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Determination of the $3d^34d$ and $3d^35s$ Configurations of Fe V

V. I. Azarov[1]*, W.-Ü L. Tchang-Brillet[2], J.-F. Wyart[3], F. Launay[2] and M. Benharrous[2]

[1] Department of Research and Development, Parametric Technology Corporation, 128 Technology Drive, Waltham, MA 02453, USA
[2] Département Atomes et Molécules en Astrophysique, Observatoire de Paris-Meudon, 92190 Meudon, France, also Universite Pierre et Marie Curie, Paris VI
[3] Laboratoire Aimé Cotton, CNRS II, Bat 505, Centre Universitaire, 91405-Orsay, France

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Abstract

The analysis of the spectrum of four times ionized iron, Fe V, has led to the determination of the $3d^34d$ and $3d^35s$ configurations. From 975 classified lines in the region 645–1190 Å we have established 123 of 168 theoretically possible $3d^34d$ levels and 26 of 38 possible $3d^35s$ levels. The estimated accuracy of values of energy levels of these two configurations is about 0.7 cm^{-1} and 1.0 cm^{-1}, respectively. The level structure of the system of the $3d^4$, $3d^34s$, $3d^34d$ and $3d^35s$ configurations has been theoretically interpreted and the energy parameters have been determined by a least squares fit to the observed levels. A comparison of parameters in Cr III and Fe V ions is given.

1. Introduction and experiment

The study of the fifth spectrum of iron (Fe V) was first reported by Bowen [1] in 1937 who established 57 levels of the $3d^4$, $3d^34s$ and $3d^34p$ configurations. In 1974 Fawcett and Henrichs [2] added 41 new levels to the system. The most extended and complete analysis of these three configurations was made by Ekberg [3] in 1975. A quite accurate (0.003–0.004 Å) linelist of the iron spectrum in the wavelength range 302–1715 Å was used in Ekberg's study that resulted in the classification of 982 spectral lines belonging to the transition arrays $3d^4$–$3d^34p$ and $3d^34s$–$3d^34p$. He confirmed all the previously found levels, although renamed some of them, and added 82 new levels. Two levels, $3d^3(^2P)4s\ ^3P_0$ and $3d^3(^2P)4p\ ^1S_0$, were not established. The uncertainty in the adopted energy level values based on these lines was about 0.4 cm^{-1}.

The purpose of the present study is to determine the $3d^34d$ and 5s levels by identification of the $3d^34p$–$3d^34d$ and $3d^34p$–$3d^35s$ transitions, so to provide additional data for the energy level structure.

In the present study, an emission spectrum of ionized iron was obtained on photographic plates in the 480–1200 Å wavelength region using a vacuum triggered spark source. The anode was made in 99.99% pure iron rode. A 4.82 μF capacitor charged with a 20 kV maximum power supply produced the main spark, triggered by a secondary discharge with a 0.5 μF capacitor charged to 3 kV. Spectrograms were recorded on the 10.7 m VUV normal incidence spectrograph at the Paris-Meudon Observatory. This instrument, presently equipped with 3600 lines/mm holographic grating, provides a plate factor of 0.25 Å/mm in the first order. For each incidence angle, two exposures were recorded with two values (~ 8 kV and ~ 13 kV) of the charging voltage for the main spark in purpose to create a "low" and a "high" excitation condition respectively enhancing lower (III and IV) and higher (V and VI) ionization stages emission. This set of spectrograms is completed by an earlier exposure in the region of 570–930 Å with a plate factor of 0.78 Å/mm recorded on the same instrument but equipped with a 1200 lines/mm ruled grating. The latter grating, although less dispersive, had the advantage to show a weaker astigmatism. The latter exposure was obtained using a different main discharge circuit including a 0.75 μF capacitor charged to 20 kV.

The plates were measured on a semi-automatic comparator equipped with a photoelectric setting device and connected to a linear fringe-counter, giving the plate position to ±1 μm. Resolved, unsaturated lines on our plates are quite symmetric and sharp. But the recorded spectrum appeared to be extremely rich in lines, with a linelist of about 7000 entries which contains lines from Fe III to Fe VI. Due to this, even with such a large dispersion of the spectrograph used in the experiment, many lines turned out to be still unresolved. The wavelengths were interpolated using known Fe III [4] and Fe IV [5] lines present in the spectra. The accuracy of wavelengths for resolved and undisturbed lines in this reduction is mostly 0.003 Å and 0.005 Å for the region above 950 Å. The $3d^34p$–($3d^34d + 3d^35s$) transition array of Fe V could be easily recognized on our plates, though it is partly overlapping with the quite strong $3d^24p$–($3d^24d + 3d^25s$) transition array of Fe VI of which the analysis is underway. The maximum of density of the mentioned Fe V transition array is observed in the region of 980−1030 Å, where many Fe III lines are blended. This explains a reduction of accuracy by 0.001–0.002 Å in this region in our measurements compared to the accuracy of Fe III lines used as standards. Thanks to the two different excitation conditions, we were able to discriminate strong Fe III and Fe IV lines from those of Fe V and Fe VI ions, but failed to find a difference between Fe V and Fe VI lines. A big help in the line discrimination was the spectrum recorded with a plate factor of 0.78 Å/mm, where the polarity effect is very distinct due to the weak astigmatism of the grating.

2. Analysis

As a first step, *ab initio* Hartree–Fock calculations with relativistic correction (HFR) were carried out using Cowan's code [6]. To take into account the effect of configuration interaction we included the $3d^4$, $3d^34s$, $3d^34d$, $3d^35s$, $3d^24s^2$, $3d^24s4d$ and $3d^24d^2$ configurations to the even system and the $3d^34p$, $3d^35p$, $3d^34f$, $3p^53d^5$, $3d^24s4p$, $3d^35f$, $3p^53d^44s$ and $3d4s^24p$ configurations to the odd one. In the present work, the effective parameters for far configuration interaction α, β and T have definitions given in Ref. [7], corrected for a misprint in Ref. [8]. It must be stressed

*e-mail: vazarov@ptc.com

that the coefficients of these parameters are different from those used in the standard version of Cowan's code.

For precise estimations of parameters of the unknown configurations at the beginning of the analysis, isoelectronic comparisons proved to be helpful. To estimate parameters of the $3d^3 4d$ and $3d^3 5s$ configurations in Fe V ion we first derived least-squared fitted (LSF) radial parameters by means of the RCG/RCE codes [6] for the even parity levels in the two isoelectronic ions taking into account all known levels. For Cr III, the experimental energies are from ref [9,10]. For Mn IV, the $3d^4$ and $3d^3 4s$ data are taken respectively from Refs. [11,12] and the $3d^3 4d$ and $3d^3 5s$ data correspond to the present status of an analysis in progress [13]. Parameters of unknown configurations were kept fixed at the values estimated from the LSF/HFR ratios of similar parameters obtained for known configurations.

The program suite IDEN [14,15] has been used to identify spectral lines, find energy levels and optimize their values. The code was extremely helpful because in the case where levels of one parity are known (as in the current study) the searching procedure allows to detect a possible level of the opposite parity by visualizing on the computer screen simultaneously all the experimental lines that fit possible transitions from/to the considered level. With the presence of several ionization stages of iron each having complicated transition arrays, the spectrum shows a high density of lines and many lines are blended or unresolved. The usual procedure that implies calculations of level differences for all couples of known levels and searching for their correspondence in the list of experimental wavenumbers is practically impossible due to an enormous amount of possible combinations that would fit within large error bars.

3. Results and discussion

3.1. *Classified lines*

A list of 975 classified lines belonging to the $3d^3 4p$–$(3d^3 4d + 3d^3 5s)$ transition array is given in Table I. Forty one lines in the list are doubly and one line is triply classified. Furthermore, some Fe V lines are blended with lines from impurities or Fe III. These lines are commented in the table. Lines with a Fe V contribution less than 20% according to intensity calculations have been discarded. In the first column of the table we give the theoretical transition probability (gA) for each identified transition. The second column shows intensities of the spectral lines (Int) on a scale 1–200. These values have been obtained by measuring the plate darkening at the peaks of the lines on photospectrograms. The third, fourth, fifth and sixth columns show wavelength (λ), wavenumber (σ), and two differences: between the experimental and calculated (by Ritz principle using the experimental energies of the levels involved) wavenumbers ($\Delta(\sigma)$) and wavelengths ($\Delta(\lambda)$). The seventh column (N) gives the number of identified spectral lines used to determine the even level. In the next to the last column we give the classification of the transition with the energy values and J-values (in parentheses) of the levels involved. The last column contains special remarks about the line.

The number N (column 7) is helpful for pointing out local systematic deviations (LSD) between the measured wavenumbers and the ones calculated by the Ritz principle. Indeed, after the energy values are optimized from the wavenumbers of all the classified lines, one would expect the signs of the $\Delta\sigma$ values to be randomly distributed along the linelist. For some reasons, such as ends of plates, defects in the plate holder, or lack of standards of wavelengths, $\Delta\sigma$ may exhibit LSD effect which is significant for transitions with an even level derived from many lines. Conversely levels determined with only one or two close lines always artificially lead to good $\Delta\sigma$ values.

3.2. *Energy levels*

Table II gives the theoretical level energies and the known experimental energies up to 499000 cm^{-1} which completely includes the five lowest even configurations $3d^4$, $3d^3 4s$, $3d^3 4d$, $3d^3 5s$, $3d^2 4s^2$. The $3d^2 4s4d$ and $3d^2 4d^2$ configurations are also present in the calculations but are predicted to be much higher (between 598000 and 891000 cm^{-1}). Experimental levels of the $3d^4$ and $3d^3 4s$ configurations are from Ref. [3] except for the $3d^4 4s\ ({}_3{}^2D)\,{}^3D_2$ level discussed in section 3.3.

The first three columns of the table show the observed (E_{obs}) and calculated (E_{calc}) energy values of levels and also the difference (E_{obs}–E_{calc}) between these values from the least squares fitting (LSF) calculations. In the fourth column we give the numbers (N) of spectral lines identified in the current analysis and used to determine new levels. Levels with no number shown in this column are either those which were previously known (Refs. [1–3]) or those which are still unknown. In the last columns the percentage composition of eigenvectors is given.

In the present analysis 123 of 168 theoretically possible $3d^3 4d$ levels and 26 of 38 theoretically possible $3d^3 5s$ levels have been established. On the average, each level was determined using 6 spectral lines. The estimated level accuracy is about 0.7 cm^{-1} and 1.0 cm^{-1} for the $3d^3 4d$ and $3d^3 5s$ configurations, respectively. The majority of not established levels have either too weak transitions to be observed on our plates or are expected to be based on one or two spectral lines that cannot be chosen without ambiguity among several possibilities.

Table III presents the parameters obtained in the calculations for the even and the odd systems in Fe V. For the configurations that were not fitted, only the average energies (E_{av}) are given. All configuration interaction parameters in both systems were kept fixed at 85% of their HFR values. The names of configurations and parameters are respectively specified in the first and second columns of the table. The third column shows the parameter values obtained in the final fit. Values in parentheses are the uncertainties of the fitted parameter values. In the fourth column the *ab initio* (HFR) values are presented. The obtained (or predetermined and fixed) scaling factors (LSF/HFR) are shown in the fifth column of Table III.

For the purpose of comparison we also include in Table III the values of the parameters α, β and T and only the LSF/HFR ratios of other parameters obtained for Cr III ion.

In addition to the above calculations, we attempted to determine the "forbidden" Slater parameters $F^1(3d, 4d)$ and $F^3(3d, 4d)$ as defined by Cowan (p. 477 of Ref. [6]) for far configuration interaction in $3d^3 4d$ in a fitting option with α, β and T constrained to be equal in all the $3d^3 nl$ con-

Table I. *Classified lines in the $3d^34p$–($3d^24d + 3d^25s$) transition array of Fe V.*

gA (10^8 s^{-1})	Int	λ (Å)	σ (cm^{-1})	$\Delta(\sigma)$[a] (cm^{-1})	$\Delta(\lambda)$[a] (Å)	N[b]	Odd level		Even level	Remark[c]
5	23	647.065	154544.0	–1.2	0.005	8	259344.8(4)	5s	413890.0(3)	
7	19	647.298	154488.3	0.4	–0.002	13	261179.6(3)	5s	415667.5(2)	
1	13	648.643	154168.0	0.1	–0.001	7	258891.5(1)	5s	413059.4(1)	
38	26	653.795	152953.1	–0.9	0.004	4	289545.9(4)	5s	442499.9(3)	
9	15	659.297	151676.7	–1.2	0.005	10	263898.6(3)	5s	415576.5(3)	
11	27	660.707	151353.0	0.2	–0.001	12	264434.2(4)	5s	415787.0(4)	
16	26	661.558	151158.2	–2.2	0.009	9	265112.6(5)	5s	416273.0(5)	
8	13	672.652	148665.3	–0.3	0.001	6	292287.6(5)	5s	440953.2(4)	
1	27	673.189	148546.6	–0.3	0.001	12	267240.1(3)	5s	415787.0(4)	
29	30	679.449	147178.0	2.0	–0.009	5	276429.7(4)	5s	423605.7(4)	Fe III
38	34	682.713	146474.4	1.4	–0.006	8	277292.7(5)	5s	423765.7(5)	
65	46	687.676	145417.4	1.6	–0.008	6	278650.7(6)	5s	424066.5(6)	
4	22	693.175	144263.6	0.5	–0.003	8	279502.6(4)	5s	423765.7(5)	
2	17	695.776	143724.4	–1.7	0.008	8	280039.6(5)	5s	423765.7(5)	
6	13	699.180	143024.6	–0.8	0.004	9	263898.6(3)	4d	406924.0(3)	
1	12	699.917	142874.1	1.5	–0.007	12	263898.6(3)	4d	406771.2(4)	
7	23	701.299	142592.5	2.0	–0.010	8	280832.2(3)	5s	423422.7(2)	
51	101	702.327	142383.8	–0.3	0.002	6	282871.9(5)	5s	425256.0(5)	O III
1	18	702.555	142337.5	0.5	–0.003	12	264434.2(4)	4d	406771.2(4)	
3	18	702.648	142318.9	–0.4	0.002	9	257138.0(5)	5s	399457.3(4)	
1	14	704.337	141977.5	–0.3	0.002	10	264434.2(4)	4d	406412.0(5)	
10	16	706.003	141642.4	1.1	–0.005	7	265112.6(5)	4d	406753.9(5)	
6	14	706.366	141569.6	2.0	–0.010	5	282038.1(4)	5s	423605.7(4)	
1	10	706.551	141532.6	1.2	–0.006	13	274136.1(2)	5s	415667.5(2)	
13	14	709.703	140904.0	1.6	–0.008	6	282423.5(2)	5s	423325.9(3)	
11	20	710.337	140778.2	0.9	–0.004	9	258680.0(3)	5s	399457.3(4)	
2	13	711.638	140520.9	0.0	0.000	13	275146.6(1)	5s	415667.5(2)	
18	34	711.888	140471.5	–0.2	0.001	6	258128.5(2)	5s	398600.2(3)	
1	8	712.374	140375.7	0.8	–0.004	13	255399.2(3)	5s	395774.1(4)	
11	46	712.795	140292.8	–0.4	0.002	13	275374.3(2)	5s	415667.5(2)	
1	16	712.985	140255.5	0.9	–0.004	6	256177.9(4)	5s	396432.5(5)	
20	53	714.895	139880.6	1.1	–0.006	7	254803.3(2)	5s	394682.8(2)	
15	29	715.313	139798.9	–0.5	0.003	11	277292.7(5)	5s	417092.1(4)	
47	61	715.536	139755.5	1.6	–0.008	8	274136.1(2)	5s	413890.0(3)	bl Cu III
29	49	716.049	139655.2	–0.5	0.002	12	255399.2(3)	5s	395054.9(3)	
41	57	716.088	139647.6	1.7	–0.009	4	273643.1(1)	5s	413289.0(2)	
63	61	716.125	139640.4	0.3	–0.002	5	254803.3(2)	5s	394443.4(1)	
24				0.8	–0.004	6	283686.3(2)	5s	423325.9(3)	
24	49	716.339	139598.7	2.5	–0.013	13	256177.9(4)	5s	395774.1(4)	
13	12	716.512	139565.0	–1.7	0.009	8	256177.9(4)	4d	395744.6(4)	
1	18	716.692	139529.9	–1.2	0.006	12	267240.1(3)	4d	406771.2(4)	
11	26	717.277	139416.2	–0.1	0.001	7	273643.1(1)	5s	413059.4(1)	
23	40	717.592	139354.9	–2.4	0.013	12	276429.7(4)	5s	415787.0(4)	
30	40	717.906	139293.9	–0.6	0.003	6	257138.0(5)	5s	396432.5(5)	
77	67	717.954	139284.7	1.1	–0.006	7	255399.2(3)	5s	394682.8(2)	
110	73	718.659	139148.0	1.2	–0.006	10	276429.7(4)	5s	415576.5(3)	
12	6	719.033	139075.8	0.3	–0.002	8	284690.3(4)	5s	423765.7(5)	
70	27	719.203	139042.8	1.0	–0.005	6	302292.7(2)	5s	441334.5(2)	
38	61	719.509	138983.6	3.3	–0.017	9	277292.7(5)	5s	416273.0(5)	bl Cu III
149	81	719.554	138975.0	0.1	–0.001	8	284790.8(5)	5s	423765.7(5)	
95	67	719.631	138960.1	0.4	–0.002	8	274930.3(3)	5s	413890.0(3)	
30	46	719.825	138922.6	–0.7	0.004	7	274136.1(2)	5s	413059.4(1)	
117	67	719.862	138915.5	0.1	–0.001	5	284690.3(4)	5s	423605.7(4)	
93	73	720.060	138877.3	0.3	–0.002	12	256177.9(4)	5s	395054.9(3)	
180	73	720.102	138869.3	–1.1	0.006	6	285196.1(6)	5s	424066.5(6)	
100	46	720.657	138762.2	0.7	–0.004	4	302377.1(3)	5s	441138.6(3)	
104	115	721.314	138635.9	–0.2	0.001	13	257138.0(5)	5s	395774.1(4)	
49	26	721.460	138607.9	1.3	–0.007	8	257138.0(5)	4d	395744.6(4)	
20	13	721.623	138576.4	0.3	–0.002	6	302377.1(3)	5s	440953.2(4)	
4	6	721.958	138512.2	0.7	–0.003	8	284911.2(2)	5s	423422.7(2)	
107	53	722.051	138494.3	0.0	0.000	12	277292.7(5)	5s	415787.0(4)	
6	22	722.512	138406.1	0.7	–0.004	9	261051.9(5)	5s	399457.3(4)	
28	34	722.761	138358.2	–0.5	0.002	4	274930.3(3)	5s	413289.0(2)	
155	57	722.797	138351.4	0.7	–0.004	6	302602.5(4)	5s	440953.2(4)	
9	9	723.033	138306.3	0.2	–0.001	7	274753.3(0)	5s	413059.4(1)	
96	67	723.184	138277.5	–0.2	0.001	9	261179.6(3)	5s	399457.3(4)	
45	53	723.648	138188.8	–0.1	0.000	6	260411.4(2)	5s	398600.2(3)	
218	90	723.929	138135.0	–0.1	0.000	6	258297.4(6)	5s	396432.5(5)	
29	30	725.095	137912.9	–1.8	0.009	4	275374.3(2)	5s	413289.0(2)	

Table I. *continued.*

gA (10^8 s^{-1})	Int	λ (Å)	σ (cm^{-1})	$\Delta(\sigma)$[a] (cm^{-1})	$\Delta(\lambda)$[a] (Å)	N[b]	Odd level		Even level	Remark[c]
21				0.1	–0.001	7	275146.6(1)	5s	413059.4(1)	
2	6	726.290	137686.1	1.0	–0.005	7	275374.3(2)	5s	413059.4(1)	
170	81	726.633	137621.1	–1.2	0.006	9	278650.7(6)	5s	416273.0(5)	Fe III
13	11	726.795	137590.5	1.0	–0.005	11	279502.6(4)	5s	417092.1(4)	
23	53	728.508	137266.9	–0.9	0.005	8	286154.9(2)	5s	423422.7(2)	bl Fe III
151	101	729.441	137091.2	3.5	–0.019	6	259344.8(4)	5s	396432.5(5)	
59				–2.9	0.015	13	258680.0(3)	5s	395774.1(4)	
46	67	729.588	137063.7	–0.9	0.005	8	258680.0(3)	4d	395744.6(4)	
42	67	729.950	136995.7	2.9	–0.015	12	278794.2(3)	5s	415787.0(4)	bl Fe III
28	53	730.242	136940.9	0.4	–0.002	7	257742.3(1)	5s	394682.8(2)	
60	81	730.312	136927.7	1.3	–0.007	12	258128.5(2)	5s	395054.9(3)	
38	27	730.491	136894.2	–0.4	0.002	6	286431.3(3)	5s	423325.9(3)	
25	115	730.877	136821.9	0.4	–0.002	8	277068.5(3)	5s	413890.0(3)	Fe III
60	73	731.088	136782.4	0.1	0.000	10	278794.2(3)	5s	415576.5(3)	
60	81	731.152	136770.5	0.1	0.000	9	279502.6(4)	5s	416273.0(5)	bl Fe III
21	30	731.398	136724.4	–0.5	0.003	11	280367.2(4)	5s	417092.1(4)	
1	27	732.982	136429.1	–0.2	0.001	13	259344.8(4)	5s	395774.1(4)	
46	46	733.606	136312.9	–0.2	0.001	8	287109.6(3)	5s	423422.7(2)	
33	57	733.678	136299.6	–0.6	0.003	7	276759.2(2)	5s	413059.4(1)	
46	81	733.762	136284.0	–0.4	0.002	12	279502.6(4)	5s	415787.0(4)	Fe III
122	81	734.031	136234.1	0.7	–0.004	9	280039.6(5)	5s	416273.0(5)	
86	81	734.103	136220.6	0.1	–0.001	4	277068.5(3)	5s	413289.0(2)	
178	90	734.411	136163.6	–1.6	0.009	5	287440.5(5)	5s	423605.7(4)	
17	26	734.900	136073.0	–0.9	0.005	10	279502.6(4)	5s	415576.5(3)	
44	36	735.804	135905.8	0.0	0.000	9	280367.2(4)	5s	416273.0(5)	
16	34	736.251	135823.2	–0.7	0.004	5	258619.5(0)	5s	394443.4(1)	
144	73	736.305	135813.3	–0.9	0.005	8	278075.8(4)	5s	413890.0(3)	
11	43	736.407	135794.4	3.1	–0.017	7	258891.5(1)	5s	394682.8(2)	bl Fe III
131	90	736.879	135707.5	1.8	–0.009	6	287620.2(4)	5s	423325.9(3)	
121				–2.6	0.014	6	289545.9(4)	5s	425256.0(5)	
198	81	737.475	135597.9	–0.6	0.003	8	288167.2(6)	5s	423765.7(5)	
34	101	737.719	135552.9	1.0	–0.005	5	258891.5(1)	5s	394443.4(1)	bl Fe III
66	36	738.442	135420.3	0.5	–0.003	12	280367.2(4)	5s	415787.0(4)	
146	101	738.663	135379.7	–0.9	0.005	6	261051.9(5)	5s	396432.5(5)	Fe III
52	73	739.070	135305.2	–1.5	0.008	7	259376.1(2)	5s	394682.8(2)	
72	115	739.351	135253.7	0.6	–0.003	13	260521.0(4)	5s	395774.1(4)	
36	81	739.511	135224.5	0.9	–0.005	8	260521.0(4)	4d	395744.6(4)	
16	90	739.595	135209.2	–3.4	0.019	10	261179.6(3)	4d	396392.2(2)	bl Fe III
119	90	739.872	135158.6	1.7	–0.009	6	290099.1(5)	5s	425256.0(5)	
100	157	739.970	135140.6	0.0	0.000	6	306193.9(3)	5s	441334.5(2)	
68	81	740.196	135099.3	–0.9	0.005	12	259954.7(3)	5s	395054.9(3)	
15	32	740.372	135067.3	0.0	0.000	5	259376.1(2)	5s	394443.4(1)	
86	67	740.444	135054.1	0.1	–0.001	11	282038.1(4)	5s	417092.1(4)	Fe III
56	49	740.537	135037.2	0.4	–0.002	10	280539.7(2)	5s	415576.5(3)	
3	27	740.612	135023.4	0.3	–0.002	9	264434.2(4)	5s	399457.3(4)	
57	67	740.989	134954.7	–0.1	0.001	12	280832.2(3)	5s	415787.0(4)	
241	115	741.332	134892.3	–2.3	0.013	6	289171.9(7)	5s	424066.5(6)	
72	61	741.529	134856.4	0.9	–0.005	4	307644.4(2)	5s	442499.9(3)	
3	6	742.064	134759.3	0.0	0.000	6	306193.9(3)	5s	440953.2(4)	
6	10	742.096	134753.4	0.5	–0.003	8	288669.8(1)	5s	423422.7(2)	
42	32	742.147	134744.2	–0.1	0.001	10	280832.2(3)	5s	415576.5(3)	
30	53	742.255	134724.5	–3.6	0.020	7	259954.7(3)	5s	394682.8(2)	
17				2.3	–0.013	13	261051.9(5)	5s	395774.1(4)	
8	17	742.459	134687.7	0.1	0.000	7	259995.2(1)	5s	394682.8(2)	
9	12	742.702	134643.4	–0.1	0.000	12	260411.4(2)	5s	395054.9(3)	
14	21	742.981	134593.0	–1.5	0.008	13	261179.6(3)	5s	395774.1(4)	
34	53	743.307	134533.9	0.0	0.000	12	260521.0(4)	5s	395054.9(3)	
137	81	743.396	134517.9	2.1	–0.012	4	306622.8(4)	5s	441138.6(3)	
80				–2.6	0.014	11	282571.6(3)	5s	417092.1(4)	
12	14	743.781	134448.2	0.0	0.000	5	259995.2(1)	5s	394443.4(1)	
172	101	744.355	134344.5	–0.2	0.001	9	265112.6(5)	5s	399457.3(4)	
34	36	744.963	134234.9	0.0	0.000	9	282038.1(4)	5s	416273.0(5)	
102	61	745.045	134220.0	–0.2	0.001	11	282871.9(5)	5s	417092.1(4)	
18				0.2	–0.001	8	289545.9(4)	5s	423765.7(5)	
124	90	745.335	134167.8	1.8	–0.010	6	264434.2(4)	5s	398600.2(3)	
100	49	745.918	134062.9	0.1	–0.001	2	263898.6(3)	5s	397961.4(2)	
6	11	746.005	134047.3	1.5	–0.008	6	307288.7(3)	5s	441334.5(2)	
38	53	746.094	134031.4	–1.6	0.009	8	289389.7(2)	5s	423422.7(2)	
21	10	746.447	133967.9	0.5	–0.003	6	290099.1(5)	5s	424066.5(6)	

Table I. *continued..*

gA ($10^8\ s^{-1}$)	Int	λ (Å)	σ (cm^{-1})	$\Delta(\sigma)^a$ (cm^{-1})	$\Delta(\lambda)^a$ (Å)	N^b	Odd level		Even level	Remark[c]
167	57	746.888	133888.8	0.0	0.000	6	307064.4(5)	5s	440953.2(4)	
1	36	746.960	133876.1	0.8	–0.004	12	261179.6(3)	5s	395054.9(3)	
15	12	747.114	133848.5	–1.4	0.008	4	307288.7(3)	5s	441138.6(3)	
5	18	748.004	133689.0	–1.1	0.006	6	307644.4(2)	5s	441334.5(2)	
86	67	748.146	133663.8	–0.7	0.004	6	307288.7(3)	5s	440953.2(4)	
3	22	748.835	133540.7	2.3	–0.013	10	282038.1(4)	5s	415576.5(3)	
31	36	749.002	133511.0	1.3	–0.007	8	289913.0(3)	5s	423422.7(2)	
59	36	749.555	133412.5	–0.4	0.002	6	289913.0(3)	5s	423325.9(3)	
10	6	750.932	133167.9	–1.6	0.009	6	308165.0(2)	5s	441334.5(2)	
64	32	752.029	132973.6	0.0	0.000	4	308165.0(2)	5s	441138.6(3)	
24	18	752.068	132966.7	–1.7	0.009	6	292287.6(5)	5s	425256.0(5)	
30	18	752.343	132918.0	–0.2	0.001	6	290407.7(2)	5s	423325.9(3)	
200	67	752.498	132890.7	0.6	–0.004	6	292365.9(6)	5s	425256.0(5)	
27	57	752.774	132842.0	3.0	–0.017	8	290583.7(1)	5s	423422.7(2)	bl Fe III, O III
20	12	752.869	132825.2	–0.1	0.000	6	292430.7(4)	5s	425256.0(5)	
46	14	753.788	132663.3	0.3	–0.002	6	308671.5(1)	5s	441334.5(2)	
8	7	755.283	132400.6	–1.2	0.007	11	284690.3(4)	5s	417092.1(4)	
14	14	756.338	132216.1	–1.1	0.006	9	267240.1(3)	5s	399457.3(4)	
10	8	757.657	131985.8	–1.6	0.009	6	266612.8(2)	5s	398600.2(3)	
1	6	758.199	131891.5	1.3	–0.007	10	283686.3(2)	5s	415576.5(3)	
125	90	758.849	131778.5	–0.4	0.002	6	292287.6(5)	5s	424066.5(6)	
14	190	760.222	131540.5	–0.2	0.001	10	263898.6(3)	4d	395439.3(4)	bl O V
130	190	760.290	131528.8	0.1	0.000	9	267928.6(4)	5s	399457.3(4)	bl O V
6	157	760.639	131468.4	1.9	–0.011	8	282423.5(2)	5s	413890.0(3)	bl Fe V * 2
73	133	761.275	131358.5	–1.6	0.009	6	267240.1(3)	5s	398600.2(3)	
55	133	761.334	131348.4	–0.2	0.001	2	266612.8(2)	5s	397961.4(2)	
98	90	761.411	131335.1	0.1	–0.001	8	292430.7(4)	5s	423765.7(5)	
116	67	761.500	131319.8	0.8	–0.005	4	311180.9(4)	5s	442499.9(3)	
7				–0.1	0.001	6	265112.6(5)	5s	396432.5(5)	
20	38	761.702	131284.9	–0.3	0.002	8	282604.8(2)	5s	413890.0(3)	
18	101	761.854	131258.8	–3.1	0.018	10	264434.2(4)	4d	395696.1(5)	bl
82	67	762.822	131092.2	–0.3	0.002	5	292513.2(3)	5s	423605.7(4)	
48	61	762.909	131077.2	0.3	–0.002	9	285196.1(6)	5s	416273.0(5)	
31	43	763.364	130999.2	3.0	–0.017	12	284790.8(5)	5s	415787.0(4)	bl
95	30	763.588	130960.7	–0.5	0.003	4	311538.7(3)	5s	442499.9(3)	
6	9	763.865	130913.1	–1.7	0.010	8	264434.2(4)	4d	395349.0(3)	
20	18	764.025	130885.7	–0.5	0.003	10	284690.3(4)	5s	415576.5(3)	
26	73	765.177	130688.6	–1.2	0.007	10	265112.6(5)	4d	395802.4(6)	
1	22	765.330	130662.6	1.1	–0.006	13	265112.6(5)	5s	395774.1(4)	
6	10	765.505	130632.8	0.8	–0.005	8	265112.6(5)	4d	395744.6(4)	
3	11	765.574	130620.9	0.2	–0.001	12	264434.2(4)	5s	395054.9(3)	
2	15	766.318	130494.1	–0.2	0.001	9	276429.7(4)	4d	406924.0(3)	
4	8	767.386	130312.5	–0.5	0.003	12	285474.0(3)	5s	415787.0(4)	
6	5	768.028	130203.5	–0.2	0.001	8	283686.3(2)	5s	413890.0(3)	
12	23	772.670	129421.4	–0.2	0.001	10	286154.9(2)	5s	415576.5(3)	
7	57	773.060	129356.1	0.4	–0.002	12	286431.3(3)	5s	415787.0(4)	
16	101	773.771	129237.3	1.1	–0.006	13	286431.3(3)	5s	415667.5(2)	bl Fe V * 2
7	57	774.875	129053.1	–1.9	0.011	13	265112.6(5)	4d	394167.6(4)	
7	16	775.667	128921.2	0.9	–0.006	4	307288.7(3)	4d	436209.0(2)	
6	10	776.370	128804.6	–0.2	0.001	13	286862.7(2)	5s	415667.5(2)	
12	26	777.294	128651.5	–1.3	0.008	9	287620.2(4)	5s	416273.0(5)	
8	34	777.753	128575.6	–0.8	0.005	10	264434.2(4)	4d	393010.6(4)	
26	34	777.865	128557.1	–0.8	0.005	13	287109.6(3)	5s	415667.5(2)	
7	46	781.389	127977.3	0.3	–0.002	12	278794.2(3)	4d	406771.2(4)	bl Fe V * 2
1	9	782.203	127844.0	–1.5	0.009	13	267928.6(4)	5s	395774.1(4)	
1	8	782.387	127814.0	–0.8	0.005	12	267240.1(3)	5s	395054.9(3)	
51	115	787.445	126993.1	0.1	–0.001	11	290099.1(5)	5s	417092.1(4)	bl Fe V * 2
19	19	788.947	126751.3	0.1	–0.001	4	307288.7(3)	4d	434039.9(4)	
16	30	789.894	126599.3	0.0	0.000	14	267240.1(3)	4d	393839.4(3)	
6	6	793.362	126045.8	1.0	–0.006	10	280367.2(4)	4d	406412.0(5)	
14	21	793.921	125957.1	–0.1	0.001	5	308165.0(2)	4d	434122.2(3)	
7	14	794.518	125862.5	1.8	–0.011	11	291231.4(3)	5s	417092.1(4)	
1	13	797.001	125470.4	0.5	–0.003	17	261179.6(3)	4d	386649.5(4)	
4	5	799.486	125080.4	–1.6	0.010	10	267928.6(4)	4d	393010.6(4)	
6	12	810.357	123402.4	–1.1	0.007	11	258128.5(2)	4d	381532.0(3)	
1	8	811.651	123205.6	–0.4	0.002	13	258128.5(2)	4d	381334.5(2)	
23	61	812.782	123034.2	–0.8	0.005	10	258128.5(2)	4d	381163.5(1)	
10	46	812.832	123026.6	–1.2	0.008	8	258680.0(3)	4d	381707.8(4)	
21	115	813.998	122850.4	–1.6	0.011	11	258680.0(3)	4d	381532.0(3)	bl

Table I. *continued.*

gA (10^8 s^{-1})	Int	λ (Å)	σ (cm^{-1})	$\Delta(\sigma)$[a] (cm^{-1})	$\Delta(\lambda)$[a] (Å)	*N*[b]	Odd level		Even level	Remark[c]
36	101	815.292	122655.4	0.9	–0.006	13	258680.0(3)	4d	381334.5(2)	
59	115	815.496	122624.7	–1.7	0.011	4	289545.9(4)	4d	412172.3(3)	bl
13	61	816.037	122543.5	–0.5	0.003	10	258619.5(0)	4d	381163.5(1)	
21	157	816.728	122439.7	–3.3	0.022	13	258891.5(1)	4d	381334.5(2)	bl
87	133	817.247	122362.0	–1.0	0.006	8	259344.8(4)	4d	381707.8(4)	
6	18	817.851	122271.6	–0.4	0.002	10	258891.5(1)	4d	381163.5(1)	
20	27	817.986	122251.5	1.0	–0.006	3	285474.0(3)	4d	407724.5(3)	
2	9	818.111	122232.8	–0.9	0.006	9	284690.3(4)	4d	406924.0(3)	
34	40	818.417	122187.1	–0.1	0.001	11	259344.8(4)	4d	381532.0(3)	
18	54	818.606	122158.9	3.0	–0.020	11	259376.1(2)	4d	381532.0(3)	bl Fe III
22	60	819.963	121956.8	–1.6	0.011	13	259376.1(2)	4d	381334.5(2)	
10	33	821.378	121746.7	0.9	–0.006	4	261179.6(3)	4d	382925.4(4)	
1	6	822.217	121622.3	1.1	–0.008	10	284790.8(5)	4d	406412.0(5)	
33	38	822.546	121573.7	–3.6	0.024	11	259954.7(3)	4d	381532.0(3)	bl
1	4	824.424	121296.9	–0.3	0.002	12	285474.0(3)	4d	406771.2(4)	
27	28	825.179	121185.9	–0.9	0.006	8	260521.0(4)	4d	381707.8(4)	
1	7	825.347	121161.1	0.9	–0.006	10	267240.1(3)	4d	388400.3(4)	
2	14	826.125	121047.1	0.0	0.000	10	258680.0(3)	4d	379727.1(2)	
34	25	826.296	121021.9	–1.6	0.011	13	294644.0(1)	5s	415667.5(2)	
11	28	826.380	121009.8	–1.2	0.008	11	260521.0(4)	4d	381532.0(3)	
3	10	827.263	120880.6	–1.3	0.009	13	279502.6(4)	4d	400384.5(4)	
16	35	828.011	120771.4	2.3	–0.016	9	286154.9(2)	4d	406924.0(3)	
7	12	828.149	120751.1	–1.0	0.006	10	260411.4(2)	4d	381163.5(1)	
37	38	828.811	120654.8	–1.1	0.008	8	261051.9(5)	4d	381707.8(4)	
1	4	829.681	120528.2	0.0	0.000	8	261179.6(3)	4d	381707.8(4)	
2	8	830.979	120340.0	0.1	–0.001	12	286431.3(3)	4d	406771.2(4)	
6	30	832.243	120157.3	2.4	–0.016	13	261179.6(3)	4d	381334.5(2)	bl
40	50	833.213	120017.3	0.0	0.000	13	280367.2(4)	4d	400384.5(4)	
16	77	836.366	119564.9	0.4	–0.003	8	289389.7(2)	4d	408954.2(3)	str
25	67	839.395	119133.4	–0.3	0.002	7	287620.2(4)	4d	406753.9(5)	
10	40	840.570	118966.9	0.0	0.000	7	264434.2(4)	4d	383401.1(3)	
6	54	841.812	118791.3	–0.5	0.003	10	287620.2(4)	4d	406412.0(5)	
11	38	843.806	118510.6	0.9	–0.007	10	277292.7(5)	4d	395802.4(6)	
98	127	844.950	118350.1	3.7	–0.027	13	282038.1(4)	4d	400384.5(4)	bl Fe III
5	14	847.056	118056.0	–0.1	0.001	6	282423.5(2)	4d	400479.6(2)	
54	50	848.119	117908.0	0.0	0.000	6	282571.6(3)	4d	400479.6(2)	
2	77	849.423	117727.0	0.3	–0.002	5	259376.1(2)	4d	377102.8(2)	
57	89	850.974	117512.5	–0.1	0.001	13	282871.9(5)	4d	400384.5(4)	
5	45	851.713	117410.4	0.7	–0.005	14	276429.7(4)	4d	393839.4(3)	
23	67	853.591	117152.2	0.5	–0.003	10	278650.7(6)	4d	395802.4(6)	
6	25	854.683	117002.5	0.4	–0.003	6	307064.4(5)	5s	424066.5(6)	
9	60	855.616	116874.9	0.0	0.000	13	277292.7(5)	4d	394167.6(4)	
16	77	855.686	116865.3	–0.8	0.006	10	289545.9(4)	4d	406412.0(5)	
54	105	857.309	116644.1	–1.0	0.007	10	278794.2(3)	4d	395439.3(4)	
8	89	857.863	116568.7	–0.9	0.006	7	280539.7(2)	4d	397109.3(1)	
34	67	858.199	116523.1	–0.4	0.003	8	292430.7(4)	4d	408954.2(3)	
105	77	858.696	116455.6	–0.3	0.002	4	295716.4(2)	4d	412172.3(3)	
39	105	859.531	116342.5	–0.5	0.004	12	276429.7(4)	4d	392772.7(3)	
15	77	860.172	116255.8	–0.1	0.000	8	278794.2(3)	4d	395050.0(2)	
60	60	860.633	116193.5	0.0	0.000	10	279502.6(4)	4d	395696.1(5)	
108	127	863.834	115763.0	0.2	–0.002	10	280039.6(5)	4d	395802.4(6)	
53	105	864.167	115718.4	0.5	–0.004	10	277292.7(5)	4d	393010.6(4)	
32	50	864.348	115694.1	–0.1	0.000	13	284690.3(4)	4d	400384.5(4)	
7	127	864.364	115691.9	–0.7	0.005	9	291231.4(3)	4d	406924.0(3)	bl Fe III
15	105	864.633	115656.0	–0.5	0.003	10	280039.6(5)	4d	395696.1(5)	str
2	28	865.400	115553.5	1.2	–0.009	12	279502.6(4)	5s	395054.9(3)	
18	35	867.089	115328.4	–0.5	0.004	10	280367.2(4)	4d	395696.1(5)	
71	20	867.721	115244.4	–0.1	0.001	7	278650.7(6)	4d	393895.2(5)	
21	60	869.014	115072.9	0.8	–0.006	10	280367.2(4)	4d	395439.3(4)	
8	16	871.224	114781.1	–1.5	0.012	4	287440.5(5)	4d	402223.1(6)	
17	89	872.546	114607.2	0.1	–0.001	10	280832.2(3)	4d	395439.3(4)	bl Fe III
32	45	872.943	114555.0	1.6	–0.012	5	278794.2(3)	4d	393347.6(2)	
23				2.2	–0.017	7	282423.5(2)	4d	396976.3(2)	
22	89	873.232	114517.2	–0.7	0.005	6	285961.7(1)	4d	400479.6(2)	
31	127	873.622	114465.9	–0.4	0.003	7	292287.6(5)	4d	406753.9(5)	str
10	105	873.773	114446.3	–1.0	0.008	10	281944.9(1)	4d	396392.2(2)	str
23	89	874.044	114410.7	–0.1	0.000	9	292513.2(3)	4d	406924.0(3)	
10	89	874.577	114341.0	0.5	–0.004	12	292430.7(4)	4d	406771.2(4)	Fe III
24	28	875.217	114257.4	–0.6	0.005	12	292513.2(3)	4d	406771.2(4)	

Table I. *continued.*

gA (10^8 s^{-1})	Int	λ (Å)	σ (cm^{-1})	$\Delta(\sigma)^a$ (cm^{-1})	$\Delta(\lambda)^a$ (Å)	N^b	Odd level		Even level	Remark^c
47	41	875.844	114175.6	0.3	–0.003	2	292287.6(5)	4d	406462.9(6)	
30	105	876.217	114126.9	–1.1	0.008	13	280039.6(5)	4d	394167.6(4)	str
9	60	877.217	113996.9	–1.3	0.010	13	265112.6(5)	4d	379110.8(5)	
27	67	877.349	113979.7	1.2	–0.009	12	278794.2(3)	4d	392772.7(3)	
9				–1.6	0.013	10	292430.7(4)	4d	406412.0(5)	
14	41	877.435	113968.6	–0.1	0.001	10	282423.5(2)	4d	396392.2(2)	
29	105	878.313	113854.6	–1.0	0.007	7	280039.6(5)	4d	393895.2(5)	bl Fe III
75	60	878.734	113800.0	–0.4	0.003	13	280367.2(4)	4d	394167.6(4)	
7	33	878.840	113786.4	–1.0	0.008	10	282604.8(2)	4d	396392.2(2)	
7	35	879.824	113659.1	1.1	–0.008	10	282038.1(4)	4d	395696.1(5)	
53	127	880.951	113513.7	5.7	–0.045	10	279502.6(4)	4d	393010.6(4)	bl Fe III
32	40	881.825	113401.2	0.0	0.000	10	282038.1(4)	4d	395439.3(4)	
5	20	882.686	113290.6	0.6	–0.005	7	283686.3(2)	4d	396976.3(2)	
4	27	882.798	113276.3	1.4	–0.011	13	287109.6(3)	4d	400384.5(4)	Fe III
19	49	882.847	113269.9	–0.2	0.001	12	279502.6(4)	4d	392772.7(3)	
74	77	884.897	113007.5	0.3	–0.002	14	280832.2(3)	4d	393839.4(3)	
4	19	885.392	112944.3	0.3	–0.002	13	287440.5(5)	4d	400384.5(4)	
66	38	886.473	112806.5	–1.4	0.011	5	280539.7(2)	4d	393347.6(2)	
68	67	887.256	112707.1	1.2	–0.009	10	283686.3(2)	4d	396392.2(2)	
25	49	887.757	112643.5	0.1	–0.001	10	280367.2(4)	4d	393010.6(4)	
15	89	891.005	112232.8	–0.2	0.002	12	280539.7(2)	4d	392772.7(3)	
37	40	891.826	112129.5	0.0	0.000	13	282038.1(4)	4d	394167.6(4)	
436	127	891.866	112124.5	0.5	–0.004	4	290099.1(5)	4d	402223.1(6)	
6	60	894.458	111799.5	–1.8	0.014	14	282038.1(4)	4d	393839.4(3)	
1	19	894.548	111788.3	1.8	–0.015	11	256177.9(4)	4d	367964.4(3)	
18	38	896.693	111520.9	–2.1	0.017	10	267240.1(3)	4d	378763.1(4)	
6	77	898.734	111267.7	–0.1	0.001	14	282571.6(3)	4d	393839.4(3)	
15	127	899.423	111182.4	0.2	–0.002	13	267928.6(4)	4d	379110.8(5)	str
8	28	899.693	111149.0	1.4	–0.011	7	285961.7(1)	4d	397109.3(1)	
28	60	901.269	110954.7	0.3	–0.003	7	286154.9(2)	4d	397109.3(1)	
48	60	901.447	110932.8	0.0	0.000	5	285474.0(3)	4d	396406.8(3)	
313	89	901.674	110904.8	–0.5	0.004	10	284790.8(5)	4d	395696.1(5)	
45	54	902.222	110837.5	–1.1	0.009	13	289545.9(4)	4d	400384.5(4)	
16	27	902.615	110789.1	0.5	–0.004	7	286187.7(1)	4d	396976.3(2)	
229	105	902.940	110749.3	0.3	–0.002	10	284690.3(4)	4d	395439.3(4)	Fe III
381	105	904.109	110606.1	–0.2	0.002	10	285196.1(6)	4d	395802.4(6)	
16	18	904.607	110545.3	0.3	–0.002	7	286431.3(3)	4d	396976.3(2)	
10	54	905.209	110471.7	0.2	–0.002	13	289913.0(3)	4d	400384.5(4)	
2	38	905.479	110438.8	–0.2	0.001	10	282571.6(3)	4d	393010.6(4)	
2	3	906.215	110349.1	–0.1	0.001	12	282423.5(2)	4d	392772.7(3)	
6	10	906.731	110286.3	0.9	–0.008	13	290099.1(5)	4d	400384.5(4)	
41	45	907.404	110204.5	0.0	0.000	10	286187.7(1)	4d	396392.2(2)	
19	67	909.404	109962.2	1.3	–0.010	10	286431.3(3)	4d	396392.2(2)	
73	49	909.623	109935.7	0.2	–0.001	4	292287.6(5)	4d	402223.1(6)	
259	89	910.268	109857.7	0.5	–0.004	4	292365.9(6)	4d	402223.1(6)	
12	67	910.447	109836.2	0.3	–0.003	11	258128.5(2)	4d	367964.4(3)	
19	67	911.134	109753.4	0.1	–0.001	9	258680.0(3)	4d	368433.3(4)	
51	77	912.453	109594.7	1.1	–0.009	5	283754.0(1)	4d	393347.6(2)	
16	67	913.350	109487.1	0.0	0.000	5	257742.3(1)	4d	367229.4(0)	
2	24	913.460	109473.8	0.2	–0.002	13	306193.9(3)	5s	415667.5(2)	
24	30	914.270	109376.9	0.1	–0.001	13	284790.8(5)	4d	394167.6(4)	
2	6	914.433	109357.4	0.6	–0.005	17	277292.7(5)	4d	386649.5(4)	
5	12	914.561	109342.1	–0.2	0.002	7	280832.2(3)	4d	390174.5(3)	
44	25	914.820	109311.1	–0.1	0.001	5	289545.9(4)	4d	398857.1(3)	
34	54	915.044	109284.3	–0.1	0.001	11	258680.0(3)	4d	367964.4(3)	
49	77	915.530	109226.4	–0.3	0.003	10	258128.5(2)	4d	367355.2(1)	
173	77	916.150	109152.5	–0.6	0.005	13	291231.4(3)	4d	400384.5(4)	
153	89	916.691	109088.0	–0.5	0.004	9	259344.8(4)	4d	368433.3(4)	
12	45	916.960	109056.0	1.7	–0.015	6	289545.9(4)	5s	398600.2(3)	
33	89	918.036	108928.2	0.0	0.000	14	284911.2(2)	4d	393839.4(3)	
84	89	918.084	108922.5	–0.2	0.002	10	258680.0(3)	4d	367602.7(2)	
33	49	919.228	108787.0	0.4	–0.003	5	287620.2(4)	4d	396406.8(3)	
23	45	919.664	108735.4	–0.3	0.002	10	258619.5(0)	4d	367355.2(1)	
38	60	919.872	108710.7	–0.5	0.004	10	258891.5(1)	4d	367602.7(2)	
80	67	919.963	108700.0	0.9	–0.007	7	285196.1(6)	4d	393895.2(5)	
18	49	920.025	108692.7	–0.9	0.007	13	285474.0(3)	4d	394167.6(4)	
18	18	920.271	108663.6	–0.9	0.007	13	287109.6(3)	5s	395774.1(4)	
30	9	920.512	108635.2	0.2	–0.002	8	287109.6(3)	4d	395744.6(4)	
86	60	920.648	108619.1	–0.5	0.004	11	259344.8(4)	4d	367964.4(3)	

Table I. *continued.*

gA (10^8 s^{-1})	Int	λ (Å)	σ (cm^{-1})	$\Delta(\sigma)^a$ (cm^{-1})	$\Delta(\lambda)^a$ (Å)	N^b	Odd level		Even level	Remark^c
31	49	920.907	108588.6	0.3	–0.003	11	259376.1(2)	4d	367964.4(3)	
37	33	921.778	108486.0	–0.3	0.003	8	286862.7(2)	4d	395349.0(3)	
12	38	921.836	108479.2	0.6	–0.005	9	259954.7(3)	4d	368433.3(4)	
12	45	921.979	108462.3	–1.4	0.012	10	258891.5(1)	4d	367355.2(1)	Fe IV * 2
16	60	922.172	108439.6	0.1	–0.001	7	288669.8(1)	4d	397109.3(1)	
14	27	922.295	108425.2	0.5	–0.004	3	276759.2(2)	4d	385183.9(2)	
72	49	922.689	108378.8	0.0	0.000	13	307288.7(3)	5s	415667.5(2)	
4	21	922.845	108360.6	–0.1	0.001	10	280039.6(5)	4d	388400.3(4)	
2	22	922.891	108355.2	0.7	–0.006	2	255399.2(3)	4d	363753.7(4)	
10	41	923.039	108337.7	–0.2	0.001	5	258891.5(1)	4d	367229.4(0)	
175	49	923.144	108325.5	–0.1	0.001	2	311180.9(4)	4d	419506.5(4)	
44	60	923.497	108284.0	–0.6	0.005	4	327924.4(3)	4d	436209.0(2)	
131	60	923.638	108267.5	–0.4	0.003	3	307644.4(2)	4d	415912.3(2)	
7	27	923.728	108257.0	1.4	–0.012	10	287440.5(5)	4d	395696.1(5)	
9	28	923.825	108245.6	0.0	0.000	6	278650.7(6)	4d	386896.3(5)	
14	41	923.874	108239.8	0.4	–0.004	8	287109.6(3)	4d	395349.0(3)	
45	60	923.984	108227.0	0.4	–0.004	10	259376.1(2)	4d	367602.7(2)	
46	60	924.039	108220.5	0.7	–0.006	10	284790.8(5)	4d	393010.6(4)	
15	49	924.261	108194.5	–0.2	0.002	8	286855.3(1)	4d	395050.0(2)	
8	33	924.320	108187.6	0.3	–0.003	8	286862.7(2)	4d	395050.0(2)	
5	49	924.668	108146.9	0.5	–0.004	4	257138.0(5)	4d	365284.4(6)	
37	49	925.224	108081.9	–0.5	0.004	12	284690.3(4)	4d	392772.7(3)	
22	38	925.718	108024.3	1.2	–0.010	13	307644.4(2)	5s	415667.5(2)	
68	77	925.855	108008.3	–1.4	0.012	11	259954.7(3)	4d	367964.4(3)	Fe III
41	60	925.936	107998.8	0.0	0.000	10	287440.5(5)	4d	395439.3(4)	
2	25	926.102	107979.5	0.4	–0.003	10	259376.1(2)	4d	367355.2(1)	
209	45	926.201	107967.9	0.1	–0.001	2	311538.7(3)	4d	419506.5(4)	
52	57	926.678	107912.3	0.0	0.000	9	260521.0(4)	4d	368433.3(4)	
24	46	926.873	107889.6	–0.1	0.000	8	258128.5(2)	4d	366018.2(3)	
17	46	926.918	107884.4	0.0	0.000	5	258680.0(3)	4d	366564.4(4)	
59	36	927.036	107870.6	–0.7	0.006	13	292513.2(3)	4d	400384.5(4)	
34	36	927.111	107861.9	0.4	–0.004	12	284911.2(2)	4d	392772.7(3)	
5	19	927.165	107855.7	0.4	–0.003	17	278794.2(3)	4d	386649.5(4)	
25	38	927.530	107813.3	–0.3	0.002	4	257742.3(1)	4d	365555.8(2)	
21	43	928.087	107748.5	1.2	–0.010	3	308165.0(2)	4d	415912.3(2)	
32	36	928.189	107736.7	0.4	–0.003	13	286431.3(3)	4d	394167.6(4)	
37	61	928.578	107691.6	0.2	–0.002	13	273643.1(1)	4d	381334.5(2)	
43	61	928.634	107685.1	0.6	–0.005	14	286154.9(2)	4d	393839.4(3)	Fe III
6	29	928.972	107645.9	–2.1	0.018	10	259954.7(3)	4d	367602.7(2)	
8	34	929.071	107634.4	–0.8	0.007	10	288167.2(6)	4d	395802.4(6)	
9	30	929.339	107603.4	0.5	–0.004	7	282571.6(3)	4d	390174.5(3)	
41	38	929.484	107586.6	0.0	0.000	7	289389.7(2)	4d	396976.3(2)	
77	61	929.914	107536.9	0.3	–0.002	10	285474.0(3)	4d	393010.6(4)	
55	57	929.981	107529.1	0.2	–0.002	10	288167.2(6)	4d	395696.1(5)	
62	81	930.073	107518.5	–1.9	0.017	10	273643.1(1)	4d	381163.5(1)	bl Fe III
6	29	930.208	107502.8	0.3	–0.003	13	308165.0(2)	5s	415667.5(2)	
44	49	930.724	107443.2	–0.2	0.001	11	260521.0(4)	4d	367964.4(3)	
34	61	930.981	107413.5	0.0	0.000	1	273643.1(1)	4d	381056.6(0)	
119	73	931.134	107395.9	0.0	0.000	11	274136.1(2)	4d	381532.0(3)	Fe III
112	73	931.259	107381.5	0.1	–0.001	9	261051.9(5)	4d	368433.3(4)	
6	19	931.461	107358.3	–1.8	0.015	10	259995.2(1)	4d	367355.2(1)	
5	9	931.980	107298.4	–0.3	0.003	12	285474.0(3)	4d	392772.7(3)	
2	7	932.367	107253.9	0.2	–0.002	9	261179.6(3)	4d	368433.3(4)	
14	27	932.547	107233.2	–1.0	0.009	5	259995.2(1)	4d	367229.4(0)	
103	57	932.849	107198.4	0.0	0.000	13	274136.1(2)	4d	381334.5(2)	
11	26	933.106	107169.0	–0.7	0.006	9	292287.6(5)	5s	399457.3(4)	Fe III
17	26	933.260	107151.2	0.5	–0.005	11	282871.9(5)	4d	390022.6(4)	
6	22	933.298	107146.9	0.0	0.000	17	279502.6(4)	4d	386649.5(4)	
93	53	934.072	107058.1	0.1	–0.001	13	287109.6(3)	4d	394167.6(4)	
37	43	934.337	107027.7	0.3	–0.003	10	274136.1(2)	4d	381163.5(1)	
16	53	934.792	106975.7	–1.0	0.009	14	286862.7(2)	4d	393839.4(3)	
28	46	935.071	106943.8	0.0	0.000	10	260411.4(2)	4d	367355.2(1)	
8	20	935.843	106855.6	–1.1	0.010	6	280039.6(5)	4d	386896.3(5)	
5	19	935.873	106852.1	–1.1	0.010	8	275146.6(1)	4d	381999.8(2)	
11	13	936.332	106799.8	0.3	–0.003	4	278650.7(6)	4d	385450.1(7)	
267	81	936.514	106779.0	1.5	–0.013	8	274930.3(3)	4d	381707.8(4)	
15	40	936.931	106731.5	0.1	–0.001	17	275374.3(2)	4d	382105.7(3)	Fe III
70	53	937.815	106630.8	0.3	–0.003	10	289171.9(7)	4d	395802.4(6)	
28	38	937.933	106617.4	–0.4	0.004	12	286154.9(2)	4d	392772.7(3)	

Table I. *continued.*

gA ($10^8\,s^{-1}$)	Int	λ (Å)	σ (cm^{-1})	$\Delta(\sigma)$[a] (cm^{-1})	$\Delta(\lambda)$[a] (Å)	N[b]	Odd level		Even level	Remark[c]
10	38	938.001	106609.7	–0.2	0.002	17	280039.6(5)	4d	386649.5(4)	
107	67	938.060	106603.0	1.3	–0.011	11	274930.3(3)	4d	381532.0(3)	
123	61	938.283	106577.6	0.5	–0.005	8	302377.1(3)	4d	408954.2(3)	
26				–1.7	0.015	10	286431.3(3)	4d	393010.6(4)	
9	8	938.557	106546.5	–0.9	0.008	13	287620.2(4)	4d	394167.6(4)	
6	27	938.657	106535.2	–0.6	0.005	6	258128.5(2)	4d	364664.3(2)	
25	38	938.740	106525.8	0.2	–0.002	7	290583.7(1)	4d	397109.3(1)	
168	53	938.817	106517.0	0.2	–0.002	5	327605.4(2)	4d	434122.2(3)	
37	30	939.025	106493.5	–0.3	0.003	5	289913.0(3)	4d	396406.8(3)	
33	49	939.160	106478.1	–1.1	0.009	10	289913.0(3)	4d	396392.2(2)	
15	36	939.614	106426.7	0.3	–0.003	5	292430.7(4)	4d	398857.1(3)	
24	43	939.650	106422.6	–0.5	0.005	10	261179.6(3)	4d	367602.7(2)	
4	10	939.756	106410.6	0.4	–0.004	10	274753.3(0)	4d	381163.5(1)	
24	34	939.814	106404.0	–0.2	0.002	13	274930.3(3)	4d	381334.5(2)	
58	67	939.925	106391.5	–1.1	0.010	7	290583.7(1)	4d	396976.3(2)	
27	29	940.019	106380.8	0.6	–0.005	8	288669.8(1)	4d	395050.0(2)	
	5	940.176	106363.1	0.9	–0.007	10	282038.1(4)	4d	388400.3(4)	
13	14	940.285	106350.7	–1.0	0.009	8	302602.5(4)	4d	408954.2(3)	
123	57	940.955	106275.0	0.0	0.000	7	287620.2(4)	4d	393895.2(5)	
27	67	941.335	106232.1	0.4	–0.003	7	273643.1(1)	4d	379874.8(1)	
7	25	941.485	106215.2	1.1	–0.009	15	278794.2(3)	4d	385008.3(3)	
33	38	941.573	106205.3	–0.6	0.005	7	290903.4(0)	4d	397109.3(1)	
35	49	941.631	106198.7	0.9	–0.008	5	327924.4(3)	4d	434122.2(3)	Fe III
5	29	941.740	106186.4	–1.5	0.013	13	275146.6(1)	4d	381334.5(2)	
257	57	942.362	106116.3	0.8	–0.007	4	327924.4(3)	4d	434039.9(4)	Fe III
62	61	942.649	106084.0	0.0	0.000	10	273643.1(1)	4d	379727.1(2)	
1	9	943.256	106015.8	–1.1	0.010	10	275146.6(1)	4d	381163.5(1)	
126	61	943.397	105999.9	0.8	–0.007	5	290407.7(2)	4d	396406.8(3)	
35	57	943.528	105985.2	0.7	–0.006	10	290407.7(2)	4d	396392.2(2)	
27				0.9	–0.008	6	258680.0(3)	4d	364664.3(2)	
25	34	943.754	105959.8	0.5	–0.004	8	289389.7(2)	4d	395349.0(3)	
9				–0.4	0.004	13	275374.3(2)	4d	381334.5(2)	
14	49	944.208	105908.9	–2.3	0.020	11	311180.9(4)	5s	417092.1(4)	bl Fe III
4	7	944.607	105864.1	–0.1	0.001	10	279502.6(4)	4d	385366.8(5)	
11	9	944.865	105835.3	–0.3	0.003	6	294644.0(1)	4d	400479.6(2)	
15	32	945.027	105817.1	–0.2	0.002	17	280832.2(3)	4d	386649.5(4)	Fe III
5	38	945.115	105807.3	–1.2	0.011	10	290583.7(1)	4d	396392.2(2)	Fe III
10	23	945.150	105803.3	0.2	–0.002	8	289545.9(4)	4d	395349.0(3)	
9	20	945.265	105790.5	1.3	–0.011	10	275374.3(2)	4d	381163.5(1)	
41	57	945.721	105739.4	0.7	–0.006	7	274136.1(2)	4d	379874.8(1)	Fe III
14	30	945.806	105730.0	0.2	–0.001	12	278794.2(3)	4d	384524.0(4)	
21	81	946.054	105702.2	–1.1	0.010	10	290099.1(5)	4d	395802.4(6)	
5	29	946.196	105686.3	–0.4	0.004	9	276765.9(1)	4d	382452.6(2)	
3	26	946.394	105664.2	–1.0	0.009	12	289389.7(2)	5s	395054.9(3)	
52	61	946.902	105607.6	0.8	–0.007	8	260411.4(2)	4d	366018.2(3)	
3	20	947.059	105590.1	–0.9	0.008	10	274136.1(2)	4d	379727.1(2)	
28	57	947.323	105560.7	0.1	–0.001	4	259995.2(1)	4d	365555.8(2)	
32	34	947.382	105554.0	0.6	–0.006	11	311538.7(3)	5s	417092.1(4)	
51	53	948.039	105480.9	–0.5	0.005	10	274136.1(2)	4d	379617.5(3)	
3	14	948.591	105419.5	–0.3	0.003	8	282423.5(2)	4d	387843.3(3)	
5	16	948.786	105397.9	–0.8	0.007	11	280539.7(2)	4d	385938.4(3)	
105	73	948.912	105383.8	–1.0	0.009	5	261179.6(3)	4d	366564.4(4)	
11	7	949.250	105346.4	–0.1	0.001	17	276759.2(2)	4d	382105.7(3)	
1	2	949.382	105331.7	–0.6	0.006	11	284690.3(4)	4d	390022.6(4)	
3	26	949.931	105270.8	–0.9	0.008	8	282571.6(3)	4d	387843.3(3)	
1	49	950.954	105157.6	–0.3	0.003	4	282871.9(5)	4d	388029.8(6)	
106	43	951.283	105121.2	–0.8	0.008	3	302602.5(4)	4d	407724.5(3)	
1	5	952.052	105036.3	–0.9	0.008	17	277068.5(3)	4d	382105.7(3)	
2	5	952.382	104999.9	0.3	–0.002	10	280367.2(4)	4d	385366.8(5)	
7	12	953.656	104859.6	1.4	–0.013	6	282038.1(4)	4d	386896.3(5)	
9	21	953.853	104838.0	–0.6	0.005	8	261179.6(3)	4d	366018.2(3)	
38	46	954.226	104797.0	0.2	–0.002	10	274930.3(3)	4d	379727.1(2)	
14	61	954.447	104772.7	–0.1	0.001	11	276759.2(2)	4d	381532.0(3)	
23	32	954.542	104762.3	–0.9	0.008	6	295716.4(2)	4d	400479.6(2)	
2	29	954.866	104726.8	–1.5	0.013	7	275146.6(1)	4d	379874.8(1)	
4	10	955.024	104709.4	–0.2	0.002	6	259954.7(3)	4d	364664.3(2)	
61	67	955.223	104687.6	0.4	–0.003	10	274930.3(3)	4d	379617.5(3)	
32	12	955.317	104677.3	–0.5	0.004	5	288669.8(1)	4d	393347.6(2)	
15	61	955.645	104641.4	2.1	–0.019	8	277068.5(3)	4d	381707.8(4)	

Table I. *continued*

gA (10^8 s^{-1})	Int	λ (Å)	σ (cm^{-1})	$\Delta(\sigma)$[a] (cm^{-1})	$\Delta(\lambda)$[a] (Å)	*N*[b]	Odd level		Even level	Remark[c]
11				0.3	–0.003	15	280367.2(4)	4d	385008.3(3)	
165	73	955.736	104631.4	0.1	–0.001	9	302292.7(2)	4d	406924.0(3)	
7	25	955.905	104612.9	0.5	–0.004	8	280367.2(4)	4d	384979.6(5)	
1	6	956.205	104580.1	–0.4	0.004	10	275146.6(1)	4d	379727.1(2)	
4	73	956.310	104568.6	0.0	0.000	13	276765.9(1)	4d	381334.5(2)	
40	34	956.508	104546.9	0.0	0.000	9	302377.1(3)	4d	406924.0(3)	
28	46	956.677	104528.5	0.6	–0.005	4	307644.4(2)	4d	412172.3(3)	
94	67	956.870	104507.4	1.0	–0.009	6	295973.2(1)	4d	400479.6(2)	
2	9	957.075	104485.1	0.7	–0.006	12	280039.6(5)	4d	384524.0(4)	
33	40	957.221	104469.1	0.5	–0.005	15	280539.7(2)	4d	385008.3(3)	
16	29	957.276	104463.1	–0.4	0.004	11	277068.5(3)	4d	381532.0(3)	
15	13	957.392	104450.4	0.7	–0.006	14	289389.7(2)	4d	393839.4(3)	
4	12	957.809	104404.9	0.6	–0.006	10	276759.2(2)	4d	381163.5(1)	
59	67	957.908	104394.1	0.0	0.000	12	302377.1(3)	4d	406771.2(4)	
56	43	958.105	104372.7	–0.9	0.008	3	311538.7(3)	4d	415912.3(2)	Fe III
7	9	958.289	104352.7	–0.1	0.001	10	275374.3(2)	4d	379727.1(2)	
2	13	958.371	104343.7	0.8	–0.007	10	254803.3(2)	4d	359146.2(3)	
13	57	959.079	104266.7	0.7	–0.007	13	277068.5(3)	4d	381334.5(2)	Fe III
14	36	959.207	104252.8	–0.1	0.001	6	260411.4(2)	4d	364664.3(2)	
15	43	959.388	104233.1	0.6	–0.006	4	261051.9(5)	4d	365284.4(6)	
24	36	959.618	104208.1	0.2	–0.002	10	291231.4(3)	4d	395439.3(4)	
2	8	959.800	104188.3	–0.5	0.004	10	255399.2(3)	4d	359588.0(4)	
8	43	959.987	104168.1	–0.6	0.006	12	302602.5(4)	4d	406771.2(4)	Fe III
16	49	960.085	104157.4	0.6	–0.006	12	280367.2(4)	4d	384524.0(4)	
194	81	960.141	104151.4	0.0	0.000	7	302602.5(4)	4d	406753.9(5)	
1	15	960.347	104129.0	0.2	–0.002	13	311538.7(3)	5s	415667.5(2)	
8	9	960.817	104078.1	0.2	–0.002	17	282571.6(3)	4d	386649.5(4)	
9	5	960.931	104065.8	0.2	–0.002	5	261179.6(3)	4d	365245.2(4)	
46	101	961.968	103953.5	0.0	0.000	11	254803.3(2)	4d	358756.8(2)	
67	81	962.473	103899.0	0.5	–0.005	7	279502.6(4)	4d	383401.1(3)	
7				–1.3	0.012	11	282038.1(4)	4d	385938.4(3)	
19	53	963.245	103815.7	–2.9	0.027	8	291231.4(3)	4d	395050.0(2)	bl Fe III
73	38	963.301	103809.7	0.2	–0.002	10	302602.5(4)	4d	406412.0(5)	
30	18	963.426	103796.3	0.2	–0.002	7	290099.1(5)	4d	393895.2(5)	
63	73	963.884	103746.9	–0.1	0.001	10	255399.2(3)	4d	359146.2(3)	Fe III
6	7	964.399	103691.5	–0.3	0.003	12	280832.2(3)	4d	384524.0(4)	
25	38	964.710	103658.1	–0.3	0.003	9	278794.2(3)	4d	382452.6(2)	
57	49	964.950	103632.3	0.3	–0.003	8	278075.8(4)	4d	381707.8(4)	
5	4	965.332	103591.3	0.0	0.000	11	286431.3(3)	4d	390022.6(4)	
1	4	965.900	103530.3	0.1	–0.001	11	264434.2(4)	4d	367964.4(3)	
78	57	966.045	103514.9	0.1	–0.001	10	292287.6(5)	4d	395802.4(6)	
12				0.0	0.000	11	282423.5(2)	4d	385938.4(3)	
135	90	966.324	103485.0	0.3	–0.003	6	261179.6(3)	4d	364664.3(2)	
60				–1.5	0.014	13	292287.6(5)	5s	395774.1(4)	
111	57	966.590	103456.5	–0.5	0.005	8	292287.6(5)	4d	395744.6(4)	
13				0.3	–0.003	11	278075.8(4)	4d	381532.0(3)	
4	11	966.710	103443.7	–0.6	0.006	7	277292.7(5)	4d	380737.0(6)	
1	9	966.817	103432.2	0.5	–0.005	14	290407.7(2)	4d	393839.4(3)	
85	101	967.022	103410.3	0.2	–0.002	10	256177.9(4)	4d	359588.0(4)	
5	40	967.075	103404.6	0.0	0.000	7	254803.3(2)	4d	358207.9(1)	
160	115	967.233	103387.7	0.0	0.000	3	276429.7(4)	4d	379817.4(4)	
12	61	967.516	103357.4	–0.2	0.002	11	255399.2(3)	4d	358756.8(2)	
1	10	967.643	103343.9	0.5	–0.005	13	292430.7(4)	5s	395774.1(4)	
4	10	967.869	103319.7	–1.0	0.009	9	265112.6(5)	4d	368433.3(4)	
1	4	967.943	103311.8	0.3	–0.003	17	278794.2(3)	4d	382105.7(3)	
7	14	968.070	103298.4	0.5	–0.004	6	284911.2(2)	4d	388209.1(2)	
80	67	968.386	103264.6	–0.8	0.008	10	292430.7(4)	4d	395696.1(5)	
17	49	968.623	103239.3	0.3	–0.003	4	284790.8(5)	4d	388029.8(6)	
33	90	968.950	103204.5	–1.1	0.010	8	278794.2(3)	4d	381999.8(2)	Fe III
20	61	969.281	103169.2	–0.5	0.004	6	254803.3(2)	4d	357973.0(2)	
76	46	969.548	103140.8	0.1	–0.001	5	295716.4(2)	4d	398857.1(3)	
	9	969.794	103114.7	–0.9	0.009	7	276759.2(2)	4d	379874.8(1)	
161	81	969.878	103105.8	1.0	–0.010	3	277292.7(5)	4d	380397.4(5)	
39	49	970.621	103026.8	0.4	–0.004	5	255399.2(3)	4d	358425.6(3)	
46	90	971.160	102969.7	1.4	–0.013	10	256177.9(4)	4d	359146.2(3)	
1	21	971.246	102960.6	–0.6	0.006	10	276765.9(1)	4d	379727.1(2)	
19	49	971.418	102942.3	0.8	–0.008	8	282038.1(4)	4d	384979.6(5)	Fe III
118	101	971.564	102926.9	0.7	–0.006	6	257138.0(5)	4d	360064.2(5)	
44				0.8	–0.007	10	292513.2(3)	4d	395439.3(4)	

Table I. *continued*

gA (10^8 s^{-1})	Int	λ (Å)	σ (cm^{-1})	$\Delta(\sigma)$[a] (cm^{-1})	$\Delta(\lambda)$[a] (Å)	N[b]	Odd level		Even level	Remark[c]
98	67	971.647	102918.0	–0.3	0.003	8	292430.7(4)	4d	395349.0(3)	
2	40	971.695	102913.0	0.0	0.000	11	287109.6(3)	4d	390022.6(4)	
37	20	971.952	102885.7	–0.1	0.001	4	280039.6(5)	4d	382925.4(4)	
7	18	972.204	102859.1	0.8	–0.007	10	276759.2(2)	4d	379617.5(3)	
20	26	972.868	102788.9	0.5	–0.004	5	331333.8(2)	4d	434122.2(3)	
17	38	973.141	102760.1	–0.2	0.002	8	306193.9(3)	4d	408954.2(3)	
66	46	973.196	102754.2	–1.0	0.010	5	331367.0(3)	4d	434122.2(3)	
7	17	973.379	102734.9	–0.2	0.002	6	285474.0(3)	4d	388209.1(2)	
35	17	973.961	102673.5	0.6	–0.006	4	331367.0(3)	4d	434039.9(4)	
59	67	974.152	102653.4	0.5	–0.005	5	256177.9(4)	4d	358830.8(4)	
15	61	974.433	102623.8	–0.4	0.004	12	292430.7(4)	5s	395054.9(3)	
16	26	974.589	102607.3	–0.7	0.006	14	291231.4(3)	4d	393839.4(3)	
20	30	974.627	102603.4	0.3	–0.003	17	279502.6(4)	4d	382105.7(3)	
105	67	974.802	102585.0	0.2	–0.002	15	282423.5(2)	4d	385008.3(3)	
31	57	974.952	102569.2	0.3	–0.003	7	280832.2(3)	4d	383401.1(3)	
59	21	975.056	102558.2	0.0	0.000	4	280367.2(4)	4d	382925.4(4)	
8	36	975.143	102549.1	0.1	–0.001	10	277068.5(3)	4d	379617.5(3)	
67	61	975.263	102536.5	–0.3	0.003	8	292513.2(3)	4d	395050.0(2)	
21	27	975.652	102495.6	0.7	–0.006	10	282871.9(5)	4d	385366.8(5)	
106	90	975.731	102487.2	1.3	–0.013	12	282038.1(4)	4d	384524.0(4)	Fe III
54	81	976.084	102450.2	0.2	–0.002	10	257138.0(5)	4d	359588.0(4)	
8	73	976.214	102436.5	–0.2	0.002	15	282571.6(3)	4d	385008.3(3)	
28	67	976.534	102403.0	–0.5	0.005	15	282604.8(2)	4d	385008.3(3)	
6	15	976.646	102391.2	–0.1	0.001	9	275146.6(1)	4d	377537.9(2)	
13	67	976.849	102370.0	0.7	–0.007	8	285474.0(3)	4d	387843.3(3)	
32	81	977.210	102332.1	0.7	–0.007	8	306622.8(4)	4d	408954.2(3)	
26				–1.3	0.012	10	276429.7(4)	4d	378763.1(4)	
45	67	977.431	102309.0	0.2	–0.002	12	275374.3(2)	4d	377683.1(3)	
113	101	977.979	102251.7	–0.4	0.004	11	283686.3(2)	4d	385938.4(3)	
68	101	978.037	102245.6	0.7	–0.007	5	257138.0(5)	4d	359382.9(5)	
52	67	978.106	102238.4	0.2	–0.002	2	274753.3(0)	4d	376991.5(1)	
13	73	978.200	102228.6	0.1	–0.001	9	276429.7(4)	4d	378658.2(5)	
224	115	978.837	102162.1	0.0	0.000	3	258297.4(6)	4d	360459.5(6)	
236	115	979.556	102087.0	0.7	–0.007	7	278650.7(6)	4d	380737.0(6)	
31	61	980.132	102027.0	–0.9	0.008	3	284690.3(4)	4d	386718.2(3)	
129	73	980.187	102021.4	–1.2	0.012	4	332017.3(4)	4d	434039.9(4)	
42				0.0	0.001	6	286187.7(1)	4d	388209.1(2)	
15	67	980.630	101975.2	–0.1	0.001	7	280367.2(4)	4d	382342.5(3)	
18	73	980.700	101968.0	–1.0	0.010	10	286431.3(3)	4d	388400.3(4)	
108	115	980.813	101956.2	0.0	0.000	5	275146.6(1)	4d	377102.8(2)	
106	115	980.850	101952.4	0.0	0.000	12	282571.6(3)	4d	384524.0(4)	
31	101	981.233	101912.6	–0.3	0.003	9	280539.7(2)	4d	382452.6(2)	
147	120	981.314	101904.2	0.0	0.000	4	275374.3(2)	4d	377278.5(3)	
23	101	981.534	101881.4	1.4	–0.013	13	292287.6(5)	4d	394167.6(4)	bl
44	81	981.752	101858.8	0.1	0.000	17	284790.8(5)	4d	386649.5(4)	
48	36	981.892	101844.2	–0.7	0.007	2	275146.6(1)	4d	376991.5(1)	
55	73	982.146	101817.9	–0.2	0.002	13	277292.7(5)	4d	379110.8(5)	
61	43	982.210	101811.2	0.2	–0.002	2	329848.6(2)	4d	431659.6(3)	
47	90	982.639	101766.8	0.0	0.000	6	258297.4(6)	4d	360064.2(5)	
416	115	982.849	101745.0	0.7	–0.007	8	276429.7(4)	4d	378174.0(5)	
70	115	982.925	101737.2	0.3	–0.003	13	292430.7(4)	4d	394167.6(4)	
44				–1.3	0.013	17	280367.2(4)	4d	382105.7(3)	
44	90	983.005	101728.9	0.4	–0.004	5	275374.3(2)	4d	377102.8(2)	
49	90	983.282	101700.2	0.0	0.000	6	285196.1(6)	4d	386896.3(5)	
134	90	983.285	101699.9	0.0	0.000	4	334509.1(2)	4d	436209.0(2)	
285	157	983.634	101663.8	–0.7	0.006	3	254803.3(2)	4d	356467.8(3)	
11	101	983.736	101653.3	1.2	–0.011	12	282871.9(5)	4d	384524.0(4)	bl Fe III
357	115	983.990	101627.0	–1.9	0.018	5	255399.2(3)	4d	357028.1(4)	bl
11	115	984.051	101620.7	0.3	–0.003	9	280832.2(3)	4d	382452.6(2)	bl
133	115	984.183	101607.1	–0.5	0.005	7	292287.6(5)	4d	393895.2(5)	
12	53	984.407	101584.0	0.0	0.000	8	264434.2(4)	4d	366018.2(3)	
1	14	984.577	101566.4	0.4	–0.004	17	280539.7(2)	4d	382105.7(3)	
5	36	984.820	101541.4	–0.3	0.003	10	278075.8(4)	4d	379617.5(3)	
35	57	985.126	101509.9	–0.4	0.004	7	280832.2(3)	4d	382342.5(3)	
147	32	985.249	101497.2	–0.6	0.005	2	327924.4(3)	4d	429422.2(3)	
20	90	985.516	101469.7	–0.7	0.007	10	277292.7(5)	4d	378763.1(4)	
378	157	985.673	101453.5	0.0	0.000	1	335947.4(3)	4d	437400.9(4)	
43	101	986.091	101410.6	–1.4	0.014	8	286431.3(3)	4d	387843.3(3)	
32				1.9	–0.018	14	292430.7(4)	4d	393839.4(3)	

Table I. *continued*

gA (10^8 s^{-1})	Int	λ (Å)	σ (cm^{-1})	$\Delta(\sigma)^a$ (cm^{-1})	$\Delta(\lambda)^a$ (Å)	N^b	Odd level		Even level	Remark[c]
472	157	986.261	101393.0	–0.1	0.001	6	277292.7(5)	4d	378685.8(6)	
10	61	986.830	101334.6	1.1	–0.011	5	258128.5(2)	4d	359462.0(3)	bl Fe III
37	81	986.912	101326.2	0.0	0.000	14	292513.2(3)	4d	393839.4(3)	
7	57	987.061	101310.9	1.1	–0.010	8	307644.4(2)	4d	408954.2(3)	
62	101	987.257	101290.8	0.1	–0.001	10	287109.6(3)	4d	388400.3(4)	
14	81	988.393	101174.3	–1.2	0.011	17	285474.0(3)	4d	386649.5(4)	
54	101	988.452	101168.3	0.7	–0.007	8	280832.2(3)	4d	381999.8(2)	
440	157	988.623	101150.8	–0.4	0.004	4	256177.9(4)	4d	357329.1(5)	
7	57	989.257	101085.9	0.4	–0.004	5	258297.4(6)	4d	359382.9(5)	
29	50	989.427	101068.6	0.0	0.000	3	255399.2(3)	4d	356467.8(3)	
172	67	989.691	101041.6	–0.5	0.005	3	265112.6(5)	4d	366154.7(5)	Fe III
124	115	989.871	101023.3	0.1	–0.001	3	278794.2(3)	4d	379817.4(4)	
38	90	989.926	101017.7	0.0	0.000	10	258128.5(2)	4d	359146.2(3)	
10	50	989.949	101015.3	0.8	–0.008	11	257742.3(1)	4d	358756.8(2)	
10	49	990.037	101006.3	–1.0	0.009	9	280539.7(2)	4d	381547.0(2)	
106	115	990.296	100979.9	–0.7	0.007	8	286862.7(2)	4d	387843.3(3)	
45	57	990.682	100940.6	–0.6	0.006	4	335267.8(1)	4d	436209.0(2)	
127	157	990.852	100923.3	–0.6	0.006	12	276759.2(2)	4d	377683.1(3)	
69	157	990.997	100908.5	0.5	–0.005	10	258680.0(3)	4d	359588.0(4)	
146	115	991.128	100895.2	0.4	–0.004	3	279502.6(4)	4d	380397.4(5)	
21	30	991.264	100881.3	0.0	0.000	8	277292.7(5)	4d	378174.0(5)	
41	57	991.492	100858.1	–1.0	0.010	5	276434.9(0)	4d	377294.0(1)	
38	61	991.574	100849.7	–0.5	0.004	5	256177.9(4)	4d	357028.1(4)	
37	61	991.708	100836.1	1.7	–0.017	5	292513.2(3)	4d	393347.6(2)	
131	90	991.950	100811.6	0.6	–0.005	5	264434.2(4)	4d	365245.2(4)	
62	101	992.185	100787.7	–1.5	0.015	8	308165.0(2)	4d	408954.2(3)	
90	115	992.268	100779.3	–0.8	0.008	10	287620.2(4)	4d	388400.3(4)	
29				0.6	–0.006	9	276759.2(2)	4d	377537.9(2)	
84	133	992.344	100771.5	–0.5	0.004	9	276765.9(1)	4d	377537.9(2)	Fe III
537	157	992.523	100753.4	0.0	0.000	4	257138.0(5)	4d	357891.4(6)	
6	73	992.711	100734.2	0.5	–0.005	8	287109.6(3)	4d	387843.3(3)	
69	90	992.758	100729.5	–0.6	0.006	9	306193.9(3)	4d	406924.0(3)	
95	133	992.857	100719.4	0.0	0.000	6	259344.8(4)	4d	360064.2(5)	Fe III
15				4.6	–0.045	9	280832.2(3)	4d	381547.0(2)	M Fe III
266	157	993.079	100696.9	–0.5	0.005	7	280039.6(5)	4d	380737.0(6)	Fe III
76	157	993.288	100675.7	–0.8	0.008	10	284690.3(4)	4d	385366.8(5)	bl Fe III
153	157	993.701	100633.8	0.2	–0.002	4	311538.7(3)	4d	412172.3(3)	
146	157	993.764	100627.5	–1.1	0.011	7	289545.9(4)	4d	390174.5(3)	
27				–0.8	0.008	11	258128.5(2)	4d	358756.8(2)	bl
581	157	993.838	100620.0	0.0	0.000	3	278650.7(6)	4d	379270.7(7)	
11	40	993.892	100614.6	0.0	0.000	12	277068.5(3)	4d	377683.1(3)	
543	157	994.146	100588.9	–0.4	0.004	4	287440.5(5)	4d	388029.8(6)	
247	133	994.259	100577.4	0.1	–0.001	12	306193.9(3)	4d	406771.2(4)	Fe III
52				–2.5	0.025	10	292430.7(4)	4d	393010.6(4)	
105	101	994.392	100564.0	0.7	–0.007	3	286154.9(2)	4d	386718.2(3)	
97	67	994.460	100557.1	0.8	–0.008	3	263898.6(3)	4d	364454.9(3)	
32	50	994.747	100528.1	0.0	0.000	5	276765.9(1)	4d	377294.0(1)	
63	115	994.840	100518.7	–0.6	0.006	4	276759.2(2)	4d	377278.5(3)	
325	133	994.931	100509.5	0.0	0.000	2	277068.5(3)	4d	377578.0(4)	
153	133	995.261	100476.1	–0.6	0.005	11	289545.9(4)	4d	390022.6(4)	
46	115	995.360	100466.2	0.0	0.000	10	258680.0(3)	4d	359146.2(3)	
14				1.8	–0.018	11	285474.0(3)	4d	385938.4(3)	
14	90	995.430	100459.1	–1.0	0.010	13	278650.7(6)	4d	379110.8(5)	Fe III
138	81	995.659	100436.0	0.2	–0.002	3	307288.7(3)	4d	407724.5(3)	
307	115	995.743	100427.5	–0.5	0.005	6	284790.8(5)	4d	385218.8(6)	
33	90	996.585	100342.7	–0.9	0.009	5	276759.2(2)	4d	377102.8(2)	
23				0.7	–0.007	12	292430.7(4)	4d	392772.7(3)	
14	67	996.641	100337.0	0.1	–0.001	5	276765.9(1)	4d	377102.8(2)	
218	81	996.756	100325.5	–0.3	0.003	2	331333.8(2)	4d	431659.6(3)	
4	61	996.828	100318.2	0.2	–0.002	15	284690.3(4)	4d	385008.3(3)	
21	101	996.949	100306.0	1.6	–0.016	7	282038.1(4)	4d	382342.5(3)	
193	133	997.115	100289.3	0.0	0.000	8	284690.3(4)	4d	384979.6(5)	
42	101	997.412	100259.5	0.0	0.000	12	292513.2(3)	4d	392772.7(3)	
368	190	997.467	100253.9	–0.1	0.001	4	285196.1(6)	4d	385450.1(7)	
32	190	997.586	100241.9	–1.3	0.013	10	259344.8(4)	4d	359588.0(4)	M Fe III
661	190	997.652	100235.4	0.0	0.000	1	258297.4(6)	4d	358532.8(7)	
15	50	997.699	100230.6	–0.1	0.001	6	257742.3(1)	4d	357973.0(2)	
118	133	997.823	100218.2	0.0	0.000	17	286431.3(3)	4d	386649.5(4)	
75	133	997.914	100209.0	–1.0	0.010	4	277068.5(3)	4d	377278.5(3)	

Table I. *continued*

gA (10^8 s^{-1})	Int	λ (Å)	σ (cm^{-1})	$\Delta(\sigma)$[a] (cm^{-1})	$\Delta(\lambda)$[a] (Å)	N[b]	Odd level		Even level	Remark[c]
601	157	998.022	100198.2	–0.8	0.008	2	288167.2(6)	4d	388366.2(7)	
35	133	998.088	100191.6	0.5	–0.005	4	257138.0(5)	4d	357329.1(5)	
10				2.8	–0.028	8	284790.8(5)	4d	384979.6(5)	
525	133	998.289	100171.4	–0.4	0.004	4	265112.6(5)	4d	365284.4(6)	
345	90	998.386	100161.7	0.0	0.000	1	331367.0(3)	4d	431528.7(4)	
45	101	998.521	100148.1	–0.3	0.003	12	306622.8(4)	4d	406771.2(4)	
136	46	998.686	100131.5	0.4	–0.004	7	306622.8(4)	4d	406753.9(5)	
11	43	998.825	100117.6	0.4	–0.004	5	259344.8(4)	4d	359462.0(3)	
8	40	998.912	100108.9	2.2	–0.022	9	257742.3(1)	4d	357849.0(2)	
3				–0.7	0.007	11	289913.0(3)	4d	390022.6(4)	
34	61	999.033	100096.8	–0.3	0.003	15	284911.2(2)	4d	385008.3(3)	
5	49	999.220	100078.0	1.2	–0.012	11	258680.0(3)	4d	358756.8(2)	
30	90	999.309	100069.1	1.5	–0.015	17	282038.1(4)	4d	382105.7(3)	bl
52	157	999.629	100037.1	–0.6	0.006	10	278794.2(3)	4d	378831.9(3)	
26				–1.0	0.010	5	259344.8(4)	4d	359382.9(5)	
19				2.0	–0.020	6	278650.7(6)	4d	378685.8(6)	
441	157	999.763	100023.7	0.0	0.000	1	264434.2(4)	4d	364457.9(5)	
14				1.0	–0.010	6	285196.1(6)	4d	385218.8(6)	
470	157	1000.140	99986.0	0.0	0.000	1	278075.8(4)	4d	378061.8(5)	
12	67	1000.312	99968.9	0.0	0.000	10	278794.2(3)	4d	378763.1(4)	
71	81	1000.769	99923.2	–0.3	0.003	11	290099.1(5)	4d	390022.6(4)	
34	81	1001.181	99882.0	1.0	–0.011	9	282571.6(3)	4d	382452.6(2)	
19	61	1001.353	99864.9	2.3	–0.023	4	288167.2(6)	4d	388029.8(6)	
3				–0.4	0.004	11	258891.5(1)	4d	358756.8(2)	
360	133	1001.451	99855.1	0.0	0.000	2	263898.6(3)	4d	363753.7(4)	
40	67	1001.558	99844.5	0.0	0.000	6	258128.5(2)	4d	357973.0(2)	
15	40	1001.679	99832.3	–1.4	0.014	12	284690.3(4)	4d	384524.0(4)	
5	57	1001.992	99801.2	–0.2	0.002	10	259344.8(4)	4d	359146.2(3)	
145	90	1002.111	99789.4	0.2	–0.002	10	306622.8(4)	4d	406412.0(5)	
16	90	1002.170	99783.5	0.0	0.000	11	286154.9(2)	4d	385938.4(3)	
14	53	1002.296	99770.9	0.0	0.000	7	282571.6(3)	4d	382342.5(3)	
72	34	1002.550	99745.6	0.0	0.000	5	258680.0(3)	4d	358425.6(3)	
21	61	1002.647	99736.0	–1.7	0.017	7	282604.8(2)	4d	382342.5(3)	
56	67	1002.798	99720.9	0.4	–0.004	9	258128.5(2)	4d	357849.0(2)	
739	115	1002.871	99713.7	0.0	0.000	1	289171.9(7)	4d	388885.6(8)	
93	101	1003.101	99690.9	1.4	–0.014	7	307064.4(5)	4d	406753.9(5)	
16	90	1003.697	99631.7	–1.6	0.016	10	259954.7(3)	4d	359588.0(4)	
31	57	1003.933	99608.2	0.0	0.000	13	279502.6(4)	4d	379110.8(5)	
22	73	1004.076	99594.0	0.0	–0.001	4	258297.4(6)	4d	357891.4(6)	
8	61	1004.130	99588.7	0.3	–0.003	7	258619.5(0)	4d	358207.9(1)	
59	101	1004.589	99543.2	0.0	0.000	6	260521.0(4)	4d	360064.2(5)	
57	101	1004.622	99539.9	0.0	0.000	17	287109.6(3)	4d	386649.5(4)	
4	81	1004.950	99507.4	0.3	–0.003	11	286431.3(3)	4d	385938.4(3)	
58	73	1005.024	99500.1	–2.1	0.021	2	278075.8(4)	4d	377578.0(4)	bl Fe III
27	101	1005.174	99485.2	–0.8	0.008	5	259344.8(4)	4d	358830.8(4)	
346	133	1005.962	99407.3	–0.3	0.003	3	261051.9(5)	4d	360459.5(6)	
518	115	1006.057	99398.0	–0.5	0.005	2	307064.4(5)	4d	406462.9(6)	
21	73	1006.230	99380.8	0.1	–0.001	11	259376.1(2)	4d	358756.8(2)	
57	53	1006.576	99346.7	–0.9	0.009	10	307064.4(5)	4d	406412.0(5)	
467	101	1006.727	99331.8	0.0	0.000	1	332017.3(4)	4d	431349.1(5)	
4	90	1006.868	99317.9	1.5	–0.015	7	258891.5(1)	4d	358207.9(1)	bl Fe III
24	115	1007.120	99293.1	0.1	–0.001	6	258680.0(3)	4d	357973.0(2)	bl Fe III
294	115	1007.292	99276.1	0.0	0.000	6	287620.2(4)	4d	386896.3(5)	
154	101	1007.447	99260.8	0.3	–0.003	10	279502.6(4)	4d	378763.1(4)	
2	20	1007.555	99250.1	–0.2	0.002	10	280367.2(4)	4d	379617.5(3)	
1	25	1007.968	99209.5	0.5	–0.005	17	287440.5(5)	4d	386649.5(4)	
2	17	1008.028	99203.6	0.9	–0.009	4	278075.8(4)	4d	377278.5(3)	
65	81	1008.158	99190.8	–0.7	0.007	10	259954.7(3)	4d	359146.2(3)	
61	101	1008.382	99168.8	–0.2	0.002	9	258680.0(3)	4d	357849.0(2)	
75	115	1009.279	99080.6	–0.9	0.009	6	258891.5(1)	4d	357973.0(2)	
110	115	1009.375	99071.2	0.0	0.000	13	280039.6(5)	4d	379110.8(5)	
117	115	1009.418	99067.0	0.0	0.000	10	260521.0(4)	4d	359588.0(4)	
128	101	1009.594	99049.7	0.2	–0.002	5	259376.1(2)	4d	358425.6(3)	
16				–0.9	0.009	5	260411.4(2)	4d	359462.0(3)	
23	53	1009.812	99028.4	–0.9	0.010	17	287620.2(4)	4d	386649.5(4)	
161	115	1009.987	99011.1	–1.2	0.012	6	261051.9(5)	4d	360064.2(5)	Fe III
43	67	1010.145	98995.7	–0.5	0.005	3	286187.7(1)	4d	385183.9(2)	
63	81	1010.251	98985.3	0.1	–0.001	3	280832.2(3)	4d	379817.4(4)	
21	81	1010.351	98975.5	0.1	–0.001	9	282571.6(3)	4d	381547.0(2)	

Table I. *continued*

gA (10^8 s^{-1})	Int	λ (Å)	σ (cm^{-1})	$\Delta(\sigma)$[a] (cm^{-1})	$\Delta(\lambda)$[a] (Å)	N[b]	Odd level		Even level	Remark[c]
8	90	1010.529	98958.1	0.6	–0.006	9	258891.5(1)	4d	357849.0(2)	
109	115	1010.683	98942.9	–0.1	0.001	4	266612.8(2)	4d	365555.8(2)	
10				–0.2	0.002	7	291231.4(3)	4d	390174.5(3)	
239	133	1011.372	98875.6	–0.5	0.005	5	259954.7(3)	4d	358830.8(4)	
256	133	1011.512	98861.9	0.0	0.000	5	260521.0(4)	4d	359382.9(5)	
10	115	1011.606	98852.8	–0.6	0.007	15	286154.9(2)	4d	385008.3(3)	bl
1	53	1011.816	98832.2	0.4	–0.004	7	259376.1(2)	4d	358207.9(1)	
14	61	1011.858	98828.1	–0.7	0.007	11	287109.6(3)	4d	385938.4(3)	
1	61	1012.130	98801.5	–0.6	0.006	11	259954.7(3)	4d	358756.8(2)	
63	90	1012.229	98791.9	0.7	–0.007	11	291231.4(3)	4d	390022.6(4)	
155	115	1012.390	98776.1	–2.0	0.020	8	267240.1(3)	4d	366018.2(3)	bl Fe III
57	81	1012.537	98761.8	0.2	–0.002	11	259995.2(1)	4d	358756.8(2)	
5	21	1012.714	98744.5	0.8	–0.008	9	278794.2(3)	4d	377537.9(2)	Fe III
28	57	1012.822	98734.0	–0.8	0.008	10	260411.4(2)	4d	359146.2(3)	
1	57	1012.867	98729.6	–0.1	0.001	13	282604.8(2)	4d	381334.5(2)	
23	53	1013.198	98697.4	–1.2	0.012	9	283754.0(1)	4d	382452.6(2)	
8	53	1013.485	98669.4	–2.0	0.021	8	279502.6(4)	4d	378174.0(5)	
34	81	1013.726	98646.0	–0.2	0.002	6	280039.6(5)	4d	378685.8(6)	
218	115	1013.832	98635.6	–0.2	0.002	5	267928.6(4)	4d	366564.4(4)	
9	73	1013.943	98624.8	–0.4	0.004	10	260521.0(4)	4d	359146.2(3)	
102	101	1014.012	98618.2	–0.4	0.004	9	280039.6(5)	4d	378658.2(5)	
4	29	1014.437	98576.9	–0.1	0.001	15	286431.3(3)	4d	385008.3(3)	
8	90	1014.852	98536.5	0.4	–0.005	10	261051.9(5)	4d	359588.0(4)	bl
196	101	1015.348	98488.4	1.1	–0.011	10	289913.0(3)	4d	388400.3(4)	
30	101	1015.516	98472.1	–0.8	0.008	9	259376.1(2)	4d	357849.0(2)	
5	27	1015.601	98463.9	–0.8	0.008	10	280367.2(4)	4d	378831.9(3)	
95	81	1015.709	98453.4	–0.2	0.003	8	289389.7(2)	4d	387843.3(3)	
24	53	1016.062	98419.2	–0.2	0.002	17	283686.3(2)	4d	382105.7(3)	
13	81	1016.188	98407.0	–1.4	0.014	10	261179.6(3)	4d	359588.0(4)	Fe III
22	81	1016.288	98397.3	1.4	–0.015	10	280367.2(4)	4d	378763.1(4)	
59	81	1016.692	98358.2	–1.1	0.011	3	282038.1(4)	4d	380397.4(5)	
6	101	1016.830	98344.9	–0.5	0.005	11	260411.4(2)	4d	358756.8(2)	bl
112	133	1016.974	98330.9	–0.1	0.001	5	261051.9(5)	4d	359382.9(5)	
20	35	1017.132	98315.7	0.0	0.000	4	267240.1(3)	4d	365555.8(2)	
42	70	1017.193	98309.8	0.0	0.000	5	260521.0(4)	4d	358830.8(4)	
157	157	1017.378	98291.9	0.9	–0.009	9	280367.2(4)	4d	378658.2(5)	
43				–0.3	0.003	10	280539.7(2)	4d	378831.9(3)	
150	90	1017.476	98282.4	0.0	0.000	5	261179.6(3)	4d	359462.0(3)	
35	81	1017.852	98246.1	0.3	–0.003	8	283754.0(1)	4d	381999.8(2)	
258	81	1018.055	98226.5	0.4	–0.004	3	267928.6(4)	4d	366154.7(5)	
64	101	1018.205	98212.0	–0.7	0.007	7	259995.2(1)	4d	358207.9(1)	
12	36	1018.530	98180.7	0.2	–0.002	12	279502.6(4)	4d	377683.1(3)	Fe III
22	57	1019.473	98089.9	0.3	–0.003	8	267928.6(4)	4d	366018.2(3)	
14	49	1020.264	98013.8	–0.4	0.004	5	260411.4(2)	4d	358425.6(3)	Fe III
203	53	1020.357	98005.0	–0.1	0.002	5	267240.1(3)	4d	365245.2(4)	
23	38	1020.411	97999.7	0.0	0.000	10	280832.2(3)	4d	378831.9(3)	
11	67	1020.627	97979.0	1.2	–0.013	6	259995.2(1)	4d	357973.0(2)	Fe III
2	90	1020.753	97966.9	0.3	–0.003	10	261179.6(3)	4d	359146.2(3)	bl
601	115	1021.011	97942.2	0.0	0.000	1	292365.9(6)	4d	390308.1(7)	
64	90	1021.123	97931.4	0.5	–0.005	10	280832.2(3)	4d	378763.1(4)	
31	90	1021.176	97926.3	0.0	0.000	10	287440.5(5)	4d	385366.8(5)	
23	22	1021.407	97904.1	–0.5	0.005	5	260521.0(4)	4d	358425.6(3)	
30	50	1021.510	97894.3	0.0	0.000	9	259954.7(3)	4d	357849.0(2)	
161	61	1022.051	97842.5	0.4	–0.004	3	266612.8(2)	4d	364454.9(3)	
9	53	1022.422	97807.0	0.2	–0.002	8	280367.2(4)	4d	378174.0(5)	
47	73	1022.473	97802.1	0.7	–0.007	6	290407.7(2)	4d	388209.1(2)	
14	101	1022.531	97796.5	0.0	0.000	7	260411.4(2)	4d	358207.9(1)	
57	101	1022.592	97790.7	–2.3	0.024	9	283754.0(1)	4d	381547.0(2)	bl
30	81	1022.708	97779.6	1.3	–0.013	6	287440.5(5)	4d	385218.8(6)	
10				0.7	–0.007	5	261051.9(5)	4d	358830.8(4)	
5	61	1023.046	97747.3	0.7	–0.007	10	287620.2(4)	4d	385366.8(5)	
6	73	1023.095	97742.6	–1.2	0.012	7	292430.7(4)	4d	390174.5(3)	
12	81	1023.159	97736.5	1.5	–0.016	11	292287.6(5)	4d	390022.6(4)	
5	23	1023.955	97660.5	–0.8	0.008	7	292513.2(3)	4d	390174.5(3)	Fe III
27	57	1024.328	97624.9	–0.5	0.005	6	290583.7(1)	4d	388209.1(2)	
10	25	1024.672	97592.2	0.3	–0.003	11	292430.7(4)	4d	390022.6(4)	
3	23	1024.802	97579.9	0.5	–0.005	10	282038.1(4)	4d	379617.5(3)	

Table I. *continued*

gA ($10^8\,s^{-1}$)	Int	λ (Å)	σ (cm^{-1})	$\Delta(\sigma)$[a] (cm^{-1})	$\Delta(\lambda)$[a] (Å)	N[b]	Odd level		Even level	Remark[c]
133	67	1025.232	97538.9	–0.2	0.003	8	287440.5(5)	4d	384979.6(5)	
13	22	1025.544	97509.2	–0.2	0.002	11	292513.2(3)	4d	390022.6(4)	
199	101	1026.160	97450.6	–0.8	0.008	4	285474.0(3)	4d	382925.4(4)	
11				–0.7	0.007	7	282423.5(2)	4d	379874.8(1)	
1	53	1026.297	97437.7	0.1	–0.001	9	260411.4(2)	4d	357849.0(2)	
90	67	1026.364	97431.3	0.0	0.000	7	284911.2(2)	4d	382342.5(3)	Fe III
2	16	1026.447	97423.5	–0.7	0.008	6	267240.1(3)	4d	364664.3(2)	
24	61	1027.586	97315.5	–0.4	0.004	12	280367.2(4)	4d	377683.1(3)	
20	61	1027.708	97303.9	0.3	–0.003	10	282423.5(2)	4d	379727.1(2)	
34	57	1027.930	97282.9	0.0	0.000	4	288167.2(6)	4d	385450.1(7)	
37	40	1028.062	97270.4	0.4	–0.004	7	282604.8(2)	4d	379874.8(1)	
14	38	1028.320	97246.0	–0.2	0.002	7	286154.9(2)	4d	383401.1(3)	
7	73	1028.660	97213.8	–1.0	0.010	3	267240.1(3)	4d	364454.9(3)	str
29	90	1028.873	97193.8	–0.7	0.008	17	284911.2(2)	4d	382105.7(3)	
28				–0.2	0.003	10	282423.5(2)	4d	379617.5(3)	
3	17	1029.140	97168.5	–0.4	0.004	10	291231.4(3)	4d	388400.3(4)	
68	81	1029.628	97122.4	0.1	–0.002	10	282604.8(2)	4d	379727.1(2)	
7	19	1029.842	97102.2	–1.4	0.015	17	289545.9(4)	4d	386649.5(4)	
101	101	1030.147	97073.5	0.8	–0.009	13	282038.1(4)	4d	379110.8(5)	
6				0.1	–0.001	5	259954.7(3)	4d	357028.1(4)	
181	49	1030.386	97051.0	–0.6	0.006	6	288167.2(6)	4d	385218.8(6)	
109	67	1030.792	97012.8	0.1	–0.001	10	282604.8(2)	4d	379617.5(3)	
3	40	1032.504	96851.9	1.0	–0.011	12	280832.2(3)	4d	377683.1(3)	
16	43	1032.641	96839.1	–0.4	0.004	4	261051.9(5)	4d	357891.4(6)	
13	61	1032.976	96807.6	–0.5	0.005	4	260521.0(4)	4d	357329.1(5)	
14	27	1033.550	96753.9	–0.4	0.004	5	280539.7(2)	4d	377294.0(1)	
9	25	1033.734	96736.6	0.1	–0.002	17	289913.0(3)	4d	386649.5(4)	
25	101	1034.063	96705.9	0.2	–0.002	9	280832.2(3)	4d	377537.9(2)	Fe III
6	40	1034.454	96669.4	0.0	0.000	9	261179.6(3)	4d	357849.0(2)	
48	81	1034.975	96620.7	0.6	–0.006	9	282038.1(4)	4d	378658.2(5)	
5	73	1035.058	96612.9	1.0	–0.011	8	291231.4(3)	4d	387843.3(3)	
61	115	1035.858	96538.3	–0.1	0.001	7	286862.7(2)	4d	383401.1(3)	
1	61	1036.188	96507.6	0.5	–0.005	5	260521.0(4)	4d	357028.1(4)	
9	38	1037.255	96408.3	–0.1	0.001	10	282423.5(2)	4d	378831.9(3)	
10	115	1038.436	96298.7	1.0	–0.011	9	286154.9(2)	4d	382452.6(2)	bl
222	133	1038.657	96278.2	0.0	0.001	4	289171.9(7)	4d	385450.1(7)	Fe III
64	101	1038.846	96260.6	0.3	–0.004	10	282571.6(3)	4d	378831.9(3)	
75	101	1039.083	96238.7	–0.2	0.002	13	282871.9(5)	4d	379110.8(5)	
13	67	1039.595	96191.3	2.8	–0.030	7	283686.3(2)	4d	379874.8(1)	
12				–0.2	0.003	10	282571.6(3)	4d	378763.1(4)	
1	14	1040.193	96136.0	0.1	–0.002	8	282038.1(4)	4d	378174.0(5)	
2	25	1040.437	96113.5	0.8	–0.009	10	292287.6(5)	4d	388400.3(4)	
1	13	1041.050	96056.9	0.5	–0.005	3	260411.4(2)	4d	356467.8(3)	
2	9	1041.161	96046.6	–0.3	0.003	6	289171.9(7)	4d	385218.8(6)	
17	36	1041.219	96041.3	0.5	–0.005	10	283686.3(2)	4d	379727.1(2)	Fe III
55	81	1041.387	96025.7	0.3	–0.004	11	289913.0(3)	4d	385938.4(3)	
23	6	1041.653	96001.3	1.0	–0.011	2	292365.9(6)	4d	388366.2(7)	
6	81	1042.192	95951.6	0.8	–0.009	17	286154.9(2)	4d	382105.7(3)	
6	36	1042.250	95946.2	0.0	0.000	7	284790.8(5)	4d	380737.0(6)	
20	29	1042.406	95931.9	0.7	–0.008	10	283686.3(2)	4d	379617.5(3)	
14	16	1042.625	95911.8	0.6	–0.006	7	286431.3(3)	4d	382342.5(3)	
59	81	1043.611	95821.2	0.3	–0.003	10	289545.9(4)	4d	385366.8(5)	
1	27	1043.694	95813.5	–0.4	0.005	6	282871.9(5)	4d	378685.8(6)	
88	101	1043.985	95786.8	0.5	–0.005	9	282871.9(5)	4d	378658.2(5)	
11	40	1045.519	95646.3	1.3	–0.014	12	282038.1(4)	4d	377683.1(3)	bl
1	6	1045.694	95630.3	0.3	–0.003	6	264434.2(4)	4d	360064.2(5)	
8	11	1045.819	95618.8	0.2	–0.002	15	289389.7(2)	4d	385008.3(3)	
4	29	1046.060	95596.8	–0.5	0.005	9	286855.3(1)	4d	382452.6(2)	
7	43	1046.139	95589.6	–0.3	0.004	9	286862.7(2)	4d	382452.6(2)	
11	30	1046.187	95585.2	–0.1	0.001	9	285961.7(1)	4d	381547.0(2)	
14	67	1046.323	95572.8	–0.2	0.002	7	311180.9(4)	4d	406753.9(5)	
17	43	1046.784	95530.7	0.0	0.000	11	290407.7(2)	4d	385938.4(3)	
36	90	1047.851	95433.4	–0.3	0.003	8	289545.9(4)	4d	384979.6(5)	
7	25	1048.301	95392.5	0.4	–0.004	9	286154.9(2)	4d	381547.0(2)	
5	49	1048.796	95347.5	0.6	–0.006	3	265112.6(5)	4d	360459.5(6)	
4	29	1049.280	95303.5	1.4	–0.015	8	282871.9(5)	4d	378174.0(5)	
170	101	1049.668	95268.2	0.5	–0.006	10	290099.1(5)	4d	385366.8(5)	

Table I. *continued*

gA ($10^8\,s^{-1}$)	Int	λ (Å)	σ (cm^{-1})	$\Delta(\sigma)^a$ (cm^{-1})	$\Delta(\lambda)^a$ (Å)	N^b	Odd level		Even level	Remark[c]
15	73	1049.965	95241.3	–1.7	0.019	17	286862.7(2)	4d	382105.7(3)	bl
157	133	1050.072	95231.6	0.5	–0.005	10	311180.9(4)	4d	406412.0(5)	
3	32	1050.920	95154.7	0.9	–0.010	10	264434.2(4)	4d	359588.0(4)	
4	14	1051.035	95144.3	–0.2	0.002	8	286855.3(1)	4d	381999.8(2)	
8	115	1051.577	95095.2	–0.1	0.001	15	289913.0(3)	4d	385008.3(3)	bl 2d ord
19	81	1052.674	94996.2	0.1	–0.001	17	287109.6(3)	4d	382105.7(3)	
20	81	1052.884	94977.2	–0.9	0.010	12	289545.9(4)	4d	384524.0(4)	
103	29	1053.592	94913.4	0.3	–0.003	2	334509.1(2)	4d	429422.2(3)	
42	133	1053.966	94879.7	–0.8	0.009	8	290099.1(5)	4d	384979.6(5)	str
3	61	1054.059	94871.3	0.8	–0.009	5	282423.5(2)	4d	377294.0(1)	
66	73	1056.987	94608.5	–0.2	0.002	6	292287.6(5)	4d	386896.3(5)	
5	10	1058.358	94486.0	0.5	–0.005	17	287620.2(4)	4d	382105.7(3)	
70	101	1058.658	94459.2	1.1	–0.013	7	295716.4(2)	4d	390174.5(3)	
15	29	1059.046	94424.6	–0.3	0.003	12	290099.1(5)	4d	384524.0(4)	
6	22	1059.097	94420.1	–0.4	0.005	13	284690.3(4)	4d	379110.8(5)	
1	7	1059.736	94363.1	1.2	–0.013	17	292287.6(5)	4d	386649.5(4)	
47	81	1061.357	94219.0	0.2	–0.003	17	292430.7(4)	4d	386649.5(4)	
20	22	1061.507	94205.7	0.7	–0.007	3	292513.2(3)	4d	386718.2(3)	
28	101	1062.257	94139.2	–2.4	0.027	10	284690.3(4)	4d	378831.9(3)	bl Fe III
53	81	1062.986	94074.6	0.0	0.000	3	285196.1(6)	4d	379270.7(7)	
28	81	1063.704	94011.1	–0.3	0.003	7	289389.7(2)	4d	383401.1(3)	
27	81	1064.133	93973.3	0.9	–0.011	10	284790.8(5)	4d	378763.1(4)	
3	32	1064.197	93967.6	–0.3	0.003	9	284690.3(4)	4d	378658.2(5)	
7	34	1064.295	93958.9	–0.7	0.008	10	273643.1(1)	4d	367602.7(2)	
24	43	1064.795	93914.8	0.1	–0.001	13	285196.1(6)	4d	379110.8(5)	
32	57	1065.026	93894.4	–0.6	0.007	6	284790.8(5)	4d	378685.8(6)	
2	29	1065.340	93866.7	–0.7	0.007	9	284790.8(5)	4d	378658.2(5)	
20	46	1065.764	93829.4	1.1	–0.013	11	274136.1(2)	4d	367964.4(3)	
2	38	1066.373	93775.8	–1.1	0.012	15	291231.4(3)	4d	385008.3(3)	
10	22	1067.089	93712.9	0.8	–0.009	10	273643.1(1)	4d	367355.2(1)	
4	13	1068.519	93587.5	1.2	–0.014	5	273643.1(1)	4d	367229.4(0)	
24	30	1068.781	93564.6	–0.5	0.006	6	294644.0(1)	4d	388209.1(2)	
40	67	1069.459	93505.2	2.2	–0.025	9	274930.3(3)	4d	368433.3(4)	
21	27	1069.705	93483.7	0.0	–0.001	8	284690.3(4)	4d	378174.0(5)	
13	30	1069.896	93467.1	0.5	–0.005	10	274136.1(2)	4d	367602.7(2)	
11	40	1069.958	93461.6	–0.5	0.006	9	285196.1(6)	4d	378658.2(5)	
4	26	1070.379	93424.9	–0.3	0.004	11	292513.2(3)	4d	385938.4(3)	
47	81	1071.899	93292.4	–0.2	0.002	12	291231.4(3)	4d	384524.0(4)	
3	6	1072.736	93219.6	0.5	–0.005	10	274136.1(2)	4d	367355.2(1)	
21	19	1073.628	93142.1	0.0	0.000	8	302602.5(4)	4d	395744.6(4)	
1	49	1073.773	93129.6	0.1	–0.001	5	263898.6(3)	4d	357028.1(4)	
23	49	1074.352	93079.4	0.2	–0.002	10	292287.6(5)	4d	385366.8(5)	
33	46	1075.254	93001.3	0.4	–0.004	10	292365.9(6)	4d	385366.8(5)	
19	115	1075.575	92973.5	1.6	–0.019	8	302377.1(3)	4d	395349.0(3)	bl Fe IV * 2
1	30	1076.486	92894.8	–0.1	0.001	4	264434.2(4)	4d	357329.1(5)	
20	34	1076.695	92876.8	–0.4	0.004	9	288669.8(1)	4d	381547.0(2)	
3	13	1076.969	92853.2	0.3	–0.004	6	292365.9(6)	4d	385218.8(6)	
1	16	1077.832	92778.8	0.0	0.000	4	265112.6(5)	4d	357891.4(6)	
16	12	1078.088	92756.8	–0.5	0.006	8	302292.7(2)	4d	395050.0(2)	
6	9	1078.839	92692.2	0.2	–0.003	8	292287.6(5)	4d	384979.6(5)	
15	36	1079.789	92610.7	0.6	–0.007	8	289389.7(2)	4d	381999.8(2)	
1	12	1080.392	92559.0	–0.8	0.009	17	289545.9(4)	4d	382105.7(3)	
14	17	1081.144	92494.7	–0.4	0.005	15	292513.2(3)	4d	385008.3(3)	
5	26	1081.589	92456.5	0.4	–0.005	10	275146.6(1)	4d	367602.7(2)	
16	32	1084.687	92192.5	–0.2	0.003	17	289913.0(3)	4d	382105.7(3)	
2	3	1085.930	92086.9	0.1	–0.002	8	289913.0(3)	4d	381999.8(2)	
3	4	1085.978	92082.9	0.1	–0.001	5	275146.6(1)	4d	367229.4(0)	
11	36	1086.841	92009.8	–1.0	0.012	12	292513.2(3)	4d	384524.0(4)	
4	20	1087.167	91982.2	1.3	–0.016	10	275374.3(2)	4d	367355.2(1)	
2	5	1090.248	91722.2	–0.1	0.001	10	287109.6(3)	4d	378831.9(3)	
11	11	1090.520	91699.4	1.4	–0.016	17	290407.7(2)	4d	382105.7(3)	
19	53	1091.762	91595.1	0.0	0.000	7	266612.8(2)	4d	358207.9(1)	Fe III
9	57	1092.114	91565.5	0.4	–0.005	7	289171.9(7)	4d	380737.0(6)	
58	38	1092.507	91532.6	–0.8	0.010	5	267928.6(4)	4d	359462.0(3)	
16	11	1092.709	91515.7	–1.0	0.012	11	267240.1(3)	4d	358756.8(2)	
4	9	1093.021	91489.6	–1.0	0.012	13	287620.2(4)	4d	379110.8(5)	
6	8	1093.900	91416.0	–0.1	0.001	8	290583.7(1)	4d	381999.8(2)	

Table I. *continued*

gA ($10^8\,s^{-1}$)	Int	λ (Å)	σ (cm^{-1})	$\Delta(\sigma)^a$ (cm^{-1})	$\Delta(\lambda)^a$ (Å)	N^b	Odd level		Even level	Remark[c]
13	73	1094.516	91364.6	–0.2	0.002	9	277068.5(3)	4d	368433.3(4)	
9	27	1095.870	91251.7	–0.1	0.002	12	286431.3(3)	4d	377683.1(3)	
3	17	1098.449	91037.4	–0.6	0.007	9	287620.2(4)	4d	378658.2(5)	
15	90	1099.260	90970.3	–0.1	0.001	7	292430.7(4)	4d	383401.1(3)	
11	43	1100.138	90897.7	1.8	–0.021	11	277068.5(3)	4d	367964.4(3)	
4	11	1100.864	90837.8	1.0	–0.012	10	276765.9(1)	4d	367602.7(2)	
4	15	1101.073	90820.5	0.1	–0.001	12	286862.7(2)	4d	377683.1(3)	
2	27	1102.750	90682.4	–0.2	0.002	9	286855.3(1)	4d	377537.9(2)	
5	101	1102.840	90675.0	–0.2	0.003	9	286862.7(2)	4d	377537.9(2)	bl Fe IV * 2
9	61	1103.300	90637.2	–0.7	0.009	7	290099.1(5)	4d	380737.0(6)	
1	61	1103.639	90609.4	0.5	–0.006	9	267240.1(3)	4d	357849.0(2)	
3	18	1103.792	90596.8	0.8	–0.009	10	276759.2(2)	4d	367355.2(1)	
10	61	1104.076	90573.5	0.0	0.000	12	287109.6(3)	4d	377683.1(3)	
32	46	1104.489	90539.6	–0.3	0.003	3	294644.0(1)	4d	385183.9(2)	
8	46	1104.542	90535.3	1.1	–0.013	10	277068.5(3)	4d	367602.7(2)	
14	32	1104.751	90518.2	–0.4	0.005	6	288167.2(6)	4d	378685.8(6)	
7	29	1105.218	90479.9	–0.1	0.001	12	302292.7(2)	4d	392772.7(3)	
4	25	1105.851	90428.1	–0.2	0.003	9	287109.6(3)	4d	377537.9(2)	
9	53	1107.229	90315.5	–0.1	0.001	9	291231.4(3)	4d	381547.0(2)	bl 2d ord
16	46	1109.893	90098.8	0.0	0.000	3	289171.9(7)	4d	379270.7(7)	
4	38	1110.344	90062.2	–0.7	0.009	12	287620.2(4)	4d	377683.1(3)	
1	16	1111.032	90006.4	–0.4	0.004	8	288167.2(6)	4d	378174.0(5)	
6	43	1112.473	89889.9	1.3	–0.015	11	278075.8(4)	4d	367964.4(3)	
7	46	1119.929	89291.3	–0.6	0.007	15	295716.4(2)	4d	385008.3(3)	
13	32	1120.512	89244.9	–0.5	0.006	10	306193.9(3)	4d	395439.3(4)	
29	90	1122.116	89117.3	–0.8	0.010	5	307288.7(3)	4d	396406.8(3)	
17	35	1122.671	89073.3	0.0	0.000	10	306622.8(4)	4d	395696.1(5)	
5	2	1123.164	89034.2	0.4	–0.005	9	292513.2(3)	4d	381547.0(2)	
4	1	1123.439	89012.4	0.7	–0.009	13	290099.1(5)	4d	379110.8(5)	
2	1	1125.535	88846.6	0.8	–0.011	13	311538.7(3)	4d	400384.5(4)	
11	1	1125.980	88811.5	0.2	–0.003	7	308165.0(2)	4d	396976.3(2)	
17	6	1126.903	88738.8	0.8	–0.010	10	307064.4(5)	4d	395802.4(6)	
7	66	1128.343	88625.5	1.3	–0.017	5	288669.8(1)	4d	377294.0(1)	
32	48	1130.595	88449.0	–0.4	0.005	7	292287.6(5)	4d	380737.0(6)	
10	30	1130.751	88436.8	–1.0	0.012	7	308671.5(1)	4d	397109.3(1)	
8	25	1134.460	88147.7	–0.5	0.006	9	289389.7(2)	4d	377537.9(2)	
4	1	1136.984	87952.0	–0.5	0.006	5	277292.7(5)	4d	365245.2(4)	
10	63	1139.348	87769.5	–0.6	0.008	12	289913.0(3)	4d	377683.1(3)	
28	2	1140.553	87676.8	0.6	–0.007	5	311180.9(4)	4d	398857.1(3)	
4	12	1140.955	87645.9	0.4	–0.005	14	306193.9(3)	4d	393839.4(3)	
3	7	1141.544	87600.7	0.2	–0.003	10	291231.4(3)	4d	378831.9(3)	
7	16	1142.276	87544.5	–0.3	0.004	13	306622.8(4)	4d	394167.6(4)	
25	57	1145.243	87317.7	–0.7	0.009	5	311538.7(3)	4d	398857.1(3)	
10	2	1147.004	87183.6	–0.4	0.005	8	308165.0(2)	4d	395349.0(3)	
24	13	1151.670	86830.4	–0.4	0.005	7	307064.4(5)	4d	393895.2(5)	
4	1	1153.680	86679.1	–1.0	0.013	13	292430.7(4)	4d	379110.8(5)	
12	5	1155.729	86525.5	0.7	–0.009	5	280039.6(5)	4d	366564.4(4)	
6	49	1157.692	86378.8	0.3	–0.004	8	308671.5(1)	4d	395050.0(2)	
2	1	1158.306	86333.0	0.6	–0.008	10	292430.7(4)	4d	378763.1(4)	
5	33	1158.492	86319.1	0.4	–0.006	10	292513.2(3)	4d	378831.9(3)	
3	15	1160.130	86197.2	0.0	0.000	5	280367.2(4)	4d	366564.4(4)	
3	28	1165.519	85798.7	0.9	–0.012	10	302602.5(4)	4d	388400.3(4)	
6	26	1165.672	85787.5	0.0	0.001	3	280367.2(4)	4d	366154.7(5)	
1	4	1169.885	85478.5	0.0	0.000	8	280539.7(2)	4d	366018.2(3)	
3	2	1173.099	85244.3	–0.5	0.007	4	280039.6(5)	4d	365284.4(6)	
3	1	1173.903	85185.9	–0.1	0.001	8	280832.2(3)	4d	366018.2(3)	
1	2	1184.556	84419.8	–0.2	0.003	12	331367.0(3)	5s	415787.0(4)	
5	31	1184.660	84412.4	–0.6	0.009	5	280832.2(3)	4d	365245.2(4)	

[a] $\Delta(x)$ = Difference between the observed and calculated (derived from the level energies) values of x.
[b] N = The number of observed transitions from the even level involved.
[c] M = The Fe V line is masked by some other line.
str = The intensity of the line is too strong compared to the expected value.
bl = The line is blended by close line.
Fe III = The line identified also as Fe III.

Table II. *Experimental and calculated energy levels (cm^{-1}) in the $3d^4$, $3d^34s$, $3d^34d$ and $3d^35s$ configurations of Fe V.*

E_{obs}	E_{calc}	Δ^a	N^b	Composition
$J = 0$				
0.0	–35	35.0		100% $3d^4$ ^5D
24055.4	24090	–34.6		59% $3d^4$ $_4^3P$ + 40% $3d^4$ $_2^3P$ + 1% $3d^4$ $_4^1S$
39633.4	39618	15.4		78% $3d^4$ $_4^1S$ + 21% $3d^4$ $_0^1S$ + 1% $3d^4$ $_4^3P$
63420.0	63392	28.0		60% $3d^4$ $_2^3P$ + 40% $3d^4$ $_4^3P$
121130.2	121097	33.2		79% $3d^4$ $_0^1S$ + 21% $3d^4$ $_4^1S$
212542.1	212698	–155.9		84% 4s $(^4P)^3P$ + 16% 4s $(^2P)^3P$
–	214805	–		84% 4s $(^2P)^3P$ + 16% 4s $(^4P)^3P$
–	363599	–		90% 4d $(^4F)^3P$ + 5% 4d $(^2P)^3P$ + 3% 4d $(_3^2D)^3P$
367229.4	367151	78.4	5	83% 4d $(^4F)^5D$ + 17% 4d $(^4P)^5D$
381056.6	380983	73.6	1	82% 4d $(^4P)^5D$ + 17% 4d $(^4F)^5D$ + 1% 4d $(^2P)^3P$
–	385046	–		67% 4d $(^4P)^3P$ + 16% 4d $(^2P)^3P$ + 10% 4d $(_3^2D)^3P$
–	389912	–		46% 4d $(^2P)^3P$ + 23% 4d $(^4P)^3P$ + 18% 4d $(_3^2D)^3P$
–	394800	–		47% 4d $(_3^2D)^3P$ + 29% 4d $(^2P)^3P$ + 13% 4d $(_1^2D)^3P$
–	404018	–		77% 4d $(_3^2D)^1S$ + 21% 4d $(_1^2D)^1S$ + 1% 4d $(^2P)^3P$
–	415261	–		84% 5s $(^4P)^3P$ + 12% 4d $(^2F)^3P$ + 1% 5s $(^2P)^3P$
–	417728	–		72% 4d $(^2F)^3P$ + 14% 5s $(^4P)^3P$ + 8% 4d $(^4P)^3P$
–	421139	–		98% 5s $(^2P)^3P$ + 1% 5s $(^4P)^3P$
–	436619	–		80% 4d $(_1^2D)^3P$ + 16% 4d $(_3^2D)^3P$ + 1% 4d $(^4P)^3P$
–	453556	–		97% $4s^2$ $(^3P)^3P$ + 1% 4d $(_1^2D)^3P$ + 1% 4d $(_3^2D)^3P$
–	458004	–		76% 4d $(_1^2D)^1S$ + 22% 4d $(_3^2D)^1S$ + 1% $4s^2$ $(^1S)^1S$
–	498127	–		98% $4s^2$ $(^1S)^1S$ + 2% 4d $(_1^2D)^1S$
$J = 1$				
142.1	110	32.1		100% $3d^4$ ^5D
24972.9	24982	–9.1		60% $3d^4$ $_4^3P$ + 39% $3d^4$ $_2^3P$
36925.4	36919	6.4		100% $3d^4$ ^3D
62914.2	62881	33.2		60% $3d^4$ $_2^3P$ + 40% $3d^4$ $_4^3P$
186433.6	186438	–4.4		100% 4s $(^4F)^5F$
204729.9	204683	46.9		99% 4s $(^4P)^5P$ + 1% 4s $(^2P)^3P$
212818.1	212936	–117.9		87% 4s $(^4P)^3P$ + 6% 4s $(^2P)^3P$ + 3% 4s $(^2P)^1P$
214611.4	214532	79.4		71% 4s $(^2P)^3P$ + 14% 4s $(_3^2D)^3D$ + 9% 4s $(^4P)^3P$
215782.6	215787	–4.4		56% 4s $(_3^2D)^3D$ + 20% 4s $(^2P)^3P$ + 16% 4s $(_1^2D)^3D$
219486.9	219511	–24.1		90% 4s $(^2P)^1P$ + 5% 4s $(_3^2D)^3D$ + 2% 4s $(^4P)^3P$
258769.5	258727	42.5		78% 4s $(_1^2D)^3D$ + 22% 4s $(_3^2D)^3D$
–	357155	–		98% 4d $(^4F)^5P$ + 1% 4d $(^4F)^3D$
–	357744	–		48% 4d $(^4F)^3D$ + 47% 4d $(^4F)^5F$ + 2% 4d $(^4P)^3D$
358207.9	358393	–185.1	7	51% 4d $(^4F)^5F$ + 44% 4d $(^4F)^3D$ + 2% 4d $(^4P)^3D$
–	364031	–		89% 4d $(^4F)^3P$ + 5% 4d $(^2P)^3P$ + 3% 4d $(_3^2D)^3P$
367355.2	367290	65.2	10	82% 4d $(^4F)^5D$ + 17% 4d $(^4P)^5D$
376991.5	377034	–42.5	2	78% 4d $(^4P)^5F$ + 14% 4d $(^4P)^3D$ + 3% 4d $(^2G)^3D$
377294.0	377354	–60.0	5	54% 4d $(^4P)^3D$ + 21% 4d $(^2G)^3D$ + 18% 4d $(^4P)^5F$
379874.8	379853	21.8	7	96% 4d $(^4P)^5P$ + 2% 4d $(^4P)^5D$
381163.5	381087	76.5	10	79% 4d $(^4P)^5D$ + 17% 4d $(^4F)^5D$ + 2% 4d $(^4P)^5P$
–	381830	–		40% 4d $(^2G)^3D$ + 22% 4d $(^2P)^1P$ + 9% 4d $(_3^2D)^1P$
–	382597	–		21% 4d $(_3^2D)^1P$ + 19% 4d $(^2P)^1P$ + 18% 4d $(^2G)^3D$
–	383786	–		40% 4d $(_3^2D)^3S$ + 25% 4d $(^2P)^3D$ + 13% 4d $(_1^2D)^3S$
–	384089	–		30% 4d $(^2P)^3D$ + 25% 4d $(_3^2D)^3S$ + 12% 4d $(^2P)^1P$
–	384968	–		44% 4d $(^4P)^3P$ + 18% 4d $(^2P)^3D$ + 12% 4d $(^2P)^3P$
–	387415	–		43% 4d $(^2P)^1P$ + 34% 4d $(_3^2D)^1P$ + 11% 4d $(^4P)^3P$
–	389460	–		45% 4d $(^2P)^3P$ + 21% 4d $(^4P)^3P$ + 19% 4d $(_3^2D)^3P$
394443.4	394425	18.4	5	100% 5s $(^4F)^5F$
–	395519	–		47% 4d $(_3^2D)^3P$ + 29% 4d $(^2P)^3P$ + 12% 4d $(_1^2D)^3P$
397109.3	397131	–21.7	7	34% 4d $(_3^2D)^3D$ + 19% 4d $(^2P)^3D$ + 13% 4d $(_1^2D)^3D$
–	405628	–		98% 4d $(^2F)^1P$ + 2% 4d $(_1^2D)^1P$
–	407672	–		89% 4d $(^2F)^3D$ + 4% 4d $(^2G)^3D$ + 3% 4d $(^4P)^3D$
413059.4	413052	7.4	7	99% 5s $(^4P)^5P$ + 1% 5s $(^2P)^3P$
–	415369	–		80% 5s $(^4P)^3P$ + 15% 4d $(^2F)^3P$ + 2% 5s $(^2P)^1P$
–	417663	–		70% 4d $(^2F)^3P$ + 16% 5s $(^4P)^3P$ + 8% 4d $(^4P)^3P$
–	421044	–		78% 5s $(^2P)^3P$ + 15% 5s $(_3^2D)^3D$ + 4% 5s $(_1^2D)^3D$
–	421924	–		44% 5s $(^2P)^1P$ + 31% 5s $(_3^2D)^3D$ + 14% 5s $(^2P)^3P$
–	423884	–		52% 5s $(^2P)^1P$ + 31% 5s $(_3^2D)^3D$ + 9% 5s $(_1^2D)^3D$
–	429441	–		75% 4d $(_1^2D)^3D$ + 24% 4d $(_3^2D)^3D$
–	432929	–		55% 4d $(_1^2D)^3S$ + 21% 4d $(_1^2D)^1P$ + 17% 4d $(_3^2D)^3S$
–	433264	–		53% 4d $(_1^2D)^1P$ + 21% 4d $(_1^2D)^3S$ + 17% 4d $(_3^2D)^1P$
–	436530	–		80% 4d $(_1^2D)^3P$ + 17% 4d $(_3^2D)^3P$ + 1% 4d $(^4P)^3P$
–	453930	–		97% $4s^2$ $(^3P)^3P$ + 1% 4d $(_1^2D)^3P$ + 1% 4d $(_3^2D)^3P$
–	466754	–		78% 5s $(_1^2D)^3D$ + 22% 5s $(_3^2D)^3D$

Table II. *continued.*

E_{obs}	E_{calc}	Δ[a]	N[b]	Composition		
$J = 2$						
417.3	392	25.3		100% 3d^4 ^{5}D		
26468.3	26486	–17.7		60% 3d^4 $_4{}^3$P	+ 39% 3d^4 $_2{}^3$P	
26760.7	26762	–1.3		78% 3d^4 $_4{}^3$F	+ 22% 3d^4 $_2{}^3$F	
36758.5	36786	–27.5		99% 3d^4 ^{3}D		
46291.2	46254	37.2		78% 3d^4 $_4{}^1$D	+ 21% 3d^4 $_2{}^1$D	+ 1% 3d^4 ^{3}D
61854.4	61867	–12.6		61% 3d^4 $_2{}^3$P	+ 39% 3d^4 $_4{}^3$P	
62321.1	62380	–58.9		78% 3d^4 $_2{}^3$F	+ 22% 3d^4 $_4{}^3$F	
93832.3	93825	7.3		78% 3d^4 $_2{}^1$D	+ 22% 3d^4 $_4{}^1$D	
186725.5	186740	–14.5		100% 4s $(^4\mathrm{F})^5\mathrm{F}$		
195196.3	195082	114.3		100% 4s $(^4\mathrm{F})^3\mathrm{F}$		
204975.4	204911	64.4		99% 4s $(^4\mathrm{P})^5\mathrm{P}$	+ 1% 4s $(^2\mathrm{P})^3\mathrm{P}$	
213649.2	213653	–3.8		93% 4s $(^4\mathrm{P})^3\mathrm{P}$	+ 6% 4s $(^2\mathrm{P})^3\mathrm{P}$	
214525.8	214537	–11.2		63% 4s $(^2\mathrm{P})^3\mathrm{P}$	+ 23% 4s $(_3^2\mathrm{D})^3\mathrm{D}$	+ 6% 4s $(_1^2\mathrm{D})^3\mathrm{D}$
216652.1[c]	216663	–10.9	5	55% 4s $(_3^2\mathrm{D})^3\mathrm{D}$	+ 28% 4s $(^2\mathrm{P})^3\mathrm{P}$	+ 15% 4s $(_1^2\mathrm{D})^3\mathrm{D}$
220621.0	220566	55.0		78% 4s $(_3^2\mathrm{D})^1\mathrm{D}$	+ 20% 4s $(_1^2\mathrm{D})^1\mathrm{D}$	+ 2% 4s $(^2\mathrm{P})^3\mathrm{P}$
234027.4	233924	103.4		100% 4s $(^2\mathrm{F})^3\mathrm{F}$		
258628.5	258587	41.5		78% 4s $(_1^2\mathrm{D})^3\mathrm{D}$	+ 21% 4s $(_3^2\mathrm{D})^3\mathrm{D}$	
262509.3	262640	–130.7		79% 4s $(_1^2\mathrm{D})^1\mathrm{D}$	+ 20% 4s $(_3^2\mathrm{D})^1\mathrm{D}$	
357849.0	357708	141.0	9	93% 4d $(^4\mathrm{F})^5\mathrm{P}$	+ 5% 4d $(^4\mathrm{F})^3\mathrm{D}$	+ 1% 4d $(^4\mathrm{F})^5\mathrm{F}$
357973.0	358082	–109.0	6	67% 4d $(^4\mathrm{F})^5\mathrm{F}$	+ 14% 4d $(^4\mathrm{F})^3\mathrm{D}$	+ 14% 4d $(^4\mathrm{F})^5\mathrm{G}$
358756.8	358628	128.8	11	47% 4d $(^4\mathrm{F})^5\mathrm{G}$	+ 47% 4d $(^4\mathrm{F})^3\mathrm{D}$	+ 3% 4d $(^4\mathrm{P})^3\mathrm{D}$
–	358799	–		38% 4d $(^4\mathrm{F})^5\mathrm{G}$	+ 30% 4d $(^4\mathrm{F})^5\mathrm{F}$	+ 27% 4d $(^4\mathrm{F})^3\mathrm{D}$
364664.3	364922	–257.7	6	89% 4d $(^4\mathrm{F})^3\mathrm{P}$	+ 5% 4d $(^2\mathrm{P})^3\mathrm{P}$	+ 4% 4d $(_3^2\mathrm{D})^3\mathrm{P}$
365555.8	365597	–41.2	4	84% 4d $(^4\mathrm{F})^3\mathrm{F}$	+ 8% 4d $(^2\mathrm{G})^3\mathrm{F}$	+ 3% 4d $(^4\mathrm{P})^3\mathrm{F}$
367602.7	367562	40.7	10	82% 4d $(^4\mathrm{F})^5\mathrm{D}$	+ 18% 4d $(^4\mathrm{P})^5\mathrm{D}$	
377102.8	377143	–40.2	5	85% 4d $(^4\mathrm{P})^5\mathrm{F}$	+ 9% 4d $(^4\mathrm{P})^3\mathrm{D}$	+ 2% 4d $(^2\mathrm{G})^3\mathrm{D}$
377537.9	377593	–55.1	9	60% 4d $(^4\mathrm{P})^3\mathrm{D}$	+ 24% 4d $(^2\mathrm{G})^3\mathrm{D}$	+ 11% 4d $(^4\mathrm{P})^5\mathrm{F}$
379727.1	379677	50.1	10	94% 4d $(^4\mathrm{P})^5\mathrm{P}$	+ 2% 4d $(^4\mathrm{P})^5\mathrm{D}$	+ 1% 4d $(^2\mathrm{P})^3\mathrm{D}$
381334.5	381245	89.5	13	77% 4d $(^4\mathrm{P})^5\mathrm{D}$	+ 17% 4d $(^4\mathrm{F})^5\mathrm{D}$	+ 3% 4d $(^4\mathrm{P})^5\mathrm{P}$
381547.0	381673	–126.0	9	37% 4d $(^4\mathrm{P})^3\mathrm{F}$	+ 18% 4d $(^2\mathrm{G})^1\mathrm{D}$	+ 16% 4d $(^2\mathrm{P})^3\mathrm{F}$
381999.8	382060	–60.2	8	34% 4d $(^2\mathrm{G})^3\mathrm{D}$	+ 10% 4d $(^4\mathrm{P})^3\mathrm{F}$	+ 10% 4d $(^4\mathrm{P})^3\mathrm{D}$
382452.6	382422	30.6	9	25% 4d $(^2\mathrm{G})^3\mathrm{F}$	+ 22% 4d $(^2\mathrm{G})^1\mathrm{D}$	+ 21% 4d $(^2\mathrm{P})^3\mathrm{F}$
–	383718	–		23% 4d $(^2\mathrm{G})^3\mathrm{F}$	+ 21% 4d $(^4\mathrm{P})^3\mathrm{F}$	+ 18% 4d $(^2\mathrm{G})^1\mathrm{D}$
–	384254	–		42% 4d $(^2\mathrm{P})^3\mathrm{D}$	+ 17% 4d $(^4\mathrm{P})^3\mathrm{P}$	+ 14% 4d $(_3^2\mathrm{D})^3\mathrm{D}$
385183.9	385233	–49.1	3	41% 4d $(^4\mathrm{P})^3\mathrm{P}$	+ 22% 4d $(^2\mathrm{P})^3\mathrm{D}$	+ 13% 4d $(^2\mathrm{P})^3\mathrm{P}$
–	387243	–		62% 4d $(_3^2\mathrm{D})^3\mathrm{F}$	+ 14% 4d $(^2\mathrm{P})^3\mathrm{F}$	+ 11% 4d $(_1^2\mathrm{D})^3\mathrm{F}$
388209.1	388271	–61.9	6	36% 4d $(^2\mathrm{P})^3\mathrm{P}$	+ 27% 4d $(^4\mathrm{P})^3\mathrm{P}$	+ 14% 4d $(_3^2\mathrm{D})^3\mathrm{P}$
–	389275	–		61% 4d $(_3^2\mathrm{D})^1\mathrm{D}$	+ 16% 4d $(_1^2\mathrm{D})^1\mathrm{D}$	+ 7% 4d $(^2\mathrm{F})^1\mathrm{D}$
393347.6	393411	–63.4	5	32% 4d $(^2\mathrm{G})^3\mathrm{F}$	+ 27% 4d $(^2\mathrm{P})^3\mathrm{F}$	+ 15% 4d $(^2\mathrm{H})^3\mathrm{F}$
394682.8	394681	1.8	7	91% 5s $(^4\mathrm{F})^5\mathrm{F}$	+ 4% 5s $(^4\mathrm{F})^3\mathrm{F}$	+ 3% 4d $(^2\mathrm{H})^3\mathrm{F}$
395050.0	395130	–80.0	8	35% 4d $(^2\mathrm{H})^3\mathrm{F}$	+ 22% 5s $(^4\mathrm{F})^3\mathrm{F}$	+ 14% 4d $(^2\mathrm{F})^3\mathrm{F}$
396392.2	396472	–79.8	10	33% 4d $(_3^2\mathrm{D})^3\mathrm{P}$	+ 18% 4d $(^2\mathrm{P})^3\mathrm{P}$	+ 13% 4d $(_3^2\mathrm{D})^3\mathrm{D}$
396976.3	397004	–27.7	7	21% 4d $(_3^2\mathrm{D})^3\mathrm{D}$	+ 13% 4d $(_3^2\mathrm{D})^3\mathrm{P}$	+ 13% 4d $(^2\mathrm{P})^3\mathrm{D}$
397961.4	397961	0.4	2	72% 5s $(^4\mathrm{F})^3\mathrm{F}$	+ 10% 4d $(^2\mathrm{H})^3\mathrm{F}$	+ 5% 4d $(^4\mathrm{P})^3\mathrm{F}$
400479.6	400449	30.6	6	64% 4d $(^2\mathrm{P})^1\mathrm{D}$	+ 24% 4d $(^2\mathrm{G})^1\mathrm{D}$	+ 2% 4d $(_1^2\mathrm{D})^1\mathrm{D}$
–	407626	–		88% 4d $(^2\mathrm{F})^3\mathrm{D}$	+ 4% 4d $(^2\mathrm{G})^3\mathrm{D}$	+ 3% 4d $(^4\mathrm{P})^3\mathrm{D}$
–	408870	–		76% 4d $(^2\mathrm{F})^3\mathrm{F}$	+ 13% 4d $(^2\mathrm{H})^3\mathrm{F}$	+ 6% 4d $(^4\mathrm{P})^3\mathrm{F}$
413289.0	413259	30.0	4	97% 5s $(^4\mathrm{P})^5\mathrm{P}$	+ 2% 5s $(^2\mathrm{P})^3\mathrm{P}$	
415667.5	415769	–101.5	13	67% 5s $(^4\mathrm{P})^3\mathrm{P}$	+ 27% 4d $(^2\mathrm{F})^3\mathrm{P}$	+ 2% 4d $(^4\mathrm{P})^3\mathrm{P}$
415912.3	416025	–112.7	3	74% 4d $(^2\mathrm{F})^1\mathrm{D}$	+ 17% 4d $(_1^2\mathrm{D})^1\mathrm{D}$	+ 3% 5s $(_3^2\mathrm{D})^1\mathrm{D}$
–	417679	–		58% 4d $(^2\mathrm{F})^3\mathrm{P}$	+ 31% 5s $(^4\mathrm{P})^3\mathrm{P}$	+ 7% 4d $(^4\mathrm{P})^3\mathrm{P}$
–	421110	–		68% 5s $(^2\mathrm{P})^3\mathrm{P}$	+ 18% 5s $(_3^2\mathrm{D})^3\mathrm{D}$	+ 5% 5s $(_1^2\mathrm{D})^3\mathrm{D}$
423422.7	423384	38.7	8	58% 5s $(_3^2\mathrm{D})^3\mathrm{D}$	+ 24% 5s $(^2\mathrm{P})^3\mathrm{P}$	+ 16% 5s $(_1^2\mathrm{D})^3\mathrm{D}$
–	424721	–		72% 5s $(_3^2\mathrm{D})^1\mathrm{D}$	+ 20% 5s $(_1^2\mathrm{D})^1\mathrm{D}$	+ 4% 5s $(^2\mathrm{P})^3\mathrm{P}$
–	429426	–		75% 4d $(_1^2\mathrm{D})^3\mathrm{D}$	+ 24% 4d $(_3^2\mathrm{D})^3\mathrm{D}$	
–	433542	–		97% 4s^2 $(^3\mathrm{F})^3\mathrm{F}$	+ 1% 4d $(^2\mathrm{H})^3\mathrm{F}$	
–	434415	–		78% 4d $(_1^2\mathrm{D})^3\mathrm{F}$	+ 17% 4d $(_3^2\mathrm{D})^3\mathrm{F}$	+ 1% 4d $(^2\mathrm{H})^3\mathrm{F}$
436209.0	436344	–135.0	4	80% 4d $(_1^2\mathrm{D})^3\mathrm{P}$	+ 17% 4d $(_3^2\mathrm{D})^3\mathrm{P}$	+ 1% 4s^2 $(^3\mathrm{P})^3\mathrm{P}$
441334.5	441290	44.5	6	99% 5s $(^2\mathrm{F})^3\mathrm{F}$	+ 1% 4d $(_1^2\mathrm{D})^3\mathrm{F}$	
–	444569	–		60% 4d $(_1^2\mathrm{D})^1\mathrm{D}$	+ 23% 4d $(_3^2\mathrm{D})^1\mathrm{D}$	+ 12% 4d $(^2\mathrm{F})^1\mathrm{D}$
–	451213	–		89% 4s^2 $(^1\mathrm{D})^1\mathrm{D}$	+ 7% 4s^2 $(^3\mathrm{P})^3\mathrm{P}$	+ 1% 4d $(_3^2\mathrm{D})^1\mathrm{D}$
–	454816	–		91% 4s^2 $(^3\mathrm{P})^3\mathrm{P}$	+ 7% 4s^2 $(^1\mathrm{D})^1\mathrm{D}$	+ 1% 4d $(_1^2\mathrm{D})^3\mathrm{P}$
–	466595	–		77% 5s $(_1^2\mathrm{D})^3\mathrm{D}$	+ 21% 5s $(_3^2\mathrm{D})^3\mathrm{D}$	+ 1% 5s $(_1^2\mathrm{D})^1\mathrm{D}$
–	467911	–		77% 5s $(_1^2\mathrm{D})^1\mathrm{D}$	+ 21% 5s $(_3^2\mathrm{D})^1\mathrm{D}$	+ 1% 5s $(_1^2\mathrm{D})^3\mathrm{D}$
$J = 3$						
803.1	793	10.1		100% 3d^4 ^{5}D		
26842.3	26850	–7.7		75% 3d^4 $_4{}^3$F	+ 20% 3d^4 $_2{}^3$F	+ 4% 3d^4 ^{3}G
29817.1	29789	28.1		95% 3d^4 ^{3}G	+ 4% 3d^4 $_4{}^3$F	+ 1% 3d^4 $_2{}^3$F
36630.1	36665	–34.9		100% 3d^4 ^{3}D		

Table II. *continued.*

E_{obs}	E_{calc}	Δ^a	N^b	Composition
52732.7	52720	12.7		99% 3d^4 ^{1}F
62364.4	62404	–39.6		78% 3d^4 $_2{}^3$F + 21% 3d^4 $_4{}^3$F + 1% 3d^4 ^{1}F
187157.5	187188	–30.5		100% 4s (^{4}F)^{5}F
195933.0	195842	91.0		100% 4s (^{4}F)^{3}F
205536.4	205456	80.4		100% 4s (^{4}P)^{5}P
208838.2	208867	–28.8		100% 4s (^{2}G)^{3}G
216538.1	216566	–27.9		80% 4s ($_3{}^2$D)^{3}D + 20% 4s ($_1{}^2$D)^{3}D
233848.9	233788	60.9		100% 4s (^{2}F)^{3}F
237729.6	237867	–137.4		99% 4s (^{2}F)^{1}F
258434.1	258393	41.1		80% 4s ($_1{}^2$D)^{3}D + 20% 4s ($_3{}^2$D)^{3}D
356467.8	356536	–68.2	3	99% 4d (^{4}F)^{5}H + 1% 4d (^{4}F)^{5}G
358425.6	358410	15.6	5	67% 4d (^{4}F)^{5}F + 27% 4d (^{4}F)^{5}G + 3% 4d (^{4}F)^{3}D
–	358544	–		88% 4d (^{4}F)^{5}P + 8% 4d (^{4}F)^{3}D + 2% 4d (^{4}F)^{5}F
359146.2	359151	–4.8	10	71% 4d (^{4}F)^{5}G + 25% 4d (^{4}F)^{5}F + 2% 4d (^{4}F)^{3}D
359462.0	359471	–9.0	5	79% 4d (^{4}F)^{3}D + 10% 4d (^{4}F)^{5}P + 5% 4d (^{4}P)^{3}D
364454.9	364448	6.9	3	88% 4d (^{4}F)^{3}G + 6% 4d (^{2}G)^{3}G + 2% 4d (^{2}H)^{3}G
366018.2	366108	–89.8	8	82% 4d (^{4}F)^{3}F + 8% 4d (^{2}G)^{3}F + 3% 4d (^{4}P)^{3}F
367964.4	367951	13.4	11	81% 4d (^{4}F)^{5}D + 18% 4d (^{4}P)^{5}D
377278.5	377308	–29.5	4	85% 4d (^{4}P)^{5}F + 7% 4d (^{4}P)^{3}D + 2% 4d (^{4}F)^{5}F
377683.1	377770	–86.9	12	61% 4d (^{4}P)^{3}D + 21% 4d (^{2}G)^{3}D + 10% 4d (^{4}P)^{5}F
–	377949	–		64% 4d (^{2}G)^{1}F + 20% 4d (^{2}G)^{3}G + 4% 4d (^{2}P)^{1}F
378831.9	379110	–278.1	10	55% 4d (^{2}G)^{3}G + 25% 4d (^{2}G)^{1}F + 7% 4d ($_3{}^2$D)^{3}G
379617.5	379509	108.5	10	92% 4d (^{4}P)^{5}P + 2% 4d (^{2}G)^{3}D + 2% 4d (^{2}P)^{3}D
381532.0	381416	116.0	11	77% 4d (^{4}P)^{5}D + 18% 4d (^{4}F)^{5}D + 2% 4d (^{4}P)^{5}P
382105.7	382143	–37.3	17	36% 4d (^{2}G)^{3}D + 18% 4d (^{4}P)^{3}F + 13% 4d (^{2}P)^{3}D
382342.5	382346	–3.5	7	30% 4d (^{2}P)^{3}F + 23% 4d (^{4}P)^{3}F + 15% 4d (^{2}G)^{3}F
383401.1	383322	79.1	7	31% 4d (^{2}G)^{3}F + 26% 4d (^{4}P)^{3}F + 12% 4d (^{2}P)^{3}F
385008.3	384829	179.3	15	38% 4d (^{2}P)^{1}F + 12% 4d ($_3{}^2$D)^{1}F + 10% 4d (^{2}P)^{3}D
385938.4	385704	234.4	11	48% 4d (^{2}P)^{3}D + 17% 4d ($_3{}^2$D)^{3}D + 7% 4d (^{2}P)^{1}F
386718.2	386598	120.2	3	34% 4d ($_3{}^2$D)^{3}G + 21% 4d (^{2}H)^{3}G + 16% 4d (^{2}P)^{1}F
387843.3	387700	143.3	8	58% 4d ($_3{}^2$D)^{3}F + 14% 4d (^{2}P)^{3}F + 10% 4d ($_1{}^2$D)^{3}F
390174.5	390139	35.5	7	58% 4d (^{2}H)^{1}F + 23% 4d ($_3{}^2$D)^{1}F + 10% 4d (^{2}P)^{1}F
392772.7	392843	–70.3	12	41% 4d (^{2}H)^{3}G + 10% 4d (^{2}G)^{3}F + 9% 4d (^{2}G)^{3}G
393839.4	393923	–83.6	14	25% 4d (^{2}G)^{3}F + 18% 4d (^{2}P)^{3}F + 16% 4d (^{2}H)^{3}G
395054.9	395087	–32.1	12	78% 5s (^{4}F)^{5}F + 7% 4d (^{2}H)^{3}F + 7% 5s (^{4}F)^{3}F
395349.0	395434	–85.0	8	32% 4d (^{2}H)^{3}F + 21% 5s (^{4}F)^{5}F + 14% 4d (^{2}F)^{3}F
396406.8	396418	–11.2	5	33% 4d ($_3{}^2$D)^{3}D + 16% 4d (^{2}P)^{3}D + 13% 4d ($_1{}^2$D)^{3}D
398600.2	398582	18.2	6	73% 5s (^{4}F)^{3}F + 6% 4d (^{2}H)^{3}F + 3% 4d (^{4}P)^{3}F
398857.1	398972	–114.9	5	25% 4d (^{2}F)^{1}F + 24% 4d (^{2}H)^{1}F + 17% 4d ($_3{}^2$D)^{1}F
406924.0	407064	–140.0	9	91% 4d (^{2}F)^{3}G + 3% 4d (^{2}G)^{3}G + 2% 4d (^{4}F)^{3}G
407724.5	407597	127.5	3	87% 4d (^{2}F)^{3}D + 5% 4d (^{2}G)^{3}D + 3% 4d (^{4}P)^{3}D
408954.2	408946	8.2	8	75% 4d (^{2}F)^{3}F + 14% 4d (^{2}H)^{3}F + 6% 4d (^{4}P)^{3}F
412172.3	412271	–98.7	4	69% 4d (^{2}F)^{1}F + 11% 4d (^{2}P)^{1}F + 8% 4d (^{2}H)^{1}F
413890.0	413836	54.0	8	100% 5s (^{4}P)^{5}P
415576.5	415584	–7.5	10	99% 5s (^{2}G)^{3}G
423325.9	423367	–41.1	6	79% 5s ($_3{}^2$D)^{3}D + 20% 5s ($_1{}^2$D)^{3}D
–	429066	–		69% 4d ($_1{}^2$D)^{1}F + 25% 4d ($_3{}^2$D)^{1}F + 2% 4d ($_1{}^2$D)^{3}D
429422.2	429405	17.2	2	74% 4d ($_1{}^2$D)^{3}D + 22% 4d ($_3{}^2$D)^{3}D + 2% 4d ($_1{}^2$D)^{1}F
431659.6	431668	–8.4	2	74% 4d ($_1{}^2$D)^{3}G + 24% 4d ($_3{}^2$D)^{3}G + 1% 4d (^{2}F)^{3}G
434122.2	434273	–150.8	5	69% 4d ($_1{}^2$D)^{3}F + 15% 4d ($_3{}^2$D)^{3}F + 9% 4s^2 (^{3}F)^{3}F
–	434588	–		89% 4s^2 (^{3}F)^{3}F + 9% 4d ($_1{}^2$D)^{3}F + 1% 4d ($_3{}^2$D)^{3}F
441138.6	441145	–6.4	4	98% 5s (^{2}F)^{3}F + 1% 5s (^{2}F)^{1}F + 1% 4d ($_1{}^2$D)^{3}F
442499.9	442513	–13.1	4	97% 5s (^{2}F)^{1}F + 1% 5s (^{2}F)^{3}F + 1% 4d ($_3{}^2$D)^{1}F
–	466411	–		80% 5s ($_1{}^2$D)^{3}D + 20% 5s ($_3{}^2$D)^{3}D
$J = 4$				
1282.8	1299	–16.2		100% 3d^4 ^{5}D
24932.5	24893	39.5		97% 3d^4 ^{3}H + 1% 3d^4 ^{3}G
26974.0	27003	–29.0		75% 3d^4 $_4{}^3$F + 19% 3d^4 $_2{}^3$F + 4% 3d^4 ^{3}G
30147.1	30156	–8.9		94% 3d^4 ^{3}G + 3% 3d^4 $_4{}^3$F + 1% 3d^4 ^{3}H
36586.3	36555	31.3		65% 3d^4 $_4{}^1$G + 33% 3d^4 $_2{}^1$G + 1% 3d^4 $_4{}^3$F
62238.1	62276	–37.9		79% 3d^4 $_2{}^3$F + 20% 3d^4 $_4{}^3$F
71280.3	71268	12.3		66% 3d^4 $_2{}^1$G + 33% 3d^4 $_4{}^1$G
187719.0	187778	–59.0		100% 4s (^{4}F)^{5}F
196838.6	196792	46.6		99% 4s (^{4}F)^{3}F
209110.1	209153	–42.9		98% 4s (^{2}G)^{3}G + 1% 4s (^{2}G)^{1}G + 1% 4s (^{2}H)^{3}H
213534.1	213432	102.1		94% 4s (^{2}G)^{1}G + 5% 4s (^{2}H)^{3}H
216779.1	216780	–0.9		94% 4s (^{2}H)^{3}H + 5% 4s (^{2}G)^{1}G + 1% 4s (^{2}G)^{3}G
233633.6	233624	9.6		100% 4s (^{2}F)^{3}F
357028.1	356916	112.1	5	98% 4d (^{4}F)^{5}H + 1% 4d (^{4}F)^{5}G
358830.8	358832	–1.2	5	65% 4d (^{4}F)^{5}F + 32% 4d (^{4}F)^{5}G + 1% 4d (^{4}P)^{5}F

Table II. *continued.*

E_{obs}	E_{calc}	Δ^a	N^b	Composition
359588.0	359642	–54.0	10	66% 4d (^{4}F)^{5}G + 32% 4d (^{4}F)^{5}F + 1% 4d (^{4}F)^{5}H
363753.7	363599	154.7	2	90% 4d (^{4}F)^{3}H + 4% 4d (^{2}H)^{3}H + 4% 4d (^{2}G)^{3}H
365245.2	365182	63.2	5	86% 4d (^{4}F)^{3}G + 5% 4d (^{2}G)^{3}G + 3% 4d (^{4}F)^{3}F
366564.4	366710	–145.6	5	81% 4d (^{4}F)^{3}F + 9% 4d (^{2}G)^{3}F + 3% 4d (^{4}P)^{3}F
368433.3	368441	–7.7	9	80% 4d (^{4}F)^{5}D + 20% 4d (^{4}P)^{5}D
377578.0	377608	–30.0	2	96% 4d (^{4}P)^{5}F + 2% 4d (^{4}F)^{5}F + 1% 4d (^{2}P)^{3}F
378763.1	379000	–236.9	10	73% 4d (^{2}G)^{3}G + 8% 4d ($_3{}^2$D)^{3}G + 8% 4d (^{2}H)^{3}G
379817.4	379679	138.4	3	81% 4d (^{2}G)^{3}H + 13% 4d (^{2}H)^{3}H + 3% 4d (^{2}G)^{3}G
381707.8	381556	151.8	8	76% 4d (^{4}P)^{5}D + 19% 4d (^{4}F)^{5}D + 3% 4d (^{2}P)^{3}F
382925.4	382925	0.4	4	41% 4d (^{2}P)^{3}F + 29% 4d (^{2}G)^{3}F + 10% 4d (^{4}P)^{3}F
–	383209	–		61% 4d (^{4}P)^{3}F + 19% 4d (^{2}H)^{3}F + 10% 4d (^{2}G)^{3}F
384524.0	384607	–83.0	12	50% 4d (^{2}G)^{1}G + 28% 4d ($_3{}^2$D)^{1}G + 6% 4d (^{2}F)^{1}G
386649.5	386503	146.5	17	48% 4d ($_3{}^2$D)^{3}G + 29% 4d (^{2}H)^{3}G + 14% 4d ($_1{}^2$D)^{3}G
388400.3	388308	92.3	10	66% 4d ($_3{}^2$D)^{3}F + 18% 4d (^{2}P)^{3}F + 11% 4d ($_1{}^2$D)^{3}F
390022.6	390003	19.6	11	62% 4d (^{2}H)^{1}G + 19% 4d ($_3{}^2$D)^{1}G + 9% 4d (^{2}F)^{1}G
393010.6	393091	–80.4	10	34% 4d (^{2}H)^{3}G + 15% 4d (^{2}G)^{3}F + 11% 4d (^{2}P)^{3}F
394167.6	394244	–76.4	13	24% 4d (^{2}G)^{3}F + 21% 4d (^{2}H)^{3}G + 17% 4d (^{2}P)^{3}F
395439.3	395399	40.3	10	78% 4d (^{2}H)^{3}H + 11% 4d (^{2}G)^{3}H + 6% 4d (^{4}F)^{3}H
395744.6	395562	182.6	8	34% 4d (^{2}H)^{3}F + 26% 5s (^{4}F)^{5}F + 15% 4d (^{2}F)^{3}F
395774.1	395813	–38.9	13	73% 5s (^{4}F)^{5}F + 13% 4d (^{2}H)^{3}F + 6% 4d (^{2}F)^{3}F
399457.3	399419	38.3	9	85% 5s (^{4}F)^{3}F + 5% 4d (^{2}H)^{3}F + 3% 4d (^{4}P)^{3}F
400384.5	400488	–103.5	13	40% 4d (^{2}G)^{1}G + 29% 4d ($_3{}^2$D)^{1}G + 17% 4d (^{2}H)^{1}G
406771.2	406621	150.2	12	91% 4d (^{2}F)^{3}H + 7% 4d (^{2}F)^{3}G + 1% 4d (^{4}F)^{3}H
–	407062	–		84% 4d (^{2}F)^{3}G + 8% 4d (^{2}F)^{3}H + 2% 4d (^{2}G)^{3}G
–	409037	–		75% 4d (^{2}F)^{3}F + 15% 4d (^{2}H)^{3}F + 6% 4d (^{4}P)^{3}F
415787.0	415793	–6.0	12	91% 5s (^{2}G)^{3}G + 8% 5s (^{2}G)^{1}G
417092.1	417038	54.1	11	83% 5s (^{2}G)^{1}G + 8% 5s (^{2}G)^{3}G + 6% 4d (^{2}F)^{1}G
419506.5	419386	120.5	2	73% 4d (^{2}F)^{1}G + 13% 4d (^{2}H)^{1}G + 7% 5s (^{2}G)^{1}G
423605.7	423602	3.7	5	98% 5s (^{2}H)^{3}H + 1% 5s (^{2}G)^{1}G + 1% 5s (^{2}G)^{3}G
431528.7	431502	26.7	1	75% 4d ($_1{}^2$D)^{3}G + 24% 4d ($_3{}^2$D)^{3}G + 1% 4d (^{2}F)^{3}G
434039.9	434112	–72.1	4	78% 4d ($_1{}^2$D)^{3}F + 16% 4d ($_3{}^2$D)^{3}F + 2% 4d (^{2}H)^{3}F
–	435825	–		97% 4s^2 (^{3}F)^{3}F + 1% 4d ($_1{}^2$D)^{3}F
437400.9	437163	237.9	1	81% 4d ($_1{}^2$D)^{1}G + 14% 4d ($_3{}^2$D)^{1}G + 2% 4d (^{2}F)^{1}G
440953.2	440993	–39.8	6	99% 5s (^{2}F)^{3}F + 1% 4d ($_1{}^2$D)^{3}F
–	460322	–		98% 4s^2 (^{1}G)^{1}G
$J = 5$				
25225.9	25219	6.9		98% 3d^4 ^{3}H + 1% 3d^4 ^{3}G
30430.1	30463	–32.9		98% 3d^4 ^{3}G + 1% 3d^4 ^{3}H
188395.3	188497	–101.7		100% 4s (^{4}F)^{5}F
209523.9	209587	–63.1		98% 4s (^{2}G)^{3}G + 1% 4s (^{2}H)^{3}H
216860.4	216899	–38.6		98% 4s (^{2}H)^{3}H + 1% 4s (^{2}G)^{3}G
221305.2	221201	104.2		99% 4s (^{2}H)^{1}H
357329.1	357393	–63.9	4	98% 4d (^{4}F)^{5}H + 1% 4d (^{4}F)^{5}G
359382.9	359415	–32.1	5	63% 4d (^{4}F)^{5}F + 34% 4d (^{4}F)^{5}G + 1% 4d (^{4}P)^{5}F
360064.2	360143	–78.8	6	64% 4d (^{4}F)^{5}G + 35% 4d (^{4}F)^{5}F + 1% 4d (^{4}F)^{5}H
364457.9	364372	85.9	1	90% 4d (^{4}F)^{3}H + 4% 4d (^{2}H)^{3}H + 4% 4d (^{2}G)^{3}H
366154.7	366064	90.7	3	88% 4d (^{4}F)^{3}G + 5% 4d (^{2}G)^{3}G + 2% 4d (^{2}H)^{3}G
378061.8	377976	85.8	1	98% 4d (^{4}P)^{5}F + 2% 4d (^{4}F)^{5}F
378174.0	378183	–9.0	8	89% 4d (^{2}G)^{3}I + 9% 4d (^{2}H)^{3}I + 1% 4d (^{2}G)^{1}H
378658.2	378934	–275.8	9	66% 4d (^{2}G)^{1}H + 14% 4d (^{2}G)^{3}G + 8% 4d (^{2}H)^{1}H
379110.8	379269	–158.2	13	57% 4d (^{2}G)^{3}G + 15% 4d (^{2}G)^{1}H + 9% 4d (^{2}G)^{3}H
380397.4	380154	243.4	3	73% 4d (^{2}G)^{3}H + 11% 4d (^{2}H)^{3}H + 5% 4d (^{2}G)^{1}H
384979.6	384903	76.6	8	75% 4d (^{2}H)^{3}I + 17% 4d (^{2}H)^{1}H + 7% 4d (^{2}G)^{3}I
385366.8	385368	–1.2	10	70% 4d (^{2}H)^{1}H + 14% 4d (^{2}H)^{3}I + 11% 4d (^{2}G)^{1}H
386896.3	386731	165.3	6	53% 4d ($_3{}^2$D)^{3}G + 31% 4d (^{2}H)^{3}G + 14% 4d ($_1{}^2$D)^{3}G
393895.2	394022	–126.8	7	55% 4d (^{2}H)^{3}G + 13% 4d ($_3{}^2$D)^{3}G + 13% 4d (^{2}G)^{3}G
395696.1	395654	42.1	10	79% 4d (^{2}H)^{3}H + 10% 4d (^{2}G)^{3}H + 6% 4d (^{4}F)^{3}H
396432.5	396475	–42.5	6	100% 5s (^{4}F)^{5}F
–	406229	–		77% 4d (^{2}F)^{1}H + 20% 4d (^{2}F)^{3}H + 1% 4d (^{2}H)^{1}H
406412.0	406570	–158.0	10	70% 4d (^{2}F)^{3}H + 18% 4d (^{2}F)^{1}H + 10% 4d (^{2}F)^{3}G
406753.9	407036	–282.1	7	82% 4d (^{2}F)^{3}G + 9% 4d (^{2}F)^{3}H + 2% 4d (^{4}F)^{3}G
416273.0	416295	–22.0	9	98% 5s (^{2}G)^{3}G + 1% 5s (^{2}H)^{3}H + 1% 5s (^{2}H)^{1}H
423765.7	423774	–8.3	8	95% 5s (^{2}H)^{3}H + 3% 5s (^{2}H)^{1}H + 1% 5s (^{2}G)^{3}G
425256.0	425209	47.0	6	96% 5s (^{2}H)^{1}H + 4% 5s (^{2}H)^{3}H + 1% 4d (^{2}F)^{1}H
431349.1	431293	56.1	1	76% 4d ($_1{}^2$D)^{3}G + 23% 4d ($_3{}^2$D)^{3}G
$J = 6$				
25528.5	25575	–46.5		100% 3d^4 ^{3}H
37511.7	37488	23.7		100% 3d^4 ^{1}I
217122.5	217198	–75.5		100% 4s (^{2}H)^{3}H
357891.4	357969	–77.6	4	99% 4d (^{4}F)^{5}H + 1% 4d (^{4}F)^{5}G

Table II. *continued.*

E_{obs}	E_{calc}	Δ[a]	N[b]	Composition
360459.5	360467	–7.5	3	98% 4d $(^4F)^5G$ + 1% 4d $(^4F)^5H$
365284.4	365286	–1.6	4	90% 4d $(^4F)^3H$ + 4% 4d $(^2H)^3H$ + 4% 4d $(^2G)^3H$
378685.8	378638	47.8	6	92% 4d $(^2G)^3I$ + 7% 4d $(^2H)^3I$
380737.0	380578	159.0	7	83% 4d $(^2G)^3H$ + 12% 4d $(^2H)^3H$ + 2% 4d $(^2H)^3I$
–	383126	–		80% 4d $(^2G)^1I$ + 16% 4d $(^2H)^1I$ + 2% 4d $(^2H)^3K$
385218.8	385121	97.8	6	90% 4d $(^2H)^3I$ + 7% 4d $(^2G)^3I$ + 2% 4d $(^2G)^3H$
388029.8	388209	–179.2	4	97% 4d $(^2H)^3K$ + 1% 4d $(^2G)^1I$ + 1% 4d $(^2G)^3I$
395802.4	395784	18.4	10	82% 4d $(^2H)^3H$ + 10% 4d $(^2G)^3H$ + 7% 4d $(^4F)^3H$
402223.1	401978	245.1	4	82% 4d $(^2H)^1I$ + 17% 4d $(^2G)^1I$
406462.9	406421	41.9	2	98% 4d $(^2F)^3H$ + 1% 4d $(^4F)^3H$
424066.5	424106	–39.5	6	100% 5s $(^2H)^3H$
$J = 7$				
358532.8	358640	–107.2	1	100% 4d $(^4F)^5H$
379270.7	379178	92.7	3	93% 4d $(^2G)^3I$ + 6% 4d $(^2H)^3I$ + 1% 4d $(^2H)^3K$
385450.1	385298	152.1	4	93% 4d $(^2H)^3I$ + 6% 4d $(^2G)^3I$ + 1% 4d $(^2H)^3K$
388366.2	388434	–67.8	2	97% 4d $(^2H)^3K$ + 1% 4d $(^2H)^1K$ + 1% 4d $(^2G)^3I$
390308.1	390257	51.1	1	98% 4d $(^2H)^1K$ + 2% 4d $(^2H)^3K$
$J = 8$				
388885.6	388781	104.6	1	100% 4d $(^2H)^3K$

[a] $\Delta = (E_{obs} - E_{calc})$.
[b] N = The number of spectral lines used to determine the energy level value.
[c] Revised level.

Table III. *Least squares fitted (LSF) and* ab initio *calculated (HFR) parameter values (cm^{-1}) in the 3d^4, 3d^{3}4s, 3d^{3}4d, 3d^{3}5s and 3d^{3}4p configurations of Fe V.*

Config.	Parameter	LSF[a]		HFR	LSF/HFR	Cr III[b]
3d^4	E_{av}	36703	(19)	42000	0.8739	0.8364
	F^2(3d,3d)	90990	(65)	105205	0.8649	0.832
	F^4(3d,3d)	56486	(151)	66194	0.853	0.804
	α	96	(2)			63
	β	–383	(42)			–130
	T	–6	(0)			–4
	ζ_{3d}	524	(19)	533	0.983	0.961
3d^{3}4s	E_{av}	215170	(17)	219246	0.9814	0.9720
	F^2(3d,3d)	95574	(84)	111188	0.8596	0.828
	F^4(3d,3d)	60553	(172)	70215	0.862	0.817
	α	105	(2)			77
	β	–386	(46)			–210
	T	–7	(0)			–5
	ξ_{3d}	585	(20)	585	1.000	1.035
	G^2(3d,4s)	10779	(61)	12235	0.881	0.801
3d^{3}4d	E_{av}	387254	(9)	390714	0.9911	0.9939
	F^2(3d,3d)	96429	(60)	112024	0.8608	0.832
	F^4(3d,3d)	60571	(129)	70790	0.856	0.808
	α	105	(2)			79
	β	–429	(32)			–114
	T	–7	(0)			–4
	ξ_{3d}	604	(14)	590	1.022	0.989
	ξ_{4d}	37	(17)	77	0.48	0.78
	F^2(3d,4d)	16619	(108)	19123	0.869	0.801
	F^4(3d,4d)	7834	(148)	8716	0.899	0.671
	G^0(3d,4d)	4930	(12)	8264	0.597	0.454
	G^2(3d,4d)	6298	(88)	7995	0.788	0.577
	G^4(3d,4d)	5208	(113)	5877	0.886	0.640
3d^{3}5s	E_{av}	421006	(23)	424121	0.9927	0.9927
	F^2(3d,3d)	96339	(139)	112221	0.859	0.831
	F^4(3d,3d)	60450	(250)	70920	0.852	0.792
	α	110	(3)			97
	β	–390				–262
	T	–6				–1
	ξ_{3d}	583	(25)	592	0.98	0.82
	G^2(3d,5s)	3022	(86)	3316	0.911	0.856
3d^{2}4s^2	E_{av}[c]	447199		453400	0.99	
3d^{2}4s4d	E_{av}[c]	623119		629320	0.99	
3d^{2}4d^2	E_{av}[c]	811346		817547	0.99	

Table III. *continued.*

Config.	Parameter	LSF[a]		HFR	LSF/HFR	Cr III[b]
Mean Deviation[d] = 90 cm^{-1}						
$3d^34p$	E_{av}	286766	(18)	289201	0.9916	0.9964
	$F^2(3d,3d)$	95629	(105)	111472	0.858	0.824
	$F^4(3d,3d)$	59980	(217)	70410	0.852	0.804
	α	99	(3)			70
	β	–284	(54)			–48
	T	–7	(1)			–5
	ξ_{3d}	567	(25)	587	0.966	0.925
	ξ_{4p}	1348	(50)	1109	1.216	1.387
	$F^2(3d,4p)$	23646	(179)	27234	0.868	0.832
	$G^1(3d,4p)$	8759	(67)	9302	0.942	0.921
	$G^3(3d,4p)$	7297	(154)	8745	0.834	0.734
$3d^35p$	E_{av}[c]	445030		451229	0.99	
$3d^34f$	E_{av}[c]	453390		459592	0.99	
$3p^53d^5$	E_{av}[c]	505980		512176	0.99	
$3d^24s4p$	E_{av}[c]	509920		516119	0.99	
$3d^35f$	E_{av}[c]	517400		523605	0.99	
$3p^53d^44s$	E_{av}[c]	680710		686910	0.99	
$3d4s^24p$	E_{av}[c]	798570		804769	0.99	
Mean Deviation[d] = 168 cm^{-1}						

[a] The uncertainties of the fitted parameter is given in parentheses.
[b] The parameters α, β and T as well as the LSF/HFR ratios of other parameters obtained for Cr III are given for the purpose of the isoelectronic comparison.
[c] The configuration was not fitted. The corresponding configuration interaction integrals were fixed at 85% of their HFR values.
[d] Mean Deviation = $[(\Sigma(E_{obs}-E_{calc})^2)/(n-m)]^{1/2}$, where n is the number of known levels, m is the number of free parameters.

Table IV. *Classified lines of the $3d^34s$ level at 216652.1 cm^{-1}.*

gA (10^8 s^{-1})	Int [3]	Int [16]	λ (Å)	[Ref]	σ (cm^{-1})	$\Delta(\sigma)$ (cm^{-1})	Odd level	Even level
23	250	–	1364.984	[3]	73260.9	0.0	289913.0 (3)	216652.1 (2)[a]
22	250	12	1374.789	[16]	72738.4	0.8	289389.7 (2)	216652.1 (2)[b]
26		14	1419.293	[16]	70457.6	0.1	287109.6 (3)	216652.1 (2)
1		6	1424.292	[16]	70210.3	–0.3	286862.7 (2)	216652.1 (2)
13		3	1438.796	[16]	69502.6	–0.2	286154.9 (2)	216652.1 (2)

[a] also classified as $3d^34s\ (^2F)^3F_2$–$3d^34p\ (^2F)^3D_3$ in [3], $gA = 4\times10^8$ s^{-1}.
[b] also classified as $3d^34s\ (_1{}^2D)^3D_2$–$3d^34p\ (_1{}^2D)^3F_3$ in [3], $gA = 3\times10^8$ s^{-1}.

figurations. In such a fit, these parameters converge to well defined positive values $F^1(3d, 4d) = 366 \pm 94$ cm^{-1} and $F^3(3d, 4d) = 1082 \pm 189$ cm^{-1}. However this had minor effects on calculated energies and wavefunctions.

3.3. *Revised $3d^34s\ (_3{}^2D)^3D_2$ level*

As a part of the interpretation of the $3d^34s$ configuration in Mn IV [12], a survey of the lowest group $(3d + 4s)^4$ had been performed from V II to Co VI by using a complete set of orthogonal parameters for 3-body electrostatic and 2-body magnetic effective interactions. The deviations E_{exp} E_{calc} being about ten times smaller than in the conventional approach, it became obvious that the level at 216592.7 cm^{-1} was too far from the expected value of $3d^34s\ (_3{}^2D)^3D_2$. The comparison of gA with intensities which was good for $^3D_1$ and $^3D_3$ of the same term confirmed that a new energy level $^3D_2$ should be found near 216654 cm^{-1}. In the present observation of Fe V involving a wavelength range shorter than the one that contains the 4s–4p transitions, we made use of the Atlas of Kalinin *et al.* [16] as a source of unclassified Fe lines readily available. The $3d^34s(^2_3D)^3D_2$ level has been found at 216652.1 cm^{-1} and the newly classified lines are listed in Table IV.

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References

1. Bowen, I. S., Phys. Rev. **52**, 1153 (1937).
2. Fawcett, B. C. and Henrichs, H. F., Astron. Astrophys. Suppl. **18**, 157 (1974).
3. Ekberg, J. O., Physica Scripta **12**, 42 (1975).
4. Ekberg, J. O., Astron. Astrophys. Suppl. **101**, 1 (1993).

5. Ekberg, J. O. and Edlen, B., Physica Scripta **18**, 107 (1978).
6. Cowan, R. D., “The theory of Atomic Structure and Spectra”, (University of California Press, Berkeley, California, 1981), and Cowan Computer Code as modified by Yu.V. Ralchenko and A. E. Kramida of the Institute of Spectroscopy, Troitsk, Russia.
7. Judd, B. R., Hansen, J. E. and Rassen, A. J. J., J. Phys. B: At. Mol. Opt. Phys. **15**, 1457 (1982).
8. Uylings, P. H. M., J. Phys. B: At. Mol. Opt. Phys. **17**, 2375 (1984).
9. Ekberg, J. O., Physica Scripta **14**, 109 (1976).
10. Ekberg, J. O., Physica Scripta **56**, 141 (1997).
11. Tchang-Brillet, W.-Ü L., Artru, M.-C. and Wyart, J.-F., Physica Scripta **33**, 320 (1986).
12. Podobedova, L. I. *et al.*, to be submitted.
13. Podobedova, L. I., Ryabtsev, A. N., Tchang-Brillet, W.-Ü L. and Wyart, J.-F., to be submitted.
14. Azarov, V. I., Physica Scripta **44**, 528 (1991).
15. Azarov, V. I., Physica Scripta **48**, 656 (1993).
16. Kalinin, S. K. *et al.*, “Atlas of Iron Spectrum for Vacuum Ultraviolet Region”, “Science” (Publishing House, The Kazakh S.S.R., Alma-Ata, 1985).