

# Relativistic Atomic Form Factors and Photon Coherent Scattering Cross Sections

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Tabulations are presented of relativistic Hartree-Fock atomic form factors  $F(x, Z)$ , for values of  $x (= \sin(\theta/2)/\lambda)$  from 0.01 to  $10^9 \text{ \AA}^{-1}$ , for all elements  $Z=1$  to 100. For  $Z=1$ ,  $F(x, Z)$  is given by the exact expression of Pirene. For  $Z=2$  to 98,  $x=0.01$  to  $2.0 \text{ \AA}^{-1}$ , the tabulated values are those of Cromer and Waber given in the *International Tables for X-Ray Crystallography* (Vol. IV, 1974), based in part on the work of Doyle and Turner. For  $Z=21$  to 92,  $x=2.2$  to  $6.0 \text{ \AA}^{-1}$ , the present tables are based on the values of Doyle and Turner and additional values ( $Z=44, 60, 68,$  and  $74$ ) as given by Øverbø. For  $Z=3$  to 20,  $x=2.2$  to  $45 \text{ \AA}^{-1}$ , and  $Z=21$  to 92,  $x=6.2$  to  $45 \text{ \AA}^{-1}$  the tables are interpolated from values given for 36 elements by Øverbø, extended to  $x=10^9 \text{ \AA}^{-1}$  using Øverbø's corrections to the Bethe-Levinger  $K$ -shell expression. The remainder of the table is filled in by interpolation and extrapolation, guided for high  $x$ -values by the Bethe-Levinger result. Tables of relativistic coherent (Rayleigh) scattering cross sections, obtained by numerical integration of the Thomson formula weighted by  $F^2(x, Z)$ , are presented for all elements  $Z=1$  to 100, for photon energies 100 eV ( $\lambda=124 \text{ \AA}=12.4 \text{ nm}$ ) to 100 MeV ( $\lambda=0.000124 \text{ \AA}=12.4 \text{ fm}$ ). Departures from the nonrelativistic coherent scattering cross sections tabulated in *J. Phys. Chem. Ref. Data* 4, 471 (1975) are less than 1% for  $Z \leq 20$ . However for a high- $Z$  element such as lead, for example, the relativistic coherent scattering cross section is systematically higher by less than 0.4% below 1 keV, by 8% at 100 keV and by 13% above 1 MeV.

Key words: Atomic form factor; coherent scattering; cross sections; gamma rays; photons; Rayleigh scattering; tabulations; x-rays.

## 1. Introduction

Atomic form factors  $F(x, Z)$  (where  $x=[1/\lambda] [\sin(\theta/2)]$ ), tabulated and parametrized in the crystallographic literature (see, e.g., [1-5]<sup>1</sup>) over  $x$ -argument ranges  $0 \leq x \leq 2.0$  to  $20 \text{ \AA}^{-1}$ , are required in materials-properties analyses involving diffracted x-ray intensities.

If the range of  $x$ -arguments is extended to higher values (e.g., to  $x=80.65 \text{ \AA}^{-1}$  for processes involving 1 MeV photons or to  $x=8065 \text{ \AA}^{-1}$  for processes involving 100 MeV photons), atomic form factors also serve as input to the theoretical prediction of a variety of physical quantities. Some of these quantities include coherent (Rayleigh) scattering, pair production and bremsstrahlung cross sections required in such diverse applications as medical x-ray technology, power reactor shielding, industrial radiation processing and analysis of nuclear physics experiments.

A previous paper in this journal [6] presented tables of non-relativistic atomic form factors  $F(x, Z)$  and incoherent scattering functions  $S(x, Z)$  extending over the range  $0 \leq x \leq 10^9 \text{ \AA}^{-1}$  for all elements  $Z=1$  to 100, composited, interpolated, and extrapolated from the available published and unpublished

literature [7-12]. Reference [6] contains an extensive review of form-factor theoretical models, also graphical comparisons with available measurements which will not be repeated here.

The use of non-relativistic  $F(x, Z)$  values for the tables in reference [6], rather than the accurate relativistic values, was for the following reasons:

(a) The two available systematic calculations of relativistic (Hartree-Fock)  $F(x, Z)$  values extended only up to  $6.0 \text{ \AA}^{-1}$  (Doyle and Turner [1], 54 elements  $Z=2$  to 92) and up to  $2.0 \text{ \AA}^{-1}$  (Cromer and Waber [2], all elements  $Z=1$  to 98), respectively, whereas non-relativistic (Hartree-Fock)  $F(x, Z)$  values (also  $S(x, Z)$  values) for  $0 < x < 80 \text{ \AA}^{-1}$  for all elements  $Z=1$  to 103 were available from Cromer [8,9].

(b) No systematic relativistic calculations of the incoherent scattering function  $S(x, Z)$  were (or are) available. Since pairs of cross sections derived from  $F(x, Z)$  and  $S(x, Z)$ , respectively, are frequently used additively (e.g., coherent plus incoherent scattering cross sections), a partial cancellation of errors from neglect of relativistic effects might be expected in such sums if this neglect were applied consistently.

It has since been noted, however, that this partial cancellation of errors, at least in the case of photon interactions, is of less significance than the relativistic-nonrelativistic differences, due to the greater sensitivity of the total cross section to  $F(x, Z)$  values than to  $S(x, Z)$  values used in computing cross sections for the individual interactions. Hence the above consistency justification (b) for use of nonrelativistic  $F(x, Z)$  values is seen to be no longer valid.

<sup>1</sup> Figures in brackets indicate literature references at the end of this paper.

Recently, Øverbø [13,14] has calculated relativistic  $F(x,Z)$  values for high momentum transfers ( $2.0 \leq x \leq 45 \text{ \AA}^{-1}$ ) for 36 elements  $Z=3$  to 92. Øverbø's work includes parametrized corrections to the Bethe-Levinger [12] high- $x$   $K$ -shell expression which provide a basis for extending his own and the relativistic calculated values of Doyle and Turner [1] and Cromer and Waber [2] to cover the entire range  $x=0$  to  $10^9 \text{ \AA}^{-1}$ ,  $Z=1$  to 100.

A recent analysis [15] of high precision attenuation coefficient measurements [16] in the range 10 to 150 MeV has provided a sensitive test of theoretical pair production cross sections which, in turn, are sensitive to the choice of  $F(x,Z)$

values used in the screening-effect part of the calculation. In this analysis, using non-relativistic [6] and relativistic (present tabulation) form factors as alternative input data in the Jost-Luttinger-Slotnick [17] screened pair production expression, and assuming other corrections [18] and other contributing processes were calculated with sufficient accuracy, the agreement between theoretical and measured data is seen to be improved by the use of relativistic form factors.

Also, the spacing of the  $x$ -grid in reference [6] has been found too coarse for reliable interpolation, particularly for high- $Z$  elements where undulations in the form factor (see fig. 1) due to atomic shell effects persist to beyond  $x=10 \text{ \AA}^{-1}$ .

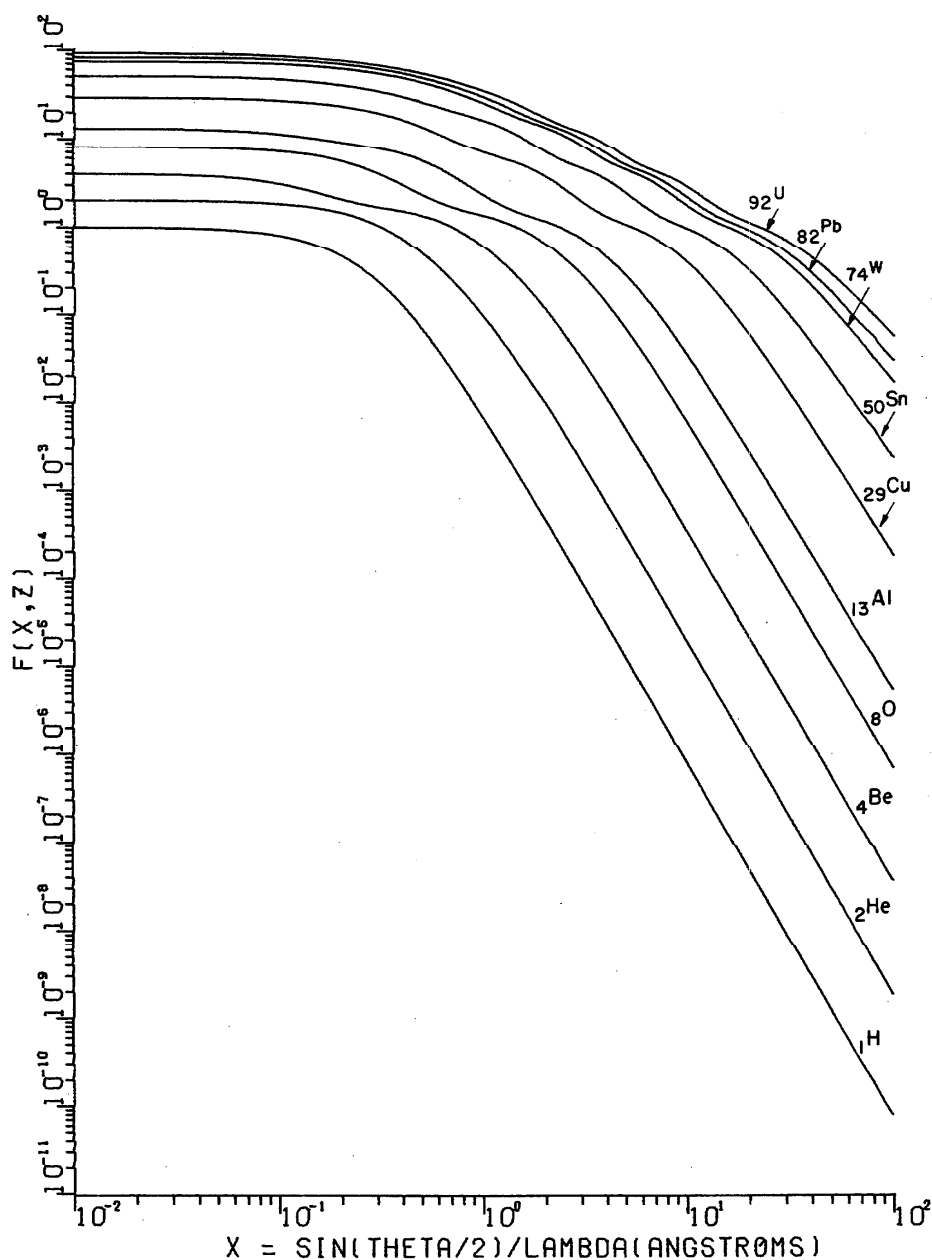


FIGURE 1. RHF atomic form factors  $F(x,Z)$  from table I for 10 selected elements over the range  $0.01 < x < 100 \text{ \AA}^{-1}$ .

As a result of the considerations discussed above, relativistic, increased-grid form factor tables, composited, interpolated and extrapolated from the literature including the newly-available work of Överbö [13,14], are here offered as a replacement for the form factor tables in reference [6]. Similarly, tables of integrated coherent (Rayleigh) scattering cross section values, computed for photon energies 100 eV to 100 MeV using the above relativistic form factors, are also presented to replace the non-relativistic coherent scattering cross sections calculated and tabulated in reference [6].

## 2. Physical Constants; Units; Notation

The physical constants included in the following listing are unchanged<sup>2</sup> from those in the more extensive listing given in reference [6]:

$c$	velocity of light = $2.99792458 \cdot 10^8 \text{ m s}^{-1}$
$e$	elementary charge = $1.6021892 \cdot 10^{-19} \text{ C}$ = $4.803242 \cdot 10^{-10} \text{ cm}^{3/2} \text{ g}^{1/2} \text{ s}^{-1}$ (e.s.u.) = $1.5189186 \cdot 10^{-14} \text{ m}^{3/2} \text{ kg}^{1/2} \text{ s}^{-1}$
$m_e$	electron rest-mass = $9.109534 \cdot 10^{-31} \text{ kg}$
$m_e c^2$	electron rest-mass energy = $5.110034 \cdot 10^5 \text{ eV}$
$b$	barn = $10^{-28} \text{ m}^2$
$r_e$	classical electron radius = $e^2/(m_e c^2) = 2.8179380 \cdot 10^{-15} \text{ m}$
$r_e^2$	= $7.940775 \cdot 10^{-30} \text{ m}^2 = 0.07940775 \text{ b}$
$\alpha$	fine structure constant = $7.2973506 \cdot 10^{-3} =$ $1/137.03604 \approx 1/137$
$a_0$	first Bohr radius = $r_e/\alpha^2 = 5.2917706 \cdot 10^{-11} \text{ m}$ = $0.52917706 \text{ \AA}$
$E$	photon energy in eV units (e.g., keV, MeV or GeV)
$k$	photon energy in units of the electron rest-mass energy (i.e., $m_e c^2$ units) = $E(\text{eV})/511003.4$
$\lambda$	photon wavelength in angstroms (1 angstrom = $10^{-10} \text{ m} = 0.1 \text{ nm}$ ) = $12398.520/E(\text{eV})$
$\theta$	angle between the photon directions of travel prior to and following a scattering interaction <sup>3</sup>
$\phi$	Bragg angle in x-ray crystallography = $\theta/2$ <sup>3</sup>

<sup>2</sup> Numerical values given here and in reference [6] are those recommended in 1973 by the Task Group on Fundamental Constants, Committee on Data for Science and Technology (CODATA) of the International Council of Scientific Unions (ICSU) [19], taken from an analysis by Cohen and Taylor [20].

<sup>3</sup> Note that the meanings of  $\theta$  and  $\phi$ , which are here the same as in reference [6] and in numerous photon interaction publications from NBS and elsewhere, are reversed from the customary meanings in the crystallographic literature.

$x$  =  $\sin(\theta/2)/\lambda = (\sin\phi)/\lambda$

$\hbar q$  momentum transfer to an atom or electron (or, in vector notation,  $\hbar \mathbf{q} = \mathbf{k}_i - \mathbf{k}_f$ , where  $\mathbf{k}_i$  and  $\mathbf{k}_f$  are initial and final momenta of the photon). In units of  $m_e c$ ,  $\hbar q = 2k \sin(\theta/2)$ . Conversion of  $q$ -arguments in  $m_e c$  units to the  $x$ -arguments in the present table (table I) is accomplished by multiplication by the factor  $20.60744 = \frac{1}{2} \cdot 511003.4/12398.52$

$Z$  atomic number = electrons/atom

$d\Omega$  differential solid angle in steradians =  $2\pi \sin\theta d\theta$

$d\sigma_T(\theta)/d\Omega$  differential Thomson scattering cross section per electron

$$= \frac{r_e^2}{2} (1 + \cos^2\theta) \quad (2)$$

$\sigma_T$  cross section for classical Thomson scattering from an electron =  $8\pi r_e^2/3 = 6.652448 \cdot 10^{-29} \text{ m}^2 = 0.6652448 \text{ b}$

$F(x, Z)$  atomic form factor (table I)

$\sigma_{\text{coh}}$  coherent (Rayleigh) scattering cross section per atom (table II)

$$= \int_{\theta=0}^{\theta=\pi} d\sigma_T(\theta) [F(x, Z)]^2 \quad (3)$$

$$= \frac{3}{8} \sigma_T \int_{-1}^{+1} (1 + \cos^2\theta) [F(x, Z)]^2 d(\cos\theta) \quad (4)$$

## 3. Composition of the Present $F(x, Z)$ Tables

The relativistic atomic form factors  $F(x, Z)$  in table I were composited from theoretical partial-range tabulations available in the literature and in some cases by computations using formulas given in the literature. Values of  $F(x, Z)$  are listed for the combined total of 94  $x$ -arguments  $0 \leq x \leq 45 \text{ \AA}^{-1}$  appearing in the input point-data tabulations, in addition to six  $x$ -arguments  $50 \leq x \leq 10^9 \text{ \AA}^{-1}$  in the computed extension region. This increase from 45  $x$ -arguments in reference [6] to 100  $x$ -arguments in the present table increases the reliability of interpolation, particularly in the region  $5 \lesssim x \lesssim 50 \text{ \AA}^{-1}$ .

The above  $x$ -grid is, however, less dense than that of reference [6] for small values of  $x$  ( $0 \leq x \leq 0.03 \text{ \AA}^{-1}$ ). In the present tabulation (table I) the lowest non-zero  $x$ -argument is  $0.01 \text{ \AA}^{-1}$  rather than  $0.005 \text{ \AA}^{-1}$  as in reference [6]. Thus for applications which heavily weight  $F(x, Z)$  values in the region  $0 \leq x \leq 0.01 \text{ \AA}^{-1}$ , the relation [21]

$$F(x, Z) \approx Z(1 - ax^2), \quad x < 0.01 \text{ \AA}^{-1}, \quad (5)$$

where

$$a = (1 - [F(x, Z)/Z])/x^2, \quad (6)$$

solved for  $x=0.01 \text{ \AA}^{-1}$ , may yield more accurate  $F(x, Z)$  values than some interpolation schemes.

The source data for the different  $x$ - and  $Z$ -regions in table I are as follows:

(a) For hydrogen, all  $F(x, 1)$  values  $0 \leq x \leq 10^9 \text{ \AA}^{-1}$  were computed from the exact expression of Pirene [10]

$$F(x, 1) = [1 + 4\pi^2 a_0^2 x^2]^{-2} \quad (7)$$

for neutral atomic hydrogen, in which  $a_0$  is the first Bohr radius ( $0.52917706 \text{ \AA}$ ). Hence the present (table I) hydrogen  $F(x, Z)$  values are identical with those listed in the main tables in reference [6]. Reference [6] also includes  $F(x, Z)$  tables for molecular and bonded hydrogen, based on the work of Stewart et al. [22, 23], which differ from the Pirene [10] values by amounts ranging up to 40%.

(b) For all elements  $Z=3$  to 98 and for  $0 \leq x \leq 2.0 \text{ \AA}^{-1}$  the  $F(x, Z)$  values are taken from the tabulation by Cromer and Waber [2] in the *International Tables for X-Ray Crystallography* (Vol. IV, 1974). A log-log quadratic extrapolation procedure was then used to extend these  $F(x, Z)$  values to include the elements  $Z=99$  and 100.

The Cromer and Waber [2]  $F(x, Z)$  tables, in turn, were taken in part from the results of Doyle and Turner [1] calculated over the range  $0 \leq x \leq 6.0 \text{ \AA}^{-1}$  for 54 elements  $Z=2$  to 92 (all elements  $Z=2$  to 38 plus the elements  $Z=42, 47, 48, 49, 50, 51, 53, 54, 55, 56, 63, 79, 80, 82, 83, 86$  and 92). The Doyle and Turner [1] results were obtained using the integral

$$F(x, Z) = 4\pi \int_0^\infty r^2 \rho(r, Z) \frac{\sin(4\pi xr)}{4\pi xr} dr \quad (8)$$

which assumes spherical symmetry for the atom and in which  $\rho(r, Z)$  is the total charge density, as a function of the radial distance  $r$  from the nucleus. The charge densities  $\rho(r, Z)$  were obtained from a relativistic Hartree-Fock (RHF) atomic wave function calculation programmed by Coulthard [24].

For the remaining elements  $39 \leq Z \leq 98$  not included in the above Doyle-Turner [1] work, Cromer and Waber [2] calculated  $F(x, Z)$  values using RHF wave functions of Mann [25]. The Mann [25] wave functions differ slightly from those of Coulthard [24] in that the effect of a finite rather than a point nucleus has been included. However, according to Cromer and Waber [2], differences between  $F(x, Z)$  values calculated from the point nucleus treatment and from the more exact finite-nucleus treatment are negligible.

(c) For helium ( $Z=2$ ) the  $F(x, Z)$  values in the range  $0 \leq x \leq 2.0 \text{ \AA}^{-1}$  in table I were also taken from the RHF values tabulated in the *International Tables for X-Ray Crystallography* [2] except for the values 0.01175 and 0.00990 at  $x=1.9$  and  $2.0 \text{ \AA}^{-1}$ , respectively, replacing the values 0.011 and 0.010 to correct for apparent round-off errors. The values 0.01175 and 0.00990 were obtained from the nine-parameter fit

$$F(x, Z) = \sum_{i=1}^4 a_i(Z) \exp(-b_i(Z)x^2) + c(Z), \quad (9)$$

$$0 \leq x \leq 2.0 \text{ \AA}^{-1}$$

for which Cromer and Waber [2] provide a table of  $a_i(Z)$ ,  $b_i(Z)$ , and  $c(Z)$  for all elements  $Z=1$  to 98.

For helium in the region  $2.2 \leq x \leq 10^9 \text{ \AA}^{-1}$ , use was made of the Bethe-Levinger high- $x$   $K$ -shell expression [12]

$$F_{BL}(x, Z) = [\sin(2\gamma \arctan Q)]/[\gamma Q(1 + Q^2)^\gamma] \quad (10)$$

where  $Q = q/(2a)$  ( $q$  in  $m_e c$  units  $= x/20.60744$ ),  $\gamma = (1 - a^2)^{1/2}$  and  $a = \alpha Z = Z/137.03604$ , normalized to the above modified Cromer-Waber value at  $x=2.0 \text{ \AA}^{-1}$  value according to

$$F(x, 2) = F_{BL}(x, 2) \cdot (0.00990/F_{BL}(2.0, 2)), \quad (11)$$

$$2.2 \leq x \leq 10^9 \text{ \AA}^{-1}.$$

(d) For elements  $3 \leq Z \leq 100$  and for  $2.2 \leq x \leq 6.0 \text{ \AA}^{-1}$ , the  $F(x, Z)$  values in table I were interpolated (semi-log cubic spline fit vs.  $Z$  and log-log cubic spline fit vs.  $x$ ) from a set of  $F(x, Z)$  values consisting of (1) the  $F(x, Z)$  values given by Doyle and Turner [1] for 35 elements  $21 \leq Z \leq 92$  and (2)  $F(x, Z)$  values given by Øverbø [13,14] for all elements  $3 \leq Z \leq 20$  and for elements  $Z=44, 60, 68$  and 74 not included in the Doyle-Turner work. The Øverbø [14] results for  $Z < 20$  are based in part on the Doyle-Turner [1] results, which are too coarsely-spaced and subject to round-off oscillations in the region  $2.2 \leq x \leq 6.0 \text{ \AA}^{-1}$  for accurate interpolation, in the sense that Øverbø derived smoothly-varying (and small) correction factors from the Doyle-Turner tabulated values and applied these factors to his more densely-spaced calculated results.

(e) For elements  $3 \leq Z \leq 100$  in the range  $6.2 \leq x \leq 10^9 \text{ \AA}^{-1}$ , the  $F(x, Z)$  values in table I were interpolated and extrapolated from  $F(x, Z)$  values calculated by Øverbø [13,14] for 36 elements:  $Z=3-20, 22, 24, 26, 29, 32, 37, 42, 44, 47, 50, 53, 60, 63, 68, 74, 79, 82$  and 92.

The Øverbø results [13,14] are listed as point-data over the range from  $x=2.0 \text{ \AA}^{-1}$  to  $x$ -values ranging from  $3.0 \text{ \AA}^{-1}$  ( $Z=3$ ) up to  $45 \text{ \AA}^{-1}$  ( $Z=92$ ). For higher  $x$ -values ( $3.0 \text{ \AA}^{-1}$  to  $45 \text{ \AA}^{-1} \leq x \leq \infty$ ) Øverbø presents his results as parametrized corrections to the Bethe-Levinger [12] analytical expression  $F_{BL}(x, Z)$  given in eq (10)

$$F(x, Z) = [1 + A(Z) + B(Z)x^{-C(Z)}] \cdot F_{BL}(x, Z) \quad (12)$$

for which Øverbø gives numerical values of  $A(Z)$ ,  $B(Z)$  and  $C(Z)$  for the above 36 elements.

Øverbø [13,14] used the integral expression in eq (8) to calculate  $F(x, Z)$ , hence he treated both symmetric and asymmetric atoms as spherically symmetric, as did Doyle and Turner [1] and Cromer and Waber [2]. Øverbø obtained his charge densities  $\rho(r, Z)$  from a relativistic self-consistent-field program by Liberman et al. [26] in which exchange is represented by a Gáspár-Kohn-Sham [27,28] equivalent potential, slightly modified by a tail correction [29]. This exchange potential is  $\frac{2}{3}$  of the one originally proposed by Slater [30], and yields charge densities  $\rho(r, Z)$  which closely approximate those obtained from relativistic Hartree-Fock equations [2,31,32], particularly for heavy elements.

Overbø's [13,14] integration procedure for eq (8), to avoid cancellation errors due to rapid oscillations of the factor  $\sin(4\pi xr)$  for high  $x$ , consisted of (a) numerical Simpson integration over the interval  $0 < r < 0.5 a_0$  (where  $a_0 = 5.2917706 \cdot 10^{-11}$  m is the Bohr radius) and (b) analytic integration over each of 310 logarithmic segments comprising the remaining interval  $0.5 < r < 60.0 a_0$ , in each segment of which  $r \rho(r, Z)$  was fitted to a quadratic form in  $r$ .

The resulting extended-range RHF  $F(x, Z)$  values, composited, interpolated and extrapolated from literature values as described above, are given in table I for all elements  $Z=1$  to 100, for 100  $x$ -arguments over the range  $0 \leq x \leq 10^9 \text{ \AA}^{-1}$ .  $F(x, Z)$  values from table I for selected elements  $Z=1, 2, 4, 8, 13, 29, 50, 74, 82$  and 92 are plotted logarithmically in figure 1 over the range  $0.01 \leq x \leq 100 \text{ \AA}^{-1}$ . As can be seen in figure 1, the  $K$ -shell contribution dominates  $F(x, Z)$  in the low  $Z$  and high  $x$  regions, with the higher shell ( $L, M, \dots$ ) contributions for  $Z > 2$  appearing as undulations in  $F(x, Z)$  in the region  $0.2 \leq x \leq 20 \text{ \AA}^{-1}$ .

#### 4. Total Cross Sections for Coherent (Rayleigh) Scattering of Photons by Atomic Electrons

Reference [6] included tables of integrated coherent scattering cross sections  $\sigma_{\text{coh}}$  obtained using eq (4) and the non-relativistic  $F(x, Z)$  values in reference [6], for all elements  $Z=1$  to 100 and over the photon energy range 100 eV to 100 MeV. New values of  $\sigma_{\text{coh}}$ , obtained from eq (4) using the same numerical integration procedures as in reference [6] but substituting relativistic  $F(x, Z)$  values from table I of this paper, are presented in table II for the same range of  $Z$ 's and photon energies. That is, a modified Simpson-rule numerical integration procedure given by Spencer [33] was used with the integration variable taken as  $(1 - \cos\theta)$  and a mesh of 1000 logarithmically-spaced points (999 intervals) over the range  $10^{-12} \leq (1 - \cos\theta) \leq 2.0$  ( $1.4 \cdot 10^{-6} \leq \theta \leq \pi$ ). Values of  $F(x, Z)$  at the integration mesh-points were obtained by log log quadratic interpolation from values listed in table I, except for the region  $0 \leq x \leq 0.01 \text{ \AA}^{-1}$  where eq (5) was used in preference to interpolation.

#### 5. Discussion

Table III lists percent differences between the present relativistic Hartree-Fock  $F(x, Z)_{\text{RHF}}$  values in table I from the non-relativistic Hartree-Fock  $F(x, Z)_{\text{HF}}$  values in reference [6] for ten elements  $Z=1$  to 92 for  $x=0.01, 0.1, 1, 10$ , and  $10 \text{ \AA}^{-1}$ . Large relativistic effects of the order of 10% to 40% are seen for high- $Z$  elements for  $x \geq 10 \text{ \AA}^{-1}$ . The 11.96% difference at  $x=10 \text{ \AA}^{-1}$  for  $Z=8$  results from a fictitious oscillation in the reference [6] input data [8,9].

Table IV similarly presents percent differences between the integrated relativistic Hartree-Fock coherent scattering cross sections  $\sigma_{\text{coh}}^{\text{RHF}}(E, Z)$  in table II and the non-relativistic values  $\sigma_{\text{coh}}^{\text{HF}}(E, Z)$  given in reference [6] for seven photon energies 100 eV to 100 MeV, for the same ten elements as in table III. For high- $Z$  elements and  $E \geq 100$  keV, the systematic and substantial relativistic effects on  $F(x, Z)$  for high- $x$  arguments in table III are seen to propagate to 5% to 20% differences

between  $\sigma_{\text{coh}}^{\text{RHF}}(E, Z)$  and  $\sigma_{\text{coh}}^{\text{HF}}(E, Z)$ , or approximately one-half the respective  $F(x, Z)$  percent differences.

The effect of the  $\sigma_{\text{coh}}$  percent differences in table IV on the total attenuation coefficient (including photoeffect, Compton scattering and, above 1.022 MeV, pair production cross sections; see, e.g. [34], amounts to less than 0.1% for  $Z \lesssim 29$  and less than 0.3% for  $Z \lesssim 50$ . However, for a high- $Z$  element such as lead ( $Z = 82$ ), the percent change in theoretical  $\mu/\rho$  compilations, due to relativistic effects in  $\sigma_{\text{coh}}$ , rises to a peak value of 0.9% at  $\sim 400$  keV, decreasing to less than 0.1% below 20 keV and above 3 MeV.

Estimates of uncertainty for the  $F(x, Z)_{\text{RHF}}$  values in table I vary widely. Two types of uncertainties, differing considerably in magnitude, results from (a) errors due to the free-atom assumption and (b) limitations of the atomic model.

(a) Free-atom assumption: Cromer and Waber [2], comparing their results with available measurements, mention discrepancies "of the order of several percent" for some metals, including aluminum, iron and copper, but "excellent agreement" between calculated and measured  $F(x, Z)$  for inert gases where the free atom assumption is valid. The graphical summary of measured data in [6] suggests uncertainties "of the order of several percent" based on the spread of the data points, particularly for  $x \approx 10 \text{ \AA}^{-1}$ . For higher  $x$ -values the uncertainties should decrease as the contribution to  $F(x, Z)$  from valence electrons becomes small. These estimates are consistent with the "overall agreement between theory and experiment of the order of 5%" (for heavy elements) noted by Schumacher and Stoffregen [35] comparing Schumacher et al. [36-38] measurements with recent calculations by Kissel and Pratt [39] based on second-order perturbation theory [40,41].

(b) Limitations of the atomic model: The Hartree independent-particle model is the basis for all the works from which the present  $F(x, Z)$  values (table I) have been composited, hence electron-correlation effects have been neglected. Tseng et al. [42] point out that  $F(x, Z)$  is rather insensitive to electron correlation effects, at least for the elements  $Z = 2$  to 6 for which such effects have been studied by Kim and Inokuti [43] and by Brown [11]. That is, although electron correlation effects on the incoherent scattering function  $S(x, Z)$  can be as high as 20-30% ( $Z = 5, x < 0.1 \text{ \AA}^{-1}$ ), such effects on the atomic form factor  $F(x, Z)$  were found to be  $\sim 1\%$  or less.

Weiss [44] also estimates the errors in  $F(x, Z)$  due to neglect of electron correlations to be  $\sim 1\%$ . He points out that the  $\sim 10\%$  independent-particle-model errors in the Hartree method are reduced to  $\sim 1\%$  in the Hartree-Fock method as a result of changing the formulation of the total wave function from a simple product (Hartree) to a single determinant (Hartree-Fock) in which error-cancellations occur.

As was mentioned earlier, recent screened pair production calculations [15, 45] involving integrals over  $x$  of  $F(x, Z)$ , compared with the pair production cross sections obtained from total attenuation coefficient measurements, strongly favor the present relativistic  $F(x, Z)$  values in table I over the non-relativistic values given in reference [6].

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RELATIVISTIC HARTREE-FOCK ATOMIC FORM FACTOR, F(X,Z)

TABLE I.

$\frac{X}{\lambda}$	1 H	2 HE	3 LI	4 BE	5 B	6 C	7 N	8 O	9 F	10 NE
0.0	1.0000+00	2.0000+00	3.0000+00	4.0000+00	5.0000+00	6.0000+00	7.0000+00	8.0000+00	9.0000+00	1.0000+01
1.0-02	9.5779-01	1.9540+00	2.9860+00	3.9870+00	4.9880+00	5.9900+00	6.9910+00	7.9920+00	8.9930+00	9.9930+00
2.0-02	9.9121-01	1.9930+00	2.9470+00	3.9500+00	4.9540+00	5.9580+00	6.9630+00	7.9670+00	8.9700+00	9.9730+00
3.0-02	9.8039-01	1.9840+00	2.8840+00	3.8890+00	4.8970+00	5.9070+00	6.9180+00	7.9260+00	8.9330+00	9.9380+00
4.0-02	9.6558-01	1.9720+00	2.8020+00	3.8070+00	4.8200+00	5.8370+00	6.8550+00	7.8690+00	8.8810+00	9.8910+00
5.0-02	9.4693-01	1.9570+00	2.7080+00	3.7070+00	4.7240+00	5.7490+00	6.7760+00	7.7980+00	8.8150+00	9.8300+00
6.0-02	9.2491-01	1.9350+00	2.6060+00	3.5520+00	4.6130+00	5.6850+00	6.7620+00	7.8120+00	8.7360+00	9.7570+00
7.0-02	8.9587-01	1.9170+00	2.5020+00	3.4680+00	4.4880+00	5.5260+00	6.5740+00	7.6120+00	8.5450+00	9.6750+00
8.0-02	8.7221-01	1.8930+00	2.4000+00	3.3360+00	4.3520+00	5.3960+00	6.4530+00	7.5010+00	8.5410+00	9.5760+00
9.0-02	8.4238-01	1.8660+00	2.3040+00	3.2010+00	4.2090+00	5.2550+00	6.3210+00	7.3780+00	8.4270+00	9.4690+00
1.0-01	8.1082-01	1.8370+00	2.2150+00	3.0650+00	4.0600+00	5.1070+00	6.1800+00	7.2450+00	8.3020+00	9.3510+00
1.1-01	7.7795-01	1.8060+00	2.1350+00	2.9320+00	3.9080+00	4.9520+00	6.0300+00	7.1030+00	8.1680+00	9.2250+00
1.2-01	7.4420-01	1.7720+00	2.0650+00	2.8040+00	3.7560+00	4.7940+00	5.8750+00	6.9540+00	8.0260+00	9.0900+00
1.3-01	7.0954-01	1.7370+00	2.0040+00	2.6830+00	3.6060+00	4.6330+00	5.7140+00	6.7980+00	7.8760+00	8.9480+00
1.4-01	6.7553-01	1.7010+00	1.9500+00	2.5690+00	3.4590+00	4.4720+00	5.5510+00	6.6370+00	7.7210+00	8.7990+00
1.5-01	6.4129-01	1.6630+00	1.9040+00	2.4630+00	3.3160+00	4.3110+00	5.3850+00	6.4720+00	7.5600+00	8.6430+00
1.6-01	6.0749-01	1.6240+00	1.8630+00	2.3650+00	3.1790+00	4.1530+00	5.2180+00	6.3040+00	7.3950+00	8.4830+00
1.7-01	5.7436-01	1.5840+00	1.8280+00	2.2770+00	3.0480+00	3.9980+00	5.0510+00	6.1340+00	7.2260+00	8.3180+00
1.8-01	5.4210-01	1.5430+00	1.7960+00	2.1970+00	2.9240+00	3.8470+00	4.8860+00	5.9640+00	7.0550+00	8.1500+00
1.9-01	5.1087-01	1.5020+00	1.7680+00	2.1250+00	2.8080+00	3.7010+00	4.7230+00	5.7930+00	6.8830+00	7.9780+00
2.0-01	4.8078-01	1.4600+00	1.7420+00	2.0600+00	2.6990+00	3.5600+00	4.5630+00	5.6230+00	6.7090+00	7.8050+00
2.2-01	4.2437-01	1.3770+00	1.6930+00	1.9510+00	2.5030+00	3.2970+00	4.2540+00	5.2890+00	6.3620+00	7.4540+00
2.4-01	3.7327-01	1.2950+00	1.6480+00	1.8460+00	2.3360+00	3.0580+00	3.9630+00	4.9650+00	6.0200+00	7.1020+00
2.5-01	3.4574-01	1.2540+00	1.6260+00	1.8280+00	2.2630+00	2.9490+00	3.8250+00	4.8080+00	5.8510+00	6.9280+00
2.6-01	3.2753-01	1.2140+00	1.6040+00	1.7950+00	2.1950+00	2.8460+00	3.6930+00	4.6550+00	5.6850+00	6.7540+00
2.8-01	2.8697-01	1.1360+00	1.5590+00	1.7390+00	2.0770+00	2.6580+00	3.4450+00	4.3630+00	5.3630+00	6.4120+00
3.0-01	2.5127-01	1.0600+00	1.5130+00	1.6920+00	1.9790+00	2.4940+00	3.2140+00	4.0890+00	5.0540+00	6.0790+00
3.2-01	2.1599-01	0.9850+00	1.4650+00	1.6520+00	1.8970+00	2.3510+00	3.0190+00	3.8340+00	4.7610+00	5.7580+00
3.4-01	1.9271-01	9.2000-01	1.4170+00	1.6160+00	1.8290+00	2.2270+00	2.8310+00	3.5990+00	4.4840+00	5.4510+00
3.5-01	1.8042-01	8.8700-01	1.3930+00	1.6000+00	1.7990+00	2.1710+00	2.7470+00	3.4890+00	4.3530+00	5.3020+00
3.6-01	1.6857-01	8.5600-01	1.3690+00	1.5830+00	1.7710+00	2.1200+00	2.6670+00	3.3830+00	4.2250+00	5.1580+00
3.8-01	1.4838-01	7.9500-01	1.3200+00	1.5510+00	1.7230+00	2.0280+00	2.5220+00	3.1860+00	3.9830+00	4.8800+00
4.0-01	1.3048-01	7.3560-01	1.2700+00	1.5200+00	1.6810+00	1.9480+00	2.3930+00	3.0060+00	3.7590+00	4.6170+00
4.2-01	1.1490-01	6.8660-01	1.2210+00	1.4890+00	1.6440+00	1.8600+00	2.2780+00	2.8440+00	3.5510+00	4.3700+00
4.4-01	1.0141-01	6.3660-01	1.1730+00	1.4580+00	1.6110+00	1.8210+00	2.1780+00	2.6970+00	3.3600+00	4.1390+00
4.5-01	9.5239-02	6.1300-01	1.1490+00	1.4430+00	1.5960+00	1.7940+00	2.1320+00	2.6290+00	3.2700+00	4.0230+00
4.6-01	8.5681-02	5.9100-01	1.1250+00	1.4270+00	1.5810+00	1.7700+00	2.0890+00	2.5640+00	3.1830+00	3.9230+00
4.8-01	7.5480-02	5.4800-01	1.0780+00	1.3950+00	1.5530+00	1.7250+00	2.0110+00	2.4450+00	3.0220+00	3.7230+00
5.0-01	7.0592-02	5.0940-01	1.0330+00	1.3620+00	1.5260+00	1.6950+00	1.9420+00	2.3380+00	2.8740+00	3.5350+00
5.5-01	5.2989-02	4.2300-01	9.2400-01	1.2790+00	1.4630+00	1.6030+00	1.8020+00	2.1150+00	2.5590+00	3.1260+00
6.0-01	4.0225-02	3.5300-01	8.2300-01	1.1550+00	1.4020+00	1.5370+00	1.6920+00	1.9460+00	2.3090+00	2.7900+00
6.5-01	3.1057-02	2.9500-01	7.3200-01	1.1120+00	1.3390+00	1.4790+00	1.6160+00	1.8160+00	2.1120+00	2.5170+00
7.0-01	2.4285-02	2.4800-01	6.5000-01	1.0300+00	1.2760+00	1.4260+00	1.5510+00	1.7140+00	1.9560+00	2.2960+00
8.0-01	1.8535-02	1.7760-01	5.1200-01	8.7630-01	1.1470+00	1.3220+00	1.4450+00	1.5680+00	1.7350+00	1.9710+00
9.0-01	1.0091-02	1.2960-01	4.0400-01	7.4000-01	1.0200+00	1.2190+00	1.3530+00	1.4630+00	1.5880+00	1.7570+00
1.0+00	6.8811-03	9.5000-02	3.2000-01	6.2200-01	9.0000-01	1.1140+00	1.2650+00	1.3770+00	1.4820+00	1.6090+00
1.1+00	4.8382-03	7.2000-02	2.5500-01	5.2200-01	7.9000-01	1.0120+00	1.1770+00	1.22980+00	1.3980+00	1.5020+00
1.2+00	3.4933-03	5.5000-02	2.0500-01	4.3900-01	6.9000-01	9.1400+00	1.0700+00	1.12210+00	1.2210+00	1.3240+00
1.3+00	2.5812-03	4.2600-02	1.6500-01	3.6900-01	6.0200-01	8.2200-01	1.0040+00	1.1450+00	1.2540+00	1.3460+00
1.4+00	1.9461-03	3.3000-02	1.3400-01	3.1100-01	5.2400-01	7.3600-01	9.2100-01	1.0700+00	1.1860+00	1.2800+00

$X \cdot \frac{\sin(\theta/\lambda)}{\lambda}$	1 H	2 HE	3 LI	4 BE	5 B	6 C	7 N	8 O	9 F	10 NE
1.5+00	1.4937-03	2.6000-02	1.1000-01	2.6300-01	4.5700-01	6.5900-01	8.4300-01	9.9700-01	1.1200+00	1.2180+00
1.6+00	1.1648-03	2.1000-02	9.1000-02	2.2300-01	3.9800-01	5.8800-01	7.6900-01	9.2600-01	1.0550+00	1.1580+00
1.7+00	9.2111-04	1.7000-02	7.5000-02	1.9000-01	3.4700-01	5.2500-01	7.0000-01	8.5700-01	9.9000+00	1.0990+00
1.8+00	7.3768-04	1.4000-02	6.3000-02	1.6300-01	3.0400-01	4.6800-01	6.3600-01	7.9200-01	9.2800+00	1.0410+00
1.9+00	5.9754-04	1.1750-02	5.3000-02	1.3900-01	2.6600-01	4.1800-01	5.7800-01	7.3100-01	8.6800+00	9.8400-01
2.0+00	4.8503-04	9.5000-03	4.4000-02	1.2000-01	2.3300-01	3.7300-01	5.2500-01	6.7400-01	8.1000+00	9.2900-01
2.2+00	3.3659-04	6.9614-03	3.2600-02	8.7100-02	1.8080-01	2.9860-01	4.3220-01	5.6990-01	7.0220+00	8.2250-01
2.4+00	2.3505-04	5.0266-03	2.4200-02	6.8700-02	1.4150-01	2.4020-01	3.5670-01	4.8180-01	6.0700+00	7.2540-01
2.5+00	2.0353-04	4.3092-03	2.1005-02	6.0292-02	1.2578-01	2.1587-01	3.2431-01	4.4295-01	5.6388+00	6.8020-01
2.6+00	1.7436-04	3.7144-03	1.8300-02	5.3100-02	1.1200-01	1.9430-01	2.9510-01	4.0730-01	5.2360+00	6.3730-01
2.8+00	1.3010-04	2.6008-03	1.4000-02	4.1600-02	8.9400-02	1.5820-01	2.4510-01	3.4480-01	4.5120-01	5.5860-01
3.0+00	9.5016-05	2.1499-03	1.0900-02	3.2900-02	7.2000-02	1.2970-01	2.0440-01	2.9250-01	3.8910-01	4.8910-01
3.3+00	6.7863-05	1.4884-03	7.6730-03	2.3590-02	5.2900-02	9.7400-02	1.5710-01	2.2970-01	3.1220-01	4.0080-01
3.5+00	5.3730-05	1.1848-03	6.1753-03	1.9187-02	4.3462-02	8.0994-02	1.3247-01	1.9630-01	2.7029-01	3.5122-01
3.6+00	4.8042-05	1.0619-03	5.5630-03	1.7370-02	3.9520-02	7.4060-02	1.2190-01	1.8170-01	2.5170-01	3.2890-01
3.9+00	3.4952-05	7.7730-04	4.1210-03	1.3040-02	3.0100-02	5.7290-02	9.5850-02	1.4490-01	2.0390-01	2.7070-01
4.0+00	3.1604-05	7.6407-04	3.7453-03	1.1895-02	2.7580-02	5.2740-02	8.8647-02	1.3465-01	1.9033-01	2.5391-01
4.2+00	2.6028-05	5.8167-04	3.1130-03	9.9520-03	2.3250-02	4.4860-02	7.6040-02	1.1660-01	1.6620-01	2.2370-01
4.6+00	1.8119-05	4.6701-04	2.1930-03	7.1100-03	1.6840-02	3.2950-02	5.6680-02	8.8330-02	1.2780-01	1.7470-01
5.0+00	1.2597-05	2.9313-04	1.5950-03	5.2040-03	1.2450-02	2.4650-02	4.2930-02	6.7800-02	9.9440-02	1.3770-01
5.4+00	9.5634-06	2.1637-04	1.1840-03	3.8900-03	9.3880-03	1.8770-02	3.3010-02	5.2710-02	7.8210-02	1.0960-01
5.5+00	8.6886-06	2.0124-04	1.1025-03	3.6280-03	8.7722-03	1.7577-02	3.0979-02	4.9588-02	7.3769-02	1.0365-01
5.8+00	7.1517-06	1.6313-04	8.9650-04	2.9630-03	7.2000-03	1.4510-02	2.5730-02	4.1740-02	6.2140-02	8.7940-02
6.0+00	6.2819-06	1.4265-04	7.8545-04	2.6025-03	6.3427-03	1.2822-02	2.2824-02	3.6943-02	5.5602-02	7.9032-02
6.2+00	5.5115-06	1.2528-04	6.9100-04	2.2950-03	5.6080-03	1.1370-02	2.0310-02	3.3000-02	4.9870-02	7.1180-02
6.6+00	4.2544-06	5.7787-05	5.4090-04	1.8020-03	4.4290-03	9.0310-03	1.6230-02	2.6540-02	4.0390-02	5.8090-02
7.0+00	3.3953-06	7.7431-05	4.2940-04	1.4300-03	3.5420-03	7.2560-03	1.3110-02	2.1560-02	3.3010-02	4.7780-02
7.4+00	2.7197-06	6.2102-05	3.4510-04	1.1580-03	2.8640-03	5.8920-03	1.0690-02	1.7670-02	2.7200-02	3.9590-02
8.0+00	1.9920-06	4.5555-05	2.5380-04	8.5430-04	2.1230-03	4.5890-03	8.0070-03	1.5320-02	2.0650-02	3.0270-02
5.0+00	1.2443-06	2.8518-05	1.5940-04	5.3680-04	1.3460-03	2.8020-03	5.1470-03	8.6330-03	1.3500-02	1.9980-02
1.0+01	8.1675-07	1.8748-05	1.0500-04	3.5620-04	8.9360-04	1.8680-03	3.4510-03	5.8220-03	9.1630-03	1.3660-02
1.1+01	5.8603-07	1.2825-05	7.1960-05	2.4470-04	6.1570-04	1.2920-03	2.3960-03	4.0610-03	6.4230-03	9.6250-03
1.2+01	3.9410-07	9.0667-06	5.0940-05	1.7350-04	4.3770-04	5.2090-04	1.7130-03	2.9140-03	4.6280-03	6.9660-03
1.4+01	2.1280-07	4.5034-06	2.7610-05	9.4290-05	2.3860-04	5.0410-04	9.4220-04	1.6110-03	2.5730-03	3.8970-03
1.6+01	1.2476-07	2.8784-06	1.6230-05	5.5530-05	1.4090-04	2.9840-04	5.5950-04	9.6010-04	1.5390-03	2.3410-03
1.8+01	7.7501-08	1.7991-06	1.0150-05	3.4750-05	8.8410-05	1.8770-04	3.5260-04	6.0670-04	9.7550-04	1.4880-03
2.0+01	5.1116-08	1.1816-06	6.6740-06	2.2890-05	5.8250-05	1.2380-04	2.3310-04	4.0190-04	6.4750-04	9.9030-04
2.2+01	3.4516-08	8.0774-07	4.5660-06	1.5680-05	3.9930-05	8.4980-05	1.6020-04	2.7660-04	4.4630-04	6.8390-04
2.5+01	2.0541-08	4.8458-07	2.7440-06	9.4300-06	2.4050-05	5.1260-05	9.6770-05	1.6740-04	2.7070-04	4.1560-04
2.8+01	1.3309-08	3.0855-07	1.7470-06	6.0090-06	1.5340-05	3.2730-05	6.1880-05	1.0720-04	1.7360-04	2.6700-04
3.1+01	8.4553-09	2.0557-07	1.1650-06	4.0090-06	1.0240-05	2.1880-05	4.1400-05	7.1800-05	1.1640-04	1.7930-04
3.5+01	5.4518-09	1.2667-07	7.1820-07	2.4740-06	6.3280-06	1.3530-05	2.5640-05	4.4510-05	7.2270-05	1.1150-04
4.0+01	3.1559-09	7.4368-08	4.2200-07	1.4550-06	3.7280-06	7.9760-06	1.5130-05	2.6310-05	4.2760-05	6.6050-05
5.0+01	1.9552-09	4.6457-08	2.6410-07	9.1150-07	2.3360-06	5.0050-06	9.5040-06	1.6540-05	2.6920-05	4.1640-05
5.0+01	1.3051-05	3.0552-08	1.7360-07	5.9590-07	1.5390-06	3.0000-06	6.2720-06	1.0930-05	1.7800-05	2.7560-05
7.0+01	3.4078-10	7.9575-05	4.5587-08	1.5758-07	4.0646-07	8.7450-07	1.6677-06	2.9155-06	4.7653-06	7.4028-06
1.0+02	8.1822-11	1.9336-08	1.1080-08	3.8570-08	9.9620-08	2.1520-07	4.1210-07	7.2350-06	1.1870-06	1.8530-06
1.0+03	8.1823-15	2.4094-13	1.5100-12	5.6990-12	1.5850-11	3.6650-11	7.4690-11	1.3890-10	2.4070-10	3.9510-10
1.0+06	8.1823-27	5.2702-23	4.4720-22	2.0540-21	6.5750-21	1.5920-20	3.7590-20	7.5070-20	1.3820-19	2.3910-19
1.0+09	8.1823-39	5.2592-32	4.4760-31	2.0620-30	6.6260-30	1.7130-29	3.8530-29	7.6800-29	1.4220-28	2.4780-28

TABLE I. CONT. RELATIVISTIC HARTREE-FOCK ATOMIC FORM FACTOR,  $F(X, Z)$ 

$X_s$ SIN(THETA/2) /LAMBDA	11 NA	12 MG	13 AL	14 SI	15 P	16 S	17 CL	18 AR	19 K	20 CA
0.0	1.1000+01	1.2000+01	1.3000+01	1.4000+01	1.5000+01	1.6000+01	1.7000+01	1.8000+01	1.9000+01	2.0000+01
1.0-02	1.6580+01	1.1978+01	1.2576+01	1.3976+01	1.4977+01	1.5979+01	1.6980+01	1.7981+01	1.8983+01	1.9985+01
2.0-02	1.6522+01	1.1914+01	1.2503+01	1.3904+01	1.4909+01	1.5915+01	1.6919+01	1.7924+01	1.8928+01	1.9933+01
3.0-02	1.0830+01	1.1811+01	1.2786+01	1.3787+01	1.4798+01	1.5809+01	1.6820+01	1.7830+01	1.8841+01	1.9852+01
4.0-02	1.0709+01	1.1674+01	1.2629+01	1.3628+01	1.4646+01	1.5665+01	1.6683+01	1.7700+01	1.8718+01	1.9736+01
5.0-02	1.0568+01	1.1507+01	1.2439+01	1.3438+01	1.4458+01	1.5488+01	1.6511+01	1.7536+01	1.8561+01	1.9587+01
6.0-02	1.0412+01	1.1319+01	1.2222+01	1.3205+01	1.4237+01	1.5271+01	1.6306+01	1.7340+01	1.8375+01	1.9410+01
7.0-02	1.0249+01	1.1116+01	1.1987+01	1.2961+01	1.3990+01	1.5030+01	1.6073+01	1.7116+01	1.8160+01	1.9204+01
8.0-02	1.0084+01	1.0903+01	1.1739+01	1.2693+01	1.3721+01	1.4764+01	1.5814+01	1.6865+01	1.7917+01	1.8970+01
9.0-02	9.9200+00	1.0687+01	1.1485+01	1.2417+01	1.3435+01	1.4478+01	1.5533+01	1.6591+01	1.7652+01	1.8715+01
1.0-01	5.7600+00	1.0472+01	1.1230+01	1.2134+01	1.3138+01	1.4177+01	1.5234+01	1.6298+01	1.7373+01	1.8457+01
1.1-01	9.6500+00	1.0262+01	1.0978+01	1.1843+01	1.2834+01	1.3865+01	1.4921+01	1.5989+01	1.7066+01	1.8153+01
1.2-01	9.4550+00	1.0053+01	1.0733+01	1.1567+01	1.2527+01	1.3546+01	1.4629+01	1.5725+01	1.6833+01	1.7952+01
1.3-01	9.3650+00	9.8640+00	1.0498+01	1.1292+01	1.2223+01	1.3224+01	1.4266+01	1.5331+01	1.6411+01	1.7503+01
1.4-01	9.1660+00	9.6780+00	1.0273+01	1.1025+01	1.1922+01	1.2902+01	1.3932+01	1.4991+01	1.6073+01	1.7167+01
1.5-01	9.0270+00	9.5020+00	1.0059+01	1.0765+01	1.1629+01	1.2583+01	1.3597+01	1.4647+01	1.5723+01	1.6815+01
1.6-01	8.8580+00	9.3340+00	9.8570+00	1.0525+01	1.1345+01	1.2270+01	1.3263+01	1.4301+01	1.5371+01	1.6453+01
1.7-01	8.7510+00	9.1750+00	9.6670+00	1.0293+01	1.1072+01	1.1964+01	1.2934+01	1.3957+01	1.5013+01	1.6091+01
1.8-01	8.6130+00	9.0230+00	9.4870+00	1.0074+01	1.0811+01	1.1668+01	1.2611+01	1.3615+01	1.4638+01	1.5682+01
1.9-01	8.4750+00	8.8760+00	9.3180+00	9.8680+00	1.0563+01	1.1382+01	1.2297+01	1.3279+01	1.4331+01	1.5450+01
2.0-01	8.3350+00	8.7350+00	9.1580+00	9.6730+00	1.0327+01	1.1109+01	1.1991+01	1.2949+01	1.3728+01	1.4304+01
2.2-01	8.0520+00	8.4650+00	8.8620+00	9.3190+00	9.8940+00	1.0598+01	1.1413+01	1.2315+01	1.3130+01	1.3760+01
2.4-01	7.7640+00	8.2050+00	8.5920+00	9.0040+00	9.5100+00	1.0138+01	1.0881+01	1.1721+01	1.2550+01	1.3225+01
2.5-01	7.6180+00	8.0780+00	8.4650+00	8.8590+00	9.3350+00	9.9270+00	1.0633+01	1.1441+01	1.2268+01	1.2941+01
2.6-01	7.4710+00	7.9510+00	8.3410+00	8.7220+00	9.1700+00	9.7270+00	1.0398+01	1.1172+01	1.1994+01	1.2710+01
2.8-01	7.1760+00	7.6980+00	8.1030+00	8.4670+00	8.8690+00	9.3630+00	9.9640+00	1.0671+01	1.1468+01	1.2195+01
3.0-01	6.8810+00	7.4460+00	7.8730+00	8.2310+00	8.6000+00	9.0390+00	9.5760+00	1.0216+01	1.0977+01	1.1745+01
3.2-01	6.5680+00	7.1940+00	7.6480+00	8.0110+00	8.3570+00	8.7520+00	9.2310+00	9.8070+00	1.0521+01	1.1240+01
3.4-01	6.2580+00	6.9430+00	7.4260+00	7.8000+00	8.1340+00	8.4940+00	8.9230+00	9.4410+00	1.0103+01	1.0800+01
3.5-01	6.1560+00	6.8170+00	7.3160+00	7.6980+00	8.0290+00	8.3760+00	8.7820+00	9.2720+00	9.9080+00	1.0590+01
3.6-01	6.0150+00	6.6910+00	7.2050+00	7.5970+00	7.9280+00	8.2620+00	8.6490+00	9.1130+00	9.7220+00	1.0388+01
3.8-01	5.7390+00	6.4420+00	6.9850+00	7.3980+00	7.7330+00	8.0510+00	8.4030+00	8.8200+00	9.3750+00	1.0004+01
4.0-01	5.4710+00	6.1940+00	6.7660+00	7.2020+00	7.5470+00	7.8560+00	8.1810+00	8.5500+00	9.0610+00	9.6500+00
4.2-01	5.2140+00	5.9510+00	6.5480+00	7.0080+00	7.3670+00	7.6730+00	7.9790+00	8.3200+00	8.7780+00	9.3240+00
4.4-01	4.9670+00	5.7120+00	6.3300+00	6.8150+00	7.1900+00	7.5010+00	7.7940+00	8.1100+00	8.5220+00	9.0250+00
4.5-01	4.8480+00	5.5950+00	6.2220+00	6.7190+00	7.1030+00	7.4170+00	7.7060+00	8.0100+00	8.4030+00	8.8850+00
4.6-01	4.7310+00	5.4800+00	6.1150+00	6.6220+00	7.0170+00	7.3350+00	7.6210+00	7.9170+00	8.2900+00	8.7520+00
4.8-01	4.5660+00	5.2530+00	5.9020+00	6.4310+00	6.8450+00	7.1740+00	7.4590+00	7.7390+00	8.0800+00	8.5020+00
5.0-01	4.2930+00	5.0340+00	5.6920+00	6.2400+00	6.6740+00	7.0170+00	7.3050+00	7.5750+00	7.8890+00	8.2750+00
5.5-01	3.8110+00	4.5200+00	5.1860+00	5.7690+00	6.2500+00	6.6330+00	6.9410+00	7.2070+00	7.4740+00	7.7880+00
6.0-01	3.3580+00	4.0550+00	4.7130+00	5.3120+00	5.8290+00	6.2540+00	6.5900+00	6.8750+00	7.1250+00	7.3920+00
6.5-01	3.0480+00	3.6520+00	4.2770+00	4.8780+00	5.4180+00	5.8750+00	6.2540+00	6.5600+00	6.8140+00	7.0570+00
7.0-01	2.7540+00	3.2570+00	3.8830+00	4.4700+00	5.0200+00	5.5050+00	5.9150+00	6.2520+00	6.5230+00	6.7620+00
8.0-01	2.3050+00	2.7290+00	3.2100+00	3.7500+00	4.2840+00	4.7900+00	5.2450+00	5.6300+00	5.9610+00	6.2500+00
9.0-01	1.9570+00	2.3170+00	2.7120+00	3.1640+00	3.6490+00	4.1380+00	4.6070+00	5.0360+00	5.4060+00	5.7170+00
1.0+00	1.7840+00	2.0220+00	2.3300+00	2.7020+00	3.1220+00	3.5700+00	4.0230+00	4.4600+00	4.8590+00	5.2090+00
1.1+00	1.6340+00	1.8120+00	2.0490+00	2.3460+00	2.6980+00	3.0920+00	3.5090+00	3.9300+00	4.3370+00	4.7100+00
1.2+00	1.5240+00	1.6600+00	1.8410+00	2.0760+00	2.3640+00	2.6950+00	3.0700+00	3.4620+00	3.8550+00	4.2330+00
1.3+00	1.4380+00	1.5460+00	1.6870+00	1.8720+00	2.1040+00	2.3840+00	2.7040+00	3.0560+00	3.4230+00	3.7910+00
1.4+00	1.3670+00	1.4550+00	1.5710+00	1.7170+00	1.9030+00	2.1330+00	2.4050+00	2.7130+00	3.0450+00	3.3910+00



$X, \sin(\theta)/\lambda$	11 NA	12 MG	13 AL	14 SI	15 P	16 S	17 CL	18 AR	19 K	20 CA
1.5+00	1.3040+00	1.3870+00	1.4810+00	1.5980+00	1.7470+00	1.9350+00	2.1620+00	2.4270+00	2.7220+00	3.0390+00
1.6+00	1.2470+00	1.3260+00	1.4080+00	1.5050+00	1.6260+00	1.7790+00	1.9670+00	2.1920+00	2.4500+00	2.7330+00
1.7+00	1.1910+00	1.2700+00	1.3530+00	1.4530+00	1.5300+00	1.6550+00	1.8110+00	2.0000+00	2.2100+00	2.4700+00
1.8+00	1.1370+00	1.2190+00	1.2920+00	1.3670+00	1.4530+00	1.5570+00	1.6860+00	1.8440+00	2.0330+00	2.2500+00
1.9+00	1.0840+00	1.1690+00	1.2430+00	1.3130+00	1.3890+00	1.4770+00	1.5850+00	1.7170+00	1.8760+00	2.0630+00
2.0+00	1.0320+00	1.1200+00	1.1950+00	1.2640+00	1.3300+00	1.4110+00	1.5020+00	1.6140+00	1.7480+00	1.9080+00
2.2+00	9.3140-01	1.0260+00	1.1060+00	1.1760+00	1.2400+00	1.3050+00	1.3760+00	1.4580+00	1.5560+00	1.6770+00
2.4+00	8.3620-01	9.3560-01	1.0210+00	1.0950+00	1.1600+00	1.2220+00	1.2810+00	1.3460+00	1.4200+00	1.5110+00
2.5+00	7.9081-01	8.9159-01	9.7931-01	1.0552+00	1.1222+00	1.1822+00	1.2404+00	1.3008+00	1.3672+00	1.4466+00
2.6+00	7.4710-01	8.4860-01	9.3820-01	1.0160+00	1.0850+00	1.1460+00	1.2030+00	1.2600+00	1.3210+00	1.3910+00
2.8+00	6.6520-01	7.6650-01	8.5840-01	9.4030-01	1.0120+00	1.0760+00	1.1340+00	1.1870+00	1.2410+00	1.2990+00
3.0+00	5.9100-01	6.9020-01	7.8270-01	8.6690-01	9.4210-01	1.0090+00	1.0660+00	1.1220+00	1.1740+00	1.2250+00
3.3+00	4.9390-01	5.8770-01	6.7800-01	7.6290-01	8.4090-01	9.1150-01	9.7490-01	1.0320+00	1.0840+00	1.1310+00
3.5+00	4.3795-01	5.2657-01	6.1458-01	6.9843-01	7.7701-01	8.4923-01	9.1489-01	9.7407-01	1.0282+00	1.0749+00
3.6+00	4.1240-01	4.9850-01	5.8480-01	6.6780-01	7.4630-01	8.1900-01	8.8550-01	9.4570-01	1.0010+00	1.0480+00
3.9+00	3.4460-01	4.2330-01	5.0310-01	5.8250-01	6.5930-01	7.3220-01	8.0030-01	8.6310-01	9.2090-01	9.7010-01
4.0+00	3.2475-01	4.0072-01	4.7838-01	5.5623-01	6.3209-01	7.0469-01	7.7253-01	8.3626-01	8.9484-01	9.4476-01
4.2+00	2.8870-01	3.5920-01	4.3250-01	5.0690-01	5.8050-01	6.5200-01	7.2000-01	7.8390-01	8.4380-01	8.9500-01
4.6+00	2.2510-01	2.8940-01	3.5370-01	4.2060-01	4.8860-01	5.5630-01	6.2230-01	6.8580-01	7.4660-01	7.9980-01
5.0+00	1.8290-01	2.3420-01	2.9000-01	3.4930-01	4.1080-01	4.7340-01	5.3590-01	5.9720-01	6.5710-01	7.1080-01
5.4+00	1.4710-01	1.9050-01	2.3860-01	2.7777-01	3.4570-01	4.0270-01	4.6070-01	5.1860-01	5.7630-01	6.2900-01
5.6+00	1.3549-01	1.8105-01	2.2740-01	2.7777-01	3.3117-01	3.8674-01	4.4355-01	5.0049-01	5.5745-01	6.0976-01
5.8+00	1.1530-01	1.5580-01	1.9720-01	2.4260-01	2.9140-01	3.4270-01	3.9580-01	4.4970-01	5.0420-01	5.5500-01
6.0+00	1.0770-01	1.4132-01	1.7960-01	2.2190-01	2.6783-01	3.1637-01	3.6669-01	4.1867-01	4.7143-01	5.2098-01
6.2+00	9.7400-02	1.2840-01	1.6380-01	2.0320-01	2.4630-01	2.9220-01	3.4020-01	3.8980-01	4.4070-01	4.8990-01
6.6+00	8.0100-02	1.0640-01	1.3660-01	1.7100-01	2.0870-01	2.4960-01	2.9290-01	3.3810-01	3.8500-01	4.3030-01
7.0+00	6.6330-02	8.6900-02	1.1480-01	1.4460-01	1.7770-01	2.1380-01	2.5260-01	2.9360-01	3.3660-01	3.7870-01
7.4+00	5.6300-02	7.4380-02	9.6870-02	1.2270-01	1.5180-01	1.8380-01	2.1830-01	2.5540-01	2.9470-01	3.3550-01
8.0+00	4.2590-02	5.7740-02	7.5790-02	9.6820-02	1.2070-01	1.4730-01	1.7650-01	2.0810-01	2.4190-01	2.7610-01
9.0+00	2.8390-02	3.8690-02	5.1580-02	6.6620-02	8.3990-02	1.0370-01	1.2560-01	1.4970-01	1.7610-01	2.0320-01
1.0+01	1.9550-02	2.7400-02	3.6110-02	4.7030-02	5.9810-02	7.4480-02	9.1030-02	1.0950-01	1.3000-01	1.5140-01
1.1+01	1.3660-02	1.9260-02	2.5920-02	3.3990-02	4.3530-02	5.4590-02	6.7210-02	8.1440-02	9.7380-02	1.1430-01
1.2+01	1.0080-02	1.4070-02	1.9030-02	2.5100-02	3.2310-02	4.0760-02	5.0480-02	6.1540-02	7.4040-02	8.7410-02
1.4+01	5.6760-03	7.9800-03	1.0880-02	1.4460-02	1.8770-02	2.3890-02	2.9850-02	3.6720-02	4.4600-02	5.3150-02
1.6+01	3.4260-03	4.8410-03	6.6340-03	8.8660-03	1.1580-02	1.4820-02	1.8640-02	2.3080-02	2.8220-02	3.3870-02
1.8+01	2.1850-03	3.0990-03	4.2630-03	5.7200-03	7.5020-03	9.6460-03	1.2150-02	1.5160-02	1.8630-02	2.2480-02
2.0+01	1.4570-03	2.0720-03	2.8590-03	3.8480-03	5.0630-03	6.5320-03	8.2820-03	1.0340-02	1.2760-02	1.5450-02
2.2+01	1.0090-03	1.4370-03	1.9870-03	2.6810-03	3.5360-03	4.5750-03	5.8160-03	7.2850-03	9.0120-03	1.0950-02
2.5+01	6.1430-04	8.7740-04	1.2170-03	1.6460-03	2.1770-03	2.8250-03	3.6030-03	4.5280-03	5.6210-03	6.8530-03
2.8+01	3.9520-04	5.6560-04	7.8580-04	1.0650-03	1.4120-03	1.8360-03	2.3480-03	2.9580-03	3.6820-03	4.5010-03
3.1+01	2.6580-04	3.8090-04	5.3000-04	7.1960-04	9.5570-04	1.2450-03	1.5950-03	2.0140-03	2.5110-03	3.0770-03
3.5+01	1.6550-04	2.3750-04	3.3110-04	4.5030-04	5.9920-04	7.8210-04	1.0040-03	1.2700-03	1.5870-03	1.9490-03
4.0+01	9.8210-05	1.4920-04	1.9720-04	2.6820-04	3.6300-04	4.6830-04	6.0220-04	7.6350-04	9.5620-04	1.1770-03
4.5+01	6.1590-05	8.9240-05	1.2480-04	1.7020-04	2.2730-04	2.9770-04	3.8340-04	4.8690-04	6.1080-04	7.5290-04
5.0+01	4.1080-05	5.9210-05	8.2880-05	1.1320-04	1.5130-04	1.9850-04	2.5600-04	3.2550-04	4.0890-04	5.0480-04
7.0+01	1.1073-05	1.6018-05	2.2500-05	3.0865-05	4.1393-05	5.4524-05	7.0603-05	9.0139-05	1.1370-04	1.4099-04
1.0+02	2.7820-06	4.0410-06	5.7020-06	7.8510-06	1.0580-05	1.3990-05	1.8150-05	2.3330-05	2.9560-05	3.6800-05
1.0+03	6.2250-10	9.4610-10	1.3940-09	1.9990-09	2.8020-09	3.8480-09	5.1890-09	6.8930-09	9.0350-09	1.1630-08
1.0+06	3.95460-19	6.2560-19	9.5800-19	1.4240-18	2.0650-18	2.8290-18	3.8730-18	5.2760-18	7.5240-18	9.9640-18
1.0+09	4.1230-28	6.5930-28	1.0190-27	1.5300-27	2.2430-27	3.2170-27	4.5300-27	6.2820-27	8.5950-27	1.1550-26

TABLE I. - CCNT. RELATIVISTIC HARTREE-FOCK ATOMIC FORM FACTOR, FIX, Z)

$X_s$ SIN(THETA/2) /LAMBDA	21 SC	22 TI	23 V	24 CR	25 MN	26 FE	27 CD	28 NI	29 CU	30 ZN
0.0	2.1000+01	2.2000+01	2.3000+01	2.4000+01	2.5000+01	2.6000+01	2.7000+01	2.8000+01	2.9000+01	3.0000+01
1.0-02	2.0562+01	2.1964+01	2.2966+01	2.3971+01	2.4969+01	2.5970+01	2.6972+01	2.7973+01	2.8974+01	2.9975+01
2.0-02	2.0288+01	2.1856+01	2.2864+01	2.3885+01	2.4876+01	2.5882+01	2.6892+01	2.7892+01	2.8908+01	2.9900+01
3.0-02	2.0655+01	2.1682+01	2.2658+01	2.3746+01	2.4726+01	2.5735+01	2.6749+01	2.7759+01	2.8794+01	2.9777+01
4.0-02	2.0422+01	2.1451+01	2.2477+01	2.3558+01	2.4523+01	2.5543+01	2.6562+01	2.7579+01	2.8640+01	2.9609+01
5.0-02	2.0131+01	2.1171+01	2.2208+01	2.3329+01	2.4274+01	2.5304+01	2.6331+01	2.7356+01	2.8448+01	2.9401+01
6.0-02	1.9805+01	2.0854+01	2.1902+01	2.3065+01	2.3988+01	2.5026+01	2.6063+01	2.7096+01	2.8223+01	2.9157+01
7.0-02	1.9459+01	2.0511+01	2.1567+01	2.2775+01	2.3671+01	2.4719+01	2.5764+01	2.6806+01	2.7971+01	2.8883+01
8.0-02	1.9051+01	2.0150+01	2.1212+01	2.2459+01	2.3331+01	2.4387+01	2.5440+01	2.6490+01	2.7694+01	2.8583+01
9.0-02	1.8723+01	1.9781+01	2.0846+01	2.2129+01	2.2976+01	2.4038+01	2.5098+01	2.6156+01	2.7397+01	2.8263+01
1.0-01	1.8356+01	1.9410+01	2.0474+01	2.1789+01	2.2611+01	2.3678+01	2.4744+01	2.5807+01	2.7084+01	2.7927+01
1.1-01	1.7595+01	1.9041+01	2.0102+01	2.1441+01	2.2240+01	2.3310+01	2.4380+01	2.5448+01	2.6758+01	2.7579+01
1.2-01	1.7643+01	1.8678+01	1.9733+01	2.1089+01	2.1868+01	2.2939+01	2.4011+01	2.5093+01	2.6422+01	2.7222+01
1.3-01	1.7301+01	1.8322+01	1.9369+01	2.0734+01	2.1497+01	2.2568+01	2.3641+01	2.4714+01	2.6077+01	2.6859+01
1.4-01	1.6568+01	1.7574+01	1.8511+01	2.0378+01	2.1128+01	2.2197+01	2.3270+01	2.4344+01	2.5726+01	2.6492+01
1.5-01	1.6645+01	1.7635+01	1.8681+01	2.0022+01	2.0764+01	2.1829+01	2.2900+01	2.3973+01	2.5370+01	2.6124+01
1.6-01	1.6330+01	1.7304+01	1.8317+01	1.9667+01	2.0404+01	2.1465+01	2.2533+01	2.3604+01	2.5009+01	2.5754+01
1.7-01	1.6023+01	1.6980+01	1.7980+01	1.9312+01	2.0049+01	2.1104+01	2.2168+01	2.3237+01	2.4645+01	2.5385+01
1.8-01	1.5722+01	1.6663+01	1.7649+01	1.8960+01	1.9699+01	2.0748+01	2.1806+01	2.2872+01	2.4278+01	2.5017+01
1.9-01	1.5426+01	1.6351+01	1.7323+01	1.8609+01	1.9354+01	2.0393+01	2.1448+01	2.2510+01	2.3910+01	2.4649+01
2.0-01	1.5135+01	1.6044+01	1.7003+01	1.8260+01	1.9012+01	2.0046+01	2.1093+01	2.2150+01	2.3540+01	2.4283+01
2.2-01	1.4564+01	1.5444+01	1.6376+01	1.7570+01	1.8342+01	1.9359+01	2.0393+01	2.1438+01	2.2798+01	2.3556+01
2.4-01	1.4006+01	1.4859+01	1.5765+01	1.6893+01	1.7686+01	1.8685+01	1.9704+01	2.0737+01	2.2057+01	2.2836+01
2.5-01	1.3732+01	1.4572+01	1.5465+01	1.6561+01	1.7364+01	1.8354+01	1.9364+01	2.0390+01	2.1687+01	2.2478+01
2.6-01	1.3462+01	1.4289+01	1.5169+01	1.6232+01	1.7045+01	1.8023+01	1.9027+01	2.0046+01	2.1319+01	2.2122+01
2.8-01	1.2533+01	1.3735+01	1.4589+01	1.5588+01	1.6417+01	1.7379+01	1.8361+01	1.9365+01	2.0589+01	2.1417+01
3.0-01	1.2423+01	1.3198+01	1.4026+01	1.4565+01	1.5806+01	1.6744+01	1.7709+01	1.8696+01	1.9869+01	2.0720+01
3.2-01	1.1534+01	1.2682+01	1.3482+01	1.4365+01	1.5211+01	1.6127+01	1.7072+01	1.8040+01	1.9162+01	2.0034+01
3.4-01	1.1467+01	1.2187+01	1.2959+01	1.3790+01	1.4634+01	1.5527+01	1.6450+01	1.7398+01	1.8472+01	1.9359+01
3.5-01	1.1244+01	1.1949+01	1.2705+01	1.3513+01	1.4353+01	1.5233+01	1.6145+01	1.7084+01	1.8133+01	1.9027+01
3.6-01	1.1027+01	1.1717+01	1.2458+01	1.3242+01	1.4078+01	1.4945+01	1.5845+01	1.6773+01	1.7799+01	1.8698+01
3.8-01	1.0613+01	1.1271+01	1.1982+01	1.2720+01	1.3543+01	1.4384+01	1.5260+01	1.6165+01	1.7145+01	1.8051+01
4.0-01	1.0226+01	1.0852+01	1.1530+01	1.2227+01	1.3031+01	1.3845+01	1.4695+01	1.5576+01	1.6514+01	1.7421+01
4.2-01	9.8660+00	1.0459+01	1.1105+01	1.1762+01	1.2543+01	1.3328+01	1.4151+01	1.5008+01	1.5904+01	1.6809+01
4.4-01	9.5340+00	1.0093+01	1.0705+01	1.1326+01	1.2080+01	1.2835+01	1.3630+01	1.4461+01	1.5318+01	1.6216+01
4.5-01	9.3770+00	9.9200+00	1.0515+01	1.1118+01	1.1858+01	1.2598+01	1.3379+01	1.4196+01	1.5034+01	1.5926+01
4.6-01	9.2270+00	9.7530+00	1.0332+01	1.0917+01	1.1642+01	1.2367+01	1.3133+01	1.3937+01	1.4757+01	1.5642+01
4.8-01	8.9460+00	9.4380+00	9.9840+00	1.0536+01	1.1228+01	1.1922+01	1.2659+01	1.3435+01	1.4219+01	1.5090+01
5.0-01	8.6670+00	9.1480+00	9.6600+00	1.0180+01	1.0840+01	1.1502+01	1.2209+01	1.2956+01	1.3707+01	1.4559+01
5.5-01	8.1320+00	8.5180+00	8.9520+00	8.4000+00	9.0730+00	1.0557+01	1.1188+01	1.1862+01	1.2533+01	1.3328+01
6.0-01	7.6820+00	8.0070+00	8.3730+00	8.7560+00	9.2450+00	9.7530+00	1.0309+01	1.0909+01	1.1507+01	1.2235+01
6.5-01	7.3120+00	7.5880+00	7.8980+00	8.2270+00	8.6390+00	9.0770+00	9.5610+00	1.0261+01	1.0621+01	1.1276+01
7.0-01	6.9560+00	7.2400+00	7.5060+00	7.7910+00	8.1370+00	8.5120+00	8.9300+00	9.3920+00	9.8610+00	1.0442+01
8.0-01	6.4600+00	6.6760+00	6.8920+00	7.1180+00	7.3660+00	7.6450+00	7.9550+00	8.3010+00	8.6630+00	9.1030+00
9.0-01	5.9750+00	6.2500+00	6.4060+00	6.6030+00	6.8080+00	7.0230+00	7.2590+00	7.5190+00	7.7990+00	8.1320+00
1.0+00	5.5010+00	5.7520+00	5.9720+00	6.1720+00	6.3590+00	6.5450+00	6.7380+00	6.9400+00	7.1660+00	7.4170+00
1.1+00	5.0300+00	5.3100+00	5.5530+00	5.7600+00	5.9620+00	6.1430+00	6.3180+00	6.4950+00	6.6810+00	6.8790+00
1.2+00	4.5700+00	4.8720+00	5.1390+00	5.3720+00	5.5950+00	5.7750+00	5.9500+00	6.1180+00	6.2850+00	6.4630+00
1.3+00	4.1310+00	4.4450+00	4.7300+00	4.9820+00	5.2150+00	5.4200+00	5.6050+00	5.7760+00	5.9390+00	6.0960+00
1.4+00	3.7220+00	4.0380+00	4.3330+00	4.5970+00	4.8490+00	5.0700+00	5.2700+00	5.4510+00	5.6170+00	5.7750+00

FORM FACTORS AND PHOTON SCATTERING CROSS SECTIONS

X, SIN(THETA/2) /LAMBDA	21 SC	22 TI	23 V	24 CR	25 MN	26 FE	27 CO	28 NI	29 CU	30 ZN
1.5+00	3.3520+00	3.6600+00	3.9560+00	4.2260+00	4.4900+00	4.7250+00	4.9390+00	5.1330+00	5.3080+00	5.4730+00
1.6+00	3.0230+00	3.3160+00	3.6040+00	3.8740+00	4.1440+00	4.3880+00	4.6130+00	4.8190+00	5.0050+00	5.1800+00
1.7+00	2.7330+00	3.0060+00	3.2810+00	3.5450+00	3.8140+00	4.0620+00	4.2950+00	4.5110+00	4.7050+00	4.8920+00
1.8+00	2.4850+00	2.7340+00	2.9920+00	3.2440+00	3.5060+00	3.7530+00	3.9890+00	4.2110+00	4.4130+00	4.6100+00
1.9+00	2.2710+00	2.4960+00	2.7300+00	2.9710+00	3.2210+00	3.4630+00	3.6970+00	3.9220+00	4.1280+00	4.3320+00
2.0+00	2.0500+00	2.2900+00	2.5060+00	2.7270+00	2.9630+00	3.1950+00	3.4240+00	3.6470+00	3.8550+00	4.0630+00
2.2+00	1.8100+00	1.9650+00	2.1376+00	2.3111+00	2.5223+00	2.7280+00	2.9370+00	3.1474+00	3.3498+00	3.5565+00
2.4+00	1.6105+00	1.7524+00	1.8641+00	2.0120+00	2.1777+00	2.3531+00	2.5360+00	2.7253+00	2.9130+00	3.1085+00
2.5+00	1.5330+00	1.6370+00	1.7560+00	1.8880+00	2.0370+00	2.1970+00	2.3660+00	2.5430+00	2.7210+00	2.9080+00
2.6+00	1.4672+00	1.5586+00	1.6636+00	1.7813+00	1.9144+00	2.0595+00	2.2144+00	2.3785+00	2.5459+00	2.7231+00
2.8+00	1.3614+00	1.4334+00	1.5157+00	1.6092+00	1.7147+00	1.8324+00	1.9607+00	2.0991+00	2.2441+00	2.3998+00
3.0+00	1.2790+00	1.3380+00	1.4040+00	1.4790+00	1.5630+00	1.6580+00	1.7630+00	1.8780+00	2.0010+00	2.1350+00
3.3+00	1.1811+00	1.2259+00	1.2810+00	1.3375+00	1.3997+00	1.4695+00	1.5469+00	1.6327+00	1.7264+00	1.8305+00
3.5+00	1.1250+00	1.1710+00	1.2170+00	1.2650+00	1.3190+00	1.3770+00	1.4410+00	1.5120+00	1.5900+00	1.6770+00
3.6+00	1.0584+00	1.1039+00	1.1484+00	1.1949+00	1.2434+00	1.2939+00	1.3466+00	1.4016+00	1.4592+00	1.5123+00
3.9+00	1.0225+00	1.0680+00	1.1109+00	1.1534+00	1.1966+00	1.2406+00	1.2881+00	1.3394+00	1.3952+00	1.4450+00
4.0+00	9.9800-01	1.0440+00	1.0870+00	1.1290+00	1.1710+00	1.2130+00	1.2580+00	1.3060+00	1.3580+00	1.4140+00
4.2+00	9.5001-01	9.9713-01	1.0408+00	1.0826+00	1.1233+00	1.1627+00	1.2042+00	1.2472+00	1.2933+00	1.3417+00
4.6+00	8.5758-01	9.0708-01	9.5289-01	9.9603-01	1.0367+00	1.0746+00	1.1131+00	1.1507+00	1.1897+00	1.2290+00
5.0+00	7.7000-01	8.2100-01	8.6900-01	9.1400-01	9.5600-01	9.9500-01	1.0330+00	1.0690+00	1.1050+00	1.1400+00
5.4+00	6.8785-01	7.3518-01	7.8257-01	8.3486-01	8.7827-01	9.1914-01	9.5767-01	9.9405-01	1.0294+00	1.0631+00
5.5+00	6.6831-01	7.1954-01	7.6914-01	8.1565-01	8.5938-01	9.0075-01	9.3950-01	9.7619-01	1.0117+00	1.0453+00
5.8+00	6.1221-01	6.6284-01	7.1282-01	7.5973-01	8.0429-01	8.4725-01	8.8672-01	9.2487-01	9.6089-01	9.9513-01
6.0+00	5.7700-01	6.2700-01	6.7700-01	7.2400-01	7.6900-01	8.1300-01	8.5300-01	8.9200-01	9.2900-01	9.6400-01
6.2+00	5.4047-01	5.9300-01	6.4078-01	6.8540-01	7.3041-01	7.7490-01	8.1687-01	8.5619-01	8.9340-01	9.2910-01
6.6+00	4.7913-01	5.2930-01	5.7572-01	6.1970-01	6.6439-01	7.0890-01	7.5132-01	7.9142-01	8.2960-01	8.6632-01
7.0+00	4.2439-01	4.7180-01	5.1637-01	5.5920-01	6.0330-01	6.4700-01	6.8930-01	7.2966-01	7.6840-01	8.0589-01
7.4+00	3.7594-01	4.2040-01	4.6274-01	5.0390-01	5.4635-01	5.8930-01	6.3100-01	6.7115-01	7.1000-01	7.4787-01
8.0+00	3.1382-01	3.5370-01	3.9234-01	4.3050-01	4.7025-01	5.1090-01	5.5092-01	5.9000-01	6.2830-01	6.6605-01
9.0+00	2.3349-01	2.6610-01	2.9850-01	3.3120-01	3.6574-01	4.0160-01	4.3759-01	4.7343-01	5.0920-01	5.4503-01
1.0+01	1.7556-01	2.0190-01	2.2855-01	2.5590-01	2.8514-01	3.1590-01	3.4727-01	3.7902-01	4.1120-01	4.4389-01
1.1+01	1.3354-01	1.5470-01	1.7646-01	1.9810-01	2.2355-01	2.4950-01	2.7633-01	3.0385-01	3.3210-01	3.6115-01
1.2+01	1.0275-01	1.1980-01	1.3754-01	1.5620-01	1.7651-01	1.9830-01	2.2103-01	2.4458-01	2.6900-01	2.9438-01
1.4+01	6.3091-02	7.4300-02	8.6145-02	9.8800-02	1.1278-01	1.2800-01	1.4415-01	1.6117-01	1.7910-01	1.9800-01
1.6+01	4.0489-02	4.8020-02	5.6082-02	6.4800-02	7.4522-02	8.5220-02	9.6704-02	1.0895-01	1.2200-01	1.3592-01
1.8+01	2.7015-02	3.2210-02	3.7828-02	4.3960-02	5.0848-02	5.8480-02	6.6750-02	7.5648-02	8.5220-02	9.5520-02
2.0+01	1.6644-02	2.0330-02	2.5335-02	3.0730-02	3.6700-02	4.3250-02	5.0400-02	5.8262-02	6.6970-02	7.6465-02
2.2+01	1.3253-02	1.5922-02	1.8841-02	2.2070-02	2.5734-02	2.9840-02	3.4343-02	3.9251-02	4.4600-02	5.0434-02
2.5+01	8.3255-03	1.0040-02	1.1930-02	1.4030-02	1.6427-02	1.9130-02	2.2114-02	2.5389-02	2.8980-02	3.2918-02
2.8+01	5.4843-03	6.6340-03	7.9055-03	9.3250-03	1.0958-02	1.2800-02	1.4845-02	1.7097-02	1.9580-02	2.2320-02
3.1+01	3.7577-03	4.5550-03	5.4406-03	6.4330-03	7.5742-03	8.8720-03	1.0318-02	1.1919-02	1.3690-02	1.5648-02
3.5+01	2.3857-03	2.8596-03	3.4713-03	4.1150-03	4.8580-03	5.7060-03	6.6538-03	7.7070-03	8.8770-03	1.0177-02
4.0+01	1.4437-03	1.7580-03	2.1102-03	2.5060-03	2.9682-03	3.4950-03	4.0864-03	4.7465-03	5.4830-03	6.3045-03
4.5+01	9.2520-04	1.1290-03	1.3579-03	1.6170-03	1.9173-03	2.2620-03	2.6503-03	3.0852-03	3.5720-03	4.1165-03
5.0+01	6.2128-04	7.5930-04	9.1473-04	1.0910-03	1.2957-03	1.5310-03	1.7967-03	2.0951-03	2.4300-03	2.8056-03
7.0+01	1.7429-04	2.1338-04	2.5887-04	3.1015-04	3.7018-04	4.3952-04	5.1835-04	6.0741-04	7.0799-04	8.2154-04
1.0+02	4.5693-05	5.6350-05	6.8486-05	8.2420-05	9.8018-05	1.1790-04	1.3970-04	1.6446-04	1.9260-04	2.2458-04
1.0+03	1.4512-02	1.8570-02	2.3771-02	2.9480-02	3.6398-02	4.4700-02	5.4492-02	6.5974-02	7.9420-02	9.5154-02
1.0+06	1.3140-17	1.7190-17	2.2152-17	2.8250-17	3.6398-08	4.4700-08	5.4492-08	6.5974-08	7.9420-08	9.5154-08
1.0+09	1.5466-26	2.0560-26	2.6940-26	3.4960-26	4.5202-26	5.8190-26	7.4445-26	9.4698-26	1.1990-25	1.5124-25

TABLE I.. CONT. RELATIVISTIC HARTREE-FOCK ATOMIC FORM FACTOR, F(X,Z)

$\frac{X}{\lambda}$	31 GA	32 GE	33 AS	34 SE	35 BR	36 KR	37 RB	38 SR	39 Y	40 ZR
0.0	3.1000+01	3.2000+01	3.3000+01	3.4000+01	3.5000+01	3.6000+01	3.7000+01	3.8000+01	3.9000+01	4.0000+01
1.0-02	3.0571+01	3.1570+01	3.2570+01	3.3570+01	3.4571+01	3.5572+01	3.6572+01	3.7574+01	3.8574+01	3.9574+01
2.0-02	3.0283+01	3.1278+01	3.2273+01	3.3268+01	3.4263+01	3.5258+01	3.6253+01	3.7248+01	3.8243+01	3.9238+01
3.0-02	3.0174+01	3.1169+01	3.2164+01	3.3159+01	3.4154+01	3.5149+01	3.6144+01	3.7139+01	3.8134+01	3.9129+01
4.0-02	3.0130+01	3.1125+01	3.2120+01	3.3115+01	3.4110+01	3.5105+01	3.6100+01	3.7095+01	3.8090+01	3.9085+01
5.0-02	3.0086+01	3.1081+01	3.2076+01	3.3071+01	3.4066+01	3.5061+01	3.6056+01	3.7051+01	3.8046+01	3.9041+01
6.0-02	3.0042+01	3.0984+01	3.1926+01	3.2868+01	3.3810+01	3.4752+01	3.5694+01	3.6636+01	3.7578+01	3.8520+01
7.0-02	2.9724+01	3.0657+01	3.1590+01	3.2523+01	3.3456+01	3.4389+01	3.5322+01	3.6255+01	3.7188+01	3.8121+01
8.0-02	2.9391+01	3.0302+01	3.1235+01	3.2168+01	3.3101+01	3.4034+01	3.4967+01	3.5900+01	3.6833+01	3.7766+01
9.0-02	2.9040+01	2.9926+01	3.0884+01	3.1872+01	3.2880+01	3.3899+01	3.4936+01	3.5973+01	3.6981+01	3.7990+01
1.0-01	2.6675+01	2.9534+01	3.0473+01	3.1449+01	3.2450+01	3.3467+01	3.4507+01	3.5558+01	3.6611+01	3.7676+01
1.1-01	2.8302+01	2.9133+01	3.0049+01	3.1009+01	3.2000+01	3.3011+01	3.4043+01	3.5096+01	3.6161+01	3.7238+01
1.2-01	2.7924+01	2.8725+01	2.9616+01	3.0557+01	3.1535+01	3.2537+01	3.3560+01	3.4604+01	3.5659+01	3.6726+01
1.3-01	2.7543+01	2.8316+01	2.9179+01	3.0099+01	3.1050+01	3.2051+01	3.3083+01	3.4136+01	3.5201+01	3.6278+01
1.4-01	2.7162+01	2.7908+01	2.8742+01	2.9637+01	3.0578+01	3.1555+01	3.2567+01	3.3604+01	3.4657+01	3.5726+01
1.5-01	2.6783+01	2.7504+01	2.8307+01	2.9175+01	3.0095+01	3.1055+01	3.2047+01	3.3061+01	3.4088+01	3.5129+01
1.6-01	2.6406+01	2.7104+01	2.7877+01	2.8718+01	2.9613+01	3.0553+01	3.1520+01	3.2513+01	3.3523+01	3.4538+01
1.7-01	2.6033+01	2.6709+01	2.7454+01	2.8266+01	2.9136+01	3.0053+01	3.0997+01	3.1970+01	3.2963+01	3.3966+01
1.8-01	2.5663+01	2.6322+01	2.7039+01	2.7822+01	2.8664+01	2.9558+01	3.0493+01	3.1466+01	3.2457+01	3.3456+01
1.9-01	2.5297+01	2.5941+01	2.6633+01	2.7387+01	2.8202+01	2.9070+01	2.9983+01	3.0931+01	3.1915+01	3.2926+01
2.0-01	2.4938+01	2.5567+01	2.6235+01	2.6962+01	2.7749+01	2.8590+01	2.9368+01	2.9988+01	3.0631+01	3.1363+01
2.2-01	2.4221+01	2.4839+01	2.5469+01	2.6145+01	2.6876+01	2.7663+01	2.8459+01	2.9128+01	2.9758+01	3.0454+01
2.4-01	2.3520+01	2.4135+01	2.4739+01	2.5372+01	2.6052+01	2.6784+01	2.7576+01	2.8280+01	2.8904+01	2.9572+01
2.5-01	2.3174+01	2.3751+01	2.4386+01	2.5011+01	2.5658+01	2.6364+01	2.7148+01	2.7863+01	2.8485+01	2.9141+01
2.6-01	2.2830+01	2.3452+01	2.4041+01	2.4641+01	2.5276+01	2.5957+01	2.6729+01	2.7482+01	2.8071+01	2.8716+01
2.8-01	2.2151+01	2.2787+01	2.3370+01	2.3947+01	2.4545+01	2.5181+01	2.5922+01	2.6649+01	2.7263+01	2.7859+01
3.0-01	2.1481+01	2.2136+01	2.2724+01	2.3288+01	2.3857+01	2.4453+01	2.5158+01	2.5875+01	2.6483+01	2.7092+01
3.2-01	2.0820+01	2.1498+01	2.2097+01	2.2656+01	2.3206+01	2.3771+01	2.4437+01	2.5135+01	2.5734+01	2.6377+01
3.4-01	2.0169+01	2.0870+01	2.1486+01	2.2048+01	2.2587+01	2.3128+01	2.3758+01	2.4430+01	2.5018+01	2.5596+01
3.5-01	1.9847+01	2.0560+01	2.1185+01	2.1751+01	2.2288+01	2.2820+01	2.3432+01	2.4050+01	2.4673+01	2.5243+01
3.6-01	1.9527+01	2.0253+01	2.0888+01	2.1459+01	2.1995+01	2.2520+01	2.3116+01	2.3760+01	2.4336+01	2.4899+01
3.8-01	1.8897+01	1.9645+01	2.0301+01	2.0887+01	2.1425+01	2.1941+01	2.2510+01	2.3125+01	2.3687+01	2.4236+01
4.0-01	1.8278+01	1.9047+01	1.9725+01	2.0328+01	2.0874+01	2.1388+01	2.1944+01	2.2522+01	2.3071+01	2.3606+01
4.2-01	1.7673+01	1.8459+01	1.9159+01	1.9780+01	2.0338+01	2.0855+01	2.1386+01	2.1950+01	2.2485+01	2.3008+01
4.4-01	1.7083+01	1.7882+01	1.8602+01	1.9242+01	1.9816+01	2.0339+01	2.0860+01	2.1404+01	2.1928+01	2.2439+01
4.5-01	1.6794+01	1.7558+01	1.8326+01	1.8977+01	1.9558+01	2.0087+01	2.0650+01	2.1141+01	2.1660+01	2.2166+01
4.6-01	1.6508+01	1.7317+01	1.8054+01	1.8713+01	1.9304+01	1.9838+01	2.0354+01	2.0883+01	2.1398+01	2.1899+01
4.8-01	1.5950+01	1.6765+01	1.7516+01	1.8193+01	1.8801+01	1.9349+01	1.9866+01	2.0383+01	2.0890+01	2.1384+01
5.0-01	1.5410+01	1.6227+01	1.6989+01	1.7682+01	1.8307+01	1.8870+01	1.9391+01	1.9920+01	2.0404+01	2.0852+01
5.5-01	1.4142+01	1.4947+01	1.5721+01	1.6444+01	1.7109+01	1.7709+01	1.8252+01	1.8764+01	1.9263+01	1.9745+01
6.0-01	1.2596+01	1.3770+01	1.4535+01	1.5269+01	1.5958+01	1.6594+01	1.7167+01	1.7696+01	1.8203+01	1.8693+01
6.5-01	1.1974+01	1.2702+01	1.3440+01	1.4166+01	1.4855+01	1.5524+01	1.6125+01	1.6678+01	1.7204+01	1.7706+01
7.0-01	1.1073+01	1.1745+01	1.2442+01	1.3145+01	1.3837+01	1.4504+01	1.5126+01	1.5702+01	1.6246+01	1.6767+01
8.0-01	9.6040+00	1.0151+01	1.0741+01	1.1362+01	1.2001+01	1.2645+01	1.3272+01	1.3872+01	1.4433+01	1.4966+01
9.0-01	8.5100+00	8.9370+00	9.4110+00	9.9380+00	1.0480+01	1.1057+01	1.1645+01	1.2230+01	1.2798+01	1.3361+01
1.0+00	7.7020+00	8.0280+00	8.3560+00	8.6900+00	9.0200+00	9.7520+00	1.0270+01	1.0806+01	1.1339+01	1.1893+01
1.1+00	7.0590+00	7.3480+00	7.6310+00	7.9520+00	8.3120+00	8.7110+00	9.1470+00	9.6120+00	1.0088+01	1.0588+01
1.2+00	6.6330+00	6.8300+00	7.0500+00	7.2950+00	7.5800+00	7.8980+00	8.2520+00	8.6400+00	9.0600+00	9.4650+00
1.3+00	6.240+00	6.4190+00	6.5970+00	6.7950+00	7.0160+00	7.2660+00	7.5480+00	7.8630+00	8.2000+00	8.5740+00
1.4+00	5.9260+00	6.0760+00	6.2310+00	6.3950+00	6.5740+00	6.7730+00	6.9960+00	7.2490+00	7.5230+00	7.8330+00

FORM FACTORS AND PHOTON SCATTERING CROSS SECTIONS

X. SIN(THETA/2) /LAMBDA	31 GA	32 GE	33 AS	34 SE	35 BR	36 KR	37 RB	38 SR	39 Y	40 ZR
1.5+00	5.7740+00	5.9170+00	5.0630+00	6.2150+00	6.3800+00	6.5620+00	6.7640+00	6.9850+00	7.2380+00	
1.6+00	5.4930+00	5.6360+00	5.7150+00	5.9130+00	6.0760+00	6.2100+00	6.3760+00	6.5540+00	6.7600+00	
1.7+00	5.2240+00	5.3720+00	5.5110+00	5.6450+00	5.7750+00	5.9130+00	6.0550+00	6.2050+00	6.3750+00	
1.8+00	4.9610+00	5.1170+00	5.2620+00	5.3980+00	5.5280+00	5.6560+00	5.7850+00	5.9140+00	6.0590+00	
1.9+00	4.7020+00	4.8670+00	5.0200+00	5.1620+00	5.2950+00	5.4200+00	5.5400+00	5.6620+00	5.7900+00	
2.0+00	4.4470+00	4.6210+00	4.7820+00	4.9320+00	5.0710+00	5.2000+00	5.3230+00	5.4400+00	5.5580+00	
2.2+00	3.9535+00	4.1359+00	4.3152+00	4.4857+00	4.6353+00	4.7700+00	4.9096+00	5.0324+00	5.1480+00	
2.4+00	3.3037+00	3.4877+00	3.6875+00	3.8700+00	4.0218+00	4.1684+00	4.3144+00	4.4695+00	4.6144+00	
2.5+00	3.0570+00	3.2470+00	3.4450+00	3.6380+00	3.8360+00	4.0300+00	4.2200+00	4.4150+00	4.5924+00	
2.6+00	2.9042+00	3.0885+00	3.2727+00	3.4443+00	3.6326+00	3.8056+00	3.9706+00	4.1275+00	4.2745+00	
2.8+00	2.5622+00	2.7314+00	2.9034+00	3.0722+00	3.2511+00	3.4228+00	3.5910+00	3.7533+00	3.9081+00	
3.0+00	2.2770+00	2.4280+00	2.5840+00	2.7450+00	2.9090+00	3.0740+00	3.2390+00	3.4010+00	3.5582+00	
3.3+00	1.9428+00	2.0649+00	2.1941+00	2.3311+00	2.4738+00	2.6219+00	2.7728+00	2.9253+00	3.0772+00	
3.5+00	1.7720+00	1.8750+00	1.9880+00	2.1080+00	2.2350+00	2.3690+00	2.5070+00	2.6490+00	2.7928+00	
3.6+00	1.6556+00	1.7552+00	1.8591+00	2.0107+00	2.1298+00	2.2563+00	2.3874+00	2.5234+00	2.6620+00	
3.9+00	1.5241+00	1.5880+00	1.6802+00	1.7889+00	1.8656+00	1.9597+00	2.0796+00	2.2173+00	2.3416+00	
4.0+00	1.4770+00	1.5450+00	1.6210+00	1.7030+00	1.7930+00	1.8900+00	2.0300+00	2.1030+00	2.2364+00	
4.2+00	1.3961+00	1.4544+00	1.5194+00	1.5856+00	1.6674+00	1.7512+00	1.8412+00	1.9382+00	2.0406+00	
4.6+00	1.2715+00	1.3163+00	1.3646+00	1.4171+00	1.4754+00	1.5375+00	1.6054+00	1.6798+00	1.7592+00	
5.0+00	1.1760+00	1.2130+00	1.2510+00	1.2920+00	1.3370+00	1.3840+00	1.4360+00	1.4930+00	1.5544+00	
5.4+00	1.0565+00	1.1296+00	1.1623+00	1.1969+00	1.2337+00	1.2715+00	1.3129+00	1.3577+00	1.4060+00	
5.8+00	1.0785+00	1.1111+00	1.1431+00	1.1766+00	1.2121+00	1.2482+00	1.2876+00	1.3300+00	1.3756+00	
6.0+00	9.9800-01	1.0604+00	1.0913+00	1.1229+00	1.1552+00	1.1877+00	1.2222+00	1.2585+00	1.2971+00	
6.2+00	9.6343-01	1.0300+00	1.0610+00	1.0920+00	1.1230+00	1.1540+00	1.1860+00	1.2190+00	1.2537+00	
6.6+00	9.0161-01	9.9640-01	1.0281+00	1.0589+00	1.0892+00	1.1193+00	1.1500+00	1.1816+00	1.2146+00	
7.0+00	8.4206-01	8.7670-01	9.5770-01	9.9417-01	1.0287+00	1.0580+00	1.0870+00	1.1161+00	1.1457+00	
7.4+00	7.8461-01	8.2000-01	8.5385-01	8.8181-01	9.1124-01	1.0005+00	1.0290+00	1.0572+00	1.0853+00	
8.0+00	7.0305-01	7.3500-01	7.7365-01	8.0693-01	8.3988-01	8.6959-01	8.9520-01	9.2787-01	9.5570-01	
9.0+00	5.8073-01	6.1600-01	6.5056-01	6.8426-01	7.1704-01	7.4885-01	7.7970-01	8.0963-01	8.3863-01	
1.0+01	4.7651-01	5.1000-01	5.4291-01	5.7449-01	6.0761-01	6.3920-01	6.7020-01	7.0059-01	7.3030-01	
1.1+01	3.9086-01	4.2100-01	4.5134-01	4.8174-01	5.1209-01	5.4230-01	5.7230-01	6.0205-01	6.3147-01	
1.2+01	3.2061-01	3.4750-01	3.7487-01	4.0258-01	4.3054-01	4.5867-01	4.8690-01	5.1518-01	5.4341-01	
1.4+01	2.1783-01	2.3850-01	2.5950-01	2.8195-01	3.0459-01	3.2776-01	3.5140-01	3.7547-01	3.9990-01	
1.6+01	1.5070-01	1.6630-01	1.8266-01	1.9975-01	2.1753-01	2.3596-01	2.5500-01	2.7462-01	2.9478-01	
1.8+01	1.0455-01	1.1830-01	1.3074-01	1.4385-01	1.5762-01	1.7204-01	1.8710-01	2.0279-01	2.1908-01	
2.0+01	7.6591-02	8.5910-02	9.5419-02	1.0551-01	1.1619-01	1.2746-01	1.3930-01	1.5173-01	1.6473-01	
2.2+01	5.6767-02	6.3600-02	7.0930-02	7.8760-02	8.6995-02	9.5939-02	1.0530-01	1.1518-01	1.2559-01	
2.5+01	3.7219-02	4.1850-02	4.6936-02	5.2366-02	5.8191-02	6.4421-02	7.1070-02	7.8149-02	8.5663-02	
2.8+01	2.5332-02	2.8620-02	3.2189-02	3.6049-02	4.0209-02	4.4682-02	4.9480-02	5.4617-02	6.0102-02	
3.1+01	1.7805-02	2.0170-02	2.2750-02	2.5555-02	2.8595-02	3.1880-02	3.5420-02	3.9226-02	4.3307-02	
3.5+01	1.1616-02	1.3200-02	1.4936-02	1.6832-02	1.8896-02	2.1135-02	2.3560-02	2.6179-02	2.9001-02	
4.0+01	7.2171-03	8.2260-03	9.3359-03	1.0553-02	1.1883-02	1.3333-02	1.4910-02	1.6622-02	1.8476-02	
4.5+01	4.7232-03	5.3560-03	6.1388-03	6.9559-03	7.8520-03	8.8323-03	9.9020-03	1.1067-02	1.2332-02	
5.0+01	3.2253-03	3.6920-03	4.2085-03	4.7781-03	5.4044-03	6.0913-03	6.8430-03	7.6638-03	8.5582-03	
7.0+01	9.4932-04	1.0924-03	1.2521-03	1.4294-03	1.6260-03	1.8432-03	2.0826-03	2.3459-03	2.6349-03	
1.0+02	2.6080-04	3.0160-04	3.4735-04	3.9849-04	4.5552-04	5.1898-04	5.8950-04	6.6773-04	7.5430-04	
1.0+03	1.1350-07	1.3480-07	1.5943-07	1.8782-07	2.2045-07	2.5784-07	3.0060-07	3.4939-07	4.0494-07	
1.0+06	1.3292-16	1.6270-16	1.9839-16	2.4106-16	2.9197-16	3.5259-16	4.2470-16	5.1036-16	6.1197-16	
1.0+09	1.9014-25	2.3830-25	2.9779-25	3.7116-25	4.6152-25	5.7270-25	7.0940-25	8.7738-25	1.0837-24	
										1.3368-24

TABLE I.: CONT. RELATIVISTIC HARTREE-FOCK ATOMIC FORM FACTOR,  $F(X, Z)$ 

$X/\Lambda$	41 NB	42 MC	43 TC	44 RU	45 RH	46 PD	47 AG	48 CD	49 IN	50 SN
0.0	4.1000+01	4.2000+01	4.3000+01	4.4000+01	4.5000+01	4.6000+01	4.7000+01	4.8000+01	4.9000+01	5.0000+01
1.0-02	4.0556+01	4.1558+01	4.2555+01	4.3560+01	4.4561+01	4.5568+01	4.6564+01	4.7562+01	4.8557+01	4.9555+01
2.0-02	4.0824+01	4.1831+01	4.2821+01	4.3824+01	4.4827+01	4.5824+01	4.6824+01	4.7828+01	4.8828+01	4.9821+01
3.0-02	4.0610+01	4.1625+01	4.2603+01	4.3589+01	4.4567+01	4.5518+01	4.6461+01	4.7400+01	4.8318+01	4.9161+01
4.0-02	4.0323+01	4.1346+01	4.2308+01	4.3286+01	4.4245+01	4.5193+01	4.6124+01	4.7040+01	4.7932+01	4.8803+01
5.0-02	3.9570+01	4.1003+01	4.1945+01	4.2881+01	4.3808+01	4.4722+01	4.5624+01	4.6514+01	4.7390+01	4.8254+01
6.0-02	3.8565+01	4.0606+01	4.1526+01	4.2431+01	4.3327+01	4.4208+01	4.5076+01	4.5932+01	4.6777+01	4.7611+01
7.0-02	3.9116+01	4.0164+01	4.1059+01	4.2254+01	4.3299+01	4.4355+01	4.5385+01	4.6287+01	4.7112+01	4.8044+01
8.0-02	3.8634+01	3.9656+01	4.0557+01	4.1789+01	4.2824+01	4.4119+01	4.4944+01	4.5822+01	4.6614+01	4.7428+01
9.0-02	3.8128+01	3.9181+01	4.0028+01	4.1292+01	4.2351+01	4.3663+01	4.4469+01	4.5324+01	4.6086+01	4.6942+01
1.0-01	3.7606+01	3.8656+01	3.9480+01	4.0770+01	4.1834+01	4.3172+01	4.3964+01	4.4787+01	4.5534+01	4.6361+01
1.1-01	3.7073+01	3.8117+01	3.8921+01	4.0229+01	4.1296+01	4.2651+01	4.3435+01	4.4248+01	4.4964+01	4.5764+01
1.2-01	3.6535+01	3.7585+01	3.8355+01	3.9674+01	4.0741+01	4.2105+01	4.2886+01	4.3663+01	4.4383+01	4.5155+01
1.3-01	3.5994+01	3.7016+01	3.7787+01	3.9108+01	4.0173+01	4.1538+01	4.2322+01	4.3104+01	4.3793+01	4.4541+01
1.4-01	3.5454+01	3.6461+01	3.7221+01	3.8536+01	3.9597+01	4.0954+01	4.1744+01	4.2517+01	4.3199+01	4.3924+01
1.5-01	3.4916+01	3.5907+01	3.6658+01	3.7959+01	3.9015+01	4.0357+01	4.1157+01	4.1923+01	4.2603+01	4.3309+01
1.6-01	3.4382+01	3.5355+01	3.6100+01	3.7381+01	3.8429+01	3.9750+01	4.0563+01	4.1355+01	4.2006+01	4.2696+01
1.7-01	3.3854+01	3.4806+01	3.5548+01	3.6803+01	3.7841+01	3.9137+01	3.9964+01	4.0726+01	4.1410+01	4.2088+01
1.8-01	3.3321+01	3.4263+01	3.5003+01	3.6228+01	3.7254+01	3.8520+01	3.9361+01	4.0126+01	4.0817+01	4.1486+01
1.9-01	3.2814+01	3.3755+01	3.4466+01	3.5655+01	3.6668+01	3.7902+01	3.8758+01	3.9527+01	4.0226+01	4.0891+01
2.0-01	3.2305+01	3.3195+01	3.3936+01	3.5088+01	3.6086+01	3.7286+01	3.8154+01	3.8930+01	3.9639+01	4.0302+01
2.2-01	3.1310+01	3.2157+01	3.2900+01	3.3971+01	3.4937+01	3.6084+01	3.6955+01	3.7746+01	3.8478+01	3.9145+01
2.4-01	3.0348+01	3.1153+01	3.1897+01	3.2886+01	3.3815+01	3.4868+01	3.5774+01	3.6581+01	3.7337+01	3.8016+01
2.5-01	2.9814+01	3.0665+01	3.1409+01	3.2356+01	3.3267+01	3.4283+01	3.5192+01	3.6007+01	3.6774+01	3.7462+01
2.6-01	2.9242+01	3.0148+01	3.0930+01	3.1837+01	3.2728+01	3.3708+01	3.4619+01	3.5440+01	3.6218+01	3.6915+01
2.8-01	2.8538+01	2.9283+01	2.9998+01	3.0880+01	3.1680+01	3.2592+01	3.3498+01	3.4350+01	3.5125+01	3.5841+01
3.0-01	2.7692+01	2.8382+01	2.9104+01	2.9866+01	3.0675+01	3.1523+01	3.2416+01	3.3251+01	3.4059+01	3.4794+01
3.2-01	2.6888+01	2.7543+01	2.8250+01	2.8949+01	2.9717+01	3.0505+01	3.1378+01	3.2210+01	3.3025+01	3.3775+01
3.4-01	2.6126+01	2.6749+01	2.7435+01	2.8079+01	2.8807+01	2.9540+01	3.0387+01	3.1240+01	3.2025+01	3.2786+01
3.5-01	2.5760+01	2.6368+01	2.7042+01	2.7662+01	2.8370+01	2.9077+01	2.9910+01	3.0725+01	3.1538+01	3.2303+01
3.6-01	2.5404+01	2.5988+01	2.6660+01	2.7257+01	2.7944+01	2.8622+01	2.9444+01	3.0252+01	3.1060+01	3.1828+01
3.8-01	2.4721+01	2.5299+01	2.5925+01	2.6480+01	2.7130+01	2.7769+01	2.8551+01	2.9338+01	3.0134+01	3.0902+01
4.0-01	2.4077+01	2.4620+01	2.5229+01	2.5749+01	2.6363+01	2.6961+01	2.7707+01	2.8468+01	2.9247+01	3.0011+01
4.2-01	2.3468+01	2.3989+01	2.4571+01	2.5082+01	2.5642+01	2.6202+01	2.6911+01	2.7644+01	2.8401+01	2.9154+01
4.4-01	2.2892+01	2.3354+01	2.3949+01	2.4415+01	2.4964+01	2.5491+01	2.6163+01	2.6865+01	2.7596+01	2.8334+01
4.5-01	2.2615+01	2.3109+01	2.3651+01	2.4106+01	2.4640+01	2.5153+01	2.5805+01	2.6492+01	2.7209+01	2.7938+01
4.6-01	2.2346+01	2.2832+01	2.3361+01	2.3807+01	2.4327+01	2.4825+01	2.5459+01	2.6129+01	2.6832+01	2.7551+01
4.8-01	2.1829+01	2.2300+01	2.2806+01	2.3235+01	2.3729+01	2.4201+01	2.4800+01	2.5436+01	2.6108+01	2.6805+01
5.0-01	2.1336+01	2.1756+01	2.2280+01	2.2696+01	2.3167+01	2.3617+01	2.4181+01	2.4784+01	2.5425+01	2.6096+01
5.5-01	2.0155+01	2.0638+01	2.1080+01	2.1476+01	2.1900+01	2.2307+01	2.2795+01	2.3320+01	2.3881+01	2.4482+01
6.0-01	1.9156+01	1.9535+01	2.0012+01	2.0403+01	2.0798+01	2.1177+01	2.1607+01	2.2053+01	2.2522+01	2.3081+01
6.5-01	1.8187+01	1.8635+01	1.9042+01	1.9438+01	1.9820+01	2.0186+01	2.0575+01	2.0978+01	2.1405+01	2.1868+01
7.0-01	1.7268+01	1.7732+01	1.8142+01	1.8531+01	1.8920+01	1.9296+01	1.9661+01	2.0027+01	2.0408+01	2.0815+01
8.0-01	1.6533+01	1.6936+01	1.7377+01	1.7732+01	1.8100+01	1.8480+01	1.8869+01	1.9260+01	1.9654+01	1.9973+01
9.0-01	1.5915+01	1.6348+01	1.6825+01	1.7245+01	1.7690+01	1.8160+01	1.8651+01	1.9100+01	1.9529+01	1.7846+01
1.0+00	1.2427+01	1.2568+01	1.3466+01	1.3568+01	1.4440+01	1.4893+01	1.5316+01	1.5698+01	1.6053+01	1.6384+01
1.1+00	1.1098+01	1.1621+01	1.2116+01	1.2620+01	1.3107+01	1.3580+01	1.4035+01	1.4451+01	1.4840+01	1.5201+01
1.2+00	9.5450+00	1.0430+01	1.0900+01	1.1355+01	1.1866+01	1.2420+01	1.2813+01	1.3253+01	1.3670+01	1.4062+01
1.3+00	8.9720+00	5.4040+00	9.8330+00	1.0282+01	1.0740+01	1.1200+01	1.1669+01	1.2116+01	1.2548+01	1.2962+01
1.4+00	8.1690+00	8.5420+00	8.9190+00	9.3230+00	9.7430+00	1.0173+01	1.0623+01	1.1060+01	1.1492+01	1.1913+01

$X_s$ SIN(THETA/2) /LAMBDA	41 NB	42 MQ	43 TC	44 RU	45 RH	46 PD	47 AG	48 CD	49 IN	50 SN
1.5+00	7.85160+00	7.8510+00	8.1540+00	8.5060+00	8.8800+00	9.2700+00	9.6870+00	1.0101+01	1.0518+01	1.0933+01
1.6+00	6.85890+00	7.2510+00	7.5210+00	7.8230+00	8.1480+00	8.4920+00	8.8690+00	9.2490+00	9.6390+00	1.0034+01
1.7+00	6.5640+00	6.7850+00	7.0040+00	7.2580+00	7.5350+00	7.8330+00	8.1650+00	8.5050+00	8.8600+00	9.2370+00
1.8+00	6.2160+00	6.3970+00	6.5820+00	6.7940+00	7.0280+00	7.2820+00	7.5690+00	7.8670+00	8.1840+00	8.5160+00
1.9+00	5.9270+00	6.0800+00	6.2340+00	6.4120+00	6.6080+00	6.8240+00	7.0690+00	7.3260+00	7.6030+00	7.8970+00
2.0+00	5.6800+00	5.8130+00	5.9460+00	6.0970+00	6.2620+00	6.4430+00	6.6510+00	6.8710+00	7.1100+00	7.3670+00
2.2+00	5.2605+00	5.3745+00	5.4938+00	5.6163+00	5.7404+00	5.8706+00	6.0136+00	6.1743+00	6.3492+00	6.5403+00
2.4+00	4.8513+00	5.0222+00	5.1098+00	5.2157+00	5.3219+00	5.4308+00	5.5451+00	5.6671+00	5.7977+00	5.9401+00
2.5+00	4.47138+00	4.6270+00	4.7337+00	4.8370+00	4.9401+00	5.0434+00	5.1510+00	5.2610+00	5.3770+00	5.5020+00
2.6+00	4.6380+00	4.6551+00	4.7638+00	4.8677+00	4.9706+00	5.0733+00	5.1755+00	5.2780+00	5.3840+00	5.4959+00
2.8+00	4.1911+00	4.3179+00	4.4349+00	4.5455+00	4.6534+00	4.7585+00	4.8594+00	4.9562+00	5.0527+00	5.1491+00
3.0+00	3.8530+00	3.9850+00	4.1137+00	4.2330+00	4.3488+00	4.4604+00	4.5660+00	4.6650+00	4.7610+00	4.8530+00
3.3+00	3.5724+00	3.5123+00	3.6454+00	3.7739+00	3.9003+00	4.0231+00	4.1394+00	4.2477+00	4.3514+00	4.4497+00
3.5+00	3.0784+00	3.2170+00	3.3509+00	3.4820+00	3.6122+00	3.7398+00	3.8620+00	3.9770+00	4.0870+00	4.1920+00
3.6+00	2.5406+00	3.0774+00	3.2107+00	3.3420+00	3.4727+00	3.6015+00	3.7258+00	3.8437+00	3.9564+00	4.0646+00
3.9+00	2.5680+00	2.6955+00	2.8228+00	2.9503+00	3.0784+00	3.2061+00	3.3321+00	3.4550+00	3.5732+00	3.6880+00
4.0+00	2.4578+00	2.6810+00	2.7651+00	2.8300+00	2.9558+00	3.0818+00	3.2070+00	3.3300+00	3.4490+00	3.5650+00
4.2+00	2.2577+00	2.3713+00	2.4874+00	2.6055+00	2.7253+00	2.8464+00	2.9679+00	3.0890+00	3.2079+00	3.3246+00
4.6+00	1.9321+00	2.0255+00	2.1233+00	2.2248+00	2.3295+00	2.4368+00	2.5463+00	2.6577+00	2.7708+00	2.8832+00
5.0+00	1.6507+00	1.7560+00	1.8663+00	1.9310+00	2.0194+00	2.1112+00	2.2060+00	2.3040+00	2.4060+00	2.5090+00
5.4+00	1.5140+00	1.5745+00	1.6398+00	1.7092+00	1.7822+00	1.8586+00	1.9385+00	2.0222+00	2.1103+00	2.2011+00
5.5+00	1.4776+00	1.5349+00	1.5967+00	1.6626+00	1.7319+00	1.8046+00	1.8808+00	1.9610+00	2.0454+00	2.1329+00
5.8+00	1.3830+00	1.4312+00	1.4835+00	1.5393+00	1.5981+00	1.6600+00	1.7256+00	1.7953+00	1.8687+00	1.9463+00
6.0+00	1.3302+00	1.3730+00	1.4195+00	1.4690+00	1.5211+00	1.5761+00	1.6350+00	1.6980+00	1.7640+00	1.8350+00
6.2+00	1.2854+00	1.3240+00	1.3651+00	1.4090+00	1.4560+00	1.5063+00	1.5600+00	1.6171+00	1.6778+00	1.7420+00
6.6+00	1.2073+00	1.2400+00	1.2745+00	1.3110+00	1.3498+00	1.3910+00	1.4350+00	1.4819+00	1.5318+00	1.5850+00
7.0+00	1.1420+00	1.1710+00	1.2008+00	1.2320+00	1.2650+00	1.3010+00	1.3370+00	1.3759+00	1.4171+00	1.4610+00
7.4+00	1.0851+00	1.1120+00	1.1392+00	1.1670+00	1.1960+00	1.2262+00	1.2580+00	1.2914+00	1.3267+00	1.3640+00
8.0+00	1.0091+00	1.0350+00	1.0605+00	1.0860+00	1.1118+00	1.1381+00	1.1650+00	1.1926+00	1.2211+00	1.2510+00
9.0+00	8.6392-01	9.2030-01	9.7100-01	9.9563-01	9.9563-01	1.0199+00	1.0440+00	1.0660+00	1.0919+00	1.1160+00
1.0+01	7.8749-01	6.1490-01	6.4153-01	6.6740-01	6.9257-01	9.1713-01	9.4120-01	9.6487-01	9.8815-01	1.0110+00
1.1+01	6.8851-01	7.1680-01	7.4407-01	7.7070-01	7.9671-01	8.2211-01	8.4690-01	8.7111-01	8.9477-01	9.1790-01
1.2+01	5.9535-01	6.2450-01	6.5406-01	6.8080-01	7.0711-01	7.3295-01	7.5830-01	7.8316-01	8.0749-01	8.3130-01
1.4+01	4.4953-01	4.7460-01	4.9975-01	5.2490-01	5.4998-01	5.7496-01	5.9980-01	6.2449-01	6.4898-01	6.7320-01
1.6+01	3.3651-01	3.5800-01	3.7955-01	4.0200-01	4.2438-01	4.4699-01	4.6970-01	4.9257-01	5.1553-01	5.3850-01
1.8+01	2.4532-01	2.7120-01	2.8954-01	3.0830-01	3.2746-01	3.4701-01	3.6690-01	3.8713-01	4.0764-01	4.2840-01
2.0+01	1.9242-01	2.0710-01	2.2231-01	2.3800-01	2.5411-01	2.7063-01	2.8760-01	3.0503-01	3.2289-01	3.4110-01
2.2+01	1.4795-01	1.5950-01	1.7235-01	1.8530-01	1.9871-01	2.1257-01	2.2690-01	2.4170-01	2.5694-01	2.7260-01
2.5+01	1.0199-01	1.1080-01	1.2003-01	1.2970-01	1.3981-01	1.5039-01	1.6140-01	1.7287-01	1.8478-01	1.9710-01
2.8+01	7.2138-02	7.6700-02	8.1631-02	9.2930-02	1.0060-01	1.0865-01	1.1710-01	1.2597-01	1.3524-01	1.4490-01
3.1+01	5.2322-02	5.7270-02	6.2520-02	6.8080-02	7.3960-02	8.0167-02	8.6710-02	9.3596-02	1.0083-01	1.0840-01
3.5+01	3.5228-02	3.8760-02	4.2470-02	4.6420-02	5.0618-02	5.5072-02	5.9790-02	6.4782-02	7.0054-02	7.5610-02
4.0+01	2.2638-02	2.4950-02	2.7433-02	3.0090-02	3.2931-02	3.5962-02	3.9190-02	4.2621-02	4.6263-02	5.0120-02
4.5+01	1.5186-02	1.6790-02	1.8516-02	2.0370-02	2.2355-02	2.4478-02	2.6750-02	2.9180-02	3.1772-02	3.4530-02
5.0+01	1.0586-02	1.1730-02	1.2967-02	1.4300-02	1.5731-02	1.7265-02	1.8910-02	2.0674-02	2.2562-02	2.4580-02
7.0+01	3.2581-03	3.6767-03	4.0858-03	4.5388-03	5.0251-03	5.5511-03	6.1203-03	6.7359-03	7.4008-03	8.1178-03
1.0+02	9.5482-04	1.0700-03	1.1960-03	1.3340-03	1.4852-03	1.6508-03	1.8310-03	2.0272-03	2.2405-03	2.4720-03
1.0+03	5.3564-07	6.0700-07	7.1238-07	8.1570-07	9.3203-07	1.0629-06	1.2100-06	1.3654-06	1.5611-06	1.7690-06
1.0+06	8.7473-16	1.0430-15	1.2417-15	1.4760-15	1.7522-15	2.0776-15	2.4610-15	2.9126-15	3.4442-15	4.0700-15
1.0+09	1.6473-24	2.0280-24	2.4947-24	3.0670-24	3.7689-24	4.6303-24	5.6880-24	6.9877-24	8.5854-24	1.0550-23

TABLE I.. CONT. RELATIVISTIC HARTREE-FOCK ATOMIC FORM FACTOR, F(X,Z)

$X \cdot$ SIN(THETA/2) /LAMBDA	51 SB	52 TE	53 I	54 XE	55 CS	56 BA	57 LA	58 CE	59 PR	60 ND
0.0	5.16000+01	5.2000+01	5.3000+01	5.4000+01	5.5000+01	5.6000+01	5.7000+01	5.8000+01	5.9000+01	6.0000+01
1.0-02	5.0955+01	5.1954+01	5.2955+01	5.3956+01	5.4932+01	5.5925+01	5.6926+01	5.7928+01	5.8929+01	5.9931+01
2.0-02	5.0619+01	5.1618+01	5.2620+01	5.3621+01	5.4623+01	5.5626+01	5.6630+01	5.7634+01	5.8637+01	5.9641+01
3.0-02	5.0356+01	5.1354+01	5.2357+01	5.3360+01	5.4371+01	5.5384+01	5.6400+01	5.7417+01	5.8436+01	5.9456+01
4.0-02	5.0129+01	5.1126+01	5.2129+01	5.3137+01	5.4152+01	5.5174+01	5.6203+01	5.7237+01	5.8276+01	5.9320+01
5.0-02	4.9915+01	5.0911+01	5.1911+01	5.2917+01	5.3932+01	5.4957+01	5.5992+01	5.7027+01	5.8062+01	5.9107+01
6.0-02	4.9744+01	5.0738+01	5.1734+01	5.2731+01	5.3739+01	5.4750+01	5.5764+01	5.6781+01	5.7800+01	5.8820+01
7.0-02	4.9617+01	5.0609+01	5.1599+01	5.2592+01	5.3589+01	5.4593+01	5.5603+01	5.6618+01	5.7638+01	5.8663+01
8.0-02	4.9534+01	5.0523+01	5.1509+01	5.2498+01	5.3493+01	5.4495+01	5.5503+01	5.6517+01	5.7536+01	5.8560+01
9.0-02	4.9496+01	5.0387+01	5.1368+01	5.2354+01	5.3347+01	5.4347+01	5.5353+01	5.6366+01	5.7385+01	5.8410+01
1.0-01	4.7250+01	4.8174+01	4.9142+01	5.0125+01	5.1122+01	5.2134+01	5.3162+01	5.4207+01	5.5270+01	5.6352+01
1.1-01	4.6625+01	4.7526+01	4.8476+01	4.9447+01	5.0439+01	5.1452+01	5.2487+01	5.3544+01	5.4624+01	5.5727+01
1.2-01	4.6088+01	4.6963+01	4.7793+01	4.8747+01	4.9730+01	5.0734+01	5.1759+01	5.2806+01	5.3875+01	5.4967+01
1.3-01	4.5634+01	4.6493+01	4.7299+01	4.8133+01	4.8995+01	4.9886+01	5.0807+01	5.1759+01	5.2734+01	5.3734+01
1.4-01	4.5256+01	4.6109+01	4.6911+01	4.7711+01	4.8545+01	4.9414+01	5.0318+01	5.1249+01	5.2207+01	5.3193+01
1.5-01	4.4945+01	4.5799+01	4.6599+01	4.7431+01	4.8293+01	4.9186+01	5.0111+01	5.1068+01	5.2049+01	5.3055+01
1.6-01	4.4695+01	4.5549+01	4.6349+01	4.7171+01	4.8023+01	4.8906+01	4.9821+01	5.0768+01	5.1739+01	5.2735+01
1.7-01	4.4499+01	4.5353+01	4.6153+01	4.6986+01	4.7851+01	4.8747+01	4.9675+01	5.0636+01	5.1621+01	5.2632+01
1.8-01	4.4356+01	4.5210+01	4.6010+01	4.6843+01	4.7708+01	4.8604+01	4.9532+01	5.0493+01	5.1487+01	5.2507+01
1.9-01	4.4268+01	4.5122+01	4.5923+01	4.6756+01	4.7621+01	4.8527+01	4.9465+01	5.0436+01	5.1440+01	5.2477+01
2.0-01	4.4230+01	4.5084+01	4.5885+01	4.6718+01	4.7583+01	4.8480+01	4.9410+01	5.0373+01	5.1370+01	5.2402+01
2.1-01	4.4240+01	4.5094+01	4.5895+01	4.6728+01	4.7593+01	4.8490+01	4.9420+01	5.0383+01	5.1380+01	5.2412+01
2.2-01	4.4291+01	4.5145+01	4.5946+01	4.6784+01	4.7649+01	4.8546+01	4.9476+01	5.0439+01	5.1446+01	5.2488+01
2.3-01	4.4383+01	4.5237+01	4.6038+01	4.6876+01	4.7741+01	4.8638+01	4.9568+01	5.0531+01	5.1538+01	5.2580+01
2.4-01	4.4516+01	4.5370+01	4.6171+01	4.7009+01	4.7874+01	4.8771+01	4.9701+01	5.0664+01	5.1671+01	5.2713+01
2.5-01	4.4690+01	4.5544+01	4.6345+01	4.7183+01	4.8048+01	4.8945+01	4.9875+01	5.0838+01	5.1845+01	5.2887+01
2.6-01	4.4904+01	4.5758+01	4.6559+01	4.7397+01	4.8262+01	4.9159+01	5.0089+01	5.1052+01	5.2059+01	5.3101+01
2.7-01	4.5158+01	4.6012+01	4.6813+01	4.7651+01	4.8516+01	4.9413+01	5.0343+01	5.1306+01	5.2313+01	5.3355+01
2.8-01	4.5452+01	4.6306+01	4.7107+01	4.7945+01	4.8810+01	4.9707+01	5.0637+01	5.1600+01	5.2607+01	5.3649+01
2.9-01	4.5786+01	4.6640+01	4.7441+01	4.8279+01	4.9144+01	5.0041+01	5.0971+01	5.1934+01	5.2941+01	5.3983+01
3.0-01	4.6160+01	4.7014+01	4.7815+01	4.8653+01	4.9518+01	5.0415+01	5.1345+01	5.2308+01	5.3315+01	5.4357+01
3.1-01	4.6574+01	4.7428+01	4.8229+01	4.9067+01	4.9932+01	5.0829+01	5.1759+01	5.2722+01	5.3729+01	5.4771+01
3.2-01	4.7028+01	4.7882+01	4.8683+01	4.9521+01	5.0386+01	5.1283+01	5.2213+01	5.3176+01	5.4183+01	5.5225+01
3.3-01	4.7522+01	4.8376+01	4.9177+01	5.0015+01	5.0880+01	5.1777+01	5.2707+01	5.3670+01	5.4677+01	5.5719+01
3.4-01	4.8056+01	4.8910+01	4.9711+01	5.0549+01	5.1414+01	5.2311+01	5.3241+01	5.4204+01	5.5211+01	5.6253+01
3.5-01	4.8630+01	4.9484+01	5.0285+01	5.1123+01	5.1988+01	5.2885+01	5.3815+01	5.4778+01	5.5785+01	5.6827+01
3.6-01	4.9244+01	5.0098+01	5.0899+01	5.1737+01	5.2602+01	5.3500+01	5.4441+01	5.5424+01	5.6449+01	5.7515+01
3.7-01	4.9898+01	5.0752+01	5.1553+01	5.2391+01	5.3256+01	5.4154+01	5.5095+01	5.6078+01	5.7103+01	5.8179+01
3.8-01	5.0592+01	5.1446+01	5.2247+01	5.3085+01	5.3950+01	5.4858+01	5.5809+01	5.6802+01	5.7837+01	5.8913+01
3.9-01	5.1326+01	5.2180+01	5.2981+01	5.3819+01	5.4684+01	5.5582+01	5.6523+01	5.7506+01	5.8531+01	5.9607+01
4.0-01	5.2090+01	5.2944+01	5.3745+01	5.4583+01	5.5448+01	5.6350+01	5.7291+01	5.8272+01	5.9293+01	6.0355+01
4.1-01	5.2894+01	5.3748+01	5.4549+01	5.5387+01	5.6252+01	5.7154+01	5.8095+01	5.9076+01	6.0097+01	6.1159+01
4.2-01	5.3738+01	5.4592+01	5.5393+01	5.6231+01	5.7096+01	5.7998+01	5.8939+01	5.9920+01	6.0941+01	6.2003+01
4.3-01	5.4622+01	5.5476+01	5.6277+01	5.7115+01	5.7980+01	5.8882+01	5.9823+01	6.0804+01	6.1825+01	6.2887+01
4.4-01	5.5546+01	5.6400+01	5.7201+01	5.8039+01	5.8904+01	5.9806+01	6.0747+01	6.1728+01	6.2749+01	6.3811+01
4.5-01	5.6510+01	5.7364+01	5.8165+01	5.8993+01	5.9858+01	6.0760+01	6.1701+01	6.2682+01	6.3703+01	6.4765+01
4.6-01	5.7514+01	5.8368+01	5.9169+01	6.0007+01	6.0872+01	6.1774+01	6.2715+01	6.3696+01	6.4717+01	6.5779+01
4.7-01	5.8558+01	5.9412+01	6.0213+01	6.1051+01	6.1916+01	6.2818+01	6.3759+01	6.4740+01	6.5761+01	6.6823+01
4.8-01	5.9642+01	6.0496+01	6.1297+01	6.2135+01	6.2990+01	6.3892+01	6.4833+01	6.5814+01	6.6835+01	6.7897+01
4.9-01	6.0766+01	6.1620+01	6.2421+01	6.3259+01	6.4124+01	6.5026+01	6.5967+01	6.6948+01	6.7969+01	6.9031+01
5.0-01	6.1930+01	6.2784+01	6.3585+01	6.4423+01	6.5288+01	6.6190+01	6.7131+01	6.8112+01	6.9133+01	7.0195+01
6.0-01	6.2366+01	6.3220+01	6.4021+01	6.4859+01	6.5724+01	6.6626+01	6.7567+01	6.8548+01	6.9569+01	7.0631+01
6.5-01	6.2830+01	6.3684+01	6.4485+01	6.5323+01	6.6188+01	6.7090+01	6.8031+01	6.9012+01	7.0033+01	7.1095+01
7.0-01	6.3324+01	6.4178+01	6.4979+01	6.5817+01	6.6682+01	6.7584+01	6.8525+01	6.9506+01	7.0527+01	7.1589+01
8.0-01	6.3838+01	6.4692+01	6.5493+01	6.6331+01	6.7196+01	6.8098+01	6.9039+01	7.0020+01	7.1041+01	7.2103+01
9.0-01	6.4372+01	6.5226+01	6.6027+01	6.6865+01	6.7730+01	6.8632+01	6.9573+01	7.0554+01	7.1575+01	7.2637+01
1.0+00	6.4926+01	6.5780+01	6.6581+01	6.7419+01	6.8284+01	6.9186+01	7.0127+01	7.1108+01	7.2129+01	7.3191+01
1.1+00	6.5490+01	6.6344+01	6.7145+01	6.7983+01	6.8848+01	6.9750+01	7.0691+01	7.1672+01	7.2693+01	7.3755+01
1.2+00	6.6064+01	6.6918+01	6.7719+01	6.8557+01	6.9422+01	7.0324+01	7.1265+01	7.2246+01	7.3267+01	7.4329+01
1.3+00	6.6648+01	6.7502+01	6.8303+01	6.9141+01	7.0006+01	7.0908+01	7.1849+01	7.2830+01	7.3851+01	7.4913+01
1.4+00	6.7242+01	6.8096+01	6.8897+01	6.9735+01	7.0600+01	7.1502+01	7.2443+01	7.3424+01	7.4445+01	7.5507+01
1.5+00	6.7846+01	6.8700+01	6.9501+01	7.0339+01	7.1204+01	7.2106+01	7.3047+01	7.4028+01	7.5049+01	7.6111+01
1.6+00	6.8460+01	6.9314+01	7.0115+01	7.0953+01	7.1818+01	7.2720+01	7.3661+01	7.4642+01	7.5663+01	7.6725+01
1.7+00	6.9084+01	6.9938+01	7.0739+01	7.1577+01	7.2442+01	7.3344+01	7.4285+01	7.5266+01	7.6287+01	7.7349+01
1.8+00	6.9718+01	7.0572+01	7.1373+01	7.2211+01	7.3076+01	7.3978+01	7.4919+01	7.5900+01	7.6921+01	7.7983+01
1.9+00	7.0362+01	7.1216+01	7.2017+01	7.2855+01	7.3720+01	7.4622+01	7.5563+01	7.6544+01	7.7565+01	7.8627+01
2.0+00	7.1016+01	7.1870+01	7.2671+01	7.3509+01	7.4374+01	7.5276+01	7.6217+01	7.7198+01	7.8219+01	7.9281+01
2.1+00	7.1680+01	7.2534+01	7.3335+01	7.4173+01	7.5038+01	7.5940+01	7.6881+01	7.7862+01	7.8883+01	7.9945+01
2.2+00	7.2354+01	7.3208+01	7.4009+01	7.4847+01	7.5712+01	7.6614+01	7.7555+01	7.8536+01	7.9557+01	8.0619+01
2.3+00	7.3038+01	7.3892+01	7.4693+01	7.5531+01	7.6396+01	7.7298+01	7.8239+01	7.9220+01	8.0241+01	8.1303+01
2.4+00	7.3732+01	7.4586+01	7.5387+01	7.6225+01	7.7090+01	7.7992+01	7.8933+01	7.9914+01	8.0935+01	8.1997+01
2.5+00	7.4436+01	7.5290+01	7.6091+01	7.6929+01	7.7794+01	7.8696+01	7.9637+01	8.0618+01	8.1639+01	8.2701+01
2.6+00	7.5150+01	7.6004+01	7.6805+01	7.7643+01	7.8508+01	7.9410+01	8.0351+01	8.1332+01	8.2353+01	8.3415+01
2.7+00	7.5874+01	7.6728+01	7.7529+01	7.8367+01	7.9232+01	8.0134+01	8.1075+01	8.2056+01	8.3077+01	8.4139+01
2.8+00	7.6608+01	7.7462+01	7.8263+01	7.9101+01	7.9966+01	8.0868+01	8.1809+01	8.2790+01	8.3811+01	8.4873+01
2.9+00	7.7352+01	7.8206+01	7.9007+01	7.9845+01	8.0710+01	8.1612+01	8.2553+01	8.3534+01	8.4555+01	8.5617+01
3.0+00	7.8106+01	7.8960+01	7.9761+01	8.0599+01	8.1464+01	8.2366+01	8.3307+01	8.4288+01	8.5309+01	8.6371+01
3.1+00	7.8870+01	7.9724+01	8.0525+01	8.1363+01						



FORM FACTORS AND PHOTON SCATTERING CROSS SECTIONS

$X \cdot \sin(\theta/2) / \lambda$	51 SB	52 TE	53 I	54 XE	55 CS	56 BA	57 LA	58 CE	59 PR	60 ND
1.5+00	1.1341+01	1.1726+01	1.2125+01	1.2494+01	1.2845+01	1.3175+01	1.3489+01	1.3776+01	1.4042+01	1.4430+01
1.6+00	1.0431+01	1.0611+01	1.1214+01	1.1592+01	1.1956+01	1.2305+01	1.2636+01	1.2939+01	1.3218+01	1.3493+01
1.7+00	9.6620+00	9.9660+00	1.0360+01	1.0736+01	1.1104+01	1.1461+01	1.1807+01	1.2123+01	1.2414+01	1.2704+01
1.8+00	8.8610+00	9.2610+00	9.5760+00	9.9400+00	1.0303+01	1.0661+01	1.1009+01	1.1333+01	1.1631+01	1.1932+01
1.9+00	8.0280+00	8.5180+00	8.9680+00	9.2120+00	9.5580+00	9.9070+00	1.0253+01	1.0576+01	1.0878+01	1.1185+01
2.0+00	7.6420+00	7.9210+00	8.2390+00	8.5560+00	8.8810+00	9.2130+00	9.5500+00	9.8680+00	1.0166+01	1.0473+01
2.1+00	6.7473+00	6.9711+00	7.2121+00	7.4676+00	7.7360+00	8.0185+00	8.3048+00	8.5917+00	8.8792+00	9.1670+00
2.2+00	6.0539+00	6.2620+00	6.4452+00	6.6430+00	6.8552+00	7.0832+00	7.3221+00	7.5692+00	7.8224+00	8.0795+00
2.5+00	5.8360+00	5.9824+00	6.1420+00	6.3150+00	6.5020+00	6.7040+00	6.9187+00	7.1438+00	7.3768+00	7.6150+00
2.6+00	5.6147+00	5.7436+00	5.8834+00	6.0347+00	6.1990+00	6.3766+00	6.5676+00	6.7702+00	6.9819+00	7.1998+00
2.8+00	5.2488+00	5.3537+00	5.4643+00	5.5819+00	5.7095+00	5.8460+00	5.9950+00	6.1559+00	6.3266+00	6.5044+00
3.0+00	4.9450+00	5.0379+00	5.1320+00	5.2390+00	5.3520+00	5.4400+00	5.5580+00	5.6861+00	5.8228+00	5.9660+00
3.3+00	4.5441+00	4.6348+00	4.7229+00	4.8097+00	4.8962+00	4.9839+00	5.0765+00	5.1743+00	5.2766+00	5.3825+00
3.5+00	4.2920+00	4.3870+00	4.4780+00	4.5660+00	4.6510+00	4.7350+00	4.8205+00	4.9080+00	4.9972+00	5.0880+00
3.6+00	4.1676+00	4.2655+00	4.3590+00	4.4488+00	4.5350+00	4.6191+00	4.7031+00	4.7877+00	4.8730+00	4.9590+00
3.9+00	3.7592+00	3.9056+00	4.0074+00	4.1048+00	4.1981+00	4.2868+00	4.3720+00	4.4548+00	4.5357+00	4.6158+00
4.0+00	3.6780+00	3.7867+00	3.8910+00	3.9910+00	4.0870+00	4.1780+00	4.2649+00	4.3485+00	4.4295+00	4.5100+00
4.2+00	3.4358+00	3.5517+00	3.6598+00	3.7642+00	3.8650+00	3.9609+00	4.0519+00	4.1389+00	4.2229+00	4.3050+00
4.6+00	2.5569+00	3.1093+00	3.2199+00	3.3290+00	3.4354+00	3.5387+00	3.6376+00	3.7323+00	3.8237+00	3.9129+00
5.0+00	2.6150+00	2.7214+00	2.8280+00	2.9350+00	3.0410+00	3.1460+00	3.2480+00	3.3470+00	3.4434+00	3.5380+00
5.4+00	2.2954+00	2.3915+00	2.4853+00	2.5887+00	2.6891+00	2.7899+00	2.8893+00	2.9872+00	3.0839+00	3.1798+00
5.5+00	2.2259+00	2.3172+00	2.4122+00	2.5092+00	2.6077+00	2.7067+00	2.8048+00	2.9018+00	2.9980+00	3.0936+00
5.8+00	2.0271+00	2.1170+00	2.1975+00	2.2864+00	2.3782+00	2.4710+00	2.5640+00	2.6572+00	2.7507+00	2.8446+00
6.0+00	1.9090+00	1.9865+00	2.0670+00	2.1500+00	2.2370+00	2.3250+00	2.4139+00	2.5040+00	2.5950+00	2.6870+00
6.2+00	1.8057+00	1.8808+00	1.9550+00	2.0321+00	2.1119+00	2.1942+00	2.2787+00	2.3651+00	2.4530+00	2.5420+00
6.6+00	1.6414+00	1.7011+00	1.7640+00	1.8299+00	1.8989+00	1.9705+00	2.0449+00	2.1218+00	2.2009+00	2.2820+00
7.0+00	1.5079+00	1.5579+00	1.6110+00	1.6671+00	1.7261+00	1.7881+00	1.8528+00	1.9201+00	1.9899+00	2.0620+00
7.4+00	1.4036+00	1.4455+00	1.4900+00	1.5372+00	1.5871+00	1.6397+00	1.6951+00	1.7531+00	1.8137+00	1.8770+00
8.0+00	1.2825+00	1.3158+00	1.3510+00	1.3882+00	1.4275+00	1.4689+00	1.5126+00	1.5586+00	1.6070+00	1.6580+00
9.0+00	1.1404+00	1.1652+00	1.1910+00	1.2179+00	1.2461+00	1.2756+00	1.3066+00	1.3391+00	1.3732+00	1.4090+00
1.0+01	1.0334+00	1.0557+00	1.0780+00	1.1007+00	1.1238+00	1.1476+00	1.1719+00	1.1970+00	1.2230+00	1.2500+00
1.1+01	9.4455-01	9.6279-01	9.8470-01	1.0064+00	1.0279+00	1.0494+00	1.0709+00	1.0926+00	1.1146+00	1.1370+00
1.2+01	8.5458-01	8.7736-01	8.9970-01	9.2165-01	9.4325-01	9.6456-01	9.8562-01	1.0065+00	1.0273+00	1.0480+00
1.4+01	6.9711-01	7.2067-01	7.4390-01	7.6678-01	7.8932-01	8.1150-01	8.3332-01	8.5480-01	8.7595-01	8.9680-01
1.6+01	5.6144-01	5.8432-01	6.0710-01	6.2976-01	6.5227-01	6.7461-01	6.9675-01	7.1869-01	7.4040-01	7.6190-01
1.8+01	4.4935-01	4.7046-01	4.9170-01	5.1303-01	5.3441-01	5.5582-01	5.7723-01	5.9861-01	6.1994-01	6.4120-01
2.0+01	3.5560-01	3.7837-01	3.9740-01	4.1669-01	4.3622-01	4.5595-01	4.7585-01	4.9590-01	5.1606-01	5.3630-01
2.2+01	2.8664-01	3.0508-01	3.2180-01	3.3890-01	3.5631-01	3.7403-01	3.9201-01	4.1025-01	4.2872-01	4.4740-01
2.5+01	2.0561-01	2.2251-01	2.3640-01	2.5030-01	2.6460-01	2.7929-01	2.9434-01	3.0974-01	3.2546-01	3.4150-01
2.8+01	1.5493-01	1.6532-01	1.7610-01	1.8727-01	1.9884-01	2.1080-01	2.2315-01	2.3586-01	2.4895-01	2.6240-01
3.1+01	1.1622-01	1.2458-01	1.3320-01	1.4218-01	1.5153-01	1.6124-01	1.7131-01	1.8174-01	1.9254-01	2.0370-01
3.5+01	8.1454-02	6.7592-02	5.4030-02	4.1007-02	3.0077-02	2.1520-01	1.5289-01	1.1390-01	8.5226-02	6.4790-01
4.0+01	5.4200-02	4.0556-02	3.0600-02	2.3857-02	1.7908-02	1.3217-02	9.3787-02	6.9623-02	5.1201-01	3.8226-02
4.5+01	3.7455-02	2.9024-02	2.3840-02	1.9318-02	1.5096-02	1.1681-02	8.9777-02	6.3250-02	4.7826-02	3.5900-02
5.0+01	2.6732-02	2.0924-02	1.6460-02	1.3047-02	1.0290-02	7.9695-02	6.2768-02	4.6015-02	3.4440-02	2.5306-02
7.0+01	8.8856-03	5.7151-03	4.0609-02	3.1563-02	2.2594-02	1.3678-02	8.4843-02	5.6088-02	3.7416-02	2.5306-02
1.0+02	2.7322-03	2.9958-03	3.2900-03	3.5083-03	3.9530-03	4.3225-03	4.7217-03	5.1514-03	5.6135-03	6.1100-03
1.0+03	2.0015-06	2.2611-06	2.5510-06	2.8746-06	3.2550-06	3.6378-06	4.0855-06	4.5838-06	5.1380-06	5.7540-06
1.0+06	4.8063-1E	5.6271-1E	6.6920-1E	7.8915-1E	9.3033-1E	1.0965-1E	1.2921-1E	1.5226-1E	1.7940-1E	2.1140-1E
1.0+09	1.2567-23	1.5943-23	1.9610-23	2.4134-23	2.9722-23	3.6629-23	4.5178-23	5.5772-23	6.8917-23	8.5250-23

TABLE I.. CONT. RELATIVISTIC HARTREE-FOCK ATOMIC FORM FACTOR, F(X,Z)

$X_s$ SIN(THETA/2) /LAMBDA	61 PM	62 SM	63 EU	64 GD	65 TB	66 DY	67 HD	68 ER	69 TM	70 YB
0.0	6.1000+01	6.2000+01	6.3000+01	6.4000+01	6.5000+01	6.6000+01	6.7000+01	6.8000+01	6.9000+01	7.0000+01
1.0-02	6.0532+01	6.1534+01	6.2536+01	6.3538+01	6.4540+01	6.5542+01	6.6544+01	6.7546+01	6.8548+01	6.9550+01
2.0-02	6.0734+01	6.1740+01	6.2746+01	6.3752+01	6.4758+01	6.5764+01	6.6770+01	6.7776+01	6.8782+01	6.9788+01
3.0-02	6.0417+01	6.1428+01	6.2441+01	6.3457+01	6.4474+01	6.5491+01	6.6509+01	6.7527+01	6.8545+01	6.9563+01
4.0-02	5.9598+01	6.1017+01	6.2036+01	6.3054+01	6.4071+01	6.5088+01	6.6106+01	6.7124+01	6.8142+01	6.9160+01
5.0-02	5.9497+01	6.0525+01	6.1552+01	6.2580+01	6.3607+01	6.4635+01	6.5663+01	6.6691+01	6.7719+01	6.8747+01
6.0-02	5.8536+01	5.9572+01	6.1007+01	6.2004+01	6.3037+01	6.4105+01	6.5166+01	6.6227+01	6.7288+01	6.8349+01
7.0-02	5.8533+01	5.9377+01	6.0419+01	6.1400+01	6.2499+01	6.3538+01	6.4513+01	6.5513+01	6.6649+01	6.7684+01
8.0-02	5.7703+01	5.8753+01	5.9801+01	6.0762+01	6.1894+01	6.2940+01	6.3895+01	6.5028+01	6.6070+01	6.7112+01
9.0-02	5.7057+01	5.8113+01	5.9166+01	6.0102+01	6.1270+01	6.2321+01	6.3251+01	6.4420+01	6.5468+01	6.6516+01
1.0-01	5.6403+01	5.7463+01	5.8521+01	5.9427+01	6.0634+01	6.1689+01	6.2591+01	6.3798+01	6.4852+01	6.5904+01
1.1-01	5.5744+01	5.6809+01	5.7869+01	5.8746+01	5.9989+01	6.1049+01	6.1921+01	6.3167+01	6.4224+01	6.5281+01
1.2-01	5.5084+01	5.6151+01	5.7214+01	5.8061+01	5.9340+01	6.0403+01	6.1247+01	6.2528+01	6.3589+01	6.4650+01
1.3-01	5.4422+01	5.5491+01	5.6555+01	5.7375+01	5.8686+01	5.9752+01	6.0581+01	6.1884+01	6.2948+01	6.4012+01
1.4-01	5.3758+01	5.4828+01	5.5893+01	5.6690+01	5.8029+01	5.9097+01	5.9891+01	6.1234+01	6.2301+01	6.3368+01
1.5-01	5.3091+01	5.4163+01	5.5228+01	5.6005+01	5.7356+01	5.8437+01	5.9212+01	6.0578+01	6.1648+01	6.2718+01
1.6-01	5.2422+01	5.3493+01	5.4559+01	5.5321+01	5.6699+01	5.7771+01	5.8532+01	6.0917+01	6.0989+01	6.2062+01
1.7-01	5.1749+01	5.2821+01	5.3886+01	5.4637+01	5.6028+01	5.7101+01	5.7851+01	6.0249+01	6.0324+01	6.1399+01
1.8-01	5.1074+01	5.2145+01	5.3210+01	5.3953+01	5.5351+01	5.6425+01	5.7169+01	6.0576+01	6.0653+01	6.1729+01
1.9-01	5.0398+01	5.1467+01	5.2530+01	5.3270+01	5.4670+01	5.5744+01	5.6486+01	6.0789+01	6.0875+01	6.1953+01
2.0-01	4.9720+01	5.0786+01	5.1847+01	5.2588+01	5.3985+01	5.5059+01	5.5803+01	6.0922+01	6.1012+01	6.2092+01
2.2-01	4.8567+01	4.9626+01	5.0680+01	5.1227+01	5.2610+01	5.3681+01	5.4431+01	6.0933+01	6.1024+01	6.2104+01
2.4-01	4.7026+01	4.8074+01	4.9119+01	4.9877+01	5.1234+01	5.2300+01	5.3070+01	6.0944+01	6.1035+01	6.2115+01
2.5-01	4.6364+01	4.7406+01	4.8444+01	4.9209+01	5.0569+01	5.1611+01	5.2390+01	6.0955+01	6.1046+01	6.2126+01
2.6-01	4.5710+01	4.6743+01	4.7775+01	4.8546+01	4.9888+01	5.0926+01	5.1714+01	6.0966+01	6.1057+01	6.2137+01
2.8-01	4.4427+01	4.5443+01	4.6458+01	4.7240+01	4.8573+01	4.9570+01	5.0375+01	6.0977+01	6.1068+01	6.2148+01
3.0-01	4.3186+01	4.4180+01	4.5176+01	4.5965+01	4.7208+01	4.8240+01	4.9055+01	6.0988+01	6.1079+01	6.2159+01
3.2-01	4.1991+01	4.2961+01	4.3935+01	4.4729+01	4.5929+01	4.6944+01	4.7722+01	6.0999+01	6.1090+01	6.2170+01
3.4-01	4.0844+01	4.1789+01	4.2740+01	4.3533+01	4.4690+01	4.5686+01	4.6520+01	6.1010+01	6.1101+01	6.2181+01
3.5-01	4.0289+01	4.1221+01	4.2160+01	4.2951+01	4.4087+01	4.5073+01	4.5908+01	6.1021+01	6.1112+01	6.2192+01
3.6-01	3.9747+01	4.0666+01	4.1591+01	4.2380+01	4.3496+01	4.4471+01	4.5305+01	6.1032+01	6.1123+01	6.2203+01
3.8-01	3.8657+01	3.9589+01	4.0489+01	4.1272+01	4.2346+01	4.3299+01	4.4131+01	6.1043+01	6.1134+01	6.2214+01
4.0-01	3.7654+01	3.8559+01	3.9433+01	4.0207+01	4.1241+01	4.2171+01	4.2986+01	6.1054+01	6.1145+01	6.2225+01
4.2-01	3.6735+01	3.7573+01	3.8421+01	3.9184+01	4.0179+01	4.1086+01	4.1903+01	6.1065+01	6.1156+01	6.2236+01
4.4-01	3.5815+01	3.6627+01	3.7451+01	3.8203+01	3.9150+01	4.0042+01	4.0849+01	6.1076+01	6.1167+01	6.2247+01
4.5-01	3.5370+01	3.6169+01	3.6960+01	3.7726+01	3.8665+01	3.9536+01	4.0337+01	6.1087+01	6.1178+01	6.2258+01
4.6-01	3.4933+01	3.5720+01	3.6519+01	3.7259+01	3.8180+01	3.9039+01	3.9834+01	6.1098+01	6.1189+01	6.2269+01
4.8-01	3.4085+01	3.4848+01	3.5623+01	3.6352+01	3.7273+01	3.8073+01	3.8856+01	6.1109+01	6.1200+01	6.2280+01
5.0-01	3.3269+01	3.4008+01	3.4761+01	3.5479+01	3.6399+01	3.7143+01	3.7914+01	6.1120+01	6.1211+01	6.2291+01
5.5-01	3.1349+01	3.2036+01	3.2737+01	3.3428+01	3.4199+01	3.4958+01	3.5699+01	6.1131+01	6.1222+01	6.2302+01
6.0-01	2.9581+01	3.0222+01	3.0877+01	3.1543+01	3.2243+01	3.2953+01	3.3644+01	6.1142+01	6.1233+01	6.2313+01
6.5-01	2.7948+01	2.8547+01	2.9161+01	2.9802+01	3.0488+01	3.1103+01	3.1766+01	6.1153+01	6.1244+01	6.2324+01
7.0-01	2.6442+01	2.7002+01	2.7576+01	2.8152+01	2.8722+01	2.9394+01	3.0049+01	6.1164+01	6.1255+01	6.2335+01
8.0-01	2.3796+01	2.4281+01	2.4781+01	2.5335+01	2.5822+01	2.6366+01	2.6958+01	6.1175+01	6.1266+01	6.2346+01
9.0-01	2.1616+01	2.2030+01	2.2459+01	2.2940+01	2.3353+01	2.3821+01	2.4333+01	6.1186+01	6.1277+01	6.2357+01
1.0+00	1.9853+01	2.0202+01	2.0665+01	2.0570+01	2.1353+01	2.1721+01	2.2167+01	6.1197+01	6.1288+01	6.2368+01
1.1+00	1.8430+01	1.8728+01	1.9035+01	1.9372+01	1.9675+01	2.0011+01	2.0385+01	6.1208+01	6.1299+01	6.2379+01
1.2+00	1.7262+01	1.7523+01	1.7789+01	1.8072+01	1.8338+01	1.8623+01	1.8934+01	6.1219+01	6.1310+01	6.2390+01
1.3+00	1.6266+01	1.6507+01	1.6747+01	1.6995+01	1.7234+01	1.7483+01	1.7746+01	6.1230+01	6.1321+01	6.2401+01
1.4+00	1.5378+01	1.5617+01	1.5841+01	1.6072+01	1.6296+01	1.6522+01	1.6753+01	6.1241+01	6.1332+01	6.2412+01

FORM FACTORS AND PHOTON SCATTERING CROSS SECTIONS

$X_p$ SIN(THETA/2) /LAMBDA	61 PM	62 SM	63 EU	64 GD	65 TB	66 DY	67 HO	68 ER	69 TM	70 YB
1.5+00	1.4551+01	1.4790+01	1.5020+01	1.5217+01	1.5465+01	1.5630+01	1.5895+01	1.6107+01	1.6321+01	1.6536+01
1.6+00	1.3755+01	1.4005+01	1.4245+01	1.4477+01	1.4697+01	1.4913+01	1.5123+01	1.5329+01	1.5533+01	1.5735+01
1.7+00	1.2580+01	1.3243+01	1.3494+01	1.3711+01	1.3998+01	1.4190+01	1.4406+01	1.4612+01	1.4815+01	1.5013+01
1.8+00	1.2220+01	1.2497+01	1.2763+01	1.3022+01	1.3259+01	1.3491+01	1.3718+01	1.3929+01	1.4137+01	1.4338+01
1.9+00	1.1481+01	1.1767+01	1.2044+01	1.2317+01	1.2564+01	1.2808+01	1.3047+01	1.3267+01	1.3483+01	1.3691+01
2.0+00	1.0773+01	1.1064+01	1.1345+01	1.1631+01	1.1886+01	1.2111+01	1.2392+01	1.2621+01	1.2847+01	1.3064+01
2.2+00	9.4549+00	9.7411+00	1.0023+01	1.0300+01	1.0570+01	1.0834+01	1.1092+01	1.1342+01	1.1587+01	1.1825+01
2.4+00	8.3866+00	8.5993+00	8.8617+00	9.1256+00	9.3902+00	9.6540+00	9.9174+00	1.0174+01	1.0426+01	1.0674+01
2.5+00	7.6560+00	8.1011+00	8.3480+00	8.6015+00	8.8565+00	9.1113+00	9.3722+00	9.6280+00	9.8800+00	1.0128+01
2.6+00	7.4214+00	7.6473+00	7.8789+00	8.1174+00	8.3616+00	8.6098+00	8.8600+00	9.1101+00	9.3581+00	9.6034+00
2.8+00	6.6873+00	6.8763+00	7.0733+00	7.2798+00	7.4950+00	7.7173+00	7.9447+00	8.1753+00	8.4070+00	8.6395+00
3.0+00	6.1144+00	6.2654+00	6.4330+00	6.6070+00	6.7908+00	6.9832+00	7.1824+00	7.3870+00	7.5952+00	7.8068+00
3.3+00	5.4516+00	5.6056+00	5.7270+00	5.8578+00	5.9977+00	6.1460+00	6.3016+00	6.4634+00	6.6306+00	6.8029+00
3.5+00	5.1805+00	5.2765+00	5.3780+00	5.4870+00	5.6035+00	5.7271+00	5.8571+00	5.9930+00	6.1343+00	6.2812+00
3.6+00	5.0462+00	5.1360+00	5.2304+00	5.3310+00	5.4380+00	5.5510+00	5.6699+00	5.7943+00	5.9239+00	6.0590+00
3.9+00	4.6958+00	4.7764+00	4.8585+00	4.9427+00	5.0295+00	5.1192+00	5.2124+00	5.3095+00	5.4110+00	5.5170+00
4.0+00	4.5657+00	4.6656+00	4.7500+00	4.8313+00	4.9141+00	4.9999+00	5.0863+00	5.1770+00	5.2716+00	5.3704+00
4.2+00	4.3863+00	4.4668+00	4.5464+00	4.6251+00	4.7034+00	4.7820+00	4.8619+00	4.9437+00	5.0284+00	5.1161+00
4.6+00	4.0077+00	4.0868+00	4.1704+00	4.2511+00	4.3291+00	4.4053+00	4.4803+00	4.5551+00	4.6303+00	4.7063+00
5.0+00	3.6314+00	3.7231+00	3.8120+00	3.8974+00	3.9796+00	4.0588+00	4.1358+00	4.2110+00	4.2850+00	4.3581+00
5.4+00	3.2751+00	3.3692+00	3.4612+00	3.5502+00	3.6363+00	3.7196+00	3.8004+00	3.8791+00	3.9559+00	4.0310+00
5.5+00	3.1889+00	3.2831+00	3.3755+00	3.4651+00	3.5520+00	3.6363+00	3.7182+00	3.7980+00	3.8758+00	3.9519+00
5.8+00	2.9387+00	3.0325+00	3.1252+00	3.2162+00	3.3051+00	3.3922+00	3.4773+00	3.5606+00	3.6422+00	3.7221+00
6.0+00	2.7797+00	2.8726+00	2.9650+00	3.0553+00	3.1463+00	3.2350+00	3.3222+00	3.4080+00	3.4924+00	3.5752+00
6.2+00	2.6317+00	2.7218+00	2.8120+00	2.9020+00	2.9917+00	3.0817+00	3.1699+00	3.2560+00	3.3419+00	3.4263+00
6.6+00	2.3648+00	2.4489+00	2.5340+00	2.6197+00	2.7059+00	2.7923+00	2.8797+00	2.9650+00	3.0510+00	3.1364+00
7.0+00	2.1361+00	2.2122+00	2.2900+00	2.3694+00	2.4501+00	2.5319+00	2.6147+00	2.6980+00	2.7816+00	2.8653+00
7.4+00	1.9428+00	2.0108+00	2.0810+00	2.1530+00	2.2268+00	2.3021+00	2.3789+00	2.4570+00	2.5362+00	2.6163+00
8.0+00	1.7115+00	1.7676+00	1.8260+00	1.8866+00	1.9494+00	2.0143+00	2.0812+00	2.1500+00	2.2206+00	2.2927+00
9.0+00	1.4467+00	1.4863+00	1.5280+00	1.5719+00	1.6180+00	1.6662+00	1.7166+00	1.7690+00	1.8234+00	1.8799+00
1.0+01	1.2781+00	1.3074+00	1.3380+00	1.3701+00	1.4038+00	1.4392+00	1.4762+00	1.5150+00	1.5557+00	1.5982+00
1.1+01	1.1600+00	1.1836+00	1.2080+00	1.2333+00	1.2596+00	1.2869+00	1.3153+00	1.3450+00	1.3760+00	1.4084+00
1.2+01	1.0688+00	1.0858+00	1.1110+00	1.1366+00	1.1648+00	1.1775+00	1.2009+00	1.2250+00	1.2500+00	1.2759+00
1.4+01	9.1737-01	9.3772-01	9.5790-01	9.7798-01	9.9799-01	1.0180+00	1.0380+00	1.0580+00	1.0781+00	1.0984+00
1.6+01	7.8317-01	8.0421-01	8.2500-01	8.4584-01	8.6585-01	8.8594-01	9.0585-01	9.2560-01	9.4524-01	9.6479-01
1.8+01	6.6237-01	6.8345-01	7.0440-01	7.2532-01	7.4590-01	7.6643-01	7.8680-01	8.0700-01	8.2704-01	8.4694-01
2.0+01	5.5660-01	5.7654-01	5.9730-01	6.1766-01	6.3800-01	6.5831-01	6.7858-01	6.9880-01	7.1896-01	7.3905-01
2.2+01	4.6627-01	4.8531-01	5.0450-01	5.2383-01	5.4327-01	5.6281-01	5.8242-01	6.0210-01	6.2182-01	6.4157-01
2.5+01	3.5782-01	3.7443-01	3.9130-01	4.0833-01	4.2582-01	4.4343-01	4.6126-01	4.7930-01	4.9753-01	5.1593-01
2.8+01	2.7620-01	2.9034-01	3.0480-01	3.1958-01	3.3466-01	3.5004-01	3.6572-01	3.8170-01	3.9797-01	4.1452-01
3.1+01	1.9522-01	2.2709-01	2.3930-01	2.5185-01	2.6474-01	2.7796-01	2.9151-01	3.0540-01	3.1962-01	3.3416-01
3.5+01	1.5690-01	1.6623-01	1.7590-01	1.8592-01	1.9628-01	2.0698-01	2.1802-01	2.2940-01	2.4111-01	2.5315-01
4.0+01	1.0875-01	1.1568-01	1.2290-01	1.3083-01	1.3827-01	1.4643-01	1.5491-01	1.6281-01	1.7281-01	1.8225-01
4.5+01	7.7587-02	8.2824-02	8.8310-02	9.4033-02	1.0006-01	1.0633-01	1.1288-01	1.1970-01	1.2680-01	1.3419-01
5.0+01	5.6871-02	6.0882-02	6.5100-02	6.9530-02	7.4177-02	7.9050-02	8.4155-02	8.9500-02	9.5091-02	1.0094-01
7.0+01	2.0341-02	2.1947-02	2.3651-02	2.5459-02	2.7376-02	2.9406-02	3.1557-02	3.3835-02	3.6247-02	3.8799-02
1.0+02	6.6432-03	7.2154-03	7.8290-03	8.4867-03	9.1911-03	9.9446-03	1.0750-02	1.1610-02	1.2528-02	1.3506-02
1.0+03	6.4383-06	7.1980-06	8.0410-06	8.9761-06	1.0013-05	1.1163-05	1.2437-05	1.3850-05	1.5416-05	1.7151-05
1.0+06	2.4913-14	2.9365-14	3.4620-14	4.0826-14	4.8160-14	5.6833-14	6.7099-14	7.9260-14	9.3680-14	1.1079-13
1.0+09	1.0557-22	1.5090-22	1.6250-22	1.8200-22	2.5147-22	3.1351-22	3.9146-22	4.8960-22	6.1339-22	7.6984-22

TABLE I., CONT. RELATIVISTIC HARTREE-FOCK ATOMIC FORM FACTOR,  $F(x, Z)$ 

$X$ , SIN(THETA/2) /LAMBDA	71 LU	72 HF	73 TA	74 W	75 RE	76 OS	77 IR	78 PT	79 AU	80 HG
0.0	7.1000+01	7.2000+01	7.3000+01	7.4000+01	7.5000+01	7.6000+01	7.7000+01	7.8000+01	7.9000+01	8.0000+01
1.0-02	7.0544+01	7.1945+01	7.2946+01	7.3948+01	7.4949+01	7.5950+01	7.6951+01	7.7952+01	7.8953+01	7.9954+01
2.0-02	7.0778+01	7.1783+01	7.2788+01	7.3793+01	7.4797+01	7.5801+01	7.6806+01	7.7810+01	7.8815+01	7.9819+01
3.0-02	7.0609+01	7.1518+01	7.2529+01	7.3539+01	7.4548+01	7.5558+01	7.6567+01	7.7576+01	7.8585+01	7.9594+01
4.0-02	7.0148+01	7.1161+01	7.2177+01	7.3194+01	7.4209+01	7.5225+01	7.6240+01	7.7255+01	7.8270+01	7.9285+01
5.0-02	6.9707+01	7.0723+01	7.1745+01	7.2767+01	7.3788+01	7.4810+01	7.5832+01	7.6854+01	7.7876+01	7.8898+01
6.0-02	6.9202+01	7.0217+01	7.1242+01	7.2265+01	7.3295+01	7.4323+01	7.5352+01	7.6381+01	7.7411+01	7.8439+01
7.0-02	6.8646+01	6.9656+01	7.0680+01	7.1711+01	7.2740+01	7.3772+01	7.4806+01	7.5840+01	7.6874+01	7.7907+01
8.0-02	6.8051+01	6.9052+01	7.0072+01	7.1103+01	7.2132+01	7.3167+01	7.4206+01	7.5240+01	7.6273+01	7.7306+01
9.0-02	6.7429+01	6.8416+01	6.9428+01	7.0455+01	7.1482+01	7.2518+01	7.3558+01	7.4591+01	7.5627+01	7.6669+01
1.0-01	6.6789+01	6.7757+01	6.8758+01	6.9778+01	7.0799+01	7.1832+01	7.2872+01	7.3916+01	7.4963+01	7.6018+01
1.1-01	6.6137+01	6.7083+01	6.8069+01	6.9078+01	7.0091+01	7.1119+01	7.2156+01	7.3200+01	7.4247+01	7.5303+01
1.2-01	6.5477+01	6.6400+01	6.7367+01	6.8363+01	6.9365+01	7.0384+01	7.1416+01	7.2456+01	7.3506+01	7.4559+01
1.3-01	6.4813+01	6.5711+01	6.6658+01	6.7637+01	6.8625+01	6.9634+01	7.0658+01	7.1702+01	7.2750+01	7.3790+01
1.4-01	6.4146+01	6.5044+01	6.5944+01	6.6906+01	6.7878+01	6.8874+01	6.9887+01	7.1130+01	7.2173+01	7.3001+01
1.5-01	6.3478+01	6.4326+01	6.5229+01	6.6172+01	6.7126+01	6.8107+01	6.9108+01	7.0343+01	7.1380+01	7.2198+01
1.6-01	6.2807+01	6.3634+01	6.4515+01	6.5437+01	6.6372+01	6.7327+01	6.8324+01	6.9346+01	7.0375+01	7.1385+01
1.7-01	6.2134+01	6.2942+01	6.3802+01	6.4703+01	6.5619+01	6.6566+01	6.7538+01	6.8742+01	6.9761+01	7.0564+01
1.8-01	6.1460+01	6.2251+01	6.3090+01	6.3972+01	6.4868+01	6.5797+01	6.6752+01	6.7934+01	6.8941+01	6.9740+01
1.9-01	6.0783+01	6.1566+01	6.2382+01	6.3243+01	6.4121+01	6.5031+01	6.5969+01	6.7125+01	6.8119+01	6.8914+01
2.0-01	6.0103+01	6.0870+01	6.1675+01	6.2519+01	6.3378+01	6.4261+01	6.5189+01	6.6317+01	6.7296+01	6.8088+01
2.2-01	5.8739+01	5.9492+01	6.0271+01	6.1082+01	6.1906+01	6.2761+01	6.3645+01	6.4709+01	6.5657+01	6.6447+01
2.4-01	5.7369+01	5.8113+01	5.8880+01	5.9663+01	6.0457+01	6.1278+01	6.2127+01	6.3125+01	6.4039+01	6.4828+01
2.5-01	5.6683+01	5.7434+01	5.8189+01	5.8961+01	5.9742+01	6.0548+01	6.1380+01	6.2344+01	6.3241+01	6.4029+01
2.6-01	5.5998+01	5.6752+01	5.7502+01	5.8285+01	5.9034+01	5.9825+01	6.0641+01	6.1571+01	6.2452+01	6.3259+01
2.8-01	5.4634+01	5.5396+01	5.6141+01	5.6888+01	5.7637+01	5.8387+01	5.9189+01	6.0056+01	6.0902+01	6.1687+01
3.0-01	5.3282+01	5.4054+01	5.4799+01	5.5536+01	5.6270+01	5.7013+01	5.7733+01	5.8528+01	5.9395+01	6.0177+01
3.2-01	5.1950+01	5.2733+01	5.3479+01	5.4210+01	5.4932+01	5.5658+01	5.6395+01	5.7182+01	5.7935+01	5.8711+01
3.4-01	5.0642+01	5.1435+01	5.2185+01	5.2918+01	5.3627+01	5.4339+01	5.5056+01	5.5769+01	5.6523+01	5.7292+01
3.5-01	4.9598+01	5.0796+01	5.1548+01	5.2274+01	5.2986+01	5.3692+01	5.4401+01	5.5094+01	5.5835+01	5.6600+01
3.6-01	4.9363+01	5.0164+01	5.0918+01	5.1644+01	5.2354+01	5.3055+01	5.3756+01	5.4432+01	5.5160+01	5.5920+01
3.8-01	4.8117+01	4.8924+01	4.9683+01	5.0409+01	5.1114+01	5.1807+01	5.2496+01	5.3141+01	5.3846+01	5.4595+01
4.0-01	4.6506+01	4.7717+01	4.8479+01	4.9205+01	4.9910+01	5.0596+01	5.1274+01	5.1937+01	5.2581+01	5.3318+01
4.2-01	4.5731+01	4.6543+01	4.7308+01	4.8036+01	4.8739+01	4.9422+01	5.0091+01	5.0697+01	5.1363+01	5.2088+01
4.4-01	4.4893+01	4.5405+01	4.6171+01	4.6900+01	4.7603+01	4.8283+01	4.8946+01	4.9540+01	5.0191+01	5.0902+01
4.5-01	4.4038+01	4.4845+01	4.5615+01	4.6344+01	4.7048+01	4.7726+01	4.8387+01	4.8977+01	4.9622+01	5.0326+01
4.6-01	4.3492+01	4.4301+01	4.5068+01	4.5797+01	4.6501+01	4.7179+01	4.7837+01	4.8424+01	4.9063+01	4.9761+01
4.8-01	4.2427+01	4.3234+01	4.3998+01	4.4728+01	4.5439+01	4.6109+01	4.6765+01	4.7347+01	4.7976+01	4.8661+01
5.0-01	4.1398+01	4.2197+01	4.2962+01	4.3691+01	4.4396+01	4.5072+01	4.5726+01	4.6308+01	4.6929+01	4.7601+01
5.5-01	3.8970+01	3.9752+01	4.0508+01	4.1236+01	4.1940+01	4.2617+01	4.3269+01	4.3860+01	4.4469+01	4.5113+01
6.0-01	3.6733+01	3.7494+01	3.8238+01	3.8960+01	3.9662+01	4.0340+01	4.0994+01	4.1601+01	4.2207+01	4.2829+01
6.5-01	3.4666+01	3.5404+01	3.6132+01	3.6846+01	3.7544+01	3.8222+01	3.8878+01	3.9502+01	4.0110+01	4.0718+01
7.0-01	3.2752+01	3.3465+01	3.4175+01	3.4878+01	3.5569+01	3.6244+01	3.6901+01	3.7539+01	3.8153+01	3.8753+01
8.0-01	2.9334+01	2.9995+01	3.0658+01	3.1327+01	3.1993+01	3.2654+01	3.3305+01	3.3958+01	3.4581+01	3.5176+01
9.0-01	2.6413+01	2.7006+01	2.7618+01	2.8236+01	2.8865+01	2.9495+01	3.0125+01	3.0766+01	3.1387+01	3.1980+01
1.0+00	2.3950+01	2.4473+01	2.5016+01	2.5576+01	2.6148+01	2.6732+01	2.7323+01	2.7930+01	2.8530+01	2.9112+01
1.1+00	2.1902+01	2.2353+01	2.2823+01	2.3313+01	2.3821+01	2.4345+01	2.4882+01	2.5437+01	2.5998+01	2.6554+01
1.2+00	2.0219+01	2.0596+01	2.0998+01	2.1418+01	2.1856+01	2.2314+01	2.2789+01	2.3281+01	2.3789+01	2.4303+01
1.3+00	1.8842+01	1.9155+01	1.9494+01	1.9847+01	2.0219+01	2.0610+01	2.1019+01	2.1445+01	2.1892+01	2.2354+01
1.4+00	1.7709+01	1.7975+01	1.8256+01	1.8552+01	1.8864+01	1.9194+01	1.9541+01	1.9902+01	2.0287+01	2.0692+01

FORM FACTORS AND PHOTON SCATTERING CROSS SECTIONS

X.  
SIN(THETA/2)  
/LAMBDA

	71 LU	72 HF	73 TA	74 W	75 RE	76 GS	77 IR	78 PT	79 AU	80 HG
1.5+00	1.6759+01	1.6588+01	1.7228+01	1.7478+01	1.7742+01	1.8019+01	1.8312+01	1.8616+01	1.8943+01	1.9290+01
1.6+00	1.5939+01	1.6145+01	1.6356+01	1.6575+01	1.6801+01	1.7038+01	1.7287+01	1.7545+01	1.7821+01	1.8116+01
1.7+00	1.5208+01	1.5403+01	1.5598+01	1.5796+01	1.5993+01	1.6208+01	1.6422+01	1.6644+01	1.6880+01	1.7131+01
1.8+00	1.4534+01	1.4727+01	1.4916+01	1.5104+01	1.5293+01	1.5483+01	1.5678+01	1.5878+01	1.6081+01	1.6298+01
1.9+00	1.3894+01	1.4091+01	1.4282+01	1.4469+01	1.4653+01	1.4835+01	1.5018+01	1.5202+01	1.5388+01	1.5581+01
2.0+00	1.3277+01	1.3481+01	1.3679+01	1.3871+01	1.4057+01	1.4239+01	1.4418+01	1.4595+01	1.4770+01	1.4949+01
2.2+00	1.2256+01	1.2281+01	1.2499+01	1.2710+01	1.2916+01	1.3119+01	1.3320+01	1.3520+01	1.3719+01	1.3914+01
2.4+00	1.0516+01	1.1153+01	1.1386+01	1.1613+01	1.1836+01	1.2054+01	1.2264+01	1.2467+01	1.2663+01	1.2854+01
2.5+00	1.0372+01	1.0612+01	1.0848+01	1.1081+01	1.1311+01	1.1536+01	1.1755+01	1.1966+01	1.2168+01	1.2360+01
2.6+00	9.8462+00	1.0087+01	1.0325+01	1.0561+01	1.0795+01	1.1026+01	1.1251+01	1.1470+01	1.1680+01	1.1881+01
2.8+00	8.6726+00	9.1064+00	9.3408+00	9.5758+00	9.8113+00	1.0046+01	1.0278+01	1.0507+01	1.0729+01	1.0945+01
3.0+00	8.0216+00	8.2356+00	8.4607+00	8.6950+00	8.9121+00	9.1111+00	9.3706+00	9.5994+00	9.8260+00	1.0049+01
3.3+00	6.5806+00	7.1635+00	7.3529+00	7.5478+00	7.7486+00	7.9547+00	8.1650+00	8.3785+00	8.5940+00	8.8104+00
3.5+00	6.4338+00	6.5924+00	6.7574+00	6.9290+00	7.1075+00	7.2923+00	7.4828+00	7.6780+00	7.8780+00	8.0810+00
3.6+00	6.1598+00	6.3467+00	6.4958+00	6.6566+00	6.8263+00	6.9955+00	7.1789+00	7.3638+00	7.5538+00	7.7482+00
3.9+00	5.6280+00	5.7440+00	5.8655+00	5.9266+00	6.1257+00	6.2649+00	6.4104+00	6.5623+00	6.7207+00	6.8858+00
4.0+00	5.4735+00	5.5814+00	5.6941+00	5.8120+00	5.9353+00	6.0644+00	6.1995+00	6.3409+00	6.4890+00	6.6440+00
4.2+00	5.2071+00	5.317+00	5.4300+00	5.5023+00	5.6099+00	5.7202+00	5.8367+00	5.9590+00	6.0876+00	6.2231+00
4.6+00	4.7834+00	4.8615+00	4.9411+00	5.0222+00	5.1052+00	5.1907+00	5.2792+00	5.3717+00	5.4687+00	5.5709+00
5.0+00	4.4304+00	4.5020+00	4.5731+00	4.6440+00	4.7149+00	4.7862+00	4.8588+00	4.9331+00	5.0100+00	5.0900+00
5.4+00	4.1044+00	4.1762+00	4.2466+00	4.3156+00	4.3835+00	4.4506+00	4.5174+00	4.5844+00	4.6520+00	4.7208+00
5.5+00	4.0263+00	4.0989+00	4.1700+00	4.2395+00	4.3077+00	4.3749+00	4.4415+00	4.5079+00	4.5745+00	4.6419+00
5.8+00	3.6002+00	3.8765+00	3.9511+00	4.0239+00	4.0950+00	4.1646+00	4.2328+00	4.2998+00	4.3659+00	4.4314+00
6.0+00	3.6564+00	3.7360+00	3.8139+00	3.8900+00	3.9643+00	4.0369+00	4.1076+00	4.1767+00	4.2440+00	4.3100+00
6.2+00	3.5530+00	3.5506+00	3.6702+00	3.7480+00	3.8239+00	3.8980+00	3.9703+00	4.0410+00	4.1100+00	4.1776+00
6.6+00	3.2210+00	3.3046+00	3.3870+00	3.4680+00	3.5473+00	3.6249+00	3.7009+00	3.7752+00	3.8480+00	3.9193+00
7.0+00	2.9489+00	3.0322+00	3.1150+00	3.1970+00	3.2781+00	3.3581+00	3.4370+00	3.5146+00	3.5910+00	3.6661+00
7.4+00	2.6571+00	2.7783+00	2.8597+00	2.9410+00	3.0219+00	3.1024+00	3.1822+00	3.2615+00	3.3400+00	3.4177+00
8.0+00	2.3664+00	2.4413+00	2.5172+00	2.5940+00	2.6713+00	2.7491+00	2.8272+00	2.9055+00	2.9840+00	3.0625+00
9.0+00	1.9383+00	1.9586+00	2.0609+00	2.1250+00	2.1909+00	2.2586+00	2.3278+00	2.3983+00	2.4700+00	2.5427+00
1.0+01	1.6427+00	1.6891+00	1.7375+00	1.7880+00	1.8405+00	1.8951+00	1.9515+00	2.0099+00	2.0700+00	2.1318+00
1.1+01	1.4423+00	1.4778+00	1.5150+00	1.5540+00	1.5949+00	1.6377+00	1.6824+00	1.7288+00	1.7770+00	1.8269+00
1.2+01	1.3629+00	1.3310+00	1.3603+00	1.3910+00	1.4232+00	1.4568+00	1.4920+00	1.5287+00	1.5670+00	1.6069+00
1.4+01	1.1190+00	1.1359+00	1.1612+00	1.1830+00	1.2055+00	1.2286+00	1.2525+00	1.2773+00	1.3030+00	1.3297+00
1.6+01	9.8430-01	1.0038+00	1.0234+00	1.0430+00	1.0628+00	1.0827+00	1.1029+00	1.1233+00	1.1440+00	1.1650+00
1.8+01	8.6671-01	8.8637-01	9.0596-01	9.2550-01	9.4503-01	9.6455-01	9.8405-01	1.0035+00	1.0230+00	1.0425+00
2.0+01	7.5907-01	7.7901-01	7.9889-01	8.1870-01	8.3845-01	8.5814-01	8.7777-01	8.9736-01	9.1690-01	9.3642-01
2.2+01	6.6134-01	6.8113-01	7.0091-01	7.2070-01	7.4048-01	7.6025-01	7.8002-01	7.9977-01	8.1950-01	8.3922-01
2.5+01	5.3450-01	5.5323-01	5.7210-01	5.9110-01	6.1023-01	6.2948-01	6.4883-01	6.6827-01	6.8780-01	7.0741-01
2.8+01	4.3135-01	4.4843-01	4.6575-01	4.8330-01	5.0107-01	5.1905-01	5.3723-01	5.5562-01	5.7420-01	5.9298-01
3.1+01	3.4903-01	3.6421-01	3.7970-01	3.9550-01	4.1160-01	4.2798-01	4.4465-01	4.6160-01	4.7880-01	4.9626-01
3.5+01	2.6553-01	2.7824-01	2.9130-01	3.0470-01	3.1846-01	3.3256-01	3.4701-01	3.6179-01	3.7690-01	3.9233-01
4.0+01	1.9201-01	2.0210-01	2.1253-01	2.2330-01	2.3442-01	2.4588-01	2.5770-01	2.6987-01	2.8240-01	2.9529-01
4.5+01	1.4187-01	1.4986-01	1.5817-01	1.6680-01	1.7577-01	1.8508-01	1.9472-01	2.0470-01	2.1500-01	2.2563-01
5.0+01	1.0704-01	1.1341-01	1.2007-01	1.2700-01	1.3422-01	1.4175-01	1.4958-01	1.5773-01	1.6620-01	1.7501-01
7.0+01	4.1457-02	4.3436-02	4.7352-02	5.0520-02	5.3857-02	5.7370-02	6.1069-02	6.4966-02	6.9070-02	7.3394-02
1.0+02	1.4550-02	1.5662-02	1.6847-02	1.8110-02	1.9456-02	2.0889-02	2.2414-02	2.4036-02	2.5760-02	2.7591-02
1.0+03	1.5073-05	2.1202-05	2.3559-05	2.6170-05	2.9060-05	3.2261-05	3.5805-05	3.9731-05	4.4080-05	4.8899-05
1.0+06	1.3113-13	1.5531-13	1.8409-13	2.1840-13	2.5934-13	3.0826-13	3.6678-13	4.3689-13	5.2100-13	6.2206-13
1.0+09	5.6798-22	1.2195-21	1.5393-21	1.9470-21	2.4679-21	3.1351-21	3.9919-21	5.0949-21	6.5190-21	8.3626-21

TABLE I. CONT. RELATIVISTIC HARTREE-FOCK ATOMIC FORM FACTOR, F(X,Z)

X, SIN(THETA/2) /LAMBDA	81 TL	82 PB	83 BI	84 PD	85 AT	86 RN	87 FR	88 RA	89 AC	90 TH
0.0	3.1000+01	8.2000+01	8.3000+01	8.1000+01	8.5000+01	6.6000+01	8.7000+01	8.8000+01	8.9000+01	9.0000+01
1.0-02	8.0550+01	6.1945+01	8.2547+01	8.3944+01	8.4944+01	8.5945+01	8.6922+01	8.7915+01	8.8915+01	8.9916+01
2.0-02	8.0759+01	8.1792+01	8.2784+01	8.3778+01	8.4776+01	8.5772+01	8.6764+01	8.7664+01	8.8664+01	8.9669+01
3.0-02	8.0953+01	8.1536+01	8.2518+01	8.3506+01	8.4502+01	8.5502+01	8.6332+01	8.7263+01	8.8260+01	8.9269+01
4.0-02	8.0217+01	8.1186+01	8.2154+01	8.3134+01	8.4125+01	8.5123+01	8.5854+01	8.6734+01	8.7723+01	8.8735+01
5.0-02	8.0758+01	6.0750+01	8.1700+01	8.2659+01	8.3658+01	8.4649+01	8.5286+01	8.6104+01	8.7077+01	8.8085+01
6.0-02	7.9305+01	8.0237+01	8.1167+01	8.2121+01	8.3098+01	8.4087+01	8.4647+01	8.5397+01	8.6346+01	8.7344+01
7.0-02	7.8748+01	7.9656+01	8.0563+01	8.1501+01	8.2466+01	8.3448+01	8.3955+01	8.4638+01	8.5553+01	8.6533+01
8.0-02	7.8134+01	7.9018+01	7.9901+01	8.0819+01	8.1770+01	8.2742+01	8.3222+01	8.3845+01	8.4719+01	8.5672+01
9.0-02	7.7473+01	7.8332+01	7.9189+01	8.0086+01	8.1020+01	8.1979+01	8.2457+01	8.3030+01	8.3859+01	8.4779+01
1.0-01	7.6773+01	7.7607+01	7.8438+01	7.9312+01	8.0226+01	8.1169+01	8.1666+01	8.2202+01	8.2985+01	8.3867+01
1.1-01	7.6042+01	7.6851+01	7.7657+01	7.8506+01	7.9398+01	8.0322+01	8.0852+01	8.1368+01	8.2105+01	8.2946+01
1.2-01	7.5284+01	7.6071+01	7.6852+01	7.7677+01	7.8545+01	7.9448+01	8.0018+01	8.0528+01	8.1225+01	8.2025+01
1.3-01	7.4507+01	7.5274+01	7.6032+01	7.6831+01	7.7674+01	7.8554+01	7.9167+01	7.9885+01	8.0348+01	8.1107+01
1.4-01	7.3715+01	7.4464+01	7.5202+01	7.5976+01	7.6794+01	7.7648+01	7.8303+01	7.8839+01	7.9474+01	8.0196+01
1.5-01	7.2912+01	7.3645+01	7.4365+01	7.5117+01	7.5908+01	7.6737+01	7.7430+01	7.7990+01	7.8605+01	7.9294+01
1.6-01	7.2101+01	7.2822+01	7.3527+01	7.4257+01	7.5023+01	7.5826+01	7.6550+01	7.7138+01	7.7739+01	7.8400+01
1.7-01	7.1285+01	7.1997+01	7.2689+01	7.3400+01	7.4143+01	7.4920+01	7.5667+01	7.6285+01	7.6879+01	7.7516+01
1.8-01	7.0467+01	7.1172+01	7.1855+01	7.2549+01	7.3269+01	7.4021+01	7.4785+01	7.5431+01	7.6023+01	7.6642+01
1.9-01	6.9648+01	7.0349+01	7.1026+01	7.1706+01	7.2405+01	7.3133+01	7.3907+01	7.4578+01	7.5172+01	7.5777+01
2.0-01	6.8830+01	6.9530+01	7.0203+01	7.0871+01	7.1553+01	7.2258+01	7.3035+01	7.3728+01	7.4326+01	7.4922+01
2.2-01	6.7205+01	6.7907+01	6.8578+01	6.9232+01	6.9885+01	7.0552+01	7.1230+01	7.2043+01	7.2654+01	7.3242+01
2.4-01	6.5600+01	6.6310+01	6.6987+01	6.7634+01	6.8269+01	6.8907+01	6.9653+01	7.0389+01	7.1014+01	7.1602+01
2.5-01	6.4807+01	6.5523+01	6.6204+01	6.6852+01	6.7481+01	6.8109+01	6.8841+01	6.9576+01	7.0208+01	7.0795+01
2.6-01	6.4022+01	6.4743+01	6.5430+01	6.6080+01	6.6706+01	6.7325+01	6.8043+01	6.8775+01	6.9412+01	7.0005+01
2.8-01	6.2476+01	6.3210+01	6.3909+01	6.4567+01	6.5193+01	6.5802+01	6.6491+01	6.7210+01	6.7855+01	6.8454+01
3.0-01	6.0570+01	6.1712+01	6.2425+01	6.3093+01	6.3725+01	6.4332+01	6.4916+01	6.5696+01	6.6345+01	6.6951+01
3.2-01	5.9503+01	6.0253+01	6.0577+01	6.1658+01	6.2301+01	6.2912+01	6.3556+01	6.4235+01	6.4884+01	6.5497+01
3.4-01	5.8479+01	5.8833+01	5.9566+01	6.0250+01	6.0915+01	6.1535+01	6.2167+01	6.2826+01	6.3473+01	6.4091+01
3.5-01	5.7383+01	5.8138+01	5.8875+01	5.9575+01	6.0236+01	6.0862+01	6.1489+01	6.2140+01	6.2785+01	6.3405+01
3.6-01	5.6698+01	5.7453+01	5.8153+01	5.8999+01	5.9566+01	6.0198+01	6.0823+01	6.1466+01	6.2110+01	6.2731+01
3.8-01	5.5362+01	5.6116+01	5.6859+01	5.7573+01	5.8253+01	5.8998+01	5.9520+01	6.0151+01	6.0792+01	6.1416+01
4.0-01	5.4722+01	5.4820+01	5.5263+01	5.6233+01	5.6974+01	5.7631+01	5.8256+01	5.8879+01	5.9517+01	6.0143+01
4.2-01	5.2626+01	5.3567+01	5.4306+01	5.5039+01	5.5728+01	5.6397+01	5.7026+01	5.7646+01	5.8282+01	5.8910+01
4.4-01	5.1625+01	5.2356+01	5.3089+01	5.3811+01	5.4515+01	5.5194+01	5.5829+01	5.6448+01	5.7084+01	5.7713+01
4.5-01	5.1041+01	5.1766+01	5.2495+01	5.3215+01	5.3921+01	5.4604+01	5.5242+01	5.5862+01	5.6497+01	5.7127+01
4.6-01	5.0467+01	5.1187+01	5.1910+01	5.2635+01	5.3353+01	5.4021+01	5.4653+01	5.5284+01	5.5919+01	5.6550+01
4.8-01	4.9352+01	5.0058+01	5.0771+01	5.1483+01	5.2189+01	5.2879+01	5.3527+01	5.4151+01	5.4787+01	5.5419+01
5.0-01	4.8276+01	4.8969+01	4.9669+01	5.0373+01	5.1075+01	5.1767+01	5.2420+01	5.3048+01	5.3684+01	5.4317+01
5.5-01	4.5753+01	4.6411+01	4.7077+01	4.7752+01	4.8435+01	4.9119+01	4.9777+01	5.0413+01	5.1050+01	5.1684+01
6.0-01	4.3442+01	4.4065+01	4.4700+01	4.5333+01	4.5997+01	4.6659+01	4.7310+01	4.7948+01	4.8580+01	4.9211+01
6.5-01	4.1313+01	4.1914+01	4.2517+01	4.3127+01	4.3750+01	4.4384+01	4.5017+01	4.5646+01	4.6268+01	4.6899+01
7.0-01	3.9337+01	3.9921+01	4.0501+01	4.1085+01	4.1678+01	4.2281+01	4.2811+01	4.3410+01	4.4110+01	4.4716+01
8.0-01	3.5755+01	3.6322+01	3.6879+01	3.7430+01	3.7980+01	3.8533+01	3.9095+01	3.9664+01	4.0229+01	4.0795+01
9.0-01	3.2561+01	3.3127+01	3.3680+01	3.4220+01	3.4751+01	3.5277+01	3.5804+01	3.6333+01	3.6863+01	3.7391+01
1.0+00	2.9687+01	3.0252+01	3.0805+01	3.1344+01	3.1872+01	3.2389+01	3.2901+01	3.3408+01	3.3912+01	3.4413+01
1.1+00	2.7109+01	2.7662+01	2.8208+01	2.8744+01	2.9271+01	2.9787+01	3.0292+01	3.0790+01	3.1283+01	3.1770+01
1.2+00	2.4824+01	2.5350+01	2.5875+01	2.6387+01	2.6915+01	2.7426+01	2.7926+01	2.8418+01	2.8906+01	2.9387+01
1.3+00	2.2627+01	2.3133+01	2.3604+01	2.4059+01	2.4499+01	2.4911+01	2.5291+01	2.5643+01	2.6044+01	2.6419+01
1.4+00	2.1110+01	2.1546+01	2.1992+01	2.2446+01	2.2909+01	2.3379+01	2.3845+01	2.4312+01	2.4779+01	2.5244+01

FORM FACTORS AND PHOTON SCATTERING CROSS SECTIONS

X* SIN(THETA/2) /LAMBDA	81 TL	82 PB	83 BI	84 PD	85 AT	86 RN	87 FR	88 RA	89 AC	90 TH
1.5+00	1.9652+01	2.0034+01	2.0429+01	2.0836+01	2.1256+01	2.1689+01	2.2123+01	2.2564+01	2.3008+01	2.3454+01
1.6+00	1.8424+01	1.8754+01	1.9097+01	1.9435+01	1.9826+01	2.0215+01	2.0608+01	2.1014+01	2.1427+01	2.1846+01
1.7+00	1.7394+01	1.7674+01	1.7969+01	1.8277+01	1.8602+01	1.8944+01	1.9295+01	1.9660+01	2.0036+01	2.0421+01
1.8+00	1.6524+01	1.6764+01	1.7017+01	1.7281+01	1.7562+01	1.7859+01	1.8165+01	1.8488+01	1.8823+01	1.9170+01
1.9+00	1.5780+01	1.5989+01	1.6207+01	1.6435+01	1.6677+01	1.6934+01	1.7199+01	1.7481+01	1.7776+01	1.8083+01
2.0+00	1.5131+01	1.5317+01	1.5510+01	1.5711+01	1.5922+01	1.6143+01	1.6377+01	1.6623+01	1.6880+01	1.7149+01
2.2+00	1.4014+01	1.4183+01	1.4351+01	1.4521+01	1.4694+01	1.4873+01	1.5059+01	1.5253+01	1.5453+01	1.5661+01
2.4+00	1.3022+01	1.3194+01	1.3361+01	1.3524+01	1.3686+01	1.3847+01	1.4012+01	1.4178+01	1.4347+01	1.4517+01
2.5+00	1.2545+01	1.2724+01	1.2896+01	1.3062+01	1.3225+01	1.3386+01	1.3547+01	1.3708+01	1.3869+01	1.4029+01
2.6+00	1.2075+01	1.2262+01	1.2441+01	1.2614+01	1.2781+01	1.2945+01	1.3108+01	1.3268+01	1.3426+01	1.3580+01
2.8+00	1.1153+01	1.1358+01	1.1553+01	1.1742+01	1.1924+01	1.2101+01	1.2274+01	1.2440+01	1.2602+01	1.2757+01
3.0+00	1.0268+01	1.0482+01	1.0690+01	1.0893+01	1.1091+01	1.1282+01	1.1467+01	1.1645+01	1.1816+01	1.1982+01
3.3+00	9.0271+00	9.2430+00	9.4574+00	9.6700+00	9.8797+00	1.0035+01	1.0284+01	1.0540+01	1.0806+01	1.1084+01
3.5+00	8.2870+00	8.4950+00	8.7040+00	8.9136+00	9.1225+00	9.3290+00	9.5315+00	9.7300+00	9.9251+00	1.0117+01
3.6+00	7.9467+00	8.1484+00	8.3521+00	8.5576+00	8.7635+00	8.9691+00	9.1700+00	9.3622+00	9.5589+00	9.7606+00
3.9+00	7.0873+00	7.2341+00	7.4151+00	7.6003+00	7.7889+00	7.9796+00	8.1713+00	8.3638+00	8.5569+00	8.7507+00
4.0+00	6.8057+00	6.9730+00	7.1450+00	7.3217+00	7.5023+00	7.6860+00	7.8717+00	8.0592+00	8.2483+00	8.4387+00
4.2+00	6.3650+00	6.5129+00	6.6659+00	6.8240+00	6.9870+00	7.1542+00	7.3251+00	7.4994+00	7.6766+00	7.8565+00
4.6+00	5.6782+00	5.7505+00	5.8279+00	6.0304+00	6.1979+00	6.2907+00	6.4289+00	6.5722+00	6.7200+00	6.8719+00
5.0+00	5.1732+00	5.2600+00	5.3510+00	5.4460+00	5.5455+00	5.6500+00	5.7601+00	5.8754+00	5.9955+00	6.1197+00
5.4+00	4.7913+00	4.8638+00	4.9387+00	5.0163+00	5.0973+00	5.1823+00	5.2718+00	5.3656+00	5.4633+00	5.5644+00
5.5+00	4.7106+00	4.7809+00	4.8530+00	4.9276+00	5.0042+00	5.0846+00	5.1717+00	5.2610+00	5.3538+00	5.4498+00
5.8+00	4.4573+00	4.5635+00	4.6298+00	4.6973+00	4.7668+00	4.8386+00	4.9132+00	4.9904+00	5.0701+00	5.1519+00
6.0+00	4.3758+00	4.4410+00	4.5050+00	4.5694+00	4.6350+00	4.7020+00	4.7706+00	4.8409+00	4.9127+00	4.9859+00
6.2+00	4.2441+00	4.3100+00	4.3756+00	4.4411+00	4.5066+00	4.5723+00	4.6384+00	4.7050+00	4.7722+00	4.8404+00
6.6+00	3.9853+00	4.0580+00	4.1255+00	4.1920+00	4.2585+00	4.3242+00	4.3895+00	4.4553+00	4.5218+00	4.5773+00
7.0+00	3.7397+00	3.8120+00	3.8828+00	3.9523+00	4.0204+00	4.0873+00	4.1531+00	4.2178+00	4.2816+00	4.3447+00
7.4+00	3.4945+00	3.5700+00	3.6441+00	3.7157+00	3.7879+00	3.8577+00	3.9261+00	3.9934+00	4.0595+00	4.1245+00
8.0+00	3.1406+00	3.2180+00	3.2943+00	3.3695+00	3.4437+00	3.5168+00	3.5891+00	3.6607+00	3.7316+00	3.8020+00
9.0+00	2.6161+00	2.6900+00	2.7643+00	2.8388+00	2.9135+00	2.9884+00	3.0634+00	3.1385+00	3.2137+00	3.2888+00
1.0+01	1.9551+00	2.2600+00	2.3263+00	2.3940+00	2.4629+00	2.5329+00	2.6039+00	2.6758+00	2.7485+00	2.8217+00
1.1+01	1.8765+00	1.9320+00	1.9875+00	2.0449+00	2.1042+00	2.1652+00	2.2278+00	2.2919+00	2.3574+00	2.4241+00
1.2+01	1.6485+00	1.6920+00	1.7375+00	1.7850+00	1.8343+00	1.8855+00	1.9385+00	1.9931+00	2.0492+00	2.1067+00
1.4+01	1.3576+00	1.3870+00	1.4180+00	1.4506+00	1.4848+00	1.5204+00	1.5573+00	1.5954+00	1.6346+00	1.6747+00
1.6+01	1.1866+00	1.2090+00	1.2324+00	1.2567+00	1.2820+00	1.3082+00	1.3352+00	1.3630+00	1.3914+00	1.4205+00
1.8+01	1.0621+00	1.0820+00	1.1024+00	1.1233+00	1.1446+00	1.1665+00	1.1887+00	1.2114+00	1.2345+00	1.2580+00
2.0+01	0.9560+00	0.9750+00	0.9956+00	1.0157+00	1.0361+00	1.0565+00	1.0772+00	1.0980+00	1.1189+00	1.1399+00
2.2+01	0.8598+00	0.8780+00	0.8973+00	0.9168+00	0.9364+00	0.9561+00	0.9759+00	0.9957+00	1.0150+00	1.0340+00
2.5+01	0.7271+00	0.7465+00	0.7662+00	0.7865+00	0.8069+00	0.8272+00	0.8478+00	0.8682+00	0.8882+00	0.9085+00
2.8+01	0.6195+00	0.6311+00	0.6504+00	0.6693+00	0.6895+00	0.7093+00	0.7293+00	0.7494+00	0.7696+00	0.7903+00
3.1+01	0.5199+00	0.5320+00	0.5501+00	0.5680+00	0.5875+00	0.6095+00	0.6261+00	0.6459+00	0.6653+00	0.6852+00
3.5+01	0.4080+00	0.4240+00	0.4405+00	0.4574+00	0.4746+00	0.4923+00	0.5092+00	0.5281+00	0.5463+00	0.5649+00
4.0+01	0.3055+00	0.3220+00	0.3367+00	0.3504+00	0.3650+00	0.3805+00	0.3964+00	0.4121+00	0.4286+00	0.4454+00
4.5+01	0.2368+00	0.2480+00	0.2591+00	0.2705+00	0.2847+00	0.2977+00	0.3112+00	0.3250+00	0.3391+00	0.3536+00
5.0+01	0.1841+00	0.1937+00	0.2036+00	0.2139+00	0.2245+00	0.2358+00	0.2469+00	0.2587+00	0.2707+00	0.2833+00
7.0+01	0.7545+02	8.0731+02	8.7758+02	9.3095+02	9.8572+02	1.0438+01	1.1046+01	1.1683+01	1.2350+01	1.3048+01
1.0+02	2.5535+02	3.1600+02	3.3793+02	3.6121+02	3.8592+02	4.1214+02	4.3993+02	4.6940+02	5.0063+02	5.3370+02
1.0+03	5.4241+05	6.0160+05	6.6721+05	7.3995+05	8.2063+05	9.1012+05	1.0094+06	1.1197+06	1.2422+06	1.3783+06
1.0+06	7.4363+13	8.9010+13	1.0668+14	1.2803+14	1.5389+14	1.8525+14	2.2336+14	2.6978+14	3.2644+14	3.9574+14
1.0+09	1.0755+20	1.3870+20	1.7935+20	2.3256+20	3.0245+20	3.9457+20	5.1640+20	6.7812+20	8.9360+20	1.1818+19

TABLE I. CONT. RELATIVISTIC HARTREE-FECK ATOMIC FORM FACTOR, F(X,Z)

$X_s$ SIN(THETA/2) /LAMBDA	91 PA	92 U	93 NP	94 PU	95 AM	96 CM	97 BK	98 CF	99 ES	100 FM
0.0	9.1000+01	9.2000+01	9.3000+01	9.4000+01	9.5000+01	9.6000+01	9.7000+01	9.8000+01	9.9000+01	1.0000+02
1.0-02	9.0519+01	9.1522+01	9.2522+01	9.3522+01	9.4526+01	9.5526+01	9.6528+01	9.7529+01	9.8529+01	9.9529+01
2.0-02	9.0678+01	9.1687+01	9.2687+01	9.3687+01	9.4687+01	9.5687+01	9.6687+01	9.7687+01	9.8723+01	9.9723+01
3.0-02	9.0930+01	9.1937+01	9.2937+01	9.3937+01	9.4937+01	9.5937+01	9.6937+01	9.7937+01	9.8365+01	9.9392+01
4.0-02	8.9772+01	9.0758+01	9.1817+01	9.2857+01	9.3877+01	9.4877+01	9.5895+01	9.6912+01	9.7928+01	9.8943+01
5.0-02	8.9144+01	9.0180+01	9.1208+01	9.2214+01	9.3299+01	9.4294+01	9.5320+01	9.6344+01	9.7366+01	9.8386+01
6.0-02	8.8427+01	8.9474+01	9.0510+01	9.1601+01	9.2638+01	9.3623+01	9.4656+01	9.5689+01	9.6719+01	9.7749+01
7.0-02	8.7644+01	8.8699+01	8.9742+01	9.0866+01	9.1910+01	9.2875+01	9.3920+01	9.4961+01	9.6002+01	9.7043+01
8.0-02	8.6813+01	8.7874+01	8.8923+01	9.0082+01	9.1131+01	9.2201+01	9.3129+01	9.4176+01	9.5222+01	9.6267+01
9.0-02	8.5950+01	8.7014+01	8.8067+01	8.9261+01	9.0315+01	9.1241+01	9.2294+01	9.3347+01	9.4400+01	9.5453+01
1.0-01	8.5066+01	8.6130+01	8.7186+01	8.8413+01	8.9470+01	9.0371+01	9.1299+01	9.2486+01	9.3542+01	9.4597+01
1.1-01	8.4170+01	8.5232+01	8.6288+01	8.7547+01	8.8605+01	8.9479+01	9.0340+01	9.1601+01	9.2662+01	9.3723+01
1.2-01	8.3269+01	8.4326+01	8.5380+01	8.6665+01	8.7723+01	8.8573+01	8.9335+01	9.0699+01	9.1765+01	9.2833+01
1.3-01	8.2366+01	8.3417+01	8.4467+01	8.5772+01	8.6829+01	8.7656+01	8.8418+01	8.9783+01	9.0851+01	9.1922+01
1.4-01	8.1463+01	8.2505+01	8.3550+01	8.4870+01	8.5924+01	8.6731+01	8.7793+01	8.8858+01	8.9926+01	9.0997+01
1.5-01	8.0563+01	8.1595+01	8.2632+01	8.3961+01	8.5011+01	8.5802+01	8.6862+01	8.7926+01	8.8994+01	9.0066+01
1.6-01	7.9665+01	8.0695+01	8.1715+01	8.3044+01	8.4090+01	8.4865+01	8.5926+01	8.6989+01	8.8058+01	8.9133+01
1.7-01	7.8771+01	7.9779+01	8.0799+01	8.2123+01	8.3163+01	8.3934+01	8.4988+01	8.6048+01	8.7114+01	8.8186+01
1.8-01	7.7881+01	7.8875+01	7.9885+01	8.1198+01	8.2231+01	8.2999+01	8.4047+01	8.5103+01	8.6166+01	8.7236+01
1.9-01	7.6995+01	7.7975+01	7.8973+01	8.0271+01	8.1296+01	8.2062+01	8.3105+01	8.4157+01	8.5218+01	8.6288+01
2.0-01	7.6115+01	7.7090+01	7.8066+01	7.9343+01	8.0360+01	8.1125+01	8.2163+01	8.3210+01	8.4267+01	8.5334+01
2.2-01	7.4375+01	7.5308+01	7.6267+01	7.7493+01	7.8490+01	7.9263+01	8.0285+01	8.1318+01	8.2362+01	8.3417+01
2.4-01	7.2668+01	7.3568+01	7.4496+01	7.5663+01	7.6636+01	7.7415+01	7.8421+01	7.9437+01	8.0467+01	8.1511+01
2.5-01	7.1299+01	7.2112+01	7.2924+01	7.3959+01	7.4719+01	7.5507+01	7.6498+01	7.7504+01	7.8525+01	8.0561+01
2.6-01	7.1001+01	7.1866+01	7.2763+01	7.3865+01	7.4811+01	7.5603+01	7.6582+01	7.7577+01	7.8588+01	7.9615+01
2.8-01	6.9380+01	7.0211+01	7.1074+01	7.2110+01	7.3027+01	7.3824+01	7.4777+01	7.5749+01	7.6740+01	7.7750+01
3.0-01	6.7810+01	6.8607+01	6.9436+01	7.0408+01	7.1293+01	7.2091+01	7.3016+01	7.3960+01	7.4923+01	7.5905+01
3.2-01	6.6524+01	6.7058+01	6.7853+01	6.8763+01	6.9615+01	7.0409+01	7.1303+01	7.2219+01	7.3157+01	7.4118+01
3.4-01	6.4832+01	6.5564+01	6.6326+01	6.7178+01	6.7997+01	6.8783+01	6.9645+01	7.0531+01	7.1441+01	7.2376+01
3.5-01	6.4121+01	6.4838+01	6.5584+01	6.6409+01	6.7212+01	6.7991+01	6.8838+01	6.9707+01	7.0598+01	7.1511+01
3.6-01	6.3423+01	6.4126+01	6.4857+01	6.5655+01	6.6441+01	6.7214+01	6.8045+01	6.8898+01	6.9773+01	7.0670+01
3.8-01	6.2066+01	6.2742+01	6.3443+01	6.4193+01	6.4947+01	6.5705+01	6.6503+01	6.7325+01	6.8171+01	6.9042+01
4.0-01	6.0758+01	6.1409+01	6.2083+01	6.2789+01	6.3513+01	6.4254+01	6.5020+01	6.5810+01	6.6624+01	6.7462+01
4.2-01	5.9495+01	6.0125+01	6.0775+01	6.1442+01	6.2137+01	6.2859+01	6.3595+01	6.4354+01	6.5136+01	6.5941+01
4.4-01	5.8274+01	5.8886+01	5.9514+01	6.0147+01	6.0816+01	6.1519+01	6.2226+01	6.2954+01	6.3703+01	6.4473+01
4.5-01	5.7679+01	5.8285+01	5.8901+01	5.9518+01	6.0175+01	6.0865+01	6.1562+01	6.2276+01	6.3011+01	6.3767+01
4.6-01	5.7093+01	5.7689+01	5.8298+01	5.8901+01	5.9546+01	6.0231+01	6.0910+01	6.1610+01	6.2331+01	6.3073+01
4.8-01	5.5548+01	5.6531+01	5.7124+01	5.7704+01	5.8325+01	5.8994+01	5.9646+01	6.0319+01	6.1011+01	6.1722+01
5.0-01	5.4836+01	5.5410+01	5.5989+01	5.6544+01	5.7148+01	5.7798+01	5.8430+01	5.9078+01	5.9742+01	6.0423+01
5.5-01	5.2191+01	5.2748+01	5.3303+01	5.3819+01	5.4385+01	5.4998+01	5.5581+01	5.6176+01	5.6783+01	5.7402+01
6.0-01	4.5719+01	5.0268+01	5.0808+01	5.1302+01	5.1842+01	5.2427+01	5.2974+01	5.3528+01	5.4089+01	5.4657+01
6.5-01	4.7405+01	4.7950+01	4.8483+01	4.8957+01	4.9490+01	5.0052+01	5.0574+01	5.1098+01	5.1624+01	5.2152+01
7.0-01	4.5241+01	4.5784+01	4.6312+01	4.6794+01	4.7307+01	4.7850+01	4.8354+01	4.8858+01	4.9362+01	4.9866+01
8.0-01	4.1333+01	4.1869+01	4.2390+01	4.2879+01	4.3380+01	4.3894+01	4.4380+01	4.4859+01	4.5331+01	4.5796+01
9.0-01	3.7530+01	3.8454+01	3.8966+01	3.9465+01	4.0449+01	4.0449+01	4.0926+01	4.1395+01	4.1856+01	4.2309+01
1.0+00	3.4246+01	3.5458+01	3.5961+01	3.6465+01	3.6952+01	3.7426+01	3.7898+01	3.8361+01	3.8815+01	3.9260+01
1.1+00	3.2592+01	3.2794+01	3.3289+01	3.3794+01	3.4276+01	3.4740+01	3.5209+01	3.5671+01	3.6126+01	3.6574+01
1.2+00	2.9857+01	3.0391+01	3.0879+01	3.1375+01	3.1858+01	3.2318+01	3.2786+01	3.3247+01	3.3701+01	3.4148+01
1.3+00	2.7714+01	2.8193+01	2.8680+01	2.9172+01	2.9648+01	3.0106+01	3.0572+01	3.1033+01	3.1498+01	3.1968+01
1.4+00	2.5720+01	2.6192+01	2.6662+01	2.7142+01	2.7611+01	2.8068+01	2.8530+01	2.8998+01	2.9445+01	2.9898+01



FORM FACTORS AND PHOTON SCATTERING CROSS SECTIONS

$X, \frac{\sin(\theta/2)}{\lambda}$	91 PA	92 U	93 NP	94 PU	95 AM	96 CM	97 BK	98 CF	99 ES	100 FM
1.5+00	2.3505+01	2.4360+01	2.4813+01	2.5275+01	2.5733+01	2.6194+01	2.6639+01	2.7093+01	2.7546+01	2.7998+01
1.6+00	2.2266+01	2.2699+01	2.3123+01	2.3566+01	2.4006+01	2.4446+01	2.4889+01	2.5332+01	2.5775+01	2.6219+01
1.7+00	2.0807+01	2.1207+01	2.1609+01	2.2019+01	2.2435+01	2.2857+01	2.3281+01	2.3708+01	2.4138+01	2.4571+01
1.8+00	1.9518+01	1.9886+01	2.0253+01	2.0630+01	2.1018+01	2.1415+01	2.1815+01	2.2221+01	2.2633+01	2.3051+01
1.9+00	1.8394+01	1.8733+01	1.9055+01	1.9399+01	1.9754+01	2.0121+01	2.0493+01	2.0872+01	2.1258+01	2.1651+01
2.0+00	1.7423+01	1.7713+01	1.8012+01	1.8319+01	1.8640+01	1.8975+01	1.9315+01	1.9662+01	2.0025+01	2.0396+01
2.2+00	1.5874+01	1.6094+01	1.6318+01	1.6548+01	1.6783+01	1.7023+01	1.7270+01	1.7522+01	1.7780+01	1.8044+01
2.4+00	1.4687+01	1.4857+01	1.5026+01	1.5194+01	1.5361+01	1.5526+01	1.5691+01	1.5853+01	1.6015+01	1.6178+01
2.5+00	1.4186+01	1.4341+01	1.4493+01	1.4641+01	1.4786+01	1.4926+01	1.5063+01	1.5197+01	1.5325+01	1.5450+01
2.6+00	1.3731+01	1.3877+01	1.4019+01	1.4155+01	1.4287+01	1.4412+01	1.4533+01	1.4647+01	1.4756+01	1.4858+01
2.8+00	1.2507+01	1.3051+01	1.3189+01	1.3320+01	1.3444+01	1.3562+01	1.3673+01	1.3776+01	1.3872+01	1.3961+01
3.0+00	1.2141+01	1.2254+01	1.2442+01	1.2583+01	1.2719+01	1.2849+01	1.2972+01	1.3088+01	1.3198+01	1.3300+01
3.3+00	1.1028+01	1.1204+01	1.1377+01	1.1547+01	1.1714+01	1.1877+01	1.2037+01	1.2194+01	1.2347+01	1.2495+01
3.5+00	1.0307+01	1.0495+01	1.0662+01	1.0828+01	1.1052+01	1.1236+01	1.1417+01	1.1597+01	1.1774+01	1.1950+01
3.6+00	9.9538+00	1.0146+01	1.0338+01	1.0529+01	1.0719+01	1.0909+01	1.1098+01	1.1285+01	1.1471+01	1.1656+01
3.9+00	8.9451+00	9.1401+00	9.3357+00	9.5317+00	9.7279+00	9.9243+00	1.0121+01	1.0317+01	1.0512+01	1.0708+01
4.0+00	8.6303+00	8.8230+00	9.0165+00	9.2106+00	9.4052+00	9.6002+00	9.7954+00	9.9907+00	1.0186+01	1.0381+01
4.2+00	8.0385+00	8.2223+00	8.4074+00	8.5937+00	8.7810+00	8.9692+00	9.1582+00	9.3479+00	9.5382+00	9.7289+00
4.6+00	7.0271+00	7.1849+00	7.3448+00	7.5065+00	7.6702+00	7.8356+00	8.0028+00	8.1718+00	8.3424+00	8.5147+00
5.0+00	6.2474+00	6.3780+00	6.5108+00	6.6457+00	6.7827+00	6.9218+00	7.0631+00	7.2066+00	7.3522+00	7.5000+00
5.4+00	5.6685+00	5.7750+00	5.8834+00	5.9936+00	6.1057+00	6.2198+00	6.3357+00	6.4537+00	6.5736+00	6.6956+00
5.5+00	5.5485+00	5.6494+00	5.7522+00	5.8567+00	5.9629+00	6.0710+00	6.1808+00	6.2926+00	6.4062+00	6.5217+00
5.8+00	5.0356+00	5.1209+00	5.2094+00	5.2954+00	5.3851+00	5.4788+00	5.5760+00	5.6761+00	5.7786+00	5.8831+00
6.0+00	5.0604+00	5.1360+00	5.2127+00	5.2904+00	5.3691+00	5.4490+00	5.5298+00	5.6118+00	5.6948+00	5.7790+00
6.2+00	4.9055+00	4.9800+00	5.0519+00	5.1254+00	5.2003+00	5.2769+00	5.3552+00	5.4350+00	5.5166+00	5.6000+00
6.6+00	4.6410+00	4.7050+00	4.7696+00	4.8349+00	4.9008+00	4.9674+00	5.0346+00	5.1024+00	5.1709+00	5.2400+00
7.0+00	4.4071+00	4.4650+00	4.5236+00	4.5819+00	4.6407+00	4.7131+00	4.7731+00	4.8326+00	4.8916+00	4.9500+00
7.4+00	4.1887+00	4.2520+00	4.3146+00	4.3766+00	4.4377+00	4.4981+00	4.5575+00	4.6160+00	4.6735+00	4.7300+00
8.0+00	3.8750+00	3.9420+00	4.0120+00	4.0820+00	4.1519+00	4.2219+00	4.2917+00	4.3613+00	4.4308+00	4.5000+00
9.0+00	3.3639+00	3.4390+00	3.5140+00	3.5888+00	3.6634+00	3.7377+00	3.8116+00	3.8850+00	3.9578+00	4.0300+00
1.0+01	2.8552+00	2.9690+00	3.0427+00	3.1164+00	3.1898+00	3.2629+00	3.3355+00	3.4077+00	3.4792+00	3.5500+00
1.1+01	2.4517+00	2.5600+00	2.6289+00	2.6982+00	2.7679+00	2.8380+00	2.9083+00	2.9787+00	3.0494+00	3.1200+00
1.2+01	2.1853+00	2.2250+00	2.2855+00	2.3465+00	2.4089+00	2.4718+00	2.5353+00	2.5996+00	2.6645+00	2.7300+00
1.4+01	1.7156+00	1.7570+00	1.7988+00	1.8410+00	1.8835+00	1.9263+00	1.9694+00	2.0127+00	2.0563+00	2.1000+00
1.6+01	1.4550+00	1.4800+00	1.5103+00	1.5408+00	1.5717+00	1.6028+00	1.6342+00	1.6659+00	1.6978+00	1.7300+00
1.8+01	1.2818+00	1.3050+00	1.3305+00	1.3552+00	1.3803+00	1.4056+00	1.4313+00	1.4572+00	1.4835+00	1.5100+00
2.0+01	1.1609+00	1.1820+00	1.2031+00	1.2242+00	1.2453+00	1.2663+00	1.2874+00	1.3083+00	1.3292+00	1.3500+00
2.2+01	1.0607+00	1.0810+00	1.1012+00	1.1214+00	1.1415+00	1.1615+00	1.1813+00	1.2011+00	1.2206+00	1.2400+00
2.5+01	9.2900+01	9.4940+01	9.6978+01	9.9011+01	1.0104+00	1.0306+00	1.0506+00	1.0706+00	1.0904+00	1.1100+00
2.8+01	8.1055+01	8.3120+01	8.5199+01	8.7290+01	8.9392+01	9.1503+01	9.3621+01	9.5744+01	9.7871+01	1.0000+00
3.1+01	7.0517+01	7.2520+01	7.4529+01	7.6540+01	7.8551+01	8.0559+01	8.2559+01	8.4553+01	8.6534+01	8.8500+01
3.5+01	5.2384+01	6.0290+01	6.2214+01	6.4155+01	6.6109+01	6.8074+01	7.0049+01	7.2030+01	7.4014+01	7.6000+01
4.0+01	4.6208+01	4.7510+01	4.9633+01	5.1373+01	5.3126+01	5.4891+01	5.6663+01	5.8441+01	6.0221+01	6.2000+01
4.5+01	3.6823+01	3.8310+01	3.9813+01	4.1328+01	4.2852+01	4.4383+01	4.5917+01	4.7450+01	4.8979+01	5.0500+01
5.0+01	2.9611+01	3.0520+01	3.2257+01	3.3622+01	3.5012+01	3.6426+01	3.7863+01	3.9320+01	4.0797+01	4.2290+01
7.0+01	1.3777+01	1.4540+01	1.5336+01	1.6167+01	1.7034+01	1.7937+01	1.8879+01	1.9859+01	2.0878+01	2.1939+01
1.0+02	5.6873+02	6.0580+02	6.4503+02	6.8653+02	7.3040+02	7.7677+02	8.2574+02	8.7745+02	9.3203+02	9.8960+02
1.0+03	1.5257+04	1.6880+04	1.8854+04	2.0939+04	2.3262+04	2.5850+04	2.8732+04	3.1945+04	3.5527+04	3.9520+04
1.0+06	4.8070+12	5.8510+12	7.1370+12	8.7243+12	1.0688+13	1.3121+13	1.6142+13	1.9903+13	2.4591+13	3.0450+13
1.0+09	1.5650+15	2.0510+15	2.7980+15	3.7590+15	5.0707+15	6.8677+15	9.3391+15	1.2751+16	1.7480+16	2.4060+16

TABLE II. RELATIVISTIC COHERENT SCATTERING CROSS SECTIONS, BARNS/ATOM

PHOTON ENERGY EV	1 H	2 HE	3 LI	4 BE	5 B	6 C	7 N	8 O	9 F	10 NE
1.0+02	6.643-01	2.659+00	5.569+00	1.062+01	1.661+01	2.392+01	3.257+01	4.255+01	5.386+01	6.649+01
1.5+02	6.630-01	2.657+00	5.545+00	1.059+01	1.657+01	2.389+01	3.253+01	4.251+01	5.382+01	6.645+01
2.0+02	6.618-01	2.655+00	5.524+00	1.057+01	1.654+01	2.385+01	3.250+01	4.247+01	5.378+01	6.642+01
3.0+02	6.571-01	2.648+00	5.439+00	1.046+01	1.642+01	2.372+01	3.236+01	4.233+01	5.364+01	6.627+01
4.0+02	6.505-01	2.637+00	5.725+00	1.031+01	1.624+01	2.353+01	3.216+01	4.213+01	5.343+01	6.606+01
5.0+02	6.423-01	2.623+00	5.588+00	1.013+01	1.603+01	2.330+01	3.192+01	4.188+01	5.317+01	6.580+01
6.0+02	6.325-01	2.607+00	5.433+00	9.916+00	1.578+01	2.302+01	3.163+01	4.157+01	5.286+01	6.548+01
8.0+02	6.088-01	2.567+00	5.090+00	9.417+00	1.517+01	2.234+01	3.091+01	4.082+01	5.207+01	6.467+01
1.0+03	5.805-01	2.517+00	4.734+00	8.857+00	1.446+01	2.152+01	3.003+01	3.989+01	5.111+01	6.367+01
1.5+03	4.585-01	2.357+00	3.941+00	7.404+00	1.248+01	1.912+01	2.734+01	3.698+01	4.801+01	6.042+01
2.0+03	4.141-01	2.163+00	3.366+00	6.140+00	1.054+01	1.659+01	2.432+01	3.356+01	4.427+01	5.640+01
3.0+03	2.764-01	1.746+00	2.669+00	4.432+00	7.548+00	1.222+01	1.861+01	2.663+01	3.625+01	4.742+01
4.0+03	1.881-01	1.372+00	2.231+00	3.474+00	5.684+00	9.179+00	1.421+01	2.081+01	2.902+01	3.886+01
5.0+03	1.341-01	1.074+00	1.895+00	2.882+00	4.524+00	7.170+00	1.110+01	1.642+01	2.325+01	3.165+01
6.0+03	9.588-02	8.507-01	1.602+00	2.467+00	3.759+00	5.819+00	8.927+00	1.523+01	1.886+01	2.594+01
8.0+03	6.126-02	5.600-01	1.163+00	1.877+00	2.805+00	4.181+00	6.246+00	9.157+00	1.307+01	1.811+01
1.0+04	4.121-02	3.525-01	6.627-01	1.459+00	2.204+00	3.232+00	4.722+00	6.814+00	9.647+00	1.335+01
1.5+04	1.543-02	1.564-01	4.626-01	8.350-01	1.318+00	1.952+00	2.895+00	3.948+00	5.470+00	7.460+00
2.0+04	1.119-02	1.167-01	2.851-01	5.295-01	8.554-01	1.292+00	1.870+00	2.627+00	3.611+00	4.977+00
3.0+04	5.062-03	5.435-02	1.382-01	2.649-01	4.377-01	6.711-01	5.839-01	1.394+00	1.921+00	2.590+00
4.0+04	2.866-03	3.114-02	8.075-02	1.577-01	2.639-01	4.079-01	6.039-01	8.541-01	1.181+00	1.596+00
5.0+04	1.840-03	2.011-02	5.270-02	1.041-01	1.758-01	2.734-01	4.042-01	5.755-01	7.966-01	1.078+00
6.0+04	1.280-03	1.404-02	3.701-02	7.363-02	1.252-01	1.956-01	2.901-01	4.138-01	5.731-01	7.754-01
8.0+04	7.211-04	7.535-03	2.106-02	4.224-02	7.237-02	1.139-01	1.697-01	2.428-01	3.370-01	4.563-01
1.0+05	4.615-04	5.090-03	1.356-02	2.729-02	4.696-02	7.418-02	1.109-01	1.591-01	2.212-01	2.998-01
1.5+05	2.055-04	2.268-03	6.059-03	1.225-02	2.117-02	3.360-02	5.046-02	7.264-02	1.013-01	1.376-01
2.0+05	1.156-04	1.277-03	3.415-03	6.915-03	1.197-02	1.903-02	2.863-02	4.128-02	5.764-02	7.840-02
3.0+05	5.135-05	5.678-04	1.520-03	3.081-03	5.342-03	8.504-03	1.281-02	1.849-02	2.585-02	3.519-02
4.0+05	2.891-05	3.194-04	8.553-04	1.735-03	3.009-03	4.792-03	7.221-03	1.043-02	1.459-02	1.987-02
5.0+05	1.850-05	2.045-04	5.475-04	1.111-03	1.927-03	3.070-03	4.626-03	6.684-03	9.349-03	1.274-02
6.0+05	1.285-05	1.420-04	3.803-04	7.715-04	1.339-03	2.133-03	3.215-03	4.645-03	6.498-03	8.853-03
8.0+05	7.227-06	7.988-05	2.139-04	4.341-04	7.532-04	1.200-03	1.809-03	2.615-03	3.658-03	4.985-03
1.0+06	4.625-06	5.112-05	1.369-04	2.778-04	4.821-04	7.682-04	1.158-03	1.674-03	2.342-03	3.191-03
1.5+06	2.056-06	2.272-05	6.086-05	1.235-04	2.143-04	3.415-04	5.149-04	7.442-04	1.041-03	1.419-03
2.0+06	1.156-06	1.278-05	3.423-05	6.947-05	1.206-04	1.921-04	2.897-04	4.187-04	5.858-04	7.983-04
3.0+06	5.139-07	5.680-06	1.521-05	3.087-05	5.358-05	8.539-05	1.287-04	1.861-04	2.604-04	3.549-04
4.0+06	2.891-07	3.195-06	8.559-06	1.737-05	3.014-05	4.803-05	7.243-05	1.047-04	1.465-04	1.996-04
5.0+06	1.850-07	2.045-06	5.478-06	1.112-05	1.929-05	3.074-05	4.635-05	6.699-05	9.374-05	1.278-04
6.0+06	1.285-07	1.420-06	3.804-06	7.719-06	1.340-05	2.135-05	3.219-05	4.652-05	6.510-05	8.872-05
8.0+06	7.227-08	7.988-07	2.140-06	4.342-06	7.535-06	1.201-05	1.811-05	2.617-05	3.662-05	4.991-05
1.0+07	4.625-08	5.112-07	1.369-06	2.779-06	4.823-06	7.685-06	1.159-05	1.675-05	2.344-05	3.194-05
1.5+07	2.056-08	2.272-07	6.086-07	1.235-06	2.143-06	3.416-06	5.150-06	7.444-06	1.042-05	1.419-05
2.0+07	1.156-08	1.278-07	3.423-07	6.947-07	1.206-06	1.921-06	2.897-06	4.187-06	5.859-06	7.985-06
3.0+07	5.135-09	5.680-08	1.521-07	3.087-07	5.358-07	8.539-07	1.288-06	1.861-06	2.604-06	3.549-06
4.0+07	2.890-09	3.195-08	8.558-08	1.737-07	3.014-07	4.803-07	7.243-07	1.047-06	1.465-06	1.996-06
5.0+07	1.850-09	2.045-08	5.477-08	1.111-07	1.929-07	3.074-07	4.635-07	6.699-07	9.374-07	1.278-06
6.0+07	1.284-09	1.420-08	3.804-08	7.718-08	1.339-07	2.135-07	3.219-07	4.652-07	6.510-07	8.872-07
8.0+07	7.222-10	7.986-09	2.139-08	4.341-08	7.534-08	1.201-07	1.810-07	2.617-07	3.662-07	4.990-07
1.0+08	4.620-10	5.110-09	1.369-08	2.778-08	4.821-08	7.684-08	1.159-07	1.675-07	2.343-07	3.194-07

TABLE II.. CONT. RELATIVISTIC COHERENT SCATTERING CROSS SECTIONS, BARNS/ATOM

PHOTON ENERGY EV	11 NA	12 MG	13 AL	14 SI	15 P	16 S	17 CL	18 AR	19 K	20 CA
1.0+02	8.040+01	9.558+01	1.123+02	1.302+02	1.495+02	1.701+02	1.921+02	2.154+02	2.398+02	2.657+02
1.5+02	8.027+01	9.553+01	1.121+02	1.300+02	1.493+02	1.700+02	1.919+02	2.152+02	2.394+02	2.653+02
2.0+02	8.015+01	9.539+01	1.119+02	1.299+02	1.491+02	1.698+02	1.917+02	2.150+02	2.390+02	2.648+02
3.0+02	7.969+01	9.483+01	1.112+02	1.291+02	1.484+02	1.690+02	1.910+02	2.143+02	2.376+02	2.631+02
4.0+02	7.917+01	9.408+01	1.103+02	1.281+02	1.474+02	1.680+02	1.900+02	2.132+02	2.356+02	2.607+02
5.0+02	7.811+01	9.315+01	1.092+02	1.269+02	1.461+02	1.667+02	1.886+02	2.119+02	2.332+02	2.578+02
6.0+02	7.744+01	9.206+01	1.078+02	1.254+02	1.446+02	1.652+02	1.871+02	2.104+02	2.304+02	2.545+02
8.0+02	7.545+01	8.550+01	1.047+02	1.219+02	1.410+02	1.614+02	1.833+02	2.065+02	2.241+02	2.469+02
1.0+03	7.327+01	8.660+01	1.011+02	1.179+02	1.366+02	1.569+02	1.786+02	2.018+02	2.174+02	2.384+02
1.5+03	6.775+01	7.895+01	9.140+01	1.066+02	1.241+02	1.435+02	1.646+02	1.872+02	1.999+02	2.169+02
2.0+03	6.266+01	7.186+01	8.236+01	9.553+01	1.113+02	1.292+02	1.490+02	1.705+02	1.829+02	1.972+02
3.0+03	5.355+01	6.051+01	6.822+01	7.783+01	8.973+01	1.038+02	1.200+02	1.382+02	1.511+02	1.639+02
4.0+03	4.524+01	5.160+01	5.804+01	6.548+01	7.447+01	8.521+01	9.782+01	1.124+02	1.244+02	1.365+02
5.0+03	3.789+01	4.403+01	4.958+01	5.335+01	6.361+01	7.206+01	8.196+01	9.345+01	1.038+02	1.145+02
6.0+03	3.171+01	3.752+01	4.318+01	4.502+01	5.533+01	6.238+01	7.043+01	7.970+01	8.831+01	9.748+01
8.0+03	2.264+01	2.746+01	3.239+01	3.749+01	4.294+01	4.850+01	5.460+01	6.133+01	6.761+01	7.429+01
1.0+04	1.683+01	2.065+01	2.470+01	2.902+01	3.363+01	3.849+01	4.365+01	4.916+01	5.429+01	5.959+01
1.5+04	5.430+00	1.164+01	1.405+01	1.672+01	1.967+01	2.290+01	2.641+01	3.022+01	3.393+01	3.774+01
2.0+04	6.155+00	7.587+00	9.166+00	1.092+01	1.287+01	1.502+01	1.740+01	2.001+01	2.266+01	2.544+01
3.0+04	3.282+00	4.056+00	4.908+00	5.852+00	6.897+00	8.049+00	9.320+00	1.072+01	1.216+01	1.370+01
4.0+04	2.033+00	2.527+00	3.073+00	3.678+00	4.346+00	5.082+00	5.890+00	6.776+00	7.691+00	8.666+00
5.0+04	1.377+00	1.717+00	2.056+00	2.518+00	2.986+00	3.503+00	4.069+00	4.690+00	5.333+00	6.016+00
6.0+04	9.525-01	1.240+00	1.517+00	1.827+00	2.172+00	2.554+00	2.974+00	3.435+00	3.915+00	4.424+00
8.0+04	5.851-01	7.326-01	8.982-01	1.084+00	1.292+00	1.523+00	1.779+00	2.061+00	2.356+00	2.670+00
1.0+05	3.852-01	4.830-01	5.930-01	7.167-01	8.552-01	1.009+00	1.180+00	1.369+00	1.567+00	1.779+00
1.5+05	1.772-01	2.229-01	2.743-01	3.323-01	3.973-01	4.698-01	5.501-01	6.390-01	7.330-01	8.334-01
2.0+05	1.011-01	1.274-01	1.570-01	1.905-01	2.281-01	2.700-01	3.166-01	3.681-01	4.227-01	4.810-01
3.0+05	4.546-02	5.734-02	7.078-02	8.599-02	1.031-01	1.222-01	1.435-01	1.671-01	1.921-01	2.188-01
4.0+05	2.548-02	3.241-02	4.003-02	4.866-02	5.837-02	6.924-02	8.134-02	9.475-02	1.090-01	1.243-01
5.0+05	1.647-02	2.079-02	2.568-02	3.123-02	3.748-02	4.447-02	5.225-02	6.089-02	7.008-02	7.991-02
6.0+05	1.145-02	1.445-02	1.786-02	2.172-02	2.607-02	3.094-02	3.636-02	4.238-02	4.879-02	5.564-02
8.0+05	6.447-03	8.140-03	1.005-02	1.224-02	1.469-02	1.744-02	2.050-02	2.389-02	2.751-02	3.138-02
1.0+06	4.128-03	5.212-03	6.443-03	7.837-03	9.409-03	1.117-02	1.313-02	1.531-02	1.763-02	2.011-02
1.5+06	1.836-03	2.318-03	2.865-03	3.486-03	4.185-03	4.969-03	5.842-03	6.811-03	7.844-03	8.949-03
2.0+06	1.033-03	1.304-03	1.612-03	1.961-03	2.355-03	2.796-03	3.287-03	3.833-03	4.414-03	5.036-03
3.0+06	4.550-04	5.797-04	7.165-04	8.718-04	1.047-03	1.243-03	1.461-03	1.704-03	1.962-03	2.239-03
4.0+06	2.582-04	3.261-04	4.031-04	4.904-04	5.899-04	6.992-04	8.221-04	9.585-04	1.104-03	1.260-03
5.0+06	1.653-04	2.087-04	2.580-04	3.139-04	3.769-04	4.475-04	5.262-04	6.135-04	7.066-04	8.062-04
6.0+06	1.142-04	1.449-04	1.792-04	2.180-04	2.617-04	3.108-04	3.654-04	4.260-04	4.907-04	5.599-04
8.0+06	6.456-05	8.153-05	1.005-04	1.226-04	1.472-04	1.748-04	2.055-04	2.397-04	2.760-04	3.149-04
1.0+07	4.132-05	5.218-05	6.450-05	7.848-05	9.423-05	1.119-04	1.315-04	1.534-04	1.767-04	2.016-04
1.5+07	1.835-05	2.319-05	2.867-05	3.482-05	4.188-05	4.972-05	5.847-05	6.817-05	7.851-05	8.938-05
2.0+07	1.033-05	1.304-05	1.613-05	1.962-05	2.356-05	2.797-05	3.289-05	3.834-05	4.416-05	5.039-05
3.0+07	4.551-06	5.798-06	7.167-06	8.719-06	1.047-05	1.243-05	1.462-05	1.704-05	1.963-05	2.240-05
4.0+07	2.582-06	3.261-06	4.031-06	4.905-06	5.899-06	6.993-06	8.222-06	9.586-06	1.104-05	1.260-05
5.0+07	1.653-06	2.087-06	2.580-06	3.139-06	3.769-06	4.475-06	5.262-06	6.135-06	7.066-06	8.063-06
6.0+07	1.148-06	1.449-06	1.792-06	2.180-06	2.617-06	3.108-06	3.654-06	4.260-06	4.907-06	5.599-06
8.0+07	6.455-07	8.152-07	1.008-06	1.226-06	1.472-06	1.748-06	2.055-06	2.396-06	2.760-06	3.149-06
1.0+08	4.131-07	5.217-07	6.449-07	7.847-07	9.422-07	1.119-06	1.315-06	1.534-06	1.766-06	2.016-06

TABLE II.. CONT. RELATIVISTIC COHERENT SCATTERING CROSS SECTIONS, BARNS/ATOM

PHOTON ENERGY EV	21 SC	22 TI	23 V	24 CR	25 MN	26 FE	27 CO	28 NI	29 CU	30 ZN
1.0+02	2.930+02	3.216+02	3.516+02	3.829+02	4.154+02	4.494+02	4.846+02	5.212+02	5.592+02	5.984+02
1.5+02	2.926+02	3.212+02	3.511+02	3.825+02	4.150+02	4.489+02	4.842+02	5.208+02	5.588+02	5.979+02
2.0+02	2.921+02	3.207+02	3.507+02	3.821+02	4.146+02	4.485+02	4.838+02	5.204+02	5.584+02	5.976+02
3.0+02	2.904+02	3.190+02	3.490+02	3.806+02	4.129+02	4.466+02	4.821+02	5.187+02	5.570+02	5.959+02
4.0+02	2.880+02	3.167+02	3.467+02	3.786+02	4.106+02	4.445+02	4.798+02	5.164+02	5.550+02	5.937+02
5.0+02	2.852+02	3.138+02	3.438+02	3.760+02	4.077+02	4.417+02	4.770+02	5.136+02	5.524+02	5.908+02
6.0+02	2.818+02	3.104+02	3.404+02	3.730+02	4.044+02	4.383+02	4.736+02	5.102+02	5.484+02	5.875+02
8.0+02	2.740+02	3.025+02	3.324+02	3.659+02	3.963+02	4.302+02	4.655+02	5.021+02	5.411+02	5.792+02
1.0+03	2.652+02	2.935+02	3.233+02	3.575+02	3.868+02	4.207+02	4.558+02	4.924+02	5.333+02	5.694+02
1.5+03	2.424+02	2.693+02	2.981+02	3.236+02	3.602+02	3.933+02	4.280+02	4.640+02	5.070+02	5.402+02
2.0+03	2.205+02	2.459+02	2.732+02	3.065+02	3.326+02	3.647+02	3.983+02	4.333+02	4.775+02	5.078+02
3.0+03	1.834+02	2.051+02	2.290+02	2.605+02	2.820+02	3.110+02	3.417+02	3.740+02	4.164+02	4.435+02
4.0+03	1.530+02	1.715+02	1.920+02	2.186+02	2.384+02	2.642+02	2.917+02	3.209+02	3.587+02	3.842+02
5.0+03	1.284+02	1.442+02	1.617+02	1.838+02	2.019+02	2.245+02	2.487+02	2.747+02	3.075+02	3.316+02
6.0+03	1.092+02	1.225+02	1.374+02	1.558+02	1.719+02	1.915+02	2.127+02	2.356+02	2.638+02	2.862+02
8.0+03	8.267+01	5.223+01	1.030+02	1.162+02	1.284+02	1.430+02	1.591+02	1.765+02	1.975+02	2.158+02
1.0+04	6.597+01	7.317+01	6.126+01	9.105+01	1.003+02	1.114+02	1.236+02	1.370+02	1.530+02	1.674+02
1.5+04	4.157+01	4.654+01	5.149+01	5.723+01	6.275+01	6.916+01	7.617+01	8.382+01	9.284+01	1.013+02
2.0+04	2.852+01	3.185+01	3.544+01	3.948+01	4.394+01	4.794+01	5.276+01	5.796+01	6.394+01	6.962+01
3.0+04	1.539+01	1.725+01	1.927+01	2.153+01	2.384+01	2.642+01	2.919+01	3.219+01	3.555+01	3.886+01
4.0+04	9.736+00	1.090+01	1.217+01	1.358+01	1.503+01	1.665+01	1.840+01	2.029+01	2.241+01	2.453+01
5.0+04	6.765+00	7.575+00	8.453+00	9.425+00	1.043+01	1.154+01	1.274+01	1.403+01	1.548+01	1.693+01
6.0+04	4.983+00	5.585+00	6.235+00	6.953+00	7.695+00	8.511+00	9.392+00	1.034+01	1.139+01	1.246+01
8.0+04	3.017+00	3.390+00	3.793+00	4.235+00	4.694+00	5.197+00	5.737+00	6.318+00	6.959+00	7.608+00
1.0+05	2.013+00	2.266+00	2.539+00	2.839+00	3.151+00	3.494+00	3.861+00	4.256+00	4.691+00	5.133+00
1.5+05	5.445-01	1.665+00	1.194+00	1.338+00	1.488+00	1.652+00	1.829+00	2.019+00	2.228+00	2.441+00
2.0+05	5.465-01	6.161-01	6.515-01	7.150-01	8.023-01	9.080-01	1.061+00	1.172+00	1.294+00	1.418+00
3.0+05	2.487-01	2.810-01	3.155-01	3.641-01	3.943-01	4.385-01	4.860-01	5.370-01	5.931-01	6.507-01
4.0+05	1.413-01	1.598-01	1.797-01	2.015-01	2.246-01	2.498-01	2.770-01	3.063-01	3.384-01	3.715-01
5.0+05	5.090-02	1.028-01	1.157-01	1.298-01	1.446-01	1.610-01	1.785-01	1.975-01	2.182-01	2.396-01
6.0+05	6.331-02	7.161-02	8.059-02	9.042-02	1.008-01	1.122-01	1.245-01	1.377-01	1.522-01	1.672-01
8.0+05	3.571-02	4.041-02	4.543-02	5.104-02	5.692-02	6.337-02	7.032-02	7.780-02	8.602-02	9.447-02
1.0+06	2.285-02	2.590-02	2.916-02	3.272-02	3.650-02	4.063-02	4.510-02	4.990-02	5.517-02	6.060-02
1.5+06	1.019-02	1.153-02	1.298-02	1.457-02	1.625-02	1.809-02	2.008-02	2.222-02	2.458-02	2.700-02
2.0+06	5.723-03	6.488-03	7.305-03	8.200-03	9.146-03	1.019-02	1.131-02	1.251-02	1.383-02	1.520-02
3.0+06	2.545-03	2.885-03	3.245-03	3.646-03	4.067-03	4.529-03	5.027-03	5.563-03	6.152-03	6.759-03
4.0+06	1.434-03	1.623-03	1.827-03	2.051-03	2.286-03	2.548-03	2.828-03	3.130-03	3.461-03	3.803-03
5.0+06	9.178-04	1.039-03	1.169-03	1.313-03	1.464-03	1.631-03	1.810-03	2.003-03	2.215-03	2.434-03
6.0+06	6.373-04	7.213-04	8.122-04	9.117-04	1.017-03	1.133-03	1.257-03	1.391-03	1.539-03	1.690-03
8.0+06	3.585-04	4.058-04	4.565-04	5.126-04	5.721-04	6.371-04	7.072-04	7.826-04	8.655-04	9.509-04
1.0+07	2.294-04	2.597-04	2.924-04	3.282-04	3.662-04	4.077-04	4.526-04	5.009-04	5.539-04	6.086-04
1.5+07	1.020-04	1.154-04	1.300-04	1.459-04	1.627-04	1.812-04	2.012-04	2.226-04	2.462-04	2.705-04
2.0+07	5.735-05	6.493-05	7.310-05	8.206-05	9.154-05	1.019-04	1.132-04	1.252-04	1.385-04	1.522-04
3.0+07	2.550-05	2.886-05	3.247-05	3.647-05	4.068-05	4.531-05	5.029-05	5.566-05	6.155-05	6.763-05
4.0+07	1.434-05	1.623-05	1.828-05	2.051-05	2.286-05	2.548-05	2.829-05	3.131-05	3.462-05	3.804-05
5.0+07	9.178-06	1.039-05	1.170-05	1.313-05	1.465-05	1.631-05	1.810-05	2.004-05	2.216-05	2.434-05
6.0+07	6.374-06	7.214-06	8.122-06	9.117-06	1.017-05	1.133-05	1.257-05	1.391-05	1.539-05	1.690-05
8.0+07	3.585-06	4.058-06	4.569-06	5.128-06	5.721-06	6.371-06	7.072-06	7.826-06	8.655-06	9.510-06
1.0+08	2.294-06	2.597-06	2.924-06	3.282-06	3.661-06	4.077-06	4.526-06	5.009-06	5.539-06	6.086-06

TABLE II... CONT. RELATIVISTIC COHERENT SCATTERING CROSS SECTIONS, BARNS/ATOM

PHOTON ENERGY EV	31 GA	32 GE	33 AS	34 SE	35 BR	36 KR	37 RB	38 SR	39 Y	40 ZR
1.0+02	6.385+02	6.808+02	7.240+02	7.686+02	8.145+02	8.617+02	9.099+02	9.597+02	1.011+03	1.063+03
1.5+02	6.384+02	6.802+02	7.234+02	7.680+02	8.139+02	8.611+02	9.089+02	9.585+02	1.010+03	1.062+03
2.0+02	6.375+02	6.797+02	7.229+02	7.674+02	8.133+02	8.606+02	9.079+02	9.574+02	1.009+03	1.061+03
3.0+02	6.359+02	6.776+02	7.207+02	7.652+02	8.111+02	8.582+02	9.041+02	9.530+02	1.004+03	1.057+03
4.0+02	6.332+02	6.747+02	7.177+02	7.622+02	8.080+02	8.552+02	9.017+02	9.471+02	9.983+02	1.051+03
5.0+02	6.298+02	6.710+02	7.140+02	7.584+02	8.041+02	8.513+02	8.927+02	9.398+02	9.910+02	1.044+03
6.0+02	6.258+02	6.667+02	7.095+02	7.538+02	7.995+02	8.466+02	8.856+02	9.314+02	9.824+02	1.035+03
8.0+02	6.161+02	6.562+02	6.985+02	7.425+02	7.880+02	8.349+02	8.691+02	9.120+02	9.624+02	1.015+03
1.0+03	6.047+02	6.437+02	6.854+02	7.289+02	7.740+02	8.207+02	8.509+02	8.904+02	9.397+02	9.917+02
1.5+03	5.716+02	6.072+02	6.463+02	6.878+02	7.313+02	7.766+02	8.021+02	8.339+02	8.789+02	9.279+02
2.0+03	5.362+02	5.682+02	6.038+02	6.422+02	6.830+02	7.260+02	7.516+02	7.793+02	8.193+02	8.642+02
3.0+03	4.683+02	4.948+02	5.237+02	5.511+02	5.890+02	6.253+02	6.527+02	6.792+02	7.120+02	7.489+02
4.0+03	4.077+02	4.313+02	4.560+02	4.811+02	5.100+02	5.399+02	5.656+02	5.912+02	6.196+02	6.509+02
5.0+03	3.842+02	3.765+02	3.989+02	4.219+02	4.459+02	4.712+02	4.959+02	5.172+02	5.422+02	5.692+02
6.0+03	3.076+02	3.288+02	3.456+02	3.711+02	3.927+02	4.150+02	4.355+02	4.563+02	4.784+02	5.020+02
8.0+03	2.339+02	2.522+02	2.707+02	2.894+02	3.082+02	3.273+02	3.450+02	3.626+02	3.809+02	4.000+02
1.0+04	1.821+02	1.972+02	2.127+02	2.286+02	2.449+02	2.615+02	2.773+02	2.930+02	3.090+02	3.257+02
1.5+04	1.100+02	1.191+02	1.286+02	1.385+02	1.489+02	1.597+02	1.706+02	1.817+02	1.931+02	2.050+02
2.0+04	7.545+01	8.160+01	8.795+01	9.458+01	1.015+02	1.087+02	1.160+02	1.236+02	1.314+02	1.396+02
3.0+04	4.229+01	4.586+01	4.957+01	5.341+01	5.740+01	6.154+01	6.571+01	6.999+01	7.437+01	7.899+01
4.0+04	2.674+01	2.507+01	2.150+01	2.040+01	1.870+01	1.737+01	1.628+01	1.517+01	1.426+01	1.349+01
5.0+04	1.846+01	2.060+01	2.175+01	2.352+01	2.537+01	2.732+01	2.930+01	3.136+01	3.349+01	3.572+01
6.0+04	1.357+01	1.475+01	1.598+01	1.728+01	1.864+01	2.006+01	2.153+01	2.305+01	2.462+01	2.628+01
8.0+04	8.266+00	9.004+00	9.755+00	1.054+01	1.137+01	1.224+01	1.313+01	1.405+01	1.501+01	1.602+01
1.0+05	5.556+00	6.083+00	6.554+00	7.130+00	7.692+00	8.281+00	8.885+00	9.514+00	1.016+01	1.085+01
1.5+05	2.666+00	2.503+00	2.351+00	2.213+00	2.087+00	1.975+00	1.874+00	1.782+00	1.699+00	1.623+00
2.0+05	1.550+00	1.688+00	1.834+00	1.988+00	2.150+00	2.319+00	2.494+00	2.677+00	2.866+00	3.065+00
3.0+05	7.115-01	7.756-01	8.432-01	9.144-01	9.893-01	1.068+00	1.149+00	1.234+00	1.324+00	1.415+00
4.0+05	4.063-01	4.431-01	4.820-01	5.228-01	5.659-01	6.111-01	6.579-01	7.068-01	7.576-01	8.111-01
5.0+05	2.622-01	2.660-01	2.111-01	2.376-01	2.655-01	2.949-01	3.252-01	3.570-01	3.899-01	4.247-01
6.0+05	1.825-01	1.596-01	1.172-01	1.357-01	1.552-01	1.758-01	1.970-01	2.193-01	2.428-01	2.677-01
8.0+05	1.034-01	1.129-01	1.228-01	1.333-01	1.444-01	1.561-01	1.682-01	1.808-01	1.939-01	2.078-01
1.0+06	6.634-02	7.242-02	7.883-02	8.568-02	9.271-02	1.002-01	1.080-01	1.161-01	1.245-01	1.334-01
1.5+06	2.556-02	3.227-02	3.513-02	3.815-02	4.133-02	4.467-02	4.814-02	5.177-02	5.554-02	5.953-02
2.0+06	1.664-02	1.817-02	1.978-02	2.148-02	2.327-02	2.516-02	2.711-02	2.916-02	3.129-02	3.353-02
3.0+06	7.401-03	8.080-03	8.797-03	9.553-03	1.035-02	1.119-02	1.206-02	1.297-02	1.392-02	1.492-02
4.0+06	4.164-03	4.546-03	4.950-03	5.375-03	5.824-03	6.296-03	6.786-03	7.298-03	7.831-03	8.394-03
5.0+06	2.665-03	2.910-03	3.168-03	3.441-03	3.728-03	4.030-03	4.348-03	4.672-03	5.013-03	5.373-03
6.0+06	1.851-03	2.021-03	2.200-03	2.383-03	2.569-03	2.759-03	2.950-03	3.144-03	3.341-03	3.542-03
8.0+06	1.041-03	1.137-03	1.238-03	1.344-03	1.456-03	1.574-03	1.697-03	1.825-03	1.958-03	2.099-03
1.0+07	6.664-04	7.276-04	7.922-04	8.603-04	9.321-04	1.008-03	1.086-03	1.168-03	1.253-03	1.344-03
1.5+07	2.562-04	3.234-04	3.521-04	3.824-04	4.143-04	4.479-04	4.827-04	5.192-04	5.571-04	5.972-04
2.0+07	1.666-04	1.817-04	1.981-04	2.151-04	2.330-04	2.519-04	2.715-04	2.921-04	3.134-04	3.359-04
3.0+07	7.405-05	8.085-05	8.802-05	9.559-05	1.036-04	1.120-04	1.207-04	1.298-04	1.393-04	1.493-04
4.0+07	4.165-05	4.548-05	4.951-05	5.377-05	5.826-05	6.299-05	6.788-05	7.301-05	7.834-05	8.398-05
5.0+07	2.666-05	2.911-05	3.169-05	3.441-05	3.729-05	4.031-05	4.345-05	4.673-05	5.014-05	5.375-05
6.0+07	1.851-05	2.021-05	2.200-05	2.390-05	2.589-05	2.799-05	3.017-05	3.245-05	3.482-05	3.732-05
8.0+07	1.041-05	1.137-05	1.238-05	1.344-05	1.456-05	1.575-05	1.697-05	1.825-05	1.959-05	2.099-05
1.0+08	6.664-06	7.276-06	7.921-06	8.602-06	9.321-06	1.008-05	1.086-05	1.168-05	1.253-05	1.344-05

TABLE II.. CONT. RELATIVISTIC COHERENT SCATTERING CROSS SECTIONS, BARNS/ATOM

PHOTON ENERGY EV	41 NB	42 MD	43 TC	44 RU	45 RH	46 PC	47 AG	48 CD	49 IN	50 SN
1.0+02	1.117+03	1.173+03	1.229+03	1.287+03	1.346+03	1.407+03	1.469+03	1.532+03	1.596+03	1.662+03
1.5+02	1.114+03	1.172+03	1.228+03	1.286+03	1.345+03	1.406+03	1.468+03	1.531+03	1.595+03	1.661+03
2.0+02	1.115+03	1.171+03	1.227+03	1.285+03	1.344+03	1.405+03	1.467+03	1.530+03	1.594+03	1.660+03
3.0+02	1.111+03	1.167+03	1.223+03	1.281+03	1.341+03	1.402+03	1.463+03	1.526+03	1.589+03	1.655+03
4.0+02	1.106+03	1.162+03	1.217+03	1.276+03	1.335+03	1.398+03	1.458+03	1.520+03	1.583+03	1.648+03
5.0+02	1.099+03	1.155+03	1.210+03	1.270+03	1.329+03	1.392+03	1.452+03	1.513+03	1.575+03	1.640+03
6.0+02	1.092+03	1.147+03	1.201+03	1.262+03	1.321+03	1.386+03	1.444+03	1.505+03	1.566+03	1.630+03
8.0+02	1.073+03	1.128+03	1.181+03	1.243+03	1.303+03	1.369+03	1.426+03	1.485+03	1.543+03	1.605+03
1.0+03	1.051+03	1.106+03	1.157+03	1.221+03	1.280+03	1.349+03	1.403+03	1.461+03	1.516+03	1.577+03
1.5+03	9.878+02	1.042+03	1.088+03	1.154+03	1.213+03	1.285+03	1.335+03	1.388+03	1.437+03	1.492+03
2.0+03	9.215+02	9.727+02	1.015+03	1.081+03	1.138+03	1.209+03	1.257+03	1.306+03	1.351+03	1.400+03
3.0+03	7.562+02	8.403+02	8.780+02	9.355+02	9.667+02	1.050+03	1.095+03	1.140+03	1.181+03	1.223+03
4.0+03	6.887+02	7.259+02	7.598+02	8.070+02	8.512+02	9.041+02	9.466+02	9.880+02	1.027+03	1.066+03
5.0+03	6.002+02	6.317+02	6.617+02	7.003+02	7.379+02	7.816+02	8.199+02	8.577+02	8.944+02	9.309+02
6.0+03	5.283+02	5.553+02	5.816+02	6.137+02	6.457+02	6.822+02	7.158+02	7.494+02	7.828+02	8.164+02
8.0+03	4.208+02	4.419+02	4.624+02	4.864+02	5.105+02	5.372+02	5.628+02	5.888+02	6.150+02	6.419+02
1.0+04	3.424+02	3.612+02	3.783+02	3.979+02	4.174+02	4.382+02	4.591+02	4.797+02	5.005+02	5.218+02
1.5+04	2.177+02	2.307+02	2.433+02	2.573+02	2.712+02	2.859+02	3.005+02	3.149+02	3.293+02	3.438+02
2.0+04	1.484+02	1.576+02	1.667+02	1.767+02	1.869+02	1.975+02	2.086+02	2.192+02	2.306+02	2.418+02
3.0+04	8.386+01	8.855+01	9.358+01	9.949+01	1.051+02	1.110+02	1.172+02	1.234+02	1.298+02	1.363+02
4.0+04	5.453+01	5.793+01	6.128+01	6.492+01	6.864+01	7.252+01	7.656+01	8.050+01	8.473+01	8.897+01
5.0+04	3.807+01	4.053+01	4.295+01	4.539+01	4.828+01	5.110+01	5.404+01	5.697+01	5.998+01	6.305+01
6.0+04	2.802+01	2.955+01	3.167+01	3.364+01	3.567+01	3.779+01	4.002+01	4.225+01	4.453+01	4.688+01
8.0+04	1.708+01	1.820+01	1.931+01	2.052+01	2.177+01	2.307+01	2.444+01	2.582+01	2.724+01	2.871+01
1.0+05	1.157+01	1.232+01	1.308+01	1.389+01	1.473+01	1.562+01	1.654+01	1.748+01	1.844+01	1.944+01
1.5+05	5.585+00	5.959+00	6.330+00	6.729+00	7.141+00	7.573+00	8.026+00	8.484+00	8.956+00	9.442+00
2.0+05	3.275+00	3.494+00	3.715+00	3.952+00	4.198+00	4.456+00	4.726+00	4.999+00	5.282+00	5.573+00
3.0+05	1.513+00	1.616+00	1.719+00	1.830+00	1.946+00	2.066+00	2.193+00	2.322+00	2.455+00	2.593+00
4.0+05	8.675-01	9.266-01	9.863-01	1.051+00	1.117+00	1.187+00	1.260+00	1.335+00	1.412+00	1.491+00
5.0+05	5.613-01	5.977-01	6.355-01	6.802-01	7.235-01	7.688-01	8.165-01	8.650-01	9.151-01	9.670-01
6.0+05	3.924-01	4.193-01	4.468-01	4.758-01	5.062-01	5.380-01	5.715-01	6.055-01	6.407-01	6.772-01
8.0+05	2.224-01	2.377-01	2.532-01	2.698-01	2.871-01	3.052-01	3.243-01	3.437-01	3.638-01	3.846-01
1.0+06	1.428-01	1.527-01	1.627-01	1.734-01	1.845-01	1.962-01	2.085-01	2.210-01	2.340-01	2.474-01
1.5+06	6.373-02	6.814-02	7.260-02	7.740-02	8.239-02	8.762-02	9.312-02	9.872-02	1.045-01	1.106-01
2.0+06	3.590-02	3.839-02	4.090-02	4.361-02	4.642-02	4.937-02	5.247-02	5.564-02	5.891-02	6.231-02
3.0+06	1.597-02	1.708-02	1.820-02	1.940-02	2.066-02	2.197-02	2.335-02	2.476-02	2.622-02	2.773-02
4.0+06	8.987-03	9.610-03	1.024-02	1.092-02	1.162-02	1.236-02	1.314-02	1.394-02	1.476-02	1.561-02
5.0+06	5.753-03	6.152-03	6.556-03	6.990-03	7.441-03	7.914-03	8.413-03	8.920-03	9.448-03	9.992-03
6.0+06	3.995-03	4.272-03	4.553-03	4.855-03	5.168-03	5.497-03	5.843-03	6.195-03	6.561-03	6.940-03
8.0+06	2.248-03	2.403-03	2.561-03	2.731-03	2.907-03	3.092-03	3.287-03	3.485-03	3.691-03	3.904-03
1.0+07	1.428-03	1.538-03	1.639-03	1.748-03	1.861-03	1.979-03	2.104-03	2.231-03	2.362-03	2.499-03
1.5+07	6.398-04	6.837-04	7.285-04	7.769-04	8.270-04	8.796-04	9.350-04	9.915-04	1.050-03	1.111-03
2.0+07	3.558-04	3.846-04	4.098-04	4.370-04	4.652-04	4.948-04	5.260-04	5.577-04	5.906-04	6.247-04
3.0+07	1.558-04	1.709-04	1.822-04	1.942-04	2.068-04	2.199-04	2.338-04	2.479-04	2.625-04	2.777-04
4.0+07	8.991-05	9.615-05	1.025-04	1.092-04	1.163-04	1.237-04	1.315-04	1.394-04	1.477-04	1.562-04
5.0+07	5.754-05	6.154-05	6.558-05	6.992-05	7.444-05	7.917-05	8.416-05	8.924-05	9.450-05	9.995-05
6.0+07	3.556-05	4.273-05	4.554-05	4.856-05	5.169-05	5.498-05	5.844-05	6.197-05	6.563-05	6.942-05
8.0+07	2.248-05	2.404-05	2.561-05	2.731-05	2.908-05	3.092-05	3.287-05	3.486-05	3.691-05	3.905-05
1.0+08	1.431-05	1.538-05	1.639-05	1.748-05	1.861-05	1.979-05	2.104-05	2.231-05	2.363-05	2.499-05

TABLE II... CONT. RELATIVISTIC COHERENT SCATTERING CROSS SECTIONS, BARNS/ATOM

PHOTON ENERGY EV	51 SB	52 TE	53 I	54 XE	55 CS	56 BA	57 LA	58 CE	59 PR	60 ND
1.0+02	1.729+03	1.798+03	1.868+03	1.939+03	2.011+03	2.084+03	2.159+03	2.236+03	2.314+03	2.393+03
1.5+02	1.728+03	1.796+03	1.866+03	1.937+03	2.009+03	2.082+03	2.157+03	2.234+03	2.311+03	2.391+03
2.0+02	1.727+03	1.795+03	1.865+03	1.936+03	2.006+03	2.080+03	2.155+03	2.231+03	2.309+03	2.388+03
3.0+02	1.722+03	1.790+03	1.860+03	1.931+03	1.998+03	2.071+03	2.146+03	2.222+03	2.300+03	2.380+03
4.0+02	1.715+03	1.783+03	1.852+03	1.924+03	1.988+03	2.058+03	2.134+03	2.210+03	2.288+03	2.368+03
5.0+02	1.706+03	1.774+03	1.843+03	1.914+03	1.975+03	2.044+03	2.119+03	2.195+03	2.274+03	2.353+03
6.0+02	1.696+03	1.763+03	1.833+03	1.903+03	1.960+03	2.027+03	2.101+03	2.178+03	2.257+03	2.336+03
8.0+02	1.670+03	1.737+03	1.806+03	1.876+03	1.926+03	1.987+03	2.061+03	2.137+03	2.217+03	2.296+03
1.0+03	1.640+03	1.706+03	1.774+03	1.844+03	1.887+03	1.943+03	2.015+03	2.091+03	2.172+03	2.251+03
1.5+03	1.551+03	1.612+03	1.677+03	1.744+03	1.782+03	1.828+03	1.892+03	1.967+03	2.052+03	2.130+03
2.0+03	1.453+03	1.509+03	1.569+03	1.631+03	1.672+03	1.713+03	1.770+03	1.843+03	1.930+03	2.006+03
3.0+03	1.267+03	1.313+03	1.362+03	1.413+03	1.455+03	1.497+03	1.543+03	1.610+03	1.695+03	1.766+03
4.0+03	1.105+03	1.145+03	1.186+03	1.229+03	1.268+03	1.306+03	1.348+03	1.407+03	1.483+03	1.548+03
5.0+03	8.673+02	1.003+03	1.041+03	1.078+03	1.113+03	1.148+03	1.184+03	1.236+03	1.303+03	1.361+03
6.0+03	8.501+02	8.836+02	9.180+02	9.523+02	9.840+02	1.016+03	1.049+03	1.095+03	1.153+03	1.204+03
8.0+03	6.694+02	6.572+02	7.262+02	7.553+02	7.830+02	8.106+02	8.391+02	8.754+02	9.199+02	9.601+02
1.0+04	5.436+02	5.660+02	5.897+02	6.136+02	6.370+02	6.607+02	6.850+02	7.145+02	7.493+02	7.818+02
1.5+04	3.585+02	3.730+02	3.884+02	4.038+02	4.190+02	4.345+02	4.504+02	4.689+02	4.900+02	5.102+02
2.0+04	2.532+02	2.645+02	2.765+02	2.893+02	3.000+02	3.118+02	3.238+02	3.372+02	3.520+02	3.663+02
3.0+04	1.431+02	1.498+02	1.571+02	1.645+02	1.719+02	1.794+02	1.872+02	1.955+02	2.045+02	2.135+02
4.0+04	5.231+01	5.768+01	6.024+02	6.371+02	6.713+02	7.055+02	7.408+02	7.772+02	8.148+02	8.535+02
5.0+04	6.620+01	6.935+01	7.274+01	7.613+01	7.955+01	8.305+01	8.665+01	9.048+01	9.456+01	9.885+01
6.0+04	4.925+01	5.171+01	5.430+01	5.690+01	5.954+01	6.222+01	6.498+01	6.790+01	7.098+01	7.408+01
8.0+04	3.023+01	3.175+01	3.339+01	3.505+01	3.673+01	3.845+01	4.023+01	4.209+01	4.407+01	4.606+01
1.0+05	2.046+01	2.150+01	2.262+01	2.374+01	2.489+01	2.607+01	2.729+01	2.857+01	2.992+01	3.129+01
1.5+05	9.545+00	1.045+01	1.100+01	1.155+01	1.211+01	1.269+01	1.328+01	1.391+01	1.457+01	1.524+01
2.0+05	5.874+00	6.179+00	6.505+00	6.836+00	7.174+00	7.521+00	7.879+00	8.255+00	8.649+00	9.050+00
3.0+05	2.736+00	2.890+00	3.035+00	3.192+00	3.354+00	3.519+00	3.690+00	3.870+00	4.058+00	4.250+00
4.0+05	1.574+00	1.658+00	1.748+00	1.839+00	1.932+00	2.029+00	2.128+00	2.233+00	2.343+00	2.454+00
5.0+05	1.021+00	1.075+00	1.134+00	1.193+00	1.255+00	1.317+00	1.383+00	1.451+00	1.522+00	1.596+00
6.0+05	7.150-01	7.535-01	7.946-01	8.365-01	8.794-01	9.237-01	9.695-01	1.017+00	1.068+00	1.119+00
8.0+05	4.062-01	4.282-01	4.516-01	4.755-01	5.001-01	5.254-01	5.517-01	5.791-01	6.080-01	6.375-01
1.0+06	2.613-01	2.755-01	2.906-01	3.061-01	3.219-01	3.383-01	3.552-01	3.730-01	3.917-01	4.107-01
1.5+06	1.168-01	1.232-01	1.299-01	1.369-01	1.440-01	1.514-01	1.590-01	1.670-01	1.753-01	1.839-01
2.0+06	6.583-02	6.842-02	7.125-02	7.417-02	7.717-02	8.025-02	8.345-02	8.676-02	9.020-02	9.377-02
3.0+06	2.930-02	3.090-02	3.261-02	3.436-02	3.615-02	3.801-02	3.992-02	4.194-02	4.405-02	4.621-02
4.0+06	1.649-02	1.739-02	1.836-02	1.934-02	2.035-02	2.139-02	2.247-02	2.361-02	2.480-02	2.602-02
5.0+06	1.055-02	1.114-02	1.175-02	1.238-02	1.303-02	1.370-02	1.439-02	1.511-02	1.588-02	1.666-02
6.0+06	7.333-03	7.734-03	8.162-03	8.599-03	9.048-03	9.513-03	9.993-03	1.050-02	1.103-02	1.157-02
8.0+06	4.125-03	4.351-03	4.552-03	4.838-03	5.091-03	5.352-03	5.622-03	5.906-03	6.204-03	6.509-03
1.0+07	2.640-03	2.785-03	2.939-03	3.096-03	3.258-03	3.425-03	3.598-03	3.780-03	3.971-03	4.166-03
1.5+07	1.174-03	1.238-03	1.305-03	1.376-03	1.448-03	1.522-03	1.599-03	1.680-03	1.765-03	1.852-03
2.0+07	6.601-04	6.962-04	7.348-04	7.742-04	8.146-04	8.564-04	8.997-04	9.451-04	9.928-04	1.042-03
3.0+07	2.938-04	3.094-04	3.265-04	3.441-04	3.621-04	3.806-04	3.999-04	4.201-04	4.413-04	4.630-04
4.0+07	1.650-04	1.741-04	1.837-04	1.936-04	2.037-04	2.141-04	2.249-04	2.363-04	2.482-04	2.604-04
5.0+07	1.055-04	1.114-04	1.176-04	1.239-04	1.303-04	1.370-04	1.439-04	1.512-04	1.588-04	1.666-04
6.0+07	7.335-05	7.736-05	8.165-05	8.602-05	9.052-05	9.516-05	9.997-05	1.050-04	1.103-04	1.157-04
8.0+07	4.126-05	4.352-05	4.593-05	4.839-05	5.091-05	5.353-05	5.623-05	5.907-05	6.205-05	6.510-05
1.0+08	2.640-05	2.785-05	2.939-05	3.097-05	3.259-05	3.426-05	3.599-05	3.780-05	3.971-05	4.167-05

TABLE II.. CONT. RELATIVISTIC COHERENT SCATTERING CROSS SECTIONS, BARNS/ATOM

PHOTON ENERGY EV	61 FM	62 SM	63 EU	64 GD	65 TB	66 DY	67 HD	68 ER	69 TM	70 YB
1.0+02	2.473+03	2.555+03	2.639+03	2.723+03	2.809+03	2.896+03	2.984+03	3.074+03	3.165+03	3.258+03
1.5+02	2.471+03	2.553+03	2.636+03	2.721+03	2.806+03	2.894+03	2.982+03	3.072+03	3.163+03	3.256+03
2.0+02	2.469+03	2.551+03	2.634+03	2.718+03	2.804+03	2.891+03	2.980+03	3.070+03	3.161+03	3.253+03
3.0+02	2.466+03	2.542+03	2.625+03	2.710+03	2.796+03	2.883+03	2.971+03	3.061+03	3.153+03	3.244+03
4.0+02	2.448+03	2.530+03	2.614+03	2.698+03	2.784+03	2.871+03	2.960+03	3.050+03	3.141+03	3.233+03
5.0+02	2.434+03	2.516+03	2.599+03	2.683+03	2.770+03	2.857+03	2.945+03	3.035+03	3.127+03	3.219+03
6.0+02	2.411+03	2.499+03	2.582+03	2.666+03	2.753+03	2.840+03	2.928+03	3.019+03	3.110+03	3.202+03
8.0+02	2.371+03	2.459+03	2.542+03	2.625+03	2.713+03	2.800+03	2.887+03	2.979+03	3.070+03	3.163+03
1.0+03	2.333+03	2.414+03	2.497+03	2.578+03	2.667+03	2.754+03	2.840+03	2.933+03	3.024+03	3.117+03
1.5+03	2.203+03	2.290+03	2.372+03	2.448+03	2.541+03	2.627+03	2.706+03	2.804+03	2.895+03	2.986+03
2.0+03	2.084+03	2.163+03	2.244+03	2.312+03	2.409+03	2.494+03	2.566+03	2.668+03	2.757+03	2.848+03
3.0+03	1.835+03	1.913+03	1.995+03	2.049+03	2.145+03	2.236+03	2.290+03	2.392+03	2.478+03	2.565+03
4.0+03	1.614+03	1.682+03	1.752+03	1.807+03	1.896+03	1.971+03	2.031+03	2.127+03	2.207+03	2.288+03
5.0+03	1.426+03	1.481+03	1.544+03	1.595+03	1.675+03	1.744+03	1.800+03	1.886+03	1.960+03	2.036+03
6.0+03	1.257+02	1.311+03	1.367+03	1.415+03	1.486+03	1.547+03	1.599+03	1.677+03	1.744+03	1.813+03
8.0+03	1.002+03	1.046+03	1.091+03	1.131+03	1.186+03	1.237+03	1.281+03	1.342+03	1.397+03	1.454+03
1.0+04	6.155+02	6.514+02	6.880+02	7.216+02	7.657+02	8.007+02	8.444+02	8.933+02	9.432+02	9.960+02
1.5+04	5.314+02	5.534+02	5.763+02	5.981+02	6.248+02	6.506+02	6.752+02	7.052+02	7.341+02	7.640+02
2.0+04	3.812+02	3.965+02	4.124+02	4.277+02	4.458+02	4.635+02	4.804+02	5.007+02	5.203+02	5.406+02
3.0+04	2.227+02	2.323+02	2.420+02	2.517+02	2.625+02	2.732+02	2.837+02	2.956+02	3.073+02	3.193+02
4.0+04	1.445+02	1.511+02	1.576+02	1.640+02	1.711+02	1.783+02	1.854+02	1.933+02	2.011+02	2.092+02
5.0+04	1.023+02	1.072+02	1.117+02	1.162+02	1.212+02	1.262+02	1.312+02	1.367+02	1.422+02	1.479+02
6.0+04	7.727+01	8.057+01	8.395+01	8.734+01	9.106+01	9.478+01	9.850+01	1.026+02	1.067+02	1.109+02
8.0+04	4.611+01	5.022+01	5.246+01	5.458+01	5.695+01	5.933+01	6.172+01	6.432+01	6.692+01	6.960+01
1.0+05	3.270+01	3.416+01	3.566+01	3.718+01	3.882+01	4.048+01	4.214+01	4.394+01	4.576+01	4.763+01
1.5+05	1.593+01	1.664+01	1.737+01	1.812+01	1.892+01	1.973+01	2.055+01	2.143+01	2.233+01	2.326+01
2.0+05	9.464+00	9.890+00	1.033+01	1.078+01	1.125+01	1.174+01	1.223+01	1.276+01	1.329+01	1.384+01
3.0+05	4.443+00	4.653+00	4.865+00	5.079+00	5.309+00	5.543+00	5.779+00	6.022+00	6.289+00	6.554+00
4.0+05	2.570+00	2.690+00	2.813+00	2.939+00	3.073+00	3.210+00	3.348+00	3.487+00	3.628+00	3.803+00
5.0+05	1.671+00	1.749+00	1.830+00	1.912+00	2.000+00	2.090+00	2.181+00	2.278+00	2.377+00	2.479+00
6.0+05	1.173+00	1.228+00	1.285+00	1.343+00	1.405+00	1.468+00	1.532+00	1.601+00	1.670+00	1.743+00
8.0+05	6.680-01	6.556-01	7.322-01	7.654-01	8.010-01	8.372-01	8.740-01	9.134-01	9.535-01	9.949-01
1.0+06	4.304-01	4.509-01	4.720-01	4.935-01	5.165-01	5.400-01	5.638-01	5.894-01	6.153-01	6.422-01
1.5+06	1.923-01	2.020-01	2.115-01	2.212-01	2.316-01	2.421-01	2.529-01	2.644-01	2.762-01	2.883-01
2.0+06	1.085-01	1.140-01	1.193-01	1.248-01	1.307-01	1.367-01	1.428-01	1.493-01	1.560-01	1.628-01
3.0+06	4.843-02	5.077-02	5.317-02	5.562-02	5.824-02	6.092-02	6.364-02	6.655-02	6.952-02	7.259-02
4.0+06	2.723-02	2.858-02	2.994-02	3.132-02	3.273-02	3.430-02	3.583-02	3.748-02	3.915-02	4.088-02
5.0+06	1.746-02	1.830-02	1.917-02	2.005-02	2.095-02	2.196-02	2.294-02	2.400-02	2.507-02	2.618-02
6.0+06	1.213-02	1.271-02	1.331-02	1.393-02	1.458-02	1.525-02	1.594-02	1.667-02	1.741-02	1.819-02
8.0+06	6.823-03	7.152-03	7.491-03	7.836-03	8.205-03	8.583-03	8.968-03	9.379-03	9.798-03	1.023-02
1.0+07	4.368-03	4.578-03	4.795-03	5.016-03	5.252-03	5.494-03	5.740-03	6.003-03	6.271-03	6.549-03
1.5+07	1.942-03	2.035-03	2.131-03	2.230-03	2.335-03	2.442-03	2.551-03	2.669-03	2.788-03	2.911-03
2.0+07	1.092-03	1.145-03	1.199-03	1.254-03	1.313-03	1.374-03	1.435-03	1.501-03	1.568-03	1.637-03
3.0+07	4.858-04	5.087-04	5.328-04	5.574-04	5.827-04	6.106-04	6.379-04	6.672-04	6.970-04	7.276-04
4.0+07	2.731-04	2.862-04	2.997-04	3.135-04	3.283-04	3.434-04	3.588-04	3.753-04	3.920-04	4.094-04
5.0+07	1.748-04	1.831-04	1.918-04	2.007-04	2.101-04	2.198-04	2.296-04	2.402-04	2.509-04	2.620-04
6.0+07	1.214-04	1.272-04	1.332-04	1.394-04	1.459-04	1.526-04	1.595-04	1.668-04	1.742-04	1.819-04
8.0+07	6.826-05	7.154-05	7.493-05	7.839-05	8.209-05	8.586-05	8.970-05	9.382-05	9.801-05	1.023-04
1.0+08	4.363-05	4.578-05	4.795-05	5.017-05	5.253-05	5.495-05	5.741-05	6.004-05	6.273-05	6.550-05



TABLE II.. CONT. RELATIVISTIC COHERENT SCATTERING CROSS SECTIONS, BARNS/ATOM

PHOTON ENERGY EV	71 LU	72 HF	73 TA	74 W	75 RE	76 OS	77 IR	78 PT	79 AU	80 HG
1.0+02	3.352+03	3.447+03	3.543+03	3.641+03	3.740+03	3.841+03	3.942+03	4.046+03	4.150+03	4.256+03
1.5+02	3.345+03	3.445+03	3.541+03	3.639+03	3.738+03	3.838+03	3.940+03	4.044+03	4.148+03	4.254+03
2.0+02	3.347+03	3.442+03	3.539+03	3.637+03	3.736+03	3.836+03	3.938+03	4.042+03	4.146+03	4.252+03
3.0+02	3.359+03	3.454+03	3.559+03	3.662+03	3.766+03	3.871+03	3.976+03	4.082+03	4.188+03	4.294+03
4.0+02	3.372+03	3.467+03	3.571+03	3.674+03	3.777+03	3.881+03	3.985+03	4.090+03	4.195+03	4.300+03
5.0+02	3.312+03	3.408+03	3.505+03	3.603+03	3.702+03	3.803+03	3.905+03	4.010+03	4.115+03	4.219+03
6.0+02	3.255+03	3.350+03	3.447+03	3.545+03	3.643+03	3.742+03	3.841+03	3.940+03	4.039+03	4.138+03
8.0+02	3.254+03	3.349+03	3.446+03	3.544+03	3.643+03	3.742+03	3.841+03	3.940+03	4.039+03	4.138+03
1.0+03	3.206+03	3.300+03	3.396+03	3.494+03	3.593+03	3.694+03	3.796+03	3.907+03	4.012+03	4.111+03
1.5+03	3.065+03	3.159+03	3.251+03	3.347+03	3.443+03	3.542+03	3.643+03	3.758+03	3.862+03	3.965+03
2.0+03	2.923+03	3.006+03	3.094+03	3.184+03	3.276+03	3.371+03	3.468+03	3.563+03	3.658+03	3.752+03
3.0+03	2.633+03	2.704+03	2.779+03	2.858+03	2.939+03	3.023+03	3.110+03	3.214+03	3.307+03	3.386+03
4.0+03	2.353+03	2.418+03	2.486+03	2.555+03	2.628+03	2.700+03	2.776+03	2.864+03	2.946+03	3.019+03
5.0+03	2.097+03	2.158+03	2.220+03	2.283+03	2.347+03	2.413+03	2.480+03	2.555+03	2.627+03	2.694+03
6.0+03	1.871+03	1.929+03	1.985+03	2.044+03	2.102+03	2.162+03	2.222+03	2.287+03	2.351+03	2.412+03
8.0+03	1.504+03	1.554+03	1.604+03	1.654+03	1.704+03	1.755+03	1.806+03	1.859+03	1.912+03	1.963+03
1.0+04	1.229+03	1.272+03	1.315+03	1.358+03	1.402+03	1.446+03	1.490+03	1.536+03	1.582+03	1.626+03
1.5+04	7.525+02	8.215+02	8.510+02	8.811+02	9.116+02	9.427+02	9.744+02	1.007+03	1.040+03	1.072+03
2.0+04	5.602+02	5.802+02	6.006+02	6.215+02	6.427+02	6.645+02	6.857+02	7.098+02	7.332+02	7.566+02
3.0+04	3.310+02	3.430+02	3.551+02	3.675+02	3.800+02	3.928+02	4.058+02	4.192+02	4.327+02	4.462+02
4.0+04	2.173+02	2.255+02	2.338+02	2.423+02	2.510+02	2.600+02	2.690+02	2.783+02	2.878+02	2.973+02
5.0+04	1.535+02	1.593+02	1.653+02	1.714+02	1.776+02	1.840+02	1.908+02	1.972+02	2.041+02	2.110+02
6.0+04	1.151+02	1.194+02	1.239+02	1.284+02	1.330+02	1.377+02	1.426+02	1.476+02	1.528+02	1.579+02
8.0+04	7.227+01	7.501+01	7.784+01	8.066+01	8.359+01	8.658+01	8.955+01	9.280+01	9.601+01	9.926+01
1.0+05	4.550+01	5.142+01	5.338+01	5.539+01	5.745+01	5.956+01	6.172+01	6.394+01	6.620+01	6.849+01
1.5+05	2.417+01	2.812+01	2.610+01	2.710+01	2.813+01	2.919+01	3.027+01	3.139+01	3.253+01	3.370+01
2.0+05	1.439+01	1.496+01	1.555+01	1.615+01	1.676+01	1.739+01	1.804+01	1.871+01	1.940+01	2.009+01
3.0+05	6.821+00	7.096+00	7.378+00	7.668+00	7.965+00	8.271+00	8.586+00	8.910+00	9.241+00	9.579+00
4.0+05	3.961+00	4.122+00	4.285+00	4.460+00	4.636+00	4.817+00	5.003+00	5.195+00	5.391+00	5.592+00
5.0+05	2.582+00	2.689+00	2.798+00	2.911+00	3.027+00	3.146+00	3.269+00	3.395+00	3.525+00	3.658+00
6.0+05	1.816+00	1.851+00	1.886+00	1.921+00	1.956+00	2.000+00	2.041+00	2.083+00	2.124+00	2.164+00
8.0+05	1.037+00	1.080+00	1.125+00	1.171+00	1.218+00	1.267+00	1.317+00	1.369+00	1.422+00	1.476+00
1.0+06	6.694-01	6.575-01	7.264-01	7.562-01	7.869-01	8.186-01	8.512-01	8.849-01	9.195-01	9.549-01
3.0+06	3.006-01	3.133-01	3.264-01	3.399-01	3.538-01	3.681-01	3.829-01	3.982-01	4.139-01	4.300-01
2.0+06	1.658-01	1.770-01	1.844-01	1.921-01	2.000-01	2.081-01	2.165-01	2.252-01	2.341-01	2.432-01
3.0+06	7.571-02	7.893-02	8.224-02	8.567-02	8.920-02	9.284-02	9.650-02	1.005-01	1.045-01	1.086-01
4.0+06	4.264-02	4.445-02	4.632-02	4.825-02	5.024-02	5.230-02	5.442-02	5.662-02	5.887-02	6.119-02
5.0+06	2.730-02	2.846-02	2.966-02	3.090-02	3.218-02	3.350-02	3.485-02	3.626-02	3.771-02	3.919-02
6.0+06	1.857-02	1.877-02	2.061-02	2.147-02	2.235-02	2.327-02	2.421-02	2.519-02	2.620-02	2.723-02
8.0+06	1.067-02	1.113-02	1.160-02	1.208-02	1.259-02	1.309-02	1.353-02	1.418-02	1.474-02	1.532-02
1.0+07	6.831-03	7.122-03	7.422-03	7.732-03	8.052-03	8.382-03	8.722-03	9.075-03	9.437-03	9.809-03
1.5+07	3.037-03	3.166-03	3.299-03	3.437-03	3.579-03	3.726-03	3.877-03	4.034-03	4.195-03	4.361-03
2.0+07	1.708-03	1.781-03	1.858-03	1.933-03	2.013-03	2.096-03	2.181-03	2.269-03	2.360-03	2.453-03
3.0+07	7.952-04	7.515-04	8.249-04	8.593-04	8.949-04	9.316-04	9.694-04	1.009-03	1.049-03	1.090-03
4.0+07	4.270-04	4.452-04	4.640-04	4.834-04	5.034-04	5.240-04	5.453-04	5.674-04	5.900-04	6.133-04
5.0+07	2.733-04	2.850-04	2.970-04	3.094-04	3.222-04	3.354-04	3.490-04	3.631-04	3.775-04	3.925-04
6.0+07	1.858-04	1.879-04	2.062-04	2.148-04	2.237-04	2.329-04	2.424-04	2.521-04	2.622-04	2.726-04
8.0+07	1.068-04	1.113-04	1.160-04	1.208-04	1.259-04	1.310-04	1.363-04	1.418-04	1.475-04	1.533-04
1.0+08	6.833-05	7.124-05	7.424-05	7.734-05	8.054-05	8.384-05	8.725-05	9.078-05	9.441-05	9.813-05

TABLE II., CONT. RELATIVISTIC COHERENT SCATTERING CROSS SECTIONS, BARNS/ATOM

PHOTON ENERGY EV	81 TL	82 PE	83 EI.	84 PD	85 AT	86 RN	87 FR	88 RA	89 AC	90 TH
1.0+02	4.363+03	4.471+03	4.581+03	4.652+03	4.804+03	4.918+03	5.032+03	5.148+03	5.266+03	5.385+03
1.5+02	4.360+03	4.469+03	4.578+03	4.669+03	4.801+03	4.915+03	5.028+03	5.144+03	5.262+03	5.381+03
2.0+02	4.368+03	4.466+03	4.576+03	4.667+03	4.799+03	4.913+03	5.025+03	5.140+03	5.258+03	5.377+03
3.0+02	4.349+03	4.457+03	4.566+03	4.676+03	4.789+03	4.902+03	5.010+03	5.124+03	5.241+03	5.361+03
4.0+02	4.337+03	4.444+03	4.553+03	4.662+03	4.774+03	4.888+03	4.991+03	5.102+03	5.219+03	5.338+03
5.0+02	4.322+03	4.428+03	4.536+03	4.645+03	4.756+03	4.870+03	4.967+03	5.076+03	5.192+03	5.311+03
6.0+02	4.304+03	4.409+03	4.515+03	4.624+03	4.735+03	4.848+03	4.939+03	5.045+03	5.160+03	5.279+03
8.0+02	4.255+03	4.362+03	4.466+03	4.572+03	4.682+03	4.794+03	4.875+03	4.972+03	5.085+03	5.203+03
1.0+03	4.204+03	4.304+03	4.406+03	4.510+03	4.618+03	4.728+03	4.801+03	4.890+03	4.999+03	5.114+03
1.5+03	4.040+03	4.131+03	4.224+03	4.321+03	4.422+03	4.527+03	4.592+03	4.665+03	4.761+03	4.866+03
2.0+03	3.851+03	3.935+03	4.020+03	4.108+03	4.201+03	4.298+03	4.365+03	4.433+03	4.517+03	4.610+03
3.0+03	3.459+03	3.533+03	3.606+03	3.681+03	3.759+03	3.840+03	3.910+03	3.978+03	4.049+03	4.125+03
4.0+03	3.089+03	3.158+03	3.226+03	3.293+03	3.362+03	3.432+03	3.497+03	3.562+03	3.628+03	3.695+03
5.0+03	2.759+03	2.824+03	2.888+03	2.952+03	3.015+03	3.079+03	3.139+03	3.199+03	3.260+03	3.323+03
6.0+03	2.473+03	2.533+03	2.593+03	2.653+03	2.713+03	2.773+03	2.829+03	2.885+03	2.943+03	3.001+03
8.0+03	2.014+03	2.065+03	2.116+03	2.168+03	2.220+03	2.273+03	2.324+03	2.374+03	2.425+03	2.476+03
1.0+04	1.670+03	1.714+03	1.758+03	1.802+03	1.847+03	1.893+03	1.937+03	1.981+03	2.026+03	2.072+03
1.5+04	1.105+03	1.138+03	1.170+03	1.203+03	1.236+03	1.270+03	1.303+03	1.336+03	1.369+03	1.402+03
2.0+04	7.803+02	8.044+02	8.288+02	8.535+02	8.785+02	9.039+02	9.292+02	9.547+02	9.805+02	1.007+03
3.0+04	4.595+02	4.738+02	4.880+02	5.023+02	5.168+02	5.317+02	5.466+02	5.618+02	5.772+02	5.929+02
4.0+04	3.668+02	3.766+02	3.864+02	3.963+02	4.064+02	4.167+02	4.271+02	4.377+02	4.484+02	4.592+02
5.0+04	2.811+02	2.852+02	2.893+02	2.935+02	2.978+02	3.021+02	3.064+02	3.107+02	3.150+02	3.193+02
6.0+04	1.632+02	1.656+02	1.681+02	1.707+02	1.734+02	1.761+02	1.788+02	1.815+02	1.842+02	1.869+02
8.0+04	1.026+02	1.059+02	1.094+02	1.129+02	1.164+02	1.201+02	1.238+02	1.276+02	1.314+02	1.353+02
1.0+05	7.082+01	7.320+01	7.562+01	7.809+01	8.060+01	8.317+01	8.576+01	8.841+01	9.110+01	9.384+01
1.5+05	3.485+01	3.610+01	3.734+01	3.861+01	3.990+01	4.123+01	4.258+01	4.395+01	4.536+01	4.679+01
2.0+05	2.081+01	2.154+01	2.228+01	2.305+01	2.383+01	2.463+01	2.544+01	2.628+01	2.713+01	2.800+01
3.0+05	5.924+00	6.028+00	6.134+00	6.242+00	6.352+00	6.464+00	6.578+00	6.694+00	6.812+00	6.932+00
4.0+05	3.754+00	3.834+00	3.917+00	4.004+00	4.094+00	4.187+00	4.282+00	4.379+00	4.478+00	4.579+00
5.0+05	2.674+00	2.773+00	2.875+00	2.980+00	3.087+00	3.198+00	3.310+00	3.426+00	3.545+00	3.666+00
8.0+05	1.532+00	1.590+00	1.649+00	1.709+00	1.772+00	1.836+00	1.902+00	1.969+00	2.038+00	2.109+00
1.0+06	5.913-01	6.029+00	6.147+00	6.267+00	6.388+00	6.510+00	6.634+00	6.760+00	6.888+00	7.018+00
1.5+06	4.465-01	4.636-01	4.812-01	4.992-01	5.178-01	5.370-01	5.566-01	5.768-01	5.975-01	6.188-01
2.0+06	2.527-01	2.624-01	2.723-01	2.826-01	2.932-01	3.041-01	3.153-01	3.268-01	3.387-01	3.508-01
3.0+06	1.128-01	1.172-01	1.217-01	1.263-01	1.310-01	1.359-01	1.410-01	1.462-01	1.515-01	1.570-01
4.0+06	6.357-02	6.503-02	6.656-02	6.817-02	6.986-02	7.163-02	7.347-02	7.538-02	7.735-02	7.938-02
5.0+06	4.072-02	4.230-02	4.392-02	4.559-02	4.732-02	4.910-02	5.092-02	5.280-02	5.474-02	5.673-02
6.0+06	2.829-02	2.939-02	3.052-02	3.168-02	3.288-02	3.412-02	3.539-02	3.669-02	3.804-02	3.942-02
8.0+06	1.592-02	1.654-02	1.717-02	1.783-02	1.850-02	1.920-02	1.992-02	2.065-02	2.141-02	2.219-02
1.0+07	1.019-02	1.059-02	1.099-02	1.141-02	1.185-02	1.229-02	1.275-02	1.322-02	1.371-02	1.421-02
1.5+07	4.531-03	4.707-03	4.888-03	5.074-03	5.266-03	5.465-03	5.669-03	5.879-03	6.095-03	6.317-03
2.0+07	2.549-03	2.648-03	2.750-03	2.854-03	2.963-03	3.074-03	3.189-03	3.307-03	3.429-03	3.554-03
3.0+07	1.132-03	1.177-03	1.222-03	1.269-03	1.317-03	1.367-03	1.417-03	1.470-03	1.524-03	1.580-03
4.0+07	6.373-04	6.620-04	6.874-04	7.137-04	7.407-04	7.687-04	7.973-04	8.269-04	8.573-04	8.885-04
5.0+07	4.078-04	4.237-04	4.400-04	4.567-04	4.741-04	4.919-04	5.103-04	5.292-04	5.487-04	5.687-04
6.0+07	2.832-04	2.942-04	3.055-04	3.172-04	3.292-04	3.416-04	3.544-04	3.675-04	3.810-04	3.949-04
8.0+07	1.593-04	1.655-04	1.719-04	1.784-04	1.852-04	1.922-04	1.993-04	2.067-04	2.143-04	2.221-04
1.0+08	1.020-04	1.059-04	1.100-04	1.142-04	1.185-04	1.230-04	1.278-04	1.323-04	1.372-04	1.422-04

TABLE II... CONT. RELATIVISTIC COHERENT SCATTERING CROSS SECTIONS, BARNS/ATOM

PHOTON ENERGY EV	91 PA	92 U	93 NP	94 PU	95 AM	96 CM	97 BK	98 CF	99 ES	100 FM
1.0+02	5.506+03	5.627+03	5.750+03	5.875+03	6.001+03	6.128+03	6.256+03	6.386+03	6.517+03	6.649+03
1.5+02	5.501+03	5.623+03	5.746+03	5.871+03	5.997+03	6.124+03	6.252+03	6.382+03	6.513+03	6.645+03
2.0+02	5.497+03	5.619+03	5.742+03	5.867+03	5.993+03	6.120+03	6.248+03	6.378+03	6.509+03	6.642+03
3.0+02	5.491+03	5.604+03	5.727+03	5.852+03	5.978+03	6.105+03	6.233+03	6.363+03	6.494+03	6.627+03
4.0+02	5.480+03	5.582+03	5.705+03	5.831+03	5.957+03	6.084+03	6.212+03	6.342+03	6.474+03	6.608+03
5.0+02	5.473+03	5.556+03	5.679+03	5.805+03	5.931+03	6.058+03	6.187+03	6.317+03	6.448+03	6.581+03
6.0+02	5.401+03	5.524+03	5.648+03	5.775+03	5.901+03	6.027+03	6.156+03	6.286+03	6.418+03	6.551+03
8.0+02	5.327+03	5.450+03	5.574+03	5.702+03	5.829+03	5.954+03	6.083+03	6.213+03	6.345+03	6.478+03
1.0+03	5.240+03	5.363+03	5.487+03	5.618+03	5.745+03	5.867+03	5.956+03	6.127+03	6.259+03	6.392+03
1.5+03	4.956+03	5.118+03	5.240+03	5.378+03	5.504+03	5.618+03	5.746+03	5.875+03	6.006+03	6.139+03
2.0+03	4.742+03	4.860+03	4.979+03	5.120+03	5.243+03	5.347+03	5.473+03	5.601+03	5.730+03	5.860+03
3.0+03	4.248+03	4.355+03	4.463+03	4.598+03	4.712+03	4.805+03	4.923+03	5.043+03	5.165+03	5.289+03
4.0+03	3.801+03	3.895+03	3.991+03	4.109+03	4.212+03	4.299+03	4.406+03	4.516+03	4.628+03	4.743+03
5.0+03	3.412+03	3.494+03	3.579+03	3.680+03	3.770+03	3.851+03	3.946+03	4.044+03	4.145+03	4.249+03
6.0+03	3.077+03	3.150+03	3.224+03	3.311+03	3.391+03	3.464+03	3.549+03	3.636+03	3.725+03	3.817+03
8.0+03	2.637+03	2.656+03	2.656+03	2.723+03	2.787+03	2.847+03	2.915+03	2.984+03	3.055+03	3.128+03
1.0+04	2.123+03	2.173+03	2.224+03	2.279+03	2.333+03	2.384+03	2.440+03	2.497+03	2.555+03	2.615+03
1.5+04	1.439+03	1.476+03	1.513+03	1.552+03	1.590+03	1.627+03	1.666+03	1.706+03	1.747+03	1.788+03
2.0+04	1.035+03	1.063+03	1.091+03	1.121+03	1.150+03	1.179+03	1.209+03	1.240+03	1.271+03	1.303+03
3.0+04	6.056+02	6.264+02	6.434+02	6.612+02	6.789+02	6.967+02	7.151+02	7.338+02	7.529+02	7.724+02
4.0+04	4.098+02	4.211+02	4.325+02	4.443+02	4.560+02	4.677+02	4.797+02	4.919+02	5.043+02	5.168+02
5.0+04	2.951+02	3.036+02	3.122+02	3.211+02	3.300+02	3.388+02	3.480+02	3.572+02	3.667+02	3.763+02
6.0+04	2.219+02	2.285+02	2.351+02	2.420+02	2.489+02	2.558+02	2.629+02	2.701+02	2.774+02	2.849+02
8.0+04	1.394+02	1.435+02	1.477+02	1.520+02	1.564+02	1.608+02	1.653+02	1.698+02	1.745+02	1.792+02
1.0+05	5.669+01	5.557+01	5.025+02	1.055+02	1.085+02	1.116+02	1.147+02	1.179+02	1.211+02	1.244+02
1.5+05	4.828+01	4.979+01	5.132+01	5.291+01	5.450+01	5.610+01	5.775+01	5.942+01	6.112+01	6.285+01
2.0+05	2.930+01	2.982+01	3.075+01	3.171+01	3.268+01	3.365+01	3.464+01	3.567+01	3.671+01	3.776+01
3.0+05	1.386+01	1.431+01	1.476+01	1.523+01	1.571+01	1.618+01	1.667+01	1.717+01	1.767+01	1.819+01
4.0+05	8.153+00	8.422+00	8.695+00	8.976+00	9.260+00	9.548+00	9.842+00	1.014+01	1.045+01	1.076+01
5.0+05	5.363+00	5.542+00	5.725+00	5.913+00	6.104+00	6.297+00	6.495+00	6.696+00	6.901+00	7.109+00
6.0+05	3.752+00	3.921+00	4.092+00	4.267+00	4.447+00	4.632+00	4.824+00	5.022+00	5.225+00	5.435+00
8.0+05	2.183+00	2.258+00	2.335+00	2.414+00	2.494+00	2.575+00	2.658+00	2.743+00	2.830+00	2.918+00
1.0+06	1.416+00	1.466+00	1.516+00	1.568+00	1.620+00	1.674+00	1.729+00	1.785+00	1.842+00	1.900+00
1.5+06	6.409+01	6.635+01	6.867+01	7.105+01	7.348+01	7.594+01	7.848+01	8.107+01	8.371+01	8.642+01
2.0+06	3.635+01	3.768+01	3.896+01	4.033+01	4.172+01	4.313+01	4.459+01	4.607+01	4.759+01	4.913+01
3.0+06	1.627+01	1.685+01	1.745+01	1.805+01	1.869+01	1.933+01	1.999+01	2.067+01	2.136+01	2.206+01
4.0+06	5.175+02	9.505+02	9.843+02	1.019+01	1.055+01	1.091+01	1.129+01	1.167+01	1.206+01	1.245+01
5.0+06	5.880+02	6.092+02	6.305+02	6.534+02	6.763+02	6.996+02	7.238+02	7.482+02	7.734+02	7.992+02
6.0+06	4.686+02	4.238+02	4.385+02	4.541+02	4.701+02	4.863+02	5.030+02	5.202+02	5.377+02	5.557+02
8.0+06	2.300+02	2.384+02	2.469+02	2.557+02	2.647+02	2.738+02	2.833+02	2.929+02	3.028+02	3.130+02
1.0+07	1.473+02	1.526+02	1.581+02	1.637+02	1.695+02	1.753+02	1.814+02	1.876+02	1.939+02	2.004+02
1.5+07	6.548+03	6.785+03	7.028+03	7.279+03	7.535+03	7.797+03	8.065+03	8.342+03	8.625+03	8.915+03
2.0+07	3.684+03	3.817+03	3.954+03	4.095+03	4.239+03	4.386+03	4.538+03	4.693+03	4.852+03	5.016+03
3.0+07	1.637+03	1.697+03	1.757+03	1.820+03	1.884+03	1.950+03	2.017+03	2.085+03	2.157+03	2.230+03
4.0+07	9.211+04	9.545+04	9.886+04	1.024+05	1.060+05	1.097+05	1.135+05	1.174+05	1.213+05	1.254+05
5.0+07	5.855+04	6.109+04	6.327+04	6.554+04	6.784+04	7.020+04	7.265+04	7.511+04	7.766+04	8.027+04
6.0+07	4.054+04	4.242+04	4.394+04	4.551+04	4.712+04	4.875+04	5.043+04	5.216+04	5.393+04	5.575+04
8.0+07	2.303+04	2.386+04	2.472+04	2.560+04	2.650+04	2.742+04	2.837+04	2.934+04	3.034+04	3.136+04
1.0+08	1.474+04	1.527+04	1.582+04	1.638+04	1.696+04	1.755+04	1.816+04	1.878+04	1.941+04	2.007+04

Table III. Percent differences of present (table I)  $F(x,Z)_{\text{RHF}}$  values from  $F(x,Z)_{\text{HF}}$  (except  $F(x,Z)_{\text{CI}}$  {configuration-interaction [11]} for  $2 \leq Z \leq 6$ ) values given in reference [6]

$Z$ $x$ $\text{Å}^{-1}$	$1^{\text{H}}$	$2^{\text{He}}$	$4^{\text{Be}}$	$8^{\text{O}}$	$13^{\text{Al}}$	$29^{\text{Cu}}$	$50^{\text{Sn}}$	$74^{\text{W}}$	$82^{\text{Pb}}$	$92^{\text{U}}$
	$\left[ F(x,Z)_{\text{RHF}} / F(x,Z)_{\text{HF}} - 1.0 \right] \times 100\%$									
0	0	0	0	0	0	0	0	0	0	0
0.01	0	0	- 0.03	+ 0.01	+ 0.02	+ 0.03	+ 0.02	+ 0.03	+ 0.02	+ 0.03
0.1	0	+ 0.03	- 1.05	+ 0.01	+ 0.04	+ 0.01	+ 0.19	+ 0.25	+ 0.42	+ 0.40
1.0	0	- 1.17	+ 0.23	+ 0.05	+ 0.22	+ 0.60	+ 1.10	+ 1.97	+ 1.72	+ 2.32
10	0	+ 2.70	+ 1.38	+ 11.96	+ 3.46	+ 4.65	+ 7.47	+ 22.48	+ 28.89	+ 36.53
100	0	+ 2.70	+ 1.43	- 4.01	+ 0.56	+ 7.13	+ 12.12	+ 17.46	+ 19.63	+ 22.86

Table IV. Percent differences of present (table II)  $\sigma_{\text{coh}}^{\text{RHF}}(E,Z)$  values from  $\sigma_{\text{coh}}^{\text{HF}}(E,Z)$  (except  $\sigma_{\text{coh}}^{\text{CI}}$  {configuration-interaction [11]} for  $2 \leq Z \leq 6$ ) values given in reference [6]

$Z$ $E$ eV, keV, MeV	$1^{\text{H}}$	$2^{\text{He}}$	$4^{\text{Be}}$	$8^{\text{O}}$	$13^{\text{Al}}$	$29^{\text{Cu}}$	$50^{\text{Sn}}$	$74^{\text{W}}$	$82^{\text{Pb}}$	$92^{\text{U}}$
	$\left[ \sigma_{\text{coh}}^{\text{RHF}}(E,Z) / \sigma_{\text{coh}}^{\text{HF}}(E,Z) - 1.0 \right] \times 100\%$									
100 eV	- 0.1	0	- 0.2	0	- 0.1	0	0	+ 0.1	0	0
1 keV	0	0	- 0.9	0	+ 0.1	0	+ 0.2	+ 0.3	+ 0.3	+ 0.4
10 keV	0	+ 0.1	- 0.6	+ 0.1	+ 0.2	+ 0.4	+ 1.0	+ 1.1	+ 1.7	+ 2.2
100 keV	0	0	- 0.9	- 0.3	0	+ 1.1	+ 3.9	+ 6.9	+ 8.3	+ 10.5
1 MeV	0	0	- 1.0	- 0.4	- 0.1	+ 1.4	+ 5.6	+ 10.2	+ 12.9	+ 17.8
10 MeV	0	0	- 0.9	- 0.4	- 0.1	+ 1.4	+ 5.7	+ 10.5	+ 13.4	+ 18.5
100 MeV	0	0	- 0.9	- 0.4	- 0.1	+ 1.4	+ 5.8	+ 10.6	+ 13.4	+ 18.5

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