Description and Analysis of the Second Spectrum of Tantalum, Ta II

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The spectrum has been observed from 2000.73 to 7813.40 Å. There are 2,629 lines listed, of which 1,890 have been classified. Observed Zeeman patterns are recorded, as well as g -values. These have aided greatly in the work on analysis. The 61 known even levels have been grouped into 26 terms from the $5d^3 6s$, $5d^2 6s^2$ and $5d^4$ configurations. The odd levels number 164; they have no assigned term designations. No series have been found, but the ionization potential is estimated to be between 16.0 and 16.5 electron volts.

1. Introduction

During the period 1930–1940 the concave-grating and quartz-prism spectrographs of the National Bureau of Standards were used to record photographically the spectra of several elements throughout the region from 1950 Å in the ultraviolet to approximately 13000 Å in the infrared. The purpose of the investigations was to acquire data for descriptions of the spectra sufficiently extensive and homogeneous to serve for the analysis of their term-structures. These descriptions as finally tabulated comprise the wavelengths of the spectral lines, their estimated intensities, and their Zeeman effects. Thus far results have been published for the first and second spectra of chromium, Cr I and Cr II, [1],¹ and for the second spectrum of molybdenum, Mo II [2]. This paper presents similar results for the second spectrum of tantalum, Ta II. A subsequent paper will present results for Ta I. It is of interest to note that no detailed description of this spectrum has appeared since the publication of volume 6 of Kayser's *Handbuch der Spectroscopie* in 1912 [3], although the M.I.T. *Tables of Wavelengths* [4] do contain new wavelengths and estimated intensities for some of the stronger lines of Ta II.

2. Experimental Procedures

In the spectroscopy laboratory of this Bureau it was a common practice, whenever a spectrograph was adjusted for a given spectral region, to photograph the spectra of several elements during a period of observation. Thus, tantalum was one of the elements investigated concurrently with chromium and molybdenum. It is, therefore, unnecessary to repeat the statements, in the earlier papers, concerning the instruments, techniques, and accessories employed in making the observations. The electrodes used in the light-sources for this investigation were tantalum rods of high purity procured from the Fansteel Co. The only impurities detected in them, from measurements of the spectrograms, were a small amount of niobium (columbium), and a possible trace of wolfram (tungsten).

¹ Figures in brackets indicate the literature references at the end of this paper.

The first observations of the Zeeman effect for this Bureau's work on the spectra of tantalum were made for us by B. E. Moore who used the electromagnet and grating-spectrograph of the Brace Laboratory of the University of Nebraska. His first results showed well-resolved patterns for many of the stronger lines of both Ta I and Ta II. However, his untimely death in 1925, brought to an end his cooperation in the work. With the acquisition of a Weiss water-cooled magnet by the NBS the work was continued here. Our first observations were made with the 21-ft concave grating ruled by Rowland with 20,000 lines per inch. The low reflectance of this instrument in the short-wave regions limited its use to the visible spectrum. Subsequently additional observations were made with the large Hilger E 185 quartz-prism spectrograph, and with the grating-spectrograph carrying the concave grating ruled by R. W. Wood with 30,000 lines per inch. Thus observations of the Zeeman effect, at fields of approximately 35,000 oersteds were obtained for lines of Ta I and Ta II in the spectral range from 2180 to 8300 Å. Subsequently the excellent plates obtained at M.I.T. under the direction of G. R. Harrison were sent to the NBS for measurement and study. All lines from 2300 to 7700 Å, showing magnetic broadening or splitting, were measured even though many of them were overlaid by the Zeeman patterns of adjacent lines.

3. Results

3.1. Wavelengths, Intensities, and Zeeman Effects

The results of this investigation are presented in tables 1, 2, and 3. The wavelengths listed in the first column of table 1 are, in general, mean values derived from measurements of two or more spectrograms. A few lines, measured only once on a more-strongly exposed plate, have been kept because their reality has been indicated by the term-analysis. Many of the lines exhibit hyperfine structure, which is designated by the letter c after the estimated intensity in the second column. The wavelengths adopted for such lines are weighted means of the

components measured in the complex patterns. It is recognized that this is not a strictly legitimate procedure because in most of the complex lines the fainter components are not fully resolved; but the adopted wavelength is sufficiently close to the undetermined real value to serve the requirements for identification and classification.

The intensities of the lines are estimated values based on the strength of photographic blackening they produce. The number 1 is assigned to the weakest lines measurable on a spectrogram, the stronger ones being graded on a linear scale relative to the faintest. It is obvious that intensities derived in this manner are not comparable in spectral regions that require different types of photographic emulsions to record them. The lines owe their complexity to a nuclear spin of $7/2$, measured by McMillan and Grace [5], for the isotope 181, in which all but 0.01 of the nuclear mass is concentrated.

The wave-numbers of the lines in the third column were taken from Kayser's *Tabelle der Schwingungszahlen*, but have been corrected by the small amounts necessary for conformity with Edlén's [6] formula for the index of refraction of air. These numbers are the basis for the analysis of the term-structure of Ta II, and are equal to the differences between the energy-levels of the Ta atom involved in the production of the spectral lines. These level-differences are given in column 4. In the last column are given the Zeeman patterns from either the M.I.T. or the NBS spectrograms. Those given to only two places of decimals are from the NBS plates; all others from those made at M.I.T. The type of shading in unresolved magnetic patterns, which gives a clue to the J - and g -values of the combining levels, are indicated by letters with the significance, $A=\lceil \rfloor$, $B=\lceil \lceil$, $C=\wedge$, $D=\square$.

3.2. The Systems of Energy Levels

Analysis of Ta II was begun independently and almost simultaneously at three laboratories. When G. R. Harrison of the M.I.T. Spectroscopy Laboratory learned that the problem had been undertaken at the Spectroscopy Laboratory of the NBS he suggested that a joint announcement be made of the first results that had been obtained, and that the necessary continuation of the work be carried on at the NBS with the aid of the M.I.T. data. This suggestion was realized in part in the paper, "Preliminary list of terms of Ta II," [7]. At the same time a similar and somewhat more extensive paper by van den Berg [8] was issued by the Zeeman Laboratory of the University of Amsterdam. This earlier work showed that the prominent low even terms of Ta II arise in the electron configurations $5d^3 6s$, $5d^2 6s^2$, and $5d^4$, the clue to their identity having been found in well-resolved Zeeman patterns that are in very close accord with those from levels with Landé g -values.

The further procedure of unravelling the spectrum has followed the conventional practices of combing the spectrum for pairs and groups of lines separated by established level-differences, and of tying together

related lines that exhibit the same g -values. These operations have been somewhat tedious; but as the structure of the spectrum began to unfold the work received guidance from the calculations of Trees et al., [9] which narrowed the limits of search for the levels expected theoretically.

In table 2 are listed the low even terms upon which the spectrum is built. The ground state a^5F arises in the electron configuration $5d^3(^4F)6s$; but interspersed among its components are levels from the 3F and 3P terms of $5d^2 6s^2$, which thus becomes a strong competitor of $5d^3 6s$ in governing the energetic processes of the atom. All of the $5d^3 6s$ terms have been found; and likewise all but 1S of $5d^2 6s^2$. The configuration $5d^4$ requires more energy to excite its levels, with the result that only six of its 16 theoretically possible terms have been detected completely or partially. Resolved Zeeman patterns of a small number of unclassified lines indicate that transitions to undetected $5d^4$ levels do occur, but the connecting links have not yet been found.

The g -values that are assigned to the levels in table 2 are, for most of them, mean values derived from two to twenty well-resolved Zeeman patterns. They are sufficiently close to LS -values to justify the designation of the levels with the LS notation, although a study, by Trees [9, 10, 11] of the configuration interaction in tantalum indicates that most of the levels of table 2 are of mixed parentage.

The odd levels in table 3 reveal the extent to which the excited states of the ionized atom have departed from LS -coupling. A few of the lowest odd levels might be uniquely designated with LS -symbols, but to apply this mode of designation to the others would be meaningless. It has seemed best, therefore, for sake of brevity, to give as the designation of the line in table 1 the first three figures of the level-value and the appropriate inner quantum number.

3.3. Series and Ionization Potential

No high levels have been found that can be ascribed unambiguously to the configurations $5d^3 ns$ and $5d^2 6sns$. It is impossible, therefore, at this stage of the analysis of Ta II, to calculate an ionization-potential from series-forming terms. An ionization potential of 7.88 ev has been found for the neutral Ta atom; for neutral W this value is 7.98 ev. For the homologous atoms Nb and Mo the estimated second ionization potentials are a little more than twice the first. If this ratio is of physical significance we may expect, therefore, that the ionization potential of singly ionized tantalum lies between 16 and 16.5 ev, which is essentially the same as the interpolated value given by Finkelnburg and Humbach [12].

During its progress the work described above has been aided with observational material from various individuals, and consultations with others. As stated previously, the late B. E. Moore, of the University of Nebraska, made the first magnetic observations that were of significance in analyzing the

spectra Ta I and Ta II. Later G. R. Harrison and W. J. Hitchcock of M.I.T. made available their Zeeman observations and the results which they had obtained from them. At the NBS, R. E. Trees has made numerous theoretical calculations to verify and identify the levels found for the low configurations and to predict the probable positions of others;

R. Zalubas has obtained and measured several spectrograms to improve the description of Ta II in the region 2500 to 1950 Å; and Mrs. Ruth Peterson has made extensive calculations and tabulations of the data. It is a pleasure for me to acknowledge my indebtedness to them and also to others who have made contributions to this work.

TABLE 1. *Wavelengths, term combinations, and Zeeman effects of Ta II*

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
7813.40	2	12795.01		
7733.92	2	12926.05		
7606.07	4	13143.78		
7510.64	2	13310.78	$c\ ^3P_2-413(1)$	
6736.86	1	14839.61		
11.75	1	14895.13	$c\ ^3F_3-385(2)$	
6598.80	4	15150.08		(0.00, 0.22, 0.46) 0.54 Å
97.09	5	15154.03	$c\ ^3P_0-385(1)$	
67.94	3	15221.27		
34.22	2	15299.82	$d\ ^3F_4-468(3)$	
00.81	5	15378.45	$b\ ^3G_5-466(4)$	
6496.20	1	15389.36		
05.76	3	15606.64	$c\ ^3F_2-385(1)$	
6374.86	10	15682.38		(0.00, 0.27) 1.21, 1.44
69.04	18	15696.61	$a\ ^1D_2-292(2)$	(0.59, 1.19) 0.00, 0.52, 1.10, 1.72
11.50	1	15839.71	$b\ ^3G_4-440(4)$	
6286.85	1	15901.82		
80.22	4	15918.61	$c\ ^3P_1-421(2)$	
73.54	1	15935.55	$c\ ^1D_2-489(3)$	
39.91	1	16021.44	$b\ ^3D_3-466(4)$	
6187.75	3	16156.49		
61.00	2	16226.64		
57.50	5	16235.86	$b\ ^3G_3-430(2)$	
46.46	3	16265.03	$b\ ^3G_4-444(3)$	
34.82	10	16295.89		(0.00) 1.10
22.58	3	16328.46	$c\ ^1G_4-514(4)$	
10.37	1	16361.09	$b\ ^3H_5-417(4)$	
6079.18	3	16445.03	$b\ ^3D_2-468(2)$	
42.47	1	16544.94	$b\ ^3D_3-471(3)$	
17.71	2	16613.02	$c\ ^3F_3-402(2)$	
5989.34	1	16691.70		
80.86	5	16715.37	$b\ ^3G_3-435(3)$	
79.61	1	16718.87		
72.96	1	16737.48	$b\ ^1G_4-421(4)$	
63.72	1	16763.41	$b\ ^3D_2-471(3)$	
53.85	1	16791.20	$c\ ^3P_2-448(3)$	
19.99	1	16887.24	$b\ ^3D_1-468(2)$	
5891.18	1	16969.83	$c\ ^1G_4-521(3)$	
78.31	7	17006.98	$d\ ^3F_2-468(2)$	
62.27	1	17053.51		
38.98	3	17121.50	$b\ ^3H_4-415(3)$	
33.85	1	17136.59		
5798.32	2	17241.59		
94.35	1	17253.41	$a\ ^1F_3-421(4)$	
90.78	2	17264.04		
86.72	1	17276.17	$b\ ^3H_4-417(5)$	
82.90	1	17287.57	$c\ ^1D_2-503(3)$	
53.43	3	17376.12	$c\ ^3F_2-403(1)$	
51.78	15	17381.10	$a\ ^5P_2-292(2)$	(0.91, 1.80) . . . , 0.52, 1.40, 2.34
38.10	1	17422.54		

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λair	Intensity and notes	Wave number	Term combination	Zeeman pattern
5735. 53	8	17430. 34	<i>b</i> ³ G ₃ —442(2)	(0.00, 0.39) 0.00 <i>w</i> , 0.46, 0.85
35. 21	2	17431. 32	<i>d</i> ³ F ₄ —489(3)	
30. 44	4	17445. 83		
18. 33	8	17482. 77	<i>a</i> ¹ H ₅ —417(5)	
16. 07	3	17489. 69	<i>a</i> ³ G ₃ —292(2)	
04. 72	12	17524. 48	<i>c</i> ³ F ₃ —411(2)	(0.000) 0.964
5688. 62	1	17574. 08	<i>b</i> ¹ G ₄ —429(3)	
60. 32	1	17661. 95		
57. 40	3	17671. 06	<i>d</i> ³ F ₂ — 475(2)	
49. 61	1	17695. 43		
37. 82	1	17732. 43		
36. 43	8	17736. 81	<i>a</i> ⁵ D ₁ —312(1)	
35. 95	8	17738. 32		
20. 19	2	17788. 06	<i>b</i> ³ G ₅ —490(5)	
04. 46	1	17837. 98	<i>b</i> ³ D ₁ —478(0)	
00. 63	18	17850. 18	<i>b</i> ¹ D ₂ —411(2)	
5576. 61	1	17927. 06	<i>a</i> ³ H ₅ —361(4)	
74. 46	15	17933. 98	<i>c</i> ³ F ₃ —415(3)	
72. 20	1	17941. 25		
69. 80	10	17948. 98	<i>a</i> ¹ P ₁ —413(1)	
62. 18	4	17973. 57	<i>c</i> ³ P ₀ —413(1)	
57. 32	4	17989. 29	<i>a</i> ⁵ D ₃ —337(2)	
52. 64	8	18004. 46	<i>d</i> ³ F ₄ —495(3)	
52. 10	5	18006. 20	<i>b</i> ³ G ₃ —448(3)	
51. 65	4	18007. 66		
51. 27	3	18008. 90		
05. 39	7	18158. 97	<i>b</i> ¹ G ₄ —435(3)	
5494. 42	7	18195. 23	<i>a</i> ¹ F ₃ —430(2)	
92. 94	2	18200. 13	<i>c</i> ³ P ₁ —444(0)	
71. 74	5	18270. 65		
63. 22	8	18299. 14	<i>c</i> ¹ D ₂ —513(1)	
51. 98	3	18336. 87		
41. 98	3	18370. 56	<i>b</i> ³ D ₂ —487(1)	
39. 40	10	18379. 27	<i>d</i> ³ F ₂ —482(2)	
16. 62	1	18456. 57	<i>b</i> ³ D ₃ —490(2)	
09. 67	6	18480. 28	<i>b</i> ³ G ₄ —466(4)	
5378. 90	4	18585. 99		
77. 45	3	18591. 01	<i>b</i> ³ H ₅ —440(4)	
73. 62	2	18604. 26		
69. 73	5	18617. 73	<i>b</i> ³ G ₃ —454(2)	
69. 19	4	18619. 64	<i>b</i> ³ G ₅ —498(5)	
67. 44	4	18625. 66	<i>c</i> ³ F ₂ —415(3)	
55. 82	7	18666. 09	<i>c</i> ³ F ₄ —417(5)	
51. 10	2	18682. 55	<i>b</i> ³ G ₄ —468(3)	
44. 57	8	18705. 38		
37. 24	1	18731. 07		
32. 66	1	18747. 15	<i>a</i> ¹ P ₁ —421(2)	
27. 06	1	18766. 86		
21. 15	7	18787. 71		
20. 69	2	18789. 33		
18. 66	7	18796. 50		
06. 67	1	18838. 97		
01. 53	2	18857. 23		
01. 16	3	18858. 55	<i>b</i> ¹ D ₂ —421(2)	
5292. 44	2	18889. 62		
90. 32	7	18897. 19	<i>c</i> ¹ G ₄ —540(5)	(0.00 <i>W</i>) 0.93 <i>A</i> (0.000 <i>W</i>) 0.999 (0.59) 1.16
86. 15	2	18912. 10	<i>b</i> ³ D ₃ —495(3)	
66. 48	7	18982. 72		
60. 67	25	19003. 70	<i>b</i> ³ G ₄ —471(3)	
55. 47	4	19022. 48	<i>b</i> ³ D ₃ —496(3)	

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λair	Intensity and notes	Wave number	Term combination	Zeeman pattern
5250.60	5	19040.14	$c\ ^3F_4-421(4)$	
49.29	7	19044.91	$b\ ^1G_4-444(3)$	(0.00 w) 1.56
48.62	3	19047.31		
46.44	4	19055.23	$c\ ^1G_4-542(4)$	
37.53	125c	19087.66	$a\ ^3D_1-337(2)$	(0.00) 0.77 w
30.97	12	19111.60	$b\ ^3H_4-435(3)$	(0.00 w) 0.94 w
29.91	5	19115.47	$b\ ^3G_4-472(4)$	(0.51 B) 1.22 w
29.38	4	19117.39	$b\ ^3D_1-490(2)$	(0.00, 0.36) 1.45
28.96	4	19118.92	$d\ ^3F_2-489(3)$	
03.70	15c	19211.74	$\left\{ \begin{array}{l} a\ ^5D_2-337(1) \\ b\ ^3H_5-446(4) \end{array} \right.$	(0.00, 1.33) 1.58, 2.74
01.38	12	19220.31	$a\ ^5D_2-337(2)$	(0.72, 1.40) 0.08, 0.81, 1.52, 2.25
5196.91	6	19236.83	$d\ ^3F_2-490(2)$	(0.46, 0.98) 0.39, 0.89, 1.39, . . .
93.80	10c	19248.36	$d\ ^3P_1-511(2)$	(0.00) 1.14 W
70.09	6	19336.65	$a\ ^5P_2-312(1)$	(0.00) 1.35
65.88	7	19352.38		(0.00) 1.12
41.39	5	19444.59	$c\ ^3F_3-430(2)$	(0.00) 1.13
40.06	1	19449.60	$b\ ^1G_4-448(3)$	
39.40	3	19452.12		(0.00) 1.44
35.55	2	19466.69		(0.00) 1.07
22.54	5	19516.11		(0.00) 0.77
11.51	3	19558.22	$b\ ^3G_3-463(2)$	
09.36	90c	19566.49	$b\ ^3F_2-292(2)$	(0.534, 1.071 W) 0.000, 0.523, 1.064, 1.600 w
04.33	1	19585.74	$d\ ^3P_1-515(2)$	
03.80	5	19587.80		(0.00) 1.14
01.85	40	19595.26	$a\ ^3D_2-367(3)$	(0.00 W) 1.10 w
5097.24	20c	19613.00	$\left\{ \begin{array}{l} b\ ^3P_1-369(1) \\ a\ ^3G_4-323(3) \end{array} \right.$	(0.00 w) 1.031 w
85.35	4	19658.86	$a\ ^1P_1-430(2)$	(0.00) 1.06
84.36	2	19662.70	$a\ ^1P_1-430(0)$	
56.70	25	19770.22	$\left\{ \begin{array}{l} b\ ^3P_2-382(3) \\ b\ ^1D_2-430(2) \end{array} \right.$	(0.508) 1.111
44.87	150	19816.59	$b\ ^3G_3-466(4)$	(0.000, 0.389, 0.751, 1.125) 0.508, 0.892, 1.245, 1.618, 1.986, 2.363
34.98	4c	19855.51	$b\ ^3P_1-372(2)$	
29.59	12	19876.80	$c\ ^3F_4-429(3)$	(0.000 w) 0.799 wA
13.62	3	19940.11	$c\ ^3P_1-461(1)$	(0.000 w) 1.354 w
4999.20	15	19997.63	$b\ ^3H_4-444(3)$	(0.000) 1.075 B
93.24	15	20021.48	$b\ ^3G_3-468(2)$	
89.98	10	20034.56	$b\ ^3P_2-385(1)$	(0.000, 0.973) 1.442, 2.415
64.78	12c	20136.28	$c\ ^3F_2-430(2)$	(0.67) 0.96
62.34	8c	20146.16	$a\ ^1D_2-337(1)$	
59.58	15c	20157.35		(0.183 W) 1.187 W
53.87	1	20180.62		
52.94	1	20184.38		
50.77	3	20193.23	$b\ ^3H_4-446(4)$	
46.04	8	20212.57	$b\ ^3G_5-514(4)$	(0.000) 1.129
41.55	12	20230.93	$a\ ^5D_1-337(1)$	(1.232) 0.275, 1.512
39.36	2	20239.89	$a\ ^5D_1-337(2)$	
34.03	10c	20261.74	$a\ ^3H_4-361(4)$	(0.00 W) 1.19
06.94	4	20373.61	$a\ ^3G_4-330(5)$	
03.76	3	20386.84	$a\ ^5D_3-361(4)$	
4895.40	8	20421.64		
91.37	1	20438.47	$c\ ^1D_2-534(3)$	
90.27	3	20443.05	$a\ ^5P_2-323(3)$	
88.66	7	20449.80	$b\ ^3D_3-510(3)$	(0.24) 1.25
88.35	6	20451.07	$a\ ^5D_3-361(2)$	(0.000, 0.533, 1.038) 1.460, 1.978, 2.477
85.79	7	20461.82	$\left\{ \begin{array}{l} b\ ^3P_2-389(3) \\ c\ ^3F_4-435(3) \end{array} \right.$	(0.00 w) 0.47 w
79.88	6	20486.59	$b\ ^3G_5-517(5)$	(0.000) 1.170

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λ air	Intensity and notes	Wave number	Term combination	Zeeman pattern
4876.40	2	20501.18		(0.00) 1.07
73.19	3	20514.70		
66.79	2	20541.70	$c\ ^3P_1-467(2)$	
64.48	50c	20551.42	$a\ ^3G_3-323(3)$	(0.00W) 0.93 w
61.03	3	20566.03		(0.000) 0.986
60.51	3	20568.24	$b\ ^3D_1-505(1)$	
59.29	2	20573.38	$b\ ^3D_3-511(2)$	(0.00) 1.12
58.38	7	20577.27	$a\ ^1F_3-454(2)$	(0.000, 0.189, 0.372) 0.613 , 0.783, 0.959, . . .
55.51	8	20589.42	$d\ ^3F_4-521(3)$	(0.000W) 1.114 w
43.84	5	20639.00	$c\ ^3F_3-442(2)$	(0.000, 0.174, 0.351) 0.719 , 0.906, 1.070, . . .
38.54	1	20661.60		(0.000W) 1.225
37.00	2	20668.20	$b\ ^3D_2-510(3)$	
32.95	1	20685.50	$b\ ^3G_3-475(2)$	
32.50	1	20687.43	$d\ ^3F_2-505(1)$	
29.67	10	20699.56	$b\ ^3P_0-369(1)$	(0.000) 0.686 w
24.98	4	20719.70	$c\ ^1D_2-537(1)$	
08.26	6	20791.72	$b\ ^3D_2-511(2)$	(0.592) 1.045, 1.367
06.37	3	20799.92	$a\ ^1P_1-442(1)$	
05.87	12	20802.09	$b\ ^3F_4-392(3)$	
04.03	10	20810.03	$c\ ^3F_3-444(3)$	(0.129, 0.254, 0.390) 0.683, 0.819, 0.939 , 1.065 , 1.213, 1.333
4798.57	2	20833.72		
94.09	15	20853.18	$a\ ^1P_1-442(2)$	(0.000) 1.302 w
93.28	3	20856.73		
89.43	4	20873.47	$b\ ^3H_5-462(4)$	(0.00) 1.57
85.68	4	20889.82	$b\ ^3G_4-490(5)$	
78.25	8	20922.33	$c\ ^3F_4-440(4)$	(0.306 w) 0.974 w
65.18	4	20979.70		
64.71	4	20981.77		
61.42	7	20996.24	$b\ ^3G_3-478(3)$	(0.360, 0.698, 1.036) 0.488, 0.844 , 1.200 , 1.552, 1.913
60.79	5	20999.04		(0.000 w) 1.252 w
59.31	2	21005.59	$c\ ^3F_3-446(4)$	
52.36	3	21036.76	$c\ ^3P_2-490(2)$	
51.96	7	21038.03	$a\ ^5D_3-367(3)$	(0.559, 0.937) . . . , 1.159 , 1.458 , 1.754
36.75	35	21105.60	$a\ ^5D_0-337(1)$	(0.000) 0.270
31.27	8	21130.05		(0.000 w) 0.704 w
28.96	5	21140.39	$b\ ^3P_1-385(2)$	(0.000) 0.996 B
26.84	5c	21149.89		
24.54	3	21160.15	$b\ ^3P_1-385(1)$	
17.93	8	21189.80	$a\ ^3D_3-397(4)$	
15.28	7c	21201.71		
12.37	2	21214.83	$c\ ^3F_3-448(3)$	
11.79	1	21217.42		
08.66	10	21231.52	$b\ ^3H_5-466(4)$	(0.000, 0.152, 0.315, 0.465, 0.620) 0.425 , 0.588, 0.744, 0.898, 1.056, 1.208
08.07	1	21234.17	$b\ ^3D_1-511(2)$	
04.54	3	21250.12	$b\ ^3F_4-397(4)$	(0.000W) 1.231 w
4698.46	3	21277.63	$c\ ^3F_2-442(1)$	(0.000, 0.442) 0.699, 1.158 w
86.79	5	21330.60	$c\ ^3F_2-442(2)$	
84.04	3	21343.10		
83.07	20	21347.54	$\left\{ \begin{array}{l} a\ ^3D_2-385(2) \\ c\ ^3F_4-444(3) \end{array} \right.$	(0.235, 0.402) 0.864, 1.040 , 1.232 , 1.404
79.64	3	21363.20	$b\ ^3D_1-513(1)$	(0.057) 1.017
78.01	10	21370.64	$\left\{ \begin{array}{l} c\ ^1G_4-565(5) \\ b\ ^3G_4-495(3) \end{array} \right.$	(0.00W) 1.47 B
74.93	2	21384.70		
70.78	2	21403.72		
67.24	4	21419.96		
65.94	1	21425.89		

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
4657. 75	3	21463. 57		
57. 03	2	21466. 89		
37. 45	5	21557. 52	$a\ ^3H_5-397(4)$	(0.000 <i>w</i>) 0.541 <i>A</i>
29. 24	5c	21595. 76	$b\ ^3F_3-361(2)$	(0.000 <i>w</i>) 1.004 <i>A</i>
23. 67	5	21621. 78	$\begin{cases} c\ ^1D_2-546(3) \\ a\ ^1F_3-464(2) \end{cases}$	(0.000 , 0.123, 0.252) 0.702<i>w</i> , 0.813
10. 79	10	21682. 17	$a\ ^5D_2-361(2)$	(0.511, 1.029) 0.430, 0.951 , 1.471 , 1.992
4591. 74	10	21772. 16	$b\ ^3G_4-499(4)$	(0.315, 0.472, 0.637) 0.647, 0.819, 0.979, 1.129 , 1.283 , 1.454, 1.593, 1.769.
89. 32	8	21783. 61	$b\ ^1G_4-471(3)$	(0.000) 1.092
85. 03	10	21803. 99	$b\ ^3P_2-403(1)$	(0.000 , 0.212) 1.404, 1.619
81. 89	10	21818. 94	$b\ ^3H_6-478(6)$	(0.478, 0.640, 0.798, 0.961) . . . , 1.088, 1.257 , 1.406 , 1.576, 1.740
80. 03	10	21827. 81	$a\ ^1P_1-452(1)$	(0.353 <i>W</i>) 1.191 <i>W</i>
79. 45	12	21830. 56		(0.000) 1.396
79. 32	25	21831. 18	$a\ ^5P_2-337(1)$	
78. 21	2	21836. 47	$c\ ^1G_4-569(4)$	
77. 52	4	21839. 79	$a\ ^5P_2-337(2)$	
74. 85	6	21852. 52	$c\ ^3P_0-452(1)$	(0.000) 1.463
62. 99	3	21909. 31	$c\ ^1G_4-570(3)$	
57. 65	3	21934. 98		
56. 81	3	21939. 03	$b\ ^1D_2-452(1)$	(0.000 , 0.353) 0.761 , 1.100
50. 90	2	21967. 54	$b\ ^3G_5-532(5)$	(0.00) 1.06
49. 93	4	21972. 19		
48. 08	7	21981. 12	$a\ ^1F_3-468(2)$	(0.000 , 0.118, 0.239) 0.799 , 0.916, 1.035
35. 77	8	22040. 78	$a\ ^5P_1-454(2)$	(0.000) 0.485
30. 00	12	22068. 89	$a\ ^1H_5-462(5)$	(0.376, 0.580, 0.776) 0.616, 0.815, 1.014 , 1.212 , 1.398, 1.595
18. 03	5	22127. 32	$a\ ^3D_2-392(3)$	(0.000 <i>W</i>) 1.014 <i>A</i>
14. 16	4	22146. 32		
13. 57	10	22149. 22	$b\ ^3G_4-503(3)$	(0.000 , 0.224, 0.435, 0.649) 0.394 , 0.615, 0.842, 1.045
06. 74	12	22182. 77	$b\ ^3F_3-367(3)$	(0.303, 0.555) 0.835, 0.997 , 1.168 , . . .
00. 64	10	22212. 85	$b\ ^3H_4-466(4)$	(0.445, 0.676, 0.906) 0.432, 0.656, 0.873, 1.093 , 1.320 , 1.553, 1.760
4493. 45	2	22248. 89		(0.000 <i>w</i>) 0.962 <i>w</i>
92. 82	2	22251. 47	$b\ ^3G_3-490(2)$	
89. 30	40	22268. 94	$a\ ^5D_2-367(3)$	(0.000 , 0.300, 0.595 <i>w</i>) 0.562<i>w</i> , 0.871 <i>w</i> , 1.172, 1.466
88. 25	1	22274. 13		
87. 84	1	22276. 20		
86. 92	1	22280. 75		
82. 00	4	22305. 22	$c\ ^3F_2-452(1)$	(0.00 , 0.80) 0.00 , 0.80
79. 82	2	22316. 04		
79. 18	3	22319. 23		
78. 05	3	22324. 88		
77. 61	4	22327. 07		
74. 67	7	22341. 75	$b\ ^3G_4-505(5)$	(0.000 <i>W</i>) 1.214 <i>W</i>
65. 65	6	22386. 87	$b\ ^3D_3-530(2)$	(0.000 , 0.211, 0.434) 0.817 , 1.031, 1.252, 1.466
63. 34	3	22398. 46	$b\ ^3H_4-468(3)$	
60. 80	5	22411. 22	$a\ ^1F_3-472(4)$	(0.000 , 0.215, 0.428, 0.652) 0.983, 1.197, 1.397, 1.612, 1.827
59. 15	6	22419. 52	$\begin{cases} a\ ^1H_5-466(4) \\ a\ ^3H_4-382(3) \end{cases}$	(0.000 , 0.205, 0.400, 0.585) 0.239 , 0.407, . . .
57. 95	4	22425. 53	$a\ ^3F_3-292(2)$	
40. 71	4	22512. 62	$a\ ^5D_4-397(4)$	(0.000 <i>W</i>) 1.276
39. 64	4	22518. 04	$c\ ^3F_2-454(2)$	
37. 81	3	22527. 32		(0.000<i>W</i> , 0.109) 1.684 <i>W B?</i>
25. 34	2	22590. 78	$a\ ^3D_3-411(2)$	(0.00) 1.02
22. 94	10	22603. 05	$a\ ^3D_1-372(2)$	(0.000 , 0.222 <i>w</i>) 0.445 <i>w</i> , 0.632
22. 49	3	22605. 35	$b\ ^3D_2-530(2)$	
21. 36	1	22611. 14		
20. 24	6	22616. 88	$a\ ^1D_2-361(2)$	(0.168, 0.320) 0.777, 0.942 , 1.115 , 1.272
18. 06	4	22628. 01	$b\ ^3F_2-323(3)$	

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
4413. 89	8	22649. 39	$\left\{ \begin{array}{l} a \ ^3H_5-408(6) \\ b \ ^3F_3-372(2) \\ d \ ^3F_4-542(4) \\ a \ ^5D_1-361(2) \end{array} \right.$	(0.000) 1.160 w (0.000 , 0.562) 0.399 , 0.950, 1.509
08. 92	3	22674. 90		
03. 73	25	22701. 66		
01. 13	4	22715. 06		
00. 32	5	22719. 24	$b \ ^3D_3-533(4)$	(0.000 , 0.148, 0.310, 0.469) 0.644 , 0.794
4398. 85	3	22726. 84		
97. 06	8	22736. 09	$\left\{ \begin{array}{l} a \ ^5D_2-372(2) \\ b \ ^3H_4-471(3) \\ b \ ^3G_3-495(2) \end{array} \right.$	(0.000 , 0.113, 0.240, . . .) 0.842 w A
91. 79	2	22763. 37		
90. 84	12	22768. 28	$a \ ^1P_1-461(1)$	(0.000 w) 0.852 w
86. 77	4	22789. 43	$a \ ^5D_3-385(2)$	(0.000 , 0.459) 1.455, 1.876, 2.309
81. 39	8	22817. 40	$b \ ^3G_3-476(3)$	(0.198, 0.379, 0.560) 0.478, 0.665, 0.849 , 1.034 , 1.222, 1.390
76. 75	5	22841. 60	$b \ ^3D_3-534(3)$	(0.069) 1.208
74. 47	20	22853. 50	$a \ ^3H_6-408(6)$	(0.434) 1.120
74. 21	50	22854. 83	$b \ ^3P_2-413(1)$	(0.000 , 0.432) 1.007 , 1.328
73. 06	3	22860. 84	$b \ ^3D_1-528(1)$	
71. 48	1	22869. 10		
71. 11	2	22871. 08	$c \ ^3F_3-464(2)$	
63. 96	8	22908. 51	$b \ ^3G_4-510(3)$	(0.000 , 0.101, 0.206, 0.314) 0.781 , 0.848, 0.959
62. 51	2	22916. 13		
60. 02	4	22929. 24	$b \ ^3P_1-403(1)$	(0.000 w) 1.282 B
58. 14	40	22939. 13	$b \ ^3G_5-542(4)$	(0.000) 1.126
56. 42	2	22948. 16		
54. 27	3	22959. 50		
50. 21	8	22980. 94	$\left\{ \begin{array}{l} d \ ^3F_2-528(1) \\ a \ ^1P_1-463(2) \\ a \ ^5P_1-337(1) \end{array} \right.$	(0.00) 1.48
47. 88	15	22993. 24		
46. 53	10	23000. 39	$a \ ^3D_3-415(3)$	(0.138, 0.285, 0.466) 0.944, 1.085, 1.214 , 1.365 , 1.495, . . .
41. 85	2	23025. 17	$c \ ^3F_3-466(4)$	(0.00) 1.78 B
41. 00	8	23029. 68	$c \ ^3P_2-510(3)$	(0.000 , 0.211) 0.764 , 1.005, 1.203, 1.387, . . .
38. 24	12	23044. 36	$b \ ^3H_6-490(5)$	(0.000 , 0.096, 0.198, 0.290) 0.657 , 0.747, 0.835, 1.032, 1.105, . . .
37. 61	4	23047. 69	$b \ ^3D_1-530(2)$	
35. 21	2	23060. 44	$b \ ^3F_4-415(3)$	
31. 15	6	23082. 07		
28. 79	7	23094. 67		
27. 58	5	23101. 13		
26. 21	3	23108. 42	$b \ ^3G_3-499(4)$	
24. 65	5	23116. 77	$d \ ^3F_4-546(3)$	
21. 05	4	23136. 04	$a \ ^3D_2-403(1)$	(0.000) 1.228 w
20. 38	2	23139. 62		
17. 86	2	23153. 09	$c \ ^3P_2-511(2)$	(0.000) 1.319
11. 12	2	23189. 33		
09. 77	1	23196. 58	$b \ ^1D_2-464(2)$	
07. 11	4	23210. 88	$c \ ^3F_3-468(3)$	
06. 83	15	23212. 43	$c \ ^3F_4-462(5)$	(0.000 , 0.170, 0.334, 0.516) 0.842, 1.018, 1.199, 1.366, 1.548, 1.722, 1.913
05. 28	3	23220. 77		
03. 52	15	23230. 25	$c \ ^3F_3-468(2)$	(0.000) 1.054
4294. 02	12	23281. 65	$b \ ^3F_4-417(4)$	(0.000) 1.250
82. 01	8	23346. 96		(0.000) 0.996
80. 85	3	23353. 28	$a \ ^1F_3-482(2)$	(0.00) 0.59
79. 96	2	23358. 13	$c \ ^3P_1-495(2)$	
75. 69	2	23381. 45		
73. 68	3	23392. 48	$b \ ^3H_4-478(3)$	(0.00) 0.344
71. 09	7	23406. 62		
67. 30	30	23427. 45	$a \ ^1D_2-369(1)$	(0.00 , 0.35) 0.63, 1.18, 1.59
65. 05	2	23439. 80		
64. 43	1	23443. 18		

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
4263. 50	3	23448. 32		
62. 95	4	23451. 32		(0.00) 1.26
61. 63	4	23458. 59	$c\ ^3F_2-463(2)$	
55. 92	2	23490. 04	$c\ ^3P_2-515(2)$	(0.00) 1.41
42. 74	20	23563. 02	$\{c\ ^3F_2-464(2)$ $c\ ^3F_4-466(4)$	(0.357, 0.546, 0.721) 0.667, 0.874, 1.032, 1.214 , 1.385, 1.562, 1.745
41. 59	8	23569. 15	$a\ ^3D_3-421(4)$	(0.000) 1.132
35. 93	15	23600. 91	$a\ ^1F_3-484(4)$	(0.000 , 0.286, 0.572, 0.859) 0.996, 1.272, 1.554, 1.826, 2.115
35. 51	7	23603. 26	$\{d\ ^3P_1-555(2)$ $a\ ^1H_5-478(6)$	(0.00) 1.42
30. 87	40	23629. 16	$b\ ^3F_4-421(4)$	(0.000 W) 1.248
23. 49	6	23670. 44	$a\ ^1D_2-372(2)$	(0.48, 0.98) 0.11, 0.63, 1.16 , 1.65
20. 09	3	23689. 53	$b\ ^3F_3-382(3)$	
19. 70	1	23691. 71		(0.00) 1.06
18. 44	12	23698. 79		(0.102) 1.186
13. 43	4	23726. 93	$a\ ^3H_6-417(5)$	(0.00 W) 0.92
13. 02	2	23729. 27		(0.16) 0.85
09. 57	6	23748. 71	$c\ ^3F_4-468(3)$	(0.00 , 0.16, 0.36, 0.53) 0.50 , 0.69, . . .
08. 42	12	23755. 20	$a\ ^3D_1-372(2)$	(0.000 , 0.892) — 0.267w, +0.611, 1.493
01. 02	15 c	23797. 06	$a\ ^1F_3-486(2)$	(0.00 w) 0.81 w
00. 30	2	23801. 10	$d\ ^3F_2-536(2)$	(0.00) 1.19
4190. 51	10	23856. 70		(0.000 w) 1.244 , 1.738
87. 43	10	23874. 27	$b\ ^1D_2-471(3)$	(0.000) 1.076
85. 06	7	23887. 81	$a\ ^3D_1-385(2)$	(0.000 , 0.169) 1.080 , 1.234
83. 93	7	23894. 22	$c\ ^3F_3-475(2)$	(0.000 , 0.220, 0.428) 0.636 , 0.815
82. 43	8	23902. 80	$c\ ^3F_2-468(3)$	(0.00 , 0.50, 1.03) 1.13, 1.65, 2.18
81. 64	8 c	23907. 35	$a\ ^3D_1-385(1)$	(0.00) 1.20
79. 06	15 c	23922. 07	$c\ ^3F_2-468(2)$	(0.392, 0.792w) 1.098, 1.497w
76. 93	25 c	23934. 30	$b\ ^3F_3-385(2)$	(0.000) 0.988
76. 62	1	23936. 09	$a\ ^3H_5-421(4)$	(0.00) 0.98 B
69. 03	15 c	23979. 62	$b\ ^3F_1-413(1)$	
62. 67	60 c	24016. 28	$b\ ^3F_2-337(1)$	
62. 45	8 c	24017. 54	$a\ ^5D_3-397(4)$	
61. 20	12 c	24024. 77	$\{b\ ^3D_3-546(3)$ $b\ ^3F_2-337(2)$	(0.282, 0.532) . . . ?, 0.536, 0.807, 1.061
59. 02	3	24037. 34	$b\ ^3H_4-484(4)$	
58. 51	3	24040. 31	$a\ ^5D_2-385(1)$	
55. 40	7 c	24058. 29	$a\ ^3G_4-367(3)$	(0.162 W) 0.754 W
52. 19	5	24076. 89	$c\ ^3P_2-521(3)$	
39. 52	7	24150. 58	$b\ ^1G_4-495(3)$	(0.000 , 0.220, 0.432, 0.652) 0.438 , 0.657, 0.868, 1.090, 1.310
33. 35	5	24186. 65	$a\ ^3D_2-413(1)$	(0.00 , 0.71) 0.55 , 1.15
30. 22	4	24204. 95	$c\ ^3F_3-478(3)$	(0.261, 0.382) 1.18
24. 65	8	24237. 67	$b\ ^3G_5-555(5)$	(0.000 W) 0.871 A
20. 67	8	24261. 03	$b\ ^1G_4-496(3)$	(0.000) 1.196 w
10. 10	5	24323. 44	$a\ ^5D_4-415(3)$	(0.000) 1.183 B
09. 40	4	24327. 57	$\{b\ ^3G_4-524(4)$ $a\ ^3P_3-367(3)$	(0.121) 1.062
4099. 42	8 c	24386. 81	$a\ ^5D_6-369(1)$	(0.000) 0.682 w
95. 53	8 c	24409. 97	$a\ ^3G_3-361(2)$	(0.000) 0.913 B
94. 60	3	24415. 52		(0.00 , 0.36, 0.75, 1.13) 0.73 , 1.10, . . .
86. 17	2 c	24465. 88	$b\ ^3F_4-429(3)$	(0.000) 0.797 w
85. 07	1	24472. 48	$b\ ^3H_5-498(5)$	(0.30, 0.52) 0.27
84. 13	2	24478. 12	$a\ ^5D_4-417(5)$	(0.000) 1.291 A
75. 50	10	24529. 94	$\{b\ ^3H_4-489(3)$ $b\ ^1D_2-478(3)$	(0.00 , 0.30, 0.60, 0.91) 0.08 , 0.38, 0.68, 1.00
74. 43	1	24536. 38	$c\ ^3P_2-525(3)$	(0.000) 1.454 w
73. 13	7 c	24544. 20	$a\ ^5D_4-417(4)$	(0.00 W) 1.19 W
66. 22	4	24585. 95	$c\ ^3F_2-475(2)$	(0.58, 1.19) 0.00 w , 0.71, 1.30 , 1.88
60. 21	4	24622. 33	$b\ ^3H_4-490(5)$	(0.000 , 0.237, 0.488, 0.739, 0.991) . . . , 1.702, 1.950, 2.195
54. 15	2	24659. 14		

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
4050.00	3	24684.41		(0.073) 1.062
49.09	1	24689.91	$d^3F_2-545(2)$	
48.31	2	24694.70		(0.000 , 0.291, 0.580) 1.149, 1.426, 1.712
45.02	3c	24714.76	$b^3F_2-392(3)$	
40.47	4c	24742.61	$c^3F_4-478(3)$	(0.000 , 0.168, 0.344, 0.522) 0.497 , 0.671, 0.846, 1.020, . . .
34.66	2c	24778.25	$b^3P_1-421(2)$	(0.00) 1.23
30.96	10c	24801.00	$a^5D_2-392(3)$	(0.000 , 0.336, 0.662) 0.470w , 0.804, 1.137, 1.470
29.08	2	24812.58		(0.000 , 0.427, 0.845) 0.077 , 0.548, 0.964, . . .
16.82	5	24888.27	$a^5P_2-367(3)$	(0.000 , 0.252, 0.502) 0.666 , 0.914, 1.162, . . .
16.28	7	24891.64	$a^5D_4-421(4)$	(0.193W) 1.234W
10.49	3	24927.55	$\left\{ \begin{array}{l} b^3D_3-555(2) \\ b^1D_2-482(2) \\ b^1G_4-503(3) \end{array} \right.$	
10.24	5	24929.08		(0.000 , 0.224, 0.451, 0.663) 0.640 , 0.849, 1.052
05.97	5	24955.69		(0.000 , 0.269, 0.518) 0.696 , 0.950, 1.212, . . ., . . .
04.83	3	24962.77	$c^3P_1-511(2)$	(0.000w) 1.347w
3999.39	3c	24996.74	$a^3G_3-367(3)$	(0.358, 0.880) 0.811, 1.314 , 1.815 , 2.332
92.44	10	25040.26	$a^5D_1-385(2)$	(0.000 , 0.489) 0.513 , 1.007, 1.497
92.15	1	25042.05	$c^1D_2-580(1)$	(0.000) 0.850
90.76	10	25050.83	$b^3F_4-435(3)$	(0.000 , 0.158, 0.329, 0.484) 0.952, 1.083, 1.229, 1.370, 1.504
89.32	2	25059.81	$a^5D_1-385(1)$	(1.04) 0.50, 1.39
87.96	3	25068.41	$a^1F_3-499(4)$	(0.000 , 0.260, 0.505) 1.073, 1.356, 1.578, 1.830
87.82	2	25069.29	$b^3G_4-532(5)$	
86.21	3	25079.37		(0.000) 1.023
84.58	2	25089.65	$\left\{ \begin{array}{l} b^3H_4-495(5) \\ c^1G_4-602(3) \\ c^3P_1-513(1) \end{array} \right.$	(0.00wD) 0.80A
84.26	12	25091.68		(0.623) 1.046, 1.336
80.99	25c	25112.28	$a^5P_2-369(1)$	(0.000 , 0.868) 0.680, 1.418, 2.151
75.64	8	25146.06	$b^3D_2-555(2)$	(0.000) 1.049
74.19	6	25155.22		(0.496) 1.225W
72.99	18c	25162.84	$b^3F_3-397(4)$	(0.000 , 0.217, 0.442w 0.781w) 0.768, 0.996 , 1.213, 1.399, 1.637w, 1.875w
70.57	10	25178.16	$b^3G_4-533(4)$	(0.148) 1.099W
69.70	2	25183.72	$b^3G_5-564(5)$	
64.96	4	25213.80	$b^3H_4-496(3)$	(0.000) 0.890
61.60	20	25235.18	$b^3D_3-558(2)$	
58.55	3	25254.63	$b^3G_5-565(5)$	(0.00W) 0.58
57.62	4	25260.58	$a^1P_1-486(2)$	(0.000) 1.130
56.35	2	25268.66		
54.68	5	25279.37	$b^3H_5-506(6)$	
52.70	7	25292.04	$b^3G_3-521(3)$	(0.478, 0.738) 0.358, 0.593, 0.841 , 1.094 , 1.329
51.50	10c	25299.67	$c^3P_1-515(2)$	(0.000 , 0.113) 1.196, 1.310
44.85	10	25342.31	$c^3F_3-489(3)$	(0.195, 0.394, 0.602) 0.675, 0.874, 1.071 , 1.271 , 1.462, 1.674
43.78	10	25349.23		(0.000) 0.867
42.84	5	25355.26	$a^5P_2-372(2)$	(0.84, 1.58) 0.16, 0.64 , . . .
41.86	3	25361.52		(0.00 , 0.22, 0.42) 0.89A
41.65	3	25362.91		
40.52	4	25370.20	$a^1P_1-487(1)$	(0.44) 0.75, 1.37
40.26	6	25371.86	$b^1D_2-486(2)$	(0.069) 1.133
36.68	10	25394.90	$c^3P_0-487(1)$	(0.000) 1.818
35.90	3	25399.93		
35.57	12	25402.11	$a^1D_2-389(3)$	(0.000 , 0.122, 0.230) 0.763 , 0.874, 1.007, 1.142
32.85	1	25419.66		
27.92	5	25451.56	$a^3D_3-440(4)$	(0.000 , 0.843) 1.600
26.48	7	25460.90		
26.02	12c	25463.88	$\left\{ \begin{array}{l} a^3G_3-372(2) \\ a^5P_1-361(2) \\ b^3D_2-558(1) \end{array} \right.$	(0.00) 0.85w
24.56	5c	25473.38		(0.000) 1.066
24.15	2	25476.00		
22.44	60c	25487.09	$a^3F_3-323(3)$	(0.226, 0.359) 0.817, 0.940 , 1.074 , 1.214

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λ air	Intensity and notes	Wave number	Term combination	Zeeman pattern
3917.62	8	25518.48	$b\ ^3D_3-561(4)$	(0.000) 1.316
15.97	2	25529.20	$d\ ^3F_4-570(3)$	(0.000 , 0.284, 0.557, 0.846) 0.335 , 0.590, 0.853, 1.142, 1.420, . . .
14.05	7	25541.78	$a\ ^3P_2-312(1)$	
12.14	1	25554.22	$b\ ^3D_1-555(1)$	
10.48	5	25565.03	$a\ ^3G_4-382(3)$	(0.00) 1.24
06.01	2	25594.32		
03.15	1	25613.07	$b\ ^3D_2-560(2)$	(0.000) 1.066
02.10	2	25619.97		(0.000 <i>w</i>) 0.000 <i>w</i>
3899.91	2	25634.33		(0.00) 0.00
98.48	1	25643.73		
96.61	10 <i>c</i>	25656.04		
95.97	2	25660.29	$a\ ^1H_5-498(5)$	
95.50	2	25663.39	$b\ ^3G_3-524(4)$	(0.000 , 0.247) 1.592
93.31	8	25677.82		(0.00) 0.95
92.10	2	25685.77		
91.90	2	25687.08		
91.55	10	25689.43	$b\ ^3P_1-430(2)$	(0.000 , 0.187) 0.844, 1.061
90.16	1	25698.59		
89.42	20 <i>c</i>	25703.52	$a\ ^3H_4-415(3)$	(0.000 <i>W</i>) 1.071 <i>wA</i>
88.68	20	25708.39	$d\ ^3F_2-552(2)$	(0.394 <i>W</i>) 1.060 <i>WD</i>
88.20	4	25711.56	$a\ ^1H_5-499(4)$	
85.32	8	25730.63		
84.56	3	25735.62	$a\ ^1D_2-392(3)$	(0.000 <i>w</i>) 1.172 <i>w</i>
84.18	2	25738.19	$c\ ^3F_2-486(2)$	
77.02	4	25785.03	$a\ ^5D_2-402(2)$ $b\ ^1D_2-490(2)$	(0.204, 0.411) 0.902, 1.111 , 1.315 , 1.518
73.38	10	25809.92	$a\ ^5D_2-403(1)$	(0.000 , 0.242) 1.233, 1.466, 1.700
72.01	2	25819.07	$a\ ^3H_5-440(4)$	(0.00) 1.04
70.64	35 <i>c</i>	25828.20	$a\ ^5D_3-415(3)$	(0.254, 0.504, 0.778) 0.687, 0.948, 1.202 , 1.454 , 1.711, 1.959
67.74	10	25847.56	$c\ ^3F_2-487(1)$	(0.000) 0.671
66.24	50 <i>c</i>	25857.57	$a\ ^3H_4\ 417(5)$	
62.89	2 <i>c</i>	25880.03	$c\ ^3F_4-489(3)$	(0.000 , 0.250, 0.523, 0.800, . . .) 0.530 , 0.790, 1.096, 1.258
62.62	2	25881.82		
61.95	3	25886.30		
60.50	7	25896.07	$b\ ^3D_1-558(2)$	
59.36	2 <i>c</i>	25903.69	$a\ ^3D_2-430(2)$	
57.56	15	25915.79	$b\ ^3D_1-558(1)$ $c\ ^3F_3-495(3)$	(0.243, 0.475, 0.716) 0.589, 0.836, 1.072 , 1.308 , 1.544, 1.771
56.93	3	25920.03		
56.33	10 <i>c</i>	25924.05	$a\ ^3H_4-417(4)$	
54.83	2 <i>c</i>	25934.11	$a\ ^5D_0-385(1)$	(0.000) 0.127, 0.476
54.15	1	25938.71		
52.61	1	25949.06		
51.84	4	25954.24	$c\ ^1G_4-611(4)$	(0.137 <i>w</i>) 1.049 <i>w</i>
49.15	4	25972.42	$c\ ^3F_4-490(5)$ $c\ ^3F_3-495(2)$	
45.62	3	25996.24		(0.000 <i>W</i>) 1.067 <i>A</i>
43.02	2	26013.80		
42.70	2	26015.99	$d\ ^3F_2-558(2)$	
37.48	1	26051.37		
35.36	12	26065.75	$b\ ^3H_5-514(4)$	(0.000 <i>WD</i>) 0.791 <i>A</i>
34.13	2	26074.11	$b\ ^3H_4-505(5)$	
33.74	100 <i>c</i>	26076.80	$a\ ^3F_2-292(2)$	(0.220, 0.460) 0.278, 0.517 , 0.743 , 0.977
31.17	15	26094.28	$b\ ^3G_4-514(4)$	(0.102 <i>w</i>) 1.113 <i>w</i>
30.00	2 <i>c</i>	26102.28		(0.000 <i>W</i>) 1.531 <i>A</i>
28.07	2	26115.40		
25.58	6 <i>c</i>	26132.40	$b\ ^3F_4-446(4)$	(0.000 <i>W</i>) 1.238 <i>w</i>
23.82	8	26144.43		(0.000) 1.135

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λair	Intensity and notes	Wave number	Term combination	Zeeman pattern
3822. 72	5	26151. 97	$c\ ^3F_2-490(2)$	(0.603, 1.222) 0.081, 0.696, 1.303 , 1.917
21. 96	1	26157. 14		
21. 76	1	26158. 54		
19. 80	2	26171. 93		
14. 07	6	26211. 30		(0.00) 0.88 <i>A</i>
09. 39	2	26243. 50		(0.00 <i>w</i>) 1.00
08. 09	7	26252. 40		
07. 79	3	26254. 51		
07. 49	5	26256. 54	$a\ ^3G_4-389(3)$	(0.000) 1.013 <i>A</i>
04. 92	5 <i>c</i>	26274. 29	$a\ ^5P_1-369(1)$	
04. 06	3	26280. 23		
03. 11	4	26286. 80		(0.00) 0.88
02. 10	1	26293. 78		
01. 75	4	26296. 20		
3798. 71	12	26317. 25	$c\ ^3F_3-499(4)$	(0.000 , 0.137, 0.281, 0.433) 1.219, 1.348, 1.490, 1.631
97. 62	4	26324. 79	$c\ ^1D_2-593(2)$	(0.18) 1.16
96. 21	15 <i>c</i>	26334. 60	$b\ ^3P_2-448(3)$	(0.000 , 0.194, 0.442) 0.823 , 1.058, 1.258, 1.430
95. 20	20 <i>c</i>	26341. 62	$b\ ^3F_4-448(3)$	(0.000 <i>w</i>) 1.228 <i>B</i>
91. 60	15 <i>c</i>	26366. 59	$a\ ^3F_4-361(4)$	(0.229 <i>w</i>) 1.225 <i>w</i>
88. 98	2	26384. 81	$a\ ^3D_2-435(1)$	(0.000) 0.985
88. 44	1	26388. 57		(0.00 <i>w</i>) 1.52 <i>B</i>
87. 26	25 <i>c</i>	26396. 83	$a\ ^5D_3-421(4)$	(0.000 , 0.197, 0.412, 0.650) 0.581 , 0.799, 1.053, 1.266, 1.455, 1.655
86. 94	2	26399. 07	$a\ ^3H_5-445(5)$	
85. 84	3	26406. 69		
85. 36	4	26410. 03		
83. 58	2	26422. 46		
82. 91	50	26427. 20	$a\ ^5D_3-421(2)$	(0.000 , 0.248, 0.500) 1.003, 1.212, 1.453, 1.703, 1.955
82. 19	1	26432. 22		
81. 54	2	26436. 73	$\begin{cases} c\ ^1G_5-615(6) \\ b\ ^3D_3-570(3) \end{cases}$	(0.28) 1.36
81. 08	2	26439. 96	$\begin{cases} c\ ^3F_4-495(5) \\ a\ ^3H_5-446(4) \end{cases}$	(0.000 , 0.178, 0.364, 0.534, 0.693) 0.159 , 0.339, 0.503, 0.660, 0.834, 0.940
79. 14	20	26453. 53	$c\ ^3F_4-495(3)$	0.000 , 0.282, 0.571, 0.852) 0.179 , 0.459, 0.744, 1.020, 1.308, 1.596
75. 25	8	26480. 77	$a\ ^1P_1-498(1)$	(0.815 <i>w</i>) 1.283, 1.990
74. 41	15 <i>c</i>	26486. 68	$b\ ^3F_2-361(2)$	(0.107, 0.216) 0.837, 0.954, 1.067 , 1.187
73. 98	2	26489. 70	$c\ ^3P_2-545(2)$	
71. 17	5	26509. 42	$d\ ^3F_4-580(4)$	
70. 45	3	26514. 53	$b\ ^3G_3-533(4)$	
70. 03	7 <i>c</i>	26517. 43	$\begin{cases} a\ ^3D_1-411(2) \\ a\ ^5P_1-372(2) \end{cases}$	(0.000 , 0.508) 0.610, 1.124
68. 98	5	26524. 86		
68. 70	20	26526. 79	$a\ ^5P_3-389(3)$	
66. 43	10	26542. 80	$c\ ^1G_4-616(3)$	(0.000 , 0.152, 0.305, 0.459) 0.921, 1.082, 1.228, 1.391, 1.539
65. 67	12	26548. 18	$a\ ^5D_1-400(0)$	(0.000) 1.504
63. 44	60 <i>c</i>	26563. 89	$\begin{cases} b\ ^3F_3-411(2) \\ c\ ^3F_4-496(3) \end{cases}$	(0.000 , 0.170, 0.377) 0.593 , 0.802, 0.998, 1.159
59. 42	2	26592. 30	$b\ ^1D_2-498(1)$	
57. 70	5	26604. 48	$c\ ^3P_2-546(3)$	
57. 29	10 <i>c</i>	26607. 35	$\begin{cases} d\ ^3F_2-564(3) \\ c\ ^3F_2-495(3) \end{cases}$	(0.00 , 0.58, 1.16) 0.74, 1.38, 1.94, 2.47
56. 88	20	26610. 28	$a\ ^1F_3-514(4)$	(0.000 , 0.139, 0.283, 0.432) 0.983, 1.114, 1.255, 1.397, 1.545
56. 27	4 <i>c</i>	26614. 57	$a\ ^5F_3-292(2)$	(0.00 , 0.75) 0.29
53. 32	5	26635. 51		
52. 70	6	26639. 90	$a\ ^5P_2-385(2)$	(0.463, 0.824) 0.602, 1.002, 1.404 , . . .
52. 53	5	26641. 13	$b\ ^3H_4-510(3)$	(0.00 <i>W</i>) 0.67
51. 36	6	26649. 41		
50. 51	3	26655. 44	$b\ ^3D_2-570(3)$	
49. 92	10 <i>c</i>	26659. 66	$a\ ^5P_2-385(1)$	
49. 13	5	26665. 25		(00.0) 0.88 <i>w</i>
48. 02	15 <i>c</i>	26673. 14	$a\ ^1D_2-402(2)$	(0.000 <i>W</i>) 1.100 <i>A</i>

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λ air	Intensity and notes	Wave number	Term combination	Zeeman pattern
3746.00	2	26687.56		
45.07	3	26694.16	$c\ ^3F_3-503(3)$	(0.196, 0.414, 0.613) . . . ?
43.80	1	26703.27		
40.55	4	26726.47		
37.50	15c	26748.22	$a\ ^3G_3-385(2)$	(0.000W) 0.798w
33.95	4	26773.68	$\left\{ \begin{array}{l} b\ ^3G_5-580(4) \\ a\ ^5D_4-440(4) \end{array} \right.$	(0.292) 1.169w
33.41	8	26777.57		(0.000, 0.194, 0.383, 0.560, 0.750) 0.602, 0.845, 1.033, 1.219, 1.404 , 1.588, 1.738, . . .
21.94	25c	26860.10	$\left\{ \begin{array}{l} a\ ^5P_3-392(3) \\ a\ ^5D_2-413(1) \end{array} \right.$	(0.000 , 0.293, 0.547) 0.917 , 1.169, 1.463, 1.768, 1.976
18.60	12c	26884.18	$\left\{ \begin{array}{l} a\ ^3F_3-337(2) \\ b\ ^3P_1-442(2) \end{array} \right.$	(0.000 , 0.309, 0.581) 0.047, 0.429, 0.865, 1.176, 1.395, 1.457, 1.651
17.49	4	26892.24	$a\ ^5F_5-330(5)$	
07.52	6	26964.56	$c\ ^1G_4-621(4)$	(0.084w) 1.058wD
00.26	20c	27017.41	$a\ ^3F_4-367(3)$	(0.000W) 1.324w
3699.98	8	27019.46	$b\ ^1D_2-503(3)$	(0.00) 1.16
96.20	7	27047.10	$b\ ^3H_4-514(4)$	(0.124, 0.265, 0.411, 0.560) . . . , 0.999, 1.141 , 1.265, 1.406, 1.535
95.26	25c	27053.97	$c\ ^1G_4-622(5)$	
94.50	50c	27059.53	$\left\{ \begin{array}{l} a\ ^5D_2-415(3) \\ b\ ^3P_1-444(0) \end{array} \right.$	(0.000 , 0.266, 0.531) 0.673 , 0.941, 1.201, 1.460, 1.710
92.62	12c	27073.32	$b\ ^3F_2-367(3)$	(0.000 , 0.113, 0.236) 1.174, 1.286, 1.404
91.85	25	27078.98	$b\ ^3H_5-524(4)$	(0.000) 0.969w
91.13	4	27084.24	$c\ ^3P_2-551(3)$	(0.26) 1.13
90.77	10	27086.92	$a\ ^5P_2-389(3)$	(0.000 , 0.420, 0.840) 0.155 , 0.584, 1.013
90.23	1	27090.87	$a\ ^3D_2-442(2)$	(0.00) 1.32B
89.60	8	27095.52		
89.25	3	27098.04		(0.00 , 0.59) . . . , 1.41, 1.74
88.25	2	27105.41		
82.22	12	27149.82	$c\ ^3P_0-505(1)$	(0.000) 1.359
79.83	3	27167.47	$b\ ^3D_3-577(2)$	(0.000 , 0.202, 0.436) . . . , 1.464, 1.666
76.09	10c	27195.05	$\left\{ \begin{array}{l} b\ ^1G_4-525(3) \\ a\ ^3G_3-389(3) \end{array} \right.$	(0.289W) 0.941w
73.28	8	27215.91	$b\ ^3G_4-553(4)$	(0.109) 1.028w
73.07	4	27217.42	$d\ ^3F_2-570(3)$	
70.96	5	27233.07	$b\ ^3D_1-571(1)$	
69.84	2	27241.42		(0.00) 0.90
67.08	10	27261.89	$a\ ^3D_2-444(3)$	
62.34	50	27297.19	$b\ ^3F_2-369(1)$	(0.000 , 0.377) 0.393, 0.687, 1.055, 1.424
59.18	6	27320.72	$b\ ^3H_4-517(5)$	(0.00W) 1.52B
58.40	2	27326.56		
56.64	5	27339.72	$b\ ^3G_4-555(5)$	(0.000 , 0.459) 1.119
56.51	10	27340.71		
54.81	50	27353.41	$a\ ^5D_4-445(5)$	(0.000W) 1.440W
51.54	7	27377.87	$\left\{ \begin{array}{l} b\ ^3G_3-542(4) \\ b\ ^3G_4-555(3) \end{array} \right.$	
49.32	7c	27394.58	$a\ ^5D_4-446(4)$	(0.145, 0.522) 1.201w
48.18	4	27403.14	$d\ ^3P_1-593(2)$	(0.00) 1.29
45.88	10	27420.41	$a\ ^5P_2-392(3)$	(0.000 , 0.284) 0.574 , 0.866, 1.140
45.44	20	27423.69		(0.000W) 1.330
44.31	25	27432.20	$b\ ^3H_5-528(6)$	(0.000 , 0.098, 0.206, 0.309, 0.418, 0.517) 1.393, 1.464, 1.585, 1.675
41.47	35	27453.60	$c\ ^3F_3-510(3)$	(0.260B) 1.106w
40.79	3	27458.71		(0.000W) 1.243w
37.69	7c	27482.11		(0.000w) 0.786
34.34	2	27507.46	$c\ ^3P_2-555(2)$	
31.93	25	27525.72	$a\ ^3D_1-421(2)$	(0.000 , 0.369) 0.838, 1.207, 1.573
31.71	20	27527.41	$a\ ^1H_5-517(5)$	(0.355, 0.473, 0.593) . . . 0.988, 1.102 , 1.201
31.48	10	27529.14	$a\ ^3G_3-392(3)$	(0.517, 0.762) 0.687, 0.914, 1.139 , 1.380
30.01	15	27540.25	$b\ ^3F_2-372(2)$	(0.438, 0.867) 0.185, 0.613, 1.050 , 1.462
28.68	50c	27550.41		(0.407B) 0.782, 1.583W
26.10	5	27569.95	$a\ ^1G_4-417(4)$	
24.17	25	27584.64	$a\ ^1D_2-411(2)$	(0.101B) 1.129w

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λ air	Intensity and notes	Wave number	Term combination	Zeeman pattern
3622. 37	1	27598. 35		
21. 62	8	27604. 04	$a\ ^5D_4-448(3)$	(0.000 w) 1.001 A
19. 96	4	27616. 76		(0.000 W) 0.672 A
19. 08	8	27623. 47	$a\ ^1F_3-524(4)$	(0.000 , 0.113, 0.230, 0.346) 1.217, 1.328, 1.430
14. 51	15	27658. 40	$a\ ^5D_2-421(2)$	(0.255, 0.509) 0.959, 1.212 , 1.467 , 1.719
13. 41	30 c	27666. 83	$a\ ^3D_2-448(3)$	(0.000 W) 1.305 w
13. 05	7	27669. 56	$a\ ^5D_1-411(2)$	(0.000 , 0.345) 0.811 , 1.156, 1.513
10. 60	40	27688. 35	$b\ ^3H_4-521(3)$	(0.000 , 0.112, 0.232, 0.343) 0.632 , 0.756, 0.863, 0.980, 1.077
10. 23	4	27691. 20		
09. 95	60 c	27693. 33	$a\ ^3H_4-435(3)$	(0.000 w) 1.219 w
08. 56	10	27703. 96	$a\ ^5D_0-403(1)$	(0.000) 1.253
3599. 20	8	27776. 04		(0.000 D) 0.708 w
90. 80	7	27779. 08	$b\ ^1D_2-510(3)$	(0.000 w) 1.234 B
95. 79	20 c	27802. 38	$a\ ^5P_1-385(2)$	(0.000 , 1.356 WD) 0.350 WD , 1.005, 2.355
94. 13	4	27815. 19	$c\ ^3P_2-558(2)$	(0.00) 1.30
93. 73	10	27818. 31	$a\ ^5D_3-435(3)$	(0.379, 0.751) 0.328, 0.715, 1.087 , 1.461 , 1.837, 2.205
93. 53	8	27819. 87	$b\ ^3G_3-546(3)$	(0.273) 0.936
93. 14	7	27822. 90		
92. 44	5	27828. 29	$b\ ^3D_1-577(2)$	(0.098) 1.143
91. 61	5	27834. 73	$c\ ^3P_2-558(1)$	(0.000 w) 1.315 w
90. 50	8	27843. 34	$c\ ^1D_2-608(2)$	(0.144) 1.072 w
89. 74	10	27849. 22	$a\ ^3H_4-437(5)$	(0.000) 1.356 B
			$b\ ^1G_4-532(5)$	
88. 42	7	27859. 48	$b\ ^3P_1-452(1)$	(0.000 w) 1.244 B
			$c\ ^3F_3-514(4)$	
87. 14	3	27869. 41	$b\ ^3D_2-582(2)$	
85. 83	8 c	27879. 60	$a\ ^5D_1-413(1)$	(0.387) 1.491
82. 86	4	27902. 72	$a\ ^5F_4-323(3)$	(0.000 , 0.363, 0.730, 1.083) . . . , 1.709, 2.018
			$b\ ^1D_2-511(2)$	
80. 89	10	27918. 03	$b\ ^3P_0-442(1)$	(0.000) 0.257, 1.717
			$a\ ^1G_4-421(4)$	
79. 42	200	27929. 48	$b\ ^3H_5-533(4)$	(0.000 w) 0.895 A
77. 42	5	27945. 10	$c\ ^3P_0-513(1)$	(0.000) 1.045
75. 78	20	27957. 98	$b\ ^1G_4-533(4)$	(0.000) 1.089
73. 42	125 c	27976. 39	$a\ ^3G_3-397(4)$	(0.000 , 0.308, 0.610 w , 0.924 w) 0.000, . . . , 0.598, 0.912, 1.212, 1.500, 1.839 w , 2.118 w .
71. 52	25	27991. 29	$c\ ^3F_4-510(3)$	(0.000 , 0.088, 0.266, 0.393) 0.628 , 0.766, 0.898, 1.033, 1.168
71. 15	20	27994. 21	$a\ ^1D_2-415(3)$	(0.000 , 0.100, 0.191) 1.400 B
69. 82	10	28004. 64	$a\ ^3G_5-408(6)$	
66. 84	10	28028. 02		
66. 37	6	28031. 74	$b\ ^1D_2-513(1)$	(0.000) 1.14
65. 57	250	28037. 98	$b\ ^3H_6-540(5)$	(0.000 W) 0.782 A
64. 22	40 c	28048. 62	$a\ ^3P_2-337(1)$	(0.000 , 1.039 w) 1.324, 2.418 w
63. 12	3	28057. 31	$a\ ^3P_2-337(2)$	
62. 08	10	28065. 50	$a\ ^3D_2-452(1)$	(0.000 , 0.248) 0.954 , 1.209, 1.463
61. 27	15 c	28071. 88	$b\ ^3P_1-454(2)$	(0.000) 1.161 w
60. 87	20 c	28075. 04		
60. 20	7	28080. 26	$b\ ^1G_4-534(3)$	(0.000 , 0.127, 0.258, 0.393) 0.749 w
58. 73	45 c	28091. 89	$a\ ^3D_3-466(4)$	(0.000 , 0.148, 0.326, 0.503) 0.709 , 0.896, 1.040, 1.215, 1.358
56. 94	3	28106. 05	$b\ ^3D_1-580(1)$	(0.137) 1.005, 1.160
54. 14	3	28128. 18	$a\ ^1P_1-515(2)$	(0.000) 1.408
53. 16	4 c	28135. 93		
52. 83	3	28138. 53		
52. 45	7	28141. 52	$a\ ^1F_3-530(2)$	(0.00 , 0.47) 0.63 , 1.10
51. 98	12	28145. 26	$c\ ^3F_2-510(3)$	(0.000 , 0.451, 0.899) 1.600, 2.053
51. 12	60 c	28152. 10	$b\ ^3F_4-466(4)$	(0.000 W) 1.219 w
50. 91	30 c	28153. 74	$a\ ^3H_4-440(4)$	(0.000 W) 1.44 W
50. 05	8	28160. 55	$d\ ^3F_4-596(5)$	(0.150, 0.302, 0.449) . . . ?
42. 22	75	28222. 83		(0.000) 1.129
41. 88	70	28225. 52	$a\ ^5F_2-292(2)$	(0.489, 0.971) 0.000, 0.513 , 1.002 , 1.487

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
3539.20	7	28246.88		
37.98	2	28256.65		
36.96	3	28264.80		
36.71	8	28266.81	$a\ ^1H_5-524(4)$	(0.00 , 0.32, 0.65) 0.78, 1.14, 1.48, 1.81
35.40	35	28277.25	$a\ ^3D_3-468(3)$	(0.000) 0.736 (0.316W) 0.800, 0.926, 1.071, 1.198 , 1.351 , . . .
34.36	3	28285.57	$b\ ^3G_4-564(5)$	(0.00W) 0.73A
32.66	20c	28299.16	$\left\{ \begin{array}{l} c\ ^3P_1-545(2) \\ b\ ^3G_3-551(3) \end{array} \right.$	(0.000 , 0.297) 0.717 , 1.000
31.80	4c	28306.06	$d\ ^3F_4-598(5)$	
31.13	10c	28311.47	$b\ ^3D_1-582(2)$	
30.30	1	28318.07		
30.03	1	28320.27		
28.74	45c	28330.65	$b\ ^3P_2-468(3)$	(0.000 , 0.236, 0.430) 0.794w , 1.215, 1.484, . . .
28.27	4	28334.39	$c\ ^1G_4-634(4)$	(0.000) 1.212
26.34	20c	28349.92	$b\ ^3P_2-468(2)$	(0.346, 0.594, 0.810) 0.760, 1.088 , 1.435 , 1.733, 1.965
25.52	15	28356.50	$b\ ^3G_4-565(5)$	(0.000W) 0.881 A
25.07	3	28360.11		
24.72	2	28362.96		
24.55	6	28364.31		
23.16	90c	28375.47	$a\ ^3P_1-337(1)$	(1.284) 0.267, 1.547
22.64	3	28379.65		
22.16	2	28383.55		
22.04	6	28384.49	$a\ ^3P_1-337(2)$	(0.000) 0.920
21.47	50	28389.13		(0.000) 0.830
19.27	10	28406.87	$c\ ^3P_2-564(3)$	(0.000 , 0.178, 0.356) 0.840 , 1.015, 1.197
17.82	2	28418.53		
17.01	10	28425.10	$b\ ^3G_5-596(5)$	(0.000 , 0.150, 0.311, 0.477) 1.282, 1.440, 1.596
15.04	3	28441.04	$a\ ^3D_1-430(0)$	(0.000) 0.857
12.01	7c	28465.58	$\left\{ \begin{array}{l} a\ ^5D_2-429(3) \\ a\ ^3G_3-402(2) \end{array} \right.$	
06.66	2	28508.98		
01.35	10	28552.28	$\left\{ \begin{array}{l} c\ ^1G_4-637(5) \\ b\ ^3G_3-553(4) \end{array} \right.$	(0.000 , 0.180, 0.356, 0.518) 0.837, 1.017, 1.200, 1.371, 1.566
3499.06	25	28570.92	$b\ ^3G_5-598(5)$	(0.000w) 1.010w
96.36	12	28592.98	$a\ ^1D_2-421(2)$	(0.125, 0.207) 1.057, 1.162 , 1.260 , 1.361
95.98	10	28596.12	$a\ ^1F_3-534(3)$	(0.258, 0.495, 0.732) . . . ?
94.80	20c	28605.79	$c\ ^3F_2-515(2)$	(0.600, 1.192) 0.108, 0.699 , 1.313 , 1.891
93.82	3	28613.76		
93.04	75	28620.14	$a\ ^1H_5-528(6)$	(0.000 , 0.156, 0.299, 0.449, 0.592, 0.767) 1.005, 1.148, 1.302, 1.446, 1.587, 1.769, 1.918
87.80	25	28663.16	$\left\{ \begin{array}{l} a\ ^5F_4-330(5) \\ b\ ^1G_4-540(5) \end{array} \right.$	(0.000 , 0.110, 0.222, 0.332, 0.445) . . . , 1.541, 1.648, 1.766, 1.875
87.31	20	28667.21	$c\ ^1D_2-616(3)$	
87.16	20c	28668.38	$b\ ^3P_2-471(3)$	(0.000 , 0.350) 0.906
86.85	25	28670.96	$c\ ^3F_4-517(5)$	(0.000W) 1.189, 1.312, 1.407, 1.498
86.29	8	28675.58	$b\ ^3F_4-471(3)$	
86.01	30	28677.85	$a\ ^5D_1-421(2)$	(0.000 , 0.297) 0.914 , 1.208, 1.504
82.82	8	28704.18	$a\ ^5D_3-444(3)$	(0.539, 1.038, 1.559) -0.093, 0.430, 0.941 , 1.452 , 1.970, 2.477
81.74	5	28713.07		
80.04	15c	28727.10	$a\ ^3D_3-472(4)$	(0.000 , 0.162, 0.365) . . . ?
78.59	7	28739.04		
75.07	2	28768.15		
74.25	200c	28774.98	$\left\{ \begin{array}{l} c\ ^3P_0-521(1) \\ a\ ^3H_4-446(4) \\ a\ ^1F_3-536(2) \end{array} \right.$	(0.471W) 0.832, 1.031 , 1.209 , 1.362
71.98	3	28793.73	$d\ ^3F_4-603(3)$	(0.00) 1.17
70.99	50	28801.98	$b\ ^3H_4-532(5)$	(0.000 , 0.166, 0.341, 0.503, 0.677) . . . , 0.976, 1.146, 1.318, 1.488, 1.649, 1.831
70.10	3	28809.34		
68.67	20	28821.21	$b\ ^1G_4-542(4)$	(0.175 B) 1.117w
68.51	4	28822.57	$b\ ^3G_4-569(4)$	(0.28) 1.11
68.05	4	28826.39	$b\ ^1D_2-521(3)$	(0.000) 1.080
67.19	1	28833.53		

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λair	Intensity and notes	Wave number	Term combination	Zeeman pattern
3466.75	7	28837.19		
65.82	20c	28844.94	$b\ ^3F_2-385(1)$	(0.000) 1.055
62.49	50	28872.66	$c\ ^3F_3-524(4)$	(0.000) 1.107
61.83	3c	28878.19	$a\ ^3G_5-417(5)$	(0.00) 1.19
60.84	8	28886.46		(0.00, 0.28, 0.56) 0.74, 0.99, 1.29, 1.55
59.22	35c	28900.00	$a\ ^5D_3-448(3)$	(0.000, 0.197, 0.417, 0.667) 0.548 , 0.779, 1.030, 1.252, 1.447, 1.659
54.47	6	28939.71		
53.70	12c	28946.12	$\left\{ \begin{array}{l} b\ ^3P_0-452(1) \\ b\ ^3D_2-593(2) \end{array} \right.$	(0.18) 1.11
50.89	10	28969.76		(0.000 <i>WD</i>) 0.802 <i>A</i>
49.50	4	28981.38		
46.86	150c	29003.62	$a\ ^3G_4-417(5)$	(0.000, 0.213, 0.476, 0.743, 1.014) 0.801, 1.016, 1.234, 1.420, . . . 2.305
46.27	25	29008.60	$a\ ^1H_5-532(5)$	
45.20	7	29017.57	$d\ ^3F_4-605(5)$	(0.000) 1.332
43.37	12	29033.00	$b\ ^3H_4-534(3)$	(0.000, 0.241, 0.487, 0.733) 0.250 , 0.490, 0.722, 0.970, 1.212, 1.456
42.72	12	29038.50	$c\ ^3F_4-521(3)$	(0.000 <i>w</i>) 0.857 <i>A</i>
41.40	35	29049.62	$a\ ^5D_2-435(3)$	(0.000, 0.377, 0.765) 0.313 , 0.702, 1.087, 1.469, . . .
40.32	85c	29058.74	$a\ ^5D_2-435(1)$	(0.000) 1.471; (0.268) 0.827
39.70	20c	29063.99	$a\ ^5D_4-462(5)$	(0.000) 1.192 <i>w</i>
39.00	80c	29069.90	$a\ ^3G_4-417(4)$	(0.216, 0.408, 0.796, 1.093) 0.791, 1.017 , 1.248 , 1.479
37.24	10	29084.74		
34.36	35	29109.16	$a\ ^5D_3-448(3)$	(0.000, 0.203, 0.411, 0.629) 0.852, 1.044, 1.252 , 1.473 , 1.668, 1.879
33.39	20	29117.39	$a\ ^1H_5-533(4)$	(0.00) 0.77
33.25	25c	29118.56	$a\ ^5P_3-415(3)$	(0.403, 0.799, 1.118, 1.276) 0.430, 0.801, 1.193 , 1.583 , 1.980, 2.299
30.94	100	29138.18	$a\ ^3F_2-323(3)$	(0.000, 0.229, 0.479) 0.000, 0.227, 0.511, 0.744, 0.967, 1.189, 1.476
30.49	2	29141.97		
29.91	3	29146.95		
29.39	10	29151.38	$c\ ^3P_2-571(1)$	(0.000, 0.407) 0.986 , 1.365, 1.721
28.78	15	29157.53		
28.36	5	29160.14		
27.39	2	29168.36		
25.74	4	29182.44		(0.00) 1.00
25.55	2	29184.02		
24.57	15	29192.38	$c\ ^3F_2-521(3)$	(0.000, 0.401, 0.817) 0.714, 1.091, 1.475, 1.848, 2.238
23.87	2	29198.37		
22.35	4	29211.31		
21.80	40c	29216.01	$a\ ^3F_4-389(3)$	(0.000, 0.226, 0.448, 0.693) 0.770, 0.992, 1.221, 1.437, 1.662, 1.896
20.93	7	29223.46		
18.83	3	29241.40		
17.50	2	29252.75		
17.02	40c	29256.86	$a\ ^5F_1-292(2)$	(0.000 <i>W</i> , 0.489 <i>w</i>) 0.000 <i>w</i> , 0.510, 1.003<i>w</i>
16.22	1	29263.73		
15.58	10	29269.24	$\left\{ \begin{array}{l} c\ ^1D_2-622(1) \\ a\ ^5P_2-411(2) \end{array} \right.$	(0.000, 0.202, 0.488) 0.916, 1.139, . . .
15.27	75	29271.87	$\left\{ \begin{array}{l} a\ ^3D_3-478(3) \\ b\ ^3F_2-389(3) \end{array} \right.$	(0.000) 0.912
14.13	200c	29281.65	$\left\{ \begin{array}{l} a\ ^3F_3-361(4) \\ b\ ^3G_5-605(5) \end{array} \right.$	(0.000 <i>WD</i>) 1.292 <i>w</i>
13.06	2	29290.78	$c\ ^1D_2-623(2)$	
12.88	10	29292.38	$a\ ^3G_5-421(4)$	
12.74	10	29293.53	$c\ ^3P_1-555(1)$	(0.000) 1.459
10.74	7c	29310.72	$a\ ^5P_1-400(0)$	(0.000) 2.416
10.42	15	29313.51	$b\ ^3G_3-561(4)$	(0.000, 0.433, 0.860, 1.287) 0.000, 0.412, 0.851, 1.288, 1.706, 2.140, 2.555
08.28	20c	29331.92	$b\ ^3F_4-478(3)$	(0.000) 1.249
07.67	10	29337.18	$a\ ^1F_3-542(4)$	(0.00 <i>W</i>) 1.67 <i>B</i>
07.40	55c	29339.46	$\left\{ \begin{array}{l} a\ ^1G_4-435(3) \\ a\ ^5P_3-417(4) \end{array} \right.$	(0.000, 0.341, 0.689, 1.032) 0.212 , 0.556, 0.877, 1.252
06.68	75	29345.71	$a\ ^3F_3-361(2)$	(0.000, 0.131, 0.262) 0.941, 1.073, 1.201, 1.341
02.93	40	29377.99	$a\ ^3G_3-411(2)$	(0.000, 0.243, 0.510) 0.408 , 0.678, 0.910, 1.153, 1.383
01.69	7	29388.71	$b\ ^3D_1-593(2)$	(0.000, 0.147) 1.005, 1.147, 1.285

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
3400. 45	3	29399. 44	$a\ ^1D_2-429(3)$	(0.000) 1.127
3399. 20	45c	29410. 29	$c\ ^3F_4-524(4)$	(0.238) 1.071 w
98. 72	5	29414. 42	$a\ ^3D_4-466(4)$	
98. 37	90c	29417. 43	$a\ ^3G_4-421(4)$	
97. 60	10c	29424. 14	$b\ ^3F_3-440(4)$	(0.000) 1.346
96. 69	1	29431. 94		
96. 17	15	29436. 46		(0.000 , 0.100, 0.191) 1.172, 1.258, 1.344
95. 39	35	29443. 25	$c\ ^3P_0-528(1)$	(0.000) 0.916
91. 22	15	29479. 47	$a\ ^5P_2-413(1)$	(0.000 , 0.466) 0.954 , 1.430, 1.909
90. 46	10	29486. 09		(0.000 W) 1.259 w
90. 20	50	29488. 34		(0.389 w) 1.158 $W\ D$
89. 51	8	29494. 36	$\left\{ \begin{array}{l} b\ ^3H_6-555(5) \\ a\ ^1G_4-437(5) \end{array} \right.$	(0.000 $W\ D$) 1.373
89. 12	5	29497. 74	$c\ ^3F_4-525(3)$	
88. 62	8	29502. 05	$c\ ^1G_4-646(3)$	(0.000) 1.088
88. 33	40	29504. 62	$a\ ^1D_2-430(2)$	(0.119) 1.099
87. 91	2	29508. 25	$d\ ^3F_2-593(2)$	
86. 53	20c	29520. 24	$a\ ^5P_1-402(2)$	(0.000 , 1.219) - 0.078 , +1.139
85. 44	8c	29529. 76	$b\ ^1D_2-528(1)$	(0.000 , 0.199) 0.907, 1.115, 1.313
83. 18	15	29549. 54	$a\ ^3F_4-392(3)$	(0.00) 1.38
82. 31	2	29557. 07		(0.36, 0.75) . . .
80. 37	2	29574. 10	$d\ ^3F_4-611(4)$	(0.00) 0.93
79. 51	100c	29581. 58	$a\ ^3P_0-337(1)$	(0.00) 0.00, 0.31
78. 58	10	29589. 74	$a\ ^5D_1-430(2)$	(0.000 , 0.448) 0.638 , 1.074
78. 17	20	29593. 29	$a\ ^5D_1-430(0)$	(0.000) 1.500 w
77. 18	5	29601. 97		
76. 78	6	29605. 49	$b\ ^3F_2-392(3)$	(0.00) 0.62
76. 47	75	29608. 26	$a\ ^3D_2-467(2)$	(0.000 , 0.307, 0.613) 0.127 , 0.412, 0.713, 1.033, 1.333
75. 75	4	29614. 52		
75. 60	20	29615. 86	$\left\{ \begin{array}{l} a\ ^3H_4-454(5) \\ b\ ^3H_4-540(5) \end{array} \right.$	(0.000 , 0.216, 0.454, 0.665, 0.889) . . ., 1.626, 1.833, 2.067
75. 47	5	29617. 03	$b\ ^3D_3-602(3)$	(0.14) 1.36
73. 68	2	29632. 69		
72. 42	4c	29643. 79	$\left\{ \begin{array}{l} c\ ^3P_1-558(1) \\ a\ ^3H_5-478(6) \end{array} \right.$	(0.000 , 0.208, 0.396, 0.610, . . .) 1.107, 1.295, 1.477, 1.728, . . .
71. 53	50c	29651. 62	$c\ ^3F_2-525(3)$	
69. 55	2	29669. 02	$a\ ^3D_3-482(2)$	
69. 27	12	29671. 50	$a\ ^3H_5-478(5)$	
68. 74	20	29676. 19	$a\ ^5F_3-323(3)$	(0.251, 0.516) 0.473, 0.711, 0.960 , 1.237 , 1.501, 1.765
68. 44	40	29678. 84	$a\ ^5P_3-415(3)$	(0.000 , 0.222, 0.452) 0.766 , 0.991, 1.213, . . .
67. 50	40c	29687. 07	$a\ ^5P_3-421(4)$	(0.000 , 0.339, 0.675, 1.037) 0.256 , 0.586, 0.917, 1.248, 1.593
67. 08	5	29690. 78		(0.00 , 0.57) 1.40
64. 74	8c	29711. 42	$a\ ^5D_2-442(1)$	(0.000 , 1.222) 1.460, 2.671
64. 19	4	29716. 30	$b\ ^1D_2-530(2)$	(0.37, 0.73) 1.24
63. 71	15c	29720. 53	$a\ ^5D_3-454(2)$	(0.000 , 0.304, 0.590) 1.150, 1.460, 1.768, 2.061
63. 42	35	29723. 10	$\left\{ \begin{array}{l} b\ ^3P_2-482(2) \\ c\ ^3F_3-533(4) \end{array} \right.$	(0.000) 1.129
60. 67	8	29747. 41	$c\ ^3P_2-577(2)$	(0.315, 0.643) 0.686, 1.013 , 1.352 , 1.667
58. 76	40c	29764. 34	$a\ ^5D_2-442(2)$	(0.216) 1.468, 1.733
57. 69	40	29773. 81	$b\ ^3H_4-542(4)$	(0.170, 0.319, 0.476, 0.641) 0.490, 0.648, 0.791, 0.959 , 1.092 , 1.272, 1.435, . . .
56. 20	15c	29787. 06	$a\ ^3G_3-415(3)$	(0.64, 0.98) 0.58, 0.90 , 1.22 , 1.58
53. 92	3	29807. 33	$a\ ^3D_1-444(0)$	(0.000) 0.852
53. 06	2	29814. 97		
52. 20	15c	29822. 63	$a\ ^1H_5-540(5)$	(0.785, 0.978) 0.670, 0.855, 1.040 , 1.227 , 1.449, 1.646
50. 74	15	29835. 53	$b\ ^3D_2-602(3)$	(0.00) 1.35
49. 21	150c	29849. 22	$\left\{ \begin{array}{l} a\ ^3H_6-478(6) \\ b\ ^3F_3-444(3) \end{array} \right.$	(0.000 $W\ D$) 0.971 w
48. 65	10	29854. 21		(0.00) 1.23
46. 26	35	29875. 54	$\left\{ \begin{array}{l} b\ ^3G_4-580(4) \\ a\ ^3H_6-478(5) \end{array} \right.$	(0.000) 1.046
43. 73	5	29898. 13		(0.00 , 0.69) 0.78

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
3341.35	4	29919.38	$b^3D_2-603(3)$	
40.87	20	29923.73	$b^3G_3-567(4)$	(0.000 , 0.354, 0.721, 1.069) 1.194, 1.552, 1.912, 2.272
39.91	100c	29932.33	$a^3F_3-367(3)$	(0.253 <i>B</i>) 1.131 <i>w</i>
39.56	5	29935.48	$a^5D_2-444(3)$	(0.00 , 0.54) 1.02, 1.60
39.29	20	29937.90	$a^5D_4-471(3)$	(0.000 <i>w</i>) 1.371 <i>w</i>
38.69	3	29943.23		
34.96	35c	29976.73	$b^3F_4-484(4)$	(0.000 <i>W</i>) 1.249
34.14	25	29984.14	$a^1D_2-435(3)$	(0.000) 1.065
33.10	45c	29993.50	$a^1D_2-435(1)$	(0.000 <i>w D</i>) 0.925 <i>W</i>
32.85	30c	29995.74	$b^1G_4-553(4)$	(0.230 <i>B</i>) 0.992 <i>D</i>
32.68	50c	29997.24	$a^3F_4-397(4)$	(0.000) 1.221
32.29	12	30000.76	$a^3D_2-471(3)$	(0.00) 0.94
31.48	15c	30008.10	$a^3G_3-417(4)$	(0.000 , 0.349, 0.687, 1.048) 0.911, 1.248, 1.563, . . .
30.99	250c	30012.51		(0.000 <i>W D</i>) 1.197 <i>W</i> , 1.582 <i>W B</i>
28.63	2	30033.76	$c^1D_2-630(2)$	(0.09) 1.05
26.86	25	30049.68	$a^5D_4-472(4)$	(0.000 <i>w</i>) 1.186
24.61	3	30070.06		(0.147) 1.061
23.68	12c	30078.50	$a^5D_1-435(1)$	(0.000) 1.498 <i>B</i>
23.23	5c	30082.59	$c^3F_2-530(2)$	
23.06	8	30084.04	$c^1G_4-652(4)$	(0.54) 1.10
22.30	25	30091.00	$b^3H_5-555(5)$	(0.108) 1.045
19.15	10	30119.56	$b^1G_4-555(5)$	(0.000) 1.037
16.95	15c	30139.52	$b^3P_1-475(2)$	(0.000) 1.322
15.58	3	30152.00	$c^3F_4-532(5)$	(0.000 <i>W</i>) . . . ; (0.00) 1.50
14.85	15c	30158.60	$b^3G_3-569(4)$	(0.000 , 0.285, 0.583, 0.907) 1.133, 1.430, 1.725, 1.971
14.41	10	30162.57	$d^3F_4-616(3)$	(0.000 , 0.192, 0.399, 0.573) 0.810, 0.959, 1.116, 1.293, 1.467 , . . .
14.06	50c	30165.79	$b^3P_2-486(2)$	(0.304, 0.622) 0.833, 1.142 , 1.446, 1.744
13.49	5	30171.00	$b^1D_2-534(3)$	(0.000 , 0.111, 0.217) 1.313, 1.420
07.58	3	30224.87	$a^1G_4-444(3)$	(0.00) 1.05
06.04	8	30238.98	$a^1P_1-536(2)$	(0.000 <i>W D</i>) 1.362 <i>W D</i>
05.69	3	30242.15		
05.23	2	30246.34		(0.00) 1.35
04.37	25	30254.24	$\left\{ \begin{array}{l} a^3G_4-429(3) \\ b^3F_3-448(3) \\ c^3F_4-533(4) \end{array} \right.$	
03.65	8	30260.82		(0.256 <i>B</i>) 0.935
02.54	12	30271.01		(0.00) 1.42
01.78	3	30278.00	$a^5P_2-421(2)$	(0.00) 1.40
01.08	12	30284.41	$a^3H_5-484(4)$	(0.000 , 0.171, 0.345, 0.529, 0.692) 0.386 , 0.575, 0.747, 0.923, . . .
3298.86	7c	30304.81		(0.00) 1.40
95.45	7	30336.12		(0.27) 0.94
94.92	15c	30341.06	$a^1P_1-537(1)$	(0.00) 1.29
94.20	6	30347.61	$d^3P_1-622(1)$	(0.36) 0.60, 0.99
93.93	25	30350.17	$b^1D_2-536(2)$	(0.000 , 0.469) 0.926 , 1.340
93.32	20c	30355.73	$a^3G_3-421(4)$	(0.000 , 0.351, 0.694) 1.257, 1.638, 2.15
92.25	1	30365.59	$c^3P_0-537(1)$	
91.57	5	30371.90	$c^3F_2-533(2)$	
90.76	12	30379.33	$a^1G_4-445(5)$	(0.00) 1.20
90.02	10	30386.19	$a^3G_3-421(2)$	(0.000 , 0.282, 0.544) 0.330 , 0.623, 0.910
88.98	8c	30395.84		
88.80	10	30397.52	$d^3F_2-602(3)$	(0.000 , 0.343, 0.681) 0.862, 1.188, 1.533, 1.877
88.57	10	30399.63	$a^3F_3-372(2)$	(0.000 , 0.192, 0.559, 0.926) 1.415, 1.758, 2.113
87.76	15c	30407.06	$b^3G_4-585(5)$	(0.000 <i>W</i>) 1.339 <i>w</i>
86.31	8c	30420.52	$a^1G_4-446(4)$	
85.61	20	30426.98	$a^3D_2-475(1)$	(0.594 <i>B</i>) 1.201 <i>D</i>
85.10	50c	30431.74	$a^5P_1-411(2)$	(0.000 , 1.074) 0.000 <i>w</i> , 1.160
83.73	10c	30444.44	$a^3H_4-462(5)$	(0.00) 0.72 <i>A</i>
82.93	4c	30451.85	$b^1D_2-537(1)$	(0.00) 1.08
82.20	2	30458.60		(0.000) 1.352
81.82	2	30462.13	$b^3P_2-489(3)$	(0.00) 1.25
81.52	10	30464.89	$b^3D_2-608(2)$	(0.00) 1.11
81.23	20c	30467.57		(0.00 <i>W</i>) 0.89

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λair	Intensity and notes	Wave number	Term combination	Zeeman pattern
3281.08	3	30469.04	$b\ ^3F_4-489(3)$	
80.60	2	30473.40		
80.01	4	30478.91		(0.00) 1.05
79.72	7	30481.61	$d\ ^3F_2-603(3)$	(0.00, 0.31, 0.61) 1.12, 1.50, 1.83
78.26	5c	30495.21		(0.00) 1.52
77.44	1	30502.88		(0.00) 0.99
77.03	8	30506.68	$c\ ^1G_4-656(3)$	(0.00) 1.19
76.51	30c	30511.46	$a\ ^1F_3-553(4)$	(0.000w) 1.132w
75.97	10	30516.48	$b\ ^3D_1-604(1)$	(0.34) 0.75, 1.06
75.66	60c	30519.36	$a\ ^3P_2-361(2)$	(0.383, 0.782) 0.559, 0.963, 1.344, 1.755
74.92	90c	30526.34	$\{ a\ ^3F_2-337(1)$	(0.000, 0.582) 0.748, 1.491
73.96	75	30535.23	$a\ ^3D_3-490(2)$	
73.13	20	30543.01	$a\ ^3F_2-337(2)$	(0.19) B) 1.211w
71.13	50c	30561.65	$b\ ^3F_2-402(2)$	(0.000) 1.214
69.34	20c	30578.41	$b\ ^3F_4-490(5)$	(0.000w) 1.041w
69.16	12	30580.04	$b\ ^3P_2-490(2)$	(0.154, 0.280) 1.175, 1.300, 1.472, 1.625
68.72	15c	30584.23	$d\ ^3F_4-621(4)$	(0.00) 1.01
66.28	5	30607.06		(0.00) 0.97
65.51	50	30614.25	$b\ ^3F_2-403(1)$	(0.000, 0.200) 0.840, 1.057, 1.246
62.64	25c	30641.22		
62.53	18c	30642.21	$a\ ^5P_1-413(1)$	(0.495) 1.825w, 2.365w
62.14	7	30645.92	$a\ ^1D_2-442(1)$	(0.00, 0.85) 1.08, 1.96
61.49	35c	30652.01	$b\ ^3H_6-566(6)$	(0.181) 1.091W
60.97	18	30656.92	$a\ ^3D_2-478(3)$	(0.000) 1.195
60.55	15	30660.83	$a\ ^5D_3-463(2)$	(0.000, 0.179, 0.375) 1.475, 1.650, 1.837
59.19	5	30673.61	$a\ ^1F_3-555(3)$	
57.50	5	30689.58	$b\ ^3P_1-480(0)$	(0.000) 1.186
56.85	25	30695.62	$b\ ^3H_4-551(3)$	(0.000, 0.266, 0.539, 0.795) 0.187, 0.457, 0.719, 0.996, 1.249, 1.509
56.50	12	30699.00	$a\ ^1D_2-442(2)$	(0.147, 0.279) 0.978, 1.112, 1.257, 1.381
56.28	2	30701.07		
55.76	12	30705.94		(0.000) 0.617
53.36	20	30728.61	$b\ ^3H_5-561(4)$	(0.000, 0.215, 0.438, 0.657, 0.895) 0.150, 0.379, 0.618, 0.851, 1.060
53.12	50	30730.86	$a\ ^5D_1-442(1)$	(1.261) 0.247, 1.501
52.26	60c	30738.98	$a\ ^5D_2-452(1)$	(0.000) 1.477
50.94	4	30751.44		
50.47	8	30755.95		(0.00) 1.71B
48.83	1	30771.46		
47.29	2	30786.05		
41.69	12	30839.23	$a\ ^3G_4-435(3)$	(0.000) 0.954
40.94	250	30846.37	$a\ ^3P_1-361(2)$	(0.000, 0.611) 0.339, 0.944, 1.527
40.70	15	30848.64	$\{ b\ ^3G_5-621(4)$	
38.90	10c	30865.79	$b\ ^3P_1-482(2)$	(0.00) 0.94
38.54	25	30869.20	$b\ ^3F_3-454(2)$	(0.128, 0.269, 0.412, 0.568, 0.712) 0.582, 0.719, 0.879, 1.011, 1.147, 1.297, 1.426, 1.567, 1.710, 1.834
38.27	3	30871.76	$\{ a\ ^3G_5-437(5)$	(0.00) 1.17
35.13	5	30901.70	$a\ ^3H_5-490(5)$	(0.000WD) 0.662A
34.68	10	30906.04	$d\ ^3P_1-628(1)$	
33.91	25	30913.44	$c\ ^3F_3-545(2)$	(0.000w) 1.098w
31.98	10	30931.89	$d\ ^3F_4-624(4)$	(0.000w) 1.115
31.34	12	30937.94	$b\ ^3G_5-622(5)$	(0.000w) 0.917w
29.89	100	30951.83	$a\ ^3D_2-454(2)$	(0.302, 0.613) 0.870, 1.160, 1.479, 1.775
29.10	10	30959.46	$a\ ^5D_1-444(0)$	(0.000) 1.488
28.77	12	30962.59	$b\ ^3G_3-577(2)$	
28.42	35	30965.98	$c\ ^3F_4-540(5)$	(0.000, 0.172, 0.357, 0.533, 0.730) 1.279, 1.453, 1.650, 1.834, 2.031
26.93	100c	30980.30	$a\ ^3H_4-468(3)$	(0.000WD) 1.036WD
25.94	10	30989.77	$a\ ^1F_3-558(2)$	(0.000, 0.333, 0.696) 0.275, 0.646, . . .
22.22	20	31025.56		(0.000w) 0.949B
21.12	15	31036.12	$b\ ^3P_2-495(3)$	(0.000W) 0.938, 1.382W
19.21	15	31054.59	$a\ ^3D_2-482(2)$	(0.218, 0.461) 0.978, 1.208, 1.443, 1.665
18.08	3	31065.51	$b\ ^1G_4-564(5)$	(0.00) 0.94
17.61	2	31070.03	$b\ ^3D_3-616(3)$	

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λ air	Intensity and notes	Wave number	Term combination	Zeeman pattern
3217.37	12	31072.27	$\left\{ \begin{array}{l} b^3H_4-555(5) \\ a^5F_3-337(2) \end{array} \right.$	(0.000 <i>WD</i>) 1.228 <i>WD</i>
17.22	6	31073.71		(0.00) 1.20
16.15	75	31084.06	$a^5P_2-429(3)$	(0.000 , 0.300, 0.615) 0.512 , 0.818, 1.114, 1.396
15.32	15c	31092.16	$b^3P_2-495(2)$	(0.00 <i>W</i>) 1.54
15.13	10	31093.99		(0.00) 1.33
13.91	150	31105.80	$\left\{ \begin{array}{l} a^5D_3-468(3) \\ a^3P_2-367(3) \end{array} \right.$	(0.000 , 0.172, 0.364) 0.788 , 1.012, . . .
13.70	20	31107.78	$b^3H_5-565(5)$	(0.31) 1.13 <i>D</i>
13.29	1	31111.80	$d^3P_1-630(2)$	
12.00	2	31124.22	$\left\{ \begin{array}{l} c^3F_4-542(4) \\ a^5D_3-468(2) \end{array} \right.$	
11.62	2	31127.89	$a^1P_1-545(2)$	(0.000) 1.027
10.73	10	31136.58	$b^1G_4-565(5)$	(0.000 <i>W</i>) 1.100 <i>D</i>
09.76	50c	31145.98	$b^3P_2-496(3)$	(0.000 , 0.430, 0.862) 0.190 , 0.624, 1.043
09.42	5	31149.30	$a^1F_3-560(2)$	(0.00) 1.00
09.03	25	31153.08	$b^3F_4-496(3)$	(0.000 , 0.201, 0.399, 0.596) . . .
08.83	10	31155.00	$a^1H_5-553(4)$	(0.000) 0.676
08.08	1	31162.31		
05.28	20c	31189.49	$a^5P_2-430(2)$	
04.58	10	31196.28	$b^3G_5-624(4)$	(0.000) 1.087
02.96	2	31212.08	$a^5F_1-312(1)$	
00.18	90c	31239.23	$\left\{ \begin{array}{l} b^1D_2-545(2) \\ a^5D_4-484(4) \end{array} \right.$	(0.183 <i>W</i> , 0.228) 1.200 <i>W D</i>
3199.21	60	31248.70	$b^3H_5-566(6)$	(0.000 <i>w</i>) 1.271 <i>B</i>
98.93	75	31251.43		(0.000 <i>w</i>) 0.885 <i>A</i>
96.72	8	31273.06	$a^1F_3-561(4)$	
96.52	15	31275.02	$a^1D_2-448(3)$	(0.000 , 0.153, 0.297) . . ., 1.179, 1.322, 1.469
96.08	25c	31279.32	$a^1H_5-555(5)$	(0.293 <i>w</i>) 0.852, 1.132 <i>w</i>
95.28	20c	31287.12	$a^5F_2-323(3)$	(0.000 <i>w</i>) 0.940 <i>w</i>
95.13	6	31288.63	$b^3D_2-616(3)$	(0.00) 0.86
94.83	75c	31291.48	$b^3P_1-486(2)$	(0.000) 1.114
94.19	2	31297.83	$a^3G_3-430(2)$	
93.97	7c	31299.97	$a^3G_4-440(4)$	(0.129, 0.280, 0.437, 0.569) 1.032 <i>W D</i>
93.16	15	31307.89	$\left\{ \begin{array}{l} c^3P_2-593(2) \\ b^3P_0-475(1) \end{array} \right.$	(0.000) 1.502
92.55	2	31313.89		
90.92	7	31329.85	$a^3P_2-369(1)$	(0.000 , 0.640) . . ., 1.337, 1.981
90.00	7	31338.94	$b^3H_5-567(4)$	(0.00 <i>D</i>) 0.58 <i>A</i>
89.19	20	31346.87		(0.000) 1.144
87.09	10	31367.48	$b^1G_4-567(4)$	(0.380 <i>w</i>) 1.146 <i>w D</i>
85.17	25c	31386.39	$b^3P_2-498(1)$	(0.000 , 0.548) 0.905 <i>w</i> , 1.442, 1.989
84.73	2	31390.74		
82.95	8	31408.33		(0.000 <i>w</i>) 1.109 <i>w</i>
79.73	25c	31440.12	$a^5P_1-421(2)$	(0.00) 1.24
79.44	12	31443.02	$a^5D_3-471(3)$	(0.42, 0.80, 1.14) 0.37, 0.75, 1.11 , 1.50 , 1.87, 2.17
79.12	8	31446.13	$b^3G_3-582(2)$	(0.00 , 0.84, 1.56) — 0.80 , +0.06, 1.64, 2.44
77.56	10	31461.55		(0.00) 0.63 <i>w</i>
77.27	2	31464.45		(0.00) 0.86 <i>A</i>
75.53	10	31481.68		(0.000) 0.737
74.49	2	31492.05	$b^3D_3-621(4)$	(0.00 <i>W</i>) 0.46
72.88	25	31508.01	$c^3F_3-551(3)$	
70.77	8	31529.00		(0.00) 1.14
68.96	15c	31547.01	$a^3D_1-461(1)$	(0.517) 0.912, 1.390
68.17	75	31554.81	$a^5D_3-472(4)$	(0.000 , 0.271, 0.503, 0.836) 0.367 , 0.653, 0.919, 1.197, 1.468, 1.727, 1.988
66.71	50c	31569.40	$a^5P_3-440(4)$	(0.000 , 0.491, 0.972, 1.457) —0.364, +0.141, 0.639, 1.118
66.36	40	31572.83	$a^3P_2-372(2)$	(0.000, 0.719, 1.436) —0.113, 0.610 , 1.333 , 2.053
65.80	4c	31578.43		
65.50	3	31581.47		(0.433, 0.653) . . .?
64.34	15	31592.97		(0.00) 1.19

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
3163.12	40c	31605.22	$\left\{ \begin{array}{l} c \text{ } ^3F_2-545(2) \\ a \text{ } ^5D_0-442(1) \\ a \text{ } ^3D_2-487(1) \end{array} \right.$	(0.098 , 0.316) 1.071 , 1.269, 1.454 (0.000 , 0.428) 0.712, 1.149, 1.576
62.86	20c	31607.86		
61.90	2	31617.36		
61.72	4	31619.20		
57.95	70c	31656.95	$a \text{ } ^3P_1-369(1)$	(0.877) 0.670, 1.546
57.64	50c	31660.03		(0.447, 0.675, 0.929) 0.582, 0.818, 1.039, 1.267 , 1.504, 1.743, 1.949
57.19	5	31664.59	$b \text{ } ^3F_2-413(1)$	(0.00 , 0.86) 0.23, . . .
56.74	50c	31669.05	$a \text{ } ^5P_2-435(3)$	(0.000 , 0.356, 0.698) 0.408w , 0.750, 1.075
56.58	10	31670.65		(0.00) 1.04
56.37	2	31672.79	$b \text{ } ^3G_4-598(5)$	(0.00) 1.18
56.14	4	31675.10	$b \text{ } ^1G_4-570(3)$	
55.69	6	31679.66	$a \text{ } ^5D_2-461(1)$	(0.000w) 1.498 A
55.35	5	31682.99		(0.00) 1.17
55.24	50	31684.16	$a \text{ } ^3F_3-385(2)$	(0.000 W D) 1.181w B
53.92	12	31697.42	$a \text{ } ^5F_4-361(4)$	(. . ., 0.334, 0.509, 0.696) . . ., 1.484, 1.662, 1.839
53.76	15c	31698.98		(0.00 W) 0.92
53.07	5c	31705.94	$b \text{ } ^3F_3-462(4)$	(0.000 W) 1.109 A
52.69	7	31709.78	$b \text{ } ^3H_4-561(4)$	(0.96, 1.20) . . ., 1.15, 1.55, 1.83, 2.23
51.65	15	31720.21	$c \text{ } ^3F_2-546(3)$	(0.000 , 0.227, 0.468) 0.716, 0.942, 1.160
51.16	50c	31725.12	$a \text{ } ^3G_4-444(3)$	(0.000 W) 1.182w
50.54	20c	31731.37	$a \text{ } ^5D_4-489(3)$	(0.000 WD) 1.057w
47.70	20c	31760.03	$a \text{ } ^3D_1-463(2)$	(0.00) 0.210 B
45.99	20c	31777.28	$a \text{ } ^3G_3-435(3)$	(0.166, 0.337, 0.531) 0.651, 0.834 , 1.008 , 1.257
44.86	30c	31788.70	$a \text{ } ^5D_3-475(2)$	(0.000 , 0.169, 0.361) 1.288, 1.462, 1.631, 1.824
44.32	10	31794.13	$a \text{ } ^3D_2-489(3)$	(0.000) 1.358B
42.95	75	31808.07	$a \text{ } ^3F_4-415(3)$	(0.000) 1.243
42.36	20c	31814.01	$b \text{ } ^3P_2-503(3)$	(0.000 , 0.201, 0.410) 0.772 , 1.039
41.69	8	31820.77	$b \text{ } ^3F_4-503(3)$	(0.000) 1.226
41.37	80c	31824.00	$a \text{ } ^5D_4-490(5)$	(0.000w) 1.327w
40.33	4	31834.56	$c \text{ } ^3P_1-580(1)$	(0.180) 1.134, 1.342
39.84	20	31839.57	$b \text{ } ^3D_3-624(4)$	(0.268w) 1.193w
38.75	7	31850.63	$d \text{ } ^3F_2-616(3)$	(0.000 WD) 1.042
38.04	5	31857.76		(0.000) 1.026
37.43	75	31863.95	$\left\{ \begin{array}{l} a \text{ } ^3D_1-464(2) \\ b \text{ } ^3F_2-415(3) \end{array} \right.$	(0.000 , 0.163, 0.331) 0.892, 1.051, 1.198, 1.358, 1.521
36.72	4	31871.19		(0.33) 1.67
35.83	120c	31880.22	$a \text{ } ^3G_4-445(5)$	(0.000 , 0.253, 0.551, 0.877, 1.187) 1.017, 1.272, 1.525, 1.860, 2.153, 2.469
35.53	5	31883.30	$a \text{ } ^1F_3-567(4)$	
35.20	15	31886.65	$a \text{ } ^1D_2-454(2)$	(0.123) 1.111w
34.80	5	31890.71	$b \text{ } ^3D_2-622(1)$	(0.00 , 0.48) 0.58, 1.13, 1.55
33.89	50	31899.95	$a \text{ } ^3P_1-372(2)$	(0.000 , 0.949) - 0.309 , +0.631, 1.556
32.86	3	31910.46	$b \text{ } ^3F_3-464(2)$	
31.85	90c	31920.73	$a \text{ } ^3G_4-446(4)$	(0.220, 0.772) . . . ?
31.60	90c	31923.33	$c \text{ } ^3F_3-555(3)$	
30.80	8	31931.46	$c \text{ } ^3F_3-555(2)$	(0.00w) 1.13
28.59	10	31954.04	$d \text{ } ^3F_4-634(4)$	(0.29) 1.10w
27.74	100c	31962.74	$a \text{ } ^3F_4-417(5)$	(0.000w) 1.264w
26.87	7	31971.58	$a \text{ } ^5D_1-454(2)$	(0.000 , 0.341) 0.781 , 1.148, 1.503
26.59	7c	31974.45	$a \text{ } ^3H_4-478(3)$	(0.000w) 1.107
24.62	50c	31994.66	$a \text{ } ^5P_3-444(3)$	(0.670, 1.326, 1.976w) . . . 0.327, 0.936 , 1.560 , 2.237, 2.912
23.46	3	32006.55	$a \text{ } ^3H_4-478(5)$	
22.78	15c	32013.42	$b \text{ } ^3F_4-505(5)$	(0.000 , 0.156, 0.330) 1.17B
22.32	18	32018.22	$b \text{ } ^3H_4-564(5)$	(0.000 , 0.205, 0.410, 0.622) 0.352 , 0.568, 0.778, 0.976, 1.186
21.26	40c	32029.03	$a \text{ } ^3F_4-417(4)$	(0.139) 1.236A
21.09	7	32030.79	$b \text{ } ^3P_2-505(1)$	
20.13	2	32040.62	$c \text{ } ^3P_1-582(2)$	
19.64	5	32045.73	$c \text{ } ^3F_4-551(3)$	(0.000) 1.302B
19.12	10	32050.99		(0.000 , 0.188) 1.231, 1.397, 1.582
17.74	10	32065.24	$b \text{ } ^3F_3-466(4)$	(0.000 , 0.210, 0.421, 0.645) 0.960 , 1.188, 1.377
16.70	15	32075.96	$b \text{ } ^3G_4-602(3)$	(0.000 , 0.123, 0.265, 0.387) 0.655 , 0.803, 0.927
15.42	20	32089.12	$\left\{ \begin{array}{l} b \text{ } ^3H_4-565(5) \\ a \text{ } ^1G_4-462(5) \end{array} \right.$	(0.000) 1.005

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λ air	Intensity and notes	Wave number	Term combination	Zeeman pattern
3114.45	8	32099.13	$a^5D_3-478(3)$	(0.269, 0.523, 0.804) 0.932, 1.186 , 1.447 , 1.699
12.88	50	32115.27		(0.247) 1.088 <i>WD</i>
12.58	6	32118.35	$a^1F_3-569(4)$	(0.000 , 0.165, 0.319, 0.475) . . . , 1.266, 1.434, 1.626
11.35	2	32131.11	$a^3F_3-389(3)$	(0.242) 0.633, 0.865 , 1.111 , 1.340.
10.81	90 <i>c</i>	32136.69		(0.263 <i>w</i>) 1.185 <i>w</i>
09.93	6 <i>c</i>	32145.72	$a^1P_1-555(2)$	(0.00) 0.94
09.81	10	32146.98	$c^3P_0-555(1)$	(0.000) 1.395
09.04	3 <i>c</i>	32154.98		(0.00 , 0.38) 0.77 , 1.14
08.58	45 <i>c</i>	32159.66	$b^3G_4-603(3)$	(0.000 <i>w</i>) 0.832
06.11	3	32185.27		
05.63	50	32190.20	$a^5P_3-446(4)$	(0.000 , 0.345, 0.675, 1.033) 0.230 , 0.575, 0.909, 1.251, 1.603
04.70	6 <i>c</i>	32199.89	$c^3F_2-551(3)$	(0.00 , 0.55, 1.13) . . . , 0.72, 1.22, 1.81, 2.48
02.90	7	32218.56	$\begin{cases} b^3P_1-495(2) \\ b^3G_5-634(4) \end{cases}$	(0.00) 1.15
01.47	10	32233.46	$b^1D_2-555(1)$	(0.000, 0.293) 0.822 , 1.097, 1.423
01.22	7	32236.02		
01.04	100 <i>c</i>	32237.86	$a^3G_3-440(4)$	(0.000 , 0.205, 0.448, 0.713) 0.683, 0.916, 1.117, 1.346, 1.598, 1.857
3099.83	20 <i>c</i>	32250.43	$b^3F_3-468(3)$	(0.211, 0.406, 0.668) 0.564, 0.784, 1.003 , 1.209 , 1.436, 1.667
99.22	2	32256.86	$b^1D_2-555(2)$	(0.00) 1.10
97.98	25 <i>c</i>	32269.69	$b^3F_3-468(2)$	(0.000 <i>w</i>) 0.875 <i>w</i>
96.88	8 <i>c</i>	32281.19	$c^3P_2-603(3)$	(0.000 , 0.218, 0.444) 0.692 , 0.943
96.13	10	32289.04	$d^3F_4-638(4)$	(0.000) 1.128
95.50	15	32295.56	$a^1H_5-565(5)$	(0.000) 1.008
95.21	10	32298.61	$c^3F_4-553(4)$	(0.000) 1.033
94.60	40 <i>c</i>	32304.94	$a^5D_4-495(3)$	(0.000 , 0.149, 0.306, 0.470) 0.717 , 0.889, 1.066
93.14	7	32320.20	$b^3H_4-567(4)$	(0.49, 0.76) 0.43, 0.85 , 1.29 , 1.79
91.90	8	32333.19	$b^3D_1-622(1)$	(0.39) 0.60, 1.00
91.58	15	32336.50	$a^5D_2-468(3)$	(0.000 , 0.253, 0.550) 0.656 , 0.948, 1.240
90.48	10	32348.04	$a^5F_4-367(3)$	(0.000 , 0.185, 0.341, 0.501) 1.317, 1.501, 1.663
90.14	20 <i>c</i>	32351.59	$a^5P_1-430(2)$	(0.000) 0.251 , 1.056
89.85	5	32354.64	$b^3D_1-623(2)$	
89.74	15 <i>c</i>	32355.83	$a^5D_2-468(2)$	(0.75 <i>B</i>) 0.68, 1.07 , 1.49 , 1.89, 2.38
88.84	4	32365.22		
88.69	10	32366.77		(0.00) 1.15
88.60	10	32367.73	$a^3D_2-495(3)$	(0.000) 1.059
87.76	100 <i>c</i>	32376.57	$a^3F_4-421(4)$	(0.020 <i>w</i>) 1.254 <i>w</i>
87.08	4	32383.65	$a^5P_2-442(2)$	
85.65	10	32398.68	$c^3F_3-560(2)$	(0.00 , 0.70) 1.13
84.06	10	32415.40	$a^5D_4-496(3)$	(0.000 , 0.147, 0.291, 0.439) 1.030, 1.171, 1.312, 1.460, 1.613
83.39	25	32422.40	$c^3F_4-555(5)$	(0.000 <i>w</i>) 0.098 <i>w</i>
83.19	6	32424.50	$a^3D_2-495(2)$	(0.34, 0.73) 0.88, 1.26 , 1.64 , . . .
82.06	90 <i>c</i>	32436.42	$\begin{cases} b^3G_5-637(5) \\ b^3D_5-630(2) \\ a^1H_5-566(6) \end{cases}$	(0.00 <i>w</i>) 1.40 <i>w</i>
80.53	1	32452.55	$d^3F_2-622(1)$	
79.56	75 <i>c</i>	32462.80	$b^3F_2-421(2)$	(0.124, 0.323) 0.846, 1.035 , 1.215 , 1.391
79.40	4	32464.43	$a^3F_3-392(3)$	(0.00) 1.11
78.47	10	32474.19	$d^3F_2-623(2)$	(0.157, 0.326) 0.673, 0.829 , 0.988 , 1.138
78.10	25 <i>c</i>	32478.17	$a^3D_2-496(3)$	(0.58) 0.71 <i>w</i>
76.80	8 <i>c</i>	32491.88	$a^3G_3-442(2)$	(0.00 , 0.39) . . . ?
76.32	20	32496.89	$a^5D_3-482(2)$	(0.000) 1.468
75.31	2	32507.60	$a^3H_5-506(6)$	(0.000 <i>WD</i>) 1.350 <i>B</i>
74.90	20 <i>c</i>	32511.94	$b^3P_1-498(1)$	(0.809) 1.922
74.23	25	32519.02		
74.13	15 <i>c</i>	32520.04	$a^3D_3-510(3)$	(0.424 <i>W</i>) 1.316 <i>W</i>
73.87	20	32522.87	$b^3G_3-593(2)$	(0.000 , 0.284, 0.604) 0.252 , 0.573, 0.846
73.50	8	32526.72	$a^1H_5-567(4)$	(0.00) 0.77
70.96	15	32553.69	$b^3G_5-638(4)$	(0.000) 1.127
69.93	8	32564.55	$b^1D_2-558(2)$	(0.229, 0.433) 0.947, 1.162 , 1.368 , 1.554
68.77	8	32576.92		(0.00) 0.99
68.45	7	32580.32		(0.000 <i>w</i>) 1.349
67.60	5	32589.29		
65.58	5	32610.78		

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Åair	Intensity and notes	Wave number	Term combination	Zeeman pattern
3065.25	8	32614.27	$\left\{ \begin{array}{l} a^1D_2-461(1) \\ c^3F_2-555(3) \end{array} \right.$	(0.000, 0.252) 0.869 , 1.105, 1.352
64.79	125c	32619.20	$a^3H_4-484(4)$	(0.445) 1.186
64.17	6c	32625.78	$a^1G_4-468(3)$	(0.00) 1.22
64.08	8	32626.77	$b^3H_5-580(4)$	(0.00) 1.35
63.68	1	32631.60	$c^1D_2-656(3)$	
63.49	8	32633.02	$a^5D_0-452(1)$	(0.00) 1.45
62.52	35c	32643.40	$a^3D_3-511(2)$	(0.000) 1.278
61.44	20	32654.92	$b^3D_2-630(2)$	(0.082) 0.755
60.65	50c	32663.26	$a^3G_3-444(3)$	(0.000w) 0.910w
59.63	15	32674.17	$a^5D_2-471(3)$	(0.000, 0.377, 0.751) 0.336 , 0.707, 1.102, 1.487
58.73	12	32683.83	$a^5F_2-337(2)$	(0.000, 0.341) 0.537, 0.869 , 1.176 , 1.482
57.23	150c	32699.88	$\left\{ \begin{array}{l} a^5D_1-461(1) \\ b^3F_3-472(4) \end{array} \right.$	(0.000, 0.198, 0.413, 0.656) 0.988, 1.176, 1.382, 1.616, 1.849
56.62	75c	32706.37	$a^5D_4-499(4)$	(0.167w) 1.216w
56.12	40	32711.68	$a^3H_6-506(6)$	(0.000wD) 1.153 B
55.48	2	32718.53	$a^3D_2-498(1)$	(0.00, 0.81) 0.46 , 1.32, 2.03
53.10	50	32744.12	$a^5D_3-484(4)$	(0.000, 0.195, 0.399, 0.615) 0.840 , 1.067, 1.265, 1.458, 1.656, 1.856
52.59	125	32749.52		(0.000WD) 0.624A
51.46	15	32761.63	$\left\{ \begin{array}{l} a^3G_4-454(5) \\ a^1H_5-569(4) \end{array} \right.$	(0.000, 0.128, 0.251, 0.392, 0.525) 0.450 , 0.620, 0.739, 0.864, 1.004
45.51	2	32825.68	$b^3F_2-513(1)$	
45.37	25c	32827.20	$a^1D_2-463(2)$	(0.224, 0.440) 0.913, 1.112 , 1.316 , . . .
44.13	3c	32840.55	$a^5P_1-435(1)$	(0.98) 1.50
42.92	4	32853.63		(0.00) 1.16
42.45	100c	32858.73	$a^3G_3-446(4)$	(0.000, 0.336, 0.679) 0.232, 0.568, 0.916, 1.256, 1.537, . . .
42.07	100c	32862.79	$a^3P_0-369(1)$	(0.000) 0.679
40.72	50c	32877.44	$a^3P_2-385(1)$	(0.000, 0.878) 0.477, 1.326, 2.187w
39.85	50	32886.83	$a^3D_1-475(2)$	(0.000, 0.444) 0.863, 1.272, 1.736
39.44	4	32891.25	$b^3D_1-628(1)$	
37.51	100c	32912.12	$\left\{ \begin{array}{l} a^3F_3-397(4) \\ a^5D_1-463(2) \end{array} \right.$	(0.102, 0.308, 0.470) . . . ?
36.61	50	32921.84	$a^1F_3-577(2)$	(0.000w) 0.923 A
35.53	7c	32933.57	$b^3F_3-475(2)$	(0.000, 0.288, 0.593) 0.429 , 0.710
34.91	10	32940.29	$\left\{ \begin{array}{l} b^3G_4-611(4) \\ a^5D_3-486(2) \end{array} \right.$	(0.000, 0.328, 0.628) 1.471, 1.784, 2.105
34.01	5c	32950.08	$c^3F_2-558(1)$	(0.00, 0.74) 0.00 , 0.74
33.12	15c	32959.78	$a^1P_2-448(3)$	(0.000, 0.183, 0.385) 0.892 , 1.069, 1.246
32.77	1	32963.55	$a^1G_4-471(3)$	(0.000) 1.021
32.34	6	32968.24	$a^3D_1-475(1)$	(0.652) 0.865, 1.507
31.22	40c	32980.63	$a^3D_3-515(2)$	(0.000w) 1.324 A
30.68	8	32986.25	$b^3F_4-514(4)$	(0.365w) 1.274w
29.70	2	32996.98	$a^3F_2-361(2)$	(0.44) 0.93 D
28.44	25	33010.74	$a^5P_3-454(2)$	(0.00) 0.84
27.62	30	33019.63	$a^5D_2-475(2)$	(0.213, 0.370) 1.105, 1.273 , 1.480 , 1.652
24.29	2	33056.02	$b^1D_2-563(3)$	
23.94	2	33059.81	$c^3F_4-561(4)$	
23.20	5	33067.88	$a^3G_3-448(3)$	(0.00) 1.11
22.56	50	33074.90	$a^1G_4-472(4)$	(0.496 B) 1.110
21.80	70	33083.28	$a^5D_4-503(3)$	(0.000 W) 1.031w
21.18	4	33090.04	$c^3F_2-560(2)$	
20.52	5	33097.22	$b^3D_1-630(2)$	(0.000) 1.225w
20.17	50	33101.06	$a^5D_2-475(1)$	(0.000) 1.460
19.34	8	33110.22		
18.70	5	33117.24	$c^3P_1-593(2)$	(0.000, 0.197) 0.919 , 1.150, 1.360
18.29	10	33121.66	$d^3F_4-646(3)$	(0.125) 1.086
16.07	25	33146.10	$a^3D_2-503(3)$	(0.000w) 1.363 B
15.84	4	33148.56	$c^1G_4-682(3)$	(0.00) 1.17
15.17	10	33156.01	$\left\{ \begin{array}{l} b^1D_2-564(1) \\ b^3P_1-505(1) \end{array} \right.$	(0.000w) 1.306w
14.94	20	33158.45	$b^3H_5-585(5)$	(0.304) 1.088JW

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
3013.78	3	33171.26	$a^1F_3-580(4)$	(0.00) 1.16
12.55	125c	33184.84	$a^3P_1-385(2)$	(0.000, 0.561) 0.460 , 1.012, 1.544; (0.957) 2.046w
11.87	10	33192.25	$b^3G_4-613(5)$	(0.76) 1.26
11.49	15	33196.52	$b^3D_3-638(4)$	(0.00) 0.84
10.80	125c	33204.09	$\left\{ \begin{array}{l} a^3P_1-385(1) \\ a^3H_4-490(5) \end{array} \right.$	(0.376 W) 1.289, 1.750 W
09.97	7	33213.27	$a^3F_4-429(3)$	(0.000w) 1.533 B
09.65	2	33216.80	$\left\{ \begin{array}{l} a^1D_2-467(2) \\ d^3F_2-630(2) \end{array} \right.$	(0.279, 0.554) 0.550, 0.816 , 1.118 , 1.376
09.16	1	33222.21		(0.000, 0.93) 1.53, 2.42
05.74	40	33259.97	$b^3F_4-517(5)$	(0.000 W D) 0.683 W
04.92	50	33269.06	$b^3F_2-429(3)$	(0.000w) 1.229
04.72	10	33271.30	$a^1D_2-468(3)$	(0.000w) 1.385w
04.32	5c	33275.71	$a^5D_4-505(5)$	(0.000) 1.084w
02.98	50	33290.51	$a^1D_2-468(2)$	(0.000) 1.108
02.68	5	33293.86	$a^3H_5-514(4)$	(0.000w) 1.009w
01.73	1	33304.45	$a^3P_2-389(3)$	
2999.38	125c	33330.53	$a^5D_2-478(3)$	(0.000, 0.266, 0.564) 0.624 , 0.931, 1.196, 1.460, 1.728
98.69	3	33338.18		(0.262 W) 1.147 W
97.28	75c	33353.85	$a^5D_3-490(2)$	(0.312w) 1.192 W D
96.88	7	33358.33	$a^5P_2-452(1)$	(0.000) 1.408w
96.49	25	33362.70	$a^3D_2-505(1)$	(0.000, 0.163) 0.754 , 0.898, 1.067
95.99	3	33368.18	$c^3F_4-564(5)$	(0.000, 0.166, 0.322, 0.482) . . . ?
95.43	30	33374.48	$b^3F_2-430(2)$	(0.000) 1.061
92.95	12	33402.11	$a^3F_3-402(2)$	(0.000 W) 1.017 B
92.69	10	33404.97	$a^1F_3-582(2)$	(0.000) 0.989
92.01	4	33412.56		
89.83	5	33437.01	$a^3D_1-480(0)$	(0.000) 0.856
89.63	20	33439.19	$c^3F_4-565(5)$	(0.000) 0.890
88.72	10	33449.38		(0.000) 0.915
87.12	2	33467.30		(0.00) 1.04
86.81	50c	33470.73	$a^5F_3-361(4)$	(0.000 W) 0.907 A
84.83	12c	33492.98	$a^5P_1-442(1)$	(0.135) 0.255, 2.376
84.55	10	33496.07	$b^3G_3-603(3)$	
83.73	2	33505.32		
80.78	1	33538.51	$a^3D_1-481(2)$	
80.12	15c	33545.92	$a^5P_1-442(2)$	(0.00, 1.13) 0.00w , 1.24
79.14	10c	33556.94	$a^5F_5-397(4)$	(0.00) 1.81
78.20	50	33567.52	$\left\{ \begin{array}{l} a^3D_3-521(3) \\ a^3H_5-517(5) \end{array} \right.$	
77.85	10c	33571.50	$a^5P_2-454(2)$	(0.53) 1.32w
76.99	50c	33581.16	$a^3G_4-462(4)$	(0.000w) 1.004W
76.76	10	33583.79	$a^3F_2-367(3)$	(0.000, 0.420, 0.842) 0.945, 1.374, 1.814, 2.265
76.22	200c	33589.80	$a^3G_4-462(5)$	(0.000, 0.187, 0.406, 0.606, 0.823) 1.004, 1.202, 1.409, 1.611, 1.795, 2.050
75.74	1	33595.29	$a^3D_1-482(2)$	
74.88	2	33605.05		
74.54	50	33608.86	$a^1D_2-471(3)$	
73.65	10	33618.85		(0.000, 0.347, 0.658) 0.453 , 0.713, 0.997, 1.303
73.52	8c	33620.41	$b^3P_2-521(3)$	(0.00, 0.40) . . . ?
72.90	8	33627.37	$b^3F_4-521(3)$	(0.00W) 1.41w
72.85	6	33627.93		
72.75	7	33629.07		(0.00) 1.08
71.96	15	33637.99	$a^3P_2-392(3)$	(0.00W) 0.77A
71.62	10	33641.83	$\left\{ \begin{array}{l} b^3F_3-482(2) \\ b^3G_5-649(6) \end{array} \right.$	(0.00) 1.31B
71.48	8	33643.46		(0.00) 0.98
70.90	1	33650.01	$c^3P_2-616(3)$	
70.46	6	33654.97	$b^3P_2-521(1)$	(0.000, 0.183) 1.281w
69.04	40c	33671.04	$c^3F_4-567(4)$	(0.000WD) 1.794WD

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Åair	Intensity and notes	Wave number	Term combination	Zeeman pattern
2968.64	10	33675.66		(0.000 , 0.165, 0.345, 0.519) 0.370 , 0.522, 0.668
68.29	75c	33679.60	$a^3G_3-454(2)$	(0.000 , 0.250, 0.568, 0.850) . . . ?
67.81	5c	33685.01	$a^3H_4-495(3)$	(0.000 , 0.197, 0.391, 0.615) 0.699 , 0.929, 1.134, 1.319, 1.501
66.18	3	33703.60	$d^3F_4-652(4)$	(0.000w) 1.369W
65.93	50c	33706.39	$a^5F_1-337(1)$	(0.269) 0.165, 0.383
65.14	250c	33715.33	$a^5F_1-337(2)$	(0.000 , 0.748) 0.771, 1.554W
64.02	50c	33728.16	$a^5D_2-482(2)$	(0.000w) 1.453
62.20	2	33748.84		(0.00) 1.55
61.47	3	33757.12		(0.000) 0.669
60.71	3	33765.78	$b^1D_2-570(3)$	(0.000 , 0.283, 0.571) 1.369, 1.695, . . .
60.37	7	33769.72		(0.000w) 0.951w
60.12	7	33772.53		(0.000w) 0.787B
58.61	3c	33789.74	$a^1P_1-571(1)$	(0.572w) 2.082
58.12	10	33795.37	$a^3H_4-496(3)$	(0.000w) 1.339W
57.88	50	33798.09	$a^3F_4-435(3)$	(0.000 , 0.150, 0.272, 0.416) 0.945, 1.082, 1.215, 1.358, 1.501, 1.650
56.84	100c	33810.07	$a^5D_3-495(3)$	(0.171, 0.355, 0.493) 0.975, 1.141, 1.304 , 1.473 , 1.637, 1.802
56.43	10	33814.73	$\left\{ \begin{array}{l} c^3P_0-571(1) \\ a^3G_5-466(4) \\ a^1H_5-580(4) \end{array} \right.$	(0.000w) 0.894A
55.79	3	33822.04	$b^3P_1-511(2)$	(0.00) 1.31A
55.32	50	33827.38	$b^3H_6-598(5)$	(0.000WD) 1.319B
54.92	8c	33831.97		
53.97	1	33842.84	$a^5D_4-510(3)$	(0.000 , 0.150) . . . ?
53.00	100	33853.96	$b^3F_2-435(3)$	(0.000w) 1.116
51.90	75	33866.56	$a^5D_3-495(2)$	(0.000w) 1.372WD
49.92	70c	33889.26	$b^3F_3-484(4)$	(0.000 , 0.263, 0.541, 0.884) 0.726, 1.003, 1.264, 1.521, 1.884, 2.176
49.02	30	33899.66		(0.000WD) 1.451
48.53	10	33905.28	$\left\{ \begin{array}{l} a^3D_2-510(3) \\ c^3F_4-569(4) \\ a^5D_3-496(3) \end{array} \right.$	(0.414) 0.903
47.21	4	33920.50	$a^3D_3-524(4)$	(0.43, 0.93, 1.36) 0.22, 0.60, 1.09 , 1.60 , . . .
45.59	60	33939.09		(0.000 , 0.241, 0.489, 0.752) 0.347 , 0.604, 0.845, 1.080
44.83	100	33947.89		(0.000) 1.166
44.57	50c	33950.86	$\left\{ \begin{array}{l} b^3G_4-621(4) \\ b^3P_1-513(1) \end{array} \right.$	(0.000) 1.065
44.27	3	33954.40	$a^1D_2-475(2)$	(0.40) 1.04
43.48	5c	33963.44	$d^3F_4-654(3)$	(0.00w) 1.06w
43.09	20	33967.95	$b^3G_5-652(4)$	(0.376 B) 1.174 D
38.02	75c	34026.60	$a^3D_3-525(3)$	(0.216 B) 1.349 D
37.80	12	34029.14	$\left\{ \begin{array}{l} a^3D_2-511(2) \\ b^3D_3-646(3) \end{array} \right.$	(0.179, 0.350, 0.549) 0.717, 0.897, 1.062 , 1.240 , 1.417, 1.614
36.95	50	34039.00	$\left\{ \begin{array}{l} a^5D_1-475(2) \\ a^3D_1-486(2) \end{array} \right.$	(0.000 , 0.209) 1.044 , 1.296w
36.74	10	34041.38	$b^3G_3-608(2)$	(0.000 , 0.222) 1.434w
35.95	10	34050.61	$a^3F_2-372(2)$	(0.000 , 0.273, 0.546) 0.292 , 0.584, 0.857, 1.123
35.62	10	34054.42		(0.138, 0.257) 0.475, 0.608 , 0.745 , 0.872
32.91	30c	34085.88	$b^3F_3-486(2)$	(0.059) 1.023
31.69	5	34100.00		(0.000 , 0.175, 0.337) 0.607 , 0.786, 0.954, 1.104, 1.285, 1.419
29.93	20	34120.55	$a^5D_1-475(1)$	(0.000 , 0.094) 0.439 , 0.532
29.45	15	34126.14	$\left\{ \begin{array}{l} d^3F_4-656(3) \\ a^3G_4-468(3) \end{array} \right.$	(0.000) 1.506
28.94	2	34132.06	$c^3F_2-570(3)$	(0.000 , 0.203, 0.376, 0.560) 0.467 , 0.643, 0.844
28.29	3	34139.68	$b^3H_4-585(5)$	
27.51	15	34148.72	$a^3D_1-487(1)$	(0.107) 0.798
26.72	20c	34158.00	$a^3D_2-513(1)$	(0.000 , 0.184) 1.077 , 1.251, 1.422
26.60	7	34159.35	$b^3P_1-515(2)$	(0.00) 1.32
25.55	8	34171.63	$\left\{ \begin{array}{l} c^3F_3-577(2) \\ a^5D_2-486(2) \end{array} \right.$	(0.341, 0.644) 0.835, 1.126 , 1.492 , 1.781
22.85	50c	34203.12		(0.000w) 0.885 D
22.28	30c	34209.78	$a^5P_3-466(4)$	
22.13	40	34211.39	$a^5D_3-499(4)$	(0.000 , 0.248, 0.494, 0.747) 0.449 , 0.694, 0.955, 1.202, 1.436, 1.692, 1.968
21.44	8	34219.66		(0.000) 0.818
18.96	200c	34248.75	$a^5D_4-514(4)$	(0.239w) 1.131 W
18.09	12	34258.92	$a^3F_4-440(4)$	(0.402 B) 1.168 D

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λ air	Intensity and notes	Wave number	Term combination	Zeeman pattern
2917. 56	50	34265. 16	$\left\{ \begin{array}{l} a^1G_4-484(4) \\ a^1D_2-478(3) \\ c^3P_2-623(2) \end{array} \right.$	(0.000w) 1.360 <i>B</i>
16. 81	1	34274. 02		
16. 55	15c	34277. 10		(0.00, 0.34) 1.25, 1.52
14. 73	50	34298. 43	$b^3G_4-624(4)$	(0.000 <i>WD</i>) 0.847w
14. 66	20c	34299. 28	$a^5P_2-461(1)$	(0.000) 1.475 <i>D</i>
14. 10	4	34305. 81		(0.000, 0.230) 1.405, 1.616, 1.858
13. 99	30	34307. 14	$a^3H_5-524(4)$	(0.000) 1.101
13. 44	30	34313. 63	$a^3F_3-411(2)$	(0.000w) 0.970 <i>A</i>
12. 41	40	34325. 77	$a^5D_1-478(0)$	(0.000) 1.515
11. 88	2	34332. 02		
10. 86	3	34344. 05		(0.000) 1.466 <i>B</i>
10. 67	2	34346. 29	$a^1H_5-585(5)$	(0.00) 1.22
09. 02	12	34365. 80	$a^3D_2-515(2)$	(0.158) 1.232
07. 33	30c	34385. 72	$a^1P_1-577(2)$	(0.000, 0.217) 0.889 , 1.055
06. 92	3	34390. 63		(0.000) 1.014
05. 24	100	34410. 51	$a^3P_0-385(1)$	(0.000) 0.472
04. 88	20	34414. 76	$a^5P_3-468(2)$	(0.000, 0.498) 1.127, 1.600, 2.079, 2.597
04. 41	2	34420. 34	$c^3F_3-580(4)$	
04. 08	20c	34424. 20	$b^3H_5-598(5)$	(0.00w) 1.09
01. 87	50	34450. 46	$a^3G_5-472(4)$	(0.141) 1.087
01. 67	4	34452. 84	$a^3D_1-490(2)$	
01. 31	15c	34457. 14	$a^3D_3-530(2)$	
00. 74	75	34463. 84	$a^3G_4-471(3)$	(0.000w) 0.875w
2899. 20	50	34482. 18	$a^1F_3-593(2)$	(0.000, 0.174, . . .) 0.622 , 0.799, 0.996, 1.179
98. 69	3	34488. 25		(0.18) 1.13
97. 99	2	34496. 61	$b^1D_2-577(2)$	(0.00) 1.13
97. 73	4	34499. 65	$b^3F_3-490(2)$	(0.000, 0.313, 0.644) 0.345 , 0.673, 0.996, 1.320
96. 84	2	34510. 28	$b^3P_2-530(2)$	(0.000w) 1.461
96. 38	20	34515. 74	$b^3F_2-442(1)$	(0.000, 0.799) 0.248, 1.049, 1.843
96. 04	7	34519. 78	$a^3G_3-462(4)$	
95. 48	30	34526. 41		(0.000, 0.155, 0.297) 0.960 , 1.139, 1.289
93. 77	10	34546. 83	$a^5F_4-389(3)$	(0.000, 0.342, 0.681, 1.013) 0.827, 1.162, 1.497, 1.840, 2.175
91. 99	2	34568. 08		(0.23) 1.11
91. 36	15	34575. 64	$\left\{ \begin{array}{l} a^3G_4-472(4) \\ a^3P_2-402(2) \end{array} \right.$	(0.188, 0.385) . . ., 1.149 , 1.336 , 1.524, 1.719
90. 53	3	34585. 63	$a^5D_2-490(2)$	(0.31) 1.57
90. 26	50c	34588. 85	$\left\{ \begin{array}{l} a^5F_3-372(2) \\ a^5D_1-480(0) \end{array} \right.$	(0.000, 0.622, 1.247) 0.000, 0.614, 1.240, 1.866, 2.491
88. 40	20	34611. 12	$b^3D_3-652(4)$	(0.000) 1.179
87. 69	2	34619. 60	$a^3G_3-463(2)$	
87. 16	2	34625. 96		
86. 34	6	34635. 81	$c^3P_1-608(2)$	(0.000, 0.209) 0.923 , 1.137, 1.330
85. 40	40c	34647. 03	$a^3P_2-403(1)$	(0.097) 1.395
84. 65	25c	34656. 06	$a^3H_4-505(5)$	(0.000) 1.123w
84. 30	12	34660. 26	$a^3H_5-528(6)$	(0.000w) 1.467 <i>B</i>
82. 83	8	34678. 01		
82. 32	25	34684. 09	$a^3F_4-444(3)$	(0.000, 0.278, 0.562, 0.835) 0.659, 0.939, 1.222, 1.496, 1.777, 2.051
82. 00	8	34687. 95	$c^3P_0-580(1)$	(0.000) 1.133
81. 60	50	34692. 82	$a^3P_1-400(0)$	(0.000) 1.549
80. 57	4	34705. 14		(0.000) 0.508
79. 09	35	34722. 99	$a^3F_3-415(3)$	(0.246, 0.385) 0.824, 0.936, 1.083 , 1.208 , 1.347, 1.462
78. 21	18c	34733. 65	$\left\{ \begin{array}{l} a^5P_3-471(3) \\ a^5P_1-454(2) \end{array} \right.$	(0.000) 1.117 <i>W D</i>
77. 67	100	34740. 19	$b^3F_2-444(3)$	(0.000w) 0.992w <i>B</i>
77. 54	25	34741. 71	$b^3F_4-532(5)$	
77. 06	25	34747. 53	$a^5D_1-482(2)$	(0.000) 1.385
74. 83	12	34774. 45		(0.000) 1.081
74. 33	30c	34780. 54	$b^3P_1-521(1)$	(0.409) 1.17, 1.608

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length air	Intensity and notes	Wave number	Term combination	Zeeman pattern
2873. 56	40	34789. 82	$a\ ^3D_3-533(4)$	(0.00 <i>w</i>) 1.64
72. 16	1	34806. 79		
71. 89	1	34810. 06	$\left\{ \begin{array}{l} d\ ^3F_2-646(3) \\ c\ ^3P_2-628(1) \end{array} \right.$	
71. 59	5	34813. 72		(0.00) 1.20
70. 87	6	34822. 47		(0.000) 0.956
69. 51	15 <i>c</i>	34838. 98	$a\ ^3F_4-445(5)$	(0.000 <i>W</i>) 1.399 <i>w</i>
69. 02	6	34844. 93	$a\ ^5P_3-472(4)$	(0.000 , 0.396) 0.775 , 1.197, 1.602
68. 64	25	34849. 53	$\left\{ \begin{array}{l} b\ ^3F_4-533(4) \\ a\ ^1G_4-490(5) \end{array} \right.$	(0.392 <i>B</i>) 1.132 <i>D</i>
68. 14	20	34855. 52	$b\ ^1G_4-602(3)$	(0.000 <i>w</i>) 0.893 <i>B</i>
67. 83	7 <i>c</i>	34859. 39		(0.000 , 0.176, 0.369, 0.539) . . . ?
67. 41	150 <i>c</i>	34864. 40	$a\ ^3H_6-528(6)$	(0.000 <i>W</i>) 1.163 <i>w</i>
66. 85	7	34871. 20	$b\ ^3D_3-654(3)$	(0.00) 1.42
66. 26	18 <i>c</i>	34878. 47	$a\ ^3G_3-466(4)$	(0.000 , 0.280, 0.586) 1.223, 1.499, 1.789, 2.102
66. 14	35 <i>c</i>	34879. 84	$\left\{ \begin{array}{l} a\ ^5F_4-392(3) \\ a\ ^3F_4-446(4) \end{array} \right.$	(0.000 <i>w</i>) 1.282 <i>w</i>
65. 70	50	34885. 23		(0.000 <i>w</i>) 1.035 <i>A</i>
65. 32	85	34889. 85	$a\ ^3D_4-521(3)$	(0.000 <i>w</i>) 1.328 <i>W</i>
64. 26	7	34902. 82	$a\ ^3P_1-402(2)$	(0.000 , 0.395) 0.751 , 1.159, 1.571
63. 54	10	34911. 56	$a\ ^3D_3-534(3)$	(0.00 <i>w</i>) 1.24
63. 44	20	34912. 80		(0.264 <i>B</i>) 1.105 <i>D</i>
62. 52	12	34923. 96		(0.000) 1.112
61. 24	10	34939. 65	$b\ ^1G_4-603(3)$	(0.00) 1.01
60. 88	75	34943. 99	$a\ ^3F_3-417(4)$	(0.000 , 0.172, 0.358, 0.542) . . . , 0.901, 1.075, 1.259, 1.436, 1.637, 1.829
59. 94	8	34955. 55	$\left\{ \begin{array}{l} b\ ^3F_3-495(3) \\ a\ ^5P_2-468(3) \end{array} \right.$	(0.000 , 0.221, 0.453) 0.766 , 0.984
59. 72	12	34958. 17	$c\ ^3F_4-580(4)$	(0.059) 1.056
59. 14	20 <i>c</i>	34965. 28	$\left\{ \begin{array}{l} b\ ^3P_2-534(3) \\ a\ ^3D_1-495(2) \end{array} \right.$	(0.000) 0.755 (0.000) 2.305
58. 75	20	34970. 05		
58. 43	125	34973. 99	$a\ ^3P_1-403(1)$	(0.317) 1.223, 1.556
57. 34	8	34987. 33	$a\ ^3D_2-521(1)$	(0.000 , 0.399) 0.853 , 1.227
56. 68	50	34995. 40	$a\ ^5D_0-475(1)$	(0.000) 1.502
55. 85	2	35005. 55		(0.00) 1.21
55. 34	20 <i>c</i>	35011. 75	$b\ ^3F_3-495(2)$	(0.000 , 0.587, 1.155, 1.678) 0.441 , 0.984, 1.581
55. 18	5	35013. 75	$d\ ^3F_4-665(4)$	(0.00) 1.10
54. 79	6	35018. 60		(0.000) 0.846
54. 21	2	35025. 68		(0.00) 0.90 <i>A</i>
53. 54	8	35033. 85	$b\ ^3D_3-656(3)$	(0.264, 0.504, 0.753) 0.501, 0.766, 1.032 , 1.274 , 1.492, 1.754
53. 18	10	35038. 26	$b\ ^3P_0-513(1)$	(0.00) 1.046
52. 94	10	35041. 32	$a\ ^5D_2-495(3)$	(0.000 , 0.161, 0.335) 0.989 , 1.120, 1.288, 1.466
52. 34	150	35048. 68	$a\ ^3H_5-532(5)$	(0.274 <i>B</i>) 1.109 <i>W D</i>
50. 98	40	35065. 40	$b\ ^3F_3-496(3)$	(0.389 <i>B</i>) 1.239 <i>W D</i>
49. 92	10	35078. 40	$d\ ^3F_4-666(5)$	
49. 86	12	35079. 08	$a\ ^5P_3-475(2)$	(0.000 , 0.325, 0.654) 0.967, 1.297, 1.604 , . . . ?
49. 51	1	35083. 43	$a\ ^3G_3-468(2)$	
49. 06	8	35089. 02	$a\ ^3F_4-448(3)$	(0.000) 1.172
48. 89	20 <i>c</i>	35091. 13	$a\ ^3D_3-536(2)$	(0.000 <i>w</i>) 1.350 <i>w</i>
48. 33	15	35097. 98	$a\ ^5D_2-495(2)$	(0.197) 1.513 <i>D</i>
47. 65	20	35106. 31	$a\ ^1D_2-486(2)$	(0.000) 1.114
46. 54	5 <i>c</i>	35120. 05	$a\ ^3G_4-478(3)$	
44. 60	10	35144. 00	$b\ ^3P_2-536(2)$	
44. 46	200	35145. 75	$a\ ^5F_2-361(2)$	(0.139 <i>B</i>) 0.988 <i>w</i>
43. 98	4	35151. 68	$a\ ^5D_2-496(3)$	
43. 51	110 <i>c</i>	35157. 50	$a\ ^3H_5-533(4)$	(0.000) 1.083
41. 61	8	35180. 95		(0.000) 1.112
40. 79	8	35191. 13	$a\ ^5D_1-486(2)$	(0.000 , 0.368) 0.770 , 1.143
40. 39	75	35196. 13		(0.000) 1.038
39. 91	10	35202. 01		(0.000 <i>w</i>) 0.889 <i>w</i>

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λair	Intensity and notes	Wave number	Term combination	Zeeman pattern
2838.78	2	35216.06	$a^1D_2-487(1)$	(0.000, 0.362) 0.795, 1.104, 1.477
38.23	175c	35222.87	$a^3H_4-510(3)$	(0.000w) 1.101w
37.11	7	35236.82		
36.35	7	35246.16	$b^3P_2-537(1)$	(0.000, 0.199) 1.407, 1.633
35.84	30c	35252.60	$a^3H_6-532(5)$	(0.000w) 1.069WB
35.29	25c	35259.39	$\left\{ \begin{array}{l} a^3D_1-498(1) \\ b^3H_4-596(5) \end{array} \right.$	(1.209) 1.995
35.10	20c	35261.78	$a^5D_4-524(4)$	(0.000, 1.081) 0.880
33.78	7	35278.20	$b^3G_5-665(4)$	(0.283) 1.081B
33.06	1	35287.19	$b^3G_3-621(4)$	(0.000) 1.314
32.70	50c	35291.63	$a^3F_3-421(4)$	(0.000, 0.191, 0.380, 0.581) 0.893, 1.074, 1.258, 1.460, 1.639, 1.866
32.54	15	35293.62	$a^5P_2-471(3)$	
31.97	8	35300.76	$a^5D_1-487(1)$	(0.751) 0.751, 1.491
31.75	2	35303.47		
31.47	4	35307.01		
30.40	10	35320.28	$b^3G_4-634(4)$	
30.26	25	35321.99	$a^3F_3-421(2)$	(0.000, 0.126, 0.289, 0.492) 0.798 , 0.934, 1.081, 1.214
29.79	30	35327.97	$a^5F_4-397(4)$	(0.478B) 0.841, 1.059 , 1.316 , 1.572
29.19	12	35335.41	$a^3F_2-385(2)$	(0.277, 0.525) . . . ?
28.58	75	35343.04	$b^3G_5-666(5)$	(0.000WD) 1.028
28.09	12c	35349.20	$a^5D_4-525(3)$	
27.59	60c	35355.38	$a^3F_2-385(1)$	(0.000, 0.243) 0.457, 0.746, 1.032w
27.47	10c	35356.90	$b^3F_3-499(4)$	(0.000, 0.209, 0.430, 0.680) 0.996, 1.202, 1.427, 1.664, 1.902
26.30	3	35371.54	$a^1F_3-602(3)$	
25.75	1	35378.42		
24.64	12	35392.28	$a^5D_2-498(1)$	(0.000, 0.532) 0.934 , 1.485, 2.024
24.36	5	35395.83		
23.82	20c	35402.55	$\left\{ \begin{array}{l} a^3G_3-471(3) \\ a^1D_2-489(3) \end{array} \right.$	(0.254) 1.002
23.61	3	35405.24	$b^3H_4-598(5)$	
23.07	15	35412.05	$a^3D_2-525(3)$	(0.000, 0.201, 0.403) 1.226, 1.411, 1.597, 1.792
20.71	6	35441.61	$b^1G_4-496(3)$	(0.000, 0.341, 0.695) 0.325 , 0.671, 0.998, 1.309
20.08	3	35449.58	$b^3P_1-528(1)$	(0.258) 1.449
19.93	1	35451.44		
19.52	15c	35456.62		
19.13	70c	35461.51	$a^5P_1-461(1)$	(1.026) 1.365, 2.362
18.35	20	35471.29	$a^5D_3-511(2)$	(0.000w) 1.655B
17.10	200	35487.11	$a^3P_2-411(2)$	(0.171, 0.369) 0.959, 1.160 , 1.352 , 1.567
15.72	2	35504.44		
15.00	25	35513.55	$a^3G_3-472(4)$	
14.46	20	35520.28	$a^1D_2-490(2)$	(0.147, 0.332, 0.508) 0.985, 1.216 , 1.403 , 1.600
14.30	90c	35522.35	$a^5F_5-417(5)$	(0.715) 1.605W
13.52	3	35532.19		
13.05	2	35538.19	$b^3G_4-637(5)$	
12.63	6	35543.44	$b^3F_2-452(1)$	(0.000, 0.408) 0.657 , 1.055, 1.451
11.70	125c	35555.20	$b^3F_4-540(5)$	(0.000W) 1.212B
11.33	15	35559.83		(0.000, 0.173, 0.341) 0.899 , 1.060, 1.240
10.48	3	35570.62		
09.94	15	35577.44	$b^3H_6-615(6)$	(0.208w) 1.147
09.06	15c	35588.61	$a^5F_5-417(4)$	(0.000W) 0.472w
08.31	25	35598.13	$b^3H_6-616(6)$	(0.000) 1.185
07.75	12	35605.17	$a^5D_1-490(2)$	(0.000, 0.193) 1.113 , 1.312, 1.508
07.39	30	35609.73		(0.000w) 0.872A
07.23	5	35611.79	$a^1H_5-598(5)$	
05.90	15c	35628.67	$\left\{ \begin{array}{l} a^5F_3-382(3) \\ a^3H_4-514(4) \end{array} \right.$	(0.000w) 1.109
05.46	3	35634.28	$b^3G_3-624(4)$	
05.33	15c	35635.96	$b^3P_1-530(2)$	(0.000, 0.299) 1.774

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λair	Intensity and notes	Wave number	Term combination	Zeeman pattern
2805. 07	8	35639. 21	$\begin{cases} a \ ^5P_2-475(2) \\ a \ ^3G_5-484(4) \end{cases}$	(0.242 <i>B</i>) 1.342 <i>D</i>
04. 58	3	35645. 46		
04. 01	20	35652. 71	$a \ ^3D_3-542(4)$	(0.000, 0.198, 0.430, 0.639) 0.531 , 0.738, 0.940, 1.145, 1.349
03. 80	10	35655. 38	$\begin{cases} b \ ^3G_4-638(4) \\ a \ ^3D_2-528(1) \end{cases}$	
02. 93	3	35666. 44		
02. 34	10	35673. 93	$a \ ^5P_1-463(2)$	
00. 53	15	35697. 01	$a \ ^5P_2-413(1)$	(0.000, 0.548) 0.782 , 1.322, 1.893
2799. 27	35	35713. 05	$b \ ^3F_4-542(4)$	(0.328 <i>Wd</i>) 1.034 <i>D</i>
98. 72	40	35720. 13	$\begin{cases} a \ ^5P_2-475(1) \\ b \ ^1G_4-611(4) \\ a \ ^1G_4-499(4) \\ a \ ^5F_2-367(3) \end{cases}$	(0.206 <i>B</i>) 0.865 <i>D</i> (0.000, 0.170, 0.355) 0.820, 0.995, 1.176, 1.351, 1.523
97. 76	200	35732. 40		
96. 58	5	35747. 41	$a \ ^3G_3-475(2)$	
96. 08	20	35753. 80	$a \ ^5D_3-514(4)$	(0.000, 0.343, 0.670, 1.005) 0.105 , 0.413, . . .
95. 20	70 <i>c</i>	35765. 01	$a \ ^3G_4-484(4)$	(0.235, 0.482, 0.818, 1.100) 0.205, 0.501, 0.778, 1.014 , 1.254 , 1.501, 1.771, 2.040. (0.000 <i>w</i>) 1.087 <i>w</i>
94. 10	8	35779. 15		
93. 86	20	35782. 25	$a \ ^3F_2-389(3)$	(0.000, 0.251, 0.519) 0.480, 0.735, 0.992, 1.241, 1.509
93. 47	4	35787. 19	$a \ ^5P_3-482(2)$	(0.000, 0.096, 0.198) . . .?
91. 84	10	35808. 14	$\begin{cases} a \ ^5D_3-515(2) \\ b \ ^3H_4-602(3) \\ a \ ^3P_1-411(2) \\ d \ ^3F_2-656(3) \\ a \ ^3D_2-530(2) \end{cases}$	(0.000, 0.239, 0.453, 0.664) 0.193 , 0.414, 0.593, 0.774, 0.976, 1.176
91. 37	50	35814. 18		(0.000, 0.392) 0.754 , 1.164, 1.551
89. 16	30	35842. 58		
88. 95	3	35845. 20		(0.246, 0.522) 0.941, 1.212 , 1.474 , 1.727
86. 77	25	35873. 20	$a \ ^5F_3-385(2)$	(0.000, 0.229, 0.476) 0.775, 1.004, 1.242, 1.484, 1.736
85. 29	8	35892. 28	$b \ ^3H_4-603(3)$	(0.000, 0.168, 0.328, 0.513) 0.471 , 0.660, 0.843, 0.991, 1.139, 1.288, 1.453
84. 96	75	35896. 60	$a \ ^3P_2-415(3)$	(0.000 <i>w</i>) 0.903 <i>A</i>
84. 46	2	35903. 04	$a \ ^3D_1-505(1)$	
83. 04	3	35921. 38	$b \ ^3D_3-665(4)$	(0.000 <i>WD</i>) 0.693 <i>A</i>
81. 90	12	35936. 05	$a \ ^5F_5-421(4)$	(0.000 <i>WD</i>) 1.841 <i>B</i>
81. 35	1	35943. 20	$b \ ^3H_5-613(5)$	
81. 14	7	35945. 92	$a \ ^1P_1-593(2)$	(0.000 <i>w</i>) 1.123
80. 83	10	35949. 92	$a \ ^5P_2-478(3)$	(0.000, 0.225, 0.435) 0.749 , 0.979, 1.196
80. 34	50	35956. 21	$a \ ^5F_2-369(1)$	(0.000, 0.333) 0.696, 0.995, 1.336
79. 46	2	35967. 65		
79. 06	2	35972. 84	$b \ ^1G_4-613(5)$	
78. 81	30	35976. 02	$a \ ^1D_2-495(3)$	(0.000, 0.209, 0.413) 0.898, 1.099, 1.299, 1.497, 1.719
76. 91	6	36000. 60	$a \ ^1F_3-608(2)$	(0.000, 0.160, 0.319) 0.653 , 0.802, 0.958, 1.145
76. 70	20	36003. 30	$a \ ^5D_4-532(5)$	(0.000 <i>w</i>) 1.086
76. 23	5	36009. 42		
75. 38	8	36020. 52	$a \ ^3H_5-542(4)$	(0.000 <i>w</i>) 0.940
75. 10	30	36024. 16	$a \ ^3P_1-413(1)$	(0.336) 1.530
74. 56	40	36031. 17		(0.000, 0.137, 0.286, 0.430, 0.562, 0.732) 0.288 , 0.412, 0.576, 0.711, 0.874, 1.024, 1.145
74. 18	15	36036. 10	$a \ ^5D_2-505(1)$	(0.000 <i>wD</i>) 1.490
73. 60	5	36043. 65		
72. 47	10	36058. 25	$a \ ^3G_3-478(3)$	(0.258, 0.755 <i>W</i>) 0.335, 0.632, 0.919 , 1.182 , 1.470, 1.787
72. 24	2	36061. 33	$c \ ^3P_1-622(1)$	
72. 06	2	36063. 66	$a \ ^5P_1-467(2)$	
71. 82	75	36066. 68	$a \ ^3H_6-540(5)$	(0.000 <i>w</i>) 1.070 <i>w</i>
70. 54	1	36083. 34	$c \ ^3P_1-623(2)$	
70. 32	4	36086. 28	$a \ ^1D_2-496(3)$	(0.000 <i>w</i>) 0.909 <i>A</i>
70. 10	15	36089. 19	$c \ ^1G_4-712(5)$	(0.000, 0.200, 0.423, 0.631, 0.892) 1.027, 1.223, 1.430, 1.630, 1.840, 2.097 .
69. 65	5	36094. 99	$a \ ^3D_3-546(3)$	(0.396, 0.574, 0.824, 1.217 <i>w</i>) . . . , 0.928 , 1.320, 1.762
68. 07	12	36115. 54	$a \ ^3F_2-392(3)$	(0.000, 0.395, 0.788) 0.339, 0.732, 1.136, 1.532, 1.922

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
2767.92	2	36117.51	$a^5D_1-495(2)$	
67.10	15	36128.20	$a^3F_3-429(3)$	(0.132) 1.083
66.79	1	36132.27	$a^3D_2-533(2)$	
66.40	12	36137.39	$a^5P_1-468(2)$	(0.000, 1.286 <i>w</i>) -0.197, +1.091, 2.357
65.59	2	36147.95	$b^3P_2-546(3)$	(0.000, 0.515, 1.048) 0.429, 0.929, 1.437
65.04	2	36155.19	$b^3F_4-546(3)$	(0.000, 0.295, 0.600, 0.907) 1.224, 1.525, 1.833, 2.124
63.36	30	36177.16	$a^5F_1-361(2)$	(0.000, 0.934) 0.000, 0.934, 1.866
62.05	75	36194.27	$b^3H_6-622(5)$	(0.000 <i>W</i>) 1.464
61.75	75	36199.54	$b^3H_5-616(6)$	
59.28	20	36230.59	$a^5F_2-372(2)$	(0.384, 0.770) 0.249, 0.612, 1.005, 1.385
			$a^5P_3-486(2)$	(0.000, 0.473, 0.990) 0.575, 1.130, 1.610, 2.067, 2.538
59.05	25	36233.65	$a^3F_3-430(2)$	(0.000) 1.097
58.16	2	36245.36		
57.26	40	36257.20	$a^3G_4-489(3)$	(0.000, 0.259, 0.549, 0.871) 0.149, 0.455, 0.774, 1.015, 1.269, 1.535, . . .
56.30	25	36269.75	$b^3P_1-536(2)$	(0.000 <i>w</i>) 1.149 <i>A</i>
54.21	2	36297.27	$a^3H_4-521(3)$	(0.000) 1.228
			$a^3D_2-534(3)$	
53.46	3	36307.20		
52.49	100	36319.96	$a^5F_3-389(3)$	(0.240, 0.475, 0.762) 0.486, 0.744, 0.997, 1.239, 1.490, 1.768
51.98	3	36326.79	$a^1D_2-498(1)$	(0.00) 0.93
50.35	100	36348.24	$a^5P_2-482(2)$	(0.176) 1.125 <i>W</i>
48.58	20	36371.70	$b^3P_1-537(1)$	(0.098) 1.217
46.83	75	36394.81	$a^5D_3-521(3)$	(0.000 <i>W</i>) 1.197 <i>D</i>
45.57	3	36411.50	$a^5D_1-498(1)$	(0.485) 1.512, 1.984
43.98	1	36432.64		(0.000) 1.011, 1.294
42.23	15	36455.83	$a^3G_3-482(2)$	(0.000, 0.524, 1.048) 0.000 <i>w</i> , 0.404, 0.913, 1.454
40.69	30	36476.34	$a^3D_2-536(2)$	(0.162, 0.279) 1.042, 1.191, 1.343, 1.476
40.11	25	36484.09	$b^3F_2-461(1)$	(0.00) 1.22
39.26	75	36495.42	$a^3P_2-421(2)$	(0.175, 0.310) 1.045, 1.184, 1.371, 1.528
38.20	1	36509.61		
37.20	2	36522.89		
36.91	15	36526.69	$a^5P_3-489(3)$	(0.332, 0.647, 0.999) 0.623, 0.944, 1.275, 1.598, 1.927, . . .
35.26	50	36548.83	$a^3F_4-462(5)$	
33.67	2	36569.98	$a^3D_1-511(2)$	
33.33	25	36574.54	$a^3D_3-551(3)$	(0.260 <i>B</i>) 1.257 <i>D</i>
31.26	8	36602.32		(0.000) 0.930
30.98	2	36606.11		
30.74	50	36609.30	$c^3P_2-646(3)$	(0.000 <i>W</i>) 1.151 <i>B</i>
			$c^3F_4-596(5)$	
30.25	1	36615.86	$b^3F_3-511(2)$	
29.93	3	36620.19	$c^3P_1-628(1)$	(0.424) 0.911, 1.340
29.37	1	36627.69	$b^3P_2-551(3)$	
28.79	15	36635.41		(0.000) 1.176
28.32	2	36641.78	$a^3H_4-524(4)$	
27.44	75	36653.62	$a^5F_3-392(3)$	(0.309) 1.198
26.85	4	36661.47		
26.41	2	36667.42		
26.01	15	36672.80	$b^3H_4-611(4)$	(0.204) 1.038 <i>D</i>
25.44	75	36680.49		(0.000 <i>W</i>) 1.032 <i>D</i>
24.09	12	36698.69	$a^3D_1-513(1)$	(0.207) 0.841, 1.000
23.85	40	36701.83	$b^3H_5-621(4)$	(0.00) 0.98
23.67	1	36704.30	$c^3F_3-603(3)$	
23.49	2	36706.70		(0.000) 0.845
22.20	1	36724.09		
21.82	3	36729.22	$a^3H_4-525(3)$	
21.16	1	36738.12		
20.05	10	36753.13		(0.113) 1.043
19.89	2	36755.26		
19.28	1	36763.60		

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
2718.95	8	36768.01	$d^3F_4-682(3)$	
17.26	2	36790.94	$\begin{cases} b^3H_5-622(5) \\ a^5P_2-486(2) \end{cases}$	
16.49	25	36801.36	$\begin{cases} a^5P_1-475(2) \\ b^3P_2-464(2) \end{cases}$	(0.000, 0.988w) 0.213 , 1.276, 2.357w
15.31	10	36817.30	$a^3G_4-495(5)$	(0.000) 1.229w
15.14	3	36819.56	$b^1G_4-622(5)$	(0.000) 1.017
14.79	3	36824.38	$a^1F_3-616(3)$	
14.67	12	36826.02	$c^3P_1-630(2)$	(0.000) 1.28
14.28	8	36831.20	$\begin{cases} a^3G_4-495(3) \\ a^5D_2-513(1) \end{cases}$	(0.000, 0.426) 1.064, 1.444, 1.879
13.44	1	36842.64		(0.000W) 1.115w
12.59	3	36854.24	$a^5D_3-525(3)$	(0.000W) 1.451
11.71	2	36866.12		(0.000) 1.072
10.73	40	36879.55	$a^1H_5-611(4)$	(0.000) 0.947
10.12	12	36887.81	$b^3F_4-553(4)$	(0.00) 1.19
09.27	125	36899.34	$\begin{cases} a^3G_3-486(2) \\ a^3F_4-466(4) \end{cases}$	(0.000, 0.228) 0.452 , 0.702, 0.935
08.73	1	36906.72	$a^3D_1-515(2)$	(0.474) 1.215
05.83	4	36946.31	$\begin{cases} b^1D_2-602(3) \\ b^3G_5-682(5) \end{cases}$	(0.000D) 1.267w
05.32	12	36953.22	$b^3F_3-515(2)$	(0.000, 0.305, 0.620) 0.352 , 0.676, 0.985, 1.295, 1.608
03.99	15	36971.45	$a^1D_2-505(1)$	(0.000, 0.257) 0.847 , 1.130, 1.398
03.69	15	36975.50	$a^5D_4-542(4)$	(0.000W) 1.134w
02.78	35	36987.90	$a^5F_1-369(1)$	(0.658) 0.000, 0.685
02.66	25	36989.64	$a^3D_3-555(3)$	(0.300w) 1.396D
02.08	10	36997.61	$a^3D_3-555(2)$	(0.000, 0.274, 0.570) 1.019, 1.308, . . .
01.07	25	37011.36	$b^3F_4-555(5)$	(0.000, 0.171, 0.353, 0.528, 0.710) 0.359 , 0.522, 0.685, 0.869, 1.057, 1.230, 1.400, 1.603
2699.90	2	37027.45	$b^3P_2-555(1)$	(0.000) 1.473
99.69	4	37030.33	$b^1D_2-603(3)$	(0.000) 1.180
98.80	15	37042.48	$b^3P_2-555(3)$	(0.000) 1.396
98.52	20	37046.34		(0.000) 1.259
98.30	10	37049.31	$\begin{cases} b^3H_5-624(4) \\ b^3F_4-555(3) \end{cases}$	(0.000) 1.044
98.01	3	37053.33	$a^3F_2-402(2)$	(0.399, . . .) 0.749, 1.155
97.84	2	37055.70	$\begin{cases} a^3G_5-498(5) \\ a^5D_1-505(1) \end{cases}$	(0.000) 1.284
97.39	10	37061.88		
96.81	5	37069.79	$b^3G_4-652(4)$	
96.52	1	37073.79	$a^1P_1-604(1)$	
96.22	8	37077.93	$b^1G_4-624(4)$	(0.000) 0.512
95.70	12	37085.04	$a^3F_4-468(3)$	(0.000) 1.242
95.54	2	37087.31	$\begin{cases} a^5P_2-489(3) \\ a^5P_1-478(0) \end{cases}$	(0.000, 0.143, 0.305) 0.968 , 1.124, 1.289
94.52	100	37101.35	$a^5F_3-397(4)$	(0.000) 1.157, 1.246w
92.83	20	37124.66	$a^3F_2-403(1)$	(0.000w) 1.190w
91.80	25	37138.78	$a^5F_4-415(3)$	(0.000, 0.489) 0.263 , 0.740, 1.230
90.79	1	37152.78		(0.000w) 1.729B
90.49	2	37156.89	$a^5P_3-495(2)$	(0.000) 1.585
90.36	3	37158.66	$b^3P_1-545(2)$	(0.000w) 0.891
90.20	5	37160.91		(0.068) 0.992
89.81	1	37166.37		
89.27	50	37173.80	$a^3F_3-440(4)$	(0.000w) 1.175w
88.75	1	37180.99	$a^3G_4-498(5)$	
88.46	3	37184.95		(0.000, 0.445) 0.676, 1.101, 1.559
87.46	4	37198.76		
87.00	2	37205.18	$a^5P_2-490(2)$	(0.222) 1.333
86.59	2	37210.87	$a^5P_3-496(3)$	

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
2685.16	150	37230.64	$\left\{ \begin{array}{l} a^3P_0-413(1) \\ a^5F_1-372(2) \end{array} \right.$	(0.000) 1.890 (0.000 , 0.613 <i>w</i>) 0.000 <i>w</i> , 0.600 <i>w</i> 1.212<i>w</i>
84.04	1	37246.22	$a^1F_3-621(4)$	
83.77	4	37249.91	$c^3F_3-608(2)$	(0.000 <i>w</i>) 1.028
82.96	4	37261.26	$b^3H_4-616(3)$	(0.000 <i>w</i>) 1.094 <i>w</i>
81.25	25	37284.91	$a^5D_3-530(2)$	(0.000) 1.464
80.66	75	37293.17	$a^5F_4-417(5)$	(0.000 <i>w</i>) 0.815 <i>A</i>
80.06	75	37301.59	$a^3P_2-429(3)$	(0.000 , 0.233, 0.461) 0.661 , 0.902, 1.126, 1.361, 1.586
79.77	2	37305.52	$a^3D_3-558(2)$	
79.26	5	37312.60	$c^3F_2-602(3)$	
78.81	50	37318.94	$a^3H_5-555(5)$	(0.000) 1.086
76.48	20	37351.44	$a^5P_1-480(0)$	(0.000) 2.394 <i>w</i>
75.90	100	37359.45	$a^5F_4-417(4)$	(0.292 <i>w</i>) 1.324 <i>D</i>
75.73	50	37361.92	$a^1H_5-615(6)$	(0.000) 1.484 <i>D</i>
75.54	3	37364.53		
74.85	3	37374.15		
74.19	30	37383.45	$a^3H_4-532(5)$	(0.000 <i>w</i>) 1.158 <i>A</i>
73.16	2	37397.74		
72.50	50	37406.97	$a^3P_2-430(2)$	(0.266, 0.563) 0.563, 0.787, 1.056 , 1.330 , 1.625, . . .
71.76	2	37417.44	$a^5D_4-546(3)$	
71.40	5	37422.38	$a^3F_4-471(3)$	
71.00	5	37427.97	$a^3F_3-442(2)$	(0.000 , 0.173, 0.349) 0.750 , 0.921, 1.103, 1.282
69.57	40	37448.07	$a^1F_3-623(2)$	(0.000) 0.953
68.40	5	37464.52	$a^3D_3-560(2)$	(0.000 <i>w</i>) 1.124
67.40	5	37478.53	$b^3F_2-471(3)$	(0.000) 1.148
67.29	5	37480.15	$c^3D_2-546(3)$	(0.000 , 0.265, 0.604) 0.352 , 0.648, 0.950
67.00	12	37484.17	$a^5F_2-385(2)$	(0.000) 1.000
66.41	30	37492.40	$a^3H_4-533(4)$	(0.000 <i>w</i>) 1.076 <i>D</i>
65.60	50	37503.81	$a^5F_2-385(1)$	(0.000 , 0.520) 0.480, 0.998, 1.520
64.25	75	37522.91	$a^3H_6-555(5)$	(0.000 <i>W</i>) 1.743 <i>B</i>
63.88	25	37528.00	$a^3D_1-521(1)$	(0.758) 0.845, 1.620
63.41	1	37534.73	$a^3F_4-472(4)$	
63.07	10	37539.42		
63.00	20	37540.47	$b^3F_3-521(3)$	(0.000) 1.048
62.96	8	37541.03		(0.000 <i>w</i>) 1.048 <i>w</i>
62.27	8	37550.79	$c^3F_2-604(1)$	(0.000) 0.714
60.81	3	37571.36		
59.40	40	37591.23	$a^5F_3-402(2)$	(0.000 <i>w</i>) 1.320 <i>A</i>
58.86	75	37598.99	$a^3F_3-444(3)$	(0.137, 0.277, 0.414) 0.650, 0.780, 0.923 , 1.086 , 1.247, 1.370
58.14	50	37609.07	$a^3G_4-503(3)$	(0.000 , 0.246, 0.511, 0.831) 0.138 , 0.542, 0.767, 1.015, 1.274, . . .
57.76	5	37614.42	$a^3H_4-534(3)$	(0.000 <i>D</i>) 0.972 <i>w</i>
56.16	20	37637.11	$a^1D_2-511(2)$	(0.245, 0.498) 0.848, 1.107 , 1.358 , 1.594
55.34	25	37648.76	$b^3F_4-561(4)$	(0.000 <i>D</i>) 1.271 <i>w</i>
54.88	6	37655.34		(0.000 , 0.338) 0.551 , 0.874, 1.208
54.51	3	37660.47	$a^5D_2-521(1)$	
54.34	3	37662.91		
53.45	6	37675.63	$b^3D_3-682(3)$	
52.46	3	37689.63		
51.23	125	37707.17	$a^5F_4-421(4)$	(0.280 <i>B</i>) 1.330 <i>D</i>
50.52	4	37717.27	$a^5P_2-495(2)$	(0.160, 0.303) 1.305, 1.453 , 1.617 , 1.788
48.54	5	37745.48		
47.10	3	37766.00	$a^1D_2-513(1)$	
46.90	20	37768.78	$a^3G_3-495(3)$	(. . ., 0.391, 0.787, 1.246) 0.070, 0.508, 0.894 , 1.316 , . . .
46.74	20	37771.02	$a^5P_2-496(3)$	(0.000 , 0.457, 0.840) 0.161 , 0.678, . . .
45.91	15	37782.96		(0.270) 1.059
45.09	30	37794.61	$a^3F_3-446(4)$	(0.000 , 0.196, 0.383, 0.577) 0.739, 0.911, 1.080, 1.252, 1.475, 1.682, 1.856
44.58	100	37801.87	$a^3G_4-505(5)$	(0.000 <i>W</i>) 1.168 <i>A</i>
43.43	15	37818.37	$a^5F_5-440(4)$	(0.000 , 0.260, 0.535, 0.779) 1.175, 1.379, 1.645, 1.931, 2.158, 2.428
43.03	12	37824.12	$\left\{ \begin{array}{l} b^3F_2-475(2) \\ b^3G_3-646(3) \end{array} \right.$	(0.247, 0.468) 0.807, 1.058 , 1.285 , 1.524
42.91	2	37825.78	$a^3G_3-495(2)$	
42.70	5	37828.79		(0.000) 0.852

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
2642. 06	3	37838. 04		
41. 16	8	37850. 85	$\left\{ \begin{array}{l} b \ ^3P_2-563(3) \\ a \ ^5D_1-513(1) \end{array} \right\}$	(0.463) 1.048, 1.508
40. 61	12	37858. 82		(0.000) 1.513
40. 13	2	37865. 64	$c \ ^1D_2-708(2)$	(0.336, 0.622) 0.412, 0.716 , 1.017 , 1.331
39. 19	40	37879. 16	$a \ ^3G_3-496(3)$	
38. 68	25	37886. 45	$a \ ^3P_2-435(3)$	(0.000 , 0.246, 0.521) 0.546 , 0.827, 1.073, 1.315
37. 94	30	37897. 05	$a \ ^5D_4-551(3)$	(0.000 <i>W</i>) 1.026 <i>A</i>
37. 34	3	37905. 72	$b \ ^3F_2-475(1)$	(0.000 , 0.454) . . . ?
36. 90	8	37912. 09	$b \ ^3F_3-524(4)$	(0.00) 1.49
36. 67	3	37915. 38	$a \ ^1G_4-521(3)$	
36. 46	2	37918. 42	$a \ ^5D_3-536(2)$	
36. 30	2	37920. 66		
35. 59	200	37930. 92	$a \ ^5F_2-389(3)$	(0.000 <i>W</i>) 0.979 <i>w</i>
34. 25	3	37950. 20	$b \ ^3P_2-564(3)$	(0.000 , 0.254) 1.195 , 1.428
33. 78	75	37956. 94	$\left\{ \begin{array}{l} a \ ^5H_5-561(4) \\ b \ ^3F_4-564(5) \end{array} \right\}$	(0.000 , 0.249, 0.434, 0.661, 0.846, 1.002) 0.316 , 0.511, 0.710, 0.856, 1.030
33. 29	10	37964. 02		(0.000) 1.247
32. 60	2	37973. 97	$a \ ^1D_2-515(2)$	(0.192, 0.385) 0.922, 1.116 , 1.299 , 1.528
32. 27	25	37978. 76	$a \ ^1H_5-622(5)$	(0.280) 1.066
30. 84	12	37999. 29	$b \ ^3F_3-525(3)$	(0.451, 0.720, 1.451) 0.633, 1.016 , 1.414 , 1.850, 2.278
30. 53	25	38003. 88	$a \ ^3F_3-448(3)$	(0.148, 0.354, 0.540) 0.714, 0.906, 1.084 , 1.246 , 1.426, 1.602
30. 18	3	38008. 85		
29. 99	2	38011. 62	$a \ ^5P_2-498(1)$	(0.000 , 0.582) 0.850 , 1.401
29. 21	1	38022. 96	$c \ ^3F_4-611(4)$	
28. 84	50	38028. 28	$b \ ^3F_4-565(5)$	(0.000 , 0.253, 0.495, 0.762, 1.049) 0.147 , 0.481, 0.733, 0.968, 1.220, 1.465, 1.758, 2.020
26. 74	3	38058. 67	$a \ ^5D_1-515(2)$	
26. 44	2	38063. 00	$a \ ^5P_1-487(1)$	
25. 70	3	38073. 80	$c \ ^3F_3-616(3)$	
25. 33	6	38079. 06	$a \ ^3F_4-478(3)$	(0.000) 1.314
21. 49	5	38134. 92	$b \ ^3F_2-478(3)$	(0.000 , 0.149, 0.285) 1.213, 1.360, 1.479
20. 45	5	38150. 06	$a \ ^5D_4-553(4)$	(0.307, 0.476, 0.630) 0.558, 0.691, 0.849, 1.004 , 1.174 , 1.351, 1.534, . . .
19. 04	2	38170. 54	$a \ ^3G_3-499(4)$	
18. 98	20	38171. 47		(0.000 , 0.283, 0.575, 0.890, 1.169) 1.209, 1.476, 1.759, 2.067, 2.362
18. 87	2	38173. 02		(0.000 <i>w</i>) 1.091 <i>A</i>
18. 62	1	38176. 59	$b \ ^3P_1-555(2)$	(0.000 <i>w</i>) 0.996 <i>B</i>
17. 65	8	38190. 86	$a \ ^1F_3-630(2)$	
17. 22	30	38197. 14	$a \ ^3D_1-528(1)$	(0.000 <i>w</i>) 0.875
16. 12	2	38213. 21		
15. 46	3	38222. 80	$a \ ^3P_1-435(1)$	(0.000) 0.884
14. 94	25	38230. 35		
13. 50	1	38251. 45		(0.000 <i>w</i>) 1.162
12. 62	50	38264. 39	$a \ ^5F_2-392(3)$	(0.000 <i>W</i>) 1.423 <i>B</i>
11. 99	20	38273. 56	$a \ ^5D_4-555(5)$	(0.000 <i>w</i>) 0.782 <i>w</i>
10. 92	12	38289. 27	$b \ ^3H_5-637(5)$	(0.237) 1.076 <i>w</i>
09. 37	6	38311. 94	$a \ ^5D_4-555(3)$	(0.000 , 0.269, 0.512, 0.804) 0.462 , 0.687, 0.924, 1.182, 1.431, 1.696
08. 18	3	38329. 52	$a \ ^5D_2-528(1)$	(0.000) 1.098
07. 84	100	38334. 48		(0.000 <i>W</i>) 1.241 <i>w</i>
06. 43	100	38355. 20	$a \ ^3H_4-542(4)$	(0.000) 1.144
06. 12	30	38359. 73	$a \ ^1D_2-555(1)$	(0.000 , 0.228) 0.975 , 1.173, 1.392
05. 58	1	38367. 72	$a \ ^5P_1-490(2)$	
05. 11	10	38374. 63	$\left\{ \begin{array}{l} a \ ^3D_2-555(3) \\ a \ ^3F_2-415(3) \end{array} \right\}$	
04. 74	4	38380. 11	$b \ ^3G_4-665(4)$	
04. 52	20	38383. 29	$a \ ^3D_2-555(2)$	(0.000 , 0.615) 0.853, 1.464, 2.080
03. 49	125	38398. 48	$a \ ^5F_5-445(5)$	(0.442) 1.330 <i>D</i>
02. 96	15	38406. 37	$\left\{ \begin{array}{l} b \ ^3H_5-638(4) \\ b \ ^3G_3-652(4) \end{array} \right\}$	(0.000 <i>w</i>) 0.848 <i>A</i>
01. 68	3	38425. 15		(0.000 , 0.168, 0.358) 0.877 , 1.055

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λair	Intensity and notes	Wave number	Term combination	Zeeman pattern
2601.04	20	38434.72	$b^1G_4-638(4)$	(0.00) 0.99
00.73	20	38439.26	$\left\{ \begin{array}{l} a^5P_2-503(3) \\ a^5F_5-446(4) \end{array} \right.$	(0.000 <i>D</i>) 1.839 <i>WB</i>
2598.72	1	38468.97	$a^3H_6-564(5)$	
98.19	75	38476.80	$a^3H_5-566(6)$	(0.000) 1.127
97.80	5	38482.61		
97.75	10	38483.35		(0.000, 0.128) 1.160 , 1.292
97.71	2	38484.00	$b^3P_1-558(2)$	(0.000, 0.182) 1.349, 1.525
96.99	2	38494.65		(0.000) 1.018
96.46	75	38502.53	$a^5F_3-411(2)$	(0.000 <i>w</i>) 1.325
96.14	10	38507.18	$a^3D_3-570(3)$	(0.00) 1.39
95.58	50	38515.46	$a^5F_1-385(2)$	(0.000 <i>w</i> , 0.963) 0.000 <i>w</i> , 0.957, 1.950
94.43	10	38532.53	$b^3F_2-482(2)$	(0.362, 0.756) 0.689, 1.089 , 1.461 , 1.800
94.25	20	38535.28	$a^5F_1-385(1)$	(0.000) 0.455 <i>A</i>
93.95	4	38539.78	$a^3H_6-565(5)$	
93.68	50	38543.67	$a^5F_4-429(3)$	(0.000, 0.212, 0.448, 0.677) 0.779, 0.999, 1.224, 1.446, 1.650, 1.888, 2.111
93.45	15	38547.12	$a^3G_3-503(3)$	(0.391, 0.763, 1.135) 0.509, 0.891 , 1.280 , 1.636
92.54	50	38560.62	$a^1D_2-521(3)$	(0.000) 1.079
92.13	2	38566.84	$a^3H_5-567(4)$	(0.000 <i>w</i>) 0.741 <i>w</i>
91.06	2	38582.69		(0.000) 1.353
90.20	20	38595.53	$a^1D_2-521(1)$	(0.000, 0.520) 0.616 , 1.110, 1.613
89.81	25	38601.27	$a^3P_2-442(2)$	(0.169) 1.361
89.12	3	38611.66	$c^3F_4-616(3)$	
88.88	15	38615.24	$a^3F_3-454(2)$	(0.000 <i>w</i>) 0.958
88.08	4	38627.16		
87.35	10	38638.05	$a^5P_3-510(3)$	(0.452, 0.885, 1.353) 0.286, 0.707, 1.143 , 1.605 , 2.042, 2.518
86.98	10	38643.52	$b^3P_1-560(2)$	(0.000 <i>w</i>) 0.891 <i>w</i>
86.41	10	38652.07		
85.47	2	38666.18	$b^3G_3-654(3)$	
84.49	75	38680.76	$\left\{ \begin{array}{l} a^5D_1-521(1) \\ a^3H_6-566(6) \end{array} \right.$	(0.342) 1.168 <i>WD</i>
84.02	75	38687.84		(0.000 <i>w</i>) 1.195 <i>w</i>
82.52	10	38710.21	$a^3D_2-558(1)$	(0.000, 0.211) 1.007 , 1.219, 1.438
81.61	15	38723.90	$a^3F_4-484(4)$	(0.156) 1.232
81.50	4	38725.61	$a^5D_0-513(1)$	(0.000) 1.047
80.60	25	38739.16		(0.000, 0.230, 0.458, 0.688, 0.918) 0.218 , 0.454, 0.682, 0.912, 1.144, 1.366, 1.603, . . .
79.06	40	38762.26	$\left\{ \begin{array}{l} a^5P_3-511(2) \\ b^3F_3-533(4) \end{array} \right.$	(0.000 <i>W</i>) 1.323 <i>WB</i>
78.25	40	38774.44	$a^3G_4-514(4)$	(0.346 <i>W</i>) 1.070 <i>WD</i>
77.37	100	38787.63		(0.000 <i>w</i>) 1.407
76.75	8	38796.98	$a^3H_4-546(3)$	
76.44	25	38801.60	$a^3H_5-569(4)$	(0.000 <i>w</i>) 1.025
76.06	8	38807.43	$a^5D_3-545(2)$	(0.000, 0.433, 0.868) 1.023, 1.460, 1.889
75.23	12	38819.86		(0.000 <i>W</i>) 1.403 <i>w</i>
74.64	3	38828.78	$b^3G_3-656(3)$	
74.09	1	38837.06		
73.70	2	38842.95	$c^3F_3-624(4)$	
73.20	8	38850.44	$a^3D_2-560(2)$	(0.205, 0.440) 0.773, 1.008 , 1.250 , 1.467
71.52	20	38875.86	$a^3P_1-442(1)$	(1.308) 0.255, 1.554
71.28	3	38879.49	$a^5P_1-495(2)$	
70.94	3	38884.63	$b^3F_3-534(3)$	
70.82	3	38886.44	$c^3P_2-669(1)$	
70.60	6	38889.78	$a^1P_1-622(1)$	
69.99	2	38898.97	$b^3H_6-649(6)$	(0.000 <i>w</i>) 1.224 <i>A</i>
69.13	40	38912.07	$\left\{ \begin{array}{l} a^1P_1-623(2) \\ a^5F_3-415(3) \end{array} \right.$	(0.133) 1.213 <i>w</i>
68.04	15	38928.49	$a^3P_1-442(2)$	(0.000, 0.301) 0.936 , 1.245, 1.538
66.52	1	38951.53	$a^1F_3-638(4)$	
65.11	4	38973.06	$a^3F_2-421(2)$	(0.000, 0.168) 0.670 , 0.826

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
2564.91	5	38976.09	$b\ ^3F_2-486(2)$	(0.160) 1.104
62.63	6	39010.75		
62.22	15	39017.00	$a\ ^3D_1-536(2)$	(0.000, 0.484) 0.892, 1.344, 1.834
61.82	1	39023.05	$b\ ^1D_2-623(2)$	
61.16	10	39033.14	$c\ ^3F_4-621(4)$	(0.121) 1.056
60.44	5	39044.05	$a\ ^5P_3-514(4)$	(0.000, 0.488) 0.374 , 0.881
60.16	4	39048.38	$a\ ^3G_4-517(5)$	(0.225) 1.182 <i>W</i>
59.87	20	39052.84	$b\ ^3H_4-634(4)$	(0.000) 0.948
59.15	3	39063.82	$b\ ^3F_3-536(2)$	(0.000, 0.351, 0.723) 0.295 , 0.662, 1.013
58.34	15	39076.10		(0.000) 1.181
57.71	50	39085.81	$b\ ^3F_2-487(1)$	(0.000, 0.303) 0.745, 1.040, 1.389
57.26	4	39092.64		(0.000) 0.850
56.88	2	39098.38	$a\ ^5P_3-515(2)$	(0.000, 0.306, 0.624) 1.287, 1.578, 1.903, 2.248
56.51	30	39104.10	$a\ ^3P_1-444(0)$	(0.000) 1.547
55.53	4	39119.15	$a\ ^3D_1-537(1)$	(0.404) 0.846, 1.261
55.34	4	39122.08	$c\ ^3F_4-622(5)$	
54.90	30	39128.68	$a\ ^5F_4-435(3)$	(0.000, 0.256, 0.516) 0.579, 0.836, 1.098, 1.350, 1.560, 1.914, 2.203
54.63	50	39132.94	$a\ ^5F_3-417(4)$	(0.000) 1.285
54.02	2	39142.14		(0.000, 0.176) 1.263, 1.406
53.52	12	39149.85	$a\ ^5D_2-536(2)$	(0.243) 1.412 <i>D</i>
53.19	40	39154.97		(0.000 <i>w</i>) 0.940 <i>D</i>
52.61	3	39163.81		
52.00	1	39173.20	$a\ ^5P_1-498(1)$	
51.73	25	39177.28	$a\ ^3P_2-448(3)$	(0.000 <i>w</i>) 1.139
50.36	5	39198.42	$a\ ^5P_2-510(3)$	(0.000, 0.257) 0.619 , 0.894, 1.155, 1.414
50.11	7	39202.25	$a\ ^5F_2-402(2)$	(0.143, 0.292) 0.856, 1.010 , 1.147 , 1.311
49.20	10	39216.16	$a\ ^3F_4-489(3)$	(0.000) 1.148
48.97	1	39219.78	$a\ ^5D_4-564(5)$	(0.000) 1.165
47.81	1	39237.66	$a\ ^3D_3-577(2)$	
47.66	5	39239.96	$b\ ^3P_0-555(1)$	(0.000) 1.406
46.32	6	39260.58	$b\ ^1G_4-534(3)$	(0.000, 0.224) 0.907 , 1.138
45.68	1	39270.45	$b\ ^3H_4-637(5)$	
45.50	75	39273.25	$a\ ^5F_2-403(1)$	(0.000, 0.251) 0.741 , 1.003, 1.252
44.91	3	39282.36	$a\ ^3D_2-564(3)$	
44.37	75	39290.60	$a\ ^5D_4-565(5)$	(0.000, 0.209, 0.391, 0.628, 0.873) 0.169 , 0.345, 0.558, 0.786, 0.937, 1.158
43.33	2	39306.76	$a\ ^3G_3-510(3)$	(0.749, 0.999, 1.269) 0.922, 1.176, 1.430 , 1.680 , 1.925, 2.162
43.18	3	39308.98	$a\ ^3F_4-490(5)$	
42.74	6	39315.93		
42.36	25	39321.76	$a\ ^5P_2-511(2)$	(0.180 <i>w</i>) 1.336 <i>w</i>
40.60	10	39348.99	$a\ ^5D_1-528(1)$	(0.596) 0.914, 1.501
39.37	1	39368.01	$c\ ^3F_2-622(1)$	(0.000) 0.747
38.75	2	39377.65		
38.56	2	39380.50	$c\ ^3F_4-624(4)$	(0.000 <i>W</i>) 1.087 <i>w</i>
37.96	75	39389.95	$b\ ^3F_2-490(2)$	(0.240, 0.546) 0.761, 1.043 , 1.311 , 1.576
37.16	6	39402.34	$a\ ^5D_3-551(3)$	(0.176, 0.408, 0.644) 0.821, 1.025, 1.254 , 1.477 , 1.703, 1.928
36.30	20	39415.64	$a\ ^3G_4-521(3)$	(0.000 <i>W</i>) 0.855
35.36	4	39430.20	$a\ ^3G_3-511(2)$	(0.000, 0.438, 0.868) 0.000 <i>w</i> , 0.511, 0.941
34.73	2	39440.11	$c\ ^3F_3-630(2)$	
34.22	1	39448.04	$a\ ^1P_1-628(1)$	
34.04	25	39450.79	$\left\{ \begin{array}{l} a\ ^1D_2-530(2) \\ a\ ^5P_2-513(1) \end{array} \right.$	(0.000, 0.390) 1.048, 1.404, 1.818
33.76	2	39455.23	$a\ ^3F_3-462(4)$	(0.000, 0.200) 1.366, 1.545
32.37	20	39476.90	$a\ ^1H_5-637(5)$	(0.433 <i>w</i>) 1.086 <i>W</i>
32.13	100	39480.58	$a\ ^5F_3-421(4)$	(0.000) 1.293
31.71	2	39487.13	$a\ ^3D_3-580(4)$	
31.10	3	39496.69		(0.000 <i>w</i>) 1.027 <i>A</i>
30.18	6	39511.03	$a\ ^5F_3-421(2)$	(0.000 <i>w</i>) 1.259 <i>A</i>
29.50	12	39521.62	$a\ ^5D_4-567(4)$	(0.101) 1.189
29.16	6	39526.86		(0.214) 1.106
28.62	10	39535.39	$a\ ^5D_1-530(2)$	(0.000) 1.447
27.85	1	39547.42	$b\ ^3F_4-580(4)$	

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
2527.34	30	39555.46	$a\ ^3F_3-463(2)$	(0.000, 0.251) 0.589 , 0.846, 1.032
27.06	2	39559.80	$b\ ^1D_2-628(1)$	(0.000, 0.206) . . . ?
26.03	50	39575.91	$a\ ^3P_2-452(1)$	(0.000 <i>w</i>) 1.212 <i>A</i>
25.50	6	39584.25		
25.11	10	39590.33	$b\ ^3P_0-558(1)$	(0.000) 1.414
24.84	8	39594.48	$a\ ^1H_5-638(4)$	
23.90	5	39609.24		
23.56	4	39614.63		(0.000, 0.372, 0.735, 1.122) 0.288, 0.649, 1.056, 1.444
22.88	3	39625.30	$b\ ^3F_3-542(4)$	(0.000 <i>w</i>) 2.163 <i>w</i>
21.05	25	39654.10	$a\ ^3H_4-555(5)$	(0.000 <i>w</i>) 0.943 <i>w</i>
20.75	2	39658.83	$a\ ^5P_2-515(2)$	
20.08	10	39669.31		
19.04	15	39685.78	$a\ ^5P_3-521(3)$	
18.88	1	39688.24		
18.64	5	39692.06	$a\ ^3H_4-555(3)$	
18.33	2	39696.92		
18.16	1	39699.65		
17.58	12	39708.77	$d\ ^3F_4-712(5)$	(0.000) 1.101
17.34	1	39712.52	$a\ ^3G_3-514(4)$	
17.21	4	39714.55		(0.000) 1.216
16.78	3	39721.43	$a\ ^3D_3-582(2)$	(0.000, 0.300) 0.955, 1.313
15.58	5	39740.27	$a\ ^1D_2-533(2)$	(0.249, 0.519) 0.882, 1.131 , 1.377 , 1.639
14.55	12	39756.53	$a\ ^5D_4-569(4)$	(0.173 <i>w</i>) 1.147 <i>w</i>
13.89	30	39766.97	$a\ ^3G_3-515(2)$	(0.000, 0.381, 0.788) 0.160 , 0.530, 0.907, 1.293
13.43	2	39774.29	$b\ ^3P_2-582(2)$	
13.10	15	39779.52	$a\ ^3F_2-429(3)$	(0.000, 0.368, 0.741) 0.368, 0.754, 1.127, 1.491, 1.863
12.83	5	39783.76	$a\ ^1F_3-646(3)$	
12.60	2	39787.48	$a\ ^3G_4-524(4)$	
12.49	12	39789.17	$a\ ^3P_2-454(2)$	(0.340 <i>w</i>) 0.910 <i>w</i>
11.64	50	39802.65		(0.00) 1.49
11.10	2	39811.12		
10.90	3	39814.43	$a\ ^3F_3-466(4)$	
10.68	75	39817.89	$a\ ^5P_1-505(1)$	(1.014) 1.335, 2.390 <i>W</i>
10.49	3	39820.93	$b\ ^3H_5-652(4)$	
09.94	15	39829.56	$b\ ^3P_1-571(1)$ $a\ ^5D_4-570(3)$	
08.92	15	39845.76	$b\ ^3F_2-495(3)$	(0.000, 0.252, 0.524) 0.809, 1.052, 1.309, 1.563, 1.822
08.35	4	39854.84	$a\ ^3H_5-580(4)$	(0.000 <i>w</i>) 1.209 <i>w</i>
07.69	15	39865.28	$c\ ^3F_3-634(4)$	(0.174) 1.027
07.08	20	39875.09	$a\ ^3G_4-525(3)$	(0.000, 0.390, 0.782) 0.226 , 0.618, 1.010
06.45	10	39884.99	$a\ ^3F_2-430(2)$	(0.322, 0.636) 0.420, 0.741 , 1.041 , 1.346
06.13	2	39890.10		
05.98	2	39892.47	$a\ ^3D_2-570(3)$	
05.48	2	39900.51	$a\ ^3F_4-496(3)$	(0.000, 0.188, 0.388) . . . , 1.417, 1.589, 1.787
05.32	15	39903.01	$a\ ^3P_1-452(1)$	(0.116) 1.493
05.13	2	39906.06	$a\ ^1D_2-534(3)$ $a\ ^3D_1-545(2)$	(0.000, 0.181) 0.844, 1.016, 1.201
03.88	3	39925.97	$c\ ^3F_2-628(1)$	(0.000, 0.203) 0.495 , 0.707, 0.906
03.01	50	39939.85		(0.000) 1.060
02.21	2	39952.66	$b\ ^3F_3-545(2)$	(0.000) 0.968
02.11	2	39954.23		
01.99	50	39956.14	$b\ ^3F_2-496(3)$	(0.000) 1.008
00.92	4	39973.20	$b\ ^3G_5-712(5)$	(0.000) 1.109
00.58	1	39978.70		
2499.74	1	39992.14		
99.24	3	40000.11	$a\ ^3F_3-468(3)$	(0.372 <i>B</i>) 1.117 <i>D</i>
98.34	12	40014.48	$a\ ^5F_4-444(3)$	(0.000, 0.397, 0.796, 1.195) 0.557, 0.949, 1.353, 1.725, 2.111, 2.521

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
2498.04	5	40019.32	$a\ ^3F_3-468(2)$	(0.000) 1.018 w
97.77	10	40023.65	$a\ ^5F_1-400(0)$	(0.118) 0.000 w , 1.018
97.51	2	40027.81	$a\ ^3D_2-571(1)$	
97.15	2	40033.58		(0.090, 0.276) . . . ?
96.24	10	40048.18	$b\ ^3G_4-682(5)$	(0.000) 1.173
95.03	3	40067.60	$b\ ^3F_3-546(3)$	(0.178 B) 0.965 w
94.33	8	40078.84	$b\ ^3F_4-585(5)$	(0.000 D) 0.761 A
94.17	6	40081.41	$a\ ^3P_0-442(1)$	(0.000) 0.262
93.97	7	40084.62	$a\ ^1D_2-536(2)$	(0.224, 0.477) 0.856, 1.091 , 1.329 , 1.562
93.56	2	40091.22		
93.14	2	40097.97		(0.00) 1.20
92.51	4	40108.10	$a\ ^5F_5-462(5)$	(0.427, 0.661, 0.894) 0.471, 0.617, 0.850, 1.026, 1.207 , 1.383 , 1.590, 1.810 . . .
92.16	12	40113.74	$a\ ^5F_2-411(2)$	(0.295 B) 1.093 D
92.01	12	40116.15	$a\ ^3P_1-454(2)$	(0.000 , 0.397) 0.776 , 1.157, 1.542
90.74	2	40136.60		
90.27	20	40144.18	$a\ ^5P_3-525(3)$	(0.406 w) 1.165 D
88.71	20	40169.40	$a\ ^5F_4-445(5)$ $a\ ^5D_1-536(2)$	(0.000 W) 1.049 A
87.65	15	40186.49	$a\ ^1D_2-537(1)$	(0.000 W) 0.997 A
87.34	8	40191.38	$a\ ^3F_4-499(4)$	(0.000) 1.592
87.26	3	40192.76		
87.04	8	40196.34	$b\ ^3F_2-498(1)$	(0.000) 1.049
86.81	5	40199.98	$c\ ^3F_3-638(4)$	(0.000) 1.151
86.18	3	40210.21	$a\ ^5F_4-446(4)$	(0.268 B) 1.282 D
85.37	4	40223.38	$a\ ^5D_0-528(1)$	
84.75	10	40233.32	$a\ ^5F_1-402(2)$	(0.000 , 1.170) 1.097, 2.301
83.48	3	40253.89		(0.000 , 0.228) 1.580, 1.775, 1.992
82.60	30	40268.26	$b\ ^3D_3-708(2)$	(0.000 W) 1.621 B
82.39	3	40271.60		
81.87	30	40280.04	$a\ ^5P_2-521(1)$	(0.000 , 0.231) 1.142 , 1.373, 1.604
81.15	3	40291.76	$a\ ^3H_4-561(4)$	(0.000 , 0.476, 0.945) 0.987, 1.487
80.61	2	40300.46		
80.37	3	40304.43	$a\ ^5F_1-403(1)$	(1.206) 0.000 D , 1.281
79.59	12	40317.07	$a\ ^5F_3-429(3)$	(0.378 B) 1.202 D
79.22	10	40323.17	$a\ ^5F_2-413(1)$	(0.000 , 0.877) 0.118 , 0.986, 1.883
78.45	1	40335.60		
78.33	3	40337.50	$a\ ^3F_3-471(3)$	(0.000) 1.103
77.18	5	40356.28		(0.259) 1.200
76.69	40	40364.26	$a\ ^3F_2-435(3)$	(0.000 , 0.352, 0.689) 0.379, 0.745, 1.080, 1.414, 1.767
76.11	3	40373.76	$a\ ^3F_2-435(1)$	
75.32	50	40386.55	$a\ ^3H_5-585(5)$	(0.257 B) 1.103
74.33	5	40402.74	$c\ ^3F_4-634(4)$	(0.000) 0.872
73.32	15	40419.30	$a\ ^5F_4-448(3)$	(0.000 w) 1.510 D
73.12	15	40422.57	$a\ ^5F_3-430(2)$	(0.000 , 0.186, 0.376) 0.946, 1.166, 1.394, 1.622
72.33	6	40435.47		
71.90	4	40442.49	$a\ ^1G_4-546(3)$	
71.48	4	40449.36	$a\ ^3F_3-472(4)$	
70.90	50	40458.82	$a\ ^5F_5-466(4)$	(0.000 , 0.166, 0.377, 0.592, 0.798) 1.024, 1.174, 1.408, 1.594, 1.822, 2.031, 2.214
70.69	3	40462.29		
69.37	25	40483.96	$a\ ^5P_1-511(2)$	(0.000 , 1.021) 0.337 , 1.353, 2.376
68.42	40	40499.48	$a\ ^3H_4-563(3)$	(0.000 , 0.202, 0.436, 0.633) 0.364 , 0.546, 0.766, 0.995, 1.210, 1.417
68.10	2	40504.74		
67.38	15	40516.60	$a\ ^3P_2-461(1)$	(0.000) 1.333
66.99	15	40522.98	$a\ ^5F_2-415(3)$	(0.000 , 0.200, 0.409) 0.812, 0.998, 1.189, 1.396, 1.621
66.66	3	40528.46		
65.52	10	40547.20	$b\ ^3F_3-551(3)$	(0.248, 0.520, 0.792) 0.470, 0.743, 0.995 , 1.256 , 1.506, 1.758

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
2464.92	3	40557.00		(0.000 , 0.313, 0.606) 0.716, 1.036, 1.333
64.24	10	40568.16	$a\ ^3F_4-503(3)$	(0.000 <i>w</i>) 1.122 <i>A</i>
63.83	50	40574.93	$a\ ^5P_3-530(2)$	(0.000 <i>w</i>) 1.963 <i>B</i>
62.88	12	40590.60	$a\ ^3H_6-585(5)$	(0.000 <i>w</i>) 1.180
62.34	2	40599.58	$\begin{cases} b\ ^3H_6-666(5) \\ a\ ^3H_4-564(5) \end{cases}$	(0.000 <i>w</i>) 1.119 <i>A</i>
61.58	7	40612.03	$a\ ^5P_1-513(1)$	
61.06	15	40620.68	$c\ ^3F_4-637(5)$	(0.000) 2.375 <i>D</i>
60.91	7	40623.05	$a\ ^3D_2-577(2)$	(0.156, 0.352) 0.859, 1.033 , 1.213 , 1.414
60.00	10	40638.13	$a\ ^3G_4-533(4)$	(0.278) 1.067 <i>D</i>
58.19	12	40668.03		(0.000) 0.851
58.02	7	40670.78	$a\ ^3H_4-565(5)$	
57.27	8	40683.32	$\begin{cases} a\ ^1H_5-649(5) \\ a\ ^3F_3-475(2) \end{cases}$	(0.000 , 0.213, 0.433) 0.653 , 0.872, 1.081, 1.287, 1.468
56.62	5	40694.05	$b\ ^3P_1-580(1)$	(0.000) 1.161
55.97	8	40704.86	$a\ ^5P_2-525(3)$	(0.000) 1.391
54.70	15	40725.80	$a\ ^3G_3-524(4)$	(0.000 , 0.193, 0.416, 0.629) 0.700, 0.904, 1.090, 1.328, 1.537, 1.726
54.50	2	40729.18	$a\ ^3P_2-463(2)$	(0.000) 1.274
53.98	15	40737.86	$c\ ^3F_4-638(4)$	(0.302 <i>B</i>) 1.077 <i>D</i>
52.60	10	40760.78	$a\ ^3G_4-534(3)$	(0.000 <i>W</i>) 0.817 <i>w</i>
51.64	2	40776.69		(0.000) 1.166
51.51	1	40778.84		
50.99	4	40787.42		
50.23	7	40800.19	$b\ ^3F_3-553(4)$	(0.000) 1.080
49.84	8	40806.67		
49.65	2	40809.80	$a\ ^5D_4-580(4)$	
49.45	25	40813.18	$a\ ^3G_3-525(3)$	(0.483, 0.974, 1.492) 0.000, 0.411, 0.894 , 1.403 , 1.884, 2.365
48.99	10	40820.83	$a\ ^5P_1-515(2)$	(0.000) 1.300
47.79	4	40840.74		
47.61	10	40843.88	$a\ ^3P_1-461(1)$	(0.199) 1.359, 1.567
47.16	25	40851.24	$b\ ^3P_2-593(2)$	(0.286, 0.626) 0.820, 1.131 , 1.444 , 1.764
45.56	20	40878.04		(0.000) 1.226
45.18	1	40884.40		
44.69	50	40892.59		(0.000 <i>w</i>) 0.000 <i>w</i>
44.24	4	40900.12	$b\ ^3P_1-582(2)$	
44.13	25	40901.93	$\begin{cases} a\ ^3H_4-567(4) \\ a\ ^5F_3-435(3) \end{cases}$	(0.357 <i>D</i>) 1.109 <i>D</i>
43.78	8	40907.77	$a\ ^5P_3-533(4)$	(0.000) 1.723
43.00	7	40920.88		
42.81	7	40924.03	$a\ ^3D_1-555(2)$	(0.000 , 0.225) 0.844, 1.078, 1.300
42.60	3	40927.53		
41.85	15	40940.08		(0.000 <i>w</i>) 1.069 <i>A</i>
41.34	12	40948.73	$a\ ^5P_2-528(1)$	(0.000 , 0.514) 0.914, 1.407, 1.869
40.53	12	40962.24	$b\ ^3F_3-555(3)$	(0.446, 0.868, 1.349) 0.561, 0.992 , 1.418 , 1.842
40.04	12	40970.60	$b\ ^3F_3-555(2)$	(0.000) 0.942
39.81	10	40974.43		(0.000 <i>w</i>) 1.023 <i>A</i>
39.14	1	40985.55		
38.93	3	40989.09		
38.64	20	40994.03	$a\ ^3F_3-478(3)$	(0.334 <i>B</i>) 1.141 <i>D</i>
38.21	25	41001.20		
38.04	2	41004.12		
37.75	15	41009.02	$a\ ^1H_5-652(4)$	(0.000 <i>w</i>) 1.038 <i>WA</i>
36.89	2	41023.40		
36.73	2	41026.20	$a\ ^3F_2-442(1)$	
36.51	25	41029.94	$a\ ^5P_3-534(3)$	(0.362, 0.719, 1.178) 0.454, 0.837, 1.217 , 1.588 , 1.975, 2.393
36.31	2	41033.24	$\begin{cases} c\ ^3F_3-646(3) \\ a\ ^5D_2-555(1) \end{cases}$	
35.59	4	41045.30		(0.000 <i>w</i>) 0.680 <i>B</i>
34.93	5	41056.49	$\begin{cases} a\ ^3P_1-463(2) \\ a\ ^5D_2-555(2) \end{cases}$	(0.000 , 0.247) 1.076 , 1.325, . . .

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λ air	Intensity and notes	Wave number	Term combination	Zeeman pattern
2434.82	5	41058.34	$a^5D_1-545(2)$	(0.000, 0.487) 0.552 , 1.029, 1.514
33.59	20	41079.13	$a^3F_2-442(2)$	(0.504, 1.019) 0.245, 0.744 , 1.248 , 1.754
33.03	8	41088.57	$a^1D_2-546(3)$	(0.000, 0.180, 0.356) 0.569 , 0.772, 0.962, 1.179, 1.368
32.71	75	41093.92	$a^5F_5-472(4)$	(0.000, 0.199, 0.407, 0.640, 0.849) 0.828, 1.022, 1.179, 1.369, 1.572, 1.820, 2.056, 2.278 .
31.97	12	41106.49	$a^3D_2-582(2)$	(0.433, 0.877) 0.740, 1.208 , 1.643
31.81	6	41109.16	$a^3P_0-452(1)$	(0.000) 1.474
31.06	15	41121.93	$a^5F_2-421(2)$	(0.201, 0.442) 0.785, 0.989 , 1.213 , 1.435
30.51	15	41131.20	$b^3H_5-665(4)$	
30.22	30	41136.04	$a^5P_2-530(2)$	(0.000w) 1.133
29.68	25	41145.16	$a^5F_1-411(2)$	(0.000w, 1.128) 0.000w, 1.150, 2.268
28.50	30	41165.19		
28.00	20	41173.60	$a^3P_2-468(3)$	(0.000w) 0.973D
26.95	4	41191.46		
26.86	7	41192.97	$a^3P_2-468(2)$	(0.393, 0.488) 0.860, 1.101 , 1.334 , 1.596
26.53	4	41198.60	$b^3F_4-596(5)$	(0.000, 0.265, 0.537, 0.820, 1.106) 0.958 , 1.222, . . .
25.91	30	41209.15	$a^5P_3-536(2)$	(0.000, 0.258, 0.577) . . . , 1.093, 1.353, 1.532, 1.9, 2.2
25.47	10	41216.61		(0.000w) 0.698A
25.20	12	41221.20		
25.13	3	41222.42		(0.000w) 1.568
24.97	3	41225.09	$b^1G_4-666(5)$	(0.000) 0.966
24.58	2	41231.80	$a^3D_1-558(2)$	(0.000, 0.486) 1.741
24.05	3	41240.70		
23.89	8	41243.51	$a^3G_3-530(2)$	(0.000, 0.552, 1.102) 0.335 , 0.899, 1.470, 1.980
23.49	20	41250.32	$a^3F_2-444(3)$	(0.000, 0.196, 0.398) 0.564, 0.753, 0.946, 1.128, 1.340
21.85	50	41278.25	$b^3F_3-558(2)$	(0.000, 0.317, 0.670) 0.324 , 0.674, 0.987, 1.306, 1.626
20.83	2	41295.67		(0.483) 1.212C
20.35	1	41303.78		
18.95	6	41327.76	$a^3F_4-510(3)$	(0.000D) 1.347w
18.77	20	41330.77		(0.000) 0.947
18.54	2	41334.74	$\left\{ \begin{array}{l} a^5D_3-570(3) \\ a^3F_3-481(2) \end{array} \right.$	
18.31	3	41338.63		
18.10	10	41342.31		
17.85	30	41346.53		(0.332w) 1.138D
17.38	4	41354.54		
17.33	5	41355.39	$a^5F_1-413(1)$	
17.15	7	41358.44	$b^1D_2-646(3)$	(0.000) 1.023
16.89	25	41362.87	$a^5F_3-440(4)$	(0.000D) 0.738A
16.73	1	41365.66		
15.83	1	41381.13		
15.70	1	41383.24	$b^3F_2-510(3)$	
15.24	15	41391.11	$a^3D_1-560(2)$	(0.000w) 1.044A
15.22	12	41391.48	$a^3F_3-482(2)$	(0.000, 0.361, 741) 0.364 , 0.715
13.78	4	41416.16		
12.54	12	41437.58	$b^3F_3-560(2)$	(0.000) 1.006
12.27	8	41442.13	$a^5P_1-521(1)$	(0.764D) 1.618, 2.326
10.61	3	41470.63	$b^3G_3-682(3)$	(0.539) 0.141, 0.770
09.80	5	41484.69		(0.000, 0.283, 0.610, 0.895) . . . , 1.475, 1.746, 2.041
08.83	8	41501.24	$a^3G_4-542(4)$	
08.50	5	41506.96	$b^3F_2-511(2)$	(0.316, 0.625) 0.722, 1.045 , 1.352 , 1.670
08.25	20	41511.27	$a^3P_2-471(3)$	(0.000, 0.260, 0.529) 0.578 , 0.849, 1.092
07.75	10	41519.89	$a^3P_1-468(2)$	(0.000, 0.458) 0.651 , 1.102, 1.562
07.54	1	41523.58	$a^5D_2-560(2)$	
06.87	2	41535.07		
05.76	2	41554.26		
05.40	3	41560.52		(0.232) 0.672, 0.948
04.80	10	41570.82	$c^3F_4-646(3)$	(0.000) 0.961
04.48	10	41576.38	$a^3G_3-533(4)$	(0.000, 0.189, 0.381, 0.561) 0.897, 1.115, 1.283, 1.477, 1.643
03.68	25	41590.22	$a^5P_2-534(3)$	(0.000, 0.216, 0.455) 0.789 , 0.988, 1.220, 1.442
03.54	3	41592.71		(0.000w) 1.078
03.13	10	41599.70		(0.000D) 1.417

TABLE 1. *Wavelengths, term combinations, and Zeeman effects of Ta II—Continued*

Wave length Åair	Intensity and notes	Wave number	Term combination	Zeeman pattern
2402.13	30	41617.06	$a\ ^5F_3-442(2)$	(0.000) 1.240
01.04	6	41635.88	$b\ ^3F_2-513(1)$	(0.000) 1.049
00.92	6	41638.03		
00.62	100	41643.16	$a\ ^5F_5-478(6)$	(0.000D) 1.175D
2399.94	15	41655.06	$a\ ^3F_2-448(3)$	(0.000 , 0.516, 1.029) 0.247, 0.744, 1.254, 1.744, 2.248
98.74	4	41675.86	$a\ ^1F_3-665(4)$	(0.000w) 1.441
98.34	6	41682.85		(0.000w) 1.211w
98.10	10	41686.97	$a\ ^3D_3-602(3)$	(0.390w) 1.275D
97.76	5	41692.81		
97.52	4	41697.07		(0.286, 0.609, 0.928) 0.281, 0.614, 0.928 , 1.224 , 1.552, 1.957
97.44	3	41698.46	$a\ ^3G_3-534(3)$	
96.74	1	41710.59		(0.355) 1.177
95.94	3	41724.57	$c\ ^3F_2-646(3)$	(0.000 , 0.388, 0.751) 1.101, 1.406, 1.807
95.40	3	41733.94	$a\ ^3F_4-514(4)$	(0.393) 1.212
95.03	12	41740.42	$b\ ^3P_2-602(3)$	(0.000 , 0.255, 0.556) 0.615 , 0.914, 1.178, 1.443, 1.732
94.77	1	41744.95		
94.65	5	41747.01	$b\ ^3F_4-602(3)$	(0.000) 1.320
93.27	7	41771.15	$a\ ^3D_3-603(3)$	(0.497D) 0.729, 0.941, 1.156 , 1.367 , . . .
92.70	6	41781.13	$b\ ^3P_0-580(1)$	(0.000) 1.143
92.29	3	41788.19	$a\ ^5F_3-444(3)$	(0.304, 0.612, 0.911) 0.320, 0.636, 0.952 , 1.248 , 1.540, 1.851
90.71	5	41815.77		
90.43	2	41820.80		(0.000) 1.521
90.22	4	41824.37	$b\ ^3P_2-603(3)$	(0.000 , 0.314, 0.635) 0.467 , 0.814, 1.130, 1.430
89.60	8	41835.29	$a\ ^3F_3-486(2)$	(0.000w) 1.021
89.11	10	41843.79	$b\ ^3F_2-515(2)$	(0.235, 0.487) 0.806, 1.052 , 1.299 , 1.554
88.39	15	41856.45	$\begin{cases} a\ ^5D_2-563(3) \\ a\ ^3P_2-475(2) \end{cases}$	(0.000w) 1.303
87.54	5	41871.39	$\begin{cases} a\ ^5F_4-462(4) \\ a\ ^5P_2-537(1) \end{cases}$	(0.000) 1.508
87.35	2	41874.68	$c\ ^3F_3-654(3)$	
87.09	50	41879.28	$a\ ^5F_4-462(5)$	(0.579D) 0.627W
84.51	1	41924.59		
84.30	12	41928.21	$a\ ^5F_2-429(3)$	(0.000w) 1.314
83.74	15	41938.01	$a\ ^3P_2-475(1)$	(0.000w) 1.161
83.15	2	41948.42		(0.000) 0.985
81.55	40	41976.68	$b\ ^3P_1-593(2)$	(0.000) 1.122
81.14	50	41983.81	$a\ ^5F_3-446(4)$	(0.000) 1.298
79.80	2	42007.54	$a\ ^3F_4-517(5)$	
78.33	10	42033.52	$a\ ^5F_2-430(2)$	(0.116) 1.038
78.20	2	42035.78		
77.41	5	42049.71	$a\ ^3P_0-461(1)$	(0.000) 1.356
77.18	8	42053.78	$a\ ^3F_2-452(1)$	(0.000 , 0.719) 0.000 , 0.741, 1.465
75.91	3	42076.22	$a\ ^5D_1-555(2)$	(0.000 , 0.456) 0.579 , 1.025
74.69	5	42097.91	$a\ ^5P_3-545(2)$	(0.000 , 0.578, 1.145) 0.990, 1.458, 2.140, 2.737
74.20	3	42106.52		
73.92	20	42111.51	$a\ ^5P_1-528(1)$	(1.457B) 0.906, 2.394w
72.81	12	42131.23	$a\ ^3F_3-489(3)$	(0.187, 0.433, 0.595) 0.683, 0.880, 1.072 , 1.274 , 1.495, 1.689
71.58	10	42153.18	$a\ ^5F_1-421(2)$	(0.000 , 1.185) 1.185 , 2.340
71.06	10	42162.44		(0.000 , 0.219, 0.453, 0.662) 0.326 , 0.548, 0.767, 1.020, 1.254, 1.487
70.77	12	42167.51	$a\ ^3P_2-478(3)$	(0.000D) 0.918A
70.52	1	42171.96	$b\ ^3F_3-567(4)$	
70.37	8	42174.64		(0.00) 1.35
69.85	7	42183.95	$a\ ^3P_1-475(2)$	(0.000 , 0.266) 1.028 , 1.291, 1.540
69.53	4	42189.54	$a\ ^3H_4-580(4)$	(0.302) 1.058
69.34	8	42192.89	$a\ ^5F_3-448(3)$	(0.000) 1.236
68.78	2	42202.99	$b\ ^3H_6-682(5)$	
68.56	2	42206.85		(0.222) 1.137
68.22	5	42212.88	$a\ ^5P_3-546(3)$	(0.676, 1.335, 1.984) 0.295, 0.954 , 1.620 , 2.262
67.71	4	42222.00		
67.26	15	42230.01	$a\ ^5F_4-466(4)$	(0.437w) 1.272D
66.18	1	42249.25	$a\ ^3F_3-490(2)$	(0.000 , 0.235, 0.462) 0.633, . . .
65.29	2	42265.20	$a\ ^3P_1-475(1)$	(0.000) 1.507

TABLE 1. *Wavelengths, term combinations, and Zeeman effects of Ta II—Continued*

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
2364. 26	40	42283. 58	$a \ ^5F_5-484(4)$	(0.000 <i>w</i>) 1.843 <i>B</i>
63. 47	1	42297. 74	$a \ ^5P_1-530(2)$	
62. 44	3	42316. 20	$\left\{ \begin{array}{l} a \ ^1G_4-565(5) \\ a \ ^3D_3-608(2) \end{array} \right.$	
62. 27	3	42319. 21		
61. 87	1	42326. 43		
61. 48	1	42333. 44		
60. 03	3	42359. 39		
59. 81	10	42363. 30	$a \ ^3H_5-605(5)$	(0.791 <i>B</i>) 0.408, 0.560, 0.732, 0.904, 1.081 , 1.253, 1.479, 1.656
59. 46	7	42369. 62	$b \ ^3P_2-608(2)$	(0.310, 0.619) 0.777, 1.109, 1.428 , 1.772
59. 17	8	42374. 76	$a \ ^3F_4-521(3)$	(0.000 <i>D</i>) 1.566 <i>B</i>
59. 08	4	42376. 45		
58. 68	2	42383. 63	$a \ ^5D_1-558(2)$	
58. 24	2	42391. 56		
56. 92	20	42415. 24	$a \ ^5F_4-468(3)$	(0.000 <i>w</i>) 1.030
56. 48	8	42423. 15	$a \ ^3G_4-551(3)$	(0.000 , 0.237, 0.471, 0.700) 0.365 <i>A</i>
56. 07	20	42430. 65	$b \ ^3F_2-521(3)$	(0.000) 1.136
55. 67	6	42437. 79		
55. 58	12	42439. 46	$a \ ^3G_3-542(4)$	(0.000 , 0.229, 0.473, 0.708) 0.681, 0.920, 1.157, 1.416, 1.662, 1.880
55. 07	3	42448. 60		
54. 59	3	42457. 25		
54. 52	5	42458. 51	$a \ ^1D_2-560(2)$	(0.217) 1.061
54. 39	4	42460. 82	$a \ ^5D_4-596(5)$	
54. 11	4	42465. 92	$b \ ^3F_2-521(1)$	(0.000 , 0.558) 0.533 , 1.057
53. 87	10	42470. 31	$a \ ^3P_1-478(0)$	(0.000) 1.548
51. 99	10	42504. 14		(0.000 <i>w</i>) 0.962 <i>w</i>
51. 74	1	42508. 70	$a \ ^3P_2-481(2)$	
51. 50	1	42513. 04	$a \ ^5F_2-435(3)$	
51. 16	1	42519. 18		
50. 92	3	42523. 45		(0.000 , 0.248, 0.513) 0.508 <i>A</i>
50. 06	3	42539. 07		(0.000 <i>w</i>) 1.174 <i>w</i>
49. 84	2	42543. 10	$a \ ^5D_1-560(2)$	(0.000 , 0.503) 0.510 , 0.986
49. 52	1	42548. 46	$a \ ^5D_3-582(2)$	
49. 32	2	42552. 52		
49. 04	1	42557. 56		(0.000 <i>w</i>) 0.952 <i>w</i>
48. 62	7	42565. 16	$a \ ^3P_2-482(2)$	(0.000 <i>B</i>) 1.367 <i>D</i>
48. 55	6	42566. 50	$c \ ^3F_2-654(3)$	
48. 45	3	42568. 24	$a \ ^3D_1-571(1)$	(0.856) 1.762
48. 06	3	42575. 35		(0.000) 1.080
47. 64	8	42582. 89		
46. 98	20	42594. 90		(0.000 <i>w</i>) 1.100 <i>B</i>
46. 44	5	42604. 76		
46. 32	2	42606. 88	$a \ ^5D_4-598(5)$	(0.000 <i>w</i>) 0.711, 0.830 <i>w</i>
46. 04	8	42612. 04	$b \ ^3F_4-611(4)$	(0.408, 0.597, 0.813) 0.425, 0.612, 0.806, 1.029, 1.221 , 1.425, 1.646, 1.855.
45. 43	1	42623. 05		
44. 64	1	42637. 41		
43. 65	20	42655. 38		(0.00 <i>w</i>) 0.86 <i>w</i>
43. 49	7	42658. 33	$a \ ^5P_2-545(2)$	(0.384, 0.800<i>w</i>) 0.628, 1.022, 1.403 , 1.801
42. 53	10	42675. 87	$a \ ^3G_4-553(4)$	
41. 62	12	42692. 32	$a \ ^5P_3-551(3)$	(0.357, 0.714, 1.123) 0.517, 0.881, 1.245, 1.590 , 1.942, 2.316
40. 94	10	42704. 85	$a \ ^3F_3-495(3)$	(0.222, 0.467, 0.712) 0.612, 0.846, 1.086, 1.306 , 1.536, 1.760
40. 30	10	42716. 48		
40. 04	10	42721. 29	$a \ ^3H_4-585(5)$	(0.000) 1.100
39. 34	1	42734. 00	$a \ ^3P_1-480(0)$	(0.000) 1.576
38. 65	8	42746. 54	$a \ ^3F_4-524(4)$	(0.468 <i>B</i>) 1.208 <i>D</i>
38. 28	15	42753. 36	$a \ ^5F_4-471(3)$	(0.000 , 0.238, 0.516, 0.791) . . . , 1.069, 1.324, 1.592, 1.902, 2.167

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length λ air	Intensity and notes	Wave number	Term combination	Zeeman pattern
2337.82	2	42761.75	$a\ ^3F_3-495(2)$	(0.000, 0.478, 0.972) 0.000, 0.451, 0.932, 1.413
37.56	3	42766.61	$a\ ^3G_3-545(2)$	
37.18	4	42773.57	$a\ ^5P_2-546(3)$	
36.55	8	42785.03		
35.75	15	42799.68	$\begin{cases} b\ ^3H_5-682(5) \\ a\ ^3G_4-555(5) \end{cases}$	(0.000w) 1.146w
35.49	3	42804.44	$a\ ^5F_3-454(2)$	(0.123) 1.057 (0.000w) 1.150A (0.000, 0.198, 0.301, 0.502) 0.643, 0.716, 0.887, 1.105, 1.349
34.90	12	42815.30	$a\ ^3F_3-496(3)$	
34.14	20	42829.27		
33.87	12	42834.15	$a\ ^3F_4-525(3)$	
33.08	2	42848.69	$c\ ^3P_2-708(2)$	(0.60) 0.92 (0.000) 0.886 (0.000w) 1.370 (0.000) 1.401
32.19	25	42865.02	$a\ ^5F_4-472(4)$	
32.00	35	42868.53	$a\ ^5F_5-490(5)$	
31.30	20	42881.44	$a\ ^3G_3-546(3)$	
30.82	5	42890.27	$b\ ^3F_2-525(3)$	
30.70	2	42892.41	$a\ ^3P_1-482(2)$	
29.88	2	42907.59		
29.45	1	42915.36		(0.000w) 1.226w
29.29	1	42918.37		
29.20	4	42919.95	$a\ ^3H_5-611(4)$	
28.96	1	42924.45		
28.76	3	42928.21		(0.189) 1.153
28.57	1	42931.64	$a\ ^5P_1-536(2)$	
27.64	6	42948.79		
27.00	4	42960.60		
26.74	1	42965.33		(0.000) 1.221 (0.00) 0.99
26.48	6	42970.29		
25.70	2	42984.70		
25.15	2	42994.85	$a\ ^3F_2-461(1)$	
24.33	2	43009.96	$a\ ^5D_4-602(3)$	
23.90	20	43017.85		(1.128w) 1.248, 2.356
23.04	3	43033.75	$a\ ^5P_1-537(1)$	
22.21	2	43049.21		
21.38	1	43064.65	$a\ ^5F_1-430(2)$	
21.17	4	43068.53	$a\ ^5F_1-430(0)$	(0.00) 0.00
20.93	1	43072.89	$a\ ^3D_2-602(3)$	
20.58	4	43079.44		(0.440D) 1.526D (0.000, 0.573, 1.148) 1.568, 2.062, 2.647
20.35	2	43083.75		
19.79	2	43094.08	$a\ ^5D_4-603(3)$	
19.51	3	43099.31		
19.25	2	43104.22	$b\ ^3P_1-604(1)$	(0.000w) 1.144
19.09	8	43107.19	$a\ ^5P_3-555(3)$	
18.64	4	43115.45	$a\ ^5P_3-555(2)$	
18.48	2	43118.46	$a\ ^3P_2-487(1)$	
17.66	2	43133.77	$b\ ^3F_2-528(1)$	(0.000, 0.393) 0.494, 0.884, 1.282
17.18	1	43142.59		
17.03	1	43145.37		
16.70	3	43151.62		
16.42	4	43156.76	$a\ ^3D_2-603(3)$	(0.000w) 0.995 (0.000w) 0.587A
16.04	5	43163.81	$a\ ^3D_1-577(2)$	
15.65	3	43171.15	$a\ ^3H_5-613(5)$	
15.45	10	43174.90	$a\ ^5F_2-442(1)$	(0.000, 0.307, 0.621, 0.940) 1.554, 1.847, 2.172
14.29	3	43196.52		
14.08	3	43200.36	$b\ ^3F_4-616(3)$	
12.93	2	43221.92		
12.62	7	43227.78	$a\ ^5F_2-442(2)$	(0.223, 0.507) 0.752, 1.008, 1.251, 1.481
11.46	1	43249.34		
11.20	5	43254.28		
08.93	1	43296.71	$a\ ^5D_2-577(2)$	
08.63	2	43302.41		(0.000) 1.207A
08.51	4	43304.74	$a\ ^3P_2-489(3)$	

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Åair	Intensity and notes	Wave number	Term combination	Zeeman pattern
2308.16	3	43311.15	$\left\{ \begin{array}{l} a^3F_2-464(2) \\ a^3D_2-604(1) \end{array} \right.$	(0.000 , 0.545) 0.660, 1.192, 1.749
06.86	3	43335.62	$\left\{ \begin{array}{l} a^3P_1-486(2) \\ a^5F_5-495(5) \end{array} \right.$	(0.000 , 0.409) 0.720 , 1.129, 1.517
05.49	1	43361.38	$a^3G_3-551(3)$	
04.75	3	43375.30	$a^3H_6-613(5)$	
03.48	6	43399.14	$a^5F_2-444(3)$	(0.000 <i>w</i>) 0.879 <i>w</i>
03.31	1	43402.42	$a^3H_5-615(6)$	
02.92	6	43409.69	$a^5F_4-478(3)$	(0.000 <i>D</i>) 1.721 <i>B</i>
02.39	1	43419.76		
02.23	6	43422.74	$\left\{ \begin{array}{l} a^3H_5-616(6) \\ a^3P_2-490(2) \end{array} \right.$	(0.000 <i>w</i>) 1.330
01.47	8	43437.04	$a^3G_4-561(4)$	(1.082 <i>B</i>) 0.240, 0.499, 0.752, 1.008 , 1.250 , 1.522, 1.759, 2.012
01.22	1	43441.84	$a^5F_4-478(5)$	
01.07	2	43444.63		
01.02	1	43445.61	$a^3P_1-487(1)$	
00.27	2	43459.72	$b^3F_3-580(4)$	(0.000 <i>w</i>) 1.115 <i>w</i>
2298.95	6	43484.73		(0.000 <i>w</i>) 0.639 <i>A</i>
98.39	1	43495.32	$b^3P_1-608(2)$	(0.000) 1.114
98.12	8	43500.39	$a^1D_2-570(3)$	(0.000 , 0.295, 0.570) 1.093, 1.378, 1.643, 1.899
97.63	2	43509.67		(0.000) 1.104
96.81	40	43525.20		(0.00 <i>w</i>) 0.99 <i>w</i>
96.68	2	43527.70	$c^3F_4-666(5)$	(0.384 <i>w</i>) 1.066 <i>D</i>
95.55	1	43549.11	$c^3P_0-669(1)$	(0.000) 0.000, 1.220
95.22	4	43555.48		(0.000 <i>w</i>) 0.895 <i>w</i>
93.77	1	43582.92	$a^5P_3-560(2)$	
92.56	15	43605.94	$a^3H_6-615(6)$	(0.362 <i>w</i>) 1.138 <i>D</i>
92.14	4	43613.98	$a^3G_3-553(4)$	(0.000 <i>D</i>) 1.297 <i>A</i>
91.50	1	43626.15	$a^5D_3-593(2)$	
91.47	1	43626.64	$a^3H_6-616(6)$	
91.00	1	43635.61	$\left\{ \begin{array}{l} a^1D_2-571(1) \\ b^1D_2-669(1) \end{array} \right.$	(0.000 , 0.628) 0.490, . . .
90.46	4	43645.93	$a^3G_4-563(3)$	
89.93	3	43656.02		
89.43	2	43665.53		
89.18	15	43670.28	$a^3F_2-468(2)$	(0.342, 0.723) 0.389, 0.739 , 1.097 , 1.447
88.88	3	43676.06	$a^5P_2-555(2)$	
87.28	12	43706.57	$a^5P_3-561(4)$	(0.000 , 0.319, 0.664, 1.023) 0.277 , 0.594, 0.926, 1.268, 1.572
87.01	1	43711.73		
86.60	3	43719.59	$a^3F_4-534(3)$	(0.000 <i>w</i>) 1.214
85.27	20	43744.97	$a^5F_3-463(2)$	(0.000 <i>w</i>) 1.171 <i>A</i>
85.02	7	43749.85	$a^3P_1-490(2)$	(0.000 , 0.257) 1.048 , 1.266, 1.528
83.67	2	43775.58	$b^3F_2-534(3)$	(0.00) 1.40
83.40	1	43780.91	$b^3H_4-682(5)$	
83.22	8	43784.32	$a^3G_3-555(2)$	(0.000) 0.706 <i>A</i>
83.07	1	43787.16		
82.21	3	43803.60	$a^5F_2-448(3)$	(0.000 , 0.271, 0.518) 1.014, 1.264, 1.519, 1.760
81.54	4	43816.44	$a^3G_4-565(5)$	(0.000, 0.912 <i>w</i>)
81.32	3	43820.71	$a^5P_1-545(2)$	(0.000) 1.015
80.58	5	43834.92		(0.00 <i>w</i>) 1.27 <i>w</i>
78.92	1	43866.91	$b^3H_4-682(3)$	
78.33	2	43878.21	$a^3P_2-495(3)$	(0.00) 1.25
78.11	2	43882.52		(0.00) 1.18
75.64	10	43930.11	$a^3H_5-621(4)$	(0.00) 1.19
74.61	2	43950.08		
74.37	2	43954.66	$b^3F_2-536(2)$	(0.58) 1.16
72.72	1	43986.55	$a^3H_4-598(5)$	
72.59	20	43989.02	$\left\{ \begin{array}{l} a^3P_2-496(3) \\ a^3F_2-471(3) \end{array} \right.$	(0.00 , 0.65) 0.68, 1.33
71.86	15	44003.24	$\left\{ \begin{array}{l} a^5F_3-466(4) \\ a^5P_2-558(1) \end{array} \right.$	(0.00) 1.16

TABLE 1. *Wavelengths, term combinations, and Zeeman effects of Ta II*—Continued

Wave length Å	Intensity and notes	Wave number	Term combination	Zeeman pattern
2271. 27	1	44014. 63		
71. 05	2	44018. 97	$a\ ^3H_5-622(5)$	(0.00) 1.09
70. 90	4	44021. 76		(0.00) 1.09
69. 56	5	44047. 73	$a\ ^3G_4-567(4)$	(0.63) 1.15 w
69. 21	4	44054. 66	$a\ ^5F_4-484(4)$	(0.00 w) 1.29
67. 50	2	44087. 86		(0.00 w) 0.70 w
67. 27	4	44092. 31	$a\ ^3G_3-558(2)$	(0.00 w) 0.82 w
65. 94	1	44118. 23		
64. 45	2	44127. 14		
63. 98	3	44156. 38		(0.00) 1.04
62. 29	25	44189. 28	$a\ ^5F_3-468(3)$	(0.00) 1.15
61. 62	12	44202. 45	$a\ ^5F_2-452(1)$	(0.00, 0.48) 0.48, 1.00
61. 43	20	44206. 09	$a\ ^5F_1-442(1)$	
60. 57	5	44222. 90	$a\ ^3H_6-622(5)$	(0.00) 1.43 A
60. 26	3	44229. 09	$a\ ^3P_2-498(1)$	(0.00, 0.67) 0.71
59. 59	5	44242. 18	$a\ ^3F_3-510(3)$	(0.18) 1.13
59. 12	3	44251. 40	$a\ ^3G_3-560(2)$	(0.00) 0.81
58. 74	5	44258. 83	$a\ ^5F_1-442(2)$	(0.00, 1.24) 0.00, 1.24, 2.53
57. 55	3	44282. 15		(0.41) 1.09
57. 11	1	44290. 73		
56. 53	12	44302. 07		(0.00) 1.20
55. 77	20	44317. 08	$a\ ^5P_3-567(4)$	(0.00 W) 0.00 W
55. 60	2	44320. 30	$a\ ^5F_5-505(5)$	
54. 88	4	44334. 45	$a\ ^3F_2-475(2)$	(1.09) 1.38
53. 47	2	44362. 24		
53. 26	3	44366. 34	$a\ ^3F_3-511(2)$	(0.00 w) 0.78
52. 80	3	44375. 46	$a\ ^3G_3-561(4)$	(0.00 w) 1.42 w
52. 06	2	44390. 02	$a\ ^3H_4-602(3)$	
50. 78	15	44415. 38	$a\ ^5F_2-454(2)$	(0.36) 1.13
49. 79	10	44434. 74	$a\ ^5F_1-444(0)$	(0.00) 0.00
48. 50	5	44460. 37	$a\ ^3F_4-542(4)$	(0.30) 1.22
47. 84	2	44473. 38		
47. 40	1	44482. 11		
46. 16	2	44506. 72	$\left\{ \begin{array}{l} a\ ^3D_3-630(2) \\ a\ ^5F_5-506(6) \end{array} \right.$	
43. 87	6	44552. 08	$a\ ^5P_3-569(4)$	(0.00 w) 0.00 w
43. 47	2	44559. 96	$b\ ^3P_2-630(2)$	
42. 68	5	44575. 74	$a\ ^5P_2-564(3)$	(0.00 w) 1.01 w
41. 72	2	44594. 86	$a\ ^5D_0-571(1)$	
39. 48	20	44639. 23	$\left\{ \begin{array}{l} a\ ^5F_4-490(5) \\ a\ ^5F_3-472(4) \end{array} \right.$	(0.00) 1.20
39. 01	5	44648. 80	$a\ ^3F_3-514(4)$	(0.00) 1.20
38. 60	1	44657. 01	$a\ ^3P_2-503(3)$	
37. 46	2	44679. 62	$c\ ^3F_3-682(3)$	
36. 29	4	44702. 96	$a\ ^3F_3-515(2)$	(0.00) 0.84
35. 94	3	44709. 97		
35. 69	3	44714. 97	$a\ ^1D_2-582(2)$	
33. 89	4	44751. 08		
32. 26	1	44783. 81		
31. 46	1	44799. 75	$a\ ^5D_1-582(2)$	
30. 86	3	44811. 88		
30. 69	1	44815. 25	$a\ ^5P_1-555(1)$	
29. 90	1	44831. 11		
29. 30	1	44843. 27	$b\ ^3F_2-545(2)$	
29. 03	1	44848. 62		
27. 85	50	44872. 37	$a\ ^5F_3-475(2)$	(0.00) 1.22
27. 23	10	44884. 82	$a\ ^5D_4-621(4)$	

TABLE 1. *Wavelengths, term combinations, and Zeeman effects of Ta II—Continued*

Wave length Åair	Intensity and notes	Wave number	Term combination	Zeeman pattern
2226. 52	15	44899. 18		(0.00 <i>w</i>) 1.05, 1.72
25. 42	3	44921. 33		
24. 91	1	44931. 62	<i>a</i> ³ D ₃ —634(4)	
23. 56	1	44958. 94	<i>b</i> ³ F ₂ —546(3)	
23. 31	10	44963. 91		(0.00 <i>w</i>) 1.55 <i>w</i>
22. 80	1	44974. 31		
22. 56	5	44979. 23		
22. 22	4	44986. 05	{ <i>a</i> ³ G ₃ —567(4) <i>a</i> ³ F ₂ —481(2)	
20. 70	15	45016. 79		
19. 41	10	45043. 04	<i>a</i> ³ F ₂ —482(2)	(1.42) . . .
18. 93	1	45052. 74		
18. 39	6	45063. 75		
17. 84	15	45074. 80		(0.00) 1.07
16. 09	4	45110. 43		
15. 58	20	45120. 77	<i>a</i> ⁵ F ₄ —495(3)	(0.00) 1.41
14. 53	25	45142. 21		(0.00 <i>w</i>) 1.30 <i>w</i>
14. 33	8	45146. 36	<i>a</i> ⁵ P ₁ —558(2)	(0.00) 0.00 <i>w</i>
13. 39	1	45165. 52	<i>a</i> ⁵ P ₁ —558(1)	
12. 42	20	45185. 40	<i>a</i> ⁵ P ₂ —570(3)	(0.00) 1.42
11. 96	1	45194. 61		
11. 66	2	45200. 74		
10. 20	6	45230. 78	<i>a</i> ⁵ F ₄ —496(3)	
10. 04	5	45234. 01	<i>a</i> ⁵ F ₁ —452(1)	(1.45) 0.00, 1.43
09. 03	3	45254. 05	<i>a</i> ³ H ₄ —611(4)	
07. 99	2	45276. 00		
07. 64	3	45283. 16		
07. 36	3	45288. 78		
07. 13	10	45293. 56	<i>a</i> ³ G ₃ —570(3)	
07. 04	5	45295. 43		
06. 54	4	45305. 67	<i>a</i> ⁵ P ₁ —560(2)	
05. 86	1	45319. 76	<i>a</i> ⁵ P ₂ —571(1)	
05. 49	1	45327. 34	<i>b</i> ³ F ₄ —638(4)	
04. 09	5	45356. 01	{ <i>a</i> ⁵ P ₃ —577(2) <i>a</i> ⁵ F ₂ —463(2)	
02. 83	1	45381. 95	<i>a</i> ⁵ F ₄ —551(3)	
02. 28	4	45393. 24		
01. 80	3	45403. 22		
01. 15	12	45416. 54	<i>a</i> ³ P ₂ —510(3)	(0.00) 1.03
00. 43	8	45431. 49		
2199. 67	25	45447. 26	<i>a</i> ⁵ F ₁ —454(2)	(0.00 , 1.12) 1.29, 2.39
97. 77	1	45486. 46	{ <i>a</i> ¹ G ₄ —596(5) <i>a</i> ³ F ₂ —486(2)	
96. 30	3	45516. 90	<i>a</i> ³ H ₅ —637(5)	
96. 05	50	45522. 04	<i>a</i> ⁵ F ₄ —499(4)	(0.41) 1.40
95. 23	1	45539. 09	<i>a</i> ³ P ₂ —511(2)	
93. 88	25	45567. 19	<i>a</i> ⁵ F ₅ —517(5)	
93. 22	15	45580. 90	<i>a</i> ⁵ F ₃ —482(2)	
92. 47	2	45596. 34		
91. 99	4	45606. 45		
90. 97	2	45627. 66		
90. 62	2	45634. 80	{ <i>a</i> ³ H ₅ —638(4) <i>a</i> ³ F ₄ —553(4)	
89. 40	1	45660. 38	<i>b</i> ³ F ₃ —602(3)	
88. 48	8	45679. 57		
86. 44	4	45722. 06		
86. 26	2	45725. 91		
85. 49	2	45742. 00	<i>a</i> ³ G ₅ —585(5)	
85. 30	2	45746. 10	<i>a</i> ⁵ D ₂ —602(3)	

TABLE 1. Wavelengths, term combinations, and Zeeman effects of Ta II—Continued

Wave length Åair	Intensity and notes	Wave number	Term combination	Zeeman pattern
2185.15	2	45759.11	$a\ ^3F_3-525(3)$	(0.00) 1.53
84.68	8	45758.98	$a\ ^3F_4-555(5)$	
83.44	2	45784.96		
83.11	3	45791.80	$a\ ^1D_2-593(2)$	
82.72	50	45800.10	$a\ ^5F_2-468(3)$	
81.80	4	45819.39	$a\ ^5F_2-468(2)$	
81.38	1	45828.15	$a\ ^5F_3-484(4)$	
80.87	8	45838.84	$\left\{ \begin{array}{l} a\ ^3H_6-638(5) \\ a\ ^5P_3-582(2) \end{array} \right.$	
80.68	10	45842.90	$a\ ^3H_4-616(3)$	
80.18	3	45853.33	$b\ ^3F_2-555(3)$	
79.81	3	45861.20	$b\ ^3F_2-555(2)$	
79.55	25	45866.62	$a\ ^3P_1-511(2)$	
79.06	2	45876.88	$a\ ^5D_1-593(2)$	
79.98	1	45878.58		
78.03	4	45898.63	$a\ ^5F_4-503(3)$	
77.97	25	45899.94	$a\ ^3F_2-490(2)$	
77.20	1	45916.06	$a\ ^5P_2-577(2)$	
74.72	3	45968.46	$a\ ^5D_3-616(3)$	
73.42	2	45996.02	$a\ ^3P_1-513(1)$	
73.05	5	46003.81		
72.85	7	46008.08	$b\ ^3P_0-622(1)$	
72.15	15	46022.95	$a\ ^1F_3-708(2)$	
72.08	7	46024.39	$\left\{ \begin{array}{l} a\ ^5F_3-486(2) \\ a\ ^3G_3-577(2) \end{array} \right.$	
71.02	1	46046.86		
70.65	2	46054.71		
69.15	10	46086.55		
67.02	1	46131.85		
66.76	3	46137.27	$a\ ^5F_2-471(3)$	
66.32	10	46146.86		
65.45	3	46165.29		
65.26	3	46169.34		
65.00	15	46174.92	$a\ ^5F_1-461(1)$	
64.77	1	46179.79	$a\ ^3F_3-530(2)$	
64.67	15	46181.86		
64.36	5	46188.45	$b\ ^3F_2-558(1)$	
64.12	1	46193.66	$a\ ^5P_2-580(1)$	
63.65	8	46203.65	$a\ ^3P_1-515(2)$	
62.65	5	46225.05		
62.45	2	46229.33		
62.26	7	46233.35		
62.04	4	46238.09		
61.88	10	46241.60	$a\ ^3F_4-569(4)$	
61.82	5	46242.80	$a\ ^3D_1-608(2)$	
61.26	7	46254.82	$a\ ^5D_4-634(4)$	
60.79	3	46264.82	$a\ ^3H_4-621(4)$	
60.36	4	46273.96		
59.63	6	46289.71	$b\ ^3F_3-608(2)$	
58.84	2	46306.62	$a\ ^5F_5-524(4)$	
58.42	25	46315.68		
58.19	3	46320.57	$a\ ^5F_3-489(3)$	
58.09	8	46322.71		
57.83	4	46328.27	$b\ ^3F_2-560(2)$	
57.66	1	46331.99		
56.91	6	46348.10		
56.65	1	46353.64	$a\ ^3H_4-622(5)$	

TABLE 1. *Wavelengths, term combinations, and Zeeman effects of Ta II—Continued*

Wave length λ air	Intensity and notes	Wave number	Term combination	Zeeman pattern
2156.53	5	46356.28	$a^3F_2-495(2)$	
55.09	8	46387.15	$a^5F_1-463(2)$	
54.67	10	46396.17	$a^3F_4-561(4)$	
54.50	12	46399.85	$a^5P_2-582(2)$	
54.20	2	46406.44	$a^3P_0-505(1)$	
54.12	10	46408.08		
53.92	2	46412.34		
53.86	15	46413.68		
53.55	10	46420.36		
52.71	20	46438.40	$a^5F_3-490(2)$	
51.56	6	46463.29	$a^3P_2-521(3)$	
51.40	20	46466.74	$a^3F_2-496(3)$	
51.15	2	46472.14	$a^5D_4-637(5)$	
50.64	18	46483.12	$a^5F_2-475(2)$	
50.47	4	46486.84		
49.96	7	46497.78	$a^3P_2-521(1)$	
49.30	2	46512.14	$a^3F_3-533(4)$	
48.72	5	46524.71	$b^3F_3-611(4)$	
47.20	15	46557.60		
46.87	25	46564.78	$a^5F_2-475(1)$	
46.40	2	46575.08		
45.76	5	46588.86	$a^5D_4-638(4)$	
45.39	8	46596.94		
43.65	5	46634.67	$a^3F_3-534(3)$	
43.16	50	46645.46		
42.52	40	46659.42	$a^5F_5-528(6)$	
42.41	7	46661.79		
41.51	20	46681.36	$a^3D_3-652(4)$	
40.43	6	46704.86	$a^3F_4-564(5)$	
40.34	2	46706.83	$a^3F_2-498(1)$	
40.15	50	46711.06		
39.59	1	46723.16	$a^3H_5-649(6)$	
39.46	7	46726.10		
38.70	4	46742.62		
37.18	6	46775.88	$a^3F_4-565(5)$	
36.35	5	46794.05	$a^5F_2-478(3)$	
35.46	4	46813.46	$a^3F_3-536(2)$	
35.20	5	46819.16		
34.94	1	46824.95	$a^3P_1-521(1)$	
32.88	20	46870.15		
32.80	2	46871.93		
31.80	20	46893.98	$a^5F_3-495(3)$	
30.64	4	46919.36	$a^1D_2-604(1)$	
30.50	6	46922.48	$a^3P_2-525(3)$	
30.29	4	46927.19	$a^3H_6-649(6)$	
29.22	7	46950.69	$a^5F_3-495(2)$	
26.75	2	47005.25	$a^5F_3-496(3)$	
26.68	5	47006.89	$\left\{ \begin{array}{l} a^3F_4-567(4) \\ a^3G_5-598(5) \end{array} \right.$	
26.33	3	47014.49	$a^1H_5-712(5)$	
24.82	20	47047.96	$a^5F_5-532(5)$	
24.56	4	47053.66		
23.45	1	47078.38	$a^5P_1-577(2)$	
21.88	2	47113.12	$b^3F_3-616(3)$	
20.91	6	47134.71	$\left\{ \begin{array}{l} a^3F_2-503(3) \\ a^5F_2-481(2) \end{array} \right.$	
19.91	5	47156.90	$a^5F_5-533(4)$	

TABLE 1. *Wavelengths, term combinations, and Zeeman effects of Ta II—Continued*

Wave length λair	Intensity and notes	Wave number	Term combination	Zeeman pattern
2119. 48	2	47166. 53	<i>a</i> 3P_2 —528(1)	
19. 24	5	47171. 81		
19. 14	1	47174. 03		
18. 83	6	47180. 89		
18. 34	6	47191. 84	<i>a</i> 5F_2 —482(2)	
15. 45	2	47256. 35		
13. 69	10	47295. 65	<i>a</i> 5F_3 —499(4)	
12. 85	7	47314. 45	<i>a</i> 3F_4 —570(3)	
11. 80	6	47337. 98	<i>a</i> 5F_4 —517(5)	
11. 21	4	47351. 16	<i>a</i> 3F_2 —505(1)	
10. 36	4	47370. 18	<i>b</i> 3F_2 —570(3)	
10. 09	3	47376. 29		
09. 91	1	47380. 35		
07. 19	1	47441. 62		
05. 65	1	47476. 27	<i>a</i> 5P_2 —593(2)	
05. 34	1	47483. 19		
04. 84	1	47494. 38	<i>a</i> 3P_1 —528(1)	
03. 72	5	47519. 77		
03. 12	5	47533. 30		
01. 85	5	47562. 07	<i>a</i> 5P_1 —582(2)	
00. 80	1	47585. 86		
00. 55	2	47591. 43		
00. 32	5	47596. 60	<i>a</i> 5F_1 —475(1)	
2099. 63	3	47612. 42		
99. 29	3	47620. 13		
98. 66	2	47634. 42	<i>a</i> 3H_4 —634(4)	
97. 84	1	47652. 99		
96. 97	3	47672. 69		
95. 65	3	47702. 78	<i>a</i> 3F_3 —545(2)	
94. 41	4	47731. 00		
91. 76	3	47791. 44		
91. 32	6	47801. 47	<i>a</i> 5F_1 —478(0)	
90. 61	4	47817. 73	<i>a</i> 3F_3 —546(3)	
88. 66	7	47862. 34	<i>a</i> 5F_5 —540(5)	
87. 96	1	47878. 45	<i>a</i> 5D_0 —604(1)	
87. 84	5	47881. 09		
87. 80	1	47882. 12	<i>b</i> 3F_3 —624(4)	
87. 28	4	47894. 00	<i>a</i> 3F_2 —510(3)	
85. 93	5	47925. 06		
84. 96	4	47947. 36		
83. 70	5	47976. 28		
80. 54	3	48049. 16	<i>a</i> 5F_2 —490(2)	
80. 08	4	48059. 81		
79. 31	3	48077. 46	<i>a</i> 5F_4 —524(4)	
76. 32	5	48146. 83	<i>a</i> 3F_2 —513(1)	
75. 54	5	48164. 94	<i>a</i> 5F_4 —525(3)	
74. 45	1	48190. 18		
74. 11	4	48197. 98		
73. 94	5	48202. 07		
73. 42	1	48214. 12		
71. 01	3	48270. 24		
69. 91	4	48295. 96		
69. 13	3	48314. 14	<i>a</i> 3P_1 —536(2)	
68. 28	8	48333. 85		
67. 41	3	48354. 35	<i>a</i> 3F_2 —515(2)	
67. 18	2	48359. 68	$\left\{ \begin{array}{l} a \text{ } ^3H_5\text{—}665(4) \\ a \text{ } ^5D_2\text{—}628(1) \end{array} \right.$	
66. 63	4	48372. 41		
65. 30	5	48403. 74		
64. 76	2	48416. 33	<i>a</i> 3P_1 —537(1)	
64. 19	4	48429. 65	<i>b</i> 3P_2 —669(1)	

TABLE 1. *Wavelengths, term combinations, and Zeeman effects of Ta II—Continued*

Wave length λ_{air}	Intensity and notes	Wave number	Term combination	Zeeman pattern
2063.34	5	48449.55	$a\ ^5P_2-603(3)$	
61.99	2	48481.25		
61.91	10	48483.13		
60.99	1	48504.84	$a\ ^5F_2-495(3)$	
60.05	2	48527.01	$a\ ^3G_5-613(5)$	
59.08	10	48549.90	$a\ ^3F_3-553(4)$	
58.84	2	48555.48	$a\ ^3F_3-511(2)$	
58.59	2	48561.47	$a\ ^5F_2-495(2)$	
57.61	2	48584.50	$b\ ^3F_2-582(2)$	
56.78	1	48604.15	$a\ ^5P_2-604(1)$	
55.76	6	48628.13	$a\ ^3H_6-666(5)$	
55.26	1	48640.02		
53.84	4	48673.74		
52.73	2	48699.99	$a\ ^3P_0-528(1)$	
51.54	2	48728.21		
51.17	1	48737.05		
50.28	1	48758.13	$a\ ^1D_2-623(2)$	
49.46	1	48777.68	$a\ ^3G_5-616(6)$	
47.40	8	48826.90	$a\ ^3F_4-585(5)$	
46.19	2	48855.60	$a\ ^5F_2-498(1)$	
44.66	5	48892.08	$a\ ^5F_3-515(2)$	
44.11	2	48905.45		
43.16	5	48927.99	$a\ ^5F_4-533(4)$	
40.61	5	48989.13	$a\ ^3G_4-616(3)$	
40.01	5	49003.53		
38.10	2	49049.45	$a\ ^5F_4-534(3)$	
35.89	3	49102.69	$a\ ^3G_3-608(2)$	
34.19	2	49143.81		
32.61	1	49181.96		
32.36	2	49187.94	$a\ ^3F_3-560(2)$	
31.53	2	49208.06		
31.17	1	49216.77		
30.62	1	49230.20		
30.25	1	49239.20	$b\ ^3F_3-638(4)$	
29.92	1	49247.05		
28.40	1	49284.05		
27.92	4	49295.64		
27.12	1	49315.16		
24.00	4	49391.10		
23.20	2	49410.72	$a\ ^3G_4-621(4)$	
22.66	1	49423.94		
22.21	1	49434.96		
20.74	1	49470.82	$a\ ^3P_2-551(3)$	
19.56	5	49499.65	$a\ ^5F_2-505(1)$	
19.18	1	49509.11	$a\ ^3G_4-622(5)$	
			$a\ ^5D_3-652(4)$	
17.71	2	49545.12		
15.50	2	49599.56		
14.66	2	49620.17		
13.17	6	49656.86		
09.19	2	49755.11		
06.71	6	49816.60		
05.86	1	49837.83		
04.54	4	49870.56		
03.92	4	49885.92	$a\ ^3P_2-555(3)$	
03.16	1	49904.84		
02.28	2	49926.82	$a\ ^3G_3-616(3)$	
01.81	5	49938.72	$a\ ^5F_3-525(3)$	
01.17	2	49954.51		
00.73	4	49965.47		

TABLE 2. *Even terms of Ta II*

Electron configuration	Term symbol	Level	$\Delta\nu$	Observed g	Electron configuration	Term symbol	Level	$\Delta\nu$	Observed g
$5d^3(^4F)6s$	$a\ ^5F_1$	0. 00		0. 000	$5d^3(^2D)6s$	$b\ ^3D_1$	29963. 20		1. 004
	$\ ^5F_2$	1031. 36	1031. 36	1. 008		$\ ^3D_2$	30405. 61	442. 41	1. 051
	$\ ^5F_3$	2642. 26	1610. 90	1. 250		$\ ^3D_3$	30624. 09	218. 48	1. 257
	$\ ^5F_4$	4415. 79	1773. 53	1. 350		$c\ ^1D_2$	33027. 18		1. 020
	$\ ^5F_5$	6186. 81	1771. 02	1. 410		$a\ ^3F_2$	3180. 04		0. 750
	$b\ ^3F_2$	9690. 47		1. 047		$\ ^3F_3$	6831. 31	3651. 27	1. 098
	$\ ^3F_3$	14581. 07	4890. 60	0. 988		$\ ^3F_4$	9746. 28	2914. 97	1. 225
	$\ ^3F_4$	18493. 66	3912. 59	1. 227		$a\ ^3P_0$	4124. 85		0. 000
$5d^3(^4P)6s$	$a\ ^5P_1$	10713. 21		2. 353	$5d^2\ 6s^2$	$\ ^3P_1$	5330. 77	1205. 92	1. 550
	$\ ^5P_2$	11875. 47	1162. 26	1. 426		$\ ^3P_2$	5657. 90	327. 13	1. 340
	$\ ^5P_3$	12435. 85	560. 38	1. 594		$a\ ^1D_2$	13560. 24		1. 120
	$b\ ^3P_0$	16288. 04				$b\ ^1G_4$	25385. 49		1. 085
	$\ ^3P_1$	17375. 00	1086. 96	1. 170		$a\ ^1S_0$	. . .		
	$\ ^3P_2$	18500. 62	1125. 62	1. 441		$a\ ^5D_0$	12600. 87		0. 000
	$a\ ^3G_3$	11767. 16		0. 908		$\ ^5D_1$	13475. 38	874. 51	1. 498
	$\ ^3G_4$	12705. 33	938. 17	1. 013		$\ ^5D_2$	14494. 87	1019. 49	1. 476
$5d^3(^2G)6s$	$\ ^3G_5$	12830. 79	125. 46	1. 280	$5d^4$	$\ ^5D_3$	15726. 15	1231. 28	1. 455
	$a\ ^1G_4$	14205. 48		0. 994		$\ ^5D_4$	17231. 19	1505. 04	1. 191
	$a\ ^3D_1$	14627. 64		0. 854		$b\ ^3H_4$	24432. 83		0. 985
	$\ ^3D_2$	17168. 48	2540. 84	1. 204		$\ ^3H_5$	25414. 13	981. 30	1. 060
$5d^3(^2D)6s$	$\ ^3D_3$	18553. 83	1385. 35	1. 355		$\ ^3H_6$	26010. 70	596. 57	1. 117
	$b\ ^1D_2$	23294. 77		1. 118		$b\ ^3G_3$	26829. 13		0. 850
	$a\ ^3H_4$	15851. 12		0. 916		$\ ^3G_4$	28165. 40	1336. 27	1. 094
	$\ ^3H_5$	18186. 04	2334. 92	1. 100		$\ ^3G_5$	31267. 10	3101. 70	
$5d^3(^2H)6s$	$\ ^3H_6$	17982. 00	—204. 04	1. 146		$d\ ^3F_2$	29843. 58		0. 833
	$a\ ^1H_5$	24226. 20		1. 000		$\ ^3F_3$	. . .		
	$c\ ^3F_2$	22928. 61		0. 700		$\ ^3F_4$	31531. 70		1. 129
	$\ ^3F_3$	23620. 35	691. 74	1. 076		$d\ ^3P_2$	. . .		
$5d^3(^2F)6s$	$\ ^3F_4$	23082. 71	—537. 64	1. 026		$d\ ^3P_1$	31948. 68		1. 000
	$a\ ^1F_3$	24869. 58		0. 995		$d\ ^3P_0$	. . .		
	$c\ ^3P_0$	23381. 28		0. 000		$c\ ^1G_4$	35151. 35		1. 078
	$\ ^3P_1$	26234. 60	2853. 32	1. 332					
$5d^3(^2P)6s$	$\ ^3P_2$	28044. 14	1809. 54	1. 358					
	$a\ ^1P_1$	23406. 13							

TABLE 3. *Odd levels of Ta II*

Level	<i>J</i>	Observed <i>g</i>	Level	<i>J</i>	Observed <i>g</i>	Level	<i>J</i>	Observed <i>g</i>	Level	<i>J</i>	Observed <i>g</i>
29256. 87	2	0. 511	45233. 91	1	1. 458	51073. 92	3	1. 156	57195. 81	1	1. 726
31212. 13	1		45446. 85	2	1. 148	51197. 42	2	1. 359	57791. 58	2	1. 050
32318. 44	3	0. 976	45466. 97	5	1. 090	51326. 31	1	1. 047	58040. 89	4	1. 045
33706. 47	1	0. 285	46174. 60	1	1. 367	51479. 86	4	1. 095	58069. 18	1	1. 147
33715. 27	2	0. 823	46286. 90	4		51534. 28	2	1. 299	58274. 85	2	1. 641
36112. 97	4	1. 180	46295. 03	5	1. 200	51753. 70	5	1. 102	58572. 56	5	
36177. 10	2	0. 946	46387. 16	2	1. 323	52121. 15	3	1. 086	59351. 96	2	1. 160
36763. 70	3	1. 169	46491. 44	2	1. 060	52155. 76	1	1. 613	59692. 16	5	
36987. 71	1	0. 685	46645. 70	4	1. 233	52492. 98	4	1. 101	59838. 00	5	
37230. 75	2	0. 623	46776. 78	2	0. 773	52580. 43	3	1. 412	60241. 07	3	1. 176
38270. 63	3	1. 010	46831. 35	3	1. 214	52824. 49	1	0. 907	60325. 15	3	1. 151
38515. 55	2	1. 006	46850. 64	2	1. 110	52846. 28	6	1. 180	60479. 60	1	0. 662
38535. 21	1	0. 472	47168. 90	3	1. 096	53010. 95	2	1. 464	60549. 32	5	0. 904
38962. 32	3	0. 976	47280. 89	4	1. 190	53234. 65	5	1. 146	60870. 30	2	1. 130
39295. 81	3	1. 138	47514. 52	2	1. 284	53300. 59	2	1. 380	61105. 69	4	1. 007
39743. 67	4	1. 223	47595. 98	1	1. 520	53343. 56	4	1. 071	61357. 45	5	
40023. 68	0		47620. 17	1		53465. 79	3	1. 216	61588. 16	6	
40233. 46	2	1. 165	47801. 03	0		53644. 83	2	1. 352	61608. 62	6	
40304. 78	1	1. 225	47825. 41	3	1. 189	53746. 80	1	1. 234	61694. 17	3	0. 937
40835. 45	6		47829. 75	6	1. 300	54048. 81	5	1. 260	62115. 97	4	1. 070
41144. 94	2	1. 152	47857. 60	5		54206. 69	4	1. 157	62204. 91	5	
41355. 11	1	1. 885	48064. 57	0		54533. 78	2	1. 016	62296. 25	1	0. 600
41554. 42	3	1. 207	48166. 15	2		54648. 73	3	0. 943	62317. 92	2	0. 986
41709. 01	5	1. 244	48223. 08	2	1. 446	55128. 38	3	1. 260	62463. 43	4	1. 167
41775. 29	4	1. 249	48470. 41	4	1. 276	55381. 25	4	1. 020	62854. 50	1	0. 908
42122. 91	4	1. 258	48666. 56	2	1. 131	55505. 08	5	1. 054	63060. 46	2	1. 106
42153. 29	2	1. 212	48776. 29	1	0. 746	55528. 22	1	1. 464	63485. 65	4	
42959. 55	3	1. 120	48962. 54	3	1. 283	55543. 11	3	1. 430	63703. 35	5	0. 977
43064. 86	2	1. 041	49055. 18	5	1. 212	55551. 60	2	1. 031	63820. 47	4	1. 01
43068. 72	0		49080. 51	2	1. 320	55859. 32	2	1. 343	64653. 35	3	1. 079
43544. 46	3	1. 059	49522. 55	5	0. 841	55878. 70	1	1. 425	64909. 19	6	
43553. 67	1		49536. 24	3	1. 317	56018. 76	2	1. 002	65225. 24	4	
43700. 05	5	1. 147	49592. 90	2	1. 629	56142. 53	4	1. 270	65495. 18	3	
44005. 20	4	1. 137	49646. 62	3	1. 048	56351. 09	3	1. 200	65657. 89	3	1. 013
44206. 24	1	0. 242	49886. 51	5		56450. 84	5	1. 045	66545. 40	4	
44259. 20	2	1. 256	49886. 97	1	2. 006	56450. 95	3	1. 195	66610. 27	5	
44430. 39	3	0. 940	49937. 74	4	1. 207	56521. 78	5	0. 980	66930. 35	1	1. 746
44434. 79	0		50314. 43	3	1. 281	56662. 76	6		68213. 70	5	
44585. 17	5	1. 297	50507. 12	5	1. 080	56753. 05	4	1. 197	68299. 80	3	
44626. 00	4	1. 265	50531. 17	1	1. 370	56987. 88	4	1. 118	70892. 62	2	0. 719
44835. 20	3	1. 242	50693. 61	6		57060. 81	3	1. 390	71240. 50	5	1. 214

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