X-RAY EMISSION WAVELENGTHS AND KEV TABLES FOR NONDIFFRACTIVE ANALYSIS

Prepared by
C. C. Johnson, Jr., and E. W. White

ASTM Data Series DS 46

AMERICAN SOCIETY FOR TESTING AND MATERIALS

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Related ASTM Publication

X-ray Emission and Absorption Wavelengths and Two-Theta Tables

DS 37A (1970), $54.00

FOREWORD

Recently developed, high-resolution X-ray detectors such as lithium-drifted silicon and germanium have resulted in widespread application of nondiffractive (also called nondispersive) analysis as an alternative or complementary technique to X-ray emission spectrography (X-ray fluorescence analysis). This table has been prepared for use in nondiffractive analyses. All the X-ray emission lines shorter than 50 Å* have been tabulated in two basic arrangements. The first section of the table is a compilation of each line for each element arranged on the basis of increasing atomic number and increasing wavelength (decreasing energy) for the lines of each element. The second section of the table lists all the X-ray lines ordered on the basis of increasing wavelength (decreasing energy) regardless of element.

All lines shorter than 50 Å* that were used in the preparation of the second edition of *X-ray Emission and Absorption Wavelengths and Two-Theta Tables, ASTM DS 37A*, by E. W. White and G. G. Johnson, Jr., have been included in this table [*1*, *2*].[1] Some of the very weak lines may not be observed in nondiffractive spectra, but most of the lines should be resolved in favorable cases.

Description of Table

The table is divided into two major sections separated by a periodic chart showing the major lines of each element. The first section presents all lines of wavelength shorter than 50 Å*. Data in this section are listed on the basis of atomic number (Z = 6 – 98) with decreasing wavelength λ for each element. The second section gives all the lines shown in the first part arranged on the basis of increasing wavelength.

The column headings and explanation of the symbols used within each column are as follows:

1. The two columns under the heading *El* show the accepted chemical symbol for each element.

2. The *Line* designation usually gives the Siegbahn notation (K α, Lβ, etc.); but when that is not established, then the level designations are used to show the two levels involved in the transitions.

[1]Italic numbers in brackets refer to the list of references at the end of the Foreword.

3. The column (*c*) carries certain comments designated in the following manner:

	/ or C	R	*	$
A				X
B			X	
C			X	X
D		X		
E		X		X
F		X	X	
G		X	X	X
H	X			
I	X			X
J	X		X	
K	X		X	X
L	X	X		
M	X	X		X
N	X	X	X	
O	X	X	X	X

where:
/ indicates that the value was interpolated from data for neighboring elements.
C indicates the value was calculated from other transitions for the same element.

R indicates that the "best" measured value was rejected by Bearden and Burr in their least squares energy level adjustment and that the original value has been replaced, as a consequence, by their adjusted value.
* indicates that this line does not represent a dipole transition and hence will be usually quite weak.
$ denotes a transition in which the electron in the initial state occupies a level that is unoccupied in the ground state of the isolated atom. These lines have been called "semioptical" lines and were so designated in "X-ray Wavelengths" [3]. However, since the experimentally observed radiation comes from a solid target (in some cases, a chemical compound rather than a pure element), the transitions can be attributed mainly to solid state or chemcial effects or both.

4. The *I*, or relative intensity, column furnishes the relative intensity of a given line within a given series for a given element. Occasional intensities left blank indicate that the intensity is very weak and unknown. The unresolved $K\alpha_1 \alpha_2$ line intensity is given as 150, or the integrated intensity of the lines.

It is impossible to assign accurate relative intensity values to X-ray lines even within a given series (K, L, M, etc.) of an element. The reason is that the observed relative intensities are dependent upon a host of experimental parameters including energy of the X-rays or electrons causing the excitation, self-absorption within the specimen, and wavelength-dependent response or efficiency of the detector. The self-absorption effect is the primary basis for the observed chemical effect among the L-series lines. The $L\alpha$ to $L\beta$ line intensity ratio may vary by a factor of two to five, depending on the element and experimental conditions used. Nevertheless, it is important to know whether a given line can be expected to be seen as very strong, weak, or very weak. An extensive search of the literature failed to provide us with enough information to assign such values for this table. The only recourse was to experimentally collect the required data. No attempt has been made to assign N-series line intensities, as these are seldom used for analysis, and also because we were unable to experimentally measure the N spectral series.

5. *Z* is the numerical value for the atomic number.

6. The value given *R* indicates the primary literature source utilized such that, for
R = 0, the reference is Cauchois [4] where the wavelength was in kX units; for
R = 1, the reference is Cauchois [4] where the wavelength was in Å units; for
R = 2, the reference is Bearden [3] where the wavelength was in Å* units; and for
R = 6, the reference is Bearden [5] where the wavelength is in Å* units.

7. The *KeV* value was determined by dividing the wavelength of each line into the value of $h\nu$, according to the formula:

$$\text{KeV} = \frac{12.396}{\lambda\ (\text{Å}^*)}$$

8. *Lambda* (λ) is the wavelength in Å*, as introduced by Bearden [3]. Wavelengths which appear as 31.599999, for example, should be understood to be 31.6. The series of 9's is due to the finite word length and numerical representation of certain numbers on a binary computer.

Acknowledgments

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[2] White, E. W., Gibbs, G. V., Johnson, Jr., G. G. and Zechman, Jr., G. R., *X-ray Wavelength and Crystal Interchange Tables for Wavelength Geared Curved Crystal Spectrometer,* Mineral Industries: Experiment Station Publication 3-64, Pennsylvania State University, University Park, Pa., 1965.

[3] Bearden, J. A., *Reviews of Modern Physics,* RMPHA, Vol 39, No. 1, 1967, pp. 78–124.

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[5] Basic data presented in Ref. *3,* with minor revisions supplied by J. A. Bearden, June 1969, on punched IBM cards.

Table I

Compilation of Each Element by Increasing Atomic Number

El	Line	I	Z	R	KeV	Lambda
C	Kα	100	6	6	0.277	44.700
N	Kα	100	7	6	0.392	31.600
O	Kα	100	8	6	0.525	23.620
F	Kα	100	9	6	0.677	18.320
F	SKα'	35	9	1	0.680	18.220
F	SKα''	30	9	1	0.681	18.200
Ne	$K\alpha_{1,2}$	100	10	6	0.848	14.610
Na	$K\alpha_{1,2}$	100	11	6	1.041	11.910
Na	SKα'	3	11	0	1.047	11.837
Na	$SK\alpha_3$	10	11	0	1.050	11.805
Na	$SK\alpha_4$	10	11	0	1.052	11.786
Na	$SK\alpha_5$	2	11	0	1.058	11.717
Na	$SK\alpha_6$	1	11	0	1.061	11.686
Na	$K\beta_1$	.5	11	1	1.067	11.617
Na	Kβ	.5	11	6	1.071	11.575
Mg	$K\alpha_{1,2}$	100	12	6	1.253	9.890
Mg	SKα'	2	12	1	1.259	9.848
Mg	$SK\alpha_3$	8	12	1	1.262	9.824
Mg	$SK\alpha_4$	8	12	1	1.264	9.808
Mg	$SK\alpha_5$	.9	12	1	1.271	9.754
Mg	$SK\alpha_6$	.8	12	1	1.274	9.728
Mg	SKβ'	.01	12	1	1.282	9.666
Mg	$K\beta_1$	.7	12	1	1.295	9.570
Mg	Kβ	.7	12	6	1.302	9.521
Al	$K\alpha_2$	50	13	6	1.486	8.342
Al	$K\alpha_{1,2}$	150	13	6	1.486	8.340
Al	$K\alpha_1$	100	13	6	1.486	8.339
Al	SKα'	2	13	1	1.493	8.305
Al	$SK\alpha_3$	8	13	1	1.496	8.287
Al	$SK\alpha_4$	4	13	1	1.499	8.271
Al	$SK\alpha_5$	.5	13	1	1.506	8.229
Al	$SK\alpha_6$	.4	13	1	1.510	8.208
Al	SKβ'	.1	13	1	1.537	8.066
Al	$K\beta_1$	.7	13	1	1.553	7.982
Al	Kβ	.7	13	6	1.557	7.960
Si	$K\alpha_2$	50	14	6	1.739	7.128
Si	$K\alpha_{1,2}$	150	14	6	1.739	7.126
Si	$K\alpha_1$	100	14	6	1.740	7.125
Si	SKα'	.5	14	1	1.747	7.094
Si	$SK\alpha_3$	6	14	1	1.752	7.077
Si	$SK\alpha_4$	3	14	1	1.754	7.067
Si	$SK\alpha_5$	.2	14	1	1.763	7.030
Si	$SK\alpha_6$	.1	14	1	1.766	7.020
Si	SKβ'	.1	14	1	1.819	6.816
Si	$K\beta_1$	2	14	1	1.829	6.778
Si	Kβ	2	14	6	1.836	6.753
P	$K\alpha_2$	50	15	6	2.012	6.160
P	$K\alpha_{1,2}$	150	15	6	2.013	6.158
P	$K\alpha_1$	100	15	6	2.013	6.157
P	SKα'	.5	15	1	2.022	6.131
P	$SK\alpha_3$	5	15	1	2.027	6.117
P	$SK\alpha_4$	5	15	1	2.029	6.109
P	$SK\alpha_5$	.01	15	1	2.040	6.075
P	$SK\alpha_6$	.01	15	1	2.044	6.063
P	SKβ'	.1	15	0	2.123	5.838
P	$K\beta_1$	3	15	0	2.136	5.804
P	Kβ	3	15	6	2.139	5.796
S	$K\alpha_2$	50	16	6	2.306	5.375
S	$K\alpha_{1,2}$	150	16	6	2.307	5.373
S	$K\alpha_1$	100	16	6	2.307	5.372
S	SKα'	.3	16	1	2.316	5.353
S	$SK\alpha_3$	45	16	1	2.321	5.341
S	$SK\alpha_4$	45	16	1	2.324	5.334
S	$K\beta_1$	7	16	6	2.464	5.032
S	Kβx	7	16	6	2.468	5.023
Cl	$K\alpha_2$	50	17	6	2.620	4.731
Cl	$K\alpha_{1,2}$	150	17	6	2.621	4.729
Cl	$K\alpha_1$	100	17	6	2.622	4.728
Cl	$SK\alpha_3$	4	17	1	2.631	4.711
Cl	$SK\alpha_4$	4	17	1	2.640	4.696
Cl	Kβ	8	17	6	2.815	4.403
Ar	$K\alpha_2$	50	18	6	2.955	4.195
Ar	$K\alpha_{1,2}$	150	18	6	2.957	4.193
Ar	$K\alpha_1$	100	18	6	2.957	4.192
Ar	$K\beta_{1,3}$	15	18	6	3.190	3.886
K	Ll	100	19	6	0.260	47.740
K	Ln	100	19	6	0.262	47.240
K	$K\alpha_2$	50	19	6	3.310	3.744
K	$K\alpha_{1,2}$	150	19	6	3.312	3.742
K	$K\alpha_1$	100	19	6	3.313	3.741
K	$SK\alpha_3$	3	19	1	3.332	3.721
K	$SK\alpha_4$	3	19	1	3.335	3.716
K	$K\beta_{1,3}$	15	19	6	3.589	3.454
K	$K\beta_5$	.01	19	6	3.602	3.441
Ca	Ll	1	20	6	0.303	40.960
Ca	Ln	1	20	6	0.306	40.460
Ca	$L\alpha_{1,2}$	100	20	6	0.341	36.330
Ca	$L\beta_1$	10	20	6	0.345	35.940
Ca	$K\alpha_2$	50	20	6	3.687	3.362
Ca	$K\alpha_{1,2}$	150	20	6	3.690	3.359
Ca	$K\alpha_1$	100	20	6	3.691	3.358
Ca	$SK\alpha_3$	2	20	1	3.711	3.340
Ca	$SK\alpha_4$	2	20	1	3.715	3.337
Ca	$K\beta_{1,3}$	15	20	6	4.012	3.090
Ca	$K\beta_5$	.01	20	6	4.032	3.075
Sc	Ll	1	21	6	0.348	35.590
Sc	Ln	1	21	6	0.353	35.130
Sc	$L\alpha_{1,2}$	100	21	6	0.395	31.350
Sc	$L\beta_1$	10	21	6	0.400	31.020
Sc	$K\alpha_2$	50	21	6	4.085	3.034
Sc	$K\alpha_{1,2}$	150	21	6	4.088	3.032
Sc	$K\alpha_1$	100	21	6	4.090	3.031
Sc	$K\beta_{1,3}$	20	21	6	4.460	2.780
Sc	$K\beta_5$	.02	21	6	4.486	2.763
Ti	Ll	1	22	6	0.395	31.360
Ti	Ln	1	22	6	0.401	30.890
Ti	$L\alpha_{1,2}$	100	22	6	0.452	27.420
Ti	$L\beta_1$	10	22	6	0.458	27.050
Ti	$K\alpha_2$	50	22	6	4.504	2.752
Ti	$K\alpha_{1,2}$	150	22	6	4.508	2.750
Ti	$K\alpha_1$	100	22	6	4.510	2.749
Ti	$K\beta_{1,3}$	20	22	6	4.931	2.514
Ti	$K\beta_5$	.02	22	6	4.961	2.498
V	Ll	1	23	6	0.446	27.770
V	Ln	1	23	6	0.453	27.340
V	$L\alpha_{1,2}$	100	23	6	0.511	24.250
V	$L\beta_1$	10	23	6	0.519	23.880
V	$L\beta_{3,4}$	.1	23	6	0.585	21.190
V	$K\alpha_2$	50	23	6	4.944	2.507
V	$K\alpha_{1,2}$	150	23	6	4.949	2.505
V	$K\alpha_1$	100	23	6	4.951	2.504
V	$K\beta_{1,3}$	20	23	6	5.426	2.284
V	$K\beta_5$	.02	23	6	5.462	2.270
Cr	Ll	1	24	6	0.500	24.780
Cr	Ln	1	24	6	0.510	24.300
Cr	$L\alpha_{1,2}$	100	24	6	0.573	21.640
Cr	$L\beta_1$	20	24	6	0.583	21.270
Cr	$L\beta_{3,4}$	.1	24	6	0.654	18.960
Cr	$K\alpha_2$	50	24	6	5.405	2.294
Cr	$K\alpha_{1,2}$	150	24	6	5.411	2.291

El	Line	I	Z	R	KeV	Lambda
Cr	$K\alpha_1$	100	24	6	5.414	2.290
Cr	$K\beta_{1,3}$	18	24	6	5.946	2.085
Cr	$K\beta_5$	.03	24	6	5.986	2.071
Mn	Ll	2	25	6	0.556	22.290
Mn	Ln	1	25	6	0.567	21.850
Mn	$L\alpha_{1,2}$	100	25	6	0.637	19.450
Mn	$L\beta_1$	30	25	6	0.649	19.110
Mn	$L\beta_{3,4}$	.1	25	6	0.721	17.190
Mn	$K\alpha_2$	50	25	6	5.887	2.106
Mn	$K\alpha_{1,2}$	150	25	6	5.894	2.103
Mn	$K\alpha_1$	100	25	6	5.898	2.102
Mn	$K\beta_{1,3}$	20	25	6	6.489	1.910
Mn	$K\beta_5$	.03	25	6	6.534	1.897
Fe	Ll	8	26	6	0.615	20.150
Fe	Ln	2	26	6	0.628	19.750
Fe	$L\alpha_{1,2}$	100	26	6	0.705	17.590
Fe	$L\beta_1$	20	26	6	0.718	17.260
Fe	$L\beta_{3,4}$	.5	26	6	0.792	15.650
Fe	$K\alpha_2$	50	26	6	6.390	1.940
Fe	$K\alpha_{1,2}$	150	26	6	6.398	1.937
Fe	$K\alpha_1$	100	26	6	6.403	1.936
Fe	$K\beta_{1,3}$	20	26	6	7.057	1.757
Fe	$K\beta_5$	.03	26	6	7.107	1.744
Co	Ll	9	27	6	0.678	18.292
Co	Ln	2	27	6	0.694	17.870
Co	$L\alpha_{1,2}$	100	27	6	0.776	15.972
Co	$L\beta_1$	18	27	6	0.791	15.666
Co	$L\beta_{3,4}$	.5	27	6	0.866	14.310
Co	$K\alpha_2$	50	27	6	6.914	1.793
Co	$K\alpha_{1,2}$	150	27	6	6.924	1.790
Co	$K\alpha_1$	100	27	6	6.929	1.789
Co	$K\beta_{1,3}$	20	27	6	7.648	1.621
Co	$K\beta_5$	.03	27	6	7.705	1.609
Ni	Ll	8	28	6	0.743	16.693
Ni	Ln	3	28	6	0.762	16.270
Ni	$L\alpha_{1,2}$	100	28	6	0.851	14.561
Ni	$L\beta_1$	21	28	6	0.869	14.271
Ni	$L\beta_{3,4}$	.8	28	6	0.941	13.180
Ni	$K\alpha_2$	50	28	6	7.460	1.662
Ni	$K\alpha_{1,2}$	150	28	6	7.471	1.659
Ni	$K\alpha_1$	100	28	6	7.477	1.658
Ni	$K\beta_{1,3}$	20	28	6	8.263	1.500
Ni	$K\beta_5$	.03	28	6	8.327	1.489
Cu	Ll	5	29	6	0.811	15.286
Cu	Ln	1	29	6	0.832	14.900
Cu	$L\alpha_{1,2}$	100	29	6	0.930	13.336
Cu	$L\beta_1$	20	29	6	0.950	13.053
Cu	$L\beta_{3,4}$	1	29	6	1.023	12.122
Cu	$K\alpha_2$	50	29	6	8.026	1.544
Cu	$K\alpha_{1,2}$	150	29	6	8.040	1.542
Cu	$K\alpha_1$	100	29	6	8.046	1.541
Cu	$K\beta_3$	6	29	6	8.901	1.393
Cu	$K\beta_{1,3}$	20	29	6	8.904	1.392
Cu	$K\beta_5$	.03	29	6	8.976	1.381
Zn	Ll	4	30	6	0.884	14.020
Zn	Ln	2	30	6	0.906	13.680
Zn	$L\alpha_{1,2}$	100	30	6	1.012	12.254
Zn	$L\beta_1$	26	30	6	1.034	11.983
Zn	$L\beta_{3,4}$	1	30	6	1.107	11.200
Zn	$K\alpha_2$	50	30	6	8.614	1.439
Zn	$K\alpha_{1,2}$	150	30	6	8.630	1.436
Zn	$K\alpha_1$	100	30	6	8.637	1.435
Zn	$K\beta_{1,3}$	20	30	6	9.570	1.295
Zn	$K\beta_5$	.04	30	6	9.648	1.285
Zn	$K\beta_2$	.3	30	6	9.656	1.284
Ga	Ll	1	31	6	0.957	12.953
Ga	Ln	1	31	6	0.984	12.597
Ga	$L\alpha_{1,2}$	100	31	6	1.098	11.292
Ga	$L\beta_1$	35	31	6	1.125	11.023
Ga	$L\beta_{3,4}$	2	31	6	1.197	10.359
Ga	$K\alpha_2$	50	31	6	9.223	1.344
Ga	$K\alpha_{1,2}$	150	31	6	9.241	1.341
Ga	$K\alpha_1$	100	31	6	9.250	1.340
Ga	$K\beta_3$	7	31	6	10.259	1.208
Ga	$K\beta_1$	14	31	6	10.263	1.208
Ga	$K\beta_5$	.04	31	6	10.346	1.198
Ga	$K\beta_2$	.3	31	6	10.365	1.196
Ge	Ll	1	32	6	1.036	11.965
Ge	Ln	1	32	6	1.068	11.609
Ge	$L\alpha_{1,2}$	100	32	6	1.188	10.436
Ge	$L\beta_1$	35	32	6	1.218	10.175
Ge	$L\beta_4$	1	32	6	1.286	9.640
Ge	$L\beta_3$	1	32	6	1.294	9.581
Ge	$K\alpha_2$	50	32	6	9.854	1.258
Ge	$K\alpha_{1,2}$	150	32	6	9.874	1.255
Ge	$K\alpha_1$	100	32	6	9.885	1.254
Ge	$K\beta_3$	7	32	6	10.976	1.129
Ge	$K\beta_1$	14	32	6	10.980	1.129
Ge	$K\beta_5$	.05	32	6	11.073	1.119
Ge	$K\beta_2$	.5	32	6	11.099	1.117
As	Ll	1	33	6	1.120	11.072
As	Ln	1	33	6	1.155	10.734
As	$L\alpha_{1,2}$	100	33	6	1.282	9.671
As	$L\beta_1$	35	33	6	1.317	9.414
As	$L\beta_{3,4}$	2	33	6	1.388	8.929
As	$K\alpha_2$	50	33	6	10.506	1.180
As	$K\alpha_{1,2}$	150	33	6	10.530	1.177
As	$K\alpha_1$	100	33	6	10.542	1.176
As	$K\beta_3$	7	33	6	11.718	1.058
As	$K\beta_1$	15	33	6	11.724	1.057
As	$K\beta_5$	.05	33	6	11.819	1.049
As	$K\beta_2$	1	33	6	11.862	1.045
Se	Ll	1	34	6	1.204	10.294
Se	Ln	1	34	6	1.244	9.962
Se	$L\alpha_{1,2}$	100	34	6	1.379	8.990
Se	$L\beta_1$	35	34	6	1.419	8.736
Se	$L\beta_{3,4}$	2	34	6	1.490	8.321
Se	$K\alpha_2$	50	34	6	11.179	1.109
Se	$K\alpha_{1,2}$	150	34	6	11.207	1.106
Se	$K\alpha_1$	100	34	6	11.220	1.105
Se	$K\beta_3$	8	34	6	12.487	0.993
Se	$K\beta_1$	16	34	6	12.494	0.992
Se	$K\beta_5$	.05	34	6	12.594	0.984
Se	$K\beta_2$	1	34	6	12.650	0.980
Br	Ll	1	35	6	1.293	9.585
Br	Ln	1	35	6	1.339	9.255
Br	$L\alpha_{1,2}$	100	35	6	1.480	8.375
Br	$L\beta_1$	35	35	6	1.526	8.125
Br	$L\beta_{3,4}$	2	35	6	1.596	7.767
Br	$K\alpha_2$	50	35	6	11.876	1.044
Br	$K\alpha_{1,2}$	150	35	6	11.907	1.041
Br	$K\alpha_1$	100	35	6	11.922	1.040
Br	$K\beta_3$	8	35	6	13.282	0.933
Br	$K\beta_1$	16	35	6	13.289	0.933
Br	$K\beta_5$	.06	35	6	13.402	0.925
Br	$K\beta_2$	2	35	6	13.467	0.920
Kr	$L\alpha_{1,2}$	100	36	6	1.586	7.817
Kr	$L\beta_1$	35	36	6	1.636	7.576
Kr	$L\beta_6$	.1	36	6	1.651	7.510
Kr	$L\beta_4$	1	36	6	1.697	7.304

El	Line	I	Z	R	KeV	Lambda
Kr	$L\gamma_5$	.1	36	6	1.703	7.279
Kr	$L\beta_3$	1	36	6	1.706	7.264
Kr	L_2-N_3	.01	36	6	1.710	7.250
Kr	$K\alpha_2$	50	36	6	12.596	0.984
Kr	$K\alpha_{1,2}$	150	36	6	12.631	0.981
Kr	$K\alpha_1$	100	36	6	12.648	0.980
Kr	$K\beta_3$	8	36	6	14.102	0.879
Kr	$K\beta_1$	16	36	6	14.110	0.878
Kr	$K\beta_5$	.06	36	6	14.235	0.871
Kr	$K\beta_2$	3	36	6	14.312	0.866
Rb	Ll	3	37	6	1.482	8.364
Rb	Ln	1	37	6	1.542	8.041
Rb	$L\alpha_2$	10	37	6	1.692	7.325
Rb	$L\alpha_1$	100	37	6	1.694	7.318
Rb	$L\beta_1$	45	37	6	1.752	7.076
Rb	$L\beta_6$	3	37	6	1.775	6.984
Rb	$L\beta_4$	3	37	6	1.817	6.821
Rb	$L\beta_3$	3	37	6	1.826	6.788
Rb	$L\gamma_5$	.1	37	6	1.835	6.755
Rb	$L\gamma_{2,3}$	.1	37	6	2.050	6.046
Rb	$K\alpha_2$	50	37	6	13.333	0.930
Rb	$K\alpha_{1,2}$	150	37	6	13.373	0.927
Rb	$K\alpha_1$	100	37	6	13.393	0.926
Rb	$K\beta_3$	8	37	6	14.949	0.829
Rb	$K\beta_1$	16	37	6	14.959	0.829
Rb	$K\beta_5$	.06	37	6	15.082	0.822
Rb	$K\beta_2$	3	37	6	15.183	0.816
Rb	$K\beta_4$	.00	37	6	15.202	0.815
Sr	Ll	3	38	6	1.582	7.836
Sr	Ln	1	38	6	1.649	7.517
Sr	$L\alpha_2$	10	38	6	1.804	6.870
Sr	$L\alpha_1$	100	38	6	1.806	6.863
Sr	$L\beta_1$	45	38	6	1.871	6.624
Sr	$L\beta_6$	3	38	6	1.901	6.519
Sr	$L\beta_4$	3	38	6	1.936	6.403
Sr	$L\beta_3$	3	38	6	1.947	6.367
Sr	$L\gamma_5$	.1	38	6	1.969	6.296
Sr	$L\gamma_{2,3}$	.1	38	6	2.196	5.644
Sr	$K\alpha_2$	50	38	6	14.095	0.879
Sr	$K\alpha_{1,2}$	150	38	6	14.140	0.877
Sr	$K\alpha_1$	100	38	6	14.163	0.875
Sr	$K\beta_3$	8	38	6	15.822	0.783
Sr	$K\beta_1$	16	38	6	15.833	0.783
Sr	$K\beta_5$	.07	38	6	15.966	0.776
Sr	$K\beta_2$	3	38	6	16.082	0.771
Sr	$K\beta_4$	.00	38	6	16.101	0.770
Y	M_3-N_1		39	6	0.256	48.500
Y	M_2-N_1		39	6	0.267	46.480
Y	Ll	3	39	6	1.685	7.356
Y	Ln	1	39	6	1.761	7.041
Y	$L\alpha_2$	10	39	6	1.920	6.456
Y	$L\alpha_1$	100	39	6	1.922	6.449
Y	$L\beta_1$	45	39	6	1.995	6.212
Y	$L\beta_6$	3	39	6	2.034	6.094
Y	$L\beta_4$	3	39	6	2.060	6.019
Y	$L\beta_3$	3	39	6	2.072	5.983
Y	$L\gamma_5$	.1	39	6	2.110	5.875
Y	$L\gamma_{2,3}$	.5	39	6	2.346	5.283
Y	$K\alpha_2$	50	39	6	14.880	0.833
Y	$K\alpha_{1,2}$	150	39	6	14.931	0.830
Y	$K\alpha_1$	100	39	6	14.956	0.829
Y	$K\beta_3$	8	39	6	16.723	0.741
Y	$K\beta_1$	16	39	6	16.735	0.741
Y	$K\beta_5$	.07	39	6	16.877	0.734
Y	$K\beta_2$	4	39	6	17.013	0.729
Y	$K\beta_4$	.01	39	6	17.033	0.728
Zr	Ll	3	40	6	1.792	6.918
Zr	Ln	1	40	6	1.876	6.607
Zr	$L\alpha_2$	10	40	6	2.040	6.078
Zr	$L\alpha_1$	100	40	6	2.042	6.070
Zr	$L\beta_1$	45	40	6	2.124	5.836
Zr	$L\beta_6$	3	40	6	2.171	5.710
Zr	$L\beta_4$	3	40	6	2.187	5.668
Zr	$L\beta_3$	3	40	6	2.201	5.633
Zr	$L\beta_{2,15}$	1	40	6	2.219	5.586
Zr	$L\gamma_5$	.1	40	6	2.255	5.498
Zr	$L\gamma_1$	1	40	6	2.302	5.384
Zr	$L\gamma_{2,3}$	.5	40	6	2.502	4.954
Zr	$K\alpha_2$	50	40	6	15.688	0.790
Zr	$K\alpha_{1,2}$	150	40	6	15.744	0.787
Zr	$K\alpha_1$	100	40	6	15.772	0.786
Zr	$K\beta_3$	9	40	6	17.651	0.702
Zr	$K\beta_1$	18	40	6	17.665	0.702
Zr	$K\beta_5$	.08	40	6	17.813	0.696
Zr	$K\beta_2$	4	40	6	17.967	0.690
Zr	$K\beta_4$	.01	40	6	17.991	0.689
Nb	M_3-N_1	10	41	6	0.305	40.700
Nb	M_2-N_1	1	41	6	0.323	38.400
Nb	$M\gamma$	100	41	6	0.355	34.900
Nb	M_2-N_4	50	41	6	0.375	33.100
Nb	Ll	3	41	6	1.902	6.518
Nb	Ln	1	41	6	1.996	6.211
Nb	$L\alpha_2$	10	41	6	2.163	5.732
Nb	$L\alpha_1$	100	41	6	2.166	5.724
Nb	$L\beta_1$	45	41	6	2.257	5.492
Nb	$L\beta_6$	3	41	6	2.312	5.361
Nb	$L\beta_4$	3	41	6	2.319	5.345
Nb	$L\beta_3$	3	41	6	2.334	5.310
Nb	$L\beta_{2,15}$	1	41	6	2.367	5.238
Nb	$L\gamma_5$	.1	41	6	2.406	5.152
Nb	$L\gamma_1$	1	41	6	2.461	5.036
Nb	$L\gamma_{2,3}$	.5	41	6	2.663	4.654
Nb	$K\alpha_2$	50	41	6	16.518	0.750
Nb	$K\alpha_{1,2}$	150	41	6	16.581	0.748
Nb	$K\alpha_1$	100	41	6	16.612	0.746
Nb	$K\beta_3$	7	41	6	18.603	0.666
Nb	$K\beta_1$	.6	41	6	18.619	0.666
Nb	$K\beta_2$	4	41	6	18.949	0.654
Nb	$K\beta_4$	.01	41	6	18.978	0.653
Mo	M_3-N_1	100	42	6	0.331	37.500
Mo	M_2-N_1	1	42	6	0.351	35.300
Mo	Ll	3	42	6	2.015	6.151
Mo	Ln	1	42	6	2.120	5.847
Mo	$L\alpha_2$	10	42	6	2.289	5.414
Mo	$L\alpha_1$	100	42	6	2.293	5.407
Mo	$L\beta_1$	45	42	6	2.394	5.177
Mo	$L\beta_4$	3	42	6	2.455	5.049
Mo	$L\beta_6$	3	42	6	2.455	5.049
Mo	$L\beta_3$	3	42	6	2.473	5.013
Mo	$L\beta_{2,15}$	1	42	6	2.518	4.923
Mo	$L\gamma_5$	.1	42	6	2.563	4.837
Mo	$L\gamma_1$	1	42	6	2.623	4.726
Mo	$L\gamma_{2,3}$	.5	42	6	2.830	4.380
Mo	$K\alpha_2$	50	42	6	17.371	0.714
Mo	$K\alpha_{1,2}$	150	42	6	17.441	0.711
Mo	$K\alpha_1$	100	42	6	17.476	0.709
Mo	$K\beta_3$	7	42	6	19.587	0.633
Mo	$K\beta_1$	17	42	6	19.605	0.632
Mo	$K\beta_5$''	.4	42	6	19.768	0.627
Mo	$K\beta_5$'	.8	42	6	19.773	0.627

El	Line	I	Z	R	KeV	Lambda
Mo	$K\beta_2''$	.1	42	6	19.959	0.621
Mo	$K\beta_2$	4	42	6	19.962	0.621
Mo	$K\beta_4$	.01	42	6	19.993	0.620
Tc	$L\alpha_1$	100	43	6	2.424	5.115
Tc	$L\beta_1$	45	43	6	2.536	4.887
Tc	$K\alpha_2$	50	43	6	18.248	0.679
Tc	$K\alpha_{1,2}$	150	43	6	18.325	0.676
Tc	$K\alpha_1$	100	43	6	18.364	0.675
Tc	$K\beta_3$	8	43	6	20.595	0.602
Tc	$K\beta_1$	16	43	6	20.615	0.601
Tc	$K\beta_2$	3	43	6	21.002	0.590
Ru	$M_{4,5}O_{2,3}$	1	44	6	0.277	44.800
Ru	M_2-N_1	1	44	6	0.384	32.300
Ru	$M\gamma$	100	44	6	0.461	26.900
Ru	M_2-N_4	1	44	6	0.486	25.500
Ru	Ll	3	44	6	2.252	5.503
Ru	Ln	1	44	6	2.382	5.205
Ru	$L\alpha_2$	10	44	6	2.554	4.854
Ru	$L\alpha_1$	100	44	6	2.558	4.846
Ru	$L\beta_1$	45	44	6	2.683	4.621
Ru	$L\beta_4$	3	44	6	2.741	4.523
Ru	$L\beta_6$	3	44	6	2.763	4.487
Ru	$L\beta_3$	3	44	6	2.763	4.487
Ru	$L\beta_{2,15}$	1	44	6	2.835	4.372
Ru	$L\gamma_5$	.1	44	6	2.891	4.287
Ru	$L\gamma_1$	1	44	6	2.964	4.182
Ru	$L\gamma_{2,3}$	.5	44	6	3.180	3.898
Ru	$K\alpha_2$	50	44	6	19.147	0.647
Ru	$K\alpha_{1,2}$	150	44	6	19.233	0.645
Ru	$K\alpha_1$	100	44	6	19.276	0.643
Ru	$K\beta_3$	8	44	6	21.631	0.573
Ru	$K\beta_1$	16	44	6	21.653	0.572
Ru	$K\beta_5''$	.5	44	6	21.824	0.568
Ru	$K\beta_5'$	.08	44	6	21.830	0.568
Ru	$K\beta_2$	3	44	6	22.070	0.562
Ru	$K\beta_4$	.01	44	6	22.101	0.561
Rh	Mz	1	45	6	0.260	47.670
Rh	$M_{4,5}O_{2,3}$	10	45	6	0.303	40.900
Rh	M_3-N_1	10	45	6	0.416	29.800
Rh	M_2-N_1	1	45	6	0.441	28.100
Rh	$M\gamma$	100	45	6	0.496	25.010
Rh	Ll	3	45	6	2.376	5.217
Rh	Ln	1	45	6	2.519	4.922
Rh	$L\alpha_2$	10	45	6	2.692	4.605
Rh	$L\alpha_1$	100	45	6	2.696	4.597
Rh	$L\beta_1$	42	45	6	2.834	4.374
Rh	$L\beta_4$	5	45	6	2.890	4.289
Rh	$L\beta_3$	11	45	6	2.915	4.252
Rh	$L\beta_6$	3	45	6	2.922	4.242
Rh	$L\beta_{2,15}$	25	45	6	3.001	4.131
Rh	$L\gamma_5$	.1	45	6	3.064	4.045
Rh	$L\gamma_1$	10	45	6	3.143	3.944
Rh	$L\gamma_{2,3}$	5	45	6	3.363	3.685
Rh	$K\alpha_2$	50	45	6	20.070	0.618
Rh	$K\alpha_{1,2}$	150	45	6	20.165	0.615
Rh	$K\alpha_1$	100	45	6	20.213	0.613
Rh	$K\beta_3$	8	45	6	22.695	0.546
Rh	$K\beta_1$	16	45	6	22.720	0.546
Rh	$K\beta_5''$	.05	45	6	22.906	0.541
Rh	$K\beta_5'$	.05	45	6	22.913	0.541
Rh	$K\beta_2''$	.1	45	6	23.164	0.535
Rh	$K\beta_2$	4	45	6	23.169	0.535
Rh	$K\beta_4$	.01	45	6	23.213	0.534
Pd	Mz	1	46	6	0.284	43.600
Pd	$M_{4,5}O_{2,3}$	10	46	6	0.331	37.400
Pd	M_3-N_1	10	46	6	0.444	27.900
Pd	M_2-N_1	1	46	6	0.473	26.200
Pd	$M\gamma$	100	46	6	0.532	23.300
Pd	M_2-N_4	50	46	6	0.561	22.100
Pd	$M_1-N_{2,3}$	1	46	6	0.617	20.100
Pd	Ll	2	46	6	2.503	4.952
Pd	Ln	1	46	6	2.660	4.660
Pd	$L\alpha_2$	10	46	6	2.833	4.376
Pd	$L\alpha_1$	100	46	6	2.838	4.368
Pd	$L\beta_1$	42	46	6	2.990	4.146
Pd	$L\beta_4$	5	46	6	3.045	4.071
Pd	$L\beta_3$	11	46	6	3.072	4.035
Pd	$L\beta_6$	1	46	6	3.087	4.015
Pd	$L\beta_{2,15}$	25	46	6	3.171	3.909
Pd	$L\gamma_5$	.1	46	6	3.243	3.822
Pd	$L\beta_{10}$	.01	46	6	3.263	3.799
Pd	$L\beta_9$	.01	46	6	3.269	3.792
Pd	$L\gamma_1$	10	46	6	3.328	3.725
Pd	$L\gamma_{2,3}$	5	46	6	3.553	3.489
Pd	$K\alpha_2$	50	46	6	21.017	0.590
Pd	$K\alpha_{1,2}$	150	46	6	21.121	0.587
Pd	$K\alpha_1$	100	46	6	21.174	0.585
Pd	$K\beta_3$	8	46	6	23.787	0.521
Pd	$K\beta_1$	18	46	6	23.815	0.521
Pd	$K\beta_5$	.1	46	6	23.991	0.517
Pd	$K\beta_2$	3	46	6	24.295	0.510
Pd	$K\beta_4$	.01	46	6	24.339	0.509
Ag	Mz	1	47	6	0.312	39.770
Ag	$M_{4,5}O_{2,3}$	1	47	6	0.370	33.500
Ag	M_3-N_1	10	47	6	0.477	26.000
Ag	M_5-N_1	1	47	6	0.508	24.400
Ag	$M\gamma$	100	47	6	0.568	21.820
Ag	M_2-N_4	50	47	6	0.600	20.660
Ag	$M_1-N_{2,3}$	1	47	6	0.659	18.800
Ag	Ll	2	47	6	2.633	4.708
Ag	Ln	1	47	6	2.806	4.418
Ag	$L\alpha_2$	10	47	6	2.978	4.163
Ag	$L\alpha_1$	100	47	6	2.984	4.154
Ag	$L\beta_1$	42	47	6	3.150	3.935
Ag	$L\beta_4$	5	47	6	3.203	3.870
Ag	$L\beta_3$	11	47	6	3.234	3.833
Ag	$L\beta_6$	1	47	6	3.255	3.808
Ag	$L\beta_{2,15}$	25	47	6	3.347	3.703
Ag	$L\gamma_5$	.1	47	6	3.428	3.616
Ag	$L\beta_{10}$	.01	47	6	3.432	3.612
Ag	$L\beta_9$	.01	47	6	3.439	3.605
Ag	$L\gamma_1$	10	47	6	3.519	3.523
Ag	$L\gamma_2$	3	47	6	3.743	3.312
Ag	$L\gamma_3$	2	47	6	3.749	3.306
Ag	$K\alpha_2$	50	47	6	21.987	0.564
Ag	$K\alpha_{1,2}$	150	47	6	22.101	0.561
Ag	$K\alpha_1$	100	47	6	22.159	0.559
Ag	$K\beta_3$	8	47	6	24.907	0.498
Ag	$K\beta_1$	18	47	6	24.938	0.497
Ag	$K\beta_5$	.1	47	6	25.141	0.493
Ag	$K\beta_2$	5	47	6	25.452	0.487
Ag	$K\beta_4$	.01	47	6	25.507	0.486
Cd	Mz	1	48	6	0.337	36.800
Cd	M_5-O_3	1	48	6	0.402	30.800
Cd	$M_4-O_{2,3}$	10	48	6	0.408	30.400
Cd	M_3-N_1	10	48	6	0.506	24.500
Cd	M_2-N_1	1	48	6	0.541	22.900
Cd	$M\gamma$	100	48	6	0.606	20.470
Cd	M_2-N_4	50	48	6	0.639	19.400
Cd	Ll	2	48	6	2.767	4.480

El	Line	I	Z	R	KeV	Lambda
Cd	Ln	1	48	6	2.956	4.193
Cd	$L\alpha_2$	10	48	6	3.126	3.965
Cd	$L\alpha_1$	100	48	6	3.133	3.956
Cd	$L\beta_1$	42	48	6	3.316	3.738
Cd	$L\beta_4$	5	48	6	3.367	3.682
Cd	$L\beta_3$	11	48	6	3.401	3.645
Cd	$L\beta_6$	1	48	6	3.429	3.615
Cd	$L\beta_{2,15}$	25	48	6	3.528	3.514
Cd	$L\beta_{10}$	.01	48	6	3.607	3.437
Cd	$L\beta_9$	.01	48	6	3.614	3.430
Cd	$L\gamma_5$	.1	48	6	3.619	3.426
Cd	$L\gamma_1$	10	48	6	3.716	3.336
Cd	$L\gamma_2$	5	48	6	3.951	3.138
Cd	$K\alpha_2$	50	48	6	22.980	0.539
Cd	$K\alpha_{1,2}$	150	48	6	23.106	0.536
Cd	$K\alpha_1$	100	48	6	23.170	0.535
Cd	$K\beta_3$	8	48	6	26.057	0.476
Cd	$K\beta_1$	19	48	6	26.091	0.475
Cd	$K\beta_2$	5	48	6	26.639	0.465
In	Ll	7	49	6	2.904	4.269
In	Ln	7	49	6	3.112	3.983
In	$L\alpha_2$	10	49	6	3.279	3.781
In	$L\alpha_1$	100	49	6	3.286	3.772
In	$L\beta_1$	75	49	6	3.487	3.555
In	$L\beta_4$	4	49	6	3.535	3.507
In	$L\beta_3$	6	49	6	3.572	3.470
In	$L\beta_6$	1	49	6	3.608	3.436
In	$L\beta_{2,15}$	17	49	6	3.713	3.338
In	$L\beta_7$	.1	49	6	3.729	3.324
In	$L\beta_{10}$	.01	49	6	3.786	3.274
In	$L\beta_9$	.01	49	6	3.794	3.268
In	$L\gamma_5$	.1	49	6	3.815	3.249
In	$L\gamma_1$	8	49	6	3.920	3.162
In	$L\gamma_{2,3}$	2	49	6	4.160	2.980
In	$L\gamma_4$	.1	49	6	4.236	2.926
In	$K\alpha_2$	50	49	6	23.998	0.517
In	$K\alpha_{1,2}$	150	49	6	24.136	0.514
In	$K\alpha_1$	100	49	6	24.206	0.512
In	$K\beta_3$	8	49	6	27.233	0.455
In	$K\beta_1$	19	49	6	27.271	0.455
In	$K\beta_5''$	.1	49	6	27.487	0.451
In	$K\beta_5'$	.1	49	6	27.494	0.451
In	$K\beta_2$	5	49	6	27.856	0.445
In	$K\beta_4$	.01	49	6	27.923	0.444
In	$K\text{-}O_{2,3}$	.01	49	6	27.935	0.444
Sn	$M_2\text{-}M_4$	1	50	6	0.262	47.300
Sn	Mz	1	50	6	0.397	31.240
Sn	$M_5\text{-}O_3$	1	50	6	0.482	25.700
Sn	$M_4\text{-}O_{2,3}$	10	50	6	0.490	25.300
Sn	$M_3\text{-}N_1$	10	50	6	0.577	21.500
Sn	$M_2\text{-}N_1$	1	50	6	0.620	20.000
Sn	$M\gamma$	100	50	6	0.691	17.940
Sn	$M_2\text{-}N_4$	50	50	6	0.732	16.930
Sn	Ll	7	50	6	3.044	4.072
Sn	Ln	7	50	6	3.272	3.789
Sn	$L\alpha_2$	10	50	6	3.435	3.609
Sn	$L\alpha_1$	100	50	6	3.443	3.600
Sn	$L\beta_1$	75	50	6	3.662	3.385
Sn	$L\beta_4$	4	50	6	3.708	3.343
Sn	$L\beta_3$	6	50	6	3.750	3.306
Sn	$L\beta_6$	1	50	6	3.792	3.269
Sn	$L\beta_{2,15}$	17	50	6	3.904	3.175
Sn	$L\beta_7$	.1	50	6	3.927	3.156
Sn	$L\beta_{10}$	.01	50	6	3.971	3.122
Sn	$L\beta_9$	.01	50	6	3.979	3.115
Sn	$L\gamma_5$	.1	50	6	4.018	3.085
Sn	$L\gamma_1$	8	50	6	4.130	3.001
Sn	$L\gamma_{2,3}$	2	50	6	4.376	2.833
Sn	$L\gamma_4$	.1	50	6	4.463	2.777
Sn	$K\alpha_2$	50	50	6	25.040	0.495
Sn	$K\alpha_{1,2}$	150	50	6	25.191	0.492
Sn	$K\alpha_1$	100	50	6	25.267	0.491
Sn	$K\beta_3$	9	50	6	28.439	0.436
Sn	$K\beta_1$	19	50	6	28.481	0.435
Sn	$K\beta_5''$	.1	50	6	28.705	0.432
Sn	$K\beta_5'$	.1	50	6	28.711	0.432
Sn	$K\beta_2$	5	50	6	29.104	0.426
Sn	$K\beta_4$	.01	50	6	29.170	0.425
Sn	$K\text{-}O_{2,3}$	.01	50	6	29.190	0.425
Sb	$M_2\text{-}M_4$	1	51	6	0.274	45.200
Sb	Mz	1	51	6	0.429	28.880
Sb	$M_3\text{-}N_1$	10	51	6	0.614	20.200
Sb	$M_2\text{-}N_1$	1	51	6	0.659	18.800
Sb	$M\gamma$	100	51	6	0.733	16.920
Sb	$M_2\text{-}N_4$	50	51	6	0.776	15.980
Sb	Ll	7	51	6	3.188	3.888
Sb	Ln	7	51	6	3.436	3.608
Sb	$L\alpha_2$	10	51	6	3.595	3.448
Sb	$L\alpha_1$	100	51	6	3.604	3.439
Sb	$L\beta_1$	75	51	6	3.843	3.226
Sb	$L\beta_4$	4	51	6	3.886	3.190
Sb	$L\beta_3$	6	51	6	3.932	3.153
Sb	$L\beta_6$	1	51	6	3.979	3.115
Sb	$L\beta_{2,15}$	17	51	6	4.100	3.023
Sb	$L\beta_7$	.1	51	6	4.125	3.005
Sb	$L\beta_{10}$	.01	51	6	4.161	2.979
Sb	$L\beta_9$	.01	51	6	4.170	2.973
Sb	$L\gamma_5$	.1	51	6	4.228	2.932
Sb	$L\gamma_1$	8	51	6	4.347	2.852
Sb	$L\gamma_{2,3}$	2	51	6	4.599	2.695
Sb	$L\gamma_4$	.1	51	6	4.696	2.640
Sb	$K\alpha_2$	50	51	6	26.106	0.475
Sb	$K\alpha_{1,2}$	150	51	6	26.271	0.472
Sb	$K\alpha_1$	100	51	6	26.355	0.470
Sb	$K\beta_3$	9	51	6	29.674	0.418
Sb	$K\beta_1$	20	51	6	29.721	0.417
Sb	$K\beta_5''$	.1	51	6	29.951	0.414
Sb	$K\beta_5'$	.1	51	6	29.958	0.414
Sb	$K\beta_2$	5	51	6	30.388	0.408
Sb	$K\beta_4$	.01	51	6	30.456	0.407
Sb	$K\text{-}O_{2,3}$	.01	51	6	30.482	0.407
Te	Mz	1	52	6	0.464	26.720
Te	$M_5\text{-}O_3$	1	52	6	0.569	21.780
Te	$M_4\text{-}O_{2,3}$	10	52	6	0.581	21.340
Te	$M_3\text{-}N_1$	10	52	6	0.649	19.100
Te	$M_2\text{-}N_1$	1	52	6	0.704	17.600
Te	$M\gamma$	100	52	6	0.778	15.930
Te	Ll	7	52	6	3.335	3.717
Te	Ln	7	52	6	3.605	3.438
Te	$L\alpha_2$	10	52	6	3.758	3.298
Te	$L\alpha_1$	100	52	6	3.769	3.289
Te	$L\beta_1$	75	52	6	4.029	3.077
Te	$L\beta_4$	4	52	6	4.069	3.047
Te	$L\beta_3$	6	52	6	4.120	3.009
Te	$L\beta_6$	1	52	6	4.173	2.971
Te	$L\beta_{2,15}$	17	52	6	4.301	2.882
Te	$L\beta_7$	.1	52	6	4.329	2.863
Te	$L\beta_{10}$	.01	52	6	4.356	2.846
Te	$L\beta_9$	.01	52	6	4.366	2.839
Te	$L\gamma_5$	.1	52	6	4.443	2.790

El	Line	I	Z	R	KeV	Lambda
Te	$L\gamma_1$	8	52	6	4.570	2.712
Te	$L\gamma_{2,3}$	2	52	6	4.828	2.567
Te	$L\gamma_4$	.1	52	6	4.936	2.511
Te	$K\alpha_2$	50	52	6	27.197	0.456
Te	$K\alpha_{1,2}$	150	52	6	27.377	0.453
Te	$K\alpha_1$	100	52	6	27.468	0.451
Te	$K\beta_3$	9	52	6	30.939	0.401
Te	$K\beta_1$	20	52	6	30.990	0.400
Te	$K\beta_2$	6	52	6	31.698	0.391
Te	$K\text{-}O_{2,3}$	.01	52	6	31.806	0.390
I	Ll	7	53	6	3.484	3.558
I	Ln	7	53	6	3.780	3.280
I	$L\alpha_2$	10	53	6	3.925	3.158
I	$L\alpha_1$	100	53	6	3.937	3.149
I	$L\beta_1$	75	53	6	4.220	2.937
I	$L\beta_4$	4	53	6	4.257	2.912
I	$L\beta_3$	6	53	6	4.313	2.874
I	$L\beta_6$	1	53	6	4.370	2.837
I	$L\beta_{2,15}$	17	53	6	4.507	2.751
I	$L\beta_7$	.1	53	6	4.543	2.729
I	$L\beta_{10}$	.01	53	6	4.556	2.721
I	$L\beta_9$	.01	53	6	4.568	2.714
I	$L\gamma_5$	.1	53	6	4.665	2.657
I	$L\gamma_1$	8	53	6	4.800	2.582
I	$L\gamma_{2,3}$	2	53	6	5.065	2.447
I	$L\gamma_4$	.1	53	6	5.184	2.391
I	$K\alpha_2$	50	53	6	28.312	0.438
I	$K\alpha_{1,2}$	150	53	6	28.508	0.435
I	$K\alpha_1$	100	53	6	28.607	0.433
I	$K\beta_3$	9	53	6	32.234	0.385
I	$K\beta_1$	20	53	6	32.289	0.384
I	$K\beta_2$	6	53	6	33.036	0.375
Xe	$L\alpha_1$	100	54	6	4.109	3.017
Xe	$L\alpha_2$	50	54	6	29.453	0.421
Xe	$K\alpha_{1,2}$	150	54	6	29.666	0.418
Xe	$K\alpha_1$	100	54	6	29.774	0.416
Xe	$K\beta_3$	9	54	6	33.556	0.369
Xe	$K\beta_1$	20	54	6	33.619	0.369
Xe	$K\beta_2$	6	54	6	34.408	0.360
Cs	Ll	2	55	6	3.794	3.267
Cs	Ln	1	55	6	4.141	2.993
Cs	$L\alpha_2$	10	55	6	4.272	2.902
Cs	$L\alpha_1$	100	55	6	4.286	2.892
Cs	$L\beta_1$	50	55	6	4.619	2.684
Cs	$L\beta_4$	5	55	6	4.649	2.667
Cs	$L\beta_3$	6	55	6	4.716	2.628
Cs	$L\beta_6$	.1	55	6	4.780	2.593
Cs	$L\beta_{2,15}$	20	55	6	4.935	2.512
Cs	$L\beta_{10}$	.01	55	6	4.974	2.492
Cs	$L\beta_9$	.01	55	6	4.988	2.485
Cs	$L\beta_7$	.1	55	6	4.989	2.485
Cs	$L\gamma_5$	.1	55	6	5.128	2.417
Cs	$L\gamma_1$	5	55	6	5.279	2.348
Cs	$L\gamma_2$	1	55	6	5.541	2.237
Cs	$L\gamma_3$	1	55	6	5.552	2.233
Cs	$L\gamma_4$	.1	55	6	5.702	2.174
Cs	$K\alpha_2$	50	55	6	30.620	0.405
Cs	$K\alpha_{1,2}$	150	55	6	30.851	0.402
Cs	$K\alpha_1$	100	55	6	30.968	0.400
Cs	$K\beta_3$	9	55	6	34.913	0.355
Cs	$K\beta_1$	21	55	6	34.981	0.354
Cs	$K\beta_2$	6	55	6	35.815	0.346
Ba	Mz	1	56	6	0.601	20.640
Ba	$M_5\text{-}O_3$	.01	56	6	0.765	16.200
Ba	$M_4\text{-}O_2$	10	56	6	0.779	15.910
Ba	$M_4\text{-}O_3$	10	56	6	0.789	15.720
Ba	$M\gamma$	100	56	6	0.972	12.750
Ba	Ll	2	56	6	3.953	3.135
Ba	Ln	1	56	6	4.330	2.863
Ba	$L\alpha_2$	10	56	6	4.450	2.786
Ba	$L\alpha_1$	100	56	6	4.465	2.776
Ba	$L\beta_1$	50	56	6	4.827	2.568
Ba	$L\beta_4$	5	56	6	4.851	2.555
Ba	$L\beta_3$	6	56	6	4.926	2.516
Ba	$L\beta_6$	.1	56	6	4.993	2.483
Ba	$L\beta_{2,15}$	20	56	6	5.156	2.404
Ba	$L\beta_{10}$	.01	56	6	5.193	2.387
Ba	$L\beta_7$	.1	56	6	5.207	2.381
Ba	$L\gamma_5$	.1	56	6	5.370	2.308
Ba	$L\gamma_1$	5	56	6	5.530	2.241
Ba	$L\gamma_2$	1	56	6	5.796	2.139
Ba	$L\gamma_3$	1	56	6	5.808	2.134
Ba	$L\gamma_4$	.1	56	6	5.972	2.076
Ba	$K\alpha_2$	50	56	6	31.812	0.390
Ba	$K\alpha_{1,2}$	150	56	6	32.062	0.387
Ba	$K\alpha_1$	100	56	6	32.188	0.385
Ba	$K\beta_3$	7	56	6	36.298	0.342
Ba	$K\beta_1$	21	56	6	36.372	0.341
Ba	$K\beta_5''$	.1	56	6	36.637	0.338
Ba	$K\beta_5'$	.1	56	6	36.659	0.338
Ba	$K\beta_2$	7	56	6	37.251	0.333
Ba	$K\beta_4$	.02	56	6	37.305	0.332
Ba	$K\text{-}O_{2,3}$	.01	56	6	37.420	0.331
La	Mz	.01	57	6	0.638	19.440
La	$M\alpha$	100	57	6	0.833	14.880
La	$M\beta$	45	57	6	0.854	14.510
La	$M\gamma$	1	57	6	1.026	12.080
La	Ll	2	57	6	4.124	3.006
La	Ln	1	57	6	4.524	2.740
La	$L\alpha_2$	10	57	6	4.633	2.675
La	$L\alpha_1$	100	57	6	4.650	2.666
La	$L\beta_1$	50	57	6	5.041	2.459
La	$L\beta_4$	5	57	6	5.061	2.449
La	$L\beta_3$	6	57	6	5.143	2.410
La	$L\beta_6$	.1	57	6	5.211	2.379
La	$L\beta_{2,15}$	20	57	6	5.383	2.303
La	$L\beta_{10}$	.01	57	6	5.413	2.290
La	$L\beta_9$	.01	57	6	5.432	2.282
La	$L\beta_7$	.1	57	6	5.449	2.275
La	$L\gamma_5$	.1	57	6	5.620	2.206
La	$L\gamma_1$	5	57	6	5.788	2.142
La	$L\gamma_2$	1	57	6	6.059	2.046
La	$L\gamma_3$	1	57	6	6.073	2.041
La	$L\gamma_4$	.1	57	6	6.251	1.983
La	$K\alpha_2$	50	57	6	33.028	0.375
La	$K\alpha_{1,2}$	150	57	6	33.299	0.372
La	$K\alpha_1$	100	57	6	33.436	0.371
La	$K\beta_3$	9	57	6	37.714	0.329
La	$K\beta_1$	21	57	6	37.795	0.328
La	$K\beta_5''$	.1	57	6	38.068	0.326
La	$K\beta_5'$	.2	57	6	38.088	0.325
La	$K\beta_2$	7	57	6	38.723	0.320
La	$K\beta_4$	.03	57	6	38.821	0.319
La	$K\text{-}O_{2,3}$	.01	57	6	38.903	0.319
Ce	Mz	.01	58	6	0.676	18.350
Ce	$M_5\text{-}O_{2,3}$	.01	58	6	0.861	14.390
Ce	$M\alpha$	100	58	6	0.883	14.040
Ce	$M\beta$	45	58	6	0.902	13.750
Ce	$M\gamma$	1	58	6	1.075	11.530
Ce	Ll	2	58	6	4.287	2.892

El	Line	I	Z	R	KeV	Lambda
Ce	Ln	1	58	6	4.731	2.620
Ce	$L\alpha_2$	10	58	6	4.822	2.571
Ce	$L\alpha_1$	100	58	6	4.839	2.561
Ce	$L\beta_1$	50	58	6	5.261	2.356
Ce	$L\beta_4$	5	58	6	5.276	2.350
Ce	$L\beta_3$	6	58	6	5.364	2.311
Ce	$L\beta_6$	.1	58	6	5.433	2.282
Ce	$L\beta_{2,15}$	20	58	6	5.612	2.209
Ce	$L\beta_{10}$	.01	58	6	5.645	2.196
Ce	$L\beta_9$	.01	58	6	5.664	2.188
Ce	$L\beta_7$	.1	58	6	5.685	2.181
Ce	$L\gamma_5$	.1	58	6	5.874	2.110
Ce	$L\gamma_1$	5	58	6	6.051	2.049
Ce	$L\gamma_8$	.1	58	6	6.125	2.024
Ce	$L\gamma_2$	1	58	6	6.324	1.960
Ce	$L\gamma_3$	1	58	6	6.340	1.955
Ce	$L\gamma_4$	.1	58	6	6.527	1.899
Ce	$K\alpha_2$	50	58	6	34.273	0.362
Ce	$K\alpha_{1,2}$	150	58	6	34.566	0.359
Ce	$K\alpha_1$	100	58	6	34.714	0.357
Ce	$K\beta_3$	10	58	6	39.163	0.317
Ce	$K\beta_1$	22	58	6	39.251	0.316
Ce	$K\beta_5''$	.2	58	6	39.532	0.314
Ce	$K\beta_5'$	.2	58	.6	39.551	0.313
Ce	$K\beta_2$	7	58	6	40.226	0.308
Ce	$K\beta_4$	.01	58	6	40.329	0.307
Ce	$K\text{-}O_{2,3}$	.01	58	6	40.420	0.307
Pr	Mz	.01	59	6	0.713	17.380
Pr	Mα	100	59	6	0.929	13.343
Pr	Mβ	45	59	6	0.949	13.060
Pr	Mγ	1	59	6	1.127	10.998
Pr	Ll	2	59	6	4.452	2.784
Pr	Ln	1	59	6	4.935	2.512
Pr	$L\alpha_2$	10	59	6	5.013	2.473
Pr	$L\alpha_1$	100	59	6	5.033	2.463
Pr	$L\beta_1$	50	59	6	5.488	2.259
Pr	$L\beta_4$	5	59	6	5.497	2.255
Pr	$L\beta_3$	6	59	6	5.591	2.217
Pr	$L\beta_6$	.1	59	6	5.659	2.191
Pr	$L\beta_{2,15}$	20	59	6	5.849	2.119
Pr	$L\beta_{10}$	.01	59	6	5.883	2.107
Pr	$L\beta_9$	.01	59	6	5.902	2.100
Pr	$L\beta_7$	.1	59	6	5.926	2.092
Pr	$L\gamma_5$	.1	59	6	6.135	2.020
Pr	$L\gamma_1$	5	59	6	6.321	1.961
Pr	$L\gamma_8$	.1	59	6	6.402	1.936
Pr	$L\gamma_2$	1	59	6	6.597	1.879
Pr	$L\gamma_3$	1	59	6	6.615	1.874
Pr	$L\gamma_4$	.1	59	6	6.814	1.819
Pr	$K\alpha_2$	50	59	6	35.544	0.349
Pr	$K\alpha_{1,2}$	150	59	6	35.860	0.346
Pr	$K\alpha_1$	100	59	6	36.020	0.344
Pr	$K\beta_3$	10	59	6	40.646	0.305
Pr	$K\beta_1$	22	59	6	40.741	0.304
Pr	$K\beta_2$	65	59	6	41.767	0.297
Nd	Mz	.01	60	6	0.753	16.460
Nd	Mα	100	60	6	0.978	12.680
Nd	Mβ	55	60	6	0.996	12.440
Nd	Mγ	1	60	6	1.180	10.505
Nd	Ll	2	60	6	4.632	2.676
Nd	Ln	1	60	6	5.145	2.409
Nd	$L\alpha_2$	10	60	6	5.207	2.381
Nd	$L\alpha_1$	100	60	6	5.229	2.370
Nd	$L\beta_4$	5	60	6	5.721	2.167
Nd	$L\beta_1$	50	60	6	5.721	2.167
Nd	$L\beta_3$	6	60	6	5.828	2.127
Nd	$L\beta_6$	.1	60	6	5.892	2.104
Nd	$L\beta_{2,15}$	20	60	6	6.088	2.036
Nd	$L\beta_{10}$	.01	60	6	6.125	2.024
Nd	$L\beta_9$	.01	60	6	6.147	2.016
Nd	$L\beta_7$	.1	60	6	6.170	2.009
Nd	$L\gamma_5$	.1	60	6	6.405	1.935
Nd	$L\gamma_1$	5	60	6	6.601	1.878
Nd	$L\gamma_8$	.1	60	6	6.682	1.855
Nd	$L\gamma_2$	1	60	6	6.882	1.801
Nd	$L\gamma_3$	1	60	6	6.900	1.796
Nd	$L\gamma_4$	.1	60	6	7.106	1.744
Nd	$K\alpha_2$	50	60	6	36.841	0.336
Nd	$K\alpha_{1,2}$	150	60	6	37.182	0.333
Nd	$K\alpha_1$	100	60	6	37.355	0.332
Nd	$K\beta_3$	10	60	6	42.159	0.294
Nd	$K\beta_1$	22	60	6	42.264	0.293
Nd	$K\beta_2$	7	60	6	43.327	0.286
Pm	$L\alpha_2$	10	61	6	5.407	2.293
Pm	$L\alpha_1$	100	61	6	5.432	2.282
Pm	$L\beta_1$	50	61	6	5.960	2.080
Pm	$L\beta_3$	6	61	6	6.070	2.042
Pm	$L\beta_{2,15}$	20	61	6	6.338	1.956
Pm	$L\gamma_1$	5	61	6	6.891	1.799
Pm	$K\alpha_2$	50	61	6	38.165	0.325
Pm	$K\alpha_{1,2}$	150	61	6	38.532	0.322
Pm	$K\alpha_1$	100	61	6	38.718	0.320
Pm	$K\beta_3$	10	61	6	43.705	0.284
Pm	$K\beta_1$	22	61	6	43.818	0.283
Pm	$K\beta_2$	8	61	6	44.929	0.276
Sm	Mz	.01	62	6	0.831	14.910
Sm	Mα	100	62	6	1.081	11.470
Sm	Mβ	45	62	6	1.100	11.270
Sm	Mγ	1	62	6	1.291	9.600
Sm	Ll	2	62	6	4.994	2.482
Sm	Ln	1	62	6	5.588	2.218
Sm	$L\alpha_2$	10	62	6	5.607	2.211
Sm	$L\alpha_1$	100	62	6	5.635	2.200
Sm	$L\beta_4$	5	62	6	6.195	2.001
Sm	$L\beta_1$	50	62	6	6.204	1.998
Sm	$L\beta_3$	6	62	6	6.317	1.962
Sm	$L\beta_6$	.1	62	6	6.369	1.946
Sm	$L\beta_{2,15}$	20	62	6	6.586	1.882
Sm	$L\beta_{10}$	.01	62	6	6.629	1.870
Sm	$L\beta_9$	.01	62	6	6.659	1.862
Sm	$L\beta_7$	.1	62	6	6.678	1.856
Sm	$L\beta_5$	.1	62	6	6.711	1.847
Sm	$L\gamma_5$	.1	62	6	6.967	1.779
Sm	$L\gamma_1$	5	62	6	7.177	1.727
Sm	$L\gamma_8$	.1	62	6	7.265	1.706
Sm	$L\gamma_6$	.01	62	6	7.306	1.697
Sm	$L\gamma_2$	1	62	6	7.465	1.660
Sm	$L\gamma_3$	1	62	6	7.485	1.656
Sm	$L\gamma_4$	.1	62	6	7.712	1.607
Sm	$K\alpha_2$	50	62	6	39.516	0.314
Sm	$K\alpha_{1,2}$	150	62	6	39.911	0.311
Sm	$K\alpha_1$	100	62	6	40.111	0.309
Sm	$K\beta_3$	10	62	6	45.281	0.274
Sm	$K\beta_1$	22	62	6	45.405	0.273
Sm	$K\beta_5$	.2	62	6	45.723	0.271
Sm	$K\beta_2$	8	62	6	46.566	0.266
Sm	$K\text{-}O_{2,3}$	.01	62	6	46.793	0.265
Eu	Mz	.01	63	6	0.872	14.220
Eu	Mα	100	63	6	1.131	10.960
Eu	Mβ	45	63	6	1.153	10.750

El	Line	I	Z	R	KeV	Lambda
Eu	$M\gamma$	1	63	6	1.346	9.211
Eu	Ll	2	63	6	5.176	2.395
Eu	Ln	1	63	6	5.816	2.131
Eu	$L\alpha_2$	10	63	6	5.816	2.131
Eu	$L\alpha_1$	100	63	6	5.845	2.121
Eu	$L\beta_4$	5	63	6	6.438	1.925
Eu	$L\beta_1$	50	63	6	6.455	1.920
Eu	$L\beta_3$	6	63	6	6.570	1.887
Eu	$L\beta_6$	.1	63	6	6.616	1.874
Eu	$L\beta_{2,15}$	20	63	6	6.842	1.812
Eu	$L\beta_{10}$	.01	63	6	6.889	1.799
Eu	$L\beta_9$	.01	63	6	6.919	1.792
Eu	$L\beta_7$	.1	63	6	6.944	1.785
Eu	$L\beta_5$	.1	63	6	6.975	1.777
Eu	$L\gamma_5$	.1	63	6	7.255	1.708
Eu	$L\gamma_1$	5	63	6	7.479	1.657
Eu	$L\gamma_8$	.1	63	6	7.584	1.635
Eu	$L\gamma_6$	.01	63	6	7.613	1.628
Eu	$L\gamma_2$	1	63	6	7.766	1.596
Eu	$L\gamma_3$	1	63	6	7.795	1.590
Eu	$L\gamma_4$	.1	63	6	8.029	1.544
Eu	$K\alpha_2$	50	63	6	40.895	0.303
Eu	$K\alpha_{1,2}$	150	63	6	41.320	0.300
Eu	$K\alpha_1$	100	63	6	41.535	0.298
Eu	$K\beta_3$	11	63	6	46.896	0.264
Eu	$K\beta_1$	23	63	6	47.030	0.264
Eu	$K\beta_2$	8	63	6	48.248	0.257
Eu	$K\text{-}O_{2,3}$	.01	63	6	48.489	0.256
Gd	Mz	.01	64	6	0.913	13.570
Gd	$M\alpha$	100	64	6	1.185	10.460
Gd	$M\beta$	45	64	6	1.209	10.254
Gd	$M\gamma$	1	64	6	1.402	8.844
Gd	Ll	2	64	6	5.361	2.312
Gd	$L\alpha_2$	10	64	6	6.024	2.058
Gd	Ln	1	64	6	6.049	2.049
Gd	$L\alpha_1$	100	64	6	6.056	2.047
Gd	$L\beta_4$	5	64	6	6.686	1.854
Gd	$L\beta_1$	50	64	6	6.712	1.847
Gd	$L\beta_3$	6	64	6	6.830	1.815
Gd	$L\beta_6$	.1	64	6	6.866	1.805
Gd	$L\beta_{2,15}$	20	64	6	7.102	1.745
Gd	$L\beta_{10}$	.01	64	6	7.159	1.731
Gd	$L\beta_9$	.01	64	6	7.190	1.724
Gd	$L\beta_7$	.1	64	6	7.206	1.720
Gd	$L\beta_5$	.1	64	6	7.236	1.713
Gd	$L\gamma_5$	.1	64	6	7.553	1.641
Gd	$L\gamma_1$	5	64	6	7.784	1.592
Gd	$L\gamma_8$	.1	64	6	7.892	1.571
Gd	$L\gamma_6$	.01	64	6	7.924	1.564
Gd	$L\gamma_2$	1	64	6	8.086	1.533
Gd	$L\gamma_3$	1	64	6	8.104	1.530
Gd	$L\gamma_4$	.1	64	6	8.354	1.484
Gd	$L_1\text{-}O_{4,5}$	.01	64	6	8.372	1.481
Gd	$K\alpha_2$	50	64	6	42.302	0.293
Gd	$K\alpha_{1,2}$	150	64	6	42.757	0.290
Gd	$K\alpha_1$	100	64	6	42.989	0.288
Gd	$K\beta_3$	11	64	6	48.547	0.255
Gd	$K\beta_1$	23	64	6	48.688	0.255
Gd	$K\beta_5$	.2	64	6	49.045	0.253
Gd	$K\beta_2$	8	64	6	49.952	0.248
Gd	$K\text{-}O_{2,3}$	.01	64	6	50.213	0.247
Tb	Mz	.01	65	6	0.955	12.980
Tb	$M\alpha$	100	65	6	1.240	10.000
Tb	$M\beta$	45	65	6	1.266	9.792
Tb	$M\gamma$	1	65	6	1.461	8.486
Tb	Ll	2	65	6	5.546	2.235
Tb	$L\alpha_2$	10	65	6	6.237	1.987
Tb	$L\alpha_1$	100	65	6	6.272	1.976
Tb	Ln	1	65	6	6.283	1.973
Tb	$L\beta_4$	5	65	6	6.939	1.786
Tb	$L\beta_1$	50	65	6	6.977	1.777
Tb	$L\beta_3$	6	65	6	7.095	1.747
Tb	$L\beta_6$	.1	65	6	7.115	1.742
Tb	$L\beta_{2,15}$	20	65	6	7.365	1.683
Tb	$L\beta_{10}$	.01	65	6	7.435	1.667
Tb	$L\beta_7$	.1	65	6	7.474	1.658
Tb	$L\beta_5$	.1	65	6	7.508	1.651
Tb	$L\gamma_5$	.1	65	6	7.852	1.579
Tb	$L\gamma_1$	5	65	6	8.100	1.530
Tb	$L\gamma_8$	.1	65	6	8.211	1.510
Tb	$L\gamma_6$	.01	65	6	8.245	1.503
Tb	$L\gamma_2$	1	65	6	8.396	1.476
Tb	$L\gamma_3$	1	65	6	8.422	1.472
Tb	$L\gamma_4$	.1	65	6	8.683	1.428
Tb	$L_1\text{-}O_{4,5}$	.01	65	6	8.712	1.423
Tb	$K\alpha_2$	50	65	6	43.737	0.283
Tb	$K\alpha_{1,2}$	150	65	6	44.226	0.280
Tb	$K\alpha_1$	100	65	6	44.474	0.279
Tb	$K\beta_3$	11	65	6	50.221	0.247
Tb	$K\beta_1$	23	65	6	50.374	0.246
Tb	$K\beta_2$	8	65	6	51.715	0.240
Tb	$K\text{-}O_{2,3}$	.01	65	6	51.957	0.239
Dy	Mz	.01	66	6	0.997	12.430
Dy	$M\alpha$	100	66	6	1.293	9.590
Dy	$M\beta$	45	66	6	1.325	9.357
Dy	$M\gamma$	1	66	6	1.522	8.144
Dy	Ll	2	66	6	5.742	2.159
Dy	$L\alpha_2$	10	66	6	6.457	1.920
Dy	$L\alpha_1$	100	66	6	6.494	1.909
Dy	Ln	1	66	6	6.533	1.897
Dy	$L\beta_4$	5	66	6	7.203	1.721
Dy	$L\beta_1$	50	66	6	7.246	1.711
Dy	$L\beta_3$	6	66	6	7.369	1.682
Dy	$L\beta_6$	.1	66	6	7.369	1.682
Dy	$L\beta_{2,15}$	20	66	6	7.634	1.624
Dy	$L\beta_{10}$	.01	66	6	7.712	1.607
Dy	$L\beta_7$	.1	66	6	7.726	1.604
Dy	$L\beta_9$	.01	66	6	7.749	1.600
Dy	$L\beta_5$	.1	66	6	7.804	1.588
Dy	$L\gamma_5$	.1	66	6	8.165	1.518
Dy	$L\gamma_1$	5	66	6	8.417	1.473
Dy	$L\gamma_6$	.01	66	6	8.574	1.446
Dy	$L\gamma_2$	1	66	6	8.713	1.423
Dy	$L\gamma_3$	1	66	6	8.752	1.416
Dy	$L\gamma_4$	.1	66	6	9.018	1.375
Dy	$K\alpha_2$	50	66	6	45.200	0.274
Dy	$K\alpha_{1,2}$	150	66	6	45.724	0.271
Dy	$K\alpha_1$	100	66	6	45.991	0.270
Dy	$K\beta_3$	11	66	6	51.949	0.239
Dy	$K\beta_1$	23	66	6	52.110	0.238
Dy	$K\beta_5$	.2	66	6	52.485	0.236
Dy	$K\beta_2$	9	66	6	53.500	0.232
Dy	$K\text{-}O_{2,3}$	.01	66	6	53.765	0.231
Ho	Mz	.01	67	6	1.045	11.860
Ho	$M\alpha$	100	67	6	1.347	9.200
Ho	$M\beta$	45	67	6	1.383	8.965
Ho	$M\gamma$	1	67	6	1.576	7.865
Ho	Ll	2	67	6	5.942	2.086
Ho	$L\alpha_2$	10	67	6	6.679	1.856
Ho	$L\alpha_1$	100	67	6	6.719	1.845

El	Line	I	Z	R	KeV	Lambda
Ho	Ln	1	67	6	6.787	1.826
Ho	$L\beta_4$	5	67	6	7.470	1.659
Ho	$L\beta_1$	50	67	6	7.524	1.647
Ho	$L\beta_6$	.1	67	6	7.634	1.624
Ho	$L\beta_3$	6	67	6	7.650	1.620
Ho	$L\beta_{2,15}$	20	67	6	7.910	1.567
Ho	$L\beta_{10}$	.01	67	6	8.005	1.549
Ho	$L\beta_5$	.1	67	6	8.061	1.538
Ho	$L\gamma_5$	.1	67	6	8.480	1.462
Ho	$L\gamma_1$	5	67	6	8.746	1.417
Ho	$L\gamma_8$	.1	67	6	8.865	1.398
Ho	$L\gamma_6$	.01	67	6	8.903	1.392
Ho	$L\gamma_2$	1	67	6	9.049	1.370
Ho	$L\gamma_3$	1	67	6	9.086	1.364
Ho	$L\gamma_4$	.1	67	6	9.373	1.322
Ho	$L_1-O_{4,5}$	.01	67	6	9.385	1.321
Ho	$K\alpha_2$	50	67	6	46.692	0.265
Ho	$K\alpha_{1,2}$	150	67	6	47.253	0.262
Ho	$K\alpha_1$	100	67	6	47.539	0.261
Ho	$K\beta_3$	11	67	6	53.702	0.231
Ho	$K\beta_1$	22	67	6	53.868	0.230
Ho	$K\beta_5$	.2	67	6	54.238	0.229
Ho	$K\beta_2$	8	67	6	55.315	0.224
Ho	$K-O_{2,3}$	.01	67	6	55.575	0.223
Er	Mz	.01	68	6	1.090	11.370
Er	$M\alpha$	100	68	6	1.405	8.820
Er	$M\beta$	45	68	6	1.443	8.592
Er	M_3-N_4	.1	68	6	1.631	7.600
Er	$M\gamma$	1	68	6	1.643	7.546
Er	Ll	2	68	6	6.152	2.015
Er	$L\alpha_2$	10	68	6	6.904	1.795
Er	$L\alpha_1$	100	68	6	6.947	1.784
Er	Ln	1	68	6	7.057	1.757
Er	$L\beta_4$	5	68	6	7.744	1.601
Er	$L\beta_1$	50	68	6	7.809	1.587
Er	$L\beta_6$	.1	68	6	7.908	1.567
Er	$L\beta_3$	6	68	6	7.938	1.562
Er	$L\beta_{2,15}$	20	68	6	8.188	1.514
Er	$L\beta_{10}$	.01	68	6	8.297	1.494
Er	$L\beta_7$	.1	68	6	8.297	1.494
Er	$L\beta_9$	.01	68	6	8.345	1.485
Er	$L\beta_5$	.1	68	6	8.349	1.485
Er	$L\gamma_5$	.1	68	6	8.812	1.407
Er	$L\gamma_1$	5	68	6	9.087	1.364
Er	$L\gamma_6$	.01	68	6	9.253	1.340
Er	$L\gamma_2$	1	68	6	9.384	1.321
Er	$L\gamma_3$	1	68	6	9.429	1.315
Er	$L\gamma_4$	.1	68	6	9.721	1.275
Er	$K\alpha_2$	50	68	6	48.213	0.257
Er	$K\alpha_{1,2}$	150	68	6	48.813	0.254
Er	$K\alpha_1$	100	68	6	49.119	0.252
Er	$K\beta_3$	12	68	6	55.485	0.223
Er	$K\beta_1$	22	68	6	55.672	0.223
Er	$K\beta_5$	.2	68	6	56.030	0.221
Er	$K\beta_2$	8	68	6	57.204	0.217
Er	$K-O_{2,3}$	.01	68	6	57.439	0.216
Tm	$M\alpha$	100	69	6	1.462	8.480
Tm	$M\beta$	45	69	6	1.503	8.249
Tm	Ll	2	69	6	6.341	1.955
Tm	$L\alpha_2$	10	69	6	7.132	1.738
Tm	$L\alpha_1$	100	69	6	7.179	1.727
Tm	Ln	1	69	6	7.308	1.696
Tm	$L\beta_4$	5	69	6	8.024	1.545
Tm	$L\beta_1$	50	69	6	8.100	1.530
Tm	$L\beta_6$	.1	69	6	8.176	1.516
Tm	$L\beta_3$	6	69	6	8.229	1.506
Tm	$L\beta_{2,15}$	20	69	6	8.467	1.464
Tm	$L\beta_{10}$	.01	69	6	8.602	1.441
Tm	$L\beta_5$	.1	69	6	8.639	1.435
Tm	$L\beta_9$	.01	69	6	8.647	1.434
Tm	$L\gamma_5$	.1	69	6	9.143	1.356
Tm	$L\gamma_1$	5	69	6	9.424	1.315
Tm	$L\gamma_6$	.01	69	6	9.606	1.290
Tm	$L\gamma_2$	1	69	6	9.728	1.274
Tm	$L\gamma_3$	1	69	6	9.778	1.268
Tm	$L\gamma_4$	.1	69	6	10.083	1.229
Tm	$L_1-O_{4,5}$	.01	69	6	10.108	1.226
Tm	$K\alpha_2$	50	69	6	49.764	0.249
Tm	$K\alpha_{1,2}$	150	69	6	50.406	0.246
Tm	$K\alpha_1$	100	69	6	50.733	0.244
Tm	$K\beta_3$	11	69	6	57.293	0.216
Tm	$K\beta_1$	23	69	6	57.506	0.216
Tm	$K\beta_5$	.2	69	6	57.914	0.214
Tm	$K\beta_2$	9	69	6	59.085	0.210
Tm	$K-O_{2,3}$	.01	69	6	59.337	0.209
Yb	Mz	.01	70	6	1.183	10.480
Yb	M_3-N_1	.5	70	6	1.464	8.470
Yb	$M\alpha$	100	70	6	1.521	8.149
Yb	$M\beta$	45	70	6	1.567	7.909
Yb	$M\gamma$	1	70	6	1.765	7.024
Yb	Ll	2	70	6	6.544	1.894
Yb	Lt	.01	70	6	6.770	1.831
Yb	$L\alpha_2$	10	70	6	7.366	1.683
Yb	$L\alpha_1$	100	70	6	7.414	1.672
Yb	Ln	1	70	6	7.579	1.636
Yb	L_2-M_2	.01	70	6	7.804	1.588
Yb	$L\beta_4$	5	70	6	8.312	1.491
Yb	$L\beta_1$	50	70	6	8.400	1.476
Yb	$L\beta_6$	.1	70	6	8.455	1.466
Yb	$L\beta_3$	6	70	6	8.535	1.452
Yb	$L\beta_{2,15}$	20	70	6	8.757	1.415
Yb	$L\beta_7$	.1	70	6	8.887	1.395
Yb	$L\beta_{10}$	.01	70	6	8.908	1.391
Yb	$L_3-O_{2,3}$	.01	70	6	8.919	1.390
Yb	$L\beta_5$	.1	70	6	8.938	1.387
Yb	$L\beta_9$	.01	70	6	8.958	1.384
Yb	$L\gamma_5$	.1	70	6	9.489	1.306
Yb	$L\gamma_1$	5	70	6	9.778	1.268
Yb	$L\gamma_8$	.1	70	6	9.923	1.249
Yb	$L_2-O_{2,3}$	.01	70	6	9.954	1.245
Yb	$L\gamma_6$	.01	70	6	9.975	1.243
Yb	$L\gamma_2$	1	70	6	10.088	1.229
Yb	$L\gamma_3$	1	70	6	10.141	1.222
Yb	L_1-O_1	.01	70	6	10.429	1.189
Yb	$L\gamma_4$	.1	70	6	10.458	1.185
Yb	$L_1-O_{4,5}$	.01	70	6	10.481	1.183
Yb	$K\alpha_2$	50	70	6	51.345	0.241
Yb	$K\alpha_{1,2}$	150	70	6	52.030	0.238
Yb	$K\alpha_1$	100	70	6	52.380	0.237
Yb	$K\beta_3$	12	70	6	59.141	0.210
Yb	$K\beta_1$	64	70	6	59.356	0.209
Yb	$K\beta_5$	.3	70	6	59.771	0.207
Yb	$K\beta_2$	9	70	6	60.974	0.203
Yb	$K-O_{2,3}$	.01	70	6	61.287	0.202
Lu	$M\alpha$	100	71	6	1.581	7.840
Lu	$M\beta$	45	71	6	1.631	7.601
Lu	$M\gamma$	1	71	6	1.832	6.768
Lu	Ll	2	71	6	6.752	1.836
Lu	Lt	.01	71	6	6.980	1.776
Lu	$L\alpha_2$	10	71	6	7.604	1.630

El	Line	I	Z	R	KeV	Lambda
Lu	$L\alpha_1$	100	71	6	7.654	1.620
Lu	Ln	1	71	6	7.856	1.578
Lu	L_2-M_2	.01	71	6	8.084	1.533
Lu	$L\beta_4$	5	71	6	8.605	1.441
Lu	$L\beta_1$	50	71	6	8.708	1.424
Lu	$L\beta_6$	.1	71	6	8.736	1.419
Lu	$L\beta_3$	6	71	6	8.845	1.401
Lu	$L\beta_{15}$	20	71	6	9.038	1.371
Lu	$L\beta_2$	1	71	6	9.047	1.370
Lu	$L\beta_7$	.1	71	6	9.186	1.349
Lu	$L_3-O_{2,3}$	.01	71	6	9.215	1.345
Lu	$L\beta_{10}$	.01	71	6	9.230	1.343
Lu	$L\beta_5$	.1	71	6	9.238	1.342
Lu	$L\beta_9$	.01	71	6	9.280	1.336
Lu	$L\gamma_5$	.1	71	6	9.841	1.260
Lu	$L\gamma_1$	5	71	6	10.142	1.222
Lu	$L\gamma_8$	.1	71	6	10.290	1.205
Lu	$L_2-O_{2,3}$	.01	71	6	10.318	1.201
Lu	$L\gamma_6$	.01	71	6	10.341	1.199
Lu	$L\gamma_2$	1	71	6	10.458	1.185
Lu	$L\gamma_3$	1	71	6	10.509	1.180
Lu	L_1-N_4	.01	71	6	10.665	1.162
Lu	$L\gamma_{11}$	.01	71	6	10.676	1.161
Lu	$L\gamma_4$	.1	71	6	10.840	1.143
Lu	$K\alpha_2$	50	71	6	52.956	0.234
Lu	$K\alpha_{1,2}$	150	71	6	53.687	0.231
Lu	$K\alpha_1$	100	71	6	54.061	0.229
Lu	$K\beta_3$	12	71	6	61.037	0.203
Lu	$K\beta_1$	65	71	6	61.272	0.202
Lu	$K\beta_5$	.3	71	6	61.721	0.201
Lu	$K\beta_2$	9	71	6	62.956	0.197
Lu	$K-O_{2,3}$	.01	71	6	63.280	0.196
Hf	$M\zeta_1$	.01	72	6	1.280	9.686
Hf	$M\zeta_2$	.01	72	6	1.280	9.686
Hf	M_3-N_1	.5	72	6	1.572	7.887
Hf	$M\alpha$	100	72	6	1.644	7.539
Hf	$M\beta$	45	72	6	1.697	7.303
Hf	$M\gamma$	1	72	6	1.894	6.544
Hf	Ll	3	72	6	6.958	1.781
Hf	Lt	.01	72	6	7.194	1.723
Hf	Ls	.01	72	6	7.452	1.663
Hf	$L\alpha_2$	10	72	6	7.843	1.580
Hf	$L\alpha_1$	100	72	6	7.898	1.570
Hf	Ln	1	72	6	8.138	1.523
Hf	L_2-M_2	.01	72	6	8.372	1.481
Hf	$L\beta_{17}$	.01	72	6	8.630	1.436
Hf	L_1-M_1	.01	72	6	8.667	1.430
Hf	$L\beta_4$	4	72	6	8.904	1.392
Hf	$L\beta_6$	.1	72	6	9.021	1.374
Hf	$L\beta_1$	50	72	6	9.021	1.374
Hf	L_3-N_2	.01	72	6	9.122	1.359
Hf	$L\beta_3$	6	72	6	9.162	1.353
Hf	L_3-N_3	.01	72	6	9.179	1.351
Hf	$L\beta_{15}$	1	72	6	9.336	1.328
Hf	$L\beta_2$	20	72	6	9.346	1.326
Hf	$L\beta_7$	.1	72	6	9.494	1.306
Hf	Lu	.01	72	6	9.542	1.299
Hf	$L\beta_{10}$	.01	72	6	9.553	1.298
Hf	$L\beta_5$	.1	72	6	9.553	1.298
Hf	$L\beta_9$	.01	72	6	9.607	1.290
Hf	$L\gamma_5$	.1	72	6	10.199	1.215
Hf	$L\gamma_1$	10	72	6	10.514	1.179
Hf	L_2-N_5	.01	72	6	10.524	1.178
Hf	$L\gamma_8$	.8	72	6	10.674	1.161
Hf	Lv	.01	72	6	10.702	1.158
Hf	$L\gamma_6$	.01	72	6	10.731	1.155
Hf	$L\gamma_2$	1	72	6	10.832	1.144
Hf	$L\gamma_3$	2	72	6	10.889	1.138
Hf	L_1-N_4	.01	72	6	11.043	1.122
Hf	$L\gamma_{11}$	.01	72	6	11.053	1.121
Hf	L_1-O_1	.01	72	6	11.201	1.107
Hf	$L\gamma_4p$	.1	72	6	11.231	1.104
Hf	$L\gamma_4$	.1	72	6	11.238	1.103
Hf	L_1-O_4	.01	72	6	11.260	1.101
Hf	$K\alpha_2$	50	72	6	54.602	0.227
Hf	$K\alpha_{1,2}$	150	72	6	55.382	0.224
Hf	$K\alpha_1$	100	72	6	55.781	0.222
Hf	$K\beta_3$	12	72	6	62.969	0.197
Hf	$K\beta_1$	66	72	6	63.222	0.196
Hf	$K\beta_2$	9	72	6	64.969	0.191
Ta	$M\zeta_2$	.01	73	6	1.329	9.330
Ta	$M\zeta_1$	.1	73	6	1.331	9.316
Ta	M_4-N_3	.01	73	6	1.393	8.900
Ta	M_3-N_1	.5	73	6	1.628	7.612
Ta	M_5-O_3	.01	73	6	1.698	7.300
Ta	$M\alpha$	100	73	6	1.709	7.252
Ta	$M_4-O_{2,3}$	.01	73	6	1.748	7.090
Ta	$M\beta$	45	73	6	1.765	7.023
Ta	M_3-N_4	.01	73	6	1.951	6.353
Ta	$M\gamma$	1	73	6	1.964	6.312
Ta	M_3-O_1	.01	73	6	2.126	5.830
Ta	$M_3-O_{4,5}$	.01	73	6	2.186	5.670
Ta	M_2-N_4	.2	73	6	2.225	5.570
Ta	M_1-N_3	.5	73	6	2.295	5.400
Ta	Ll	3	73	6	7.172	1.728
Ta	Lt	.01	73	6	7.411	1.673
Ta	Ls	.01	73	6	7.687	1.613
Ta	$L\alpha_2$	10	73	6	8.086	1.533
Ta	$L\alpha_1$	100	73	6	8.145	1.522
Ta	Ln	1	73	6	8.427	1.471
Ta	L_2-M_2	.01	73	6	8.666	1.430
Ta	$L\beta_{17}$	.01	73	6	8.941	1.386
Ta	$L\beta_4$	4	73	6	9.211	1.346
Ta	$L\beta_6$	.1	73	6	9.314	1.331
Ta	$L\beta_1$	50	73	6	9.342	1.327
Ta	L_2-M_5	.01	73	6	9.398	1.319
Ta	L_3-N_2	.01	73	6	9.414	1.317
Ta	L_3-N_3	.01	73	6	9.473	1.309
Ta	$L\beta_3$	6	73	6	9.486	1.307
Ta	$L\beta_{15}$	1	73	6	9.638	1.286
Ta	$L\beta_2$	20	73	6	9.650	1.285
Ta	$L\beta_7$	.1	73	6	9.808	1.264
Ta	$L_3-O_{2,3}$	.01	73	6	9.837	1.260
Ta	Lu	.01	73	6	9.855	1.258
Ta	$L\beta_5$	.1	73	6	9.873	1.255
Ta	$L\beta_{10}$	.01	73	6	9.888	1.254
Ta	$L\beta_9$	.01	73	6	9.944	1.247
Ta	$L\gamma_5$	.1	73	6	10.569	1.173
Ta	L_2-N_2	.01	73	6	10.670	1.162
Ta	L_2-N_3	.01	73	6	10.730	1.155
Ta	$L\gamma_1$	10	73	6	10.893	1.138
Ta	L_2-N_5	.01	73	6	10.904	1.137
Ta	$L\gamma_8$	.1	73	6	11.063	1.120
Ta	L_2-O_2	.01	73	6	11.089	1.118
Ta	L_2-O_3	.01	73	6	11.098	1.117
Ta	Lv	.01	73	6	11.110	1.116
Ta	L_1-N_1	.01	73	6	11.115	1.115
Ta	$L\gamma_6$	.01	73	6	11.129	1.114
Ta	$L\gamma_2$	1	73	6	11.215	1.105
Ta	$L\gamma_3$	2	73	6	11.276	1.099

El	Line	I	Z	R	KeV	Lambda
Ta	L_1-N_4	.01	73	6	11.438	1.084
Ta	$L\gamma_{11}$	.01	73	6	11.450	1.083
Ta	L_1-O_1	.01	73	6	11.610	1.068
Ta	$L\gamma_4p$	.1	73	6	11.635	1.065
Ta	$L\gamma_4$	.1	73	6	11.643	1.065
Ta	$L_1-N_{6,7}$	.01	73	6	11.655	1.064
Ta	$L_1-O_{4,5}$	.01	73	6	11.673	1.062
Ta	$K\alpha_2$	50	73	6	56.267	0.220
Ta	$K\alpha_{1,2}$	150	73	6	57.098	0.217
Ta	$K\alpha_1$	100	73	6	57.523	0.215
Ta	$K\beta_3$	12	73	6	64.938	0.191
Ta	$K\beta_1$	26	73	6	65.212	0.190
Ta	$K\beta_5''$	.3	73	6	65.615	0.189
Ta	$K\beta_5'$	.3	73	6	65.672	0.189
Ta	$K\beta_2''$	9	73	6	66.937	0.185
Ta	$K\beta_2'$	9	73	6	67.001	0.185
Ta	$K\beta_4$	.08	73	6	67.183	0.185
Ta	$K-O_{2,3}$	.01	73	6	67.358	0.184
W	Mz_2	.01	74	6	1.378	8.993
W	Mz_1	.01	74	6	1.383	8.962
W	M_4-N_3	.01	74	6	1.446	8.573
W	M_3-N_1	.5	74	6	1.684	7.360
W	M_5-O_3	.01	74	6	1.770	7.005
W	$M\alpha_2$	100	74	6	1.773	6.992
W	$M\alpha_1$	100	74	6	1.775	6.983
W	M_4-O_2	.01	74	6	1.821	6.806
W	$M\beta$	45	74	6	1.835	6.757
W	M_2-N_1	.01	74	6	1.974	6.280
W	M_3-N_4	.1	74	6	2.021	6.134
W	$M\gamma$	1	74	6	2.035	6.092
W	M_3-O_1	.01	74	6	2.203	5.628
W	M_2-N_4	.1	74	6	2.314	5.357
W	M_1-N_3	.5	74	6	2.397	5.172
W	$M_1-O_{2,3}$	.01	74	6	2.792	4.440
W	Ll	3	74	6	7.386	1.678
W	Lt	.01	74	6	7.631	1.624
W	Ls	.01	74	6	7.925	1.564
W	$L\alpha_2$	10	74	6	8.334	1.487
W	$L\alpha_1$	100	74	6	8.396	1.476
W	Ln	1	74	6	8.723	1.421
W	$L\beta_{17}$	.01	74	6	9.260	1.339
W	L_1-M_1	.01	74	6	9.275	1.336
W	$L\beta_4$	4	74	6	9.524	1.302
W	$L\beta_6$	.1	74	6	9.610	1.290
W	$L\beta_1$	50	74	6	9.671	1.282
W	L_3-N_2	.01	74	6	9.711	1.276
W	L_2-M_5	.01	74	6	9.739	1.273
W	L_3-N_3	.01	74	6	9.782	1.267
W	$L\beta_3$	6	74	6	9.817	1.263
W	$L\beta_{15}$	1	74	6	9.946	1.246
W	$L\beta_2$	20	74	6	9.960	1.245
W	$L\beta_7$	.1	74	6	10.127	1.224
W	$L_3-O_{2,3}$	.01	74	6	10.152	1.221
W	Lu	.01	74	6	10.172	1.219
W	$L\beta_5$	.1	74	6	10.199	1.215
W	$L\beta_{10}$	.01	74	6	10.226	1.212
W	$L\beta_9$	.01	74	6	10.289	1.205
W	$L\gamma_5$	.1	74	6	10.947	1.132
W	L_2-N_2	.01	74	6	11.050	1.122
W	L_2-N_3	.01	74	6	11.118	1.115
W	$L\gamma_1$	10	74	6	11.284	1.099
W	$L\gamma_8$	.1	74	6	11.466	1.081
W	L_2-O_3	.01	74	6	11.505	1.077
W	Lv	.01	74	6	11.509	1.077
W	$L\gamma_6$	.01	74	6	11.537	1.074
W	$L\gamma_2$	1	74	6	11.606	1.068
W	$L\gamma_3$	2	74	6	11.672	1.062
W	L_1-N_4	.01	74	6	11.842	1.047
W	$L\gamma_{11}$	.01	74	6	11.853	1.046
W	L_1-O_1	.01	74	6	12.015	1.032
W	$L\gamma_4p$	.1	74	6	12.051	1.029
W	$L\gamma_4$	.1	74	6	12.061	1.028
W	$L_1-O_{4,5}$	.01	74	6	12.094	1.025
W	$K-L_1$	.01	74	6	57.410	0.216
W	$K\alpha_2$	50	74	6	57.972	0.214
W	$K\alpha_{1,2}$	150	74	6	58.856	0.211
W	$K\alpha_1$	100	74	6	59.308	0.209
W	$K\beta_3$	12	74	6	66.940	0.185
W	$K\beta_1$	26	74	6	67.233	0.184
W	$K\beta_5''$	.3	74	6	67.640	0.183
W	$K\beta_5'$	.3	74	6	67.704	0.183
W	$K\beta_2''$	10	74	6	69.020	0.180
W	$K\beta_2'$	10	74	6	69.089	0.179
W	$K\beta_4$	.1	74	6	69.282	0.179
W	$K-O_{2,3}$	.01	74	6	69.467	0.178
Re	Mz_2	.01	75	6	1.431	8.664
Re	Mz_1	.01	75	6	1.437	8.629
Re	M_4-N_3	.01	75	6	1.505	8.239
Re	$M\alpha$	100	75	6	1.842	6.729
Re	$M\beta$	45	75	6	1.906	6.504
Re	M_3-N_4	.01	75	6	2.090	5.931
Re	$M\gamma$	1	75	6	2.106	5.885
Re	Ll	3	75	6	7.602	1.631
Re	Lt	.01	75	6	7.851	1.579
Re	Ls	.01	75	6	8.167	1.518
Re	$L\alpha_2$	10	75	6	8.585	1.444
Re	$L\alpha_1$	100	75	6	8.651	1.433
Re	Ln	1	75	6	9.026	1.373
Re	L_2-M_2	.01	75	6	9.274	1.337
Re	$L\beta_{17}$	.01	75	6	9.589	1.293
Re	$L\beta_4$	4	75	6	9.845	1.259
Re	$L\beta_6$	.1	75	6	9.909	1.251
Re	$L\beta_1$	50	75	6	10.008	1.239
Re	L_2-M_5	.01	75	6	10.074	1.230
Re	L_3-N_3	.01	75	6	10.092	1.228
Re	$L\beta_3$	6	75	6	10.158	1.220
Re	$L\beta_{15}$	1	75	6	10.260	1.208
Re	$L\beta_2$	20	75	6	10.274	1.207
Re	$L\beta_7$	.1	75	6	10.451	1.186
Re	Lu	.01	75	6	10.492	1.181
Re	$L\beta_5$	.1	75	6	10.530	1.177
Re	$L\beta_{10}$	.01	75	6	10.575	1.172
Re	$L\beta_9$	.01	75	6	10.642	1.165
Re	$L\gamma_5$	.1	75	6	11.332	1.094
Re	L_2-N_2	.01	75	6	11.436	1.084
Re	L_2-N_3	.01	75	6	11.513	1.077
Re	$L\gamma_1$	10	75	6	11.683	1.061
Re	$L\gamma_8$	.1	75	6	11.874	1.044
Re	L_1-N_1	.01	75	6	11.896	1.042
Re	Lv	.01	75	6	11.915	1.040
Re	L_2-O_3	.01	75	6	11.923	1.040
Re	$L\gamma_6$	.01	75	6	11.954	1.037
Re	$L\gamma_2$	1	75	6	12.008	1.032
Re	$L\gamma_3$	2	75	6	12.080	1.026
Re	L_1-N_4	.01	75	6	12.250	1.012
Re	$L\gamma_{11}$	.01	75	6	12.264	1.011
Re	L_1-O_1	.01	75	6	12.440	0.996
Re	$L\gamma_4p$	.1	75	6	12.479	0.993
Re	$L\gamma_4$	.1	75	6	12.490	0.992
Re	$L_1-O_{4,5}$	.01	75	6	12.521	0.990

El	Line	I	Z	R	KeV	Lambda
Re	$K\alpha_2$	50	75	6	59.708	0.208
Re	$K\alpha_{1,2}$	150	75	6	60.648	0.204
Re	$K\alpha_1$	100	75	6	61.130	0.203
Re	$K\beta_3$	12	75	6	68.983	0.180
Re	$K\beta_1$	26	75	6	69.298	0.179
Re	$K\beta_5''$	.3	75	6	69.707	0.178
Re	$K\beta_5'$	.3	75	6	69.774	0.178
Re	$K\beta_2''$	10	75	6	71.139	0.174
Re	$K\beta_2'$	10	75	6	71.219	0.174
Re	$K\beta_4$	.1	75	6	71.397	0.174
Re	$K\text{-}O_{2,3}$	.01	75	6	71.620	0.173
Os	Mz_2	.01	76	6	1.483	8.359
Os	Mz_1	.01	76	6	1.492	8.310
Os	$M_3\text{-}N_1$	.5	76	6	1.799	6.890
Os	$M\alpha$	100	76	6	1.914	6.478
Os	$M\beta$	45	76	6	1.978	6.267
Os	$M_2\text{-}N_1$	.01	76	6	2.134	5.810
Os	$M_3\text{-}N_4$	.1	76	6	2.166	5.724
Os	$M\gamma$	1	76	6	2.182	5.682
Os	$M_2\text{-}N_4$	.2	76	6	2.502	4.955
Os	$M_1\text{-}N_3$	.5	76	6	2.588	4.790
Os	Ll	3	76	6	7.821	1.585
Os	Lt	.01	76	6	8.077	1.535
Os	Ls	.01	76	6	8.413	1.473
Os	$L\alpha_2$	10	76	6	8.840	1.402
Os	$L\alpha_1$	100	76	6	8.910	1.391
Os	Ln	1	76	6	9.335	1.328
Os	$L_2\text{-}M_2$	.01	76	6	9.584	1.293
Os	$L\beta_{17}$	.01	76	6	9.933	1.248
Os	$L\beta_4$	4	76	6	10.174	1.218
Os	$L\beta_6$	.1	76	6	10.215	1.213
Os	$L_3\text{-}N_2$	.01	76	6	10.323	1.201
Os	$L\beta_1$	50	76	6	10.354	1.197
Os	$L_2\text{-}M_5$	.01	76	6	10.423	1.189
Os	$L\beta_3$	6	76	6	10.509	1.180
Os	$L\beta_{15}$	1	76	6	10.580	1.172
Os	$L\beta_2$	20	76	6	10.597	1.170
Os	$L\beta_7$	7	76	6	10.785	1.149
Os	Lu	.01	76	6	10.823	1.145
Os	$L\beta_5$	.1	76	6	10.869	1.140
Os	$L\beta_{10}$	.01	76	6	10.936	1.134
Os	$L\beta_9$	.01	76	6	11.005	1.126
Os	$L\gamma_5$	.1	76	6	11.728	1.057
Os	$L_2\text{-}N_3$	.01	76	6	11.915	1.040
Os	$L\gamma_1$	10	76	6	12.093	1.025
Os	$L\gamma_8$	.1	76	6	12.299	1.008
Os	Lv	.01	76	6	12.334	1.005
Os	$L_2\text{-}O_3$	.01	76	6	12.338	1.005
Os	$L\gamma_6$	.01	76	6	12.383	1.001
Os	$L\gamma_2$	1	76	6	12.420	0.998
Os	$L\gamma_3$	2	76	6	12.498	0.992
Os	$L_1\text{-}N_4$	.01	76	6	12.685	0.977
Os	$L\gamma_{11}$	.01	76	6	12.694	0.976
Os	$L_1\text{-}O_1$	.01	76	6	12.882	0.962
Os	$L\gamma_4p$	.1	76	6	12.908	0.960
Os	$L\gamma_4$	.1	76	6	12.921	0.959
Os	$L_1\text{-}O_{4,5}$	.01	76	6	12.966	0.956
Os	$K\alpha_2$	50	76	6	61.476	0.202
Os	$K\alpha_{1,2}$	150	76	6	62.477	0.198
Os	$K\alpha_1$	100	76	6	62.990	0.197
Os	$K\beta_3$	12	76	6	71.065	0.174
Os	$K\beta_1$	27	76	6	71.401	0.174
Os	$K\beta_5''$	.3	76	6	71.811	0.173
Os	$K\beta_5'$	.3	76	6	71.882	0.172
Os	$K\beta_2''$	10	76	6	73.306	0.169
Os	$K\beta_2'$	10	76	6	73.390	0.169
Os	$K\beta_4$	.2	76	6	73.602	0.168
Os	$K\text{-}O_{2,3}$	.01	76	6	73.795	0.168
Ir	Mz_2	.01	77	6	1.537	8.065
Ir	Mz_1	.01	77	6	1.545	8.021
Ir	$M_4\text{-}N_3$	.01	77	6	1.621	7.645
Ir	$M_3\text{-}N_1$	.5	77	6	1.859	6.669
Ir	$M\alpha_2$	100	77	6	1.975	6.275
Ir	$M\alpha_1$	100	77	6	1.980	6.262
Ir	$M\beta$	45	77	6	2.053	6.038
Ir	$M_3\text{-}N_4$	.1	77	6	2.238	5.540
Ir	$M\gamma$	1	77	6	2.254	5.500
Ir	$M_3\text{-}O_{4,5}$	.5	77	6	2.546	4.869
Ir	$M_2\text{-}N_4$	.2	77	6	2.593	4.780
Ir	$M_1\text{-}N_3$	.5	77	6	2.677	4.631
Ir	Ll	3	77	6	8.040	1.542
Ir	Lt	.01	77	6	8.303	1.493
Ir	Ls	.01	77	6	8.658	1.432
Ir	$L\alpha_2$	10	77	6	9.098	1.362
Ir	$L\alpha_1$	100	77	6	9.174	1.351
Ir	Ln	1	77	6	9.649	1.285
Ir	$L_2\text{-}M_2$	.01	77	6	9.915	1.250
Ir	$L_1\text{-}M_1$	.01	77	6	10.243	1.210
Ir	$L\beta_{17}$	.01	77	6	10.271	1.207
Ir	$L\beta_4$	4	77	6	10.509	1.180
Ir	$L\beta_6$	.1	77	6	10.523	1.178
Ir	$L_3\text{-}N_2$	.01	77	6	10.636	1.165
Ir	$L\beta_1$	50	77	6	10.706	1.158
Ir	$L_3\text{-}N_3$	.01	77	6	10.723	1.156
Ir	$L_2\text{-}M_5$	.01	77	6	10.789	1.149
Ir	$L\beta_3$	6	77	6	10.866	1.141
Ir	$L\beta_{15}$	1	77	6	10.902	1.137
Ir	$L\beta_2$	20	77	6	10.919	1.135
Ir	$L\beta_7$	.1	77	6	11.119	1.115
Ir	Lu	.01	77	6	11.153	1.111
Ir	$L_3\text{-}O_{2,3}$	.01	77	6	11.175	1.109
Ir	$L\beta_5$	.1	77	6	11.209	1.106
Ir	$L\beta_{10}$	.01	77	6	11.300	1.097
Ir	$L\beta_9$	.01	77	6	11.375	1.090
Ir	$L\gamma_5$	.1	77	6	12.132	1.022
Ir	$L_2\text{-}N_2$	.01	77	6	12.249	1.012
Ir	$L_2\text{-}N_3$	.01	77	6	12.329	1.005
Ir	$L\gamma_1$	10	77	6	12.510	0.991
Ir	$L\gamma_8$	.1	77	6	12.726	0.974
Ir	$L_1\text{-}N_1$	.01	77	6	12.726	0.974
Ir	Lv	.01	77	6	12.758	0.972
Ir	$L_2\text{-}O_3$	.01	77	6	12.771	0.971
Ir	$L\gamma_6$	.01	77	6	12.818	0.967
Ir	$L\gamma_2$	1	77	6	12.840	0.965
Ir	$L\gamma_3$	2	77	6	12.922	0.959
Ir	$L_1\text{-}N_4$	.01	77	6	13.105	0.946
Ir	$L\gamma_{11}$	.01	77	6	13.123	0.945
Ir	$L\gamma_4p$	.1	77	6	13.353	0.928
Ir	$L\gamma_4$	.1	77	6	13.366	0.927
Ir	$L_1\text{-}O_{4,5}$	.01	77	6	13.411	0.924
Ir	$K\alpha_2$	50	77	6	63.276	0.196
Ir	$K\alpha_{1,2}$	150	77	6	64.339	0.193
Ir	$K\alpha_1$	100	77	6	64.885	0.191
Ir	$K\beta_3$	12	77	6	73.190	0.169
Ir	$K\beta_1$	27	77	6	73.548	0.169
Ir	$K\beta_5''$	.3	77	6	73.966	0.168
Ir	$K\beta_5'$	.3	77	6	74.062	0.167
Ir	$K\beta_2''$	10	77	6	75.516	0.164
Ir	$K\beta_2'$	10	77	6	75.606	0.164
Ir	$K\beta_4$	.2	77	6	75.807	0.164

El	Line	I	Z	R	KeV	Lambda
Ir	$K-O_{2,3}$	.01	77	6	76.040	0.163
Pt	N_4-N_6		78	6	0.258	48.100
Pt	Mz_2	1	78	6	1.591	7.790
Pt	Mz_1	2	78	6	1.602	7.738
Pt	M_4-N_3	.01	78	6	1.682	7.371
Pt	M_3-N_1	1	78	6	1.920	6.455
Pt	$M\alpha_2$	100	78	6	2.046	6.058
Pt	$M\alpha_1$	100	78	6	2.050	6.047
Pt	M_5-O_3	.01	78	6	2.070	5.987
Pt	$M\beta$	50	78	6	2.127	5.828
Pt	M_3-N_4	1	78	6	2.314	5.357
Pt	$M\gamma$	3	78	6	2.331	5.319
Pt	M_3-O_1	.01	78	6	2.542	4.876
Pt	$M_3-O_{4,5}$	.5	78	6	2.641	4.694
Pt	M_2-N_4	.5	78	6	2.694	4.601
Pt	M_1-N_3	1	78	6	2.779	4.460
Pt	Ll	3	78	6	8.267	1.499
Pt	Lt	.01	78	6	8.531	1.453
Pt	Ls	.01	78	6	8.921	1.389
Pt	$L\alpha_2$	10	78	6	9.360	1.324
Pt	$L\alpha_1$	100	78	6	9.441	1.313
Pt	Ln	1	78	6	9.973	1.243
Pt	L_2-M_2	.01	78	6	10.219	1.213
Pt	L_1-M_1	.01	78	6	10.598	1.170
Pt	$L\beta_{17}$	.01	78	6	10.625	1.167
Pt	$L\beta_6$	.1	78	6	10.840	1.144
Pt	$L\beta_4$	4	78	6	10.852	1.142
Pt	L_3-N_2	.01	78	6	10.960	1.131
Pt	L_3-N_3	.01	78	6	11.042	1.123
Pt	$L\beta_1$	50	78	6	11.069	1.120
Pt	L_2-M_5	.01	78	6	11.149	1.112
Pt	$L\beta_3$	6	78	6	11.233	1.104
Pt	$L\beta_2$	20	78	6	11.249	1.102
Pt	$L\beta_7$	.1	78	6	11.460	1.082
Pt	Lu	.01	78	6	11.489	1.079
Pt	$L_3-O_{2,3}$	.01	78	6	11.519	1.076
Pt	$L\beta_5$	1	78	6	11.559	1.072
Pt	$L\beta_{10}$	.01	78	6	11.674	1.062
Pt	$L\beta_9$	.01	78	6	11.756	1.054
Pt	$L\gamma_5$	.1	78	6	12.550	0.988
Pt	L_2-N_2	.01	78	6	12.659	0.979
Pt	L_2-N_3	.01	78	6	12.751	0.972
Pt	$L\gamma_1$	10	78	6	12.940	0.958
Pt	L_1-N_1	.01	78	6	13.156	0.942
Pt	$L\gamma_8$	.1	78	6	13.172	0.941
Pt	Lv	.01	78	6	13.197	0.939
Pt	$L\gamma_2$	1	78	6	13.268	0.934
Pt	$L\gamma_6$	.01	78	6	13.269	0.934
Pt	$L\gamma_3$	2	78	6	13.359	0.928
Pt	$L\gamma_{11}$	.01	78	6	13.558	0.914
Pt	L_1-O_1	.01	78	6	13.781	0.899
Pt	$L\gamma_4p$	.1	78	6	13.812	0.897
Pt	$L\gamma_4$	.1	78	6	13.826	0.897
Pt	$L_1-O_{4,5}$	.01	78	6	13.875	0.893
Pt	$K\alpha_2$	50	78	6	65.112	0.190
Pt	$K\alpha_{1,2}$	150	78	6	66.241	0.187
Pt	$K\alpha_1$	100	78	6	66.821	0.186
Pt	$K\beta_3$	12	78	6	75.355	0.165
Pt	$K\beta_1$	27	78	6	75.735	0.164
Pt	$K\beta_5''$	.3	78	6	76.185	0.163
Pt	$K\beta_5'$	.3	78	6	76.260	0.163
Pt	$K\beta_5'$	.3	78	6	76.260	0.163
Pt	$K\beta_2''$	10	78	6	77.772	0.159
Pt	$K\beta_2'$	10	78	6	77.864	0.159
Pt	$K\beta_4$	.2	78	6	78.056	0.159
Pt	$K\beta_4$	.2	78	6	78.056	0.159
Pt	$K-O_{2,3}$	.01	78	6	78.327	0.158
Au	$N_5-N_{6,7}$		79	6	0.251	49.400
Au	N_4-N_6		79	6	0.265	46.800
Au	Mz_2	1	79	6	1.648	7.523
Au	Mz_1	2	79	6	1.660	7.466
Au	M_4-N_3	.01	79	6	1.746	7.101
Au	M_3-N_1	1	79	6	1.981	6.259
Au	$M\alpha_2$	100	79	6	2.118	5.854
Au	$M\alpha_1$	100	79	6	2.123	5.840
Au	M_5-O_3	.01	79	6	2.149	5.767
Au	$M\beta$	50	79	6	2.204	5.624
Au	M_3-N_4	1	79	6	2.390	5.186
Au	$M\gamma$	3	79	6	2.409	5.145
Au	M_3-O_1	.1	79	6	2.636	4.703
Au	$M_3-O_{4,5}$	.5	79	6	2.741	4.522
Au	M_2-N_4	.5	79	6	2.797	4.432
Au	M_1-N_3	1	79	6	2.883	4.300
Au	Ll	3	79	6	8.493	1.460
Au	Lt	.01	79	6	8.769	1.414
Au	Ls	.01	79	6	9.173	1.351
Au	$L\alpha_2$	10	79	6	9.626	1.288
Au	$L\alpha_1$	100	79	6	9.712	1.276
Au	Ln	1	79	6	10.307	1.203
Au	L_2-M_2	.01	79	6	10.588	1.171
Au	L_1-M_1	.01	79	6	10.926	1.135
Au	$L\beta_{17}$	.01	79	6	10.990	1.128
Au	$L\beta_6$	.1	79	6	11.158	1.111
Au	$L\beta_4$	4	79	6	11.203	1.107
Au	L_3-N_2	.01	79	6	11.272	1.100
Au	L_3-N_3	.01	79	6	11.370	1.090
Au	$L\beta_1$	50	79	6	11.440	1.084
Au	L_2-M_5	.01	79	6	11.525	1.076
Au	$L\beta_{15}$	1	79	6	11.565	1.072
Au	$L\beta_2$	20	79	6	11.583	1.070
Au	$L\beta_3$	6	79	6	11.608	1.068
Au	$L\beta_7$	.1	79	6	11.809	1.050
Au	Lu	.01	79	6	11.834	1.048
Au	$L_3-O_{2,3}$	.01	79	6	11.862	1.045
Au	$L\beta_5$	1	79	6	11.914	1.040
Au	$L_3-P_{2,3}$	.01	79	6	11.933	1.039
Au	$L\beta_{10}$	.01	79	6	12.060	1.028
Au	$L\beta_9$	.01	79	6	12.145	1.021
Au	$L\gamma_5$	.1	79	6	12.972	0.956
Au	L_2-N_3	.01	79	6	13.184	0.940
Au	$L\gamma_1$	10	79	6	13.379	0.926
Au	L_1-N_1	.01	79	6	13.592	0.912
Au	$L\gamma_8$	.1	79	6	13.624	0.910
Au	Lv	.01	79	6	13.646	0.908
Au	L_2-O_2	.01	79	6	13.660	0.907
Au	L_2-O_3	.01	79	6	13.676	0.906
Au	$L\gamma_2$	1	79	6	13.707	0.904
Au	$L\gamma_6$	.01	79	6	13.728	0.903
Au	$L\gamma_3$	2	79	6	13.807	0.898
Au	L_1-N_4	.01	79	6	13.997	0.886
Au	$L\gamma_{11}$	.01	79	6	14.017	0.884
Au	L_1-O_1	.01	79	6	14.243	0.870
Au	$L\gamma_4p$	.1	79	6	14.278	0.868
Au	$L\gamma_4$	.1	79	6	14.297	0.867
Au	$L_1-O_{4,5}$	.01	79	6	14.347	0.864
Au	$K-L_1$	.01	79	6	66.388	0.187
Au	$K\alpha_2$	50	79	6	66.978	0.185
Au	$K\alpha_{1,2}$	150	79	6	68.177	0.182
Au	$K\alpha_1$	100	79	6	68.792	0.180
Au	$K\beta_3$	13	79	6	77.567	0.160

El	Line	I	Z	R	KeV	Lambda
Au	$K\beta_1$	27	79	6	77.971	0.159
Au	$K\beta_5$''	.3	79	6	78.425	0.158
Au	$K\beta_5$'	.3	79	6	78.515	0.158
Au	$K\beta_2$''	10	79	6	80.062	0.155
Au	$K\beta_2$'	10	79	6	80.172	0.155
Au	$K\beta_4$	.2	79	6	80.377	0.154
Au	$K-O_{2,3}$	.01	79	6	80.654	0.154
Hg	$N_5-N_{6,7}$		80	6	0.259	47.900
Hg	N_4-N_6		80	6	0.274	45.200
Hg	$M\delta$	.01	80	6	1.804	6.870
Hg	M_3-N_1	1	80	6	2.035	6.090
Hg	$M\alpha$	100	80	6	2.195	5.648
Hg	$M\beta$	50	80	6	2.282	5.432
Hg	$M\gamma$	3	80	6	2.487	4.984
Hg	Ll	3	80	6	8.720	1.422
Hg	Lt	.01	80	6	9.004	1.377
Hg	Ls	.01	80	6	9.435	1.314
Hg	$L\alpha_2$	10	80	6	9.896	1.253
Hg	$L\alpha_1$	100	80	6	9.987	1.241
Hg	Ln	1	80	6	10.649	1.164
Hg	L_2-M_2	.01	80	6	10.886	1.139
Hg	L_1-M_1	.01	80	6	11.270	1.100
Hg	$L\beta_{17}$	.01	80	6	11.356	1.092
Hg	$L\beta_6$	.1	80	6	11.480	1.080
Hg	$L\beta_4$	4	80	6	11.561	1.072
Hg	L_3-N_2	.01	80	6	11.605	1.068
Hg	L_3-N_3	.01	80	6	11.711	1.058
Hg	$L\beta_1$	50	80	6	11.821	1.049
Hg	$L\beta_{15}$	1	80	6	11.902	1.042
Hg	$L\beta_2$	20	80	6	11.922	1.040
Hg	$L\beta_3$	6	80	6	11.993	1.034
Hg	$L\beta_7$	.1	80	6	12.160	1.019
Hg	Lup	.01	80	6	12.181	1.018
Hg	Lu	.01	80	6	12.183	1.017
Hg	L_3-O_2	.01	80	6	12.206	1.016
Hg	L_3-O_3	.01	80	6	12.224	1.014
Hg	$L\beta_5$	1	80	6	12.275	1.010
Hg	$L\beta_{10}$	.01	80	6	12.443	0.996
Hg	$L\beta_9$	.01	80	6	12.558	0.987
Hg	$L\gamma_5$	.1	80	6	13.408	0.925
Hg	L_2-N_3	.01	80	6	13.638	0.909
Hg	$L\gamma_1$	10	80	6	13.828	0.896
Hg	L_1-N_1	.01	80	6	14.043	0.883
Hg	$L\gamma_8$	.1	80	6	14.087	0.880
Hg	Lv	.01	80	6	14.105	0.879
Hg	L_2-O_2	.01	80	6	14.112	0.878
Hg	L_2-O_3	.01	80	6	14.154	0.876
Hg	$L\gamma_2$	1	80	6	14.160	0.875
Hg	$L\gamma_6$	.01	80	6	14.196	0.873
Hg	$L\gamma_3$	2	80	6	14.262	0.869
Hg	$L\gamma_{11}$	.01	80	6	14.472	0.857
Hg	L_1-O_1	.01	80	6	14.716	0.842
Hg	$L\gamma_4p$	.1	80	6	14.755	0.840
Hg	$L\gamma_4$	.1	80	6	14.776	0.839
Hg	$L_1-O_{4,5}$	.01	80	6	14.846	0.835
Hg	$K\alpha_2$	50	80	6	68.883	0.180
Hg	$K\alpha_{1,2}$	150	80	6	70.154	0.177
Hg	$K\alpha_1$	100	80	6	70.807	0.175
Hg	$K\beta_3$	13	80	6	79.809	0.155
Hg	$K\beta_1$	28	80	6	80.240	0.154
Hg	$K\beta_5$	.4	80	6	80.740	0.154
Hg	$K\beta_2$''	10	80	6	82.420	0.150
Hg	$K\beta_2$'	10	80	6	82.530	0.150
Hg	$K\beta_4$	.2	80	6	82.761	0.150
Hg	$K-O_{2,3}$	.01	80	6	83.022	0.149
Tl	$N_5-N_{6,7}$		81	6	0.267	46.500
Tl	Mz_2	1	81	6	1.763	7.032
Tl	Mz_1	2	81	6	1.777	6.974
Tl	M_3-N_1	1	81	6	2.107	5.884
Tl	$M\alpha_2$	100	81	6	2.265	5.472
Tl	$M\alpha_1$	100	81	6	2.270	5.460
Tl	$M\beta$	55	81	6	2.362	5.249
Tl	M_4-O_2	.1	81	6	2.386	5.196
Tl	M_3-N_4	1	81	6	2.548	4.865
Tl	$M\gamma$	3	81	6	2.570	4.823
Tl	$M_3-O_{4,5}$	.5	81	6	2.940	4.216
Tl	M_2-N_4	1	81	6	3.012	4.116
Tl	M_1-N_3	1	81	6	3.089	4.013
Tl	Ll	3	81	6	8.952	1.385
Tl	Lt	.01	81	6	9.240	1.342
Tl	Ls	.01	81	6	9.699	1.278
Tl	$L\alpha_2$	10	81	6	10.171	1.219
Tl	$L\alpha_1$	100	81	6	10.267	1.207
Tl	Ln	1	81	6	10.992	1.128
Tl	L_2-M_2	.01	81	6	11.280	1.099
Tl	L_1-M_1	.01	81	6	11.646	1.064
Tl	$L\beta_{17}$	.01	81	6	11.738	1.056
Tl	$L\beta_6$	.1	81	6	11.810	1.050
Tl	$L\beta_4$	4	81	6	11.929	1.039
Tl	L_3-N_3	.01	81	6	12.051	1.029
Tl	$L\beta_1$	50	81	6	12.211	1.015
Tl	$L\beta_{15}$	1	81	6	12.249	1.012
Tl	$L\beta_2$	20	81	6	12.270	1.010
Tl	L_2-M_5	.01	81	6	12.307	1.007
Tl	$L\beta_3$	6	81	6	12.388	1.001
Tl	$L\beta_7$	.1	81	6	12.519	0.990
Tl	Lu	.01	81	6	12.536	0.989
Tl	L_3-O_2	.01	81	6	12.554	0.987
Tl	L_3-O_3	.01	81	6	12.580	0.985
Tl	$L\beta_5$	1	81	6	12.641	0.981
Tl	$L_3-P_{2,3}$	.01	81	6	12.659	0.979
Tl	$L\beta_{10}$	.01	81	6	12.860	0.964
Tl	$L\beta_9$	.01	81	6	12.956	0.957
Tl	$L\gamma_5$	.1	81	6	13.850	0.895
Tl	L_2-N_2	.01	81	6	13.974	0.887
Tl	L_2-N_3	.01	81	6	14.087	0.880
Tl	$L\gamma_1$	10	81	6	14.289	0.868
Tl	L_1-N_1	.01	81	6	14.500	0.855
Tl	$L\gamma_8$	.1	81	6	14.561	0.851
Tl	Lv	.01	81	6	14.575	0.850
Tl	L_2-O_2	.01	81	6	14.601	0.849
Tl	$L\gamma_2$	1	81	6	14.623	0.848
Tl	$L\gamma_6$	.01	81	6	14.684	0.844
Tl	$L\gamma_3$	2	81	6	14.734	0.841
Tl	L_1-N_4	.01	81	6	14.935	0.830
Tl	$L\gamma_{11}$	.01	81	6	14.957	0.829
Tl	L_1-O_1	.01	81	6	15.208	0.815
Tl	$L\gamma_4p$	.1	81	6	15.246	0.813
Tl	$L\gamma_4$	.1	81	6	15.269	0.812
Tl	$L_1-O_{4,5}$	.01	81	6	15.330	0.809
Tl	$K\alpha_2$	50	81	6	70.820	0.175
Tl	$K\alpha_{1,2}$	150	81	6	72.167	0.172
Tl	$K\alpha_1$	100	81	6	72.859	0.170
Tl	$K\beta_3$	13	81	6	82.104	0.151
Tl	$K\beta_1$	78	81	6	82.562	0.150
Tl	$K\beta_5$	.4	81	6	83.100	0.149
Tl	$K\beta_2$''	10	81	6	84.823	0.146
Tl	$K\beta_2$'	10	81	6	84.933	0.146
Tl	$K\beta_4$	.2	81	6	85.178	0.146
Tl	$K-O_{2,3}$	.01	81	6	85.437	0.145

El	Line	I	Z	R	KeV	Lambda
Pb	$N_5-N_{6,7}$		82	6	0.275	45.000
Pb	N_4-N_6		82	6	0.293	42.300
Pb	Mz_2	.1	82	6	1.822	6.802
Pb	Mz_1	1	82	6	1.839	6.740
Pb	M_4-N_3	.01	82	6	1.942	6.384
Pb	M_3-N_1	1	82	6	2.173	5.704
Pb	$M\alpha_2$	100	82	6	2.339	5.299
Pb	$M\alpha_1$	100	82	6	2.345	5.286
Pb	M_5-O_3	.01	82	6	2.399	5.168
Pb	$M\beta$	60	82	6	2.442	5.076
Pb	M_4-O_2	1	82	6	2.477	5.004
Pb	M_3-N_4	5	82	6	2.629	4.715
Pb	$M\gamma$	5	82	6	2.652	4.674
Pb	M_2-N_1	.01	82	6	2.663	4.655
Pb	M_3-O_1	.5	82	6	2.921	4.244
Pb	$M_3-O_{4,5}$	1	82	6	3.046	4.069
Pb	M_2-N_4	5	82	6	3.124	3.968
Pb	M_1-N_3	.1	82	6	3.201	3.872
Pb	Ll	3	82	6	9.183	1.350
Pb	Lt	.01	82	6	9.479	1.308
Pb	Ls	.01	82	6	9.966	1.244
Pb	$L\alpha_2$	10	82	6	10.448	1.186
Pb	$L\alpha_1$	100	82	6	10.550	1.175
Pb	Ln	1	82	6	11.347	1.092
Pb	L_2-M_2	.01	82	6	11.646	1.064
Pb	L_1-M_1	.01	82	6	12.008	1.032
Pb	$L\beta_{17}$	.01	82	6	12.132	1.022
Pb	$L\beta_6$	.1	82	6	12.141	1.021
Pb	L_3-N_2	.01	82	6	12.268	1.010
Pb	$L\beta_4$	4	82	6	12.304	1.007
Pb	L_3-N_3	.01	82	6	12.390	1.000
Pb	$L\beta_{15}$	1	82	6	12.599	0.984
Pb	$L\beta_1$	50	82	6	12.612	0.983
Pb	$L\beta_2$	20	82	6	12.621	0.982
Pb	L_2-M_5	.01	82	6	12.718	0.975
Pb	$L\beta_3$	6	82	6	12.791	0.969
Pb	$L\beta_7$	.1	82	6	12.886	0.962
Pb	Lu	.01	82	6	12.895	0.961
Pb	L_3-O_2	.01	82	6	12.931	0.959
Pb	L_3-O_3	.01	82	6	12.942	0.958
Pb	$L\beta_5$	1	82	6	13.013	0.953
Pb	$L_3-P_{2,3}$	.01	82	6	13.032	0.951
Pb	$L\beta_{10}$	.01	82	6	13.273	0.934
Pb	$L\beta_9$	.01	82	6	13.375	0.927
Pb	$L\gamma_5$	.1	82	6	14.305	0.867
Pb	L_2-N_2	.01	82	6	14.439	0.858
Pb	L_2-N_3	.01	82	6	14.551	0.852
Pb	$L\gamma_1$	10	82	6	14.762	0.840
Pb	L_2-N_5	.01	82	6	14.789	0.838
Pb	L_1-N_1	.01	82	6	14.960	0.829
Pb	$L\gamma_8$	.1	82	6	15.050	0.824
Pb	Lv	.01	82	6	15.057	0.823
Pb	$L\gamma_2$	1	82	6	15.099	0.821
Pb	L_2-O_3	.01	82	6	15.117	0.820
Pb	$L\gamma_6$	.01	82	6	15.176	0.817
Pb	L_2-P_1	.1	82	6	15.194	0.816
Pb	$L\gamma_3$	2	82	6	15.215	0.815
Pb	L_1-N_4	.01	82	6	15.425	0.804
Pb	$L\gamma_{11}$	.01	82	6	15.450	0.802
Pb	L_1-O_1	.01	82	6	15.711	0.789
Pb	$L_1-N_{6,7}$	.01	82	6	15.723	0.788
Pb	$L\gamma_4P$	.1	82	6	15.750	0.787
Pb	$L\gamma_4$	.1	82	6	15.775	0.786
Pb	$L_1-O_{4,5}$	.01	82	6	15.840	0.783
Pb	$K\alpha_2$	50	82	6	72.792	0.170
Pb	$K\alpha_{1,2}$	150	82	6	74.221	0.167
Pb	$K\alpha_1$	100	82	6	74.956	0.165
Pb	$K\beta_3$	13	82	6	84.436	0.147
Pb	$K\beta_1$	88	82	6	84.922	0.146
Pb	$K\beta_5''$	.4	82	6	85.419	0.145
Pb	$K\beta_5'$	.4	82	6	85.519	0.145
Pb	$K\beta_2''$	11	82	6	87.222	0.142
Pb	$K\beta_2'$	11	82	6	87.351	0.142
Pb	$K\beta_4$	.2	82	6	87.573	0.142
Pb	$K-O_{2,3}$	.01	82	6	87.907	0.141
Pb	K-P	.01	82	6	88.040	0.141
Bi	$N_1-P_{2,3}$		83	6	0.932	13.300
Bi	Mz_2	.1	83	6	1.882	6.585
Bi	Mz_1	1	83	6	1.901	6.521
Bi	M_4-N_3	.01	83	6	2.012	6.162
Bi	M_3-N_1	1	83	6	2.239	5.537
Bi	$M\alpha_2$	100	83	6	2.416	5.130
Bi	$M\alpha_1$	100	83	6	2.422	5.118
Bi	$M\beta$	60	83	6	2.525	4.909
Bi	M_4-O_2	1	83	6	2.570	4.823
Bi	$M_4-P_{2,3}$	.01	83	6	2.701	4.590
Bi	M_3-N_4	5	83	6	2.712	4.571
Bi	$M\gamma$	5	83	6	2.735	4.532
Bi	M_3-O_1	.5	83	6	3.020	4.105
Bi	$M_3-O_{4,5}$	1	83	6	3.153	3.932
Bi	M_1-N_2	1	83	6	3.185	3.892
Bi	M_2-N_4	5	83	6	3.233	3.834
Bi	M_1-N_3	.1	83	6	3.314	3.740
Bi	Ll	3	83	6	9.419	1.316
Bi	Lt	.01	83	6	9.724	1.275
Bi	Ls	.01	83	6	10.240	1.210
Bi	$L\alpha_2$	10	83	6	10.729	1.155
Bi	$L\alpha_1$	100	83	6	10.837	1.144
Bi	Ln	1	83	6	11.710	1.059
Bi	L_2-M_2	.01	83	6	11.981	1.035
Bi	L_1-M_1	.01	83	6	12.390	1.000
Bi	$L\beta_6$	.1	83	6	12.479	0.993
Bi	$L\beta_{17}$	.01	83	6	12.532	0.989
Bi	L_3-N_2	.01	83	6	12.613	0.983
Bi	$L\beta_4$	4	83	6	12.689	0.977
Bi	L_3-N_3	.01	83	6	12.737	0.973
Bi	$L\beta_{15}$	1	83	6	12.953	0.957
Bi	$L\beta_2$	20	83	6	12.978	0.955
Bi	$L\beta_1$	50	83	6	13.021	0.952
Bi	L_2-M_5	.01	83	6	13.129	0.944
Bi	$L\beta_3$	6	83	6	13.208	0.939
Bi	$L\beta_7$	.1	83	6	13.257	0.935
Bi	Lu	.01	83	6	13.257	0.935
Bi	L_3-O_2	.01	83	6	13.296	0.932
Bi	L_3-O_3	.01	83	6	13.326	0.930
Bi	$L\beta_5$	1	83	6	13.393	0.926
Bi	$L_3-P_{2,3}$	.01	83	6	13.414	0.924
Bi	$L\beta_{10}$	.01	83	6	13.698	0.905
Bi	$L\beta_9$	.01	83	6	13.805	0.898
Bi	$L\gamma_5$	.1	83	6	14.771	0.839
Bi	L_2-N_2	.01	83	6	14.856	0.834
Bi	L_2-N_3	.01	83	6	15.029	0.825
Bi	$L\gamma_1$	10	83	6	15.245	0.813
Bi	L_1-N_1	.01	83	6	15.453	0.802
Bi	$L\gamma_8$	.1	83	6	15.547	0.797
Bi	Lv	.01	83	6	15.549	0.797
Bi	$L\gamma_2$	1	83	6	15.580	0.796
Bi	L_2-O_3	.01	83	6	15.615	0.794
Bi	$L\gamma_6$	.01	83	6	15.683	0.790
Bi	$L\gamma_3$	2	83	6	15.708	0.789

El	Line	I	Z	R	KeV	Lambda
Bi	L_1-N_4	.01	83	6	15.922	0.779
Bi	$L\gamma_{11}$	.01	83	6	15.948	0.777
Bi	$L_1-N_{6,7}$	.01	83	6	16.223	0.764
Bi	$L\gamma_4p$	.1	83	6	16.268	0.762
Bi	$L\gamma_4$	.1	83	6	16.292	0.761
Bi	$L_1-O_{4,5}$	.01	83	6	16.355	0.758
Bi	$L\gamma_{13}$	.01	83	6	16.382	0.757
Bi	$K\alpha_2$	50	83	6	74.802	0.166
Bi	$K\alpha_{1,2}$	150	83	6	76.315	0.162
Bi	$K\alpha_1$	100	83	6	77.095	0.161
Bi	$K\beta_3$	13	83	6	86.819	0.143
Bi	$K\beta_1$	89	83	6	87.328	0.142
Bi	$K\beta_5$	.4	83	6	87.888	0.141
Bi	$K\beta_2''$	11	83	6	89.716	0.138
Bi	$K\beta_2'$	11	83	6	89.846	0.138
Bi	$K\beta_4$	.3	83	6	90.094	0.138
Bi	$K-O_{2,3}$	.01	83	6	90.422	0.137
Po	Ll	3	84	6	9.662	1.283
Po	$L\alpha_2$	10	84	6	11.014	1.125
Po	$L\alpha_1$	100	84	6	11.129	1.114
Po	$L\beta_6$	.1	84	6	12.816	0.967
Po	$L\beta_4$	4	84	6	13.083	0.947
Po	$L\beta_{15}$	1	84	6	13.312	0.931
Po	$L\beta_2$	20	84	6	13.338	0.929
Po	$L\beta_1$	50	84	6	13.445	0.922
Po	$L\beta_3$	6	84	6	13.635	0.909
Po	$L\beta_5$	1	84	6	13.779	0.900
Po	$L\gamma_1$	10	84	6	15.741	0.787
Po	$L\gamma_2$	1	84	6	16.057	0.772
Po	$L\gamma_6$	.01	84	6	16.215	0.764
Po	$K\alpha_2$	50	84	6	76.851	0.161
Po	$K\alpha_{1,2}$	150	84	6	78.452	0.158
Po	$K\alpha_1$	100	84	6	79.279	0.156
Po	$K\beta_3$	13	84	6	89.231	0.139
Po	$K\beta_1$	89	84	6	89.781	0.138
Po	$K\beta_2''$	11	84	6	92.246	0.134
Po	$K\beta_2'$	11	84	6	92.383	0.134
At	$L\alpha_2$	10	85	6	11.303	1.097
At	$L\alpha_1$	100	85	6	11.425	1.085
At	$L\beta_1$	50	85	6	13.874	0.893
At	$L\beta_3$	10	85	6	14.065	0.881
At	$L\gamma_1$	10	85	6	16.249	0.763
At	$K\alpha_2$	50	85	6	78.930	0.157
At	$K\alpha_{1,2}$	150	85	6	80.624	0.154
At	$K\alpha_1$	100	85	6	81.499	0.152
At	$K\beta_3$	13	85	6	91.707	0.135
At	$K\beta_1$	29	85	6	92.287	0.134
At	$K\beta_2''$	11	85	6	94.829	0.131
At	$K\beta_2'$	11	85	6	94.974	0.131
Rn	$L\alpha_2$	10	86	6	11.596	1.069
Rn	$L\alpha_1$	100	86	6	11.725	1.057
Rn	$L\beta_1$	50	86	6	14.313	0.866
Rn	$L\beta_3$	10	86	6	14.509	0.854
Rn	$L\gamma_1$	10	86	6	16.768	0.739
Rn	$K\alpha_2$	50	86	6	81.051	0.153
Rn	$K\alpha_{1,2}$	150	86	6	82.843	0.150
Rn	$K\alpha_1$	100	86	6	83.768	0.148
Rn	$K\beta_3$	13	86	6	94.230	0.132
Rn	$K\beta_1$	29	86	6	94.850	0.131
Rn	$K\beta_2''$	11	86	6	97.460	0.127
Rn	$K\beta_2'$	11	86	6	97.622	0.127
Fr	$L\alpha_2$	10	87	6	11.893	1.042
Fr	$L\alpha_1$	100	87	6	12.029	1.030
Fr	$L\beta_2$	20	87	6	14.448	0.858
Fr	$L\beta_1$	50	87	6	14.768	0.839
Fr	$L\beta_3$	10	87	6	14.973	0.828
Fr	$L\gamma_1$	10	87	6	17.300	0.717
Fr	$K\alpha_2$	50	87	6	83.217	0.149
Fr	$K\alpha_{1,2}$	150	87	6	85.110	0.146
Fr	$K\alpha_1$	100	87	6	86.089	0.144
Fr	$K\beta_3$	14	87	6	96.791	0.128
Fr	$K\beta_1$	29	87	6	97.460	0.127
Fr	$K\beta_2''$	11	87	6	100.137	0.124
Fr	$K\beta_2'$	11	87	6	100.307	0.124
Ra	Ll	3	88	6	10.620	1.167
Ra	$L\alpha_2$	10	88	6	12.194	1.017
Ra	$L\alpha_1$	100	88	6	12.338	1.005
Ra	Ln	1	88	6	13.661	0.907
Ra	$L\beta_6$	.1	88	6	14.234	0.871
Ra	L_3-N_2	.01	88	6	14.384	0.862
Ra	L_3-N_3	.01	88	6	14.563	0.851
Ra	$L\beta_{17}$	.01	88	6	14.691	0.844
Ra	$L\beta_4$	4	88	6	14.745	0.841
Ra	$L\beta_{15}$	1	88	6	14.806	0.837
Ra	$L\beta_2$	20	88	6	14.839	0.835
Ra	Lu	.01	88	6	15.143	0.819
Ra	$L\beta_7$	.1	88	6	15.187	0.816
Ra	$L\beta_1$	50	88	6	15.233	0.814
Ra	$L\beta_5$	1	88	6	15.375	0.806
Ra	L_3-P_1	.01	88	6	15.399	0.805
Ra	$L_3-P_{2,3}$	.01	88	6	15.422	0.804
Ra	$L\beta_3$	6	88	6	15.442	0.803
Ra	$L\beta_{10}$	.01	88	6	15.985	0.775
Ra	$L\beta_9$	.01	88	6	16.129	0.769
Ra	$L\gamma_5$	.1	88	6	17.271	0.718
Ra	L_2-N_3	.01	88	6	17.600	0.704
Ra	$L\gamma_1$	10	88	6	17.845	0.695
Ra	L_2-N_5	.01	88	6	17.882	0.693
Ra	L_1-N_1	.01	88	6	18.033	0.687
Ra	$L\gamma_2$	1	88	6	18.176	0.682
Ra	$L\gamma_8$	.1	88	6	18.227	0.680
Ra	L_2-O_2	.01	88	6	18.283	0.678
Ra	L_2-O_3	.01	88	6	18.326	0.676
Ra	$L\gamma_3$	2	88	6	18.354	0.675
Ra	$L\gamma_6$	.01	88	6	18.411	0.673
Ra	L_2-P_1	.01	88	6	18.435	0.672
Ra	$L_2-P_{2,3}$	.01	88	6	18.463	0.671
Ra	L_1-N_4	.01	88	6	18.596	0.667
Ra	$L\gamma_{11}$	.01	88	6	18.629	0.665
Ra	$L\gamma_4p$	.1	88	6	19.032	0.651
Ra	$L\gamma_4$	.1	88	6	19.081	0.650
Ra	$L_1-O_{4,5}$	.01	88	6	19.165	0.647
Ra	$L\gamma_{13}$	.01	88	6	19.215	0.645
Ra	$K\alpha_2$	50	88	6	85.419	0.145
Ra	$K\alpha_{1,2}$	150	88	6	87.419	0.142
Ra	$K\alpha_1$	100	88	6	88.454	0.140
Ra	$K\beta_3$	14	88	6	99.415	0.125
Ra	$K\beta_1$	30	88	6	100.113	0.124
Ra	$K\beta_2''$	11	88	6	102.871	0.120
Ra	$K\beta_2'$	11	88	6	103.051	0.120
Ac	$L\alpha_2$	10	89	6	12.499	0.992
Ac	$L\alpha_1$	100	89	6	12.650	0.980
Ac	$L\beta_1$	50	89	6	15.710	0.789
Ac	$L\beta_3$	10	89	6	15.929	0.778
Ac	$L\gamma_1$	10	89	6	18.405	0.674
Ac	$K\alpha_2$	50	89	6	87.660	0.141
Ac	$K\alpha_{1,2}$	150	89	6	89.773	0.138
Ac	$K\alpha_1$	100	89	6	90.868	0.136
Ac	$K\beta_3$	14	89	6	102.084	0.121
Ac	$K\beta_1$	30	89	6	102.829	0.121

El	Line	I	Z	R	KeV	Lambda
Ac	$K\beta_2''$	11	89	6	105.660	0.117
Ac	$K\beta_2'$	11	89	6	105.849	0.117
Th	N_7-O_5		90	6	0.248	50.000
Th	N_6-O_4		90	6	0.250	49.500
Th	N_6-O_5		90	6	0.257	48.200
Th	$N_5-N_{6,7}$		90	6	0.341	36.320
Th	N_4-N_6		90	6	0.369	33.570
Th	N_3-O_5		90	6	0.898	13.800
Th	N_2-O_4		90	6	1.072	11.560
Th	N_2-P_1		90	6	1.120	11.070
Th	N_1-P_2		90	6	1.313	9.440
Th	N_1-P_3		90	6	1.319	9.400
Th	Mz_2	.1	90	6	2.321	5.340
Th	Mz_1	1	90	6	2.363	5.245
Th	M_4-N_3	.01	90	6	2.524	4.911
Th	M_3-N_1	1	90	6	2.714	4.568
Th	$M\alpha_2$	100	90	6	2.986	4.151
Th	$M\alpha_1$	100	90	6	2.996	4.138
Th	$M\beta$	60	90	6	3.145	3.941
Th	M_4-O_2	1	90	6	3.255	3.808
Th	M_5-P_3	.01	90	6	3.297	3.760
Th	M_3-N_4	5	90	6	3.334	3.718
Th	$M\gamma$	5	90	6	3.369	3.679
Th	M_2-N_1	.01	90	6	3.505	3.537
Th	M_3-O_1	.5	90	6	3.776	3.283
Th	$M_3-O_{4,5}$	1	90	6	3.959	3.131
Th	M_2-N_4	5	90	6	4.117	3.011
Th	M_1-N_3	.1	90	6	4.225	2.934
Th	M_2-O_4	1	90	6	4.735	2.618
Th	M_1-O_3	.01	90	6	5.076	2.442
Th	Ll	1	90	6	11.117	1.115
Th	Lt	.01	90	6	11.468	1.081
Th	Ls	.01	90	6	12.252	1.012
Th	$L\alpha_2$	10	90	6	12.807	0.968
Th	$L\alpha_1$	100	90	6	12.967	0.956
Th	Ln	1	90	6	14.507	0.854
Th	L_2-M_2	.01	90	6	14.867	0.834
Th	$L\beta_6$	.1	90	6	14.973	0.828
Th	L_3-N_2	.01	90	6	15.136	0.819
Th	L_1-M_1	.01	90	6	15.287	0.811
Th	L_3-N_3	.01	90	6	15.338	0.808
Th	$L\beta_{15}$	1	90	6	15.585	0.795
Th	$L\beta_2$	20	90	6	15.621	0.794
Th	$L\beta_4$	4	90	6	15.640	0.793
Th	$L\beta_{17}$	.01	90	6	15.644	0.792
Th	Lu	.01	90	6	15.962	0.777
Th	$L\beta_7$	.1	90	6	16.008	0.774
Th	L_3-O_2	.01	90	6	16.072	0.771
Th	L_3-O_3	.01	90	6	16.120	0.769
Th	$L\beta_1$	50	90	6	16.199	0.765
Th	$L\beta_5$	1	90	6	16.211	0.765
Th	L_3-P_1	.01	90	6	16.238	0.763
Th	$L_3-P_{2,3}$	.01	90	6	16.257	0.762
Th	$L_3-P_{4,5}$	.01	90	6	16.292	0.761
Th	L_2-M_5	.01	90	6	16.356	0.758
Th	$L\beta_3$	6	90	6	16.423	0.755
Th	$L\beta_{10}$	.01	90	6	16.978	0.730
Th	$L\beta_9$	.01	90	6	17.136	0.723
Th	$L\gamma_5$	.1	90	6	18.361	0.675
Th	L_2-N_3	.01	90	6	18.725	0.662
Th	$L\gamma_1$	10	90	6	18.979	0.653
Th	L_2-N_5	.01	90	6	19.009	0.652
Th	L_1-N_1	.01	90	6	19.143	0.648
Th	$L\gamma_2$	1	90	6	19.302	0.642
Th	Lv	.01	90	6	19.349	0.641
Th	$L\gamma_8$	.1	90	6	19.400	0.639
Th	L_2-O_2	.01	90	6	19.463	0.637
Th	L_2-O_3	.01	90	6	19.503	0.636
Th	$L\gamma_3$	2	90	6	19.503	0.636
Th	$L\gamma_6$	.01	90	6	19.596	0.633
Th	L_2-P_1	.01	90	6	19.626	0.632
Th	$L_2-P_{2,3}$	.01	90	6	19.639	0.631
Th	L_2-P_4	.01	90	6	19.679	0.630
Th	L_1-N_4	.01	90	6	19.751	0.628
Th	$L\gamma_{11}$	.01	90	6	19.791	0.626
Th	$L_1-N_{6,7}$	.01	90	6	20.123	0.616
Th	L_1-O_1	.01	90	6	20.169	0.615
Th	$L\gamma_4p$	.1	90	6	20.238	0.613
Th	$L\gamma_4$	.1	90	6	20.289	0.611
Th	$L_1-O_{4,5}$	.01	90	6	20.378	0.608
Th	$L\gamma_{13}$	.01	90	6	20.420	0.607
Th	$K\alpha_2$	50	90	6	89.938	0.138
Th	$K\alpha_{1,2}$	150	90	6	92.174	0.134
Th	$K\alpha_1$	100	90	6	93.334	0.133
Th	$K\beta_3$	14	90	6	104.813	0.118
Th	$K\beta_1$	30	90	6	105.591	0.117
Th	$K\beta_5$	.5	90	6	106.251	0.117
Th	$K\beta_2''$	11	90	6	108.489	0.114
Th	$K\beta_2'$	11	90	6	108.699	0.114
Th	$K\beta_4$	.4	90	6	108.940	0.114
Th	$K-O_{2,3}$	.01	90	6	109.486	0.113
Pa	Mz_2	.1	91	6	2.387	5.193
Pa	Mz_1	1	91	6	2.434	5.092
Pa	M_3-N_1	1	91	6	2.786	4.450
Pa	$M\alpha_2$	100	91	6	3.072	4.035
Pa	$M\alpha_1$	100	91	6	3.082	4.022
Pa	$M\beta$	60	91	6	3.239	3.827
Pa	M_4-O_2	1	91	6	3.358	3.691
Pa	M_3-N_4	5	91	6	3.430	3.614
Pa	$M\gamma$	5	91	6	3.465	3.577
Pa	M_2-N_1	.01	91	6	3.602	3.441
Pa	M_3-O_1	.5	91	6	3.820	3.245
Pa	$M_3-O_{4,5}$	1	91	6	4.080	3.038
Pa	M_2-N_4	5	91	6	4.260	2.910
Pa	M_2-O_4	.01	91	6	4.905	2.527
Pa	Ll	3	91	6	11.364	1.091
Pa	$L\alpha_2$	10	91	6	13.120	0.945
Pa	$L\alpha_1$	100	91	6	13.288	0.933
Pa	Ln	1	91	6	14.944	0.829
Pa	$L\beta_6$	.1	91	6	15.343	0.808
Pa	$L\beta_2$	20	91	6	16.022	0.774
Pa	$L\beta_4$	4	91	6	16.101	0.770
Pa	$L\beta_7$	.1	91	6	16.427	0.755
Pa	$L\beta_5$	1	91	6	16.634	0.745
Pa	$L\beta_1$	50	91	6	16.699	0.742
Pa	$L\beta_3$	6	91	6	16.927	0.732
Pa	$L\beta_{10}$	.01	91	6	17.489	0.709
Pa	$L\beta_9$	.01	91	6	17.663	0.702
Pa	$L\gamma_5$	.1	91	6	18.925	0.655
Pa	$L\gamma_1$	10	91	6	19.565	0.634
Pa	$L\gamma_2$	1	91	6	19.869	0.624
Pa	$L\gamma_3$	2	91	6	20.094	0.617
Pa	$L\gamma_6$	.01	91	6	20.212	0.613
Pa	$L\gamma_4$	.1	91	6	20.879	0.594
Pa	$K\alpha_2$	50	91	6	92.271	0.134
Pa	$K\alpha_{1,2}$	150	91	6	94.627	0.131
Pa	$K\alpha_1$	100	91	6	95.852	0.129
Pa	$K\beta_3$	14	91	6	107.576	0.115
Pa	$K\beta_1$	30	91	6	108.409	0.114
Pa	$K\beta_2''$	11	91	6	111.385	0.111

El	Line	I	Z	R	KeV	Lambda
Pa	$K\beta_2'$	11	91	6	111.605	0.111
U	N_6-O_4		92	6	0.286	43.300
U	N_6-O_5		92	6	0.294	42.100
U	$N_5-N_{6,7}$		92	6	0.356	34.800
U	N_4-N_6		92	6	0.390	31.800
U	N_3-O_5		92	6	0.961	12.900
U	N_2-P_1		92	6	1.192	10.400
U	N_1-O_3		92	6	1.229	10.090
U	N_1-P_2		92	6	1.407	8.810
U	N_1-P_3		92	6	1.415	8.760
U	$N_1-P_{4,5}$		92	6	1.441	8.600
U	Mz_2	.1	92	6	2.455	5.050
U	Mz_1	1	92	6	2.506	4.946
U	M_4-N_3	.01	92	6	2.680	4.625
U	M_3-N_1	1	92	6	2.863	4.330
U	$M\alpha_2$	100	92	6	3.159	3.924
U	$M\alpha_1$	100	92	6	3.170	3.910
U	$M\beta$	60	92	6	3.336	3.716
U	M_4-O_2	1	92	6	3.466	3.576
U	M_3-N_4	5	92	6	3.521	3.521
U	$M\gamma$	5	92	6	3.563	3.479
U	M_2-N_1	.01	92	6	3.724	3.329
U	M_3-O_1	.5	92	6	3.979	3.115
U	$M_3-O_{4,5}$	1	92	6	4.205	2.948
U	M_1-N_2	1	92	6	4.245	2.920
U	M_2-N_4	5	92	6	4.400	2.817
U	M_1-N_3	.1	92	6	4.503	2.753
U	M_2-O_4	.01	92	6	5.074	2.443
U	M_1-O_3	.01	92	6	5.380	2.304
U	M_1-P_3	.01	92	6	5.502	2.253
U	Ll	3	92	6	11.616	1.067
U	Lt	.01	92	6	11.980	1.035
U	Ls	.01	92	6	12.864	0.964
U	$L\alpha_2$	10	92	6	13.437	0.923
U	$L\alpha_1$	100	92	6	13.612	0.911
U	Ln	1	92	6	15.397	0.805
U	$L\beta_6$	.1	92	6	15.723	0.788
U	L_3-N_2	.01	92	6	15.889	0.780
U	L_3-N_3	.01	92	6	16.118	0.769
U	$L\beta_{15}$	1	92	6	16.383	0.757
U	$L\beta_2$	20	92	6	16.425	0.755
U	$L\beta_4$	4	92	6	16.573	0.748
U	$L\beta_{17}$	.01	92	6	16.638	0.745
U	Lu	.01	92	6	16.783	0.739
U	$L\beta_7$	.1	92	6	16.842	0.736
U	L_3-O_2	.01	92	6	16.904	0.733
U	L_3-O_3	.01	92	6	16.960	0.731
U	$L\beta_5$	1	92	6	17.067	0.726
U	L_3-P_1	.01	92	6	17.093	0.725
U	$L_3-P_{2,3}$	.01	92	6	17.115	0.724
U	$L_3-P_{4,5}$	.01	92	6	17.159	0.722
U	$L\beta_1$	50	92	6	17.217	0.720
U	$L\beta_3$	6	92	6	17.452	0.710
U	$L\beta_{10}$	.01	92	6	18.028	0.688
U	$L\beta_9$	.01	92	6	18.202	0.681
U	$L\gamma_5$	.1	92	6	19.504	0.636
U	L_2-N_3	.01	92	6	19.904	0.623
U	$L\gamma_1$	10	92	6	20.164	0.615
U	$L\gamma_2$	1	92	6	20.481	0.605
U	Lv	.01	92	6	20.554	0.603
U	$L\gamma_8$	.1	92	6	20.617	0.601
U	$L\gamma_3$	2	92	6	20.709	0.599
U	L_2-O_3	.01	92	6	20.754	0.597
U	$L\gamma_6$	.01	92	6	20.839	0.595
U	$L_2-P_{2,3}$	.01	92	6	20.904	0.593
U	L_2-P_4	.01	92	6	20.938	0.592
U	L_1-N_4	.01	92	6	20.976	0.591
U	$L\gamma_{11}$	.01	92	6	21.015	0.590
U	$L\gamma_4p$	.1	92	6	21.495	0.577
U	$L\gamma_4$	.1	92	6	21.559	0.575
U	$L_1-O_{4,5}$	.01	92	6	21.652	0.572
U	$L\gamma_{13}$	.01	92	6	21.724	0.571
U	$K\alpha_2$	50	92	6	94.649	0.131
U	$K\alpha_{1,2}$	150	92	6	97.131	0.128
U	$K\alpha_1$	100	92	6	98.422	0.126
U	$K\beta_3$	14	92	6	110.387	0.112
U	$K\beta_1$	31	92	6	111.281	0.111
U	$K\beta_5$	.6	92	6	111.988	0.111
U	$K\beta_2''$	11	92	6	114.314	0.108
U	$K\beta_2'$	11	92	6	114.587	0.108
U	$K\beta_4$	.4	92	6	114.832	0.108
U	$K-O_{2,3}$	.01	92	6	115.376	0.107
Np	Ll	3	93	6	11.887	1.043
Np	$L\alpha_2$	10	93	6	13.757	0.901
Np	$L\alpha_1$	100	93	6	13.942	0.889
Np	Ln	1	93	6	15.874	0.781
Np	$L\beta_6$	.1	93	6	16.120	0.769
Np	$L\beta_2$	20	93	6	16.837	0.736
Np	$L\beta_4$	4	93	6	17.058	0.727
Np	$L\beta_5$	1	93	6	17.505	0.708
Np	$L\beta_1$	50	93	6	17.747	0.698
Np	$L\beta_3$	6	93	6	17.986	0.689
Np	$L\gamma_5$	.1	93	6	20.123	0.616
Np	$L\gamma_1$	10	93	6	20.781	0.596
Np	$L\gamma_2$	1	93	6	21.107	0.587
Np	$L\gamma_3$	2	93	6	21.336	0.581
Np	$L\gamma_6$	.01	93	6	21.484	0.577
Np	$L\gamma_4$	.1	93	6	22.195	0.558
Np	$K\alpha_2$	50	93	3	96.844	0.128
Np	$K\alpha_{1,2}$	150	93	3	99.407	0.125
Np	$K\alpha_1$	100	93	3	100.781	0.123
Np	$K\beta_1$	30	93	3	113.725	0.109
Np	$K\beta_2$	11	93	3	118.057	0.105
Pu	Ll	3	94	6	12.122	1.023
Pu	$L\alpha_2$	10	94	6	14.082	0.880
Pu	$L\alpha_1$	100	94	6	14.276	0.868
Pu	Ln	1	94	6	16.330	0.759
Pu	$L\beta_6$	.1	94	6	16.495	0.751
Pu	$L\beta_{15}$	1	94	6	17.205	0.720
Pu	$L\beta_2$	20	94	6	17.252	0.719
Pu	$L\beta_4$	4	94	6	17.553	0.706
Pu	Lu	.01	94	6	17.630	0.703
Pu	$L\beta_7$	.1	94	6	17.701	0.700
Pu	$L\beta_5$	1	94	6	17.948	0.691
Pu	$L\beta_1$	50	94	6	18.291	0.678
Pu	$L\beta_3$	6	94	6	18.537	0.669
Pu	$L\beta_{10}$	.01	94	6	19.124	0.648
Pu	$L\beta_9$	.01	94	6	19.320	0.642
Pu	$L\gamma_5$	.1	94	6	20.701	0.599
Pu	$L\gamma_1$	10	94	6	21.414	0.579
Pu	$L\gamma_2$	1	94	6	21.721	0.571
Pu	$L\gamma_8$	.1	94	6	21.909	0.566
Pu	$L\gamma_3$	2	94	6	21.979	0.564
Pu	$L\gamma_6$	.01	94	6	22.146	0.560
Pu	$L\gamma_4p$	.1	94	6	22.820	0.543
Pu	$L\gamma_4$	.1	94	6	22.888	0.542
Pu	$K\alpha_2$	50	94	3	99.168	0.125
Pu	$K\alpha_{1,2}$	150	94	3	101.857	0.122
Pu	$K\alpha_1$	100	94	3	103.300	0.120
Pu	$K\beta_1$	30	94	3	116.943	0.106

El	Line	I	Z	R	KeV	Lambda
Pu	$K\beta_2$	11	94	3	120.350	0.103
Am	Ll	3	95	6	12.381	1.001
Am	$L\alpha_2$	10	95	6	14.409	0.860
Am	$L\alpha_1$	100	95	6	14.615	0.848
Am	$L\beta_6$	.1	95	6	16.884	0.734
Am	$L\beta_{15}$	1	95	6	17.623	0.703
Am	$L\beta_2$	20	95	6	17.673	0.701
Am	$L\beta_4$	4	95	6	18.060	0.686
Am	$L\beta_5$	1	95	6	18.396	0.674
Am	$L\beta_1$	50	95	6	18.849	0.658
Am	$L\beta_3$	6	95	6	19.103	0.649
Am	$L\gamma_1$	10	95	6	22.061	0.562
Am	$L\gamma_2$	1	95	6	22.359	0.554
Am	$L\gamma_6$	.01	95	6	22.824	0.543
Am	$K\alpha_2$	50	95	3	101.607	0.122
Am	$K\alpha_{1,2}$	150	95	3	104.431	0.119
Am	$K\alpha_1$	100	95	3	105.949	0.117
Am	$K\beta_1$	30	95	3	120.350	0.103
Am	$K\beta_2$	11	95	3	123.960	0.100
Cm	$L\alpha_2$	10	96	3	14.740	0.841
Cm	$L\alpha_1$	100	96	3	14.953	0.829
Cm	$L\beta_2$	20	96	3	18.096	0.685
Cm	$L\beta_1$	50	96	3	19.399	0.639
Cm	$L\gamma_1$	10	96	3	22.703	0.546
Cm	$K\alpha_2$	50	96	3	104.168	0.119
Cm	$K\alpha_{1,2}$	150	96	3	107.139	0.116
Cm	$K\alpha_1$	100	96	3	108.737	0.114
Cm	$K\beta_1$	30	96	3	122.733	0.101
Cm	$K\beta_2$	11	96	3	126.490	0.098
Bk	$L\alpha_2$	10	97	3	15.080	0.822
Bk	$L\alpha_1$	100	97	3	15.304	0.810
Bk	$L\beta_2$	20	97	3	18.529	0.669
Bk	$L\beta_1$	50	97	3	19.961	0.621
Bk	$L\gamma_1$	10	97	3	23.389	0.530
Bk	$K\alpha_2$	50	97	3	106.862	0.116
Bk	$K\alpha_{1,2}$	150	97	3	109.991	0.113
Bk	$K\alpha_1$	100	97	3	111.676	0.111
Bk	$K\beta_1$	30	97	3	126.490	0.098
Bk	$K\beta_2$	11	97	3	130.484	0.095
Cf	$L\alpha_2$	10	98	3	15.418	0.804
Cf	$L\alpha_1$	100	98	3	15.652	0.792
Cf	$L\beta_2$	20	98	3	18.983	0.653
Cf	$L\beta_1$	50	98	3	20.557	0.603
Cf	$L\gamma_1$	10	98	3	24.070	0.515
Cf	$K\alpha_2$	50	98	3	109.699	0.113
Cf	$K\alpha_{1,2}$	150	98	3	112.999	0.110
Cf	$K\alpha_1$	100	98	3	114.778	0.108
Cf	$K\beta_1$	30	98	3	127.794	0.097
Cf	$K\beta_2$	11	98	3	133.290	0.093
Cf	$K\beta_2$	11	98	3	133.290	0.093

Table II

X-ray Lines Ordered by Increasing Wavelength

El	Line	I	Z	R	KeV	Lambda
Cf	$K\beta_2$	11	98	3	133.290	0.093
Bk	$K\beta_2$	11	97	3	130.484	0.095
Cf	$K\beta_1$	30	98	3	127.794	0.097
Cm	$K\beta_2$	11	96	3	126.490	0.098
Bk	$K\beta_1$	30	97	3	126.490	0.098
Am	$K\beta_2$	11	95	3	123.960	0.100
Cm	$K\beta_1$	30	96	3	122.733	0.101
Pu	$K\beta_2$	11	94	3	120.350	0.103
Am	$K\beta_1$	30	95	3	120.350	0.103
Np	$K\beta_2$	11	93	3	118.057	0.105
Pu	$K\beta_1$	30	94	3	116.943	0.105
U	$K-O_{2,3}$	.01	92	6	115.376	0.107
U	$K\beta_4$	.4	92	6	114.332	0.108
Cf	$K\alpha_1$	100	98	3	114.778	0.108
U	$K\beta_2'$	11	92	6	114.587	0.108
U	$K\beta_2''$	11	92	6	114.314	0.108
Np	$K\beta_1$	30	93	3	113.725	0.109
Cf	$K\alpha_{1,2}$	150	98	3	112.999	0.110
U	$K\beta_5$	.6	92	6	111.988	0.111
Bk	$K\alpha_1$	100	97	3	111.676	0.111
Pa	$K\beta_2'$	11	91	6	111.605	0.111
Pa	$K\beta_2''$	11	91	6	111.385	0.111
U	$K\beta_1$	31	92	6	111.281	0.111
U	$K\beta_3$	14	92	6	110.387	0.112
Bk	$K\alpha_{1,2}$	150	97	3	109.991	0.113
Cf	$K\alpha_2$	50	98	3	109.699	0.113
Th	$K-O_{2,3}$	.01	90	6	109.486	0.113
Th	$K\beta_4$	.4	90	6	108.940	0.114
Cm	$K\alpha_1$	100	96	3	108.737	0.114
Th	$K\beta_2'$	11	90	6	108.699	0.114
Th	$K\beta_2''$	11	90	6	108.489	0.114
Pa	$K\beta_1$	30	91	6	108.409	0.114
Pa	$K\beta_3$	14	91	6	107.576	0.115
Cm	$K\alpha_{1,2}$	150	96	3	107.139	0.116
Bk	$K\alpha_2$	50	97	3	106.862	0.116
Th	$K\beta_5$	.5	90	6	106.251	0.117
Am	$K\alpha_1$	100	95	3	105.949	0.117
Ac	$K\beta_2'$	11	89	6	105.849	0.117
Ac	$K\beta_2''$	11	89	6	105.660	0.117
Th	$K\beta_1$	30	90	6	105.591	0.117
Th	$K\beta_3$	14	90	6	104.813	0.118
Am	$K\alpha_{1,2}$	150	95	3	104.431	0.119
Cm	$K\alpha_2$	50	96	3	104.168	0.119
Pu	$K\alpha_1$	100	94	3	103.300	0.120
Ra	$K\beta_2'$	11	88	6	103.051	0.120
Ra	$K\beta_2''$	11	88	6	102.871	0.120
Ac	$K\beta_1$	30	89	6	102.829	0.121
Ac	$K\beta_3$	14	89	6	102.084	0.121
Pu	$K\alpha_{1,2}$	150	94	3	101.857	0.122
Am	$K\alpha_2$	50	95	3	101.607	0.122
Np	$K\alpha_1$	100	93	3	100.781	0.123
Fr	$K\beta_2'$	11	87	6	100.307	0.124
Fr	$K\beta_2''$	11	87	6	100.137	0.124
Ra	$K\beta_1$	30	88	6	100.113	0.124
Ra	$K\beta_3$	14	88	6	99.415	0.125
Np	$K\alpha_{1,2}$	150	93	3	99.407	0.125
Pu	$K\alpha_2$	50	94	3	99.168	0.125
U	$K\alpha_1$	100	92	6	98.422	0.126
Rn	$K\beta_2'$	11	86	6	97.622	0.127
Rn	$K\beta_2''$	11	86	6	97.460	0.127
Fr	$K\beta_1$	29	87	6	97.460	0.127
U	$K\alpha_{1,2}$	150	92	6	97.131	0.128
Np	$K\alpha_2$	50	93	3	96.844	0.128
Fr	$K\beta_3$	14	87	6	96.791	0.128
Pa	$K\alpha_1$	100	91	6	95.852	0.129
At	$K\beta_2'$	11	85	6	94.974	0.131
Rn	$K\beta_1$	29	86	6	94.850	0.131
At	$K\beta_2''$	11	85	6	94.829	0.131
U	$K\alpha_2$	50	92	6	94.649	0.131
Pa	$K\alpha_{1,2}$	150	91	6	94.627	0.131
Rn	$K\beta_3$	13	86	6	94.230	0.132
Th	$K\alpha_1$	100	90	6	93.334	0.133
Po	$K\beta_2'$	11	84	6	92.383	0.134
At	$K\beta_1$	29	85	6	92.287	0.134
Pa	$K\alpha_2$	50	91	6	92.271	0.134
Po	$K\beta_2''$	11	84	6	92.246	0.134
Th	$K\alpha_{1,2}$	150	90	6	92.174	0.134
At	$K\beta_3$	13	85	6	91.707	0.135
Ac	$K\alpha_1$	100	89	6	90.868	0.136
Bi	$K-O_{2,3}$	.01	83	6	90.422	0.137
Bi	$K\beta_4$	.3	83	6	90.094	0.138
Th	$K\alpha_2$	50	90	6	89.938	0.138
Bi	$K\beta_2'$	11	83	6	89.845	0.138
Po	$K\beta_1$	89	84	6	89.781	0.138
Ac	$K\alpha_{1,2}$	150	89	6	89.773	0.138
Bi	$K\beta_2''$	11	83	6	89.716	0.138
Po	$K\beta_3$	13	84	6	89.231	0.139
Ra	$K\alpha_1$	100	88	6	88.454	0.140
Pb	K-P	.01	82	6	88.040	0.141
Pb	$K-O_{2,3}$	.01	82	6	87.907	0.141
Bi	$K\beta_5$	.4	83	6	87.888	0.141
Ac	$K\alpha_2$	50	89	6	87.660	0.141
Pb	$K\beta_4$	.2	82	6	87.573	0.142
Ra	$K\alpha_{1,2}$	150	88	6	87.419	0.142
Pb	$K\beta_2'$	11	82	6	87.351	0.142
Bi	$K\beta_1$	89	83	6	87.328	0.142
Pb	$K\beta_2''$	11	82	6	87.222	0.142
Bi	$K\beta_3$	13	83	6	86.819	0.143
Fr	$K\alpha_1$	100	87	6	86.089	0.144
Pb	$K\beta_5'$	.4	82	6	85.519	0.145
Tl	$K-O_{2,3}$	.01	81	6	85.437	0.145
Pb	$K\beta_5''$	.4	82	6	85.419	0.145
Ra	$K\alpha_2$	50	88	6	85.419	0.145
Tl	$K\beta_4$	.2	81	6	85.178	0.146
Fr	$K\alpha_{1,2}$	150	87	6	85.110	0.146
Tl	$K\beta_2'$	10	81	6	84.933	0.146
Pb	$K\beta_1$	88	82	6	84.922	0.146
Tl	$K\beta_2''$	10	81	6	84.823	0.146
Pb	$K\beta_3$	13	82	6	84.436	0.147
Rn	$K\alpha_1$	100	86	6	83.768	0.148
Fr	$K\alpha_2$	50	87	6	83.217	0.149
Tl	$K\beta_5$	.4	81	6	83.100	0.149
Hg	$K-O_{2,3}$	.01	80	6	83.022	0.149
Rn	$K\alpha_{1,2}$	150	86	6	82.843	0.150
Hg	$K\beta_4$	.2	80	6	82.761	0.150
Tl	$K\beta_1$	78	81	6	82.562	0.150
Hg	$K\beta_2'$	10	80	6	82.530	0.150
Hg	$K\beta_2''$	10	80	6	82.420	0.150
Tl	$K\beta_3$	13	81	6	82.104	0.151
At	$K\alpha_1$	100	85	6	81.499	0.152
Rn	$K\alpha_2$	50	86	6	81.051	0.153
Hg	$K\beta_5$	.4	80	6	80.740	0.154
Au	$K-O_{2,3}$	.01	79	6	80.654	0.154
At	$K\alpha_{1,2}$	150	85	6	80.624	0.154
Au	$K\beta_4$	.2	79	6	80.377	0.154
Hg	$K\beta_1$	28	80	6	80.240	0.154
Au	$K\beta_2'$	10	79	6	80.172	0.155
Au	$K\beta_2''$	10	79	6	80.062	0.155
Hg	$K\beta_3$	13	80	6	79.809	0.155
Po	$K\alpha_1$	100	84	6	79.279	0.156

El	Line	I	Z	R	KeV	Lambda
At	$K\alpha_2$	50	85	6	78.930	0.157
Au	$K\beta_5'$	.3	79	6	78.515	0.158
Po	$K\alpha_{1,2}$	150	84	6	78.452	0.158
Au	$K\beta_5''$	.3	79	6	78.425	0.158
Pt	$K\text{-}O_{2,3}$	.01	78	6	78.327	0.158
Pt	$K\beta_4$	.2	78	6	78.056	0.159
Pt	$K\beta_4$	.2	78	6	78.056	0.159
Au	$K\beta_1$	27	79	6	77.971	0.159
Pt	$K\beta_2'$	10	78	6	77.864	0.159
Pt	$K\beta_2''$	10	78	6	77.772	0.159
Au	$K\beta_3$	13	79	6	77.567	0.160
Bi	$K\alpha_1$	100	83	6	77.095	0.161
Po	$K\alpha_2$	50	84	6	76.851	0.161
Bi	$K\alpha_{1,2}$	150	83	6	76.315	0.162
Pt	$K\beta_5'$	.3	78	6	76.260	0.163
Pt	$K\beta_5'$	.3	78	6	76.260	0.163
Pt	$K\beta_5''$	.3	78	6	76.185	0.163
Ir	$K\text{-}O_{2,3}$	.01	77	6	76.040	0.163
Ir	$K\beta_4$	.2	77	6	75.807	0.164
Pt	$K\beta_1$	27	78	6	75.735	0.164
Ir	$K\beta_2'$	10	77	6	75.606	0.164
Ir	$K\beta_2''$	10	77	6	75.516	0.164
Pt	$K\beta_3$	12	78	6	75.355	0.165
Pb	$K\alpha_1$	100	82	6	74.956	0.165
Bi	$K\alpha_2$	50	83	6	74.302	0.166
Pb	$K\alpha_{1,2}$	150	82	6	74.221	0.167
Ir	$K\beta_5'$	.3	77	6	74.062	0.167
Ir	$K\beta_5''$	.3	77	6	73.966	0.168
Os	$K\text{-}O_{2,3}$	.01	76	6	73.795	0.168
Os	$K\beta_4$	.2	76	6	73.602	0.168
Ir	$K\beta_1$	27	77	6	73.548	0.169
Os	$K\beta_2'$	10	76	6	73.390	0.169
Os	$K\beta_2''$	10	76	6	73.306	0.169
Ir	$K\beta_3$	12	77	6	73.190	0.169
Tl	$K\alpha_1$	100	81	6	72.859	0.170
Pb	$K\alpha_2$	50	82	6	72.792	0.170
Tl	$K\alpha_{1,2}$	150	81	6	72.167	0.172
Os	$K\beta_5'$	.3	76	6	71.882	0.172
Os	$K\beta_5''$	.3	76	6	71.811	0.173
Re	$K\text{-}O_{2,3}$	.01	75	6	71.620	0.173
Os	$K\beta_1$	27	76	6	71.401	0.174
Re	$K\beta_4$	.1	75	6	71.397	0.174
Re	$K\beta_2'$	10	75	6	71.219	0.174
Re	$K\beta_2''$	10	75	6	71.139	0.174
Os	$K\beta_3$	12	76	6	71.065	0.174
Tl	$K\alpha_2$	50	81	6	70.820	0.175
Hg	$K\alpha_1$	100	80	6	70.807	0.175
Hg	$K\alpha_{1,2}$	150	80	6	70.154	0.177
Re	$K\beta_5'$	.3	75	6	69.774	0.178
Re	$K\beta_5''$	.3	75	6	69.707	0.178
W	$K\text{-}O_{2,3}$	.01	74	6	69.467	0.178
Re	$K\beta_1$	26	75	6	69.298	0.179
W	$K\beta_4$	.1	74	6	69.282	0.179
W	$K\beta_2'$	10	74	6	69.089	0.179
W	$K\beta_2''$	10	74	6	69.020	0.180
Re	$K\beta_3$	12	75	6	68.983	0.180
Hg	$K\alpha_2$	50	80	6	68.883	0.180
Au	$K\alpha_1$	100	79	6	68.792	0.180
Au	$K\alpha_{1,2}$	150	79	6	68.177	0.182
W	$K\beta_5'$	.3	74	6	67.704	0.183
W	$K\beta_5''$	.3	74	6	67.640	0.183
Ta	$K\text{-}O_{2,3}$	.01	73	6	67.358	0.184
W	$K\beta_1$	26	74	6	67.233	0.184
Ta	$K\beta_4$	.08	73	6	67.183	0.185
Ta	$K\beta_2'$	9	73	6	67.001	0.185
Au	$K\alpha_2$	50	79	6	66.978	0.185
W	$K\beta_3$	12	74	6	66.940	0.185
Ta	$K\beta_2''$	9	73	6	66.937	0.185
Pt	$K\alpha_1$	100	78	6	66.821	0.186
Au	$K\text{-}L_1$	.01	79	6	66.388	0.187
Pt	$K\alpha_{1,2}$	150	78	6	66.241	0.187
Ta	$K\beta_5'$	.3	73	6	65.672	0.189
Ta	$K\beta_5''$	.3	73	6	65.615	0.189
Ta	$K\beta_1$	26	73	6	65.212	0.190
Pt	$K\alpha_2$	50	78	6	65.112	0.190
Hf	$K\beta_2$	9	72	6	64.969	0.191
Ta	$K\beta_3$	12	73	6	64.938	0.191
Ir	$K\alpha_1$	100	77	6	64.885	0.191
Ir	$K\alpha_{1,2}$	150	77	6	64.339	0.193
Lu	$K\text{-}O_{2,3}$	.01	71	6	63.280	0.196
Ir	$K\alpha_2$	50	77	6	63.276	0.196
Hf	$K\beta_1$	66	72	6	63.222	0.196
Os	$K\alpha_1$	100	76	6	62.990	0.197
Hf	$K\beta_3$	12	72	6	62.969	0.197
Lu	$K\beta_2$	9	71	6	62.956	0.197
Os	$K\alpha_{1,2}$	150	76	6	62.477	0.198
Lu	$K\beta_5$	.3	71	6	61.721	0.201
Os	$K\alpha_2$	50	76	6	61.476	0.202
Yb	$K\text{-}O_{2,3}$	.01	70	6	61.287	0.202
Lu	$K\beta_1$	65	71	6	61.272	0.202
Re	$K\alpha_1$	100	75	6	61.130	0.203
Lu	$K\beta_3$	12	71	6	61.037	0.203
Yb	$K\beta_2$	9	70	6	60.974	0.203
Re	$K\alpha_{1,2}$	150	75	6	60.648	0.204
Yb	$K\beta_5$	.3	70	6	59.771	0.207
Re	$K\alpha_2$	50	75	6	59.708	0.208
Yb	$K\beta_1$	64	70	6	59.356	0.209
Tm	$K\text{-}O_{2,3}$	.01	69	6	59.337	0.209
W	$K\alpha_1$	100	74	6	59.308	0.209
Yb	$K\beta_3$	12	70	6	59.141	0.210
Tm	$K\beta_2$	9	69	6	59.085	0.210
W	$K\alpha_{1,2}$	150	74	6	58.856	0.211
W	$K\alpha_2$	50	74	6	57.972	0.214
Tm	$K\beta_5$	.2	69	6	57.914	0.214
Ta	$K\alpha_1$	100	73	6	57.523	0.215
Tm	$K\beta_1$	23	69	6	57.506	0.216
Er	$K\text{-}O_{2,3}$	.01	68	6	57.439	0.216
W	$K\text{-}L_1$	.01	74	6	57.410	0.216
Tm	$K\beta_3$	11	69	6	57.293	0.216
Er	$K\beta_2$	8	68	6	57.204	0.217
Ta	$K\alpha_{1,2}$	150	73	6	57.098	0.217
Ta	$K\alpha_2$	50	73	6	56.267	0.220
Er	$K\beta_5$	.2	68	6	56.030	0.221
Hf	$K\alpha_1$	100	72	6	55.781	0.222
Er	$K\beta_1$	22	68	6	55.672	0.223
Ho	$K\text{-}O_{2,3}$	.01	67	6	55.575	0.223
Er	$K\beta_3$	12	68	6	55.485	0.223
Hf	$K\alpha_{1,2}$	150	72	6	55.382	0.224
Ho	$K\beta_2$	8	67	6	55.315	0.224
Hf	$K\alpha_2$	50	72	6	54.602	0.227
Ho	$K\beta_5$	.2	67	6	54.238	0.229
Lu	$K\alpha_1$	100	71	6	54.061	0.229
Ho	$K\beta_1$	22	67	6	53.868	0.230
Dy	$K\text{-}O_{2,3}$	.01	66	6	53.765	0.231
Ho	$K\beta_3$	11	67	6	53.702	0.231
Lu	$K\alpha_{1,2}$	150	71	6	53.687	0.231
Dy	$K\beta_2$	9	66	6	53.500	0.232
Lu	$K\alpha_2$	50	71	6	52.956	0.234
Dy	$K\beta_5$	.2	66	6	52.485	0.236
Yb	$K\alpha_1$	100	70	6	52.380	0.237

El	Line	I	Z	R	KeV	Lambda
Dy	$K\beta_1$	23	66	6	52.110	0.238
Yb	$K\alpha_{1,2}$	150	70	6	52.030	0.238
Tb	$K\text{-}O_{2,3}$	.01	65	6	51.957	0.239
Dy	$K\beta_3$	11	66	6	51.949	0.239
Tb	$K\beta_2$	8	65	6	51.715	0.240
Yb	$K\alpha_2$	50	70	6	51.345	0.241
Tm	$K\alpha_1$	100	69	6	50.733	0.244
Tm	$K\alpha_{1,2}$	150	69	6	50.406	0.246
Tb	$K\beta_1$	23	65	6	50.374	0.245
Tb	$K\beta_3$	11	65	6	50.221	0.247
Gd	$K\text{-}O_{2,3}$	.01	64	6	50.213	0.247
Gd	$K\beta_2$	8	64	6	49.952	0.248
Tm	$K\alpha_2$	50	69	6	49.764	0.249
Er	$K\alpha_1$	100	68	6	49.119	0.252
Gd	$K\beta_5$	.2	64	6	49.045	0.253
Er	$K\alpha_{1,2}$	150	68	6	48.813	0.254
Gd	$K\beta_1$	23	64	6	48.688	0.255
Gd	$K\beta_3$	11	64	6	48.547	0.255
Eu	$K\text{-}O_{2,3}$	.01	63	6	48.489	0.256
Eu	$K\beta_2$	8	63	6	48.248	0.257
Er	$K\alpha_2$	50	68	6	48.213	0.257
Ho	$K\alpha_1$	100	67	6	47.539	0.261
Ho	$K\alpha_{1,2}$	150	67	6	47.253	0.262
Eu	$K\beta_1$	23	63	6	47.030	0.264
Eu	$K\beta_3$	11	63	6	46.896	0.264
Sm	$K\text{-}O_{2,3}$	.01	62	6	46.793	0.265
Ho	$K\alpha_2$	50	67	6	46.692	0.265
Sm	$K\beta_2$	8	62	6	46.566	0.266
Dy	$K\alpha_1$	100	66	6	45.991	0.270
Dy	$K\alpha_{1,2}$	150	66	6	45.724	0.271
Sm	$K\beta_5$	.2	62	6	45.723	0.271
Sm	$K\beta_1$	22	62	6	45.405	0.273
Sm	$K\beta_3$	10	62	6	45.281	0.274
Dy	$K\alpha_2$	50	66	6	45.200	0.274
Pm	$K\beta_2$	8	61	6	44.929	0.276
Tb	$K\alpha_1$	100	65	6	44.474	0.279
Tb	$K\alpha_{1,2}$	150	65	6	44.226	0.280
Pm	$K\beta_1$	22	61	6	43.818	0.283
Tb	$K\alpha_2$	50	65	6	43.737	0.283
Pm	$K\beta_3$	10	61	6	43.705	0.284
Nd	$K\beta_2$	7	60	6	43.327	0.286
Gd	$K\alpha_1$	100	64	6	42.989	0.288
Gd	$K\alpha_{1,2}$	150	64	6	42.757	0.290
Gd	$K\alpha_2$	50	64	6	42.302	0.293
Nd	$K\beta_1$	22	60	6	42.264	0.293
Nd	$K\beta_3$	10	60	6	42.159	0.294
Pr	$K\beta_2$	65	59	6	41.767	0.297
Eu	$K\alpha_1$	100	63	6	41.535	0.298
Eu	$K\alpha_{1,2}$	150	63	6	41.320	0.300
Eu	$K\alpha_2$	50	63	6	40.895	0.303
Pr	$K\beta_1$	22	59	6	40.741	0.304
Pr	$K\beta_3$	10	59	6	40.646	0.305
Ce	$K\text{-}O_{2,3}$	.01	58	6	40.420	0.307
Ce	$K\beta_4$	.01	58	6	40.329	0.307
Ce	$K\beta_2$	7	58	6	40.226	0.308
Sm	$K\alpha_1$	100	62	6	40.111	0.309
Sm	$K\alpha_{1,2}$	150	62	6	39.911	0.311
Ce	$K\beta_5'$	.2	58	6	39.551	0.313
Ce	$K\beta_5''$	.2	58	6	39.532	0.314
Sm	$K\alpha_2$	50	62	6	39.516	0.314
Ce	$K\beta_1$	22	58	6	39.251	0.316
Ce	$K\beta_3$	10	58	6	39.163	0.317
La	$K\text{-}O_{2,3}$	.01	57	6	38.903	0.319
La	$K\beta_4$	.03	57	6	38.821	0.319
La	$K\beta_2$	7	57	6	38.723	0.320
Pm	$K\alpha_1$	100	61	6	38.718	0.320
Pm	$K\alpha_{1,2}$	150	61	6	38.532	0.322
Pm	$K\alpha_2$	50	61	6	38.165	0.325
La	$K\beta_5'$	.2	57	6	38.088	0.325
La	$K\beta_5''$	.1	57	6	38.068	0.326
La	$K\beta_1$	21	57	6	37.795	0.328
La	$K\beta_3$	9	57	6	37.714	0.329
Ba	$K\text{-}O_{2,3}$	.01	56	6	37.420	0.331
Nd	$K\alpha_1$	100	60	6	37.355	0.332
Ba	$K\beta_4$	.02	56	6	37.305	0.332
Ba	$K\beta_2$	7	56	6	37.251	0.333
Nd	$K\alpha_{1,2}$	150	60	6	37.182	0.333
Nd	$K\alpha_2$	50	60	6	36.841	0.336
Ba	$K\beta_5'$	.1	56	6	36.659	0.338
Ba	$K\beta_5''$	.1	56	6	36.637	0.338
Ba	$K\beta_1$	21	56	6	36.372	0.341
Ba	$K\beta_3$	7	56	6	36.298	0.342
Pr	$K\alpha_1$	100	59	6	36.020	0.344
Pr	$K\alpha_{1,2}$	150	59	6	35.860	0.346
Cs	$K\beta_2$	6	55	6	35.815	0.346
Pr	$K\alpha_2$	50	59	6	35.544	0.349
Cs	$K\beta_1$	21	55	6	34.981	0.354
Cs	$K\beta_3$	9	55	6	34.913	0.355
Ce	$K\alpha_1$	100	58	6	34.714	0.357
Ce	$K\alpha_{1,2}$	150	58	6	34.566	0.359
Xe	$K\beta_2$	6	54	6	34.408	0.360
Ce	$K\alpha_2$	50	58	6	34.273	0.362
Xe	$K\beta_1$	20	54	6	33.619	0.369
Xe	$K\beta_3$	9	54	6	33.556	0.369
La	$K\alpha_1$	100	57	6	33.436	0.371
La	$K\alpha_{1,2}$	150	57	6	33.299	0.372
I	$K\beta_2$	6	53	6	33.036	0.375
La	$K\alpha_2$	50	57	6	33.028	0.375
I	$K\beta_1$	20	53	6	32.289	0.384
I	$K\beta_3$	9	53	6	32.234	0.385
Ba	$K\alpha_1$	100	56	6	32.188	0.385
Ba	$K\alpha_{1,2}$	150	56	6	32.062	0.387
Ba	$K\alpha_2$	50	56	6	31.812	0.390
Te	$K\text{-}O_{2,3}$	.01	52	6	31.806	0.390
Te	$K\beta_2$	6	52	6	31.698	0.391
Te	$K\beta_1$	20	52	6	30.990	0.400
Cs	$K\alpha_1$	100	55	6	30.968	0.400
Te	$K\beta_3$	9	52	6	30.939	0.401
Cs	$K\alpha_{1,2}$	150	55	6	30.851	0.402
Cs	$K\alpha_2$	50	55	6	30.620	0.405
Sb	$K\text{-}O_{2,3}$	.01	51	6	30.482	0.407
Sb	$K\beta_4$	.01	51	6	30.456	0.407
Sb	$K\beta_2$	5	51	6	30.388	0.408
Sb	$K\beta_5'$	.1	51	6	29.958	0.414
Sb	$K\beta_5''$	.1	51	6	29.951	0.414
Xe	$K\alpha_1$	100	54	6	29.774	0.416
Sb	$K\beta_1$	20	51	6	29.721	0.417
Sb	$K\beta_3$	9	51	6	29.674	0.418
Xe	$K\alpha_{1,2}$	150	54	6	29.666	0.418
Xe	$K\alpha_2$	50	54	6	29.453	0.421
Sn	$K\text{-}O_{2,3}$	.01	50	6	29.190	0.425
Sn	$K\beta_4$	.01	50	6	29.170	0.425
Sn	$K\beta_2$	5	50	6	29.104	0.426
Sn	$K\beta_5'$	.1	50	6	28.711	0.432
Sn	$K\beta_5''$	.1	50	6	28.705	0.432
I	$K\alpha_1$	100	53	6	28.607	0.433
I	$K\alpha_{1,2}$	150	53	6	28.508	0.435
Sn	$K\beta_1$	19	50	6	28.481	0.435
Sn	$K\beta_3$	9	50	6	28.439	0.436
I	$K\alpha_2$	50	53	6	28.312	0.438

El	Line	I	Z	R	KeV	Lambda
In	K-O$_{2,3}$	.01	49	6	27.935	0.444
In	Kβ_4	.01	49	6	27.923	0.444
In	Kβ_2	5	49	6	27.856	0.445
In	Kβ_5'	.1	49	6	27.494	0.451
In	Kβ_5''	.1	49	6	27.487	0.451
Te	Kα_1	100	52	6	27.468	0.451
Te	K$\alpha_{1,2}$	150	52	6	27.377	0.453
In	Kβ_1	19	49	6	27.271	0.455
In	Kβ_3	8	49	6	27.233	0.455
Te	Kα_2	50	52	6	27.197	0.455
Cd	Kβ_2	5	48	6	26.639	0.465
Sb	Kα_1	100	51	6	26.355	0.470
Sb	K$\alpha_{1,2}$	150	51	6	26.271	0.472
Sb	Kα_2	50	51	6	26.106	0.475
Cd	Kβ_1	19	48	6	26.091	0.475
Cd	Kβ_3	8	48	6	26.057	0.476
Ag	Kβ_4	.01	47	6	25.507	0.486
Ag	Kβ_2	5	47	6	25.452	0.487
Sn	Kα_1	100	50	6	25.267	0.491
Sn	K$\alpha_{1,2}$	150	50	6	25.191	0.492
Ag	Kβ_5	.1	47	6	25.141	0.493
Sn	Kα_2	50	50	6	25.040	0.495
Ag	Kβ_1	18	47	6	24.938	0.497
Ag	Kβ_3	8	47	6	24.907	0.498
Pd	Kβ_4	.01	46	6	24.339	0.509
Pd	Kβ_2	3	46	6	24.295	0.510
In	Kα_1	100	49	6	24.206	0.512
In	K$\alpha_{1,2}$	150	49	6	24.136	0.514
Cf	Lγ_1	10	98	3	24.070	0.515
In	Kα_2	50	49	6	23.998	0.517
Pd	Kβ_5	.1	46	6	23.991	0.517
Pd	Kβ_1	18	46	6	23.815	0.521
Pd	Kβ_3	8	46	6	23.787	0.521
Bk	Lγ_1	10	97	3	23.389	0.530
Rh	Kβ_4	.01	45	6	23.213	0.534
Cd	Kα_1	100	48	6	23.170	0.535
Rh	Kβ_2	4	45	6	23.169	0.535
Rh	Kβ_2''	.1	45	6	23.164	0.535
Cd	K$\alpha_{1,2}$	150	48	6	23.106	0.536
Cd	Kα_2	50	48	6	22.980	0.539
Rh	Kβ_5'	.05	45	6	22.913	0.541
Rh	Kβ_5''	.05	45	6	22.906	0.541
Pu	Lγ_4	.1	94	6	22.883	0.542
Am	Lγ_6	.01	95	6	22.824	0.543
Pu	Lγ_4p	.1	94	6	22.820	0.543
Rh	Kβ_1	16	45	6	22.720	0.545
Cm	Lγ_1	10	96	3	22.703	0.545
Rh	Kβ_3	8	45	6	22.695	0.546
Am	Lγ_2	1	95	6	22.359	0.554
Np	Lγ_4	.1	93	6	22.195	0.558
Ag	Kα_1	100	47	6	22.159	0.559
Pu	Lγ_6	.01	94	6	22.146	0.560
Ag	K$\alpha_{1,2}$	150	47	6	22.101	0.561
Ru	Kβ_4	.01	44	6	22.101	0.561
Ru	Kβ_2	3	44	6	22.070	0.562
Am	Lγ_1	10	95	6	22.061	0.562
Ag	Kα_2	50	47	6	21.987	0.564
Pu	Lγ_3	2	94	6	21.979	0.564
Pu	Lγ_8	.1	94	6	21.909	0.566
Ru	Kβ_5'	.08	44	6	21.830	0.568
Ru	Kβ_5''	.5	44	6	21.824	0.568
U	Lγ_{13}	.01	92	6	21.724	0.571
Pu	Lγ_2	1	94	6	21.721	0.571
Ru	Kβ_1	16	44	6	21.653	0.572
U	L$_1$-O$_{4,5}$	.01	92	6	21.652	0.572
Ru	Kβ_3	8	44	6	21.631	0.573
U	Lγ_4	.1	92	6	21.559	0.575
U	Lγ_4p	.1	92	6	21.495	0.577
Np	Lγ_6	.01	93	6	21.484	0.577
Pu	Lγ_1	10	94	6	21.414	0.579
Np	Lγ_3	2	93	6	21.336	0.581
Pd	Kα_1	100	46	6	21.174	0.585
Pd	K$\alpha_{1,2}$	150	46	6	21.121	0.587
Np	Lγ_2	1	93	6	21.107	0.587
Pd	Kα_2	50	46	6	21.017	0.590
U	Lγ_{11}	.01	92	6	21.015	0.590
Tc	Kβ_2	3	43	6	21.002	0.590
U	L$_1$-N$_4$	.01	92	6	20.976	0.591
U	L$_2$-P$_4$	.01	92	6	20.938	0.592
U	L$_2$-P$_{2,3}$	.01	92	6	20.904	0.593
Pa	Lγ_4	.1	91	6	20.879	0.594
U	Lγ_6	.01	92	6	20.839	0.595
Np	Lγ_1	10	93	6	20.781	0.596
U	L$_2$-O$_3$	.01	92	6	20.754	0.597
U	Lγ_3	2	92	6	20.709	0.599
Pu	Lγ_5	.1	94	6	20.701	0.599
U	Lγ_8	.1	92	6	20.617	0.601
Tc	Kβ_1	16	43	6	20.615	0.601
Tc	Kβ_3	8	43	6	20.595	0.602
Cf	Lβ_1	50	98	3	20.557	0.603
U	Lv	.01	92	6	20.554	0.603
U	Lγ_2	1	92	6	20.481	0.605
Th	Lγ_{13}	.01	90	6	20.420	0.607
Th	L$_1$-O$_{4,5}$	.01	90	6	20.378	0.608
Th	Lγ_4	.1	90	6	20.289	0.611
Th	Lγ_4p	.1	90	6	20.238	0.613
Rh	Kα_1	100	45	6	20.213	0.613
Pa	Lγ_6	.01	91	6	20.212	0.613
Th	L$_1$-O$_1$	.01	90	6	20.169	0.615
Rh	K$\alpha_{1,2}$	150	45	6	20.165	0.615
U	Lγ_1	10	92	6	20.164	0.615
Np	Lγ_5	.1	93	6	20.123	0.616
Th	L$_1$-N$_{6,7}$	.01	90	6	20.123	0.616
Pa	Lγ_3	2	91	6	20.094	0.617
Rh	Kα_2	50	45	6	20.070	0.618
Mo	Kβ_4	.01	42	6	19.993	0.620
Mo	Kβ_2	4	42	6	19.962	0.621
Bk	Lβ_1	50	97	3	19.961	0.621
Mo	Kβ_2''	.1	42	6	19.959	0.621
U	L$_2$-N$_3$	.01	92	6	19.904	0.623
Pa	Lγ_2	1	91	6	19.869	0.624
Th	Lγ_{11}	.01	90	6	19.791	0.626
Mo	Kβ_5'	.8	42	6	19.773	0.627
Mo	Kβ_5''	.4	42	6	19.763	0.627
Th	L$_1$-N$_4$	.01	90	6	19.751	0.628
Th	L$_2$-P$_4$	.01	90	6	19.679	0.630
Th	L$_2$-P$_{2,3}$	.01	90	6	19.639	0.631
Th	L$_2$-P$_1$	.01	90	6	19.626	0.632
Mo	Kβ_1	17	42	6	19.605	0.632
Th	Lγ_6	.01	90	6	19.596	0.633
Mo	Kβ_3	7	42	6	19.587	0.633
Pa	Lγ_1	10	91	6	19.565	0.634
U	Lγ_5	.1	92	6	19.504	0.636
Th	Lγ_3	2	90	6	19.503	0.636
Th	L$_2$-O$_3$	.01	90	6	19.503	0.636
Th	L$_2$-O$_2$	.01	90	6	19.463	0.637
Th	Lγ_8	.1	90	6	19.400	0.639
Cm	Lβ_1	50	96	3	19.399	0.639
Th	Lv	.01	90	6	19.349	0.641
Pu	Lβ_9	.01	94	6	19.320	0.642

El	Line	I	Z	R	KeV	Lambda
Th	$L\gamma_2$	1	90	6	19.302	0.642
Ru	$K\alpha_1$	100	44	6	19.276	0.643
Ru	$K\alpha_{1,2}$	150	44	6	19.233	0.645
Ra	$L\gamma_{13}$	.01	88	6	19.215	0.645
Ra	L_1-$O_{4,5}$	.01	88	6	19.165	0.647
Ru	$K\alpha_2$	50	44	6	19.147	0.647
Th	L_1-N_1	.01	90	6	19.143	0.648
Pu	$L\beta_{10}$	.01	94	6	19.124	0.648
Am	$L\beta_3$	6	95	6	19.103	0.649
Ra	$L\gamma_4$	.1	88	6	19.081	0.650
Ra	$L\gamma_4p$	.1	88	6	19.032	0.651
Th	L_2-N_5	.01	90	6	19.009	0.652
Cf	$L\beta_2$	20	98	3	18.983	0.653
Th	$L\gamma_1$	10	90	6	18.979	0.653
Nb	$K\beta_4$	.01	41	6	18.978	0.653
Nb	$K\beta_2$	4	41	6	18.949	0.654
Pa	$L\gamma_5$	.1	91	6	18.925	0.655
Am	$L\beta_1$	50	95	6	18.849	0.658
Th	L_2-N_3	.01	90	6	18.725	0.662
Ra	$L\gamma_{11}$	.01	88	6	18.629	0.665
Nb	$K\beta_1$	.6	41	6	18.619	0.666
Nb	$K\beta_3$	7	41	6	18.603	0.666
Ra	L_1-N_4	.01	88	6	18.596	0.667
Pu	$L\beta_3$	6	94	6	18.537	0.669
Bk	$L\beta_2$	20	97	3	18.529	0.669
Ra	L_2-$P_{2,3}$	.01	88	6	18.463	0.671
Ra	L_2-P_1	.01	88	6	18.435	0.672
Ra	$L\gamma_6$	.01	88	6	18.411	0.673
Ac	$L\gamma_1$	10	89	6	18.405	0.674
Am	$L\beta_5$	1	95	6	18.396	0.674
Tc	$K\alpha_1$	100	43	6	18.364	0.675
Th	$L\gamma_5$	.1	90	6	18.361	0.675
Ra	$L\gamma_3$	2	88	6	18.354	0.675
Ra	L_2-O_3	.01	88	6	18.325	0.676
Tc	$K\alpha_{1,2}$	150	43	6	18.325	0.676
Pu	$L\beta_1$	50	94	6	18.291	0.678
Ra	L_2-O_2	.01	88	6	18.283	0.678
Tc	$K\alpha_2$	50	43	6	18.248	0.679
Ra	$L\gamma_8$	.1	88	6	18.227	0.680
U	$L\beta_9$	.01	92	6	18.202	0.681
Ra	$L\gamma_2$	1	88	6	18.176	0.682
Cm	$L\beta_2$	20	96	3	18.096	0.685
Am	$L\beta_4$	4	95	6	18.060	0.686
Ra	L_1-N_1	.01	88	6	18.033	0.687
U	$L\beta_{10}$	.01	92	6	18.028	0.688
Zr	$K\beta_4$	.01	40	6	17.991	0.689
Np	$L\beta_3$	6	93	6	17.986	0.689
Zr	$K\beta_2$	4	40	6	17.967	0.690
Pu	$L\beta_5$	1	94	6	17.948	0.691
Ra	L_2-N_5	.01	88	6	17.882	0.693
Ra	$L\gamma_1$	10	88	6	17.845	0.695
Zr	$K\beta_5$	.08	40	6	17.813	0.696
Np	$L\beta_1$	50	93	6	17.747	0.698
Pu	$L\beta_7$	.1	94	6	17.701	0.700
Am	$L\beta_2$	20	95	6	17.673	0.701
Zr	$K\beta_1$	18	40	6	17.665	0.702
Pa	$L\beta_9$	.01	91	6	17.663	0.702
Zr	$K\beta_3$	9	40	6	17.651	0.702
Pu	Lu	.01	94	6	17.630	0.703
Am	$L\beta_{15}$	1	95	6	17.623	0.703
Ra	L_2-N_3	.01	88	6	17.600	0.704
Pu	$L\beta_4$	4	94	6	17.553	0.706
Np	$L\beta_5$	1	93	6	17.505	0.708
Pa	$L\beta_{10}$	.01	91	6	17.489	0.709
Mo	$K\alpha_1$	100	42	6	17.476	0.709
U	$L\beta_3$	6	92	6	17.452	0.710
Mo	$K\alpha_{1,2}$	150	42	6	17.441	0.711
Mo	$K\alpha_2$	50	42	6	17.371	0.714
Fr	$L\gamma_1$	10	87	6	17.300	0.717
Ra	$L\gamma_5$	.1	88	6	17.271	0.718
Pu	$L\beta_2$	20	94	6	17.252	0.719
U	$L\beta_1$	50	92	6	17.217	0.720
Pu	$L\beta_{15}$	1	94	6	17.205	0.720
U	L_3-$P_{4,5}$	.01	92	6	17.159	0.722
Th	$L\beta_9$	.01	90	6	17.136	0.723
U	L_3-$P_{2,3}$	.01	92	6	17.115	0.724
U	L_3-P_1	.01	92	6	17.093	0.725
U	$L\beta_5$	1	92	6	17.067	0.726
Np	$L\beta_4$	4	93	6	17.058	0.727
Y	$K\beta_4$	.01	39	6	17.033	0.728
Y	$K\beta_2$	4	39	6	17.013	0.729
Th	$L\beta_{10}$	.01	90	6	16.978	0.730
U	L_3-O_3	.01	92	6	16.960	0.731
Pa	$L\beta_3$	6	91	6	16.927	0.732
U	L_3-O_2	.01	92	6	16.904	0.733
Am	$L\beta_6$	.1	95	6	16.884	0.734
Y	$K\beta_5$	.07	39	6	16.877	0.734
U	$L\beta_7$	.1	92	6	16.842	0.736
Np	$L\beta_2$	20	93	6	16.837	0.736
U	Lu	.01	92	6	16.783	0.739
Rn	$L\gamma_1$	10	86	6	16.768	0.739
Y	$K\beta_1$	16	39	6	16.735	0.741
Y	$K\beta_3$	8	39	6	16.723	0.741
Pa	$L\beta_1$	50	91	6	16.699	0.742
U	$L\beta_{17}$	.01	92	6	16.638	0.745
Pa	$L\beta_5$	1	91	6	16.634	0.745
Nb	$K\alpha_1$	100	41	6	16.612	0.746
Nb	$K\alpha_{1,2}$	150	41	6	16.581	0.748
U	$L\beta_4$	4	92	6	16.573	0.748
Nb	$K\alpha_2$	50	41	6	16.518	0.750
Pu	$L\beta_6$	.1	94	6	16.495	0.751
Pa	$L\beta_7$	.1	91	6	16.427	0.755
U	$L\beta_2$	20	92	6	16.425	0.755
Th	$L\beta_3$	6	90	6	16.423	0.755
U	$L\beta_{15}$	1	92	6	16.383	0.757
Bi	$L\gamma_{13}$	.01	83	6	16.382	0.757
Th	L_2-M_5	.01	90	6	16.356	0.758
Bi	L_1-$O_{4,5}$	.01	83	6	16.355	0.758
Pu	Ln	1	94	6	16.330	0.759
Th	L_3-$P_{4,5}$	.01	90	6	16.292	0.761
Bi	$L\gamma_4$	.1	83	6	16.292	0.761
Bi	$L\gamma_4p$	.1	83	6	16.268	0.762
Th	L_3-$P_{2,3}$	.01	90	6	16.257	0.762
At	$L\gamma_1$	10	85	6	16.249	0.763
Th	L_3-P_1	.01	90	6	16.238	0.763
Bi	L_1-$N_{6,7}$	.01	83	6	16.223	0.764
Po	$L\gamma_6$	.01	84	6	16.215	0.764
Th	$L\beta_5$	1	90	6	16.211	0.765
Th	$L\beta_1$	50	90	6	16.199	0.765
Ra	$L\beta_9$	.01	88	6	16.129	0.769
Th	L_3-O_3	.01	90	6	16.120	0.769
Np	$L\beta_6$	.1	93	6	16.120	0.769
U	L_3-N_3	.01	92	6	16.118	0.769
Sr	$K\beta_4$	.00	38	6	16.101	0.770
Pa	$L\beta_4$	4	91	6	16.101	0.770
Sr	$K\beta_2$	3	38	6	16.082	0.771
Th	L_3-O_2	.01	90	6	16.072	0.771
Po	$L\gamma_2$	1	84	6	16.057	0.772
Pa	$L\beta_2$	20	91	6	16.022	0.774
Th	$L\beta_7$	.1	90	6	16.008	0.774

El	Line	I	Z	R	KeV	Lambda
Ra	$L\beta_{10}$	.01	88	6	15.985	0.775
Sr	$K\beta_5$	.07	38	6	15.966	0.776
Th	Lu	.01	90	6	15.962	0.777
Bi	$L\gamma_{11}$	.01	83	6	15.948	0.777
Ac	$L\beta_3$	10	89	6	15.929	0.778
Bi	L_1-N_4	.01	83	6	15.922	0.779
U	L_3-N_2	.01	92	6	15.889	0.780
Np	Ln	1	93	6	15.874	0.781
Pb	L_1-$O_{4,5}$	.01	82	6	15.840	0.783
Sr	$K\beta_1$	16	38	6	15.833	0.783
Sr	$K\beta_3$	8	38	6	15.822	0.783
Pb	$L\gamma_4$	.1	82	6	15.775	0.786
Zr	$K\alpha_1$	100	40	6	15.772	0.786
Pb	$L\gamma_4$p	.1	82	6	15.750	0.787
Zr	$K\alpha_{1,2}$	150	40	6	15.744	0.787
Po	$L\gamma_1$	10	84	6	15.741	0.787
U	$L\beta_6$	.1	92	6	15.723	0.788
Pb	L_1-$N_{6,7}$	.01	82	6	15.723	0.788
Pb	L_1-O_1	.01	82	6	15.711	0.789
Ac	$L\beta_1$	50	89	6	15.710	0.789
Bi	$L\gamma_3$	2	83	6	15.708	0.789
Zr	$K\alpha_2$	50	40	6	15.688	0.790
Bi	$L\gamma_6$	.01	83	6	15.683	0.790
Cf	$L\alpha_1$	100	98	3	15.652	0.792
Th	$L\beta_{17}$	.01	90	6	15.644	0.792
Th	$L\beta_4$	4	90	6	15.640	0.793
Th	$L\beta_2$	20	90	6	15.621	0.794
Bi	L_2-O_3	.01	83	6	15.615	0.794
Th	$L\beta_{15}$	1	90	6	15.585	0.795
Bi	$L\gamma_2$	1	83	6	15.580	0.796
Bi	Lv	.01	83	6	15.549	0.797
Bi	$L\gamma_8$	.1	83	6	15.547	0.797
Bi	L_1-N_1	.01	83	6	15.453	0.802
Pb	$L\gamma_{11}$	.01	82	6	15.450	0.802
Ra	$L\beta_3$	6	88	6	15.442	0.803
Pb	L_1-N_4	.01	82	6	15.425	0.804
Ra	L_3-$P_{2,3}$	.01	88	6	15.422	0.804
Cf	$L\alpha_2$	10	98	3	15.418	0.804
Ra	L_3-P_1	.01	88	6	15.399	0.805
U	Ln	1	92	6	15.397	0.805
Ra	$L\beta_5$	1	88	6	15.375	0.806
Pa	$L\beta_6$	.1	91	6	15.343	0.808
Th	L_3-N_3	.01	90	6	15.338	0.808
Tl	L_1-$O_{4,5}$	.01	81	6	15.330	0.809
Bk	$L\alpha_1$	100	97	3	15.304	0.810
Th	L_1-M_1	.01	90	6	15.287	0.811
Tl	$L\gamma_4$	.1	81	6	15.269	0.812
Tl	$L\gamma_4$p	.1	81	6	15.246	0.813
Bi	$L\gamma_1$	10	83	6	15.245	0.813
Ra	$L\beta_1$	50	88	6	15.233	0.814
Pb	$L\gamma_3$	2	82	6	15.215	0.815
Tl	L_1-O_1	.01	81	6	15.208	0.815
Rb	$K\beta_4$	.00	37	6	15.202	0.815
Pb	L_2-P_1	.1	82	6	15.194	0.816
Ra	$L\beta_7$	.1	88	6	15.187	0.816
Rb	$K\beta_2$	3	37	6	15.183	0.816
Pb	$L\gamma_6$	.01	82	6	15.176	0.817
Ra	Lu	.01	88	6	15.143	0.819
Th	L_3-N_2	.01	90	6	15.136	0.819
Pb	L_2-O_3	.01	82	6	15.117	0.820
Pb	$L\gamma_2$	1	82	6	15.099	0.821
Rb	$K\beta_5$	.06	37	6	15.082	0.822
Bk	$L\alpha_2$	10	97	3	15.080	0.822
Pb	Lv	.01	82	6	15.057	0.823
Pb	$L\gamma_8$	.1	82	6	15.050	0.824
Bi	L_2-N_3	.01	83	6	15.029	0.825
Fr	$L\beta_3$	10	87	6	14.973	0.828
Th	$L\beta_6$	.1	90	6	14.973	0.828
Pb	L_1-N_1	.01	82	6	14.960	0.829
Rb	$K\beta_1$	16	37	6	14.959	0.829
Tl	$L\gamma_{11}$	.01	81	6	14.957	0.829
Y	$K\alpha_1$	100	39	6	14.956	0.829
Cm	$L\alpha_1$	100	96	3	14.953	0.829
Rb	$K\beta_3$	8	37	6	14.949	0.829
Pa	Ln	1	91	6	14.944	0.829
Tl	L_1-N_4	.01	81	6	14.935	0.830
Y	$K\alpha_{1,2}$	150	39	6	14.931	0.830
Y	$K\alpha_2$	50	39	6	14.880	0.833
Th	L_2-M_2	.01	90	6	14.867	0.834
Bi	L_2-N_2	.01	83	6	14.856	0.834
Hg	L_1-$O_{4,5}$	.01	80	6	14.846	0.835
Ra	$L\beta_2$	20	88	6	14.839	0.835
Ra	$L\beta_{15}$	1	88	6	14.806	0.837
Pb	L_2-N_5	.01	82	6	14.789	0.838
Hg	$L\gamma_4$	.1	80	6	14.776	0.839
Bi	$L\gamma_5$	.1	83	6	14.771	0.839
Fr	$L\beta_1$	50	87	6	14.768	0.839
Pb	$L\gamma_1$	10	82	6	14.762	0.840
Hg	$L\gamma_4$p	.1	80	6	14.755	0.840
Ra	$L\beta_4$	4	88	6	14.745	0.841
Cm	$L\alpha_2$	10	96	3	14.740	0.841
Tl	$L\gamma_3$	2	81	6	14.734	0.841
Hg	L_1-O_1	.01	80	6	14.716	0.842
Ra	$L\beta_{17}$	.01	88	6	14.691	0.844
Tl	$L\gamma_6$	.01	81	6	14.684	0.844
Tl	$L\gamma_2$	1	81	6	14.623	0.848
Am	$L\alpha_1$	100	95	6	14.615	0.848
Tl	L_2-O_2	.01	81	6	14.601	0.849
Tl	Lv	.01	81	6	14.575	0.850
Ra	L_3-N_3	.01	88	6	14.563	0.851
Tl	$L\gamma_8$	.1	81	6	14.561	0.851
Pb	L_2-N_3	.01	82	6	14.551	0.852
Rn	$L\beta_3$	10	86	6	14.509	0.854
Th	Ln	1	90	6	14.507	0.854
Tl	L_1-N_1	.01	81	6	14.500	0.855
Hg	$L\gamma_{11}$	.01	80	6	14.472	0.857
Fr	$L\beta_2$	20	87	6	14.448	0.858
Pb	L_2-N_2	.01	82	6	14.439	0.858
Am	$L\alpha_2$	10	95	6	14.409	0.860
Ra	L_3-N_2	.01	88	6	14.384	0.862
Au	L_1-$O_{4,5}$	.01	79	6	14.347	0.864
Rn	$L\beta_1$	50	86	6	14.313	0.866
Kr	$K\beta_2$	3	36	6	14.312	0.866
Pb	$L\gamma_5$	.1	82	6	14.305	0.867
Au	$L\gamma_4$	.1	79	6	14.297	0.867
Tl	$L\gamma_1$	10	81	6	14.289	0.868
Au	$L\gamma_4$p	.1	79	6	14.278	0.868
Pu	$L\alpha_1$	100	94	6	14.276	0.868
Hg	$L\gamma_3$	2	80	6	14.262	0.869
Au	L_1-O_1	.01	79	6	14.243	0.870
Kr	$K\beta_5$	.06	36	6	14.235	0.871
Ra	$L\beta_6$	.1	88	6	14.234	0.871
Hg	$L\gamma_6$	.01	80	6	14.196	0.873
Sr	$K\alpha_1$	100	38	6	14.163	0.875
Hg	$L\gamma_2$	1	80	6	14.160	0.875
Hg	L_2-O_3	.01	80	6	14.154	0.876
Sr	$K\alpha_{1,2}$	150	38	6	14.140	0.877
Hg	L_2-O_2	.01	80	6	14.112	0.878
Kr	$K\beta_1$	16	36	6	14.110	0.878
Hg	Lv	.01	80	6	14.105	0.879

El	Line	I	Z	R	KeV	Lambda
Kr	$K\beta_3$	8	36	6	14.102	0.879
Sr	$K\alpha_2$	50	38	6	14.095	0.879
Hg	$L\gamma_8$	.1	80	6	14.087	0.880
Tl	L_2-N_3	.01	81	6	14.087	0.880
Pu	$L\alpha_2$	10	94	6	14.082	0.880
At	$L\beta_3$	10	85	6	14.065	0.881
Hg	L_1-N_1	.01	80	6	14.043	0.883
Au	$L\gamma_{11}$	.01	79	6	14.017	0.884
Au	L_1-N_4	.01	79	6	13.997	0.886
Tl	L_2-N_2	.01	81	6	13.974	0.887
Np	$L\alpha_1$	100	93	6	13.942	0.889
Pt	L_1-$O_{4,5}$	.01	78	6	13.875	0.893
At	$L\beta_1$	50	85	6	13.874	0.893
Tl	$L\gamma_5$	.1	81	6	13.850	0.895
Hg	$L\gamma_1$	10	80	6	13.828	0.896
Pt	$L\gamma_4$	.1	78	6	13.826	0.897
Pt	$L\gamma_4p$	.1	78	6	13.812	0.897
Au	$L\gamma_3$	2	79	6	13.807	0.898
Bi	$L\beta_9$	.01	83	6	13.805	0.898
Pt	L_1-O_1	.01	78	6	13.781	0.899
Po	$L\beta_5$	1	84	6	13.779	0.900
Np	$L\alpha_2$	10	93	6	13.757	0.901
Au	$L\gamma_6$	.01	79	6	13.728	0.903
Au	$L\gamma_2$	1	79	6	13.707	0.904
Bi	$L\beta_{10}$	.01	83	6	13.698	0.905
Au	L_2-O_3	.01	79	6	13.676	0.906
Ra	Ln	1	88	6	13.661	0.907
Au	L_2-O_2	.01	79	6	13.660	0.907
Au	Lv	.01	79	6	13.646	0.908
Hg	L_2-N_3	.01	80	6	13.638	0.909
Po	$L\beta_3$	6	84	6	13.635	0.909
Au	$L\gamma_8$	.1	79	6	13.624	0.910
U	$L\alpha_1$	100	92	6	13.612	0.911
Au	L_1-N_1	.01	79	6	13.592	0.912
Pt	$L\gamma_{11}$	.01	78	6	13.558	0.914
Br	$K\beta_2$	2	35	6	13.467	0.920
Po	$L\beta_1$	50	84	6	13.445	0.922
U	$L\alpha_2$	10	92	6	13.437	0.923
Bi	L_3-$P_{2,3}$	.01	83	6	13.414	0.924
Ir	L_1-$O_{4,5}$	.01	77	6	13.411	0.924
Hg	$L\gamma_5$	.1	80	6	13.408	0.925
Br	$K\beta_5$	.06	35	6	13.402	0.925
Rb	$K\alpha_1$	100	37	6	13.393	0.926
Bi	$L\beta_5$	1	83	6	13.393	0.926
Au	$L\gamma_1$	10	79	6	13.379	0.926
Pb	$L\beta_9$	.01	82	6	13.375	0.927
Rb	$K\alpha_{1,2}$	150	37	6	13.373	0.927
Ir	$L\gamma_4$	.1	77	6	13.366	0.927
Pt	$L\gamma_3$	2	78	6	13.359	0.928
Ir	$L\gamma_4p$	.1	77	6	13.353	0.928
Po	$L\beta_2$	20	84	6	13.338	0.929
Rb	$K\alpha_2$	50	37	6	13.333	0.930
Bi	L_3-O_3	.01	83	6	13.326	0.930
Po	$L\beta_{15}$	1	84	6	13.312	0.931
Bi	L_3-O_2	.01	83	6	13.296	0.932
Br	$K\beta_1$	16	35	6	13.289	0.933
Pa	$L\alpha_1$	100	91	6	13.288	0.933
Br	$K\beta_3$	8	35	6	13.282	0.933
Pb	$L\beta_{10}$	.01	82	6	13.273	0.934
Pt	$L\gamma_6$	.01	78	6	13.269	0.934
Pt	$L\gamma_2$	1	78	6	13.268	0.934
Bi	Lu	.01	83	6	13.257	0.935
Bi	$L\beta_7$	.1	83	6	13.257	0.935
Bi	$L\beta_3$	6	83	6	13.208	0.939
Pt	Lv	.01	78	6	13.197	0.939
Au	L_2-N_3	.01	79	6	13.184	0.940
Pt	$L\gamma_8$	.1	78	6	13.172	0.941
Pt	L_1-N_1	.01	78	6	13.156	0.942
Bi	L_2-M_5	.01	83	6	13.129	0.944
Ir	$L\gamma_{11}$	.01	77	6	13.123	0.945
Pa	$L\alpha_2$	10	91	6	13.120	0.945
Ir	L_1-N_4	.01	77	6	13.105	0.946
Po	$L\beta_4$	4	84	6	13.083	0.947
Pb	L_3-$P_{2,3}$	.01	82	6	13.032	0.951
Bi	$L\beta_1$	50	83	6	13.021	0.952
Pb	$L\beta_5$	1	82	6	13.013	0.953
Bi	$L\beta_2$	20	83	6	12.978	0.955
Au	$L\gamma_5$	.1	79	6	12.972	0.956
Th	$L\alpha_1$	100	90	6	12.967	0.956
Os	L_1-$O_{4,5}$	.01	76	6	12.966	0.956
Tl	$L\beta_9$	.01	81	6	12.956	0.957
Bi	$L\beta_{15}$	1	83	6	12.953	0.957
Pb	L_3-O_3	.01	82	6	12.942	0.958
Pt	$L\gamma_1$	10	78	6	12.940	0.958
Pb	L_3-O_2	.01	82	6	12.931	0.959
Ir	$L\gamma_3$	2	77	6	12.922	0.959
Os	$L\gamma_4$	.1	76	6	12.921	0.959
Os	$L\gamma_4p$	.1	76	6	12.908	0.960
Pb	Lu	.01	82	6	12.895	0.961
Pb	$L\beta_7$	.1	82	6	12.886	0.962
Os	L_1-O_1	.01	76	6	12.882	0.962
U	Ls	.01	92	6	12.864	0.964
Tl	$L\beta_{10}$	.01	81	6	12.860	0.964
Ir	$L\gamma_2$	1	77	6	12.840	0.965
Ir	$L\gamma_6$	.01	77	6	12.818	0.967
Po	$L\beta_6$	.1	84	6	12.816	0.967
Th	$L\alpha_2$	10	90	6	12.807	0.968
Pb	$L\beta_3$	6	82	6	12.791	0.969
Ir	L_2-O_3	.01	77	6	12.771	0.971
Ir	Lv	.01	77	6	12.758	0.972
Pt	L_2-N_3	.01	78	6	12.751	0.972
Bi	L_3-N_3	.01	83	6	12.737	0.973
Ir	L_1-N_1	.01	77	6	12.726	0.974
Ir	$L\gamma_8$	.1	77	6	12.726	0.974
Pb	L_2-M_5	.01	82	6	12.718	0.975
Os	$L\gamma_{11}$	.01	76	6	12.694	0.976
Bi	$L\beta_4$	4	83	6	12.689	0.977
Os	L_1-N_4	.01	76	6	12.685	0.977
Pt	L_2-N_2	.01	78	6	12.659	0.979
Tl	L_3-$P_{2,3}$	.01	81	6	12.659	0.979
Se	$K\beta_2$	1	34	6	12.650	0.980
Ac	$L\alpha_1$	100	89	6	12.650	0.980
Kr	$K\alpha_1$	100	36	6	12.648	0.980
Tl	$L\beta_5$	1	81	6	12.641	0.981
Kr	$K\alpha_{1,2}$	150	36	6	12.631	0.981
Pb	$L\beta_2$	20	82	6	12.621	0.982
Bi	L_3-N_2	.01	83	6	12.613	0.983
Pb	$L\beta_1$	50	82	6	12.612	0.983
Pb	$L\beta_{15}$	1	82	6	12.599	0.984
Kr	$K\alpha_2$	50	36	6	12.596	0.984
Se	$K\beta_5$	.05	34	6	12.594	0.984
Tl	L_3-O_3	.01	81	6	12.580	0.985
Hg	$L\beta_9$	.01	80	6	12.558	0.987
Tl	L_3-O_2	.01	81	6	12.554	0.987
Pt	$L\gamma_5$	.1	78	6	12.550	0.988
Tl	Lu	.01	81	6	12.536	0.989
Bi	$L\beta_{17}$	.01	83	6	12.532	0.989
Re	L_1-$O_{4,5}$	.01	75	6	12.521	0.990
Tl	$L\beta_7$	.1	81	6	12.519	0.990
Ir	$L\gamma_1$	10	77	6	12.510	0.991

El	Line	I	Z	R	KeV	Lambda
Ac	$L\alpha_2$	10	89	6	12.499	0.992
Os	$L\gamma_3$	2	76	6	12.498	0.992
Se	$K\beta_1$	16	34	6	12.494	0.992
Re	$L\gamma_4$	.1	75	6	12.490	0.992
Se	$K\beta_3$	8	34	6	12.487	0.993
Bi	$L\beta_6$	.1	83	6	12.479	0.993
Re	$L\gamma_4p$	.1	75	6	12.479	0.993
Hg	$L\beta_{10}$	.01	80	6	12.443	0.996
Re	L_1-O_1	.01	75	6	12.440	0.996
Os	$L\gamma_2$	1	76	6	12.420	0.998
Pb	L_3-N_3	.01	82	6	12.390	1.000
Bi	L_1-M_1	.01	83	6	12.390	1.000
Tl	$L\beta_3$	6	81	6	12.388	1.001
Os	$L\gamma_6$	.01	76	6	12.383	1.001
Am	Ll	3	95	6	12.381	1.001
Os	L_2-O_3	.01	76	6	12.338	1.005
Ra	$L\alpha_1$	100	88	6	12.338	1.005
Os	Lv	.01	76	6	12.334	1.005
Ir	L_2-N_3	.01	77	6	12.329	1.005
Tl	L_2-M_5	.01	81	6	12.307	1.007
Pb	$L\beta_4$	4	82	6	12.304	1.007
Os	$L\gamma_8$	.1	76	6	12.299	1.008
Hg	$L\beta_5$	1	80	6	12.275	1.010
Tl	$L\beta_2$	20	81	6	12.270	1.010
Pb	L_3-N_2	.01	82	6	12.268	1.010
Re	$L\gamma_{11}$	.01	75	6	12.264	1.011
Th	Ls	.01	90	6	12.252	1.012
Re	L_1-N_4	.01	75	6	12.250	1.012
Ir	L_2-N_2	.01	77	6	12.249	1.012
Tl	$L\beta_{15}$	1	81	6	12.249	1.012
Hg	L_3-O_3	.01	80	6	12.224	1.014
Tl	$L\beta_1$	50	81	6	12.211	1.015
Hg	L_3-O_2	.01	80	6	12.206	1.016
Ra	$L\alpha_2$	10	88	6	12.194	1.017
Hg	Lu	.01	80	6	12.183	1.017
Hg	Lup	.01	80	6	12.181	1.018
Hg	$L\beta_7$	.1	80	6	12.160	1.019
Au	$L\beta_9$	.01	79	6	12.145	1.021
Pb	$L\beta_6$	.1	82	6	12.141	1.021
Ir	$L\gamma_5$	.1	77	6	12.132	1.022
Pb	$L\beta_{17}$	.01	82	6	12.132	1.022
Pu	Ll	3	94	6	12.122	1.023
W	$L_1-O_{4,5}$	.01	74	6	12.094	1.025
Os	$L\gamma_1$	10	76	6	12.093	1.025
Re	$L\gamma_3$	2	75	6	12.080	1.026
W	$L\gamma_4$	.1	74	6	12.061	1.028
Au	$L\beta_{10}$	.01	79	6	12.060	1.028
Tl	L_3-N_3	.01	81	6	12.051	1.029
W	$L\gamma_4p$	.1	74	6	12.051	1.029
Fr	$L\alpha_1$	100	87	6	12.029	1.030
W	L_1-O_1	.01	74	6	12.015	1.032
Pb	L_1-M_1	.01	82	6	12.008	1.032
Re	$L\gamma_2$	1	75	6	12.008	1.032
Hg	$L\beta_3$	6	80	6	11.993	1.034
Bi	L_2-M_2	.01	83	6	11.981	1.035
U	Lt	.01	92	6	11.980	1.035
Re	$L\gamma_6$	.01	75	6	11.954	1.037
Au	$L_3-P_{2,3}$	.01	79	6	11.933	1.039
Tl	$L\beta_4$	4	81	6	11.929	1.039
Re	L_2-O_3	.01	75	6	11.923	1.040
Br	$K\alpha_1$	100	35	6	11.922	1.040
Hg	$L\beta_2$	20	80	6	11.922	1.040
Os	L_2-N_3	.01	76	6	11.915	1.040
Re	Lv	.01	75	6	11.915	1.040
Au	$L\beta_5$	1	79	6	11.914	1.040
Br	$K\alpha_{1,2}$	150	35	6	11.907	1.041
Hg	$L\beta_{15}$	1	80	6	11.902	1.042
Re	L_1-N_1	.01	75	6	11.896	1.042
Fr	$L\alpha_2$	10	87	6	11.893	1.042
Np	Ll	3	93	6	11.887	1.043
Br	$K\alpha_2$	50	35	6	11.876	1.044
Re	$L\gamma_8$	.1	75	6	11.874	1.044
Au	$L_3-O_{2,3}$	.01	79	6	11.862	1.045
As	$K\beta_2$	1	33	6	11.862	1.045
W	$L\gamma_{11}$	.01	74	6	11.853	1.046
W	L_1-N_4	.01	74	6	11.842	1.047
Au	Lu	.01	79	6	11.834	1.048
Hg	$L\beta_1$	50	80	6	11.821	1.049
As	$K\beta_5$	.05	33	6	11.819	1.049
Tl	$L\beta_6$	.1	81	6	11.810	1.050
Au	$L\beta_7$	.1	79	6	11.809	1.050
Pt	$L\beta_9$	.01	78	6	11.756	1.054
Tl	$L\beta_{17}$	.01	81	6	11.738	1.056
Os	$L\gamma_5$	.1	76	6	11.728	1.057
Rn	$L\alpha_1$	100	86	6	11.725	1.057
As	$K\beta_1$	15	33	6	11.724	1.057
As	$K\beta_3$	7	33	6	11.718	1.058
Hg	L_3-N_3	.01	80	6	11.711	1.058
Bi	Ln	1	83	6	11.710	1.059
Re	$L\gamma_1$	10	75	6	11.683	1.061
Pt	$L\beta_{10}$	.01	78	6	11.674	1.062
Ta	$L_1-O_{4,5}$	.01	73	6	11.673	1.062
W	$L\gamma_3$	2	74	6	11.672	1.062
Ta	$L_1-N_{6,7}$	.01	73	6	11.655	1.064
Pb	L_2-M_2	.01	82	6	11.646	1.064
Tl	L_1-M_1	.01	81	6	11.646	1.064
Ta	$L\gamma_4$	.1	73	6	11.643	1.065
Ta	$L\gamma_4p$	.1	73	6	11.635	1.065
U	Ll	3	92	6	11.616	1.067
Ta	L_1-O_1	.01	73	6	11.610	1.068
Au	$L\beta_3$	6	79	6	11.608	1.068
W	$L\gamma_2$	1	74	6	11.606	1.068
Hg	L_3-N_2	.01	80	6	11.605	1.068
Rn	$L\alpha_2$	10	86	6	11.596	1.069
Au	$L\beta_2$	20	79	6	11.583	1.070
Au	$L\beta_{15}$	1	79	6	11.565	1.072
Hg	$L\beta_4$	4	80	6	11.561	1.072
Pt	$L\beta_5$	1	78	6	11.559	1.072
W	$L\gamma_6$	.01	74	6	11.537	1.074
Au	L_2-M_5	.01	79	6	11.525	1.076
Pt	$L_3-O_{2,3}$	.01	78	6	11.519	1.076
Re	L_2-N_3	.01	75	6	11.513	1.077
W	Lv	.01	74	6	11.509	1.077
W	L_2-O_3	.01	74	6	11.505	1.077
Pt	Lu	.01	78	6	11.489	1.079
Hg	$L\beta_6$	.1	80	6	11.480	1.080
Th	Lt	.01	90	6	11.468	1.081
W	$L\gamma_8$	.1	74	6	11.466	1.081
Pt	$L\beta_7$	.1	78	6	11.460	1.082
Ta	$L\gamma_{11}$	.01	73	6	11.450	1.083
Au	$L\beta_1$	50	79	6	11.440	1.084
Ta	L_1-N_4	.01	73	6	11.438	1.084
Re	L_2-N_2	.01	75	6	11.436	1.084
At	$L\alpha_1$	100	85	6	11.425	1.085
Ir	$L\beta_9$	.01	77	6	11.375	1.090
Au	L_3-N_3	.01	79	6	11.370	1.090
Pa	Ll	3	91	6	11.364	1.091
Hg	$L\beta_{17}$	.01	80	6	11.356	1.092
Pb	Ln	1	82	6	11.347	1.092
Re	$L\gamma_5$	.1	75	6	11.332	1.094

El	Line	I	Z	R	KeV	Lambda
At	$L\alpha_2$	10	85	6	11.303	1.097
Ir	$L\beta_{10}$	.01	77	6	11.300	1.097
W	$L\gamma_1$	10	74	6	11.284	1.099
Tl	L_2-M_2	.01	81	6	11.280	1.099
Ta	$L\gamma_3$	2	73	6	11.276	1.099
Au	L_3-N_2	.01	79	6	11.272	1.100
Hg	L_1-M_1	.01	80	6	11.270	1.100
Hf	L_1-O_4	.01	72	6	11.260	1.101
Pt	$L\beta_2$	20	78	6	11.249	1.102
Hf	$L\gamma_4$	.1	72	6	11.238	1.103
Pt	$L\beta_3$	6	78	6	11.233	1.104
Hf	$L\gamma_4$p	.1	72	6	11.231	1.104
Se	$K\alpha_1$	100	34	6	11.220	1.105
Ta	$L\gamma_2$	1	73	6	11.215	1.105
Ir	$L\beta_5$	.1	77	6	11.209	1.106
Se	$K\alpha_{1,2}$	150	34	6	11.207	1.106
Au	$L\beta_4$	4	79	6	11.203	1.107
Hf	L_1-O_1	.01	72	6	11.201	1.107
Se	$K\alpha_2$	50	34	6	11.179	1.109
Ir	L_3-$O_{2,3}$	.01	77	6	11.175	1.109
Au	$L\beta_6$	.1	79	6	11.158	1.111
Ir	Lu	.01	77	6	11.153	1.111
Pt	L_2-M_5	.01	78	6	11.149	1.112
Po	$L\alpha_1$	100	84	6	11.129	1.114
Ta	$L\gamma_6$	.01	73	6	11.129	1.114
Ir	$L\beta_7$	.1	77	6	11.119	1.115
W	L_2-N_3	.01	74	6	11.118	1.115
Th	Ll	1	90	6	11.117	1.115
Ta	L_1-N_1	.01	73	6	11.115	1.115
Ta	Lv	.01	73	6	11.110	1.116
Ge	$K\beta_2$	.5	32	6	11.099	1.117
Ta	L_2-O_3	.01	73	6	11.098	1.117
Ta	L_2-O_2	.01	73	6	11.089	1.118
Ge	$K\beta_5$	.05	32	6	11.073	1.119
Pt	$L\beta_1$	50	78	6	11.069	1.120
Ta	$L\gamma_8$	.1	73	6	11.063	1.120
Hf	$L\gamma_{11}$	.01	72	6	11.053	1.121
W	L_2-N_2	.01	74	6	11.050	1.122
Hf	L_1-N_4	.01	72	6	11.043	1.122
Pt	L_3-N_3	.01	78	6	11.042	1.123
Po	$L\alpha_2$	10	84	6	11.014	1.125
Os	$L\beta_9$	.01	76	6	11.005	1.126
Tl	Ln	1	81	6	10.992	1.128
Au	$L\beta_{17}$	.01	79	6	10.990	1.128
Ge	$K\beta_1$	14	32	6	10.980	1.129
Ge	$K\beta_3$	7	32	6	10.976	1.129
Pt	L_3-N_2	.01	78	6	10.960	1.131
W	$L\gamma_5$	.1	74	6	10.947	1.132
Os	$L\beta_{10}$	.01	76	6	10.936	1.134
Au	L_1-M_1	.01	79	6	10.926	1.135
Ir	$L\beta_2$	20	77	6	10.919	1.135
Ta	L_2-N_5	.01	73	6	10.904	1.137
Ir	$L\beta_{15}$	1	77	6	10.902	1.137
Ta	$L\gamma_1$	10	73	6	10.893	1.138
Hf	$L\gamma_3$	2	72	6	10.889	1.138
Hg	L_2-M_2	.01	80	6	10.886	1.139
Os	$L\beta_5$	.1	76	6	10.869	1.140
Ir	$L\beta_3$	6	77	6	10.866	1.141
Pt	$L\beta_4$	4	78	6	10.852	1.142
Lu	$L\gamma_4$	.1	71	6	10.840	1.143
Pt	$L\beta_6$	.1	78	6	10.840	1.144
Bi	$L\alpha_1$	100	83	6	10.837	1.144
Hf	$L\gamma_2$	1	72	6	10.832	1.144
Os	Lu	.01	76	6	10.823	1.145
Ir	L_2-M_5	.01	77	6	10.789	1.149
Os	$L\beta_7$	7	76	6	10.785	1.149
Hf	$L\gamma_6$	.01	72	6	10.731	1.155
Ta	L_2-N_3	.01	73	6	10.730	1.155
Bi	$L\alpha_2$	10	83	6	10.729	1.155
Ir	L_3-N_3	.01	77	6	10.723	1.156
Ir	$L\beta_1$	50	77	6	10.706	1.158
Hf	Lv	.01	72	6	10.702	1.158
Lu	$L\gamma_{11}$	.01	71	6	10.676	1.161
Hf	$L\gamma_8$	.8	72	6	10.674	1.161
Ta	L_2-N_2	.01	73	6	10.670	1.162
Lu	L_1-N_4	.01	71	6	10.665	1.162
Hg	Ln	1	80	6	10.649	1.164
Re	$L\beta_9$	.01	75	6	10.642	1.165
Ir	L_3-N_2	.01	77	6	10.636	1.165
Pt	$L\beta_{17}$	.01	78	6	10.625	1.167
Ra	Ll	3	88	6	10.620	1.167
Pt	L_1-M_1	.01	78	6	10.598	1.170
Os	$L\beta_2$	20	76	6	10.597	1.170
Au	L_2-M_2	.01	79	6	10.588	1.171
Os	$L\beta_{15}$	1	76	6	10.580	1.172
Re	$L\beta_{10}$	.01	75	6	10.575	1.172
Ta	$L\gamma_5$	.1	73	6	10.569	1.173
Pb	$L\alpha_1$	100	82	6	10.550	1.175
As	$K\alpha_1$	100	33	6	10.542	1.176
As	$K\alpha_{1,2}$	150	33	6	10.530	1.177
Re	$L\beta_5$	.1	75	6	10.530	1.177
Hf	L_2-N_5	.01	72	6	10.524	1.178
Ir	$L\beta_6$	.1	77	6	10.523	1.178
Hf	$L\gamma_1$	10	72	6	10.514	1.179
Lu	$L\gamma_3$	1	71	6	10.509	1.180
Os	$L\beta_3$	6	76	6	10.509	1.180
Ir	$L\beta_4$	4	77	6	10.509	1.180
As	$K\alpha_2$	50	33	6	10.506	1.180
Re	Lu	.01	75	6	10.492	1.181
Yb	L_1-$O_{4,5}$	.01	70	6	10.481	1.183
Lu	$L\gamma_2$	1	71	6	10.458	1.185
Yb	$L\gamma_4$	.1	70	6	10.458	1.185
Re	$L\beta_7$	.1	75	6	10.451	1.186
Pb	$L\alpha_2$	10	82	6	10.448	1.186
Yb	L_1-O_1	.01	70	6	10.429	1.189
Os	L_2-M_5	.01	76	6	10.423	1.189
Ga	$K\beta_2$	.3	31	6	10.365	1.196
Os	$L\beta_1$	50	76	6	10.354	1.197
Ga	$K\beta_5$	.04	31	6	10.346	1.198
Lu	$L\gamma_6$	.01	71	6	10.341	1.199
Os	L_3-N_2	.01	76	6	10.323	1.201
Lu	L_2-$O_{2,3}$	.01	71	6	10.318	1.201
Au	Ln	1	79	6	10.307	1.203
Lu	$L\gamma_8$	.1	71	6	10.290	1.205
W	$L\beta_9$	.01	74	6	10.289	1.205
Re	$L\beta_2$	20	75	6	10.274	1.207
Ir	$L\beta_{17}$	.01	77	6	10.271	1.207
Tl	$L\alpha_1$	100	81	6	10.267	1.207
Ga	$K\beta_1$	14	31	6	10.263	1.208
Re	$L\beta_{15}$	1	75	6	10.260	1.208
Ga	$K\beta_3$	7	31	6	10.259	1.208
Ir	L_1-M_1	.01	77	6	10.243	1.210
Bi	Ls	.01	83	6	10.240	1.210
W	$L\beta_{10}$	.01	74	6	10.226	1.212
Pt	L_2-M_2	.01	78	6	10.219	1.213
Os	$L\beta_6$	.1	76	6	10.215	1.213
Hf	$L\gamma_5$	.1	72	6	10.199	1.215
W	$L\beta_5$	.1	74	6	10.199	1.215
Os	$L\beta_4$	4	76	6	10.174	1.218
W	Lu	.01	74	6	10.172	1.219

El	Line	I	Z	R	KeV	Lambda
Tl	$L\alpha_2$	10	81	6	10.171	1.219
Re	$L\beta_3$	6	75	6	10.158	1.220
W	L_3-$O_{2,3}$	.01	74	6	10.152	1.221
Lu	$L\gamma_1$	5	71	6	10.142	1.222
Yb	$L\gamma_3$	1	70	6	10.141	1.222
W	$L\beta_7$	.1	74	6	10.127	1.224
Tm	L_1-$O_{4,5}$	.01	69	6	10.108	1.226
Re	L_3-N_3	.01	75	6	10.092	1.228
Yb	$L\gamma_2$	1	70	6	10.088	1.229
Tm	$L\gamma_4$	.1	69	6	10.083	1.229
Re	L_2-M_5	.01	75	6	10.074	1.230
Re	$L\beta_1$	50	75	6	10.008	1.239
Hg	$L\alpha_1$	100	80	6	9.987	1.241
Yb	$L\gamma_6$	.01	70	6	9.975	1.243
Pt	Ln	1	78	6	9.973	1.243
Pb	Ls	.01	82	6	9.966	1.244
W	$L\beta_2$	20	74	6	9.960	1.245
Yb	L_2-$O_{2,3}$	.01	70	6	9.954	1.245
W	$L\beta_{15}$	1	74	6	9.946	1.246
Ta	$L\beta_9$	.01	73	6	9.944	1.247
Os	$L\beta_{17}$	.01	76	6	9.933	1.248
Yb	$L\gamma_8$	.1	70	6	9.923	1.249
Ir	L_2-M_2	.01	77	6	9.915	1.250
Re	$L\beta_6$	.1	75	6	9.909	1.251
Hg	$L\alpha_2$	10	80	6	9.896	1.253
Ta	$L\beta_{10}$	.01	73	6	9.888	1.254
Ge	$K\alpha_1$	100	32	6	9.885	1.254
Ge	$K\alpha_{1,2}$	150	32	6	9.874	1.255
Ta	$L\beta_5$	.1	73	6	9.873	1.255
Ta	Lu	.01	73	6	9.855	1.258
Ge	$K\alpha_2$	50	32	6	9.854	1.258
Re	$L\beta_4$	4	75	6	9.845	1.259
Lu	$L\gamma_5$	.1	71	6	9.841	1.260
Ta	L_3-$O_{2,3}$	.01	73	6	9.837	1.260
W	$L\beta_3$	6	74	6	9.817	1.263
Ta	$L\beta_7$	.1	73	6	9.808	1.264
W	L_3-N_3	.01	74	6	9.782	1.267
Yb	$L\gamma_1$	5	70	6	9.778	1.268
Tm	$L\gamma_3$	1	69	6	9.778	1.268
W	L_2-M_5	.01	74	6	9.739	1.273
Tm	$L\gamma_2$	1	69	6	9.728	1.274
Bi	Lt	.01	83	6	9.724	1.275
Er	$L\gamma_4$	.1	68	6	9.721	1.275
Au	$L\alpha_1$	100	79	6	9.712	1.276
W	L_3-N_2	.01	74	6	9.711	1.276
Tl	Ls	.01	81	6	9.699	1.278
W	$L\beta_1$	50	74	6	9.671	1.282
Po	Ll	3	84	6	9.662	1.283
Zn	$K\beta_2$	.3	30	6	9.656	1.284
Ta	$L\beta_2$	20	73	6	9.650	1.285
Ir	Ln	1	77	6	9.649	1.285
Zn	$K\beta_5$	.04	30	6	9.648	1.285
Ta	$L\beta_{15}$	1	73	6	9.638	1.286
Au	$L\alpha_2$	10	79	6	9.626	1.288
W	$L\beta_6$	.1	74	6	9.610	1.290
Hf	$L\beta_9$	.01	72	6	9.607	1.290
Tm	$L\gamma_6$	.01	69	6	9.606	1.290
Re	$L\beta_{17}$	.01	75	6	9.589	1.293
Os	L_2-M_2	.01	76	6	9.584	1.293
Zn	$K\beta_{1,3}$	20	30	6	9.570	1.295
Hf	$L\beta_5$	.1	72	6	9.553	1.298
Hf	$L\beta_{10}$	.01	72	6	9.553	1.298
Hf	Lu	.01	72	6	9.542	1.299
W	$L\beta_4$	4	74	6	9.524	1.302
Hf	$L\beta_7$	.1	72	6	9.494	1.306
Yb	$L\gamma_5$	.1	70	6	9.489	1.306
Ta	$L\beta_3$	6	73	6	9.486	1.307
Pb	Lt	.01	82	6	9.479	1.308
Ta	L_3-N_3	.01	73	6	9.473	1.309
Pt	$L\alpha_1$	100	78	6	9.441	1.313
Hg	Ls	.01	80	6	9.435	1.314
Er	$L\gamma_3$	1	68	6	9.429	1.315
Tm	$L\gamma_1$	5	69	6	9.424	1.315
Bi	Ll	3	83	6	9.419	1.316
Ta	L_3-N_2	.01	73	6	9.414	1.317
Ta	L_2-M_5	.01	73	6	9.398	1.319
Ho	L_1-$O_{4,5}$	.01	67	6	9.385	1.321
Er	$L\gamma_2$	1	68	6	9.384	1.321
Ho	$L\gamma_4$	.1	67	6	9.373	1.322
Pt	$L\alpha_2$	10	78	6	9.360	1.324
Hf	$L\beta_2$	20	72	6	9.346	1.326
Ta	$L\beta_1$	50	73	6	9.342	1.327
Hf	$L\beta_{15}$	1	72	6	9.336	1.328
Os	Ln	1	76	6	9.335	1.328
Ta	$L\beta_6$	.1	73	6	9.314	1.331
Lu	$L\beta_9$	.01	71	6	9.280	1.336
W	L_1-M_1	.01	74	6	9.275	1.336
Re	L_2-M_2	.01	75	6	9.274	1.337
W	$L\beta_{17}$	.01	74	6	9.260	1.339
Er	$L\gamma_6$	.01	68	6	9.253	1.340
Ga	$K\alpha_1$	100	31	6	9.250	1.340
Ga	$K\alpha_{1,2}$	150	31	6	9.241	1.341
Tl	Lt	.01	81	6	9.240	1.342
Lu	$L\beta_5$	.1	71	6	9.238	1.342
Lu	$L\beta_{10}$	.01	71	6	9.230	1.343
Ga	$K\alpha_2$	50	31	6	9.223	1.344
Lu	L_3-$O_{2,3}$	.01	71	6	9.215	1.345
Ta	$L\beta_4$	4	73	6	9.211	1.346
Lu	$L\beta_7$	.1	71	6	9.186	1.349
Pb	Ll	3	82	6	9.183	1.350
Hf	L_3-N_3	.01	72	6	9.179	1.351
Ir	$L\alpha_1$	100	77	6	9.174	1.351
Au	Ls	.01	79	6	9.173	1.351
Hf	$L\beta_3$	6	72	6	9.162	1.353
Tm	$L\gamma_5$	.1	69	6	9.143	1.356
Hf	L_3-N_2	.01	72	6	9.122	1.359
Ir	$L\alpha_2$	10	77	6	9.098	1.362
Er	$L\gamma_1$	5	68	6	9.087	1.364
Ho	$L\gamma_3$	1	67	6	9.086	1.364
Ho	$L\gamma_2$	1	67	6	9.049	1.370
Lu	$L\beta_2$	1	71	6	9.047	1.370
Lu	$L\beta_{15}$	20	71	6	9.038	1.371
Re	Ln	1	75	6	9.026	1.373
Hf	$L\beta_1$	50	72	6	9.021	1.374
Hf	$L\beta_6$	.1	72	6	9.021	1.374
Dy	$L\gamma_4$	.1	66	6	9.018	1.375
Hg	Lt	.01	80	6	9.004	1.377
Cu	$K\beta_5$	.03	29	6	8.976	1.381
Yb	$L\beta_9$	.01	70	6	8.958	1.384
Tl	Ll	3	81	6	8.952	1.385
Ta	$L\beta_{17}$	.01	73	6	8.941	1.386
Yb	$L\beta_5$	.1	70	6	8.938	1.387
Pt	Ls	.01	78	6	8.921	1.389
Yb	L_3-$O_{2,3}$	.01	70	6	8.919	1.390
Os	$L\alpha_1$	100	76	6	8.910	1.391
Yb	$L\beta_{10}$	.01	70	6	8.908	1.391
Hf	$L\beta_4$	4	72	6	8.904	1.392
Cu	$K\beta_{1,3}$	20	29	6	8.904	1.392
Ho	$L\gamma_6$	.01	67	6	8.903	1.392
Cu	$K\beta_3$	6	29	6	8.901	1.393

El	Line	I	Z	R	KeV	Lambda
Yb	$L\beta_7$	.1	70	6	8.887	1.395
Ho	$L\gamma_8$	.1	67	6	8.865	1.398
Lu	$L\beta_3$	6	71	6	8.845	1.401
Os	$L\alpha_2$	10	76	6	8.840	1.402
Er	$L\gamma_5$	.1	68	6	8.812	1.407
Au	Lt	.01	79	6	8.769	1.414
Yb	$L\beta_{2,15}$	20	70	6	8.757	1.415
Dy	$L\gamma_3$	1	66	6	8.752	1.416
Ho	$L\gamma_1$	5	67	6	8.746	1.417
Lu	$L\beta_6$	.1	71	6	8.736	1.419
W	Ln	1	74	6	8.723	1.421
Hg	Ll	3	80	6	8.720	1.422
Dy	$L\gamma_2$	1	66	6	8.713	1.423
Tb	L_1-$O_{4,5}$	.01	65	6	8.712	1.423
Lu	$L\beta_1$	50	71	6	8.708	1.424
Tb	$L\gamma_4$	.1	65	6	8.683	1.428
Hf	L_1-M_1	.01	72	6	8.667	1.430
Ta	L_2-M_2	.01	73	6	8.666	1.430
Ir	Ls	.01	77	6	8.658	1.432
Re	$L\alpha_1$	100	75	6	8.651	1.433
Tm	$L\beta_9$	.01	69	6	8.647	1.434
Tm	$L\beta_5$	.1	69	6	8.639	1.435
Zn	$K\alpha_1$	100	30	6	8.637	1.435
Hf	$L\beta_{17}$	.01	72	6	8.630	1.436
Zn	$K\alpha_{1,2}$	150	30	6	8.630	1.436
Zn	$K\alpha_2$	50	30	6	8.614	1.439
Lu	$L\beta_4$	5	71	6	8.605	1.441
Tm	$L\beta_{10}$	.01	69	6	8.602	1.441
Re	$L\alpha_2$	10	75	6	8.585	1.444
Dy	$L\gamma_6$	.01	66	6	8.574	1.446
Yb	$L\beta_3$	6	70	6	8.535	1.452
Pt	Lt	.01	78	6	8.531	1.453
Au	Ll	3	79	6	8.493	1.460
Ho	$L\gamma_5$	.1	67	6	8.480	1.462
Tm	$L\beta_{2,15}$	20	69	6	8.467	1.464
Yb	$L\beta_6$	.1	70	6	8.455	1.466
Ta	Ln	1	73	6	8.427	1.471
Tb	$L\gamma_3$	1	65	6	8.422	1.472
Dy	$L\gamma_1$	5	66	6	8.417	1.473
Os	Ls	.01	76	6	8.413	1.473
Yb	$L\beta_1$	50	70	6	8.400	1.476
W	$L\alpha_1$	100	74	6	8.396	1.476
Tb	$L\gamma_2$	1	65	6	8.396	1.476
Hf	L_2-M_2	.01	72	6	8.372	1.481
Gd	L_1-$O_{4,5}$	.01	64	6	8.372	1.481
Gd	$L\gamma_4$	.1	64	6	8.354	1.484
Er	$L\beta_5$	.1	68	6	8.349	1.485
Er	$L\beta_9$	.01	68	6	8.345	1.485
W	$L\alpha_2$	10	74	6	8.334	1.487
Ni	$K\beta_5$	.03	28	6	8.327	1.489
Yb	$L\beta_4$	5	70	6	8.312	1.491
Ir	Lt	.01	77	6	8.303	1.493
Er	$L\beta_7$	.1	68	6	8.297	1.494
Er	$L\beta_{10}$	.01	68	6	8.297	1.494
Pt	Ll	3	78	6	8.267	1.499
Ni	$K\beta_{1,3}$	20	28	6	8.263	1.500
Tb	$L\gamma_6$	.01	65	6	8.245	1.503
Tm	$L\beta_3$	6	69	6	8.229	1.506
Tb	$L\gamma_8$	.1	65	6	8.211	1.510
Er	$L\beta_{2,15}$	20	68	6	8.188	1.514
Tm	$L\beta_6$	.1	69	6	8.176	1.516
Re	Ls	.01	75	6	8.167	1.518
Dy	$L\gamma_5$	.1	66	6	8.165	1.518
Ta	$L\alpha_1$	100	73	6	8.145	1.522
Hf	Ln	1	72	6	8.138	1.523
Gd	$L\gamma_3$	1	64	6	8.104	1.530
Tb	$L\gamma_1$	5	65	6	8.100	1.530
Tm	$L\beta_1$	50	69	6	8.100	1.530
Ta	$L\alpha_2$	10	73	6	8.086	1.533
Gd	$L\gamma_2$	1	64	6	8.086	1.533
Lu	L_2-M_2	.01	71	6	8.084	1.533
Os	Lt	.01	76	6	8.077	1.535
Ho	$L\beta_5$	.1	67	6	8.061	1.538
Cu	$K\alpha_1$	100	29	6	8.046	1.541
Ir	Ll	3	77	6	8.040	1.542
Cu	$K\alpha_{1,2}$	150	29	6	8.040	1.542
Eu	$L\gamma_4$	.1	63	6	8.029	1.544
Cu	$K\alpha_2$	50	29	6	8.026	1.544
Tm	$L\beta_4$	5	69	6	8.024	1.545
Ho	$L\beta_{10}$	.01	67	6	8.005	1.549
Er	$L\beta_3$	6	68	6	7.938	1.562
W	Ls	.01	74	6	7.925	1.564
Gd	$L\gamma_6$	.01	64	6	7.924	1.564
Ho	$L\beta_{2,15}$	20	67	6	7.910	1.567
Er	$L\beta_6$	.1	68	6	7.908	1.567
Hf	$L\alpha_1$	100	72	6	7.898	1.570
Gd	$L\gamma_8$	.1	64	6	7.892	1.571
Lu	Ln	1	71	6	7.856	1.578
Tb	$L\gamma_5$	.1	65	6	7.852	1.579
Re	Lt	.01	75	6	7.851	1.579
Hf	$L\alpha_2$	10	72	6	7.843	1.580
Os	Ll	3	76	6	7.821	1.585
Er	$L\beta_1$	50	68	6	7.809	1.587
Dy	$L\beta_5$	.1	66	6	7.804	1.588
Yb	L_2-M_2	.01	70	6	7.804	1.588
Eu	$L\gamma_3$	1	63	6	7.795	1.590
Gd	$L\gamma_1$	5	64	6	7.784	1.592
Eu	$L\gamma_2$	1	63	6	7.766	1.596
Dy	$L\beta_9$	.01	66	6	7.749	1.600
Er	$L\beta_4$	5	68	6	7.744	1.601
Dy	$L\beta_7$	.1	66	6	7.726	1.604
Sm	$L\gamma_4$	.1	62	6	7.712	1.607
Dy	$L\beta_{10}$	.01	66	6	7.712	1.607
Co	$K\beta_5$	.03	27	6	7.705	1.609
Ta	Ls	.01	73	6	7.687	1.613
Lu	$L\alpha_1$	100	71	6	7.654	1.620
Ho	$L\beta_3$	6	67	6	7.650	1.620
Co	$K\beta_{1,3}$	20	27	6	7.648	1.621
Dy	$L\beta_{2,15}$	20	66	6	7.634	1.624
Ho	$L\beta_6$	.1	67	6	7.634	1.624
W	Lt	.01	74	6	7.631	1.624
Eu	$L\gamma_6$	.01	63	6	7.613	1.628
Lu	$L\alpha_2$	10	71	6	7.604	1.630
Re	Ll	3	75	6	7.602	1.631
Eu	$L\gamma_8$	.1	63	6	7.584	1.635
Yb	Ln	1	70	6	7.579	1.636
Gd	$L\gamma_5$	.1	64	6	7.553	1.641
Ho	$L\beta_1$	50	67	6	7.524	1.647
Tb	$L\beta_5$	.1	65	6	7.508	1.651
Sm	$L\gamma_3$	1	62	6	7.485	1.656
Eu	$L\gamma_1$	5	63	6	7.479	1.657
Ni	$K\alpha_1$	100	28	6	7.477	1.658
Tb	$L\beta_7$	.1	65	6	7.474	1.658
Ni	$K\alpha_{1,2}$	150	28	6	7.471	1.659
Ho	$L\beta_4$	5	67	6	7.470	1.659
Sm	$L\gamma_2$	1	62	6	7.465	1.660
Ni	$K\alpha_2$	50	28	6	7.460	1.662
Hf	Ls	.01	72	6	7.452	1.663
Tb	$L\beta_{10}$	.01	65	6	7.435	1.667
Yb	$L\alpha_1$	100	70	6	7.414	1.672

El	Line	I	Z	R	KeV	Lambda
Ta	Lt	.01	73	6	7.411	1.673
W	Ll	3	74	6	7.386	1.678
Dy	$L\beta_6$	.1	66	6	7.369	1.682
Dy	$L\beta_3$	6	66	6	7.369	1.682
Yb	$L\alpha_2$	10	70	6	7.366	1.683
Tb	$L\beta_{2,15}$	20	65	6	7.365	1.683
Tm	Ln	1	69	6	7.308	1.696
Sm	$L\gamma_6$	.01	62	6	7.306	1.697
Sm	$L\gamma_8$	.1	62	6	7.265	1.706
Eu	$L\gamma_5$	.1	63	6	7.255	1.709
Dy	$L\beta_1$	50	66	6	7.246	1.711
Gd	$L\beta_5$	.1	64	6	7.236	1.713
Gd	$L\beta_7$	.1	64	6	7.206	1.720
Dy	$L\beta_4$	5	66	6	7.203	1.721
Hf	Lt	.01	72	6	7.194	1.723
Gd	$L\beta_9$	.01	64	6	7.190	1.724
Tm	$L\alpha_1$	100	69	6	7.179	1.727
Sm	$L\gamma_1$	5	62	6	7.177	1.727
Ta	Ll	3	73	6	7.172	1.729
Gd	$L\beta_{10}$	.01	64	6	7.159	1.731
Tm	$L\alpha_2$	10	69	6	7.132	1.738
Tb	$L\beta_6$	.1	65	6	7.115	1.742
Fe	$K\beta_5$	.03	26	6	7.107	1.744
Nd	$L\gamma_4$	.1	60	6	7.106	1.744
Gd	$L\beta_{2,15}$	20	64	6	7.102	1.745
Tb	$L\beta_3$	5	65	6	7.095	1.747
Er	Ln	1	68	6	7.057	1.757
Fe	$K\beta_{1,3}$	20	26	6	7.057	1.757
Lu	Lt	.01	71	6	6.980	1.776
Tb	$L\beta_1$	50	65	6	6.977	1.777
Eu	$L\beta_5$	.1	63	6	6.975	1.777
Sm	$L\gamma_5$	.1	62	6	6.967	1.779
Hf	Ll	3	72	6	6.958	1.781
Er	$L\alpha_1$	100	68	6	6.947	1.784
Eu	$L\beta_7$	.1	63	6	6.944	1.785
Tb	$L\beta_4$	5	65	6	6.939	1.786
Co	$K\alpha_1$	100	27	6	6.929	1.789
Co	$K\alpha_{1,2}$	150	27	6	6.924	1.790
Eu	$L\beta_9$	.01	63	6	6.919	1.792
Co	$K\alpha_2$	50	27	6	6.914	1.793
Er	$L\alpha_2$	10	68	6	6.904	1.795
Nd	$L\gamma_3$	1	60	6	6.900	1.796
Pm	$L\gamma_1$	5	61	6	6.891	1.799
Eu	$L\beta_{10}$	.01	63	6	6.889	1.799
Nd	$L\gamma_2$	1	60	6	6.882	1.801
Gd	$L\beta_6$	.1	64	6	6.866	1.805
Eu	$L\beta_{2,15}$	20	63	6	6.842	1.812
Gd	$L\beta_3$	6	64	6	6.830	1.815
Pr	$L\gamma_4$	.1	59	6	6.814	1.819
Ho	Ln	1	67	6	6.787	1.826
Yb	Lt	.01	70	6	6.770	1.831
Lu	Ll	2	71	6	6.752	1.836
Ho	$L\alpha_1$	100	67	6	6.719	1.845
Gd	$L\beta_1$	50	64	6	6.712	1.847
Sm	$L\beta_5$	.1	62	6	6.711	1.847
Gd	$L\beta_4$	5	64	6	6.686	1.854
Nd	$L\gamma_8$	.1	60	6	6.682	1.855
Ho	$L\alpha_2$	10	67	6	6.679	1.856
Sm	$L\beta_7$	.1	62	6	6.678	1.856
Sm	$L\beta_9$	.01	62	6	6.659	1.862
Sm	$L\beta_{10}$	.01	62	6	6.629	1.870
Eu	$L\beta_6$	.1	63	6	6.616	1.874
Pr	$L\gamma_3$	1	59	6	6.615	1.874
Nd	$L\gamma_1$	5	60	6	6.601	1.878
Pr	$L\gamma_2$	1	59	6	6.597	1.879
Sm	$L\beta_{2,15}$	20	62	6	6.586	1.882
Eu	$L\beta_3$	6	63	6	6.570	1.887
Yb	Ll	2	70	6	6.544	1.894
Mn	$K\beta_5$	.03	25	6	6.534	1.897
Dy	Ln	1	66	6	6.533	1.897
Ce	$L\gamma_4$	.1	58	6	6.527	1.899
Dy	$L\alpha_1$	100	66	6	6.494	1.909
Mn	$K\beta_{1,3}$	20	25	6	6.489	1.910
Dy	$L\alpha_2$	10	66	6	6.457	1.920
Eu	$L\beta_1$	50	63	6	6.455	1.920
Eu	$L\beta_4$	5	63	6	6.438	1.925
Nd	$L\gamma_5$	.1	60	6	6.405	1.935
Fe	$K\alpha_1$	100	26	6	6.403	1.936
Pr	$L\gamma_8$	.1	59	6	6.402	1.936
Fe	$K\alpha_{1,2}$	150	26	6	6.398	1.937
Fe	$K\alpha_2$	50	26	6	6.390	1.940
Sm	$L\beta_6$	.1	62	6	6.369	1.946
Tm	Ll	2	69	6	6.341	1.955
Ce	$L\gamma_3$	1	58	6	6.340	1.955
Pm	$L\beta_{2,15}$	20	61	6	6.338	1.956
Ce	$L\gamma_2$	1	58	6	6.324	1.960
Pr	$L\gamma_1$	5	59	6	6.321	1.961
Sm	$L\beta_3$	6	62	6	6.317	1.962
Tb	Ln	1	65	6	6.283	1.973
Tb	$L\alpha_1$	100	65	6	6.272	1.976
La	$L\gamma_4$	.1	57	6	6.251	1.983
Tb	$L\alpha_2$	10	65	6	6.237	1.987
Sm	$L\beta_1$	50	62	6	6.204	1.998
Sm	$L\beta_4$	5	62	6	6.195	2.001
Nd	$L\beta_7$	.1	60	6	6.170	2.009
Er	Ll	2	68	6	6.152	2.015
Nd	$L\beta_9$	.01	60	6	6.147	2.016
Pr	$L\gamma_5$	.1	59	6	6.135	2.020
Ce	$L\gamma_8$	.1	58	6	6.125	2.024
Nd	$L\beta_{10}$	.01	60	6	6.125	2.024
Nd	$L\beta_{2,15}$	20	60	6	6.088	2.036
La	$L\gamma_3$	1	57	6	6.073	2.041
Pm	$L\beta_3$	6	61	6	6.070	2.042
La	$L\gamma_2$	1	57	6	6.059	2.046
Gd	$L\alpha_1$	100	64	6	6.056	2.047
Ce	$L\gamma_1$	5	58	6	6.051	2.049
Gd	Ln	1	64	6	6.049	2.049
Gd	$L\alpha_2$	10	64	6	6.024	2.058
Cr	$K\beta_5$	.03	24	6	5.986	2.071
Ba	$L\gamma_4$	.1	56	6	5.972	2.076
Pm	$L\beta_1$	50	61	6	5.960	2.080
Cr	$K\beta_{1,3}$	18	24	6	5.946	2.085
Ho	Ll	2	67	6	5.942	2.086
Pr	$L\beta_7$	.1	59	6	5.926	2.092
Pr	$L\beta_9$	.01	59	6	5.902	2.100
Mn	$K\alpha_1$	100	25	6	5.898	2.102
Mn	$K\alpha_{1,2}$	150	25	6	5.894	2.103
Nd	$L\beta_6$	.1	60	6	5.892	2.104
Mn	$K\alpha_2$	50	25	6	5.887	2.106
Pr	$L\beta_{10}$	.01	59	6	5.883	2.107
Ce	$L\gamma_5$	.1	58	6	5.874	2.110
Pr	$L\beta_{2,15}$	20	59	6	5.849	2.119
Eu	$L\alpha_1$	100	63	6	5.845	2.121
Nd	$L\beta_3$	6	60	6	5.828	2.127
Eu	Ln	1	63	6	5.816	2.131
Eu	$L\alpha_2$	10	63	6	5.816	2.131
Ba	$L\gamma_3$	1	56	6	5.808	2.134
Ba	$L\gamma_2$	1	56	6	5.796	2.139
La	$L\gamma_1$	5	57	6	5.789	2.142
Dy	Ll	2	66	6	5.742	2.159

El	Line	I	Z	R	KeV	Lambda
Nd	$L\beta_1$	50	60	6	5.721	2.167
Nd	$L\beta_4$	5	60	6	5.721	2.167
Cs	$L\gamma_4$	.1	55	6	5.702	2.174
Ce	$L\beta_7$	.1	58	6	5.685	2.181
Ce	$L\beta_9$	.01	58	6	5.664	2.188
Pr	$L\beta_6$	.1	59	6	5.659	2.191
Ce	$L\beta_{10}$	.01	58	6	5.645	2.196
Sm	$L\alpha_1$	100	62	6	5.635	2.200
La	$L\gamma_5$	.1	57	6	5.620	2.206
Ce	$L\beta_{2,15}$	20	58	6	5.612	2.209
Sm	$L\alpha_2$	10	62	6	5.607	2.211
Pr	$L\beta_3$	6	59	6	5.591	2.217
Sm	Ln	1	62	6	5.588	2.218
Cs	$L\gamma_3$	1	55	6	5.552	2.233
Tb	Ll	2	65	6	5.546	2.235
Cs	$L\gamma_2$	1	55	6	5.541	2.237
Ba	$L\gamma_1$	5	56	6	5.530	2.241
U	M_1-P_3	.01	92	6	5.502	2.253
Pr	$L\beta_4$	5	59	6	5.497	2.255
Pr	$L\beta_1$	50	59	6	5.488	2.259
V	$K\beta_5$	.02	23	6	5.462	2.270
La	$L\beta_7$	.1	57	6	5.449	2.275
Ce	$L\beta_6$	.1	58	6	5.433	2.282
La	$L\beta_9$	.01	57	6	5.432	2.282
Pm	$L\alpha_1$	100	61	6	5.432	2.282
V	$K\beta_{1,3}$	20	23	6	5.426	2.284
Cr	$K\alpha_1$	100	24	6	5.414	2.290
La	$L\beta_{10}$	.01	57	6	5.413	2.290
Cr	$K\alpha_{1,2}$	150	24	6	5.411	2.291
Pm	$L\alpha_2$	10	61	6	5.407	2.293
Cr	$K\alpha_2$	50	24	6	5.405	2.294
La	$L\beta_{2,15}$	20	57	6	5.383	2.303
U	M_1-O_3	.01	92	6	5.380	2.304
Ba	$L\gamma_5$	.1	56	6	5.370	2.308
Ce	$L\beta_3$	6	58	6	5.364	2.311
Gd	Ll	2	64	6	5.361	2.312
Cs	$L\gamma_1$	5	55	6	5.279	2.348
Ce	$L\beta_4$	5	58	6	5.276	2.350
Ce	$L\beta_1$	50	58	6	5.261	2.356
Nd	$L\alpha_1$	100	60	6	5.229	2.370
La	$L\beta_6$	.1	57	6	5.211	2.379
Ba	$L\beta_7$	.1	56	6	5.207	2.381
Nd	$L\alpha_2$	10	60	6	5.207	2.381
Ba	$L\beta_{10}$	.01	56	6	5.193	2.387
I	$L\gamma_4$	.1	53	6	5.184	2.391
Eu	Ll	2	63	6	5.176	2.395
Ba	$L\beta_{2,15}$	20	56	6	5.156	2.404
Nd	Ln	1	60	6	5.145	2.409
La	$L\beta_3$	6	57	6	5.143	2.410
Cs	$L\gamma_5$	.1	55	6	5.128	2.417
Th	M_1-O_3	.01	90	6	5.076	2.442
U	M_2-O_4	.01	92	6	5.074	2.443
I	$L\gamma_{2,3}$	2	53	6	5.065	2.447
La	$L\beta_4$	5	57	6	5.061	2.449
La	$L\beta_1$	50	57	6	5.041	2.459
Pr	$L\alpha_1$	100	59	6	5.033	2.463
Pr	$L\alpha_2$	10	59	6	5.013	2.473
Sm	Ll	2	62	6	4.994	2.482
Ba	$L\beta_6$	.1	56	6	4.993	2.483
Cs	$L\beta_7$	.1	55	6	4.989	2.485
Cs	$L\beta_9$	.01	55	6	4.988	2.485
Cs	$L\beta_{10}$	.01	55	6	4.974	2.492
Ti	$K\beta_5$	.02	22	6	4.961	2.498
V	$K\alpha_1$	100	23	6	4.951	2.504
V	$K\alpha_{1,2}$	150	23	6	4.949	2.505
V	$K\alpha_2$	50	23	6	4.944	2.507
Te	$L\gamma_4$	.1	52	6	4.936	2.511
Cs	$L\beta_{2,15}$	20	55	6	4.935	2.512
Pr	Ln	1	59	6	4.935	2.512
Ti	$K\beta_{1,3}$	20	22	6	4.931	2.514
Ba	$L\beta_3$	6	56	6	4.926	2.516
Pa	M_2-O_4	.01	91	6	4.905	2.527
Ba	$L\beta_4$	5	56	6	4.851	2.555
Ce	$L\alpha_1$	100	58	6	4.839	2.561
Te	$L\gamma_{2,3}$	2	52	6	4.828	2.567
Ba	$L\beta_1$	50	56	6	4.827	2.568
Ce	$L\alpha_2$	10	58	6	4.822	2.571
I	$L\gamma_1$	8	53	6	4.800	2.582
Cs	$L\beta_6$	.1	55	6	4.780	2.593
Th	M_2-O_4	1	90	6	4.735	2.618
Ce	Ln	1	58	6	4.731	2.620
Cs	$L\beta_3$	6	55	6	4.716	2.628
Sb	$L\gamma_4$	.1	51	6	4.696	2.640
I	$L\gamma_5$	.1	53	6	4.665	2.657
La	$L\alpha_1$	100	57	6	4.650	2.666
Cs	$L\beta_4$	5	55	6	4.649	2.667
La	$L\alpha_2$	10	57	6	4.633	2.675
Nd	Ll	2	60	6	4.632	2.676
Cs	$L\beta_1$	50	55	6	4.619	2.684
Sb	$L\gamma_{2,3}$	2	51	6	4.599	2.695
Te	$L\gamma_1$	8	52	6	4.570	2.712
I	$L\beta_9$	.01	53	6	4.568	2.714
I	$L\beta_{10}$	.01	53	6	4.556	2.721
I	$L\beta_7$	.1	53	6	4.543	2.729
La	Ln	1	57	6	4.524	2.740
Ti	$K\alpha_1$	100	22	6	4.510	2.749
Ti	$K\alpha_{1,2}$	150	22	6	4.508	2.750
I	$L\beta_{2,15}$	17	53	6	4.507	2.751
Ti	$K\alpha_2$	50	22	6	4.504	2.752
U	M_1-N_3	.1	92	6	4.503	2.753
Sc	$K\beta_5$	.02	21	6	4.486	2.763
Ba	$L\alpha_1$	100	56	6	4.465	2.776
Sn	$L\gamma_4$	.1	50	6	4.463	2.777
Sc	$K\beta_{1,3}$	20	21	6	4.460	2.780
Pr	Ll	2	59	6	4.452	2.784
Ba	$L\alpha_2$	10	56	6	4.450	2.786
Te	$L\gamma_5$	.1	52	6	4.443	2.790
U	M_2-N_4	5	92	6	4.400	2.817
Sn	$L\gamma_{2,3}$	2	50	6	4.376	2.833
I	$L\beta_6$	1	53	6	4.370	2.837
Te	$L\beta_9$	.01	52	6	4.366	2.839
Te	$L\beta_{10}$	.01	52	6	4.356	2.846
Sb	$L\gamma_1$	8	51	6	4.347	2.852
Ba	Ln	1	56	6	4.330	2.863
Te	$L\beta_7$	.1	52	6	4.329	2.863
I	$L\beta_3$	6	53	6	4.313	2.874
Te	$L\beta_{2,15}$	17	52	6	4.301	2.882
Ce	Ll	2	58	6	4.287	2.892
Cs	$L\alpha_1$	100	55	6	4.286	2.892
Cs	$L\alpha_2$	10	55	6	4.272	2.902
Pa	M_2-N_4	5	91	6	4.260	2.910
I	$L\beta_4$	4	53	6	4.257	2.912
U	M_1-N_2	1	92	6	4.245	2.920
In	$L\gamma_4$	.1	49	6	4.236	2.926
Sb	$L\gamma_5$	.1	51	6	4.228	2.932
Th	M_1-N_3	.1	90	6	4.225	2.934
I	$L\beta_1$	75	53	6	4.220	2.937
U	M_3-$O_{4,5}$	1	92	6	4.205	2.948
Te	$L\beta_6$	1	52	6	4.173	2.971
Sb	$L\beta_9$	.01	51	6	4.170	2.973

El	Line	I	Z	R	KeV	Lambda
Sb	$L\beta_{10}$	.01	51	6	4.161	2.979
In	$L\gamma_{2,3}$	2	49	6	4.160	2.980
Cs	Ln	1	55	6	4.141	2.993
Sn	$L\gamma_1$	8	50	6	4.130	3.001
Sb	$L\beta_7$	.1	51	6	4.125	3.005
La	Ll	2	57	6	4.124	3.006
Te	$L\beta_3$	6	52	6	4.120	3.009
Th	M_2-N_4	5	90	6	4.117	3.011
Xe	$L\alpha_1$	100	54	6	4.109	3.017
Sb	$L\beta_{2,15}$	17	51	6	4.100	3.023
Sc	$K\alpha_1$	100	21	6	4.090	3.031
Sc	$K\alpha_{1,2}$	150	21	6	4.088	3.032
Sc	$K\alpha_2$	50	21	6	4.085	3.034
Pa	M_3-$O_{4,5}$	1	91	6	4.080	3.038
Te	$L\beta_4$	4	52	6	4.069	3.047
Ca	$K\beta_5$	.01	20	6	4.032	3.075
Te	$L\beta_1$	75	52	6	4.029	3.077
Sn	$L\gamma_5$	.1	50	6	4.018	3.085
Ca	$K\beta_{1,3}$	15	20	6	4.012	3.090
U	M_3-O_1	.5	92	6	3.979	3.115
Sn	$L\beta_9$	.01	50	6	3.979	3.115
Sb	$L\beta_6$	1	51	6	3.979	3.115
Sn	$L\beta_{10}$	.01	50	6	3.971	3.122
Th	M_3-$O_{4,5}$	1	90	6	3.959	3.131
Ba	Ll	2	56	6	3.953	3.135
Cd	$L\gamma_2$	5	48	6	3.951	3.138
I	$L\alpha_1$	100	53	6	3.937	3.149
Sb	$L\beta_3$	6	51	6	3.932	3.153
Sn	$L\beta_7$	.1	50	6	3.927	3.156
I	$L\alpha_2$	10	53	6	3.925	3.158
In	$L\gamma_1$	8	49	6	3.920	3.162
Sn	$L\beta_{2,15}$	17	50	6	3.904	3.175
Sb	$L\beta_4$	4	51	6	3.886	3.190
Sb	$L\beta_1$	75	51	6	3.843	3.226
Pa	M_3-O_1	.5	91	6	3.820	3.245
In	$L\gamma_5$	.1	49	6	3.815	3.249
Cs	Ll	2	55	6	3.794	3.267
In	$L\beta_9$	.01	49	6	3.794	3.268
Sn	$L\beta_6$	1	50	6	3.792	3.269
In	$L\beta_{10}$	.01	49	6	3.786	3.274
I	Ln	7	53	6	3.780	3.280
Th	M_3-O_1	.5	90	6	3.776	3.283
Te	$L\alpha_1$	100	52	6	3.769	3.289
Te	$L\alpha_2$	10	52	6	3.758	3.298
Sn	$L\beta_3$	6	50	6	3.750	3.306
Ag	$L\gamma_3$	2	47	6	3.749	3.306
Ag	$L\gamma_2$	3	47	6	3.743	3.312
In	$L\beta_7$	.1	49	6	3.729	3.324
U	M_2-N_1	.01	92	6	3.724	3.329
Cd	$L\gamma_1$	10	48	6	3.716	3.336
Ca	$SK\alpha_4$	2	20	1	3.715	3.337
In	$L\beta_{2,15}$	17	49	6	3.713	3.338
Ca	$SK\alpha_3$	2	20	1	3.711	3.340
Sn	$L\beta_4$	4	50	6	3.708	3.343
Ca	$K\alpha_1$	100	20	6	3.691	3.358
Ca	$K\alpha_{1,2}$	150	20	6	3.690	3.359
Ca	$K\alpha_2$	50	20	6	3.687	3.362
Sn	$L\beta_1$	75	50	6	3.662	3.385
Cd	$L\gamma_5$	.1	48	6	3.619	3.426
Cd	$L\beta_9$	.01	48	6	3.614	3.430
In	$L\beta_6$	1	49	6	3.608	3.436
Cd	$L\beta_{10}$	.01	48	6	3.607	3.437
Te	Ln	7	52	6	3.605	3.438
Sb	$L\alpha_1$	100	51	6	3.604	3.439
Pa	M_2-N_1	.01	91	6	3.602	3.441
K	$K\beta_5$	.01	19	6	3.602	3.441
Sb	$L\alpha_2$	10	51	6	3.595	3.448
K	$K\beta_{1,3}$	15	19	6	3.589	3.454
In	$L\beta_3$	6	49	6	3.572	3.470
U	$M\gamma$	5	92	6	3.563	3.479
Pd	$L\gamma_{2,3}$	5	46	6	3.553	3.489
In	$L\beta_4$	4	49	6	3.535	3.507
Cd	$L\beta_{2,15}$	25	48	6	3.528	3.514
U	M_3-N_4	5	92	6	3.521	3.521
Ag	$L\gamma_1$	10	47	6	3.519	3.523
Th	M_2-N_1	.01	90	6	3.505	3.537
In	$L\beta_1$	75	49	6	3.487	3.555
I	Ll	7	53	6	3.484	3.558
U	M_4-O_2	1	92	6	3.466	3.576
Pa	$M\gamma$	5	91	6	3.465	3.577
Sn	$L\alpha_1$	100	50	6	3.443	3.600
Ag	$L\beta_9$	.01	47	6	3.439	3.605
Sb	Ln	7	51	6	3.436	3.608
Sn	$L\alpha_2$	10	50	6	3.435	3.609
Ag	$L\beta_{10}$	.01	47	6	3.432	3.612
Pa	M_3-N_4	5	91	6	3.430	3.614
Cd	$L\beta_6$	1	48	6	3.429	3.615
Ag	$L\gamma_5$	.1	47	6	3.428	3.616
Cd	$L\beta_3$	11	48	6	3.401	3.645
Th	$M\gamma$	5	90	6	3.369	3.679
Cd	$L\beta_4$	5	48	6	3.367	3.682
Rh	$L\gamma_{2,3}$	5	45	6	3.363	3.685
Pa	M_4-O_2	1	91	6	3.358	3.691
Ag	$L\beta_{2,15}$	25	47	6	3.347	3.703
U	$M\beta$	60	92	6	3.336	3.716
K	$SK\alpha_4$	3	19	1	3.335	3.716
Te	Ll	7	52	6	3.335	3.717
Th	M_3-N_4	5	90	6	3.334	3.718
K	$SK\alpha_3$	3	19	1	3.332	3.721
Pd	$L\gamma_1$	10	46	6	3.328	3.725
Cd	$L\beta_1$	42	48	6	3.316	3.738
Bi	M_1-N_3	.1	83	6	3.314	3.740
K	$K\alpha_1$	100	19	6	3.313	3.741
K	$K\alpha_{1,2}$	150	19	6	3.312	3.742
K	$K\alpha_2$	50	19	6	3.310	3.744
Th	M_5-P_3	.01	90	6	3.297	3.760
In	$L\alpha_1$	100	49	6	3.286	3.772
In	$L\alpha_2$	10	49	6	3.279	3.781
Sn	Ln	7	50	6	3.272	3.789
Pd	$L\beta_9$	.01	46	6	3.269	3.792
Pd	$L\beta_{10}$	.01	46	6	3.263	3.799
Ag	$L\beta_6$	1	47	6	3.255	3.808
Th	M_4-O_2	1	90	6	3.255	3.808
Pd	$L\gamma_5$	.1	46	6	3.243	3.822
Pa	$M\beta$	60	91	6	3.239	3.827
Ag	$L\beta_3$	11	47	6	3.234	3.833
Bi	M_2-N_4	5	83	6	3.233	3.834
Ag	$L\beta_4$	5	47	6	3.203	3.870
Pb	M_1-N_3	.1	82	6	3.201	3.872
Ar	$K\beta_{1,3}$	15	18	6	3.190	3.886
Sb	Ll	7	51	6	3.188	3.888
Bi	M_1-N_2	1	83	6	3.185	3.892
Ru	$L\gamma_{2,3}$	.5	44	6	3.180	3.898
Pd	$L\beta_{2,15}$	25	46	6	3.171	3.909
U	$M\alpha_1$	100	92	6	3.170	3.910
U	$M\alpha_2$	100	92	6	3.159	3.924
Bi	M_3-$O_{4,5}$	1	83	6	3.153	3.932
Ag	$L\beta_1$	42	47	6	3.150	3.935
Th	$M\beta$	60	90	6	3.145	3.941
Rh	$L\gamma_1$	10	45	6	3.143	3.944

El	Line	I	Z	R	KeV	Lambda
Cd	$L\alpha_1$	100	48	6	3.133	3.956
Cd	$L\alpha_2$	10	48	6	3.126	3.965
Pb	M_2-N_4	5	82	6	3.124	3.968
In	Ln	7	49	6	3.112	3.983
Tl	M_1-N_3	1	81	6	3.089	4.013
Pd	$L\beta_6$	1	46	6	3.087	4.016
Pa	$M\alpha_1$	100	91	6	3.082	4.022
Pd	$L\beta_3$	11	46	6	3.072	4.035
Pa	$M\alpha_2$	100	91	6	3.072	4.035
Rh	$L\gamma_5$	.1	45	6	3.064	4.045
Pb	M_3-$O_{4,5}$	1	82	6	3.046	4.069
Pd	$L\beta_4$	5	46	6	3.045	4.071
Sn	Ll	7	50	6	3.044	4.072
Bi	M_3-O_1	.5	83	6	3.020	4.105
Tl	M_2-N_4	1	81	6	3.012	4.116
Rh	$L\beta_{2,15}$	25	45	6	3.001	4.131
Th	$M\alpha_1$	100	90	6	2.996	4.138
Pd	$L\beta_1$	42	46	6	2.990	4.146
Th	$M\alpha_2$	100	90	6	2.986	4.151
Ag	$L\alpha_1$	100	47	6	2.984	4.154
Ag	$L\alpha_2$	10	47	6	2.978	4.163
Ru	$L\gamma_1$	1	44	6	2.964	4.182
Ar	$K\alpha_1$	100	18	6	2.957	4.192
Ar	$K\alpha_{1,2}$	150	18	6	2.957	4.193
Cd	Ln	1	48	6	2.956	4.193
Ar	$K\alpha_2$	50	18	6	2.955	4.195
Tl	M_3-$O_{4,5}$	.5	81	6	2.940	4.216
Rh	$L\beta_6$	3	45	6	2.922	4.242
Pb	M_3-O_1	.5	82	6	2.921	4.244
Rh	$L\beta_3$	11	45	6	2.915	4.252
In	Ll	7	49	6	2.904	4.269
Ru	$L\gamma_5$	.1	44	6	2.891	4.287
Rh	$L\beta_4$	5	45	6	2.890	4.289
Au	M_1-N_3	1	79	6	2.883	4.300
U	M_3-N_1	1	92	6	2.863	4.330
Pd	$L\alpha_1$	100	46	6	2.838	4.368
Ru	$L\beta_{2,15}$	1	44	6	2.835	4.372
Rh	$L\beta_1$	42	45	6	2.834	4.374
Pd	$L\alpha_2$	10	46	6	2.833	4.376
Mo	$L\gamma_{2,3}$	.5	42	6	2.830	4.380
Cl	$K\beta$	8	17	6	2.815	4.403
Ag	Ln	1	47	6	2.806	4.418
Au	M_2-N_4	.5	79	6	2.797	4.432
W	M_1-$O_{2,3}$	.01	74	6	2.792	4.440
Pa	M_3-N_1	1	91	6	2.786	4.450
Pt	M_1-N_3	1	78	6	2.779	4.460
Cd	Ll	2	48	6	2.767	4.480
Ru	$L\beta_3$	3	44	6	2.763	4.487
Ru	$L\beta_6$	3	44	6	2.763	4.487
Au	M_3-$O_{4,5}$	.5	79	6	2.741	4.522
Ru	$L\beta_4$	3	44	6	2.741	4.523
Bi	$M\gamma$	5	83	6	2.735	4.532
Th	M_3-N_1	1	90	6	2.714	4.568
Bi	M_3-N_4	5	83	6	2.712	4.571
Bi	M_4-$P_{2,3}$	.01	83	6	2.701	4.590
Rh	$L\alpha_1$	100	45	6	2.696	4.597
Pt	M_2-N_4	.5	78	6	2.694	4.601
Rh	$L\alpha_2$	10	45	6	2.692	4.605
Ru	$L\beta_1$	45	44	6	2.683	4.621
U	M_4-N_3	.01	92	6	2.680	4.625
Ir	M_1-N_3	.5	77	6	2.677	4.631
Nb	$L\gamma_{2,3}$	.5	41	6	2.663	4.654
Pb	M_2-N_1	.01	82	6	2.663	4.655
Pd	Ln	1	46	6	2.660	4.660
Pb	$M\gamma$	5	82	6	2.652	4.674
Pt	M_3-$O_{4,5}$	.5	78	6	2.641	4.694
Cl	$SK\alpha_4$	4	17	1	2.640	4.696
Au	M_3-O_1	.1	79	6	2.636	4.703
Ag	Ll	2	47	6	2.633	4.708
Cl	$SK\alpha_3$	4	17	1	2.631	4.711
Pb	M_3-N_4	5	82	6	2.629	4.715
Mo	$L\gamma_1$	1	42	6	2.623	4.726
Cl	$K\alpha_1$	100	17	6	2.622	4.728
Cl	$K\alpha_{1,2}$	150	17	6	2.621	4.729
Cl	$K\alpha_2$	50	17	6	2.620	4.731
Ir	M_2-N_4	.2	77	6	2.593	4.780
Os	M_1-N_3	.5	76	6	2.588	4.790
Bi	M_4-O_2	1	83	6	2.570	4.823
Tl	$M\gamma$	3	81	6	2.570	4.823
Mo	$L\gamma_5$	.1	42	6	2.563	4.837
Ru	$L\alpha_1$	100	44	6	2.558	4.846
Ru	$L\alpha_2$	10	44	6	2.554	4.854
Tl	M_3-N_4	1	81	6	2.548	4.865
Ir	M_3-$O_{4,5}$	.5	77	6	2.546	4.869
Pt	M_3-O_1	.01	78	6	2.542	4.876
Tc	$L\beta_1$	45	43	6	2.536	4.887
Bi	$M\beta$	60	83	6	2.525	4.909
Th	M_4-N_3	.01	90	6	2.524	4.911
Rh	Ln	1	45	6	2.519	4.922
Mo	$L\beta_{2,15}$	1	42	6	2.518	4.923
U	Mz_1	1	92	6	2.506	4.946
Pd	Ll	2	46	6	2.503	4.952
Zr	$L\gamma_{2,3}$	.5	40	6	2.502	4.954
Os	M_2-N_4	.2	76	6	2.502	4.955
Hg	$M\gamma$	3	80	6	2.487	4.984
Pb	M_4-O_2	1	82	6	2.477	5.004
Mo	$L\beta_3$	3	42	6	2.473	5.013
S	$K\beta x$	7	16	6	2.468	5.023
S	$K\beta_1$	7	16	6	2.464	5.032
Nb	$L\gamma_1$	1	41	6	2.461	5.036
Mo	$L\beta_4$	3	42	6	2.455	5.049
Mo	$L\beta_6$	3	42	6	2.455	5.049
U	Mz_2	.1	92	6	2.455	5.050
Pb	$M\beta$	60	82	6	2.442	5.076
Pa	Mz_1	1	91	6	2.434	5.092
Tc	$L\alpha_1$	100	43	6	2.424	5.115
Bi	$M\alpha_1$	100	83	6	2.422	5.118
Bi	$M\alpha_2$	100	83	6	2.416	5.130
Au	$M\gamma$	3	79	6	2.409	5.145
Nb	$L\gamma_5$	.1	41	6	2.406	5.152
Pb	M_5-O_3	.01	82	6	2.399	5.168
W	M_1-N_3	.5	74	6	2.397	5.172
Mo	$L\beta_1$	45	42	6	2.394	5.177
Au	M_3-N_4	1	79	6	2.390	5.186
Pa	Mz_2	.1	91	6	2.387	5.193
Tl	M_4-O_2	.1	81	6	2.386	5.196
Ru	Ln	1	44	6	2.382	5.205
Rh	Ll	3	45	6	2.376	5.217
Nb	$L\beta_{2,15}$	1	41	6	2.367	5.238
Th	Mz_1	1	90	6	2.363	5.245
Tl	$M\beta$	55	81	6	2.362	5.249
Y	$L\gamma_{2,3}$	.5	39	6	2.346	5.283
Pb	$M\alpha_1$	100	82	6	2.345	5.286
Pb	$M\alpha_2$	100	82	6	2.339	5.299
Nb	$L\beta_3$	3	41	6	2.334	5.310
Pt	$M\gamma$	3	78	6	2.331	5.319
S	$SK\alpha_4$	45	16	1	2.324	5.334
Th	Mz_2	.1	90	6	2.321	5.340
S	$SK\alpha_3$	45	16	1	2.321	5.341
Nb	$L\beta_4$	3	41	6	2.319	5.345

El	Line	I	Z	R	KeV	Lambda
S	SKα'	.3	16	1	2.316	5.353
Pt	M_3-N_4	1	78	6	2.314	5.357
W	M_2-N_4	.1	74	6	2.314	5.357
Nb	$L\beta_6$	3	41	6	2.312	5.361
S	$K\alpha_1$	100	16	6	2.307	5.372
S	$K\alpha_{1,2}$	150	16	6	2.307	5.373
S	$K\alpha_2$	50	16	6	2.306	5.375
Zr	$L\gamma_1$	1	40	6	2.302	5.384
Ta	M_1-N_3	.5	73	6	2.296	5.400
Mo	$L\alpha_1$	100	42	6	2.293	5.407
Mo	$L\alpha_2$	10	42	6	2.289	5.414
Hg	Mβ	50	80	6	2.282	5.432
Tl	$M\alpha_1$	100	81	6	2.270	5.460
Tl	$M\alpha_2$	100	81	6	2.265	5.472
Nb	$L\beta_1$	45	41	6	2.257	5.492
Zr	$L\gamma_5$	.1	40	6	2.255	5.498
Ir	Mγ	1	77	6	2.254	5.500
Ru	Ll	3	44	6	2.252	5.503
Bi	M_3-N_1	1	83	6	2.239	5.537
Ir	M_3-N_4	.1	77	6	2.238	5.540
Ta	M_2-N_4	.2	73	6	2.225	5.570
Zr	$L\beta_{2,15}$	1	40	6	2.219	5.586
Au	Mβ	50	79	6	2.204	5.624
W	M_3-O_1	.01	74	6	2.203	5.628
Zr	$L\beta_3$	3	40	6	2.201	5.633
Sr	$L\gamma_{2,3}$	.1	38	6	2.196	5.644
Hg	Mα	100	80	6	2.195	5.648
Zr	$L\beta_4$	3	40	6	2.187	5.668
Ta	M_3-$O_{4,5}$	.01	73	6	2.186	5.670
Os	Mγ	1	76	6	2.182	5.682
Pb	M_3-N_1	1	82	6	2.173	5.704
Zr	$L\beta_6$	3	40	6	2.171	5.710
Os	M_3-N_4	.1	76	6	2.166	5.724
Nb	$L\alpha_1$	100	41	6	2.166	5.724
Nb	$L\alpha_2$	10	41	6	2.163	5.732
Au	M_5-O_3	.01	79	6	2.149	5.767
P	Kβ	3	15	6	2.139	5.796
P	$K\beta_1$	3	15	0	2.136	5.804
Os	M_2-N_1	.01	76	6	2.134	5.810
Pt	Mβ	50	78	6	2.127	5.828
Ta	M_3-O_1	.01	73	6	2.126	5.830
Zr	$L\beta_1$	45	40	6	2.124	5.836
P	SKβ'	.1	15	0	2.123	5.838
Au	$M\alpha_1$	100	79	6	2.123	5.840
Mo	Ln	1	42	6	2.120	5.847
Au	$M\alpha_2$	100	79	6	2.118	5.854
Y	$L\gamma_5$	.1	39	6	2.110	5.875
Tl	M_3-N_1	1	81	6	2.107	5.884
Re	Mγ	1	75	6	2.106	5.885
Re	M_3-N_4	.01	75	6	2.090	5.931
Y	$L\beta_3$	3	39	6	2.072	5.983
Pt	M_5-O_3	.01	78	6	2.070	5.987
Y	$L\beta_4$	3	39	6	2.060	6.019
Ir	Mβ	45	77	6	2.053	6.038
Rb	$L\gamma_{2,3}$	.1	37	6	2.050	6.046
Pt	$M\alpha_1$	100	78	6	2.050	6.047
Pt	$M\alpha_2$	100	78	6	2.046	6.058
P	$SK\alpha_6$	.01	15	1	2.044	6.063
Zr	$L\alpha_1$	100	40	6	2.042	6.070
P	$SK\alpha_5$	.01	15	1	2.040	6.075
Zr	$L\alpha_2$	10	40	6	2.040	6.078
Hg	M_3-N_1	1	80	6	2.035	6.090
W	Mγ	1	74	6	2.035	6.092
Y	$L\beta_6$	3	39	6	2.034	6.094
P	$SK\alpha_4$	5	15	1	2.029	6.109
P	$SK\alpha_3$	5	15	1	2.027	6.117
P	SKα'	.5	15	1	2.022	6.131
W	M_3-N_4	.1	74	6	2.021	6.134
Mo	Ll	3	42	6	2.015	6.151
P	$K\alpha_1$	100	15	6	2.013	6.157
P	$K\alpha_{1,2}$	150	15	6	2.013	6.158
P	$K\alpha_2$	50	15	6	2.012	6.160
Bi	M_4-N_3	.01	83	6	2.012	6.162
Nb	Ln	1	41	6	1.996	6.211
Y	$L\beta_1$	45	39	6	1.995	6.212
Au	M_3-N_1	1	79	6	1.981	6.259
Ir	$M\alpha_1$	100	77	6	1.980	6.262
Os	Mβ	45	76	6	1.978	6.267
Ir	$M\alpha_2$	100	77	6	1.975	6.275
W	M_2-N_1	.01	74	6	1.974	6.280
Sr	$L\gamma_5$	.1	38	6	1.969	6.296
Ta	Mγ	1	73	6	1.964	6.312
Ta	M_3-N_4	.01	73	6	1.951	6.353
Sr	$L\beta_3$	3	38	6	1.947	6.367
Pb	M_4-N_3	.01	82	6	1.942	6.384
Sr	$L\beta_4$	3	38	6	1.936	6.403
Y	$L\alpha_1$	100	39	6	1.922	6.449
Pt	M_3-N_1	1	78	6	1.920	6.455
Y	$L\alpha_2$	10	39	6	1.920	6.456
Os	Mα	100	76	6	1.914	6.478
Re	Mβ	45	75	6	1.906	6.504
Nb	Ll	3	41	6	1.902	6.518
Sr	$L\beta_6$	3	38	6	1.901	6.519
Bi	Mz_1	1	83	6	1.901	6.521
Hf	Mγ	1	72	6	1.894	6.544
Bi	Mz_2	.1	83	6	1.882	6.585
Zr	Ln	1	40	6	1.876	6.607
Sr	$L\beta_1$	45	38	6	1.871	6.624
Ir	M_3-N_1	.5	77	6	1.859	6.669
Re	Mα	100	75	6	1.842	6.729
Pb	Mz_1	1	82	6	1.839	6.740
Si	Kβ	2	14	6	1.836	6.753
Rb	$L\gamma_5$	.1	37	6	1.835	6.755
W	Mβ	45	74	6	1.835	6.757
Lu	Mγ	1	71	6	1.832	6.768
Si	$K\beta_1$	2	14	1	1.829	6.778
Rb	$L\beta_3$	3	37	6	1.826	6.788
Pb	Mz_2	.1	82	6	1.822	6.802
W	M_4-O_2	.01	74	6	1.821	6.806
Si	SKβ'	.1	14	1	1.819	6.816
Rb	$L\beta_4$	3	37	6	1.817	6.821
Sr	$L\alpha_1$	100	38	6	1.806	6.863
Sr	$L\alpha_2$	10	38	6	1.804	6.870
Hg	Mδ	.01	80	6	1.804	6.870
Os	M_3-N_1	.5	76	6	1.799	6.890
Zr	Ll	3	40	6	1.792	6.918
Tl	Mz_1	2	81	6	1.777	6.974
W	$M\alpha_1$	100	74	6	1.775	6.983
Rb	$L\beta_6$	3	37	6	1.775	6.984
W	$M\alpha_2$	100	74	6	1.773	6.992
W	M_5-O_3	.01	74	6	1.770	7.005
Si	$SK\alpha_6$	.1	14	1	1.766	7.020
Ta	Mβ	45	73	6	1.765	7.023
Yb	Mγ	1	70	6	1.765	7.024
Si	$SK\alpha_5$	.2	14	1	1.763	7.030
Tl	Mz_2	1	81	6	1.763	7.032
Y	Ln	1	39	6	1.761	7.041
Si	$SK\alpha_4$	3	14	1	1.754	7.067
Rb	$L\beta_1$	45	37	6	1.752	7.076
Si	$SK\alpha_3$	6	14	1	1.752	7.077

El	Line	I	Z	R	KeV	Lambda
Ta	M_4-$O_{2,3}$	.01	73	6	1.748	7.090
Si	SKα'	.5	14	1	1.747	7.094
Au	M_4-N_3	.01	79	6	1.746	7.101
Si	Kα_1	100	14	6	1.740	7.125
Si	K$\alpha_{1,2}$	150	14	6	1.739	7.126
Si	Kα_2	50	14	6	1.739	7.128
Kr	L_2-N_3	.01	36	6	1.710	7.250
Ta	Mα	100	73	6	1.709	7.252
Kr	Lβ_3	1	36	6	1.706	7.264
Kr	Lγ_5	.1	36	6	1.703	7.279
Ta	M_5-O_3	.01	73	6	1.698	7.300
Hf	Mβ	45	72	6	1.697	7.303
Kr	Lβ_4	1	36	6	1.697	7.304
Rb	Lα_1	100	37	6	1.694	7.318
Rb	Lα_2	10	37	6	1.692	7.325
Y	Ll	3	39	6	1.685	7.356
W	M_3-N_1	.5	74	6	1.684	7.360
Pt	M_4-N_3	.01	78	6	1.682	7.371
Au	Mζ_1	2	79	6	1.660	7.466
Kr	Lβ_6	.1	36	6	1.651	7.510
Sr	Ln	1	38	6	1.649	7.517
Au	Mζ_2	1	79	6	1.648	7.523
Hf	Mα	100	72	6	1.644	7.539
Er	Mγ	1	68	6	1.643	7.546
Kr	Lβ_1	35	36	6	1.636	7.576
Er	M_3-N_4	.1	68	6	1.631	7.600
Lu	Mβ	45	71	6	1.631	7.601
Ta	M_3-N_1	.5	73	6	1.628	7.612
Ir	M_4-N_3	.01	77	6	1.621	7.645
Pt	Mζ_1	2	78	6	1.602	7.738
Br	L$\beta_{3,4}$	2	35	6	1.596	7.767
Pt	Mζ_2	1	78	6	1.591	7.790
Kr	L$\alpha_{1,2}$	100	36	6	1.586	7.817
Sr	Ll	3	38	6	1.582	7.836
Lu	Mα	100	71	6	1.581	7.840
Ho	Mγ	1	67	6	1.576	7.865
Hf	M_3-N_1	.5	72	6	1.572	7.887
Yb	Mβ	45	70	6	1.567	7.909
Al	Kβ	.7	13	6	1.557	7.960
Al	Kβ_1	.7	13	1	1.553	7.982
Ir	Mζ_1	.01	77	6	1.545	8.021
Rb	Ln	1	37	6	1.542	8.041
Ir	Mζ_2	.01	77	6	1.537	8.065
Al	SKβ'	.1	13	1	1.537	8.066
Br	Lβ_1	35	35	6	1.526	8.125
Dy	Mγ	1	66	6	1.522	8.144
Yb	Mα	100	70	6	1.521	8.149
Al	SKα_6	.4	13	1	1.510	8.208
Al	SKα_5	.5	13	1	1.506	8.229
Re	M_4-N_3	.01	75	6	1.505	8.239
Tm	Mβ	45	69	6	1.503	8.249
Al	SKα_4	4	13	1	1.499	8.271
Al	SKα_3	8	13	1	1.496	8.287
Al	SKα'	2	13	1	1.493	8.305
Os	Mζ_1	.01	76	6	1.492	8.310
Se	L$\beta_{3,4}$	2	34	6	1.490	8.321
Al	Kα_1	100	13	6	1.486	8.339
Al	K$\alpha_{1,2}$	150	13	6	1.486	8.340
Al	Kα_2	50	13	6	1.486	8.342
Os	Mζ_2	.01	76	6	1.483	8.359
Rb	Ll	3	37	6	1.482	8.364
Br	L$\alpha_{1,2}$	100	35	6	1.480	8.375
Yb	M_3-N_1	.5	70	6	1.464	8.470
Tm	Mα	100	69	6	1.462	8.480
Tb	Mγ	1	65	6	1.461	8.486
W	M_4-N_3	.01	74	6	1.446	8.573
Er	Mβ	45	68	6	1.443	8.592
U	N_1-$P_{4,5}$		92	6	1.441	8.600
Re	Mζ_1	.01	75	6	1.437	8.629
Re	Mζ_2	.01	75	6	1.431	8.664
Se	Lβ_1	35	34	6	1.419	8.736
U	N_1-P_3		92	6	1.415	8.760
U	N_1-P_2		92	6	1.407	8.810
Er	Mα	100	68	6	1.405	8.820
Gd	Mγ	1	64	6	1.402	8.844
Ta	M_4-N_3	.01	73	6	1.393	8.900
As	L$\beta_{3,4}$	2	33	6	1.388	8.929
W	Mζ_1	.01	74	6	1.383	8.962
Ho	Mβ	45	67	6	1.383	8.965
Se	L$\alpha_{1,2}$	100	34	6	1.379	8.990
W	Mζ_2	.01	74	6	1.378	8.993
Ho	Mα	100	67	6	1.347	9.200
Eu	Mγ	1	63	6	1.346	9.211
Br	Ln	1	35	6	1.339	9.255
Ta	Mζ_1	.1	73	6	1.331	9.316
Ta	Mζ_2	.01	73	6	1.329	9.330
Dy	Mβ	45	66	6	1.325	9.357
Th	N_1-P_3		90	6	1.319	9.400
As	Lβ_1	35	33	6	1.317	9.414
Th	N_1-P_2		90	6	1.313	9.440
Mg	Kβ	.7	12	6	1.302	9.521
Mg	Kβ_1	.7	12	1	1.295	9.570
Ge	Lβ_3	1	32	6	1.294	9.581
Br	Ll	1	35	6	1.293	9.585
Dy	Mα	100	66	6	1.293	9.590
Sm	Mγ	1	62	6	1.291	9.600
Ge	Lβ_4	1	32	6	1.286	9.640
Mg	SKβ'	.01	12	1	1.282	9.666
As	L$\alpha_{1,2}$	100	33	6	1.282	9.671
Hf	Mζ_1	.01	72	6	1.280	9.686
Hf	Mζ_2	.01	72	6	1.280	9.686
Mg	SKα_6	.8	12	1	1.274	9.728
Mg	SKα_5	.9	12	1	1.271	9.754
Tb	Mβ	45	65	6	1.266	9.792
Mg	SKα_4	8	12	1	1.264	9.808
Mg	SKα_3	8	12	1	1.262	9.824
Mg	SKα'	2	12	1	1.259	9.848
Mg	K$\alpha_{1,2}$	100	12	6	1.253	9.890
Se	Ln	1	34	6	1.244	9.962
Tb	Mα	100	65	6	1.240	10.000
U	N_1-O_3		92	6	1.229	10.090
Ge	Lβ_1	35	32	6	1.218	10.175
Gd	Mβ	45	64	6	1.209	10.254
Se	Ll	1	34	6	1.204	10.294
Ga	L$\beta_{3,4}$	2	31	6	1.197	10.359
U	N_2-P_1		92	6	1.192	10.400
Ge	L$\alpha_{1,2}$	100	32	6	1.188	10.436
Gd	Mα	100	64	6	1.185	10.460
Yb	Mz	.01	70	6	1.183	10.480
Nd	Mγ	1	60	6	1.180	10.505
As	Ln	1	33	6	1.155	10.734
Eu	Mβ	45	63	6	1.153	10.750
Eu	Mα	100	63	6	1.131	10.960
Pr	Mγ	1	59	6	1.127	10.998
Ga	Lβ_1	35	31	6	1.125	11.023
Th	N_2-P_1		90	6	1.120	11.070
As	Ll	1	33	6	1.120	11.072
Zn	L$\beta_{3,4}$	1	30	6	1.107	11.200
Sm	Mβ	45	62	6	1.100	11.270
Ga	L$\alpha_{1,2}$	100	31	6	1.098	11.292

El	Line	I	Z	R	KeV	Lambda
Er	Mz	.01	68	6	1.090	11.370
Sm	Mα	100	62	6	1.081	11.470
Ce	Mγ	1	58	6	1.075	11.530
Th	N_2-O_4		90	6	1.072	11.560
Na	Kβ	.5	11	6	1.071	11.575
Ge	Ln	1	32	6	1.068	11.609
Na	$K\beta_1$	.5	11	1	1.067	11.617
Na	$SK\alpha_6$	1	11	0	1.061	11.686
Na	$SK\alpha_5$	2	11	0	1.058	11.717
Na	$SK\alpha_4$	10	11	0	1.052	11.786
Na	$SK\alpha_3$	10	11	0	1.050	11.805
Na	SKα'	3	11	0	1.047	11.837
Ho	Mz	.01	67	6	1.045	11.860
Na	$K\alpha_{1,2}$	100	11	6	1.041	11.910
Ge	Ll	1	32	6	1.036	11.965
Zn	$L\beta_1$	26	30	6	1.034	11.983
La	Mγ	1	57	6	1.026	12.080
Cu	$L\beta_{3,4}$	1	29	6	1.023	12.122
Zn	$L\alpha_{1,2}$	100	30	6	1.012	12.254
Dy	Mz	.01	66	6	0.997	12.430
Nd	Mβ	55	60	6	0.996	12.440
Ga	Ln	1	31	6	0.984	12.597
Nd	Mα	100	60	6	0.978	12.680
Ba	Mγ	100	56	6	0.972	12.750
U	N_3-O_5		92	6	0.961	12.900
Ga	Ll	1	31	6	0.957	12.953
Tb	Mz	.01	65	6	0.955	12.980
Cu	$L\beta_1$	20	29	6	0.950	13.053
Pr	Mβ	45	59	6	0.949	13.060
Ni	$L\beta_{3,4}$	.8	28	6	0.941	13.180
Bi	N_1-$P_{2,3}$		83	6	0.932	13.300
Cu	$L\alpha_{1,2}$	100	29	6	0.930	13.336
Pr	Mα	100	59	6	0.929	13.343
Gd	Mz	.01	64	6	0.913	13.570
Zn	Ln	2	30	6	0.906	13.680
Ce	Mβ	45	58	6	0.902	13.750
Th	N_3-O_5		90	6	0.898	13.800
Zn	Ll	4	30	6	0.884	14.020
Ce	Mα	100	58	6	0.883	14.040
Eu	Mz	.01	63	6	0.872	14.220
Ni	$L\beta_1$	21	28	6	0.869	14.271
Co	$L\beta_{3,4}$	.5	27	6	0.866	14.310
Ce	M_5-$O_{2,3}$	.01	58	6	0.861	14.390
La	Mβ	45	57	6	0.854	14.510
Ni	$L\alpha_{1,2}$	100	28	6	0.851	14.561
Ne	$K\alpha_{1,2}$	100	10	6	0.848	14.610
La	Mα	100	57	6	0.833	14.880
Cu	Ln	1	29	6	0.832	14.900
Sm	Mz	.01	62	6	0.831	14.910
Cu	Ll	5	29	6	0.811	15.286
Fe	$L\beta_{3,4}$	.5	26	6	0.792	15.650
Co	$L\beta_1$	18	27	6	0.791	15.666
Ba	M_4-O_3	10	56	6	0.789	15.720
Ba	M_4-O_2	10	56	6	0.779	15.910
Te	Mγ	100	52	6	0.778	15.930
Co	$L\alpha_{1,2}$	100	27	6	0.776	15.972
Sb	M_2-N_4	50	51	6	0.776	15.980
Ba	M_5-O_3	.01	56	6	0.765	16.200
Ni	Ln	3	28	6	0.762	16.270
Nd	Mz	.01	60	6	0.753	16.460
Ni	Ll	8	28	6	0.743	16.693
Sb	Mγ	100	51	6	0.733	16.920
Sn	M_2-N_4	50	50	6	0.732	16.930
Mn	$L\beta_{3,4}$	.1	25	6	0.721	17.190
Fe	$L\beta_1$	20	26	6	0.718	17.260
Pr	Mz	.01	59	6	0.713	17.380
Fe	$L\alpha_{1,2}$	100	26	6	0.705	17.590
Te	M_2-N_1	1	52	6	0.704	17.600
Co	Ln	2	27	6	0.694	17.870
Sn	Mγ	100	50	6	0.691	17.940
F	SKα''	30	9	1	0.681	18.200
F	SKα'	35	9	1	0.680	18.220
Co	Ll	9	27	6	0.678	18.292
F	Kα	100	9	6	0.677	18.320
Ce	Mz	.01	58	6	0.676	18.350
Sb	M_2-N_1	1	51	6	0.659	18.800
Ag	M_1-$N_{2,3}$	1	47	6	0.659	18.800
Cr	$L\beta_{3,4}$	.1	24	6	0.654	18.960
Te	M_3-N_1	10	52	6	0.649	19.100
Mn	$L\beta_1$	30	25	6	0.649	19.110
Cd	M_2-N_4	50	48	6	0.639	19.400
La	Mz	.01	57	6	0.638	19.440
Mn	$L\alpha_{1,2}$	100	25	6	0.637	19.450
Fe	Ln	2	26	6	0.628	19.750
Sn	M_2-N_1	1	50	6	0.620	20.000
Pd	M_1-$N_{2,3}$	1	46	6	0.617	20.100
Fe	Ll	8	26	6	0.615	20.150
Sb	M_3-N_1	10	51	6	0.614	20.200
Cd	Mγ	100	48	6	0.606	20.470
Ba	Mz	1	56	6	0.601	20.640
Ag	M_2-N_4	50	47	6	0.600	20.660
V	$L\beta_{3,4}$	.1	23	6	0.585	21.190
Cr	$L\beta_1$	20	24	6	0.583	21.270
Te	M_4-$O_{2,3}$	10	52	6	0.581	21.340
Sn	M_3-N_1	10	50	6	0.577	21.500
Cr	$L\alpha_{1,2}$	100	24	6	0.573	21.640
Te	M_5-O_3	1	52	6	0.569	21.780
Ag	Mγ	100	47	6	0.568	21.820
Mn	Ln	1	25	6	0.567	21.850
Pd	M_2-N_4	50	46	6	0.561	22.100
Mn	Ll	2	25	6	0.556	22.290
Cd	M_2-N_1	1	48	6	0.541	22.900
Pd	Mγ	100	46	6	0.532	23.300
O	Kα	100	8	6	0.525	23.620
V	$L\beta_1$	10	23	6	0.519	23.880
V	$L\alpha_{1,2}$	100	23	6	0.511	24.250
Cr	Ln	1	24	6	0.510	24.300
Ag	M_5-N_1	1	47	6	0.508	24.400
Cd	M_3-N_1	10	48	6	0.506	24.500
Cr	Ll	1	24	6	0.500	24.780
Rh	Mγ	100	45	6	0.496	25.010
Sn	M_4-$O_{2,3}$	10	50	6	0.490	25.300
Ru	M_2-N_4	1	44	6	0.486	25.500
Sn	M_5-O_3	1	50	6	0.482	25.700
Ag	M_3-N_1	10	47	6	0.477	26.000
Pd	M_2-N_1	1	46	6	0.473	26.200
Te	Mz	1	52	6	0.464	26.720
Ru	Mγ	100	44	6	0.461	26.900
Ti	$L\beta_1$	10	22	6	0.458	27.050
V	Ln	1	23	6	0.453	27.340
Ti	$L\alpha_{1,2}$	100	22	6	0.452	27.420
V	Ll	1	23	6	0.446	27.770
Pd	M_3-N_1	10	46	6	0.444	27.900
Rh	M_2-N_1	1	45	6	0.441	28.100
Sb	Mz	1	51	6	0.429	28.880
Rh	M_3-N_1	10	45	6	0.416	29.800
Cd	M_4-$O_{2,3}$	10	48	6	0.408	30.400
Cd	M_5-O_3	1	48	6	0.402	30.800
Ti	Ln	1	22	6	0.401	30.890
Sc	$L\beta_1$	10	21	6	0.400	31.020

El	Line	I	Z	R	KeV	Lambda
Sn	Mz	1	50	6	0.397	31.240
Sc	$L\alpha_{1,2}$	100	21	6	0.395	31.350
Ti	Ll	1	22	6	0.395	31.360
N	Kα	100	7	6	0.392	31.600
U	N_4-N_6		92	6	0.390	31.800
Ru	M_2-N_1	1	44	6	0.384	32.300
Nb	M_2-N_4	50	41	6	0.375	33.100
Ag	$M_{4,5}O_{2,3}$	1	47	6	0.370	33.500
Th	N_4-N_6		90	6	0.369	33.570
U	N_5-$N_{6,7}$		92	6	0.356	34.800
Nb	Mγ	100	41	6	0.355	34.900
Sc	Ln	1	21	6	0.353	35.130
Mo	M_2-N_1	1	42	6	0.351	35.300
Sc	Ll	1	21	6	0.348	35.590
Ca	$L\beta_1$	10	20	6	0.345	35.940
Th	N_5-$N_{6,7}$		90	6	0.341	36.320
Ca	$L\alpha_{1,2}$	100	20	6	0.341	36.330
Cd	Mz	1	48	6	0.337	36.800
Pd	$M_{4,5}O_{2,3}$	10	46	6	0.331	37.400
Mo	M_3-N_1	100	42	6	0.331	37.500
Nb	M_2-N_1	1	41	6	0.323	38.400
Ag	Mz	1	47	6	0.312	39.770
Ca	Ln	1	20	6	0.306	40.460
Nb	M_3-N_1	10	41	6	0.305	40.700
Rh	$M_{4,5}O_{2,3}$	10	45	6	0.303	40.900
Ca	Ll	1	20	6	0.303	40.960
U	N_6-O_5		92	6	0.294	42.100
Pb	N_4-N_6		82	6	0.293	42.300
U	N_6-O_4		92	6	0.286	43.300
Pd	Mz	1	46	6	0.284	43.600
C	Kα	100	6	6	0.277	44.700
Ru	$M_{4,5}O_{2,3}$	1	44	6	0.277	44.800
Pb	N_5-$N_{6,7}$		82	6	0.275	45.000
Hg	N_4-N_6		80	6	0.274	45.200
Sb	M_2-M_4	1	51	6	0.274	45.200
Y	M_2-N_1		39	6	0.267	46.480
Tl	N_5-$N_{6,7}$		81	6	0.267	46.500
Au	N_4-N_6		79	6	0.265	46.800
K	Ln	100	19	6	0.262	47.240
Sn	M_2-M_4	1	50	6	0.262	47.300
Rh	Mz	1	45	6	0.260	47.670
K	Ll	100	19	6	0.260	47.740
Hg	N_5-$N_{6,7}$		80	6	0.259	47.900
Pt	N_4-N_6		78	6	0.258	48.100
Th	N_6-O_5		90	6	0.257	48.200
Y	M_3-N_1		39	6	0.256	48.500
Au	N_5-$N_{6,7}$		79	6	0.251	49.400
Th	N_6-O_4		90	6	0.250	49.500
Th	N_7-O_5		90	6	0.248	50.000
Th	N_7-O_5		90	6	0.248	50.000

WAVELENGTHS OF SELECTED

	IA	IIA	IIIB	IVB	VB	VIB	VIIB	VIII	
	H 1								
	Li 3	Be 4							
Kα	230.0	114.0							
	Na 11	Mg 12							
Kα	11.91	9.890							
$K\beta_1$	11.62	9.570							
	K 19	Ca 20	Sc 21	Ti 22	V 23	Cr 24	Mn 25	Fe 26	Co 27
Kα	3.742	3.359	3.032	2.750	2.505	2.291	2.103	1.937	1.790
$K\beta_1$	3.454	3.090	2.780	2.514	2.284	2.085	1.910	1.757	1.621
$L\alpha^1$		36.33	31.35	27.42	24.25	21.64	19.45	17.59	15.97
	Rb 37	Sr 38	Y 39	Zr 40	Nb 41	Mo 42	Tc 43	Ru 44	Rh 45
Kα	0.927	0.877	0.830	0.787	0.748	0.711	0.676	0.644	0.615
$K\beta_1$	0.829	0.783	0.741	0.702	0.666	0.632	0.601	0.572	0.546
$L\alpha_1$	7.318	6.863	6.449	6.070	5.724	5.406	5.115	4.846	4.597
	Ca 55	Ba 56	La*57	Hf 72	Ta 73	W 74	Re 75	Os 76	Ir 77
Kα	0.402	0.387	0.372	0.224	0.217	0.211	0.204	0.198	0.193
$L\alpha_1$	2.892	2.776	2.666	1.570	1.522	1.476	1.433	0.391	1.351
$M\alpha^1$			14.88	7.539	7.252	6.983	6.729	6.478	6.262
N#					58.20	55.80	54.70	52.80	50.20
	Fr 87	Ra 88	Ac+89						
Kα	0.146	0.142	0.138						
$L\alpha_1$	1.030	1.005	0.980						

	Ce 58	Pr 59	Nd 60	Pm 61	Sm 62
Kα	0.359	0.346	0.333	0.322	0.310
$L\alpha_1$	2.561	2.463	2.370	2.282	2.200
$M\alpha^1$	14.04	13.34	12.68		11.47
	Th 90	Pa 91	U 92	Np 93	Pu 94
Kα	0.134	0.131	0.128	0.125	0.122
$L\alpha_1$	0.956	0.933	0.911	0.889	0.868
$M\alpha^1$	4.138	4.022	3.910		
N#	9.442		8.810		

*La Series

+Ac Series

See table for line designation

X-RAY EMISSION LINES

			IIIA	IVA	VA	VIA	VIIA	0	
								He 2	
			B 5	C 6	N 7	O 8	F 9	Ne 10	
			67.6	44.7	31.60	23.62	18.32	14.61	Kα
			Al 13	Si 14	P 15	S 16	Cl 17	Ar 18	
			8.340	7.126	6.158	5.373	4.729	4.193	Kα
	IB	IIB	7.982	6.778	5.804	5.032	4.403	3.886	$K\beta_1$
i 28	Cu 29	Zn 30	Ga 31	Ge 32	As 33	Se 34	Br 35	Kr 36	
.659	1.542	1.436	1.341	1.255	1.177	1.106	1.041	0.981	Kα
.500	1.392	1.295	1.208	1.129	1.057	0.992	0.933	0.878	$K\beta_1$
4.56	13.34	12.25	11.29	10.44	9.671	8.990	8.375	7.817	$L\alpha$
d 46	Ag 47	Cd 48	In 49	Sn 50	Sb 51	Te 52	I 53	Xe 54	
.587	0.561	0.536	0.514	0.492	0.472	0.453	0.435	0.417	Kα
.520	0.497	0.475	0.454	0.435	0.417	0.400	0.384	0.368	$K\beta_1$
.368	4.154	3.956	3.772	3.600	3.439	3.289	3.149	3.015	$L\alpha_1$
t 78	Au 79	Hg 80	Tl 81	Pb 82	Bi 83	Po 84	At 85	Rn 86	
.187	0.182	0.177	0.172	0.167	0.162	0.158	0.154	0.150	Kα
.313	1.276	1.241	1.207	1.175	1.144	1.114	1.085	1.057	$L\alpha_1$
.047	5.840	5.648	5.460	5.286	5.118				Mα
8.10	46.80	45.20	46.50	42.30					N#

u 63	Gd 64	Tb 65	Dy 66	Ho 67	Er 68	Tm 69	Yb 70	Lu 71	
.300	0.290	0.280	0.271	0.262	0.254	0.246	0.238	0.231	Kα
.121	2.047	1.976	1.909	1.845	1.784	1.727	1.672	1.619	$L\alpha_1$
0.96	10.46	10.00	9.590	9.200	8.820	8.480	8.149	7.840	Mα
m 95	Cm 96	Bk 97	Cf 98	Es 99	Fm 100	Md 101	No 102		
.119	0.116	0.113	0.110						Kα
.848	0.829	0.810	0.792						$L\alpha_1$
									Mα
									N#