THE SPECTRUM OF α^2 CANUM VENATICORUM*

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ABSTRACT

A new list of wave lengths containing 3107 absorption lines between λ 3087.9 and λ 4740.6 has been obtained from 28 spectrograms taken at the Mount Wilson and the McDonald observatories. Of these plates, 18 were obtained with a dispersion of around 3 A/mm, while the other plates, used in the ultraviolet region, had 20 A/mm. The identifications are based upon all available laboratory material and show that all singly ionized rare earths which have been measured in the laboratory and which have a sufficient number of lines in the region covered by the stellar spectrograms are present. One doubly ionized rare earth, *Ce* III, is almost certainly present, and others may contribute to blends. The intensities of all rare-earth lines are variable in a period of 5.5 days and follow the pattern of the *Eu* II lines (designated as group A). The lines of *Cr* II and some other elements vary in the opposite sense (group B), while certain other lines—*Si* II, *Mg* II, etc.—do not appreciably change in intensity (group C).

The radial velocities as measured from the lines of different elements also fall into three groups, designated as a, b, and c, which roughly correspond to the intensity groups A, B, and C. Group a, consisting of the rare earths and some other elements predominantly of low ionization potential, shows a shallow minimum of velocity at phase 4.5 days after maximum *Eu* II intensity and a sharp maximum of velocity at phase 1.5 days. Group b, represented by *Cr II* and some other elements, shows a velocity-curve with a double wave. The highest maximum is at phase 5.0 days and the deepest minimum at phase 0.7 day. Group c, consisting of *Mg* II, *Si* II, *H*, and *Ca* II, shows no appreciable variation.

A recent review[1] of the problem presented by the variable line-intensities in α^2 Canum Venaticorum has shown that several important conclusions rested upon somewhat inadequate observational data. In particular, there exists as yet no satisfactory list of the absorption lines in this remarkable spectrum. The most complete previous set of measurements was obtained by W. W. Morgan[2] on Yerkes single-prism spectrograms and covers the region λλ 3913–4572, with a linear dispersion of 30 A/mm at λ 4500. The more recent work by Tai[3] contains fewer lines and therefore adds relatively little to Morgan's identifications. The spectrum is exceedingly rich in lines. With small, or even with moderately large, dispersion the great majority of the lines are blends—many of which have never before been identified or even measured. Since Baxandall's discovery in 1910[4] that five strong absorption lines, measured by Belopolsky and found by the latter to have variable intensities, were due to the rare earth europium, several other ionized rare-earth atoms have been identified in α^2 CVn, though until recently[1] there existed little agreement among different observers.

The purpose of this investigation is to present as complete a list of wave lengths and identifications as can be obtained at the present time and to study the variations in radial velocities presented by lines of different atoms. There has been some controversy concerning the reality of the changes in radial velocity first observed by Belopolsky for *Eu* II; and for a number of years the opinion appeared justified that, in some of these lines at least, the observed variations were caused by disturbing blends near minimum intensity of *Eu* II. The reality of the changes in velocity was definitely established by our preliminary measurements of McDonald Observatory coudé spectrograms.[1]

* *Contributions from the McDonald Observatory, University of Texas*, No. 78.

[1] Struve, *Proc. Amer. Phil. Soc.*, **85**, 349, 1942; Struve and Swings, *Observatory*, **64**, 291, 1942. Since these reviews were written, Nikonov and Brodskaja (*Bull. Acad. Sci. Georgian S.S.R.*, **3**, No. 7, 657, 1942) have found that the star changes in color-temperature by about 2000°, being bluest when the total light is at minimum.

[2] *Pub. Yerkes Obs.*, **7**, Part III, 1935.

[3] *M.N.*, **100**, 94, 1939.

[4] *Observatory*, **36**, 440, 1913.

The tables presented in this paper are based upon a number of spectrograms obtained at the Mount Wilson and McDonald observatories. The nine McDonald coudé plates have already been used in part.[1] They extend from about λ 3900 to λ 4800. The dispersing system consists of two large prisms of Chance glass, figured by Hilger and giving excellent definition over the entire range. The emulsion used was Eastman Ia0. The dispersion varies from 1.9 A/mm at λ 3933 to 4.5 A/mm at λ 5000.

We are greatly indebted to Dr. W. S. Adams, director of the Mount Wilson Observatory, for extending to us the use of his exquisite coudé spectrograms, also nine in number, which were taken with various adjustments of a large plane grating ruled on aluminum on glass. These spectrograms extend over a very large range in wave lengths and are uniformly of excellent quality. The dispersion is 3 A/mm. We have reproduced in Plates XXIII–XXX a number of the best spectrograms of each observatory. The changes in the line-intensities with phase are very conspicuous. The McDonald plates were taken through the glass (a practice which was necessitated by the large amount of curvature of our plateholders and which has since been abandoned because of a new technique which permits us to bend the plates sufficiently without breaking them), and this accounts for some of the irregular spots on the reproductions. The extreme ultraviolet region, from λ 3087.9 to λ 3408.0, has been measured on McDonald Observatory Cassegrain quartz spectrograms, having a dispersion of 20 A/mm at λ 3250 or 40 A/mm at λ 3933. These plates were obtained on Eastman Process emulsion and are of fine quality, but the dispersion was insufficient to resolve many of the blends. The Cassegrain quartz plates (*CQ*) were measured by Swings. All high-dispersion plates were measured by Struve. The identifications were made by Swings and were later in part re-examined by Struve. Because of the unusually large amount of work involved in these measurements, Struve measured all eighteen coudé plates in one direction and later remeasured two of them, Cd 81 and MtW 1992, in the reverse direction. The reductions were made quite independently, and the comparisons of direct and reverse measures furnish a valuable indication of the precision and of the essential absence of systematic differences in the two sets. Although a small tendency exists in each plate for strong and weak lines to differ slightly in the direct and the reverse measurements, the trend of the two spectrograms is opposite in sense. Hence it may be concluded that for the relatively broad lines of α^2 CVn no systematic errors in excess of 0.01 A have been introduced into the results. The actual precision of the faintest lines should be of the order of 0.02 A, and of the stronger lines it should be more nearly of the order of 0.01 A.

The phases used in this paper were computed with the formula established by Miss G. Farnsworth:[5]

$$\text{Maximum intensity of } Eu\ \textsc{ii} = \text{JD } 2419869.720 + 5.46939E .$$

This formula satisfactorily predicts the phase of the maximum *Eu* II intensity, but it is possible that there are small departures from one cycle to another in the curve of intensity plotted against time. Hence the combination of observations made in different years may not be rigorously correct; unfortunately, the high-dispersion material is not sufficient to study possible departures from the mean curves.

Table 1 covers the region λλ 3088–3315 and is based upon only one spectrogram at phase $3^{d}.77$, where the rare-earth lines should be weak. The contributions of these lines to blends, which should become important at other phases, are indicated in a separate column.

Table 2 gives the region λλ 3317–3408 and is based upon three spectrograms at phases $0^{d}.47$, $1^{d}.46$, and $4^{d}.93$, which were measured from λ 3317 to λ 3369, and upon six spectrograms, which were measured from λ 3369 to λ 3408.

[5] *Ap. J.*, **75**, 364, 1932.

Table 3 is based upon nine Mount Wilson coudé plates and one McDonald coudé plate. The manner in which the phases of some of the plates were combined for the forming of average wave lengths and intensities is shown in Table 7.

All wave lengths have been corrected to the sun in the usual manner. The curvature correction was applied to the McDonald plates but was, of course, neglected for the Mount Wilson plates, which were taken with a grating.

The intensities of the star lines are rough estimates and are not intended for a study of the variations of the intensities, because they are affected by underexposure or overexposure of the region in question. The illustrations give a far better idea of the variations. Intensities greater than 9 are shown by the symbol x in the tables. An intensity of 0 does not mean that the line is absent, but a single measure of such a line is rather doubtful and may not be real.

The work of identification was especially difficult for the following reasons:

a) The variation of λ with phase. This variation may be so different for two atoms, A and B, that a line may be single at one phase and become double at another phase.

b) The unsatisfactory state of laboratory data for certain rare earths.

c) Considerable differences which may exist between the laboratory and the stellar intensities. Let us adopt $T_{\text{exc}} = 10{,}000^\circ$ for α^2 CVn and $T_{\text{exc}} = 5{,}000^\circ$ for an arc. Table 8 gives the ratio $(I_1/I_2)_{\text{arc}}/(I_1/I_2)_{\alpha^2\text{CVn}}$ for various differences in excitation potential of the two lines. Hence high-level lines may be considerably enhanced in α^2 CVn relative to their laboratory intensities. The criterion of "arc intensity" (as applied by Tai, for example) is not reliable, although it may still be the best one could use in many cases when a term classification is not available. Whenever a term classification is known, the identifications have been discussed on the basis of multiplet intensity relations.

d) A contribution of minor importance at a specific phase may become important at some other phase (at least as far as v_{rad} is concerned). Hence many minor contributions have been included in the tables.

The list of identifications gives the probable major contributors first. These are followed by minor, but appreciable, contributors. Less important contributors and uncertain contributors are given in parentheses.

The laboratory material used for identifications consisted of the following:

a) Miss Moore's original multiplet table, combined with new M.I.T. wave lengths wherever advisable.

b) New material on *Ne* II, *A* II, *P* II, *Fe* I, etc.

c) Considerable unpublished material generously supplied by Mrs. Sitterly (parts of her revised multiplet table) and by Dr. A. S. King for: *Fe* II, *Cr* II, *Ti* II, *Mn* II, *Co* II, *Ni* II, *Sc* II, *Cu* II, *Ce* II, *Pr* II, *Nd* II, *Sm* II, *Eu* II, *Gd* II, *Dy* II, *Tm* II, *Yb* II, *Lu* II.

d) Meggers' and Moore's analysis of *V* II.[6]

e) No term analysis is available for *Tb* II, *Dy* II, *Ho* II, *Er* II. For *Dy* II, a temperature classification by A. S. King is available over the whole astronomical region, but it seems to concern only the strong lines. A summarized copy belonging to Mrs. Sitterly was used.

For *Ho* II and *Tb* II, King's temperature classification covers only the region $\lambda\lambda$ 3836–4680. Hence the M.I.T. table had to be used for $\lambda < 3836$. Only the *Ho* and *Tb* lines have been entered, which are observed in the spark (the separation of *Ho* I–II and *Tb* I–II is not known for $\lambda < 3836$). The corresponding identifications are marked *Ho* (II?) and *Tb* (II?), and the intensities denoted by *S* are taken from the spark column of the M.I.T. table.

A recent temperature classification of *Gd* II extending over the whole astronomical region was received from Dr. A. S. King prior to publication; it was used with considerable success.

For erbium, only the old work of Exner and Hascheck and of Eder is available. This does not separate *Er* I and *Er* II. Over the whole astronomical region the wave lengths

[6] *Jour. Res., Nat. Bur. Stand.*, **25**, 83, 1940.

were taken from the M.I.T. table, for the lines only which appear in the spark. These wave lengths may be less satisfactory than for most other elements.

Generally speaking, the term analyses are still very incomplete for the rare earths. Hence the temperature classifications were used extensively.

f) Nothing has been published on the doubly ionized rare earths, except *Ce* III.[7] Yet it is very probable that a number of unidentified lines are due to *Eu* III, *Gd* III, *Dy* III, etc.

g) Each wave length of α^2 CVn was compared with the neighboring wave lengths in the M.I.T. table.

With regard to the elements represented in α^2 CVn the following notes are pertinent:

a) *Ne* II and *A* II. Probably pure chance coincidences or minor contributions.

b) *Sc* II. Extremely weak compared with α Cygni.

c) Singly ionized rare earths. The evidence is probably satisfactory for all singly ionized rare earths, except *Yb* II and *Er* II. *Yb* II is very faint, yet almost certainly present. The uncertainty of *Er* II is due to the lack of reliable laboratory data.

d) Doubly ionized rare earths. These identifications were made with the help of unpublished data kindly supplied by Dr. A. S. King.

Ce III.—The stellar evidence is summarized in Table 9. The following multiplets are present: $fs^3F^0-fp^3F$, $fs^3F^0-fp^3G$, $fs^3F^0-fp^1F^3$, $fs^3F^0-d^2\,{}^1G_4$, $fs^1F^0_3-fp^3F$, $fs^1F^0_3-fp^1F$, $fs^1F^0_3-d^2\,{}^1G_4$.

Eu III (λλ 2900–3194).—The region covered by King's list was taken only on *CQ* spectrograms and cannot provide reliable identifications. The *Eu* III line λ 3183.7(100) may contribute, but it is badly blended by *Cr* II.

Gd III (λλ 2900–3177).—λ 3118.0 (1000) may contribute. This region was taken only on *CQ* spectrograms.

Sm III (λλ 2903–3398.4).—No definite evidence; *Sm* III contributes probably in a number of blends, but the region is too crowded.

Nd III (λλ 2899–3431).—Contributions by *Nd* III probably improve the identifications of blends.

Pr III (λλ 3147–3568).—Most lines are blended; but their contributions improve the identification of the blends; λ 3397.5(600) cannot be appreciably blended and is probably present.

La III.—λ 3517.14 may be present.

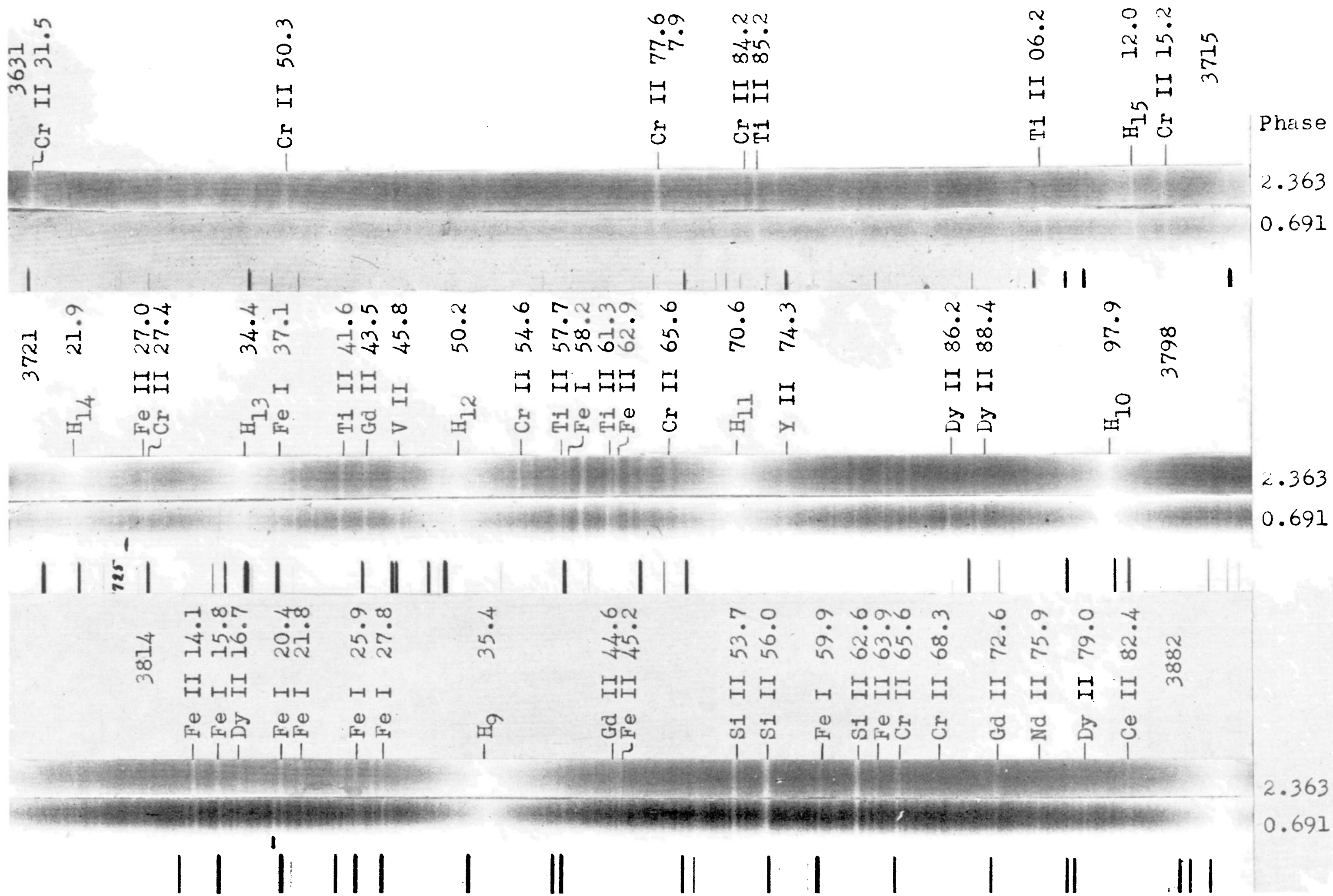
Table 4 contains the best lines for a number of atoms and ions, selected for lack of seriously disturbing blends. The selection was made without regard to any changes in wave length. The radial velocities determined from the individual lines are, of course, corrected to the sun and represent in each case the true velocity as determined from each individual line on each plate. These velocities are arranged in order of phase and are given individually, not only for the ten plates used in Table 3, but also for the remaining eight McDonald coudé spectrograms. For each atom or ion the mean radial velocity has been derived individually for each plate, together with the number of measures used in forming each mean. The mean velocities are plotted in Figures 1–5 as functions of the phase. The value of the period, 5.5 days, is indicated along the abscissae, so that the amount of repetition of each set of points can be clearly seen in all diagrams.

The velocity-curves fall into three distinct groups:

a) Lines which show a large range in velocity, with a pronounced minimum at phase 4.5 days after the epoch of maximum of *Eu* II intensity. Maximum velocity occurs at phase 1.5 days, and the curve is characterized by a sharp maximum and a shallow minimum. This type of variation is best determined for *Eu* II and *Dy* II. Probably all rare earths share in this type of variation, with the exception of *Ho* II, for which the material is inadequate. The following elements belong to group a: *Al* II, *Ca* I, *Mn* I, *Ni* I, *Ce* II, *Pr* II, *Nd* II, *Sm* II, *Eu* II, *Gd* II, *Dy* II, and perhaps *Sr* II. The range of the

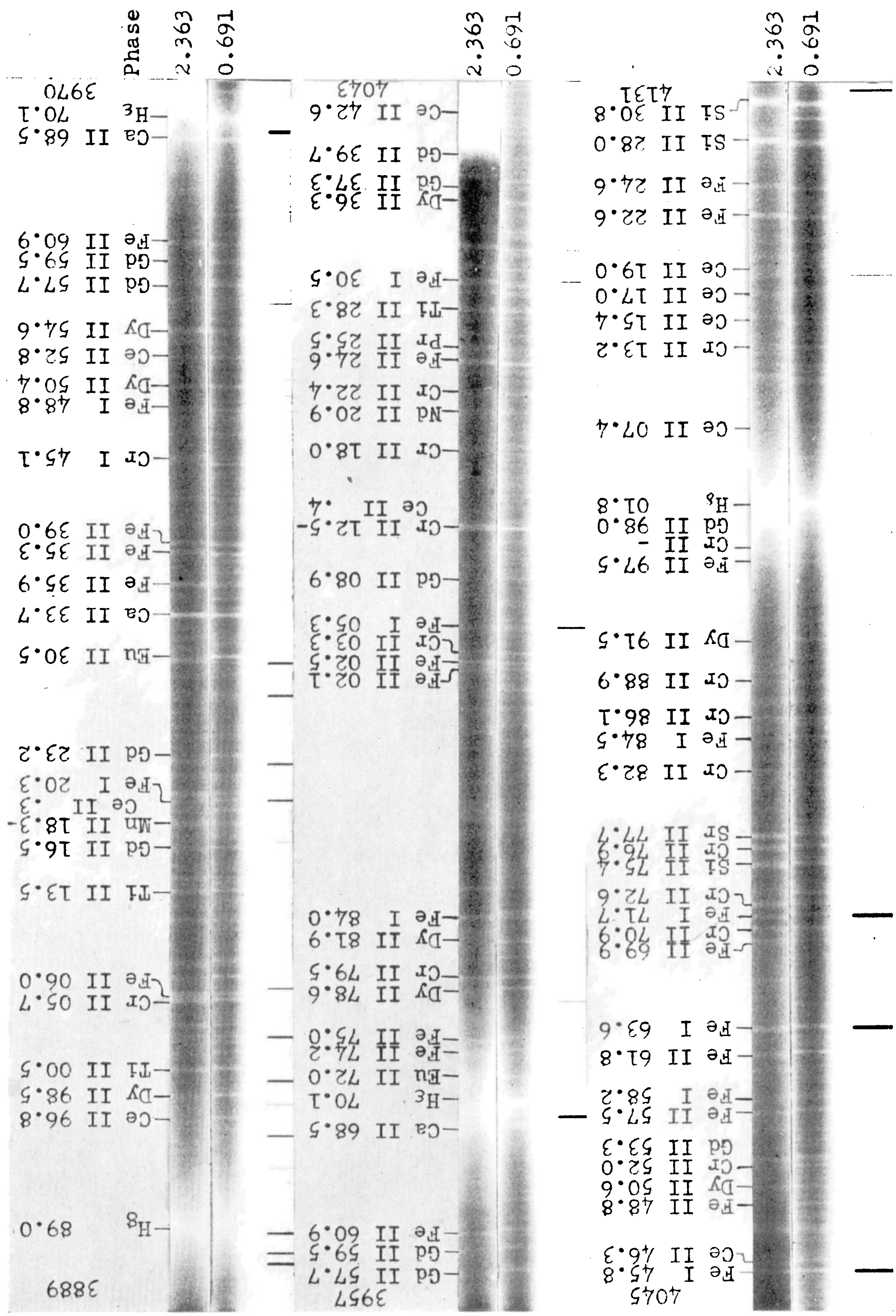
[7] Russell, King, and Lang, *Phys. Rev.*, **52**, 456, 1937.

PLATE XXIII



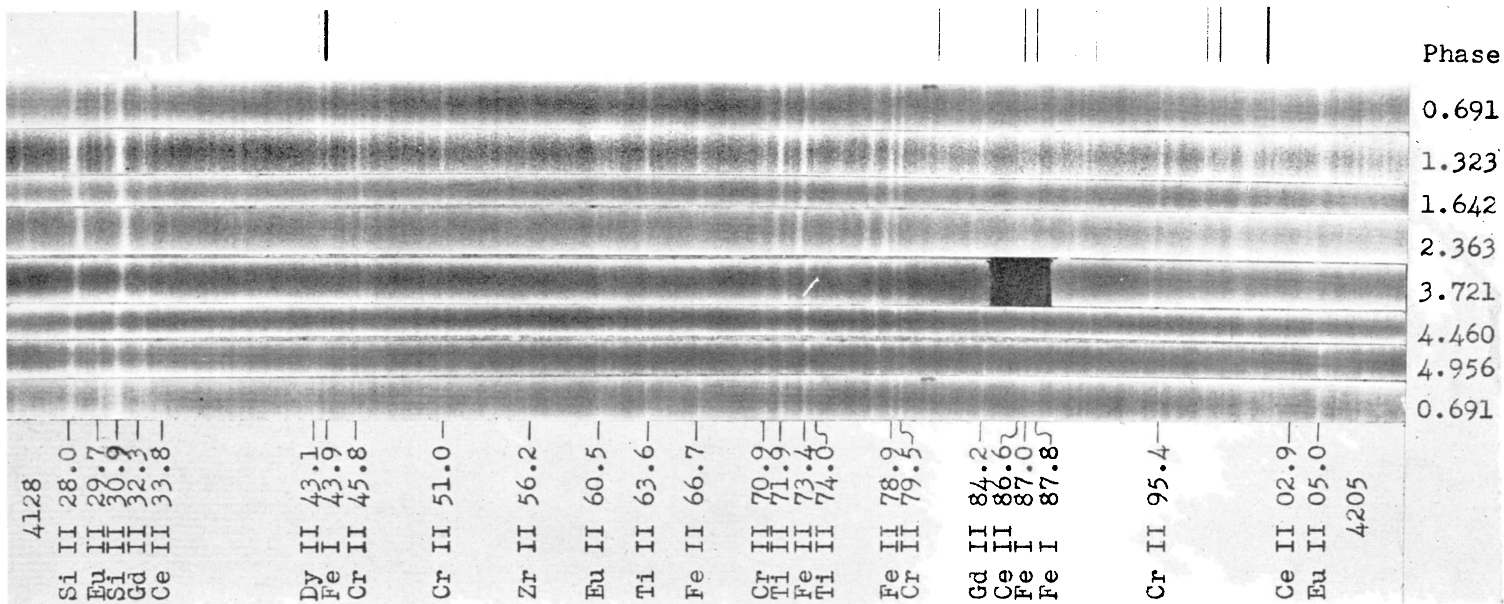
The Spectrum of α^2 Canum Venaticorum

PLATE XXIV



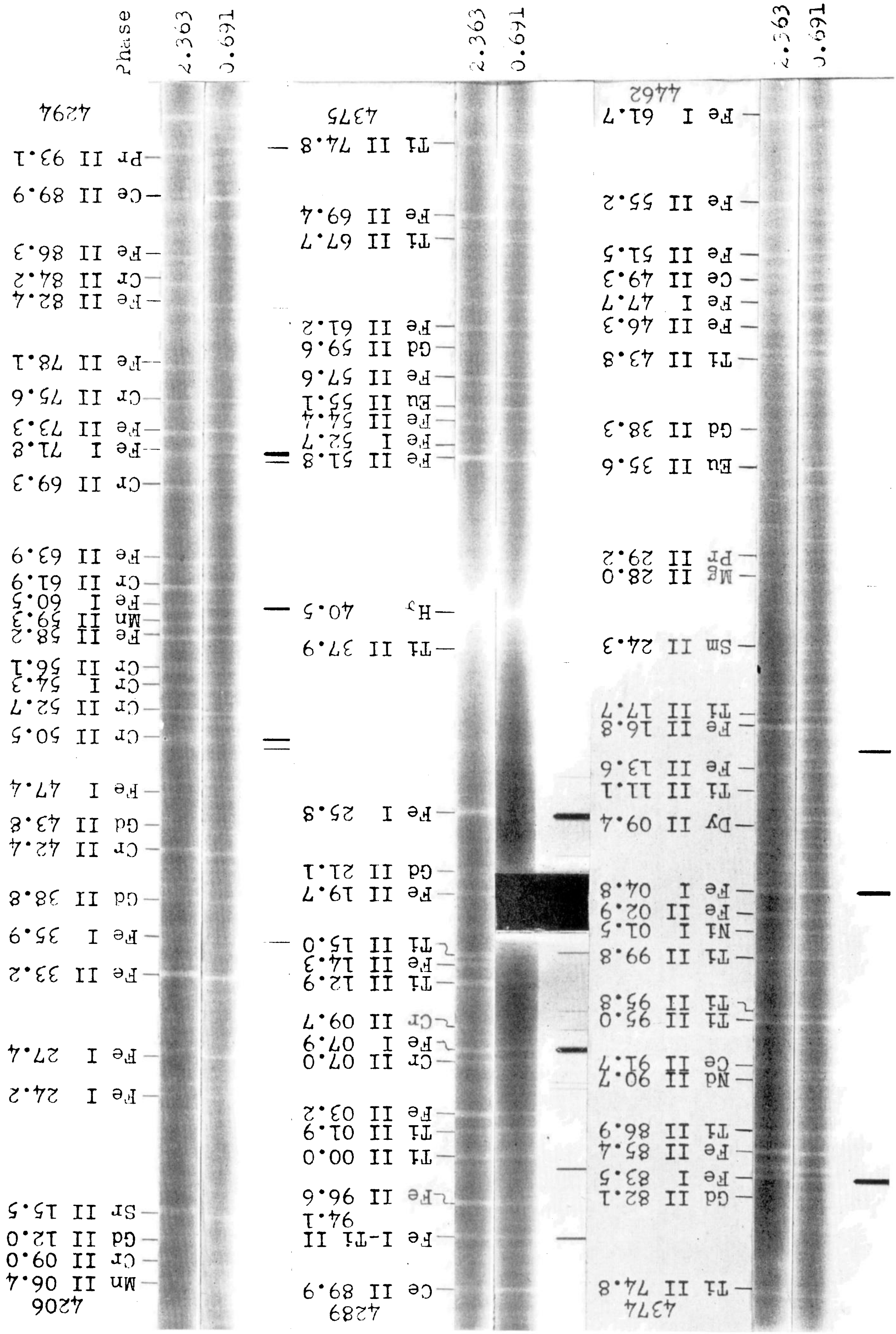
The Spectrum of α^2 Canum Venaticorum

PLATE XXV



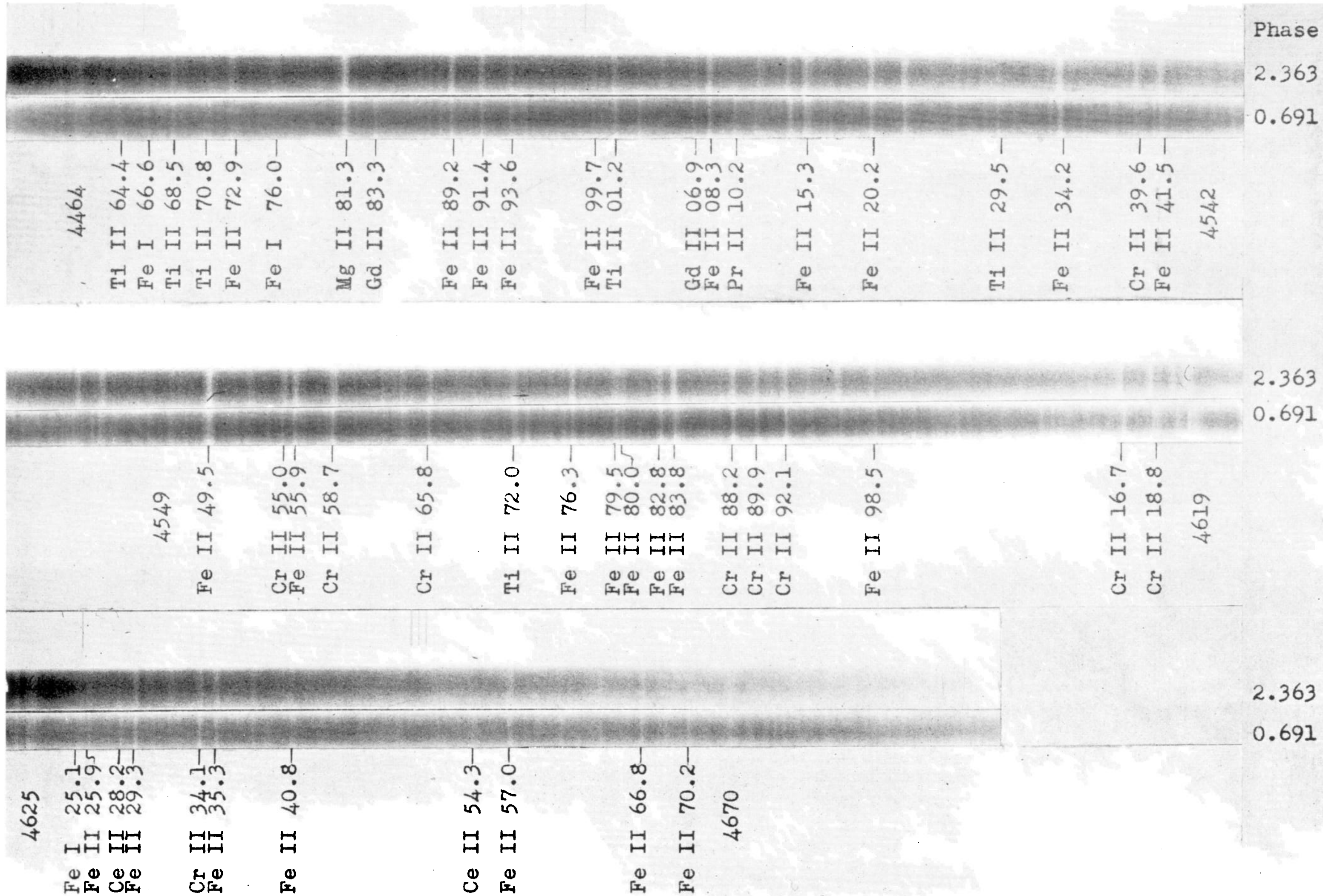
THE SPECTRUM OF α^2 CANUM VENATICORUM

PLATE XXVI



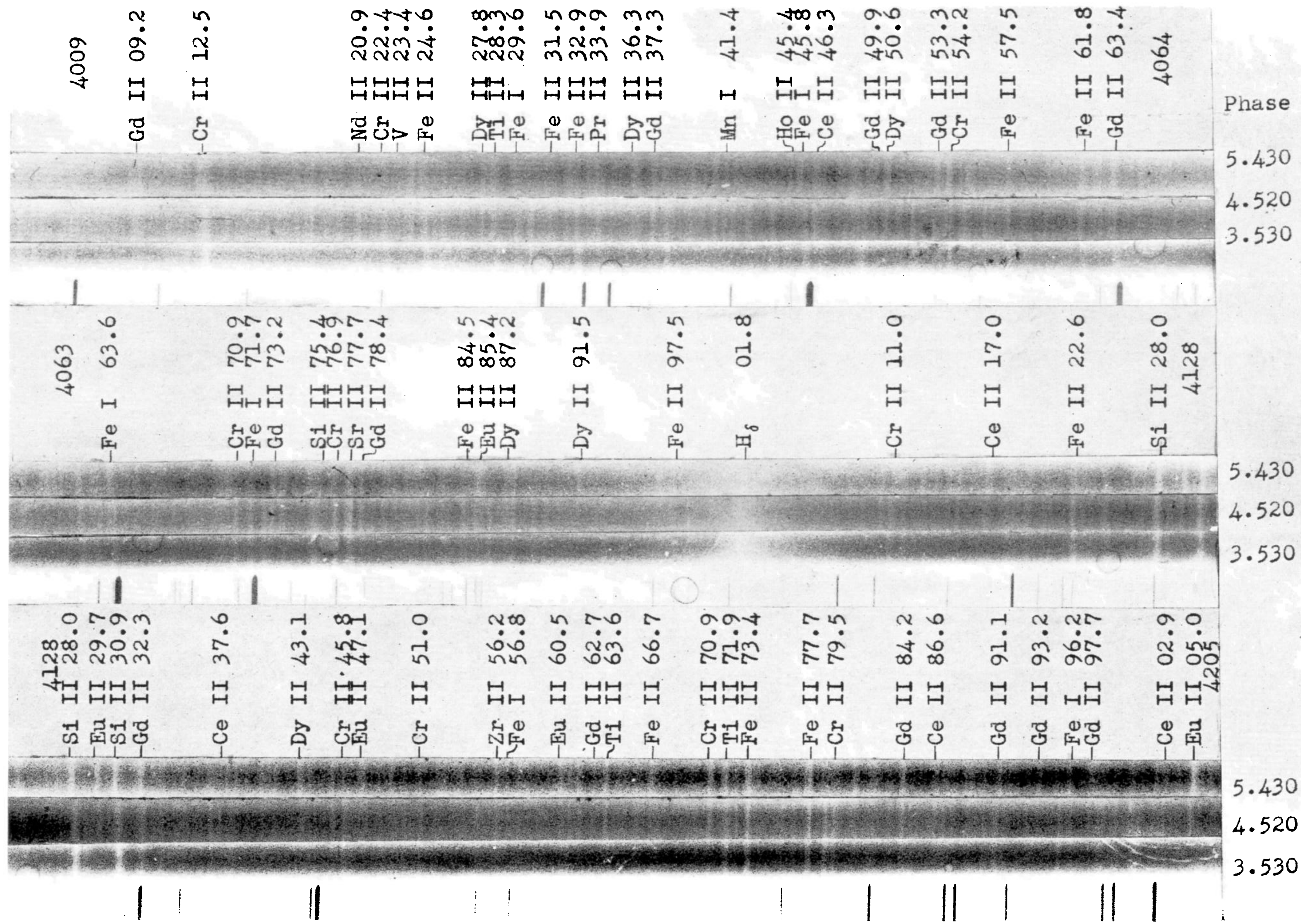
THE SPECTRUM OF α^2 CANUM VENATICORUM

PLATE XXVII



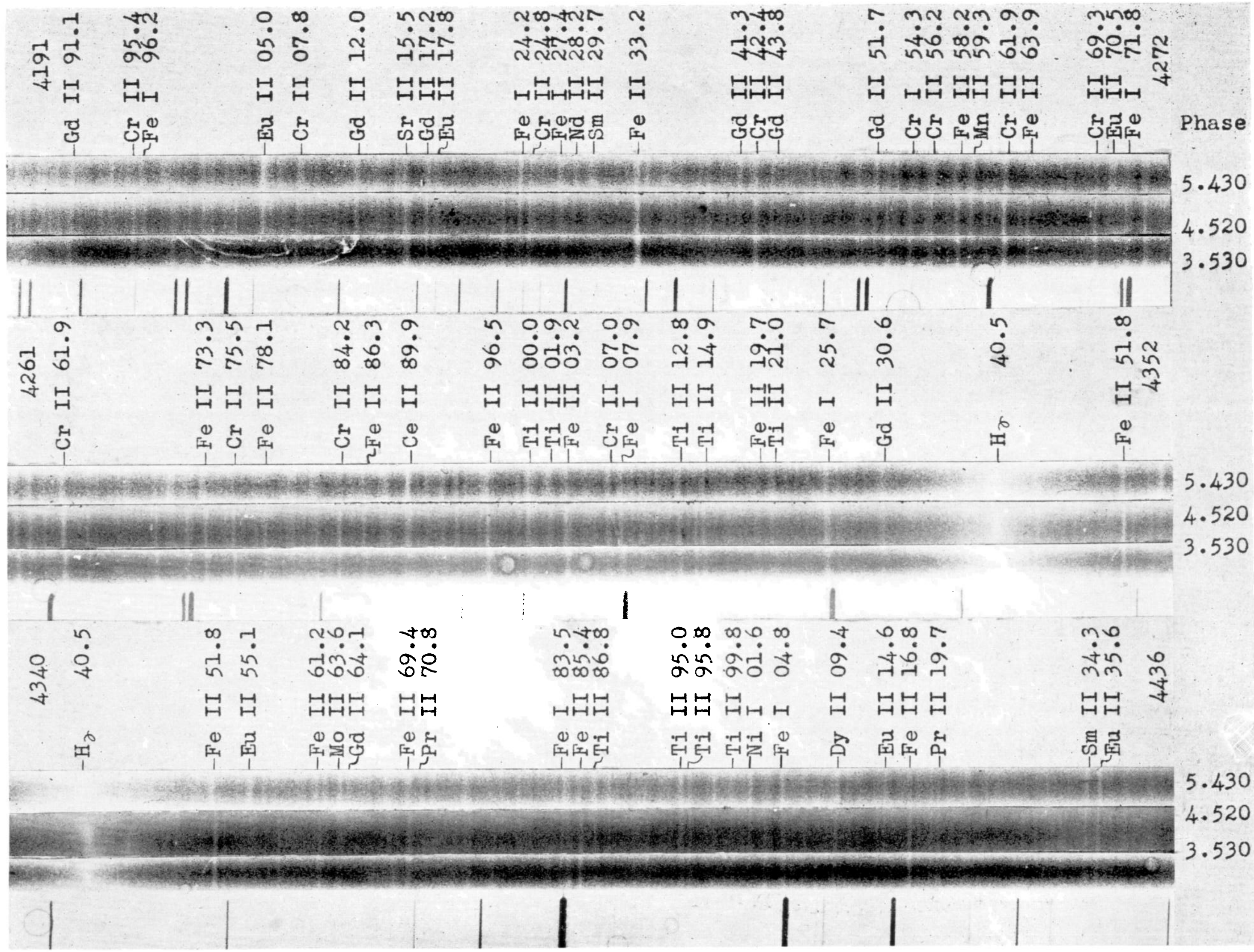
The Spectrum of α^2 Canum Venaticorum

PLATE XXVIII



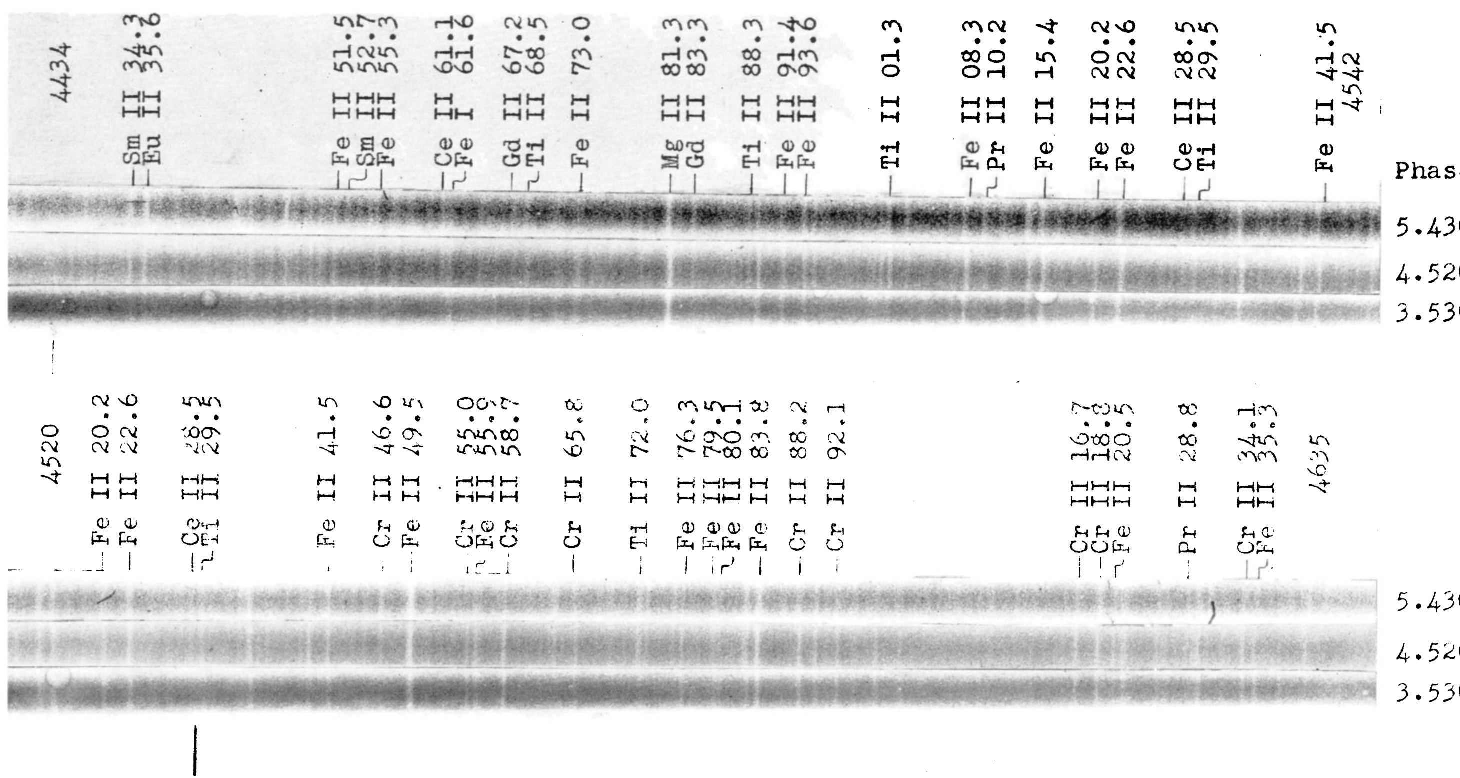
THE SPECTRUM OF α^2 CANUM VENATICORUM

PLATE XXIX



THE SPECTRUM OF α^2 CANUM VENATICORUM

PLATE XXX



THE SPECTRUM OF α^2 CANUM VENATICORUM

TABLE 1

α^2 CVn Region $\lambda < 3315$

Wave Length and Int.	Principal Contributors	Rare Earths and Minor Contributors
3087.94 (2)	Ti II 88.03 (500) Cr II 87.90 (20)	
3089.17 (0)	Fe II 89.39 (4) Ti II 89.40 (100)	Sa III 88.7 (100) Yb II 89.09 (10) Gd II 89.20 (30) Gd II 89.25 (20)
3089.86 (2)	Ti II 90.05 (100) Gd II 89.95 (400)	Fe II 90.04 (8) Cr II 89.75 (1) Eu II 89.64 (3)
3091.49 (1)	Fe I 91.58 (300) (Eu II 91.29 (10))	Gd II 91.46 (8)
3093.64 (4nn)	Cr II 93.48 (40) Cr II 93.97 (15)	V II 93.11 (2500) Dy II 93.11 (60) Sa III 93.1 (20) Gd II 93.85 (25)
3098.28 (1)	Cr II 98.16 (18) (Nd II 98.48 (50))	Sa III 98.3 (80) Sa III 98.6 (250)
3102.26 (2)	Cr II 02.30 (2) Cr II 02.58 (2)	V II 02.29 (2000) Gd II 02.55 (1000) Dy II 02.19 (70)
3103.62 (1)	Cr II 03.48 (30) Ti II 03.80 (200)	Ce II 03.38 (125) Dy II 03.84 (60) Dy II 03.25 (60)
3105.25 (1)	Fe II 05.55 (5) Fe II 05.17 (5)	Ti II 05.08 (100) Dy II 05.00 (40) Gd II 05.53 (80) Nd II 05.42 (30)
3106.61 (1)	Fe II 06.56 (4) (Ti II 06.23 (150))	Ce III 06.97 (200) Zr II 06.58 (35)
3107.57 (2)	Cr II 07.58 (50)	
3108.94 (1)	Cr II 08.66 (10)	
3110.64 (2n)	V II 10.71 (1500) (Ti II 10.67 (100))	Ce III 10.52 (200) Sa III 10.0 (150) Zr II 10.87 (8)
3111.97 (1)	Cr II 11.95 (15) (Ce II 12.20 (S 15))	Ti II 12.05 (70) Gd II 11.99 (20) Sa III 12.0 (20)
3114.49 (2n)	Fe II 14.29 (7) Fe II 14.68 (4)	
3115.56 (2)	Cr II 15.65 (20) Cr II 15.28 (12)	Fe II 15.49 (1) Fe II 15.35 (2) Sa III 15.6 (50) Gd II 15.77 (10)
3116.84 (2)	Cr II 16.76 (20) Cr II 17.28 (15)	Fe II 16.59 (6) Sa III 16.9 (150) Gd II 17.01 (15)
3118.70 (4n)	Cr II 18.65 (60) Cr II 18.14 (10) V II 18.38 (1000)	Gd II 18.60 (150) Gd III 18.0 (1000) Sm III 18.3 (40) Sm III 18.8 (80) Fe II 18.30 (0) Fe II 18.71 (0)
3120.06 (1)	Fe II 20.02 (1) (Ti II 19.80 (150))	Dy II 20.18 (80) Gd II 19.94 (800) Gd II 20.18 (125) Nd II 19.75 (15)
3120.58 (3)	Cr II 20.37 (75)	
3121.44 (1)	Cr II 21.04 (8) Cr II 21.22 (2)	Ce III 21.55 (400) Ti II 21.60 (20) Pr II 21.57 (25)
3122.00 (1)	Cr II 21.97 (7) Cr II 21.84 (10)	Ti II 22.06 (50) Gd II 21.76 (80)
3122.74 (1)	Cr II 22.60 (30)	
3125.11 (5)	Cr II 24.98 (100) Cr II 25.46 (7)	Cr II 25.02 (15) V II 25.28 (600) Sm III 24.9 (150)
3126.30 (1)	Dy II 26.18 (50) (V II 26.21 (150))	Zr II 25.92 (12)

TABLE 1 -- Continued

Wave Length and Int.	Principal Contributors	Rare Earths and Minor Contributors
3127.93 (1)	Ti II 27.88 (35) Gd II 27.70 (100)	Ce II 27.53 (80)
3128.87 (4)	Cr II 28.70 (40) Fe II 29.01 (1) Ti II 28.64 (70)	Dy II 28.41 (150) Gd II 28.56 (200) Sm III 29.0 (60) Zr II 29.16 (10)
3130.10 (1)	V II 30.26 (100) (Zr II 29.76 (12))	Gd II 29.95 (100) Gd II 29.70 (80)
3130.71 (2)	Fe II 30.56 (2) Ti II 30.80 (100)	Cr II 30.55 (1) Gd II 30.81 (200) Eu II 30.73 (80)
3132.08 (5)	Cr II 32.06 (125) Fe II 31.72 (4)	Sm III 31.6 (25) Sm III 32.5 (125) Eu II 32.16 (40)
3133.42 (1)	Fe II 33.05 (4) (Fe II 33.72 (1))	V II 33.33 (150) Nd II 33.60 (100) Zr II 33.49 (25)
3134.36 (2)	Cr II 34.33 (25) (Eu II 34.69 (15))	
3135.65 (4)	Cr II 35.74 (30) Fe II 35.36 (9)	Cr II 35.35 (20) Dy II 35.37 (500)
3136.70 (3)	Cr II 36.68 (40) (Eu II 36.96 (15))	Pr II 36.79 (20)
3137.44 (2)	Cr II 37.55 (8) Cr II 37.11 (3)	Nd II 37.25 (30)
3138.40 (1)	Cr II 38.25 (7) Fe II 38.21 (1n)	Zr II 38.66 (25)
3140.06 (4)	Cr II 39.91 (8) (Gd II 39.72(15))	
3140.34 (4)	Cr II 40.21 (25) Fe II 40.69 (1)	Dy II 40.64 (150) Eu II 40.36 (15)
3141.43 (1)	Cr II 41.80 (4) Ce III 41.25 (250)	Dy II 41.13 (200) Nd II 41.48 (40)
3142.21 (1)	Fe II 42.22 (0) V II 42.48 (150)	Fe I 42.45 (125) Dy II 42.30 (40) Ce II 42.31 (25) Nd II 42.44 (30)
3142.91 (1)	Cr II 42.74 (10) Cr II 42.97 (8)	Gd II 42.90 (300) Fe I 42.88 (80)
3143.15 (1)	Gd II 43.13 (400) (Fe I 43.24 (60))	
3145.03 (2)	Cr II 45.10 (10) Fe II 44.75 (5)	Gd II 45.00 (2500) Ce II 45.28 (150) Ce III 43.96 (200) Sa III 45.1 (30)
3145.96 (1)	Cr II 45.77 (15) Gd II 45.52 (800)	
3147.35 (4n)	Cr II 47.23 (50) Ce III 47.05 (300)	Pr III 47.0 (60) Pr III 47.7 (100) Gd II 46.88 (250) Eu II 47.43 (20) Dy II 47.53 (30)
3149.33 (1n?)	Cr II 49.12 (4) Sm III 49.4 (20)	Sm III 49.7 (100) Nd II 49.30 (40) Nd II 49.51 (40)
3150.20 (3)	Cr II 50.11 (20) Cr II 49.83 (20)	Eu II 49.88 (60)
3151.32 (1)	Fe I 51.35 (300) (V II 51.32 (100))	Tm II 51.04 (200) Pr II 51.54 (25)
3152.25 (3)	Cr II 52.21 (40) Ti II 52.25 (125)	Sm II 52.52 (300) Gd II 51.91 (20) Dy II 51.89 (50)
3154.33 (5)	Fe II 54.20 (12) Cr II 54.04 (5)	Cr II 54.10 (2) Ti II 54.19 (100)
3155.91 (1)	Fe II 55.95 (2) Ti II 55.67 (125)	Nd III 56.0 (10) Ce II 55.70 (20) Zr II 55.68 (10) Nd II 55.76 (10)
3158.11 (1)	Cr II 58.03 (20)	
3159.13 (2)	Cr II 59.10 (5) (Fe II 59.32 (pr))	Zr II 59.12 (5) Nd II 59.22 (10)

TABLE 1 -- Continued

Wave Length and Int.	Principal Contributors	Rare Earths and Minor Contributors
3160.18 (1)	Cr II 59.86 (5) Cr II 60.11 (3)	Dy II 60.50 (40) Eu II 60.33 (10) Pr III 60.0 (150)
3161.41 (1)	Gd II 61.37 (2500) Ti II 61.20 (125)	Ti II 61.77 (150)
3162.19 (1)	Cr II 62.46 (10) Fe II 61.94 (5)	Ti II 62.57 (200) Fe I 61.95 (200)
3163.13 (1)	Fe II 62.80 (8) Fe II 63.09 (5)	Nd III 63.3 (10)
3164.12 (2)	Cr II 63.93 (10) Cr II 64.28 (4)	Cr II 64.48 (1) Ce II 64.15 (200) Zr II 64.32 (20)
3165.54 (1)	Ce III 65.54 (25) Sm III 65.5 (150)	Zr II 65.45 (7) Zr II 65.98 (10)
3166.48 (2)	Fe II 66.67 (4) (Fe II 66.22 (pr))	Eu II 66.49 (25) Zr II 66.29 (8)
3168.03 (3)	Fe II 67.85 (11) (Cr II 68.39 (2))	Sm III 68.0 (50) Sm III 68.2 (80) Ce III 68.02 (25) Gd II 68.13 (50) Gd II 68.29 (60)
3168.86 (1)	Cr II 69.20 (25) Ti II 68.52 (300)	Ce II 69.18 (150) Yb II 69.06 (10)
3170.22 (1)	Fe II 70.34 (6) (Cr II 69.85 (2))	Dy II 69.98 (300) Eu II 70.41 (50) Sm II 69.87 (250) Pr III 70.2 (50)
3172.13 (2)	Cr II 72.08 (40) (Nd III 71.7 (40))	Eu II 71.94 (50) Pr II 72.31 (50) Gd II 72.17 (30)
3172.92 (1)	Tm II 72.83 (180) Pr III 72.9 (100)	Gd II 72.86 (40)
3173.71 (1)	Cr II 73.58 (15) Eu II 73.61 (100)	
3175.33 (2)	Fe II 75.08 (4) Fe I 75.45 (200)	Ti II 75.66 (20)
3177.70 (3)	Fe II 77.53 (10) (Cr II 77.90 (1))	Dy II 77.88 (125) Gd II 77.49 (30)
3178.72 (1)	Cr II 78.79 (7) (Ti II 78.63 (25))	Eu II 78.71 (12) Gd II 78.94 (12)
3179.51 (2)	Fe II 79.50 (8) Cr II 79.45 (8)	
3180.18 (1)	Fe II 80.16 (7) Fe I 80.23 (300)	Ti II 80.22 (20) Gd II 80.03 (10)
3180.80 (2)	Cr II 80.73 (75)	
3181.54 (2)	Cr II 81.43 (20) (Zr II 81.58 (8))	
3182.04 (1)	Ti II 81.84 (50) Fe I 82.06 (80)	Zr II 81.94 (7)
3182.73 (1)	Fe I 82.97 (125) (Fe II 83.11 (8))	Ti II 82.57 (40) Zr II 82.86 (35) Gd II 82.55 (60) Eu II 82.98 (12)
3183.56 (4)	Cr II 83.32 (40) Ce II 83.52 (250)	Eu III 83.7 (100) Sm II 83.92 (400)
3184.52 (2)	Cr II 84.36 (15) Pr III 84.8 (150)	Dy II 84.78 (40)
3185.30 (1)	Fe II 85.31 (5) Eu II 85.54 (70)	Sm III 85.6 (10)
3186.74 (5)	Fe II 86.74 (11) Cr II 86.75 (18)	Sm II 87.01 (200) Dy II 86.37 (80)
3187.59 (1)	Fe II 87.29 (8) V II 87.72 (200)	Sm II 87.22 (300) Sm II 87.79 (200) Dy II 87.68 (60) He I 87.74 (200)
3188.75 (1)	Fe I 88.57 (150) Fe I 88.82 (150)	V II 88.52 (300)
3190.75 (3)	Cr II 90.69 (6) Ti II 90.87 (200)	V II 90.68 (150) Fe II 90.84 (pr) Eu II 90.60 (15)
3192.00 (1)	Fe II 92.06 (3) Pr III 91.8 (60)	Ti I 91.99 (100) Zr II 91.93 (12)

TABLE 1 -- Continued

Wave Length and Int.	Principal Contributors	Rare Earths and Minor Contributors
3193.00 (1)	Fe II 92.92 (9) Sm II 93.01 (300)	Cr II 93.41 (2) Gd II 93.17 (200) Dy II 93.31 (80) Yb II 92.88 (50)
3193.96 (3)	Fe II 93.81 (11)	
3194.81 (1)	Cr II 94.63 (10) Ce II 94.82 (200)	Ti II 94.76 (40) Eu II 95.10 (10) Sm III 94.8 (15) Sm III 95.0 (15)
3196.14 (4)	Fe II 96.07 (10) (Sm II 96.18 (150))	Pr II 96.04 (50)
3197.08 (4)	Cr II 97.12 (75) Cr II 96.96 (20)	Fe I 96.93 (500) Sm III 96.7 (15) Sm III 97.2 (10) Nd III 96.7 (20)
3198.62 (1)	(Eu II 98.76 (20)) (Yb (II?) 98.64 (S 20))	
3199.91 (1n)	Cr II 99.87 (10) Cr II 00.45 (10)	Fe I 99.52 (300) Ti I 99.91 (200) Sm III 99.6 (50) Gd II 00.31 (50)
3201.45 (1)	Cr II 01.26 (25) Ce II 01.71 (300)	Nd III 01.5 (40) Yb II 01.16 (25)
3202.60 (1)	Cr II 02.52 (15) Ti II 02.54 (200)	
3203.53 (1)	Cr II 03.53 (15) Fe II 03.51 (1)	Fe II 03.74 (0) Ti II 03.43 (15) Nd II 03.46 (30)
3205.14 (3)	Cr II 05.11 (25) Fe I 05.40 (300)	Sm III 05.4 (20)
3206.32 (1)	Gd II 06.47 (400) Dy II 06.40 (80)	Fe II 06.21 (0) Ti II 05.99 (15)
3207.22 (1)	Sm II 07.18 (400) Dy II 07.10 (60)	Eu II 07.31 (20)
3208.67 (2)	Cr II 08.62 (20) Dy II 08.81 (80)	Ti II 08.61 (20)
3209.42 (2)	Cr II 09.21 (50) Fe II 09.60 (1)	Fe I 09.30 (200) Sm III 09.3 (40) Gd II 09.66 (60)
3210.49 (1)	Fe II 10.45 (10) (Eu II 10.16 (10))	
3211.89 (1)	Cr II 11.50 (3) Sm II 11.73 (400)	Gd II 11.57 (50) Fe I 11.99 (70)
3213.30 (3)	Fe II 13.31 (13) Cr II 12.91 (18)	Cr II 13.46 (3)
3214.74 (1)	V II 14.75 (120) Ti II 14.75 (80)	Sm III 14.9 (20)
3215.69 (1)	Fe I 15.94 (300) (Dy II 15.19 (125))	
3216.62 (3)	Cr II 16.55 (20) (Sm II 16.85 (300)	Dy II 16.63 (150) Y II 16.68 (70)
3217.28 (3)	Cr II 17.44 (50) V II 17.12 (400)	Ti II 17.06 (150) Sm III 17.5 (30) Gd II 17.03 (25) Gd II 17.13 (40) Nd II 17.12 (25)
3218.85 (1)	Ce II 18.94 (200) Sm II 18.60 (300)	Zr II 18.52 (7)
3219.48 (2)	Cr II 19.79 (10) Cr II 19.13 (18)	Fe I 19.58 (200) Pr II 19.55 (75) Gd II 19.25 (15)
3220.91 (1n)	Fe II 20.83 (0) Ce II 21.17 (250)	Sm III 21.2 (40)
3222.99 (3)	Fe II 23.44 (1) Ti II 22.84 (150)	Fe II 22.94 (0) Sm III 22.7 (100) Dy II 23.29 (80)
3224.20 (1)	Ti II 24.24 (150) Gd II 23.74 (1000)	
3225.66 (2)	Cr II 25.44 (8) Cr II 25.39 (12)	Fe I 25.79 (300) Gd II 25.46 (600) Sm III 25.4 (50) Dy II 25.96 (80)

TABLE 1 -- Continued

Wave Length and Int.	Principal Contributors	Rare Earths and Minor Contributors
3226.61 (1)	Fe II 26.38 (2) Cr II 26.36 (4)	Gd II 26.32 (1000) Ti II 26.77 (35)
3227.73 (3)	Fe II 27.73 (13) (Cr II 27.48 (3))	Sm III 27.5 (25) Nd II 28.05 (20)
3228.72 (1)	Fe II 28.60 (3) Ti II 28.60 (100)	Sm II 28.78 (200) Ce III 28.56 (400) Sm III 29.1 (80) Zr II 28.81 (15) Gd II 28.64 (15)
3229.58 (2)	Cr II 29.89 (10) Cr II 29.38 (8)	Ti II 29.42 (70) Ti II 29.19 (60) Nd III 29.9 (300) Pr III 29.2 (30) Gd II 29.32 (25) Ce II 29.36 (25)
3230.54 (1)	Fe II 30.50 (1) Sm II 30.56 (400)	
3231.78 (3)	Fe II 31.70 (5) Cr II 31.64 (8)	Zr II 31.69 (30) Eu II 31.87 (10)
3232.15 (1)	Ti II 32.28 (100) Fe II 32.05 (0)	Eu II 32.31 (20)
3233.08 (3)	Fe II 32.79 (7) (Fe I 33.05 (100))	Gd II 32.95 (80) Gd II 32.70 (50)
3234.28 (3n)	Cr II 34.06 (50) Ti II 34.52 (500)	Ce II 34.27 (300) Ce II 34.16 (300) Eu II 34.31 (15) Pr II 34.22 (20)
3236.60 (2)	Ti II 36.57 (300) Sm II 36.64 (500)	Ce II 36.73 (150) Fe II 36.85 (0) Dy II 36.63 (40)
3237.77 (2)	Fe II 37.81 (8) Fe II 37.40 (5)	V II 37.88 (350) Gd II 37.62 (100) Nd III 37.7 (200) Eu II 37.37 (15) Nd II 37.91 (20)
3238.95 (2)	Cr II 38.77 (50) Ti II 39.04 (300)	Gd II 38.62 (300) Pr II 38.87 (15)
3239.49 (1)	Fe I 39.44 (400) Ti II 39.66 (80)	
3239.99 (1)	Cr II 40.07 (7) Sm II 39.66 (300)	Fe II 39.87 (pr) Tm II 40.23 (125) Eu II 40.11 (10)
3241.87 (2)	Fe II 41.68 (2) Ti II 41.99 (300)	Y II 42.28 (100) Sm III 42.3 (20) Sm III 42.6 (50) Sm II 41.59 (100) Tm II 41.53 (180)
3243.69 (2)	Fe II 43.72 (8) Ce II 43.37 (200)	
3244.03 (1)	Fe I 44.19 (300) (Eu II 44.21 (8))	Eu II 44.47 (12)
3245.67 (1)	Fe I 45.98 (200) Cr II 45.31 (5)	Pr II 45.46 (25)
3247.45 (4)	Fe II 47.17 (9) Fe II 47.39 (3)	Cr II 47.33 (8) Sm III 47.17 (400) Nd III 47.1 (30) Eu II 47.32 (30)
3248.64 (1)	Ti II 48.60 (200) (Gd II 48.46 (25))	
3249.77 (2)	Fe II 49.66 (4) Fe II 49.91 (1)	Cr II 49.52 (3) Nd III 49.4 (80) Gd II 50.19 (300) Gd II 49.75 (40)
3251.73 (1n)	Ti II 51.91 (150) Fe II 51.34 (2)	V II 51.87 (200) Dy II 51.26 (300) Dy II 51.90 (50) Dy II 52.19 (50) Eu II 51.44 (20)
3252.94 (1)	Ti II 52.91 (200) Cr II 52.50 (5)	Gd II 52.74 (30)
3254.47 (2)	Ti II 54.25 (125) Fe I 54.36 (200)	V II 54.77 (300) Sm II 54.38 (500) Nd III 54.7 (250) Lu II 54.32 (90)
3256.02 (2)	Fe II 55.88 (8) Dy II 56.20 (80)	Nd III 56.4 (40) Gd II 55.82 (150) Gd II 56.38 (80)

TABLE 1 -- Continued

Wave Length and Int.	Principal Contributors	Rare Earths and Minor Contributors
3257.08 (1)	Fe II 57.36 (1) Gd II 57.07 (100)	Nd II 56.90 (15)
3257.97 (2)	Fe II 57.89 (3) Cr II 58.01 (3)	V II 57.89 (100) Tm II 58.05 (150)
3258.98 (3)	Fe II 59.05 (10) Fe II 58.77 (10)	Cr II 58.77 (30) Gd II 59.25 (250) Eu II 58.68 (20) Nd II 59.23 (30)
3260.57 (1)	(Ti II 60.26 (30)) (Ce II 60.97 (60))	Dy II 60.69 (50) Nd III 60.9 (15) Nd II 60.66 (20)
3261.45 (2)	Ti II 61.60 (300) Cr II 61.56 (4)	Fe II 61.51 (1) Sm III 61.2 (50) Nd III 61.3 (400) Yb II 61.51 (10)
3262.01 (3)	Cr II 61.89 (0) Fe I 62.28 (50)	Nd III 62.3 (300) Sm II 62.26 (...)
3263.80 (1)	Ti II 63.69 (70)	
3264.49 (2)	Cr II 64.26 (35)	
3266.94 (2)	Fe II 66.94 (4) Fe II 67.03 (3)	Eu II 66.39 (200) Gd II 67.08 (10) Nd II 67.25 (30)
3268.73 (1n)	Cr II 68.48 (10) Cr II 69.11 (10)	Fe II 68.51 (3) Fe II 68.92 (pr) Dy II 69.12 (80)
3270.24 (1)	Cr II 70.14 (40) (GdII 70.51 (100))	
3271.59 (1)	Ti II 71.65 (125) V II 71.12 (1200)	Cr II 71.40 (0)
3272.04 (1)	Ti II 72.08 (100) Ce II 72.25 (250)	Zr II 72.21 (8)
3273.34 (1)	Fe II 73.50 (3) Cr II 73.20 (1)	Zr II 73.04 (75) Sm II 73.48 (500) Nd III 73.2 (25) Gd II 73.16 (12)
3276.55 (1)	Fe II 76.61 (5) Cr II 76.28 (1)	V II 76.12 (1500) Ce II 76.25 (18)
3278.81 (1)	Cr II 78.79 (2) Ti II 78.92 (150)	Sm III 78.7 (20)
3280.85 (1)	Pr III 81.0 (200) (Zr II 80.75 (3)	
3281.72 (1n)	Fe II 81.29 (7) Ti II 82.33 (150)	Gd II 81.61 (200) Gd II 82.30 (400) Sm III 81.6 (25) Nd III 81.7 (10) Nd III 82.1 (20)
3283.07 (1)	Cr II 83.04 (20) (Zr II 82.84 (12))	Dy II 82.79 (100) Nd II 82.78 (8)
3284.17 (1)	(Ce II 84.22 (20)) (Eu II 83.87 (10))	Nd III 83.6 (200)
3285.60 (1)	Cr II 85.96 (20) Fe II 85.42 (3)	Sm II 85.66 (200) Eu II 85.88 (12)
3288.03 (2)	Cr II 88.04 (15) Ti II 87.65 (200)	Sm III 88.1 (40) Dy II 87.95 (50) Nd III 87.4 (60) Nd III 88.0 (15)
3291.76 (2)	Cr II 91.75 (40) (Gd II 92.21 (800))	Nd III 91.4 (15)
3295.44 (4)	Cr II 95.43 (50) Fe II 95.24 (4)	Fe II 95.81 (6) Ce II 95.29 (80) Pr III 96.1 (250) Pr II 95.53 (15)
3298.04 (1)	Fe II 97.89 (5) Sm II 98.10 (500)	Eu II 98.30 (25) Dy II 97.61 (20)
3299.97 (1)	Fe II 99.77 (1) (Fe II 00.06 (tr))	Ce II 00.15 (60) Nd II 00.15 (70)
3301.41 (1)	Cr II 01.21 (18) (Sm II 01.68 (100))	Nd III 02.0 (40)
3303.17 (1)	Fe II 02.86 (4) Fe II 03.47 (4)	Cr II 02.93 (1)

TABLE 1 -- Continued

Wave Length and Int.	Principal Contributors	Rare Earths and Minor Contributors
3304.83 (1)	Cr II 04.73 (5) (Zr II 05.15 (15))	Ce II 04.84 (60) Sm II 05.18 (200) Nd II 04.65 (10)
3306.86 (1)	Cr II 06.95 (50) Cr II 07.04 (50)	Sm II 07.02 (500)
3308.03 (1)	Cr II 08.15 (18) (Fe II 08.14 (tr))	Eu II 08.02 (200)
3309.16 (1)	Ti II 08.81 (100) (Nd III 09.15 (150))	Dy II 08.89 (200)
3310.69 (1)	Cr II 10.65 (35) (Sm II 10.66 (500))	Eu II 10.80 (10) Tm II 10.59 (60) Nd II 10.36 (15) Nd II 10.90 (30)
3312.19 (3)	Cr II 12.18 (40) Cr II 11.93 (40)	Ce II 12.21 (50) Eu II 12.15 (10)
3313.69 (1)	Gd II 13.73 (600) Eu II 13.33 (400)	Gd II 13.37 (80) Zr II 13.70 (8)
3314.36 (1)	Cr II 14.57 (35) Cr II 14.06 (18)	Sm III 14.9 (40) Ce II 14.72 (100) Zr II 14.49 (10) Pr II 14.38 (12)

TABLE 2

α^2 CVn. Region λ 3317 - λ 3408

Phase 0.47	1.46	2.93	3.94	4.93	Identification
				3317.39 (1)	(Dy II 7.12 (40)) (Eu II 7.35 (8))
				3318.00 (2)	Ti II 8.02 (125) Ce II 7.80 (30) Gd II 8.06 (100)
				3318.96 (1)	Fe II 8.86 (0) (Zr II 9.03 (8))
				3320.03 (2^+)	Gd II 0.44 (300) Eu 9.89 (80) Dy II 9.89 (400) Sm II 0.15 (600) (Gd II 0.32 (20)) (Gd II 9.83 (15))
				3320.87 (1)	Sm II 1.12 (800) (Ce II 0.94 (10)) (Ce II 0.79 (8))
3321.46 (2)	1.61 (2)			1.83 (3)	Fe II 1.49 (1) Ti II 1.70 (125) Eu II 1.86 (100) (V II 1.54 (150)) (Nd III 1.9 (30))
3322.95 (3)	2.97 (3)			3.04 (5)	Fe II 3.07 (8) Ti II 2.94 (300) Cr II 2.69 (12) Cr II 3.53 (8) (Sm III 2.7 (30)) (Zr II 2.99 (10))
3324.21 (2)	4.13 (3)			4.26 (2)	Cr II 4.35 (50) Cr II 4.06 (25) Cr II 4.10 (20) (Sm III 4.3 (15))
3325.31 (1)	5.33 (1)			5.38 (2)	Fe II 5.01 (1) Fe I 5.46 (100) Ce II 5.33 (50) Sm II 5.26 (300) Sm III 5.3 (100)
3326.22 (1)				6.40 (1)	Dy II 6.19 (50)

TABLE 2 -- Continued

Phase 0.47	1.46	2.93	3.94	4.93	Identification
3326.91 (3)	6.73 (2n)			7.06 (4)	Ti II 6.76 (125) Nd III 7.2 (100) Dy II 7.08 (30) (Zr II 6.81 (15)) (Sm III 6.7 (20)) (Eu II 7.08 (8))
	7.54 (1?)				(Fe II 7.63 (pr)) (Y II 7.87 (60))
3328.10 (3)	8.30 (2)			8.13 (1)	Cr II 8.35 (20) (Eu II 8.05 (15)) (Nd II 8.27 (80)) (Gd II 7.89 (10))
3329.23 (3)	9.24 (2)			9.41 (4)	Ti II 9.46 (200) Fe II 9.07 (2) Cr II 9.45 (4) Gd II 9.34 (400)
3330.70 (1)	0.73 (1)			0.66 (1)	(Gd II 0.34 (800))
3331.28 (1)				1.37 (1)	Gd II 1.38 (4000) (Eu II 1.21 (15)) (Nd II 1.57 (40)) (Ce II 1.22 (10))
3332.06 (2)	1.97 (2)			2.11 (3)	Ti II 2.11 (125) Gd II 2.13 (1000) (Cr II 2.14 (0))
3333.09 (1)	3.12 (1)			2.91 (2)	Sm III 3.0 (60) Gd II 3.21 (40) Si II 3.16 (2)
3334.01 (1)	4.10 (1)			4.21 (1)	Fe I 4.22 (150) Ce II 4.45 (60) Gd II 4.06 (150) Dy II 4.14 (30) (Zr II 4.25 (10)) (Nd II 4.47 (50))
3335.21 (4)	5.21 (4)			5.19 (5)	Cr II 5.28 (40) Cr II 5.46 (30) Ti II 5.19 (150)
3336.13 (3)	6.16 (2)			6.33 (5)	Cr II 6.33 (40) Gd II 6.18 (2500) Sm II 6.12 (200) (Cr II 5.93 (4)) (Cr II 6.16 (2)) (Eu II 6.51 (15))
3337.34 (1)	7.35 (1)			7.43 (1)	Fe I 7.67 (125) La II 7.49 (800) (Eu II 7.59 (8))
3338.49 (1)	8.67 (1)			8.74 (1)	Fe II 8.52 (3) Eu 8.75 (80) (Zr II 8.41 (10)) (Nd II 9.06 (60))
3339.64 (3)	9.50 (2)			9.74 (5)	Cr II 9.80 (50) Cr II 9.90 (20) Si II 9.84 (3) Dy II 9.51 (50) (Nd III 9.6 (80)) (Nd III 9.9 (60))
3340.49 (2)	0.38 (1)			0.50 (3)	Ti II 0.34 (100) Fe I 0.57 (125) Sm II 0.58 (800) (Zr II 0.55 (15))
3341.81 (3)	1.53 (3)			1.74 (4)	Ti II 1.87 (300) Cr II 1.98 (5) Ce II 1.87 (100) Pr III 1.3 (1200) Dy II 1.88 (80) (Dy II 1.43 (40)) (Nd III 1.9 (40))
3342.60 (2)	2.41 (2)			2.55 (1)	Cr II 2.51 (50) (Sm II 2.35 (200)) (Sm III 2.7 (40))
3343.39 (1)				3.57 (2)	Sm II 3.49 (200) (Nd III 3.35 (60))
3344.03 (1)	3.84 (1)				Ti II 3.77 (70) Ce II 3.86 (200) (Zr II 3.81 (15))
3344.80 (1)	4.63 (1)				Ce II 4.76 (300) La II 4.56 (300) (Sm III 5.0 (30)) (Cr II 4.52 (1)) (Zr II 4.80 (15))
3345.62 (1)	5.62 (1)			5.87 (1)	Gd II 5.98 (2000) (Gd II 5.41 (100)) (Gd II 5.82 (80))

TABLE 2 -- Continued

Phase 0.47	1.46	2.93	3.94	4.93	Identification
3346.80 (3)	6.58 (2)			6.85 (3)	Ti II 6.73 (60) (Eu II 6.63 (20))
3347.81 (3)	7.78 (2)			7.83 (3)	Cr II 7.84 (40) Dy II 7.82 (40) (Sm III 7.9 (30)) (Nd II 8.16 (25)) (Nd II 7.57 (10))
3348.88 (3)	8.82 (3)			8.88 (4)	Ti II 9.03 (800) (Sm II 8.68 (200))
3349.41 (3)	9.47 (4)			9.32 (4)	Ti II 9.41 (400) Cr II 9.34 (6) (Eu II 9.7 (3))
3350.48 (1)	0.44 (1)			0.34 (1)	Gd II 0.47 (10,000) (Gd II 0.10 (400)) (Ni II 0.42 (5))
3351.65 (1)	1.76 (1)			1.65 (1)	Fe I 1.74 (80) Fe I 1.52 (70) Eu II 1.56 (40) (Nd III 1.6 (25)) (Ti II 1.67 (5))
3353.21 (3)	3.10 (4)			3.06 (4)	Cr II 3.12 (20) Dy II 2.70 (50) Ce III 3.26 (150) (Co II 2.80 (30)) (Nd II 3.59 (20))
3354.99 (1n)	4.94 (1n)			4.76 (1)	Pr III 4.9 (600) (Eu II 4.38 (30)) (Eu II 4.51 (10)) (Eu II 4.60 (10)) (Eu II 5.03 (6)) (Gd II 4.92 (25)) (Nd II 4.62 (10))
3355.29 (1)				5.27 (1)	Fe I 5.23 (100) (Cr II 5.2 (1)) (Sm III 5.4 (80)) (Eu II 5.42 (20))
3356.14 (1)	6.10 (1)			6.22 (2)	Fe II 6.26 (2) Dy II 6.22 (40) Gd II 6.51 (80) (Zr II 6.08 (18)) (Eu II 6.02 (12)) (Nd II 5.92 (40))
3357.35 (2)	7.31 (2)			7.37 (2)	Cr II 7.40 (40) Ce II 7.21 (125) Pr III 7.7 (800) (Zr II 7.26 (15))
3358.48 (3)	8.40 (3)			8.53 (4)	Cr II 8.50 (75) Fe II 8.25 (3) Gd II 8.62 (8000) (Dy II 8.61 (40)) (Nd III 8.7 (20)) (Co II 8.60 (20))
3359.52 (1)	9.37 (1)			9.57 (1)	Pr III 9.5 (700) Dy II 9.48 (40) (Cr II 9.64 (0)) (Sm III 9.3 (40)) (Nd II 9.77 (15))
3360.24 (2)	0.25 (3)			0.36 (2)	Cr II 0.29 (100) Fe II 0.10 (3) Gd II 0.71 (1000) Ce II 0.54 (75) (Nd III 0.6 (25)) (Zr II 9.96 (12))
3361.22 (2)	1.13 (2)			1.29 (2)	Ti II 1.21 (600)
3361.78 (1)	1.78 (2)				Cr II 1.77 (30) (Eu II 1.62 (15))
3362.27 (1)				2.04 (1)	Gd II 2.23 (10,000)
	2.72 (1)				Gd II 2.94 (125) Tm II 2.62 (300) Fe II 2.76 (0) (Ti II 2.65 (5))
3363.58 (1)	3.64 (1)			3.86 (2)	Cr II 3.71 (12) (Gd II 3.97 (30))
3364.60 (2)	4.74 (1)			4.47 (2)	Gd II 4.24 (500) (Pr III 4.7 (30)) (Cr II 4.72 (1)) (Eu II 4.21 (15) (Nd II 4.95 (50))
3366.22 (1n)	5.87 (1)			5.99 (1n)	Ti II 6.18 (50) Ce II 6.55 (150) Fe II 5.64 (0) Gd II 5.59 (400) Sm II 5.86 (400) (Dy II 5.80 (30))

TABLE 2 -- Continued

Phase 0.47	1.46	2.93	3.94	4.93	Identification
3367.30 (2)	7.23 (2)			7.35 (3)	Cr II 7.42 (12) Fe II 6.96 (3) Pr III 7.6 (1,000) Gd II 7.09 (100) Gd II 7.66 (150)
3368.10 (4)	8.12 (3)			7.96 (4)	Cr II 8.05 (150) Dy II 8.12 (150) (Zr II 7.81 (5))
3368.94 (2)	8.93 (2)				Cr II 9.05 (18) Cr II 8.73 (10) Eu II 9.05 (200)
3369.60 (2)	9.57 (2)			9.44 (3)	Fe II 9.35 (3) Fe I 9.55 (300) Gd II 9.62 (400) Sm II 9.45 (200)
3371.05 (1)	1.19 (1)	0.94 (1)	0.60 (1)	0.91 (1)	Fe I 0.79 (300) Dy II 0.86 (40) Sm II 1.21 (150) Cr II 0.71 (0) Cr II 1.46 (1) (Co II 0.94 (50))
3371.98 (2)	2.14 (3)	2.10 (1)	1.87 (1)	2.07 (2)	Cr II 2.13 (15) Pr III 2.0 (100) Ti II 2.21 (15) Dy II 1.7 (40) Dy II 1.8 (40)
3372.82 (3)	2.70 (3)	2.82 (1)	2.66 (2)	2.88 (3)	Ti II 2.80 (400) (Cr II 2.45 (0)) (Pr II 2.51 (25))
				3.63 (1)	Ce II 3.73 (125) Ce II 3.45 (100) (Zr II 3.42 (8))
			3.93 (1)		Ni II 3.97 (4)
3374.04 (2)	4.16 (1)	4.37 (1)		4.18 (2)	Ti II 4.35 (30) (Tm II 4.51 (100) (Eu II 4.47 (10))
	5.04 (2)	5.03 (2)	4.94 (2)	4.85 (1)	Cr II 4.99 (8) Cr II 4.95 (3) Gd II 4.69 (300) (Nd II 5.24 (15)) (Zr II 4.71 (15))
3375.88 (2)					(Sm III 5.6 (40)) (Yb II 5.48 (15))
3376.22 (3)	6.33 (2n)	6.40 (2)	6.49 (1)	6.34 (2)	Cr II 6.27 (10) (Zr II 6.25 (7))
		6.74 (1)			Cr II 6.72 (5)
3377.15 (1)	7.33 (1)		7.35 (1)	7.26 (1)	Cr II 7.36 (5) Ce II 7.13 (300) (Pr III 7.05 (60)) (Zr II 7.45 (6))
3378.24 (3)	8.38 (3)	8.35 (1)	8.22 (2)	8.54 (2)	Cr II 8.34 (25) Fe I 8.68 (150) Dy II 8.43 (40) (Zr II 8.30 (5))
3379.38 (2)	9.45 (2)		9.50 (2)	9.45 (1)	Cr II 9.37 (30) Ce II 9.17 (100)
3380.07 (3)	0.15 (2)	9.83 (2)	9.90 (2)	0.24 (4)	Cr II 9.82 (60) Ti II 0.28 (150) Fe I 0.11 (200) Eu II 0.25 (100) Gd II 9.76 (400) Gd II 0.01 (200) Pr III 0.1 (200)
3381.43 (1)	1.32 (1)	1.18 (1n)	1.37 (2)	1.62 (1)	Fe II 1.00 (4) Pr III 1.2 (300) (Gd II 1.51 (10))
		1.93 (1)			Pr III 1.7 (200) Eu II 1.73 (30) Gd II 1.79 (40)
3382.69 (3)	2.69 (4)	2.71 (2)	2.63 (2)	2.74 (2)	Cr II 2.68 (60)
3383.86 (4)	3.83 (3)	3.70 (1)	3.65 (2)	4.03 (4)	Ti II 3.76 (300) Fe I 3.70 (100) (Gd II 3.68 (20))
		4.22 (1)			

TABLE 2 -- Continued

0.47	1.46	Phase 2.93	3.94	4.93	Identification
3384.77 (4)			4.74 (1)		Sm II 4.66 (300)
3385.08 (2)	4.98 (1)	5.15 (1)	5.22 (1)	5.36 (2)	Dy II 5.03 (400) (Gd II 5.31 (30))
3385.87 (1?)	5.85 (1)				
3386.61 (2)	6.75 (1)	6.53 (1)	6.60 (1)	6.69 (1)	Fe II 6.45 (1) Fe II 6.72 (2) Dy II 6.58 (60) (Cr II 6.95 (0)) (Nd II 6.52 (20))
3387.87 (4)	7.48 (4)	7.93 (3)	7.62 (4)	7.98 (5)	Ti II 7.84 (125) Fe II 8.13 (2) Cr II 7.73 (5) Cr II 7.96 (3) Gd II 8.06 (40) (Nd II 8.02 (5)) (Co II 7.69 (15)) (Co II 8.17 (12)) (Zr II 7.87 (12))
3388.89 (1)	8.69 (1)			8.68 (1)	Ti II 8.75 (35) Dy II 8.86 (100) Gd II 8.91 (100)
3389.90 (1)	9.88 (1)			9.82 (1)	Fe II 0.08 (2) Pr III 0.1 (40)
3391.28 (3)	1.49 (2)	1.42 (2)	1.19 (3)	1.25 (2)	Cr II 1.43 (35) Fe II 1.30 (1) Gd II 0.88 (200) Pr III 0.9 (100) Gd II 1.29 (150)
3392.10 (1)	2.04 (1)				Eu II 1.99 (100) Fe I 2.31 (125) Zr II 1.96 (100) Sm III 1.8 (100) (Gd II 2.01 (25))
3392.89 (2)	2.88 (2)	3.07 (3)	2.65 (2)	2.85 (2)	Cr II 3.00 (35) Gd II 2.53 (2000) Sm II 2.7 (150) (Eu II 3.26 (15)) (Gd II 3.07 (30)) (Zr II 3.12 (10))
3393.82 (2)	3.81 (1)	3.96 (2)	3.68 (2)	3.95 (2)	Cr II 3.86 (30) Gd II 3.63 (400) Dy II 3.58 (400) Ce II 3.92 (50) Eu II 4.06 (20) (Eu II 3.77 (10)) (Nd II 3.64 (60)) (Nd III 4.0 (20))
3394.32 (2^+)	4.39 (2)	4.54 (2)	4.35 (3)	4.55 (2^+)	Cr II 4.32 (35) Ti II 4.57 (200) Fe I 4.59 (150) Pr III 4.2 (100) (Gd II 4.15 (40)) (Pr II 4.61 (75))
3395.39 (2)	5.54 (2)	5.61 (3)	5.63 (2)	5.62 (1)	Cr II 5.62 (20) Fe II 5.34 (4) (Ce III 5.73 (50)) (Eu II 5.36 (20))
3396.64 (2)	6.68 (1)		6.55 (1)	6.72 (2)	Eu II 6.58 (200) Pr III 6.5 (800) (Cr II 6.50 (0)) (Gd II 6.78 (20)) (Zr II 6.34 (7)) (Zr II 6.66 (6))
3397.53 (1)			7.44 (1)	7.73 (1)	Pr III 7.5 (600) Tm II 7.50 (100) (Ni II 7.82 (1))
	8.12 (1)				Fe II 8.35 (4) (Sm III 8.4 (60))
3398.71 (2)	8.90 (2)			8.88 (2)	Ce III 8.91 (20) (Gd II 9.15 (12)) (Ho (II?) 8.98 (S 60))
			9.46 (1nn)		Cr II 9.54 (18) Fe I 9.34 (200) Gd II 9.41 (500) (Zr II 9.36 (10))
3399.93 (2)	9.82 (2)	9.77 (1)		0.01 (2)	Gd II 9.99 (1200) Cr II 0.08 (2)
3401.28 (1)		1.21 (1)		1.67 (1)	Fe I 1.52 (150) Gd II 1.07 (300) (Ni II 1.76 (2))

TABLE 2 -- Continued

Phase 0.47	1.46	2.93	3.94	4.93	Identification
3402.22 (2)	2.24 (2)	2.37 (2)	2.26 (2)	2.31 (3)	Cr II 2.43 (25) Gd II 2.07 (1000) Ti II 2.42 (90) Sm II 2.46 (500) (Eu II 2.44 (15)
3403.28 (5)	3.31 (3)	3.30 (3)	3.37 (4)	3.44 (3)	Cr II 3.32 (100) (Gd II 3.08 (150)) (Eu II 3.16 (12)) (Zr II 3.69 (8)) (Gd II 3.34 (40))
3404.42 (1)	4.69 (1)	4.11 (1)			Fe I 4.36 (100)
3404.98 (2)		5.12 (1)	4.80 (1)	4.80 (2)	Gd II 5.04 (150) (Zr II 4.84 (12))
3405.95 (1)	5.52 (1)	5.70 (1)	5.85 (1)	5.81 (1)	Ce II 5.98 (100) Cr II 5.3 (1n) (Eu II 5.43 (15)) (Eu II 6.14 (25))
3406.65 (2)	6.51 (1)	6.72 (1)	6.70 (1)	7.00 (2)	Fe I 6.80 (100) (Fe II 6.76 (pr))
3407.45 (2)	7.27 (2)	7.40 (1)	7.45 (1)	7.66 (2)	Fe I 7.46 (400) Ti II 7.20 (50) Ni II 7.30 (8) Gd II 7.61 (1500) Gd II 7.56 (600) (Dy II 7.17 (40))
	8.05 (1)	8.24 (1)	8.04 (1)	8.03 (1)	Dy II 7.80 (800) (Dy II 8.16 (60)) (Zr II 8.09 (10))

TABLE 3

α^2 CVn Region λ 3407 - λ 4740

2.363	Identification
3407.32 (1)	Ti II .20 (50) Ni II .30 (8) (Fe I .46 (400))
3408.11 (1)	Dy II .80 (800) Zr II .08 (9) (Dy II .16 (60))
3408.85 (2)	Cr II .76 (150) (Sm II .68 (400))
3416.05 (0)	Fe II .02 (5)
3416.85 (0)	Ti II .96 (50) Gd II .95 (2500) (Eu II .74 (60)) (Eu II .88 (30))
3419.47 (0)	Cr II .31 (1) Dy II .64 (50) (Pr II .24 (12))
3421.16 (3)	Cr II .21 (75) (Eu II .23 (12))
3421.68 (1)	Cr II .62 (4) (Eu II .67 (25))
3422.74 (2)	Cr II .74 (125) Ce II .71 (300) Ti II .66 (S 10) Gd II .75 (500) (Fe I .66 (100)) (Dy II .88 (25))
3423.88 (1n)	Gd II .92 (1500) Co II .83 (20) (Fe I .29 (200)) (Ni I .71 (600)) (Fe II .17 (pr))
3424.62 (0)	Gd II .59 (1200) Cr II .65 (1) (Zr II .82 (7))
3425.57 (1)	Fe II .58 (3) (Tm II .63 (150)) (Gd II .62 (50))
3426.19 (1)	Cr II .13 (8) Gd II .93 (600) Gd II .34 (50) Ce II .21 (250) (Fe I .39 (80))

TABLE 3 -- Continued

1.323	2.363	Identification
	7.18 (1n)	Pr III .0 (300) Ce III .33 (125) Gd II .36 (80) Cr II 7.92 (1) (Cr II .11 (1)) (Fe II 6.81 (pr)) (Eu II .04 (6)) (Eu II 8.33 (5))
	8.45 (0)	Gd II .47 (500) Cr II .94 (7) (Al II .92 (50)) (Eu II .76 (15)) (Nd II .92 (40)) (Eu II .92 (12)) (Eu II 9.25 (15)) (Eu II 9.33 (12)) (Dy II 9.44 (60))
	0.49 (1)	Cr II .42 (3) Cr II .67 (0) Zr II .53 (30) Gd II .24 (40) (Eu II .37 (15))
	1.46 (0)	Nd III .4 (30) Gd II .50 (40) (Zr II .57 (6))
	2.19 (1)	Cr II .32 (2) (Cr II .12 (pr))
	3.30 (5)	Cr II .31 (75)
	4.15 (2)	Dy II .37 (200) (Zr II .90 (8))
	5.02 (0)	Eu II .05 (40)
	6.08 (1)	Fe II .11 (5)
	6.60 (0)	Cr II .75 (1) (Pr III .4 (150))
	7.30 (0)	Pr III .3 (600) (Zr II .16 (10)) (Ni I .28 (600))
	7.90 (0)	Cr II .93 (2) (Gd II .84 (10))
	8.22 (1)	Zr II .23 (100) (Cr II .46 (0))
	8.98 (1)	Mn II .97 (20) Gd II .21 (3000) (Dy II .95 (40)) (Yb II .84 (15))
	9.76 (1)	Gd II .99 (6000) Gd II .78 (1500) Ce II .83 (60) (Eu II .59 (10))
3440.71 (1)	0.58 (1)	Pr III .6 (100) Fe I .61 (500) Sm II .50 (100) Cr II .60 (1)
	1.00 (1)	Fe I .99 (300) Dy II .94 (60) (Eu II .00 (80)) (Eu II .82 (30))
3441.31 (1)	1.36 (0)	Ce II .21 (150) Dy II .45 (100) (Tm II .50 (200))
3441.95 (3)	1.99 (4)	Mn II .99 (75) (Gd II .79 (400)) (Fe II .90 (0)) (Ce II .87 (100))
3442.50 (0)		Fe II .24 (3) Ce II .38 (75)
	2.72 (0)	Fe II .79 (pr)
	3.15 (0)	(Nd II .31 (20)) (Ti II .39 (35))
3443.55 (1)	3.66 (1)	Ce III .61 (150) (Eu II .54 (6)) (Nd II .60 (15)) (Zr II .57 (7))
3444.28 (1)	4.34 (1)	Cr II .34 (4) Ti II .31 (150)
3444.67 (0)		Fe II .76 (pr)
3445.08 (1)	5.08 (1)	Cr II .04 (5) Pr III .3 (1000) (Eu II .18 (30))
3445.67 (0)	5.55 (0)	Dy II .58 (300) Fe II .58 (pr)
3446.45 (0)	6.28 (1)	Co II .39 (60) Ni I .26 (1000) (Eu II .37 (20))
	7.30 (0)	Fe I .28 (100) (Dy II .00 (60))
3447.86 (0)	7.72 (1)	(Nd II .62 (8))
	8.47 (1)	Fe II .43 (1) (Gd II .32 (20))
3449.39 (1)	9.21 (1n)	Cr II .28 (2) Gd II .16 (30) Gd II .62 (800)

TABLE 3 -- Continued

1.323	2.363	Identification
3450.31 (0)	0.29 (1)	Gd II .38 (4000) Fe I .33 (150)
	0.89 (0)	Cr II .84 (3)
3451.34 (1)	1.29 (1n)	Fe II .23 (2) Fe II .32 (2) Gd II .23 (2000) (Fe II .61 (2))
3452.55 (1)	2.42 (1)	Ti II .47 (100) (Fe I .28 (150))
3453.62 (0)	3.43 (1)	Fe II .60 (2) Eu II .47 (50)
	3.84 (0)	Tm II .66 (200)
3454.12 (0)	4.25 (2)	Ni II .16 (5) Gd II .14 (1500) Pr III .1 (40) Yb II .07 (60) (Eu II .15 (15))
3454.45 (0)		Ce III .37 (150) Dy II .33 (150) (Dy II .52 (40)) (Nd II .39(10))
3454.91 (2)	4.99 (2)	Cr II .98 (35) Gd II .90 (2000)
3455.66 (0)	5.71 (0)	(Ho (II ?) .70 (S 6))
3456.36 (0)	6.36 (1)	Ti II .39 (125) (Dy II .57 (80))
3456.79 (0)	6.88 (1)	Fe II .93 (5) (Gd II .05 (300))
3457.58 (1)	7.60 (2)	Cr II .62 (30) (Zr II .56 (12)) (Eu II .57 (30))
3458.08 (0)	8.06 (1)	(Nd II .00 (10)) (Yb (II?) .28 (S 100))
3458.89 (1)	8.77 (0)	(Zr II .93 (10)) (Nd II .95 (15))
3459.38 (2)	9.29 (3)	Cr II .29 (25) (Ce III .37 (200)) (Eu II .36 (10))
3459.97 (1)	0.07 (1)	Mn II .02 (8) Cr II .03 (1) Fe I .92 (80)
3460.28 (2)	0.37 (4)	Mn II .33 (75) (Eu II .29 (15))
3460.94 (0)	0.96 (0)	Dy II .97 (300) Cr II .80 (0)
	1.36 (2)	Cr II .28 (3) (Eu II .38 (80))
3461.59 (1)		Ti II .50 (125) (Ni I .65 (800))
3462.03 (0)		Gd II .95 (300) Tm II .20 (300)
3462.67 (1)	2.79 (1)	Cr II .73 (6)
3463.36 (0)	3.36 (0)	Mn II .33 (6) (Eu II .28 (12))
3463.96 (1)	3.99 (2)	Gd II .98 (5000) Mn II .04 (7) Cr II .02 (4) Fe II .97 (1) Gd II .13 (100) (Dy II .88 (20))
3464.44 (1)	4.47 (2)	Fe II .50 (3) Sr II .46 (200)
3464.93 (0)	4.96 (0)	Mn II .04 (8)
3465.53 (1)	5.44 (0)	Ti II .56 (60) Ni II .62 (1)
3466.10 (1)		(Fe I .86 (500))
	6.30 (1)	Mn II .34 (9) Cr II .25 (2) Eu II .41 (40) (Gd II .50 (150))
3466.98 (1)	7.08 (1)	Gd II .95 (600) Gd II .27 (3500) Eu II .86 (20) (Fe II .85 (pr))
3467.74 (0)	7.92 (0)	Sm II .87 (100) (Gd II .66 (40))
3468.12 (0)		Gd II .08 (200) (Ce II .11 (6))

TABLE 3 -- Continued

1.323	2.363	Identification
3468.56 (2)	8.69 (3)	Fe II .68 (8) (Dy II .44 (60))
3468.99 (1)		Gd II .99 (3000)
	9.16 (0)	
3469.47 (0)		Gd II .31 (100)
3470.17 (0)	0.14 (1)	Fe II .24 (1)
3470.94 (0)	0.87 (2)	Ce III .89 (300) Nd II .87 (20) (O II .77 (100)) (P II .82 (850)) (Dy II .15 (50))
	1.48 (1)	Ni II .35 (2) Dy II .53 (40 + 30) (Fe I .34 (40))
3471.97 (3)	2.04 (2)	Cr II .07 (25)
3472.92 (0n)	3.03 (0)	Fe II .89 (0)
3473.28 (0)		Gd II .22 (2000)
	3.84 (1)	Fe II .82 (2) Dy II .70 (50) (Pr II .85 (30))
3474.04 (6)		
	4.17 (3)	Mn II .04 (50) Mn II .12 (40) Dy II .29 (30)
3474.42 (1)		Pr III .5 (60) Eu II .50 (15)
	4.92 (0)	Sr II .89 (50) (La II .84 (8))
3475.10 (4)	5.18 (2)	Cr II .13 (20)
3475.69 (1)	5.72 (1)	(Fe II .74 (pr))
3476.12 (0)	6.26 (0)	Gd II .31 (200)
3476.66 (0)	6.70 (1)	Fe I .70 (300) (Eu II .60 (30))
3477.10 (1n)	7.10 (1)	Ti II .18 (100) Dy II .07 (100) (Eu II .98 (25)) (Ce II .84(150)) (Ti II .98 (8))
3478.00 (0)	7.84 (0)	Cr II .17 (3) (Gd II .03 (20)) (Gd II .07 (15))
3478.60 (0)	8.57 (1)	(Fe II .55 (pr)) (Yb II .84 (80)) (Zr II .50 (3))
3479.36 (0)	9.36 (1)	Zr II .39 (30)
3479.86 (1)	9.85 (1)	Fe II .91 (2) (Cr II .84 (0)) (Cr II .13 (0))
3480.48 (0)		Gd II .55 (60) (Zr II .40 (5)) (Eu II .40 (6))
	1.24 (1n)	Gd II .28 (5000) (Zr II .14 (35))
3482.00 (0)		Gd II .80 (3000) (Mn II .06 (1))
3482.47 (1)	2.50 (0n)	Cr II .58 (12) Fe II .43 (2) Gd II .60 (800) (Eu II .53 (12))
3482.90 (3)	2.96 (3)	Mn II .91 (40) (Gd II .95 (10))
3483.83 (1)	3.63 (1)	Ti II .80 (70) Gd II .76 (25) Gd II .94 (12) (Zr II .54 (12))
3484.12 (2)	4.20 (2)	Cr II .15 (20) (Fe II .35 (1))
3484.95 (0)		Ce II .05 (400)
	5.06 (0n)	
3485.26 (0)		Fe I .34 (100) Eu II .16 (15) Eu II .43 (25) (Zr II .31 (5))

TABLE 3 -- Continued

1.323	2.363	Identification
3486.41 (0)	6.49 (0)	(Ho (II ?) .34 (S 6))
3486.90 (0)	6.92 (0)	
3487.58 (0)	7.41 (0)	Cr II .30 (1) Pr II .57 (25) Dy II .58 (30)
3487.95 (1)	7.93 (1)	Fe II .99 (3) Fe I .84 (200)
3488.64 (4)	8.69 (3)	Mn II .68 (40) (Ce II .55 (75))
3489.08 (1)	9.22 (1)	Cr II .07 (2) (Pr II .01 (15))
3489.36 (1)		Cr II .45 (2) (Gd II .28 (40)) (Eu II .25 (25))
3489.81 (0)		Ti II .74 (S 20) (Gd II .76 (30))
3490.19 (0)	0.07 (0)	(Er (II?) .06 (S 3))
3490.58 (2)	0.60 (1)	Fe I .58 (400) (Eu II .48 (15))
3491.06 (3)	1.13 (1)	Ti II .05 (S 8) (Eu II .11 (12))
3491.40 (0)		(Gd II .51 (10))
3491.96 (0)	1.76 (0)	Gd II .95 (2000) Gd II 1.74 (150) (Pr II .94 (12))
3492.38 (1)	2.30 (1)	Ti II .5 (S 35)
3492.72 (0)	2.80 (0)	
3493.46 (4)	3.43 (5)	Fe II .47 (10)
3493.81 (0)		(Tb (II?) .90 (S 3)) (Gd II .03 (80)) (La II .97 (2))
	4.23 (1)	Pr III .3 (50) Dy II .16 (30) (Gd II .03 (80))
3494.53 (3)	4.60 (4)	Fe II .67 (5) Gd II .40 (3000) Dy II .50 (300) (Cr II .52 (4))
3494.99 (0)		Eu II .13 (15)
3495.38 (4)	5.42 (7)	Cr II .38 (25) Cr II .56 (20) (Fe I .29 (100))
3495.74 (3)	5.91 (1)	Mn II .83 (40) Fe II .62 (4) (Co I .69 (1000)) (Gd II .94 (20))
3496.30 (1)	6.31 (1)	Zr II .18 (50) Dy II .27 (50) (Fe II .34 (0))
3496.78 (2)	6.78 (1)	Mn II .81 (20)
3497.12 (0)	7.25 (0)	Fe I .11 (200) V II .03 (200)
3497.50 (3)	7.67 (4)	Mn II .54 (25)
3497.87 (4)		Fe II .81 (2) Fe I .84 (200) Ce III .76 (60) Dy II .84 (40) (Fe II .73 (pr)) (Zr II .90 (12)) (Eu II .84 (10))
3498.25 (0)	8.35 (1)	Cr II .35 (1)
3498.77 (0)	8.88 (0)	Dy II .67 (60) Dy II .94 (30)
3499.47 (0)		Zr II .58 (8) (Pr II .57 (25))
3499.86 (2)	9.78 (1)	Fe II .88 (4) (Cr II .65 (0))
3500.36 (1)		Ti II .34 (S 35) (Gd II .18 (30)) (Zr II .15 (4))
3500.82 (0)		(Tb (II?) .84 (S 15))
	1.06 (1)	Cr II .27 (2)

TABLE 3 -- Continued

1.323	2.363	Identification
3501.66 (1n)	1.61 (3)	Ce II .45 (60) Cr II .53 (1) Co II .72 (100) Dy II .44 (40) Gd II .46 (15) Gd II .58 (30) (F II .42 (200))
3502.20 (0)	2.16 (1)	
	2.70 (0)	Fe II .78 (0) (Eu II .79 (20))
3503.34 (1n)	3.39 (1)	Cr II .36 (3) Fe II .47 (2) (Gd II .21 (60))
3504.77 (4n)	4.70 (5n)	Ti II .89 (150) Ce III .60 (100) Dy II .52 (50) Gd II .91 (30)
3505.47 (1)	5.48 (1)	Gd II .51 (2000) Zr II .47 (15) Dy II .46 (50) (Eu II .30 (20)) (F II .61 (600))
3505.82 (0)		Zr II .67 (12) Ti II .90 (S 5) Dy II .83 (20)
	6.12 (0)	(Zr II .04 (4))
3506.81 (1)	6.70 (1)	Cr II .61 (1) Dy II .82 (150)
3507.32 (1)	7.24 (1)	Fe II .39 (3)
3507.81 (0)	7.78 (1)	Ce II .94 (125) Zr II .66 (4)
3508.23 (0)	8.24 (1)	Fe II .21 (1)
3509.01 (0)	9.11 (1)	Eu II .85 (20)
3509.37 (0)		(Ho (II?) .35 (S 2))
3509.90 (1)	9.77 (1)	Ti II .84 (20)
	0.00 (0)	Mn II .97 (0) Gd II .13 (30) (La II .00 (15))
3510.35 (0)		Pr III .4 (50) Zr II .46 (7)
3510.87 (3)	0.77 (2)	Ti II .84 (125) (Nd II .69 (20))
	1.41 (0)	(Sm II .23 (150) (Zr II .55 (2))
3511.80 (3)	1.84 (3)	Cr II .84 (35) (Eu II .86 (10))
3512.22 (0)		Gd II .22 (800) (Eu II .27 (5))
	2.53 (0)	Gd II .50 (600) Dy II .71 (30) (Dy II .56 (20)) (Fe II .72 (2?)) (Zr II .67 (3))
3513.00 (2)	3.05 (1)	Cr II .03 (10) (La II .93 (10))
3513.84 (1)	3.98 (2)	Ni II .93 (8) Fe I .82 (400)
3514.13 (0)		Co II .21 (20) Eu II .20 (12)
3514.46 (0)		Eu II .48 (15) (Zr II .64 (4))
	4.84 (0)	(Er (II?) .89 (S 5)) (Tb (II?) .04 (S 8)) (La II .87 (2))
3515.24 (0)		Cr II .37 (1) (Ni I .05 (1000))
3515.76 (0)	5.64 (1)	Fe II .82 (2)
	6.36 (1)	(Fe I .42 (40))
3517.01 (0)	6.84 (1)	La III .14 (..) Gd II .78 (60)
3517.38 (0)	7.40 (2)	Ce II .38 (300) V II .30 (800) Dy II .27 (40) (Co II .45 (10))
	8.05 (0)	Cr II .01 (1) (Gd II .89 (60))

TABLE 3 -- Continued

1.323	2.363	Identification
3518.56 (1)	8.55 (0)	Cr II .62 (3) Eu II .48 (25) (Gd II .63 (30))
3519.20 (0)		Ce II .08 (25?)
	9.67 (0)	(Fe II .72 (pr))
3520.24 (2)	0.14 (1)	Ti II .25 (18) (Eu II .14 (8)) (Yb II .29 (20))
3521.18 (1)	0.94 (0)	Eu II .91 (10) Eu II .09 (100) Fe I .26 (300) (Zr II .87 (5)) (La II .72 (10))
3521.65 (0)	1.58 (0)	
3522.11 (2)	2.20 (1)	Cr II .14 (7) Pr III .0 (150) (Nd II .04 (25)) (Fe I .28 (50)) (Ce II .88 (200))
	2.64 (0)	Pr III .5 (40) (Gd II .45 (50))
	3.47 (1)	Eu II .49 (30)
	3.82 (0)	(Tb (II?) .66 (S 50))
3524.03 (0)	4.13 (0)	Gd II .20 (1000) Dy II .03 (300) (Fe I .07 (50)) (Fe I .24 (60))
	4.88 (1)	Ti II .87 (5)
	5.52 (0)	(Cr II .28 (1)) (Sm II .50 (S 2)) (Tb (II?) .61 (S 8))
3526.17 (1)	6.08 (1n)	Zr II .81 (8) (Fe I .04 (80)) (Fe I .17 (50))
	6.60 (0)	Eu II .65 (8) Fe I .68 (80)
3526.94 (0)	6.78 (1)	
	7.33 (0)	Cr II .24 (1) Zr II .42 (7)
	7.92 (1)	Fe I .80 (100) Eu II .87 (30)
3528.85 (0)	8.82 (1)	
	9.31 (0)	(Eu II .34 (6))
3529.56 (0)		
	9.79 (1)	Cr II .73 (2) Fe I .82 (125) (Zr II .99 (5))
3530.62 (1)	0.52 (1)	Pr III .5 (60) Sm II .60 (150) Cr II .72 (1) (La II .67 (8))
	0.87 (0)	V II .77 (100) Zr II .85 (6) (K II .71 (40))
3531.69 (2)	1.64 (0)	Dy II .71 (1500) (Eu II .79 (15)) (Nd II .71 (10)) (Cr II .42 (1))
3532.59 (1)	2.70 (1)	Fe II .65 (2)
3533.16 (1)	3.22 (1)	Fe I .20 (50)
3533.63 (0)		Nd II .59 (30) Pr II .75 (25) (La II .67 (3))
	3.90 (0)	Ti II .87 (35) Ce II .05 (300) Eu II .12 (20) Cr II .13 (2)
	4.46 (0)	Cr II .37 (1) Gd II .24 (40)
3534.89 (0)		Dy II .90 (200) Mg II .04 (8) (Gd II .98 (20))
3535.49 (2)	5.32 (1)	Ti II .41 (125) Fe II .63 (2) Cr II .50 (1) (Tm II .52 (100)) (Sm II .65 (150))
3536.06 (1)		Dy II .02 (400)

TABLE 3 -- Continued

1.323	2.363	Identification
	7.25 (On)	Gd II .15 (30)
	8.12 (On)	Cr II .02 (1) Eu II .08 (40) (V II .24 (50))
3538.99 (1)	8.98 (1)	Cr II .00 (4) Ce II .09 (300) (Mg II .86 (8)) (Zr II .05 (4))
3539.55 (0)		Fe II .55 (3?) Dy II .38 (30)
	0.04 (1)	Pr II .92 (25) (Fe I .12 (100))
3540.41 (0)		(Gd II .46 (15))
3541.05 (1)	0.92 (0)	Fe I .09 (200)
	2.18 (0)	Fe I .08 (150) Eu II .15 (80) Dy II .33 (100) (Gd II .34 (15))
3543.30 (0)	3.26 (On)	Nd II .35 (50) (Gd II .42 (10?))
3544.10 (1)	3.98 (1)	Ce III .00 (80) Eu II .85 (60) Eu II .17 (20) Dy II .21 (25)
3545.11 (1)	4.92 (1)	V II .19 (1000) (Co II .04 (30)) (Gd II .98 (60))
3545.89 (On)	5.79 (0)	Gd II .80 (3000) Ce II .19 (150) (Fe I .64 (90)) (A II .84 (125))
3546.93 (On)	7.04 (0)	Cr II .10 (3) Dy II .84 (100) (Eu II .10 (20))
	7.96 (0)	(Dy II .20 (20))
	9.95 (0)	Yb II .82 (15) (Dy II .23 (300))
	0.62 (0)	(La II .82 (6))
3551.87 (0)		Zr II .94 (18) Dy II .59 (150)
	2.87 (0)	Cr II .7 (2) (Fe I .83 (80))
	3.64 (0)	Fe I .74 (100) Gd II .72 (40) (Mg II .51 (8))
	*4.99 (1)	Fe I .93 (400) Ce II .99 (150) (Gd II .80 (30))
3555.35 (0)		
	5.84 (0)	Co II .94 (6) Nd II .72 (25)
3556.11 (0)		Cr II .13 (1)
	6.44 (0)	Zr II .61 (30) (P II .48 (100))
3556.83 (1)	6.82 (2)	V II .80 (1500) Gd II .05 (1000) (Fe I .88 (300))
3557.63 (1)	7.46 (1)	Fe II .55 (2)
3558.15 (0)	8.28 (1)	Gd II .19 (400)
	8.57 (1)	Fe I .52 (400) Gd II .47 (250) (Sc II .54 (20))
	9.04 (0)	Sm II .10 (300) (Eu II .09 (6))
3559.38 (0)		Ce II .33 (6) (Eu II .42 (3))
3560.08 (0)	0.14 (0)	(Yb II .33 (30))
	0.54 (0)	Cr II .48 (1) V II .59 (90) (Nd II .73 (40)) (Yb II .73 (20)) (Ce II .80 (500))
3561.01 (1)	1.01 (2)	Cr II .91 (1)

* Phase 3.042 begins at wave length 3554.99

TABLE 3 -- Continued

1.323	3.042	Identification
3561.69 (1)	1.71 (1)	Ti II .58 (20) Ti II .91 (12) Tb (II?) .74 (200) (Nd II .59 (15))
	2.77 (0)	
3563.08 (1n)	2.95 (1)	Dy II .15 (200)
3563.80 (1)	3.84 (1)	Cr II .92 (5) Dy II .70 (40) Gd II .05 (60) (Eu II .79 (3))
3564.51 (1)	4.50 (2)	Cr II .31 (1) Gd II .64 (40)
3565.32 (2)	5.34 (2)	Cr II .31 (5) Fe I .38 (400) (Ti II .33 (5) (Zr II .41 (5))
3566.08 (2)	6.13 (2)	Fe II .15 (3) Fe II .05 (2) (Ti II .99 (S 25)) (Cr II .37 (1))
3566.91 (1)	6.93 (1)	Sm II .84 (150) Cr II .75 (1) Gd II .12 (30) Gd II .21 (30) (Fe I .04 (50)) (S II .17 (40))
3567.63 (0)	7.65 (0)	Sc II .70 (40) Gd II .65 (40)
3568.87 (0)	8.82 (0n)	Cr II .70 (1) Nd II .88 (40)
	9.33 (0)	(Cr II .16 (1))
3569.70 (0)		Cr II .73 (1) Dy II .67 (20) Gd II .57 (40)
3570.04 (1)	0.08 (2)	Fe I .10 (300) Eu II .10 (40) (La II .10 (30))
3570.51 (0)	0.69 (1)	Gd II .41 (30)
3571.29 (1)	1.35 (1)	Cr II .37 (3)
3571.99 (1)	1.88 (1)	Fe I .00 (100) Gd II .93 (300) (Ni I .87 (1000))
3572.48 (1)	2.56 (1)	Sc II .52 (50) Zr II .47 (30) (Eu II .58 (20))
3573.12 (0)		Zr II .09 (8)
	3.35 (0)	Fe I .40 (50)
3573.80 (1)	3.69 (1)	Ti II .74 (40) Dy II .84 (60)
3574.56 (0)	4.49 (1)	(Gd II .74 (150))
3575.23 (1n)	5.23 (1)	
3576.23 (1)	6.18 (1)	Dy II .25 (300) Sc II .34 (45)
3576.79 (0)	6.78 (0)	Ni II .76 (3) Dy II .87 (150) Zr II .88 (20) Gd II .77 (25) Fe I .76 (80)
3577.20 (0)	7.25 (1)	
3578.02 (0)	7.92 (1)	Dy II .99 (60) Co II .03 (30)
3578.63 (2)	8.68 (1)	Gd II .60 (30) Cr I .69 (500) Eu II .49 (8) (Ti II .69 (5)) (La II .89 (5))
3579.54 (0)	9.33 (1)	Gd II .55 (25) (Tb (II?) .20 (S 50))
3580.09 (0)		Dy II .04 (40) (La II .10 (8))
	0.51 (0n)	Gd II .62 (40)
3581.19 (1)	1.12 (2)	Fe I .20 (1000)
3581.70 (0)		La II .68 (20)

TABLE 3 -- Continued

1.323	3.042	Identification
	1.82 (1n)	
3582.10 (1)		Gd II .91 (200) Dy II .03 (20) (Zr II .08 (2))
3582.60 (0)	2.43 (0)	
	3.05 (0)	
3583.93 (0)	3.90 (1)	(Cr II .01 (pr))
3584.60 (1)	4.50 (1)	Y II .52 (100) Fe I .66 (100) Dy II .43 (40)
3585.34 (10)	5.42 (9)	Cr II .30 (60) Cr II .51 (40) (Fe I .32 (150)) (Dy II .07 (250)) (Dy II .78 (100))
3586.13 (1)	6.09 (1n)	Dy II .12 (50) (Fe I .11 (80))
3586.60 (0)		Al II .55 (200) Al II .69 (200) (Gd II .58 (10))
3587.06 (1)	7.01 (2)	Ti II .13 (25) Fe I .99 (200) (Al II .06 (100)) (Al II .91 (500)) (Gd II .19 (40))
3587.76 (0)	7.84 (0)	Fe I .76 (50) Zr II .98 (7)
	8.88 (0)	(Er (II?) .76 (S 1)) (Er (II?) .95 (S 3)) (Zr II .80 (2))
3589.50 (0)	9.48 (1)	V II .74 (1000) (Fe I .46 (50))
3590.29 (0)	0.26 (1)	Gd II .47 (100) Eu II .15 (15)
3590.79 (0)		Cr II .71 (1) Cr II .01 (1) Ce II .60 (125)
3592.02 (0)	1.89 (0)	V II .01 (800) Gd II .91 (30) Dy II .82 (40)
	2.28 (0)	Dy II .12 (30) (Ho (II?) .22 (S 10))
3592.66 (0)		Sm II .60 (1500) Gd II .71 (1500) (Nd II .60 (60))
3593.34 (2)	3.42 (1)	Gd II .44 (60) Cr I .49 (500) (V II .32 (600))
	4.19 (0)	Cr II .33 (1) (Tb (II?) .25 (S 8))
3594.62 (0)	4.68 (1)	Fe I .64 (125)
	4.96 (0)	Dy II .05 (125)
3595.21 (0)	5.40 (0)	
3596.09 (1)	5.92 (1)	Ti II .06 (60) Dy II .07 (20) (Eu II .15 (10))
3596.55 (1)	6.45 (0)	Cr II .34 (1) Cr II .67 (2) (Ti II .55 (S 2))
3597.05 (0)	6.97 (0)	Eu II .85 (20) (Fe I .06 (40))
3597.60 (1)	7.60 (2)	Cr II .55 (1) (Ni I .70 (1000))
3598.37 (0n)	8.40 (0)	(Ce II .20 (50))
3598.90 (0)		Cr II .90 (1) (Ho (II?) .77 (S 30))
	9.69 (0)	Cr II .53 (0) Fe I .62 (40)
3599.93 (0)		(Ce II .97 (10)) (Er (II?) .83 (S 20)) (Zr II .91 (7))
3600.32 (1)		Dy II .34 (50) (Tb II .44 (S 50))
3600.68 (1)	0.69 (1)	Ce II .58 (60) Y II .73 (300) (Er (II?) .74 (S 20))

TABLE 3 -- Continued

1.323	3.042	4.956	Identification
	1.35 (1)		
3601.60 (1n)			Sm II .69 (200) (Al III .62 (6))
	1.90 (0)		Y II .92 (60) Gd II .00 (20)
	2.52 (1)		(Fe II .60 (pr)) (Fe I .53 (50)) (Eu II .49 (12))
3602.88 (1)			
3603.27 (0)	3.11 (1)		Eu II .20 (200) Fe I .21 (150)
3603.68 (10)	3.74 (8)		Cr II .80 (40) Cr II .86 (20) Cr II .61 (20)
3604.62 (0)	4.56 (1n)		
3605.31 (1)	5.28 (1)		Gd II .26 (100) Fe I .46 (300) Cr I .33 (500) (Eu II .33 (8))
3606.00 (0)	5.96 (1)		Dy II .13 (150)
3606.64 (0)	6.64 (1)	6.72 (1)	Eu II .70 (80) Fe I .68 (200)
3607.00 (0)			Gd II .12 (40) (Fe II .05 (pr))
	7.43 (1)	7.46 (0)	Cr II .32 (1) (Zr II .39 (7))
3607.81 (0)	7.73 (0)	7.89 (1)	Gd II .90 (20) Ce II .62 (200)
	8.26 (0)	8.31 (0)	(La II .18 (4))
3608.62 (1)	8.72 (2n)	8.58 (1)	Cr II .66 (3) Eu II .70 (20)
3608.86 (1)		8.93 (0)	Fe I .86 (500) Gd II .75 (200) (Tm II .77 (200))
3609.34 (0)	9.37 (1)		Sm II .49 (1200) (La II .22 (4))
3609.72 (0)	9.66 (0)	9.75 (1)	Ce II .69 (250) Nd II .79 (40)
3610.38 (0)	0.20 (1)	0.46 (0)	Ni I .46 (1000) La II .25 (30) Fe I .16 (100) (Fe II .33 (pr))
	0.90 (0)	1.05 (1)	Gd II .76 (200) Gd II .91 (100)
	1.14 (1)		Y II .05 (60) Eu II .36 (25)
	1.66 (1)		Eu II .57 (100)
3611.81 (0)		2.00 (1)	Zr II .90 (15) Fe I .07 (80) (Pr II .94 (30))
3612.34 (1)	2.30 (1)	2.48 (1)	Eu II .19 (20) Eu II .46 (8) Zr II .34 (3) (La II .34 (50))
3613.12 (5)	3.13 (4)	3.12 (2)	Cr II .21 (20) Cr II .26 (15) Dy II .06 (15) (Zr II .08 (12))
3613.64 (0)			Ce II .70 (150) Sc II .84 (70) (Mg II .80 (4)) (Gd II .49 (80))
3614.13 (1n)	3.95 (0)	4.10 (1)	Fe II .96 (1?) (Eu II .07 (15))
	4.23 (1)		Cr II .26 (2) Gd II .21 (100) (Dy II .08 (20)) (Eu II .26 (8))
3614.84 (2)	4.85 (2)	4.77 (1)	Fe II .87 (5) (Zr II .79 (18))

TABLE 3 -- Continued

1.323	3.042	4.956	Identification
3615.29 (1)		5.22 (1)	Pr II .16 (25)
	5.59 (0)		(Mg II .64 (2)) (Cr II .45 (pr)) (Tb (II?) .66(S 15))
3615.81 (1)		5.92 (0)	Cr II .79 (1) Nd II .82 (30)
3616.28 (0)			Eu II .15 (100)
3616.65 (0)		6.51 (1)	Pr II .68 (25) Gd II .46 (12)
3617.25 (1)	7.24 (1)		Cr II .32 (7) Gd II .16 (200)
3617.73 (0)	7.80 (1)	7.65 (1)	Fe I .79 (125)
3618.27 (0)	8.26 (1)	8.28 (1)	Dy II .07 (20) Gd II .06 (15)
3618.65 (1)	8.73 (2)	8.84 (1)	Fe I .77 (400) Dy II .52 (40)
3619.19 (0)	9.30 (0)		Ni I .39 (2000) Eu II .17 (8)
3619.56 (0)			Dy II .47 (15)
		9.87 (0)	Yb II .81 (15) Cr II .99 (0) (Dy II .96 (20))
3620.12 (1)	0.17 (0)		Dy II .18 (60)
		0.46 (0)	Gd II .46 (150)
3620.74 (0)			Eu II .89 (30)
3621.23 (5)	1.20 (4)	1.16 (5)	Fe II .27 (6) (Co II .18 (50)) (Sm II .23 (600))
3621.60 (0)	1.68 (0)		Cr II .51 (1) Fe I .46 (125) (La II .77 (4))
	2.04 (1)	1.92 (1)	Fe I .00 (125) Eu II .89 (50) (Ce II .14 (100))
	2.44 (0)	2.34 (1)	Cr II .45 (1) Eu II .54 (150) Sm II .50 (100) (Pr II .38 (25))
		2.70 (0)	Gd II .81 (60)
3623.09 (0)	3.24 (0)	3.32 (1)	Fe I .19 (100) Sm II .32 (200) (Eu II .43 (12))
3623.80 (0)		3.77 (1)	Ce II .84 (200) (Eu II .65 (10)) (Eu II .72 (10))
	3.96 (0n)	4.12 (1)	Dy II .25 (30) Lu II .98 (40)
3624.87 (3)	4.87 (3)	4.87 (5n)	Fe II .89 (5) Fe II .69 (2) Ti II .82 (125) (Gd II .89 (80)) (Nd II .65 (15)) (Cr II .63 (1))
3625.35 (0)		5.34 (1)	Gd II .26 (60) (Fe I .15 (70))
3625.66 (0)	5.58 (0)		(Tb (II?) .54 (S 15))
	5.96 (0)	6.04 (0)	(Cr II .92 (pr))
3626.46 (0)			Cr II .31 (1) Gd II .32 (40) Gd II .41 (30)
	7.07 (0n)		Sm II .01 (400) Gd II .90 (15)
3627.36 (0)		7.23 (0)	Fe II .17 (1) Eu II .41 (25)
		8.15 (1)	Ce II .25 (10?) Sm II .97 (100)
		8.73 (0)	Y II .71 (50) La II .83 (60)
	9.88 (0)	0.09 (1)	Dy II .18 (250) Eu II .80 (40) Cr II .19 (0) (Zr II .03 (10)) (Nd II .93 (10))

TABLE 3 -- Continued

1.323	3.042	4.956	Identification
3630.44 (0)			Gd II .25 (20) Eu II .50 (12) Dy II .46 (25)
	0.82 (0)	1.01 (1)	Sc II .74 (70) Ce II .19 (125) Pr II .97 (40) Sm II .13 (400) (Nd II .02 (20)) (Gd II .88 (30))
3631.53 (5)	1.54 (6)	1.66 (2)	Cr II .49 (50) Cr II .69 (40) Fe I .46 (500)
3631.93 (0)	1.80 (2)		Eu II .79 (15) Eu II .97 (8) (Fe I .04 (50))
3632.22 (1)	2.22 (1)	2.38 (1)	Fe II .29 (3) Eu II .18 (80) (Ce II .11 (10?))
3632.67 (0)			Dy II .73 (25)
3633.10 (1)	3.17 (1)		Y II .12 (100) Dy II .00 (15)
		3.37 (0)	Zr II .49 (10) (Tb (II?) .29 (S 30))
3633.97 (1)	3.94 (0n)	4.14 (1)	Cr II .04 (10)
3634.37 (0)			Sm II .29 (1500) Nd II .28 (40)
	4.66 (0)	4.73 (1)	Gd II .76 (100)
3634.96 (0)			Sm II .93 (200) Nd II .87 (15)
3635.37 (1)		5.26 (0)	Pr II .28 (30) Dy II .26 (30) Y II .33 (12)
		5.89 (0)	Eu II .85 (20)
		6.46 (0)	Zr II .46 (8)
	6.77 (0)		Eu II .72 (10) Fe II .90 (pr) (Gd II .80 (10))
		7.21 (0)	Dy II .27 (25) La II .15 (40) (Nd II .23 (30))
3638.35 (0)	8.27 (0)	8.24 (0)	Fe I .30 (100)
3639.06 (1)		8.91 (1)	Gd II .05 (30) Gd II .88 (10) (Sm II .77 (400))
		9.36 (0)	(La II .25 (3))
3639.60 (0)	9.70 (1)	9.84 (1)	(A II .85 (25))
		0.12 (0)	Gd II .18 (50) Dy II .24 (100) (Nd II .24 (30))
3640.36 (1)	0.35 (0)	0.36 (0)	Fe I .39 (300)
3641.01 (0)			Eu II .19 (20)
3641.37 (3)	1.28 (2n)	1.28 (2)	Ti II .33 (150) Gd II .39 (125) (Nd II .50 (25))
		2.23 (0)	
3642.49 (1)			
		2.74 (0)	Sc II .78 (50) Ti I .68 (300)
3643.17 (2)	3.20 (2)	3.34 (1)	Cr II .20 (10) (Pr II .32 (15))
	3.72 (0)	3.80 (1)	Dy II .89 (40) Nd II .63 (10) (Ne II .89 (18))
3644.39 (1)	4.42 (2n)	4.24 (1)	(Eu II .46 (12))
3644.70 (2)	4.74 (1)	4.71 (1)	Cr II .69 (10)
3645.38 (1n)	5.37 (0)	5.32 (1)	La II .43 (200) Dy II .42 (1000) Sc II .31 (50) Sm II .29 (300) Sm II .39 (200) (Eu II .18 (30)) (Pr II .54 (60))

TABLE 3 -- Continued

1.323	3.042	4.460	4.956	Identification
			5.80(0)	Dy II .86 (25) Fe I .82 (80) Pr II .66 (75) Gd II .62 (300) (Fe II .78 (pr)) (Nd II .78 (15))
3646.29(0)	6.10(0)			Gd II .19 (3000) (Pr II .30 (60))
3646.80(0)			6.90(0)	Ce II .96 (200) Eu II .65 (30) Eu II .75 (35) (Eu II .02 (12))
3647.30(2)	7.36(1)		7.46(0)	Cr II .39 (8)
3647.91(2)	7.87(2)		7.87(1)	Fe I .84 (500)
3648.43(1)		8.39(1)		Eu II .26 (15) Pr II .30 (15)
3648.89(1)	8.70(1)		8.74(1)	Ti II .86 (10) Dy II .81 (60)
	9.12(1)			Cr II .20 (1) Gd II .00 (10) (Al II .18 (5))
3649.49(1)			9.39(0)	Sm II .53 (500) Fe I .30 (60) Fe I .51 (100) Gd II .44 (80)
	9.70(1)	9.80(0)		(Eu II .81 (5)) (Cr (II?) .66 (2))
3650.26(2)	0.38(2)	0.35(1)	0.27(1)	Cr II .34 (40) (Nd II .42 (15)) (Sm II .17 (200)) (La II .19 (80)) (Fe I .28 (70))
	1.05(0)	0.83(0)	0.98(0)	Al II .06 (50) Al II .09 (18) Gd II .95 (100) Sm II .00 (150) (Gd II .19 (60)) (Zr II .73 (7))
3651.60(2)	1.52(1)		1.79(0)	Cr II .66 (12) Fe I .47 (300) (Zr II .50 (2))
3651.92(0)				Sc II .80 (20)
3652.44(1)			2.50(0)	Gd II .54 (200) Mo II .33 (25)
3652.97(0)		3.04(0)	3.08(1)	Ce II .11 (125) Nd II .15 (15)
	3.46(0)			Ti I .50 (500)
3653.73(1)	3.87(0)		3.74(0)	Ce II .67 (250) (Cr II .85 (pr))
3654.27(0)				
3654.64(0)	4.66(1)		4.60(1)	Gd II .62 (2000)
3655.73(0)	5.68(0)		5.51(0)	Ce II .85 (500) Zr II .56 (7)
			6.15(1)	Gd II .15 (1500) Sm II .22 (200)
3656.34(1)	6.43(0)	6.40(0)		Cr II .45 (3)
	6.60(0)			
3657.09(0)				
			7.35(0)	Eu II .38 (12)
3658.04(1)	8.07(2)	8.05(1)	8.12(1)	Cr II .17 (20) Cr II .94 (1)
3658.66(0)	8.78(0)		8.82(0)	Tb (II?) .88 (S 100) Eu II .77 (10)
3659.26(1)				Ce II .23 (125) Eu II .11 (15)
3659.68(3)	9.66(1)	9.57(1n)	9.64(2)	Ti II .76 (150) Fe I .52 (125)
3660.34(0)				Pr II .38 (30)

TABLE 3 -- Continued

1.323	3.042	4.460	4.956	Identification
3660.84(1)	0.56(0)		0.73(0)	Ce II .64(250) Eu II .58(15) Eu II .63(12) (Zr II .92(3))
3661.39(1)	1.36(1)	1.32(1)	1.60(0)	Cr II .44(3) Sm II .36(1000) Gd II .66(30) (V II .38(200)) (Nd II .34(10)) (Pr II .62(25)) (Zr II .33(4))
3661.92(0)				Dy II .75(15)
3662.22(1)	2.14(1)	2.11(1)	2.18(1)	Ti II .24(100) Gd II .26(800) (Zr II .14(8)) (Eu II .33(20)) (Nd II .26(30)) (La II .08(30)) (Sm II .25(S50))
3662.63(1)				Sm II .69(200) Eu II .50(25)
3663.10(0)	2.86(1)			Cr II .84(8) Eu II .94(30) Sm II .90(200)
3663.72(0)	3.53(0)			
3664.21(1)	4.00(0)			Ne II .11(250) P II .19(100)
	4.46(0)			(Er (II?) .44(S20))
	4.68(0)		4.62(0)	Gd II .60(2000) Y II .61(100) (Dy II .63(20))
3664.80(2)	4.94(2)	4.95(1)	5.08(1)	Cr II .94(30)
3665.25(0)				Cr II .29(1) Nd II .18(50) Dy II .20(20)
3665.57(0)	5.53(1)			(Cr II .48 (pr))
3665.93(1)	5.98(1)	5.95(0)	5.82(0)	Cr II .02(pr)
3666.38(1)			6.46(0)	Eu II .27(15) Ti II .59(1) Sc II .54(8)
3667.02(1)	6.99(1)	7.15(0)	7.16(0)	Fe I .26(80) (Ho (II?) .05(S10)) (Zr II .06(3))
3668.02(0)				Ce II .98(400) Sm II .93(150) (Fe I .00(60)) (Tm II .09(120))
			8.45(0)	Y II .49(20) Gd II .32(25) (Zr II .48(8))
3668.68(1)				Ce II .72(12?)
	9.01(0)		8.91(0)	Pr II .83(150) S II .05(60) Eu II .14(10) Dy II .91(15) (Ti I .97(100)) (Fe I .16(50))
3669.49(1)	9.40(1)			Fe I .52(200) V II .41(300)
3670.03(0)				Fe I .07(200) Fe I .03(100)
3670.37(1)				(Ho (II?) .29(S6)) (La II .23(4))
			0.59(0)	Sm II .68(150)
3670.84(0)				Sm II .84(1000) (Eu II .81(12))
3671.31(1)	1.08(0)	1.11(1)	1.24(1)	Gd II .20(1500) Zr II .28(20) (Gd II .36(30))
3672.33(1)				Dy II .31(125) Nd II .36(50) (Ce II .17(5d ?))
		2.89(1)	2.90(1)	Ce II .79(60) Dy II .67(40)
3673.12(0)				Eu II .19(80) Dy II .15(40)
3673.72(1)				Nd II .54(50)
3674.18(1)			3.92(0)	Dy II .09(200)

TABLE 3 -- Continued

0.691	1.323	3.042	4.460	5.003	Identification
	4.74(0)	4.79(0)		4.64(0)	Zr II .74(40) Eu II .63(50)
		5.35(0)		5.32(0)	
	5.93(0)				(Tb(II?) .78(S8))
	6.07(1)				(K II .05(10))
				6.32(1)	Fe I .31(200) (Tb(II?) .35(S200))
	6.55(1)	6.50(1)	6.49(0)	6.69(0)	Dy II .56(200) Eu II .64(20)
	7.04(1)				(Eu II .87(25))
	7.33(0)				(Fe I .31(40))
3677.68(3)	7.72(x)	7.79(x)	7.81(7)	7.89(3)	Cr II .68(40) Cr II .89(50) (Sm II .79(200)) (Fe I .63(80))
	8.41(1)	8.36(0)		8.28(1)	Eu II .26(100) (Sc II .34 (15))
3679.02(0n)	8.94(0)	8.72(1n)	8.72(0)	8.92(1)	Fe I .86(100) Zr II .91(10)
	9.32(1)				Ce II .42(50) Cr II .34(pr)
3679.57(0)	9.77(1)	9.60(0n)		9.67(1)	Eu II .50(80) Ti II .69(pr) (F II .67(15)) (Zr II .64(1))
		9.97(0)		0.10(1)	Fe I .92(500)
	0.25(1)			0.28(0)	
3680.82(1)	0.79(0)	0.81(1)		0.75(0)	Eu II .76(25)
3681.50(1)	1.48(0)	1.30(1)		1.28(1)	
		2.03(0)	1.95(0)	2.00(0)	
				2.25(0)	Fe I .21(400) (Tb(II?) .26(S30))
3682.75(0)	2.70(1n)	2.82(0)		2.61(1)	Gd II .73(20) (Zr II .67(2))
	3.44(1)	3.49(1)	3.44(1n)	3.65(1n)	
3684.06(1)	4.16(3)	4.23(3)	4.20(1)	4.33(2)	Cr II .25(25) Fe I .11(300)
	4.67(0)				(Tb(II?) .81(S8))
3685.12(5)	5.16(8)	5.11(4n)	5.05(2)	5.15(4)	Ti II .20(700) (Mn II .05(1))
	5.80(1)	5.80(0)	5.64(0)	5.85(1)	Nd II .80(60)
	6.21(0)	6.11(1)		6.23(1)	Gd II .33(100) Fe I .00(150) (Mn II .20(1))
	6.57(2)	6.65(2)	6.70(1)	6.79(1)	Cr II .67(20)
	7.01(1)				Pr II .04(125) Pr II .20(60)
3687.33(0)		7.31(0)		7.26(1)	Cr II .35(2) Nd II .29(40)
	7.51(0)	7.49(1)			Fe I .46(400)
3687.86(0)				7.70(1)	Gd II .74(800) Eu II .78(80) (Ce II .80(30
			8.15(0)	8.33(1)	Sm II .42(100) Mo II .29(15) (Tb(II?) .15(S15))
	8.56(0)			8.65(0)	Eu II .42(1500)

TABLE 3 -- Continued

0.691	1.323	3.042	4.460	5.003	Identification
	9.25(1)	9.24(0)	8.98(0)	9.01(1)	(Tb(II?) .12(S8))
3689.59(0)		9.40(0)		9.46(0)	Fe I .46(200) Cr II .62(1)
		9.83(0)		9.72(0)	Nd II .69(30) Pr II .71(20)
3690.06(0)				0.02(0)	
		0.23(0)		0.33(0)	
	0.74(0)			0.70(1)	Fe I .73(80)
	1.27(0)	1.01(0)		1.14(0)	(Tb(II?) .15(S50)
	1.87(0)		1.70(0)	1.60(0)	H 18 .56(2)
3692.62(1)	2.46(1)	2.43(0)	2.30(1)	2.38(2)	Sm II .22(150) (Ho(II?) .65(S15)) (Er(II?) .65(S12))
	3.25(0)	3.23(1n)		3.35(1)	Cr II .12(1)
3693.47(1)	3.55(0)			3.74(0)	Gd II .60(20)
	4.03(0)	3.96(1)	4.04(1)	4.10(1)	Fe I .01(400) Sm II .99(1200) Gd II .03(80) (Eu II .80(20))
	4.49(1)	4.30(0)			Yb II .20(1000) Gd II .31(15) Dy II .36(15) (Ne II .20(250)) (La II .27(7))
3694.87(2)	5.00(1)	4.93(1)	4.77(0)	4.82(1)	Dy II .75(500) Cr II .97(4) (Nd II .79(10))
				5.22(1)	(Fe I .05(200))
3695.86(0)	5.91(0)	5.89(0)		5.91(1n)	(Cr II .91(1))
		6.17(0)	6.02(0)	6.22(0)	
3696.42(0)	6.58(0)				Ti II .39(12)
		6.75(1)	6.82(0n)	6.82(1)	Cr II .78(8) Gd II .76(100)
3697.15(1n)	7.06(0)			7.18(1)	H 17 .15(3) (Dy II .25(25))
	7.42(1)	7.46(1)		7.56(1)	Fe I .43(100) Zr II .49(20) (Nd II .54(10))
	7.92(2)	8.00(2)	8.04(2)		Cr II .00(35) Gd II .73(1000) (Eu II .94(12)) (Pr II .07(25))
				8.18(2)	Zr II .17(100) Dy II .17(50)
		8.35(0)			
	8.55(0)				(Ce II .65(5?))
		9.02(0n)	9.18(0n)	9.05(1)	
	9.32(0)				(S II .37(8))
	9.86(0)	0.13(0)		9.97(0)	Ce II .92(50) (Gd(II?) .75(S250) (Pr II .95(12?))
3700.36(1)	0.36(0)		0.27(0n)		V II .34(200) Tm II .26(300) (Nd II .44(10))
3701.28(1)	1.28(1)	1.21(1)	1.14(1)	1.27(1)	Fe I .09(300) Tm II .36(250)

TABLE 3 -- Continued

0.691	1.323	3.042	4.460	5.003	Identification
	1.81(1)	2.04(0)		2.03(0)	Cr II .90(4) Dy II .62(30) (Pr II .81(20)) (La II .81(40)) (Fe I .03(50))
	2.74(1)		2.80(1)	2.98(0)	Tb II .85(S200)
3703.38(1n)					Al II .22(18) Fe I .56(100) (Y II .32(10)) (Eu II .56(25)) (Gd II .51(15))
	3.81(5n)	3.72(1n)	3.71(0n)	3.75(2n)	H 16 .86(4) (Cr II .70(2))
3704.07(0)					
				4.37(0)	Fe I .46(125)
3705.04(0)	5.02(0)		4.86(0)	4.88(1)	(Cr II .40(pr))
3705.45(0)	5.54(1)	5.48(0)		5.42(1)	Fe I .57(700)
3705.80(0)	5.90(1)				La II .81(80)
3706.14(5)	6.23(3)	6.07(1)	6.05(1)	5.96(3)	Ti II .23(125) Ca II .03(40) (P II .05(150))
3706.84(1n)	6.98(1)	7.03(0)	7.09(0n)	6.85(0)	Cr II .13(3) Cr II .69(1) Sm II .75(300) Fe I .05(150) Sm II .17(100) Sm II .98(200) (Mn II .91(1)) (Pr II .77(50))
3707.51(0n)	7.57(0)			7.38(1)	Eu II .42(20) Dy II .42(30) Dy II .57(40) (Gd II .59(10)) (Gd II .71(8))
	8.15(0)	8.01(0)		8.11(1)	Mn II .06(1) Fe I .92(80) (Dy II .23(40))
3708.88(0)		8.61(0)		8.61(0)	Sm II .65(300)
3709.25(1)	9.25(2)	9.20(2)	9.21(3)	9.29(3)	Fe I .25(600) Ce II .29(400) Zr II .27(60) (Gd II .13(50))
3709.86(0)	9.93(1)	9.83(0)	0.04(0)	9.99(1)	Ce II .93(500) Cr II .09(1) Dy II .08(30) (Mn II .88(1))
3710.38(1)		0.27(1n)			Y II .29(150) Eu II .28(10) (Zr II .47(1))
				0.62(0)	Sm II .87(100) Eu II .87(80)
3711.18(1n)				1.06(1n)	Cr II .28(7) Fe I .22(80) (Pr II .10(25)) (Na II .07(60))
			1.57(0)	1.68(1)	Sm II .54(200) Dy II .65(20)
3711.94(2n)	1.78(8n)	1.75(2n)		1.81(3n)	H 15 .97(5)
				2.21(1)	Sm II .11(100) Fe II .97(1)
			2.52(0)	2.63(1)	Gd II .70(2000) Sm II .76(200)
3712.82(2)	2.87(x)	2.93(6)	2.95(2)	2.99(2)	Cr II .95(50)
	3.39(1)		3.62(0)	3.50(1)	Eu II .45(125) La II .54(100) Nd II .70(25)
3713.89(0)	3.87(1)				Dy II .84(15)
	4.33(0)	4.07(0n)		4.16(0)	Nd II .19(15)
		4.49(0)			

TABLE 3 -- Continued

0.691	1.323	3.042	4.460	5.003	Identification
3714.71(0)		4.78(0)	4.77(1)	4.82(1)	Eu II .90(100) Zr II .77(15) (Nd II .73(12)) (Nd II .81(20)) (Nd II .05(15)) (La II .87(40))
3715.06(3n)	5.34(6)	5.25(6n)			Cr II .19(20) Dy II .28(15) (Gd II .23(8))
	5.45(4)	5.50(2)	5.38(3)	5.43(3n)	Cr II .43(20) V II .48(1200) (La II .53(50)) (Nd II .39(15))
	5.78(1)				Fe I .92(80) P II .85(50) (Nd II .68(20))
3716.36(1n)	6.46(1)	6.20(1)	6.25(1)	6.36(1n)	Ce II .36(600) Gd II .36(1000) (Fe I .45(150)) (Nd II .58(10))
3716.98(1)	7.11(0)	7.02(0n)	6.94(0)	6.98(1)	Eu II .94(60) Dy II .93(15) (Ce II .93(10?)) (Zr II .02(2))
	7.55(0)		7.62(0)	7.59(0)	Eu II .69(80) Mn II .53(1) (P II .62(70)) (Gd(II?) .49(850))
3718.28(0)				8.23(0)	Ce II .19(150) (A II .21(15))
			8.44(0)		Fe I .41(80) Ce II .38(200)
3718.73(0)					Sm II .88(500) (Zr II .86(6))
3719.48(1)		9.55(0)	9.39(1)	9.37(1)	Gd II .45(800) Gd II .53(300)
3719.83(0)		9.92(2)	9.94(1)	0.04(1)	Fe I .94(1000) (Ce II .80(15?)) (Cr II .72(1))
		0.58(0)	0.45(0)	0.73(1)	Eu II .72(10) Eu II .39(8)
3721.77(9n)	1.71(9n)	1.82(4n)	1.63(1n)	1.83(9n)	H 14 .94(6) Ti II .64(125) (Sm II .85(400)) (Cr II .14(1)) (Gd II .07(100))
	2.46(0)			2.52(0)	Fe I .56(500)
	3.28(0)	3.41(1)	3.40(1)	3.48(0)	Cr II .40(15) (Ti II .63(15)) (Nd II .51(50)) (Gd II .24(8)) (Gd II .69(20))
3724.08(0)		4.22(0)	4.22(1n)	4.19(1)	Ti II .11(18) Fe I .38(200) (Dy II .42(125))
3724.96(2)	5.02(1)	4.70(1)	4.75(1)	4.83(2)	Eu II .94(4000) (Mn II .81(1)) (Nd II .88(30)) (La II .05(20) (Sm II .90(200))
3725.23(0)		5.22(1)	5.33(1)	5.38(0)	Fe II .30(3) (Mn II .29(1))
3725.82(1n)	5.87(1)	5.83(1n)	5.81(1)	5.69(2n)	Fe II .90(2) Gd II .47(200) (Ce II .68(40?))
3726.33(0)		6.40(0)		6.54(1)	(Pr II .31(15))
3726.92(1)	6.96(2)	6.96(2)	6.94(2)	7.05(4)	Fe II .04(4) Fe I .92(100) (Sm II .80(100)) (Ne II .08(125))
3727.23(2)	7.32(3)	7.44(2)	7.44(1)	7.48(2)	Cr II .36(40) V II .35(1000) (O II .30(50))
	7.69(1)			7.77(1)	Fe I .62(200) Zr II .72(10)
	8.02(1)				Nd II .13(50)
3728.22(0n)	8.43(0)	8.41(0)		8.32(0)	Ce II .42(250) Sm II .47(400) (V II .34(200))
3728.71(0)	8.89(0)			8.58(1)	(P II .66(50))

TABLE 3 -- Continued

0.691	1.323	3.042	4.460	5.003	Identification
				9.03(0)	Eu II .06(15)
3729.52(0)	9.43(1)	9.43(0)		9.45(2)	Mn II .49(1) Pr II .40(15)
	9.78(1)				Eu II .68(30) Eu II .74(20) (Ti I .82(500)) (Zr II .74(5))
3730.09(0)	0.10(1)			9.96(1)	(Tb(II?) .91(815))
	0.47(0)		0.70(0)	0.64(0n)	Nd II .58(30) Pr II .58(30) Fe I .39(70)
3730.84(0)					Gd II .84(1000) (Fe I .95(50))
	1.33(1)		1.07(0)	1.18(0)	Zr II .26(35) Sm II .26(600) Nd II .22(20) (La II .42(8))
				1.67(1)	Cr II .64(1)
	1.93(0)				Eu II .84(25) (Al II .95(2))
			2.52(0)	2.52(0)	Fe I .40(200) Gd II .45(100)
	3.18(1)			2.98(1)	Gd II .08(300) Pr II .03(60) (Nd II .76(10))
			3.31(0)	3.44(1)	Fe I .32(400) Eu II .65(25)
3734.34(xn)	4.47(xn)	4.25(9n)	4.37(3n)	4.42(xn)	H 13 .37(8)
				4.86(0)	Fe I .87(1000) (Eu II .85(15))
			5.78(0)	5.92(1)	Sm II .98(500) Cr II .90(2) Eu II .94(20) Eu II .06(10) (Pr II .76(40)) (La II .85(10))
3736.44(0)			6.66(0)		Cr II .56(1) (Pr II .50(40)) (La II .41(15))
3737.02(2)	7.06(1)	6.88(1)	7.11(1)	6.84(1)	Fe I .13(1000) Ca II .90(50) (Sm II .14(200)) (Gd II .26(10))
3737.51(1n)	7.48(1)	7.59(1)	7.48(1)	7.26(0) 7.64(1)	Cr II .55(10)
	7.91(0)		7.96(1)	8.00(0)	Eu II .08(80) Nd II .06(40) (A II .89(15)) (Al II .00(10))
3738.21(2)	8.28(7)	8.33(6)	8.38(2)	8.46(1)	Cr II .38(25) (Fe I .31(100)) (Zr II .13(5))
3738.83(0)	8.87(1)	9.04(0)		8.90(0)	
	9.20(1)	9.32(0n)	9.24(0)	9.28(1)	Sm II .12(300) Dy II .36(25) Sm II .20(200) (Pr II .19(100))
3739.50(2)	9.66(1)				(Fe I .53(80))
3740.08(1)	0.17(1)	9.83(0)	0.09(0)	0.14(1)	Gd II .02(150) (O II .92(35))
3740.27(0)					Fe I .25(70) Eu II .25(20)
3740.86(0n)	0.69(0)	0.82(0)		0.93(1)	
3741.51(6)	1.58(9)	1.54(4)	1.56(3)	1.64(5)	Ti II .64(200) Eu II .31(400) (Eu II .62(12)) (Nd II .43(50))
	2.18(0)		2.27(0)	2.25(0)	Eu II .34(15) (Cr II .20(pr))

TABLE 3 -- Continued

0.691	1.323	3.042	4.460	5.003	Identification
3742.40(0)	2.54(1)			2.58(1)	(Fe I .62(50))
	3.05(1)			2.89(0)	Cr II .97(1)
3743.40(9)	3.41(3)	3.33(5)	3.28(3)	3.35(9)	Gd II .47(2000) (Fe I .36(200)) (Eu II .56(100))
3743.92(0)	3.98(0)	4.01(1)	3.96(1)	4.03(1)	Sm II .87(500) Pr II .99(20)
3744.34(0)				4.54(1)	Eu II .54(20)
	4.78(0)	4.96(0)	4.84(1)	4.91(1)	(Gd(II?) .80(S12))
3745.12(0)	5.30(1)				(Fe II .36(pr))
3745.50(1)	5.58(0)	5.43(1)	5.49(0n)		Fe I .56(500) Nd II .60(200)
3745.83(3)	5.89(3)	5.75(3n)	5.76(1)	5.73(7n)	V II .81(800) Fe I .90(150) (Zr II .97(40))
3746.49(1)	6.55(1)	6.55(1)	6.39(1)	6.62(1)	(Fe II .56(pr)) (Gd II .44(8))
3746.99(0)	6.97(1)				(Fe I .93(40))
3747.54(0)	7.62(0)	7.48(0)		7.51(0)	Fe II .50(2)
		7.98(0)		8.03(1)	Fe I .26(500) Ti II .00(25) (Ce II .06(150)) (Dy II .1(20)) (Dy II .83(100))
		8.63(2)	8.65(1)	8.59(1)	Fe II .49(8) Cr II .68(7) (Gd II .88(50))
		9.44(1)			Fe I .49(1000)
3750.08(xn)	0.13(xn)	0.09(xn)	0.02(3n)	0.14(xn)	H 12 .15(10)
			1.44(0)	1.50(0)	Cr II .60(3) Cr II .43(1) (Zr II .60(75))
				2.49)	Nd II .50(40) Nd II .68(30) (Eu II .51(5)) (Gd II .66(8))
	2.88(0)		2.92(0)		Eu II .05(30) Eu II .83(15) (Ti I .86(200)) (Nd II .68(30))
3753.70(2)	3.60(1)	3.55(1)	3.69(0)	3.59(1n)	Dy II .76(200) Dy II .51(150) (Fe I .61(150)) (Gd II .56(10))
	4.00(1)	4.05(0)		4.19(0)	
		4.38(0)			
3754.42(1)	4.53(2)	4.59(6)	4.59(3)	4.67(4)	Cr II .58(20)
3754.83(1)					(Sm II .86(S10))
	5.07(1)	5.16(1)	5.15(1)	5.19(1)	Cr II .13(2) Sm II .28(200) (Gd II .24(30)) (Tb(II?) .24(100))
3755.46(2)	5.61(2)	5.60(2)	5.60(1)	5.63(1)	Fe II .56(4) Ce II .42(75) (Gd II .56(40)) (Nd II .60(30))
	6.15(0)	6.31(0)	6.08(0)	6.28(1)	(Gd II .09(10))
3756.50(1n)	6.50(1)	6.57(1)	6.50(1)	6.63(0)	Cr II .55(3) Sm II .41(600)
	7.07(1)	7.05(0)		6.88(0)	Fe I .94(80) (Zr II .96(1))

TABLE 3 -- Continued

0.691	1.323	3.042	4.460	5.003	Identification
3757.40(0)	7.44(1)		7.18(1)	7.27(2)	Dy II .37(500) Eu II .42(15)
3757.69(3n)	7.72(2)	7.66(1)	7.66(2)	7.72(3)	Ti II .69(100) Sm II .53(300) Gd II .74(80) (Eu II .64(30)) (Ce II .86(15?)) (Nd II .82(30)) (Zr II .80(8))
3758.16(2)	*8.22(2)	8.19(4)	8.23(3)	8.29(4)	Fe I .24(700) Gd II .31(200) (Eu II .29(30))
3758.43(1)	8.67(1)				Cr II .46(1) Eu II .54(20)
		8.79(0)	8.80(1)	8.94(1)	Gd II .00(300) La II .08(300) Sm II .97(200) (Nd II .94(40))
3759.27(9n)	9.36(8)	9.36(9)	9.38(5)	9.36(9n)	Ti II .30(400) Fe II .46(6)
3759.80(0)	9.85(1)	0.06(9)	0.01(0)		Cr II .94(1) Pr II .61(75) (Nd II .80(20))
3760.15(1)	0.21(1)			0.04(1)	Fe I .05(150) Eu II .33(50) (Pr II .08(30))
†3760.80(1)	0.64(1n)	0.58(0)	0.58(1)	0.66(1)	Sm II .69(500) Fe I .53(100) Gd II .71(200) Gd II .92(100) (Ce II .69(6))
3761.26(3)	1.27(6)	1.24(3n)	1.26(3)	1.24(5)	Ti II .32(300) Eu II .12(300) (Tm II .33(800))
3761.52(0)					
3761.77(2)	1.80(6)	1.80(5)	1.81(4)	1.89(5)	Cr II .70(7) Cr II .87(8) Ti II .89(15) (Pr II .87(250)) (P II .81(30)) (Tm II .91(600))
3762.05(0)					Tm II .91(600)
	2.39(0)	2.36(0)	2.41(1)	2.28(0)	
				2.69(0)	Sm II .59(200)
3762.87(2n)	2.90(2n)	2.88(3)	2.91(2)	2.99(2)	Fe II .89(5) (Gd II .00(50))
3763.33(0)					Nd II .48(60) Gd II .33(60)
3763.70(2)	3.79(3)	3.74(3)	3.74(1)	3.65(1)	Fe I .79(500)
3764.19(0)	4.19(1)	4.09(1)	4.10(2)	4.16(3)	Ce II .12(150) Fe II .09(?) (Gd II .15(15)) (Gd II .20(50))
			4.41(1)		Sm II .37(300)
3764.85(1)		4.79(0)	4.92(0)	4.65(0)	Pr II .81(125) Gd II .60(50)
3765.15(0)	5.18(0)	5.12(0)		5.04(1n)	Cr II .28(3) Cr II .32(1) (Tb (II?) .14(S100)) (Ce II .04(12?))
3765.45(2)	5.57(3)	5.58(3)	5.58(2)	5.67(1)	Cr II .61(8) Fe I .54(200)
3766.20(0)			5.97(0)	6.09(0)	Eu II .93(150)
3766.39(0)		6.31(1)			(Ne II .29(75))
3766.49(1)	6.63(2)	6.58(2n)	6.61(1n)	6.51(1)	Cr II .65(4) Zr II .83(25) (Ce II .51(?4n)) (La II .58(3))

* Phase 1.482 begins at wave length 3758.22

† Phase 0.756 begins at wave length 3760.80

TABLE 3 -- Continued

0.756	1.482	3.042	4.460	5.003	Identification
3767.14(1)	7.21(2)	7.18(2)	7.08(1)	7.26(1)	Fe I .19(500) Gd II .04(500) (Sm II .36(200)) (La II .05(5))
3767.95(0)		7.77(0)		7.78(0)	Sm II .76(150) (Zr II .89(5))
3768.52(1)		8.33(1)	8.29(1)	8.36(2)	Gd II .38(2000) (Gd II .50(60))
		9.66(0)			Nd II .64(40) Gd II .45(100) (Pr II .70(30)) (Ni II .46(5))
3770.53(x)	0.36(xn)	0.52(xn)	0.55(6n)	0.62(xn) 1.58(0)	H 11 .63(15) (Gd II .69(300))
3772.02(0)					Cr II .00(1) Cr II .10(1) Nd II .06(15) (Zr II .06(4)) (Zr II .98(2))
			2.45(0)	2.46(0)	
				2.89(0)	Pr II .85(100)
		3.06(0)		3.19(0)	La II .12(150)
3773.56(0)	3.54(0)	3.44(0)		3.62(0)	Dy II .32(25) Fe I .70(40)
3774.35(1n)	4.22(2)	4.25(1)	4.03(0)	4.22(1)	Y II .33(100) Pr II .06(75) (Sm II .29(150)) (Gd II .30(80))
3774.91(0)				4.75(1)	Fe I .83(100) (Ti II .65(1))
3775.26(0)			5.31(0)	5.13(0)	Cr II .09(1) Eu II .47(4) (P II .02(30))
	5.81(0)	5.87(0)		5.56(1)	Cr II .73(0) Nd II .50(20) (Ni I .57(500)) (Eu II .69(5))
3775.97(2)	6.22(1)	6.14(1)	5.99(1)	6.02(1)	Ti II .06(60) Fe I .46(125)
3776.66(0)	6.69(1)	6.58(0)	6.52(0)	6.70(0)	(Y II .56(12)) (Eu II .51(5)) (Tb(II?) .49(S100))
	7.36(0)			7.19(1)	(Ne II .16(75)) (Er(II?) .09(S10))
3777.64(1)	7.70(1)	7.49(1)	7.43(1)	7.46(1)	Pr II .63(50) Eu II .61(15)
3778.23(1)	8.21(1)	8.24(1)	8.23(0)	8.02(0)	Sm II .14(400)
3778.54(1)	8.62(1n)	8.60(2n)	8.69(1)	8.40(0)	Cr II .69(6) Fe I .51(60) (Fe II .37(pr))
				8.80(0)	(Eu II .87(6)) (Eu II .65(4))
				9.16(0)	Cr II .06(1) Cr II .12(0) (Dy II .25(25))
3779.48(2)	9.58(2)	9.52(1n)	9.50(2)	9.67(2)	Fe I .45(100) Nd II .47(40)
3779.84(0)		0.14(0)		9.97(0)	Gd II .83(20) (Eu II .87(6))
3780.56(0)		0.49(1n)	0.62(1n)	0.41(1)	Cr II .49(2) Eu II .54(10) Nd II .39(20) (La II .53(50))
3780.88(1)		0.74(1)		0.90(1)	Sm II .93(150) Sm II .76(200) Pr II .66(50) (Fe I .19(40)) (La II .67(50)) (A II .84(8))
3781.45(2)	1.49(2)	1.48(2)	1.44(1)	1.53(2)	Fe II .51(1) Eu II .40(50) (Ce II .62(150)) (Nd II .32(20))
3781.93(0)	1.95(0)	2.04(1)			

TABLE 3 -- Continued

0.756	1.482	3.042	4.460	5.003	Identification
		2.28(1)	2.22(1)	2.21(2)	Gd II .34(300) Cr II .18(2) Cr II .34(1) (Zr II .24(4))
3782.38(2n)	2.46(1)			2.54(1)	Ce II .52(75)
3782.82(1)			2.98(1)	3.06(0)	Dy II .89(20) (Zr II .72(5))
3783.25(2)	3.30(3)	3.30(3)	3.40(2)	3.43(2)	Fe II .35(4) Cr II .56(2) (Ni I .53(500)) (S II .16(8)) (Tm II .56(60))
3783.70(1)	3.73(1)			3.84(1)	Gd II .73(20) Cr II .81(1)
3784.04(0)					
3784.25(1)	4.40(1)	4.17(1)	4.14(1)	4.39(1)	Nd II .25(80) Eu II .26(15)
3784.68(0)	4.75(0)	4.67(0)	4.90(0)	4.96(1)	Nd II .85(20) La II .81(15)
3785.12(0)					Cr II .23(1)
3785.46(1n)	5.45(1)			5.41(1)	Cr II .35(1) Dy II .42(30) (Pr II .50(50)) (Eu II .48(4))
	6.07(0)		5.84(0)	6.06(2)	Fe I .95(125) Eu II .82(15)
3786.22(3)	6.40(2)	6.23(1n)		6.37(1)	Dy II .20(300) Fe I .18(100)
3786.61(0)	6.66(1)		6.64(1)	6.73(1)	Ce II .63(150) Fe I .68(125) (P II .69(15))
3787.00(0)	7.02(1)				Pr II .88(75) Eu II .98(8)
3787.37(0)	7.41(1)	7.20(0)		7.11(1)	Sm II .20(100) V II .24(150)
				7.57(0)	Gd II .56(400)
3787.79(1n)	7.77(2)	7.84(1)	7.86(0)	7.85(1)	Fe I .88(500)
3788.39(3n)	8.51(2)	8.43(1n)	8.30(1)	8.36(3)	Dy II .45(150) (Sm II .12(400))
3788.61(1n)	8.78(1)	8.64(0)	8.77(0)	8.82(0)	Ce II .75(75) Eu II .76(30) (Y II .70(30))
3789.23(0)	9.31(0n)			9.22(1)	Fe I .18(80) Eu II .17(10)
	9.52(0)	9.65(0)			
3789.97(1)	0.15(1)			9.83(1)	Fe I .10(200) (Cr II .89(pr))
3790.47(1)	0.65(0)		0.24(0)	0.35(1)	Gd II .44(20)
3791.17(1)	1.20(1)		1.05(0n)	1.10(1)	Gd II .17(300)
3791.89(1)	1.82(0)	1.70(1n)	1.71(1)	1.73(3)	Cr II .75(2) Dy II .82(50) Sm II .02(150) Eu II .50(30) Gd II .72(30)
3792.47(1)	2.43(1)	2.33(1n)	2.39(0)	2.34(1)	Gd II .39(200) Ce II .33(50) Pr II .52(100) (S II .46(35)) (Zr II .32(2))
3793.06(0)				3.09(0)	Eu II .06(25)
3793.50(0)					(P II .60(30)) (Tb(II?) .55(S15))
3794.19(0)					Sm II .97(500) Fe I .34(80)
3794.71(0)		4.62(0)		4.63(1)	La II .77(400)
				6.43(0)	Gd II .37(2500) Zr II .47(20) (Eu II .33(8))
				7.06(0)	Ti II .88(15) Sm II .28(150)

TABLE 3 -- Continued

0.756	1.482	3.042	4.460	5.003	Identification
3797.86(x)	7.80(xn)	7.94(xn)	7.79(8n)	7.87(xn)	H 10 .90(20) (Sm II .73(600)) (Cr II .95(1))
		8.89(0)			Eu II .01(100)
	9.53(0)	9.46(0)		9.67(0)	Fe I .55(400) Sm II .54(300) Cr II .62(1) (Eu II .49(10))
		0.34(0)	0.26(0)		Mn II .24(2) Pr II .30(200) Sm II .37(100)
				0.66(0)	Sm II .89(400) Gd II .68(15) (Eu II .55(10)) (Zr II .73(5))
3801.06(0)	1.15(0)	1.21(1)		1.32(0)	Cr II .21(10) Gd II .29(400)
3801.40(1)	1.58(1)	1.77(0)			Ce II .53(500) Mn II .63(3) (Eu II .58(8)) (Fe I .68(50))
3801.99(0)	1.99(0)				
				2.48(0)	
			2.89(0)	2.82(0)	Gd II .85(40) Mn II .96(0)
3803.42(0)	3.50(0)	3.21(0)		3.25(0)	Ce II .10(200) Nd II .47(40)
3804.08(1)	4.09(0)	3.88(0)	4.00(1n)	3.98(1)	Cr II .10(1) Dy II .15(40) (Mn II .88(0)) (Fe I .01(40))
3804.72(1)	4.85(0)			4.77(1n)	Pr II .85(75n)
3805.24(1)	5.36(1)	5.28(1)	5.38(2)	5.48(3)	Fe I .34(400) Nd II .36(100) (Nd II .55(20)) (Gd II .52(200)) (Gd II .09(80))
3805.65(1)					Sm II .63(200)
3806.09(1)		6.10(1)	6.09(1)	6.17(2)	Dy II .28(50) (Fe I .22(40))
3806.35(1)	6.37(0)				
3806.60(1)	6.78(0)	6.68(1n)		6.78(2)	Fe I .70(200)
3806.95(2)	7.02(2)			7.05(1)	Fe II .82(pr) Nd II .23(15) (Tb(II?) .85(S50))
3807.52(1)	7.51(1)	7.49(1)	7.61(1)	7.54(1)	Fe I .54(150) Cr II .34(1) (Eu II .54(30)) (Gd II .65(25)) (Zr II .41(2))
3808.08(1)	8.17(1)	8.07(1n)	8.09(0)	8.22(1)	Ce II .12(300)
3808.62(0)					
3809.06(2n)			8.80(1)	8.89(2)	Nd II .05(25) Nd II .77(30) Fe I .73(100) Dy II .04(25)
3809.42(0)	9.19(0)	9.14(1)	9.35(1)	9.34(1)	Cr II .54(1) Ce II .22(25) (Pr II .16(30)) (A II .49(25))
	9.76(0)	9.74(0)	9.81(1)		
3810.05(2)	0.09(2)		0.22(0)	9.89(2)	Cr II .05(1)
3810.50(0)				0.31(0)	Nd II .48(40)
3810.84(1)	0.81(1n)	0.69(1)	0.74(1)	0.72(2)	Cr II .74(1) Fe I .76(70) (Nd II .07(20)) (Ho(II?) .70(S40))

TABLE 3 -- Continued

0.756	1.482	3.042	4.460	5.003	Identification
3811.41(0)	1.52(0)			1.46(0)	
		2.08(0)		1.97(0)	Nd II .77(20)
3812.16(1)	2.32(0)			2.38(1n)	Sm II .07(150) Gd II .19(8)
3812.77(2n)	2.91(1)	3.01(1)	3.04(0)	3.11(3)	Fe I .96(400)
3813.34(3)	3.45(2)	3.39(1)	3.40(1)	3.50(2)	Ti II .39(20)
				3.84(0)	Dy II .68(40) Fe I .89(50)
3814.03(6)	4.08(5)	4.01(5)	4.04(4)	4.07(5)	Fe II .12(4) Cr II .00(12) (Gd II .97(2000))
3814.63(2n)	4.64(2)	4.64(2)	4.59(1)	4.64(4)	Ti II .58(35) Fe I .52(80)
3814.82(2n)	4.81(1)				Nd II .72(60) Zr II .97(2) (Gd II .74(100))
		5.06(0)		5.07(0)	
3815.21(0)	5.36(0)	5.35(1)	5.38(0)	5.44(1)	V II .38(200) Eu II .50(80)
3815.74(5)	5.81(4)	5.82(4)		5.81(1n)	Fe I .84(700) Cr II .77(2) (Ce II .83(250))
			5.95(3n)	6.03(5n)	
3816.28(2n)	6.28(1)			6.24(1)	Pr II .17(125) (La II .25(10))
3816.83(3)	6.82(1)	6.53(1n)	6.63(2)	6.68(5)	Dy II .77(200) Gd II .64(250)
3817.26(1)	7.35(2)	7.33(2n)			Nd II .37(15) La II .24(8) (Tm II .40(100))
3817.47(1)	7.57(1)		7.41(1n)	7.47(4n)	Ce II .46(25?) Fe I .65(50) (Zr II .59(12))
3817.88(0)	7.92(1)		7.81(1)	7.72(1)	Pr II .87(30)
3818.24(1)	8.32(1)	8.08(1)	8.19(1)	8.28(2)	Pr II .28(125) Y II .34(50) (Ne II .44(25))
3818.85(2)	8.81(1)	8.68(0)	8.80(2n)	8.76(3)	Gd II .75(150)
3819.16(0)				9.14(1)	
	9.42(1)	9.47(1)			
3819.73(6)	9.77(2)	9.69(1)	9.55(3)	9.59(9)	Eu II .67(6000)
			0.06(0)	0.19(1)	
3820.38(4n)	0.39(5)	0.38(5)	0.41(3)	0.51(2n)	Fe I .43(800) Cr II .48(2)
3820.61(0)	0.95(1)		0.86(1)	0.94(2)	Ce II .87(5?)
3821.08(2)	1.16(2)	1.15(1n)	1.25(2)	1.32(1)	Fe I .18(100)
3821.86(3)	1.93(2)	1.85(2)	1.88(3)	1.93(3)	Pr II .82(50) Fe I .84(50) (Fe II .92(pr))
	2.29(0)				Gd II .17(80)
		2.40(0)		2.47(1)	Nd II .47(20)
3822.61(1)	2.61(1)		2.67(1)		Dy II .59(20)
				2.76(2)	Fe II .74(3)

TABLE 3 -- Continued

0.756	1.482	3.042	4.460	5.003	Identification
3822.90(1)	3.00(0)	3.00(0)	3.08(1)		(Gd II .20(12)) (Pr II .18(75))
3823.41(1n)	3.41(0n)			3.37(1n)	Pr II .57(10) (Zr II .41(3))
3823.86(1)	3.87(1)	3.84(0)			Ce II .90(50) (Zr II .72(1))
3824.31(3n)	4.39(1)	4.31(2)	4.36(1)	4.41(2n)	Fe I .44(150)
3824.84(3)	4.97(2)	4.89(2)	4.94(3)	5.03(4)	Fe II .91(4) (Gd II .02(50))
3825.26(1)	5.34(2)	5.40(1)	5.39(1)	5.44(1)	
3825.77(5n)	5.84(3)	5.86(4)	5.88(4)	5.98(7)	Fe I .88(500) Dy II .6(30)
3826.12(2n)	6.06(1)				Sm II .20(400) Gd II .05(200) (Pr II .29(100)) (Dy II .0(20))
3826.35(0)	6.38(0)	6.42(1)	6.55(1)	6.51(1)	Nd II .42(60)
	6.77(0)			6.74(0)	Eu II .68(50)
3826.99(2)	7.06(2)	7.06(3n)	7.11(2)	7.16(3)	Fe II .08 (4) Cr II .95(1) (Cr II .06(0))
				7.55(1)	Gd II .33(80) (P II .44(150))
3827.70(4)	7.82(3)	7.78(3)	7.90(1)	7.90(2n)	Fe I .82(200)
3828.22(2)	8.36(1)		8.18(0)	8.01(2)	Gd II .00(30) Nd II .99(30)
		8.58(0)		8.71(0)	(Gd II .69(6))
3829.00(0)	8.95(0)			9.02(0)	Fe II .86(2) Nd II .84(40) (Eu(II?) .93(30))
	9.28(0)				Mg I .35(100) Nd II .15(30)
		9.87(0)			(Ne II .77(40))
3830.57(0)	0.54(0)			0.34(1)	Sm II .29(200) Nd II .48(20) (N I .39(150)) (A II .43(10))
3831.13(0)				1.08(1)	Gd II .98(30)
3831.66(1)			1.56(1)	1.62(1)	Sm II .50(400) Dy II .64(20)
				2.16(0)	Mg I .31(250) (Gd II .80(100))
				2.49(0)	Cr II .40(0)
3833.03(0n)		2.90(0)		2.90(1)	Fe II .96(2?) Cr II .74(1) (Y II .89(80)) (Ce II .74(4?)) (Zr II .94(1)) (Fe I .31(100))
		4.16(0)		4.12(0)	Fe I .22(400) (Sm II .83(200))
3835.48(xn)	5.40(xn)	5.32(xn)	5.42(9n)	5.40(xn)	H 9 .39(40)
	6.68(0)	6.83(0)		6.92(0)	Dy II .51(200) Gd II .91(300) Nd II .54(60) (Zr II .76(60))
				7.34(0)	Cr II .51(1) Ce II .21(3) Cr II .63(0) (Ho II .45(15))
		8.30(0)	8.48(0)		Mg I .26(300) Ce II .54(150) Eu II .24(30) (Zr II .28(5))
	8.94(0)	8.76(0)			Sm II .94(200) Nd II .98(80) (Dy II .67(5))

TABLE 3 -- Continued

0.756	1.482	3.042	4.460	5.003	Identification.
3839.55(1)	9.62(1)	9.38(0)	9.37(1n)	9.50(0)	Gd II .64(300) Fe I .26(100) (Nd II .50(15))
3840.14(0)			9.95(1)		
3840.35(1n)	0.49(1n)	0.42(2)	0.41(1)	0.49(2)	Fe I .44(400) (La II .72(60))
3840.98(2n)	1.06(2)	1.02(2)	1.09(1n)	1.14(1)	Fe I .05(500) (Pr II .01(60))
		1.60(0)			Dy II .32(100)
3841.98(1n)	2.08(1)	2.09(1)	2.08(1n)	1.93(1n)	Al II .04(10) (Ho II .05(4))
	2.41(0)			2.28(0)	Gd II .20(400) Pr II .36(60) Cr II .45(1) (Eu II .35(8)) (Tb II .49(40)) (Cr II .66(1))
	3.09(1n)	3.06(1n)	2.95(1)	3.02(1)	Mn II .98(1) Zr II .03(30)
3843.14(2)	3.17(0)		3.24(0)	3.20(1n)	Fe I .26(125) Gd II .27(500) (Eu II .15(50))
3843.65(0)		3.68(0)		3.42(1)	Sm II .50(200)
3843.97(1n)				3.92(1)	Gd II .80(25) (Ho II .86(8))
3844.19(1n)	4.16(1)	4.15(1)		4.12(0)	Eu II .23(8)
3844.67(2)	4.67(1)	4.64(0)	4.43(1)	4.54(1)	Gd II .58(500) (Pr II .56(60))
		4.83(1n)			
3845.10(2)	5.22(2)	5.24(2)	5.28(1)	5.29(3)	Fe II .18(4) Fe I .17(100) (Cr II .16(1))
3845.52(1)					Gd II .47(20) Co I .47(500) (Cl II .42(50))
3845.74(1)	5.66(1)	5.72(0)	5.69(1n)	5.79(1)	(Cl II .82(30)) (Tb II .61(10)) (Cl II .68(75))
3846.46(1n)	6.38(0)	6.44(0)	6.51(0n)	6.26(1)	Dy II .36(25) Fe I .42(50)
3846.80(1n)	6.79(1n)	6.77(1)		6.65(2)	Fe I .80(125) Pr II .61(125) (Ho II .68(10))
3847.39(0n)	7.33(0)	7.44(1)	7.47(0)	7.35(0)	Sm II .51(150) V II .32(100)
				7.80(1)	Eu II .85(50)
3848.07(1)	8.18(1)			8.23(0)	Tm II .02(1000) Mg II .24(10) (Nd II .23(50)) (Nd II .31(40))
3848.53(1)	8.64(1)	8.54(0)	8.50(1)	8.62(3)	Eu II .40(10) Nd II .52(80) Ce II .60(150)
3848.76(1n)	8.76(0)				Sm II .78(200) Tb II .75(100)
3848.93(1)	9.07(0)				La II .01(100)
3849.44(3)	9.43(2)	9.52(1)	9.43(0)	9.28(2)	Dy II .40(20)
	9.56(0)			9.57(0)	Ni II .58(2)
3849.87(1)	9.93(1n)	9.91(1)		9.81(0)	Fe I .97(500)
3850.30(0)				0.20(1)	Mg II .40(5) Nd II .23(20)

TABLE 3 -- Continued

0.756	1.482	3.042	4.460	5.003	Identification
	0.54(0)	0.55(0)		0.54(1)	Gd II .69(800) (Dy II .45(4)) (Dy II .53(5))
3850.80(2n)	0.87(2n)	0.75(1)	0.82(2)	0.91(4)	Gd II .97(1200) Fe I .82(200) (Pr II .82(150)) (S II .93(8)) (Cl II .02(100))
3851.32(1n)					(Cl II .42(75)) (Ho II .4(4))
3851.70(1n)	1.60(1n)	1.43(0)	1.60(1)	1.52(1)	Pr II .62(200) (Nd II .75(60)) (Nd II .66(30)) (F II .67(200))
			1.95(1)	1.95(0)	Sm II .88(150) (Tb II .86(5))
3852.16(1)	2.18(0)	2.15(0n)			
3852.52(2)	2.49(1)	2.40(1)	2.40(1)	2.42(2)	Gd II .45(1000) Fe I .58(150) (Cr II .61(1))
3853.07(4)	3.14(2)		2.85(1)	2.93(3)	Dy II .04(100) Ce II .16(125) (Pr II .80(150)) (Zr II .07(2))
3853.63(8)	3.64(8)	3.62(8)	3.65(3)	3.58(5n)	Si II .67(3)
	4.03(0)				Ho II .08(20)
3854.25(4)	4.35(2)	4.17(1)	4.22(1)	4.19(1n)	Sm II .21(300) Ce II .19(100) Ce II .32(100)
3854.70(1)		4.53(0)	4.79(0)	4.75(1)	Cr II .73(2) Eu II .64(20)
3854.97(1)	4.95(1n)				Pr II .90(100) Fe II .13(0) Cr II .86(2) (La II .91(30)) (Eu II .81(20))
3855.59(0)	5.46(0)	5.50(0n)	5.43(1n)	5.45(1)	Gd II .56(200) (Tb II .58(10)) (Zr II .43(3))
3855.99(x)	6.00(9)	5.99(x)	5.97(6)	5.99(9)	Si II .03(8)
	6.39(1)	6.50(1)	6.43(1)	6.53(1)	Fe I .37(500)
3856.69(1)	6.75(0)	6.94(1)	6.98(2)	6.88(2)	Cr II .93(2) Ce II .03(5) (Ho II .98(8))
3857.11(0)	7.19(0)			7.39(0)	Cr II .19(1) Ce II .24(4?)
3857.69(0)	7.68(1n)	7.55(1)	7.64(1)	7.71(1)	
				8.02(0)	Sm II .91(100)
3858.18(0)	8.19(0)		8.17(0)	8.29(1)	Pr II .26(30) Ni I .30(800)
3858.49(1)	8.51(1)			8.54(1)	
3858.80(0)	8.89(1)	9.00(0)	9.03(0)		
3859.29(2)	9.36(1)	9.30(1n)	9.46(1)	9.16(1)	Cr II .38(1) Fe I .22(100) (Al II .33(10))
	9.73(1)			9.62(0)	
3859.82(5)	9.93(3)	9.89(3)	9.90(2)	0.02(3)	Fe I .91(1000)
3860.23(0)	0.19(0)				
	0.51(1)	0.57(0)	0.69(1n)		(S II .64(15))
3860.80(2n)	0.78(1)			0.84(3n)	Fe II .92(3) Eu II .73(10) (Cl II .99(100)) (Cl II .83(150))

TABLE 3 -- Continued

0.756	1.482	3.042	4.460	5.003	Identification
3861.23(1n)	1.26(1)			1.26(1)	Eu II .18(80) Gd II .14(50) Fe I .34(80) Cr II .34(1) (Pr II .31(30))
3861.68(0)	1.75(1)		1.70(1)	1.73(0n)	Ho II .68(40)
3861.99(1)	2.04(3)				Sm II .05(150)
3862.57(x)	2.59(9)	2.56(x)	2.52(7)	2.56(8)	Si II .60(6) (Nd II .49(15))
	3.13(1)	3.14(1)	3.07(1)		Gd II .05(150)
3863.28(5)	3.40(2)	3.42(1)	3.31(2n)	3.38(2n)	Fe II .41(1) Cr II .46(1) Nd II .41(60) (Nd II .33(20))
3863.91(4n)	3.95(2)	3.96(3)	3.94(3)	4.01(3)	Fe II .95(1) Eu II .11(40) (Mo I .11(1000))
3864.59(1)	4.67(1)		4.47(1)	4.57(2)	La II .49(100)
3864.98(1)	5.02(1)	4.83(1)	4.98(1)	5.01(1)	(Eu II .29(15))
		5.43(2)		5.44(1)	Pr II .46(100) Dy II .45(8)
3865.50(5)	5.58(4)	5.61(4)	5.58(5)	5.68(4)	Cr II .59(75) Fe I .53(600)
3865.90(2)	6.04(2)	6.02(1)	6.04(2)	6.12(1)	Cr II .01(5) Nd II .99(10)
	6.33(0)				Eu II .19(20)
3866.41(2)	6.56(2)	6.50(2)	6.53(3)	6.57(3)	Cr II .55(7) Dy II .59(30) (Nd II .52(15))
3866.68(1)	6.91(0)				Nd II .80(10)
3867.15(1)	7.22(1)	7.05(1)	7.09(1)	7.06(2)	Fe I .22(150) Gd II .26(60)
3867.48(0)					Pr II .55(30)
3867.89(1)	7.68(1)		7.62(1)	7.72(2)	Cr II .80(1) Cr II .86(1) (Dy II .84(5))
3868.49(2)	8.44(1)	8.32(1)	8.35(1)	8.40(3n)	Cr II .32(2) Dy II .45(50) (La II .35(3))
3869.11(1)	9.17(1)	9.03(0)	8.96(1)	9.10(2n)	Nd II .04(30)
				9.28(2)	
3869.48(2)	9.61(1)	9.47(0)	9.70(0)	9.71(1)	Cr II .62(2) Dy II .43(60) Fe I .56(100)
3869.91(1)	9.92(1)			9.95(0)	Dy II .87(60) (Tb II .75(15))
3870.23(0)				0.16(0)	
3870.62(2n)	0.64(1)		0.43(1)	0.40(1)	
3870.96(1)			0.96(0)	0.85(1)	
3871.37(0)				1.24(0)	
3871.57(1n)	1.56(1)	1.56(1n)	1.51(1)	1.60(2)	Gd II .54(80) La II .63(200) Sm II .78(300) Cr II .76(1) (Dy II .64(30)) (Fe I .75(100))
	1.85(0)				Cr II .85(1)
3872.15(1)	2.19(1)		2.01(1)	2.03(2)	Dy II .12(600)

TABLE 3 -- Continued

0.756	1.482	3.042	4.460	5.003	Identification
3872.46(0)	2.51(1)	2.58(2n)	2.55(1)	2.56(2)	Fe I .50(300) Cr II .57(1?)
3872.68(3)	2.77(3)	2.71(3)		2.72(2)	Gd II .62(60) Fe II .76(pr)
3873.28(1)	3.39(0)		3.02(0)	3.15(1)	Gd II .32(15)
				3.53(0)	Cr II .51(2)
3873.86(1)	3.71(1)	3.70(1)	3.82(1)	3.89(2)	Dy II .00(60) (Tb II .78(8))
3874.32(0)	4.25(1)	4.43(1)	4.56(1)	4.58(2)	Pr II .45(25) Cr II .41(pr) Tb II .18(200) (Ho II .11(2))
3874.72(2)	4.73(1)				Ho II .70(6) Cr II .76(pr)
	5.12(1)		5.20(1n)	5.11(1)	Sm II .19(100) Eu II .10(8) Ce II .04(6d?) (Dy II .15(4)) (Tb II .21(20)) (A II .26(25))
3875.34(0)	5.46(0)				Gd II .46(100) Sm II .55(200)
3875.71(3)	5.77(1)			5.58(3)	Nd II .87(40) Nd II .74(20)
				5.98(0)	(Fe I .04(40))
3876.17(2)	6.25(1)	6.10(0)	5.99(1n)	6.25(2n)	Pr II .18(50)
3876.63(1)	6.68(1)		6.46(1)	6.53(1)	Lu II .65(100)
3877.28(1)	7.15(1)	7.10(1)	7.13(1)	7.24(3n)	Cr II .26(2) Eu II .27(40) (Ce II .97(15)) (Pr II .22(200))
3877.63(0)	7.42(1)	7.56(0)		7.42(0)	Cr II .48(1) (Tb (II?) .56(6))
	7.74(0)				Eu II .88(10)
3877.99(1)	7.96(1)	7.98(1)	7.83(1)	7.88(2)	Fe I .02(400) (Dy II .94(2))
3878.54(1)	8.53(1)	8.55(1)		8.68(1)	Fe I .58(300) Ce II .37(150) Nd II .58(50)
	8.71(2)	8.92(0)	8.84(1)	8.95(2)	V II .72(300) (Fe I .68(30))
3879.13(3)	9.21(1)	9.13(0)			Dy II .05(30) Pr II .21(25)
3879.64(1)	9.69(1)	9.55(0)	9.47(0)	9.60(1)	Nd II .54(40)
3880.29(1)		0.24(0)		0.13(0)	Nd II .38(30) (Pr II .47(100))
3880.76(2)	0.77(0)		0.50(0n)	0.70(2)	Pr II .47(100) Fe II .78(1) Sm II .77(150) Cr II .80(2) (Nd II .78(40)) (Nd II .37(30))
3881.51(1)	1.60(0)		1.21(0)	1.37(2)	Cr II .36(2) Sm II .38(100)
3881.93(0)			1.78(1)	1.92(2)	Gd II .84(50) Dy II .00(20) Gd II .94(30) (Ni II .92(1)) (Zr II .97(7))
3882.46(2n)	2.44(1)	2.25(1)	2.33(1)	2.39(3)	Ce II .45(75)
3882.98(1)		3.19(0)	3.35(0)	3.04(1)	Mn II .28(3) Fe I .29(70) (Dy II .06(4))
3883.52(0)				3.59(1n)	Eu II .64(20) Tm II .44(200)
3884.63(0)				4.47(0n)	Gd II .66(15)
3885.35(0)				5.27(0)	Sm II .29(1000) Pr II .19(75)

TABLE 3 -- Continued

0.756	1.482	3.042	4.460	5.003	Identification
3886.16(0)	6.35(0)	6.19(0)	6.26(1)	6.29(1)	Fe I .28(600) La II .37(150) (Ho II .4(6))
			6.86(1n)	6.96(0)	Gd II .16(40) Tb II .83(20) (Cr I .79(125))
				8.06(0)	Nd II .87(30)
3889.08(xn)	9.04(xn)	9.00(xn)	8.99(xn)	8.99(xn)	H8 .05(60) (Dy II .99(20))
3889.78(0)				9.93(1)	Ce II .99(300) Nd II .66(20) Nd II .93(50) (Tb II .85(10))
3890.16(0)					Sm II .08(200) Nd II .22(8)
3891.10(0)		0.85(0)	0.77(0)	0.90(1)	Gd II .85(30) Cr II .86(1) Ho II .02(200) Nd II .94(60) (Fe I .84(60))
				1.53(1)	Nd II .51(20) Pr II .70(12)
3892.06(0n)	2.13(1)	2.11(0)		2.14(1)	Cr II .14(4) Fe I .93(100) (Dy II .85(3)) (Nd II .06(10)) (La II .05(3))
				2.65(0)	(La II .47(3))
3893.09(1n)		3.10(0)		3.03(1)	(Ho II .10(4))
	3.33(0)			3.39(0)	Fe I .39(100) Cr II .31(1) Cr II .52(1) (Tb II .35(15)) (Ho II .54(5))
3893.89(0)	3.96(1)	3.98(0)		4.00(1)	(Co I .08(1000))
3894.54(0)	4.57(0)	4.55(1)	4.54(1)	4.67(1)	Gd II .70(2000) (A I .66(300)) (Nd II .63(40)) (Cr II .77(1))
3895.03(0)	5.16(1n)	5.14(1)	5.18(2)	5.22(4)	Gd II .23(200) Cr II .16(2) Ce II .11(125) (Pr II .08(10))
3895.38(1)		5.54(1)			Dy II .35(25) Nd II .38(3) (Ho II .53(4))
		5.90(0n)		5.77(2)	Gd II .79(400) Fe I .66(400)
3895.96(2)	6.04(1)	6.12(1)	5.95(0n)	6.14(2)	Nd II .14(10) V II .16(60) Tb II .04(25)
3896.34(1)					Gd II .42(10)
3896.83(2)	6.89(2)	6.72(1n)	6.64(1)	6.78(4)	Ce II .80(100) Cr II .62(1) (Pr II .84(10)) (Ho II .75(5)) (Tb II .60(25))
			7.07(0)	7.19(1)	Sm II .98(600) ~~Pr~~ II .04(12)
3897.42(0)	7.55(1n)	7.51(1)		7.37(1)	Pr II .28(25) (Tb II .39(4)) (La II .43(4)) (Ho II .27(4))
	8.13(1)	8.02(1)	8.13(1)	7.97(1)	Fe I .01(80) Ce II .27(100) (Fe I .90(100)) (Cr II .81(1)) (Eu II .25(10))
3898.51(4n)	8.60(3)	8.56(1)	8.42(1)	8.42(5)	Dy II .54(500) Cr II .49(1) Gd II .40(10)
3899.03(1)	9.18(1)	9.27(0)		8.93(2)	V II .14(200) Cr II .80(0) (Pr II .84(10)) (Tb II .19(200))
3899.58(1)	9.47(0)				Eu II .49(10) (Tb II .54(15))

TABLE 3 -- Continued

0.756	1.482	3.042	4.460	5.003	Identification
3899.69(1)	9.77(1)	9.67(1n)	9.75(0n)	9.62(1)	Fe I .71(500) Cr II .95(2) (A I .86(100))
3900.17(0)	0.34(0)				Eu II .18(10) Nd II .23(60)
3900.51(7)	0.56(4)	0.51(3n)	0.45(3)	0.50(6)	Ti II .54(50) (Fe I .52(60))
3900.66(1)					Al II .68(200) Cr II .81(1) (Tm II .79(90))
3901.15(1n)	1.34(1)		1.04(0)	1.04(0)	Cr II .29(0)
3901.71(2)	1.75(1n)	1.53(1n)	1.46(1n)	1.55(3)	Nd II .85(50) (Eu II .63(3)) (Tb II .60(6))
3902.02(0)				1.99(0)	(Tb II .98(15))
		2.21(0n)		2.25(1)	(Ho II .24(4))
3902.38(2)	2.49(1)		2.36(1n)	2.62(2)	Gd II .40(1000) Pr II .47(25) (Dy II .39(2)) (Tb II .35(10))
3902.89(2)	2.98(2)	2.95(1)	2.97(1)	3.02(2)	Fe I .95(500) (Mo I .96(1000))
3903.17(1)	3.28(1)		3.30(0)	3.42(1)	V II .27(250) Sm II .42(500)
3903.66(2)	3.79(3)	3.73(2)	3.78(3)	3.82(3)	(Zr II .77(1))
3903.99(1)					Fe I .90(100) Cr II .15(1) (Dy II .14(20))
3904.47(0)	4.49(0)	4.48(1n)	4.32(0)	4.47(1)	(Ce II .34(5?))
3904.83(1)	4.74(0)			4.76(1)	
3905.20(0)	5.04(0)		5.01(0)		
				5.41(2)	Si I .53(20)
3905.54(6)	5.61(8)	5.58(3n)	5.65(4)	5.72(3)	Cr II .66(25) (Si I .53(20)) (Dy II .56(2))
3906.00(4)	6.06(4)	6.05(3n)	6.08(4)	6.16(5)	Fe II .04(5) Nd II .89(100) (Ho II .78(30)) (Nd II .10(10))
3906.43(1)	6.41(1)		6.52(0)	6.50(1)	Fe I .48(300)
3906.86(0)	6.91(1)				
3907.21(7)	7.15(2n)	7.10(3)	6.94(2n)	7.02(7)	Eu II .10(3000)
			7.30(1)	7.37(1)	Ce II .29(125) Cr II .36(1) (Sc I .48(125))
3907.63(0)				7.69(1)	Tb II .65(3) Tb II .79(3) (Ti II .65(pr))
3907.98(3)	8.08(2n)	8.07(2n)	8.02(3)	8.16(7)	Fe I .94(100) Pr II .03(150) (Gd II .14(8)) (Nd II .84(20))
3908.37(4n)	8.51(3n)		8.45(2)	8.51(3)	Pr II .43(200) Ce II .41(125)
3908.68(1)					Ce II .54(100) (Fe II .54(pr)) (Cr I .76(200)) (La II .79(15))
3909.14(1n)	9.19(1)	9.21(1n)	8.97(0)	9.04(1)	Cr II .17(1)

TABLE 3 -- Continued

0.756	1.482	3.042	4.460	5.003	Identification
	9.32(1)		9.31(1)	9.42(2)	Ce II .31(35)
3909.59(1n)	9.78(1n)		9.88(0)	0.03(1)	Pr II .62(8) (Fe I .84(40)) (Tb II .13(4))
3910.23(1)	0.27(0)	0.53(1)	0.46(1)	0.42(1)	Gd II .20(6) Cr II .44(1)
3910.67(1)	0.74(1)			0.78(1)	Fe I .84(30) (Tb II .57(2)) (La II .81(10))
				1.15(0)	Nd II .17(60)
3911.19(1)	1.34(3)	1.35(2)	1.39(3)	1.45(5)	Cr II .32(3)
3911.53(0)					Cr II .54(2)
3911.73(1n)	1.67(1)				(Sc I .81(150))
3912.22(0n)	2.27(1)	2.11(0)	2.04(1n)	2.09(2)	Nd II .23(20) Ce II .19(5) (O II .95(150))
3912.36(1n)	2.55(1)	2.47(1n)	2.54(2)	2.47(2)	Ce II .42(300)
3912.78(1n)	2.99(1)			2.70(2)	Pr II .90(125) (Tb II .78(5)) (Dy II .85(3))
	3.23(0)				Cr II .20(2)
3913.44(3)	3.56(3)	3.44(2)	3.44(4)	3.43(4)	Ti II .46(70) Cr II .48(1) (Fe I .64(100)) (Nd II .69(8)) (Pr II.56(15))
3914.06(1)	3.82(0)		3.91(1)	3.91(2)	Eu II .72(10) Gd II .78(20) Cr II .76 (2) Cr II .13(2) Ho II .96(3) Dy II .95(6) Cr II .96(1) (Cl II .92(30))
	4.29(1)				Cr II .13(12)
3914.40(2)	4.49(2)	4.43(1)	4.58(2)	4.63(1)	Fe II .48(2) (A II .76(25)) (Pr II .76 (8)) (V II .33(250)) (Zr II .36(7))
3914.93(2)	4.98(1)		4.99(0)	4.98(0)	Dy II .88(40) Ce II .95(18) (Nd II .13(8))
3915.51(1)	5.48(1n)	5.30(1n)	5.42(2)	5.49(3)	Dy II .60(40) Cr II .58(1) (Pr II .47(10)) (Eu II .24(15))
3916.08(0)		5.95(1)	5.83(1)	5.98(1)	Zr II .94(25) Nd II .95(20) (La II .05(300))
3916.65(3)	6.62(1n)	6.50(1)	6.41(2)	6.55(4)	Gd II .51(3000) V II .42(200)
			6.77(0)		Fe I .73(100)
				7.00(1)	Fe I .18(150)
3917.43(1n)	7.40(1)	7.44(1n)	7.23(1)	7.32(1)	Eu II .29(60) Sm II .44(200) (Pr II .23(20))
			7.61(1)	7.69(1)	Eu II .70(10)
3918.19(2)	8.24(2n)		8.07(0)	8.15(1)	Gd II .06(150) Gd II .24(150)
3918.47(2n)	8.42(3)	8.41(2n)	8.46(1n)	8.44(2)	Mn II .32(3) Ce II .28(200) (Dy II .54(4)) (Fe II .51(pr))
		8.69(1)			(Fe I .65(60))

TABLE 3 -- Continued

0.756	1.482	3.042	4.460	5.003	Identification
	9.00(1)			8.98(1)	Eu II .09(15) Pr II .86(150) (Tb II .82(8))
3919.39(2n)	9.44(2n)	9.31(1)	9.31(0)	9.36(2)	(? O II .28(35)) (Tb II .54(40))
3919.82(0)	9.86(1)			9.67(0)	Ce II .81(100) Nd II .92(10) (Pr II .62(25))
3920.14(2)	0.22(2n)	0.05(1)	0.19(1n)	0.03(2)	Fe I .26(500) (Gd II .99(6))
3920.57(2)	0.68(3n)	0.57(2)	*0.63(3)	0.70(3)	(C II .68(200)) (Pr II .52(15)) (Tb II .72(10))
3920.80(0)	1.05(1)	1.22(0)	1.05(1)	1.17(1n)	Nd II .96(100)
3921.38(0n)	1.41(0)		1.33(0)	1.51(0)	(La II .54(200))
3921.87(1)	1.87(1)	1.86(1n)	1.86(1n)	1.82(1)	Ce II .73(100) Ce II .00(2?)
	2.00(3)		2.11(1)	2.21(0)	Tb II .09(20)
3922.46(0)			2.48(1)	2.35(1)	Sm II .40(800) (Zr II .36(1))
3922.86(1)	2.89(1)	2.88(1n)		2.84(0)	Fe I .91(600) Tb II .74(50)
3823.37(4)	3.43(1)	3.42(0)	3.13(3)	3.21(5n)	Gd II .25(300) Gd II .33(80) Ce II .11 (125) (S II .48(200)) (Dy II .39(30)) (Dy II .30(3)) (Tb II .33(6)) (Ho II .37(5))
	3.80(0)	3.89(1)	3.85(1n)	3.90(1)	
3923.99(1)	4.03(1)		4.23(0)	4.28(1)	Pr II .14(10)
3924.50(1)				4.36(1)	Ce II .64(60) Tb II .40(4) (Nd II .48 (8)) (Dy II .46(2)) (Ti I .53(70))
3924.80(1)	4.80(1)	4.77(1)	4.82(2n)	4.89(3)	Tb II .81(10)
3925.46(1)	5.51(1)	5.39(1)	5.47(2)	5.53(2n)	Tb II .45(150) Pr II .46(75) (Fe I .65(80))
3925.96(0)	6.14(0)	6.01(1)	5.98(1n)	6.05(1)	(Fe I .95(50)) (Tb II .09(1))
3926.47(0n)	6.67(1)	6.76(1)	6.58(1)	6.73(1n)	
3927.30(0)				7.17(0)	Nd II .11(40) Tb II .15(4)
3927.42(1)	7.54(0)	7.37(1)	7.44(1n)	7.53(1)	Pr II .45(30) (Ce II .38(4))
3927.88(2)	7.99(1)	7.99(1)	7.94(1n)	7.86(1n)	Fe I .92(500) (Pr II .71(8))
3928.36(1)	8.43(0)		8.44(0)	8.44(0)	Sm II .28(400)
3928.82(1n)			8.56(1)	8.74(0)	Eu II .87(15) Pr II .62(10) Pr II .91(10)
		9.09(1)	9.14(2n)		Pr II .26(20) (Ti II .15(pr))
3929.35(1n)	9.32(0n)		9.30(2n)	9.29(3n)	La II .22(300) Cr II .52(1) (Nd II .26 (15)) (Dy II .33(15)) (Zr II .54(8))
3929.80(1)	0.09(1)	9.84(1)	9.80(1)	9.98(1)	Eu II .91(6) V II .73(50) (Ti I .88(70))

* Phase 4.490 begins at wave length 3920.6

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
3930.27(3)	0.33(3)	0.32(3)			Fe I .30(600) (Fe II .31(pr))
3930.61(8)	0.69(3)	0.69(0)	0.37(5)	0.45(9)	Eu II .48(4000)
			0.63(1n)	0.68(0n)	Tb II .76(8)
3930.99(1)			0.96(0)		Cr II .88(pr)
3931.34(1)	1.17(1)	1.13(1)	1.28(2n)	1.36(3n)	Ce II .09(125) Ce II .37(100) Dy II .29(20) (Fe I .12(35))
3931.50(2)	1.62(1)				Dy II .54(150)
3931.99(1)	2.14(2)	2.01(1)	2.02(3)	2.10(4n)	Ti II .02(30) (S II .94(15))
3932.30(0)	2.30(0)				Dy II .23(20)
3932.58(0)	2.70(1)	2.54(1)	2.62(1n)	2.60(1)	Fe I .63(80) (A II .55(25)) (La II .53(10))
3933.03(1)	3.09(1)		2.81(0n)	2.86(1n)	Gd II .98(50) Dy II .98(5) (S II .29(80))
3933.62(9)	3.63(9)	3.62(8)	3.64(4n)	3.61(8n)	Ca II .67(600) (Fe I .61(200)) (Ce II .73(60))
3934.17(2)	4.21(1)	4.29(1)	4.10(1)	4.06(3)	Zr II .14(20) Dy II .17(20) (Nd II .09(6))
3934.87(2)	4.97(2)	4.83(1n)	4.71(2)	4.74(3)	Gd II .82(300) Zr II .80(20) Nd II .82(50) Cr II .18(pr)
3935.36(1)	5.41(1)	5.04(0)	5.15(1)	5.23(2)	Tb II .25(50) (Fe I .31(40))
				5.66(1)	Sm II .76(150)
3935.85(3)	5.93(4n)	5.92(4)	5.96(5)	6.02(6)	Fe II .94(6) Fe I .82(100) (Pr II .82(25))
3936.06(2)					Cr II .13(1) Dy II .03(15) Zr II .07(7) (Nd II .14(10))
3936.39(1)	6.43(0)	6.49(1)	6.43(2)	6.31(0)	La II .22(50) Ho II .51(10) Dy II .29(4)
3936.83(3)	6.89(2)	6.92(1)		6.73(3)	Cr II .95(1)
3937.19(1)	7.12(0)		7.18(1)	7.24(1)	Fe I .33(80)
3937.63(3)	7.66(1)	7.71(1n)	7.73(1)	7.88(2)	Cr II .61(1) Nd II .58(5)
			8.07(0)	8.14(1)	Gd II .11(40) Dy II .06(4) (Ce II .09(7)) (Tb II .16(3))
3938.15(5)	8.39(5)	8.28(3)	8.36(2n)	8.46(3)	Fe II .29(2) (Pr II .31(15))
3938.57(0)	8.73(1)				
3938.87(6)	8.98(5)	8.95(4)	8.99(2n)	9.01(2)	Fe II .97(4) Gd II .97(50) (Nd II .87(40))
3939.57(1n)	9.63(1)	9.51(0)	9.46(1)	9.55(1)	Tb II .60(200) (Nd II .55(8))
	0.07(0)		0.02(1n)	0.94(1)	Pr II .15(20) La II .85(20) (Tb II .10(2))
3940.30(1n)	0.46(1)	0.26(0)	0.30(1)	0.36(1)	Ce II .34(100) (Ti II .32(pr))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
			0.58(0)	0.69(1)	Ho II .55(12)
3940.83(1)	0.90(1)	0.89(0)	0.94(0)	1.05(0)	Fe I .88(150) Tb II .16(15)
3941.32(0n)	1.26(0)	1.44(1)	1.32(0n)	1.35(0)	Fe I .28(60) (Tb II .35(4))
3941.54(1)	1.57(0)			1.62(0)	Eu II .56(20) Nd II .51(150)
3942.13(2)	2.10(2)	2.09(1)	2.16(1n)	2.18(1)	Eu II .21(30) Sm II .87(300) Ce II .15 (125) Nd II .14(4) Dy II .05(4) Tb II .20(15) (Zr II .92(3))
	2.33(0)			2.46(2n)	Fe I .44(100) Dy II .54(30)
3942.67(2)	2.80(1)	2.66(0)	2.77(1)	2.85(1)	Ce II .75(150) (Nd II .63(6))
3943.09(1)	3.22(1)		2.96(1)	3.00(1n)	Eu II .08(40) Eu II .94(8) (Ce II .14(5))
3943.33(1)			3.36(1)		Sm II .24(200) Fe I .35(40)
	3.53(0)			3.52(1)	
3943.77(1)	3.93(1)	3.80(0)	3.92(1)		Ce II .89(100) Cr II .64(1) (Mn II .82(1))
3944.10(1)				3.99(2)	Al I .03(2000) (Gd II .09(6))
3944.33(0)	4.26(0)				(A II .27(50))
3944.74(4)	4.78(3)		4.51(1n)	4.59(4)	Dy II .69(600)
3945.09(1)	5.19(3n)	5.18(2)	5.18(1n)	5.09(1)	Cr II .11(1) (Fe I .13(30)) (Fe II .21(pr))
3945.35(1)				5.32(1)	
	5.69(0)			5.66(0)	Eu II .67(15) Pr II .66(10)
3946.04(0)	6.20(1)	6.13(0)	6.10(0)	6.28(1)	(A II .10(25))
3946.47(0)				6.46(1n)	Sm II .51(200)
3946.98(2)	6.89(1)	6.85(0)	6.79(0)	6.84(2)	Tb II .87(150) Fe I .00(50) Dy II .94(30) Ce II .68(20)
	7.07(1)				Fe I .00(50)
3947.55(0)			7.63(1)	7.62(0)	Pr II .63(100) Fe I .53(70) (A I .50(1000))
3947.85(1n)	7.94(0n)		7.98(0)	7.95(1)	Sm II .11(300) Fe I .11(125) Sm II .84(100)
3948.29(1)	8.33(0)		8.52(1)		Nd II .32(15) Tb II .35(20)
3948.76(1)	8.76(2)	8.71(1)	8.79(0)	8.65(1)	Fe I .78(150) (Ti I .67(80))
3949.36(1n)	9.45(1)	9.35(1)	9.37(1)	9.50(1)	Pr II .44(125) Gd II .25(25) (Tb II .51(6))
3949.84(1)	9.96(0)		0.16(2)	9.87(0)	Fe I .96(150) Eu II .84(15) (Tb II .88(4))
3950.42(4)	0.41(3)	0.35(1)	0.28(1n)	0.28(4)	Dy II .40(30) Y II .36(100)
				0.48(1)	Y II .36(100)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
3951.09(1)	1.25(1)	1.07(1)	1.08(1)	1.16(2n)	Nd II .15(150) Fe I .17(150)
3951.44(0)			1.41(0)		(La II .43(3))
3951.83(1)	1.71(0)			1.71(0)	Tb II .71(3)
3952.06(1)	2.08(1n)	1.97(0)	1.93(1n)	1.99(1n)	Gd II .00(300) V II .97(500) (Nd II .20(100))
3952.54(3)	2.70(1)	2.44(1)	2.48(1)	2.55(2n)	Ce II .57(125) Fe I .61(80) (Nd II .87(25))
3953.10(1)	3.15(1)		3.03(0)	3.05(1)	Fe I .16(80)
3953.57(1)	3.65(2)	3.48(1n)	3.48(1n)	3.57(2)	Nd II .52(60) Pr II .52(125) Ce II .66(12) (Nd II .40(10))
				4.05(1)	
3954.20(0)	4.30(2n)				(O II .37(100))
3954.53(2n)	4.53(2n)	4.44(2n)	4.38(2n)	4.45(4)	(Dy II .56(25)) (O II .37(100))
			5.10(1n)	4.93(0)	(Tb II .77(1))
3955.23(1n)	5.38(1n)	5.28(0)	5.32(1n)	5.36(2n)	(Fe I .35(25)) (La II .21(3))
3955.50(1n)			5.71(0)		(Gd II .70(6))
3955.88(0)	6.09(0)	6.06(0)	5.93(1n)	5.92(0)	Nd II .97(10) Gd II .14(8)
3956.27(0)	6.38(1)		6.31(1)	6.18(1)	Ce II .28(150) Gd II .14(8) (Ti I .34(100)) (Tb II .16(8)) (La II .07(4))
3956.60(0)	6.66(1n)	6.63(1n)	6.66(1)	6.76(1)	Fe I .68(150) Fe I .46(100) (Pr II .76(20))
3956.89(0)	6.99(1)		7.08(1)		Ce II .90(4) Fe I .03(50)
3957.40(0)	7.38(0)		7.21(1)	7.22(1)	(Nd II .47(15))
3957.85(4)	7.92(3)	7.87(1n)	7.64(2)	7.73(3)	Gd II .67(1000) Dy II .80(40)
3958.26(2)	8.22(2n)	8.13(0)	8.12(1n)	8.08(2)	Cr II .07(1) Nd II .00(40) Tb II .97(40) Tm II .10(200) Eu II .92(15) Ce II .27(6) Zr II .24(50) (Ti I .21(150))
				8.39(0)	Tb II .35(60)
3958.82(1n)	8.80(1)	8.78(0)	8.82(0)	8.82(1)	
3959.51(3n)	9.44(1)	9.48(1)	9.35(2n)	9.42(3n)	Gd II .52(500) Gd II .44(300) Sm II .53(100) (Dy II .35(3))
				9.73(1)	Cr II .73(1)
3960.36(1)	0.27(0)	0.33(0)	0.27(1)	0.49(1)	
3960.81(3)	0.90(2)	0.81(2)	0.90(2)	1.00(2)	Fe II .90(3) (Ce II .91(125))
3961.63(1)	1.60(1)	1.47(1)	1.41(1)	1.49(2)	Al I .53(3000)
	1.90(0)	1.93(0)	1.98(0)		La II .03(10)
3962.19(0)			2.02(0)	2.14(0)	Gd II .10(30) Nd II .22(15)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
3962.56(1)			2.66(0)		Pr II .45(40)
3962.99(0)				2.80(1)	Sm II .00(200) (Ti I .85(80)) (La II .04(5))
3963.08(2)	3.06(1)	3.08(0)		3.28(0)	Fe I .11(125) Nd II .11(60)
3963.59(2)	3.60(1)	3.59(1)		3.70(0)	Gd II .66(150) Cr I .69(300)
3963.83(0)					Nd II .91(20) Dy II .80(3)
3964.19(0)			4.29(0)		Pr II .26(40) Ti I .27(80) (Nd II .19(5))
3964.50(0)	4.49(1)	4.62(1n)		4.58(0)	Fe I .52(80) Dy II .70(2) (Fe II .57(pr))
3965.11(0)				5.03(0)	Eu II .90(60) Pr II .82(250) (Eu II .02(15)) (Pr II .26(150))
	6.15(1)				Sm II .04(150) Fe I .07(100) (Tb II .95(15))
3966.55(0)					Fe I .63(80) Pr II .57(80) (Eu II .59(81)) (Fe II .43(pr))
				7.17(0)	Ce II .05(100) Nd II .07(15) (Gd II .85(4))
3967.38(0)	7.54(1)				Fe I .42(125)
3968.36(1)					Dy II .40(1000) Gd II .26(60) (V II .11(150))
3968.51(4)	8.48(3)	8.46(4)	8.29(3)	8.36(8)	Ca II .47(500) (Dy II .40(1000))
				9.00(0)	Fe I .26(600) (Gd II .29(300))
3970.14(xn)	0.12(xn)	0.10(xn)	0.06(xn)	0.03(xn)	Hϵ .08
	1.02(1)			1.02(0)	Gd II .06(100) Pr II .16(40) (Eu II .10(8))
3972.10(3)	2.10(2)	1.80(0)	1.89(0)	1.86(6)	Eu II .96(4000) Gd II .75(300) (Gd II .17(30)) (Pr II .69(25)) (Pr II .16 (100)) (Ce II .68(10)) (Tb II .05(20))
	2.52(1)	2.44(0)		2.44(1)	
3973.29(1)	3.22(0n)	3.37(0)		3.22(2)	Nd II .27(80) O II .27(125) (Ni I .56(800))
			3.70(0)	3.75(1)	V II .64(300) Nd II .65(60) (Ni I .56(800))
3974.05(2)	4.04(1n)	4.11(2n)	4.20(1)	4.26(1)	Fe II .16(3) Gd II .98(500) (Tb II .30(15)) (Gd II .22(10))
				4.62(1)	Fe II .54(1)
3974.90(1)	5.01(1n)	4.96(2n)	5.03(1)	5.14(2)	Fe II .03(2) Gd II .11(60) (Pr II .86(15))
3975.35(0)		5.76(0)	5.67(0)	5.69(0)	
3975.99(0)	6.07(1n)	6.15(1)	6.25(1)	6.20(0)	Sm II .27(200)
3976.54(0)	6.66(1)	6.68(0)	6.65(0)	6.67(0)	Sm II .43(200) (Cr I .66(300))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
	7.00(0)		6.76(0)	6.86(1)	Tb II .86(250) Nd II .84(60) (Ho II .05(3))
3977.42(0)	7.48(1)		7.36(0)	7.22(0)	
3977.77(0)	7.85(1)	7.77(0)	7.82(1)	7.90(1)	Fe I .74(300)
3978.60(5)	8.67(2)	8.49(0)	8.41(3)	8.45(4)	Dy II .57(200) Ce II .65(125)
3979.03(0)			9.26(0)	9.01(1)	Sm II .20(150) (La II .08(8))
3979.42(4)	9.53(6)	9.49(4)	9.53(2)	9.41(2)	Cr II .52(20) Nd II .48(60) (Dy II .48(25))
				9.62(1)	Eu II .63(8)
3980.16(0n)	0.15(1)		0.09(0)	0.19(1)	(Tb II .28(3)) (S II .86(35))
	0.56(1)		0.64(1n)	0.65(2)	
3980.87(2)	0.86(2n)	0.75(0)	0.83(1n)	0.04(2)	Ce II .90(100) (Tb II .15(20))
3981.24(0)	1.42(1)	1.38(0)		1.44(0)	Nd II .22(15) La II .36(10)
3981.62(1)	1.74(0)				Fe I .77(150) (Fe II .61(pr)) (Ti I .76(100))
3981.98(3)	2.12(2)	1.82(1)	1.85(1n)	1.82(3)	Dy II .94(100) Pr II .06(150) Tb II .92(150) Ti II .01(3) (Zr II .01(3))
		2.05(0)	2.11(1)	2.17(2)	
3982.29(1)	2.37(1)	2.43(0)	2.42(0)	2.43(1)	Nd II .36(20) Pr II .50(40)
3983.00(1n)	3.06(1)	2.93(1n)	2.92(2)	3.00(4)	Gd II .01(80) Ce II .90(60) Sm II .14(200)
	3.41(1)	3.55(0)	3.50(0)	3.54(2)	Nd II .40(10)
3983.70(2)	3.74(3)				Dy II .66(150) (Tb II .85(15)) (Tb II .04(15))
3984.17(3n)	4.02(2n)	3.94(2)	3.96(4)	4.05(7)	Fe I .96(200) Dy II .23(80) (Cr I .91(200))
	4.37(1)	4.15(0)	4.30(1)		Dy II .23(80)
3984.75(1)	4.74(2)	4.68(1n)	4.57(1)	4.67(2)	Ce II .68(100) (Dy II .70(2)) (Tb II .84(6)) (Zr II .76(4))
3985.28(1)	5.27(1)	5.00(0)		5.06(0)	Tb II .08(5)
3985.46(0)		5.42(0)	5.53(0)	5.54(0)	Fe I .39(125)
3985.94(1n)	6.04(2)	6.03(2n)	6.08(1)	6.00(1)	Fe I .17(125) Mn II .01(1) (Ho II .80(6))
3986.35(0)	6.51(1)	6.54(0)	6.49(1)	6.50(2n)	Nd II .23(40) Tb II .34(15) (Ho II .5(5))
3986.73(1)	6.74(0)				Mg I .73(15) Sm II .68(150)
3987.18(1)	7.21(1)		7.11(0)	7.02(1)	Gd II .21(600) (Dy II .06(3))
3987.70(1)	7.73(1)	7.78(0)	7.58(4)	7.63(2)	Nd II .81(5) Ho II .55(3)
3988.26(1)	8.30(0)			8.09(1)	Eu II .24(8)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
3988.65(0)				8.52(0)	La II .52(500)
	9.02(0)		9.05(0)	8.94(0)	(Nd II .81(8))
3989.35(0)	9.42(0)	9.48(0)	9.55(0n)	9.24(1)	Gd II .25(50) Ce II .44(30)
3989.77(1)	9.82(1)			9.78(0)	Pr II .72(100) Ti I .76(150)
3990.25(1)	0.25(2)	0.22(1n)	0.20(1)	0.41(0)	Fe I .38(70) Nd II .10(60) (Dy II .35(2)) (Ho II .35(1))
3990.93(1)	1.04(1)	1.04(1)	0.89(1)	0.74(1)	Zr II .14(40) Cr I .12(200) (S II .94(40))
3991.39(1n)	1.45(1)		1.15(3)	1.22(3)	Dy II .33(40)
3991.86(0n)	1.84(0)	1.70(1)	1.71(1n)	1.80(2)	Si II .77(2n) Nd II .74(80) Gd II .69(15) Pr II .89(25) Dy II .89(2) (Ho II .85(1))
3992.34(0n)	2.31(0n)	2.26(0)	2.30(0n)	2.37(1n)	Ce II .39(125) (Pr II .18(10)) (Tb II .20(2))
3992.79(1)	2.85(1)	2.90(0)	3.04(1)	2.95(0)	Ce II .91(15) (Nd II .57(15))
3993.24(0)	3.31(0)			3.18(0)	Gd II .21 (200) Sm II .31(200) (S II .53(50))
3993.74(1)	3.80(1)	3.87(1n)	3.81(1n)	3.84(1n)	Ce II .82(200) (Mn II .86(1)) (Eu II .93(15))
3994.19(0)	4.29(1)	4.48(0)	4.37(0)	4.31(0)	Gd II .16(800) (La II .50(10))
3994.84(1)	4.81(1)		4.79(1)	4.83(2)	Pr II .83(200) (N II .00(300)) (Nd II .68(80))
3995.38(1)	5.31(1n)	5.28(1)	5.42(0)	5.31(1)	Nd II .24(15) Co I .31(1000)
3995.82(0)	5.90(0)		5.84(1)	5.90(0)	La II .75(400) Al II .86(30) Fe I .99(60) Eu II .98(10) Tb II .80(6)
3996.40(1)	6.38(1)	6.27(0)	6.32(2)	6.43(2)	Gd II .32(800) (Fe II .36(pr))
			6.56(2)		Dy II .70(150) Tm II .52(200) (Tb II .68(2))
3996.79(1)	6.82(2)		6.95(1)	6.91(0)	
	7.18(1)				V II .13(200) Pr II .05(40)
3997.39(0)	7.53(0)	7.52(0)	7.53(0)		Fe I .40(300) Nd II .44(10)
3997.88(1)	8.00(1)		7.77(1n)	7.81(2n)	Gd II .76(300) Si II .00(1n) Fe I .06(150) (Pr II .96(6)) (Dy II .10(2))
3998.53(0n)	8.54(0)			8.40(0)	Ti I .64(150) Tb II .41(15)
	8.96(1)	8.93(1n)	8.93(1n)	9.02(2n)	Zr II .98(30) (Eu II .81(4)) (S II .79(60))
3999.11(3n)	9.30(1)	9.26(1)		9.30(1n)	Ce II .24(500) Pr II .19(20) Tb II .41(25)
3999.93(1n)	9.99(1)	0.01(0)	9.73(0)	9.84(1)	Mn II .06(1) Tb II .01(10) Pr II .19(40)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4000.48(2)	0.60(1)		0.29(3)	0.36(5)	Dy II .45(800) (Pr II .48(15)) (Nd II .49(30)) (Nd II .56(20))
4000.67(0)	0.80(0)	0.77(0)	0.89(0)		
			1.19(1)	1.18(2)	Gd II .26(600) (Ce II .05(4))
4001.37(1)	1.42(1)	1.36(1)	1.47(1)	1.52(1)	(Cr I .44(200))
4001.68(0)	...		1.74(0)		Fe I .67(80)
4001.99(2)	2.05(1)	2.01(1)	2.10(2)	2.09(2)	Fe II .07(2) Gd II .96(25) (Tb II .20(50))
4002.45(3)	2.55(4)	2.52(2)	2.56(4)	2.64(2)	Fe II .55(3) Cr II .48(5) (Tb II .60(100))
4002.82(1)	2.93(1)	2.78(0)	2.83(0)	3.04(1)	V II .94(80) (Ho II .70(3)) (Zr II .95(2))
4003.17(3)	3.28(3)	3.26(2)	3.32(2)	3.38(1)	Cr II .33(25)
4003.76(1)	3.86(1)	3.88(1n)	3.75(1)	3.83(1)	Ce II .77(100) Gd II .85(30) Fe (II?) .77(80) (Ti I .81(50)) (Eu II .71(12)) (Tb II .78(15)) (Tb II .91(10))
4004.01(1)	4.27(0)		4.17(1)	4.23(1)	Nd II .01(60) Fe II .15(pr)
4004.44(0)					Eu II .59(6) Tb II .52(8)
	4.72(1)	4.75(0)	4.82(1)	4.83(2)	Gd II .94(150) (Pr II .71(25))
4005.08(3)	5.13(2n)	5.19(1n)	5.29(1)	5.38(1)	Fe I .25(250)
4005.61(1)	5.78(1)	5.83(0)	5.69(1)	5.75(1)	V II .71(800) Tb II .55(200)
4006.14(0)				6.12(0)	
4006.29(0)	6.30(1)		6.31(0)	6.38(0)	Fe I .32(60)
4006.84(1n)	6.79(1)	6.54(0)	6.67(0)	6.76(1)	Cr II .75(1) Pr II .70(8)
	7.23(0)	7.00(0)		7.10(0)	Fe I .27(80)
4007.46(1)	7.54(0)	7.53(0)	7.29(0)	7.37(0)	Cr II .56(2) Nd II .44(50) Ce II .59(15)
		7.78(0)	7.68(1)	7.73(1)	Fe II .72(pr) (S II .78(5)) (Dy II .77(3)) (La II .64(7))
4007.96(1)	8.02(1)		8.09(1)	8.04(1n)	(Er (II?) .97(87))
		8.50(1)		8.53(1)	
4008.68(2)	8.86(2)		8.74(1n)	8.85(2n)	Gd II .91(400) Eu II .87(6) Pr II .71(75)
4009.28(2)	9.32(1)	9.23(0)		9.19(1)	Gd II .22(80) (He I .27(10))
			9.54(1)	9.60(1)	Tb II .54(12)
4009.77(1)	9.76(1)	9.68(1)		9.76(1n)	Fe I .72(120)
4010.15(1)	0.18(1)			9.94(2)	Dy II .08(3)
		0.37(1)	0.49(1)	0.41(0)	Nd II .45(10)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4010.62(1)	0.62(1)	0.71(1)	0.66(0n)		Mn II .84(1) (Pr II .64(12))
4011.18(1n)	1.39(2n)	1.34(1)	1.19(1)	1.17(2)	Dy II .30(30) Nd II .07(15)
4011.87(0)	1.75(1)	1.45(1n)	1.58(2)	1.64(2)	Eu II .69(100)
		2.32(2)	2.24(0)	2.26(3)	Ti II .39 (50) Nd II .25(300) Ce II .39(300)
4012.37(9)	2.50(9)	2.55(5)	2.56(7n)	2.58(6)	Cr II .47(30) Ce II .39(300) Fe II .47(1) (Tb II .46(4))
4012.82(2n)	2.89(1)			2.84(1)	Eu II .82(15) Nd II .70(50) Tb II .84(40)
4013.02(0)			3.21(0)	3.23(0)	Nd II .22(15)
4013.50(0)	3.53(1)	3.50(1n)			
4013.75(1)	3.86(1)		3.67(1n)	3.68(2)	Gd II .80(250) Fe I .82(200) Gd II .95(60) Fe I .80(80) (A II .87(200))
4014.39(1)		4.26(0)	4.26(0)		Ho II .18(2)
4014.43(1)	4.54(1)		4.54(0)	4.45(1)	Fe I .53(200) (Dy II .71(40))
4014.85(1)	4.98(1)	4.75(0)		4.70(0)	Ce II .90(125) Dy II .71(40)
				5.11(1)	Dy II .18(4)
4015.50(1n)	5.51(1)		5.34(1)	5.46(2)	Ni II .50(1) Pr II .39(40) Tb II .52(15)
	5.87(0)	5.83(0n)	5.88(1)	6.00(1)	Ce II .88(20) Tb II .94(8) (Tb II .04(2))
4016.24(1n)	6.32(1n)		6.42(1)	6.48(1)	Tb II .34(12)
4016.81(0)	6.86(1)	6.75(0)	6.86(0)	6.84(1)	Pr II .75(20)
4017.05(1)		7.34(1)		7.27(1)	Fe I .15(80)
4017.51(1)	7.57(1)		7.49(1)	7.63(1)	Eu II .58(100) Eu II .72(20) (Ce II .60(10))
4017.83(2)	7.97(2)	7.95(1)	7.99(1)	8.12(1)	Cr II .96(3) (Tb II .85(4))
4018.44(1n)	8.34(1)	8.18(0)	8.33(2)	8.40(2n)	Zr II .38(10) Eu II .39(6)
4018.94(0)	8.67(1)				Nd II .83(30)
	9.10(1)	9.04(0)	9.07(1n)	9.14(2)	Tb II .14(20)
4019.36(1n)	9.59(1)			9.60(0)	Dy II .48(2)
4020.06(0)	9.96(1)	9.96(2)	9.87(1n)	9.97(1)	Sm II .98(80) Nd II .81(12) (Nd II .06(5))
4020.60(0)			0.30(0)	0.43(0)	Tb II .47(30) (Sc I .40(50))
4020.88(2)	0.92(2n)	0.88(1)	0.86(2n)	0.90(3n)	Nd II .87(60) Co I .90(500) Dy II .90(4) Pr II .99(15)
4021.38(1)	1.36(0)		1.26(0)	1.36(0)	Nd II .33(80)
4021.83(1)	1.91(1)		1.68(1)	1.78(2)	Fe I .87(200) Ti I .83(100) Nd II .80(60)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
				2.29(1)	Gd II .33(300)
4022.30(3)	2.42(3)	2.24(2n)	2.33(2)	2.40(2n)	Cr II .36(3) Gd II .33(300) (Pr II .20(8))
4022.60(0)	2.74(1)			2.85(1)	Pr II .74(15) (Ho II .86(2))
4022.95(1)	3.07(1)	3.01(0)	3.00(1)	3.07(2)	Nd II .00(80) Sm II .23(300)
4023.30(2)	3.36(1)		3.44(1)	3.56(1)	V II .39(600) La II .58(40)
4023.84(2n)	3.95(2)	3.77(1)	3.80(3)	3.87(3)	Sc I .69(100) Tb II .10(30)
			4.34(0)	4.36(2)	Ce II .49(60) Dy II .44(12) (Eu II .24(4))
4024.48(5)	4.54(5)	4.49(3)	4.53(4n)	4.60(3)	Fe II .55(5) (Zr II .45(12)) (Nd II .78(30))
4025.06(1n)	5.23(1)		5.04(2)	5.09(2)	Ti II .14(25) (F II .01(150))
4025.56(1n)	5.66(2)	5.50(2n)	5.56(2n)	5.57(2)	Pr II .55(20) F II .50(300) Tb II .74(10) Dy II .75(3)
4025.81(0)					La II .87(50)
4026.21(0)	6.26(0)			6.21(1)	He I .19(70)
4026.52(1n)	6.59(1)	6.48(1)	6.59(1)	6.58(1n)	Al II .50(30)
4027.00(0)	7.13(1)		7.00(1)	7.08(1n)	Pr II .84(15)
4027.42(0)	7.60(0)	7.57(1n)			
4027.88(3)	7.80(1)		7.66(3)	7.74(4)	Dy II .79(30)
4028.39(3)	8.46(2)	8.38(1n)	8.27(3n)	8.35(3n)	Ti II .34(80) Ce II .41(150) (Dy II .32(8))
4028.77(1)	8.72(0)		8.70(1)	8.81(1)	S II .79(200)
	9.40(0)		9.22(1)	9.29(1n)	
4029.61(3n)	9.74(2)	9.47(1)	9.61(3)	9.71(3n)	Fe I .64(80) Zr II .68(20) (Eu II .58(4))
4030.26(3)	0.32(3n)	0.30(2)	0.38(3)	0.46(2)	Fe I .49(120) Nd II .47(25)
4030.88(1)	1.00(1)	0.87(0)	0.80(1)	1.09(1)	Cr II .68(3) Mn I .76(500) (Cr II .13(2))
4031.38(3)	1.45(2)	1.43(1)	1.47(1n)	1.52(2n)	Fe II .46(1) Ce II .34(150) (Eu II .35(4)) (Nd II .54(10))
4031.82(1)	1.87(1)		1.84(0)	1.99(0)	Nd II .81(100) Fe I .96(80) Pr II .76 (50) (Tb II .65(50)) (La II .68(300))
4032.46(1)	2.39(1)	2.30(1n)	2.37(2)	2.45(3)	Dy II .48(50) (Pr II .49(15))
4033.03(3)	2.96(4)	2.92(4)	2.95(4)	3.04(4)	Fe II .95(3) Mn I .07(400) Tb II .05 (200) Gd II .08(8) Pr II .97(15)
4033.22(1)					Gd II .08(8)
4033.77(2)	3.80(1n)	3.58(1)	3.53(1)	3.58(3)	Pr II .86(75) Dy II .67(10) (P II .68(15))
4034.20(3)	4.25(2)	4.09(1n)	4.14(2n)	4.09(3n)	(Eu II .10(4)) (Nd II .01(4)) (Zr II .10(5))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4034.55(1)		4.38(1)		4.29(2n)	Mn I .49(250)
	4.74(0)	4.84(0)	4.90(1)	4.87(1)	
4035.06(1n)	5.10(0)				Sm II .11(250) Cr II .15(1)
4035.45(1n)	5.50(1n)	5.42(0n)	5.52(0)	5.40(1)	(Fe II .54(pr)) (A II .47(30))
4035.80(0)				5.77(0)	V II .63(400)
4036.30(4n)	6.35(2n)	6.19(1)	6.16(1n)	6.19(4n)	Dy II .34(15) Tb II .45(6) (P II .22(15)) (Nd II .00(4))
4036.97(1)	7.06(1)	7.09(1)		6.80(0)	(V II .78(60))
4037.41(3)	7.37(1)		7.19(3)	7.29(4)	Gd II .33(1500) (Eu II .15(5))
				7.75(1)	Ce II .66(25)
4037.92(4)	7.99(5)	7.97(3)	8.01(3)	7.99(2)	Cr II .03(25) Gd II .90(1200) (Nd II .12(20)) (Pr II .15(20))
4038.47(1)	8.60(0)	8.66(0)	8.38(1)	8.41(1)	Dy II .53(8) Pr II .47(40)
4038.93(1)			8.76(0)	8.80(1)	
4039.28(0)	9.26(0)	9.33(0n)	9.16(1)	9.12(1)	Pr II .36(30) (Tb II .20(3))
4039.61(1)				9.44(3)	Gd II .67(100) Gd II .49(50) (V II .57(20))
4040.04(0)			0.02(2n)	0.12(2)	
4040.33(1)					(Zr II .24(4))
4040.83(1)	0.84(1)	0.65(1)	0.72(3)	0.82(3)	Ce II .76(300) Nd II .80(100)
4041.45(1)			1.24(2)	1.37(3)	Mn I .36(100)
	1.64(0)		1.76(2)	1.85(2)	Sm II .68(200)
4042.05(1)			2.08(0)		Eu II .02(15) Dy II .99(10) (Ce II .14(8))
		2.44(0)		2.33(1)	Tb II .36(6)
4042.57(1)	2.79(1)		2.62(2)	2.78(2)	Ce II .58(200) Sm II .90(250) Sm II .72(200) La II .91(300) Gd II .76(20)
4043.10(0)		3.41(0)	3.35(0)	3.25(1)	
4043.49(1)				3.62(1)	Nd II .60(15) (Cu II .50(75))
4043.90(2)	3.98(1)	3.93(1)	4.03(2)	4.07(2n)	Fe II .01(2)
4044.26(0)		4.40(0)		4.51(1)	Fe I .61(70) P II .49(150) (K I .14 (800)) (Nd II .35(5)) (A I .42(1200))
4044.74(1)	5.02(0)	4.65(1)	4.78(1)	4.90(2)	Pr II .82(60)
4045.23(2)		5.26(0)	5.37(0)	5.41(2)	Ho II .43(200) Gd II .15(100)
4045.67(6)	5.71(4)	5.77(4)	5.84(3)	5.88(3)	Fe I .82(400) (A I .97(150))
4046.42(3n)	6.47(2n)	6.32(2)	6.38(3)	6.42(5)	Ce II .34(100)
		6.68(1)		6.71(0)	Pr II .64(8)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4046.80(2n)	6.87(2n)	6.94(1)	6.91(1)	6.94(2)	Gd II .84(150) (Fe II .81(pr)) (Pr II .10(15))
4047.27(0n)	7.26(1)				Sm II .16(80) K I .20(400)
4047.92(2)	7.91(1)	7.84(0n)	7.68(1)	7.75(1n)	Gd II .81(100)
			8.09(1)	8.23(2)	(Cr II .02(pr)) (Er (II?) .35(S1))
4048.46(1)			8.50(1)		Gd II .60(90)
4048.74(3)	8.65(3n)	8.76(1)	8.84(1)	8.65(2)	Fe II .83(3) Gd II .60(90) (Zr II .68(25)) (Nd II .81(15))
4049.00(3)	9.03(4n)	9.06(2n)	9.25(2)	8.94(2)	Cr II .16(18)
4049.53(1n)	9.42(1)		9.36(1)	9.35(2)	Gd II .43(1200)
		9.67(1)		9.70(1)	
4049.90(1n)	9.84(1)	9.83(0)	9.77(2)	9.89(2)	Gd II .86(2000) (La II .08(200))
	0.34(1)	0.35(1)	0.22(1)		Zr II .32(15)
4050.54(3)	0.59(2)		0.42(2)	0.45(4)	Dy II .58(100) (Eu II .43(4))
	0.99(0)		0.91(1n)	0.94(1)	
4051.14(2)	1.24(1)	1.19(1n)	1.26(2n)	1.32(1)	Nd II .14(60) Pr II .15(20) (Fe II .21(pr))
	1.51(1)	1.69(1)	1.59(1)	1.72(0)	(Tb II .52(4))
4051.84(3)	1.89(4)	1.93(3)	2.00(4)	2.08(3)	Cr II .97(12) (Tb II .87(30))
4052.40(1)	2.46(1)	2.39(1)		2.36(1)	(Tb II .43(4))
		2.50(0)	2.54(1n)	2.67(2)	Pr II .58(10)
4052.94(1)	2.92(1)				(Tb II .87(20)) (A II .94(20))
4053.37(4)	3.43(4)	3.32(1)	3.20(3)	3.28(4)	Gd II .29(1000) Cr II .45(1)
			3.48(1)	3.57(0)	Cr II .45(1) Ce II .51(100)
4053.84(0)	3.83(3)	3.98(7)	3.85(2)	3.95(4)	Ti II .84(8)
4054.01(3)	4.06(o)	4.03(3n)	4.16(2)	4.21(1)	Cr II .18(8)
4054.73(1)	4.53(1)	4.68(1)	4.64(0)	4.62(1)	
4054.90(1)	4.84(1n)	4.81(1)	4.86(2n)	5.01(3)	Ce II .99(50) Pr II .84(80) (Fe I .88(25)) (Nd II .86(10))
4055.23(1)	5.27(1n)	5.35(1)	5.22(0n)	5.34(1)	Dy II .16(40) Fe I .04(40) (Er (II?) .47(S2))
4055.60(1)			5.62(1n)	5.77(1)	
4056.00(2)	6.07(2n)	6.03(1)	6.13(2)	6.22(1)	Cr II .05(4) Gd II .01(30) (Ti II .21(2))
4056.55(1)	6.56(1n)	6.49(1)	6.53(2)	6.63(2)	Pr II .54(80)
4056.99(1)	6.99(1)	6.84(1)	7.08(1)	7.10(1)	(Nd II .84(4)) (Tb II .06(4))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4057.44(3)	7.45(4)	7.40(2n)	7.48(3)	7.51(3)	Fe II .46(2) Dy II .40(2) (Mg I .63(10))
4058.01(0)	7.78(0)				La II .08(5) Pb I .82(2000)
4058.37(2n)	8.33(2n)	8.30(1n)	8.35(1n)	8.26(2n)	Fe I .23(80)
4058.66(0n)	8.81(1n)	8.70(0)	8.71(1n)	8.92(0)	Fe I .76(40) (Pr II .78(15)) (Cr I .77(80))
4059.41(1)	9.41(1)		9.23(1)	9.26(1)	Gd II .37(80) Eu II .37(15) (Tb II .47(4))
4059.86(1)	9.81(1)	9.73(1)	9.60(1)	9.70(2)	Nd II .96(50) (Er (II?) .78(S2))
4060.27(0)	0.32(0)		0.06(1)	0.09(0)	Ti I .26(60)
4060.67(2)	0.69(1)	0.67(0)	0.42(0)	0.49(1)	Dy II .58(4) (Tb II .86(40))
4061.09(1)			1.07(1)		Nd II .08(200)
4061.32(0)	1.21(1)			1.19(1n)	Gd II .30(80)
4061.71(6)	1.76(5)	1.59(2)	1.69(3n)	1.67(3n)	Fe II .79(1) Eu II .57(10) (Cr II .77(pr))
4062.26(1)		2.24(0)	2.24(0)		Eu II .15(15) Ce II .22(60) (Pr II .22(8))
4062.52(0)	2.36(1)		2.46(1)	2.42(2n)	Fe I .44(120)
		2.60(1)			Gd II .59(500) Eu II .65(15)
4062.77(3)	2.83(2)	2.75(1n)	2.82(1)	2.94(1)	Pr II .82(125) (Tb II .80(10))
			3.36(2)	3.44(4)	Gd II .39(1500)
4063.50(6)	3.54(5)	3.52(3)	3.66(3)	3.70(2)	Fe I .60(400) Gd II .59(200) (Mn I .53(100))
4063.99(0)	4.08(1)	4.06(1)	4.06(1)		Cr II .14(1) Tb II .95(15) (Cr II .94(pr))
		4.23(1)	4.25(1)	4.25(1)	
4064.32(1)	4.32(1)		4.44(1)	4.42(2n)	Ti II .40(2)
4064.70(0)	4.74(0)	4.57(1)	4.75(0)	4.87(2)	Sm II .58(300) (P II .64(30))
4065.15(2)	5.10(1n)	4.99(1)	5.00(1)	5.13(1n)	Ho II .10(10) V II .07(100) (Ti I .10(80))
4065.75(1)		5.73(0)	5.85(0)	5.60(0)	Gd II .61(15) Cr I .72(80)
4066.11(0)	6.02(0n)	6.06(0)	5.91(1)	6.03(1n)	Eu II .05(4) (Cr II .16(pr))
4066.49(0)	6.65(0)	6.57(0)	6.50(0)	6.57(1)	Sm II .74(200) Gd II .56(5)
4066.88(0)	6.92(1n)				Fe I .98(100) Ni II .05(30) (Cr II .05(pr)) (Ho II .04(2))
4067.35(0)	7.26(0)	7.15(1)	7.20(1)	7.23(1n)	Ce II .28(50) Fe I .28(80) La II .39(100)
4068.01(0)	7.94(1)		7.88(1)	7.90(1)	Fe I .98(150) (Ho II .80(2))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
	8.14(1)	8.15(0)	8.22(0)	8.25(1)	
4068.44(1)	8.52(0)		8.39(1)	8.50(0)	Sm II .33(100) (Eu II .34(4))
4068.88(0)	9.01(0)	8.99(0n)	8.78(0)	8.86(1)	Ce II .84(75) Nd II .90(10) (Pr II .80(15))
	9.21(0)	9.18(0)	9.22(0)	9.40(1)	Nd II .27(80) (Tb II .30(1))
4069.79(1n)	9.86(2n)	9.92(2)	9.98(1n)	9.95(1n)	Fe II .88(1) Ce II .09(15)
4070.16(0)	0.28(0)		0.22(1n)	0.09(2)	Gd II .29(600) (Pr II .26(10))
			0.43(1)	0.40(2n)	Gd II .39(200) (Tb II .58(10))
4070.68(4n)	0.81(4)	0.84(3)	0.92(3)	0.99(2)	Cr II .90(10) (Tb II .58(10))
4071.08(0)	1.18(0)				Zr II .09(4)
		1.34(0)	1.38(0)	1.32(0)	Eu II .38(10)
4071.65(2)	1.73(4)	1.72(3n)	1.79(3)	1.82(4)	Fe I .74(300) Ce II .81(150)
4072.11(0)	2.28(1)		2.12(1)	2.14(0)	O II .16(300) (P II .13(30))
4072.48(5)	2.62(5)	2.61(4)	2.60(2n)	2.60(4)	Cr II .56(4) (Tb II .35(4))
4072.68(0)					Dy II .65(3)
4073.24(3)	3.28(2)	3.32(1)	3.03(4)	3.12(5)	Gd II .20(400) Dy II .11(150)
4073.43(0)					Ce II .48(200) Fe II .45(8)
		3.63(1)	3.55(3)	3.59(3)	Gd II .76(1500) Fe II .45(8)
4073.72(1)	3.79(1)	3.72(1)	3.74(2)	3.88(3)	Fe I .78(80)
4074.18(0)	4.14(1)			4.27(1)	Dy II .02(3)
	4.48(1)	4.36(0)		4.47(1)	Fe II .41(2?) Nd II .42(8) (Eu II .48(3))
4074.72(1n)	4.79(1)	4.78(1n)	4.67(0)	4.84(1)	Fe I .79(80)
				5.07(3n)	Nd II .12(60) Nd II .27(50) (Tb II .22(20))
4075.41(4)	5.48(6)	5.48(4n)	5.37(1n)	5.28(2n)	Si II .45(2) (Gd II .47(15))
4075.83(2)	5.97(2)	6.02(1)	5.61(4n)	5.72(3n)	Cr II .97(4) Ce II .71(150) Sm II .84(250) Ce II .85(125) (O II .87(800)) (Tb II .90(2)) (Cr II .63(pr))
4076.24(1)	6.37(1)		6.21(1)	6.14(1)	
4076.74(4)	6.80(9)	6.78(5)	6.84(5)	6.85(6n)	Cr II .87(3) Si II .78(1) (Fe I .64(60)) (La II .71(40))
4077.00(0)					Eu II .95(4) Fe II .16(3?) (Zr II .05(3))
4077.41(1)			7.53(2)	7.63(3)	Cr II .50(4)
4077.61(3)	7.63(8n)	7.63(5)	7.77(6)	7.86(8)	Sr II .71(500) (Ce II .47(75)) (Cr II .50(4)) (La II .35(300))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4077.97(2n)	8.05(2)	7.86(5)			Dy II .97(800) (Er (II?) .97(S18))
4078.56(2)	8.40(1)	8.35(2)	8.38(3)	8.40(4)	Gd II .44(1200) Ce II .32(60) (Fe I .36(80)) (Ti I .47(125))
4079.17(1)	8.94(0)	9.05(0)	9.01(1n)	8.97(1)	
	9.31(1)			9.35(1)	
4079.78(1)	9.73(0)	9.66(0)	9.75(1n)	9.85(3)	Fe I .84(80) Pr II .79(30)
4080.19(0)	0.25(0)	0.27(0)			Nd II .23(50) (Fe I .22(60))
4080.53(0)	0.65(1)	0.35(1)	0.40(1)	0.48(1)	Ce II .44 (5)
4081.22(1)	1.35(1)	1.08(1)	1.12(1)	1.13(1)	Ce II .22(150) Cr II .21(1) Pr II .02(50) (Eu II .04(5))
4081.82(0)	1.72(0)	1.68(1)	1.85(1)	1.85(1)	(Pr II .90(50))
4082.14(1)	2.24(4)	2.30(2)	2.36(2)	2.43(1)	Cr II .30(10) (Tb II .23(4))
4082.63(0)	2.77(1)	2.74(1)	2.96(0)	2.81(1)	Fe II .59(1) Sm II .60(100) (Nd II .58(3))
4083.09(0)		3.09(0)			
4083.44(1)	3.31(2)	3.19(0)	3.28(1)	3.38(2)	Ce II .23(200) (Pr II .34(30))
4083.79(0)	3.63(2)	3.60(1)	3.66(1)	3.78(1)	Sm II .58(100) (Mn II .67(pr))
	4.10(0)			4.17(0)	(Gd II .95(3))
4084.68(2n)	4.65(2n)	4.55(1)	4.56(2)	4.64(4)	Fe I .50(120) (Gd II .68(30))
4085.17(1)					Eu II .04(4)
4085.46(0)	5.38(1)	5.32(1)	5.30(2n)	5.40(3)	Eu II .38(40) Ce II .23(100) Fe I .32(100)
4085.62(1)	5.66(1)	5.66(1)	5.59(2n)	5.67(1)	Gd II .56(2000) Eu II .38(40) (Nd II .82(30)) (Zr II .68(5))
4086.04(3)	6.09(3)	6.15(2)	6.18(2)	6.14(1)	Cr II .14(8) Eu II .42(8)
4086.61(0)	6.63(1)		6.74(0)		La II .72(300)
4087.23(1n)	7.33(2)	7.18(1n)	7.17(1)	7.21(3n)	Dy II .21(25) Ce II .30(4) (Fe II .27(pr)) (Pr II .21(15))
4087.66(1)	7.68(1)	7.58(2n)	7.62(2)	7.68(4n)	Gd II .69(200) Cr II .63(2) (Nd II .47(4))
4087.92(0)			8.06(0)		
4088.29(1)	8.24(1)	8.17(0)	8.28(1)	8.33(1)	
4088.71(1)	8.79(2)	8.80(1)	8.86(2)	8.89(2n)	Cr II .90(1) Gd II .81(10)
4089.36(1)	9.55(1)	9.56(1n)	9.53(1)		Cr II .49(2) (Tb II .34(15)) (Nd II .68(4)) (Tb II .50(6))
4089.79(0)	9.80(1)		9.68(1)	9.67(2)	Nd II .68(4)
4090.39(1)	0.45(1n)	0.37(0)	0.51(0n)	0.39(1)	Zr II .52(10)
4091.10(0)	1.11(1)	0.92(0)		1.01(1)	Ce II .95(6) (Nd II .99(3))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4091.78(3)	1.72(1n)		1.52(0)	1.59(3)	Dy II .53(20) Dy II .77(10) (P II .53(30))
4092.47(1)	2.32(0)		2.08(0)	2.31(1)	Sm II .27(400)
4092.70(0)	2.67(1)			2.89(0)	
4093.12(1)	3.19(2)	3.23(1)	3.19(0)	3.33(1)	Fe II .24(0)
4093.89(0)	3.96(0)			3.98(0)	Ce II .96(30)
4094.58(0)	4.47(0)		4.56(0)	4.64(0)	Gd II .48(300) (Nd II .62(5)) (Tb II .45(5))
4095.83(0)			5.71(0)	5.65(1)	Nd II .78(3) Fe I .98(80)
4096.52(0)			6.56(0)	6.53(1)	(Pr II .34(12)) (Zr II .63(4))
4096.90(1)				7.18(1)	Eu II .80(40) Pr II .82(25) (Nd II .70(4))
4097.47(1)	7.53(2)	7.43(1)	7.34(1)	7.47(2)	Fe II .51(1) (Tb II .44(10))
4098.31(1)	8.36(2)	8.44(1)	8.46(2)	8.54(3)	Cr II .44(8) Gd II .61(3000) (Pr II .41(10))
4099.93(1)	0.03(0)	9.87(0)		9.81(2)	Mn II .00(1) (N I .94(150))
4100.66(0n)				0.64(1)	Fe I .74(80) Pr II .75(150)
4101.77(xn)	1.63(xn)	1.72(xn)	1.73(xn)	1.69(xn)	Hδ .75
4102.27(1)					(Tb II .54(15))
			3.02(0)	3.32(0)	Dy II .31(600) (Mn I .96(100)) (F II .08(150)) (Si I .95(12))
4104.18(0)		4.02(0)		4.20(0)	Fe I .13(100) (Nd II .23(10)) (Tb II .91(20))
4104.98(1)	5.01(0)				Mn II .01(2) Ce II .00(50) Dy II .05(8) (O II .00(7))
4105.65(0)					Gd II .79(15) Eu II .84(6) (Pr II .73(8))
4106.31(0n)					Ce II .13(30?) Dy II .39(3) (Nd II .58(8))
	6.53(0)			6.65(0)	Dy II .70(2) (Nd II .58(8)) (Ho II .6(2))
4106.80(0n)	6.98(0)				Ce II .88(5d?)
4107.40(1)	7.48(1)	7.30(0)		7.39(0)	Ce II .43(200) Fe I .49(120) Sm II .39(200) (Nd II .45(4)) (Dy II .45(2))
	7.85(0)		7.73(0)		Eu II .90(10) Pr II .75(10) (Nd II .96(4))
4108.56(0)	8.46(0)	8.59(0)		8.42(1)	Gd II .40(50)
4108.92(0n)	9.18(1)				Nd II .07(100)
4109.48(0)	9.53(1)			9.48(1)	Sm II .40(150) Nd II .46(200)
4110.07(0)	9.99(0)	9.72(0)	9.97(0)	9.95(0)	Fe I .81(120) N I .98(1000) (Eu II .93(4)) (Zr II .05(3))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4110.54(2)	0.62(2)	0.39(1n)	0.44(2)	0.49(4)	Ce II .38(60) Gd II .60(150) Gd II .43 (30) Nd II .47(40) (Co I .54(600))
4110.87(3)	1.00(4)	0.99(2)	1.08(2)	1.16(4)	Cr II .01(18) (Mn I .90(80)) (Eu II .07(5))
4111.39(2)	1.48(3)			1.51(1)	Gd II .44(500) Ce II .39(60) Dy II .35(125)
4111.83(2)	1.87(2)	1.81(1n)	1.86(2)	1.95(3)	Gd II .74(100) Fe II .90(1) (Eu II .04(30)) (Eu II .17(20)) (Pr II .87(25))
4112.58(1)	2.59(1n)	2.62(1)	2.64(1)	2.50(1)	Cr II .59(1)
4112.78(0)	2.82(0)	2.96(0)		3.00(1)	Fe I .97(70)
4113.14(3)	3.20(3)	3.22(1)	3.27(1)	3.41(1)	Cr II .24(5) (La II .28(40))
4113.68(1)	3.80(1)	3.70(0)	3.82(0n)	3.91(2)	Gd II .77(15) Sm II .90(100) Ce II .73 (30?) Nd II .83(20) Pr II .89(25)
4114.17(1)	4.09(1)				Dy II .09(1) (Tb II .15(20)) (N I .00(30))
	4.45(1)			4.30(1)	Fe I .45(80)
4114.78(2)	4.85(1)	4.63(0)	4.67(2n)	4.70(2)	
4115.34(1)	5.44(2)	5.28(1)	5.30(3)	5.36(3)	Ce II .37(150) Gd II .38(80) (Tb II .34(20))
		5.73(0)—	—5.68(0)		
4116.09(0)	6.06(1)	6.05(0)	6.13(1)	6.02(1)	
4116.36(0)				6.41(1)	(F II .55(50))
	6.68(0)	6.87(1n)	6.89(1n)	6.77(1)	Cr II .66(2) Nd II .76(30)
4117.28(1)	7.04(1)		7.18(2n)	7.12(3)	Ce II .01(75) (P II .09(50))
	7.33(1)			7.40(0)	Ce II .29(20?)
4117.52(0)	7.67(1)			7.68(0)	
4118.10(0)	8.11(1)	8.29(0)	8.04(1)	8.10(0)	Ce II .14(200)
4118.41(1)	8.45(1)	8.42(1)	8.45(2)	8.45(1)	Pr II .48(200) Sm II .55(400) Fe I .55(200)
4118.74(0)		8.72(1)	8.84(1)	8.83(0)	Co I .77(1000)
4118.98(3)	9.07(2)	8.93(0)	8.92(0)	8.97(1)	Ce II .02(25)
4119.42(2)	9.48(2)			9.32(0)	Gd II .38(80) Dy II .32(20) (Fe II .53(pr)) (Eu II .30(15))
4119.84(2)	9.76(2)	9.66(1)	9.73(1n)	9.69(1)	Ce II .78(20) Ce II .88(20)
4120.16(0)	0.16(0)	0.24(1)		0.01(1)	Fe I .21(80)
4120.77(1n)	0.66(1)	0.70(0)	0.85(1n)	0.60(1)	Ce II .83(150) Nd II .65(6) (P II .78(2))
4121.04(1)	1.01(1n)	1.08(0n)		0.95(1)	Ce II .83(150) Gd II .03(8)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
	1.29(0)			1.31(1)	Co I .32(1000)
4121.57(1)	1.69(1)				
4121.93(1)	1.93(1)		2.11(0)	1.96(1)	Fe I .81(100) (Nd II .94(4))
4122.54(5)	2.63(7)	2.60(4)	2.64(5)	2.75(4)	Fe II .64(4) (Fe I .51(70))
4123.19(1)	3.25(0)	3.23(1)	3.22(1n)	3.31(3)	La II .23(400) Ce II .23(5?)
4123.57(1)	3.56(2)				Ce II .49(20?)
4123.79(1)	3.79(1)	3.80(1)	3.82(1)	3.89(2)	Ce II .87(150) Sm II .96(150) Fe I .75 (80) (Nd II .88(40)) (Tb II .80(5))
4124.24(0)	4.28(0)				
			4.52(1n)	4.56(2)	Eu II .54(10)
4124.67(4)	4.77(4)	4.72(3)	4.73(2n)	4.80(2n)	Dy II .63(40) Fe II .79(1) Eu II .89(12) (Y II .91(18))
4125.27(0)	5.48(0)	5.46(0)	5.38(0)	5.30(1)	Tb II .25(15)
4125.95(0n)	5.88(1)			5.78(1)	Mn II .86(1) Fe I .62(80) (Ce II .78(2?))
	6.21(1)		6.28(0n)		Fe I .19(80)
4126.64(1)	6.54(1)	6.35(1n)		6.43(2)	(Cr I .52(100))
4126.94(1)	6.83(0)	6.90(1)		6.82(1)	
4127.32(1)	7.08(2)	7.24(1)	7.13(1)	7.18(2)	Cr II .08(3) Ce II .37(150) (Tb II .29(10))
	7.47(1)	7.56(0)		7.49(2)	Fe I .61(100) Gd II .72(25) (Ce II .37(150)) (P II .49(70))
4128.04(x)	8.05(x)	8.03(9)	8.06(8)	8.06(x)	Si II .05(8)
	8.38(0)			8.49(0)	Dy II .24(30) Gd II .39(10)
4128.61(2)	8.76(3)	8.74(2)	8.77(2)	8.78(2)	Fe II .74(3)
4129.11(1n)	9.22(3)	8.96(0)	9.12(1n)	9.22(2)	Sm II .23(100) Pr II .15(20) (Ce II .18(5?))
4129.41(0)	9.47(1)				Dy II .43(100)
4129.83(8)	9.94(3)	9.62(1n)	9.68(3)	9.71(8)	Eu II .70(5000)
4130.41(2)	0.48(1)	0.26(1)	0.25(2)	0.32(2)	Gd II .37(3000)
4130.91(x)	0.88(x)	0.87(9)	0.84(9)	0.84(9)	Si II .88(10)
	1.19(1)	1.28(0)		1.22(1)	Ce II .10(100) Fe II .17(pr) Dy II .04(6) (Ce II .71(100)) (Nd II .72(3)) (Pr II .77(40))
4131.46(1)	1.50(1)	1.46(0)	1.39(0)	1.63(1)	Gd II .48(200)
4131.95(1)	1.96(1)	2.01(0)	1.76(0)		Fe I .06(300) (A II .73(80)) (La II .74(5))
4132.29(2)	2.37(4)	2.12(1)	2.19(2)	2.21(1)	Gd II .28(2000)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4132.48(3)	2.56(3)	2.46(2)	2.48(6)	2.55(9)	Cr II .44(7) Gd II .28(2000) (Mn II .28(5)) (Pr II .23(30)) (Nd II .55(10)) (La II .50(10))
4132.80(2)					Fe I .91(100) (Dy II .85(3)) (O II .82(100))
4133.45(1)	3.46(2n)	3.05(1)	3.18(2)	3.24(2)	Eu II .10(6) Nd II .36(50) Dy II .37(8) (La II .33(6))
4133.62(2n)	3.72(1)	3.58(2)	3.65(2)	3.68(1)	Ce II .80(500) (Pr II .62(15))
4134.08(0)		4.05(1)		3.99(1)	
4134.23(1)	4.36(1)	4.48(1)	4.23(0)	4.30(0)	
4134.65(0)	4.84(0)	4.67(0)	4.70(1)	4.72(1)	Fe I .68(150) (Nd II .71(10)) (K II .72(40))
4134.95(0)					Eu II .96(5)
4135.40(1n)	5.39(1n)	5.26(1)	5.25(2)	5.32(3)	Nd II .32(50) Ce II .44(20)
4135.79(0)	5.98(0)	5.71(1)	5.93(0)	5.81(0)	Cr II .77(pr) (Nd II .79(3))
4136.30(1)	6.34(2)	6.23(1)	6.30(2)	6.11(1)	Nd II .23(2)
				6.40(1)	(Eu II .59(20))
4136.82(1)	6.90(1)	6.86(1)	6.97(4)	6.85(1)	Mn II .91(2) Nd II .75(10)
4137.01(0)	7.12(1)		7.03(1)	7.16(2)	Gd II .10(500) Fe I .00(100)
4137.54(1n)	7.66(1)	7.52(1)	7.56(2)	7.65(1)	Ce II .65(400)
4138.26(2n)	7.31(2)	7.21(2)	7.30(2n)	7.23(1)	Fe II .21(pr)
4138.88(2)	8.85(1)		8.77(1n)	8.76(1)	
4139.21(0)	9.25(0)	9.19(0)	9.32(1)	9.41(1)	
4139.59(1n)	9.66(1n)	9.63(3)	9.74(0)		Eu II .67(15)
				9.91(1)	Eu II .02(8) (Fe I .92(40))
4140.40(1n)	0.47(1)	0.35(0)	0.40(1n)	0.46(2)	Gd II .45(100)
4141.09(1)	1.10(1)	0.98(0)	1.13(1n)	0.97(1)	Eu II .02(25) Gd II .02(25)
			1.22(1n)	1.38(2)	Pr II .26(80)
4141.66(0)	1.62(1)			1.66(0)	Eu II .72(40) Dy II .52(40) (La II .73(200))
	2.10(1)	2.19(1)		2.08(0)	
4142.33(1)	2.42(1)		2.40(1)	2.48(1)	Ce II .40(150) (S II .29(150))
4142.73(1)	2.73(0)				
4143.14(3)	3.24(2)	3.04(1)	3.02(2)	2.97(2n)	Dy II .10(150) Pr II .14(150) (Fe II .07(pr))
4143.32(0)	3.44(0)	3.53(1)	3.49(1)	3.39(2)	Fe I .42(200)
4143.81(4)	3.90(3)	3.93(1)	3.92(2)	3.98(1)	Fe I .87(400) (La II .77(15))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4144.39(1)	4.27(1)	4.37(0)		4.32(0)	
4144.56(1)			4.45(1)	4.49(1)	Tb II .47(100) Ce II .49(10) Eu II .51(8) Nd II .55(20)
4145.09(2)	5.04(2n)	5.13(1)	5.06(3n)	5.14(4n)	Eu II .23(8) Ce II .00(60) S II .10(250)
4145.67(3)	5.79(4)	5.80(3)	5.84(4)	5.91(3)	Cr II .80(25)
			6.13(1)		Nd II .13(10)
4146.22(2)	6.29(2)	6.31(2)	6.36(0)	6.32(1)	Ce II .23(75) (Eu II .32(4))
4146.59(0)	6.49(1)	6.50(1)	6.50(0)	6.64(0)	Cr II .45(1) (Pr II .54(15))
4147.12(2)	7.24(2n)	7.18(1)	7.10(1)	7.12(2n)	Eu II .22(12)
4147.46(2)	7.56(1)	7.64(0)		7.70(1)	Fe I .67(200)
4148.11(0)	8.05(1)	8.10(1)	8.19(1)	8.18(1)	
4148.29(2n)	8.37(1)			8.28(2)	Eu II .40(8) (Pr II .46(15)) (La II .2(4))
4148.80(1)	8.90(1)	8.93(0)	8.90(1)		Ce II .90(25)
4149.25(2)	9.24(1)		9.18(1)	9.10(3n)	Zr II .22(75) Fe I .37(100) (Tb II .16(6)) (K II .17(20))
4149.89(1)		9.80(1)	9.86(2)	9.79(0)	Sm II .83(200)
4149.93(1)	0.02(2)			9.96(2n)	Ce II .94(60) Pr II .04(10)
4150.38(0)		0.20(1)	0.26(0)	0.34(0)	Fe I .26(50) Eu II .31(8)
	0.59(1)			0.68(1)	Gd II .61(20)
4150.87(3)	1.03(3)	0.93(2)	0.97(3)	1.02(4)	Cr II .00(5) Eu II .19(12) (Zr II .97(10)) (La II .97(12))
4151.54(0)	1.52(1)			1.51(0)	Gd II .63(30) Eu II .52(20) N I .46(1000)
4151.97(1n)	2.00(1)	1.80(1)	1.90(1n)	1.98(1n)	Ce II .97(200) Sm II .21(200) Fe I .17 (70) (La II .98(250)) (Gd II .03(10))
4152.46(1)	2.38(0)	2.47(0)	2.42(0)	2.47(1)	Dy II .43(1)
4152.89(2n)	2.89(1)			2.60(0n)	La II .78(100) (Fe II .98(pr))
		3.11(1)	3.00(1)	3.13(1)	S II .10(600)
4153.45(0)					Gd II .51(125) Eu II .44(8) (O II .31(200))
4153.81(1n)	3.87(2n)	3.78(1)	3.77(1n)	3.64(1)	Fe I .91(120) (Nd II .73(4)) (Ce II .67(pr))
4154.28(0)	4.23(0)			4.15(0)	Dy II .22(2) Cr II .29(pr)
4154.64(1n)	4.65(1n)	4.64(1n)	4.71(2)	4.63(1)	Fe I .50(100) Fe I .81(100) (Gd II .86(250))
4155.29(0)	5.30(1)	5.34(0)	5.36(1)		Sm II .32(100) Sm II .22(100)
4155.85(0)	5.68(0)	5.90(0)	5.73(1)	5.55(0)	Nd II .08(250) Ce II .53(6)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4156.20(3)	6.31(1n)	6.02(0n)	6.04(3)	6.15(3)	Zr II .24(15) Nd II .26(30)
4157.02(1)	6.90(1)		6.82(1n)	6.86(2)	Fe I .80(100)
	7.39(0)			7.33(0)	
4157.56(1)	7.61(1)	7.56(1n)	7.54(1n)	7.64(1)	Nd II .58(3)
4157.91(0)	7.93(1)			7.72(1)	Fe I .79(150) Dy II .86(1)
4158.38(0)	8.44(1)		8.24(0)	8.31(1)	A I .59(1200) (Tb II .28(6))
4158.81(0)	8.81(0)	8.91(1)	8.86(1)	8.81(1)	Fe I .80(100)
4159.02(0)	9.11(1)	9.18(0)		9.14(0)	Ce II .03(50)
	9.45(0)	9.53(0)		9.57(1)	Al II .45(4) Al II .41(2) (Ti I .64(60)) (Nd II .56(4))
4159.75(0)	9.84(0)	9.94(1)	9.97(1)	9.92(1)	Al II .72(6) Al II .81(4)
4160.24(1)	0.22(0)			0.05(1)	Al II .24(12) Al II .26(15)
4160.66(2)	0.59(1)	0.54(3)	0.52(3)	0.58(4)	Eu II .48(12) Nd II .56(30) (P II .56(30))
4161.21(1)	1.14(1n)	1.10(2)	1.08(2)	1.18(3)	Ce II .14(50) Ce II .18(18?) Cr II .05 (2) (Cr II .27(pr)) (Zr II .20(20))
4161.52(1)	1.59(1)				Ti II .54(30) (Cr II .56(pr))
4161.88(3)	1.82(1)	1.71(1)	1.71(2)	1.75(3)	(Sr I .80(30))
4162.30(1)	2.33(0)		2.20(0)	2.03(1)	Eu II .14(8)
4162.75(1n)	2.78(1n)	2.62(1)	2.62(2n)	2.73(2n)	Gd II .73(500) (S II .70(600))
4163.25(0)	3.24(0)	3.43(1)			
4163.56(4)	3.68(4n)	3.56(3)	3.54(4)	3.62(4)	Ti II .65(150) (Ce II .52(20)) (Cr I .62(100))
4163.73(1)		3.88(1)			
4164.13(0)	4.26(1)		4.17(1)	4.28(1)	Pr II .19(100) A I .18(1000)
	4.47(0)			4.47(1n)	
4164.64(2)	4.78(1n)	4.63(1n)	4.87(1)	4.96(1)	
4165.16(1)	5.15(1)			5.02(2)	Nd II .04(5)
4165.65(1)	5.65(1)	5.60(0)	5.60(2)	5.62(1)	Ce II .61(200) (Cr I .52(80))
	5.91(1)			5.90(1)	
4166.19(1)	6.35(1)		6.17(0)	6.31(0)	
4166.83(4)	6.90(3)	6.74(1n)	6.63(2)	6.71(2)	Fe II .70(tr) (P II .73(15))
4167.32(1)	7.15(2n)	7.12(1)	7.13(1n)	7.08(1)	Gd II .16(40) (Mg I .39(6)) (Dy II .40(2))
4167.73(1)	7.75(1n)	7.64(1)	7.67(1)	7.62(0)	Ce II .80(12?)
	8.21(0)	8.50(0)	8.28(0)	8.42(1)	(S II .41(50))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4168.57(1)	8.61(1)		8.76(0)	8.74(0)	(Fe II .66(pr)) (Nd II .76(3))
4168.98(0)	9.10(0)				
4169.34(0)	9.51(0)			9.30(0)	Sm II .48(200) Eu II .35(5) Pr II .46(15) (Dy II .24(2))
4169.73(1n)	9.60(1)	9.73(1n)	9.78(2)	9.61(0)	Ce II .77(12?) (Cr I .84(80))
	9.96(2)		9.93(0)	9.93(1)	Gd II .11(150) Ce II .88(30) (Fe II .98(pr))
4170.57(1)	0.61(2)			0.42(1)	Cr II .58(pr) (Nd II .45(4))
4170.96(3)	0.93(2n)	0.79(2)	0.79(3n)	0.86(6)	Cr II .86(1) Fe I .91(80) (Nd II .75(6))
4171.34(0)	1.38(1)		1.36(0)	1.40(1)	
4171.87(8)	1.97(7)	1.92(4)	1.98(4n)	1.92(6)	Ti II .90(70) Cr II .92(3) (Pr II .82(40))
4172.07(1)					Fe I .13(80)
				2.34(1)	Pr II..27(50)
4172.46(2)	2.59(3)	2.63(3)	2.66(2)		Cr II .60(2)
4172.87(2)	2.88(0)			2.76(2)	Eu II .80(30) Fe I .75(60)
4173.41(9)	3.46(9)	3.41(6)	3.45(6)	3.50(8)	Fe II .45(8) Ti II .55(40) Gd II .56(100) (Nd II .38(8))
4174.06(2)	4.25(2)	4.13(1)	3.88(0)	4.07(1)	Ti II .09(12) (Fe I .93(50)) (S II .04(50)) (Mn II .31(pr))
4174.61(0)	4.54(0)		4.41(0)	4.48(0)	
	4.91(0)			4.75(1)	Fe I .92(100) (Cr I .80(100))
4175.17(0n)	5.39(0)	5.07(0)	5.35(0)	5.34(1)	Eu II .16(12) Pr II .30(15)
4175.62(1n)	5.77(2n)	5.84(1)	5.84(1n)	5.85(1)	Fe I .64(100) Nd II .61(50) (Pr II .64(15))
	6.02(1)			6.27(0)	Ce II .08(12?)
4176.59(1n)	6.43(0)	6.55(1n)			Fe I .57(100) Eu II .62(8) (Mn I .60(100))
4176.83(1n)	6.70(2n)		6.66(2)	6.73(3)	(Gd II .79(15))
			7.18(1)	7.33(0)	Nd II .32(200) (Eu II .37(5))
4177.56(5)	7.66(5n)	7.62(4)	7.70(7)	7.76(6)	Fe I .60(100) Eu II .57(15) (Y II .55(50)) (Fe II .70(pr))
4177.91(3)	7.98(1)			8.11(0)	Sm II .02(100)
4178.29(0)	8.38(0)	8.31(7)	8.36(1)	8.48(1)	Nd II .64(15) Pr II .64(20) (Nd II .44(6)) (Nd II .53(8))
4178.77(5)	8.82(7)	8.82(5)	8.85(5)	8.94(4)	Fe II .86(8) (Tb II .97(15))
4179.34(5)	9.44(6)	9.46(3)	9.42(4)	9.52(3)	Cr II .46(12) Pr II .42(150) (Nd II .58(30)) (Cr I .26(100)) (Eu II .37(4)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4179.91(1)	0.00(1n)	9.99(0)	9.90(0)	9.97(0)	Eu II .88(8) Zr II .81(15) (Cr II .92(pr))
4180.40(1)	0.46(1)	0.44(0)		0.41(1)	
			0.71(2n)	0.67(0)	Pr II .68(8)
4181.04(3)	1.03(1)	0.83(1n)	0.89(0n)	0.91(2n)	Yb II .83(40) (Ti I .87(100))
4181.26(0)					Ti II .17(pr)
			1.48(1)	1.49(0)	Cr II .50(1)
4181.66(1)	1.69(1)	1.75(1n)		1.77(0)	Fe I .76(200) (A I .88(1000))
	1.99(0)			1.98(2)	
4182.17(1)	2.18(2n)	2.11(1n)	2.13(2n)	2.30(2)	Nd II .29(2)
4182.50(0)	2.62(0)	2.59(0)	2.74(0)	2.68(0)	Dy II .42(8) Fe I .39(80) (Nd II .51(4))
	2.98(0)			2.84(0)	
4183.29(1)	3.39(2)	3.36(1)	3.30(2n)	3.40(1n)	V II .44(250)
4183.86(1)	3.81(1)			3.89(0)	Sm II .76(150) (Eu II .78(4))
4184.29(3)	4.28(3n)	4.21(1)	4.23(4)	4.24(6)	Gd II .25(2000) Lu II .26(120) (Pr II .24(8)) (Ti II .33(20))
4184.87(0)	4.83(1)	4.86(1)	4.81(1)	4.90(1)	Fe I .90(100) (Eu II .98(6)) (Nd II .98(15))
4185.26(0)	5.26(0)			5.23(0)	Ce II .33(5?) Pr II .15(10)
4185.60(0)	5.52(0)		5.61(1)	5.58(1)	Cr II .50(pr) (O II .45(150))
4186.07(0)	6.11(1)	5.97(0)	6.13(0)	6.14(0)	Fe I .12(100) Cr II .08(pr) Nd II .03(8) (K II .23(60))
4186.62(1n)	6.62(2n)	6.51(1)	6.52(2)	6.62(2)	Ce II .60(600) (Zr II .70(12))
4187.20(1)	7.11(1)	7.07(1)	7.19(2)	7.17(1)	Fe I .04(250)
4187.44(0)	7.41(1)				Ce II .32(35?)
4187.73(2)	7.82(3)	7.73(2)	7.78(2n)	7.87(2n)	Fe I .80(200) Gd II .10(60) (Gd II .96(10))
4188.23(1)	8.30(1)	8.24(0)			Sm II .13(200) Gd II .10(60)
			8.50(0)	8.58(1)	(Tb II .53(8))
4188.79(3)	8.77(1)				
4189.04(2)	8.97(2n)	8.89(1)	8.91(1n)	9.01(1)	
4189.46(1)	9.51(1)	9.44(0)	9.40(1)	9.59(1)	Pr II .52(125) (S II .71(250))
4189.83(1)				9.86(0)	Eu II .75(5) O II .79(500)
4190.09(3)	0.04(2n)	0.04(1)	0.07(2)	0.11(1)	
4190.64(2)	0.76(3)	0.73(3)		0.64(0)	Si II .74(3) Ce II .63(30) (A I .71(600))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4191.22(2)	1.30(2)	1.27(0)	0.89(2n)	1.02(3n)	Gd II .07(800) (A I .03(1200)) (Gd II .36(10)) (Cr I .27(70))
4191.53(0)	1.45(1)	1.54(1)	1.52(1n)	1.54(1n)	Fe I .44(200) (Pr II .62(20)) (Zr II .50(6))
4191.75(0)	1.87(0)			1.76(1)	(Cr I .75(50))
4192.04(1)					Ni II .07(1)
4192.43(1n)	2.39(0)	2.28(0)		2.25(1)	La II .35(100)
4192.82(0)					Eu II .62(12?)
4193.19(1)	3.14(1n)	2.98(1)	3.07(2)	3.02(0n)	Gd II .15(60) Ce II .09(50)
		3.47(0)		3.41(0)	Mg II .44(?)
4193.76(1)	3.94(1n)	3.98(0)	3.84(1)	3.90(3)	Ce II .87(35?) (Cr I .66(100)) ?
4194.13(2)	4.02(0n)				
			4.25(0)	4.38(1)	La II .36(30)
4194.68(1)	4.82(0)	4.71(1)	4.89(0)	4.69(0)	
4194.92(0)			4.92(0)	5.01(1)	Nd II .03(30)
4195.28(4)	5.42(5)	5.39(3)	5.46(2)	5.47(1)	Cr II .41(10) Fe I .34(150) Gd II .41(60) (Eu II .36(10))
4195.54(0)				5.58(1)	Fe I .62(25)
4196.00(1)	5.79(0)			5.94(0)	Gd II .85(20)
4196.19(3n)	6.19(3n)	6.13(2)	6.19(1n)	6.15(3)	Fe I .21(100) Eu II .18(15) Ce II .34(75)
				6.32(1)	Ce II .34(75)
		6.69(0)			La II .55(250)
4196.91(1n)	7.06(1n)	7.00(0)	6.87(1)	6.85(1)	Gd II .07(150)
	7.40(0)	7.35(0)	7.29(1)		(Cr I .23(70))
4197.62(1)	7.76(1)	7.67(0)	7.57(2)	7.62(1n)	Gd II .68(800) (Ce II .67(4?))
4198.09(3)	8.16(3n)	8.11(2n)			Si II .17(2) (Ce II .00(5?)) (Nd II .17(2)) (Ti II .95(pr))
	8.39(1)		8.27(2n)	8.30(1n)	Fe I .31(250)
4198.61(1)		8.51(1n)	8.60(1n)	8.54(1)	Cr I .52(100) (Ce II .43(4?))
	8.83(1)		8.67(0)	8.77(1)	Ce II .67(75) Ce II .72(60)
4199.02(1)	9.06(2)	8.96(1)	9.10(1)	9.15(1)	Fe I .10(300) (Nd II .10(10)) (Cr II .02(pr))
4199.43(2)	9.47(2n)	9.41(2n)	9.52(2)	9.57(2)	
4199.74(0)				9.68(1)	
4199.95(0)	9.88(1)				Tm II .92(100)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4200.06(1)		0.02(0)		0.13(1)	Mn II .25(2) Nd II .03(3)
4200.51(4n)	0.64(4n)	0.72(3n)	0.54(3n)	0.61(3)	A I .68(1200) (?Ti II .40(pr))
4200.79(3n)	0.86(4)		0.82(0)		Fe I .93(80)
4201.22(0)			1.13(1n)	1.23(2n)	Pr II .18(15) Tb II .00(30)
4201.43(2)	1.43(1)			1.62(0)	Dy II .37(10) Pr II .53(10)
4201.92(3)	1.96(2)	1.91(1)	2.11(1n)	2.06(1)	Fe I .03(400)
4202.43(4)	2.48(3)	2.28(1)	2.53(0)	2.43(2)	Gd II .52(80) (V II .35(150)) (Al II .4(8))
4202.94(1)	2.81(2n)	2.75(1n)	2.90(4)	2.98(3)	Ce II .94(150) Sm II .05(125)
4203.48(1n)	3.59(1)	3.39(1)	3.47(1)	3.43(1)	(Cr I .59(100)) (Nd II .43(2))
4204.00(2)	4.06(1)	3.98(0)	3.96(0)	3.88(1)	Fe I .99(200) (La II .03(100))
4204.63(0)	4.52(0)		4.41(0)	4.56(0)	Cr II .66(pr)
4205.10(8n)	5.28(4n)	4.79(1n)	4.88(4)	4.95(9)	Eu II .05(6000) Gd II .86(300) (V II .08(250)) (Cr II .83(pr))
4205.33(1n)	5.38(3n)				Nd II .26(10) Fe II .48(pr) (Mn II .37(pr))
4205.42(3)	5.54(3n)	5.53(2n)	5.54(2)	5.59(3)	Nd II .60(40) (Fe I .55(50)) (Eu II .57(5))
4205.75(1n)					
	5.95(0)		6.07(0)	6.08(2)	Sm II .13(100) (Ti II .92(pr)) (Zr II .91(2))
4206.28(3)	6.35(2)	6.38(1n)	6.45(1)	6.42(1)	Mn II .43(2) Dy II .54(40)
4206.67(1)	6.75(1)			6.85(1)	Fe I .70(125) Pr II .74(100)
4207.02(0)					Fe I .13(80)
4207.27(3)	7.30(3)	7.31(1)	7.45(2n)		Cr II .35(4) (Mn II .23(pr))
4207.79(3n)	7.83(3)	7.74(0)	7.79(1)	7.63(4)	(Pr II .81(8)) (La II .61(10))
	7.98(0)			7.91(1)	
4208.10(1)	8.23(1)	8.40(0)	8.34(1)	8.37(2)	Gd II .37(8) (Eu II .17(5)) (Pr II .30(15)) (Cr I .36(100))
4208.56(1)	8.55(1)	8.52(0)			Fe I .62(100)
4208.99(3)	9.09(2)	9.15(1)	9.05(1)	9.02(1)	Cr II .02(3) (Zr II .99(30)) (Gd II .75(8))
4209.51(1)	9.53(1)			9.56(0)	Ce II .41(25?)
4209.74(0)	9.79(1)	9.70(1)	9.85(0)	0.03(1)	Cr II .84(pr)
4210.22(1)	0.27(1)	0.24(1n)	0.40(2)	0.48(1)	Fe I .35(300) Sm II .35(150) (La II .22(50))
4210.64(0)	0.67(1)	0.79(0)			(Zr II .62(5))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4210.93(1n)	1.08(1)			1.06(1)	
	1.33(1)	1.19(1)	1.12(1n)	1.40(1)	Eu II .28(10) Nd II .29(40) (Cr I .35(100))
4211.70(0)	1.84(1)				Zr II .88(12) Pr II .86(20)
4211.95(3n)	2.05(1)	1.83(1)	1.86(4)	1.90(6)	Gd II .00(800)
4212.60(1)	2.41(0)	2.46(0)	2.47(0)	2.52(2)	
4212.74(1)	2.75(1)	2.77(0)			Nd II .75(6)
	3.07(0)		2.98(1)	3.07(1)	Ce II .04(15) (Nd II .06(4))
4213.33(1)	3.42(1n)	3.45(1n)	3.47(2)		Eu II .48(4) (Nd II .21(5))
4213.63(0n)	3.68(1)		3.56(1)	3.59(1)	Fe I .65(100) (Tb II .50(30)) (Pr II .57(10))
4214.03(1)	4.12(1)	3.87(1)	4.05(1)	4.17(1)	Ce II .04(50) (Nd II .23(4))
4214.45(0)	4.55(1)	4.46(0)			Gd II .58(20) (Nd II .60(12)) (Tb II .42(15))
4215.01(2)	5.04(1)	4.85(1)	4.88(1n)	4.86(2n)	Gd II .02(600)
4215.40(1n)		5.39(1)			
4215.63(6n)	5.64(5)	5.62(3)	5.55(3)	5.58(4)	Sr II .52(400) (Cr II .77(2)) (Zr II .76(1))
4216.07(0)	6.24(1)		5.85(1)	6.09(1)	Fe I .19(200)
4216.47(1)		6.57(1)	6.51(1)	6.40(0)	
4216.92(0)	7.02(1n)	6.98(1)		6.95(0)	Cr II .87(1) Cr II .07(1)
4217.24(1n)	7.20(1)	7.18(1)	7.14(4)	7.27(4)	Gd II .20(500) (Nd II .28(5)) (S II .23(30))
4217.61(1n)	7.58(1)		7.60(0)	7.57(0)	Fe I .56(100) Ce II .59(30) La II .56(200) (Cr I .63(150))
4217.82(1)	7.98(2n)	7.80(1n)	7.89(2)	8.00(3)	Eu II .75(10)
4218.26(0)	8.28(1)				(Ti II .18(pr))
4218.62(0)	8.71(1)			8.46(1)	Eu II .45(6) Dy II .58(5) (Nd II .55(3))
4219.24(1)			8.91(0)	8.98(1)	Eu II .03(10)
	9.38(1n)	9.38(1)	9.41(0n)	9.49(1)	Fe I .36(250)
4219.61(1)	9.74(1)	9.57(1n)	9.51(1)	9.55(0)	Pr II .65(15) (Nd II .57(4)) (Ne II .76(100))
4220.14(0)				0.03(0)	Nd II .26(20) (Tb II .12(6))
4220.28(1)	0.34(0)	0.45(0n)	0.44(0n)	0.49(0)	Fe I .35(80) Sm II .66(200)
	0.82(0)	0.91(0)			(Ne II .92(15))
4221.18(0)	1.24(1)	1.29(0)		1.35(1)	Eu II .08(25) Nd II .33(80)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4221.86(1)	1.98(1)	1.92(1)			Cr II .00(1)
4222.13(0)	2.01(1)	2.03(0)	2.09(0)	2.16(1)	Fe I .22(200) Cr II .00(1)
4222.45(1)	2.67(2)	2.36(0)	2.36(0)	2.57(1)	Ce II .60(300) (Zr II .41(3))
4222.81(1n)	2.94(2)	2.85(2)	2.93(3)	3.01(3n)	Gd II .02(60) Pr II .98(150) (Nd II .21(5)) (Cr I .73(100)) (K II .98(40))
4223.60(1)	3.71(1)	3.66(0)	3.56(0n)	3.63(1)	
4223.89(1)	4.04(1)	4.00(1)			Eu II .88(15) (Cr II .09(pr))
4224.34(3)	4.39(1)	4.24(1)	4.17(4)	4.24(4)	Fe I .18(200) Cr II .09(pr) (Zr II .27(3))
		4.66(0)		4.65(1)	
4224.76(2)	4.84(4)	4.87(2)	4.92(3)	5.01(2)	Cr II .85(20) (Nd II .85(8))
4225.11(0)		5.17(1)			Gd II .15(100) (V II .23(120))
4225.31(2)	5.39(2)		5.26(2)	5.36(1)	Sm II .33(400) V II .23(120) (Pr II .33(150))
4225.68(0)	5.79(0)			5.86(0)	Eu II .68(8) (K II .60(40))
4226.05(1)	6.14(1)	6.15(1)	6.08(1)	6.21(0)	.
4226.78(1)	6.80(1)			6.60(1)	Ca I .73(500) Al II .81(35) Eu II .87 (4?) (Nd II .99(4)) (Cr I .76(125))
			7.25(1n)	7.16(1n)	Gd II .14(200) (Ti II .34(pr))
4227.30(5)	7.39(4)	7.40(2n)	7.50(1n)	7.51(1n)	Fe I .43(300) Eu II .40(6) (Al II .50(30)) (Al II .41(8))
4227.74(1)	7.84(1)			7.79(1)	Ce II .75(100) Cr II .73(1) Nd II .72(30)
4228.07(0)		8.06(0)			(Al II .98(20)) (Eu II .04(3)) (Nd II .02(10))
4228.37(1)	8.33(1)	8.44(1n)	8.30(2)	8.41(3)	Nd II .20(8) Nd II .57(2)
4228.74(1)	8.72(1)			8.90(0)	Nd II .84(2)
4229.36(0)	9.27(1)	9.22(1)			Eu II .33(12)
4229.67(1)		9.63(0)	9.42(2)	9.59(2n)	Sm II .70(300) Eu II .52(5) (Nd II .52(5))
	9.81(1n)	9.99(0)	9.80(0)	9.95(0)	Gd II .80(200) Cr II .81(1)
4230.33(1)	0.15(1)	0.37(0)			
4231.08(1)	0.84(0)	0.93(0)	0.81(0)	0.74(0)	Eu II .63(12?) La II .95(150) Gd II .03(5) (S II .98(35))
4231.71(1)	1.80(1)		1.62(1)	1.60(0)	Ce II .74(30) (Zr II .64(8)) (Ne II .60(50))
4232.22(0)				2.22(0)	Nd II .38(150) Tb II .20(20) (Cr I .22(70))
4232.49(0)	2.53(1)				Gd II .47(40) Eu II .45(12)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4233.11(x)	3.17(x)	3.14(x)	3.20(9)	3.21(9)	Fe II .17(11) Cr II .25(10) (Pr II .13(10))
4233.51(1)	3.65(1)	3.70(0)			Fe I .61(250)
4233.87(1n)	3.98(2)	3.95(1n)	3.83(1n)	3.86(3)	
4234.06(1)	4.31(0)			4.25(0)	Eu II .09(8) Nd II .20(6) (Cl II .09(50))
4234.72(0)		4.53(0)	4.61(1)	4.65(0)	Sm II .57(200) Ce II .73(12) (V II .55(40))
	4.87(0)		4.96(0)	4.86(0)	Gd II .07(15)
4235.28(1n)	5.34(2n)	5.29(1)	5.38(2n)	5.37(1n)	Mn (II?) .29(80) (Nd II .23(6))
				5.71(1)	Eu II .72(12)
4235.86(2)	5.95(2)	5.91(1)	5.86(2)	6.05(1)	Fe I .94(300) Gd II .88(60)
4236.38(1)	6.47(2)	6.44(1)	6.45(1)	6.48(1)	Eu II .22(8) Pr II .21(25) (Cr II .33(pr)) (Zr II .56(5))
4236.72(0)	6.66(0)		6.82(1)	6.65(1n)	Sm II .74(250) (Pr II .64(10))
4236.98(0)	7.08(0)	6.97(1)	7.11(0)	6.94(0)	
4237.45(0n)	7.66(1)	7.64(0)	7.31(0)	7.41(1)	Sm II .66(200) Eu II .51(40) (Dy II .54(2)) (Cr I .71(70))
	7.98(1)	7.95(1)	7.94(1)	8.01(1)	(Dy II .04(1))
4238.16(1)		8.21(1n)		8.33(0)	La II .38(400) (Dy II .44(2))
4238.78(3n)	8.78(2n)	8.72(3)	8.75(2)	8.77(1)	Gd II .78(500) Fe I .82(200) (Eu II .69(20)) (Cr II .69(pr))
	9.26(1)				Cr II .31(0)
4239.69(2n)	9.73(2)	9.75(2)	9.54(1)	9.68(1)	(Mn I .72(100))
	9.92(1)		9.93(2)	0.02(0)	Ce II .91(200) Pr II .03(20) (Nd II .83(10)) (Tb II .14(15))
4240.40(1)	0.48(1)	0.51(1)	0.43(2)	0.52(1)	(Eu II .21(4)) (Eu II .38(5))
4240.64(0)				0.89(1)	Al II .75(15) Eu II .83(6) (Cr I .70(200))
4241.20(2)	1.12(1)	1.20(1)	1.12(2n)	1.18(3n)	Gd II .28(80) Pr II .02(60) (Nd II .21(4)) (La II .20(15))
	1.45(1)				Gd II .28(80) (Cl II .38(60))
4241.66(0)	1.72(1)	1.67(0)	1.79(1)	1.87(1)	(Eu II .60(10))
4242.24(6)	2.29(9)	2.38(6)	2.40(5)	2.46(2)	Cr II .38(30) (Mg II .47(4)) (Mn II .30(2)) (Tb II .57(12))
4242.79(1)	2.82(1)	2.94(0)		2.84(1)	Ce II .72(15)
4243.08(0)	3.12(1)	3.18(0)	3.04(1)	3.08(0)	
4243.43(0)	3.44(0)	3.53(1)			(Pr II .53(20))
4243.87(3)	3.90(1)		3.63(3)	3.64(3)	Gd II .84(150)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4244.37(1)	4.35(1)	4.14(1)	4.15(1)	4.18(1)	Mn II .25(1) Eu II .41(6)
			4.48(1)		Eu II .41(6)
			4.68(0)	4.66(2)	Sm II .70(200)
4244.88(1)	5.02(1)	5.06(0)	4.91(0)		Ni II .80(1) Cr II .08(1) (Dy II .79(1)) (Nd II .97(3))
			5.26(1)	5.20(1)	Fe I .26(80) Cr II .08(1)
4245.36(1)	5.43(1)				Eu II .46(10)
4245.79(0)		5.71(1)	5.79(1)	5.66(0)	(Eu II .85(3))
4246.18(1)	5.99(1)			5.99(1)	Fe I .09(80) (Ce II .98(6)) (F II .16(300))
	6.40(2)	6.36(2)	6.46(2)	6.51(2)	Gd II .57(150) Cr II .41(2)
4246.70(1)	6.76(1)				Ce II .71(30?)
4246.97(0)			6.92(0)		Sc II 83(500) Nd II .88(10?) (Cr II .88(1))
4247.11(0)	7.17(1)	7.19(1)		7.22(1)	Eu II .06(25)
4247.37(3)	7.44(2)	7.31(0n)	7.33(1)		Fe I .43(200) Dy II .37(20) (Nd II .37(200))
	7.89(1)			7.83(0)	Eu II .88(6) Mn II .95(1) Pr II .66(60)
4248.07(1)	8.12(1)	8.10(0)	8.10(0n)	8.22(0)	Fe I .23(150)
4248.55(1)	8.72(1)	8.52(1)	8.71(1)	8.80(1)	Ce II .68(200) (Dy II .44(2)) (Tb II .59(4))
4248.94(1)		9.02(0)			Pr II .08(10)
4249.48(0)	9.47(0)	9.36(0)		9.50(1)	Pr II .48(15)
4249.94(1)	0.01(1)			9.91(0)	La II .99(100)
		0.24(1)	0.14(1)	0.27(1n)	Fe I 13(250)
4250.47(3n)	0.40(2)	0.54(1)	0.40(2n)	0.54(1)	Cr II .51(1) Pr II .40(20) (Mo II .69(125)) (Ne II .68(50))
	0.86(1)	0.84(1)	0.78(0)		Fe I .79(400)
4251.03(1)	1.17(1)	1.14(0)	1.17(0)	1.14(0)	
4251.61(1n)	1.77(1)	1.70(1n)	1.71(4)	1.75(5)	Gd II .73(2000) Mn II .77(2) (Sm II .79(200)) (Pr II .49(20))
4251.95(2n)	2.16(0)	2.33(0)	2.30(1)	2.29(0)	(Ti II .05(pr))
4252.50(6)	2.63(4)	2.64(3)	2.68(5)	2.74(3)	Cr II .66(10) (Nd II .44(40))
4252.95(1)	3.04(1)				Mn II .02(2) (La II .92(4))
4253.46(2n)	3.54(1)	3.34(1)	3.33(2n)	3.38(3n)	Gd II .37(800) Ce II .36(50) (Gd II .61(800)) (Cl II .51(75))
	3.94(0)		4.11(1)	4.21(0)	Eu II .80(20) (O II .98(100)) (Nd II .87(3))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4254.35(3)	4.44(4)	4.44(4)	4.53(4)	4.57(2n)	Cr I .35(5000) Pr II .42(20) Er (II?) .32(S1)
4254.85(0)	4.87(1)			4.96(0)	
4255.16(0)			5.26(0)		
4255.60(2)	5.43(0)	5.59(1)			Gd II .57(20) Gd II .41(15)
	5.76(1)	5.68(3)	5.75(2)	5.77(1n)	Ce II .78(60)
4255.98(2)	6.10(3n)	6.11(3n)	6.17(4)	6.24(3)	Cr II .16(5) (Ti I .04(80)) (Ce II .16(5)) (Nd II .24(8)) (Dy II .97(1)) (Dy II .20(3))
4256.39(1)	6.40(1)				Sm II .39(400) Dy II .32(80)
			6.63(0)	6.62(1)	
4256.76(1)	6.84(1)			6.96(0)	Nd II .82(8)
4257.19(1)	7.20(0)	7.03(0)	7.13(0)	7.16(0)	Ce II .12(20) (Eu II .08(4))
4257.32(0)	7.38(1)	7.50(1)	7.54(1)	7.57(1)	(S II .42(30))
4257.77(0)	7.69(0)				Mn I .66(100) Eu II .85(4) (Nd II .78(4)) (Dy II .72(1))
4258.11(8)	8.17(5)	8.14(5)	8.21(7)	8.22(3n)	Fe II .16(3) (Eu II .19(8)) (Zr II .05(12))
4258.58(0)					Eu II .50(8) Ti I .54(70)
	8.84(0)		8.86(0)	8.96(1)	
4259.23(3n)	9.27(2n)	9.20(3)	9.31(6)	9.36(3n)	Mn II .26(2) A I .36(1200) (Eu II .22(3))
4259.50(2n)	9.46(1)				
4259.78(0)		9.87(0)	9.76(0)	9.83(1)	Ce II .75(15) (Nd II .61(4))
4260.08(0)			0.02(0)	0.21(1)	(Eu II .99(2))
4260.40(3)	0.51(3)	0.43(2)	0.48(2)	0.50(2)	Fe I .48(400)
4260.92(1)	1.00(1)				Eu II .98(5)
4261.25(0)		1.17(1)	1.16(2n)	1.26(1)	Ce II .16(18) (Cr I .35(125)) (Eu II .16(3))
	1.44(0)		1.50(1)	1.66(0)	Ti I .60(70)
4261.83(5)	1.92(8)	1.92(8)	1.97(9)	2.01(7)	Cr II .91(20) Gd II .09(2500) (Nd II .84(20)) (Pr II .80(15))
4262.12(1n)					Gd II .09(2500) (Nd II .24(4)) (Pr II .31(10))
4262.59(0)	2.57(1)	2.77(1n)	2.46(0)	2.77(1)	Sm II .68(300)
4263.07(1n)	3.06(1)	3.14(0)	3.22(1n)	3.29(1)	Ti I .13(125) Cr I .14(125) Ce II .43(40?) (Nd II .44(10))
4263.77(2)	3.86(3)	3.81(2)	3.89(3)	3.97(2n)	Fe II .90(1) (Eu II .80(5?)) (Pr II .80(30)) (Gd II .01(5))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4264.36(1)	4.41(1)	4.51(1)			Ce II .37(10?)
4264.94(0)	4.79(0)	4.60(0)	4.61(1)	4.67(1)	(Eu II .91(3)) (Zr II .91(4))
		5.16(0)	5.24(0)	5.23(0)	Sm II .08(100) Cr II .04(0)
	5.42(0)			5.68(0)	
4265.81(1n)	5.90(1)	5.83(0)	6.02(0)	5.93(0)	Mn I .92(100) (Eu II .81(4)) (Dy II .83(1))
	6.16(0)	6.35(0)	6.35(1)	6.42(2)	A I .29(1200) (Cr II .23(pr)) (Eu II .38(4?))
4266.64(1)	6.80(0)	7.00(0)	6.97(0)	6.92(1)	Fe I .97(70) Nd II .72(30) (C II .02(350)) (Zr II .72(1))
4267.21(1)	7.25(0)		7.23(0)	7.33(1)	C II .27(500)
4268.14(0n)	8.09(0)	8.05(0)	7.90(0n)	7.93(1)	Ce II .16(500) Fe I .83(125)
	8.54(0)			8.58(0)	Eu II .44(3)
4268.73(3)	8.84(2)	8.94(1)	8.87(1)		Cr II .93(1) Gd II .73(150) (Pr II .100(10))
4269.16(4)	9.32(4)	9.30(4)	9.34(4)	9.38(3)	Cr II .28(10)
4269.34(0)					La II .50(300)
4269.99(0n)	0.01(1n)	0.06(1)	0.08(0)	0.04(0)	Eu II .24(10) Ce II .19(60) (Ti I .14(30))
4270.64(4)	0.67(1)		0.47(1n)	0.52(3n)	Eu II .50(12?) Eu II .24(10) Nd II .56(25)
			0.74(1n)	0.85(2)	Ce II .72(50)
4271.02(3)	1.22(2)	1.21(1)	1.19(1)		Fe I .16(400)
			1.36(1)	1.42(1)	
4271.67(3)	1.81(3)	1.71(2n)	1.85(4)	1.88(3)	Fe I .76(1000) (Pr II .76(15))
4272.13(1n)	2.08(1)	2.17(1)	2.24(3)	2.34(2)	Pr II .27(80) (A I .17(1200)) (Eu II .11(4))
4272.56(0)	2.51(0)	2.62(0)	2.61(0)		Ti I .43(40) (Eu II .76(3)) (Nd II .79(30))
4272.82(0)			2.91(1)	2.94(0)	Eu II .76(3) Nd II .79(30)
				3.04(1)	Eu II .06(4) (Dy II .14(2)) (Tb II .19(3))
4273.24(6)	3.32(6)	3.29(5)	3.36(6)	3.42(4)	Fe II .32(3)
4273.62(1)					Zr II .52(4)
4274.06(1)	3.91(0)	4.09(1)	3.84(1)	3.89(1)	
			4.30(0)	4.40(0)	
4274.59(3)	4.66(2n)		4.60(1)		Ti I .58(100)
4274.93(1)	4.98(1)	4.87(2n)	4.90(1n)	5.01(0)	Cr I .80(4000) Eu II .86(5) (Nd II .08(10)) (Gd II .03(4))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4275.43(5)	5.56(4)	5.57(3)	5.62(4)	5.66(2)	Cr II .57(30) (La II .64(100)) (Ce II .56(25))
4276.15(0)	5.97(1)	6.18(0)	6.28(1)	6.31(1)	Eu II .20(30) (Tb II .14(2)) (Ti I .43(50))
4276.61(1)	6.59(1n)	6.54(0)	6.86(0)		(Tb II .75(15)) (Ti I .43(50))
4276.96(0)	7.17(0)			7.13(0)	(Nd II .28(6))
4277.44(1)	7.47(1)	7.42(1)	7.45(2)	7.45(1)	(Zr II .37(4)) (Nd II .28(6))
4278.07(2)	8.13(3n)	8.08(3)	8.20(4)	8.24(3n)	Fe II .13(1) Cr II .10(1)
4278.62(0)	8.68(0)	8.69(1)	8.73(1)	8.80(1)	Tb II .54(200) Ce II .87(20) (S II .54(30)) (Cr II .94(pr))
4279.34(0)			9.46(0)		
4279.71(0)	9.64(0)	9.78(1)		9.66(0)	Sm II .68(200)
4279.97(1)		0.24(1)	0.03(2)	0.23(0)	Ce II .14(15?) Pr II .10(30)
4280.46(1)	0.33(1n)		0.44(2)	0.50(2n)	Gd II .49(1500) Sm II .79(400) (Eu II .36(8)) (Cr II .33(pr))
4280.98(1)	1.05(1n)	1.00(0)	1.01(1)		Sm II .01(100) (Cr II .03(pr)) (Mn I .10(100))
4281.62(1)	1.59(1)	1.60(0)	1.37(1)	1.37(1)	Ti I .38(80)
4281.87(0)	1.88(1)	1.80(0)	2.04(1n)	2.02(0)	Eu II .92(8)
4282.36(4)	2.48(2)	2.42(1)	2.44(3)	2.47(1n)	Fe I .41(600) Mn II .50(3) Pr II .44 (60) (Nd II .57(15)) (Nd II .44(50)) (Zr II .21(6))
4282.95(1)	3.04(1)	3.00(0)	3.29(1)	3.18(0)	Cr II .02(1) (Gd II .79(50))
4283.56(0)	3.51(0)	3.75(0)	3.76(1)	3.74(0)	Mn II .81(1) (Eu II .87(4))
4284.09(2)	4.15(2)	4.25(4)	4.32(6)	4.40(3n)	Cr II .21(20) (Mn I .08(40))
4284.48(1)	4.47(1)				Nd II .52(100) (Mn II .42(0)) (Gd II .57(5))
4285.35(1)	5.40(1)	5.30(1n)	5.32(1n)	5.38(2n)	Fe I .44(125) Ce II .37(30) (Eu II .34(4))
4285.62(1)		5.58(0)		5.74(0)	Sm II .50(200) (Tb II .74(5))
4286.16(3)	6.19(3n)	6.23(2)	6.32(3)	6.36(2)	Fe II .31(1) Ti I .01(100) Cr II .36(1)
4286.63(1)					Sm II .64(100) (Eu II .70(4)) (Zr II .51(5))
4287.05(1)	6.98(1)	7.02(1n)	7.06(1)	7.20(1)	La II .97(300) (Tb II .89(8))
4287.81(2)	7.92(3)	7.75(1n)	7.79(1)	7.89(2)	Ti II .88(30)
4288.44(3)	8.43(2n)	8.43(2n)	8.34(2n)	8.38(1)	P II .52(50) (Eu II .60(2))
4289.05(1)	9.09(1)	9.24(0)	8.94(0)	9.18(0)	Ti I .07(125) (Zr II .18(2))
4289.35(1)					Ce II .45(25)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4289.59(1)	9.62(1)	9.65(1)			Cr I .72(3000) Ce II .45(25)
4290.19(x)	0.20(4n)	0.07(2n)	9.99(6n)	0.02(5)	Ce II .94(300) Gd II .88(80) (Ti II .23(60))
4290.92(1n)	0.94(1n)	0.89(1)	0.90(1)	0.94(1)	Nd II .96(6)
4291.63(1n)	1.80(1)	1.61(0)	1.67(1n)	1.64(1)	Fe I .47(125)
4292.16(0)	2.23(1)	2.25(1)	2.28(1)	2.40(1)	Sm II .18(150) Mn II .25(2) (Eu II .95 (5)) (Eu II .44(6)) (Gd II .31(5))
4292.80(1)					Gd II .75(25) Ce II .77(4) (Tb II .63(2))
4293.13(2)	3.04(1n)	2.96(1)	2.91(2)	2.99(2n)	Pr II .14(15) Zr II .14(7)
4293.52(0)	3.71(0)		3.50(0)		Pr II .58(20)
4294.07(4)	4.14(3)	4.05(2)	4.04(2)	4.09(3)	Ti II .12(80) Fe I .13(700) (Ti I .12(60))
4294.72(0)	4.79(1)	4.79(0)	4.81(1)	4.83(2)	Pr II .70(20) Dy II .94(60) Eu II .54(3) Eu II .70(3)
4295.11(3)	5.17(2)	5.41(0)	5.34(1)	5.43(2)	Dy II .94(60) Eu II .44(15) (Cr II .37(pr))
4295.62(1)	5.65(0)	5.87(1)			Ti I .76(100) Cr I .76(125)
4296.09(0)			6.07(2)	6.15(1)	Gd II .08(1000) La II .05(300) Ce II .07(6)
4296.48(4)	6.49(4n)	6.56(9)	6.62(8)	6.68(3)	Fe II .57(6) Gd II .30(400)
4296.78(1)	6.86(1)				Ce II .68(200) (Ce II .79(5)) (Gd II .17(400))
4297.30(1)	7.31(1)	7.19(1)	7.13(1)	7.25(1)	Gd II .17(400) Cr I .05(100) (Nd II .35(8))
	7.58(1)	7.63(1)	7.62(0)	7.58(0)	
4297.85(0)	7.80(1)		7.74(0)		Pr II .76(80) Cr I .74(125) (Nd II .80(30))
	8.07(0)	8.20(0)	8.20(1)	8.29(1n)	Fe I .04(100)
4298.52(0)	8.41(1)				Gd II .43(30) Ti I .66(125)
	9.04(1)		8.86(1n)		Pr II .92(15)
4299.19(1n)	9.29(1)	9.21(1)	9.26(2n)	9.21(2)	Fe I .24(500) Ce II .36(60) (F II .18(150))
	9.78(1)		9.84(2)		Cr I .72(100) Nd II .70(10)
4300.03(4n)	0.07(3)	0.09(3)	9.97(5)	0.02(4)	Ti II .05(100) (A I .10(1200))
4300.24(1n)					Ce II .33(60) (Mn II .20(1))
4300.61(0)	0.73(1n)	0.53(1)	0.44(0n)	0.53(1)	Ce II .33(60) La II .44(60) Cr I .51(100) Ti I .56(125) (Dy II .76(1)) (Dy II .41(1))
4301.38(0)	1.42(1)	1.30(1)	1.27(0n)	1.38(1)	V II .13(40) (Cr I .18(100)) (Eu II .58(6))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4301.85(5)	1.97(3)	1.81(2)	1.86(3n)	1.87(3n)	Ti II .93(50) (Pr II .10(60)) (Zr II .81(5))
4302.58(0)	2.48(1)		2.56(0)	2.44(1)	Cr II .58(1) (Dy II .57(4))
4303.13(6)	3.12(6)	3.14(7)	3.20(6n)	3.26(2)	Fe II .17(8)
4303.64(0)	3.68(1)	3.65(1)	3.52(0n)	3.61(0)	Gd II .47(25) Nd II .57(400)
4304.19(0)	4.12(1)	4.00(0)	4.11(0)	4.05(0)	Gd II .09(25) (La II .11(10))
4304.78(0)	4.95(1)	4.94(0n)	4.74(1n)	4.80(1)	Gd II .90(400)
4305.45(0)	5.52(0)		5.64(1n)	5.70(1)	Fe I .46(100) Pr II .76(100) (Cr I .45(150))
4306.01(1)	6.10(1)			6.17(1)	Pr II .08(30) Ti I .92(300)
4306.40(1)					Eu II .38(4)
4306.90(4n)	6.91(4)	6.91(2)	6.80(3)	6.81(4)	Cr II .95(5)
4307.36(0)	7.63(1)			7.46(0)	
				7.77(2)	Ti II .90(100)
4307.82(4)	7.90(4)	7.86(4)	7.86(4)		Fe I .91(1000) Ti II .91(100) (Gd II .87(40)) (Nd II .78(15))
				8.00(4)	Fe I .91(1000)
	8.30(1)		8.36(1)	8.42(2)	Gd II .23(40)
4308.66(1)	8.82(2)	8.88(0)	8.86(2)	8.89(2)	Dy II .62(200) Cr II .82(2) (Tb II .68 (25)) (Eu II .83(3)) (Zr II .94(4))
4309.06(0)	9.10(0)				Sm II .01(200) (K II .08(40)) (Cl II .06(50))
				9.42(0)	Fe I .38(125)
4309.71(1)	9.68(2n)	9.61(1n)	9.65(1)	9.72(1)	Cr II .75(3) Ce II .74(50) (Y II .63(50))
	0.45(2)				Nd II .51(6)
	0.75(0)	0.80(0n)			Ce II .70(30?) (Eu II .60(2))
			0.90(2)	0.94(1)	Gd II .98(200) (Eu II .02(5)) (Tb II .99(8))
4311.18(1)	1.13(1)			1.31(1)	Eu II .28(3) (Pr II .10(10))
4311.54(0)	1.68(1)				
4312.04(1)	2.21(1)	1.92(0n)	1.94(3)	2.14(1)	Tb II .09(8) (Zr II .23(3))
4312.84(4)	2.92(5)	2.89(4n)	2.90(5)	2.92(4n)	Ti II .87(100) (Fe II .03(1))
4313.82(1)	3.74(1)		3.68(3)	3.65(3)	Eu II .85(5) (Dy II .89(2))
4314.30(1n)	4.25(2)	4.27(3)	4.33(4)	4.38(3)	Fe II .29(4) (Nd II .37(8)) (Gd II .28(10)) (Nd II .51(5))
4314.89(3)	5.02(3)	4.89(2)	4.93(4)	4.97(4)	Ti II .98(20) Fe I .09(500) (Ti I .80(100))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4315.27(1)		5.01(1)			Fe I .09(500)
	5.43(1)	5.57(1)	5.50(1)	5.53(1)	
4316.01(1n)	6.15(0n)	6.02(0)	6.04(1)	6.11(1)	Gd II .05(600) Gd II .27(150) (La II .90(30))
4316.77(2)	6.92(2)	6.67(0)	6.68(1)	6.66(0)	Ti II .80(35) (Yb II .97(10))
4317.23(0)		6.97(0)	7.26(1n)	7.21(0)	Zr II .32(12) (O II .16(150))
4317.73(1)	7.83(1)	7.77(0n)	7.59(0)	7.64(1)	Eu II .67(8) (Pr II .84(10))
4318.05(1)	8.24(1)	8.10(1)	8.18(0)	8.30(1)	Fe II .22(0n)
	8.72(1)	8.81(0)	8.74(0)	8.72(1)	Cr II .77(pr)
		8.95(0)		9.08(1)	Sm II .94(500) (Pr II .00(10))
4319.58(2)	9.56(3n)	9.54(2)	9.54(2n)	9.75(2)	Fe II .72(1n) (Cr I .64(100)) (O II .65(150))
4320.21(0)	0.11(1)	0.24(0)		0.35(1n)	(Eu II .16(2))
4320.81(2)	0.84(2n)	0.75(1)	0.74(2n)	0.92(1)	Ti II .96(40) Ce II .72(60) (Sc II .74(40)) (Cr I .59(125))
4321.19(2)	1.32(1)	1.23(1)		1.40(1)	Gd II .11(200) Fe II .34(1n)
		1.60(0)		1.77(1)	Ti I .66(70) (Eu II .67(3))
4321.95(1)	2.06(1n)		1.97(0)	2.18(0)	Gd II .20(125) (Eu II .87(4)) (Dy II .19(1))
4323.09(1)	3.13(1n)		2.91(1)	2.89(1)	(Sm II .28(200))
	3.80(0)		3.78(0)	3.62(0)	Pr II .55(25) (Tb II .65(15)) (Zr II .62(2))
4324.00(1n)					Gd II .06(150) (Nd II .90(2))
			4.34(0)	4.36(0)	Eu II .31(4)
4324.75(1)	4.91(1)	4.97(1)	4.91(1)	4.98(2)	(Dy II .14(40))
4325.64(4)	5.57(4n)	5.58(4n)	5.55(5)	5.58(5)	Fe I .76(1000) Gd II .57(200) (Nd II .77(150)) (Tb II .82(60)) (Zr II .64(3))
	6.16(0)			6.13(1)	Eu II .13(4)
4326.38(1)					Gd II .32(20)
4326.54(1)	6.60(2)	6.65(1)	6.62(1n)	6.61(1)	(Mn II .71(3)) (Ce II .83(15))
4327.08(1)	7.19(0)			7.11(0)	Gd II .12(1500) Fe I .10(100)
4327.93(1n)	8.15(0)		7.84(1)	7.84(1n)	Nd II .93(30) (Tb II .08(1))
4328.96(1)	9.04(0)		8.72(0n)	8.83(2)	Dy II .90(20) Sm II .02(400) (Cr II .91(pr)) (Pr II .98(20))
4329.59(0)				9.43(0)	Pr II .42(25)
				9.76(1)	(Dy II .89(1))
4330.19(0)	0.30(1n)	0.27(0)	0.25(1)	0.12(0)	Ti II .24(40) Gd II .32(20)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4330.50(3n)	0.73(1n)		0.51(2n)	0.46(2n)	Gd II .61(600) Ti II .71(30) Eu II .61(40) Ce II .44(30)
4331.47(0)					Fe II .53(3)
	1.70(0)		1.68(0)	1.62(1)	(Ni I .64(200))
4332.55(0)				2.52(0n)	Cr I .57(125) (Eu II .40(2))
	2.80(0)			2.76(0)	(Eu II .85(3))
4333.42(0)				3.35(1n)	Zr II .28(15) (A I .56(1000))
4334.20(1)			4.05(0)	3.98(1)	Sm II .15(400) Pr II .91(100) La II .76(500) (Eu II .16(6))
		4.63(0)		4.62(0)	Pr II .62(15)
4334.88(0)					La II .96(100) Eu II .75(12)
4336.34(0)			6.24(0)	6.37(1)	Ce II .26(50) Eu II .44(6) (Cl II .26(45))
4337.12(0)				7.04(0)	Fe I .05(400) (Ho II .13(4))
4337.84(1)	7.91(0)	7.84(1)		7.97(1n)	Ti II .92(125) Ce II .78(125) (La II .78(10)) (Zr II .63(5))
4338.65(0)			8.62(0)		Nd II .70(80) Pr II .69(25) (Fe II .70(pr))
4339.23(0)				9.35(0)	Ce II .32(30) (Cr I .45(300))
4340.43(xn)	0.44(xn)	0.45(xn)	0.45(xn)	0.46(xn)	H γ .48(200)
				1.54(1)	Gd II .28(600) (Ti II .38(40))
4341.74(0)		1.73(0)		1.77(0)	
				2.24(0)	Gd II .18(1500) Fe II .36(0) (Nd II .07(20))
4342.66(0)			2.64(0)		Tb II .50(30)
4343.18(1)		3.16(0)		3.32(0)	
4344.12(1n)	3.98(1)	4.03(1)	4.09(2)	4.07(0n)	Gd II .30(100) Ti II .29(50) Mn II .99(2) Pr II .33(40) (Tb II .20(3))
4344.63(0)		4.52(0)		4.64(0)	Gd II .49(40) Cr I .51(400)
		5.37(0)	5.13(0)	5.15(0)	A I .17(1000)
4345.57(0)		5.66(1)		5.65(1)	(O II .57(125)) (Mn II .60(pr)?)
4346.38(1n)	6.42(1n)	6.37(0)	6.33(0)	6.38(1)	(Dy II .33(1))
4347.34(1n)		7.41(1)	7.40(1)	7.52(1)	Gd II .31(400) (Pr II .49(30))
4347.79(1)					Sm II .80(400) Al II .78(20) (Al II .80(18)) (A II .11(500))
4348.53(1n)	8.34(0)	8.66(0)		8.30(0)	Mn II .49(1) (Tb II .34(3))
4349.08(1)				8.97(0)	

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4349.46(0)	9.56(0)		9.54(0)		(O II .44(300)) (Eu II .49(2))
4349.80(1)	9.91(0)	9.64(0)	9.73(0)	9.75(0)	Ce II .79(100)
4350.35(1)	0.39(1)	0.63(1)	0.53(0)		Sm II .46(300) Pr II .40(20) (Eu II .42(2))
4350.75(2)	0.92(1)	0.97(1)	0.77(0)	0.69(0)	Ti II .83(30) (Cr I .05(100))
4351.23(0)				1.45(0)	Eu II .26(4) Nd II .30(40) (O II .28(125)) (Nd II .18(15))
4351.67(7)	1.73(7)	1.75(9)	1.82(9)	1.88(8)	Fe II .76(9) (Cr I .77(300)) (Pr II .85(50)) (Tb II .57(8))
4351.96(0)					Mg I .91(15) Sm II .10(200)
4352.53(2)	2.60(2)	2.56(3)	2.63(3)	2.67(2n)	Fe I .74(300) Ce II .73(75) (Eu II .24(6)) (Gd II .67(15))
4353.35(1)	3.36(1)	3.29(1n)	3.41(0)	3.43(1n)	Tb II .19(50) (Eu II .51(2))
	3.71(0)	3.87(0)			
4354.24(3)	4.34(2)	4.26(2)	4.26(1)	4.30(2)	Fe II .36(2) (Gd II .06(40))
4354.95(1)	5.02(0)	4.90(0)	4.97(1n)	5.17(3n)	(Pr II .91(15))
4355.36(6)	5.40(3)	5.36(1)	5.40(1n)		Eu II .09(300) (Nd II .35(2))
4355.71(0)	5.50(1)		5.53(1)	5.62(1)	
4356.04(1)	6.08(0)		6.14(1)		(Nd II .02(10))
		6.38(1n)	6.33(1)	6.42(3)	
4356.61(3)	6.69(2)	6.79(1n)	6.78(0)		Gd II .74(10)
	7.03(1)		6.98(0)	7.15(1)	
4357.45(5)	7.57(3)	7.53(3)	7.56(3)	7.67(2)	Fe II .57(4)
4358.17(1)	8.22(1)	8.24(1)	8.20(2)	8.28(1)	Nd II .17(200)
4358.54(1)	8.57(0)		8.79(1)	8.65(0)	Dy II .46(60) Fe I .50(70) (Nd II .70(15))
4358.94(0)		8.93(1)			
4359.14(0)	9.04(0)	9.13(0)	9.00(0)	9.08(1)	Pr II .11(15) Gd II .15(40) (Nd II .24(5))
4359.73(2)	9.71(1n)	9.63(0)	9.55(1)	9.64(0)	Gd II .64(30) Pr II .80(30) (Zr II .74(10)) (Cr I .63(200)) (Ni I .58(100))
4360.28(1)	0.21(1)	0.35(1n)	9.99(0)	9.95(1)	Ce II .16(25?)
	0.66(0)		0.75(0)	0.64(1)	Sm II .72(150) (Nd II .82(2))
4361.15(4n)	1.26(3)	1.20(4n)	1.26(4)	1.29(3)	Fe II .25(2) Gd II .92(250)
4361.45(1)					Eu II .57(8) (Dy II .39(2))
4361.96(2n)	2.09(1)	1.99(1)	1.92(1)	1.94(2n)	Sm II .04(300) Ni II .10(1) Ce II .66(18)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4362.21(1)	2.38(0)	2.31(0)		2.37(1n)	(Eu II .43(2)) (Gd II .30(4))
4362.82(2)	2.97(2)	2.87(1)	2.97(2)	2.95(1)	Cr II .93(3) (Pr II .98(10)) (La II .05(50))
4363.51(3n)	3.61(1)	3.62(0)	3.34(2)	3.39(4)	Mo II .64(200) (Pr II .22(10))
4364.21(1)	4.26(1)		4.00(1)	4.07(2)	Gd II .14(25) Dy II .28(40) Nd II .14(10) Dy II .06(2) (Ho II .18(3))
4364.63(1)	4.80(1)	4.57(0)	4.65(1)	4.76(1)	Ce II .66(125) (La II .66(100))
4365.09(1)					(Eu II .18(2))
4365.62(1)	5.54(0)		5.32(0)	5.40(1)	
4366.15(2)	6.15(1)	5.97(0)	5.97(2n)	6.06(1n)	Fe II .16(tr) (Nd II .32(12)) (Nd II .39(8)) (Tb II .01(3))
4367.01(1)	7.07(0)	6.76(1)	6.79(1)	6.84(1)	(O II .91(100))
	7.37(0)			7.54(0n)	Gd II .31(15)
4367.60(3)	7.75(2)	7.52(1)	7.60(2)	7.74(2n)	Ti II .66(25) Fe I .58(100) (Eu II .54(3))
4368.01(2)	8.14(2)	8.01(1)			Fe I .91(60) Sm II .03(150) (Eu II .89(2)) (Gd II .03(4))
4368.30(0)		8.36(1)	8.24(2)	8.36(1)	Fe II .26(1) Pr II .33(150) (O I .30(1000)) (Ce II .23(8?)) (Eu II .42(8))
4368.72(0)	8.66(0)			8.80(0)	Nd II .63(60)
4369.28(3)	9.34(3n)	9.39(4n)	9.48(5n)	9.53(3n)	Fe II .40(2) Eu II .47(40) (Cl I .52(12))
4369.56(1)					Eu II .47(40)
4369.78(1n)	9.79(1n)			9.87(0)	Fe I .77(200) Gd II .77(500) (Ne II .77(70))
4370.40(0)		0.38(1)	0.44(1)	0.23(0)	Eu II .34(20)
4370.97(2n)	0.88(1)	0.95(1n)	0.96(1)	0.81(3)	Pr II .80(8) Zr II .96(8) (Tb II .93(3)) (Nd II .07(10))
	1.06(2n)				Nd II .07(10)
				1.71(1)	Pr II .61(40)
4371.89(3n)	1.99(1n)	1.93(1n)	1.90(0)	1.90(1)	
4372.30(1n)	2.34(1)		2.22(0)	2.27(1)	Ce II .40(35?) Eu II .20(8) (Nd II .28(8)) (Nd II .14(3))
4372.92(1)	3.05(1)	2.87(0)	2.92(0)	2.86(1)	(Nd II .73(4))
4373.47(1)	3.59(1)	3.58(1)	3.57(1)	3.52(1)	Fe I .57(50) Sm II .46(100) (Eu II .45(3))
4373.79(0)				3.87(0)	Ce II .82(50) Pr II .82(10)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4374.28(1)	4.31(1)			4.18(1)	Dy II .24(125) Gd II .24(30) (Pr II .41(20)) (Sc II .46(25)) (Cr I .16(50))
4374.78(3)	4.90(2)	4.91(2)	4.66(2)	4.70(3)	Ti II .82(35) Dy II .80(100) Sm II .98(200) (Y II .94(150)) (Mn I .95(150)) (Nd II .04(30)) (Nd II .92(20))
4375.31(1)	5.28(0)		5.09(2)	5.18(2)	Dy II .33(50) Eu II .12(5)
4375.94(1)	5.94(1)	5.85(1)	6.05(0n)	5.99(1n)	Fe I .93(500) Ce II .92(60)
4376.31(1)	6.34(1)		6.32(0)	6.25(0)	(Eu II .42(3)) (Nd II .44(3)) (Tb II .44(5))
4377.08(2n)	7.13(2n)	7.12(1n)	7.10(1n)	7.14(1n)	(Nd II .10(5)) (Nd II .40(4))
4377.70(0)	7.77(0)			7.56(0)	Mo II .76(200)
4378.20(1)	8.29(1)	8.02(0)	8.00(1)	8.03(2)	Sm II .24(150) Cr II .34(1) (La II 10(50)) (Eu II .27(1))
4379.01(1)			8.86(0)	8.93(1)	(Tb II .73(4))
4379.79(1n)	9.82(1)	9.55(1)	9.59(1n)	9.80(2)	Zr II .78(9) Mn II .74(1) (Eu II .81(5)) (Cl I .91(15))
4380.72(1)	0.71(1)	0.61(0)	0.51(1)	0.65(2n)	Gd II .64(100) (Pr II .32(12))
4381.18(0)			1.39(1)	1.44(1)	Nd II .29(10?)
4381.67(2)	1.66(1)	1.62(0)			Mn I .70(80)
4382.21(2)		2.13(0)	2.04(0)	2.05(1)	Gd II .06(60) Ce II .17(200) (Eu II .05(4))
4382.41(1)	2.50(2n)	2.56(1n)	2.55(2)	2.68(1)	Cr II .53(1) Pr II .42(20) (Nd II .74(15)) (Mn I .63(80))
4382.99(1)	2.93(0)	3.00(0)	2.99(0)	3.09(1)	Gd II .12(150) Eu II .17(200) (Pr II .82(20)) (Zr II .95(1))
4383.42(5)	3.48(4)	3.51(3)	3.59(3)	3.77(2n)	Fe I .55(1000) (La II .44(100))
4384.11(7)	4.19(5)	4.23(4n)	4.22(3)	4.23(2n)	(Pr II .14(20)) (Dy II .30(2)) (Tb II .06(5))
4384.50(0)	4.62(1)	4.78(0)	4.77(1)	4.47(1)	Mg II .64(8)
				4.83(0)	(Cr I .98(150)) (Er (II?) .70(55))
4385.31(9)	5.34(7)	5.36(9)	5.39(6)	5.44(5)	Fe II .38(7) (Nd II .66(150)) (Dy II .29(2)) (La II .20(40))
4386.09(1)	6.05(1)			5.90(1)	Tb II .09(10)
4386.53(1n)	6.53(1n)	6.27(0)	6.24(1)	6.30(1)	
4386.80(6n)	6.96(3)	6.74(1n)	6.74(4)	6.76(4)	Ti II .85(80) (Ce II .84(15))
	7.30(1)	7.03(1)			
4387.66(1)	7.72(1)	7.72(0n)	7.54(1)	7.56(2)	Gd II .67(300) Fe I .90(150)
4388.23(2)	8.28(1n)		8.03(2)	8.12(3)	Ce II .01(8) Fe I .41(125) (K II .13(40))

Table 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
			8.69(0)	8.67(1)	(Zr II .50(2))
4388.94(1n)	9.01(1n)	8.98(0)		9.04(1)	Gd II .98(15) (Eu II .07(4)) (Tb II .04(3))
4389.71(1n)		9.40(0)	9.50(0n)	9.61(1)	Fe II .40(1) (Gd II .69(6))
	9.86(0)			9.94(0)	Gd II .00(10) (Cl I .76(25))
4390.47(3)	0.54(1)	0.44(0)	0.26(1n)	0.34(3)	Nd II .66(20) Mg II .58(10) (Eu II .36(3))
4391.04(3)	1.15(1)		0.86(1n)	0.90(2n)	Gd II .95(300) Ti II .03(25) Sm II .86(600) Fe I .95(100) (Nd II .11(10))
4391.64(4)	1.76(2)	1.70(1)	1.62(1n)	1.69(1n)	Ce II .66(250) Gd II .44(15) (Eu II .37(10)) (S II .84(30))
4392.16(1)	2.15(0)			1.94(0)	(Ne II .94(150)) (Gd (?) .07(100))
4392.56(1)	2.54(1)	2.58(0)	2.59(0)	2.42(0)	
4393.10(2)	3.18(1)	3.05(0)		2.92(2)	
			3.32(1n)	3.40(2)	
4393.62(2)	3.72(1)				
4394.02(3)	4.15(2)	4.09(1)	3.91(2)	3.96(1)	Ti II .06(15) (Ti I .92(60)) (Nd II .20(2))
4394.39(1)				4.36(0)	
4395.06(6)	5.10(3)	5.01(2n)	4.94(4n)	4.96(5n)	Ti II .04(150) Fe I .29(80) Dy II .98(40) (Pr II .00(15)) (Tb II .92(3))
4395.76(5)	5.84(3)	5.77(2n)	5.78(4n)	5.82(4)	Ti II .84(30) Pr II .79(30)
				6.26(0)	Pr II .12(40)
4396.57(0)	6.45(1)		6.54(1)		
4397.10(0)	6.89(1)	6.92(1)	6.81(1)	6.73(1)	
4397.59(0)			7.38(1)	7.41(1)	Gd II .51(300)
4397.88(0)	7.88(0n)				Y II .01(100) Eu II .70(8) (Ne II .94(100)) (Nd II .67(3))
4398.25(3)	8.29(1)	8.06(1n)	8.10(2n)	8.08(2)	Ti II .31(10) Y II .01(100)
		8.61(0)		8.51(1)	
4398.78(0)	8.87(1)			8.98(1)	Ce II .79(20?)
4399.14(1)	9.31(1)	9.05(1)	9.08(1n)	9.19(1)	Eu II .32(15) Ce II .20(60) (Pr II .33(15)) (Zr II .44(2))
4399.71(4)	9.85(3)	9.82(2)	9.66(2)	9.72(2n)	Ti II .77(100)
4400.13(1)	0.25(1)		0.31(0)	0.24(0)	Gd II .18(25) (Pr II .03(15)) (Dy II .10(1)) (Sc II .36(30)) (Pr II .25(10))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4400.57(1)				0.59(0)	
4401.10(1)	0.86(0)	0.71(0)	0.73(1)	0.85(2n)	Nd II .83(100)
4401.61(4)	1.71(1)	1.51(1n)	1.43(3)	1.45(5)	Ni I .55(1000) (Fe I .30(60)) (Tb II .54(10))
4402.26(0)	2.05(0)	2.38(0)	2.35(0)	2.07(0)	(Eu II .26(2))
	2.54(0)			2.48(1)	
4402.78(3)	2.88(3)	2.88(3)	2.86(3)	3.05(3)	Fe II .88(2)
4403.39(2)	3.51(1)		3.50(2)	3.46(0)	Sm II .36(100) (Zr II .35(6)) (Pr II .28(10))
		3.70(1)	3.66(0)	3.74(0)	Pr II .60(25)
4403.98(0)		3.90(0)	4.22(0)	4.16(0)	(Ti I .28(50))
4404.67(9)	4.75(7)	4.64(3)	4.63(5)	4.61(4n)	Fe I .75(1000)
4405.13(1)	5.25(1)			5.12(1n)	Eu II .27(20)
4405.58(0)		5.56(2)	5.58(2n)	5.43(1)	Pr II .85(80) (Tb II .41(8))
4405.78(1)	5.74(1n)				Pr II .85(80)
4406.25(1)	6.38(1)	6.40(1n)	6.33(1n)		
4406.68(2)	6.67(1n)		6.74(3n)	6.60(1n)	Gd II .67(400)
		6.90(1)	6.94(1)	6.92(1)	(Eu II .07(15))
4407.14(1)	7.27(1)			7.40(1)	Ce II .28(40?) Eu II .07(15) (Nd II .07(10))
4407.65(5)	7.82(2)	7.75(1)	7.74(2)		Ti II .68(10) Fe I .72(100)
4407.89(0)				7.91(1)	(Dy II .05(2))
4408.26(4)	8.35(2)	8.56(1)	8.42(0)	8.31(1)	Gd II .25(400) Fe I .42(125)
4408.74(2)	8.84(2)	8.68(1)	8.78(2)	8.86(1)	Pr II .84(200)
4409.10(0)	9.03(0)		9.22(0)	9.29(1)	Ti II .22(8) (Ne II .30(150))
4409.43(4)	9.49(2)	9.54(2)	9.69(3n)	9.78(4)	Dy II .38(200) Ti II .52(10) (Tb II .51(20))
4409.96(5)	0.05(1)	0.10(0)			
	0.26(0)	0.34(1)	0.28(1)	0.36(0)	Nd II .25(2)
4410.60(1)			0.64(0)		Ce II .64(30)
	0.82(1)			0.81(2)	
4411.01(2)	1.15(1n)	0.88(1)	1.00(1)	1.17(1)	Ti II .08(100) Nd II .05(150) La II .21(25) (Gd (II?) .16(?))
4411.47(0)	1.53(0)	1.66(0)	1.78(1)	1.60(0)	
4411.92(1)	1.99(1)	2.00(1)	1.89(0)	1.93(0)	Ti II .94(12) (Mn I .88(100))
4412.23(0)	2.19(0)			2.11(0)	(Nd II .26(20)) (Pr II .16(20)) (Eu II .38(4))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4412.84(0n)	2.91(0)		2.85(0)	2.85(0)	(Eu II .98(2)?)
			3.11(0)	3.28(0)	(Nd II .33(10)) (Ne II .20(50))
4413.52(3n)	3.60(3)	3.57(3n)	3.66(2)	3.74(1)	Fe II .60(0) Pr II .76(50) (Nd II .78(5?))
4413.95(1)	4.04(0)	4.12(0)			
4414.56(3n)	4.55(1)	4.41(0)	4.36(2)	4.40(3)	Eu II .64(6) Pr II .40(10) (Nd II .43(8)) (Zr II .54(5))
		4.95(1)		4.91(0)	(O II .89(300))
4415.08(2)	5.20(1)	5.10(2)	5.14(1)	5.20(1)	Fe I .12(600)
4415.53(0)	5.63(0)	5.70(1)	5.79(1)	5.58(1)	Sc II .56(25)
4415.93(1)				6.10(1n)	
4416.27(1n)	6.12(0)	6.17(1)	6.19(0n)	6.14(1)	Tb II .28(20)
4416.73(4)	6.78(6)	6.77(8)	6.83(4)	6.90(4)	Fe II .82(7) (Nd II .88(15))
4417.67(4)	7.73(3n)	7.72(2)	7.62(2)	7.64(3n)	Ti II .72(80) Sm II .58(80)
4418.25(2)	8.36(2)	8.26(1)	8.24(1)	8.32(1n)	Ti II .34(20) (Nd II .05(1))
4418.85(2n)	8.94(2)	8.84(2n)	8.90(3)	8.91(4)	Ce II .78(200) Gd II .03(800) (Pr II .06(25)) (La II .16(30))
4419.65(3n)	9.61(2n)	9.59(2)	9.61(3)	9.59(2)	Pr II .67(30) Eu II .66(8) (Er (II?) .61(54)) (Fe III .60(10))
4420.23(0)	0.31(0)			0.10(0)	
		0.43(0)	0.48(1n)	0.48(0n)	Sm II .53(200) (Ho II .54(2))
4420.76(1)	0.79(1)	0.84(1)	0.95(1)		A II .90(40)
4421.32(1)	1.42(0)	1.04(0)		1.09(1n)	Gd II .24(200) Sm II .14(200) Pr II .23(40)
4421.85(2)	1.94(1)	1.70(1)	1.90(0)	1.85(0)	Ti II .96(35) (Ti I .76(60)) (Dy II .69(1))
	2.12(1)	2.32(0)	2.21(0)	2.34(3n)	
4422.56(3n)	2.56(1)	2.46(0n)	2.60(0)	2.54(0)	Fe I .57(300) Gd II .55(20)
4422.83(0)	2.89(1)	2.83(0)		2.80(0)	Ti I .83(80)
4423.29(0)	3.29(1)	3.23(0)	3.22(1)		(Ti II .27(pr))
4423.79(0n)		3.66(0)		3.64(1)	Ce II .68(25?)
4423.89(1)	3.86(0)	3.98(0)		3.88(1)	
4424.45(2)	4.43(1)	4.36(0)	4.15(2n)	4.24(3)	Sm II .34(600) Gd II .10(40) (Pr II .60(25))
4424.95(0)	4.99(1)	4.85(1)		4.74(0)	
			5.21(1)	5.26(1n)	
4425.53(2)	5.57(1)	5.78(0)	5.62(0)	5.78(0)	
4426.03(0)			6.03(0)	6.23(0)	Gd II .15(80) A II .01(300)

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4426.64(0)	6.45(0)	6.39(0)			Eu II .42(5) (Nd II .82(4))
4427.06(1)	7.08(1)	6.96(0)	6.97(0)	7.09(1)	Gd II .03(20) Ti I .10(125) (Nd II .82(4))
4427.36(0)	7.36(1)	7.32(1)	7.40(0)		Fe I .31(500)
		7.78(1)		7.64(0)	Gd II .61(60) La II .52(100)
4427.88(2n)	7.94(1)	8.03(1)	7.85(1)	8.07(1)	Mg II .00(7) (Ce II .92(6?)) (Ti II .92(pr))
4428.38(0)	8.56(0)		8.45(0)	8.61(1)	(Ne II .54(100))
4429.30(2n)	9.24(0)	9.10(1)	9.18(3)	9.27(2)	Pr II .24(100) Ce II .27(100) (Zr II .34(2))
4429.90(1)	0.07(1)	9.92(0)	9.83(0)		La II .90(400) Eu II .76(15) (A II .18(100)) (Tb II .13(2))
4430.43(3)	0.49(2)	0.40(0)	0.29(1n)	0.32(2n)	Fe I .62(200) (Ne II .90(50)) (Gd II .34(5))
4431.00(1)	1.06(1)	1.05(1)	0.97(2)	0.98(2)	Dy II .00(3)
4431.62(2)	1.69(1)	1.54(2)	1.67(2)	1.65(2n)	Fe II .63(1n)
4432.28(0)	2.10(0)	2.23(0)	2.44(0)	2.34(1)	Pr II .34(25) (Nd II .29(4)) (S II .41(50))
4432.82(1)	2.72(0)	2.85(0)	2.91(0)	3.01(0)	(La II .95(20))
4433.28(0n)				3.10(0)	Fe I .22(150) Eu II .28(8)
	3.49(0)	3.52(0)	3.53(1)		Gd II .64(60)
4433.83(1)	4.04(1)			3.76(1)	Sm II .88(300) Mg II .99(8) Cr II .84(1) (Ti I .00(100))
4434.35(4n)	4.40(1)	4.12(2)	4.14(5)	4.17(6)	Sm II .32(400) (Tb II .48(10))
4434.80(0)	4.94(1)		4.74(0)	4.85(1)	Eu II .81(20)
4435.20(1)	5.29(2)	5.29(1n)			
4435.65(4)	5.71(2)		5.42(4n)	5.44(10)	Eu II .56(3000) (Dy II .78(1))
4436.27(0)	6.28(1)	6.06(1)	6.12(1)	6.12(2)	Gd II .22(200)
4436.37(1)			6.56(1)	6.61(1)	Mg II .48(5) (Eu II .59(1)) (Zr II .36(2)) (Dy II .65(1))
4436.79(1)	6.91(1)	6.74(1)	6.82(1)	6.89(1)	
		7.40(0)	7.50(0)	7.39(0)	Gd II .45(8)
4437.66(0n)	7.70(0)	7.62(0)	7.66(1)	7.76(1)	Ce II .61(4?)
		7.91(1)	8.04(1n)	8.14(1)	Eu II .96(4)
4438.32(2n)	8.36(1)			8.36(0)	Gd II .26(150) Pr II .18(20) Gd II .13(30)
4438.87(1n)		8.99(1)	9.06(1)	8.97(1)	Nd II .00(10) (Tb II .98(10))
4439.20(1)	9.27(0)				(Ne II .30(30)) (Fe II .13(pr))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4439.87(0)	0.12(0)		9.89(0)	9.82(0)	
4440.53(1n)	0.60(1)	0.63(1n)		0.56(1)	Zr II .45(10)
4440.76(0)			0.78(0n)		Ce II .88(20?)
4441.64(1)	1.49(0)		1.56(1)	1.48(0)	Eu II .47(15)
	1.76(1)	1.71(1)		1.74(1n)	(Ti II .72(pr))
4442.20(1)	2.27(0)	2.24(1)	2.36(0)		Fe I .34(400)
4442.46(0)	2.57(1)		2.45(0)	2.46(1)	Eu II .42(3)
4443.08(1)	3.09(1)	3.05(1n)	3.09(2n)	3.13(3n)	Fe I .20(200) Zr II .99(25) Ce II .72(50)
4443.41(2)	3.49(1)	3.57(1)			(Nd II .40(2))
4443.73(3)	3.85(2)	3.82(2)	3.73(2)	3.83(2n)	Ti II .80(125) Ce II .74(18?) (La II .94(20))
4444.49(4)	4.48(2n)	4.46(2)	4.44(2n)	4.43(3)	Ce II .39(60) Fe II .56(1) Sm II .26 (150) Ti II .56(12) (Nd II .28(6))
4445.15(2n)	5.22(2)	5.18(1)	5.30(1)	5.20(1)	
4445.71(0)			5.62(0)		
			5.87(1)	5.93(1)	Pr II .87(10)
4446.08(4)	6.23(3n)	6.22(2n)	6.27(2n)	6.33(1)	Fe II .25(1n) Nd II .39(200)
4446.57(1)					Gd II .49(250) F II .71(150) (F II .51(40))
4447.25(0)	7.28(0)	7.34(1n)	7.01(0)	6.98(1)	Pr II .98(20) F II .18(200) (N II .04(300))
4447.64(7)	7.63(2)	7.60(1n)	7.45(2)	7.47(4)	
	7.71(1)	7.74(1)		7.69(0)	Fe I .72(200) Al II .8(15)
			7.88(1)	8.03(3)	(Nd II .99(4)) (Dy II .23(2))
4448.36(3)	8.50(2)	8.44(1)	8.42(1)	8.50(2n)	(Dy II .23(2))
4449.27(3)			9.09(1)	9.07(2)	Ce II .34(200) Ti I .15(150) (Dy II .16(2))
4449.56(1)	9.45(2n)			9.42(1)	
4449.78(1)	9.53(1)	9.51(2n)	9.63(2)	9.65(2)	Fe II .66(1n) Dy II .70(300) Pr II .87(150) (Gd II .95(15))
4450.43(2)	0.45(2n)	0.31(2n)	0.35(2)	0.32(2)	Ti II .49(50) Pr II .21(40)
4450.72(0)		0.64(0)			Ce II .73(75)
4450.92(1)	0.90(0)		0.79(1)	0.82(2)	Ti I .90(150) Ce II .73(75)
4451.42(4)	1.55(3)	1.47(3n)	1.56(4n)	1.61(3n)	Fe II .54(4) Nd II .57(400) (Mn I .59(125)) (Eu II .63(2))
4451.82(1)					(Pr II .95(20))
4452.04(1)	2.06(1)	2.02(1)	2.03(0)	2.08(1)	(Nd II .98(50))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4452.44(0)	2.56(1)	2.58(1)	2.52(1)	2.65(2)	(P II .44(150))
4452.87(2)			2.71(0)	2.70(3)	Sm II .73(250)
4453.19(1)	3.13(2n)	3.15(1n)	3.21(1)	3.18(0)	Ti I .32(150) (V II .35(30)) (Eu II .08(1))
4453.88(2)	4.00(1)	3.67(1n)	3.68(1)	3.74(2)	Gd II .93(60) Ti I .71(80)
4454.29(0)		4.44(1n)	4.45(0n)	4.33(0)	Fe I .38(200) (Pr II .38(30))
4454.68(1n)			4.52(1n)	4.63(1)	Sm II .63(200)
4455.17(1n)	5.18(2)	5.20(3n)	5.27(3n)	5.29(2)	Fe II .26(3) Ti I .33(150) (Dy II .49(4))
4455.67(0)	5.80(1)	5.83(0)	5.92(0)	5.92(1)	Ca I .89(100) Fe II .85(pr) (La II .79(50))
4456.53(1n)	6.62(2n)	6.52(1)	6.47(2n)	6.52(1)	Ti II .65(10) Nd II .39(40)
4457.01(1n)	6.80(1)	6.83(1)	7.01(1n)	6.97(1)	Cr II .84(pr) (Ne II .95(70)
	7.16(0)	7.22(1)		7.01(1)	Nd II .18(5?)
4457.40(0)				7.34(1)	Ti I .43(150) Zr II .42(8)
4458.31(1)	8.28(0)	7.95(1)	8.01(0)	8.00(1n)	Pr II .34(25) (Fe I .11(30))
4458.60(0)	8.76(1)	8.71(0)		8.60(0)	Sm II .52(400) (Cr I .54(50)) (Tb II .45(2))
4459.14(1)	9.22(0)			9.09(1)	Fe I .12(400) Ni I .04(400)
4459.53(0)	9.73(1)	9.55(0)	9.67(1)	9.77(1)	
4460.17(1n)	0.34(1)	0.02(1)	0.16(2)	0.27(2)	Ce II .21(400)
4460.78(1)	0.83(1)	1.02(1)	0.97(3n)	1.00(3)	Ce II .14(50) (Eu II .88(2))
4461.29(3)	1.31(3)			1.30(0)	Zr II .22(10)
4461.64(2)	1.68(3)	1.65(6n)	1.68(3)	1.85(2)	Fe I .65(300) (Eu II .55(2))
4462.16(1)	2.18(0)				Eu II .14(5) Tb II .18(10)
	2.53(1)	2.60(1)		2.52(0)	Nd II .41(30) (Ni I .46(150))
4462.93(0)			2.91(0)	2.79(1n)	Nd II .98(250) (P II .94(70))
4463.29(1n)	3.15(1n)	3.23(1)		3.16(1)	Gd II .25(80)
	3.49(1)		3.42(0)	3.52(0)	Ce II .41(60) Gd II .25(80)(SII.58(20C
	3.88(0)	3.67(0)	3.80(0n)		(Eu II .83(3))
4464.38(2)	4.48(2n)	4.53(2n)	4.37(2)	4.39(3)	Ti II .46(40) (S II .42(100))
4465.05(1)	5.12(1)	5.19(0)	5.07(1)	5.13(1)	Eu II .97(200) Cr II .00(1) (Nd II .08(10))
4465.62(1n)	5.73(2)	5.78(1)	5.85(1)	5.71(1)	Cr II .78(4) (Ti I .81(100)) (Nd II .60(10))
	6.13(1)			5.95(0)	Pr II .98(25) (P II .10(30)) (Eu II .01(3))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4466.50(3)	6.53(2)	6.47(1)	6.52(0n)	6.44(2n)	Fe I .55(500) Gd II .55(500)
4467.40(2n)	7.22(1)	7.29(1)	7.24(1)	7.28(2n)	Gd II .23(80) Sm II .34(500)
4467.69(1)	7.58(1)			7.62(1)	Ce II .54(5?)
4467.82(1)	7.89(1)	7.80(0)	7.95(1)	8.00(1)	Dy II .16(60) Dy II .89(20) (P II .97(50)) (Nd II .85(3))
4468.43(4)	8.56(3)	8.44(2n)	8.51(2)	8.51(3n)	Ti II .50(150) (Pr II .71(150))
4469.09(1)			9.08(0)	9.10(1)	Ti II .16(1)
4469.32(0)	9.26(1)	9.34(1n)		9.23(1)	Fe I .38(200) (Nd II .26(8)) (Ce I .37(12))
	9.66(0)		9.62(1)	9.74(1)	Eu II .64(6) Tb II .68(8)
4470.01(1)	0.15(1)				Ce II .85(4?) (Mn I .14(80))
				0.39(0)	
4470.73(2)	0.99(1n)	0.62(1)	0.68(1)	0.90(1)	Ti II .86(25) (Nd II .96(6))
4471.18(2)	1.30(2)	1.12(2n)	1.20(2n)	1.28(1)	Gd II .29(200) Ce II .24(200) (Ti I .24(100))
	1.78(1)	1.47(1)	1.63(1n)	1.70(2)	Eu II .64(4) Nd II .41(10) (Tb II .72(5)) (He I .48(100))
4471.97(1n)		1.93(0)			
	2.18(1)	2.26(0)	2.24(1)	2.36(1)	Eu II .34(6)
				2.78(1)	(Mn I .79(100)) (Eu II .87(1))
4472.78(3)	2.87(3n)	2.86(3n)	2.93(3n)	3.05(2)	Fe II .92(2) Sm II .02(150) (Tb II .84(3))
4473.26(1)	3.39(1)		3.34(1)	3.38(2)	
4473.66(0)	3.88(1)	3.67(0)			
4474.11(1)	4.23(1)	4.10(1)	4.30(1n)	4.26(1n)	Fe II .19(0) (Gd II .14(150)) (La II .03(10))
4474.82(1)	4.80(1)		4.98(1n)	4.85(0)	Ti I .85(80)
4475.18(0)	5.10(1)	5.22(1)	5.12(0)	5.21(0)	P II .26(150) (Cl II .28(12))
4475.48(1)	5.57(0)			5.53(0)	
4475.90(1)	6.06(1)	5.89(1)	6.03(1n)	6.02(1)	Fe I .02(500)
4476.57(0)	6.58(0)			6.50(1)	
		6.92(1n)	6.94(1)	6.95(1)	(Eu II .89(1))
4477.18(1)	7.16(5)		7.40(1)	7.41(1)	Pr II .26(40) Nd II .45(6)
4477.74(0)	7.83(0)		7.79(0)		
4478.08(0)			8.13(0)	8.04(0)	
4478.66(1n)	8.66(1)	8.66(1)	8.56(2)	8.63(2n)	Gd II .80(250) Mn II .74(1) Sm II .66(125) (Gd II .48(6))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4479.22(0)	9.35(0)		9.38(1n)	9.33(1n)	Ce II .36(50) Ce II .43(30)
4479.71(0)	9.87(1)			9.77(1)	Ti I .70(70) (Tb II .04(2))
4480.57(1)	0.70(0)	0.55(0)		0.50(1)	Fe II .69(1)
4481.19(x)	1.22(x)	1.20(x)	1.23(x)	1.18(9)	Mg II .33(100) (Cr II .49(1)) {(Pr II .41(10)) (Tm II .27(200))} (Gd II .06(300))
	1.92(1)	1.92(1)		1.89(1)	{(Cl II .02(10)) (Zr II .04(3))} (A II .8[illegible](80))
4482.08(2)	2.23(1n)		2.04(1)	2.13(2n)	Fe I .17(150) Fe I .26(15)
4482.68(1)		2.57(0)	2.60(0)	2.77(1)	(Ti I .69(40))
4482.99(0)	2.92(0)			2.83(0)	
4483.46(3)	3.50(2n)	3.23(1)	3.25(4)	3.30(6)	Gd II .33(300) (S II .42(100))
4483.88(1)	3.90(1)	3.86(0)	3.76(1)	3.92(1)	Ce II .90(100)
4484.17(0)			4.34(0)		Fe I .22(125) (Eu II .07(2))
	4.46(0)		4.42(0)	4.48(0)	Gd II .47(20)
4485.19(0)	5.25(0)			5.04(0)	Eu II .15(100)
4485.63(1)	5.71(0)		5.58(0)	5.64(0)	Fe I .68(50) (Eu II .52(4)) (Zr II .44(2))
4486.14(1)		6.04(0)	5.90(0n)	6.07(0)	(Nd II .95(3))
4486.41(0)	6.48(0)	6.22(0)	6.30(0)		Gd II .35(100)
4486.81(1)	7.00(0)	6.72(1)	6.77(1)	6.96(1)	Ce II .91(150)
4487.41(2)	7.57(1)	7.45(1)	7.56(2)	7.60(1)	(Nd II .62(2)) (Eu II .79(1))
4487.88(0)	7.99(0)	8.10(1)			Pr II .82(20) Pr II .17(20)
4488.29(2)	8.42(2)	8.34(1)	8.30(2)	8.33(5)	Ti II .32(125) Eu II .28(15)
4488.52(1)					Gd II .40(80)
4489.08(4)	9.13(6)	9.11(7n)	9.16(5)	9.22(7)	Fe II .18(4) (Ti I .09(100))
4489.35(1)					(Eu II .26(2)) (O II .47(10))
4489.89(1)	9.97(1)	9.79(1)	9.78(0)	9.86(2)	Fe I .74(100) Ce II .00(50) (Mn I .08(100)) (Tb II .76(3))
4490.52(1)	0.53(0)	0.58(0n)		0.54(0)	{(Fe I .76(40)) (Eu II .59(2))} {(Tb II .63(8)) (Nd II .77(2))}
4490.91(0)			0.98(1n)	1.14(1)	Ce II .10(50?)
4491.30(4)	1.36(4)	1.36(5)	1.41(3n)	1.46(3)	Fe II .41(5) (Nd II .64(3))
4492.11(1n)	2.03(0)	1.95(1)	2.16(0)	1.96(1)	
	2.68(0)	2.52(0n)	2.58(1)	2.54(0)	Pr II .43(15) Nd II .47(3)
4492.89(0)	3.11(0)			2.76(0)	
4493.44(2)	3.55(2)	3.44(3)	3.45(4)	3.49(4)	Fe II .58(1n) (Ti II .53(8)) (Nd II .42(8))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4494.26(0)	4.16(0)	4.30(0)	4.29(2)	4.34(4)	(Pr II .19(20)) (Zr II .41(8))
4494.60(3)	4.59(1)				Fe I .57(400)
4495.18(1)	5.12(0)	5.17(0)	4.86(0)	4.97(1)	Gd II .85(25) Eu II .05(15) (Tb II .03(2))
4495.48(1)	5.50(1)		5.44(1n)	5.37(0)	(Ti II .43(pr)) (Ce II .39(4)) (Zr II .44(3))
	5.68(0)			5.74(0)	(Fe II .52(pr))
4495.90(0)			5.77(0)	6.00(0)	(Eu II .98(2))
4496.38(0)	6.19(0)	6.25(0)		6.41(0)	Pr II .43(250) (Ti I .15(60))
4496.95(1)	7.06(0)		7.02(1)	6.99(0)	Zr II .96(15) Mn II .99(2) Cr I .86(200)
			7.54(0)	7.40(0)	(Eu II .45(4)) (Nd II .92(8))
4497.68(1)	7.94(0)	7.71(0)		7.81(0)	Ce II .85(25) (Nd II .92(8))
			8.21(1)	8.36(2)	Gd II .28(300)
4498.50(1n)	8.55(0)				
4498.89(0)	8.68(1)			8.80(0)	La II .76(10) (Ne II .00(20)) (Tb II .96(1))
4499.18(0)	9.29(0)		9.19(1)	9.27(2)	
4499.60(2)	9.70(1)	9.67(1)	9.70(2)	9.78(3)	Fe II .71(0) (Sm II .48(125))
4500.27(1)	0.02(0)	0.26(0n)			Eu II .27(30)
4500.55(0)	0.53(1)	0.41(1)	0.38(3)	0.48(4)	(Gd II .64(20))
4501.19(6)	1.35(4)	1.12(3)	1.17(4)	1.19(6)	Ti II .27(100)
4501.86(0)	1.96(1)	1.92(1)	1.85(1n)	1.77(1)	Nd II .81(50)
4502.35(1)	2.31(1)		2.31(0)	2.23(1n)	Mn I .22(125) (La II .16(10)) (Eu II .10(2))
4502.99(3)	3.07(2n)	2.83(1)	2.80(2)	2.83(3)	(Dy II .25(25))
4503.76(0)		3.57(0)	3.52(1)	3.57(1)	(Tb II .58(2)) (Mn I .87(60))
			4.09(0)	4.05(0)	
4504.34(0)	4.24(0n)		4.40(0)	4.52(0)	Eu II .52(4) (?Cr II .52(pr))
4504.80(0)	4.92(0)	4.94(1n)	4.91(1n)	4.99(0)	Eu II .98(3)
4505.63(0)		5.97(1n)	5.99(1)	5.79(0)	(Nd II .75(8?)) (Cu II .00(50)) (Eu II .73(2))
	6.28(0)		6.50(0)	6.31(0)	Gd II .33(200)
4507.02(3)	7.13(2)	7.03(2n)	7.08(2n)	6.83(1)	Gd II .93(60) Fe II .20(0)
				7.26(1)	Fe II .20(0) (Cr II .19(pr))
4507.52(1)	7.61(0)		7.42(0)		

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4508.20(7)	8.26(7)	8.24(8)	8.26(6)	8.31(5n)	Fe II .28(8)
4509.16(1n)	9.24(1)	9.00(1n)	9.12(1n)	9.05(1)	Gd II .08(50) (Tb II .03(15))
	9.41(1n)			9.27(1)	
4510.05(3)	0.17(1)	9.92(1n)	0.00(3n)	9.99(3n)	Pr II .16(100) Mn II .21(3)
				0.26(1)	Mn II .21(3)
4510.75(0)		0.70(0)	0.76(1)	0.87(0)	A I .73(1000)
4511.62(2)	1.70(1)			1.61(0)	(Eu II .53(3))
4511.92(1)	1.96(1)	1.86(2n)	1.95(2n)	1.85(0)	Sm II .83(200) (Cr II .82(pr))
4512.18(1)		2.24(0)		2.17(1)	
4512.51(0)			2.59(0n)	2.71(0)	Ti I .74(100) (Eu II .62(2))
4512.87(0)		3.03(0n)	3.05(1)	3.01(0)	Tb II .97(8)
4513.34(1)	3.28(1)			3.43(1)	Nd II .33(20)
4514.14(9)	4.25(3)	4.01(3)	4.06(8)	4.09(7)	(Tb II .31(8))
4514.62(1)	4.66(1)	4.47(3)	4.55(1)	4.56(1)	Gd II .50(200) (Gd II .67(5))
4515.24(7)	5.38(7)	5.35(7n)	5.35(7n)	5.41(6)	Fe II .34(7)
4515.64(3)	5.85(2)	5.71(1n)	5.80(1)	5.92(1)	(Tb II .87(6))
4516.28(1)	6.35(1)	6.51(1n)	6.48(1n)	6.50(0)	Nd II .35(30) (Cr II .56(pr))
4516.62(1)					Nd II .64(4) (Cr II .56(pr))
4517.10(2)	7.23(1)	7.13(1n)	7.06(0)	7.26(1)	Gd II .10(30) Eu II .36(6) (Eu II .94(4))
4517.67(0)				7.61(0)	Pr II .60(40)
4518.25(1)	8.36(1)	8.23(0n)	8.22(1)	8.36(2)	(Ti I .03(100))
4518.60(1)	8.50(0)			8.75(1)	Dy II .54(15) Eu II .70(8)
4519.11(0)	9.03(0)			8.95(1)	
4519.58(1)			9.49(0n)	9.49(1)	Sm II .63(200) (Eu II .54(4))
4520.12(5)	0.17(5)	0.16(7)	0.25(5)	0.21(3)	Fe II .24(7) (Gd II .07(150)) (Tb II .09(4))
4520.76(1)	0.91(1)	0.83(1)		0.94(1n)	Pr II .78(8)
4521.40(0)			1.19(0)	1.31(1)	Gd II .30(100)
4522.02(1)	1.76(0)	1.82(0n)	2.06(1)	1.95(2)	Gd II .94(150)
				2.46(3)	Eu II .57(2000) (La II .37(400))
4522.56(7n)	2.64(7)	2.61(8)	2.66(7)	2.65(9n)	Fe II .63(9) Eu II .57(2000)
				2.76(4)	Fe II .63(19) (Gd II .82(250)) (Nd II .84(4)) (Ti I .80(100))
4522.95(1)	3.12(1)			3.26(1)	Ce II .08(125) Sm II .04(150) (P II .92(50)) (Mn I .39(50))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4523.61(0)	3.52(0)	3.48(1)	3.68(0)	3.70(0)	Nd II .57(4)
4524.28(0n)	4.38(0)	4.48(1)		4.43(0)	Gd II .39(15)
			4.67(1n)	4.66(1)	Ti II .73(10)
4525.02(1n)	5.08(1n)		5.27(1)	5.21(0)	Fe I .15(100) La II .31(100) (S II .95(150)) (Tb II .99(8))
4525.78(0)				5.79(0)	Gd II .61(5)
				6.06(1)	La II .12(200)
4526.32(2)	6.38(2n)	6.40(1n)	6.34(1n)	6.36(0)	(Cl I .21(25))
	6.55(1)			6.64(1)	Fe II .58(1) (Tm II .56(80))
4526.96(0)	7.08(0)	7.06(1)			(Er (II?) .92(52))
4527.41(1)	7.50(1)	7.36(1)	7.34(1)	7.47(3)	Ce II .35(200) Ti I .31(100) (Er (II?) .24(510))
4527.85(0)			7.92(0)	7.91(0)	Dy II .78(30)
4528.42(2)	8.52(1)	8.38(1n)	8.45(2)	8.35(2n)	V II .51(300) Ce II .47(150)
	8.68(1)	8.68(1n)		8.52(1)	Fe I .62(600)
4528.93(0)			9.13(0)	9.11(0)	(Al III .18(6))
4529.40(3)	9.59(2)	9.53(1n)	9.52(2)	9.55(2n)	Ti II .46(40) (Fe II .56(pr)) (Tm II .38(80))
4529.80(1)					Pr II .93(10)
4530.49(1)	0.54(1)	0.43(0)	0.31(0)	0.32(1)	Gd II .65(4) (Nd II .33(4)) (La II .54(15))
4531.00(0)			0.87(1)	0.89(1)	Cr I .74(150) (Co I .96(1000)) (P II .78(150))
4531.08(0)				1.15(1)	Fe I .15(125) (Pr II .09(20))
4531.72(1)	1.89(1)	1.80(1)	1.86(1)	1.67(1)	Tb II .83(6)
4532.04(0)	2.29(0)			2.09(2)	
4532.60(1)	2.50(0)		2.41(0)	2.55(1)	
4533.25(3)	3.28(1)	3.18(1)	3.02(2n)	2.97(3n)	Ti I .24(150) (Eu II .08(2))
			3.34(0)	3.43(1)	(Eu II .63(5))
			3.84(1)	3.96(5n)	Ti II .97(150)
4534.00(9)	4.08(8)	4.04(8)	4.02(5)	3.91(8n)	Fe II .17(2) Ti II .97(150) (Pr II .15 (60)) (P II .81(15)) (Mg II .26(4))
			4.21(3)	4.25(3)	Fe II .17(2)
4534.90(1)	5.02(1)	4.89(1)	4.89(1)	4.86(2)	
4535.68(2)	5.90(1)	5.58(1n)	5.70(1)	5.75(1n)	Ti I .58(80) Cr I .72(125) (Pr II .92(60)) (Ti I .92(40))
4536.23(1)			6.40(0)	6.31(1)	(Gd II .56(5))

TABLE 3 -- Continued

0.756	1.482	3.042	4.490	5.003	Identification
4536.76(1n)	6.82(0)	6.84(0)		6.77(1)	(Cl II .78(20)) (Tb II .93(8))
4537.11(1)					
			7.50(0)	7.49(1)	
4537.91(1n)	7.83(1)	7.81(0)		7.91(1)	Sm II .95(200)
4538.23(0)			8.46(0)	8.36(0)	
4538.61(1)	8.65(1)				Dy II .76(20) (Eu II .55(2)) (Tb II .74(2))
4538.96(1)		8.82(1)	8.96(1)	8.93(2)	La II .87(8)
4539.54(2)	9.60(2)				Cr II .62(2)
4539.76(0)	*9.70(3)	9.63(4)	9.70(4)	9.78(4)	Ce II .76(200) Cr II .62(2) (Eu II .69(3))
4540.20(1)			9.91(1)	0.12(1)	Gd II .02(200) (Tb II .23(4))
4540.42(0)			0.58(1)	0.60(2)	(Tb II .58(3))
4540.85(3)		0.81(1)	0.67(1)		(La II .71(10))
			1.11(0)	1.21(1)	Nd II .27(50)
4541.41(4)	1.50(4)	1.47(5)	1.53(6)	1.59(9)	Fe II .52(4)
4541.75(1)					Dy II .70(30)
4542.19(0)				2.17(1)	
4542.62(0)	2.66(0)	2.61(0)	2.51(0n)	2.65(1)	Nd II .60(60) Pr II .54(15) (Cr II .77(pr)) (Tb II .4(4))
4543.02(0)			3.08(0)	3.04(0)	
				3.77(1)	
4544.02(1n)			3.90(1)	4.20(1)	Ti II .01(20) Sm II .95(250) (Nd II .26(2))
4544.46(1)			4.39(1n)		Cr I .62(100) Ti I .69(150) (Mn .41(60))
4545.04(2)		4.95(1)	5.04(1)	5.06(2n)	Ti II .14(15) Ce II .96(5) (A II .08(200))
4545.36(0)	5.35(1)				Eu II .45(3) Nd II .33(2) (Dy II .35(1)) (Cr II .49(pr))
				5.73(1)	
4545.92(1)		5.90(0)			Cr I .96(200)
4546.64(2)	6.78(1)	6.60(1)	6.59(2)	6.60(5)	Cr II .62(1)
4547.18(0)		7.16(1)		7.04(0)	Eu II .22(3) (Ni II .15(?))
			7.45(0)	7.44(1)	
4547.77(1)		7.99(0)		7.99(0)	Fe I .85(200)

* Phase 1.482 discontinued at wave length 4539.7

TABLE 3 -- Continued

0.756	1.642	3.042	4.490	5.003	Identification
4548.49(1n)		8.37(1n)	8.37(1n)	8.57(1)	Pr II .54(15) (Mn I .58(80))
4549.06(2)					Nd II .02(3)
4549.44(9)	9.44(9)	9.39(9)	9.49(x)	9.49(x)	Fe II .47(10) (Fe II .21(4)) (Eu II .52(6)) (S II .55(80))
4549.65(4)					Ti II .63(200) (Co I .66(600)) (Tb II .70(8))
4550.18(1)		0.07(0)	0.08(0)	0.16(1)	(Gd II .05(3))
4550.59(1)		0.73(0)	0.67(1)	0.76(2)	Gd II .95(150) Dy II .89(15) Pr II .77 (15) Pr II .88(15) (Gd II .41(3))
4551.05(1)	1.14(0)	1.22(1)	1.28(1)		Ce II .30(20) Gd II .95(150)
4551.52(2)			1.33(1n)	1.35(4)	Gd II .46(30) Ce II .30(20)
4552.02(1)			1.96(1)	1.98(1)	Eu II .14(5)
4552.35(2)			2.40(1n)		S II .38(200) Eu II .28(6) (Nd II .28 (2)) (Gd II .44(2)) (Ti II .29(pr))
4552.72(1)	2.57(1)	2.52(2)	2.65(0)	2.60(1)	Sm II .66(150) (Si III .61(9))
4553.75(1)		3.63(1)	3.56(1)	3.59(1)	
4553.96(1)				3.90(0)	Zr II .96(12) Ba II .04(200)
4554.49(1)		4.41(0)	4.41(1)	4.30(1)	
4554.86(3)	5.02(4)	4.98(5)	5.05(6)	5.12(3)	Cr II .03(20) Gd II .99(50)
4555.52(0)				5.50(1)	Ti I .49(125) (Eu II .39(4)) (Eu II .59(6))
4555.81(4)	5.93(4)	5.82(6)	5.92(7)	5.95(3)	Fe II .90(8)
4556.30(1)					Fe I .12(150) (Nd II .14(12))
4556.60(1)	6.54(1)	6.47(1)		6.47(2)	Dy II .46(1)
4556.89(1)			6.93(0)		Nd II .74(12) (Tb II .92(8))
4557.13(0)		7.24(1n)	7.36(1)		(Tb II .29(2))
4557.56(1)			7.72(1n)	7.40(0)	
4558.13(2)				8.16(1)	Gd II .08(250) (P II .03(100))
4558.57(7)	8.71(8)	8.67(9)	8.70(9)	8.76(6)	Cr II .66(100) (Cr II .83(pr))
4559.46(1n)		9.41(1)	9.41(1)	9.43(1)	La II .28(100)
4560.19(1)		0.14(1)	0.21(0)	0.28(1)	Ce II .28(125)
4561.08(1)		0.92(0)	0.96(1)	1.01(2)	Ce II .96(60) (Nd II .18(8))
4561.67(1)			1.53(1)	1.46(1)	(Pr II .46(6))
4562.32(2)		2.22(1)	2.29(1)	2.12(1)	Tb II .25(8) (Eu II .18(1))
4562.51(0)				2.50(1)	Ce II .36(400) (La II .5(5))
4563.11(1)		3.08(1)	3.10(1)	3.15(1)	Pr II .13(30) Nd II .22(40) (Gd II .03(4))

TABLE 3 -- Continued

0.756	1.642	3.042	4.490	5.003	Identification
4563.69(2)	3.94(1)	3.62(1n)	3.71(2)	3.79(3)	Ti II .77(200) (Tb II .68(20))
4564.15(1)			4.30(1)	4.37(1)	Cr II .27(1)
4564.60(0)		4.53(0)	4.48(1)	4.55(0)	V II .59(200)
4565.06(0)		5.14(0)	5.24(0)	5.22(0n)	(P II .21(100)) (Eu II .93(2))
4565.63(3)	5.75(3)	5.70(5)	5.82(4)	5.91(3)	Cr II .78(10) Ce II .84(50) (Eu II .57(5))
4566.56(1)		6.59(1)	6.56(1)	6.54(1)	
4567.24(0)		7.16(0)	7.10(0)	7.15(0)	
4567.68(1)	7.91(1)	7.79(0)	7.84(1)	7.85(0n)	Nd II .61(12) (Tb II .72(6)) (Si III .83(7))
4568.53(0)		8.46(0)		8.37(0)	Ti II .31(8) Pr II .54(30?)
4568.96(1)		9.09(1)		8.73(1)	
4569.32(2)		9.25(0n)	9.20(1)	9.24(1)	(Tb II .29(2))
4570.26(0)				0.20(1)	
4570.58(0)		0.42(0)	0.52(0)	0.55(1n)	Pr II .56(20)
4571.19(1)				1.04(1)	Gd II .98(40) Mg I .15(20) La II .97(10) (Cr II .24(pr))
			1.46(0)	1.34(1)	(Tb II .42(1)) (Gd II .54(2))
4571.99(8n)	2.13(1)	1.86(2n)	1.99(3n)	1.87(5)	Ti II .98(300)
4572.40(0)		2.12(1)		2.36(2)	Ce II .28(250) (Cl II .13(100))
4572.96(5)	3.07(1)	2.81(1)	2.78(3)	2.85(5)	(Cr II .83(pr)) (Tb II .18(8))
4573.61(1)		3.55(0)	3.60(1)	3.66(2n)	Eu II .66(4) (Cr II .63(pr))
4573.93(1)				3.87(2n)	Dy II .87(2)
4574.29(0)		4.49(0)	4.36(1)	4.42(2)	Zr II .49(6)
4574.65(2)	4.67(1)				(Fe I .72(12))
4575.03(0)				4.89(0)	La II .88(200) (Eu II .00(2))
4575.62(3n)		5.35(0)	5.43(1)	5.46(4)	(Tb II .42(2))
4576.28(3)	6.38(3)	6.32(6)	6.35(4)	6.42(4)	Fe II .33(4) Eu II .35(12) (Pr II .32(20))
4576.58(1)					Dy II .60(2)
4576.98(0)		7.03(1)	6.98(0)		Eu II .93(10)
4577.24(2)			7.10(1)	7.12(1)	
		7.39(1)	7.43(1)		
				7.55(1)	Sm II .69(250)
4577.91(1)	8.18(0)	7.95(1n)	7.98(1)	8.08(1)	(Pr II .14(25))

TABLE 3 -- Continued

0.756	1.642	3.042	4.490	5.003	Identification
4578.76(0)		8.96(0)		8.70(1)	Tb II .62(30) (Nd II .88(30))
				9.26(1)	Nd II .31(30) (A II .39(80))
4579.42(3)	9.45(1)	9.50(2n)	9.50(2n)	9.66(2)	Fe II .52(1) Mn I .67(50)
4579.99(3)	0.27(0)	0.07(1)	0.07(2n)	0.15(3)	Fe II .05(1) Cr I .06(300) Eu II .23(5) (La II .05(150))
4580.45(1)					Ti II .46(5)
4581.18(1)		0.82(1n)	0.86(0)	0.90(1n)	Gd II .09(200) Cr I .06(300)
		1.43(1n)	1.46(1)	1.57(1)	Fe I .52(60) Co I .60(1000) Pr II .58(10)
4581.72(1)					(Mn I .83(125)) (Eu II .62(5))
4582.48(1)		2.34(0)	2.33(1)	2.44(1n)	Gd II .53(400) Gd II .38(300) (Ce II .50(50?)) (Tb II .57(6))
4582.72(5)	2.85(4)	2.79(4n)	2.73(3n)	2.92(2n)	Fe II .84(3)
4583.38(0)				3.35(0)	Ti II .44(10) Gd II .33(20)
4583.78(8)	3.90(5)	3.81(9)	3.86(9)	3.94(9)	Fe II .85(11)
4584.03(2)					Nd II .04(4)
4584.36(1)				4.54(1)	
4584.93(1)		4.76(0)		4.68(1n)	(Tb II .62(6))
4585.23(1)		5.04(0n)	5.18(0)	5.22(0)	
		5.90(0)	5.95(0)	6.03(1n)	Ca I .87(125) Eu II .68(8) (Al II .82(40))
4586.64(0)				6.58(0)	
4587.13(2)	7.41(1)	7.25(1n)	7.30(1)	7.39(0)	
4588.06(7)	8.26(4)	8.21(6)	8.24(6)	8.27(4)	Cr II .22(75) Dy II .93(40) (Al II .19(30)) (P II .90(300))
4589.24(1)		9.18(0)	9.09(0)	9.20(1)	
4589.80(6)	9.90(2)	9.85(3)	9.91(4)	9.99(4)	Cr II .94(3) Ti II .95(100) (A II .93(150))
		0.66(1)		0.53(1)	
4590.80(2n)	0.93(0n)	0.86(2n)	0.94(1n)	0.95(2)	(O II .94(300))
4591.20(2n)		1.16(0)			Cr I .39(200) Cr II .39(tr) Eu (II?) .06(8?)
4591.63(0)				1.74(1)	Sm II .82(100) (Dy II .78(1)) (Tb II .56(8))
4591.92(6)	2.12(3)	2.02(6)	2.07(4)	2.17(4)	Cr II .06(20)
4592.70(1)		2.65(1)	2.75(0)	2.63(0)	Fe I .66(200)
4593.13(0)		2.84(1n)	3.06(0)	3.08(1n)	(Cs I .18(1000R))

TABLE 3 -- Continued

0.756	1.642	3.042	4.490	5.003	Identification
4593.69(2n)	3.64(1)	3.67(1n)	3.80(2n)	3.86(1n)	Ce II .93(200) Sm II .54(150) (Pr II .93(10))
		4.43(0)			Nd II .45(6)
4595.12(1)		4.91(1n)	5.06(0)	5.02(1n)	Sm II .29(250) (Dy II .14(1))
4595.54(1)					Fe II .68(pr)
4595.93(2)	6.06(1)	5.91(3n)	6.05(2)	6.08(2)	(O II .13(150)) (A I .10(1000))
4597.00(1)	7.12(0)	6.80(1)	6.84(1)	6.98(1)	Gd II .98(400) (N II .01(20))
4597.52(0)		7.69(0)	7.73(1)		
4598.10(1)				7.88(1)	Gd II .91(500) Fe I .14(50)
4598.43(4n)	8.56(1)	8.44(2)	8.46(1)	8.53(2)	Fe II .53(1n)
4599.30(1)		9.31(0)		9.21(0)	
4599.89(1)				9.87(0)	
4600.26(1)				0.39(0)	V II .19(150) (Ni I .37(200)) (Nd II .52(2))
4600.76(0)			0.79(0)	0.76(1)	Cr I .75(150) (Cl I .00(20))
		1.15(0)	0.95(0)	0.91(0)	Gd II .05(500)
4601.27(1)	*1.28(0)	1.22(1)	1.33(0)	1.43(1)	Fe II .34(pr) (N II .49(100))
4601.80(0)				1.98(0)	P II .10(300) (Fe I .01(20)) (Zr II .97(2))
			2.28(0)	2.32(1)	Nd II .24(2)
4602.55(1)				2.78(0)	
4602.96(1)		2.86(0)	3.02(1)	3.08(2)	Fe I .94(300)
4603.88(1)		3.64(0)	3.90(0)	3.74(1)	(Tb II .08(3))
4604.37(2)			4.44(0)	4.20(1)	
4605.27(1)		5.29(1n)	5.37(0)	5.44(1n)	Mn I .36(150)
4606.49(1)		6.34(1n)	6.39(1)	6.45(1)	Ce II .40(50) Sm II .51(100) (Gd II .64(8))
4607.66(1)		7.74(0)	7.70(1n)	7.68(1n)	Fe I .65(50) Mn I .62(50)
4608.78(1)			8.83(0n)	8.93(0)	
4608.27(1)				9.39(0)	(Nd II .15(1?)) (Ti II .27(pr)) (O II .39(60))
4610.47(3)			0.34(0n)	0.25(2)	
		0.57(0)	0.56(0)	0.67(0)	
4610.94(0)			1.03(0)	1.04(1)	(Gd II .94(1))
4611.29(2)				1.17(1)	Fe I .29(200)

*Phase 1.642 discontinued at wave length 4601.3

TABLE 3 -- Continued

0.756	3.042	4.490	5.003	Identification
		1.49(1)	1.52(0)	
4611.87(0)	1.84(1)			
	1.96(0)	1.97(1)	2.12(2)	(Pr II .07(20))
4612.51(1)	2.31(0)			(Eu II .43(2)) (Nd II .47(4))
4613.06(1)	3.11(0)	3.24(0)		(Fe I .22(30)) (Cr I .37(150)) (La II .38(200))
4613.65(1)	3.55(0)		3.62(0)	
4614.45(1)	4.53(1)	4.56(1)	4.65(1n)	Eu II .63(6)
4615.28(2)	5.33(0)	5.29(1)	5.34(2)	Sm II .44(150) (Gd II .44(3))
4615.68(0)		5.73(0)	5.83(0)	Sm II .69(300)
4616.07(1)		6.30(1)	6.33(1)	(Cr I .14(300))
4616.51(5)	6.62(9)	6.65(4)	6.74(3)	Cr II .66(18)
4617.42(1)	7.19(1)	7.19(0)		Dy II .27(30) Ti I .27(200)
4618.17(1)	7.88(1n)	7.95(0n)	8.04(2n)	
4618.66(5)	8.63(1)		8.59(0)	
4619.05(2)	8.82(4)	8.84(4)	8.88(6)	Cr II .83(35)
	9.35(0)	9.22(0)	9.30(1)	Fe I .30(100)
4619.54(1)	9.67(1n)	9.67(0)	9.74(1)	Gd II .63(8) La II .87(300)
4620.08(0)			0.13(0)	Dy II .04(60)
4620.44(4)	0.44(5)	0.52(4)	0.57(4)	Fe II .51(3) (Gd II .45(15))
4621.29(6)		1.04(0)	1.07(2)	(Cr II .41(pr))
4621.69(3)	1.56(5n)	1.62(5n)	1.73(2n)	
4622.02(0)		2.21(1)	2.35(0)	(Dy II .38(1))
4622.65(0)				Gd II .63(8) (P II .70(50))
4623.32(0)		3.50(0)	3.53(0)	
4624.38(0)				(Cr II .58(2))
4625.08(2n)	4.91(0n)	4.99(2n)	5.00(1n)	Fe I .06(100) Ce II .90(60)
4625.37(0)			5.27(0)	
4625.81(2)	5.88(1)	5.92(2)	6.02(2)	Fe II .91(1)
4626.73(0)	6.72(0n)	6.86(1)	6.78(1)	Fe II .78(pr) Tb II .91(15)
4627.35(0)	7.41(0)		7.24(0)	(Eu I .22(8000))
4628.19(3)	7.97(1)	8.07(2)	8.11(2n)	Ce II .16(500) (Dy II .08(1))
4628.76(1)	8.70(1)	8.84(2)	8.88(2)	Pr II .75(100) Fe II .82(0n) (P II .70(50))
4629.27(7)	9.31(5)	9.35(4)	9.42(3)	Fe II .33(7) (Ti (II?) .34(15))

TABLE 3 --Continued

0.756	3.042	4.490	5.003	Identification
4629.82(0)		9.82(0)	9.90(0)	Nd II .90(40)
4630.12(0)	0.24(1n)	0.32(1)	0.32(2)	(Fe I .13(10))
4630.50(2n)			0.68(1)	(N II .55(300))
4631.07(2)		1.23(0)	1.25(0)	
4631.75(2)	1.82(1n)	1.86(2n)	1.97(1n)	Fe II .90(0n)
	2.63(1)	2.65(1)	2.76(1)	Nd II .69(4)
4633.07(1)	3.17(0)		3.09(0)	Eu II .07(8) Fe I .92(70)
4633.58(0)			3.78(1)	
4633.94(7)	4.06(5)	4.12(5)	4.15(3)	Cr II .09(25)
4635.25(5)	5.28(5)	5.27(3)	5.39(3)	Fe II .33(5)
4636.19(1)			6.08(0)	
	6.50(1n)	6.46(1)	6.47(0)	La II .42(80) (Nd II .57(2)) (Al II .38(4))
4637.14(0)	6.94(0)	7.28(0)	6.93(0)	(Cr I .18(20)) (A II .25(30)) (Tb II .00(3))
		7.48(0)	7.44(1)	Fe I .52(100)
4637.93(2n)	7.99(3)	8.05(2)	8.15(2)	Fe I .02(80) (Eu II .74(2))
4638.92(1n)	8.99(0n)	8.82(1)	8.79(1)	Gd II .00(200) (O II .86(70)) (Nd II .71(10))
4639.39(0)	9.32(0)			Ti I .37(80) (Nd II .38(4))
4639.90(0)	0.15(0)	9.91(0)	0.05(1)	Ti I .95(60)
4640.27(1)			0.43(0)	Al II .36(20) Al II .38(18)
4640.86(2)	0.81(2)	0.84(3)	0.90(5)	Fe II .84(0) (Tb II .98(15))
4641.03(2)				
4641.62(0)			1.64(1)	
4641.90(0)	1.86(0)			(O II .83(150)) (Tb II .97(30))
4642.38(0)	2.09(1)	2.13(1n)	2.16(0n)	Sm II .24(500)
4642.86(1n)	2.94(1)	2.91(1)	2.92(1n)	(Mn I .81(50)) (N II .11(100))
4644.25(0)	4.14(1n)	4.29(0n)	4.33(1)	
4645.14(0)			5.10(0)	Ti I .19(100) Tb II .26(50) La II .28(100)
4645.88(0)	6.18(0)	6.15(1)	6.05(0)	Cr I .17(100) Gd II .33(40) (Nd II .77(20)) (Pr II .06(30))
		*7.34(1)	7.33(0)	Fe I .44(125) La II .50(100)
		8.17(1)	8.27(1)	Sm II .16(100) (Fe II .23(pr)) (S II .17(35))
4648.54(1)	8.76(0)			Ni I .66(400) (Al II .62(4))
4648.88(1)		8.94(0)	8.99(0)	Fe II .93(0) (Cr I .87(50))

*Phase 4.490 discontinued at wave length 4647.3

TABLE 3 -- Continued

0.756	3.042	4.520	5.003	Identification
4649.49(1)			9.49(0)	
4650.17(0)			0.11(0)	Ti I .02(60) (Nd II .23(3)) (Gd II .98(6))
4650.62(0)	0.44(0)		0.67(0)	Al II .54(8) Al II .65(6)
4651.10(1)				(Cr I .28(100)) (Eu II .13(2)) (Tb II .07(1))
4651.60(2)		1.63(1)	1.61(1)	Pr II .52(75) (Dy II .54(2))
4652.07(2)				Cr I .16(200) (Fe II .28(tr))
			2.43(1)	Eu II .44(6) (Fe II .28(tr))
4652.73(0n)	2.86(0)		2.95(0)	
4654.20(3)	4.05(1n)	4.12(1n)	4.12(1)	Ce II .29(30)
	5.06(1)		5.19(1)	(Gd II .99(100))
4655.44(1)				(La II .50(400))
		5.71(1)	5.85(0)	Ti II .71(3)
4656.33(1)			6.20(0)	(Fe I .47(150))
4656.87(4)	6.89(5)	7.03(4)	7.08(4)	Fe II .97(1)
4658.12(1)			8.16(1n)	P II .11(100)
4658.91(1)	8.73(0)	8.84(1)	8.84(1)	(Eu II .63(15)) (Gd II .97(3))
4659.69(1n)			9.69(0)	
4660.66(1)	0.56(1)	0.57(1)	0.59(3)	
	1.54(0)		1.60(1)	(O II .65(125))
4662.72(0)	2.97(1)		2.75(1)	La II .51(200) (Ti II .76(pr)) (Nd II .97(2))
4663.07(1)				Al II .05(11)
4663.66(2)	3.63(1)	3.73(1)	3.68(1)	Fe II .70(0) La II .76(300)
4664.24(1)				Fe II .23(tr) Gd II .27(30)
			4.46(0)	Nd II .45(4)
4664.73(1)				Dy II .68(80) Cr I .80(70) Pr II .65(20)
4665.52(2)	5.03(0)		5.25(3)	
			6.52(1)	Gd II .45(40)
4666.60(4)	6.72(4)	6.75(3)	6.79(3)	Fe II .75(2) (Al II .8(5)) (Gd II .45(40))
4667.36(1)			7.58(1)	Fe I .46(150) (Eu II .41(3))
4667.89(2)			7.62(1)	Ti I .59(150) (Ni I .77(100))
	8.16(1)		8.29(1)	Fe I .14(125)
4668.47(2)			8.34(2)	
4668.89(1)			8.95(1)	La II .91(250)

TABLE 3 -- Continued

0.756	3.042	4.520	5.003	Identification
	9.19(1)		9.16(0)	(Fe I .18(15)) (Cr I .34(50)) (Nd II .13(3))
4669.45(1)				Sm II .40(500) Ce II .50(20)
			9.73(1)	Sm II .65(500)
4670.13(4)	0.22(2)			Fe II .17(0)
			0.35(2)	Sc II .40(300)
4671.32(1n)	1.34(1)		1.44(1)	(Cr II .36(pr))
4672.14(0)			2.23(1)	Pr II .08(40)
4672.73(1)				
			3.08(1)	Fe I .17(20)
4673.27(2n)	*3.27(5n)	‡3.34(3)	3.46(2)	
4674.65(2n)			4.50(2)	Sm II .60(600) Gd II .54(8) (Cu II .76(30))
4675.32(0n)			5.40(1)	Gd II .27(5)
4675.80(1)	5.90(0)			Gd II .78(8)
4676.47(2)			6.34(2)	(O II .25(125))
4676.75(0)				
†4677.15(2)			7.00(1)	Sm II .91(500) Gd II .99(8)
4678.01(1)			8.01(0)	
4678.73(0)			8.91(0)	Fe I .85(150) (P II .94(100)) (Ce II .94(pr))
4679.23(1)				
			9.93(0)	(Cr II .87(pr))
4680.31(2n)	0.54(0)		0.42(1)	Ce II .13(25) Ce II .46(2?)
4680.74(1)				Nd II .73(30)
	1.63(0)			
4681.96(1n)			1.87(1)	Gd II .85(6) Ti I .92(200) (Cu II .99(50)) (La II .12(5))
4683.14(0)			3.33(0)	Si II .02(2)
4683.74(1)	3.91(1)		4.02(1)	
4684.27(1)			4.37(0)	
4684.80(2)	4.69(1)		4.76(2)	Cr II .77(1) Ce II .61(30) (Pr II .94(20))
4685.90(2)			5.74(2)	
4686.42(1)			6.43(0)	

* Phase 3.042 discontinued at wave length 4673.3

‡ Phase 4.520 discontinued at wave length 4673.3

† Phase 0.756 discontinued at wave length 4677.2

TABLE 3 -- Continued

0.691	3.721	5.003	Identification
4686.89(1)			
4687.40(1)	7.44(1)	7.52(0)	
4688.95(1)		8.74(1)	La II .65(40) (Eu II .51(3))
4689.78(1)		9.61(1)	Dy II .77(40)
4690.97(1)		1.19(1)	(La II .17(50)) (Gd (?) .17(S2))
4691.43(2)		1.26(2)	Fe I .41(80) Ti I .34(125)
4692.52(0)		2.49(0)	La II .50(200)
4693.26(2)		3.31(1)	(Co I .21(500))
4693.81(0)		3.98(1)	
4694.44(0n)		4.32(1)	
4695.36(1)		5.44(1)	(Eu II .35(4))
4696.31(1n)		6.26(1)	(O II .32(30))
		6.97(2)	(Cr I .06(50))
4697.28(3)			Fe II .32(tr)
4697.97(0)		7.72(1)	Cr II .62(2)
4698.77(1)		8.66(2)	Dy II .69(60) (Ti I .76(100)) (Cr II .64(pr))
4699.53(2)		9.47(3)	La II .63(200) (Cr .59(30))
4701.37(1)			(Ni I .54(150))
		2.71(0)	
4703.21(1)			La II .27(150) (Mg I .02(8)) (O II .14(30)) (Zr II .03(5))
4703.94(3)		3.77(1)	Ni I .81(200)
4704.50(1)		4.37(0)	Sm II .40(500) (Ne I .40(1500))
4705.20(1)		5.20(1)	(O II .32(300))
		6.42(0)	Nd II .54(100)
		7.51(0n)	Pr II .54(20) (Gd II .33(3))
4707.97(1)			Cr I .04(200) Pr II .94(60) Pr II .16(60)
4708.58(2)		8.77(1)	Ti II .66(20) (Ne I .85(1200))
4709.07(2)			Fe I .96(50) (Fe I .10(20))
4709.93(1)		9.70(1)	Nd II .71(20) Mn .72(150)
4710.61(1)		0.47(1)	
4711.28(3)		1.26(1)	
4711.82(0)		2.09(1)	Gd II .98(80) (Eu II .12(3)) (Ne I .06(1000)) (Gd II .68(6))

TABLE 3 -- Continued

0.691	5.003	Identification
4712.32(0)	2.47(0)	
4712.98(1)	2.84(1)	Gd II .80(50) Sm II .06(150) La II .92(40)
4713.68(2n)	3.64(3n)	(Eu .61(400))
4715.04(3)	4.99(3n)	Cr II .12(1) (Ce II .83(?))
	5.87(0)	Ni I .78(200) (Gd II .97(4))
4716.18(1)		(S II .23(600)) (Eu II .29(2))
4717.15(0)	7.20(1n)	(P II .00(15)) (Nd II .08(10)) (La II .58(50))
4717.87(1)	8.07(0)	
4718.30(0)	8.59(1n)	Cr I .43(200) Sm II .33(150)
4718.81(2)	8.79(1)	Gd II .04(60)
4719.59(1)	9.51(2)	Ti II .52(2)
	0.26(1)	? La II .95(300) (P II .26(30))
4720.68(1)		
	0.94(1)	
4721.56(0n)		(Cl II .43(25)) (Gd II .27(50))
4723.03(3)	2.85(3)	
4723.88(0)	3.57(1)	Gd II .73(40)
	*4.33(0)	Cr I .42(125) Nd II .36(20) La II .42(40)
4724.65(1)		
4725.01(0)		
4725.44(1)	5.64(2)	Gd II .78(20) Eu II .69(6)
4726.17(0)		Yb II .08(60) (Er (II?) .08(S5))
4727.14(1)	7.00(1)	Dy II .13(50) (Cr I .15(80)) (A II .91(200))
	8.24(1)	La II .42(100)
4728.56(1)		Gd II .47(300) Fe I .56(20) (Pr II .63(15))
4729.15(0)	9.44(0)	
4729.68(0)	9.90(0)	Cr I .72(30)
4730.34(1)		Mn II .36(int?)
4730.79(0)		
4731.38(3)	1.58(4)	Fe II .49(1)
4731.82(0)		Dy II .85(150)
4732.68(0)	2.52(1)	Gd II .60(600)
	3.30(0)	(Ti I .43(25))

* Phase 5.003 discontinued at wave length 4724.3

TABLE 3 -- Continued

0.691	5.050	Identification
	4.17(1)	Fe II .09(3?) (Sc I .09(100)) (Pr II .18(25))
4734.67(1n)	4.86(1)	
4735.71(3)	5.46(3)	(Gd (?) .76(S150))
4736.87(1)	6.75(0)	Fe I .78(125)
4737.38(1)	7.23(1)	Ce II .28(60) Cr I .35(200)
4738.18(0)	8.28(0)	Mn II .29(1) (Gd (?) .13(S50))
4738.97(1)	9.02(1)	(Mn (?) .11(150))
4739.85(0)		(La II .80(15))
4740.60(0)	0.35(1)	La II .27(120)

NOTES TO TABLE 3

λ 3865.6 and λ 3865.9 form two distinct lines on MtW 1995, while MtW 2544 shows only one broadened line. The assignment of the components to *Cr* II + *Fe* I and to *Cr* II + *Nd* II is not certain.

λ3903.8 main contributor unknown. The line is of class B.

λλ 3905.7 and 3906.0 are clearly divided on MtW 1995 but are blended on MtW 2544.

λ 3919.4 is a fairly strong unidentified line of class A.

λ 3920.6 is a strong, unidentified line of class B.

λ 3930.3 of *Fe* I and λ 3930.5 of *Eu* II are clearly double on MtW 1995 but are blended on MtW 2544.

λ 4012.3 and λ 4012.4 are single on MtW 1995, but double on MtW 2544. It is difficult to disentangle the blends contributing to these lines.

λ 4034.2 is a strong line not satisfactorily identified.

λ 4050.5 is of class B and is probably not all due to *Dy* II.

Lines *Ti* II 4053.84 and *Cr* II 4054.18 are not resolved on all plates. For phase 3.042 the two entries are two separate measures of the same blended line.

λ 4060.6 is of class B and cannot be due to *Eu* II and *Nd* II alone.

λ 4161.8 is of class B and is mostly unidentified.

λλ 4177.6 and 4177.9 are not satisfactorily identified. The latter line is of class A or is completely blended with λ 4177.6 on some plates.

λλ 4200.5 and 4200.8 are not satisfactorily identified.

λ 4288.4 is not satisfactorily identified.

λ 4289.9 is one of the most remarkable lines of class A. It is probably due to *Ce* II.

λ 4356.4 is a strong unidentified line.

λ 4371.9 is a strong unidentified line.

The line *Fe* I 4383.6 is the violet component of a double line. The red ccmponent, whose shift is not the same on all plates, has not been satisfactorily identified.

λ 4384.2 is not satisfactorily identified. Class B, very strong.

λ 4393.0, strong unidentified line.

λ 4393.7, strong unidentified line.

λ 4410.0, strong unidentified line.

λ 4410.8, strong unidentified line.

λ 4419.6, not satisfactorily identified, class B.

λ 4447.5, strong unidentified line, class A.

λ 4448.4, not satisfactorily identified.

λ 4502.9, not satisfactorily identified.

λ 4511.9, not satisfactorily identified.

λ 4514.1, very strong unidentified line of class B.

λ 4515.6, strong unidentified line.

λ 4540.8, strong unidentified line.

λ 4618.6, strong unidentified line.

λ 4621.1, strong unidentified line.

λ 4621.6, strong unidentified line.

λ 4660.6, strong unidentified line.

λ 4673.3, strong unidentified line.

λ 4722.9, strong unidentified line.

TABLE 4

Departures of Individual Lines from Mean Plate Velocities in Km/Sec

Laboratory λ	0.500	0.691	0.822	0.981	1.323	1.460	1.510	1.642	2.363	2.58(
3711.97(5)		- 2.3(2n)			-15.4(8n)				-19.6(2n)	
3721.94(6)		-13.5(9n)			-18.8(9n)				- 1.6(5n)	
3734.37(8)		- 2.6(xn)			+ 7.8(xn)				- 9.2(xn)	
3750.15(10)		- 6.1(xn)			- 1.8(xn)				- 1.5(xn)	
3770.63(15)		- 8.0(x)			-21.8(xn)				- 2.8(xn)	
3797.90(20)		- 3.2(x)			- 7.9(xn)				+ 5.8(xn)	
3835.39(40)		+ 6.6(x)			+ 1.2(xn)				- 8.0(xn)	
3889.05(60)		- 4.6(x)	+ 8.0(xn)		+ 0.1(xn)			- 1.8(xn)	- 4.4(xn)	
3970.08	- 0.2(x)	+ 3.9(x)	+ 5.0(xn)		- 3.4(xn)	+ 3.4(xn)		+10.3(xn)	+ 0.7(xn)	+ 4.4(x
4101.75	+ 1.8(xn)	+ 2.6(x)	- 0.3(xn)		-11.3(xn)	- 1.6(xn)		- 6.7(xn)	- 0.6(xn)	+ 3.4(x
4340.48(200)		- 1.7(x)	- 4.6(xn)		- 5.2(xn)	- 1.2(xn)		- 0.5(xn)	- 2.1(xn)	+ 1.4(x
Mean	+ 0.8	- 2.63	+ 2.02		- 6.95	+ 0.2		+ 0.32	- 3.94	+ 3.07
Number of measures	(2)	(11)	(4)	(0)	(11)	(3)	(0)	(4)	(11)	(3)
Mg II										
4481.33(100)	- 9.6(x)	- 9.5(x)	- 9.2(9)	- 9.1(x)	- 7.6(x)	- 9.6(x)	- 5.4(9)	- 7.1(x)	- 7.2(x)	- 7.0(9
Mean	- 9.6	- 9.5	- 9.2	- 9.1	- 7.6	- 9.6	- 5.4	- 7.1	- 7.2	- 7.0
Number of measures	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Al I										
3961.53(3000)	- 0.7(1n)	+ 8.6(1)	+ 7.6(1)		+ 5.5(1)	+10.6(1)			- 4.6(1)	+ 8.0(1
Mean	- 0.7	+ 8.6	+ 7.6		+ 5.5	+10.6			- 4.6	+ 8.0
Number of measures	(1)	(1)	(1)	(0)	(1)	(1)	(0)	(0)	(1)	(1)
Si II										
3853.67(3)		- 5.2(9)	- 1.4(5)		- 4.4(9)			- 1.2(5)	- 4.8(9)	
3856.03(8)		- 4.4(x)	- 1.7(x)		- 2.5(x)			+ 2.1(8)	- 2.6(x)	
3862.60(6)		- 2.8(x)	- 0.8(x)		- 3.0(x)			+ 2.7(9)	- 3.3(x)	
4128.05(8)	+ 1.2(9)	- 0.1(x)	- 1.4(9)	+ 2.7(9)	- 1.7(x)	+ 2.0(x)	- 0.7(9)	+ 2.4(9)	- 0.9(9)	- 1.2(
4130.88(10)	+ 3.8(9)	+ 2.4(x)	+ 1.5(x)	+ 1.5(x)	- 2.5(x)	+ 2.0(9)	+ 1.1(9)	+ 2.8(9)	- 0.2(9)	+ 1.6(
Mean	+ 2.5	- 2.02	- 0.76	+ 2.1	- 2.82	+ 2.0	+ 0.2	+ 1.76	- 2.36	+ 0.2
Number of measures	(2)	(5)	(5)	(2)	(5)	(2)	(2)	(5)	(5)	(2)
Ca I										
4226.73(500)	+ 3.8(1)	+ 0.3(1)	+ 7.7(1)	+11.6(0)	+ 5.4(1)					
Mean	+ 3.8	+ 0.3	+ 7.7	+11.6	+ 5.4					
Number of measures	(1)	(1)	(1)	(1)	(1)	(0)	(0)	(0)	(0)	(0)

3.490	3.530	3.721	4.460	4.520	4.956	5.050	5.430	Blends
		-17.0(1n)						
		-18.0(3n)	-25.1(1n)		-11.4(9n)	- 6.6(9n)		Ti II .636(125) (Sm II .847(400)) (Cr II .14(1)) (Gd II .068(100))
		-10.8(4n)	+ 0.2(3n)		+ 3.5(9n)	+ 4.8(xn)		
		- 8.1(6n)	-10.8(3n)		- 2.0(xn)	- 0.6(xn)		
		-14.4(9n)	- 6.4(6n)		- 0.7(xn)	- 1.9(xn)		(Gd II .69(300))
		+ 1.0(xn)	+ 8.7(8n)		+ 0.2(xn)	- 5.1(xn)		(Sm II .730(600)) (Cr II .95(1))
		- 2.1(xn)	+ 3.0(9n)		- 2.3(xn)	+12.0(xn)		
		- 3.9(xn)	- 4.6(xn)		- 6.3(xn)	- 3.9(xn)		(Dy II .99(20))
		+ 1.9(xn)	- 1.6(xn)		- 4.4(xn)	- 2.7(xn)		
+ 3.8(xn)	- 6.0(xn)	- 3.1(xn)	- 0.7(xn)	- 2.4(x)	- 6.1(xn)	- 3.0(xn)		
+ 0.9(xn)	- 2.0(xn)	- 1.2(xn)	- 2.5(xn)	- 1.7(x)	+ 1.2(x)	- 2.9(xn)	- 4.9(x)	
+ 2.35 (2)	- 4.0 (2)	- 6.88 (11)	- 3.98 (10)	- 2.05 (2)	- 2.83 (10)	- 0.99 (10)	- 4.9 (1)	
- 9.0(9)	-10.6(9)	- 9.6(x)	- 5.0(x)	- 8.1(x)	-10.5(9)	- 9.4(9)	-10.6(9)	(Cr II .49(1)) (Pr II .410(10)) (Gd II .056(300)) (Tm II .273(200))
- 9.0 (1)	-10.6 (1)	- 9.6 (1)	- 5.0 (1)	- 8.1 (1)	-10.5 (1)	- 9.4 (1)	-10.6 (1)	
			- 8.4(1)	- 9.9(1)	- 5.4(1)	- 0.1(2)		
(0)	(0)	(0)	- 8.4 (1)	- 9.9 (1)	- 5.4 (1)	- 0.1 (1)	(0)	
		- 4.0(5)	- 1.9(3)		- 6.5(4n)	- 7.8(5)		
		- 3.7(9)	- 4.5(6)		- 3.6(7)	- 2.1(9)		
		- 2.9(8)	- 5.7(7)		- 3.4(5)	- 2.4(9)		(Nd II .487(15))
+ 1.1(9)	- 2.3(9)	- 2.2(9)	+ 1.4(5)	- 0.1(9)	+ 1.3(9)	- 0.2(x)	+ 6.0(9)	
+ 0.4(9)	- 1.7(9)	- 0.9(9)	- 1.7(6)	- 3.8(9)	- 3.8(9)	- 2.8(9)	+ 1.5(9)	(Ce II .706(100)) (Nd II .722(3)) (Pr II .770(40))
+ 0.75 (2)	- 2.0 (2)	- 3.3 (5)	- 2.48 (5)	- 1.95 (2)	- 3.2 (5)	- 5.1 (5)	+ 3.75 (2)	
					-11.9(1)	- 6.0(0)	+ 0.6(1)	Al II .809(35) Eu II .87(4?) (Nd II .992(4)) (Cr I .758(125))
(0)	(0)	(0)	(0)	(0)	-11.9 (1)	- 6.0 (1)	+ 0.6 (1)	

TABLE 4-- Continued

Laboratory λ	0.500	0.691	0.822	0.981	1.323	1.460	1.510	1.642	2.363	2.580
Ca II										
3933.67(600)	-2.4(9)	-4.3(9)	-2.2(9)		-1.8(9)	-1.4(9)		-3.0(8)	-4.6(9)	+0.4(x)
3968.47(500)	+5.8(3)	+8.5(6)	-2.3(1)		+4.5(3)			-2.0(2)	-5.2(6)	-2.7(1)
Mean Number of measures	+1.7 (2)	+2.1 (2)	-2.25 (2)	(0)	-1.35 (2)	-1.4 (1)	(0)	-2.5 (2)	-4.9 (2)	-1.15 (2)
Ti II										
3900.54(50)	-5.2(5n)	-0.7(8)	-3.6(5)		+2.8(5)	+8.4(2)		+0.9(0)	0.0(3)	+4.8(3)
4163.65(150)	-4.0(3n)	-8.4(4)	-4.8(3)	-0.5(2)	+0.4(5)	+3.7(3)	+8.8(1)	+1.9(3n)	-7.1(3)	-4.1(1)
4290.23(60)	-4.7(9)	-4.5(x)	-0.6(9)	+0.4(5)	-1.8(4n)	+3.1(4)	+6.3(1)		-13.8(3n)	-15.0(2)
4300.05(100)	-2.0(3)	-1.5(4n)		+5.4(2)	+1.0(3)	+4.7(3)	+3.2(1)	+1.5(3)	-3.6(4)	-1.7(3)
4301.93(50)	-7.2(3)	-5.9(5)		-1.9(3)	+0.1(4)	+4.6(3)	+2.7(1)	+5.5(2)	-4.5(2)	-4.2(1)
4312.87(100)	-0.4(3)	-2.6(4)	-1.8(4)	+4.9(4)	+1.0(7)	+6.7(4)	+6.7(2)	+6.0(3)	+0.8(5)	-0.1(4)
4337.92(125)		-3.7(2)	-6.5(0)		-0.8(0)				-5.2(1)	-3.1(1)
4367.66(25)	-0.8(2n)	-6.0(3)	-2.0(2)	+8.0(1n)	-0.8(3)		+14.6(1)	+13.7(0)	-4.0(1)	-1.8(0)
4386.35(80)	-5.9(3)	-2.7(8n)	-5.0(4n)	+5.4(3)	+3.8(4)	+2.0(3)	+6.4(1n)	+10.2(2)	-4.4(1n)	-5.7(2)
4395.04(150)	-1.6(3)	+4.4(6)	-1.2(6)	-0.5(3)	+1.6(4)	+6.0(4)	+3.0(1)	+7.6(2)	-4.2(3)	-0.6(2)
4399.77(100)	+6.2(0)	-5.8(4)	-2.9(3)	+3.9(1)	+2.5(4)	+7.4(2)	+4.3(1)	+7.9(1)	-4.4(2)	+6.9(0)
4411.08(100)	-5.8(1)	-7.9(3)	-1.6(1)	-3.7(1)	+5.4(2)	-3.5(1n)		+4.4(0n)	-11.4(1)	-11.8(1)
4443.80(125)		-6.5(3)	-3.3(3)	-10.6(3n)	+2.0(3)	+3.8(3)		+4.5(1)	-7.8(2)	-4.3(1)
4450.49(50)	-1.8(1)	-4.8(2)	-3.0(2)	+4.1(1)	-8.0(2n)	+1.2(3)	-3.2(1)	+2.6(1n)	-9.7(2n)	-0.8(2)
4468.50(150)	-0.7(2)	-4.8(4)	-4.4(3)	+1.5(1)	+2.6(3)	0.0(3)	+8.6(1n)	+6.1(2)	-6.0(3)	-2.2(2)
4488.32(125)	-2.4(1)	-2.3(3)	-1.3(1)	+0.4(2)	+4.0(3)	+6.8(3)	+7.8(1)	+9.2(1)	-4.5(2)	+0.5(1)
4501.27(100)	-5.3(3)	-5.5(6)	-6.1(5)	+0.5(2)	+5.9(4)	+2.1(4)	+3.0(2)	+3.8(3)	-8.2(3)	-3.1(3)
4529.46(40)	-7.1(1)	-5.3(3)	-3.4(2)		+5.6(3)	+12.5(3)	+7.2(0)	+11.2(1)	-0.7(1n)	+9.1(1)
4533.97(150)	+1.8(5)	+2.2(9)	+1.9(9)		+5.3(9)	+7.2(8)	+9.1(3)	+9.1(5)	+2.9(9)	+8.5(7)
4563.77(200)	+2.8(2n)	-6.0(3)	-3.9(1)				+11.2(1)	+11.6(1)	-3.8(2n)	-1.0(1)
4571.98(300)	+7.8(5)	+1.0(9n)	+1.0(3)			+6.7(3)	+3.2(2)	+9.7(1)	-0.4(2n)	+3.8(2)
Mean Number of measures	-1.91 (19)	-3.68 (21)	-2.76 (19)	+1.15 (15)	+1.72 (19)	+4.63 (18)	+6.05 (17)	+6.71 (19)	-4.76 (21)	-1.23 (21)
Cr I										
4254.35(5000)	-4.0(1)	-0.4(2)	+1.0(3)	+4.1(3)	+5.9(4)	+10.2(5)	+6.8(2)	+7.3(3)	+12.5(4)	+5.9(3)
4274.80(4000)	-14.5(1)	+8.9(1)		-9.6(1)	+19.8(0)		-1.2(1)	+4.9(1)	+5.1(1)	-0.8(0)
4289.72(3000)		-9.9(1)	-9.0(1)	-13.1(1)	-6.9(1)	-6.4(1)	+0.4(0)			
Mean Number of measures	-9.25 (2)	+0.47 (3)	-4.0 (2)	-6.2 (3)	+6.27 (3)	+1.9 (2)	+2.0 (3)	+6.2 (2)	+8.8 (2)	+2.55 (2)

3.490	3.530	3.721	4.460	4.520	4.956	5.050	5.430	Blends
+ 0.2(9)	- 0.3(8)	- 2.9(5)	- 1.8(4)	- 2.1(4n)	- 3.9(7n)	- 5.3(9)		(Fe I .605(200)) (Ce II .731(60))
		+ 4.5(2)	-13.5(3)		- 9.6(8)	- 7.5(8)		(Dy II .395(1000))
+ 0.2 (1)	- 0.3 (1)	+ 0.8 (2)	- 7.65 (2)	- 2.1 (1)	- 6.75 (2)	- 6.4 (2)	(0)	
		- 5.2(2n)	- 7.0(3)		- 4.5(3)	- 2.0(6)		(Fe I .519(60))
+ 5.5(0)	+ 1.9(1n)		- 7.3(2)	- 9.7(5)	- 3.4(3)	- 1.2(5)	+ 0.6(5)	(Ce II .516(20)) (Cr I .620(100))
	-10.8(1n)	- 8.0(1)	-15.7(4n)	-17.5(7n)	-14.5(5)	-14.9(5)	- 9.6(9)	Ce II .938(300) Gd II .884(80)
+ 6.6(1)	+ 5.2(1)	+ 9.6(2)	- 6.6(3)	- 4.0(7)	- 3.7(3)	- 0.2(4)	+ 6.7(5n)	(A I .100(1200))
- 3.1(1n)	- 4.9(1)	-13.2(1)	- 3.9(3)	- 7.0(3n)	- 7.2(2)	- 1.4(3n)	- 5.6(6)	(Pr II .100(60)) (Zr II .81(5))
+ 6.5(1)	+ 2.3(2)	+ 2.2(2n)		+ 1.8(5)	+ 3.5(4n)		+ 4.5(4)	(Fe II .034(1))
					- 3.9(2n)	+10.4(0)		Ce II .777(125) (La II .78(10)) (Zr II .63(5))
		-15.6(1)	- 5.1(1)	- 2.4(3)	- 1.0(2n)	+13.0(2)	+ 1.4(2n)	Fe I .582(100) (Eu II .54(3))
-12.2(1n)		-11.4(1)	- 5.3(1)	-10.6(6)	- 8.9(4)	- 4.0(4)	- 1.4(5)	(Ce II .835(15))
	+ 2.5(2)	+ 0.3(1n)	- 4.4(1n)	- 9.1(7)	- 3.4(5n)	- 6.5(4)	- 2.3(3)	Fe I .286(80) Dy II .98(40) (Pr II .005(15)) (Tb II .92(3))
	+ 3.8(1)	+10.6(1)	- 9.0(1)	- 5.9(3)	- 6.9(1)	+ 0.3(2n)	- 0.3(2)	
	+ 0.3(0)	-15.0(0)	- 6.7(1)	+ 4.1(1)	+ 5.6(1)	+ 6.5(1)	- 9.1(2)	Nd II .052(150) La II .21(25) (Gd (II?) .159(?))
	- 6.1(1)	+10.4(1)	- 4.2(1)	- 6.4(2)	+ 0.1(2n)	+ 3.0(2)	+ 2.2(1)	Ce II .743(18?) (La II .94(20))
+ 0.7(0)	- 9.1(1)	-14.3(1)	- 8.4(1)	-10.5(3)	-12.7(2)	-10.0(2)	- 2.6(2)	Pr II .214(40)
+ 7.2(1)	+ 4.5(2)	- 1.7(1n)	+ 4.0(1)	- 2.4(3)	+ 3.2(3n)	- 1.1(3)	+ 1.3(3)	(Pr II .712(150))
+ 7.5(0)	-12.0(0)	+ 8.2(0)	+ 2.0(1)	- 4.5(3)	+ 1.1(4)	+ 1.1(5)	+ 5.1(2)	Eu II .25(15)
- 2.1(1)	-10.0(3)	-12.8(2)	- 6.9(3)	- 6.7(5)	- 6.8(6)	- 4.7(6)	- 1.9(3)	
+ 3.0(1)	+ 9.1(1)	+ 8.7(1n)	+ 6.2(1)	+ 1.6(3)	+ 2.9(2n)	+ 8.8(2)	+12.0(1)	(Fe II .56(pr)) (Tm II .376(80))
+ 6.1(3)	+ 7.1(4)	+ 7.3(5)	- 8.7(1)	+ 3.2(5)	- 3.6(8n)	- 0.8(5n)	+ 3.6(7)	Fe II .166(2) (Pr II .154(60)) (P II .81(15)) (Mg II .26(4))
+ 4.8(1)	+ 7.6(1)	-14.7(0)	- 3.7(1)	- 3.4(3)	+ 1.8(3)	+ 1.0(3)	- 1.2(3)	(Tb II .68(20))
	+ 0.6(1)	-15.3(1)	+ 3.2(1n)	- 1.9(5)	-13.6(4)	- 1.1(5)	+ 3.1(3)	
+ 2.54 (12)	- 0.05 (17)	- 3.68 (19)	- 4.61 (19)	- 4.81 (19)	- 3.61 (21)	- 0.19 (20)	+ 0.34 (19)	
- 2.3(3)	+ 1.2(3)	+ 1.3(3)	+13.0(4)	+12.3(4)	+11.9(2n)	+19.4(2n)	- 0.8(1n)	Pr II .420(20)
- 7.4(0)	-11.6(1)	+ 4.1(2n)	+ 3.6(1n)	+ 9.3(1)	+ 8.1(0)	+20.6(0)	- 8.5(1)	Eu II .86(5) (Nd II .083(10)) (Gd II .033(4))
-13.6(0)		- 5.2(1)						Ce II .454(25)
- 7.78 (3)	- 5.2 (2)	+ 0.07 (3)	+ 8.3 (2)	+10.8 (2)	+10.0 (2)	+20.0 (2)	- 4.65 (2)	

TABLE 4 -- Continued

Laboratory λ	0.500	0.691	0.822	0.981	1.323	1.460	1.510	1.642	2.363	2.580
Cr II										
3712.95(50)		-10.6(2)			- 6.2(x)				+ 2.3(6)	
3723.40(15)					- 9.1(0)				+ 7.7(1)	
3727.36(40)		-10.0(2)			- 3.3(3)				+10.4(2)	
3738.38(25)		-13.2(2)			- 7.5(7)				- 2.0(8)	
3754.58(20)		-12.2(1)			- 3.9(2)				+ 4.9(7)	
3801.21(10)		-11.8(0)			- 4.4(0)				+ 3.7(1)	
3865.59(75)		- 6.1(5)	- 7.2(5)		- 3.6(5)			+ 1.5(3)	+ 7.4(3)	
3905.65(25)	-11.8(9)	-10.8(7)	- 6.5(5)		- 4.9(9)	- 0.8(6)		- 1.9(6)	- 3.8(3n)	- 6.4(3n)
4003.33(25)		-12.6(3)	-11.1(3)		- 4.2(3)	- 0.5(3)		- 5.1(3)	- 2.0(1)	-10.9(1n)
4012.47(30)	- 9.6(9)	- 8.1(x)	- 7.1(8)	- 3.7(9)	- 0.8(9)	+ 2.8(9)	+ 5.0(3)	+ 4.6(5)	+11.1(4)	- 1.2(5)
4038.03(25)	- 8.6(5)	- 8.9(5)	- 7.9(3)	- 4.8(2)	- 5.6(5)	- 1.6(3)	- 1.5(2)	- 0.4(4)	- 5.0(3)	+ 7.5(3)
4049.16(18)		-10.2(3)	-13.7(2)		- 9.3(4n)	+ 0.7(3)			+ 0.2(1)	+14.3(0)
4051.97(12)	-11.3(2)	- 8.9(3)	-10.8(3)	-10.2(2)	- 9.0(5)	+ 0.7(3)	+ 4.7(1)	- 3.2(3)	+ 1.4(2)	
4054.18(8)		-12.1(3)	-14.2(3)	- 9.7(2)	-10.2(7)	- 9.2(6)	- 6.1(2)	- 8.0(5)	-11.8(2n)	
4070.90(10)	-16.7(5)	-14.7(3n)	-17.8(4)	-10.9(3)	- 8.2(4)	- 6.5(6)	- 4.2(1)	- 4.9(3)	- 2.9(3)	- 7.7(2)
4082.30(10)		-11.8(1)	-11.4(1)	- 9.1(1)	- 6.5(4)	- 2.5(3)	+ 0.4(0)	- 2.2(3)	+ 3.9(2)	+ 8.7(0)
4098.44(8)	-13.4(1)	- 9.4(1)	- 9.7(0)		- 5.7(2)	- 5.3(0)			+ 4.3(2)	+ 3.7(1)
4111.01(18)		-12.0(3)	- 8.5(2)	-10.2(1)	- 4.2(5)	- 2.2(3n)	- 9.3(1n)	+ 2.6(3)	- 0.6(2)	- 2.9(1)
4113.24(5)	- 8.5(3)	- 7.6(3)	- 6.8(2)	- 0.2(2)	- 5.5(4)	- 4.2(3)	- 3.4(1)	- 1.1(1)	+ 1.9(1)	+ 8.3(1)
4145.80(25)	-12.3(1)	-10.3(3)	- 8.6(2)	-10.2(2)	- 4.3(4)	- 3.0(3)	- 0.4(1)	+ 2.2(3)	+ 2.5(2)	-13.3(0)
4179.46(12)	- 7.4(3)	- 8.4(5)	- 8.0(4)	- 4.0(3)	- 5.1(8)	- 1.2(4)	- 1.4(1)	+ 1.6(3)	+ 2.8(3)	+ 3.7(1)
4224.85(20)		- 7.8(2)	- 4.8(2)	- 0.6(2)	- 3.2(5)	+ 2.8(2)	0 (1)	+ 1.4(3)	+ 8.7(2)	+ 6.2(0)
4242.38(30)	- 9.5(4)	-11.4(5)	- 9.1(7)	- 6.1(8)	- 5.6(9)	- 1.1(7)	- 0.6(9)	- 7.1(7)	+ 5.0(5)	+ 1.6(4)
4252.66(10)	- 9.3(1)	-13.3(4)	- 9.9(7)	- 7.0(3)	- 6.0(5)	- 2.9(7)	- 2.9(3)	+ 1.9(3)	+ 4.1(3)	- 1.6(3)
4256.16(5)		-14.0(2)	-11.3(2)		- 5.0(2)		- 7.0(2n)	- 4.1(3n)	+ 2.9(3)	-11.1(2)
4261.91(20)	+ 2.1(4n)	- 6.8(4)	- 4.8(5)	- 1.2(5)	- 3.2(9)	+ 3.2(9)	+ 4.1(5)	+ 5.6(6)	+ 4.5(8)	+ 5.8(5)
4269.28(10)	- 8.3(1)	- 8.9(4)	- 8.2(3)	- 0.4(2)	- 2.1(4)	+ 0.8(3)	- 2.0(2)	+ 7.4(3)	+ 4.6(3)	- 0.5(3)
4275.57(30)	- 8.7(3)	- 9.6(4)	-10.5(5)	- 5.0(3)	- 6.1(5)	- 1.0(4)	+ 0.4(3)	+ 4.1(3)	+ 3.5(3)	- 1.0(1)
4284.21(20)		-10.0(2)	- 7.4(2)	- 4.6(2)	- 5.8(3)	- 1.8(3)	- 4.2(2)	- 3.2(2)	+ 6.4(3)	- 3.4(2n)
4555.03(20)	- 2.5(0)	- 8.3(4)	-13.7(2)			- 7.2(4)	- 7.0(1)	- 0.3(4)	+ 1.0(5)	- 4.9(2)
4558.66(100)	- 7.1(3n)	- 6.1(9)	- 5.3(5)			- 1.4(9)	+ 0.9(3)	+ 3.2(8)	+ 2.7(9)	- 0.9(4)
4565.78(10)	- 5.4(1)	- 9.4(4)	-10.3(2)			- 1.0(4)	- 2.0(1)	- 1.9(3)	- 1.7(5)	- 3.4(1)
4588.22(75)	+ 6.5(3)	-10.0(9)	-10.9(3)			- 0.3(5)	+ 0.2(2)	+ 2.6(4)	+ 2.2(6)	+ 0.7(3)
4592.06(20)	+ 9.3(1)	- 8.0(8)	- 9.5(4)			- 1.8(4)	+ 0.5(1)	+ 3.9(3)	+ 0.2(5)	+ 1.8(2)
4616.66(18)		- 7.6(6)	-12.3(3)			- 6.4(6)			- 3.0(9)	- 6.3(3)
4618.83(35)		+11.3(3)	+17.8(0)			+ 0.8(5)			+ 4.3(3)	+ 0.3(2)
4634.09(25)		- 9.9(8)	- 8.9(5)			- 1.0(6)			+ 1.9(4)	- 0.8(2)
Mean Number of measures	- 6.97 (19)	- 9.43 (36)	- 8.66 (31)	- 5.76 (17)	- 5.48 (29)	- 1.76 (29)	- 1.58 (23)	- 0.03 (26)	+ 2.26 (37)	- 0.49 (28)

3.490	3.530	3.721	4.460	4.520	4.956	5.050	5.430	Blends
		- 5.9(5)	- 0.2(2)		+ 3.5(2)			
		- 4.6(1)	+ 0.7(1)		+ 6.8(0)	+ 7.2(0)		(Ti II .631(15)) (Gd II .24(8)) (Gd II .69(20)) (Nd II .506(50))
		+ 3.0(1)	+ 6.1(1)		+ 9.5(2)			V II .351(1000) (O II .30(50))
		- 5.4(3)	+ 0.5(2)		+ 4.3(1)	+ 9.1(1)		(Fe I .308(100)) (Zr II .13(5))
		- 3.0(4)	+ 1.2(3)		+ 5.2(4)	+ 9.4(3)		
		- 3.7(1)			+ 7.5(0)	+ 9.6(0)		Gd II .29(400)
		- 4.2(4)	- 0.7(5)		+ 7.2(3)	+ 7.1(4)		Fe I .526(600)
- 6.6(3)	- 7.9(2)	- 6.7(3)	+ 0.2(4)		+ 6.1(2)	+ 3.9(3)		(Si I .528(20)) (Dy II .56(2))
-10.3(2)	- 6.2(2)	- 8.4(2)	- 0.7(1)	- 1.4(2)	+ 6.3(1)	+ 1.6(1)		
	- 0.3(9)	+ 1.0(5)	+ 8.8(8)	+ 4.9(5n)	+ 8.8(3)	+ 7.8(8)		Ce II .389(300) Fe II .467(1) (Tb II .46(4))
		- 4.6(3)	- 1.9(2)	- 1.8(3)	+ 4.4(1)	-10.6(3)		Gd II .897(1200) (Nd II .124(20)) (Pr II .154(20))
	+ 4.2(0)	-15.3(2n)		+ 6.7(2)	-15.3(2)	-16.7(1)		
- 5.4(2)	- 5.2(3)	- 7.3(3)	+ 3.8(3)	+ 0.4(4)	+ 5.4(3)	+10.1(2)		(Tb II .87(30))
-14.1(2)	-13.0(3)	-11.0(3)	- 0.4(1)	- 2.8(3)	+ 2.2(1)		-13.2(3)	
- 9.9(2)	- 7.9(3)	- 6.0(3)	+ 3.5(2)	- 0.3(3)	+ 8.3(3)	+ 4.6(1)	-27.7(5)	(Tb II .58(10))
- 2.8(1)	- 9.7(1)	- 3.3(2)	+ 8.0(1)	+ 1.4(2)	+ 6.8(1)	+12.8(1)		(Tb II .23(4))
- 1.2(1)	- 2.8(1)	- 4.5(0)	- 0.2(1)	+ 3.5(3)	+ 8.2(3)	+ 6.4(3)		Gd II .606(3000) (Pr II .410(10))
- 6.1(2)	- 7.7(2)	- 2.6(2)	+ 3.4(1)	+ 6.8(3)	+ 7.1(5)	+14.4(2)		(Mn I .903(80)) (Eu II .07(5))
- 3.6(1)	- 1.2(0)	- 5.3(1)	+ 1.4(0)	+ 2.4(1)	+ 9.5(1)	+15.6(0)	- 5.7(2)	(La II .28(40))
- 7.3(2)	- 3.7(2)	- 3.2(3)	+ 3.9(2)	+ 1.5(5)	+ 5.1(3)	+10.2(2)	+ 9.5(1)	
- 2.7(2)	- 4.6(3)	- 3.0(3)	- 3.4(2)	- 2.7(6)	+ 1.4(3)	+ 8.0(3)	+11.0(0n)	Pr II .421(150) (Cr I .257(100)) (Eu II .37(4))
+ 0.5(1)	- 4.5(1)	- 6.0(2)	+ 5.8(2)	+ 3.7(4)	+10.2(2)	+12.0(2)		(Nd II .847(8))
- 4.3(7)	- 5.0(7)	- 5.0(7)	+ 2.2(3)	+ 0.9(6)	+ 1.6(2)	+ 9.0(2)	- 3.1(5)	(Mg II .47(4)) (Mn II .30(2)) (Tb II .57(12))
- 7.2(2)		- 6.8(3)	+ 0.4(3)	+ 1.7(6)	+ 4.0(3)	+ 6.6(3)	+10.1(3)	(Nd II .437(40))
	-12.7(3)	- 9.7(2n)	+ 1.8(2)	- 0.3(5)	+ 4.6(3)	+ 6.5(3)	+11.4(4n)	(Ti I .036(80)) (Ce II .156(5)) (Nd II .239(8)) (Dy II .97(1)) (Dy II .204(3))
- 0.4(5)	- 0.7(8)	- 2.1(7)	+ 5.6(5)	+ 3.7(x)	+ 5.4(6)	+ 9.3(8)	+11.5(8)	Gd II .092(2500) (Nd II .837(20)) (Pr II .796(15))
- 4.9(1)	- 3.9(4)	- 1.2(4)	+ 5.6(2)	+ 3.5(5)	+ 6.6(3)	+ 7.2(3)	+10.6(2)	
- 2.2(2)	- 1.4(2)	- 3.7(3)	+ 3.7(3)	+ 3.1(4)	+ 4.8(2)	+ 7.8(2)	+12.4(2)	(La II .641(100)) (Ce II .561(25))
	- 3.8(5)	- 0.2(4)	+ 8.9(4)	+ 6.9(8)	+11.3(3n)	+15.0(3n)	+19.7(3)	(Mn I .084(40))
- 7.8(4)	-13.3(3)	- 8.0(4)	+ 1.0(3)	+ 1.6(9)	+ 4.7(3)	+ 7.1(3)		Gd II .989(50)
- 2.0(8)	- 2.4(7)	- 1.6(9)	+ 3.0(9)	+ 2.6(9)	+ 6.5(5)	+ 6.4(7)	+ 7.5(2)	(Cr II .83(pr))
+ 1.2(1)	- 3.1(2)	- 9.0(4)	+ 3.2(3)	+ 1.9(5)	+ 5.4(3)	+11.7(2)		Ce II .842(50) (Eu II .57(5))
- 0.7(7)	- 7.0(4)	- 3.3(5)	+ 1.4(5)	+ 1.0(6)	+ 3.4(3)	+ 3.3(4)	-10.2(2)	Dy II .931(40) (P II .90(300)) (Al II .194(30))
- 1.4(5)	- 5.4(4)	- 5.2(7)	+ 2.2(4)	- 0.6(4)	+ 7.4(4)	+ 6.7(3)	- 6.4(2)	
- 4.7(3)	- 9.9(3)		+ 1.4(4)	- 3.4(4)	+ 3.8(3)	+ 6.0(3)		
- 1.4(4)	- 2.5(4)	- 5.1(5)	+ 0.1(3)	+ 1.1(5)	+ 4.0(5)	+ 3.0(7)		
- 2.0(5)	- 5.0(3)	- 5.7(5)	+ 3.8(5)	+ 0.3(4)	+ 1.1(3)	+ 7.4(2)		
- 4.29 (25)	- 5.24 (28)	- 4.91 (36)	+ 2.40 (35)	+ 1.60 (29)	+ 5.22 (37)	+ 6.63 (34)	+ 2.49 (15)	

TABLE 4 -- Continued

Laboratory λ	0.500	0.691	0.822	0.981	1.323	1.460	1.510	1.642	2.363	2.580
Mn I										
4034.49(250)		+ 1.5(0)	+ 7.8(1)			-11.4(1)	- 8.1(1)			
4041.36(100)	+ 9.1(2)	+ 5.9(1)	+ 7.6(1)	+12.2(1)		+ 9.6(0)				+ 5.6(0)
Mean Number of measures	+ 9.1 (1)	+ 3.7 (2)	+ 7.7 (2)	+12.2 (1)	(0)	- 0.9 (2)	- 8.1 (1)	(0)	(0)	+ 5.6 (1)
Mn II										
4206.43(2)	- 8.9(3)	-11.0(3)	- 9.6(3)	- 4.6(2)	- 8.0(3)	- 3.6(1)	+ 2.5(1)	- 2.9(1)	+ 0.1(1)	+ 6.3(1)
4253.02(2)	- 2.1(0)	- 4.7(1)	- 5.2(0)	- 0.9(0)	- 1.3(1)	+ 4.9(0)		+ 4.8(1)		
4259.26(2)	- 7.2(1n)	- 5.8(2n)	+ 1.3(3n)	+ 3.4(2)	- 5.0(2n)	- 0.6(3)		+ 5.8(2)	- 4.1(3)	- 5.4(3)
4419.78(2)	- 7.7(1n)			- 7.1(1n)		-11.8(1)	- 9.4(0)			-12.4(1)
4510.21(3)	- 6.3(1)			- 1.7(0)		+ 2.2(1)				- 5.8(0)
Mean Number of measures	- 6.44 (5)	- 7.17 (3)	- 4.5 (3)	- 2.18 (5)	- 4.77 (3)	- 1.78 (5)	- 3.45 (2)	+ 2.57 (3)	- 2.0 (2)	- 4.33 (4)
Fe I										
3763.79(500)		- 8.9(2)	- 5.3(1)		- 5.1(4)			+ 5.4(1)	+ 3.1(3)	
3787.88(500)		-10.4(1n)	- 4.5(1)		- 6.8(2)			-10.6(1)	- 1.0(1)	
3812.96(400)		-21.6(0n)	- 8.6(3)		-12.3(1)			+ 4.3(1)	-10.5(1)	
3815.84(700)		- 7.0(5)	- 8.2(4)		- 4.5(5)			- 1.1(2)	- 3.9(3)	
3820.43(800)		- 5.3(5n)	- 2.5(3)		- 4.7(6)			- 1.4(4)	- 4.2(6)	
3841.05(500)		- 4.8(2)	- 5.6(2n)		- 0.6(3)			+ 1.4(1)	- 3.8(2)	
3856.37(500)					- 2.3(1)			+ 5.4(1)	+ 9.6(1)	
3859.91(1000)		- 8.7(5)	- 5.8(4)		- 1.2(3)			+ 4.3(2)	- 1.8(3)	
3902.95(500)	- 0.2(0)	- 3.9(2)	- 4.8(1)		- 0.2(3)	+ 1.2(1)		- 5.2(1)	- 0.6(1)	- 5.1(0n)
3930.30(600)	-11.3(2)	+ 2.4(3)	- 6.4(2)		+ 0.7(2)	+ 3.1(3)		+ 3.7(3)	- 0.7(3)	-13.1(3)
4005.25(250)	-14.2(3)	-12.1(2)	-12.5(3)		-12.1(2n)	+ 7.3(0n)		- 5.2(2)	-14.0(1)	
4045.82(400)	-11.4(6)	-10.7(7)	-10.7(5)	- 4.4(4)	-11.8(5)	- 1.7(4)	- 0.4(2)	- 4.1(3)	- 3.8(5)	+ 0.7(3)
4063.60(400)	- 7.7(5)	- 6.4(7)	- 8.4(5)	- 1.7(3)	- 6.7(5)	+ 0.2(4)	- 0.1(2)	- 1.4(4)	- 6.0(4)	- 4.7(3)
4071.74(300)	-10.8(1)	- 4.4(2)	- 8.2(2)	- 1.1(2)	- 2.6(4)	- 0.1(4)	+ 4.6(1)	+ 1.0(3)	- 3.1(4)	- 1.6(3)
4132.06(300)	- 1.9(0)	- 7.8(1)	- 8.2(1)	- 3.8(0n)	- 6.0(1)	+ 7.1(0)	+11.8(1)	- 8.9(0)		
4143.42(200)		- 6.9(0)		-13.9(2)	+ 8.2(0)	- 7.8(2)	- 7.2(1)	- 5.4(1)	+17.0(0)	
4143.87(400)	- 7.7(2)	- 6.5(5)	- 1.9(3)	+ 0.1(2)	+ 0.3(4)	+ 4.4(2)	+ 2.0(1)	+ 3.5(1)	+ 4.2(1)	+ 5.3(0)
4147.67(200)		-15.0(2)		- 6.8(0)	- 8.2(1)					
4187.04(250)	+15.7(2n)	+ 4.2(1)	+18.6(0)		+ 1.6(1)	+ 7.7(0)		+ 8.4(1)	+ 1.7(1)	+ 8.4(0)
4199.10(300)		- 6.6(1)	- 5.4(1)		- 3.1(2)	- 3.9(0)	- 4.8(1)			+12.6(0)
4202.03(400)	- 6.5(1)	- 7.1(2)	- 8.9(3)	- 6.0(2)	- 5.2(3)	- 3.1(1)	- 6.8(1)	- 5.4(1)	-10.3(1)	-11.6(0)
4210.35(300)	- 6.0(1)	-10.7(1)	- 8.5(1)	-13.6(0)	- 9.0(1)	- 7.1(0)	- 7.9(0)	- 2.4(1)	-10.8(1n)	
4219.36(250)				- 1.7(0)	- 4.0(1n)		- 4.0(1n)	+ 5.5(0)		- 8.4(0)
4227.43(300)	- 9.4(4)	-11.4(4)	- 7.2(5)	- 6.4(5)	- 3.7(5)	+ 3.5(2)	- 0.4(3)	- 2.0(3)	- 3.3(2n)	+ 2.1(2)
4235.94(300)	- 7.0(1)	- 5.9(2)	- 5.0(2)	- 1.6(1)	+ 0.4(2)	+ 3.2(0)	+ 6.2(0)		+ 0.8(1)	
4260.48(400)	- 1.8(1)	- 5.9(2)	- 5.6(3)	- 0.1(2)	+ 0.5(3)	+ 0.6(2)	+ 0.4(2)	+ 4.1(3)	- 0.8(2)	-11.4(2)

3.490	3.530	3.721	4.460	4.520	4.956	5.050	5.430	Blends
	- 0.3(0)	- 8.4(1)				-14.7(2n)	- 2.8(0)	
	+13.4(0)		- 6.6(1)	-11.1(3)	- 0.3(3)	+ 2.2(2)	+ 4.2(1)	
(0)	+ 6.55 (2)	- 8.4 (1)	- 6.6 (1)	-11.1 (1)	- 0.3 (1)	- 6.25 (2)	+ 0.7 (2)	
+13.6(0)		- 6.8(1n)	+ 1.5(0)	+ 1.7(1)	- 4.4(1)	+ 3.9(1)		Dy II .544(40)
	+ 2.3(0)							(La II .92(4))
- 9.9(1)	-10.2(2n)	- 3.8(3)	+ 3.5(3)	+ 4.0(9)	+ 1.8(3n)	+12.2(3)	+10.8(7)	A I .361(1200) (Eu II .22(3))
	-13.0(1)				+ 0.3(1)		- 8.2(2)	
					+ 3.2(1)		-11.0(4)	
+ 1.85 (2)	- 6.97 (3)	- 5.3 (2)	+ 2.5 (2)	+ 2.85 (2)	+ 0.23 (4)	+ 8.05 (2)	- 2.80 (3)	
		-11.3(2)	- 4.1(1)		-12.3(1)	- 9.9(1)		
		- 5.6(0)	- 1.9(0)		+ 8.8(1)	-14.0(1)		
		+17.7(0)	+ 6.0(0)		+11.3(3)	+11.8(3)		
		+ 0.2(4)				- 2.2(1n)		Cr II .77(2) (Ce II .831(250))
		- 3.5(3)	- 1.2(3)		+ 7.5(2)	+ 5.0(2n)		Cr II .48(2)
		- 1.6(2)	+ 3.4(1n)		+ 5.1(1)	+ 8.9(1)		(Pr II .006(60))
			+ 4.5(1)		+10.8(1)	+13.1(1)		
		- 2.2(2)	- 0.6(2)		+ 7.4(2)	+ 8.9(3)		
		+ 0.1(1)	+ 1.5(1)		+ 2.5(2)	+ 8.2(1)		(Mo I .963(1000))
- 0.9(3)	+ 2.6(3)	+ 3.2(3)		+ 6.5(5)				(Fe II .31(pr))
- 2.5(1)	- 4.8(1)	+ 0.8(1n)	+ 3.0(1)	+ 3.6(1)	+ 9.7(1)	+10.1(1)		
- 2.4(3)	- 4.4(3)	- 3.1(3)	+ 1.8(2)	+ 2.5(3)	+ 5.8(4)	+ 3.6(2)		(A I .966(150))
- 3.2(2)	- 0.1(2)	- 6.0(2)	+ 3.4(2)	+ 5.5(4)	+ 6.4(2)	+ 8.3(2)	-12.0(4)	Gd II .59(200) (Mn I .528(100)
0 (2)	- 3.1(2)	- 0.6(2n)	+ 6.7(2)	+ 1.2(4)	+ 2.3(4)	+10.1(3)	+ 7.3(0)	Ce II .814(150) (Ce II .814(1
		- 3.8(0)		-21.6(0)				(A II .73(80)) (La II .74(5))
		- 1.7(1)	+ 1.7(1)	+ 8.5(1)	+ 9.8(2)	+10.3(2)		
- 1.8(0)	+ 0.1(1)		+ 3.3(1)	+ 3.0(2)	+ 8.2(1)	+ 6.8(1)	-11.6(2)	(La II .77(15))
- 6.4(0)		- 2.8(0)			- 7.6(1)	+11.2(1)	+10.9(0)	
			+11.4(1)	+ 9.4(3)	+ 9.2(1)	+ 9.0(1)	+10.6(2)	
	+ 0.6(0)	- 9.7(1)		+ 0.3(1)	+ 0.1(1)	+ 6.9(1)		(Nd II .099(10)) (Cr II .02(p
- 2.7(1)		- 7.4(1)	+ 3.8(1)	+ 7.5(1n)	+ 6.5(2)	- 1.9(0)		
	- 3.1(0)	- 5.4(1)	+ 6.2(1)	+ 1.7(2)	+ 7.8(1)	+ 9.9(1)	+ 8.4(1)	Sm II .352(150) (La II .22(5C
+ 1.8(0)	+ 3.6(1)	+ 0.8(1)		+ 3.6(0n)	+ 8.8(1)		- 7.6(1)	
- 4.2(1)	- 5.0(2)	- 0.1(1n)		+ 4.8(1n)	+ 8.4(1)	+ 3.2(0n)	- 9.3(3)	Eu II .40(6) (Al II .500(30)) (Al II .406(8))
		- 5.3(1)	+ 2.3(1)	+ 0.6(2)	+ 3.8(1)	+11.3(0)	-12.0(1)	Gd II .88(60)
- 4.8(1)	- 7.6(1)	- 6.0(2)	+ 5.1(1)	- 4.4(3)	- 2.9(2)	+ 6.6(1)	- 0.1(3)	

TABLE 4 -- Continued

Laboratory λ	0.500	0.691	0.822	0.981	1.323	1.460	1.510	1.642	2.363	2.580
Fe I - Continued										
4271.76(1000)	+ 4.4(1n)	- 6.0(2)	- 6.8(3)	+ 0.5(3)	- 0.8(3)	+ 4.2(2)	+ 6.1(1)	+ 7.6(3)	- 1.0(1n)	+ 5.4(1)
4282.41(600)	- 2.2(3)	- 4.8(4)	- 2.2(3)	+ 2.4(3)	+ 1.7(3)	+ 7.3(3)	+ 3.5(1)	+ 8.5(1)	+ 5.5(1)	+ 1.0(1)
4299.24(500)	- 8.7(1)	- 3.5(1n)		- 3.7(0)	+12.8(1)	- 1.4(2)	+ 8.3(0)	- 5.4(1)	+ 7.3(1)	+ 1.0(0)
4383.55(1000)		- 8.3(5)	- 8.5(4)	- 5.3(2)	- 4.6(4)	- 1.7(3)	- 7.3(2)	- 4.6(3)	- 1.8(3)	- 1.2(3)
4404.75(1000)	- 3.1(4)	- 7.2(9)	- 4.1(9)	- 1.6(5)	- 2.4(9)	- 0.5(5)	- 1.3(3)	+ 2.1(4)	- 7.6(4)	- 0.1(3)
4415.12(600)		- 5.2(1)	- 1.5(2)	+12.4(0)	- 0.3(2)	-13.4(0)		+ 9.8(0)	- 1.8(2)	-10.5(0)
4427.31(500)	- 4.2(0)	+ 3.2(0)				-13.2(0)		+ 3.0(1)		- 2.6(0)
4442.34(400)			- 9.7(1)	+ 6.7(1)	- 4.7(0)				- 7.3(1)	
4476.02(500)	+ 3.8(0)	-10.0(1)	- 6.4(1)	+ 5.0(0)	+ 0.6(1)			+ 4.1(0)	- 7.4(1)	-12.1(0)
4528.62(600)	-12.5(1)			+ 0.9(1)		- 6.0(1)	+ 3.4(1)	+ 4.2(1)		+ 0.8(1)
4602.94(300)		+ 1.2(1)				-12.3(0)			- 0.1(0)	
Mean Number of measures	- 4.89 (21)	- 6.73 (33)	- 5.61 (29)	- 1.99 (22)	- 2.83 (34)	- 0.90 (25)	+ 0.32 (19)	+ 0.72 (32)	- 1.82 (31)	- 2.14 (21)
Fe II										
3824.91(4)		- 6.7(4)	- 4.2(2)		+ 0.4(3)			+ 8.9(1)	- 1.6(2)	
3827.08(4)		- 6.5(3)	- 7.9(1)		- 3.7(3)			+ 0.8(1)	- 2.5(3n)	
3845.18(4)		- 6.8(3)	- 5.1(1)		- 0.6(3)			+ 6.7(0)	+ 8.3(2)	
3906.04(5)	- 5.6(8)	- 8.0(5)	- 2.8(3)		- 0.8(5)	+ 2.8(3)		+ 4.5(3)	+ 1.2(3n)	+ 1.3(3n)
3938.97(4)	-10.0(6)	- 8.3(6)	- 6.6(5)		+ 0.9(6)	+ 0.2(5)		+ 0.1(4)	- 2.1(4)	+ 0.6(3)
3960.90(3)	- 5.6(3)	- 1.9(3)	- 3.7(2)		+ 0.6(3)	+ 2.3(1)		- 0.2(1)	- 3.6(2)	- 0.3(3)
3974.16(3)	- 9.4(1)	- 8.3(2)	- 8.6(1)		- 9.0(1n)	- 9.7(0n)			- 4.5(2n)	
4024.55(5)	- 6.9(5)	- 5.4(5)	- 5.2(5)	- 0.2(3)	- 0.4(5)	+ 2.2(4)	- 2.4(1)	- 1.9(5)	- 3.4(3)	- 2.7(5)
4048.83(3)	- 9.6(4)	- 4.5(4)	- 8.7(2)	- 0.4(3)	-13.6(3n)	+ 0.7(4)	+ 4.4(1)		- 0.8(2)	+ 4.4(3)
4122.64(4)	- 6.1(2)	- 3.6(5)	-11.4(4)	+ 0.6(5)	- 2.4(9)	+ 3.1(6)	+ 0.3(2)	+ 1.2(4)	- 3.4(5)	+ 1.1(6)
4128.74(3)	- 8.4(2)	- 7.9(2)	-10.1(1)	+ 0.2(1)	- 1.4(3)	+ 3.3(1)	+ 4.1(1)	+ 5.5(2)	+ 6.7(2)	- 4.3(1)
4173.45(8)	- 2.1(9)	- 5.2(7)	- 1.3(9)		- 0.8(9)	+ 0.6(7)	+ 2.3(5)	+ 2.2(8)	- 1.6(7)	+ 0.7(8)
4178.86(8)	- 8.5(3)	- 7.4(5)	- 5.1(4)	- 5.0(3)	- 5.2(8)	+ 0.1(5)	- 3.9(3)	- 0.4(5)	- 3.6(7)	- 3.0(5)
4233.17(11)	- 3.3(6)	- 5.8(x)	- 2.3(9)	- 2.0(9)	- 1.1(x)	+ 0.6(9)	+ 2.6(8)	+ 1.1(9)	+ 0.1(x)	- 1.4(7)
4258.16(3)	- 7.7(4)	- 2.4(7)	- 4.2(8)	- 2.5(3)	- 2.3(7)	+ 3.2(7)	+ 5.4(4)	+ 4.6(3)	- 1.3(6)	+ 0.8(6)
4273.32(3)	- 1.2(3)	- 7.4(6)	- 3.4(5)	- 1.0(6)	- 4.4(8)	+ 1.5(0)	+ 1.5(3)	+ 4.9(3)	- 1.8(6)	- 0.4(4)
4296.57(6)	- 0.6(5n)	- 6.7(4)	- 4.5(3)	- 3.6(3)	- 4.3(5n)	- 0.1(6)	+ 0.1(3n)	- 6.4(2n)	+ 0.1(9)	+ 2.1(7)
4303.17(8)	- 1.2(4)	- 2.7(6)		- 2.0(4)	- 3.6(7)	+ 0.3(5)	- 0.3(3)	- 2.7(5)	- 2.3(9)	- 1.3(6)
4314.29(4)	-12.0(1n)	+ 3.1(1)	- 1.0(1n)	- 9.2(1)	- 5.5(1)	+ 0.4(2)	+ 1.7(0)	- 0.2(2)	+ 0.3(3)	- 1.1(3)
4351.76(9)	- 3.2(3)	- 8.2(7)	- 5.0(6)	- 2.1(3)	- 3.9(8)	- 1.0(5)	- 2.3(3)	- 1.0(5)	- 0.6(9)	+ 1.3(8)
4357.57(4)	- 9.6(1)	- 9.4(5)	- 7.3(5)	- 0.8(3)	- 4.9(3)	- 4.3(1)	+ 1.4(0)	+ 4.2(2)	- 3.2(3)	- 1.4(4)
4385.38(7)	- 2.7(3)	- 5.0(9)	- 5.1(8)	- 1.4(4)	- 3.5(9)	+ 1.3(6)	+ 0.3(4)	- 1.5(5)	+ 0.1(8)	+ 1.4(7)

3.490	3.530	3.721	4.460	4.520	4.956	5.050	5.430	Blends
- 0.4(1)	- 2.5(2)	+ 0.8(2)	+ 8.1(3)	+ 3.6(5)	+ 7.0(3)	+ 9.1(3)		(Pr II .764(15))
- 0.5(1)	- 2.3(2)	- 2.9(1)	+ 1.5(2)	+ 3.8(3)	+ 3.6(1n)	+ 5.2(1)	-10.1(3n)	Mn II .50(3) Pr II .440(60) (Nd II .570(15)) (Nd II .443(50) (Zr II .21(
- 5.4(0)		-11.2(1)	+ 3.0(2)	- 0.8(1n)		- 2.2(2)	+ 7.1(2)	Ce II .362(60) (F II .177(150))
+ 1.6(1)	- 1.4(2)	- 2.8(2)	+ 2.7(2)	+ 2.9(3)	+12.0(2?)	+18.1(2n)		(La II .44(100))
- 1.2(2)		- 7.6(2)	- 9.0(2)	- 7.4(7)	-12.0(4n)	- 7.8(3)	- 7.4(6)	
+ 8.7(0)	- 8.3(1)		- 0.2(0)	+ 1.2(1)	+ 7.7(1)	+ 3.1(1)	- 1.6(0)	
		+ 0.6(1)		+ 5.8(0)				
	- 7.4(0)		+ 0.8(0)					
		-10.7(1)	+ 0.9(1)	- 0.1(1n)	+ 2.0(1)	- 2.5(1)	+ 0.1(1)	
- 9.1(0)		+ 4.2(1n)				- 6.2(1)	- 7.4(1)	
		-10.2(0)	+ 5.7(1)	+ 4.6(0)	+12.6(1)	+ 5.7(2)		
- 1.86 (18)	- 2.69 (16)	- 2.91 (32)	+ 2.49 (28)	+ 1.86 (25)	+ 5.01 (30)	+ 4.93 (32)	- 2.12 (16)	
		- 2.4(2)	+ 1.8(3)		+ 7.8(4)	+10.2(4)		(Gd II .02(50))
		- 0.5(2)	+ 2.7(2)		+ 5.6(3)	+ 7.5(2)		Cr II .95(1) (Cr II .06(0))
		+ 1.0(1)	+ 7.4(1)		+ 5.4(2)	+10.9(3)		Fe I .174(100) (Cr II .16(1))
- 0.5(3)		+ 0.8(2)	+ 3.6(4)		+ 8.4(4)	+11.0(5)		Nd II .886(100) (Nd II .096(10)) (Ho II .78(30))
	+ 0.6(3)	- 1.4(3)	+ 1.3(2)	+ 2.2(2n)	+ 0.8(2)	+ 5.0(1)		Gd II .971(50) (Nd II .874(40))
	- 4.2(1n)	- 2.3(2)	+ 0.7(2)	+ 0.2(2)	+ 7.4(1)	+ 8.6(1)		(Ce II .914(125))
- 1.2(1)		- 2.9(1n)	+ 3.4(1)		+ 3.7(0)	+10.6(1)		Gd II .981(500) (Tb II .30(15)) (Gd II .223(10))
- 1.0(3)	- 1.2(3)	- 6.0(3)	- 0.9(3n)	- 2.2(4)	+ 1.7(3)	+ 5.8(3)		(Zr II .45(12)) (Nd II .785(30))
+ 8.6(3)	+11.5(4)	- 9.3(0)	- 0.6(1)	+ 2.4(1)	-16.8(1)	- 9.9(2)	-13.3(2n)	Gd II .597(90) (Zr II .68(25)) (Nd II .814(15))
+ 0.3(3)	- 0.4(9)	- 1.5(3)	+ 0.7(3)	+ 0.2(6)	+ 6.9(4)	+ 8.8(4)	+ 3.1(1)	(Fe I .510(70))
+ 3.1(1)	- 5.6(1)	- 5.2(1)	+ 2.9(1)	+ 1.6(2)	+ 2.0(2)	+ 4.4(1)	+14.2(1)	
0.0(5)	+ 0.6(8)	- 3.7(4)	+ 1.4(3)	- 1.1(9)	+ 3.4(9)	+ 4.5(7)	+ 3.2(4)	Ti II .549(40) Gd II .556(100) (Nd II .379(8))
+ 0.5(4)	- 2.6(5)	- 0.7(3)	+ 1.6(2)	- 1.7(7)	+ 4.2(4)	+ 7.2(4)	-12.1(1)	(Tb II .97(15))
- 0.4(9)	- 2.2(9)	- 3.3(9)	+ 2.8(9)	+ 1.4(9)	+ 3.8(9)	+ 2.8(7)	+ 2.3(x)	Cr II .25(10) (Pr II .134(10))
+ 0.9(3)	- 0.3(5)	- 0.4(4)	+ 4.5(4)	+ 3.7(9)	+ 3.6(3n)	+ 5.6(3n)	- 1.4(6)	(Eu II .19(8)) (Zr II .05(12))
- 1.2(3)	- 3.0(4)	- 2.6(4)	+ 2.2(4)	+ 4.0(7)	+ 4.8(4)	+ 9.4(3)	- 1.5(6)	
- 0.6(4)	+ 2.5(4)	- 0.9(8)	+ 4.8(5)	+ 2.7(9)		+ 7.9(3)	+10.1(6n)	Gd II .30(400)
+ 2.8(5)	+ 3.3(9)	- 1.9(4)	+ 3.3(3)	+ 1.2(9n)	+ 5.8(3)	+ 6.3(1)		
+ 0.3(1)	+ 1.4(3)	- 3.1(2)		+ 2.6(4)	+ 6.2(3)		+ 7.5(1)	(Gd II .28(10)) (Nd II .369(8)) (Nd II .511(5))
- 3.5(4)	+ 0.2(6)	- 0.6(8)	+ 4.8(8)	+ 2.6(x)	+ 7.1(7)	+ 8.9(8)	+ 7.1(5)	(Cr I .770(300)) (Pr II .849(50)) (Tb II .57(8))
+ 2.1(2)	- 6.1(2)	- 3.1(2)	- 0.1(1)	- 1.3(4)	+ 4.7(2)	+ 8.1(2)	- 5.8(1)	
+ 2.3(5)	- 4.0(4)	- 3.4(9)	+ 2.0(4)	- 0.5(8)	+ 1.3(5)	+ 6.1(4)	+ 0.8(3)	(Nd II .663(150)) (Dy II .29(2)) (La II .20(40))

TABLE 4 -- Continued

boratory λ	0.500	0.691	0.822	0.981	1.323	1.460	1.510	1.642	2.363	2.580
Fe II - Continued										
16.82(7)	- 6.0(1)	- 6.2(4)	- 6.0(4)	- 2.7(3)	- 4.6(5)	- 0.5(4)	- 6.3(2)	- 1.2(6)	- 3.1(x)	+ 1.8(5)
451.54(4)	- 2.4(0)	- 8.8(3)	- 7.5(4)	+ 3.8(1)	- 1.0(3)	- 0.3(3)	- 6.5(1n)	+ 2.2(2)	- 4.4(3)	- 2.0(3)
455.26(3)		- 7.8(1n)	- 3.8(1)	- 8.2(1n)	- 3.3(2)	+ 0.3(2)	- 1.5(1)	- 7.4(1)	- 2.8(3)	- 4.0(2)
491.41(5)	- 5.9(1)	- 8.0(5)	- 6.8(3)	- 1.7(3)	- 2.3(5)	+ 1.7(5)	- 0.9(1)	- 4.5(3)	- 3.7(6)	- 3.8(3)
508.28(8)	- 4.8(3)	- 7.2(9)	- 4.7(4)	- 0.2(3)	- 2.2(8)	+ 1.4(6)	+ 2.9(2)	- 1.7(5)	- 2.7(9)	- 3.7(5)
515.34(7)	+10.1(5)	- 7.0(6)	- 7.6(7)	+ 8.5(5)	- 0.3(x)	+ 8.7(9)	+ 6.4(3)	+ 5.2(3)	0.0(8)	+ 2.3(5)
4520.24(7)	- 9.8(3)	- 8.1(7)	- 6.8(3)	+ 2.1(3)	- 5.6(6)	- 1.1(5)	- 9.9(2)	- 2.7(3)	- 4.5(7)	- 1.3(3)
4522.63(9)	+ 1.6(4)	- 5.4(8)	- 4.1(6n)	- 0.5(3)	- 1.9(7)	+ 0.1(4)	- 7.1(1)	+ 2.2(6)	- 1.3(8)	+ 1.2(4)
4541.52(4)	+ 1.4(1n)	- 8.2(5)	- 7.3(3)			- 4.2(4)	- 4.3(3)	- 1.4(4)	- 3.2(5)	- 4.6(3)
4549.47(10)	+ 4.9(9)	- 2.6(9)	- 1.9(xn)			0.0(x)	- 2.4(5)	- 2.2(9)	- 4.2(x)	- 3.0(9)
4555.90(8)	- 1.0(2)	- 4.7(5)	- 6.2(3)			- 0.7(5)	+ 2.3(1)	+ 2.3(4)	- 4.0(8)	+ 0.6(4)
4576.33(4)	+13.5(1)	- 4.4(5)	- 2.5(1)			- 3.1(2)		+ 3.0(3)	- 0.3(5)	- 5.0(3)
4582.84(3)	+ 4.9(2)	- 5.0(6)	-10.5(3)			- 3.4(3)	- 4.5(1)	+ 0.7(4)	- 2.1(4)	- 5.4(2)
4583.85(11)	+ 5.7(5n)	- 5.2(9)	- 4.1(5)			- 1.0(5)	- 3.7(1)	+ 3.6(5)	- 2.7(9)	+ 2.1(4)
4620.51(3)		- 4.5(4)	- 5.5(3)			+ 0.9(4)			- 4.6(7)	+ 5.3(1)
4629.33(7)		- 6.9(8)	0.0(5)			- 0.7(5)			- 1.5(6)	- 6.9(3)
4635.33(5)		- 5.1(7)	- 5.4(3)			- 1.5(4)			- 1.4(6)	- 5.0(2)
Mean	- 3.17	- 5.9	- 7.76	- 1.29	- 3.02	+ 0.11	- 0.72	+ 0.84	- 1.69	- 0.96
Number of measures	(32)	(39)	(38)	(22)	(30)	(36)	(28)	(34)	(39)	(35)
Ni I										
4401.55(1000)	+ 8.7(2)	+ 3.3(5)	+ 4.6(3)	+ 4.2(1)	+12.6(1)	+ 6.1(1)	+12.2(1)	+10.2(0)	+ 8.0(1n)	+ 5.2(0)
Mean	+ 8.7	+ 3.3	+ 4.6	+ 4.2	+12.6	+ 6.1	+12.2	+10.2	+ 8.0	+ 5.2
Number of measures	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Sr II										
4215.52(400)	+ 3.1(5n)	+ 7.2(4n)	+ 8.3(8)	+ 8.5(5)	+ 5.2(7)	+ 8.4(4)	+11.6(3)	+11.8(3)	+ 3.8(3)	+ 2.0(4)
Mean	+ 3.1	+ 7.2	+ 8.3	+ 8.5	+ 5.2	+ 8.4	+11.6	+11.8	+ 3.8	+ 2.0
Number of measures	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Ce II										
3942.75(150)	- 7.2(1)	- 8.8(2)	- 2.3(1)		+ 0.2(1)	+ 5.4(0)		+ 8.9(0)	- 6.7(0)	- 6.5(0)
3952.57(125)	- 6.4(3)	- 4.0(4)	- 1.3(2)		+ 6.0(2)	+ 7.6(3)		+13.2(0)	- 4.4(1)	- 5.2(1)
3980.90(100)	- 5.0(2)	- 2.6(3)	- 1.4(1)		+ 1.3(2)			- 6.6(1n)	-10.9(0)	- 1.9(1)
4133.80(500)		- 6.4(2)	-19.5(1n)	+ 0.2(0)	+ 3.1(1)	+ 0.9(1)		-15.5(1)	-12.8(3)	
4186.60(600)	-10.0(2)	+ 1.4(1)	+ 0.9(1n)	+ 8.1(1)	+ 8.3(2)	+10.2(1)		- 4.6(1n)	- 6.4(1)	-10.2(0
4289.94(300)	+15.5(9)	+15.7(x)	+19.6(9)	+20.6(5)	+18.4(4n)	+23.3(4)	+26.5(1)		+ 6.4(3n)	+ 5.2(2
4391.66(250)	- 1.3(1n)	- 2.3(4)	- 1.2(3)	+ 0.9(1)	+ 2.5(3)	+ 8.8(3)	+ 8.4(1)	+10.6(1)	+ 4.0(1)	
4449.34(200)	- 2.4(1n)	- 7.0(3)	- 1.6(2)				+15.0(1)			+11.7(1
Mean	- 2.4	- 1.75	- 0.08	+ 7.45	+ 5.68	+ 9.36	+16.63	+ 1.0	- 4.4	- 2.85
Number of measures	(7)	(8)	(8)	(4)	(7)	(6)	(3)	(6)	(7)	(6)

	3.490	3.530	3.721	4.460	4.520	4.956	5.050	5.430	Blends
	- 2.1(4)	- 0.9(5)	- 3.3(x)	+ 0.1(3)	+ 1.3(5)	+ 4.8(5)	+ 6.0(3)	+ 7.0(3)	(Nd II .884(15))
	+ 1.7(2)	- 6.4(2)	- 5.6(3n)	+ 0.1(3n)	+ 1.8(4)	+ 3.3(3n)	+ 5.8(3)		Nd II .566(400) (Mn I .586(125)) (Eu II .63(2))
	- 0.9(1)	- 6.2(1n)	- 5.3(2n)	+ 1.6(2)	+ 0.2(3n)	+ 0.7(2)	+ 3.8(2)	+ 6.5(2)	(Ti I .326(150)) (Dy II .49(4))
	- 0.5(3)	- 0.3(3)	- 2.5(3)	- 1.9(2)	+ 2.1(4n)	+ 1.2(3)	+ 6.3(3)	- 3.7(1)	(Nd II .644(3))
	- 1.1(4)	- 5.4(5)	- 3.0(6)	- 1.0(3)	- 2.6(8)	+ 0.4(5n)	+ 3.3(5)	- 2.4(3)	
	+ 4.6(5)	+ 4.9(4)	+ 0.9(5n)	- 0.5(3n)	+ 1.1(9)	+ 4.0(5)	+ 4.4(7)	+ 5.4(6)	
	0.0(4)	- 0.6(6)	- 5.6(7)	+ 0.4(3)	+ 1.7(6)	- 0.8(3)	- 3.1(3)	- 8.3(1)	(Gd II .070(150)) (Tb II .09(4))
	- 2.8(5)	- 2.4(8)	- 2.1(7)	+ 2.4(4)	+ 1.7(9)	+ 1.3(9n)	+ 8.4(4)	+ 7.0(5)	Eu II .57(2000)
	+ 0.7(5)	- 4.0(4)	- 4.0(4)	- 0.4(4)	+ 0.8(7)	+ 3.8(9)	+ 4.6(8)	+ 6.0(3)	
	- 0.5(9)	- 3.7(9)	- 6.0(x)	+ 2.5(9)	+ 0.5(x)	+ 0.5(x)	+ 2.1(x)	+ 7.6(9)	(Fe II .214(4)) (Eu II .52(6)) (S II .547(80))
	+ 4.1(3)	- 1.2(4)	- 5.5(4)	+ 2.4(3)	+ 0.3(9)	+ 5.9(3)	+ 1.6(2)	+ 6.6(2n)	
	+ 1.5(3)	- 0.6(2)	- 1.5(6)	+ 2.8(3)	- 0.5(4)	+ 5.3(5)	+ 5.9(3)	+ 3.5(2)	Eu II .35(12) (Pr II .320(20))
	- 8.2(2)	- 4.0(3)	- 3.6(3n)	+ 0.3(2)	-13.6(4n)	+ 1.8(2)	+ 9.0(2n)	- 5.7(3)	
	+ 2.0(6)	+ 0.5(7)	- 2.2(8)	- 0.1(7)	+ 1.5(9)	+ 3.8(9)	+ 7.5(9)	+12.0(3)	
	+ 4.2(1)	- 3.5(1)	- 4.3(3)	+ 0.5(3)	0.0(4)	+ 2.7(4)	+ 5.1(4)		(Gd II .45(15))
	+ 0.9(3)	- 5.0(3)	- 1.4(3)	+ 3.6(4)	- 1.2(4)	+ 4.0(3)	+ 7.4(3)		(Ti (II?) .337(15))
	+ 2.1(4)	- 2.3(3)	- 4.2(4)	- 3.6(3)	- 3.6(3)	+ 2.5(3)	+ 5.1(3)		
	+ 0.54 (34)	- 1.49 (34)	- 2.89 (39)	+ 1.57 (38)	+ 0.28 (34)	+ 3.24 (38)	+ 5.87 (38)	+ 2.14 (26)	
			-12.8(1)	- 8.2(2)	- 7.9(4)	-11.5(5)	- 2.0(5)	+ 8.8(5)	(Fe I .300(60)) (Tb II .54(10))
	(0)	(0)	-12.8 (1)	- 8.2 (1)	- 7.9 (1)	-11.5 (1)	- 2.0 (1)	+ 8.8 (1)	
	+ 4.8(2)	+ 5.0(3)	+ 9.9(2)	+ 1.8(2)	+ 1.5(3)	+ 5.3(3)	+ 3.1(4)	+ 2.3(3)	(Cr II .77(2)) (Zr II .76(1))
	+ 4.8 (1)	+ 5.0 (1)	+ 9.9 (1)	+ 1.8 (1)	+ 1.5 (1)	+ 5.3 (1)	+ 3.1 (1)	+ 2.3 (1)	
		+10.6(0)			- 1.6(1)	+ 8.0(1)			(Nd II .631(6))
		- 4.5(1n)	-15.3(1)	- 7.4(1)	- 6.4(1)	+ 1.3(1)	- 5.0(2n)		Fe I .606(80) (Nd II .870(25))
		-14.2(0)		- 9.3(1n)	- 1.0(0)				
	- 5.5(0)	-12.0(1)	-18.3(1)	-14.2(1)	- 7.4(3)	- 9.5(2)	- 7.9(0)		(Pr II .618(15))
	+ 5.4(0)	+ 2.6(0n)		- 4.6(1)	- 3.6(3)	- 2.4(1)	+ 4.9(2)	- 1.8(1n)	(Zr II .70(12))
		+ 9.4(1n)	+12.2(1)	+ 4.5(4n)	+ 2.7(7n)	+ 5.7(5)	+ 5.3(5)	+10.6(9)	Ti II .227(60) Gd II .884(80)
		- 2.8(1)	+ 1.2(1)	- 4.0(0n)	- 1.1(2n)	+ 1.0(1)	+ 3.1(1n)	- 1.4(1)	Gd II .445(15) (Eu II .37(10)) (S II .84(30))
		+ 7.6(2)		-14.6(1)	-18.0(1)	-21.1(1)	-15.4(2)	-10.7(2)	Ti II .148(150) (Dy II .16(2))
	+ 0.05 (2)	- 0.41 (8)	- 5.05 (4)	- 7.08 (7)	- 4.55 (8)	- 2.43 (7)	- 2.5 (6)	- 0.82 (4)	

TABLE 4 -- Continued

Laboratory λ	0.500	0.691	0.822	0.981	1.323	1.460	1.510	1.642	2.363	2.580
Pr II										
4033.86(75)	- 7.7(3)	- 6.5(2,	- 6.3(2)	+ 0.4(0)	- 4.4(1n)	- 3.9(1n)	- 3.4(1)		-21.8(0)	-12.4(0)
4408.84(200)		- 7.5(1)	- 6.8(2)	+ 0.5(1)	- 0.5(2)	+ 0.9(0)			-11.4(1)	
4510.16(100)		- 6.5(3)	- 7.6(3)	+ 1.7(0)	- 0.5(1)	+ 5.5(1)		+ 2.3(1)	+10.6(1n)	- 2.5(0)
Mean	- 7.7	- 6.83	- 6.9	+ 0.87	- 1.8	+ 0.83	- 3.4	+ 2.3	- 7.53	- 7.45
Number of measures	(1)	(3)	(3)	(3)	(3)	(3)	(1)	(1)	(3)	(2)
Nd II										
3901.85(50)	+ 1.3(0)	- 8.8(2)	-12.5(2)		- 8.8(2)			- 7.0(0n).	-24.6(1n)	
4390.66(20)	-12.6(0)	-11.4(4)	-14.8(2)	- 9.4(1)	-13.0(1)	- 9.4(1)		- 4.0(1)		
Mean	- 5.65	-10.1	-13.65	- 9.4	-10.9	- 9.4		- 5.5	-24.6	
Number of measures	(2)	(2)	(2)	(1)	(2)	(1)	(0)	(2)	(1)	(0)
Sm II										
4362.04(300)	+ 7.4(1)	+10.6(2n)	-22.3(1)	+15.9(0)	+ 2.2(1)	- 0.9(0)		+ 4.7(0)	- 9.3(1)	
4424.34(600)	+ 0.8(1)	+ 3.7(2)	+11.9(1)	-12.4(0n)	+ 6.2(1)	+ 6.8(0)	+ 2.9(0)		+ 1.7(0)	
4434.32(400)	- 6.4(3)	+ 1.3(4n)	+ 2.1(4)	- 6.9(1n)	+ 1.5(2)	- 7.6(1n)	- 6.6(1n)	+ 8.9(0)	-12.0(1)	
Mean	+ 0.6	+ 5.2	- 2.77	- 1.13	+ 3.3	- 0.57	- 1.85	+ 6.8	- 6.53	
Number of measures	(3)	(3)	(3)	(3)	(3)	(3)	(2)	(2)	(3)	(0)
Eu II										
3724.94(4000)		+ 1.3(2)			+ 6.8(1)					
3765.93(150)		+21.2(0)								
3819.67(6000)		+ 4.5(7)	+ 4.9(5)		+ 4.9(3)			+10.9(1)	- 9.7(1)	
3907.10(3000)	+ 5.3(9)	+ 7.4(9)	+10.5(4)		+12.4(3)	+15.0(2)		- 4.2(1n)	+ 2.8(1n)	+ 1.8(0n)
3917.29(60)	+ 5.1(1n)	+ 6.1(1n)	+15.6(1)		+ 1.9(1)	+12.8(1)		+14.3(0)	+11.7(1n)	
3971.96(4000)	+ 6.9(3)	+ 7.6(5)	+14.3(1)		+10.6(2)	+10.6(1)				
4011.69(100)	+ 4.8(1)	+10.5(0)	+15.9(0)		+21.9(0)					
4129.70(5000)	+10.1(9)	+ 8.9(9)	+ 9.9(6)	+16.0(6)	+14.5(4)	+15.8(3)	+20.6(1)	+20.3(1)	- 5.5(0)	+ 4.0(0)
4141.02(25)	+ 6.4(1)	+ 2.3(1)	+ 7.2(1)	+10.4(1)	+ 5.4(1)	+14.3(0)			+ 1.4(0)	
4205.05(6000)	+ 3.4(x)	+ 2.7(9n)	+ 4.0(5)	+10.6(5n)	+10.0(5n)		+24.4(2n)	+23.5(3n)	-14.4(1)	- 7.7(1
4435.56(3000)	+ 7.4(4)	+ 6.2(5)	+ 6.6(3)	+13.3(1)	+ 9.9(2)					
Mean	+ 6.18	+ 7.16	+ 9.88	+12.58	+ 9.83	+13.7	+22.5	+12.96	- 2.28	- 0.63
Number of measures	(8)	(11)	(9)	(4)	(10)	(5)	(2)	(5)	(6)	(3)

3.490	3.530	3.721	4.460	4.520	4.956	5.050	5.430	Blends
	-20.7(0)	-20.0(1)	-23.3(1)	-24.9(0)	-22.5(2)	-18.8(3)		Dy II .666(10) (P II .68(15))
			- 1.4(1)	- 6.9(2)	- 3.0(1)	+ 4.8(1)		
	-11.2(0)	-21.2(1)	-14.2(1n)	- 7.7(4)	-17.8(3)	- 5.2(2n)	- 7.6(4)	Mn II .210(3)
(0)	-15.9 (2)	-20.6 (2)	-13.0 (3)	-13.17 (3)	-14.43 (3)	- 6.4 (3)	- 7.6 (1)	
			-29.9(1n)		-25.3(2)	-20.5(4)		(Eu II .63(3) (Tb II .60(6))
	-15.6(1)	-14.9(0)	-27.2(1)	-27.2(0n)	-22.5(2)	-21.0(3)	-11.8(2)	Mg II .585(10) (Eu II .36(3))
(0)	-15.6 (1)	-14.9 (1)	-28.6 (2)	-27.2 (1)	-23.9 (2)	-20.75 (2)	-11.8 (1)	
		+ 2.5(1)	- 4.4(1)	-12.4(1)	- 7.8(2n)	- 6.7(2)	+ 6.2(3)	Ni II .10(1) Ce II .661(18)
			- 9.8(1n)	-15.6(2n)	-10.3(3)	- 3.9(3)	+ 1.6(3)	Gd II .102(40) (Pr II .595(25))
		-16.2(2)	-12.5(3)	-11.8(6)	- 8.9(6)	-11.9(5)	- 6.2(8)	(Tb II .48(10))
(0)	(0)	- 6.85 (2)	- 8.9 (3)	-13.27 (3)	- 9.0 (3)	- 7.5 (3)	+ 0.53 (3)	
		-19.1(1)	-15.1(1)		-11.4(2)	- 5.7(2)		(Mn II .81(1)) (Nd II .877(30)) (La II .05(20)) (Sm II .902(200))
			+ 3.3(0)					
						+13.0(0)		
		+13.3(0)	- 9.3(3)		- 8.1(7)	- 4.6(9)		
+ 6.8(1n)		- 3.1(0n)	-12.2(2n)		- 7.8(5)	- 4.9(8)		
- 1.5(0)			- 4.4(1)		+ 1.9(1)	+ 2.8(1)		Sm II .442(200) (Pr II .229(20))
+ 9.2(0)		-12.3(0)	- 5.1(0)		-10.6(5)	- 5.1(6)		Gd II .754(300) (Gd II .166(30)) (Ce II .684(10)) (Tb II .05(20)) (Pr II .693(25)) (Pr II .164(100))
			- 8.4(2)	- 8.8(1)	- 2.6(1)	- 4.1(2)		
		- 5.8(1n)	+ 0.6(2)	- 3.5(4)	+ 0.7(7)	+ 0.7(8)	+ 3.5(1)	
+ 1.4(0)	+ 1.3(0)	- 7.7(0)		+ 8.2(1n)	- 1.7(0)	- 5.9(1)	+ 5.1(0)	Gd II .017(25)
		-22.5(1n)	-12.0(1)	-11.9(6)	-10.0(7)	- 3.9(9)	- 2.8(9)	Gd II .857(300) (V II .080(250)) (Cr II .83(pr))
			- 9.6(2n)	-10.0(6)	- 9.4(9)	- 7.6(9)	- 1.2(9)	(Dy II .78(1))
+ 3.98 (4)	+ 1.3 (1)	- 8.17 (7)	- 7.22 (10)	- 5.2 (5)	- 5.90 (10)	- 2.30 (11)	+ 1.15 (4)	

TABLE 4 -- Continued

boratory λ	0.500	0.691	0.822	0.981	1.323	1.460	1.510	1.642	2.363	2.580
Gd II										
902.40(1000)	+ 0.2(3)	- 1.9(2)	- 1.1(1)		+ 6.5(1)	+ 8.2(1)		+ 7.8(0)		
923.25(300)	+ 8.9(7)	+10.2(5)	+ 9.0(3)		+13.6(2)			+14.4(0)	+13.3(0)	
934.82(300)	+ 1.8(2)	+ 3.5(3)	+ 2.7(1)		+ 7.2(2)	+ 7.3(1)		+15.2(1)	+15.8(0n)	+ 8.9(1)
3957.67(1000)	+14.5(5)	+12.7(5)	+13.6(2)		+18.6(3)	- 6.5(0)			+15.2(1n)	
3959.52(500)	+ 0.3(3n)	- 1.7(3n)	0.0(2)		+ 0.6(1)	+ 2.3(0)		-13.6(0)	+ 6.9(1)	-12.9(0)
4008.91(400)	+ 3.2(0)	-19.5(2)	-15.9(1)	-10.2(0)	- 9.6(2)	- 6.4(1)		+ 1.3(1)		
4037.33(1500)	+ 2.2(4)	+ 9.5(3)	+ 2.0(2)	+12.1(1)	+10.0(1)	- 4.1(1)	- 6.6(0)	- 4.9(1)		-10.5(1)
4047.81(100)	+ 7.8(1)	+10.9(2)	+ 4.5(1)	+ 7.2(1)	+ 1.9(1)	+10.2(1)		+12.4(0)		- 1.6(0)
4053.29(1000)	+ 6.1(3)	+ 6.4(4)		+ 8.5(3)	+ 6.3(5)	+10.0(3)	+11.3(1n)		+ 0.8(1)	
4073.20(400)	+ 3.4(3)	+ 1.1(3)	+ 5.5(2)	+12.2(1)	+ 3.5(2)	+ 5.7(1)		+ 8.3(1)	+ 9.1(1)	
4078.44(1200)	+ 9.2(2)	+10.0(3)	+ 7.0(1)	+10.6(1n)	+ 5.2(1)	+12.6(1)		-11.5(1)	- 8.2(1)	- 6.0(1)
4111.44(500)	- 9.9(1)	- 3.6(2)	- 3.1(1)	+ 1.5(0)	+ 3.1(3)	+10.3(0)				
4130.37(3000)	+10.6(1)	+ 3.3(3)	+ 1.5(1)	+ 9.1(0)	+ 7.6(1)	+ 7.9(1)			- 8.4(1)	
4132.28(2000)	+ 4.6(1)	+ 1.4(2)			+ 7.1(4)	- 8.5(0)	- 3.8(1)		-11.0(1)	+ 2.8(2n)
4184.25(2000)	+ 2.3(5)	+ 2.6(4)	+ 2.9(2)	+ 5.3(3)	+ 1.9(3)	+ 7.2(3)	+ 7.0(1)	+ 2.5(2n)	- 3.1(1)	+ 2.0(2)
4191.07(800)	+10.0(2)	+ 5.7(2)	+15.9(2)	+ 9.5(1)	+10.5(2)			+23.0(1)		
4202.52(80)	- 6.5(2)	- 5.8(3)	- 7.1(4)	- 3.2(3)	- 3.4(3)	+ 3.4(2)	+ 2.5(1)			
4212.00(800)	- 4.2(3)	- 4.4(2n)	- 2.7(3)	+ 2.1(2n)	+ 3.1(1)	+ 0.1(1n)	- 0.9(0)		- 7.3(1)	+ 2.3(1)
4392.07(100)	+15.9(0)	+ 5.3(0)	+ 7.1(1)		+ 5.1(0)	+15.8(0)				
4408.25(400)	+ 3.5(1)	+ 0.8(4)	+ 1.1(4)	+10.7(1)	+ 3.3(3)	+11.7(1)		+11.2(1)		
4471.29(200)		- 7.4(2)	- 7.1(1)		+ 0.5(2)	- 9.4(3)	- 3.5(1)		-10.1(1n)	- 8.5(1n)
4483.33(300)	+12.5(3)	+ 9.0(4)	+ 9.2(2)	+11.8(1)	+12.2(3)	+13.6(1)		+11.4(0n)	- 5.0(1)	+ 5.6(0)
4558.08(250)	+ 5.1(0)	+ 3.5(3)	+ 3.0(1)							
Mean Number of measures	+ 4.61 (22)	+ 2.24 (23)	+ 2.28 (21)	+ 6.23 (14)	+ 5.22 (22)	+ 4.57 (20)	+ 0.86 (7)	+ 5.96 (13)	+ 0.62 (13)	- 1.79 (10)
Dy II										
3898.54(500)	- 5.1(5)	- 2.7(5n)	- 2.5(3)		+ 1.4(4)			+ 6.7(1)	+ 1.2(1)	+10.9(1)
3944.69(600)	- 0.7(5)	+ 2.1(4)	+ 5.1(3)		+ 6.8(3)	+14.4(1)				
3978.57(200)	+ 2.1(5)	+ 0.5(6)	+ 2.9(3)		+ 5.8(3)	+10.8(2)		+ 8.9(1)	- 0.9(0)	+ 1.3(1n
4000.45(800)	+ 2.3(3)	- 0.3(2)	+ 4.7(1)		+ 6.8(2)	+ 6.1(1)		+15.4(0)		
4027.79(30)	+ 5.6(2)	+ 7.7(3)	+ 6.8(2)	+ 7.9(1)	+ 8.8(1)	+11.9(1)		- 7.5(0)		-11.5(1
4050.58(100)	- 4.1(3)	- 2.9(3)	- 2.6(3)	+ 0.9(1)	+ 1.5(2)	+ 3.2(2)		- 0.5(1)		
4143.10(150)	- 1.3(3)	+ 3.2(3)	+ 3.3(3)	+ 9.3(2)	+10.4(2)	+15.4(2)	+16.0(1)		+ 2.9(1)	- 3.3(0
4409.38(200)	- 1.4(1)	+ 5.2(5)	+ 2.3(3)	+ 1.4(1)	+ 4.9(3)	+11.0(2)	+10.6(1)	+ 9.3(1)	+ 8.4(2)	+ 2.6(1
Mean Number of measures	- 0.32 (8)	+ 1.6 (8)	+ 2.5 (8)	+ 4.88 (4)	+ 5.8 (8)	+10.4 (7)	+13.3 (2)	+ 5.38 (6)	+ 2.9 (4)	0 (5)
Ho II										
4045.43(200)	-16.2(1)	-14.1(2)	-16.0(2)	- 0.7(0)		- 5.6(0)			-17.7(0)	
Mean Number of measures	-16.2 (1)	-14.1 (1)	-16.0 (1)	- 0.7 (1)	(0)	- 5.6 (1)	(0)	(0)	-17.7 (1)	(0)

3.490	3.530	3.721	4.460	4.520	4.956	5.050	5.430	Blends
			- 2.8(1n)		+10.9(2)	+23.3(1)		Pr II .470(25) (Dy II .39(2)) (Tb II .35(10))
	+ 6.9(0)		-12.0(3)	- 5.9(3)	- 5.4(4n)	+ 0.2(7)		Gd II .329(80) Ce II .109(125) S II .483(200) Dy II .394(30) (Tb II .33(6)) (Ho II .37(5)) (Dy II .300(3))
+ 8.5(0)	- 6.4(1n)	-14.8(1)	- 7.4(2)	-10.7(1)	- 8.0(2)	- 4.3(3)		Zr II .80(20) Nd II .823(50) Cr II .18(pr)
	+ 8.2(0)		- 5.6(1)	+ 1.4(2)	+ 3.9(2)	+ 5.2(4)		Dy II .802(40)
		-13.9(1)	-10.4(1n)	-15.9(2)	- 9.3(2n)	- 6.9(3n)		Gd II .436(300) Sm II .527(100) Dy II .35(3)
			-11.4(1n)	-14.0(1n)	- 2.1(2n)	- 7.7(2)		Pr II .714(75) Eu II .87(6)
			-11.2(2)	- 9.9(4)	- 4.4(3)	- 1.6(4)	+ 1.0(2)	(Eu II .149(5))
- 4.1(0)	-11.5(1)	+ 2.4(0n)	- 8.5(0)	-10.7(1)	-10.2(1)	+ 0.3(1n)	+ 2.4(1)	
+ 7.2(1)	+11.4(1)	+ 2.7(1)	- 3.5(3)	- 9.8(3)	+ 2.7(3)	+ 0.1(4)	+ 4.7(1)	Cr II .45(1)
- 0.2(0)				-12.1(4)	- 7.6(6)	- 4.2(4)	- 3.5(5)	Dy II .110(150)
- 7.2(1)	- 3.1(1)	- 5.9(2)	- 2.4(1)	- 6.4(4)	- 2.4(4)	- 4.8(3)	+ 1.4(4)	Ce II .321(60) (Fe I .358(80)) (Ti I .474(125))
					+ 4.2(1)	+ 6.0(0)	-12.8(1n)	Ce II .394(60) Dy II .346(125)
-10.8(0)		- 7.8(0)	- 8.6(1)	- 8.5(2)	- 2.0(3)	- 5.7(1)	- 1.7(1)	
+ 5.2(3)	- 0.1(3)		- 3.3(0)	- 8.6(2)	- 3.0(1)	- 6.7(1)		
- 0.5(1)	- 2.1(2)		- 1.2(3)	- 2.6(4)	0.0(4)	- 1.3(7)	+ 4.7(5)	Lu II .26(120) (Pr II .242(8)) (Ti II .329(20))
		+14.5(0)	-12.5(1)	-13.1(3n)	- 4.6(2)	- 2.6(3n)	+ 3.6(3)	(Gd II .355(10)) (A I .028(1200)) (Cr I .271(70))
		-17.2(0)	+ 0.8(0)		+ 3.8(1)	-17.1(3)	-13.2(3)	(V II .350(150)) (Al II .4(8))
		-16.7(1)	- 9.3(2)	-10.8(5)	- 8.0(6)	- 5.9(5)	- 6.4(4)	
					- 9.2(0)			(Ne II .94(150))
		+21.4(1)	+11.6(0)		+ 2.2(1)	+ 6.2(0)		Fe I .419(125)
	- 4.6(2n)	-12.7(2)	- 4.6(1n)	- 7.3(2n)	- 0.3(1)		- 1.1(1n)	Ce II .240(200) (Ti I .240(100))
+ 8.6(0n)	- 9.1(1)	- 8.7(1)	- 6.3(3)	- 4.5(4)	- 1.9(5)	- 1.6(6)	+ 9.1(3)	(S II .424(100))
					+ 3.0(2)	+ 7.5(0)	-12.2(0n)	(P II .03(100))
+ 0.74 (9)	- 1.04 (10)	- 4.7 (12)	- 5.72 (19)	- 8.79 (17)	- 2.07 (23)	- 1.03 (21)	- 1.71 (14)	
		+ 1.9(1)	- 9.3(1)		- 9.7(3)	- 9.2(7)		Cr II .49(1) (Gd II .402(10))
	- 8.5(0)		-13.4(1)	-14.3(1n)	- 8.6(3)	- 6.5(4)		
- 2.6(0)	+ 8.1(1)	-11.8(0)	-11.6(2)	-13.4(3)	- 9.6(3)	- 8.2(5)		Ce II .650(125)
			-14.3(2)	-10.0(3)	- 8.2(3)	- 6.0(6)		(Pr II .478(15)) (Nd II .493(30))
	-10.5(0)		- 9.2(2)	- 9.4(3)	- 4.0(4)	- 3.6(3)		(Nd II .562(20))
-12.8(0)	+ 6.4(0)		-13.0(1)	-10.1(3)	-10.2(3)	- 8.9(5)	- 0.6(5)	(Eu II .43(4))
		-11.2(1)	- 5.0(1)	- 6.3(3)	-13.1(2)	- 6.0(3n)	- 5.3(2)	Pr II .136(50) (Fe II .07(pr))
+ 2.9(1)	+11.6(1)	+13.0(2)	+22.4(2n)				- 7.3(1)	Ti II .519(10) (Tb II .51(20))
- 4.17 (3)	+ 1.42 (5)	- 2.02 (4)	- 6.68 (8)	-10.58 (6)	- 9.06 (7)	- 6.91 (7)	- 4.4 (3)	
		- 7.0(0)	- 3.9(0)	- 4.6(0)	- 2.2(1)	- 0.3(3)	+ 9.0(1)	Gd II .148(100)
(0)	(0)	- 7.0 (1)	- 3.9 (1)	- 4.6 (1)	- 2.2 (1)	- 0.3 (1)	+ 9.0 (1)	

TABLE 5

OBSERVATIONS OF α^2 CANUM VENATICORUM

Plate No.	Date	U.T.	Phase in Days	Dispersion at λ 3933	Used in Table
				A/mm	
MtW 1667.....	1938 May 13	6^h27^m	0.822	3	3
MtW 1669.....	1938 May 14	4 40	1.642	3	3
MtW 1992.....	1939 Apr. 27	4 04	5.050	3	3
MtW 1995.....	1939 Apr. 28	4 26	0.691	3	3
MtW 2229.....	1940 Jan. 19	11 29	4.460	3	3
CQ 377.......	1940 May 12	7 22	2.93	40	2
CQ 378.......	1940 May 12	7 32	2.93	40	2
CQ 385.......	1940 May 13	7 22	3.94	40	2
CQ 386.......	1940 May 13	7 44	3.94	40	2
CQ 387.......	1940 May 14	7 45	4.93	40	2
CQ 388.......	1940 May 15	7 22	0.47	40	2
CQ 389.......	1940 May 15	7 40	0.47	40	2
CQ 392.......	1940 May 16	7 17	1.46	40	2
CQ 393.......	1940 May 16	7 45	1.46	40	2
CQ 479.......	1940 Aug. 19	2 09	3.77	40	1
Cd 50.........	1941 Jan. 21	10 37	0.500	2	3
Cd 56.........	1941 Jan. 22	9 38	1.460	2	3
Cd 57.........	1941 Jan. 22	10 46	1.510	2	3
Cd 63.........	1941 Jan. 23	12 26	2.580	2	3
Cd 76.........	1941 Jan. 24	10 16	3.490	2	3
Cd 77.........	1941 Jan. 24	11 23	3.530	2	3
Cd 81.........	1941 Jan. 25	11 01	4.520	2	3
Cd 86.........	1941 Jan. 26	8 53	5.430	2	3
Cd 90.........	1941 Jan. 27	9 15	0.981	2	3
MtW 2540.....	1941 Apr. 22	4 00	3.721	3	3
MtW 2543.....	1941 May 6	4 23	1.323	3	3
MtW 2544.....	1941 May 7	5 18	2.363	3	3
MtW 2580.....	1941 June 6	3 52	4.956	3	3

TABLE 6

CD 81—COMPARISON BETWEEN DIRECT AND REVERSE MEASUREMENTS

Intensity	No. of Lines	Average Value of $\lambda_{direct}-\lambda_{reverse}$	Average Absolute Value of $\lambda_{direct}-\lambda_{reverse}$	Intensity	No. of Lines	Average Value of $\lambda_{direct}-\lambda_{reverse}$	Average Absolute Value of $\lambda_{direct}-\lambda_{reverse}$
0........	100	−0.002 A	0.034 A	4–5–6....	74	+0.0015 A	0.0232 A
1........	100	− .007	.029	7–8–9–10.	27	+ .0051	.028
2........	84	− .007	.031	>10.....	8	+0.011	0.0295
3........	100	−0.0062	0.0272				

MTW 1992—COMPARISON BETWEEN DIRECT AND REVERSE MEASUREMENTS

Intensity	No. of Lines	Average Value of $\lambda_{direct}-\lambda_{reverse}$	Average Absolute Value of $\lambda_{direct}-\lambda_{reverse}$	Intensity	No. of Lines	Average Value of $\lambda_{direct}-\lambda_{reverse}$	Average Absolute Value of $\lambda_{direct}-\lambda_{reverse}$
0........	100	+0.0037 A	0.0381 A	3........	60	−0.0122 A	0.0287 A
1........	100	+ .0055	.0357	4–5–6....	36	− .0164	.0270
2........	100	−0.0073	0.0317	7–8–9–10.	10	−0.0054	0.0172

velocity-curves is not the same: it is 30 km/sec for *Eu* II, 25 km/sec for *Dy* II and *Pr* II, 20 km/sec for *Ce* II and *Ni* I, 15 km/sec for *Sm* II, 10 km/sec for *Gd* II, and less than 5 km/sec for *Sr* II. The reality of this effect is attested by the small range shown by *Gd* II, of which there are many strong unblended lines.

b) Lines which show a remarkable double wave, with principal maximum at phase 5ᵈ0, secondary maximum at phase 2ᵈ0, principal minimum at phase 0ᵈ7, and secondary

TABLE 7

WAVE-LENGTHS REGIONS MEASURED

From λ	To λ	Plate	Phase	Combined Phases
3407.315	3554.850	MtW 2544	2.363	
3554.850	4673.278	MtW 2544	2.363	3.042
		MtW 2540	3.721	
4673.278	4687.437	MtW 2540	3.721	
3440.714	3758.242	MtW 2543	1.323	
3758.242	4539.596	MtW 2543	1.323	1.482
		MtW 1669	1.642	
4539.596	4601.279	MtW 1669	1.642	
3606.724	3677.920	MtW 2580	4.956	
3677.920	4724.272	MtW 2580	4.956	5.003
		MtW 1992	5.050	
4724.272	4740.820	MtW 1992	5.050	
3648.386	3920.619	MtW 2229	4.460	
3920.619	4647.340	MtW 2229	4.460	4.490
		Cd 81	4.520	
4647.340	4673.344	Cd 81	4.520	
3677.677	3760.841	MtW 1995	0.691	
3760.841	4677.144	MtW 1995	0.691	0.756
		MtW 1667	0.822	
4677.144	4740.785	MtW 1995	0.691	

TABLE 8

Diff. in Exc. Pot.*	Ratio $\left(\frac{I_1}{I_2}\right)_{\text{arc}} / \left(\frac{I_1}{I_2}\right)_{\alpha^2\text{CVn}}$	Diff. in Exc. Pot.*	Ratio $\left(\frac{I_1}{I_2}\right)_{\text{arc}} / \left(\frac{I_1}{I_2}\right)_{\alpha^2\text{CVn}}$
1 volt	0.31	4 volt	0.010
2	0.10	5	0.003
3	0.031		

* Two lines of same spectral region.

minimum at phase 3ᵈ5. This type of variation is best shown by *Cr* II, where the total range is 15 km/sec. It is conspicuously present for *Cr* I, where the range is even larger, though the scatter is also larger. The same type is shown by *Fe* II and *Fe* I, though the range is only 10 km/sec, and by *Mn* II, where the range is also about 10 km/sec. The variation of *Ti* II seems to be intermediate between types a and b. Considering the large number of excellent lines of *Ti* II used in forming this curve, the observed maximum velocity at phase 1.5 days probably reflects a superposition of the principal maximum of type a and the secondary maximum of type b.

c) Lines which show no variation. Conspicuous in this group is *Mg* II with a very small range, in spite of the fact that the curve is based upon one line only, λ 4481. Other representatives are *Si* II, *H*, and *Ca* II.

Attention may be drawn to the fact that some of the curves are systematically displaced from one another. *H* and *Si* II cluster around 0 km/sec; *Mg* II gives, in the mean, about −9 km/sec, while *Sr* II gives +7 km/sec. These differences are much too large to be caused by errors of measurement. They may be attributable to blends; but in the case of *Mg* II no blend is known that would be strong enough to produce the observed displacement, while in the case of *Sr* II a weak line of *Cr* II may possibly influence the measured wave length to a slight extent. It is entirely possible, though by no means certain, that we are dealing here with an effect of relative motion similar to that observed by Adams in several other stars.

TABLE 9

OBSERVED INTENSITIES OF *Ce* III LINES

λ	Lab. Int.	Phase: Coudé 0.823	Coudé 1.863	CQ 0.47	CQ 1.46	CQ 2.93	CQ 3.94	CQ 4.93	Blends	Spec. Not.
3353.26	150	.....	....	3	4	.....	.....	4	*Cr* II	$fs^3F^0_4-fp^3F_4$
3395.73	50	.....	....	1–2	1–2	3	2	1	*Cr* II, *Fe* II	$fs^1F^0_3-fp^3F_4$
3427.332	125	.....	1n (bl)	2	1	1	2	2	Weak *Eu* II, *Cr* II, *Fe* I	$fs^3F^0_2-fp^3F_2$
3443.609	150	1	1	2	2	1	1	2	Weak *Nd* II, *Zr* II	$fs^3F^0_2-fp^3G_3$
3454.368	150	0	2	2	2	1n	2n	2–3	Very weak *Nd* II + *Dy* II	$fs^3F^0_3-fp^3F_2$
3459.374	200	2	3	3	2	1–2	2	3	*Cr* II	$fs^3F^0_4-fp^1F_3$
3470.894	300	0	2	1+	1n	1	1–2	2	Very weak *Nd* II + *Dy* II	$fs^3F^0_3-fp^3G_3$
3497.755	60	4 bl	4 bl	3	3–4	2	3	3	*Fe* II, *Fe* I, *Zr* II, *Dy* II	$fs^3F^0_4-d^2\,{}^1G_4$
3504.596	100	4nn	(5n) bl	3	2+	2	3	3+	*Ti* II (*Dy* II strong line) (should decrease)	$fs^1F^0_3-fp^1F_3$
3543 999	80	1	1	1	1	?	1–0	2	Weak *Eu* II, *Dy* II	$fs^1F^0_3-d^2\,{}^1G_4$

It will be noticed that in a general way our groups a, b, and c coincide with the groups A, B, and C first established by Belopolsky, which represent lines varying in intensity, like *Eu* II; lines varying in the opposite sense, like *Cr* II; and lines which remain constant in intensity, like *Mg* II. There are appreciable differences in the results of different observers who have attempted to classify the lines into groups A, B, and C. For example, Belopolsky considers *H*, *Mg* II, *Ca* II, and *Fe* II to belong to class C. Tai attributes *Fe* II to group B and *Fe* I to group A, while for *H*, *Mg* II, and *Si* II the group may be either B or C. But it is undoubtedly significant that all rare earths belong simultaneously to groups A and a, while *Cr* II, the most conspicuous representative of group B, is also the most characteristic representative of group b.

Although it was not the primary purpose of this investigation to provide extensive data concerning the variations in the intensities, we have estimated on an arbitrary scale the intensities of a number of lines of different elements, in order to verify Tai's conclusion that the rare earths all belong to group A. These estimates are independent of those made during the measurements. Their advantage consists in the fact that they were made by comparing the enlargements of three McDonald coudé spectrograms, Cd 77, Cd 81, and Cd 86. The corresponding phases are 3^d530, 4^d520, and 5^d430. The estimates in Table 10 are given in this order. The last phase is, of course, very close to

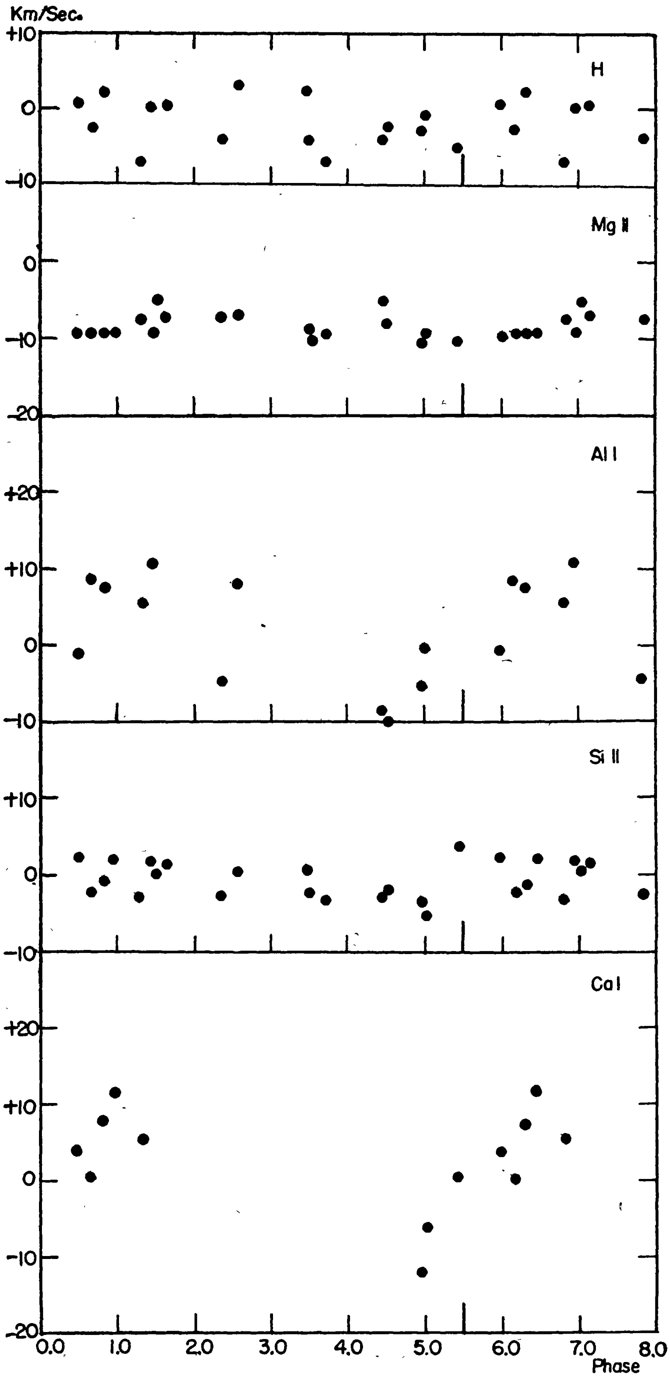
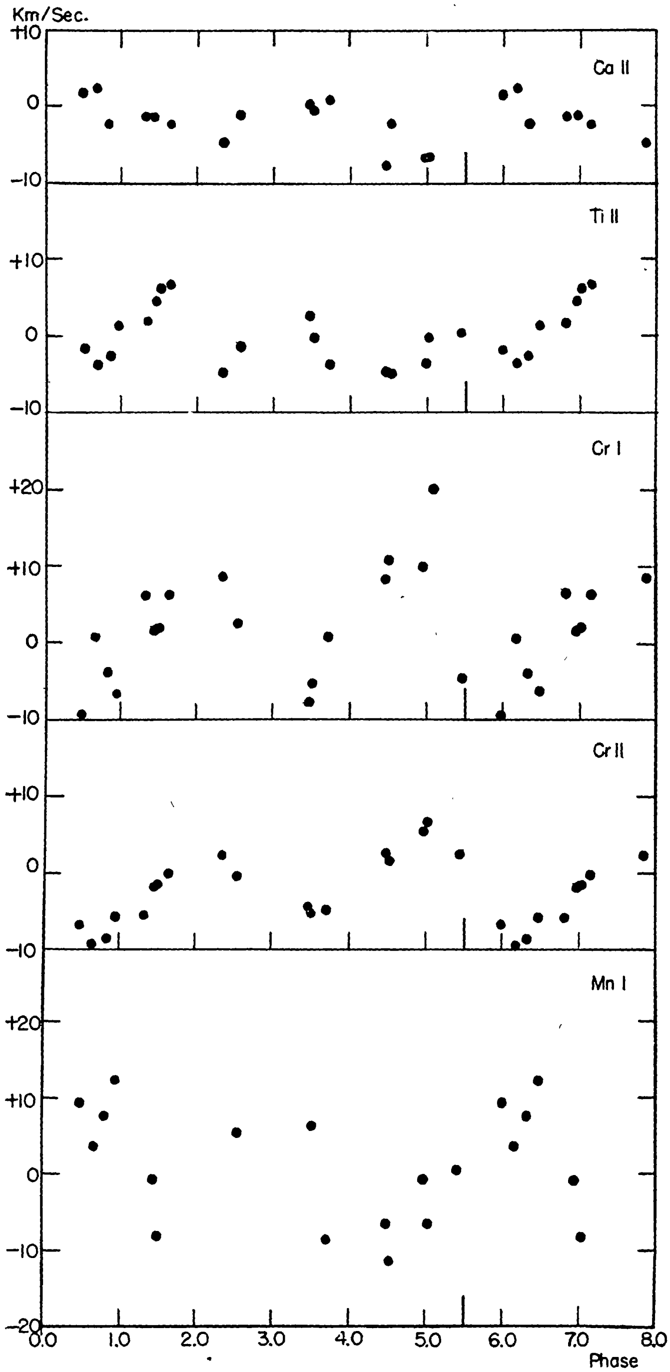


FIG. 1.—Radial velocities of α^2 Canum Venaticorum


Km/Sec.
Ca II
Ti II
Cr I
Cr II
Mn I
+10
0
-10
+20
-20
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
Phase

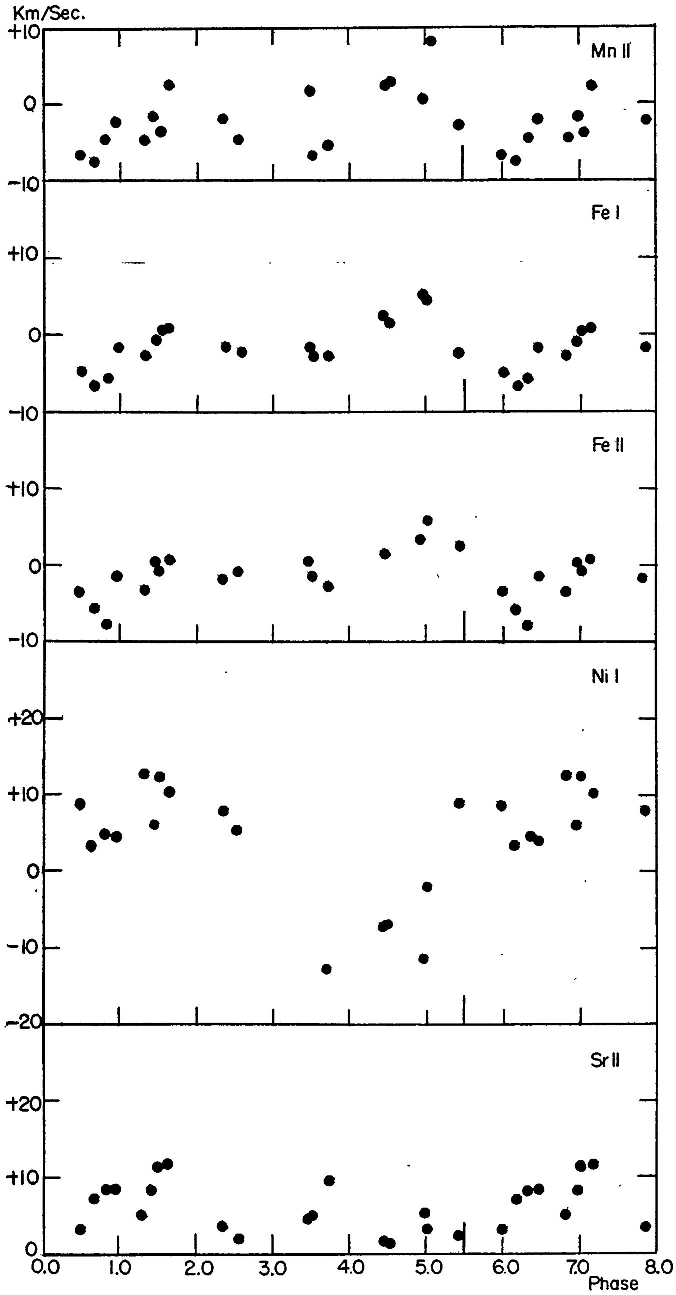


FIG. 3.—Radial velocities of α^2 Canum Venaticorum

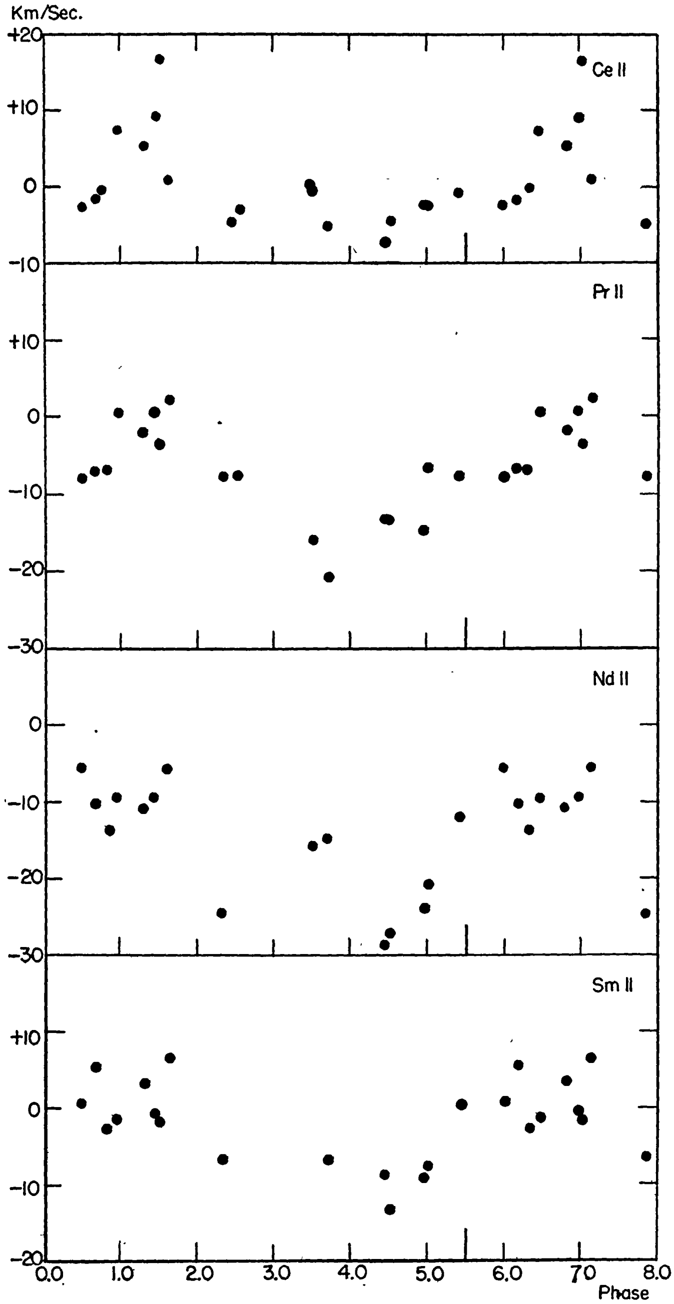


FIG. 4.—Radial velocities of α^2 Canum Venaticorum

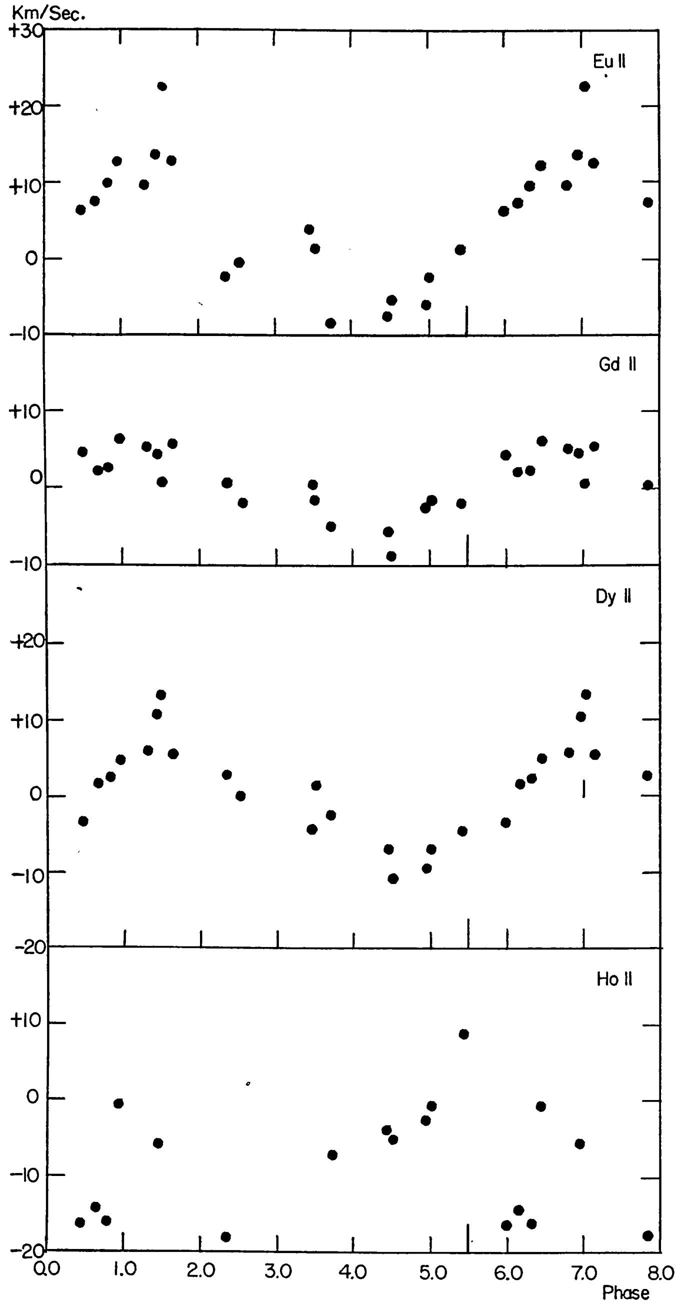


FIG. 5.—Radial velocities of α^2 Canum Venaticorum

TABLE 10

ESTIMATES OF LINE INTENSITIES

Line	Phases 3.530	Phases 4.520	Phases 5.430
	Si II (14)	16.3 v.	(C)
4128.0	6	6	6
	Ti II (22)	13.6 v.	(A)
4163.6	1	4	4
4171.9	4	4	5
4300.0	0	4	5
4301.9	0	3	4
4312.8	2	3	4
4314.9	2	3	3
4386.8	2	4	5
4395.0	2	4	5
4395.8	2	3	3
4468.5	2	3	3
4488.3	1	3	3
4501.3	2	3	3
	Cr I (24)	6.7 v.	(C–A)
4254.4	2	3	2
	Cr II (24)	16.6 v.	(B)
4052.0	5	3	0
4070.9	2	3	1
4076.9	5	6	3
4195.4	3	3	1
4242.4	5	5	3
4269.3	3	3	2
	Mn II (25)	15.7 v.	(A)
4136.9	1	3	2
4259.3	2	3	3
	Fe I (26)	7.8 v.	(A)
4260.5	1	3	2
4271.8	2	3	3
4307.9	2	3	3
4404.8	4	5	6
	Fe II (26)	16.5 v.	(B-C)
4057.5	3	3	3
4061.8	3	4	4
4122.6	4	4	3
4233.2	8	6	5
4385.4	5	4	3
4461.6	3	4	2
4489.2	5	6	4
	Ni I (28)	7.6 v.	(A)
4401.6	0	3	5
	Sr II (38)	11.0 v.	(A)
4077.7	3	6	5
	Ce II (58)		(A)
4117.0	1	3	3
4186.6	0	2	1
4255.8	1	3	1
4289.9	0	5	6
4418.8	1	3	2
4461.1	1	3	4
4486.9	0	2	1
	Pr II (59)		(A)
4032.9	0	3	3
	Nd II (60)		(A)
4075.1	0	0	3
4177.3	0	0	2
	Sm II (62)	11.4 v.	(A)
4434.3	2	3	4
4452.7	0	1	3

TABLE 10—*Continued*

Line	Phases 3.530	Phases 4.520	Phases 5.430	Line	Phases 3.530	Phases 4.520	Phases 5.430
	Eu II (63)	11.2 v.	(A)		*Gd* II (64)		(A)
4085.4	0	3	3	4184.2	1	3	4
4129.7	0	8	10	4212.0	0	5	5
4205.0	0	4	10	4215.0	1	3	4
4270.5	0	1	3	4217.2	1	3	4
4355.1	0	3	6	4241.3	0	2	3
4414.6	0	1	3	4251.7	1	3	5
4435.6	2	5	6	4467.2	0	2	3
				4483.3	0	3	5
	Gd II (64)		(A)		*Dy* II (66)		(A)
4037.3	1	5	3				
4049.9	0	3	2	4036.3	0	2	5
4053.3	1	3	5	4050.6	0	3	5
4078.4	1	4	3	4143.1	1	2	5
4130.4	0	2	1	4409.4	2	3	4

the predicted maximum of intensity of *Eu* II. The elements are arranged in order of atomic weight. The ionization potential and the intensity group are given at the head of each element. It is certain that all rare earths included in Table 10 belong to group A, and it is probable that the range in intensity is largest for *Eu* II, and somewhat smaller for *Gd* II. But this conclusion may be related to the fact that at maximum the lines of *Eu* II are the strongest among the rare-earth lines.

TABLE 11

Phase in Days	Diffuseness of Lines	Phase in Days	Diffuseness of Lines
5.050	4	2.363	10
0.691	3	3.721	8
0.822	1	4.460	2
1.323	3	4.956	5
1.642	2	5.050	4

It has already been pointed out[1] that the contours of the lines of groups C and B are somewhat broader when the *Eu* II lines are weak. Estimates of diffuseness were made on the Mount Wilson coudé plates for the region near *Ca* II K. If 10 designates the broadest lines and 1 the narrowest (on any arbitrary scale), we obtain the relation with phase shown in Table 11. The lines were broadest at phases 2.3 and 3.7 days. They were narrow at phase 0.8 and again at phase 4.5 days. Possibly the double wave shown in these estimates is related to the double wave in the radial velocities of group b and to the peculiar changes in line contours observed in ϵ Ursae Majoris.[8]

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[8] Struve and Hiltner, *Ap. J.*, 98, 225, 1943.