 | | O II | 86 |
| 4491.401 | | Fe II | 37 |
| 4491.678 | | Cr I | 95 |
| 4491.858 | | Cr I | 83 |
| 4492.312 | | Cr I | 197 |
| 4492.3 | | S II | 58 |
| 4492.40 | | N I | |
| 4492.427 | | Pr II | 23 |
| 4492.540 | | Ti I | 184 |
| 4492.693 | | Fe I | 969 |
| 4492.98 | P | Fe I | 639 |
| 4493.37 | P | Fe I | 796 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4493.53 | | Ti II | 18 | 4507.854 | | Ca I | 24 | 4521.924 | | Ni I | 116 |
| 4493.579 | | Fe II | 222 | 4507.95 | | Cr I | 267 | 4521.94 | | Gd II | 135 |
| 4494.05 | P | Fe I | 973 | 4508.083 | | Ce II | 153 | 4522 | P | O V | 15 |
| 4494.180 | | Na I | 15 | 4508.21 | | Ne II | 68 | 4522.00 | | Cr I | 173 |
| 4494.41 | | Zr II | 130 | 4508.26 | P | Fe II | 222 | 4522.3238 | | A I | 7 |
| 4494.47 | P | Fe I | 411 | 4508.283 | | Fe II | 38 | 4522.37 | | La II | 8,74 |
| 4494.568 | | Fe I | 68 | 4508.48 | | La II | 52 | 4522.59 | | Eu II | 4 |
| 4494.67 | | N I | | 4509.0 | | S II | 48 | 4522.634 | | Fe II | 38 |
| 4494.71 | | La I | 11 | 4509.082 | | Gd II | 84 | 4522.66 | | Ne II | 68 |
| 4494.746 | | Co I | 168 | 4509.13 | P | Fe I | 213 | 4522.798 | | Ti I | 42 |
| 4494.853 | | Gd II | 14 | 4509.287 | | V I | 110 | 4522.82 | | Gd II | 103 |
| 4495 | P | N IV | 6 | 4509.306 | | Fe I | 514,937 | 4523.037 | | Sm II | 3 |
| 4495.006 | | Ti I | | 4509.446 | | Ca I | 24 | 4523.077 | | Ce II | 2 |
| 4495.04 | | Cr I | 101 | 4510.160 | | Pr II | 20 | 4523.403 | | Fe I | 829 |
| 4495.275 | | Cr I | 275 | 4510.210 | | Mn II | 17 | 4523.60 | | N III | 3 |
| 4495.386 | | Fe I | 319,970 | 4510.380 | | Gd II | 30 | 4523.74 | P | Ni I | 99 |
| 4495.389 | | Ce II | 154 | 4510.7333 | | A I | 9 | 4523.912 | | Sm II | 41 |
| 4495.44 | | Zr II | 79 | 4510.82 | P | Fe I | 823 | 4524.218 | | V I | 99 |
| 4495.46 | P | Ti II | 40 | 4510.92 | | N III | 3 | 4524.344 | | Mo I | 6 |
| 4495.52 | P | Fe II | 147 | 4511.04 | P | Fe I | 970 | 4524.68 | | S II | 40 |
| 4495.566 | | Fe I | 827 | 4511.176 | | Ti I | | 4524.732 | | Ti II | 60 |
| 4495.9 | | S II | 48 | 4511.29 | | Ne II | 70 | 4524.74 | | Hf II | 104 |
| 4495.986 | | Fe I | 825 | 4511.310 | | In I | 1 | 4524.744 | | Sn I | 5 |
| 4496.062 | | V I | 110 | 4511.37 | | Ne II | 70 | 4524.81 | P | V II | 212 |
| 4496.146 | | Ti I | 146 | 4511.82 | P | Cr II | 191 | 4524.841 | | Cr I | 276 |
| 4496.245 | | Ti I | 8 | 4511.829 | | Sm II | 14 | 4524.928 | | Ba II | 3 |
| 4496.429 | | Pr II | 4,25 | 4511.903 | | Cr I | 150 | 4524.946 | | S II | 40 |
| 4496.75 | P | Ti I | 184 | 4512.282 | | Ca I | 24 | 4525.142 | | Fe I | 826 |
| 4496.862 | | Cr I | 10 | 4512.535 | | Al III | 3 | 4525.15 | P | Fe I | 819 |
| 4496.864 | | V I | 86 | 4512.72 | | V II | 212 | 4525.168 | | V I | 110 |
| 4496.96 | | Zr II | 40 | 4512.734 | | Ti I | 42 | 4525.21 | P | Ti II | 18 |
| 4496.989 | | Mn II | 17 | 4512.995 | | Ni I | 163 | 4525.31 | | La II | 76 |
| 4497.30 | | Cl II | 41,85 | 4513.21 | | Cr I | 150 | 4525.75 | P | Fe II | 9 |
| 4497.58 | | B III | 3 | 4513.58 | | Y I | 15 | 4525.875 | | Fe I | 319 |
| 4497.657 | | Na I | 15 | 4513.715 | | Ti I | 112 | 4526.108 | | Cr I | 196 |
| 4497.709 | | Ti I | 184 | 4513.72 | P | Fe I | 213 | 4526.12 | | La II | 50 |
| 4497.849 | | Ce II | 19 | 4513.89 | | Cr I | 175 | 4526.20 | | Cl I | 15 |
| 4497.88 | | S II | 53 | 4513.90 | P | Ni I | 131 | 4526.374 | | Ti I | 127,184 |
| 4498.276 | | Gd II | 31 | 4514.189 | | Fe I | 514 | 4526.40 | P | Fe I | 969 |
| 4498.54 | P | Fe I | 988 | 4514.191 | | V I | 110 | 4526.466 | | Cr I | 33 |
| 4498.55 | | A II | 136 | 4514.373 | | Cr I | 287 | 4526.563 | | Fe I | 471 |
| 4498.730 | | Cr I | 81 | 4514.505 | | Gd II | 103 | 4526.565 | | Tm II | 1 |
| 4498.76 | | La II | 94 | 4514.531 | | Cr I | 95 | 4526.58 | P | Fe II | 171 |
| 4498.897 | | Mn I | 22 | 4514.80 | | Ne II | 55 | 4526.794 | | Co I | 177 |
| 4498.94 | | Ne II | 64 | 4514.89 | | N III | 3 | 4526.935 | | Ca I | 36 |
| 4499.18 | | P II | 11 | 4515.094 | | Sm II | | 4527.25 | | Y I | 14 |
| 4499.29 | | S III | 7 | 4515.17 | P | Fe I | 319 | 4527.305 | | Ti I | 42 |
| 4499.475 | | Sm II | 23 | 4515.19 | P | Fe II | 20 | 4527.339 | | Cr I | 33,82 |
| 4500.295 | | Cr I | 150 | 4515.337 | | Fe II | 37 | 4527.348 | | Ce II | 108 |
| 4500.32 | P | Ti II | 18 | 4515.440 | | Cr I | 126 | 4527.455 | | Ti I | 7 |
| 4500.86 | P | V II | 30 | 4515.558 | | V I | 100 | 4527.471 | | Cr I | 174 |
| 4501.112 | | Cr I | 81 | 4515.610 | | Ti I | 184 | 4527.648 | | Cb II | 8 |
| 4501.256 | | V I | 86 | 4516.02 | | C III | 9 | 4527.796 | | Fe I | 641 |
| 4501.270 | | Ti II | 31 | 4516.08 | P | Fe I | 639 | 4527.80 | | Y I | 14 |
| 4501.692 | | Ni I | 115 | 4516.27 | P | Fe I | 819 | 4527.86 | | N III | 13 |
| 4501.788 | | Cr I | 81 | 4516.38 | | La II | | 4527.90 | P | Fe I | 897 |
| 4501.808 | | Nd II | 53 | 4516.45 | P | Fe I | 825 | 4527.919 | | Co I | 156 |
| 4501.972 | | V I | 62 | 4516.56 | P | Cr II | 191 | 4527.96 | | S III | 7 |
| 4502.16 | | La II | 154 | 4516.93 | | C III | 9 | 4527.990 | | V I | |
| 4502.220 | | Mn I | 22 | 4517.094 | | Co I | 150 | 4528 | P | N IV | 6 |
| 4502.52 | | Ne II | 56 | 4517.10 | | Gd II | 135 | 4528.472 | | Ce II | 1 |
| 4502.592 | | Fe I | 796 | 4517.35 | | V II | 211 | 4528.51 | | V II | 56 |
| 4502.95 | | A II | 63 | 4517.43 | P Forb | He I | 13 | 4528.619 | | Fe I | 68 |
| 4503.05 | | Cr I | 310 | 4517.530 | | Fe I | 472 | 4528.76 | P | Fe I | 595 |
| 4503.13 | P | V II | 13 | 4517.595 | | Pr II | 2 | 4528.82 | P | Fe I | 468 |
| 4503.762 | | Ti I | 184 | 4517.60 | P | Fe I | 992 | 4528.911 | | Al III | 3 |
| 4504.23 | P | Fe I | 988 | 4517.79 | | Ne II | 55 | 4529.08 | | V II | 198 |
| 4504.27 | | Cl II | 41 | 4517.81 | | Ni I | 103 | 4529.176 | | Al III | 3 |
| 4504.52 | P | Cr II | 16 | 4518.022 | | Ti I | 42 | 4529.301 | | V I | 95 |
| 4504.838 | | Fe I | 555 | 4518.18 | | N III | 3 | 4529.376 | | Tm II | 5 |
| 4505.00 | | Ca I | 24 | 4518.30 | P | Ti II | 18 | 4529.465 | | Ti II | 82 |
| 4505.22 | | Cr I | 151 | 4518.38 | | V II | 212 | 4529.56 | P | Fe II | 171 |
| 4505.33 | | K II | 4 | 4518.45 | | Fe I | 593 | 4529.562 | | Fe I | 987 |
| 4505.715 | | Ti I | 184 | 4518.58 | P | Fe I | 69 | 4529.589 | | V I | 99 |
| 4505.75 | | Nd II | 3 | 4518.58 | | Lu I | | 4529.7 | | O III | 32 |
| 4505.95 | | Y I | 14 | 4518.63 | | Cr I | 34,100 | 4529.851 | | Cr I | 33 |
| 4505.997 | | Cu II | 1 | 4518.700 | | Ti I | 112 | 4530.034 | | Mn II | 17 |
| 4506.302 | | Ni I | 133 | 4518.9 | | S II | 47 | 4530.12 | P | Cr I | 126 |
| 4506.333 | | Gd II | 44 | 4519.02 | | Hf II | | 4530.403 | | N II | 59 |
| 4506.50 | | O II | | 4519.19 | | Cl II | 41 | 4530.54 | | La II | 73 |
| 4506.582 | | Nd II | 7 | 4519.633 | | Sm II | 49 | 4530.57 | | A II | 35 |
| 4506.624 | | Ca I | 24 | 4519.83 | | Cr I | 126 | 4530.688 | | Cr I | 33 |
| 4506.74 | P | Ti II | 30 | 4519.986 | | Ni I | 51 | 4530.755 | | Cr I | 33 |
| 4506.853 | | Cr I | 288 | 4520.070 | | Gd II | 82 | 4530.78 | | P II | 25,35 |
| 4506.931 | | Gd II | 13 | 4520.225 | | Fe II | 37 | 4530.785 | | Cu I | 8 |
| 4507.11 | | Zr I | 31 | 4520.24 | P | Fe I | 471 | 4530.84 | | N III | 3 |
| 4507.19 | P | Cr II | 16 | 4520.37 | P | Ti II | 30 | 4530.949 | | Co I | 150 |
| 4507.195 | | Fe II | 213 | 4521.141 | | Cr I | 277,287 | 4531.152 | | Fe I | 39 |
| 4507.417 | | Ca I | 24 | 4521.296 | | Gd II | 44 | 4531.60 | P | Ti I | 112 |
| 4507.559 | | N II | 21 | 4521.65 | P | Fe I | 641 | 4531.633 | | Fe I | 555,847,992 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4531.82 | | Cr I | 275 | 4545.335 | | Cr I | 33 | 4561.03 | | A II | 51 |
| 4532.188 | | V II | 212 | 4545.394 | | V I | 109 | 4561.20 | | Cr I | 34 |
| 4532.75 | | Cr I | 212 | 4545.49 | P | Cr II | 16 | 4561.461 | | Pr II | 23 |
| 4533.143 | | Fe I | 641 | 4545.54 | P | Fe I | 894 | 4561.54 | | Cr I | 277 |
| 4533.18 | | Hf II | 25 | 4545.956 | | Cr I | 10 | 4561.88 | | S II | |
| 4533.238 | | Ti I | 42 | 4545.985 | | Co I | 142 | 4562.05 | | Ne II | 64 |
| 4533.3 | | S II | 47 | 4546.36 | | N III | 13 | 4562.360 | | Ce II | 1 |
| 4533.81 | | P II | 25 | 4546.47 | P | Fe I | 1047 | 4562.5 | | La II | 161 |
| 4533.966 | | Ti II | 50 | 4546.68 | P | Fe I | 989 | 4562.637 | | Ti I | 7 |
| 4533.985 | | Co I | 150 | 4546.930 | | Ni I | 261 | 4563.245 | | Cr I | 246 |
| 4534.154 | | Pr II | 20 | 4547.022 | | Fe I | 39 | 4563.427 | | Ti I | 266 |
| 4534.166 | | Fe II | 37 | 4547.234 | | Ni I | 146 | 4563.657 | | Cr I | 172 |
| 4534.26 | | Mg II | 26 | 4547.34 | | N III | 3 | 4563.761 | | Ti II | 50 |
| 4534.57 | | N III | 3 | 4547.78 | | A II | 76 | 4563.78 | | A II | |
| 4534.62 | P | Fe I | 1169 | 4547.850 | | Ti I | 270 | 4564.166 | | Cr I | 312 |
| 4534.66 | | Ne II | 58 | 4547.851 | | Fe I | 755 | 4564.216 | | Ti I | 112 |
| 4534.782 | | Ti I | 42 | 4548.094 | | Ti I | 270 | 4564.43 | | A II | 85 |
| 4535.11 | | N III | 13 | 4548.764 | | Ti I | 42 | 4564.592 | | V II | 56 |
| 4535.146 | | Cr I | 33 | 4549.214 | | Fe II | 186 | 4564.715 | | Fe I | 823 |
| 4535.215 | | V II | 210 | 4549.467 | | Fe II | 38 | 4564.78 | | N II | 14 |
| 4535.38 | | Hf II | 72 | 4549.50 | | La I | 11 | 4564.832 | | Fe I | 472 |
| 4535.47 | | Ne II | 55 | 4549.547 | | S II | | 4565.13 | P | Ni I | 88 |
| 4535.50 | | Fe III | | 4549.622 | | Ti II | 82 | 4565.22 | | P II | 36 |
| 4535.51 | | A II | 86 | 4549.644 | | V I | | 4565.324 | | Fe I | 641 |
| 4535.574 | | Ti I | 42 | 4549.658 | | Co I | 150 | 4565.43 | | Zr II | 116 |
| 4535.721 | | Cr I | 33,276 | 4549.82 | P | Ti II | 39 | 4565.45 | P | Ni I | 99 |
| 4535.75 | | Zr I | 30 | 4550.954 | | Gd II | 44 | 4565.49 | | Ne II | 55 |
| 4535.87 | P | Ti I | 112 | 4551.236 | | Ni I | 236 | 4565.512 | | Cr I | 21 |
| 4535.920 | | Ti I | 42 | 4551.297 | | Ce II | 229 | 4565.578 | | Co I | 150 |
| 4535.921 | | Pr II | 1 | 4551.455 | | Gd II | 62 | 4565.684 | | Fe I | 554 |
| 4536.051 | | Ti I | 42 | 4551.667 | | Fe I | 972 | 4565.73 | | Mn I | 52 |
| 4536.509 | | Fe I | 896 | 4551.860 | | V I | 82 | 4565.78 | | Cr II | 39 |
| 4536.55 | | Cr I | 190 | 4552.25 | P | Ti II | 30 | 4565.842 | | Ce II | 21 |
| 4536.78 | | Cl II | 41 | 4552.37 | | As II | 4 | 4566.03 | P | Fe I | 1169 |
| 4537.663 | | V I | 82 | 4552.378 | | S II | 40,48 | 4566.206 | | Sm II | 32 |
| 4537.67 | | A II | 123 | 4552.453 | | Ti I | 42 | 4566.520 | | Fe I | 641 |
| 4537.677 | | Fe I | 594 | 4552.536 | | N II | 58 | 4566.602 | | Cr I | 125 |
| 4537.751 | | Ne I | 11 | 4552.544 | | Fe I | | 4566.68 | P | Fe I | 212 |
| 4537.952 | | Sm II | 45 | 4552.654 | | S III | 2 | 4566.990 | | Fe I | 723 |
| 4538.20 | P | Fe I | 1071 | 4552.659 | | Sm II | 23 | 4567.415 | | Ni I | 102 |
| 4538.58 | P | Fe I | 972 | 4553.01 | | Zr I | 31 | 4567.606 | | Nd II | 49 |
| 4538.64 | | V II | 212 | 4553.056 | | V I | 133 | 4567.872 | | Si III | 2 |
| 4538.73 | | A II | 104 | 4553.16 | | Ne II | 55 | 4567.90 | | La I | 11 |
| 4538.764 | | Fe I | 115 | 4553.175 | | Ni I | 135 | 4568 | P | O IV | 15 |
| 4538.84 | | Fe I | 969 | 4553.48 | P | Fe I | 472 | 4568.312 | | Ti II | 60 |
| 4538.87 | | La II | 149 | 4553.949 | | Cr I | 276 | 4568.545 | | Pr II | 33 |
| 4538.95 | P | Fe I | 1048 | 4553.96 | | Zr II | 130 | 4568.62 | P | Fe I | 989 |
| 4539.096 | | Ti I | | 4554.033 | | Ba II | 1 | 4568.789 | | Fe I | 554 |
| 4539.62 | | Cr II | 39 | 4554.28 | | O V | 7 | 4568.842 | | Fe I | 894 |
| 4539.755 | | Ce II | 108 | 4554.467 | | Fe I | 319 | 4569.01 | | Ne II | 69 |
| 4539.788 | | Cr I | 33 | 4554.509 | | Ru I | 5 | 4569.06 | P | Fe I | 593 |
| 4540.014 | | V I | 100 | 4554.81 | | P II | 28 | 4569.42 | | Cl II | 35 |
| 4540.016 | | Gd II | 135 | 4554.830 | | Cr I | 173 | 4569.50 | | O III | 36 |
| 4540.376 | | Ne I | 17 | 4554.989 | | Gd II | 82 | 4569.530 | | Cr I | 173 |
| 4540.483 | | Ti I | 8 | 4555.02 | | Cr II | 44 | 4569.644 | | Cr I | 173 |
| 4540.502 | | Cr I | 33 | 4555.069 | | Ti I | 266 | 4569.82 | | Fe III | 82 |
| 4540.71 | | La II | 81 | 4555.09 | | Cr I | 149 | 4569.849 | | Nd II | 5 |
| 4540.719 | | Cr I | 150 | 4555.30 | | Cr I | 212 | 4570.02 | | La I | 11 |
| 4540.873 | | Ti I | 112 | 4555.30 | | O III | 34 | 4570.024 | | Co I | 178 |
| 4541.071 | | Cr I | 33 | 4555.421 | | Cs I | 2 | 4570.30 | | Cr I | 125,190 |
| 4541.269 | | Nd II | 58 | 4555.486 | | Ti I | 42 | 4570.34 | | Fe III | 66 |
| 4541.31 | | Hf II | 36 | 4555.75 | P | Fe I | 640 | 4570.425 | | V I | 109 |
| 4541.513 | | Cr I | 149 | 4555.890 | | Fe II | 37 | 4570.70 | | Hf II | 86 |
| 4541.523 | | Fe II | 38 | 4555.922 | | Cu II | 1 | 4570.906 | | Ti I | 266 |
| 4541.59 | | He II | 2 | 4556.129 | | Fe I | 410,820,974 | 4570.97 | | La II | 38 |
| 4541.671 | | Na I | 14 | 4556.136 | | Nd II | 6 | 4570.977 | | Gd II | 84 |
| 4541.953 | | Fe I | 593 | 4556.169 | | Cr I | 173 | 4570.98 | | Cr I | 173 |
| 4542.22 | | Zr I | 49 | 4556.735 | | Nd II | 12 | 4571.0956 | | Mg I | 1 |
| 4542.422 | | Fe I | 894 | 4556.765 | | V II | 198 | 4571.105 | | Cr I | 125 |
| 4542.603 | | Nd II | | 4556.939 | | Fe I | 638 | 4571.24 | P | Cr II | 16 |
| 4542.621 | | Cr I | 149,275 | 4557.237 | | Sc I | | 4571.44 | P | Fe I | 319 |
| 4542.720 | | Fe I | 827 | 4557.857 | | Ti I | 270 | 4571.676 | | Cr I | 32 |
| 4542.77 | P | Cr II | 16 | 4558.04 | | P II | 29 | 4571.783 | | V I | 109 |
| 4543.22 | P | Fe I | 893 | 4558.080 | | Gd II | 44 | 4571.83 | | Cr I | 246 |
| 4543.74 | | Cr I | 100 | 4558.092 | | Ti I | 262,263 | 4571.971 | | Ti II | 82 |
| 4543.810 | | Co I | 142 | 4558.108 | | Fe I | 894,974 | 4572.13 | | Cl II | 35 |
| 4543.91 | | A II | 95 | 4558.46 | | La II | 39 | 4572.16 | | Cr I | 190,246 |
| 4543.948 | | Sm II | 32 | 4558.46 | | V II | 212 | 4572.277 | | Ce II | 1 |
| 4544.009 | | Ti II | 60 | 4558.58 | P | Fe II | 20 | 4572.671 | | Be I | 3 |
| 4544.11 | | Ne II | 64 | 4558.659 | | Cr II | 44 | 4572.83 | P | Cr II | 16 |
| 4544.48 | | Cl II | 48 | 4558.83 | | Cr II | 44 | 4572.86 | P | Fe I | 819 |
| 4544.50 | P | Fe I | 970 | 4559.09 | | Fe III | | 4572.92 | | A II | 94 |
| 4544.619 | | Cr I | 33 | 4559.28 | | La II | 53 | 4573.14 | | Fe III | |
| 4544.688 | | Ti I | 42 | 4559.920 | | Ti I | 112 | 4573.38 | | Cr I | 246 |
| 4544.70 | P | Cr II | 16 | 4559.945 | | Ni I | 115 | 4573.63 | P | Cr II | 16 |
| 4544.80 | | N III | 12 | 4560.096 | | Fe I | 823 | 4573.81 | | Hf II | 40 |
| 4544.961 | | Ce II | 123 | 4560.26 | | Cr I | 211 | 4573.993 | | Sc I | |
| 4545.08 | | A II | 15 | 4560.280 | | Ce II | 8 | 4574.03 | | Ni I | 87 |
| 4545.144 | | Ti II | 30 | 4560.710 | | V I | 109 | 4574.240 | | Fe I | 554 |
| 4545.218 | | Na I | 14 | 4560.959 | | Ce II | 2 | 4574.32 | | Ta I | 1 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4574.45 | | Cr I | 148 | 4588.217 | | Cr II | 44 | 4602.005 | | Fe I | 39 |
| 4574.49 | | Ne II | 64 | 4588.40 | P | Cr II | 16 | 4602.11 | | O II | 93 |
| 4574.49 | | Zr II | 139 | 4588.730 | | Co I | 15 | 4602.51 | | Cr I | 210 |
| 4574.724 | | Fe I | 115 | 4589.689 | | Al II | 45 | 4602.75 | P | Fe II | 19 |
| 4574.777 | | Si III | 2 | 4589.750 | | Al II | 45 | 4602.944 | | Fe I | 39 |
| 4574.87 | | La II | 23 | 4589.76 | | Pr II | 23 | 4602.99 | | Li I | 6 |
| 4575.121 | | Cr I | 196 | 4589.79 | | P II | 24,36 | 4603.2 | P | N V | 1 |
| 4575.52 | | Zr I | 5 | 4589.89 | | Cr II | 44 | 4603.34 | P | Fe I | 348 |
| 4575.80 | | Fe I | 593,970 | 4589.93 | | A II | 31 | 4603.956 | | Fe I | 410 |
| 4576.331 | | Fe II | 38 | 4589.961 | | Ti II | 50 | 4604.23 | P | Fe I | 348 |
| 4576.500 | | Mo I | 6 | 4590.00 | P | Cr II | 16 | 4604.42 | | Zr I | 29 |
| 4576.551 | | Ti I | 262 | 4590.505 | | V II | 210 | 4604.58 | | Cr I | 190 |
| 4576.76 | | Cr I | 148 | 4590.68 | | Fe III | 52 | 4604.85 | P | Fe I | 846 |
| 4577.13 | P | V II | 56 | 4590.69 | | Cr I | 125 | 4604.994 | | Ni I | 98 |
| 4577.173 | | V I | 4 | 4590.8 | | S II | 47 | 4605.10 | P | Fe I | 348 |
| 4577.690 | | Sm II | 23 | 4590.971 | | O II | 15 | 4605.352 | | V II | 56 |
| 4577.78 | P | Fe II | 54 | 4591.05 | | S II | | 4605.363 | | Mn I | |
| 4578.139 | | Pr II | 10 | 4591.220 | | V I | 133 | 4605.78 | | La II | 52 |
| 4578.334 | | Cr I | 246 | 4591.26 | P | Fe II | 17 | 4605.79 | | Hf II | 22 |
| 4578.558 | | Ca I | 23 | 4591.394 | | Cr I | 21 | 4605.99 | P | Fe I | 893 |
| 4578.728 | | V I | 109 | 4591.818 | | Sm II | 14 | 4606.146 | | V I | 4 |
| 4579.05 | P | Fe I | 988 | 4591.991 | | V I | 95 | 4606.231 | | Ni I | 100 |
| 4579.07 | P | Fe I | 640 | 4592.09 | | Cr II | 44 | 4606.375 | | Cr I | 303 |
| 4579.198 | | V I | 109 | 4592.529 | | Ni I | 98 | 4606.402 | | Ce II | 6 |
| 4579.344 | | Fe I | 319,936 | 4592.54 | | Cr I | 303 | 4606.514 | | Sm II | 1 |
| 4579.39 | | A II | 17 | 4592.655 | | Fe I | 39 | 4606.59 | P | V II | 45 |
| 4579.446 | | Cb II | 8 | 4593.195 | | Cs I | 2 | 4607.08 | P | Fe I | 724 |
| 4579.523 | | Fe II | | 4593.44 | | A II | 51 | 4607.153 | | N II | 5 |
| 4579.59 | | Cr I | 246 | 4593.47 | | C III | | 4607.331 | | Sr I | 2 |
| 4579.68 | P | Fe I | 894 | 4593.544 | | Fe I | 971 | 4607.655 | | Fe I | 554,969 |
| 4579.825 | | Fe I | 469 | 4593.544 | | Sm II | 36 | 4607.94 | | Y II | 80 |
| 4580.05 | | La II | 53 | 4593.84 | | Cr I | 190 | 4608.030 | | Gd II | 144 |
| 4580.055 | | Fe II | 26 | 4593.932 | | Ce II | 6 | 4608.21 | | Cl III | 13 |
| 4580.056 | | Cr I | 10 | 4594.03 | | Eu I | 1 | 4608.45 | | K II | 7 |
| 4580.139 | | Co I | 27 | 4594.103 | | V I | 4 | 4608.908 | | Co I | 57 |
| 4580.35 | | Ne II | 72 | 4594.403 | | Cr I | | 4609.148 | | Nd II | 3 |
| 4580.394 | | V I | 4 | 4594.447 | | Nd II | 52 | 4609.26 | P | Ti II | 39 |
| 4580.458 | | Ti II | 60 | 4594.51 | P | Ti I | 262 | 4609.42 | | O II | 93 |
| 4580.46 | P | Fe I | 348 | 4594.633 | | Co I | 176 | 4609.60 | | A II | 31 |
| 4580.600 | | Fe I | 827 | 4594.908 | | Ni I | | 4609.646 | | V I | 61 |
| 4580.619 | | Ni I | 146 | 4594.959 | | Fe I | 638 | 4609.7 | | Al II | 44 |
| 4581.063 | | Cr I | 148 | 4595.05 | | Cr I | 190,211 | 4609.894 | | Cr I | 303 |
| 4581.086 | | Gd II | 44 | 4595.160 | | Mo I | 6 | 4610.14 | | O II | 92 |
| 4581.32 | | Y I | 15 | 4595.21 | P | Fe I | 846 | 4610.59 | P | Fe II | 170 |
| 4581.380 | | Co I | 156 | 4595.291 | | Sm II | 45 | 4610.925 | | V I | 39 |
| 4581.402 | | Ca I | 23 | 4595.363 | | Fe I | 594 | 4611.05 | P | Fe I | 641 |
| 4581.517 | | Fe I | 555 | 4595.590 | | Cr I | 286 | 4611.19 | P | Fe I | 319 |
| 4581.596 | | Co I | 150 | 4595.68 | P | Fe II | 38 | 4611.25 | | A II | |
| 4581.77 | | P II | 9 | 4595.951 | | Ni I | 101 | 4611.285 | | Fe I | 826 |
| 4582.12 | P | Fe II | 19 | 4596.059 | | Fe I | 820 | 4611.29 | P | Fe I | 819 |
| 4582.38 | | Gd II | 82 | 4596.09 | | Fe III | | 4611.35 | P | Fe I | 17 |
| 4582.502 | | Ce II | 7 | 4596.0970 | | A I | 9 | 4611.968 | | Cr I | |
| 4582.53 | | Gd II | 65 | 4596.174 | | O II | 15 | 4612.473 | | Nd II | 3 |
| 4582.835 | | Fe II | 37 | 4596.37 | | V II | 210 | 4612.64 | | Fe I | 349 |
| 4582.941 | | Fe I | 348 | 4596.38 | | Cr I | 210 | 4612.84 | | P II | 9 |
| 4583.443 | | Ti II | 39 | 4596.433 | | Fe I | 823 | 4612.89 | | Ne II | 64 |
| 4583.72 | P | Fe I | 472 | 4596.90 | | Cr I | 171 | 4613.11 | | O II | 93 |
| 4583.783 | | V I | 109 | 4596.903 | | Co I | 177 | 4613.210 | | Fe I | 554 |
| 4583.829 | | Fe II | 38 | 4596.978 | | Gd II | 44 | 4613.373 | | Cr I | 21 |
| 4583.89 | | Cr I | 125 | 4597.013 | | Nd II | 51 | 4613.38 | | La II | 50 |
| 4583.99 | P | Fe II | 26 | 4597.06 | P | Fe I | 17 | 4613.47 | | S III | 10 |
| 4584.095 | | Cr I | 172 | 4597.91 | | Gd II | 44 | 4613.67 | | O II | 92 |
| 4584.28 | | Cl II | | 4598.122 | | Fe I | 554 | 4613.74 | | Hf II | 103 |
| 4584.445 | | Ru I | 6 | 4598.33 | P | Fe I | 17 | 4613.868 | | N II | 5 |
| 4584.732 | | Fe I | 820 | 4598.37 | P | Fe I | 970 | 4613.95 | | Zr II | 67 |
| 4584.75 | | Cr I | 125 | 4598.441 | | Cr I | 172 | 4614.15 | | Cr I | 148 |
| 4584.824 | | Fe I | 822 | 4598.528 | | Fe II | 219 | 4614.216 | | Fe I | 638 |
| 4584.934 | | Cr I | 196 | 4598.74 | P | Fe I | 819 | 4614.523 | | Cr I | 245 |
| 4585.03 | | Cl II | 34 | 4598.77 | | A II | 38 | 4614.58 | | Ni I | 99 |
| 4585.088 | | Cr I | 212 | 4598.99 | P | Ti I | 262 | 4614.73 | | Cr I | |
| 4585.59 | P | Fe I | 468 | 4599.00 | | Cr I | 171 | 4615.441 | | Sm II | 49 |
| 4585.72 | | Cr I | 211 | 4599.226 | | Ti I | | 4615.690 | | Sm II | 22 |
| 4585.820 | | Al II | 45 | 4599.25 | | Cr I | 171 | 4615.98 | | Ne II | 64,67 |
| 4585.871 | | Ca I | 23 | 4599.46 | | Hf II | 92 | 4616.137 | | Cr I | 21 |
| 4585.923 | | Ca I | 23 | 4600.104 | | Cr I | 32 | 4616.64 | | Cr II | 44 |
| 4585.94 | | V I | 61 | 4600.11 | | Ne II | 64 | 4616.95 | | Fe III | 108 |
| 4586.138 | | Cr I | 172 | 4600.19 | | V II | 56 | 4617.269 | | Ti I | 145 |
| 4586.25 | | Hf II | 23 | 4600.28 | P | Ti II | 60 | 4617.94 | | Ni I | 115 |
| 4586.364 | | V I | 4 | 4600.372 | | Ni I | 98 | 4618.12 | P | V II | 56 |
| 4586.95 | P | Ti I | 266 | 4600.59 | | La II | 148 | 4618.52 | | V II | 252 |
| 4586.99 | | Cr I | | 4600.752 | | Cr I | 21 | 4618.568 | | Fe I | 1151 |
| 4587.132 | | Fe I | 795 | 4600.937 | | Fe I | 591 | 4618.765 | | Fe I | 409 |
| 4587.72 | P | Fe I | 971 | 4601.00 | | Cl I | 15 | 4618.800 | | V I | 39 |
| 4587.86 | | Cr I | 125 | 4601.021 | | Cr I | 32 | 4618.83 | | Cr II | 44 |
| 4587.90 | | A II | 16 | 4601.05 | | Gd II | 44 | 4618.85 | | C II | 50 |
| 4587.91 | | P II | 15,35 | 4601.15 | | Cr I | 172 | 4619.294 | | Fe I | 821 |
| 4587.91 | | P III | 7 | 4601.34 | P | Fe II | 43 | 4619.329 | | Co I | 27 |
| 4588.082 | | Al II | 45 | 4601.478 | | N II | 5 | 4619.4 | P | N V | 1 |
| 4588.13 | | Ne II | 68 | 4601.97 | | P II | 15 | 4619.525 | | Ti I | 261 |
| 4588.194 | | Al II | 45 | 4601.97 | | Zr II | 138 | 4619.551 | | Cr I | 81 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 4619.648 | | V I | |
| 4619.771 | | V I | 4 |
| 4619.87 | | La II | 76 |
| 4620.13 | P | Fe I | 468 |
| 4620.38 | | Ni I | 163 |
| 4620.513 | | Fe II | 38 |
| 4621.00 | | Cr I | 32 |
| 4621.28 | | O II | 92 |
| 4621.39 | | Fe III | 108 |
| 4621.392 | | N II | 5 |
| 4621.41 | P | Cr II | 25 |
| 4621.63 | P | Fe I | 989 |
| 4621.893 | | Cr I | 32 |
| 4621.963 | | Cr I | 32,244 |
| 4622.40 | P | Fe II | 17 |
| 4622.491 | | Cr I | 233 |
| 4622.71 | | Hf II | 70 |
| 4622.71 | | P II | 36 |
| 4622.761 | | Cr I | 81 |
| 4623.020 | | Co I | 156 |
| 4623.098 | | Ti I | 145 |
| 4624.11 | | S II | |
| 4624.404 | | V I | 39 |
| 4624.42 | | Fe III | 108 |
| 4624.561 | | Co I | 141 |
| 4624.657 | | V I | 94 |
| 4624.86 | | Zr II | 116 |
| 4624.899 | | Ce II | 27 |
| 4625.052 | | Fe I | 554 |
| 4625.30 | | Cr I | 171 |
| 4625.44 | P | Fe I | 974 |
| 4625.549 | | Fe II | 219 |
| 4625.65 | | Cr I | 244 |
| 4625.71 | | C II | 49 |
| 4625.767 | | Co I | 176 |
| 4625.911 | | Fe II | 186 |
| 4625.925 | | Cr I | 244 |
| 4626.188 | | Cr I | 21 |
| 4626.36 | P | Fe I | 636 |
| 4626.467 | | Mo I | 6 |
| 4626.480 | | V I | 39 |
| 4626.53 | | Fe III | 108 |
| 4626.544 | | Mn I | |
| 4626.565 | | Tm II | |
| 4626.61 | | P II | 15 |
| 4626.758 | | Fe I | 410 |
| 4626.78 | P | Fe II | 170 |
| 4626.81 | | Cr I | 209 |
| 4627.02 | P | Fe I | 637 |
| 4627.22 | | Eu I | 1 |
| 4627.48 | | V II | 210 |
| 4627.66 | | Gd II | 43 |
| 4627.85 | | Ne II | 73 |
| 4627.86 | P | Fe II | 54 |
| 4628.160 | | Ce II | 1 |
| 4628.4410 | | A I | 9 |
| 4628.473 | | Cr I | 186 |
| 4628.69 | P | Fe I | 819 |
| 4628.71 | | P II | 28 |
| 4628.751 | | Pr II | 1 |
| 4628.821 | | Fe II | 219 |
| 4628.908 | | Co I | 15 |
| 4629.07 | | Zr II | 139 |
| 4629.29 | P | Ti II | 38 |
| 4629.336 | | Fe II | 37 |
| 4629.336 | | Ti I | 145 |
| 4629.359 | | Co I | 156 |
| 4629.7 | | Al II | 35 |
| 4629.814 | | Zn I | 8 |
| 4629.90 | P | Fe II | 170 |
| 4629.98 | P | Ni I | 223 |
| 4630.125 | | Fe I | 115 |
| 4630.52 | | C II | 49 |
| 4630.537 | | N II | 5 |
| 4630.785 | | Fe I | 969 |
| 4631.03 | P | Fe I | 1071 |
| 4631.38 | | Si IV | 6 |
| 4631.49 | | Fe I | 1152 |
| 4631.5 | | Al II | 97 |
| 4631.895 | | Fe II | 219 |
| 4632.14 | P | Fe I | 754 |
| 4632.180 | | Cr I | 171 |
| 4632.83 | P | Fe I | 820 |
| 4632.915 | | Fe I | 39 |
| 4633.05 | P | Fe I | 17 |
| 4633.2 | | Al II | 97 |
| 4633.286 | | Cr I | 186 |
| 4633.764 | | Fe I | 410 |
| 4633.99 | | Zr I | 5 |
| 4634.11 | | Cr II | 44 |
| 4634.16 | | N III | 2 |
| 4634.21 | | V II | 210 |
| 4634.59 | | Cr I | 171 |
| 4634.60 | P | Fe II | 25 |
| 4634.73 | | Ne II | 67 |
| 4634.95 | | La II | 133 |
| 4635.176 | | V I | 4 |
| 4635.328 | | Fe II | 186 |
| 4635.539 | | Ti I | 261 |
| 4635.62 | P | Fe I | 319 |
| 4635.7 | | Al II | 97 |
| 4635.846 | | Fe I | 349 |
| 4636.345 | | Ti II | 38 |
| 4636.42 | | La II | 101 |
| 4636.66 | P | Fe I | 513 |
| 4637.182 | | Cr I | 32 |
| 4637.209 | | Ti I | 261 |
| 4637.25 | | A II | 31 |
| 4637.512 | | Fe I | 554 |
| 4637.772 | | Cr I | 32 |
| 4637.887 | | Ti I | 261 |
| 4638.016 | | Fe I | 822 |
| 4638.12 | | Si III | 13 |
| 4638.854 | | O II | 1 |
| 4639.001 | | Gd II | 64,102 |
| 4639.150 | | Mn II | 18 |
| 4639.326 | | Al II | 69 |
| 4639.369 | | Ti I | 145 |
| 4639.384 | | Al II | 69 |
| 4639.538 | | Cr I | 186 |
| 4639.669 | | Ti I | 145 |
| 4639.725 | | Al II | 69 |
| 4639.833 | | Al II | 69 |
| 4639.944 | | Ti I | 145 |
| 4640.062 | | V I | 39 |
| 4640.14 | | Hf II | 74 |
| 4640.309 | | V I | 94 |
| 4640.362 | | Al II | 69 |
| 4640.384 | | Al II | 69 |
| 4640.431 | | Ti I | 261 |
| 4640.55 | | Cr I | 171 |
| 4640.64 | | N III | 2 |
| 4640.67 | | Cr I | 244 |
| 4640.735 | | V I | 39 |
| 4641.22 | P | Fe I | 347 |
| 4641.77 | Forb | K I | 2 |
| 4641.811 | | O II | 1 |
| 4641.90 | | N III | 2 |
| 4642.011 | | Cr I | 244 |
| 4642.235 | | Sm II | 36 |
| 4642.27 | Forb | K I | 2 |
| 4642.58 | P | Fe I | 688 |
| 4643.086 | | N II | 5 |
| 4643.20 | P | Fe I | 38 |
| 4643.468 | | Fe I | 820 |
| 4643.69 | | Y I | 4 |
| 4644.09 | P | Fe II | 31 |
| 4644.82 | | Zr I | 64 |
| 4645.193 | | Ti I | 145 |
| 4645.28 | | La II | 8 |
| 4645.971 | | V I | 4 |
| 4646.059 | | Pr II | 22 |
| 4646.174 | | Cr I | 21 |
| 4646.326 | | Gd II | 82 |
| 4646.396 | | V I | 39 |
| 4646.495 | | Cr I | 147 |
| 4646.684 | | Sm II | 26 |
| 4646.808 | | Cr I | 186 |
| 4646.94 | P | Ni I | 145 |
| 4647 | P | C IV | 6 |
| 4647.34 | | Ne II | 72 |
| 4647.40 | | C III | 1 |
| 4647.40 | | Ti IV | |
| 4647.42 | P | Ni I | 148 |
| 4647.437 | | Fe I | 409 |
| 4647.50 | | La II | 77 |
| 4647.585 | | Mn II | 18 |
| 4647.72 | P | Fe I | 722 |
| 4647.759 | | Nd II | 46 |
| 4648.126 | | Cr I | 32 |
| 4648.160 | | Sm II | 1 |
| 4648.17 | | S II | 36 |
| 4648.23 | P | Fe II | 38 |
| 4648.62 | | Al II | 82 |
| 4648.659 | | Ni I | 98 |
| 4648.868 | | Cr I | 32 |
| 4648.933 | | Fe II | 25 |
| 4649.06 | | A II | 51 |
| 4649.139 | | O II | 1 |
| 4649.461 | | Cr I | 32 |
| 4649.54 | P | Cr I | 233 |
| 4649.828 | | Fe I | 592 |
| 4650.016 | | Ti I | 145 |
| 4650.04 | P | Fe II | 146 |
| 4650.16 | | C III | 1 |
| 4650.544 | | Al II | 59 |
| 4650.646 | | Al II | 59 |
| 4650.841 | | O II | 1 |
| 4651.285 | | Cr I | 21 |
| 4651.35 | | C III | 1 |
| 4651.42 | P | V II | 45 |
| 4651.517 | | Pr II | 6 |
| 4652.158 | | Cr I | 21 |
| 4652.280 | | Fe II | 219 |
| 4652.816 | | Mn II | 18 |
| 4653.0 | | Al II | 81 |
| 4653.49 | P | Fe I | 17 |
| 4654.14 | | Si IV | 7 |
| 4654.23 | | O I | 18 |
| 4654.286 | | Ce II | 154 |
| 4654.501 | | Fe I | 38 |
| 4654.56 | | O I | 18 |
| 4654.57 | | N II | 11 |
| 4654.628 | | Fe I | 554,821 |
| 4654.736 | | Cr I | 186 |
| 4654.986 | | Gd II | 65 |
| 4655.05 | | Al II | 106 |
| 4655.36 | | O I | 18 |
| 4655.49 | | La II | 75 |
| 4655.661 | | Ni I | 115 |
| 4655.712 | | Ti I | 261 |
| 4655.75 | P | Ti II | 38 |
| 4656.048 | | Ti I | 145 |
| 4656.189 | | Cr I | 147 |
| 4656.468 | | Ti I | 6 |
| 4656.74 | | S II | 9 |
| 4656.80 | | Si II | |
| 4656.837 | | Cr I | 311 |
| 4656.974 | | Fe II | 43 |
| 4657.210 | | Ti II | 59 |
| 4657.38 | | Ni I | 254 |
| 4657.390 | | Co I | 156 |
| 4657.598 | | Fe I | 346 |
| 4657.64 | | Zr I | 64 |
| 4657.94 | | A II | 15 |
| 4658.03 | P | Fe II | 170 |
| 4658.03 | | Lu I | 2 |
| 4658.12 | | P II | 15 |
| 4658.29 | | Fe I | 591 |
| 4658.64 | | C IV | 8 |
| 4659.38 | | K II | 5 |
| 4660 | P | C IV | 9 |
| 4660.93 | P | Fe II | 146 |
| 4661.19 | P | Fe II | 170 |
| 4661.22 | | Cl I | 15 |
| 4661.33 | P | Fe I | 347 |
| 4661.538 | | Fe I | 1207 |
| 4661.635 | | O II | 1 |
| 4661.78 | | Zr II | 129 |
| 4661.88 | | Eu I | 1 |
| 4661.933 | | Mo I | 6 |
| 4661.975 | | Fe I | 409 |
| 4662.0 | P Forb | Na I | 13 |
| 4662.51 | | La II | 8 |
| 4662.71 | P | Ti II | 38 |
| 4662.74 | P | Ti II | 38 |
| 4662.767 | | Mo I | 6 |
| 4663.054 | | Al II | 2 |
| 4663.183 | | Fe I | 754 |
| 4663.328 | | Cr I | 186 |
| 4663.403 | | Co I | 156 |
| 4663.53 | | C III | 5 |
| 4663.700 | | Fe II | 44 |
| 4663.76 | | La II | 82 |
| 4663.78 | | Fe III | 52 |
| 4663.832 | | Cr I | 186 |
| 4664.14 | | Hf II | 14 |
| 4664.272 | | Gd II | 127 |
| 4664.32 | P | Ni I | 147 |
| 4664.647 | | Pr II | 27 |
| 4664.71 | P | Fe I | 347 |
| 4664.79 | P | Fe II | 17 |
| 4664.798 | | Cr I | 186 |
| 4664.811 | | Na I | 12 |
| 4665 | P | C IV | 7 |
| 4665.24 | P | Fe I | 1115 |
| 4665.56 | P | Fe I | 1044 |
| 4665.8 | P Forb | Na I | 13 |
| 4665.80 | P | Fe II | 26 |
| 4665.87 | | Si III | 13 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4665.90 | | C III | 5 | 4681.908 | | Ti I | 6 | 4700.42 | P | Fe I | 67 |
| 4665.902 | | Cr I | 233 | 4681.990 | | Cu II | 4 | 4700.608 | | Cr I | 62 |
| 4666.149 | | V I | 94 | 4682.12 | | La II | 37 | 4700.80 | | P II | 14 |
| 4666.215 | | Cr I | 99 | 4682.28 | | Ha II | 1 | 4701.052 | | Fe I | 820 |
| 4666.28 | | A II | 51 | 4682.29 | | A II | | 4701.159 | | Mn I | 21 |
| 4666.448 | | Gd II | 101 | 4682.32 | | Y II | 12 | 4701.23 | | O II | 58 |
| 4666.512 | | Cr I | 186 | 4682.361 | | Co I | 156 | 4701.336 | | Ni I | 101 |
| 4666.750 | | Fe II | 37 | 4682.58 | | Fe I | 384 | 4701.536 | | Ni I | 235 |
| 4666.8 | | Al II | 105 | 4682.68 | | Hf II | 102 | 4701.65 | | Al III | 6 |
| 4666.994 | | Ni I | 146 | 4683.018 | | Si III | 13 | 4701.76 | | O II | 58 |
| 4667.181 | | Cr I | 99 | 4683.43 | | Zr I | 63 | 4701.90 | P | Fe I | 688 |
| 4667.28 | | N II | 11 | 4683.565 | | Fe I | 346 | 4701.92 | | Cr I | 170 |
| 4667.459 | | Fe I | 822 | 4683.774 | | Si III | 13 | 4702.3164 | | A I | 9 |
| 4667.53 | P | Ti I | 77 | 4684.457 | | V I | 94 | 4702.57 | | N II | 68 |
| 4667.585 | | Ti I | 6 | 4684.484 | | Ti I | 203 | 4702.9758 | | Mg I | 11 |
| 4667.766 | | Ni I | 163 | 4684.605 | | Ce II | 228 | 4702.9831 | | Mg I | 11 |
| 4668.07 | P | Fe I | 826 | 4684.605 | | Cr I | 146 | 4702.9909 | | Mg I | 11 |
| 4668.142 | | Fe I | 554 | 4684.77 | | Cr II | 178 | 4703.03 | | Zr II | 138 |
| 4668.357 | | Ti I | 77 | 4685.03 | P | Fe I | 347 | 4703.18 | | O II | 40 |
| 4668.560 | | Na I | 12 | 4685.19 | | Zr II | 129 | 4703.27 | | La II | 76 |
| 4668.58 | | S II | 36 | 4685.265 | | Ca I | 51 | 4703.36 | | A II | |
| 4668.91 | | La II | 76 | 4685.682 | | He II | 1 | 4703.576 | | Nd II | 55 |
| 4669.174 | | Fe I | 821 | 4685.837 | | Ge I | 3 | 4703.62 | | Hf II | 72 |
| 4669.273 | | V I | 4 | 4685.95 | P | Fe II | 50 | 4703.808 | | Ni I | 133 |
| 4669.33 | | O II | 90 | 4686.218 | | Ni I | 98 | 4704.33 | | N II | 68 |
| 4669.336 | | Cr I | 186 | 4686.921 | | Ti I | 203 | 4704.386 | | Co I | 178 |
| 4669.396 | | Sm II | 7 | 4686.926 | | V I | 93 | 4704.395 | | Ne I | 11 |
| 4669.502 | | Ce II | | 4687.183 | | Sm II | 3 | 4704.397 | | Sm II | 1 |
| 4669.53 | | O II | 89 | 4687.30 | P | Fe I | 17 | 4704.958 | | Fe I | 821 |
| 4669.650 | | Sm II | 26 | 4687.387 | | Fe I | 347 | 4705.099 | | V I | 136 |
| 4669.67 | | Cr I | 170 | 4687.67 | P | Fe I | 347 | 4705.355 | | O II | 25 |
| 4669.977 | | Ru I | 11 | 4687.80 | | Zr I | 43 | 4705.464 | | Fe I | 752 |
| 4670.170 | | Fe II | 25 | 4687.82 | P | Ti I | 111 | 4705.50 | | Ni I | 101 |
| 4670.404 | | Sc II | 24 | 4688.38 | P | Fe I | 1071 | 4705.93 | | Ni I | 128 |
| 4670.483 | | V I | 39 | 4688.392 | | Ti I | 306 | 4706.102 | | Cr I | 170 |
| 4671.25 | | Fe III | 58 | 4688.45 | P | V II | 45 | 4706.178 | | V I | 94 |
| 4671.36 | P | Cr II | 178 | 4688.45 | | Zr I | 5 | 4706.31 | P | Fe I | 890 |
| 4671.686 | | Cu II | 4 | 4688.65 | | La II | 92 | 4706.41 | | N II | 68 |
| 4671.688 | | Mn I | 21 | 4689.374 | | Cr I | 186 | 4706.542 | | Nd II | 3 |
| 4671.82 | | La II | 80 | 4689.46 | P | Ti II | 38 | 4706.574 | | V I | 119 |
| 4671.94 | P | Sc II | 48 | 4690.146 | | Fe I | 820 | 4706.967 | | Sc I | 22 |
| 4672.02 | P | Fe I | 1045 | 4690.38 | P | Fe I | 17 | 4707.281 | | Fe I | 554 |
| 4672.081 | | Pr II | 21 | 4690.827 | | Ti I | 76 | 4707.487 | | Fe I | 346 |
| 4672.75 | | O I | 17 | 4690.97 | | O II | 58 | 4707.541 | | Pr II | 5 |
| 4672.83 | P | Fe I | 40 | 4691.17 | | La II | 23 | 4707.754 | | Cr I | 195 |
| 4673.169 | | Fe I | 820 | 4691.336 | | Ti I | 75 | 4707.78 | | Zr I | 63 |
| 4673.28 | P | Fe I | 822 | 4691.414 | | Fe I | 409 | 4707.80 | | O II | 89 |
| 4673.462 | | Be II | 6 | 4691.47 | | O II | 58 | 4708.040 | | Cr I | 186 |
| 4673.555 | | Cu II | 4 | 4691.55 | P | Fe II | 17 | 4708.663 | | Ti II | 49 |
| 4673.70 | | O I | 17 | 4692.45 | P | Ti I | 77 | 4708.854 | | Ne I | 11 |
| 4673.75 | | O II | 1 | 4692.50 | | La II | 75 | 4708.94 | | Ba II | 15 |
| 4673.91 | | C III | 5 | 4692.97 | | Cr I | 99 | 4708.972 | | Fe I | 889 |
| 4674.41 | | Zr II | 139 | 4693.190 | | Co I | 156 | 4708.976 | | Ti I | 203 |
| 4674.599 | | Sm II | 14 | 4693.628 | | Sm II | 14 | 4709.092 | | Fe I | 821 |
| 4674.65 | P | Fe I | 40 | 4693.670 | | Ti I | 6 | 4709.336 | | Sc I | 22 |
| 4674.84 | | Y I | 4 | 4693.949 | | Cr I | 99 | 4709.45 | | N II | 25,68 |
| 4674.98 | | N II | 11 | 4694.13 | | S I | 2 | 4709.484 | | Ru I | 14 |
| 4675.118 | | Ti I | 77 | 4694.55 | | N II | 61 | 4709.714 | | Nd II | 7 |
| 4675.45 | | Hf II | 92 | 4695.153 | | Cr I | 99 | 4709.715 | | Mn I | 21 |
| 4675.639 | | Ni I | 115 | 4695.45 | | S I | 2 | 4710.04 | | Ne II | 73 |
| 4676.234 | | O II | 1 | 4695.91 | | N II | 68 | 4710.04 | | O II | 24 |
| 4676.911 | | Sm II | 3 | 4696.12 | P | Ce II | 153 | 4710.058 | | Ne I | 11 |
| 4677.00 | | O II | 91 | 4696.25 | | S I | 2 | 4710.08 | | Zr I | 43 |
| 4677.528 | | Co I | 15 | 4696.36 | | O II | 1 | 4710.186 | | Ti I | 75,203 |
| 4677.59 | P | Fe I | 1072 | 4696.71 | P | Sc II | 48 | 4710.24 | | Cr I | 145 |
| 4677.67 | | S III | 10 | 4696.923 | | Ti I | 203 | 4710.286 | | Fe I | 409 |
| 4677.858 | | Tm II | 5 | 4697.062 | | Cr I | 62 | 4710.566 | | V I | 119 |
| 4677.93 | | N II | 62 | 4697.395 | | Cr I | 195 | 4711.68 | P | Ti I | 111 |
| 4678.160 | | Cd I | 2 | 4697.62 | | Cr II | 177 | 4711.732 | | Sc I | 22 |
| 4678.41 | P | Fe I | 688 | 4698.276 | | Sc II | 13 | 4711.91 | | Zr I | 64 |
| 4678.852 | | Fe I | 821 | 4698.389 | | Co I | 156 | 4711.975 | | Gd II | 64 |
| 4678.94 | P | Ce II | 153 | 4698.408 | | Ni I | 235 | 4712.060 | | Ne I | 16 |
| 4678.95 | | P II | 28 | 4698.456 | | Cr I | 186 | 4712.069 | | Ni I | 131 |
| 4679.229 | | Fe I | 688 | 4698.48 | | O II | 40 | 4712.104 | | Fe I | 467 |
| 4679.73 | P | Ti I | 77 | 4698.615 | | Cr I | 62,146 | 4712.13 | | N II | 68 |
| 4679.87 | P | Cr II | 25 | 4698.62 | | N II | 68 | 4712.92 | | La II | 38 |
| 4679.96 | P | Fe I | 1071 | 4698.64 | P | Cr II | 25 | 4713.057 | | Sm II | 49 |
| 4680.127 | | Ce II | 18 | 4698.67 | P | Ti II | 59 | 4713.143 | | He I | 12 |
| 4680.138 | | Zn I | 2 | 4698.766 | | Ti I | 75 | 4713.18 | P | Fe II | 26 |
| 4680.297 | | Fe I | 39 | 4698.86 | P | Ti I | 203 | 4713.26 | | Y II | 22 |
| 4680.458 | | Ce II | 2 | 4698.947 | | Cr I | 146 | 4713.373 | | He I | 12 |
| 4680.475 | | Fe I | 346 | 4699.180 | | Co I | 27 | 4713.84 | P | Ni I | 128 |
| 4680.49 | | Cr I | 186 | 4699.21 | | O II | 25,40 | 4713.996 | | Ce II | 250 |
| 4680.539 | | W I | 1 | 4699.589 | | Cr I | 292 | 4714.074 | | Fe I | 1206 |
| 4680.734 | | Nd II | 4 | 4699.62 | | La II | 39 | 4714.113 | | V I | 119 |
| 4680.870 | | Cr I | 170 | 4699.72 | | Hf II | 71 | 4714.182 | | Fe I | 591 |
| 4681.05 | P | Ni I | 143 | 4700.1 | | Ne II | 67 | 4714.421 | | Ni I | 98 |
| 4681.32 | | S II | 8 | 4700.12 | | N II | 68 | 4714.53 | | Fe III | 57 |
| 4681.52 | | A II | 76 | 4700.171 | | Fe I | 935 | 4714.83 | | Ce II | 17 |
| 4681.786 | | Ru I | 6 | 4700.21 | | S II | 52 | 4715.12 | | Cr II | 178 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 4715.295 | | Ti I | 6 |
| 4715.344 | | Ne I | 16 |
| 4715.589 | | Nd II | 49 |
| 4715.778 | | Ni I | 98 |
| 4715.900 | | V I | 136 |
| 4716.13 | P | Sc II | 13 |
| 4716.226 | | S II | 9 |
| 4716.44 | | La II | 52 |
| 4716.576 | | Gd II | 102 |
| 4716.644 | | V I | 51 |
| 4716.658 | | Si III | |
| 4716.85 | P | Fe I | 634 |
| 4717.031 | | Sc I | 14 |
| 4717.58 | | La II | 87 |
| 4717.688 | | Cr I | 170 |
| 4717.692 | | V I | 119 |
| 4717.718 | | Sm II | 41 |
| 4718.16 | | Ca II | 7 |
| 4718.329 | | Sm II | 53 |
| 4718.429 | | Cr I | 186 |
| 4718.43 | | N II | 68 |
| 4719.040 | | Gd II | 43 |
| 4719.10 | | Hf II | 15 |
| 4719.12 | | Zr I | 66 |
| 4719.37 | | Ne II | 67 |
| 4719.515 | | Ti II | 59 |
| 4719.80 | | Zr II | 116 |
| 4719.838 | | Sm II | 3 |
| 4719.93 | | La II | 81 |
| 4720.15 | P | Fe II | 54 |
| 4720.26 | | P II | 8 |
| 4720.56 | P | Fe I | 1114 |
| 4720.830 | | Sc I | 14 |
| 4720.997 | | Fe I | 1071,409 |
| 4721.14 | | Cr I | 232 |
| 4721.273 | | Gd II | 83 |
| 4721.43 | | Cl II | 75 |
| 4721.524 | | V I | 108 |
| 4721.59 | | N II | 68 |
| 4721.62 | | A II | 85 |
| 4722.159 | | Zn I | 2 |
| 4722.278 | | Sr I | 5 |
| 4722.333 | | Bi I | 2 |
| 4722.58 | | Ca II | 7 |
| 4722.603 | | Ti I | 75 |
| 4722.652 | | Bi I | 2 |
| 4722.741 | | Cr I | 195 |
| 4722.877 | | V I | 108 |
| 4723 | P | N IV | 11 |
| 4723.06 | | Cr I | 145 |
| 4723.171 | | Ti I | 75 |
| 4723.18 | | Cr I | 292 |
| 4723.37 | P | Ni I | 162 |
| 4723.88 | P | Ni I | 167 |
| 4724.07 | P | Fe II | 17 |
| 4724.416 | | Cr I | 145 |
| 4724.42 | | La II | 50 |
| 4724.679 | | Ti I | 203 |
| 4725.090 | | Ce II | 153 |
| 4725.67 | | Cr I | 195 |
| 4725.94 | | Fe I | 1134 |
| 4725.95 | | Cr I | 99 |
| 4726.165 | | Fe I | 384 |
| 4726.725 | | Gd II | 148 |
| 4726.91 | | A II | 14 |
| 4727.01 | P | Fe I | 635 |
| 4727.153 | | Cr I | 99 |
| 4727.21 | | C II | 48 |
| 4727.405 | | Fe I | 821 |
| 4727.476 | | Mn I | 21 |
| 4727.851 | | Ni I | 146 |
| 4727.9 | P | Mn II | 5 |
| 4727.936 | | Co I | 15 |
| 4728.41 | | La II | 22 |
| 4728.42 | | Ni I | 115 |
| 4728.468 | | Gd II | 65 |
| 4728.555 | | Fe I | 822 |
| 4728.769 | | Sc I | 14 |
| 4729.028 | | Fe I | 1043a |
| 4729.226 | | Sc I | 14 |
| 4729.291 | | Ni I | 235 |
| 4729.45 | | S II | 46 |
| 4729.544 | | V I | 93 |
| 4729.699 | | Fe I | 688 |
| 4729.723 | | Cr I | 169 |
| 4730.0285 | | Mg I | 10 |
| 4730.24 | | Ne II | 72 |
| 4730.361 | | Mn II | 5 |
| 4730.394 | | V I | 108 |
| 4730.69 | | A II | 94 |
| 4730.711 | | Cr I | 145 |
| 4730.92 | | As II | 3 |
| 4731.172 | | Ti I | 202 |
| 4731.36 | | Hf II | 38 |
| 4731.439 | | Fe II | 43 |
| 4731.77 | P | Fe I | 67 |
| 4731.809 | | Ni I | 163 |
| 4732.051 | | Co I | 15 |
| 4732.08 | | A II | 38 |
| 4732.34 | | Zr I | 48 |
| 4732.465 | | Ni I | 235 |
| 4732.53 | | Ne II | 67 |
| 4732.60 | | Gd II | 65 |
| 4732.96 | P | Ti II | 29 |
| 4733 | P | N IV | 11 |
| 4733.426 | | Ti I | 202 |
| 4733.596 | | Fe I | 38 |
| 4734.094 | | Sc I | 14 |
| 4734.100 | | Fe I | 1133 |
| 4734.177 | | Pr II | 4 |
| 4734.427 | | Gd II | 43 |
| 4734.52 | | Y II | |
| 4734.682 | | Ti I | 233 |
| 4734.75 | | C II | 48 |
| 4734.828 | | Co I | 156 |
| 4734.94 | | Zr II | 138 |
| 4735.67 | | Hf II | 25 |
| 4735.75 | | Hf II | 59 |
| 4735.846 | | Fe I | 1042 |
| 4735.93 | | A II | 6 |
| 4736.13 | | Cr I | 195 |
| 4736.50 | | Ni I | 99 |
| 4736.780 | | Fe I | 554 |
| 4737 | P | C IV | 12 |
| 4737.282 | | Ce II | |
| 4737.350 | | Cr I | 145 |
| 4737.59 | | V II | 16 |
| 4737.633 | | Fe I | 590 |
| 4737.642 | | Sc I | 14 |
| 4737.769 | | Co I | 57 |
| 4738.11 | | C II | 1 |
| 4738.29 | | Mn II | 5 |
| 4738.41 | | Cl II | 75 |
| 4738.52 | P | Fe II | 170 |
| 4739.108 | | Mn I | 21 |
| 4739.42 | | Cl II | 13 |
| 4739.48 | | Zr I | 43 |
| 4739.49 | | Ce II | 157 |
| 4739.49 | | P II | 14 |
| 4739.59 | | Mg II | 18 |
| 4739.80 | | La II | 64 |
| 4740 | P | N IV | 11 |
| 4740.165 | | Ni I | 99 |
| 4740.27 | | La II | 8 |
| 4740.343 | | Fe I | 409 |
| 4740.40 | | Cl II | 51 |
| 4741.018 | | Sc I | 14 |
| 4741.081 | | Fe I | 688 |
| 4741.089 | | Cr I | 292 |
| 4741.34 | P | Ni I | 166 |
| 4741.533 | | Fe I | 346 |
| 4741.71 | | O II | 25 |
| 4741.922 | | Sr I | 5 |
| 4742.00 | | Ge II | 2 |
| 4742.129 | | Ti I | 202 |
| 4742.32 | P | Ti I | 111 |
| 4742.4 | | S II | 8 |
| 4742.631 | | V I | 128 |
| 4742.791 | | Ti I | 233 |
| 4742.93 | P | Fe I | 1072 |
| 4743.08 | | La II | 75 |
| 4743.112 | | Cr I | 290 |
| 4743.28 | P | Fe II | 31 |
| 4743.814 | | Sc I | 14 |
| 4744.13 | P | Fe I | 1168 |
| 4744.64 | P | Fe I | 17 |
| 4744.90 | | C II | 1 |
| 4744.925 | | Pr II | 3 |
| 4745.129 | | Fe I | 67 |
| 4745.308 | | Cr I | 61 |
| 4745.680 | | Sm II | 7 |
| 4745.806 | | Fe I | 821,1068 |
| 4746.115 | | Co I | 182 |
| 4746.638 | | V I | 113 |
| 4747.00 | | Cr I | 168 |
| 4747.143 | | Ce II | |
| 4747.256 | | Ti I | 75 |
| 4747.680 | | Ti I | 233 |
| 4747.941 | | Na I | 11 |
| 4748.12 | P | Sc II | 48 |
| 4748.525 | | V I | 113 |
| 4748.67 | | Cl II | 75 |
| 4748.73 | | La II | 65 |
| 4749.25 | | Cr I | 195 |
| 4749.25 | P | Fe I | 1098 |
| 4749.68 | | Co I | 156 |
| 4749.93 | | Fe I | 1206 |
| 4750.49 | P | Fe II | 206 |
| 4750.990 | | V I | 113 |
| 4751 | P | N V | 5 |
| 4751 | P | O VI | 10 |
| 4751.04 | | Cr I | 290 |
| 4751.34 | | O II | 24 |
| 4751.574 | | V I | 94 |
| 4751.822 | | Na I | 11 |
| 4752 | P | N IV | 11 |
| 4752.084 | | Cr I | |
| 4752.124 | | Ni I | 165 |
| 4752.426 | | Ni I | 132 |
| 4752.70 | | O II | 24 |
| 4752.7313 | | Ne I | 21 |
| 4752.87 | | Cr I | 194 |
| 4753.06 | | Zr I | 66 |
| 4753.152 | | Sc I | 5 |
| 4753.957 | | V I | 113 |
| 4754.042 | | Mn I | 16 |
| 4754.358 | | Co I | 156 |
| 4754.38 | | Ti I | 202 |
| 4754.635 | | Pr II | 4 |
| 4754.743 | | Cr I | 168 |
| 4754.768 | | Ni I | 141 |
| 4755.12 | | S II | 35 |
| 4755.137 | | Cr I | 124 |
| 4755.347 | | Gd II | 134 |
| 4755.64 | | Cl II | 13 |
| 4755.728 | | Mn II | 5 |
| 4756.113 | | Cr I | 145 |
| 4756.519 | | Ni I | 98 |
| 4756.722 | | Co I | 180 |
| 4757.326 | | Cr I | 290 |
| 4757.37 | | V I | 113 |
| 4757.50 | | V I | 113 |
| 4757.565 | | W I | 7 |
| 4757.582 | | Fe I | 634,1115 |
| 4757.591 | | Cr I | 231 |
| 4757.791 | | Gd II | 45 |
| 4757.841 | | Ru I | 12 |
| 4757.842 | | Ce II | |
| 4758.120 | | Ti I | 233 |
| 4758.42 | | Ni I | 193 |
| 4758.421 | | Cu II | 1 |
| 4758.742 | | V I | 51 |
| 4758.913 | | Ti I | 41 |
| 4759.272 | | Ti I | 233 |
| 4759.74 | | Cr I | 124 |
| 4759.74 | | Ti I | 202 |
| 4759.907 | | Cr I | 169 |
| 4760.07 | P | Fe I | 384 |
| 4760.15 | P | Fe II | 169 |
| 4760.23 | P | Ni I | 114 |
| 4760.59 | | Hf II | 85 |
| 4760.98 | | Y I | 4 |
| 4761.242 | | Cr I | 169 |
| 4761.42 | | Cr II | 176 |
| 4761.526 | | Mn I | 21 |
| 4761.67 | | Zr II | 107 |
| 4761.73 | | Cr I | 194 |
| 4762 | P | N IV | 11 |
| 4762.376 | | Mn I | 21 |
| 4762.41 | | C I | 6 |
| 4762.627 | | Ni I | 71 |
| 4762.727 | | Pr II | 26 |
| 4762.77 | | Ti II | 17 |
| 4762.78 | | Zr I | 66 |
| 4763.38 | | S II | 35 |
| 4763.624 | | Nd II | 54 |
| 4763.79 | P | Fe II | 50 |
| 4763.84 | P | Ti II | 48 |
| 4763.865 | | Nd II | 6 |
| 4763.950 | | Ni I | 146 |
| 4764.294 | | Cr I | 231 |
| 4764.535 | | Ti II | 48 |
| 4764.643 | | Cr I | 124 |
| 4764.7 | P | Mn II | 5 |
| 4764.89 | | A II | 15 |
| 4765.30 | | Cl II | 13 |
| 4765.485 | | Fe I | 40 |
| 4765.78 | | Hf II | 84 |
| 4765.859 | | Mn I | 21 |
| 4766.330 | | Ti I | 233 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4766.430 | | Mn I | 21 | 4786.908 | | Gd II | 65 | 4804.12 | | S II | 8 |
| 4766.62 | | C I | 6 | 4787.50 | P | Fe I | 409 | 4804.529 | | Fe I | 794 |
| 4766.63 | | Cr I | 231 | 4787.64 | P | Ti I | 40 | 4804.59 | P | Fe I | 721 |
| 4766.635 | | V I | 113 | 4787.74 | | Cr I | 168 | 4804.64 | | Cr I | 61 |
| 4766.66 | P | Cr I | 124 | 4787.84 | | Fe I | 384 | 4805.105 | | Ti II | 92 |
| 4766.87 | P | Fe I | 688 | 4788.126 | | N II | 29 | 4805.18 | P | Cr II | 25 |
| 4767.142 | | Co I | 182 | 4788.69 | | Zr I | 43 | 4805.24 | | Cr I | 283 |
| 4767.280 | | Cr I | 231 | 4788.757 | | Fe I | 568 | 4805.416 | | Ti I | 260 |
| 4767.30 | P | Ti II | 29 | 4788.9258 | | Ne I | 15 | 4805.817 | | Gd II | 60 |
| 4767.860 | | Cr I | 231 | 4789 | P | C IV | 5 | 4805.88 | | Zr I | 43 |
| 4768.072 | | Co I | 156 | 4789.354 | | Cr I | 31 | 4806.07 | | A II | 6 |
| 4768.334 | | Fe I | 821 | 4789.654 | | Fe I | 753 | 4806.165 | | Gd II | 116 |
| 4768.397 | | Fe I | 384 | 4789.68 | P | Ce II | 228 | 4806.286 | | Cr I | 61 |
| 4768.68 | | Cl II | 40 | 4789.803 | | Ti I | 41 | 4806.53 | P | Ti II | 17 |
| 4769.775 | | Ti I | 233 | 4790.218 | | Ne I | 32 | 4806.75 | P | Ti I | 40 |
| 4769.80 | | Cr I | 283 | 4790.337 | | Cr I | 31 | 4806.989 | | Ni I | 163 |
| 4770.00 | | C I | 6 | 4790.56 | P | Fe I | 1068 | 4807.14 | | Hf II | 57 |
| 4770.670 | | Cr I | 124 | 4790.72 | | Hf II | 60 | 4807.249 | | Fe I | 634,1088 |
| 4771.09 | | Cl II | 40 | 4790.75 | P | Fe I | 632 | 4807.537 | | V I | 113 |
| 4771.103 | | Ti I | 41 | 4791.00 | | Ni I | 71 | 4807.729 | | Fe I | 688 |
| 4771.108 | | Co I | 156 | 4791.150 | | Gd II | 65 | 4808.155 | | Fe I | 633 |
| 4771.57 | | Cr I | 124 | 4791.250 | | Fe I | 633 | 4808.52 | | Ni I | 114 |
| 4771.66 | | Cl II | 45 | 4791.500 | | Sc I | 5 | 4808.582 | | Ti I | 305 |
| 4771.702 | | Fe I | 67 | 4791.584 | | Sm II | 7 | 4808.864 | | Ni I | 160 |
| 4771.72 | | C I | 6 | 4792.02 | | S II | 46 | 4809.00 | | La II | 37 |
| 4772.32 | | Zr I | 43 | 4792.04 | | Cl II | 18 | 4809.14 | | Fe I | 933 |
| 4772.54 | | O I | 16 | 4792.06 | | P II | 36 | 4809.18 | | Hf II | 59 |
| 4772.57 | | O IV | 9 | 4792.12 | | A II | 62 | 4809.20 | P | Fe I | 1039 |
| 4772.728 | | Gd II | 133 | 4792.24 | P | Ti I | 40 | 4809.32 | | Cr I | 230 |
| 4772.77 | P | Fe II | 31 | 4792.39 | P | Ti II | 48 | 4809.94 | | Fe I | 793 |
| 4772.817 | | Fe I | 38,467 | 4792.482 | | Ti I | 269 | 4810.06 | | Cl II | 1 |
| 4772.89 | | Ni I | 162 | 4792.513 | | Cr I | 168 | 4810.17 | | V II | 35 |
| 4772.89 | | O I | 16 | 4792.63 | | Au I | 3 | 4810.286 | | N II | 20 |
| 4773.412 | | Ni I | 167 | 4792.855 | | Co I | 158 | 4810.534 | | Zn I | 2 |
| 4773.52 | P | Fe I | 408 | 4793.47 | | Ni I | 158 | 4810.733 | P | Cr I | 144 |
| 4773.76 | | O I | 16 | 4793.656 | | N II | 20 | 4810.760 | | Fe II | 169 |
| 4773.942 | | Ce II | 17 | 4793.96 | P | Fe I | 512 | 4811.04 | | Fe I | 467 |
| 4774.222 | | N II | 20 | 4794.22 | | O IV | 9 | 4811.074 | | Ti I | 158 |
| 4774.557 | | Cr I | 124 | 4794.36 | P | Fe I | 115 | 4811.14 | | V II | 197 |
| 4775.141 | | Cr I | 230 | 4794.54 | | Cl II | 1 | 4811.343 | | Nd II | 3 |
| 4775.53 | | Cr I | 283 | 4794.84 | P | Ti II | 29 | 4811.57 | | Cl II | 74 |
| 4775.87 | | C I | 6 | 4795.62 | | Ne II | 71 | 4811.61 | | Au I | 3 |
| 4775.87 | P | Fe I | 1115 | 4795.84 | | Ni I | 128 | 4811.881 | | Sr I | 5 |
| 4776.075 | | Fe I | 635 | 4795.853 | | Co I | 185 | 4811.999 | | Ni I | 130 |
| 4776.311 | | Co I | 158 | 4796.169 | | Cr I | 283 | 4812.240 | | Ti I | 260 |
| 4776.34 | | Fe I | 1206 | 4796.210 | | Ti I | 260 | 4812.35 | | Cr II | 30 |
| 4776.364 | | V I | 113 | 4796.378 | | Co I | 14 | 4812.84 | | C I | 5 |
| 4776.519 | | V I | 128 | 4796.67 | | La II | 63 | 4812.906 | | Ti I | 41 |
| 4777.57 | | Cr I | 124 | 4796.84 | | Cr I | 283 | 4812.940 | | Cu II | 8 |
| 4777.78 | P | Cr II | 25 | 4796.930 | | V I | 113 | 4813.00 | | V II | 248 |
| 4777.846 | | Sm II | 3 | 4797.157 | | Nd II | 60 | 4813.07 | | O IV | 9 |
| 4778.233 | | Co I | 186 | 4797.69 | | Cr I | 230 | 4813.11 | | Fe I | 630 |
| 4778.259 | | Ti I | 232 | 4797.973 | | V I | 93 | 4813.280 | | Si III | 9 |
| 4778.50 | | Cr I | 124 | 4797.983 | | Ti I | 260 | 4813.45 | P | Co I | 142 |
| 4778.93 | | Cl II | 40 | 4798.25 | | O IV | 9 | 4813.476 | | Co I | 158 |
| 4779.09 | | O IV | 9 | 4798.269 | | Fe I | 1042 | 4813.72 | P | Fe I | 1243 |
| 4779.11 | | S II | 8 | 4798.40 | | Cl II | 13 | 4813.952 | | V II | 197 |
| 4779.347 | | Sc I | 5 | 4798.535 | | Ti II | 17 | 4813.966 | | Co I | 158 |
| 4779.444 | | Fe I | 720 | 4798.736 | | Fe I | 38 | 4814.265 | | Cr I | 144 |
| 4779.710 | | N II | 20 | 4799.06 | P | Fe I | 1098 | 4814.617 | | Ni I | 98 |
| 4779.87 | | Cr I | 124 | 4799.30 | | Y I | 13 | 4814.80 | | Ge II | 2 |
| 4779.979 | | Co I | 158 | 4799.412 | | Fe I | 888 | 4815.05 | | Zr I | 44 |
| 4779.986 | | Ti II | 92 | 4799.423 | | Nd II | 2 | 4815.22 | P | Fe I | 720 |
| 4780.60 | P | Fe II | 50 | 4799.786 | | V I | 3 | 4815.515 | | S II | 9 |
| 4780.81 | P | Fe I | 633 | 4799.797 | | Ti I | 242 | 4815.62 | | Zr I | 43 |
| 4781.04 | | Y I | 13 | 4799.83 | | Ni I | 161 | 4815.806 | | Sm II | 14 |
| 4781.168 | | N II | 20 | 4799.859 | | Gd II | 126 | 4815.900 | | Co I | 142 |
| 4781.32 | | Cl II | 40 | 4799.918 | | Cd I | 2 | 4815.92 | | Ni I | 131 |
| 4781.432 | | Co I | 57 | 4799.94 | P | V II | 29 | 4816.012 | | Sm II | 41 |
| 4781.718 | | Ti I | 41 | 4800.100 | | Gd II | 133 | 4816.41 | | Cr I | 283 |
| 4781.82 | | Cl II | 13 | 4800.14 | | Fe I | 384 | 4816.47 | P | Ti I | 40 |
| 4781.95 | | Ne II | 71 | 4800.55 | P | Fe I | 590 | 4816.47 | | Zr II | 66 |
| 4782.79 | P | Fe I | 588 | 4800.652 | | Fe I | 1042 | 4816.67 | P | Fe I | 588 |
| 4783.06 | | Cr I | 283 | 4800.77 | P | O IV | 9 | 4817.22 | | Hf II | 69 |
| 4783.306 | | Ti I | 41 | 4801.030 | | Cr I | 168 | 4817.33 | | C I | 5 |
| 4783.420 | | Mn I | 16 | 4801.05 | | Gd II | 65 | 4817.773 | | Fe I | 67 |
| 4783.43 | | O IV | 9 | 4801.150 | | Pr II | 36 | 4817.847 | | Ni I | 254 |
| 4784.320 | | Sr I | 5 | 4801.63 | P | Fe I | 1115 | 4818.26 | P | Fe II | 11 |
| 4784.480 | | V I | 3 | 4801.80 | | O I | 15 | 4818.66 | P | Fe I | 719 |
| 4784.70 | P | Cr I | 168 | 4801.90 | P | Ti I | 40 | 4819.46 | | Cl II | 1 |
| 4784.94 | | Zr I | 44 | 4801.93 | P | Ti I | 40 | 4819.60 | | S II | 46,52 |
| 4785.070 | | Co I | 186 | 4802.20 | | O I | 15 | 4819.64 | | Y I | 13 |
| 4785.42 | | Lu II | 5 | 4802.53 | P | Fe I | 1206 | 4819.746 | | Si III | 9 |
| 4785.44 | | Cl II | 40 | 4802.575 | | Gd II | 43 | 4819.79 | | Cl II | 13 |
| 4785.963 | | Fe I | 1044 | 4802.81 | | S III | | 4820.336 | | Nd II | 47 |
| 4786.293 | | Ni I | 50 | 4802.883 | | Fe I | 888,934 | 4820.410 | | Ti I | 126 |
| 4786.515 | | V I | 113 | 4803.00 | | O I | 15 | 4821.01 | P | Ti II | 29 |
| 4786.541 | | Ni I | 98 | 4803.272 | | N II | 20 | 4821.143 | | Ni I | 254 |
| 4786.58 | | Y II | 22 | 4803.536 | | Gd II | 102 | 4821.29 | | Ti I | 201 |
| 4786.810 | | Fe I | 467 | 4804.04 | | La II | 37 | 4821.955 | | Gd II | 133 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4822.06 | | Cr I | 144 | 4840.329 | | Fe I | 1068 | 4858.24 | P | Fe I | 1069 |
| 4822.39 | P | Ti II | 110 | 4840.874 | | Ti I | 53 | 4858.27 | P | Fe I | 1098 |
| 4822.66 | P | Fe I | 633 | 4840.89 | P | Fe I | 1070 | 4858.74 | | N III | 9 |
| 4823.31 | | Y II | 22 | 4841.52 | P | Cr I | 266 | 4858.88 | | N III | 9 |
| 4823.396 | | V II | 223 | 4841.65 | P | Fe I | 633 | 4859.030 | | Nd II | 3 |
| 4823.516 | | Mn I | 16 | 4841.67 | P | Ni I | 164 | 4859.038 | | Pr II | 25 |
| 4823.84 | | P II | 13 | 4841.701 | | Sm I | 2 | 4859.12 | | Fe I | 1068 |
| 4823.93 | P | O IV | 9 | 4841.73 | | Cr I | 266 | 4859.18 | | La II | 86 |
| 4824.05 | | La II | 50 | 4841.80 | | Fe I | 1070 | 4859.28 | | Si II | |
| 4824.07 | | S II | 52 | 4841.98 | | Zr II | 138 | 4859.31 | P | Fe I | 632 |
| 4824.13 | | Cr II | 30 | 4842.01 | | Ni I | 260 | 4859.323 | | Me II | 2 |
| 4824.162 | | Fe I | 888 | 4842.19 | P | Fe I | 511 | 4859.748 | | Fe I | 318 |
| 4824.20 | | Ge II | 2 | 4842.50 | | V II | 248 | 4859.84 | | Y I | 13 |
| 4824.29 | | Zr I | 43 | 4842.71 | P | Fe I | 1098 | 4860.029 | | D | 1 |
| 4824.97 | P | Cr II | 25 | 4842.78 | | Fe I | 1069 | 4860.20 | | Cr II | 30 |
| 4825.445 | | Ti I | 250 | 4843.155 | | Fe I | 687 | 4860.35 | | N II | 67 |
| 4825.482 | | Nd II | 3 | 4843.165 | | Ni I | 50 | 4860.37 | | Cr I | 31 |
| 4825.51 | | Cr I | 144 | 4843.19 | | Mn I | 43 | 4860.90 | | La II | 8 |
| 4825.593 | | Mn I | 43 | 4843.26 | | O II | 105 | 4860.98 | P | Fe I | 688 |
| 4825.71 | P | Fe II | 30 | 4843.29 | | La II | 98 | 4861.03 | | O II | 57 |
| 4825.91 | | Ra I | 1 | 4843.39 | P | Fe I | 794 | 4861.205 | | Cr I | 31 |
| 4826.649 | | Pr II | 20 | 4843.454 | | Co I | 158 | 4861.33 | | N III | 9 |
| 4826.73 | | C I | 5 | 4843.46 | | Ba II | 15 | 4861.332 | | H | 1 |
| 4826.87 | | La II | 22 | 4843.53 | P | Ni I | 235 | 4861.842 | | Cr I | 31 |
| 4826.896 | | Mn I | 43 | 4843.829 | | W I | 1 | 4862.054 | | Mn I | 43 |
| 4827.338 | | Ne I | 10 | 4843.989 | | Ti I | 217 | 4862.54 | P | Fe I | 1070 |
| 4827.458 | | V I | 3 | 4844.00 | | Hf II | 16 | 4862.60 | P | Fe I | 1069 |
| 4827.597 | | Ti I | 250 | 4844.016 | | Fe I | 750 | 4863.653 | | Fe I | 687 |
| 4828.05 | | Zr I | 44 | 4844.208 | | Sm II | 26 | 4863.75 | P | Ti I | 217 |
| 4828.66 | | Cr I | 31 | 4844.31 | P | V II | 29 | 4863.78 | P | Fe I | 384 |
| 4828.923 | | Si III | 9 | 4844.315 | | Mn I | 43 | 4863.931 | | Ni I | 113 |
| 4829.028 | | Ni I | 131 | 4844.87 | P | Ce II | 8 | 4864.187 | | Ti I | 201 |
| 4829.23 | | K II | 1 | 4845.01 | | O II | 30 | 4864.282 | | Ni I | 128 |
| 4829.376 | | Cr I | 31 | 4845.17 | | Ni I | 115 | 4864.32 | | Cr II | 30 |
| 4829.568 | | Sm II | 36 | 4845.656 | | Fe I | 588,888 | 4864.38 | | P II | 13 |
| 4829.68 | P | Fe I | 1038 | 4845.67 | | Y I | 13 | 4864.741 | | V I | 3 |
| 4830.40 | P | Fe II | 206 | 4846.29 | | Cr I | 208 | 4864.83 | P | V I | 50 |
| 4830.51 | | La II | 51 | 4846.47 | P | Fe II | 25 | 4864.95 | | O II | 29 |
| 4831.11 | P | Fe II | 54 | 4846.574 | | Ce II | 17 | 4865.02 | | Gd II | 65 |
| 4831.15 | P | Ni I | 100 | 4847.09 | P | Fe I | 67 | 4865.43 | | Hf II | 93 |
| 4831.183 | | Ni I | 111 | 4847.14 | | Ba II | 14 | 4865.620 | | Ti II | 29 |
| 4831.627 | | Cr I | 208 | 4847.177 | | Cr I | 144 | 4865.96 | | A II | 85 |
| 4831.642 | | V I | 3 | 4847.296 | | Ca I | 50 | 4866.07 | | Zr I | 44 |
| 4832.065 | | Ti I | 250 | 4847.61 | P | Fe II | 30 | 4866.267 | | Ni I | 111 |
| 4832.075 | | Sr I | 4,5 | 4847.760 | | Sm II | 53 | 4866.77 | P | Fe I | 1093 |
| 4832.236 | | Cu II | 1 | 4847.90 | | A II | 6 | 4867.18 | | N III | 9 |
| 4832.276 | | Nd II | | 4848.24 | | Cr II | 30 | 4867.53 | P | Fe I | 38 |
| 4832.427 | | V I | 3 | 4848.41 | P | Ti I | 217 | 4867.59 | | A II | 62 |
| 4832.54 | P | Cr I | 266 | 4848.46 | | Hf II | 83 | 4867.64 | P | Fe I | 587 |
| 4832.704 | | Ni I | 146 | 4848.487 | | Ti I | 201 | 4867.73 | P | Fe II | 30 |
| 4832.734 | | Fe I | 888,1098 | 4848.821 | | V I | 78 | 4867.79 | P | V II | 29 |
| 4832.97 | P | Cr II | 176 | 4848.898 | | Fe I | 114 | 4867.839 | | Nd II | 46 |
| 4833.027 | | V I | 78 | 4849.12 | P | Ni I | 112 | 4867.870 | | Co I | 158 |
| 4833.21 | P | Fe II | 30 | 4849.18 | P | Ti II | 29 | 4868.264 | | Ti I | 231 |
| 4834.232 | | Gd II | 65 | 4849.4 | | Ne II | 71 | 4868.38 | P | Fe I | 38 |
| 4834.359 | | Co I | 57 | 4849.67 | P | Fe I | 793 | 4868.700 | | Sr I | 10 |
| 4834.511 | | Fe I | 115 | 4850.58 | | La II | 51,88 | 4868.82 | P | Fe II | 30 |
| 4834.618 | | Sm II | 45 | 4850.84 | | Ba II | 15 | 4869.153 | | Ru I | 11 |
| 4834.82 | P | Ni I | 158 | 4851.10 | | Mg II | 25 | 4869.45 | P | Fe I | 751 |
| 4835.68 | | Cr I | 229 | 4851.36 | | Zr I | 43 | 4869.8 | | Ne II | 71 |
| 4835.85 | | S II | 46 | 4851.465 | | Cr I | 208 | 4870.05 | P | Fe I | 985 |
| 4835.862 | | Fe I | 1068 | 4851.483 | | V I | 3 | 4870.129 | | Ti I | 231 |
| 4835.982 | | Nd II | 1 | 4852.560 | | Ni I | 130 | 4870.71 | P | Fe II | 30 |
| 4836.125 | | Ti I | 241 | 4852.69 | | Y I | 13 | 4870.796 | | Cr I | 143 |
| 4836.18 | P | Cr I | 266 | 4853.30 | P | Ni I | 207 | 4870.845 | | Ni I | 131 |
| 4836.22 | | Cr II | 30 | 4853.52 | P | Cr I | 61 | 4871.27 | P | Fe II | 25 |
| 4836.27 | | Ni I | 114 | 4853.74 | | Ni I | 99 | 4871.323 | | Fe I | 318 |
| 4836.79 | | Cl II | 13 | 4854.18 | P | Fe I | 1243 | 4871.58 | | O II | 57 |
| 4836.857 | | Cr I | 144 | 4854.365 | | Sm II | 36 | 4871.94 | P | Fe I | 630 |
| 4837.42 | P | Ti I | 250 | 4854.604 | | Mn I | 43 | 4872.02 | | Cr I | 30 |
| 4837.65 | P | Fe I | 1243 | 4854.65 | | Zr II | 78 | 4872.144 | | Fe I | 318 |
| 4837.65 | P | Ni I | 85 | 4854.727 | | Ti I | 217 | 4872.493 | | Sr I | 4 |
| 4837.948 | | Co I | 15 | 4854.87 | | Y II | 22 | 4872.69 | P | Fe I | 1115 |
| 4838.09 | P | Fe I | 630 | 4854.89 | | Fe I | 1043 | 4872.91 | P | Fe I | 1097 |
| 4838.244 | | Mn I | 43 | 4855.045 | | Sr I | 10 | 4873.27 | P | Ni I | 112 |
| 4838.519 | | Fe I | 687 | 4855.146 | | Cr I | 61 | 4873.339 | | Gd II | 65 |
| 4838.651 | | Ni I | 260 | 4855.235 | | Co I | 14 | 4873.437 | | Ni I | 111 |
| 4838.81 | P | Fe I | 1167 | 4855.414 | | Ni I | 130 | 4873.58 | | N III | 9 |
| 4839.08 | | V II | 223 | 4855.54 | P | Fe II | 25 | 4873.74 | P | Fe I | 633 |
| 4839.251 | | Ti I | 217 | 4855.683 | | Fe I | 687 | 4874.025 | | Ti II | 114 |
| 4839.251 | | Ti II | 110 | 4855.95 | P | Ti II | 114 | 4874.35 | P | Fe I | 467 |
| 4839.549 | | Fe I | 588 | 4856.012 | | Ti I | 231 | 4874.651 | | Cr I | 167 |
| 4839.616 | | Gd II | 126 | 4856.19 | | Cr II | 30 | 4874.805 | | V II | 197 |
| 4839.62 | | Lu II | 2 | 4856.49 | | O II | 29 | 4874.809 | | Ni I | 98 |
| 4839.77 | P | Fe I | 1206 | 4856.76 | | O II | 29 | 4875.32 | P | Fe I | 1038 |
| 4839.87 | | Y I | 13 | 4857.04 | | Cl II | 74 | 4875.462 | | V I | 3 |
| 4840.00 | P | Fe II | 30 | 4857.34 | | Cr I | 61 | 4875.49. | P | V II | 248 |
| 4840.02 | | La II | 37 | 4857.382 | | Ni I | 111 | 4875.72 | P | Fe I | 1243 |
| 4840.22 | | Cr I | 266 | 4857.60 | | Cr II | 200 | 4875.89 | | Fe I | 687 |
| 4840.253 | | Co I | 158 | 4857.938 | | Co I | 15 | 4875.966 | | Gd II | 126 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4876.06 | | Sr I | 4 | 4896.71 | | N III | 9 | 4919.867 | | Ti I | 200 |
| 4876.19 | P | Fe I | 631 | 4896.77 | | Cl II | 17 | 4920.272 | | Co I | 57 |
| 4876.325 | | Sr I | 5 | 4898.52 | | Al II | 96 | 4920.28 | P | Cr II | 36 |
| 4876.41 | | Cr II | 30 | 4898.76 | | Al II | 104 | 4920.35 | P Forb | He I | 49 |
| 4876.48 | P | Cr II | 30 | 4899.520 | | Co I | 92 | 4920.509 | | Fe I | 318 |
| 4877.08 | | A II | 112 | 4899.64 | | Al II | 96 | 4920.692 | | Nd II | 2 |
| 4877.61 | P | Fe I | 384 | 4899.90 | P | Fe II | 30 | 4920.945 | | Cr I | 143 |
| 4878.049 | | Gd II | 64 | 4899.910 | | Ti I | 157 | 4920.98 | | La II | 7 |
| 4878.132 | | Ca I | 35 | 4899.92 | | La II | 7 | 4921.074 | | Ru I | 11 |
| 4878.218 | | Fe I | 318 | 4899.934 | | Ba II | 3 | 4921.18 | P | Ni I | 100 |
| 4879.121 | | Pr II | 20 | 4900.03 | P | Ti I | 295 | 4921.29 | | Ta I | 5 |
| 4879.90 | | A II | 14 | 4900.13 | | Y II | 22 | 4921.69 | | Si II | |
| 4880.06 | | Cr I | 167 | 4900.47 | | S II | 46 | 4921.768 | | Ti I | 200 |
| 4880.20 | | La II | 153 | 4900.50 | P | Cr I | 202 | 4921.80 | | La II | 7 |
| 4880.25 | | Co I | 15 | 4900.624 | | V I | 118 | 4921.929 | | He I | 48 |
| 4880.30 | P | V II | 29 | 4900.625 | | Ti I | 295 | 4922.14 | | Cl II | 17 |
| 4880.560 | | V I | 50 | 4900.83 | P | Cr I | 202 | 4922.18 | P | Fe I | 1110 |
| 4880.922 | | Ti I | 201 | 4900.97 | | Ni I | 98 | 4922.267 | | Cr I | 143 |
| 4881.25 | | Zr I | 44 | 4901.30 | | S II | 46 | 4922.3 | | Ne II | 71 |
| 4881.3 | | Li II | 4 | 4901.65 | | Cr II | 190 | 4923.578 | | Gd II | 126 |
| 4881.44 | | Y II | 12 | 4902.77 | | Al II | 96 | 4923.921 | | Fe II | 42 |
| 4881.554 | | V I | 3 | 4902.89 | P | V II | 29 | 4924.043 | | Zn II | 3 |
| 4881.726 | | Fe I | 588,1041 | 4903.10 | P | Fe I | 589 | 4924.08 | | S II | 7 |
| 4881.81 | | N III | 9 | 4903.239 | | Cr I | 31 | 4924.28 | | Cl II | 12 |
| 4881.925 | | Gd II | 113,133 | 4903.317 | | Fe I | 318 | 4924.60 | | O II | 28 |
| 4882.151 | | Fe I | 687 | 4903.71 | | Al III | 11 | 4924.776 | | Fe I | 114 |
| 4882.183 | | V I | 50 | 4903.85 | P | Fe II | 30 | 4924.83 | | Cl II | 39 |
| 4882.25 | | A II | | 4904.172 | | Co I | 141 | 4925 | P | O V | 10 |
| 4882.326 | | Ti I | 231 | 4904.285 | | V I | 50 | 4925.17 | | Cl II | 12 |
| 4882.462 | | Ce II | | 4904.350 | | V I | 118 | 4925.28 | | Fe I | 1065 |
| 4882.704 | | Co I | 158 | 4904.413 | | Ni I | 129 | 4925.32 | | S II | 7 |
| 4883.415 | | V II | 209 | 4904.447 | | V I | 118 | 4925.396 | | Ti I | 157 |
| 4883.61 | | Zr I | 44 | 4904.51 | | Hf II | 83 | 4925.578 | | Ni I | 141 |
| 4883.69 | | Y II | 22 | 4904.75 | | A II | 34 | 4925.657 | | V I | 50 |
| 4883.73 | | S II | 46 | 4904.76 | | Cl II | 17 | 4925.90 | | Zr II | 107 |
| 4884.06 | | V II | 197 | 4905.09 | | Zr I | 43 | 4926.02 | | Ta I | 6 |
| 4884.14 | | N III | 9 | 4905.15 | | Fe I | 986 | 4926.148 | | Ti I | 39 |
| 4884.57 | | Cr II | 30 | 4906.11 | | Y I | 13 | 4926.82 | P | Fe I | 844 |
| 4884.915 | | Ne I | 20,35 | 4906.80 | P | Fe I | 1096 | 4926.94 | P | V II | 29 |
| 4884.949 | | Cr I | | 4906.88 | | O II | 28 | 4926.99 | | Hf II | 13 |
| 4885.082 | | Ti I | 157 | 4906.88 | | Si II | | 4927.17 | | P II | 13 |
| 4885.435 | | Fe I | 966 | 4907.125 | | Co I | 14 | 4927.42 | | Fe I | 792 |
| 4885.63 | | S II | 15 | 4907.17 | | Cl II | 39 | 4927.56 | | Fe III | 43 |
| 4885.776 | | Cr I | 30 | 4907.743 | | Fe I | 687 | 4928.290 | | Co I | 158 |
| 4885.957 | | Cr I | 143 | 4907.888 | | Ru I | 11 | 4928.342 | | Ti I | 200 |
| 4886.17 | P | Fe I | 467 | 4908.46 | | Ti I | 295 | 4928.62 | P | V II | 29 |
| 4886.335 | | Fe I | 1066 | 4908.61 | P | Fe I | 115 | 4928.895 | | Ti I | 39 |
| 4886.725 | | Ni I | 158 | 4908.67 | | Zr II | 145 | 4930.04 | P | Fe I | 631 |
| 4886.821 | | V I | 50 | 4908.74 | | Fe III | 111 | 4930.183 | | Cr I | 259 |
| 4886.92 | P | Fe II | 54 | 4909.105 | | Ti I | 39 | 4930.331 | | Fe I | 985 |
| 4886.992 | | Ni I | 141 | 4909.387 | | Fe I | 985 | 4930.821 | | Ni I | 193 |
| 4887.013 | | Cr I | 143 | 4909.726 | | Cu II | 5 | 4931.653 | | Cu II | 5 |
| 4887.189 | | Fe I | 1065 | 4909.87 | | Cr I | 61 | 4932.00 | | C I | 13 |
| 4887.37 | P | Fe I | 1037 | 4910.027 | | Fe I | 687 | 4932.029 | | V I | 50 |
| 4887.72 | | Zr I | 43 | 4910.328 | | Fe I | 1068 | 4933 | P | N V | 7 |
| 4887.73 | | Cr I | 31 | 4910.570 | | Fe I | 1068 | 4933.19 | P | Fe I | 1070 |
| 4888.29 | | A II | 135 | 4910.838 | | Gd II | 64 | 4933.24 | | A II | 6 |
| 4888.530 | | Cr I | 31 | 4911.205 | | Ti II | 114 | 4933.348 | | Fe I | 1065 |
| 4888.542 | | Gd II | 126 | 4911.34 | | La II | 87 | 4933.878 | | Fe I | 968 |
| 4888.651 | | Fe I | 1066 | 4911.52 | P | Fe I | 1098 | 4934.023 | | Fe I | 1068 |
| 4889.009 | | Fe I | 67,749 | 4911.593 | | Ru I | 11 | 4934.086 | | Ba II | 1 |
| 4889.06 | | A II | 15 | 4911.664 | | Zn II | 3 | 4934.46 | | Hf II | 16 |
| 4889.113 | | Fe I | 985 | 4911.786 | | Fe I | 984 | 4934.83 | | La II | 72 |
| 4889.15 | | Re I | 1 | 4912.030 | | Ni I | 111 | 4934.89 | | Cr I | 259 |
| 4889.690 | | Cu II | 1 | 4912.38 | | V II | 222 | 4935.03 | | N I | 9 |
| 4889.73 | | Cr I | 61 | 4912.399 | | Co I | 14 | 4935.42 | P | Fe I | 886 |
| 4890.45 | P | Ni I | 114 | 4912.49 | | Cr II | 190 | 4935.61 | | La II | 50 |
| 4890.762 | | Fe I | 318 | 4912.52 | P | Fe I | 1040 | 4935.830 | | Ni I | 177 |
| 4890.93 | | O II | 28 | 4913.248 | | Sm II | 53 | 4936.13 | | A II | 34 |
| 4891.43 | | La II | 95 | 4913.366 | | Fe II | 218 | 4936.155 | | Gd II | 116 |
| 4891.496 | | Fe I | 318 | 4913.616 | | Ti I | 157 | 4936.334 | | Cr I | 166 |
| 4891.55 | P | Cr II | 36 | 4913.970 | | Ni I | 132 | 4936.41 | | Ta I | 11 |
| 4891.828 | | Ti I | 201 | 4914.32 | | A II | 112 | 4936.99 | | Cl II | 12 |
| 4891.97 | | Cr I | 61 | 4914.32 | | Cl II | 17 | 4937.196 | | Cu II | 6 |
| 4891.980 | | Sr I | 10 | 4914.385 | | Nd II | 52 | 4937.337 | | Ni I | 114 |
| 4892.11 | | Gd II | 116 | 4914.90 | | N I | 9 | 4937.719 | | Ti I | 39 |
| 4892.86 | | Fe I | 1070 | 4915.236 | | Ti I | 157 | 4938.04 | | Ti I | 173 |
| 4893.065 | | Ti I | 231 | 4916.67 | P | Fe I | 986 | 4938.100 | | Sm II | 23 |
| 4893.12 | | Zr I | 43 | 4916.78 | | Gd II | 125 | 4938.183 | | Fe I | 966 |
| 4893.44 | | Y I | 13 | 4917.15 | | S II | 15 | 4938.283 | | Ti I | 289 |
| 4893.59 | P | Fe I | 1096 | 4917.25 | | Fe I | 1066 | 4938.820 | | Fe I | 318 |
| 4893.70 | P | Fe I | 1113 | 4917.72 | | Cl II | 17 | 4939.244 | | Fe I | 1065,1070 |
| 4893.780 | | Fe II | 36 | 4918.03 | | Fe I | 1070 | 4939.46 | P | Fe I | 1043 |
| 4893.90 | | Ti I | 201 | 4918.363 | | Ni I | 177 | 4939.690 | | Fe I | 16 |
| 4893.968 | | Ce II | 31 | 4918.373 | | Cu II | 5 | 4940 | P | O V | 10 |
| 4894.218 | | V I | 118 | 4918.712 | | Ni I | 113 | 4941.015 | | Ti I | 173 |
| 4894.30 | | Gd II | 65 | 4918.98 | | Al II | 103 | 4941.03 | P | Cr II | 36 |
| 4894.43 | | Zr II | 107 | 4918.999 | | Fe I | 318 | 4941.12 | | O II | 33 |
| 4895.20 | | N II | 1 | 4919.73 | P | Fe I | 631 | 4941.322 | | Ti I | 39 |
| 4896.437 | | Fe I | 984 | 4919.814 | | Th II | 7 | 4941.562 | | Ti I | 200 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4941.920 | | Ni I | 114 | 4967.944 | | Sr I | 4 | 4997.099 | | Ti I | 5 |
| 4942.418 | | Mn I | 20 | 4968.50 | | V II | 68 | 4997.23 | | N II | 64 |
| 4942.47 | | S II | 7 | 4968.566 | | Ti I | 173 | 4997.81 | | Ba II | 14 |
| 4942.495 | | Cr I | 9 | 4968.575 | | Gd II | 124 | 4998.233 | | Ni I | 111 |
| 4942.59 | P | Fe I | 1097 | 4968.709 | | Fe I | 887 | 4998.373 | | Gd II | 133 |
| 4942.96 | | A II | 75 | 4968.76 | | O I | 14 | 4998.43 | P | Al II | 30 |
| 4943 | P | N V | 9 | 4969.65 | | P II | 13 | 4998.55 | | Cr I | 123 |
| 4943.06 | | O II | 33 | 4969.927 | | Fe I | 1066 | 4999.114 | | Fe I | 1040 |
| 4943.074 | | Ti I | 52 | 4970.12 | | Cl II | 12 | 4999.46 | | La II | 37 |
| 4943.24 | | Cl II | 47 | 4970.39 | | La II | 37 | 4999.504 | | Ti I | 38 |
| 4943.24 | | K II | 7 | 4970.496 | | Fe I | 883 | 4999.69 | | Hf II | 35 |
| 4943.42 | | P II | 13 | 4970.66 | P | Fe I | 985 | 5000.335 | | Ni I | 145 |
| 4944.388 | | Ti I | 173 | 4971.354 | | Ni I | 274 | 5000.73 | P | Fe II | 25 |
| 4944.59 | | Cr I | 259 | 4971.475 | | Ce II | | 5000.91 | | Zr II | 95 |
| 4945 | P | N V | 10 | 4971.668 | | Sr I | 4 | 5000.97 | | Al II | 79 |
| 4945.29 | P | Fe I | 466 | 4971.92 | | Li I | 5 | 5000.991 | | Ti I | 173 |
| 4945.38 | | Hf II | 15 | 4971.035 | | Co I | 158 | 5001.128 | | N II | 19 |
| 4945.458 | | Ni I | 145 | 4972.16 | | A II | 6 | 5001.15 | | Lu I | |
| 4945.65 | | Fe I | 1113 | 4972.39 | P | Fe I | 1096 | 5001.469 | | N II | 19 |
| 4946.037 | | Ni I | 148 | 4972.90 | P | Fe I | 631 | 5001.489 | | Ca II | 15 |
| 4946.394 | | Fe I | 687 | 4973.051 | | Ti I | 173 | 5001.871 | | Fe I | 965 |
| 4946.47 | | La II | 36 | 4973.108 | | Fe I | 984 | 5002.02 | | Fe III | |
| 4947.56 | | V II | 197 | 4973.16 | | V II | 209 | 5002.12 | | La II | 92 |
| 4947.91 | P | Cr I | 202 | 4973.4 | P Forb | Na I | 10 | 5002.320 | | V I | 132 |
| 4947.994 | | Ti I | 39 | 4973.896 | | Gd II | 64 | 5002.692 | | N II | 4 |
| 4948.183 | | Ti I | 200 | 4974.47 | | Co I | 92 | 5002.800 | | Fe I | 687 |
| 4948.54 | | Fe III | | 4975.344 | | Ti I | 283 | 5003.751 | | Ni I | 50 |
| 4948.627 | | Sm II | 49 | 4975.415 | | Fe I | 586 | 5003.85 | P | Fe I | 211 |
| 4948.64 | P | Cr I | 202 | 4976.155 | | Ni I | 112 | 5004.034 | | Fe I | 1112 |
| 4948.77 | | Zr I | 28 | 4976.345 | | Ni I | 49 | 5004.187 | | Co I | 141 |
| 4948.848 | | Fe II | | 4976.71 | P | Ni I | 254 | 5004.264 | | Fe II | |
| 4949.45 | | A II | 62 | 4977.6 | P Forb | Na I | 10 | 5004.38 | | Cr I | 122 |
| 4949.58 | | Cr I | 259 | 4977.653 | | Fe I | 985 | 5004.907 | | Mn I | 20 |
| 4949.76 | | La I | 4 | 4977.731 | | Ti I | 173 | 5005.140 | | N II | 19,6 |
| 4950.112 | | Fe I | 687 | 4978.11 | P | Fe I | 986 | 5005.160 | | Ne I | 29 |
| 4951.66 | P | V II | 29 | 4978.191 | | Ti I | 173 | 5005.18 | P | Ti II | 71 |
| 4952 | P | N V | 8 | 4978.541 | | Na I | 9 | 5005.60 | | K II | 2 |
| 4952.06 | | La II | 92 | 4978.606 | | Fe I | 966 | 5005.720 | | Fe I | 984 |
| 4952.334 | | Ni I | 113 | 4978.70 | P | Fe I | 1035 | 5006.126 | | Fe I | 318 |
| 4952.371 | | Sm II | 32 | 4979.58 | | Fe I | 883 | 5006.169 | | W I | 1 |
| 4952.646 | | Fe I | 1068,1111 | 4979.84 | P | Fe I | 465 | 5006.71 | | S II | 57 |
| 4952.78 | | Cr II | | 4980.161 | | Ni I | 112 | 5006.72 | P | Fe I | 211 |
| 4953.179 | | Co I | 14 | 4980.30 | P | Cr I | 123 | 5006.787 | | Cu II | 10 |
| 4953.204 | | Ni I | 111 | 4981.30 | P | Cr I | 123 | 5007.209 | | Ti I | 38 |
| 4953.37 | P | Ti I | 39 | 4981.38 | P | Ti II | 71 | 5007.286 | | Co I | 14 |
| 4953.714 | | Cr I | 166 | 4981.732 | | Ti I | 38 | 5007.289 | | Fe I | 966,1065 |
| 4953.733 | | Cu II | 9 | 4982.13 | | Y II | 20 | 5007.316 | | N II | 24 |
| 4953.979 | | Fe II | 168 | 4982.507 | | Fe I | 1067 | 5009.35 | | A II | 6 |
| 4954.025 | | Gd II | 114 | 4982.813 | | Na I | 9 | 5009.54 | | S II | 7 |
| 4954.16 | | C II | 25 | 4983.258 | | Fe I | 1067 | 5009.652 | | Ti I | 5 |
| 4954.30 | P | Fe I | 1093 | 4983.63 | P | Cr I | 202 | 5010.045 | | Ni I | 111 |
| 4954.33 | | P II | 13 | 4983.855 | | Fe I | 1066 | 5010.202 | | Ti II | 113 |
| 4954.811 | | Cr I | 166 | 4984.126 | | Ni I | 143 | 5010.30 | P | Fe I | 211 |
| 4955.78 | | O II | 33 | 4984.905 | | Gd II | 64 | 5010.620 | | N II | 4 |
| 4957.0334 | | Ne I | 25 | 4985.261 | | Fe I | 984 | 5010.821 | | Gd II | 59 |
| 4957.15 | | Ba II | 10 | 4985.46 | P | Cr II | 36 | 5010.961 | | Ni I | 144 |
| 4957.302 | | Fe I | 318 | 4985.503 | | Cu II | 6 | 5011.24 | P | Fe I | 1066 |
| 4957.603 | | Fe I | 318 | 4985.553 | | Fe I | 318 | 5011.24 | | N II | 64 |
| 4957.68 | P | Fe I | 1066 | 4985.60 | | As II | 3 | 5012.026 | | N II | 64 |
| 4958.26 | P | Ti I | 52 | 4985.98 | P | Fe I | 1094 | 5012.071 | | Fe I | 16 |
| 4958.788 | | Gd II | 64 | 4986.24 | | Fe I | 1070 | 5012.16 | P | Fe I | 1070 |
| 4959.130 | | Nd II | 1 | 4986.82 | | La II | 22 | 5012.464 | | Ni I | 111 |
| 4959.52 | | C II | 25 | 4986.90 | P | Fe I | 1092 | 5012.611 | | Cu II | 7 |
| 4959.682 | | Co I | 14 | 4987.377 | | N II | 24 | 5012.68 | P | Fe I | 1093 |
| 4961.396 | | Nd II | 22 | 4987.62 | P | Fe I | 1094 | 5013.00 | | Ba II | 10 |
| 4961.908 | | Fe I | 845 | 4987.83 | P | Fe I | 966 | 5013.284 | | Ti I | 173 |
| 4961.936 | | Sm II | 41 | 4987.853 | | Co I | 14 | 5013.316 | | Cr I | 60 |
| 4962.10 | | Al II | 80 | 4988.963 | | Fe I | 1066 | 5013.38 | P | Ti II | 113 |
| 4962.263 | | Sr I | 4 | 4989.140 | | Ti I | 173 | 5013.712 | | Ti II | 71 |
| 4962.564 | | Fe I | 1097 | 4991.067 | | Ti I | 38 | 5014.03 | | S II | 15 |
| 4963.75 | | V II | 221 | 4991.11 | P | Fe II | 25 | 5014.185 | | Ti I | 5 |
| 4964.34 | P | Cr II | 36 | 4991.22 | | N II | 64 | 5014.277 | | Ti I | 38 |
| 4964.713 | | Ti I | 173 | 4991.27 | | La II | 57 | 5014.45 | | La II | 159 |
| 4964.90 | | C II | 25 | 4991.277 | | Fe I | 1065 | 5014.620 | | V I | 132 |
| 4964.928 | | Cr I | 9 | 4991.86 | P | Fe I | 1094 | 5014.950 | | Fe I | 965 |
| 4965.047 | | Gd II | 143 | 4991.94 | | S II | 7 | 5015.04 | | Gd I | 6 |
| 4965.12 | | A II | 14 | 4992.80 | P | Fe I | 1110 | 5015.30 | P | Fe I | 968 |
| 4965.14 | | Ni I | 147 | 4993.355 | | Fe II | 36 | 5015.675 | | He I | 4 |
| 4965.40 | | V II | 209 | 4993.51 | | S I | | 5016.162 | | Ti I | 38 |
| 4965.881 | | Mn I | 20 | 4993.687 | | Fe I | 1111 | 5016.387 | | N II | 19 |
| 4966.08 | P | V II | 29 | 4994.133 | | Fe I | 16 | 5016.48 | P | Fe I | 1089 |
| 4966.096 | | Fe I | 687 | 4994.14 | | Lu II | 2 | 5016.60 | | V II | 251 |
| 4966.30 | P | Fe I | 986 | 4994.358 | | N II | 24,64 | 5017.16 | | A II | 37 |
| 4966.581 | | Co I | 14 | 4995.062 | | Ti I | 216 | 5017.591 | | Ni I | 111 |
| 4966.80 | | Cr I | 259 | 4995.41 | P | Fe I | 1113 | 5017.63 | | A II | 13 |
| 4967.30 | | Ti I | 5 | 4995.52 | | Cl II | 12 | 5018.02 | P | Fe I | 884 |
| 4967.40 | | O I | 14 | 4995.65 | P | Ni I | 145 | 5018.294 | | Ni I | 162 |
| 4967.551 | | Ni I | 141 | 4995.89 | P | Ti II | 71 | 5018.43 | P | Fe I | 585 |
| 4967.86 | | O I | 14 | 4996.82 | | La II | 93 | 5018.434 | | Fe II | 42 |
| 4967.899 | | Fe I | 1067 | 4996.850 | | Ni I | 144 | 5018.78 | | O I | 13 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5019.18 | P | Fe I | 1242 | 5040.902 | | Fe I | 1092,1094 | 5070.249 | | Sc I | 13 |
| 5019.20 | | Cr I | 20 | 5041.063 | | Si II | 5 | 5070.957 | | Fe II | |
| 5019.34 | | O I | 13 | 5041.074 | | Fe I | 16 | 5071.023 | | Gd II | 114 |
| 5019.361 | | Gd II | 81 | 5041.077 | | Ni I | 158 | 5071.23 | | Hf II | 23 |
| 5019.478 | | Fe II | 168 | 5041.32 | P | Fe I | 1328 | 5071.40 | P | Co I | 14 |
| 5019.74 | P | Fe I | 966 | 5041.33 | P | Fe I | 1110 | 5071.475 | | Ti I | 110 |
| 5019.855 | | V II | 232 | 5041.620 | | Ca I | 34 | 5072.077 | | Fe I | 1089 |
| 5019.979 | | Ca II | 15 | 5041.66 | | C I | 4 | 5072.30 | | Ti II | 113 |
| 5020.028 | | Ti I | 38 | 5041.759 | | Fe I | 36 | 5072.690 | | Fe I | 1095 |
| 5020.13 | | O I | 13 | 5042.195 | | Ni I | 131 | 5072.920 | | Cr I | 8 |
| 5020.368 | | Gd II | 64 | 5042.589 | | Mn I | 20 | 5073 | P | N IV | 17 |
| 5020.67 | P | Fe I | 629 | 5043.578 | | Ti I | 38 | 5073.60 | | N II | 10 |
| 5020.819 | | Fe I | 748 | 5044.008 | | Ce II | 16 | 5073.78 | | Fe III | 5 |
| 5021 | P | C IV | 3 | 5044.221 | | Fe I | 318 | 5074.063 | | Fe II | 205 |
| 5021.141 | | Ca II | 15 | 5044.8 | | C II | 35 | 5074.757 | | Fe I | 1094 |
| 5021.60 | P | Fe I | 1093 | 5045.098 | | N II | 4 | 5075.17 | P | Fe I | 1089 |
| 5021.68 | P | Fe I | 1067 | 5045.400 | | Ti I | 38 | 5075.304 | | Ce II | 14 |
| 5021.894 | | Fe I | 629 | 5046.61 | | Zr I | 62 | 5075.814 | | Sc I | 13 |
| 5021.903 | | Cr I | 8 | 5047.14 | P | Fe I | 1242 | 5075.829 | | Fe II | |
| 5022.244 | | Fe I | 965 | 5047.2 | | C II | 35 | 5075.92 | | Hf II | 16 |
| 5022.82 | P | Ti II | 71 | 5047.28 | | S II | 15 | 5076.15 | | Cr II | 201 |
| 5022.871 | | Ce II | 16 | 5047.308 | | V II | 127 | 5076.288 | | Fe I | 1089 |
| 5022.871 | | Ti I | 38 | 5047.736 | | He I | 47 | 5076.321 | | Ni I | 143 |
| 5022.874 | | Fe II | | 5048.04 | | La II | 90 | 5077.410 | | Co I | 184 |
| 5023 | P | C IV | 3 | 5048.082 | | Ni I | 161 | 5078.25 | | Cl II | 16 |
| 5023.11 | | N II | 64 | 5048.208 | | Ti I | 199 | 5078.28 | | Zr I | 62 |
| 5023.133 | | Gd II | 64 | 5048.454 | | Fe I | 984 | 5078.53 | P | Fe I | 744 |
| 5023.226 | | Fe I | 1095 | 5048.752 | | Cr I | 20 | 5078.711 | | Cr I | |
| 5023.39 | | Ti I | 199 | 5048.851 | | Ni I | 195 | 5079.002 | | Fe I | 1092 |
| 5023.476 | | Fe I | 1150 | 5048.91 | | V II | 209 | 5079.226 | | Fe I | 66 |
| 5024.842 | | Ti I | 38 | 5049.825 | | Fe I | 114 | 5079.65 | | Hf II | 71 |
| 5025.08 | P | Fe I | 1110 | 5050.13 | P | Fe I | 963 | 5079.681 | | Ce II | 15 |
| 5025.54 | | Cr I | 20 | 5050.878 | | Gd II | 114 | 5079.742 | | Fe I | 16 |
| 5025.570 | | Ti I | 173 | 5051.29 | P | Fe I | 1089 | 5079.961 | | Ni I | 60 |
| 5025.665 | | N II | 19 | 5051.527 | | Ni I | 144 | 5080.21 | | La II | 80 |
| 5025.73 | P | Fe I | 466 | 5051.636 | | Fe I | 16 | 5080.44 | | Hf II | 83 |
| 5026.50 | | Ni I | 158 | 5051.778 | | Cu II | 7 | 5080.523 | | Ni I | 143 |
| 5027.136 | | Fe I | 1065 | 5051.900 | | Cr I | 8 | 5080.95 | P | Fe I | 585 |
| 5027.19 | | S II | 1 | 5052.122 | | C I | 12 | 5081.111 | | Ni I | 194 |
| 5027.212 | | Fe I | 883 | 5052.879 | | Ti I | 199 | 5081.39 | P | Ti I | 109 |
| 5027.34 | P | Fe I | 968 | 5052.97 | P | Fe I | 585 | 5081.554 | | Sc I | 13 |
| 5027.51 | P | Fe I | 960 | 5053.300 | | W I | 1 | 5081.86 | P | Fe I | 962 |
| 5027.66 | P | Cr I | 202 | 5054.070 | | Ti I | 171,294 | 5081.920 | | Fe II | 221 |
| 5027.785 | | Fe I | 1110 | 5054.647 | | Fe I | 884 | 5082.354 | | Ni I | 130 |
| 5028.00 | | Cr I | 122 | 5056.00 | | Fe I | 1149 | 5082.68 | P | Fe I | 466 |
| 5028.129 | | Fe I | 791 | 5056.020 | | Si II | 5 | 5083.342 | | Fe I | 16 |
| 5029.623 | | Fe I | 718 | 5056.27 | | K II | 3 | 5083.713 | | Sc I | 13 |
| 5029.812 | | Mn I | 20 | 5056.353 | | Si II | 5 | 5084.081 | | Ni I | 162 |
| 5030.740 | | Fe II | | 5056.856 | | Fe I | 1111 | 5084.55 | P | Fe I | 932 |
| 5030.75 | | Fe III | | 5057.03 | | Hf II | 71 | 5085.02 | | Al II | 43 |
| 5030.784 | | Fe I | 585 | 5057.49 | | Fe I | 1067,1150 | 5085.333 | | Ti I | 109 |
| 5031.019 | | Sc II | 23 | 5057.83 | P | Fe I | 1185 | 5085.479 | | Ni I | 130 |
| 5031.030 | | Fe I | 746,883 | 5058.00 | | Fe I | 967 | 5085.547 | | Sc I | 13 |
| 5031.290 | | Gd II | 114 | 5058.03 | | Ni I | 141 | 5085.68 | P | Fe I | 1093 |
| 5031.562 | | Gd II | 64 | 5058.18 | | Hf II | 37 | 5085.695 | | Co I | 14 |
| 5031.901 | | Fe I | 1150 | 5058.50 | | Fe I | 884 | 5085.824 | | Cd I | 2 |
| 5032.41 | | S II | 7 | 5060.079 | | Fe I | 1,1095 | 5085.93 | P | Fe I | 963 |
| 5032.748 | | Ni I | 207 | 5060.635 | | Cu II | 1 | 5086.69 | | Fe III | 5 |
| 5032.794 | | Fe II | | 5061.794 | | Fe II | | 5086.77 | P | Fe I | 1067 |
| 5033.2 | | C II | 17 | 5062.07 | | A II | 6 | 5086.951 | | Sc I | 13 |
| 5034.06 | | Co I | 91 | 5062.112 | | Ti I | 199 | 5087.055 | | Ti I | 109 |
| 5034.33 | | Hf II | 26 | 5062.862 | | Gd II | 64 | 5087.25 | | Fe II | |
| 5034.415 | | Pr II | 37 | 5062.91 | | La II | 50 | 5087.42 | | Y II | 20 |
| 5035.025 | | Fe I | 885 | 5063.296 | | Fe I | 1066 | 5088.16 | P | Fe I | 1066 |
| 5035.374 | | Ni I | 143 | 5063.30 | | Fe III | 5 | 5088.260 | | Cu II | 6 |
| 5035.773 | | Fe II | | 5064.068 | | Ti I | 294 | 5088.534 | | Ni I | 190 |
| 5035.908 | | Ti I | 110 | 5064.321 | | Sc I | 13 | 5088.956 | | Ni I | 162 |
| 5035.961 | | Ni I | 145 | 5064.654 | | Ti I | 5 | 5089.278 | | Fe II | |
| 5036.294 | | Fe I | | 5064.69 | | Au I | 1 | 5089.837 | | Nd II | 46 |
| 5036.468 | | Ti I | 110 | 5064.92 | | Zr I | 62 | 5090.55 | | A II | 122 |
| 5036.92 | | Fe II | 36 | 5064.95 | P | Fe I | 1095 | 5090.56 | | La II | 100 |
| 5036.931 | | Fe I | 465 | 5065.020 | | Fe I | 1094 | 5090.787 | | Fe I | 1090 |
| 5037.0 | | C II | 17 | 5065.201 | | Fe I | 883 | 5091.14 | | Cr II | 201 |
| 5037.33 | | Ta I | 12 | 5065.448 | | Cu II | 11 | 5091.282 | | Co I | 14 |
| 5037.65 | | Ta I | 2 | 5065.910 | | Cr I | 60 | 5091.72 | P | Fe I | 745 |
| 5037.7505 | | Ne I | 14 | 5065.985 | | Ti I | 110 | 5091.73 | P | Fe I | 717 |
| 5037.81 | P | Ti II | 71 | 5066.28 | P | Fe I | 882 | 5091.890 | | Cr I | 20 |
| 5038.400 | | Ti I | 110 | 5066.99 | | La II | 162 | 5092.251 | | Gd II | 114 |
| 5038.599 | | Ni I | 166 | 5067 | P | N V | 6 | 5092.797 | | Nd II | 48 |
| 5038.81 | P | Fe I | 510 | 5067.082 | | Cu II | 7 | 5093.41 | | Cr I | 20 |
| 5038.87 | P | Cr I | 20 | 5067.162 | | Fe I | 1092 | 5093.470 | | Fe II | 205 |
| 5039.05 | | C I | 4 | 5067.714 | | Cr I | 60 | 5093.646 | | Fe II | |
| 5039.259 | | Ni I | 142 | 5067.82 | | Ni I | 141 | 5093.65 | | Al II | 43 |
| 5039.266 | | Fe I | 687 | 5068.10 | | Cl II | 16 | 5094.416 | | Ni I | 164 |
| 5039.959 | | Ti I | 5 | 5068.290 | | Cr I | 20 | 5094.955 | | Co I | 92 |
| 5040.25 | P | Fe I | 1093 | 5068.332 | | Ti I | 294 | 5096.063 | | Gd II | 59 |
| 5040.642 | | Ti I | 38 | 5068.774 | | Fe I | 383 | 5096.17 | P | Fe I | 1242 |
| 5040.744 | | Ru I | 11 | 5069.12 | | Ti II | 113 | 5096.716 | | Sc I | 13 |
| 5040.76 | | N II | 19 | 5069.351 | | Ti I | 199 | 5096.874 | | Ni I | 111 |
| 5040.82 | | Hf II | 14 | 5069.60 | P | Fe I | 211 | 5096.998 | | Fe I | 1092 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5097.29 | | Cr II | 24 | 5123.723 | | Fe I | 16 | 5146.06 | | O I | 28,39 |
| 5097.375 | | Fe II | | 5124.05 | P | Fe II | 167 | 5146.12 | P | Fe II | 35 |
| 5098.34 | | Cl II | 16 | 5124.17 | P | Fe I | 1035 | 5146.30 | P | Fe I | 1150 |
| 5098.38 | | Gd II | 114 | 5124.60 | P | Fe I | 585 | 5146.478 | | Ni I | 162 |
| 5098.594 | | Fe I | 984 | 5124.718 | | Co I | 197 | 5146.753 | | Co I | 170 |
| 5098.703 | | Fe I | 66 | 5124.98 | | Zr II | 87 | 5147.09 | | Fe II | |
| 5099.091 | | Fe I | 965 | 5125.130 | | Fe I | 1090 | 5147.483 | | Ti I | 4 |
| 5099.228 | | Sc I | 13 | 5125.211 | | Ni I | 160 | 5148.061 | | Fe I | 1090 |
| 5099.30 | | Cl II | 16 | 5125.56 | | Gd II | 99 | 5148.19 | P | Fe II | 52 |
| 5099.322 | | Ni I | 141 | 5125.715 | | Co I | 181 | 5148.234 | | Fe I | 1095 |
| 5099.946 | | Ni I | 161 | 5125.84 | | A II | 122 | 5148.65 | | Ni I | 158 |
| 5100.34 | | Al II | 43 | 5126.13 | | S II | 57 | 5148.724 | | V I | 123 |
| 5100.66 | P | Fe II | 35 | 5126.19 | P | Fe II | 53 | 5148.838 | | Na I | 8 |
| 5100.704 | | Fe II | | 5126.201 | | Co I | 170 | 5149.13 | | Mn I | 32 |
| 5100.706 | | Fe III | | 5126.218 | | Fe I | 1089 | 5149.33 | | Fe III | |
| 5100.840 | | Fe II | 185 | 5126.598 | | Fe I | 961 | 5149.538 | | Fe II | |
| 5100.937 | | Gd II | 114 | 5127.32 | | Fe III | 5 | 5149.796 | | Co I | 39 |
| 5100.95 | | Fe II | | 5127.363 | | Fe I | 16 | 5149.841 | | Gd II | 115 |
| 5101.121 | | Sc I | 13 | 5127.367 | | Ti I | 230 | 5150.19 | P | Fe I | 789 |
| 5101.48 | | Fe II | | 5127.68 | P | Fe I | 1 | 5150.843 | | Fe I | 16 |
| 5102.24 | P | Fe I | 65 | 5127.866 | | Fe II | 167 | 5150.86 | | Al III | 14 |
| 5102.971 | | Ni I | 49 | 5128.03 | | Ni I | 113 | 5150.890 | | Mn I | 32 |
| 5103.04 | | Cl II | 16 | 5128.53 | | Hf II | 58 | 5150.93 | P | Fe II | 35 |
| 5103.30 | | S II | 7 | 5128.530 | | V I | 123 | 5151.08 | | C II | 16 |
| 5103.45 | | Gd I | 6 | 5129.143 | | Ti II | 86 | 5151.83 | | Cr I | 19 |
| 5104.03 | P | Cr II | 38 | 5129.383 | | Ni I | 159 | 5151.87 | | V II | 196 |
| 5104.038 | | Fe I | 465 | 5129.520 | | Pr II | 38 | 5151.915 | | Fe I | 16 |
| 5104.08 | | Cl II | 16 | 5129.658 | | Fe I | 965 | 5152.185 | | Ti I | 4 |
| 5104.21 | | Fe I | 1092 | 5130.28 | | Gd II | 115 | 5152.20 | | P II | 7 |
| 5104.45 | | N II | 34 | 5130.389 | | Ni I | 177 | 5153.235 | | Cu I | 7 |
| 5104.47 | P | Fe I | 1090 | 5130.53 | | O I | 29,39 | 5153.402 | | Na I | 8 |
| 5105.541 | | Cu I | 2 | 5130.596 | | Nd II | 75 | 5153.49 | | Cr II | 21 |
| 5105.80 | | As II | 4 | 5130.91 | P | Fe I | 1149 | 5154.061 | | Ti II | 70 |
| 5106.23 | | La I | 9 | 5131.28 | P | Ti II | 86 | 5154.40 | P | Fe II | 35 |
| 5106.233 | | V II | 127 | 5131.475 | | Fe I | 66 | 5155.136 | | Ru I | 10 |
| 5107.406 | | Gd II | 81 | 5131.770 | | Ni I | 114 | 5155.140 | | Ni I | 206 |
| 5107.452 | | Fe I | 16 | 5132.19 | | V II | 127 | 5155.764 | | Ni I | 210 |
| 5107.54 | | La II | 164 | 5132.67 | P | Fe II | 35 | 5155.845 | | Gd I | 6 |
| 5107.645 | | Fe I | 36 | 5132.931 | | Ti I | 230 | 5156.0 | | Fe III | 5 |
| 5107.70 | | Cr I | 19 | 5132.96 | | C II | 16 | 5156.040 | | Sr I | 11 |
| 5107.80 | | As II | 6 | 5133.22 | P | Fe I | 818 | 5156.06 | | Hf II | 83 |
| 5108.903 | | Co I | 181 | 5133.29 | | C II | 16 | 5156.10 | | Fe II | |
| 5108.91 | | Gd II | 114 | 5133.42 | | Zr I | 27 | 5156.366 | | Co I | 180 |
| 5108.93 | | Cr I | 60 | 5133.467 | | Co I | 180 | 5156.74 | | La II | 7 |
| 5109.427 | | Ti I | 109 | 5133.692 | | Fe I | 1092 | 5156.76 | | Gd II | 114 |
| 5109.662 | | Fe I | 1089 | 5135.10 | | Lu I | 2 | 5157.28 | | V II | 127 |
| 5110.36 | P | Fe I | 790 | 5135.125 | | Pr II | 37 | 5157.43 | | La II | 97 |
| 5110.382 | | Pr II | 38 | 5136.09 | | Fe I | 1036 | 5157.993 | | Ni I | 111 |
| 5110.414 | | Fe I | 1 | 5136.47 | | Ta I | 5 | 5158.187 | | AI II | 58 |
| 5110.43 | | Cr II | 199 | 5136.788 | | Fe II | 35 | 5158.854 | | Co I | 188 |
| 5110.61 | | Hf II | 106 | 5137.075 | | Ni I | 48 | 5159.066 | | Fe I | 1091 |
| 5110.751 | | Cr I | 60 | 5137.09 | | Cr II | 201 | 5159.350 | | V I | 123 |
| 5110.768 | | Pr II | 35 | 5137.26 | | C II | 16 | 5159.93 | | Fe II | |
| 5111.930 | | Gd II | 114 | 5137.388 | | Fe I | 1090 | 5159.95 | P | Fe I | 1095 |
| 5112 | P | O VI | 12 | 5137.94 | | Cr I | 207 | 5160.02 | | O II | 32 |
| 5112.28 | | Zr II | 95 | 5138.431 | | V I | 123 | 5160.105 | | Gd II | 115 |
| 5112.490 | | Cr I | 19 | 5138.71 | | Cr I | 19 | 5160.824 | | Fe II | 167 |
| 5113.130 | | Cr I | 60 | 5139.21 | | C II | 16 | 5160.896 | | Gd II | 115 |
| 5113.232 | | Co I | 91 | 5139.255 | | Ni I | 129 | 5161.18 | P | Fe II | 35 |
| 5113.36 | | CI II | 16 | 5139.260 | | Fe I | 383 | 5161.765 | | Cr I | 60 |
| 5113.448 | | Ti I | 109 | 5139.468 | | Fe I | 383 | 5162.288 | | Fe I | 1089 |
| 5114 | P | O V | 1 | 5139.654 | | Cr I | 207 | 5162.34 | | Cl II | 33 |
| 5114.07 | | C II | 51 | 5140.839 | | Gd II | 115 | 5162.38 | P | Fe I | 210 |
| 5114.10 | | Fe III | 5 | 5141.55 | P | Fe I | 930 | 5162.47 | | Gd II | 140 |
| 5114.52 | P | Fe I | 1242 | 5141.63 | | Ta I | 6 | 5162.80 | | A II | 126 |
| 5114.55 | | La II | 36 | 5141.750 | | Fe I | 114 | 5162.93 | P | Ni I | 159 |
| 5115.397 | | Ni I | 177 | 5141.84 | | A II | 37 | 5163.61 | | La II | 7 |
| 5115.788 | | Fe I | 789 | 5142.263 | | Cr I | 60 | 5163.74 | | Fe III | 2 |
| 5116.06 | | Cr II | 24 | 5142.33 | | S II | 1 | 5163.90 | | AI III | 19 |
| 5116.700 | | Sm II | 56 | 5142.541 | | Fe I | 1090,1092 | 5164.542 | | Gd II | 97 |
| 5117.107 | | Fe II | | 5142.763 | | Ru I | 11 | 5164.56 | | Fe I | 1166 |
| 5117.175 | | Ce II | 23 | 5142.771 | | Ni I | 161 | 5164.56 | | Hf II | 83 |
| 5117.937 | | Mn I | 32 | 5142.932 | | Fe I | 16 | 5164.69 | P | Fe II | 167 |
| 5119.12 | | Y II | 20 | 5142.98 | P | Ni I | 113 | 5164.70 | P | Fe I | 210 |
| 5119.55 | | C II | 51 | 5143.49 | | C II | 16 | 5164.922 | | Fe I | 1033 |
| 5119.90 | P | Fe I | 960 | 5143.73 | P | Fe I | 65 | 5165.140 | | Nd II | 77 |
| 5120.34 | P | Fe II | 35 | 5144.413 | | Al II | 68 | 5165.156 | | Co I | 39 |
| 5120.420 | | Ti I | 288 | 5144.47 | P | Cr II | 38 | 5165.422 | | Fe I | 1089 |
| 5120.89 | P | Fe I | 1150 | 5144.672 | | Cr I | 60 | 5165.82 | | A II | 75 |
| 5121.570 | | Ni I | 177 | 5144.875 | | AI II | 68 | 5166.227 | | Cr I | 207 |
| 5121.646 | | Fe I | 1095 | 5144.9376 | | Ne I | 34 | 5166.286 | | Fe I | 1 |
| 5121.69 | | C II | 12 | 5144.998 | | AI II | 68 | 5167.28 | | La II | 95 |
| 5121.96 | P | Fe I | 745 | 5145.011 | | Ne I | 34 | 5167.3216 | | Mg I | 2 |
| 5122.082 | | Ti I | 230 | 5145.105 | | Fe I | 66 | 5167.491 | | Fe I | 37 |
| 5122.121 | | Cr I | 19 | 5145.16 | | C II | 16 | 5167.70 | P | Fe I | 717 |
| 5122.767 | | Co I | 170 | 5145.36 | | A II | 13 | 5167.96 | | Cr I | 207 |
| 5122.99 | | La II | 36 | 5145.42 | | La I | 9 | 5168.18 | P | Fe I | 964 |
| 5123.21 | | Y II | 21 | 5145.465 | | Ti I | 109 | 5168.19 | P | Fe I | 960 |
| 5123.28 | P | Fe I | 1150 | 5145.654 | | Al II | 68 | 5168.24 | | N II | 70 |
| 5123.465 | | Cr I | 20 | 5145.73 | P | Fe I | 931 | 5168.63 | | Cr I | 19 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5168.660 | | Ni I | 112 | 5191.60 | | Zr II | 95 | 5214.64 | | Cr I | 189 |
| 5168.901 | | Fe I | 1 | 5192.000 | | Cr I | 201 | 5215.185 | | Fe I | 553 |
| 5169.030 | | Fe II | 42 | 5192.350 | | Fe I | 383 | 5215.29 | | Cr I | 206 |
| 5169.30 | P | Fe I | 1032 | 5192.524 | | Ni I | 111 | 5215.928 | | V II | 55 |
| 5169.733 | | Fe II | | 5192.621 | | Nd II | 75 | 5216.17 | | Cr I | 189 |
| 5170.08 | P | Fe I | 1241 | 5192.75 | | Si II | | 5216.278 | | Fe I | 36 |
| 5170.08 | | N II | 70 | 5192.971 | | Ti I | 4 | 5216.512 | | Ni I | 113 |
| 5171.028 | | Ru I | 11 | 5193.004 | | V I | 125 | 5216.84 | | A II | 126 |
| 5171.13 | P | V II | 115 | 5193.03 | | Cl II | 33 | 5216.99 | | Fe III | |
| 5171.46 | | N II | 70 | 5193.43 | P | V II | 115 | 5217.36 | P | V II | 115 |
| 5171.599 | | Fe I | 36 | 5193.488 | | Cr I | 206 | 5217.395 | | Fe I | 553 |
| 5171.62 | P | Fe II | 35 | 5193.89 | | Fe III | 5 | 5217.69 | P | Fe I | 965 |
| 5172.21 | P | Fe I | 210 | 5194.043 | | Ti I | 183 | 5217.83 | | La II | |
| 5172.32 | | N II | 66 | 5194.43 | | Fe III | 5 | 5217.927 | | Fe I | 880 |
| 5172.6 | | Al III | 18 | 5194.57 | | Hf II | 69 | 5217.93 | | Cl II | 3 |
| 5172.6843 | | Mg I | 2 | 5194.824 | | V I | 125 | 5218.202 | | Cu I | 7 |
| 5172.89 | | La II | 100 | 5194.943 | | Fe I | 36 | 5218.51 | P | Fe I | 1240 |
| 5173.002 | | Fe II | 185 | 5195.110 | | Pr II | 38 | 5219.008 | | Co I | 170 |
| 5173.15 | | Cl II | 33 | 5195.307 | | Pr II | 38 | 5219.053 | | Pr II | 37 |
| 5173.37 | | N II | 66 | 5195.394 | | V I | 125 | 5219.40 | | Gd I | 6 |
| 5173.742 | | Ti I | 4 | 5195.471 | | Fe I | 1092 | 5219.697 | | Ti I | 4 |
| 5173.83 | | La II | 158 | 5196.100 | | Fe I | 1091 | 5220.070 | | Cu I | 7 |
| 5173.898 | | Pr II | 35 | 5196.24 | P | Fe I | 406 | 5220.113 | | Pr II | 35 |
| 5174.46 | | N II | 70 | 5196.43 | | Y II | 28 | 5220.297 | | Gd II | 80 |
| 5175.71 | P | Fe I | 1 | 5196.443 | | Cr I | 207 | 5220.307 | | Ni I | 114 |
| 5175.78 | P | Ni I | 188 | 5196.57 | | Cr I | 207 | 5220.912 | | Cr I | 201 |
| 5175.839 | | Gd II | 114 | 5196.591 | | Mn I | 32 | 5221.34 | | Cl II | 3 |
| 5175.85 | | Cl II | 50,81 | 5197.165 | | Ni I | 204 | 5221.43 | P | Fe I | 1 |
| 5175.89 | | N II | 66 | 5197.216 | | Mn I | 32 | 5221.75 | P | Fe I | 628 |
| 5176.00 | | O II | 32 | 5197.569 | | Fe II | 49 | 5221.753 | | Cr I | 193 |
| 5176.085 | | Co I | 92 | 5197.768 | | Gd I | 6 | 5222.39 | | Cr I | 206 |
| 5176.26 | P | Cr II | 38 | 5197.93 | P | Fe I | 1091 | 5222.40 | P | Fe I | 112 |
| 5176.28 | | A II | 37 | 5198.714 | | Fe I | 66 | 5222.676 | | Cr I | 59 |
| 5176.285 | | Gd II | 60 | 5198.843 | | Fe I | 743 | 5222.685 | | Ti I | 183 |
| 5176.565 | | Ni I | 209 | 5198.89 | | S II | 57 | 5223.191 | | Fe I | 880 |
| 5177.230 | | Fe I | 930 | 5199.211 | | Gd II | 115 | 5223.623 | | Ti I | 183 |
| 5177.30 | | La I | 9 | 5199.50 | | N II | 66 | 5224.082 | | Cr I | 201 |
| 5177.430 | | Cr I | 201 | 5199.68 | | V II | 55 | 5224.14 | P | Ti I | 37 |
| 5177.73 | | Fe III | | 5200.188 | | Cr I | 201 | 5224.30 | P | Fe I | 65 |
| 5177.83 | | Cr I | 206 | 5200.42 | | Y II | 20 | 5224.301 | | Ti I | 183 |
| 5178.104 | | Gd II | 114 | 5200.549 | | Gd II | 147 | 5224.541 | | Cr I | 59,193 |
| 5178.71 | P | Fe II | 35 | 5201.00 | | S II | 39 | 5224.558 | | Ti I | 183 |
| 5178.798 | | Fe I | 1166 | 5201.096 | | Ti I | 183 | 5224.680 | | W I | 1 |
| 5178.843 | | Gd II | 147 | 5201.32 | | S II | 39 | 5224.928 | | Ti I | 183 |
| 5178.95 | P | Fe II | 35 | 5202.27 | | Fe I | 1090 | 5224.94 | | Zr I | 27 |
| 5179.136 | | Ni I | 202 | 5202.339 | | Fe I | 66 | 5224.941 | | Cr I | 201 |
| 5179.50 | | N II | 66,70 | 5202.51 | | Si II | | 5225.032 | | Cr I | 201 |
| 5179.919 | | Gd II | 100 | 5202.94 | | V II | 142 | 5225.533 | | Fe I | 1 |
| 5180.065 | | Fe I | 1166 | 5203.86 | | P III | 5 | 5225.821 | | Cr I | 58 |
| 5180.34 | | N II | 66 | 5204.14 | | La II | 96 | 5226.06 | | Fe I | 716 |
| 5180.53 | P | Fe II | 35 | 5204.46 | | A II | 126 | 5226.20 | | La II | 96 |
| 5181.77 | | Si II | | 5204.518 | | Cr I | 7 | 5226.42 | P | Fe I | 406 |
| 5181.86 | | Hf I | 1 | 5204.582 | | Fe I | 1 | 5226.534 | | Ti II | 70 |
| 5181.97 | P | Fe II | 53 | 5204.95 | P | Fe I | 407 | 5226.868 | | Fe I | 383 |
| 5181.995 | | Zn I | 7 | 5205.31 | P | Fe I | 1112 | 5226.891 | | Cr I | 193 |
| 5183.21 | | N II | 70 | 5205.73 | | Y II | 20 | 5227.10 | | Cr I | 59 |
| 5183.41 | | Cr I | 19 | 5206.039 | | Cr I | 7 | 5227.15 | P | Fe I | 114 |
| 5183.42 | | La II | 36 | 5206.059 | | Ti I | 276 | 5227.192 | | Fe I | 37 |
| 5183.6042 | | Mg I | 2 | 5206.15 | P | Cr I | 59 | 5227.53 | | Fe III | |
| 5183.72 | | Ti II | 86 | 5206.52 | P | Cr I | 206 | 5227.70 | | V II | 115 |
| 5184.17 | P | Fe I | 1147 | 5206.562 | | Pr II | 38 | 5227.75 | | Cr I | 58 |
| 5184.292 | | Fe I | 1089 | 5206.73 | | O II | 32 | 5227.87 | P | Ti II | 103 |
| 5184.585 | | Ni I | 159 | 5206.80 | P | Fe I | 1095 | 5228.082 | | Cr I | 193 |
| 5184.590 | | Cr I | 201 | 5207.852 | | Ti I | 183 | 5228.408 | | Fe I | 1091 |
| 5184.97 | | N II | 66 | 5207.95 | P | Fe I | 880 | 5228.427 | | Nd II | 46 |
| 5185.09 | | Si II | | 5208.07 | P | Cr I | 59 | 5229.57 | | Fe III | 113 |
| 5185.90 | | Ti II | 86 | 5208.436 | | Cr I | 7 | 5229.857 | | Fe I | 553,1090 |
| 5186.17 | | N II | 70 | 5208.601 | | Fe I | 553 | 5230.210 | | Co I | 39 |
| 5186.329 | | Ti I | 183 | 5209.90 | P | Fe I | 584 | 5230.228 | | Cr I | 58 |
| 5186.592 | | Ni I | 205 | 5210.042 | | Co I | 167 | 5230.363 | | Co I | 187 |
| 5186.915 | | Gd II | 114 | 5210.386 | | Ti I | 4 | 5230.967 | | Ti I | 215 |
| 5187.237 | | Gd II | 114 | 5210.488 | | Gd II | 115 | 5231.41 | | Fe I | 787 |
| 5187.452 | | Ce II | 15 | 5210.834 | | Co I | 187 | 5232.50 | | Cr II | 43 |
| 5187.75 | | Hf II | 23 | 5210.87 | | Cr II | 24 | 5232.946 | | Fe I | 383 |
| 5187.86 | | Ni I | 159 | 5210.88 | P | Cr II | 38 | 5233.817 | | Ti I | 37 |
| 5187.922 | | Fe I | 1032 | 5211.22 | P | Ti I | 37 | 5234.088 | | V I | 131 |
| 5188.21 | | La II | 95 | 5211.544 | | Ti II | 103 | 5234.195 | | Nd II | 74 |
| 5188.700 | | Ti II | 70 | 5211.832 | | Co I | 184 | 5234.27 | | La I | 10 |
| 5188.848 | | Ca I | 49 | 5211.85 | | La I | 9 | 5234.28 | P | V II | 55 |
| 5189.61 | P | Ti I | 215 | 5212.27 | | Cr I | 189 | 5234.620 | | Fe II | 49 |
| 5189.70 | | Cl II | 33 | 5212.271 | | Ti I | 215 | 5235.188 | | Co I | 83 |
| 5190.42 | | N II | 66 | 5212.365 | | Nd II | 44 | 5235.3 | | Fe III | 113 |
| 5190.56 | | O II | 32 | 5212.61 | | S II | 39 | 5235.392 | | Fe I | 210,1031 |
| 5191.081 | | Gd II | 115 | 5212.699 | | Co I | 170 | 5235.45 | | Ni I | 208 |
| 5191.41 | | P II | 7 | 5212.75 | | Ta I | 1 | 5236 | P | N IV | 5 |
| 5191.448 | | Nd II | 45 | 5212.997 | | Ti I | 215 | 5236.189 | | Fe I | 1034 |
| 5191.46 | | Cr II | 24 | 5213.08 | P | V II | 55 | 5236.38 | P | Fe I | 1146 |
| 5191.460 | | Fe I | 383 | 5213.35 | P | Fe I | 1165 | 5236.63 | | Cr I | 205 |
| 5191.58 | P | Fe II | 52 | 5213.80 | P | Fe I | 962 | 5237.34 | | Cr II | 43 |
| 5191.59 | | V II | 208 | 5214.127 | | Cr I | 193 | 5237.35 | | Cr I | 206 |

| λ A | Type | Element | Multiplet No. | λ A | Type | Element | Multiplet No. | λ A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5238.25 | P | Fe I | 962 | 5261.754 | | Cr I | 237 | 5278.955 | | Fe II | 184 |
| 5238.560 | | Ti I | 37,183 | 5262.104 | | Ti II | 70 | 5278.99 | | S I | 4 |
| 5238.58 | P | Fe II | 41 | 5262.244 | | Ca I | 22 | 5279 | P | O VI | 14 |
| 5238.971 | | Cr I | 59 | 5262.48 | P | Fe II | 52 | 5279.11 | | La II | 90 |
| 5239.823 | | Sc II | 26 | 5262.61 | P | Fe I | 1149 | 5279.65 | P | Fe I | 584 |
| 5239.942 | | Ti I | 37 | 5262.89 | P | Fe I | 628 | 5279.92 | | Cr II | 43 |
| 5240.36 | P | Fe I | 584 | 5263.314 | | Fe I | 553 | 5280.00 | | V II | 195 |
| 5240.468 | | Cr I | 237 | 5263.483 | | Ti I | 183 | 5280.08 | | Cr II | 43 |
| 5240.878 | | V I | 131 | 5263.750 | | Cr I | 309 | 5280.21 | | Al II | 95 |
| 5240.94 | | Cr I | 193 | 5263.874 | | Fe I | 788 | 5280.289 | | Cr I | 192 |
| 5240.97 | P | V II | 55 | 5263.99 | | V II | 115 | 5280.364 | | Fe I | 880 |
| 5241.19 | | V II | 241 | 5264.14 | | Mg II | 17 | 5280.62 | P | V II | 55 |
| 5241.458 | | Cr I | 59 | 5264.152 | | Cr I | 18 | 5280.631 | | Co I | 172 |
| 5241.90 | P | Fe I | 1150 | 5264.239 | | Ca I | 22 | 5280.91 | P | Fe I | 210 |
| 5242.495 | | Fe I | 843 | 5264.49 | P | V II | 55 | 5281 | P | N IV | 5 |
| 5243.3 | | Fe III | 113 | 5264.801 | | Fe II | 48 | 5281.18 | P | Fe I | 1240 |
| 5243.395 | | Cr I | 201 | 5264.95 | | Hf II | 70 | 5281.18 | | N I | 14 |
| 5243.50 | P | Cr II | 38 | 5265.160 | | Cr I | 201 | 5281.692 | | Ni I | 231 |
| 5243.798 | | Fe I | 1089 | 5265.25 | P | Fe I | 407 | 5281.796 | | Fe I | 383 |
| 5244.5 | | C III | 4 | 5265.42 | P | Fe I | 1145 | 5282.1 | | Fe III | 113 |
| 5245 | P | N IV | 5 | 5265.523 | | Co I | 38 | 5282.378 | | Ti I | 74 |
| 5245.49 | | A II | 40 | 5265.557 | | Ca I | 22 | 5282.52 | | N III | 15 |
| 5245.62 | P | Fe I | 1149 | 5265.710 | | Ce II | 23 | 5283.076 | | Gd I | 6 |
| 5245.72 | P | Fe I | 715 | 5265.722 | | Cr I | 18 | 5283.441 | | Ti I | 156 |
| 5246.00 | P | Fe I | 628 | 5265.748 | | Ni I | 141 | 5283.628 | | Fe I | 553 |
| 5246.143 | | Ti I | 282 | 5265.786 | | Co I | 170 | 5283.77 | | Al II | 95 |
| 5246.574 | | Ti I | 37 | 5265.94 | P | Fe I | 210 | 5284.092 | | Fe II | 41 |
| 5246.75 | | Cr II | 23 | 5265.967 | | Ti I | 156 | 5284.27 | P | Fe I | 875 |
| 5247.052 | | Fe I | 1 | 5266.118 | | V I | 139 | 5284.380 | | Ti I | 74 |
| 5247.10 | | Hf II | 92 | 5266.302 | | Co I | 172 | 5284.416 | | Fe I | 842 |
| 5247.293 | | Ti I | 183 | 5266.49 | P | Ti I | 36 | 5284.62 | P | Fe I | 1032 |
| 5247.564 | | Cr I | 18 | 5266.506 | | Co I | 83 | 5284.85 | | Fe III | |
| 5247.921 | | Co I | 39 | 5266.562 | | Fe I | 383 | 5285.12 | P | Fe I | 1166 |
| 5248.028 | | Fe II | | 5267.10 | | Cr II | 38 | 5285.34 | | Ca II | 14 |
| 5248.402 | | Ti I | 37,156 | 5267.28 | P | Fe I | 1146 | 5285.38 | | Cr I | 285 |
| 5249.099 | | Fe I | 1166 | 5267.322 | | Gd II | 60 | 5285.48 | | Cl II | 32 |
| 5249.22 | | V II | 220 | 5268.06 | | O III | 19 | 5285.60 | P | Fe I | 961 |
| 5249.40 | | Cr II | 23 | 5268.348 | | Ni I | 273 | 5285.63 | | Cr I | 192 |
| 5249.43 | | C II | 30 | 5268.498 | | Co I | 172 | 5285.752 | | Sc I | 23 |
| 5249.585 | | Nd II | 75 | 5268.62 | | Ti II | 103 | 5285.85 | | Al II | 102 |
| 5249.6 | | C III | 23 | 5269.15 | | Fe III | 112 | 5286.42 | P | V II | 54 |
| 5250.003 | | Co I | 190 | 5269.541 | | Fe I | 15 | 5286.74 | | Fe III | 110 |
| 5250.212 | | Fe I | 1 | 5269.93 | | Ti I | 156 | 5286.92 | | A II | 13 |
| 5250.650 | | Fe I | 66 | 5270.06 | P | Fe I | 877 | 5287.188 | | Cr I | 225 |
| 5250.816 | | Nd II | 80 | 5270.270 | | Ca I | 22 | 5287.574 | | Co I | 175 |
| 5250.95 | | Ti I | 37 | 5270.322 | | Be II | 3 | 5287.62 | | Cr I | 309 |
| 5251.180 | | Gd I | 6 | 5270.360 | | Fe I | 37 | 5287.785 | | Co I | 187 |
| 5251.49 | | Ti I | 37 | 5270.59 | | N III | 15 | 5288.21 | P | Ni I | 202 |
| 5251.738 | | Pr II | 20 | 5270.843 | | Be II | 3 | 5288.24 | P | Fe I | 818 |
| 5252.04 | P | Ti II | 103 | 5271.18 | | La I | 4 | 5288.31 | | V II | 195 |
| 5252.105 | | Ti I | 4 | 5271.26 | P | V II | 55 | 5288.38 | P | Fe I | 406 |
| 5252.14 | | Gd II | 99 | 5272.0 | | Fe III | 113 | 5288.533 | | Fe I | 929 |
| 5253.03 | P | Fe I | 113 | 5272.010 | | Cr I | 225 | 5289 | P | O VI | 16 |
| 5253.25 | P | Fe I | 875 | 5272.413 | | Fe II | 185 | 5289.27 | | Cr I | 192 |
| 5253.479 | | Fe I | 553 | 5272.56 | | C III | 4 | 5289.28 | | Ti I | 36 |
| 5253.49 | | P II | 10 | 5272.60 | | N III | 15 | 5289.82 | | Y II | 20 |
| 5253.55 | | C II | 30 | 5272.86 | | Fe III | | 5289.98 | | Hf II | 100 |
| 5253.55 | | C III | 4 | 5273 | P | N V | 4 | 5290.74 | | V II | 207 |
| 5254.652 | | Co I | 187 | 5273.176 | | Fe I | 553 | 5290.79 | P | Fe I | 1147 |
| 5254.918 | | Cr I | 201 | 5273.379 | | Fe I | 114 | 5290.83 | | La II | 6 |
| 5254.92 | P | Fe II | 49 | 5273.431 | | Nd II | 75 | 5291 | P | O VI | 18 |
| 5254.956 | | Fe I | 1 | 5273.439 | | Cr I | 201 | 5291.78 | | Fe III | |
| 5255.132 | | Cr I | 225 | 5273.62 | P | Fe I | 1147 | 5292 | P | O VI | 17 |
| 5255.325 | | Mn I | 32 | 5274.244 | | Ce II | 15 | 5292.10 | | Pr II | 24 |
| 5255.510 | | Nd II | 43 | 5274.99 | | Cr II | 43 | 5292.630 | | Pr II | 37 |
| 5255.68 | P | Fe I | 1089 | 5275.00 | | Fe I | 1029 | 5292.861 | | Mn I | 36 |
| 5255.76 | P | Fe I | 1091 | 5275.08 | | O I | 27 | 5292.865 | | Cr I | 205 |
| 5255.805 | | Gd I | 6 | 5275.11 | P | Cr I | 192 | 5293.03 | P | Fe I | 1165 |
| 5255.811 | | Ti I | 183 | 5275.171 | | Cr I | 94 | 5293.168 | | Nd II | 75 |
| 5256.030 | | Gd II | 114 | 5275.30 | P | Fe I | 742 | 5293.383 | | Cr I | 192 |
| 5256.89 | P | Fe II | 41 | 5275.54 | | Re I | 1 | 5293.973 | | Fe I | 1031 |
| 5257.07 | | Cr I | 205 | 5275.65 | | V II | 195 | 5294.216 | | Mn II | 11 |
| 5257.36 | | C II | 30 | 5275.689 | | Cr I | 94 | 5294.555 | | Fe I | 875 |
| 5257.51 | P | V II | 55 | 5275.994 | | Fe II | 49 | 5294.97 | | Si II | |
| 5257.621 | | Co I | 188 | 5276.03 | | Cr I | 94 | 5295.292 | | Mn II | 11 |
| 5257.65 | P | Fe I | 788 | 5276.183 | | Co I | 190 | 5295.30 | P | Sc II | 22 |
| 5258.333 | | Sc I | 23 | 5276.2 | | Fe III | 113 | 5295.316 | | Fe I | 1146 |
| 5259.09 | P | Fe I | 1149 | 5276.42 | | Al II | 67 | 5295.781 | | Ti I | 74 |
| 5259.38 | | La II | 21 | 5276.81 | | Al II | 67 | 5296.09 | | P II | 7 |
| 5259.62 | | C II | 30 | 5276.879 | | Nd II | 81 | 5296.48 | | A II | 110 |
| 5259.743 | | Pr II | 35 | 5277.31 | P | Fe I | 1149 | 5296.686 | | Cr I | 18 |
| 5259.976 | | Ti I | 298 | 5277.32 | P | Fe I | 584 | 5296.968 | | Mn II | 11 |
| 5260.25 | | Fe III | | 5277.40 | | Zr I | 27 | 5297.236 | | Ti I | 156 |
| 5260.375 | | Ca I | 22 | 5277.59 | P | Fe I | 983 | 5297.360 | | Cr I | 94 |
| 5260.44 | | Hf II | 36 | 5277.68 | | Al II | 67 | 5297.86 | | N III | 15 |
| 5260.771 | | Mn I | 32 | 5278.10 | | S I | 4 | 5297.976 | | Cr I | 94 |
| 5260.91 | | Al III | 13 | 5278.262 | | Cr I | 309 | 5298 | P | O VI | 15 |
| 5260.91 | | N III | 15 | 5278.265 | | Fe II | 225 | 5298.06 | | Hf II | 49 |
| 5261.49 | P | Fe I | 406 | 5278.62 | | Al II | 95 | 5298.269 | | Cr I | 18 |
| 5261.706 | | Ca I | 22 | 5278.70 | | S I | 4 | 5298.429 | | Ti I | 281 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5298.44 | P | Cr I | 94 | 5322.78 | P | Cr II | 24 | 5346.56 | P | Fe II | 49 |
| 5298.789 | | Fe I | 875 | 5322.81 | | V II | 240 | 5347.499 | | Co I | 196 |
| 5298.93 | | N III | 15 | 5323.51 | P | Fe I | 113 | 5347.71 | P | Ni I | 145 |
| 5299.00 | | O I | 26 | 5323.958 | | Ti I | 36 | 5347.806 | | Ce II | 227 |
| 5299.278 | | Mn II | 11 | 5324.185 | | Fe I | 553 | 5348.069 | | Mn I | 36 |
| 5299.85 | | Hf II | 14 | 5324.26 | | Hf II | 36 | 5348.319 | | Cr I | 18 |
| 5299.9 | | Fe III | 113 | 5324.61 | | Al II | 101 | 5348.40 | | Hf II | 22 |
| 5300.012 | | Ti I | 74 | 5325.276 | | Co I | 192 | 5348.67 | | Gd I | 6 |
| 5300.41 | P | Fe I | 1240 | 5325.559 | | Fe II | 49 | 5349.08 | | Ta I | 5 |
| 5300.749 | | Cr I | 18 | 5325.71 | P | V II | 54 | 5349.294 | | Sc I | 17 |
| 5301.042 | | Co I | 39 | 5325.949 | | Co I | 194 | 5349.472 | | Ca I | 33 |
| 5301.33 | P | Fe I | 1162 | 5326.154 | | Fe I | 407,785 | 5349.702 | | Sc I | 4 |
| 5301.67 | | Gd I | 6 | 5326.247 | | Co I | 175 | 5349.742 | | Fe I | 1163 |
| 5301.936 | | Sc I | 4 | 5326.793 | | Fe I | 1147 | 5349.75 | | V II | 54 |
| 5301.97 | | La II | 36 | 5327.25 | P | Fe I | 875 | 5350.10 | | Zr II | 115 |
| 5302.279 | | Nd II | 80 | 5327.45 | P | N II | 69 | 5350.36 | | Zr II | 115 |
| 5302.307 | | Fe I | 553 | 5327.86 | P | Fe I | 1145 | 5350.37 | | V II | 54 |
| 5302.320 | | Mn II | 11 | 5328.042 | | Fe I | 15 | 5350.38 | | Gd I | 7 |
| 5302.5 | | Fe III | 113 | 5328.339 | | Cr I | 94 | 5350.527 | | Tl I | 1 |
| 5302.62 | | La II | 86 | 5328.38 | | Ta I | 2 | 5351.072 | | Ti I | 300 |
| 5302.76 | | Gd I | 6 | 5328.534 | | Fe I | 37 | 5351.21 | | N II | 69 |
| 5303.26 | | V II | 54 | 5328.70 | | N I | 13 | 5351.85 | P | Ni I | 177 |
| 5303.419 | | Fe II | 225 | 5328.70 | P | Ni I | 129 | 5352 | P | O V | 13 |
| 5303.43 | | Gd II | 80 | 5328.98 | | O I | 12 | 5352.046 | | Co I | 172 |
| 5303.54 | | La II | 36 | 5329.12 | | Cr I | 94 | 5353.26 | | Gd I | 7 |
| 5304.11 | P | Fe I | 983 | 5329.59 | | O I | 12 | 5353.386 | | Fe I | 1062 |
| 5304.211 | | Cr I | 225 | 5329.719 | | Cr I | 94 | 5353.415 | | Ni I | 70 |
| 5304.26 | P | Fe II | 184 | 5329.994 | | Fe I | 1028 | 5353.500 | | Co I | 198 |
| 5304.923 | | Gd II | 62 | 5330.582 | | Ce II | 13 | 5353.534 | | Ce II | 15 |
| 5305.3 | P | O IV | 11 | 5330.66 | | O I | 12 | 5353.78 | | Fe III | |
| 5305.41 | P | Fe I | 877 | 5330.779 | | Ne I | 9 | 5354.01 | P | Co I | 91 |
| 5305.77 | | A II | 93 | 5331.20 | P | Fe I | 817 | 5354.66 | P | Cr II | 29 |
| 5305.85 | | Cr II | 24 | 5331.456 | | Co I | 39 | 5354.67 | | Ta I | 6 |
| 5306.6 | | Fe III | 113 | 5331.48 | P | Fe I | 210 | 5355.752 | | Sc I | 19 |
| 5307.121 | | Tm I | | 5331.54 | | As II | 3 | 5356.100 | | Sc I | 17 |
| 5307.281 | | Cr I | 237 | 5332.65 | | V II | 54 | 5356.14 | | Cl II | |
| 5307.30 | | Ca II | 14 | 5332.652 | | Co I | 170 | 5356.77 | | N I | 13 |
| 5307.30 | | Gd I | 6 | 5332.673 | | Fe I | 1031 | 5356.976 | | Nd II | 80 |
| 5307.365 | | Fe I | 36 | 5332.903 | | Fe I | 36 | 5357.195 | | Sc II | 30 |
| 5307.53 | P | Mn I | 36 | 5333.15 | P | Fe I | 1023 | 5357.35 | | V II | 54 |
| 5308.44 | | Cr II | 43 | 5333.30 | | Gd I | 7 | 5357.790 | | Gd II | 62 |
| 5308.71 | P | Fe I | 1091 | 5333.647 | | Co I | 190 | 5358.10 | P | Fe I | 628 |
| 5309.267 | | Ru I | 10 | 5333.70 | | Cl II | 15 | 5359.200 | | Co I | 194 |
| 5309.47 | | Cr I | 285 | 5333.77 | P | Fe I | 464 | 5361.174 | | Nd II | 46 |
| 5310.219 | | Co I | 196 | 5334.228 | | Sc II | 30 | 5361.35 | | Ba II | 6 |
| 5310.70 | | Cr II | 43 | 5334.32 | P | Fe I | 1064 | 5361.474 | | Nd II | 74 |
| 5310.76 | | Al II | 94 | 5334.804 | | Mn I | 36 | 5361.637 | | Fe I | 1143 |
| 5311.42 | | Zr I | 27 | 5334.821 | | Co I | 191 | 5361.724 | | Ti I | 35 |
| 5311.461 | | Nd II | 80 | 5334.88 | | Cr II | 43 | 5362.4 | P | O IV | 11 |
| 5311.60 | | Hf II | 37 | 5336.163 | | Co I | 191 | 5362.56 | | Zr I | 27 |
| 5311.78 | | Zr II | 95 | 5336.7 | | C II | 11 | 5362.69 | | S II | 61 |
| 5312.32 | | Al II | 94 | 5336.809 | | Ti II | 69 | 5362.781 | | Co I | 198 |
| 5312.650 | | Co I | 197 | 5337.713 | | Fe II | 48 | 5362.864 | | Fe II | 48 |
| 5312.878 | | Cr I | 225 | 5337.79 | | Cr II | 43 | 5362.98 | | Cr I | 258 |
| 5313.239 | | Ti I | 74 | 5338.326 | | Ti I | 35 | 5363.80 | | Fe III | |
| 5313.41 | | Fe I | 1239 | 5338.66 | | N II | 69 | 5364.874 | | Fe I | 1146 |
| 5313.43 | | N II | 69 | 5339.29 | | Ca II | 20 | 5365.403 | | Fe I | 786 |
| 5313.59 | | Cr II | 43 | 5339.40 | P | Fe I | 1162 | 5366.651 | | Ti I | 35 |
| 5313.76 | P | Ti II | 81 | 5339.528 | | Co I | 199 | 5367.470 | | Fe I | 1146 |
| 5313.839 | | Fe I | 1238 | 5339.92 | | Fe III | | 5367.53 | P | V II | 53 |
| 5314.45 | | N III | 15 | 5339.935 | | Fe I | 553 | 5367.78 | | Cr I | 258 |
| 5315.07 | | Fe I | 1147 | 5340.20 | | N II | 69 | 5367.95 | P | Ti II | 80 |
| 5315.618 | | Fe II | 225 | 5340.437 | | Cr I | 225 | 5368.10 | P | Cr II | 29 |
| 5315.78 | P | Fe I | 877 | 5340.66 | | La II | 91 | 5368.546 | | Cr I | 258 |
| 5316.07 | | Al II | 94 | 5340.68 | | Ti I | 36 | 5368.904 | | Co I | 167 |
| 5316.07 | | P II | 6 | 5340.92 | | Fe III | | 5368.97 | | Pt I | 6 |
| 5316.609 | | Fe II | 49 | 5341.026 | | Fe I | 37 | 5369.25 | P | Cr II | 29 |
| 5316.772 | | Co I | 192 | 5341.040 | | Sc I | 19 | 5369.591 | | Co I | 39 |
| 5316.777 | | Fe II | 48 | 5341.065 | | Mn I | 4 | 5369.635 | | Ti I | |
| 5317.095 | | Mn I | 36 | 5341.096 | | Ne I | 9 | 5369.965 | | Fe I | 1146 |
| 5317.394 | | Fe I | 584 | 5341.22 | | V II | 239 | 5370.356 | | Cr I | |
| 5317.53 | P | Fe I | 1032 | 5341.328 | | Co I | 199 | 5371.43 | P | Fe I | 1163 |
| 5318.025 | | Fe II | | 5341.492 | | Ti I | 316 | 5371.48 | | Cr I | 258 |
| 5318.04 | P | Fe I | 406 | 5342.05 | P | Sc II | 30 | 5371.493 | | Fe I | 15 |
| 5318.267 | | Fe II | | 5342.703 | | Co I | 190 | 5371.621 | | Gd II | 60 |
| 5318.337 | | Sc II | 22 | 5342.961 | | Sc I | 4 | 5371.84 | | Al II | 42 |
| 5318.41 | | Cr II | 23 | 5343 | P | O V | 13 | 5371.935 | | Nd II | 79 |
| 5318.61 | P | V II | 53 | 5343.00 | | Gd I | 7 | 5372.216 | | Gd II | 99 |
| 5318.775 | | Cr I | 225 | 5343.284 | | Ne I | 9 | 5372.66 | | N I | 13 |
| 5319.22 | P | Fe I | 1029 | 5343.383 | | Co I | 190 | 5373.704 | | Fe I | 1166 |
| 5319.818 | | Nd II | 75 | 5344.570 | | Co I | 191 | 5373.715 | | Cr I | 258,302 |
| 5320.048 | | Fe I | 877 | 5344.73 | | P II | 6 | 5374.78 | P | Fe I | 785 |
| 5320.70 | | S II | 38 | 5344.761 | | Cr I | 225 | 5375.346 | | Sc I | 19 |
| 5320.78 | | Y II | 20 | 5345.61 | P | Cr I | 225 | 5375.393 | | Gd II | 99 |
| 5320.96 | | N II | 69 | 5345.67 | | S II | 38 | 5375.68 | | Fe III | |
| 5321.106 | | Fe I | 1165 | 5345.807 | | Cr I | 18 | 5376 | P | O V | 13 |
| 5321.496 | | Gd I | 6 | 5346.12 | P | Cr II | 24 | 5376.59 | P | Ti I | 3 |
| 5321.777 | | Gd I | 6 | 5346.30 | | Hf II | 92 | 5376.849 | | Fe I | 1132 |
| 5322.049 | | Fe I | 112 | 5346.34 | P | Fe I | 817 | 5377.08 | | La II | 95 |
| 5322.778 | | Pr II | 35 | 5346.54 | | Cr II | 23 | 5377.628 | | Mn I | 42 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5378.07 | P | Cr II | 29 | 5405.778 | | Fe I | 15 | 5435.79 | P | Fe II | 48 |
| 5378.12 | | P II | 23 | 5406.36 | P | Fe I | 1026 | 5435.871 | | Ni I | 70 |
| 5379.19 | P | Ti II | 102 | 5406.77 | P | Fe I | 1148 | 5436.299 | | Fe I | 1161 |
| 5379.580 | | Fe I | 928 | 5407.424 | | Mn I | 4 | 5436.594 | | Fe I | 113 |
| 5380.242 | | C I | 11 | 5407.44 | | A II | | 5436.703 | | Ti I | 51 |
| 5380.97 | | La II | 56 | 5407.520 | | Co I | 192 | 5436.80 | | Fe III | 110 |
| 5381.020 | | Ti II | 69 | 5407.62 | | Cr II | 23 | 5436.83 | | O I | 11 |
| 5381.105 | | Co I | 56 | 5408.119 | | Co I | 112 | 5437.19 | P | Fe I | 1145 |
| 5381.262 | | Pr II | 37 | 5408.59 | | O I | 53 | 5438.04 | P | Fe I | 1237 |
| 5381.77 | | La II | 91 | 5408.842 | | Fe II | 184 | 5438.310 | | Ti I | 108 |
| 5381.776 | | Co I | 196 | 5408.940 | | Ti I | 3 | 5438.41 | | Si II | |
| 5381.91 | | La II | 91 | 5409.125 | | Fe I | 1147 | 5439.30 | | V II | 53 |
| 5382.52 | P | Fe II | 184 | 5409.224 | | Ce II | 23 | 5440.53 | P | Ti I | 107 |
| 5382.750 | | Fe I | 741 | 5409.28 | P | Cr II | 29 | 5441.17 | | Gd II | 146 |
| 5382.96 | P | Ti I | 155 | 5409.609 | | Ti I | 155 | 5441.321 | | Fe I | 1144 |
| 5383.374 | | Fe I | 1146 | 5409.66 | | P II | 6 | 5442.274 | | Nd II | 76 |
| 5383.82 | | N II | 23 | 5409.791 | | Cr I | 18 | 5442.413 | | Cr I | 204 |
| 5384.22 | P | Fe I | 817 | 5410 | P | O VI | 13 | 5443.41 | P | Fe I | 1059 |
| 5384.634 | | Ti I | 35 | 5410.39 | P | Cr II | 29 | 5443.42 | | Cl II | 2 |
| 5384.89 | | V II | 53 | 5410.76 | | O I | 51,52 | 5443.88 | | Fe III | 110 |
| 5385.14 | | Zr I | 26 | 5410.913 | | Fe I | 1165 | 5444.07 | | Hf II | 69 |
| 5385.28 | | Cr I | | 5411.227 | | Ni I | 222 | 5444.096 | | Mn I | 31 |
| 5385.58 | P | Fe I | 927 | 5411.39 | P | Fe I | 670 | 5444.25 | | Cl II | 2 |
| 5386.341 | | Fe I | 1064 | 5411.524 | | He II | 2 | 5444.585 | | Co I | 196 |
| 5386.87 | | P II | 6 | 5412.56 | P | Fe I | 1237 | 5444.99 | | Cl II | 2 |
| 5386.958 | | Fe I | 875 | 5412.80 | P | Fe I | 1162 | 5445.045 | | Fe I | 1163 |
| 5386.978 | | Cr I | 191 | 5413.47 | | Ta I | 5 | 5445.97 | P | Fe II | 53 |
| 5387.136 | | Fe II | | 5413.687 | | Mn I | 42 | 5446.46 | P | Ti II | 68 |
| 5387.35 | | Fe III | | 5414.089 | | Fe II | 48 | 5446.57 | P | Cr II | 35 |
| 5387.51 | | Fe I | 1031 | 5414.91 | P | Fe I | 874 | 5446.58 | P | Fe I | 1144 |
| 5387.573 | | Cr I | 191 | 5415.201 | | Fe I | 1165 | 5446.593 | | Ti I | 3,259 |
| 5388.350 | | Ni I | 70 | 5415.277 | | V I | 130 | 5446.76 | | Cr I | 204 |
| 5388.48 | | Al II | 34 | 5416.381 | | Nd II | 80 | 5446.87 | P | Fe I | 37 |
| 5388.521 | | Mn I | 36 | 5417 | P | O V | 13 | 5446.920 | | Fe I | 15 |
| 5389.180 | | Ti I | 35 | 5417.03 | | Fe I | 1148 | 5447.59 | | La II | 112 |
| 5389.461 | | Fe I | 1145 | 5418.01 | | Zr II | 94 | 5448.882 | | Ti I | 259 |
| 5389.996 | | Ti I | 155 | 5418.802 | | Ti II | 69 | 5449.155 | | Ti I | 107 |
| 5390.394 | | Cr I | 191 | 5419.189 | | Ti I | 258 | 5450.66 | | P II | 23 |
| 5391.06 | P | Ti I | 155 | 5419.19 | | Ta I | 6 | 5450.836 | | Sr I | 9 |
| 5391.350 | | Cr I | 191,302 | 5419.36 | | Cr II | 22,29 | 5451.115 | | Nd II | |
| 5391.36 | | Hf II | 48 | 5419.876 | | Gd II | 99 | 5451.60 | P | Fe II | 184 |
| 5391.493 | | Fe I | 1062 | 5420.362 | | Mn I | 4 | 5451.965 | | Ti I | 265 |
| 5391.60 | | Ba II | 6 | 5420.90 | | Cr II | 23 | 5452.03 | | Ti II | 109 |
| 5391.78 | P | Fe I | 270 | 5421.05 | | Ba II | 6 | 5452.119 | | Fe I | 870 |
| 5392.075 | | Sc I | 19 | 5421.40 | P | Fe I | 874 | 5452.12 | | N II | 29 |
| 5392.12 | | Cl II | 28 | 5421.559 | | Nd II | 79 | 5452.305 | | Co I | 175 |
| 5392.371 | | Ni I | 250 | 5421.85 | P | Fe I | 1183 | 5453.255 | | Ni I | 231 |
| 5392.95 | P | Cr II | 29 | 5422.15 | P | Fe I | 1145 | 5453.338 | | Co I | 194 |
| 5393.174 | | Fe I | 553 | 5422.47 | | Ti II | 80 | 5453.616 | | Ti I | 108 |
| 5393.391 | | Ce II | 24 | 5423.25 | | Cl II | 2 | 5453.81 | | S II | 6 |
| 5393.659 | | Gd II | 100 | 5423.52 | | Cl II | 2 | 5453.98 | P | Fe I | 1064 |
| 5394.321 | | Gd II | 63 | 5423.73 | P | Fe I | 927 | 5454.05 | P | Ti II | 68 |
| 5394.674 | | Mn I | 1 | 5423.82 | | La II | 7 | 5454.26 | | N II | 29 |
| 5394.682 | | Fe I | 1031 | 5424.072 | | Fe I | 1146 | 5454.41 | | A II | |
| 5395.25 | | Fe I | 1143 | 5424.15 | P | Fe I | 1026 | 5454.573 | | Co I | 195 |
| 5395.41 | P | Cr II | 29 | 5424.36 | | Cl II | 2 | 5455.09 | P | Fe I | 627 |
| 5396.3 | | Ti II | 80 | 5424.551 | | Ba I | 9 | 5455.14 | | La I | 3 |
| 5396.59 | P | Ti II | 102 | 5424.56 | P | Ni I | 231 | 5455.433 | | Fe I | 1145 |
| 5396.600 | | Ti I | 3 | 5424.654 | | Ni I | 70 | 5455.613 | | Fe I | 15 |
| 5396.90 | P | Fe I | 464 | 5425.269 | | Fe II | 49 | 5455.80 | | Cr II | 50 |
| 5397.093 | | Ti I | 155 | 5425.29 | P | Cr II | 29 | 5455.815 | | Nd II | 83 |
| 5397.131 | | Fe I | 15 | 5425.621 | | Co I | 196 | 5456.11 | | Si II | |
| 5397.60 | | A II | | 5425.93 | | P II | 6 | 5456.27 | | Cl II | 2 |
| 5397.60 | | Fe I | 841 | 5426.256 | | Ti I | 3 | 5456.48 | | Fe I | 817 |
| 5398.285 | | Fe I | 1145 | 5427.832 | | Fe II | | 5457.02 | | Cl II | 2 |
| 5398.82 | | Ti IV | | 5428.64 | | S II | 6 | 5457.10 | | V II | 53 |
| 5399.489 | | Mn I | 42 | 5428.71 | P | Fe I | 1032 | 5457.47 | | Cl II | 2 |
| 5400.509 | | Fe I | 1145 | 5428.79 | | Ba II | 9 | 5457.471 | | Mn I | 4 |
| 5400.5620 | | Ne I | 3 | 5428.85 | | Ni I | 161 | 5458.68 | | La II | 99 |
| 5400.608 | | Cr I | 191 | 5429.139 | | Ti I | 259 | 5460.502 | | Ti I | 3 |
| 5400.67 | | S II | 61 | 5429.43 | P | Fe I | 1029 | 5460.644 | | Mn I | 31 |
| 5401.05 | | Mg II | 24 | 5429.52 | P | Fe I | 1062 | 5460.742 | | Hg I | 1 |
| 5401.27 | P | Fe I | 1146 | 5429.699 | | Fe I | 15 | 5460.8 | | Fe III | 68 |
| 5401.32 | | Ti I | 35 | 5429.83 | P | Fe I | 1162 | 5460.909 | | Fe I | 464 |
| 5401.945 | | V I | 130,139 | 5430.14 | | Fe III | | 5461.31 | | Ta I | 4 |
| 5402.000 | | Co I | 195 | 5430.41 | P | Cr II | 29 | 5461.54 | | Fe I | 1145 |
| 5402.113 | | Fe II | | 5431.526 | | Nd II | 80 | 5461.80 | P | Fe I | 817 |
| 5402.27 | | Fe III | | 5432 | P | O V | 13 | 5462.487 | | Ni I | 192 |
| 5402.51 | | Ta I | 1 | 5432.09 | | V II | 53 | 5462.62 | | N II | 29 |
| 5402.57 | | Lu I | 2 | 5432.318 | | Ti I | 265 | 5462.970 | | Fe I | 1163 |
| 5402.69 | | A II | | 5432.347 | | Cr I | 204 | 5463.282 | | Fe I | 1163 |
| 5402.78 | | Y II | 35 | 5432.548 | | Mn I | 1 | 5463.38 | | Hf II | 14 |
| 5403.823 | | Fe I | 1029 | 5432.77 | | S II | 6 | 5463.974 | | Cr I | 204 |
| 5404.023 | | Ti I | 259 | 5432.950 | | Fe I | 1143 | 5464.286 | | Fe I | 1030 |
| 5404.12 | P | Fe I | 1145 | 5432.98 | P | Fe II | 55 | 5464.36 | P | Cr II | 35 |
| 5404.144 | | Fe I | 1165 | 5434.527 | | Fe I | 15 | 5464.37 | | La II | 49 |
| 5404.87 | | O I | 53 | 5435.16 | | O I | 11 | 5465.04 | P | Fe I | 840 |
| 5404.95 | | Ta I | 13 | 5435.17 | P | Fe I | 1161 | 5466.021 | | Fe II | |
| 5405.004 | | Cr I | 191 | 5435.27 | | Ta I | 9 | 5466.404 | | Fe I | 1144 |
| 5405.35 | P | Fe I | 1162 | 5435.76 | | O I | 11 | 5466.46 | | Fe III | |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5466.46 | | Y I | 12 | 5490.65 | P | Ti II | 68 | 5519.83 | P | Fe II | 52 |
| 5466.55 | | S II | 11 | 6490.840 | | Ti I | 3 | 5520.19 | P | Fe I | 1144 |
| 5466.94 | | Fe II | | 5491.84 | | Fe I | 1031 | 5520.496 | | Sc I | 15 |
| 5466.993 | | Fe I | 784,817 | 5492.43 | | Ti IV | | 5521.14 | P | Fe I | 839 |
| 5467.76 | P | Fe I | 741 | 5492.8 | | O I | 62 | 5521.28 | P | Fe I | 1162 |
| 5468.101 | | Ni I | 192 | 5492.82 | P | Ti II | 68 | 5521.44 | | Ni I | 175 |
| 5468.37 | P | Ce II | 24 | 5493.22 | | Hf II | 113 | 5521.56 | P | Y II | 27 |
| 5468.44 | P | Ti II | 102 | 5493.33 | P | Fe I | 873 | 5521.765 | | Sr I | 9 |
| 5468.92 | | Si II | | 5493.46 | | La II | 4 | 5522.46 | | Fe I | 1108 |
| 5469.09 | P | Fe I | 1131 | 5493.608 | | Fe I | 1061 | 5523.310 | | Co I | 112 |
| 5469.29 | P | Fe I | 1143 | 5493.850 | | Fe I | 464,1062 | 5524.25 | P | Fe I | 1059 |
| 5469.305 | | Co I | 56 | 5494.35 | P | V II | 53 | 5524.35 | | Hf II | 25 |
| 5469.72 | | Gd II | 60 | 5494.468 | | Fe I | 1024 | 5524.990 | | Co I | 192 |
| 5470.17 | | Fe I | 1144 | 5494.726 | | Ti I | 108 | 5525.14 | P | Fe II | 56 |
| 5470.460 | | Co I | 175 | 5494.890 | | Ni I | 231 | 5525.48 | P | Fe I | 1107 |
| 5470.50 | | Ti I | 108 | 5495.682 | | Co I | 166 | 5525.552 | | Fe I | 1062 |
| 5470.53 | | Gd II | 63 | 5495.70 | | N II | 29 | 5525.90 | P | Cr II | 22 |
| 5470.638 | | Mn I | 4 | 5495.8720 | | A I | 14 | 5526.06 | | Sc I | 18 |
| 5470.81 | P | Fe II | 52 | 6496.020 | | V I | 2 | 5526.22 | | S II | 11 |
| 5471.198 | | Ti I | 106 | 5496.24 | | Si II | | 5526.26 | | N II | 63 |
| 5472.297 | | Ce II | 24 | 5496.57 | P | Fe I | 1281 | 5526.809 | | Sc II | 31 |
| 5472.63 | | Cr II | 50 | 5497.42 | | Y II | 27 | 5527.07 | P | Fe I | 464 |
| 5472.696 | | Ti I | 107 | 5497.519 | | Fe I | 15 | 5527.54 | | Y I | 12 |
| 5472.720 | | Fe I | 1108 | 5497.70 | P | Fe II | 204 | 5527.606 | | Ti I | 265 |
| 5473 | P | O V | 13 | 5497.86 | P | Cr II | 22 | 5527.72 | | V I | 1 |
| 5473.18 | P | Fe I | 1064 | 5497.92 | P | Ti I | 51 | 5528.3876 | | Mg I | 9 |
| 5473.40 | | Y II | 27 | 5498.18 | | S I | 12 | 5528.3986 | | Mg I | 9 |
| 5473.517 | | Ti I | 259 | 5498.19 | P | Fe II | 24 | 5528.4094 | | Mg I | 9 |
| 5473.517 | | Ti II | 109 | 5499.39 | P | Ni I | 176 | 5528.89 | P | Fe I | 1161 |
| 5473.59 | | S II | 6 | 5499.60 | P | Fe I | 1159 | 5529.15 | | Fe I | 872 |
| 5473.908 | | Fe I | 1062 | 5499.72 | | P II | 6 | 5529.80 | P | Fe I | 344 |
| 5474.09 | P | Fe I | 1314 | 5500.43 | | Gd II | 99 | 5629.94 | P | Ti II | 68 |
| 5474.228 | | Ti I | 108 | 5500.61 | P | Cr II | 35 | 5529.940 | | Fe II | 224 |
| 5474.449 | | Ti I | 259 | 5501.34 | | La I | 3 | 5530.10 | | V II | 247 |
| 5474.734 | | Nd II | 82 | 5501.469 | | Fe I | 15 | 5530.27 | | N II | 63 |
| 5475.57 | | Ni I | 159 | 5501.54 | | S I | 12 | 5530.780 | | Co I | 38 |
| 5476.298 | | Fe I | 1029 | 5502.05 | | Cr II | 50 | 5531.949 | | Fe I | 1281 |
| 5476.571 | | Fe I | 1062 | 5502.88 | | Al II | 78 | 5532.13 | P | Fe I | 344 |
| 5476.69 | | Lu II | 2 | 5503.18 | | Cr II | 50 | 5532.17 | | La II | 106 |
| 5476.906 | | Ni I | 59 | 5503.397 | | Fe II | | 5532.65 | | Fe III | 56 |
| 5477.089 | | Co I | 175 | 5503.897 | | Ti I | 287 | 5532.752 | | Fe I | 783 |
| 5477.45 | P | Cr II | 50 | 5504.120 | | Ni I | 175 | 5533.01 | | Mo I | 4 |
| 5477.67 | P | Fe II | 49 | 5604.184 | | Sr I | 9 | 5534.68 | | Fe I | 871,1063 |
| 5477.695 | | Ti I | 265 | 5504.21 | | Mn I | 31 | 5534.794 | | Sr I | 9 |
| 5477.82 | | Zr II | 115 | 5505.75 | P | Fe I | 1162 | 5534.860 | | Fe II | 55 |
| 5478.13 | | N II | 29 | 5505.869 | | Mn I | 4 | 5535.382 | | V I | 1 |
| 5478.35 | | Cr II | 50 | 5505.893 | | Fe I | 1145 | 5535.39 | | N II | 63 |
| 5478.48 | | Fe I | 1062 | 5506.268 | | Fe II | | 5535.419 | | Fe I | 626,1029 |
| 5478.6 | | C II | 34 | 5506.51 | | Mo I | 4 | 5535.484 | | Ba I | 2 |
| 5479.95 | P | Fe I | 1282 | 5506.782 | | Fe I | 15 | 5535.66 | | La II | 71 |
| 5480.10 | | N II | 29 | 5507.01 | | S I | 12 | 5536.0 | | C II | 10 |
| 5480.30 | | Ba II | 9 | 5507.15 | | P II | 23 | 5536.01 | | K II | 6 |
| 5480.502 | | Cr I | 204 | 5507.753 | | V I | 129 | 5536.59 | P | Fe I | 345 |
| 5480.72 | | La II | 90 | 5508.11 | | O III | 16 | 5536.77 | | S II | 11 |
| 5480.75 | | Y II | 27 | 5508.60 | | Cr II | 50 | 5537.11 | | Ni I | 188 |
| 5480.865 | | Sr I | 9 | 5508.88 | P | Cr I | 224 | 5537.756 | | Mn I | 4 |
| 5480.872 | | Fe I | 1062 | 5509.67 | | S II | 6 | 5538.32 | | Gd II | |
| 5480.893 | | Ni I | 191 | 5509.91 | | Y II | 19 | 5538.54 | | Fe I | 839,1064 |
| 5481.252 | | Fe I | 1058 | 5510.001 | | Ni I | 190 | 5539.28 | | Fe I | 871 |
| 5481.396 | | Mn I | 4,31 | 5510.174 | | Mn I | 31 | 5539.831 | | Fe I | 1130 |
| 5481.426 | | Ti I | 265 | 5510.23 | P | Fe I | 1023 | 5540.051 | | Sr I | 9 |
| 5481.451 | | Fe I | 1061 | 5510.58 | | Gd II | 132 | 5540.16 | | N II | 63 |
| 5481.862 | | Ti I | 106 | 5510.68 | | Cr II | 23 | 5540.74 | | Si II | 9 |
| 5481.989 | | Sc I | 16 | 5511.795 | | Ti I | 108,275 | 5541.030 | | Sc I | 18 |
| 5482.26 | P | Fe I | 873 | 5512.085 | | Ce II | 24 | 5541.19 | | P II | 23 |
| 5482.27 | | La II | 4 | 5512.277 | | Fe I | 1143 | 5541.58 | P | Fe I | 627 |
| 5482.471 | | V I | 2 | 5512.40 | P | Fe I | 1148 | 5543.03 | P | Fe I | 1064 |
| 5483.111 | | Fe I | 1061 | 5512.529 | | Ti I | 106 | 5543.04 | P | Fe I | 926 |
| 5483.354 | | Co I | 39 | 5512.69 | | Cr I | 121 | 5543.184 | | Fe I | 926 |
| 5483.55 | | Li II | 1 | 5512.71 | | O I | 25 | 5543.49 | | N II | 63 |
| 5483.56 | | P II | 23 | 5512.979 | | Ca I | 48 | 5543.86 | P | Cr II | 35 |
| 5483.962 | | Co I | 175 | 5513.86 | P | Fe I | 925 | 5543.930 | | Fe I | 1062 |
| 5484.618 | | Sc I | 16 | 5514.215 | | Sc I | 15 | 5544.61 | | Y II | 27 |
| 5485.6 | | Fe III | 68 | 5514.350 | | Ti I | 106 | 5544.76 | P | Fe II | 166 |
| 5485.65 | | Li II | 1 | 5514.536 | | Ti I | 106 | 5544.865 | | V I | 38 |
| 5485.699 | | Nd II | 79 | 5514.712 | | W I | 1 | 5545.01 | | Gd II | 98 |
| 5486.136 | | Sr I | 9 | 5514.80 | | Ni I | 189 | 5545.11 | | N I | 26 |
| 5486.6 | | O I | 63 | 5515.083 | | V I | 2 | 5545.26 | P | Fe II | 24 |
| 5486.86 | | La II | 68 | 5515.371 | | V I | 1 | 5545.933 | | V I | 38 |
| 5487.00 | | V II | 53 | 5515.990 | | Co I | 195 | 5545.937 | | Co I | 191 |
| 5487.16 | | Fe I | 1143 | 5516.09 | | Sm I | 2 | 5546.02 | | Y II | 27 |
| 5487.49 | P | Fe I | 870 | 5516.29 | P | Fe I | 1057 | 5546.512 | | Fe I | 1145 |
| 5487.52 | P | Fe I | 1064 | 5516.771 | | Mn I | 4 | 5547.00 | | Fe I | 1061 |
| 5487.747 | | Fe I | 1025 | 5517.08 | | Fe I | 1109 | 5547.080 | | V I | 38 |
| 5487.915 | | V I | 129 | 5518.11 | P | Ti I | 265 | 5548.474 | | Nd II | 73 |
| 5488.14 | P | Fe I | 1183 | 5518.491 | | Ce II | 26 | 5549.55 | P | Fe I | 1159 |
| 5486.210 | | Ti I | 265 | 5518.57 | P | Fe I | 1314 | 5549.66 | P | Fe I | 1314 |
| 5488.97 | P | Cr II | 35 | 5518.74 | | S II | 61 | 5549.68 | | Sc I | 15 |
| 5489.85 | P | Fe I | 1148 | 5519.047 | | Ba I | 9 | 5549.94 | | Fe I | 926 |
| 5490.151 | | Ti I | 107 | 5519.72 | P | Fe II | 204 | 5550.60 | | Hf I | 1 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5551.29 | P | Fe I | 714 | 5587.865 | | Ni I | 70 | 5624.606 | | V I | 37 |
| 5551.77 | P | Fe I | 1059 | 5587.9 | | Fe III | | 5624.895 | | V I | 37 |
| 5551.95 | | N II | 63 | 5588.07 | P | Fe I | 1109 | 5625.326 | | Ni I | 221 |
| 5551.985 | | Mn I | | 5588.25 | | P II | 27 | 5625.43 | | N I | 24 |
| 5552.12 | | Hf I | 7 | 5588.757 | | Ca I | 21 | 5625.74 | | A II | 121 |
| 5552.25 | | Sc II | 25 | 5589.00 | P | Fe I | 1160 | 5626.014 | | V I | 37 |
| 5552.54 | | N II | 63 | 5589.384 | | Ni I | 205 | 5626.60 | P | Cr II | 22 |
| 5552.70 | P | Fe I | 1281 | 5590.120 | | Ca I | 21 | 5627.08 | P | Fe I | 1084 |
| 5552.85 | P | Fe I | 344 | 5590.73 | | Hf II | 48 | 5627.49 | P | Fe II | 57 |
| 5553.22 | P | Fe I | 1064 | 5590.744 | | Co I | 90 | 5627.628 | | V I | 37 |
| 5553.586 | | Fe I | 1161 | 5591.322 | | Sc I | 18 | 5628.347 | | Ni I | 215 |
| 5553.693 | | Ni I | 69 | 5591.38 | P | Fe II | 55 | 5628.645 | | Cr I | 203 |
| 5553.81 | P | Cr II | 34 | 5592.146 | | Ni I | 250 | 5630.14 | | Y I | 12 |
| 5554.895 | | Fe I | 1183 | 5592.283 | | Ni I | 69 | 5631.404 | | Tm I | |
| 5554.94 | | O I | 24 | 5592.37 | | O III | 5 | 5631.707 | | Sn I | 4 |
| 5555.17 | P | Fe I | 740 | 5592.400 | | V I | 37 | 5631.72 | | Fe I | 1159 |
| 5556.01 | | S II | 6 | 5592.962 | | V I | 1 | 5632.25 | | Gd I | 3 |
| 5556.19 | | Cr I | 120,121 | 5593.23 | | Al II | 16 | 5632.469 | | V I | 1 |
| 5556.48 | | Yb I | 1 | 5593.735 | | Ni I | 206 | 5633.970 | | Fe I | 1314 |
| 5557.08 | | Al I | 6 | 5594.425 | | Nd II | 79 | 5634.53 | P | Fe I | 1281 |
| 5557.453 | | V I | 1 | 5594.468 | | Ca I | 21 | 5634.84 | | Cl II | 23 |
| 5557.90 | P | Fe I | 464,1164 | 5594.661 | | Fe I | 1182 | 5635.85 | | Fe I | 1088 |
| 5557.95 | | Al I | 6 | 5595.06 | P | Fe I | 1314 | 5636.00 | P | Fe I | 1058 |
| 5557.954 | | Fe I | 1163 | 5597.21 | | Gd II | 95 | 5636.235 | | Ru I | 10 |
| 5558.31 | | As II | 2 | 5597.87 | | Cr I | 239 | 5636.708 | | Fe I | 868 |
| 5558.752 | | V I | 77 | 5597.92 | | Ti I | 229 | 5637.121 | | Ni I | 218 |
| 5558.825 | | Co I | 166 | 5598.303 | | Fe I | 1183 | 5637.734 | | Co I | 195 |
| 5559.06 | | S II | 61 | 5598.47 | P | Fe I | 113 | 5638.266 | | Fe I | 1087 |
| 5559.64 | P | Fe I | 282 | 5598.487 | | Ca I | 21 | 5638.82 | | Ni I | 203 |
| 5560.230 | | Fe I | 1164 | 5600 | P | O V | 3 | 5639.492 | | Si II | 9 |
| 5560.37 | | N I | 25 | 5600.038 | | Ni I | 219 | 5639.96 | | S II | 14 |
| 5560.548 | | V I | 1 | 5600.242 | | Fe I | 866,1108 | 5640.32 | | S II | 11 |
| 5560.69 | | Gd II | 99 | 5601.285 | | Ca I | 21 | 5640.46 | | Fe I | 1202 |
| 5561 | P | N IV | 13 | 5602 | P | O VI | 11 | 5640.50 | | C II | 15 |
| 5561.670 | | V I | 77 | 5602.54 | P | Fe I | 1281 | 5640.971 | | Sc II | 29 |
| 5562.02 | | V II | 247 | 5602.788 | | Fe I | 1062 | 5641.112 | | Ni I | 230 |
| 5562.12 | P | Fe I | 1162 | 5602.846 | | Ca I | 21 | 5641.464 | | Fe I | 1087 |
| 5562.712 | | Fe I | 626,1163 | 5602.955 | | Fe I | 686 | 5641.880 | | Ni I | 234 |
| 5562.769 | | Ne I | 19 | 5603.651 | | Nd I | 45 | 5642.01 | | V II | 238 |
| 5563.604 | | Fe I | 1062 | 5604.205 | | V I | 85 | 5642.362 | | Cr I | 239 |
| 5563.69 | P | Fe I | 112,1023 | 5604.943 | | V I | 37 | 5642.660 | | Ni I | 203 |
| 5564.37 | | N I | 25 | 5605.91 | P | Fe II | 51 | 5642.75 | P | Fe I | 1184 |
| 5564.861 | | Sc I | 18 | 5606 | P | O V | 3 | 5643.099 | | Ni I | 259 |
| 5564.94 | | S II | 6 | 5606.11 | | S II | 11 | 5643.24 | | Gd I | 3 |
| 5565.30 | | N II | 63 | 5607.05 | | Ni I | 205 | 5643.94 | P | Fe I | 1021 |
| 5565.476 | | Ti I | 229 | 5607.12 | P | Fe II | 24 | 5644.137 | | Ti I | 240 |
| 5565.56 | | Hf II | 100 | 5607.66 | P | Fe I | 1058 | 5644.35 | P | Fe I | 1057 |
| 5565.708 | | Fe I | 1163 | 5608 | P | O V | 3 | 5644.84 | | Gd II | 60 |
| 5566.06 | P | Cr II | 35 | 5608.98 | P | Fe I | 1108 | 5645.62 | | S II | 6 |
| 5566.82 | P | Fe I | 625 | 5609.19 | | Cr I | 223 | 5645.665 | | Si I | 10 |
| 5566.92 | | La II | 90 | 5609.97 | P | Fe I | 866 | 5646.112 | | V I | 37 |
| 5567.401 | | Fe I | 209 | 5610.01 | P | Cr II | 34 | 5646.70 | P | Fe I | 1109 |
| 5567.815 | | Fe II | | 5610.257 | | Ce II | 26 | 5646.98 | | S II | 14 |
| 5568.07 | P | Fe I | 1059 | 5610.36 | | Y II | 19 | 5647.234 | | Co I | 112 |
| 5568.44 | P | Fe I | 1058 | 5610.53 | | La II | 106 | 5648.08 | | C II | 15 |
| 5568.71 | P | Fe I | 1026 | 5611.35 | P | Fe I | 869 | 5648.18 | | Cr I | 239 |
| 5568.81 | | Cl II | 80 | 5613.19 | | Al II | 77 | 5648.570 | | Ti I | 269 |
| 5568.81 | | Fe I | 869 | 5613.698 | | Ce II | 32 | 5648.90 | P | Fe I | 625 |
| 5569.62 | | Fe I | 686 | 5613.70 | P | Fe I | 1282 | 5649.371 | | Cr I | 239 |
| 5570.06 | P | Fe I | 345 | 5614.29 | P | Fe I | 1314 | 5649.66 | | Fe I | 838 |
| 5570.46 | | Mo I | 4 | 5614.303 | | Nd II | 87 | 5649.697 | | Ni I | 231 |
| 5571 | P | N IV | 13 | 5614.58 | P | Fe I | 739 | 5650.01 | | Fe I | 1314 |
| 5572.849 | | Fe I | 686 | 5614.790 | | Ni I | 250 | 5650.31 | P | Fe I | 1180 |
| 5573 | P | O V | 3 | 5615.18 | P | Fe I | 1143 | 5650.7034 | | A I | 12 |
| 5573.10 | | Fe I | 1061 | 5615.308 | | Fe I | 209 | 5650.71 | | Fe I | 1314 |
| 5573.3 | | Fe III | 68 | 5615.54 | P | Cr I | 239 | 5651.47 | P | Fe I | 1161 |
| 5574.41 | | Cr I | 120 | 5615.652 | | Fe I | 686 | 5651.53 | | As II | 2 |
| 5576.097 | | Fe I | 686 | 5616.21 | | Gd II | 61 | 5651.734 | | Co I | 56 |
| 5576.61 | | Si II | 9 | 5616.54 | | N I | 24 | 5652.01 | P | Fe I | 1059 |
| 5577.03 | P | Fe I | 1314 | 5616.63 | | S II | 11 | 5652.3 | | La II | 103 |
| 5577.70 | | A II | 134 | 5617.14 | P | Fe I | 1065 | 5652.32 | | Fe I | 1108 |
| 5578.734 | | Ni I | 47 | 5617.22 | | Fe I | 626 | 5653.889 | | Fe I | 1159 |
| 5578.85 | | S II | 11 | 5617.91 | | Gd I | 3 | 5655.179 | | Fe I | 1314 |
| 5579.34 | P | Fe I | 1061 | 5618.646 | | Fe I | 1107 | 5655.506 | | Fe I | 1107,1314 |
| 5580.51 | | Cr I | 223 | 5619.23 | P | Fe I | 923 | 5656.6585 | | Ne I | 24 |
| 5581.87 | | Y I | 12 | 5611.60 | | Fe I | 1161 | 5656.895 | | V I | 127 |
| 5581.971 | | Ca I | 21 | 5620.04 | | Fe I | 1026,1205 | 5657.449 | | V I | 37 |
| 5582 | P | C V | 3 | 5620.16 | | Zr I | 25 | 5657.870 | | Sc II | 29 |
| 5583.33 | | P II | 23 | 5620.527 | | Fe I | 1061 | 5657.92 | P | Fe II | 57 |
| 5583.68 | | Gd II | 59 | | | | | 5658.334 | | Sc II | 29 |
| 5583.97 | P | Fe I | 1059 | 5620.62 | P | Nd II | 86 | 5658.542 | | Fe I | 686 |
| 5584 | P | O V | 3 | 5620.63 | | Cr II | 189 | 5658.67 | P | Fe I | 1087 |
| 5584.490 | | V I | 37 | 5621.43 | | Gd II | 132 | 5658.826 | | Fe I | 686 |
| 5584.738 | | V I | 85 | 5622.075 | | V I | 85 | 5659.104 | | Ti I | 50 |
| 5584.768 | | Fe I | 782 | 5622.23 | | Si I | 11 | 5659.121 | | Co I | 82 |
| 5586.007 | | V I | 85 | 5623.20 | | N I | 24 | 5659.86 | | Sm I | 2 |
| 5586.16 | | Gd II | 78 | 5623.64 | P | Fe I | 625 | 5659.95 | | S II | 11 |
| 5586.763 | | Fe I | 686 | 5624.056 | | Fe I | 1160 | 5660.79 | | Fe I | 869 |
| 5587.36 | P | Fe I | 563 | 5624.223 | | V I | 127 | 5661.03 | P | Fe I | 1234 |
| 5587.582 | | Fe I | 1026 | 5624.549 | | Fe I | 686 | 5661.36 | | Fe I | 1108 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5661.97 | P | Fe I | 1109 | 5701.138 | | Si I | 10 | 5731.771 | | Fe I | 1087 |
| 5662.154 | | Ti I | 249 | 5701.35 | | Gd I | 3 | 5732.29 | P | Fe I | 1313 |
| 5662.51 | | C II | 15 | 5701.375 | | Si II | | 5732.72 | P | Fe II | 57 |
| 5662.525 | | Fe I | 1087 | 5701.46 | P | Cr II | 22 | 5732.86 | P | Fe I | 1055 |
| 5662.58 | P | Cr II | 34 | 5701.553 | | Fe I | 209 | 5733.86 | | Gd II | 94 |
| 5662.891 | | Ti I | 269 | 5702.244 | | Nd II | 78 | 5734 | P | N IV | 9 |
| 5662.94 | | Fe I | 924 | 5702.307 | | Cr I | 203 | 5734.004 | | V I | 135 |
| 5662.95 | | Y II | 38 | 5702.434 | | Fe I | 866 | 5735.70 | | Zr I | 4 |
| 5664.017 | | Ni I | 272 | 5702.666 | | Ti I | 249 | 5735.74 | | Ca I | 54 |
| 5664.040 | | Cr I | 203 | 5703.09 | P | Fe I | 1053 | 5736.55 | | Lu I | 1 |
| 5664.55 | | Zr I | 47 | 5703.32 | | La II | 48 | 5736.632 | | Cr I | 228 |
| 5664.73 | | S II | 11 | 5703.562 | | V I | 35 | 5737.040 | | V I | 35 |
| 5665.601 | | Si I | 10 | 5705.32 | P | Fe I | 1058 | 5737.68 | P | Fe II | 58 |
| 5666.64 | | N II | 3 | 5705.48 | | Fe I | 1087 | 5737.71 | | Fe I | 1053 |
| 5666.78 | P | Ni I | 233 | 5705.988 | | Fe I | 1183 | 5738.22 | P | Fe I | 1084 |
| 5666.837 | | Fe I | 1053,1060 | 5706.11 | P | Fe I | 1088 | 5738.286 | | Mn I | |
| 5667.164 | | Sc II | 29 | 5706.11 | | S I | 11 | 5738.554 | | Cr I | 227 |
| 5667.67 | P | Fe I | 209 | 5706.206 | | Nd II | 86 | 5739.08 | P | Ti I | 249 |
| 5668.369 | | V I | 37 | 5706.375 | | Si II | | 5739.30 | | Sc I | 12 |
| 5668.868 | | Nd II | 84 | 5706.973 | | V I | 35 | 5739.464 | | Ti I | 228 |
| 5668.901 | | Ce II | 23 | 5707.03 | | Ca I | 54 | 5739.762 | | Si III | 4 |
| 5669.030 | | Sc II | 29 | 5707.068 | | Fe I | 868 | 5739.78 | P | Fe I | 1057 |
| 5669.590 | | Si II | | 5707.25 | P | Fe I | 866 | 5739.975 | | Ti I | 228 |
| 5669.8 | P Forb | Na I | 7 | 5707.70 | P | Fe I | 1056 | 5740.65 | | La I | 8 |
| 5669.945 | | Ni I | 250 | 5708.109 | | Fe I | 1161 | 5740.862 | | Nd II | 86 |
| 5670.827 | | V I | 36 | 5708.199 | | Ti I | 249 | 5741.192 | | Ti I | 280 |
| 5671.54 | | La II | 95 | 5708.280 | | Nd II | 79 | 5741.36 | | Sc I | 12 |
| 5671.62 | P | Cr II | 22 | 5708.437 | | Si I | 10 | 5741.861 | | Fe I | 1086 |
| 5671.805 | | Sc I | 12 | 5708.600 | | Sc I | 12 | 5742.95 | P | Fe I | 1084 |
| 5672.28 | P | Fe I | 1234 | 5709.378 | | Fe I | 686 | 5743.28 | | Ca I | |
| 5673.58 | | Hf II | 112 | 5709.559 | | Ni I | 46 | 5743.438 | | V I | 35 |
| 5675.08 | P | Fe I | 583 | 5709.93 | P | Fe I | 1088 | 5746.32 | P | Cr I | 228 |
| 5675.3 | P Forb | Na I | 7 | 5709.976 | | Tm II | | 5746.432 | | Cr I | 243 |
| 5675.413 | | Ti I | 249 | 5710.76 | | N II | 3 | 5746.81 | | Ca I | 54 |
| 5675.853 | | Tm I | | 5711.0735 | | Mg I | 8 | 5747.29 | | N II | 9 |
| 5676.02 | | N II | 3 | 5711.0831 | | Mg I | 8 | 5747.36 | | N I | 35 |
| 5677.68 | P | Fe I | 1057 | 5711.0912 | | Mg I | 8 | 5747.85 | P | Fe I | 343 |
| 5678.04 | P | Fe I | 1290 | 5711.754 | | Sc I | 12 | 5747.88 | P | Fe II | 164 |
| 5678.38 | P | Fe I | 982 | 5711.852 | | Ti I | 249 | 5747.95 | | Fe I | 1182 |
| 5678.42 | | Cr II | 189 | 5711.867 | | Fe I | 1087 | 5748.15 | P | Fe I | 1290 |
| 5678.60 | P | Fe I | 113 | 5711.905 | | Ni I | 69 | 5748.299 | | Ne I | 13 |
| 5679.023 | | Fe I | 1183 | 5712.150 | | Fe I | 686 | 5748.343 | | Ni I | 45 |
| 5679.56 | | N II | 3 | 5712.39 | | La II | 20 | 5748.412 | | V I | 127 |
| 5679.908 | | Ti I | 269 | 5712.635 | | Cr I | | 5748.860 | | V I | 92 |
| 5680.26 | | Fe I | 1026 | 5712.778 | | Cr I | 119 | 5749.28 | | Ni I | 176 |
| 5680.93 | | Zr I | 25 | 5713.895 | | Ti I | 249 | 5749.41 | | Gd II | 97 |
| 5681.198 | | Cr I | | 5714.88 | P | Fe I | 552 | 5749.65 | P | Fe I | 1160 |
| 5682.204 | | Ni I | 232 | 5715.086 | | Ni I | 231 | 5750.424 | | O I | 40 |
| 5682.483 | | Cr I | 239 | 5715.107 | | Fe I | 1061,1086 | 5751.41 | | Mo I | 5 |
| 5682.633 | | Na I | 6 | 5715.123 | | Ti I | 228 | 5752.043 | | Fe I | 1180 |
| 5682.88 | | Ca I | | 5715.47 | P | Fe I | 1054 | 5752.64 | | N I | 33 |
| 5684.190 | | Sc II | 29 | 5715.80 | P | Fe I | 1198 | 5752.711 | | V I | 92 |
| 5684.523 | | Si I | 11 | 5716.450 | | Ti I | 249 | 5752.89 | | Ti I | 214 |
| 5685.86 | P | Fe I | 1281 | 5717.30 | | Sc I | 12 | 5753.136 | | Fe I | 1107 |
| 5686.21 | | N II | 3 | 5717.845 | | Fe I | 1107 | 5753.38 | P | Fe I | 1084 |
| 5686.532 | | Fe I | 1182 | 5717.99 | | Ca I | 54 | 5753.692 | | Cr I | |
| 5686.826 | | Sc I | 12 | 5718.120 | | Nd II | 86 | 5753.97 | P | Fe I | 170 |
| 5688.193 | | Na I | 6 | 5719.18 | | Hf I | 6 | 5754.17 | | Gd II | |
| 5688.205 | | Na I | 6 | 5719.2254 | | Ne I | 28 | 5754.258 | | Si I | 10 |
| 5688.47 | | Ca I | | 5719.821 | | Cr I | 119 | 5754.41 | | Fe I | 866 |
| 5688.525 | | Nd II | 79 | 5720.445 | | Ti I | 249 | 5754.675 | | Ni I | 68 |
| 5688.593 | | Co I | 90 | 5720.613 | | O I | 40 | 5754.89 | P | Fe I | 113 |
| 5688.856 | | Si II | | 5720.79 | P | Fe I | 1291 | 5756.45 | P | Ti I | 228 |
| 5689.22 | | Mo I | 5 | 5720.89 | P | Fe I | 1178 | 5757.69 | | Ca I | 54 |
| 5689.465 | | Ti I | 249 | 5721.02 | P | Cr II | 34 | 5759.270 | | Fe I | 1184 |
| 5690.07 | P | Fe I | 1281 | 5721.70 | P | Fe I | 1057 | 5759.56 | P | Fe I | 1087 |
| 5690.470 | | Si I | 10 | 5721.71 | P | Fe I | 1088 | 5759.57 | P | Fe I | 1204 |
| 5691.38 | P | Fe II | 47 | 5721.99 | | Gd II | 110 | 5760.351 | | Fe I | 867 |
| 5691.509 | | Fe I | 1087 | 5722.56 | P | Fe II | 58 | 5760.53 | P | Fe I | 1054 |
| 5691.52 | | Ni I | 228 | 5722.65 | | Al III | 2 | 5760.71 | P | Fe I | 1056 |
| 5691.69 | P | Fe I | 1084 | 5723.66 | P | Fe I | 1160 | 5760.847 | | Ni I | 231 |
| 5691.71 | | A II | 134 | 5723.87 | P | Ti II | 79 | 5761.08 | P | Fe I | 1057 |
| 5691.99 | P | Ti II | 79 | 5724.073 | | Sc I | 12 | 5761.27 | | Fe I | 867 |
| 5694.46 | | He II | 8 | 5724.37 | | A II | 12 | 5761.411 | | V I | 35 |
| 5694.730 | | Cr I | 239 | 5724.445 | | Fe I | 1109 | 5761.88 | | Ca I | 54 |
| 5694.998 | | Ni I | 220 | 5725.633 | | V I | 135 | 5762.295 | | Ti I | 309 |
| 5696.0 | | C III | 2 | 5725.95 | P | Fe II | 57 | 5762.434 | | Fe I | 866 |
| 5696.10 | P | Fe I | 1179 | 5727.024 | | V I | 35 | 5762.84 | P | Fe I | 1086 |
| 5696.11 | P | Fe II | 18 | 5727.29 | | La II | 48 | 5762.992 | | Fe I | 1107 |
| 5696.22 | | Gd I | 3 | 5727.662 | | V I | 35 | 5764.300 | | Tm I | |
| 5696.47 | | Al III | 2 | 5727.69 | | P II | 27 | 5764.32 | | Ca I | |
| 5696.63 | | S I | 11 | 5727.75 | | Fe I | 1204 | 5764.419 | | Ne I | 13 |
| 5698.05 | | Fe I | 867 | 5728.32 | | Gd II | 60 | 5766.330 | | Ti I | 309 |
| 5698.330 | | Cr I | 239 | 5728.74 | P | Fe II | 51 | 5767.18 | | Hf II | 22 |
| 5698.37 | | Fe I | 1130 | 5728.91 | | Y II | 34 | 5767.43 | | N II | 9 |
| 5698.509 | | V I | 35 | 5729.203 | | Cr I | 257 | 5768.895 | | Ce II | 32 |
| 5700.14 | | Sc I | 12 | 5730.67 | | N II | 3 | 5769.06 | | La II | 70 |
| 5700.24 | | S I | 11 | 5731.103 | | O I | 40 | 5769.31 | P | Fe I | 1179 |
| 5700.240 | | Cu I | 2 | 5731.257 | | V I | 36 | 5769.32 | | La I | 8 |
| 5700.514 | | Cr I | 203,228 | 5731.70 | | Ca I | 54 | 5769.598 | | Hg I | 5 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5770.17 | P | Fe I | 1236a | 5801.71 | | Hf II | 59 | 5840.47 | | Gd II | 112 |
| 5772.258 | | Si I | 17 | 5804.020 | | Nd II | 79 | 5841.01 | | N I | 32 |
| 5772.402 | | V I | 92 | 5804.06 | | Fe I | 959 | 5841.86 | | Cr II | 198 |
| 5772.676 | | Cr I | 227 | 5804.265 | | Ti I | 309 | 5842.23 | | Hf II | 50 |
| 5773.75 | P | Fe II | 165 | 5804.4488 | | Ne I | 19 | 5842.391 | | Nd II | 86 |
| 5774.037 | | Ti I | 309 | 5804.478 | | Fe I | 1087 | 5843.24 | | Cr I | 119 |
| 5775.090 | | Fe I | 1087 | 5804.91 | P | Fe II | 165 | 5843.77 | | C II | 22 |
| 5776.670 | | V I | 36 | 5805.233 | | Ni I | 234 | 5843.80 | | A II | 12 |
| 5776.76 | | Ta I | 5 | 5805.76 | | C I | 18 | 5844.606 | | Cr I | 119 |
| 5777.622 | | Ba I | 9 | 5805.76 | P | Fe I | 1313 | 5844.879 | | Fe I | 1056 |
| 5777.77 | | Cr I | 257 | 5805.77 | | La II | 1 | 5845.27 | P | Fe I | 1313 |
| 5778.47 | | Fe I | 209 | 5806.31 | P | Cr II | 34 | 5845.71 | | Gd II | 112 |
| 5778.81 | P | Fe I | 1203 | 5806.56 | | La II | 90 | 5846 | P | N IV | 15 |
| 5779.65 | P | Fe II | 24 | 5806.727 | | Fe I | 1180 | 5846.12 | | Si II | 8 |
| 5780.189 | | Mn I | | 5806.75 | | Si II | 8 | 5846.306 | | V I | 142 |
| 5780.452 | | Si I | 9 | 5806.77 | P | Sc II | 21 | 5846.575 | | Co I | 169 |
| 5780.621 | | Fe I | 552 | 5807.05 | | Gd II | 112 | 5847.010 | | Ni I | 44 |
| 5780.77 | | Ni I | 217 | 5807.14 | | V I | 142 | 5848.09 | | Fe I | 552,1175 |
| 5780.778 | | Ti I | 214 | 5807.22 | P | Fe I | 581 | 5848.95 | | La II | 111 |
| 5780.83 | | Fe I | 552,922,1159 | 5807.79 | P | Fe I | 552 | 5849.67 | P | Fe I | 922 |
| 5780.97 | | Cr I | 188 | 5807.97 | P | Fe I | 1178 | 5850.286 | | V I | 92 |
| 5781.195 | | Cr I | 119,188 | 5808.31 | | La II | 4 | 5851.63 | | Gd I | 3 |
| 5781.69 | | Y II | 34 | 5808.63 | | La II | 118 | 5852.19 | | Fe I | 1178 |
| 5781.73 | P | Ti II | 79 | 5809.249 | | Fe I | 982 | 5852.4878 | | Ne I | 6 |
| 5781.806 | | Cr I | 188 | 5809.50 | | Hf II | 14 | 5853.18 | | Fe I | 35 |
| 5782.132 | | Cu I | 2 | 5809.75 | | Ti I | 73 | 5853.48 | P | Fe I | 1340 |
| 5782.356 | | Tm II | | 5809.88 | P | Fe I | 1084 | 5853.62 | | Al II | 41 |
| 5782.601 | | V I | 35,127 | 5811.10 | | Ta I | 3 | 5853.675 | | Ba II | 2 |
| 5783.112 | | Cr I | 188 | 5811.572 | | Nd II | 78 | 5854.1 | | Fe III | |
| 5783.15 | P | Cr I | 227 | 5811.93 | | Fe I | 1022 | 5854.16 | | N I | 32 |
| 5783.509 | | V I | 141 | 5811.93 | P | Fe II | 24 | 5854.27 | | Cr I | |
| 5783.934 | | Cr I | 188 | 5812 | P | N IV | 15 | 5854.31 | P | Sc II | 21 |
| 5784.18 | | Ba II | 13 | 5812.14 | | C IV | 1 | 5855.126 | | Fe I | 1179 |
| 5784.360 | | V I | 141 | 5812.81 | | A II | 125 | 5855.24 | | Gd II | 112 |
| 5784.69 | | Fe I | 686 | 5812.827 | | Ti I | 309 | 5856.084 | | Fe I | 1128 |
| 5785.0 | | Fe II | 215 | 5813.33 | P | Fe I | 1054 | 5856.09 | | C II | 22 |
| 5785.002 | | Cr I | 188 | 5813.67 | | Fe II | 163 | 5856.22 | | Gd I | 3 |
| 5785.08 | | Mg I | 24 | 5814.00 | | Ti I | 73 | 5856.45 | P | Fe II | 183 |
| 5785.64 | | Si II | | 5814.62 | P | Ti II | 79 | 5856.96 | | Gd II | 60 |
| 5785.67 | | Ti I | 309 | 5814.80 | | Fe I | 1086 | 5857.454 | | Ca I | 47 |
| 5785.820 | | Cr I | 188 | 5815.16 | | Fe I | 1055 | 5857.755 | | Ni I | 228 |
| 5785.86 | | Cr I | 17 | 5815.23 | P | Fe I | 1234 | 5857.9 | P | C III | 20 |
| 5785.979 | | Ti I | 309 | 5815.42 | P | Fe I | 1053 | 5858.27 | P | Fe I | 170 |
| 5786.153 | | V I | 141 | 5815.85 | | Gd II | 112 | 5858.28 | | Mo I | 5 |
| 5786.99 | P | Fe I | 1084 | 5816.07 | P | Fe I | 1127 | 5858.77 | P | Fe I | 1084 |
| 5787.036 | | Cr I | 119 | 5816.36 | | Fe I | 1179 | 5859.20 | | Fe I | 1084 |
| 5787.27 | P | Fe I | 625 | 5816.48 | | N I | 32 | 5859.23 | P | Si I | 9 |
| 5787.99 | | Cr I | 188 | 5816.844 | | Mn I | | 5859.608 | | Fe I | 1181 |
| 5788.389 | | Cr I | 119 | 5817.063 | | V I | 92 | 5859.96 | P | Fe I | 1054 |
| 5788.549 | | V I | 92 | 5817.532 | | V I | 142 | 5860.73 | | Gd II | 58 |
| 5789.22 | | La I | 8 | 5817.87 | | C II | 22 | 5860.92 | P | Ti II | 79 |
| 5790.50 | | CI II | 27 | 5818.74 | | Eu II | 9 | 5861.11 | P | Fe I | 1084 |
| 5790.59 | P | Cr I | 17 | 5819.22 | | S II | 14 | 5861.53 | | Al II | 41 |
| 5790.659 | | Hg I | 4 | 5819.93 | | V II | 99 | 5862.357 | | Fe I | 1180 |
| 5791.005 | | Cr I | 188 | 5820.155 | | Ne I | 19 | 5862.80 | | V II | 91 |
| 5791.044 | | Fe I | 552 | 5820.99 | | Gd II | 112 | 5863.70 | | La II | 62 |
| 5791.32 | | La I | 8 | 5823.13 | | C II | 22 | 5863.96 | | Cr I | 185 |
| 5791.38 | | Gd I | 3 | 5823.17 | | Fe II | 164 | 5863.97 | | Ni I | 253 |
| 5791.47 | | V II | | 5823.679 | | Ti I | 239 | 5864.24 | P | Fe I | 1086 |
| 5791.53 | P | Fe I | 1234 | 5824.40 | P | Fe II | 58 | 5864.54 | P | Fe II | 24 |
| 5791.781 | | Cr I | 243 | 5826.12 | P | Fe II | 182 | 5866.453 | | Ti I | 72 |
| 5791.86 | | Mo I | 5 | 5826.299 | | Co I | 169 | 5867.01 | P | Fe I | 1203 |
| 5793.128 | | Si I | 9 | 5826.64 | P | Fe I | 1084 | 5867.497 | | Si II | 8 |
| 5793.16 | P | Fe II | 47 | 5827.1 | | C III | 22 | 5867.572 | | Ca I | 46 |
| 5793.51 | | C I | 18 | 5827.24 | | Cr II | 198 | 5867.81 | | Al II | 41 |
| 5793.70 | P | Fe I | 1236a | 5827.80 | | C II | 22 | 5868.404 | | Si II | 8 |
| 5793.932 | | Fe I | 1086 | 5827.80 | | Si II | 8 | 5870.65 | P | Fe I | 1235 |
| 5794 | P | N IV | 15 | 5827.89 | P | Fe I | 552 | 5871.04 | | Fe I | 150 |
| 5795.87 | | Fe II | 211 | 5828 | P | N IV | 15 | 5871.289 | | Fe I | 1055 |
| 5796.078 | | Ni I | 68 | 5829.12 | P | Fe II | 165 | 5871.6 | P | C III | 20 |
| 5796.67 | P | Fe I | 1054 | 5829.53 | | N I | 32 | 5871.81 | | Gd II | 79 |
| 5796.757 | | Cr I | | 5830.719 | | V I | 142 | 5872.73 | P | Fe I | 552 |
| 5797.352 | | V I | 142 | 5831.624 | | Ni I | 233,250 | 5872.828 | | Ne I | 31 |
| 5797.445 | | Ti I | 309 | 5832.47 | | Ti I | 309 | 5872.98 | | Eu II | 9 |
| 5797.53 | P | Cr I | 185 | 5833.65 | | Fe III | 114 | 5873.211 | | Fe I | 1087 |
| 5797.57 | | La II | 4 | 5833.93 | P | Fe I | 209 | 5874.00 | | La II | 48 |
| 5797.76 | | Zr I | 4 | 5834.06 | P | Fe II | 165 | 5875.6 | | Fe III | |
| 5797.81 | P | Fe II | 165 | 5834.93 | P | Fe II | 57 | 5875.618 | | He I | 11 |
| 5797.912 | | Si I | 9 | 5835.10 | P | Fe I | 1084 | 5875.650 | | He I | 11 |
| 5798.00 | P | Cr I | 185 | 5835.41 | P | Fe I | 1313 | 5875.989 | | He I | 11 |
| 5798.194 | | Fe I | 982 | 5835.43 | P | Fe II | 58 | 5876.27 | P | Fe I | 1084 |
| 5798.46 | | Cr I | 17 | 5835.50 | P | Fe II | 182 | 5876.55 | | Cr I | 119 |
| 5798.905 | | V I | 142 | 5835.58 | P | Fe I | 343 | 5877.26 | | Gd II | 94 |
| 5800.02 | P | Fe II | 165 | 5835.61 | | Fe II | | 5877.770 | | Fe I | 1083 |
| 5800.229 | | Ba I | 9 | 5836.31 | | C II | 22 | 5879.49 | P | Fe I | 1201 |
| 5800.48 | | Si II | 8 | 5837.29 | | Au I | 2 | 5879.79 | | Zr I | 4 |
| 5801.14 | | Cr I | 243 | 5837.709 | | Fe I | 1129 | 5880.00 | | Fe I | 1201 |
| 5801.17 | | C I | 18 | 5838.418 | | Fe I | 959 | 5880.306 | | Ti I | 71 |
| 5801.30 | | Gd II | 112 | 5838.66 | | Cr I | 119 | 5880.63 | | La II | 35 |
| 5801.51 | | C IV | 1 | 5839.78 | P | Ti I | 105 | 5881.28 | P | Fe I | 1178 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5881.76 | P | Fe I | 63 | 5929.700 | | Fe I | 1176 | 5978.970 | | Si II | 4 |
| 5881.8950 | | Ne I | 1 | 5930.173 | | Fe I | 1180 | 5980.748 | | V I | 49 |
| 5883.06 | P | Fe I | 1124 | 5930.61 | | La I | 2 | 5980.89 | | Ti I | 72 |
| 5883.421 | | Co I | 90 | 5930.68 | | La I | 2 | 5981.25 | | Ba II | 13 |
| 5883.838 | | Fe I | 982 | 5931.79 | | N II | 28 | 5981.38 | P | Fe I | 837 |
| 5884.45? | | Cr I | 119 | 5931.89 | P | Fe I | 1017 | 5981.96 | | Cr I | 185 |
| 5884.59 | | Gd II | 112 | 5932.05 | P | Fe II | 47 | 5982.52 | | Ti I | 264 |
| 5885.61 | | Zr I | 2 | 5932.95 | | S II | 13 | 5982.84 | | Cr I | 185 |
| 5887.46 | P | Fe I | 1203 | 5933.80 | P | Fe I | 1198 | 5983.704 | | Fe I | 175 |
| 5888.32 | | Mo I | 5 | 5934.658 | | Fe I | 982 | 5983.90 | | Lu II | 2 |
| 5889.95? | | Na I | 1 | 5934.747 | | Nd II | 78 | 5984.092 | | Co I | 37 |
| 5889.97 | | C II | 5 | 5935.23 | | Zr I | 2 | 5984.253 | | Co I | 201 |
| 5890.02 | P | Sc II | 21 | 5935.391 | | Co I | 55 | 5984.586 | | Ti I | 2 |
| 5890.48 | P | Fe I | 1313 | 5936.22 | | La II | 19 | 5984.602 | | V I | 49 |
| 5890.487 | | Co I | 82 | 5937.806 | | Ti I | 72 | 5984.805 | | Fe I | 1260 |
| 5891.12 | | Fe I | 581 | 5939.75 | | Ta I | 7 | 5986.54 | P | Fe II | 24 |
| 5891.16 | P | Fe I | 1179 | 5940.25 | | N II | 28 | 5987.057 | | Fe I | 1260 |
| 5891.36 | | Fe II | 211 | 5940.68 | | Ti I | 2 | 5987.11 | | Gd II | 97 |
| 5891.528 | | Nd II | 86 | 5940.69 | | S II | 21 | 5988.560 | | Ti I | 154 |
| 5891.5 | | Fe III | 114 | 5940.972 | | Fe I | 1083 | 5990.59 | P | Fe II | 51 |
| 5891.65 | | C II | 5 | 5941.36 | P | Fe II | 58 | 5991.34 | | O I | 44 |
| 5891.89 | P | Fe I | 1236 | 5941.67 | | N II | 28 | 5991.383 | | Fe II | 46 |
| 5891.9 | | Fe II | | 5941.755 | | Ti I | 72 | 5991.58 | P | Fe I | 1232 |
| 5892.46 | P | Fe I | 1201 | 5942.71 | P | Fe I | 1233 | 5991.890 | | Co I | 90 |
| 5892.66 | | La II | 48 | 5943.11 | P | Fe I | 1021 | 5991.93 | | O I | 44 |
| 5892.71 | | Fe I | 1086 | 5943.58 | P | Fe I | 63 | 5992.65 | P | Fe I | 1080 |
| 5892.76 | P | Ni I | 250 | 5943.62 | P | Fe I | 1085 | 5993.18 | | O I | 44 |
| 5892.80 | P | Fe I | 63 | 5944.01 | | Ta I | 8 | 5995.28 | | O I | 44 |
| 5892.878 | | Ni I | 68 | 5944.65 | P | Ti I | 2 | 5995.685 | | Ti I | 311 |
| 5893.24 | P | Fe I | 1055 | 5944.8342 | | Ne I | 1 | 5995.93 | P | Fe I | 1198 |
| 5893.42 | | Ce II | 1 | 5946.484 | | Co I | 169 | 5996.007 | | Ti I | 154 |
| 5894.1 | P | C III | 20 | 5947.30 | P | Fe I | 1056 | 5996.16 | | S II | 13 |
| 5894.351 | | Zn II | 1 | 5947.50 | P | Fe I | 1199 | 5996.22 | P | Fe I | 624 |
| 5895.007 | | e I | 1235 | 5948.30 | | La II | 105 | 5996.49 | P | Fe I | 1083 |
| 5895.646 | | Tm I | | 5948.584 | | Si I | 16 | 5996.74 | | Ni I | 249 |
| 5895.89 | | S II | 20 | 5949.35 | | Fe I | 14,1176 | 5997.088 | | Ba I | 7 |
| 5895.90 | | Cr II | 198 | 5950.13 | P | Fe I | 1200 | 5997.24 | | Ta I | 12 |
| 5895.92 | | Na I | 1 | 5950.91 | | A II | 12 | 5997.610 | | Ni I | 252 |
| 5897.54 | | V II | 98 | 5951.30 | | S II | 21 | 5997.808 | | Fe I | 1175 |
| 5897.62 | | Gd II | 112 | 5951.45 | | V II | 98 | 5998.86 | | Ni I | 226 |
| 5898.212 | | Fe I | 1259 | 5951.60 | | Gd II | 95 | 5999.003 | | Ti I | 198 |
| 5899.295 | | Ti I | 72 | 5952.19 | P | Fe I | 1313 | 5999.30 | | Fe III | 117 |
| 5901.0 | | Fe III | 115 | 5952.39 | | N II | 28 | 5999.47 | | I I | 16 |
| 5901.53 | P | Fe I | 1083 | 5952.55 | P | Fe II | 182 | 5999.668 | | Ti I | 227 |
| 5901.95 | | La II | 107 | 5952.749 | | Fe I | 959 | 5999.70 | | Al II | 93 |
| 5902.182 | | Cr I | 119 | 5953.162 | | Ti I | 154 | 5999.83 | | Al II | 93 |
| 5902.52 | | Fe I | 1234 | 5953.65 | | Fe III | 115 | 5999.85 | | Ba II | 13 |
| 5903.317 | | Ti I | 71 | 5955.12 | P | Fe I | 1233 | 6000.668 | | Co I | 169 |
| 5903.6 | | Fe II | | 5955.37 | | Zr I | 3 | 6001.18 | | Al II | 109 |
| 5904.07 | | Gd II | 112 | 5955.682 | | Fe I | 1106 | 6001.53 | P | Sc II | 20 |
| 5905.673 | | Fe I | 1181 | 5956.48 | | Gd II | 59 | 6001.81 | | Al II | 93 |
| 5906.50 | P | Ti I | 105 | 5956.5 | | Fe II | | 6002.273 | | V I | 49 |
| 5907.36 | | C II | 44 | 5956.702 | | Fe I | 14 | 6002.601 | | V I | 34 |
| 5908.24 | | Fe I | 150 | 5957.612 | | Si II | 4 | 6002.640 | | Ti I | 198 |
| 5908.25 | | S II | 13 | 5958.22 | P | Fe I | 1199 | 6003.033 | | Fe I | 959 |
| 5909.38 | P | Fe II | 57 | 5958.23 | P | Fe I | 14 | 6004.53 | | Lu I | 1 |
| 5909.99 | | Fe I | 552 | 5958.34 | P | Fe I | 63 | 6004.57 | | Gd II | 112 |
| 5911.45 | | Gd II | | 5958.46 | | O I | 23 | 6005.030 | | Co I | 37 |
| 5913.35 | P | Fe I | 781 | 5958.63 | | O I | 23 | 6005.53 | | Fe I | 207,1079 |
| 5913.55 | | Gd II | | 5959.878 | | Fe I | 1020 | 6006.42 | | Al II | 93 |
| 5913.730 | | Ti I | 2 | 5960.93 | | N II | 28 | 6007.313 | | Ni I | 42 |
| 5913.87 | | Cr II | | 5961.91 | P | Fe I | 1080 | 6007.75 | P | Fe I | 581 |
| 5914.16 | | Fe I | 1180,1181 | 5962.4 | | Fe II | | 6007.961 | | Fe I | 1178 |
| 5914.28 | | V II | 126 | 5963.25 | | Fe I | 63 | 6008.295 | | Mn II | 16 |
| 5914.92 | | C II | 44 | 5965.040 | | Co I | 169 | 6008.35 | P | Fe I | 1079 |
| 5915.123 | | Ti I | 228 | 5965.474 | | Ne I | 39 | 6008.48 | | N I | 16 |
| 5915.266 | | Si II | 8 | 5965.828 | | Ti I | 154 | 6008.577 | | Fe I | 982 |
| 5915.551 | | Co I | 82 | 5966.07 | | Eu II | 9 | 6008.648 | | V I | 49 |
| 5915.93 | | Cr I | 185 | 5967.77 | | V II | 126 | 6009.298 | | Mn II | 16 |
| 5916.250 | | Fe I | 170 | 5969.38 | | Hf II | 66 | 6009.45 | P | Fe I | 60 |
| 5916.364 | | V II | 126 | 5969.554 | | Fe I | 1086 | 6009.83 | P | Fe I | 824 |
| 5916.73 | | Cr I | 185 | 5969.64 | | K II | 7 | 6009.962 | | Mn II | 16 |
| 5918.548 | | Ti I | 71 | 5971.07 | | Ti I | 264 | 6011.12 | | Gd II | 60 |
| 5918.93 | P | Fe I | 1083 | 5971.09 | | La II | 69 | 6012.21 | P | Fe I | 64 |
| 5919.60 | | C II | 44 | 5971.28 | | Tm I | | 6012.251 | | Ni I | |
| 5920.0 | | Fe III | 115 | 5971.699 | | Ba I | 7 | 6012.53 | | Ti I | 264 |
| 5920.520 | | Fe I | 581 | 5971.94 | | Al II | 100 | 6012.75 | P | Fe I | 1198 |
| 5922.112 | | Ti I | 72 | 5973.37 | P | Fe I | 1175 | 6013.498 | | Mn I | 27 |
| 5922.365 | | Co I | 55 | 5973.52 | | La II | 103 | 6015.25 | P | Fe I | 63 |
| 5923.930 | | Ni I | 259 | 5973.66 | | Ni I | 226 | 6016.637 | | Mn I | 27 |
| 5925.81 | P | Ni I | 42 | 5974.62 | P | Fe I | 1055 | 6016.66 | | Fe I | 638 |
| 5926.83 | P | Fe I | 1231 | 5974.628 | | Ne I | 28 | 6016.95 | P | Fe I | 1232 |
| 5927.15 | | S II | 21 | 5975.355 | | Fe I | 1017,1260 | 6017.52 | P | Ti I | 257 |
| 5927.71 | | La II | 111 | 5975.5340 | | Ne I | 1 | 6017.90 | | V I | 49 |
| 5927.798 | | Fe I | 1175 | 5975.830 | | Ce II | 30 | 6018.34 | P | Fe I | 176 |
| 5927.82 | | N II | 28 | 5976.18 | P | Fe I | 1125 | 6018.423 | | Ti I | 198 |
| 5928.50 | P | Fe I | 1055 | 5976.799 | | Fe I | 959 | 6018.62 | | Ti I | 70 |
| 5928.86 | | V II | 98 | 5978.17 | P | Fe I | 1199 | 6019.36 | P | Fe I | 780 |
| 5929.35 | | Hf II | 66 | 5978.543 | | Ti I | 154 | 6019.470 | | Ba I | 7 |
| 5929.5 | | Fe III | 114 | 5978.90 | | Fe III | 117 | 6020.173 | | Fe I | 1178 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 6021.09 | | Ge II | 1 |
| 6021.18 | P | Fe II | 24 |
| 6021.802 | | Mn I | 27 |
| 6021.82 | | Fe I | 63,1079,1085 |
| 6022.81 | | As II | 1 |
| 6023.41 | | Y I | 3 |
| 6024.066 | | Fe I | 1178 |
| 6024.15 | | P II | 5 |
| 6025.723 | | Pr II | 39 |
| 6025.73 | | Ni I | 251 |
| 6026.81 | | V II | 125 |
| 6027.057 | | Fe I | 1018 |
| 6027.23 | | V II | 90 |
| 6027.57 | | Hf II | 91 |
| 6027.76 | P | Fe I | 1312 |
| 6028.26 | | V II | 97 |
| 6028.64 | | Zr II | 136 |
| 6028.98 | | V II | 125 |
| 6029.28 | | Cr I | 242 |
| 6029.9971 | | Ne I | 3 |
| 6030.66 | | Mo I | 5 |
| 6031.07 | | V II | 97 |
| 6031.68 | | Ti I | 2 |
| 6032.124 | | A I | 13 |
| 6032.30 | | Fe III | 117 |
| 6032.67 | | Fe I | 1082 |
| 6034.01 | | P II | 5 |
| 6034.04 | P | Fe I | 1142 |
| 6034.204 | | Ce II | 30 |
| 6035.34 | P | Fe I | 1125 |
| 6035.487 | | Ce II | 30 |
| 6036.17 | | Sc I | |
| 6036.7 | | He II | 8 |
| 6039.312 | | Ni I | 248 |
| 6039.690 | | V I | 34 |
| 6041.44 | | Hf II | 65 |
| 6041.93 | | S I | 10 |
| 6042.092 | | Fe I | |
| 6043.10 | | P II | 5 |
| 6043.386 | | Ce II | 30 |
| 6043.738 | | Fe I | 664 |
| 6044.53 | P | Fe II | 46 |
| 6045.38 | | Ta I | 10 |
| 6045.497 | | Fe II | 200 |
| 6046.04 | | S I | 10 |
| 6046.26 | | O I | 22 |
| 6046.46 | | O I | 22 |
| 6047.665 | | Cr I | 242 |
| 6048.636 | | V I | 49 |
| 6049.110 | | Co I | 201 |
| 6049.50 | | Gd II | 54 |
| 6049.51 | | Eu II | 9 |
| 6050.446 | | Mn II | 16 |
| 6051.00 | P | Fe I | 207 |
| 6051.860 | | Mn II | 16 |
| 6052.66 | | S I | 10 |
| 6052.892 | | Mn II | 16 |
| 6053.48 | | Cr II | 105 |
| 6053.680 | | Ni I | 247 |
| 6054.100 | | Fe I | 1142 |
| 6055.987 | | Fe I | 1259 |
| 6058.113 | | V I | 34 |
| 6058.76 | P | Ti I | 70 |
| 6059.28 | P | Sc I | 20 |
| 6060.81 | P | Fe I | 1081 |
| 6061.04 | | Fe I | 217 |
| 6061.11 | | Al I | 99 |
| 6062.75 | | Cr I | 185 |
| 6062.88 | | Zr I | 3 |
| 6062.89 | | Fe I | 63 |
| 6063.117 | | Ba I | 7 |
| 6064.631 | | Ti I | 69 |
| 6065.487 | | Fe I | 207 |
| 6065.5 | | N II | 27 |
| 6065.81 | P | Fe I | 581 |
| 6066.32 | | Al II | 92 |
| 6066.44 | | Al II | 92 |
| 6067.13 | | La II | 48 |
| 067.62 | P | Si I | 15 |
| 6068.00 | | Cr II | 107 |
| 6068.46 | | Al II | 92 |
| 6069.69 | | Cr II | 107 |
| 6070.08 | | Cr II | 105 |
| 6073.23 | | Al II | 92 |
| 6074.1 | | He II | 8 |
| 6074.3377 | | Ne I | 3 |
| 6077.43 | | A II | 12 |
| 6078.496 | | Fe I | 1259 |
| 6079.02 | | Fe I | 1176 |
| 6080.11 | | V II | 206 |
| 6080.65 | | Gd II | 112 |
| 6080.85 | | S II | 20 |
| 6081.421 | | V I | 34 |
| 6081.51 | | Cr II | 188 |
| 6081.72 | P | Fe I | 1142 |
| 6081.85 | P | Fe I | 1018 |
| 6082.431 | | Co I | 169 |
| 6082.718 | | Fe I | 64 |
| 6083.67 | P | Fe I | 981 |
| 6083.82 | | V II | 125 |
| 6084.11 | | Fe II | 46 |
| 6085.228 | | Ti I | 69 |
| 6085.267 | | Fe I | 269 |
| 6085.43 | | La II | 111 |
| 6086.290 | | Ni I | 249 |
| 6086.55 | | V I | 49 |
| 6086.663 | | Co I | 165 |
| 6086.93 | | V II | 125 |
| 6087.485 | | V I | 33 |
| 6087.76 | | P II | 5 |
| 6089.473 | | V I | 33 |
| 6089.566 | | Fe I | 1327 |
| 6089.69 | | Cr II | 187 |
| 6090.184 | | V I | 34 |
| 6090.54 | P | V I | 33 |
| 6091.175 | | Ti I | 238 |
| 6091.74 | P | Fe I | 1200 |
| 6092.13 | | S II | 20 |
| 6092.814 | | Ti I | 153 |
| 6093.144 | | Co I | 37 |
| 6093.66 | | Fe I | 1177 |
| 6094.419 | | Fe I | 1177 |
| 6094.65 | | Cl II | 26 |
| 6095.37 | | C II | 24 |
| 6095.93 | | V II | 97 |
| 6096.689 | | Fe I | 959 |
| 6097.08 | P | Fe I | 64 |
| 6097.12 | | S II | 13 |
| 6097.42 | | V I | 33 |
| 6098.28 | P | Fe I | 1200 |
| 6098.62 | | C II | 24 |
| 6098.655 | | Ti I | 304 |
| 6100.04 | | Zr II | 93 |
| 6100.23 | P | Fe I | 1199 |
| 6100.29 | P | Fe I | 1199 |
| 6100.37 | | La II | 47 |
| 6102.178 | | Fe I | 1259 |
| 6102.26 | | S II | 26 |
| 6102.59 | | C II | 24 |
| 6102.59 | P | Fe III | 3 |
| 6102.722 | | Ca I | 3 |
| 6103.190 | | Fe I | 1260 |
| 6103.54 | | Fe II | 200 |
| 6103.56 | | A II | 27 |
| 6103.642 | | Li I | 4 |
| 6105.15 | P | Fe I | 1175 |
| 6105.381 | | Mn II | 16 |
| 6106.19 | | Gd II | 95 |
| 6106.25 | | O I | 43 |
| 6106.47 | | Zr II | 106,137 |
| 6106.84 | P | Fe I | 208 |
| 6106.967 | | V I | 60 |
| 6107.09 | P | Fe I | 1081 |
| 6107.293 | | Mn II | 16 |
| 6107.32 | P | Fe I | 1015 |
| 6108.121 | | Ni I | 45 |
| 6108.8 | P | Mn II | 16 |
| 6109.318 | | Fe I | 581 |
| 6110.30 | | As II | 5 |
| 6110.784 | | Ba I | 7 |
| 6111.06 | | Ni I | 230 |
| 6111.632 | | V I | 34 |
| 6112.26 | | Cr II | 105 |
| 6113.33 | | Fe II | 46 |
| 6114.07 | | Gd I | 3 |
| 6114.41 | P | Fe I | 981 |
| 6114.6 | | N II | 36 |
| 6114.7( | | Zr II | 93 |
| 6114.92 | | A II | 102 |
| 6115.21 | | C II | 19 |
| 6116.04 | P | Fe II | 46 |
| 6116.181 | | Ni I | 218,251 |
| 6116.994 | | Co I | 37 |
| 6118.06 | | Ni I | 230 |
| 6118.2 | | He II | 8 |
| 6119.505 | | V I | 34 |
| 6119.780 | | Ni I | 244 |
| 6120.12 | | A II | 22 |
| 6120.25 | P | Fe I | 14 |
| 6120.86 | | Zr I | 24 |
| 6120.98 | | V II | 97 |
| 6121.008 | | Ti I | 153 |
| 6122.219 | | Ca I | 3 |
| 6122.438 | | Mn II | 13 |
| 6122.640 | | Co I | 169 |
| 6122.799 | | Mn II | 13 |
| 6123.164 | | Mn II | 13 |
| 6123.38 | | A II | 102 |
| 6123.41 | | S II | 13 |
| 6124.08 | P | Fe I | 1326 |
| 6124.85 | | Si I | 30 |
| 6124.86 | | Zr I | 24 |
| 6125 | P | N IV | 16 |
| 6125.03 | | Si I | 30 |
| 6125.855 | | Mn II | 13 |
| 6126.09 | | La II | 69 |
| 6126.210 | | Mn II | 13 |
| 6126.217 | | Ti I | 69 |
| 6126.516 | | Mn II | 13 |
| 6127.49 | | Zr I | 2 |
| 6127.913 | | Fe I | 1017,1082 |
| 6128.21 | | S II | 28 |
| 6128.30 | | V I | 33 |
| 6128.725 | | Mn II | 13 |
| 6128.990 | | Ni I | 42 |
| 6129.022 | | Mn II | 13 |
| 6129.23 | | Cr II | 105 |
| 6129.255 | | Mn II | 13 |
| 6129.57 | | La II | 47 |
| 6129.71 | P | Fe II | 46 |
| 6130.174 | | Ni I | 248 |
| 6130.37 | P | Fe I | 624 |
| 6130.794 | | Mn II | 13 |
| 6131.005 | | Mn II | 13 |
| 6131.30 | P | Si I | 30 |
| 6131.54 | | Si I | 30 |
| 6131.86 | | Si I | 30 |
| 6131.917 | | Mn II | 13 |
| 6133.948 | | Ni I | 229 |
| 6134.58 | | Zr I | 2 |
| 6135.07 | | V I | 60 |
| 6135.10 | | Hf II | 90 |
| 6135.36 | | V I | 34 |
| 6135.759 | | Cr I | 314 |
| 6135.83 | | Ba II | 12 |
| 6136.620 | | Fe I | 169 |
| 6136.9 | | N II | 36 |
| 6136.999 | | Fe I | 62 |
| 6137.51 | P | Fe I | 685 |
| 6137.696 | | Fe I | 207 |
| 6138.38 | | Ti I | 197 |
| 6138.44 | | Y I | 3 |
| 6138.67 | | A II | 21,103 |
| 6138.77 | | Cr II | 188 |
| 6138.98 | | S II | 63 |
| 6139.65 | P | Fe I | 208 |
| 6140.50 | | Zr I | 24 |
| 6141.01 | P | Fe II | 46 |
| 6141.718 | | Ba II | 2 |
| 6141.734 | | Fe I | 816 |
| 6142.047 | | Ni I | 244 |
| 6142.21 | P | Si I | 30 |
| 6142.53 | | Si I | 30 |
| 6143.0623 | | Ne I | 1 |
| 6143.23 | | Zr I | 2 |
| 6145.06 | | Si I | 29 |
| 6145.42 | P | Fe I | 685 |
| 6146.225 | | Ti I | 153 |
| 6146.38 | | Co I | 80 |
| 6146.53 | | La II | 4 |
| 6147.15 | | Cr II | 105 |
| 6147.735 | | Fe II | 74 |
| 6147.85 | | Fe I | 1016 |
| 6148.65 | P | Fe I | 1141 |
| 6149.238 | | Fe II | 74 |
| 6149.743 | | Ti I | 197 |
| 6150.10 | P | Fe II | 46 |
| 6150.132 | | V I | 20 |
| 6150.9 | | N II | 36 |
| 6151.509 | | V I | 33 |
| 6151.624 | | Fe I | 62 |
| 6152.82 | P | Fe I | 1312 |
| 6154.225 | | Na I | 5 |
| 6154.4 | P | C III | 13 |
| 6155.22 | | Si I | 29 |
| 6155.24 | P | Fe II | 161 |
| 6155.4 | P | C III | 13 |
| 6155.73 | | Si I | 29 |
| 6155.99 | | O I | 10 |
| 6156.10 | | Ca I | 20 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6156.25 | | Hf II | 67 | 6212.04 | | Fe I | 1142 | 6257.834 | | Nd II | 72 |
| 6156.6 | P | C III | 13 | 6212.30 | | Ti II | 108 | 6258.103 | | Ti I | 104 |
| 6156.78 | | O I | 10 | 6213.06 | | Zr I | 24 | 6258.591 | | Ni I | 226 |
| 6157.41 | P | Fe I | 624 | 6213.438 | | Fe I | 62 | 6258.595 | | V I | 19 |
| 6157.734 | | Fe I | 1015 | 6213.874 | | V I | 20 | 6258.706 | | Ti I | 104 |
| 6158.19 | | O I | 10 | 6214.58 | | Zn II | 1 | 6258.962 | | Sc I | 3 |
| 6159.409 | | Fe I | 1175 | 6215.152 | | Fe I | 1018 | 6259.615 | | Ni I | 216 |
| 6160.747 | | Na I | 5 | 6215.212 | | Ti I | 293 | 6260.31 | | Gd II | 111 |
| 6160.75 | P | Fe II | 161 | 6216.368 | | V I | 19 | 6261.101 | | Ti I | 104 |
| 6161.194 | | Pr II | 39 | 6217.2813 | | Ne I | 1 | 6261.236 | | V I | 20 |
| 6161.289 | | Ca I | 20 | 6217.288 | | Fe I | 1335 | 6261.55 | | O I | 50 |
| 6161.84 | | S II | 27 | 6217.95 | P | Fe II | 34 | 6262.30 | | La II | 33 |
| 6162.172 | | Ca I | 3 | 6219.290 | | Fe I | 62 | 6264.55 | | O I | 49 |
| 6163.42 | | Ni I | 230 | 6219.35 | P | Fe II | 161 | 6264.825 | | Ti I | 144 |
| 6163.560 | | Fe I | 64 | 6219.54 | P | Fe I | 685 | 6265.140 | | Fe I | 62 |
| 6163.5939 | | Ne I | 5 | 6219.54 | P | Fe II | 34 | 6266.021 | | Ti I | 144 |
| 6163.758 | | Ca I | 20 | 6220.460 | | Ti I | 293 | 6266.32 | | V I | 20 |
| 6165.18 | P | Ni I | 229 | 6220.78 | | Fe I | 958 | 6266.4950 | | Ne I | 5 |
| 6165.366 | | Fe I | 1018 | 6221.40 | | Fe I | 981 | 6266.89 | | O I | 48 |
| 6165.56 | | P II | 5 | 6221.41 | | Ti I | 293 | 6267.64 | P | Fe I | 110 |
| 6165.945 | | Pr II | 39 | 6221.661 | | Fe I | 13 | 6267.845 | | Fe I | 1123 |
| 6166.443 | | Ca I | 20 | 6221.88 | | Lu II | 2 | 6268.50 | | Ti I | 103 |
| 6167.82 | | N II | 36,60 | 6222.59 | | Y I | 2 | 6268.841 | | V I | 20 |
| 6168.46 | | Cr II | 196 | 6222.81 | | Hf II | 57 | 6270.238 | | Fe I | 342 |
| 6168.86 | | Co I | 82 | 6223.994 | | Ni I | 228 | 6271.289 | | Fe I | 685 |
| 6169.055 | | Ca I | 20 | 6224.23 | P | Fe I | 1257 | 6271.52 | P | Fe I | 1231 |
| 6169.559 | | Ca I | 20 | 6224.26 | P | V I | 20 | 6271.83 | | Cr II | 196 |
| 6170.16 | | N II | 36 | 6224.507 | | V I | 20 | 6272.650 | | Ni I | 244 |
| 6170.340 | | V I | 20 | 6226.18 | | Al II | 10 | 6273.389 | | Ti I | 1 |
| 6170.47 | | As II | 1 | 6226.29 | | V II | 124 | 6273.76 | | La II | 131 |
| 6170.492 | | Fe I | 1260 | 6226.66 | | Cr II | 105 | 6274.34 | | S II | 19 |
| 6170.568 | | Ni I | 228,230 | 6226.77 | | Fe I | 981 | 6274.670 | | V I | 19 |
| 6170.6 | | He II | 8 | 6229.234 | | Fe I | 342 | 6274.94 | | Cr II | 196 |
| 6171.01 | P | Fe I | 1256 | 6229.34 | P | Fe II | 34 | 6276.310 | | Sc I | 2 |
| 6172.28 | | A II | 102 | 6230.115 | | Ni I | 227 | 6277.525 | | Ti I | 144 |
| 6172.72 | | La II | 4 | 6230.728 | | Fe I | 207 | 6278.30 | | Au I | 1 |
| 6173.05 | | Eu II | 9 | 6230.736 | | V I | 19 | 6279.757 | | Sc II | 28 |
| 6173.343 | | Fe I | 62 | 6230.84 | | Hf II | 69 | 6279.84 | | Hf II | 13 |
| 6173.40 | | N II | 36 | 6230.968 | | Co I | 37 | 6280.625 | | Fe I | 13 |
| 6174.15 | | La II | 47 | 6231.76 | | Sc I | 3 | 6282.636 | | Co I | 37 |
| | | | | 6231.78 | | Al II | 10 | 6282.92 | | Cr II | 196 |
| 6175.158 | | Fe II | 200 | 6232.661 | | Fe I | 816 | 6284.00 | P | Fe I | 624 |
| 6175.424 | | Ni I | 217 | 6232.735 | | Fe I | 685 | 6284.30 | | N II | 32 |
| 6176.813 | | Ni I | 228 | 6233.187 | | V I | 20 | 6285.185 | | V I | 19 |
| 6176.95 | | Cr II | 105 | 6233.52 | | Fe II | | 6286.35 | | S II | 19 |
| 6177.258 | | Ni I | 58 | 6233.8 | | He II | 7 | 6287.06 | | S II | 26 |
| 6177.49 | | Ni I | 244 | 6237.34 | | Si I | 28 | 6290.55 | P | Fe I | 208 |
| 6178.13 | P | Fe II | 46 | 6237.62 | | Si I | 27 | 6290.968 | | Fe I | 1258 |
| 6179.17 | | Cr II | 187 | 6238.375 | | Fe II | 74 | 6292.858 | | V I | 19 |
| 6179.378 | | Fe II | 163 | 6239.36 | P | Fe II | 34 | 6293.00 | P | Ti I | 103 |
| 6180.093 | | Ni I | 65,217 | 6239.410 | | Sc I | 2 | 6293.92 | P | Fe I | 1260 |
| 6180.216 | | Fe I | 269 | 6239.64 | | F I | 3 | 6295.251 | | Ti I | 1,144 |
| 6180.42 | | Gd II | 111 | 6239.73 | | A II | 21 | 6295.949 | | Ti I | 144 |
| 6181.57 | | Al II | 66 | 6239.77 | | Cr II | 105 | 6296.08 | | La II | 47,68 |
| 6181.68 | | Al II | 66 | 6239.778 | | Sc I | 3 | 6296.518 | | V I | 19 |
| 6182.28 | | Al II | 66 | 6239.95 | P | Fe II | 74 | 6296.646 | | Ti I | 1 |
| 6182.45 | | Al II | 66 | 6240.137 | | V I | 20 | 6297.800 | | Fe I | 62 |
| 6183.42 | | Al II | 66 | 6240.266 | | Fe I | 1015 | 6298.075 | | Ti I | 144 |
| 6183.892 | | Ni I | 226 | 6240.656 | | Fe I | 64 | 6299.07 | | Gd II | 123 |
| 6184.94 | P | Fe II | 163 | 6242.52 | | N II | 57 | 6299.74 | P | Fe III | 3 |
| 6185.1 | | Fe III | | 6242.80 | | V I | 19 | 6300.363 | | Ni I | 246 |
| 6185.34 | P | Fe II | 46 | 6243.11 | | V I | 19 | 6300.697 | | Sc II | 28 |
| 6186.14 | | Ti I | 197 | 6243.13 | | A II | 21 | 6301.515 | | Fe I | 816 |
| 6186.740 | | Ni I | 229 | 6243.36 | | Al II | 10 | 6301.86 | P | Fe I | 863 |
| 6187.41 | P | Fe I | 342 | 6243.86 | | Si I | 28 | 6302.507 | | Fe I | 816 |
| 6188.00 | P | Cr II | 187 | 6244.13 | P | Si I | 28 | 6303.41 | | Eu II | 8 |
| 6188.037 | | Fe I | 959 | 6244.344 | | Pr II | 39 | 6303.46 | | Fe I | 1140 |
| 6188.09 | | La II | 117 | 6244.51 | | Sc I | 3 | 6303.754 | | Ti I | 104 |
| 6189.005 | | Co I | 37 | 6244.56 | | Si I | 27 | 6304.35 | | Zr I | 24 |
| 6189.350 | | V I | 20 | 6245.214 | | V I | 20 | 6305.15 | | Gd II | 94 |
| 6191.186 | | Ni I | 45 | 6245.629 | | Sc II | 28 | 6305.262 | | Pr II | 39 |
| 6191.562 | | Fe I | 169 | 6245.84 | | Fe I | 1289 | 6305.318 | | Fe II | 200 |
| 6191.73 | | Y I | 2 | 6246.334 | | Fe I | 816 | 6305.46 | | La II | 5 |
| 6192.96 | | Zr I | 24 | 6247.562 | | Fe II | 74 | 6305.51 | | S II | 19 |
| 6193.672 | | Sc I | 3 | 6248.916 | | Fe II | | 6305.60 | | Cr II | |
| 6195.18 | | Cr II | 105 | 6248.95 | | Hf II | 22 | 6305.671 | | Sc I | 2 |
| 6196.71 | P | Fe II | 46 | 6249.65 | P | Fe I | 685 | 6306.047 | | Sc I | 3 |
| 6199.16 | | Fe II | 162 | 6249.92 | | La I | 7 | 6306.17 | | Hf II | 81 |
| 6199.202 | | V I | 19 | 6251.26 | P | Fe I | 1176 | 6306.19 | P | Fe I | 1230 |
| 6199.475 | | Fe I | 208 | 6251.83 | | V I | 19 | 6307.25 | | La II | 117 |
| 6200.323 | | Fe I | 207 | 6252.561 | | Fe I | 169 | 6307.85 | P | Fe I | 863 |
| 6201.52 | | Al II | 57 | 6253.82 | P | Fe I | 1256 | 6309.902 | | Sc II | 28 |
| 6201.70 | | Al II | 57 | 6254.25 | | Si I | 28 | 6310.543 | | Fe I | 405 |
| 6202.31 | P | Fe I | 208 | 6254.262 | | Fe I | 111 | 6310.8 | | He II | 7 |
| 6203.51 | | La II | 111 | 6254.96 | | Si I | 28 | 6310.91 | | La II | 103 |
| 6204.640 | | Ni I | 226 | 6256.365 | | Ni I | 43 | 6311.289 | | Ti I | 103 |
| 6207.251 | | V I | 20 | 6256.370 | | Fe I | 169 | 6311.506 | | Fe I | 342 |
| 6208.18 | | Cr II | 105 | 6256.84 | | O I | 50 | 6312.240 | | Ti I | 104 |
| 6209.73 | P | Fe I | 981 | 6256.906 | | V I | 19 | 6312.68 | | S II | 26 |
| 6210.676 | | Sc I | 2 | 6257.72 | | Ti I | 1 | 6313.05 | | Zr I | 65 |

| I A | Type | Element | Multiplet No. |
|---|---|---|---|
| 6313.57 | | Zr II | 136 |
| 6314.22 | | Gd II | 121 |
| 6314.29 | | S II | 28 |
| 6314.666 | | Ni I | 67 |
| 6314.67 | P | Ni I | 249 |
| 6315.316 | | Fe I | 1015 |
| 6315.42 | P | Fe I | 1016 |
| 6315.79 | | La II | 117 |
| 6315.814 | | Fe I | 1014 |
| 6316.61 | | Ni I | 248 |
| 6318.022 | | Fe I | 168 |
| 6318.027 | | Ti I | 103 |
| 6318.11 | | Ca I | 53 |
| 6318.23 | | Mg I | 23 |
| 6318.75 | | Mg I | 23 |
| 6320.39 | | La II | 19 |
| 6320.854 | | Sc II | 28 |
| 6322.165 | | Ni I | 249 |
| 6322.693 | | Fe I | 207 |
| 6322.98 | P | Fe III | 3 |
| 6323.39 | | O I | 31 |
| 6324.45 | | A II | |
| 6324.84 | | O I | 31 |
| 6325.22 | | Ti I | 1 |
| 6325.90 | | La I | 2 |
| 6326.43 | | S II | 63 |
| 6326.845 | | V I | 84 |
| 6327.603 | | Ni I | 44 |
| 6328.6 | | N II | 46 |
| 6329 | P | O V | 14 |
| 6330.101 | | Cr I | 6 |
| 6330.856 | | Fe I | 1254 |
| 6331.969 | | Fe II | 199 |
| 6334.4279 | | Ne I | 1 |
| 6335.335 | | Fe I | 62 |
| 6335.74 | | Al II | 22 |
| 6336.104 | | Ti I | 103 |
| 6336.835 | | Fe I | 816 |
| 6338.896 | | Fe I | 1258 |
| 6339.090 | | V I | 84 |
| 6339.148 | | Ni I | 248 |
| 6339.96 | P | Fe I | 685 |
| 6340.67 | | N II | 46 |
| 6341.682 | | Ba I | 6 |
| 6342.682 | | Sc II | 28 |
| 6343.29 | | Ca I | 53 |
| 6343.963 | | Ce II | |
| 6344.154 | | Fe I | 169 |
| 6344.831 | | Sc I | 1 |
| 6346.54 | | Zr II | 128 |
| 6346.65 | | Gd II | 96 |
| 6346.67 | | Mg II | 16 |
| 6347.091 | | Si II | 2 |
| 6347.1 | | N II | 46 |
| 6347.843 | | Co I | 200 |
| 6348.50 | | F I | 3 |
| 6349.477 | | V I | 84 |
| 6349.748 | | Mn I | 39 |
| 6351.17 | | O I | 61 |
| 6351.29 | P | Fe I | 1140 |
| 6351.448 | | Co I | 200 |
| 6353.84 | P | Fe I | 13 |
| 6355.038 | | Fe I | 342 |
| 6356.057 | | Mn I | 39 |
| 6356.293 | | Fe I | 208 |
| 6357.0 | | N II | 46 |
| 6357.10 | P | Zr I | 2 |
| 6357.297 | | V I | 84 |
| 6358.12 | | La II | 47 |
| 6358.692 | | Fe I | 13 |
| 6359.896 | | Ti I | 1 |
| 6360.798 | | Ni I | 229 |
| 6361.41 | | Ti I | 196 |
| 6361.79 | | Ca I | 53 |
| 6362.286 | | Sc I | 1 |
| 6362.347 | | Zn I | 6 |
| 6362.414 | | Ni I | |
| 6362.874 | | Cr I | 6 |
| 6362.889 | | Fe I | 1019 |
| 6364.384 | | Fe I | 1253 |
| 6364.597 | | Ni I | 67 |
| 6364.717 | | Fe I | 1229 |
| 6364.92 | | Ti I | 1 |
| 6365.7 | | N II | 2 |
| 6366.33 | | O I | 60 |
| 6366.354 | | Ti I | 103 |
| 6366.483 | | Ni I | 230 |
| 6369.34 | | Si II | 19 |
| 6369.45 | | Fe II | 40 |
| 6370.383 | | Ni I | 127 |
| 6371.359 | | Si II | 2 |
| 6374.08 | | La II | 111 |
| 6374.31 | | O I | 59 |
| 6375.96 | | Fe II | |
| 6376.00 | | A II | 61 |
| 6376.22 | P | Fe I | 1140 |
| 6378.263 | | Ni I | 247 |
| 6378.824 | | Sc I | 1 |
| 6378.91 | | Ba II | 12 |
| 6379.63 | | N II | 2 |
| 6380.11 | | V II | 231 |
| 6380.748 | | Fe I | 1015 |
| 6380.95 | | Gd II | 111 |
| 6381.416 | | Ti I | 196 |
| 6382.169 | | Mn I | 39 |
| 6382.9914 | | Ne I | 3 |
| 6383 | P | N IV | 2 |
| 6383.753 | | Fe II | |
| 6384.669 | | Mn I | 39 |
| 6384.697 | | Ni I | 246 |
| 6384.89 | | S II | 19 |
| 6385.196 | | Nd II | 85 |
| 6385.473 | | Fe II | |
| 6385.74 | P | Fe I | 1253 |
| 6386.48 | | Si II | 5 |
| 6386.75 | | Fe II | 203 |
| 6388.41 | P | Fe I | 685 |
| 6390.48 | | La II | 33 |
| 6391.214 | | Mn I | 39 |
| 6392.534 | | Fe I | 109 |
| 6393.605 | | Fe I | 168 |
| 6394.23 | | La I | 7 |
| 6395.158 | | Co I | 174 |
| 6395.16 | | Ca I | |
| 6395.27 | | S II | |
| 6396.39 | P | Fe I | 921 |
| 6397.30 | | S II | 19 |
| 6398.05 | | S II | 19 |
| 6399.04 | | La II | 104 |
| 6399.23 | | A II | 21 |
| 6399.41 | | Cl II | 58 |
| 6400.010 | | Fe I | 816 |
| 6400.335 | | Fe I | 13 |
| 6402.005 | | Y I | 2 |
| 6402.2455 | | Ne I | 1 |
| 6402.43 | P | Fe I | 1344 |
| 6403.58 | | Si I | 9 |
| 6405.89 | | Ca I | |
| 6406.3 | | He II | 7 |
| 6406.42 | | Fe I | 1334 |
| 6407.03 | | Zr I | 2 |
| 6407.30 | | Fe II | 74 |
| 6408.031 | | Fe I | 816 |
| 6408.13 | | S I | 9 |
| 6408.463 | | Sr I | 8 |
| 6410.98 | | La I | 7 |
| 6411.10 | P | Fe I | 1256 |
| 6411.658 | | Fe I | 816 |
| 6412.20 | P | Fe I | 169 |
| 6413.13 | P | Ti I | 1 |
| 6413.353 | | Sc I | 1 |
| 6413.66 | | F I | 3 |
| 6413.71 | | Si II | 19 |
| 6413.92 | | Mn I | 39 |
| 6414.603 | | Ni I | 244 |
| 6415.24 | | Si I | |
| 6415.50 | | S I | 9 |
| 6415.59 | | Cr II | 196 |
| 6416.905 | | Fe II | 74 |
| 6416.94 | P | Fe I | 1253 |
| 6417.824 | | Co I | 111 |
| 6418.87 | | Cr II | 196 |
| 6419.15 | | Ti I | 196 |
| 6419.65 | P | Fe I | 958 |
| 6419.982 | | Fe I | 1258 |
| 6420.47 | | N I | 23 |
| 6421.355 | | Fe I | 111 |
| 6421.507 | | Ni I | 258 |
| 6424.905 | | Ni I | 227 |
| 6428.80 | | Fe I | 1138 |
| 6429.913 | | Co I | 81 |
| 6430.471 | | V I | 107 |
| 6430.78 | | Ta I | 11 |
| 6430.851 | | Fe I | 62 |
| 6431.620 | | V I | 107 |
| 6432.06 | | Ni I | 126 |
| 6432.654 | | Fe II | 40 |
| 6433.17 | | V I | 107 |
| 6433.85 | | Fe II | 199 |
| 6434.44 | P | Fe III | 3 |
| 6435.02 | | Y I | 2 |
| 6435.148 | | V I | 107 |
| 6436.43 | | Fe I | 1016 |
| 6437.01 | | N I | 23 |
| 6437.63 | | A II | 25 |
| 6437.64 | | Eu II | 8 |
| 6438.4696 | | Cd I | 3 |
| 6438.775 | | Fe I | 1158 |
| 6439.073 | | Ca I | 18 |
| 6440.974 | | Mn I | 39 |
| 6441.70 | | N I | 23 |
| 6441.95 | | A II | |
| 6442.97 | | Fe II | |
| 6443.05 | | La II | 117 |
| 6443.492 | | Mn I | 39 |
| 6445.05 | | N III | 14 |
| 6445.76 | | Zr I | 57 |
| 6446.281 | | Mn II | 19 |
| 6446.43 | | Fe II | 199 |
| 6446.62 | | La II | 104 |
| 6448.10 | | Sc I | 1 |
| 6449.810 | | Ca I | 19 |
| 6450.09 | P | Co I | 80 |
| 6450.230 | | Co I | 37 |
| 6450.78 | | N III | 14 |
| 6450.854 | | Ba I | 6 |
| 6450.99 | | Fe I | 1344 |
| 6451.58 | | Fe I | 921 |
| 6451.580 | | Ni I | 257 |
| 6452.354 | | V I | 48 |
| 6452.77 | | Ni I | 226 |
| 6453.50 | | Sn II | 1 |
| 6453.64 | | O I | 9 |
| 6453.95 | | N III | 14 |
| 6454.48 | | O I | 9 |
| 6454.998 | | Co I | 174 |
| 6455.600 | | Ca I | 19 |
| 6455.85 | | Hf II | 82 |
| 6455.99 | | La I | 1 |
| 6456.01 | | O I | 9 |
| 6456.376 | | Fe II | 74 |
| 6456.87 | P | Fe I | 1256 |
| 6456.907 | | Ca II | 19 |
| 6457.93 | | N I | 22 |
| 6458.68 | P | Fe III | 3 |
| 6460.1 | | P II | 32 |
| 6462.210 | | Mn II | 20 |
| 6462.454 | | Mn II | 20 |
| 6462.566 | | Ca I | 18 |
| 6462.72 | P | Fe I | 13 |
| 6462.731 | | Fe I | 168 |
| 6462.799 | | Mn II | 20 |
| 6463.03 | | N III | 14 |
| 6463.11 | | Lu II | 2 |
| 6463.195 | | Mn II | 20 |
| 6463.637 | | Mn II | 20 |
| 6464.67 | P | Fe I | 13 |
| 6464.70 | | Ca I | 19 |
| 6466.86 | | N III | 14 |
| 6466.97 | | V I | 32 |
| 6468.32 | | N I | 22 |
| 6468.77 | | N III | 14 |
| 6468.86 | P | Fe I | 1254 |
| 6469.12 | P | Fe I | 168 |
| 6469.214 | | Fe I | 1258 |
| 6470.25 | | Zr I | 65 |
| 6471.660 | | Ca I | 18 |
| 6472.15 | P | Fe I | 1140 |
| 6472.34 | | Sm II | 60 |
| 6473.89 | | Hf II | 91 |
| 6474.558 | | Co I | 165 |
| 6474.61 | | Fe I | 861 |
| 6475.632 | | Fe I | 206 |
| 6477.861 | | Co I | 174 |
| 6478.69 | | N III | 14 |
| 6480.11 | | Gd II | 109 |
| 6481.73 | | N I | 21 |
| 6481.878 | | Fe I | 109 |
| 6482.07 | | N II | 8 |
| 6482.205 | | Fe II | 199 |
| 6482.74 | | N I | 21 |
| 6482.811 | | Ni I | 66 |
| 6483.10 | | A II | 27 |
| 6483.75 | | N I | 21 |
| 6483.95 | P | Fe I | 34 |
| 6484.88 | | N I | 21 |
| 6485.36 | | Ta I | 12 |
| 6487.43 | | Fe II | 203 |
| 6487.48 | P | Fe III | 3 |
| 6487.55 | | N III | 14 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6489.10 | | Yb I | 3 | 6560.099 | | He II | 2 | 6634.10 | P | Fe I | 1258 |
| 6489.68 | | Zr I | 65 | 6560.68 | | Si I | 62 | 6634.36 | | Gd II | 94 |
| 6490.344 | | Co I | 81 | 6561.032 | | D | 1 | 6635.15 | | Ni I | 264 |
| 6491.28 | | Fe II | | 6562.817 | | H | 1 | 6635.68 | P | Fe I | 1155 |
| 6491.28 | | N I | 21 | 6563.403 | | Co I | 80 | 6636.53 | | La II | 61 |
| 6491.61 | P | Ti II | 91 | 6563.86 | | Hf II | 81 | 6637.01 | | N I | 20 |
| 6491.712 | | Mn I | 39 | 6565.62 | | Ti I | | 6638.24 | | A II | 20 |
| 6492.0 | | N II | 45 | 6565.88 | | V I | 48 | 6639.35 | P | Fe I | 1279 |
| 6493.05 | | Fe II | | 6567.22 | P | Fe I | 168 | 6639.71 | P | Fe I | 1195 |
| 6493.780 | | Ca I | 18 | 6567.39 | | Hf II | 90 | 6639.72 | | A II | 20 |
| 6494.11 | | Gd I | 123 | 6568.00 | | Gd II | 121 | 6639.90 | P | Fe I | 1007 |
| 6494.52 | P | Fe I | 1255 | 6569.261 | | Fe I | 1253 | 6640.90 | | O II | 4 |
| 6494.985 | | Fe I | 168 | 6569.31 | | Sm II | 62 | 6641.06 | | S II | 25 |
| 6495.45 | | Al II | 65 | 6570.0 | | He II | 7 | 6642.79 | | La II | 103 |
| 6495.779 | | Fe I | 1253 | 6570.834 | | Mn I | 51 | 6643.023 | | Cr I | 256 |
| 6496.456 | | Fe I | 1258 | 6570.96 | | La II | 47 | 6643.536 | | Sr I | 8 |
| 6496.896 | | Ba II | 2 | 6571.22 | | Fe I | 1121 | 6643.641 | | Ni I | 43 |
| 6497.689 | | Ti I | 102 | 6572.781 | | Ca I | 1 | 6643.79 | | A II | 20 |
| 6498.19 | | La II | 104 | 6572.900 | | Cr I | 16 | 6644.60 | | Hf II | 34 |
| 6498.759 | | Ba I | 6 | 6574.238 | | Fe I | 13 | 6644.96 | | N I | 20 |
| 6498.950 | | Fe I | 13 | 6575.022 | | Fe I | 206 | 6645.11 | | Eu II | 8 |
| 6499.52 | | N I | 21 | 6575.180 | | Ti I | 286 | 6646.52 | | N I | 20 |
| 6499.649 | | Ca I | 18 | 6576.95 | P | Ni I | 283 | 6646.90 | P | Fe I | 1156 |
| 6500.25 | | A II | 26 | 6578.03 | | C II | 2 | 6646.98 | | Fe I | 206 |
| 6501.212 | | Cr I | 16 | 6578.51 | | La I | 1 | 6647.06 | | Hf II | 65 |
| 6501.681 | | Fe I | | 6578.96 | | V I | 32 | 6647.90 | P | Fe I | 551 |
| 6503.989 | | Sr I | 8 | 6580.22 | | Ni I | 265 | 6648.08 | P | Fe I | 13 |
| 6504.164 | | V I | 48 | 6580.96 | | Cr I | 16 | 6653.41 | | N I | 20 |
| 6504.9 | | N II | 45 | 6581.22 | | Fe I | 34 | 6653.75 | | Cl II | 38 |
| 6506.33 | | Fe II | | 6582.85 | | C II | 2 | 6653.78 | | O I | 65 |
| 6506.45 | | N I | 21 | 6584.53 | | Hf II | 99 | 6653.88 | | Fe I | 1052 |
| 6506.5279 | | Ne I | 3 | 6584.89 | | Y I | 1 | 6656.61 | | N I | 20 |
| 6508.135 | | Ti I | 102 | 6586.328 | | Ni I | 4 | 6657.54 | | Cr I | 282 |
| 6508.742 | | Ca I | 18 | 6586.343 | | Mn I | 51 | 6660.49 | | Si II | |
| 6509.16 | | A II | 21 | 6586.69 | | Fe II | | 6661.076 | | Cr I | 282 |
| 6509.56 | | Fe I | 1012 | 6587.75 | | C I | 22 | 6661.39 | | Ni I | 246 |
| 6511.62 | | Hf II | 69 | 6588.91 | | Sm I | 1 | 6661.68 | | Cl II | 38 |
| 6512.61 | | Hf II | 49 | 6591.32 | | Fe I | 1229 | 6663.26 | | Fe I | 1195 |
| 6516.026 | | Cr I | 265 | 6591.834 | | Co I | 202 | 6663.446 | | Fe I | 111 |
| 6516.053 | | Fe II | 40 | 6592 | P | C IV | 10 | 6665.42 | P | Fe I | 1156 |
| 6517.01 | | Fe II | | 6592.472 | | Ni I | 248 | 6665.43 | P | Fe I | 34 |
| 6517.27 | | V II | 230 | 6592.91 | P | Ti I | 102 | 6666.36 | | A II | 25 |
| 6518.376 | | Fe I | 342 | 6592.919 | | Fe I | 268 | 6666.548 | | Ti I | 101 |
| 6519.371 | | Mn I | 39 | 6593.878 | | Fe I | 168 | 6666.94 | | O II | 85 |
| 6521.39 | | S II | 25 | 6595.326 | | Ba I | 6 | 6667.17 | P | Fe I | 110 |
| 6522.3 | | N II | 45 | 6595.869 | | Co I | 174 | 6667.42 | P | Fe I | 168 |
| 6522.38 | | Cl II | 59 | 6597.556 | | Cr I | 282 | 6667.73 | | Fe I | 1228 |
| 6524.76 | P | Fe I | 1280 | 6597.607 | | Fe I | 1253 | 6669.257 | | Cr I | 282 |
| 6526.99 | | La II | 33 | 6598.594 | | Ni I | 249 | 6671.36 | | Fe I | 1343 |
| 6527.20 | P | Si I | 52 | 6598.9529 | | Ne I | 6 | 6671.41 | | La II | 33 |
| 6527.312 | | Ba I | 6 | 6599.112 | | Ti I | 19 | 6671.43 | P | Fe I | 1255 |
| 6527.49 | | Si I | 62 | 6601.13 | P | Fe I | 1280 | 6671.51 | | Sm I | 1 |
| 6528.53 | | Fe I | | 6603.20 | P | Fe I | 862 | 6671.88 | | Si II | |
| 6529.197 | | Cr I | 265 | 6603.67 | P | Fe I | 860 | 6672.84 | | V II | 229 |
| 6531.44 | | V I | 48 | 6604.60 | | Sc II | 19 | 6672.88 | P | Fe I | 205 |
| 6531.66 | | Hf II | 48 | 6604.67 | | Fe I | 1254 | 6673.84 | P | Fe I | 1254 |
| 6532.891 | | Ni I | 64 | 6605.546 | | Mn I | 51 | 6675.271 | | Ba I | 6 |
| 6533.0 | | N II | 45 | 6605.98 | | V I | 48 | 6676.86 | P | Fe I | 1194 |
| 6533.97 | | Fe I | 1197 | 6607.02 | P | Ti II | 91 | 6677.24 | | Cr I | 256 |
| 6537.921 | | Cr I | 16 | 6607.82 | | V I | 49 | 6677.25 | | Ti I | 274 |
| 6539.72 | | Fe I | 405 | 6608.03 | | Fe I | 109 | 6677.33 | | Fe II | 210 |
| 6541.49 | P | Fe I | 1195 | 6609.116 | | Fe I | 206 | 6677.49 | P | Fe I | 1280 |
| 6542.80 | | Hf II | 100 | 6609.20 | | Hf II | 105 | 6677.54 | P | Fe I | 551 |
| 6543.17 | | La I | 7 | 6609.56 | | Fe I | | 6677.96 | P | Fe I | 205 |
| 6543.51 | | V I | 48 | 6609.64 | | Al II | 76 | 6677.993 | | Fe I | 268 |
| 6543.98 | | Fe I | 1139 | 6609.68 | P | Fe I | 13 | 6678.03 | | Zr II | 128 |
| 6545.2 | | N II | 45 | 6610.04 | | Gd II | 108 | 6678.149 | | He I | 46 |
| 6545.80 | | Mg II | 23 | 6610.58 | | N II | 31 | 6678.19 | | O II | 85 |
| 6546.245 | | Fe I | 268 | 6612.17 | | Cr I | 282 | 6678.2764 | | Ne I | 6 |
| 6546.276 | | Ti I | 102 | 6613.74 | | Y II | 26 | 6678.60 | P | Ti I | 213 |
| 6546.791 | | Sr I | 8 | 6613.83 | P | Fe I | 13 | 6678.818 | | Co I | 54 |
| 6547.58 | P | Fe I | 13 | 6615.03 | P | Fe I | 1155 | 6680.19 | | Cr I | 282 |
| 6548.72 | | Hf II | | 6617.126 | | Co I | 202 | 6680.26 | | Ti II | 112 |
| 6550.01 | | Hf II | 111 | 6617.14 | P | Ni I | 248 | 6681.03 | | Cl II | 38 |
| 6550.244 | | Sr I | 12 | 6617.266 | | Sr I | 8 | 6681.23 | | Gd II | 94 |
| 6551.466 | | Co I | 54 | 6621.24 | | Ni I | 97 | 6681.34 | P | Fe I | 1155 |
| 6551.68 | P | Fe I | 13 | 6622.28 | | Gd II | 110 | 6682.23 | P | Fe I | 1008 |
| 6552.77 | | Fe I | 1325 | 6622.41 | P | Fe I | 1157 | 6683.2 | | He II | 7 |
| 6554.18 | | La II | 109 | 6622.53 | | N I | 20 | 6684.36 | | A II | 20 |
| 6554.226 | | Ti I | 102 | 6623.78 | P | Fe I | 1010 | 6686.04 | | Cl II | 38 |
| 6555.20 | | Si I | 62 | 6624.86 | | V I | 48 | 6687.57 | | Y I | 1 |
| 6555.87 | P | Fe I | 1007 | 6625.04 | | Fe I | 13 | 6690.80 | | Ni I | 140 |
| 6556.066 | | Ti I | 102 | 6627.28 | | Fe II | 210 | 6692.47 | P | Fe I | 1192 |
| 6556.79. | | Fe I | 1255 | 6627.558 | | Fe I | 1174 | 6693.842 | | Ba I | 6 |
| 6557.40 | | Y I | 1 | 6627.62 | | O II | 85 | 6695.97 | | Al I | 5 |
| 6557.87 | | Sc I | 24 | 6630.015 | | Cr I | 16 | 6696.30 | P | Fe I | 1255 |
| 6557.91 | | Hf II | 66 | 6630.5 | | N II | 41 | 6696.39 | | Al II | 29 |
| 6558.02 | | V I | 59 | 6632.438 | | Co I | 111 | 6698.63 | | Al I | 5 |
| 6558.05 | | Sc I | 24 | 6633.44 | | Fe I | 1258 | 6699.14 | | Fe I | 1228 |
| 6559.380 | | Ti II | 91 | 6633.764 | | Fe I | 1197 | 6699.46 | | Al II | 29 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6700.89 | P | Fe I | 1156 | 6752.832 | | A I | 11 | 6823.48 | | Al II | 9 |
| 6700.90 | P | Fe I | 1333 | 6753.00 | | V I | 31 | 6824.82 | P | Fe I | 1280 |
| 6700.90 | P | Ni I | 248 | 6753.45 | P | Fe I | 1196 | 6828.25 | | Gd I | 2 |
| 6701.64 | | Cr I | 256 | 6754.61 | | Hf II | 35 | 6828.5 | | C I | 21 |
| 6702.12 | | Gd II | 130 | 6754.75 | | C II | 21 | 6828.610 | | Fe I | 1195 |
| 6703.573 | | Fe I | 268 | 6755.609 | | Fe I | | 6829.92 | | Co I | 81 |
| 6704.18 | | Gd II | 110 | 6756.56 | P | Fe I | 1120 | 6829.94 | | V I | 31 |
| 6704.48 | P | Fe I | 1052 | 6756.61 | | A II | 20 | 6830 | P | O V | 12 |
| 6705.117 | | Fe I | 1197 | 6757.16 | | S I | 8 | 6830.83 | | La II | 108 |
| 6705.13 | P | Fe I | 1280 | 6757.78 | | Cr I | 315 | 6831.44 | P | Fe I | 550 |
| 6706.20 | | N I | 31 | 6758.60 | | N I | 30 | 6831.62 | | Cl II | 44 |
| 6707.74 | | Li I | 1 | 6759.41 | | Ni I | 245 | 6832.44 | | V I | 31 |
| 6707.89 | | Li I | 1 | 6759.42 | | Cl II | 54 | 6832.49 | | Y II | 26 |
| 6708.27 | | F I | 2 | 6761.07 | P | Fe I | 1227 | 6832.93 | | Zr I | 1 |
| 6708.81 | | N I | | 6762.38 | | Zr I | 1 | 6833.24 | | Fe I | 1194 |
| 6709.49 | | La I | 6 | 6762.41 | | Cr I | 315 | 6834.07 | | La II | 3 |
| 6709.88 | | Ca I | 45 | 6764.13 | P | Fe I | 1225 | 6834.26 | | F I | 2 |
| 6710.31 | | Fe I | 34 | 6766.49 | | V I | 31 | 6835.03 | | Sc I | |
| 6711.24 | P | Fe I | 1220 | 6767 | P | O V | 12 | 6835.29 | | Hf II | 13 |
| 6712.44 | P | Fe I | 1279 | 6767.778 | | Ni I | 57 | 6836.2 | | N II | 54 |
| 6712.68 | P | Fe I | 206 | 6769.62 | | Ba II | 8 | 6837.00 | | Fe I | 1225 |
| 6713.14 | | Fe I | 1013,1195 | 6769.66 | P | Fe I | 1226 | 6837.14 | | Al II | 9 |
| 6713.43 | | Cl II | 38 | 6771.040 | | Co I | 54 | 6837.91 | | La II | 33 |
| 6713.76 | | Fe I | 1255 | 6772.36 | | Ni I | 127 | 6838.08 | | Fe I | 1192 |
| 6714.08 | | La II | 103 | 6773.97 | | F I | 2 | 6838.86 | | Fe I | |
| 6715.38 | | Cr I | 282 | 6774.28 | | La II | 2 | 6839.828 | | Fe I | 205 |
| 6715.410 | | Fe I | 1174 | 6775.97 | | Al II | 111 | 6841.349 | | Fe I | 1195 |
| 6716.24 | | Fe I | 1225 | 6777.44 | | Fe I | 1010,1013 | 6841.65 | P | Fe I | 1333 |
| 6716.679 | | Ti I | 273 | 6779.74 | | C II | 14 | 6841.86 | | Cl II | 54 |
| 6717.556 | | Fe I | 1194 | 6780.27 | | C II | 14 | 6841.89 | | V I | 31 |
| 6717.685 | | Ca I | 32 | 6783.27 | P | Fe I | 206 | 6842.07 | | Ni I | 126 |
| 6717.911 | | Ti II | 112 | 6783.71 | | Fe I | 205 | 6842.35 | P | Si I | 61 |
| 6718.14 | | Gd II | 130 | 6783.75 | | C II | 14 | 6842.668 | | Fe I | 1197 |
| 6718.68 | | La II | 129 | 6784.98 | | V I | 31 | 6843.671 | | Fe I | 1173 |
| 6719 | P | N V | 11 | 6785.25 | P | Ti II | 112 | 6844.05 | | Sn II | 1 |
| 6719.40 | | Hf II | 110 | 6785.76 | P | Fe I | 1226 | 6844.67 | P | Fe I | 34 |
| 6721.35 | | O II | 4 | 6785.88 | P | Fe I | 1007 | 6845.24 | | Y I | 16 |
| 6721.97 | | Si I | | 6786.41 | P | Fe I | 551 | 6845.93 | P | Fe I | 1190 |
| 6722.67 | | Si I | 38 | 6786.88 | | Fe I | 1052 | 6846.60 | | Gd II | 94 |
| 6723.12 | | N I | 31 | 6787.09 | | C II | 14 | 6846.97 | | O II | 45 |
| 6725.38 | | Fe I | 1052 | 6787.15 | | Zr II | 135 | 6847.60 | P | Fe I | 1078 |
| 6726.25 | | O I | 2 | 6787.61 | P | Fe I | 1156 | 6848.65 | | Si I | 37 |
| 6726.50 | | O I | 2 | 6789.17 | | Cr I | | 6848.86 | P | Fe I | 1192 |
| 6726.668 | | Fe I | 1197 | 6790 | P | O V | 12 | 6850.07 | | Hf II | |
| 6726.78 | | Fe I | | 6790.00 | | Sm II | 56 | 6850.21 | | Cl II | 54 |
| 6726.84 | | C II | 21 | 6791.022 | | Sr I | 3 | 6850.48 | | Ni I | 157 |
| 6727.1 | P | C III | 3 | 6791.30 | | C II | 14 | 6851.64 | P | Fe I | 34 |
| 6727.83 | | Gd II | 96 | 6793.26 | | Fe I | 1005 | 6854.82 | | Fe I | 1224a |
| 6729.72 | | Cr I | 301 | 6793.62 | | Fe I | | 6855.176 | | Fe I | 1195 |
| 6729.80 | P | Si I | 61 | 6793.71 | | Y I | 1 | 6855.74 | | Fe I | 1194 |
| 6730.38 | P | Si I | 61 | 6794.60 | P | Fe I | 1279 | 6856.02 | | F I | 2 |
| 6730.7 | P | C III | 3 | 6795.41 | | Y II | 26 | 6856.03 | | Sm II | 58 |
| 6730.73 | | Gd I | 2 | 6795.52 | | F I | 2 | 6857.13 | | Gd II | 122 |
| 6730.79 | | C II | 21 | 6796.11 | | Fe I | 1007 | 6857.25 | | Fe I | 1006 |
| 6731.84 | | Sm II | 59 | 6798.04 | | C II | 14 | 6857.3 | P | C III | 19 |
| 6732.06 | | Fe I | 1225 | 6798.51 | | Ca I | 31 | 6857.6 | | N II | 71 |
| 6732.80 | | La II | 109 | 6799.32 | | A II | 74 | 6858.164 | | Fe I | 1173 |
| 6732.88 | | S II | 25 | 6799.61 | | Yb I | 3 | 6858.25 | | Y II | 26 |
| 6733.164 | | Fe I | 1195 | 6800.50 | | C II | 14 | 6859.03 | | La II | 34 |
| 6733.48 | | N I | 31 | 6801.16 | | V II | 219 | 6859.49 | P | Fe I | 340 |
| 6733.56 | | C II | 21 | 6801.31 | P | Fe I | 551 | 6860.13 | P | Fe I | 1255 |
| 6734.16 | | Cr I | 282 | 6801.38 | | La II | 130 | 6860.29 | | Fe I | 205 |
| 6735.00 | P | Fe I | 1157 | 6801.87 | P | Fe I | 34 | 6860.96 | P | Fe I | 341 |
| 6736.56 | P | Fe I | 1122 | 6803.30 | P | Fe I | 1192 | 6861.24 | | Ni I | 293 |
| 6737.29 | P | Fe I | 551 | 6803.84 | P | Fe I | 1191 | 6861.30 | | A II | 25 |
| 6737.87 | | Sc I | | 6804.020 | | Fe I | 1174 | 6861.47 | | Ti I | 237 |
| 6738.36 | | C II | 21 | 6804.27 | | Fe I | 1225 | 6861.93 | | Fe I | 109 |
| 6738.81 | | Cr I | 315 | 6805.72 | P | Fe I | 1220 | 6862.481 | | Fe I | 1191 |
| 6739.54 | | Fe I | 34 | 6806.851 | | Fe I | 268 | 6862.82 | | Sm II | 55 |
| 6741.29 | | N I | 31 | 6808.55 | | A II | 24 | 6862.9 | P | C III | 19 |
| 6742.05 | | C II | 21 | 6808.80 | P | Fe I | 340 | 6863.52 | | A II | 20 |
| 6743.124 | | Ti I | 48 | 6808.88 | | La II | 1 | 6864.31 | P | Fe I | 1186 |
| 6743.58 | | S I | 8 | 6810.28 | | Fe I | 1197 | 6869.74 | | O II | 45 |
| 6744.2 | P | C III | 3 | 6812.19 | | C II | 14 | 6870.22 | | F I | 2 |
| 6744.66 | | Cr I | 315 | 6812.26 | | N II | 54 | 6870.8 | | N II | 71 |
| 6745.11 | | Fe I | 1227 | 6812.40 | | V I | 31 | 6871.7 | P | C III | 19 |
| 6745.5? | P | Ti I | 226 | 6813.55 | P | Fe I | 1288 | 6872.32 | | Co I | 54 |
| 6745.? | P | Fe I | 1005 | 6813.598 | | Ni I | 288 | 6874.09 | | Ba II | 8 |
| 6746.4 | | Ti I | 152 | 6813.68 | | La II | 110 | 6875.45 | | Fe I | 167 |
| 6746.96 | P | Fe I | 205 | 6813.85 | P | Si I | 61 | 6875.98 | | Fe I | 1013 |
| 6748.43 | | Ti I | 152 | 6814.950 | | Co I | 54 | 6876.71 | | Ni I | 97 |
| 6748.79 | | S I | 8 | 6816.69 | | Al II | 9 | 6878 | P | O V | 12 |
| 6749.52 | P | Fe I | 860 | 6817.08 | | Sc I | | 6878.313 | | Sr I | 3 |
| 6750.152 | | Fe I | 111 | 6818.39 | | A II | 50 | 6879.51 | P | Fe I | 1157 |
| 6750.22 | | C II | 21 | 6819 | P | O V | 12 | 6879.59 | P | Fe I | 551 |
| 6751.28 | | Cr I | 315 | 6819.42 | P | Fe I | 463 | 6880.65 | | Fe I | 1051 |
| 6751.94 | | Ti I | 152 | 6819.60 | P | Fe I | 1051 | 6881.07 | P | Fe I | 1174 |
| 6752.40 | | N I | 30 | 6820.43 | | Fe I | 1197 | 6881.46 | | Fe I | |
| 6752.67 | | Gd II | 130 | 6822.00 | P | Fe I | 1220 | 6881.64 | | Cr I | 222 |
| 6752.724 | | Fe I | 1196 | 6822.05 | P | Fe I | 110 | 6881.74 | | Fe I | 1194 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6882.48 | | Cr I | 222 | 6971.95 | | Fe I | 404 | 7039.22 | | Sm II | 57,61 |
| 6883.04 | | Cr I | 222 | 6975.46 | | Fe I | | 7039.36 | | Ti I | 307 |
| 6885.07 | | O II | 45 | 6976.306 | | Fe I | 1194 | 7042.06 | | Al II | 3 |
| 6885.772 | | Fe I | 1173 | 6976.53 | | Si I | 60 | 7042.24 | | Sm II | 58 |
| 6886.57 | | A II | 20 | 6976.8 | | N II | 53 | 7044.60 | | Fe I | 1276 |
| 6887.63 | | Gd II | | 6976.934 | | Fe I | 1221 | 7045.8 | | C II | 26 |
| 6888.7 | | N II | 71 | 6977.445 | | Fe I | 1225 | 7045.96 | | La I | 6 |
| 6890.88 | | He II | 7 | 6978.46 | | Cr I | 222 | 7050.65 | | Ti I | 256 |
| 6892.585 | | Sr I | 1 | 6978.855 | | Fe I | 111 | 7051.00 | | Gd II | 122 |
| 6894.92 | P | Mg I | 34 | 6979.10 | | N I | 29 | 7052.872 | | Co I | 54 |
| 6895.29 | | O II | 45 | 6979.17 | P | Fe I | 340 | 7052.9 | | C II | 26 |
| 6896.00 | | Y II | 26 | 6979.82 | | Cr I | 222 | 7053.48 | P | Fe I | 1186 |
| 6898.31 | | Fe I | 1078 | 6980.86 | | Gd II | | 7054.042 | | Co I | 140 |
| 6900.73 | | Gd II | 122 | 6980.91 | | Cr I | 222 | 7054.62 | | Gd II | 130 |
| 6901.52 | | Co I | 164 | 6980.91 | | Hf II | 22 | 7055.01 | | A II | 74 |
| 6902.46 | | F I | 2 | 6981.40 | | S II | 18 | 7056.60 | | Al II | 3 |
| 6902.80 | | Fe I | | 6983.53 | P | Fe I | 1220 | 7057.96 | P | Fe I | 815 |
| 6906.54 | | O II | 45 | 6983.54 | P | Fe II | 63 | 7058.02 | | Gd II | 130 |
| 6908.08 | | Co I | 164 | 6985.74 | | A II | 137 | 7059.941 | | Ba I | 5 |
| 6908.11 | | O II | 45 | 6985.89 | | Gd II | | 7060.43 | P | Mg I | 32 |
| 6909 | P | O V | 12 | 6988.530 | | Fe I | 167 | 7061.90 | | Hf II | |
| 6909.82 | | F I | 2 | 6988.75 | | Gd II | 130 | 7062.80 | P | Fe I | 1273 |
| 6910.75 | | O II | 45 | 6989.64 | P | Fe I | 1191 | 7062.97 | | Ni I | 64 |
| 6910.84 | | Co I | 80 | 6990.16 | | A II | 20 | 7063.4 | | C II | 26 |
| 6911.52 | | Fe I | 109 | 6991.92 | | Gd I | 2 | 7063.57 | | Ni I | 270 |
| 6912.43 | P | Fe I | 341 | 6995.35 | | Ta I | 5 | 7063.64 | | Al II | 3 |
| 6914.562 | | Ni I | 62 | 6996.63 | | Ti I | 256 | 7065.15 | | Ti I | 100 |
| 6916.57 | | Gd I | 2 | 6996.76 | | Gd II | 121 | 7065.188 | | He I | 10 |
| 6916.702 | | Fe I | 1052 | 6997.13 | P | Fe I | 1273 | 7065.719 | | He I | 10 |
| 6917.52 | P | Fe I | 1190 | 6997.83 | | Hf II | 89 | 7066.15 | P | Fe I | 1277 |
| 6917.93 | | Al II | 75 | 6999.902 | | Fe I | 1051 | 7066.24 | | La II | 1 |
| 6919.96 | | Al II | 15 | 7000.633 | | Fe I | 1005 | 7067.2170 | | A I | 1 |
| 6920.16 | P | Fe I | 1192 | 7000.75 | | Gd II | 122 | 7067.44 | | Fe II | |
| 6920.62 | | Gd II | 122 | 7001.57 | | Ni I | 64 | 7067.50 | | Ni I | 277 |
| 6924.13 | | Cr I | 222 | 7001.93 | | O I | 21 | 7068.02 | P | Fe I | 1276 |
| 6925.24 | | Cr I | 222 | 7002.22 | | O I | 21 | 7068.37 | | La I | 1 |
| 6926.04 | | Cr I | 222 | 7003.0 | | N II | 53 | 7068.415 | | Fe I | 1004 |
| 6926.40 | P | Fe I | 1222 | 7003.58 | | Si I | 60 | 7068.60 | P | Fe I | 1276 |
| 6926.90 | | N I | 29 | 7004.60 | | Ti I | 256 | 7069.11 | | Ti I | 307 |
| 6928.25 | | Ni I | 110 | 7004.81 | | Co I | 89 | 7069.54 | P | Fe I | 205 |
| 6928.319 | | Zn I | 10 | 7005.84 | | Si I | 60 | 7070.071 | | Sr I | 3 |
| 6928.52 | P | Ni I | 61 | 7006.16 | | Gd II | 130 | 7071.88 | | Fe I | 1194 |
| 6929.4678 | | Ne I | 6 | 7007.81 | | Ti I | 100 | 7072.82 | P | Fe I | 1003 |
| 6929.96 | P | Fe I | 34 | 7008.014 | | Fe I | 1078 | 7074.45 | P | Fe I | 1173 |
| 6930.35 | P | Fe I | 1186 | 7008.35 | | Ti I | 256 | 7077.03 | | A II | 20 |
| 6930.64 | | Fe I | 1221 | 7010.362 | | Fe I | 1221 | 7077.10 | | Eu II | 8 |
| 6932.49 | P | Fe I | 1220 | 7010.94 | | Ti I | 256 | 7079.32 | P | Fe I | 1278 |
| 6933.04 | | Fe I | 1051 | 7011.364 | | Fe I | 1221 | 7082.22 | | Ni I | 267 |
| 6933.55 | | Y I | 1 | 7014.99 | | Fe I | 167 | 7082.37 | | Sm II | 55 |
| 6933.628 | | Fe I | 167,1005 | 7015.3 | | N II | 53 | 7083.396 | | Fe I | 1277 |
| 6935.16 | | Hf II | 35 | 7016.075 | | Fe I | 109 | 7084.25 | P | Ti I | 99 |
| 6936.27 | | K I | 7 | 7016.436 | | Fe I | 1051 | 7084.33 | | Si I | 60 |
| 6936.48 | P | Fe I | 1196 | 7016.602 | | Co I | 54 | 7084.974 | | Co I | 54 |
| 6937.81 | | Co I | 139 | 7016.90 | P | Si I | 51 | 7085.52 | | Gd II | 130 |
| 6938.472 | | Zn I | 10 | 7016.99 | | Hf II | 99 | 7086.76 | | Fe I | 815,1311 |
| 6942.82 | P | Fe I | 1008 | 7017.68 | | Si I | 51 | 7087.35 | | Zr I | 42 |
| 6942.9 | | N II | 53 | 7017.73 | | Gd II | 137 | 7089.03 | P | Si I | 70 |
| 6943.202 | | Zn I | 10 | 7017.98 | | Si I | 51 | 7089.73 | P | Fe I | 1220 |
| 6943.67 | P | Fe I | 1349 | 7020.44 | | Sm II | 59 | 7090.404 | | Fe I | 1051 |
| 6945.208 | | Fe I | 111 | 7021.23 | | Hf II | 67 | 7090.55 | | A II | 60 |
| 6945.22 | | N I | 29 | 7022.39 | P | Fe I | 1078 | 7091.83 | | Fe I | 1278 |
| 6945.98 | | Gd II | 122 | 7022.976 | | Fe I | 1051 | 7091.91 | P | Fe I | 1277 |
| 6946.31 | | Co I | 110 | 7024.0508 | | Ne I | 6 | 7093.10 | P | Fe I | 1189 |
| 6947.501 | | Fe I | 1221,1224 | 7024.084 | | Fe I | 1003 | 7094.30 | P | Fe I | 778 |
| 6949.37 | P | Fe I | 1220 | 7024.649 | | Fe I | 1187 | 7095.40 | | Ni I | 276 |
| 6950.32 | | Y I | 16 | 7024.86 | | Ni I | 271 | 7095.425 | | Fe I | 1105 |
| 6950.82 | P | Fe I | 205 | 7025.52 | | O I | 32 | 7097.78 | | Zr I | 42 |
| 6951.261 | | Fe I | 1186,1193 | 7027.60 | | Fe I | 1221 | 7100.20 | P | Fe I | 267 |
| 6951.62 | P | Fe I | 1078 | 7027.797 | | Co I | 179 | 7101.28 | P | Fe I | 61 |
| 6951.68 | | Y II | 33 | 7028.58 | P | Fe I | 463 | 7102.95 | | Zr I | 42 |
| 6952.13 | | Cl II | 54 | 7028.60 | P | Ni I | 156 | 7103.15 | P | Fe I | 167 |
| 6952.52 | | La II | 18 | 7028.95 | P | Ni I | 61 | 7103.28 | | N IV | 4 |
| 6953.01 | P | Fe I | 815 | 7030.06 | | Ni I | 126 | 7103.77 | | Zr I | 42 |
| 6954.54 | | La II | 1 | 7030.33 | | Hf II | 66 | 7105.34 | P | Si I | 70 |
| 6955.06 | | Ni I | 157 | 7031.02 | P | Fe I | 1173 | 7105.90 | P | Fe I | 1008 |
| 6957.95 | | S II | 18 | 7031.42 | P | Fe I | 1278 | 7107.30 | P | Fe I | 1324 |
| 6958.11 | | La II | 67 | 7032.16 | | Ni I | 279 | 7107.461 | | Fe I | 1005 |
| 6959.24 | | Gd II | 130 | 7032.4127 | | Ne I | 1 | 7109.48 | | N IV | 4 |
| 6960.334 | | Fe I | 1222 | 7034.06 | P | Fe I | 1190 | 7109.67 | P | Fe I | 1190 |
| 6963.02 | P | Fe I | 1007 | 7034.08 | P | Fe I | 1190 | 7110.91 | | Ni I | 64 |
| 6964.18 | | K I | 7 | 7034.42 | | Ni I | 97 | 7111.28 | | N IV | 4 |
| 6964.69 | | K I | 7 | 7034.96 | | Si I | 50 | 7111.71 | | Zr I | 23 |
| 6965.42 | P | Mg I | 33 | 7035.86 | | Ti I | 307 | 7112.176 | | Fe I | 404 |
| 6965.4302 | | A I | 1 | 7037.04 | P | Fe I | 61 | 7112.36 | | C II | 20 |
| 6966.35 | | F I | 6 | 7037.26 | | Gd II | | 7114.55 | P | Fe I | 267 |
| 6966.9 | | Fe II | 198 | 7037.37 | | Ni I | 288 | 7115.13 | | C II | 20 |
| 6967.6 | | N II | 53 | 7037.45 | | F I | 6 | 7115.25 | P | Fe I | 1186 |
| 6968.78 | | La II | 109 | 7038.251 | | Fe I | 1051 | 7116.77 | | Gd II | 130 |
| 6970.48 | P | Fe I | 463 | 7038.80 | | Ti I | 256 | 7118.12 | P | Fe I | 1278 |
| 6971.66 | | Gd II | 130 | 7038.818 | | Fe I | 1078 | 7118.5 | | C I | 26 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7118.86 | | Gd II | 130 | 7193.74 | | Y II | 33 | 7284.27 | | A II | 24 |
| 7119.45 | | C II | 20 | 7193.89 | | Si I | 25 | 7284.843 | | Fe I | 1004 |
| 7120.01 | P | Fe I | 1187 | 7194.02 | P | Fe I | 1307 | 7285.28 | | Co I | 140 |
| 7120.56 | P | Fe I | 1006 | 7194.81 | | Eu II | 8 | 7285.286 | | Fe I | 1188 |
| 7122.24 | | Ni I | 126 | 7194.92 | | Fe I | 1273 | 7285.94 | P | Si I | 58 |
| 7123.10 | | N IV | 4 | 7195.235 | | Ba I | 10 | 7286.56 | | Ni I | 109 |
| 7124.28 | | S II | 18 | 7196.37 | P | Fe I | 1252 | 7287.36 | | Fe II | 197 |
| 7124.47 | | Co I | 53 | 7196.83 | | Cr I | 264 | 7288.760 | | Fe I | 1077 |
| 7125.00 | P | Fe I | 815 | 7197.07 | | Ni I | 62 | 7289.05 | P | Fe II | 72 |
| 7125.28 | P | Fe I | 1220 | 7197.08 | | Gd II | 121 | 7289.25 | | Si I | 24 |
| 7125.49 | | C II | 20 | 7202.194 | | Ca I | 29 | 7290.21 | | Si I | 24 |
| 7126.71 | | Ni I | 97 | 7202.37 | | F I | 6 | 7290.87 | | Ni I | 287 |
| 7127.21 | | N IV | 4 | 7205.51 | P | Fe I | 1251 | 7291.03 | P | Ti I | 143 |
| 7127.58 | P | Fe I | 1273 | 7207.123 | | Fe I | 1001 | 7291.48 | | Ni I | 63 |
| 7127.88 | | F I | 6 | 7207.406 | | Fe I | 1051 | 7292.856 | | Fe I | 1189 |
| 7129 | P | N IV | 4 | 7207.85 | | Cr I | 264 | 7293.068 | | Fe I | 1077 |
| 7129.30 | P | Fe I | 1219 | 7208.20 | | Si I | 25 | 7295.00 | | Fe I | 1187 |
| 7130.34 | P | Ti I | 100 | 7209.44 | | Ti I | 99 | 7295.27 | P | Fe I | 1189 |
| 7130.942 | | Fe I | 1051 | 7212.47 | | Fe I | 1273 | 7297.75 | | Ni I | 293 |
| 7131.29 | | Al II | 114 | 7213.35 | | Ti I | 143 | 7299.67 | | Ti I | 97 |
| 7132.989 | | Fe I | 1002 | 7213.84 | P | Fe I | 1105 | 7300.47 | | Fe I | 1275 |
| 7133.16 | | Gd II | 137 | 7214.78 | P | Ti II | 101 | 7300.59 | P | Fe I | 1003 |
| 7133.52 | | C II | 20 | 7214.97 | | Ti I | 314 | 7301.17 | | Eu II | 8 |
| 7134.290 | | Co I | 179 | 7216.20 | | Ti I | 98 | 7301.57 | P | Fe II | 72 |
| 7134.66 | | Al II | 114 | 7216.68 | P | Fe I | 1273 | 7302.89 | | Mn I | 50 |
| 7134.99 | | Fe II | 197 | 7217.0 | | N II | 52 | 7305.87 | | Ti I | 143 |
| 7135.73 | | Gd II | | 7217.34 | | Co I | 126 | 7306.61 | | Fe I | 1077 |
| 7138.05 | P | Ti I | 98 | 7217.55 | | Eu II | 8 | 7307.938 | | Fe I | 1002 |
| 7138.81 | | Al II | 114 | 7218.57 | | Cr I | 264 | 7307.97 | | Fe II | 73 |
| 7138.91 | | Ti I | 99 | 7219.686 | | Fe I | 1001 | 7310.24 | | Fe II | 73 |
| 7139.79 | | S II | 18 | 7220.79 | | Ni I | 294 | 7311.02 | | F I | 5 |
| 7139.8 | | N II | 52 | 7221.22 | | Fe I | 1189 | 7311.101 | | Fe I | 1077 |
| 7141.17 | | Gd II | 131 | 7222.39 | | Fe II | 73 | 7311.26 | P | Fe I | 1105 |
| 7141.62 | | Ni I | 283 | 7222.88 | | Fe I | 1187,1311 | 7312.05 | P | Fe I | 1310 |
| 7142.522 | | Fe I | 1274 | 7223.668 | | Fe I | 463 | 7315.73 | | Co I | 89 |
| 7145.317 | | Fe I | 1186,1193 | 7224.51 | | Fe II | 73 | 7316.77 | P | Fe I | 267 |
| 7146.13 | | Gd II | 130 | 7225.82 | P | Fe I | 1278 | 7317.03 | | S II | 18 |
| 7147.0406 | | A I | 1 | 7226.20 | | Si I | 26 | 7317.40 | P | Fe I | 1278 |
| 7147.31 | | Gd II | | 7228.70 | | Fe I | 267 | 7318.39 | | Ti I | 212 |
| 7148.147 | | Ca I | 30 | 7228.974 | | Pb I | 2 | 7320.694 | | Fe I | 1188,1276 |
| 7148.61 | | Ta I | 11 | 7231.12 | | C II | 3 | 7320.70 | | Fe II | 73 |
| 7148.69 | | Fe I | 1078,1339 | 7233.58 | | A II | | 7323.20 | P | Ti II | 101 |
| 7151.18 | P | Sc II | 27 | 7235.32 | | Si I | 26 | 7323.38 | P | Fe I | 859 |
| 7151.495 | | Fe I | 109 | 7235.86 | | Si I | 25 | 7324.89 | | Gd II | |
| 7154.688 | | Co I | 89 | 7236.19 | | C II | 3 | 7325.33 | P | Fe I | 980 |
| 7155.64 | | Fe I | 1276 | 7236.91 | | S II | 18 | 7326.146 | | Ca I | 44 |
| 7156.80 | | O I | 38 | 7239.885 | | Fe I | 1105 | 7326.51 | | Mn I | 50 |
| 7158.502 | | Fe I | 815 | 7242.24 | | Gd II | 137 | 7327.67 | | Ni I | 140 |
| 7160.33 | | Ti I | 98 | 7244.77 | | S I | 15 | 7328.64 | | Hf II | 65 |
| 7160.85 | P | Fe I | 1310 | 7244.86 | | Fe I | 1276 | 7330 | P | N V | 12 |
| 7161.04 | P | Fe I | 1190 | 7244.86 | | Ti I | 99 | 7330.16 | P | Fe I | 1187 |
| 7162.37 | P | Fe I | 1278 | 7245.1668 | | Ne I | 3 | 7330.54 | P | Mn II | 4 |
| 7164.469 | | Fe I | 1051 | 7247.82 | | Mn I | | 7330.97 | | Ti I | 143 |
| 7164.63 | | S II | 18 | 7250.12 | | Co I | 53 | 7331.95 | | F I | 1 |
| 7164.75 | | Si I | 49 | 7250.69 | | Si I | 25 | 7332.26 | | Ti I | 143 |
| 7164.90 | | Gd II | 130 | 7251.74 | | Ti I | 99 | 7332.97 | | Y II | 25 |
| 7165.09 | P | Si I | 49 | 7252.70 | | Gd II | 109 | 7333.49 | | Ni I | 263 |
| 7165.62 | | Si I | 48 | 7253.76 | | Ti I | 143 | 7333.62 | | Fe I | 1078 |
| 7167.01 | | Ni I | 109 | 7254.19 | | O I | 20 | 7334.66 | | Fe II | 209 |
| 7168.37 | | Gd I | 1 | 7254.47 | | O I | 20 | 7336.03 | | Zr I | 23 |
| 7169.14 | | Zr I | 42 | 7254.649 | | Fe I | | 7337.61 | | S II | 18 |
| 7170.14 | | Ni I | 282 | 7255.28 | P | Si I | 59 | 7337.78 | P | Ti I | 212 |
| 7172.26 | | Gd II | 109 | 7256.13 | P | Fe I | 1278 | 7338.92 | | V I | 117 |
| 7173.73 | | Ni I | 269 | 7256.63 | | Cl I | 5 | 7340.78 | P | Fe I | 684 |
| 7173.9389 | | Ne I | 6 | 7256.72 | | Ni I | 97 | 7341.78 | P | Fe I | 1307 |
| 7175.937 | | Fe I | 1188 | 7256.96 | | S II | 18 | 7344.18 | P | Fe I | 266 |
| 7176.886 | | Fe I | 1276 | 7259.3 | | N II | 52 | 7344.72 | | Ti I | 97 |
| 7177.50 | | He II | 6 | 7261.00 | P | Fe I | 267 | 7346.37 | | Ta I | 12 |
| 7178.33 | P | Sc II | 27 | 7261.29 | P | Fe I | 1273 | 7347.16 | P | Fe I | 266 |
| 7179.16 | P | Fe II | 72 | 7261.54 | | Fe I | 1188 | 7347.72 | P | Mn II | 4 |
| 7180.020 | | Fe I | 33 | 7261.94 | | Ni I | 62 | 7348.11 | | A II | 60 |
| 7181.21 | P | Fe II | 72 | 7262.46 | P | Fe I | 859 | 7348.51 | P | Fe I | 1004 |
| 7181.222 | | Fe I | 1078 | 7264.19 | | Y II | 33 | 7350.55 | P | Fe I | 509 |
| 7181.93 | | Fe I | 1274 | 7264.99 | | Fe II | 197 | 7351.160 | | Fe I | 1273 |
| 7182.00 | | Ni I | 126 | 7266.22 | | Ni I | 288 | 7351.56 | | Fe I | 1275 |
| 7184.54 | | Si I | 25 | 7266.29 | | Ti I | 143 | 7352.16 | | Ti I | 272 |
| 7184.89 | | Si I | 25 | 7267.00 | P | Fe I | 61 | 7353.52 | P | Mn II | 4 |
| 7185.50 | | Cr I | 264 | 7268.58 | P | Fe I | 957 | 7353.528 | | Fe I | 1251 |
| 7187.341 | | Fe I | 1051 | 7271.41 | | Ti I | 97 | 7354.579 | | Co I | 53 |
| 7188.06 | | Cr I | 264 | 7273.20 | | S II | 18 | 7355.46 | P | Ti II | 101 |
| 7188.55 | | Ti I | 99 | 7273.77 | | Ti I | 212 | 7355.94 | | Cr I | 93 |
| 7188.7 | | N II | 52 | 7275.28 | | Si I | 24 | 7356.51 | | V I | 117 |
| 7189.17 | | Fe I | 463 | 7277.67 | | Hf II | 66 | 7356.81 | P | Fe I | 1187 |
| 7189.57 | | Gd II | 138 | 7278.48 | P | Fe I | 1274 | 7357.74 | | Ti I | 97 |
| 7189.89 | | Ti I | 285 | 7278.72 | | Hf II | 111 | 7359.95 | P | Fe I | 1310 |
| 7190.12 | P | Fe I | 463 | 7280.298 | | Ba I | 5 | 7361.39 | | V I | 117 |
| 7191.66 | | Fe I | 1274 | 7281.349 | | He I | 45 | 7361.56 | P | Ti I | 212 |
| 7193.20 | P | Mg I | 31 | 7282.36 | | La II | 1 | 7361.59 | | Al I | 11 |
| 7193.23 | | Fe II | 197 | 7282.39 | | Fe I | 1274 | 7362.31 | | Al I | 11 |
| 7193.56 | | Si I | 25 | 7283.80 | | Mn I | 50 | 7363.16 | | V I | 117 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7363.96 | | Fe I | 1274 | 7449.34 | | Fe II | 73 | 7559.62 | | 1 I | 292 |
| 7364.11 | | Ti I | 97 | 7449.42 | | Al II | 98 | 7559.68 | | Fe I | 1308 |
| 7366.37 | | Fe I | 1188 | 7450.32 | | Y II | 25 | 7561.08 | | Hf II | 80 |
| 7366.60 | | Ti I | 96 | 7452.08 | P | Fe I | 1303 | 7563.03 | | Fe I | 1251 |
| 7369.73 | P | Mn II | 4 | 7454.02 | | Fe I | 1001 | 7565.53 | | Cl II | |
| 7370.16 | | Fe I | 1250 | 7455.47 | P | Si I | 75 | 7567.35 | | Ni I | 291 |
| 7370.22 | | Eu II | 8 | 7458.92 | | Ni I | 291 | 7568.925 | | Fe I | 1077 |
| 7373.02 | | Si I | 58 | 7461.28 | P | Fe I | 1351 | 7573.41 | | F I | 1 |
| 7373.07 | P | Fe I | 108 | 7461.534 | | Fe I | 204 | 7573.53 | | Fe I | |
| 7376.434 | | Fe I | | 7462.37 | | Cr I | 93 | 7573.76 | P | Fe I | 957 |
| 7376.46 | | Fe II | | 7462.38 | | Fe II | 73 | 7574.08 | | Ni I | 156 |
| 7380.45 | | A II | | 7463.38 | P | Fe I | 1307 | 7578.07 | | Cl II | 79 |
| 7381.94 | | Ni I | 292 | 7466.44 | P | Ti I | 142 | 7578.96 | | S I | |
| 7382.63 | P | Fe I | 266 | 7468.29 | | N I | 3 | 7580.55 | | Ti I | 211 |
| 7382.99 | | Fe I | 1188 | 7468.41 | | Ca I | | 7582.15 | P | Fe I | 1274 |
| 7384.96 | P | Fe I | 1308 | 7471.36 | | O I | 55 | 7583.796 | | Fe I | 402 |
| 7385.24 | | Ni I | 84 | 7471.41 | | Al II | 21 | 7586.044 | | Fe I | 1137 |
| 7385.54 | P | Fe I | 1251 | 7471.75 | P | Fe I | 267 | 7586.72 | | Co I | 139 |
| 7385.97 | | Gd II | 139 | 7473.23 | | O I | 55 | 7588.30 | P | Fe I | 1306 |
| 7386.21 | | Ni I | 286 | 7473.56 | | Fe I | 1188 | 7588.48 | | Zn II | 2 |
| 7386.394 | | Fe I | 1275 | 7474.50 | P | Fe I | 957 | 7590.57 | | Co I | 89 |
| 7387.10 | P | Mn II | 4 | 7474.60 | P | Fe I | 980 | 7592.74 | | He II | 6 |
| 7387.70 | P | Mg I | 30 | 7474.94 | | Ti I | 142 | 7605.32 | | Fe I | 1308 |
| 7388.46 | | Y II | 37 | 7476.40 | P | Fe I | 1251 | 7607.17 | | F I | 4 |
| 7388.689 | | Co I | 139 | 7476.45 | | O I | 55 | 7610.24 | | Co I | 126 |
| 7389.34 | P | Fe I | 1274 | 7476.92 | P | Fe I | 1004 | 7614.50 | | Ti I | 211 |
| 7389.425 | | Fe I | 1077 | 7477.21 | | O I | 55 | 7617.00 | | Ni I | 139 |
| 7392.18 | P | Si I | 75 | 7477.52 | P | Fe I | 957 | 7617.19 | P | Fe I | 1304 |
| 7392.411 | | Ba I | 10 | 7478.77 | | Co I | 53 | 7617.86 | | A II | 73 |
| 7393.63 | | Ni I | 109 | 7478.79 | | Zn II | 1 | 7617.97 | P | Fe I | 1001 |
| 7394.90 | | Gd II | 109 | 7478.87 | P | Fe I | 683 | 7619.21 | | Ni I | 156 |
| 7396.50 | P | Fe I | 1278 | 7479.06 | | O I | 55 | 7620.538 | | Fe I | 1250 |
| 7398.68 | | F I | 1 | 7479.70 | P | Fe II | 72 | 7624.48 | | Al II | 91 |
| 7398.72 | | Co I | 164 | 7480.66 | | O I | 55 | 7624.75 | | Ni I | 292 |
| 7398.78 | P | Fe I | 684 | 7481.49 | | Ni I | 286 | 7627.85 | | Al II | 91 |
| 7398.96 | | Hf II | 110 | 7481.74 | P | Fe I | 266 | 7629.82 | | S I | |
| 7398.98 | P | Fe I | 1306 | 7481.93 | P | Fe I | 1250 | 7634.50 | | Co I | 183 |
| 7400.23 | | Cr I | 93 | 7482.20 | P | Fe I | 1308 | 7635.1053 | | A I | 1 |
| 7400.87 | P | Fe I | 204 | 7482.72 | | F I | 1 | 7635.33 | | Al II | 91 |
| 7401.13 | | Ni I | 291 | 7483.48 | | La II | 1 | 7639.99 | | O I | 42 |
| 7401.17 | P | Ni I | 283 | 7484.28 | P | Fe I | 1306 | 7647.83 | P | Fe I | 1137 |
| 7401.689 | | Fe I | 1004 | 7486.13 | P | Fe I | 980 | 7650.95 | P | Fe I | 266 |
| 7405.85 | | Si I | 23 | 7488.083 | | Ba I | 5 | 7653.783 | | Fe I | 1250 |
| 7406.23 | | Co I | 164 | 7488.73 | | Ni I | 157 | 7654.44 | | Ti I | 211 |
| 7406.23 | | Y II | 25 | 7489.14 | | F I | 5 | 7655.47 | | Fe II | 73 |
| 7409.11 | | Si I | 23 | 7489.61 | | Ti I | 225 | 7657.30 | | Ni I | 278 |
| 7409.17 | P | Ni I | 283 | 7491.678 | | Fe I | 1077 | 7657.60 | | Mg I | 22 |
| 7409.39 | | Ni I | 139 | 7494.72 | P | Fe I | 33 | 7661.223 | | Fe I | 1077 |
| 7411.178 | | Fe I | 1077 | 7495.088 | | Fe I | 1077 | 7661.46 | P | Fe I | 1309 |
| 7414.10 | | Cl I | 4 | 7495.67 | P | Fe I | 1275 | 7663.09 | | Hf II | 68 |
| 7414.51 | | Ni I | 62 | 7496.12 | | Ti I | 225 | 7663.45 | | O I | 42 |
| 7415.19 | P | Fe I | 1308 | 7498.56 | | Fe I | 1001 | 7664.15 | P | Fe I | 1250 |
| 7415.37 | | Si I | 23 | 7501.25 | P | Fe I | 1002 | 7664.302 | | Fe I | 402 |
| 7415.78 | P | Mn II | 4 | 7501.81 | | Ni I | 282 | 7664.907 | | K I | 1 |
| 7416.00 | | Si I | 22 | 7503.8676 | | A I | 8 | 7665.02 | | S II | 70 |
| 7417.38 | | Co I | 89 | 7505.35 | | Gd II | 109 | 7665.48 | | O I | 42 |
| 7418.32 | P | Fe I | 1002 | 7505.98 | P | Fe I | 1306 | 7672.092 | | Ba I | 5 |
| 7418.674 | | Fe I | 1001 | 7507.300 | | Fe I | 1137 | 7672.44 | | Cl I | 3 |
| 7419.35 | | Ni I | 287 | 7508.53 | P | Fe I | 1274 | 7677.46 | | Mn I | 54 |
| 7420.20 | P | Fe I | 1307 | 7509.03 | | S II | 24 | 7679.60 | | S I | 7 |
| 7421.60 | | Fe I | 1188 | 7510.74 | | Au I | 2 | 7680.22 | | Mn I | 55 |
| 7422.30 | | Ni I | 139 | 7511.045 | | Fe I | 1077 | 7680.35 | | Si I | 36 |
| 7423.17 | | Ti I | 97 | 7512.12 | P | Fe I | 108 | 7686.13 | | S I | 7 |
| 7423.54 | | Si I | 23 | 7512.17 | P | Fe I | 1001 | 7687.779 | | Ag I | 2 |
| 7423.63 | | N I | 3 | 7514.93 | | F I | 1 | 7689.10 | P | Fe I | 1304 |
| 7424.63 | | Si I | 23 | 7515.88 | | Fe II | 73 | 7689.36 | | A II | |
| 7425.12 | P | Fe II | 209 | 7521.09 | | Ni I | 282 | 7691.57 | P | Mg I | 29 |
| 7425.64 | | F I | 1 | 7522.78 | | Ni I | 126 | 7696.73 | | S I | 7 |
| 7426.57 | | Eu II | 8 | 7525.14 | | Ni I | 139 | 7698.979 | | K I | 1 |
| 7430.58 | | Fe I | 204 | 7526.2 | | Al II | 119 | 7699.49 | | Yb I | 3 |
| 7430.73 | | Fe I | 1351 | 7526.72 | P | Fe I | 1352 | 7706.52 | | Mn I | 54 |
| 7430.90 | | Fe I | 1189 | 7528.15 | P | Fe I | 1307 | 7706.77 | | O I | 42 |
| 7431.17 | P | Si I | 89 | 7531.171 | | Fe I | 1137 | 7709.78 | | Al II | 113 |
| 7431.94 | P | Fe I | 1189 | 7533.42 | | Fe II | 72 | 7709.98 | | Mn I | 54 |
| 7431.98 | P | Ti I | 142 | 7534.83 | P | Fe II | 87 | 7710.390 | | Fe I | 1077 |
| 7432.27 | P | Mn II | 4 | 7537.44 | P | Fe I | 1000 | 7711.71 | | Fe II | 73 |
| 7433.48 | | Ni I | 280 | 7537.97 | P | Fe I | 1352 | 7712.42 | | Mn I | 55 |
| 7437.16 | | Co I | 53 | 7540.44 | P | Fe I | 266 | 7712.661 | | Co I | 126 |
| 7438 | P | O V | 17 | 7541.61 | | Fe I | 957 | 7714.27 | | Ni I | 62 |
| 7439.89 | | Zr I | 23 | 7545.69 | | Ni I | 287 | 7715.63 | | Ni I | 109 |
| 7440.54 | | A II | 60 | 7546.177 | | Fe I | | 7717.57 | | Cl I | 4 |
| 7440.60 | | Ti I | 225 | 7547.06 | | Cl I | 5 | 7719.05 | P | Fe I | 1304 |
| 7440.98 | | Fe I | 1273 | 7547.89 | P | Fe I | 1306 | 7720.68 | P | Fe I | 1304 |
| 7442.28 | | N I | 3 | 7551.10 | P | Fe I | 1303 | 7722.60 | P | Mg I | 44 |
| 7443.031 | | Fe I | 1002 | 7552.24 | | F I | 1 | 7723.20 | | Fe I | 108 |
| 7443.26 | P | Fe I | 1309 | 7552.52 | P | Ni I | 286 | 7723.7597 | | A I | 1 |
| 7445.70 | P | Fe I | 107 | 7552.79 | P | Fe I | 1303 | 7724.2064 | | A I | 6 |
| 7445.776 | | Fe I | 1077 | 7553.970 | | Co I | 183 | 7727.66 | | Ni I | 156 |
| 7447.43 | | Fe I | 1273 | 7554.73 | | Zr I | 23 | 7732.50 | | Zn II | 2 |
| 7448.00 | P | Fe I | 1352 | 7555.60 | | Ni I | 187 | 7733.24 | | Mn I | 54 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7733.50 | | Gd I | 1 | 7909.60 | P | Fe I | 1287 | 8035.39 | | Si I | 57 |
| 7733.68 | P | Fe I | 1306 | 7910.50 | | Cr I | 316 | 8043.308 | | Co I | 193 |
| 7734.43 | | Mn I | 55 | 7911.338 | | Ba I | 1 | 8048.073 | | Fe I | 1136 |
| 7735.99 | | Ni I | 281 | 7912.55 | | Si I | 68 | 8046.78 | P | Si I | 73 |
| 7737.67 | P | Fe I | 1137 | 7912.866 | | Fe I | 12 | 8047.60 | | Fe I | 12 |
| 7742.7 | | Si I | | 7913.47 | | Si I | 35 | 8048.70 | | Sm II | 87 |
| 7742.71 | | Fe I | 1306 | 7917.48 | | Ni I | 109 | 8051.91 | | S II | 31 |
| 7743.2 | | Si I | | 7917.85 | | Cr I | 316 | 8055.996 | | Co I | 193 |
| 7743.27 | | Co I | 183 | 7918.38 | | Si I | 57 | 8058.14 | | Zr I | 41 |
| 7744.94 | | Cl I | 5 | 7923.95 | | S I | 22 | 8061.27 | | Cr I | 300 |
| 7745.05 | | S II | 70 | 7924.14 | P | Fe I | 1250 | 8063.10 | | Zr I | 40 |
| 7745.48 | P | Fe I | 1305 | 7924.62 | | Cl I | 4 | 8065.99 | | Al I | 16 |
| 7746.56 | P | Fe I | 1309 | 7926.37 | | Ti I | 308 | 8066.05 | P | Ti I | 151 |
| 7748.281 | | Fe I | 402 | 7928.14 | | Sm II | 65 | 8066.20 | | Y II | 31 |
| 7748.37 | | Gd II | 142 | 7928.84 | | S I | 22 | 8088.24 | | Ti I | 151 |
| 7748.93 | | Ni I | 156 | 7930.25 | | Gd II | | 8068.48 | | Sm II | 88 |
| 7751.18 | | Fe I | 1304 | 7930.33 | | S I | 22 | 8070.12 | | Zr I | 40 |
| 7754.70 | | F I | 4 | 7930.83 | P | Mg I | 42 | 8070.64 | P | Si I | 87 |
| 7755.15 | | Mn I | 55 | 7931.70 | | S I | 22 | 8072.16 | P | Fe I | 108 |
| 7757.89 | | Hf II | 86 | 7932.20 | | Si I | 57 | 8075.13 | | Fe I | 12 |
| 7764.72 | | Mn I | 54 | 7933.130 | | Cu I | 6 | 8075.37 | | Al I | 18 |
| 7788.72 | P | Fe I | 957 | 7937.166 | | Fe I | 1136 | 8080.55 | P | Ti I | 195 |
| 7771.74 | | Cr I | | 7938.53 | P | Ti I | 151 | 8080.668 | | Fe I | 823 |
| 7771.96 | | O I | 1 | 7939.49 | | O I | 35 | 8082.4580 | | Ne I | 6 |
| 7774.18 | | O I | 1 | 7941.09 | | Fe I | 623 | 8084.98 | | Cr I | 299 |
| 7775.40 | | O I | 1 | 7941.84 | P | Fe I | 508 | 8085.200 | | Fe I | 1136 |
| 7780.479 | | Ha I | 5 | 7942.02 | | Cr I | 300 | 8085.29 | | S II | 89 |
| 7780.588 | | Fe I | 1154 | 7942.91 | | Mn I | | 8088.18 | P | Si I | 87 |
| 7788.95 | | Ni I | 82 | 7943.15 | | O I | 35 | 8086.67 | | S II | 31 |
| 7797.62 | | Ni I | 201 | 7943.1802 | | Ne I | 18 | 8088.91 | | Al II | 118 |
| 7798.90 | P | Fe I | 403 | 7943.93 | | Ti I | 308 | 8089.88 | | S II | 89 |
| 7800.0 | | Si I | 81 | 7943.94 | | Si I | 57 | 8089.96 | | Gd II | 145 |
| 7800.22 | | F I | 4 | 7944.65 | | Zr I | 40 | 8092.634 | | Cu I | 6 |
| 7800.227 | | Rb I | 1 | 7945.878 | | Fe I | 1154 | 8093.25 | | S II | 68 |
| 7802.49 | P | Fe I | 1303 | 7945.98 | P | Fe I | 107 | 8093.32 | | Si I | 34 |
| 7807.97 | P | Fe I | 1303 | 7947.204 | | O I | 35 | 8093.48 | | V I | 30 |
| 7808.04 | | Fe I | | 7947.58 | | O I | 35 | 8093.932 | | Co I | 189 |
| 7809.24 | | Co I | 79 | 7947.60 | | Rb I | 1 | 8095.93 | | Ni I | 290 |
| 7809.4 | | Na I | 20 | 7948.1754 | | A I | 6 | 8096.874 | | Fe I | 999 |
| 7810.81 | P | Fe I | 1303 | 7949.17 | | Ti I | 125 | 8098.50 | P | Ti I | 195 |
| 7811.14 | P | Mg I | 43 | 7950.83 | | O I | 35 | 8098.72 | P | Mg I | 41 |
| 7812.31 | | Al II | 90 | 7952.18 | | O I | 35 | 8103.8922 | | A I | 3 |
| 7813.62 | P | Fe I | 1305 | 7953.11 | | Ni I | 286 | 8108.33 | P | Fe I | 265 |
| 7815.83 | | Al II | 90 | 7954.94 | P | Fe I | 402 | 8112.13 | | Co I | 183 |
| 7816.16 | | He I | 89 | 7955.81 | | Fe I | 1305 | 8112.17 | P | Fe I | 285 |
| 7820.80 | P | Fe I | 1118 | 7956.69 | | Zr I | 41 | 8114.93 | | S II | 69 |
| 7821.47 | | S II | 31 | 7959.21 | | Fe I | 1304 | 8115.3115 | | A I | 1 |
| 7823.72 | | Al II | 90 | 7961.58 | | Ti I | 308 | 8118.80 | | V I | 30 |
| 7828.81 | | Ni I | 109 | 7963.25 | | Gd II | | 8119.13 | | r I | 299 |
| 7832.224 | | Fe I | 1154 | 7964.93 | P | Fe I | 1303 | 8119.72 | | l II | 110 |
| 7835.08 | | Sm II | 69 | 7965.52 | P | Fe I | 1305 | 8121.89 | | Al II | 110 |
| 7835.33 | | Al I | 10 | 7967.03 | P | Fe I | 1000 | 8122.08 | | Al II | 110 |
| 7838.15 | | Al I | 10 | 7987.43 | | S II | 12 | 8123.52 | | Al II | 110 |
| 7837.27 | | Sm II | 64 | 7970.26 | | Si I | 57 | 8126.52 | | Li I | 3 |
| 7838.09 | P | Fe II | 87 | 7978.88 | | Ti I | 151,308 | 8128.28 | | Cr I | 300 |
| 7841.40 | P | Fe II | 72 | 7980.04 | P | Fe I | 1304 | 8129.32 | P | Fe I | 285 |
| 7844.55 | P | Fe I | 1259 | 7980.58 | | Cl I | 2 | 8133.00 | | Zr I | 40 |
| 7844.87 | | Gd II | | 7981.97 | | O I | 19 | 8133.02 | | S II | 68 |
| 7848.35 | | Gd II | | 7982.41 | | O I | 19 | 8133.38 | P | Ti I | 195 |
| 7848.47 | P | Fe I | 1323 | 7983.68 | | Hf II | 99 | 8138.4060 | | Ne I | 23 |
| 7849.38 | | Zr I | 40 | 7987.00 | | O I | 19 | 8144.58 | | V I | 30 |
| 7850 | | C I | 32 | 7987.34 | | O I | 19 | 8145.47 | | Fe I | |
| 7850.5 | | Si I | 81 | 7987.38 | | Co I | 89 | 8146.67 | P | Fe I | 623 |
| 7852.74 | P | Ti I | 34 | 7989.38 | | Cr I | 300 | 8149.59 | | Fe I | 1217,1218 |
| 7855.12 | | Ni I | 267 | 7994.473 | | Fe I | | 8150.57 | P | Si I | 20 |
| 7855.41 | P | Fe I | 1305 | 7995.00 | P | Si I | 21 | 8151.95 | | Co I | 193 |
| 7861.10 | | Ni I | 156 | 7995.12 | | O I | 19 | 8160.15 | | Al II | 118 |
| 7881.22 | | Hf II | 66 | 7998.53 | | Ti I | 308 | 8161.06 | | V I | 30 |
| 7883.79 | | Ni I | 268 | 7998.80 | | Co I | 79 | 8163.22 | | Cr I | 298 |
| 7869.85 | | Fe I | 1137 | 7997.80 | | Cl I | 3 | 8166.66 | | Cr I | 298,299 |
| 7869.868 | | Co I | 189 | 7997.85 | | S II | 69 | 8187.94 | | Cr I | 291 |
| 7870.00 | | Zr I | 41 | 7998.972 | | Fe I | 1136 | 8189.80 | | Cr I | 300 |
| 7871.370 | | Co I | 189 | 8002.55 | P | Fe I | 1217 | 8171.30 | P | Fe I | 1322 |
| 7877.13 | | Mg II | 8 | 8005.24 | | S II | 68 | 8179.03 | | Fe I | 1138 |
| 7878.22 | | Cl I | 3 | 8008.1556 | | A I | 3 | 8179.31 | | S II | 69 |
| 7879.75 | P | Fe I | 1308 | 8009.39 | P | Si I | 74 | 8179.43 | P | Si I | 33 |
| 7881.90 | | Y II | 32 | 8014.7858 | | A I | 1 | 8183.256 | | Na I | 4 |
| 7885.00 | P | Ti I | 34 | 8018.51 | P | Fe I | 1249 | 8184.80 | | N I | 2 |
| 7885.26 | | S II | 68 | 8018 | | C I | 31 | 8185.69 | | Cr I | 299 |
| 7886.31 | | O I | 64 | 8018.04 | | Cr I | 299 | 8186.73 | | V I | 30 |
| 7890.22 | | Ni I | 200,287 | 8018.70 | | S II | 68 | 8188.80 | | Fe I | 1272 |
| 7895.50 | P | Ti I | 34 | 8024.50 | | Fe I | | 8187.95 | | N I | 2 |
| 7898.37 | | Mg II | 8 | 8024.84 | | Ti I | 151 | 8194.35 | | Cl I | 2 |
| 7898.38 | P | Si I | 69 | 8025.12 | | Sm II | 83 | 8194.791 | | Na I | 4 |
| 7904.12 | P | Fe I | 403 | 8026.32 | | Sm II | 67 | 8194.824 | | Na I | 4 |
| 7905.751 | | Ba I | 10 | 8027.36 | | V I | 30 | 8196.52 | P | Fe I | 1217 |
| 7908.06 | | Gd II | 120 | 8027.96 | P | Fe I | 823 | 8198.87 | | V I | 30 |
| 7908.30 | | Cr I | 318 | 8028.341 | | Fe I | 1154 | 8198.951 | | Fe I | 1154 |
| 7908.879 | | Co I | 189 | 8032.03 | | Sm II | 61 | 8200.31 | | N I | 2 |
| 7909.34 | P | Ti I | 308 | 8034.56 | | Ni I | 109 | 8201.73 | | Zr I | 40 |

# FINDING LIST

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 8203.2 | P | Ca II | 13 | 8316.38 | | Gd II | | 8428.342 | | O I | 54 |
| 8203.572 | | H | 14 | 8317.45 | | Si I | 19 | 8428.94 | | As I | 4 |
| 8204.10 | P | Fe I | 12 | 8322.06 | | Cr I | 298 | 8429.128 | | O I | 54 |
| 8204.93 | P | Fe I | 12 | 8323.428 | | H | 12 | 8429.36 | | Y II | |
| 8207.767 | | Fe I | 1136 | 8323.44 | | Cr I | 298 | 8431.20 | | Mn I | 53 |
| 8208.57 | | Co I | 193 | 8327.063 | | Fe I | 60 | 8434.51 | P | Fe I | 1270 |
| 8210.64 | | N I | 2 | 8331.941 | | Fe I | 1153 | 8434.98 | | Ti I | 33 |
| 8211.48 | | Si I | 19 | 8333.29 | | Cl I | 2 | 8435.28 | P | Si I | 8 |
| 8212.00 | | Cl I | 2 | 8333.785 | | H | 11 | 8435.68 | | Ti I | 33 |
| 8212.43 | | Mn I | | 8334.37 | | Ti I | 33 | 8437.958 | | H | 10 |
| 8212.59 | | Zr I | 40 | 8335.19 | | C I | 10 | 8438.93 | | Ti I | 224 |
| 8213.02 | P | Mg I | 28 | 8338.43 | | Si I | 33 | 8439.603 | | Fe I | 1172 |
| 8216.28 | | Cr I | 299 | 8338.83 | | Cr I | 298 | 8442.58 | | Gd II | |
| 8216.28 | | N I | 2 | 8339.431 | | Fe I | 1153 | 8442.98 | | Ti I | 210 |
| 8217.8 | P | Mg II | 7 | 8342.21 | P | Fe I | 401 | 8444.00 | | Si I | 46 |
| 8220.40 | | Cl I | 3 | 8342.95 | | Fe I | 1270 | 8444.48 | | Si I | 46 |
| 8220.406 | | Fe I | 1136 | 8345.20 | P | Fe I | 265 | 8446.35 | | O I | 4 |
| 8221.63 | | S II | 31 | 8345.553 | | H | 11 | 8446.42 | P | Fe I | 1272 |
| 8221.73 | | Cl I | 3 | 8346.13 | P | Mg I | 40 | 8446.56 | P | Fe I | 1267 |
| 8221.84 | | O I | 34 | 8348.28 | | Cr I | 56 | 8446.76 | | O I | 4 |
| 8222.15 | | S II | 68 | 8348.68 | | Sm II | 64 | 8447.41 | P | Fe I | 1266 |
| 8223.07 | | N I | 2 | 8349.05 | P | Fe I | 12 | 8447.63 | P | Fe I | 12 |
| 8223.16 | | S II | 68 | 8353.15 | | Ti I | 33 | 8449.54 | | S I | 14 |
| 8224.09 | | Cr I | 98 | 8354.35 | | Al II | 40 | 8450.26 | | Cr I | 56 |
| 8225.15 | | S II | 69 | 8355.16 | P | Fe I | 1050 | 8450.89 | | Ti I | 224 |
| 8225.67 | | Cr I | 299 | 8356.07 | P | Fe I | 1117 | 8451.55 | | S I | 14 |
| 8227.64 | | O I | 34 | 8358.53 | P | Fe I | 401 | 8452.14 | | S I | 14 |
| 8230.01 | | O I | 34 | 8359.006 | | H | 11 | 8455.24 | | Cr I | 56 |
| 8230.67 | | Si I | 19 | 8359.23 | | Al II | 40 | 8457.10 | | Ti I | 141 |
| 8232.347 | | Fe I | 1136 | 8359.57 | | Al II | 40 | 8459.01 | P | Fe I | 1270 |
| 8232.99 | | O I | 34 | 8360.63 | | Cl II | 5 | 8461.41 | P | Fe I | 814 |
| 8233.30 | | S II | 68 | 8360.822 | | Fe I | 1153 | 8464.02 | P | Fe I | 1330 |
| 8235.31 | | O I | 34 | 8361.77 | | He I | 68 | 8464.65 | | Zr I | 40 |
| 8235.89 | | Cr I | 298 | 8361.95 | | S II | 31 | 8465.23 | P | Fe I | 1270 |
| 8236.13 | | Hf II | 65 | 8363.30 | | Al II | 40 | 8466.10 | P | Fe I | 1269 |
| 8236.77 | | He II | 6 | 8363.52 | | Al II | 40 | 8466.54 | P | Fe I | 999 |
| 8238.29 | | Cr I | 298 | 8363.58 | P | Ti I | 182 | 8467.15 | | Ti I | 182 |
| 8238.4 | P | Mg II | 7 | 8364.24 | | Ti I | 33 | 8467.256 | | H | 10 |
| 8239.130 | | Fe I | 108 | 8365.642 | | Fe I | 623 | 8468.413 | | Fe I | 60 |
| 8241.61 | | V I | 30 | 8369.87 | P | Fe I | 1271 | 8468.46 | | Ti I | 150 |
| 8242.34 | | N I | 2 | 8370.21 | | Zr I | 40 | 8471.75 | | Fe I | 1270 |
| 8248.151 | | Fe I | 1136 | 8372.79 | | Co I | 193 | 8480.63 | P | Fe I | 1272 |
| 8250.2 | P | Ca II | 13 | 8374.478 | | H | 11 | 8481.96 | P | Fe I | 999 |
| 8253.51 | | V I | 30 | 8375.95 | | Cl I | 2 | 8483.16 | | Ti I | 150 |
| 8253.78 | P | Fe I | 1216 | 8376.41 | | Ne I | 12 | 8485.99 | | Sm II | 66 |
| 8254.10 | | Be I | 2 | 8377.6068 | | Ne I | 12 | 8493.79 | P | Fe I | 1269 |
| 8254.34 | P | Fe I | 508 | 8377.79 | | S II | 31 | 8494.42 | | Ti I | 141 |
| 8255.153 | | H | 14 | 8377.90 | | Ti I | 33 | 8495.3600 | | Ne I | 18 |
| 8255.90 | | V I | 30 | 8379.44 | | Co I | 193 | 8495.51 | | Ti I | 210 |
| 8256.1 | P | Ca II | 13 | 8380.77 | | Mn I | | 8496.03 | | Ti I | 209,313 |
| 8257.859 | | H | 14 | 8382.23 | P | Fe I | 12 | 8496.51 | P | Fe I | 1136 |
| 8258.27 | | S II | 31 | 8382.54 | | Ti I | 33 | 8497.00 | | Fe I | 1172 |
| 8260.938 | | H | 14 | 8382.82 | | Ti I | 33 | 8498.018 | | Ca II | 2 |
| 8261.95 | | Cr I | 98 | 8386.24 | P | Ti I | 182 | 8498.44 | | Zr I | 40 |
| 8263.86 | P | Fe I | 1272 | 8387.781 | | Fe I | 60 | 8501.50 | | Si I | 47 |
| 8264.27 | | Fe I | 1332 | 8389.42 | | Zr I | 40 | 8501.81 | | Ni I | 186 |
| 8264.288 | | H | 14 | 8389.48 | | Ti I | 182 | 8502.38 | | Si I | 46 |
| 8264.5209 | | A I | 8 | 8392.400 | | H | 11 | 8502.487 | | H | 10 |
| 8266.076 | | Ne I | 27 | 8395.87 | | Mn I | 53 | 8503.17 | | Si I | |
| 8267.941 | | H | 13 | 8396.93 | | Ti I | 33 | 8509.63 | P | Fe I | 1136 |
| 8269.66 | P | Fe I | 1218 | 8397.04 | | Cr I | 57 | 8510.90 | | Sm II | 64 |
| 8271.934 | | H | 13 | 8397.96 | P | Si I | 18 | 8512.95 | P | Fe I | 462 |
| 8273.46 | | S II | 31 | 8401.42 | | Fe I | 108 | 8514.075 | | Fe I | 60 |
| 8273.519 | | Ag I | 2 | 8401.68 | P | Fe I | 1136 | 8514.64 | P | Si I | 18 |
| 8274.28 | | Fe I | 1332 | 8402.54 | | Ti I | 224 | 8515.08 | | Fe I | 401 |
| 8275.91 | | Fe I | 1270 | 8408.208 | | A I | 8 | 8515.48 | | S II | 37 |
| 8276.310 | | H | 13 | 8409.88 | | Mn I | 53 | 8518.05 | | Ti I | 182 |
| 8281.125 | | H | 13 | 8412.36 | | Ti I | 33 | 8518.37 | | Ti I | 150 |
| 8286.434 | | H | 13 | 8413.321 | | H | 10 | 8519.05 | P | Fe I | 1267 |
| 8287.38 | | Cr I | 298 | 8414.00 | | Zr I | 40 | 8520.23 | | S II | 34 |
| 8290.62 | | Cr I | 298 | 8414.08 | P | Fe I | 1154 | 8521.10 | | Cs I | 1 |
| 8292.309 | | H | 12 | 8416.97 | | Ti I | 224 | 8521.4407 | | A I | 8 |
| 8293.527 | | Fe I | 623 | 8417.24 | | Ni I | 156 | 8522.64 | | S II | 62 |
| 8296.90 | | Cr I | 57 | 8417.54 | | Ti I | 182 | 8525.04 | P | Fe I | 1215 |
| 8297.58 | | Cr I | 297 | 8417.89 | P | Si I | 18 | 8526.685 | | Fe I | 1270 |
| 8298.837 | | H | 12 | 8418.4274 | | Ne I | 18 | 8527.32 | P | Si I | 18 |
| 8300.01 | P | Fe I | 1331 | 8418.70 | | Ti I | | 8527.88 | P | Fe I | 1270 |
| 8300.3258 | | Ne I | 12 | 8420.968 | | O I | 54 | 8531.36 | | Ti I | 141 |
| 8303.11 | P | Fe I | 265 | 8422.39 | | S II | 37 | 8533.38 | | Si I | 80 |
| 8303.19 | | Cr I | 57 | 8422.95 | | Fe I | 999 | 8538.02 | P | Fe I | 1266 |
| 8305.62 | | As I | 5 | 8423.10 | | Ti I | 150 | 8539.36 | | Ti I | 209 |
| 8305.79 | | Sm II | 69 | 8424.14 | | Fe I | 1272 | 8541.65 | | As I | 3 |
| 8305.94 | | Zr I | 40 | 8424.41 | | Ti I | 182 | 8542.089 | | Ca II | 2 |
| 8306.115 | | H | 12 | 8424.647 | | A I | 3 | 8543.72 | | Cr I | 56 |
| 8306.80 | | Si I | 19 | 8424.780 | | O I | 54 | 8545.384 | | H | 10 |
| 8307.41 | | Ti I | 33 | 8425.37 | | S II | 62 | 8548.07 | | Ti I | 150 |
| 8307.61 | P | Fe I | 12 | 8425.89 | P | Fe I | 12 | 8548.83 | | Cr I | 56 |
| 8310.98 | P | Fe I | 12 | 8426.326 | | O I | 54 | 8550.34 | P | Si I | 88 |
| 8314.262 | | H | 12 | 8426.50 | | Ti I | 33 | 8550.46 | | Cl I | 13 |
| 8314.73 | | S II | 12 | 8428.25 | | Cl I | 2 | 8550.54 | | Ti I | 141 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 8555.54 | | Cr I | 56 | 8680.77 | P | Fe I | 999 | 8819.42 | P | Fe I | 1266 |
| 8556.64 | | Si I | 45 | 8681.920 | | Ne I | 23 | 8819.48 | P | Fe I | 1269 |
| 8559.98 | | Fe I | 1321 | 8682.99 | | Ti I | 68 | 8820.45 | | O I | 37 |
| 8562.13 | P | Fe I | 1153 | 8683.38 | | N I | 1 | 8821.14 | | Ti I | 139 |
| 8564.71 | | As I | 3 | 8686.13 | | N I | 1 | 8821.76 | | As I | 3 |
| 8565.45 | | Ti I | 141 | 8686.28 | | CI I | 14 | 8824.227 | | Fe I | 60 |
| 8567.74 | | N I | 8 | 8686.77 | P | Fe I | 1269 | 8828.08 | P | Fe I | 1269 |
| 8567.78 | P | Fe I | 1269 | 8686.79 | P | Fe I | 956 | 8828.91 | | Al I | 15 |
| 8569.72 | | Ti I | 209 | 8688.633 | | Fe I | 60 | 8834.04 | P | Fe I | 1050 |
| 8571.84 | P | Fe I | 1272 | 8689.71 | P | Fe I | 507 | 8835.67 | | Cr I | 142 |
| 8575.25 | | CI I | 2 | 8689.83 | P | Fe I | 1330 | 8835.85 | | Y II | 30 |
| 8576.46 | P | Si I | 87 | 8692.34 | | Ti I | 68 | 8838.433 | | Fe I | 339 |
| 8576.50 | P | Fe I | 1215 | 8693.24 | | S I | 6 | 8841.26 | | Al I | 15 |
| 8578.40 | | Ti I | 141 | 8693.98 | | S I | 6 | 8846.82 | | Fe I | 1267 |
| 8579.15 | | Si I | 56 | 8694.70 | | S I | 6 | 8848.25 | P | Fe I | 1153 |
| 8581.88 | | Hf II | 66 | 8698.71 | P | Fe I | 400 | 8848.46 | P | Fe I | 1214 |
| 8582.267 | | Fe I | 401 | 8699.13 | | Mn I | 49 | 8852.30 | P | Fe I | 1318 |
| 8584.82 | P | Fe I | 1270 | 8699.43 | | Fe I | 1267 | 8853.867 | | Ne I | 27 |
| 8585.60 | | S I | | 8700.34 | P | Fe I | 1266 | 8858.39 | | Al II | 115 |
| 8585.96 | | Cl I | 2 | 8701.05 | | Mn I | 49 | 8858.77 | | Al II | 115 |
| 8586.20 | P | Ni I | 296 | 8702.49 | | Ni I | 83 | 8862.59 | | Ni I | 214 |
| 8589.78 | | Co I | 193 | 8703.24 | | N I | 1 | 8862.787 | | H | 9 |
| 8591.2584 | | Ne I | 30 | 8703.76 | | Mn I | 49 | 8863.64 | | Fe I | 1283 |
| 8592.10 | P | Fe I | 1269 | 8704.15 | | Ne I | 23 | 8865.759 | | Ne I | 8 |
| 8592.97 | | Fe I | 1267 | 8707.42 | | Cr I | 56 | 8866.961 | | Fe I | 1172 |
| 8594.01 | | N I | 8 | 8707.95 | | Cr I | 296 | 8868.42 | | Fe I | 400 |
| 8596.02 | P | Si I | 80 | 8710.29 | | Fe I | 1267 | 8869.69 | | As I | 4 |
| 8597.00 | | Si I | 80 | 8710.82 | | Ba II | 5 | 8874.53 | | S I | 21 |
| 8598.18 | | Ti I | 236 | 8711.69 | | N I | 1 | 8876.13 | | Fe I | 1267 |
| 8598.394 | | H | 9 | 8713.19 | | Fe I | 400,1267 | 8877.07 | | Ni I | 285 |
| 8598.79 | | Fe I | 1153 | 8718.70 | | Cr I | 296 | 8878.26 | P | Fe I | 401 |
| 8600.98 | | Ti I | 141,209 | 8718.82 | | N I | 1 | 8878.76 | P | Fe I | 1050 |
| 8606.43 | | Si I | 55 | 8719.56 | | Ti I | 140 | 8880.70 | | S I | 21 |
| 8606.45 | | Ni I | 275 | 8725.76 | | Ti I | 139 | 8882.47 | | S I | 21 |
| 8607.08 | P | Fe I | 1272 | 8727.10 | P | Fe I | 999 | 8883.84 | | Si I | 54 |
| 8610.62 | P | Fe I | 1153 | 8728.38 | | Si I | 79 | 8884.23 | | S I | 21 |
| 8611.807 | | Fe I | 339 | 8728.88 | | N I | 1 | 8887.10 | P | Fe I | 1265 |
| 8612.91 | | Ti I | 141 | 8729.02 | | Si I | 79 | 8892.13 | P | Fe I | 1302 |
| 8613.93 | P | Fe I | 1272 | 8729.12 | P | Fe I | 713 | 8892.97 | | Si I | 54 |
| 8616.27 | P | Fe I | 1266 | 8732.17 | | Cr I | 296 | 8896.00 | P | Fe I | 1153 |
| 8618.44 | | Ti I | 209 | 8734.60 | | Mn I | 49 | 8898.97 | | Si I | 79,86 |
| 8621.612 | | Fe I | 401 | 8734.70 | | Ti I | 68 | 8899.50 | | Si I | 79 |
| 8629.24 | | N I | 8 | 8736.0 | P | Mg I | 39 | 8901.0 | | Mn I | 56 |
| 8632.42 | P | Fe I | 1050 | 8737.32 | | Mn I | 49 | 8902.94 | P | Fe I | 1266 |
| 8634.6480 | | Ne I | 23 | 8737.74 | | Ba II | 5 | 8905.99 | P | Fe I | 1302 |
| 8636.26 | | Cr I | 56 | 8740.93 | | Mn I | 49 | 8912.88 | | Al I | 14 |
| 8637.04 | | Ni I | 186 | 8742.60 | | Si I | 44 | 8912.88 | | CI I | 13 |
| 8640.70 | | Al II | 4 | 8747.32 | | Fe I | 401 | 8916.26 | | Fe I | 32 |
| 8641.47 | | Ti I | | 8747.35 | | N I | 1 | 8918.88 | | Se I | 1 |
| 8643.03 | | Cr I | 56 | 8750.13 | | Co I | 203 | 8919.50 | | Ne I | 27 |
| 8643.29 | P | Fe I | 1261 | 8750.475 | | H | 9 | 8919.95 | | Fe I | 1301 |
| 8647.05 | | Ne I | 33 | 8751.18 | P | Si I | 44 | 8920.02 | P | Fe I | 1261 |
| 8648.89 | | Si I | | 8752.17 | | Si I | 43 | 8922.66 | P | Fe I | 1298 |
| 8649.6 | | Na I | 19 | 8757.192 | | Fe I | 339 | 8923.56 | | Al I | 14 |
| 8652.50 | P | Fe I | 1050 | 8761.44 | | Ti I | 139 | 8923.8 | | Mg I | 25 |
| 8654.16 | | As I | 3 | 8764.000 | | Fe I | 1172 | 8925.55 | | Si I | 54 |
| 8654.3835 | | Ne I | 33 | 8766.64 | | Ti I | 68 | 8925.75 | | Cr I | 142 |
| 8654.40 | P | Fe I | 623 | 8766.68 | | Si I | 54 | 8926.06 | | Mn I | 56 |
| 8654.51 | | Ne I | 33 | 8767.65 | P | Fe I | 814 | 8929.04 | | Fe I | 1301 |
| 8654.63 | | Mn I | 59 | 8770.68 | | Ni I | 82 | 8929.72 | | Mn I | 56 |
| 8655.88 | | N I | 8 | 8771.70 | | Ne I | 38 | 8931.78 | P | Fe I | 507 |
| 8656.67 | P | Fe I | 1269 | 8772.88 | | Al I | 9 | 8943.00 | | Fe I | 338 |
| 8659.38 | | Mn I | 59 | 8773.56 | | Cr I | 296 | 8943.50 | | Cs I | 1 |
| 8661.908 | | Fe I | 60 | 8773.91 | | Al I | 9 | 8943.6 | | Na I | 26 |
| 8662.140 | | Ca II | 2 | 8778.66 | | Ti I | 140 | 8945.204 | | Fe I | 1301 |
| 8663.73 | P | Fe I | 1270 | 8779.12 | P | Fe I | 1050 | 8946.25 | | Fe I | 338 |
| 8665.021 | | H | 9 | 8780.6223 | | Ne I | 27 | 8947.20 | | Cr I | 142 |
| 8667.37 | P | Fe I | 166 | 8783.755 | | Ne I | 38 | 8948.01 | | CI I | 1 |
| 8667.40 | P | Si I | 55 | 8784.44 | | Fe I | 1270 | 8949.33 | | Si I | 54 |
| 8667.9430 | | A I | 6 | 8786.28 | P | Cr I | 142 | 8950.20 | P | Fe I | 1050 |
| 8670.19 | | S I | 6 | 8786.96 | | Cr I | 296 | 8954.65 | | Ni I | 200 |
| 8670.65 | | S I | 6 | 8790.62 | | Fe I | 1267 | 8956.26 | P | Fe I | 1266 |
| 8670.92 | | Mn I | 49 | 8790.88 | | Si I | 79 | 8959.88 | P | Fe I | 1320 |
| 8671.06 | | Al II | 112 | 8791.28 | | Si I | 79 | 8965.94 | | Ni I | 225 |
| 8671.28 | | Al II | 112 | 8793.376 | | Fe I | 1172 | 8967.53 | P | Fe I | 1286 |
| 8671.37 | | S I | 6 | 8796 | | Na I | 27 | 8968.20 | | Ni I | 284 |
| 8671.86 | P | Fe I | 1272 | 8796.42 | | Fe I | 1266 | 8975.408 | | Fe I | 400 |
| 8672.06 | | Mn I | 49 | 8798.05 | P | Fe I | 1286 | 8976.88 | | Cr I | 142 |
| 8673.97 | | Mn I | 49 | 8801.78 | P | Fe I | 956 | 8978.04 | P | Fe I | 1266 |
| 8674.751 | | Fe I | 339 | 8804.624 | | Fe I | 106 | 8978.17 | P | Fe I | 713 |
| 8674.92 | | Al II | 112 | 8805.21 | P | Fe I | 1265 | 8979.34 | P | Ti II | 100 |
| 8675.28 | | Al II | 112 | 8806.7032 | | Mg I | 7 | 8982.35 | | Ni I | 213 |
| 8675.38 | | Ti I | 68 | 8806.7358 | | Mg I | 7 | 8984.87 | | Fe I | 1301 |
| 8679.00 | | 8 I | 6 | 8806.7678 | | Mg I | 7 | 8988.58 | | Ne I | 8 |
| 8679.491 | | Ne I | 37 | 8808.17 | P | Fe I | 1267 | 8989.44 | | Ti I | 138 |
| 8679.61 | P | Fe I | 1286 | 8809.47 | | Ni I | 200 | 8994.57 | P | Fe I | 622 |
| 8679.70 | | S I | 6 | 8814.50 | P | Fe I | 1330 | 8999.561 | | Fe I | 339 |
| 8680.24 | | N I | 1 | 8816.86 | P | Fe I | 1271 | 9002.00 | | Sc I | 1 |
| 8680.31 | | Al II | 112 | 8819.11 | | Co I | 203 | 9006.72 | | Fe I | 1261 |
| 8680.47 | | 8 I | 6 | 8819.39 | | Ti I | 68 | 9008.37 | | Fe I | 1329 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9009.04 | | Si I | 91 | 9214.85 | P | Fe II | 71 | 9413.46 | | S I | 18 |
| 9009.95 | | Cr I | 187 | 9217.4 | P | Mg II | 1 | 9413.59 | | Si I | 14 |
| 9010.55 | | Fe I | 202 | 9217.54 | | Fe I | 1298 | 9414.14 | | Fe I | 1298 |
| 9012.098 | | Fe I | 1301 | 9220.05 | | Ne I | 33 | 9415.04 | P | Fe I | 1297 |
| 9013.90 | | Fe I | 106 | 9221.59 | | Ne I | 33 | 9415.5 | | Mg I | 38 |
| 9014.911 | | H | 9 | 9224.498 | | A I | 8 | 9421.82 | | Si I | 72 |
| 9015.16 | | Zr I | 39 | 9225.55 | | Fe I | 1213 | 9421.93 | | S I | 18 |
| 9017.10 | | Cr I | 187 | 9226.67 | | Ne I | 30 | 9423.07 | P | Fe I | 1300 |
| 9019.84 | | Fe I | 1301 | 9228.11 | | S I | 1 | 9425.38 | | Ne I | 36 |
| 9021.69 | | Cr I | 187 | 9229.017 | | H | 8 | 9429.58 | | Mn I | 57 |
| 9024.47 | | Fe I | 1265 | 9233.15 | P | Fe I | 1342 | 9430.08 | | Fe I | |
| 9024.78 | P | Fe I | 1297 | 9237.49 | | S I | 1 | 9433.29 | P | Fe I | 1292 |
| 9027.32 | | Ti I | 138 | 9238.60 | | Si I | 66 | 9437.11 | | S I | 18 |
| 9027.90 | P | Ti II | 100 | 9242.32 | | Fe I | 1262 | 9437.91 | | Fe I | 1171 |
| 9028.9 | | N I | 15 | 9243.29 | | Mn I | 46 | 9443.98 | | Fe I | 1298 |
| 9030.67 | | Fe I | 338 | 9243.4 | P | Mg II | 1 | 9444.36 | | Cr I | 29 |
| 9035.86 | | Cr I | 142 | 9246.54 | | Fe I | 203 | 9447.00 | | Cr I | 29 |
| 9035.92 | | S I | 13 | 9248.13 | P | Fe I | 1338 | 9452.06 | | Cl I | 13 |
| 9036.32 | | S I | 13 | 9248.80 | P | Fe I | 1285 | 9452.45 | | Fe I | 1263,1292 |
| 9036.73 | | S I | 13 | 9249.41 | | Al II | 117 | 9454.24 | | Fe I | 1298 |
| 9036.74 | P | Fe I | 1269 | 9252.67 | P | Ti II | 100 | 9459.21 | | Ne I | 38 |
| 9038.65 | | Sc I | 1 | 9253.72 | P | Fe I | 1261 | 9460.66 | P | N I | 7 |
| 9038.72 | | S I | 13 | 9254.59 | | Si I | | 9462.97 | | Fe I | 1263 |
| 9038.84 | P | Fe I | 400 | 9256.0 | | Mg I | 27 | 9463.57 | | He I | 67 |
| 9039.27 | | S I | 13 | 9258.30 | | Fe I | 1172 | 9466.0 | | Na I | 24 |
| 9045.40 | | Cl I | 13 | 9259.05 | | Fe I | 1263 | 9476.57 | | Mn I | 57 |
| 9052.56 | P | Fe I | 1342 | 9260.88 | | O I | 8 | 9482.82 | P | Fe I | 1319 |
| 9059.74 | | Cr I | 165 | 9262.73 | | O I | 8 | 9485.93 | P | Fe I | 622 |
| 9060.6 | | N I | 15 | 9263.97 | | Cr I | 165 | 9486.680 | | Ne I | 8 |
| 9061.3[illegible] | P | Fe II | 71 | 9265.99 | | O I | 8 | 9486.89 | | Cl I | 1 |
| 9061.48 | | C I | 3 | 9267.29 | | As I | 3 | 9487.49 | | O I | 47 |
| 9062.24 | | Fe I | 1301 | 9276.89 | | Zr I | 39 | 9498.04 | | O I | 47 |
| 9062.53 | | C I | 3 | 9286.578 | | Al II | 64 | 9499.39 | | O I | 46 |
| 9063.40 | | He I | 77 | 9286.794 | | Al II | 64 | 9502.12 | | Mn I | 58 |
| 9064.06 | | Si I | 91 | 9288.145 | | Al II | 64 | 9505.28 | | Si I | 72 |
| 9070.42 | | Fe I | 1076,1300 | 9288.550 | | Al II | 64 | 9505.67 | | O I | 46 |
| 9073.15 | | Cl I | 12 | 9288.82 | | Cl I | 11 | 9506.04 | | Ti I | 312 |
| 9078.32 | | C I | 3 | 9289.39 | P | Fe I | 1298 | 9508.49 | | Ti I | 312 |
| 9079.599 | | Be I | 1172 | 9290.14 | | Cr I | 29 | 9510.81 | | Ti I | 312 |
| 9080.48 | | Fe I | 1265,1298 | 9290.649 | | Al II | 64 | 9511.55 | | Ti I | 312 |
| 9084.20 | P | Fe I | 1076 | 9290.747 | | Al II | 64 | 9511.80 | | Ti I | 312 |
| 9084.29 | | Mn I | 46 | 9294.17 | | Cr I | 29 | 9513.24 | | Fe I | 1298 |
| 9088.326 | | Fe I | 339 | 9294.66 | | Fe I | 1301 | 9516.51 | | He I | 76 |
| 9088.57 | | C I | 3 | 9297.14 | P | Fe I | 1247 | 9516.66 | | He I | 76 |
| 9089.413 | | Fe I | 400 | 9298.05 | P | Fe I | 1262 | 9520.06 | | Ni I | 224 |
| 9090.70 | | Ti I | 138 | 9300.62 | | As I | 5 | 9522.01 | | O I | 45 |
| 9094.89 | | C I | 3 | 9300.85 | | Ne I | 33 | 9525.78 | | P I | 3 |
| 9100.50 | | Fe I | 1264 | 9304.88 | | P I | 3 | 9526.17 | | He I | 82 |
| 9103.37 | | Si I | 66 | 9307.94 | | Fe I | 1297 | 9527.73 | P | Fe I | 1297 |
| 9103.64 | | Fe I | 1076 | 9313.55 | | Cr I | 80 | 9529.27 | | He I | 86 |
| 9106.40 | | Ni I | 289 | 9313.98 | | Ne I | 33 | 9529.31 | | Fe I | |
| 9111.85 | | C I | 3 | 9318.13 | | Fe I | 1263 | 9531.22 | P | Fe I | 1292 |
| 9112.25 | P | Fe I | 1297 | 9318.24 | | Si I | 66 | 9534.17 | | Ne I | 38 |
| 9112.95 | P | Fe II | 71 | 9324.07 | | Fe I | 1300 | 9535.72 | | Mn I | 57 |
| 9114.02 | | Mn I | 46 | 9326.52 | | Ne I | 36 | 9543.376 | | D | 2 |
| 9116.89 | P | Fe I | 1265 | 9328.64 | P | Fe I | 1261 | 9545.974 | | H | 8 |
| 9117.10 | | Fe I | 338 | 9331.546 | | Al II | 56 | 9546.07 | | Ti I | 32 |
| 9118.888 | | Fe I | 338 | 9331.979 | | Al II | 56 | 9547.26 | | Zr I | 39 |
| 9121.10 | | Cl I | 1 | 9333.94 | | Fe I | 1297 | 9547.40 | | Ne I | 38 |
| 9122.9660 | | A I | 1 | 9335.27 | P | Fe I | 1338 | 9550.90 | | Fe I | 1263 |
| 9124.27 | | Al II | 108 | 9336.47 | | Mn I | 58 | 9556.56 | | Fe I | 622 |
| 9140.15 | P | Fe I | 622 | 9343.40 | | Fe I | 1300 | 9563.45 | | P I | 2 |
| 9146.11 | | Fe I | 202 | 9344.93 | | He II | 6 | 9568.58 | | Cr I | 29 |
| 9147.800 | | Fe I | 1301 | 9346.69 | | La II | 152 | 9569.960 | | Fe I | 1296 |
| 9148.45 | | Cr I | 165 | 9350.46 | | Fe I | 1171 | 9570.08 | | Si I | 42,65 |
| 9148.68 | | Ne I | 30 | 9354.218 | | A I | 8 | 9571.76 | | Cr I | 29 |
| 9154.7 | | Na I | 25 | 9359.420 | | Fe I | 203 | 9573.65 | P | Fe I | 1297 |
| 9155.67 | P | Fe I | 1301 | 9362.06 | | Cr I | 80 | 9574.25 | | Cr I | 29 |
| 9156.02 | | O I | 41 | 9362.370 | | Fe I | 106 | 9582.28 | | V I | 106 |
| 9156.23 | P | Fe I | 400 | 9370.57 | P | Fe I | 338 | 9584.77 | | Cl I | 1 |
| 9157.07 | P | Fe I | 1268 | 9372.900 | | Fe I | 202 | 9585.72 | | Si I | 7 |
| 9157.08 | P | Fe I | 1261 | 9373.28 | | Ne I | 33 | 9592.20 | | Cl I | 11 |
| 9164.51 | | Fe I | 1263 | 9375.14 | P | Fe I | 400 | 9593.54 | | P I | 2 |
| 9172.09 | | Mn I | 46 | 9382.93 | P | Fe I | 1284 | 9595.60 | | K I | 10 |
| 9173.20 | P | Fe I | 203 | 9383.40 | P | Fe I | 1285 | 9597.76 | | K I | 10 |
| 9173.63 | P | Fe I | 1300 | 9385.62 | | Ni I | 225 | 9597.94 | | As I | 3 |
| 9173.83 | | Fe I | 622 | 9386.79 | | N I | 7 | 9599.53 | | Ti I | 32 |
| 9175.85 | | P I | 3 | 9388.28 | | Fe I | 1263 | 9602.07 | | Fe I | 1283 |
| 9178.57 | | Fe I | 1262 | 9392.77 | P | Fe I | 1262 | 9603.09 | | C I | 2 |
| 9191.67 | | Cl I | 1 | 9392.80 | | N I | 7 | 9603.50 | | He I | 71 |
| 9197.49 | | Cl I | 14 | 9393.40 | | Si I | 72 | 9608.56 | | Mn I | 60 |
| 9199.52 | | Fe I | 1298 | 9393.81 | | Cl I | 1 | 9608.89 | P | Fe I | 1285 |
| 9201.76 | | Ne I | 30 | 9394.71 | | Fe I | 1264 | 9608.97 | | P I | 2 |
| 9203.10 | P | Fe I | 1298 | 9396.57 | | Ni I | | 9611.60 | | V I | 106 |
| 9208.29 | | Cr I | 165 | 9401.09 | | Fe I | 1297 | 9614.68 | | V I | 106 |
| 9208.55 | | Si I | 66 | 9403.36 | P | Fe II | 71 | 9620.86 | | C I | 2 |
| 9210.030 | | Fe I | 338 | 9404.80 | P | Fe I | 1264 | 9620.93 | P | Fe I | 737 |
| 9210.28 | | He I | 83 | 9405.77 | | C I | 9 | 9625.72 | | Ge I | 7 |
| 9212.91 | | S I | 1 | 9409.55 | P | Fe I | 1296 | 9625.80 | | He I | 90 |
| 9214.45 | | Fe I | 1264 | 9410.15 | P | Fe I | 1298 | 9626.30 | | Cr I | 80 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9626.562 | | Fe I | 1296 | 9790.08 | | P I | 4 | 10061.29 | | Ni I | 284 |
| 9632.37 | | Cl I | 12 | 9796.79 | | P I | 2 | 10065.080 | | Fe I | 1247 |
| 9633.0 | P | Mg II | 15 | 9800.335 | | Fe I | 1296 | 10066.47 | | Ti I | 193 |
| 9633.02 | | Mn I | 58 | 9800.79 | P | Fe I | 1292 | 10067.84 | | Si I | 64 |
| 9633.78 | | S I | 17 | 9811.36 | | Fe I | 1285 | 10070.58 | P | Fe I | 1345 |
| 9634.22 | | Fe I | 1296 | 9820.24 | P | Fe I | 106 | 10072.10 | | He I | 80 |
| 9636.69 | | Fe I | 1212 | 9821.8 | | N I | 19 | 10076.29 | | Al II | 6 |
| 9637.55 | | Fe I | | 9822.30 | | Zr I | 39 | 10077.32 | | Al II | 6 |
| 9638.28 | | Ti I | 32 | 9826.69 | | As I | 3 | 10077.53 | | Al II | 6 |
| 9639.40 | P | Ca I | 55 | 9832.15 | | Ti I | 149 | 10080.32 | | Cr I | 226 |
| 9647.40 | | Ti I | 32 | 9833.76 | | As I | 2 | 10080.44 | P | Fe I | 1293 |
| 9649.94 | | S I | 17 | 9834.04 | | Fe I | 1294 | 10081.40 | P | Fe I | 106 |
| 9653.143 | | Fe I | 1247 | 9839.38 | | Fe I | 1211 | 10084.22 | | P I | 4 |
| 9657.00 | | La II | 60 | 9839.58 | | Si I | 65 | 10084.42 | P | Fe I | 1209 |
| 9657.30 | | Fe I | 1296 | 9856.7 | P | Ca II | 12 | 10084.70 | | Zr I | 39 |
| 9657.7841 | | A I | 3 | 9861.793 | | Fe I | 1296 | 10086.27 | P | Fe I | 399 |
| 9658.49 | | C I | 2 | 9862.5 | | N I | 19 | 10091.12 | | Te I | 1 |
| 9658.94 | | Fe I | 1292 | 9865.44 | | V I | 76 | 10091.64 | | Cl I | 10 |
| 9661.42 | | Ti I | 194 | 9868.09 | | Fe I | 1292,1299 | 10107.19 | | Al II | 6 |
| 9663.58 | P | Ca I | 55 | 9875.95 | | Cl I | 11 | 10108.01 | | Al II | 6 |
| 9664.29 | P | Ca I | 55 | 9878.18 | P | Fe I | 1293 | 10108.37 | | Al II | 6 |
| 9665.426 | | Ne I | 8 | 9879.41 | | Ti I | 149 | 10113.4 | | N I | 18 |
| 9666.59 | | Fe I | | 9881.51 | P | Fe I | 1209 | 10113.86 | | Fe I | 264 |
| 9667.20 | | Cr I | 29 | 9886.92 | | Si I | 85 | 10117.81 | P | Fe I | 1295 |
| 9668.9 | | V I | 106 | 9889.082 | | Fe I | 1296 | 10119.20 | | Ti I | 315 |
| 9670.48 | | Cr I | 29 | 9891.90 | | Si I | 71 | 10120.90 | | Ti I | 193 |
| 9672.34 | | S I | 17 | 9898.90 | | Ni I | 243 | 10122.50 | | Al II | 6 |
| 9673.16 | | Fe I | 580 | 9900.87 | | Cr I | 80 | 10123.61 | | He II | 2 |
| 9675.55 | | Ti I | 32 | 9903.74 | | P I | 4 | 10137.06 | P | Fe I | 1294 |
| 9676.25 | P | Ca I | 55 | 9913.16 | | Si I | 65 | 10138.50 | | He I | 89 |
| 9676.42 | | Fe I | 1345 | 9913.19 | P | Fe I | 1292 | 10142.82 | | Fe I | 1294 |
| 9676.50 | | Mn I | 60 | 9917.93 | | Fe I | 1317 | 10143.59 | P | Fe I | 979 |
| 9677.41 | | O I | 58 | 9920.46 | P | Fe I | 1292 | 10145.00 | P | Fe I | 621 |
| 9680.80 | | S I | 17 | 9923.03 | | As I | 2 | 10145.37 | | Ni I | 243 |
| 9683.57 | | Fe I | 1337 | 9924.35 | P | Fe I | 737 | 10145.48 | | Ti I | |
| 9684.9 | | Mn I | 60 | 9927.35 | | Ti I | 149 | 10145.601 | | Fe I | 1247 |
| 9686.3 | | Mn I | | 9932.26 | | S I | 16 | 10147.09 | | Ti I | 315 |
| 9688.60 | P | Ca I | 55 | 9933.3 | P | Ca II | 12 | 10147.3 | | N I | 18 |
| 9688.86 | | Ti I | 32 | 9937.10 | P | Fe I | 1210 | 10149.09 | P | Fe I | 1294 |
| 9689.35 | | Ni I | 295 | 9941.33 | | Ti I | 193 | 10153.13 | P | Si I | 40 |
| 9689.41 | | Si I | 65 | 9944.13 | | Fe I | 1285 | 10153.30 | P | Fe I | 1348 |
| 9690.62 | | Ti I | 194 | 9948.98 | | Ti I | 193 | 10155.18 | P | Fe I | 59 |
| 9691.58 | | V I | 106 | 9949.06 | | Cr I | 226 | 10155.88 | | Si I | 64 |
| 9693.68 | | S I | 20 | 9949.84 | | S I | 16 | 10156.50 | P | Fe I | 1209 |
| 9693.69 | | Fe I | 1292 | 9950.5 | | K I | 8 | 10164.5 | | N I | 18 |
| 9697.33 | | S I | 17 | 9950.70 | P | Fe I | 1209 | 10167.4 | | Fe I | 59 |
| 9699.70 | | Fe I | 1292,1299 | 9951.15 | P | Fe I | 1346 | 10170.60 | | Ti I | 95 |
| 9701.81 | P | Ca I | 55 | 9953.45 | P | Fe I | 1346 | 10179.92 | | Ti I | 315 |
| 9702.35 | | Cl I | 1 | 9955.2 | | K I | 8 | 10189.26 | | Ti I | 95 |
| 9702.66 | | He I | 75 | 9955.85 | P | Fe I | 1211 | 10191.51 | P | Fe I | 149 |
| 9702.86 | | Ti I | 248 | 9958.90 | | S I | | 10193.25 | | Ni I | 213 |
| 9705.64 | | Ti I | 32 | 9959.18 | P | Fe I | 998 | 10193.66 | | V I | 76 |
| 9710.21 | P | Ni I | 285 | 9961.0 | | Na I | 23 | 10195.11 | | Fe I | 264 |
| 9717.00 | | Ti I | 248 | 9967.32 | P | Fe I | 1293 | 10197.05 | | Cr I | 80 |
| 9718.96 | | Ti I | 124 | 9967.46 | | Si I | 64 | 10203.45 | | V I | 76 |
| 9722.88 | | Te I | 1 | 9970.26 | P | Fe I | 461 | 10204.72 | | P I | 4 |
| 9728.36 | | Ti I | 32 | 9976.65 | | P I | 2 | 10216.351 | | Fe I | 1247 |
| 9730.32 | | Cr I | 226 | 9977.52 | | Fe I | 1293 | 10218.36 | | Fe I | 461 |
| 9734.52 | | Cr I | 29 | 9980.55 | | Fe I | 1295 | 10262.49 | P | Si I | 63 |
| 9734.74 | | P I | 2 | 9981.16 | | Ti I | | 10265.23 | P | Fe I | 59 |
| 9738.50 | | V I | 106 | 9987.0 | | Mg I | 36 | 10283.87 | P | Fe I | 1346 |
| 9738.60 | | Si I | | 9987.88 | P | Fe I | 59 | 10288.83 | | Si I | 6 |
| 9738.624 | | Fe I | 1296 | 9993.7 | | Mg I | 36 | 10295.05 | | Ni I | |
| 9739.74 | | S I | 20 | 9997.94 | | Ti I | 149 | 10302.61 | | Ni I | 242 |
| 9741.49 | | O I | 57 | 10001.35 | P | Si I | 64 | 10307.48 | P | Fe I | 1208 |
| 9741.93 | | S I | 20 | 10003.02 | | Ti I | 193 | 10307.60 | | Se I | 2 |
| 9742.28 | | Hf II | 66 | 10011.72 | | Ti I | 193 | 10311.18 | | He I | 74 |
| 9743.60 | | Ti I | 32 | 10012.15 | P | Fe I | 1336 | 10311.37 | | He I | 74 |
| 9744.33 | | Cl I | 10 | 10015.33 | | Si I | | 10311.88 | P | Fe I | 106 |
| 9746.86 | | Ti I | 248 | 10016.67 | P | Fe I | 1293 | 10321.10 | | Ni I | 289 |
| 9747.24 | | Fe I | 1209 | 10019.77 | P | Fe I | 1348 | 10327.30 | | Se I | 2 |
| 9750.73 | | P I | 2 | 10020.16 | | Si I | 41 | 10327.314 | | Sr II | 2 |
| 9752.84 | | Cr I | 80 | 10022.34 | P | Fe I | 1345 | 10330.23 | | Ni I | 224 |
| 9753.129 | | Fe I | 1247 | 10023.98 | | As I | 2 | 10332.33 | P | Fe I | 858 |
| 9758.08 | | Si I | 65 | 10025.80 | P | Si I | 64 | 10333.24 | P | Fe I | 1208 |
| 9760.65 | | O I | 56 | 10026.10 | P | Fe I | 1211 | 10340.77 | | Fe I | 59 |
| 9763.450 | | Fe I | 1296 | 10027.73 | | He I | 81 | 10343.85 | | Ca I | 43 |
| 9763.913 | | Fe I | 1292 | 10031.16 | | He I | 85 | 10348.16 | | Fe I | 1347 |
| 9764.40 | P | Fe I | 1348 | 10032.84 | P | Fe I | 1348 | 10353.85 | P | Fe I | 1346 |
| 9768.27 | | Si I | 7 | 10034.45 | | Ti I | 95 | 10362.73 | P | Fe I | 1345 |
| 9770.10 | | Si I | | 10036.658 | | Sr II | 2 | 10364.13 | P | Fe I | 1347 |
| 9770.28 | | Ti I | 32 | 10046.64 | | D | 2 | 10371.23 | | Si I | 6 |
| 9771.06 | P | Fe I | 1211 | 10048.60 | | Ni I | 242 | 10378.62 | | Ni I | 224 |
| 9783.30 | | Ti I | 32 | 10048.78 | | Ti I | 95 | 10379.01 | P | Fe I | 59 |
| 9783.59 | | Ti I | 32 | 10049.38 | | H | 8 | 10386.45 | | Se I | 2 |
| 9783.96 | | Fe I | 1295 | 10051.55 | | Te I | 1 | 10388.73 | P | Fe I | 1346 |
| 9784.5010 | | A I | 8 | 10057.64 | | Fe I | 1294 | 10392.45 | | Cl I | 10 |
| 9786.62 | | Fe I | 1171 | 10057.69 | | Ti I | 193 | 10395.75 | | Fe I | 59 |
| 9787.67 | | Ti I | 32 | 10058.28 | P | Fe I | 59 | 10396.85 | | Ti I | 31 |
| 9789.24 | | Si I | 65 | 10059.87 | | Ti I | 95 | 10401.72 | P | Fe I | 461 |

| I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. | I A | Type | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10405.05 | | Ge I | 7 | 10838.77 | | Ca I | 56 | 11564.8 | | N I | 12 |
| 10422.99 | | Fe I | 264 | 10844.02 | | Si I | 31 | 11588.73 | P | Ni I | 242 |
| 10423.65 | | Fe I | 461 | 10844.54 | | Ne I | 26 | 11591.98 | | Si I | 90 |
| 10435.38 | P | Fe I | 1246 | 10847.72 | | Ti I | 31 | 11593.55 | | Fe I | 58 |
| 10452.70 | | Fe I | 955 | 10849.68 | | Fe I | 1352 | 11602.94 | P | C I | 25 |
| 10455.47 | | S I | 3 | 10861.51 | | Ca I | 56 | 11607.42 | | Si I | 82 |
| 10456.79 | | S I | 3 | 10863.60 | | Fe I | 1246 | 11607.57 | | Fe I | 58 |
| 10459.46 | | S I | 3 | 10863.72 | | Ca I | 56 | 11609.41 | | Ti I | |
| 10460.07 | | Ti I | 223 | 10869.37 | | Ca I | 56 | 11609.91 | P | °C I | 25 |
| 10469.59 | | Fe I | 979 | 10869.54 | | Si I | 13 | 11611.49 | | Si I | 90 |
| 10470.051 | | A I | 6 | 10872.47 | P | Al I | 12 | 11619.0 | | C I | 25 |
| 10486.24 | | Cr I | 118 | 10875.00 | P | Fe I | 1316 | 11626.40 | | He II | 6 |
| 10496.14 | | Ti I | 31 | 10879.78 | | Ca I | 56 | 11628.0 | | N I | 12 |
| 10506.5 | | N I | 28 | 10881.65 | | Fe I | 336 | 11631.59 | P | C I | 25 |
| 10509.96 | | Cr I | 118 | 10882.66 | | Si I | 53 | 11638.25 | | Fe I | 58 |
| 10511.45 | | P I | 1 | 10884.30 | | Fe I | 979 | 11638.60 | P | C I | 25 |
| 10529.45 | | P I | 1 | 10885.16 | | Si I | 77 | 11640.58 | | Si I | 90 |
| 10530.53 | | Ni I | 224 | 10890.13 | P | Fe I | 1341 | 11656.0 | | C I | 29 |
| 10532.21 | | Fe I | 979 | 10891.21 | P | AI I | 12 | 11656.0 | | N I | 12 |
| 10539.0 | | N I | 28 | 10891.25 | | Ni I | 224 | 11667.1 | | C I | 25,29 |
| 10548.0 | | C I | 20 | 10893.72 | P | Si I | 78 | 11676.99 | P | C I | 25 |
| 10548.0 | | N I | 28 | 10896.10 | | Ti I | 310 | 11689.76 | | K I | 6 |
| 10553.02 | | Ti I | 223 | 10896.30 | | Fe I | 461 | 11689.98 | | Fe I | 58 |
| 10555.63 | P | Fe I | 1345 | 10912.92 | | He I | 79 | 11747.5 | | C I | 24 |
| 10562.43 | | Ne I | 40 | 10914.2 | P | Mg II | 3 | 11754.0 | | C I | 24 |
| 10565.97 | | Ti I | 223 | 10914.877 | | Sr II | 2 | 11769.41 | | K I | 6 |
| 10577.14 | P | Fe I | 579 | 10916.98 | | He I | 84 | 11772.66 | | K I | 6 |
| 10581.52 | | P I | 1 | 10925.80 | | Fe I | 1350 | 11783.28 | | Fe I | 337 |
| 10582.66 | | Si I | 84 | 10929.90 | | Cr I | 118 | 11801.8 | | C I | 24 |
| 10584.66 | | Ti I | 31 | 10935.11 | | D | 2 | 11828.8 | | Mg I | 6 |
| 10585.12 | | Si I | 6 | 10938.09 | | H | 8 | 11836.4 | P | Ca II | 5 |
| 10596.92 | | P I | 1 | 10947.51 | | Ge I | 6 | 11849.3 | | C I | 23 |
| 10603.38 | | Si I | 5 | 10949.4 | P | Mg II | 3 | 11863.0 | | C I | 23 |
| 10607.78 | | Ti I | 31 | 10957.19 | | Cr I | 118 | 11880.4 | | C I | 23 |
| 10616.75 | P | Fe I | 579 | 10961.2 | P | Mg I | 35 | 11882.80 | | Fe I | 58 |
| 10627.81 | | Si I | 32 | 10966.1 | P | Mg I | 35 | 11884.12 | | Fe I | 58 |
| 10647.66 | | Cr I | 118 | 10979.27 | | Si I | 5 | 11890.44 | P | Si I | 12 |
| 10653.6 | | C I | 8 | 10979.87 | | Ni I | 242 | 11894.9 | | C I | 23 |
| 10660.98 | | Si I | 5 | 10982.28 | | Si I | 77 | 11905.83 | | Cr I | 221 |
| 10661.61 | | Ti I | 31 | 10984.24 | | Si I | 77 | 11927.89 | P | Ni I | 242 |
| 10667.53 | | Cr I | 118 | 10987.22 | P | Fe I | 337 | 11947.0 | P | Ca II | 5 |
| 10667.60 | | He I | 73 | 10996.55 | | He I | 78 | 11969.07 | | He I | 72 |
| 10672.17 | | Cr I | 118 | 11012.97 | | He I | 70 | 11973.01 | | Fe I | 58 |
| 10673.55 | | A I | 10 | 11013.27 | | Fe I | 1246 | 11984.20 | | Si I | 4 |
| 10677.04 | | Ti I | 31 | 11015.63 | | Cr I | 221 | 11991.57 | | Si I | 4 |
| 10681.43 | | P I | 1 | 11018.00 | | Si I | 39 | 11997.9 | | N I | 37 |
| 10683.18 | | C I | 1 | 11022.3 | | K I | 9 | 12031.49 | | Si I | 4 |
| 10685.44 | | C I | 1 | 11044.64 | | Cr I | 118 | 12074.1 | | N I | 37 |
| 10689.52 | | Si I | 53 | 11044.95 | | He I | 88 | 12083.79 | P | Mg I | 26 |
| 10691.36 | | C I | 1 | 11119.80 | | Fe I | 337 | 12103.46 | | Si I | 4 |
| 10694.14 | | Si I | 53 | 11125.28 | | Ge I | 6 | 12107.4 | | N I | 37 |
| 10707.44 | | C I | 1 | 11130.37 | | Si I | 77 | 12128.6 | | N I | 27 |
| 10725.19 | P | Fe I | 858 | 11149.34 | | Fe I | 336 | 12186.9 | | N I | 27,34 |
| 10726.33 | | Ti I | 31 | 11157.03 | | Cr I | 221 | 12203.4 | | N I | 27 |
| 10727.21 | | Si I | 53 | 11187.74 | | Si I | 76 | 12232.9 | | N I | 27 |
| 10729.59 | | C I | 1 | 11196.70 | P | Ni I | 81 | 12270.50 | | Si I | 4 |
| 10732.89 | | Ti I | 31 | 11202.02 | | Si I | 76 | 12288.0 | | N I | 27,34 |
| 10734.14 | | Ge I | 6 | 11225.83 | | He I | 87 | 12327.7 | | N I | 34 |
| 10745.9 | | Na I | 18 | 11227.5 | | N I | 17 | 12395.97 | P | Si I | 4 |
| 10748.7 | | Na I | 18 | 11230.91 | | Ti I | | 12434.3 | | K I | 5 |
| 10749.40 | | Si I | 5 | 11251.09 | | Fe I | 337 | 12461.2 | | N I | 36 |
| 10752.99 | | Fe I | 1352 | 11253.81 | P | AI I | 8 | 12467.8 | | N I | 36 |
| 10754.09 | P | C I | 1 | 11255.69 | P | Al I | 8 | 12521.0 | | C I | 28 |
| 10762.24 | | Ni I | 242 | 11290.01 | | Si I | 76 | 12523.0 | | K I | 5 |
| 10768.39 | P | Al I | 13 | 11294.0 | | N I | 17 | 12551.0 | | C I | 30 |
| 10774.92 | | Ti I | 31 | 11294.97 | | O I | 7 | 12565.0 | | C I | 30 |
| 10780.71 | P | Fe I | 579 | 11297.54 | | O I | 7 | 12582.3 | | C I | 30 |
| 10782.12 | P | AI I | 13 | 11298.83 | | Fe I | 337 | 12582.3 | | N I | 36 |
| 10783.09 | | Fe I | 461 | 11302.22 | | O I | 7 | 12602.6 | | C I | 30 |
| 10784.33 | | Si I | 53 | 11308.45 | | Si I | 76 | 12614.8 | | C I | 30 |
| 10786.78 | P | Al I | 13 | 11313.8 | | N I | 17 | 12679.0 | | Na I | 21 |
| 10786.86 | | Si I | 5 | 11329.0 | | N I | 17 | 12814.56 | | D | 2 |
| 10792.59 | P | Ti I | 31 | 11330.36 | | C I | 19 | 12816.06 | P | Ca I | 52 |
| 10793.65 | | Ti I | 310 | 11355.97 | | Fe I | 858 | 12818.05 | | H | 8 |
| 10796.52 | | Si I | 78 | 11374.02 | | Fe I | 58 | 12823.89 | P | Ca I | 52 |
| 10798.12 | | Ne I | 22 | 11381.21 | | Na I | 3 | 12827.09 | P | Ca I | 52 |
| 10801.37 | | Cr I | 118 | 11381.53 | | Ti I | | 13123.37 | P | Al I | 4 |
| 10812.8 | | Mg I | 37 | 11403.55 | | Na I | 3 | 13150.68 | P | Al I | 4 |
| 10813.03 | | P I | 1 | 11403.89 | | Ti I | | 13164.1 | | C I | 27 |
| 10816.91 | | Cr I | 118 | 11422.30 | | Fe I | 58 | | | | |
| 10818.36 | | Fe I | 979 | 11439.06 | | Fe I | 337 | | | | |
| 10820.31 | | Ti I | 310 | 11453 | | S I | 19 | | | | |
| 10821.62 | | Cr I | 118 | 11464 | | S I | 19 | | | | |
| 10827.09 | | Si I | 5 | 11468.54 | | Si I | 76 | | | | |
| 10828.04 | | Ti I | 31 | 11472 | | S I | 19 | | | | |
| 10829.081 | | He I | 1 | 11479.87 | P | Fe I | 1315 | | | | |
| 10830.250 | | He I | 1 | 11485.68 | | Si I | 83 | | | | |
| 10830.341 | | He I | 1 | 11502.94 | | Si I | 90 | | | | |
| 10833.12 | | Ca I | 56 | 11539.50 | | Ti I | | | | | |
| 10834.4 | | Na I | 22 | 11542.96 | P | Fe I | 1341 | | | | |

| I A | Element | Multiplet No. | I A | Element | Multiplet No. | I A | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|
| 2972? | Ne V | 2 F | 3298.61 | Cr II | 5 F | 3492.5 | Co VII | 3 F |
| 2972.3 | O I | 2 F | 3299.6 | Ni VII | 1 F | 3493.55 | Fe I | 10 F |
| 2990.4 | Ni VII | 1 F | 3299.8 | Co VI | 1 F | 3494.7 | Fe VI | 4 F |
| 3000.6 | Ni VII | 3 F | 3300.5 | Fe III | 6 F | 3500.4 | Mg VI | 1 F |
| 3005.1 | A III | 2 F | 3301.6 | Fe III | 6 F | 3501.62 | Fe II | 26 F |
| 3008.4 | Ti III | 5 F | 3307.0 | Co VI | 2 F | 3503.0 | Mg VI | 1 F |
| 3026.4 | Ni VIII | 4 F | 3316.1 | Fe III | 7 F | 3503.5 | Fe V | 4 F |
| 3035.3 | Ni VIII | 3 F | 3318.38 | Fe II | 27 F | 3503.8 | Ni VII | 1 F |
| 3038.3 | Ni VII | 1 F | 3319.2 | Fe III | 6 F | 3504.02 | Fe II | 26 F |
| 3038.4 | Ni VII | 3 F | 3319.3 | Na IV | 1 F | 3504.51 | Fe II | 26 F |
| 3042.44 | Mn II | 4 F | 3322.54 | Fe III | 5 F | 3505.81 | Fe II | 25 F |
| 3042.61 | Mn II | 4 F | 3326.9 | Co VI | 2 F | 3509.78 | Fe I | 10 F |
| 3044.52 | Mn II | 4 F | 3329.3 | Ca XII | 1 F | 3511.6 | Fe VI | 4 F |
| 3048.8 | Ni VII | 3 F | 3333.8 | Fe III | 6 F | 3511.64 | Fe I | 10 F |
| 3049.05 | Mn II | 4 F | 3334.9 | Fe III | 6 F | 3512.9 | Co VI | 1 F |
| 3063.0 | N II | 2 F | 3336.9 | Co VI | 2 F | 3516.17 | Fe I | 10 F |
| 3066.29 | Cr II | 8 F | 3337.7 | Ti III | 4 F | 3522.76 | Fe I | 10 F |
| 3068.8 | Al VII | 1 F | 3337.77 | Cr II | 5 F | 3524.38 | Fe II | 26 F |
| 3070.8 | N II | 2 F | 3337.82 | Mn II | 3 F | 3527.33 | Fe I | 10 F |
| 3071.0 | Co VII | 4 F | 3338.5 | Co VII | 3 F | 3528.28 | Fe II | 25 F |
| 3074.0 | Al VII | 1 F | 3339.14 | Fe II | 27 F | 3532.2 | F IV | 2 F |
| 3074.11 | Ni II | 6 F | 3340.7 | Fe III | 6 F | 3536.25 | Fe II | 26 F |
| 3075.6 | Ni VIII | 3 F | 3341.38 | Mn II | 3 F | 3538.69 | Fe II | 26 F |
| 3081.6 | Ni VII | 3 F | 3341.5 | Co VI | 1 F | 3538.8 | Co VI | 1 F |
| 3089.76 | Cr II | 8 F | 3342.7 | Cl III | 2 F | 3539.19 | Fe II | 26 F |
| 3093.4 | Al VII | 1 F | 3342.9 | Ne III | 2 F | 3543.5 | Fe VI | 5 F |
| 3098.6 | Co VII | 4 F | 3344.72 | Mn II | 3 F | 3558.1 | Fe VI | 4 F |
| 3098.7 | Al VII | 1 F | 3345.9 N | Ne V | 1 F | 3559.86 | Ni II | 5 F |
| 3106.0 | Ni VII | 1 F | 3353.4 | Cl III | 2 F | 3569.0 | Fe VI | 5 F |
| 3106.1 | Ni VII | 3 F | 3355.5 | Fe III | 6 F | 3575.6 | Fe VI | 4 F |
| 3109.0 | A III | 2 F | 3356.6 | Fe III | 6 F | 3575.72 | Fe II | 25 F |
| 3117.1 | Ni VII | 3 F | 3361.7 | Co VII | 3 F | 3579.81 | Fe II | 25 F |
| 3118.3 | Cl IV | 2 F | 3362.5 | Fe V | 4 F | 3583.2 | Cl II | 2 F |
| 3124.18 | Fe II | 12 F | 3363.2 | Ti III | 4 F | 3586.8 | Co VI | 1 F |
| 3159.5 | Co VII | 4 F | 3366.2 | Fe III | 6 F | 3587.2 | Fe VII | 3 F |
| 3162.21 | Fe II | 12 F | 3367.3 | Fe III | 6 F | 3590.8 | Sc VI | 2 F |
| 3165.4 | Ni VII | 3 F | 3367.5 | Co VI | 2 F | 3593.3 | Ti III | 6 F |
| 3168.2 | Co VII | 3 F | 3368.9 | Fe V | 4 F | 3601.3 | Ni XVI | 1 F |
| 3170.55 | Cr II | 7 F | 3371.4 | Fe III | 5 F | 3608.5 | Ti III | 6 F |
| 3175.38 | Fe II | 11 F | 3374.6 | Fe V | 4 F | 3615.5 | Ti III | 9 F |
| 3181.05 | Fe II | 12 F | 3376.20 | Fe II | 26 F | 3616.00 | Fe II | 25 F |
| 3185.01 | Fe II | 11 F | 3378.4 | Ti III | 4 F | 3622.9 | Ti III | 6 F |
| 3188.79 | Cr II | 7 F | 3378.55 | Ni II | 5 F | 3627.35 | Ni II | 5 F |
| 3189.1 | Co VII | 3 F | 3379.7 | Ni VII | 1 F | 3628.65 | Fe II | 25 F |
| 3190.76 | Fe II | 12 F | 3380.95 | Fe II | 27 F | 3630.3 | Fe VI | 5 F |
| 3191.2 | Ni VII | 1 F | 3387.10 | Fe II | 26 F | 3631.4 | Mn VI | 3 F |
| 3191.3 | Ni VII | 3 F | 3387.7 | Fe XIII | 2 F | 3631.8 | Ti III | 6 F |
| 3202.25 | Cr II | 6 F | 3388.2 | Co VI | 2 F | 3638.4 | Ti III | 6 F |
| 3203.3 | Cl IV | 2 F | 3396.7 | Ni VII | 2 F | 3640.6 | Ti III | 6 F |
| 3207.46 | Cr II | 6 F | 3398.5 | Co VI | 2 F | 3643.3 | Ni XIII | 2 F |
| 3207.6 | Ti III | 7 F | 3400.3 | Fe V | 4 F | 3645.7 | Fe VI | 4 F |
| 3209.3 | Co VII | 4 F | 3402.50 | Fe II | 27 F | 3646.3 | Ca VI | 1 F |
| 3209.94 | Fe II | 12 F | 3403.3 | Co VI | 1 F | 3656.3 | Ti III | 6 F |
| 3212.75 | Cr II | 6 F | 3403.65 | Fe I | 10 F | 3658.1 | Co VI | 1 F |
| 3214.5 | Ni VII | 1 F | 3405.39 | Fe I | 10 F | 3659.96 | Fe II | 10 F |
| 3214.5 | Ti III | 7 F | 3406.2 | Fe III | 5 F | 3661.3 | Ti III | 11 F |
| 3214.67 | Fe II | 11 F | 3406.6 | Fe V | 4 F | 3664.1 | Fe VI | 4 F |
| 3216.32 | Cr II | 6 F | 3413.3 | Ni VII | 2 F | 3670.62 | Fe II | 10 F |
| 3224.54 | Fe II | 11 F | 3425.8 N | Ne V | 1 F | 3672.37 | Cr I | 4 F |
| 3226.7 | Ti III | 7 F | 3428.24 | Fe II | 27 F | 3675.0 | Cl II | 2 F |
| 3226.99 | Fe II | 11 F | 3428.8 | Fe III | 5 F | 3675.2 | Fe VI | 5 F |
| 3228.2 | Ni VIII | 3 F | 3430.3 | Fe V | 4 F | 3678.71 | Cr I | 4 F |
| 3230.17 | Fe II | 12 F | 3439.29 | Ni II | 5 F | 3680.3 | Ni IX | 2 F |
| 3236.7 | Fe III | 7 F | 3440.3 | Ni VII | 1 F | 3686 | V VIII | 1 F |
| 3239.07 | Cr II | 5 F | 3440.99 | Fe II | 26 F | 3688? | Ca VII | 2 F |
| 3239.7 | Fe III | 6 F | 3444.1 | Co VI | 2 F | 3695.0 | Ni VIII | 2 F |
| 3239.8 | Co VII | 3 F | 3445.4 | Fe V | 4 F | 3702.7 | Ca VI | 1 F |
| 3243.2 | Ni VII | 1 F | 3445.9 | Na IV | 1 F | 3705.8 | Ni VIII | 2 F |
| 3244.18 | Fe II | 11 F | 3450.39 | Fe II | 27 F | 3708.3 | Co VI | 1 F |
| 3254.24 | Fe II | 11 F | 3452.30 | Fe II | 26 F | 3709.14 | Fe II | 10 F |
| 3254.7 | Fe III | 6 F | 3452.54 | Fe I | 10 F | 3712.26 | Fe II | 10 F |
| 3256.31 | Fe II | 11 F | 3454.34 | Fe I | 10 F | 3721.1 | S III | 2 F |
| 3256.73 | Fe II | 11 F | 3455.11 | Fe II | 26 F | 3726.16 N | O II | 1 F |
| 3261.7 | Co VII | 3 F | 3457.3 | Fe VII | 3 F | 3728.91 N | O II | 1 F |
| 3263.1 | Ti VII | 2 F | 3458.73 | Fe I | 10 F | 3733.6 | Mn VI | 3 F |
| 3264.84 | Fe II | 11 F | 3460.20 | Fe II | 25 F | 3735.2 | Fe V | 3 F |
| 3272.9 | Co VI | 2 F | 3461.42 | Fe II | 27 F | 3736.17 | Fe II | 10 F |
| 3273.5 | Cr IX | 1 F | 3463.4 | Fe V | 4 F | 3740.2 | Fe VI | 5 F |
| 3274.7 | Co VII | 4 F | 3465.7 | Co VI | 2 F | 3744.1 | Fe V | 3 F |
| 3275.02 | Fe II | 11 F | 3466.4 | N I | 2 F | 3751.66 | Fe II | 10 F |
| 3277.12 | Fe II | 11 F | 3470.0 | Ni IX | 2 F | 3754.98 | Fe I | 9 F |
| 3277.3 | Co VI | 1 F | 3476.5 | Co VI | 2 F | 3755.5 | Fe V | 3 F |
| 3277.55 | Fe II | 11 F | 3481.5 | Co VI | 1 F | 3759.9 | Fe VII | 3 F |
| 3283.1 | Fe III | 7 F | 3484.01 | Fe II | 27 F | 3761.0 | Co VI | 1 F |
| 3285.6 | Co VI | 2 F | 3485.5 | Mg VI | 1 F | 3764.8 | Fe V | 3 F |
| 3286.2 | Fe III | 6 F | 3486.6 | Ni VII | 2 F | 3774.9 | Fe VI | 3 F |
| 3287.35 | Fe II | 11 F | 3487.23 | Fe I | 10 F | 3776.1 | Fe VI | 4 F |
| 3289.46 | Fe II | 11 F | 3488.1 | Mg VI | 1 F | 3777.4 | Fe V | 1 F |
| 3289.89 | Fe II | 11 F | 3489.07 | Fe I | 10 F | 3782.9 | Fe V | 3 F |
| 3295.4 | Co VI | 2 F | 3489.98 | Fe II | 26 F | 3794.6 | Fe V | 3 F |

# FINDING LIST

## Forbidden Lines

| I A | | Element | Multiplet No. | I A | | Element | Multiplet No. | I A | | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3796.7 | | S III | 2 F | 4055.5 | | Mn V | 4 F | 4231.56 | | Fe II | 21 F |
| 3798.2 | | Fe V | 1 F | 4059.3 | | F IV | 1 F | 4234.81 | | Fe II | 37 F |
| 3806.34 | | Cu II | 2 F | 4062.2 | | Mn V | 4 F | 4243.98 | | Fe II | 21 F |
| 3810.6 | | Ni IX | 2 F | 4065.7 | | Ni IX | 2 F | 4244.81 | | Fe II | 21 F |
| 3812.07 | | Fe I | 9 F | 4068.62 | N | S II | 1 F | 4249.07 | | Fe II | 36 F |
| 3814.58 | | Fe I | 9 F | 4070.7 | | Fe III | 4 F | 4249.48 | | Ni II | 4 F |
| 3815.1 | | Fe VI | 3 F | 4071.5 | | Fe V | 1 F | 4251.99 | | Cr I | 2 F |
| 3820.2 | | Fe V | 3 F | 4076.22 | N | S II | 1 F | 4262.7 | | Co VII | 2 F |
| 3834.73 | | Fe II | 9 F | 4077.5 | | Fe V | 2 F | 4263? | | Ti VIII | 1 F |
| 3836.89 | | Fe II | 8 F | 4079.7 | | Fe III | 4 F | 4263.07 | | Fe I | 7 F |
| 3838.1 | | Fe V | 1 F | 4080.00 | | Fe II | 24 F | 4263.62 | | Fe I | 8 F |
| 3838.9 | | Fe V | 3 F | 4083.78 | | Fe II | 23 F | 4266.34 | | Fe II | 36 F |
| 3846.46 | | Fe I | 9 F | 4084.32 | | Fe II | 24 F | 4268.67 | | Fe II | 37 F |
| 3847.78 | | Fe II | 8 F | 4086.5 | | Ca XIII | 1 F | 4269.60 | | Fe I | 7 F |
| 3849.1 | | Fe VI | 3 F | 4093.0 | | Fe V | 2 F | 4270.62 | | Fe II | 36 F |
| 3850.3 | | Ni VIII | 2 F | 4096.6 | | Fe III | 4 F | 4274.87 | | Mn II | 6 F |
| 3850.8 | | Fe V | 3 F | 4097? | | K VI | 2 F | 4275.21 | | Mn II | 6 F |
| 3851.63 | | Fe II | 9 F | 4099.29 | | Fe I | 8 F | 4276.83 | | Fe II | 21 F |
| 3856.98 | | Fe I | 9 F | 4103.1 | | Co VII | 2 F | 4278.21 | | Fe I | 7 F |
| 3862.3 | | Ni VIII | 2 F | 4104.59 | | Fe I | 8 F | 4278.97 | | Mn II | 6 F |
| 3866.9 | | Mn VI | 3 F | 4106.1 | | Ni VIII | 2 F | 4280.04 | | Fe I | 8 F |
| 3868.74 | N | Ne III | 1 F | 4107.51 | | Fe I | 7 F | 4285.90 | | Ni II | 4 F |
| 3873.51 | | Fe I | 9 F | 4108.02 | | Fe I | 8 F | 4287.40 | | Fe II | 7 F |
| 3874.07 | | Fe II | 8 F | 4112.7 | | Ni IX | 2 F | 4294.70 | | Ni II | 4 F |
| 3882.73 | | Fe II | 24 F | 4113.42 | | Cr I | 3 F | 4297.8 | | Ni VIII | 1 F |
| 3884.57 | | Fe I | 9 F | 4113.7 | | Mn V | 4 F | 4298.8 | | Ni VIII | 2 F |
| 3889.58 | | Fe I | 9 F | 4114.10 | | Cr I | 3 F | 4302.3 | | Cr V | 3 F |
| 3890.9 | | Fe VI | 3 F | 4114.48 | | Fe II | 23 F | 4305.90 | | Fe II | 21 F |
| 3891.8 | | Fe V | 3 F | 4116.36 | | Cr I | 3 F | 4308.4 | | Mn V | 4 F |
| 3894.40 | | Fe II | 8 F | 4116.60 | | Ti II | 20 F | 4310.46 | | Ni II | 10 F |
| 3895.7 | | Fe V | 1 F | 4117.09 | | Cr I | 3 F | 4314.92 | | Ni II | 10 F |
| 3898.19 | | Fe I | 9 F | 4120.7 | | Mn V | 4 F | 4319.62 | | Fe II | 21 F |
| 3905.62 | | Fe II | 8 F | 4122.6 | | Mn X | 2 F | 4321.92 | | Fe II | 37 F |
| 3911.1 | | Fe V | 3 F | 4123.9 | | Fe V | 2 F | 4326.85 | | Ni II | 3 F |
| 3914.83 | | Sc III | 1 F | 4125? | | K V | 1 F | 4329.43 | | Fe II | 36 F |
| 3917.23 | | Fe I | 9 F | 4129.4 | | Fe III | 4 F | 4331.7 | | Ni IX | 1 F |
| 3917.64 | | Fe I | 9 F | 4129.49 | | Ti II | 20 F | 4331.9 | | Mn V | 3 F |
| 3923.5 | | Fe V | 3 F | 4130.47 | | Fe I | 8 F | 4346.85 | | Fe II | 21 F |
| 3929.35 | | Fe II | 24 F | 4130.7 | | Fe III | 4 F | 4347.35 | | Fe II | 36 F |
| 3931.44 | | Fe II | 8 F | 4131.51 | | Fe II | 24 F | 4351.05 | | Fe II | 36 F |
| 3931.50 | | Fe I | 9 F | 4134.01 | | Fe II | 21 F | 4351.80 | | Fe II | 36 F |
| 3932.72 | | Fe II | 8 F | 4136.4 | | Fe V | 1 F | 4352.78 | | Fe II | 21 F |
| 3937.80 | | Fe II | 8 F | 4139.5 | | Co VII | 2 F | 4356.14 | | Fe II | 22 F |
| 3945.34 | | Sc III | 1 F | 4140.4? | | Ti III | 8 F | 4358.10 | | Fe II | 6 F |
| 3945.70 | | Fe I | 9 F | 4142.5 | | Fe V | 2 F | 4358.37 | | Fe II | 21 F |
| 3946.0 | | Co VIII | 2 F | 4143.17 | | Ni II | 10 F | 4359? | | A XIV | 1 F |
| 3949.27 | | Fe II | 8 F | 4144.3 | | Fe III | 4 F | 4359.34 | | Fe II | 7 F |
| 3967.51 | N | Ne III | 1 F | 4144.8 | | Ti VII | 1 F | 4363.21 | N | O III | 2 F |
| 3968.23 | | Ti II | 11 F | 4144.97 | | Fe I | 7 F | 4365.2 | | Mn V | 3 F |
| 3968.27 | | Fe II | 8 F | 4146.65 | | Fe II | 21 F | 4372.43 | | Fe II | 21 F |
| 3968.66 | | Fe II | 24 F | 4147.21 | | Ti II | 20 F | 4375.71 | | Cu II | 1 F |
| 3970.1 | | Fe V | 1 F | 4147.30 | | Ni II | 10 F | 4377.37 | | Fe I | 6 F |
| 3976.2 | | Fe III | 4 F | 4149.52 | | Cr I | 2 F | 4382.75 | | Fe II | 6 F |
| 3976.97 | | Fe II | 8 F | 4153.72 | | Fe I | 8 F | 4384.21 | | Fe II | 36 F |
| 3979.78 | | Fe II | 9 F | 4156.25 | | Ti II | 20 F | 4387.4 | | Mn IV | 2 F |
| 3979.93 | | Fe II | 8 F | 4157.5 | | F II | 2 F | 4391.1 | | Mn IV | 2 F |
| 3983.08 | | Ti II | 11 F | 4157.89 | | Fe II | 37 F | 4396.9 | | Cr V | 3 F |
| 3986.1 | | Fe XI | 2 F | 4160.9 | | Ti III | 10 F | 4398.4 | | Mn V | 3 F |
| 3986.38 | | Fe II | 8 F | 4163.6? | | Ti III | 8 F | 4402.60 | | Fe II | 36 F |
| 3991.47 | | Cr II | 4 F | 4165.79 | | Cu II | 1 F | 4404.4 | | Ni VIII | 1 F |
| 3991.84 | | Fe II | 8 F | 4166? | | K V | 1 F | 4405.2 | | Mn IV | 2 F |
| 3992.08 | | Cr II | 4 F | 4169.40 | | Ti II | 20 F | 4406.39 | | Fe II | 36 F |
| 3993.29 | | Cr II | 4 F | 4169.41 | | Ti II | 20 F | 4407.16 | | Fe II | 36 F |
| 3993.57 | | Cr II | 4 F | 4175.2 | | Fe V | 2 F | 4407.9 | | Cr IX | 1 F |
| 3993.65 | | Ni II | 4 F | 4177.21 | | Fe II | 21 F | 4408.5 | | Mn IV | 2 F |
| 3995.8 | | Fe VI | 3 F | 4178.93 | | Fe I | 7 F | 4409.86 | | Fe II | 22 F |
| 3996.3 | | Ca V | 2 F | 4178.95 | | Fe II | 23 F | 4413.78 | | Fe II | 7 F |
| 3996.3 | | F IV | 1 F | 4179.45 | | Fe I | 8 F | 4414.45 | | Fe II | 6 F |
| 4003.2 | | Fe V | 1 F | 4181.3 | | Fe V | 1 F | 4416.27 | | Fe II | 6 F |
| 4004.07 | | Ti II | 11 F | 4185.74 | | Fe I | 8 F | 4422.4 | | Co VIII | 2 F |
| 4005.07 | | Ti II | 11 F | 4187.46 | | Ti II | 20 F | 4427.7 | | Mn IV | 2 F |
| 4008.3 | | Fe III | 4 F | 4190.53 | | Fe II | 37 F | 4430.79 | | Ti I | 25 F |
| 4010.91 | | Fe II | 9 F | 4190.6 | | Ni IX | 2 F | 4432.45 | | Fe II | 6 F |
| 4011.2 | | Na V | 1 F | 4196.3 | | Mn V | 4 F | 4432.8 | | Mn V | 3 F |
| 4015.3 | | Na V | 1 F | 4197.81 | | Fe II | 22 F | 4435.08 | | Fe II | 36 F |
| 4017.38 | | Fe II | 24 F | 4198.0 | | Co VIII | 2 F | 4435.1 | | Co VII | 2 F |
| 4017.5 | | Na V | 1 F | 4200.6 | | Ti III | 10 F | 4437.10 | | Fe I | 6 F |
| 4020.20 | | Ti II | 11 F | 4201.56 | | Fe I | 8 F | 4438.92 | | Fe II | 36 F |
| 4021.6 | | Na V | 1 F | 4201.74 | | Ni II | 3 F | 4439.73 | | Fe II | 36 F |
| 4025.80 | | Ni II | 4 F | 4203.39 | | Fe I | 7 F | 4442.0 | | Mn IV | 2 F |
| 4026.6 | | Fe V | 1 F | 4203.5 | | Mn V | 4 F | 4446.2 | | Ni VIII | 1 F |
| 4029.41 | | Fe II | 9 F | 4204.9 | | Co VIII | 2 F | 4452.11 | | Fe II | 7 F |
| 4031.15 | | Ti II | 11 F | 4216.4 | | Ni VIII | 1 F | 4454.37 | | Fe I | 21 F |
| 4032.3 | | Ni VIII | 2 F | 4217.71 | | Fe I | 7 F | 4457.95 | | Fe II | 6 F |
| 4033.56 | | Ni II | 4 F | 4225.9 | | Ni VIII | 1 F | 4458.57 | | Fe I | 6 F |
| 4033.98 | | Fe II | 24 F | 4226.8 | | Fe V | 2 F | 4461.0 | | Co VIII | 1 F |
| 4041.57 | | Ti II | 11 F | 4229.8 | | Fe V | 1 F | 4461.0 | | Mn IV | 2 F |
| 4043.4 | | Ni IX | 1 F | 4229.86 | | Fe I | 7 F | 4461.54 | | Ni II | 10 F |
| 4046.4 | | Fe III | 4 F | 4230.40 | | Fe I | 8 F | 4466.33 | | Ni II | 10 F |
| 4052.5 | | Ni VIII | 1 F | 4231.4 | | Ni XII | 1 F | 4468? | | Ti VIII | 1 F |

## Forbidden Lines

| I A | Element | Multiplet No. | I A | Element | Multiplet No. | I A | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|
| 4470.29 | Fe II | 6 F | 4658.1 | Fe III | 3 F | 4874.21 | V II | 8 F |
| 4472.37 | Ti I | 19 F | 4662.7 | Mn IV | 1 F | 4874.49 | Fe II | 20 F |
| 4473.46 | Fe I | 6 F | 4664.45 | Fe II | 4 F | 4876.0 | Cr III | 3 F |
| 4474.91 | Fe II | 7 F | 4664.97 | Fe II | 5 F | 4877.01 | Ti II | 10 F |
| 4475.0 | Co VII | 2 F | 4665.5 | Co VII | 2 F | 4880.00 | V II | 8 F |
| 4477.91 | Ti I | 19 F | 4665.65 | Fe II | 4 F | 4881.0 | Fe III | 2 F |
| 4478.8 | Mn IV | 1 F | 4667.0 | Fe III | 3 F | 4881.87 | Mn II | 5 F |
| 4480.6 | Mn IV | 2 F | 4669.5 | P II | 2 F | 4883.9 | Fe III | 1 F |
| 4484.84 | Ti I | 19 F | 4672.2 | Sc VI | 1 F | 4886.56 | Fe I | 4 F |
| 4485.87 | Ni II | 3 F | 4674.64 | Fe I | 21 F | 4887.27 | Cr II | 15 F |
| 4486.35 | Ti I | 19 F | 4677.94 | Fe I | 21 F | 4889.49 | Mn II | 5 F |
| 4488.75 | Fe II | 6 F | 4680.05 | Fe I | 5 F | 4889.63 | Fe II | 4 F |
| 4488.76 | Ti I | 19 F | 4685.99 | Fe I | 21 F | 4889.70 | Fe II | 3 F |
| 4492.3 | Co VIII | 2 F | 4687.56 | Fe II | 5 F | 4893.9 | Fe VII | 2 F |
| 4492.64 | Fe II | 6 F | 4692.6 | Co VII | 1 F | 4894.1 | Cr III | 3 F |
| 4493.23 | Fe I | 5 F | 4693.56 | Fe I | 5 F | 4894.8 | Cr IV | 4 F |
| 4493.3 | Ni VIII | 1 F | 4694.59 | Fe I | 5 F | 4896.65 | Mn II | 5 F |
| 4494.57 | Fe I | 6 F | 4699.0 | Fe VII | 2 F | 4896.87 | V II | 8 F |
| 4495.3 | Mn IV | 2 F | 4699.3 | Mn IV | 1 F | 4897.21 | V II | 8 F |
| 4496.21 | Ti I | 19 F | 4701.5 | Fe III | 3 F | 4898.49 | Ti I | 13 F |
| 4497.23 | Ti I | 19 F | 4711.4 | A IV | 1 F | 4898.64 | V II | 8 F |
| 4497.4 | Mn IV | 1 F | 4711.86 | Fe I | 21 F | 4899.4 | Cr IV | 4 F |
| 4498.90 | Ti I | 19 F | 4714? | Ne IV | 1 F | 4901.1 | Co VII | 1 F |
| 4500.00 | Ti I | 19 F | 4715.21 | Fe I | 21 F | 4905.35 | Fe II | 20 F |
| 4501.36 | Ti I | 19 F | 4716? | Ne IV | 1 F | 4907.6 | Cr IV | 5 F |
| 4504.71 | Ti I | 19 F | 4716.36 | Fe II | 5 F | 4908.8 | Mn IV | 1 F |
| 4505.9 | Co VII | 1 F | 4717? | Ne IV | 1 F | 4911.9 | Cr III | 3 F |
| 4506.9 | S I | 2 F | 4719.7 | Mn IV | 1 F | 4912.82 | Ca I | 1 F |
| 4508.52 | Ti I | 19 F | 4720? | Ne IV | 1 F | 4916.18 | Ca I | 1 F |
| 4509.61 | Fe II | 6 F | 4723.39 | Fe I | 21 F | 4916.26 | Fe I | 4 F |
| 4509.85 | Ti I | 19 F | 4728.07 | Fe II | 4 F | 4916.81 | Ti II | 23 F |
| 4510.63 | Fe I | 6 F | 4733.9 | Fe III | 3 F | 4917.22 | Fe II | 3 F |
| 4511.0 | K IV | 2 F | 4734 | V VIII | 1 F | 4923.05 | V II | 7 F |
| 4514.90 | Fe II | 6 F | 4736.6 | P II | 2 F | 4924.5 | Fe III | 2 F |
| 4515.52 | Ti I | 19 F | 4738.9 | Co VII | 1 F | 4924.81 | Cr II | 15 F |
| 4516.60 | Fe I | 6 F | 4740.3 | A IV | 1 F | 4925.84 | Ti II | 23 F |
| 4517.36 | Ti I | 19 F | 4745.49 | Fe II | 20 F | 4928.68 | V II | 8 F |
| 4521.76 | Ti I | 19 F | 4750.57 | Fe II | 5 F | 4928.9 | Cr III | 3 F |
| 4523.16 | Ni I | 3 F | 4751.75 | Fe I | 4 F | 4930.5 | Fe III | 1 F |
| 4523.6 | Cr V | 3 F | 4754.7 | Fe III | 3 F | 4931.8 | O III | 1 F |
| 4526.55 | Ti I | 19 F | 4761.9 | Mn IV | 1 F | 4936.4 | Fe III | 1 F |
| 4528.3 | Mn IV | 2 F | 4769.4 | Fe III | 3 F | 4938.6 | Ca VII | 1 F |
| 4528.39 | Fe II | 6 F | 4771.54 | Ti II | 10 F | 4940.22 | V II | 7 F |
| 4528.7 | Mn V | 3 F | 4772.07 | Fe II | 4 F | 4942.3 | Fe VII | 2 F |
| 4532.09 | Fe I | 6 F | 4772.4 | Ni VIII | 1 F | 4942.95 | Fe I | 4 F |
| 4533.00 | Fe II | 6 F | 4774.74 | Fe II | 20 F | 4946.76 | Ti I | 12 F |
| 4535.7 | Mn IV | 1 F | 4777.7 | Fe III | 3 F | 4947.17 | Cr II | 15 F |
| 4536.05 | Ti I | 19 F | 4779? | Ti VIII | 1 F | 4947.38 | Fe II | 20 F |
| 4544.36 | Fe I | 5 F | 4785.21 | Ti II | 10 F | 4950.74 | Fe II | 20 F |
| 4545? | Ti VIII | 1 F | 4785.9 | Co VIII | 1 F | 4956.35 | Fe I | 4 F |
| 4545.20 | Fe I | 21 F | 4789.19 | Fe I | 4 F | 4958.23 | Fe II | 4 F |
| 4548.3 | Be I | 1 F | 4789.5 | F II | 1 F | 4958.91 N | O III | 1 F |
| 4548.32 | Fe I | 21 F | 4793.03 | Ti II | 10 F | 4961.18 | Fe I | 4 F |
| 4548.5 | Mn IV | 2 F | 4798.28 | Fe II | 4 F | 4965.31 | V II | 7 F |
| 4550.48 | Fe II | 6 F | 4799.31 | Fe II | 4 F | 4965.6 | Cr III | 3 F |
| 4550.64 | Fe I | 6 F | 4799.4 | Cr IV | 5 F | 4965.78 | Fe II | 3 F |
| 4551.98 | Fe II | 6 F | 4799.5 | Fe III | 3 F | 4968.65 | V II | 7 F |
| 4554.49 | Fe I | 6 F | 4806.83 | Ti II | 10 F | 4968.8 | Fe VI | 2 F |
| 4555.01 | Fe II | 6 F | 4807.5 | Fe VI | 2 F | 4969.3 | Cr IV | 5 F |
| 4563.7 | Mn IV | 2 F | 4813.27 | Ni I | 3 F | 4971.8 | Cr IV | 4 F |
| 4564.7 | Co VIII | 2 F | 4813.9 | Fe III | 3 F | 4973.39 | Fe II | 20 F |
| 4573.23 | Fe I | 6 F | 4814.0 | Cr IV | 5 F | 4974.0 | Fe VI | 2 F |
| 4573.45 | Ni II | 10 F | 4814.55 | Fe II | 20 F | 4976.33 | V II | 7 F |
| 4573.9 | Fe III | 3 F | 4823.3 | Mn IV | 1 F | 4976.5 | Cr IV | 4 F |
| 4573.93 | Cr I | 1 F | 4823.44 | Ti II | 10 F | 4982.73 | Ti II | 23 F |
| 4575.46 | Ca I | 2 F | 4824? | Sc VII | 1 F | 4982.92 | Ti I | 11 F |
| 4575.84 | Cr I | 1 F | 4824.1 | Fe III | 3 F | 4983.42 | Fe I | 4 F |
| 4577.32 | Cr I | 1 F | 4835.4 | Cr III | 3 F | 4985.27 | V II | 7 F |
| 4578.83 | Fe I | 5 F | 4837.42 | Ti II | 10 F | 4985.64 | Cr II | 15 F |
| 4580.80 | Cr II | 3 F | 4838.7 | Cr IV | 4 F | 4985.9 | Fe III | 2 F |
| 4580.88 | Cr II | 3 F | 4842.4 | Cr III | 3 F | 4987? | Sc VII | 1 F |
| 4581.18 | Cr II | 3 F | 4843.1 | Cr IV | 4 F | 4987.2 | Fe III | 2 F |
| 4589.0 | S I | 2 F | 4843.34 | Fe I | 4 F | 4987.68 | Ti II | 19 F |
| 4591.4 | Mn IV | 1 F | 4843.51 | Fe II | 3 F | 4988.75 | Ti I | 12 F |
| 4598.07 | Fe II | 4 F | 4847.01 | Ti I | 13 F | 4989.4 | Fe VII | 2 F |
| 4603.66 | Fe I | 5 F | 4847.58 | Fe I | 4 F | 4992.68 | Cr II | 2 F |
| 4604.48 | Fe II | 5 F | 4850.9 | Fe VI | 2 F | 5002.01 | Fe I | 4 F |
| 4607.0 | Fe III | 3 F | 4851.6 | Co VII | 1 F | 5002.63 | Ti II | 19 F |
| 4610? | A V | 2 F | 4852.73 | Fe II | 20 F | 5002.88 | V II | 7 F |
| 4618.97 | Fe I | 21 F | 4857.50 | V II | 8 F | 5005.52 | Fe II | 20 F |
| 4621.5 | C I | 2 F | 4858.4 | Co VII | 1 F | 5006.63 | Ti II | 19 F |
| 4622.19 | Fe I | 21 F | 4859.87 | Cr II | 15 F | 5006.65 | Fe II | 4 F |
| 4627.3 | C I | 2 F | 4861.41 | Ti II | 23 F | 5006.84 N | O III | 1 F |
| 4630.06 | Fe I | 21 F | 4862.80 | Ti II | 10 F | 5011.3 | Fe III | 1 F |
| 4631.93 | Fe I | 5 F | 4863.9 | Mn IV | 1 F | 5014.37 | Fe I | 4 F |
| 4632.27 | Fe II | 5 F | 4869.3 | F II | 1 F | 5020.24 | Fe II | 20 F |
| 4639.68 | Fe II | 4 F | 4870.8 | Cr III | 3 F | 5021.69 | Ti II | 19 F |
| 4640.05 | Fe I | 5 F | 4871.43 | V II | 8 F | 5025.53 | Ti I | 11 F |
| 4644.2 | Ni VIII | 1 F | 4872.80 | V II | 8 F | 5027.34 | Ni I | 3 F |
| 4652.2 | Co VII | 1 F | 4873.4 | Cr IV | 5 F | 5032.69 | Ti II | 19 F |

# FINDING LIST

## Forbidden Lines

| I A | | Element | Multiplet No. | I A | | Element | Multiplet No. | I A | | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5032.7 | | Fe III | 2 F | 5227.25 | | V II | 6 F | 5428.6 | | Fe VI | 1 F |
| 5034.05 | | Cr II | 15 F | 5228.44 | | Cr II | 13 F | 5431.39 | | Ni II | 9 F |
| 5035.50 | | Fe II | 4 F | 5229.06 | | Zr II | 7 F | 5432.1 | | Cr III | 2 F |
| 5036.55 | | Fe II | 3 F | 5235.07 | | V II | 6 F | 5433.15 | | Fe II | 18 F |
| 5039.10 | | Fe II | 19 F | 5236.6 | | Fe VI | 1 F | 5433.69 | | Zr III | 1 F |
| 5043.30 | | Ti I | 12 F | 5237.7 | | V IV | 3 F | 5434.30 | | Zr II | 6 F |
| 5043.53 | | Fe II | 20 F | 5238.35 | | Cr II | 13 F | 5435.6 | | Cr III | 2 F |
| 5045? | | Sc VII | 1 F | 5239.47 | | Cr I | 15 F | 5439.72 | | Fe I | 3 F |
| 5047.91 | | Ti II | 19 F | 5242.00 | | Cr II | 13 F | 5439.9 | | Fe III | 1 F |
| 5049.29 | | Fe II | 20 F | 5245.25 | | V II | 6 F | 5440.45 | | Fe II | 16 F |
| 5049.73 | | Cr II | 2 F | 5247.84 | | Cr II | 13 F | 5442.82 | | Cr II | 12 F |
| 5056.5 | | Ni IX | 1 F | 5248.64 | | Cr II | 14 F | 5446.0 | | V IV | 3 F |
| 5060.3 | | Fe III | 1 F | 5254.49 | | V II | 6 F | 5449.43 | | Cr II | 12 F |
| 5063.7 | | Fe III | 2 F | 5255.97 | | Cr II | 13 F | 5453.4 | | Cr III | 2 F |
| 5065.43 | | Ti II | 19 F | 5261.61 | | Fe II | 19 F | 5460.0 | | Ca VI | 2 F |
| 5071.6 | | Cr IV | 4 F | 5268.4 | | Co VIII | 1 F | 5466.67 | | Ti I | 9 F |
| 5072.40 | | Fe II | 19 F | 5268.82 | | Fe I | 19 F | 5470.51 | | Cr II | 12 F |
| 5074.90 | | Fe I | 19 F | 5268.88 | | Fe II | 18 F | 5471.3 | | Cr III | 2 F |
| 5076.3 | | Co VII | 1 F | 5269.16 | | Ni II | 14 F | 5472.09 | | V II | 5 F |
| 5076.57 | | Fe II | 20 F | 5270.19 | | Cr II | 13 F | 5473.37 | | Mn II | 9 F |
| 5080.84 | | Ti II | 19 F | 5270.4 | | Fe III | 1 F | 5473.94 | | Mn II | 9 F |
| 5082.54 | | Cr I | 16 F | 5273.38 | | Fe II | 18 F | 5475.59 | | V II | 5 F |
| 5083.72 | | Fe II | 35 F | 5274.27 | | Ni II | 9 F | 5477.25 | | Fe II | 34 F |
| 5084.8 | | Fe III | 1 F | 5275.83 | | Ni II | 14 F | 5477.40 | | Fe I | 20 F |
| 5086.52 | | Fe II | 3 F | 5276.1 | | Fe VII | 2 F | 5478.76 | | V II | 5 F |
| 5092.60 | | Cr II | 2 F | 5278.39 | | Fe II | 35 F | 5481.17 | | Fe I | 20 F |
| 5092.97 | | Cr I | 8 F | 5279.2 | | Fe VI | 1 F | 5482.91 | | V II | 5 F |
| 5098.44 | | Cr I | 16 F | 5279.80 | | Cr II | 13 F | 5483.3 | | Cr III | 2 F |
| 5100.4 | | Fe VI | 1 F | 5280.25 | | Fe II | 16 F | 5485.7 | | Fe VI | 1 F |
| 5104.5 | | Ti VII | 1 F | 5281.46 | | Ni II | 9 F | 5493.10 | | V II | 20 F |
| 5105.16 | | Cr I | 8 F | 5282.88 | | V II | 6 F | 5494.80 | | Mn II | 9 F |
| 5107.95 | | Fe II | 18 F | 5283.11 | | Fe II | 35 F | 5495.42 | | Zr II | 7 F |
| 5108.53 | | Cr I | 8 F | 5285.21 | | Cr II | 13 F | 5495.82 | | Fe II | 17 F |
| 5108.57 | | Cr II | 14 F | 5285.34 | | Cr I | 15 F | 5496.84 | | V II | 5 F |
| 5111.63 | | Fe II | 19 F | 5286.31 | | Ti I | 10 F | 5504.22 | | V II | 5 F |
| 5116.03 | C | Ni XIII | 1 F | 5288.83 | | Cr II | 12 F | 5505.1 | | Cr III | 2 F |
| 5116.3 | | Ni XIII | 1 F | 5289.66 | | Fe I | 19 F | 5505.25 | | Cr II | 12 F |
| 5118.07 | | Zr III | 1 F | 5290.75 | | Fe I | 20 F | 5509.51 | | Ti I | 7 F |
| 5119.47 | | Cr II | 2 F | 5295.70 | | Fe II | 17 F | 5509.63 | | V II | 5 F |
| 5122.88 | | Zr II | 7 F | 5296.3 | | Cr IV | 3 F | 5517.2 | | Cl III | 1 F |
| 5124.41 | | Cr I | 16 F | 5296.84 | | Fe II | 19 F | 5517.24 | | Zr III | 1 F |
| 5126.25 | | Cr I | 16 F | 5299.42 | | Cr II | 13 F | 5518.00 | | Ti I | 9 F |
| 5127.09 | | Cr II | 14 F | 5302.86 | C | Fe XIV | 1 F | 5520.18 | | Zr II | 7 F |
| 5134.16 | | Cr I | 15 F | 5303.37 | | Zr III | 1 F | 5523.28 | | Fe II | 33 F |
| 5136.3 | | Co VII | 1 F | 5303.6 | | Fe XIV | 1 F | 5523.3 | | Cr III | 2 F |
| 5144.39 | | Zr II | 7 F | 5303.99 | | Fe I | 3 F | 5527.33 | | Fe II | 17 F |
| 5145.5 | | Cr IV | 3 F | 5304.06 | | Fe I | 20 F | 5527.61 | | Fe II | 34 F |
| 5145.55 | | Cr I | 15 F | 5308.68 | | Cr II | 12 F | 5527.92 | | V II | 5 F |
| 5146.8 | | Fe VI | 2 F | 5308.9 | | Ca V | 1 F | 5528.87 | | Zr II | 6 F |
| 5147.16 | | Fe I | 19 F | 5310.36 | | Ti I | 10 F | 5530.11 | | Mn II | 9 F |
| 5150.07 | | Cr I | 15 F | 5312.52 | | Ti I | 10 F | 5530.69 | | Mn II | 9 F |
| 5151.9 | | Fe III | 1 F | 5313.88 | | Cr II | 13 F | 5532.41 | | Fe I | 20 F |
| 5154.28 | | Cr I | 16 F | 5316.97 | | Zr III | 1 F | 5534.6 | | A X | 1 F |
| 5157.59 | | Cr II | 14 F | 5322.2 | | Cl IV | 3 F | 5535.09 | | Ti I | 7 F |
| 5158.00 | | Fe II | 18 F | 5323.64 | | Cr II | 13 F | 5536.98 | | Mn II | 9 F |
| 5158.3 | | Fe VII | 2 F | 5326.5 | | V IV | 3 F | 5537.7 | | Cl III | 1 F |
| 5158.81 | | Fe II | 19 F | 5331.46 | | Zr II | 7 F | 5539.6 | | Sc VI | 1 F |
| 5162.53 | | Cr I | 15 F | 5332.4 | | P I | 2 F | 5539.74 | | Zr III | 1 F |
| 5163.94 | | Fe II | 35 F | 5333.65 | | Fe II | 19 F | 5541.7 | | Mn VI | 2 F |
| 5165.98 | | Cr I | 15 F | 5334.30 | | Ti I | 10 F | 5542.54 | | Ti I | 8 F |
| 5170.84 | | Fe I | 3 F | 5336.4 | | Fe VI | 1 F | 5543.9 | | Mn V | 2 F |
| 5174.95 | | Cr II | 14 F | 5339.65 | | Cr II | 13 F | 5545.88 | | Fe II | 33 F |
| 5177.0 | | Fe VI | 2 F | 5339.7 | | P I | 2 F | 5546.59 | | Fe II | 2 F |
| 5180.78 | | Fe I | 20 F | 5341.39 | | Cr II | 12 F | 5549.49 | | V II | 5 F |
| 5181.21 | | Cr I | 15 F | 5347.67 | | Fe II | 18 F | 5550.25 | | V II | 14 F |
| 5181.97 | | Fe II | 18 F | 5352.29 | | Fe I | 20 F | 5550.3 | | Cr III | 2 F |
| 5182.71 | | Cr I | 16 F | 5354.15 | | Cr II | 13 F | 5551.31 | | Fe II | 39 F |
| 5184.80 | | Fe II | 19 F | 5354.76 | | Zr II | 7 F | 5552.93 | | Cr II | 12 F |
| 5185 | | Co XI | 1 F | 5355.9 | | Fe III | 1 F | 5554.68 | | V II | 20 F |
| 5191.4 | N | A III | 3 F | 5356.32 | | Fe I | 3 F | 5555.33 | | Ti I | 7 F |
| 5193.13 | | Fe I | 19 F | 5358.79 | | Ti I | 10 F | 5556.31 | | Fe II | 18 F |
| 5193.82 | | Cr I | 15 F | 5362.06 | | Fe II | 17 F | 5557.14 | | Cr II | 12 F |
| 5194.19 | | Fe I | 20 F | 5363.91 | | Fe I | 20 F | 5561.21 | | Mn II | 9 F |
| 5197.31 | | Cr I | 15 F | 5368.91 | | Cr II | 13 F | 5561.66 | | Ti I | 7 F |
| 5198.5 | | N I | 1 F | 5370.5 | | Fe VI | 2 F | 5562.94 | | Ti I | 8 F |
| 5199.18 | | Fe II | 35 F | 5374.6 | | Mn VI | 2 F | 5565.68 | | Fe I | 3 F |
| 5200.7 | | N I | 1 F | 5376.47 | | Fe II | 19 F | 5567.08 | | Mn II | 9 F |
| 5206.02 | | Cr II | 14 F | 5382.26 | | Fe I | 3 F | 5572.6 | | Cr III | 2 F |
| 5206.84 | | Zr II | 7 F | 5386.27 | | Cr II | 12 F | 5573.84 | | V II | 14 F |
| 5209.1 | | Cr IV | 3 F | 5394.78 | | Mn II | 9 F | 5574.04 | | Mn II | 9 F |
| 5212.95 | | Fe I | 19 F | 5396.71 | | Ti I | 10 F | 5575.69 | | V II | 14 F |
| 5216.07 | | V II | 6 F | 5404.80 | | Fe I | 20 F | 5577.350 | A | O I | 3 F |
| 5219.02 | | Cr II | 13 F | 5412.0 | | Fe III | 1 F | 5579.06 | | Cr II | 12 F |
| 5220.06 | | Fe II | 19 F | 5412.64 | | Fe II | 17 F | 5579.65 | | V II | 14 F |
| 5220.56 | | Fe I | 3 F | 5412.97 | | Fe I | 20 F | 5579.73 | | Mn II | 9 F |
| 5224? | | Sc VII | 1 F | 5413.34 | | Fe II | 16 F | 5580.82 | | Fe II | 39 F |
| 5224.15 | | Fe I | 3 F | 5415.04 | | Mn II | 9 F | 5582.01 | | Fe II | 2 F |
| 5224.30 | | Cr II | 13 F | 5418.0 | | Cr III | 2 F | 5584.81 | | Ti I | 9 F |
| 5225.90 | | V II | 6 F | 5425.3 | | Fe VI | 1 F | 5587.2 | | Ca VI | 2 F |
| 5228.64 | | Cr I | 15 F | 5427.17 | | Fe I | 20 F | 5587.73 | | Ti I | 7 F |

# FINDING LIST

## Forbidden Lines

| I A | | Element | Multiplet No. | I A | | Element | Multiplet No. | I A | | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5588.15 | | Fe II | 39 F | 5832.40 | | Eu II | 2 F | 6100.26 | | Fe I | 30 F |
| 5591.3 | | Cr III | 2 F | 5834.64 | | Fe I | 2 F | 6101.1 | | K IV | 1 F |
| 5591.9 | | Mn V | 2 F | 5836.21 | | Cr I | 14 F | 6104.67 | | Cr I | 12 F |
| 5595.31 | | Ti I | 8 F | 5843.6 | | Cr III | 1 F | 6104.8 | | V III | 3 F |
| 5600.1 | | Cr III | 1 F | 5843.90 | | Fe II | 34 F | 6106.17 | | Cr I | 12 F |
| 5600.66 | | Fe II | 33 F | 5846.3 | | Xe III | 2 F | 6111.14 | | Cr I | 12 F |
| 5601.6 | | Mn VI | 2 F | 5852.48 | | Cr I | 14 F | 6112.75 | | Cr I | 12 F |
| 5603.2 | | K VI | 1 F | 5852.8 | | Co II | 2 F | 6113.40 | | Fe I | 17 F |
| 5606.36 | | V II | 14 F | 5855.37 | | Zr II | 6 F | 6113.97 | | Fe I | 30 F |
| 5609.27 | | Fe I | 31 F | 5863.1 | | Mn V | 2 F | 6114.52 | | Fe I | 18 F |
| 5611.94 | | V II | 14 F | 5867.17 | | Fe I | 2 F | 6114.66 | | Cr I | 12 F |
| 5613.81 | | V II | 14 F | 5867.87 | | Ti I | 6 F | 6114.85 | | V II | 19 F |
| 5614.62 | | Ti I | 8 F | 5868.3 | | Mn V | 1 F | 6117.60 | | Cr I | 11 F |
| 5615.19 | | Cr II | 12 F | 5872.77 | | Fe I | 2 F | 6124.57 | | Ti II | 22 F |
| 5615.8 | | Ca VII | 1 F | 5876.23 | | Cr I | 14 F | 6140.20 | | Cr I | 11 F |
| 5618.9 | | Cr III | 1 F | 5876.92 | | Cr I | 14 F | 6147.13 | | Ti II | 22 F |
| 5625.0 | | Mn VI | 2 F | 5879.32 | | Eu II | 2 F | 6151.82 | | Ti II | 26 F |
| 5625.4 | | Co II | 2 F | 5884.9 | | Cr III | 1 F | 6152.9 | | Cl II | 3 F |
| 5629.54 | | Ti I | 7 F | 5889.0 | | Mn V | 2 F | 6159.3 | | Mn V | 1 F |
| 5630.85 | | Ti I | 8 F | 5893.89 | | Fe I | 17 F | 6159.3 | | V III | 3 F |
| 5631.0 | | Ca VI | 2 F | 5898.30 | | Fe I | 2 F | 6160.1 | | V III | 3 F |
| 5631.6 | | Fe VI | 1 F | 5900.64 | | Zr II | 12 F | 6164.64 | | Ti II | 26 F |
| 5634.78 | | V II | 20 F | 5901.26 | | Fe II | 34 F | 6165.35 | | Zr II | 12 F |
| 5639.55 | | Fe I | 2 F | 5902.64 | | Fe I | 18 F | 6167.7 | | Mn V | 1 F |
| 5643.02 | | Zr III | 1 F | 5907.1 | | Mn VI | 2 F | 6167.84 | | Cr I | 12 F |
| 5643.44 | | Fe II | 39 F | 5913.34 | | Cr I | 13 F | 6169.37 | | Cr I | 12 F |
| 5644.00 | | Fe II | 18 F | 5926.18 | | Cr I | 14 F | 6172.91 | | Ti II | 28 F |
| 5648? | | Ca XV | 1 F | 5929.20 | | Zr II | 12 F | 6174.44 | | Cr I | 12 F |
| 5649.67 | | Fe II | 39 F | 5929.31 | | Eu II | 2 F | 6176.08 | | Cr I | 12 F |
| 5650.39 | | Fe II | 2 F | 5931.19 | | Fe I | 17 F | 6177.21 | | Fe I | 17 F |
| 5650.94 | | Fe II | 39 F | 5932.88 | | Zr II | 6 F | 6178.35 | | Fe I | 18 F |
| 5654.85 | | Fe II | 17 F | 5933.4 | | Mn VI | 1 F | 6180.9 | | Co II | 2 F |
| 5656.39 | | Fe I | 3 F | 5934.41 | | Fe I | 2 F | 6184.51 | | Cr I | 11 F |
| 5659.83 | | Fe II | 33 F | 5934.73 | | Cr I | 14 F | 6188.55 | | Fe II | 44 F |
| 5662.62 | | V II | 14 F | 5936.99 | | Fe I | 2 F | 6193.7 | | Zr III | 3 F |
| 5664.02 | | Ti I | 8 F | 5943.2 | | Co II | 2 F | 6196.53 | | Zr II | 12 F |
| 5669.58 | | Zr II | 6 F | 5945.1 | | Cr III | 1 F | 6196.75 | | Fe I | 17 F |
| 5675.73 | | Zr II | 6 F | 5946.87 | | Fe I | 30 F | 6215.6 | | V III | 3 F |
| 5678.0 | | Fe VI | 1 F | 5949.99 | | Cr I | 13 F | 6220.7 | | Mn V | 1 F |
| 5679.3 | | Mn VI | 1 F | 5951.24 | | Cr I | 14 F | 6223.4 | | K V | 2 F |
| 5683.56 | | Fe II | 33 F | 5952.21 | | Fe I | 30 F | 6226.64 | | Fe I | 17 F |
| 5689.3 | | Cr III | 1 F | 5955.61 | | Fe I | 18 F | 6227.19 | | Ti II | 22 F |
| 5694.8 | | Mn V | 2 F | 5968.87 | | Fe I | 2 F | 6229.2 | | K VI | 1 F |
| 5696.36 | | Fe I | 2 F | 5971.33 | | Fe I | 17 F | 6230.4 | | Cr V | 2 F |
| 5699.57 | | Ti I | 6 F | 5971.6 | | Co II | 2 F | 6231.27 | | Fe I | 29 F |
| 5703.3 | | Mn V | 2 F | 5972.59 | | Cr I | 13 F | 6233.9 | | V III | 3 F |
| 5703.64 | | Ni II | 14 F | 5975.39 | | Cr I | 13 F | 6249.35 | | Cr I | 11 F |
| 5708.96 | | Fe I | 2 F | 5982.55 | | Cr I | 7 F | 6249.75 | | Cr I | 12 F |
| 5711.46 | | Ni II | 14 F | 5983.99 | | Cr I | 7 F | 6250.51 | | Ti II | 22 F |
| 5712.7 | | Cr III | 1 F | 5988.76 | | Cr I | 7 F | 6251.33 | | Cr I | 12 F |
| 5713.35 | | Fe II | 2 F | 5990.31 | | Cr I | 7 F | 6258.22 | | Cr I | 12 F |
| 5715.94 | | Fe I | 3 F | 5991.0 | | Mn V | 1 F | 6277.3 | | Mn VI | 1 F |
| 5720.9 | | Fe VII | 1 F | 5992.15 | | Cr I | 7 F | 6280.22 | | Cr I | 6 F |
| 5721.2 | | F III | 1 F | 5999.99 | | Fe I | 2 F | 6300.23 | L | O I | 1 F |
| 5721.35 | | Fe II | 33 F | 6007.34 | | Ni II | 8 F | 6310.2 | | S III | 3 F |
| 5724.62 | | Fe II | 39 F | 6010.53 | | Cr I | 14 F | 6314.58 | | Zr II | 17 F |
| 5725.92 | | Fe II | 39 F | 6013.28 | | Ti II | 9 F | 6316.6 | | K V | 2 F |
| 5733.0 | | F II | 1 F | 6015.26 | | Zr II | 12 F | 6317.64 | | Zr II | 11 F |
| 5737.59 | | Ti I | 6 F | 6016.15 | | Fe I | 18 F | 6328.46 | | Ti II | 31 F |
| 5741.11 | | Fe II | 33 F | 6018.54 | | Fe I | 17 F | 6333.46 | | Cr I | 11 F |
| 5742.07 | | Fe I | 17 F | 6019.63 | | Fe I | 18 F | 6339.70 | | Fe II | 15 F |
| 5745.49 | | Fe I | 3 F | 6026.18 | | Cr I | 13 F | 6342.98 | | Cr I | 11 F |
| 5745.70 | | Fe II | 17 F | 6029.7 | | Mn V | 1 F | 6344.56 | | Zr II | 12 F |
| 5746.96 | | Fe II | 34 F | 6040.31 | | V II | 19 F | 6346.2 | | Mn V | 1 F |
| 5746.99 | | Fe I | 30 F | 6040.94 | | Cr I | 12 F | 6349.5 | | K V | 2 F |
| 5750.95 | | Fe II | 2 F | 6044.94 | | Zr II | 12 F | 6360.66 | | Ti II | 18 F |
| 5753.83 | | Fe II | 33 F | 6045.80 | | Cr I | 12 F | 6363.88 | L | O I | 1 F |
| 5754.8 | N | N II | 3 F | 6047.46 | | Ti II | 9 F | 6365.52 | | Ni II | 8 F |
| 5755.39 | | Ti I | 6 F | 6049.37 | | Cr I | 13 F | 6367.28 | | Cr I | 11 F |
| 5755.60 | | Ti I | 6 F | 6053.14 | | Ti II | 9 F | 6372.11 | | V II | 13 F |
| 5766.4 | | Ca VI | 2 F | 6059.21 | | Cr I | 6 F | 6372.9 | | Fe X | 1 F |
| 5773.51 | | Zr III | 1 F | 6061.50 | | Cr I | 12 F | 6374.51 | C | Fe X | 1 F |
| 5775.05 | | Fe I | 2 F | 6062.98 | | Cr I | 12 F | 6376.6 | | Cr V | 2 F |
| 5778.35 | | Fe II | 33 F | 6065.2 | | V III | 4 F | 6377.59 | | Zr II | 12 F |
| 5778.97 | | Zr II | 6 F | 6065.34 | | Ti II | 26 F | 6377.83 | | Ti II | 31 F |
| 5780.29 | | Cr I | 14 F | 6067.88 | | Cr I | 12 F | 6381.13 | | V II | 13 F |
| 5783.4 | | Mn VI | 2 F | 6069.2 | | Mn V | 2 F | 6382.03 | | V II | 13 F |
| 5785.4 | | Cr III | 1 F | 6071.35 | | Cr I | 12 F | 6391.51 | | Ti II | 18 F |
| 5794.16 | | Ti I | 6 F | 6077.80 | | Ti II | 26 F | 6393.72 | | Fe I | 29 F |
| 5795.58 | | Cr I | 14 F | 6083.2 | | Co II | 2 F | 6396.2 | | Mn V | 1 F |
| 5796.28 | | Eu II | 2 F | 6085.5 | | Fe VII | 1 F | 6396.30 | | Fe II | 44 F |
| 5799.53 | | Fe I | 31 F | 6085.9 | | Ca V | 1 F | 6404.46 | | Ni I | 2 F |
| 5804.45 | | Fe I | 2 F | 6087.77 | | Ti II | 9 F | 6405.27 | | Ti II | 18 F |
| 5809.43 | | Fe II | 33 F | 6088.5 | | Mn V | 1 F | 6405.67 | | V II | 13 F |
| 5812.53 | | Ti I | 6 F | 6093.32 | | Fe I | 17 F | 6408.5 | | Zr VI | 1 F |
| 5815.53 | | Fe I | 17 F | 6094.65 | | Fe I | 30 F | 6409.46 | | Ti II | 31 F |
| 5815.79 | | Cr I | 14 F | 6095.96 | | Ti II | 9 F | 6414.93 | | Cr I | 11 F |
| 5819.54 | | Cr I | 14 F | 6096.3 | | Fe III | 10 F | 6415.69 | | V II | 13 F |
| 5823.2 | | Cr III | 1 F | 6098.1 | | V III | 4 F | 6418.86 | | Zr II | 17 F |
| 5828.12 | | Ti I | 6 F | 6099.31 | | Fe I | 17 F | 6420.88 | | Cr I | 6 F |

# FINDING LIST

## Forbidden Lines

| I A | | Element | Multiplet No. | I A | | Element | Multiplet No. | I A | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|---|---|
| 6422.66 | | Ti II | 31 F | 6729.85 | | Fe II | 31 F | 7093.98 | Fe II | 31 F |
| 6423.45 | | Mn II | 8 F | 6730.25 | | Ni I | 5 F | 7102.84 | Ni II | 13 F |
| 6430.7 | | Cr V | 2 F | 6730.99 | | Fe I | 16 F | 7107.04 | Fe I | 27 F |
| 6431.11 | | V II | 13 F | 6731.2 | | Cr IV | 2 F | 7109.01 | Fe I | 28 F |
| 6434.04 | | Ti II | 18 F | 6731.3 | | S II | 2 F | 7110.54 | Zr II | 4 F |
| 6434.9 | | A V | 1 F | 6738.40 | | Sr II | 1 F | 7111.4 | Cr IV | 1 F |
| 6436.55 | | Ti II | 18 F | 6739.63 | | Ti I | 5 F | 7115.47 | Ti II | 17 F |
| 6437.70 | | Ni I | 5 F | 6739.91 | | Y II | 2 F | 7117.45 | Cr I | 10 F |
| 6440.40 | | Fe II | 15 F | 6746.2 | | Cr IV | 2 F | 7119.56 | Ti II | 17 F |
| 6446.5 | | K V | 2 F | 6758.48 | | Fe I | 16 F | 7122.07 | Cr I | 10 F |
| 6449.21 | | Zr II | 11 F | 6760.61 | | Fe I | 15 F | 7125.65 | Cr I | 10 F |
| 6456.04 | | V II | 13 F | 6763.56 | | Mn II | 2 F | 7126.40 | Ti I | 4 F |
| 6462.3 | | Cr V | 2 F | 6768.65 | | Ti I | 5 F | 7130.24 | Ni I | 5 F |
| 6467.52 | | Ni II | 8 F | 6785.44 | | Zr II | 5 F | 7131.13 | Fe II | 43 |
| 6473.52 | | Ti II | 31 F | 6787.00 | | Ni I | 5 F | 7131.55 | Y II | 1 F |
| 6473.86 | | Fe II | 44 F | 6791.02 | | Ti I | 5 F | 7131.77 | Fe II | 30 F |
| 6484.72 | | Cr I | 11 F | 6791.61 | | Ni II | 8 F | 7134.08 | Fe I | 15 F |
| 6487.5 | | Zr III | 3 F | 6793.01 | | Zr II | 11 F | 7135.8 | A III | 1 F |
| 6489.61 | | Ni I | 5 F | 6794.37 | | Ni II | 7 F | 7144.60 | Y II | 4 F |
| 6497.76 | | V II | 13 F | 6794.8 | | K IV | 1 F | 7147.16 | Fe I | 15 F |
| 6506.40 | | Zr II | 17 F | 6808.42 | | Fe I | 16 F | 7149.08 | Zr II | 5 F |
| 6507.62 | | Fe II | 32 F | 6809.21 | | Fe II | 31 F | 7150.21 | Ti I | 4 F |
| 6511.90 | | Cr I | 11 F | 6813.73 | | Ni II | 8 F | 7152.8 | Ti III | 3 F |
| 6523.23 | | Mn II | 8 F | 6823.42 | | Fe I | 27 F | 7155.14 | Fe II | 14 F |
| 6525.11 | | Fe I | 15 F | 6826.9 | | Kr III | 1 F | 7156.26 | Zr II | 5 F |
| 6526.85 | | Si I | 1 F | 6829.01 | | Fe II | 31 F | 7156.94 | Zr II | 20 F |
| 6527.4 | | N II | 1 F | 6829.24 | | Zr II | 11 F | 7168.42 | Fe I | 14 F |
| 6535.99 | | Mn II | 8 F | 6830.06 | | Fe II | 32 F | 7169.0 | A IV | 2 F |
| 6548.1 | N | N II | 1 F | 6836.94 | | Fe I | 15 F | 7171.6 | Cr IV | 1 F |
| 6548.47 | | Zr II | 16 F | 6850.42 | | Mn II | 2 F | 7171.98 | Fe II | 14 F |
| 6548.87 | | Ti II | 8 F | 6864.4 | | Zr III | 4 F | 7173.92 | Ti I | 4 F |
| 6550.29 | | Ti II | 37 F | 6868.18 | | Sr II | 1 F | 7177.04 | Cr I | 10 F |
| 6558.51 | | Fe II | 15 F | 6872.17 | | Fe II | 31 F | 7180.4 | Cr IV | 1 F |
| 6561.75 | | Cr I | 11 F | 6873.87 | | Fe II | 43 F | 7181.74 | Cr I | 10 F |
| 6569.73 | | Ti II | 34 F | 6884.50 | | Fe I | 15 F | 7185.39 | Cr I | 10 F |
| 6583.6 | N | N II | 1 F | 6893.2 | | Cr IV | 2 F | 7193.97 | Ni I | 5 F |
| 6583.66 | | Zr II | 16 F | 6896.18 | | Fe II | 14 F | 7196.91 | Zr II | 15 F |
| 6586.7 | | Cr V | 2 F | 6906.1 | | Cr IV | 1 F | 7197.88 | Zr II | 20 F |
| 6589.42 | | Ti II | 8 F | 6911.05 | | Ni II | 7 F | 7204.82 | Zr II | 4 F |
| 6589.74 | | Si I | 1 F | 6915.6 | | Cr IV | 2 F | 7213.88 | Ti I | 4 F |
| 6590.10 | | Mn II | 8 F | 6919 | | A XI | 1 F | 7214.69 | Fe II | 30 F |
| 6590.88 | | Ti II | 37 F | 6932.4 | | Cr V | 1 F | 7219.15 | Zr II | 3 F |
| 6591.0 | | Cr IV | 2 F | 6933.53 | | Zr II | 5 F | 7220.0 | Fe III | 15 F |
| 6592.93 | | Ti II | 8 F | 6933.67 | | Fe II | 31 F | 7233.4 | Cr IV | 1 F |
| 6595.88 | | Ti I | 5 F | 6941.63 | | Ni I | 2 F | 7236.0 | A IV | 2 F |
| 6599.7 | | Fe VII | 1 F | 6944.91 | | Fe II | 43 F | 7238.29 | Ti I | 4 F |
| 6603.99 | | Mn II | 8 F | 6954.69 | | Fe I | 27 F | 7243.99 | Ni I | 2 F |
| 6604.30 | | Ni I | 5 F | 6956.25 | | Ni II | 8 F | 7250.78 | Y II | 4 F |
| 6614.0 | | Fe III | 10 F | 6963.02 | | Ti II | 17 F | 7252.8 | Cr V | 1 F |
| 6616.12 | | Ti II | 34 F | 6963.85 | | Zr II | 20 F | 7256.16 | Ni II | 7 F |
| 6616.18 | | Fe I | 16 F | 6966.32 | | Fe II | 31 F | 7263.3 | A IV | 2 F |
| 6617.06 | | Mn II | 8 F | 6972.07 | | Fe I | 15 F | 7264.43 | Zr II | 23 F |
| 6617.12 | | Ti I | 5 F | 6978.57 | | Mn II | 2 F | 7264.51 | Cr I | 10 F |
| 6617.17 | | Zr II | 17 F | 6984.07 | | Zr II | 11 F | 7269.33 | Cr I | 10 F |
| 6622.05 | | Zr II | 11 F | 6989.04 | | Ni I | 5 F | 7273.06 | Cr I | 10 F |
| 6625.75 | | Ti II | 37 F | 6991.75 | | Zr II | 5 F | 7273.33 | Zr II | 4 F |
| 6631.20 | | Fe II | 31 F | 6991.8 | | Ti III | 3 F | 7274.6 | Co II | 3 F |
| 6633.48 | | Fe I | 15 F | 6999.99 | | Ti II | 17 F | 7281.67 | Fe II | 30 F |
| 6640.0 | | Cr IV | 2 F | 7002.02 | | Ni I | 2 F | 7287.25 | Ti I | 4 F |
| 6642.57 | | Ti I | 5 F | 7003.95 | | Ti II | 17 F | 7290.42 | Fe I | 14 F |
| 6642.66 | | Mn II | 8 F | 7005.23 | | Fe I | 15 F | 7291.46 | Ca II | 1 F |
| 6646.31 | | Zr II | 11 F | 7006.3 | | A V | 1 F | 7294.30 | V II | 4 F |
| 6647.05 | | Ti II | 8 F | 7008.84 | | Cr I | 5 F | 7307.76 | Zr II | 23 F |
| 6650.61 | | Ti II | 8 F | 7008.89 | | Fe I | 15 F | 7307.82 | Ni II | 7 F |
| 6651.26 | | Ti II | 37 F | 7011.24 | | Fe II | 31 F | 7309.90 | V II | 26 F |
| 6656.77 | | Mn II | 8 F | 7013.33 | | Cr I | 5 F | 7316.44 | Fe I | 28 F |
| 6660.68 | | Zr II | 16 F | 7016.21 | | Fe I | 28 F | 7317.43 | Fe I | 14 F |
| 6661.7 | | Zr III | 3 F | 7016.80 | | Cr I | 5 F | 7318.6 | O II | 2 F |
| 6668.16 | | Ni II | 2 F | 7017.94 | | Fe II | 31 F | 7319.4 | O II | 2 F |
| 6668.63 | | Mn II | 8 F | 7021.0 | | Cr IV | 1 F | 7321.23 | Fe I | 28 F |
| 6670.76 | | Ti I | 5 F | 7033.0 | | Ti III | 3 F | 7321.87 | V II | 12 F |
| 6671.31 | | Ti II | 34 F | 7047.99 | | Fe II | 31 F | 7323.88 | Ca II | 1 F |
| 6671.90 | | Fe II | 31 F | 7051.04 | | Ti II | 17 F | 7328.50 | Ti I | 4 F |
| 6682.18 | | Fe I | 16 F | 7051.7 | | Cr IV | 1 F | 7329.9 | O II | 2 F |
| 6692.48 | | Ti I | 5 F | 7054.37 | | Ni II | 8 F | 7330.7 | O II | 2 F |
| 6693.12 | | Ti II | 37 F | 7055.06 | | Ti II | 17 F | 7332.0 | A IV | 2 F |
| 6697.09 | | Zr II | 16 F | 7058.76 | | Zr II | 3 F | 7332.06 | V II | 4 F |
| 6698.02 | | Fe II | 32 F | 7059.62 | C | Fe XV | 1 F | 7338.0 | Cr IV | 1 F |
| 6700.1 | | Cr V | 1 F | 7066.07 | | Zr II | 15 F | 7344.03 | V II | 12 F |
| 6700.6 | | Ni XV | 1 F | 7075.26 | | Fe II | 31 F | 7353.77 | V II | 4 F |
| 6700.61 | | Ni II | 8 F | 7078.2 | | Fe III | 9 F | 7355.92 | La II | 1 F |
| 6700.68 | | Fe II | 43 F | 7078.25 | | Ni II | 8 F | 7370.00 | V II | 12 F |
| 6701.83 | C | Ni XV | 1 F | 7080.2 | | Fe XV | 1 F | 7370.94 | Fe II | 30 F |
| 6705.5 | | Cr V | 2 F | 7086.7 | | Cr IV | 2 F | 7373.32 | V II | 4 F |
| 6709.08 | | Mn II | 2 F | 7087.10 | | Cr I | 10 F | 7379.57 | Ni II | 2 F |
| 6710.68 | | Fe I | 16 F | 7087.39 | | Ti I | 4 F | 7383.38 | Cr I | 10 F |
| 6717.0 | | S II | 2 F | 7088.3 | | Fe III | 15 F | 7386.11 | Zr II | 5 F |
| 6721.89 | | Fe I | 15 F | 7091.17 | | Y II | 1 F | 7387.23 | Cr I | 10 F |
| 6722.02 | | Ti II | 8 F | 7091.68 | | Cr I | 10 F | 7387.47 | V II | 4 F |
| 6725.67 | | Ti II | 8 F | 7092.89 | | Fe I | 15 F | 7387.74 | V II | 12 F |

| I A | Element | Multiplet No. | I A | Element | Multiplet No. | I A | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|
| 7388.16 | Fe II | 14 F | 7689.65 | Cr II | 11 F | 8039.68 | Ti II | 39 F |
| 7390.6 | Cr IV | 1 F | 7692.91 | Mn II | 7 F | 8043.80 | Cr I | 9 F |
| 7393.71 | Ni I | 1 F | 7693.38 | Mn II | 7 F | 8045.57 | Cr I | 9 F |
| 7395.79 | Ni I | 2 F | 7694.82 | Ni II | 7 F | 8046.1 | Cl IV | 1 F |
| 7398.95 | V II | 4 F | 7696.30 | Mn II | 7 F | 8047.93 | Cr I | 9 F |
| 7404.36 | Zr II | 20 F | 7706.06 | Y II | 3 F | 8054.83 | Fe I | 13 F |
| 7406.61 | Fe I | 14 F | 7706.58 | Cr II | 20 F | 8060.16 | Ti II | 6 F |
| 7411.90 | V II | 4 F | 7708.83 | Fe I | 1 F | 8074.29 | Ti II | 7 F |
| 7413.33 | Ni II | 2 F | 7710.58 | Zr II | 23 F | 8076.58 | V II | 31 F |
| 7418.75 | V II | 4 F | 7710.79 | Fe II | 30 F | 8085.17 | Ti II | 6 F |
| 7419.42 | Fe II | 1 F | 7717.29 | Ti I | 24 F | 8086.73 | Fe I | 24 F |
| 7421.5 | Co II | 3 F | 7724.7 | S I | 3 F | 8091.87 | Ti I | 18 F |
| 7430.26 | V II | 3 F | 7733.12 | Fe II | 1 F | 8098.70 | Zr II | 25 F |
| 7431.08 | V II | 12 F | 7740.11 | Fe II | 29 F | 8101.03 | V II | 18 F |
| 7431.2 | V IV | 2 F | 7741.96 | Fe I | 14 F | 8106.38 | Ti II | 39 F |
| 7432.23 | Fe II | 47 F | 7750.56 | Cr II | 11 F | 8106.88 | Cr II | 20 F |
| 7439.58 | Fe I | 28 F | 7751.0 | A II | 1 F | 8111.97 | Ni I | 8 F |
| 7440.62 | V II | 3 F | 7752.86 | Cr II | 11 F | 8119.16 | Fe II | 38 F |
| 7444.80 | Zr II | 3 F | 7756.59 | Fe I | 14 F | 8119.46 | Ti I | 18 F |
| 7445.63 | Zr II | 4 F | 7757.43 | Cr II | 11 F | 8125.50 | Cr II | 1 F |
| 7449.45 | Fe II | 30 F | 7758.47 | Cr II | 11 F | 8137.88 | Zr II | 19 F |
| 7452.50 | Fe II | 14 F | 7759.25 | Fe I | 14 F | 8138.59 | Ti II | 7 F |
| 7454.82 | Zr II | 5 F | 7764.69 | Fe II | 30 F | 8138.62 | V II | 31 F |
| 7457.80 | V II | 4 F | 7769.35 | Zr II | 4 F | 8148.37 | Ti I | 18 F |
| 7459.30 | V II | 4 F | 7773.91 | Fe I | 13 F | 8151.33 | Fe I | 1 F |
| 7460.57 | V II | 3 F | 7786.03 | Zr II | 3 F | 8153.46 | Ti I | 18 F |
| 7460.93 | Zr II | 3 F | 7787.00 | Y II | 3 F | 8160.66 | Ti I | 18 F |
| 7464.39 | Ni I | 2 F | 7793.9 | Co II | 3 F | 8164.85 | Fe I | 13 F |
| 7467.0 | Co II | 3 F | 7797.2 | Co II | 3 F | 8166.83 | Ti II | 24 F |
| 7468.52 | V II | 4 F | 7803.90 | Fe II | 1 F | 8176.33 | Ti I | 18 F |
| 7469.44 | V II | 3 F | 7805.47 | Mn II | 7 F | 8183.69 | Cr I | 9 F |
| 7470.10 | Y II | 4 F | 7805.66 | Ti I | 23 F | 8185.52 | Cr I | 9 F |
| 7475.84 | V II | 12 F | 7805.96 | Mn II | 7 F | 8189.44 | Ti II | 24 F |
| 7477.26 | V II | 12 F | 7806.22 | Fe II | 1 F | 8192.33 | Ti II | 39 F |
| 7479.79 | Zr II | 15 F | 7806.88 | Cr II | 20 F | 8194.57 | Ni I | 8 F |
| 7489.15 | V II | 29 F | 7835.98 | Ti II | 6 F | 8201.77 | Ni I | 1 F |
| 7497.68 | V II | 3 F | 7845.41 | Cr II | 11 F | 8220.64 | Zr II | 10 F |
| 7507.44 | Ni I | 4 F | 7847.76 | Cr II | 11 F | 8225.25 | Sc II | 3 F |
| 7510.54 | Fe I | 14 F | 7849.08 | Zr II | 4 F | 8228.16 | Fe II | 30 F |
| 7515.13 | V II | 4 F | 7853.3 | Zr III | 2 F | 8229.81 | Cr II | 1 F |
| 7518.35 | V II | 29 F | 7853.51 | Cr II | 11 F | 8229.81 | Ti II | 24 F |
| 7518.81 | Zr II | 4 F | 7859.60 | Fe I | 14 F | 8231.57 | Fe I | 1 F |
| 7523.27 | Fe II | 1 F | 7867.83 | Cr I | 9 F | 8233.22 | Fe I | 24 F |
| 7526.46 | V II | 26 F | 7869.5 | P II | 3 F | 8235.69 | V II | 18 F |
| 7526.94 | V II | 3 F | 7874.23 | Fe II | 1 F | 8245.12 | Fe II | 29 F |
| 7530.9 | Cl IV | 1 F | 7876.34 | Fe I | 13 F | 8249.61 | Ti I | 3 F |
| 7533.84 | V II | 3 F | 7879.32 | Mn II | 7 F | 8251.14 | Cr I | 9 F |
| 7536 | S XII | 1 F | 7888.6 | Fe XI | 1 F | 8252.38 | Fe II | 38 F |
| 7536.93 | Fe I | 14 F | 7889.15 | Zr II | 19 F | 8261.21 | Sc II | 3 F |
| 7537.93 | Mn II | 7 F | 7891.94 C | Fe XI | 1 F | 8261.59 | Zr II | 25 F |
| 7539.67 | Fe II | 38 F | 7893.57 | Zr II | 3 F | 8268.36 | Cr II | 25 F |
| 7540.14 | V II | 12 F | 7894.10 | Ti II | 6 F | 8271.32 | Sc II | 3 F |
| 7540.54 | Y II | 3 F | 7899.63 | Fe I | 14 F | 8272.21 | Cr II | 25 F |
| 7540.74 | Mn II | 7 F | 7904.04 | Y II | 3 F | 8275.57 | Fe I | 1 F |
| 7541.42 | Fe I | 28 F | 7906.95 | Zr II | 22 F | 8279.99 | Sc II | 3 F |
| 7541.95 | V II | 4 F | 7908.30 | Ni I | 4 F | 8284.1 | Y V | 1 F |
| 7544.00 | Fe II | 14 F | 7916.25 | Ti II | 6 F | 8289.45 | Fe I | 13 F |
| 7547.77 | Mn II | 7 F | 7916.98 | Fe II | 29 F | 8303.23 | Ni II | 2 F |
| 7551.9 | V IV | 2 F | 7917.03 | Ti II | 25 F | 8307.67 | Sc II | 3 F |
| 7552.38 | Fe II | 1 F | 7926.90 | Fe II | 1 F | 8308.68 | Cr II | 1 F |
| 7556.03 | V II | 29 F | 7929.70 | Ni I | 8 F | 8315.71 | Zr II | 25 F |
| 7567.6 | Co II | 3 F | 7935.32 | Fe I | 26 F | 8321.51 | Fe I | 26 F |
| 7571.69 | V II | 3 F | 7938.41 | Cr I | 9 F | 8326.66 | Sc II | 3 F |
| 7586.23 | Y II | 3 F | 7940.71 | Cr I | 9 F | 8328.78 | Cr II | 19 F |
| 7604.53 | Fe I | 14 F | 7945.02 | Ti II | 7 F | 8337.65 | Fe I | 1 F |
| 7611.2 | V IV | 2 F | 7947.28 | Cr II | 20 F | 8339.72 | La III | 1 F |
| 7611.7 | Co II | 3 F | 7954.24 | Y II | 3 F | 8342.34 | Fe II | 30 F |
| 7612.96 | Ni II | 7 F | 7954.76 | Zr II | 25 F | 8343.02 | V II | 17 F |
| 7613.15 | Fe II | 30 F | 7956.90 | Ti II | 39 F | 8347.16 | V II | 17 F |
| 7623.44 | Zr II | 3 F | 7958.50 | Fe II | 29 F | 8347.24 | Sc II | 3 F |
| 7626.54 | Zr II | 15 F | 7959.00 | Fe I | 1 F | 8347.55 | Fe I | 1 F |
| 7637.52 | Fe II | 1 F | 7960.85 | Cr II | 20 F | 8348.93 | Ti II | 30 F |
| 7640.39 | Cr II | 11 F | 7964.27 | Fe I | 1 F | 8357.78 | Cr II | 1 F |
| 7642.3 | Co II | 3 F | 7965.96 | Cr II | 11 F | 8363.05 | Ti II | 27 F |
| 7642.61 | Cr II | 11 F | 7966.36 | Ti II | 7 F | 8367.07 | Ti I | 3 F |
| 7647.06 | Cr II | 11 F | 7974.31 | Cr II | 11 F | 8371.34 | Ti II | 30 F |
| 7658.84 | Fe I | 14 F | 7975.58 | Ti II | 6 F | 8380.68 | Zr II | 22 F |
| 7658.92 | Y II | 3 F | 7976.95 | Ti II | 6 F | 8384.28 | Sc II | 3 F |
| 7662.36 | Zr II | 23 F | 7978.7 | Mn IX | 1 F | 8400.89 | Cr II | 19 F |
| 7664.67 | Y II | 3 F | 7999.47 | Fe II | 1 F | 8403.62 | Sc II | 3 F |
| 7665.29 | Fe II | 1 F | 8000.12 | Cr II | 1 F | 8405.16 | Ti II | 27 F |
| 7673.74 | Fe II | 38 F | 8009.53 | Fe II | 46 F | 8408.39 | Zr II | 19 F |
| 7674.06 | Fe II | 46 F | 8012.08 | Fe II | 46 F | 8412.97 | Fe I | 12 F |
| 7681.89 | Cr II | 11 F | 8022.25 | Fe I | 13 F | 8413.26 | Fe II | 38 F |
| 7684.16 | Cr II | 11 F | 8022.63 | Fe II | 29 F | 8413.83 | V II | 17 F |
| 7685.58 | Fe II | 46 F | 8024 | Ni XV | 1 F | 8416.96 | Zr II | 25 F |
| 7686.19 | Fe II | 14 F | 8024.21 C | Ni XV | 1 F | 8420.72 | V II | 2 F |
| 7686.90 | Fe II | 1 F | 8028.94 | Ti II | 7 F | 8428.62 | Zr II | 22 F |
| 7687.94 | Fe II | 46 F | 8033.86 | Ni II | 7 F | 8430.1 | Ni VIII | 5 F |
| 7688.64 | Cr II | 11 F | 8037.29 | Fe II | 30 F | 8431.56 | Fe I | 1 F |

# FINDING LIST

## Forbidden Lines

| I A | Element | Multiplet No. | I A | Element | Multiplet No. | I A | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|
| 8433.7 | Cl III | 3 F | 8702.70 | Zr II | 9 F | 9105.8 | Ni VIII | 5 F |
| 8436.37 | Ti II | 15 F | 8703.03 | Ti II | 33 F | 9106.17 | Fe I | 36 F |
| 8437.9 | V III | 2 F | 8703.79 | Cr II | 18 F | 9106.60 | V II | 25 F |
| 8441.27 | Cr II | 25 F | 8704.24 | Ni II | 12 F | 9108.42 | Ti II | 32 F |
| 8444.83 | Zr II | 10 F | 8705.08 | Ti I | 16 F | 9108.53 | Zr II | 10 F |
| 8445.28 | Cr II | 25 F | 8706.79 | Fe II | 52 F | 9116.41 | Fe II | 51 F |
| 8446.11 | Fe II | 29 F | 8708.23 | Ti I | 17 F | 9125.8 | Cl II | 1 F |
| 8446.39 | Cr II | 25 F | 8709.38 | V II | 2 F | 9133.63 | Fe II | 42 F |
| 8456.74 | Fe I | 33 F | 8715.84 | Fe II | 42 F | 9134.50 | Sc II | 1 F |
| 8457.2 | V III | 2 F | 8716.24 | Ti I | 2 F | 9136.73 | Fe I | 36 F |
| 8466.38 | Ni I | 4 F | 8719.70 | Ti II | 36 F | 9137.01 | Ti I | 15 F |
| 8466.95 | Fe I | 24 F | 8721.54 | Ti I | 16 F | 9144.25 | V II | 10 F |
| 8467.54 | Fe I | 33 F | 8722.54 | Ti II | 16 F | 9149.11 | Ti II | 35 F |
| 8469.75 | Fe I | 25 F | 8723.13 | Ti I | 29 F | 9165.30 | V II | 10 F |
| 8471.07 | V II | 2 F | 8727.4 | C I | 3 F | 9166.00 | V II | 10 F |
| 8481.6 | Cl III | 3 F | 8728.09 | Fe III | 8 F | 9179.54 | Zr II | 9 F |
| 8485.90 | V II | 17 F | 8730.02 | Cr II | 18 F | 9180.13 | Ti I | 21 F |
| 8488.19 | Fe I | 24 F | 8731.38 | Ti I | 17 F | 9183.58 | V II | 9 F |
| 8488.93 | Ti I | 2 F | 8735.0 | V III | 1 F | 9189.22 | Ti I | 15 F |
| 8490.18 | V II | 17 F | 8738.1 | Fe VII | 4 F | 9191.34 | Sc II | 1 F |
| 8490.34 | Fe I | 25 F | 8739.71 | Ti I | 16 F | 9196.26 | Fe II | 51 F |
| 8490.44 | V II | 11 F | 8740.05 | Ti I | 17 F | 9199.44 | Ti I | 15 F |
| 8490.71 | Ti II | 15 F | 8743.65 | Zr II | 10 F | 9199.54 | Ti II | 35 F |
| 8491.16 | Ti II | 27 F | 8743.66 | Ti II | 29 F | 9202.81 | Zr II | 8 F |
| 8493.1 | V III | 1 F | 8745.0 | V III | 1 F | 9208.72 | Zr II | 8 F |
| 8501.8 | Cl III | 3 F | 8746.99 | Fe I | 33 F | 9209.25 | V II | 9 F |
| 8510.24 | V II | 11 F | 8761.8 | Ni VIII | 5 F | 9216.20 | Fe II | 51 F |
| 8518.20 | Sc II | 2 F | 8763.28 | V II | 2 F | 9217.51 | V II | 27 F |
| 8520.22 | Cr II | 19 F | 8763.95 | Ti II | 36 F | 9222.25 | Cr II | 16 F |
| 8521.66 | Ti I | 3 F | 8766.76 | Zr II | 10 F | 9223.81 | Cr II | 24 F |
| 8525.41 | Zr II | 10 F | 8770.71 | Ti I | 17 F | 9226.60 | Fe II | 13 F |
| 8529.50 | Ti II | 15 F | 8771.24 | Fe I | 12 F | 9228.60 | Cr II | 24 F |
| 8530.15 | Cr II | 19 F | 8774.69 | V II | 11 F | 9235.10 | Ti I | 15 F |
| 8532.12 | Ti I | 30 F | 8775.19 | Fe I | 33 F | 9235.60 | V II | 10 F |
| 8544.49 | V II | 28 F | 8777.26 | Ti I | 2 F | 9245.82 | Ti I | 15 F |
| 8545.12 | V II | 2 F | 8782.6 | V III | 2 F | 9251.37 | Ti I | 21 F |
| 8549.64 | Ti II | 16 F | 8787.6 | P I | 1 F | 9253.44 | V II | 9 F |
| 8550.5 | Cl III | 3 F | 8787.81 | Ti I | 17 F | 9255.10 | Y II | 5 F |
| 8553.73 | Ti II | 16 F | 8789.70 | Ti II | 29 F | 9256.51 | V II | 9 F |
| 8553.87 | V II | 11 F | 8792.09 | Cr II | 18 F | 9258.83 | Ti I | 15 F |
| 8561.42 | Zr II | 26 F | 8792.49 | Fe I | 24 F | 9267.54 | Fe II | 13 F |
| 8564.56 | Fe I | 1 F | 8794.80 | Fe I | 25 F | 9268.77 | V II | 10 F |
| 8565.94 | Ti II | 15 F | 8798.79 | Ti II | 33 F | 9273.10 | Cr II | 29 F |
| 8567.60 | Sc II | 2 F | 8798.82 | Zr II | 26 F | 9274.58 | Cr II | 16 F |
| 8575.4 | V IV | 1 F | 8799.09 | Ti I | 2 F | 9274.68 | Cr II | 29 F |
| 8576.73 | Ti I | 22 F | 8799.1 | P I | 1 F | 9279.59 | V II | 10 F |
| 8579.15 | V II | 11 F | 8808.47 | Ti I | 17 F | 9281.86 | Ti I | 15 F |
| 8579.5 | Cl II | 1 F | 8815.9 | V IV | 1 F | 9282.92 | V II | 27 F |
| 8582.52 | V II | 28 F | 8826.02 | Cr II | 19 F | 9285.20 | Sc II | 1 F |
| 8585.04 | Ti II | 15 F | 8830.3 | Co II | 1 F | 9288.45 | Ti I | 15 F |
| 8585.14 | Fe I | 33 F | 8830.7 | Fe III | 8 F | 9291.03 | Zr II | 9 F |
| 8588.84 | Ti I | 2 F | 8831.94 | Cr II | 18 F | 9292.19 | V II | 25 F |
| 8596.27 | Fe I | 33 F | 8832.31 | Ni I | 7 F | 9307.5 | Zr III | 5 F |
| 8598.3 | V III | 2 F | 8838.2 | Fe III | 8 F | 9308.03 | Ti I | 21 F |
| 8598.79 | Ti I | 29 F | 8843.42 | Ni I | 1 F | 9313.72 | V II | 9 F |
| 8599.1 | V III | 1 F | 8848.50 | Ti I | 17 F | 9324.01 | Y II | 5 F |
| 8612.91 | Ti I | 30 F | 8850.73 | Zr II | 9 F | 9324.8 | Ti III | 2 F |
| 8613.35 | Ti I | 2 F | 8851.13 | Fe II | 52 F | 9336.2 | Co II | 1 F |
| 8615.4 | V III | 2 F | 8851.45 | Ti I | 17 F | 9337.40 | Cr II | 23 F |
| 8616.96 | Fe II | 13 F | 8858.94 | Cr II | 18 F | 9342.24 | Cr II | 23 F |
| 8621.67 | Zr II | 26 F | 8862.47 | Zr II | 26 F | 9343.61 | Cr II | 23 F |
| 8623.51 | Fe I | 33 F | 8868.91 | Fe I | 1 F | 9349.2 | Zr III | 5 F |
| 8625.25 | Zr II | 8 F | 8872.37 | Zr II | 8 F | 9356.40 | V II | 27 F |
| 8625.8 | V III | 1 F | 8878.98 | V II | 2 F | 9358.90 | V II | 9 F |
| 8625.93 | Ti II | 16 F | 8884.12 | Ti I | 2 F | 9364.08 | Cr II | 16 F |
| 8626.85 | Ti I | 16 F | 8885.66 | Fe II | 42 F | 9376.93 | Zr II | 2 F |
| 8627.35 | V II | 11 F | 8891.88 | Fe II | 13 F | 9377.33 | Ni II | 1 F |
| 8640.22 | Ti I | 22 F | 8899.71 | Cr II | 16 F | 9377.83 | Zr II | 24 F |
| 8640.27 | Ti I | 29 F | 8909.40 | Zr II | 2 F | 9381.78 | Cr II | 23 F |
| 8643.14 | Fe I | 12 F | 8921.0 | Zr III | 5 F | 9386.74 | Cr II | 23 F |
| 8645.95 | Ti I | 22 F | 8929.91 | Cr II | 18 F | 9386.96 | Fe I | 12 F |
| 8647.89 | Fe I | 1 F | 8930.70 | Ti I | 17 F | 9388.12 | Cr II | 23 F |
| 8648.72 | Ti II | 16 F | 8931.47 | Fe II | 49 F | 9392.85 | Eu II | 1 F |
| 8649.11 | Sc II | 2 F | 8954.34 | Zr II | 9 F | 9395.23 | V II | 9 F |
| 8649.72 | Fe I | 24 F | 8969.06 | Zr II | 22 F | 9398.59 | Ti II | 21 F |
| 8651.14 | Ti II | 29 F | 8970.23 | Ti I | 2 F | 9399.02 | Fe II | 13 F |
| 8652.17 | Cr II | 18 F | 8970.56 | Cr II | 18 F | 9405.71 | Ti II | 21 F |
| 8653.20 | Cr II | 19 F | 8983.71 | Eu II | 1 F | 9427.18 | Cr II | 23 F |
| 8658.20 | Ti I | 16 F | 9012.04 | Cr II | 18 F | 9428.3 | Ti III | 2 F |
| 8661.20 | Ti II | 15 F | 9033.45 | Fe II | 13 F | 9432.18 | Cr II | 23 F |
| 8661.96 | Ti II | 15 F | 9033.73 | Cr II | 16 F | 9442.77 | Y II | 5 F |
| 8665.66 | Y II | 6 F | 9043.52 | V II | 10 F | 9444.2 | Fe III | 12 F |
| 8669.28 | Ti I | 2 F | 9051.92 | Fe II | 13 F | 9454.15 | V II | 9 F |
| 8674.27 | V II | 17 F | 9058.16 | Zr II | 2 F | 9457.95 | Cr II | 23 F |
| 8682.13 | V II | 2 F | 9069.4 | S III | 1 F | 9470.93 | Fe II | 13 F |
| 8683.4 | V III | 1 F | 9071.07 | Ti II | 35 F | 9487.4 | Ti III | 2 F |
| 8689.73 | Ti I | 16 F | 9072.86 | Cr II | 24 F | 9487.5 | Xe II | 1 F |
| 8691.53 | Zr II | 19 F | 9089.24 | Zr II | 10 F | 9488.3 | Ti III | 2 F |
| 8698.18 | V II | 11 F | 9093.67 | Fe I | 36 F | 9490.96 | Zr II | 8 F |
| 8698.69 | V II | 11 F | 9096.76 | V II | 10 F | 9491.15 | Cr II | 29 F |

| I A | Element | Multiplet No. | I A | Element | Multiplet No. | I A | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|
| 9496.60 | Zr II | 27 F | 10021.39 | Ti II | 4 F | 10461.95 | Zr II | 24 F |
| 9512.58 | Cr II | 16 F | 10028.62 | Fe II | 28 F | 10464.94 | Zr II | 1 F |
| 9513.87 | Fe II | 41 F | 10028.71 | Zr II | 1 F | 10475.96 | Ti I | 27 F |
| 9517.76 | Fe II | 52 F | 10034.9 | Zr III | 5 F | 10486.97 | Sc II | 6 F |
| 9522.24 | V II | 32 F | 10036.79 | Fe II | 40 F | 10491.99 | Cr II | 28 F |
| 9532.1 | S III | 1 F | 10038.79 | Fe II | 48 F | 10494.00 | Cr II | 28 F |
| 9534.75 | Zr II | 14 F | 10055.97 | Fe I | 11 F | 10500.65 | Cr II | 10 F |
| 9543.3 | Zr III | 5 F | 10066.92 | Ti II | 5 F | 10502.67 | Cr II | 10 F |
| 9544.00 | Ti I | 28 F | 10066.98 | Ti II | 5 F | 10503.47 | Ti II | 3 F |
| 9558.5 | Co VII | 5 F | 10074.84 | Eu II | 1 F | 10504.3 | Fe III | 8 F |
| 9565.8 | Ni VIII | 5 F | 10075.00 | Fe I | 38 F | 10508.07 | Fe II | 28 F |
| 9570.24 | V II | 9 F | 10083.37 | Zr II | 13 F | 10510.25 | V II | 15 F |
| 9582.55 | Zr II | 9 F | 10098.2 | Cr VIII | 1 F | 10519.77 | Ti I | 27 F |
| 9590.94 | Cr II | 16 F | 10116.66 | Ti II | 4 F | 10553.58 | Mn II | 1 F |
| 9594.5 | Ti III | 2 F | 10119.57 | Cr II | 22 F | 10561.05 | V II | 24 F |
| 9595.12 | Ti I | 28 F | 10120.75 | Zr II | 24 F | 10568.84 | Ti I | 27 F |
| 9595.85 | V II | 32 F | 10125.99 | Ti II | 5 F | 10569.44 | Sc II | 7 F |
| 9607.90 | Zr II | 8 F | 10128.19 | Zr II | 27 F | 10576.98 | V II | 15 F |
| 9608.6 | Fe III | 12 F | 10136.59 | Cr II | 10 F | 10592.32 | Fe I | 23 F |
| 9619.74 | Fe I | 12 F | 10137.00 | Cr II | 10 F | 10594.89 | Fe II | 40 F |
| 9622.68 | Ti I | 28 F | 10138.47 | Cr II | 10 F | 10601.80 | Fe I | 37 F |
| 9635.9 | Cr V | 4 F | 10148.57 | Ti II | 4 F | 10603.65 | Zr II | 1 F |
| 9639.4 | Co II | 1 F | 10163.13 | Ti II | 5 F | 10608.1 | Fe III | 14 F |
| 9642.42 | Ti II | 21 F | 10178.29 | Fe I | 11 F | 10608.18 | Ti II | 3 F |
| 9644.96 | V II | 25 F | 10188.1 | Co II | 1 F | 10627.5 | Ni VIII | 6 F |
| 9649.94 | Ti II | 21 F | 10196.82 | Fe I | 36 F | 10640.19 | Ti II | 3 F |
| 9651.02 | Cr II | 17 F | 10202.05 | Ti II | 5 F | 10640.4 | Fe III | 13 F |
| 9652.70 | Fe II | 13 F | 10206.5 | Xe III | 1 F | 10642.86 | Ti I | 27 F |
| 9670.04 | Zr II | 24 F | 10208.43 | Zr II | 14 F | 10660.35 | Sc II | 7 F |
| 9670.87 | Zr II | 27 F | 10209.10 | Ni II | 12 F | 10671.7 | Co VII | 5 F |
| 9671.2 | Zr III | 5 F | 10209.78 | Cr II | 10 F | 10676.61 | Ti II | 3 F |
| 9674.66 | Ti I | 28 F | 10210.20 | Cr II | 10 F | 10696.87 | Cr II | 27 F |
| 9681.84 | Ti I | 28 F | 10211.69 | Cr II | 10 F | 10718.16 | Ni II | 1 F |
| 9682.13 | Fe II | 41 F | 10215.85 | Cr II | 22 F | 10719.84 | Cr II | 10 F |
| 9686.70 | Cr II | 16 F | 10223.27 | Cr II | 22 F | 10746.80 C | Fe XIII | 1 F |
| 9694.01 | Eu II | 1 F | 10223.27 | Ti II | 5 F | 10747.64 | Ti II | 3 F |
| 9697.42 | Ti I | 28 F | 10225.3 | Ni VIII | 6 F | 10749.7 | Fe XIII | 1 F |
| 9701.3 | Fe III | 11 F | 10229.79 | Fe I | 11 F | 10755.91 | Cr II | 27 F |
| 9704.10 | Zr II | 9 F | 10235.17 | Fe I | 36 F | 10758.04 | Cr II | 27 F |
| 9706.8 | Ti III | 2 F | 10245.4 | Co II | 1 F | 10758.32 | Ti II | 3 F |
| 9720.20 | Ti I | 20 F | 10261.18 | Zr II | 1 F | 10770.38 | Fe I | 36 F |
| 9731.40 | Fe I | 23 F | 10262.84 | Fe I | 11 F | 10771.88 | Fe I | 23 F |
| 9733.52 | V II | 16 F | 10264.65 | Fe I | 23 F | 10780.17 | Sc II | 7 F |
| 9752.5 | Co VII | 5 F | 10280.7 | Co II | 1 F | 10784.80 | Ti II | 3 F |
| 9755.81 | Fe II | 50 F | 10284.3 | S II | 3 F | 10796.00 | Cr II | 27 F |
| 9774.53 | Zr II | 14 F | 10291.94 | V II | 15 F | 10796.2 | Fe XIII | 1 F |
| 9775.94 | Fe I | 35 F | 10297.11 | Cr II | 28 F | 10796.48 | Fe II | 45 F |
| 9778.67 | Ti I | 28 F | 10297.14 | Ti I | 27 F | 10797.66 | Cr II | 27 F |
| 9778.70 | Fe I | 12 F | 10298.63 | Cr II | 28 F | 10797.95 C | Fe XIII | 1 F |
| 9786.00 | Ti I | 28 F | 10299.05 | Cr II | 28 F | 10798.14 | Cr II | 27 F |
| 9795.21 | Fe II | 28 F | 10299.79 | Cr II | 22 F | 10800.75 | V II | 15 F |
| 9806.20 | Cr II | 17 F | 10300.86 | Ti II | 5 F | 10807.8 | Cr V | 5 F |
| 9808.9 | C I | 1 F | 10305.67 | Cr II | 22 F | 10819.8 | S I | 1 F |
| 9822.50 | Fe I | 39 F | 10307.34 | Cr II | 22 F | 10835.22 | V II | 23 F |
| 9823.4 | C I | 1 F | 10314.96 | Fe I | 38 F | 10860.44 | Zr II | 1 F |
| 9826.83 | Fe I | 11 F | 10317.7 | S II | 3 F | 10867.84 | Fe I | 37 F |
| 9831.29 | Ti I | 20 F | 10318.68 | Fe I | 23 F | 10872.05 | Sc II | 5 F |
| 9849.5 | C I | 1 F | 10321.34 | Fe II | 40 F | 10882.6 | Fe III | 14 F |
| 9862.21 | Fe II | 40 F | 10327.56 | Fe II | 28 F | 10890.02 | Zr II | 13 F |
| 9866.49 | Cr II | 17 F | 10331.43 | Cr II | 10 F | 10901.79 | Ti II | 3 F |
| 9870.08 | Zr II | 8 F | 10331.86 | Cr II | 10 F | 10908.34 | Fe I | 34 F |
| 9884.29 | Ti I | 20 F | 10333.39 | Cr II | 10 F | 10912.8 | Co VII | 5 F |
| 9885.74 | Ni II | 1 F | 10336.0 | S II | 3 F | 10916.5 | Fe III | 13 F |
| 9886.87 | Zr II | 27 F | 10351.92 | Zr II | 13 F | 10916.64 | Fe I | 41 F |
| 9887.18 | Ni I | 6 F | 10355.58 | Zr II | 1 F | 10921.07 | Ni II | 1 F |
| 9902.2 | Kr III | 1 F | 10355.93 | V II | 15 F | 10956.10 | Ti II | 3 F |
| 9903.31 | La II | 1 F | 10356.68 | Ti I | 27 F | 10965.77 | Ti II | 14 F |
| 9916.30 | Eu II | 1 F | 10366.26 | Cr II | 22 F | 10972.9 | Co II | 1 F |
| 9917.9 | S VIII | 1 F | 10369.7 | S II | 3 F | 10983.23 | V II | 23 F |
| 9918.01 | Fe II | 51 F | 10372.30 | Cr II | 22 F | 10986.0 | Co VII | 6 F |
| 9926.0 | Zr III | 5 F | 10373.30 | Cr II | 21 F | 10991.52 | Si I | 2 F |
| 9937.20 | Zr II | 27 F | 10373.98 | Cr II | 22 F | 11011.70 | La II | 1 F |
| 9937.27 | Fe II | 51 F | 10379.73 | Ti II | 5 F | 11018.07 | Fe I | 32 F |
| 9941.20 | Fe II | 51 F | 10380.40 | Cr II | 21 F | 11019.11 | V II | 24 F |
| 9942.2 | Fe III | 11 F | 10382.14 | V II | 15 F | 11024.82 | Ti II | 13 F |
| 9947.19 | Zr II | 14 F | 10386.86 | Ti I | 27 F | 11044.11 | Fe I | 35 F |
| 9949.32 | Fe II | 48 F | 10388.07 | Cr II | 21 F | 11049.28 | Ti I | 26 F |
| 9953.5 | Co VII | 5 F | 10394.3 | Cr V | 5 F | 11056.70 | Cr II | 26 F |
| 9957.23 | Ni II | 12 F | 10395.4 | N I | 3 F | 11057.76 | Ti II | 14 F |
| 9957.44 | Fe II | 28 F | 10399.33 | Sc II | 6 F | 11058.94 | Cr II | 26 F |
| 9960.0 | Fe III | 8 F | 10400.53 | Fe II | 40 F | 11069.08 | Fe I | 37 F |
| 9969.6 | Fe III | 8 F | 10404.1 | N I | 3 F | 11078.26 | Ti II | 2 F |
| 9972.59 | Ti II | 5 F | 10431.10 | Fe II | 40 F | 11080.02 | Ti II | 14 F |
| 9974.41 | Fe I | 23 F | 10432.60 | Fe II | 48 F | 11084.87 | Ti I | 32 F |
| 9977.1 | Ni VIII | 5 F | 10443.95 | Fe I | 11 F | 11088.0 | Fe III | 13 F |
| 9982.17 | V II | 16 F | 10447.44 | Ti I | 27 F | 11096.98 | Zr II | 18 F |
| 9986.60 | Fe I | 39 F | 10452.56 | Fe I | 11 F | 11098.96 | V II | 23 F |
| 9997.3 | Mn X | 1 F | 10456.86 | Sc II | 6 F | 11107.3 | Fe III | 13 F |
| 9998.31 | Fe I | 11 F | 10458.9 | Zr III | 5 F | 11110.92 | Ti II | 2 F |
| 10013.88 | Fe II | 41 F | 10459.79 | Ni II | 11 F | 11117.80 | Ti II | 13 F |

# FINDING LIST

## Forbidden Lines

| I A | Element | Multiplet No. | I A | Element | Multiplet No. | I A | Element | Multiplet No. |
|---|---|---|---|---|---|---|---|---|
| 11123.53 | Ti I | 26 F | 11595.50 | Zr II | 18 F | 11951.78 | Cr II | 9 F |
| 11132.24 | Zr II | 21 F | 11602.41 | Ti II | 1 F | 11971.26 | Ti II | 1 F |
| 11151.54 | Ti II | 14 F | 11606.00 | V II | 23 F | 11997.42 | Fe I | 40 F |
| 11173.94 | Ti II | 14 F | 11611.10 | Ti II | 12 F | 12012.60 | Ti I | 1 F |
| 11178.94 | Ti II | 13 F | 11616.88 | Ni II | 1 F | 12019.17 | Fe I | 40 F |
| 11185.14 | Ti I | 26 F | 11618.68 | Ti II | 2 F | 12024.89 | Ti I | 14 F |
| 11185.70 | Ti II | 14 F | 11619.10 | V II | 1 F | 12025.23 | Fe I | 22 F |
| 11191.43 | Ti I | 26 F | 11621.54 | Ti I | 1 F | 12061.0 | Ti III | 1 F |
| 11193.04 | Ti I | 26 F | 11658.88 | V II | 22 F | 12072.48 | Fe I | 40 F |
| 11202.11 | Fe I | 41 F | 11659.62 | Zr II | 18 F | 12094.78 | Zr II | 21 F |
| 11203.92 | Zr II | 13 F | 11665.66 | Ti I | 31 F | 12095.67 | Ti I | 14 F |
| 11228.14 | Ti II | 2 F | 11679.85 | Ti I | 14 F | 12168.18 | Cr II | 9 F |
| 11233.80 | Fe I | 22 F | 11681.81 | Ti I | 14 F | 12168.8 | Co II | 1 F |
| 11237.04 | Fe I | 32 F | 11690.94 | Ti I | 14 F | 12168.80 | Ti I | 1 F |
| 11242.12 | Ti II | 2 F | 11698.62 | Zr II | 21 F | 12170.50 | Cr II | 9 F |
| 11246.87 | V II | 1 F | 11714.28 | Ti II | 12 F | 12178.83 | Cr II | 9 F |
| 11261.79 | Ti I | 26 F | 11715.20 | V II | 1 F | 12209.6 | Co VII | 6 F |
| 11272.6 | Fe III | 13 F | 11735.52 | Ti II | 1 F | 12211.22 | Zr II | 18 F |
| 11280.5 | Co II | 1 F | 11748.60 | Ti I | 14 F | 12219.66 | V II | 22 F |
| 11284.9 | Fe III | 13 F | 11757.66 | V II | 1 F | 12300.16 | Cr II | 26 F |
| 11305.8 | S I | 1 F | 11764.23 | Fe I | 32 F | 12300.77 | Cr II | 26 F |
| 11315.52 | V II | 30 F | 11765.16 | Fe I | 40 F | 12323.27 | Ni II | 11 F |
| 11324.18 | V II | 22 F | 11767.30 | Ti I | 14 F | 12372.55 | Fe I | 22 F |
| 11332.50 | Ti I | 26 F | 11771.95 | Ti I | 1 F | 12387.48 | Fe I | 22 F |
| 11347.6 | Co VII | 6 F | 11778.39 | Ti II | 12 F | 12417.8 | Ti III | 1 F |
| 11359.87 | Ni II | 11 F | 11782.27 | Ti II | 1 F | 12460.65 | Cr II | 9 F |
| 11368.21 | V II | 22 F | 11782.63 | Cr II | 26 F | 12463.08 | Cr II | 9 F |
| 11396.50 | Ti II | 2 F | 11784.62 | Cr II | 26 F | 12471.70 | Cr II | 9 F |
| 11402.97 | Ti I | 26 F | 11785.17 | Cr II | 26 F | 12645.23 | Fe I | 22 F |
| 11414.22 | V II | 1 F | 11786.08 | Fe I | 40 F | | | |
| 11432.93 | Ti II | 1 F | 11789.27 | Cr II | 9 F | | | |
| 11444.61 | V II | 1 F | 11790.50 | Fe I | 32 F | | | |
| 11444.66 | V II | 30 F | 11791.90 | Fe I | 22 F | | | |
| 11450.66 | Fe I | 40 F | 11792.55 | Ti I | 14 F | | | |
| 11458.27 | Ti II | 2 F | 11799.5 | Ti III | 1 F | | | |
| 11471.69 | V II | 23 F | 11823.03 | Ti II | 12 F | | | |
| 11477.29 | Ti II | 1 F | 11835.06 | Ti I | 14 F | | | |
| 11478.92 | Ti II | 38 F | 11849.83 | Ti I | 1 F | | | |
| 11479.51 | V II | 23 F | 11852.49 | V II | 22 F | | | |
| 11483.2 | P II | 1 F | 11856.02 | Ti I | 1 F | | | |
| 11495.96 | Fe I | 32 F | 11857.28 | V II | 1 F | | | |
| 11509.6 | Ni VIII | 6 F | 11857.96 | Ti II | 12 F | | | |
| 11518.28 | Fe I | 32 F | 11881.68 | Ti I | 14 F | | | |
| 11520.46 | Ti I | 31 F | 11884.57 | Ti II | 12 F | | | |
| 11521.31 | Ti I | 33 F | 11896.48 | Sc II | 4 F | | | |
| 11524.46 | Fe I | 32 F | 11898.2 | P II | 1 F | | | |
| 11537.68 | Fe I | 22 F | 11918.75 | V II | 21 F | | | |
| 11557.08 | Ti II | 1 F | 11933.60 | Ti I | 14 F | | | |
| 11568.38 | V II | 22 F | 11943.75 | Cr II | 9 F | | | |
| 11580.17 | V II | 1 F | 11950.77 | Ti I | 14 F | | | |

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U.S. DEPARTMENT OF COMMERCE
Frederick H. Mueller, *Secretary*

NATIONAL BUREAU OF STANDARDS
A. V. Astin, *Director*

# THE NATIONAL BUREAU OF STANDARDS

The scope of activities of the National Bureau of Standards at its major laboratories in Washington, D.C., and Boulder, Colorado, is suggested in the following listing of the divisions and sections engaged in technical work. In general, each section carries out specialized research, development, and engineering in the field indicated by its title. A brief description of the activities, and of the resultant publications, appears on the inside of the front cover.

## WASHINGTON, D.C.

**Electricity and Electronics.** Resistance and Reactance. Electron Devices. Electrical Instruments. Magnetic Measurements. Dielectrics. Engineering Electronics. Electronic Instrumentation. Electrochemistry.

**Optics and Metrology.** Photometry and Colorimetry. Photographic Technology. Length. Engineering Metrology.

**Heat.** Temperature Physics. Thermodynamics. Cryogenic Physics. Rheology. Molecular Kinetics. Free Radicals Research.

**Atomic and Radiation Physics.** Spectroscopy. Radiometry. Mass Spectrometry. Solid State Physics. Electron Physics. Atomic Physics. Neutron Physics. Radiation Theory. Radioactivity. X-rays. High Energy Radiation. Nucleonic Instrumentation. Radiological Equipment.

**Chemistry.** Organic Coatings. Surface Chemistry. Organic Chemistry. Analytical Chemistry. Inorganic Chemistry. Electrodeposition. Molecular Structure and Properties of Gases. Physical Chemistry. Thermochemistry. Spectrochemistry. Pure Substances.

**Mechanics.** Sound. Mechanical Instruments. Fluid Mechanics. Engineering Mechanics. Mass and Scale. Capacity, Density, and Fluid Meters. Combustion Controls.

**Organic and Fibrous Materials.** Rubber. Textiles. Paper. Leather. Testing and Specifications. Polymer Structure. Plastics. Dental Research.

**Metallurgy.** Thermal Metallurgy. Chemical Metallurgy. Mechanical Metallurgy. Corrosion. Metal Physics.

**Mineral Products.** Engineering Ceramics. Glass. Refractories. Enameled Metals. Constitution and Microstructure.

**Building Technology.** Structural Engineering. Fire Protection. Air Conditioning, Heating, and Refrigeration. Floor, Roof, and Wall Coverings. Codes and Safety Standards. Heat Transfer. Concreting Materials.

**Applied Mathematics.** Numerical Analysis. Computation. Statistical Engineering. Mathematical Physics.

**Data Processing Systems.** SEAC Engineering Group. Components and Techniques. Digital Circuitry. Digital Systems. Analog Systems. Application Engineering.

- Office of Basic Instrumentation.
- Office of Weights and Measures.

## BOULDER, COLORADO

**Cryogenic Engineering.** Cryogenic Equipment. Cryogenic Processes. Properties of Materials. Gas Liquefaction.

**Radio Propagation Physics.** Upper Atmosphere Research. Ionospheric Research. Regular Propagation Services. Sun-Earth Relationships. VHF Research. Radio Warning Services. Airglow and Aurora. Radio Astronomy and Arctic Propagation.

**Radio Propagation Engineering.** Data Reduction Instrumentation. Modulation Research. Radio Noise. Tropospheric Measurements. Tropospheric Analysis. Propagation Obstacles Engineering. Radio-Meteorology. Lower Atmosphere Physics.

**Radio Standards.** High Frequency Electrical Standards. Radio Broadcast Service. High Frequency Impedance Standards. Electronic Calibration Center. Microwave Physics. Microwave Circuit Standards.

**Radio Communication and Systems.** Low Frequency and Very Low Frequency Research. High Frequency and Very High Frequency Research. Ultra High Frequency and Super High Frequency Research. Modulation Research. Antenna Research. Navigation Systems. Systems Analysis. Field Operations.

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