



International Atomic Energy Agency

INDC(CCP)-92/N

INDC

INTERNATIONAL NUCLEAR DATA COMMITTEE

INTERNAL CONVERSION COEFFICIENTS FOR ATOMIC NUMBERS $Z \leq 30$

I.M. Band, M.A. Listengarten and

M.B. Trzhaskovskaya

USSR ACADEMY OF SCIENCES

Leningrad Nuclear Physics Institute (LIFYaF)

Translated by the IAEA

June 1976

IAEA NUCLEAR DATA SECTION, KÄRNTNER RING 11, A-1010 VIENNA

Reproduced by the IAEA in Austria
June 1976
76-4428

INTERNAL CONVERSION COEFFICIENTS FOR ATOMIC NUMBERS $Z \leq 30$

I.M. Band, M.A. Listengarten and
M.B. Trzhaskovskaya

USSR ACADEMY OF SCIENCES
Leningrad Nuclear Physics Institute (LIYaF)

Translated by the IAEA

June 1976

ABSTRACT

The tables contain internal conversion coefficients (ICC) for 20 values of the atomic number Z over the range $3 \leq Z \leq 30$, including all $Z \geq 14$; 10 multipoles EI-E5 and MI-M5; 19 gamma energies ranging from 15 keV to 6 MeV for the K-shell, and 18 energy values between 15 keV and 2 MeV for 3 L sub-shells.

The calculations are relativistic and take into account the finite dimensions of the nucleus in the model for the surface transition currents, and a uniform charge distribution over the nucleus with radius $R_0 = 1.2 A^{1/3}$ fm. Use is made of the first non-vanishing order in the perturbation theory and the one-electron approximation for a free neutral atom with a spherically symmetric potential. Allowance is made for the absence of an electron in the final state. The binding energies are taken from experimental results. The calculations are made in a relativistic Hartree-Fock-Slater atomic field (HFS) with the coefficient $C = 1$ in the expression for the potential exchange term.

The paper presents tables of electron densities close to zero, making it possible to go on from the ICCs computed by us to those in any other spherically symmetric field for which the densities close to zero are known. Tables are given for a transition to ICCs in an HFS field with coefficient $C = 2/3$.

A comparison is made with former calculations, disregarding screening and non-relativistic computations. The difference amounts to 30%. For $Z = 30$ there is a comparison with the Hager and Seltzer tables. The difference is almost entirely governed by the difference in selection of the coefficient C in the potential exchange term.

Introduction

Despite the fact that experimental studies of internal gamma-ray conversion are being conducted for almost all radioactive nuclei, including many lighter than zinc, there are as yet no tables of exact internal conversion coefficients (ICC) for the atomic numbers $Z < 30$. The widely used ICC tables of Sliv and Band [1], Rose [2], and Hager and Seltzer [3] do not contain these coefficients for $Z < 30$ or $Z < 25$ [2]. For light elements there have only been approximate non-relativistic calculations [4, 5], or simple and extremely relativistic equations [6], and relativistic calculations [7, 8] for $Z = 10, 15$ and 20 , disregarding screening, and only for nuclear transition energies $E_\gamma \geq 150$ keV. Furthermore, in Ref. [9], for data taken from Refs [2, 4-8] there is interpolation and extrapolation for each Z over the range $6 \leq Z \leq 24$, with the introduction of approximate corrections for screening (using Eq. (6); see below). The error in theoretical ICCs due to all the approximations introduced into the calculations contained in Refs [4-9] remains uncertain.

Generally speaking, since we are in possession of computer programs [10-12] for calculating exact ICCs, they can be obtained for any Z or multipolarity, and for experimental values of the transition energy. But for rapid analysis of the data, for planning experiments and for reference purposes it is more convenient to have internal conversion coefficients in the form of tables.

The ICC tables that follow have been calculated by the program described in Ref. [10]. They cover, basically, almost all multiplicities and energies encountered in practice at these values of Z , taking into account the fact that for $Z \geq 16$ and energies greater than 1 MeV there are tables available [13] for the K-shell.

Calculation method

The bases of the ICC theory and relativistic expressions for ICC in the i -th atomic shell $\alpha_i^{(\tau L)}$ are given, for example, in Refs [2, 14-16]

$$\alpha_i^{(\tau L)} = \sum_{\chi} |M_{i,\chi}^{(\tau L)}|^2, \quad (1)$$

where νL is the multipolarity of the nuclear transition (EL - electric; ML - magnetic), $M_{i,\kappa}^{(\nu L)}$ are the conversion matricial elements, and κ is a relativistic quantum number describing the quantum state of the free electron emitted from the atom during conversion. The quantity $M_{i,\kappa}^{(\nu L)}$ includes the sum of the radial integrals $R_1 - R_6$ in the form

$$R \sim \int_0^\infty F_\kappa F_i X_\nu r^2 dr, \quad (2)$$

F_κ is one of the relativistic radial electron wave functions $f(r)$ or $g(r)$ for the final (free) state of the electron, F_i is one of the functions of the initial (bound) state, X_ν is the radial part of the transition potential (see below), and $\nu = L$ or $\nu = L - 1$.

The functions $f(r)$ and $g(r)$ were found by numerical integration of a set of two radial differential Dirac equations for the spherically symmetric potential $V(r)$. As $V(r)$ use was made of the atom field potential self-consistent under the Hartree-Fock-Slater (HFS) method. Exchange in the HFS field is accounted for by means of the local exchange potential [17].

$$V_{\text{ex}} = -c\alpha \frac{3}{2} \left[\frac{3}{4\pi} \rho(r) \right]^{1/3}, \quad (3)$$

where $\rho(r)$ is the total spherically averaged electron density

$$\rho(r) = \frac{1}{4\pi} \sum [f_i^2(r) + g_i^2(r)]$$

at $\int_0^\infty \int_0^\pi \int_0^{2\pi} \rho(r) r^2 dr \sin\theta d\varphi d\theta = Z - J$. (4)

Summing is carried out over all the occupied electron states of the atom, and the coefficient C in Eq. (3) was assumed equal to unity. J is the degree of ionization of the atom, and $\alpha = e^2/\hbar c$. Self-consistency is included in the ICC calculation program [10].

The wave functions for the bound electrons were calculated in a neutral atomic field, while those for the free electrons were calculated in a self-consistent ion field with a hole in the shell or sub-shell from which the conversion occurred. We should point out that this method of calculating wave functions for a conversion electron is important when computing ICCs

for conversion from internal atomic shells at low energies [18]. For high values of r , when calculating all electron functions, both for the initial and final states, the potential $V(r)$ was assumed equal to $-\alpha/r$. The finite dimensions of the nucleus were calculated with a spherical nucleus model with radius $R_0 = 1.2 A^{1/3}$ fm (A is the mass number). The static effect of the finite dimensions is taken into account by calculating the electron wave functions in the field for uniform electric charge distribution over the nucleus. The dynamic (or penetration) effect is taken into account on the basis of Sliv's model for surface transition currents, i.e. the radial part of the transition potential $X_\nu = h_\nu(kr)$ is replaced by $j_\nu(kr)h_\nu(kR_0)/j_\nu(kR_0)$ at $r < R_0$, where $j_\nu(kr)$ and $h_\nu(kr)$ are spherical Bessel and Hankel functions, respectively, and $k = E_\gamma/mc^2$ is the gamma transition energy in relativistic units.

The total free electron energy during conversion from the i -th shell

$$E_i = k - \varepsilon_i + 1, \quad (5)$$

was calculated by means of the experimental values [19] of the electron binding energy ε_i on the atomic shells, with the exception of the L_{II} and L_{III} shells at $Z \leq 10$, when the computed eigenvalues of the energy were used.

For $Z \geq 10$ the tables contain the ICCs for filled K -, L_I -, L_{II} -, and L_{III} -shells. For $Z = 3$ the ICCs on the L_I -shell are given with allowance for the fact that lithium has only one $2s_{\frac{1}{2}}$ electron, i.e. α_{L_I} calculated from the normal equations are divided by 2. For $Z = 6$ we give α_k and α_{L_I} .

As is known (see, for example, Refs [14-16]), the theoretical equations for the ICCs are derived on the assumption of the following conditions: a first non-vanishing order in the perturbation theory, a one-electron approximation, and a free neutral atom with a spherically symmetric potential. Possible deviations from these conditions were not taken into account.

The numerical methods used by us to compute the ICCs and all aspects of the programs are described in detail in "The relativistic atom; interaction between electromagnetic radiation and nuclei and atomic electrons" [10].

The relative error in computing the internal conversion coefficients is less than 0.1%. Hence in the Tables, which are given here to three significant figures, the error is equal to half the last digit. The given accuracy (0.1%) does not include possible deviations due to the above-enumerated approximations of a physical rather than theoretical nature. In all there are about 15 000 ICCs in the Tables.

Comparison with previous calculations

A comparison with Ref. [9] shows that for $Z < 20$, the approximate ICCs [9] in the K- and L_I -shells accord quite well (with an accuracy of 5-6%, disregarding fluctuations due to rounding off in Ref. [9]) with the more exact calculations; the ICCs taken from Ref. [9] for the L_{II} - and L_{III} -shells are up to 30% too low.

When comparing them with Ref. [13], in which the ICCs are given for higher energies and $Z \geq 16$, we can see that for the K-shell they tally with the given calculations to within 1.5%. For the L-shell Ref. [13] does not contain any ICCs for $Z \leq 30$.

A comparison with Coulomb relativistic calculations [7, 8] for $Z = 10, 15$ and 20 shows that the difference is virtually the same for all energies $E_\gamma > 150$ keV and multiplicities. For example, all the ICCs [7, 8] for $Z = 10$ are $6.5 \pm 0.8\%$ higher than those calculated by us. There can be no doubt that this is the result of disregarding screening in Refs [7, 8].

Comparison with non-relativistic calculations which disregard screening for the K-shell [4] shows that in the case of relatively low energies (15-25 keV) the ICCs [4] differ from those calculated here by up to 10% at $Z = 10$ (greatest difference in E1) and up to 25% at $Z = 20$ (greatest difference in E5). Apart from disregard for screening in Ref. [4], the difference, even at these Z and energies, may be associated with relativistic effects. For example, the ratio $\alpha_{L_{III}} / \alpha_{L_{II}}$, according to exact calculations, is not equal to 2, as would be required by the non-relativistic ICC theory.

For one of the Z values given in the tables ($Z = 30$) one can make a comparison with the internal conversion coefficients of Hager and Seltzer [3]. For this Z our ICCs are 0.5% higher than those given in Ref. [3] for the K-shell. Any deviation from this 0.5% difference can, in the case of the K-shell, be attributed to rounding off the numbers to three figures in all the tables. For the L_I -shell our ICCs are 1.9% higher than α_{L_I} [3], with the exception of the transitions of the lowest electric multipolarity energies, for which α_{L_I} vanishes in the non-relativistic approximation. In this region the extremely small absolute difference in radial integrals ($\leq 1\%$) or slight shift in binding energy (≤ 5 eV) may produce a relative error of up to 3%. In the L_{II} - and L_{III} -shells the difference in the ICCs is equal to 3.2-4.1% (the ICCs in Ref. [3] are smaller than those calculated here). The reason for the difference from Ref. [3] was carefully investigated. It turned out that the chief factor was variation in the constant C in the expression given above - Eq. (3) - for the exchange number of the HFS potential. In Ref. [3] $C = 2/3$, while for us $C = 1$. Special calculations made by us for this particular case with $C = 2/3$ showed that the ICCs, when calculated in this field, coincide very well (with accuracy better than 0.5%) with those in Ref. [3]. We should point out the following fact in this connection: as is known, when a self-consistent atomic field varies, variation in the ICC in the i -th atomic shell can be fairly accurately calculated [6, 9, 18, 20, 21] by the following equation

$$\alpha_i^{(1)} = \alpha_i^{(2)} \cdot \lim_{r \rightarrow 0} \left[\rho_i^{(1)}(r) / \rho_i^{(2)}(r) \right], \quad (6)$$

where $\alpha_i^{(1)}$ and $\alpha_i^{(2)}$ are the ICCs of the given multipolarity, as calculated in two spherically symmetric atomic fields, and $\rho_i^{(1)}(r)$ and $\rho_i^{(2)}(r)$ are the densities for the corresponding (i -th) electron in these fields. Table 1 gives the deviations between the ICCs taken from Ref. [3] and our own data for the L_{II} -shell, $Z = 30$, and, for purposes of comparison, the electron density ratios $2p_{\frac{1}{2}}$ in relativistic self-consistent HFS atomic fields with coefficients $C = 2/3$ and $C = 1$ in Eq. (3). The table shows that the figures taken from Ref. [3] and adjusted in accordance with Eq. (6) coincide with an accuracy of up to 0.5% with those calculated in the present work.

The slight deviations are due to the fact that we rounded off the data to three figures in all the tables, and are also caused by the inaccuracy of Eq. (6).

Table 1

Difference between the Hager and Seltzer [3] internal conversion coefficients (ICC) and those computed by us for $Z = 30$, and a comparison of this difference with that of the corresponding electron densities $\rho(r)$ close to zero for two values of the constant C in the HFS potential exchange term (see Eq. (3)); $\alpha_{(B,L+T)}$ and $\alpha_{(H+S)}$ denote our own ICCs and those taken from Ref. [3], respectively.

| $(\alpha_{(B,L+T)} / \alpha_{(H+S)} - 1) \cdot 100\%$ | | | | | | | | | |
|---|-----|-----|-----|-----|----------------|-----|-----|-----|---|
| $Z = 30;$ | | | | | L_{II} shell | | | | |
| $E_\gamma, \text{ keV}$ | E1 | E2 | E3 | E4 | M1 | M2 | M3 | M4 | : |
| 15 | 3,2 | 3,6 | 3,2 | 3,2 | 3,8 | 3,7 | 3,2 | 2,8 | : |
| 150 | 3,5 | 3,8 | 3,7 | 4,1 | 3,9 | 3,8 | 3,3 | 3,5 | : |
| 300 | 3,6 | 3,9 | 3,9 | 3,9 | 3,6 | 3,7 | 3,8 | 3,7 | : |
| 1000 | 3,8 | 3,9 | 3,4 | 3,9 | 3,7 | 3,8 | 3,5 | 3,8 | : |

$$\left\{ \lim_{r \rightarrow 0} \left[\frac{\rho_{2p_{1/2}}^{(c=1)}(r)}{\rho_{2p_{1/2}}^{(c=2/3)}(r)} - 1 \right] \right\} 100\% = 3,74$$

Internal conversion coefficients in various self-consistent atomic fields and electron densities for K- and L-shells close to zero

Although the eigenvalues of the energies found with coefficient $C = 1$ in Eq. (3) are closer to the experimental binding energies than those with $C = 2/3$ [19, 22, 23], it is normally considered that the wave functions calculated with $C = 2/3$ are better, since they are somewhat closer to the Hartree-Fock (HF) functions. A number of investigators [23] consider that the optimum value of C is somewhere between $2/3$ and 1. It should be borne in mind that the HF electron wave functions with which we are comparing the HFS wave functions with $C = 1$ and $C = 2/3$ are themselves approximate. They do not take into account the inadequacy of the one-electron approximation or deviation of the field from spherical symmetry, which in the case of atoms with small Z and unfilled valence shells may be considerable.

So as not to have to recalculate the ICC tables whenever the atomic field is refined, we show below Table 2, which contains values proportional to $Q(r)$ close to zero, with which the coefficients can be found, on the basis of Eq. (6), for the particular field considered optimum on a given day, or for any other self-consistent field. In particular, Table 3 enables us to calculate the ICCs in an HFS field with $C = 2/3$ quite easily.

Table 2

The values N_i (see Eq. (7)), proportional to the electron densities close to zero in a relativistic HFS atomic field with $C = 1$ (Eq. (3)) for K-, L_I -, L_{II} - and L_{III} -shells and $Z \leq 30$. The brackets show the order of magnitude by which the digit standing alongside has to be multiplied (N_i is given in atomic units).

| Z | S H E L L | | | |
|----|-----------|-----------|------------|-----------|
| | K | L_I | L_{II} | L_{III} |
| 3 | 9,275 (1) | 2,719 (0) | | |
| 6 | 8,018 (2) | 4,277 (1) | | |
| 10 | 3,909 (3) | 2,295 (2) | 1,194 (-1) | 9.685 (2) |
| 14 | 1,125 (4) | 8,213 (2) | 1,074 (0) | 8,530 (3) |
| 15 | 1,402 (4) | 1,061 (2) | 1,646 (0) | 1,299 (4) |
| 16 | 1,724 (4) | 1,348 (3) | 2,443 (0) | 1,915 (4) |
| 17 | 2,094 (4) | 1,685 (3) | 3,530 (0) | 2,747 (4) |
| 18 | 2,519 (4) | 2,078 (3) | 4,982 (0) | 3,849 (4) |
| 19 | 3,006 (4) | 2,538 (3) | 6,903 (0) | 5,290 (4) |
| 20 | 3,558 (4) | 3,068 (3) | 9,402 (0) | 7,146 (4) |
| 21 | 4,179 (4) | 3,675 (3) | 1,262 (1) | 9,509 (4) |
| 22 | 4,879 (4) | 4,369 (3) | 1,670 (1) | 1,248 (5) |
| 23 | 5,662 (4) | 5,155 (3) | 2,183 (1) | 1,616 (5) |
| 24 | 6,540 (4) | 6,047 (3) | 2,824 (1) | 2,070 (5) |
| 25 | 7,515 (4) | 7,046 (3) | 3,610 (1) | 2,620 (5) |
| 26 | 8,601 (4) | 8,173 (3) | 4,578 (1) | 3,289 (5) |
| 27 | 9,800 (4) | 9,429 (3) | 5,754 (1) | 4,090 (5) |
| 28 | 1,114 (5) | 1,084 (4) | 7,182 (1) | 5,048 (5) |
| 29 | 1,259 (5) | 1,240 (4) | 8,894 (1) | 6,183 (5) |
| 30 | 1,421 (5) | 1,414 (4) | 1,094 (2) | 7,519 (5) |

Table 3

The ratio $N_i^{(C = 2/3)} / N_i^{(C = 1)}$ (for N_i see Eq. (7)). To obtain the ICCs in a relativistic HFS field with the coefficient $C = 2/3$ in the potential exchange term (see Eq. (3)), we multiply the ICCs derived from the tables in the present paper by the figures in this table for the relevant Z and shell.

| Z | S H E L L | | | |
|----|-----------|----------------|-----------------|------------------|
| | K | L _I | L _{II} | L _{III} |
| 3 | 0,898 | 0,969 | | |
| 6 | 0,953 | 0,896 | | |
| 10 | 0,973 | 0,946 | 0,847 | 0,847 |
| 14 | 0,981 | 0,953 | 0,909 | 0,909 |
| 15 | 0,982 | 0,956 | 0,916 | 0,916 |
| 16 | 0,983 | 0,959 | 0,923 | 0,923 |
| 17 | 0,985 | 0,962 | 0,928 | 0,928 |
| 18 | 0,986 | 0,964 | 0,933 | 0,933 |
| 19 | 0,986 | 0,965 | 0,936 | 0,936 |
| 20 | 0,987 | 0,967 | 0,940 | 0,940 |
| 21 | 0,988 | 0,969 | 0,943 | 0,943 |
| 22 | 0,988 | 0,971 | 0,946 | 0,946 |
| 23 | 0,989 | 0,976 | 0,949 | 0,949 |
| 24 | 0,989 | 0,976 | 0,954 | 0,954 |
| 25 | 0,989 | 0,975 | 0,954 | 0,954 |
| 26 | 0,990 | 0,976 | 0,956 | 0,956 |
| 27 | 0,990 | 0,978 | 0,958 | 0,958 |
| 28 | 0,990 | 0,979 | 0,959 | 0,959 |
| 29 | 0,991 | 0,980 | 0,961 | 0,961 |
| 30 | 0,991 | 0,981 | 0,963 | 0,963 |

Having calculated the electron densities close to zero in the relativistic HF field, we can then compile, with the aid of Table 2, a table similar to Table 3, and calculate the ICCs in the HF field.

The N_i values given in Table 2 are linked in the following manner with the electron density close to zero.

$$N_i = \lim_{r \rightarrow 0} 4\pi \cdot r^{1-2j} \rho(r), \quad (7)$$

Eq. (7) reflects the fact that for any charge distribution over the nucleus of finite dimensions

$$\rho(r) \sim N_i r^{2j-1}, \quad (8)$$

where N_i is a constant.

In Table 2, N_i is given in atomic units. To transform it into relativistic units we should multiply it by α^{2j+2} , where $\alpha = e^2/\hbar c \approx (137.04)^{-1}$.

Table 3 contains values equal to the ratios of N_i at $C = 2/3$ to N_i at $C = 1$ in a relativistic HFS field. To obtain ICCs with $C = 2/3$ we have to multiply the figures from our tables by the figures in Table 3 for the relevant Z and shells. Table 3 also illustrates the way in which the coefficient varies when going from an HFS field with $C = 1$ to a field with $C = 2/3$.

Eq. (6) is approximately valid even for the valence shells of heavier elements [18, 21]. For the energy and Z region given in our tables the error in Eq. (6) in the case of self-consistent fields is $\lesssim 1\%$.

The authors are indebted to L.A. Sliv and I.A. Kondurov for their interest in the work and for their useful observations.

REFERENCES

- [1] SLIV, L.A., BAND, I.M., "Tables of gamma ray internal conversion coefficients" (in Russian), USSR Acad. Sci. Press, part I, The K-shell (1956); II, The L-shell (1958); "Gamma rays", (in Russian), USSR Acad. Sci. Press, Moscow-Leningrad (1961); "Alpha, beta and gamma spectroscopy" (in Russian), Atomizdat, Moscow (1969).
- [2] M.E.Rose. Internal Conversion Coefficients, North-Holland, Amsterdam, 1958.
- [3] R.S.Hager, E.C.Seltzer, Nucl.Data, A4, 1, 1968.
- [4] M.Hebb, E.Nelson, Phys.Rev., 58, 486, 1940.
- [5] BERESTETSKIJ, V.B., Zh. ehks. teor. fiz. 18 (1948) 1057.
- [6] S.Dankoff, P.Morrison, Phys.Rev., 55, 122, 1939.
- [7] M.E.Rose, C.H.Goertzel, C.L.Perry. ORNL-1023, Oak Ridge, USA, 1951.
- [8] ROSE, M.E., "Beta and gamma spectroscopy", Fizmatgiz, Moscow (1959).
- [9] DRANITSINA, G.F., LISTENGARTEN, M.A., "Gamma rays" (in Russian), USSR Acad. Sci. Press, Moscow-Leningrad (1961).
- [10] BAND, I.M., LISTENGARTEN, M.A., TRZHASKOVSKAYA, M.B., Izv. Akad. Nauk. Ser. Fiz. 35 (1971) 1750; Byulleten' tsentra dannykh LIYaF, 2 Leningrad (1975) 24.
- [11] H.C.Pauli, Computer Program for Internal Conversion Coefficients. N.Bohr Institute Report, Copenhagen, Denmark, 1968; H.C.Pauli, U.Raff, Computer Physics Communications, 9, 392, 1975.
- [12] J.Adam, O.Dragoun, M.Honusek. Soubor programu pro zprucovan dat v jaderne spectroscopii. CAV, Rez u Prahy, 1973.
- [13] V.F.Trusov. Nucl.Data Tables, A10, 477, 1973.
- [14] LISTENGARTEN, M.A., "Gamma rays", USSR Acad. Sci. Press, Moscow-Leningrad (1961).
- [15] AKHIEZER, A.I., BERESTETSKIJ, V.B., Quantum aerodynamics (in Russian), Nauka Press, Moscow (1969).
- [16] ROSE, M.E., Multipole fields, For. Lit. Press (1957).

- [17] J.C.Slater. Phys.Rev., 81, 385, 1951.
- [18] I.M.Band, L.A.Sliv, M.B.Trzhaskovskaja. Nucl.Phys., A156, 170, 1970.
- [19] J.A.Bearden, A.F.Burr, Rev.Mod.Phys., 39, 125, 1967.
- [20] R.Leamer, G.Hinman, Phys.Rev., 96, 1607, 1954; G.Hinman, Phys.Rev., 104, 1332, 1956; O.Dragoun et al., Phys.Letters, 28B, 251, 1968.
- [21] LISTENGARTEN, M.A., BAND, I.M., Izv. Akad. Nauk Ser. Fiz. 38 (1974) 158.
- [22] BAND, I.M., TRZHASKOVSKAYA, M.B., Table of eigenvalues of electron energies, densities close to zero, and mean values in self-consistent fields of atoms and ions, LIYaF preprints 90, 91 and 92 Leningrad (1974).
- [23] J.Slater et al., Phys.Rev., 179, 28, 1969; 184, 672, 1969; I.Lindgren, A.Rosen, Phys.Rev., 174, 114, 1969.

Internal Conversion Coefficient (ICC) Tables

Explanation of tables

The tables contain internal conversion coefficients (ICC) for 20 atomic numbers Z over the range $3 \leq Z \leq 30$, including all $Z \geq 14$, 10 multipoles E1-E5 and M1-M5, 19 gamma-ray energies ranging from 15 keV to 6 MeV for the K-shell, and 18 energies ranging from 15 keV to 2 MeV for three L-sub-shells.

Designations used in the tables

| | |
|--------------------------|---|
| Z | atomic number |
| K1 shell, L1 shell, etc. | ICCs for the K-shell, the L_I -shell and so forth |
| E1, E2 | electric dipolar, quadrupolar, etc., transitions |
| M1, M2 | magnetic dipolar, quadrupolar, etc., transitions |
| EG | energy of the gamma transition E_γ (keV) |
| EB | electron binding energy for the given shell (keV) |

Example

In the ICC tables for $Z = 3$, K-shell, the first two lines from the top begin as follows:

| | | |
|----|----------|----------------|
| EG | E1 | E2 |
| 15 | 6.55E-02 | 5.65E+00 |

This means that for a nuclear transition with energy 15 keV the internal conversion coefficient for the multipolarity E1 is 6.55×10^{-2} , for the multipolarity E2 it is 5.65, and so on.

Z = 3 K1 SHELL ER = 5.50001-02 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 6.55E-02 | 3.65E 00 | 4.10E 02 | 2.83E 04 | 1.92E 06 | 2.85E-03 | 1.87E-01 | 1.25E 01 | 8.37E 02 | 5.64E 04 |
| 17 | 4.30E-02 | 3.29E 00 | 2.12E 02 | 1.30E 04 | 7.82E 05 | 2.07E-03 | 1.21E-01 | 7.12E 00 | 4.23E 02 | 2.52E 04 |
| 20 | 2.48E-02 | 1.63E 00 | 8.99E 01 | 4.72E 03 | 2.43E 05 | 1.37E-03 | 6.84E-02 | 3.45E 00 | 1.75E 02 | 8.91E 03 |
| 25 | 1.17E-02 | 6.20E-01 | 2.77E 01 | 1.17E 03 | 4.89E 04 | 7.82E-04 | 3.15E-02 | 1.28E 00 | 5.23E 01 | 2.14E 03 |
| 32 | 5.06E-03 | 2.12E-01 | 7.50E 00 | 2.52E 02 | 8.29E 03 | 4.22E-04 | 1.34E-02 | 4.30E-01 | 1.38E 01 | 4.48E 02 |
| 40 | 2.37E-03 | 8.07E-02 | 2.31E 00 | 6.28E 01 | 1.67E 03 | 2.42E-04 | 6.22E-03 | 1.61E-01 | 4.20E 00 | 1.10E 02 |
| 50 | 1.11E-03 | 3.07E-02 | 7.12E-01 | 1.57E 01 | 3.39E 02 | 1.39E-04 | 2.91E-03 | 6.10E-02 | 1.28E 00 | 2.71E 01 |
| 65 | 4.56E-04 | 9.86E-03 | 1.79E-01 | 3.10E 00 | 5.24E 01 | 7.33E-05 | 1.20E-03 | 1.96E-02 | 3.23E-01 | 5.34E 00 |
| 80 | 2.26E-04 | 4.03E-03 | 6.05E-02 | 8.64E-01 | 1.21E 01 | 4.43E-05 | 5.98E-04 | 8.10E-03 | 1.10E-01 | 1.50E 00 |
| 100 | 1.06E-04 | 1.55E-03 | 1.90E-02 | 2.21E-01 | 2.52E 00 | 2.59E-05 | 2.86E-04 | 3.16E-03 | 3.50E-02 | 3.88E-01 |
| 120 | 5.77E-05 | 7.12E-04 | 7.42E-03 | 7.35E-02 | 7.12E-01 | 1.68E-05 | 1.58E-04 | 1.48E-03 | 1.39E-02 | 1.31E-01 |
| 150 | 2.74E-05 | 2.78E-04 | 2.38E-03 | 1.94E-02 | 1.55E-01 | 9.95E-06 | 7.69E-05 | 5.94E-04 | 4.59E-03 | 3.56E-02 |
| 200 | 1.07E-05 | 8.41E-05 | 5.65E-04 | 3.61E-03 | 2.25E-02 | 5.13E-06 | 3.11E-05 | 1.89E-04 | 1.14E-03 | 6.93E-03 |
| 300 | 2.97E-06 | 1.66E-05 | 8.01E-05 | 3.69E-04 | 1.66E-03 | 2.08E-06 | 9.15E-06 | 4.01E-05 | 1.76E-04 | 7.69E-04 |
| 450 | 9.07E-07 | 3.65E-06 | 1.30E-05 | 4.42E-05 | 1.48E-04 | 8.79E-07 | 2.89E-06 | 9.42E-06 | 3.07E-05 | 1.00E-04 |
| 650 | 3.50E-07 | 1.06E-06 | 2.93E-06 | 7.80E-06 | 2.05E-05 | 4.21E-07 | 1.09E-06 | 2.81E-06 | 7.22E-06 | 1.85E-05 |
| 1000 | 1.38E-07 | 3.11E-07 | 6.61E-07 | 1.37E-06 | 2.81E-06 | 1.89E-07 | 3.86E-07 | 7.84E-07 | 1.59E-06 | 3.21E-06 |
| 2000 | 4.41E-08 | 6.99E-08 | 1.08E-07 | 1.66E-07 | 2.53E-07 | 6.01E-08 | 9.20E-08 | 1.40E-07 | 2.13E-07 | 3.22E-07 |
| 6000 | 1.15E-08 | 1.36E-08 | 1.61E-08 | 1.90E-08 | 2.24E-08 | 1.34E-08 | 1.58E-08 | 1.86E-08 | 2.19E-08 | 2.58E-08 |

Z = 3 L1 SHELL ER = 5.4957E-03 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 9.58E-04 | 8.23E-02 | 5.95E 00 | 4.09E 02 | 2.76E 04 | 4.17E-05 | 2.74E-03 | 1.82E-01 | 1.22E 01 | 8.24E 02 |
| 17 | 6.29E-04 | 4.80E-02 | 3.08E 00 | 1.88E 02 | 1.13E 04 | 3.03E-05 | 1.77E-03 | 1.04E-01 | 6.19E 00 | 3.69E 02 |
| 20 | 3.64E-04 | 2.38E-02 | 1.31E 00 | 6.85E 01 | 3.51E 03 | 2.01E-05 | 1.00E-03 | 5.05E-02 | 2.56E 00 | 1.30E 02 |
| 25 | 1.71E-04 | 9.05E-03 | 4.03E-01 | 1.71E 01 | 7.08E 02 | 1.15E-05 | 4.61E-04 | 1.87E-02 | 7.65E-01 | 3.14E 01 |
| 32 | 7.41E-05 | 3.10E-03 | 1.09E-01 | 3.67E 00 | 1.20E 02 | 6.18E-06 | 1.96E-04 | 6.29E-03 | 2.03E-01 | 6.55E 00 |
| 40 | 3.48E-05 | 1.18E-03 | 3.37E-02 | 9.16E-01 | 2.43E 01 | 3.55E-06 | 9.12E-05 | 2.36E-03 | 6.15E-02 | 1.60E 00 |
| 50 | 1.63E-05 | 4.49E-04 | 1.04E-02 | 2.29E-01 | 4.94E 00 | 2.04E-06 | 4.26E-05 | 8.93E-04 | 1.88E-02 | 3.97E-01 |
| 65 | 6.69E-06 | 1.44E-04 | 2.62E-03 | 4.53E-02 | 7.64E-01 | 1.07E-06 | 1.75E-05 | 2.88E-04 | 4.74E-03 | 7.81E-02 |
| 80 | 3.31E-06 | 5.90E-05 | 8.86E-04 | 1.26E-02 | 1.76E-01 | 6.49E-07 | 8.76E-06 | 1.19E-04 | 1.61E-03 | 2.19E-02 |
| 100 | 1.56E-06 | 2.27E-05 | 2.78E-04 | 3.24E-03 | 3.69E-02 | 3.80E-07 | 4.19E-06 | 4.63E-05 | 5.13E-04 | 5.69E-03 |
| 120 | 8.45E-07 | 1.04E-05 | 1.09E-04 | 1.08E-03 | 1.04E-02 | 2.46E-07 | 2.31E-06 | 2.17E-05 | 2.04E-04 | 1.92E-03 |
| 150 | 4.02E-07 | 4.07E-06 | 3.49E-05 | 2.84E-04 | 2.26E-03 | 1.46E-07 | 1.13E-06 | 8.71E-06 | 6.73E-05 | 5.21E-04 |
| 200 | 1.57E-07 | 1.23E-06 | 8.28E-06 | 5.28E-05 | 3.30E-04 | 7.52E-08 | 4.56E-07 | 2.76E-06 | 1.67E-05 | 1.02E-04 |
| 300 | 4.35E-08 | 2.43E-07 | 1.17E-06 | 5.40E-06 | 2.44E-05 | 3.05E-08 | 1.34E-07 | 5.88E-07 | 2.57E-06 | 1.13E-05 |
| 450 | 1.33E-08 | 5.35E-08 | 1.90E-07 | 6.47E-07 | 2.17E-06 | 1.29E-08 | 4.23E-08 | 1.38E-07 | 4.50E-07 | 1.47E-06 |
| 650 | 5.13E-09 | 1.56E-08 | 4.29E-08 | 1.14E-07 | 3.00E-07 | 6.17E-09 | 1.60E-08 | 4.12E-08 | 1.06E-07 | 2.72E-07 |
| 1000 | 2.02E-09 | 4.57E-09 | 9.69E-09 | 2.01E-08 | 4.13E-08 | 2.77E-09 | 5.66E-09 | 1.15E-08 | 2.33E-08 | 4.71E-08 |
| 2000 | 6.46E-10 | 1.02E-09 | 1.59E-09 | 2.43E-09 | 3.70E-09 | 8.81E-10 | 1.35E-09 | 2.05E-09 | 3.12E-09 | 4.73E-09 |

Z = 6 K1 SHELL EB = 2.8400E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 4.38E-01 | 3.51E 01 | 2.36E 03 | 1.52E 05 | 9.63E 06 | 2.81E-02 | 1.80E 00 | 1.16E 02 | 7.57E 03 | 4.96E 05 |
| 17 | 2.91E-01 | 2.08E 01 | 1.25E 03 | 7.17E 04 | 4.04E 06 | 2.02E-02 | 1.15E 00 | 6.58E 01 | 3.80E 03 | 2.21E 05 |
| 20 | 1.71E-01 | 1.05E 01 | 5.45E 02 | 2.69E 04 | 1.31E 06 | 1.32E-02 | 6.43E-01 | 3.15E 01 | 1.56E 03 | 7.76E 04 |
| 25 | 8.19E-02 | 4.12E 00 | 1.74E 02 | 6.97E 03 | 2.76E 05 | 7.42E-03 | 2.91E-01 | 1.15E 01 | 4.62E 02 | 1.86E 04 |
| 32 | 3.62E-02 | 1.45E 00 | 4.87E 01 | 1.56E 03 | 4.90E 04 | 3.94E-03 | 1.22E-01 | 3.83E 00 | 1.21E 02 | 3.85E 03 |
| 40 | 1.73E-02 | 5.63E-01 | 1.54E 01 | 4.01E 02 | 1.03E 04 | 2.23E-03 | 5.62E-02 | 1.43E 00 | 3.65E 01 | 9.38E 02 |
| 50 | 8.21E-03 | 2.18E-01 | 4.87E 00 | 1.03E 02 | 2.15E 03 | 1.27E-03 | 2.60E-02 | 5.36E-01 | 1.11E 01 | 2.31E 02 |
| 65 | 3.42E-03 | 7.16E-02 | 1.26E 00 | 2.10E 01 | 3.44E 02 | 6.63E-04 | 1.06E-02 | 1.72E-01 | 2.79E 00 | 4.54E 01 |
| 80 | 1.71E-03 | 2.97E-02 | 4.33E-01 | 5.99E 00 | 8.13E 01 | 3.97E-04 | 5.28E-03 | 7.04E-02 | 9.45E-01 | 1.27E 01 |
| 100 | 8.16E-04 | 1.16E-02 | 1.38E-01 | 1.57E 00 | 1.74E 01 | 2.31E-04 | 2.51E-03 | 2.74E-02 | 3.00E-01 | 3.30E 00 |
| 120 | 4.46E-04 | 5.38E-03 | 5.48E-02 | 5.29E-01 | 5.01E 00 | 1.49E-04 | 1.38E-03 | 1.28E-02 | 1.19E-01 | 1.11E 00 |
| 150 | 2.14E-04 | 2.12E-03 | 1.78E-02 | 1.42E-01 | 1.11E 00 | 8.76E-05 | 6.71E-04 | 5.13E-03 | 3.94E-02 | 3.02E-01 |
| 200 | 8.43E-05 | 6.53E-04 | 4.30E-03 | 2.70E-02 | 1.65E-01 | 4.49E-05 | 2.71E-04 | 1.63E-03 | 9.78E-03 | 5.89E-02 |
| 300 | 2.37E-05 | 1.31E-04 | 6.23E-04 | 2.83E-03 | 1.26E-02 | 1.80E-05 | 7.92E-05 | 3.45E-04 | 1.50E-03 | 6.56E-03 |
| 450 | 7.33E-06 | 2.92E-05 | 1.03E-04 | 3.46E-04 | 1.15E-03 | 7.56E-06 | 2.49E-05 | 8.11E-05 | 2.64E-04 | 8.55E-04 |
| 650 | 2.85E-06 | 8.61E-06 | 2.36E-05 | 6.23E-05 | 1.62E-04 | 3.59E-06 | 9.39E-06 | 2.42E-05 | 6.20E-05 | 1.59E-04 |
| 1000 | 1.12E-06 | 2.55E-06 | 5.40E-06 | 1.12E-05 | 2.28E-05 | 1.60E-06 | 3.30E-06 | 6.73E-06 | 1.36E-05 | 2.75E-05 |
| 2000 | 3.58E-07 | 5.75E-07 | 8.94E-07 | 1.37E-06 | 2.10E-06 | 4.99E-07 | 7.74E-07 | 1.19E-06 | 1.81E-06 | 2.76E-06 |
| 6000 | 9.29E-08 | 1.11E-07 | 1.32E-07 | 1.57E-07 | 1.85E-07 | 1.09E-07 | 1.30E-07 | 1.54E-07 | 1.83E-07 | 2.16E-07 |

Z = 6 L1 SHELL EB = 1.7553E-02 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 2.30E-02 | 1.82E 00 | 1.22E 02 | 7.74E 03 | 4.85E 05 | 1.50E-03 | 9.70E-02 | 6.32E 00 | 4.17E 02 | 2.77E 04 |
| 17 | 1.53E-02 | 1.08E 00 | 6.45E 01 | 3.67E 03 | 2.05E 05 | 1.08E-03 | 6.18E-02 | 3.57E 00 | 2.08E 02 | 1.22E 04 |
| 20 | 9.00E-03 | 5.51E-01 | 2.83E 01 | 1.38E 03 | 6.68E 04 | 7.07E-04 | 3.45E-02 | 1.70E 00 | 8.50E 01 | 4.27E 03 |
| 25 | 4.33E-03 | 2.16E-01 | 9.05E 00 | 3.61E 02 | 1.42E 04 | 3.96E-04 | 1.56E-02 | 6.22E-01 | 2.50E 01 | 1.01E 03 |
| 32 | 1.92E-03 | 7.63E-02 | 2.55E 00 | 8.12E 01 | 2.54E 03 | 2.10E-04 | 6.55E-03 | 2.06E-01 | 6.54E 00 | 2.09E 02 |
| 40 | 9.15E-04 | 2.97E-02 | 8.10E-01 | 2.10E 01 | 5.35E 02 | 1.19E-04 | 3.01E-03 | 7.66E-02 | 1.97E 00 | 5.07E 01 |
| 50 | 4.36E-04 | 1.15E-02 | 2.57E-01 | 5.43E 00 | 1.13E 02 | 6.80E-05 | 1.39E-03 | 2.87E-02 | 5.97E-01 | 1.25E 01 |
| 65 | 1.82E-04 | 3.80E-03 | 6.65E-02 | 1.11E 00 | 1.81E 01 | 3.54E-05 | 5.68E-04 | 9.19E-03 | 1.49E-01 | 2.44E 00 |
| 80 | 9.11E-05 | 1.58E-03 | 2.29E-02 | 3.17E-01 | 4.29E 00 | 2.12E-05 | 2.82E-04 | 3.77E-03 | 5.06E-02 | 6.82E-01 |
| 100 | 4.34E-05 | 6.15E-04 | 7.33E-03 | 8.30E-02 | 9.21E-01 | 1.23E-05 | 1.34E-04 | 1.47E-03 | 1.61E-02 | 1.77E-01 |
| 120 | 2.37E-05 | 2.86E-04 | 2.91E-03 | 2.81E-02 | 2.65E-01 | 7.95E-06 | 7.37E-05 | 6.85E-04 | 6.38E-03 | 5.96E-02 |
| 150 | 1.14E-05 | 1.13E-04 | 9.47E-04 | 7.55E-03 | 5.88E-02 | 4.68E-06 | 3.58E-05 | 2.74E-04 | 2.10E-03 | 1.62E-02 |
| 200 | 4.49E-06 | 3.48E-05 | 2.29E-04 | 1.43E-03 | 8.78E-03 | 2.40E-06 | 1.45E-05 | 8.69E-05 | 5.23E-04 | 3.15E-03 |
| 300 | 1.27E-06 | 6.97E-06 | 3.32E-05 | 1.50E-04 | 6.69E-04 | 9.62E-07 | 4.23E-06 | 1.84E-05 | 8.04E-05 | 3.50E-04 |
| 450 | 3.91E-07 | 1.56E-06 | 5.47E-06 | 1.84E-05 | 6.10E-05 | 4.03E-07 | 1.33E-06 | 4.33E-06 | 1.41E-05 | 4.57E-05 |
| 650 | 1.52E-07 | 4.59E-07 | 1.26E-06 | 3.32E-06 | 8.64E-06 | 1.92E-07 | 5.00E-07 | 1.29E-06 | 3.31E-06 | 8.47E-06 |
| 1000 | 6.00E-08 | 1.36E-07 | 2.88E-07 | 5.95E-07 | 1.22E-06 | 8.51E-08 | 1.76E-07 | 3.59E-07 | 7.27E-07 | 1.47E-06 |
| 2000 | 1.91E-08 | 3.06E-08 | 6.77E-08 | 7.33E-08 | 1.12E-07 | 2.66E-08 | 4.13E-08 | 6.34E-08 | 9.67E-08 | 1.47E-07 |

Z = 10 K1 SHELL EA = 8.6700E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.05E 00 | 1.11E 02 | 6.67E 03 | 3.83E 05 | 2.18E 07 | 1.66E-01 | 1.05E 01 | 6.42E 02 | 3.96E 04 | 2.45E 06 |
| 17 | 1.04E 00 | 6.75E 01 | 3.64E 03 | 1.88E 05 | 9.62E 06 | 1.18E-01 | 6.58E 00 | 7.60E 02 | 1.98E 04 | 1.10E 06 |
| 20 | 6.24E-01 | 3.51E 01 | 1.65E 03 | 7.40E 04 | 3.29E 06 | 7.60E-02 | 3.62E 00 | 1.70E 02 | 8.07E 03 | 3.85E 05 |
| 25 | 3.06E-01 | 1.42E 01 | 5.49E 02 | 2.03E 04 | 7.44E 05 | 4.17E-02 | 1.60E 00 | 6.14E 01 | 2.37E 03 | 9.19E 04 |
| 32 | 1.38E-01 | 5.17E 00 | 1.61E 02 | 4.81E 03 | 1.41E 05 | 2.17E-02 | 6.59E-01 | 2.00E 01 | 6.15E 02 | 1.90E 04 |
| 40 | 6.73E-02 | 2.06E 00 | 5.29E 01 | 1.30E 03 | 3.12E 04 | 1.21E-02 | 2.98E-01 | 7.36E 00 | 1.84E 02 | 4.60E 03 |
| 50 | 3.26E-02 | 8.21E-01 | 1.73E 01 | 3.47E 02 | 6.86E 03 | 6.77E-03 | 1.36E-01 | 2.73E 00 | 5.54E 01 | 1.13E 03 |
| 65 | 1.38E-02 | 2.77E-01 | 4.62E 00 | 7.36E 01 | 1.15E 03 | 3.46E-03 | 5.46E-02 | 8.64E-01 | 1.38E 01 | 2.20E 02 |
| 80 | 7.02E-03 | 1.17E-01 | 1.63E 00 | 2.16E 01 | 2.81E 02 | 2.05E-03 | 2.68E-02 | 3.52E-01 | 4.64E 00 | 6.15E 01 |
| 100 | 3.39E-03 | 4.64E-02 | 5.33E-01 | 5.82E 00 | 6.24E 01 | 1.18E-03 | 1.27E-02 | 1.36E-01 | 1.47E 00 | 1.59E 01 |
| 120 | 1.87E-03 | 2.19E-02 | 2.15E-01 | 2.01E 00 | 1.84E 01 | 7.54E-04 | 6.91E-03 | 6.32E-02 | 5.81E-01 | 5.36E 00 |
| 150 | 9.09E-04 | 8.77E-03 | 7.13E-02 | 5.51E-01 | 4.18E 00 | 4.40E-04 | 3.34E-03 | 2.52E-02 | 1.91E-01 | 1.45E 00 |
| 200 | 3.63E-04 | 2.74E-03 | 1.76E-02 | 1.07E-01 | 6.42E-01 | 2.23E-04 | 1.34E-03 | 7.95E-03 | 4.74E-02 | 2.83E-01 |
| 300 | 1.04E-04 | 5.62E-04 | 2.62E-03 | 1.17E-02 | 5.08E-02 | 8.83E-05 | 3.88E-04 | 1.68E-03 | 7.27E-03 | 3.15E-02 |
| 450 | 3.25E-05 | 1.28E-04 | 4.43E-04 | 1.47E-03 | 4.80E-03 | 3.66E-05 | 1.21E-04 | 3.94E-04 | 1.27E-03 | 4.11E-03 |
| 650 | 1.28E-05 | 3.83E-05 | 1.04E-04 | 2.72E-04 | 7.00E-04 | 1.72E-05 | 4.53E-05 | 1.17E-04 | 2.99E-04 | 7.64E-04 |
| 1000 | 5.06E-06 | 1.15E-05 | 2.43E-05 | 5.01E-05 | 1.02E-04 | 1.75E-06 | 1.58E-05 | 3.24E-05 | 6.57E-05 | 1.33E-04 |
| 2000 | 1.60E-06 | 2.61E-06 | 4.09E-06 | 6.31E-06 | 9.65E-06 | 2.30E-06 | 3.63E-06 | 5.63E-06 | 8.55E-06 | 1.32E-05 |
| 6000 | 4.11E-07 | 4.97E-07 | 5.97E-07 | 7.14E-07 | 8.50E-07 | 4.88E-07 | 5.90E-07 | 7.07E-07 | 8.45E-07 | 1.01E-06 |

Z = 10 L1 SHELL EA = 4.5000E-02 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 8.71E-02 | 6.12E 00 | 3.60E 02 | 2.02E 04 | 1.13E 06 | 9.81E-03 | 6.43E-01 | 4.13E 01 | 2.68E 03 | 1.75E 05 |
| 17 | 5.89E-02 | 3.74E 00 | 1.93E 02 | 1.00E 04 | 5.04E 05 | 6.96E-03 | 4.02E-01 | 2.29E 01 | 1.32E 03 | 7.63E 04 |
| 20 | 3.54E-02 | 1.96E 00 | 9.05E 01 | 4.00E 03 | 1.75E 05 | 4.47E-03 | 2.19E-01 | 1.07E 01 | 5.25E 02 | 2.60E 04 |
| 25 | 1.75E-02 | 7.99E-01 | 3.05E 01 | 1.12E 03 | 4.03E 04 | 2.45E-03 | 9.66E-02 | 3.79E 00 | 1.51E 02 | 6.02E 03 |
| 32 | 7.94E-03 | 2.93E-01 | 9.06E 00 | 2.67E 02 | 7.78E 03 | 1.27E-03 | 3.94E-02 | 1.22E 00 | 3.83E 01 | 1.21E 03 |
| 40 | 3.88E-03 | 1.18E-01 | 3.00E 00 | 7.27E 01 | 1.74E 03 | 7.09E-04 | 1.77E-02 | 4.45E-01 | 1.13E 01 | 2.88E 02 |
| 50 | 1.88E-03 | 4.71E-02 | 9.85E-01 | 1.96E 01 | 3.85E 02 | 3.98E-04 | 8.05E-03 | 1.64E-01 | 3.37E 00 | 6.96E 01 |
| 65 | 8.03E-04 | 1.60E-02 | 2.65E-01 | 4.20E 00 | 6.53E 01 | 2.03E-04 | 3.23E-03 | 5.16E-02 | 8.29E-01 | 1.34E 01 |
| 80 | 4.08E-04 | 6.76E-03 | 9.39E-02 | 1.24E 00 | 1.61E 01 | 1.21E-04 | 1.59E-03 | 2.04E-02 | 2.78E-01 | 3.71E 00 |
| 100 | 1.97E-04 | 2.69E-03 | 3.08E-02 | 3.35E-01 | 3.58E 00 | 6.92E-05 | 7.46E-04 | 8.06E-03 | 8.74E-02 | 9.53E-01 |
| 120 | 1.09E-04 | 1.27E-03 | 1.24E-02 | 1.16E-01 | 1.06E 00 | 4.43E-05 | 4.07E-04 | 3.74E-03 | 3.45E-02 | 3.20E-01 |
| 150 | 5.31E-05 | 5.11E-04 | 4.14E-03 | 3.20E-02 | 2.41E-01 | 2.58E-05 | 1.97E-04 | 1.13E-03 | 1.13E-02 | 8.64E-02 |
| 200 | 2.12E-05 | 1.60E-04 | 1.03E-03 | 6.25E-03 | 3.73E-02 | 1.31E-05 | 7.87E-05 | 4.69E-04 | 2.80E-03 | 1.68E-02 |
| 300 | 6.08E-06 | 3.29E-05 | 1.53E-04 | 6.80E-04 | 2.96E-03 | 5.18E-06 | 2.28E-05 | 9.89E-05 | 4.28E-04 | 1.86E-03 |
| 450 | 1.91E-06 | 7.49E-06 | 2.59E-05 | 8.60E-05 | 2.80E-04 | 2.14E-06 | 7.11E-06 | 2.31E-05 | 7.49E-05 | 2.42E-04 |
| 650 | 7.48E-07 | 2.24E-06 | 6.08E-06 | 1.59E-05 | 4.10E-05 | 1.01E-06 | 2.66E-06 | 6.87E-06 | 1.76E-05 | 4.49E-05 |
| 1000 | 2.96E-07 | 6.74E-07 | 1.43E-06 | 2.93E-06 | 5.96E-06 | 4.41E-07 | 9.26E-07 | 1.90E-06 | 3.86E-06 | 7.80E-06 |
| 2000 | 9.40E-08 | 1.53E-07 | 2.40E-07 | 3.70E-07 | 5.66E-07 | 1.35E-07 | 2.13E-07 | 3.31E-07 | 5.08E-07 | 7.75E-07 |

Z = 10 L2 SHELL ER = 2.0080E-02 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.08E-03 | 2.63E-01 | 4.83E 01 | 6.40E 03 | 7.03E 05 | 1.82E-04 | 2.50E-02 | 2.71E 00 | 2.62E 02 | 2.35E 04 |
| 17 | 6.51E-04 | 1.37E-01 | 2.22E 01 | 2.60E 03 | 2.54E 05 | 1.20E-04 | 1.46E-02 | 1.41E 00 | 1.21E 02 | 9.61E 03 |
| 20 | 3.34E-04 | 5.88E-02 | 8.06E 00 | 8.08E 02 | 6.75E 04 | 7.02E-05 | 7.27E-03 | 6.00E-01 | 4.41E 01 | 3.01E 03 |
| 25 | 1.34E-04 | 1.84E-02 | 2.01E 00 | 1.62E 02 | 1.10E 04 | 3.35E-05 | 2.78E-03 | 1.86E-01 | 1.11E 01 | 6.12E 02 |
| 32 | 4.83E-05 | 5.09E-03 | 4.34E-01 | 2.76E 01 | 1.47E 03 | 1.47E-05 | 9.63E-04 | 5.09E-02 | 2.40E 00 | 1.05E 02 |
| 40 | 1.92E-05 | 1.60E-03 | 1.09E-01 | 5.59E 00 | 2.42E 02 | 7.00E-06 | 3.69E-04 | 1.58E-02 | 6.03E-01 | 2.14E 01 |
| 50 | 7.63E-06 | 5.04E-04 | 2.74E-02 | 1.14E 00 | 3.94E 01 | 3.33E-06 | 1.42E-04 | 4.91E-03 | 1.52E-01 | 4.39E 00 |
| 65 | 2.59E-06 | 1.30E-04 | 5.48E-03 | 1.77E-01 | 4.85E 00 | 1.39E-06 | 4.61E-05 | 1.25E-03 | 3.04E-02 | 6.87E-01 |
| 80 | 1.10E-06 | 4.50E-05 | 1.55E-03 | 4.11E-02 | 9.29E-01 | 6.97E-07 | 1.90E-05 | 4.26E-04 | 8.54E-03 | 1.60E-01 |
| 100 | 4.43E-07 | 1.45E-05 | 4.01E-04 | 8.67E-03 | 1.60E-01 | 3.33E-07 | 7.37E-06 | 1.35E-04 | 2.21E-03 | 3.37E-02 |
| 120 | 2.12E-07 | 5.80E-06 | 1.35E-04 | 2.47E-03 | 3.85E-02 | 1.82E-07 | 3.42E-06 | 5.30E-05 | 7.38E-04 | 9.59E-03 |
| 150 | 8.66E-08 | 1.91E-06 | 3.61E-05 | 5.40E-04 | 6.92E-03 | 8.76E-08 | 1.34E-06 | 1.71E-05 | 1.96E-04 | 2.09E-03 |
| 200 | 2.80E-08 | 4.71E-07 | 6.81E-06 | 7.91E-05 | 7.92E-04 | 3.43E-08 | 4.09E-07 | 4.07E-06 | 3.65E-05 | 3.05E-04 |
| 300 | 5.99E-09 | 6.97E-08 | 7.05E-07 | 5.82E-06 | 4.18E-05 | 9.31E-09 | 7.92E-08 | 5.66E-07 | 3.66E-06 | 2.21E-05 |
| 450 | 1.39E-09 | 1.14E-08 | 8.23E-08 | 4.94E-07 | 2.60E-06 | 2.61E-09 | 1.62E-08 | 8.54E-08 | 4.09E-07 | 1.83E-06 |
| 650 | 4.07E-10 | 2.48E-09 | 1.33E-08 | 6.14E-08 | 2.51E-07 | 8.54E-10 | 4.08E-09 | 1.67E-08 | 6.26E-08 | 2.20E-07 |
| 1000 | 1.10E-10 | 4.82E-10 | 1.90E-09 | 6.61E-09 | 2.07E-08 | 2.45E-10 | 8.87E-10 | 2.81E-09 | 8.16E-09 | 2.24E-08 |
| 2000 | 1.84E-11 | 5.11E-11 | 1.31E-10 | 3.12E-10 | 6.90E-10 | 3.86E-11 | 9.62E-11 | 2.17E-10 | 4.56E-10 | 9.15E-10 |

Z = 10 L3 SHELL ER = 1.9963E-02 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 2.12E-03 | 5.00E-01 | 9.09E 01 | 1.20E 04 | 1.31E 06 | 9.64E-05 | 2.41E-02 | 4.83E 00 | 6.60E 02 | 7.47E 04 |
| 17 | 1.27E-03 | 2.60E-01 | 4.14E 01 | 4.83E 03 | 4.70E 05 | 6.42E-05 | 1.34E-02 | 2.34E 00 | 2.83E 02 | 2.94E 04 |
| 20 | 6.51E-04 | 1.11E-01 | 1.49E 01 | 1.49E 03 | 1.24E 05 | 3.78E-05 | 6.29E-03 | 9.18E-01 | 9.45E 01 | 8.10E 03 |
| 25 | 2.60E-04 | 3.43E-02 | 3.68E 00 | 2.95E 02 | 1.98E 04 | 1.83E-05 | 2.23E-03 | 2.56E-01 | 2.11E 01 | 1.46E 03 |
| 32 | 9.37E-05 | 9.39E-03 | 7.79E-01 | 4.91E 01 | 2.61E 03 | 8.17E-06 | 7.17E-04 | 6.29E-02 | 4.08E 00 | 2.23E 02 |
| 40 | 3.72E-05 | 2.91E-03 | 1.92E-01 | 9.71E 00 | 4.17E 02 | 3.94E-06 | 2.58E-04 | 1.79E-02 | 9.34E-01 | 4.12E 01 |
| 50 | 1.48E-05 | 9.02E-04 | 4.71E-02 | 1.92E 00 | 6.68E 01 | 1.91E-06 | 9.38E-05 | 5.13E-03 | 2.16E-01 | 7.71E 00 |
| 65 | 5.00E-06 | 2.28E-04 | 9.10E-03 | 2.88E-01 | 7.80E 00 | 8.12E-07 | 2.88E-05 | 1.20E-03 | 3.92E-02 | 1.09E 00 |
| 80 | 2.13E-06 | 7.72E-05 | 2.48E-03 | 6.43E-02 | 1.43E 00 | 4.15E-07 | 1.14E-05 | 3.82E-04 | 1.03E-02 | 2.37E-01 |
| 100 | 8.60E-07 | 2.43E-05 | 6.14E-04 | 1.29E-02 | 2.34E-01 | 2.02E-07 | 4.25E-06 | 1.13E-04 | 2.48E-03 | 4.65E-02 |
| 120 | 4.13E-07 | 9.48E-06 | 2.00E-04 | 3.51E-03 | 5.38E-02 | 1.13E-07 | 1.91E-06 | 4.23E-05 | 7.84E-04 | 1.25E-02 |
| 150 | 1.70E-07 | 3.04E-06 | 5.08E-05 | 7.20E-04 | 8.99E-03 | 5.60E-08 | 7.26E-07 | 1.29E-05 | 1.95E-04 | 2.55E-03 |
| 200 | 5.59E-08 | 7.17E-07 | 8.86E-06 | 9.58E-05 | 9.23E-04 | 2.30E-08 | 2.13E-07 | 2.84E-06 | 3.34E-05 | 3.42E-04 |
| 300 | 1.25E- 8 | 1.01E-07 | 8.09E-07 | 5.98E-06 | 4.04E-05 | 6.83E-09 | 3.94E-08 | 3.56E-07 | 2.97E-06 | 2.20E-05 |
| 450 | 3.16E-09 | 1.59E-08 | 8.34E-08 | 4.24E-07 | 2.04E-06 | 2.17E-09 | 8.16E-09 | 4.85E-08 | 2.93E-07 | 1.60E-06 |
| 650 | 1.03E-09 | 3.47E-09 | 1.25E-08 | 4.58E-08 | 1.65E-07 | 8.23E-10 | 2.15E-09 | 8.79E-09 | 3.97E-08 | 1.69E-07 |
| 1000 | 3.27E-10 | 7.30E-10 | 1.76E-09 | 4.51E-09 | 1.14E-08 | 2.95E-10 | 5.34E-10 | 1.41E-09 | 4.50E-09 | 1.45E-08 |
| 2000 | 7.46E-11 | 1.04E-10 | 1.54E-10 | 2.44E-10 | 4.13E-10 | 7.29E-11 | 9.05E-11 | 1.32E-10 | 2.33E-10 | 4.68E-10 |

Z = 14 K1 SHELL ER = 1.8390E 00 KEV

| EG | E1 | E2 | F3 | E4 | F5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 3.30E 00 | 2.09E 02 | 1.09E 04 | 5.49E 05 | 2.75E 07 | 5.79E-01 | 3.62E 01 | 2.07E 03 | 1.17E 05 | 6.67E 06 |
| 17 | 2.25E 00 | 1.29E 02 | 6.16E 03 | 2.82E 05 | 1.29E 07 | 4.06E-01 | 2.25E 01 | 1.15E 03 | 5.91E 04 | 3.03E 06 |
| 20 | 1.30E 00 | 6.92E 01 | 2.91E 03 | 1.17E 05 | 4.70E 06 | 2.58E-01 | 1.22E 01 | 5.43E 02 | 2.42E 04 | 1.08E 06 |
| 25 | 6.82E-01 | 2.89E 01 | 1.02E 03 | 3.44E 04 | 1.15E 06 | 1.39E-01 | 5.28E 00 | 1.94E 02 | 7.12E 03 | 2.63E 05 |
| 32 | 3.15E-01 | 1.09E 01 | 3.13E 02 | 8.64E 03 | 2.36E 05 | 7.06E-02 | 2.13E 00 | 6.24E 01 | 1.84E 03 | 5.48E 04 |
| 40 | 1.56E-01 | 4.47E-00 | 1.07E 02 | 2.44E 03 | 5.51E 04 | 3.87E-02 | 9.44E-01 | 2.27E 01 | 5.48E 02 | 1.33E 04 |
| 50 | 7.65E-02 | 1.82E 00 | 3.60E 01 | 6.81E 02 | 1.27E 04 | 2.14E-02 | 4.24E-01 | 8.31E 00 | 1.64E 02 | 3.27E 03 |
| 65 | 3.31E-02 | 6.29E-01 | 9.97E 00 | 1.51E 02 | 2.25E 03 | 1.08E-02 | 1.68E-01 | 2.60E 00 | 4.05E 01 | 6.36E 02 |
| 80 | 1.70E-02 | 2.71E-01 | 3.60E 01 | 4.56E 01 | 5.68E 02 | 6.30E-03 | 8.15E-02 | 1.05E 00 | 1.36E 01 | 1.77E 02 |
| 100 | 8.30E-03 | 1.09E-01 | 1.21E 00 | 1.26E 01 | 1.30E 02 | 3.57E-03 | 3.80E-02 | 4.02E-01 | 4.27E 00 | 4.56E 01 |
| 120 | 4.63E-03 | 5.23E-02 | 4.94E-01 | 4.45E 00 | 3.93E 01 | 2.27E-03 | 2.06E-02 | 1.86E-01 | 1.68E 00 | 1.53E 01 |
| 150 | 2.27E-03 | 2.13E-02 | 1.67E-01 | 1.25E 00 | 9.19E 00 | 1.31E-03 | 9.87E-03 | 7.36E-02 | 5.51E-01 | 4.14E 00 |
| 200 | 9.19E-04 | 6.77E-03 | 4.22E-02 | 2.51E-01 | 1.46E 00 | 6.56E-04 | 3.92E-03 | 2.31E-02 | 1.36E-01 | 8.05E-01 |
| 300 | 2.68E-04 | 1.42E-03 | 6.47E-03 | 2.82E-02 | 1.20E-01 | 2.56E-04 | 1.13E-03 | 4.84E-03 | 2.08E-02 | 8.94E-02 |
| 450 | 8.49E-05 | 3.24E-04 | 1.12E-03 | 3.67E-03 | 1.18E-02 | 1.04E-04 | 3.48E-04 | 1.13E-03 | 3.63E-03 | 1.17E-02 |
| 650 | 3.36E-05 | 1.00E-04 | 2.69E-04 | 6.96E-04 | 1.77E-03 | 4.34E-05 | 1.29E-04 | 3.34E-04 | 8.52E-04 | 2.17E-03 |
| 1000 | 1.34E-05 | 3.05E-05 | 6.43E-05 | 1.32E-04 | 2.66E-04 | 2.09E-05 | 4.46E-05 | 9.18E-05 | 1.87E-04 | 3.76E-04 |
| 2000 | 4.22E-06 | 6.97E-06 | 1.10E-05 | 1.71E-05 | 2.61E-05 | 6.23E-06 | 1.00E-05 | 1.57E-05 | 2.43E-05 | 3.72E-05 |
| 6000 | 1.07E-06 | 1.31E-06 | 1.54E-06 | 1.92E-06 | 2.30E-06 | 1.28E-06 | 1.57E-06 | 1.91E-06 | 2.30E-06 | 2.76E-06 |

Z = 14 L1 SHELL ER = 1.4900E-01 KEV

| EG | F1 | F2 | F3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 2.22E-01 | 1.36E 01 | 6.84E 02 | 3.29E 04 | 1.56E 06 | 4.24E-02 | 2.91E 00 | 1.86E 02 | 1.19E 04 | 7.64E 05 |
| 17 | 1.52E-01 | 8.51E 00 | 3.92E 02 | 1.73E 04 | 7.51E 05 | 2.47E-02 | 1.79E 00 | 1.01E 02 | 5.74E 03 | 3.28E 05 |
| 20 | 9.33E-02 | 4.60E 00 | 1.88E 02 | 7.35E 03 | 2.84E 05 | 1.88E-02 | 9.54E-01 | 4.62E 01 | 2.24E 03 | 1.10E 05 |
| 25 | 4.72E-02 | 1.95E 00 | 6.72E 01 | 2.21E 03 | 7.19E 04 | 1.01E-02 | 4.08E-01 | 1.59E 01 | 6.26E 02 | 2.48E 04 |
| 32 | 2.20E-02 | 7.47E-01 | 2.11E 01 | 5.69E 02 | 1.52E 04 | 5.15E-03 | 1.62E-01 | 4.99E 00 | 1.55E 02 | 4.85E 03 |
| 40 | 1.04E-02 | 3.09E-01 | 7.28E 00 | 1.64E 02 | 3.63E 03 | 2.82E-03 | 7.12E-02 | 1.77E 00 | 4.46E 01 | 1.13E 03 |
| 50 | 5.42E-03 | 1.27E-01 | 2.49E 00 | 4.64E 01 | 8.53E 02 | 1.56E-03 | 3.17E-02 | 6.40E-01 | 1.30E 01 | 2.68E 02 |
| 65 | 2.36E-03 | 4.44E-02 | 6.96E-01 | 1.04E 01 | 1.53E 02 | 7.43E-04 | 1.25E-02 | 1.97E-01 | 3.15E 00 | 5.05E 01 |
| 80 | 1.21E-03 | 1.92E-02 | 2.53E-01 | 3.18E 00 | 3.93E 01 | 4.58E-04 | 6.03E-03 | 7.89E-02 | 1.04E 00 | 1.38E 01 |
| 100 | 5.96E-04 | 7.80E-03 | 8.53E-02 | 8.88E-01 | 9.09E 00 | 2.60E-04 | 2.80E-03 | 3.00E-02 | 3.23E-01 | 3.50E 00 |
| 120 | 3.33E-04 | 3.74E-03 | 3.52E-02 | 3.14E-01 | 2.76E 00 | 1.65E-04 | 1.51E-03 | 1.38E-02 | 1.27E-01 | 1.17E 00 |
| 150 | 1.64E-04 | 1.53E-03 | 1.20E-02 | 8.90E-02 | 6.51E-01 | 9.52E-05 | 7.23E-04 | 5.44E-03 | 4.11E-02 | 3.12E-01 |
| 200 | 6.64E-05 | 4.88E-04 | 3.03E-03 | 1.79E-02 | 1.04E-01 | 4.77E-05 | 2.87E-04 | 1.70E-03 | 1.01E-02 | 6.01E-02 |
| 300 | 1.94E-05 | 1.03E-04 | 4.67E-04 | 2.03E-03 | 8.64E-03 | 1.88E-05 | 8.22E-05 | 3.55E-04 | 1.53E-03 | 6.62E-03 |
| 450 | 6.17E-06 | 2.39E-05 | 8.13E-05 | 2.65E-04 | 8.51E-04 | 7.60E-06 | 2.54E-05 | 8.26E-05 | 2.67E-04 | 8.59E-04 |
| 650 | 2.44E-06 | 7.27E-06 | 1.95E-05 | 5.05E-05 | 1.29E-04 | 3.53E-06 | 9.43E-06 | 2.44E-05 | 6.24E-05 | 1.59E-04 |
| 1000 | 9.71E-07 | 2.22E-06 | 4.68E-06 | 9.59E-06 | 1.94E-05 | 1.52E-06 | 3.25E-06 | 6.70E-06 | 1.36E-05 | 2.75E-05 |
| 2000 | 3.07E-07 | 5.07E-07 | 8.01E-07 | 1.24E-06 | 1.90E-06 | 4.53E-07 | 7.31E-07 | 1.15E-06 | 1.77E-06 | 2.72E-06 |

Z = 14 L2 SHELL ER = 1.0000E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 6.97E-03 | 1.92E 00 | 3.64E 02 | 4.74E 04 | 5.05E 06 | 1.42E-03 | 1.93E-01 | 2.04E 01 | 1.90E 03 | 1.64E 05 |
| 17 | 4.25E-03 | 1.01E 00 | 1.68E 02 | 1.94E 04 | 1.84E 06 | 9.41E-04 | 1.14E-01 | 1.07E 01 | 8.83E 02 | 6.81E 04 |
| 20 | 2.23E-03 | 4.37E-01 | 6.17E 01 | 6.10E 03 | 4.97E 05 | 5.53E-04 | 5.70E-02 | 4.59E 00 | 3.27E 02 | 2.17E 04 |
| 25 | 9.12E-04 | 1.39E-01 | 1.56E 01 | 1.24E 03 | 8.21E 04 | 2.66E-04 | 2.21E-02 | 1.44E 00 | 8.35E 01 | 4.50E 03 |
| 32 | 3.38E-04 | 3.89E-02 | 3.40E 00 | 2.14E 02 | 1.12E 04 | 1.18E-04 | 7.72E-03 | 4.00E-01 | 1.84E 01 | 7.88E 02 |
| 40 | 1.37E-04 | 1.24E-02 | 8.62E-01 | 4.39E 01 | 1.87E 03 | 5.68E-05 | 2.99E-03 | 1.26E-01 | 4.70E 00 | 1.64E 02 |
| 50 | 5.57E-05 | 3.95E-03 | 2.20E-01 | 9.05E 00 | 3.12E 02 | 2.73E-05 | 1.16E-03 | 3.95E-02 | 1.20E 00 | 3.40E 01 |
| 65 | 1.93E-05 | 1.03E-03 | 4.44E-02 | 1.43E 00 | 3.86E 01 | 1.15E-05 | 3.81E-04 | 1.02E-02 | 2.43E-01 | 5.42E 00 |
| 80 | 8.33E-06 | 3.61E-04 | 1.26E-02 | 3.35E-01 | 7.48E 00 | 5.81E-06 | 1.58E-04 | 3.50E-03 | 6.93E-02 | 1.28E 00 |
| 100 | 3.40E-06 | 1.17E-04 | 3.31E-03 | 7.13E-02 | 1.30E 00 | 2.80E-06 | 6.19E-05 | 1.12E-03 | 1.81E-02 | 2.73E-01 |
| 120 | 1.65E-06 | 4.73E-05 | 1.12E-03 | 2.04E-02 | 3.17E-01 | 1.54E-06 | 2.89E-05 | 4.44E-04 | 6.11E-03 | 7.84E-02 |
| 150 | 6.82E-07 | 1.58E-05 | 3.02E-04 | 4.51E-03 | 5.75E-02 | 7.45E-07 | 1.14E-05 | 1.44E-04 | 1.64E-03 | 1.73E-02 |
| 200 | 2.23E-07 | 3.92E-06 | 5.77E-05 | 6.70E-04 | 6.66E-03 | 2.94E-07 | 3.51E-06 | 3.47E-05 | 3.09E-04 | 2.56E-03 |
| 300 | 4.88E-08 | 5.89E-07 | 6.05E-06 | 5.00E-05 | 3.57E-04 | 8.07E-08 | 6.89E-07 | 4.90E-06 | 3.15E-05 | 1.89E-04 |
| 450 | 1.15E-08 | 9.77E-08 | 7.14E-07 | 4.30E-06 | 2.26E-05 | 2.28E-08 | 1.43E-07 | 7.49E-07 | 3.56E-06 | 1.59E-05 |
| 650 | 3.40E-09 | 2.13E-08 | 1.17E-07 | 5.40E-07 | 2.20E-06 | 7.50E-09 | 3.62E-08 | 1.48E-07 | 5.53E-07 | 1.93E-06 |
| 1000 | 9.22E-10 | 4.17E-09 | 1.68E-08 | 5.86E-08 | 1.84E-07 | 2.15E-09 | 7.91E-09 | 2.51E-08 | 7.28E-08 | 1.99E-07 |
| 2000 | 1.54E-10 | 4.42E-10 | 1.16E-09 | 2.78E-09 | 6.19E-09 | 3.36E-10 | 8.57E-10 | 1.95E-09 | 4.11E-09 | 8.25E-09 |

Z = 14 L3 SHELL ER = 9.9000E-02 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.35E-02 | 3.61E 00 | 6.76E 02 | 8.74E 04 | 9.29E 06 | 6.99E-04 | 2.49E-01 | 5.53E 01 | 7.57E 03 | 8.45E 05 |
| 17 | 8.19E-03 | 1.89E 00 | 3.10E 02 | 3.56E 04 | 3.36E 06 | 4.69E-04 | 1.37E-01 | 2.64E 01 | 3.20E 03 | 3.17E 05 |
| 20 | 4.28E-03 | 8.12E-01 | 1.13E 02 | 1.11E 04 | 8.97E 05 | 2.78E-04 | 6.33E-02 | 1.01E 01 | 1.05E 03 | 8.90E 04 |
| 25 | 1.75E-03 | 2.55E-01 | 2.80E 01 | 2.22E 03 | 1.46E 05 | 1.36E-04 | 2.20E-02 | 2.75E 00 | 2.29E 02 | 1.57E 04 |
| 32 | 6.47E-04 | 7.06E-02 | 6.00E 00 | 3.74E 02 | 1.95E 04 | 6.15E-05 | 6.93E-03 | 6.60E-01 | 4.32E 01 | 2.35E 03 |
| 40 | 2.62E-04 | 2.21E-02 | 1.49E 00 | 7.49E 01 | 3.16E 03 | 3.00E-05 | 2.46E-03 | 1.84E-01 | 9.69E 00 | 4.26E 02 |
| 50 | 1.06E-04 | 6.93E-03 | 3.70E-01 | 1.50E 01 | 5.13E 02 | 1.46E-05 | 8.79E-04 | 5.17E-02 | 2.20E 00 | 7.84E 01 |
| 65 | 3.66E-05 | 1.77E-03 | 7.21E-02 | 2.27E 00 | 6.07E 01 | 6.30E-06 | 2.65E-04 | 1.18E-02 | 3.92E-01 | 1.09E 01 |
| 80 | 1.58E-05 | 6.05E-04 | 1.98E-02 | 5.11E-01 | 1.13E 01 | 3.24E-06 | 1.04E-04 | 3.72E-03 | 1.02E-01 | 2.34E 00 |
| 100 | 6.47E-06 | 1.92E-04 | 4.97E-03 | 1.04E-01 | 1.86E 00 | 1.59E-06 | 3.82E-05 | 1.09E-03 | 2.41E-02 | 4.54E-01 |
| 120 | 3.13E-06 | 7.54E-05 | 1.62E-03 | 2.83E-02 | 4.29E-01 | 8.95E-07 | 1.70E-05 | 4.02E-04 | 7.56E-03 | 1.21E-01 |
| 150 | 1.31E-06 | 2.43E-05 | 4.13E-04 | 5.84E-03 | 7.24E-02 | 4.45E-07 | 6.41E-06 | 1.21E-04 | 1.86E-03 | 2.44E-02 |
| 200 | 4.35E-07 | 5.78E-06 | 7.25E-05 | 7.83E-04 | 7.50E-03 | 1.84E-07 | 1.86E-06 | 2.63E-05 | 3.15E-04 | 3.24E-03 |
| 300 | 9.88E-08 | 8.17E-07 | 6.66E-06 | 4.93E-05 | 3.32E-04 | 5.49E-08 | 3.44E-07 | 3.24E-06 | 2.76E-05 | 2.05E-04 |
| 450 | 2.52E-08 | 1.30E-07 | 6.90E-07 | 3.52E-06 | 1.69E-05 | 1.74E-08 | 6.51E-08 | 4.34E-07 | 2.68E-06 | 1.48E-05 |
| 650 | 8.23E-09 | 2.84E-08 | 1.03E-07 | 3.81E-07 | 1.37E-06 | 6.63E-09 | 1.79E-08 | 7.72E-08 | 3.59E-07 | 1.55E-06 |
| 1000 | 2.62E-09 | 5.96E-09 | 1.45E-08 | 3.76E-08 | 9.93E-08 | 2.37E-09 | 4.39E-09 | 1.21E-08 | 3.99E-08 | 1.31E-07 |
| 2000 | 5.96E-10 | 8.42E-10 | 1.25E-09 | 2.00E-09 | 3.43E-09 | 5.82E-10 | 7.29E-10 | 1.08E-09 | 1.96E-09 | 4.06E-09 |

Z = 15 K1 SHELL ER = 2.1490E 00 KEV

| EG | F1 | F2 | F3 | F4 | F5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 3.82E 00 | 2.33E 02 | 1.17E 04 | 5.60E 05 | 2.74E 07 | 7.54E-01 | 4.70E 01 | 2.62E 03 | 1.45E 05 | 8.01E 06 |
| 17 | 2.61E 00 | 1.45E 02 | 6.68E 03 | 2.95E 05 | 1.30E 07 | 5.28E-01 | 2.92E 01 | 1.47E 03 | 7.33E 04 | 3.67E 06 |
| 20 | 1.59E 00 | 7.82E 01 | 3.18E 03 | 1.25E 05 | 4.86E 06 | 3.34E-01 | 1.57E 01 | 6.90E 02 | 3.02E 04 | 1.32E 06 |
| 25 | 7.98E-01 | 3.30E 01 | 1.13E 03 | 3.72E 04 | 1.22E 06 | 1.79E-01 | 6.80E 00 | 2.46E 02 | 8.90E 03 | 3.23E 05 |
| 32 | 3.70E-01 | 1.25E 01 | 3.53E 02 | 9.51E 03 | 2.54E 05 | 9.07E-02 | 2.72E 00 | 7.92E 01 | 2.31E 03 | 6.77E 04 |
| 40 | 1.84E-01 | 5.18E 00 | 1.21E 02 | 2.72E 03 | 6.03E 04 | 4.95E-02 | 1.20E 00 | 2.87E 01 | 6.87E 02 | 1.65E 04 |
| 50 | 9.06E-02 | 2.12E 00 | 4.13E 01 | 7.68E 02 | 1.41E 04 | 2.72E-02 | 5.39E-01 | 1.05E 01 | 2.06E 02 | 4.06E 03 |
| 65 | 3.93E-02 | 7.38E-01 | 1.15E 01 | 1.72E 02 | 2.53E 03 | 1.16E-02 | 2.12E-01 | 3.27E 00 | 5.07E 01 | 7.91E 02 |
| 80 | 2.03E-02 | 3.19E-01 | 4.19E 00 | 5.24E 01 | 6.46E 02 | 7.97E-03 | 1.03E-01 | 1.32E 00 | 1.70E 01 | 2.20E 02 |
| 100 | 9.93E-03 | 1.30E-01 | 1.41E 00 | 1.46E 01 | 1.49E 02 | 4.51E-03 | 4.79E-02 | 5.04E-01 | 5.33E 00 | 5.67E 01 |
| 120 | 5.55E-03 | 6.21E-02 | 5.81E-01 | 5.18E 00 | 4.53E 01 | 2.85E-03 | 2.59E-02 | 2.33E-01 | 2.10E 00 | 1.91E 01 |
| 150 | 2.71E-03 | 2.53E-02 | 1.98E-01 | 1.47E 00 | 1.07E 01 | 1.64E-03 | 1.24E-02 | 9.20E-02 | 6.87E-01 | 5.15E 00 |
| 200 | 1.11E-03 | 8.10E-03 | 5.02E-02 | 2.96E-01 | 1.71E 00 | 8.21E-04 | 4.90E-03 | 2.88E-02 | 1.69E-01 | 9.99E-01 |
| 300 | 3.24E-04 | 1.71E-03 | 7.75E-03 | 3.35E-02 | 1.42E-01 | 3.19E-04 | 1.40E-03 | 6.03E-03 | 2.59E-02 | 1.11E-01 |
| 450 | 1.03E-04 | 3.98E-04 | 1.35E-03 | 4.40E-03 | 1.41E-02 | 1.30E-04 | 4.34E-04 | 1.40E-03 | 4.51E-03 | 1.45E-02 |
| 650 | 4.09E-05 | 1.22E-04 | 3.26E-04 | 8.41E-04 | 2.14E-03 | 6.00E-05 | 1.61E-04 | 4.15E-04 | 1.06E-03 | 2.69E-03 |
| 1000 | 1.63E-05 | 3.72E-05 | 7.84E-05 | 1.60E-04 | 3.24E-04 | 2.58E-05 | 5.52E-05 | 1.14E-04 | 2.31E-04 | 4.67E-04 |
| 2000 | 5.14E-06 | 8.51E-06 | 1.35E-05 | 2.09E-05 | 3.20E-05 | 7.64E-06 | 1.24E-05 | 1.95E-05 | 3.01E-05 | 4.61E-05 |
| 6000 | 1.30E-06 | 1.59E-06 | 1.94E-06 | 2.34E-06 | 2.81E-06 | 1.56E-06 | 1.92E-06 | 2.34E-06 | 2.82E-06 | 3.39E-06 |

Z = 15 L1 SHELL ER = 1.8900E-01 KEV

| EG | F1 | F2 | F3 | F4 | F5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 2.64E-01 | 1.55E 01 | 7.48E 02 | 3.43E 04 | 1.54E 06 | 5.73E-02 | 3.99E 00 | 2.54E 02 | 1.62E 04 | 1.04E 06 |
| 17 | 1.82E-01 | 9.79E 00 | 4.33E 02 | 1.83E 04 | 7.61E 05 | 4.01E-02 | 2.44E 00 | 1.38E 02 | 7.79E 03 | 4.43E 05 |
| 20 | 1.12E-01 | 5.34E 00 | 2.11E 02 | 7.94E 03 | 2.95E 05 | 2.53E-02 | 1.30E 00 | 6.27E 01 | 3.03E 03 | 1.48E 05 |
| 25 | 5.68E-02 | 2.29E 00 | 7.65E 01 | 2.44E 03 | 7.70E 04 | 1.36E-02 | 5.51E-01 | 2.15E 01 | 8.41E 02 | 3.32E 04 |
| 32 | 2.66E-02 | 8.84E-01 | 2.43E 01 | 6.41E 02 | 1.67E 04 | 6.87E-03 | 2.17E-01 | 6.68E 00 | 2.07E 02 | 6.46E 03 |
| 40 | 1.33E-02 | 3.70E-01 | 8.51E 00 | 1.87E 02 | 4.07E 03 | 3.75E-03 | 9.49E-02 | 2.36E 00 | 5.93E 01 | 1.50E 03 |
| 50 | 6.63E-03 | 1.53E-01 | 2.93E 00 | 5.38E 01 | 9.72E 02 | 2.06E-03 | 4.21E-02 | 8.48E-01 | 1.73E 01 | 3.53E 02 |
| 65 | 2.90E-03 | 5.38E-02 | 8.30E-01 | 1.22E 01 | 1.77E 02 | 1.03E-03 | 1.64E-02 | 2.60E-01 | 4.14E 00 | 6.64E 01 |
| 80 | 1.50E-03 | 2.34E-02 | 3.04E-01 | 3.77E 00 | 4.59E 01 | 6.02E-04 | 7.92E-03 | 1.04E-01 | 1.36E 00 | 1.81E 01 |
| 100 | 7.37E-04 | 9.55E-03 | 1.03E-01 | 1.06E 00 | 1.07E 01 | 3.41E-04 | 3.67E-03 | 3.92E-02 | 4.22E-01 | 4.57E 00 |
| 120 | 4.13E-04 | 4.59E-03 | 4.27E-02 | 3.78E-01 | 3.29E 00 | 2.15E-04 | 1.98E-03 | 1.80E-02 | 1.65E-01 | 1.52E 00 |
| 150 | 2.04E-04 | 1.88E-03 | 1.46E-02 | 1.08E-01 | 7.81E-01 | 1.24E-04 | 9.43E-04 | 7.04E-03 | 5.35E-02 | 4.05E-01 |
| 200 | 8.30E-05 | 6.05E-04 | 3.73E-03 | 2.19E-02 | 1.26E-01 | 6.20E-05 | 3.73E-04 | 2.21E-03 | 1.31E-02 | 7.78E-02 |
| 300 | 2.43E-05 | 1.28E-04 | 5.79E-04 | 2.50E-03 | 1.06E-02 | 2.47E-05 | 1.07E-04 | 4.60E-04 | 1.98E-03 | 8.55E-03 |
| 450 | 7.77E-06 | 2.99E-05 | 1.02E-04 | 3.30E-04 | 1.05E-03 | 9.80E-06 | 3.29E-05 | 1.07E-04 | 3.44E-04 | 1.11E-03 |
| 650 | 3.08E-06 | 9.16E-06 | 2.45E-05 | 6.33E-05 | 1.61E-04 | 4.53E-06 | 1.22E-05 | 3.15E-05 | 8.05E-05 | 2.05E-04 |
| 1000 | 1.23E-06 | 2.80E-06 | 5.91E-06 | 1.21E-05 | 2.44E-05 | 1.94E-06 | 4.17E-06 | 8.62E-06 | 1.75E-05 | 3.54E-05 |
| 2000 | 3.87E-07 | 6.42E-07 | 1.02E-06 | 1.58E-06 | 2.42E-06 | 5.76E-07 | 9.35E-07 | 1.47E-06 | 2.28E-06 | 3.49E-06 |

Z = 15 L2 SHELL EB = 1.3600E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 9.84E-03 | 2.80E 00 | 5.35E 02 | 6.92E 04 | 7.31E 06 | 2.09E-03 | 2.85E-01 | 2.98E 01 | 2.75E 03 | 2.36E 05 |
| 17 | 6.02E-03 | 1.47E 00 | 2.47E 02 | 2.84E 04 | 2.67E 06 | 1.39E-03 | 1.68E-01 | 1.56E 01 | 1.28E 03 | 9.81E 04 |
| 20 | 3.17E-03 | 6.40E-01 | 9.08E 01 | 8.94E 03 | 7.23E 05 | 8.20E-04 | 8.44E-02 | 6.75E 00 | 4.77E 02 | 3.14E 04 |
| 25 | 1.31E-03 | 2.04E-01 | 2.30E 01 | 1.83E 03 | 1.20E 05 | 3.96E-04 | 3.28E-02 | 2.13E 00 | 1.22E 02 | 6.54E 03 |
| 32 | 4.87E-04 | 5.73E-02 | 5.03E 00 | 3.16E 02 | 1.65E 04 | 1.76E-04 | 1.15E-02 | 5.92E-01 | 2.71E 01 | 1.15E 03 |
| 40 | 1.99E-04 | 1.83E-02 | 1.28E 00 | 6.50E 01 | 2.75E 03 | 8.49E-05 | 4.46E-03 | 1.87E-01 | 6.94E 00 | 2.40E 02 |
| 50 | 8.09E-05 | 5.84E-03 | 3.27E-01 | 1.34E 01 | 4.62E 02 | 4.08E-05 | 1.73E-03 | 5.88E-02 | 1.78E 00 | 5.02E 01 |
| 65 | 2.81E-05 | 1.54E-03 | 6.62E-02 | 2.13E 00 | 5.74E 01 | 1.73E-05 | 5.71E-04 | 1.52E-02 | 3.62E-01 | 8.02E 00 |
| 80 | 1.22E-05 | 5.38E-04 | 1.89E-02 | 5.00E-01 | 1.11E 01 | 8.74E-06 | 2.38E-04 | 5.24E-03 | 1.03E-01 | 1.90E 00 |
| 100 | 5.01E-06 | 1.75E-04 | 4.96E-03 | 1.07E-01 | 1.94E 00 | 4.21E-06 | 9.32E-05 | 1.68E-03 | 2.71E-02 | 4.07E-01 |
| 120 | 2.43E-06 | 7.08E-05 | 1.68E-03 | 3.07E-02 | 4.74E-01 | 2.32E-06 | 4.36E-05 | 6.67E-04 | 9.16E-03 | 1.17E-01 |
| 150 | 1.01E-06 | 2.36E-05 | 4.55E-04 | 6.79E-03 | 8.62E-02 | 1.13E-06 | 1.73E-05 | 2.18E-04 | 2.46E-03 | 2.59E-02 |
| 200 | 3.32E-07 | 5.89E-06 | 8.70E-05 | 1.01E-03 | 1.00E-02 | 4.45E-07 | 5.32E-06 | 5.25E-05 | 4.65E-04 | 3.85E-03 |
| 300 | 7.28E-08 | 8.88E-07 | 9.15E-06 | 7.57E-05 | 5.40E-04 | 1.22E-07 | 1.05E-06 | 7.44E-06 | 4.76E-05 | 2.85E-04 |
| 450 | 1.73E-08 | 1.48E-07 | 1.08E-06 | 6.53E-06 | 3.43E-05 | 3.47E-08 | 2.17E-07 | 1.14E-06 | 5.42E-06 | 2.41E-05 |
| 650 | 5.11E-09 | 3.23E-08 | 1.78E-07 | 8.21E-07 | 3.35E-06 | 1.14E-08 | 5.52E-08 | 2.26E-07 | 8.42E-07 | 2.94E-06 |
| 1000 | 1.39E-09 | 6.33E-09 | 2.55E-08 | 8.94E-08 | 2.81E-07 | 3.27E-09 | 1.21E-08 | 3.83E-08 | 1.11E-07 | 3.04E-07 |
| 2000 | 2.32E-10 | 6.70E-10 | 1.77E-09 | 4.25E-09 | 9.46E-09 | 5.11E-10 | 1.31E-09 | 2.98E-09 | 6.30E-09 | 1.26E-08 |

Z = 15 L3 SHELL EB = 1.3500E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.89E-02 | 5.25E 00 | 9.88E 02 | 1.27E 05 | 1.34E 07 | 1.02E-03 | 3.95E-01 | 8.97E 01 | 1.23E 04 | 1.37E 06 |
| 17 | 1.16E-02 | 2.75E 00 | 4.54E 02 | 5.18E 04 | 4.86E 06 | 6.82E-04 | 2.17E-01 | 4.26E 01 | 5.17E 03 | 5.10E 05 |
| 20 | 6.07E-03 | 1.18E 00 | 1.65E 02 | 1.61E 04 | 1.30E 06 | 4.06E-04 | 9.97E-02 | 1.63E 01 | 1.69E 03 | 1.43E 05 |
| 25 | 2.49E-03 | 3.73E-01 | 4.12E 01 | 3.25E 03 | 2.12E 05 | 1.99E-04 | 3.46E-02 | 4.41E 00 | 3.67E 02 | 2.51E 04 |
| 32 | 9.27E-04 | 1.04E-01 | 8.84E 00 | 5.50E 02 | 2.85E 04 | 9.02E-05 | 1.08E-02 | 1.05E 00 | 6.89E 01 | 3.73E 03 |
| 40 | 3.77E-04 | 3.25E-02 | 2.20E 00 | 1.10E 02 | 4.63E 03 | 4.41E-05 | 3.82E-03 | 2.91E-01 | 1.54E 01 | 6.74E 02 |
| 50 | 1.53E-04 | 1.02E-02 | 5.47E-01 | 2.21E 01 | 7.54E 02 | 2.15E-05 | 1.36E-03 | 8.15E-02 | 3.48E 00 | 1.24E 02 |
| 65 | 5.32E-05 | 2.62E-03 | 1.07E-01 | 3.36E 00 | 8.95E 01 | 9.29E-06 | 4.10E-04 | 1.85E-02 | 6.17E-01 | 1.72E 01 |
| 80 | 2.31E-05 | 8.95E-04 | 2.94E-02 | 7.58E-01 | 1.66E 01 | 4.79E-06 | 1.60E-04 | 5.82E-03 | 1.59E-01 | 3.66E 00 |
| 100 | 9.46E-06 | 2.84E-04 | 7.40E-03 | 1.54E-01 | 2.75E 00 | 2.36E-06 | 5.86E-05 | 1.69E-03 | 3.77E-02 | 7.08E-01 |
| 120 | 4.60E-06 | 1.12E-04 | 2.41E-03 | 4.21E-02 | 6.37E-01 | 1.33E-06 | 2.61E-05 | 6.25E-04 | 1.18E-02 | 1.88E-01 |
| 150 | 1.92E-06 | 3.61E-05 | 6.16E-04 | 8.71E-03 | 1.08E-01 | 6.61E-07 | 9.79E-06 | 1.87E-04 | 2.89E-03 | 3.80E-02 |
| 200 | 6.41E-07 | 8.61E-06 | 1.08E-04 | 1.17E-03 | 1.12E-02 | 2.73E-07 | 2.83E-06 | 4.06E-05 | 4.87E-04 | 5.02E-03 |
| 300 | 1.46E-07 | 1.22E-06 | 9.98E-06 | 7.38E-05 | 4.97E-04 | 8.16E-08 | 5.21E-07 | 4.98E-06 | 4.26E-05 | 3.18E-04 |
| 450 | 3.73E-08 | 1.94E-07 | 1.03E-06 | 5.28E-06 | 2.54E-05 | 2.60E-08 | 1.04E-07 | 6.64E-07 | 4.12E-06 | 2.28E-05 |
| 650 | 1.22E-08 | 4.24E-08 | 1.55E-07 | 5.72E-07 | 2.06E-06 | 9.86E-09 | 2.70E-08 | 1.18E-07 | 5.50E-07 | 2.38E-06 |
| 1000 | 3.90E-09 | 8.89E-09 | 2.18E-08 | 5.64E-08 | 1.49E-07 | 3.52E-09 | 6.57E-09 | 1.83E-08 | 6.08E-08 | 2.01E-07 |
| 2000 | 8.85E-10 | 1.25E-09 | 1.87E-09 | 2.99E-09 | 5.14E-09 | 8.64E-10 | 1.08E-09 | 1.62E-09 | 2.96E-09 | 6.16E-09 |

Z = 16 K1 SHELL ER = 2.4720E 00 KFY

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 4.37E 00 | 2.56E 02 | 1.24E 04 | 5.75E 05 | 2.67E 07 | 9.68E-01 | 6.03E 01 | 3.28E 03 | 1.76E 05 | 9.45E 06 |
| 17 | 2.99E 00 | 1.61E 02 | 7.13E 03 | 3.04E 05 | 1.30E 07 | 6.77E-01 | 3.73E 01 | 1.84E 03 | 8.95E 04 | 4.37E 06 |
| 20 | 1.83E 00 | 8.73E 01 | 3.44E 03 | 1.31E 05 | 4.94E 06 | 4.26E-01 | 2.01E 01 | 8.65E 02 | 3.70E 04 | 1.59E 06 |
| 25 | 9.22E-01 | 3.72E 01 | 1.24E 03 | 3.97E 04 | 1.27E 06 | 2.28E-01 | 8.65E 00 | 3.08E 02 | 1.10E 04 | 3.92E 05 |
| 32 | 4.29E-01 | 1.42E 01 | 3.92E 02 | 1.03E 04 | 2.70E 05 | 1.15E-01 | 3.45E 00 | 9.91E 01 | 2.85E 03 | 8.26E 04 |
| 40 | 2.14E-01 | 5.92E 00 | 1.36E 02 | 2.99E 03 | 6.52E 04 | 6.25E-02 | 1.52E 00 | 3.58E 01 | 8.49E 02 | 2.02E 04 |
| 50 | 1.06E-01 | 2.44E 00 | 4.67E 01 | 8.55E 02 | 1.55E 04 | 3.43E-02 | 6.76E-01 | 1.31E 01 | 2.55E 02 | 4.98E 03 |
| 65 | 4.61E-02 | 8.55E-01 | 1.32E 01 | 1.94E 02 | 2.81E 03 | 1.71E-02 | 2.66E-01 | 4.07E 00 | 6.27E 01 | 9.71E 02 |
| 80 | 2.38E-02 | 3.71E-01 | 4.81E 00 | 5.94E 01 | 7.24E 02 | 9.96E-03 | 1.28E-01 | 1.64E 00 | 2.10E 01 | 2.70E 02 |
| 100 | 1.17E-02 | 1.51E-01 | 1.63E 00 | 1.67E 01 | 1.69E 02 | 5.62E-03 | 5.95E-02 | 6.24E-01 | 6.57E 00 | 6.96E 01 |
| 120 | 6.56E-03 | 7.27E-02 | 6.74E-01 | 5.95E 00 | 5.16E 01 | 3.55E-03 | 3.21E-02 | 2.88E-01 | 2.59E 00 | 2.34E 01 |
| 150 | 3.24E-03 | 2.98E-02 | 2.31E-01 | 1.70E 00 | 1.22E 01 | 2.04E-03 | 1.53E-02 | 1.14E-01 | 8.45E-01 | 6.31E 00 |
| 200 | 1.32E-03 | 9.57E-03 | 5.89E-02 | 3.44E-01 | 1.98E 00 | 1.02E-03 | 6.06E-03 | 3.55E-02 | 2.08E-01 | 1.22E 00 |
| 300 | 3.87E-04 | 2.03E-03 | 9.15E-03 | 3.94E-02 | 1.66E-01 | 3.93E-04 | 1.73E-03 | 7.42E-03 | 3.17E-02 | 1.36E-01 |
| 450 | 1.24E-04 | 4.75E-04 | 1.61E-03 | 5.21E-03 | 1.66E-02 | 1.59E-04 | 5.33E-04 | 1.72E-03 | 5.53E-03 | 1.77E-02 |
| 650 | 4.91E-05 | 1.46E-04 | 3.89E-04 | 1.00E-03 | 2.54E-03 | 7.33E-05 | 1.97E-04 | 5.08E-04 | 1.30E-03 | 3.29E-03 |
| 1000 | 1.96E-05 | 4.47E-05 | 9.42E-05 | 1.93E-04 | 3.88E-04 | 3.14E-05 | 6.75E-05 | 1.39E-04 | 2.83E-04 | 5.70E-04 |
| 2000 | 6.17E-06 | 1.03E-05 | 1.63E-05 | 2.53E-05 | 3.86E-05 | 9.24E-06 | 1.51E-05 | 2.37E-05 | 3.68E-05 | 5.63E-05 |
| 6000 | 1.55E-06 | 1.91E-06 | 2.33E-06 | 2.83E-06 | 3.40E-06 | 1.88E-06 | 2.32E-06 | 2.83E-06 | 3.42E-06 | 4.12E-06 |

Z = 16 L1 SHELL ER = 2.2900E-01 KFY

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 3.08E-01 | 1.74E 01 | 8.00E 02 | 3.49E 04 | 1.48E 06 | 7.59E-02 | 5.37E 00 | 3.42E 02 | 2.16E 04 | 1.38E 06 |
| 17 | 2.13E-01 | 1.11E 01 | 4.69E 02 | 1.89E 04 | 7.49E 05 | 5.31E-02 | 3.28E 00 | 1.85E 02 | 1.04E 04 | 5.88E 05 |
| 20 | 1.32E-01 | 6.09E 00 | 2.31E 02 | 8.38E 03 | 2.99E 05 | 3.34E-02 | 1.73E 00 | 8.36E 01 | 4.03E 03 | 1.96E 05 |
| 25 | 6.73E-02 | 2.64E 00 | 8.54E 01 | 2.64E 03 | 8.06E 04 | 1.79E-02 | 7.31E-01 | 2.85E 01 | 1.11E 03 | 4.37E 04 |
| 32 | 3.17E-02 | 1.03E 00 | 2.76E 01 | 7.08E 02 | 1.79E 04 | 9.00E-03 | 2.86E-01 | 8.80E 00 | 2.72E 02 | 8.47E 03 |
| 40 | 1.59E-02 | 4.33E-01 | 9.75E 00 | 2.10E 02 | 4.46E 03 | 4.89E-03 | 1.24E-01 | 3.09E 00 | 7.75E 01 | 1.95E 03 |
| 50 | 7.96E-03 | 1.81E-01 | 3.40E 00 | 6.11E 01 | 1.08E 03 | 2.68E-03 | 5.49E-02 | 1.11E 00 | 2.24E 01 | 4.59E 02 |
| 65 | 3.50E-03 | 6.39E-02 | 9.72E-01 | 1.41E 01 | 2.01E 02 | 1.34E-03 | 2.13E-02 | 3.37E-01 | 5.36E 00 | 8.58E 01 |
| 80 | 1.82E-03 | 2.80E-02 | 3.59E-01 | 4.38E 00 | 5.27E 01 | 7.77E-04 | 1.02E-02 | 1.34E-01 | 1.76E 00 | 2.33E 01 |
| 100 | 8.96E-04 | 1.15E-02 | 1.22E-01 | 1.24E 00 | 1.24E 01 | 4.38E-03 | 4.73E-03 | 5.05E-02 | 5.42E-01 | 5.86E 00 |
| 120 | 5.04E-04 | 5.54E-03 | 5.10E-02 | 4.46E-01 | 3.84E 00 | 2.77E-04 | 2.54E-03 | 2.31E-02 | 2.11E-01 | 1.94E 00 |
| 150 | 2.49E-04 | 2.28E-03 | 1.75E-02 | 1.28E-01 | 9.20E-01 | 1.59E-04 | 1.21E-03 | 9.07E-03 | 6.83E-02 | 5.17E-01 |
| 200 | 1.02E-04 | 7.36E-04 | 4.51E-03 | 2.62E-02 | 1.50E-01 | 7.91E-05 | 4.76E-04 | 2.81E-03 | 1.67E-02 | 9.90E-02 |
| 300 | 3.00E-05 | 1.57E-04 | 7.05E-04 | 3.03E-03 | 1.27E-02 | 3.06E-05 | 1.36E-04 | 5.85E-04 | 2.52E-03 | 1.09E-02 |
| 450 | 9.60E-06 | 3.69E-05 | 1.25E-04 | 4.03E-04 | 1.28E-03 | 1.24E-05 | 4.17E-05 | 1.35E-04 | 4.36E-04 | 1.40E-03 |
| 650 | 3.82E-06 | 1.13E-05 | 3.03E-05 | 7.79E-05 | 1.97E-04 | 5.72E-06 | 1.54E-05 | 3.99E-05 | 1.02E-04 | 2.60E-04 |
| 1000 | 1.52E-06 | 3.48E-06 | 7.34E-06 | 1.50E-05 | 3.03E-05 | 2.44E-06 | 5.27E-06 | 1.09E-05 | 2.22E-05 | 4.48E-05 |
| 2000 | 4.80E-07 | 7.99E-07 | 1.27E-06 | 1.97E-06 | 3.02E-06 | 7.20E-07 | 1.17E-06 | 1.85E-06 | 2.87E-06 | 4.41E-06 |

Z = 16 L2 SHFLB EB = 1.6500E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.34E-02 | 3.96E 00 | 7.61E 02 | 9.79E 04 | 1.03E 07 | 3.00E-03 | 4.08E-01 | 4.23E 01 | 3.87E 03 | 3.28E 05 |
| 17 | 8.25E-03 | 2.09E 00 | 3.52E 02 | 4.03E 04 | 3.76E 06 | 2.00E-03 | 2.41E-01 | 2.22E 01 | 1.81E 03 | 1.37E 05 |
| 20 | 4.36E-03 | 9.08E-01 | 1.30E 02 | 1.27E 04 | 1.02E 06 | 1.18E-03 | 1.21E-01 | 9.62E 00 | 6.75E 02 | 4.40E 04 |
| 25 | 1.81E-03 | 2.89E-01 | 3.29E 01 | 2.61E 03 | 1.70E 05 | 5.70E-04 | 4.71E-02 | 3.04E 00 | 1.74E 02 | 9.22E 03 |
| 32 | 6.78E-04 | 8.18E-02 | 7.22E 00 | 4.52E 02 | 2.35E 04 | 2.55E-04 | 1.66E-02 | 8.50E-01 | 3.86E 01 | 1.63E 03 |
| 40 | 2.78E-04 | 2.61E-02 | 1.84E 00 | 9.33E 01 | 3.93E 03 | 1.23E-04 | 6.45E-03 | 2.68E-01 | 9.93E 00 | 3.42E 02 |
| 50 | 1.14E-04 | 8.38E-03 | 4.71E-01 | 1.93E 01 | 6.62E 02 | 5.92E-05 | 2.51E-03 | 8.49E-02 | 2.56E 00 | 7.17E 01 |
| 65 | 3.98E-05 | 2.21E-03 | 9.57E-02 | 3.07E 00 | 8.25E 01 | 2.51E-05 | 8.29E-04 | 2.20E-02 | 5.22E-01 | 1.15E 01 |
| 80 | 1.74E-05 | 7.75E-04 | 2.73E-02 | 7.23E-01 | 1.61E 01 | 1.27E-05 | 3.46E-04 | 7.61E-03 | 1.49E-01 | 2.73E 00 |
| 100 | 7.14E-06 | 2.53E-04 | 7.20E-03 | 1.55E-01 | 2.81E 00 | 6.14E-06 | 1.36E-04 | 2.44E-03 | 3.92E-02 | 5.88E-01 |
| 120 | 3.47E-06 | 1.03E-04 | 2.44E-03 | 4.45E-02 | 6.87E-01 | 3.39E-06 | 6.36E-05 | 9.72E-04 | 1.33E-02 | 1.69E-01 |
| 150 | 1.45E-06 | 3.43E-05 | 6.62E-04 | 9.88E-03 | 1.25E-01 | 1.65E-06 | 2.53E-05 | 3.18E-04 | 3.58E-03 | 3.76E-02 |
| 200 | 4.78E-07 | 8.58E-06 | 1.27E-04 | 1.47E-03 | 1.46E-02 | 6.52E-07 | 7.80E-06 | 7.68E-05 | 6.79E-04 | 6.1E-03 |
| 300 | 1.05E-07 | 1.30E-06 | 1.34E-05 | 1.11E-04 | 7.90E-04 | 1.80E-07 | 1.54E-06 | 1.09E-05 | 6.98E-05 | 4.17E-04 |
| 450 | 2.51E-08 | 2.16E-07 | 1.59E-06 | 9.59E-06 | 5.04E-05 | 5.11E-08 | 3.20E-07 | 1.68E-06 | 7.97E-06 | 3.54E-05 |
| 650 | 7.43E-09 | 4.74E-08 | 2.62E-07 | 1.21E-06 | 4.94E-06 | 1.68E-08 | 8.16E-08 | 3.34E-07 | 1.24E-06 | 4.34E-06 |
| 1000 | 2.02E-09 | 9.30E-09 | 3.77E-08 | 1.32E-07 | 4.15E-07 | 4.83E-09 | 1.79E-08 | 5.67E-08 | 1.65E-07 | 4.49E-07 |
| 2000 | 3.38E-10 | 9.83E-10 | 2.61E-09 | 6.29E-09 | 1.40E-08 | 7.52E-10 | 1.94E-09 | 4.42E-09 | 9.34E-09 | 1.88E-08 |

Z = 16 L3 SHFLB EB = 1.6400E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 2.58E-02 | 7.39E 00 | 1.40E 03 | 1.79E 05 | 1.87E 07 | 1.43E-03 | 6.06E-01 | 1.41E 02 | 1.93E 04 | 2.14E 06 |
| 17 | 1.58E-02 | 3.87E 00 | 6.44E 02 | 7.32E 04 | 6.81E 06 | 9.62E-04 | 3.32E-01 | 6.68E 01 | 8.09E 03 | 7.96E 05 |
| 20 | 8.33E-03 | 1.67E 00 | 2.35E 02 | 2.28E 04 | 1.83E 06 | 5.74E-04 | 1.52E-01 | 2.54E 01 | 2.63E 03 | 2.22E 05 |
| 25 | 3.44E-03 | 5.28E-01 | 5.86E 01 | 4.61E 03 | 2.99E 05 | 2.82E-04 | 5.26E-02 | 6.83E 00 | 5.70E 02 | 3.89E 04 |
| 32 | 1.29E-03 | 1.47E-01 | 1.26E 01 | 7.82E 02 | 4.03E 04 | 1.28E-04 | 1.64E-02 | 1.62E 00 | 1.06E 02 | 5.74E 03 |
| 40 | 5.26E-04 | 4.62E-02 | 3.15E 00 | 1.57E 02 | 6.58E 03 | 6.27E-05 | 5.76E-03 | 4.46E-01 | 2.36E 01 | 1.03E 03 |
| 50 | 2.15E-04 | 1.46E-02 | 7.84E-01 | 3.17E 01 | 1.07E 03 | 3.07E-05 | 2.04E-03 | 1.24E-01 | 5.32E 00 | 1.89E 02 |
| 65 | 7.49E-05 | 3.74E-03 | 1.54E-01 | 4.82E 00 | 1.28E 02 | 1.33E-05 | 6.12E-04 | 2.82E-02 | 9.39E-01 | 2.61E 01 |
| 80 | 3.26E-05 | 1.28E-03 | 4.24E-02 | 1.09E 00 | 2.38E 01 | 6.85E-06 | 2.38E-04 | 8.80E-03 | 2.41E-01 | 5.55E 00 |
| 100 | 1.34E-05 | 4.08E-04 | 1.07E-02 | 2.22E-01 | 3.95E 00 | 3.38E-06 | 8.71E-05 | 2.56E-03 | 5.70E-02 | 1.07E 00 |
| 120 | 6.53E-06 | 1.61E-04 | 3.48E-03 | 6.07E-02 | 9.16E-01 | 1.90E-06 | 3.87E-05 | 9.41E-04 | 1.78E-02 | 2.84E-01 |
| 150 | 2.74E-06 | 5.20E-05 | 8.90E-04 | 1.26E-02 | 1.55E-01 | 9.49E-07 | 1.45E-05 | 2.81E-04 | 4.35E-03 | 5.72E-02 |
| 200 | 9.16E-07 | 1.24E-05 | 1.57E-04 | 1.69E-03 | 1.61E-02 | 3.93E-07 | 4.17E-06 | 6.06E-05 | 7.31E-04 | 7.54E-03 |
| 300 | 2.10E-07 | 1.76E-06 | 1.45E-05 | 1.07E-04 | 7.19E-04 | 1.18E-07 | 7.64E-07 | 7.41E-06 | 6.37E-05 | 4.75E-04 |
| 450 | 5.37E-08 | 2.81E-07 | 1.50E-06 | 7.67E-06 | 3.68E-05 | 3.74E-08 | 1.52E-07 | 9.83E-07 | 6.14E-06 | 3.40E-05 |
| 650 | 1.76E-08 | 6.13E-08 | 2.25E-07 | 8.32E-07 | 2.99E-06 | 1.42E-08 | 3.92E-08 | 1.73E-07 | 8.16E-07 | 3.54E-06 |
| 1000 | 5.61E-09 | 1.29E-08 | 3.16E-08 | 8.19E-08 | 2.17E-07 | 5.06E-09 | 9.51E-09 | 2.67E-08 | 8.99E-08 | 2.98E-07 |
| 2000 | 1.27E-09 | 1.81E-09 | 2.70E-09 | 4.34E-09 | 7.46E-09 | 1.24E-09 | 1.56E-09 | 2.34E-09 | 4.32E-09 | 9.05E-09 |

Z = 17 K1 SHELL ER = 3.8589E-03 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 4.94E 00 | 2.79E 02 | 1.29E 04 | 5.73E 05 | 2.56E 07 | 1.23E 00 | 7.64E 01 | 4.04E 03 | 2.10E 05 | 1.09E 07 |
| 17 | 3.40E 00 | 1.76E 02 | 7.50E 03 | 3.08E 05 | 1.26E 07 | 8.56E-01 | 4.71E 01 | 2.27E 03 | 1.07E 05 | 5.10E 06 |
| 20 | 2.08E 00 | 9.63E 01 | 3.67E 03 | 1.35E 05 | 4.93E 06 | 5.38E-01 | 2.53E 01 | 1.07E 03 | 4.47E 04 | 1.87E 06 |
| 25 | 1.05E 00 | 4.14E 01 | 1.34E 03 | 4.18E 04 | 1.30E 06 | 2.86E 01 | 1.09E 01 | 3.81E 02 | 1.33E 04 | 4.67E 05 |
| 32 | 4.93E-01 | 1.60E 01 | 4.29E 02 | 1.11E 04 | 2.83E 05 | 1.44E-01 | 4.31E 00 | 1.22E 02 | 3.48E 03 | 9.92E 04 |
| 40 | 2.46E-01 | 8.69E 00 | 1.51E 02 | 3.25E 03 | 6.95E 04 | 7.80E-02 | 1.89E 00 | 4.42E 01 | 1.04E 03 | 2.44E 04 |
| 50 | 1.22E-01 | 2.78E 00 | 5.22E 01 | 9.39E 02 | 1.67E 04 | 4.26E-02 | 8.39E-01 | 1.61E 01 | 3.11E 02 | 6.02E 03 |
| 65 | 5.35E-02 | 9.78E-01 | 1.48E 01 | 2.15E 02 | 3.08E 03 | 2.12E-02 | 3.28E-01 | 5.00E 00 | 7.65E 01 | 1.18E 03 |
| 80 | 2.77E-02 | 4.27E-01 | 5.46E 00 | 6.66E 01 | 8.01E 02 | 1.23E-02 | 1.58E-01 | 2.01E 00 | 2.56E 01 | 3.27E 02 |
| 100 | 1.37E-02 | 1.75E-01 | 1.86E 00 | 1.84E 01 | 1.88E 02 | 6.92E-03 | 7.32E-02 | 7.63E-01 | 8.01E 00 | 8.44E 01 |
| 120 | 7.47E-03 | 8.42E-02 | 7.73E-01 | 6.75E 00 | 5.80E 01 | 4.36E-03 | 3.94E-02 | 3.52E-01 | 3.15E 00 | 2.84E 01 |
| 150 | 3.80E-03 | 3.47E-02 | 2.66E-01 | 1.94E 00 | 1.34E 01 | 2.50E-03 | 1.88E-02 | 1.39E-01 | 1.03E 00 | 7.65E 00 |
| 200 | 1.55E-03 | 1.12E-02 | 6.82E-02 | 3.96E-01 | 2.26E 00 | 1.24E-03 | 7.40E-03 | 4.32E-02 | 2.53E-01 | 1.48E 00 |
| 300 | 4.57E-04 | 2.38E-03 | 1.07E-02 | 4.57E-02 | 1.92E-01 | 4.78E-04 | 2.11E-03 | 9.02E-03 | 3.85E-02 | 1.65E-01 |
| 450 | 1.46E-04 | 5.60E-04 | 1.89E-03 | 6.10E-03 | 1.93E-02 | 1.93E-04 | 6.47E-04 | 2.09E-03 | 6.70E-03 | 2.14E-02 |
| 650 | 5.83E-05 | 1.73E-04 | 4.60E-04 | 1.18E-03 | 2.98E-03 | 8.86E-05 | 2.38E-04 | 6.16E-04 | 1.57E-03 | 3.98E-03 |
| 1000 | 2.33E-05 | 5.32E-05 | 1.12E-04 | 2.29E-04 | 4.60E-04 | 3.78E-05 | 8.16E-05 | 1.69E-04 | 3.43E-04 | 6.90E-04 |
| 2000 | 7.32E-06 | 1.22E-05 | 1.94E-05 | 3.02E-05 | 4.63E-05 | 1.11E-05 | 1.81E-05 | 2.86E-05 | 4.44E-05 | 6.81E-05 |
| 6000 | 1.84E-06 | 2.27E-06 | 2.78E-06 | 3.37E-06 | 4.07E-06 | 2.23E-06 | 2.76E-06 | 3.38E-06 | 4.10E-06 | 4.94E-06 |

Z = 17 L1 SHELL ER = 2.7000E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 3.54E-01 | 1.92E 01 | 8.40E 02 | 3.45E 04 | 1.37E 06 | 9.90E-02 | 7.12E 00 | 4.53E 02 | 2.85E 04 | 1.80E 06 |
| 17 | 2.46E-01 | 1.23E 01 | 4.99E 02 | 1.92E 04 | 7.17E 05 | 6.71E-02 | 4.33E 00 | 2.44E 02 | 1.36E 04 | 7.68E 05 |
| 20 | 1.53E-01 | 6.82E 00 | 2.49E 02 | 8.67E 03 | 2.96E 05 | 4.34E-02 | 2.28E 00 | 1.10E 02 | 5.27E 03 | 2.55E 05 |
| 25 | 7.85E-02 | 2.99E 00 | 9.36E 01 | 2.80E 03 | 8.25E 04 | 2.31E-02 | 9.56E-01 | 3.72E 01 | 1.45E 03 | 5.67E 04 |
| 32 | 3.72E-02 | 1.18E 00 | 3.08E 01 | 7.68E 02 | 1.89E 04 | 1.16E-02 | 3.72E-01 | 1.14E 01 | 3.52E 02 | 1.09E 04 |
| 40 | 1.88E-02 | 5.00E-01 | 1.10E 01 | 2.31E 02 | 4.81E 03 | 6.28E-03 | 1.61E-01 | 3.99E 00 | 9.97E 01 | 2.51E 03 |
| 50 | 9.42E-03 | 2.10E-01 | 3.87E 00 | 6.83E 01 | 1.19E 03 | 3.43E-03 | 7.05E-02 | 1.42E 00 | 2.87E 01 | 5.87E 02 |
| 65 | 4.16E-03 | 7.49E-02 | 1.12E 00 | 1.60E 01 | 2.25E 02 | 1.70E-03 | 2.72E-02 | 4.30E-01 | 6.82E 00 | 1.09E 02 |
| 80 | 2.17E-03 | 3.29E-02 | 4.16E-01 | 5.01E 00 | 5.94E 01 | 9.88E-04 | 1.30E-02 | 1.70E-01 | 2.23E 00 | 2.95E 01 |
| 100 | 1.07E-03 | 1.36E-02 | 1.43E-01 | 1.44E 00 | 1.42E 01 | 5.55E-04 | 5.99E-03 | 6.39E-02 | 6.86E-01 | 7.41E 00 |
| 120 | 6.04E-04 | 6.58E-03 | 5.99E-02 | 5.18E-01 | 4.41E 00 | 3.50E-04 | 3.22E-03 | 2.92E-02 | 2.67E-01 | 2.45E 00 |
| 150 | 3.00E-04 | 2.72E-03 | 2.07E-02 | 1.50E-01 | 1.07E 00 | 2.00E-04 | 1.52E-03 | 1.14E-02 | 8.60E-02 | 6.50E-01 |
| 200 | 1.23E-04 | 8.82E-04 | 5.36E-03 | 3.09E-02 | 1.75E-01 | 9.95E-05 | 5.99E-04 | 3.54E-03 | 2.09E-02 | 1.24E-01 |
| 300 | 3.64E-05 | 1.89E-04 | 8.45E-04 | 3.60E-03 | 1.51E-02 | 3.84E-05 | 1.70E-04 | 7.33E-04 | 3.15E-03 | 1.36E-02 |
| 450 | 1.17E-05 | 4.47E-05 | 1.50E-04 | 4.85E-04 | 1.53E-03 | 1.55E-05 | 5.21E-05 | 1.69E-04 | 5.45E-04 | 1.75E-03 |
| 650 | 4.66E-06 | 1.38E-05 | 3.67E-05 | 9.43E-05 | 2.38E-04 | 7.11E-06 | 1.92E-05 | 4.97E-05 | 1.27E-04 | 3.24E-04 |
| 1000 | 1.86E-06 | 4.26E-06 | 8.96E-06 | 1.83E-05 | 3.69E-05 | 3.03E-06 | 6.55E-06 | 1.36E-05 | 2.76E-05 | 5.58E-05 |
| 2000 | 5.86E-07 | 9.78E-07 | 1.56E-06 | 2.42E-06 | 3.72E-06 | 8.86E-07 | 1.45E-06 | 2.30E-06 | 3.57E-06 | 5.4 E-06 |

Z = 17 L2 SHELL EH = 2.0200E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.79E-02 | 5.45E 00 | 1.05E 03 | 1.35E 05 | 1.40E 07 | 4.19E-03 | 5.69E-01 | 5.85E 01 | 5.29E 03 | 4.45E 05 |
| 17 | 1.10E-02 | 2.88E 00 | 4.89E 02 | 5.56E 04 | 5.15E 06 | 2.79E-03 | 3.36E-01 | 3.08E 01 | 2.48E 03 | 1.86E 05 |
| 20 | 5.85E-03 | 1.25E 00 | 1.80E 02 | 1.76E 04 | 1.40E 06 | 1.65E-03 | 1.69E-01 | 1.33E 01 | 9.28E 02 | 6.00E 04 |
| 25 | 2.44E-03 | 4.01E-01 | 4.58E 01 | 3.62E 03 | 2.35E 05 | 8.00E-04 | 6.60E-02 | 4.23E 00 | 2.40E 02 | 1.26E 04 |
| 32 | 9.21E-04 | 1.14E-01 | 1.01E 01 | 6.30E 02 | 3.25E 04 | 3.58E-04 | 2.33E-02 | 1.19E 00 | 5.36E 01 | 2.25E 03 |
| 40 | 3.80E-04 | 3.64E-02 | 2.57E 00 | 1.30E 02 | 5.46E 03 | 1.73E-04 | 9.07E-03 | 3.76E-01 | 1.38E 01 | 4.73E 02 |
| 50 | 1.56E-04 | 1.17E-02 | 6.61E-01 | 2.71E 01 | 9.23E 02 | 8.35E-05 | 3.54E-03 | 1.19E-01 | 3.57E 00 | 9.96E 01 |
| 65 | 5.48E-05 | 3.10E-03 | 1.35E-01 | 4.31E 00 | 1.15E 02 | 3.55E-05 | 1.17E-03 | 3.10E-02 | 7.31E-01 | 1.61E 01 |
| 80 | 2.40E-05 | 1.09E-03 | 3.85E-02 | 1.02E 00 | 2.25E 01 | 1.80E-05 | 4.90E-04 | 1.07E-02 | 2.10E-01 | 3.82E 00 |
| 100 | 9.90E-06 | 3.57E-04 | 1.02E-02 | 2.18E-01 | 3.96E 00 | 8.72E-06 | 1.93E-04 | 3.46E-03 | 5.53E-02 | 8.25E-01 |
| 120 | 4.83E-06 | 1.44E-04 | 3.46E-03 | 6.30E-02 | 9.69E-01 | 4.83E-06 | 9.04E-05 | 1.38E-03 | 1.88E-02 | 2.39E-01 |
| 150 | 2.02E-06 | 4.84E-05 | 9.39E-04 | 1.40E-02 | 1.77E-01 | 2.35E-06 | 3.60E-05 | 4.51E-04 | 5.07E-03 | 5.32E-02 |
| 200 | 6.70E-07 | 1.21E-05 | 1.81E-04 | 2.09E-03 | 2.07E-02 | 9.31E-07 | 1.11E-05 | 1.09E-04 | 9.65E-04 | 7.94E-03 |
| 300 | 1.48E-07 | 1.84E-06 | 1.91E-05 | 1.58E-04 | 1.13E-03 | 2.58E-07 | 2.20E-06 | 1.56E-05 | 9.96E-05 | 5.94E-04 |
| 450 | 3.54E-08 | 3.08E-07 | 2.28E-06 | 1.37E-05 | 7.20E-05 | 7.32E-08 | 4.59E-07 | 2.41E-06 | 1.14E-05 | 5.06E-05 |
| 650 | 1.05E-08 | 6.76E-08 | 3.75E-07 | 1.74E-06 | 7.08E-06 | 2.42E-08 | 1.17E-07 | 4.80E-07 | 1.78E-06 | 6.22E-06 |
| 1000 | 2.87E-09 | 1.33E-08 | 5.41E-08 | 1.90E-07 | 5.97E-07 | 6.92E-09 | 2.58E-08 | 8.18E-08 | 2.37E-07 | 6.47E-07 |
| 2000 | 4.79E-10 | 1.41E-09 | 3.74E-09 | 9.05E-09 | 2.02E-08 | 1.08E-09 | 2.79E-09 | 6.38E-09 | 1.35E-08 | 2.71E-08 |

Z = 17 L3 SHELL EB = 2.0000E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 3.42E-02 | 1.01E 01 | 1.93E 03 | 2.46E 05 | 2.55E 07 | 1.97E-03 | 9.05E-01 | 2.16E 02 | 2.95E 04 | 3.25E 06 |
| 17 | 2.10E-02 | 5.32E 00 | 8.90E 02 | 1.01E 05 | 9.26E 06 | 1.32E-03 | 4.94E-01 | 1.02E 02 | 1.23E 04 | 1.21E 06 |
| 20 | 1.11E-02 | 2.30E 00 | 3.25E 02 | 3.15E 04 | 2.50E 06 | 7.90E-04 | 2.26E-01 | 3.86E 01 | 3.99E 03 | 3.36E 05 |
| 25 | 4.63E-03 | 7.28E-01 | 8.13E 01 | 6.37E 03 | 4.11E 05 | 3.84E-04 | 7.78E-02 | 1.03E 01 | 8.60E 02 | 5.85E 04 |
| 32 | 1.74E-03 | 2.03E-01 | 1.75E 01 | 1.08E 03 | 5.55E 04 | 1.77E-04 | 2.41E-02 | 2.43E 00 | 1.59E 02 | 8.60E 03 |
| 40 | 7.14E-04 | 6.41E-02 | 4.38E 00 | 2.19E 02 | 9.09E 03 | 8.68E-05 | 8.46E-03 | 6.66E-01 | 3.53E 01 | 1.54E 03 |
| 50 | 2.93E-04 | 2.02E-02 | 1.09E 00 | 4.41E 01 | 1.49E 03 | 4.26E-05 | 2.99E-03 | 1.85E-01 | 7.91E 00 | 2.81E 02 |
| 65 | 1.03E-04 | 5.21E-03 | 2.15E-01 | 6.72E 00 | 1.78E 02 | 1.85E-05 | 8.91E-04 | 4.17E-02 | 1.39E 00 | 3.87E 01 |
| 80 | 4.48E-05 | 1.79E-03 | 5.93E-02 | 1.52E 00 | 3.32E 01 | 9.54E-06 | 3.45E-04 | 1.30E-02 | 3.57E-01 | 8.19E 00 |
| 100 | 1.85E-05 | 5.70E-04 | 1.50E-02 | 3.10E-01 | 5.52E 00 | 4.71E-06 | 1.26E-04 | 3.75E-03 | 8.40E-02 | 1.58E 00 |
| 120 | 9.03E-06 | 2.25E-04 | 4.88E-03 | 8.52E-02 | 1.28E 00 | 2.66E-06 | 5.58E-05 | 1.38E-03 | 2.61E-02 | 4.17E-01 |
| 150 | 3.80E-06 | 7.29E-05 | 1.25E-03 | 1.77E-02 | 2.17E-01 | 1.33E-06 | 2.08E-05 | 4.10E-04 | 6.37E-03 | 8.37E-02 |
| 200 | 1.27E-06 | 1.74E-05 | 2.21E-04 | 2.38E-03 | 2.27E-02 | 5.50E-07 | 5.99E-06 | 8.83E-05 | 1.07E-03 | 1.10E-02 |
| 300 | 2.93E-07 | 2.48E-06 | 2.04E-05 | 1.51E-04 | 1.01E-03 | 1.65E-07 | 1.09E-06 | 1.07E-05 | 9.26E-05 | 6.92E-04 |
| 450 | 7.50E-08 | 3.95E-07 | 2.12E-06 | 1.08E-05 | 5.20E-05 | 5.25E-08 | 2.17E-07 | 1.42E-06 | 8.90E-06 | 4.94E-05 |
| 650 | 2.46E-08 | 8.63E-08 | 3.18E-07 | 1.18E-06 | 4.23E-06 | 1.99E-08 | 5.55E-08 | 2.49E-07 | 1.18E-06 | 5.12E-06 |
| 1000 | 7.85E-09 | 1.81E-08 | 4.46E-08 | 1.16E-07 | 3.07E-07 | 7.09E-09 | 1.34E-08 | 3.81E-08 | 1.29E-07 | 4.29E-07 |
| 2000 | 1.78E-09 | 2.53E-09 | 3.80E-09 | 6.11E-09 | 1.05E-08 | 1.74E-09 | 2.19E-09 | 3.30E-09 | 6.13E-09 | 1.29E-08 |

Z = 18 K1 SHELL ER = 3.2030E 00 KEV

| EG | F1 | F2 | F3 | F4 | F5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 5.53E 00 | 2.99E 02 | 1.32E 04 | 5.60E 05 | 2.34E 07 | 1.54E 00 | 9.56E 01 | 4.91E 03 | 2.46E 05 | 1.23E 07 |
| 17 | 3.81E 00 | 1.91E 02 | 7.78E 01 | 3.07E 05 | 1.21E 07 | 1.07E 00 | 5.84E 01 | 2.76E 03 | 1.27E 05 | 5.82E 06 |
| 20 | 2.34E 00 | 1.05E 02 | 3.86E 03 | 1.37E 05 | 4.83E 06 | 6.71E-01 | 3.15E 01 | 1.30E 03 | 5.31E 04 | 2.17E 06 |
| 25 | 1.19E 00 | 4.55E 01 | 1.43E 03 | 4.34E 04 | 1.31E 06 | 3.56E-01 | 1.35E 01 | 4.65E 02 | 1.59E 04 | 5.48E 05 |
| 32 | 5.60E-01 | 1.78E 01 | 4.65E 02 | 1.17E 04 | 2.92E 05 | 1.78E-01 | 5.33E 00 | 1.49E 02 | 4.18E 03 | 1.17E 05 |
| 40 | 2.81E-01 | 7.48E 00 | 1.65E 02 | 3.49E 03 | 7.31E 04 | 9.63E-02 | 2.33E 00 | 5.39E 01 | 1.25E 03 | 2.90E 04 |
| 50 | 1.40E-01 | 3.12E 00 | 5.77E 01 | 1.02E 03 | 1.78E 04 | 5.24E-02 | 1.03E 00 | 1.96E 01 | 3.75E 02 | 7.20E 03 |
| 65 | 6.15E-02 | 1.11E 00 | 1.66E 01 | 2.36E 02 | 3.33E 03 | 2.60E-02 | 4.02E-01 | 6.07E 00 | 9.23E 01 | 1.41E 03 |
| 80 | 3.19E-02 | 4.85E-01 | 6.13E 00 | 7.38E 01 | 8.76E 02 | 1.50E-02 | 1.93E-01 | 2.43E 00 | 3.08E 01 | 3.93E 02 |
| 100 | 1.58E-02 | 2.00E-01 | 2.10E 00 | 2.11E 01 | 2.08E 02 | 8.44E-03 | 8.91E-02 | 9.25E-01 | 9.65E 00 | 1.01E 02 |
| 120 | 8.88E-03 | 9.66E-02 | 8.77E-01 | 7.58E 00 | 6.45E 01 | 5.30E-03 | 4.27E-02 | 4.25E-01 | 3.79E 00 | 3.40E 01 |
| 150 | 4.41E-03 | 3.99E-02 | 3.03E-01 | 2.19E 00 | 1.55E 01 | 3.03E-03 | 2.27E-02 | 1.67E-01 | 1.24E 00 | 9.18E 00 |
| 200 | 1.80E-03 | 1.29E-02 | 7.82E-02 | 4.50E-01 | 2.55E 00 | 1.50E-03 | 8.94E-03 | 5.21E-02 | 3.04E-01 | 1.78E 00 |
| 300 | 5.34E-04 | 2.76E-03 | 1.23E-02 | 5.24E-02 | 2.19E-01 | 5.77E-04 | 2.54E-03 | 1.09E-02 | 4.62E-02 | 1.97E-01 |
| 450 | 1.72E-04 | 6.54E-04 | 2.20E-03 | 7.06E-03 | 2.23E-02 | 2.32E-04 | 7.78E-04 | 2.51E-03 | 8.04E-03 | 2.57E-02 |
| 650 | 6.85E-05 | 2.03E-04 | 5.38E-04 | 1.38E-03 | 3.47E-03 | 1.06E-04 | 2.86E-04 | 7.39E-04 | 1.88E-03 | 4.77E-03 |
| 1000 | 2.73E-05 | 6.26E-05 | 1.32E-04 | 2.69E-04 | 5.40E-04 | 4.50E-05 | 9.76E-05 | 2.02E-04 | 4.10E-04 | 8.27E-04 |
| 2000 | 8.60E-06 | 1.44E-05 | 2.30E-05 | 3.57E-05 | 5.48E-05 | 1.31E-05 | 2.16E-05 | 3.42E-05 | 5.31E-05 | 8.14E-05 |
| 4000 | 2.15E-06 | 2.67E-06 | 3.27E-06 | 3.98E-06 | 4.81E-06 | 2.61E-06 | 3.25E-06 | 4.00E-06 | 4.86E-06 | 5.87E-06 |

Z = 18 L1 SHELL ER = 3.2000E-01 KEV

| EG | F1 | F2 | F3 | F4 | F5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 4.03E-01 | 2.09E 01 | 8.64E 02 | 3.34E 04 | 1.22E 06 | 1.27E-01 | 9.32E 00 | 5.91E 02 | 3.70E 04 | 2.33E 06 |
| 17 | 2.81E-01 | 1.35E 01 | 5.21E 02 | 1.89E 04 | 6.64E 05 | 8.86E-02 | 5.64E 00 | 3.17E 02 | 1.77E 04 | 9.89E 05 |
| 20 | 1.75E-01 | 7.53E 00 | 2.64E 02 | 8.78E 03 | 2.85E 05 | 5.56E-02 | 2.96E 00 | 1.42E 02 | 6.80E 03 | 3.27E 05 |
| 25 | 9.03E-02 | 3.34E 00 | 1.01E 02 | 2.91E 03 | 8.25E 04 | 2.95E-02 | 1.23E 00 | 4.78E 01 | 1.86E 03 | 7.25E 04 |
| 32 | 4.30E-02 | 1.33E 00 | 3.37E 01 | 8.18E 02 | 1.96E 04 | 1.47E-02 | 4.76E-01 | 1.46E 01 | 4.49E 02 | 1.39E 04 |
| 40 | 2.18E-02 | 5.69E-01 | 1.22E 01 | 2.51E 02 | 5.08E 03 | 7.45E-03 | 2.05E-01 | 5.08E 00 | 1.27E 02 | 3.18E 03 |
| 50 | 1.10E-02 | 2.41E-01 | 4.35E 00 | 7.51E 01 | 1.28E 03 | 4.33E-03 | 8.94E-02 | 1.80E 00 | 3.64E 01 | 7.41E 02 |
| 65 | 4.87E-03 | 8.64E-02 | 1.27E 00 | 1.78E 01 | 2.46E 02 | 2.14E-03 | 3.44E-02 | 5.42E-01 | 8.59E 00 | 1.37E 02 |
| 80 | 2.55E-03 | 3.82E-02 | 4.76E-01 | 5.64E 00 | 6.60E 01 | 1.24E-03 | 1.64E-02 | 2.13E-01 | 2.80E 00 | 3.69E 01 |
| 100 | 1.27E-03 | 1.58E-02 | 1.65E-01 | 1.63E 00 | 1.59E 01 | 6.45E-04 | 7.51E-03 | 8.00E-02 | 8.57E-01 | 9.25E 00 |
| 120 | 7.15E-04 | 7.71E-03 | 6.93E-02 | 5.93E-01 | 4.99E 00 | 4.36E-04 | 4.02E-03 | 3.64E-02 | 3.32E-01 | 3.05E 00 |
| 150 | 3.56E-04 | 3.20E-03 | 2.41E-02 | 1.73E-01 | 1.22E 00 | 2.49E-04 | 1.90E-03 | 1.42E-02 | 1.07E-01 | 8.07E-01 |
| 200 | 1.46E-04 | 1.04E-03 | 6.28E-03 | 3.60E-02 | 2.02E-01 | 1.23E-04 | 7.43E-04 | 4.39E-03 | 2.59E-02 | 1.54E-01 |
| 300 | 4.35E-05 | 2.25E-04 | 9.99E-04 | 4.23E-03 | 1.76E-02 | 4.74E-05 | 2.10E-04 | 9.07E-04 | 3.89E-03 | 1.67E-02 |
| 450 | 1.40E-05 | 5.34E-05 | 1.79E-04 | 5.74E-04 | 1.81E-03 | 1.71E-05 | 6.43E-05 | 2.09E-04 | 6.72E-04 | 2.16E-03 |
| 650 | 5.61E-06 | 1.66E-05 | 4.40E-05 | 1.13E-04 | 2.84E-04 | 8.72E-06 | 2.36E-05 | 6.12E-05 | 1.57E-04 | 3.98E-04 |
| 1000 | 2.24E-06 | 5.14E-06 | 1.08E-05 | 2.21E-05 | 4.44E-05 | 3.70E-06 | 8.04E-06 | 1.67E-05 | 3.40E-05 | 6.86E-05 |
| 2000 | 7.05E-07 | 1.18E-06 | 1.89E-06 | 2.94E-06 | 4.51E-06 | 1.08E-06 | 1.77E-06 | 2.81E-06 | 4.37E-06 | 6.72E-06 |

Z = 18 L2 SHELL EB = 2.4700E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 2.33E-02 | 7.34E 00 | 1.43E 03 | 1.81E 05 | 1.87E 07 | 5.71E-03 | 7.74E-01 | 7.88E 01 | 7.06E 03 | 5.88E 05 |
| 17 | 1.44E-02 | 3.88E 00 | 6.62E 02 | 7.49E 04 | 6.88E 06 | 3.82E-03 | 4.58E-01 | 4.16E 01 | 3.32E 03 | 2.47E 05 |
| 20 | 7.68E-03 | 1.69E 00 | 2.45E 02 | 2.37E 04 | 1.88E 06 | 2.26E-03 | 2.31E-01 | 1.81E 01 | 1.25E 03 | 7.99E 04 |
| 25 | 3.22E-03 | 5.43E-01 | 6.23E 01 | 4.90E 03 | 3.16E 05 | 1.10E-03 | 9.03E-02 | 5.75E 00 | 3.23E 02 | 1.69E 04 |
| 32 | 1.22E-03 | 1.54E-01 | 1.37E 01 | 8.56E 02 | 4.39E 04 | 4.92E-04 | 3.19E-02 | 1.62E 00 | 7.26E 01 | 3.03E 03 |
| 40 | 5.06E-04 | 4.95E-02 | 3.52E 00 | 1.78E 02 | 7.41E 03 | 2.38E-04 | 1.25E-02 | 5.14E-01 | 1.88E 01 | 6.39E 02 |
| 50 | 2.09E-04 | 1.60E-02 | 9.05E-01 | 3.70E 01 | 1.26E 03 | 1.15E-04 | 4.87E-03 | 1.63E-01 | 4.87E 00 | 1.35E 02 |
| 65 | 7.37E-05 | 4.24E-03 | 1.85E-01 | 5.91E 00 | 1.58E 02 | 4.91E-05 | 1.62E-03 | 4.26E-02 | 1.00E 00 | 2.19E 01 |
| 80 | 3.24E-05 | 1.49E-03 | 5.31E-02 | 1.40E 00 | 3.09E 01 | 2.30E-05 | 6.78E-04 | 1.48E-02 | 2.88E-01 | 5.22E 00 |
| 100 | 1.34E-05 | 4.90E-04 | 1.40E-02 | 3.01E-01 | 5.44E 00 | 1.21E-05 | 2.67E-04 | 4.77E-03 | 7.62E-02 | 1.13E 00 |
| 120 | 6.56E-06 | 1.99E-04 | 4.78E-03 | 8.69E-02 | 1.33E 00 | 6.70E-06 | 1.25E-04 | 1.91E-03 | 2.59E-02 | 3.28E-01 |
| 150 | 2.75E-06 | 6.68E-05 | 1.30E-03 | 1.94E-02 | 2.45E-01 | 3.26E-06 | 5.01E-05 | 6.26E-04 | 7.02E-03 | 7.33E-02 |
| 200 | 9.16E-07 | 1.68E-05 | 2.51E-04 | 2.91E-03 | 2.87E-02 | 1.30E-06 | 1.55E-05 | 1.52E-04 | 1.34E-03 | 1.10E-02 |
| 300 | 2.04E-07 | 2.56E-06 | 2.66E-05 | 2.20E-04 | 1.57E-03 | 3.60E-07 | 3.08E-06 | 2.18E-05 | 1.39E-04 | 8.26E-04 |
| 450 | 4.88E-08 | 4.29E-07 | 3.18E-06 | 1.92E-05 | 1.01E-04 | 1.02E-07 | 6.44E-07 | 3.37E-06 | 1.59E-05 | 7.06E-05 |
| 650 | 1.46E-08 | 9.43E-08 | 5.25E-07 | 2.43E-06 | 9.92E-06 | 3.39E-08 | 1.65E-07 | 6.74E-07 | 2.50E-06 | 8.71E-06 |
| 1000 | 3.97E-09 | 1.85E-08 | 7.59E-08 | 2.67E-07 | 8.38E-07 | 9.71E-09 | 3.62E-08 | 1.15E-07 | 3.33E-07 | 9.08E-07 |
| 2000 | 6.63E-10 | 1.96E-09 | 5.25E-09 | 1.27E-08 | 2.85E-08 | 1.51E-09 | 3.93E-09 | 8.99E-09 | 1.90E-08 | 3.82E-08 |

Z = 18 L3 SHFLI EB = 2.4500E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 4.43E-02 | 1.36E 01 | 2.61E 03 | 3.29E 05 | 3.38E 07 | 2.64E-03 | 1.32E 00 | 3.21E 02 | 4.39E 04 | 4.81E 06 |
| 17 | 2.73E-02 | 7.15E 00 | 1.20E 03 | 1.35E 05 | 1.23E 07 | 1.78E-03 | 7.18E-01 | 1.51E 02 | 1.83E 04 | 1.78E 06 |
| 20 | 1.46E-02 | 3.10E 00 | 4.39E 02 | 4.23E 04 | 3.33E 06 | 1.06E-03 | 3.28E-01 | 5.71E 01 | 5.91E 03 | 4.94E 05 |
| 25 | 6.08E-03 | 9.81E-01 | 1.10E 02 | 8.58E 03 | 5.50E 05 | 5.24E-04 | 1.12E-01 | 1.52E 01 | 1.27E 03 | 8.58E 04 |
| 32 | 2.30E-03 | 2.75E-01 | 2.38E 01 | 1.47E 03 | 7.47E 04 | 2.39E-04 | 3.47E-02 | 3.55E 00 | 2.34E 02 | 1.26E 04 |
| 40 | 9.48E-04 | 8.68E-02 | 5.96E 00 | 2.96E 02 | 1.23E 04 | 1.17E-04 | 1.21E-02 | 9.70E-01 | 5.14E 01 | 2.24E 03 |
| 50 | 3.90E-04 | 2.74E-02 | 1.49E 00 | 5.99E 01 | 2.01E 03 | 5.77E-05 | 4.27E-03 | 2.68E-01 | 1.15E 01 | 4.07E 02 |
| 65 | 1.37E-04 | 7.09E-03 | 2.93E-01 | 9.16E 00 | 2.41E 02 | 2.51E-05 | 1.27E-03 | 6.01E-02 | 2.01E 00 | 5.58E 01 |
| 80 | 6.01E-05 | 2.44E-03 | 8.11E-02 | 2.08E 00 | 4.52E 01 | 1.30E-05 | 4.90E-04 | 1.87E-02 | 5.14E-01 | 1.18E 01 |
| 100 | 2.49E-05 | 7.77E-04 | 2.05E-02 | 4.25E-01 | 7.52E 00 | 6.42E-06 | 1.78E-04 | 5.38E-03 | 1.21E-01 | 2.27E 00 |
| 120 | 1.22E-05 | 3.07E-04 | 6.69E-03 | 1.17E-01 | 1.75E 00 | 3.63E-06 | 7.87E-05 | 1.97E-03 | 3.74E-02 | 5.98E-01 |
| 150 | 5.14E-06 | 9.97E-05 | 1.72E-03 | 2.42E-02 | 2.97E-01 | 1.81E-06 | 2.93E-05 | 5.85E-04 | 9.11E-03 | 1.20E-01 |
| 200 | 1.73E-06 | 2.39E-05 | 3.04E-04 | 3.27E-03 | 3.11E-02 | 7.52E-07 | 8.40E-06 | 1.25E-04 | 1.52E-03 | 1.57E-02 |
| 300 | 3.99E-07 | 3.40E-06 | 2.81E-05 | 2.08E-04 | 1.39E-03 | 2.26E-07 | 1.52E-06 | 1.52E-05 | 1.32E-04 | 9.84E-04 |
| 450 | 1.02E-07 | 5.43E-07 | 2.92E-06 | 1.50E-05 | 7.16E-05 | 7.18E-08 | 3.01E-07 | 2.00E-06 | 1.26E-05 | 7.01E-05 |
| 650 | 3.36E-08 | 1.19E-07 | 4.38E-07 | 1.62E-06 | 5.35E-06 | 2.73E-08 | 7.68E-08 | 3.49E-07 | 1.66E-06 | 7.25E-06 |
| 1000 | 1.07E-08 | 2.48E-08 | 6.14E-08 | 1.60E-07 | 4.25E-07 | 9.70E-09 | 1.85E-08 | 5.31E-08 | 1.81E-07 | 6.05E-07 |
| 2000 | 2.43E-09 | 3.47E-09 | 5.21E-09 | 8.41E-09 | 1.45E-08 | 2.37E-09 | 3.00E-09 | 4.54E-09 | 8.51E-09 | 1.80E-08 |

Z = 19 K1 SHELL ER = 3.60X0E 00 KEV

| EG | F1 | F2 | F3 | F4 | F5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 6.15E 00 | 3.16E 02 | 1.33E 04 | 5.40E 05 | 2.20E 07 | 1.21E 00 | 1.18E 02 | 5.89E 03 | 2.84E 05 | 1.36E 07 |
| 17 | 4.25E 00 | 2.04E 02 | 7.98E 03 | 3.01E 05 | 1.14E 07 | 1.33E 00 | 7.29E 01 | 3.32E 03 | 1.48E 05 | 6.56E 06 |
| 20 | 2.62E 00 | 1.13E 02 | 4.01E 03 | 1.37E 05 | 4.68E 06 | 8.30E-01 | 3.89E 01 | 1.57E 03 | 6.24E 04 | 2.48E 06 |
| 25 | 1.34E 00 | 4.97E 01 | 1.51E 03 | 4.45E 04 | 1.30E 06 | 4.39E-01 | 1.66E 01 | 5.62E 02 | 1.89E 04 | 6.35E 05 |
| 32 | 6.31E-01 | 1.95E 01 | 4.99E 02 | 1.23E 04 | 2.99E 05 | 2.19E-01 | 6.53E 00 | 1.81E 02 | 4.98E 03 | 1.38E 05 |
| 40 | 3.17E-01 | 8.29E 00 | 1.79E 02 | 3.70E 03 | 7.61E 04 | 1.18E-01 | 2.85E 00 | 6.51E 01 | 1.49E 03 | 3.42E 04 |
| 50 | 1.59E-01 | 3.48E 00 | 6.32E 01 | 1.10E 03 | 1.89E 04 | 6.40E-02 | 1.26E 00 | 2.37E 01 | 4.48E 02 | 8.52E 03 |
| 65 | 7.00E-02 | 1.24E 00 | 1.83E 01 | 2.57E 02 | 3.57E 03 | 3.16E-02 | 4.88E-01 | 7.32E 00 | 1.10E 02 | 1.67E 03 |
| 80 | 3.65E-02 | 5.47E-01 | 6.81E 00 | 8.09E 01 | 9.49E 02 | 1.32E-02 | 2.34E-01 | 2.93E 00 | 3.69E 01 | 4.67E 02 |
| 100 | 1.81E-02 | 2.26E-01 | 2.35E 00 | 2.33E 01 | 2.27E 02 | 1.02E-02 | 1.08E-01 | 1.11E 00 | 1.15E 01 | 1.20E 02 |
| 120 | 1.02E-02 | 1.10E-01 | 9.85E-01 | 8.43E 00 | 7.10E 01 | 6.40E-03 | 5.77E-02 | 5.10E-01 | 4.53E 00 | 4.04E 01 |
| 150 | 5.07E-03 | 4.54E-02 | 3.42E-01 | 2.45E 00 | 1.72E 01 | 3.65E-03 | 2.73E-02 | 2.01E-01 | 1.48E 00 | 1.09E 01 |
| 200 | 2.08E-03 | 1.48E-02 | 8.88E-02 | 5.08E-01 | 2.85E 00 | 1.80E-03 | 1.07E-02 | 6.23E-02 | 3.62E-01 | 2.11E 00 |
| 300 | 6.18E-04 | 3.18E-03 | 1.41E-02 | 5.96E-02 | 2.47E-01 | 6.89E-04 | 3.04E-03 | 1.30E-02 | 5.51E-02 | 2.34E-01 |
| 450 | 1.99E-04 | 7.57E-04 | 2.53E-03 | 8.10E-03 | 2.54E-02 | 2.76E-04 | 9.28E-04 | 2.99E-03 | 9.57E-03 | 3.05E-02 |
| 650 | 7.97E-05 | 2.35E-04 | 6.23E-04 | 1.59E-03 | 4.00E-03 | 1.26E-04 | 3.41E-04 | 8.80E-04 | 2.24E-03 | 5.67E-03 |
| 1000 | 3.19E-05 | 7.30E-05 | 1.53E-04 | 3.13E-04 | 6.28E-04 | 5.31E-05 | 1.16E-04 | 2.40E-04 | 4.87E-04 | 9.81E-04 |
| 2000 | 1.00E-05 | 1.68E-05 | 2.69E-05 | 4.19E-05 | 6.43E-05 | 1.54E-05 | 2.54E-05 | 4.04E-05 | 6.29E-05 | 9.65E-05 |
| 6000 | 2.49E-06 | 3.10E-06 | 3.82E-06 | 4.66E-06 | 5.64E-06 | 3.04E-06 | 3.80E-06 | 4.68E-06 | 5.71E-06 | 6.91E-06 |

Z = 19 L1 SHELL ER = 3.7700E-01 KEV

| EG | F1 | F2 | F3 | F4 | F5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 4.53E-01 | 2.24E 01 | 8.76E 02 | 3.15E 04 | 1.06E 06 | 1.61E-01 | 1.20E 01 | 7.62E 02 | 4.75E 04 | 2.97E 06 |
| 17 | 3.16E-01 | 1.46E 01 | 5.36E 02 | 1.84E 04 | 5.99E 05 | 1.12E-01 | 7.26E 00 | 4.08E 02 | 2.26E 04 | 1.26E 06 |
| 20 | 1.98E-01 | 8.23E 00 | 2.76E 02 | 8.75E 03 | 2.68E 05 | 7.03E-02 | 3.79E 00 | 1.82E 02 | 8.68E 03 | 4.16E 05 |
| 25 | 1.03E-01 | 3.68E 00 | 1.08E 02 | 2.99E 03 | 8.11E 04 | 3.72E-02 | 1.57E 00 | 6.09E 01 | 2.36E 03 | 9.17E 04 |
| 32 | 4.93E-02 | 1.48E 00 | 3.66E 01 | 8.60E 02 | 1.99E 04 | 1.85E-02 | 6.04E-01 | 1.85E 01 | 5.67E 02 | 1.75E 04 |
| 40 | 2.51E-02 | 6.34E-01 | 1.34E 01 | 2.69E 02 | 5.30E 03 | 9.96E-03 | 2.58E-01 | 6.40E 00 | 1.59E 02 | 3.99E 03 |
| 50 | 1.27E-02 | 2.72E-01 | 4.83E 00 | 8.16E 01 | 1.36E 03 | 5.40E-03 | 1.12E-01 | 2.25E 00 | 4.55E 01 | 9.25E 02 |
| 65 | 5.65E-03 | 9.87E-02 | 1.43E 00 | 1.96E 01 | 2.67E 02 | 2.66E-03 | 4.29E-02 | 6.75E-01 | 1.07E 01 | 1.70E 02 |
| 80 | 2.97E-03 | 4.38E-02 | 5.38E-01 | 6.28E 00 | 7.24E 01 | 1.54E-03 | 2.04E-02 | 2.65E-01 | 3.47E 00 | 4.57E 01 |
| 100 | 1.48E-03 | 1.83E-02 | 1.88E-01 | 1.83E 00 | 1.77E 01 | 8.59E-04 | 9.30E-03 | 9.90E-02 | 1.06E 00 | 1.14E 01 |
| 120 | 8.37E-04 | 8.92E-03 | 7.93E-02 | 6.71E-01 | 5.58E 00 | 5.18E-04 | 4.97E-03 | 4.50E-02 | 4.10E-01 | 3.75E 00 |
| 150 | 4.18E-04 | 3.72E-03 | 2.78E-02 | 1.97E-01 | 1.37E 00 | 3.07E-04 | 2.34E-03 | 1.75E-02 | 1.31E-01 | 9.91E-01 |
| 200 | 1.73E-04 | 1.22E-03 | 7.28E-03 | 4.13E-02 | 2.30E-01 | 1.51E-04 | 9.13E-04 | 5.38E-03 | 3.18E-02 | 1.88E-01 |
| 300 | 5.15E-05 | 2.64E-04 | 1.17E-03 | 4.92E-03 | 2.03E-02 | 5.80E-05 | 2.58E-04 | 1.11E-03 | 4.76E-03 | 2.05E-02 |
| 450 | 1.67E-05 | 6.32E-05 | 2.11E-04 | 6.73E-04 | 2.11E-03 | 2.32E-05 | 7.85E-05 | 2.55E-04 | 8.19E-04 | 2.63E-03 |
| 650 | 6.68E-06 | 1.97E-05 | 5.21E-05 | 1.33E-04 | 3.34E-04 | 1.06E-05 | 2.88E-05 | 7.46E-05 | 1.91E-04 | 4.85E-04 |
| 1000 | 2.67E-06 | 6.13E-06 | 1.29E-05 | 2.63E-05 | 5.28E-05 | 4.47E-06 | 9.75E-06 | 2.03E-05 | 4.13E-05 | 8.34E-05 |
| 2000 | 8.39E-07 | 1.41E-06 | 2.26E-06 | 3.52E-06 | 5.41E-06 | 1.29E-06 | 2.14E-06 | 3.40E-06 | 5.30E-06 | 8.16E-06 |

Z = 19 L2 SHELL EB = 2.9700E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 2.97E-02 | 9.70E 00 | 1.90E 03 | 2.40E 05 | 2.45E 07 | 7.65E-03 | 1.03E 00 | 1.04E 02 | 9.26E 03 | 7.64E 05 |
| 17 | 1.84E-02 | 5.13E 00 | 8.82E 02 | 9.91E 04 | 9.03E 06 | 5.11E-03 | 6.12E-01 | 5.52E 01 | 4.37E 03 | 3.22E 05 |
| 20 | 9.87E-03 | 2.24E 00 | 3.26E 02 | 3.15E 04 | 2.47E 06 | 3.03E-03 | 3.10E-01 | 2.40E 01 | 1.64E 03 | 1.05E 05 |
| 25 | 4.16E-03 | 7.21E-01 | 8.32E 01 | 6.52E 03 | 4.17E 05 | 1.47E-03 | 1.21E-01 | 7.67E 00 | 4.28E 02 | 2.22E 04 |
| 32 | 1.59E-03 | 2.05E-01 | 1.84E 01 | 1.14E 03 | 5.83E 04 | 6.63E-04 | 4.30E-02 | 2.16E 00 | 9.65E 01 | 4.00E 03 |
| 40 | 6.61E-04 | 6.62E-02 | 4.72E 00 | 2.38E 02 | 9.87E 03 | 3.22E-04 | 1.68E-02 | 6.89E-01 | 2.51E 01 | 8.48E 02 |
| 50 | 2.74E-04 | 2.14E-02 | 1.22E 00 | 4.97E 01 | 1.68E 03 | 1.56E-04 | 6.58E-03 | 2.20E-01 | 6.52E 00 | 1.80E 02 |
| 65 | 9.73E-05 | 5.68E-03 | 2.49E-01 | 7.96E 00 | 2.12E 02 | 6.65E-05 | 2.19E-03 | 5.75E-02 | 1.34E 00 | 2.93E 01 |
| 80 | 4.29E-05 | 2.01E-03 | 7.17E-02 | 1.84E 00 | 4.15E 01 | 3.39E-05 | 9.20E-04 | 2.00E-02 | 3.88E-01 | 7.00E 00 |
| 100 | 1.78E-05 | 6.61E-04 | 1.90E-02 | 4.07E-01 | 7.33E 00 | 1.65E-05 | 3.63E-04 | 6.47E-03 | 1.03E-01 | 1.52E 00 |
| 120 | 8.74E-06 | 2.69E-04 | 6.48E-03 | 1.18E-01 | 1.80E 00 | 9.13E-06 | 1.71E-04 | 2.59E-03 | 3.51E-02 | 4.43E-01 |
| 150 | 3.68E-06 | 9.04E-05 | 1.77E-03 | 2.63E-02 | 3.31E-01 | 4.45E-06 | 6.83E-05 | 8.52E-04 | 9.52E-03 | 9.92E-02 |
| 200 | 1.23E-06 | 2.28E-05 | 3.41E-04 | 3.96E-03 | 3.90E-02 | 1.77E-06 | 2.12E-05 | 2.08E-04 | 1.82E-03 | 1.49E-02 |
| 300 | 2.74E-07 | 3.48E-06 | 3.64E-05 | 3.01E-04 | 2.14E-03 | 4.93E-07 | 4.22E-06 | 2.98E-05 | 1.90E-04 | 1.13E-03 |
| 450 | 6.61E-08 | 5.85E-07 | 4.36E-06 | 2.63E-05 | 1.38E-04 | 1.41E-07 | 8.85E-07 | 4.63E-06 | 2.19E-05 | 9.66E-05 |
| 650 | 1.97E-08 | 1.29E-07 | 7.20E-07 | 3.34E-06 | 1.36E-05 | 4.65E-08 | 2.27E-07 | 9.28E-07 | 3.44E-06 | 1.20E-05 |
| 1000 | 5.39E-09 | 2.54E-08 | 1.04E-07 | 3.67E-07 | 1.15E-06 | 1.34E-08 | 4.99E-08 | 1.59E-07 | 4.59E-07 | 1.25E-06 |
| 2000 | 9.00E-10 | 2.69E-09 | 7.23E-09 | 1.76E-08 | 3.93E-08 | 2.07E-09 | 5.42E-09 | 1.24E-08 | 2.63E-08 | 5.28E-08 |

Z = 19 L3 SHELL EB = 2.9400E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 5.64E-02 | 1.79E 01 | 3.45E 03 | 4.33E 05 | 4.40E 07 | 3.47E-03 | 1.88E 00 | 4.70E 02 | 6.42E 04 | 6.99E 06 |
| 17 | 3.49E-02 | 9.42E 00 | 1.59E 03 | 1.78E 05 | 1.61E 07 | 2.34E-03 | 1.02E 00 | 2.20E 02 | 2.67E 04 | 2.59E 06 |
| 20 | 1.86E-02 | 4.04E 00 | 5.83E 02 | 5.59E 04 | 4.37E 06 | 1.40E-03 | 4.66E-01 | 8.30E 01 | 8.58E 03 | 7.15E 05 |
| 25 | 7.82E-03 | 1.30E 00 | 1.46E 02 | 1.14E 04 | 7.23E 05 | 6.92E-04 | 1.59E-01 | 2.19E 01 | 1.83E 03 | 1.24E 05 |
| 32 | 2.97E-03 | 3.64E-01 | 3.17E 01 | 1.95E 03 | 9.86E 04 | 3.17E-04 | 4.90E-02 | 5.11E 00 | 3.36E 02 | 1.80E 04 |
| 40 | 1.23E-03 | 1.15E-01 | 7.95E 00 | 3.94E 02 | 1.62E 04 | 1.56E-04 | 1.70E-02 | 1.39E 00 | 7.36E 01 | 3.20E 03 |
| 50 | 5.09E-04 | 3.65E-02 | 1.99E 00 | 7.99E 01 | 2.67E 03 | 7.68E-05 | 5.98E-03 | 3.82E-01 | 1.64E 01 | 5.79E 02 |
| 65 | 1.80E-04 | 9.45E-03 | 3.93E-01 | 1.22E 01 | 3.21E 02 | 3.34E-05 | 1.77E-03 | 8.52E-02 | 2.85E 00 | 7.92E 01 |
| 80 | 7.91E-05 | 3.25E-03 | 1.09E-01 | 2.78E 00 | 6.03E 01 | 1.73E-05 | 6.82E-04 | 2.64E-02 | 7.27E-01 | 1.67E 01 |
| 100 | 3.29E-05 | 1.04E-03 | 2.75E-02 | 5.70E-01 | 1.01E 01 | 8.58E-06 | 2.47E-04 | 7.57E-03 | 1.70E-01 | 3.19E 00 |
| 120 | 1.61E-05 | 4.12E-04 | 9.00E-03 | 1.57E-01 | 2.34E 00 | 4.85E-06 | 1.09E-04 | 2.77E-03 | 5.27E-02 | 8.41E-01 |
| 150 | 6.82E-06 | 1.34E-04 | 2.31E-03 | 3.26E-02 | 3.99E-01 | 2.43E-06 | 4.04E-05 | 8.18E-04 | 1.28E-02 | 1.68E-01 |
| 200 | 2.30E-06 | 3.21E-05 | 4.09E-04 | 4.41E-03 | 4.18E-02 | 1.01E-06 | 1.15E-05 | 1.75E-04 | 2.13E-03 | 2.20E-02 |
| 300 | 5.32E-07 | 4.53E-06 | 3.80E-05 | 2.81E-04 | 1.88E-03 | 3.03E-07 | 2.08E-06 | 2.11E-05 | 1.83E-04 | 1.37E-03 |
| 450 | 1.37E-07 | 7.32E-07 | 3.95E-06 | 2.02E-05 | 9.68E-05 | 9.64E-08 | 4.10E-07 | 2.76E-06 | 1.75E-05 | 9.75E-05 |
| 650 | 4.51E-08 | 1.60E-07 | 5.93E-07 | 2.20E-06 | 7.91E-06 | 3.66E-08 | 1.04E-07 | 4.79E-07 | 2.30E-06 | 1.01E-05 |
| 1000 | 1.44E-08 | 3.34E-08 | 8.24E-08 | 2.16E-07 | 5.76E-07 | 1.30E-08 | 2.49E-08 | 7.25E-08 | 2.50E-07 | 8.37E-07 |
| 2000 | 3.25E-09 | 4.66E-09 | 7.02E-09 | 1.13E-08 | 1.97E-08 | 3.17E-09 | 4.02E-09 | 6.13E-09 | 1.16E-08 | 2.48E-08 |

Z = 20 K1 SHELL EA = 4.0380E 00 K1V

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 6.78E 00 | 3.35E 02 | 1.33E 04 | 5.12E 05 | 1.98E 07 | 2.34E 00 | 1.45E 02 | 6.98E 03 | 3.22E 05 | 1.48E 07 |
| 17 | 4.69E 00 | 2.16E 02 | 8.08E 03 | 2.92E 05 | 1.06E 07 | 1.63E 00 | 8.93E 01 | 3.95E 03 | 1.69E 05 | 7.25E 06 |
| 20 | 2.90E 00 | 1.21E 02 | 4.13E 03 | 1.36E 05 | 4.46E 06 | 1.02E 00 | 4.76E 01 | 1.88E 03 | 7.23E 04 | 2.79E 06 |
| 25 | 1.49E 00 | 5.37E 01 | 1.59E 03 | 4.51E 04 | 1.28E 06 | 5.36E-01 | 2.02E 01 | 6.73E 02 | 2.21E 04 | 7.26E 05 |
| 32 | 7.05E-01 | 2.13E 01 | 5.31E 02 | 1.27E 04 | 3.02E 05 | 2.67E-01 | 7.94E 00 | 2.16E 02 | 5.86E 03 | 1.59E 05 |
| 40 | 3.56E-01 | 9.11E 00 | 1.92E 02 | 3.90E 03 | 7.84E 04 | 1.43E-01 | 3.45E 00 | 7.80E 01 | 1.76E 03 | 3.99E 04 |
| 50 | 1.79E-01 | 3.85E 00 | 6.85E 01 | 1.17E 03 | 1.97E 04 | 7.74E-02 | 1.52E 00 | 2.84E 01 | 5.31E 02 | 9.98E 03 |
| 65 | 7.90E-02 | 1.38E 00 | 2.00E 01 | 2.77E 02 | 3.80E 03 | 3.81E-02 | 5.87E-01 | 8.74E 00 | 1.31E 02 | 1.97E 03 |
| 80 | 4.13E-02 | 6.11E-01 | 7.51E 00 | 8.80E 01 | 1.02E 03 | 2.19E-02 | 2.80E-01 | 3.49E 00 | 4.37E 01 | 5.49E 02 |
| 100 | 2.05E-02 | 2.54E-01 | 2.61E 00 | 2.55E 01 | 2.46E 02 | 1.22E-02 | 1.29E-01 | 1.32E 00 | 1.37E 01 | 1.42E 02 |
| 120 | 1.16E-02 | 1.23E-01 | 1.10E 00 | 9.29E 00 | 7.74E 01 | 7.65E-03 | 6.89E-02 | 6.07E-01 | 5.37E 00 | 4.77E 01 |
| 150 | 5.78E-03 | 5.14E-02 | 3.83E-01 | 2.71E 00 | 1.89E 01 | 4.36E-03 | 3.26E-02 | 2.38E-01 | 1.75E 00 | 1.29E 01 |
| 200 | 2.38E-03 | 1.68E-02 | 1.00E-01 | 5.67E-01 | 3.16E 00 | 2.14E-03 | 1.27E-02 | 7.39E-02 | 4.28E-01 | 2.49E 00 |
| 300 | 7.04E-04 | 3.63E-03 | 1.60E-02 | 6.73E-02 | 2.77E-01 | 8.17E-04 | 3.60E-03 | 1.53E-02 | 6.50E-02 | 2.76E-01 |
| 450 | 2.30E-04 | 8.69E-04 | 2.89E-03 | 9.21E-03 | 2.88E-02 | 3.26E-04 | 1.10E-03 | 3.54E-03 | 1.13E-02 | 3.59E-02 |
| 650 | 9.21E-05 | 2.71E-04 | 7.16E-04 | 1.82E-03 | 4.57E-03 | 1.48E-04 | 4.02E-04 | 1.04E-03 | 2.64E-03 | 6.68E-03 |
| 1000 | 3.68E-05 | 8.45E-05 | 1.77E-04 | 3.61E-04 | 7.24E-04 | 6.23E-05 | 1.36E-04 | 2.83E-04 | 5.74E-04 | 1.16E-03 |
| 2000 | 1.16E-05 | 1.95E-05 | 3.12E-05 | 4.87E-05 | 7.48E-05 | 1.79E-05 | 2.98E-05 | 4.74E-05 | 7.39E-05 | 1.14E-04 |
| 6000 | 2.87E-06 | 3.58E-06 | 4.42E-06 | 5.41E-06 | 6.56E-06 | 3.51E-06 | 4.41E-06 | 5.45E-06 | 6.66E-06 | 8.07E-06 |

Z = 20 L1 SHELL EA = 4.3800E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 5.04E-01 | 2.36E 01 | 8.74E 02 | 2.91E 04 | 8.72E 05 | 2.03E-01 | 1.54E 01 | 9.73E 02 | 6.03E 04 | 3.74E 06 |
| 17 | 3.54E-01 | 1.56E 01 | 5.43E 02 | 1.74E 04 | 5.22E 05 | 1.41E-01 | 9.26E 00 | 5.19E 02 | 2.86E 04 | 1.58E 06 |
| 20 | 2.22E-01 | 8.88E 00 | 2.85E 02 | 8.56E 03 | 2.46E 05 | 8.79E-02 | 4.81E 00 | 2.31E 02 | 1.10E 04 | 5.22E 05 |
| 25 | 1.16E-01 | 4.02E 00 | 1.13E 02 | 3.02E 03 | 7.82E 04 | 4.64E-02 | 1.98E 00 | 7.69E 01 | 2.96E 03 | 1.15E 05 |
| 32 | 5.58E-02 | 1.63E 00 | 3.91E 01 | 8.92E 02 | 1.99E 04 | 2.30E-02 | 7.58E-01 | 2.32E 01 | 7.09E 02 | 2.18E 04 |
| 40 | 2.86E-02 | 7.12E-01 | 1.46E 01 | 2.84E 02 | 5.45E 03 | 1.24E-02 | 3.23E-01 | 7.99E 00 | 1.98E 02 | 4.95E 03 |
| 50 | 1.45E-02 | 3.05E-01 | 5.30E 00 | 8.76E 01 | 1.43E 03 | 6.68E-03 | 1.39E-01 | 2.80E 00 | 5.64E 01 | 1.14E 03 |
| 65 | 6.49E-03 | 1.11E-01 | 1.58E 00 | 2.14E 01 | 2.86E 02 | 3.28E-03 | 5.31E-02 | 8.34E-01 | 1.32E 01 | 2.10E 02 |
| 80 | 3.42E-03 | 4.98E-02 | 6.01E-01 | 6.92E 00 | 7.84E 01 | 1.89E-03 | 2.51E-02 | 3.26E-01 | 4.27E 00 | 5.62E 01 |
| 100 | 1.71E-03 | 2.08E-02 | 2.11E-01 | 2.04E 00 | 1.94E 01 | 1.05E-03 | 1.14E-02 | 1.21E-01 | 1.30E 00 | 1.40E 01 |
| 120 | 9.70E-04 | 1.02E-02 | 8.98E-02 | 7.51E-01 | 6.17E 00 | 6.58E-04 | 6.08E-03 | 5.50E-02 | 5.01E-01 | 4.58E 00 |
| 150 | 4.86E-04 | 4.28E-03 | 3.16E-02 | 2.22E-01 | 1.53E 00 | 3.74E-04 | 2.86E-03 | 2.13E-02 | 1.60E-01 | 1.21E 00 |
| 200 | 2.01E-04 | 1.41E-03 | 8.34E-03 | 4.70E-02 | 2.60E-01 | 1.84E-04 | 1.11E-03 | 6.54E-03 | 3.86E-02 | 2.28E-01 |
| 300 | 6.03E-05 | 3.07E-04 | 1.35E-03 | 5.65E-03 | 2.32E-02 | 7.01E-05 | 3.12E-04 | 1.34E-03 | 5.76E-03 | 2.47E-02 |
| 450 | 1.96E-05 | 7.40E-05 | 2.45E-04 | 7.81E-04 | 2.44E-03 | 2.80E-05 | 9.49E-05 | 3.08E-04 | 9.89E-04 | 3.18E-03 |
| 650 | 7.87E-06 | 2.32E-05 | 6.12E-05 | 1.56E-04 | 3.90E-04 | 1.27E-05 | 3.47E-05 | 9.00E-05 | 2.30E-04 | 5.84E-04 |
| 1000 | 3.15E-06 | 7.23E-06 | 1.52E-05 | 3.10E-05 | 6.21E-05 | 5.34E-06 | 1.17E-05 | 2.44E-05 | 4.97E-05 | 1.00E-04 |
| 2000 | 9.89E-07 | 1.67E-06 | 2.68E-06 | 4.18E-06 | 6.43E-06 | 1.53E-06 | 2.56E-06 | 4.08E-06 | 6.37E-06 | 9.80E-06 |

Z = 20 L2 SHELL ER = 3.5000E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 3.73E-02 | 1.26E 01 | 2.48E 03 | 3.11E 05 | 3.15E 07 | 1.01E-02 | 1.36E 00 | 1.36E 02 | 1.19E 04 | 9.76E 05 |
| 17 | 2.32E-02 | 6.68E 00 | 1.15E 03 | 1.29E 05 | 1.17E 07 | 6.74E-03 | 8.05E-01 | 7.20E 01 | 5.65E 03 | 4.13E 05 |
| 20 | 1.25E-02 | 2.93E 00 | 4.27E 02 | 4.11E 04 | 3.20E 06 | 4.00E-03 | 4.08E-01 | 3.14E 01 | 2.13E 03 | 1.34E 05 |
| 25 | 5.29E-03 | 9.42E-01 | 1.09E 02 | 8.53E 03 | 5.42E 05 | 1.95E-03 | 1.60E-01 | 1.01E 01 | 5.58E 02 | 2.87E 04 |
| 32 | 2.03E-03 | 2.69E-01 | 2.42E 01 | 1.50E 03 | 7.61E 04 | 8.78E-04 | 5.68E-02 | 2.85E 00 | 1.26E 02 | 5.19E 03 |
| 40 | 8.49E-04 | 8.69E-02 | 6.23E 00 | 3.13E 02 | 1.29E 04 | 4.27E-04 | 2.23E-02 | 9.09E-01 | 3.29E 01 | 1.10E 03 |
| 50 | 3.54E-04 | 2.81E-02 | 1.61E 00 | 6.55E 01 | 2.21E 03 | 2.97E-04 | 8.74E-03 | 2.91E-01 | 8.58E 00 | 2.35E 02 |
| 65 | 1.26E-04 | 7.50E-03 | 3.30E-01 | 1.05E 01 | 2.79E 02 | 8.86E-05 | 2.92E-03 | 7.63E-02 | 1.78E 00 | 3.85E 01 |
| 80 | 5.58E-05 | 2.65E-03 | 9.52E-02 | 2.50E 00 | 5.49E 01 | 4.53E-05 | 1.23E-03 | 2.66E-02 | 5.13E-01 | 9.23E 00 |
| 100 | 2.33E-05 | 8.75E-04 | 2.53E-02 | 5.41E-01 | 9.71E 00 | 2.20E-05 | 4.86E-04 | 8.62E-03 | 1.37E-01 | 2.01E 00 |
| 120 | 1.14E-05 | 3.57E-04 | 8.64E-03 | 1.57E-01 | 2.39E 00 | 1.22E-05 | 2.29E-04 | 3.45E-03 | 4.66E-02 | 5.87E-01 |
| 150 | 4.84E-06 | 1.20E-04 | 2.36E-03 | 3.51E-02 | 4.41E-01 | 5.97E-06 | 9.15E-05 | 1.14E-03 | 1.27E-02 | 1.32E-01 |
| 200 | 1.62E-06 | 3.04E-05 | 4.57E-04 | 5.29E-03 | 5.21E-02 | 2.38E-06 | 2.85E-05 | 2.78E-04 | 2.44E-03 | 1.99E-02 |
| 300 | 3.63E-07 | 4.66E-06 | 4.89E-05 | 4.04E-04 | 2.86E-03 | 6.64E-07 | 5.69E-06 | 4.01E-05 | 2.55E-04 | 1.51E-03 |
| 450 | 8.78E-08 | 7.85E-07 | 5.87E-06 | 3.54E 05 | 1.85E-04 | 1.90E-07 | 1.20E-06 | 6.25E-06 | 2.95E-05 | 1.30E-04 |
| 650 | 2.63E-08 | 1.73E-07 | 9.72E-07 | 4.51E-06 | 1.84E-05 | 6.28E-08 | 3.07E-07 | 1.26E-06 | 4.65E-06 | 1.61E-05 |
| 1000 | 7.20E-09 | 3.42E-08 | 1.41E-07 | 4.97E-07 | 1.56E-06 | 1.81E-08 | 6.78E-08 | 2.15E-07 | 6.23E-07 | 1.70E-06 |
| 2000 | 1.20E-09 | 3.62E-09 | 9.78E-09 | 2.38E-08 | 5.34E-08 | 2.79E-09 | 7.35E-09 | 1.69E-08 | 3.58E-08 | 7.18E-08 |

Z = 20 L3 SHELL ER = 3.4700E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 7.05E-02 | 2.32E 01 | 4.50E 03 | 5.60E 05 | 5.64E 07 | 4.50E-03 | 2.63E 00 | 6.75E 02 | 9.21E 04 | 9.98E 06 |
| 17 | 4.38E-02 | 1.22E 01 | 2.08E 03 | 2.30E 05 | 2.07E 07 | 3.04E-03 | 1.43E 00 | 3.16E 02 | 3.82E 04 | 3.68E 06 |
| 20 | 2.35E-02 | 5.31E 00 | 7.61E 02 | 7.25E 04 | 5.62E 06 | 1.82E-03 | 6.50E-01 | 1.18E 02 | 1.22E 04 | 1.01E 06 |
| 25 | 9.90E-03 | 1.69E 00 | 1.91E 02 | 1.48E 04 | 9.35E 05 | 9.00E-04 | 2.21E-01 | 3.11E 01 | 2.59E 03 | 1.75E 05 |
| 32 | 3.78E-03 | 4.74E-01 | 4.15E 01 | 2.54E 03 | 1.28E 05 | 4.12E-04 | 6.79E-02 | 7.20E 00 | 4.74E 02 | 2.53E 04 |
| 40 | 1.58E-03 | 1.50E-01 | 1.04E 01 | 5.16E 02 | 2.11E 04 | 2.03E-04 | 2.35E-02 | 1.95E 00 | 1.03E 02 | 4.49E 03 |
| 50 | 6.54E-04 | 4.77E-02 | 2.62E 00 | 1.05E 02 | 3.49E 03 | 1.00E-04 | 8.24E-03 | 5.34E-01 | 2.29E 01 | 8.09E 02 |
| 65 | 2.32E-04 | 1.24E-02 | 5.17E-01 | 1.61E 01 | 4.20E 02 | 4.37E-05 | 2.43E-03 | 1.19E-01 | 3.98E 00 | 1.10E 02 |
| 80 | 1.02E-04 | 4.27E-03 | 1.43E-01 | 3.66E 00 | 7.91E 01 | 2.27E-05 | 9.32E-04 | 3.66E-02 | 1.01E 00 | 2.32E 01 |
| 100 | 4.26E-05 | 1.37E-03 | 3.63E-02 | 7.51E-01 | 1.32E 01 | 1.13E-05 | 3.37E-04 | 1.05E-02 | 2.36E-01 | 4.42E 00 |
| 120 | 2.10E-05 | 5.42E-04 | 1.19E-02 | 2.07E-01 | 3.09E 00 | 6.37E-06 | 1.48E-04 | 3.81E-03 | 7.28E-02 | 1.16E 00 |
| 150 | 8.89E-06 | 1.76E-04 | 3.06E-03 | 4.31E-02 | 5.27E-01 | 3.19E-06 | 5.49E-05 | 1.12E-03 | 1.76E-02 | 2.32E-01 |
| 200 | 3.01E-06 | 4.24E-05 | 5.43E-04 | 5.84E-03 | 5.53E-02 | 1.33E-06 | 1.56E-05 | 2.39E-04 | 2.93E-03 | 3.02E-02 |
| 300 | 6.99E-07 | 6.06E-06 | 5.04E-05 | 3.73E-04 | 2.49E-03 | 3.99E-07 | 2.80E-06 | 2.87E-05 | 2.51E-04 | 1.88E-03 |
| 450 | 1.80E-07 | 9.69E-07 | 5.25E-06 | 2.69E-05 | 1.29E-04 | 1.27E-07 | 5.49E-07 | 3.74E-06 | 2.39E-05 | 1.33E-04 |
| 650 | 5.94E-08 | 2.12E-07 | 7.88E-07 | 2.92E-06 | 1.05E-05 | 4.83E-08 | 1.39E-07 | 6.48E-07 | 3.13E-06 | 1.37E-05 |
| 1000 | 1.89E-08 | 4.43E-08 | 1.10E-07 | 2.88E-07 | 7.67E-07 | 1.71E-08 | 3.31E-08 | 9.74E-08 | 3.38E-07 | 1.14E-06 |
| 2000 | 4.28E-09 | 6.15E-09 | 9.28E-09 | 1.50E-08 | 2.62E-08 | 4.18E-09 | 5.31E-09 | 8.13E-09 | 1.55E-08 | 3.33E-08 |

Z = 21 K1 SHELL EB = 4.4930E 00 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 7.42E 00 | 3.48E 02 | 1.31E 04 | 4.76E 05 | 1.74E 07 | 2.86E 00 | 1.77E 02 | 8.16E 03 | 3.59E 05 | 1.58E 07 |
| 17 | 5.15E 00 | 2.27E 02 | 8.07E 03 | 2.77E 05 | 9.56E 06 | 1.98E 00 | 1.09E 02 | 4.64E 03 | 1.91E 05 | 7.86E 06 |
| 20 | 3.19E 00 | 1.29E 02 | 4.20E 03 | 1.32E 05 | 4.18E 06 | 1.24E 00 | 5.77E 01 | 2.21E 03 | 8.26E 04 | 3.08E 06 |
| 25 | 1.65E 00 | 5.75E 01 | 1.64E 03 | 4.52E 04 | 1.24E 06 | 6.50E-01 | 2.45E 01 | 7.97E 02 | 2.55E 04 | 8.18E 05 |
| 32 | 7.82E-01 | 2.31E 01 | 5.58E 02 | 1.30E 04 | 3.01E 05 | 3.22E-01 | 9.57E 00 | 2.57E 02 | 6.83E 03 | 1.82E 05 |
| 40 | 3.96E-01 | 9.93E 00 | 2.05E 02 | 4.06E 03 | 7.98E 04 | 1.72E-01 | 4.15E 00 | 9.26E 01 | 2.06E 03 | 4.60E 04 |
| 50 | 2.00E-01 | 4.22E 00 | 7.37E 01 | 1.23E 03 | 2.04E 04 | 9.29E-02 | 1.82E 00 | 3.36E 01 | 6.23E 02 | 1.16E 04 |
| 65 | 8.86E-02 | 1.53E 00 | 2.18E 01 | 2.96E 02 | 4.00E 03 | 4.56E-02 | 7.01E-01 | 1.04E 01 | 1.54E 02 | 2.29E 03 |
| 80 | 4.64E-02 | 6.78E-01 | 8.21E 00 | 9.49E 01 | 1.08E 03 | 2.62E-02 | 3.34E-01 | 4.14E 00 | 5.14E 01 | 6.41E 02 |
| 100 | 2.31E-02 | 2.82E-01 | 2.87E 00 | 2.77E 01 | 2.65E 02 | 1.46E-02 | 1.53E 00 | 1.56E 00 | 1.61E 01 | 1.66E 02 |
| 120 | 1.31E-02 | 1.38E-01 | 1.21E 00 | 1.02E 01 | 8.38E 01 | 9.09E-03 | 8.17E-02 | 7.17E-01 | 6.31E 00 | 5.57E 01 |
| 150 | 6.54E-03 | 5.76E-02 | 4.25E-01 | 2.99E 00 | 2.06E 01 | 5.16E-03 | 3.86E-02 | 2.81E-01 | 2.05E 00 | 1.50E 01 |
| 200 | 2.70E-03 | 1.89E-02 | 1.12E-01 | 6.29E-01 | 3.48E 00 | 2.53E-03 | 1.51E-02 | 8.70E-02 | 5.03E-01 | 2.91E 00 |
| 300 | 8.09E-04 | 4.11E-03 | 1.80E-02 | 7.53E-02 | 3.08E-01 | 9.61E-04 | 4.24E-03 | 1.80E-02 | 7.62E-02 | 3.23E-01 |
| 450 | 2.63E-04 | 9.89E-04 | 3.28E-03 | 1.04E-02 | 3.24E-02 | 3.82E-04 | 1.29E-03 | 4.15E-03 | 1.32E-02 | 4.20E-02 |
| 650 | 1.06E-04 | 3.10E-04 | 8.17E-04 | 2.07E-03 | 5.18E-03 | 1.73E-04 | 4.71E-04 | 1.22E-03 | 3.09E-03 | 7.81E-03 |
| 1000 | 4.23E-05 | 9.70E-05 | 2.04E-04 | 4.14E-04 | 8.29E-04 | 7.25E-05 | 1.59E-04 | 3.30E-04 | 6.71E-04 | 1.35E-03 |
| 2000 | 1.32E-05 | 2.25E-05 | 3.60E-05 | 5.62E-05 | 8.64E-05 | 2.07E-05 | 3.46E-05 | 5.53E-05 | 8.62E-05 | 1.33E-04 |
| 6000 | 3.28E-06 | 4.11E-06 | 5.09E-06 | 6.23E-06 | 7.57E-06 | 4.02E-06 | 5.07E-06 | 6.29E-06 | 7.70E-06 | 9.35E-06 |

Z = 21 L1 SHELL EB = 5.0000E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 5.57E-01 | 2.49E 01 | 8.57E 02 | 2.60E 04 | 6.79E 05 | 2.52E-01 | 1.95E 01 | 1.23E 03 | 7.57E 04 | 4.67E 06 |
| 17 | 3.92E-01 | 1.65E 01 | 5.42E 02 | 1.61E 04 | 4.36E 05 | 1.75E-01 | 1.17E 01 | 6.54E 02 | 3.59E 04 | 1.97E 06 |
| 20 | 2.47E-01 | 9.49E 00 | 2.90E 02 | 8.20E 03 | 2.19E 05 | 1.09E-01 | 6.06E 00 | 2.90E 02 | 1.37E 04 | 6.49E 05 |
| 25 | 1.30E-01 | 4.35E 00 | 1.18E 02 | 3.00E 03 | 7.37E 04 | 5.73E-02 | 2.48E 00 | 9.61E 01 | 3.69E 03 | 1.42E 05 |
| 32 | 6.27E-02 | 1.79E 00 | 4.14E 01 | 9.12E 02 | 1.96E 04 | 2.84E-02 | 9.43E-01 | 2.88E 01 | 8.79E 02 | 2.70E 04 |
| 40 | 3.23E-02 | 7.84E-01 | 1.56E 01 | 2.96E 02 | 5.52E 03 | 1.52E-02 | 4.00E-01 | 9.88E 00 | 2.45E 02 | 6.09E 03 |
| 50 | 1.65E-02 | 3.39E-01 | 5.75E 00 | 9.29E 01 | 1.48E 03 | 8.19E-03 | 1.72E-01 | 3.45E 00 | 6.93E 01 | 1.40E 03 |
| 65 | 7.39E-03 | 1.25E-01 | 1.74E 00 | 2.31E 01 | 3.02E 02 | 4.01E-03 | 6.51E-02 | 1.02E 00 | 1.61E 01 | 2.56E 02 |
| 80 | 3.90E-03 | 5.60E-02 | 6.65E-01 | 7.53E 00 | 8.40E 01 | 2.30E-03 | 3.07E-02 | 3.98E-01 | 5.20E 00 | 6.84E 01 |
| 100 | 1.96E-03 | 2.36E-02 | 2.36E-01 | 2.24E 00 | 2.10E 01 | 1.28E-03 | 1.39E-02 | 1.48E-01 | 1.58E 00 | 1.69E 01 |
| 120 | 1.11E-03 | 1.16E-02 | 1.01E-01 | 8.32E-01 | 6.76E 00 | 7.98E-04 | 7.38E-03 | 6.68E-02 | 6.07E-01 | 5.55E 00 |
| 150 | 5.60E-04 | 4.88E-03 | 3.57E-02 | 2.48E-01 | 1.69E 00 | 4.53E-04 | 3.46E-03 | 2.58E-02 | 1.93E-01 | 1.46E 00 |
| 200 | 2.33E-04 | 1.61E-03 | 9.48E-03 | 5.29E-02 | 2.90E-01 | 2.22E-04 | 1.34E-03 | 7.89E-03 | 4.65E-02 | 2.75E-01 |
| 300 | 7.00E-05 | 3.55E-04 | 1.55E-03 | 6.43E-03 | 2.62E-02 | 8.42E-05 | 3.75E-04 | 1.61E-03 | 6.92E-03 | 2.97E-02 |
| 450 | 2.28E-05 | 8.58E-05 | 2.83E-04 | 8.98E-04 | 2.79E-03 | 3.35E-05 | 1.14E-04 | 3.69E-04 | 1.19E-03 | 3.80E-03 |
| 650 | 9.19E-06 | 2.70E-05 | 7.11E-05 | 1.80E-04 | 4.51E-04 | 1.51E-05 | 4.14E-05 | 1.07E-04 | 2.74E-04 | 6.97E-04 |
| 1000 | 3.68E-06 | 8.46E-06 | 1.78E-05 | 3.62E-05 | 7.25E-05 | 6.34E-06 | 1.40E-05 | 2.91E-05 | 5.94E-05 | 1.20E-04 |
| 2000 | 1.15E-06 | 1.96E-06 | 3.15E-06 | 4.92E-06 | 7.58E-06 | 1.81E-06 | 3.03E-06 | 4.85E-06 | 7.58E-06 | 1.17E-05 |

Z = 21 L2 SHELL EB = 4.0700E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 4.62E-02 | 1.62E 01 | 3.20E 03 | 3.98E 05 | 3.99E 07 | 1.31E-02 | 1.76E 00 | 1.74E 02 | 1.51E 04 | 1.22E 06 |
| 17 | 2.88E-02 | 8.58E 00 | 1.44E 03 | 1.65E 05 | 1.48E 07 | 8.76E-03 | 1.04E 00 | 9.25E 01 | 7.18E 03 | 5.19E 05 |
| 20 | 1.56E-02 | 3.76E 00 | 5.52E 02 | 5.27E 04 | 4.08E 06 | 5.20E-03 | 5.29E-01 | 4.05E 01 | 2.72E 03 | 1.70E 05 |
| 25 | 6.63E-03 | 1.21E 00 | 1.41E 02 | 1.10E 04 | 6.94E 05 | 2.54E-03 | 2.08E-01 | 1.30E 01 | 7.14E 02 | 3.65E 04 |
| 32 | 2.56E-03 | 3.48E-01 | 3.14E 01 | 1.94E 03 | 9.77E 04 | 1.15E-03 | 7.41E-02 | 3.69E 00 | 1.62E 02 | 6.64E 03 |
| 40 | 1.07E-03 | 1.12E-01 | 8.10E 00 | 4.05E 02 | 1.67E 04 | 5.59E-04 | 2.91E-02 | 1.18E 00 | 4.24E 01 | 1.42E 03 |
| 50 | 4.50E-04 | 3.65E-02 | 2.10E 00 | 8.51E 01 | 2.85E 03 | 2.72E-04 | 1.14E-02 | 3.79E-01 | 1.11E 01 | 3.03E 02 |
| 65 | 1.61E-04 | 9.76E-03 | 4.31E-01 | 1.37E 01 | 3.62E 02 | 1.16E-04 | 3.83E-03 | 9.97E-02 | 2.31E 00 | 4.98E 01 |
| 80 | 7.15E-05 | 3.46E-03 | 1.25E-01 | 3.27E 00 | 7.14E 01 | 5.96E-05 | 1.61E-03 | 3.48E-02 | 6.70E-01 | 1.20E 01 |
| 100 | 3.00E-05 | 1.14E-03 | 3.31E-02 | 7.08E-01 | 1.27E 01 | 2.90E-05 | 6.39E-04 | 1.13E-02 | 1.78E-01 | 2.62E 00 |
| 120 | 1.48E-05 | 4.67E-04 | 1.13E-02 | 2.06E-01 | 3.13E 00 | 1.61E-05 | 3.02E-04 | 4.54E-03 | 6.11E-02 | 7.66E-01 |
| 150 | 6.26E-06 | 1.58E-04 | 3.10E-03 | 4.61E-02 | 5.79E-01 | 7.90E-06 | 1.21E-04 | 1.50E-03 | 1.67E-02 | 1.73E-01 |
| 200 | 2.11E-06 | 4.00E-05 | 6.03E-04 | 6.98E-03 | 6.86E-02 | 3.16E-06 | 3.77E-05 | 3.68E-04 | 3.21E-03 | 2.62E-02 |
| 300 | 4.74E-07 | 6.14E-06 | 6.46E-05 | 5.34E-04 | 3.78E-03 | 8.82E-07 | 7.56E-06 | 5.32E-05 | 3.37E-04 | 1.99E-03 |
| 450 | 1.15E-07 | 1.04E-06 | 7.78E-06 | 4.70E-05 | 2.46E-04 | 2.52E-07 | 1.59E-06 | 8.31E-06 | 3.91E-05 | 1.72E-04 |
| 650 | 3.45E-08 | 2.29E-07 | 1.29E-06 | 6.00E-06 | 2.44E-05 | 8.37E-08 | 4.10E-07 | 1.67E-06 | 6.19E-06 | 2.15E-05 |
| 1000 | 9.48E-09 | 4.53E-08 | 1.88E-07 | 6.63E-07 | 2.08E-06 | 2.40E-08 | 9.05E-08 | 2.88E-07 | 8.32E-07 | 2.26E-06 |
| 2000 | 1.58E-09 | 4.80E-09 | 1.30E-08 | 3.19E-08 | 7.14E-08 | 3.72E-09 | 9.84E-09 | 2.26E-08 | 4.80E-08 | 9.63E-08 |

Z = 21 L3 SHELL ER = 4.0200E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 8.69E-02 | 2.97E 01 | 5.77E 03 | 7.14E 05 | 7.12E 07 | 5.75E-03 | 3.63E 00 | 9.54E 02 | 1.30E 05 | 1.40E 07 |
| 17 | 5.41E-02 | 1.56E 01 | 2.67E 03 | 2.94E 05 | 2.62E 07 | 3.88E-03 | 1.97E 00 | 4.45E 02 | 5.37E 04 | 5.16E 06 |
| 20 | 2.91E-02 | 6.80E 00 | 9.79E 02 | 9.27E 04 | 7.13E 06 | 2.33E-03 | 8.94E-01 | 1.66E 02 | 1.72E 04 | 1.42E 06 |
| 25 | 1.24E-02 | 2.17E 00 | 2.47E 02 | 1.90E 04 | 1.19E 06 | 1.15E-03 | 3.04E-01 | 4.34E 01 | 3.62E 03 | 2.43E 05 |
| 32 | 4.74E-03 | 6.10E-01 | 5.36E 01 | 3.26E 03 | 1.63E 05 | 5.30E-04 | 9.28E-02 | 1.00E 01 | 6.58E 02 | 3.51E 04 |
| 40 | 1.98E-03 | 1.94E-01 | 1.35E 01 | 6.64E 02 | 2.71E 04 | 2.62E-04 | 3.21E-02 | 2.69E 00 | 1.43E 02 | 6.20E 03 |
| 50 | 8.27E-04 | 6.16E-02 | 3.39E 00 | 1.35E 02 | 4.48E 03 | 1.29E-04 | 1.12E+02 | 7.35E-01 | 3.16E 01 | 1.11E 03 |
| 65 | 2.95E-04 | 1.60E-02 | 6.70E-01 | 2.08E 01 | 5.42E 02 | 5.65E-05 | 3.28E-03 | 1.63E-01 | 5.46E 00 | 1.51E 02 |
| 80 | 1.30E-04 | 5.53E-03 | 1.86E-01 | 4.75E 00 | 1.02E 02 | 2.94E-05 | 1.26E-03 | 5.00E-02 | 1.38E 00 | 3.17E 01 |
| 100 | 5.45E-05 | 1.77E-03 | 4.73E-02 | 9.75E-01 | 1.71E 01 | 1.46E-05 | 4.53E-04 | 1.43E-02 | 3.22E-01 | 6.03E 00 |
| 120 | 2.69E-05 | 7.04E-04 | 1.55E-02 | 2.69E-01 | 4.00E 00 | 8.26E-06 | 1.99E-04 | 5.18E-03 | 9.91E-02 | 1.58E 00 |
| 150 | 1.14E-05 | 2.29E-04 | 3.99E-03 | 5.62E-02 | 6.84E-01 | 4.14E-06 | 7.33E-05 | 1.52E-03 | 2.39E-02 | 3.15E-01 |
| 200 | 3.88E-06 | 5.52E-05 | 7.09E-04 | 7.62E-03 | 7.20E-02 | 1.72E-06 | 2.08E-05 | 3.23E-04 | 3.96E-03 | 4.09E-02 |
| 300 | 9.03E-07 | 7.90E-06 | 6.59E-05 | 4.87E-04 | 3.25E-03 | 5.19E-07 | 3.72E-06 | 3.86E-05 | 3.39E-04 | 2.54E-03 |
| 450 | 2.34E-07 | 1.26E-06 | 6.87E-06 | 3.52E-05 | 1.68E-04 | 1.65E-07 | 7.24E-07 | 5.01E-06 | 3.21E-05 | 1.79E-04 |
| 650 | 7.70E-08 | 2.76E-07 | 1.03E-06 | 3.83E-06 | 1.38E-05 | 6.27E-08 | 1.83E-07 | 8.63E-07 | 4.20E-06 | 1.84E-05 |
| 1000 | 2.46E-08 | 5.77E-08 | 1.44E-07 | 3.77E-07 | 1.01E-06 | 2.23E-08 | 4.33E-08 | 1.29E-07 | 4.51E-07 | 1.52E-06 |
| 2000 | 5.54E-09 | 8.00E-09 | 1.21E-08 | 1.96E-08 | 3.43E-08 | 5.41E-09 | 6.90E-09 | 1.06E-08 | 2.04E-08 | 4.42E-08 |

Z = 22 K1 SHELL FR = 4.9650E 00 KEV

| EG | E1 | F2 | F3 | F4 | F5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 8.07E 00 | 3.59E 02 | 1.27E 04 | 4.34E 05 | 1.49E 07 | 3.45E 00 | 2.13E 02 | 9.41E 03 | 3.94E 05 | 1.64E 07 |
| 17 | 5.62E 00 | 2.37E 02 | 7.98E 03 | 2.60E 05 | 8.52E 06 | 2.34E 00 | 1.30E 02 | 5.38E 03 | 2.12E 05 | 8.75E 06 |
| 20 | 3.50E 00 | 1.35E 02 | 4.22E 03 | 1.27E 05 | 3.86E 06 | 1.49E 00 | 6.93E 01 | 2.58E 03 | 9.30E 04 | 3.35E 06 |
| 25 | 1.81E 00 | 6.12E 01 | 1.64E 03 | 4.48E 04 | 1.19E 06 | 7.79E-01 | 2.93E 01 | 9.33E 02 | 2.91E 04 | 9.08E 05 |
| 32 | 8.63E-01 | 2.48E 01 | 5.83E 02 | 1.32E 04 | 2.98E 05 | 3.35E-01 | 1.14E 01 | 3.02E 02 | 7.86E 03 | 2.05E 05 |
| 40 | 4.39E-01 | 1.08E 01 | 2.17E 02 | 4.19E 03 | 8.06E 04 | 2.05E-01 | 4.44E 00 | 1.09E 02 | 2.38E 03 | 5.24E 04 |
| 50 | 2.22E-01 | 4.60E 00 | 7.87E 01 | 1.24E 03 | 2.10E 04 | 1.11E-01 | 2.16E 00 | 3.95E 01 | 7.23E 02 | 1.33E 04 |
| 65 | 9.87E-02 | 1.68E 00 | 2.35E 01 | 3.15E 02 | 4.17E 03 | 5.40E-02 | 8.30E-01 | 1.22E 01 | 1.79E 02 | 2.64E 03 |
| 80 | 5.18E-02 | 7.47E-01 | 8.91E 00 | 1.02E 02 | 1.14E 03 | 3.09E-02 | 3.95E-01 | 4.85E 00 | 5.98E 01 | 7.40E 02 |
| 100 | 2.59E-02 | 3.13E-01 | 3.13E 00 | 2.94E 01 | 2.82E 02 | 1.72E-02 | 1.80E-01 | 1.83E 00 | 1.87E 01 | 1.92E 02 |
| 120 | 1.47E-02 | 1.53E-01 | 1.33E 00 | 1.10E 01 | 9.00E 01 | 1.07E-02 | 9.61E-02 | 8.39E-01 | 7.34E 00 | 6.45E 01 |
| 150 | 7.36E-03 | 6.42E-02 | 4.64E-01 | 3.26E 00 | 2.23E 01 | 6.08E-03 | 4.52E-02 | 3.28E-01 | 2.39E 00 | 1.74E 01 |
| 200 | 3.05E-03 | 2.11E-02 | 1.24E-01 | 6.93E-01 | 3.80E 00 | 2.26E-03 | 1.76E-02 | 1.01E-01 | 5.85E-01 | 3.38E 00 |
| 300 | 9.16E-04 | 4.63E-03 | 2.02E-02 | 8.37E-02 | 3.41E-01 | 1.12E-03 | 4.95E-03 | 2.10E-02 | 8.85E-02 | 3.74E-01 |
| 450 | 2.94E-04 | 1.12E-03 | 3.64E-03 | 1.17E-02 | 3.62E-02 | 4.44E-04 | 1.50E-03 | 4.82E-03 | 1.53E-02 | 4.87E-02 |
| 650 | 1.20E-04 | 3.52E-04 | 9.26E-04 | 2.34E-03 | 5.84E-03 | 2.01E-04 | 5.48E-04 | 1.41E-03 | 3.58E-03 | 9.04E-03 |
| 1000 | 4.82E-05 | 1.11E-04 | 2.32E-04 | 4.71E-04 | 9.43E-04 | 8.38E-05 | 1.85E-04 | 3.84E-04 | 7.80E-04 | 1.57E-03 |
| 2000 | 1.51E-05 | 2.57E-05 | 4.12E-05 | 6.45E-05 | 9.92E-05 | 2.38E-05 | 4.00E-05 | 6.40E-05 | 9.99E-05 | 1.54E-04 |
| 6000 | 3.72E-06 | 4.68E-06 | 5.91E-06 | 7.13E-06 | 8.68E-06 | 4.57E-06 | 5.80E-06 | 7.21E-06 | 8.85E-06 | 1.08E-05 |

Z = 22 L1 SHELL FR = 5.6400E-01 KEV

| EG | F1 | F2 | F3 | F4 | F5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 6.10E-01 | 2.59E 01 | 8.26E 02 | 2.25E 04 | 4.93E 05 | 3.10E-01 | 2.45E 01 | 1.54E 03 | 9.42E 04 | 5.76E 06 |
| 17 | 4.30E-01 | 1.73E 01 | 5.33E 02 | 1.46E 04 | 3.48E 05 | 2.15E-01 | 1.46E 01 | 8.17E 02 | 4.46E 04 | 2.43E 06 |
| 20 | 2.72E-01 | 1.00E 01 | 2.91E 02 | 7.72E 03 | 1.89E 05 | 1.34E-01 | 7.55E 00 | 3.61E 02 | 1.70E 04 | 7.99E 05 |
| 25 | 1.44E-01 | 4.66E 00 | 1.21E 02 | 2.93E 03 | 6.81E 04 | 7.02E-02 | 3.08E 00 | 1.19E 02 | 4.55E 03 | 1.75E 05 |
| 32 | 6.99E-02 | 1.93E 00 | 4.34E 01 | 9.21E 02 | 1.90E 04 | 3.47E-02 | 1.16E 00 | 3.55E 01 | 1.08E 03 | 3.30E 04 |
| 40 | 3.61E-02 | 8.57E-01 | 1.66E 01 | 3.05E 02 | 5.52E 03 | 1.85E-02 | 4.91E-01 | 1.21E 01 | 2.99E 02 | 7.43E 03 |
| 50 | 1.85E-02 | 3.73E-01 | 6.18E 00 | 9.75E 01 | 1.51E 03 | 9.95E-03 | 2.10E-01 | 4.21E 00 | 8.45E 01 | 1.71E 03 |
| 65 | 8.34E-03 | 1.38E-01 | 1.89E 00 | 2.46E 01 | 3.16E 02 | 4.85E-03 | 7.92E-02 | 1.24E 00 | 1.96E 01 | 3.11E 02 |
| 80 | 4.42E-03 | 6.25E-02 | 7.30E-01 | 8.12E 00 | 8.91E 01 | 2.78E-03 | 3.72E-02 | 4.82E-01 | 6.29E 00 | 8.25E 01 |
| 100 | 2.23E-03 | 2.64E-02 | 2.60E-01 | 2.44E 00 | 2.26E 01 | 1.54E-03 | 1.68E-02 | 1.78E-01 | 1.90E 00 | 2.04E 01 |
| 120 | 1.27E-03 | 1.31E-02 | 1.12E-01 | 9.13E-01 | 7.32E 00 | 9.59E-04 | 8.89E-03 | 8.03E-02 | 7.29E-01 | 6.66E 00 |
| 150 | 6.40E-04 | 5.52E-03 | 3.94E-02 | 2.74E-01 | 1.85E 00 | 5.42E-04 | 4.15E-03 | 3.10E-02 | 2.32E-01 | 1.74E 00 |
| 200 | 2.67E-04 | 1.83E-03 | 1.07E-02 | 5.91E-02 | 3.21E-01 | 2.65E-04 | 1.61E-03 | 9.44E-03 | 5.55E-02 | 3.28E-01 |
| 300 | 8.06E-05 | 4.05E-04 | 1.76E-03 | 7.25E-03 | 2.94E-02 | 1.00E-04 | 4.48E-04 | 1.92E-03 | 8.24E-03 | 3.53E-02 |
| 450 | 2.64E-05 | 9.87E-05 | 3.25E-04 | 1.02E-03 | 3.17E-03 | 3.97E-05 | 1.35E-04 | 4.38E-04 | 1.41E-03 | 4.51E-03 |
| 650 | 1.06E-05 | 3.12E-05 | 8.19E-05 | 2.07E-04 | 5.17E-04 | 1.79E-05 | 4.90E-05 | 1.27E-04 | 3.25E-04 | 8.26E-04 |
| 1000 | 4.27E-06 | 9.82E-06 | 2.06E-05 | 4.19E-05 | 8.39E-05 | 7.45E-06 | 1.65E-05 | 3.44E-05 | 7.03E-05 | 1.42E-04 |
| 2000 | 1.34E-06 | 2.28E-06 | 3.67E-06 | 5.74E-06 | 8.85E-06 | 2.11E-06 | 3.56E-06 | 5.72E-06 | 8.95E-06 | 1.38E-05 |

Z = 22 L2 SHELL EH = 4.6100E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 5.63E-02 | 2.05E 01 | 4.07E 03 | 5.03E 05 | 4.99E 07 | 1.67E-02 | 2.25E 00 | 2.21E 02 | 1.90E 04 | 1.52E 06 |
| 17 | 3.53E-02 | 1.09E 01 | 1.90E 03 | 2.09E 05 | 1.86E 07 | 1.12E-02 | 1.34E 00 | 1.17E 02 | 9.02E 03 | 6.46E 05 |
| 20 | 1.91E-02 | 4.77E 00 | 7.04E 02 | 6.68E 04 | 5.13E 06 | 6.68E-03 | 6.78E-01 | 5.14E 01 | 3.43E 03 | 2.12E 05 |
| 25 | 8.19E-03 | 1.54E 00 | 1.81E 02 | 1.40E 04 | 8.76E 05 | 3.27E-03 | 2.67E-01 | 1.66E 01 | 9.03E 02 | 4.58E 04 |
| 32 | 3.18E-03 | 4.43E-01 | 4.02E 01 | 2.47E 03 | 1.24E 05 | 1.48E-03 | 9.53E-02 | 4.71E 00 | 2.06E 02 | 8.37E 03 |
| 40 | 1.34E-03 | 1.44E-01 | 1.04E 01 | 5.18E 02 | 2.12E 04 | 7.21E-04 | 3.75E-02 | 1.51E 00 | 5.41E 01 | 1.80E 03 |
| 50 | 5.64E-04 | 4.66E-02 | 2.69E 00 | 1.09E 02 | 3.64E 03 | 3.51E-04 | 1.48E-02 | 4.86E-01 | 1.42E 01 | 3.86E 02 |
| 65 | 2.03E-04 | 1.25E-02 | 5.56E-01 | 1.76E 01 | 4.63E 02 | 1.51E-04 | 4.95E-03 | 1.28E-01 | 2.96E 00 | 6.35E 01 |
| 80 | 9.04E-05 | 4.44E-03 | 1.61E-01 | 4.21E 00 | 9.17E 01 | 7.73E-05 | 2.09E-03 | 4.50E-02 | 8.61E-01 | 1.53E 01 |
| 100 | 3.80E-05 | 1.47E-03 | 4.28E-02 | 9.14E-01 | 1.63E 01 | 3.77E-05 | 8.30E-04 | 1.46E-02 | 2.30E-01 | 3.37E 00 |
| 120 | 1.88E-05 | 6.02E-04 | 1.47E-02 | 2.66E-01 | 4.04E 00 | 2.10E-05 | 3.92E-04 | 5.89E-03 | 7.89E-02 | 9.86E-01 |
| 150 | 7.99E-06 | 2.04E-04 | 4.03E-03 | 5.98E-02 | 7.48E-01 | 1.03E-05 | 1.58E-04 | 1.95E-03 | 2.16E-02 | 2.23E+01 |
| 200 | 2.70E-06 | 5.18E-05 | 7.84E-04 | 9.07E-03 | 8.89E-02 | 4.13E-06 | 4.93E-05 | 4.79E-04 | 4.17E-03 | 3.39E-02 |
| 300 | 6.10E-07 | 7.98E-06 | 8.43E-05 | 6.97E-04 | 4.93E-03 | 1.15E-06 | 9.90E-06 | 6.96E-05 | 4.39E-04 | 2.59E-03 |
| 450 | 1.49E-07 | 1.35E-06 | 1.02E-05 | 6.15E-05 | 3.21E-04 | 3.32E-07 | 2.09E-06 | 1.09E-05 | 5.12E-05 | 2.25E-04 |
| 650 | 4.47E-08 | 3.00E-07 | 1.69E-06 | 7.88E-06 | 3.20E-05 | 1.10E-07 | 5.39E-07 | 2.20E-06 | 8.13E-06 | 2.82E-05 |
| 1000 | 1.23E-08 | 5.93E-08 | 2.47E-07 | 8.72E-07 | 2.74E-06 | 3.16E-08 | 1.19E-07 | 3.79E-07 | 1.10E-06 | 2.98E-06 |
| 2000 | 2.05E-09 | 6.28E-09 | 1.72E-08 | 4.20E-08 | 9.42E-08 | 4.88E-09 | 1.30E-08 | 2.99E-08 | 6.34E-08 | 1.27E-07 |

Z = 22 L3 SHELL EH = 4.5500E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.06E-01 | 3.74E 01 | 7.31E 03 | 8.97E 05 | 8.85E 07 | 7.24E-03 | 4.94E 00 | 1.33E 03 | 1.81E 05 | 1.93E 07 |
| 17 | 6.60E-02 | 1.97E 01 | 3.38E 03 | 3.70E 05 | 3.26E 07 | 4.89E-03 | 2.68E 00 | 6.17E 02 | 7.45E 04 | 7.11E 06 |
| 20 | 3.57E-02 | 8.59E 00 | 1.24E 03 | 1.17E 05 | 8.91E 06 | 2.94E-03 | 1.21E 00 | 2.30E 02 | 2.37E 04 | 1.95E 06 |
| 25 | 1.52E-02 | 2.74E 00 | 3.13E 02 | 2.40E 04 | 1.49E 06 | 1.46E-03 | 4.10E-01 | 5.98E 01 | 4.98E 03 | 3.33E 05 |
| 32 | 5.87E-03 | 7.73E-01 | 6.82E 01 | 4.14E 03 | 2.06E 05 | 6.71E-04 | 1.25E-01 | 1.37E 01 | 9.01E 02 | 4.79E 04 |
| 40 | 2.46E-03 | 2.46E-01 | 1.72E 01 | 8.44E 02 | 3.42E 04 | 3.32E-04 | 4.31E-02 | 3.68E 00 | 1.95E 02 | 8.44E 03 |
| 50 | 1.03E-03 | 7.83E-02 | 4.33E 00 | 1.72E 02 | 5.68E 03 | 1.64E-04 | 1.50E-02 | 9.99E-01 | 4.29E 01 | 1.51E 03 |
| 65 | 3.69E-04 | 2.04E-02 | 8.58E-01 | 2.66E 01 | 6.89E 02 | 7.18E-05 | 4.38E-03 | 2.20E-01 | 7.39E 00 | 2.04E 02 |
| 80 | 1.64E-04 | 7.06E-03 | 2.39E-01 | 6.07E 00 | 1.30E 02 | 3.74E-05 | 1.67E-03 | 6.74E-02 | 1.87E 00 | 4.27E 01 |
| 100 | 6.87E-05 | 2.27E-03 | 6.06E-02 | 1.25E 00 | 2.18E 01 | 1.86E-05 | 6.01E-04 | 1.92E-02 | 4.33E-01 | 8.11E 00 |
| 120 | 3.39E-05 | 9.01E-04 | 1.99E-02 | 3.45E-01 | 5.12E 00 | 1.05E-05 | 2.63E-04 | 6.95E-03 | 1.33E-01 | 2.12E 00 |
| 150 | 1.45E-05 | 2.94E-04 | 5.13E-03 | 7.21E-02 | 8.76E-01 | 5.29E-06 | 9.68E-05 | 2.04E-03 | 3.20E-02 | 4.21E-01 |
| 200 | 4.93E-06 | 7.08E-05 | 9.12E-04 | 9.80E-03 | 9.24E-02 | 2.21E-06 | 2.73E-05 | 4.31E-04 | 5.29E-03 | 5.47E-02 |
| 300 | 1.15E-06 | 1.01E-05 | 8.50E-05 | 6.28E-04 | 4.18E-03 | 6.64E-07 | 4.86E-06 | 5.11E-05 | 4.50E-04 | 3.38E-03 |
| 450 | 2.99E-07 | 1.63E-06 | 8.87E-06 | 4.55E-05 | 2.17E-04 | 2.12E-07 | 9.41E-07 | 6.59E-06 | 4.24E-05 | 2.38E-04 |
| 650 | 9.85E-08 | 3.55E-07 | 1.33E-06 | 4.95E-06 | 1.78E-05 | 8.03E-08 | 2.36E-07 | 1.13E-06 | 5.54E-06 | 2.44E-05 |
| 1000 | 3.14E-08 | 7.42E-08 | 1.86E-07 | 4.88E-07 | 1.30E-06 | 2.85E-08 | 5.58E-08 | 1.68E-07 | 5.93E-07 | 2.01E-06 |
| 2000 | 7.08E-09 | 1.02E-08 | 1.55E-08 | 2.53E-08 | 4.42E-08 | 6.92E-09 | 8.84E-09 | 1.37E-08 | 2.65E-08 | 5.78E-08 |

Z = 23 K1 SHELL ER = 5.4650E 00 KEV

| EG | F1 | F2 | F3 | F4 | F5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 8.74E 00 | 3.67E 02 | 1.21E 04 | 3.88E 05 | 1.25E 07 | 4.14E 00 | 2.55E 02 | 1.08E 04 | 4.25E 05 | 1.67E 07 |
| 17 | 6.10E 00 | 2.44E 02 | 7.78E 03 | 2.40E 05 | 7.42E 06 | 2.86E 00 | 1.56E 02 | 6.14E 03 | 2.33E 05 | 8.72E 06 |
| 20 | 3.80E 00 | 1.41E 02 | 4.21E 03 | 1.21E 05 | 3.50E 06 | 1.78E 00 | 8.28E 01 | 2.94E 03 | 1.04E 05 | 3.59E 06 |
| 25 | 1.97E 00 | 6.46E 01 | 1.72E 03 | 4.39E 04 | 1.13E 06 | 9.31E-01 | 3.44E 01 | 1.09E 03 | 3.29E 04 | 9.97E 05 |
| 32 | 9.46E-01 | 2.65E 01 | 6.04E 02 | 1.33E 04 | 2.91E 05 | 4.54E-01 | 1.36E 01 | 3.52E 02 | 8.99E 03 | 2.30E 05 |
| 40 | 4.83E-01 | 1.16E 01 | 2.27E 02 | 4.29E 03 | 8.06E 04 | 2.46E-01 | 5.86E 00 | 1.27E 02 | 2.74E 03 | 5.93E 04 |
| 50 | 2.45E-01 | 4.98E 00 | 8.34E 01 | 1.34E 03 | 2.14E 04 | 1.31E-01 | 2.55E 00 | 4.62E 01 | 8.35E 02 | 1.51E 04 |
| 65 | 1.09E-01 | 1.83E 00 | 2.51E 01 | 3.31E 02 | 4.73E 03 | 6.18E-02 | 9.74E-01 | 1.42E 01 | 2.07E 02 | 3.02E 03 |
| 80 | 5.76E-02 | 8.18E-01 | 9.61E 00 | 1.08E 02 | 1.20E 03 | 3.65E-02 | 4.64E-01 | 5.67E 00 | 6.93E 01 | 8.51E 02 |
| 100 | 2.88E-02 | 3.44E-01 | 3.40E 00 | 3.21E 01 | 2.99E 02 | 2.02E-02 | 2.11E-01 | 2.14E 00 | 2.17E 01 | 2.21E 02 |
| 120 | 1.64E-02 | 1.64E-01 | 1.45E 00 | 1.19E 01 | 9.60E 01 | 1.26E-02 | 1.13E-01 | 9.77E-01 | 8.51E 00 | 7.44E 01 |
| 150 | 8.23E-03 | 7.11E-02 | 5.14E-01 | 3.54E 00 | 2.40E 01 | 7.09E-03 | 5.29E-02 | 3.82E-01 | 2.77E 00 | 2.01E 01 |
| 200 | 3.42E-03 | 2.35E-02 | 1.37E-01 | 7.58E-01 | 4.12E 00 | 3.46E-03 | 2.05E-02 | 1.18E-01 | 6.77E-01 | 3.90E 00 |
| 300 | 1.03E-03 | 5.18E-03 | 2.24E-02 | 9.24E-02 | 3.74E-01 | 1.30E-03 | 5.75E-03 | 2.43E-02 | 1.02E-01 | 4.32E-01 |
| 450 | 3.37E-04 | 1.26E-03 | 4.13E-03 | 1.30E-02 | 4.01E-02 | 5.14E-04 | 1.74E-03 | 5.54E-03 | 1.77E-02 | 5.62E-02 |
| 650 | 1.36E-04 | 3.98E-04 | 1.04E-03 | 2.63E-03 | 6.54E-03 | 2.31E-04 | 6.34E-04 | 1.63E-03 | 4.14E-03 | 1.04E-02 |
| 1000 | 5.46E-05 | 1.25E-04 | 2.63E-04 | 5.33E-04 | 1.07E-03 | 9.63E-05 | 2.13E-04 | 4.43E-04 | 9.00E-04 | 1.81E-03 |
| 2000 | 1.71E-05 | 2.92E-05 | 4.70E-05 | 7.35E-05 | 1.13E-04 | 2.71E-05 | 4.59E-05 | 7.37E-05 | 1.15E-04 | 1.77E-04 |
| 6000 | 4.19E-06 | 5.29E-06 | 6.59E-06 | 8.11E-06 | 9.89E-06 | 5.17E-06 | 6.54E-06 | 8.22E-06 | 1.01E-05 | 1.23E-05 |

Z = 23 L1 SHELL ER = 6.2800E-01 KEV

| EG | E1 | E2 | E3 | E4 | F5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 6.63E-01 | 2.66E 01 | 7.84E 02 | 1.89E 04 | 3.26E 05 | 3.78E-01 | 3.05E 01 | 1.91E 03 | 1.16E 05 | 7.06E 06 |
| 17 | 4.70E-01 | 1.79E 01 | 5.17E 02 | 1.28E 04 | 2.62E 05 | 2.62E-01 | 1.82E 01 | 1.01E 03 | 5.49E 04 | 2.98E 06 |
| 20 | 2.98E-01 | 1.05E 01 | 2.89E 02 | 7.12E 03 | 1.57E 05 | 1.63E-01 | 9.34E 00 | 4.46E 02 | 2.08E 04 | 9.76E 05 |
| 25 | 1.58E-01 | 4.94E 00 | 1.23E 02 | 2.83E 03 | 6.14E 04 | 8.53E-02 | 3.79E 00 | 1.46E 02 | 5.57E 03 | 2.13E 05 |
| 32 | 7.74E-02 | 2.08E 00 | 4.50E 01 | 9.18E 02 | 1.81E 04 | 4.20E-02 | 1.43E 00 | 4.34E 01 | 1.32E 03 | 4.01E 04 |
| 40 | 4.01E-02 | 9.28E-01 | 1.75E 01 | 3.12E 02 | 5.44E 03 | 2.24E-02 | 5.98E-01 | 1.48E 01 | 3.64E 02 | 9.00E 03 |
| 50 | 2.06E-02 | 4.08E-01 | 6.59E 00 | 1.01E 02 | 1.53E 03 | 1.20E-02 | 2.55E-01 | 5.10E 00 | 1.02E 02 | 2.06E 03 |
| 65 | 9.35E-03 | 1.52E-01 | 2.04E 00 | 2.60E 01 | 3.27E 02 | 5.83E-03 | 9.56E-02 | 1.50E 00 | 2.36E 01 | 3.73E 02 |
| 80 | 4.97E-03 | 6.91E-02 | 7.94E-01 | 8.69E 00 | 9.36E 01 | 3.33E-03 | 4.48E-02 | 5.80E-01 | 7.55E 00 | 9.89E 01 |
| 100 | 2.51E-03 | 2.94E-02 | 2.86E-01 | 2.64E 00 | 2.40E 01 | 1.84E-03 | 2.01E-02 | 2.13E-01 | 2.27E 00 | 2.44E 01 |
| 120 | 1.44E-03 | 1.46E-02 | 1.23E-01 | 9.93E-01 | 7.87E 00 | 1.14E-03 | 1.06E-02 | 9.60E-02 | 8.70E-01 | 7.94E 00 |
| 150 | 7.25E-04 | 6.19E-03 | 4.42E-02 | 3.01E-01 | 2.01E 00 | 6.46E-04 | 4.95E-03 | 3.69E-02 | 2.76E-01 | 2.07E 00 |
| 200 | 3.03E-04 | 2.07E-03 | 1.19E-02 | 6.54E-02 | 3.52E-01 | 3.14E-04 | 1.91E-03 | 1.12E-02 | 6.54E-02 | 3.89E-01 |
| 300 | 9.21E-05 | 4.60E-04 | 1.98E-03 | 8.12E-03 | 3.27E-02 | 1.18E-04 | 5.30E-04 | 2.28E-03 | 9.74E-03 | 4.17E-02 |
| 450 | 3.03E-05 | 1.13E-04 | 3.69E-04 | 1.16E-03 | 3.57E-03 | 4.67E-05 | 1.59E-04 | 5.17E-04 | 1.66E-03 | 5.32E-03 |
| 650 | 1.22E-05 | 3.58E-05 | 9.37E-05 | 2.37E-04 | 5.88E-04 | 2.09E-05 | 5.77E-05 | 1.50E-04 | 3.83E-04 | 9.72E-04 |
| 1000 | 4.92E-06 | 1.13E-05 | 2.37E-05 | 4.82E-05 | 9.64E-05 | 8.70E-06 | 1.94E-05 | 4.05E-05 | 8.26E-05 | 1.67E-04 |
| 2000 | 1.54E-06 | 2.63E-06 | 4.25E-06 | 6.65E-06 | 1.03E-05 | 2.45E-06 | 4.16E-06 | 6.69E-06 | 1.05E-05 | 1.62E-05 |

Z = 23 L2 SHELL ER = 5.2000E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 6.79E-02 | 2.56E 01 | 5.11E 03 | 6.26E 05 | 6.15E 07 | 2.12E-02 | 2.84E 00 | 2.76E 02 | 2.34E 04 | 1.85E 06 |
| 17 | 4.27E-02 | 1.36E 01 | 2.38E 03 | 2.61E 05 | 2.30E 07 | 1.42E-02 | 1.69E 00 | 1.47E 02 | 1.12E 04 | 7.92E 05 |
| 20 | 2.32E-02 | 5.98E 00 | 8.86E 02 | 8.36E 04 | 6.36E 06 | 8.46E-03 | 8.57E-01 | 6.45E 01 | 4.26E 03 | 2.61E 05 |
| 25 | 1.00E-02 | 1.94E 00 | 2.28E 02 | 1.75E 04 | 1.09E 06 | 4.15E-03 | 3.39E-01 | 2.08E 01 | 1.13E 03 | 5.67E 04 |
| 32 | 3.90E-03 | 5.57E-01 | 5.09E 01 | 3.11E 03 | 1.55E 05 | 1.88E-03 | 1.21E-01 | 5.95E 00 | 2.58E 02 | 1.04E 04 |
| 40 | 1.65E-03 | 1.81E-01 | 1.32E 01 | 6.53E 02 | 2.66E 04 | 9.19E-04 | 4.77E-02 | 1.92E 00 | 6.80E 01 | 2.24E 03 |
| 50 | 6.98E-04 | 5.89E-02 | 3.42E 00 | 1.38E 02 | 4.58E 03 | 4.49E-04 | 1.88E-02 | 6.17E-01 | 1.79E 01 | 4.84E 02 |
| 65 | 2.52E-04 | 1.58E-02 | 7.07E-01 | 2.24E 01 | 5.85E 02 | 1.93E-04 | 6.32E-03 | 1.63E-01 | 3.75E 00 | 8.00E 01 |
| 80 | 1.13E-04 | 5.64E-03 | 2.05E-01 | 5.35E 00 | 1.16E 02 | 9.90E-05 | 2.67E-03 | 5.73E-02 | 1.09E 00 | 1.94E 01 |
| 100 | 4.76E-05 | 1.87E-03 | 5.46E-02 | 1.16E 00 | 2.07E 01 | 4.84E-05 | 1.06E-03 | 1.87E-02 | 2.93E-01 | 4.27E 00 |
| 120 | 2.36E-05 | 7.67E-04 | 1.88E-02 | 3.39E-01 | 5.14E 00 | 2.70E-05 | 9.03E-04 | 7.54E-03 | 1.01E-01 | 1.25E 00 |
| 150 | 1.01E-05 | 2.60E-04 | 5.16E-03 | 7.65E-02 | 9.55E-01 | 1.32E-05 | 2.03E-04 | 2.50E-03 | 2.76E-02 | 2.84E-01 |
| 200 | 3.41E-06 | 6.62E-05 | 1.01E-03 | 1.16E-02 | 1.14E-01 | 5.32E-06 | 6.35E-05 | 6.16E-04 | 5.35E-03 | 4.33E-02 |
| 300 | 7.75E-07 | 1.02E-05 | 1.09E-04 | 8.97E-04 | 6.33E-03 | 1.49E-06 | 1.28E-05 | 8.92E-05 | 5.66E-04 | 3.33E-03 |
| 450 | 1.89E-07 | 1.74E-06 | 1.32E-05 | 7.94E-05 | 4.14E-04 | 4.29E-07 | 2.71E-06 | 1.41E-05 | 6.62E-05 | 2.91E-04 |
| 650 | 5.72E-08 | 3.86E-07 | 2.19E-06 | 1.02E-05 | 4.15E-05 | 1.43E-07 | 7.00E-07 | 2.86E-06 | 1.05E-05 | 3.64E-05 |
| 1000 | 1.57E-08 | 7.66E-08 | 3.20E-07 | 1.13E-06 | 3.56E-06 | 4.10E-08 | 1.55E-07 | 4.93E-07 | 1.42E-06 | 3.87E-06 |
| 2000 | 2.62E-09 | 8.10E-09 | 2.73E-08 | 5.46E-08 | 1.23E-07 | 6.31E-09 | 1.69E-08 | 3.90E-08 | 8.26E-08 | 1.66E-07 |

Z = 23 L3 SHELL ER = 5.1300E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.27E-01 | 4.66E 01 | 9.14E 03 | 1.11E 06 | 1.09E 08 | 9.01E-03 | 6.61E 00 | 1.83E 03 | 2.48E 05 | 2.64E 07 |
| 17 | 7.95E-02 | 2.46E 01 | 4.23E 03 | 4.60E 05 | 4.02E 07 | 6.09E-03 | 3.58E 00 | 8.46E 02 | 1.02E 05 | 9.68E 06 |
| 20 | 4.31E-02 | 1.07E 01 | 1.56E 03 | 1.46E 05 | 1.10E 07 | 3.66E-03 | 1.62E 00 | 3.14E 02 | 3.23E 04 | 2.65E 06 |
| 25 | 1.85E-02 | 3.42E 00 | 3.93E 02 | 2.99E 04 | 1.85E 06 | 1.82E-03 | 5.47E-01 | 8.12E 01 | 6.76E 03 | 4.51E 05 |
| 32 | 7.16E-03 | 9.67E-01 | 8.58E 01 | 5.18E 03 | 2.56E 05 | 8.38E-04 | 1.66E-01 | 1.85E 01 | 1.22E 03 | 6.46E 04 |
| 40 | 3.02E-03 | 3.08E-01 | 2.16E 01 | 1.06E 03 | 4.26E 04 | 4.16E-04 | 5.70E-02 | 4.95E 00 | 2.63E 02 | 1.13E 04 |
| 50 | 1.27E-03 | 9.83E-02 | 5.46E 00 | 2.16E 02 | 7.10E 03 | 2.06E-04 | 1.98E-02 | 1.34E 00 | 5.76E 01 | 2.02E 03 |
| 65 | 4.56E-04 | 2.57E-02 | 1.08E 00 | 3.35E 01 | 8.64E 02 | 9.02E-05 | 5.76E-03 | 2.94E-01 | 9.87E 00 | 2.72E 02 |
| 80 | 2.03E-04 | 8.90E-03 | 3.02E-01 | 7.66E 00 | 1.64E 02 | 4.70E-05 | 2.19E-03 | 8.96E-02 | 2.49E 00 | 5.68E 01 |
| 100 | 8.55E-05 | 2.86E-03 | 7.68E-02 | 1.58E 00 | 2.75E 01 | 2.34E-05 | 7.86E-04 | 2.54E-02 | 5.75E-01 | 1.08E 01 |
| 120 | 4.23E-05 | 1.14E-03 | 2.52E-02 | 4.37E-01 | 6.46E 00 | 1.33E-05 | 3.43E-04 | 9.19E-03 | 1.76E-01 | 2.81E 00 |
| 150 | 1.81E-05 | 3.72E-04 | 6.51E-03 | 9.14E-02 | 1.11E 00 | 6.68E-06 | 1.26E-04 | 2.69E-03 | 4.23E-02 | 5.57E-01 |
| 200 | 6.18E-06 | 8.97E-05 | 1.16E-03 | 1.24E-02 | 1.17E-01 | 2.79E-06 | 3.54E-05 | 5.66E-04 | 6.97E-03 | 7.21E-02 |
| 300 | 1.45E-06 | 1.29E-05 | 1.08E-04 | 7.99E-04 | 5.31E-03 | 8.40E-07 | 6.27E-06 | 6.69E-05 | 5.91E-04 | 4.44E-03 |
| 450 | 3.76E-07 | 2.07E-06 | 1.13E-05 | 5.79E-05 | 2.76E-04 | 2.68E-07 | 1.21E-06 | 8.60E-06 | 5.56E-05 | 3.12E-04 |
| 650 | 1.24E-07 | 4.51E-07 | 1.70E-06 | 6.31E-06 | 2.27E-05 | 1.02E-07 | 3.02E-07 | 1.47E-06 | 7.22E-06 | 3.18E-05 |
| 1000 | 3.97E-08 | 9.41E-08 | 2.36E-07 | 6.22E-07 | 1.66E-06 | 3.60E-08 | 7.10E-08 | 2.17E-07 | 7.69E-07 | 2.62E-06 |
| 2000 | 8.93E-09 | 1.30E-08 | 1.97E-08 | 3.22E-08 | 5.64E-08 | 8.72E-09 | 1.12E-08 | 1.74E-08 | 3.40E-08 | 7.47E-08 |

Z = 24 K1 SHELL EB = 5.9890E 00 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 9.40E 00 | 3.71E 02 | 1.14E 04 | 3.38E 05 | 1.01E 07 | 4.93E 00 | 3.03E 02 | 1.21E 04 | 4.49E 05 | 1.65E 07 |
| 17 | 6.38E 00 | 2.50E 02 | 7.47E 03 | 2.16E 05 | 6.29E 06 | 3.41E 00 | 1.85E 02 | 7.03E 03 | 2.51E 05 | 8.89E 06 |
| 20 | 4.12E 00 | 1.46E 02 | 4.13E 03 | 1.13E 05 | 3.11E 06 | 2.12E 00 | 9.83E 01 | 3.42E 03 | 1.14E 05 | 3.77E 06 |
| 25 | 2.15E 00 | 6.77E 01 | 1.73E 03 | 4.25E 04 | 1.05E 06 | 1.11E 00 | 4.14E 01 | 1.25E 03 | 3.68E 04 | 1.08E 06 |
| 32 | 1.03E 00 | 2.80E 01 | 6.20E 02 | 1.32E 04 | 2.81E 05 | 5.44E 01 | 1.61E 01 | 4.08E 02 | 1.02E 04 | 2.54E 05 |
| 40 | 5.28E-01 | 1.24E 01 | 2.36E 02 | 4.35E 03 | 7.98E 04 | 2.88E-01 | 6.91E 00 | 1.48E 02 | 3.13E 03 | 6.64E 04 |
| 50 | 2.69E-01 | 5.36E 00 | 8.78E 01 | 1.38E 03 | 2.16E 04 | 1.54E-01 | 3.00E 00 | 5.37E 01 | 9.56E 02 | 1.71E 04 |
| 65 | 1.20E-01 | 1.98E 00 | 2.67E 01 | 3.46E 02 | 4.44E 03 | 7.50E-02 | 1.15E 00 | 1.65E 01 | 2.38E 02 | 3.44E 03 |
| 80 | 6.36E-02 | 8.90E-01 | 1.03E 01 | 1.14E 02 | 1.25E 03 | 4.27E-02 | 5.43E-01 | 6.58E 00 | 7.98E 01 | 9.71E 02 |
| 100 | 3.19E-02 | 3.76E-01 | 3.67E 00 | 3.42E 01 | 3.14E 02 | 2.36E-02 | 2.47E-01 | 2.48E 00 | 2.50E 01 | 2.53E 02 |
| 120 | 1.82E-02 | 1.85E-01 | 1.57E 00 | 1.27E 01 | 1.02E 02 | 1.47E-02 | 1.31E-01 | 1.13E 00 | 9.81E 00 | 8.53E 01 |
| 150 | 9.15E-03 | 7.83E-02 | 5.61E-01 | 3.82E 00 | 2.57E 01 | 8.26E-03 | 6.15E-02 | 4.42E-01 | 3.19E 00 | 2.31E 01 |
| 200 | 3.81E-03 | 2.60E-02 | 1.50E-01 | 8.23E-01 | 4.44E 00 | 4.01E-03 | 2.38E-02 | 1.36E-01 | 7.80E-01 | 4.48E 00 |
| 300 | 1.15E-03 | 5.76E-03 | 2.47E-02 | 1.01E-01 | 4.08E-01 | 1.51E-03 | 6.65E-03 | 2.81E-02 | 1.18E-01 | 4.96E-01 |
| 450 | 3.79E-04 | 1.41E-03 | 4.59E-03 | 1.44E-02 | 4.43E-02 | 5.93E-04 | 2.01E-03 | 6.44E-03 | 2.04E-02 | 6.46E-02 |
| 650 | 1.53E-04 | 4.47E-04 | 1.17E-03 | 2.94E-03 | 7.28E-03 | 2.66E-04 | 7.29E-04 | 1.88E-03 | 4.76E-03 | 1.20E-02 |
| 1000 | 6.15E-05 | 1.42E-04 | 2.96E-04 | 6.00E-04 | 1.20E-03 | 1.10E-04 | 2.45E-04 | 5.09E-04 | 1.03E-03 | 2.08E-03 |
| 2000 | 1.92E-05 | 3.30E-05 | 5.32E-05 | 8.33E-05 | 1.28E-04 | 3.08E-05 | 5.24E-05 | 8.43E-05 | 1.32E-04 | 2.03E-04 |
| 6000 | 4.70E-06 | 5.96E-06 | 7.45E-06 | 9.19E-06 | 1.12E-05 | 5.81E-06 | 7.45E-06 | 9.33E-06 | 1.15E-05 | 1.40E-05 |

Z = 24 L1 SHELL EB = 6.9500E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 7.17E-01 | 2.71E 01 | 7.30E 02 | 1.51E 04 | 1.87E 05 | 4.58E-01 | 3.77E 01 | 2.36E 03 | 1.42E 05 | 8.55E 06 |
| 17 | 5.09E-01 | 1.84E 01 | 4.93E 02 | 1.09E 04 | 1.82E 05 | 3.17E-01 | 2.24E 01 | 1.24E 03 | 6.70E 04 | 3.61E 06 |
| 20 | 3.24E-01 | 1.10E 01 | 2.82E 02 | 6.40E 03 | 1.24E 05 | 1.97E-01 | 1.15E 01 | 5.46E 02 | 2.54E 04 | 1.18E 06 |
| 25 | 1.73E-01 | 5.21E 00 | 1.23E 02 | 2.68E 03 | 5.39E 04 | 1.03E-01 | 4.64E 00 | 1.79E 02 | 6.77E 03 | 2.57E 05 |
| 32 | 8.51E-02 | 2.21E 00 | 4.62E 01 | 9.03E 02 | 1.70E 04 | 5.06E-02 | 1.73E 00 | 5.28E 01 | 1.59E 03 | 4.83E 04 |
| 40 | 4.43E-02 | 9.98E-01 | 1.82E 01 | 3.14E 02 | 5.29E 03 | 2.69E-02 | 7.25E-01 | 1.79E 01 | 4.38E 02 | 1.08E 04 |
| 50 | 2.29E-02 | 4.42E-01 | 6.96E 00 | 1.04E 02 | 1.53E 03 | 1.44E-02 | 3.08E-01 | 6.15E 00 | 1.23E 02 | 2.47E 03 |
| 65 | 1.04E-02 | 1.66E-01 | 2.18E 00 | 2.72E 01 | 3.35E 02 | 6.97E-03 | 1.15E-01 | 1.80E 00 | 2.82E 01 | 4.46E 02 |
| 80 | 5.55E-03 | 7.60E-02 | 8.57E-01 | 9.20E 00 | 9.74E 01 | 3.97E-03 | 5.36E-02 | 6.93E-01 | 9.01E 00 | 1.18E 02 |
| 100 | 2.81E-03 | 3.25E-02 | 3.11E-01 | 2.83E 00 | 2.53E 01 | 2.19E-03 | 2.40E-02 | 2.54E-01 | 2.71E 00 | 2.90E 01 |
| 120 | 1.61E-03 | 1.62E-02 | 1.35E-01 | 1.07E 00 | 8.38E 00 | 1.36E-03 | 1.26E-02 | 1.14E-01 | 1.03E 00 | 9.41E 00 |
| 150 | 8.17E-04 | 6.90E-03 | 4.87E-02 | 3.27E-01 | 2.16E 00 | 7.64E-04 | 5.87E-03 | 4.37E-02 | 3.27E-01 | 2.45E 00 |
| 200 | 3.43E-04 | 2.32E-03 | 1.32E-02 | 7.18E-02 | 3.83E-01 | 3.71E-04 | 2.25E-03 | 1.32E-02 | 7.77E-02 | 4.58E-01 |
| 300 | 1.05E-04 | 5.19E-04 | 2.22E-03 | 9.03E-03 | 3.61E-02 | 1.39E-04 | 6.23E-04 | 2.68E-03 | 1.14E-02 | 4.90E-02 |
| 450 | 3.45E-05 | 1.28E-04 | 4.16E-04 | 1.30E-03 | 3.99E-03 | 5.46E-05 | 1.87E-04 | 6.06E-04 | 1.94E-03 | 6.22E-03 |
| 650 | 1.40E-05 | 4.08E-05 | 1.06E-04 | 2.68E-04 | 6.64E-04 | 2.45E-05 | 6.76E-05 | 1.76E-04 | 4.49E-04 | 1.14E-03 |
| 1000 | 5.62E-06 | 1.29E-05 | 2.72E-05 | 5.51E-05 | 1.10E-04 | 1.01E-05 | 2.26E-05 | 4.73E-05 | 9.66E-05 | 1.95E-04 |
| 2000 | 1.76E-06 | 3.02E-06 | 4.88E-06 | 7.66E-06 | 1.18E-05 | 2.82E-06 | 4.82E-06 | 7.78E-06 | 1.22E-05 | 1.89E-05 |

Z = 24 L2 SHELL EB = 5.8400E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 8.11E-02 | 3.17E 01 | 6.34E 03 | 7.71E 05 | 7.49E 07 | 2.65E-02 | 3.54E 00 | 3.40E 02 | 2.86E 04 | 2.23E 06 |
| 17 | 5.11E-02 | 1.69E 01 | 2.96E 03 | 3.22E 05 | 2.80E 07 | 1.78E-02 | 2.11E 00 | 1.81E 02 | 1.37E 04 | 9.57E 05 |
| 20 | 2.79E-02 | 7.42E 00 | 1.10E 03 | 1.03E 05 | 7.79E 06 | 1.06E-02 | 1.07E 00 | 7.99E 01 | 5.22E 03 | 3.17E 05 |
| 25 | 1.21E-02 | 2.41E 00 | 2.84E 02 | 2.17E 04 | 1.34E 06 | 5.21E-03 | 4.24E-01 | 2.59E 01 | 1.39E 03 | 6.93E 04 |
| 32 | 4.73E-03 | 6.94E-01 | 6.36E 01 | 3.87E 03 | 1.91E 05 | 2.37E-03 | 1.52E-01 | 7.42E 00 | 3.19E 02 | 1.28E 04 |
| 40 | 2.02E-03 | 2.26E-01 | 1.65E 01 | 8.15E 02 | 3.30E 04 | 1.16E-03 | 6.00E-02 | 2.39E 00 | 8.44E 01 | 2.77E 03 |
| 50 | 8.55E-04 | 7.37E-02 | 4.29E 00 | 1.72E 02 | 5.70E 03 | 5.67E-04 | 2.37E-02 | 7.74E-01 | 2.23E 01 | 5.99E 02 |
| 65 | 3.11E-04 | 1.99E-02 | 8.89E-01 | 2.80E 01 | 7.31E 02 | 2.44E-04 | 7.99E-03 | 2.05E-01 | 4.69E 00 | 9.96E 01 |
| 80 | 1.39E-04 | 7.08E-03 | 2.58E-01 | 6.72E 00 | 1.45E 02 | 1.26E-04 | 3.38E-03 | 7.22E-02 | 1.37E 00 | 2.42E 01 |
| 100 | 5.90E-05 | 2.36E-03 | 6.90E-02 | 1.47E 00 | 2.60E 01 | 6.14E-05 | 1.35E-03 | 2.36E-02 | 3.68E-01 | 5.35E 00 |
| 120 | 2.93E-05 | 9.66E-04 | 2.37E-02 | 4.28E-01 | 6.47E 00 | 3.43E-05 | 6.39E-04 | 9.54E-03 | 1.27E-01 | 1.57E 00 |
| 150 | 1.25E-05 | 3.29E-04 | 6.53E-03 | 9.68E-02 | 1.21E 00 | 1.69E-05 | 2.58E-04 | 3.17E-03 | 3.49E-02 | 3.58E-01 |
| 200 | 4.26E-06 | 8.38E-05 | 1.28E-03 | 1.48E-02 | 1.44E-01 | 6.79E-06 | 8.10E-05 | 7.83E-04 | 6.78E-03 | 5.48E-02 |
| 300 | 9.74E-07 | 1.30E-05 | 1.38E-04 | 1.14E-03 | 8.05E-03 | 1.91E-06 | 1.64E-05 | 1.15E-04 | 7.20E-04 | 4.23E-03 |
| 450 | 2.39E-07 | 2.22E-06 | 1.68E-05 | 1.01E-04 | 5.28E-04 | 5.50E-07 | 3.47E-06 | 1.81E-05 | 8.46E-05 | 3.71E-04 |
| 650 | 7.23E-08 | 4.93E-07 | 2.81E-06 | 1.31E-05 | 5.31E-05 | 1.83E-07 | 9.00E-07 | 3.67E-06 | 1.35E-05 | 4.66E-05 |
| 1000 | 1.99E-08 | 9.78E-08 | 4.10E-07 | 1.45E-06 | 4.57E-06 | 5.26E-08 | 2.00E-07 | 6.35E-07 | 1.83E-06 | 4.97E-06 |
| 2000 | 3.32E-09 | 1.03E-08 | 2.86E-08 | 7.02E-08 | 1.58E-07 | 8.09E-09 | 2.17E-08 | 5.02E-08 | 1.07E-07 | 2.14E-07 |

Z = 24 L3 SHELL EB = 5.7500E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.51E-01 | 5.74E 01 | 1.13E 04 | 1.36E 06 | 1.31E 08 | 1.11E-02 | 8.76E 00 | 2.48E 03 | 3.35E 05 | 3.54E 07 |
| 17 | 9.49E-02 | 3.03E 01 | 5.24E 03 | 5.64E 05 | 4.88E 07 | 7.51E-03 | 4.74E 00 | 1.14E 03 | 1.38E 05 | 1.30E 07 |
| 20 | 5.16E-02 | 1.32E 01 | 1.93E 03 | 1.79E 05 | 1.34E 07 | 4.52E-03 | 2.14E 00 | 4.23E 02 | 4.35E 04 | 3.53E 06 |
| 25 | 2.22E-02 | 4.23E 00 | 4.88E 02 | 3.69E 04 | 2.26E 06 | 2.25E-03 | 7.20E-01 | 1.09E 02 | 9.06E 03 | 6.00E 05 |
| 32 | 8.66E-03 | 1.20E 00 | 1.07E 02 | 6.40E 03 | 3.14E 05 | 1.04E-03 | 2.18E-01 | 2.48E 01 | 1.63E 03 | 8.58E 04 |
| 40 | 3.67E-03 | 3.83E-01 | 2.69E 01 | 1.31E 03 | 5.25E 04 | 5.15E-04 | 7.47E-02 | 6.58E 00 | 3.49E 02 | 1.50E 04 |
| 50 | 1.55E-03 | 1.22E-01 | 6.81E 00 | 2.69E 02 | 8.77E 03 | 2.55E-04 | 2.58E-02 | 1.77E 00 | 7.63E 01 | 2.67E 03 |
| 65 | 5.58E-04 | 3.20E-02 | 1.35E 00 | 4.16E 01 | 1.07E 03 | 1.12E-04 | 7.50E-03 | 3.87E-01 | 1.30E 01 | 3.59E 02 |
| 80 | 2.49E-04 | 1.11E-02 | 3.77E-01 | 9.55E 00 | 2.03E 02 | 5.85E-05 | 2.85E-03 | 1.18E-01 | 3.27E 00 | 7.46E 01 |
| 100 | 1.05E-04 | 3.57E-03 | 9.61E-02 | 1.97E 00 | 3.42E 01 | 2.92E-05 | 1.02E-03 | 3.33E-02 | 7.54E-01 | 1.41E 01 |
| 120 | 5.22E-05 | 1.42E-03 | 3.16E-02 | 5.46E-01 | 8.05E 00 | 1.66E-05 | 4.43E-04 | 1.20E-02 | 2.31E-01 | 3.68E 00 |
| 150 | 2.24E-05 | 4.65E-04 | 8.17E-03 | 1.15E-01 | 1.38E 00 | 8.34E-06 | 1.62E-04 | 3.50E-03 | 5.53E-02 | 7.27E-01 |
| 200 | 7.66E-06 | 1.12E-04 | 1.46E-03 | 1.56E-02 | 1.47E-01 | 3.48E-06 | 4.55E-05 | 7.36E-04 | 9.08E-03 | 9.39E-02 |
| 300 | 1.80E-06 | 1.62E-05 | 1.36E-04 | 1.01E-03 | 6.67E-03 | 1.05E-06 | 8.01E-06 | 8.65E-05 | 7.68E-04 | 5.77E-03 |
| 450 | 4.69E-07 | 2.59E-06 | 1.42E-05 | 7.30E-05 | 3.48E-04 | 3.35E-07 | 1.54E-06 | 1.11E-05 | 7.19E-05 | 4.04E-04 |
| 650 | 1.55E-07 | 5.67E-07 | 2.14E-06 | 7.96E-06 | 2.87E-05 | 1.27E-07 | 3.83E-07 | 1.88E-06 | 9.32E-06 | 4.12E-05 |
| 1000 | 4.95E-08 | 1.18E-07 | 2.97E-07 | 7.84E-07 | 2.10E-06 | 4.49E-08 | 8.93E-08 | 2.76E-07 | 9.88E-07 | 3.37E-06 |
| 2000 | 1.11E-08 | 1.62E-08 | 2.47E-08 | 4.04E-08 | 7.11E-08 | 1.09E-08 | 1.40E-08 | 2.19E-08 | 4.32E-08 | 9.54E-08 |

Z = 25 K1 SHELL ER = 6.5390E 00 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.01E 01 | 3.72E 02 | 1.06E 04 | 2.91E 05 | 8.04E 06 | 5.84E 00 | 3.58E 02 | 1.36E 04 | 4.70E 05 | 1.60E 07 |
| 17 | 7.07E 00 | 2.54E 02 | 7.12E 03 | 1.93E 05 | 3.26E 06 | 4.04E 00 | 2.19E 02 | 7.95E 03 | 2.08E 05 | 8.96E 06 |
| 20 | 4.44E 00 | 1.50E 02 | 4.04E 03 | 1.05E 05 | 2.73E 06 | 2.50E 00 | 1.16E 02 | 3.90E 03 | 1.24E 05 | 3.93E 06 |
| 25 | 2.32E 00 | 7.06E 01 | 1.73E 03 | 4.09E 04 | 9.68E 05 | 1.31E 00 | 4.88E 01 | 1.44E 03 | 4.09E 04 | 1.16E 06 |
| 32 | 1.12E 00 | 2.96E 01 | 6.34E 02 | 1.31E 04 | 2.70E 05 | 6.40E-01 | 1.89E 01 | 4.70E 02 | 1.15E 04 | 2.79E 05 |
| 40 | 5.75E-01 | 1.31E 01 | 2.45E 02 | 4.39E 03 | 7.85E 04 | 3.39E-01 | 8.10E 00 | 1.71E 02 | 3.55E 03 | 7.39E 04 |
| 50 | 2.93E-01 | 5.74E 00 | 9.20E 01 | 1.42E 03 | 2.17E 04 | 1.81E-01 | 3.52E 00 | 6.21E 01 | 1.09E 03 | 1.92E 04 |
| 65 | 1.32E-01 | 2.13E 00 | 2.83E 01 | 3.60E 02 | 4.54E 03 | 8.76E-02 | 1.34E 00 | 1.91E 01 | 2.72E 02 | 3.89E 03 |
| 80 | 6.98E-02 | 9.64E-01 | 1.10E 01 | 1.20E 02 | 1.29E 03 | 4.98E-02 | 6.33E-01 | 7.60E 00 | 9.14E 01 | 1.10E 03 |
| 100 | 3.52E-02 | 4.09E-01 | 3.94E 00 | 3.62E 01 | 3.29E 02 | 2.75E-02 | 2.87E-01 | 2.86E 00 | 2.86E 01 | 2.88E 02 |
| 120 | 2.01E-02 | 2.02E-01 | 1.70E 00 | 1.36E 01 | 1.07E 02 | 1.70E-02 | 1.52E-01 | 1.31E 00 | 1.12E 01 | 9.72E 01 |
| 150 | 1.01E-02 | 8.58E-02 | 6.08E-01 | 4.10E 00 | 2.73E 01 | 9.57E-03 | 7.12E-02 | 5.10E-01 | 3.66E 00 | 2.63E 01 |
| 200 | 4.23E-03 | 2.86E-02 | 1.64E-01 | 8.91E-01 | 4.77E 00 | 4.64E-03 | 2.75E-02 | 1.57E-01 | 8.94E-01 | 5.11E 00 |
| 300 | 1.29E-03 | 6.37E-03 | 2.72E-02 | 1.11E-01 | 4.43E-01 | 1.73E-03 | 7.65E-03 | 3.22E-02 | 1.35E-01 | 5.66E-01 |
| 450 | 4.23E-04 | 1.56E-03 | 5.09E-03 | 1.59E-02 | 4.86E-02 | 6.79E-04 | 2.30E-03 | 7.38E-03 | 2.34E-02 | 7.38E-02 |
| 650 | 1.71E-04 | 4.99E-04 | 1.30E-03 | 3.27E-03 | 8.06E-03 | 3.04E-04 | 8.35E-04 | 2.15E-03 | 5.45E-03 | 1.37E-02 |
| 1000 | 6.90E-05 | 1.59E-04 | 3.32E-04 | 6.72E-04 | 1.34E-03 | 1.25E-04 | 2.80E-04 | 5.82E-04 | 1.18E-03 | 2.37E-03 |
| 2000 | 2.15E-05 | 3.71E-05 | 5.99E-05 | 9.39E-05 | 1.45E-04 | 3.48E-05 | 5.95E-05 | 9.60E-05 | 1.50E-04 | 2.32E-04 |
| 6000 | 5.25E-06 | 6.67E-06 | 8.36E-06 | 1.03E-05 | 1.27E-05 | 6.50E-06 | 8.38E-06 | 1.05E-05 | 1.30E-05 | 1.59E-05 |

Z = 25 L1 SHELL ER = 7.6900E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 7.71E-01 | 2.74E 01 | 6.70E 02 | 1.15E 04 | 9.08E 04 | 5.50E-01 | 4.63E 01 | 2.89E 03 | 1.73E 05 | 1.03E 07 |
| 17 | 5.49E-01 | 1.88E 01 | 4.64E 02 | 9.04E 03 | 1.15E 05 | 3.81E-01 | 2.75E 01 | 1.52E 03 | 8.14E 04 | 4.35E 06 |
| 20 | 3.51E-01 | 1.13E 01 | 2.74E 02 | 5.65E 03 | 9.44E 04 | 2.36E-01 | 1.40E 01 | 6.66E 02 | 3.08E 04 | 1.42E 06 |
| 25 | 1.88E-01 | 5.45E 00 | 1.23E 02 | 2.50E 03 | 4.62E 04 | 1.23E-01 | 5.64E 00 | 2.17E 02 | 8.17E 03 | 3.09E 05 |
| 32 | 9.29E-02 | 2.34E 00 | 4.71E 01 | 8.80E 02 | 1.56E 04 | 6.05E-02 | 2.10E 00 | 6.37E 01 | 1.92E 03 | 5.79E 04 |
| 40 | 4.86E-02 | 1.07E 00 | 1.89E 01 | 3.14E 02 | 5.08E 03 | 3.20E-02 | 8.72E-01 | 2.15E 01 | 5.26E 02 | 1.29E 04 |
| 50 | 2.52E-02 | 4.76E-01 | 7.31E 00 | 1.06E 02 | 1.52E 03 | 1.71E-02 | 3.69E-01 | 7.36E 00 | 1.47E 02 | 2.94E 03 |
| 65 | 1.15E-02 | 1.81E-01 | 2.32E 00 | 2.83E 01 | 3.40E 02 | 8.26E-03 | 1.37E-01 | 2.14E 00 | 3.36E 01 | 5.29E 02 |
| 80 | 6.16E-03 | 8.29E-02 | 9.19E-01 | 9.68E 00 | 1.01E 02 | 4.70E-03 | 6.36E-02 | 8.23E-01 | 1.07E 01 | 1.40E 02 |
| 100 | 3.13E-03 | 3.56E-02 | 3.36E-01 | 3.01E 00 | 2.65E 01 | 2.58E-03 | 2.84E-02 | 3.01E-01 | 3.20E 00 | 3.42E 01 |
| 120 | 1.80E-03 | 1.78E-02 | 1.47E-01 | 1.15E 00 | 8.86E 00 | 1.60E-03 | 1.49E-02 | 1.35E-01 | 1.22E 00 | 1.11E 01 |
| 150 | 9.14E-04 | 7.63E-03 | 5.33E-02 | 3.54E-01 | 2.31E 00 | 8.98E-04 | 6.92E-03 | 5.15E-02 | 3.84E-01 | 2.88E 00 |
| 200 | 3.85E-04 | 2.58E-03 | 1.46E-02 | 7.84E-02 | 4.14E-01 | 4.35E-04 | 2.65E-03 | 1.55E-02 | 9.11E-02 | 5.37E-01 |
| 300 | 1.18E-04 | 5.80E-04 | 2.46E-03 | 9.97E-03 | 3.96E-02 | 1.62E-04 | 7.28E-04 | 3.12E-03 | 1.33E-02 | 5.71E-02 |
| 450 | 3.90E-05 | 1.44E-04 | 4.66E-04 | 1.45E-03 | 4.43E-03 | 6.35E-05 | 2.18E-04 | 7.06E-04 | 2.26E-03 | 1.24E-03 |
| 650 | 1.58E-05 | 4.61E-05 | 1.20E-04 | 3.02E-04 | 7.45E-04 | 2.83E-05 | 7.86E-05 | 2.04E-04 | 5.21E-04 | 1.32E-03 |
| 1000 | 6.38E-06 | 1.47E-05 | 3.08E-05 | 6.25E-05 | 1.25E-04 | 1.17E-05 | 2.62E-05 | 5.49E-05 | 1.12E-04 | 2.26E-04 |
| 2000 | 1.99E-06 | 3.44E-06 | 5.57E-06 | 8.75E-06 | 1.35E-05 | 3.23E-06 | 5.55E-06 | 8.98E-06 | 1.41E-05 | 2.18E-05 |

Z = 25 L2 SHELL ER = 6.5200E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 9.56E-02 | 3.89E 01 | 7.80E 03 | 9.41E 05 | 9.05E 07 | 3.28E-02 | 4.37E 00 | 4.16E 02 | 3.46E 04 | 2.67E 06 |
| 17 | 6.04E-02 | 2.07E 01 | 3.65E 03 | 3.93E 05 | 3.39E 07 | 2.21E-02 | 2.60E 00 | 2.22E 02 | 1.66E 04 | 1.15E 06 |
| 20 | 3.31E-02 | 9.11E 00 | 1.36E 03 | 1.27E 05 | 9.47E 06 | 1.32E-02 | 1.33E 00 | 9.81E 01 | 6.35E 03 | 3.82E 05 |
| 25 | 1.44E-02 | 2.96E 00 | 3.51E 02 | 2.67E 04 | 1.64E 06 | 6.47E-03 | 5.26E-01 | 3.19E 01 | 1.70E 03 | 8.39E 04 |
| 32 | 5.69E-03 | 8.54E-01 | 7.84E 01 | 4.74E 03 | 2.32E 05 | 2.95E-03 | 1.88E-01 | 9.11E 00 | 3.89E 02 | 1.54E 04 |
| 40 | 2.43E-03 | 2.78E-01 | 2.04E 01 | 1.01E 03 | 4.05E 04 | 1.44E-03 | 7.47E-02 | 2.96E 00 | 1.04E 02 | 3.38E 03 |
| 50 | 1.03E-03 | 9.10E-02 | 5.32E 00 | 2.13E 02 | 7.02E 03 | 7.07E-04 | 2.96E-02 | 9.59E-01 | 2.75E 01 | 7.35E 02 |
| 65 | 3.78E-04 | 2.46E-02 | 1.10E 00 | 3.48E 01 | 9.03E 02 | 3.06E-04 | 9.98E-03 | 2.55E-01 | 5.80E 00 | 1.23E 02 |
| 80 | 1.70E-04 | 8.78E-03 | 3.21E-01 | 8.36E 00 | 1.80E 02 | 1.57E-04 | 4.23E-03 | 9.00E-02 | 1.70E 00 | 2.99E 01 |
| 100 | 7.22E-05 | 2.93E-03 | 8.61E-02 | 1.83E 00 | 3.23E 01 | 7.71E-05 | 1.69E-03 | 2.95E-02 | 4.58E-01 | 6.63E 00 |
| 120 | 3.60E-05 | 1.20E-03 | 2.97E-02 | 5.35E-01 | 8.06E 00 | 4.31E-05 | 8.02E-04 | 1.19E-02 | 1.58E-01 | 1.96E 00 |
| 150 | 1.54E-05 | 4.10E-04 | 8.18E-03 | 1.21E-01 | 1.50E 00 | 2.12E-05 | 3.24E-04 | 3.98E-03 | 4.36E-02 | 4.46E-01 |
| 200 | 5.27E-06 | 1.05E-04 | 1.60E-03 | 1.85E-02 | 1.80E-01 | 8.56E-06 | 1.02E-04 | 9.84E-04 | 8.50E-03 | 6.85E-02 |
| 300 | 1.21E-06 | 1.63E-05 | 1.74E-04 | 1.44E-03 | 1.01E-02 | 2.41E-06 | 2.07E-05 | 1.44E-04 | 9.07E-04 | 5.31E-03 |
| 450 | 2.98E-07 | 2.79E-06 | 2.12E-05 | 1.28E-04 | 6.66E-04 | 6.96E-07 | 4.40E-06 | 2.28E-05 | 1.07E-04 | 4.67E-04 |
| 650 | 9.03E-08 | 6.21E-07 | 3.55E-06 | 1.65E-05 | 6.71E-05 | 2.32E-07 | 1.14E-06 | 4.65E-06 | 1.71E-05 | 5.90E-05 |
| 1000 | 2.50E-08 | 1.23E-07 | 5.20E-07 | 1.84E-06 | 5.80E-06 | 6.67E-08 | 2.54E-07 | 8.07E-07 | 2.33E-06 | 6.31E-06 |
| 2000 | 4.16E-09 | 1.31E-08 | 3.62E-08 | 8.93E-08 | 2.01E-07 | 1.02E-08 | 2.77E-08 | 6.40E-08 | 1.36E-07 | 2.73E-07 |

Z = 25 L3 SHELL ER = 6.4100E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.77E-01 | 7.00E 01 | 1.38E 04 | 1.66E 06 | 1.58E 08 | 1.35E-02 | 1.15E 01 | 3.32E 03 | 4.50E 05 | 4.72E 07 |
| 17 | 1.12E-01 | 3.70E 01 | 6.42E 03 | 6.87E 05 | 5.88E 07 | 9.15E-03 | 6.19E 00 | 1.53E 03 | 1.84E 05 | 1.73E 07 |
| 20 | 6.10E-02 | 1.62E 01 | 2.36E 03 | 2.18E 05 | 1.62E 07 | 5.51E-03 | 2.79E 00 | 5.64E 02 | 5.80E 04 | 4.69E 06 |
| 25 | 2.64E-02 | 5.18E 00 | 5.99E 02 | 4.51E 04 | 2.74E 06 | 2.75E-03 | 9.38E-01 | 1.45E 02 | 1.20E 04 | 7.94E 05 |
| 32 | 1.03E-02 | 1.47E 00 | 1.31E 02 | 7.84E 03 | 3.82E 05 | 1.27E-03 | 2.83E-01 | 3.27E 01 | 2.15E 03 | 1.13E 05 |
| 40 | 4.39E-03 | 4.69E-01 | 3.32E 01 | 1.61E 03 | 6.41E 04 | 6.30E-04 | 9.68E-02 | 8.66E 00 | 4.60E 02 | 1.97E 04 |
| 50 | 1.86E-03 | 1.50E-01 | 8.39E 00 | 3.30E 02 | 1.07E 04 | 3.13E-04 | 3.34E-02 | 2.33E 00 | 1.00E 02 | 3.50E 03 |
| 65 | 6.74E-04 | 3.93E-02 | 1.67E 00 | 5.13E 01 | 1.31E 03 | 1.38E-04 | 9.66E-03 | 5.05E-01 | 1.70E 01 | 4.68E 02 |
| 80 | 3.02E-04 | 1.37E-02 | 4.67E-01 | 1.18E 01 | 2.50E 02 | 7.19E-05 | 3.66E-03 | 1.53E-01 | 4.26E 00 | 9.77E 01 |
| 100 | 1.28E-04 | 4.41E-03 | 1.19E-01 | 2.44E 00 | 4.22E 01 | 3.59E-05 | 1.30E-03 | 4.32E-02 | 9.79E-01 | 1.83E 01 |
| 120 | 6.36E-05 | 1.76E-03 | 3.92E-02 | 6.76E-01 | 9.93E 00 | 2.04E-05 | 5.66E-04 | 1.55E-02 | 2.99E-01 | 4.76E 00 |
| 150 | 2.73E-05 | 5.75E-04 | 1.01E-02 | 1.42E-01 | 1.71E 00 | 1.03E-05 | 2.07E-04 | 4.52E-03 | 7.15E-02 | 9.39E-01 |
| 200 | 9.38E-06 | 1.39E-04 | 1.81E-03 | 1.94E-02 | 1.81E-01 | 4.29E-06 | 5.77E-05 | 9.45E-04 | 1.17E-02 | 1.21E-01 |
| 300 | 2.21E-06 | 2.00E-05 | 1.69E-04 | 1.25E-03 | 8.28E-03 | 1.30E-06 | 1.01E-05 | 1.11E-04 | 9.85E-04 | 7.41E-03 |
| 450 | 5.78E-07 | 3.22E-06 | 1.77E-05 | 9.09E-05 | 4.33E-04 | 4.14E-07 | 1.93E-06 | 1.41E-05 | 9.21E-05 | 5.17E-04 |
| 650 | 1.91E-07 | 7.03E-07 | 2.66E-06 | 9.92E-06 | 3.57E-05 | 1.57E-07 | 4.79E-07 | 2.39E-06 | 1.19E-05 | 5.26E-05 |
| 1000 | 6.10E-08 | 1.46E-07 | 3.70E-07 | 9.77E-07 | 2.62E-06 | 5.54E-08 | 1.11E-07 | 3.47E-07 | 1.25E-06 | 4.29E-06 |
| 2000 | 1.37E-08 | 2.00E-08 | 3.06E-08 | 5.02E-08 | 8.85E-08 | 1.34E-08 | 1.73E-08 | 2.72E-08 | 5.41E-08 | 1.21E-07 |

Z = 26 K1 SHELL FR #7.1140E 00 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.08E 01 | 3.70E 02 | 9.65E 03 | 2.42E 05 | 6.12E 06 | 6.89E 00 | 4.21E 02 | 1.50E 04 | 4.79E 05 | 1.50E 07 |
| 17 | 7.96E 00 | 2.55E 02 | 6.68E 03 | 1.68E 05 | 4.27E 06 | 4.76E 00 | 2.57E 02 | 8.87E 03 | 2.81E 05 | 8.79E 06 |
| 20 | 4.76E 00 | 1.53E 02 | 3.89E 03 | 9.54E 04 | 2.35E 06 | 2.95E 00 | 1.36E 02 | 4.39E 03 | 1.33E 05 | 4.01E 06 |
| 25 | 2.50E 00 | 7.31E 01 | 1.71E 03 | 3.88E 04 | 8.80E 05 | 1.53E 00 | 5.72E 01 | 1.63E 03 | 4.49E 04 | 1.23E 06 |
| 32 | 1.21E 00 | 3.10E 01 | 6.42E 02 | 1.28E 04 | 2.56E 05 | 7.50E-01 | 2.21E 01 | 5.38E 02 | 1.28E 04 | 3.03E 05 |
| 40 | 6.24E-01 | 1.39E 01 | 2.52E 02 | 4.40E 03 | 7.65E 04 | 3.46E-01 | 9.46E 00 | 1.96E 02 | 3.99E 03 | 8.15E 04 |
| 50 | 3.19E-01 | 6.11E 00 | 9.57E 01 | 1.44E 03 | 2.16E 04 | 2.11E-01 | 4.09E 00 | 7.14E 01 | 1.23E 03 | 2.14E 04 |
| 65 | 1.44E-01 | 2.29E 00 | 2.98E 01 | 3.72E 02 | 4.61E 03 | 1.02E-01 | 1.56E 00 | 2.20E 01 | 3.09E 02 | 4.37E 03 |
| 80 | 7.64E-02 | 1.04E 00 | 1.16E 01 | 1.25E 02 | 1.32E 03 | 5.79E-02 | 7.33E-01 | 8.74E 00 | 1.04E 02 | 1.24E 03 |
| 100 | 3.86E-02 | 4.43E-01 | 4.20E 00 | 3.81E 01 | 3.41E 02 | 3.18E-02 | 3.32E-01 | 3.29E 00 | 3.27E 01 | 3.26E 02 |
| 120 | 2.20E-02 | 2.20E-01 | 1.82E 00 | 1.44E 01 | 1.12E 02 | 1.97E-02 | 1.76E-01 | 1.50E 00 | 1.28E 01 | 1.10E 02 |
| 150 | 1.11E-02 | 9.35E-02 | 6.55E-01 | 4.38E 00 | 2.88E 01 | 1.10E-02 | 8.20E-02 | 5.85E-01 | 4.17E 00 | 2.99E 01 |
| 200 | 4.67E-03 | 3.13E-02 | 1.78E-01 | 9.58E-01 | 5.09E 00 | 5.33E-03 | 3.16E-02 | 1.80E-01 | 1.02E 00 | 5.81E 00 |
| 300 | 1.42E-03 | 7.01E-03 | 2.98E-02 | 1.20E-01 | 4.76E-01 | 1.99E-03 | 8.77E-03 | 3.69E-02 | 1.54E-01 | 6.44E-01 |
| 450 | 4.71E-04 | 1.73E-03 | 5.61E-03 | 1.74E-02 | 5.30E-02 | 7.75E-04 | 2.63E-03 | 8.42E-03 | 2.66E-02 | 8.39E-02 |
| 650 | 1.91E-04 | 5.55E-04 | 1.44E-03 | 3.61E-03 | 8.89E-03 | 3.45E-04 | 9.53E-04 | 2.45E-03 | 6.20E-03 | 1.56E-02 |
| 1000 | 7.70E-05 | 1.77E-04 | 3.71E-04 | 7.50E-04 | 1.49E-03 | 1.42E-04 | 3.18E-04 | 6.63E-04 | 1.35E-03 | 2.70E-03 |
| 2000 | 2.40E-05 | 4.15E-05 | 6.72E-05 | 1.05E-04 | 1.63E-04 | 3.91E-05 | 6.74E-05 | 1.09E-04 | 1.71E-04 | 2.63E-04 |
| 6000 | 3.83E-06 | 7.44E-06 | 9.35E-06 | 1.16E-05 | 1.42E-05 | 7.24E-06 | 9.39E-06 | 1.18E-05 | 1.47E-05 | 1.80E-05 |

Z = 26 L1 SHELL FR #8.4600E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 8.24E-01 | 2.75E 01 | 6.01E 02 | 8.21E 03 | 4.35E 04 | 6.57E-01 | 5.65E 01 | 3.52E 03 | 2.09E 05 | 1.23E 07 |
| 17 | 5.89E-01 | 1.91E 01 | 4.30E 02 | 7.13E 03 | 6.35E 04 | 4.54E-01 | 3.34E 01 | 1.85E 03 | 9.81E 04 | 5.20E 06 |
| 20 | 3.78E-01 | 1.16E 01 | 2.61E 02 | 4.84E 03 | 6.66E 04 | 2.82E-01 | 1.70E 01 | 8.06E 02 | 3.70E 04 | 1.70E 06 |
| 25 | 2.03E-01 | 5.66E 00 | 1.21E 02 | 2.29E 03 | 3.82E 04 | 1.47E-01 | 6.81E 00 | 2.61E 02 | 9.80E 03 | 3.68E 05 |
| 32 | 1.01E-01 | 2.46E 00 | 4.75E 01 | 8.45E 02 | 1.41E 04 | 7.19E-02 | 2.52E 00 | 7.65E 01 | 2.29E 03 | 6.89E 04 |
| 40 | 5.30E-02 | 1.13E 00 | 1.94E 01 | 3.11E 02 | 4.81E 03 | 3.80E-02 | 1.04E 00 | 2.56E 01 | 6.26E 02 | 1.54E 04 |
| 50 | 2.76E-02 | 5.09E-01 | 7.61E 00 | 1.08E 02 | 1.48E 03 | 2.02E-02 | 4.39E-01 | 8.76E 00 | 1.74E 02 | 3.48E 03 |
| 65 | 1.27E-02 | 1.95E-01 | 2.45E 00 | 2.92E 01 | 3.42E 02 | 9.75E-03 | 1.62E-01 | 2.54E 00 | 3.97E 01 | 6.25E 02 |
| 80 | 6.79E-03 | 8.99E-02 | 9.78E-01 | 1.01E 01 | 1.03E 02 | 5.53E-03 | 7.52E-02 | 9.72E-01 | 1.26E 01 | 1.64E 02 |
| 100 | 3.46E-03 | 3.89E-02 | 3.60E-01 | 3.18E 00 | 2.76E 01 | 3.03E-03 | 3.35E-02 | 3.54E-01 | 3.76E 00 | 4.01E 01 |
| 120 | 2.00E-03 | 1.95E-02 | 1.58E-01 | 1.22E 00 | 9.30E 00 | 1.87E-03 | 1.76E-02 | 1.58E-01 | 1.43E 00 | 1.30E 01 |
| 150 | 1.02E-03 | 8.40E-03 | 5.79E-02 | 3.80E-01 | 2.45E 00 | 1.05E-03 | 8.11E-03 | 6.02E-02 | 4.49E-01 | 3.36E 00 |
| 200 | 4.30E-04 | 2.85E-03 | 1.60E-02 | 8.50E-02 | 4.45E-01 | 5.07E-04 | 3.09E-03 | 1.81E-02 | 1.06E-01 | 6.25E-01 |
| 300 | 1.32E-04 | 6.46E-04 | 2.72E-03 | 1.09E-02 | 4.32E-02 | 1.88E-04 | 8.47E-04 | 3.63E-03 | 1.55E-02 | 6.62E-02 |
| 450 | 4.39E-05 | 1.61E-04 | 5.20E-04 | 1.61E-03 | 4.90E-03 | 7.34E-05 | 2.52E-04 | 8.18E-04 | 2.62E-03 | 8.38E-03 |
| 650 | 1.79E-05 | 5.19E-05 | 1.35E-04 | 3.38E-04 | 8.32E-04 | 3.26E-05 | 9.08E-05 | 2.36E-04 | 6.03E-04 | 1.53E-03 |
| 1000 | 7.21E-06 | 1.66E-05 | 3.49E-05 | 7.06E-05 | 1.41E-04 | 1.34E-05 | 3.02E-05 | 6.33E-05 | 1.29E-04 | 2.61E-04 |
| 2000 | 2.25E-06 | 3.90E-06 | 6.33E-06 | 9.95E-06 | 1.54E-05 | 3.68E-06 | 6.36E-06 | 1.03E-05 | 1.62E-05 | 2.51E-05 |

Z = 26 L2 SHELL EB = 7.2300E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.12E-01 | 4.72E 01 | 9.50E 03 | 1.14E 06 | 1.08E 08 | 4.03E-02 | 5.35E 00 | 5.04E 02 | 4.13E 04 | 3.15E 06 |
| 17 | 7.09E-02 | 2.51E 01 | 4.45E 03 | 4.76E 05 | 4.06E 07 | 2.71E-02 | 3.19E 00 | 2.69E 02 | 1.99E 04 | 1.36E 06 |
| 20 | 3.90E-02 | 1.11E 01 | 1.66E 03 | 1.53E 05 | 1.14E 07 | 1.62E-02 | 1.63E 00 | 1.19E 02 | 7.64E 03 | 4.56E 05 |
| 25 | 1.71E-02 | 3.61E 00 | 4.29E 02 | 3.24E 04 | 1.97E 06 | 7.97E-03 | 6.46E-01 | 3.88E 01 | 2.05E 03 | 1.00E 05 |
| 32 | 6.76E-03 | 1.04E 00 | 9.63E 01 | 5.81E 03 | 2.84E 05 | 3.63E-03 | 2.32E-01 | 1.12E 01 | 4.75E 02 | 1.87E 04 |
| 40 | 2.90E-03 | 3.41E-01 | 2.50E 01 | 1.23E 03 | 4.92E 04 | 1.78E-03 | 9.21E-02 | 3.63E 00 | 1.26E 02 | 4.09E 03 |
| 50 | 1.24E-03 | 1.12E-01 | 6.5 E 00 | 2.62E 02 | 8.56E 03 | 8.76E-04 | 3.65E-02 | 1.18E 00 | 3.36E 01 | 8.93E 02 |
| 65 | 4.55E-04 | 3.02E-02 | 1.36E 00 | 4.28E 01 | 1.11E 03 | 3.79E-04 | 1.24E-02 | 3.15E-01 | 7.12E 00 | 1.50E 02 |
| 80 | 2.06E-04 | 1.08E-02 | 3.97E-01 | 1.03E 01 | 2.21E 02 | 1.95E-04 | 5.25E-03 | 1.11E-01 | 2.09E 00 | 3.66E 01 |
| 100 | 8.76E-05 | 3.61E-03 | 1.06E-01 | 2.26E 00 | 3.98E 01 | 9.59E-05 | 2.10E-03 | 3.65E-02 | 5.65E-01 | 8.14E 00 |
| 120 | 4.38E-05 | 1.49E-03 | 3.67E-02 | 6.61E-01 | 9.94E 00 | 5.37E-05 | 9.98E-04 | 1.48E-02 | 1.96E-01 | 2.41E 00 |
| 150 | 1.88E-05 | 5.07E-04 | 1.02E-02 | 1.50E-01 | 1.86E 00 | 2.65E-05 | 4.04E-04 | 4.94E-03 | 5.40E-02 | 5.50E-01 |
| 200 | 6.45E-06 | 1.30E-04 | 1.99E-03 | 2.30E-02 | 2.24E-01 | 1.07E-05 | 1.27E-04 | 1.23E-03 | 1.06E-02 | 8.49E-02 |
| 300 | 1.49E-06 | 2.03E-05 | 2.17E-04 | 1.79E-03 | 1.26E-02 | 3.02E-06 | 2.59E-05 | 1.81E-04 | 1.13E-03 | .61E-03 |
| 450 | 3.68E-07 | 3.47E-06 | 2.65E-05 | 1.60E-04 | 8.33E-04 | 8.73E-07 | 5.52E-06 | 2.86E-05 | 1.34E-04 | 5.84E-04 |
| 650 | 1.12E-07 | 7.76E-07 | 4.45E-06 | 2.07E-05 | 8.42E-05 | 2.91E-07 | 1.44E-06 | 5.85E-06 | 2.15E-05 | 7.39E-05 |
| 1000 | 3.10E-08 | 1.54E-07 | 6.54E-07 | 2.32E-06 | 7.29E-06 | 8.39E-08 | 3.20E-07 | 1.02E-06 | 2.93E-06 | 7.93E-06 |
| 2000 | 5.16E-09 | 1.63E-08 | 4.56E-08 | 1.13E-07 | 2.54E-07 | 1.28E-08 | 3.49E-08 | 8.09E-08 | 1.72E-07 | 3.44E-07 |

Z = 26 L3 SHELL EB = 7.1000E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 2.07E-01 | 8.47E 01 | 1.68E 04 | 1.99E 06 | 1.88E 08 | 1.63E-02 | 1.48E 01 | 4.40E 03 | 5.95E 05 | 6.19E 07 |
| 17 | 1.31E-01 | 4.48E 01 | 7.78E 03 | 8.25E 05 | 6.99E 07 | 1.11E-02 | 8.00E 00 | 2.02E 03 | 2.43E 05 | 2.26E 07 |
| 20 | 7.16E-02 | 1.96E 01 | 2.87E 03 | 2.63E 05 | 1.93E 07 | 6.67E-03 | 3.60E 00 | 7.43E 02 | 7.63E 04 | 6.14E 06 |
| 25 | 3.11E-02 | 6.28E 00 | 7.29E 02 | 5.44E 04 | 3.29E 06 | 3.33E-03 | 1.21E 00 | 1.90E 02 | 1.58E 04 | 1.04E 06 |
| 32 | 1.22E-02 | 1.78E 00 | 1.60E 02 | 9.49E 03 | 4.59E 05 | 1.54E-03 | 3.64E-01 | 4.28E 01 | 2.80E 03 | 1.47E 05 |
| 40 | 5.22E-03 | 5.70E-01 | 4.04E 01 | 1.95E 03 | 7.73E 04 | 7.65E-04 | 1.24E-01 | 1.13E 01 | 5.98E 02 | 2.56E 04 |
| 50 | 2.22E-03 | 1.83E-01 | 1.02E 01 | 4.02E 02 | 1.30E 04 | 3.81E-04 | 4.27E-02 | 3.02E 00 | 1.30E 02 | 4.52E 03 |
| 65 | 8.08E-04 | 4.80E-02 | 2.04E 00 | 6.26E 01 | 1.59E 03 | 1.68E-04 | 1.23E-02 | 6.53E-01 | 2.20E 01 | 6.03E 02 |
| 80 | 3.63E-04 | 1.67E-02 | 5.71E-01 | 1.44E 01 | 3.04E 02 | 8.77E-05 | 4.65E-03 | 1.97E-01 | 5.49E 00 | 1.25E 02 |
| 100 | 1.54E-04 | 5.39E-03 | 1.46E-01 | 2.98E 00 | 5.14E 01 | 4.38E-05 | 1.65E-03 | 5.55E-02 | 1.26E 00 | 2.35E 01 |
| 120 | 7.68E-05 | 2.15E-03 | 4.81E-02 | 8.28E-01 | 1.21E 01 | 2.49E-05 | 7.17E-04 | 1.99E-02 | 3.84E-01 | 6.10E 00 |
| 150 | 3.31E-05 | 7.05E-04 | 1.25E-02 | 1.74E-01 | 2.09E 00 | 1.26E-05 | 2.61E-04 | 5.77E-03 | 9.15E-02 | 1.20E 00 |
| 200 | 1.14E-05 | 1.71E-04 | 2.23E-03 | 2.38E-02 | 2.22E-01 | 5.25E-06 | 7.26E-05 | 1.20E-03 | 1.49E-02 | 1.54E-01 |
| 300 | 2.70E-06 | 2.46E-05 | 2.09E-04 | 1.54E-03 | 1.02E-02 | 1.59E-06 | 1.27E-05 | 1.40E-04 | 1.25E-03 | 9.43E-03 |
| 450 | 7.06E-07 | 3.96E-06 | 2.19E-05 | 1.12E-04 | 5.33E-04 | 5.07E-07 | 2.41E-06 | 1.78E-05 | 1.17E-04 | 6.57E-04 |
| 650 | 2.34E-07 | 8.65E-07 | 3.28E-06 | 1.23E-05 | 4.41E-05 | 1.92E-07 | 5.93E-07 | 3.00E-06 | 1.50E-05 | 6.66E-05 |
| 1000 | 7.46E-08 | 1.80E-07 | 4.56E-07 | 1.21E-06 | 3.24E-06 | 6.78E-08 | 1.37E-07 | 4.34E-07 | 1.58E-06 | 5.42E-06 |
| 2000 | 1.67E-08 | 2.45E-08 | 3.76E-08 | 6.18E-08 | 1.09E-07 | 1.64E-08 | 2.12E-08 | 3.36E-08 | 6.73E-08 | 1.51E-07 |

Z = 27 K1 SHELL ER = 7.7090E 00 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.14E 01 | 3.63E 02 | 8.61E 03 | 1.95E 05 | 4.48E 06 | 8.07E 00 | 4.92E 02 | 1.64E 04 | 4.80E 05 | 1.37E 07 |
| 17 | 8.05E 00 | 2.55E 02 | 6.17E 03 | 1.43E 05 | 3.36E 06 | 5.57E 00 | 3.01E 02 | 9.81E 03 | 2.90E 05 | 8.44E 06 |
| 20 | 5.09E 00 | 1.55E 02 | 3.71E 03 | 8.55E 04 | 1.98E 06 | 3.45E 00 | 1.59E 02 | 4.92E 03 | 1.42E 05 | 4.03E 06 |
| 25 | 2.68E 00 | 7.53E 01 | 1.69E 03 | 3.64E 04 | 7.89E 05 | 1.79E 00 | 6.67E 01 | 1.85E 03 | 4.89E 04 | 1.29E 06 |
| 32 | 1.30E 00 | 3.23E 01 | 6.46E 02 | 1.25E 04 | 2.40E 05 | 8.75E 01 | 2.57E 01 | 6.12E 02 | 1.42E 04 | 3.26E 05 |
| 40 | 6.74E-01 | 1.46E 01 | 2.58E 02 | 4.37E 03 | 7.40E 04 | 4.62E-01 | 1.10E 01 | 2.24E 02 | 4.47E 03 | 8.92E 04 |
| 50 | 3.46E-01 | 6.48E 00 | 9.91E 01 | 1.46E 03 | 2.13E 04 | 2.45E-01 | 4.75E 00 | 8.17E 01 | 1.39E 03 | 2.37E 04 |
| 65 | 1.57E-01 | 2.44E 00 | 3.12E 01 | 3.82E 02 | 4.65E 03 | 1.18E-01 | 1.80E 00 | 2.52E 01 | 3.50E 02 | 4.89E 03 |
| 80 | 8.32E-02 | 1.11E 00 | 1.23E 01 | 1.30E 02 | 1.35E 03 | 6.69E-02 | 8.46E-01 | 1.00E 01 | 1.18E 02 | 1.40E 03 |
| 100 | 4.21E-02 | 4.77E-01 | 4.46E 00 | 3.99E 01 | 3.53E 02 | 3.67E-02 | 3.82E-01 | 3.76E 00 | 3.71E 01 | 3.67E 02 |
| 120 | 2.41E-02 | 2.38E-01 | 1.94E 00 | 1.52E 01 | 1.17E 02 | 2.26E-02 | 2.02E-01 | 1.72E 00 | 1.46E 01 | 1.24E 02 |
| 150 | 1.22E-02 | 1.01E-01 | 7.04E-01 | 4.65E 00 | 3.03E 01 | 1.27E-02 | 9.41E-02 | 6.68E-01 | 4.74E 00 | 3.38E 01 |
| 200 | 5.14E-03 | 3.42E-02 | 1.92E-01 | 1.03E 00 | 5.40E 00 | 6.11E-03 | 3.62E-02 | 2.05E-01 | 1.16E 00 | 6.58E 00 |
| 300 | 1.57E-03 | 7.69E-03 | 3.24E-02 | 1.30E-01 | 5.14E-01 | 2.27E-03 | 1.00E-02 | 4.20E-02 | 1.75E-01 | 7.30E-01 |
| 450 | 5.21E-04 | 1.91E-03 | 6.15E-03 | 1.90E-02 | 5.77E-02 | 8.81E-04 | 3.00E-03 | 9.58E-03 | 3.02E-02 | 9.51E-02 |
| 650 | 2.12E-04 | 6.15E-04 | 1.59E-03 | 3.98E-03 | 9.76E-03 | 3.91E-04 | 1.08E-03 | 2.74E-03 | 7.04E-03 | 1.77E-02 |
| 1000 | 8.55E-05 | 1.97E-04 | 4.12E-04 | 8.32E-04 | 1.65E-03 | 1.60E-04 | 3.61E-04 | 7.52E-04 | 1.53E-03 | 3.06E-03 |
| 2000 | 2.66E-05 | 4.62E-05 | 7.51E-05 | 1.18E-04 | 1.82E-04 | 4.38E-05 | 7.60E-05 | 1.23E-04 | 1.93E-04 | 2.98E-04 |
| 6000 | 6.44E-06 | 8.26E-06 | 1.04E-05 | 1.29E-05 | 1.59E-05 | 8.02E-06 | 1.05E-05 | 1.32E-05 | 1.65E-05 | 2.02E-05 |

Z = 27 L1 SHELL ER = 5.2600E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 8.77E-01 | 2.73E 01 | 5.27E 02 | 5.33E 03 | 5.51E 04 | 7.80E-01 | 6.86E 01 | 4.26E 03 | 2.51E 05 | 1.47E 07 |
| 17 | 6.28E-01 | 1.92E 01 | 3.91E 02 | 5.34E 03 | 3.24E 04 | 5.39E-01 | 4.04E 01 | 2.23E 03 | 1.18E 05 | 6.18E 06 |
| 20 | 4.05E-01 | 1.18E 01 | 2.46E 02 | 4.02E 03 | 4.32E 04 | 3.34E-01 | 2.05E 01 | 9.70E 02 | 4.43E 04 | 2.02E 06 |
| 25 | 2.19E-01 | 5.84E 00 | 1.18E 02 | 2.06E 03 | 3.04E 04 | 1.74E-01 | 8.18E 00 | 3.13E 02 | 1.17E 04 | 4.37E 05 |
| 32 | 1.09E-01 | 2.58E 00 | 4.76E 01 | 8.02E 02 | 1.25E 04 | 8.49E-02 | 3.01E 00 | 9.13E 01 | 2.72E 03 | 8.15E 04 |
| 40 | 5.76E-02 | 1.19E 00 | 1.97E 01 | 3.05E 02 | 4.49E 03 | 4.48E-02 | 1.24E 00 | 3.05E 01 | 7.42E 02 | 1.81E 04 |
| 50 | 3.01E-02 | 5.41E-01 | 7.87E 00 | 1.08E 02 | 1.44E 03 | 2.38E-02 | 5.21E-01 | 1.04E 01 | 2.06E 02 | 4.10E 03 |
| 65 | 1.39E-02 | 2.09E-01 | 2.57E 00 | 2.99E 01 | 3.41E 02 | 1.14E-02 | 1.92E-01 | 3.00E 00 | 4.68E 01 | 7.34E 02 |
| 80 | 7.46E-03 | 9.70E-02 | 1.03E 00 | 1.05E 01 | 1.04E 02 | 6.47E-03 | 8.86E-02 | 1.14E 00 | 1.48E 01 | 1.92E 02 |
| 100 | 3.82E-03 | 4.22E-02 | 3.84E-01 | 3.33E 00 | 2.84E 01 | 3.55E-03 | 3.93E-02 | 4.15E-01 | 4.40E 00 | 4.69E 01 |
| 120 | 2.20E-03 | 2.13E-02 | 1.70E-01 | 1.29E 00 | 9.69E 00 | 2.19E-03 | 2.05E-02 | 1.85E-01 | 1.67E 00 | 1.51E 01 |
| 150 | 1.13E-03 | 9.19E-03 | 6.26E-02 | 4.05E-01 | 2.58E 00 | 1.22E-03 | 9.46E-03 | 7.02E-02 | 5.23E-01 | 3.91E 00 |
| 200 | 4.77E-04 | 3.13E-03 | 1.74E-02 | 9.16E-02 | 4.76E-01 | 5.88E-04 | 3.59E-03 | 2.10E-02 | 1.23E-01 | 7.25E-01 |
| 300 | 1.47E-04 | 7.16E-04 | 2.99E-03 | 1.19E-02 | 4.68E-02 | 2.18E-04 | 9.82E-04 | 4.21E-03 | 1.79E-02 | 7.67E-02 |
| 450 | 4.92E-05 | 1.79E-04 | 5.76E-04 | 1.78E-03 | 5.38E-03 | 8.43E-05 | 2.91E-04 | 9.42E-04 | 3.02E-03 | 9.64E-03 |
| 650 | 2.01E-05 | 5.81E-05 | 1.51E-04 | 3.76E-04 | 9.24E-04 | 3.74E-05 | 1.04E-04 | 2.71E-04 | 6.93E-04 | 1.76E-03 |
| 1000 | 8.10E-06 | 1.87E-05 | 3.92E-05 | 7.93E-05 | 1.58E-04 | 1.53E-05 | 3.46E-05 | 7.26E-05 | 1.48E-04 | 3.00E-04 |
| 2000 | 2.52E-06 | 4.39E-06 | 7.15E-06 | 1.13E-05 | 1.74E-05 | 4.17E-06 | 7.26E-06 | 1.18E-05 | 1.86E-05 | 2.88E-05 |

Z = 27 L2 SHELL ER = 7.9400E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.30E-01 | 5.69E 01 | 1.15E 04 | 1.36E 06 | 1.28E 08 | 4.21E-02 | 6.42E 00 | 6.05E 02 | 4.90E 04 | 3.69E 06 |
| 17 | 8.25E-02 | 3.03E 01 | 5.38E 03 | 5.71E 05 | 4.82E 07 | 3.50E-02 | 3.87E 00 | 3.24E 02 | 2.36E 04 | 1.60E 06 |
| 20 | 4.56E-02 | 1.34E 01 | 2.01E 03 | 1.85E 05 | 1.36E 07 | 1.78E-02 | 1.98E 00 | 1.44E 02 | 9.12E 03 | 5.38E 05 |
| 25 | 2.00E-02 | 4.36E 00 | 5.20E 02 | 3.91E 04 | 2.30E 06 | 9.74E-03 | 7.87E-01 | 6.69E 01 | 2.45E 03 | 1.19E 05 |
| 32 | 7.97E-03 | 1.26E 00 | 1.17E 02 | 7.02E 03 | 3.41E 05 | 4.45E-03 | 2.83E-01 | 1.36E 01 | 5.71E 02 | 2.24E 04 |
| 40 | 3.44E-03 | 4.13E-01 | 3.05E 01 | 1.49E 03 | 5.93E 04 | 2.15E-03 | 1.13E-01 | 4.41E 00 | 1.53E 02 | 4.91E 03 |
| 50 | 1.48E-03 | 1.36E-01 | 7.98E 00 | 3.18E 02 | 1.04E 04 | 1.07E-03 | 4.48E-02 | 1.44E 00 | 4.07E 01 | 1.08E 03 |
| 65 | 5.44E-04 | 3.68E-02 | 1.66E 00 | 5.21E 01 | 1.34E 03 | 4.66E-04 | 1.52E-02 | 3.79E-01 | 8.65E 00 | 1.81E 02 |
| 80 | 2.46E-04 | 1.32E-02 | 4.85E-01 | 1.26E 01 | 2.69E 02 | 2.41E-04 | 6.45E-03 | 1.36E-01 | 2.55E 00 | 4.44E 01 |
| 100 | 1.05E-04 | 4.41E-03 | 1.31E-01 | 2.76E 00 | 4.85E 01 | 1.18E-04 | 2.59E-03 | 4.48E-02 | 6.90E-01 | 9.91E 00 |
| 120 | 5.25E-05 | 1.82E-03 | 4.51E-02 | 8.11E-01 | 1.21E 01 | 6.64E-05 | 1.23E-03 | 1.82E-02 | 2.39E-01 | 2.1E 00 |
| 150 | 2.28E-05 | 6.22E-04 | 1.25E-02 | 1.84E-01 | 2.25E 00 | 3.28E-05 | 4.99E-04 | 6.09E-03 | 6.93E-02 | 6.73E-01 |
| 200 | 7.83E-06 | 1.60E-04 | 2.46E-03 | 2.83E-02 | 2.75E-01 | 1.53E-05 | 1.58E-04 | 1.51E-03 | 1.30E-02 | 1.04E-01 |
| 300 | 1.81E-06 | 2.50E-05 | 2.69E-04 | 2.22E-03 | 1.55E-02 | 3.75E-06 | 3.22E-05 | 2.24E-04 | 1.40E-03 | 8.15E-03 |
| 450 | 4.50E-07 | 4.25E-06 | 3.29E-05 | 1.99E-04 | 1.03E-03 | 1.09E-06 | 6.88E-06 | 3.56E-05 | 1.66E-04 | 7.23E-04 |
| 650 | 1.37E-07 | 9.61E-07 | 5.53E-06 | 2.58E-05 | 1.05E-04 | 3.63E-07 | 1.79E-06 | 7.20E-06 | 2.67E-05 | 9.19E-05 |
| 1000 | 3.81E-08 | 1.92E-07 | 8.14E-07 | 2.89E-06 | 9.08E-06 | 1.05E-07 | 4.00E-07 | 1.27E-06 | 3.66E-06 | 9.89E-06 |
| 2000 | 6.35E-09 | 2.03E-08 | 5.68E-08 | 1.61E-07 | 3.17E-07 | 1.60E-08 | 4.36E-08 | 1.01E-07 | 2.15E-07 | 4.31E-07 |

Z = 27 L3 SHELL ER = 7.7900E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 2.39E-01 | 1.02E 02 | 2.02E 04 | 2.38E 06 | 2.22E 08 | 1.96E-02 | 1.90E 01 | 5.79E 03 | 7.83E 05 | 8.09E 07 |
| 17 | 1.51E-01 | 5.37E 01 | 9.38E 03 | 9.82E 05 | 8.28E 07 | 1.53E-02 | 1.03E 01 | 2.66E 03 | 3.18E 05 | 2.95E 07 |
| 20 | 8.32E-02 | 2.35E 01 | 3.46E 03 | 3.15E 05 | 2.30E 07 | 8.00E-03 | 4.61E 00 | 2.72E 02 | 9.98E 04 | 7.98E 06 |
| 25 | 3.63E-02 | 7.55E 00 | 8.80E 02 | 6.53E 04 | 3.91E 06 | 3.99E-03 | 1.54E 00 | 2.47E 02 | 2.05E 04 | 1.34E 06 |
| 32 | 1.43E-02 | 2.15E 00 | 1.93E 02 | 1.14E 04 | 5.49E 05 | 1.85E-03 | 4.65E-01 | 5.54E 01 | 3.63E 03 | 1.90E 05 |
| 40 | 6.15E-03 | 6.88E-01 | 4.89E 01 | 2.35E 03 | 4.26E 04 | 9.21E-04 | 1.58E-01 | 1.46E 01 | 7.73E 02 | 3.29E 04 |
| 50 | 2.62E-03 | 2.21E-01 | 1.24E 01 | 4.85E 02 | 1.57E 04 | 6.59E-04 | 5.42E-02 | 3.88E 00 | 1.67E 02 | 5.80E 03 |
| 65 | 9.58E-04 | 5.80E-02 | 2.48E 00 | 7.57E 01 | 1.92E 03 | 2.02E-04 | 1.56E-02 | 8.37E-01 | 2.82E 01 | 7.72E 02 |
| 80 | 4.32E-04 | 2.02E-02 | 6.94E-01 | 1.74E 01 | 3.66E 02 | 1.06E-04 | 5.87E-03 | 2.52E-01 | 7.01E 00 | 1.59E 02 |
| 100 | 1.84E-04 | 6.53E-03 | 1.77E-01 | 3.62E 00 | 6.27E 01 | 5.30E-05 | 2.08E-03 | 7.06E-02 | 1.60E 00 | 2.99E 01 |
| 120 | 9.19E-05 | 2.61E-03 | 5.85E-02 | 1.01E 00 | 1.47E 01 | 3.02E-05 | 8.99E-04 | 2.53E-02 | 4.88E-01 | 7.75E 00 |
| 150 | 3.96E-05 | 8.56E-04 | 1.52E-02 | 2.12E-01 | 2.54E 00 | 1.52E-05 | 3.27E-04 | 7.31E-03 | 1.16E-01 | 1.52E 00 |
| 200 | 1.37E-05 | 2.08E-04 | 2.72E-03 | 2.90E-02 | 2.70E-01 | 6.37E-06 | 9.06E-05 | 1.52E-03 | 1.88E-02 | 1.95E-01 |
| 300 | 3.26E-06 | 3.00E-05 | 2.55E-04 | 1.88E-03 | 1.24E-02 | 1.93E-06 | 1.57E-05 | 1.76E-04 | 1.58E-03 | 1.19E-02 |
| 450 | 8.54E-07 | 4.83E-06 | 2.67E-05 | 1.37E-04 | 6.51E-04 | 6.15E-07 | 2.97E-06 | 2.23E-05 | 1.47E-04 | 8.26E-04 |
| 650 | 2.83E-07 | 1.05E-06 | 4.01E-06 | 1.50E-05 | 5.40E-05 | 2.33E-07 | 7.29E-07 | 3.74E-06 | 1.88E-05 | 8.36E-05 |
| 1000 | 9.05E-08 | 2.19E-07 | 5.57E-07 | 1.48E-06 | 3.96E-06 | 3.22E-08 | 1.67E-07 | 5.32E-07 | 1.97E-06 | 6.78E-06 |
| 2000 | 2.02E-08 | 2.95E-08 | 4.58E-08 | 7.54E-08 | 1.34E-07 | 1.98E-08 | 2.57E-08 | 4.10E-08 | 8.29E-08 | 1.87E-07 |

* 28 K1 SHELL ER = 8.330E 00 K12

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.21E 01 | 3.53E 02 | 7.51E 03 | 1.52E 05 | 3.12E 06 | 9.41E 00 | 5.72E 02 | 1.76E 04 | 4.67E 05 | 1.20E 07 |
| 17 | 8.55E 00 | 2.52E 02 | 5.60E 03 | 1.19E 05 | 2.56E 06 | 6.50E 00 | 3.44E 02 | 1.07E 04 | 2.94E 05 | 7.87E 06 |
| 20 | 3.41E 00 | 1.56E 02 | 3.50E 03 | 7.52E 04 | 1.63E 06 | 4.32E 00 | 1.85E 02 | 5.45E 03 | 1.48E 05 | 3.97E 06 |
| 25 | 2.86E 00 | 7.71E 01 | 1.64E 03 | 3.37E 04 | 6.96E 05 | 2.04E 00 | 7.74E 01 | 2.07E 03 | 5.26E 04 | 1.33E 06 |
| 32 | 1.40E 00 | 3.35E 01 | 6.46E 02 | 1.20E 04 | 2.23E 05 | 1.02E 00 | 2.98E 01 | 6.92E 02 | 1.55E 04 | 3.47E 05 |
| 40 | 7.25E-01 | 1.53E 01 | 2.62E 02 | 4.31E 03 | 7.09E 04 | 5.35E-01 | 1.27E 01 | 2.54E 02 | 4.96E 03 | 9.68E 04 |
| 50 | 3.73E-01 | 6.84E 00 | 1.02E 02 | 1.44E 03 | 2.09E 04 | 2.84E-01 | 5.48E 00 | 9.29E 01 | 1.55E 03 | 2.60E 04 |
| 65 | 1.69E-01 | 2.54E 00 | 3.25E 01 | 3.91E 02 | 4.66E 03 | 1.36E-01 | 2.07E 00 | 2.87E 01 | 3.94E 02 | 5.42E 03 |
| 80 | 9.03E-02 | 1.14E 00 | 1.24E 01 | 1.34E 02 | 1.38E 03 | 7.71E-02 | 9.73E-01 | 1.14E 01 | 1.33E 02 | 1.56E 03 |
| 100 | 4.58E-02 | 5.12E-01 | 4.72E 00 | 4.16E 01 | 3.63E 02 | 4.22E-02 | 4.38E-01 | 4.24E 00 | 4.19E 01 | 4.11E 02 |
| 120 | 2.63E-02 | 2.56E-01 | 2.07E 00 | 1.59E 01 | 1.21E 02 | 2.69E-02 | 2.31E-01 | 1.95E 00 | 1.65E 01 | 1.40E 02 |
| 150 | 1.34E-02 | 1.10E-01 | 7.52E-01 | 4.91E 00 | 3.17E 01 | 1.45E-02 | 1.08E-01 | 7.60E-01 | 5.37E 00 | 3.80E 01 |
| 200 | 5.63E-03 | 3.71E-02 | 2.06E-01 | 1.04E 00 | 5.71E 00 | 6.27E-03 | 4.13E-02 | 2.33E-01 | 1.31E 00 | 7.41E 00 |
| 300 | 1.73E-03 | 8.34E-03 | 3.51E-02 | 1.40E-01 | 5.50E-01 | 2.53E-03 | 1.14E-02 | 4.76E-02 | 1.98E-01 | 8.23E-01 |
| 450 | 3.75E-04 | 2.10E-03 | 6.72E-03 | 2.07E-02 | 6.24E-02 | 4.24E-04 | 3.40E-03 | 1.02E-02 | 3.42E-02 | 1.07E-01 |
| 650 | 2.35E-04 | 6.78E-04 | 1.75E-03 | 4.36E-03 | 1.07E-02 | 4.42E-04 | 1.23E-03 | 3.15E-03 | 7.95E-03 | 1.99E-02 |
| 1000 | 9.47E-05 | 2.18E-04 | 4.56E-04 | 9.20E-04 | 1.83E-03 | 1.80E-04 | 4.07E-04 | 3.49E-04 | 1.72E-03 | 3.45E-03 |
| 2000 | 2.94E-05 | 5.13E-05 | 8.35E-05 | 1.31E-04 | 2.03E-04 | 4.89E-05 | 8.53E-05 | 1.39E-04 | 2.18E-04 | 3.36E-04 |
| 6000 | 7.10E-06 | 9.13E-06 | 1.16E-05 | 1.44E-05 | 1.77E-05 | 8.36E-06 | 1.16E-05 | 1.48E-05 | 1.84E-05 | 2.26E-05 |

* 28 L1 SHELL ER = 1.0080E 00 K14

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 9.30E-01 | 2.69E 01 | 4.50E 02 | 3.07E 03 | 1.33E 05 | 9.20E-01 | 8.27E 01 | 5.12E 03 | 2.99E 05 | 1.73E 07 |
| 17 | 6.68E-01 | 1.91E 01 | 3.42E 02 | 3.73E 03 | 2.55E 04 | 6.35E-01 | 4.86E 01 | 2.68E 03 | 1.40E 05 | 7.30E 06 |
| 20 | 4.92E-01 | 1.19E 01 | 2.28E 02 | 3.22E 03 | 2.58E 04 | 3.93E-01 | 2.46E 01 | 1.16E 03 | 5.26E 04 | 2.38E 06 |
| 25 | 2.34E-01 | 5.99E 00 | 1.14E 02 | 1.82E 03 | 2.32E 04 | 2.05E-01 | 9.77E 00 | 3.73E 02 | 1.39E 04 | 5.15E 05 |
| 32 | 1.18E-01 | 2.68E 00 | 4.72E 01 | 7.51E 02 | 1.08E 04 | 9.96E-02 | 3.58E 00 | 1.08E 02 | 3.22E 03 | 9.59E 04 |
| 40 | 6.22E-02 | 1.25E 00 | 2.00E 01 | 2.95E 02 | 4.13E 03 | 5.25E-02 | 1.47E 00 | 3.61E 01 | 8.75E 02 | 2.13E 04 |
| 50 | 3.26E-02 | 5.73E-01 | 8.08E 00 | 1.07E 02 | 1.37E 03 | 2.79E-02 | 6.15E-01 | 1.22E 01 | 2.42E 02 | 4.81E 03 |
| 65 | 1.51E-02 | 2.23E-01 | 2.67E 00 | 3.04E 01 | 3.37E 02 | 1.34E-02 | 2.25E-01 | 3.52E 00 | 5.48E 01 | 8.58E 02 |
| 80 | 8.15E-03 | 1.04E-01 | 1.04E 00 | 1.08E 01 | 1.05E 02 | 7.55E-03 | 1.04E-01 | 1.34E 00 | 1.73E 01 | 2.24E 02 |
| 100 | 4.18E-03 | 4.55E-02 | 4.08E-01 | 3.47E 00 | 2.91E 01 | 4.12E-03 | 4.54E-02 | 4.84E-01 | 5.13E 00 | 5.45E 01 |
| 120 | 2.42E-03 | 2.30E-02 | 1.82E-01 | 1.36E 00 | 1.00E 01 | 2.54E-03 | 2.32E-02 | 2.15E-01 | 1.94E 00 | 1.76E 01 |
| 150 | 1.24E-03 | 1.00E-02 | 6.73E-02 | 4.30E-01 | 2.71E 00 | 1.42E-03 | 1.10E-02 | 8.15E-02 | 6.06E-01 | 4.53E 00 |
| 200 | 3.28E-04 | 3.43E-03 | 1.83E-02 | 9.83E-02 | 5.05E-01 | 6.29E-04 | 4.16E-03 | 2.43E-02 | 1.42E-01 | 8.37E-01 |
| 300 | 1.64E-04 | 7.89E-04 | 3.27E-03 | 1.30E-02 | 5.05E-02 | 2.51E-04 | 1.13E-03 | 4.85E-03 | 2.07E-02 | 8.82E-02 |
| 450 | 3.48E-05 | 1.99E-04 | 6.36E-04 | 1.95E-03 | 5.88E-03 | 9.66E-05 | 3.34E-04 | 1.08E-03 | 3.46E-03 | 1.11E-02 |
| 650 | 2.24E-05 | 6.48E-05 | 1.67E-04 | 4.17E-04 | 1.02E-03 | 4.27E-05 | 1.20E-04 | 3.11E-04 | 7.94E-04 | 2.01E-03 |
| 1000 | 9.07E-06 | 2.09E-05 | 4.34E-05 | 8.87E-05 | 1.77E-04 | 1.24E-05 | 3.95E-05 | 8.30E-05 | 1.70E-04 | 3.43E-04 |
| 2000 | 2.82E-06 | 4.93E-06 | 8.04E-06 | 1.27E-05 | 1.96E-05 | 4.21E-06 | 8.24E-06 | 1.34E-05 | 2.12E-05 | 3.28E-05 |

Z = 28 L2 SHELL ER = 8.7200E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.44E-01 | 6.80E 01 | 1.38E 04 | 1.62E 06 | 1.50E 08 | 5.93E-02 | 7.81E 00 | 7.20E 02 | 5.76E 04 | 4.28E 06 |
| 17 | 9.52E-02 | 1.63E 01 | 6.46E 03 | 6.80E 05 | 5.68E 07 | 4.00E-02 | 4.67E 00 | 3.87E 02 | 2.79E 04 | 1.87E 06 |
| 20 | 5.28E-02 | 1.60E 01 | 2.41E 03 | 2.20E 05 | 1.60E 07 | 2.39E-02 | 2.39E 00 | 1.72E 02 | 1.08E 04 | 6.30E 05 |
| 25 | 2.33E-02 | 5.23E 00 | 6.26E 02 | 4.68E 04 | 2.80E 06 | 1.18E-02 | 9.51E-01 | 5.63E 01 | 2.92E 03 | 1.41E 05 |
| 32 | 9.32E-03 | 1.52E 00 | 1.41E 02 | 8.42E 03 | 4.06E 05 | 5.40E-03 | 3.43E-01 | 1.63E 01 | 6.82E 02 | 2.65E 04 |
| 40 | 4.04E-03 | 4.97E-01 | 3.68E 01 | 1.79E 03 | 7.09E 04 | 2.66E-03 | 1.37E-01 | 5.32E 00 | 1.83E 02 | 5.84E 03 |
| 50 | 1.74E-03 | 1.63E-01 | 9.65E 00 | 3.83E 02 | 1.24E 04 | 1.31E-03 | 5.44E-02 | 1.74E 00 | 4.89E 01 | 1.28E 03 |
| 65 | 6.44E-04 | 4.44E-02 | 2.02E 00 | 6.30E 01 | 1.61E 03 | 5.69E-04 | 1.85E-02 | 4.66E-01 | 1.04E 01 | 2.17E 02 |
| 80 | 2.93E-04 | 1.60E-02 | 5.89E-01 | 1.52E 01 | 3.25E 02 | 2.94E-04 | 7.87E-03 | 1.65E-01 | 3.08E 00 | 5.35E 01 |
| 100 | 1.26E-04 | 5.35E-03 | 1.59E-01 | 3.35E 00 | 5.87E 01 | 1.45E-04 | 3.16E-03 | 5.45E-02 | 8.37E-01 | 1.20E 01 |
| 120 | 6.31E-05 | 2.21E-03 | 5.50E-02 | 9.86E-01 | 1.47E 01 | 8.13E-05 | 1.51E-03 | 2.22E-02 | 2.91E-01 | 3.55E 00 |
| 150 | 2.73E-05 | 7.56E-04 | 1.52E-02 | 2.25E-01 | 2.77E 00 | 4.02E-05 | 6.12E-04 | 7.44E-03 | 8.07E-02 | 8.17E-01 |
| 200 | 9.43E-06 | 1.95E-04 | 3.01E-03 | 3.46E-02 | 3.35E-01 | 1.63E-05 | 1.94E-04 | 1.86E-03 | 1.59E-02 | 1.27E-01 |
| 300 | 2.20E-06 | 3.06E-05 | 3.30E-04 | 2.72E-03 | 1.90E-02 | 4.63E-06 | 3.96E-05 | 2.75E-04 | 1.71E-03 | 9.98E-03 |
| 450 | 5.47E-07 | 5.27E-06 | 4.05E-05 | 2.44E-04 | 1.27E-03 | 1.34E-06 | 8.50E-06 | 4.39E-05 | 2.04E-04 | 8.88E-04 |
| 650 | 1.67E-07 | 1.18E-06 | 6.83E-06 | 3.18E-05 | 1.29E-04 | 4.48E-07 | 2.22E-06 | 9.01E-06 | 3.30E-05 | 1.13E-04 |
| 1000 | 4.65E-08 | 2.36E-07 | 1.01E-06 | 3.58E-06 | 1.12E-05 | 1.29E-07 | 4.96E-07 | 1.58E-06 | 4.53E-06 | 1.22E-05 |
| 2000 | 7.75E-09 | 2.49E-08 | 7.03E-08 | 1.74E-07 | 3.93E-07 | 1.97E-08 | 5.42E-08 | 1.26E-07 | 2.67E-07 | 5.36E-07 |

Z = 28 L3 SHELL ER = 8.5500E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 2.74E-01 | 1.21E 02 | 2.41E 04 | 2.80E 06 | 2.58E 08 | 2.33E-02 | 2.41E 01 | 7.54E 03 | 1.02E 06 | 1.04E 08 |
| 17 | 1.74E-01 | 6.40E 01 | 1.12E 04 | 1.17E 06 | 9.67E 07 | 1.56E-02 | 1.30E 01 | 3.45E 03 | 4.13E 05 | 3.79E 07 |
| 20 | 9.60E-02 | 2.80E 01 | 4.13E 03 | 3.73E 05 | 2.69E 07 | 9.52E-03 | 5.85E 00 | 1.26E 03 | 1.29E 05 | 1.02E 07 |
| 25 | 4.21E-02 | 9.01E 00 | 1.05E 03 | 7.76E 04 | 4.60E 06 | 4.76E-03 | 1.96E 00 | 3.19E 02 | 2.64E 04 | 1.72E 06 |
| 32 | 1.67E-02 | 2.56E 00 | 2.31E 02 | 1.36E 04 | 6.49E 05 | 2.21E-03 | 5.87E-01 | 7.12E 01 | 4.66E 03 | 2.42E 05 |
| 40 | 7.19E-03 | 8.23E-01 | 5.87E 01 | 2.81E 03 | 1.10E 05 | 1.10E-03 | 1.99E-01 | 1.86E 01 | 9.88E 02 | 4.19E 04 |
| 50 | 3.08E-03 | 2.64E-01 | 1.49E 01 | 5.80E 02 | 1.85E 04 | 5.49E-04 | 6.82E-02 | 4.95E 00 | 2.13E 02 | 7.38E 03 |
| 65 | 1.13E-03 | 6.96E-02 | 2.98E 00 | 9.07E 01 | 2.29E 03 | 2.42E-04 | 1.96E-02 | 1.06E 00 | 3.58E 01 | 9.78E 02 |
| 80 | 5.10E-04 | 2.43E-02 | 8.36E-01 | 2.09E 01 | 4.38E 02 | 1.27E-04 | 7.35E-03 | 3.19E-01 | 8.89E 00 | 2.02E 02 |
| 100 | 2.18E-04 | 7.85E-03 | 2.14E-01 | 4.35E 00 | 7.45E 01 | 6.35E-05 | 2.60E-03 | 8.92E-02 | 2.03E 00 | 3.77E 01 |
| 120 | 1.09E-04 | 3.14E-03 | 7.06E-02 | 1.21E 00 | 1.76E 01 | 3.62E-05 | 1.12E-03 | 3.19E-02 | 6.15E-01 | 9.77E 00 |
| 150 | 4.72E-05 | 1.03E-03 | 1.83E-02 | 2.55E-01 | 3.05E 00 | 1.83E-05 | 4.06E-04 | 9.19E-03 | 1.46E-01 | 1.91E 00 |
| 200 | 1.64E-05 | 2.51E-04 | 3.29E-03 | 3.51E-02 | 3.26E-01 | 7.66E-06 | 1.12E-04 | 1.90E-03 | 2.37E-02 | 2.45E-01 |
| 300 | 3.90E-06 | 3.62E-05 | 3.09E-04 | 2.28E-03 | 1.50E-02 | 2.32E-06 | 1.93E-05 | 2.20E-04 | 1.98E-03 | 1.49E-02 |
| 450 | 1.02E-06 | 5.84E-06 | 3.24E-05 | 1.66E-04 | 7.89E-04 | 7.41E-07 | 3.64E-06 | 2.77E-05 | 1.83E-04 | 1.03E-03 |
| 650 | 3.40E-07 | 1.27E-06 | 4.86E-06 | 1.82E-05 | 6.55E-05 | 2.80E-07 | 8.90E-07 | 4.62E-06 | 2.34E-05 | 1.04E-04 |
| 1000 | 1.09E-07 | 2.64E-07 | 6.75E-07 | 1.79E-06 | 4.82E-06 | 9.88E-08 | 2.03E-07 | 6.60E-07 | 2.44E-06 | 8.43E-06 |
| 2000 | 2.43E-08 | 3.58E-08 | 5.52E-08 | 9.12E-08 | 1.62E-07 | 2.37E-08 | 3.09E-08 | 4.97E-08 | 1.01E-07 | 2.30E-07 |

Z = 29 L1 SHELL ER = 6.9790E 00 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.28E 01 | 3.40E 02 | 6.39E 03 | 1.14E 05 | 2.05E 06 | 1.09E 01 | 6.62E 02 | 1.88E 04 | 4.44E 05 | 1.01E 07 |
| 17 | 9.04E 00 | 2.47E 02 | 5.00E 03 | 9.64E 04 | 1.88E 06 | 7.54E 00 | 4.04E 02 | 1.16E 04 | 2.92E 05 | 7.13E 06 |
| 20 | 5.74E 00 | 1.56E 02 | 3.26E 03 | 6.51E 04 | 1.31E 06 | 4.66E 00 | 2.14E 02 | 6.00E 03 | 1.53E 05 | 3.83E 06 |
| 25 | 3.05E 00 | 7.85E 01 | 1.59E 03 | 3.10E 04 | 6.06E 05 | 2.42E 00 | 8.94E 01 | 2.31E 03 | 5.62E 04 | 1.35E 06 |
| 32 | 1.50E 00 | 3.46E 01 | 6.42E 02 | 1.15E 04 | 2.05E 05 | 1.18E 00 | 3.44E 01 | 7.79E 02 | 1.69E 04 | 3.67E 05 |
| 40 | 7.76E-01 | 1.60E 01 | 2.65E 02 | 4.23E 03 | 6.75E 04 | 6.18E-01 | 1.46E 01 | 2.87E 02 | 5.48E 03 | 1.04E 05 |
| 50 | 4.01E-01 | 7.18E 00 | 1.05E 02 | 1.46E 03 | 2.04E 04 | 3.27E-01 | 6.31E 00 | 1.05E 02 | 1.73E 03 | 2.84E 04 |
| 65 | 1.83E-01 | 2.75E 00 | 3.37E 01 | 3.27E 02 | 4.65E 03 | 1.57E-01 | 2.38E 00 | 3.25E 01 | 4.41E 02 | 5.99E 03 |
| 80 | 9.77E-02 | 1.27E 00 | 1.35E 01 | 1.37E 02 | 1.39E 03 | 8.84E-02 | 1.11E 00 | 1.29E 01 | 1.50E 02 | 1.73E 03 |
| 100 | 4.97E-02 | 5.47E-01 | 4.97E 00 | 4.32E 01 | 3.71E 02 | 4.83E-02 | 5.01E-01 | 4.87E 00 | 4.72E 01 | 4.59E 02 |
| 120 | 2.57E-02 | 2.74E-01 | 2.19E 00 | 1.66E 01 | 1.25E 02 | 2.97E-02 | 2.64E-01 | 2.22E 00 | 1.86E 01 | 1.56E 02 |
| 150 | 1.17E-02 | 1.18E-01 | 8.01E-01 | 5.17E 00 | 3.30E 01 | 1.65E-02 | 1.23E-01 | 8.61E-01 | 6.05E 00 | 4.26E 01 |
| 200 | 6.14E-03 | 4.01E-02 | 2.21E-01 | 1.16E 00 | 6.01E 00 | 7.93E-03 | 4.69E-02 | 2.64E-01 | 1.48E 00 | 8.32E 00 |
| 300 | 1.89E-03 | 9.13E-03 | 3.80E-02 | 1.50E-01 | 5.87E-01 | 2.92E-03 | 1.29E-02 | 5.38E-02 | 2.23E-01 | 9.25E-01 |
| 450 | 6.32E-04 | 2.29E-03 | 7.31E-03 | 2.24E-02 | 6.74E-02 | 1.13E-03 | 3.85E-03 | 1.22E-02 | 3.85E-02 | 1.21E-01 |
| 650 | 2.58E-04 | 7.45E-04 | 1.92E-03 | 4.76E-03 | 1.16E-02 | 4.97E-04 | 1.38E-03 | 3.56E-03 | 8.96E-03 | 2.24E-02 |
| 1000 | 1.04E-04 | 2.41E-04 | 5.03E-04 | 1.01E-03 | 2.01E-03 | 2.02E-04 | 4.58E-04 | 9.56E-04 | 1.94E-03 | 3.88E-03 |
| 2000 | 3.24E-05 | 5.68E-05 | 9.26E-05 | 1.46E-04 | 2.25E-04 | 5.44E-05 | 9.54E-05 | 1.55E-04 | 2.44E-04 | 3.77E-04 |
| 6000 | 7.79E-06 | 1.01E-05 | 1.28E-05 | 1.60E-05 | 1.97E-05 | 9.75E-06 | 1.29E-05 | 1.64E-05 | 2.05E-05 | 2.52E-05 |

Z = 29 L1 SHELL ER = 1.0960E 00 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 9.82E-01 | 2.63E 01 | 3.73E 02 | 1.59E 03 | 2.82E 05 | 1.08E 00 | 9.93E 01 | 6.13E 03 | 3.54E 05 | 2.03E 07 |
| 17 | 7.07E-01 | 1.89E 01 | 3.05E 02 | 2.39E 03 | 4.62E 04 | 7.46E-01 | 5.83E 01 | 3.20E 03 | 1.66E 05 | 8.56E 06 |
| 20 | 4.59E-01 | 1.20E 01 | 2.09E 02 | 2.46E 03 | 1.54E 04 | 4.61E-01 | 2.94E 01 | 1.38E 03 | 6.23E 04 | 2.79E 06 |
| 25 | 2.50E-01 | 6.10E 00 | 1.08E 02 | 1.57E 03 | 1.67E 04 | 2.40E-01 | 1.16E 01 | 4.43E 02 | 1.64E 04 | 6.04E 05 |
| 32 | 1.26E-01 | 2.77E 00 | 4.65E 01 | 6.93E 02 | 9.10E 03 | 1.17E-01 | 4.24E 00 | 1.28E 02 | 3.79E 03 | 1.12E 05 |
| 40 | 6.70E-02 | 1.31E 00 | 2.01E 01 | 2.83E 02 | 3.74E 03 | 6.14E-02 | 1.74E 00 | 4.25E 01 | 1.03E 03 | 2.49E 04 |
| 50 | 3.53E-02 | 6.03E-01 | 8.25E 00 | 1.06E 02 | 1.30E 03 | 3.25E-02 | 7.23E-01 | 1.44E 01 | 2.83E 02 | 5.61E 03 |
| 65 | 1.64E-02 | 2.37E-01 | 2.77E 00 | 3.06E 01 | 3.31E 02 | 1.56E-02 | 2.64E-01 | 4.11E 00 | 6.39E 01 | 9.98E 02 |
| 80 | 8.87E-03 | 1.11E-01 | 1.14E 00 | 1.11E 01 | 1.05E 02 | 8.76E-03 | 1.21E-01 | 1.56E 00 | 2.01E 01 | 2.60E 02 |
| 100 | 4.57E-03 | 4.89E-02 | 4.31E-01 | 3.60E 00 | 2.96E 01 | 4.78E-03 | 5.34E-02 | 5.63E-01 | 5.95E 00 | 6.31E 01 |
| 120 | 2.65E-03 | 2.49E-02 | 1.93E-01 | 1.42E 00 | 1.03E 01 | 2.93E-03 | 2.77E-02 | 2.49E-01 | 2.24E 00 | 2.03E 01 |
| 150 | 1.36E-03 | 1.08E-02 | 7.20E-02 | 4.54E-01 | 2.82E 00 | 1.63E-03 | 1.27E-02 | 9.42E-02 | 7.00E-01 | 5.22E 00 |
| 200 | 5.81E-04 | 3.74E-03 | 2.03E-02 | 1.05E-01 | 5.83E-01 | 7.81E-04 | 4.79E-03 | 2.80E-02 | 1.64E-01 | 9.63E-01 |
| 300 | 1.81E-04 | 8.65E-04 | 3.57E-03 | 1.40E-02 | 5.42E-02 | 2.87E-04 | 1.30E-03 | 5.56E-03 | 2.37E-02 | 1.01E-01 |
| 450 | 6.08E-05 | 2.20E-04 | 6.99E-04 | 2.13E-03 | 6.41E-03 | 1.10E-04 | 3.82E-04 | 1.24E-03 | 3.96E-03 | 1.26E-02 |
| 650 | 2.49E-05 | 7.19E-05 | 1.85E-04 | 4.60E-04 | 1.13E-03 | 4.85E-05 | 1.36E-04 | 3.55E-04 | 9.06E-04 | 2.29E-03 |
| 1000 | 1.01E-05 | 2.34E-05 | 4.84E-05 | 9.88E-05 | 1.96E-04 | 1.96E-05 | 4.49E-05 | 9.45E-05 | 1.93E-04 | 3.90E-04 |
| 2000 | 3.14E-06 | 5.51E-06 | 9.01E-06 | 1.42E-05 | 2.21E-05 | 5.29E-06 | 9.32E-06 | 1.52E-05 | 2.41E-05 | 3.73E-05 |

Z = 29 L2 SHELL EB = 9.5100E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.71E-01 | 8.09E 01 | 1.64E 04 | 1.91E 06 | 1.75E 08 | 7.12E-02 | 9.35E 00 | 8.52E 02 | 6.73E 04 | 4.93E 06 |
| 17 | 1.09E+01 | 4.31E 01 | 7.70E 03 | 8.04E 05 | 6.64E 07 | 4.80E-02 | 5.59E 00 | 4.58E 02 | 3.26E 04 | 2.16E 06 |
| 20 | 6.08E-02 | 1.91E 01 | 2.88E 03 | 2.61E 05 | 1.88E 07 | 2.88E-02 | 2.86E 00 | 2.04E 02 | 1.27E 04 | 7.32E 05 |
| 25 | 2.64E-02 | 6.23E 00 | 7.49E 02 | 5.56E 04 | 3.30E 06 | 1.42E-02 | 1.14E 00 | 6.70E 01 | 3.44E 03 | 1.64E 05 |
| 32 | 1.08E-02 | 1.81E 00 | 1.69E 02 | 1.00E 04 | 4.80E 05 | 6.52E-03 | 4.13E-01 | 1.95E 01 | 8.08E 02 | 3.12E 04 |
| 40 | 4.72E-03 | 5.94E-01 | 4.42E 01 | 2.14E 03 | 8.42E 04 | 3.21E-03 | 1.65E-01 | 6.37E 00 | 2.17E 02 | 6.89E 03 |
| 50 | 2.04E-03 | 1.96E-01 | 1.16E 01 | 4.59E 02 | 1.48E 04 | 1.58E-03 | 6.56E-02 | 2.08E 00 | 5.84E 01 | 1.52E 03 |
| 65 | 7.58E-04 | 5.33E-02 | 2.43E 00 | 7.56E 01 | 1.93E 03 | 6.89E-04 | 2.23E-02 | 5.61E-01 | 1.25E 01 | 2.59E 02 |
| 80 | 3.46E-04 | 1.92E-02 | 7.11E-01 | 1.83E 01 | 3.84E 02 | 3.57E-04 | 9.54E-03 | 1.99E-01 | 3.70E 00 | 6.39E 01 |
| 100 | 1.49E-04 | 6.44E-03 | 1.92E-01 | 4.04E 00 | 7.06E 01 | 1.76E-04 | 3.84E-03 | 6.59E-02 | 1.01E 00 | 1.43E 01 |
| 120 | 7.50E-05 | 2.66E-03 | 6.65E-02 | 1.19E 00 | 1.77E 01 | 9.90E-05 | 1.83E-03 | 2.68E-02 | 3.51E-01 | 4.27E 00 |
| 150 | 3.26E-05 | 9.14E-04 | 1.85E-02 | 2.72E-01 | 3.34E 00 | 4.90E-05 | 7.45E-04 | 9.03E-03 | 9.76E-02 | 9.85E-01 |
| 200 | 1.13E-05 | 2.36E-04 | 3.66E-03 | 4.20E-02 | 4.00E-01 | 1.99E-05 | 2.36E-04 | 2.26E-03 | 1.93E-02 | 1.53E-01 |
| 300 | 2.64E-06 | 3.72E-05 | 4.02E-04 | 3.31E-03 | 2.31E-02 | 5.67E-06 | 4.85E-05 | 3.36E-04 | 2.09E-03 | 1.21E-02 |
| 450 | 6.59E-07 | 6.41E-06 | 4.95E-05 | 2.99E-04 | 1.55E-03 | 1.65E-06 | 1.04E-05 | 5.38E-05 | 2.50E-04 | 1.08E-03 |
| 650 | 2.02E-07 | 1.44E-06 | 8.36E-06 | 3.90E-05 | 1.58E-04 | 5.51E-07 | 2.73E-06 | 1.11E-05 | 4.05E-05 | 1.39E-04 |
| 1000 | 5.63E-08 | 2.88E-07 | 1.23E-06 | 4.39E-06 | 1.38E-05 | 1.59E-07 | 6.11E-07 | 1.94E-06 | 5.58E-06 | 1.50E-05 |
| 2000 | 9.39E-09 | 3.05E-08 | 8.64E-08 | 2.15E-07 | 4.85E-07 | 2.42E-08 | 6.67E-08 | 1.55E-07 | 3.30E-07 | 6.61E-07 |

Z = 29 L3 SHELL EB = 9.3100E-01 KEV

| EG | E1 | E2 | E3 | E4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 3.12E-01 | 1.43E 02 | 2.86E 04 | 3.30E 06 | 3.00E 08 | 2.75E-02 | 3.04E 01 | 9.76E 03 | 1.31E 06 | 1.34E 08 |
| 17 | 1.99E-01 | 7.58E 01 | 1.33E 04 | 1.37E 06 | 1.13E 08 | 1.86E-02 | 1.64E 01 | 4.46E 03 | 5.32E 05 | 4.86E 07 |
| 20 | 1.10E-01 | 3.32E 01 | 4.91E 03 | 4.40E 05 | 3.14E 07 | 1.13E-02 | 7.36E 00 | 1.62E 03 | 1.66E 05 | 1.31E 07 |
| 25 | 4.84E-02 | 1.07E 01 | 1.25E 03 | 9.18E 04 | 5.40E 06 | 5.63E-03 | 2.46E 00 | 4.09E 02 | 3.39E 04 | 2.19E 06 |
| 32 | 1.93E-02 | 3.04E 00 | 2.75E 02 | 1.61E 04 | 7.64E 05 | 2.61E-03 | 7.37E-01 | 9.09E 01 | 5.95E 03 | 3.08E 05 |
| 40 | 8.34E-03 | 9.78E-01 | 7.00E 01 | 3.34E 03 | 1.30E 05 | 1.30E-03 | 2.49E-01 | 2.37E 01 | 1.26E 03 | 5.32E 04 |
| 50 | 3.58E-03 | 3.14E-01 | 1.78E 01 | 6.90E 02 | 2.19E 04 | 6.51E-04 | 8.52E-02 | 6.27E 00 | 2.70E 02 | 9.32E 03 |
| 65 | 1.32E-03 | 8.29E-02 | 3.56E 00 | 1.08E 02 | 2.72E 03 | 2.88E-04 | 2.44E-02 | 1.34E 00 | 4.52E 01 | 1.23E 03 |
| 80 | 5.98E-04 | 2.89E-02 | 1.00E 00 | 2.50E 01 | 5.21E 02 | 1.51E-04 | 9.13E-03 | 4.02E-01 | 1.12E 01 | 2.53E 02 |
| 100 | 2.56E-04 | 9.38E-03 | 2.56E-01 | 5.20E 00 | 8.87E 01 | 7.57E-05 | 3.22E-03 | 1.12E-01 | 2.54E 00 | 4.73E 01 |
| 120 | 1.29E-04 | 3.75E-03 | 8.47E-02 | 1.45E 00 | 2.10E 01 | 4.32E-05 | 1.39E-03 | 3.99E-02 | 7.71E-01 | 1.22E 01 |
| 150 | 5.57E-05 | 1.23E-03 | 2.20E-02 | 3.06E-01 | 3.64E 00 | 2.18E-05 | 5.00E-04 | 1.15E-02 | 1.82E-01 | 2.39E 00 |
| 200 | 1.94E-05 | 3.00E-04 | 3.95E-03 | 4.21E-02 | 3.90E-01 | 9.15E-06 | 1.38E-04 | 2.37E-03 | 2.95E-02 | 3.05E-01 |
| 300 | 4.63E-06 | 4.35E-05 | 3.72E-04 | 2.74E-03 | 1.80E-02 | 2.77E-06 | 2.37E-05 | 2.72E-04 | 2.45E-03 | 1.85E-02 |
| 450 | 1.22E-06 | 7.01E-06 | 3.90E-05 | 2.00E-04 | 9.49E-04 | 8.85E-07 | 4.43E-06 | 3.41E-05 | 2.26E-04 | 1.28E-03 |
| 650 | 4.05E-07 | 1.53E-06 | 5.86E-06 | 2.19E-05 | 7.89E-05 | 3.35E-07 | 1.08E-06 | 5.68E-06 | 2.89E-05 | 1.29E-04 |
| 1000 | 1.29E-07 | 3.17E-07 | 8.12E-07 | 2.16E-06 | 5.82E-06 | 1.18E-07 | 2.44E-07 | 8.05E-07 | 2.99E-06 | 1.04E-05 |
| 2000 | 2.89E-08 | 4.28E-08 | 6.62E-08 | 1.10E-07 | 1.95E-07 | 2.83E-08 | 3.70E-08 | 5.98E-08 | 1.23E-07 | 2.82E-07 |

Z = 30 U1 SHELL FR = 0.650E 00 KIV

| EG | E1 | F2 | F3 | E4 | F5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.34E 01 | 3.20E 02 | 5.22E 03 | 8.01E 04 | 1.24E 06 | 1.26E 01 | 7.60E 02 | 1.95E 04 | 4.04E 05 | 7.96E 06 |
| 17 | 9.52E 00 | 2.39E 02 | 4.34E 03 | 7.50E 04 | 1.31E 06 | 8.71E 00 | 4.65E 02 | 1.24E 04 | 2.82E 05 | 6.19E 06 |
| 20 | 6.07E 00 | 1.55E 02 | 2.98E 03 | 5.49E 04 | 1.02E 06 | 5.38E 00 | 2.46E 02 | 6.52E 03 | 1.55E 05 | 3.60E 06 |
| 25 | 3.24E 00 | 7.93E 01 | 1.52E 03 | 2.79E 04 | 5.17E 05 | 2.79E 00 | 1.03E 02 | 2.55E 03 | 5.91E 04 | 1.35E 06 |
| 32 | 1.59E 00 | 3.56E 01 | 6.32E 02 | 1.06E 04 | 1.86E 05 | 1.36E 00 | 3.95E 01 | 8.69E 02 | 1.83E 04 | 3.82E 05 |
| 40 | 8.31E-01 | 1.66E 01 | 2.66E 02 | 4.11E 03 | 6.35E 04 | 7.11E-01 | 1.68E 01 | 3.22E 02 | 5.99E 03 | 1.11E 05 |
| 50 | 4.30E-01 | 7.51E 00 | 1.06E 02 | 1.45E 03 | 1.97E 04 | 3.76E-01 | 7.22E 00 | 1.19E 02 | 1.91E 03 | 3.08E 04 |
| 65 | 1.97E-01 | 2.89E 00 | 3.48E 01 | 4.01E 02 | 4.61E 03 | 1.40E-01 | 2.72E 00 | 3.67E 01 | 4.90E 02 | 6.56E 03 |
| 80 | 1.05E-01 | 1.34E 00 | 1.40E 01 | 1.40E 02 | 1.40E 03 | 1.01E-01 | 1.27E 00 | 1.46E 01 | 1.67E 02 | 1.91E 03 |
| 100 | 5.36E-02 | 5.82E-01 | 5.21E 00 | 4.46E 01 | 3.78E 02 | 5.51E-02 | 3.70E-01 | 5.49E 00 | 5.28E 01 | 5.09E 02 |
| 120 | 3.09E-02 | 2.93E-01 | 2.31E 00 | 1.73E 01 | 1.28E 02 | 3.36E-02 | 3.00E-01 | 2.50E 00 | 2.08E 01 | 1.74E 02 |
| 150 | 1.58E-02 | 1.27E-01 | 8.49E-01 | 5.42E 00 | 3.42E 01 | 1.88E-02 | 1.39E-01 | 9.72E-01 | 6.78E 00 | 4.75E 01 |
| 200 | 6.68E-03 | 4.32E-02 | 2.36E-01 | 1.23E 00 | 6.29E 00 | 8.29E-03 | 5.31E-02 | 2.97E-01 | 1.66E 00 | 9.29E 00 |
| 300 | 2.07E-03 | 9.90E-03 | 4.08E-02 | 1.61E-01 | 6.23E-01 | 3.30E-03 | 1.46E-02 | 6.06E-02 | 2.50E-01 | 1.03E 00 |
| 450 | 6.93E-04 | 2.50E-03 | 7.93E-03 | 2.42E-02 | 7.24E-02 | 1.27E-03 | 4.33E-03 | 1.38E-02 | 4.32E-02 | 1.35E-01 |
| 650 | 2.84E-04 | 8.16E-04 | 2.10E-03 | 5.19E-03 | 1.26E-02 | 5.57E-04 | 1.55E-03 | 3.99E-03 | 1.00E-02 | 2.51E-02 |
| 1000 | 1.15E-04 | 2.65E-04 | 5.53E-04 | 1.11E-03 | 2.20E-03 | 2.25E-04 | 5.13E-04 | 1.07E-03 | 2.17E-03 | 4.34E-03 |
| 2000 | 3.56E-05 | 6.26E-05 | 1.02E-04 | 1.61E-04 | 2.49E-04 | 6.03E-05 | 1.06E-04 | 1.74E-04 | 2.73E-04 | 4.22E-04 |
| 6000 | 8.52E-06 | 1.10E-05 | 1.41E-05 | 1.76E-05 | 2.12E-05 | 1.07E-05 | 1.42E-05 | 1.82E-05 | 2.27E-05 | 2.81E-05 |

Z = 30 U1 SHELL FR = 1.1940E 00 KIV

| EG | E1 | F2 | F3 | E4 | F5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.03E 00 | 2.55E 01 | 2.98E 02 | 1.04E 03 | 5.08E 05 | 1.26E 00 | 1.19E 02 | 7.29E 03 | 4.18E 05 | 2.37E 07 |
| 17 | 7.46E-01 | 1.86E 01 | 2.59E 02 | 1.40E 03 | 9.71E 04 | 8.71E-01 | 6.94E 01 | 3.80E 03 | 1.95E 05 | 9.98E 06 |
| 20 | 4.85E-01 | 1.19E 01 | 1.88E 02 | 1.78E 03 | 1.34E 04 | 5.39E-01 | 3.49E 01 | 1.64E 03 | 7.32E 04 | 3.26E 06 |
| 25 | 2.66E-01 | 6.18E 00 | 1.02E 02 | 1.31E 03 | 1.15E 04 | 2.79E-01 | 1.36E 01 | 5.23E 02 | 1.92E 04 | 7.04E 05 |
| 32 | 1.35E-01 | 2.84E 00 | 4.53E 01 | 6.29E 02 | 7.45E 03 | 1.36E-01 | 5.00E 00 | 1.51E 02 | 4.44E 03 | 1.31E 05 |
| 40 | 7.18E-02 | 1.36E 00 | 2.00E 01 | 2.69E 02 | 3.32E 03 | 7.13E-02 | 2.04E 00 | 4.98E 01 | 1.20E 03 | 2.89E 04 |
| 50 | 3.79E-02 | 6.32E-01 | 8.37E 00 | 1.03E 02 | 1.21E 03 | 3.77E-02 | 8.46E-01 | 1.68E 01 | 3.30E 02 | 6.51E 03 |
| 65 | 1.77E-02 | 2.50E-01 | 2.86E 00 | 3.07E 01 | 3.21E 02 | 1.40E-02 | 3.08E-01 | 4.79E 00 | 7.42E 01 | 1.16E 03 |
| 80 | 9.61E-03 | 1.18E-01 | 1.19E 00 | 1.12E 01 | 1.04E 02 | 1.01E-02 | 1.41E-01 | 1.81E 00 | 2.33E 01 | 3.01E 02 |
| 100 | 4.96E-03 | 5.23E-02 | 4.52E-01 | 3.71E 00 | 3.00E 01 | 5.51E-03 | 4.18E-02 | 6.51E-01 | 6.87E 00 | 7.28E 01 |
| 120 | 2.89E-03 | 2.67E-02 | 2.04E-01 | 1.48E 00 | 1.06E 01 | 3.38E-03 | 3.21E-02 | 2.88E-01 | 2.59E 00 | 2.34E 01 |
| 150 | 1.49E-03 | 1.17E-02 | 7.66E-02 | 4.77E-01 | 2.93E 00 | 1.88E-03 | 1.46E-02 | 1.08E-01 | 8.05E-01 | 6.00E 00 |
| 200 | 6.37E-04 | 4.05E-03 | 2.18E-02 | 1.11E-01 | 5.61E-01 | 8.95E-04 | 5.51E-03 | 3.22E-02 | 1.88E-01 | 1.10E 00 |
| 300 | 1.99E-04 | 9.45E-04 | 3.87E-03 | 1.51E-02 | 5.79E-02 | 3.28E-04 | 1.49E-03 | 6.36E-03 | 2.71E-02 | 1.15E-01 |
| 450 | 6.72E-05 | 2.42E-04 | 7.65E-04 | 2.32E-03 | 6.94E-03 | 1.25E-04 | 4.35E-04 | 1.41E-03 | 4.51E-03 | 1.44E-02 |
| 650 | 2.76E-05 | 7.95E-05 | 2.04E-04 | 5.06E-04 | 1.23E-03 | 5.44E-05 | 1.55E-04 | 4.04E-04 | 1.03E-03 | 2.61E-03 |
| 1000 | 1.12E-05 | 2.59E-05 | 5.43E-05 | 1.10E-04 | 2.16E-04 | 2.22E-05 | 5.09E-05 | 1.07E-04 | 2.19E-04 | 4.43E-04 |
| 2000 | 3.48E-06 | 6.13E-06 | 1.01E-05 | 1.59E-05 | 2.47E-05 | 5.92E-06 | 1.05E-05 | 1.72E-05 | 2.72E-05 | 4.22E-05 |

Z = 30 L2 SHELL ER = 1.0440E 00 KEV

| EG | E1 | F2 | E3 | F4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 1.94E-01 | 9.55E 01 | 1.94E 04 | 2.24E 06 | 2.02E 08 | 8.50E-02 | 1.11E 01 | 9.99E 02 | 7.77E 04 | 5.62E 06 |
| 17 | 1.24E-01 | 5.10E 01 | 9.12E 03 | 9.42E 05 | 7.69E 07 | 5.73E-02 | 6.64E 00 | 5.38E 02 | 3.78E 04 | 2.47E 06 |
| 20 | 6.95E-02 | 2.26E 01 | 3.42E 03 | 3.07E 05 | 2.18E 07 | 3.44E-02 | 3.41E 00 | 2.40E 02 | 1.48E 04 | 8.42E 05 |
| 25 | 3.09E-02 | 7.38E 00 | 8.89E 02 | 6.55E 04 | 3.85E 06 | 1.70E-02 | 1.36E 00 | 7.92E 01 | 4.02E 03 | 1.90E 05 |
| 32 | 1.25E-02 | 2.15E 00 | 2.01E 07 | 1.19E 04 | 5.64E 05 | 7.80E-03 | 4.93E-01 | 2.31E 01 | 9.49E 02 | 3.13E 04 |
| 40 | 5.46E-03 | 7.06E-01 | 5.26E 01 | 2.54E 03 | 9.91E 04 | 3.85E-03 | 1.97E-01 | 7.57E 00 | 2.56E 02 | 8.07E 03 |
| 50 | 2.37E-03 | 2.33E-01 | 1.38E 01 | 5.45E 02 | 1.75E 04 | 1.90E-03 | 7.86E-02 | 2.48E 00 | 6.91E 01 | 1.79E 03 |
| 65 | 8.86E-04 | 6.35E-02 | 2.90E 00 | 9.01E 01 | 2.24E 03 | 8.30E-04 | 2.68E-02 | 6.70E-01 | 1.48E 01 | 3.05E 02 |
| 80 | 4.05E-04 | 2.29E-02 | 8.51E-01 | 2.19E 01 | 4.63E 02 | 4.30E-04 | 1.15E-02 | 2.39E-01 | 4.40E 00 | 7.57E 01 |
| 100 | 1.75E-04 | 7.70E-03 | 2.30E-01 | 4.84E 00 | 8.41E 01 | 2.13E-04 | 4.62E-03 | 7.91E-02 | 1.20E 00 | 1.70E 01 |
| 120 | 8.84E-05 | 3.19E-03 | 7.99E-02 | 1.43E 00 | 2.12E 01 | 1.20E-04 | 2.21E-03 | 3.23E-02 | 4.20E-01 | 5.09E 00 |
| 150 | 3.85E-05 | 1.10E-03 | 2.72E-02 | 3.27E-01 | 4.00E 00 | 5.93E-05 | 8.99E-04 | 1.09E-02 | 1.17E-01 | 1.18E 00 |
| 200 | 1.34E-05 | 2.84E-04 | 4.41E-03 | 5.06E-02 | 4.88E-01 | 2.41E-05 | 2.86E-04 | 2.72E-03 | 2.72E-02 | 1.84E-01 |
| 300 | 3.14E-06 | 4.48E-05 | 4.86E-04 | 4.00E-03 | 2.79E-02 | 6.87E-06 | 5.88E-05 | 4.07E-04 | 2.52E-03 | 1.46E-02 |
| 450 | 7.89E-07 | 7.75E-06 | 6.00E-05 | 3.62E-04 | 1.87E-03 | 2.00E-06 | 1.27E-05 | 6.54E-05 | 3.03E-04 | 1.31E-03 |
| 650 | 2.43E-07 | 1.74E-06 | 1.02E-05 | 4.74E-05 | 1.92E-04 | 6.71E-07 | 3.33E-06 | 1.35E-05 | 4.93E-05 | 1.68E-04 |
| 1000 | 6.77E-08 | 3.49E-07 | 1.50E-06 | 5.36E-06 | 1.68E-05 | 1.94E-07 | 7.47E-07 | 2.37E-06 | 6.81E-06 | 1.83E-05 |
| 2000 | 1.13E-08 | 1.70E-08 | 1.05E-07 | 2.62E-07 | 5.93E-07 | 2.94E-08 | 8.17E-08 | 1.90E-07 | 4.04E-07 | 8.09E-07 |

Z = 30 L3 SHELL ER = 1.0210E 00 KEV

| EG | E1 | F2 | E3 | F4 | E5 | M1 | M2 | M3 | M4 | M5 |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 15 | 3.53E-01 | 1.68E 02 | 3.36E 04 | 3.83E 06 | 3.43E 08 | 3.22E-02 | 3.81E 01 | 1.25E 04 | 1.67E 06 | 1.69E 08 |
| 17 | 2.25E-01 | 8.92E 01 | 1.56E 04 | 1.60E 06 | 1.29E 08 | 2.19E-02 | 2.05E 01 | 5.69E 03 | 6.77E 05 | 6.12E 07 |
| 20 | 1.25E-01 | 3.91E 01 | 5.79E 03 | 5.13E 05 | 3.62E 07 | 1.32E-02 | 9.19E 00 | 2.06E 03 | 2.11E 05 | 1.65E 07 |
| 25 | 5.53E-02 | 1.26E 01 | 1.48E 03 | 1.07E 05 | 6.25E 06 | 6.62E-03 | 3.07E 00 | 5.19E 02 | 4.29E 04 | 2.76E 06 |
| 32 | 2.22E-02 | 3.59E 00 | 3.25E 02 | 1.89E 04 | 8.88E 05 | 3.07E-03 | 9.17E-01 | 1.15E 02 | 7.50E 03 | 3.87E 05 |
| 40 | 9.61E-03 | 1.15E 00 | 8.28E 01 | 3.92E 03 | 1.51E 05 | 1.54E-03 | 3.10E-01 | 2.98E 01 | 1.58E 03 | 6.66E 04 |
| 50 | 4.14E-03 | 3.71E-01 | 2.11E 01 | 8.13E 02 | 2.57E 04 | 7.68E-04 | 1.06E-01 | 7.87E 00 | 3.38E 02 | 1.16E 04 |
| 65 | 1.53E-03 | 9.81E-02 | 4.23E 00 | 1.28E 02 | 3.19E 03 | 3.40E-04 | 3.01E-02 | 1.68E 00 | 5.65E 01 | 1.54E 03 |
| 80 | 6.96E-04 | 3.43E-02 | 1.19E 00 | 2.96E 01 | 6.13E 02 | 1.78E-04 | 1.13E-02 | 5.01E-01 | 1.39E 01 | 3.15E 02 |
| 100 | 2.99E-04 | 1.11E-02 | 3.05E-01 | 6.16E 00 | 1.05E 02 | 8.95E-05 | 3.96E-03 | 1.39E-01 | 3.16E 00 | 5.87E 01 |
| 120 | 1.50E-04 | 4.45E-03 | 1.01E-01 | 1.72E 00 | 2.48E 01 | 5.11E-05 | 1.70E-03 | 4.95E-02 | 9.57E-01 | 1.52E 01 |
| 150 | 6.54E-05 | 1.47E-03 | 2.62E-02 | 3.64E-01 | 4.31E 00 | 2.58E-05 | 6.13E-04 | 1.42E-02 | 2.26E-01 | 2.96E 00 |
| 200 | 2.28E-05 | 3.57E-04 | 4.71E-03 | 5.01E-02 | 4.63E-01 | 1.08E-05 | 1.68E-04 | 2.92E-03 | 3.65E-02 | 3.77E-01 |
| 300 | 5.46E-06 | 5.18E-05 | 4.44E-04 | 3.26E-03 | 2.14E-02 | 3.29E-06 | 2.87E-05 | 3.35E-04 | 3.02E-03 | 2.28E-02 |
| 450 | 1.44E-06 | 8.35E-06 | 4.66E-05 | 2.39E-04 | 1.13E-03 | 1.05E-06 | 5.35E-06 | 4.18E-05 | 2.78E-04 | 1.57E-03 |
| 650 | 4.80E-07 | 1.82E-06 | 7.00E-06 | 2.62E-05 | 9.43E-05 | 3.97E-07 | 1.29E-06 | 6.91E-06 | 3.54E-05 | 1.58E-04 |
| 1000 | 1.53E-07 | 3.77E-07 | 9.69E-07 | 2.58E-06 | 6.96E-06 | 1.40E-07 | 2.92E-07 | 9.75E-07 | 3.65E-06 | 1.27E-05 |
| 2000 | 3.42E-08 | 5.08E-08 | 7.87E-08 | 1.31E-07 | 2.34E-07 | 3.34E-08 | 4.38E-08 | 7.15E-08 | 1.49E-07 | 3.42E-07 |