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**THEORETICAL RADIATIVE TRANSITION RATES
FOR K- AND L-SHELL X RAYS**

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THEORETICAL RADIATIVE TRANSITION RATES FOR K- AND L-SHELL X RAYS

Abstract

Theoretical results covering the range of elements from $Z=5$ to 102 are given for the radiative transition rates in filling vacancies in the K and L shells. The calculations use a relativistic Hartree model for the atoms. Given here are the ratios of the rates for the major K-shell x rays, the total radiative decay rate and theoretical binding energies for the K-shell and L-subshells, the transition rate and theoretical energy for each of the K x ray going by E-1, E-2, or M-1 radiation and each L x ray going by E-1 or E-2 radiation, the ratios of M-2 to E-1 rates and the A_{22} angular correlation factor between K and L x rays.

In a previous paper¹ the theory for the relativistic calculation of atomic x-ray emission rates was developed and results were given for transitions filling vacancies in K- and L-shells for a number of atoms. The present paper presents results for the range of elements from $Z = 5$ to 102. The model used is the same as that previously described. The electrons are treated relativistically, and are assumed to move in a Hartree-type central potential.

Relativistic Hartree calculations have also been carried out by Rosner and Bhalla² and by Lu *et al.*³ with essentially the same model and results. Rosner and Bhalla present results for a selection of elements while Lu *et al.* cover the range for $Z = 92$ to 126.

Table 1 lists the total radiative rates for filling K-shell vacancies, the theoretical K binding energy, and the ratios of rates for the major K x-ray components. Rates throughout are given in units of $\text{eV}/\hbar$ where $1 \text{ eV}/\hbar = 0.6582 \times 10^{-15} \text{ sec}^{-1} = 1/27.21 \text{ a.u.}$ The designation for the x-ray components are $K_{\alpha 1}$ for the L_3 to K transition, $K_{\alpha 2}$ for L_2 to K, K_{α} for all L to K transitions, K_{β} for transitions from above the L-shell, $K'_{\beta 1}$ for the transitions from the M- to K-shell, $K'_{\beta 2}$ for transitions from shells above the M-shell, $K_{\beta 1}$ for the M_3 to K transition, and $K_{\beta 3}$ for the M_2 to K transition.

A number of experiments have recently been carried out measuring the widths of the x-ray lines⁴ and the ratios of the K x-ray emission rates.⁵⁻²⁰ The values obtained for the radiative widths from the experimental total line widths and fluorescence yield are in good agreement with the theoretical values.⁴ There is excellent agreement

Table 1. K-shell total rate, theoretical binding energy and ratios of major components.

Z	Total rate (eV/h)	Binding energy	$K_{\alpha 2}/K_{\alpha 1}$	K_{β}/K_{α}	$K'_{\beta 1}/K_{\alpha 1}$	$K'_{\beta 2}/K_{\alpha 1}$	$K_{\beta 3}/K_{\beta 1}$
Z	TOTAL RATE	B. ENGY	A2/A1	B/A	B1P/A1	B2P/A1	B3/B1
5	.00012	.1956	0.5009				
6	.00031	.2910	0.5012				
7	.00066	.4049	0.5015				
8	.00123	.5373	0.5020				
9	.00211	.6884	0.5025				
10	.00337	.8582	0.5032				
11	.00575	1.364	0.5032	0.0000	0.0000		
12	.00912	1.294	0.5035	0.0000	0.0000		
13	.01383	1.550	0.5038	0.0061	0.0092		0.5038
14	.02024	1.828	0.5042	0.0171	0.0256		0.5040
15	.02875	2.130	0.5046	0.0309	0.0465		0.5044
16	.03981	2.456	0.5050	0.0467	0.0702		0.5049
17	.05393	2.805	0.5055	0.0638	0.0960		0.5054
18	.07167	3.178	0.5060	0.0819	0.1233		0.5059
19	.09330	3.583	0.5065	0.0956	0.1441	0.0000	0.5053
20	.1194	4.015	0.5070	0.1065	0.1605	0.0000	0.5053
21	.1500	4.466	0.5075	0.1106	0.1668	0.0000	0.5057
22	.1860	4.941	0.5081	0.1137	0.1715	0.0000	0.5062
23	.2280	5.440	0.5087	0.1161	0.1751	0.0000	0.5068
24	.2761	5.958	0.5093	0.1153	0.1739	0.0000	0.5077
25	.3325	6.511	0.5100	0.1195	0.1805	0.0000	0.5080
26	.3964	7.083	0.5106	0.1208	0.1824	0.0000	0.5086
27	.4690	7.681	0.5114	0.1218	0.1841	0.0000	0.5093
28	.5511	8.303	0.5121	0.1227	0.1855	0.0000	0.5100
29	.6425	8.943	0.5128	0.1216	0.1839	0.0000	0.5111
30	.7468	9.622	0.5136	0.1241	0.1879	0.0000	0.5115
31	.8640	10.33	0.5144	0.1277	0.1923	0.0011	0.5117
32	.9955	11.07	0.5152	0.1321	0.1970	0.0032	0.5119
33	1.142	11.83	0.5161	0.1371	0.2018	0.0061	0.5122
34	1.305	12.62	0.5170	0.1425	0.2066	0.0097	0.5124
35	1.486	13.44	0.5178	0.1483	0.2112	0.0139	0.5125
36	1.686	14.28	0.5188	0.1545	0.2158	0.0188	0.5127
37	1.905	15.16	0.5197	0.1600	0.2204	0.0228	0.5129
38	2.144	16.07	0.5207	0.1652	0.2248	0.0264	0.5131
39	2.405	17.00	0.5217	0.1696	0.2291	0.0290	0.5132
40	2.688	17.96	0.5227	0.1738	0.2332	0.0313	0.5134
41	2.995	18.95	0.5238	0.1772	0.2372	0.0329	0.5136
42	3.328	19.97	0.5249	0.1809	0.2410	0.0348	0.5138
43	3.687	21.01	0.5260	0.1843	0.2447	0.0365	0.5139
44	4.075	22.09	0.5271	0.1875	0.2482	0.0382	0.5141
45	4.493	23.19	0.5283	0.1906	0.2516	0.0397	0.5143
46	4.940	24.32	0.5295	0.1933	0.2549	0.0408	0.5145
47	5.423	25.49	0.5307	0.1964	0.2581	0.0426	0.5147
48	5.940	26.69	0.5319	0.1994	0.2611	0.0444	0.5149
49	6.494	27.92	0.5332	0.2027	0.2641	0.0467	0.5150
50	7.089	29.19	0.5345	0.2061	0.2671	0.0492	0.5152
51	7.724	30.48	0.5358	0.2096	0.2699	0.0520	0.5154
52	8.402	31.81	0.5372	0.2132	0.2727	0.0551	0.5156
53	9.124	33.17	0.5386	0.2168	0.2754	0.0582	0.5157
54	9.894	34.56	0.5401	0.2205	0.2781	0.0616	0.5159
55	10.71	35.99	0.5415	0.2240	0.2807	0.0646	0.5160
56	11.57	37.45	0.5430	0.2273	0.2832	0.0676	0.5161
57	12.49	38.95	0.5445	0.2304	0.2857	0.0701	0.5162
58	13.44	40.45	0.5461	0.2316	0.2882	0.0699	0.5164
59	14.45	42.01	0.5477	0.2336	0.2907	0.0709	0.5165
60	15.52	43.60	0.5493	0.2355	0.2930	0.0718	0.5167

Table 1. (continued)

Z	Total rate (eV/h)	Binding energy	$K_{\alpha 2}/K_{\alpha 1}$	K_{β}/K_{α}	$K'_{\beta 1}/K_{\alpha 1}$	$K'_{\beta 2}/K_{\alpha 1}$	$K_{\beta 3}/K_{\beta 1}$
61	16.65	45.22	0.5509	0.2372	0.2953	0.0726	0.5168
62	17.83	46.88	0.5526	0.2389	0.2975	0.0734	0.5169
63	19.07	48.57	0.5544	0.2405	0.2997	0.0742	0.5170
64	20.39	50.31	0.5561	0.2427	0.3018	0.0759	0.5171
65	21.75	52.06	0.5579	0.2435	0.3039	0.0755	0.5172
66	23.19	53.86	0.5598	0.2449	0.3059	0.0761	0.5173
67	24.70	55.70	0.5617	0.2463	0.3079	0.0767	0.5174
68	26.28	57.58	0.5636	0.2476	0.3099	0.0773	0.5174
69	27.93	59.50	0.5655	0.2489	0.3118	0.0779	0.5175
70	29.66	61.45	0.5675	0.2501	0.3137	0.0784	0.5175
71	31.47	63.46	0.5696	0.2518	0.3155	0.0798	0.5176
72	33.37	65.50	0.5717	0.2535	0.3173	0.0812	0.5176
73	35.35	67.59	0.5739	0.2551	0.3191	0.0826	0.5176
74	37.41	69.72	0.5761	0.2568	0.3208	0.0840	0.5175
75	39.56	71.89	0.5783	0.2584	0.3226	0.0854	0.5175
76	41.80	74.10	0.5806	0.2600	0.3243	0.0869	0.5174
77	44.13	76.35	0.5830	0.2615	0.3260	0.0881	0.5173
78	46.56	78.66	0.5854	0.2631	0.3277	0.0897	0.5172
79	49.08	81.00	0.5878	0.2647	0.3293	0.0911	0.5170
80	51.71	83.40	0.5904	0.2663	0.3310	0.0927	0.5169
81	54.43	85.85	0.5929	0.2679	0.3326	0.0944	0.5166
82	57.27	88.35	0.5956	0.2696	0.3343	0.0962	0.5164
83	60.21	90.90	0.5983	0.2714	0.3359	0.0981	0.5161
84	63.27	93.50	0.6010	0.2731	0.3376	0.1001	0.5159
85	66.44	96.15	0.6039	0.2749	0.3392	0.1021	0.5155
86	69.72	98.86	0.6067	0.2767	0.3408	0.1042	0.5151
87	73.12	101.6	0.6097	0.2785	0.3424	0.1063	0.5147
88	76.63	104.4	0.6127	0.2802	0.3440	0.1082	0.5143
89	80.26	107.3	0.6158	0.2818	0.3457	0.1101	0.5138
90	84.01	110.3	0.6190	0.2833	0.3473	0.1120	0.5132
91	87.86	113.2	0.6223	0.2845	0.3489	0.1133	0.5127
92	91.84	116.3	0.6256	0.2858	0.3505	0.1148	0.5120
93	95.94	119.4	0.6290	0.2871	0.3521	0.1163	0.5113
94	100.2	122.6	0.6325	0.2881	0.3537	0.1175	0.5106
95	104.5	125.8	0.6361	0.2893	0.3553	0.1190	0.5098
96	109.0	129.1	0.6398	0.2906	0.3568	0.1206	0.5089
97	113.6	132.5	0.6436	0.2917	0.3584	0.1220	0.5080
98	118.4	135.9	0.6475	0.2926	0.3600	0.1231	0.5070
99	123.2	139.5	0.6515	0.2935	0.3616	0.1244	0.5059
100	128.3	143.1	0.6556	0.2945	0.3632	0.1257	0.5048
101	133.4	146.8	0.6598	0.2954	0.3648	0.1270	0.5036
102	138.7	150.5	0.6641	0.2963	0.3664	0.1283	0.5023

between experiment and theory on the ratio of the $K_{\alpha 2}$ to $K_{\alpha 1}$ emission rates.^{6,7,9,11,12,14-16,19-21} There is a good bit of scatter in the experimental values for the ratio of the K_{β} to K_{α} rates. In general, the experimental values^{5,7,9,11,14-16,18,19,21} for the ratio range from about 30% above the theoretical values for low Z's to about 5% above at high Z's. In Fig. 1 experimental and theoretical values of the K_{β}/K_{α} ratio are plotted.

Table 2 lists the radiation multipoles emitted in the filling of a vacancy in a S or P state by an electron in an S, P, D or F state. Table 3 lists the transition rates of all

Fig. 1. Ratio of K_{β} rate to K_{α} rate. The theoretical values are given by the solid curve. Schult's data¹⁶ do not contain measurements for transitions from shells above the N-shell. The theoretical value of the ratio of the rates to the $K_{\beta 1}$ rate have been used to include these transitions.

Table 2. Radiation multipoles emitted in a transition from an S, P, D or F state to an S or P state.

	$S_{1/2}$	$P_{1/2}$	$P_{3/2}$	$D_{3/2}$	$D_{5/2}$	$F_{5/2}$	$F_{7/2}$
$S_{1/2}$	M-1	E-1	E-1, M-2	E-2, M-1	E-2, M-3	M-2, E-3	E-3, M-4
$P_{1/2}$	E-1	M-1	E-2, M-1	E-1, M-2	M-2, E-3	E-2, M-3	M-3, E-4
$P_{3/2}$	E-1, M-2	E-2, M-1	E-2, M-1, M-3	E-1, E-3	E-1, M-2, E-3, M-4	E-2, M-1, M-3, E-4	E-2, M-3, E-4, M-5

transitions having E-1, E-2 or M-1 components in filling a K-shell vacancy. Table 4 lists the theoretical x-ray energies of these K x rays.

Table 3. K x-ray transition rates, in eV/h.

Z	2 S 1/2	2 P 1/2	2 P 3/2	3 S 1/2	3 P 1/2	3 P 3/2
5	1.94E-15	3.89E-05	7.77E-05			
6	1.50E-14	.000103	.000207			
7	8.04E-14	.000221	.000440			
8	3.36E-13	.000413	.000822			
9	1.17E-12	.000705	.001404			
10	3.55E-12	.001128	.002242			
11	1.03E-11	.001926	.003828	3.64E-13		
12	2.72E-11	.003053	.006063	1.61E-12		
13	6.64E-11	.004604	.009138	5.71E-12	2.81E-05	5.58E-05
14	1.51E-10	.006670	.01323	1.56E-11	.0001137	.000226
15	3.21E-10	.009353	.01854	3.76E-11	.0002889	.000573
16	6.51E-10	.01276	.02527	8.30E-11	.0005954	.001179
17	1.26E-09	.01702	.03367	1.72E-10	.001085	.002147
18	2.34E-09	.02226	.04399	3.36E-10	.001822	.003601
19	4.20E-09	.02863	.05653	6.60E-10	.002734	.005410
20	7.32E-09	.03630	.07160	1.24E-09	.003858	.007635
21	1.24E-08	.04547	.08958	2.18E-09	.005018	.009923
22	2.04E-08	.05626	.1107	3.68E-09	.006381	.01260
23	3.30E-08	.06887	.1354	6.07E-09	.007973	.01573
24	5.21E-08	.08353	.1640	9.60E-09	.009604	.01892
25	8.06E-08	.1003	.1967	1.53E-08	.01195	.02353
26	1.23E-07	.1196	.2341	2.35E-08	.01439	.02830
27	1.83E-07	.1415	.2766	3.55E-08	.01718	.03373
28	2.70E-07	.1662	.3246	5.27E-08	.02033	.03986
29	3.93E-07	.1942	.3787	7.64E-08	.02354	.04605
30	5.63E-07	.2254	.4389	1.11E-07	.02787	.05450
31	7.97E-07	.2603	.5059	1.61E-07	.03289	.06427
32	1.12E-06	.2990	.5803	2.29E-07	.03865	.07549
33	1.55E-06	.3419	.6625	3.24E-07	.04520	.08825
34	2.12E-06	.3893	.7531	4.52E-07	.05259	.1027
35	2.88E-06	.4415	.8526	6.27E-07	.06090	.1188
36	3.88E-06	.4988	.9615	8.60E-07	.07017	.1369
37	5.19E-06	.5616	1.081	1.17E-06	.08051	.1570
38	6.89E-06	.6302	1.210	1.58E-06	.09199	.1793
39	9.07E-06	.7049	1.351	2.11E-06	.1047	.2039
40	1.19E-05	.7862	1.504	2.80E-06	.1186	.2310
41	1.54E-05	.8744	1.669	3.69E-06	.1339	.2607
42	1.99E-05	.9700	1.848	4.84E-06	.1506	.2931
43	2.55E-05	1.073	2.040	6.29E-06	.1688	.3284
44	3.26E-05	1.184	2.247	8.13E-06	.1885	.3667
45	4.13E-05	1.304	2.469	1.05E-05	.2100	.4083
46	5.22E-05	1.433	2.707	1.34E-05	.2332	.4532
47	6.56E-05	1.571	2.961	1.69E-05	.2582	.5017
48	8.21E-05	1.719	3.233	2.14E-05	.2852	.5540
49	.0001022	1.878	3.522	2.69E-05	.3143	.6102
50	.0001268	2.047	3.830	3.37E-05	.3455	.6706
51	.0001566	2.228	4.157	4.21E-05	.3790	.7354
52	.0001926	2.420	4.505	5.22E-05	.4149	.8047
53	.0002360	2.625	4.873	6.45E-05	.4532	.8788
54	.0002882	2.843	5.263	7.94E-05	.4941	.9579
55	.0003507	3.074	5.676	9.74E-05	.5377	1.042
56	.0004254	3.319	6.112	.0001190	.5841	1.132
57	.0005143	3.579	6.572	.0001449	.6335	1.227
58	.0006201	3.855	7.058	.0001760	.6863	1.329
59	.0007454	4.146	7.570	.0002130	.7420	1.437
60	.0008935	4.454	8.108	.0002570	.8010	1.550
61	.001068	4.779	8.674	.0003091	.8633	1.670
62	.001273	5.122	9.268	.0003707	.9291	1.797
63	.001514	5.483	9.891	.0004433	.9985	1.931

Table 3. (continued)

Z	2 S 1/2	2 P 1/2	2 P 3/2	3 S 1/2	3 P 1/2	3 P 3/2	
64	.001796	5.863	10.54	.0005285	1.071	2.072	
65	.002125	6.264	11.23	.0006289	1.148	2.221	
66	.002509	6.685	11.94	.0007462	1.229	2.377	
67	.002956	7.127	12.69	.0008832	1.314	2.540	
68	.003475	7.591	13.47	.001043	1.404	2.712	
69	.004077	8.077	14.28	.001229	1.497	2.892	
70	.004773	8.587	15.13	.001445	1.595	3.081	
71	.005577	9.122	16.01	.001695	1.697	3.278	
72	.006503	9.680	16.93	.001984	1.803	3.484	
73	.007571	10.26	17.89	.002318	1.915	3.700	
74	.008798	10.88	18.88	.002703	2.031	3.925	
75	.01021	11.51	19.91	.003146	2.152	4.159	
76	.01182	12.18	20.98	.003655	2.279	4.404	
77	.01367	12.88	22.09	.004240	2.410	4.659	
78	.01579	13.60	23.24	.004909	2.547	4.925	
79	.01820	14.36	24.43	.005676	2.689	5.201	
80	.02096	15.15	25.66	.006553	2.837	5.488	
81	.02409	15.97	26.94	.007553	2.990	5.787	
82	.02767	16.83	28.25	.008694	3.149	6.098	
83	.03173	17.72	29.61	.009993	3.314	6.420	
84	.03634	18.64	31.02	.01147	3.484	6.755	
85	.04157	19.60	32.46	.01315	3.661	7.102	
86	.04750	20.60	33.96	.01506	3.844	7.461	
87	.05422	21.64	35.49	.01722	4.032	7.833	
88	.06182	22.72	37.08	.01967	4.227	8.219	
89	.07041	23.84	38.71	.02245	4.428	8.618	
90	.08012	25.00	40.38	.02559	4.635	9.030	
91	.09109	26.20	42.10	.02914	4.848	9.457	
92	.1035	27.45	43.87	.03314	5.067	9.897	
93	.1174	28.74	45.69	.03767	5.293	10.35	
94	.1331	30.08	47.55	.04277	5.525	10.82	
95	.1509	31.46	49.46	.04852	5.762	11.30	
96	.1708	32.89	51.41	.05499	6.006	11.80	
97	.1932	34.37	53.41	.06228	6.256	12.31	
98	.2185	35.91	55.46	.07048	6.511	12.84	
99	.2469	37.49	57.55	.07970	6.772	13.38	
100	.2788	39.12	59.68	.09005	7.038	13.94	
101	.3146	40.81	61.86	.1017	7.309	14.51	
102	.3549	42.56	64.08	.1148	7.585	15.10	
Z	3 D 3/2	3 D 5/2	4 S 1/2	4 P 1/2	4 P 3/2	4 D 3/2	4 D 5/2
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19			1.64E-11				
20			9.72E-11				
21	1.58E-07	2.33E-07	1.71E-10				
22	5.14E-07	7.56E-07	2.85E-10				
23	1.19E-06	1.74E-06	4.56E-10				
24	2.56E-06	3.74E-06	2.66E-10				

Table 3. (continued)

Z	3 D 3/2	3 D 5/2	4 S 1/2	4 P 1/2	4 P 3/2	4 D 3/2	4 D 5/2
25	4.22E-06	6.17E-06	1.08E-09				
26	7.08E-06	1.03E-05	1.60E-09				
27	1.13E-05	1.65E-05	2.34E-09				
28	1.74E-05	2.53E-05	3.37E-09				
29	2.66E-05	3.84E-05	1.80E-09				
30	3.77E-05	5.45E-05	6.69E-09				
31	5.23E-05	7.55E-05	1.27E-08	.0001876	.0003578		
32	7.09E-05	.0001024	2.11E-08	.0006305	.001209		
33	9.45E-05	.0001361	3.34E-08	.001377	.002648		
34	.0001239	.0001782	5.10E-08	.002493	.004800		
35	.0001602	.0002300	7.60E-08	.004061	.007817		
36	.0002046	.0002931	1.11E-07	.006167	.01187		
37	.0002587	.0003699	1.65E-07	.008394	.01628		
38	.0003240	.0004623	2.42E-07	.01085	.02111		
39	.0004020	.0005724	3.43E-07	.01331	.02590	2.37E-06	3.35E-06
40	.0004946	.0007027	4.76E-07	.01599	.03111	6.98E-06	9.86E-06
41	.0006035	.0008555	6.46E-07	.01863	.03617	1.73E-05	2.42E-05
42	.0007314	.001034	8.74E-07	.02183	.04234	2.94E-05	4.11E-05
43	.0008805	.001242	1.17E-06	.02533	.04909	4.66E-05	6.50E-05
44	.001053	.001482	1.55E-06	.02916	.05647	7.02E-05	9.76E-05
45	.001253	.001758	2.03E-06	.03334	.06451	.0001018	.0001412
46	.001482	.002074	2.64E-06	.03756	.07248	.0001477	.0002030
47	.001745	.002435	3.43E-06	.04284	.08270	.0001966	.0002710
48	.002045	.002846	4.43E-06	.04877	.09419	.0002352	.0003516
49	.002386	.003311	5.70E-06	.05533	.1070	.0003263	.0004494
50	.002773	.003836	7.30E-06	.06257	.1211	.0004103	.0005642
51	.003210	.004427	9.29E-06	.07049	.1365	.0005086	.0006981
52	.003702	.005090	1.18E-05	.07912	.1534	.0006231	.0008534
53	.004254	.005832	1.48E-05	.08850	.1717	.0007556	.001033
54	.004873	.006658	1.86E-05	.09865	.1916	.0009083	.001238
55	.005564	.007578	2.32E-05	.1096	.2131	.001085	.001475
56	.006334	.008597	2.89E-05	.1215	.2365	.001287	.001745
57	.007190	.009725	3.57E-05	.1343	.2616	.001517	.002052
58	.008156	.01099	4.34E-05	.1454	.2827	.001715	.002308
59	.009217	.01238	5.29E-05	.1583	.3077	.001963	.002632
60	.01039	.01390	6.42E-05	.1719	.3341	.002238	.002989
61	.01168	.01557	7.77E-05	.1863	.3619	.002541	.003380
62	.01309	.01739	9.36E-05	.2015	.3911	.002875	.003809
63	.01465	.01938	.0001124	.2175	.4219	.003242	.004277
64	.01634	.02153	.0001351	.2354	.4570	.003682	.004839
65	.01821	.02390	.0001608	.2520	.4884	.004086	.005344
66	.02024	.02645	.0001914	.2706	.5242	.004569	.005948
67	.02244	.02921	.0002273	.2902	.5618	.005095	.006603
68	.02484	.03219	.0002692	.3107	.6012	.005669	.007312
69	.02745	.03541	.0003181	.3322	.6425	.006294	.008078
70	.03026	.03888	.0003750	.3548	.6858	.006971	.008905
71	.03330	.04258	.0004420	.3794	.7339	.007755	.009863
72	.03657	.04655	.0005202	.4055	.7849	.008618	.01091
73	.04009	.05080	.0006111	.4331	.8390	.009564	.01206
74	.04389	.05534	.0007166	.4621	.8962	.01060	.01330
75	.04796	.06019	.0008369	.4927	.9566	.01173	.01465
76	.05233	.06535	.0009805	.5247	1.020	.01296	.01612
77	.05702	.07084	.001144	.5584	1.087	.01430	.01770
78	.06203	.07668	.001332	.5936	1.158	.01574	.01940
79	.06739	.08288	.001549	.6304	1.231	.01731	.02123
80	.07312	.08945	.001799	.6689	1.309	.01900	.02319
81	.07922	.09640	.002085	.7091	1.390	.02083	.02529
82	.08572	.1037	.002414	.7510	1.475	.02280	.02755
83	.09265	.1115	.002790	.7946	1.565	.02491	.02995
84	.1000	.1197	.003221	.8400	1.658	.02719	.03252
85	.1078	.1283	.003712	.8872	1.755	.02963	.03525
86	.1161	.1373	.004273	.9361	1.857	.03224	.03816
87	.1249	.1469	.004912	.9869	1.963	.03504	.04124
88	.1341	.1568	.005640	1.039	2.073	.03803	.04451
89	.1440	.1673	.006467	1.094	2.188	.04121	.04797

Table 3. (continued)

Z	3 D 3/2	3 D 5/2	4 S 1/2	4 P 1/2	4 P 3/2	4 D 3/2	4 D 5/2
90	.1543	.1782	.007408	1.150	2.308	.04461	.05163
91	.1653	.1897	.008473	1.208	2.432	.04821	.05548
92	.1768	.2016	.009682	1.268	2.561	.05204	.05953
93	.1890	.2141	.01105	1.329	2.695	.05610	.06379
94	.2018	.2271	.01260	1.392	2.834	.06040	.06826
95	.2152	.2405	.01435	1.457	2.977	.06494	.07294
96	.2293	.2545	.01633	1.523	3.126	.06975	.07784
97	.2440	.2690	.01856	1.591	3.280	.07482	.08296
98	.2595	.2841	.02108	1.660	3.439	.08015	.08829
99	.2757	.2996	.02393	1.731	3.603	.08577	.09385
100	.2925	.3156	.02713	1.804	3.773	.09168	.09963
101	.3102	.3321	.03073	1.877	3.948	.09788	.1056
102	.3285	.3491	.03479	1.952	4.128	.1044	.1119

Z	5 S 1/2	5 P 1/2	5 P 3/2	5 D 3/2	5 D 5/2	6 S 1/2
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36						
37	4.64E-09					
38	2.10E-08					
39	3.19E-08					
40	4.53E-08					
41	2.53E-08					
42	3.36E-08					
43	4.38E-08					
44	5.62E-08					
45	7.15E-08					
46						
47	1.13E-07					
48	3.54E-07					
49	5.71E-07	.0004647	.0008274			

Table 3. (continued)

Z	5 S 1/2	5 P 1/2	5 P 3/2	5 D 3/2	5 D 5/2	6 S 1/2
50	8.31E-07	.001417	.002574			
51	1.16E-06	.002882	.005294			
52	1.59E-06	.004924	.009104			
53	2.13E-06	.007629	.01415			
54	2.83E-06	.01109	.02062			
55	3.84E-06	.01436	.02723			1.24E-07
56	5.14E-06	.01778	.03400			5.03E-07
57	6.70E-06	.02105	.04033	1.23E-05	1.63E-05	7.08E-07
58	7.70E-06	.02109	.04014			7.20E-07
59	9.33E-06	.02278	.04324			8.54E-07
60	1.13E-05	.02452	.04641			1.01E-06
61	1.35E-05	.02631	.04966			1.19E-06
62	1.62E-05	.02816	.05300			1.39E-06
63	1.93E-05	.03007	.05644			1.53E-06
64	2.40E-05	.03424	.06446	2.27E-05	2.88E-05	2.23E-06
65	2.72E-05	.03413	.06365			2.21E-06
66	3.22E-05	.03628	.06744			2.57E-06
67	3.79E-05	.03851	.07135			2.97E-06
68	4.46E-05	.04083	.07539			3.44E-06
69	5.24E-05	.04324	.07958			3.97E-06
70	6.13E-05	.04575	.08390			4.58E-06
71	7.46E-05	.05130	.09461	3.52E-05	4.17E-05	6.36E-06
72	9.05E-05	.05730	.1061	9.54E-05	.0001143	8.23E-06
73	.0001095	.06376	.1185	.0001835	.0002205	1.03E-05
74	.0001321	.07067	.1317	.0003042	.0003655	1.28E-05
75	.0001588	.07803	.1457	.0004630	.0005551	1.55E-05
76	.0001903	.08585	.1607	.0006657	.0007957	1.87E-05
77	.0002256	.09289	.1730	.001046	.001216	
78	.0002695	.1022	.1912	.001311	.001539	1.16E-05
79	.0003199	.1114	.2087	.001698	.001985	1.37E-05
80	.0003802	.1219	.2296	.002060	.002417	3.66E-05
81	.0004508	.1331	.2522	.002485	.002925	5.19E-05
82	.0005336	.1451	.2765	.002953	.003478	6.85E-05
83	.0006300	.1578	.3025	.003469	.004081	8.78E-05
84	.0007423	.1712	.3301	.004035	.004737	.0001108
85	.0008725	.1853	.3593	.004656	.005452	.0001382
86	.001023	.2062	.3903	.005333	.006225	.0001706
87	.001198	.2158	.4231	.006085	.007079	.0002148
88	.001399	.2321	.4578	.006907	.008008	.0002680
89	.001632	.2492	.4945	.007802	.009012	.0003292
90	.001899	.2670	.5330	.008772	.01009	.0004005
91	.002198	.2842	.5685	.009635	.01100	.0004528
92	.002543	.3025	.6074	.01064	.01208	.0005268
93	.002936	.3213	.6478	.01171	.01321	.0006104
94	.003381	.3402	.6875	.01276	.01428	.0006850
95	.003890	.3601	.7306	.01395	.01552	.0007893
96	.004473	.3810	.7773	.01531	.01694	.0009332
97	.005131	.4020	.8235	.01666	.01830	.001070
98	.005873	.4230	.8690	.01799	.01960	.001192
99	.006718	.4450	.9183	.01950	.02109	.001362
100	.007677	.4675	.9692	.02109	.02264	.001555
101	.008761	.4904	1.022	.02276	.02425	.001773
102	.009988	.5138	1.076	.02453	.02593	.002019

Z	6 P 1/2	6 P 3/2	7 S 1/2
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Table 3. (continued)

Z	5 P 1/2	6 P 3/2	7 S 1/2
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81	.001394	.001983	
82	.003922	.006013	
83	.007509	.01204	
84	.01222	.02014	
85	.01817	.03048	
86	.02545	.04322	
87	.03119	.05608	7.51E-06
88	.03707	.06839	2.74E-05
89	.04275	.07987	3.80E-05
90	.04859	.09163	4.94E-05
91	.04987	.09282	5.02E-05
92	.05335	.09903	5.71E-05
93	.05682	.1052	6.48E-05
94	.05780	.1050	6.25E-05
95	.06119	.1107	7.03E-05
96	.06738	.1234	9.33E-05
97	.07097	.1295	.0001051
98	.07159	.1277	9.92E-05
99	.07515	.1334	.0001110
100	.07877	.1392	.0001242
101	.08244	.1449	.0001369
102	.08618	.1507	.0001552

Table 4. K x-ray energies, in keV.

Z	2 S 1/2	2 P 1/2	2 P 3/2	3 S 1/2	3 P 1/2	3 P 3/2
5	.1830	.1889	.1889			
6	.2735	.2820	.2820			
7	.3817	.3934	.3934			
8	.5081	.5231	.5231			
9	.6524	.6713	.6714			
10	.8150	.8361	.8362			
11	.9995	1.026	1.026	1.059		
12	1.205	1.236	1.236	1.288		
13	1.431	1.469	1.469	1.540	1.545	1.545

Table 4. (continued)

Z	2 S 1/2	2 P 1/2	2 P 3/2	3 S 1/2	3 P 1/2	3 P 3/2
14	1.677	1.720	1.720	1.815	1.822	1.822
15	1.943	1.991	1.992	2.113	2.122	2.122
16	2.230	2.283	2.284	2.435	2.445	2.446
17	2.537	2.595	2.597	2.780	2.792	2.793
18	2.864	2.928	2.930	3.149	3.163	3.163
19	3.212	3.282	3.285	3.543	3.559	3.560
20	3.581	3.656	3.660	3.962	3.981	3.981
21	3.972	4.052	4.057	4.405	4.426	4.427
22	4.383	4.469	4.475	4.872	4.896	4.896
23	4.816	4.908	4.915	5.363	5.389	5.390
24	5.270	5.368	5.377	5.878	5.906	5.907
25	5.744	5.848	5.859	6.418	6.449	6.450
26	6.240	6.350	6.363	6.982	7.015	7.017
27	6.758	6.873	6.888	7.571	7.607	7.608
28	7.296	7.418	7.436	8.184	8.222	8.225
29	7.857	7.985	8.006	8.822	8.863	8.865
30	8.438	8.572	8.596	9.485	9.529	9.532
31	9.040	9.181	9.209	10.17	10.22	10.22
32	9.664	9.811	9.844	10.89	10.94	10.94
33	10.31	10.46	10.50	11.63	11.68	11.68
34	10.98	11.14	11.18	12.39	12.45	12.45
35	11.67	11.83	11.88	13.18	13.24	13.25
36	12.38	12.55	12.61	14.00	14.06	14.07
37	13.11	13.29	13.35	14.85	14.91	14.92
38	13.87	14.05	14.12	15.72	15.79	15.80
39	14.65	14.84	14.92	16.61	16.69	16.70
40	15.45	15.65	15.74	17.54	17.62	17.63
41	16.27	16.48	16.58	18.49	18.57	18.59
42	17.12	17.34	17.44	19.47	19.56	19.57
43	17.99	18.21	18.33	20.48	20.57	20.59
44	18.88	19.12	19.25	21.51	21.61	21.63
45	19.80	20.04	20.19	22.58	22.67	22.70
46	20.74	20.99	21.15	23.67	23.77	23.80
47	21.71	21.96	22.14	24.79	24.89	24.92
48	22.69	22.96	23.15	25.93	26.04	26.08
49	23.71	23.98	24.19	27.11	27.22	27.26
50	24.74	25.02	25.26	28.32	28.43	28.47
51	25.81	26.09	26.35	29.55	29.67	29.72
52	26.89	27.19	27.47	30.82	30.94	30.99
53	28.00	28.31	28.61	32.11	32.24	32.30
54	29.14	29.45	29.78	33.44	33.57	33.63
55	30.30	30.62	30.98	34.79	34.93	35.00
56	31.49	31.82	32.21	36.18	36.32	36.39
57	32.70	33.04	33.46	37.60	37.74	37.82
58	33.95	34.29	34.75	39.05	39.20	39.29
59	35.21	35.57	36.06	40.53	40.69	40.79
60	36.51	36.88	37.40	42.05	42.21	42.32
61	37.83	38.21	38.77	43.60	43.76	43.88
62	39.18	39.56	40.17	45.18	45.35	45.48
63	40.56	40.95	41.61	46.80	46.97	47.11
64	41.96	42.37	43.07	48.45	48.63	48.77
65	43.40	43.81	44.56	50.13	50.32	50.47
66	44.86	45.28	46.09	51.85	52.04	52.21
67	46.35	46.78	47.65	53.61	53.80	53.98
68	47.87	48.31	49.24	55.40	55.60	55.79
69	49.42	49.87	50.87	57.23	57.43	57.64
70	51.00	51.47	52.52	59.09	59.30	59.52
71	52.61	53.09	54.22	60.99	61.20	61.44
72	54.25	54.74	55.95	62.93	63.15	63.40
73	55.93	56.42	57.71	64.90	65.13	65.40

Table 4. (continued)

Z	2 S 1/2	2 P 1/2	2 P 3/2	3 S 1/2	3 P 1/2	3 P 3/2
74	57.63	58.14	59.51	66.92	67.15	67.44
75	59.37	59.89	61.35	68.97	69.21	69.52
76	61.14	61.67	63.22	71.07	71.31	71.65
77	62.95	63.49	65.14	73.20	73.45	73.81
78	64.79	65.34	67.09	75.38	75.63	76.02
79	66.66	67.23	69.08	77.60	77.86	78.27
80	68.57	69.15	71.12	79.86	80.13	80.57
81	70.51	71.11	73.19	82.17	82.44	82.91
82	72.49	73.10	75.31	84.52	84.80	85.30
83	74.51	75.13	77.47	86.92	87.21	87.73
84	76.57	77.20	79.68	89.37	89.66	90.22
85	78.66	79.31	81.94	91.86	92.16	92.75
86	80.80	81.46	84.24	94.40	94.71	95.34
87	82.97	83.65	86.59	97.00	97.31	97.98
88	85.19	85.88	88.98	99.64	99.96	100.7
89	87.45	88.15	91.43	102.3	102.7	103.4
90	89.75	90.47	93.94	105.1	105.4	106.2
91	92.09	92.83	96.49	107.9	108.2	109.1
92	94.48	95.24	99.10	110.8	111.1	112.0
93	96.92	97.69	101.8	113.7	114.0	115.0
94	99.41	100.2	104.5	116.7	117.0	118.0
95	101.9	102.7	107.3	119.7	120.1	121.1
96	104.5	105.3	110.1	122.8	123.2	124.3
97	107.2	108.0	113.0	126.0	126.4	127.5
98	109.8	110.7	116.0	129.2	129.6	130.8
99	112.6	113.5	119.1	132.5	132.9	134.2
100	115.4	116.3	122.2	135.9	136.3	137.7
101	118.2	119.2	125.4	139.3	139.8	141.2
102	121.2	122.1	128.7	142.9	143.3	144.8

Z	3 D 3/2	3 D 5/2	4 S 1/2	4 P 1/2	4 P 3/2	4 D 3/2	4 D 5/2
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12							
13							
14							
15							
16							
17							
18							
19			3.579				
20			4.010				
21	4.459	4.459	4.460				
22	4.932	4.932	4.934				
23	5.430	5.430	5.433				
24	5.951	5.951	5.952				
25	6.499	6.499	6.504				
26	7.070	7.071	7.076				
27	7.667	7.667	7.673				
28	8.288	8.288	8.295				
29	8.933	8.933	8.936				
30	9.606	9.606	9.614				
31	10.30	10.30	10.32	10.33	10.33		
32	11.03	11.03	11.05	11.06	11.06		
33	11.78	11.78	11.81	11.82	11.82		
34	12.55	12.55	12.60	12.61	12.61		
35	13.36	13.36	13.41	13.42	13.42		

Table 4. (continued)

I	3 D 3/2	3 D 5/2	4 S 1/2	4 P 1/2	4 P 3/2	4 D 3/2	4 D 5/2
36	14.18	14.19	14.25	14.27	14.27		
37	15.04	15.04	15.12	15.14	15.14		
38	15.92	15.92	16.02	16.04	16.04		
39	16.83	16.83	16.95	16.97	16.97	17.00	17.00
40	17.77	17.77	17.90	17.92	17.92	17.95	17.96
41	18.73	18.74	18.88	18.91	18.91	18.94	18.94
42	19.72	19.73	19.90	19.92	19.92	19.96	19.96
43	20.74	20.75	20.94	20.96	20.97	21.00	21.00
44	21.79	21.80	22.01	22.03	22.04	22.08	22.08
45	22.87	22.87	23.10	23.13	23.14	23.18	23.18
46	23.97	23.98	24.23	24.26	24.27	24.31	24.31
47	25.11	25.11	25.39	25.42	25.43	25.48	25.48
48	26.27	26.28	26.58	26.61	26.62	26.67	26.67
49	27.46	27.47	27.79	27.83	27.84	27.90	27.90
50	28.68	28.69	29.04	29.08	29.09	29.15	29.15
51	29.93	29.94	30.32	30.36	30.37	30.44	30.44
52	31.21	31.22	31.63	31.68	31.69	31.76	31.76
53	32.52	32.54	32.98	33.02	33.03	33.11	33.11
54	33.87	33.88	34.35	34.40	34.41	34.49	34.49
55	35.24	35.26	35.76	35.81	35.82	35.90	35.90
56	36.65	36.66	37.20	37.25	37.26	37.35	37.35
57	38.08	38.10	38.67	38.72	38.74	38.83	38.83
58	39.55	39.57	40.18	40.23	40.25	40.34	40.35
59	41.06	41.08	41.72	41.77	41.79	41.89	41.90
60	42.60	42.62	43.29	43.35	43.37	43.47	43.48
61	44.17	44.19	44.90	44.96	44.99	45.09	45.09
62	45.77	45.80	46.54	46.61	46.63	46.74	46.75
63	47.41	47.44	48.22	48.29	48.32	48.43	48.43
64	49.08	49.11	49.93	50.00	50.03	50.15	50.16
65	50.79	50.82	51.68	51.75	51.79	51.91	51.92
66	52.53	52.57	53.47	53.54	53.58	53.70	53.71
67	54.32	54.36	55.29	55.37	55.41	55.54	55.54
68	56.13	56.18	57.15	57.23	57.27	57.41	57.42
69	57.99	58.03	59.05	59.13	59.18	59.32	59.33
70	59.88	59.93	60.99	61.07	61.12	61.26	61.27
71	61.81	61.86	62.96	63.05	63.11	63.25	63.26
72	63.78	63.83	64.98	65.07	65.13	65.28	65.29
73	65.79	65.85	67.03	67.13	67.19	67.35	67.36
74	67.83	67.90	69.13	69.23	69.30	69.45	69.47
75	69.92	69.99	71.27	71.37	71.44	71.61	71.62
76	72.05	72.13	73.45	73.55	73.63	73.80	73.82
77	74.23	74.31	75.67	75.78	75.87	76.04	76.06
78	76.44	76.53	77.94	78.05	78.14	78.32	78.34
79	78.70	78.79	80.26	80.37	80.47	80.65	80.67
80	81.01	81.10	82.61	82.73	82.84	83.02	83.04
81	83.36	83.46	85.02	85.14	85.25	85.45	85.47
82	85.76	85.86	87.47	87.59	87.72	87.92	87.94
83	88.20	88.31	89.98	90.10	90.23	90.43	90.46
84	90.70	90.81	92.53	92.65	92.79	93.00	93.03
85	93.24	93.36	95.13	95.26	95.41	95.62	95.65
86	95.83	95.97	97.78	97.92	98.08	98.30	98.33
87	98.48	98.62	100.5	100.6	100.8	101.0	101.0
88	101.2	101.3	103.2	103.4	103.6	103.8	103.8
89	103.9	104.1	106.1	106.2	106.4	106.6	106.7
90	106.7	106.9	108.9	109.1	109.3	109.5	109.6
91	109.6	109.8	111.9	112.0	112.2	112.5	112.5
92	112.5	112.7	114.9	115.0	115.2	115.5	115.5
93	115.5	115.7	117.9	118.1	118.3	118.6	118.6
94	118.6	118.8	121.0	121.2	121.5	121.7	121.8
95	121.7	121.9	124.2	124.4	124.7	124.9	125.0
96	124.9	125.1	127.5	127.6	127.9	128.2	128.3
97	128.1	128.4	130.8	130.9	131.3	131.5	131.6
98	131.5	131.7	134.2	134.3	134.7	135.0	135.0
99	134.9	135.1	137.6	137.8	138.2	138.5	138.5
100	138.3	138.6	141.2	141.3	141.7	142.0	142.1
101	141.9	142.2	144.8	145.0	145.4	145.7	145.7
102	145.5	145.8	148.5	148.7	149.1	149.4	149.5

Table 4. (continued)

Z	5 S 1/2	5 P 1/2	5 P 3/2	5 D 3/2	5 D 5/2	6 S 1/2
5						
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30						
31						
32						
33						
34						
35						
36						
37	15.15					
38	16.06					
39	16.99					
40	17.96					
41	18.94					
42	19.96					
43	21.01					
44	22.08					
45	23.19					
46						
47	25.48					
48	26.68					
49	27.91	27.92	27.92			
50	29.17	29.18	29.18			
51	30.46	30.47	30.47			
52	31.79	31.80	31.80			
53	33.15	33.16	33.16			
54	34.53	34.55	34.55			
55	35.96	35.97	35.97			35.98
56	37.41	37.43	37.43			37.45
57	38.90	38.92	38.92	38.94	38.94	38.94
58	40.42	40.43	40.44			40.46
59	41.97	41.99	41.99			42.01
60	43.56	43.57	43.58			43.60
61	45.18	45.20	45.20			45.22
62	46.84	46.85	46.86			46.88
63	48.53	48.55	48.55			48.57
64	50.26	50.28	50.28	50.31	50.31	50.31

Table 4. (continued)

Z	5 S 1/2	5 P 1/2	5 P 3/2	5 D 3/2	5 D 5/2	6 S 1/2
65	52.02	52.04	52.04			52.06
66	53.82	53.84	53.84			53.87
67	55.66	55.68	55.68			55.71
68	57.53	57.55	57.56			57.58
69	59.45	59.47	59.47			59.50
70	61.40	61.42	61.43			61.45
71	63.39	63.42	63.43	63.46	63.46	63.45
72	65.43	65.46	65.47	65.50	65.50	65.50
73	67.51	67.54	67.55	67.58	67.58	67.58
74	69.63	69.66	69.67	69.71	69.71	69.71
75	71.79	71.82	71.84	71.88	71.88	71.88
76	74.00	74.03	74.04	74.09	74.09	74.09
77	76.25	76.28	76.30	76.34	76.34	
78	78.55	78.58	78.60	78.64	78.65	78.65
79	80.89	80.93	80.94	80.99	80.99	81.00
80	83.28	83.32	83.33	83.39	83.39	83.39
81	85.71	85.75	85.77	85.83	85.83	85.84
82	88.20	88.24	88.26	88.32	88.32	88.34
83	90.73	90.78	90.80	90.86	90.87	90.88
84	93.32	93.36	93.39	93.46	93.46	93.48
85	95.95	96.00	96.03	96.10	96.11	96.13
86	98.64	98.69	98.73	98.80	98.80	98.83
87	101.4	101.4	101.5	101.5	101.6	101.6
88	104.2	104.2	104.3	104.4	104.4	104.4
89	107.0	107.1	107.1	107.2	107.2	107.3
90	109.9	110.0	110.1	110.1	110.1	110.2
91	112.9	113.0	113.0	113.1	113.1	113.2
92	116.0	116.0	116.1	116.2	116.2	116.2
93	119.1	119.1	119.2	119.3	119.3	119.3
94	122.2	122.3	122.3	122.4	122.5	122.5
95	125.4	125.5	125.6	125.7	125.7	125.7
96	128.7	128.8	128.9	129.0	129.0	129.1
97	132.1	132.2	132.3	132.4	132.4	132.4
98	135.5	135.6	135.7	135.8	135.8	135.9
99	139.0	139.1	139.2	139.3	139.3	139.4
100	142.6	142.7	142.8	142.9	142.9	143.0
101	146.3	146.4	146.5	146.6	146.6	146.7
102	150.1	150.1	150.2	150.4	150.4	150.5

Z	6 P 1/2	6 P 3/2	7 S 1/2
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73			

Table 4. (continued)

Z	6 P 1/2	6 P 3/2	7 S 1/2
74			
75			
76			
77			
78			
79			
80			
81	85.85	85.85	
82	88.34	88.35	
83	90.89	90.89	
84	93.49	93.49	
85	96.14	96.14	
86	98.84	98.85	
87	101.6	101.6	101.6
88	104.4	104.4	104.4
89	107.3	107.3	107.3
90	110.2	110.2	110.2
91	113.2	113.2	113.2
92	116.2	116.3	116.3
93	119.4	119.4	119.4
94	122.5	122.5	122.6
95	125.8	125.8	125.8
96	129.1	129.1	129.1
97	132.5	132.5	132.5
98	135.9	135.9	135.9
99	139.4	139.5	139.5
100	143.0	143.1	143.1
101	146.7	146.7	146.8
102	150.5	150.5	150.5

Tables 5 and 6 list the rates and energies of those transitions having E-1 or E-2 components in filling a vacancy in the L_1 subshell; Tables 7 and 8 list the same properties for a vacancy in the L_2 subshell, and Tables 9 and 10 are for a vacancy in the L_3 subshell.*

The emission of M-2 radiation gives only a slight increase in the radiative emission rates. However, the interference between the E-1 and M-2 radiation can alter more substantially the angular correlations between successive emissions.† Tables 11 through 14 list the ratio of the M-2 to E-1 rates for those K and L transitions for which both occur.

*A recent review of the L rates has been given in Ref. 22.

†The experimental work described in Ref. 23 gives earlier references of the K-L x-ray angular correlations.

Table 5. L_1 x-ray transition rates, in eV/h.

Z	TOTAL	2 P 1/2	2 P 3/2	3 P 1/2	3 P 3/2	3 D 3/2	3 D 5/2
5	5.69E-07	1.89E-07	3.80E-07				
6	1.08E-06	3.60E-07	7.23E-07				
7	1.86E-06	6.18E-07	1.25E-06				
8	3.00E-06	9.93E-07	2.01E-06				
9	4.60E-06	1.52E-06	3.08E-06				
10	6.76E-06	2.23E-06	4.54E-06				
11	8.84E-06	2.90E-06	5.94E-06				
12	1.10E-05	3.60E-06	7.43E-06				
13	1.49E-05	4.34E-06	9.06E-06	5.09E-07	9.88E-07		
14	2.37E-05	5.12E-06	1.08E-05	2.64E-06	5.12E-06		
15	4.23E-05	5.95E-06	1.27E-05	8.05E-06	1.56E-05		
16	7.76E-05	6.84E-06	1.49E-05	1.91E-05	3.69E-05		
17	.0001389	7.77E-06	1.72E-05	3.90E-05	7.50E-05		
18	.0002381	8.75E-06	1.97E-05	7.18E-05	.0001378		
19	.0003752	9.76E-06	2.25E-05	.0001175	.0002255		
20	.0005581	1.08E-05	2.54E-05	.0001790	.0003428		
21	.0007614	1.18E-05	2.86E-05	.0002479	.0004731	3.02E-08	4.50E-08
22	.001010	1.29E-05	3.20E-05	.0003326	.0006525	9.54E-08	1.42E-07
23	.001311	1.40E-05	3.58E-05	.0004356	.0008251	2.15E-07	3.21E-07
24	.001632	1.51E-05	4.00E-05	.0005462	.001030	4.58E-07	6.80E-07
25	.002097	1.63E-05	4.47E-05	.0007066	.001327	7.37E-07	1.10E-06
26	.002596	1.75E-05	4.99E-05	.0008801	.001645	1.22E-06	1.82E-06
27	.003177	1.87E-05	5.57E-05	.001083	.002015	1.93E-06	2.87E-06
28	.003848	2.00E-05	6.22E-05	.001318	.002440	2.94E-06	4.36E-06
29	.004547	2.13E-05	6.93E-05	.001565	.002880	4.45E-06	6.59E-06
30	.005495	2.28E-05	7.75E-05	.001900	.003479	6.24E-06	9.25E-06
31	.006650	2.42E-05	8.67E-05	.002295	.004183	8.55E-06	1.27E-05
32	.008047	2.58E-05	9.71E-05	.002758	.005004	1.15E-05	1.71E-05
33	.009719	2.73E-05	.0001088	.003296	.005951	1.51E-05	2.25E-05
34	.01170	2.90E-05	.0001220	.003915	.007035	1.97E-05	2.92E-05
35	.01403	3.07E-05	.0001368	.004623	.008267	2.52E-05	3.75E-05
36	.01676	3.24E-05	.0001536	.005429	.009659	3.19E-05	4.75E-05
37	.01984	3.42E-05	.0001725	.006344	.01123	4.01E-05	5.97E-05
38	.02330	3.60E-05	.0001938	.007379	.01299	4.99E-05	7.43E-05
39	.02712	3.79E-05	.0002179	.008540	.01495	6.16E-05	9.18E-05
40	.03137	3.97E-05	.0002450	.009840	.01713	7.55E-05	.0001124
41	.03600	4.17E-05	.0002757	.01129	.01953	9.18E-05	.0001367
42	.04120	4.36E-05	.0003104	.01289	.02218	.0001109	.0001652
43	.04695	4.57E-05	.0003497	.01467	.02508	.0001331	.0001984
44	.05327	4.77E-05	.0003943	.01664	.02826	.0001590	.0002370
45	.06020	4.99E-05	.0004448	.01880	.03172	.0001888	.0002816
46	.06768	5.20E-05	.0005020	.02117	.03548	.0002233	.0003329
47	.07605	5.43E-05	.0005669	.02377	.03956	.0002628	.0003919
48	.08524	5.65E-05	.0006405	.02662	.04398	.0003080	.0004595
49	.09539	5.89E-05	.0007240	.02973	.04875	.0003597	.0005367
50	.1066	6.13E-05	.0008187	.03312	.05389	.0004185	.0006246
51	.1189	6.37E-05	.0009261	.03680	.05942	.0004853	.0007243
52	.1323	6.62E-05	.001048	.04080	.06535	.0005609	.0008373
53	.1470	6.88E-05	.001186	.04514	.07171	.0006462	.0009649
54	.1631	7.14E-05	.001343	.04984	.07850	.0007424	.001109
55	.1803	7.41E-05	.001521	.05492	.08575	.0008506	.001271
56	.1988	7.69E-05	.001722	.06040	.09347	.0009719	.001452
57	.2186	7.97E-05	.001950	.06631	.1017	.001108	.001655
58	.2382	8.22E-05	.002206	.07279	.1106	.001262	.001886
59	.2599	8.50E-05	.002497	.07969	.1199	.001432	.002141
60	.2831	8.78E-05	.002827	.08711	.1297	.001622	.002426
61	.3077	9.06E-05	.003200	.09508	.1402	.001834	.002742
62	.3339	9.35E-05	.003622	.1036	.1511	.002068	.003094
63	.3617	9.65E-05	.004100	.1128	.1627	.002328	.003483
64	.3922	9.96E-05	.004642	.1225	.1748	.002614	.003912
65	.4225	.0001025	.005251	.1330	.1876	.002933	.004390
66	.4557	.0001056	.005943	.1441	.2009	.003284	.004915
67	.4908	.0001088	.006724	.1560	.2149	.003670	.005494
68	.5279	.0001121	.007606	.1687	.2295	.004095	.006130
69	.5671	.0001154	.008603	.1822	.2447	.004562	.006830
70	.6086	.0001188	.009729	.1966	.2605	.005075	.007599

Table 5. (continued)

Z	TOTAL	2 P 1/2	2 P 3/2	3 P 1/2	3 P 3/2	3 D 3/2	3 D 5/2
71	.6535	.0001224	.01100	.2119	.2769	.005636	.008438
72	.7011	.0001260	.01244	.2280	.2939	.006249	.009357
73	.7514	.0001298	.01406	.2453	.3115	.006920	.01036
74	.8045	.0001337	.01589	.2635	.3297	.007654	.01146
75	.8606	.0001377	.01795	.2829	.3485	.008454	.01266
76	.9198	.0001418	.02028	.3034	.3679	.009328	.01397
77	.9816	.0001460	.02289	.3252	.3879	.01028	.01539
78	1.047	.0001504	.02584	.3482	.4085	.01132	.01694
79	1.117	.0001549	.02916	.3726	.4296	.01244	.01863
80	1.190	.0001595	.03290	.3985	.4513	.01367	.02046
81	1.267	.0001643	.03711	.4259	.4734	.01501	.02246
82	1.349	.0001692	.04184	.4549	.4961	.01646	.02462
83	1.435	.0001742	.04716	.4855	.5192	.01803	.02697
84	1.526	.0001794	.05315	.5180	.5427	.01974	.02951
85	1.622	.0001848	.05987	.5523	.5666	.02159	.03227
86	1.724	.0001904	.06743	.5885	.5908	.02368	.03526
87	1.830	.0001961	.07591	.6268	.6152	.02577	.03850
88	1.941	.0002020	.08544	.6673	.6399	.02812	.04200
89	2.058	.0002082	.09615	.7101	.6647	.03067	.04578
90	2.181	.0002145	.1082	.7554	.6895	.03343	.04987
91	2.308	.0002209	.1216	.8032	.7144	.03641	.05429
92	2.441	.0002276	.1368	.8538	.7392	.03964	.05906
93	2.582	.0002345	.1538	.9072	.7638	.04313	.06421
94	2.728	.0002416	.1728	.9637	.7881	.04689	.06978
95	2.882	.0002490	.1942	1.023	.8119	.05096	.07577
96	3.046	.0002568	.2182	1.086	.8352	.05535	.08223
97	3.217	.0002648	.2451	1.153	.8578	.06009	.08919
98	3.395	.0002731	.2753	1.223	.8796	.06521	.09669
99	3.584	.0002818	.3091	1.297	.9003	.07073	.1048
100	3.784	.0002909	.3471	1.376	.9199	.07669	.1135
101	3.993	.0003003	.3898	1.459	.9381	.08311	.1228
102	4.215	.0003102	.4377	1.547	.9548	.09004	.1329

Z	4 P 1/2	4 P 3/2	4 D 3/2	4 D 5/2	5 P 1/2	5 P 3/2
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28						
29						
30						
31	1.38E-05	2.47E-05				
32	4.77E-05	8.53E-05				

Table 5. (continued)

Z	4 P 1/2	4 P 3/2	4 D 3/2	4 D 5/2	5 P 1/2	5 P 3/2
33	.0001066	.0001906				
34	.0001974	.0003519				
35	.0003285	.0005833				
36	.0005091	.0009000				
37	.0007071	.001255				
38	.0009316	.001651				
39	.001164	.002055	2.90E-07	4.31E-07		
40	.001424	.002501	8.34E-07	1.24E-06		
41	.001687	.002943	2.02E-06	3.01E-06		
42	.002009	.003486	3.38E-06	5.02E-06		
43	.002369	.004086	5.26E-06	7.82E-06		
44	.002770	.004746	7.80E-06	1.16E-05		
45	.003215	.005476	1.11E-05	1.66E-05		
46	.003674	.006208	1.60E-05	2.37E-05		
47	.004251	.007144	2.10E-05	3.13E-05		
48	.004906	.008203	2.69E-05	4.02E-05		
49	.005643	.009386	3.40E-05	5.10E-05	4.78E-05	7.34E-05
50	.006468	.01070	4.22E-05	6.36E-05	.0001479	.0002302
51	.007385	.01215	5.18E-05	7.83E-05	.0003049	.0004771
52	.008399	.01374	6.29E-05	9.52E-05	.0005281	.0008264
53	.009516	.01548	7.57E-05	.0001148	.0008292	.001294
54	.01074	.01737	9.03E-05	.0001373	.001221	.001857
55	.01209	.01943	.0001071	.0001631	.001602	.002520
56	.01357	.02167	.0001264	.0001929	.002010	.003166
57	.01519	.02409	.0001482	.0002267	.002411	.003777
58	.01665	.02616	.0001670	.0002555	.002847	.003777
59	.01836	.02860	.0001907	.0002921	.002676	.004088
60	.02020	.03118	.0002170	.0003328	.002916	.004406
61	.02216	.03390	.0002462	.0003780	.003168	.004733
62	.02427	.03677	.0002785	.0004281	.003433	.005070
63	.02652	.03979	.0003143	.0004837	.003712	.005417
64	.02906	.04321	.0003573	.0005509	.004279	.006207
65	.03150	.04631	.0003976	.0006132	.004318	.006145
66	.03425	.04982	.0004458	.0006883	.004647	.006526
67	.03719	.05350	.0004989	.0007713	.004995	.006920
68	.04032	.05734	.0005575	.0008627	.005362	.007326
69	.04365	.06137	.0006219	.0009634	.005751	.007744
70	.04721	.06558	.0006927	.001074	.006162	.008175
71	.05113	.07022	.0007753	.001204	.006997	.009230
72	.05534	.07513	.0008673	.001349	.007516	.01036
73	.05986	.08032	.0009695	.001511	.008922	.01158
74	.06470	.08577	.001083	.001690	.01002	.01287
75	.06987	.09150	.001208	.001889	.01121	.01425
76	.07540	.09750	.001347	.002110	.01249	.01570
77	.08130	.1038	.001500	.002354	.01370	.01689
78	.08759	.1103	.001669	.002623	.01527	.01865
79	.09429	.1171	.001855	.002920	.01688	.02034
80	.1014	.1242	.002059	.003247	.01873	.02234
81	.1090	.1316	.002284	.003607	.02075	.02445
82	.1171	.1393	.002531	.004003	.02294	.02680
83	.1257	.1472	.002802	.004439	.02531	.02924
84	.1348	.1554	.003100	.004918	.02787	.03181
85	.1445	.1638	.003426	.005444	.03063	.03452
86	.1548	.1725	.003784	.006021	.03358	.03735
87	.1657	.1814	.004175	.006653	.03676	.04032
88	.1773	.1905	.004605	.007347	.04018	.04343
89	.1896	.1999	.005074	.008106	.04384	.04667
90	.2026	.2095	.005588	.008937	.04775	.05003
91	.2163	.2192	.006146	.009843	.05168	.05304
92	.2319	.2290	.006760	.01083	.05596	.05629

Table 5. (continued)

Z	4 P 1/2	4 P 3/2	4 D 3/2	4 D 5/2	5 P 1/2	5 P 3/2
93	.2463	.2390	.007428	.01192	.06049	.05960
94	.2626	.2491	.008158	.01310	.06521	.06276
95	.2799	.2592	.008954	.01439	.07030	.06613
96	.2981	.2693	.009823	.01580	.07580	.06971
97	.3174	.2794	.01077	.01733	.08153	.07312
98	.3378	.2895	.01180	.01900	.08750	.07634
99	.3594	.2994	.01293	.02082	.09394	.07974
100	.3823	.3092	.01416	.02281	.1008	.08311
101	.4064	.3187	.01550	.02497	.1080	.08644
102	.4319	.3280	.01696	.02732	.1157	.08972

Z	5 D 3/2	5 D 5/2	6 P 1/2	6 P 3/2
55				
56				
57	1.12E-06	1.69E-06		
58				
59				
60				
61				
62				
63				
64	2.05E-06	3.06E-06		
65				
66				
67				
68				
69				
70				
71	3.26E-06	4.75E-06		
72	8.87E-06	1.32E-05		
73	1.71E-05	2.57E-05		
74	2.86E-05	4.31E-05		
75	4.37E-05	6.62E-05		
76	6.32E-05	9.62E-05		
77	.0001001	.0001491		
78	.0001264	.0001914		
79	.0001651	.0002506		
80	.0002020	.0003099		
81	.0002459	.0003812	.0002178	.0001933
82	.0002952	.0004610	.0006214	.0005850
83	.0003504	.0005505	.001207	.001169
84	.0004122	.0006509	.001994	.001950
85	.0004813	.0007636	.003010	.002942
86	.0005583	.0008894	.004281	.004157
87	.0006454	.001032	.005330	.005375
88	.0007430	.001193	.006435	.006526
89	.0008517	.001373	.007544	.007587
90	.0009724	.001572	.008716	.008659
91	.001086	.001756	.009098	.008720
92	.001220	.001975	.009902	.009244
93	.001366	.002215	.01073	.009748
94	.001517	.002460	.01112	.009662
95	.001692	.002746	.01199	.01010
96	.001895	.003081	.01345	.01116
97	.002106	.003426	.01444	.01160
98	.002325	.003780	.01486	.01132
99	.002578	.004191	.01592	.01169

Table 5. (continued)

Z	5 D 3/2	5 D 5/2	6 P 1/2	6 P 3/2
100	.002855	.004642	.01704	.01205
101	.003159	.005135	.01823	.01238
102	.003492	.005674	.01948	.01270

Table 6. L_1 x-ray energies, in keV.

Z	B. ENGY	2 P 1/2	2 P 3/2	3 P 1/2	3 P 3/2	3 D 3/2	3 D 5/2
5	.01258	.005911	.005914				
6	.01756	.008568	.008577				
7	.02311	.01160	.01162				
8	.02923	.01504	.01508				
9	.03593	.01889	.01896				
10	.04324	.02316	.02327				
11	.06448	.02806	.02826				
12	.08946	.03291	.03322				
13	.1191	.03785	.03832	.1142	.1142		
14	.1516	.04288	.04357	.1450	.1450		
15	.1872	.04801	.04897	.1788	.1788		
16	.2260	.05324	.05456	.2156	.2157		
17	.2680	.05857	.06035	.2556	.2558		
18	.3134	.06401	.06634	.2988	.2990		
19	.3712	.06951	.07252	.3474	.3477		
20	.4341	.07507	.07890	.4001	.4005		
21	.4943	.08061	.08543	.4547	.4552	.4872	.4872
22	.5574	.08622	.09220	.5123	.5130	.5490	.5491
23	.6238	.09191	.09925	.5731	.5740	.6142	.6143
24	.6873	.09760	.1065	.6361	.6371	.6809	.6810
25	.7665	.1035	.1143	.7044	.7057	.7546	.7548
26	.8430	.1094	.1223	.7749	.7765	.8300	.8302
27	.9230	.1154	.1307	.8488	.8507	.9090	.9092
28	1.006	.1215	.1395	.9260	.9283	.9916	.9918
29	1.086	.1276	.1486	1.006	1.008	1.076	1.076
30	1.184	.1339	.1584	1.091	1.094	1.168	1.168
31	1.291	.1404	.1687	1.180	1.183	1.263	1.264
32	1.402	.1469	.1795	1.273	1.277	1.363	1.364
33	1.519	.1535	.1909	1.370	1.375	1.468	1.469
34	1.641	.1602	.2029	1.472	1.478	1.577	1.577
35	1.769	.1671	.2156	1.577	1.584	1.690	1.691
36	1.902	.1740	.2289	1.687	1.695	1.807	1.808
37	2.048	.1810	.2430	1.801	1.811	1.929	1.930
38	2.200	.1881	.2578	1.920	1.931	2.055	2.057
39	2.355	.1952	.2734	2.043	2.055	2.186	2.188
40	2.515	.2024	.2899	2.170	2.184	2.322	2.324
41	2.676	.2097	.3072	2.301	2.317	2.461	2.464
42	2.847	.2171	.3256	2.437	2.455	2.606	2.610
43	3.022	.2246	.3449	2.577	2.597	2.755	2.759
44	3.204	.2322	.3653	2.722	2.745	2.909	2.914
45	3.391	.2398	.3868	2.871	2.897	3.068	3.073
46	3.580	.2476	.4095	3.025	3.053	3.232	3.238
47	3.784	.2554	.4335	3.183	3.215	3.400	3.407
48	3.994	.2634	.4589	3.346	3.382	3.574	3.581
49	4.214	.2715	.4856	3.514	3.553	3.753	3.761
50	4.440	.2796	.5137	3.687	3.730	3.937	3.946
51	4.674	.2879	.5434	3.865	3.912	4.126	4.136
52	4.914	.2963	.5748	4.047	4.100	4.321	4.332
53	5.162	.3048	.6078	4.235	4.292	4.521	4.533
54	5.417	.3134	.6426	4.428	4.491	4.726	4.740
55	5.685	.3221	.6793	4.626	4.695	4.938	4.952
56	5.961	.3310	.7179	4.829	4.904	5.155	5.171
57	6.242	.3399	.7585	5.037	5.120	5.377	5.395
58	6.507	.3486	.8011	5.254	5.343	5.609	5.628
59	6.793	.3575	.8460	5.475	5.572	5.844	5.865
60	7.087	.3666	.8933	5.701	5.807	6.087	6.110

Table 6. (continued)

Z	B.E.N.T	2 P 1/2	2 P 3/2	3 P 1/2	3 P 3/2	3 D 3/2	3 D 5/2
61	7.380	.3757	.9431	5.933	6.048	6.335	6.360
62	7.696	.3850	.9954	6.171	6.295	6.590	6.617
63	8.012	.3944	1.050	6.415	6.549	6.852	6.881
64	8.351	.4040	1.108	6.664	6.809	7.119	7.151
65	8.667	.4135	1.169	6.921	7.078	7.395	7.430
66	9.006	.4233	1.233	7.183	7.352	7.677	7.714
67	9.354	.4332	1.300	7.451	7.633	7.967	8.007
68	9.711	.4432	1.371	7.726	7.922	8.263	8.306
69	10.07	.4534	1.445	8.008	8.218	8.567	8.613
70	10.45	.4637	1.521	8.296	8.521	8.878	8.928
71	10.85	.4744	1.604	8.590	8.831	9.197	9.250
72	11.25	.4852	1.690	8.890	9.149	9.523	9.580
73	11.66	.4962	1.780	9.198	9.475	9.857	9.918
74	12.08	.5074	1.875	9.513	9.809	10.20	10.26
75	12.51	.5188	1.974	9.835	10.15	10.55	10.62
76	12.95	.5304	2.078	10.16	10.50	10.91	10.98
77	13.40	.5422	2.187	10.50	10.86	11.28	11.36
78	13.87	.5543	2.301	10.85	11.23	11.66	11.74
79	14.34	.5666	2.421	11.20	11.61	12.04	12.13
80	14.83	.5792	2.547	11.56	12.00	12.44	12.53
81	15.34	.5920	2.679	11.93	12.39	12.84	12.94
82	15.86	.6050	2.817	12.31	12.80	13.26	13.37
83	16.39	.6184	2.961	12.69	13.22	13.69	13.80
84	16.93	.6320	3.113	13.09	13.65	14.13	14.24
85	17.49	.6459	3.272	13.49	14.09	14.57	14.70
86	18.06	.6602	3.438	13.91	14.54	15.04	15.17
87	18.65	.6747	3.613	14.33	15.00	15.51	15.65
88	19.25	.6895	3.795	14.77	15.48	15.99	16.14
89	19.87	.7048	3.987	15.21	15.96	16.49	16.64
90	20.50	.7203	4.187	15.67	16.47	17.00	17.16
91	21.14	.7361	4.397	16.14	16.98	17.52	17.70
92	21.80	.7523	4.617	16.62	17.51	18.06	18.24
93	22.47	.7690	4.848	17.11	18.05	18.61	18.80
94	23.15	.7861	5.090	17.61	18.61	19.18	19.38
95	23.86	.8035	5.343	18.13	19.18	19.76	19.98
96	24.59	.8215	5.609	18.65	19.77	20.36	20.59
97	25.35	.8400	5.887	19.20	20.38	20.98	21.21
98	26.10	.8590	6.179	19.75	21.00	21.61	21.86
99	26.88	.8786	6.485	20.32	21.64	22.27	22.52
100	27.69	.8988	6.807	20.91	22.31	22.94	23.21
101	28.52	.9196	7.144	21.51	22.99	23.63	23.91
102	29.37	.9410	7.497	22.13	23.69	24.34	24.63

Z	4 P 1/2	4 P 3/2	4 D 3/2	4 D 5/2	5 P 1/2	5 P 3/2
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

Table 6. (continued)

L	4 P 1/2	4 P 3/2	4 D 3/2	4 D 5/2	5 P 1/2	5 P 3/2
23						
24						
25						
26						
27						
28						
29						
30						
31	1.286	1.286				
32	1.396	1.396				
33	1.511	1.511				
34	1.632	1.632				
35	1.758	1.758				
36	1.889	1.890				
37	2.027	2.028				
38	2.172	2.173				
39	2.321	2.323	2.350	2.350		
40	2.476	2.478	2.508	2.508		
41	2.636	2.638	2.670	2.671		
42	2.801	2.804	2.840	2.840		
43	2.973	2.976	3.014	3.015		
44	3.150	3.153	3.195	3.195		
45	3.332	3.336	3.381	3.381		
46	3.520	3.525	3.572	3.572		
47	3.715	3.720	3.771	3.772		
48	3.916	3.922	3.976	3.977		
49	4.123	4.130	4.188	4.189	4.209	4.209
50	4.337	4.345	4.407	4.408	4.434	4.435
51	4.557	4.566	4.632	4.633	4.666	4.667
52	4.783	4.794	4.864	4.865	4.905	4.906
53	5.017	5.028	5.102	5.104	5.151	5.153
54	5.257	5.269	5.347	5.349	5.405	5.406
55	5.503	5.517	5.600	5.602	5.667	5.669
56	5.757	5.773	5.859	5.862	5.937	5.939
57	6.018	6.035	6.125	6.129	6.214	6.217
58	6.285	6.304	6.398	6.401	6.487	6.490
59	6.560	6.581	6.678	6.682	6.773	6.776
60	6.841	6.864	6.965	6.969	7.066	7.069
61	7.130	7.155	7.260	7.264	7.366	7.369
62	7.426	7.453	7.562	7.567	7.673	7.677
63	7.729	7.759	7.871	7.877	7.989	7.993
64	8.040	8.072	8.189	8.195	8.316	8.321
65	8.358	8.393	8.514	8.520	8.642	8.647
66	8.685	8.722	8.847	8.854	8.981	8.986
67	9.019	9.060	9.188	9.196	9.328	9.333
68	9.361	9.405	9.538	9.546	9.683	9.689
69	9.711	9.759	9.896	9.904	10.05	10.05
70	10.07	10.12	10.26	10.27	10.42	10.43
71	10.44	10.49	10.64	10.65	10.81	10.81
72	10.81	10.87	11.02	11.03	11.20	11.21
73	11.20	11.26	11.42	11.43	11.61	11.62
74	11.59	11.66	11.82	11.83	12.02	12.03
75	11.99	12.07	12.23	12.25	12.45	12.46
76	12.41	12.49	12.66	12.67	12.89	12.90
77	12.83	12.92	13.09	13.11	13.34	13.35
78	13.26	13.36	13.53	13.55	13.79	13.81
79	13.71	13.81	13.99	14.01	14.26	14.28
80	14.16	14.27	14.45	14.47	14.75	14.76
81	14.62	14.74	14.93	14.95	15.24	15.26

Table 6. (continued)

Z	4 P 1/2	4 P 3/2	4 D 3/2	4 D 5/2	5 P 1/2	5 P 3/2
82	15.10	15.22	15.42	15.44	15.74	15.77
83	15.59	15.72	15.92	15.95	16.26	16.29
84	16.08	16.22	16.43	16.46	16.79	16.82
85	16.60	16.74	16.96	16.99	17.34	17.37
86	17.12	17.28	17.50	17.53	17.89	17.93
87	17.65	17.82	18.05	18.08	18.47	18.50
88	18.20	18.38	18.61	18.65	19.05	19.09
89	18.76	18.96	19.19	19.23	19.65	19.69
90	19.34	19.54	19.79	19.82	20.26	20.31
91	19.93	20.15	20.40	20.44	20.89	20.95
92	20.53	20.77	21.02	21.06	21.54	21.59
93	21.15	21.40	21.66	21.71	22.20	22.26
94	21.79	22.05	22.32	22.37	22.88	22.94
95	22.44	22.72	22.99	23.04	23.57	23.64
96	23.11	23.41	23.68	23.74	24.29	24.36
97	23.79	24.11	24.39	24.45	25.02	25.10
98	24.50	24.83	25.12	25.18	25.77	25.85
99	25.22	25.58	25.87	25.93	26.54	26.63
100	25.96	26.34	26.64	26.70	27.33	27.43
101	26.72	27.12	27.43	27.50	28.14	28.25
102	27.50	27.93	28.24	28.31	28.98	29.09

Z	5 D 3/2	5 D 5/2	6 P 1/2	6 P 3/2
55				
56				
57	6.237	6.237		
58				
59				
60				
61				
62				
63				
64	8.346	8.346		
65				
66				
67				
68				
69				
70				
71	10.84	10.84		
72	11.24	11.24		
73	11.65	11.65		
74	12.07	12.07		
75	12.50	12.50		
76	12.94	12.94		
77	13.39	13.39		
78	13.86	13.86		
79	14.33	14.33		
80	14.82	14.82		
81	15.32	15.32	15.33	15.33
82	15.83	15.83	15.85	15.85
83	16.35	16.35	16.38	16.38
84	16.89	16.89	16.92	16.92
85	17.44	17.44	17.47	17.48
86	18.00	18.00	18.04	18.05
87	18.58	18.58	18.63	18.63
88	19.17	19.17	19.23	19.23
89	19.78	19.78	19.84	19.85

Table 6. (Continued)

Z	5 D 3/2	5 D 5/2	6 P 1/2	6 P 3/2
90	20.40	20.40	20.47	20.48
91	21.03	21.04	21.11	21.12
92	21.69	21.69	21.76	21.77
93	22.35	22.36	22.44	22.45
94	23.04	23.05	23.13	23.14
95	23.74	23.75	23.83	23.84
96	24.46	24.48	24.56	24.57
97	25.20	25.22	25.31	25.32
98	25.96	25.98	26.07	26.08
99	26.74	26.76	26.85	26.87
100	27.54	27.56	27.66	27.67
101	28.37	28.38	28.48	28.50
102	29.21	29.23	29.33	29.35

Table 7. L_2 x-ray transition rates, in eV/h.

Z	TOTAL	2 P 3/2	3 S 1/2	3 P 3/2	3 D 3/2	4 S 1/2	4 P 3/2
5	1.46E-22	1.46E-22					
6	5.08E-21	5.08E-21					
7	5.66E-20	5.66E-20					
8	3.76E-19	3.76E-19					
9	1.90E-18	1.90E-18					
10	8.70E-18	8.70E-18					
11	3.84E-07	4.43E-17					
12	1.15E-06	1.83E-16					
13	2.69E-06	6.50E-16	2.69E-06	2.94E-11			
14	4.90E-06	2.00E-15	4.90E-06	1.90E-10			
15	7.98E-06	5.55E-15	7.98E-06	7.07E-10			
16	1.21E-05	1.44E-14	1.21E-05	2.02E-09			
17	1.75E-05	3.48E-14	1.75E-05	4.87E-09			
18	2.44E-05	7.96E-14	2.44E-05	1.05E-08			
19	3.55E-05	1.69E-13	3.46E-05	1.99E-08		8.45E-07	
20	5.15E-05	3.49E-13	4.78E-05	3.50E-08		3.65E-06	
21	.0001377	6.92E-13	6.22E-05	5.51E-08	7.06E-05	4.77E-06	
22	.0002871	1.32E-12	7.93E-05	8.33E-08	.0002018	5.96E-06	
23	.0005205	2.46E-12	9.92E-05	1.22E-07	.0004140	7.25E-06	
24	.0009243	4.41E-12	.0001204	1.70E-07	.0008004	3.25E-06	
25	.001343	7.70E-12	.0001490	2.43E-07	.001184	1.02E-05	
26	.001994	1.31E-11	.0001796	3.33E-07	.001802	1.19E-05	
27	.002855	2.19E-11	.0002145	4.48E-07	.002626	1.38E-05	
28	.003968	3.88E-11	.0002540	5.94E-07	.003697	1.58E-05	
29	.005498	5.76E-11	.0002956	7.65E-07	.005195	6.80E-06	
30	.007148	9.06E-11	.0003489	1.01E-06	.006778	2.04E-05	
31	.009120	1.40E-10	.0004102	1.31E-06	.008677	3.15E-05	7.76E-09
32	.01143	2.15E-10	.0004808	1.70E-06	.01090	4.30E-05	2.90E-08
33	.01410	3.23E-10	.0005611	2.18E-06	.01348	5.61E-05	7.00E-08

Table 7. (continued)

Z	TOTAL	2 P 3/2	3 S 1/2	3 P 3/2	3 D 3/2	4 S 1/2	4 P 3/2
34	.01718	4.79E-10	.0006520	2.78E-06	.01646	7.11E-05	1.39E-07
35	.02071	7.04E-10	.0007545	3.51E-06	.01986	8.84E-05	2.48E-07
36	.02472	1.02E-09	.0008694	4.40E-06	.02374	.0001082	4.11E-07
37	.02929	1.47E-09	.0009980	5.47E-06	.02815	.0001360	6.14E-07
38	.03447	2.09E-09	.001141	6.77E-06	.03313	.0001684	8.65E-07
39	.04046	2.95E-09	.001301	8.32E-06	.03872	.0002026	1.15E-06
40	.04726	4.12E-09	.001476	1.02E-05	.04496	.0002403	1.49E-06
41	.05513	5.70E-09	.001670	1.23E-05	.05188	.0002793	1.87E-06
42	.06384	7.84E-09	.001883	1.49E-05	.05955	.0003249	2.35E-06
43	.07360	1.07E-08	.002116	1.79E-05	.06801	.0003751	2.92E-06
44	.08452	1.45E-08	.002374	2.13E-05	.07733	.0004304	3.60E-06
45	.09670	1.95E-08	.002650	2.53E-05	.08755	.0004910	4.39E-06
46	.1105	2.61E-08	.002954	3.00E-05	.09872	.0005544	5.27E-06
47	.1253	3.46E-08	.003283	3.53E-05	.1109	.0006298	6.40E-06
48	.1415	4.57E-08	.003642	4.14E-05	.1242	.0007140	7.75E-06
49	.1593	6.00E-08	.004030	4.83E-05	.1387	.0008072	9.35E-06
50	.1786	7.84E-08	.004450	5.63E-05	.1544	.0009103	1.12E-05
51	.1997	1.02E-07	.004904	6.53E-05	.1715	.001024	1.34E-05
52	.2225	1.32E-07	.005393	7.55E-05	.1899	.001148	1.60E-05
53	.2472	1.70E-07	.005921	8.71E-05	.2098	.001284	1.89E-05
54	.2740	2.17E-07	.006489	.0001001	.2312	.001432	2.22E-05
55	.3029	2.77E-07	.007099	.0001147	.2543	.001593	2.61E-05
56	.3341	3.52E-07	.007754	.0001311	.2790	.001768	3.05E-05
57	.3681	4.46E-07	.008456	.0001494	.3056	.001958	3.55E-05
58	.4022	5.63E-07	.009217	.0001703	.3346	.002135	4.04E-05
59	.4398	7.07E-07	.01003	.0001933	.3654	.002336	4.62E-05
60	.4800	8.86E-07	.01089	.0002189	.3983	.002551	5.27E-05
61	.5228	1.10E-06	.01181	.0002473	.4334	.002781	5.99E-05
62	.5684	1.37E-06	.01280	.0002788	.4708	.003025	6.79E-05
63	.6170	1.71E-06	.01385	.0003136	.5106	.003286	7.68E-05
64	.6700	2.11E-06	.01496	.0003518	.5526	.003576	8.70E-05
65	.7235	2.60E-06	.01615	.0003943	.5978	.003858	9.74E-05
66	.7817	3.20E-06	.01741	.0004408	.6455	.004171	.0001093
67	.8435	3.92E-06	.01875	.0004918	.6960	.004505	.0001224
68	.9089	4.79E-06	.02017	.0005478	.7495	.004859	.0001367
69	.9781	5.84E-06	.02168	.0006090	.8061	.005235	.0001525
70	1.051	7.11E-06	.02328	.0006760	.8659	.005634	.0001698
71	1.130	8.63E-06	.02497	.0007487	.9287	.006070	.0001894
72	1.214	1.05E-05	.02675	.0008280	.9949	.006536	.0002110
73	1.303	1.26E-05	.02864	.0009141	1.065	.007034	.0002348
74	1.397	1.52E-05	.03064	.001008	1.138	.007565	.0002610
75	1.498	1.83E-05	.03275	.001109	1.215	.008131	.0002897
76	1.604	2.20E-05	.03498	.001219	1.296	.008733	.0003213
77	1.718	2.63E-05	.03733	.001338	1.382	.009373	.0003558
78	1.836	3.15E-05	.03982	.001467	1.471	.01005	.0003934
79	1.962	3.76E-05	.04245	.001607	1.565	.01077	.0004346
80	2.094	4.49E-05	.04522	.001757	1.664	.01154	.0004794
81	2.232	5.34E-05	.04814	.001919	1.767	.01235	.0005283
82	2.378	6.35E-05	.05122	.002094	1.875	.01322	.0005815
83	2.531	7.53E-05	.05446	.002282	1.989	.01413	.0006392
84	2.692	8.92E-05	.05789	.002485	2.107	.01510	.0007020
85	2.861	.0001055	.06149	.002702	2.231	.01612	.0007701
86	3.038	.0001246	.06529	.002936	2.361	.01721	.0008438
87	3.224	.0001471	.06930	.003186	2.496	.01836	.0009237
88	3.418	.0001733	.07351	.003455	2.638	.01957	.001010
89	3.623	.0002039	.07795	.003742	2.785	.02085	.001104
90	3.838	.0002397	.08262	.004050	2.939	.02221	.001204
91	4.058	.0002816	.08755	.004380	3.100	.02364	.001313
92	4.289	.0003303	.09273	.004732	3.267	.02515	.001430
93	4.531	.0003871	.09818	.005109	3.441	.02675	.001556
94	4.782	.0004532	.1039	.005511	3.623	.02843	.001692
95	5.045	.0005301	.1100	.005939	3.811	.03020	.001838
96	5.322	.0006195	.1163	.006395	4.007	.03208	.001994
97	5.608	.0007234	.1230	.006882	4.211	.03406	.002162
98	5.903	.0008441	.1301	.007401	4.423	.03614	.002342

Table 7. (continued)

Z	TOTAL	2 P 3/2	3 S 1/2	3 P 3/2	3 C 3/2	4 S 1/2	4 P 3/2
99	6.213	.0009842	.1375	.007952	4.643	.03834	.002536
100	6.536	.001147	.1453	.008538	4.871	.04066	.002743
101	6.871	.001335	.1535	.009161	5.107	.04311	.002964
102	7.220	.001554	.1622	.009823	5.352	.04570	.003201

Z	4 D 3/2	4 F 5/2	5 S 1/2	5 P 3/2	5 C 3/2	5 F 5/2
5						
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36						
37			3.80E-06			
38			1.45E-05			
39	.0002004		1.88E-05			
40	.0005518		2.27E-05			
41	.001282		1.09E-05			
42	.002048		1.24E-05			
43	.003057		1.39E-05			
44	.004348		1.55E-05			
45	.005965		1.71E-05			
46	.008207					
47	.01037		2.05E-05			
48	.01279		5.65E-05			
49	.01556		8.03E-05	7.32E-08		
50	.01865		.0001025	2.42E-07		
51	.02206		.0001266	5.27E-07		
52	.02583		.0001531	9.60E-07		
53	.02997		.0001824	1.58E-06		
54	.03452		.0002147	2.43E-06		

Table 7. (continued)

Z	4 D 3/2	4 F 5/2	5 S 1/2	5 P 3/2	5 D 3/2	5 F 5/2
55	.03954		.0002596	3.38E-06		
56	.04506		.0003102	4.46E-06		
57	.05106		.0003615	5.57E-06	.0003594	
58	.05556	5.71E-06	.0003727	5.83E-06		
59	.06130	1.06E-05	.0004057	6.61E-06		
60	.06742	1.73E-05	.0004403	7.45E-06		
61	.07393	2.61E-05	.0004766	8.37E-06		
62	.08085	3.75E-05	.0005147	9.37E-06		
63	.08822	5.18E-05	.0005549	1.05E-05		
64	.09703	6.56E-05	.0006255	1.25E-05	.0005786	
65	.1044	9.16E-05	.0006420	1.29E-05		
66	.1132	.0001182	.0006892	1.43E-05		
67	.1226	.0001503	.0007389	1.58E-05		
68	.1326	.0001887	.0007915	1.75E-05		
69	.1431	.0002342	.0008470	1.92E-05		
70	.1543	.0002877	.0009056	2.12E-05		
71	.1671	.0003437	.001007	2.49E-05	.0007328	
72	.1810	.0004071	.001118	2.91E-05	.001933	
73	.1959	.0004784	.001239	3.38E-05	.003624	
74	.2118	.0005585	.001370	3.91E-05	.005856	
75	.2289	.0006481	.001511	4.51E-05	.008692	
76	.2471	.0007479	.001664	5.17E-05	.01220	
77	.2665	.0008584	.001814	5.78E-05	.01873	
78	.2871	.0009815	.001994	6.64E-05	.02292	
79	.3090	.001117	.002182	7.54E-05	.02905	
80	.3322	.001266	.002392	8.61E-05	.03446	
81	.3569	.001433	.002618	9.81E-05	.04071	
82	.3830	.001615	.002865	.0001117	.04740	
83	.4107	.001814	.003126	.0001267	.05456	
84	.4400	.002032	.003408	.0001434	.06224	
85	.4709	.002270	.003711	.0001619	.07047	
86	.5036	.002529	.004035	.0001822	.07926	
87	.5381	.002810	.004381	.0002047	.08883	
88	.5745	.003116	.004752	.0002294	.09911	
89	.6128	.003447	.005147	.0002567	.1101	
90	.6532	.003805	.005569	.0002865	.1218	
91	.6955	.004188	.005997	.0003163	.1317	5.75E-05
92	.7401	.004600	.006459	.0003498	.1433	.0001023
93	.7868	.005043	.006947	.0003860	.1554	.0001596
94	.8359	.005516	.007456	.0004239	.1671	.0002584
95	.8873	.006023	.008002	.0004660	.1803	.0003476
96	.9413	.006566	.008587	.0005127	.1954	.0004214
97	.9979	.007143	.009196	.0005617	.2100	.0005445
98	1.057	.007757	.009835	.0006129	.2242	.0007271
99	1.119	.008410	.01052	.0006696	.2402	.0008977
100	1.184	.009103	.01124	.0007306	.2571	.001054
101	1.251	.009837	.01200	.0007961	.2747	.001319
102	1.322	.01061	.01281	.0008664	.2932	.001573

Z	6 S 1/2	6 P 3/2
55	8.38E-06	
56	3.03E-05	
57	3.81E-05	
58	3.48E-05	
59	3.70E-05	
60	3.93E-05	
61	4.17E-05	
62	4.41E-05	

Table 7. (continued)

L	6 S 1/2	6 P 3/2
63	4.66E-05	
64	5.79E-05	
65	5.20E-05	
66	5.48E-05	
67	5.78E-05	
68	6.09E-05	
69	6.41E-05	
70	6.75E-05	
71	8.56E-05	
72	.001013	
73	.001166	
74	.001318	
75	.001471	
76	.001627	
77		
78	8.57E-05	
79	9.30E-05	
80	.0012297	
81	.0013004	7.74E-07
82	.0013661	2.44E-06
83	.0014340	5.06E-06
84	.0015067	8.79E-06
85	.0015851	1.38E-05
86	.0016695	2.03E-05
87	.0017819	2.73E-05
88	.0019054	3.45E-05
89	.001033	4.17E-05
90	.001168	4.95E-05
91	.001229	5.20E-05
92	.001339	5.74E-05
93	.001436	6.31E-05
94	.001502	6.52E-05
95	.001614	7.11E-05
96	.001781	8.20E-05
97	.001907	8.93E-05
98	.001984	9.08E-05
99	.002120	9.80E-05
100	.002263	.0001057
101	.002414	.0001136
102	.002573	.0001223

Table 8. L_2 x-ray energies, in keV.

Z	B-ENGY	2 P 3/2	3 S 1/2	3 P 3/2	3 C 3/2	4 S 1/2	4 P 3/2
5	.006665	2.86E-06					
6	.008990	9.35E-06					
7	.01150	2.09E-05					
8	.01419	3.93E-05					
9	.01704	6.73E-05					
10	.02008	.0001119					
11	.03642	.0001926					
12	.05655	.0003087					
13	.08120	.0004713	.07104	.07633			
14	.1087	.0006856	.09504	.1022			
15	.1391	.0009637	.1219	.1308			
16	.1727	.001325	.1518	.1625			
17	.2095	.001777	.1846	.1972			
18	.2494	.002335	.2205	.2350			
19	.3017	.003009	.2611	.2782			
20	.3590	.003833	.3059	.3254		.2974	.3536
21	.4137	.004815	.3528	.3746	.4066	.4078	
22	.4712	.005979	.4026	.4268	.4628	.4649	
23	.5319	.007346	.4555	.4821	.5223	.5252	
24	.5897	.008931	.5105	.5395	.5833	.5838	
25	.6630	.01075	.5704	.6022	.6511	.6557	
26	.7335	.01285	.6325	.6671	.7206	.7260	
27	.8075	.01524	.6978	.7353	.7936	.7997	
28	.8850	.01796	.7663	.8068	.8701	.8769	
29	.9585	.02104	.8373	.8807	.9484	.9514	
30	1.050	.02448	.9130	.9599	1.034	1.042	
31	1.150	.02832	.9926	1.043	1.123	1.139	1.145
32	1.255	.03263	1.076	1.130	1.217	1.241	1.249
33	1.366	.03739	1.164	1.222	1.314	1.348	1.358
34	1.481	.04267	1.255	1.317	1.416	1.460	1.472
35	1.602	.04852	1.351	1.417	1.522	1.578	1.591
36	1.728	.05494	1.450	1.521	1.633	1.701	1.716
37	1.867	.06201	1.554	1.630	1.748	1.830	1.847
38	2.012	.06975	1.662	1.743	1.867	1.966	1.985
39	2.160	.07822	1.774	1.860	1.991	2.106	2.128
40	2.312	.08746	1.890	1.981	2.119	2.252	2.275
41	2.467	.09752	2.011	2.107	2.252	2.403	2.428
42	2.629	.1085	2.135	2.238	2.389	2.560	2.587
43	2.798	.1203	2.264	2.373	2.531	2.722	2.751
44	2.972	.1331	2.398	2.512	2.677	2.890	2.921
45	3.151	.1470	2.535	2.657	2.828	3.063	3.097
46	3.333	.1620	2.678	2.806	2.984	3.242	3.277
47	3.528	.1781	2.824	2.960	3.145	3.426	3.465
48	3.731	.1955	2.975	3.118	3.311	3.617	3.659
49	3.943	.2141	3.131	3.282	3.481	3.815	3.859
50	4.161	.2341	3.292	3.450	3.657	4.018	4.065
51	4.386	.2555	3.457	3.624	3.838	4.228	4.278
52	4.618	.2785	3.627	3.803	4.024	4.444	4.497
53	4.857	.3030	3.802	3.988	4.216	4.666	4.723
54	5.104	.3292	3.982	4.177	4.413	4.895	4.956
55	5.363	.3571	4.167	4.372	4.615	5.131	5.195
56	5.630	.3869	4.357	4.573	4.824	5.374	5.442
57	5.902	.4186	4.552	4.780	5.037	5.623	5.695
58	6.158	.4525	4.755	4.995	5.260	5.880	5.956
59	6.436	.4885	4.963	5.214	5.487	6.144	6.223
60	6.720	.5267	5.175	5.440	5.720	6.414	6.498
61	7.012	.5673	5.394	5.672	5.960	6.691	6.779
62	7.311	.6104	5.618	5.910	6.205	6.975	7.068
63	7.617	.6560	5.848	6.155	6.458	7.267	7.364
64	7.947	.7043	6.082	6.405	6.715	7.565	7.668
65	8.253	.7556	6.325	6.664	6.982	7.872	7.980
66	8.583	.8097	6.572	6.929	7.254	8.186	8.299
67	8.921	.8670	6.826	7.200	7.533	8.508	8.626
68	9.267	.9275	7.085	7.479	7.820	8.838	8.962
69	9.621	.9915	7.352	7.764	8.113	9.176	9.306

Table 8. (continued)

Z	B. ENGY	2 P 3/2	3 S 1/2	3 P 3/2	3 D 3/2	4 S 1/2	4 P 3/2
70	9.984	1.059	7.624	8.057	8.415	9.521	9.658
71	10.37	1.130	7.902	8.357	8.722	9.875	10.02
72	10.76	1.205	8.187	8.664	9.038	10.24	10.39
73	11.16	1.284	8.478	8.979	9.361	10.61	10.77
74	11.57	1.367	8.776	9.302	9.692	10.99	11.15
75	11.99	1.455	9.081	9.633	10.03	11.38	11.55
76	12.42	1.548	9.393	9.972	10.38	11.78	11.96
77	12.86	1.645	9.712	10.32	10.74	12.18	12.37
78	13.31	1.747	10.04	10.68	11.10	12.60	12.80
79	13.78	1.855	10.37	11.04	11.48	13.03	13.24
80	14.25	1.968	10.72	11.42	11.86	13.47	13.69
81	14.75	2.087	11.07	11.80	12.25	13.91	14.15
82	15.25	2.212	11.42	12.20	12.66	14.37	14.62
83	15.77	2.343	11.79	12.60	13.07	14.84	15.10
84	16.30	2.481	12.17	13.02	13.49	15.32	15.59
85	16.84	2.626	12.55	13.44	13.93	15.82	16.10
86	17.40	2.778	12.95	13.88	14.37	16.32	16.62
87	17.97	2.938	13.35	14.33	14.83	16.84	17.15
88	18.56	3.106	13.76	14.79	15.30	17.37	17.69
89	19.16	3.282	14.18	15.26	15.78	17.91	18.25
90	19.78	3.467	14.62	15.74	16.28	18.47	18.82
91	20.40	3.661	15.06	16.24	16.79	19.04	19.41
92	21.05	3.865	15.52	16.76	17.31	19.62	20.01
93	21.70	4.079	15.98	17.28	17.84	20.22	20.63
94	22.37	4.304	16.46	17.82	18.40	20.84	21.27
95	23.06	4.540	16.95	18.38	18.96	21.47	21.92
96	23.78	4.787	17.45	18.95	19.54	22.11	22.58
97	24.51	5.047	17.97	19.54	20.14	22.77	23.27
98	25.24	5.320	18.50	20.14	20.76	23.45	23.97
99	26.01	5.607	19.04	20.77	21.39	24.15	24.70
100	26.79	5.908	19.60	21.41	22.04	24.87	25.44
101	27.60	6.224	20.17	22.07	22.71	25.60	26.20
102	28.43	6.556	20.76	22.75	23.40	26.36	26.99

Z	4 D 3/2	4 F 5/2	5 S 1/2	5 P 3/2	5 D 3/2	5 F 5/2
5						
6						
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31						

Table 8. (continued)

Z	4 D 3/2	4 F 5/2	5 S 1/2	5 P 3/2	5 G 3/2	5 F 5/2
32						
33						
34						
35						
36						
37			1.863			
38			2.037			
39	2.154		2.154			
40	2.306		2.306			
41	2.461		2.461			
42	2.622		2.623			
43	2.790		2.792			
44	2.963		2.965			
45	3.141		3.145			
46	3.324					
47	3.516		3.521			
48	3.713		3.723			
49	3.917		3.932	3.938		
50	4.127		4.147	4.155		
51	4.344		4.370	4.379		
52	4.567		4.600	4.610		
53	4.797		4.836	4.848		
54	5.034		5.080	5.093		
55	5.278		5.332	5.347		
56	5.528		5.592	5.608		
57	5.786		5.859	5.877	5.897	
58	6.049	6.158	6.123	6.142		
59	6.321	6.435	6.400	6.419		
60	6.599	6.719	6.683	6.703		
61	6.884	7.010	6.973	6.994		
62	7.177	7.309	7.270	7.292		
63	7.477	7.615	7.576	7.598		
64	7.785	7.930	7.892	7.917	7.942	
65	8.100	8.250	8.209	8.233		
66	8.424	8.580	8.537	8.563		
67	8.755	8.918	8.873	8.900		
68	9.095	9.264	9.218	9.246		
69	9.442	9.618	9.571	9.600		
70	9.799	9.982	9.933	9.963		
71	10.16	10.35	10.31	10.34	10.37	
72	10.54	10.74	10.69	10.72	10.76	
73	10.92	11.13	11.08	11.12	11.16	
74	11.31	11.53	11.49	11.53	11.56	
75	11.71	11.94	11.90	11.94	11.98	
76	12.13	12.36	12.33	12.37	12.41	
77	12.55	12.79	12.76	12.81	12.85	
78	12.98	13.23	13.20	13.26	13.30	
79	13.42	13.68	13.66	13.71	13.76	
80	13.88	14.14	14.13	14.19	14.24	
81	14.34	14.61	14.61	14.67	14.72	
82	14.82	15.10	15.10	15.16	15.22	
83	15.30	15.59	15.60	15.67	15.73	
84	15.80	16.10	16.12	16.19	16.26	
85	16.31	16.62	16.64	16.72	16.79	
86	16.84	17.16	17.18	17.27	17.34	
87	17.37	17.70	17.74	17.83	17.90	
88	17.92	18.26	18.31	18.40	18.48	
89	18.49	18.83	18.89	18.99	19.07	
90	19.07	19.42	19.49	19.59	19.68	

Table 8. (continued)

Z	4 D 3/2	4 F 5/2	5 S 1/2	5 P 3/2	5 D 3/2	5 F 5/2
91	19.66	20.03	20.10	20.21	20.30	20.40
92	20.27	20.64	20.72	20.84	20.93	21.04
93	20.69	21.28	21.37	21.49	21.59	21.69
94	21.53	21.93	22.03	22.16	22.25	22.37
95	22.19	22.59	22.70	22.84	22.94	23.06
96	22.66	23.28	23.39	23.54	23.64	23.77
97	23.55	23.98	24.10	24.26	24.36	24.49
98	24.26	24.70	24.83	25.00	25.10	25.24
99	24.99	25.44	25.58	25.75	25.86	26.00
100	25.74	26.20	26.35	26.53	26.64	26.79
101	26.51	26.98	27.14	27.33	27.45	27.59
102	27.30	27.78	27.95	28.15	28.27	28.42

Z	6 S 1/2	6 P 3/2
55	5.359	
56	5.626	
57	5.897	
58	6.160	
59	6.438	
60	6.722	
61	7.014	
62	7.313	
63	7.620	
64	7.941	
65	8.256	
66	8.585	
67	8.923	
68	9.269	
69	9.624	
70	9.987	
71	10.37	
72	10.76	
73	11.16	
74	11.56	
75	11.98	
76	12.41	
77		
78	13.30	
79	13.77	
80	14.24	
81	14.73	14.74
82	15.24	15.25
83	15.75	15.76
84	16.28	16.29
85	16.82	16.83
86	17.37	17.39
87	17.94	17.96
88	18.52	18.54
89	19.12	19.14
90	19.73	19.76
91	20.35	20.38
92	20.99	21.02
93	21.65	21.68

Table 8. (continued)

Z	5 S 1/2	4 P 3/2
96	28.37	22.35
97	28.61	23.04
98	28.72	23.75
99	28.84	24.48
100	28.99	25.22
101	29.19	25.99
102	29.43	26.77
103	29.64	27.56
104	29.87	28.41

Table 9. L_{α} X-ray transition rates, $\times 10^8$ s⁻¹.

Z	TOTAL	3 S 1/2	3 P 1/2	3 P 3/2	3 D 3/2	3 D 5/2	4 S 1/2
5							
6							
7							
8							
9							
10							
11	3.85E-07	3.85E-07					
12	1.15E-06	1.15E-06					
13	2.71E-06	2.71E-06	1.48E-11	1.46E-11			
14	4.95E-06	4.95E-06	9.56E-11	9.43E-11			
15	8.07E-06	8.07E-06	3.56E-10	3.51E-10			
16	1.23E-05	1.23E-05	1.01E-09	1.00E-09			
17	1.78E-05	1.78E-05	2.45E-09	2.41E-09			
18	2.48E-05	2.48E-05	5.29E-09	5.19E-09			
19	3.62E-05	3.54E-05	1.00E-08	9.86E-09			
20	5.28E-05	4.90E-05	1.76E-08	1.73E-08			8.62E-07
21	.0001389	6.40E-05	2.77E-08	2.72E-08	7.03E-06	6.29E-05	3.74E-06
22	.0002876	8.18E-05	4.19E-08	4.11E-08	2.61E-05	.0001795	4.90E-06
23	.0005192	.0001028	6.15E-08	6.01E-08	4.12E-05	.0003677	6.14E-06
24	.0009167	.0001253	8.56E-08	8.35E-08	7.55E-05	.0007083	7.51E-06
25	.001332	.0001557	1.23E-07	1.19E-07	.0001175	.001048	3.38E-06
26	.001973	.000188E	1.68E-07	1.63E-07	.0001788	.001593	1.07E-05
27	.002818	.0002261	2.26E-07	2.19E-07	.0002402	.002316	1.43E-05
28	.003907	.0002691	3.00E-07	2.90E-07	.0003460	.003255	1.67E-05
29	.005390	.0003146	3.87E-07	3.73E-07	.0005138	.004553	7.22E-06
30	.007708	.0003733	5.09E-07	4.90E-07	.0006696	.005562	2.18E-05
31	.008936	.0004413	6.64E-07	6.38E-07	.0008561	.007604	3.38E-05
32	.01119	.0005199	8.60E-07	8.24E-07	.001074	.009544	4.63E-05
33	.01379	.0006102	1.10E-06	1.06E-06	.001327	.01179	6.08E-05
34	.01679	.0007131	1.40E-06	1.34E-06	.001617	.01437	7.75E-05
35	.02021	.0008362	1.77E-06	1.69E-06	.001949	.01733	9.69E-05
36	.02409	.0009625	2.22E-06	2.12E-06	.002326	.02067	.0001192
37	.02850	.001112	2.76E-06	2.63E-06	.002754	.02448	.0001507
38	.03349	.001280	3.42E-06	3.25E-06	.003277	.02877	.0001878
39	.03926	.001468	4.20E-06	3.98E-06	.003777	.03356	.0002274
40	.04579	.001678	5.12E-06	4.86E-06	.004378	.03890	.0002714
41	.05331	.001911	6.21E-06	5.88E-06	.005043	.04480	.0003175

Table 9. (continued)

Z	TOTAL	3 S 1/2	3 P 1/2	3 P 3/2	3 D 3/2	3 D 5/2	4 S 1/2
42	.06161	.002170	7.48E-06	7.08E-06	.005778	.05133	.0003718
43	.07089	.002457	8.97E-06	8.48E-06	.006588	.05851	.0004322
44	.08125	.002773	1.07E-05	1.01E-05	.007476	.06638	.0004993
45	.09276	.003122	1.27E-05	1.20E-05	.008448	.07500	.0005736
46	.1057	.003506	1.50E-05	1.41E-05	.009508	.08439	.0006523
47	.1196	.003928	1.77E-05	1.66E-05	.01066	.09461	.0007463
48	.1349	.004391	2.07E-05	1.94E-05	.01192	.1057	.0008523
49	.1515	.004898	2.42E-05	2.26E-05	.01328	.1178	.0009708
50	.1696	.005453	2.81E-05	2.63E-05	.01475	.1308	.001103
51	.1891	.006059	3.26E-05	3.04E-05	.01634	.1449	.001250
52	.2103	.006721	3.76E-05	3.51E-05	.01806	.1601	.001413
53	.2332	.007441	4.33E-05	4.03E-05	.01990	.1764	.001592
54	.2578	.008225	4.98E-05	4.63E-05	.02188	.1939	.001790
55	.2843	.009077	5.73E-05	5.29E-05	.02401	.2127	.002007
56	.3129	.01000	6.50E-05	6.03E-05	.02629	.2328	.002246
57	.3438	.01100	7.40E-05	6.85E-05	.02872	.2543	.002508
58	.3748	.01210	8.42E-05	7.78E-05	.03137	.2777	.002756
59	.4087	.01329	9.54E-05	8.81E-05	.03416	.3024	.003042
60	.4449	.01456	.0001079	9.95E-05	.03714	.3287	.003350
61	.4833	.01594	.0001217	.0001121	.04030	.3566	.003682
62	.5241	.01743	.0001370	.0001260	.04366	.3863	.004040
63	.5674	.01904	.0001538	.0001413	.04722	.4177	.004425
64	.6143	.02076	.0001722	.0001580	.05096	.4506	.004857
65	.6616	.02263	.0001927	.0001765	.05498	.4860	.005285
66	.7128	.02463	.0002150	.0001968	.05919	.5232	.005764
67	.7669	.02678	.0002395	.0002189	.06363	.5623	.006279
68	.8239	.02909	.0002662	.0002430	.06832	.6036	.006831
69	.8840	.03157	.0002954	.0002693	.07325	.6470	.007424
70	.9473	.03423	.0003272	.0002980	.07845	.6927	.008059
71	1.015	.03707	.0003616	.0003290	.08387	.7405	.008758
72	1.087	.04011	.0003989	.0003627	.08957	.7906	.009513
73	1.163	.04336	.0004394	.0003991	.09555	.8431	.01032
74	1.244	.04684	.0004832	.0004385	.1018	.8982	.01120
75	1.328	.05055	.0005306	.0004811	.1084	.9558	.01214
76	1.418	.05452	.0005817	.0005271	.1152	1.016	.01315
77	1.513	.05876	.0006368	.0005767	.1224	1.079	.01423
78	1.612	.06328	.0006962	.0006302	.1299	1.145	.01539
79	1.717	.06810	.0007601	.0006877	.1377	1.214	.01663
80	1.826	.07324	.0008287	.0007495	.1459	1.285	.01796
81	1.940	.07872	.0009023	.0008159	.1544	1.360	.01938
82	2.060	.08455	.0009812	.0008872	.1633	1.438	.02090
83	2.185	.09075	.001066	.0009636	.1726	1.519	.02252
84	2.316	.09735	.001156	.001045	.1822	1.604	.02425
85	2.452	.1044	.001253	.001133	.1922	1.692	.02609
86	2.595	.1118	.001356	.001226	.2027	1.783	.02805
87	2.744	.1198	.001465	.001327	.2135	1.878	.03014
88	2.899	.1282	.001582	.001433	.2248	1.977	.03235
89	3.062	.1371	.001706	.001547	.2365	2.079	.03471
90	3.232	.1466	.001838	.001669	.2486	2.185	.03721
91	3.404	.1566	.001979	.001798	.2613	2.296	.03986
92	3.586	.1673	.002128	.001936	.2744	2.410	.04267
93	3.774	.1785	.002285	.002082	.2879	2.529	.04565
94	3.968	.1905	.002452	.002238	.3020	2.652	.04879
95	4.171	.2031	.002628	.002404	.3165	2.779	.05211
96	4.384	.2164	.002813	.002579	.3316	2.911	.05562
97	4.602	.2305	.003009	.002765	.3471	3.047	.05932
98	4.827	.2454	.003215	.002963	.3633	3.188	.06322
99	5.062	.2611	.003432	.003172	.3799	3.333	.06733
100	5.305	.2777	.003659	.003393	.3971	3.483	.07165
101	5.557	.2951	.003897	.003627	.4148	3.638	.07618
102	5.817	.3135	.004147	.003875	.4331	3.798	.08094

Table 9. (continued)

	4 P 1/2	4 P 3/2	4 D 3/2	4 D 5/2	4 F 5/2	4 F 7/2	5 S 1/2
2							
3	3.99E-09	3.76E-09	1.94E-05	.0001716			4.21E-06
5			5.33E-05	.0004716			1.62E-05
6	1.48E-08	1.40E-08	.0001234	.001088			2.10E-05
7	3.56E-08	3.38E-08	.0001966	.001735			2.56E-05
8	7.66E-08	6.70E-08	.0002927	.002582			1.24E-05
9	1.25E-07	1.19E-07	.0004150	.003662			1.42E-05
10	2.07E-07	1.97E-07	.0005676	.005006			1.60E-05
11	3.06E-07	2.93E-07	.0007786	.006826			1.80E-05
12	4.29E-07	4.11E-07	.0009805	.008642			2.00E-05
13	5.68E-07	5.45E-07	.001205	.01065			
14	7.35E-07	7.04E-07	.001462	.01295			2.42E-05
15	9.19E-07	8.79E-07	.001745	.01549			6.74E-05
16	1.15E-06	1.10E-06	.002057	.01829			9.61E-05
17	1.43E-06	1.37E-06	.002399	.02136			.0001241
18	1.76E-06	1.68E-06	.002774	.02472			.0001544
19	2.14E-06	2.04E-06	.003162	.02838			.0001881
20	2.57E-06	2.44E-06	.003631	.03241			.0002258
21	3.05E-06	2.96E-06	.004120	.03682			.0002678
22	3.57E-06	3.42E-06	.004651	.04160			.0003264
23	4.10E-06	3.96E-06	.005039	.04504			.0003930
24	4.65E-06	4.49E-06	.005536	.04949			.0004617
25	5.20E-06	5.03E-06	.006061	.05419			.0004799
26	5.77E-06	5.59E-06	.006617	.05916			.0005268
27	6.35E-06	6.16E-06	.007204	.06442			.0005764
28	6.94E-06	6.74E-06	.007825	.06997			.0006291
29	7.55E-06	7.34E-06	.008464	.07664			.0006851
30	8.18E-06	7.96E-06	.009170	.08201			.0007449
31	8.83E-06	8.61E-06	.009899	.08853			.0008066
32	9.49E-06	9.26E-06	.01067	.09539			.0008666
33	1.017E-05	9.94E-06	.01147	.1026			.0009265
34	1.086E-05	1.064E-05	.01232	.1102			.0009848
35	1.157E-05	1.135E-05					.001026
36	1.230E-05	1.208E-05					.001108
37	1.304E-05	1.282E-05					.001196
38	1.379E-05	1.357E-05					
39	1.454E-05	1.432E-05					
40	1.529E-05	1.507E-05					
41	1.604E-05	1.582E-05					
42	1.679E-05	1.657E-05					
43	1.754E-05	1.732E-05					
44	1.829E-05	1.807E-05					
45	1.904E-05	1.882E-05					
46	1.979E-05	1.957E-05					
47	2.054E-05	2.032E-05					
48	2.129E-05	2.107E-05					
49	2.204E-05	2.182E-05					
50	2.279E-05	2.257E-05					
51	2.354E-05	2.332E-05					
52	2.429E-05	2.407E-05					
53	2.504E-05	2.482E-05					
54	2.579E-05	2.557E-05					
55	2.654E-05	2.632E-05					
56	2.729E-05	2.707E-05					
57	2.804E-05	2.782E-05					
58	2.879E-05	2.857E-05					
59	2.954E-05	2.932E-05					
60	3.029E-05	3.007E-05					
61	3.104E-05	3.082E-05					
62	3.179E-05	3.157E-05					
63	3.254E-05	3.232E-05					
64	3.329E-05	3.307E-05					
65	3.404E-05	3.382E-05					
66	3.479E-05	3.457E-05					
67	3.554E-05	3.532E-05					
68	3.629E-05	3.607E-05					
69	3.704E-05	3.682E-05					

Table 9. (continued)

Z	4 P 1/2	4 P 3/2	4 D 3/2	4 D 5/2	4 F 5/2	4 F 7/2	5 S 1/2
70	7.28E-05	7.09E-05	.01321	.1182	4.25E-05	.0002379	.001290
71	8.06E-05	7.87E-05	.01424	.1274	5.08E-05	.0002850	.001446
72	8.90E-05	8.72E-05	.01534	.1374	6.02E-05	.0003381	.001619
73	9.83E-05	9.65E-05	.01651	.1480	7.08E-05	.0003979	.001809
74	.0001082	.0001067	.01775	.1593	8.28E-05	.0004650	.002017
75	.0001191	.0001178	.01907	.1713	9.62E-05	.0005401	.002244
76	.0001308	.0001299	.02047	.1840	.0001112	.0006238	.002490
77	.0001434	.0001431	.02195	.1975	.0001278	.0007165	.002737
78	.0001569	.0001573	.02351	.2117	.0001463	.0008199	.003034
79	.0001715	.0001728	.02515	.2267	.0001668	.0009361	.003346
80	.0001871	.0001896	.02687	.2425	.0001895	.001060	.003696
81	.0002039	.0002077	.02869	.2591	.0002146	.001200	.004077
82	.0002218	.0002273	.03059	.2767	.0002423	.001353	.004492
83	.0002408	.0002464	.03259	.2951	.0002726	.001521	.004941
84	.0002612	.0002712	.03469	.3144	.0003060	.001705	.005427
85	.0002828	.0002957	.03688	.3347	.0003425	.001906	.005952
86	.0003057	.0003221	.03918	.3560	.0003824	.002126	.006516
87	.0003300	.0003505	.04158	.3782	.0004259	.002366	.007124
88	.0003557	.0003809	.04409	.4016	.0004734	.002626	.007778
89	.0003828	.0004135	.04670	.4259	.0005250	.002908	.008479
90	.0004114	.0004485	.04943	.4514	.0005810	.003214	.009229
91	.0004414	.0004859	.05226	.4779	.0006411	.003542	.009998
92	.0004729	.0005259	.05521	.5055	.0007063	.003897	.01083
93	.0005060	.0005686	.05827	.5343	.0007766	.004279	.01171
94	.0005404	.0006142	.06145	.5642	.0008521	.004689	.01263
95	.0005764	.0006628	.06475	.5954	.0009336	.005130	.01362
96	.0006138	.0007146	.06818	.6278	.001021	.005603	.01468
97	.0006528	.0007697	.07172	.6614	.001115	.006109	.01579
98	.0006931	.0008283	.07539	.6963	.001216	.006649	.01694
99	.0007347	.0008907	.07920	.7325	.001323	.007227	.01818
100	.0007778	.0009569	.08313	.7701	.001439	.007844	.01948
101	.0008220	.001027	.08720	.8091	.001562	.008501	.02085
102	.0008674	.001102	.09140	.8494	.001693	.009201	.02229

Z	5 P 1/2	5 P 3/2	5 D 3/2	5 D 5/2	5 F 5/2	5 F 7/2	6 S 1/2
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Table 9. (continued)

Z	5 P 1/2	5 P 3/2	5 D 3/2	5 D 5/2	5 F 5/2	5 F 7/2	6 S 1/2
35							
36							
37							
38							
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41							
42							
43							
44							
45							
46							
47							
48							
49	3.80E-08	3.35E-08					
50	1.22E-07	1.10E-07					
51	2.63E-07	2.39E-07					
52	4.73E-07	4.33E-07					
53	7.71E-07	7.09E-07					
54	1.18E-06	1.09E-06					
55	1.60E-06	1.51E-06					1.05E-05
56	2.08E-06	1.98E-06					3.84E-05
57	2.57E-06	2.46E-06	3.62E-05	.0003188			4.87E-05
58	2.70E-06	2.56E-06					4.48E-05
59	3.05E-06	2.89E-06					4.81E-05
60	3.43E-06	3.24E-06					5.14E-05
61	3.63E-06	3.62E-06					5.50E-05
62	4.28E-06	4.04E-06					5.87E-05
63	4.76E-06	4.48E-06					6.26E-05
64	5.63E-06	5.34E-06	5.08E-05	.0004390			7.84E-05
65	5.84E-06	5.49E-06					7.10E-05
66	6.44E-06	6.05E-06					7.55E-05
67	7.10E-06	6.65E-06					8.02E-05
68	7.80E-06	7.30E-06					8.52E-05
69	8.56E-06	8.00E-06					9.06E-05
70	9.38E-06	8.75E-06					9.62E-05
71	1.09E-05	1.02E-05	6.20E-05	.0005183			.0001228
72	1.26E-05	1.19E-05	.0001625	.001382			.0001467
73	1.44E-05	1.38E-05	.0003028	.002597			.0001701
74	1.65E-05	1.58E-05	.0004863	.004192			.0001939
75	1.88E-05	1.81E-05	.0007173	.006205			.0002182
76	2.13E-05	2.06E-05	.001000	.008675			.0002433
77	2.37E-05	2.30E-05	.001526	.01295			
78	2.68E-05	2.62E-05	.001855	.01599			.0001303
79	3.00E-05	2.96E-05	.002335	.02016			.0001424
80	3.37E-05	3.36E-05	.002752	.02400			.0003545
81	3.78E-05	3.80E-05	.003227	.02841			.0004672
82	4.23E-05	4.30E-05	.003731	.03306			.0005736
83	4.72E-05	4.85E-05	.004264	.03798			.0006850
84	5.24E-05	5.45E-05	.004828	.04321			.0008056
85	5.81E-05	6.11E-05	.005426	.04876			.0009367
86	6.42E-05	6.83E-05	.006056	.05462			.001079
87	7.07E-05	7.62E-05	.006735	.06097			.001269
88	7.77E-05	8.48E-05	.007457	.06774			.001479
89	8.52E-05	9.42E-05	.008218	.07491			.001698
90	9.32E-05	.0001044	.009019	.08247			.001931
91	.0001011	.0001145	.009676	.08851	8.71E-06	4.70E-05	.002043
92	.0001097	.0001257	.01044	.09563	1.55E-05	8.38E-05	.002225
93	.0001186	.0001377	.01123	.1030	2.43E-05	.0001309	.002414
94	.0001278	.0001501	.01197	.1098	3.94E-05	.0002105	.002537
95	.0001376	.0001638	.01281	.1177	5.32E-05	.0002836	.002739
96	.0001480	.0001789	.01376	.1268	6.46E-05	.0003466	.003035
97	.0001586	.0001946	.01466	.1353	8.38E-05	.0004484	.003262
98	.0001694	.0002107	.01551	.1432	.0001122	.0005955	.003405
99	.0001808	.0002285	.01648	.1523	.0001390	.0007362	.003649

Table 9. (continued)

Z	5 P 1/2	5 P 3/2	5 D 3/2	5 D 5/2	5 F 5/2	5 F 7/2	6 S 1/2
100	.0001926	.0002474	.01747	.1617	.0001701	.0008986	.003906
101	.0002047	.0002675	.01850	.1715	.0002057	.001084	.004175
102	.0002171	.0002889	.01957	.1816	.0002465	.001296	.004457

Z	6 P 1/2	6 P 3/2	7 S 1/2
55			
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58			
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75			
76			
77			
78			
79			
80			
81	3.95E-07	2.99E-07	
82	1.14E-06	9.36E-07	
83	2.14E-06	1.93E-06	
84	3.73E-06	3.33E-06	
85	5.08E-06	5.19E-06	
86	8.13E-06	7.57E-06	
87	1.02E-05	1.01E-05	4.43E-05
88	1.24E-05	1.27E-05	.0001509
89	1.45E-05	1.52E-05	.0001960
90	1.69E-05	1.80E-05	.0002377
91	1.76E-05	1.87E-05	.0002262
92	1.92E-05	2.05E-05	.0002410
93	2.18E-05	2.24E-05	.0002557
94	2.16E-05	2.30E-05	.0002313
95	2.32E-05	2.49E-05	.0002437
96	2.59E-05	2.84E-05	.0003029
97	2.77E-05	3.06E-05	.0003199
98	2.84E-05	3.10E-05	.0002830
99	3.02E-05	3.33E-05	.0002970
100	3.21E-05	3.56E-05	.0003115
101	3.40E-05	3.80E-05	.0003265
102	3.60E-05	4.05E-05	.0003422

Table 10. L_3 x-ray energies, in keV.

Z	B. ENGY	3 S 1/2	3 P 1/2	3 P 3/2	3 D 3/2	3 D 5/2	4 S 1/2
5							
6							
7							
8							
9							
10							
11	.03623	.03107					
12	.05624	.04935					
13	.08073	.07057					
14	.1080	.09436	.07585	.07586			
15	.1382	.1210	.1298	.1299			
16	.1714	.1505	.1611	.1611			
17	.2077	.1829	.1953	.1954			
18	.2471	.2182	.2325	.2327			
19	.2986	.2581	.2749	.2752			.2944
20	.3552	.3020	.3212	.3216			.3498
21	.4089	.3480	.3693	.3698	.4018	.4018	.4030
22	.4652	.3966	.4201	.4208	.4569	.4569	.4590
23	.5245	.4481	.4739	.4747	.5149	.5150	.5179
24	.5808	.5016	.5296	.5306	.5743	.5744	.5748
25	.6522	.5596	.5901	.5914	.6404	.6405	.6450
26	.7207	.6197	.6527	.6542	.7078	.7080	.7132
27	.7923	.6826	.7181	.7200	.7783	.7786	.7845
28	.8670	.7484	.7865	.7888	.8521	.8524	.8589
29	.9375	.8162	.8570	.8596	.9274	.9277	.9304
30	1.026	.8886	.9323	.9354	1.009	1.009	1.017
31	1.122	.9643	1.011	1.015	1.095	1.095	1.110
32	1.223	1.043	1.093	1.098	1.184	1.185	1.208
33	1.328	1.126	1.179	1.184	1.277	1.278	1.310
34	1.439	1.212	1.269	1.275	1.374	1.375	1.418
35	1.554	1.302	1.362	1.369	1.474	1.475	1.529
36	1.673	1.395	1.458	1.466	1.578	1.579	1.646
37	1.805	1.492	1.558	1.568	1.686	1.687	1.768
38	1.942	1.592	1.662	1.673	1.797	1.799	1.896
39	2.081	1.696	1.769	1.782	1.913	1.915	2.028
40	2.225	1.803	1.880	1.894	2.032	2.034	2.165
41	2.369	1.913	1.994	2.010	2.154	2.157	2.306
42	2.521	2.027	2.111	2.129	2.281	2.284	2.451
43	2.678	2.144	2.232	2.253	2.410	2.414	2.602
44	2.839	2.265	2.357	2.379	2.544	2.545	2.756
45	3.004	2.388	2.484	2.510	2.681	2.686	2.916
46	3.171	2.516	2.615	2.644	2.822	2.828	3.080
47	3.350	2.646	2.750	2.781	2.967	2.973	3.248
48	3.535	2.780	2.888	2.923	3.115	3.122	3.422
49	3.728	2.917	3.029	3.068	3.267	3.275	3.600
50	3.927	3.058	3.173	3.216	3.423	3.432	3.784
51	4.130	3.201	3.321	3.369	3.583	3.593	3.972
52	4.340	3.349	3.473	3.525	3.746	3.757	4.165
53	4.554	3.499	3.627	3.685	3.913	3.925	4.363
54	4.775	3.653	3.785	3.848	4.084	4.097	4.566
55	5.006	3.810	3.946	4.015	4.258	4.273	4.774
56	5.243	3.970	4.111	4.186	4.437	4.453	4.987
57	5.484	4.133	4.279	4.361	4.619	4.636	5.205
58	5.706	4.303	4.453	4.542	4.807	4.827	5.428
59	5.947	4.474	4.629	4.726	4.998	5.019	5.655
60	6.194	4.649	4.808	4.914	5.193	5.216	5.887
61	6.445	4.826	4.990	5.105	5.392	5.417	6.124
62	6.700	5.007	5.176	5.300	5.595	5.622	6.365
63	6.961	5.192	5.365	5.499	5.801	5.831	6.611
64	7.243	5.378	5.556	5.701	6.011	6.043	6.861
65	7.498	5.569	5.752	5.908	6.226	6.261	7.117
66	7.773	5.762	5.950	6.119	6.444	6.481	7.377
67	8.054	5.959	6.151	6.333	6.666	6.706	7.641
68	8.340	6.158	6.355	6.551	6.892	6.935	7.910
69	8.630	6.360	6.563	6.773	7.122	7.168	8.184

Table 10. (continued)

Z	B. ENGY	3 S 1/2	3 P 1/2	3 P 3/2	3 D 3/2	3 D 5/2	4 S 1/2
70	8.925	6.565	6.773	6.999	7.356	7.405	8.463
71	9.243	6.772	6.985	7.227	7.592	7.645	8.745
72	9.558	6.982	7.200	7.459	7.833	7.889	9.032
73	9.879	7.194	7.418	7.695	8.077	8.137	9.324
74	10.21	7.408	7.638	7.934	8.325	8.389	9.621
75	10.54	7.626	7.861	8.178	8.576	8.645	9.922
76	10.88	7.845	8.086	8.425	8.832	8.905	10.23
77	11.21	8.067	8.314	8.675	9.091	9.169	10.54
78	11.57	8.292	8.544	8.930	9.354	9.437	10.85
79	11.92	8.519	8.777	9.188	9.621	9.710	11.17
80	12.29	8.748	9.013	9.450	9.892	9.986	11.50
81	12.66	8.979	9.250	9.715	10.17	10.27	11.83
82	13.04	9.213	9.490	9.985	10.44	10.55	12.16
83	13.42	9.449	9.732	10.26	10.73	10.84	12.50
84	13.82	9.686	9.976	10.53	11.01	11.13	12.84
85	14.21	9.926	10.22	10.82	11.30	11.43	13.19
86	14.62	10.17	10.47	11.10	11.60	11.73	13.54
87	15.03	10.41	10.72	11.39	11.89	12.03	13.90
88	15.46	10.66	10.97	11.68	12.20	12.34	14.26
89	15.88	10.90	11.23	11.98	12.50	12.66	14.63
90	16.31	11.15	11.48	12.28	12.81	12.98	15.00
91	16.74	11.40	11.74	12.58	13.13	13.30	15.38
92	17.18	11.65	12.00	12.89	13.44	13.63	15.76
93	17.63	11.90	12.26	13.20	13.77	13.96	16.14
94	18.06	12.16	12.52	13.52	14.09	14.29	16.53
95	18.52	12.41	12.78	13.84	14.42	14.63	16.93
96	18.99	12.67	13.05	14.16	14.76	14.98	17.32
97	19.46	12.92	13.31	14.49	15.09	15.33	17.73
98	19.92	13.18	13.57	14.82	15.44	15.68	18.13
99	20.40	13.44	13.84	15.16	15.78	16.04	18.54
100	20.88	13.69	14.10	15.50	16.13	16.40	18.96
101	21.37	13.95	14.37	15.84	16.48	16.77	19.38
102	21.87	14.20	14.63	16.19	16.84	17.14	19.80

Z	4 P 1/2	4 P 3/2	4 D 3/2	4 D 5/2	4 F 5/2	4 F 7/2	5 S 1/2
5							
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29							
30							
31	1.117	1.117					
32	1.216	1.216					
33	1.320	1.320					

Table 10. (continued)

L	4 P 1/2	4 P 3/2	4 D 3/2	4 D 5/2	4 F 5/2	4 F 7/2	5 S 1/2
34	1.429	1.429					
35	1.542	1.543					
36	1.660	1.661					
37	1.784	1.785					1.801
38	1.914	1.915					1.937
39	2.048	2.049	2.076	2.076			2.076
40	2.186	2.188	2.218	2.218			2.219
41	2.328	2.331	2.363	2.363			2.363
42	2.476	2.479	2.514	2.514			2.515
43	2.628	2.631	2.669	2.670			2.671
44	2.784	2.788	2.829	2.830			2.832
45	2.946	2.950	2.994	2.995			2.998
46	3.111	3.115	3.162	3.163			
47	3.282	3.287	3.337	3.338			3.343
48	3.457	3.463	3.518	3.518			3.527
49	3.638	3.644	3.703	3.704			3.718
50	3.823	3.831	3.893	3.894			3.913
51	4.013	4.022	4.089	4.090			4.115
52	4.209	4.219	4.289	4.290			4.321
53	4.409	4.420	4.494	4.496			4.533
54	4.614	4.627	4.705	4.707			4.751
55	4.824	4.838	4.920	4.923			4.975
56	5.039	5.055	5.141	5.144			5.205
57	5.259	5.277	5.367	5.370			5.440
58	5.484	5.503	5.597	5.600	5.706	5.706	5.671
59	5.714	5.735	5.832	5.836	5.947	5.947	5.911
60	5.948	5.971	6.072	6.076	6.192	6.193	6.156
61	6.187	6.212	6.317	6.321	6.443	6.443	6.406
62	6.430	6.458	6.566	6.571	6.698	6.695	6.660
63	6.679	6.708	6.821	6.826	6.959	6.960	6.919
64	6.931	6.964	7.080	7.086	7.226	7.226	7.188
65	7.189	7.224	7.345	7.351	7.495	7.496	7.453
66	7.452	7.489	7.614	7.621	7.770	7.771	7.727
67	7.719	7.759	7.888	7.895	8.051	8.052	8.006
68	7.990	8.034	8.167	8.175	8.336	8.337	8.291
69	8.267	8.314	8.451	8.460	8.627	8.628	8.580
70	8.548	8.599	8.740	8.749	8.923	8.924	8.874
71	8.833	8.888	9.034	9.044	9.224	9.226	9.177
72	9.123	9.182	9.333	9.343	9.531	9.533	9.486
73	9.418	9.482	9.637	9.648	9.843	9.845	9.800
74	9.717	9.786	9.946	9.958	10.16	10.16	10.12
75	10.02	10.10	10.26	10.27	10.48	10.48	10.45
76	10.33	10.41	10.58	10.59	10.81	10.81	10.78
77	10.64	10.73	10.90	10.92	11.14	11.15	11.11
78	10.96	11.05	11.23	11.25	11.48	11.48	11.46
79	11.28	11.38	11.57	11.59	11.82	11.83	11.81
80	11.61	11.72	11.91	11.93	12.17	12.18	12.16
81	11.95	12.06	12.25	12.27	12.53	12.53	12.52
82	12.28	12.40	12.60	12.63	12.89	12.89	12.89
83	12.62	12.76	12.96	12.98	13.25	13.26	13.26
84	12.97	13.11	13.32	13.35	13.62	13.63	13.63
85	13.32	13.47	13.69	13.71	14.00	14.00	14.02
86	13.68	13.84	14.06	14.09	14.38	14.38	14.41
87	14.04	14.21	14.44	14.47	14.76	14.77	14.80
88	14.41	14.59	14.82	14.85	15.16	15.16	15.20
89	14.78	14.97	15.21	15.24	15.55	15.56	15.61
90	15.15	15.36	15.60	15.64	15.96	15.97	16.02
91	15.53	15.75	16.00	16.04	16.36	16.37	16.44
92	15.92	16.15	16.40	16.45	16.78	16.79	16.86
93	16.31	16.55	16.81	16.86	17.20	17.21	17.29
94	16.70	16.96	17.23	17.28	17.62	17.64	17.72
95	17.10	17.38	17.65	17.70	18.05	18.07	18.16
96	17.50	17.80	18.07	18.13	18.49	18.50	18.61
97	17.91	18.22	18.50	18.56	18.93	18.95	19.06
98	18.32	18.65	18.94	19.00	19.38	19.40	19.51

Table 10. (continued)

Z	4 P 1/2	4 P 3/2	4 D 3/2	4 D 5/2	4 F 5/2	4 F 7/2	5 S 1/2
99	18.73	19.09	19.38	19.45	19.83	19.85	19.98
100	19.15	19.53	19.83	19.90	20.29	20.31	20.44
101	19.57	19.98	20.28	20.35	20.75	20.77	20.92
102	20.00	20.43	20.74	20.81	21.22	21.24	21.39
7	5 P 1/2	5 P 3/2	5 D 3/2	5 D 5/2	5 F 5/2	5 F 7/2	6 S 1/2
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41							
42							
43							
44							
45							
46							
47							
48							
49	3.723	3.724					
50	3.920	3.921					
51	4.123	4.123					
52	4.330	4.331					
53	4.544	4.545					
54	4.762	4.764					
55	4.988	4.990					
56	5.219	5.221					5.002
57	5.455	5.456	5.478	5.478			5.229
58	5.686	5.689					5.479
59	5.927	5.930					5.708
60	6.173	6.176					5.949
61	6.423	6.426					6.196
							6.447

Table 10. (continued)

Z	5 P 1/2	5 P 3/2	5 D 3/2	5 D 5/2	5 F 5/2	5 F 7/2	6 S 1/2
62	6.678	6.682					6.703
63	6.938	6.942					6.964
64	7.298	7.212	7.237				7.237
65	7.473	7.478					7.500
66	7.748	7.753					7.776
67	8.028	8.033					8.056
68	8.313	8.318					8.342
69	8.602	8.608					8.632
70	8.897	8.904					8.928
71	9.202	9.209	9.239	9.239			9.237
72	9.512	9.520	9.552	9.553			9.551
73	9.828	9.837	9.872	9.873			9.872
74	10.15	10.16	10.20	10.20			10.20
75	10.48	10.49	10.53	10.53			10.53
76	10.81	10.82	10.87	10.87			10.87
77	11.15	11.16	11.21	11.21			11.21
78	11.49	11.51	11.55	11.56			11.56
79	11.84	11.86	11.91	11.91			11.91
80	12.20	12.22	12.27	12.27			12.27
81	12.56	12.58	12.64	12.64			12.65
82	12.93	12.95	13.01	13.01			13.02
83	13.30	13.33	13.39	13.39			13.41
84	13.68	13.71	13.77	13.78			13.80
85	14.07	14.10	14.16	14.17			14.19
86	14.46	14.49	14.56	14.57			14.59
87	14.85	14.89	14.96	14.97			15.00
88	15.25	15.30	15.37	15.38			15.42
89	15.66	15.71	15.79	15.80			15.84
90	16.08	16.12	16.21	16.22			16.26
91	16.50	16.55	16.64	16.64			16.69
92	16.92	16.98	17.07	17.08			17.13
93	17.36	17.41	17.51	17.52			17.57
94	17.79	17.85	17.95	17.96			18.02
95	18.23	18.30	18.40	18.41			18.47
96	18.68	18.75	18.86	18.87			18.93
97	19.13	19.21	19.32	19.33			19.40
98	19.59	19.68	19.78	19.80			19.87
99	20.05	20.15	20.26	20.27			20.35
100	20.52	20.62	20.74	20.75			20.83
101	21.00	21.10	21.22	21.24			21.31
102	21.48	21.59	21.71	21.73			21.81
					16.73	16.74	
					17.17	17.17	
					17.61	17.62	
					18.06	18.06	
					18.52	18.52	
					19.00	19.00	
					19.45	19.45	
					19.92	19.92	
					20.35	20.35	
					20.80	20.80	
					21.37	21.37	
					21.87	21.87	

2 6 P 1/2 6 P 3/2 7 S 1/2

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Table 10. (continued)

Z	6 P 1/2	6 P 3/2	7 S 1/2
74			
75			
76			
77			
78			
79			
80			
81	12.65	12.66	
82	13.03	13.03	
83	13.42	13.42	
84	13.81	13.81	
85	14.20	14.21	
86	14.60	14.61	
87	15.01	15.02	15.03
88	15.43	15.44	15.45
89	15.85	15.86	15.88
90	16.28	16.29	16.31
91	16.71	16.72	16.74
92	17.15	17.16	17.17
93	17.59	17.60	17.62
94	18.04	18.05	18.06
95	18.49	18.50	18.52
96	18.95	18.97	18.99
97	19.42	19.43	19.45
98	19.89	19.90	19.92
99	20.37	20.38	20.40
100	20.85	20.86	20.88
101	21.34	21.36	21.38
102	21.83	21.85	21.87

Table 11. M-2/E-1 ratios for K x rays.

Z	2 P 3/2	3 P 3/2	4 P 3/2	5 P 3/2
5	2.56E-08			
6	5.71E-08			
7	1.11E-07			
8	1.96E-07			
9	3.23E-07			
10	5.42E-07			
11	7.58E-07			
12	1.10E-06			
13	1.55E-06	1.71E-06		
14	2.12E-06	2.38E-06		
15	2.85E-06	3.23E-06		
16	3.74E-06	4.29E-06		
17	4.84E-06	5.59E-06		
18	6.16E-06	7.17E-06		
19	7.73E-06	9.08E-06		
20	9.60E-06	1.13E-05		
21	1.18E-05	1.40E-05		
22	1.43E-05	1.72E-05		
23	1.73E-05	2.06E-05		
24	2.07E-05	2.49E-05		
25	2.46E-05	2.97E-05		
26	2.90E-05	3.52E-05		
27	3.40E-05	4.13E-05		

Table 11. (continued)

L	2 P 3/2	3 P 3/2	4 P 3/2	5 P 3/2
28	3.96E-05	4.83E-05		
29	4.58E-05	5.60E-05		
30	5.28E-05	6.46E-05		
31	6.06E-05	7.45E-05	7.59E-05	
32	6.92E-05	8.50E-05	8.70E-05	
33	7.87E-05	9.71E-05	9.94E-05	
34	8.92E-05	.0001103	.0001130	
35	.0001007	.0001247	.0001279	
36	.0001134	.0001406	.0001444	
37	.0001272	.0001579	.0001625	
38	.0001421	.0001768	.0001822	
39	.0001585	.0001975	.0002037	
40	.0001763	.0002199	.0002271	
41	.0001956	.0002442	.0002524	
42	.0002164	.0002706	.0002799	
43	.0002390	.0002990	.0003097	
44	.0002634	.0003298	.0003419	
45	.0002895	.0003629	.0003764	
46	.0003176	.0003982	.0004135	
47	.0003480	.0004365	.0004535	
48	.0003801	.0004773	.0004963	
49	.0004148	.0005211	.0005423	.0005452
50	.0004519	.0005678	.0005913	.0005949
51	.0004915	.0006178	.0006440	.0006480
52	.0005338	.0006712	.0006999	.0007045
53	.0005789	.0007280	.0007593	.0007652
54	.0006268	.0007884	.0008234	.0008291
55	.0006777	.0008528	.0008896	.0008978
56	.0007319	.0009204	.0009623	.0009706
57	.0007897	.0009935	.0010334	.0010448
58	.0008508	.001070	.001119	.001129
59	.0009156	.001152	.001205	.001215
60	.0009843	.001238	.001295	.001307
61	.001057	.001329	.001391	.001404
62	.001134	.001426	.001493	.001506
63	.001215	.001527	.001600	.001614
64	.001301	.001635	.001712	.001728
65	.001392	.001747	.001831	.001848
66	.001488	.001867	.001957	.001975
67	.001588	.001993	.002089	.002107
68	.001694	.002124	.002227	.002246
69	.001806	.002264	.002373	.002395
70	.001925	.002410	.002527	.002549
71	.002049	.002564	.002686	.002712
72	.002179	.002725	.002857	.002884
73	.002317	.002895	.003034	.003063
74	.002462	.003072	.003221	.003252
75	.002613	.003259	.003416	.003450
76	.002773	.003452	.003618	.003656
77	.002939	.003658	.003835	.003873
78	.003115	.003871	.004059	.004100
79	.003300	.004097	.004295	.004338
80	.003494	.004331	.004540	.004584
81	.003695	.004576	.004796	.004847
82	.003909	.004833	.005066	.005118
83	.004130	.005102	.005348	.005406
84	.004365	.005383	.005643	.005701
85	.004610	.005678	.005948	.006013
86	.004865	.005984	.006271	.006338

Table 11. (continued)

Z	2 P 3/2	3 P 3/2	4 P 3/2	5 P 3/2
87	.005135	.006305	.006605	.006676
88	.005415	.006639	.006955	.007030
89	.005711	.006990	.007320	.007399
90	.006019	.007356	.007703	.007786
91	.006343	.007738	.008098	.008189
92	.006682	.008137	.008512	.008609
93	.007035	.008557	.008948	.009048
94	.007407	.008992	.009401	.009507
95	.007795	.009437	.009871	.009983
96	.008204	.009894	.01037	.01048
97	.008631	.01041	.01088	.01100
98	.009078	.01093	.01141	.01154
99	.009546	.01147	.01197	.01211
100	.01004	.01203	.01256	.01271
101	.01055	.01262	.01317	.01332
102	.01109	.01324	.01380	.01397

Table 12. M-2/E-1 ratios for L_1 x rays.

Z	2 P 3/2	3 P 3/2	4 P 3/2	5 P 3/2
5	2.51E-11			
6	5.28E-11			
7	9.69E-11			
8	1.63E-10			
9	2.58E-10			
10	3.88E-10			
11	5.73E-10			
12	7.92E-10			
13	1.05E-09	9.35E-09		
14	1.36E-09	1.51E-08		
15	1.72E-09	2.30E-08		
16	2.13E-09	3.34E-08		
17	2.61E-09	4.70E-08		
18	3.16E-09	6.42E-08		
19	3.77E-09	8.68E-08		
20	4.46E-09	1.15E-07		
21	5.23E-09	1.49E-07		
22	6.09E-09	1.89E-07		
23	7.06E-09	2.37E-07		
24	8.13E-09	2.92E-07		
25	9.34E-09	3.58E-07		
26	1.07E-08	4.33E-07		
27	1.22E-08	5.20E-07		
28	1.39E-08	6.19E-07		
29	1.58E-08	7.31E-07		
30	1.79E-08	8.60E-07		
31	2.04E-08	1.01E-06	1.19E-06	

Table 12. (continued)

2	2 P 3/2	3 P 3/2	4 P 3/2	5 P 3/2
32	2.30E-08	1.17E-06	1.40E-06	
33	2.61E-08	1.36E-06	1.64E-06	
34	2.94E-08	1.57E-06	1.92E-06	
35	3.32E-08	1.81E-06	2.22E-06	
36	3.74E-08	2.07E-06	2.57E-06	
37	4.22E-08	2.36E-06	2.96E-06	
38	4.75E-08	2.68E-06	3.40E-06	
39	5.34E-08	3.04E-06	3.88E-06	
40	6.00E-08	3.43E-06	4.42E-06	
41	6.74E-08	3.86E-06	5.01E-06	
42	7.56E-08	4.34E-06	5.66E-06	
43	8.49E-08	4.86E-06	6.38E-06	
44	9.52E-08	5.43E-06	7.16E-06	
45	1.07E-07	6.04E-06	8.02E-06	
46	1.20E-07	6.71E-06	8.95E-06	
47	1.34E-07	7.45E-06	9.97E-06	
48	1.50E-07	8.24E-06	1.11E-05	
49	1.68E-07	9.10E-06	1.23E-05	1.28E-05
50	1.88E-07	1.00E-05	1.36E-05	1.42E-05
51	2.10E-07	1.10E-05	1.50E-05	1.57E-05
52	2.35E-07	1.21E-05	1.66E-05	1.73E-05
53	2.63E-07	1.33E-05	1.82E-05	1.91E-05
54	2.94E-07	1.46E-05	2.00E-05	2.11E-05
55	3.28E-07	1.59E-05	2.20E-05	2.32E-05
56	3.66E-07	1.74E-05	2.40E-05	2.54E-05
57	4.09E-07	1.89E-05	2.63E-05	2.79E-05
58	4.56E-07	2.06E-05	2.87E-05	3.04E-05
59	5.09E-07	2.24E-05	3.13E-05	3.31E-05
60	5.67E-07	2.44E-05	3.40E-05	3.60E-05
61	6.32E-07	2.65E-05	3.70E-05	3.92E-05
62	7.03E-07	2.87E-05	4.01E-05	4.25E-05
63	7.83E-07	3.10E-05	4.35E-05	4.61E-05
64	8.71E-07	3.36E-05	4.71E-05	5.00E-05
65	9.69E-07	3.63E-05	5.09E-05	5.40E-05
66	1.08E-06	3.92E-05	5.50E-05	5.83E-05
67	1.20E-06	4.22E-05	5.93E-05	6.29E-05
68	1.33E-06	4.55E-05	6.40E-05	6.78E-05
69	1.48E-06	4.90E-05	6.89E-05	7.30E-05
70	1.64E-06	5.27E-05	7.41E-05	7.86E-05
71	1.82E-06	5.67E-05	7.97E-05	8.46E-05
72	2.02E-06	6.08E-05	8.56E-05	9.09E-05
73	2.24E-06	6.53E-05	9.19E-05	9.77E-05
74	2.48E-06	7.00E-05	9.86E-05	.0001048
75	2.75E-06	7.51E-05	.0001056	.0001125
76	3.05E-06	8.04E-05	.0001131	.0001206
77	3.37E-06	8.60E-05	.0001211	.0001292
78	3.73E-06	9.21E-05	.0001296	.0001383
79	4.13E-06	9.84E-05	.0001385	.0001480
80	4.57E-06	.0001052	.0001480	.0001582
81	5.05E-06	.0001124	.0001581	.0001691
82	5.58E-06	.0001201	.0001688	.0001807
83	6.16E-06	.0001281	.0001800	.0001930
84	6.81E-06	.0001367	.0001920	.0002059
85	7.52E-06	.0001458	.0002045	.0002197
86	8.29E-06	.0001555	.0002180	.0002343
87	9.15E-06	.0001658	.0002322	.0002498

Table 12. (continued)

Z	2 P 3/2	3 P 3/2	4 P 3/2	5 P 3/2
88	1.01E-05	.0001766	.0002473	.0002660
89	1.11E-05	.0001883	.0002632	.0002833
90	1.23E-05	.0002005	.0002802	.0003017
91	1.35E-05	.0002136	.0002981	.0003212
92	1.49E-05	.0002275	.0003170	.0003419
93	1.64E-05	.0002423	.0003373	.0003638
94	1.81E-05	.0002579	.0003586	.0003869
95	1.99E-05	.0002746	.0003812	.0004115
96	2.19E-05	.0002924	.0004053	.0004376
97	2.41E-05	.0003113	.0004307	.0004652
98	2.65E-05	.0003314	.0004580	.0004945
99	2.92E-05	.0003526	.0004865	.0005257
100	3.22E-05	.0003757	.0005172	.0005588
101	3.53E-05	.0004002	.0005498	.0005939
102	3.89E-05	.0004263	.0005842	.0006314

Table 13. M-2/E-1 ratios for L₂ x rays.

Z	3 C 3/2	4 D 3/2	5 D 3/2
5			
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12			
13			
14			
15			
16			
17			
18			
19			
20			
21	4.73E-09		
22	6.13E-09		
23	7.81E-09		
24	9.74E-09		
25	1.21E-08		
26	1.49E-08		
27	1.80E-08		
28	2.16E-08		
29	2.57E-08		
30	3.05E-08		
31	3.60E-08		
32	4.22E-08		
33	4.92E-08		
34	5.71E-08		
35	6.60E-08		
36	7.59E-08		
37	8.69E-08		
38	9.91E-08		
39	1.13E-07	1.32E-07	

Table 13. (continued)

2	3 0 3/2	4 0 3/2	5 0 3/2
40	1.27E-07	1.51E-07	
41	1.44E-07	1.71E-07	
42	1.62E-07	1.95E-07	
43	1.81E-07	2.20E-07	
44	2.03E-07	2.48E-07	
45	2.26E-07	2.78E-07	
46	2.51E-07	3.11E-07	
47	2.79E-07	3.48E-07	
48	3.09E-07	3.87E-07	
49	3.41E-07	4.31E-07	
50	3.76E-07	4.78E-07	
51	4.14E-07	5.29E-07	
52	4.55E-07	5.83E-07	
53	4.99E-07	6.43E-07	
54	5.45E-07	7.07E-07	
55	5.96E-07	7.76E-07	
56	6.50E-07	8.50E-07	
57	7.08E-07	9.30E-07	9.65E-07
58	7.71E-07	1.02E-06	
59	8.38E-07	1.11E-06	
60	9.10E-07	1.20E-06	
61	9.86E-07	1.31E-06	
62	1.07E-06	1.42E-06	
63	1.15E-06	1.54E-06	
64	1.25E-06	1.66E-06	1.73E-06
65	1.35E-06	1.80E-06	
66	1.45E-06	1.94E-06	
67	1.56E-06	2.09E-06	
68	1.68E-06	2.25E-06	
69	1.81E-06	2.43E-06	
70	1.94E-06	2.61E-06	
71	2.08E-06	2.80E-06	2.91E-06
72	2.23E-06	3.00E-06	3.12E-06
73	2.39E-06	3.22E-06	3.35E-06
74	2.56E-06	3.45E-06	3.59E-06
75	2.73E-06	3.69E-06	3.85E-06
76	2.92E-06	3.94E-06	4.12E-06
77	3.12E-06	4.21E-06	4.40E-06
78	3.33E-06	4.49E-06	4.71E-06
79	3.55E-06	4.79E-06	5.03E-06
80	3.79E-06	5.11E-06	5.36E-06
81	4.03E-06	5.44E-06	5.72E-06
82	4.29E-06	5.80E-06	6.10E-06
83	4.57E-06	6.17E-06	6.50E-06
84	4.86E-06	6.56E-06	6.92E-06
85	5.17E-06	6.97E-06	7.36E-06
86	5.49E-06	7.41E-06	7.83E-06
87	5.83E-06	7.87E-06	8.32E-06
88	6.19E-06	8.35E-06	8.84E-06
89	6.58E-06	8.86E-06	9.38E-06
90	6.97E-06	9.39E-06	9.96E-06
91	7.40E-06	9.96E-06	1.06E-05
92	7.85E-06	1.06E-05	1.12E-05
93	8.32E-06	1.12E-05	1.19E-05
94	8.82E-06	1.18E-05	1.26E-05
95	9.35E-06	1.25E-05	1.33E-05

Table 13. (continued)

Z	3 D 3/2	4 D 3/2	5 D 3/2
96	9.90E-06	1.33E-05	1.41E-05
97	1.05E-05	1.40E-05	1.49E-05
98	1.11E-05	1.48E-05	1.58E-05
99	1.18E-05	1.57E-05	1.67E-05
100	1.25E-05	1.66E-05	1.77E-05
101	1.32E-05	1.75E-05	1.87E-05
102	1.39E-05	1.85E-05	1.97E-05

Table 14. M-2/E-1 ratios for L_3 x rays.

Z	3 S 1/2	3 D 5/2	4 S 1/2	4 D 5/2	5 S 1/2	5 D 5/2
5						
6						
7						
8						
9						
10						
11	6.92E-10					
12	1.75E-09					
13	3.57E-09					
14	6.38E-09					
15	1.05E-08					
16	1.62E-08					
17	2.40E-08					
18	3.41E-08					
19	4.78E-08			6.22E-08		
20	6.54E-08			8.79E-08		
21	8.68E-08	1.50E-07	1.17E-07			
22	1.13E-07	1.94E-07	1.51E-07			
23	1.44E-07	2.47E-07	1.93E-07			
24	1.81E-07	3.07E-07	2.37E-07			
25	2.25E-07	3.81E-07	2.99E-07			
26	2.76E-07	4.66E-07	3.66E-07			
27	3.34E-07	5.63E-07	4.43E-07			
28	4.02E-07	6.75E-07	5.31E-07			
29	4.79E-07	8.00E-07	6.23E-07			
30	5.67E-07	9.47E-07	7.45E-07			
31	6.68E-07	1.11E-06	8.88E-07			
32	7.83E-07	1.30E-06	1.05E-06			
33	9.12E-07	1.52E-06	1.24E-06			
34	1.06E-06	1.75E-06	1.45E-06			
35	1.22E-06	2.02E-06	1.69E-06			
36	1.40E-06	2.32E-06	1.96E-06			
37	1.60E-06	2.64E-06	2.26E-06		2.34E-06	
38	1.83E-06	3.00E-06	2.60E-06		2.71E-06	
39	2.07E-06	3.40E-06	2.97E-06	4.00E-06	3.12E-06	
40	2.34E-06	3.84E-06	3.39E-06	4.56E-06	3.56E-06	
41	2.64E-06	4.31E-06	3.85E-06	5.18E-06	4.04E-06	
42	2.97E-06	4.83E-06	4.35E-06	5.86E-06	4.58E-06	
43	3.32E-06	5.40E-06	4.91E-06	6.60E-06	5.17E-06	
44	3.71E-06	6.02E-06	5.51E-06	7.42E-06	5.82E-06	
45	4.13E-06	6.69E-06	6.17E-06	8.30E-06	6.52E-06	
46	4.58E-06	7.41E-06	6.89E-06	9.25E-06		
47	5.07E-06	8.19E-06	7.67E-06	1.03E-05	8.12E-06	
48	5.60E-06	9.03E-06	8.51E-06	1.14E-05	9.04E-06	

Table 14. (continued)

Z	3 S 1/2	3 D 5/2	4 S 1/2	4 D 5/2	5 S 1/2	5 D 5/2
49	6.17E-06	9.92E-06	9.43E-06	1.27E-05	1.01E-05	
50	6.78E-06	1.09E-05	1.04E-05	1.40E-05	1.11E-05	
51	7.44E-06	1.19E-05	1.15E-05	1.54E-05	1.23E-05	
52	8.14E-06	1.31E-05	1.26E-05	1.70E-05	1.36E-05	
53	8.89E-06	1.42E-05	1.39E-05	1.86E-05	1.50E-05	
54	9.70E-06	1.55E-05	1.52E-05	2.04E-05	1.65E-05	
55	1.16E-05	1.69E-05	1.66E-05	2.23E-05	1.81E-05	
56	1.15E-05	1.83E-05	1.82E-05	2.44E-05	1.98E-05	
57	1.25E-05	1.98E-05	1.98E-05	2.65E-05	2.16E-05	2.76E-05
58	1.35E-05	2.15E-05	2.15E-05	2.88E-05	2.35E-05	
59	1.46E-05	2.32E-05	2.34E-05	3.13E-05	2.56E-05	
60	1.58E-05	2.51E-05	2.54E-05	3.39E-05	2.77E-05	
61	1.70E-05	2.71E-05	2.75E-05	3.67E-05	3.01E-05	
62	1.83E-05	2.91E-05	2.97E-05	3.96E-05	3.25E-05	
63	1.97E-05	3.13E-05	3.21E-05	4.27E-05	3.51E-05	
64	2.12E-05	3.36E-05	3.45E-05	4.60E-05	3.79E-05	4.79E-05
65	2.27E-05	3.61E-05	3.72E-05	4.95E-05	4.08E-05	
66	2.43E-05	3.87E-05	4.00E-05	5.31E-05	4.39E-05	
67	2.60E-05	4.14E-05	4.29E-05	5.70E-05	4.71E-05	
68	2.78E-05	4.42E-05	4.60E-05	6.11E-05	5.06E-05	
69	2.97E-05	4.72E-05	4.93E-05	6.53E-05	5.42E-05	
70	3.16E-05	5.04E-05	5.27E-05	6.98E-05	5.80E-05	
71	3.37E-05	5.36E-05	5.63E-05	7.46E-05	6.20E-05	7.77E-05
72	3.58E-05	5.71E-05	6.01E-05	7.95E-05	6.63E-05	8.31E-05
73	3.80E-05	6.07E-05	6.42E-05	8.47E-05	7.08E-05	8.86E-05
74	4.03E-05	6.45E-05	6.83E-05	9.02E-05	7.56E-05	9.45E-05
75	4.28E-05	6.85E-05	7.27E-05	9.59E-05	8.05E-05	.0001006
76	4.53E-05	7.26E-05	7.73E-05	.0001019	8.58E-05	.0001071
77	4.79E-05	7.70E-05	8.21E-05	.0001082	9.13E-05	.0001138
78	5.07E-05	8.15E-05	8.71E-05	.0001147	9.70E-05	.0001209
79	5.35E-05	8.62E-05	9.24E-05	.0001216	.0001030	.0001282
80	5.64E-05	9.11E-05	9.78E-05	.0001288	.0001094	.0001360
81	5.95E-05	9.62E-05	.0001036	.0001362	.0001160	.0001441
82	6.27E-05	.0001016	.0001095	.0001440	.0001229	.0001526
83	6.59E-05	.0001072	.0001157	.0001521	.0001301	.0001615
84	6.93E-05	.0001130	.0001222	.0001606	.0001377	.0001707
85	7.28E-05	.0001191	.0001290	.0001695	.0001455	.0001803
86	7.65E-05	.0001254	.0001360	.0001786	.0001538	.0001904
87	8.02E-05	.0001318	.0001433	.0001881	.0001623	.0002008
88	8.40E-05	.0001387	.0001509	.0001981	.0001713	.0002117
89	8.80E-05	.0001457	.0001587	.0002085	.0001805	.0002231
90	9.20E-05	.0001530	.0001669	.0002191	.0001902	.0002349
91	9.63E-05	.0001606	.0001754	.0002302	.0002003	.0002471
92	.0001006	.0001685	.0001842	.0002418	.0002106	.0002598
93	.0001050	.0001767	.0001933	.0002538	.0002214	.0002729
94	.0001096	.0001852	.0002027	.0002663	.0002327	.0002867
95	.0001142	.0001940	.0002125	.0002792	.0002443	.0003008
96	.0001190	.0002031	.0002226	.0002925	.0002564	.0003155
97	.0001239	.0002126	.0002330	.0003064	.0002691	.0003308
98	.0001289	.0002223	.0002438	.0003206	.0002819	.0003465
99	.0001339	.0002324	.0002549	.0003355	.0002954	.0003628
100	.0001392	.0002429	.0002664	.0003508	.0003093	.0003797
101	.0001444	.0002537	.0002782	.0003666	.0003236	.0003971
102	.0001497	.0002647	.0002903	.0003830	.0003384	.0004152

Table 14. (continued)

Z	6 S 1/2	7 S 1/2
55	1.83E-05	
56	2.00E-05	
57	2.19E-05	
58	2.38E-05	
59	2.59E-05	
60	2.81E-05	
61	3.05E-05	
62	3.29E-05	
63	3.56E-05	
64	3.84E-05	
65	4.13E-05	
66	4.44E-05	
67	4.77E-05	
68	5.12E-05	
69	5.48E-05	
70	5.87E-05	
71	6.29E-05	
72	6.72E-05	
73	7.19E-05	
74	7.67E-05	
75	8.19E-05	
76	8.72E-05	
77		
78	9.88E-05	
79	.0001049	
80	.0001115	
81	.0001183	
82	.0001255	
83	.0001331	
84	.0001409	
85	.0001492	
86	.0001577	
87	.0001667	.0001674
88	.0001761	.0001769
89	.0001859	.0001867
90	.0001960	.0001971
91	.0002065	.0002076
92	.0002174	.0002186
93	.0002288	.0002300
94	.0002405	.0002418
95	.0002528	.0002541
96	.0002655	.0002670
97	.0002786	.0002803
98	.0002922	.0002938
99	.0003062	.0003080
100	.0003209	.0003227
101	.0003360	.0003379
102	.0003514	.0003537

The probability that two successive x rays are emitted with an angle θ between them is proportional to the series

$$1 + \sum_{k=2,4,6 \text{ in } K_{\max}} A_{kk} P_k(\cos \theta),$$

where the P_k 's are the Legendre polynomials and A_{kk} can be written as the product of two factors,

$$A_{kk} = A_k(t_1) A_k(t_2),$$

one factor for each of the two transitions of the cascade. Each factor depends only on the initial and final angular momentum and the mixture of multipoles emitted in the particular transition. For an intermediate $j = 1/2$ state in the cascade, the distribution is isotropic. With only E-1 radiation, the possible cascades which have nonzero values of A_{22} in filling a K vacancy have the sequences of j values for the vacancy state of $\frac{1}{2} - \frac{3}{2} - \frac{1}{2}$, $\frac{1}{2} - \frac{3}{2} - \frac{3}{2}$, and $\frac{1}{2} - \frac{3}{2} - \frac{5}{2}$; these have the values of 0.25, -0.2 and 0.05 for the value of A_{22} respectively. With r the positive square root,

$$r = (M-2 \text{ rate}/E-1 \text{ rate})^{1/2},$$

and in the $2P_{3/2}$ state, the intermediate state in a K x ray—L x ray cascade, for the $P_3 \rightarrow S_{1/2}$ transition,

$$A_2 = (0.5 + 1.732r - 0.5r^2)/(1 + r^2).$$

For a $D_{5/2} \rightarrow P_{3/2}$ transition,

$$A_2 = (0.1 + 1.832r + 0.3571r^2)/(1 + r^2).$$

For a $S_{1/2} \rightarrow P_{3/2}$ transition,

$$A_2 = (0.5 - 1.732r - 0.5r^2)/(1 + r^2).$$

For the $D_{3/2} \rightarrow P_{3/2}$ transition, the theoretical M-2 rate is zero and $A_2 = -0.4$.

Table 15 lists the values of A_{22} for all the $K_{\alpha 1}$ —L x-ray cascades having E-1 components. Table 16 gives the average values of A_{22} for $K_{\alpha 1}$ —L x-ray cascades with A_{22} for the individual cascades weighted according to the rates of the L x rays. In each case, a vacancy in the K-shell is filled by an electron in the L_3 subshell. For the cascade designated $K_{\alpha 1} L_{\alpha}$, the L_3 vacancy is filled by electrons from the M_4 or M_5 subshells, for $K_{\alpha 1} L_{\alpha 1}$, by electrons from M_1 , M_4 or M_5 subshells, and for $K_{\alpha 1} L_{\beta}$ by electrons in the N-, O- or P-shells.

Table 15. A_{22} values for L_3 x ray— $K_{\alpha 1}$ correlations.

2	3 S 1/2	3 D 3/2	3 D 5/2	4 S 1/2	4 D 3/2	4 D 5/2
5						
6						
7						
8						
9						
10						
11	.2507					
12	.2509					
13	.2510					
14	.2512					
15	.2514					
16	.2516					
17	.2518					
18	.2520					
19	.2522			.2522		
20	.2525			.2524		
21	.2527	-.2024	.05083	.2527		
22	.2530	-.2026	.05092	.2529		
23	.2533	-.2029	.05102	.2532		
24	.2536	-.2031	.05112	.2535		
25	.2539	-.2034	.05123	.2538		
26	.2542	-.2037	.05134	.2541		
27	.2545	-.2040	.05146	.2544		
28	.2549	-.2043	.05158	.2548		
29	.2552	-.2047	.05171	.2551		
30	.2556	-.2050	.05184	.2555		
31	.2560	-.2054	.05198	.2559		
32	.2564	-.2057	.05213	.2563		
33	.2568	-.2061	.05228	.2567		
34	.2572	-.2065	.05244	.2571		
35	.2576	-.2069	.05260	.2575		
36	.2581	-.2073	.05277	.2579		
37	.2586	-.2078	.05294	.2583		
38	.2590	-.2082	.05312	.2588		
39	.2595	-.2087	.05330	.2593	-.2067	.05340
40	.2600	-.2091	.05349	.2597	-.2051	.05335
41	.2605	-.2096	.05359	.2602	-.2056	.05381
42	.2611	-.2101	.05389	.2607	-.2101	.05403
43	.2616	-.2106	.05410	.2612	-.2106	.05425
44	.2622	-.2111	.05432	.2618	-.2111	.05449
45	.2627	-.2117	.05454	.2623	-.2117	.05472
46	.2633	-.2122	.05476	.2629	-.2122	.05496
47	.2639	-.2128	.05500	.2634	-.2128	.05522
48	.2645	-.2133	.05523	.2640	-.2133	.05547
49	.2651	-.2139	.05548	.2646	-.2139	.05574
50	.2658	-.2145	.05573	.2652	-.2145	.05601
51	.2664	-.2152	.05599	.2658	-.2152	.05629
52	.2671	-.2158	.05625	.2664	-.2158	.05658
53	.2677	-.2164	.05652	.2670	-.2164	.05687
54	.2684	-.2171	.05680	.2677	-.2171	.05718
55	.2691	-.2178	.05709	.2683	-.2178	.05748
56	.2698	-.2184	.05738	.2690	-.2184	.05780
57	.2706	-.2191	.05768	.2697	-.2191	.05813
58	.2713	-.2199	.05798	.2704	-.2199	.05846
59	.2721	-.2206	.05829	.2711	-.2206	.05880
60	.2728	-.2213	.05861	.2718	-.2213	.05915
61	.2736	-.2221	.05894	.2725	-.2221	.05950
62	.2744	-.2229	.05927	.2733	-.2229	.05987

Table 15. (continued)

Z	3 S 1/2	3 D 3/2	3 D 5/2	4 S 1/2	4 D 3/2	4 D 5/2
63	.2752	-.2236	.05962	.2740	-.2226	.06024
64	.2761	-.2244	.05996	.2748	-.2244	.06062
65	.2769	-.2253	.06032	.2756	-.2252	.06101
66	.2778	-.2261	.06069	.2764	-.2261	.06141
67	.2786	-.2269	.06106	.2772	-.2269	.06181
68	.2795	-.2278	.06143	.2780	-.2278	.06222
69	.2804	-.2287	.06182	.2789	-.2287	.06264
70	.2814	-.2296	.06222	.2797	-.2296	.06308
71	.2823	-.2305	.06262	.2806	-.2305	.06352
72	.2832	-.2314	.06303	.2814	-.2314	.06396
73	.2842	-.2323	.06345	.2823	-.2323	.06443
74	.2852	-.2333	.06388	.2832	-.2332	.06489
75	.2862	-.2343	.06431	.2842	-.2343	.06537
76	.2872	-.2353	.06476	.2851	-.2353	.06586
77	.2882	-.2363	.06521	.2860	-.2362	.06635
78	.2893	-.2373	.06567	.2870	-.2373	.06686
79	.2904	-.2384	.06615	.2880	-.2384	.06738
80	.2914	-.2394	.06663	.2890	-.2394	.06791
81	.2925	-.2405	.06711	.2899	-.2405	.06844
82	.2937	-.2416	.06762	.2910	-.2416	.06899
83	.2948	-.2427	.06812	.2920	-.2427	.06955
84	.2960	-.2438	.06864	.2930	-.2438	.07012
85	.2971	-.2450	.06917	.2941	-.2450	.07071
86	.2983	-.2462	.06971	.2952	-.2462	.07130
87	.2995	-.2473	.07026	.2963	-.2473	.07190
88	.3008	-.2486	.07082	.2974	-.2486	.07252
89	.3020	-.2498	.07139	.2985	-.2498	.07315
90	.3033	-.2510	.07197	.2996	-.2510	.07378
91	.3046	-.2523	.07256	.3008	-.2523	.07444
92	.3059	-.2536	.07316	.3020	-.2536	.07510
93	.3073	-.2549	.07378	.3032	-.2549	.07578
94	.3086	-.2562	.07441	.3044	-.2562	.07647
95	.3100	-.2576	.07504	.3056	-.2576	.07717
96	.3114	-.2590	.07570	.3069	-.2590	.07786
97	.3129	-.2604	.07636	.3081	-.2604	.07863
98	.3143	-.2618	.07704	.3094	-.2618	.07937
99	.3158	-.2633	.07772	.3107	-.2633	.08013
100	.3173	-.2648	.07843	.3121	-.2648	.08091
101	.3189	-.2662	.07914	.3134	-.2662	.08170
102	.3204	-.2678	.07987	.3148	-.2678	.08250
Z	5 S 1/2	5 D 3/2	5 D 5/2	6 S 1/2	7 S 1/2	
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Table 15. (continued)

2	5 S 1/2	5 D 3/2	5 D 5/2	6 S 1/2	7 S 1/2
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37	.2583				
38	.2588				
39	.2592				
40	.2597				
41	.2602				
42	.2607				
43	.2612				
44	.2617				
45	.2622				
46					
47	.2633				
48	.2639				
49	.2645				
50	.2651				
51	.2657				
52	.2663				
53	.2669				
54	.2675				
55	.2682			.2682	
56	.2688			.2688	
57	.2695	-.2191	.05819	.2695	
58	.2702			.2702	
59	.2709			.2708	
60	.2716			.2716	
61	.2723			.2723	
62	.2730			.2730	
63	.2738			.2737	
64	.2745	-.2244	.06071	.2745	
65	.2753			.2753	
66	.2761			.2761	
67	.2769			.2768	
68	.2777			.2777	
69	.2785			.2785	
70	.2794			.2793	
71	.2802	-.2305	.06364	.2801	
72	.2811	-.2314	.06410	.2810	
73	.2819	-.2323	.06457	.2819	
74	.2828	-.2331	.06505	.2827	
75	.2837	-.2340	.06554	.2836	
76	.2846	-.2353	.06604	.2845	
77	.2855	-.2361	.06654		
78	.2865	-.2373	.06706	.2864	

Table 15. (continued)

L	5 S 1/2	5 D 3/2	5 D 5/2	6 S 1/2	7 S 1/2
79	.2874	-.2384	.06759	.2873	
80	.2864	-.2394	.06813	.2883	
81	.2893	-.2405	.06868	.2892	
82	.2903	-.2416	.06925	.2902	
83	.2913	-.2427	.06982	.2912	
84	.2923	-.2438	.07041	.2922	
85	.2934	-.2450	.07100	.2932	
86	.2944	-.2462	.07161	.2942	
87	.2954	-.2473	.07223	.2953	.2952
88	.2965	-.2486	.07287	.2963	.2963
89	.2976	-.2498	.07352	.2974	.2973
90	.2987	-.2510	.07417	.2985	.2984
91	.2998	-.2523	.07485	.2996	.2995
92	.3009	-.2536	.07553	.3007	.3006
93	.3021	-.2549	.07622	.3018	.3018
94	.3032	-.2562	.07694	.3030	.3029
95	.3044	-.2576	.07766	.3041	.3041
96	.3056	-.2590	.07840	.3053	.3052
97	.3068	-.2604	.07916	.3065	.3064
98	.3081	-.2618	.07992	.3077	.3077
99	.3093	-.2633	.08071	.3089	.3089
100	.3106	-.2648	.08151	.3102	.3101
101	.3119	-.2662	.08232	.3115	.3114
102	.3132	-.2678	.08315	.3128	.3127

Table 16. Average A_{22} values for L_3 x ray— $K_{\alpha 1}$ correlations.

Z	$K_{\alpha 1} L_{\alpha}$	$K_{\alpha 1} L_{\alpha, \ell}$	$K_{\alpha 1} L_{\beta}$
5			
6			
7			
8			
9			
10			
11		.2507	
12		.2509	
13		.2510	
14		.2512	
15		.2514	
16		.2516	
17		.2518	
18		.2520	
19		.2522	.2522
20		.2525	.2524
21	.02536	.1340	.2527
22	.02541	.09159	.2529
23	.02546	.07123	.2532
24	.02546	.05676	.2535
25	.02556	.05247	.2538
26	.02560	.04758	.2541
27	.02566	.04412	.2544
28	.02572	.04157	.2548
29	.02571	.03912	.2551
30	.02583	.03811	.2555
31	.02594	.03734	.2559
32	.02605	.03680	.2563
33	.02614	.03639	.2567
34	.02625	.03611	.2571
35	.02637	.03591	.2575
36	.02646	.03577	.2579
37	.02657	.03568	.2583
38	.02669	.03562	.2588
39	.02680	.03560	.1582
40	.02693	.03563	.1111
41	.02705	.03567	.07689
42	.02718	.03574	.06604
43	.02731	.03583	.05884
44	.02745	.03595	.05384
45	.02759	.03607	.05018
46	.02773	.03621	.04620
47	.02788	.03637	.04537
48	.02802	.03653	.04513
49	.02819	.03672	.04467
50	.02834	.03692	.04435
51	.02851	.03712	.04414
52	.02867	.03734	.04406
53	.02885	.03758	.04404
54	.02903	.03782	.04410
55	.02921	.03807	.04431
56	.02940	.03833	.04467
57	.02959	.03861	.04481
58	.02978	.03888	.04520
59	.02998	.03918	.04552
60	.03019	.03948	.04585
61	.03040	.03979	.04619
62	.03062	.04011	.04657

Table 16. (continued)

Z	$K_{\alpha 1} L_{\alpha}$	$K_{\alpha 1} L_{\alpha, \ell}$	$K_{\alpha 1} L_{\beta}$
63	.03085	.04047	.04696
64	.03107	.04081	.04731
65	.03129	.04115	.04778
66	.03154	.04153	.04823
67	.03179	.04191	.04867
68	.03202	.04229	.04915
69	.03227	.04269	.04964
70	.03253	.04311	.05015
71	.03280	.04354	.05065
72	.03307	.04397	.05111
73	.03334	.04442	.05158
74	.03363	.04488	.05203
75	.03389	.04533	.05247
76	.03420	.04584	.05289
77	.03449	.04632	.05289
78	.03480	.04684	.05350
79	.03512	.04737	.05392
80	.03543	.04789	.054
81	.03575	.04843	.05516
82	.03609	.04901	.05578
83	.03641	.04956	.05639
84	.03677	.05017	.05702
85	.03712	.05077	.05767
86	.03746	.05137	.05834
87	.03784	.05202	.05906
88	.03821	.05266	.05982
89	.03858	.05331	.06057
90	.03898	.05400	.06132
91	.03937	.05467	.06208
92	.03976	.05537	.06285
93	.04019	.05611	.06365
94	.04061	.05685	.06444
95	.04103	.05759	.06526
96	.04147	.05836	.06613
97	.04192	.05915	.06700
98	.04238	.05995	.06786
99	.04283	.06076	.06875
100	.04330	.06160	.06967
101	.04379	.06247	.07060
102	.04428	.06333	.07154

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