The Spectra of Krypton in the Extreme Ultraviolet

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Increased dispersion and resolving power have made possible a revision and extension of the work of previous investigators on the spectra of krypton in the extreme ultraviolet. Lists of classified lines are given for Kr I, Kr II and Kr III, and for one multiplet of Kr IV, in the range from λ2000 to λ500. No new lines were found for Kr I, but the accuracy of the measurements is considerably improved. 82 lines of Kr II are given including 31 lines newly identified. 138 lines of Kr III have been identified in collaboration with C. J. Humphreys. The consolidated term table for Kr III is included in the previous paper.

THE extreme ultraviolet spectra of krypton have been investigated by using the two-meter normal incidence vacuum spectrograph[1] of the Carnegie Institution of Washington, which is located in the Spectroscopy Laboratory of the Massachusetts Institute of Technology. The method of reduction of the plates has been discussed with the results on neon[2] and the standards used have been published.[3] For lines whose wavelength is given to three decimal places the probable error ranges from 0.005A to 0.01A, and this estimate is confirmed by the accuracy of the term combinations. When the character of the line did not permit precise measurement, the wavelengths are given to two decimal places and here the error may be as great as 0.02A. The lines newly identified in the present investigation are denoted by an asterisk. The presence of Roman numerals in the intensity column denotes that the line is a blend with a line of the other spectrum. Previous measurements on krypton in this spectral range were made by Taylor[4] and by Abbink and Dorgelo.[5] The gas used in the present investigation was purchased from the Air Reduction Company and was found to be quite free from xenon. Exposures were made of electrodeless discharges at different pressures, both of the pure gas and of mixtures of it with helium, neon and argon. Lines due to different stages of ionization were distinguished by this means.

Kr I. Classified lines are given in Table I. As this type of discharge does not favor the strong excitation of first spectra, these lines are few and faint. The notation used for the upper levels from which these lines arise corresponds to that in the revised term table given by Meggers and Humphreys.[6] The ground state is located at 112, 915.7 cm^{-1} when referred to the other terms of that table. This alters by a trivial amount the older result of Meggers, de Bruin and Humphreys[7] which was based on the extreme ultraviolet measurements of Abbink and Dorgelo.[5] The ionization potential, 13.94 volts, already published[7] is unchanged.

TABLE I. *Kr I classified lines.*

λ	Int.	ν	Classification
1235.819	13	80,917.9	$^1S_0-1s^0{}_4$
1164.868	4	85,846.6	$^1S_0-1s^0{}_2$
*1030.020	2	97,085.5	$^1S_0-3d^0{}_5$
1003.542	2	99,647.1	$^1S_0-3d^0{}_2$
1001.048	2	99,895.3	$^1S_0-2s^0{}_4$
963.34	1	103,805	$^1S_0-4d^0{}_5$
953.42	1	104,886	$^1S_0-2s^0{}_2$
*951.06	0	105,144	$^1S_0-3s'^0{}_1$
946.52	1*d*	105,650	$^1S_0-4d^0{}_2$
945.45	1*d*	105,770	$^1S_0-3s^0{}_4$

Kr II. The classified lines given in Table II make no extension or revision in the term table of de Bruin, Humphreys and Meggers.[8] 31 additional lines have now been identified in the extreme ultraviolet, but these involve terms already known from other combinations in the more accessible portion of the spectrum. The ionization potential is 24.47 volts.[8]

Kr III. The principal group of lines was located by analogy with the $s^2p^4\,{}^3P-sp^5\,{}^3P^0$ groups of Ne III and A III. Other multiplets

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[2] J. C. Boyce, Phys. Rev. **46**, 378 (1934).
[3] J. C. Boyce and C. A. Rieke, Phys. Rev. **47**, 653 (1935).
[4] L. B. Taylor, Proc. Nat. Acad. Sci. **12**, 658 (1926).
[5] J. H. Abbink and H. B. Dorgelo, Zeits. f. Physik **47**, 221 (1928).
[6] W. F. Meggers and C. J. Humphreys, Bur. Standards J. Research **10**, 427 (1933).
[7] W. F. Meggers, T. L. de Bruin and C. J. Humphreys, Bur. Standards J. Research **3**, 129 (1929).
[8] T. L. de Bruin, C. J. Humphreys and W. F. Meggers, Bur. Standards J. Research **11**, 409 (1933).

TABLE II. *Kr II classified lines.*

λ	Int.	ν	Classification
964.962	30	103,631	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - sp^6\,{}^2S_{\frac{1}{2}}$
917.434	20	109,000	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - sp^6\,{}^2S_{\frac{1}{2}}$
911.384	25	109,723	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)5s\,{}^4P_{1\frac{1}{2}}$
890.982	20	112,236	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)5s\,{}^4P_{\frac{1}{2}}$
886.302	30	112,828	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5s\,{}^4P_{2\frac{1}{2}}$
884.144	30	113,104	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)5s\,{}^2P_{1\frac{1}{2}}$
868.869	25	115,092	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5s\,{}^4P_{1\frac{1}{2}}$
864.812	20	115,632	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - \begin{cases}({}^3P)4d\,{}^4D_{1\frac{1}{2}} \\ ({}^3P)5s\,{}^2P_{\frac{1}{2}}\end{cases}$
859.040	20	116,409	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)4d\,{}^4D_{\frac{1}{2}}$
850.318	6	117,603	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5s\,{}^4P_{\frac{1}{2}}$
844.058	25	118,475	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5s\,{}^2P_{1\frac{1}{2}}$
830.377	18	120,427	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)4d\,{}^4D_{2\frac{1}{2}}$
826.432	22	121,002	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - \begin{cases}({}^3P)4d\,{}^4D_{1\frac{1}{2}} \\ ({}^3P)5s\,{}^2P_{\frac{1}{2}}\end{cases}$
821.161	20	121,779	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)4d\,{}^4D_{\frac{1}{2}}$
818.147	25	122,227	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^1D)5s\,{}^2D_{1\frac{1}{2}}$
799.083	9	125,143	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)4d\,{}^4P_{\frac{1}{2}}$
*796.678	6	125,521	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)4d\,{}^4P_{1\frac{1}{2}}$
783.715	20	127,597	$\begin{cases}s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^1D)5s\,{}^2D_{1\frac{1}{2}} \\ s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)4d\,{}^2D_{1\frac{1}{2}}\end{cases}$
782.084	25	127,864	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^1D)5s\,{}^2D_{2\frac{1}{2}}$
773.684	18	129,252	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)4d\,{}^2P_{1\frac{1}{2}}$
771.024	18	129,698	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)4d\,{}^4F_{2\frac{1}{2}}$
766.202	9	130,514	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)4d\,{}^4P_{\frac{1}{2}}$
763.976	11	130,894	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)4d\,{}^4P_{1\frac{1}{2}}$
761.050	18	131,376	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)4d\,{}^4P_{2\frac{1}{2}}$
752.051	30	132,970	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)4d\,{}^2D_{1\frac{1}{2}}$
743.122	9	134,567	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)4d\,{}^2D_{2\frac{1}{2}}$
*742.821	9	134,622	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)4d\,{}^2P_{1\frac{1}{2}}$
729.402	20	137,099	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)4d\,{}^2F_{2\frac{1}{2}}$
722.036	50*III*	138,497	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - 59{,}687$
712.036	8	140,442	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^1S)5s\,{}^2S_{\frac{1}{2}}$
690.557	11	144,811	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^1D)4d\,{}^2D_{1\frac{1}{2}}$
685.812	11	145,813	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^1S)5s\,{}^2S_{\frac{1}{2}}$
682.791	16	146,458	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^1D)4d\,{}^2P_{1\frac{1}{2}}$
681.119	16	146,817	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^1D)4d\,{}^2P_{\frac{1}{2}}$
668.827	20	149,516	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^1D)4d\,{}^2D_{2\frac{1}{2}}$
665.870	9	150,180	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^1D)4d\,{}^2D_{1\frac{1}{2}}$
663.039	20*III*	150,821	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^1D)4d\,{}^2F_{2\frac{1}{2}}$
*658.637	5	151,829	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^1D)4d\,{}^2P_{1\frac{1}{2}}$
657.088	13	152,187	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^1D)4d\,{}^2P_{\frac{1}{2}}$
*655.677	5	152,514	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)6s\,{}^4P_{1\frac{1}{2}}$
643.404	9	155,423	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)5d\,{}^4P_{\frac{1}{2}}$
640.870	5	156,038	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)5d\,{}^4P_{1\frac{1}{2}}$
639.263	5	156,430	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)5d\,{}^4D_{1\frac{1}{2}}$
638.952	5	156,506	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)6s\,{}^4P_{\frac{1}{2}}$
*638.214	4	156,687	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)6s\,{}^2P_{1\frac{1}{2}}$
*636.154	3	157,195	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)6s\,{}^2P_{\frac{1}{2}}$
634.265	4	157,663	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)5d\,{}^4D_{\frac{1}{2}}$
633.375	5	157,884	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)6s\,{}^4P_{1\frac{1}{2}}$
621.910	5	160,795	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5d\,{}^4P_{\frac{1}{2}}$
621.071	5	161,012	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5d\,{}^4P_{2\frac{1}{2}}$
*619.548	2	161,408	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5d\,{}^4P_{1\frac{1}{2}}$
*619.379	2	161,452	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5d\,{}^4D_{2\frac{1}{2}}$
*618.879	3	161,582	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)5d\,{}^2P_{\frac{1}{2}}$
*618.515	2	161,678	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)5d\,{}^4F_{1\frac{1}{2}}$
*618.042	4	161,801	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5d\,{}^4D_{1\frac{1}{2}}$
*617.750	4	161,878	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)6s\,{}^4P_{\frac{1}{2}}$
*617.068	6	162,059	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)6s\,{}^2P_{1\frac{1}{2}}$
*615.225	4	162,542	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)5d\,{}^2D_{1\frac{1}{2}}$
*615.134	4*III*	162,566	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)6s\,{}^2P_{\frac{1}{2}}$
*613.366	4	163,035	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5d\,{}^4D_{\frac{1}{2}}$
608.124	5	164,440	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^1S)6s\,{}^2S_{\frac{1}{2}}$
605.776	5	165,078	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5d\,{}^4F_{2\frac{1}{2}}$
*605.536	5	165,143	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5d\,{}^2P_{1\frac{1}{2}}$
*605.316	5	165,203	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^1D)6s\,{}^2D_{1\frac{1}{2}}$
599.944	4	166,682	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^1S)4d\,{}^2D_{1\frac{1}{2}}$
*598.968	3	166,954	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5d\,{}^2P_{\frac{1}{2}}$
*598.791	3	167,003	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - 31{,}181$
*598.66	0	167,051	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5d\,{}^4F_{1\frac{1}{2}}$
*596.944	4	167,520	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5d\,{}^2F_{2\frac{1}{2}}$
595.530	7*III*	167,918	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5d\,{}^2D_{1\frac{1}{2}}$
589.262	5	169,704	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)5d\,{}^2D_{2\frac{1}{2}}$
*586.269	1	170,570	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^1D)6s\,{}^2D_{2\frac{1}{2},\,1\frac{1}{2}}$
*585.684	2	170,740	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^1D)5d\,{}^2D_{1\frac{1}{2}}$
581.496	3	171,970	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^1S)4d\,{}^2D_{2\frac{1}{2}}$
*581.22	1	172,053	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^1S)4d\,{}^2D_{1\frac{1}{2}}$
*580.342	3	172,312	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^1D)5d\,{}^2P_{1\frac{1}{2}}$
*579.11	0	172,680	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^3P)7s\,{}^4P_{\frac{1}{2}}$
*577.01	0	173,308	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)7s\,{}^4P_{2\frac{1}{2}}$
*576.647	4	173,416	$s^2p^5\,{}^2P^0_{\frac{1}{2}} - ({}^1D)5d\,{}^2P_{\frac{1}{2}}$
575.902	2	173,641	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^3P)7s\,{}^4P_{1\frac{1}{2}}$
*560.788	3	178,320	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^1D)5d\,{}^2D_{2\frac{1}{2}}$
*559.320	4	178,788	$s^2p^5\,{}^2P^0_{1\frac{1}{2}} - ({}^1D)5d\,{}^2P_{\frac{1}{2}}$

TABLE III. *Kr III classified lines.*

λ	Int.	ν	Classification
*1923.88	0	51,978.2	$sp^5\,{}^1P^0_1 - ({}^2D)5p\,{}^3F_2$
*1914.086	3	52,244.2	$sp^5\,{}^1P^0_1 - ({}^2D)5p\,{}^1P_1$
*1721.637	1	58,084.3	$sp^5\,{}^3P^0_0 - ({}^4S)5p\,{}^3P_1$
*1659.809	2	60,247.9	$sp^5\,{}^3P^0_1 - ({}^4S)5p\,{}^3P_1$
*1647.359	2*d*	60,703.2	$sp^5\,{}^3P^0_1 - ({}^4S)5p\,{}^3P_2$
*1638.816	3	61,019.7	$sp^5\,{}^1P^0_1 - ({}^2D)5p\,{}^1D_2$
*1569.886	2	63,698.9	$sp^5\,{}^3P^0_2 - ({}^4S)5p\,{}^3P_1$
*1558.802	2	64,151.8	$sp^5\,{}^3P^0_2 - ({}^4S)5p\,{}^3P_2$
*1483.429	2	67,411.8	$sp^5\,{}^1P^0_1 - ({}^2P)5p\,{}^1P_1$
*1423.553	1	70,246.8	$sp^5\,{}^1P^0_1 - ({}^2P)5p\,{}^1D_2$
*1400.90	1	71,382.5	$sp^5\,{}^3P^0_1 - ({}^2D)5p\,{}^3D_1$
*1377.833	2	72,577.8	$sp^5\,{}^3P^0_0 - ({}^2D)5p\,{}^1P_1$
*1363.853	2	73,321.7	$sp^5\,{}^3P^0_1 - ({}^2D)5p\,{}^3D_2$
*1342.678	1	74,478.0	$sp^5\,{}^3P^0_1 - ({}^2D)5p\,{}^3F_2$
*1302.586	2	76,770.4	$sp^5\,{}^3P^0_2 - ({}^2D)5p\,{}^3D_2$
*1293.988	3	77,280.4	$sp^5\,{}^3P^0_1 - ({}^2D)5p\,{}^3P_1$
*1283.798	3	77,893.9	$sp^5\,{}^3P^0_2 - ({}^2D)5p\,{}^3D_3$
*1283.313	3	77,923.3	$sp^5\,{}^3P^0_2 - ({}^2D)5p\,{}^3F_2$
*1278.943	1	78,189.6	$sp^5\,{}^3P^0_2 - ({}^2D)5p\,{}^1P_1$
*1270.204	5	78,727.5	$sp^5\,{}^3P^0_1 - ({}^2D)5p\,{}^3P_2$
*1265.315	4	79,031.7	$sp^5\,{}^3P^0_2 - ({}^2D)5p\,{}^3F_3$
*1259.309	3	79,408.9	$sp^5\,{}^3P^0_1 - ({}^2D)5p\,{}^3P_0$
*1258.745	3	79,442.2	$sp^5\,{}^3P^0_1 - ({}^2D)5p\,{}^3P_1$
*1216.896	5	82,176.6	$sp^5\,{}^3P^0_2 - ({}^2D)5p\,{}^3P_2$
*1206.346	5	82,894.9	$sp^5\,{}^3P^0_2 - ({}^2D)5p\,{}^3P_1$
*1158.724	6	86,301.8	$s^2p^4\,{}^1S_0 - sp^5\,{}^3P^0_1$
*987.281	18	101,288	$s^2p^4\,{}^1D_2 - sp^5\,{}^3P^0_2$
*954.774	4	104,737	$s^2p^4\,{}^1D_2 - sp^5\,{}^3P^0_1$
*919.143	2	108,797	$s^2p^4\,{}^1S_0 - sp^5\,{}^1P^0_1$
*897.801	40	111,383	$s^2p^4\,{}^3P_1 - sp^5\,{}^3P^0_2$
*876.674	22	114,068	$s^2p^4\,{}^3P_0 - sp^5\,{}^3P^0_1$
*870.825	20	114,834	$s^2p^4\,{}^3P_1 - sp^5\,{}^3P^0_1$
*862.578	35	115,932	$s^2p^4\,{}^3P_2 - sp^5\,{}^3P^0_2$
*854.733	25	116,996	$s^2p^4\,{}^3P_1 - sp^5\,{}^3P^0_0$
*837.666	22	119,379	$s^2p^4\,{}^3P_2 - sp^5\,{}^3P^0_1$
*785.968	25	127,232	$s^2p^4\,{}^1D_2 - sp^5\,{}^1P^0_1$
*768.104	1	130,191	$s^2p^4\,{}^1S_0 - ({}^2D)5s\,{}^3D^0_1$
*750.986	4	133,158	$s^2p^4\,{}^3P_0 - ({}^4S)4d\,{}^5D^0_1$
*646.417	20	154,699	$s^2p^4\,{}^3P_2 - ({}^2D)4d\,{}^3F^0_3$
*644.521	1	155,154	$s^2p^4\,{}^1S_0 - ({}^2P)4d\,{}^1P^0_1$
*642.84	1	155,559	$s^2p^4\,{}^1D_2 - ({}^2D)4d\,{}^3D^0_1$
*639.981	15	156,255	$s^2p^4\,{}^1D_2 - ({}^2D)5s\,{}^1D^0_2$
*636.348	1	157,147	$s^2p^4\,{}^1S_0 - ({}^2P)4d\,{}^3P^0_1$
*633.631	5	157,820	$s^2p^4\,{}^1D_2 - ({}^2D)4d\,{}^3D^0_2$
*633.082	7	157,957	$s^2p^4\,{}^3P_0 - ({}^2D)5s\,{}^3D^0_1$
*631.550	7	158,341	$s^2p^4\,{}^1D_2 - ({}^2D)4d\,{}^3S^0_1$
*630.037	15	158,721	$s^2p^4\,{}^3P_1 - ({}^2D)5s\,{}^3D^0_1$
*628.581	15	159,088	$s^2p^4\,{}^3P_1 - ({}^2D)5s\,{}^3D^0_2$
*625.758	13	159,806	$s^2p^4\,{}^1D_2 - ({}^2D)4d\,{}^3D^0_3$
*625.011	9	159,997	$s^2p^4\,{}^3P_2 - ({}^2D)4d\,{}^3G^0_3$
*624.268	3	160,188	$s^2p^4\,{}^1D_2 - ({}^2P)4d\,{}^3F^0_3$
*622.795	11	160,566	$s^2p^4\,{}^1D_2 - ({}^2P)4d\,{}^3F^0_2$
*621.448	8	160,914	$s^2p^4\,{}^3P_1 - ({}^2D)4d\,{}^1D^0_2$
*616.728	5	162,146	$s^2p^4\,{}^1D_2 - ({}^2P)4d\,{}^3D^0_2$
*612.485	6	163,269	$s^2p^4\,{}^3P_2 - ({}^2D)5s\,{}^3D^0_1$
*611.187	8	163,616	$s^2p^4\,{}^1D_2 - ({}^2P)5s\,{}^3P^0_1$
*611.100	9	163,639	$s^2p^4\,{}^3P_2 - ({}^2D)5s\,{}^3D^0_2$
*606.460	9	164,891	$s^2p^4\,{}^3P_0 - ({}^2D)4d\,{}^3D^0_1$
*605.862	9	165,054	$s^2p^4\,{}^3P_2 - ({}^2D)5s\,{}^3D^0_3$
*604.355	4	165,466	$s^2p^4\,{}^3P_2 - ({}^2D)4d\,{}^1D^0_2$
*603.849	6	165,604	$s^2p^4\,{}^1D_2 - ({}^2P)5s\,{}^3P^0_2$
*603.666	7	165,655	$s^2p^4\,{}^3P_1 - ({}^2D)4d\,{}^3D^0_1$
*601.134	7	166,352	$s^2p^4\,{}^3P_1 - ({}^2D)5s\,{}^1D^0_2$
*600.167	5	166,620	$s^2p^4\,{}^1D_2 - ({}^2P)5s\,{}^1P^0_1$
*599.944	4*II*	166,682	$s^2p^4\,{}^3P_0 - ({}^2D)4d\,{}^1P^0_1$
*597.194	6	167,450	$s^2p^4\,{}^3P_1 - ({}^2D)4d\,{}^1P^0_1$
*596.576	6	167,623	$s^2p^4\,{}^1D_2 - ({}^2P)4d\,{}^3D^0_1$
*596.401	6	167,672	$s^2p^4\,{}^3P_0 - ({}^2D)4d\,{}^3S^0_1$
*595.530	7	167,918	$s^2p^4\,{}^3P_1 - ({}^2D)4d\,{}^3D^0_2$
*594.090	9	168,325	$s^2p^4\,{}^1D_2 - ({}^2P)4d\,{}^1F^0_3$
*593.699	7	168,436	$s^2p^4\,{}^3P_1 - ({}^2D)4d\,{}^3S^0_1$
*587.543	4	170,200	$s^2p^4\,{}^3P_2 - ({}^2D)4d\,{}^3D^0_1$
*587.374	4	170,249	$s^2p^4\,{}^1D_2 - ({}^2P)4d\,{}^3D^0_3$
*585.950	8	170,663	$s^2p^4\,{}^3P_1 - ({}^2P)4d\,{}^3F^0_2$
*585.140	8	170,899	$s^2p^4\,{}^3P_2 - ({}^2D)5s\,{}^1D^0_2$
*580.577	6	172,242	$s^2p^4\,{}^3P_1 - ({}^2P)4d\,{}^3D^0_2$

TABLE III. (*Continued*)

λ	INT.	ν	CLASSIFICATION	λ	INT.	ν	CLASSIFICATION
*746.834	5	133,899	$s^2p^4\,{}^3P_1-({}^4S)4d\,{}^5D^0_0$	*579.823	6	172,466	$s^2p^4\,{}^3P_2-({}^2D)4d\,{}^3D^0_2$
*746.695	7	133,924	$s^2p^4\,{}^3P_1-({}^4S)4d\,{}^5D^0_{2,\,1}$	*578.220	5	172,945	$s^2p^4\,{}^3P_0-({}^2P)5s\,{}^3P^0_1$
*745.763	3	134,091	$s^2p^4\,{}^1D_2-({}^4S)4d\,{}^3D^0_3$	*578.09	0	172,983	$s^2p^4\,{}^3P_2-({}^2D)4d\,{}^3S^0_1$
*743.870	3	134,432	$s^2p^4\,{}^1D_2-({}^4S)4d\,{}^3D^0_1$	*576.076	4	173,588	$s^2p^4\,{}^1D_2-({}^2P)4d\,{}^1P^0_1$
*732.259	4	136,564	$s^2p^4\,{}^3P_0-sp^5\,{}^1P^0_1$	*575.716	5	173,697	$s^2p^4\,{}^3P_1-({}^2P)5s\,{}^3P^0_{1,\,0}$
*730.264	3	136,937	$s^2p^4\,{}^1D_2-({}^4S)5s\,{}^3S^0_1$	*574.956	5	173,926	$s^2p^4\,{}^1D_2-({}^2P)4d\,{}^1D^0_2$
*722.036	50*II*	138,497	$s^2p^4\,{}^3P_2-({}^4S)4d\,{}^5D^0_{3,\,2,\,1}$	*573.228	13	174,451	$s^2p^4\,{}^3P_2-({}^2D)4d\,{}^3D^0_3$
*719.85	1	138,918	$s^2p^4\,{}^1D_2-({}^2D)4d\,{}^3F^0_2$	*571.983	15	174,830	$s^2p^4\,{}^3P_2-({}^2P)4d\,{}^3F^0_3$
*714.772	2	139,905	$s^2p^4\,{}^1S_0-({}^2D)4d\,{}^3S^0_1$	*570.738	4	175,212	$s^2p^4\,{}^3P_2-({}^2P)4d\,{}^3F^0_2$
*713.999	7	140,056	$s^2p^4\,{}^1D_2-({}^2D)4d\,{}^3F^0_3$	*569.156	7	175,699	$s^2p^4\,{}^3P_1-({}^2P)5s\,{}^3P^0_2$
*708.356	8	141,172	$s^2p^4\,{}^3P_1-({}^4S)5s\,{}^5S^0_2$	*565.879	4	176,716	$s^2p^4\,{}^3P_1-({}^2P)5s\,{}^1P^0_1$
*704.838	4	141,877	$s^2p^4\,{}^3P_2-sp^5\,{}^1P^0_1$	*565.640	5	176,791	$s^2p^4\,{}^3P_2-({}^2P)4d\,{}^3D^0_2$
*698.037	20	143,259	$s^2p^4\,{}^3P_1-({}^4S)4d\,{}^3D^0_2$	*565.124	4	176,952	$s^2p^4\,{}^3P_0-({}^2P)4d\,{}^3D^0_1$
*695.604	15	143,760	$s^2p^4\,{}^3P_0-({}^4S)4d\,{}^3D^0_1$	*562.690	5	177,718	$s^2p^4\,{}^3P_1-({}^2P)4d\,{}^3D^0_1$
*691.919	18	144,526	$s^2p^4\,{}^3P_1-({}^4S)4d\,{}^3D^0_1$	*560.986	5	178,258	$s^2p^4\,{}^3P_2-({}^2P)5s\,{}^3P^0_1$
*687.979	11	145,353	$s^2p^4\,{}^1D_2-({}^2D)4d\,{}^3G^0_3$	*558.634	15	179,008	$s^2p^4\,{}^1D_2-({}^2P)4d\,{}^3P^0_2$
*686.254	20	145,719	$s^2p^4\,{}^3P_2-({}^4S)5s\,{}^5S^0_2$	*554.794	7	180,247	$s^2p^4\,{}^3P_2-({}^2P)5s\,{}^3P^0_2$
*683.666	18	146,270	$s^2p^4\,{}^3P_0-({}^4S)5s\,{}^3S^0_1$	*551.689	4	181,262	$s^2p^4\,{}^3P_2-({}^2P)5s\,{}^1P^0_1$
*680.119	22	147,033	$s^2p^4\,{}^3P_1-({}^4S)5s\,{}^3S^0_1$	*548.652	5	182,265	$s^2p^4\,{}^3P_2-({}^2P)4d\,{}^3D^0_1$
*676.564	25	147,806	$s^2p^4\,{}^3P_2-({}^4S)4d\,{}^3D^0_2$	*546.686	5	182,920	$s^2p^4\,{}^3P_0-({}^2P)4d\,{}^1P^0_1$
*674.828	8	148,186	$s^2p^4\,{}^1S_0-({}^2P)5s\,{}^1P^0_1$	*546.547	6	182,967	$s^2p^4\,{}^3P_2-({}^2P)4d\,{}^1F^0_3$
*672.826	7	148,627	$s^2p^4\,{}^1D_2-({}^2D)5s\,{}^3D^0_1$	*544.413	5	183,684	$s^2p^4\,{}^3P_1-({}^2P)4d\,{}^1P^0_1$
*672.330	25	148,736	$s^2p^4\,{}^3P_2-({}^4S)4d\,{}^3D^0_3$	*543.420	8	184,020	$s^2p^4\,{}^3P_1-({}^2P)4d\,{}^1D^0_2$
*671.175	7	148,992	$s^2p^4\,{}^1D_2-({}^2D)5s\,{}^3D^0_2$	*540.860	4	184,891	$s^2p^4\,{}^3P_2-({}^2P)4d\,{}^3D^0_3$
*671.058	7	149,018	$s^2p^4\,{}^3P_1-({}^2D)4d\,{}^3F^0_2$	*540.788	5	184,915	$s^2p^4\,{}^3P_0-({}^2P)4d\,{}^3P^0_1$
*670.813	3	149,073	$s^2p^4\,{}^3P_2-({}^4S)4d\,{}^3D^0_1$	*538.544	8	185,686	$s^2p^4\,{}^3P_1-({}^2P)4d\,{}^3P^0_1$
*670.300	4	149,187	$s^2p^4\,{}^1S_0-({}^2P)4d\,{}^3D^0_1$	*531.255	4	188,234	$s^2p^4\,{}^3P_2-({}^2P)4d\,{}^1P^0_1$
*664.844	11	150,411	$s^2p^4\,{}^1D_2-({}^2D)5s\,{}^3D^0_3$	*530.306	6	188,570	$s^2p^4\,{}^3P_2-({}^2P)4d\,{}^1D^0_2$
*663.039	20	150,821	$s^2p^4\,{}^1D_2-({}^2D)4d\,{}^1D^0_2$	*528.811	4	189,103	$s^2p^4\,{}^3P_1-({}^2P)4d\,{}^3P^0_2$
*659.716	22	151,580	$s^2p^4\,{}^3P_2-({}^4S)5s\,{}^3S^0_1$	*525.687	4	190,227	$s^2p^4\,{}^3P_2-({}^2P)4d\,{}^3P^0_1$
*651.198	8	153,563	$s^2p^4\,{}^3P_2-({}^2D)4d\,{}^3F^0_2$	*516.384	4	193,654	$s^2p^4\,{}^3P_2-({}^2P)4d\,{}^3P^0_2$

having differences characteristic of the ground state were then found to give connections with the analysis of visible and near ultraviolet data already undertaken by C. J. Humphreys. The complete identification of the 138 lines classified in Table III was made possible by the very generous cooperation of Dr. Humphreys. All of the low states of Kr III have been located and many intersystem combinations have been found. The consolidated term table for Kr III is given by Humphreys in the previous paper.[9] The ionization potential is 36.8 volts.

Kr IV. A provisional identification has been made in Table IV of the principal multiplet in Kr IV. The investigation of this spectrum is being continued.

[9] C. J. Humphreys, Phys. Rev. **47**, 712 (1935).

TABLE IV. *Kr IV classified lines.*

λ	INT.	ν	CLASSIFICATION
*842.035	22	118,760	$s^2p^3\,{}^4S^0_{1\frac{1}{2}}-sp^4\,{}^4P_{2\frac{1}{2}}$
*816.822	18	122,426	$s^2p^3\,{}^4S^0_{1\frac{1}{2}}-sp^4\,{}^4P_{1\frac{1}{2}}$
*805.763	7	124,108	$s^2p^3\,{}^4S^0_{1\frac{1}{2}}-sp^4\,{}^4P_{\frac{1}{2}}$

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