

**THICK TARGET K_{α} X-RAY YIELDS FOR 66 ELEMENTS FROM Na TO Pb
INDUCED BY 1-100 MeV PROTONS**

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ABSTRACT

In the course of a feasibility study of a high intensity X-ray source to be used for XRF, the K_{α} X-ray yields produced by 1-100 MeV proton bombardment of 66 pure element targets from Na to Pb have been calculated. The report presents the analytical model used for the computer simulations. In particular, the models adopted for the calculation of the K X-ray production cross section and the stopping power are described with some detail. A set of tables with the numerical results is enclosed in the Appendix. Some comparisons with experimental results obtained in the energy range 12-38 MeV are also reported.

1. - INTRODUCTION

XRF⁽¹⁾ and PIXE⁽²⁾ are well established tools for elemental analysis in a number of fields, such as biomedicine, environmental and material sciences, archeometry, industrial quality assurance procedures, etc. Several authors have compared the two techniques and discussed their

fields of applications and respective advantages and disadvantages (see chapter 17 of ref. 2 and references therein). The possibility of exploiting the intense production of characteristic X-rays from proton bombardment of a pure elemental target for use in XRF analysis has also been investigated.⁽³⁻⁹⁾ However, most of these previous studies are limited to proton energies typical of PIXE applications (2 to 4 MeV).

At present, several models of multi-particle, variable energy cyclotrons are commercially available from a limited number of manufacturers^(10,11) and have now reached a good degree of reliability. Well above one hundred of these machines are presently installed in research centres, hospital sites or industrial facilities all over the world. In view of the large diffusion of these accelerators, it may be feasible to extend the above technique to much higher proton energies, up to several tens MeV.

In the course of a feasibility study of high intensity X-ray sources induced by proton bombardment⁽¹²⁾, to be employed for XRF, the K_{α} X-ray yields have been calculated for 66 pure elemental targets from Na to Pb as a function of incident particle energy (in the range 1-100 MeV) and irradiation geometry. The present paper discusses the model adopted for the calculations and reports the numerical results. A comparison with some preliminary experimental results in the energy range 12-38 MeV is also presented.

2. - CALCULATION OF THE K_{α} X-RAY YIELD

The K_{α} X-ray yield per unit solid angle $Y(E_0)$ induced by a proton beam of energy E_0 impinging onto a thick target of pure elemental composition is given by:

$$Y(E_0) = \frac{1}{4\pi} I_p \frac{\rho N_{Av}}{P_{At}} \cdot \frac{1}{1+f_k} \cdot \frac{1}{1+g_k} \int_0^{E_0} \sigma_x(E_p) \left\{ e^{-\mu(\alpha_1)x(E_p)tg\phi} + g_k e^{-\mu(\alpha_2)x(E_p)tg\phi} \right\} \frac{dE_p}{S(E_p)} \quad (\text{Photons /s/sr}) \quad (1)$$

in which I_p is the number of incident protons per second, ρ and P_{At} are respectively the density and the atomic weight of the target element, N_{Av} is the Avogadro's number, $f_k=I(K_{\beta})/I(K_{\alpha})$, $g_k=I(K_{\alpha_2})/I(K_{\alpha_1})$, where $I(K)$ is the strength of the transition, $\sigma_x(E_p)$ is the K X-ray production cross section at proton energy E_p , $\mu(\alpha_1)$ and $\mu(\alpha_2)$ are the linear absorption coefficients for K_{α_1} and K_{α_2} X-ray lines of the target element, $S(E_p)$ is the stopping power at energy E_p . ϕ and $x(E_p)$ (see fig. 1) are respectively the angle between the direction of the incident protons and the target surface (angle of incidence), and the depth travelled by a proton suffering an energy loss $\Delta E=E_0-E_p$:

$$\chi(E_p) = \int_{E_0}^{E_p} \frac{-dE'}{S(E')} \quad (2)$$

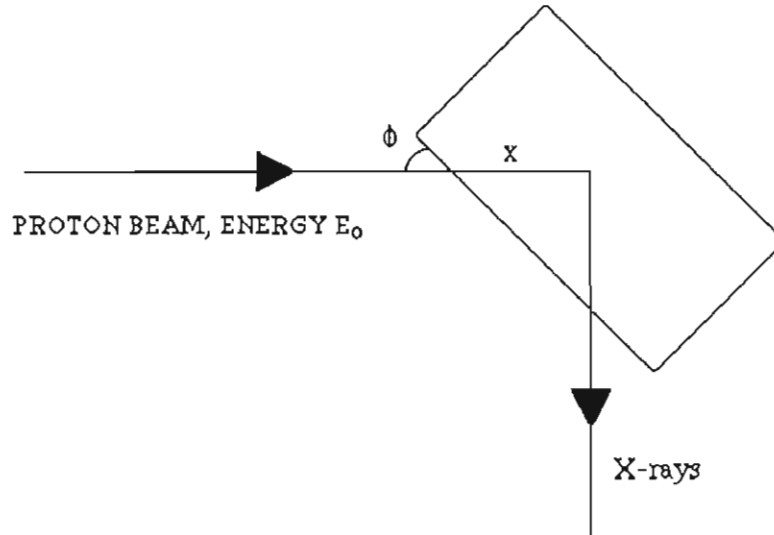


FIG. 1- Sketch of the geometry with definition of the angle ϕ .

Expression (1) assumes that the angle between the direction of the incident proton beam and that of the detected X-rays is 90° , as shown in fig. 1. This geometry is of common experimental use. We shall now discuss in more detail the models adopted for the calculation of the quantities $\sigma_x(E_p)$ and $S(E)$ appearing in expression (1).

2.1. - K X-ray production cross section

$\sigma_x(E_p)$ has been calculated using the analytical formula for the K X-ray production cross section given by Paul.⁽¹³⁾ This expression is based on a comparison between the predictions of the ECPSSR (Energy-loss Coulomb Perturbed Stationary States Relativistic) theoretical model⁽¹⁴⁾ and a compilation of about 3200 experimental data points taken from the literature. The usefulness of this approach consists in representing the X-ray production cross section by simple analytical expressions which are much more convenient for numerical simulations than the exact quantum mechanical formulation of the model. As data concern experiments performed on elements with atomic number $11 \leq Z_T \leq 90$, the formula is valid within this Z_T range. According to Paul,⁽¹³⁾ the analytical cross section formula for the K shell, for protons on all targets with $11 \leq Z_T \leq 90$, is based on all relevant numerical experimental data which have been found in the literature (before 1984). The following steps are used in the construction of the formula: a) normalize the data by a convenient theory; b) average the normalized data and reject discrepant data where necessary; c) fit the normalized data by an analytical function; d) fit the theory by an analytical function, and combine the two fits. The K X-ray production cross section is given by:

$$\sigma_x(E_p) = s_c \cdot \sigma_f \quad (3)$$

where s_c is the normalized cross section and

$$\sigma_f = 10^f / Z_T^{2.2} \quad (4)$$

approximates the K X-ray production cross section calculated by the ECPSSR model:

$$\sigma_x^{\text{ECPSSR}} = \omega_K \cdot \sigma_i^{\text{ECPSSR}} \quad (5)$$

Here σ_i^{ECPSSR} is the theoretical ionization cross section and ω_K is the fluorescence yield. The parameter f appearing in expression (4) is defined on the basis of the theoretical cross section:

$$f = \log_{10}(\sigma_x^{\text{ECPSSR}} \cdot Z_T^{2.2}) \quad (6)$$

The main parameter involved in the proton-electron collision is the scaled velocity $v = v_p / v_{eK}$, i.e. the ratio between the velocity of the incoming proton, v_p , and the classical velocity of the electron in the K shell, $v_{eK} = (2U/m_e)^{1/2}$ (where U is the binding energy of the shell and m_e is the rest mass of the electron). In the ECPSSR formulation the scaled velocity is included in the quantity ξ :

$$\xi = 2\eta^{1/2}/\theta \quad (7)$$

in which:

$$\eta = v^2 = 40.0283 E_p / (Z_T - 0.3)^2 \quad (8a)$$

E_p is the proton energy expressed in MeV and θ is the experimental ionization energy divided by its hydrogenic value. θ can be approximated within 0.002 by the relationship:⁽¹³⁾

$$\theta = (0.313076 + 0.149231 Z_T - 5.54982 \times 10^{-5} Z_T^2 + 3.7093 \times 10^{-6} Z_T^3) / (1 + 0.166608 Z_T) \quad (8b)$$

With $y = \log_{10}\xi$, all experimental data fall in the range $-0.86 \leq y \leq 0.83$. A best fit to the experimental points yields the following expression for s_c :

$$\begin{aligned} s_c &= -2.17171 - 10.8883 y - 9.45875 y^2 & -0.86 \leq y < -0.582 \\ &= 0.975316 + 0.0165458 \cos[13.6(y + 0.393)] & -0.582 \leq y < -0.037 \\ &= 1.00859 + 0.0474606 \cos[6.23(y - 0.33)] & -0.037 \leq y < 0.83 \end{aligned} \quad (9)$$

To develop the analytical formula, it is more convenient to use $e = \log_{10}(E_p/Z_T^2)$ as independent variable, with $-3.7 \leq e \leq -1.4$, instead of y . Since the behaviour of f vs e is approximately parabolic,⁽¹³⁾ f can be represented by means of simple functions:

$$f = b_1 + b_2(e - b_3)^2 + b_4P_3(x) + b_5P_4(x) + b_6P_5(x) + b_7P_6(x) \quad (10)$$

b_i are fitting coefficients given as a function of the target element⁽¹⁵⁾ and $P_i(x)$ are Legendre's polynomials describing the deviations from the parabola. Choosing $x = e/1.15 + 2.22$, with $-1 \leq x \leq 1$, $P_i(x)$ are orthogonal in this range, and the fitting coefficients b_i result highly uncorrelated.

For any given Z_T , the limits of applicability of the analytical expressions used for $\sigma_x(E_p)$ define an interval for the incident proton energy. For instance, in the case of Na ($Z_T=11$) $0.024 \leq E_p \leq 4.82$ while for Pb ($Z_T=82$) $1.34 \leq E_p \leq 267.69$ (with E_p expressed in MeV). However, we shall see below that the upper limit for the yield calculations is set at 100 MeV, due to the constraint imposed by the analytical formula used for the calculation of the stopping power. The estimated error (standard deviation) of $\sigma_x(E_p)$ is from 11% to 21% for $11 \leq Z_T \leq 20$, from 2.5% to 5% for $21 \leq Z_T \leq 30$, 8.5% for $31 \leq Z_T \leq 60$ and 10% for $61 \leq Z_T \leq 90$.⁽¹³⁾

We can compare the ionization cross section given by Paul with that given by the Binary Encounter Approximation (BEA) model as described in refs. 16 and 17. In the BEA model the ionization cross section is expressed as:

$$\sigma_i^{\text{BEA}}(E_p) = N\sigma_0 Z_p^2 G(v)/U^2 \quad (11)$$

where N is the number of electrons in the shell with binding energy U ($N=2$ for the K shell), $\sigma_0 = 6.56 \times 10^{-14} \text{ cm}^2 \text{ eV}^2$ is the geometrical cross section and Z_p is the charge of the projectile ($Z_p=1$ in the present case). $G(v)$ is an universal function, depending only on the scaled velocity v , given independently by Vriens⁽¹⁸⁾ and Gryzinsky.⁽¹⁶⁾ $G_{\text{Gryz}}(v)$ and $G_{\text{Vriens}}(v)$ can be compared with the equivalent quantity deduced from Paul's cross section (for $Z_p=1$ and $N=2$):

$$G_{\text{Paul}}(\xi) = \sigma_x(E_p)U^2 / (2\sigma_0\omega_K) \quad (12)$$

where all quantities are those previously defined and ω_K and U are given in refs. 19 and 20 respectively. Here G is a function of ξ rather than v . In reality, $G(\xi)$ is only approximately an universal function; in fact it is slowly dependent on the target element since the expression for $\sigma_x(E_p)$ contains Z_T terms and the ratio $\sigma_x(E_p)/U^2$ is not strictly Z_T -independent. However, for the present purpose of comparing the BEA and ECPSSR cross sections this weak dependence can be neglected. Fig. 2 compares the BEA universal functions according to Vriens and Gryzinsky with that calculated by the Paul's model for silver, which has been chosen as a medium Z_T element. As shown in the figure, G_{Paul} lies between G_{Vriens} and G_{Gryz} . The three functions have a broad

maximum around the value $v=1$, which corresponds to the fact that the ionization cross sections are maximal when the proton velocity equals the classical electron velocity.

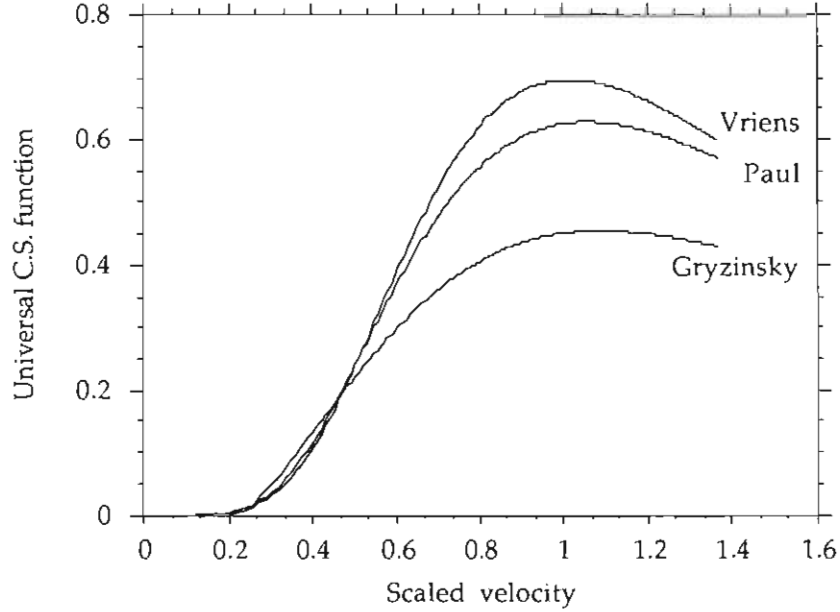


FIG. 2 - Comparison of universal cross section functions.

2.2. - Stopping power

In expression (1), the stopping power has been represented by the semi-empirical formula given by Andersen and Ziegler.⁽²¹⁾ These authors have developed a fitting procedure in three different intervals of the proton energy covering an energy range up to 100 MeV, using for each target element a set of 12 fitting coefficients.

At very low proton energies ($E_p < 10$ keV), the approximation chosen is:⁽²²⁾

$$S = A_1 E_p^{1/2} \quad (13)$$

For the intermediate energy range (10 keV $< E_p < 1$ MeV), the following formula is used:

$$S = S_1 S_2 / (S_1 + S_2) \quad (14)$$

where $S_1 = A_2 E_p^{0.45}$, $S_2 = A_3 \ln(1 + A_4/E_p + A_5 E_p) / E_p$, $A_5 = 4m_e / (I m_p)$, m_e and m_p are the rest mass of the electron and the proton respectively and I is the mean ionization potential.⁽²²⁾ For proton energies $E_p > 1$ MeV, an approximation to Bethe's formula is used:

$$S = (A_6 / \beta^2) \{ \ln[A_7 \beta^2 / (1 - \beta^2)] - \beta^2 - (A_8 + A_9 \ln E_p + A_{10} \ln^2 E_p + A_{11} \ln^3 E_p + A_{12} \ln^4 E_p) \} \quad (15)$$

where $\beta=v_p/c$, with c =velocity of light, and $A_{6,12}$ are the fitting coefficients.⁽²²⁾ Here energies are expressed in keV and the stopping power is given in units of eV/(10^{15} atoms/cm²). At high energy the fit is accurate to 1% (except for the rare earth region where little experimental data exists). The accuracy of the fit decreases with decreasing energy: it is about 5% at 500 keV and from 10% to 20% at 10 keV.⁽²¹⁾

2.3. - Absorption coefficients

The terms $e^{-\mu(\alpha_1)x(E)tg\phi}$ and $e^{-\mu(\alpha_2)x(E)tg\phi}$ represent the self-absorption of the K_{α_1} and K_{α_2} X-rays in the target. The values of $\mu(\alpha_1)$ and $\mu(\alpha_2)$ were taken from ref. 23. However, the most recent compilation of experimental X-ray attenuation cross sections is due to Saloman, Hubbell and Scofield.⁽²⁴⁾ A systematic comparison of the two sets of data shows differences of the order of a few percent, which are irrelevant for the purpose of the present work.

2.4. - Other Parameters

The values of the intensity ratios f_k and g_k and of the density and atomic weight of the element, appearing in expression (1), were respectively taken from ref. 19 and 25.

3. - CALCULATIONS AND RESULTS

The thick target K_{α} X-ray yields have been calculated for 66 elements from Na to Pb as a function of incident particle energy and irradiation geometry. The numerical simulations have been carried out by means of FORTRAN programs running on a Intel 80386/20-based Personal Computer. The time required for the calculation of each value of the yield is about 2 minutes. The complete results are given in the Appendix for three representative values of the angle ϕ defined above.

Several parameters affect the K_{α} X-ray yield: 1) target element Z_T , 2) projectile energy E_0 , 3) angle between the direction of the incident particles and the target surface ϕ and 4) target thickness. In addition, we point out that for application of this proton induced X-ray source to elemental analysis, the choice of the appropriate target allows the selection of the characteristic X-rays in dependence on the elements to be detected and the possibility of avoiding secondary excitation effects by heavier elements in the sample.

Fig. 3 shows the K_{α} X-ray yield for several targets as a function of incident proton energy E_0 , calculated from expression (1) for 1 μ A beam current (i.e., 6.25×10^{12} protons/s) and $\phi = 45^\circ$. The curves shown are for 8 out of the 66 elements for which calculations were carried out. It can be noticed that the shape of the curves is similar and that, for any given Z_T , each curve shows a steep increase up to a maximum (which is reached at a different proton energy for any given Z_T) and a smooth decrease. The decrease of the yield with increasing energy of the incident protons is

due to the fact that the maximum of $\sigma_x(E_p)$ occurs at increasing depth in the target, with the self-absorption of the produced X-rays therefore playing a relevant role. It is seen from fig. 3 that the maximum of the curves reaches values around $3\text{-}5 \times 10^{10}$ photons/s/sr, for $1 \mu\text{A}$ proton current, which can compare to a radioisotopic source of several Curies. A X-ray tube of 1 kW power associated with a Silver secondary anode has a characteristic emission of about 10^8 photons/s/sr, equivalent to a ^{109}Cd source of about 30 mCi . The strength of the proton induced X-ray source is

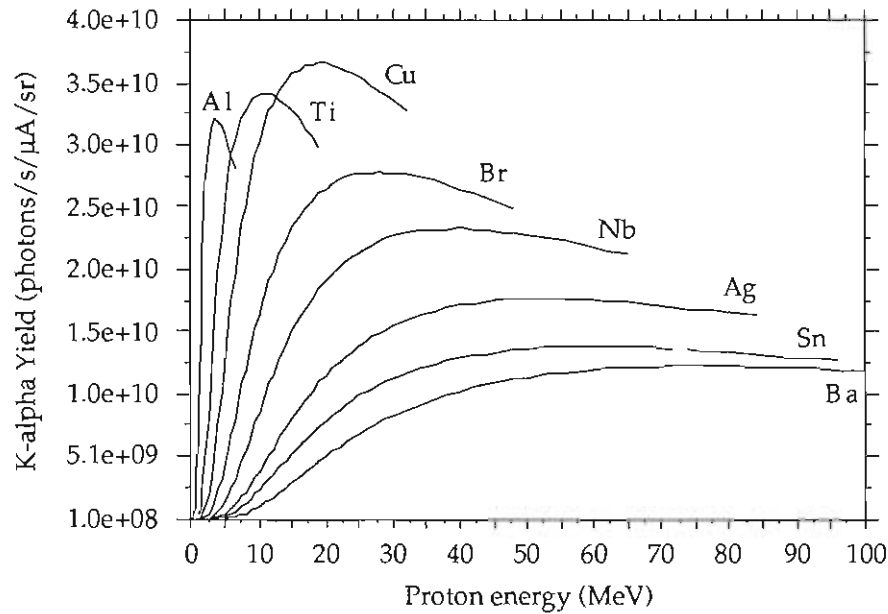


FIG. 3 - K_{α} X-ray yield as a function of proton energy E_0 and target element Z_T , for $1 \mu\text{A}$ proton current and $\phi = 45^\circ$.

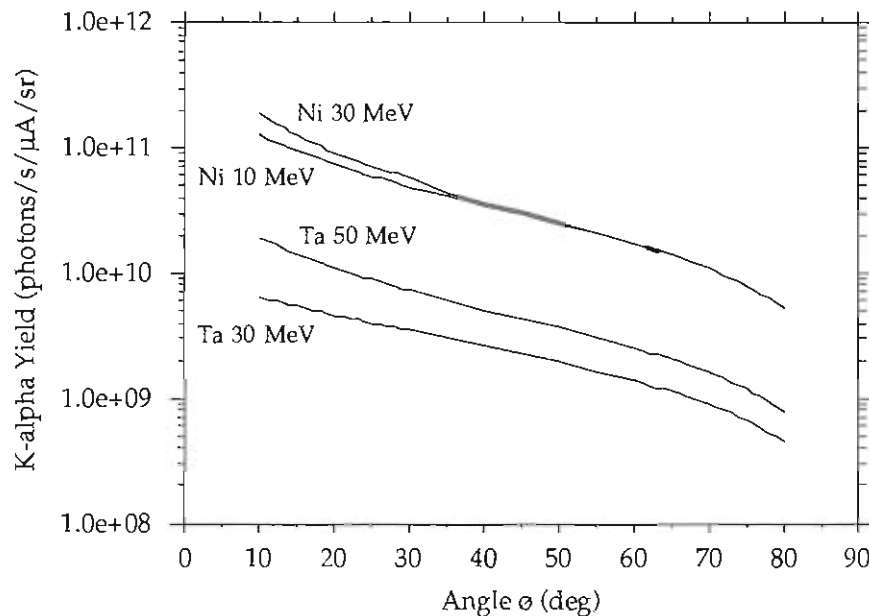


FIG. 4 - K_{α} X-ray yield as a function of the angle ϕ defined in fig. 1.

of course directly proportional to the intensity of the incident beam, and modern commercial cyclotrons can easily provide beams of up to 50-100 μA extracted current.

By changing the angle ϕ (see fig. 1) the self-absorption of the produced radiation can be varied, as shown in fig. 4, where the K_{α} X-ray yield for Ni and Ta at two proton energies is plotted as a function of ϕ . It can be seen that by reducing the angle from 80° to 10° the yield can be increased by more than one order of magnitude.

Although the present calculations and the results reported in the Appendix are for thick targets, in reality, due to the self-absorption, most of the emitted photons come from a fairly superficial layer. Therefore a "semithick" target (i.e., a target in which the protons only lose part of their energy) is sufficient to obtain a yield very close to that generated by a target infinitely thick. Fig. 5 shows the K_{α} yields for Mo, Ag and Ta for 18 MeV protons, as a function of the target thickness expressed in MeV (i.e. the amount of energy dropped by the proton in the target).

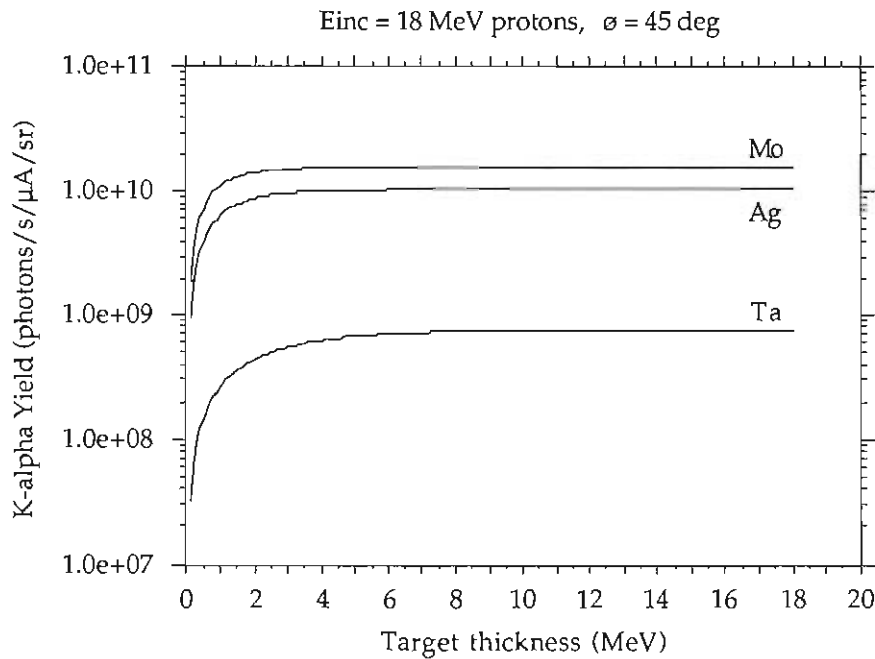


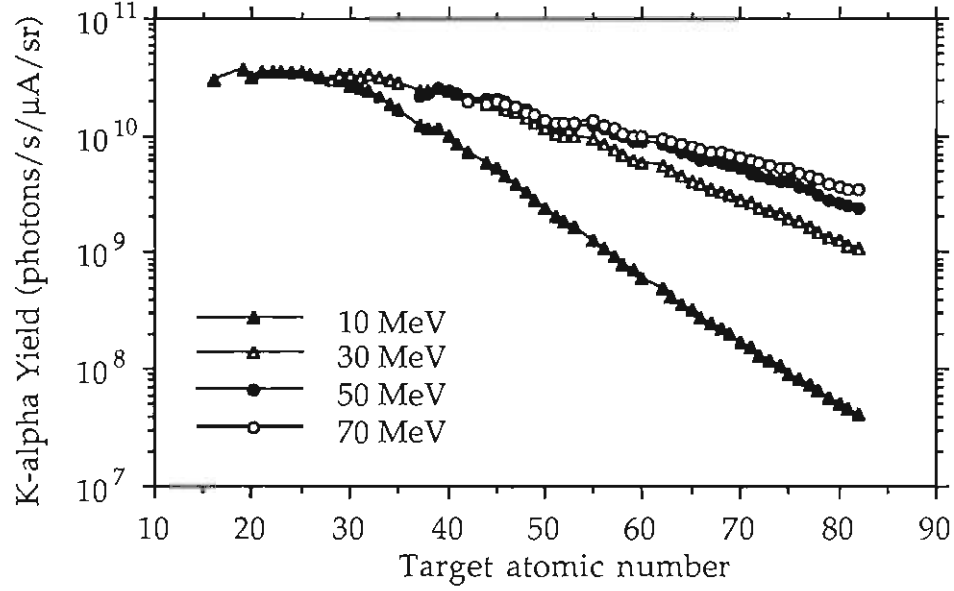
FIG. 5 - K_{α} yield as a function of target thickness.

Finally, fig. 6 shows the K_{α} yield as a function of target atomic number for 10, 30, 50 and 70 MeV protons.

A simple expression providing the maximum of the curve of the yield once the corresponding proton energy E^* is known, for any given pure elemental target, may be deduced as follows. Expression (1) can be rewritten as:

$$Y(E_0) = Y_1(E_0) + Y_2(E_0) \quad (16)$$

where

FIG. 6 - K_{α} yield as a function of target atomic number.

$$Y_1(E_0) = C \cdot e^{-\mu(\alpha_1)x(E_0,0)tg\phi} \int_0^{E_0} \sigma_x(E_p) e^{\mu(\alpha_1)x(E_p,0)tg\phi} \frac{dE_p}{S(E_p)} \quad (17)$$

$$Y_2(E_0) = C \cdot e^{-\mu(\alpha_2)x(E_0,0)tg\phi} \cdot g_k \int_0^{E_0} \sigma_x(E_p) e^{\mu(\alpha_2)x(E_p,0)tg\phi} \frac{dE_p}{S(E_p)} \quad (18)$$

with

$$C = \frac{1}{4\pi} I_p \frac{\rho N_{Av}}{P_{At}} \cdot \frac{1}{1+f_k} \cdot \frac{1}{1+g_k} \quad (19)$$

and

$$x(E_p,0) = \int_0^{E_p} \frac{dE}{S(E)} \quad x(E_0,0) = \int_0^{E_0} \frac{dE}{S(E)} \quad (20)$$

The curve has its maximum at the proton energy for which $dY(E_0)/dE_0 = 0$. The derivative of expression (16) yields:

$$\begin{aligned} dY(E_0)/dE_0 &= dY_1(E_0)/dE_0 + dY_2(E_0)/dE_0 = \\ &= [-\mu_1 tg\phi Y_1(E_0) + C\sigma_x(E_0)]/S(E_0) + [-\mu_2 tg\phi Y_2(E_0) + Cg_k\sigma_x(E_0)]/S(E_0) = \\ &= [C\sigma_x(E_0)(1+g_k) - tg\phi[\mu(\alpha_1)Y_1(E_0) + \mu(\alpha_2)Y_2(E_0)]]/S(E_0) \end{aligned} \quad (21)$$

In general, $dY_1(E_0)/dE_0 = 0$ for $E_0 = E_1^*$, $dY_2(E_0)/dE_0 = 0$ for $E_0 = E_2^*$ and $dY(E_0)/dE_0 = 0$ for $E = E^*$, with $E_1^* < E^* < E_2^*$. This is because of the difference between $\mu(\alpha_1)$ and $\mu(\alpha_2)$. However, since this difference is not large even for the heaviest elements, we can assume $E_1^* \approx E^* \approx E_2^*$ and hence $\sigma_x(E_1^*) \approx \sigma_x(E^*) \approx \sigma_x(E_2^*)$ without committing any appreciable error. Now $dY_1(E_0)/dE_0 = 0$ yields:

$$Y_1(E_1^*) = C\sigma_x(E_1^*)/[\mu(\alpha_1)\text{tg}\phi] \approx C\sigma_x(E^*)/[\mu(\alpha_1)\text{tg}\phi] = Y_1(E^*) \quad (22)$$

Therefore, equating expression (21) to zero we obtain a simple formula by which the value of the maximum yield for any given target may be calculated:

$$Y(E^*) \approx C\sigma_x(E^*)\{[g_k\mu(\alpha_1)+\mu(\alpha_2)]/[\mu(\alpha_1)\mu(\alpha_2)]\}/\text{tg}\phi \quad (23)$$

A scaling law providing the value E^* as a function of atomic number Z_T has been deduced by fitting the data (Z_T, E^*) for 46 elements from Na to Sm, for which the value E^* lies within the range of validity of the present model. This formula allows one to calculate the energy E^* corresponding to the maximum of the yield for all elements with $11 \leq Z_T \leq 90$. If the distribution of the E^* values (taken from the tables reported in the Appendix) with atomic number (see fig. 7) is fitted by a power function, the following expression is obtained:

$$E^* = 0.017188 Z_T^{2.0841} \quad (24)$$

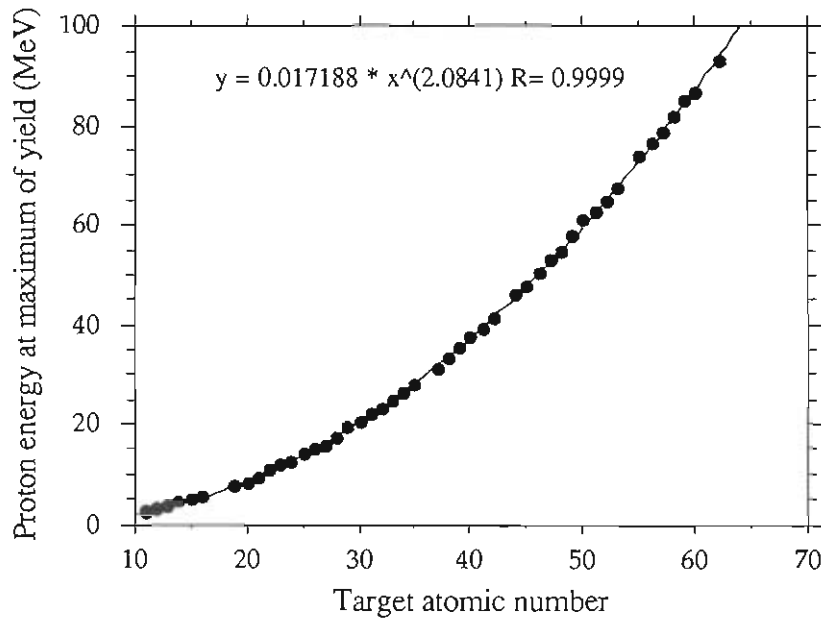


FIG. 7 - Proton energy at maximum of yield as a function of target atomic number.

with a correlation coefficient of 0.9999. For example, in the case of Sm ($Z_T=62$) for which $E^*=93$ MeV, the relative difference between the exact value $Y(E^*)$ calculated by expression (1) and the figure deduced by expression (23) is only 2×10^{-3} .

4. - COMPARISON WITH EXPERIMENTAL RESULTS

Preliminary experimental tests of the photon source have been carried out at the Cyclotron Laboratory of the J.R.C.-Ispra of the Commission of the European Communities.⁽²⁶⁾ In fig. 8 the experimental K_α yields measured for Ge and Ta at 6 proton energies are compared with the predictions of the present model, while fig. 9 shows the experimental values obtained for 6 elements at 18 MeV along with the calculated curve. The agreement between the calculated and experimental K_α emissions is good. The experimental results show a behaviour versus energy in agreement with the calculations, even if for Ge the experimental yields are slightly lower (up to about 30%) than those calculated. However these discrepancies are within the experimental uncertainties which might derive from: 1) tilting of the target with respect to the direction of the incoming protons (a $\Delta\phi$ of $\pm 2^\circ$ results in a variation of the yield up to 10%); 2) the uncertainties on the reading of the collected charge (about 5%); 3) the uncertainties of the cross section value from the Paul's formula (from 8 to 10%⁽¹³⁾). The experimental results can therefore be considered in good agreement with the numerical predictions of the simulation.

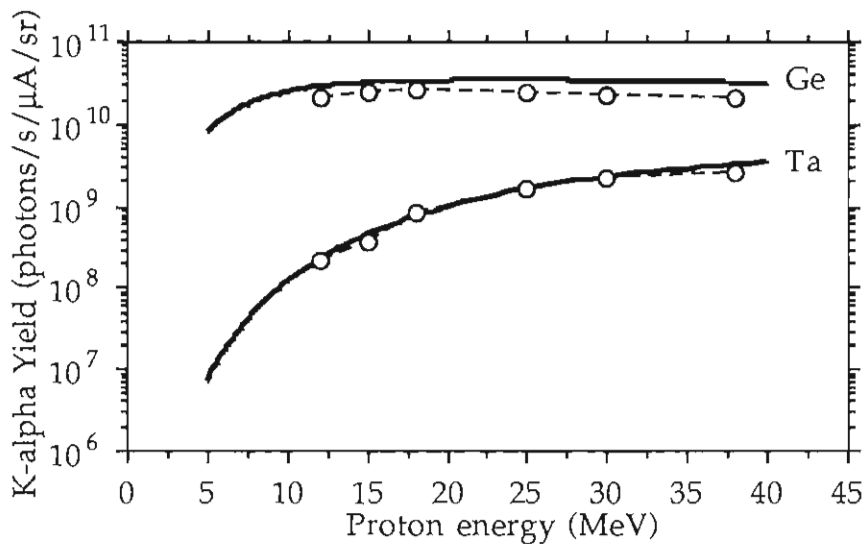


FIG. 8 - Experimental and calculated K_α X-ray yields for Ge and Ta as a function of proton energy. The uncertainties on the data are within the dot size.

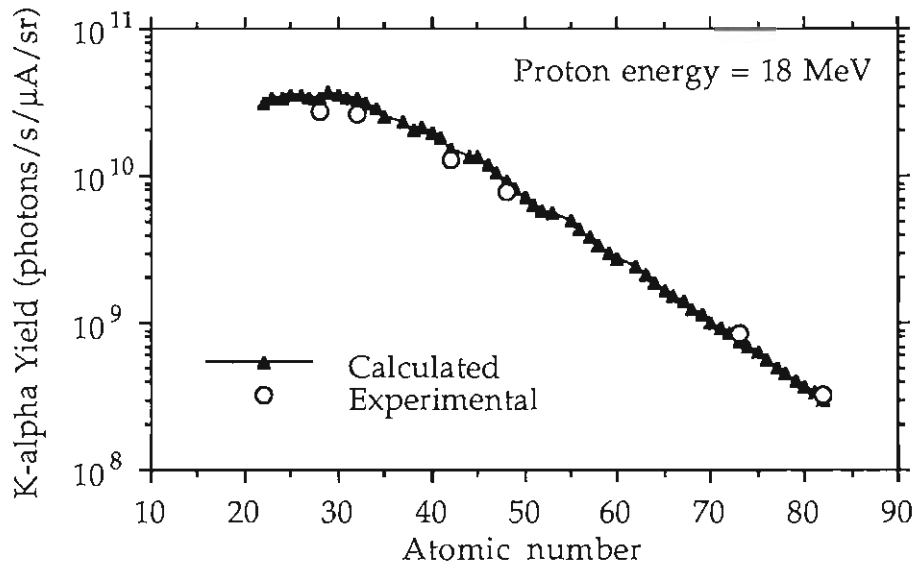


FIG. 9 - Experimental and calculated K_{α} X-ray yields as a function of atomic number at 18 MeV proton energy. The uncertainties on the data are within the dot size.

5. - CONCLUSIONS

The values of the calculated yields as well as the first results of the experimental tests demonstrate that proton induced X-ray sources should be very useful for analytical applications. Moreover, although the calculations reported in the present paper are for protons, they can be extended to heavier ions. Most commercial cyclotrons are in fact capable of accelerating alpha particles as well as protons, to the same final energy. However, the velocity is scaled by a factor 4 for alpha beams. Since for the same value of the ion velocity the X-ray production cross section is proportional to the square of the charge of the incident ion, higher yields are expected using alpha particles in the case of the lightest targets. Numerical simulations and experimental investigations are due to be undertaken in the near future.

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APPENDIX

The calculated K_{α} X-ray yields (photons/s/ μ A/sr) for 66 elements from Na to Pb are reported in the following tables for three values of the angle of incidence ϕ (20° , 45° and 60°) as a function of the incident proton energy. Elements are ordered by atomic number. Calculations were only performed for elements which would be of practical interest as a target material. Atomic number, atomic weight (g/mole), density (g/cm^3), linear absorption coefficients for the $K_{\alpha 1}$ and $K_{\alpha 2}$ lines (cm^{-1}) and intensity rates $f_k = I(K_{\beta})/I(K_{\alpha})$ and $g_k = I(K_{\alpha 1})/I(K_{\alpha 2})$ for each element are also given.

For each element, the tabulation of the K_{α} X-ray yield starts in correspondence to the energy at which the cross section becomes significant. For any given energy, yield data can be obtained for any angle between $\phi=20^{\circ}$ and $\phi=60^{\circ}$ by logarithmic interpolation. The error of the fit proved to be about 1% in the low energy region and increases to about 5% in correspondence to the higher energies.

Na

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
11	22.98977	0.97	563.634	563.634	.000	.000

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
.125	0.132E+08	0.130E+08	0.127E+08
.250	0.254E+09	0.244E+09	0.232E+09
.375	0.122E+10	0.113E+10	0.104E+10
.500	0.335E+10	0.296E+10	0.260E+10
.625	0.679E+10	0.569E+10	0.473E+10
.750	0.115E+11	0.903E+10	0.711E+10
.875	0.171E+11	0.126E+11	0.944E+10
1.000	0.235E+11	0.162E+11	0.115E+11
1.125	0.302E+11	0.195E+11	0.133E+11
1.250	0.371E+11	0.224E+11	0.147E+11
1.375	0.438E+11	0.248E+11	0.157E+11
1.500	0.503E+11	0.268E+11	0.166E+11
1.625	0.563E+11	0.283E+11	0.172E+11
1.750	0.618E+11	0.295E+11	0.177E+11
1.875	0.666E+11	0.304E+11	0.180E+11
2.000	0.709E+11	0.311E+11	0.182E+11
2.250	0.775E+11	0.318E+11	0.185E+11
2.500	0.819E+11	0.321E+11	0.185E+11
2.750	0.845E+11	0.320E+11	0.185E+11
3.000	0.857E+11	0.317E+11	0.183E+11
3.250	0.858E+11	0.313E+11	0.180E+11
3.500	0.852E+11	0.308E+11	0.177E+11
3.750	0.840E+11	0.302E+11	0.174E+11
4.000	0.826E+11	0.296E+11	0.170E+11
4.500	0.790E+11	0.282E+11	0.162E+11

Mg

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f _k	g _k
12	24.305	1.74	915.948	915.948	.000	.000

Yield (photons/s/μA/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
.125	0.491E+07	0.485E+07	0.478E+07
.250	0.119E+09	0.115E+09	0.111E+09
.375	0.651E+09	0.611E+09	0.569E+09
.500	0.193E+10	0.174E+10	0.155E+10
.625	0.415E+10	0.356E+10	0.304E+10
.750	0.733E+10	0.598E+10	0.485E+10
.875	0.114E+11	0.878E+10	0.679E+10
1.000	0.162E+11	0.118E+11	0.867E+10
1.125	0.216E+11	0.147E+11	0.104E+11
1.250	0.274E+11	0.175E+11	0.119E+11
1.375	0.333E+11	0.200E+11	0.131E+11
1.500	0.391E+11	0.222E+11	0.142E+11
1.625	0.448E+11	0.241E+11	0.150E+11
1.750	0.502E+11	0.256E+11	0.157E+11
1.875	0.553E+11	0.269E+11	0.162E+11
2.000	0.599E+11	0.279E+11	0.166E+11
2.250	0.677E+11	0.293E+11	0.172E+11
2.500	0.737E+11	0.301E+11	0.175E+11
2.750	0.779E+11	0.305E+11	0.177E+11
3.000	0.806E+11	0.307E+11	0.177E+11
3.250	0.822E+11	0.307E+11	0.177E+11
3.500	0.829E+11	0.305E+11	0.176E+11
3.750	0.829E+11	0.302E+11	0.174E+11
4.000	0.825E+11	0.299E+11	0.172E+11
4.500	0.806E+11	0.290E+11	0.167E+11
5.000	0.780E+11	0.280E+11	0.161E+11
5.500	0.750E+11	0.269E+11	0.154E+11

Al

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
	(g/mole)	(g/cm ³)	(cm ⁻¹)	(cm ⁻¹)		
13	26.98154	2.70	1131.252	1131.252	.000	.000

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
.125	0.286E+07	0.282E+07	0.278E+07
.250	0.745E+08	0.721E+08	0.695E+08
.375	0.407E+09	0.384E+09	0.360E+09
.500	0.123E+10	0.112E+10	0.101E+10
.625	0.270E+10	0.237E+10	0.207E+10
.750	0.491E+10	0.413E+10	0.346E+10
.875	0.786E+10	0.632E+10	0.507E+10
1.000	0.115E+11	0.880E+10	0.677E+10
1.125	0.158E+11	0.115E+11	0.846E+10
1.250	0.206E+11	0.141E+11	0.100E+11
1.375	0.257E+11	0.167E+11	0.115E+11
1.500	0.310E+11	0.191E+11	0.127E+11
1.625	0.364E+11	0.213E+11	0.138E+11
1.750	0.417E+11	0.232E+11	0.147E+11
1.875	0.469E+11	0.249E+11	0.154E+11
2.000	0.519E+11	0.263E+11	0.161E+11
2.250	0.609E+11	0.285E+11	0.170E+11
2.500	0.685E+11	0.300E+11	0.177E+11
2.750	0.746E+11	0.310E+11	0.181E+11
3.000	0.792E+11	0.316E+11	0.184E+11
3.250	0.826E+11	0.320E+11	0.185E+11
3.500	0.849E+11	0.321E+11	0.186E+11
3.750	0.863E+11	0.321E+11	0.186E+11
4.000	0.870E+11	0.320E+11	0.185E+11
4.500	0.870E+11	0.316E+11	0.182E+11
5.000	0.857E+11	0.309E+11	0.178E+11
5.500	0.837E+11	0.301E+11	0.173E+11
6.000	0.813E+11	0.292E+11	0.168E+11
6.500	0.786E+11	0.282E+11	0.162E+11

Si

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
	(g/mole)	(g/cm ³)	(cm ⁻¹)	(cm ⁻¹)		
14	28.0855	2.33	861.705	863.193	.000	.000

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
.125	0.124E+07	0.123E+07	0.121E+07
.250	0.373E+08	0.363E+08	0.353E+08
.375	0.226E+09	0.216E+09	0.205E+09
.500	0.733E+09	0.680E+09	0.625E+09
.625	0.170E+10	0.153E+10	0.136E+10
.750	0.323E+10	0.279E+10	0.239E+10
.875	0.535E+10	0.444E+10	0.366E+10
1.000	0.807E+10	0.641E+10	0.509E+10
1.125	0.113E+11	0.860E+10	0.658E+10
1.250	0.151E+11	0.109E+11	0.805E+10
1.375	0.193E+11	0.133E+11	0.945E+10
1.500	0.238E+11	0.156E+11	0.108E+11
1.625	0.284E+11	0.178E+11	0.119E+11
1.750	0.332E+11	0.198E+11	0.130E+11
1.875	0.381E+11	0.217E+11	0.139E+11
2.000	0.429E+11	0.233E+11	0.147E+11
2.250	0.520E+11	0.261E+11	0.159E+11
2.500	0.603E+11	0.282E+11	0.169E+11
2.750	0.674E+11	0.297E+11	0.175E+11
3.000	0.733E+11	0.308E+11	0.180E+11
3.250	0.781E+11	0.315E+11	0.184E+11
3.500	0.818E+11	0.320E+11	0.186E+11
3.750	0.845E+11	0.324E+11	0.188E+11
4.000	0.864E+11	0.325E+11	0.188E+11
4.500	0.884E+11	0.326E+11	0.188E+11
5.000	0.887E+11	0.323E+11	0.186E+11
5.500	0.879E+11	0.318E+11	0.183E+11
6.000	0.864E+11	0.312E+11	0.179E+11
6.500	0.845E+11	0.304E+11	0.175E+11
7.000	0.824E+11	0.296E+11	0.171E+11

P

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
15	30.97376	1.82	536.240	536.904	.000	.000

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
.125	0.700E+06	0.694E+06	0.687E+06
.250	0.206E+08	0.202E+08	0.197E+08
.375	0.129E+09	0.125E+09	0.119E+09
.500	0.440E+09	0.414E+09	0.387E+09
.625	0.107E+10	0.981E+09	0.892E+09
.750	0.212E+10	0.188E+10	0.166E+10
.875	0.363E+10	0.312E+10	0.266E+10
1.000	0.565E+10	0.468E+10	0.385E+10
1.125	0.816E+10	0.649E+10	0.516E+10
1.250	0.111E+11	0.849E+10	0.653E+10
1.375	0.145E+11	0.106E+11	0.790E+10
1.500	0.183E+11	0.128E+11	0.923E+10
1.625	0.223E+11	0.150E+11	0.105E+11
1.750	0.266E+11	0.171E+11	0.116E+11
1.875	0.310E+11	0.191E+11	0.127E+11
2.000	0.356E+11	0.210E+11	0.137E+11
2.250	0.446E+11	0.243E+11	0.153E+11
2.500	0.533E+11	0.270E+11	0.165E+11
2.750	0.613E+11	0.291E+11	0.175E+11
3.000	0.685E+11	0.307E+11	0.182E+11
3.250	0.746E+11	0.320E+11	0.188E+11
3.500	0.798E+11	0.329E+11	0.192E+11
3.750	0.840E+11	0.336E+11	0.196E+11
4.000	0.873E+11	0.341E+11	0.198E+11
4.500	0.918E+11	0.346E+11	0.200E+11
5.000	0.940E+11	0.347E+11	0.201E+11
5.500	0.947E+11	0.346E+11	0.199E+11
6.000	0.943E+11	0.342E+11	0.197E+11
6.500	0.933E+11	0.337E+11	0.194E+11
7.000	0.919E+11	0.331E+11	0.191E+11
8.000	0.881E+11	0.317E+11	0.182E+11

S

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
16	32.06	2.07	564.118	564.851	.000	.000

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
.125	0.365E+06	0.362E+06	0.359E+06
.250	0.121E+08	0.119E+08	0.116E+08
.375	0.799E+08	0.772E+08	0.742E+08
.500	0.281E+09	0.266E+09	0.250E+09
.625	0.703E+09	0.649E+09	0.594E+09
.750	0.142E+10	0.128E+10	0.114E+10
.875	0.250E+10	0.218E+10	0.188E+10
1.000	0.397E+10	0.334E+10	0.280E+10
1.125	0.583E+10	0.474E+10	0.384E+10
1.250	0.810E+10	0.634E+10	0.498E+10
1.375	0.107E+11	0.810E+10	0.616E+10
1.500	0.137E+11	0.995E+10	0.735E+10
1.625	0.170E+11	0.119E+11	0.851E+10
1.750	0.206E+11	0.138E+11	0.962E+10
1.875	0.244E+11	0.156E+11	0.107E+11
2.000	0.283E+11	0.174E+11	0.116E+11
2.250	0.364E+11	0.208E+11	0.133E+11
2.500	0.444E+11	0.236E+11	0.147E+11
2.750	0.522E+11	0.260E+11	0.158E+11
3.000	0.594E+11	0.279E+11	0.168E+11
3.250	0.659E+11	0.294E+11	0.175E+11
3.500	0.716E+11	0.307E+11	0.181E+11
3.750	0.765E+11	0.316E+11	0.185E+11
4.000	0.806E+11	0.324E+11	0.189E+11
4.500	0.866E+11	0.334E+11	0.194E+11
5.000	0.903E+11	0.339E+11	0.196E+11
5.500	0.923E+11	0.341E+11	0.197E+11
6.000	0.931E+11	0.341E+11	0.196E+11
6.500	0.930E+11	0.338E+11	0.195E+11
7.000	0.924E+11	0.335E+11	0.193E+11
8.000	0.900E+11	0.325E+11	0.187E+11
9.000	0.868E+11	0.313E+11	0.180E+11
10.000	0.830E+11	0.299E+11	0.172E+11

K

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
19	39.0983	0.86	147.992	148.350	.000	.000

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
.125	0.499E+05	0.497E+05	0.495E+05
.250	0.252E+07	0.249E+07	0.246E+07
.375	0.195E+08	0.191E+08	0.186E+08
.500	0.751E+08	0.725E+08	0.696E+08
.625	0.202E+09	0.191E+09	0.181E+09
.750	0.435E+09	0.405E+09	0.375E+09
.875	0.810E+09	0.740E+09	0.671E+09
1.000	0.136E+10	0.122E+10	0.108E+10
1.125	0.211E+10	0.184E+10	0.160E+10
1.250	0.307E+10	0.262E+10	0.222E+10
1.375	0.428E+10	0.355E+10	0.293E+10
1.500	0.572E+10	0.462E+10	0.372E+10
1.625	0.741E+10	0.581E+10	0.457E+10
1.750	0.933E+10	0.711E+10	0.546E+10
1.875	0.115E+11	0.848E+10	0.636E+10
2.000	0.138E+11	0.992E+10	0.727E+10
2.250	0.191E+11	0.129E+11	0.905E+10
2.500	0.250E+11	0.158E+11	0.107E+11
2.750	0.313E+11	0.186E+11	0.122E+11
3.000	0.378E+11	0.212E+11	0.136E+11
3.250	0.443E+11	0.236E+11	0.148E+11
3.500	0.507E+11	0.257E+11	0.158E+11
3.750	0.569E+11	0.275E+11	0.167E+11
4.000	0.628E+11	0.291E+11	0.175E+11
4.500	0.731E+11	0.316E+11	0.187E+11
5.000	0.816E+11	0.335E+11	0.196E+11
5.500	0.882E+11	0.348E+11	0.203E+11
6.000	0.931E+11	0.358E+11	0.208E+11
6.500	0.966E+11	0.364E+11	0.211E+11
7.000	0.990E+11	0.368E+11	0.213E+11
8.000	0.101E+12	0.371E+11	0.214E+11
9.000	0.101E+12	0.369E+11	0.213E+11
10.000	0.100E+12	0.364E+11	0.210E+11
11.000	0.986E+11	0.356E+11	0.205E+11
12.000	0.962E+11	0.348E+11	0.200E+11
13.000	0.936E+11	0.338E+11	0.194E+11
14.000	0.906E+11	0.327E+11	0.188E+11

Ca

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
20	(g/mole) 40.08	(g/cm ³) 1.55	(cm ⁻¹) 252.675	(cm ⁻¹) 253.546	.128	.503

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.842E+09	0.760E+09	0.681E+09
1.125	0.127E+10	0.112E+10	0.988E+09
1.250	0.183E+10	0.159E+10	0.138E+10
1.375	0.255E+10	0.217E+10	0.184E+10
1.500	0.343E+10	0.286E+10	0.237E+10
1.625	0.447E+10	0.364E+10	0.296E+10
1.750	0.569E+10	0.452E+10	0.359E+10
1.875	0.707E+10	0.547E+10	0.426E+10
2.000	0.862E+10	0.649E+10	0.495E+10
2.125	0.103E+11	0.757E+10	0.565E+10
2.250	0.122E+11	0.868E+10	0.635E+10
2.375	0.141E+11	0.982E+10	0.704E+10
2.500	0.162E+11	0.110E+11	0.772E+10
2.625	0.185E+11	0.121E+11	0.838E+10
2.750	0.208E+11	0.133E+11	0.902E+10
2.875	0.231E+11	0.144E+11	0.963E+10
3.000	0.256E+11	0.155E+11	0.102E+11
3.250	0.306E+11	0.175E+11	0.113E+11
3.500	0.357E+11	0.194E+11	0.122E+11
3.750	0.407E+11	0.211E+11	0.131E+11
4.000	0.456E+11	0.227E+11	0.139E+11
4.250	0.504E+11	0.240E+11	0.145E+11
4.500	0.548E+11	0.252E+11	0.151E+11
4.750	0.590E+11	0.263E+11	0.156E+11
5.000	0.628E+11	0.272E+11	0.161E+11
5.250	0.663E+11	0.280E+11	0.165E+11
5.500	0.695E+11	0.286E+11	0.168E+11
5.750	0.723E+11	0.292E+11	0.171E+11
6.000	0.748E+11	0.297E+11	0.173E+11
6.500	0.790E+11	0.305E+11	0.178E+11
7.000	0.820E+11	0.311E+11	0.180E+11
7.500	0.842E+11	0.315E+11	0.182E+11
8.000	0.857E+11	0.317E+11	0.184E+11
8.500	0.867E+11	0.319E+11	0.184E+11
9.000	0.872E+11	0.319E+11	0.184E+11
9.500	0.874E+11	0.318E+11	0.184E+11
10.000	0.873E+11	0.317E+11	0.183E+11
11.000	0.865E+11	0.313E+11	0.181E+11
12.000	0.851E+11	0.308E+11	0.177E+11
13.000	0.834E+11	0.301E+11	0.173E+11
14.000	0.813E+11	0.294E+11	0.169E+11
15.000	0.791E+11	0.286E+11	0.164E+11

Sc

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
21	44.9559	3.0	370.453	371.513	.1305	.5035

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.620E+09	0.568E+09	0.517E+09
1.125	0.986E+09	0.888E+09	0.794E+09
1.250	0.148E+10	0.130E+10	0.114E+10
1.375	0.210E+10	0.182E+10	0.156E+10
1.500	0.288E+10	0.244E+10	0.205E+10
1.625	0.381E+10	0.315E+10	0.260E+10
1.750	0.490E+10	0.396E+10	0.319E+10
1.875	0.614E+10	0.485E+10	0.383E+10
2.000	0.755E+10	0.581E+10	0.450E+10
2.125	0.912E+10	0.684E+10	0.519E+10
2.250	0.108E+11	0.792E+10	0.589E+10
2.375	0.127E+11	0.903E+10	0.659E+10
2.500	0.147E+11	0.102E+11	0.729E+10
2.625	0.168E+11	0.113E+11	0.798E+10
2.750	0.190E+11	0.125E+11	0.865E+10
2.875	0.213E+11	0.136E+11	0.930E+10
3.000	0.237E+11	0.148E+11	0.994E+10
3.250	0.286E+11	0.170E+11	0.111E+11
3.500	0.338E+11	0.191E+11	0.122E+11
3.750	0.390E+11	0.210E+11	0.132E+11
4.000	0.441E+11	0.228E+11	0.141E+11
4.250	0.492E+11	0.244E+11	0.149E+11
4.500	0.541E+11	0.258E+11	0.156E+11
4.750	0.587E+11	0.271E+11	0.162E+11
5.000	0.631E+11	0.282E+11	0.168E+11
5.250	0.671E+11	0.292E+11	0.173E+11
5.500	0.709E+11	0.301E+11	0.177E+11
5.750	0.743E+11	0.309E+11	0.181E+11
6.000	0.775E+11	0.316E+11	0.185E+11
6.500	0.828E+11	0.327E+11	0.191E+11
7.000	0.870E+11	0.336E+11	0.195E+11
7.500	0.902E+11	0.342E+11	0.198E+11
8.000	0.926E+11	0.347E+11	0.201E+11
8.500	0.943E+11	0.350E+11	0.202E+11
9.000	0.955E+11	0.352E+11	0.203E+11
9.500	0.962E+11	0.353E+11	0.204E+11
10.000	0.966E+11	0.353E+11	0.204E+11
11.000	0.966E+11	0.351E+11	0.203E+11
12.000	0.958E+11	0.347E+11	0.200E+11
13.000	0.945E+11	0.342E+11	0.197E+11
14.000	0.928E+11	0.336E+11	0.193E+11
15.000	0.909E+11	0.328E+11	0.189E+11
16.000	0.888E+11	0.321E+11	0.185E+11
17.000	0.865E+11	0.312E+11	0.180E+11

Ti

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
22	47.90	4.50	506.520	508.347	.133	.504

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.448E+09	0.413E+09	0.378E+09
1.125	0.719E+09	0.651E+09	0.585E+09
1.250	0.109E+10	0.966E+09	0.852E+09
1.375	0.156E+10	0.136E+10	0.118E+10
1.500	0.215E+10	0.184E+10	0.156E+10
1.625	0.287E+10	0.240E+10	0.200E+10
1.750	0.372E+10	0.305E+10	0.249E+10
1.875	0.471E+10	0.377E+10	0.302E+10
2.000	0.583E+10	0.456E+10	0.358E+10
2.125	0.709E+10	0.541E+10	0.416E+10
2.250	0.848E+10	0.631E+10	0.476E+10
2.375	0.999E+10	0.726E+10	0.538E+10
2.500	0.116E+11	0.824E+10	0.600E+10
2.625	0.134E+11	0.924E+10	0.661E+10
2.750	0.152E+11	0.103E+11	0.722E+10
2.875	0.172E+11	0.113E+11	0.782E+10
3.000	0.192E+11	0.123E+11	0.841E+10
3.250	0.235E+11	0.143E+11	0.953E+10
3.500	0.280E+11	0.163E+11	0.106E+11
3.750	0.327E+11	0.181E+11	0.115E+11
4.000	0.374E+11	0.199E+11	0.124E+11
4.250	0.420E+11	0.214E+11	0.132E+11
4.500	0.466E+11	0.229E+11	0.140E+11
4.750	0.510E+11	0.242E+11	0.146E+11
5.000	0.552E+11	0.254E+11	0.152E+11
5.250	0.593E+11	0.265E+11	0.158E+11
5.500	0.630E+11	0.274E+11	0.163E+11
5.750	0.665E+11	0.283E+11	0.167E+11
6.000	0.698E+11	0.291E+11	0.171E+11
6.500	0.754E+11	0.304E+11	0.178E+11
7.000	0.801E+11	0.314E+11	0.183E+11
7.500	0.838E+11	0.322E+11	0.187E+11
8.000	0.868E+11	0.328E+11	0.191E+11
8.500	0.890E+11	0.333E+11	0.193E+11
9.000	0.907E+11	0.337E+11	0.195E+11
9.500	0.919E+11	0.339E+11	0.196E+11
10.000	0.927E+11	0.340E+11	0.197E+11
11.000	0.935E+11	0.341E+11	0.197E+11
12.000	0.934E+11	0.340E+11	0.196E+11
13.000	0.928E+11	0.337E+11	0.194E+11
14.000	0.917E+11	0.332E+11	0.191E+11
15.000	0.903E+11	0.327E+11	0.188E+11
16.000	0.886E+11	0.321E+11	0.185E+11
17.000	0.868E+11	0.314E+11	0.181E+11
18.000	0.849E+11	0.307E+11	0.177E+11

19.000	0.829E+11	0.299E+11	0.172E+11
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V

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
23	50.9415	5.8	547.741	550.773	.133	.5045

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.320E+09	0.299E+09	0.277E+09
1.125	0.521E+09	0.479E+09	0.437E+09
1.250	0.797E+09	0.721E+09	0.646E+09
1.375	0.116E+10	0.103E+10	0.908E+09
1.500	0.161E+10	0.141E+10	0.122E+10
1.625	0.217E+10	0.186E+10	0.159E+10
1.750	0.284E+10	0.239E+10	0.200E+10
1.875	0.363E+10	0.299E+10	0.245E+10
2.000	0.453E+10	0.366E+10	0.295E+10
2.125	0.555E+10	0.439E+10	0.347E+10
2.250	0.669E+10	0.517E+10	0.402E+10
2.375	0.795E+10	0.601E+10	0.459E+10
2.500	0.933E+10	0.689E+10	0.517E+10
2.625	0.108E+11	0.781E+10	0.576E+10
2.750	0.124E+11	0.875E+10	0.635E+10
2.875	0.141E+11	0.972E+10	0.694E+10
3.000	0.159E+11	0.107E+11	0.753E+10
3.250	0.197E+11	0.127E+11	0.867E+10
3.500	0.238E+11	0.146E+11	0.976E+10
3.750	0.281E+11	0.165E+11	0.108E+11
4.000	0.325E+11	0.183E+11	0.117E+11
4.250	0.370E+11	0.200E+11	0.126E+11
4.500	0.415E+11	0.216E+11	0.134E+11
4.750	0.460E+11	0.231E+11	0.142E+11
5.000	0.503E+11	0.244E+11	0.149E+11
5.250	0.545E+11	0.257E+11	0.155E+11
5.500	0.586E+11	0.268E+11	0.161E+11
5.750	0.624E+11	0.278E+11	0.166E+11
6.000	0.661E+11	0.288E+11	0.170E+11
6.500	0.726E+11	0.304E+11	0.179E+11
7.000	0.782E+11	0.317E+11	0.185E+11
7.500	0.830E+11	0.327E+11	0.191E+11
8.000	0.868E+11	0.336E+11	0.195E+11
8.500	0.900E+11	0.343E+11	0.199E+11
9.000	0.924E+11	0.348E+11	0.202E+11
9.500	0.944E+11	0.352E+11	0.204E+11
10.000	0.958E+11	0.355E+11	0.205E+11
11.000	0.977E+11	0.358E+11	0.207E+11
12.000	0.984E+11	0.359E+11	0.207E+11
13.000	0.984E+11	0.358E+11	0.206E+11
14.000	0.978E+11	0.355E+11	0.205E+11
15.000	0.969E+11	0.351E+11	0.202E+11
16.000	0.956E+11	0.346E+11	0.199E+11
17.000	0.941E+11	0.340E+11	0.196E+11
18.000	0.925E+11	0.334E+11	0.193E+11

19.000	0.907E+11	0.328E+11	0.189E+11
20.000	0.888E+11	0.321E+11	0.185E+11
21.000	0.868E+11	0.314E+11	0.181E+11

Cr

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
24	(g/mole) 51.996	(g/cm ³) 7.19	(cm ⁻¹) 633.029	(cm ⁻¹) 635.757	.133	.505

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.234E+09	0.219E+09	0.204E+09
1.125	0.386E+09	0.357E+09	0.327E+09
1.250	0.596E+09	0.543E+09	0.490E+09
1.375	0.874E+09	0.783E+09	0.696E+09
1.500	0.123E+10	0.108E+10	0.946E+09
1.625	0.167E+10	0.144E+10	0.124E+10
1.750	0.220E+10	0.187E+10	0.158E+10
1.875	0.282E+10	0.235E+10	0.195E+10
2.000	0.354E+10	0.290E+10	0.236E+10
2.125	0.437E+10	0.350E+10	0.281E+10
2.250	0.530E+10	0.416E+10	0.328E+10
2.375	0.633E+10	0.487E+10	0.377E+10
2.500	0.747E+10	0.562E+10	0.428E+10
2.625	0.871E+10	0.641E+10	0.480E+10
2.750	0.100E+11	0.724E+10	0.533E+10
2.875	0.115E+11	0.808E+10	0.587E+10
3.000	0.130E+11	0.895E+10	0.640E+10
3.250	0.163E+11	0.107E+11	0.746E+10
3.500	0.198E+11	0.125E+11	0.849E+10
3.750	0.236E+11	0.143E+11	0.947E+10
4.000	0.276E+11	0.160E+11	0.104E+11
4.250	0.316E+11	0.177E+11	0.113E+11
4.500	0.358E+11	0.192E+11	0.121E+11
4.750	0.399E+11	0.207E+11	0.128E+11
5.000	0.440E+11	0.221E+11	0.135E+11
5.250	0.481E+11	0.233E+11	0.142E+11
5.500	0.520E+11	0.245E+11	0.148E+11
5.750	0.558E+11	0.256E+11	0.154E+11
6.000	0.594E+11	0.266E+11	0.159E+11
6.500	0.661E+11	0.283E+11	0.168E+11
7.000	0.720E+11	0.298E+11	0.175E+11
7.500	0.771E+11	0.310E+11	0.181E+11
8.000	0.814E+11	0.320E+11	0.187E+11
8.500	0.850E+11	0.328E+11	0.191E+11
9.000	0.880E+11	0.335E+11	0.195E+11
9.500	0.904E+11	0.340E+11	0.197E+11
10.000	0.923E+11	0.345E+11	0.200E+11
11.000	0.950E+11	0.351E+11	0.203E+11
12.000	0.965E+11	0.354E+11	0.204E+11
13.000	0.971E+11	0.354E+11	0.205E+11
14.000	0.971E+11	0.353E+11	0.204E+11
15.000	0.967E+11	0.351E+11	0.202E+11
16.000	0.959E+11	0.348E+11	0.200E+11
17.000	0.948E+11	0.343E+11	0.198E+11
18.000	0.935E+11	0.339E+11	0.195E+11

19.000	0.921E+11	0.333E+11	0.192E+11
20.000	0.906E+11	0.328E+11	0.189E+11
21.000	0.889E+11	0.321E+11	0.185E+11
22.000	0.872E+11	0.315E+11	0.181E+11

Mn

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
25	54.9380	7.43	562.005	565.794	.1335	.506

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.172E+09	0.162E+09	0.152E+09
1.125	0.285E+09	0.266E+09	0.246E+09
1.250	0.444E+09	0.408E+09	0.372E+09
1.375	0.655E+09	0.594E+09	0.534E+09
1.500	0.927E+09	0.828E+09	0.734E+09
1.625	0.127E+10	0.111E+10	0.972E+09
1.750	0.168E+10	0.145E+10	0.125E+10
1.875	0.217E+10	0.185E+10	0.156E+10
2.000	0.275E+10	0.230E+10	0.191E+10
2.125	0.341E+10	0.280E+10	0.229E+10
2.250	0.416E+10	0.335E+10	0.270E+10
2.375	0.500E+10	0.396E+10	0.314E+10
2.500	0.594E+10	0.461E+10	0.359E+10
2.625	0.696E+10	0.529E+10	0.407E+10
2.750	0.807E+10	0.602E+10	0.455E+10
2.875	0.927E+10	0.678E+10	0.505E+10
3.000	0.106E+11	0.756E+10	0.555E+10
3.250	0.134E+11	0.919E+10	0.656E+10
3.500	0.165E+11	0.109E+11	0.756E+10
3.750	0.198E+11	0.126E+11	0.854E+10
4.000	0.234E+11	0.143E+11	0.948E+10
4.250	0.271E+11	0.159E+11	0.104E+11
4.500	0.310E+11	0.175E+11	0.112E+11
4.750	0.349E+11	0.190E+11	0.120E+11
5.000	0.388E+11	0.204E+11	0.128E+11
5.250	0.428E+11	0.218E+11	0.135E+11
5.500	0.467E+11	0.231E+11	0.141E+11
5.750	0.505E+11	0.242E+11	0.147E+11
6.000	0.542E+11	0.253E+11	0.153E+11
6.500	0.612E+11	0.273E+11	0.163E+11
7.000	0.676E+11	0.290E+11	0.171E+11
7.500	0.733E+11	0.304E+11	0.179E+11
8.000	0.783E+11	0.316E+11	0.185E+11
8.500	0.826E+11	0.326E+11	0.190E+11
9.000	0.862E+11	0.335E+11	0.195E+11
9.500	0.893E+11	0.342E+11	0.199E+11
10.000	0.918E+11	0.348E+11	0.202E+11
11.000	0.956E+11	0.356E+11	0.206E+11
12.000	0.980E+11	0.362E+11	0.209E+11
13.000	0.994E+11	0.364E+11	0.210E+11
14.000	0.100E+12	0.365E+11	0.211E+11
15.000	0.100E+12	0.364E+11	0.210E+11
16.000	0.998E+11	0.363E+11	0.209E+11
17.000	0.991E+11	0.360E+11	0.207E+11
18.000	0.982E+11	0.356E+11	0.205E+11

19.000	0.971E+11	0.352E+11	0.203E+11
20.000	0.958E+11	0.347E+11	0.200E+11
21.000	0.944E+11	0.342E+11	0.197E+11
22.000	0.929E+11	0.336E+11	0.194E+11
23.000	0.914E+11	0.330E+11	0.190E+11
24.000	0.897E+11	0.324E+11	0.187E+11

Fe

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
26	55.847	7.86	550.962	553.716	.134	.507

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.127E+09	0.120E+09	0.113E+09
1.125	0.212E+09	0.198E+09	0.185E+09
1.250	0.330E+09	0.306E+09	0.281E+09
1.375	0.490E+09	0.448E+09	0.406E+09
1.500	0.697E+09	0.629E+09	0.563E+09
1.625	0.958E+09	0.852E+09	0.751E+09
1.750	0.128E+10	0.112E+10	0.973E+09
1.875	0.166E+10	0.143E+10	0.123E+10
2.000	0.211E+10	0.179E+10	0.151E+10
2.125	0.264E+10	0.220E+10	0.183E+10
2.250	0.324E+10	0.266E+10	0.217E+10
2.375	0.391E+10	0.316E+10	0.254E+10
2.500	0.467E+10	0.370E+10	0.293E+10
2.625	0.550E+10	0.428E+10	0.334E+10
2.750	0.641E+10	0.490E+10	0.377E+10
2.875	0.740E+10	0.555E+10	0.421E+10
3.000	0.847E+10	0.623E+10	0.466E+10
3.250	0.108E+11	0.766E+10	0.557E+10
3.500	0.135E+11	0.916E+10	0.650E+10
3.750	0.163E+11	0.107E+11	0.741E+10
4.000	0.195E+11	0.123E+11	0.831E+10
4.250	0.227E+11	0.138E+11	0.917E+10
4.500	0.262E+11	0.153E+11	0.100E+11
4.750	0.297E+11	0.168E+11	0.108E+11
5.000	0.333E+11	0.182E+11	0.115E+11
5.250	0.370E+11	0.196E+11	0.122E+11
5.500	0.406E+11	0.208E+11	0.129E+11
5.750	0.443E+11	0.220E+11	0.135E+11
6.000	0.478E+11	0.232E+11	0.141E+11
6.500	0.547E+11	0.252E+11	0.152E+11
7.000	0.611E+11	0.270E+11	0.161E+11
7.500	0.670E+11	0.286E+11	0.169E+11
8.000	0.723E+11	0.299E+11	0.176E+11
8.500	0.769E+11	0.310E+11	0.182E+11
9.000	0.810E+11	0.320E+11	0.187E+11
9.500	0.845E+11	0.329E+11	0.191E+11
10.000	0.875E+11	0.336E+11	0.195E+11
11.000	0.921E+11	0.347E+11	0.201E+11
12.000	0.953E+11	0.354E+11	0.205E+11
13.000	0.974E+11	0.359E+11	0.207E+11
14.000	0.987E+11	0.361E+11	0.209E+11
15.000	0.993E+11	0.362E+11	0.209E+11
16.000	0.994E+11	0.362E+11	0.209E+11
17.000	0.992E+11	0.361E+11	0.208E+11
18.000	0.987E+11	0.358E+11	0.207E+11

19.000	0.979E+11	0.355E+11	0.205E+11
20.000	0.970E+11	0.351E+11	0.203E+11
21.000	0.959E+11	0.347E+11	0.200E+11
22.000	0.947E+11	0.343E+11	0.197E+11
23.000	0.934E+11	0.338E+11	0.195E+11
24.000	0.920E+11	0.333E+11	0.192E+11
25.000	0.905E+11	0.327E+11	0.189E+11
26.000	0.891E+11	0.322E+11	0.185E+11

Co

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
27	58.9332	8.90	583.371	586.875	.1345	.5075

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.946E+08	0.897E+08	0.846E+08
1.125	0.158E+09	0.148E+09	0.138E+09
1.250	0.248E+09	0.230E+09	0.212E+09
1.375	0.370E+09	0.339E+09	0.308E+09
1.500	0.529E+09	0.478E+09	0.429E+09
1.625	0.730E+09	0.651E+09	0.576E+09
1.750	0.978E+09	0.860E+09	0.751E+09
1.875	0.128E+10	0.111E+10	0.952E+09
2.000	0.163E+10	0.139E+10	0.118E+10
2.125	0.205E+10	0.172E+10	0.144E+10
2.250	0.252E+10	0.208E+10	0.172E+10
2.375	0.306E+10	0.249E+10	0.202E+10
2.500	0.367E+10	0.293E+10	0.234E+10
2.625	0.434E+10	0.341E+10	0.268E+10
2.750	0.508E+10	0.391E+10	0.304E+10
2.875	0.588E+10	0.445E+10	0.341E+10
3.000	0.676E+10	0.502E+10	0.379E+10
3.250	0.870E+10	0.623E+10	0.458E+10
3.500	0.109E+11	0.752E+10	0.538E+10
3.750	0.133E+11	0.885E+10	0.619E+10
4.000	0.159E+11	0.102E+11	0.698E+10
4.250	0.188E+11	0.116E+11	0.776E+10
4.500	0.217E+11	0.129E+11	0.852E+10
4.750	0.248E+11	0.143E+11	0.925E+10
5.000	0.280E+11	0.156E+11	0.994E+10
5.250	0.312E+11	0.168E+11	0.106E+11
5.500	0.344E+11	0.180E+11	0.112E+11
5.750	0.377E+11	0.191E+11	0.118E+11
6.000	0.409E+11	0.202E+11	0.124E+11
6.500	0.473E+11	0.222E+11	0.134E+11
7.000	0.533E+11	0.240E+11	0.143E+11
7.500	0.589E+11	0.255E+11	0.151E+11
8.000	0.640E+11	0.269E+11	0.159E+11
8.500	0.686E+11	0.281E+11	0.165E+11
9.000	0.727E+11	0.291E+11	0.170E+11
9.500	0.762E+11	0.300E+11	0.175E+11
10.000	0.794E+11	0.307E+11	0.179E+11
11.000	0.844E+11	0.320E+11	0.186E+11
12.000	0.880E+11	0.329E+11	0.191E+11
13.000	0.905E+11	0.335E+11	0.194E+11
14.000	0.922E+11	0.339E+11	0.196E+11
15.000	0.933E+11	0.342E+11	0.197E+11
16.000	0.939E+11	0.343E+11	0.198E+11
17.000	0.940E+11	0.342E+11	0.198E+11
18.000	0.939E+11	0.341E+11	0.197E+11

19.000	0.935E+11	0.339E+11	0.196E+11
20.000	0.929E+11	0.337E+11	0.194E+11
21.000	0.922E+11	0.334E+11	0.193E+11
22.000	0.913E+11	0.331E+11	0.191E+11
23.000	0.903E+11	0.327E+11	0.188E+11
24.000	0.892E+11	0.323E+11	0.186E+11
25.000	0.880E+11	0.319E+11	0.184E+11
26.000	0.868E+11	0.314E+11	0.181E+11
27.000	0.856E+11	0.310E+11	0.178E+11
28.000	0.843E+11	0.305E+11	0.175E+11
29.000	0.829E+11	0.300E+11	0.173E+11

Ni

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
28	(g/mole) 58.70	(g/cm ³) 8.90	(cm ⁻¹) 553.765	(cm ⁻¹) 558.111	.135	.508

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.696E+08	0.663E+08	0.628E+08
1.125	0.118E+09	0.111E+09	0.104E+09
1.250	0.186E+09	0.174E+09	0.161E+09
1.375	0.279E+09	0.257E+09	0.236E+09
1.500	0.401E+09	0.366E+09	0.331E+09
1.625	0.557E+09	0.501E+09	0.447E+09
1.750	0.750E+09	0.666E+09	0.586E+09
1.875	0.985E+09	0.862E+09	0.749E+09
2.000	0.126E+10	0.109E+10	0.935E+09
2.125	0.159E+10	0.135E+10	0.114E+10
2.250	0.197E+10	0.165E+10	0.138E+10
2.375	0.240E+10	0.198E+10	0.163E+10
2.500	0.289E+10	0.235E+10	0.190E+10
2.625	0.344E+10	0.274E+10	0.219E+10
2.750	0.404E+10	0.317E+10	0.250E+10
2.875	0.470E+10	0.363E+10	0.282E+10
3.000	0.542E+10	0.411E+10	0.315E+10
3.250	0.703E+10	0.515E+10	0.384E+10
3.500	0.887E+10	0.627E+10	0.457E+10
3.750	0.109E+11	0.746E+10	0.530E+10
4.000	0.132E+11	0.868E+10	0.603E+10
4.250	0.156E+11	0.993E+10	0.676E+10
4.500	0.182E+11	0.112E+11	0.748E+10
4.750	0.209E+11	0.124E+11	0.817E+10
5.000	0.238E+11	0.136E+11	0.884E+10
5.250	0.267E+11	0.148E+11	0.948E+10
5.500	0.296E+11	0.160E+11	0.101E+11
5.750	0.326E+11	0.171E+11	0.107E+11
6.000	0.356E+11	0.182E+11	0.113E+11
6.500	0.416E+11	0.202E+11	0.123E+11
7.000	0.474E+11	0.220E+11	0.132E+11
7.500	0.529E+11	0.235E+11	0.141E+11
8.000	0.580E+11	0.250E+11	0.148E+11
8.500	0.627E+11	0.262E+11	0.155E+11
9.000	0.669E+11	0.273E+11	0.161E+11
9.500	0.707E+11	0.283E+11	0.166E+11
10.000	0.741E+11	0.292E+11	0.170E+11
11.000	0.797E+11	0.306E+11	0.178E+11
12.000	0.839E+11	0.316E+11	0.184E+11
13.000	0.870E+11	0.324E+11	0.188E+11
14.000	0.893E+11	0.330E+11	0.191E+11
15.000	0.908E+11	0.334E+11	0.193E+11
16.000	0.918E+11	0.336E+11	0.194E+11
17.000	0.924E+11	0.337E+11	0.195E+11
18.000	0.926E+11	0.337E+11	0.195E+11

19.000	0.925E+11	0.336E+11	0.194E+11
20.000	0.922E+11	0.335E+11	0.193E+11
21.000	0.918E+11	0.333E+11	0.192E+11
22.000	0.912E+11	0.331E+11	0.191E+11
23.000	0.904E+11	0.328E+11	0.189E+11
24.000	0.896E+11	0.325E+11	0.187E+11
25.000	0.887E+11	0.321E+11	0.185E+11
26.000	0.877E+11	0.317E+11	0.183E+11
27.000	0.866E+11	0.314E+11	0.181E+11
28.000	0.855E+11	0.309E+11	0.178E+11
29.000	0.843E+11	0.305E+11	0.176E+11
30.000	0.832E+11	0.301E+11	0.173E+11
31.000	0.820E+11	0.297E+11	0.171E+11

Cu

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
29	63.546	8.96	441.889	444.347	.135	.509

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.511E+08	0.491E+08	0.469E+08
1.125	0.874E+08	0.832E+08	0.788E+08
1.250	0.140E+09	0.132E+09	0.123E+09
1.375	0.211E+09	0.197E+09	0.183E+09
1.500	0.306E+09	0.283E+09	0.259E+09
1.625	0.427E+09	0.391E+09	0.354E+09
1.750	0.579E+09	0.523E+09	0.469E+09
1.875	0.764E+09	0.682E+09	0.605E+09
2.000	0.986E+09	0.870E+09	0.762E+09
2.125	0.125E+10	0.109E+10	0.941E+09
2.250	0.155E+10	0.134E+10	0.114E+10
2.375	0.190E+10	0.162E+10	0.136E+10
2.500	0.230E+10	0.193E+10	0.160E+10
2.625	0.275E+10	0.227E+10	0.186E+10
2.750	0.325E+10	0.264E+10	0.214E+10
2.875	0.380E+10	0.304E+10	0.244E+10
3.000	0.440E+10	0.347E+10	0.275E+10
3.125	0.506E+10	0.393E+10	0.307E+10
3.250	0.577E+10	0.441E+10	0.340E+10
3.375	0.653E+10	0.492E+10	0.375E+10
3.500	0.735E+10	0.544E+10	0.410E+10
3.625	0.821E+10	0.599E+10	0.446E+10
3.750	0.913E+10	0.655E+10	0.482E+10
3.875	0.101E+11	0.713E+10	0.519E+10
4.000	0.111E+11	0.773E+10	0.556E+10
4.125	0.122E+11	0.833E+10	0.593E+10
4.250	0.133E+11	0.894E+10	0.630E+10
4.375	0.144E+11	0.956E+10	0.667E+10
4.500	0.156E+11	0.102E+11	0.704E+10
4.625	0.169E+11	0.108E+11	0.740E+10
4.750	0.181E+11	0.114E+11	0.776E+10
4.875	0.194E+11	0.121E+11	0.812E+10
5.000	0.208E+11	0.127E+11	0.847E+10
5.250	0.235E+11	0.139E+11	0.916E+10
5.500	0.263E+11	0.152E+11	0.983E+10
5.750	0.292E+11	0.164E+11	0.105E+11
6.000	0.322E+11	0.175E+11	0.111E+11
6.250	0.352E+11	0.186E+11	0.117E+11
6.500	0.382E+11	0.197E+11	0.122E+11
6.750	0.412E+11	0.207E+11	0.128E+11
7.000	0.442E+11	0.217E+11	0.133E+11
7.250	0.471E+11	0.227E+11	0.138E+11
7.500	0.500E+11	0.236E+11	0.142E+11
7.750	0.528E+11	0.244E+11	0.147E+11
8.000	0.556E+11	0.252E+11	0.151E+11

8.250	0.582E+11	0.260E+11	0.155E+11
8.500	0.608E+11	0.267E+11	0.159E+11
8.750	0.633E+11	0.274E+11	0.162E+11
9.000	0.657E+11	0.280E+11	0.166E+11
9.250	0.680E+11	0.286E+11	0.169E+11
9.500	0.702E+11	0.292E+11	0.172E+11
9.750	0.723E+11	0.297E+11	0.175E+11
10.000	0.743E+11	0.302E+11	0.177E+11
10.500	0.780E+11	0.311E+11	0.182E+11
11.000	0.813E+11	0.320E+11	0.187E+11
11.500	0.842E+11	0.327E+11	0.191E+11
12.000	0.868E+11	0.333E+11	0.194E+11
12.500	0.890E+11	0.339E+11	0.197E+11
13.000	0.910E+11	0.344E+11	0.200E+11
13.500	0.927E+11	0.348E+11	0.202E+11
14.000	0.942E+11	0.352E+11	0.204E+11
14.500	0.955E+11	0.355E+11	0.205E+11
15.000	0.965E+11	0.357E+11	0.207E+11
16.000	0.982E+11	0.361E+11	0.209E+11
17.000	0.993E+11	0.364E+11	0.210E+11
18.000	0.100E+12	0.365E+11	0.211E+11
19.000	0.100E+12	0.366E+11	0.211E+11
20.000	0.100E+12	0.366E+11	0.211E+11
21.000	0.100E+12	0.364E+11	0.210E+11
22.000	0.999E+11	0.363E+11	0.209E+11
23.000	0.994E+11	0.361E+11	0.208E+11
24.000	0.987E+11	0.358E+11	0.206E+11
25.000	0.979E+11	0.355E+11	0.205E+11
26.000	0.971E+11	0.352E+11	0.203E+11
27.000	0.961E+11	0.348E+11	0.201E+11
28.000	0.951E+11	0.344E+11	0.198E+11
29.000	0.940E+11	0.340E+11	0.196E+11
30.000	0.929E+11	0.336E+11	0.194E+11
31.000	0.918E+11	0.332E+11	0.191E+11
32.000	0.906E+11	0.328E+11	0.189E+11
33.000	0.894E+11	0.323E+11	0.186E+11

Zn

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
30	(g/mole) 65.38	(g/cm ³) 7.14	(cm ⁻¹) 334.167	(cm ⁻¹) 336.328	.135	.510

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.384E+08	0.369E+08	0.353E+08
1.125	0.650E+08	0.620E+08	0.589E+08
1.250	0.104E+09	0.980E+08	0.922E+08
1.375	0.157E+09	0.147E+09	0.137E+09
1.500	0.228E+09	0.211E+09	0.195E+09
1.625	0.319E+09	0.293E+09	0.268E+09
1.750	0.434E+09	0.395E+09	0.356E+09
1.875	0.575E+09	0.517E+09	0.462E+09
2.000	0.745E+09	0.663E+09	0.585E+09
2.125	0.947E+09	0.833E+09	0.726E+09
2.250	0.118E+10	0.103E+10	0.885E+09
2.375	0.146E+10	0.125E+10	0.106E+10
2.500	0.177E+10	0.150E+10	0.126E+10
2.625	0.212E+10	0.177E+10	0.147E+10
2.750	0.251E+10	0.207E+10	0.170E+10
2.875	0.295E+10	0.239E+10	0.194E+10
3.000	0.343E+10	0.275E+10	0.220E+10
3.125	0.395E+10	0.312E+10	0.247E+10
3.250	0.452E+10	0.352E+10	0.275E+10
3.375	0.514E+10	0.394E+10	0.304E+10
3.500	0.580E+10	0.438E+10	0.334E+10
3.625	0.651E+10	0.484E+10	0.365E+10
3.750	0.726E+10	0.531E+10	0.396E+10
3.875	0.805E+10	0.581E+10	0.428E+10
4.000	0.889E+10	0.631E+10	0.461E+10
4.125	0.977E+10	0.683E+10	0.493E+10
4.250	0.107E+11	0.736E+10	0.526E+10
4.375	0.117E+11	0.790E+10	0.559E+10
4.500	0.127E+11	0.844E+10	0.592E+10
4.625	0.137E+11	0.899E+10	0.624E+10
4.750	0.148E+11	0.955E+10	0.657E+10
4.875	0.159E+11	0.101E+11	0.689E+10
5.000	0.170E+11	0.107E+11	0.722E+10
5.250	0.193E+11	0.118E+11	0.785E+10
5.500	0.218E+11	0.129E+11	0.846E+10
5.750	0.243E+11	0.140E+11	0.906E+10
6.000	0.269E+11	0.151E+11	0.964E+10
6.250	0.296E+11	0.161E+11	0.102E+11
6.500	0.323E+11	0.171E+11	0.107E+11
6.750	0.349E+11	0.181E+11	0.112E+11
7.000	0.376E+11	0.190E+11	0.117E+11
7.250	0.403E+11	0.199E+11	0.122E+11
7.500	0.430E+11	0.208E+11	0.127E+11
7.750	0.456E+11	0.216E+11	0.131E+11
8.000	0.482E+11	0.224E+11	0.135E+11

8.250	0.507E+11	0.231E+11	0.139E+11
8.500	0.531E+11	0.239E+11	0.143E+11
8.750	0.555E+11	0.245E+11	0.146E+11
9.000	0.578E+11	0.252E+11	0.150E+11
9.250	0.601E+11	0.258E+11	0.153E+11
9.500	0.622E+11	0.264E+11	0.156E+11
9.750	0.643E+11	0.269E+11	0.159E+11
10.000	0.662E+11	0.274E+11	0.162E+11
10.500	0.699E+11	0.284E+11	0.167E+11
11.000	0.733E+11	0.293E+11	0.171E+11
11.500	0.763E+11	0.300E+11	0.175E+11
12.000	0.790E+11	0.307E+11	0.179E+11
12.500	0.814E+11	0.313E+11	0.182E+11
13.000	0.836E+11	0.319E+11	0.185E+11
13.500	0.854E+11	0.323E+11	0.188E+11
14.000	0.871E+11	0.328E+11	0.190E+11
14.500	0.886E+11	0.331E+11	0.192E+11
15.000	0.898E+11	0.334E+11	0.194E+11
16.000	0.918E+11	0.340E+11	0.197E+11
17.000	0.933E+11	0.343E+11	0.199E+11
18.000	0.944E+11	0.346E+11	0.200E+11
19.000	0.950E+11	0.347E+11	0.201E+11
20.000	0.954E+11	0.348E+11	0.201E+11
21.000	0.955E+11	0.348E+11	0.201E+11
22.000	0.955E+11	0.347E+11	0.200E+11
23.000	0.952E+11	0.346E+11	0.200E+11
24.000	0.948E+11	0.344E+11	0.199E+11
25.000	0.943E+11	0.342E+11	0.197E+11
26.000	0.937E+11	0.340E+11	0.196E+11
27.000	0.930E+11	0.337E+11	0.194E+11
28.000	0.922E+11	0.334E+11	0.193E+11
29.000	0.914E+11	0.331E+11	0.191E+11
30.000	0.905E+11	0.328E+11	0.189E+11
31.000	0.895E+11	0.324E+11	0.187E+11
32.000	0.886E+11	0.321E+11	0.185E+11
33.000	0.876E+11	0.317E+11	0.183E+11
34.000	0.865E+11	0.313E+11	0.180E+11
35.000	0.855E+11	0.309E+11	0.178E+11

Ga

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
31	69.72	5.91	248.106	250.311	.1415	.511

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.276E+08	0.267E+08	0.256E+08
1.125	0.475E+08	0.455E+08	0.433E+08
1.250	0.765E+08	0.727E+08	0.686E+08
1.375	0.117E+09	0.110E+09	0.103E+09
1.500	0.171E+09	0.159E+09	0.148E+09
1.625	0.240E+09	0.222E+09	0.204E+09
1.750	0.328E+09	0.301E+09	0.273E+09
1.875	0.437E+09	0.396E+09	0.356E+09
2.000	0.569E+09	0.510E+09	0.454E+09
2.125	0.726E+09	0.644E+09	0.566E+09
2.250	0.910E+09	0.798E+09	0.694E+09
2.375	0.112E+10	0.974E+09	0.837E+09
2.500	0.137E+10	0.117E+10	0.996E+09
2.625	0.165E+10	0.139E+10	0.117E+10
2.750	0.196E+10	0.164E+10	0.136E+10
2.875	0.231E+10	0.190E+10	0.156E+10
3.000	0.269E+10	0.219E+10	0.178E+10
3.125	0.312E+10	0.250E+10	0.200E+10
3.250	0.358E+10	0.283E+10	0.224E+10
3.375	0.408E+10	0.318E+10	0.249E+10
3.500	0.462E+10	0.355E+10	0.275E+10
3.625	0.519E+10	0.394E+10	0.301E+10
3.750	0.581E+10	0.434E+10	0.329E+10
3.875	0.647E+10	0.476E+10	0.356E+10
4.000	0.716E+10	0.519E+10	0.385E+10
4.125	0.789E+10	0.564E+10	0.414E+10
4.250	0.866E+10	0.610E+10	0.443E+10
4.375	0.947E+10	0.657E+10	0.472E+10
4.500	0.103E+11	0.705E+10	0.501E+10
4.625	0.112E+11	0.753E+10	0.531E+10
4.750	0.121E+11	0.802E+10	0.560E+10
4.875	0.130E+11	0.852E+10	0.590E+10
5.000	0.140E+11	0.902E+10	0.619E+10
5.250	0.160E+11	0.100E+11	0.677E+10
5.500	0.181E+11	0.110E+11	0.735E+10
5.750	0.203E+11	0.120E+11	0.791E+10
6.000	0.226E+11	0.130E+11	0.845E+10
6.250	0.250E+11	0.140E+11	0.898E+10
6.500	0.274E+11	0.150E+11	0.949E+10
6.750	0.298E+11	0.159E+11	0.998E+10
7.000	0.322E+11	0.168E+11	0.105E+11
7.250	0.347E+11	0.176E+11	0.109E+11
7.500	0.371E+11	0.185E+11	0.114E+11
7.750	0.395E+11	0.193E+11	0.118E+11
8.000	0.419E+11	0.201E+11	0.122E+11

8.250	0.443E+11	0.208E+11	0.126E+11
8.500	0.466E+11	0.215E+11	0.129E+11
8.750	0.489E+11	0.222E+11	0.133E+11
9.000	0.511E+11	0.228E+11	0.136E+11
9.250	0.533E+11	0.234E+11	0.140E+11
9.500	0.554E+11	0.240E+11	0.143E+11
9.750	0.574E+11	0.246E+11	0.146E+11
10.000	0.594E+11	0.251E+11	0.149E+11
10.500	0.631E+11	0.261E+11	0.154E+11
11.000	0.665E+11	0.270E+11	0.159E+11
11.500	0.696E+11	0.278E+11	0.163E+11
12.000	0.724E+11	0.285E+11	0.167E+11
12.500	0.750E+11	0.292E+11	0.170E+11
13.000	0.773E+11	0.298E+11	0.173E+11
13.500	0.793E+11	0.303E+11	0.176E+11
14.000	0.811E+11	0.308E+11	0.179E+11
14.500	0.828E+11	0.312E+11	0.181E+11
15.000	0.842E+11	0.316E+11	0.183E+11
16.000	0.866E+11	0.322E+11	0.187E+11
17.000	0.884E+11	0.327E+11	0.189E+11
18.000	0.898E+11	0.330E+11	0.191E+11
19.000	0.908E+11	0.333E+11	0.192E+11
20.000	0.914E+11	0.334E+11	0.193E+11
21.000	0.919E+11	0.335E+11	0.194E+11
22.000	0.920E+11	0.335E+11	0.194E+11
23.000	0.921E+11	0.335E+11	0.193E+11
24.000	0.919E+11	0.334E+11	0.193E+11
25.000	0.916E+11	0.333E+11	0.192E+11
26.000	0.912E+11	0.331E+11	0.191E+11
27.000	0.907E+11	0.329E+11	0.190E+11
28.000	0.902E+11	0.327E+11	0.188E+11
29.000	0.895E+11	0.325E+11	0.187E+11
30.000	0.888E+11	0.322E+11	0.185E+11
31.000	0.881E+11	0.319E+11	0.184E+11
32.000	0.873E+11	0.316E+11	0.182E+11
33.000	0.864E+11	0.313E+11	0.180E+11
34.000	0.856E+11	0.310E+11	0.178E+11
35.000	0.847E+11	0.307E+11	0.177E+11
36.000	0.838E+11	0.303E+11	0.175E+11
37.000	0.828E+11	0.300E+11	0.173E+11
38.000	0.819E+11	0.296E+11	0.171E+11

Ge

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
	(g/mole)	(g/cm ³)	(cm ⁻¹)	(cm ⁻¹)		
32	72.59	5.32	193.744	196.234	.148	.512

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.197E+08	0.191E+08	0.185E+08
1.125	0.346E+08	0.334E+08	0.320E+08
1.250	0.565E+08	0.540E+08	0.514E+08
1.375	0.870E+08	0.826E+08	0.780E+08
1.500	0.128E+09	0.121E+09	0.113E+09
1.625	0.182E+09	0.170E+09	0.157E+09
1.750	0.249E+09	0.231E+09	0.212E+09
1.875	0.334E+09	0.306E+09	0.278E+09
2.000	0.436E+09	0.396E+09	0.357E+09
2.125	0.559E+09	0.503E+09	0.448E+09
2.250	0.704E+09	0.627E+09	0.553E+09
2.375	0.873E+09	0.769E+09	0.671E+09
2.500	0.107E+10	0.929E+09	0.803E+09
2.625	0.129E+10	0.111E+10	0.949E+09
2.750	0.154E+10	0.131E+10	0.111E+10
2.875	0.182E+10	0.153E+10	0.128E+10
3.000	0.213E+10	0.177E+10	0.147E+10
3.125	0.247E+10	0.203E+10	0.166E+10
3.250	0.285E+10	0.231E+10	0.187E+10
3.375	0.326E+10	0.261E+10	0.209E+10
3.500	0.370E+10	0.293E+10	0.232E+10
3.625	0.418E+10	0.326E+10	0.256E+10
3.750	0.469E+10	0.361E+10	0.280E+10
3.875	0.524E+10	0.398E+10	0.306E+10
4.000	0.582E+10	0.436E+10	0.331E+10
4.125	0.644E+10	0.476E+10	0.358E+10
4.250	0.709E+10	0.517E+10	0.385E+10
4.375	0.777E+10	0.559E+10	0.412E+10
4.500	0.849E+10	0.603E+10	0.440E+10
4.625	0.924E+10	0.647E+10	0.468E+10
4.750	0.100E+11	0.692E+10	0.496E+10
4.875	0.108E+11	0.738E+10	0.524E+10
5.000	0.117E+11	0.784E+10	0.552E+10
5.250	0.134E+11	0.878E+10	0.608E+10
5.500	0.153E+11	0.974E+10	0.664E+10
5.750	0.173E+11	0.107E+11	0.719E+10
6.000	0.193E+11	0.117E+11	0.773E+10
6.250	0.215E+11	0.126E+11	0.825E+10
6.500	0.236E+11	0.136E+11	0.877E+10
6.750	0.259E+11	0.145E+11	0.927E+10
7.000	0.282E+11	0.154E+11	0.975E+10
7.250	0.305E+11	0.163E+11	0.102E+11
7.500	0.328E+11	0.171E+11	0.107E+11
7.750	0.351E+11	0.179E+11	0.111E+11
8.000	0.374E+11	0.187E+11	0.115E+11

8.250	0.397E+11	0.195E+11	0.119E+11
8.500	0.420E+11	0.202E+11	0.123E+11
8.750	0.443E+11	0.210E+11	0.127E+11
9.000	0.465E+11	0.216E+11	0.131E+11
9.250	0.487E+11	0.223E+11	0.134E+11
9.500	0.509E+11	0.229E+11	0.137E+11
9.750	0.529E+11	0.235E+11	0.140E+11
10.000	0.550E+11	0.241E+11	0.144E+11
10.500	0.589E+11	0.252E+11	0.149E+11
11.000	0.625E+11	0.262E+11	0.154E+11
11.500	0.659E+11	0.271E+11	0.159E+11
12.000	0.690E+11	0.279E+11	0.163E+11
12.500	0.719E+11	0.286E+11	0.167E+11
13.000	0.745E+11	0.293E+11	0.171E+11
13.500	0.769E+11	0.299E+11	0.174E+11
14.000	0.790E+11	0.304E+11	0.177E+11
14.500	0.809E+11	0.309E+11	0.180E+11
15.000	0.827E+11	0.314E+11	0.182E+11
16.000	0.856E+11	0.321E+11	0.186E+11
17.000	0.880E+11	0.327E+11	0.190E+11
18.000	0.898E+11	0.332E+11	0.192E+11
19.000	0.912E+11	0.336E+11	0.194E+11
20.000	0.922E+11	0.338E+11	0.196E+11
21.000	0.929E+11	0.340E+11	0.196E+11
22.000	0.934E+11	0.341E+11	0.197E+11
23.000	0.937E+11	0.342E+11	0.197E+11
24.000	0.938E+11	0.341E+11	0.197E+11
25.000	0.937E+11	0.341E+11	0.197E+11
26.000	0.935E+11	0.340E+11	0.196E+11
27.000	0.932E+11	0.339E+11	0.195E+11
28.000	0.929E+11	0.337E+11	0.194E+11
29.000	0.924E+11	0.335E+11	0.193E+11
30.000	0.918E+11	0.333E+11	0.192E+11
31.000	0.912E+11	0.331E+11	0.191E+11
32.000	0.906E+11	0.328E+11	0.189E+11
33.000	0.898E+11	0.326E+11	0.188E+11
34.000	0.891E+11	0.323E+11	0.186E+11
35.000	0.883E+11	0.320E+11	0.184E+11
36.000	0.875E+11	0.317E+11	0.182E+11
37.000	0.867E+11	0.314E+11	0.181E+11
38.000	0.858E+11	0.311E+11	0.179E+11
39.000	0.849E+11	0.307E+11	0.177E+11
40.000	0.840E+11	0.304E+11	0.175E+11

As

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
33	(g/mole) 74.9216	(g/cm ³) 5.72	(cm ⁻¹) 195.301	(cm ⁻¹) 196.835	.153	.513

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.148E+08	0.144E+08	0.139E+08
1.125	0.261E+08	0.251E+08	0.242E+08
1.250	0.426E+08	0.409E+08	0.390E+08
1.375	0.660E+08	0.628E+08	0.594E+08
1.500	0.975E+08	0.921E+08	0.864E+08
1.625	0.139E+09	0.130E+09	0.121E+09
1.750	0.191E+09	0.178E+09	0.164E+09
1.875	0.257E+09	0.236E+09	0.216E+09
2.000	0.337E+09	0.307E+09	0.278E+09
2.125	0.433E+09	0.391E+09	0.351E+09
2.250	0.546E+09	0.489E+09	0.435E+09
2.375	0.679E+09	0.602E+09	0.530E+09
2.500	0.833E+09	0.731E+09	0.636E+09
2.625	0.101E+10	0.876E+09	0.755E+09
2.750	0.121E+10	0.104E+10	0.884E+09
2.875	0.143E+10	0.122E+10	0.103E+10
3.000	0.168E+10	0.141E+10	0.118E+10
3.125	0.196E+10	0.162E+10	0.134E+10
3.250	0.226E+10	0.185E+10	0.152E+10
3.375	0.259E+10	0.210E+10	0.170E+10
3.500	0.295E+10	0.236E+10	0.189E+10
3.625	0.334E+10	0.264E+10	0.209E+10
3.750	0.376E+10	0.293E+10	0.230E+10
3.875	0.421E+10	0.324E+10	0.252E+10
4.000	0.469E+10	0.357E+10	0.274E+10
4.125	0.520E+10	0.390E+10	0.297E+10
4.250	0.573E+10	0.425E+10	0.320E+10
4.375	0.630E+10	0.461E+10	0.344E+10
4.500	0.690E+10	0.498E+10	0.368E+10
4.625	0.753E+10	0.536E+10	0.393E+10
4.750	0.818E+10	0.575E+10	0.417E+10
4.875	0.886E+10	0.615E+10	0.442E+10
5.000	0.957E+10	0.656E+10	0.467E+10
5.250	0.111E+11	0.738E+10	0.517E+10
5.500	0.127E+11	0.823E+10	0.568E+10
5.750	0.144E+11	0.908E+10	0.618E+10
6.000	0.161E+11	0.995E+10	0.667E+10
6.250	0.180E+11	0.108E+11	0.715E+10
6.500	0.199E+11	0.117E+11	0.763E+10
6.750	0.218E+11	0.125E+11	0.809E+10
7.000	0.238E+11	0.133E+11	0.855E+10
7.250	0.259E+11	0.142E+11	0.899E+10
7.500	0.280E+11	0.150E+11	0.941E+10
7.750	0.301E+11	0.157E+11	0.983E+10
8.000	0.322E+11	0.165E+11	0.102E+11

8.250	0.343E+11	0.172E+11	0.106E+11
8.500	0.364E+11	0.179E+11	0.110E+11
8.750	0.384E+11	0.186E+11	0.114E+11
9.000	0.405E+11	0.193E+11	0.117E+11
9.250	0.425E+11	0.199E+11	0.120E+11
9.500	0.445E+11	0.205E+11	0.124E+11
9.750	0.465E+11	0.211E+11	0.127E+11
10.000	0.484E+11	0.217E+11	0.130E+11
10.500	0.522E+11	0.227E+11	0.135E+11
11.000	0.557E+11	0.237E+11	0.141E+11
11.500	0.590E+11	0.246E+11	0.145E+11
12.000	0.621E+11	0.255E+11	0.150E+11
12.500	0.649E+11	0.262E+11	0.154E+11
13.000	0.676E+11	0.269E+11	0.158E+11
13.500	0.700E+11	0.275E+11	0.161E+11
14.000	0.722E+11	0.281E+11	0.164E+11
14.500	0.742E+11	0.286E+11	0.167E+11
15.000	0.761E+11	0.291E+11	0.169E+11
16.000	0.792E+11	0.300E+11	0.174E+11
17.000	0.818E+11	0.306E+11	0.178E+11
18.000	0.839E+11	0.312E+11	0.181E+11
19.000	0.855E+11	0.316E+11	0.183E+11
20.000	0.868E+11	0.320E+11	0.185E+11
21.000	0.878E+11	0.322E+11	0.186E+11
22.000	0.885E+11	0.324E+11	0.187E+11
23.000	0.890E+11	0.325E+11	0.188E+11
24.000	0.893E+11	0.326E+11	0.188E+11
25.000	0.895E+11	0.326E+11	0.188E+11
26.000	0.895E+11	0.326E+11	0.188E+11
27.000	0.894E+11	0.325E+11	0.187E+11
28.000	0.892E+11	0.324E+11	0.187E+11
29.000	0.889E+11	0.323E+11	0.186E+11
30.000	0.885E+11	0.321E+11	0.185E+11
31.000	0.881E+11	0.320E+11	0.184E+11
32.000	0.876E+11	0.318E+11	0.183E+11
33.000	0.870E+11	0.316E+11	0.182E+11
34.000	0.864E+11	0.313E+11	0.181E+11
35.000	0.858E+11	0.311E+11	0.179E+11
36.000	0.852E+11	0.309E+11	0.178E+11
37.000	0.845E+11	0.306E+11	0.176E+11
38.000	0.838E+11	0.303E+11	0.175E+11
39.000	0.830E+11	0.301E+11	0.173E+11
40.000	0.823E+11	0.298E+11	0.171E+11
41.000	0.815E+11	0.295E+11	0.170E+11
42.000	0.807E+11	0.292E+11	0.168E+11
43.000	0.799E+11	0.289E+11	0.166E+11

Se

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
34	78.96	4.80	154.447	155.875	.158	.514

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.108E+08	0.105E+08	0.101E+08
1.125	0.191E+08	0.185E+08	0.178E+08
1.250	0.315E+08	0.303E+08	0.290E+08
1.375	0.491E+08	0.469E+08	0.445E+08
1.500	0.730E+08	0.691E+08	0.651E+08
1.625	0.104E+09	0.981E+08	0.916E+08
1.750	0.145E+09	0.135E+09	0.125E+09
1.875	0.195E+09	0.180E+09	0.165E+09
2.000	0.256E+09	0.235E+09	0.214E+09
2.125	0.331E+09	0.300E+09	0.270E+09
2.250	0.419E+09	0.377E+09	0.336E+09
2.375	0.522E+09	0.465E+09	0.411E+09
2.500	0.642E+09	0.566E+09	0.496E+09
2.625	0.780E+09	0.681E+09	0.590E+09
2.750	0.936E+09	0.809E+09	0.694E+09
2.875	0.111E+10	0.951E+09	0.807E+09
3.000	0.131E+10	0.111E+10	0.930E+09
3.250	0.177E+10	0.146E+10	0.120E+10
3.500	0.232E+10	0.187E+10	0.151E+10
3.750	0.297E+10	0.234E+10	0.185E+10
4.000	0.372E+10	0.286E+10	0.222E+10
4.250	0.457E+10	0.343E+10	0.260E+10
4.500	0.553E+10	0.404E+10	0.301E+10
4.750	0.658E+10	0.468E+10	0.343E+10
5.000	0.773E+10	0.536E+10	0.386E+10
5.250	0.897E+10	0.607E+10	0.429E+10
5.500	0.103E+11	0.679E+10	0.473E+10
5.750	0.117E+11	0.753E+10	0.516E+10
6.000	0.132E+11	0.828E+10	0.560E+10
6.500	0.164E+11	0.978E+10	0.645E+10
7.000	0.198E+11	0.113E+11	0.728E+10
7.500	0.234E+11	0.127E+11	0.806E+10
8.000	0.270E+11	0.141E+11	0.881E+10
8.500	0.308E+11	0.154E+11	0.951E+10
9.000	0.344E+11	0.167E+11	0.102E+11
9.500	0.381E+11	0.178E+11	0.108E+11
10.000	0.416E+11	0.189E+11	0.114E+11
11.000	0.483E+11	0.209E+11	0.124E+11
12.000	0.543E+11	0.225E+11	0.133E+11
13.000	0.595E+11	0.240E+11	0.141E+11
14.000	0.641E+11	0.252E+11	0.147E+11
15.000	0.679E+11	0.262E+11	0.153E+11
16.000	0.711E+11	0.270E+11	0.157E+11
17.000	0.737E+11	0.278E+11	0.161E+11
18.000	0.759E+11	0.284E+11	0.164E+11

19.000	0.777E+11	0.288E+11	0.167E+11
20.000	0.791E+11	0.292E+11	0.169E+11
21.000	0.803E+11	0.295E+11	0.171E+11
22.000	0.812E+11	0.298E+11	0.172E+11
23.000	0.818E+11	0.300E+11	0.173E+11
24.000	0.823E+11	0.301E+11	0.174E+11
25.000	0.826E+11	0.302E+11	0.174E+11
26.000	0.828E+11	0.302E+11	0.174E+11
27.000	0.829E+11	0.302E+11	0.174E+11
28.000	0.829E+11	0.302E+11	0.174E+11
29.000	0.828E+11	0.301E+11	0.174E+11
30.000	0.826E+11	0.300E+11	0.173E+11
31.000	0.823E+11	0.299E+11	0.172E+11
32.000	0.820E+11	0.298E+11	0.172E+11
33.000	0.816E+11	0.296E+11	0.171E+11
34.000	0.812E+11	0.294E+11	0.170E+11
35.000	0.807E+11	0.293E+11	0.169E+11
36.000	0.802E+11	0.291E+11	0.168E+11
37.000	0.797E+11	0.289E+11	0.166E+11
38.000	0.791E+11	0.287E+11	0.165E+11
39.000	0.785E+11	0.284E+11	0.164E+11
40.000	0.779E+11	0.282E+11	0.163E+11
41.000	0.773E+11	0.280E+11	0.161E+11
42.000	0.766E+11	0.278E+11	0.160E+11
43.000	0.760E+11	0.275E+11	0.158E+11
44.000	0.753E+11	0.273E+11	0.157E+11
45.000	0.746E+11	0.270E+11	0.155E+11
46.000	0.739E+11	0.268E+11	0.154E+11

Br

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
35	(g/mole) 79.904	(g/cm ³) 3.12	(cm ⁻¹) 98.895	(cm ⁻¹) 99.944	.163	.515

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.802E+07	0.780E+07	0.757E+07
1.125	0.144E+08	0.139E+08	0.134E+08
1.250	0.238E+08	0.229E+08	0.219E+08
1.375	0.373E+08	0.356E+08	0.338E+08
1.500	0.556E+08	0.528E+08	0.497E+08
1.625	0.799E+08	0.752E+08	0.703E+08
1.750	0.111E+09	0.104E+09	0.961E+08
1.875	0.150E+09	0.139E+09	0.128E+09
2.000	0.198E+09	0.182E+09	0.166E+09
2.125	0.256E+09	0.233E+09	0.210E+09
2.250	0.325E+09	0.293E+09	0.262E+09
2.375	0.407E+09	0.363E+09	0.322E+09
2.500	0.501E+09	0.443E+09	0.389E+09
2.625	0.610E+09	0.534E+09	0.464E+09
2.750	0.734E+09	0.636E+09	0.548E+09
2.875	0.874E+09	0.750E+09	0.639E+09
3.000	0.103E+10	0.875E+09	0.738E+09
3.125	0.121E+10	0.101E+10	0.845E+09
3.250	0.140E+10	0.116E+10	0.960E+09
3.375	0.161E+10	0.132E+10	0.108E+10
3.500	0.184E+10	0.150E+10	0.121E+10
3.625	0.210E+10	0.168E+10	0.135E+10
3.750	0.237E+10	0.188E+10	0.149E+10
3.875	0.266E+10	0.208E+10	0.164E+10
4.000	0.298E+10	0.230E+10	0.179E+10
4.125	0.331E+10	0.253E+10	0.195E+10
4.250	0.367E+10	0.277E+10	0.212E+10
4.375	0.405E+10	0.302E+10	0.229E+10
4.500	0.445E+10	0.328E+10	0.246E+10
4.625	0.488E+10	0.355E+10	0.264E+10
4.750	0.532E+10	0.382E+10	0.281E+10
4.875	0.579E+10	0.410E+10	0.300E+10
5.000	0.627E+10	0.439E+10	0.318E+10
5.250	0.731E+10	0.499E+10	0.355E+10
5.500	0.842E+10	0.561E+10	0.393E+10
5.750	0.960E+10	0.624E+10	0.431E+10
6.000	0.109E+11	0.688E+10	0.468E+10
6.250	0.122E+11	0.753E+10	0.506E+10
6.500	0.136E+11	0.819E+10	0.543E+10
6.750	0.150E+11	0.884E+10	0.580E+10
7.000	0.165E+11	0.949E+10	0.616E+10
7.250	0.180E+11	0.101E+11	0.652E+10
7.500	0.196E+11	0.108E+11	0.687E+10
7.750	0.211E+11	0.114E+11	0.721E+10
8.000	0.227E+11	0.120E+11	0.754E+10

8.250	0.244E+11	0.126E+11	0.787E+10
8.500	0.260E+11	0.132E+11	0.818E+10
8.750	0.276E+11	0.138E+11	0.849E+10
9.000	0.292E+11	0.143E+11	0.879E+10
9.250	0.309E+11	0.149E+11	0.908E+10
9.500	0.325E+11	0.154E+11	0.936E+10
9.750	0.341E+11	0.159E+11	0.963E+10
10.000	0.357E+11	0.164E+11	0.990E+10
10.500	0.387E+11	0.174E+11	0.104E+11
11.000	0.417E+11	0.182E+11	0.109E+11
11.500	0.446E+11	0.191E+11	0.113E+11
12.000	0.472E+11	0.198E+11	0.117E+11
12.500	0.498E+11	0.205E+11	0.121E+11
13.000	0.522E+11	0.212E+11	0.125E+11
13.500	0.544E+11	0.218E+11	0.128E+11
14.000	0.565E+11	0.224E+11	0.131E+11
14.500	0.584E+11	0.229E+11	0.134E+11
15.000	0.602E+11	0.234E+11	0.136E+11
16.000	0.634E+11	0.242E+11	0.141E+11
17.000	0.660E+11	0.250E+11	0.145E+11
18.000	0.682E+11	0.256E+11	0.149E+11
19.000	0.701E+11	0.261E+11	0.151E+11
20.000	0.716E+11	0.265E+11	0.154E+11
21.000	0.729E+11	0.269E+11	0.156E+11
22.000	0.739E+11	0.272E+11	0.157E+11
23.000	0.747E+11	0.274E+11	0.158E+11
24.000	0.753E+11	0.276E+11	0.159E+11
25.000	0.758E+11	0.277E+11	0.160E+11
26.000	0.761E+11	0.278E+11	0.160E+11
27.000	0.764E+11	0.278E+11	0.161E+11
28.000	0.765E+11	0.279E+11	0.161E+11
29.000	0.765E+11	0.278E+11	0.161E+11
30.000	0.764E+11	0.278E+11	0.160E+11
31.000	0.763E+11	0.277E+11	0.160E+11
32.000	0.761E+11	0.277E+11	0.160E+11
33.000	0.759E+11	0.276E+11	0.159E+11
34.000	0.756E+11	0.275E+11	0.158E+11
35.000	0.753E+11	0.273E+11	0.157E+11
36.000	0.749E+11	0.272E+11	0.157E+11
37.000	0.745E+11	0.270E+11	0.156E+11
38.000	0.741E+11	0.269E+11	0.155E+11
39.000	0.736E+11	0.267E+11	0.154E+11
40.000	0.731E+11	0.265E+11	0.153E+11
41.000	0.726E+11	0.263E+11	0.152E+11
42.000	0.721E+11	0.261E+11	0.150E+11
43.000	0.716E+11	0.259E+11	0.149E+11
44.000	0.710E+11	0.257E+11	0.148E+11
45.000	0.705E+11	0.255E+11	0.147E+11
46.000	0.699E+11	0.253E+11	0.146E+11
47.000	0.693E+11	0.251E+11	0.144E+11
48.000	0.687E+11	0.249E+11	0.143E+11

Rb

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
	(g/mole)	(g/cm ³)	(cm ⁻¹)	(cm ⁻¹)		
37	85.4678	1.53	44.695	45.353	.1725	.517

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.446E+07	0.434E+07	0.422E+07
1.125	0.805E+07	0.781E+07	0.754E+07
1.250	0.135E+08	0.130E+08	0.125E+08
1.375	0.213E+08	0.204E+08	0.195E+08
1.500	0.321E+08	0.305E+08	0.289E+08
1.625	0.464E+08	0.439E+08	0.412E+08
1.750	0.650E+08	0.610E+08	0.568E+08
1.875	0.885E+08	0.823E+08	0.761E+08
2.000	0.118E+09	0.108E+09	0.994E+08
2.125	0.153E+09	0.140E+09	0.127E+09
2.250	0.195E+09	0.177E+09	0.160E+09
2.375	0.245E+09	0.221E+09	0.197E+09
2.500	0.304E+09	0.271E+09	0.240E+09
2.625	0.372E+09	0.328E+09	0.288E+09
2.750	0.449E+09	0.393E+09	0.341E+09
2.875	0.537E+09	0.465E+09	0.400E+09
3.000	0.636E+09	0.546E+09	0.465E+09
3.125	0.747E+09	0.634E+09	0.535E+09
3.250	0.871E+09	0.731E+09	0.611E+09
3.375	0.101E+10	0.836E+09	0.692E+09
3.500	0.116E+10	0.950E+09	0.779E+09
3.625	0.132E+10	0.107E+10	0.871E+09
3.750	0.150E+10	0.120E+10	0.967E+09
3.875	0.169E+10	0.134E+10	0.107E+10
4.000	0.190E+10	0.149E+10	0.118E+10
4.125	0.212E+10	0.165E+10	0.129E+10
4.250	0.236E+10	0.181E+10	0.140E+10
4.375	0.261E+10	0.198E+10	0.152E+10
4.500	0.288E+10	0.216E+10	0.164E+10
4.625	0.316E+10	0.234E+10	0.177E+10
4.750	0.346E+10	0.254E+10	0.189E+10
4.875	0.378E+10	0.273E+10	0.203E+10
5.000	0.411E+10	0.294E+10	0.216E+10
5.250	0.482E+10	0.336E+10	0.243E+10
5.500	0.559E+10	0.381E+10	0.271E+10
5.750	0.642E+10	0.427E+10	0.299E+10
6.000	0.730E+10	0.475E+10	0.328E+10
6.250	0.824E+10	0.523E+10	0.357E+10
6.500	0.923E+10	0.572E+10	0.385E+10
6.750	0.103E+11	0.622E+10	0.414E+10
7.000	0.113E+11	0.672E+10	0.442E+10
7.250	0.125E+11	0.722E+10	0.471E+10
7.500	0.136E+11	0.772E+10	0.498E+10
7.750	0.148E+11	0.821E+10	0.526E+10
8.000	0.160E+11	0.870E+10	0.553E+10

8.250	0.172E+11	0.919E+10	0.579E+10
8.500	0.185E+11	0.967E+10	0.605E+10
8.750	0.197E+11	0.101E+11	0.631E+10
9.000	0.210E+11	0.106E+11	0.656E+10
9.250	0.223E+11	0.110E+11	0.680E+10
9.500	0.235E+11	0.115E+11	0.704E+10
9.750	0.248E+11	0.119E+11	0.727E+10
10.000	0.261E+11	0.123E+11	0.750E+10
10.500	0.286E+11	0.131E+11	0.793E+10
11.000	0.310E+11	0.139E+11	0.834E+10
11.500	0.334E+11	0.146E+11	0.873E+10
12.000	0.357E+11	0.153E+11	0.910E+10
12.500	0.378E+11	0.160E+11	0.945E+10
13.000	0.399E+11	0.166E+11	0.977E+10
13.500	0.419E+11	0.171E+11	0.101E+11
14.000	0.438E+11	0.177E+11	0.104E+11
14.500	0.455E+11	0.181E+11	0.106E+11
15.000	0.472E+11	0.186E+11	0.109E+11
16.000	0.502E+11	0.195E+11	0.114E+11
17.000	0.528E+11	0.202E+11	0.118E+11
18.000	0.550E+11	0.208E+11	0.121E+11
19.000	0.569E+11	0.214E+11	0.124E+11
20.000	0.585E+11	0.218E+11	0.127E+11
21.000	0.599E+11	0.223E+11	0.129E+11
22.000	0.611E+11	0.226E+11	0.131E+11
23.000	0.621E+11	0.229E+11	0.132E+11
24.000	0.629E+11	0.231E+11	0.134E+11
25.000	0.636E+11	0.233E+11	0.135E+11
26.000	0.642E+11	0.235E+11	0.136E+11
27.000	0.646E+11	0.236E+11	0.136E+11
28.000	0.649E+11	0.237E+11	0.137E+11
29.000	0.652E+11	0.238E+11	0.137E+11
30.000	0.654E+11	0.238E+11	0.138E+11
31.000	0.655E+11	0.239E+11	0.138E+11
32.000	0.655E+11	0.239E+11	0.138E+11
33.000	0.655E+11	0.238E+11	0.137E+11
34.000	0.655E+11	0.238E+11	0.137E+11
35.000	0.653E+11	0.238E+11	0.137E+11
36.000	0.652E+11	0.237E+11	0.137E+11
37.000	0.650E+11	0.236E+11	0.136E+11
38.000	0.648E+11	0.235E+11	0.136E+11
39.000	0.646E+11	0.234E+11	0.135E+11
40.000	0.643E+11	0.233E+11	0.134E+11
41.000	0.640E+11	0.232E+11	0.134E+11
42.000	0.637E+11	0.231E+11	0.133E+11
43.000	0.633E+11	0.230E+11	0.132E+11
44.000	0.630E+11	0.228E+11	0.132E+11
45.000	0.626E+11	0.227E+11	0.131E+11
46.000	0.623E+11	0.226E+11	0.130E+11
47.000	0.619E+11	0.224E+11	0.129E+11
48.000	0.615E+11	0.223E+11	0.128E+11
49.000	0.611E+11	0.221E+11	0.127E+11
50.000	0.606E+11	0.220E+11	0.126E+11
51.000	0.602E+11	0.218E+11	0.125E+11
52.000	0.598E+11	0.217E+11	0.124E+11
53.000	0.593E+11	0.215E+11	0.124E+11
54.000	0.589E+11	0.213E+11	0.123E+11

Sr

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
38	87.62	2.6	67.594	69.006	.177	.518

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.328E+07	0.321E+07	0.313E+07
1.125	0.600E+07	0.584E+07	0.566E+07
1.250	0.101E+08	0.981E+07	0.946E+07
1.375	0.161E+08	0.155E+08	0.149E+08
1.500	0.244E+08	0.233E+08	0.222E+08
1.625	0.355E+08	0.337E+08	0.319E+08
1.750	0.499E+08	0.471E+08	0.442E+08
1.875	0.681E+08	0.639E+08	0.595E+08
2.000	0.908E+08	0.846E+08	0.782E+08
2.125	0.119E+09	0.110E+09	0.101E+09
2.250	0.152E+09	0.139E+09	0.127E+09
2.375	0.191E+09	0.174E+09	0.157E+09
2.500	0.238E+09	0.215E+09	0.192E+09
2.625	0.292E+09	0.261E+09	0.232E+09
2.750	0.353E+09	0.313E+09	0.276E+09
2.875	0.424E+09	0.373E+09	0.325E+09
3.000	0.503E+09	0.438E+09	0.379E+09
3.125	0.593E+09	0.511E+09	0.438E+09
3.250	0.692E+09	0.592E+09	0.502E+09
3.375	0.802E+09	0.679E+09	0.572E+09
3.500	0.924E+09	0.774E+09	0.646E+09
3.625	0.106E+10	0.877E+09	0.725E+09
3.750	0.120E+10	0.987E+09	0.809E+09
3.875	0.136E+10	0.110E+10	0.897E+09
4.000	0.153E+10	0.123E+10	0.990E+09
4.125	0.171E+10	0.136E+10	0.109E+10
4.250	0.191E+10	0.150E+10	0.119E+10
4.375	0.212E+10	0.165E+10	0.129E+10
4.500	0.234E+10	0.181E+10	0.140E+10
4.625	0.258E+10	0.197E+10	0.151E+10
4.750	0.283E+10	0.213E+10	0.163E+10
4.875	0.310E+10	0.231E+10	0.175E+10
5.000	0.338E+10	0.249E+10	0.187E+10
5.250	0.398E+10	0.287E+10	0.212E+10
5.500	0.463E+10	0.327E+10	0.238E+10
5.750	0.534E+10	0.368E+10	0.264E+10
6.000	0.611E+10	0.412E+10	0.291E+10
6.250	0.692E+10	0.456E+10	0.318E+10
6.500	0.778E+10	0.502E+10	0.345E+10
6.750	0.869E+10	0.548E+10	0.372E+10
7.000	0.965E+10	0.595E+10	0.400E+10
7.250	0.106E+11	0.643E+10	0.427E+10
7.500	0.117E+11	0.690E+10	0.454E+10
7.750	0.127E+11	0.738E+10	0.481E+10
8.000	0.138E+11	0.785E+10	0.507E+10

8.250	0.149E+11	0.832E+10	0.533E+10
8.500	0.161E+11	0.879E+10	0.559E+10
8.750	0.173E+11	0.925E+10	0.584E+10
9.000	0.184E+11	0.970E+10	0.608E+10
9.250	0.196E+11	0.101E+11	0.633E+10
9.500	0.208E+11	0.106E+11	0.656E+10
9.750	0.220E+11	0.110E+11	0.680E+10
10.000	0.232E+11	0.114E+11	0.702E+10
10.500	0.256E+11	0.123E+11	0.746E+10
11.000	0.280E+11	0.130E+11	0.788E+10
11.500	0.303E+11	0.138E+11	0.828E+10
12.000	0.326E+11	0.145E+11	0.865E+10
12.500	0.348E+11	0.151E+11	0.901E+10
13.000	0.369E+11	0.158E+11	0.935E+10
13.500	0.390E+11	0.163E+11	0.967E+10
14.000	0.409E+11	0.169E+11	0.997E+10
14.500	0.428E+11	0.174E+11	0.103E+11
15.000	0.445E+11	0.179E+11	0.105E+11
16.000	0.477E+11	0.188E+11	0.110E+11
17.000	0.505E+11	0.196E+11	0.114E+11
18.000	0.530E+11	0.203E+11	0.118E+11
19.000	0.551E+11	0.209E+11	0.122E+11
20.000	0.570E+11	0.214E+11	0.124E+11
21.000	0.586E+11	0.219E+11	0.127E+11
22.000	0.599E+11	0.223E+11	0.129E+11
23.000	0.611E+11	0.226E+11	0.131E+11
24.000	0.621E+11	0.229E+11	0.133E+11
25.000	0.629E+11	0.232E+11	0.134E+11
26.000	0.637E+11	0.234E+11	0.135E+11
27.000	0.642E+11	0.235E+11	0.136E+11
28.000	0.647E+11	0.237E+11	0.137E+11
29.000	0.651E+11	0.238E+11	0.137E+11
30.000	0.654E+11	0.239E+11	0.138E+11
31.000	0.656E+11	0.239E+11	0.138E+11
32.000	0.658E+11	0.240E+11	0.138E+11
33.000	0.658E+11	0.240E+11	0.138E+11
34.000	0.659E+11	0.240E+11	0.138E+11
35.000	0.659E+11	0.240E+11	0.138E+11
36.000	0.658E+11	0.239E+11	0.138E+11
37.000	0.657E+11	0.239E+11	0.138E+11
38.000	0.656E+11	0.238E+11	0.137E+11
39.000	0.654E+11	0.238E+11	0.137E+11
40.000	0.652E+11	0.237E+11	0.136E+11
41.000	0.650E+11	0.236E+11	0.136E+11
42.000	0.647E+11	0.235E+11	0.135E+11
43.000	0.645E+11	0.234E+11	0.135E+11
44.000	0.642E+11	0.233E+11	0.134E+11
45.000	0.639E+11	0.232E+11	0.133E+11
46.000	0.635E+11	0.230E+11	0.133E+11
47.000	0.632E+11	0.229E+11	0.132E+11
48.000	0.629E+11	0.228E+11	0.131E+11
49.000	0.625E+11	0.227E+11	0.130E+11
50.000	0.621E+11	0.225E+11	0.130E+11
51.000	0.617E+11	0.224E+11	0.129E+11
52.000	0.614E+11	0.222E+11	0.128E+11
53.000	0.610E+11	0.221E+11	0.127E+11
54.000	0.606E+11	0.219E+11	0.126E+11
55.000	0.601E+11	0.218E+11	0.125E+11

56.000	0.597E+11	0.216E+11	0.124E+11
57.000	0.593E+11	0.215E+11	0.123E+11

Y

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
39	88.9059	4.5	96.845	99.848	.181	.519

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
1.000	0.246E+07	0.242E+07	0.237E+07
1.125	0.454E+07	0.444E+07	0.433E+07
1.250	0.773E+07	0.752E+07	0.730E+07
1.375	0.124E+08	0.120E+08	0.116E+08
1.500	0.188E+08	0.181E+08	0.174E+08
1.625	0.275E+08	0.263E+08	0.251E+08
1.750	0.388E+08	0.370E+08	0.351E+08
1.875	0.532E+08	0.504E+08	0.475E+08
2.000	0.712E+08	0.671E+08	0.628E+08
2.125	0.932E+08	0.873E+08	0.812E+08
2.250	0.120E+09	0.111E+09	0.103E+09
2.375	0.151E+09	0.140E+09	0.128E+09
2.500	0.189E+09	0.173E+09	0.158E+09
2.625	0.232E+09	0.212E+09	0.191E+09
2.750	0.282E+09	0.255E+09	0.229E+09
2.875	0.339E+09	0.305E+09	0.271E+09
3.000	0.404E+09	0.360E+09	0.318E+09
3.125	0.477E+09	0.421E+09	0.370E+09
3.250	0.558E+09	0.489E+09	0.426E+09
3.375	0.649E+09	0.564E+09	0.487E+09
3.500	0.749E+09	0.646E+09	0.553E+09
3.625	0.859E+09	0.734E+09	0.624E+09
3.750	0.979E+09	0.830E+09	0.699E+09
3.875	0.111E+10	0.933E+09	0.779E+09
4.000	0.125E+10	0.104E+10	0.864E+09
4.125	0.141E+10	0.116E+10	0.953E+09
4.250	0.157E+10	0.128E+10	0.105E+10
4.375	0.175E+10	0.142E+10	0.115E+10
4.500	0.194E+10	0.155E+10	0.125E+10
4.625	0.214E+10	0.170E+10	0.135E+10
4.750	0.235E+10	0.185E+10	0.146E+10
4.875	0.258E+10	0.201E+10	0.158E+10
5.000	0.282E+10	0.218E+10	0.169E+10
5.250	0.334E+10	0.253E+10	0.193E+10
5.500	0.391E+10	0.290E+10	0.219E+10
5.750	0.454E+10	0.330E+10	0.245E+10
6.000	0.521E+10	0.371E+10	0.272E+10
6.250	0.594E+10	0.414E+10	0.299E+10
6.500	0.671E+10	0.459E+10	0.327E+10
6.750	0.754E+10	0.505E+10	0.355E+10
7.000	0.841E+10	0.552E+10	0.383E+10
7.250	0.932E+10	0.599E+10	0.411E+10
7.500	0.103E+11	0.648E+10	0.440E+10
7.750	0.113E+11	0.696E+10	0.468E+10
8.000	0.123E+11	0.745E+10	0.496E+10

8.250	0.134E+11	0.794E+10	0.523E+10
8.500	0.144E+11	0.843E+10	0.551E+10
8.750	0.156E+11	0.892E+10	0.578E+10
9.000	0.167E+11	0.940E+10	0.604E+10
9.250	0.179E+11	0.988E+10	0.631E+10
9.500	0.191E+11	0.104E+11	0.656E+10
9.750	0.203E+11	0.108E+11	0.682E+10
10.000	0.215E+11	0.113E+11	0.706E+10
10.500	0.239E+11	0.122E+11	0.754E+10
11.000	0.263E+11	0.130E+11	0.800E+10
11.500	0.288E+11	0.139E+11	0.844E+10
12.000	0.312E+11	0.146E+11	0.886E+10
12.500	0.336E+11	0.154E+11	0.926E+10
13.000	0.359E+11	0.161E+11	0.964E+10
13.500	0.382E+11	0.168E+11	0.100E+11
14.000	0.403E+11	0.174E+11	0.103E+11
14.500	0.424E+11	0.180E+11	0.107E+11
15.000	0.444E+11	0.186E+11	0.110E+11
16.000	0.482E+11	0.196E+11	0.115E+11
17.000	0.515E+11	0.205E+11	0.120E+11
18.000	0.545E+11	0.214E+11	0.125E+11
19.000	0.571E+11	0.221E+11	0.129E+11
20.000	0.594E+11	0.227E+11	0.132E+11
21.000	0.615E+11	0.233E+11	0.135E+11
22.000	0.632E+11	0.238E+11	0.138E+11
23.000	0.647E+11	0.242E+11	0.140E+11
24.000	0.661E+11	0.246E+11	0.142E+11
25.000	0.672E+11	0.249E+11	0.144E+11
26.000	0.681E+11	0.252E+11	0.146E+11
27.000	0.690E+11	0.254E+11	0.147E+11
28.000	0.696E+11	0.256E+11	0.148E+11
29.000	0.702E+11	0.257E+11	0.149E+11
30.000	0.707E+11	0.259E+11	0.150E+11
31.000	0.711E+11	0.260E+11	0.150E+11
32.000	0.714E+11	0.261E+11	0.150E+11
33.000	0.716E+11	0.261E+11	0.151E+11
34.000	0.717E+11	0.261E+11	0.151E+11
35.000	0.718E+11	0.262E+11	0.151E+11
36.000	0.719E+11	0.262E+11	0.151E+11
37.000	0.718E+11	0.261E+11	0.151E+11
38.000	0.718E+11	0.261E+11	0.151E+11
39.000	0.717E+11	0.261E+11	0.150E+11
40.000	0.716E+11	0.260E+11	0.150E+11
41.000	0.714E+11	0.259E+11	0.150E+11
42.000	0.712E+11	0.259E+11	0.149E+11
43.000	0.710E+11	0.258E+11	0.149E+11
44.000	0.708E+11	0.257E+11	0.148E+11
45.000	0.705E+11	0.256E+11	0.147E+11
46.000	0.702E+11	0.255E+11	0.147E+11
47.000	0.699E+11	0.254E+11	0.146E+11
48.000	0.696E+11	0.252E+11	0.145E+11
49.000	0.692E+11	0.251E+11	0.145E+11
50.000	0.689E+11	0.250E+11	0.144E+11
51.000	0.685E+11	0.248E+11	0.143E+11
52.000	0.682E+11	0.247E+11	0.142E+11
53.000	0.678E+11	0.246E+11	0.141E+11
54.000	0.674E+11	0.244E+11	0.141E+11
55.000	0.670E+11	0.243E+11	0.140E+11

56.000	0.666E+11	0.241E+11	0.139E+11
57.000	0.662E+11	0.240E+11	0.138E+11
58.000	0.657E+11	0.238E+11	0.137E+11
59.000	0.653E+11	0.237E+11	0.136E+11
60.000	0.649E+11	0.235E+11	0.135E+11

Zr

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
40	91.22	6.49	133.453	135.110	.185	.520

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
2.000	0.554E+08	0.524E+08	0.492E+08
2.125	0.728E+08	0.684E+08	0.638E+08
2.250	0.938E+08	0.876E+08	0.812E+08
2.375	0.119E+09	0.110E+09	0.102E+09
2.500	0.148E+09	0.137E+09	0.125E+09
2.625	0.183E+09	0.167E+09	0.152E+09
2.750	0.223E+09	0.202E+09	0.183E+09
2.875	0.268E+09	0.242E+09	0.217E+09
3.000	0.320E+09	0.287E+09	0.255E+09
3.125	0.379E+09	0.337E+09	0.297E+09
3.250	0.444E+09	0.392E+09	0.343E+09
3.375	0.517E+09	0.453E+09	0.393E+09
3.500	0.598E+09	0.519E+09	0.447E+09
3.625	0.687E+09	0.591E+09	0.506E+09
3.750	0.785E+09	0.670E+09	0.568E+09
3.875	0.891E+09	0.754E+09	0.635E+09
4.000	0.101E+10	0.845E+09	0.705E+09
4.125	0.113E+10	0.942E+09	0.780E+09
4.250	0.127E+10	0.104E+10	0.859E+09
4.375	0.141E+10	0.115E+10	0.941E+09
4.500	0.157E+10	0.127E+10	0.103E+10
4.625	0.173E+10	0.139E+10	0.112E+10
4.750	0.191E+10	0.152E+10	0.121E+10
4.875	0.210E+10	0.165E+10	0.131E+10
5.000	0.230E+10	0.179E+10	0.140E+10
5.125	0.251E+10	0.194E+10	0.151E+10
5.250	0.273E+10	0.209E+10	0.161E+10
5.375	0.296E+10	0.224E+10	0.172E+10
5.500	0.320E+10	0.240E+10	0.183E+10
5.625	0.346E+10	0.257E+10	0.194E+10
5.750	0.372E+10	0.274E+10	0.206E+10
5.875	0.400E+10	0.292E+10	0.217E+10
6.000	0.429E+10	0.310E+10	0.229E+10
6.125	0.459E+10	0.328E+10	0.241E+10
6.250	0.490E+10	0.347E+10	0.253E+10
6.375	0.522E+10	0.366E+10	0.265E+10
6.500	0.555E+10	0.385E+10	0.277E+10
6.625	0.590E+10	0.405E+10	0.290E+10
6.750	0.625E+10	0.425E+10	0.302E+10
6.875	0.662E+10	0.446E+10	0.315E+10
7.000	0.699E+10	0.466E+10	0.327E+10
7.250	0.777E+10	0.508E+10	0.352E+10
7.500	0.859E+10	0.551E+10	0.378E+10
7.750	0.944E+10	0.594E+10	0.403E+10
8.000	0.103E+11	0.638E+10	0.428E+10

8.250	0.112E+11	0.681E+10	0.453E+10
8.500	0.122E+11	0.725E+10	0.478E+10
8.750	0.132E+11	0.769E+10	0.503E+10
9.000	0.142E+11	0.813E+10	0.527E+10
9.250	0.152E+11	0.856E+10	0.551E+10
9.500	0.162E+11	0.899E+10	0.575E+10
9.750	0.173E+11	0.942E+10	0.598E+10
10.000	0.184E+11	0.984E+10	0.621E+10
10.250	0.194E+11	0.103E+11	0.643E+10
10.500	0.205E+11	0.107E+11	0.665E+10
10.750	0.216E+11	0.111E+11	0.687E+10
11.000	0.227E+11	0.115E+11	0.708E+10
11.250	0.238E+11	0.118E+11	0.729E+10
11.500	0.249E+11	0.122E+11	0.750E+10
11.750	0.260E+11	0.126E+11	0.770E+10
12.000	0.271E+11	0.130E+11	0.789E+10
12.500	0.293E+11	0.137E+11	0.827E+10
13.000	0.315E+11	0.143E+11	0.863E+10
13.500	0.336E+11	0.150E+11	0.897E+10
14.000	0.356E+11	0.156E+11	0.930E+10
14.500	0.376E+11	0.162E+11	0.961E+10
15.000	0.394E+11	0.167E+11	0.991E+10
15.500	0.413E+11	0.172E+11	0.102E+11
16.000	0.430E+11	0.177E+11	0.105E+11
16.500	0.447E+11	0.182E+11	0.107E+11
17.000	0.463E+11	0.186E+11	0.109E+11
17.500	0.478E+11	0.191E+11	0.112E+11
18.000	0.492E+11	0.195E+11	0.114E+11
19.000	0.518E+11	0.202E+11	0.118E+11
20.000	0.541E+11	0.208E+11	0.121E+11
21.000	0.561E+11	0.214E+11	0.124E+11
22.000	0.579E+11	0.219E+11	0.127E+11
23.000	0.595E+11	0.223E+11	0.130E+11
24.000	0.609E+11	0.227E+11	0.132E+11
25.000	0.621E+11	0.231E+11	0.134E+11
26.000	0.631E+11	0.234E+11	0.135E+11
27.000	0.640E+11	0.236E+11	0.137E+11
28.000	0.648E+11	0.239E+11	0.138E+11
29.000	0.654E+11	0.241E+11	0.139E+11
30.000	0.660E+11	0.242E+11	0.140E+11
31.000	0.665E+11	0.243E+11	0.141E+11
32.000	0.668E+11	0.245E+11	0.141E+11
33.000	0.672E+11	0.245E+11	0.142E+11
34.000	0.674E+11	0.246E+11	0.142E+11
35.000	0.676E+11	0.246E+11	0.142E+11
36.000	0.677E+11	0.247E+11	0.142E+11
37.000	0.678E+11	0.247E+11	0.142E+11
38.000	0.678E+11	0.247E+11	0.142E+11
39.000	0.678E+11	0.247E+11	0.142E+11
40.000	0.677E+11	0.246E+11	0.142E+11
41.000	0.677E+11	0.246E+11	0.142E+11
42.000	0.675E+11	0.245E+11	0.142E+11
43.000	0.674E+11	0.245E+11	0.141E+11
44.000	0.672E+11	0.244E+11	0.141E+11
45.000	0.671E+11	0.243E+11	0.140E+11
46.000	0.668E+11	0.243E+11	0.140E+11
47.000	0.666E+11	0.242E+11	0.139E+11
48.000	0.664E+11	0.241E+11	0.139E+11

49.000	0.661E+11	0.240E+11	0.138E+11
50.000	0.658E+11	0.239E+11	0.138E+11
51.000	0.655E+11	0.238E+11	0.137E+11
52.000	0.652E+11	0.237E+11	0.136E+11
53.000	0.649E+11	0.235E+11	0.136E+11
54.000	0.646E+11	0.234E+11	0.135E+11
55.000	0.643E+11	0.233E+11	0.134E+11
56.000	0.639E+11	0.232E+11	0.133E+11
57.000	0.636E+11	0.230E+11	0.133E+11
58.000	0.632E+11	0.229E+11	0.132E+11
59.000	0.629E+11	0.228E+11	0.131E+11
60.000	0.625E+11	0.226E+11	0.130E+11
61.000	0.621E+11	0.225E+11	0.129E+11
62.000	0.617E+11	0.224E+11	0.129E+11
63.000	0.614E+11	0.222E+11	0.128E+11

Nb

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
41	(g/mole) 92.9064	(g/cm ³) 8.55	(cm ⁻¹) 167.616	(cm ⁻¹) 169.864	.189	.521

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
2.000	0.437E+08	0.414E+08	0.390E+08
2.125	0.575E+08	0.542E+08	0.507E+08
2.250	0.743E+08	0.696E+08	0.647E+08
2.375	0.944E+08	0.878E+08	0.811E+08
2.500	0.118E+09	0.109E+09	0.100E+09
2.625	0.146E+09	0.134E+09	0.122E+09
2.750	0.178E+09	0.162E+09	0.147E+09
2.875	0.215E+09	0.195E+09	0.175E+09
3.000	0.257E+09	0.231E+09	0.206E+09
3.125	0.304E+09	0.272E+09	0.241E+09
3.250	0.357E+09	0.317E+09	0.279E+09
3.375	0.417E+09	0.367E+09	0.320E+09
3.500	0.482E+09	0.421E+09	0.365E+09
3.625	0.555E+09	0.481E+09	0.413E+09
3.750	0.635E+09	0.545E+09	0.465E+09
3.875	0.722E+09	0.615E+09	0.521E+09
4.000	0.817E+09	0.690E+09	0.580E+09
4.125	0.920E+09	0.771E+09	0.642E+09
4.250	0.103E+10	0.856E+09	0.708E+09
4.375	0.115E+10	0.947E+09	0.778E+09
4.500	0.128E+10	0.104E+10	0.851E+09
4.625	0.142E+10	0.115E+10	0.926E+09
4.750	0.156E+10	0.125E+10	0.101E+10
4.875	0.172E+10	0.137E+10	0.109E+10
5.000	0.188E+10	0.148E+10	0.117E+10
5.125	0.206E+10	0.161E+10	0.126E+10
5.250	0.224E+10	0.173E+10	0.135E+10
5.375	0.244E+10	0.187E+10	0.144E+10
5.500	0.264E+10	0.200E+10	0.154E+10
5.625	0.285E+10	0.214E+10	0.163E+10
5.750	0.308E+10	0.229E+10	0.173E+10
5.875	0.331E+10	0.244E+10	0.183E+10
6.000	0.355E+10	0.260E+10	0.194E+10
6.125	0.381E+10	0.275E+10	0.204E+10
6.250	0.407E+10	0.292E+10	0.215E+10
6.375	0.434E+10	0.308E+10	0.225E+10
6.500	0.462E+10	0.325E+10	0.236E+10
6.625	0.491E+10	0.342E+10	0.247E+10
6.750	0.522E+10	0.360E+10	0.258E+10
6.875	0.553E+10	0.378E+10	0.269E+10
7.000	0.585E+10	0.396E+10	0.280E+10
7.250	0.651E+10	0.433E+10	0.303E+10
7.500	0.721E+10	0.470E+10	0.325E+10
7.750	0.795E+10	0.508E+10	0.348E+10
8.000	0.872E+10	0.547E+10	0.371E+10

8.250	0.951E+10	0.586E+10	0.393E+10
8.500	0.103E+11	0.625E+10	0.416E+10
8.750	0.112E+11	0.665E+10	0.438E+10
9.000	0.121E+11	0.704E+10	0.460E+10
9.250	0.130E+11	0.743E+10	0.482E+10
9.500	0.139E+11	0.783E+10	0.504E+10
9.750	0.148E+11	0.821E+10	0.525E+10
10.000	0.158E+11	0.860E+10	0.547E+10
10.250	0.167E+11	0.898E+10	0.567E+10
10.500	0.177E+11	0.936E+10	0.588E+10
10.750	0.187E+11	0.973E+10	0.608E+10
11.000	0.197E+11	0.101E+11	0.628E+10
11.250	0.207E+11	0.105E+11	0.647E+10
11.500	0.217E+11	0.108E+11	0.666E+10
11.750	0.227E+11	0.112E+11	0.685E+10
12.000	0.237E+11	0.115E+11	0.704E+10
12.500	0.256E+11	0.122E+11	0.739E+10
13.000	0.276E+11	0.128E+11	0.773E+10
13.500	0.295E+11	0.134E+11	0.806E+10
14.000	0.314E+11	0.140E+11	0.837E+10
14.500	0.333E+11	0.145E+11	0.867E+10
15.000	0.351E+11	0.151E+11	0.896E+10
15.500	0.368E+11	0.156E+11	0.923E+10
16.000	0.384E+11	0.161E+11	0.949E+10
16.500	0.400E+11	0.165E+11	0.974E+10
17.000	0.416E+11	0.169E+11	0.997E+10
17.500	0.430E+11	0.174E+11	0.102E+11
18.000	0.444E+11	0.177E+11	0.104E+11
19.000	0.470E+11	0.185E+11	0.108E+11
20.000	0.493E+11	0.191E+11	0.112E+11
21.000	0.513E+11	0.197E+11	0.115E+11
22.000	0.531E+11	0.202E+11	0.118E+11
23.000	0.547E+11	0.207E+11	0.120E+11
24.000	0.562E+11	0.211E+11	0.122E+11
25.000	0.574E+11	0.214E+11	0.124E+11
26.000	0.585E+11	0.218E+11	0.126E+11
27.000	0.595E+11	0.220E+11	0.128E+11
28.000	0.603E+11	0.223E+11	0.129E+11
29.000	0.611E+11	0.225E+11	0.130E+11
30.000	0.617E+11	0.227E+11	0.131E+11
31.000	0.622E+11	0.228E+11	0.132E+11
32.000	0.627E+11	0.230E+11	0.133E+11
33.000	0.631E+11	0.231E+11	0.133E+11
34.000	0.634E+11	0.232E+11	0.134E+11
35.000	0.636E+11	0.232E+11	0.134E+11
36.000	0.638E+11	0.233E+11	0.134E+11
37.000	0.640E+11	0.233E+11	0.135E+11
38.000	0.641E+11	0.233E+11	0.135E+11
39.000	0.641E+11	0.234E+11	0.135E+11
40.000	0.642E+11	0.234E+11	0.135E+11
41.000	0.642E+11	0.233E+11	0.135E+11
42.000	0.641E+11	0.233E+11	0.135E+11
43.000	0.641E+11	0.233E+11	0.134E+11
44.000	0.640E+11	0.232E+11	0.134E+11
45.000	0.638E+11	0.232E+11	0.134E+11
46.000	0.637E+11	0.231E+11	0.133E+11
47.000	0.635E+11	0.231E+11	0.133E+11
48.000	0.634E+11	0.230E+11	0.133E+11

49.000	0.632E+11	0.229E+11	0.132E+11
50.000	0.629E+11	0.228E+11	0.132E+11
51.000	0.627E+11	0.228E+11	0.131E+11
52.000	0.625E+11	0.227E+11	0.131E+11
53.000	0.622E+11	0.226E+11	0.130E+11
54.000	0.620E+11	0.225E+11	0.129E+11
55.000	0.617E+11	0.224E+11	0.129E+11
56.000	0.614E+11	0.223E+11	0.128E+11
57.000	0.611E+11	0.222E+11	0.128E+11
58.000	0.608E+11	0.221E+11	0.127E+11
59.000	0.605E+11	0.219E+11	0.126E+11
60.000	0.602E+11	0.218E+11	0.126E+11
61.000	0.599E+11	0.217E+11	0.125E+11
62.000	0.596E+11	0.216E+11	0.124E+11
63.000	0.592E+11	0.215E+11	0.123E+11
64.000	0.589E+11	0.213E+11	0.123E+11
65.000	0.586E+11	0.212E+11	0.122E+11
66.000	0.582E+11	0.211E+11	0.121E+11

Mo

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
42	(g/mole) 95.94	(g/cm ³) 10.2	(cm ⁻¹) 196.308	(cm ⁻¹) 199.413	.193	.522

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
2.000	0.347E+08	0.328E+08	0.309E+08
2.125	0.458E+08	0.431E+08	0.403E+08
2.250	0.593E+08	0.554E+08	0.515E+08
2.375	0.754E+08	0.701E+08	0.648E+08
2.500	0.946E+08	0.874E+08	0.801E+08
2.625	0.117E+09	0.107E+09	0.978E+08
2.750	0.143E+09	0.130E+09	0.118E+09
2.875	0.173E+09	0.156E+09	0.141E+09
3.000	0.207E+09	0.186E+09	0.166E+09
3.125	0.245E+09	0.219E+09	0.194E+09
3.250	0.289E+09	0.256E+09	0.225E+09
3.375	0.337E+09	0.296E+09	0.258E+09
3.500	0.390E+09	0.341E+09	0.295E+09
3.625	0.450E+09	0.389E+09	0.334E+09
3.750	0.515E+09	0.442E+09	0.377E+09
3.875	0.586E+09	0.499E+09	0.422E+09
4.000	0.664E+09	0.560E+09	0.471E+09
4.125	0.748E+09	0.626E+09	0.522E+09
4.250	0.839E+09	0.697E+09	0.576E+09
4.375	0.938E+09	0.772E+09	0.633E+09
4.500	0.104E+10	0.851E+09	0.693E+09
4.625	0.116E+10	0.935E+09	0.756E+09
4.750	0.128E+10	0.102E+10	0.821E+09
4.875	0.141E+10	0.112E+10	0.889E+09
5.000	0.154E+10	0.121E+10	0.959E+09
5.125	0.169E+10	0.132E+10	0.103E+10
5.250	0.184E+10	0.142E+10	0.111E+10
5.375	0.200E+10	0.153E+10	0.118E+10
5.500	0.217E+10	0.165E+10	0.126E+10
5.625	0.235E+10	0.176E+10	0.134E+10
5.750	0.253E+10	0.189E+10	0.143E+10
5.875	0.273E+10	0.201E+10	0.151E+10
6.000	0.293E+10	0.214E+10	0.160E+10
6.125	0.314E+10	0.227E+10	0.168E+10
6.250	0.336E+10	0.241E+10	0.177E+10
6.375	0.359E+10	0.255E+10	0.186E+10
6.500	0.382E+10	0.269E+10	0.195E+10
6.625	0.407E+10	0.284E+10	0.205E+10
6.750	0.432E+10	0.298E+10	0.214E+10
6.875	0.458E+10	0.313E+10	0.223E+10
7.000	0.485E+10	0.329E+10	0.233E+10
7.250	0.541E+10	0.360E+10	0.252E+10
7.500	0.600E+10	0.392E+10	0.271E+10
7.750	0.663E+10	0.424E+10	0.291E+10
8.000	0.728E+10	0.457E+10	0.310E+10

8.250	0.795E+10	0.490E+10	0.329E+10
8.500	0.865E+10	0.524E+10	0.349E+10
8.750	0.938E+10	0.558E+10	0.368E+10
9.000	0.101E+11	0.592E+10	0.387E+10
9.250	0.109E+11	0.626E+10	0.407E+10
9.500	0.117E+11	0.660E+10	0.426E+10
9.750	0.125E+11	0.693E+10	0.444E+10
10.000	0.133E+11	0.727E+10	0.463E+10
10.250	0.141E+11	0.760E+10	0.481E+10
10.500	0.150E+11	0.793E+10	0.499E+10
10.750	0.158E+11	0.826E+10	0.517E+10
11.000	0.167E+11	0.858E+10	0.534E+10
11.250	0.175E+11	0.890E+10	0.552E+10
11.500	0.184E+11	0.921E+10	0.569E+10
11.750	0.193E+11	0.952E+10	0.585E+10
12.000	0.201E+11	0.982E+10	0.602E+10
12.500	0.219E+11	0.104E+11	0.634E+10
13.000	0.236E+11	0.110E+11	0.665E+10
13.500	0.253E+11	0.115E+11	0.694E+10
14.000	0.270E+11	0.121E+11	0.722E+10
14.500	0.286E+11	0.126E+11	0.750E+10
15.000	0.302E+11	0.130E+11	0.776E+10
15.500	0.317E+11	0.135E+11	0.801E+10
16.000	0.332E+11	0.139E+11	0.825E+10
16.500	0.347E+11	0.144E+11	0.847E+10
17.000	0.361E+11	0.148E+11	0.869E+10
17.500	0.374E+11	0.151E+11	0.890E+10
18.000	0.386E+11	0.155E+11	0.910E+10
19.000	0.410E+11	0.162E+11	0.947E+10
20.000	0.431E+11	0.168E+11	0.980E+10
21.000	0.450E+11	0.173E+11	0.101E+11
22.000	0.468E+11	0.178E+11	0.104E+11
23.000	0.483E+11	0.183E+11	0.106E+11
24.000	0.497E+11	0.187E+11	0.108E+11
25.000	0.509E+11	0.190E+11	0.110E+11
26.000	0.519E+11	0.193E+11	0.112E+11
27.000	0.529E+11	0.196E+11	0.114E+11
28.000	0.537E+11	0.199E+11	0.115E+11
29.000	0.545E+11	0.201E+11	0.116E+11
30.000	0.551E+11	0.203E+11	0.117E+11
31.000	0.557E+11	0.205E+11	0.118E+11
32.000	0.562E+11	0.206E+11	0.119E+11
33.000	0.566E+11	0.207E+11	0.120E+11
34.000	0.570E+11	0.208E+11	0.120E+11
35.000	0.573E+11	0.209E+11	0.121E+11
36.000	0.575E+11	0.210E+11	0.121E+11
37.000	0.577E+11	0.211E+11	0.122E+11
38.000	0.579E+11	0.211E+11	0.122E+11
39.000	0.580E+11	0.211E+11	0.122E+11
40.000	0.581E+11	0.212E+11	0.122E+11
41.000	0.581E+11	0.212E+11	0.122E+11
42.000	0.582E+11	0.212E+11	0.122E+11
43.000	0.581E+11	0.212E+11	0.122E+11
44.000	0.581E+11	0.211E+11	0.122E+11
45.000	0.581E+11	0.211E+11	0.122E+11
46.000	0.580E+11	0.211E+11	0.122E+11
47.000	0.579E+11	0.210E+11	0.121E+11
48.000	0.578E+11	0.210E+11	0.121E+11

49.000	0.576E+11	0.209E+11	0.121E+11
50.000	0.575E+11	0.209E+11	0.120E+11
51.000	0.573E+11	0.208E+11	0.120E+11
52.000	0.572E+11	0.207E+11	0.120E+11
53.000	0.570E+11	0.207E+11	0.119E+11
54.000	0.568E+11	0.206E+11	0.119E+11
55.000	0.566E+11	0.205E+11	0.118E+11
56.000	0.563E+11	0.204E+11	0.118E+11
57.000	0.561E+11	0.204E+11	0.117E+11
58.000	0.559E+11	0.203E+11	0.117E+11
59.000	0.556E+11	0.202E+11	0.116E+11
60.000	0.554E+11	0.201E+11	0.116E+11
61.000	0.551E+11	0.200E+11	0.115E+11
62.000	0.549E+11	0.199E+11	0.114E+11
63.000	0.546E+11	0.198E+11	0.114E+11
64.000	0.543E+11	0.197E+11	0.113E+11
65.000	0.541E+11	0.196E+11	0.113E+11
66.000	0.538E+11	0.195E+11	0.112E+11
67.000	0.535E+11	0.194E+11	0.111E+11
68.000	0.532E+11	0.193E+11	0.111E+11
69.000	0.529E+11	0.192E+11	0.110E+11
70.000	0.526E+11	0.191E+11	0.109E+11

Ru

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
44	101.07	12.2	195.958	201.210	.201	.525

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
2.000	0.215E+08	0.205E+08	0.195E+08
2.125	0.285E+08	0.271E+08	0.256E+08
2.250	0.371E+08	0.350E+08	0.329E+08
2.375	0.474E+08	0.446E+08	0.416E+08
2.500	0.597E+08	0.558E+08	0.518E+08
2.625	0.741E+08	0.689E+08	0.636E+08
2.750	0.910E+08	0.841E+08	0.771E+08
2.875	0.110E+09	0.101E+09	0.925E+08
3.000	0.133E+09	0.121E+09	0.110E+09
3.125	0.158E+09	0.143E+09	0.129E+09
3.250	0.186E+09	0.168E+09	0.150E+09
3.375	0.218E+09	0.195E+09	0.174E+09
3.500	0.254E+09	0.226E+09	0.199E+09
3.625	0.293E+09	0.259E+09	0.227E+09
3.750	0.337E+09	0.296E+09	0.257E+09
3.875	0.385E+09	0.335E+09	0.290E+09
4.000	0.437E+09	0.378E+09	0.324E+09
4.125	0.494E+09	0.424E+09	0.362E+09
4.250	0.556E+09	0.474E+09	0.401E+09
4.375	0.623E+09	0.527E+09	0.443E+09
4.500	0.695E+09	0.583E+09	0.487E+09
4.625	0.772E+09	0.643E+09	0.533E+09
4.750	0.855E+09	0.707E+09	0.582E+09
4.875	0.944E+09	0.774E+09	0.633E+09
5.000	0.104E+10	0.844E+09	0.686E+09
5.125	0.114E+10	0.919E+09	0.741E+09
5.250	0.125E+10	0.996E+09	0.798E+09
5.375	0.136E+10	0.108E+10	0.857E+09
5.500	0.148E+10	0.116E+10	0.919E+09
5.625	0.160E+10	0.125E+10	0.982E+09
5.750	0.173E+10	0.134E+10	0.105E+10
5.875	0.187E+10	0.144E+10	0.111E+10
6.000	0.202E+10	0.154E+10	0.118E+10
6.125	0.217E+10	0.164E+10	0.125E+10
6.250	0.233E+10	0.174E+10	0.132E+10
6.375	0.249E+10	0.185E+10	0.139E+10
6.500	0.266E+10	0.196E+10	0.147E+10
6.625	0.284E+10	0.207E+10	0.154E+10
6.750	0.302E+10	0.219E+10	0.162E+10
6.875	0.322E+10	0.231E+10	0.170E+10
7.000	0.341E+10	0.243E+10	0.178E+10
7.250	0.383E+10	0.268E+10	0.193E+10
7.500	0.427E+10	0.293E+10	0.210E+10
7.750	0.474E+10	0.320E+10	0.226E+10
8.000	0.523E+10	0.347E+10	0.243E+10

8.250	0.575E+10	0.375E+10	0.259E+10
8.500	0.629E+10	0.403E+10	0.276E+10
8.750	0.685E+10	0.431E+10	0.293E+10
9.000	0.743E+10	0.460E+10	0.310E+10
9.250	0.803E+10	0.490E+10	0.327E+10
9.500	0.865E+10	0.519E+10	0.344E+10
9.750	0.929E+10	0.548E+10	0.360E+10
10.000	0.995E+10	0.578E+10	0.377E+10
10.250	0.106E+11	0.607E+10	0.394E+10
10.500	0.113E+11	0.637E+10	0.410E+10
10.750	0.120E+11	0.666E+10	0.426E+10
11.000	0.127E+11	0.695E+10	0.442E+10
11.250	0.134E+11	0.724E+10	0.458E+10
11.500	0.142E+11	0.753E+10	0.474E+10
11.750	0.149E+11	0.781E+10	0.490E+10
12.000	0.156E+11	0.809E+10	0.505E+10
12.500	0.171E+11	0.864E+10	0.535E+10
13.000	0.187E+11	0.918E+10	0.564E+10
13.500	0.202E+11	0.970E+10	0.592E+10
14.000	0.217E+11	0.102E+11	0.619E+10
14.500	0.232E+11	0.107E+11	0.646E+10
15.000	0.246E+11	0.112E+11	0.671E+10
15.500	0.261E+11	0.116E+11	0.696E+10
16.000	0.275E+11	0.120E+11	0.719E+10
16.500	0.289E+11	0.125E+11	0.742E+10
17.000	0.302E+11	0.129E+11	0.764E+10
17.500	0.315E+11	0.133E+11	0.784E+10
18.000	0.328E+11	0.136E+11	0.804E+10
19.000	0.352E+11	0.143E+11	0.842E+10
20.000	0.374E+11	0.149E+11	0.877E+10
21.000	0.394E+11	0.155E+11	0.909E+10
22.000	0.413E+11	0.161E+11	0.938E+10
23.000	0.429E+11	0.165E+11	0.964E+10
24.000	0.444E+11	0.170E+11	0.988E+10
25.000	0.458E+11	0.174E+11	0.101E+11
26.000	0.471E+11	0.177E+11	0.103E+11
27.000	0.482E+11	0.181E+11	0.105E+11
28.000	0.492E+11	0.184E+11	0.106E+11
29.000	0.501E+11	0.186E+11	0.108E+11
30.000	0.509E+11	0.189E+11	0.109E+11
31.000	0.516E+11	0.191E+11	0.110E+11
32.000	0.522E+11	0.193E+11	0.112E+11
33.000	0.528E+11	0.194E+11	0.112E+11
34.000	0.533E+11	0.196E+11	0.113E+11
35.000	0.537E+11	0.197E+11	0.114E+11
36.000	0.541E+11	0.198E+11	0.115E+11
37.000	0.544E+11	0.199E+11	0.115E+11
38.000	0.547E+11	0.200E+11	0.116E+11
39.000	0.550E+11	0.201E+11	0.116E+11
40.000	0.552E+11	0.202E+11	0.116E+11
41.000	0.554E+11	0.202E+11	0.117E+11
42.000	0.555E+11	0.202E+11	0.117E+11
43.000	0.556E+11	0.203E+11	0.117E+11
44.000	0.557E+11	0.203E+11	0.117E+11
45.000	0.557E+11	0.203E+11	0.117E+11
46.000	0.557E+11	0.203E+11	0.117E+11
47.000	0.558E+11	0.203E+11	0.117E+11
48.000	0.557E+11	0.203E+11	0.117E+11

49.000	0.557E+11	0.203E+11	0.117E+11
50.000	0.556E+11	0.202E+11	0.117E+11
51.000	0.556E+11	0.202E+11	0.116E+11
52.000	0.555E+11	0.202E+11	0.116E+11
53.000	0.554E+11	0.201E+11	0.116E+11
54.000	0.553E+11	0.201E+11	0.116E+11
55.000	0.552E+11	0.200E+11	0.115E+11
56.000	0.550E+11	0.200E+11	0.115E+11
57.000	0.549E+11	0.199E+11	0.115E+11
58.000	0.547E+11	0.199E+11	0.114E+11
59.000	0.545E+11	0.198E+11	0.114E+11
60.000	0.544E+11	0.197E+11	0.114E+11
61.000	0.542E+11	0.197E+11	0.113E+11
62.000	0.540E+11	0.196E+11	0.113E+11
63.000	0.538E+11	0.195E+11	0.112E+11
64.000	0.536E+11	0.194E+11	0.112E+11
65.000	0.534E+11	0.194E+11	0.111E+11
66.000	0.532E+11	0.193E+11	0.111E+11
67.000	0.530E+11	0.192E+11	0.110E+11
68.000	0.527E+11	0.191E+11	0.110E+11
69.000	0.525E+11	0.190E+11	0.109E+11
70.000	0.523E+11	0.189E+11	0.109E+11
71.000	0.520E+11	0.189E+11	0.108E+11
72.000	0.518E+11	0.188E+11	0.108E+11
73.000	0.516E+11	0.187E+11	0.107E+11
74.000	0.513E+11	0.186E+11	0.107E+11
75.000	0.511E+11	0.185E+11	0.106E+11
76.000	0.508E+11	0.184E+11	0.106E+11
77.000	0.506E+11	0.183E+11	0.105E+11

Rh

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
45	(g/mole) 102.9055	(g/cm ³) 12.4	(cm ⁻¹) 178.136	(cm ⁻¹) 180.843	.2045	.526

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
2.000	0.172E+08	0.165E+08	0.157E+08
2.125	0.229E+08	0.218E+08	0.207E+08
2.250	0.298E+08	0.283E+08	0.268E+08
2.375	0.382E+08	0.361E+08	0.340E+08
2.500	0.482E+08	0.454E+08	0.424E+08
2.625	0.600E+08	0.562E+08	0.522E+08
2.750	0.738E+08	0.687E+08	0.635E+08
2.875	0.897E+08	0.831E+08	0.764E+08
3.000	0.108E+09	0.994E+08	0.909E+08
3.125	0.129E+09	0.118E+09	0.107E+09
3.250	0.152E+09	0.138E+09	0.125E+09
3.375	0.178E+09	0.161E+09	0.145E+09
3.500	0.208E+09	0.187E+09	0.167E+09
3.625	0.241E+09	0.215E+09	0.191E+09
3.750	0.277E+09	0.246E+09	0.216E+09
3.875	0.316E+09	0.279E+09	0.244E+09
4.000	0.360E+09	0.315E+09	0.274E+09
4.125	0.407E+09	0.355E+09	0.307E+09
4.250	0.459E+09	0.397E+09	0.341E+09
4.375	0.515E+09	0.442E+09	0.377E+09
4.500	0.575E+09	0.491E+09	0.416E+09
4.625	0.640E+09	0.542E+09	0.457E+09
4.750	0.710E+09	0.597E+09	0.499E+09
4.875	0.785E+09	0.655E+09	0.544E+09
5.000	0.864E+09	0.716E+09	0.591E+09
5.125	0.949E+09	0.781E+09	0.641E+09
5.250	0.104E+10	0.849E+09	0.692E+09
5.375	0.113E+10	0.920E+09	0.745E+09
5.500	0.124E+10	0.994E+09	0.800E+09
5.625	0.134E+10	0.107E+10	0.856E+09
5.750	0.145E+10	0.115E+10	0.915E+09
5.875	0.157E+10	0.124E+10	0.975E+09
6.000	0.170E+10	0.132E+10	0.104E+10
6.125	0.183E+10	0.141E+10	0.110E+10
6.250	0.196E+10	0.151E+10	0.117E+10
6.375	0.210E+10	0.160E+10	0.123E+10
6.500	0.225E+10	0.170E+10	0.130E+10
6.625	0.241E+10	0.180E+10	0.137E+10
6.750	0.256E+10	0.191E+10	0.144E+10
6.875	0.273E+10	0.201E+10	0.151E+10
7.000	0.290E+10	0.212E+10	0.159E+10
7.250	0.327E+10	0.235E+10	0.173E+10
7.500	0.365E+10	0.259E+10	0.189E+10
7.750	0.406E+10	0.283E+10	0.204E+10
8.000	0.450E+10	0.308E+10	0.220E+10

8.250	0.495E+10	0.334E+10	0.236E+10
8.500	0.543E+10	0.360E+10	0.252E+10
8.750	0.593E+10	0.387E+10	0.268E+10
9.000	0.645E+10	0.415E+10	0.285E+10
9.250	0.700E+10	0.442E+10	0.301E+10
9.500	0.756E+10	0.470E+10	0.317E+10
9.750	0.814E+10	0.499E+10	0.334E+10
10.000	0.874E+10	0.527E+10	0.350E+10
10.250	0.935E+10	0.555E+10	0.366E+10
10.500	0.998E+10	0.584E+10	0.382E+10
10.750	0.106E+11	0.612E+10	0.398E+10
11.000	0.113E+11	0.641E+10	0.414E+10
11.250	0.119E+11	0.669E+10	0.430E+10
11.500	0.126E+11	0.698E+10	0.446E+10
11.750	0.133E+11	0.726E+10	0.461E+10
12.000	0.140E+11	0.753E+10	0.476E+10
12.500	0.154E+11	0.808E+10	0.506E+10
13.000	0.169E+11	0.862E+10	0.536E+10
13.500	0.183E+11	0.914E+10	0.564E+10
14.000	0.198E+11	0.965E+10	0.592E+10
14.500	0.212E+11	0.101E+11	0.618E+10
15.000	0.227E+11	0.106E+11	0.644E+10
15.500	0.241E+11	0.111E+11	0.669E+10
16.000	0.255E+11	0.115E+11	0.693E+10
16.500	0.269E+11	0.120E+11	0.716E+10
17.000	0.283E+11	0.124E+11	0.739E+10
17.500	0.296E+11	0.128E+11	0.760E+10
18.000	0.309E+11	0.132E+11	0.781E+10
19.000	0.334E+11	0.139E+11	0.820E+10
20.000	0.357E+11	0.146E+11	0.857E+10
21.000	0.378E+11	0.152E+11	0.890E+10
22.000	0.398E+11	0.157E+11	0.921E+10
23.000	0.416E+11	0.162E+11	0.949E+10
24.000	0.432E+11	0.167E+11	0.975E+10
25.000	0.447E+11	0.171E+11	0.999E+10
26.000	0.461E+11	0.175E+11	0.102E+11
27.000	0.474E+11	0.179E+11	0.104E+11
28.000	0.485E+11	0.182E+11	0.106E+11
29.000	0.495E+11	0.185E+11	0.107E+11
30.000	0.504E+11	0.188E+11	0.109E+11
31.000	0.512E+11	0.190E+11	0.110E+11
32.000	0.520E+11	0.193E+11	0.112E+11
33.000	0.526E+11	0.194E+11	0.113E+11
34.000	0.532E+11	0.196E+11	0.114E+11
35.000	0.537E+11	0.198E+11	0.114E+11
36.000	0.542E+11	0.199E+11	0.115E+11
37.000	0.546E+11	0.200E+11	0.116E+11
38.000	0.550E+11	0.202E+11	0.116E+11
39.000	0.553E+11	0.202E+11	0.117E+11
40.000	0.556E+11	0.203E+11	0.117E+11
41.000	0.558E+11	0.204E+11	0.118E+11
42.000	0.560E+11	0.205E+11	0.118E+11
43.000	0.562E+11	0.205E+11	0.118E+11
44.000	0.563E+11	0.205E+11	0.119E+11
45.000	0.564E+11	0.206E+11	0.119E+11
46.000	0.565E+11	0.206E+11	0.119E+11
47.000	0.565E+11	0.206E+11	0.119E+11
48.000	0.566E+11	0.206E+11	0.119E+11

49.000	0.566E+11	0.206E+11	0.119E+11
50.000	0.566E+11	0.206E+11	0.119E+11
51.000	0.565E+11	0.206E+11	0.119E+11
52.000	0.565E+11	0.205E+11	0.118E+11
53.000	0.564E+11	0.205E+11	0.118E+11
54.000	0.564E+11	0.205E+11	0.118E+11
55.000	0.563E+11	0.204E+11	0.118E+11
56.000	0.562E+11	0.204E+11	0.118E+11
57.000	0.561E+11	0.204E+11	0.117E+11
58.000	0.559E+11	0.203E+11	0.117E+11
59.000	0.558E+11	0.203E+11	0.117E+11
60.000	0.557E+11	0.202E+11	0.116E+11
61.000	0.555E+11	0.201E+11	0.116E+11
62.000	0.553E+11	0.201E+11	0.116E+11
63.000	0.552E+11	0.200E+11	0.115E+11
64.000	0.550E+11	0.200E+11	0.115E+11
65.000	0.548E+11	0.199E+11	0.115E+11
66.000	0.546E+11	0.198E+11	0.114E+11
67.000	0.544E+11	0.197E+11	0.114E+11
68.000	0.542E+11	0.197E+11	0.113E+11
69.000	0.540E+11	0.196E+11	0.113E+11
70.000	0.538E+11	0.195E+11	0.112E+11
71.000	0.536E+11	0.194E+11	0.112E+11
72.000	0.534E+11	0.194E+11	0.111E+11
73.000	0.532E+11	0.193E+11	0.111E+11
74.000	0.529E+11	0.192E+11	0.110E+11
75.000	0.527E+11	0.191E+11	0.110E+11
76.000	0.525E+11	0.190E+11	0.109E+11
77.000	0.523E+11	0.189E+11	0.109E+11
78.000	0.520E+11	0.188E+11	0.108E+11
79.000	0.518E+11	0.188E+11	0.108E+11
80.000	0.515E+11	0.187E+11	0.107E+11

Pd

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
46	106.4	12.0	165.700	168.519	.208	.527

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
2.000	0.138E+08	0.132E+08	0.126E+08
2.125	0.184E+08	0.175E+08	0.167E+08
2.250	0.240E+08	0.228E+08	0.216E+08
2.375	0.308E+08	0.291E+08	0.274E+08
2.500	0.389E+08	0.367E+08	0.343E+08
2.625	0.485E+08	0.455E+08	0.423E+08
2.750	0.597E+08	0.557E+08	0.515E+08
2.875	0.727E+08	0.674E+08	0.620E+08
3.000	0.876E+08	0.808E+08	0.739E+08
3.125	0.105E+09	0.959E+08	0.872E+08
3.250	0.124E+09	0.113E+09	0.102E+09
3.375	0.145E+09	0.132E+09	0.118E+09
3.500	0.169E+09	0.153E+09	0.136E+09
3.625	0.196E+09	0.176E+09	0.156E+09
3.750	0.226E+09	0.201E+09	0.177E+09
3.875	0.259E+09	0.229E+09	0.201E+09
4.000	0.295E+09	0.259E+09	0.226E+09
4.125	0.334E+09	0.291E+09	0.252E+09
4.250	0.376E+09	0.326E+09	0.281E+09
4.375	0.423E+09	0.364E+09	0.311E+09
4.500	0.473E+09	0.404E+09	0.343E+09
4.625	0.526E+09	0.447E+09	0.377E+09
4.750	0.584E+09	0.493E+09	0.413E+09
4.875	0.646E+09	0.541E+09	0.451E+09
5.000	0.713E+09	0.592E+09	0.490E+09
5.125	0.783E+09	0.646E+09	0.532E+09
5.250	0.858E+09	0.703E+09	0.574E+09
5.375	0.938E+09	0.763E+09	0.619E+09
5.500	0.102E+10	0.825E+09	0.666E+09
5.625	0.111E+10	0.890E+09	0.713E+09
5.750	0.121E+10	0.958E+09	0.763E+09
5.875	0.130E+10	0.103E+10	0.814E+09
6.000	0.141E+10	0.110E+10	0.867E+09
6.125	0.152E+10	0.118E+10	0.921E+09
6.250	0.163E+10	0.126E+10	0.976E+09
6.375	0.175E+10	0.134E+10	0.103E+10
6.500	0.187E+10	0.142E+10	0.109E+10
6.625	0.200E+10	0.151E+10	0.115E+10
6.750	0.214E+10	0.160E+10	0.121E+10
6.875	0.228E+10	0.169E+10	0.127E+10
7.000	0.242E+10	0.178E+10	0.133E+10
7.250	0.273E+10	0.198E+10	0.146E+10
7.500	0.306E+10	0.218E+10	0.159E+10
7.750	0.341E+10	0.239E+10	0.173E+10
8.000	0.378E+10	0.260E+10	0.187E+10

8.250	0.416E+10	0.283E+10	0.201E+10
8.500	0.457E+10	0.305E+10	0.215E+10
8.750	0.500E+10	0.329E+10	0.229E+10
9.000	0.545E+10	0.353E+10	0.243E+10
9.250	0.592E+10	0.377E+10	0.257E+10
9.500	0.640E+10	0.401E+10	0.272E+10
9.750	0.690E+10	0.426E+10	0.286E+10
10.000	0.742E+10	0.451E+10	0.301E+10
10.250	0.795E+10	0.476E+10	0.315E+10
10.500	0.849E+10	0.501E+10	0.330E+10
10.750	0.905E+10	0.526E+10	0.344E+10
11.000	0.963E+10	0.552E+10	0.358E+10
11.250	0.102E+11	0.577E+10	0.372E+10
11.500	0.108E+11	0.602E+10	0.386E+10
11.750	0.114E+11	0.627E+10	0.400E+10
12.000	0.120E+11	0.652E+10	0.414E+10
12.500	0.133E+11	0.701E+10	0.441E+10
13.000	0.145E+11	0.749E+10	0.467E+10
13.500	0.158E+11	0.797E+10	0.493E+10
14.000	0.171E+11	0.843E+10	0.518E+10
14.500	0.184E+11	0.888E+10	0.543E+10
15.000	0.197E+11	0.932E+10	0.566E+10
15.500	0.210E+11	0.974E+10	0.589E+10
16.000	0.223E+11	0.102E+11	0.611E+10
16.500	0.235E+11	0.106E+11	0.633E+10
17.000	0.248E+11	0.109E+11	0.654E+10
17.500	0.260E+11	0.113E+11	0.674E+10
18.000	0.272E+11	0.117E+11	0.693E+10
19.000	0.294E+11	0.123E+11	0.730E+10
20.000	0.316E+11	0.130E+11	0.764E+10
21.000	0.336E+11	0.135E+11	0.796E+10
22.000	0.354E+11	0.141E+11	0.825E+10
23.000	0.371E+11	0.146E+11	0.853E+10
24.000	0.387E+11	0.150E+11	0.878E+10
25.000	0.401E+11	0.154E+11	0.901E+10
26.000	0.415E+11	0.158E+11	0.922E+10
27.000	0.427E+11	0.162E+11	0.941E+10
28.000	0.438E+11	0.165E+11	0.959E+10
29.000	0.447E+11	0.168E+11	0.975E+10
30.000	0.457E+11	0.171E+11	0.990E+10
31.000	0.465E+11	0.173E+11	0.100E+11
32.000	0.472E+11	0.175E+11	0.102E+11
33.000	0.479E+11	0.177E+11	0.103E+11
34.000	0.485E+11	0.179E+11	0.104E+11
35.000	0.490E+11	0.181E+11	0.105E+11
36.000	0.495E+11	0.182E+11	0.105E+11
37.000	0.500E+11	0.184E+11	0.106E+11
38.000	0.504E+11	0.185E+11	0.107E+11
39.000	0.507E+11	0.186E+11	0.107E+11
40.000	0.510E+11	0.187E+11	0.108E+11
41.000	0.513E+11	0.188E+11	0.108E+11
42.000	0.515E+11	0.188E+11	0.109E+11
43.000	0.517E+11	0.189E+11	0.109E+11
44.000	0.519E+11	0.189E+11	0.109E+11
45.000	0.520E+11	0.190E+11	0.110E+11
46.000	0.521E+11	0.190E+11	0.110E+11
47.000	0.522E+11	0.190E+11	0.110E+11
48.000	0.523E+11	0.191E+11	0.110E+11

49.000	0.524E+11	0.191E+11	0.110E+11
50.000	0.524E+11	0.191E+11	0.110E+11
51.000	0.524E+11	0.191E+11	0.110E+11
52.000	0.524E+11	0.191E+11	0.110E+11
53.000	0.524E+11	0.191E+11	0.110E+11
54.000	0.524E+11	0.190E+11	0.110E+11
55.000	0.523E+11	0.190E+11	0.110E+11
56.000	0.522E+11	0.190E+11	0.109E+11
57.000	0.522E+11	0.190E+11	0.109E+11
58.000	0.521E+11	0.189E+11	0.109E+11
59.000	0.520E+11	0.189E+11	0.109E+11
60.000	0.519E+11	0.188E+11	0.109E+11
61.000	0.518E+11	0.188E+11	0.108E+11
62.000	0.517E+11	0.188E+11	0.108E+11
63.000	0.515E+11	0.187E+11	0.108E+11
64.000	0.514E+11	0.187E+11	0.107E+11
65.000	0.513E+11	0.186E+11	0.107E+11
66.000	0.511E+11	0.185E+11	0.107E+11
67.000	0.509E+11	0.185E+11	0.106E+11
68.000	0.508E+11	0.184E+11	0.106E+11
69.000	0.506E+11	0.184E+11	0.106E+11
70.000	0.505E+11	0.183E+11	0.105E+11
71.000	0.503E+11	0.182E+11	0.105E+11
72.000	0.501E+11	0.182E+11	0.105E+11
73.000	0.499E+11	0.181E+11	0.104E+11
74.000	0.497E+11	0.180E+11	0.104E+11
75.000	0.495E+11	0.180E+11	0.103E+11
76.000	0.493E+11	0.179E+11	0.103E+11
77.000	0.491E+11	0.178E+11	0.102E+11
78.000	0.489E+11	0.177E+11	0.102E+11
79.000	0.487E+11	0.177E+11	0.102E+11
80.000	0.485E+11	0.176E+11	0.101E+11
81.000	0.483E+11	0.175E+11	0.101E+11
82.000	0.481E+11	0.174E+11	0.100E+11
83.000	0.479E+11	0.174E+11	0.997E+10
84.000	0.477E+11	0.173E+11	0.992E+10

Ag

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
47	107.868	10.5	141.996	144.648	.211	.5285

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
2.000	0.109E+08	0.105E+08	0.100E+08
2.125	0.146E+08	0.140E+08	0.133E+08
2.250	0.191E+08	0.182E+08	0.172E+08
2.375	0.246E+08	0.233E+08	0.219E+08
2.500	0.311E+08	0.293E+08	0.275E+08
2.625	0.388E+08	0.365E+08	0.340E+08
2.750	0.479E+08	0.447E+08	0.415E+08
2.875	0.584E+08	0.542E+08	0.500E+08
3.000	0.705E+08	0.651E+08	0.597E+08
3.125	0.842E+08	0.774E+08	0.706E+08
3.250	0.999E+08	0.912E+08	0.827E+08
3.375	0.117E+09	0.107E+09	0.962E+08
3.500	0.137E+09	0.124E+09	0.111E+09
3.625	0.159E+09	0.143E+09	0.127E+09
3.750	0.183E+09	0.164E+09	0.145E+09
3.875	0.210E+09	0.186E+09	0.164E+09
4.000	0.239E+09	0.211E+09	0.184E+09
4.125	0.272E+09	0.238E+09	0.207E+09
4.250	0.307E+09	0.267E+09	0.230E+09
4.375	0.345E+09	0.298E+09	0.256E+09
4.500	0.386E+09	0.331E+09	0.282E+09
4.625	0.430E+09	0.367E+09	0.311E+09
4.750	0.478E+09	0.405E+09	0.341E+09
4.875	0.529E+09	0.445E+09	0.372E+09
5.000	0.584E+09	0.487E+09	0.405E+09
5.125	0.642E+09	0.532E+09	0.440E+09
5.250	0.704E+09	0.580E+09	0.476E+09
5.375	0.770E+09	0.629E+09	0.513E+09
5.500	0.840E+09	0.682E+09	0.552E+09
5.625	0.914E+09	0.736E+09	0.593E+09
5.750	0.992E+09	0.793E+09	0.635E+09
5.875	0.107E+10	0.853E+09	0.678E+09
6.000	0.116E+10	0.914E+09	0.723E+09
6.125	0.125E+10	0.978E+09	0.769E+09
6.250	0.135E+10	0.104E+10	0.816E+09
6.375	0.145E+10	0.111E+10	0.864E+09
6.500	0.155E+10	0.118E+10	0.914E+09
6.625	0.166E+10	0.126E+10	0.964E+09
6.750	0.177E+10	0.133E+10	0.102E+10
6.875	0.189E+10	0.141E+10	0.107E+10
7.000	0.201E+10	0.149E+10	0.112E+10
7.250	0.227E+10	0.166E+10	0.123E+10
7.500	0.255E+10	0.183E+10	0.135E+10
7.750	0.284E+10	0.201E+10	0.146E+10
8.000	0.315E+10	0.219E+10	0.158E+10

8.250	0.349E+10	0.239E+10	0.170E+10
8.500	0.383E+10	0.258E+10	0.183E+10
8.750	0.420E+10	0.279E+10	0.195E+10
9.000	0.458E+10	0.299E+10	0.208E+10
9.250	0.498E+10	0.320E+10	0.220E+10
9.500	0.540E+10	0.342E+10	0.233E+10
9.750	0.583E+10	0.363E+10	0.246E+10
10.000	0.627E+10	0.385E+10	0.258E+10
10.250	0.673E+10	0.407E+10	0.271E+10
10.500	0.720E+10	0.430E+10	0.284E+10
10.750	0.769E+10	0.452E+10	0.297E+10
11.000	0.819E+10	0.474E+10	0.309E+10
11.250	0.869E+10	0.497E+10	0.322E+10
11.500	0.921E+10	0.519E+10	0.335E+10
11.750	0.974E+10	0.541E+10	0.347E+10
12.000	0.103E+11	0.564E+10	0.359E+10
12.500	0.114E+11	0.608E+10	0.384E+10
13.000	0.125E+11	0.651E+10	0.408E+10
13.500	0.136E+11	0.694E+10	0.431E+10
14.000	0.148E+11	0.736E+10	0.454E+10
14.500	0.159E+11	0.777E+10	0.476E+10
15.000	0.171E+11	0.817E+10	0.498E+10
15.500	0.183E+11	0.856E+10	0.519E+10
16.000	0.194E+11	0.894E+10	0.540E+10
16.500	0.205E+11	0.930E+10	0.560E+10
17.000	0.217E+11	0.966E+10	0.579E+10
17.500	0.228E+11	0.100E+11	0.598E+10
18.000	0.238E+11	0.103E+11	0.616E+10
19.000	0.259E+11	0.110E+11	0.650E+10
20.000	0.279E+11	0.116E+11	0.682E+10
21.000	0.298E+11	0.121E+11	0.712E+10
22.000	0.315E+11	0.126E+11	0.740E+10
23.000	0.331E+11	0.131E+11	0.766E+10
24.000	0.346E+11	0.135E+11	0.790E+10
25.000	0.360E+11	0.139E+11	0.812E+10
26.000	0.373E+11	0.143E+11	0.833E+10
27.000	0.384E+11	0.146E+11	0.852E+10
28.000	0.395E+11	0.150E+11	0.869E+10
29.000	0.405E+11	0.152E+11	0.886E+10
30.000	0.414E+11	0.155E+11	0.900E+10
31.000	0.422E+11	0.158E+11	0.914E+10
32.000	0.429E+11	0.160E+11	0.926E+10
33.000	0.436E+11	0.162E+11	0.938E+10
34.000	0.442E+11	0.164E+11	0.948E+10
35.000	0.448E+11	0.165E+11	0.958E+10
36.000	0.453E+11	0.167E+11	0.966E+10
37.000	0.457E+11	0.168E+11	0.974E+10
38.000	0.461E+11	0.170E+11	0.981E+10
39.000	0.465E+11	0.171E+11	0.987E+10
40.000	0.468E+11	0.172E+11	0.993E+10
41.000	0.471E+11	0.173E+11	0.998E+10
42.000	0.474E+11	0.173E+11	0.100E+11
43.000	0.476E+11	0.174E+11	0.101E+11
44.000	0.478E+11	0.175E+11	0.101E+11
45.000	0.480E+11	0.175E+11	0.101E+11
46.000	0.482E+11	0.176E+11	0.101E+11
47.000	0.483E+11	0.176E+11	0.102E+11
48.000	0.484E+11	0.176E+11	0.102E+11

49.000	0.485E+11	0.177E+11	0.102E+11
50.000	0.485E+11	0.177E+11	0.102E+11
51.000	0.486E+11	0.177E+11	0.102E+11
52.000	0.486E+11	0.177E+11	0.102E+11
53.000	0.486E+11	0.177E+11	0.102E+11
54.000	0.486E+11	0.177E+11	0.102E+11
55.000	0.486E+11	0.177E+11	0.102E+11
56.000	0.486E+11	0.177E+11	0.102E+11
57.000	0.486E+11	0.177E+11	0.102E+11
58.000	0.485E+11	0.176E+11	0.102E+11
59.000	0.485E+11	0.176E+11	0.102E+11
60.000	0.484E+11	0.176E+11	0.101E+11
61.000	0.483E+11	0.176E+11	0.101E+11
62.000	0.482E+11	0.175E+11	0.101E+11
63.000	0.481E+11	0.175E+11	0.101E+11
64.000	0.480E+11	0.174E+11	0.100E+11
65.000	0.479E+11	0.174E+11	0.100E+11
66.000	0.478E+11	0.174E+11	0.100E+11
67.000	0.477E+11	0.173E+11	0.997E+10
68.000	0.476E+11	0.173E+11	0.994E+10
69.000	0.474E+11	0.172E+11	0.991E+10
70.000	0.473E+11	0.172E+11	0.988E+10
71.000	0.472E+11	0.171E+11	0.985E+10
72.000	0.470E+11	0.171E+11	0.981E+10
73.000	0.469E+11	0.170E+11	0.978E+10
74.000	0.467E+11	0.169E+11	0.975E+10
75.000	0.465E+11	0.169E+11	0.971E+10
76.000	0.464E+11	0.168E+11	0.967E+10
77.000	0.462E+11	0.168E+11	0.964E+10
78.000	0.460E+11	0.167E+11	0.960E+10
79.000	0.459E+11	0.166E+11	0.956E+10
80.000	0.457E+11	0.166E+11	0.952E+10
81.000	0.455E+11	0.165E+11	0.948E+10
82.000	0.453E+11	0.164E+11	0.944E+10
83.000	0.452E+11	0.164E+11	0.940E+10
84.000	0.450E+11	0.163E+11	0.936E+10
85.000	0.448E+11	0.162E+11	0.932E+10
86.000	0.446E+11	0.162E+11	0.928E+10
87.000	0.444E+11	0.161E+11	0.924E+10

Cd

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
48	(g/mole) 112.41	(g/cm ³) 8.65	(cm ⁻¹) 111.903	(cm ⁻¹) 114.252	.214	.530

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
2.000	0.866E+07	0.832E+07	0.796E+07
2.125	0.116E+08	0.111E+08	0.106E+08
2.250	0.152E+08	0.145E+08	0.137E+08
2.375	0.196E+08	0.186E+08	0.175E+08
2.500	0.249E+08	0.235E+08	0.220E+08
2.625	0.311E+08	0.292E+08	0.273E+08
2.750	0.384E+08	0.359E+08	0.334E+08
2.875	0.469E+08	0.437E+08	0.403E+08
3.000	0.567E+08	0.525E+08	0.482E+08
3.125	0.679E+08	0.625E+08	0.571E+08
3.250	0.806E+08	0.738E+08	0.670E+08
3.375	0.949E+08	0.864E+08	0.780E+08
3.500	0.111E+09	0.100E+09	0.902E+08
3.625	0.129E+09	0.116E+09	0.103E+09
3.750	0.149E+09	0.133E+09	0.118E+09
3.875	0.171E+09	0.152E+09	0.134E+09
4.000	0.195E+09	0.172E+09	0.151E+09
4.125	0.221E+09	0.194E+09	0.169E+09
4.250	0.250E+09	0.218E+09	0.189E+09
4.375	0.281E+09	0.244E+09	0.210E+09
4.500	0.315E+09	0.271E+09	0.232E+09
4.625	0.351E+09	0.301E+09	0.256E+09
4.750	0.391E+09	0.332E+09	0.280E+09
4.875	0.433E+09	0.365E+09	0.307E+09
5.000	0.478E+09	0.401E+09	0.334E+09
5.125	0.526E+09	0.438E+09	0.363E+09
5.250	0.578E+09	0.478E+09	0.394E+09
5.375	0.633E+09	0.519E+09	0.425E+09
5.500	0.691E+09	0.563E+09	0.458E+09
5.625	0.752E+09	0.609E+09	0.492E+09
5.750	0.817E+09	0.656E+09	0.527E+09
5.875	0.886E+09	0.706E+09	0.564E+09
6.000	0.958E+09	0.758E+09	0.602E+09
6.125	0.103E+10	0.812E+09	0.640E+09
6.250	0.111E+10	0.868E+09	0.680E+09
6.375	0.120E+10	0.926E+09	0.722E+09
6.500	0.128E+10	0.985E+09	0.764E+09
6.625	0.137E+10	0.105E+10	0.807E+09
6.750	0.147E+10	0.111E+10	0.851E+09
6.875	0.157E+10	0.118E+10	0.896E+09
7.000	0.167E+10	0.124E+10	0.942E+09
7.250	0.189E+10	0.138E+10	0.104E+10
7.500	0.212E+10	0.153E+10	0.113E+10
7.750	0.237E+10	0.169E+10	0.123E+10
8.000	0.263E+10	0.184E+10	0.134E+10

8.250	0.291E+10	0.201E+10	0.144E+10
8.500	0.321E+10	0.218E+10	0.155E+10
8.750	0.352E+10	0.235E+10	0.166E+10
9.000	0.385E+10	0.253E+10	0.177E+10
9.250	0.419E+10	0.272E+10	0.188E+10
9.500	0.454E+10	0.290E+10	0.199E+10
9.750	0.491E+10	0.309E+10	0.210E+10
10.000	0.530E+10	0.328E+10	0.221E+10
10.250	0.569E+10	0.348E+10	0.233E+10
10.500	0.610E+10	0.367E+10	0.244E+10
10.750	0.652E+10	0.387E+10	0.255E+10
11.000	0.695E+10	0.406E+10	0.266E+10
11.250	0.739E+10	0.426E+10	0.278E+10
11.500	0.784E+10	0.446E+10	0.289E+10
11.750	0.830E+10	0.466E+10	0.300E+10
12.000	0.876E+10	0.485E+10	0.311E+10
12.500	0.972E+10	0.525E+10	0.333E+10
13.000	0.107E+11	0.564E+10	0.354E+10
13.500	0.117E+11	0.602E+10	0.375E+10
14.000	0.127E+11	0.640E+10	0.396E+10
14.500	0.137E+11	0.677E+10	0.416E+10
15.000	0.148E+11	0.713E+10	0.436E+10
15.500	0.158E+11	0.748E+10	0.455E+10
16.000	0.168E+11	0.783E+10	0.474E+10
16.500	0.179E+11	0.816E+10	0.492E+10
17.000	0.189E+11	0.849E+10	0.510E+10
17.500	0.199E+11	0.881E+10	0.527E+10
18.000	0.209E+11	0.911E+10	0.544E+10
19.000	0.228E+11	0.970E+10	0.576E+10
20.000	0.246E+11	0.102E+11	0.606E+10
21.000	0.263E+11	0.108E+11	0.634E+10
22.000	0.279E+11	0.112E+11	0.661E+10
23.000	0.294E+11	0.117E+11	0.685E+10
24.000	0.308E+11	0.121E+11	0.708E+10
25.000	0.321E+11	0.125E+11	0.729E+10
26.000	0.333E+11	0.128E+11	0.749E+10
27.000	0.344E+11	0.132E+11	0.767E+10
28.000	0.355E+11	0.135E+11	0.784E+10
29.000	0.364E+11	0.138E+11	0.800E+10
30.000	0.373E+11	0.140E+11	0.815E+10
31.000	0.381E+11	0.143E+11	0.828E+10
32.000	0.388E+11	0.145E+11	0.840E+10
33.000	0.395E+11	0.147E+11	0.852E+10
34.000	0.401E+11	0.149E+11	0.862E+10
35.000	0.407E+11	0.151E+11	0.872E+10
36.000	0.412E+11	0.152E+11	0.881E+10
37.000	0.416E+11	0.154E+11	0.889E+10
38.000	0.421E+11	0.155E+11	0.896E+10
39.000	0.424E+11	0.156E+11	0.903E+10
40.000	0.428E+11	0.157E+11	0.909E+10
41.000	0.431E+11	0.158E+11	0.914E+10
42.000	0.434E+11	0.159E+11	0.919E+10
43.000	0.436E+11	0.160E+11	0.923E+10
44.000	0.439E+11	0.160E+11	0.927E+10
45.000	0.441E+11	0.161E+11	0.930E+10
46.000	0.442E+11	0.162E+11	0.933E+10
47.000	0.444E+11	0.162E+11	0.936E+10
48.000	0.445E+11	0.162E+11	0.938E+10

49.000	0.446E+11	0.163E+11	0.940E+10
50.000	0.447E+11	0.163E+11	0.941E+10
51.000	0.448E+11	0.163E+11	0.942E+10
52.000	0.449E+11	0.163E+11	0.943E+10
53.000	0.449E+11	0.164E+11	0.944E+10
54.000	0.449E+11	0.164E+11	0.944E+10
55.000	0.450E+11	0.164E+11	0.944E+10
56.000	0.450E+11	0.164E+11	0.944E+10
57.000	0.450E+11	0.164E+11	0.943E+10
58.000	0.449E+11	0.163E+11	0.942E+10
59.000	0.449E+11	0.163E+11	0.942E+10
60.000	0.449E+11	0.163E+11	0.940E+10
61.000	0.448E+11	0.163E+11	0.939E+10
62.000	0.448E+11	0.163E+11	0.938E+10
63.000	0.447E+11	0.162E+11	0.936E+10
64.000	0.446E+11	0.162E+11	0.934E+10
65.000	0.446E+11	0.162E+11	0.933E+10
66.000	0.445E+11	0.162E+11	0.931E+10
67.000	0.444E+11	0.161E+11	0.929E+10
68.000	0.443E+11	0.161E+11	0.926E+10
69.000	0.442E+11	0.160E+11	0.924E+10
70.000	0.441E+11	0.160E+11	0.921E+10
71.000	0.440E+11	0.160E+11	0.919E+10
72.000	0.439E+11	0.159E+11	0.916E+10
73.000	0.437E+11	0.159E+11	0.914E+10
74.000	0.436E+11	0.158E+11	0.911E+10
75.000	0.435E+11	0.158E+11	0.908E+10
76.000	0.434E+11	0.157E+11	0.905E+10
77.000	0.432E+11	0.157E+11	0.902E+10
78.000	0.431E+11	0.156E+11	0.899E+10
79.000	0.429E+11	0.156E+11	0.895E+10
80.000	0.428E+11	0.155E+11	0.892E+10
81.000	0.427E+11	0.155E+11	0.889E+10
82.000	0.425E+11	0.154E+11	0.886E+10
83.000	0.423E+11	0.154E+11	0.882E+10
84.000	0.422E+11	0.153E+11	0.879E+10
85.000	0.420E+11	0.152E+11	0.875E+10
86.000	0.419E+11	0.152E+11	0.872E+10
87.000	0.417E+11	0.151E+11	0.868E+10
88.000	0.416E+11	0.151E+11	0.864E+10
89.000	0.414E+11	0.150E+11	0.861E+10
90.000	0.412E+11	0.149E+11	0.857E+10
91.000	0.411E+11	0.149E+11	0.853E+10

In

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
49	114.82	7.31	92.647	94.796	.217	.5315

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
2.000	0.687E+07	0.661E+07	0.633E+07
2.125	0.922E+07	0.884E+07	0.842E+07
2.250	0.121E+08	0.116E+08	0.110E+08
2.375	0.157E+08	0.149E+08	0.140E+08
2.500	0.199E+08	0.188E+08	0.177E+08
2.625	0.249E+08	0.235E+08	0.219E+08
2.750	0.309E+08	0.289E+08	0.269E+08
2.875	0.377E+08	0.352E+08	0.325E+08
3.000	0.457E+08	0.423E+08	0.389E+08
3.125	0.548E+08	0.505E+08	0.462E+08
3.250	0.651E+08	0.597E+08	0.543E+08
3.375	0.767E+08	0.700E+08	0.633E+08
3.500	0.898E+08	0.814E+08	0.733E+08
3.625	0.104E+09	0.941E+08	0.842E+08
3.750	0.121E+09	0.108E+09	0.961E+08
3.875	0.139E+09	0.123E+09	0.109E+09
4.000	0.158E+09	0.140E+09	0.123E+09
4.125	0.180E+09	0.158E+09	0.138E+09
4.250	0.204E+09	0.178E+09	0.154E+09
4.375	0.229E+09	0.199E+09	0.172E+09
4.500	0.257E+09	0.222E+09	0.190E+09
4.625	0.287E+09	0.246E+09	0.210E+09
4.750	0.320E+09	0.272E+09	0.231E+09
4.875	0.354E+09	0.300E+09	0.252E+09
5.000	0.392E+09	0.329E+09	0.275E+09
5.125	0.432E+09	0.360E+09	0.300E+09
5.250	0.474E+09	0.393E+09	0.325E+09
5.375	0.520E+09	0.428E+09	0.351E+09
5.500	0.568E+09	0.464E+09	0.379E+09
5.625	0.619E+09	0.502E+09	0.407E+09
5.750	0.673E+09	0.542E+09	0.437E+09
5.875	0.730E+09	0.584E+09	0.467E+09
6.000	0.790E+09	0.627E+09	0.499E+09
6.125	0.853E+09	0.672E+09	0.532E+09
6.250	0.919E+09	0.719E+09	0.566E+09
6.375	0.988E+09	0.768E+09	0.600E+09
6.500	0.106E+10	0.818E+09	0.636E+09
6.625	0.114E+10	0.870E+09	0.672E+09
6.750	0.122E+10	0.924E+09	0.709E+09
6.875	0.130E+10	0.979E+09	0.748E+09
7.000	0.138E+10	0.104E+10	0.787E+09
7.250	0.157E+10	0.115E+10	0.867E+09
7.500	0.176E+10	0.128E+10	0.950E+09
7.750	0.197E+10	0.141E+10	0.104E+10
8.000	0.220E+10	0.155E+10	0.112E+10

8.250	0.243E+10	0.169E+10	0.121E+10
8.500	0.268E+10	0.183E+10	0.131E+10
8.750	0.295E+10	0.198E+10	0.140E+10
9.000	0.322E+10	0.214E+10	0.149E+10
9.250	0.351E+10	0.229E+10	0.159E+10
9.500	0.382E+10	0.245E+10	0.169E+10
9.750	0.413E+10	0.262E+10	0.178E+10
10.000	0.446E+10	0.278E+10	0.188E+10
10.250	0.480E+10	0.295E+10	0.198E+10
10.500	0.515E+10	0.312E+10	0.208E+10
10.750	0.551E+10	0.329E+10	0.218E+10
11.000	0.588E+10	0.346E+10	0.228E+10
11.250	0.626E+10	0.363E+10	0.237E+10
11.500	0.664E+10	0.381E+10	0.247E+10
11.750	0.704E+10	0.398E+10	0.257E+10
12.000	0.745E+10	0.415E+10	0.267E+10
12.500	0.828E+10	0.450E+10	0.286E+10
13.000	0.913E+10	0.484E+10	0.305E+10
13.500	0.100E+11	0.519E+10	0.324E+10
14.000	0.109E+11	0.552E+10	0.343E+10
14.500	0.118E+11	0.585E+10	0.361E+10
15.000	0.127E+11	0.618E+10	0.379E+10
15.500	0.136E+11	0.649E+10	0.396E+10
16.000	0.145E+11	0.681E+10	0.413E+10
16.500	0.154E+11	0.711E+10	0.430E+10
17.000	0.163E+11	0.740E+10	0.446E+10
17.500	0.172E+11	0.769E+10	0.461E+10
18.000	0.181E+11	0.797E+10	0.477E+10
19.000	0.198E+11	0.851E+10	0.506E+10
20.000	0.215E+11	0.901E+10	0.534E+10
21.000	0.230E+11	0.948E+10	0.560E+10
22.000	0.245E+11	0.993E+10	0.584E+10
23.000	0.259E+11	0.103E+11	0.607E+10
24.000	0.272E+11	0.107E+11	0.629E+10
25.000	0.284E+11	0.111E+11	0.649E+10
26.000	0.296E+11	0.114E+11	0.667E+10
27.000	0.306E+11	0.117E+11	0.685E+10
28.000	0.316E+11	0.120E+11	0.701E+10
29.000	0.325E+11	0.123E+11	0.716E+10
30.000	0.333E+11	0.126E+11	0.730E+10
31.000	0.341E+11	0.128E+11	0.743E+10
32.000	0.348E+11	0.130E+11	0.755E+10
33.000	0.354E+11	0.132E+11	0.766E+10
34.000	0.360E+11	0.134E+11	0.777E+10
35.000	0.366E+11	0.136E+11	0.786E+10
36.000	0.371E+11	0.137E+11	0.795E+10
37.000	0.375E+11	0.139E+11	0.803E+10
38.000	0.380E+11	0.140E+11	0.811E+10
39.000	0.384E+11	0.141E+11	0.817E+10
40.000	0.387E+11	0.142E+11	0.824E+10
41.000	0.390E+11	0.143E+11	0.829E+10
42.000	0.393E+11	0.144E+11	0.834E+10
43.000	0.396E+11	0.145E+11	0.839E+10
44.000	0.398E+11	0.146E+11	0.843E+10
45.000	0.401E+11	0.147E+11	0.847E+10
46.000	0.403E+11	0.147E+11	0.850E+10
47.000	0.404E+11	0.148E+11	0.853E+10
48.000	0.406E+11	0.148E+11	0.856E+10

49.000	0.407E+11	0.149E+11	0.858E+10
50.000	0.408E+11	0.149E+11	0.860E+10
51.000	0.409E+11	0.149E+11	0.861E+10
52.000	0.410E+11	0.149E+11	0.863E+10
53.000	0.411E+11	0.150E+11	0.864E+10
54.000	0.411E+11	0.150E+11	0.865E+10
55.000	0.412E+11	0.150E+11	0.865E+10
56.000	0.412E+11	0.150E+11	0.865E+10
57.000	0.412E+11	0.150E+11	0.865E+10
58.000	0.412E+11	0.150E+11	0.865E+10
59.000	0.412E+11	0.150E+11	0.865E+10
60.000	0.412E+11	0.150E+11	0.864E+10
61.000	0.412E+11	0.150E+11	0.864E+10
62.000	0.412E+11	0.150E+11	0.863E+10
63.000	0.411E+11	0.150E+11	0.862E+10
64.000	0.411E+11	0.149E+11	0.861E+10
65.000	0.411E+11	0.149E+11	0.859E+10
66.000	0.410E+11	0.149E+11	0.858E+10
67.000	0.409E+11	0.149E+11	0.857E+10
68.000	0.409E+11	0.148E+11	0.855E+10
69.000	0.408E+11	0.148E+11	0.853E+10
70.000	0.407E+11	0.148E+11	0.851E+10
71.000	0.406E+11	0.147E+11	0.849E+10
72.000	0.405E+11	0.147E+11	0.847E+10
73.000	0.404E+11	0.147E+11	0.845E+10
74.000	0.403E+11	0.146E+11	0.843E+10
75.000	0.402E+11	0.146E+11	0.840E+10
76.000	0.401E+11	0.146E+11	0.838E+10
77.000	0.400E+11	0.145E+11	0.835E+10
78.000	0.399E+11	0.145E+11	0.833E+10
79.000	0.398E+11	0.144E+11	0.830E+10
80.000	0.397E+11	0.144E+11	0.828E+10
81.000	0.396E+11	0.143E+11	0.825E+10
82.000	0.394E+11	0.143E+11	0.822E+10
83.000	0.393E+11	0.143E+11	0.819E+10
84.000	0.392E+11	0.142E+11	0.816E+10
85.000	0.391E+11	0.142E+11	0.813E+10
86.000	0.389E+11	0.141E+11	0.810E+10
87.000	0.388E+11	0.141E+11	0.807E+10
88.000	0.387E+11	0.140E+11	0.804E+10
89.000	0.385E+11	0.140E+11	0.801E+10
90.000	0.384E+11	0.139E+11	0.798E+10
91.000	0.382E+11	0.139E+11	0.795E+10
92.000	0.381E+11	0.138E+11	0.792E+10
93.000	0.379E+11	0.137E+11	0.789E+10
94.000	0.378E+11	0.137E+11	0.785E+10
95.000	0.377E+11	0.136E+11	0.782E+10

Sn

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
50	(g/mole) 118.69	(g/cm ³) 7.30	(cm ⁻¹) 89.961	(cm ⁻¹) 92.246	.220	.533

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
2.000	0.553E+07	0.532E+07	0.510E+07
2.125	0.743E+07	0.712E+07	0.679E+07
2.250	0.979E+07	0.934E+07	0.887E+07
2.375	0.127E+08	0.120E+08	0.114E+08
2.500	0.161E+08	0.153E+08	0.143E+08
2.625	0.202E+08	0.191E+08	0.178E+08
2.750	0.251E+08	0.235E+08	0.219E+08
2.875	0.307E+08	0.286E+08	0.265E+08
3.000	0.372E+08	0.345E+08	0.318E+08
3.125	0.447E+08	0.412E+08	0.378E+08
3.250	0.532E+08	0.488E+08	0.445E+08
3.375	0.628E+08	0.573E+08	0.519E+08
3.500	0.736E+08	0.668E+08	0.601E+08
3.625	0.856E+08	0.773E+08	0.692E+08
3.750	0.990E+08	0.889E+08	0.791E+08
3.875	0.114E+09	0.102E+09	0.899E+08
4.000	0.130E+09	0.115E+09	0.102E+09
4.125	0.148E+09	0.131E+09	0.114E+09
4.250	0.168E+09	0.147E+09	0.128E+09
4.375	0.189E+09	0.164E+09	0.142E+09
4.500	0.212E+09	0.183E+09	0.158E+09
4.625	0.237E+09	0.204E+09	0.174E+09
4.750	0.264E+09	0.225E+09	0.191E+09
4.875	0.293E+09	0.249E+09	0.210E+09
5.000	0.324E+09	0.273E+09	0.229E+09
5.125	0.358E+09	0.299E+09	0.249E+09
5.250	0.393E+09	0.327E+09	0.270E+09
5.375	0.431E+09	0.356E+09	0.293E+09
5.500	0.471E+09	0.386E+09	0.316E+09
5.625	0.514E+09	0.418E+09	0.340E+09
5.750	0.559E+09	0.452E+09	0.365E+09
5.875	0.607E+09	0.487E+09	0.391E+09
6.000	0.657E+09	0.523E+09	0.418E+09
6.125	0.710E+09	0.561E+09	0.445E+09
6.250	0.766E+09	0.601E+09	0.474E+09
6.375	0.824E+09	0.642E+09	0.503E+09
6.500	0.885E+09	0.685E+09	0.534E+09
6.625	0.949E+09	0.729E+09	0.565E+09
6.750	0.102E+10	0.774E+09	0.596E+09
6.875	0.109E+10	0.821E+09	0.629E+09
7.000	0.116E+10	0.870E+09	0.662E+09
7.250	0.131E+10	0.971E+09	0.731E+09
7.500	0.148E+10	0.108E+10	0.802E+09
7.750	0.166E+10	0.119E+10	0.876E+09
8.000	0.185E+10	0.130E+10	0.951E+09

8.250	0.205E+10	0.143E+10	0.103E+10
8.500	0.226E+10	0.155E+10	0.111E+10
8.750	0.249E+10	0.168E+10	0.119E+10
9.000	0.272E+10	0.181E+10	0.127E+10
9.250	0.297E+10	0.195E+10	0.136E+10
9.500	0.323E+10	0.209E+10	0.144E+10
9.750	0.350E+10	0.223E+10	0.152E+10
10.000	0.378E+10	0.237E+10	0.161E+10
10.250	0.408E+10	0.252E+10	0.170E+10
10.500	0.438E+10	0.267E+10	0.178E+10
10.750	0.469E+10	0.282E+10	0.187E+10
11.000	0.501E+10	0.297E+10	0.196E+10
11.250	0.534E+10	0.312E+10	0.204E+10
11.500	0.567E+10	0.327E+10	0.213E+10
11.750	0.602E+10	0.342E+10	0.222E+10
12.000	0.637E+10	0.358E+10	0.230E+10
12.500	0.710E+10	0.388E+10	0.248E+10
13.000	0.784E+10	0.419E+10	0.265E+10
13.500	0.861E+10	0.449E+10	0.282E+10
14.000	0.940E+10	0.479E+10	0.298E+10
14.500	0.102E+11	0.509E+10	0.315E+10
15.000	0.110E+11	0.538E+10	0.331E+10
15.500	0.118E+11	0.567E+10	0.346E+10
16.000	0.126E+11	0.595E+10	0.362E+10
16.500	0.134E+11	0.622E+10	0.377E+10
17.000	0.142E+11	0.649E+10	0.392E+10
17.500	0.150E+11	0.675E+10	0.406E+10
18.000	0.158E+11	0.701E+10	0.420E+10
19.000	0.174E+11	0.750E+10	0.447E+10
20.000	0.189E+11	0.796E+10	0.472E+10
21.000	0.203E+11	0.840E+10	0.496E+10
22.000	0.217E+11	0.881E+10	0.519E+10
23.000	0.229E+11	0.920E+10	0.541E+10
24.000	0.242E+11	0.956E+10	0.561E+10
25.000	0.253E+11	0.991E+10	0.580E+10
26.000	0.263E+11	0.102E+11	0.597E+10
27.000	0.273E+11	0.105E+11	0.614E+10
28.000	0.283E+11	0.108E+11	0.630E+10
29.000	0.291E+11	0.111E+11	0.644E+10
30.000	0.299E+11	0.113E+11	0.658E+10
31.000	0.306E+11	0.115E+11	0.670E+10
32.000	0.313E+11	0.117E+11	0.682E+10
33.000	0.319E+11	0.119E+11	0.693E+10
34.000	0.325E+11	0.121E+11	0.703E+10
35.000	0.331E+11	0.123E+11	0.713E+10
36.000	0.336E+11	0.124E+11	0.721E+10
37.000	0.340E+11	0.126E+11	0.729E+10
38.000	0.345E+11	0.127E+11	0.737E+10
39.000	0.348E+11	0.129E+11	0.744E+10
40.000	0.352E+11	0.130E+11	0.750E+10
41.000	0.355E+11	0.131E+11	0.756E+10
42.000	0.358E+11	0.132E+11	0.761E+10
43.000	0.361E+11	0.133E+11	0.766E+10
44.000	0.364E+11	0.133E+11	0.771E+10
45.000	0.366E+11	0.134E+11	0.775E+10
46.000	0.368E+11	0.135E+11	0.778E+10
47.000	0.370E+11	0.135E+11	0.782E+10
48.000	0.372E+11	0.136E+11	0.784E+10

49.000	0.373E+11	0.136E+11	0.787E+10
50.000	0.374E+11	0.137E+11	0.789E+10
51.000	0.376E+11	0.137E+11	0.791E+10
52.000	0.377E+11	0.137E+11	0.793E+10
53.000	0.378E+11	0.138E+11	0.794E+10
54.000	0.378E+11	0.138E+11	0.796E+10
55.000	0.379E+11	0.138E+11	0.797E+10
56.000	0.379E+11	0.138E+11	0.797E+10
57.000	0.380E+11	0.138E+11	0.798E+10
58.000	0.380E+11	0.138E+11	0.798E+10
59.000	0.380E+11	0.138E+11	0.798E+10
60.000	0.380E+11	0.138E+11	0.798E+10
61.000	0.381E+11	0.138E+11	0.798E+10
62.000	0.380E+11	0.138E+11	0.798E+10
63.000	0.380E+11	0.138E+11	0.797E+10
64.000	0.380E+11	0.138E+11	0.797E+10
65.000	0.380E+11	0.138E+11	0.796E+10
66.000	0.380E+11	0.138E+11	0.795E+10
67.000	0.379E+11	0.138E+11	0.794E+10
68.000	0.379E+11	0.138E+11	0.793E+10
69.000	0.378E+11	0.137E+11	0.791E+10
70.000	0.378E+11	0.137E+11	0.790E+10
71.000	0.377E+11	0.137E+11	0.788E+10
72.000	0.376E+11	0.137E+11	0.787E+10
73.000	0.376E+11	0.136E+11	0.785E+10
74.000	0.375E+11	0.136E+11	0.783E+10
75.000	0.374E+11	0.136E+11	0.782E+10
76.000	0.373E+11	0.135E+11	0.780E+10
77.000	0.372E+11	0.135E+11	0.778E+10
78.000	0.371E+11	0.135E+11	0.776E+10
79.000	0.371E+11	0.134E+11	0.773E+10
80.000	0.370E+11	0.134E+11	0.771E+10
81.000	0.369E+11	0.134E+11	0.769E+10
82.000	0.368E+11	0.133E+11	0.767E+10
83.000	0.367E+11	0.133E+11	0.764E+10
84.000	0.366E+11	0.133E+11	0.762E+10
85.000	0.364E+11	0.132E+11	0.759E+10
86.000	0.363E+11	0.132E+11	0.757E+10
87.000	0.362E+11	0.131E+11	0.754E+10
88.000	0.361E+11	0.131E+11	0.752E+10
89.000	0.360E+11	0.130E+11	0.749E+10
90.000	0.359E+11	0.130E+11	0.746E+10
91.000	0.358E+11	0.130E+11	0.744E+10
92.000	0.356E+11	0.129E+11	0.741E+10
93.000	0.355E+11	0.129E+11	0.738E+10
94.000	0.354E+11	0.128E+11	0.735E+10
95.000	0.353E+11	0.128E+11	0.733E+10
96.000	0.351E+11	0.127E+11	0.730E+10
97.000	0.350E+11	0.127E+11	0.727E+10
98.000	0.349E+11	0.126E+11	0.724E+10
99.000	0.348E+11	0.126E+11	0.721E+10

Sb

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
51	121.75	6.68	79.031	81.359	.223	.5345

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
2.000	0.445E+07	0.429E+07	0.411E+07
2.125	0.600E+07	0.575E+07	0.550E+07
2.250	0.791E+07	0.756E+07	0.719E+07
2.375	0.103E+08	0.976E+07	0.924E+07
2.500	0.131E+08	0.124E+08	0.117E+08
2.625	0.164E+08	0.155E+08	0.145E+08
2.750	0.204E+08	0.192E+08	0.179E+08
2.875	0.250E+08	0.234E+08	0.217E+08
3.000	0.304E+08	0.282E+08	0.261E+08
3.125	0.365E+08	0.338E+08	0.310E+08
3.250	0.435E+08	0.400E+08	0.365E+08
3.375	0.514E+08	0.470E+08	0.427E+08
3.500	0.603E+08	0.549E+08	0.496E+08
3.625	0.703E+08	0.636E+08	0.571E+08
3.750	0.813E+08	0.732E+08	0.654E+08
3.875	0.936E+08	0.838E+08	0.744E+08
4.000	0.107E+09	0.953E+08	0.841E+08
4.125	0.122E+09	0.108E+09	0.947E+08
4.250	0.138E+09	0.122E+09	0.106E+09
4.375	0.156E+09	0.136E+09	0.118E+09
4.500	0.175E+09	0.152E+09	0.131E+09
4.625	0.196E+09	0.169E+09	0.145E+09
4.750	0.219E+09	0.187E+09	0.160E+09
4.875	0.243E+09	0.207E+09	0.175E+09
5.000	0.269E+09	0.227E+09	0.191E+09
5.125	0.297E+09	0.249E+09	0.209E+09
5.250	0.326E+09	0.273E+09	0.227E+09
5.375	0.358E+09	0.297E+09	0.245E+09
5.500	0.392E+09	0.323E+09	0.265E+09
5.625	0.428E+09	0.350E+09	0.286E+09
5.750	0.466E+09	0.378E+09	0.307E+09
5.875	0.506E+09	0.408E+09	0.329E+09
6.000	0.548E+09	0.439E+09	0.352E+09
6.125	0.593E+09	0.471E+09	0.376E+09
6.250	0.639E+09	0.505E+09	0.400E+09
6.375	0.689E+09	0.540E+09	0.425E+09
6.500	0.740E+09	0.576E+09	0.451E+09
6.625	0.794E+09	0.614E+09	0.478E+09
6.750	0.851E+09	0.653E+09	0.505E+09
6.875	0.910E+09	0.693E+09	0.533E+09
7.000	0.971E+09	0.734E+09	0.562E+09
7.250	0.110E+10	0.821E+09	0.622E+09
7.500	0.124E+10	0.912E+09	0.683E+09
7.750	0.139E+10	0.101E+10	0.747E+09
8.000	0.156E+10	0.111E+10	0.813E+09

8.250	0.173E+10	0.121E+10	0.881E+09
8.500	0.191E+10	0.132E+10	0.951E+09
8.750	0.210E+10	0.143E+10	0.102E+10
9.000	0.231E+10	0.155E+10	0.109E+10
9.250	0.252E+10	0.167E+10	0.117E+10
9.500	0.274E+10	0.179E+10	0.124E+10
9.750	0.298E+10	0.192E+10	0.132E+10
10.000	0.322E+10	0.204E+10	0.139E+10
10.250	0.347E+10	0.217E+10	0.147E+10
10.500	0.374E+10	0.230E+10	0.155E+10
10.750	0.401E+10	0.243E+10	0.163E+10
11.000	0.429E+10	0.257E+10	0.170E+10
11.250	0.457E+10	0.270E+10	0.178E+10
11.500	0.487E+10	0.284E+10	0.186E+10
11.750	0.517E+10	0.298E+10	0.194E+10
12.000	0.548E+10	0.311E+10	0.202E+10
12.500	0.612E+10	0.339E+10	0.217E+10
13.000	0.678E+10	0.366E+10	0.233E+10
13.500	0.746E+10	0.394E+10	0.248E+10
14.000	0.815E+10	0.421E+10	0.263E+10
14.500	0.886E+10	0.448E+10	0.278E+10
15.000	0.959E+10	0.474E+10	0.293E+10
15.500	0.103E+11	0.501E+10	0.307E+10
16.000	0.110E+11	0.526E+10	0.321E+10
16.500	0.118E+11	0.552E+10	0.335E+10
17.000	0.125E+11	0.576E+10	0.349E+10
17.500	0.132E+11	0.601E+10	0.362E+10
18.000	0.140E+11	0.624E+10	0.375E+10
19.000	0.154E+11	0.670E+10	0.400E+10
20.000	0.168E+11	0.713E+10	0.424E+10
21.000	0.181E+11	0.754E+10	0.447E+10
22.000	0.193E+11	0.793E+10	0.468E+10
23.000	0.206E+11	0.830E+10	0.488E+10
24.000	0.217E+11	0.864E+10	0.507E+10
25.000	0.228E+11	0.897E+10	0.526E+10
26.000	0.238E+11	0.928E+10	0.543E+10
27.000	0.247E+11	0.956E+10	0.558E+10
28.000	0.256E+11	0.983E+10	0.573E+10
29.000	0.264E+11	0.101E+11	0.588E+10
30.000	0.272E+11	0.103E+11	0.601E+10
31.000	0.279E+11	0.105E+11	0.613E+10
32.000	0.286E+11	0.108E+11	0.625E+10
33.000	0.292E+11	0.109E+11	0.635E+10
34.000	0.298E+11	0.111E+11	0.646E+10
35.000	0.303E+11	0.113E+11	0.655E+10
36.000	0.308E+11	0.115E+11	0.664E+10
37.000	0.313E+11	0.116E+11	0.672E+10
38.000	0.317E+11	0.117E+11	0.679E+10
39.000	0.321E+11	0.119E+11	0.686E+10
40.000	0.325E+11	0.120E+11	0.693E+10
41.000	0.328E+11	0.121E+11	0.699E+10
42.000	0.331E+11	0.122E+11	0.705E+10
43.000	0.334E+11	0.123E+11	0.710E+10
44.000	0.337E+11	0.124E+11	0.714E+10
45.000	0.339E+11	0.124E+11	0.719E+10
46.000	0.341E+11	0.125E+11	0.723E+10
47.000	0.343E+11	0.126E+11	0.726E+10
48.000	0.345E+11	0.126E+11	0.729E+10

49.000	0.347E+11	0.127E+11	0.732E+10
50.000	0.348E+11	0.127E+11	0.735E+10
51.000	0.350E+11	0.128E+11	0.737E+10
52.000	0.351E+11	0.128E+11	0.739E+10
53.000	0.352E+11	0.128E+11	0.741E+10
54.000	0.353E+11	0.129E+11	0.743E+10
55.000	0.354E+11	0.129E+11	0.744E+10
56.000	0.354E+11	0.129E+11	0.745E+10
57.000	0.355E+11	0.129E+11	0.746E+10
58.000	0.355E+11	0.129E+11	0.747E+10
59.000	0.356E+11	0.130E+11	0.747E+10
60.000	0.356E+11	0.130E+11	0.748E+10
61.000	0.356E+11	0.130E+11	0.748E+10
62.000	0.357E+11	0.130E+11	0.748E+10
63.000	0.357E+11	0.130E+11	0.748E+10
64.000	0.357E+11	0.130E+11	0.748E+10
65.000	0.357E+11	0.130E+11	0.747E+10
66.000	0.356E+11	0.130E+11	0.747E+10
67.000	0.356E+11	0.129E+11	0.746E+10
68.000	0.356E+11	0.129E+11	0.745E+10
69.000	0.356E+11	0.129E+11	0.744E+10
70.000	0.355E+11	0.129E+11	0.744E+10
71.000	0.355E+11	0.129E+11	0.742E+10
72.000	0.354E+11	0.129E+11	0.741E+10
73.000	0.354E+11	0.129E+11	0.740E+10
74.000	0.353E+11	0.128E+11	0.739E+10
75.000	0.353E+11	0.128E+11	0.737E+10
76.000	0.352E+11	0.128E+11	0.736E+10
77.000	0.351E+11	0.128E+11	0.734E+10
78.000	0.351E+11	0.127E+11	0.732E+10
79.000	0.350E+11	0.127E+11	0.731E+10
80.000	0.349E+11	0.127E+11	0.729E+10
81.000	0.348E+11	0.126E+11	0.727E+10
82.000	0.348E+11	0.126E+11	0.725E+10
83.000	0.347E+11	0.126E+11	0.723E+10
84.000	0.346E+11	0.125E+11	0.721E+10
85.000	0.345E+11	0.125E+11	0.719E+10
86.000	0.344E+11	0.125E+11	0.717E+10
87.000	0.343E+11	0.124E+11	0.715E+10
88.000	0.342E+11	0.124E+11	0.713E+10
89.000	0.341E+11	0.124E+11	0.710E+10
90.000	0.340E+11	0.123E+11	0.708E+10
91.000	0.339E+11	0.123E+11	0.706E+10
92.000	0.338E+11	0.123E+11	0.703E+10
93.000	0.337E+11	0.122E+11	0.701E+10
94.000	0.336E+11	0.122E+11	0.699E+10
95.000	0.335E+11	0.121E+11	0.696E+10
96.000	0.334E+11	0.121E+11	0.694E+10
97.000	0.333E+11	0.121E+11	0.691E+10
98.000	0.332E+11	0.120E+11	0.689E+10
99.000	0.330E+11	0.120E+11	0.686E+10
100.000	0.329E+11	0.119E+11	0.683E+10

Te

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
52	(g/mole) 127.60	(g/cm ³) 6.24	(cm ⁻¹) 66.115	(cm ⁻¹) 68.558	.226	.536

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
2.000	0.357E+07	0.345E+07	0.332E+07
2.125	0.482E+07	0.464E+07	0.444E+07
2.250	0.637E+07	0.611E+07	0.583E+07
2.375	0.827E+07	0.790E+07	0.751E+07
2.500	0.106E+08	0.101E+08	0.951E+07
2.625	0.133E+08	0.126E+08	0.119E+08
2.750	0.165E+08	0.156E+08	0.146E+08
2.875	0.203E+08	0.191E+08	0.178E+08
3.000	0.247E+08	0.231E+08	0.214E+08
3.125	0.297E+08	0.277E+08	0.255E+08
3.250	0.355E+08	0.328E+08	0.302E+08
3.375	0.420E+08	0.387E+08	0.354E+08
3.500	0.493E+08	0.452E+08	0.411E+08
3.625	0.575E+08	0.524E+08	0.475E+08
3.750	0.667E+08	0.605E+08	0.544E+08
3.875	0.768E+08	0.693E+08	0.620E+08
4.000	0.880E+08	0.790E+08	0.703E+08
4.125	0.100E+09	0.896E+08	0.793E+08
4.250	0.114E+09	0.101E+09	0.889E+08
4.375	0.129E+09	0.113E+09	0.993E+08
4.500	0.145E+09	0.127E+09	0.110E+09
4.625	0.162E+09	0.141E+09	0.122E+09
4.750	0.181E+09	0.157E+09	0.135E+09
4.875	0.201E+09	0.173E+09	0.148E+09
5.000	0.223E+09	0.191E+09	0.162E+09
5.125	0.246E+09	0.209E+09	0.177E+09
5.250	0.271E+09	0.229E+09	0.193E+09
5.375	0.298E+09	0.250E+09	0.209E+09
5.500	0.326E+09	0.272E+09	0.226E+09
5.625	0.356E+09	0.296E+09	0.244E+09
5.750	0.388E+09	0.320E+09	0.263E+09
5.875	0.422E+09	0.346E+09	0.282E+09
6.000	0.458E+09	0.372E+09	0.303E+09
6.125	0.495E+09	0.400E+09	0.323E+09
6.250	0.535E+09	0.430E+09	0.345E+09
6.375	0.577E+09	0.460E+09	0.367E+09
6.500	0.621E+09	0.491E+09	0.390E+09
6.625	0.667E+09	0.524E+09	0.414E+09
6.750	0.715E+09	0.558E+09	0.438E+09
6.875	0.765E+09	0.593E+09	0.463E+09
7.000	0.817E+09	0.630E+09	0.489E+09
7.250	0.929E+09	0.706E+09	0.542E+09
7.500	0.105E+10	0.786E+09	0.598E+09
7.750	0.118E+10	0.871E+09	0.655E+09
8.000	0.132E+10	0.960E+09	0.715E+09

8.250	0.147E+10	0.105E+10	0.777E+09
8.500	0.163E+10	0.115E+10	0.840E+09
8.750	0.179E+10	0.125E+10	0.905E+09
9.000	0.197E+10	0.136E+10	0.972E+09
9.250	0.216E+10	0.146E+10	0.104E+10
9.500	0.235E+10	0.157E+10	0.111E+10
9.750	0.256E+10	0.169E+10	0.118E+10
10.000	0.277E+10	0.180E+10	0.125E+10
10.250	0.299E+10	0.192E+10	0.132E+10
10.500	0.322E+10	0.204E+10	0.139E+10
10.750	0.346E+10	0.216E+10	0.147E+10
11.000	0.371E+10	0.229E+10	0.154E+10
11.250	0.397E+10	0.241E+10	0.161E+10
11.500	0.423E+10	0.254E+10	0.168E+10
11.750	0.450E+10	0.267E+10	0.176E+10
12.000	0.478E+10	0.279E+10	0.183E+10
12.500	0.536E+10	0.305E+10	0.198E+10
13.000	0.595E+10	0.331E+10	0.213E+10
13.500	0.657E+10	0.357E+10	0.227E+10
14.000	0.721E+10	0.383E+10	0.242E+10
14.500	0.787E+10	0.409E+10	0.256E+10
15.000	0.853E+10	0.434E+10	0.270E+10
15.500	0.921E+10	0.459E+10	0.284E+10
16.000	0.989E+10	0.484E+10	0.298E+10
16.500	0.106E+11	0.509E+10	0.311E+10
17.000	0.113E+11	0.533E+10	0.324E+10
17.500	0.120E+11	0.556E+10	0.337E+10
18.000	0.127E+11	0.579E+10	0.350E+10
19.000	0.140E+11	0.624E+10	0.374E+10
20.000	0.153E+11	0.667E+10	0.398E+10
21.000	0.166E+11	0.707E+10	0.420E+10
22.000	0.179E+11	0.746E+10	0.441E+10
23.000	0.191E+11	0.782E+10	0.462E+10
24.000	0.202E+11	0.817E+10	0.481E+10
25.000	0.213E+11	0.849E+10	0.499E+10
26.000	0.223E+11	0.880E+10	0.516E+10
27.000	0.233E+11	0.909E+10	0.532E+10
28.000	0.242E+11	0.936E+10	0.547E+10
29.000	0.250E+11	0.962E+10	0.561E+10
30.000	0.258E+11	0.986E+10	0.575E+10
31.000	0.265E+11	0.101E+11	0.587E+10
32.000	0.272E+11	0.103E+11	0.599E+10
33.000	0.279E+11	0.105E+11	0.610E+10
34.000	0.285E+11	0.107E+11	0.621E+10
35.000	0.290E+11	0.109E+11	0.630E+10
36.000	0.296E+11	0.110E+11	0.640E+10
37.000	0.300E+11	0.112E+11	0.648E+10
38.000	0.305E+11	0.113E+11	0.656E+10
39.000	0.309E+11	0.115E+11	0.664E+10
40.000	0.313E+11	0.116E+11	0.671E+10
41.000	0.317E+11	0.117E+11	0.677E+10
42.000	0.320E+11	0.118E+11	0.683E+10
43.000	0.323E+11	0.119E+11	0.689E+10
44.000	0.326E+11	0.120E+11	0.694E+10
45.000	0.329E+11	0.121E+11	0.698E+10
46.000	0.331E+11	0.122E+11	0.703E+10
47.000	0.333E+11	0.122E+11	0.707E+10
48.000	0.335E+11	0.123E+11	0.710E+10

49.000	0.337E+11	0.124E+11	0.714E+10
50.000	0.339E+11	0.124E+11	0.717E+10
51.000	0.341E+11	0.125E+11	0.720E+10
52.000	0.342E+11	0.125E+11	0.722E+10
53.000	0.343E+11	0.125E+11	0.724E+10
54.000	0.345E+11	0.126E+11	0.726E+10
55.000	0.346E+11	0.126E+11	0.728E+10
56.000	0.347E+11	0.126E+11	0.730E+10
57.000	0.347E+11	0.127E+11	0.731E+10
58.000	0.348E+11	0.127E+11	0.732E+10
59.000	0.349E+11	0.127E+11	0.733E+10
60.000	0.349E+11	0.127E+11	0.734E+10
61.000	0.350E+11	0.127E+11	0.734E+10
62.000	0.350E+11	0.127E+11	0.735E+10
63.000	0.350E+11	0.127E+11	0.735E+10
64.000	0.350E+11	0.128E+11	0.735E+10
65.000	0.350E+11	0.128E+11	0.735E+10
66.000	0.350E+11	0.128E+11	0.735E+10
67.000	0.350E+11	0.127E+11	0.735E+10
68.000	0.350E+11	0.127E+11	0.734E+10
69.000	0.350E+11	0.127E+11	0.734E+10
70.000	0.350E+11	0.127E+11	0.733E+10
71.000	0.350E+11	0.127E+11	0.732E+10
72.000	0.349E+11	0.127E+11	0.732E+10
73.000	0.349E+11	0.127E+11	0.731E+10
74.000	0.349E+11	0.127E+11	0.730E+10
75.000	0.348E+11	0.127E+11	0.729E+10
76.000	0.348E+11	0.126E+11	0.727E+10
77.000	0.347E+11	0.126E+11	0.726E+10
78.000	0.347E+11	0.126E+11	0.725E+10
79.000	0.346E+11	0.126E+11	0.723E+10
80.000	0.345E+11	0.125E+11	0.722E+10
81.000	0.345E+11	0.125E+11	0.720E+10
82.000	0.344E+11	0.125E+11	0.719E+10
83.000	0.343E+11	0.125E+11	0.717E+10
84.000	0.343E+11	0.124E+11	0.715E+10
85.000	0.342E+11	0.124E+11	0.714E+10
86.000	0.341E+11	0.124E+11	0.712E+10
87.000	0.340E+11	0.123E+11	0.710E+10
88.000	0.339E+11	0.123E+11	0.708E+10
89.000	0.339E+11	0.123E+11	0.706E+10
90.000	0.338E+11	0.122E+11	0.704E+10
91.000	0.337E+11	0.122E+11	0.702E+10
92.000	0.336E+11	0.122E+11	0.700E+10
93.000	0.335E+11	0.121E+11	0.698E+10
94.000	0.334E+11	0.121E+11	0.695E+10
95.000	0.333E+11	0.121E+11	0.693E+10
96.000	0.332E+11	0.120E+11	0.691E+10
97.000	0.331E+11	0.120E+11	0.689E+10
98.000	0.330E+11	0.120E+11	0.686E+10
99.000	0.329E+11	0.119E+11	0.684E+10
100.000	0.328E+11	0.119E+11	0.682E+10

I

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
53	126.9045	4.92	47.660	49.940	.2285	.5375

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
2.000	0.293E+07	0.284E+07	0.274E+07
2.125	0.396E+07	0.383E+07	0.368E+07
2.250	0.525E+07	0.505E+07	0.484E+07
2.375	0.683E+07	0.655E+07	0.625E+07
2.500	0.874E+07	0.835E+07	0.793E+07
2.625	0.110E+08	0.105E+08	0.992E+07
2.750	0.137E+08	0.130E+08	0.123E+08
2.875	0.169E+08	0.159E+08	0.149E+08
3.000	0.205E+08	0.193E+08	0.180E+08
3.125	0.247E+08	0.232E+08	0.215E+08
3.250	0.296E+08	0.275E+08	0.255E+08
3.375	0.350E+08	0.325E+08	0.299E+08
3.500	0.412E+08	0.380E+08	0.349E+08
3.625	0.481E+08	0.442E+08	0.403E+08
3.750	0.558E+08	0.511E+08	0.463E+08
3.875	0.644E+08	0.586E+08	0.529E+08
4.000	0.739E+08	0.669E+08	0.601E+08
4.125	0.843E+08	0.760E+08	0.679E+08
4.250	0.957E+08	0.858E+08	0.763E+08
4.375	0.108E+09	0.965E+08	0.854E+08
4.500	0.122E+09	0.108E+09	0.951E+08
4.625	0.137E+09	0.121E+09	0.105E+09
4.750	0.153E+09	0.134E+09	0.117E+09
4.875	0.170E+09	0.148E+09	0.128E+09
5.000	0.188E+09	0.163E+09	0.141E+09
5.125	0.208E+09	0.180E+09	0.154E+09
5.250	0.230E+09	0.197E+09	0.168E+09
5.375	0.252E+09	0.215E+09	0.182E+09
5.500	0.277E+09	0.235E+09	0.198E+09
5.625	0.303E+09	0.255E+09	0.214E+09
5.750	0.330E+09	0.276E+09	0.230E+09
5.875	0.359E+09	0.299E+09	0.248E+09
6.000	0.390E+09	0.323E+09	0.266E+09
6.125	0.422E+09	0.347E+09	0.285E+09
6.250	0.457E+09	0.373E+09	0.304E+09
6.375	0.493E+09	0.400E+09	0.325E+09
6.500	0.531E+09	0.428E+09	0.345E+09
6.625	0.570E+09	0.457E+09	0.367E+09
6.750	0.612E+09	0.488E+09	0.389E+09
6.875	0.656E+09	0.519E+09	0.412E+09
7.000	0.701E+09	0.551E+09	0.435E+09
7.250	0.798E+09	0.620E+09	0.484E+09
7.500	0.903E+09	0.692E+09	0.535E+09
7.750	0.102E+10	0.769E+09	0.589E+09
8.000	0.114E+10	0.850E+09	0.644E+09

8.250	0.127E+10	0.935E+09	0.702E+09
8.500	0.141E+10	0.102E+10	0.761E+09
8.750	0.156E+10	0.112E+10	0.822E+09
9.000	0.171E+10	0.121E+10	0.885E+09
9.250	0.188E+10	0.131E+10	0.949E+09
9.500	0.205E+10	0.141E+10	0.101E+10
9.750	0.224E+10	0.152E+10	0.108E+10
10.000	0.243E+10	0.163E+10	0.115E+10
10.250	0.263E+10	0.174E+10	0.122E+10
10.500	0.284E+10	0.185E+10	0.129E+10
10.750	0.305E+10	0.197E+10	0.136E+10
11.000	0.328E+10	0.209E+10	0.143E+10
11.250	0.351E+10	0.220E+10	0.150E+10
11.500	0.375E+10	0.232E+10	0.157E+10
11.750	0.400E+10	0.245E+10	0.164E+10
12.000	0.425E+10	0.257E+10	0.171E+10
12.500	0.478E+10	0.282E+10	0.185E+10
13.000	0.533E+10	0.307E+10	0.200E+10
13.500	0.591E+10	0.332E+10	0.214E+10
14.000	0.651E+10	0.358E+10	0.228E+10
14.500	0.712E+10	0.383E+10	0.242E+10
15.000	0.775E+10	0.408E+10	0.256E+10
15.500	0.840E+10	0.433E+10	0.270E+10
16.000	0.905E+10	0.458E+10	0.284E+10
16.500	0.971E+10	0.482E+10	0.297E+10
17.000	0.104E+11	0.506E+10	0.310E+10
17.500	0.110E+11	0.529E+10	0.323E+10
18.000	0.117E+11	0.553E+10	0.336E+10
19.000	0.131E+11	0.598E+10	0.361E+10
20.000	0.144E+11	0.641E+10	0.385E+10
21.000	0.157E+11	0.682E+10	0.407E+10
22.000	0.169E+11	0.721E+10	0.429E+10
23.000	0.181E+11	0.759E+10	0.449E+10
24.000	0.193E+11	0.794E+10	0.469E+10
25.000	0.204E+11	0.828E+10	0.488E+10
26.000	0.215E+11	0.860E+10	0.505E+10
27.000	0.225E+11	0.890E+10	0.522E+10
28.000	0.234E+11	0.919E+10	0.538E+10
29.000	0.243E+11	0.945E+10	0.553E+10
30.000	0.251E+11	0.971E+10	0.567E+10
31.000	0.259E+11	0.995E+10	0.580E+10
32.000	0.267E+11	0.102E+11	0.592E+10
33.000	0.274E+11	0.104E+11	0.604E+10
34.000	0.280E+11	0.106E+11	0.615E+10
35.000	0.286E+11	0.108E+11	0.626E+10
36.000	0.292E+11	0.109E+11	0.636E+10
37.000	0.297E+11	0.111E+11	0.645E+10
38.000	0.302E+11	0.113E+11	0.653E+10
39.000	0.307E+11	0.114E+11	0.661E+10
40.000	0.311E+11	0.115E+11	0.669E+10
41.000	0.315E+11	0.117E+11	0.676E+10
42.000	0.319E+11	0.118E+11	0.683E+10
43.000	0.322E+11	0.119E+11	0.689E+10
44.000	0.325E+11	0.120E+11	0.694E+10
45.000	0.328E+11	0.121E+11	0.700E+10
46.000	0.331E+11	0.122E+11	0.705E+10
47.000	0.334E+11	0.123E+11	0.709E+10
48.000	0.336E+11	0.123E+11	0.714E+10

49.000	0.338E+11	0.124E+11	0.717E+10
50.000	0.340E+11	0.125E+11	0.721E+10
51.000	0.342E+11	0.125E+11	0.724E+10
52.000	0.344E+11	0.126E+11	0.727E+10
53.000	0.345E+11	0.126E+11	0.730E+10
54.000	0.347E+11	0.127E+11	0.732E+10
55.000	0.348E+11	0.127E+11	0.735E+10
56.000	0.349E+11	0.128E+11	0.737E+10
57.000	0.350E+11	0.128E+11	0.738E+10
58.000	0.351E+11	0.128E+11	0.740E+10
59.000	0.352E+11	0.128E+11	0.741E+10
60.000	0.353E+11	0.129E+11	0.743E+10
61.000	0.354E+11	0.129E+11	0.744E+10
62.000	0.354E+11	0.129E+11	0.744E+10
63.000	0.354E+11	0.129E+11	0.745E+10
64.000	0.355E+11	0.129E+11	0.746E+10
65.000	0.355E+11	0.129E+11	0.746E+10
66.000	0.355E+11	0.129E+11	0.746E+10
67.000	0.356E+11	0.129E+11	0.746E+10
68.000	0.356E+11	0.129E+11	0.746E+10
69.000	0.356E+11	0.129E+11	0.746E+10
70.000	0.356E+11	0.129E+11	0.746E+10
71.000	0.355E+11	0.129E+11	0.745E+10
72.000	0.355E+11	0.129E+11	0.745E+10
73.000	0.355E+11	0.129E+11	0.744E+10
74.000	0.355E+11	0.129E+11	0.743E+10
75.000	0.355E+11	0.129E+11	0.742E+10
76.000	0.354E+11	0.129E+11	0.742E+10
77.000	0.354E+11	0.129E+11	0.741E+10
78.000	0.353E+11	0.128E+11	0.739E+10
79.000	0.353E+11	0.128E+11	0.738E+10
80.000	0.352E+11	0.128E+11	0.737E+10
81.000	0.352E+11	0.128E+11	0.736E+10
82.000	0.351E+11	0.128E+11	0.734E+10
83.000	0.351E+11	0.127E+11	0.733E+10
84.000	0.350E+11	0.127E+11	0.732E+10
85.000	0.349E+11	0.127E+11	0.730E+10
86.000	0.349E+11	0.127E+11	0.728E+10
87.000	0.348E+11	0.126E+11	0.727E+10
88.000	0.347E+11	0.126E+11	0.725E+10
89.000	0.347E+11	0.126E+11	0.723E+10
90.000	0.346E+11	0.125E+11	0.721E+10
91.000	0.345E+11	0.125E+11	0.720E+10
92.000	0.344E+11	0.125E+11	0.718E+10
93.000	0.343E+11	0.124E+11	0.716E+10
94.000	0.342E+11	0.124E+11	0.714E+10
95.000	0.341E+11	0.124E+11	0.712E+10
96.000	0.341E+11	0.123E+11	0.710E+10
97.000	0.340E+11	0.123E+11	0.708E+10
98.000	0.339E+11	0.123E+11	0.705E+10
99.000	0.338E+11	0.122E+11	0.703E+10
100.000	0.337E+11	0.122E+11	0.701E+10

Cs

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
55	132.9054	1.87	14.688	15.043	.2335	.5405

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
3.000	0.134E+08	0.128E+08	0.121E+08
3.125	0.162E+08	0.154E+08	0.145E+08
3.250	0.194E+08	0.184E+08	0.173E+08
3.375	0.231E+08	0.217E+08	0.204E+08
3.500	0.272E+08	0.255E+08	0.238E+08
3.625	0.319E+08	0.298E+08	0.277E+08
3.750	0.371E+08	0.345E+08	0.320E+08
3.875	0.429E+08	0.398E+08	0.367E+08
4.000	0.493E+08	0.456E+08	0.418E+08
4.125	0.564E+08	0.519E+08	0.474E+08
4.250	0.643E+08	0.589E+08	0.535E+08
4.375	0.728E+08	0.665E+08	0.602E+08
4.500	0.822E+08	0.747E+08	0.673E+08
4.625	0.924E+08	0.835E+08	0.750E+08
4.750	0.103E+09	0.931E+08	0.832E+08
4.875	0.115E+09	0.103E+09	0.919E+08
5.000	0.128E+09	0.114E+09	0.101E+09
5.125	0.142E+09	0.126E+09	0.111E+09
5.250	0.157E+09	0.139E+09	0.122E+09
5.375	0.173E+09	0.152E+09	0.133E+09
5.500	0.190E+09	0.166E+09	0.144E+09
5.625	0.208E+09	0.181E+09	0.157E+09
5.750	0.227E+09	0.197E+09	0.170E+09
5.875	0.248E+09	0.214E+09	0.183E+09
6.000	0.270E+09	0.231E+09	0.197E+09
6.125	0.293E+09	0.250E+09	0.212E+09
6.250	0.317E+09	0.269E+09	0.227E+09
6.375	0.343E+09	0.290E+09	0.243E+09
6.500	0.370E+09	0.311E+09	0.260E+09
6.625	0.399E+09	0.333E+09	0.277E+09
6.750	0.429E+09	0.356E+09	0.295E+09
6.875	0.460E+09	0.380E+09	0.313E+09
7.000	0.493E+09	0.405E+09	0.332E+09
7.125	0.527E+09	0.431E+09	0.352E+09
7.250	0.563E+09	0.458E+09	0.372E+09
7.375	0.601E+09	0.486E+09	0.393E+09
7.500	0.640E+09	0.515E+09	0.414E+09
7.625	0.681E+09	0.544E+09	0.436E+09
7.750	0.723E+09	0.575E+09	0.458E+09
7.875	0.767E+09	0.607E+09	0.481E+09
8.000	0.813E+09	0.639E+09	0.504E+09
8.250	0.910E+09	0.707E+09	0.553E+09
8.500	0.101E+10	0.778E+09	0.603E+09
8.750	0.112E+10	0.854E+09	0.655E+09
9.000	0.124E+10	0.932E+09	0.709E+09

9.250	0.137E+10	0.101E+10	0.765E+09
9.500	0.150E+10	0.110E+10	0.822E+09
9.750	0.164E+10	0.119E+10	0.880E+09
10.000	0.179E+10	0.128E+10	0.940E+09
10.250	0.194E+10	0.137E+10	0.100E+10
10.500	0.210E+10	0.147E+10	0.106E+10
10.750	0.227E+10	0.157E+10	0.113E+10
11.000	0.245E+10	0.167E+10	0.119E+10
11.250	0.263E+10	0.178E+10	0.126E+10
11.500	0.282E+10	0.188E+10	0.132E+10
11.750	0.302E+10	0.199E+10	0.139E+10
12.000	0.323E+10	0.210E+10	0.145E+10
12.250	0.344E+10	0.221E+10	0.152E+10
12.500	0.365E+10	0.232E+10	0.159E+10
12.750	0.388E+10	0.244E+10	0.166E+10
13.000	0.411E+10	0.255E+10	0.172E+10
13.250	0.434E+10	0.267E+10	0.179E+10
13.500	0.459E+10	0.279E+10	0.186E+10
13.750	0.483E+10	0.290E+10	0.193E+10
14.000	0.509E+10	0.302E+10	0.200E+10
14.500	0.561E+10	0.326E+10	0.213E+10
15.000	0.615E+10	0.350E+10	0.227E+10
15.500	0.671E+10	0.374E+10	0.240E+10
16.000	0.728E+10	0.398E+10	0.253E+10
16.500	0.786E+10	0.421E+10	0.266E+10
17.000	0.846E+10	0.445E+10	0.280E+10
17.500	0.907E+10	0.468E+10	0.292E+10
18.000	0.968E+10	0.491E+10	0.305E+10
18.500	0.103E+11	0.514E+10	0.317E+10
19.000	0.109E+11	0.536E+10	0.330E+10
19.500	0.116E+11	0.558E+10	0.342E+10
20.000	0.122E+11	0.580E+10	0.354E+10
21.000	0.134E+11	0.622E+10	0.377E+10
22.000	0.147E+11	0.663E+10	0.399E+10
23.000	0.159E+11	0.701E+10	0.420E+10
24.000	0.171E+11	0.738E+10	0.440E+10
25.000	0.182E+11	0.774E+10	0.459E+10
26.000	0.193E+11	0.807E+10	0.478E+10
27.000	0.204E+11	0.839E+10	0.495E+10
28.000	0.214E+11	0.870E+10	0.512E+10
29.000	0.224E+11	0.899E+10	0.528E+10
30.000	0.233E+11	0.926E+10	0.543E+10
31.000	0.242E+11	0.952E+10	0.558E+10
32.000	0.250E+11	0.977E+10	0.571E+10
33.000	0.258E+11	0.100E+11	0.584E+10
34.000	0.265E+11	0.102E+11	0.596E+10
35.000	0.272E+11	0.104E+11	0.608E+10
36.000	0.279E+11	0.106E+11	0.619E+10
37.000	0.285E+11	0.108E+11	0.629E+10
38.000	0.291E+11	0.110E+11	0.639E+10
39.000	0.296E+11	0.112E+11	0.648E+10
40.000	0.301E+11	0.113E+11	0.657E+10
41.000	0.306E+11	0.115E+11	0.665E+10
42.000	0.311E+11	0.116E+11	0.673E+10
43.000	0.315E+11	0.117E+11	0.680E+10
44.000	0.319E+11	0.118E+11	0.687E+10
45.000	0.323E+11	0.120E+11	0.693E+10
46.000	0.326E+11	0.121E+11	0.699E+10

47.000	0.329E+11	0.122E+11	0.705E+10
48.000	0.332E+11	0.123E+11	0.710E+10
49.000	0.335E+11	0.124E+11	0.715E+10
50.000	0.338E+11	0.124E+11	0.720E+10
51.000	0.340E+11	0.125E+11	0.724E+10
52.000	0.342E+11	0.126E+11	0.728E+10
53.000	0.345E+11	0.127E+11	0.731E+10
54.000	0.346E+11	0.127E+11	0.735E+10
55.000	0.348E+11	0.128E+11	0.738E+10
56.000	0.350E+11	0.128E+11	0.741E+10
57.000	0.351E+11	0.129E+11	0.744E+10
58.000	0.353E+11	0.129E+11	0.746E+10
59.000	0.354E+11	0.130E+11	0.748E+10
60.000	0.355E+11	0.130E+11	0.750E+10
61.000	0.356E+11	0.130E+11	0.752E+10
62.000	0.357E+11	0.131E+11	0.754E+10
63.000	0.358E+11	0.131E+11	0.755E+10
64.000	0.359E+11	0.131E+11	0.756E+10
65.000	0.360E+11	0.131E+11	0.757E+10
66.000	0.360E+11	0.131E+11	0.758E+10
67.000	0.361E+11	0.132E+11	0.759E+10
68.000	0.361E+11	0.132E+11	0.760E+10
69.000	0.362E+11	0.132E+11	0.760E+10
70.000	0.362E+11	0.132E+11	0.761E+10
71.000	0.362E+11	0.132E+11	0.761E+10
72.000	0.362E+11	0.132E+11	0.761E+10
73.000	0.363E+11	0.132E+11	0.761E+10
74.000	0.363E+11	0.132E+11	0.761E+10
75.000	0.363E+11	0.132E+11	0.761E+10
76.000	0.363E+11	0.132E+11	0.760E+10
77.000	0.362E+11	0.132E+11	0.760E+10
78.000	0.362E+11	0.132E+11	0.759E+10
79.000	0.362E+11	0.132E+11	0.759E+10
80.000	0.362E+11	0.132E+11	0.758E+10
81.000	0.362E+11	0.131E+11	0.757E+10
82.000	0.361E+11	0.131E+11	0.756E+10
83.000	0.361E+11	0.131E+11	0.756E+10
84.000	0.360E+11	0.131E+11	0.755E+10
85.000	0.360E+11	0.131E+11	0.753E+10
86.000	0.360E+11	0.131E+11	0.752E+10
87.000	0.359E+11	0.130E+11	0.751E+10
88.000	0.359E+11	0.130E+11	0.750E+10
89.000	0.358E+11	0.130E+11	0.749E+10
90.000	0.357E+11	0.130E+11	0.747E+10
91.000	0.357E+11	0.130E+11	0.746E+10
92.000	0.356E+11	0.129E+11	0.744E+10
93.000	0.355E+11	0.129E+11	0.743E+10
94.000	0.355E+11	0.129E+11	0.741E+10
95.000	0.354E+11	0.128E+11	0.740E+10
96.000	0.353E+11	0.128E+11	0.738E+10
97.000	0.353E+11	0.128E+11	0.736E+10
98.000	0.352E+11	0.128E+11	0.735E+10
99.000	0.351E+11	0.127E+11	0.733E+10
100.000	0.350E+11	0.127E+11	0.731E+10

Ba

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
56	137.33	3.5	26.480	27.178	.236	.542

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
3.000	0.104E+08	0.998E+07	0.949E+07
3.125	0.126E+08	0.120E+08	0.114E+08
3.250	0.152E+08	0.144E+08	0.136E+08
3.375	0.180E+08	0.171E+08	0.161E+08
3.500	0.213E+08	0.201E+08	0.188E+08
3.625	0.250E+08	0.235E+08	0.219E+08
3.750	0.291E+08	0.273E+08	0.253E+08
3.875	0.337E+08	0.314E+08	0.291E+08
4.000	0.388E+08	0.361E+08	0.333E+08
4.125	0.445E+08	0.412E+08	0.378E+08
4.250	0.507E+08	0.467E+08	0.428E+08
4.375	0.575E+08	0.528E+08	0.481E+08
4.500	0.649E+08	0.594E+08	0.539E+08
4.625	0.731E+08	0.665E+08	0.601E+08
4.750	0.819E+08	0.742E+08	0.668E+08
4.875	0.914E+08	0.825E+08	0.739E+08
5.000	0.102E+09	0.915E+08	0.816E+08
5.125	0.113E+09	0.101E+09	0.897E+08
5.250	0.125E+09	0.111E+09	0.983E+08
5.375	0.138E+09	0.122E+09	0.107E+09
5.500	0.151E+09	0.134E+09	0.117E+09
5.625	0.166E+09	0.146E+09	0.127E+09
5.750	0.181E+09	0.159E+09	0.138E+09
5.875	0.198E+09	0.172E+09	0.149E+09
6.000	0.216E+09	0.187E+09	0.161E+09
6.125	0.234E+09	0.202E+09	0.173E+09
6.250	0.254E+09	0.218E+09	0.186E+09
6.375	0.275E+09	0.234E+09	0.199E+09
6.500	0.297E+09	0.252E+09	0.213E+09
6.625	0.320E+09	0.270E+09	0.227E+09
6.750	0.344E+09	0.289E+09	0.242E+09
6.875	0.369E+09	0.309E+09	0.257E+09
7.000	0.396E+09	0.330E+09	0.273E+09
7.125	0.424E+09	0.351E+09	0.290E+09
7.250	0.453E+09	0.373E+09	0.307E+09
7.375	0.484E+09	0.396E+09	0.324E+09
7.500	0.516E+09	0.420E+09	0.342E+09
7.625	0.549E+09	0.445E+09	0.361E+09
7.750	0.584E+09	0.471E+09	0.379E+09
7.875	0.620E+09	0.497E+09	0.399E+09
8.000	0.657E+09	0.524E+09	0.419E+09
8.250	0.736E+09	0.581E+09	0.460E+09
8.500	0.821E+09	0.641E+09	0.503E+09
8.750	0.912E+09	0.704E+09	0.548E+09
9.000	0.101E+10	0.770E+09	0.594E+09

9.250	0.111E+10	0.840E+09	0.642E+09
9.500	0.122E+10	0.912E+09	0.691E+09
9.750	0.134E+10	0.987E+09	0.742E+09
10.000	0.146E+10	0.107E+10	0.794E+09
10.250	0.159E+10	0.115E+10	0.847E+09
10.500	0.172E+10	0.123E+10	0.901E+09
10.750	0.186E+10	0.131E+10	0.956E+09
11.000	0.201E+10	0.140E+10	0.101E+10
11.250	0.217E+10	0.149E+10	0.107E+10
11.500	0.233E+10	0.158E+10	0.113E+10
11.750	0.249E+10	0.168E+10	0.119E+10
12.000	0.266E+10	0.177E+10	0.124E+10
12.250	0.284E+10	0.187E+10	0.130E+10
12.500	0.303E+10	0.197E+10	0.136E+10
12.750	0.322E+10	0.207E+10	0.142E+10
13.000	0.341E+10	0.217E+10	0.148E+10
13.250	0.361E+10	0.227E+10	0.154E+10
13.500	0.382E+10	0.238E+10	0.161E+10
13.750	0.403E+10	0.248E+10	0.167E+10
14.000	0.425E+10	0.259E+10	0.173E+10
14.500	0.469E+10	0.280E+10	0.185E+10
15.000	0.516E+10	0.301E+10	0.197E+10
15.500	0.564E+10	0.322E+10	0.209E+10
16.000	0.614E+10	0.344E+10	0.221E+10
16.500	0.665E+10	0.365E+10	0.233E+10
17.000	0.717E+10	0.387E+10	0.245E+10
17.500	0.770E+10	0.408E+10	0.257E+10
18.000	0.824E+10	0.429E+10	0.268E+10
18.500	0.879E+10	0.450E+10	0.280E+10
19.000	0.934E+10	0.470E+10	0.291E+10
19.500	0.990E+10	0.490E+10	0.302E+10
20.000	0.105E+11	0.510E+10	0.313E+10
21.000	0.116E+11	0.549E+10	0.334E+10
22.000	0.127E+11	0.586E+10	0.355E+10
23.000	0.138E+11	0.623E+10	0.374E+10
24.000	0.149E+11	0.657E+10	0.393E+10
25.000	0.160E+11	0.690E+10	0.411E+10
26.000	0.170E+11	0.722E+10	0.429E+10
27.000	0.180E+11	0.752E+10	0.445E+10
28.000	0.189E+11	0.781E+10	0.461E+10
29.000	0.199E+11	0.808E+10	0.476E+10
30.000	0.207E+11	0.834E+10	0.490E+10
31.000	0.216E+11	0.859E+10	0.504E+10
32.000	0.224E+11	0.883E+10	0.517E+10
33.000	0.231E+11	0.905E+10	0.529E+10
34.000	0.238E+11	0.926E+10	0.541E+10
35.000	0.245E+11	0.946E+10	0.552E+10
36.000	0.251E+11	0.965E+10	0.563E+10
37.000	0.257E+11	0.983E+10	0.573E+10
38.000	0.263E+11	0.100E+11	0.582E+10
39.000	0.268E+11	0.102E+11	0.591E+10
40.000	0.273E+11	0.103E+11	0.600E+10
41.000	0.278E+11	0.105E+11	0.608E+10
42.000	0.283E+11	0.106E+11	0.615E+10
43.000	0.287E+11	0.107E+11	0.623E+10
44.000	0.291E+11	0.108E+11	0.629E+10
45.000	0.295E+11	0.110E+11	0.636E+10
46.000	0.298E+11	0.111E+11	0.642E+10

47.000	0.301E+11	0.112E+11	0.647E+10
48.000	0.304E+11	0.113E+11	0.653E+10
49.000	0.307E+11	0.114E+11	0.658E+10
50.000	0.310E+11	0.114E+11	0.662E+10
51.000	0.312E+11	0.115E+11	0.667E+10
52.000	0.315E+11	0.116E+11	0.671E+10
53.000	0.317E+11	0.117E+11	0.675E+10
54.000	0.319E+11	0.117E+11	0.678E+10
55.000	0.321E+11	0.118E+11	0.681E+10
56.000	0.323E+11	0.118E+11	0.684E+10
57.000	0.324E+11	0.119E+11	0.687E+10
58.000	0.326E+11	0.119E+11	0.690E+10
59.000	0.327E+11	0.120E+11	0.692E+10
60.000	0.328E+11	0.120E+11	0.695E+10
61.000	0.330E+11	0.121E+11	0.697E+10
62.000	0.331E+11	0.121E+11	0.698E+10
63.000	0.332E+11	0.121E+11	0.700E+10
64.000	0.333E+11	0.122E+11	0.702E+10
65.000	0.333E+11	0.122E+11	0.703E+10
66.000	0.334E+11	0.122E+11	0.704E+10
67.000	0.335E+11	0.122E+11	0.705E+10
68.000	0.335E+11	0.122E+11	0.706E+10
69.000	0.336E+11	0.122E+11	0.707E+10
70.000	0.336E+11	0.123E+11	0.707E+10
71.000	0.337E+11	0.123E+11	0.708E+10
72.000	0.337E+11	0.123E+11	0.708E+10
73.000	0.337E+11	0.123E+11	0.709E+10
74.000	0.338E+11	0.123E+11	0.709E+10
75.000	0.338E+11	0.123E+11	0.709E+10
76.000	0.338E+11	0.123E+11	0.709E+10
77.000	0.338E+11	0.123E+11	0.709E+10
78.000	0.338E+11	0.123E+11	0.709E+10
79.000	0.338E+11	0.123E+11	0.708E+10
80.000	0.338E+11	0.123E+11	0.708E+10
81.000	0.337E+11	0.123E+11	0.707E+10
82.000	0.337E+11	0.123E+11	0.707E+10
83.000	0.337E+11	0.123E+11	0.706E+10
84.000	0.337E+11	0.122E+11	0.706E+10
85.000	0.337E+11	0.122E+11	0.705E+10
86.000	0.336E+11	0.122E+11	0.704E+10
87.000	0.336E+11	0.122E+11	0.703E+10
88.000	0.335E+11	0.122E+11	0.702E+10
89.000	0.335E+11	0.122E+11	0.701E+10
90.000	0.335E+11	0.122E+11	0.700E+10
91.000	0.334E+11	0.121E+11	0.699E+10
92.000	0.334E+11	0.121E+11	0.698E+10
93.000	0.333E+11	0.121E+11	0.697E+10
94.000	0.333E+11	0.121E+11	0.695E+10
95.000	0.332E+11	0.121E+11	0.694E+10
96.000	0.331E+11	0.120E+11	0.693E+10
97.000	0.331E+11	0.120E+11	0.691E+10
98.000	0.330E+11	0.120E+11	0.690E+10
99.000	0.330E+11	0.120E+11	0.688E+10
100.000	0.329E+11	0.119E+11	0.687E+10

La

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
57	(g/mole) 138.9055	(g/cm ³) 6.7	(cm ⁻¹) 50.269	(cm ⁻¹) 51.717	.2385	.5435

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
3.000	0.891E+07	0.851E+07	0.808E+07
3.125	0.108E+08	0.103E+08	0.973E+07
3.250	0.130E+08	0.123E+08	0.116E+08
3.375	0.155E+08	0.146E+08	0.137E+08
3.500	0.183E+08	0.172E+08	0.161E+08
3.625	0.214E+08	0.201E+08	0.188E+08
3.750	0.250E+08	0.234E+08	0.217E+08
3.875	0.290E+08	0.270E+08	0.250E+08
4.000	0.334E+08	0.310E+08	0.285E+08
4.125	0.383E+08	0.354E+08	0.324E+08
4.250	0.436E+08	0.402E+08	0.367E+08
4.375	0.495E+08	0.454E+08	0.413E+08
4.500	0.560E+08	0.511E+08	0.463E+08
4.625	0.630E+08	0.573E+08	0.517E+08
4.750	0.707E+08	0.640E+08	0.574E+08
4.875	0.790E+08	0.712E+08	0.636E+08
5.000	0.880E+08	0.789E+08	0.702E+08
5.125	0.976E+08	0.872E+08	0.772E+08
5.250	0.108E+09	0.960E+08	0.847E+08
5.375	0.119E+09	0.105E+09	0.925E+08
5.500	0.131E+09	0.115E+09	0.101E+09
5.625	0.144E+09	0.126E+09	0.110E+09
5.750	0.157E+09	0.137E+09	0.119E+09
5.875	0.172E+09	0.149E+09	0.129E+09
6.000	0.187E+09	0.162E+09	0.139E+09
6.125	0.203E+09	0.175E+09	0.149E+09
6.250	0.221E+09	0.189E+09	0.160E+09
6.375	0.239E+09	0.203E+09	0.172E+09
6.500	0.258E+09	0.218E+09	0.184E+09
6.625	0.278E+09	0.234E+09	0.196E+09
6.750	0.299E+09	0.251E+09	0.209E+09
6.875	0.322E+09	0.268E+09	0.223E+09
7.000	0.345E+09	0.286E+09	0.236E+09
7.125	0.370E+09	0.305E+09	0.251E+09
7.250	0.395E+09	0.324E+09	0.265E+09
7.375	0.422E+09	0.344E+09	0.281E+09
7.500	0.450E+09	0.365E+09	0.296E+09
7.625	0.479E+09	0.387E+09	0.312E+09
7.750	0.510E+09	0.409E+09	0.329E+09
7.875	0.541E+09	0.432E+09	0.346E+09
8.000	0.574E+09	0.456E+09	0.363E+09
8.250	0.644E+09	0.505E+09	0.399E+09
8.500	0.718E+09	0.558E+09	0.436E+09
8.750	0.799E+09	0.613E+09	0.475E+09
9.000	0.884E+09	0.671E+09	0.515E+09

9.250	0.975E+09	0.732E+09	0.557E+09
9.500	0.107E+10	0.795E+09	0.600E+09
9.750	0.117E+10	0.861E+09	0.644E+09
10.000	0.128E+10	0.929E+09	0.690E+09
10.250	0.140E+10	0.100E+10	0.736E+09
10.500	0.151E+10	0.107E+10	0.784E+09
10.750	0.164E+10	0.115E+10	0.832E+09
11.000	0.177E+10	0.123E+10	0.881E+09
11.250	0.191E+10	0.130E+10	0.931E+09
11.500	0.205E+10	0.139E+10	0.982E+09
11.750	0.219E+10	0.147E+10	0.103E+10
12.000	0.235E+10	0.155E+10	0.108E+10
12.250	0.251E+10	0.164E+10	0.114E+10
12.500	0.267E+10	0.173E+10	0.119E+10
12.750	0.284E+10	0.181E+10	0.124E+10
13.000	0.301E+10	0.190E+10	0.130E+10
13.250	0.319E+10	0.199E+10	0.135E+10
13.500	0.337E+10	0.209E+10	0.140E+10
13.750	0.356E+10	0.218E+10	0.146E+10
14.000	0.375E+10	0.227E+10	0.151E+10
14.500	0.415E+10	0.246E+10	0.162E+10
15.000	0.457E+10	0.265E+10	0.173E+10
15.500	0.500E+10	0.284E+10	0.184E+10
16.000	0.544E+10	0.303E+10	0.194E+10
16.500	0.590E+10	0.322E+10	0.205E+10
17.000	0.637E+10	0.341E+10	0.216E+10
17.500	0.684E+10	0.360E+10	0.226E+10
18.000	0.733E+10	0.379E+10	0.237E+10
18.500	0.782E+10	0.397E+10	0.247E+10
19.000	0.832E+10	0.416E+10	0.257E+10
19.500	0.882E+10	0.434E+10	0.267E+10
20.000	0.932E+10	0.452E+10	0.277E+10
21.000	0.103E+11	0.487E+10	0.296E+10
22.000	0.113E+11	0.521E+10	0.315E+10
23.000	0.123E+11	0.554E+10	0.333E+10
24.000	0.133E+11	0.585E+10	0.350E+10
25.000	0.143E+11	0.616E+10	0.367E+10
26.000	0.152E+11	0.645E+10	0.383E+10
27.000	0.161E+11	0.672E+10	0.398E+10
28.000	0.170E+11	0.699E+10	0.413E+10
29.000	0.178E+11	0.724E+10	0.427E+10
30.000	0.186E+11	0.749E+10	0.440E+10
31.000	0.194E+11	0.772E+10	0.453E+10
32.000	0.201E+11	0.794E+10	0.465E+10
33.000	0.208E+11	0.815E+10	0.477E+10
34.000	0.215E+11	0.835E+10	0.488E+10
35.000	0.221E+11	0.854E+10	0.498E+10
36.000	0.227E+11	0.872E+10	0.508E+10
37.000	0.233E+11	0.889E+10	0.518E+10
38.000	0.238E+11	0.905E+10	0.527E+10
39.000	0.243E+11	0.921E+10	0.536E+10
40.000	0.248E+11	0.935E+10	0.544E+10
41.000	0.252E+11	0.949E+10	0.551E+10
42.000	0.257E+11	0.962E+10	0.559E+10
43.000	0.261E+11	0.975E+10	0.566E+10
44.000	0.264E+11	0.987E+10	0.572E+10
45.000	0.268E+11	0.998E+10	0.579E+10
46.000	0.271E+11	0.101E+11	0.584E+10

47.000	0.274E+11	0.102E+11	0.590E+10
48.000	0.277E+11	0.103E+11	0.595E+10
49.000	0.280E+11	0.104E+11	0.600E+10
50.000	0.283E+11	0.104E+11	0.605E+10
51.000	0.285E+11	0.105E+11	0.609E+10
52.000	0.288E+11	0.106E+11	0.613E+10
53.000	0.290E+11	0.107E+11	0.617E+10
54.000	0.292E+11	0.107E+11	0.621E+10
55.000	0.294E+11	0.108E+11	0.624E+10
56.000	0.296E+11	0.108E+11	0.627E+10
57.000	0.297E+11	0.109E+11	0.630E+10
58.000	0.299E+11	0.110E+11	0.633E+10
59.000	0.300E+11	0.110E+11	0.636E+10
60.000	0.302E+11	0.110E+11	0.638E+10
61.000	0.303E+11	0.111E+11	0.640E+10
62.000	0.304E+11	0.111E+11	0.642E+10
63.000	0.305E+11	0.111E+11	0.644E+10
64.000	0.306E+11	0.112E+11	0.646E+10
65.000	0.307E+11	0.112E+11	0.647E+10
66.000	0.308E+11	0.112E+11	0.648E+10
67.000	0.308E+11	0.113E+11	0.650E+10
68.000	0.309E+11	0.113E+11	0.651E+10
69.000	0.310E+11	0.113E+11	0.652E+10
70.000	0.310E+11	0.113E+11	0.653E+10
71.000	0.311E+11	0.113E+11	0.653E+10
72.000	0.311E+11	0.113E+11	0.654E+10
73.000	0.311E+11	0.113E+11	0.655E+10
74.000	0.312E+11	0.114E+11	0.655E+10
75.000	0.312E+11	0.114E+11	0.655E+10
76.000	0.312E+11	0.114E+11	0.655E+10
77.000	0.312E+11	0.114E+11	0.656E+10
78.000	0.312E+11	0.114E+11	0.656E+10
79.000	0.312E+11	0.114E+11	0.656E+10
80.000	0.312E+11	0.114E+11	0.655E+10
81.000	0.312E+11	0.114E+11	0.655E+10
82.000	0.312E+11	0.114E+11	0.655E+10
83.000	0.312E+11	0.114E+11	0.655E+10
84.000	0.312E+11	0.113E+11	0.654E+10
85.000	0.312E+11	0.113E+11	0.654E+10
86.000	0.312E+11	0.113E+11	0.653E+10
87.000	0.312E+11	0.113E+11	0.652E+10
88.000	0.311E+11	0.113E+11	0.652E+10
89.000	0.311E+11	0.113E+11	0.651E+10
90.000	0.311E+11	0.113E+11	0.650E+10
91.000	0.310E+11	0.113E+11	0.649E+10
92.000	0.310E+11	0.113E+11	0.648E+10
93.000	0.310E+11	0.112E+11	0.648E+10
94.000	0.309E+11	0.112E+11	0.647E+10
95.000	0.309E+11	0.112E+11	0.645E+10
96.000	0.308E+11	0.112E+11	0.644E+10
97.000	0.308E+11	0.112E+11	0.643E+10
98.000	0.307E+11	0.112E+11	0.642E+10
99.000	0.307E+11	0.111E+11	0.641E+10
100.000	0.306E+11	0.111E+11	0.640E+10

Ce

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
	(g/mole)	(g/cm ³)	(cm ⁻¹)	(cm ⁻¹)		
58	140.12	6.78	49.989	51.583	.241	.545

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
3.000	0.737E+07	0.705E+07	0.670E+07
3.125	0.894E+07	0.852E+07	0.807E+07
3.250	0.108E+08	0.102E+08	0.964E+07
3.375	0.128E+08	0.121E+08	0.114E+08
3.500	0.152E+08	0.143E+08	0.134E+08
3.625	0.178E+08	0.167E+08	0.156E+08
3.750	0.208E+08	0.195E+08	0.181E+08
3.875	0.241E+08	0.225E+08	0.208E+08
4.000	0.278E+08	0.258E+08	0.238E+08
4.125	0.319E+08	0.295E+08	0.271E+08
4.250	0.364E+08	0.336E+08	0.307E+08
4.375	0.414E+08	0.380E+08	0.346E+08
4.500	0.468E+08	0.428E+08	0.388E+08
4.625	0.527E+08	0.480E+08	0.434E+08
4.750	0.591E+08	0.536E+08	0.483E+08
4.875	0.661E+08	0.597E+08	0.535E+08
5.000	0.737E+08	0.663E+08	0.591E+08
5.125	0.818E+08	0.732E+08	0.651E+08
5.250	0.906E+08	0.807E+08	0.714E+08
5.375	0.100E+09	0.887E+08	0.781E+08
5.500	0.110E+09	0.972E+08	0.852E+08
5.625	0.121E+09	0.106E+09	0.927E+08
5.750	0.132E+09	0.116E+09	0.101E+09
5.875	0.144E+09	0.126E+09	0.109E+09
6.000	0.157E+09	0.136E+09	0.117E+09
6.125	0.171E+09	0.148E+09	0.127E+09
6.250	0.186E+09	0.159E+09	0.136E+09
6.375	0.201E+09	0.172E+09	0.146E+09
6.500	0.217E+09	0.185E+09	0.156E+09
6.625	0.235E+09	0.198E+09	0.167E+09
6.750	0.253E+09	0.213E+09	0.178E+09
6.875	0.272E+09	0.227E+09	0.189E+09
7.000	0.291E+09	0.243E+09	0.201E+09
7.125	0.312E+09	0.259E+09	0.214E+09
7.250	0.334E+09	0.275E+09	0.226E+09
7.375	0.357E+09	0.293E+09	0.239E+09
7.500	0.381E+09	0.311E+09	0.253E+09
7.625	0.406E+09	0.329E+09	0.267E+09
7.750	0.432E+09	0.348E+09	0.281E+09
7.875	0.459E+09	0.368E+09	0.296E+09
8.000	0.487E+09	0.388E+09	0.311E+09
8.250	0.546E+09	0.431E+09	0.342E+09
8.500	0.610E+09	0.477E+09	0.374E+09
8.750	0.679E+09	0.524E+09	0.408E+09
9.000	0.752E+09	0.574E+09	0.443E+09

9.250	0.830E+09	0.627E+09	0.480E+09
9.500	0.913E+09	0.682E+09	0.517E+09
9.750	0.100E+10	0.739E+09	0.556E+09
10.000	0.109E+10	0.799E+09	0.596E+09
10.250	0.119E+10	0.860E+09	0.636E+09
10.500	0.129E+10	0.924E+09	0.678E+09
10.750	0.140E+10	0.990E+09	0.721E+09
11.000	0.152E+10	0.106E+10	0.764E+09
11.250	0.163E+10	0.113E+10	0.808E+09
11.500	0.176E+10	0.120E+10	0.853E+09
11.750	0.188E+10	0.127E+10	0.899E+09
12.000	0.202E+10	0.134E+10	0.945E+09
12.250	0.216E+10	0.142E+10	0.991E+09
12.500	0.230E+10	0.150E+10	0.104E+10
12.750	0.244E+10	0.158E+10	0.109E+10
13.000	0.260E+10	0.166E+10	0.113E+10
13.250	0.275E+10	0.174E+10	0.118E+10
13.500	0.291E+10	0.182E+10	0.123E+10
13.750	0.308E+10	0.190E+10	0.128E+10
14.000	0.325E+10	0.198E+10	0.133E+10
14.500	0.360E+10	0.215E+10	0.142E+10
15.000	0.396E+10	0.232E+10	0.152E+10
15.500	0.434E+10	0.249E+10	0.162E+10
16.000	0.474E+10	0.266E+10	0.172E+10
16.500	0.514E+10	0.283E+10	0.181E+10
17.000	0.556E+10	0.301E+10	0.191E+10
17.500	0.598E+10	0.318E+10	0.201E+10
18.000	0.641E+10	0.335E+10	0.210E+10
18.500	0.685E+10	0.352E+10	0.219E+10
19.000	0.730E+10	0.369E+10	0.229E+10
19.500	0.775E+10	0.385E+10	0.238E+10
20.000	0.821E+10	0.402E+10	0.247E+10
21.000	0.912E+10	0.434E+10	0.265E+10
22.000	0.100E+11	0.465E+10	0.282E+10
23.000	0.110E+11	0.496E+10	0.299E+10
24.000	0.119E+11	0.525E+10	0.315E+10
25.000	0.127E+11	0.553E+10	0.330E+10
26.000	0.136E+11	0.580E+10	0.345E+10
27.000	0.144E+11	0.606E+10	0.359E+10
28.000	0.152E+11	0.631E+10	0.373E+10
29.000	0.160E+11	0.655E+10	0.386E+10
30.000	0.168E+11	0.678E+10	0.399E+10
31.000	0.175E+11	0.700E+10	0.411E+10
32.000	0.182E+11	0.721E+10	0.423E+10
33.000	0.188E+11	0.741E+10	0.434E+10
34.000	0.195E+11	0.760E+10	0.444E+10
35.000	0.201E+11	0.778E+10	0.455E+10
36.000	0.206E+11	0.795E+10	0.464E+10
37.000	0.212E+11	0.812E+10	0.473E+10
38.000	0.217E+11	0.828E+10	0.482E+10
39.000	0.222E+11	0.843E+10	0.490E+10
40.000	0.226E+11	0.857E+10	0.498E+10
41.000	0.231E+11	0.870E+10	0.506E+10
42.000	0.235E+11	0.883E+10	0.513E+10
43.000	0.239E+11	0.895E+10	0.520E+10
44.000	0.242E+11	0.907E+10	0.526E+10
45.000	0.246E+11	0.918E+10	0.532E+10
46.000	0.249E+11	0.928E+10	0.538E+10

47.000	0.252E+11	0.938E+10	0.544E+10
48.000	0.255E+11	0.947E+10	0.549E+10
49.000	0.258E+11	0.956E+10	0.554E+10
50.000	0.261E+11	0.965E+10	0.559E+10
51.000	0.263E+11	0.972E+10	0.563E+10
52.000	0.266E+11	0.980E+10	0.567E+10
53.000	0.268E+11	0.987E+10	0.571E+10
54.000	0.270E+11	0.993E+10	0.575E+10
55.000	0.272E+11	0.100E+11	0.578E+10
56.000	0.274E+11	0.101E+11	0.581E+10
57.000	0.275E+11	0.101E+11	0.585E+10
58.000	0.277E+11	0.102E+11	0.587E+10
59.000	0.278E+11	0.102E+11	0.590E+10
60.000	0.280E+11	0.103E+11	0.593E+10
61.000	0.281E+11	0.103E+11	0.595E+10
62.000	0.282E+11	0.103E+11	0.597E+10
63.000	0.283E+11	0.104E+11	0.599E+10
64.000	0.284E+11	0.104E+11	0.601E+10
65.000	0.285E+11	0.104E+11	0.603E+10
66.000	0.286E+11	0.105E+11	0.604E+10
67.000	0.287E+11	0.105E+11	0.606E+10
68.000	0.288E+11	0.105E+11	0.607E+10
69.000	0.289E+11	0.105E+11	0.608E+10
70.000	0.289E+11	0.106E+11	0.609E+10
71.000	0.290E+11	0.106E+11	0.610E+10
72.000	0.290E+11	0.106E+11	0.611E+10
73.000	0.291E+11	0.106E+11	0.612E+10
74.000	0.291E+11	0.106E+11	0.612E+10
75.000	0.291E+11	0.106E+11	0.613E+10
76.000	0.292E+11	0.106E+11	0.613E+10
77.000	0.292E+11	0.106E+11	0.613E+10
78.000	0.292E+11	0.106E+11	0.614E+10
79.000	0.292E+11	0.106E+11	0.614E+10
80.000	0.293E+11	0.106E+11	0.614E+10
81.000	0.293E+11	0.106E+11	0.614E+10
82.000	0.293E+11	0.106E+11	0.614E+10
83.000	0.293E+11	0.106E+11	0.614E+10
84.000	0.293E+11	0.106E+11	0.614E+10
85.000	0.293E+11	0.106E+11	0.613E+10
86.000	0.292E+11	0.106E+11	0.613E+10
87.000	0.292E+11	0.106E+11	0.613E+10
88.000	0.292E+11	0.106E+11	0.612E+10
89.000	0.292E+11	0.106E+11	0.612E+10
90.000	0.292E+11	0.106E+11	0.611E+10
91.000	0.292E+11	0.106E+11	0.610E+10
92.000	0.291E+11	0.106E+11	0.610E+10
93.000	0.291E+11	0.106E+11	0.609E+10
94.000	0.291E+11	0.106E+11	0.608E+10
95.000	0.290E+11	0.105E+11	0.607E+10
96.000	0.290E+11	0.105E+11	0.607E+10
97.000	0.290E+11	0.105E+11	0.606E+10
98.000	0.289E+11	0.105E+11	0.605E+10
99.000	0.289E+11	0.105E+11	0.604E+10
100.000	0.288E+11	0.105E+11	0.603E+10

Pr

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
59	140.9077	6.77	48.069	49.942	.2435	.5465

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
3.000	0.617E+07	0.591E+07	0.563E+07
3.125	0.750E+07	0.716E+07	0.679E+07
3.250	0.902E+07	0.858E+07	0.812E+07
3.375	0.108E+08	0.102E+08	0.962E+07
3.500	0.127E+08	0.120E+08	0.113E+08
3.625	0.150E+08	0.141E+08	0.132E+08
3.750	0.175E+08	0.164E+08	0.153E+08
3.875	0.203E+08	0.190E+08	0.176E+08
4.000	0.234E+08	0.218E+08	0.202E+08
4.125	0.269E+08	0.250E+08	0.230E+08
4.250	0.307E+08	0.284E+08	0.261E+08
4.375	0.350E+08	0.322E+08	0.294E+08
4.500	0.396E+08	0.363E+08	0.331E+08
4.625	0.446E+08	0.408E+08	0.370E+08
4.750	0.501E+08	0.456E+08	0.412E+08
4.875	0.560E+08	0.508E+08	0.457E+08
5.000	0.625E+08	0.564E+08	0.505E+08
5.125	0.694E+08	0.624E+08	0.556E+08
5.250	0.769E+08	0.688E+08	0.611E+08
5.375	0.849E+08	0.757E+08	0.669E+08
5.500	0.935E+08	0.830E+08	0.730E+08
5.625	0.103E+09	0.907E+08	0.795E+08
5.750	0.113E+09	0.989E+08	0.863E+08
5.875	0.123E+09	0.108E+09	0.935E+08
6.000	0.134E+09	0.117E+09	0.101E+09
6.125	0.146E+09	0.127E+09	0.109E+09
6.250	0.158E+09	0.137E+09	0.117E+09
6.375	0.172E+09	0.147E+09	0.126E+09
6.500	0.186E+09	0.159E+09	0.135E+09
6.625	0.200E+09	0.170E+09	0.144E+09
6.750	0.216E+09	0.183E+09	0.154E+09
6.875	0.232E+09	0.196E+09	0.164E+09
7.000	0.249E+09	0.209E+09	0.174E+09
7.125	0.267E+09	0.223E+09	0.185E+09
7.250	0.286E+09	0.237E+09	0.196E+09
7.375	0.306E+09	0.252E+09	0.208E+09
7.500	0.326E+09	0.268E+09	0.219E+09
7.625	0.348E+09	0.284E+09	0.232E+09
7.750	0.370E+09	0.301E+09	0.244E+09
7.875	0.394E+09	0.318E+09	0.257E+09
8.000	0.418E+09	0.336E+09	0.270E+09
8.250	0.469E+09	0.373E+09	0.298E+09
8.500	0.525E+09	0.413E+09	0.326E+09
8.750	0.585E+09	0.455E+09	0.356E+09
9.000	0.648E+09	0.499E+09	0.388E+09

9.250	0.716E+09	0.546E+09	0.420E+09
9.500	0.789E+09	0.594E+09	0.454E+09
9.750	0.865E+09	0.645E+09	0.488E+09
10.000	0.946E+09	0.698E+09	0.524E+09
10.250	0.103E+10	0.752E+09	0.560E+09
10.500	0.112E+10	0.809E+09	0.598E+09
10.750	0.122E+10	0.867E+09	0.636E+09
11.000	0.132E+10	0.928E+09	0.675E+09
11.250	0.142E+10	0.990E+09	0.715E+09
11.500	0.153E+10	0.105E+10	0.756E+09
11.750	0.164E+10	0.112E+10	0.797E+09
12.000	0.176E+10	0.119E+10	0.838E+09
12.250	0.188E+10	0.125E+10	0.881E+09
12.500	0.200E+10	0.132E+10	0.923E+09
12.750	0.213E+10	0.139E+10	0.967E+09
13.000	0.227E+10	0.147E+10	0.101E+10
13.250	0.241E+10	0.154E+10	0.105E+10
13.500	0.255E+10	0.161E+10	0.110E+10
13.750	0.270E+10	0.169E+10	0.114E+10
14.000	0.285E+10	0.176E+10	0.119E+10
14.500	0.316E+10	0.191E+10	0.128E+10
15.000	0.349E+10	0.207E+10	0.137E+10
15.500	0.383E+10	0.223E+10	0.146E+10
16.000	0.418E+10	0.239E+10	0.155E+10
16.500	0.455E+10	0.254E+10	0.164E+10
17.000	0.492E+10	0.270E+10	0.173E+10
17.500	0.531E+10	0.286E+10	0.182E+10
18.000	0.570E+10	0.302E+10	0.190E+10
18.500	0.611E+10	0.318E+10	0.199E+10
19.000	0.651E+10	0.334E+10	0.208E+10
19.500	0.693E+10	0.349E+10	0.216E+10
20.000	0.734E+10	0.364E+10	0.225E+10
21.000	0.819E+10	0.395E+10	0.242E+10
22.000	0.904E+10	0.424E+10	0.258E+10
23.000	0.988E+10	0.453E+10	0.274E+10
24.000	0.107E+11	0.481E+10	0.289E+10
25.000	0.116E+11	0.508E+10	0.304E+10
26.000	0.124E+11	0.533E+10	0.318E+10
27.000	0.132E+11	0.558E+10	0.332E+10
28.000	0.139E+11	0.582E+10	0.345E+10
29.000	0.147E+11	0.605E+10	0.358E+10
30.000	0.154E+11	0.627E+10	0.370E+10
31.000	0.161E+11	0.649E+10	0.382E+10
32.000	0.168E+11	0.669E+10	0.393E+10
33.000	0.174E+11	0.688E+10	0.404E+10
34.000	0.180E+11	0.707E+10	0.414E+10
35.000	0.186E+11	0.725E+10	0.424E+10
36.000	0.191E+11	0.742E+10	0.433E+10
37.000	0.197E+11	0.758E+10	0.442E+10
38.000	0.202E+11	0.773E+10	0.451E+10
39.000	0.207E+11	0.788E+10	0.459E+10
40.000	0.211E+11	0.802E+10	0.467E+10
41.000	0.215E+11	0.815E+10	0.474E+10
42.000	0.220E+11	0.828E+10	0.482E+10
43.000	0.223E+11	0.840E+10	0.488E+10
44.000	0.227E+11	0.852E+10	0.495E+10
45.000	0.231E+11	0.863E+10	0.501E+10
46.000	0.234E+11	0.873E+10	0.507E+10

47.000	0.237E+11	0.883E+10	0.512E+10
48.000	0.240E+11	0.893E+10	0.518E+10
49.000	0.243E+11	0.902E+10	0.523E+10
50.000	0.246E+11	0.910E+10	0.527E+10
51.000	0.248E+11	0.918E+10	0.532E+10
52.000	0.250E+11	0.926E+10	0.536E+10
53.000	0.253E+11	0.933E+10	0.540E+10
54.000	0.255E+11	0.940E+10	0.544E+10
55.000	0.257E+11	0.946E+10	0.548E+10
56.000	0.259E+11	0.952E+10	0.551E+10
57.000	0.261E+11	0.958E+10	0.554E+10
58.000	0.262E+11	0.963E+10	0.557E+10
59.000	0.264E+11	0.969E+10	0.560E+10
60.000	0.265E+11	0.973E+10	0.563E+10
61.000	0.267E+11	0.978E+10	0.565E+10
62.000	0.268E+11	0.982E+10	0.567E+10
63.000	0.269E+11	0.986E+10	0.570E+10
64.000	0.270E+11	0.989E+10	0.572E+10
65.000	0.271E+11	0.993E+10	0.574E+10
66.000	0.272E+11	0.996E+10	0.575E+10
67.000	0.273E+11	0.999E+10	0.577E+10
68.000	0.274E+11	0.100E+11	0.578E+10
69.000	0.275E+11	0.100E+11	0.580E+10
70.000	0.276E+11	0.101E+11	0.581E+10
71.000	0.276E+11	0.101E+11	0.582E+10
72.000	0.277E+11	0.101E+11	0.583E+10
73.000	0.277E+11	0.101E+11	0.584E+10
74.000	0.278E+11	0.101E+11	0.585E+10
75.000	0.278E+11	0.101E+11	0.586E+10
76.000	0.279E+11	0.102E+11	0.586E+10
77.000	0.279E+11	0.102E+11	0.587E+10
78.000	0.279E+11	0.102E+11	0.587E+10
79.000	0.280E+11	0.102E+11	0.588E+10
80.000	0.280E+11	0.102E+11	0.588E+10
81.000	0.280E+11	0.102E+11	0.588E+10
82.000	0.280E+11	0.102E+11	0.588E+10
83.000	0.280E+11	0.102E+11	0.588E+10
84.000	0.280E+11	0.102E+11	0.588E+10
85.000	0.280E+11	0.102E+11	0.588E+10
86.000	0.280E+11	0.102E+11	0.588E+10
87.000	0.280E+11	0.102E+11	0.588E+10
88.000	0.280E+11	0.102E+11	0.588E+10
89.000	0.280E+11	0.102E+11	0.587E+10
90.000	0.280E+11	0.102E+11	0.587E+10
91.000	0.280E+11	0.102E+11	0.586E+10
92.000	0.280E+11	0.102E+11	0.586E+10
93.000	0.280E+11	0.102E+11	0.585E+10
94.000	0.279E+11	0.102E+11	0.585E+10
95.000	0.279E+11	0.101E+11	0.584E+10
96.000	0.279E+11	0.101E+11	0.584E+10
97.000	0.279E+11	0.101E+11	0.583E+10
98.000	0.278E+11	0.101E+11	0.582E+10
99.000	0.278E+11	0.101E+11	0.581E+10
100.000	0.278E+11	0.101E+11	0.581E+10

Nd

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
60	(g/mole) 144.24	(g/cm ³) 7.00	(cm ⁻¹) 46.279	(cm ⁻¹) 48.457	.246	.548

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
3.000	0.518E+07	0.497E+07	0.475E+07
3.125	0.630E+07	0.602E+07	0.573E+07
3.250	0.758E+07	0.723E+07	0.686E+07
3.375	0.906E+07	0.861E+07	0.814E+07
3.500	0.107E+08	0.102E+08	0.958E+07
3.625	0.126E+08	0.119E+08	0.112E+08
3.750	0.148E+08	0.139E+08	0.130E+08
3.875	0.171E+08	0.161E+08	0.150E+08
4.000	0.198E+08	0.185E+08	0.172E+08
4.125	0.228E+08	0.212E+08	0.196E+08
4.250	0.260E+08	0.241E+08	0.223E+08
4.375	0.296E+08	0.274E+08	0.251E+08
4.500	0.335E+08	0.309E+08	0.282E+08
4.625	0.378E+08	0.347E+08	0.316E+08
4.750	0.425E+08	0.388E+08	0.352E+08
4.875	0.475E+08	0.433E+08	0.391E+08
5.000	0.530E+08	0.481E+08	0.433E+08
5.125	0.590E+08	0.533E+08	0.478E+08
5.250	0.654E+08	0.588E+08	0.525E+08
5.375	0.722E+08	0.647E+08	0.575E+08
5.500	0.796E+08	0.710E+08	0.629E+08
5.625	0.875E+08	0.777E+08	0.685E+08
5.750	0.959E+08	0.849E+08	0.745E+08
5.875	0.105E+09	0.924E+08	0.807E+08
6.000	0.114E+09	0.100E+09	0.873E+08
6.125	0.125E+09	0.109E+09	0.942E+08
6.250	0.135E+09	0.118E+09	0.101E+09
6.375	0.147E+09	0.127E+09	0.109E+09
6.500	0.159E+09	0.137E+09	0.117E+09
6.625	0.171E+09	0.147E+09	0.125E+09
6.750	0.185E+09	0.158E+09	0.134E+09
6.875	0.199E+09	0.169E+09	0.143E+09
7.000	0.214E+09	0.181E+09	0.152E+09
7.125	0.229E+09	0.193E+09	0.161E+09
7.250	0.245E+09	0.205E+09	0.171E+09
7.375	0.262E+09	0.219E+09	0.181E+09
7.500	0.280E+09	0.232E+09	0.192E+09
7.625	0.299E+09	0.246E+09	0.203E+09
7.750	0.318E+09	0.261E+09	0.214E+09
7.875	0.339E+09	0.276E+09	0.225E+09
8.000	0.360E+09	0.292E+09	0.237E+09
8.250	0.404E+09	0.325E+09	0.261E+09
8.500	0.453E+09	0.360E+09	0.287E+09
8.750	0.504E+09	0.397E+09	0.314E+09
9.000	0.560E+09	0.436E+09	0.342E+09

9.250	0.619E+09	0.478E+09	0.371E+09
9.500	0.683E+09	0.521E+09	0.402E+09
9.750	0.750E+09	0.566E+09	0.433E+09
10.000	0.821E+09	0.613E+09	0.465E+09
10.250	0.896E+09	0.662E+09	0.498E+09
10.500	0.975E+09	0.713E+09	0.532E+09
10.750	0.106E+10	0.765E+09	0.567E+09
11.000	0.115E+10	0.820E+09	0.603E+09
11.250	0.124E+10	0.876E+09	0.639E+09
11.500	0.133E+10	0.933E+09	0.676E+09
11.750	0.143E+10	0.992E+09	0.714E+09
12.000	0.154E+10	0.105E+10	0.752E+09
12.250	0.164E+10	0.111E+10	0.791E+09
12.500	0.176E+10	0.118E+10	0.831E+09
12.750	0.187E+10	0.124E+10	0.871E+09
13.000	0.199E+10	0.131E+10	0.911E+09
13.250	0.212E+10	0.137E+10	0.951E+09
13.500	0.224E+10	0.144E+10	0.992E+09
13.750	0.237E+10	0.151E+10	0.103E+10
14.000	0.251E+10	0.158E+10	0.108E+10
14.500	0.279E+10	0.172E+10	0.116E+10
15.000	0.309E+10	0.187E+10	0.124E+10
15.500	0.339E+10	0.201E+10	0.133E+10
16.000	0.372E+10	0.216E+10	0.141E+10
16.500	0.405E+10	0.231E+10	0.150E+10
17.000	0.439E+10	0.246E+10	0.158E+10
17.500	0.474E+10	0.261E+10	0.167E+10
18.000	0.510E+10	0.276E+10	0.175E+10
18.500	0.547E+10	0.291E+10	0.183E+10
19.000	0.585E+10	0.305E+10	0.192E+10
19.500	0.623E+10	0.320E+10	0.200E+10
20.000	0.662E+10	0.335E+10	0.208E+10
21.000	0.740E+10	0.364E+10	0.224E+10
22.000	0.820E+10	0.392E+10	0.239E+10
23.000	0.900E+10	0.420E+10	0.255E+10
24.000	0.980E+10	0.446E+10	0.269E+10
25.000	0.106E+11	0.472E+10	0.284E+10
26.000	0.114E+11	0.497E+10	0.297E+10
27.000	0.121E+11	0.522E+10	0.311E+10
28.000	0.129E+11	0.545E+10	0.324E+10
29.000	0.136E+11	0.567E+10	0.336E+10
30.000	0.143E+11	0.589E+10	0.348E+10
31.000	0.150E+11	0.610E+10	0.359E+10
32.000	0.156E+11	0.630E+10	0.371E+10
33.000	0.163E+11	0.649E+10	0.381E+10
34.000	0.169E+11	0.667E+10	0.391E+10
35.000	0.174E+11	0.685E+10	0.401E+10
36.000	0.180E+11	0.702E+10	0.411E+10
37.000	0.185E+11	0.718E+10	0.419E+10
38.000	0.190E+11	0.733E+10	0.428E+10
39.000	0.195E+11	0.748E+10	0.436E+10
40.000	0.200E+11	0.762E+10	0.444E+10
41.000	0.204E+11	0.776E+10	0.452E+10
42.000	0.208E+11	0.789E+10	0.459E+10
43.000	0.212E+11	0.801E+10	0.466E+10
44.000	0.216E+11	0.813E+10	0.472E+10
45.000	0.219E+11	0.824E+10	0.479E+10
46.000	0.223E+11	0.834E+10	0.484E+10

47.000	0.226E+11	0.845E+10	0.490E+10
48.000	0.229E+11	0.854E+10	0.496E+10
49.000	0.232E+11	0.863E+10	0.501E+10
50.000	0.235E+11	0.872E+10	0.506E+10
51.000	0.237E+11	0.880E+10	0.510E+10
52.000	0.240E+11	0.888E+10	0.515E+10
53.000	0.242E+11	0.896E+10	0.519E+10
54.000	0.244E+11	0.903E+10	0.523E+10
55.000	0.246E+11	0.910E+10	0.527E+10
56.000	0.248E+11	0.916E+10	0.530E+10
57.000	0.250E+11	0.922E+10	0.534E+10
58.000	0.252E+11	0.928E+10	0.537E+10
59.000	0.254E+11	0.933E+10	0.540E+10
60.000	0.255E+11	0.938E+10	0.543E+10
61.000	0.257E+11	0.943E+10	0.545E+10
62.000	0.258E+11	0.948E+10	0.548E+10
63.000	0.260E+11	0.952E+10	0.550E+10
64.000	0.261E+11	0.956E+10	0.552E+10
65.000	0.262E+11	0.959E+10	0.554E+10
66.000	0.263E+11	0.963E+10	0.556E+10
67.000	0.264E+11	0.966E+10	0.558E+10
68.000	0.265E+11	0.969E+10	0.560E+10
69.000	0.266E+11	0.972E+10	0.561E+10
70.000	0.267E+11	0.975E+10	0.563E+10
71.000	0.267E+11	0.977E+10	0.564E+10
72.000	0.268E+11	0.979E+10	0.565E+10
73.000	0.269E+11	0.981E+10	0.566E+10
74.000	0.269E+11	0.983E+10	0.568E+10
75.000	0.270E+11	0.985E+10	0.568E+10
76.000	0.270E+11	0.986E+10	0.569E+10
77.000	0.271E+11	0.988E+10	0.570E+10
78.000	0.271E+11	0.989E+10	0.571E+10
79.000	0.272E+11	0.990E+10	0.571E+10
80.000	0.272E+11	0.991E+10	0.572E+10
81.000	0.272E+11	0.992E+10	0.572E+10
82.000	0.272E+11	0.992E+10	0.572E+10
83.000	0.273E+11	0.993E+10	0.573E+10
84.000	0.273E+11	0.993E+10	0.573E+10
85.000	0.273E+11	0.994E+10	0.573E+10
86.000	0.273E+11	0.994E+10	0.573E+10
87.000	0.273E+11	0.994E+10	0.573E+10
88.000	0.273E+11	0.994E+10	0.573E+10
89.000	0.273E+11	0.994E+10	0.573E+10
90.000	0.273E+11	0.993E+10	0.573E+10
91.000	0.273E+11	0.993E+10	0.572E+10
92.000	0.273E+11	0.993E+10	0.572E+10
93.000	0.273E+11	0.992E+10	0.572E+10
94.000	0.273E+11	0.991E+10	0.571E+10
95.000	0.273E+11	0.991E+10	0.571E+10
96.000	0.272E+11	0.990E+10	0.570E+10
97.000	0.272E+11	0.989E+10	0.570E+10
98.000	0.272E+11	0.988E+10	0.569E+10
99.000	0.272E+11	0.987E+10	0.569E+10
100.000	0.272E+11	0.986E+10	0.568E+10

Sm

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
	(g/mole)	(g/cm ³)	(cm ⁻¹)	(cm ⁻¹)		
62	150.4	7.54	41.444	44.095	.250	.552

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
3.000	0.368E+07	0.355E+07	0.341E+07
3.125	0.448E+07	0.431E+07	0.413E+07
3.250	0.541E+07	0.519E+07	0.496E+07
3.375	0.647E+07	0.619E+07	0.590E+07
3.500	0.768E+07	0.733E+07	0.696E+07
3.625	0.905E+07	0.861E+07	0.816E+07
3.750	0.106E+08	0.101E+08	0.949E+07
3.875	0.123E+08	0.117E+08	0.110E+08
4.000	0.143E+08	0.135E+08	0.126E+08
4.125	0.164E+08	0.154E+08	0.144E+08
4.250	0.188E+08	0.176E+08	0.164E+08
4.375	0.214E+08	0.200E+08	0.186E+08
4.500	0.243E+08	0.226E+08	0.209E+08
4.625	0.274E+08	0.254E+08	0.235E+08
4.750	0.308E+08	0.285E+08	0.262E+08
4.875	0.346E+08	0.319E+08	0.292E+08
5.000	0.386E+08	0.355E+08	0.324E+08
5.125	0.430E+08	0.394E+08	0.358E+08
5.250	0.477E+08	0.435E+08	0.394E+08
5.375	0.528E+08	0.480E+08	0.433E+08
5.500	0.582E+08	0.528E+08	0.474E+08
5.625	0.641E+08	0.578E+08	0.518E+08
5.750	0.703E+08	0.632E+08	0.564E+08
5.875	0.770E+08	0.690E+08	0.613E+08
6.000	0.841E+08	0.751E+08	0.664E+08
6.125	0.917E+08	0.815E+08	0.718E+08
6.250	0.997E+08	0.883E+08	0.775E+08
6.375	0.108E+09	0.954E+08	0.835E+08
6.500	0.117E+09	0.103E+09	0.897E+08
6.625	0.127E+09	0.111E+09	0.962E+08
6.750	0.137E+09	0.119E+09	0.103E+09
6.875	0.147E+09	0.128E+09	0.110E+09
7.000	0.158E+09	0.137E+09	0.117E+09
7.125	0.170E+09	0.146E+09	0.125E+09
7.250	0.182E+09	0.156E+09	0.133E+09
7.375	0.195E+09	0.167E+09	0.141E+09
7.500	0.209E+09	0.177E+09	0.150E+09
7.625	0.223E+09	0.188E+09	0.158E+09
7.750	0.238E+09	0.200E+09	0.167E+09
7.875	0.253E+09	0.212E+09	0.177E+09
8.000	0.269E+09	0.224E+09	0.186E+09
8.250	0.303E+09	0.251E+09	0.206E+09
8.500	0.340E+09	0.279E+09	0.228E+09
8.750	0.380E+09	0.308E+09	0.250E+09
9.000	0.422E+09	0.340E+09	0.273E+09

9.250	0.468E+09	0.373E+09	0.298E+09
9.500	0.517E+09	0.408E+09	0.323E+09
9.750	0.569E+09	0.445E+09	0.349E+09
10.000	0.624E+09	0.483E+09	0.377E+09
10.250	0.683E+09	0.524E+09	0.405E+09
10.500	0.745E+09	0.565E+09	0.434E+09
10.750	0.810E+09	0.609E+09	0.464E+09
11.000	0.879E+09	0.654E+09	0.495E+09
11.250	0.951E+09	0.701E+09	0.527E+09
11.500	0.103E+10	0.749E+09	0.559E+09
11.750	0.111E+10	0.799E+09	0.592E+09
12.000	0.119E+10	0.851E+09	0.626E+09
12.250	0.127E+10	0.903E+09	0.660E+09
12.500	0.136E+10	0.957E+09	0.695E+09
12.750	0.146E+10	0.101E+10	0.730E+09
13.000	0.155E+10	0.107E+10	0.766E+09
13.250	0.165E+10	0.113E+10	0.802E+09
13.500	0.176E+10	0.119E+10	0.839E+09
13.750	0.187E+10	0.125E+10	0.876E+09
14.000	0.198E+10	0.131E+10	0.914E+09
14.500	0.221E+10	0.143E+10	0.990E+09
15.000	0.245E+10	0.156E+10	0.107E+10
15.500	0.271E+10	0.169E+10	0.114E+10
16.000	0.298E+10	0.182E+10	0.122E+10
16.500	0.326E+10	0.196E+10	0.130E+10
17.000	0.355E+10	0.210E+10	0.138E+10
17.500	0.385E+10	0.223E+10	0.146E+10
18.000	0.416E+10	0.237E+10	0.154E+10
18.500	0.448E+10	0.251E+10	0.162E+10
19.000	0.481E+10	0.265E+10	0.170E+10
19.500	0.515E+10	0.279E+10	0.177E+10
20.000	0.549E+10	0.293E+10	0.185E+10
21.000	0.619E+10	0.320E+10	0.200E+10
22.000	0.691E+10	0.348E+10	0.215E+10
23.000	0.764E+10	0.374E+10	0.230E+10
24.000	0.838E+10	0.400E+10	0.244E+10
25.000	0.912E+10	0.426E+10	0.258E+10
26.000	0.986E+10	0.451E+10	0.272E+10
27.000	0.106E+11	0.475E+10	0.285E+10
28.000	0.113E+11	0.498E+10	0.298E+10
29.000	0.120E+11	0.521E+10	0.310E+10
30.000	0.127E+11	0.542E+10	0.322E+10
31.000	0.134E+11	0.563E+10	0.334E+10
32.000	0.141E+11	0.584E+10	0.345E+10
33.000	0.147E+11	0.603E+10	0.356E+10
34.000	0.153E+11	0.622E+10	0.366E+10
35.000	0.159E+11	0.640E+10	0.377E+10
36.000	0.165E+11	0.658E+10	0.386E+10
37.000	0.170E+11	0.674E+10	0.395E+10
38.000	0.176E+11	0.691E+10	0.404E+10
39.000	0.181E+11	0.706E+10	0.413E+10
40.000	0.186E+11	0.721E+10	0.421E+10
41.000	0.190E+11	0.735E+10	0.429E+10
42.000	0.195E+11	0.749E+10	0.437E+10
43.000	0.199E+11	0.762E+10	0.444E+10
44.000	0.203E+11	0.774E+10	0.451E+10
45.000	0.207E+11	0.786E+10	0.458E+10
46.000	0.211E+11	0.798E+10	0.464E+10

47.000	0.214E+11	0.809E+10	0.470E+10
48.000	0.218E+11	0.819E+10	0.476E+10
49.000	0.221E+11	0.829E+10	0.482E+10
50.000	0.224E+11	0.839E+10	0.487E+10
51.000	0.227E+11	0.848E+10	0.492E+10
52.000	0.230E+11	0.857E+10	0.497E+10
53.000	0.232E+11	0.865E+10	0.502E+10
54.000	0.235E+11	0.873E+10	0.506E+10
55.000	0.237E+11	0.881E+10	0.510E+10
56.000	0.240E+11	0.888E+10	0.515E+10
57.000	0.242E+11	0.895E+10	0.518E+10
58.000	0.244E+11	0.902E+10	0.522E+10
59.000	0.246E+11	0.908E+10	0.526E+10
60.000	0.248E+11	0.914E+10	0.529E+10
61.000	0.249E+11	0.919E+10	0.532E+10
62.000	0.251E+11	0.925E+10	0.535E+10
63.000	0.253E+11	0.930E+10	0.538E+10
64.000	0.254E+11	0.935E+10	0.541E+10
65.000	0.256E+11	0.939E+10	0.543E+10
66.000	0.257E+11	0.943E+10	0.545E+10
67.000	0.258E+11	0.948E+10	0.548E+10
68.000	0.259E+11	0.951E+10	0.550E+10
69.000	0.261E+11	0.955E+10	0.552E+10
70.000	0.262E+11	0.958E+10	0.554E+10
71.000	0.263E+11	0.961E+10	0.556E+10
72.000	0.264E+11	0.964E+10	0.557E+10
73.000	0.264E+11	0.967E+10	0.559E+10
74.000	0.265E+11	0.970E+10	0.560E+10
75.000	0.266E+11	0.972E+10	0.562E+10
76.000	0.267E+11	0.974E+10	0.563E+10
77.000	0.267E+11	0.977E+10	0.564E+10
78.000	0.268E+11	0.978E+10	0.565E+10
79.000	0.269E+11	0.980E+10	0.566E+10
80.000	0.269E+11	0.982E+10	0.567E+10
81.000	0.270E+11	0.983E+10	0.568E+10
82.000	0.270E+11	0.985E+10	0.568E+10
83.000	0.270E+11	0.986E+10	0.569E+10
84.000	0.271E+11	0.987E+10	0.569E+10
85.000	0.271E+11	0.988E+10	0.570E+10
86.000	0.271E+11	0.989E+10	0.570E+10
87.000	0.272E+11	0.989E+10	0.571E+10
88.000	0.272E+11	0.990E+10	0.571E+10
89.000	0.272E+11	0.990E+10	0.571E+10
90.000	0.272E+11	0.991E+10	0.571E+10
91.000	0.272E+11	0.991E+10	0.571E+10
92.000	0.272E+11	0.991E+10	0.571E+10
93.000	0.272E+11	0.991E+10	0.571E+10
94.000	0.272E+11	0.991E+10	0.571E+10
95.000	0.272E+11	0.991E+10	0.571E+10
96.000	0.272E+11	0.991E+10	0.571E+10
97.000	0.272E+11	0.990E+10	0.571E+10
98.000	0.272E+11	0.990E+10	0.571E+10
99.000	0.272E+11	0.989E+10	0.570E+10
100.000	0.272E+11	0.989E+10	0.570E+10

Eu

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
63	(g/mole) 151.96	(g/cm ³) 5.26	(cm ⁻¹) 28.374	(cm ⁻¹) 29.320	.252	.5535

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
3.000	0.311E+07	0.301E+07	0.289E+07
3.125	0.379E+07	0.365E+07	0.350E+07
3.250	0.458E+07	0.440E+07	0.421E+07
3.375	0.548E+07	0.525E+07	0.501E+07
3.500	0.651E+07	0.622E+07	0.592E+07
3.625	0.768E+07	0.732E+07	0.694E+07
3.750	0.899E+07	0.855E+07	0.808E+07
3.875	0.105E+08	0.992E+07	0.935E+07
4.000	0.121E+08	0.114E+08	0.108E+08
4.125	0.139E+08	0.131E+08	0.123E+08
4.250	0.160E+08	0.150E+08	0.140E+08
4.375	0.182E+08	0.170E+08	0.159E+08
4.500	0.207E+08	0.193E+08	0.179E+08
4.625	0.233E+08	0.217E+08	0.201E+08
4.750	0.263E+08	0.244E+08	0.224E+08
4.875	0.295E+08	0.272E+08	0.250E+08
5.000	0.329E+08	0.303E+08	0.277E+08
5.125	0.367E+08	0.337E+08	0.307E+08
5.250	0.407E+08	0.373E+08	0.338E+08
5.375	0.451E+08	0.411E+08	0.372E+08
5.500	0.498E+08	0.452E+08	0.408E+08
5.625	0.548E+08	0.496E+08	0.445E+08
5.750	0.602E+08	0.543E+08	0.486E+08
5.875	0.659E+08	0.592E+08	0.528E+08
6.000	0.720E+08	0.645E+08	0.573E+08
6.125	0.786E+08	0.700E+08	0.619E+08
6.250	0.855E+08	0.759E+08	0.669E+08
6.375	0.928E+08	0.821E+08	0.721E+08
6.500	0.101E+09	0.886E+08	0.775E+08
6.625	0.109E+09	0.955E+08	0.831E+08
6.750	0.117E+09	0.103E+09	0.891E+08
6.875	0.127E+09	0.110E+09	0.952E+08
7.000	0.136E+09	0.118E+09	0.102E+09
7.125	0.146E+09	0.126E+09	0.108E+09
7.250	0.157E+09	0.135E+09	0.115E+09
7.375	0.168E+09	0.144E+09	0.122E+09
7.500	0.180E+09	0.153E+09	0.130E+09
7.625	0.192E+09	0.163E+09	0.138E+09
7.750	0.205E+09	0.173E+09	0.145E+09
7.875	0.218E+09	0.183E+09	0.154E+09
8.000	0.232E+09	0.194E+09	0.162E+09
8.250	0.262E+09	0.217E+09	0.180E+09
8.500	0.294E+09	0.242E+09	0.198E+09
8.750	0.328E+09	0.268E+09	0.218E+09
9.000	0.365E+09	0.295E+09	0.239E+09

9.250	0.405E+09	0.324E+09	0.260E+09
9.500	0.448E+09	0.355E+09	0.283E+09
9.750	0.493E+09	0.388E+09	0.306E+09
10.000	0.541E+09	0.422E+09	0.330E+09
10.250	0.592E+09	0.457E+09	0.355E+09
10.500	0.646E+09	0.494E+09	0.381E+09
10.750	0.704E+09	0.533E+09	0.408E+09
11.000	0.764E+09	0.573E+09	0.435E+09
11.250	0.827E+09	0.614E+09	0.464E+09
11.500	0.893E+09	0.657E+09	0.492E+09
11.750	0.963E+09	0.701E+09	0.522E+09
12.000	0.104E+10	0.747E+09	0.552E+09
12.250	0.111E+10	0.794E+09	0.583E+09
12.500	0.119E+10	0.842E+09	0.614E+09
12.750	0.127E+10	0.891E+09	0.646E+09
13.000	0.136E+10	0.942E+09	0.678E+09
13.250	0.145E+10	0.994E+09	0.711E+09
13.500	0.154E+10	0.105E+10	0.744E+09
13.750	0.163E+10	0.110E+10	0.778E+09
14.000	0.173E+10	0.116E+10	0.812E+09
14.500	0.194E+10	0.127E+10	0.881E+09
15.000	0.215E+10	0.138E+10	0.951E+09
15.500	0.238E+10	0.150E+10	0.102E+10
16.000	0.262E+10	0.162E+10	0.109E+10
16.500	0.287E+10	0.174E+10	0.117E+10
17.000	0.313E+10	0.187E+10	0.124E+10
17.500	0.340E+10	0.200E+10	0.131E+10
18.000	0.368E+10	0.212E+10	0.138E+10
18.500	0.397E+10	0.225E+10	0.145E+10
19.000	0.427E+10	0.238E+10	0.153E+10
19.500	0.457E+10	0.250E+10	0.160E+10
20.000	0.488E+10	0.263E+10	0.167E+10
21.000	0.552E+10	0.289E+10	0.181E+10
22.000	0.617E+10	0.314E+10	0.195E+10
23.000	0.684E+10	0.339E+10	0.209E+10
24.000	0.752E+10	0.363E+10	0.222E+10
25.000	0.820E+10	0.387E+10	0.235E+10
26.000	0.889E+10	0.410E+10	0.248E+10
27.000	0.957E+10	0.433E+10	0.261E+10
28.000	0.102E+11	0.455E+10	0.273E+10
29.000	0.109E+11	0.476E+10	0.284E+10
30.000	0.116E+11	0.497E+10	0.296E+10
31.000	0.122E+11	0.517E+10	0.307E+10
32.000	0.128E+11	0.536E+10	0.317E+10
33.000	0.134E+11	0.555E+10	0.328E+10
34.000	0.140E+11	0.573E+10	0.338E+10
35.000	0.146E+11	0.590E+10	0.347E+10
36.000	0.151E+11	0.607E+10	0.357E+10
37.000	0.156E+11	0.623E+10	0.366E+10
38.000	0.162E+11	0.638E+10	0.374E+10
39.000	0.166E+11	0.653E+10	0.382E+10
40.000	0.171E+11	0.668E+10	0.390E+10
41.000	0.176E+11	0.681E+10	0.398E+10
42.000	0.180E+11	0.695E+10	0.405E+10
43.000	0.184E+11	0.707E+10	0.413E+10
44.000	0.188E+11	0.720E+10	0.419E+10
45.000	0.192E+11	0.731E+10	0.426E+10
46.000	0.195E+11	0.743E+10	0.432E+10

47.000	0.199E+11	0.753E+10	0.438E+10
48.000	0.202E+11	0.764E+10	0.444E+10
49.000	0.205E+11	0.774E+10	0.450E+10
50.000	0.208E+11	0.783E+10	0.455E+10
51.000	0.211E+11	0.792E+10	0.460E+10
52.000	0.214E+11	0.801E+10	0.465E+10
53.000	0.217E+11	0.809E+10	0.469E+10
54.000	0.219E+11	0.817E+10	0.474E+10
55.000	0.222E+11	0.825E+10	0.478E+10
56.000	0.224E+11	0.832E+10	0.482E+10
57.000	0.226E+11	0.839E+10	0.486E+10
58.000	0.228E+11	0.846E+10	0.490E+10
59.000	0.230E+11	0.852E+10	0.493E+10
60.000	0.232E+11	0.858E+10	0.497E+10
61.000	0.234E+11	0.864E+10	0.500E+10
62.000	0.236E+11	0.869E+10	0.503E+10
63.000	0.237E+11	0.874E+10	0.506E+10
64.000	0.239E+11	0.879E+10	0.509E+10
65.000	0.240E+11	0.884E+10	0.511E+10
66.000	0.242E+11	0.888E+10	0.514E+10
67.000	0.243E+11	0.893E+10	0.516E+10
68.000	0.244E+11	0.897E+10	0.518E+10
69.000	0.245E+11	0.900E+10	0.520E+10
70.000	0.246E+11	0.904E+10	0.522E+10
71.000	0.248E+11	0.907E+10	0.524E+10
72.000	0.249E+11	0.910E+10	0.526E+10
73.000	0.249E+11	0.913E+10	0.528E+10
74.000	0.250E+11	0.916E+10	0.529E+10
75.000	0.251E+11	0.919E+10	0.531E+10
76.000	0.252E+11	0.921E+10	0.532E+10
77.000	0.253E+11	0.924E+10	0.533E+10
78.000	0.253E+11	0.926E+10	0.535E+10
79.000	0.254E+11	0.928E+10	0.536E+10
80.000	0.255E+11	0.930E+10	0.537E+10
81.000	0.255E+11	0.931E+10	0.538E+10
82.000	0.256E+11	0.933E+10	0.538E+10
83.000	0.256E+11	0.934E+10	0.539E+10
84.000	0.256E+11	0.935E+10	0.540E+10
85.000	0.257E+11	0.937E+10	0.541E+10
86.000	0.257E+11	0.938E+10	0.541E+10
87.000	0.258E+11	0.939E+10	0.542E+10
88.000	0.258E+11	0.939E+10	0.542E+10
89.000	0.258E+11	0.940E+10	0.542E+10
90.000	0.258E+11	0.941E+10	0.543E+10
91.000	0.258E+11	0.941E+10	0.543E+10
92.000	0.259E+11	0.942E+10	0.543E+10
93.000	0.259E+11	0.942E+10	0.543E+10
94.000	0.259E+11	0.942E+10	0.543E+10
95.000	0.259E+11	0.942E+10	0.543E+10
96.000	0.259E+11	0.942E+10	0.543E+10
97.000	0.259E+11	0.942E+10	0.543E+10
98.000	0.259E+11	0.942E+10	0.543E+10
99.000	0.259E+11	0.942E+10	0.543E+10
100.000	0.259E+11	0.942E+10	0.543E+10

Gd

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
64	157.25	7.89	40.710	42.188	.254	.555

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
3.000	0.260E+07	0.251E+07	0.242E+07
3.125	0.317E+07	0.306E+07	0.293E+07
3.250	0.383E+07	0.368E+07	0.353E+07
3.375	0.459E+07	0.440E+07	0.420E+07
3.500	0.545E+07	0.522E+07	0.497E+07
3.625	0.643E+07	0.614E+07	0.583E+07
3.750	0.754E+07	0.718E+07	0.680E+07
3.875	0.878E+07	0.834E+07	0.787E+07
4.000	0.102E+08	0.963E+07	0.906E+07
4.125	0.117E+08	0.111E+08	0.104E+08
4.250	0.134E+08	0.126E+08	0.118E+08
4.375	0.153E+08	0.144E+08	0.134E+08
4.500	0.174E+08	0.163E+08	0.151E+08
4.625	0.197E+08	0.183E+08	0.170E+08
4.750	0.222E+08	0.206E+08	0.190E+08
4.875	0.249E+08	0.230E+08	0.212E+08
5.000	0.278E+08	0.257E+08	0.235E+08
5.125	0.310E+08	0.285E+08	0.261E+08
5.250	0.344E+08	0.316E+08	0.287E+08
5.375	0.381E+08	0.349E+08	0.316E+08
5.500	0.421E+08	0.384E+08	0.347E+08
5.625	0.464E+08	0.421E+08	0.379E+08
5.750	0.510E+08	0.461E+08	0.414E+08
5.875	0.559E+08	0.503E+08	0.450E+08
6.000	0.611E+08	0.548E+08	0.488E+08
6.125	0.666E+08	0.596E+08	0.529E+08
6.250	0.725E+08	0.646E+08	0.571E+08
6.375	0.788E+08	0.699E+08	0.616E+08
6.500	0.854E+08	0.755E+08	0.663E+08
6.625	0.924E+08	0.814E+08	0.712E+08
6.750	0.998E+08	0.876E+08	0.763E+08
6.875	0.108E+09	0.941E+08	0.816E+08
7.000	0.116E+09	0.101E+09	0.871E+08
7.125	0.125E+09	0.108E+09	0.929E+08
7.250	0.134E+09	0.115E+09	0.989E+08
7.375	0.143E+09	0.123E+09	0.105E+09
7.500	0.153E+09	0.131E+09	0.112E+09
7.625	0.164E+09	0.140E+09	0.118E+09
7.750	0.175E+09	0.148E+09	0.125E+09
7.875	0.186E+09	0.157E+09	0.132E+09
8.000	0.198E+09	0.167E+09	0.140E+09
8.250	0.223E+09	0.186E+09	0.155E+09
8.500	0.251E+09	0.208E+09	0.171E+09
8.750	0.281E+09	0.230E+09	0.188E+09
9.000	0.313E+09	0.254E+09	0.206E+09

9.250	0.347E+09	0.280E+09	0.225E+09
9.500	0.384E+09	0.306E+09	0.245E+09
9.750	0.423E+09	0.335E+09	0.265E+09
10.000	0.465E+09	0.364E+09	0.287E+09
10.250	0.509E+09	0.395E+09	0.309E+09
10.500	0.556E+09	0.428E+09	0.332E+09
10.750	0.605E+09	0.461E+09	0.355E+09
11.000	0.657E+09	0.496E+09	0.380E+09
11.250	0.712E+09	0.533E+09	0.404E+09
11.500	0.770E+09	0.571E+09	0.430E+09
11.750	0.831E+09	0.609E+09	0.456E+09
12.000	0.894E+09	0.650E+09	0.483E+09
12.250	0.960E+09	0.691E+09	0.510E+09
12.500	0.103E+10	0.734E+09	0.538E+09
12.750	0.110E+10	0.777E+09	0.567E+09
13.000	0.118E+10	0.822E+09	0.595E+09
13.250	0.125E+10	0.868E+09	0.625E+09
13.500	0.133E+10	0.915E+09	0.654E+09
13.750	0.142E+10	0.963E+09	0.684E+09
14.000	0.150E+10	0.101E+10	0.715E+09
14.500	0.168E+10	0.111E+10	0.777E+09
15.000	0.187E+10	0.121E+10	0.840E+09
15.500	0.207E+10	0.132E+10	0.904E+09
16.000	0.229E+10	0.143E+10	0.968E+09
16.500	0.251E+10	0.154E+10	0.103E+10
17.000	0.274E+10	0.165E+10	0.110E+10
17.500	0.298E+10	0.177E+10	0.116E+10
18.000	0.323E+10	0.188E+10	0.123E+10
18.500	0.349E+10	0.200E+10	0.130E+10
19.000	0.375E+10	0.211E+10	0.136E+10
19.500	0.402E+10	0.223E+10	0.143E+10
20.000	0.430E+10	0.234E+10	0.149E+10
21.000	0.487E+10	0.258E+10	0.162E+10
22.000	0.546E+10	0.281E+10	0.175E+10
23.000	0.607E+10	0.304E+10	0.188E+10
24.000	0.669E+10	0.326E+10	0.200E+10
25.000	0.731E+10	0.348E+10	0.212E+10
26.000	0.793E+10	0.370E+10	0.224E+10
27.000	0.856E+10	0.391E+10	0.236E+10
28.000	0.918E+10	0.411E+10	0.247E+10
29.000	0.979E+10	0.431E+10	0.258E+10
30.000	0.104E+11	0.451E+10	0.269E+10
31.000	0.110E+11	0.469E+10	0.279E+10
32.000	0.116E+11	0.488E+10	0.289E+10
33.000	0.121E+11	0.505E+10	0.299E+10
34.000	0.127E+11	0.522E+10	0.308E+10
35.000	0.132E+11	0.539E+10	0.318E+10
36.000	0.137E+11	0.554E+10	0.326E+10
37.000	0.142E+11	0.570E+10	0.335E+10
38.000	0.147E+11	0.585E+10	0.343E+10
39.000	0.152E+11	0.599E+10	0.351E+10
40.000	0.156E+11	0.613E+10	0.359E+10
41.000	0.161E+11	0.626E+10	0.366E+10
42.000	0.165E+11	0.638E+10	0.373E+10
43.000	0.169E+11	0.651E+10	0.380E+10
44.000	0.172E+11	0.662E+10	0.386E+10
45.000	0.176E+11	0.674E+10	0.393E+10
46.000	0.180E+11	0.685E+10	0.399E+10

47.000	0.183E+11	0.695E+10	0.405E+10
48.000	0.186E+11	0.705E+10	0.410E+10
49.000	0.189E+11	0.715E+10	0.416E+10
50.000	0.192E+11	0.724E+10	0.421E+10
51.000	0.195E+11	0.733E+10	0.426E+10
52.000	0.198E+11	0.742E+10	0.431E+10
53.000	0.200E+11	0.750E+10	0.435E+10
54.000	0.203E+11	0.758E+10	0.440E+10
55.000	0.205E+11	0.765E+10	0.444E+10
56.000	0.208E+11	0.772E+10	0.448E+10
57.000	0.210E+11	0.779E+10	0.452E+10
58.000	0.212E+11	0.786E+10	0.455E+10
59.000	0.214E+11	0.792E+10	0.459E+10
60.000	0.216E+11	0.798E+10	0.462E+10
61.000	0.217E+11	0.804E+10	0.465E+10
62.000	0.219E+11	0.809E+10	0.468E+10
63.000	0.221E+11	0.814E+10	0.471E+10
64.000	0.222E+11	0.819E+10	0.474E+10
65.000	0.224E+11	0.824E+10	0.477E+10
66.000	0.225E+11	0.829E+10	0.479E+10
67.000	0.226E+11	0.833E+10	0.482E+10
68.000	0.228E+11	0.837E+10	0.484E+10
69.000	0.229E+11	0.841E+10	0.486E+10
70.000	0.230E+11	0.845E+10	0.488E+10
71.000	0.231E+11	0.848E+10	0.490E+10
72.000	0.232E+11	0.851E+10	0.492E+10
73.000	0.233E+11	0.855E+10	0.494E+10
74.000	0.234E+11	0.858E+10	0.495E+10
75.000	0.235E+11	0.860E+10	0.497E+10
76.000	0.236E+11	0.863E+10	0.499E+10
77.000	0.237E+11	0.865E+10	0.500E+10
78.000	0.237E+11	0.868E+10	0.501E+10
79.000	0.238E+11	0.870E+10	0.502E+10
80.000	0.239E+11	0.872E+10	0.503E+10
81.000	0.239E+11	0.874E+10	0.504E+10
82.000	0.240E+11	0.875E+10	0.505E+10
83.000	0.240E+11	0.877E+10	0.506E+10
84.000	0.241E+11	0.879E+10	0.507E+10
85.000	0.241E+11	0.880E+10	0.508E+10
86.000	0.242E+11	0.881E+10	0.509E+10
87.000	0.242E+11	0.882E+10	0.509E+10
88.000	0.242E+11	0.883E+10	0.510E+10
89.000	0.243E+11	0.884E+10	0.510E+10
90.000	0.243E+11	0.885E+10	0.511E+10
91.000	0.243E+11	0.886E+10	0.511E+10
92.000	0.243E+11	0.887E+10	0.511E+10
93.000	0.244E+11	0.887E+10	0.512E+10
94.000	0.244E+11	0.888E+10	0.512E+10
95.000	0.244E+11	0.888E+10	0.512E+10
96.000	0.244E+11	0.888E+10	0.512E+10
97.000	0.244E+11	0.888E+10	0.512E+10
98.000	0.244E+11	0.888E+10	0.512E+10
99.000	0.244E+11	0.888E+10	0.512E+10
100.000	0.244E+11	0.888E+10	0.512E+10

Tb

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
65	(g/mole) 158.9254	(g/cm ³) 8.27	(cm ⁻¹) 41.817	(cm ⁻¹) 43.603	.2555	.557

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
3.000	0.223E+07	0.215E+07	0.207E+07
3.125	0.272E+07	0.262E+07	0.252E+07
3.250	0.328E+07	0.316E+07	0.302E+07
3.375	0.393E+07	0.378E+07	0.361E+07
3.500	0.468E+07	0.448E+07	0.427E+07
3.625	0.552E+07	0.527E+07	0.501E+07
3.750	0.647E+07	0.617E+07	0.584E+07
3.875	0.754E+07	0.717E+07	0.677E+07
4.000	0.874E+07	0.828E+07	0.779E+07
4.125	0.101E+08	0.951E+07	0.893E+07
4.250	0.115E+08	0.109E+08	0.102E+08
4.375	0.132E+08	0.124E+08	0.115E+08
4.500	0.150E+08	0.140E+08	0.130E+08
4.625	0.169E+08	0.158E+08	0.146E+08
4.750	0.191E+08	0.177E+08	0.164E+08
4.875	0.214E+08	0.199E+08	0.183E+08
5.000	0.240E+08	0.221E+08	0.203E+08
5.125	0.267E+08	0.246E+08	0.225E+08
5.250	0.297E+08	0.273E+08	0.248E+08
5.375	0.329E+08	0.301E+08	0.273E+08
5.500	0.363E+08	0.331E+08	0.300E+08
5.625	0.400E+08	0.364E+08	0.328E+08
5.750	0.440E+08	0.398E+08	0.358E+08
5.875	0.482E+08	0.435E+08	0.389E+08
6.000	0.528E+08	0.474E+08	0.423E+08
6.125	0.576E+08	0.516E+08	0.458E+08
6.250	0.627E+08	0.559E+08	0.495E+08
6.375	0.681E+08	0.605E+08	0.534E+08
6.500	0.739E+08	0.654E+08	0.575E+08
6.625	0.800E+08	0.705E+08	0.617E+08
6.750	0.864E+08	0.759E+08	0.662E+08
6.875	0.932E+08	0.815E+08	0.708E+08
7.000	0.100E+09	0.875E+08	0.757E+08
7.125	0.108E+09	0.936E+08	0.807E+08
7.250	0.116E+09	0.100E+09	0.860E+08
7.375	0.124E+09	0.107E+09	0.914E+08
7.500	0.133E+09	0.114E+09	0.970E+08
7.625	0.142E+09	0.121E+09	0.103E+09
7.750	0.151E+09	0.129E+09	0.109E+09
7.875	0.161E+09	0.137E+09	0.115E+09
8.000	0.172E+09	0.145E+09	0.122E+09
8.250	0.194E+09	0.162E+09	0.135E+09
8.500	0.218E+09	0.181E+09	0.149E+09
8.750	0.244E+09	0.200E+09	0.164E+09
9.000	0.272E+09	0.221E+09	0.180E+09

9.250	0.302E+09	0.244E+09	0.197E+09
9.500	0.334E+09	0.267E+09	0.214E+09
9.750	0.368E+09	0.292E+09	0.232E+09
10.000	0.405E+09	0.318E+09	0.251E+09
10.250	0.443E+09	0.345E+09	0.271E+09
10.500	0.485E+09	0.374E+09	0.291E+09
10.750	0.528E+09	0.404E+09	0.312E+09
11.000	0.574E+09	0.435E+09	0.333E+09
11.250	0.622E+09	0.467E+09	0.355E+09
11.500	0.673E+09	0.500E+09	0.378E+09
11.750	0.726E+09	0.534E+09	0.401E+09
12.000	0.781E+09	0.570E+09	0.425E+09
12.250	0.840E+09	0.607E+09	0.449E+09
12.500	0.900E+09	0.644E+09	0.474E+09
12.750	0.963E+09	0.683E+09	0.499E+09
13.000	0.103E+10	0.723E+09	0.525E+09
13.250	0.110E+10	0.764E+09	0.551E+09
13.500	0.117E+10	0.805E+09	0.578E+09
13.750	0.124E+10	0.848E+09	0.605E+09
14.000	0.132E+10	0.891E+09	0.632E+09
14.500	0.148E+10	0.981E+09	0.687E+09
15.000	0.165E+10	0.107E+10	0.744E+09
15.500	0.182E+10	0.117E+10	0.801E+09
16.000	0.201E+10	0.127E+10	0.860E+09
16.500	0.221E+10	0.136E+10	0.919E+09
17.000	0.242E+10	0.147E+10	0.978E+09
17.500	0.263E+10	0.157E+10	0.104E+10
18.000	0.285E+10	0.167E+10	0.110E+10
18.500	0.308E+10	0.178E+10	0.116E+10
19.000	0.332E+10	0.188E+10	0.122E+10
19.500	0.356E+10	0.199E+10	0.128E+10
20.000	0.381E+10	0.209E+10	0.134E+10
21.000	0.433E+10	0.231E+10	0.146E+10
22.000	0.487E+10	0.252E+10	0.157E+10
23.000	0.542E+10	0.273E+10	0.169E+10
24.000	0.598E+10	0.293E+10	0.181E+10
25.000	0.654E+10	0.314E+10	0.192E+10
26.000	0.711E+10	0.334E+10	0.203E+10
27.000	0.769E+10	0.353E+10	0.214E+10
28.000	0.825E+10	0.372E+10	0.224E+10
29.000	0.882E+10	0.391E+10	0.234E+10
30.000	0.938E+10	0.409E+10	0.244E+10
31.000	0.993E+10	0.426E+10	0.254E+10
32.000	0.105E+11	0.443E+10	0.263E+10
33.000	0.110E+11	0.460E+10	0.273E+10
34.000	0.115E+11	0.476E+10	0.281E+10
35.000	0.120E+11	0.491E+10	0.290E+10
36.000	0.125E+11	0.506E+10	0.298E+10
37.000	0.130E+11	0.521E+10	0.306E+10
38.000	0.134E+11	0.535E+10	0.314E+10
39.000	0.138E+11	0.548E+10	0.322E+10
40.000	0.143E+11	0.562E+10	0.329E+10
41.000	0.147E+11	0.574E+10	0.336E+10
42.000	0.151E+11	0.586E+10	0.343E+10
43.000	0.155E+11	0.598E+10	0.349E+10
44.000	0.158E+11	0.609E+10	0.356E+10
45.000	0.162E+11	0.620E+10	0.362E+10
46.000	0.165E+11	0.631E+10	0.368E+10

47.000	0.168E+11	0.641E+10	0.373E+10
48.000	0.171E+11	0.651E+10	0.379E+10
49.000	0.174E+11	0.660E+10	0.384E+10
50.000	0.177E+11	0.669E+10	0.389E+10
51.000	0.180E+11	0.678E+10	0.394E+10
52.000	0.183E+11	0.686E+10	0.398E+10
53.000	0.185E+11	0.694E+10	0.403E+10
54.000	0.188E+11	0.702E+10	0.407E+10
55.000	0.190E+11	0.709E+10	0.411E+10
56.000	0.192E+11	0.716E+10	0.415E+10
57.000	0.194E+11	0.723E+10	0.419E+10
58.000	0.196E+11	0.729E+10	0.423E+10
59.000	0.198E+11	0.735E+10	0.426E+10
60.000	0.200E+11	0.741E+10	0.430E+10
61.000	0.202E+11	0.747E+10	0.433E+10
62.000	0.203E+11	0.753E+10	0.436E+10
63.000	0.205E+11	0.758E+10	0.439E+10
64.000	0.207E+11	0.763E+10	0.442E+10
65.000	0.208E+11	0.768E+10	0.444E+10
66.000	0.210E+11	0.772E+10	0.447E+10
67.000	0.211E+11	0.776E+10	0.449E+10
68.000	0.212E+11	0.781E+10	0.452E+10
69.000	0.213E+11	0.785E+10	0.454E+10
70.000	0.215E+11	0.788E+10	0.456E+10
71.000	0.216E+11	0.792E+10	0.458E+10
72.000	0.217E+11	0.795E+10	0.460E+10
73.000	0.218E+11	0.798E+10	0.462E+10
74.000	0.219E+11	0.802E+10	0.463E+10
75.000	0.220E+11	0.804E+10	0.465E+10
76.000	0.220E+11	0.807E+10	0.466E+10
77.000	0.221E+11	0.810E+10	0.468E+10
78.000	0.222E+11	0.812E+10	0.469E+10
79.000	0.223E+11	0.815E+10	0.470E+10
80.000	0.223E+11	0.817E+10	0.472E+10
81.000	0.224E+11	0.819E+10	0.473E+10
82.000	0.225E+11	0.821E+10	0.474E+10
83.000	0.225E+11	0.822E+10	0.475E+10
84.000	0.226E+11	0.824E+10	0.476E+10
85.000	0.226E+11	0.826E+10	0.477E+10
86.000	0.227E+11	0.827E+10	0.477E+10
87.000	0.227E+11	0.828E+10	0.478E+10
88.000	0.227E+11	0.830E+10	0.479E+10
89.000	0.228E+11	0.831E+10	0.479E+10
90.000	0.228E+11	0.832E+10	0.480E+10
91.000	0.228E+11	0.833E+10	0.480E+10
92.000	0.229E+11	0.833E+10	0.481E+10
93.000	0.229E+11	0.834E+10	0.481E+10
94.000	0.229E+11	0.835E+10	0.482E+10
95.000	0.229E+11	0.835E+10	0.482E+10
96.000	0.230E+11	0.836E+10	0.482E+10
97.000	0.230E+11	0.836E+10	0.482E+10
98.000	0.230E+11	0.837E+10	0.482E+10
99.000	0.230E+11	0.837E+10	0.483E+10
100.000	0.230E+11	0.837E+10	0.483E+10

Dy

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
66	162.50	8.54	41.199	43.239	.257	.559

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
3.000	0.190E+07	0.184E+07	0.178E+07
3.125	0.232E+07	0.224E+07	0.216E+07
3.250	0.281E+07	0.271E+07	0.259E+07
3.375	0.337E+07	0.324E+07	0.309E+07
3.500	0.401E+07	0.384E+07	0.366E+07
3.625	0.473E+07	0.452E+07	0.430E+07
3.750	0.555E+07	0.529E+07	0.502E+07
3.875	0.647E+07	0.615E+07	0.582E+07
4.000	0.750E+07	0.711E+07	0.671E+07
4.125	0.865E+07	0.818E+07	0.769E+07
4.250	0.992E+07	0.935E+07	0.877E+07
4.375	0.113E+08	0.106E+08	0.995E+07
4.500	0.129E+08	0.121E+08	0.112E+08
4.625	0.146E+08	0.136E+08	0.126E+08
4.750	0.164E+08	0.153E+08	0.142E+08
4.875	0.184E+08	0.171E+08	0.158E+08
5.000	0.206E+08	0.191E+08	0.176E+08
5.125	0.230E+08	0.212E+08	0.195E+08
5.250	0.256E+08	0.235E+08	0.215E+08
5.375	0.284E+08	0.260E+08	0.237E+08
5.500	0.313E+08	0.286E+08	0.260E+08
5.625	0.345E+08	0.315E+08	0.284E+08
5.750	0.380E+08	0.345E+08	0.310E+08
5.875	0.416E+08	0.377E+08	0.338E+08
6.000	0.456E+08	0.411E+08	0.367E+08
6.125	0.497E+08	0.447E+08	0.398E+08
6.250	0.542E+08	0.485E+08	0.430E+08
6.375	0.589E+08	0.525E+08	0.464E+08
6.500	0.639E+08	0.567E+08	0.500E+08
6.625	0.692E+08	0.612E+08	0.538E+08
6.750	0.748E+08	0.659E+08	0.577E+08
6.875	0.807E+08	0.708E+08	0.617E+08
7.000	0.869E+08	0.760E+08	0.660E+08
7.125	0.934E+08	0.814E+08	0.704E+08
7.250	0.100E+09	0.871E+08	0.750E+08
7.375	0.108E+09	0.930E+08	0.798E+08
7.500	0.115E+09	0.991E+08	0.848E+08
7.625	0.123E+09	0.106E+09	0.899E+08
7.750	0.131E+09	0.112E+09	0.953E+08
7.875	0.140E+09	0.119E+09	0.101E+09
8.000	0.149E+09	0.126E+09	0.106E+09
8.250	0.168E+09	0.142E+09	0.118E+09
8.500	0.189E+09	0.158E+09	0.131E+09
8.750	0.212E+09	0.175E+09	0.144E+09
9.000	0.237E+09	0.194E+09	0.158E+09

9.250	0.263E+09	0.213E+09	0.173E+09
9.500	0.291E+09	0.234E+09	0.189E+09
9.750	0.321E+09	0.256E+09	0.205E+09
10.000	0.353E+09	0.279E+09	0.221E+09
10.250	0.387E+09	0.303E+09	0.239E+09
10.500	0.423E+09	0.329E+09	0.257E+09
10.750	0.461E+09	0.355E+09	0.276E+09
11.000	0.501E+09	0.383E+09	0.295E+09
11.250	0.544E+09	0.411E+09	0.315E+09
11.500	0.589E+09	0.441E+09	0.335E+09
11.750	0.635E+09	0.472E+09	0.356E+09
12.000	0.685E+09	0.503E+09	0.377E+09
12.250	0.736E+09	0.536E+09	0.399E+09
12.500	0.789E+09	0.570E+09	0.422E+09
12.750	0.845E+09	0.605E+09	0.445E+09
13.000	0.904E+09	0.640E+09	0.468E+09
13.250	0.964E+09	0.677E+09	0.491E+09
13.500	0.103E+10	0.714E+09	0.515E+09
13.750	0.109E+10	0.753E+09	0.540E+09
14.000	0.116E+10	0.792E+09	0.565E+09
14.500	0.130E+10	0.872E+09	0.615E+09
15.000	0.145E+10	0.956E+09	0.667E+09
15.500	0.161E+10	0.104E+10	0.719E+09
16.000	0.178E+10	0.113E+10	0.772E+09
16.500	0.196E+10	0.122E+10	0.826E+09
17.000	0.214E+10	0.131E+10	0.881E+09
17.500	0.233E+10	0.141E+10	0.936E+09
18.000	0.253E+10	0.150E+10	0.991E+09
18.500	0.274E+10	0.160E+10	0.105E+10
19.000	0.296E+10	0.170E+10	0.110E+10
19.500	0.318E+10	0.179E+10	0.116E+10
20.000	0.340E+10	0.189E+10	0.121E+10
21.000	0.387E+10	0.209E+10	0.132E+10
22.000	0.436E+10	0.228E+10	0.143E+10
23.000	0.487E+10	0.248E+10	0.154E+10
24.000	0.538E+10	0.267E+10	0.165E+10
25.000	0.590E+10	0.286E+10	0.176E+10
26.000	0.643E+10	0.305E+10	0.186E+10
27.000	0.696E+10	0.323E+10	0.196E+10
28.000	0.749E+10	0.341E+10	0.206E+10
29.000	0.802E+10	0.359E+10	0.216E+10
30.000	0.854E+10	0.376E+10	0.225E+10
31.000	0.906E+10	0.393E+10	0.234E+10
32.000	0.957E+10	0.409E+10	0.243E+10
33.000	0.101E+11	0.425E+10	0.252E+10
34.000	0.106E+11	0.440E+10	0.261E+10
35.000	0.110E+11	0.455E+10	0.269E+10
36.000	0.115E+11	0.469E+10	0.277E+10
37.000	0.119E+11	0.483E+10	0.285E+10
38.000	0.124E+11	0.497E+10	0.292E+10
39.000	0.128E+11	0.510E+10	0.299E+10
40.000	0.132E+11	0.522E+10	0.306E+10
41.000	0.136E+11	0.535E+10	0.313E+10
42.000	0.140E+11	0.546E+10	0.320E+10
43.000	0.143E+11	0.558E+10	0.326E+10
44.000	0.147E+11	0.569E+10	0.332E+10
45.000	0.150E+11	0.579E+10	0.338E+10
46.000	0.154E+11	0.590E+10	0.344E+10

47.000	0.157E+11	0.600E+10	0.349E+10
48.000	0.160E+11	0.609E+10	0.355E+10
49.000	0.163E+11	0.618E+10	0.360E+10
50.000	0.166E+11	0.627E+10	0.365E+10
51.000	0.168E+11	0.636E+10	0.370E+10
52.000	0.171E+11	0.644E+10	0.374E+10
53.000	0.173E+11	0.652E+10	0.379E+10
54.000	0.176E+11	0.659E+10	0.383E+10
55.000	0.178E+11	0.667E+10	0.387E+10
56.000	0.180E+11	0.674E+10	0.391E+10
57.000	0.182E+11	0.680E+10	0.395E+10
58.000	0.184E+11	0.687E+10	0.398E+10
59.000	0.186E+11	0.693E+10	0.402E+10
60.000	0.188E+11	0.699E+10	0.405E+10
61.000	0.190E+11	0.705E+10	0.408E+10
62.000	0.192E+11	0.710E+10	0.412E+10
63.000	0.193E+11	0.716E+10	0.414E+10
64.000	0.195E+11	0.721E+10	0.417E+10
65.000	0.196E+11	0.726E+10	0.420E+10
66.000	0.198E+11	0.730E+10	0.423E+10
67.000	0.199E+11	0.735E+10	0.425E+10
68.000	0.201E+11	0.739E+10	0.428E+10
69.000	0.202E+11	0.743E+10	0.430E+10
70.000	0.203E+11	0.747E+10	0.432E+10
71.000	0.204E+11	0.750E+10	0.434E+10
72.000	0.205E+11	0.754E+10	0.436E+10
73.000	0.206E+11	0.757E+10	0.438E+10
74.000	0.207E+11	0.761E+10	0.440E+10
75.000	0.208E+11	0.764E+10	0.441E+10
76.000	0.209E+11	0.766E+10	0.443E+10
77.000	0.210E+11	0.769E+10	0.444E+10
78.000	0.211E+11	0.772E+10	0.446E+10
79.000	0.212E+11	0.774E+10	0.447E+10
80.000	0.212E+11	0.777E+10	0.449E+10
81.000	0.213E+11	0.779E+10	0.450E+10
82.000	0.214E+11	0.781E+10	0.451E+10
83.000	0.214E+11	0.783E+10	0.452E+10
84.000	0.215E+11	0.785E+10	0.453E+10
85.000	0.215E+11	0.786E+10	0.454E+10
86.000	0.216E+11	0.788E+10	0.455E+10
87.000	0.216E+11	0.789E+10	0.456E+10
88.000	0.217E+11	0.791E+10	0.457E+10
89.000	0.217E+11	0.792E+10	0.457E+10
90.000	0.217E+11	0.793E+10	0.458E+10
91.000	0.218E+11	0.794E+10	0.458E+10
92.000	0.218E+11	0.795E+10	0.459E+10
93.000	0.218E+11	0.796E+10	0.460E+10
94.000	0.219E+11	0.797E+10	0.460E+10
95.000	0.219E+11	0.798E+10	0.460E+10
96.000	0.219E+11	0.799E+10	0.461E+10
97.000	0.219E+11	0.799E+10	0.461E+10
98.000	0.220E+11	0.800E+10	0.461E+10
99.000	0.220E+11	0.800E+10	0.461E+10
100.000	0.220E+11	0.801E+10	0.462E+10

Ho

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
	(g/mole)	(g/cm ³)	(cm ⁻¹)	(cm ⁻¹)		
67	164.9304	8.80	39.983	42.351	.259	.561

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
3.000	0.163E+07	0.158E+07	0.153E+07
3.125	0.200E+07	0.193E+07	0.186E+07
3.250	0.241E+07	0.233E+07	0.224E+07
3.375	0.290E+07	0.279E+07	0.267E+07
3.500	0.345E+07	0.331E+07	0.316E+07
3.625	0.407E+07	0.390E+07	0.372E+07
3.750	0.478E+07	0.457E+07	0.434E+07
3.875	0.557E+07	0.531E+07	0.503E+07
4.000	0.646E+07	0.614E+07	0.581E+07
4.125	0.745E+07	0.707E+07	0.666E+07
4.250	0.855E+07	0.809E+07	0.760E+07
4.375	0.977E+07	0.921E+07	0.863E+07
4.500	0.111E+08	0.104E+08	0.975E+07
4.625	0.126E+08	0.118E+08	0.110E+08
4.750	0.142E+08	0.133E+08	0.123E+08
4.875	0.159E+08	0.148E+08	0.137E+08
5.000	0.178E+08	0.166E+08	0.153E+08
5.125	0.199E+08	0.184E+08	0.169E+08
5.250	0.221E+08	0.204E+08	0.187E+08
5.375	0.245E+08	0.226E+08	0.206E+08
5.500	0.271E+08	0.249E+08	0.227E+08
5.625	0.299E+08	0.274E+08	0.248E+08
5.750	0.329E+08	0.300E+08	0.271E+08
5.875	0.361E+08	0.328E+08	0.295E+08
6.000	0.395E+08	0.358E+08	0.321E+08
6.125	0.431E+08	0.389E+08	0.348E+08
6.250	0.470E+08	0.423E+08	0.377E+08
6.375	0.511E+08	0.458E+08	0.407E+08
6.500	0.555E+08	0.495E+08	0.439E+08
6.625	0.601E+08	0.534E+08	0.472E+08
6.750	0.649E+08	0.576E+08	0.506E+08
6.875	0.701E+08	0.619E+08	0.542E+08
7.000	0.755E+08	0.665E+08	0.580E+08
7.125	0.812E+08	0.712E+08	0.620E+08
7.250	0.872E+08	0.762E+08	0.661E+08
7.375	0.936E+08	0.814E+08	0.703E+08
7.500	0.100E+09	0.868E+08	0.747E+08
7.625	0.107E+09	0.925E+08	0.793E+08
7.750	0.114E+09	0.984E+08	0.841E+08
7.875	0.122E+09	0.105E+09	0.890E+08
8.000	0.130E+09	0.111E+09	0.941E+08
8.250	0.147E+09	0.124E+09	0.105E+09
8.500	0.165E+09	0.139E+09	0.116E+09
8.750	0.185E+09	0.154E+09	0.128E+09
9.000	0.207E+09	0.171E+09	0.141E+09

9.250	0.230E+09	0.188E+09	0.154E+09
9.500	0.255E+09	0.207E+09	0.168E+09
9.750	0.281E+09	0.226E+09	0.182E+09
10.000	0.309E+09	0.247E+09	0.198E+09
10.250	0.339E+09	0.269E+09	0.213E+09
10.500	0.371E+09	0.291E+09	0.230E+09
10.750	0.405E+09	0.315E+09	0.247E+09
11.000	0.440E+09	0.340E+09	0.264E+09
11.250	0.478E+09	0.365E+09	0.282E+09
11.500	0.518E+09	0.392E+09	0.301E+09
11.750	0.559E+09	0.420E+09	0.320E+09
12.000	0.603E+09	0.449E+09	0.339E+09
12.250	0.648E+09	0.478E+09	0.359E+09
12.500	0.696E+09	0.509E+09	0.380E+09
12.750	0.746E+09	0.540E+09	0.401E+09
13.000	0.798E+09	0.573E+09	0.422E+09
13.250	0.852E+09	0.606E+09	0.444E+09
13.500	0.908E+09	0.640E+09	0.466E+09
13.750	0.966E+09	0.675E+09	0.489E+09
14.000	0.103E+10	0.711E+09	0.512E+09
14.500	0.115E+10	0.785E+09	0.558E+09
15.000	0.129E+10	0.861E+09	0.606E+09
15.500	0.143E+10	0.941E+09	0.655E+09
16.000	0.158E+10	0.102E+10	0.705E+09
16.500	0.174E+10	0.111E+10	0.755E+09
17.000	0.191E+10	0.119E+10	0.806E+09
17.500	0.209E+10	0.128E+10	0.858E+09
18.000	0.227E+10	0.137E+10	0.910E+09
18.500	0.246E+10	0.146E+10	0.962E+09
19.000	0.265E+10	0.155E+10	0.101E+10
19.500	0.286E+10	0.164E+10	0.107E+10
20.000	0.306E+10	0.173E+10	0.112E+10
21.000	0.350E+10	0.192E+10	0.122E+10
22.000	0.395E+10	0.210E+10	0.133E+10
23.000	0.441E+10	0.229E+10	0.143E+10
24.000	0.489E+10	0.247E+10	0.154E+10
25.000	0.538E+10	0.266E+10	0.164E+10
26.000	0.588E+10	0.283E+10	0.174E+10
27.000	0.638E+10	0.301E+10	0.183E+10
28.000	0.688E+10	0.318E+10	0.193E+10
29.000	0.739E+10	0.335E+10	0.202E+10
30.000	0.788E+10	0.352E+10	0.211E+10
31.000	0.838E+10	0.368E+10	0.220E+10
32.000	0.887E+10	0.384E+10	0.229E+10
33.000	0.935E+10	0.399E+10	0.238E+10
34.000	0.982E+10	0.414E+10	0.246E+10
35.000	0.103E+11	0.429E+10	0.254E+10
36.000	0.107E+11	0.443E+10	0.262E+10
37.000	0.112E+11	0.456E+10	0.269E+10
38.000	0.116E+11	0.470E+10	0.277E+10
39.000	0.120E+11	0.483E+10	0.284E+10
40.000	0.124E+11	0.495E+10	0.291E+10
41.000	0.128E+11	0.507E+10	0.297E+10
42.000	0.132E+11	0.519E+10	0.304E+10
43.000	0.135E+11	0.530E+10	0.310E+10
44.000	0.139E+11	0.541E+10	0.316E+10
45.000	0.142E+11	0.551E+10	0.322E+10
46.000	0.146E+11	0.562E+10	0.328E+10

47.000	0.149E+11	0.572E+10	0.333E+10
48.000	0.152E+11	0.581E+10	0.339E+10
49.000	0.155E+11	0.590E+10	0.344E+10
50.000	0.158E+11	0.599E+10	0.349E+10
51.000	0.160E+11	0.608E+10	0.354E+10
52.000	0.163E+11	0.616E+10	0.358E+10
53.000	0.165E+11	0.624E+10	0.363E+10
54.000	0.168E+11	0.631E+10	0.367E+10
55.000	0.170E+11	0.639E+10	0.371E+10
56.000	0.172E+11	0.646E+10	0.375E+10
57.000	0.175E+11	0.653E+10	0.379E+10
58.000	0.177E+11	0.659E+10	0.383E+10
59.000	0.179E+11	0.666E+10	0.386E+10
60.000	0.180E+11	0.672E+10	0.390E+10
61.000	0.182E+11	0.678E+10	0.393E+10
62.000	0.184E+11	0.683E+10	0.396E+10
63.000	0.186E+11	0.689E+10	0.399E+10
64.000	0.187E+11	0.694E+10	0.402E+10
65.000	0.189E+11	0.699E+10	0.405E+10
66.000	0.190E+11	0.704E+10	0.407E+10
67.000	0.192E+11	0.708E+10	0.410E+10
68.000	0.193E+11	0.713E+10	0.413E+10
69.000	0.194E+11	0.717E+10	0.415E+10
70.000	0.196E+11	0.721E+10	0.417E+10
71.000	0.197E+11	0.725E+10	0.419E+10
72.000	0.198E+11	0.729E+10	0.421E+10
73.000	0.199E+11	0.732E+10	0.423E+10
74.000	0.200E+11	0.735E+10	0.425E+10
75.000	0.201E+11	0.739E+10	0.427E+10
76.000	0.202E+11	0.742E+10	0.429E+10
77.000	0.203E+11	0.745E+10	0.430E+10
78.000	0.204E+11	0.747E+10	0.432E+10
79.000	0.205E+11	0.750E+10	0.433E+10
80.000	0.205E+11	0.753E+10	0.435E+10
81.000	0.206E+11	0.755E+10	0.436E+10
82.000	0.207E+11	0.757E+10	0.437E+10
83.000	0.208E+11	0.759E+10	0.439E+10
84.000	0.208E+11	0.761E+10	0.440E+10
85.000	0.209E+11	0.763E+10	0.441E+10
86.000	0.209E+11	0.765E+10	0.442E+10
87.000	0.210E+11	0.767E+10	0.443E+10
88.000	0.210E+11	0.768E+10	0.444E+10
89.000	0.211E+11	0.770E+10	0.444E+10
90.000	0.211E+11	0.771E+10	0.445E+10
91.000	0.212E+11	0.773E+10	0.446E+10
92.000	0.212E+11	0.774E+10	0.447E+10
93.000	0.212E+11	0.775E+10	0.447E+10
94.000	0.213E+11	0.776E+10	0.448E+10
95.000	0.213E+11	0.777E+10	0.448E+10
96.000	0.213E+11	0.778E+10	0.449E+10
97.000	0.214E+11	0.779E+10	0.449E+10
98.000	0.214E+11	0.779E+10	0.450E+10
99.000	0.214E+11	0.780E+10	0.450E+10
100.000	0.214E+11	0.780E+10	0.450E+10

Er

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
68	(g/mole) 167.26	(g/cm ³) 9.05	(cm ⁻¹) 38.489	(cm ⁻¹) 41.206	.261	.563

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
3.000	0.141E+07	0.137E+07	0.132E+07
3.125	0.172E+07	0.166E+07	0.161E+07
3.250	0.208E+07	0.201E+07	0.193E+07
3.375	0.250E+07	0.241E+07	0.231E+07
3.500	0.297E+07	0.286E+07	0.274E+07
3.625	0.351E+07	0.337E+07	0.322E+07
3.750	0.412E+07	0.395E+07	0.376E+07
3.875	0.481E+07	0.460E+07	0.437E+07
4.000	0.558E+07	0.532E+07	0.504E+07
4.125	0.644E+07	0.612E+07	0.578E+07
4.250	0.739E+07	0.701E+07	0.660E+07
4.375	0.845E+07	0.799E+07	0.750E+07
4.500	0.961E+07	0.906E+07	0.849E+07
4.625	0.109E+08	0.102E+08	0.956E+07
4.750	0.123E+08	0.115E+08	0.107E+08
4.875	0.138E+08	0.129E+08	0.120E+08
5.000	0.154E+08	0.144E+08	0.133E+08
5.125	0.172E+08	0.160E+08	0.148E+08
5.250	0.192E+08	0.178E+08	0.164E+08
5.375	0.213E+08	0.197E+08	0.180E+08
5.500	0.235E+08	0.217E+08	0.198E+08
5.625	0.260E+08	0.238E+08	0.217E+08
5.750	0.286E+08	0.262E+08	0.238E+08
5.875	0.313E+08	0.286E+08	0.259E+08
6.000	0.343E+08	0.312E+08	0.282E+08
6.125	0.375E+08	0.340E+08	0.306E+08
6.250	0.409E+08	0.369E+08	0.331E+08
6.375	0.444E+08	0.400E+08	0.358E+08
6.500	0.482E+08	0.433E+08	0.386E+08
6.625	0.523E+08	0.468E+08	0.415E+08
6.750	0.565E+08	0.504E+08	0.446E+08
6.875	0.610E+08	0.542E+08	0.478E+08
7.000	0.658E+08	0.583E+08	0.512E+08
7.125	0.708E+08	0.625E+08	0.547E+08
7.250	0.761E+08	0.669E+08	0.583E+08
7.375	0.816E+08	0.715E+08	0.621E+08
7.500	0.874E+08	0.763E+08	0.661E+08
7.625	0.935E+08	0.813E+08	0.702E+08
7.750	0.999E+08	0.865E+08	0.744E+08
7.875	0.107E+09	0.920E+08	0.788E+08
8.000	0.114E+09	0.976E+08	0.834E+08
8.250	0.128E+09	0.110E+09	0.930E+08
8.500	0.145E+09	0.122E+09	0.103E+09
8.750	0.162E+09	0.136E+09	0.114E+09
9.000	0.181E+09	0.151E+09	0.125E+09

9.250	0.201E+09	0.167E+09	0.137E+09
9.500	0.223E+09	0.183E+09	0.150E+09
9.750	0.247E+09	0.201E+09	0.163E+09
10.000	0.272E+09	0.219E+09	0.177E+09
10.250	0.298E+09	0.239E+09	0.191E+09
10.500	0.326E+09	0.259E+09	0.206E+09
10.750	0.356E+09	0.280E+09	0.222E+09
11.000	0.388E+09	0.303E+09	0.238E+09
11.250	0.421E+09	0.326E+09	0.254E+09
11.500	0.456E+09	0.350E+09	0.271E+09
11.750	0.493E+09	0.375E+09	0.289E+09
12.000	0.532E+09	0.401E+09	0.307E+09
12.250	0.573E+09	0.428E+09	0.325E+09
12.500	0.615E+09	0.456E+09	0.344E+09
12.750	0.660E+09	0.485E+09	0.363E+09
13.000	0.706E+09	0.514E+09	0.383E+09
13.250	0.754E+09	0.545E+09	0.403E+09
13.500	0.805E+09	0.576E+09	0.424E+09
13.750	0.857E+09	0.608E+09	0.445E+09
14.000	0.911E+09	0.641E+09	0.466E+09
14.500	0.102E+10	0.709E+09	0.509E+09
15.000	0.115E+10	0.779E+09	0.554E+09
15.500	0.128E+10	0.852E+09	0.600E+09
16.000	0.141E+10	0.928E+09	0.646E+09
16.500	0.156E+10	0.101E+10	0.694E+09
17.000	0.171E+10	0.109E+10	0.742E+09
17.500	0.187E+10	0.117E+10	0.790E+09
18.000	0.204E+10	0.125E+10	0.839E+09
18.500	0.221E+10	0.133E+10	0.889E+09
19.000	0.239E+10	0.142E+10	0.939E+09
19.500	0.257E+10	0.151E+10	0.989E+09
20.000	0.276E+10	0.159E+10	0.104E+10
21.000	0.316E+10	0.177E+10	0.114E+10
22.000	0.358E+10	0.195E+10	0.124E+10
23.000	0.402E+10	0.212E+10	0.134E+10
24.000	0.447E+10	0.230E+10	0.144E+10
25.000	0.493E+10	0.248E+10	0.153E+10
26.000	0.539E+10	0.265E+10	0.163E+10
27.000	0.587E+10	0.282E+10	0.172E+10
28.000	0.635E+10	0.299E+10	0.182E+10
29.000	0.682E+10	0.315E+10	0.191E+10
30.000	0.730E+10	0.331E+10	0.200E+10
31.000	0.778E+10	0.347E+10	0.208E+10
32.000	0.825E+10	0.362E+10	0.217E+10
33.000	0.871E+10	0.377E+10	0.225E+10
34.000	0.917E+10	0.392E+10	0.233E+10
35.000	0.962E+10	0.406E+10	0.241E+10
36.000	0.101E+11	0.420E+10	0.249E+10
37.000	0.105E+11	0.434E+10	0.256E+10
38.000	0.109E+11	0.447E+10	0.264E+10
39.000	0.113E+11	0.460E+10	0.271E+10
40.000	0.117E+11	0.472E+10	0.278E+10
41.000	0.121E+11	0.484E+10	0.284E+10
42.000	0.125E+11	0.495E+10	0.291E+10
43.000	0.128E+11	0.507E+10	0.297E+10
44.000	0.132E+11	0.518E+10	0.303E+10
45.000	0.135E+11	0.528E+10	0.309E+10
46.000	0.139E+11	0.538E+10	0.315E+10

47.000	0.142E+11	0.548E+10	0.320E+10
48.000	0.145E+11	0.558E+10	0.326E+10
49.000	0.148E+11	0.567E+10	0.331E+10
50.000	0.151E+11	0.576E+10	0.336E+10
51.000	0.153E+11	0.584E+10	0.340E+10
52.000	0.156E+11	0.593E+10	0.345E+10
53.000	0.159E+11	0.601E+10	0.350E+10
54.000	0.161E+11	0.609E+10	0.354E+10
55.000	0.163E+11	0.616E+10	0.358E+10
56.000	0.166E+11	0.623E+10	0.362E+10
57.000	0.168E+11	0.630E+10	0.366E+10
58.000	0.170E+11	0.637E+10	0.370E+10
59.000	0.172E+11	0.644E+10	0.374E+10
60.000	0.174E+11	0.650E+10	0.377E+10
61.000	0.176E+11	0.656E+10	0.380E+10
62.000	0.178E+11	0.662E+10	0.384E+10
63.000	0.179E+11	0.667E+10	0.387E+10
64.000	0.181E+11	0.673E+10	0.390E+10
65.000	0.183E+11	0.678E+10	0.393E+10
66.000	0.184E+11	0.683E+10	0.395E+10
67.000	0.186E+11	0.687E+10	0.398E+10
68.000	0.187E+11	0.692E+10	0.401E+10
69.000	0.189E+11	0.696E+10	0.403E+10
70.000	0.190E+11	0.701E+10	0.406E+10
71.000	0.191E+11	0.705E+10	0.408E+10
72.000	0.192E+11	0.709E+10	0.410E+10
73.000	0.193E+11	0.712E+10	0.412E+10
74.000	0.195E+11	0.716E+10	0.414E+10
75.000	0.196E+11	0.719E+10	0.416E+10
76.000	0.197E+11	0.722E+10	0.418E+10
77.000	0.198E+11	0.726E+10	0.420E+10
78.000	0.198E+11	0.729E+10	0.421E+10
79.000	0.199E+11	0.731E+10	0.423E+10
80.000	0.200E+11	0.734E+10	0.424E+10
81.000	0.201E+11	0.737E+10	0.426E+10
82.000	0.202E+11	0.739E+10	0.427E+10
83.000	0.202E+11	0.742E+10	0.428E+10
84.000	0.203E+11	0.744E+10	0.430E+10
85.000	0.204E+11	0.746E+10	0.431E+10
86.000	0.204E+11	0.748E+10	0.432E+10
87.000	0.205E+11	0.750E+10	0.433E+10
88.000	0.206E+11	0.751E+10	0.434E+10
89.000	0.206E+11	0.753E+10	0.435E+10
90.000	0.207E+11	0.755E+10	0.436E+10
91.000	0.207E+11	0.756E+10	0.437E+10
92.000	0.207E+11	0.758E+10	0.437E+10
93.000	0.208E+11	0.759E+10	0.438E+10
94.000	0.208E+11	0.760E+10	0.439E+10
95.000	0.209E+11	0.761E+10	0.439E+10
96.000	0.209E+11	0.762E+10	0.440E+10
97.000	0.209E+11	0.763E+10	0.440E+10
98.000	0.210E+11	0.764E+10	0.441E+10
99.000	0.210E+11	0.765E+10	0.441E+10
100.000	0.210E+11	0.766E+10	0.442E+10

Tm

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
69	168.9342	9.33	37.137	39.020	.2625	.565

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
3.000	0.122E+07	0.118E+07	0.115E+07
3.125	0.149E+07	0.144E+07	0.139E+07
3.250	0.180E+07	0.174E+07	0.168E+07
3.375	0.216E+07	0.209E+07	0.201E+07
3.500	0.257E+07	0.248E+07	0.238E+07
3.625	0.304E+07	0.293E+07	0.281E+07
3.750	0.358E+07	0.343E+07	0.328E+07
3.875	0.417E+07	0.400E+07	0.381E+07
4.000	0.484E+07	0.463E+07	0.440E+07
4.125	0.559E+07	0.533E+07	0.505E+07
4.250	0.642E+07	0.610E+07	0.577E+07
4.375	0.734E+07	0.696E+07	0.656E+07
4.500	0.835E+07	0.790E+07	0.743E+07
4.625	0.946E+07	0.893E+07	0.837E+07
4.750	0.107E+08	0.100E+08	0.940E+07
4.875	0.120E+08	0.113E+08	0.105E+08
5.000	0.134E+08	0.126E+08	0.117E+08
5.125	0.150E+08	0.140E+08	0.130E+08
5.250	0.167E+08	0.156E+08	0.144E+08
5.375	0.185E+08	0.172E+08	0.159E+08
5.500	0.205E+08	0.190E+08	0.175E+08
5.625	0.226E+08	0.209E+08	0.191E+08
5.750	0.249E+08	0.229E+08	0.209E+08
5.875	0.273E+08	0.251E+08	0.229E+08
6.000	0.299E+08	0.274E+08	0.249E+08
6.125	0.327E+08	0.298E+08	0.270E+08
6.250	0.357E+08	0.324E+08	0.293E+08
6.375	0.388E+08	0.352E+08	0.317E+08
6.500	0.422E+08	0.381E+08	0.342E+08
6.625	0.457E+08	0.412E+08	0.368E+08
6.750	0.494E+08	0.444E+08	0.395E+08
6.875	0.534E+08	0.478E+08	0.424E+08
7.000	0.576E+08	0.514E+08	0.454E+08
7.125	0.620E+08	0.551E+08	0.486E+08
7.250	0.666E+08	0.590E+08	0.519E+08
7.375	0.715E+08	0.631E+08	0.553E+08
7.500	0.766E+08	0.674E+08	0.589E+08
7.625	0.820E+08	0.719E+08	0.625E+08
7.750	0.876E+08	0.765E+08	0.664E+08
7.875	0.935E+08	0.814E+08	0.704E+08
8.000	0.996E+08	0.864E+08	0.745E+08
8.250	0.113E+09	0.971E+08	0.831E+08
8.500	0.127E+09	0.109E+09	0.923E+08
8.750	0.143E+09	0.121E+09	0.102E+09
9.000	0.159E+09	0.134E+09	0.113E+09

9.250	0.177E+09	0.148E+09	0.123E+09
9.500	0.197E+09	0.163E+09	0.135E+09
9.750	0.217E+09	0.179E+09	0.147E+09
10.000	0.240E+09	0.196E+09	0.160E+09
10.250	0.263E+09	0.213E+09	0.173E+09
10.500	0.288E+09	0.232E+09	0.187E+09
10.750	0.315E+09	0.251E+09	0.201E+09
11.000	0.343E+09	0.272E+09	0.216E+09
11.250	0.373E+09	0.293E+09	0.231E+09
11.500	0.404E+09	0.315E+09	0.247E+09
11.750	0.437E+09	0.338E+09	0.263E+09
12.000	0.472E+09	0.362E+09	0.280E+09
12.250	0.508E+09	0.386E+09	0.297E+09
12.500	0.547E+09	0.412E+09	0.314E+09
12.750	0.586E+09	0.438E+09	0.332E+09
13.000	0.628E+09	0.465E+09	0.351E+09
13.250	0.671E+09	0.493E+09	0.370E+09
13.500	0.717E+09	0.522E+09	0.389E+09
13.750	0.764E+09	0.552E+09	0.409E+09
14.000	0.812E+09	0.582E+09	0.429E+09
14.500	0.915E+09	0.645E+09	0.470E+09
15.000	0.103E+10	0.711E+09	0.512E+09
15.500	0.114E+10	0.779E+09	0.555E+09
16.000	0.127E+10	0.850E+09	0.599E+09
16.500	0.140E+10	0.923E+09	0.644E+09
17.000	0.154E+10	0.998E+09	0.690E+09
17.500	0.168E+10	0.108E+10	0.737E+09
18.000	0.184E+10	0.115E+10	0.784E+09
18.500	0.200E+10	0.123E+10	0.832E+09
19.000	0.216E+10	0.132E+10	0.879E+09
19.500	0.233E+10	0.140E+10	0.928E+09
20.000	0.251E+10	0.148E+10	0.976E+09
21.000	0.288E+10	0.165E+10	0.107E+10
22.000	0.327E+10	0.182E+10	0.117E+10
23.000	0.368E+10	0.199E+10	0.127E+10
24.000	0.410E+10	0.217E+10	0.136E+10
25.000	0.454E+10	0.234E+10	0.146E+10
26.000	0.499E+10	0.251E+10	0.155E+10
27.000	0.544E+10	0.267E+10	0.165E+10
28.000	0.590E+10	0.284E+10	0.174E+10
29.000	0.636E+10	0.300E+10	0.183E+10
30.000	0.682E+10	0.316E+10	0.191E+10
31.000	0.729E+10	0.332E+10	0.200E+10
32.000	0.775E+10	0.347E+10	0.209E+10
33.000	0.820E+10	0.362E+10	0.217E+10
34.000	0.865E+10	0.376E+10	0.225E+10
35.000	0.910E+10	0.391E+10	0.233E+10
36.000	0.953E+10	0.404E+10	0.240E+10
37.000	0.996E+10	0.418E+10	0.248E+10
38.000	0.104E+11	0.431E+10	0.255E+10
39.000	0.108E+11	0.444E+10	0.262E+10
40.000	0.112E+11	0.456E+10	0.269E+10
41.000	0.116E+11	0.468E+10	0.276E+10
42.000	0.120E+11	0.480E+10	0.282E+10
43.000	0.123E+11	0.491E+10	0.289E+10
44.000	0.127E+11	0.502E+10	0.295E+10
45.000	0.130E+11	0.513E+10	0.301E+10
46.000	0.134E+11	0.523E+10	0.306E+10

47.000	0.137E+11	0.533E+10	0.312E+10
48.000	0.140E+11	0.543E+10	0.317E+10
49.000	0.143E+11	0.553E+10	0.323E+10
50.000	0.146E+11	0.562E+10	0.328E+10
51.000	0.149E+11	0.570E+10	0.333E+10
52.000	0.152E+11	0.579E+10	0.337E+10
53.000	0.154E+11	0.587E+10	0.342E+10
54.000	0.157E+11	0.595E+10	0.347E+10
55.000	0.159E+11	0.603E+10	0.351E+10
56.000	0.162E+11	0.610E+10	0.355E+10
57.000	0.164E+11	0.618E+10	0.359E+10
58.000	0.166E+11	0.625E+10	0.363E+10
59.000	0.168E+11	0.631E+10	0.367E+10
60.000	0.170E+11	0.638E+10	0.370E+10
61.000	0.172E+11	0.644E+10	0.374E+10
62.000	0.174E+11	0.650E+10	0.377E+10
63.000	0.176E+11	0.656E+10	0.380E+10
64.000	0.178E+11	0.661E+10	0.384E+10
65.000	0.179E+11	0.667E+10	0.387E+10
66.000	0.181E+11	0.672E+10	0.389E+10
67.000	0.182E+11	0.677E+10	0.392E+10
68.000	0.184E+11	0.682E+10	0.395E+10
69.000	0.185E+11	0.686E+10	0.398E+10
70.000	0.187E+11	0.691E+10	0.400E+10
71.000	0.188E+11	0.695E+10	0.403E+10
72.000	0.189E+11	0.699E+10	0.405E+10
73.000	0.191E+11	0.703E+10	0.407E+10
74.000	0.192E+11	0.707E+10	0.409E+10
75.000	0.193E+11	0.711E+10	0.411E+10
76.000	0.194E+11	0.714E+10	0.413E+10
77.000	0.195E+11	0.718E+10	0.415E+10
78.000	0.196E+11	0.721E+10	0.417E+10
79.000	0.197E+11	0.724E+10	0.419E+10
80.000	0.198E+11	0.727E+10	0.420E+10
81.000	0.199E+11	0.730E+10	0.422E+10
82.000	0.200E+11	0.732E+10	0.423E+10
83.000	0.200E+11	0.735E+10	0.425E+10
84.000	0.201E+11	0.737E+10	0.426E+10
85.000	0.202E+11	0.740E+10	0.427E+10
86.000	0.203E+11	0.742E+10	0.429E+10
87.000	0.203E+11	0.744E+10	0.430E+10
88.000	0.204E+11	0.746E+10	0.431E+10
89.000	0.204E+11	0.748E+10	0.432E+10
90.000	0.205E+11	0.750E+10	0.433E+10
91.000	0.206E+11	0.751E+10	0.434E+10
92.000	0.206E+11	0.753E+10	0.435E+10
93.000	0.206E+11	0.754E+10	0.436E+10
94.000	0.207E+11	0.756E+10	0.436E+10
95.000	0.207E+11	0.757E+10	0.437E+10
96.000	0.208E+11	0.758E+10	0.438E+10
97.000	0.208E+11	0.760E+10	0.438E+10
98.000	0.208E+11	0.761E+10	0.439E+10
99.000	0.209E+11	0.762E+10	0.440E+10
100.000	0.209E+11	0.763E+10	0.440E+10

Yb

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
70	173.04	6.98	27.241	28.493	.264	.567

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
3.000	0.105E+07	0.102E+07	0.986E+06
3.125	0.128E+07	0.124E+07	0.120E+07
3.250	0.155E+07	0.150E+07	0.145E+07
3.375	0.186E+07	0.180E+07	0.173E+07
3.500	0.222E+07	0.214E+07	0.205E+07
3.625	0.262E+07	0.252E+07	0.242E+07
3.750	0.308E+07	0.296E+07	0.283E+07
3.875	0.360E+07	0.345E+07	0.329E+07
4.000	0.418E+07	0.399E+07	0.380E+07
4.125	0.482E+07	0.460E+07	0.436E+07
4.250	0.554E+07	0.527E+07	0.499E+07
4.375	0.633E+07	0.601E+07	0.567E+07
4.500	0.721E+07	0.682E+07	0.642E+07
4.625	0.817E+07	0.771E+07	0.724E+07
4.750	0.922E+07	0.869E+07	0.813E+07
4.875	0.104E+08	0.974E+07	0.909E+07
5.000	0.116E+08	0.109E+08	0.101E+08
5.125	0.130E+08	0.121E+08	0.113E+08
5.250	0.145E+08	0.135E+08	0.125E+08
5.375	0.160E+08	0.149E+08	0.137E+08
5.500	0.178E+08	0.164E+08	0.151E+08
5.625	0.196E+08	0.181E+08	0.166E+08
5.750	0.216E+08	0.199E+08	0.182E+08
5.875	0.237E+08	0.218E+08	0.198E+08
6.000	0.260E+08	0.238E+08	0.216E+08
6.125	0.284E+08	0.259E+08	0.234E+08
6.250	0.309E+08	0.282E+08	0.254E+08
6.375	0.337E+08	0.305E+08	0.275E+08
6.500	0.366E+08	0.331E+08	0.297E+08
6.625	0.397E+08	0.357E+08	0.320E+08
6.750	0.429E+08	0.386E+08	0.344E+08
6.875	0.464E+08	0.415E+08	0.369E+08
7.000	0.500E+08	0.446E+08	0.395E+08
7.125	0.538E+08	0.479E+08	0.423E+08
7.250	0.579E+08	0.513E+08	0.451E+08
7.375	0.621E+08	0.549E+08	0.481E+08
7.500	0.666E+08	0.586E+08	0.512E+08
7.625	0.712E+08	0.625E+08	0.545E+08
7.750	0.762E+08	0.666E+08	0.578E+08
7.875	0.813E+08	0.709E+08	0.613E+08
8.000	0.867E+08	0.753E+08	0.649E+08
8.250	0.981E+08	0.846E+08	0.725E+08
8.500	0.111E+09	0.947E+08	0.806E+08
8.750	0.124E+09	0.106E+09	0.892E+08
9.000	0.139E+09	0.117E+09	0.983E+08

9.250	0.155E+09	0.129E+09	0.108E+09
9.500	0.172E+09	0.143E+09	0.118E+09
9.750	0.190E+09	0.156E+09	0.129E+09
10.000	0.209E+09	0.171E+09	0.140E+09
10.250	0.230E+09	0.187E+09	0.151E+09
10.500	0.252E+09	0.203E+09	0.163E+09
10.750	0.275E+09	0.220E+09	0.176E+09
11.000	0.300E+09	0.238E+09	0.189E+09
11.250	0.326E+09	0.256E+09	0.202E+09
11.500	0.354E+09	0.276E+09	0.216E+09
11.750	0.383E+09	0.296E+09	0.231E+09
12.000	0.413E+09	0.317E+09	0.246E+09
12.250	0.445E+09	0.339E+09	0.261E+09
12.500	0.479E+09	0.361E+09	0.276E+09
12.750	0.514E+09	0.385E+09	0.292E+09
13.000	0.550E+09	0.409E+09	0.309E+09
13.250	0.589E+09	0.434E+09	0.325E+09
13.500	0.628E+09	0.459E+09	0.343E+09
13.750	0.670E+09	0.485E+09	0.360E+09
14.000	0.713E+09	0.512E+09	0.378E+09
14.500	0.804E+09	0.568E+09	0.414E+09
15.000	0.901E+09	0.626E+09	0.452E+09
15.500	0.101E+10	0.687E+09	0.490E+09
16.000	0.112E+10	0.750E+09	0.530E+09
16.500	0.123E+10	0.815E+09	0.570E+09
17.000	0.136E+10	0.882E+09	0.611E+09
17.500	0.149E+10	0.951E+09	0.653E+09
18.000	0.162E+10	0.102E+10	0.695E+09
18.500	0.176E+10	0.109E+10	0.738E+09
19.000	0.191E+10	0.117E+10	0.781E+09
19.500	0.206E+10	0.124E+10	0.825E+09
20.000	0.222E+10	0.132E+10	0.868E+09
21.000	0.255E+10	0.147E+10	0.956E+09
22.000	0.290E+10	0.162E+10	0.104E+10
23.000	0.327E+10	0.178E+10	0.113E+10
24.000	0.365E+10	0.193E+10	0.122E+10
25.000	0.404E+10	0.209E+10	0.131E+10
26.000	0.445E+10	0.224E+10	0.139E+10
27.000	0.486E+10	0.240E+10	0.148E+10
28.000	0.527E+10	0.255E+10	0.156E+10
29.000	0.569E+10	0.270E+10	0.164E+10
30.000	0.612E+10	0.284E+10	0.173E+10
31.000	0.654E+10	0.299E+10	0.180E+10
32.000	0.696E+10	0.313E+10	0.188E+10
33.000	0.738E+10	0.327E+10	0.196E+10
34.000	0.779E+10	0.340E+10	0.203E+10
35.000	0.820E+10	0.353E+10	0.211E+10
36.000	0.860E+10	0.366E+10	0.218E+10
37.000	0.900E+10	0.379E+10	0.225E+10
38.000	0.938E+10	0.391E+10	0.232E+10
39.000	0.976E+10	0.403E+10	0.238E+10
40.000	0.101E+11	0.415E+10	0.245E+10
41.000	0.105E+11	0.426E+10	0.251E+10
42.000	0.108E+11	0.437E+10	0.257E+10
43.000	0.112E+11	0.447E+10	0.263E+10
44.000	0.115E+11	0.458E+10	0.269E+10
45.000	0.118E+11	0.468E+10	0.274E+10
46.000	0.122E+11	0.478E+10	0.280E+10

47.000	0.125E+11	0.487E+10	0.285E+10
48.000	0.128E+11	0.496E+10	0.290E+10
49.000	0.130E+11	0.505E+10	0.295E+10
50.000	0.133E+11	0.514E+10	0.300E+10
51.000	0.136E+11	0.522E+10	0.305E+10
52.000	0.139E+11	0.530E+10	0.309E+10
53.000	0.141E+11	0.538E+10	0.314E+10
54.000	0.143E+11	0.546E+10	0.318E+10
55.000	0.146E+11	0.553E+10	0.322E+10
56.000	0.148E+11	0.560E+10	0.326E+10
57.000	0.150E+11	0.567E+10	0.330E+10
58.000	0.152E+11	0.574E+10	0.334E+10
59.000	0.154E+11	0.580E+10	0.337E+10
60.000	0.156E+11	0.587E+10	0.341E+10
61.000	0.158E+11	0.593E+10	0.344E+10
62.000	0.160E+11	0.599E+10	0.347E+10
63.000	0.162E+11	0.604E+10	0.351E+10
64.000	0.163E+11	0.610E+10	0.354E+10
65.000	0.165E+11	0.615E+10	0.357E+10
66.000	0.167E+11	0.620E+10	0.359E+10
67.000	0.168E+11	0.625E+10	0.362E+10
68.000	0.170E+11	0.630E+10	0.365E+10
69.000	0.171E+11	0.634E+10	0.367E+10
70.000	0.172E+11	0.638E+10	0.370E+10
71.000	0.174E+11	0.643E+10	0.372E+10
72.000	0.175E+11	0.647E+10	0.374E+10
73.000	0.176E+11	0.651E+10	0.377E+10
74.000	0.177E+11	0.654E+10	0.379E+10
75.000	0.178E+11	0.658E+10	0.381E+10
76.000	0.180E+11	0.661E+10	0.383E+10
77.000	0.181E+11	0.665E+10	0.385E+10
78.000	0.182E+11	0.668E+10	0.386E+10
79.000	0.182E+11	0.671E+10	0.388E+10
80.000	0.183E+11	0.674E+10	0.390E+10
81.000	0.184E+11	0.677E+10	0.391E+10
82.000	0.185E+11	0.680E+10	0.393E+10
83.000	0.186E+11	0.682E+10	0.394E+10
84.000	0.187E+11	0.685E+10	0.396E+10
85.000	0.187E+11	0.687E+10	0.397E+10
86.000	0.188E+11	0.689E+10	0.398E+10
87.000	0.189E+11	0.691E+10	0.400E+10
88.000	0.189E+11	0.694E+10	0.401E+10
89.000	0.190E+11	0.695E+10	0.402E+10
90.000	0.191E+11	0.697E+10	0.403E+10
91.000	0.191E+11	0.699E+10	0.404E+10
92.000	0.192E+11	0.701E+10	0.405E+10
93.000	0.192E+11	0.702E+10	0.406E+10
94.000	0.193E+11	0.704E+10	0.406E+10
95.000	0.193E+11	0.705E+10	0.407E+10
96.000	0.193E+11	0.707E+10	0.408E+10
97.000	0.194E+11	0.708E+10	0.409E+10
98.000	0.194E+11	0.709E+10	0.409E+10
99.000	0.195E+11	0.710E+10	0.410E+10
100.000	0.195E+11	0.711E+10	0.411E+10

Lu

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
71	(g/mole) 174.967	(g/cm ³) 9.84	(cm ⁻¹) 37.002	(cm ⁻¹) 38.914	.2655	.569

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
3.000	0.899E+06	0.875E+06	0.849E+06
3.125	0.110E+07	0.107E+07	0.103E+07
3.250	0.133E+07	0.129E+07	0.125E+07
3.375	0.160E+07	0.155E+07	0.149E+07
3.500	0.191E+07	0.184E+07	0.177E+07
3.625	0.226E+07	0.218E+07	0.209E+07
3.750	0.266E+07	0.255E+07	0.245E+07
3.875	0.310E+07	0.298E+07	0.284E+07
4.000	0.360E+07	0.345E+07	0.329E+07
4.125	0.416E+07	0.398E+07	0.378E+07
4.250	0.478E+07	0.456E+07	0.432E+07
4.375	0.547E+07	0.520E+07	0.491E+07
4.500	0.623E+07	0.591E+07	0.557E+07
4.625	0.706E+07	0.668E+07	0.628E+07
4.750	0.797E+07	0.752E+07	0.705E+07
4.875	0.897E+07	0.844E+07	0.789E+07
5.000	0.101E+08	0.944E+07	0.880E+07
5.125	0.112E+08	0.105E+08	0.978E+07
5.250	0.125E+08	0.117E+08	0.108E+08
5.375	0.139E+08	0.129E+08	0.120E+08
5.500	0.154E+08	0.143E+08	0.132E+08
5.625	0.170E+08	0.157E+08	0.145E+08
5.750	0.187E+08	0.173E+08	0.158E+08
5.875	0.205E+08	0.189E+08	0.173E+08
6.000	0.225E+08	0.207E+08	0.188E+08
6.125	0.246E+08	0.225E+08	0.205E+08
6.250	0.268E+08	0.245E+08	0.222E+08
6.375	0.292E+08	0.266E+08	0.240E+08
6.500	0.318E+08	0.288E+08	0.259E+08
6.625	0.344E+08	0.312E+08	0.280E+08
6.750	0.373E+08	0.336E+08	0.301E+08
6.875	0.403E+08	0.362E+08	0.323E+08
7.000	0.435E+08	0.389E+08	0.346E+08
7.125	0.468E+08	0.418E+08	0.370E+08
7.250	0.503E+08	0.448E+08	0.396E+08
7.375	0.540E+08	0.480E+08	0.422E+08
7.500	0.579E+08	0.512E+08	0.450E+08
7.625	0.620E+08	0.547E+08	0.478E+08
7.750	0.663E+08	0.583E+08	0.508E+08
7.875	0.708E+08	0.620E+08	0.539E+08
8.000	0.755E+08	0.659E+08	0.571E+08
8.250	0.856E+08	0.742E+08	0.638E+08
8.500	0.965E+08	0.830E+08	0.710E+08
8.750	0.108E+09	0.926E+08	0.786E+08
9.000	0.121E+09	0.103E+09	0.867E+08

9.250	0.135E+09	0.114E+09	0.953E+08
9.500	0.150E+09	0.125E+09	0.104E+09
9.750	0.166E+09	0.138E+09	0.114E+09
10.000	0.183E+09	0.151E+09	0.124E+09
10.250	0.201E+09	0.164E+09	0.134E+09
10.500	0.221E+09	0.179E+09	0.145E+09
10.750	0.241E+09	0.194E+09	0.156E+09
11.000	0.263E+09	0.210E+09	0.168E+09
11.250	0.286E+09	0.227E+09	0.180E+09
11.500	0.310E+09	0.244E+09	0.193E+09
11.750	0.336E+09	0.262E+09	0.206E+09
12.000	0.363E+09	0.281E+09	0.219E+09
12.250	0.391E+09	0.300E+09	0.233E+09
12.500	0.421E+09	0.321E+09	0.247E+09
12.750	0.452E+09	0.341E+09	0.261E+09
13.000	0.485E+09	0.363E+09	0.276E+09
13.250	0.518E+09	0.385E+09	0.291E+09
13.500	0.554E+09	0.408E+09	0.307E+09
13.750	0.591E+09	0.432E+09	0.323E+09
14.000	0.629E+09	0.456E+09	0.339E+09
14.500	0.710E+09	0.507E+09	0.372E+09
15.000	0.797E+09	0.559E+09	0.406E+09
15.500	0.889E+09	0.614E+09	0.441E+09
16.000	0.988E+09	0.672E+09	0.478E+09
16.500	0.109E+10	0.731E+09	0.515E+09
17.000	0.120E+10	0.792E+09	0.552E+09
17.500	0.132E+10	0.855E+09	0.591E+09
18.000	0.144E+10	0.919E+09	0.630E+09
18.500	0.157E+10	0.985E+09	0.669E+09
19.000	0.170E+10	0.105E+10	0.709E+09
19.500	0.184E+10	0.112E+10	0.750E+09
20.000	0.198E+10	0.119E+10	0.790E+09
21.000	0.228E+10	0.133E+10	0.872E+09
22.000	0.260E+10	0.147E+10	0.954E+09
23.000	0.294E+10	0.162E+10	0.104E+10
24.000	0.329E+10	0.176E+10	0.112E+10
25.000	0.365E+10	0.191E+10	0.120E+10
26.000	0.402E+10	0.205E+10	0.128E+10
27.000	0.440E+10	0.220E+10	0.136E+10
28.000	0.478E+10	0.234E+10	0.144E+10
29.000	0.517E+10	0.248E+10	0.152E+10
30.000	0.557E+10	0.262E+10	0.159E+10
31.000	0.596E+10	0.276E+10	0.167E+10
32.000	0.636E+10	0.289E+10	0.174E+10
33.000	0.675E+10	0.302E+10	0.182E+10
34.000	0.714E+10	0.315E+10	0.189E+10
35.000	0.753E+10	0.328E+10	0.196E+10
36.000	0.791E+10	0.340E+10	0.203E+10
37.000	0.828E+10	0.352E+10	0.209E+10
38.000	0.865E+10	0.364E+10	0.216E+10
39.000	0.901E+10	0.375E+10	0.222E+10
40.000	0.937E+10	0.386E+10	0.228E+10
41.000	0.972E+10	0.397E+10	0.234E+10
42.000	0.101E+11	0.408E+10	0.240E+10
43.000	0.104E+11	0.418E+10	0.246E+10
44.000	0.107E+11	0.428E+10	0.252E+10
45.000	0.110E+11	0.438E+10	0.257E+10
46.000	0.113E+11	0.447E+10	0.262E+10

47.000	0.116E+11	0.457E+10	0.268E+10
48.000	0.119E+11	0.466E+10	0.273E+10
49.000	0.122E+11	0.474E+10	0.277E+10
50.000	0.125E+11	0.483E+10	0.282E+10
51.000	0.127E+11	0.491E+10	0.287E+10
52.000	0.130E+11	0.499E+10	0.291E+10
53.000	0.132E+11	0.507E+10	0.295E+10
54.000	0.135E+11	0.514E+10	0.300E+10
55.000	0.137E+11	0.521E+10	0.304E+10
56.000	0.139E+11	0.528E+10	0.308E+10
57.000	0.141E+11	0.535E+10	0.311E+10
58.000	0.143E+11	0.542E+10	0.315E+10
59.000	0.145E+11	0.548E+10	0.319E+10
60.000	0.147E+11	0.554E+10	0.322E+10
61.000	0.149E+11	0.560E+10	0.326E+10
62.000	0.151E+11	0.566E+10	0.329E+10
63.000	0.153E+11	0.572E+10	0.332E+10
64.000	0.154E+11	0.577E+10	0.335E+10
65.000	0.156E+11	0.582E+10	0.338E+10
66.000	0.158E+11	0.587E+10	0.341E+10
67.000	0.159E+11	0.592E+10	0.343E+10
68.000	0.161E+11	0.597E+10	0.346E+10
69.000	0.162E+11	0.602E+10	0.349E+10
70.000	0.163E+11	0.606E+10	0.351E+10
71.000	0.165E+11	0.610E+10	0.354E+10
72.000	0.166E+11	0.614E+10	0.356E+10
73.000	0.167E+11	0.618E+10	0.358E+10
74.000	0.168E+11	0.622E+10	0.360E+10
75.000	0.169E+11	0.626E+10	0.362E+10
76.000	0.171E+11	0.629E+10	0.364E+10
77.000	0.172E+11	0.633E+10	0.366E+10
78.000	0.173E+11	0.636E+10	0.368E+10
79.000	0.174E+11	0.639E+10	0.370E+10
80.000	0.175E+11	0.642E+10	0.371E+10
81.000	0.175E+11	0.645E+10	0.373E+10
82.000	0.176E+11	0.648E+10	0.375E+10
83.000	0.177E+11	0.651E+10	0.376E+10
84.000	0.178E+11	0.653E+10	0.378E+10
85.000	0.179E+11	0.656E+10	0.379E+10
86.000	0.179E+11	0.658E+10	0.380E+10
87.000	0.180E+11	0.660E+10	0.382E+10
88.000	0.181E+11	0.662E+10	0.383E+10
89.000	0.181E+11	0.664E+10	0.384E+10
90.000	0.182E+11	0.666E+10	0.385E+10
91.000	0.183E+11	0.668E+10	0.386E+10
92.000	0.183E+11	0.670E+10	0.387E+10
93.000	0.184E+11	0.672E+10	0.388E+10
94.000	0.184E+11	0.673E+10	0.389E+10
95.000	0.185E+11	0.675E+10	0.390E+10
96.000	0.185E+11	0.676E+10	0.391E+10
97.000	0.186E+11	0.678E+10	0.391E+10
98.000	0.186E+11	0.679E+10	0.392E+10
99.000	0.186E+11	0.680E+10	0.393E+10
100.000	0.187E+11	0.682E+10	0.393E+10

Hf

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
72	(g/mole) 178.49	(g/cm ³) 13.1	(cm ⁻¹) 46.781	(cm ⁻¹) 49.590	.267	.571

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
4.000	0.312E+07	0.299E+07	0.285E+07
4.125	0.360E+07	0.345E+07	0.328E+07
4.250	0.414E+07	0.395E+07	0.375E+07
4.375	0.474E+07	0.451E+07	0.427E+07
4.500	0.539E+07	0.513E+07	0.484E+07
4.625	0.612E+07	0.580E+07	0.547E+07
4.750	0.691E+07	0.654E+07	0.614E+07
4.875	0.778E+07	0.734E+07	0.688E+07
5.000	0.872E+07	0.821E+07	0.767E+07
5.125	0.975E+07	0.915E+07	0.853E+07
5.250	0.109E+08	0.102E+08	0.945E+07
5.375	0.121E+08	0.113E+08	0.104E+08
5.500	0.134E+08	0.124E+08	0.115E+08
5.625	0.147E+08	0.137E+08	0.126E+08
5.750	0.162E+08	0.150E+08	0.138E+08
5.875	0.179E+08	0.165E+08	0.151E+08
6.000	0.196E+08	0.180E+08	0.165E+08
6.125	0.214E+08	0.197E+08	0.179E+08
6.250	0.234E+08	0.214E+08	0.194E+08
6.375	0.254E+08	0.232E+08	0.211E+08
6.500	0.276E+08	0.252E+08	0.227E+08
6.625	0.300E+08	0.272E+08	0.245E+08
6.750	0.325E+08	0.294E+08	0.264E+08
6.875	0.351E+08	0.317E+08	0.284E+08
7.000	0.379E+08	0.341E+08	0.304E+08
7.125	0.408E+08	0.366E+08	0.326E+08
7.250	0.439E+08	0.392E+08	0.348E+08
7.375	0.471E+08	0.420E+08	0.372E+08
7.500	0.505E+08	0.449E+08	0.396E+08
7.625	0.541E+08	0.479E+08	0.421E+08
7.750	0.579E+08	0.511E+08	0.448E+08
7.875	0.618E+08	0.544E+08	0.475E+08
8.000	0.660E+08	0.578E+08	0.503E+08
8.250	0.748E+08	0.651E+08	0.563E+08
8.500	0.844E+08	0.730E+08	0.627E+08
8.750	0.948E+08	0.815E+08	0.696E+08
9.000	0.106E+09	0.905E+08	0.768E+08
9.250	0.118E+09	0.100E+09	0.845E+08
9.500	0.131E+09	0.111E+09	0.925E+08
9.750	0.145E+09	0.121E+09	0.101E+09
10.000	0.160E+09	0.133E+09	0.110E+09
10.250	0.176E+09	0.145E+09	0.119E+09
10.500	0.194E+09	0.158E+09	0.129E+09
10.750	0.212E+09	0.172E+09	0.139E+09
11.000	0.231E+09	0.186E+09	0.150E+09

11.250	0.251E+09	0.201E+09	0.161E+09
11.500	0.273E+09	0.216E+09	0.172E+09
11.750	0.296E+09	0.233E+09	0.184E+09
12.000	0.320E+09	0.249E+09	0.196E+09
12.250	0.345E+09	0.267E+09	0.208E+09
12.500	0.371E+09	0.285E+09	0.221E+09
12.750	0.399E+09	0.304E+09	0.234E+09
13.000	0.427E+09	0.323E+09	0.248E+09
13.250	0.458E+09	0.344E+09	0.262E+09
13.500	0.489E+09	0.364E+09	0.276E+09
13.750	0.522E+09	0.386E+09	0.290E+09
14.000	0.556E+09	0.408E+09	0.305E+09
14.500	0.628E+09	0.453E+09	0.335E+09
15.000	0.705E+09	0.501E+09	0.367E+09
15.500	0.788E+09	0.551E+09	0.399E+09
16.000	0.877E+09	0.603E+09	0.432E+09
16.500	0.970E+09	0.657E+09	0.466E+09
17.000	0.107E+10	0.713E+09	0.501E+09
17.500	0.117E+10	0.771E+09	0.537E+09
18.000	0.128E+10	0.830E+09	0.573E+09
18.500	0.140E+10	0.891E+09	0.610E+09
19.000	0.152E+10	0.952E+09	0.647E+09
19.500	0.164E+10	0.102E+10	0.684E+09
20.000	0.177E+10	0.108E+10	0.722E+09
21.000	0.205E+10	0.121E+10	0.798E+09
22.000	0.234E+10	0.134E+10	0.875E+09
23.000	0.264E+10	0.148E+10	0.953E+09
24.000	0.296E+10	0.162E+10	0.103E+10
25.000	0.330E+10	0.175E+10	0.111E+10
26.000	0.364E+10	0.189E+10	0.118E+10
27.000	0.399E+10	0.202E+10	0.126E+10
28.000	0.435E+10	0.216E+10	0.133E+10
29.000	0.471E+10	0.229E+10	0.141E+10
30.000	0.508E+10	0.242E+10	0.148E+10
31.000	0.545E+10	0.255E+10	0.155E+10
32.000	0.582E+10	0.268E+10	0.162E+10
33.000	0.620E+10	0.281E+10	0.169E+10
34.000	0.656E+10	0.293E+10	0.176E+10
35.000	0.693E+10	0.305E+10	0.183E+10
36.000	0.729E+10	0.317E+10	0.189E+10
37.000	0.765E+10	0.329E+10	0.196E+10
38.000	0.801E+10	0.340E+10	0.202E+10
39.000	0.835E+10	0.351E+10	0.208E+10
40.000	0.869E+10	0.362E+10	0.214E+10
41.000	0.903E+10	0.372E+10	0.220E+10
42.000	0.936E+10	0.383E+10	0.226E+10
43.000	0.967E+10	0.393E+10	0.231E+10
44.000	0.999E+10	0.402E+10	0.237E+10
45.000	0.103E+11	0.412E+10	0.242E+10
46.000	0.106E+11	0.421E+10	0.247E+10
47.000	0.109E+11	0.430E+10	0.252E+10
48.000	0.112E+11	0.439E+10	0.257E+10
49.000	0.114E+11	0.447E+10	0.262E+10
50.000	0.117E+11	0.456E+10	0.267E+10
51.000	0.120E+11	0.464E+10	0.271E+10
52.000	0.122E+11	0.471E+10	0.275E+10
53.000	0.124E+11	0.479E+10	0.280E+10
54.000	0.127E+11	0.486E+10	0.284E+10

55.000	0.129E+11	0.494E+10	0.288E+10
56.000	0.131E+11	0.501E+10	0.292E+10
57.000	0.133E+11	0.507E+10	0.295E+10
58.000	0.135E+11	0.514E+10	0.299E+10
59.000	0.137E+11	0.520E+10	0.303E+10
60.000	0.139E+11	0.526E+10	0.306E+10
61.000	0.141E+11	0.532E+10	0.309E+10
62.000	0.143E+11	0.538E+10	0.313E+10
63.000	0.145E+11	0.544E+10	0.316E+10
64.000	0.146E+11	0.549E+10	0.319E+10
65.000	0.148E+11	0.554E+10	0.322E+10
66.000	0.150E+11	0.559E+10	0.325E+10
67.000	0.151E+11	0.564E+10	0.327E+10
68.000	0.153E+11	0.569E+10	0.330E+10
69.000	0.154E+11	0.574E+10	0.333E+10
70.000	0.155E+11	0.578E+10	0.335E+10
71.000	0.157E+11	0.582E+10	0.337E+10
72.000	0.158E+11	0.586E+10	0.340E+10
73.000	0.159E+11	0.590E+10	0.342E+10
74.000	0.161E+11	0.594E+10	0.344E+10
75.000	0.162E+11	0.598E+10	0.346E+10
76.000	0.163E+11	0.602E+10	0.348E+10
77.000	0.164E+11	0.605E+10	0.350E+10
78.000	0.165E+11	0.608E+10	0.352E+10
79.000	0.166E+11	0.612E+10	0.354E+10
80.000	0.167E+11	0.615E+10	0.356E+10
81.000	0.168E+11	0.618E+10	0.357E+10
82.000	0.169E+11	0.621E+10	0.359E+10
83.000	0.169E+11	0.623E+10	0.361E+10
84.000	0.170E+11	0.626E+10	0.362E+10
85.000	0.171E+11	0.629E+10	0.364E+10
86.000	0.172E+11	0.631E+10	0.365E+10
87.000	0.173E+11	0.633E+10	0.366E+10
88.000	0.173E+11	0.636E+10	0.367E+10
89.000	0.174E+11	0.638E+10	0.369E+10
90.000	0.175E+11	0.640E+10	0.370E+10
91.000	0.175E+11	0.642E+10	0.371E+10
92.000	0.176E+11	0.644E+10	0.372E+10
93.000	0.176E+11	0.646E+10	0.373E+10
94.000	0.177E+11	0.647E+10	0.374E+10
95.000	0.177E+11	0.649E+10	0.375E+10
96.000	0.178E+11	0.651E+10	0.376E+10
97.000	0.178E+11	0.652E+10	0.377E+10
98.000	0.179E+11	0.654E+10	0.377E+10
99.000	0.179E+11	0.655E+10	0.378E+10
100.000	0.180E+11	0.656E+10	0.379E+10

Ta

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
73	(g/mole) 180.9479	(g/cm ³) 16.6	(cm ⁻¹) 56.540	(cm ⁻¹) 60.474	.2685	.573

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
4.000	0.270E+07	0.259E+07	0.248E+07
4.125	0.312E+07	0.299E+07	0.285E+07
4.250	0.359E+07	0.343E+07	0.326E+07
4.375	0.410E+07	0.392E+07	0.372E+07
4.500	0.468E+07	0.445E+07	0.422E+07
4.625	0.531E+07	0.504E+07	0.476E+07
4.750	0.599E+07	0.568E+07	0.535E+07
4.875	0.675E+07	0.638E+07	0.600E+07
5.000	0.757E+07	0.714E+07	0.669E+07
5.125	0.846E+07	0.796E+07	0.745E+07
5.250	0.943E+07	0.885E+07	0.826E+07
5.375	0.105E+08	0.981E+07	0.913E+07
5.500	0.116E+08	0.108E+08	0.101E+08
5.625	0.128E+08	0.119E+08	0.111E+08
5.750	0.141E+08	0.131E+08	0.121E+08
5.875	0.155E+08	0.144E+08	0.132E+08
6.000	0.170E+08	0.157E+08	0.144E+08
6.125	0.186E+08	0.172E+08	0.157E+08
6.250	0.203E+08	0.187E+08	0.171E+08
6.375	0.222E+08	0.203E+08	0.185E+08
6.500	0.241E+08	0.220E+08	0.200E+08
6.625	0.261E+08	0.238E+08	0.215E+08
6.750	0.283E+08	0.257E+08	0.232E+08
6.875	0.306E+08	0.277E+08	0.249E+08
7.000	0.330E+08	0.299E+08	0.268E+08
7.125	0.356E+08	0.321E+08	0.287E+08
7.250	0.383E+08	0.344E+08	0.307E+08
7.375	0.412E+08	0.369E+08	0.327E+08
7.500	0.441E+08	0.394E+08	0.349E+08
7.625	0.473E+08	0.421E+08	0.372E+08
7.750	0.506E+08	0.449E+08	0.395E+08
7.875	0.540E+08	0.478E+08	0.419E+08
8.000	0.577E+08	0.508E+08	0.445E+08
8.250	0.654E+08	0.573E+08	0.498E+08
8.500	0.738E+08	0.643E+08	0.555E+08
8.750	0.830E+08	0.718E+08	0.616E+08
9.000	0.929E+08	0.798E+08	0.681E+08
9.250	0.104E+09	0.884E+08	0.750E+08
9.500	0.115E+09	0.976E+08	0.822E+08
9.750	0.128E+09	0.107E+09	0.898E+08
10.000	0.141E+09	0.118E+09	0.979E+08
10.250	0.155E+09	0.129E+09	0.106E+09
10.500	0.170E+09	0.140E+09	0.115E+09
10.750	0.186E+09	0.152E+09	0.124E+09
11.000	0.203E+09	0.165E+09	0.134E+09

11.250	0.221E+09	0.178E+09	0.144E+09
11.500	0.240E+09	0.192E+09	0.154E+09
11.750	0.260E+09	0.207E+09	0.165E+09
12.000	0.282E+09	0.222E+09	0.175E+09
12.250	0.304E+09	0.238E+09	0.187E+09
12.500	0.327E+09	0.254E+09	0.198E+09
12.750	0.352E+09	0.271E+09	0.210E+09
13.000	0.378E+09	0.289E+09	0.223E+09
13.250	0.404E+09	0.307E+09	0.235E+09
13.500	0.432E+09	0.325E+09	0.248E+09
13.750	0.461E+09	0.345E+09	0.261E+09
14.000	0.492E+09	0.365E+09	0.275E+09
14.500	0.556E+09	0.406E+09	0.303E+09
15.000	0.625E+09	0.449E+09	0.332E+09
15.500	0.700E+09	0.495E+09	0.361E+09
16.000	0.779E+09	0.543E+09	0.392E+09
16.500	0.863E+09	0.592E+09	0.424E+09
17.000	0.952E+09	0.643E+09	0.456E+09
17.500	0.105E+10	0.696E+09	0.489E+09
18.000	0.115E+10	0.750E+09	0.522E+09
18.500	0.125E+10	0.806E+09	0.556E+09
19.000	0.136E+10	0.863E+09	0.591E+09
19.500	0.147E+10	0.922E+09	0.626E+09
20.000	0.159E+10	0.981E+09	0.661E+09
21.000	0.184E+10	0.110E+10	0.732E+09
22.000	0.210E+10	0.123E+10	0.804E+09
23.000	0.238E+10	0.135E+10	0.877E+09
24.000	0.268E+10	0.148E+10	0.950E+09
25.000	0.298E+10	0.161E+10	0.102E+10
26.000	0.330E+10	0.174E+10	0.110E+10
27.000	0.363E+10	0.187E+10	0.117E+10
28.000	0.396E+10	0.200E+10	0.124E+10
29.000	0.430E+10	0.212E+10	0.131E+10
30.000	0.464E+10	0.225E+10	0.138E+10
31.000	0.499E+10	0.237E+10	0.145E+10
32.000	0.534E+10	0.249E+10	0.151E+10
33.000	0.569E+10	0.261E+10	0.158E+10
34.000	0.604E+10	0.273E+10	0.165E+10
35.000	0.639E+10	0.285E+10	0.171E+10
36.000	0.673E+10	0.296E+10	0.177E+10
37.000	0.708E+10	0.307E+10	0.184E+10
38.000	0.741E+10	0.318E+10	0.190E+10
39.000	0.775E+10	0.329E+10	0.196E+10
40.000	0.807E+10	0.339E+10	0.201E+10
41.000	0.840E+10	0.350E+10	0.207E+10
42.000	0.871E+10	0.359E+10	0.213E+10
43.000	0.902E+10	0.369E+10	0.218E+10
44.000	0.932E+10	0.379E+10	0.223E+10
45.000	0.962E+10	0.388E+10	0.228E+10
46.000	0.991E+10	0.397E+10	0.233E+10
47.000	0.102E+11	0.406E+10	0.238E+10
48.000	0.105E+11	0.414E+10	0.243E+10
49.000	0.107E+11	0.423E+10	0.248E+10
50.000	0.110E+11	0.431E+10	0.252E+10
51.000	0.112E+11	0.439E+10	0.257E+10
52.000	0.115E+11	0.446E+10	0.261E+10
53.000	0.117E+11	0.454E+10	0.265E+10
54.000	0.120E+11	0.461E+10	0.269E+10

55.000	0.122E+11	0.468E+10	0.273E+10
56.000	0.124E+11	0.475E+10	0.277E+10
57.000	0.126E+11	0.482E+10	0.281E+10
58.000	0.128E+11	0.488E+10	0.284E+10
59.000	0.130E+11	0.494E+10	0.288E+10
60.000	0.132E+11	0.500E+10	0.291E+10
61.000	0.134E+11	0.506E+10	0.295E+10
62.000	0.136E+11	0.512E+10	0.298E+10
63.000	0.137E+11	0.518E+10	0.301E+10
64.000	0.139E+11	0.523E+10	0.304E+10
65.000	0.141E+11	0.528E+10	0.307E+10
66.000	0.142E+11	0.533E+10	0.310E+10
67.000	0.144E+11	0.538E+10	0.312E+10
68.000	0.145E+11	0.543E+10	0.315E+10
69.000	0.147E+11	0.548E+10	0.318E+10
70.000	0.148E+11	0.552E+10	0.320E+10
71.000	0.150E+11	0.556E+10	0.323E+10
72.000	0.151E+11	0.561E+10	0.325E+10
73.000	0.152E+11	0.565E+10	0.327E+10
74.000	0.153E+11	0.569E+10	0.329E+10
75.000	0.154E+11	0.572E+10	0.332E+10
76.000	0.156E+11	0.576E+10	0.334E+10
77.000	0.157E+11	0.580E+10	0.336E+10
78.000	0.158E+11	0.583E+10	0.338E+10
79.000	0.159E+11	0.586E+10	0.339E+10
80.000	0.160E+11	0.589E+10	0.341E+10
81.000	0.161E+11	0.593E+10	0.343E+10
82.000	0.162E+11	0.595E+10	0.345E+10
83.000	0.162E+11	0.598E+10	0.346E+10
84.000	0.163E+11	0.601E+10	0.348E+10
85.000	0.164E+11	0.604E+10	0.349E+10
86.000	0.165E+11	0.606E+10	0.351E+10
87.000	0.166E+11	0.609E+10	0.352E+10
88.000	0.166E+11	0.611E+10	0.353E+10
89.000	0.167E+11	0.613E+10	0.355E+10
90.000	0.168E+11	0.616E+10	0.356E+10
91.000	0.168E+11	0.618E+10	0.357E+10
92.000	0.169E+11	0.620E+10	0.358E+10
93.000	0.170E+11	0.622E+10	0.359E+10
94.000	0.170E+11	0.623E+10	0.360E+10
95.000	0.171E+11	0.625E+10	0.361E+10
96.000	0.171E+11	0.627E+10	0.362E+10
97.000	0.172E+11	0.629E+10	0.363E+10
98.000	0.172E+11	0.630E+10	0.364E+10
99.000	0.173E+11	0.632E+10	0.365E+10
100.000	0.173E+11	0.633E+10	0.366E+10

W

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
74	183.85	19.3	61.411	66.572	.270	.575

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
4.000	0.236E+07	0.227E+07	0.217E+07
4.125	0.273E+07	0.262E+07	0.250E+07
4.250	0.314E+07	0.301E+07	0.287E+07
4.375	0.359E+07	0.343E+07	0.327E+07
4.500	0.409E+07	0.390E+07	0.371E+07
4.625	0.464E+07	0.442E+07	0.419E+07
4.750	0.525E+07	0.499E+07	0.471E+07
4.875	0.591E+07	0.560E+07	0.528E+07
5.000	0.663E+07	0.627E+07	0.590E+07
5.125	0.741E+07	0.700E+07	0.656E+07
5.250	0.826E+07	0.778E+07	0.728E+07
5.375	0.918E+07	0.863E+07	0.805E+07
5.500	0.102E+08	0.954E+07	0.888E+07
5.625	0.112E+08	0.105E+08	0.976E+07
5.750	0.124E+08	0.116E+08	0.107E+08
5.875	0.136E+08	0.127E+08	0.117E+08
6.000	0.149E+08	0.139E+08	0.128E+08
6.125	0.164E+08	0.151E+08	0.139E+08
6.250	0.179E+08	0.165E+08	0.151E+08
6.375	0.195E+08	0.179E+08	0.164E+08
6.500	0.212E+08	0.194E+08	0.177E+08
6.625	0.230E+08	0.210E+08	0.191E+08
6.750	0.249E+08	0.227E+08	0.206E+08
6.875	0.269E+08	0.245E+08	0.222E+08
7.000	0.291E+08	0.264E+08	0.238E+08
7.125	0.313E+08	0.284E+08	0.255E+08
7.250	0.337E+08	0.304E+08	0.273E+08
7.375	0.362E+08	0.326E+08	0.291E+08
7.500	0.389E+08	0.349E+08	0.311E+08
7.625	0.417E+08	0.373E+08	0.331E+08
7.750	0.446E+08	0.398E+08	0.352E+08
7.875	0.476E+08	0.424E+08	0.374E+08
8.000	0.508E+08	0.451E+08	0.397E+08
8.250	0.577E+08	0.509E+08	0.445E+08
8.500	0.652E+08	0.571E+08	0.497E+08
8.750	0.733E+08	0.638E+08	0.552E+08
9.000	0.821E+08	0.710E+08	0.610E+08
9.250	0.916E+08	0.788E+08	0.672E+08
9.500	0.102E+09	0.870E+08	0.738E+08
9.750	0.113E+09	0.958E+08	0.808E+08
10.000	0.125E+09	0.105E+09	0.881E+08
10.250	0.137E+09	0.115E+09	0.957E+08
10.500	0.151E+09	0.125E+09	0.104E+09
10.750	0.165E+09	0.136E+09	0.112E+09
11.000	0.180E+09	0.148E+09	0.121E+09

11.250	0.196E+09	0.160E+09	0.130E+09
11.500	0.213E+09	0.172E+09	0.139E+09
11.750	0.231E+09	0.186E+09	0.149E+09
12.000	0.250E+09	0.199E+09	0.159E+09
12.250	0.270E+09	0.214E+09	0.170E+09
12.500	0.291E+09	0.229E+09	0.180E+09
12.750	0.313E+09	0.244E+09	0.191E+09
13.000	0.336E+09	0.260E+09	0.203E+09
13.250	0.360E+09	0.277E+09	0.214E+09
13.500	0.385E+09	0.294E+09	0.226E+09
13.750	0.412E+09	0.312E+09	0.239E+09
14.000	0.439E+09	0.330E+09	0.251E+09
14.500	0.497E+09	0.368E+09	0.277E+09
15.000	0.559E+09	0.408E+09	0.304E+09
15.500	0.626E+09	0.450E+09	0.332E+09
16.000	0.698E+09	0.494E+09	0.360E+09
16.500	0.774E+09	0.540E+09	0.390E+09
17.000	0.855E+09	0.587E+09	0.420E+09
17.500	0.941E+09	0.636E+09	0.451E+09
18.000	0.103E+10	0.687E+09	0.483E+09
18.500	0.113E+10	0.739E+09	0.515E+09
19.000	0.122E+10	0.792E+09	0.547E+09
19.500	0.133E+10	0.847E+09	0.580E+09
20.000	0.144E+10	0.903E+09	0.614E+09
21.000	0.166E+10	0.102E+10	0.682E+09
22.000	0.191E+10	0.114E+10	0.751E+09
23.000	0.217E+10	0.126E+10	0.820E+09
24.000	0.244E+10	0.138E+10	0.890E+09
25.000	0.273E+10	0.150E+10	0.960E+09
26.000	0.302E+10	0.162E+10	0.103E+10
27.000	0.333E+10	0.175E+10	0.110E+10
28.000	0.364E+10	0.187E+10	0.117E+10
29.000	0.397E+10	0.199E+10	0.124E+10
30.000	0.429E+10	0.211E+10	0.130E+10
31.000	0.462E+10	0.223E+10	0.137E+10
32.000	0.496E+10	0.235E+10	0.144E+10
33.000	0.529E+10	0.247E+10	0.150E+10
34.000	0.563E+10	0.259E+10	0.156E+10
35.000	0.596E+10	0.270E+10	0.163E+10
36.000	0.629E+10	0.281E+10	0.169E+10
37.000	0.663E+10	0.292E+10	0.175E+10
38.000	0.695E+10	0.303E+10	0.181E+10
39.000	0.728E+10	0.313E+10	0.187E+10
40.000	0.760E+10	0.323E+10	0.192E+10
41.000	0.791E+10	0.333E+10	0.198E+10
42.000	0.822E+10	0.343E+10	0.203E+10
43.000	0.853E+10	0.353E+10	0.209E+10
44.000	0.883E+10	0.362E+10	0.214E+10
45.000	0.912E+10	0.371E+10	0.219E+10
46.000	0.941E+10	0.380E+10	0.224E+10
47.000	0.968E+10	0.389E+10	0.229E+10
48.000	0.996E+10	0.398E+10	0.234E+10
49.000	0.102E+11	0.406E+10	0.238E+10
50.000	0.105E+11	0.414E+10	0.243E+10
51.000	0.107E+11	0.422E+10	0.247E+10
52.000	0.110E+11	0.430E+10	0.251E+10
53.000	0.112E+11	0.437E+10	0.256E+10
54.000	0.115E+11	0.444E+10	0.260E+10

55.000	0.117E+11	0.451E+10	0.264E+10
56.000	0.119E+11	0.458E+10	0.267E+10
57.000	0.121E+11	0.465E+10	0.271E+10
58.000	0.123E+11	0.471E+10	0.275E+10
59.000	0.125E+11	0.478E+10	0.278E+10
60.000	0.127E+11	0.484E+10	0.282E+10
61.000	0.129E+11	0.490E+10	0.285E+10
62.000	0.131E+11	0.496E+10	0.288E+10
63.000	0.133E+11	0.501E+10	0.292E+10
64.000	0.134E+11	0.507E+10	0.295E+10
65.000	0.136E+11	0.512E+10	0.298E+10
66.000	0.138E+11	0.517E+10	0.301E+10
67.000	0.139E+11	0.522E+10	0.303E+10
68.000	0.141E+11	0.527E+10	0.306E+10
69.000	0.142E+11	0.532E+10	0.309E+10
70.000	0.144E+11	0.536E+10	0.311E+10
71.000	0.145E+11	0.541E+10	0.314E+10
72.000	0.146E+11	0.545E+10	0.316E+10
73.000	0.148E+11	0.549E+10	0.318E+10
74.000	0.149E+11	0.553E+10	0.321E+10
75.000	0.150E+11	0.557E+10	0.323E+10
76.000	0.151E+11	0.561E+10	0.325E+10
77.000	0.152E+11	0.565E+10	0.327E+10
78.000	0.153E+11	0.568E+10	0.329E+10
79.000	0.154E+11	0.572E+10	0.331E+10
80.000	0.155E+11	0.575E+10	0.333E+10
81.000	0.156E+11	0.578E+10	0.335E+10
82.000	0.157E+11	0.581E+10	0.336E+10
83.000	0.158E+11	0.584E+10	0.338E+10
84.000	0.159E+11	0.587E+10	0.340E+10
85.000	0.160E+11	0.590E+10	0.341E+10
86.000	0.161E+11	0.592E+10	0.343E+10
87.000	0.162E+11	0.595E+10	0.344E+10
88.000	0.162E+11	0.597E+10	0.346E+10
89.000	0.163E+11	0.600E+10	0.347E+10
90.000	0.164E+11	0.602E+10	0.348E+10
91.000	0.165E+11	0.604E+10	0.349E+10
92.000	0.165E+11	0.607E+10	0.351E+10
93.000	0.166E+11	0.609E+10	0.352E+10
94.000	0.166E+11	0.611E+10	0.353E+10
95.000	0.167E+11	0.613E+10	0.354E+10
96.000	0.168E+11	0.614E+10	0.355E+10
97.000	0.168E+11	0.616E+10	0.356E+10
98.000	0.169E+11	0.618E+10	0.357E+10
99.000	0.169E+11	0.619E+10	0.358E+10
100.000	0.170E+11	0.621E+10	0.359E+10

Re

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
75	186.207	21.0	64.404	68.115	.271	.577

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
4.000	0.204E+07	0.197E+07	0.189E+07
4.125	0.237E+07	0.228E+07	0.218E+07
4.250	0.272E+07	0.261E+07	0.250E+07
4.375	0.312E+07	0.299E+07	0.285E+07
4.500	0.355E+07	0.340E+07	0.324E+07
4.625	0.403E+07	0.385E+07	0.366E+07
4.750	0.456E+07	0.435E+07	0.412E+07
4.875	0.514E+07	0.489E+07	0.462E+07
5.000	0.577E+07	0.547E+07	0.516E+07
5.125	0.645E+07	0.611E+07	0.575E+07
5.250	0.719E+07	0.679E+07	0.638E+07
5.375	0.800E+07	0.754E+07	0.706E+07
5.500	0.886E+07	0.833E+07	0.779E+07
5.625	0.980E+07	0.919E+07	0.857E+07
5.750	0.108E+08	0.101E+08	0.940E+07
5.875	0.119E+08	0.111E+08	0.103E+08
6.000	0.130E+08	0.121E+08	0.112E+08
6.125	0.143E+08	0.133E+08	0.122E+08
6.250	0.156E+08	0.144E+08	0.133E+08
6.375	0.170E+08	0.157E+08	0.144E+08
6.500	0.185E+08	0.170E+08	0.156E+08
6.625	0.201E+08	0.185E+08	0.168E+08
6.750	0.218E+08	0.200E+08	0.182E+08
6.875	0.235E+08	0.215E+08	0.195E+08
7.000	0.254E+08	0.232E+08	0.210E+08
7.125	0.274E+08	0.249E+08	0.225E+08
7.250	0.295E+08	0.268E+08	0.241E+08
7.375	0.317E+08	0.287E+08	0.258E+08
7.500	0.340E+08	0.307E+08	0.275E+08
7.625	0.365E+08	0.328E+08	0.293E+08
7.750	0.390E+08	0.350E+08	0.312E+08
7.875	0.417E+08	0.373E+08	0.331E+08
8.000	0.446E+08	0.397E+08	0.352E+08
8.250	0.506E+08	0.449E+08	0.395E+08
8.500	0.572E+08	0.504E+08	0.441E+08
8.750	0.643E+08	0.564E+08	0.490E+08
9.000	0.721E+08	0.628E+08	0.543E+08
9.250	0.805E+08	0.697E+08	0.599E+08
9.500	0.896E+08	0.770E+08	0.658E+08
9.750	0.993E+08	0.849E+08	0.721E+08
10.000	0.110E+09	0.932E+08	0.787E+08
10.250	0.121E+09	0.102E+09	0.856E+08
10.500	0.133E+09	0.111E+09	0.928E+08
10.750	0.146E+09	0.121E+09	0.100E+09
11.000	0.159E+09	0.131E+09	0.108E+09

11.250	0.173E+09	0.142E+09	0.117E+09
11.500	0.188E+09	0.154E+09	0.125E+09
11.750	0.204E+09	0.166E+09	0.134E+09
12.000	0.221E+09	0.178E+09	0.143E+09
12.250	0.239E+09	0.191E+09	0.153E+09
12.500	0.258E+09	0.204E+09	0.163E+09
12.750	0.277E+09	0.218E+09	0.173E+09
13.000	0.298E+09	0.233E+09	0.183E+09
13.250	0.319E+09	0.248E+09	0.194E+09
13.500	0.342E+09	0.263E+09	0.205E+09
13.750	0.365E+09	0.279E+09	0.216E+09
14.000	0.389E+09	0.296E+09	0.227E+09
14.500	0.441E+09	0.331E+09	0.251E+09
15.000	0.497E+09	0.367E+09	0.276E+09
15.500	0.557E+09	0.405E+09	0.302E+09
16.000	0.622E+09	0.446E+09	0.328E+09
16.500	0.690E+09	0.488E+09	0.356E+09
17.000	0.763E+09	0.531E+09	0.384E+09
17.500	0.840E+09	0.577E+09	0.412E+09
18.000	0.922E+09	0.623E+09	0.442E+09
18.500	0.101E+10	0.671E+09	0.472E+09
19.000	0.110E+10	0.721E+09	0.502E+09
19.500	0.119E+10	0.772E+09	0.533E+09
20.000	0.129E+10	0.824E+09	0.565E+09
21.000	0.150E+10	0.930E+09	0.628E+09
22.000	0.172E+10	0.104E+10	0.693E+09
23.000	0.196E+10	0.115E+10	0.759E+09
24.000	0.221E+10	0.127E+10	0.825E+09
25.000	0.247E+10	0.138E+10	0.892E+09
26.000	0.275E+10	0.150E+10	0.958E+09
27.000	0.303E+10	0.162E+10	0.102E+10
28.000	0.332E+10	0.174E+10	0.109E+10
29.000	0.362E+10	0.185E+10	0.115E+10
30.000	0.393E+10	0.197E+10	0.122E+10
31.000	0.424E+10	0.208E+10	0.128E+10
32.000	0.456E+10	0.220E+10	0.135E+10
33.000	0.487E+10	0.231E+10	0.141E+10
34.000	0.519E+10	0.242E+10	0.147E+10
35.000	0.551E+10	0.253E+10	0.153E+10
36.000	0.583E+10	0.264E+10	0.159E+10
37.000	0.614E+10	0.274E+10	0.165E+10
38.000	0.646E+10	0.285E+10	0.171E+10
39.000	0.677E+10	0.295E+10	0.176E+10
40.000	0.708E+10	0.305E+10	0.182E+10
41.000	0.738E+10	0.315E+10	0.187E+10
42.000	0.768E+10	0.324E+10	0.193E+10
43.000	0.798E+10	0.334E+10	0.198E+10
44.000	0.827E+10	0.343E+10	0.203E+10
45.000	0.855E+10	0.352E+10	0.208E+10
46.000	0.883E+10	0.361E+10	0.213E+10
47.000	0.911E+10	0.369E+10	0.217E+10
48.000	0.937E+10	0.377E+10	0.222E+10
49.000	0.964E+10	0.386E+10	0.227E+10
50.000	0.989E+10	0.394E+10	0.231E+10
51.000	0.101E+11	0.401E+10	0.235E+10
52.000	0.104E+11	0.409E+10	0.240E+10
53.000	0.106E+11	0.416E+10	0.244E+10
54.000	0.108E+11	0.423E+10	0.248E+10

55.000	0.111E+11	0.430E+10	0.252E+10
56.000	0.113E+11	0.437E+10	0.255E+10
57.000	0.115E+11	0.444E+10	0.259E+10
58.000	0.117E+11	0.450E+10	0.263E+10
59.000	0.119E+11	0.457E+10	0.266E+10
60.000	0.121E+11	0.463E+10	0.270E+10
61.000	0.123E+11	0.469E+10	0.273E+10
62.000	0.125E+11	0.474E+10	0.276E+10
63.000	0.126E+11	0.480E+10	0.279E+10
64.000	0.128E+11	0.486E+10	0.283E+10
65.000	0.130E+11	0.491E+10	0.285E+10
66.000	0.132E+11	0.496E+10	0.288E+10
67.000	0.133E+11	0.501E+10	0.291E+10
68.000	0.135E+11	0.506E+10	0.294E+10
69.000	0.136E+11	0.511E+10	0.297E+10
70.000	0.138E+11	0.515E+10	0.299E+10
71.000	0.139E+11	0.520E+10	0.302E+10
72.000	0.140E+11	0.524E+10	0.304E+10
73.000	0.142E+11	0.528E+10	0.306E+10
74.000	0.143E+11	0.532E+10	0.309E+10
75.000	0.144E+11	0.536E+10	0.311E+10
76.000	0.145E+11	0.540E+10	0.313E+10
77.000	0.146E+11	0.544E+10	0.315E+10
78.000	0.148E+11	0.547E+10	0.317E+10
79.000	0.149E+11	0.551E+10	0.319E+10
80.000	0.150E+11	0.554E+10	0.321E+10
81.000	0.151E+11	0.558E+10	0.323E+10
82.000	0.152E+11	0.561E+10	0.325E+10
83.000	0.153E+11	0.564E+10	0.326E+10
84.000	0.153E+11	0.567E+10	0.328E+10
85.000	0.154E+11	0.570E+10	0.330E+10
86.000	0.155E+11	0.572E+10	0.331E+10
87.000	0.156E+11	0.575E+10	0.333E+10
88.000	0.157E+11	0.578E+10	0.334E+10
89.000	0.158E+11	0.580E+10	0.336E+10
90.000	0.158E+11	0.583E+10	0.337E+10
91.000	0.159E+11	0.585E+10	0.338E+10
92.000	0.160E+11	0.587E+10	0.340E+10
93.000	0.160E+11	0.589E+10	0.341E+10
94.000	0.161E+11	0.591E+10	0.342E+10
95.000	0.162E+11	0.593E+10	0.343E+10
96.000	0.162E+11	0.595E+10	0.344E+10
97.000	0.163E+11	0.597E+10	0.345E+10
98.000	0.163E+11	0.599E+10	0.346E+10
99.000	0.164E+11	0.601E+10	0.347E+10
100.000	0.164E+11	0.602E+10	0.348E+10

Os

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
76	190.2	22.4	66.922	70.382	.272	.579

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
4.000	0.179E+07	0.173E+07	0.166E+07
4.125	0.208E+07	0.200E+07	0.192E+07
4.250	0.239E+07	0.230E+07	0.220E+07
4.375	0.274E+07	0.262E+07	0.251E+07
4.500	0.312E+07	0.299E+07	0.284E+07
4.625	0.354E+07	0.338E+07	0.322E+07
4.750	0.401E+07	0.382E+07	0.362E+07
4.875	0.451E+07	0.429E+07	0.406E+07
5.000	0.507E+07	0.481E+07	0.454E+07
5.125	0.567E+07	0.537E+07	0.506E+07
5.250	0.633E+07	0.598E+07	0.561E+07
5.375	0.703E+07	0.663E+07	0.621E+07
5.500	0.780E+07	0.734E+07	0.686E+07
5.625	0.862E+07	0.809E+07	0.754E+07
5.750	0.951E+07	0.890E+07	0.828E+07
5.875	0.105E+08	0.977E+07	0.906E+07
6.000	0.115E+08	0.107E+08	0.990E+07
6.125	0.126E+08	0.117E+08	0.108E+08
6.250	0.137E+08	0.127E+08	0.117E+08
6.375	0.150E+08	0.138E+08	0.127E+08
6.500	0.163E+08	0.150E+08	0.138E+08
6.625	0.177E+08	0.163E+08	0.149E+08
6.750	0.192E+08	0.176E+08	0.160E+08
6.875	0.207E+08	0.190E+08	0.173E+08
7.000	0.224E+08	0.205E+08	0.185E+08
7.125	0.242E+08	0.220E+08	0.199E+08
7.250	0.260E+08	0.236E+08	0.213E+08
7.375	0.280E+08	0.253E+08	0.228E+08
7.500	0.300E+08	0.271E+08	0.243E+08
7.625	0.322E+08	0.290E+08	0.259E+08
7.750	0.345E+08	0.309E+08	0.276E+08
7.875	0.368E+08	0.330E+08	0.293E+08
8.000	0.393E+08	0.351E+08	0.311E+08
8.250	0.447E+08	0.397E+08	0.349E+08
8.500	0.505E+08	0.446E+08	0.390E+08
8.750	0.569E+08	0.499E+08	0.434E+08
9.000	0.637E+08	0.556E+08	0.481E+08
9.250	0.712E+08	0.617E+08	0.531E+08
9.500	0.792E+08	0.682E+08	0.584E+08
9.750	0.879E+08	0.752E+08	0.639E+08
10.000	0.971E+08	0.826E+08	0.698E+08
10.250	0.107E+09	0.904E+08	0.760E+08
10.500	0.118E+09	0.987E+08	0.825E+08
10.750	0.129E+09	0.107E+09	0.892E+08
11.000	0.141E+09	0.117E+09	0.963E+08

11.250	0.154E+09	0.126E+09	0.104E+09
11.500	0.167E+09	0.136E+09	0.111E+09
11.750	0.181E+09	0.147E+09	0.119E+09
12.000	0.196E+09	0.158E+09	0.127E+09
12.250	0.212E+09	0.170E+09	0.136E+09
12.500	0.229E+09	0.182E+09	0.145E+09
12.750	0.246E+09	0.194E+09	0.154E+09
13.000	0.264E+09	0.207E+09	0.163E+09
13.250	0.283E+09	0.221E+09	0.173E+09
13.500	0.303E+09	0.235E+09	0.183E+09
13.750	0.324E+09	0.249E+09	0.193E+09
14.000	0.346E+09	0.264E+09	0.203E+09
14.500	0.392E+09	0.295E+09	0.224E+09
15.000	0.442E+09	0.327E+09	0.247E+09
15.500	0.496E+09	0.362E+09	0.270E+09
16.000	0.554E+09	0.398E+09	0.294E+09
16.500	0.615E+09	0.436E+09	0.319E+09
17.000	0.680E+09	0.475E+09	0.344E+09
17.500	0.749E+09	0.516E+09	0.370E+09
18.000	0.822E+09	0.558E+09	0.397E+09
18.500	0.899E+09	0.602E+09	0.424E+09
19.000	0.980E+09	0.646E+09	0.451E+09
19.500	0.106E+10	0.692E+09	0.480E+09
20.000	0.115E+10	0.739E+09	0.508E+09
21.000	0.134E+10	0.836E+09	0.566E+09
22.000	0.154E+10	0.936E+09	0.625E+09
23.000	0.176E+10	0.104E+10	0.685E+09
24.000	0.198E+10	0.114E+10	0.746E+09
25.000	0.222E+10	0.125E+10	0.807E+09
26.000	0.247E+10	0.136E+10	0.868E+09
27.000	0.273E+10	0.147E+10	0.929E+09
28.000	0.300E+10	0.157E+10	0.990E+09
29.000	0.327E+10	0.168E+10	0.105E+10
30.000	0.355E+10	0.179E+10	0.111E+10
31.000	0.384E+10	0.189E+10	0.117E+10
32.000	0.413E+10	0.200E+10	0.123E+10
33.000	0.442E+10	0.210E+10	0.129E+10
34.000	0.471E+10	0.221E+10	0.134E+10
35.000	0.500E+10	0.231E+10	0.140E+10
36.000	0.530E+10	0.241E+10	0.145E+10
37.000	0.559E+10	0.251E+10	0.151E+10
38.000	0.588E+10	0.261E+10	0.156E+10
39.000	0.617E+10	0.270E+10	0.162E+10
40.000	0.646E+10	0.279E+10	0.167E+10
41.000	0.674E+10	0.289E+10	0.172E+10
42.000	0.702E+10	0.298E+10	0.177E+10
43.000	0.730E+10	0.306E+10	0.182E+10
44.000	0.757E+10	0.315E+10	0.187E+10
45.000	0.784E+10	0.324E+10	0.191E+10
46.000	0.810E+10	0.332E+10	0.196E+10
47.000	0.836E+10	0.340E+10	0.200E+10
48.000	0.861E+10	0.348E+10	0.205E+10
49.000	0.885E+10	0.355E+10	0.209E+10
50.000	0.909E+10	0.363E+10	0.213E+10
51.000	0.933E+10	0.370E+10	0.217E+10
52.000	0.956E+10	0.378E+10	0.221E+10
53.000	0.978E+10	0.385E+10	0.225E+10
54.000	0.100E+11	0.391E+10	0.229E+10

55.000	0.102E+11	0.398E+10	0.233E+10
56.000	0.104E+11	0.405E+10	0.237E+10
57.000	0.106E+11	0.411E+10	0.240E+10
58.000	0.108E+11	0.417E+10	0.244E+10
59.000	0.110E+11	0.423E+10	0.247E+10
60.000	0.112E+11	0.429E+10	0.250E+10
61.000	0.114E+11	0.435E+10	0.253E+10
62.000	0.116E+11	0.440E+10	0.257E+10
63.000	0.117E+11	0.446E+10	0.260E+10
64.000	0.119E+11	0.451E+10	0.263E+10
65.000	0.120E+11	0.456E+10	0.265E+10
66.000	0.122E+11	0.461E+10	0.268E+10
67.000	0.124E+11	0.466E+10	0.271E+10
68.000	0.125E+11	0.471E+10	0.274E+10
69.000	0.126E+11	0.475E+10	0.276E+10
70.000	0.128E+11	0.480E+10	0.279E+10
71.000	0.129E+11	0.484E+10	0.281E+10
72.000	0.131E+11	0.488E+10	0.283E+10
73.000	0.132E+11	0.492E+10	0.286E+10
74.000	0.133E+11	0.496E+10	0.288E+10
75.000	0.134E+11	0.500E+10	0.290E+10
76.000	0.135E+11	0.504E+10	0.292E+10
77.000	0.137E+11	0.508E+10	0.294E+10
78.000	0.138E+11	0.511E+10	0.296E+10
79.000	0.139E+11	0.515E+10	0.298E+10
80.000	0.140E+11	0.518E+10	0.300E+10
81.000	0.141E+11	0.521E+10	0.302E+10
82.000	0.142E+11	0.524E+10	0.304E+10
83.000	0.143E+11	0.527E+10	0.305E+10
84.000	0.143E+11	0.530E+10	0.307E+10
85.000	0.144E+11	0.533E+10	0.309E+10
86.000	0.145E+11	0.536E+10	0.310E+10
87.000	0.146E+11	0.539E+10	0.312E+10
88.000	0.147E+11	0.541E+10	0.313E+10
89.000	0.148E+11	0.544E+10	0.315E+10
90.000	0.148E+11	0.546E+10	0.316E+10
91.000	0.149E+11	0.548E+10	0.317E+10
92.000	0.150E+11	0.551E+10	0.318E+10
93.000	0.150E+11	0.553E+10	0.320E+10
94.000	0.151E+11	0.555E+10	0.321E+10
95.000	0.152E+11	0.557E+10	0.322E+10
96.000	0.152E+11	0.559E+10	0.323E+10
97.000	0.153E+11	0.561E+10	0.324E+10
98.000	0.153E+11	0.563E+10	0.325E+10
99.000	0.154E+11	0.564E+10	0.326E+10
100.000	0.154E+11	0.566E+10	0.327E+10

Ir

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
77	192.22	22.5	65.851	69.469	.2735	.581

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
4.000	0.158E+07	0.152E+07	0.146E+07
4.125	0.183E+07	0.176E+07	0.169E+07
4.250	0.210E+07	0.202E+07	0.194E+07
4.375	0.241E+07	0.231E+07	0.221E+07
4.500	0.275E+07	0.263E+07	0.251E+07
4.625	0.312E+07	0.298E+07	0.284E+07
4.750	0.353E+07	0.337E+07	0.320E+07
4.875	0.398E+07	0.379E+07	0.359E+07
5.000	0.447E+07	0.424E+07	0.401E+07
5.125	0.500E+07	0.474E+07	0.446E+07
5.250	0.558E+07	0.527E+07	0.496E+07
5.375	0.620E+07	0.585E+07	0.549E+07
5.500	0.688E+07	0.648E+07	0.606E+07
5.625	0.761E+07	0.714E+07	0.667E+07
5.750	0.839E+07	0.786E+07	0.732E+07
5.875	0.923E+07	0.863E+07	0.801E+07
6.000	0.101E+08	0.945E+07	0.875E+07
6.125	0.111E+08	0.103E+08	0.954E+07
6.250	0.121E+08	0.113E+08	0.104E+08
6.375	0.132E+08	0.122E+08	0.112E+08
6.500	0.144E+08	0.133E+08	0.122E+08
6.625	0.156E+08	0.144E+08	0.132E+08
6.750	0.169E+08	0.156E+08	0.142E+08
6.875	0.183E+08	0.168E+08	0.153E+08
7.000	0.198E+08	0.181E+08	0.164E+08
7.125	0.214E+08	0.195E+08	0.176E+08
7.250	0.230E+08	0.209E+08	0.189E+08
7.375	0.247E+08	0.224E+08	0.202E+08
7.500	0.265E+08	0.240E+08	0.215E+08
7.625	0.285E+08	0.257E+08	0.230E+08
7.750	0.305E+08	0.274E+08	0.245E+08
7.875	0.326E+08	0.292E+08	0.260E+08
8.000	0.348E+08	0.311E+08	0.276E+08
8.250	0.395E+08	0.352E+08	0.310E+08
8.500	0.447E+08	0.395E+08	0.347E+08
8.750	0.503E+08	0.442E+08	0.386E+08
9.000	0.565E+08	0.493E+08	0.428E+08
9.250	0.631E+08	0.548E+08	0.472E+08
9.500	0.702E+08	0.606E+08	0.519E+08
9.750	0.779E+08	0.668E+08	0.569E+08
10.000	0.861E+08	0.734E+08	0.622E+08
10.250	0.949E+08	0.804E+08	0.677E+08
10.500	0.104E+09	0.878E+08	0.735E+08
10.750	0.114E+09	0.956E+08	0.796E+08
11.000	0.125E+09	0.104E+09	0.859E+08

11.250	0.136E+09	0.112E+09	0.925E+08
11.500	0.148E+09	0.122E+09	0.994E+08
11.750	0.161E+09	0.131E+09	0.107E+09
12.000	0.174E+09	0.141E+09	0.114E+09
12.250	0.188E+09	0.151E+09	0.122E+09
12.500	0.203E+09	0.162E+09	0.129E+09
12.750	0.219E+09	0.173E+09	0.138E+09
13.000	0.235E+09	0.185E+09	0.146E+09
13.250	0.252E+09	0.197E+09	0.155E+09
13.500	0.270E+09	0.209E+09	0.164E+09
13.750	0.289E+09	0.222E+09	0.173E+09
14.000	0.308E+09	0.236E+09	0.182E+09
14.500	0.349E+09	0.263E+09	0.201E+09
15.000	0.394E+09	0.293E+09	0.221E+09
15.500	0.442E+09	0.324E+09	0.242E+09
16.000	0.494E+09	0.357E+09	0.264E+09
16.500	0.549E+09	0.391E+09	0.287E+09
17.000	0.607E+09	0.426E+09	0.310E+09
17.500	0.669E+09	0.463E+09	0.333E+09
18.000	0.735E+09	0.501E+09	0.357E+09
18.500	0.804E+09	0.541E+09	0.382E+09
19.000	0.877E+09	0.581E+09	0.407E+09
19.500	0.953E+09	0.623E+09	0.433E+09
20.000	0.103E+10	0.666E+09	0.459E+09
21.000	0.120E+10	0.754E+09	0.512E+09
22.000	0.138E+10	0.845E+09	0.567E+09
23.000	0.158E+10	0.939E+09	0.622E+09
24.000	0.178E+10	0.104E+10	0.677E+09
25.000	0.200E+10	0.113E+10	0.734E+09
26.000	0.223E+10	0.123E+10	0.790E+09
27.000	0.247E+10	0.133E+10	0.846E+09
28.000	0.271E+10	0.143E+10	0.903E+09
29.000	0.296E+10	0.153E+10	0.959E+09
30.000	0.322E+10	0.163E+10	0.101E+10
31.000	0.348E+10	0.173E+10	0.107E+10
32.000	0.375E+10	0.183E+10	0.112E+10
33.000	0.401E+10	0.193E+10	0.118E+10
34.000	0.428E+10	0.202E+10	0.123E+10
35.000	0.456E+10	0.212E+10	0.128E+10
36.000	0.483E+10	0.221E+10	0.134E+10
37.000	0.510E+10	0.230E+10	0.139E+10
38.000	0.537E+10	0.239E+10	0.144E+10
39.000	0.564E+10	0.248E+10	0.149E+10
40.000	0.591E+10	0.257E+10	0.154E+10
41.000	0.618E+10	0.266E+10	0.159E+10
42.000	0.644E+10	0.274E+10	0.163E+10
43.000	0.670E+10	0.283E+10	0.168E+10
44.000	0.695E+10	0.291E+10	0.172E+10
45.000	0.721E+10	0.299E+10	0.177E+10
46.000	0.745E+10	0.307E+10	0.181E+10
47.000	0.770E+10	0.314E+10	0.186E+10
48.000	0.793E+10	0.322E+10	0.190E+10
49.000	0.817E+10	0.329E+10	0.194E+10
50.000	0.839E+10	0.336E+10	0.198E+10
51.000	0.862E+10	0.343E+10	0.202E+10
52.000	0.884E+10	0.350E+10	0.206E+10
53.000	0.905E+10	0.357E+10	0.209E+10
54.000	0.926E+10	0.364E+10	0.213E+10

55.000	0.946E+10	0.370E+10	0.217E+10
56.000	0.966E+10	0.376E+10	0.220E+10
57.000	0.985E+10	0.382E+10	0.223E+10
58.000	0.100E+11	0.388E+10	0.227E+10
59.000	0.102E+11	0.394E+10	0.230E+10
60.000	0.104E+11	0.400E+10	0.233E+10
61.000	0.106E+11	0.405E+10	0.236E+10
62.000	0.107E+11	0.411E+10	0.239E+10
63.000	0.109E+11	0.416E+10	0.242E+10
64.000	0.111E+11	0.421E+10	0.245E+10
65.000	0.112E+11	0.426E+10	0.248E+10
66.000	0.114E+11	0.431E+10	0.251E+10
67.000	0.115E+11	0.435E+10	0.253E+10
68.000	0.117E+11	0.440E+10	0.256E+10
69.000	0.118E+11	0.444E+10	0.258E+10
70.000	0.119E+11	0.449E+10	0.261E+10
71.000	0.121E+11	0.453E+10	0.263E+10
72.000	0.122E+11	0.457E+10	0.266E+10
73.000	0.123E+11	0.461E+10	0.268E+10
74.000	0.124E+11	0.465E+10	0.270E+10
75.000	0.126E+11	0.469E+10	0.272E+10
76.000	0.127E+11	0.473E+10	0.274E+10
77.000	0.128E+11	0.476E+10	0.276E+10
78.000	0.129E+11	0.480E+10	0.278E+10
79.000	0.130E+11	0.483E+10	0.280E+10
80.000	0.131E+11	0.486E+10	0.282E+10
81.000	0.132E+11	0.489E+10	0.284E+10
82.000	0.133E+11	0.493E+10	0.285E+10
83.000	0.134E+11	0.496E+10	0.287E+10
84.000	0.135E+11	0.498E+10	0.289E+10
85.000	0.136E+11	0.501E+10	0.290E+10
86.000	0.136E+11	0.504E+10	0.292E+10
87.000	0.137E+11	0.507E+10	0.293E+10
88.000	0.138E+11	0.509E+10	0.295E+10
89.000	0.139E+11	0.512E+10	0.296E+10
90.000	0.140E+11	0.514E+10	0.298E+10
91.000	0.140E+11	0.516E+10	0.299E+10
92.000	0.141E+11	0.519E+10	0.300E+10
93.000	0.142E+11	0.521E+10	0.301E+10
94.000	0.142E+11	0.523E+10	0.303E+10
95.000	0.143E+11	0.525E+10	0.304E+10
96.000	0.143E+11	0.527E+10	0.305E+10
97.000	0.144E+11	0.529E+10	0.306E+10
98.000	0.145E+11	0.531E+10	0.307E+10
99.000	0.145E+11	0.533E+10	0.308E+10
100.000	0.146E+11	0.534E+10	0.309E+10

Pt

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f_k	g_k
78	195.09	21.4	61.592	65.195	.275	.583

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
4.000	0.140E+07	0.136E+07	0.130E+07
4.125	0.163E+07	0.157E+07	0.150E+07
4.250	0.187E+07	0.180E+07	0.172E+07
4.375	0.214E+07	0.206E+07	0.197E+07
4.500	0.245E+07	0.234E+07	0.223E+07
4.625	0.278E+07	0.266E+07	0.252E+07
4.750	0.314E+07	0.300E+07	0.284E+07
4.875	0.354E+07	0.337E+07	0.319E+07
5.000	0.398E+07	0.378E+07	0.357E+07
5.125	0.445E+07	0.422E+07	0.397E+07
5.250	0.497E+07	0.470E+07	0.441E+07
5.375	0.552E+07	0.521E+07	0.489E+07
5.500	0.612E+07	0.577E+07	0.539E+07
5.625	0.677E+07	0.636E+07	0.594E+07
5.750	0.747E+07	0.700E+07	0.652E+07
5.875	0.822E+07	0.769E+07	0.714E+07
6.000	0.902E+07	0.842E+07	0.779E+07
6.125	0.988E+07	0.919E+07	0.849E+07
6.250	0.108E+08	0.100E+08	0.923E+07
6.375	0.118E+08	0.109E+08	0.100E+08
6.500	0.128E+08	0.118E+08	0.108E+08
6.625	0.139E+08	0.128E+08	0.117E+08
6.750	0.151E+08	0.139E+08	0.126E+08
6.875	0.163E+08	0.150E+08	0.136E+08
7.000	0.176E+08	0.161E+08	0.146E+08
7.125	0.190E+08	0.174E+08	0.157E+08
7.250	0.205E+08	0.186E+08	0.168E+08
7.375	0.220E+08	0.200E+08	0.180E+08
7.500	0.237E+08	0.214E+08	0.192E+08
7.625	0.254E+08	0.229E+08	0.205E+08
7.750	0.272E+08	0.244E+08	0.218E+08
7.875	0.291E+08	0.261E+08	0.232E+08
8.000	0.310E+08	0.278E+08	0.246E+08
8.250	0.353E+08	0.314E+08	0.277E+08
8.500	0.399E+08	0.353E+08	0.309E+08
8.750	0.449E+08	0.395E+08	0.344E+08
9.000	0.504E+08	0.440E+08	0.382E+08
9.250	0.563E+08	0.489E+08	0.422E+08
9.500	0.627E+08	0.541E+08	0.464E+08
9.750	0.695E+08	0.597E+08	0.508E+08
10.000	0.769E+08	0.656E+08	0.555E+08
10.250	0.848E+08	0.718E+08	0.605E+08
10.500	0.932E+08	0.784E+08	0.657E+08
10.750	0.102E+09	0.854E+08	0.711E+08
11.000	0.112E+09	0.928E+08	0.768E+08

11.250	0.122E+09	0.101E+09	0.827E+08
11.500	0.133E+09	0.109E+09	0.889E+08
11.750	0.144E+09	0.117E+09	0.953E+08
12.000	0.156E+09	0.126E+09	0.102E+09
12.250	0.168E+09	0.135E+09	0.109E+09
12.500	0.182E+09	0.145E+09	0.116E+09
12.750	0.196E+09	0.155E+09	0.123E+09
13.000	0.210E+09	0.165E+09	0.131E+09
13.250	0.226E+09	0.176E+09	0.139E+09
13.500	0.242E+09	0.188E+09	0.146E+09
13.750	0.258E+09	0.199E+09	0.155E+09
14.000	0.276E+09	0.211E+09	0.163E+09
14.500	0.313E+09	0.236E+09	0.180E+09
15.000	0.353E+09	0.263E+09	0.199E+09
15.500	0.396E+09	0.291E+09	0.217E+09
16.000	0.443E+09	0.320E+09	0.237E+09
16.500	0.492E+09	0.351E+09	0.257E+09
17.000	0.545E+09	0.383E+09	0.278E+09
17.500	0.600E+09	0.416E+09	0.299E+09
18.000	0.660E+09	0.450E+09	0.321E+09
18.500	0.722E+09	0.486E+09	0.344E+09
19.000	0.787E+09	0.523E+09	0.367E+09
19.500	0.856E+09	0.560E+09	0.390E+09
20.000	0.928E+09	0.599E+09	0.413E+09
21.000	0.108E+10	0.679E+09	0.462E+09
22.000	0.125E+10	0.762E+09	0.511E+09
23.000	0.142E+10	0.847E+09	0.561E+09
24.000	0.161E+10	0.935E+09	0.612E+09
25.000	0.181E+10	0.102E+10	0.664E+09
26.000	0.201E+10	0.111E+10	0.715E+09
27.000	0.223E+10	0.121E+10	0.767E+09
28.000	0.245E+10	0.130E+10	0.819E+09
29.000	0.268E+10	0.139E+10	0.870E+09
30.000	0.291E+10	0.148E+10	0.922E+09
31.000	0.315E+10	0.157E+10	0.973E+09
32.000	0.340E+10	0.166E+10	0.102E+10
33.000	0.364E+10	0.175E+10	0.107E+10
34.000	0.389E+10	0.184E+10	0.112E+10
35.000	0.414E+10	0.193E+10	0.117E+10
36.000	0.439E+10	0.202E+10	0.122E+10
37.000	0.464E+10	0.210E+10	0.127E+10
38.000	0.489E+10	0.219E+10	0.131E+10
39.000	0.514E+10	0.227E+10	0.136E+10
40.000	0.539E+10	0.235E+10	0.141E+10
41.000	0.564E+10	0.243E+10	0.145E+10
42.000	0.588E+10	0.251E+10	0.150E+10
43.000	0.612E+10	0.259E+10	0.154E+10
44.000	0.636E+10	0.267E+10	0.158E+10
45.000	0.659E+10	0.274E+10	0.162E+10
46.000	0.682E+10	0.282E+10	0.166E+10
47.000	0.705E+10	0.289E+10	0.171E+10
48.000	0.727E+10	0.296E+10	0.174E+10
49.000	0.749E+10	0.303E+10	0.178E+10
50.000	0.771E+10	0.309E+10	0.182E+10
51.000	0.792E+10	0.316E+10	0.186E+10
52.000	0.812E+10	0.323E+10	0.189E+10
53.000	0.832E+10	0.329E+10	0.193E+10
54.000	0.852E+10	0.335E+10	0.196E+10

55.000	0.871E+10	0.341E+10	0.200E+10
56.000	0.890E+10	0.347E+10	0.203E+10
57.000	0.908E+10	0.353E+10	0.206E+10
58.000	0.926E+10	0.359E+10	0.210E+10
59.000	0.943E+10	0.364E+10	0.213E+10
60.000	0.960E+10	0.369E+10	0.216E+10
61.000	0.976E+10	0.375E+10	0.219E+10
62.000	0.993E+10	0.380E+10	0.222E+10
63.000	0.101E+11	0.385E+10	0.224E+10
64.000	0.102E+11	0.390E+10	0.227E+10
65.000	0.104E+11	0.395E+10	0.230E+10
66.000	0.105E+11	0.399E+10	0.232E+10
67.000	0.107E+11	0.404E+10	0.235E+10
68.000	0.108E+11	0.408E+10	0.237E+10
69.000	0.109E+11	0.412E+10	0.240E+10
70.000	0.111E+11	0.417E+10	0.242E+10
71.000	0.112E+11	0.421E+10	0.244E+10
72.000	0.113E+11	0.425E+10	0.247E+10
73.000	0.114E+11	0.429E+10	0.249E+10
74.000	0.116E+11	0.432E+10	0.251E+10
75.000	0.117E+11	0.436E+10	0.253E+10
76.000	0.118E+11	0.440E+10	0.255E+10
77.000	0.119E+11	0.443E+10	0.257E+10
78.000	0.120E+11	0.446E+10	0.259E+10
79.000	0.121E+11	0.450E+10	0.261E+10
80.000	0.122E+11	0.453E+10	0.263E+10
81.000	0.123E+11	0.456E+10	0.264E+10
82.000	0.124E+11	0.459E+10	0.266E+10
83.000	0.125E+11	0.462E+10	0.268E+10
84.000	0.126E+11	0.465E+10	0.269E+10
85.000	0.126E+11	0.468E+10	0.271E+10
86.000	0.127E+11	0.470E+10	0.272E+10
87.000	0.128E+11	0.473E+10	0.274E+10
88.000	0.129E+11	0.475E+10	0.275E+10
89.000	0.129E+11	0.478E+10	0.277E+10
90.000	0.130E+11	0.480E+10	0.278E+10
91.000	0.131E+11	0.483E+10	0.279E+10
92.000	0.132E+11	0.485E+10	0.281E+10
93.000	0.132E+11	0.487E+10	0.282E+10
94.000	0.133E+11	0.489E+10	0.283E+10
95.000	0.134E+11	0.491E+10	0.284E+10
96.000	0.134E+11	0.493E+10	0.285E+10
97.000	0.135E+11	0.495E+10	0.286E+10
98.000	0.135E+11	0.497E+10	0.287E+10
99.000	0.136E+11	0.499E+10	0.288E+10
100.000	0.136E+11	0.500E+10	0.289E+10

Au

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
	(g/mole)	(g/cm ³)	(cm ⁻¹)	(cm ⁻¹)		
79	196.9665	19.3	54.601	58.070	.276	.5855

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
4.000	0.123E+07	0.119E+07	0.114E+07
4.125	0.143E+07	0.137E+07	0.132E+07
4.250	0.164E+07	0.158E+07	0.151E+07
4.375	0.188E+07	0.181E+07	0.173E+07
4.500	0.215E+07	0.206E+07	0.196E+07
4.625	0.244E+07	0.233E+07	0.222E+07
4.750	0.276E+07	0.263E+07	0.250E+07
4.875	0.311E+07	0.296E+07	0.281E+07
5.000	0.349E+07	0.332E+07	0.314E+07
5.125	0.391E+07	0.371E+07	0.350E+07
5.250	0.436E+07	0.413E+07	0.388E+07
5.375	0.485E+07	0.458E+07	0.430E+07
5.500	0.538E+07	0.507E+07	0.475E+07
5.625	0.595E+07	0.560E+07	0.523E+07
5.750	0.656E+07	0.616E+07	0.574E+07
5.875	0.722E+07	0.676E+07	0.629E+07
6.000	0.793E+07	0.741E+07	0.687E+07
6.125	0.869E+07	0.809E+07	0.749E+07
6.250	0.949E+07	0.882E+07	0.814E+07
6.375	0.104E+08	0.960E+07	0.884E+07
6.500	0.113E+08	0.104E+08	0.957E+07
6.625	0.122E+08	0.113E+08	0.103E+08
6.750	0.133E+08	0.122E+08	0.112E+08
6.875	0.144E+08	0.132E+08	0.120E+08
7.000	0.155E+08	0.142E+08	0.129E+08
7.125	0.168E+08	0.153E+08	0.139E+08
7.250	0.180E+08	0.164E+08	0.149E+08
7.375	0.194E+08	0.176E+08	0.159E+08
7.500	0.208E+08	0.189E+08	0.170E+08
7.625	0.224E+08	0.202E+08	0.181E+08
7.750	0.239E+08	0.216E+08	0.193E+08
7.875	0.256E+08	0.230E+08	0.205E+08
8.000	0.273E+08	0.245E+08	0.218E+08
8.250	0.311E+08	0.277E+08	0.245E+08
8.500	0.352E+08	0.312E+08	0.274E+08
8.750	0.396E+08	0.349E+08	0.305E+08
9.000	0.445E+08	0.389E+08	0.339E+08
9.250	0.497E+08	0.433E+08	0.374E+08
9.500	0.553E+08	0.479E+08	0.412E+08
9.750	0.614E+08	0.528E+08	0.451E+08
10.000	0.679E+08	0.581E+08	0.493E+08
10.250	0.749E+08	0.637E+08	0.538E+08
10.500	0.824E+08	0.696E+08	0.584E+08
10.750	0.903E+08	0.758E+08	0.633E+08
11.000	0.988E+08	0.824E+08	0.684E+08

11.250	0.108E+09	0.893E+08	0.737E+08
11.500	0.117E+09	0.965E+08	0.792E+08
11.750	0.127E+09	0.104E+09	0.849E+08
12.000	0.138E+09	0.112E+09	0.909E+08
12.250	0.149E+09	0.120E+09	0.970E+08
12.500	0.161E+09	0.129E+09	0.103E+09
12.750	0.173E+09	0.138E+09	0.110E+09
13.000	0.186E+09	0.147E+09	0.117E+09
13.250	0.200E+09	0.157E+09	0.124E+09
13.500	0.214E+09	0.167E+09	0.131E+09
13.750	0.229E+09	0.177E+09	0.138E+09
14.000	0.245E+09	0.188E+09	0.146E+09
14.500	0.278E+09	0.211E+09	0.162E+09
15.000	0.314E+09	0.234E+09	0.178E+09
15.500	0.352E+09	0.260E+09	0.195E+09
16.000	0.394E+09	0.286E+09	0.213E+09
16.500	0.438E+09	0.314E+09	0.231E+09
17.000	0.485E+09	0.343E+09	0.250E+09
17.500	0.535E+09	0.373E+09	0.269E+09
18.000	0.588E+09	0.404E+09	0.289E+09
18.500	0.644E+09	0.436E+09	0.310E+09
19.000	0.702E+09	0.469E+09	0.330E+09
19.500	0.764E+09	0.504E+09	0.352E+09
20.000	0.829E+09	0.539E+09	0.373E+09
21.000	0.966E+09	0.611E+09	0.417E+09
22.000	0.111E+10	0.687E+09	0.462E+09
23.000	0.127E+10	0.765E+09	0.508E+09
24.000	0.144E+10	0.845E+09	0.555E+09
25.000	0.162E+10	0.927E+09	0.602E+09
26.000	0.181E+10	0.101E+10	0.650E+09
27.000	0.200E+10	0.109E+10	0.698E+09
28.000	0.221E+10	0.118E+10	0.746E+09
29.000	0.242E+10	0.126E+10	0.793E+09
30.000	0.263E+10	0.135E+10	0.841E+09
31.000	0.285E+10	0.143E+10	0.888E+09
32.000	0.307E+10	0.152E+10	0.935E+09
33.000	0.330E+10	0.160E+10	0.982E+09
34.000	0.353E+10	0.168E+10	0.103E+10
35.000	0.376E+10	0.176E+10	0.107E+10
36.000	0.399E+10	0.185E+10	0.112E+10
37.000	0.423E+10	0.193E+10	0.116E+10
38.000	0.446E+10	0.201E+10	0.121E+10
39.000	0.469E+10	0.208E+10	0.125E+10
40.000	0.492E+10	0.216E+10	0.129E+10
41.000	0.515E+10	0.224E+10	0.134E+10
42.000	0.538E+10	0.231E+10	0.138E+10
43.000	0.561E+10	0.238E+10	0.142E+10
44.000	0.583E+10	0.246E+10	0.146E+10
45.000	0.605E+10	0.253E+10	0.150E+10
46.000	0.626E+10	0.260E+10	0.154E+10
47.000	0.648E+10	0.266E+10	0.158E+10
48.000	0.669E+10	0.273E+10	0.161E+10
49.000	0.689E+10	0.280E+10	0.165E+10
50.000	0.709E+10	0.286E+10	0.169E+10
51.000	0.729E+10	0.292E+10	0.172E+10
52.000	0.749E+10	0.299E+10	0.175E+10
53.000	0.768E+10	0.305E+10	0.179E+10
54.000	0.786E+10	0.311E+10	0.182E+10

55.000	0.805E+10	0.316E+10	0.185E+10
56.000	0.822E+10	0.322E+10	0.189E+10
57.000	0.840E+10	0.328E+10	0.192E+10
58.000	0.857E+10	0.333E+10	0.195E+10
59.000	0.873E+10	0.338E+10	0.198E+10
60.000	0.890E+10	0.343E+10	0.201E+10
61.000	0.905E+10	0.348E+10	0.203E+10
62.000	0.921E+10	0.353E+10	0.206E+10
63.000	0.936E+10	0.358E+10	0.209E+10
64.000	0.951E+10	0.363E+10	0.212E+10
65.000	0.965E+10	0.367E+10	0.214E+10
66.000	0.979E+10	0.372E+10	0.217E+10
67.000	0.992E+10	0.376E+10	0.219E+10
68.000	0.101E+11	0.381E+10	0.221E+10
69.000	0.102E+11	0.385E+10	0.224E+10
70.000	0.103E+11	0.389E+10	0.226E+10
71.000	0.104E+11	0.393E+10	0.228E+10
72.000	0.106E+11	0.397E+10	0.230E+10
73.000	0.107E+11	0.400E+10	0.233E+10
74.000	0.108E+11	0.404E+10	0.235E+10
75.000	0.109E+11	0.408E+10	0.237E+10
76.000	0.110E+11	0.411E+10	0.239E+10
77.000	0.111E+11	0.414E+10	0.241E+10
78.000	0.112E+11	0.418E+10	0.242E+10
79.000	0.113E+11	0.421E+10	0.244E+10
80.000	0.114E+11	0.424E+10	0.246E+10
81.000	0.115E+11	0.427E+10	0.248E+10
82.000	0.116E+11	0.430E+10	0.249E+10
83.000	0.117E+11	0.433E+10	0.251E+10
84.000	0.118E+11	0.436E+10	0.253E+10
85.000	0.118E+11	0.439E+10	0.254E+10
86.000	0.119E+11	0.441E+10	0.256E+10
87.000	0.120E+11	0.444E+10	0.257E+10
88.000	0.121E+11	0.446E+10	0.258E+10
89.000	0.121E+11	0.449E+10	0.260E+10
90.000	0.122E+11	0.451E+10	0.261E+10
91.000	0.123E+11	0.453E+10	0.262E+10
92.000	0.124E+11	0.456E+10	0.264E+10
93.000	0.124E+11	0.458E+10	0.265E+10
94.000	0.125E+11	0.460E+10	0.266E+10
95.000	0.125E+11	0.462E+10	0.267E+10
96.000	0.126E+11	0.464E+10	0.268E+10
97.000	0.127E+11	0.466E+10	0.269E+10
98.000	0.127E+11	0.468E+10	0.270E+10
99.000	0.128E+11	0.469E+10	0.271E+10
100.000	0.128E+11	0.471E+10	0.272E+10

Hg

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
80	(g/mole) 200.59	(g/cm ³) 13.53	(cm ⁻¹) 36.846	(cm ⁻¹) 39.542	.277	.588

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
4.000	0.108E+07	0.105E+07	0.101E+07
4.125	0.125E+07	0.121E+07	0.116E+07
4.250	0.144E+07	0.139E+07	0.133E+07
4.375	0.165E+07	0.159E+07	0.152E+07
4.500	0.189E+07	0.181E+07	0.173E+07
4.625	0.215E+07	0.206E+07	0.196E+07
4.750	0.243E+07	0.232E+07	0.221E+07
4.875	0.274E+07	0.261E+07	0.248E+07
5.000	0.307E+07	0.293E+07	0.277E+07
5.125	0.344E+07	0.327E+07	0.309E+07
5.250	0.384E+07	0.364E+07	0.343E+07
5.375	0.427E+07	0.404E+07	0.380E+07
5.500	0.474E+07	0.448E+07	0.420E+07
5.625	0.525E+07	0.494E+07	0.462E+07
5.750	0.579E+07	0.544E+07	0.508E+07
5.875	0.637E+07	0.597E+07	0.556E+07
6.000	0.699E+07	0.654E+07	0.608E+07
6.125	0.766E+07	0.715E+07	0.663E+07
6.250	0.838E+07	0.780E+07	0.721E+07
6.375	0.914E+07	0.849E+07	0.783E+07
6.500	0.995E+07	0.922E+07	0.848E+07
6.625	0.108E+08	0.999E+07	0.917E+07
6.750	0.117E+08	0.108E+08	0.990E+07
6.875	0.127E+08	0.117E+08	0.107E+08
7.000	0.137E+08	0.126E+08	0.115E+08
7.125	0.148E+08	0.135E+08	0.123E+08
7.250	0.159E+08	0.146E+08	0.132E+08
7.375	0.171E+08	0.156E+08	0.141E+08
7.500	0.184E+08	0.167E+08	0.151E+08
7.625	0.198E+08	0.179E+08	0.161E+08
7.750	0.212E+08	0.191E+08	0.171E+08
7.875	0.226E+08	0.204E+08	0.182E+08
8.000	0.242E+08	0.217E+08	0.194E+08
8.250	0.275E+08	0.246E+08	0.218E+08
8.500	0.311E+08	0.277E+08	0.244E+08
8.750	0.351E+08	0.310E+08	0.272E+08
9.000	0.394E+08	0.346E+08	0.302E+08
9.250	0.440E+08	0.385E+08	0.334E+08
9.500	0.490E+08	0.426E+08	0.367E+08
9.750	0.544E+08	0.470E+08	0.403E+08
10.000	0.602E+08	0.517E+08	0.441E+08
10.250	0.665E+08	0.567E+08	0.481E+08
10.500	0.731E+08	0.620E+08	0.523E+08
10.750	0.802E+08	0.676E+08	0.567E+08
11.000	0.877E+08	0.735E+08	0.612E+08

11.250	0.957E+08	0.797E+08	0.660E+08
11.500	0.104E+09	0.862E+08	0.710E+08
11.750	0.113E+09	0.930E+08	0.762E+08
12.000	0.123E+09	0.100E+09	0.816E+08
12.250	0.133E+09	0.108E+09	0.872E+08
12.500	0.143E+09	0.115E+09	0.930E+08
12.750	0.154E+09	0.123E+09	0.989E+08
13.000	0.166E+09	0.132E+09	0.105E+09
13.250	0.178E+09	0.141E+09	0.111E+09
13.500	0.191E+09	0.150E+09	0.118E+09
13.750	0.204E+09	0.159E+09	0.125E+09
14.000	0.218E+09	0.169E+09	0.132E+09
14.500	0.248E+09	0.189E+09	0.146E+09
15.000	0.280E+09	0.211E+09	0.161E+09
15.500	0.314E+09	0.233E+09	0.176E+09
16.000	0.352E+09	0.257E+09	0.192E+09
16.500	0.391E+09	0.283E+09	0.209E+09
17.000	0.434E+09	0.309E+09	0.227E+09
17.500	0.479E+09	0.336E+09	0.244E+09
18.000	0.526E+09	0.365E+09	0.263E+09
18.500	0.577E+09	0.394E+09	0.281E+09
19.000	0.630E+09	0.424E+09	0.300E+09
19.500	0.685E+09	0.456E+09	0.320E+09
20.000	0.744E+09	0.488E+09	0.340E+09
21.000	0.868E+09	0.555E+09	0.380E+09
22.000	0.100E+10	0.624E+09	0.422E+09
23.000	0.115E+10	0.696E+09	0.465E+09
24.000	0.130E+10	0.770E+09	0.508E+09
25.000	0.146E+10	0.846E+09	0.552E+09
26.000	0.164E+10	0.923E+09	0.597E+09
27.000	0.182E+10	0.100E+10	0.641E+09
28.000	0.200E+10	0.108E+10	0.686E+09
29.000	0.219E+10	0.116E+10	0.731E+09
30.000	0.239E+10	0.124E+10	0.775E+09
31.000	0.260E+10	0.132E+10	0.820E+09
32.000	0.280E+10	0.140E+10	0.864E+09
33.000	0.301E+10	0.147E+10	0.908E+09
34.000	0.323E+10	0.155E+10	0.951E+09
35.000	0.344E+10	0.163E+10	0.995E+09
36.000	0.366E+10	0.171E+10	0.104E+10
37.000	0.388E+10	0.178E+10	0.108E+10
38.000	0.410E+10	0.186E+10	0.112E+10
39.000	0.431E+10	0.193E+10	0.116E+10
40.000	0.453E+10	0.200E+10	0.120E+10
41.000	0.475E+10	0.208E+10	0.124E+10
42.000	0.496E+10	0.215E+10	0.128E+10
43.000	0.517E+10	0.222E+10	0.132E+10
44.000	0.538E+10	0.229E+10	0.136E+10
45.000	0.559E+10	0.235E+10	0.140E+10
46.000	0.580E+10	0.242E+10	0.143E+10
47.000	0.600E+10	0.249E+10	0.147E+10
48.000	0.620E+10	0.255E+10	0.151E+10
49.000	0.640E+10	0.261E+10	0.154E+10
50.000	0.659E+10	0.267E+10	0.158E+10
51.000	0.678E+10	0.273E+10	0.161E+10
52.000	0.697E+10	0.279E+10	0.164E+10
53.000	0.715E+10	0.285E+10	0.168E+10
54.000	0.733E+10	0.291E+10	0.171E+10

55.000	0.750E+10	0.296E+10	0.174E+10
56.000	0.767E+10	0.302E+10	0.177E+10
57.000	0.784E+10	0.307E+10	0.180E+10
58.000	0.801E+10	0.312E+10	0.183E+10
59.000	0.817E+10	0.317E+10	0.186E+10
60.000	0.832E+10	0.322E+10	0.188E+10
61.000	0.848E+10	0.327E+10	0.191E+10
62.000	0.863E+10	0.332E+10	0.194E+10
63.000	0.877E+10	0.337E+10	0.197E+10
64.000	0.892E+10	0.341E+10	0.199E+10
65.000	0.905E+10	0.346E+10	0.202E+10
66.000	0.919E+10	0.350E+10	0.204E+10
67.000	0.932E+10	0.354E+10	0.206E+10
68.000	0.945E+10	0.359E+10	0.209E+10
69.000	0.958E+10	0.363E+10	0.211E+10
70.000	0.970E+10	0.367E+10	0.213E+10
71.000	0.982E+10	0.371E+10	0.215E+10
72.000	0.994E+10	0.374E+10	0.218E+10
73.000	0.101E+11	0.378E+10	0.220E+10
74.000	0.102E+11	0.382E+10	0.222E+10
75.000	0.103E+11	0.385E+10	0.224E+10
76.000	0.104E+11	0.389E+10	0.226E+10
77.000	0.105E+11	0.392E+10	0.227E+10
78.000	0.106E+11	0.395E+10	0.229E+10
79.000	0.107E+11	0.398E+10	0.231E+10
80.000	0.108E+11	0.401E+10	0.233E+10
81.000	0.109E+11	0.404E+10	0.235E+10
82.000	0.109E+11	0.407E+10	0.236E+10
83.000	0.110E+11	0.410E+10	0.238E+10
84.000	0.111E+11	0.413E+10	0.239E+10
85.000	0.112E+11	0.416E+10	0.241E+10
86.000	0.113E+11	0.418E+10	0.242E+10
87.000	0.114E+11	0.421E+10	0.244E+10
88.000	0.114E+11	0.423E+10	0.245E+10
89.000	0.115E+11	0.426E+10	0.247E+10
90.000	0.116E+11	0.428E+10	0.248E+10
91.000	0.117E+11	0.430E+10	0.249E+10
92.000	0.117E+11	0.433E+10	0.250E+10
93.000	0.118E+11	0.435E+10	0.252E+10
94.000	0.119E+11	0.437E+10	0.253E+10
95.000	0.119E+11	0.439E+10	0.254E+10
96.000	0.120E+11	0.441E+10	0.255E+10
97.000	0.120E+11	0.443E+10	0.256E+10
98.000	0.121E+11	0.445E+10	0.257E+10
99.000	0.121E+11	0.447E+10	0.258E+10
100.000	0.122E+11	0.448E+10	0.259E+10

TI

atomic number	atomic weight (g/mole)	density (g/cm ³)	$\mu(\alpha_1)$ (cm ⁻¹)	$\mu(\alpha_2)$ (cm ⁻¹)	f _k	g _k
81	204.37	11.85	30.652	33.212	.278	.590

Yield (photons/s/μA/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
4.000	0.946E+06	0.916E+06	0.884E+06
4.125	0.110E+07	0.106E+07	0.102E+07
4.250	0.126E+07	0.122E+07	0.117E+07
4.375	0.145E+07	0.139E+07	0.134E+07
4.500	0.165E+07	0.159E+07	0.152E+07
4.625	0.188E+07	0.180E+07	0.172E+07
4.750	0.213E+07	0.204E+07	0.194E+07
4.875	0.240E+07	0.229E+07	0.218E+07
5.000	0.269E+07	0.257E+07	0.244E+07
5.125	0.302E+07	0.287E+07	0.272E+07
5.250	0.337E+07	0.320E+07	0.302E+07
5.375	0.375E+07	0.355E+07	0.335E+07
5.500	0.416E+07	0.394E+07	0.370E+07
5.625	0.460E+07	0.435E+07	0.408E+07
5.750	0.508E+07	0.479E+07	0.448E+07
5.875	0.559E+07	0.526E+07	0.491E+07
6.000	0.614E+07	0.576E+07	0.537E+07
6.125	0.673E+07	0.630E+07	0.586E+07
6.250	0.736E+07	0.687E+07	0.638E+07
6.375	0.803E+07	0.748E+07	0.693E+07
6.500	0.874E+07	0.813E+07	0.751E+07
6.625	0.950E+07	0.881E+07	0.812E+07
6.750	0.103E+08	0.954E+07	0.877E+07
6.875	0.112E+08	0.103E+08	0.945E+07
7.000	0.121E+08	0.111E+08	0.102E+08
7.125	0.130E+08	0.120E+08	0.109E+08
7.250	0.140E+08	0.129E+08	0.117E+08
7.375	0.151E+08	0.138E+08	0.125E+08
7.500	0.162E+08	0.148E+08	0.134E+08
7.625	0.174E+08	0.158E+08	0.143E+08
7.750	0.186E+08	0.169E+08	0.152E+08
7.875	0.199E+08	0.181E+08	0.162E+08
8.000	0.213E+08	0.192E+08	0.172E+08
8.250	0.242E+08	0.218E+08	0.194E+08
8.500	0.274E+08	0.245E+08	0.217E+08
8.750	0.309E+08	0.275E+08	0.243E+08
9.000	0.347E+08	0.307E+08	0.269E+08
9.250	0.388E+08	0.342E+08	0.298E+08
9.500	0.433E+08	0.379E+08	0.328E+08
9.750	0.481E+08	0.418E+08	0.361E+08
10.000	0.532E+08	0.460E+08	0.395E+08
10.250	0.588E+08	0.505E+08	0.431E+08
10.500	0.647E+08	0.552E+08	0.469E+08
10.750	0.709E+08	0.602E+08	0.508E+08
11.000	0.776E+08	0.655E+08	0.550E+08

11.250	0.848E+08	0.711E+08	0.594E+08
11.500	0.923E+08	0.770E+08	0.639E+08
11.750	0.100E+09	0.831E+08	0.686E+08
12.000	0.109E+09	0.895E+08	0.735E+08
12.250	0.118E+09	0.963E+08	0.786E+08
12.500	0.127E+09	0.103E+09	0.839E+08
12.750	0.137E+09	0.111E+09	0.893E+08
13.000	0.147E+09	0.118E+09	0.950E+08
13.250	0.158E+09	0.126E+09	0.101E+09
13.500	0.170E+09	0.134E+09	0.107E+09
13.750	0.182E+09	0.143E+09	0.113E+09
14.000	0.194E+09	0.152E+09	0.119E+09
14.500	0.221E+09	0.170E+09	0.132E+09
15.000	0.249E+09	0.190E+09	0.146E+09
15.500	0.280E+09	0.211E+09	0.160E+09
16.000	0.314E+09	0.232E+09	0.175E+09
16.500	0.349E+09	0.256E+09	0.191E+09
17.000	0.388E+09	0.280E+09	0.207E+09
17.500	0.428E+09	0.305E+09	0.223E+09
18.000	0.471E+09	0.331E+09	0.240E+09
18.500	0.517E+09	0.358E+09	0.258E+09
19.000	0.564E+09	0.386E+09	0.276E+09
19.500	0.615E+09	0.415E+09	0.294E+09
20.000	0.668E+09	0.445E+09	0.312E+09
21.000	0.781E+09	0.506E+09	0.350E+09
22.000	0.903E+09	0.571E+09	0.389E+09
23.000	0.104E+10	0.638E+09	0.429E+09
24.000	0.118E+10	0.707E+09	0.470E+09
25.000	0.133E+10	0.778E+09	0.512E+09
26.000	0.148E+10	0.850E+09	0.554E+09
27.000	0.165E+10	0.924E+09	0.596E+09
28.000	0.182E+10	0.998E+09	0.638E+09
29.000	0.200E+10	0.107E+10	0.681E+09
30.000	0.218E+10	0.115E+10	0.723E+09
31.000	0.237E+10	0.122E+10	0.766E+09
32.000	0.257E+10	0.130E+10	0.808E+09
33.000	0.276E+10	0.137E+10	0.850E+09
34.000	0.296E+10	0.145E+10	0.891E+09
35.000	0.317E+10	0.152E+10	0.933E+09
36.000	0.337E+10	0.160E+10	0.974E+09
37.000	0.358E+10	0.167E+10	0.101E+10
38.000	0.378E+10	0.174E+10	0.105E+10
39.000	0.399E+10	0.181E+10	0.109E+10
40.000	0.420E+10	0.188E+10	0.113E+10
41.000	0.440E+10	0.195E+10	0.117E+10
42.000	0.461E+10	0.202E+10	0.121E+10
43.000	0.481E+10	0.209E+10	0.125E+10
44.000	0.502E+10	0.215E+10	0.128E+10
45.000	0.522E+10	0.222E+10	0.132E+10
46.000	0.541E+10	0.228E+10	0.136E+10
47.000	0.561E+10	0.235E+10	0.139E+10
48.000	0.580E+10	0.241E+10	0.143E+10
49.000	0.599E+10	0.247E+10	0.146E+10
50.000	0.618E+10	0.253E+10	0.149E+10
51.000	0.637E+10	0.259E+10	0.153E+10
52.000	0.655E+10	0.265E+10	0.156E+10
53.000	0.672E+10	0.270E+10	0.159E+10
54.000	0.690E+10	0.276E+10	0.162E+10

55.000	0.707E+10	0.281E+10	0.165E+10
56.000	0.724E+10	0.287E+10	0.168E+10
57.000	0.740E+10	0.292E+10	0.171E+10
58.000	0.756E+10	0.297E+10	0.174E+10
59.000	0.772E+10	0.302E+10	0.177E+10
60.000	0.787E+10	0.307E+10	0.179E+10
61.000	0.803E+10	0.312E+10	0.182E+10
62.000	0.817E+10	0.316E+10	0.185E+10
63.000	0.832E+10	0.321E+10	0.187E+10
64.000	0.846E+10	0.325E+10	0.190E+10
65.000	0.860E+10	0.330E+10	0.192E+10
66.000	0.873E+10	0.334E+10	0.195E+10
67.000	0.886E+10	0.338E+10	0.197E+10
68.000	0.899E+10	0.342E+10	0.199E+10
69.000	0.911E+10	0.346E+10	0.202E+10
70.000	0.924E+10	0.350E+10	0.204E+10
71.000	0.935E+10	0.354E+10	0.206E+10
72.000	0.947E+10	0.358E+10	0.208E+10
73.000	0.958E+10	0.362E+10	0.210E+10
74.000	0.969E+10	0.365E+10	0.212E+10
75.000	0.980E+10	0.369E+10	0.214E+10
76.000	0.991E+10	0.372E+10	0.216E+10
77.000	0.100E+11	0.375E+10	0.218E+10
78.000	0.101E+11	0.379E+10	0.220E+10
79.000	0.102E+11	0.382E+10	0.222E+10
80.000	0.103E+11	0.385E+10	0.223E+10
81.000	0.104E+11	0.388E+10	0.225E+10
82.000	0.105E+11	0.391E+10	0.227E+10
83.000	0.106E+11	0.394E+10	0.228E+10
84.000	0.107E+11	0.396E+10	0.230E+10
85.000	0.107E+11	0.399E+10	0.231E+10
86.000	0.108E+11	0.402E+10	0.233E+10
87.000	0.109E+11	0.404E+10	0.234E+10
88.000	0.110E+11	0.407E+10	0.236E+10
89.000	0.110E+11	0.409E+10	0.237E+10
90.000	0.111E+11	0.412E+10	0.239E+10
91.000	0.112E+11	0.414E+10	0.240E+10
92.000	0.113E+11	0.416E+10	0.241E+10
93.000	0.113E+11	0.419E+10	0.242E+10
94.000	0.114E+11	0.421E+10	0.244E+10
95.000	0.115E+11	0.423E+10	0.245E+10
96.000	0.115E+11	0.425E+10	0.246E+10
97.000	0.116E+11	0.427E+10	0.247E+10
98.000	0.116E+11	0.429E+10	0.248E+10
99.000	0.117E+11	0.431E+10	0.249E+10
100.000	0.117E+11	0.432E+10	0.250E+10

Pb

atomic number	atomic weight	density	$\mu(\alpha_1)$	$\mu(\alpha_2)$	f_k	g_k
82	(g/mole) 207.2	(g/cm ³) 11.4	(cm ⁻¹) 27.992	(cm ⁻¹) 30.703	.279	.592

Yield (photons/s/ μ A/sr)

<i>Energy</i> (MeV)	<i>Yield</i> (20°)	<i>Yield</i> (45°)	<i>Yield</i> (60°)
4.000	0.844E+06	0.818E+06	0.790E+06
4.125	0.978E+06	0.946E+06	0.912E+06
4.250	0.113E+07	0.109E+07	0.105E+07
4.375	0.129E+07	0.125E+07	0.120E+07
4.500	0.148E+07	0.142E+07	0.136E+07
4.625	0.168E+07	0.161E+07	0.154E+07
4.750	0.190E+07	0.182E+07	0.174E+07
4.875	0.214E+07	0.205E+07	0.195E+07
5.000	0.241E+07	0.230E+07	0.219E+07
5.125	0.269E+07	0.257E+07	0.244E+07
5.250	0.301E+07	0.286E+07	0.271E+07
5.375	0.335E+07	0.318E+07	0.301E+07
5.500	0.371E+07	0.352E+07	0.332E+07
5.625	0.411E+07	0.389E+07	0.366E+07
5.750	0.454E+07	0.429E+07	0.402E+07
5.875	0.500E+07	0.471E+07	0.441E+07
6.000	0.549E+07	0.516E+07	0.482E+07
6.125	0.601E+07	0.564E+07	0.526E+07
6.250	0.657E+07	0.616E+07	0.573E+07
6.375	0.717E+07	0.671E+07	0.622E+07
6.500	0.781E+07	0.729E+07	0.675E+07
6.625	0.849E+07	0.790E+07	0.730E+07
6.750	0.921E+07	0.855E+07	0.788E+07
6.875	0.998E+07	0.924E+07	0.850E+07
7.000	0.108E+08	0.997E+07	0.914E+07
7.125	0.116E+08	0.107E+08	0.982E+07
7.250	0.125E+08	0.115E+08	0.105E+08
7.375	0.135E+08	0.124E+08	0.113E+08
7.500	0.145E+08	0.133E+08	0.121E+08
7.625	0.156E+08	0.142E+08	0.129E+08
7.750	0.167E+08	0.152E+08	0.137E+08
7.875	0.178E+08	0.162E+08	0.146E+08
8.000	0.191E+08	0.173E+08	0.155E+08
8.250	0.217E+08	0.196E+08	0.175E+08
8.500	0.246E+08	0.221E+08	0.196E+08
8.750	0.277E+08	0.247E+08	0.219E+08
9.000	0.311E+08	0.276E+08	0.243E+08
9.250	0.348E+08	0.308E+08	0.270E+08
9.500	0.388E+08	0.341E+08	0.297E+08
9.750	0.431E+08	0.377E+08	0.327E+08
10.000	0.478E+08	0.415E+08	0.358E+08
10.250	0.527E+08	0.455E+08	0.391E+08
10.500	0.580E+08	0.498E+08	0.425E+08
10.750	0.637E+08	0.544E+08	0.462E+08
11.000	0.697E+08	0.592E+08	0.500E+08

11.250	0.762E+08	0.643E+08	0.539E+08
11.500	0.830E+08	0.696E+08	0.581E+08
11.750	0.902E+08	0.752E+08	0.624E+08
12.000	0.978E+08	0.811E+08	0.669E+08
12.250	0.106E+09	0.872E+08	0.716E+08
12.500	0.114E+09	0.936E+08	0.765E+08
12.750	0.123E+09	0.100E+09	0.815E+08
13.000	0.133E+09	0.107E+09	0.867E+08
13.250	0.142E+09	0.114E+09	0.920E+08
13.500	0.153E+09	0.122E+09	0.975E+08
13.750	0.164E+09	0.130E+09	0.103E+09
14.000	0.175E+09	0.138E+09	0.109E+09
14.500	0.199E+09	0.155E+09	0.121E+09
15.000	0.225E+09	0.173E+09	0.134E+09
15.500	0.253E+09	0.192E+09	0.147E+09
16.000	0.283E+09	0.212E+09	0.161E+09
16.500	0.316E+09	0.233E+09	0.175E+09
17.000	0.350E+09	0.255E+09	0.190E+09
17.500	0.387E+09	0.279E+09	0.206E+09
18.000	0.427E+09	0.303E+09	0.222E+09
18.500	0.468E+09	0.328E+09	0.238E+09
19.000	0.512E+09	0.354E+09	0.255E+09
19.500	0.558E+09	0.381E+09	0.272E+09
20.000	0.606E+09	0.408E+09	0.289E+09
21.000	0.710E+09	0.466E+09	0.325E+09
22.000	0.822E+09	0.526E+09	0.362E+09
23.000	0.944E+09	0.589E+09	0.399E+09
24.000	0.107E+10	0.654E+09	0.438E+09
25.000	0.121E+10	0.721E+09	0.477E+09
26.000	0.136E+10	0.789E+09	0.517E+09
27.000	0.151E+10	0.859E+09	0.557E+09
28.000	0.167E+10	0.929E+09	0.597E+09
29.000	0.184E+10	0.100E+10	0.638E+09
30.000	0.201E+10	0.107E+10	0.678E+09
31.000	0.219E+10	0.114E+10	0.719E+09
32.000	0.237E+10	0.122E+10	0.759E+09
33.000	0.255E+10	0.129E+10	0.799E+09
34.000	0.274E+10	0.136E+10	0.839E+09
35.000	0.293E+10	0.143E+10	0.879E+09
36.000	0.313E+10	0.150E+10	0.918E+09
37.000	0.332E+10	0.157E+10	0.957E+09
38.000	0.352E+10	0.164E+10	0.996E+09
39.000	0.372E+10	0.171E+10	0.103E+10
40.000	0.392E+10	0.178E+10	0.107E+10
41.000	0.411E+10	0.184E+10	0.111E+10
42.000	0.431E+10	0.191E+10	0.115E+10
43.000	0.451E+10	0.197E+10	0.118E+10
44.000	0.470E+10	0.204E+10	0.122E+10
45.000	0.489E+10	0.210E+10	0.125E+10
46.000	0.509E+10	0.216E+10	0.129E+10
47.000	0.527E+10	0.223E+10	0.132E+10
48.000	0.546E+10	0.229E+10	0.136E+10
49.000	0.565E+10	0.235E+10	0.139E+10
50.000	0.583E+10	0.240E+10	0.142E+10
51.000	0.601E+10	0.246E+10	0.145E+10
52.000	0.618E+10	0.252E+10	0.149E+10
53.000	0.636E+10	0.257E+10	0.152E+10
54.000	0.653E+10	0.263E+10	0.155E+10

55.000	0.670E+10	0.268E+10	0.158E+10
56.000	0.686E+10	0.273E+10	0.161E+10
57.000	0.702E+10	0.278E+10	0.163E+10
58.000	0.718E+10	0.283E+10	0.166E+10
59.000	0.733E+10	0.288E+10	0.169E+10
60.000	0.749E+10	0.293E+10	0.172E+10
61.000	0.763E+10	0.298E+10	0.174E+10
62.000	0.778E+10	0.303E+10	0.177E+10
63.000	0.792E+10	0.307E+10	0.179E+10
64.000	0.806E+10	0.312E+10	0.182E+10
65.000	0.820E+10	0.316E+10	0.184E+10
66.000	0.833E+10	0.320E+10	0.187E+10
67.000	0.846E+10	0.324E+10	0.189E+10
68.000	0.859E+10	0.328E+10	0.191E+10
69.000	0.871E+10	0.332E+10	0.194E+10
70.000	0.883E+10	0.336E+10	0.196E+10
71.000	0.895E+10	0.340E+10	0.198E+10
72.000	0.907E+10	0.344E+10	0.200E+10
73.000	0.918E+10	0.347E+10	0.202E+10
74.000	0.929E+10	0.351E+10	0.204E+10
75.000	0.940E+10	0.354E+10	0.206E+10
76.000	0.950E+10	0.358E+10	0.208E+10
77.000	0.960E+10	0.361E+10	0.210E+10
78.000	0.970E+10	0.364E+10	0.212E+10
79.000	0.980E+10	0.368E+10	0.213E+10
80.000	0.990E+10	0.371E+10	0.215E+10
81.000	0.999E+10	0.374E+10	0.217E+10
82.000	0.101E+11	0.377E+10	0.219E+10
83.000	0.102E+11	0.380E+10	0.220E+10
84.000	0.103E+11	0.382E+10	0.222E+10
85.000	0.103E+11	0.385E+10	0.223E+10
86.000	0.104E+11	0.388E+10	0.225E+10
87.000	0.105E+11	0.390E+10	0.226E+10
88.000	0.106E+11	0.393E+10	0.228E+10
89.000	0.107E+11	0.395E+10	0.229E+10
90.000	0.107E+11	0.398E+10	0.230E+10
91.000	0.108E+11	0.400E+10	0.232E+10
92.000	0.109E+11	0.402E+10	0.233E+10
93.000	0.109E+11	0.405E+10	0.234E+10
94.000	0.110E+11	0.407E+10	0.236E+10
95.000	0.111E+11	0.409E+10	0.237E+10
96.000	0.111E+11	0.411E+10	0.238E+10
97.000	0.112E+11	0.413E+10	0.239E+10
98.000	0.112E+11	0.415E+10	0.240E+10
99.000	0.113E+11	0.417E+10	0.241E+10
100.000	0.114E+11	0.419E+10	0.242E+10