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Small-Angle Rayleigh Scattering of Photons at High Energies: Tabulations of Relativistic HFS Modified Atomic Form Factors^{a)}

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Tabulations are presented of relativistic Hartree-Fock-Slater modified atomic form factors from $x = 0$ to 100 \AA^{-1} for all elements from $Z = 1$ to $Z = 100$. These modified form factors represent the atomic Rayleigh scattering amplitudes with good accuracy at energies well above the K-shell binding energies and small momentum transfers and therefore should be used instead of the normal relativistic atomic form factors in the MeV energy range.

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

1. Introduction

The elastic scattering of photons by atoms is composed of the following elementary processes: atomic Rayleigh (R) scattering by its bound electrons,¹ Delbrück (D) scattering by the electrostatic field of the nucleus,²⁻⁴ and nuclear scattering. One part of the nuclear scattering process is coherent with R and D scattering and may be split up into two portions: (i) into the center-of-mass motion of the nucleus, i.e., nuclear Thomson (T) scattering, and (ii) into scattering via photoexcitation of the giant-dipole-resonance (GDR) of the nucleus (N). For the N scattering process the terms "nuclear Rayleigh" or "nuclear resonance" scattering have been used in the literature. At energies well above the particle threshold, where the widths of nuclear levels are much larger than the distances between levels, the imaginary and the real parts of the N scattering amplitude can be calculated from the nuclear photoabsorption cross section via optical theorem and dispersion relation, respectively. Below the particle threshold, the N scattering amplitude has only a real part which to a good approximation may be calculated in the same way as described for energies in the continuum GDR region. A discussion of nuclear scattering has been given in Refs. 3, 5, and 6. In addition to the coherent elastic scattering processes discussed above, incoherent elastic scattering may take place either by photoexcitation of isolated nuclear levels or by the tensorial excitation of the GDR.⁷

The present paper is concerned with R scattering in the

MeV energy region. Here, R scattering is the dominating process at small angles and is unimportant at large angles. "Exact" calculations of R scattering may be based on the second-order S-matrix of quantum electrodynamics (QED) and self-consistent relativistic (DHFS) wave functions. Though recently there has been considerable progress in carrying out these exact calculations,^{1,4,8} there is still a need for approximations. The reasons for this are that the exact calculations have been possible only for few inner shells and that in the forward direction many subshells contribute to the R scattering process, leading to large computational difficulties when treated by the exact procedure.

The approximation commonly used at low energies is the form factor based on appropriate nonrelativistic or relativistic wave functions, supplemented by dispersion corrections which are necessary when the photon energy is close to the binding energy of an atomic shell. This procedure has a firm theoretical basis in the nonrelativistic limit but leads to sizable discrepancies between theory and experiment already at the near relativistic energy of 60 keV.⁹ At intermediate energies above 100 keV dispersion effects become small, but irrespective of this the form factor only leads to a rough approximation of the exact amplitude. At MeV energies and large angles the form factor completely loses validity.¹⁰

In the forward direction the optical theorem

$$\text{Im } A(E,0) = \frac{E}{4\pi^2\hbar c} \sigma(E) \quad (1)$$

and the subtracted dispersion relation

$$\text{Re } A(E,0) = \text{Re } A(\infty,0) + \frac{1}{2\pi^2\hbar c} P \int_0^\infty \frac{E'^2 \sigma(E')}{E'^2 - E^2} dE' \quad (2)$$

make a firm prediction about the imaginary and real parts of the scattering amplitude A in terms of the cross section σ . The cross section σ is equal to the photoelectric cross section

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σ_{pe} at energies below $2m_0c^2 - \epsilon$ (ϵ = electron binding energy), and equal to $\sigma_{pe} - \sigma_{pc}$ above $2m_0c^2 - \epsilon$, with σ_{pc} being the cross section for a pair production process where the electron of the electron-positron pair is created in an unoccupied bound state.¹ Then, at high energies (> 500 keV) a finite-angle approximation may be obtained by neglecting the terms containing σ and by using the Thomson amplitude

$$-\left(\frac{e^2}{mc^2}\right)\epsilon_f \cdot \epsilon_i \quad (3)$$

(where e is the electron charge, mc^2 the electron rest mass, ϵ_f , ϵ_i the final and initial photon polarization) as high-energy limit for the single electron. This procedure extrapolates the zero-angle results of Eq. (2) to finite scattering angles and leads to the form factor approximation

$$A(E, \theta) = -\epsilon_f \cdot \epsilon_i \frac{e^2}{mc^2} \int \psi^* \psi e^{iqr} dr \quad (4)$$

[where $q = 2(E_r/mc^2)\sin(\theta/2)$ is the momentum transfer and $f(q) = \int \psi^* \psi e^{iqr} dr$ the form factor] for the scattering amplitude. In (4) $q = 2(E_r/mc^2)\sin(\theta/2)$ denotes the momentum transfer in units of mc . This corresponds to $x = \sin(\theta/2)/\lambda$ in units of \AA^{-1} , where λ is the photon wavelength in \AA . Conversion of q arguments to x arguments is accomplished by multiplying q by the factor 20.607 44. However, as has been stressed by Goldberger and Low,¹¹ the conjecture that the Thomson amplitude represents the high energy limit is wrong. Consequently, the form factor cannot be valid in the forward direction at high energies.

There have been two procedures used to overcome this difficulty: Florescu and Gavrila¹² have evaluated the matrix element for R scattering by atomic K-shell electrons in the limit of high photon energies at finite momentum transfers q . The expression obtained for the matrix element is equivalent to the one found by Goldberger and Low.¹¹ The evaluation of the matrix element is carried out in momentum space for the case of a Coulomb atomic field.

Brown and Mayers,¹³ following a previous suggestion of Franz¹⁴, have proposed to use the "modified" or "corrected" form factor (MFF)

$$g(q) = \int \psi^* \psi \frac{mc^2}{E - V(r)} e^{iqr} dr \quad (5)$$

(E = relativistic total energy of the bound electron,

$V(r)$ = central potential)

instead of the form factor when calculating the small-angle scattering amplitude above 500 keV. Comparing the MFF with the exact amplitudes they found that it gave improved results.¹³ Furthermore, they noticed that the MFF exactly reproduces the zero-angle amplitude at infinite energy as calculated by Levinger and Rustgi,¹⁵ and that it was suggested by the Born-approximation calculation of Brown and Woodward.¹⁶ When the MFF is expanded in powers of $Z\alpha$, it reproduces the first- and second-order terms of this approximation.

The MFF is favored in comparison to the approximation introduced by Florescu and Gavrila¹² because of the ease of carrying out the calculations on the basis of DHFS wave functions for any subshell of the atom. On the other hand, the range of momentum transfers where the approxi-

mations are valid and the sizes of the deviations from the exact amplitudes are roughly the same for both approximations.^{1,17}

2. Accuracy of MFF

The accuracy of the MFF has been studied by Kissel *et al.*¹ The upper limit of the momentum transfer where the MFF leads to reasonable results is given by $(Zamc)/n^2$ with n being the principal quantum number. Up to this momentum transfer the relative difference between the MFF and the exact amplitude is almost constant. In general the accuracy of the MFF increases with increasing photon energy and decreasing binding energies of the electrons. This means that the relative difference between the MFF and the exact calculation is smaller for light atoms than for heavy atoms and smaller for outer shells than for inner shells. The errors in the resulting total-atom differential scattering amplitudes for light-Z atoms will be less than 10% at energies of about $5\epsilon_K$ (ϵ_K being the K-shell binding energy), 5% at about $10\epsilon_K$ and 1% at about $25\epsilon_K$. The errors in the resulting total-atom differential scattering amplitudes for heavy-Z atoms will be less than 1% at about $3\epsilon_K$ because of the larger number of outer electrons.¹ An improvement of the accuracy of the forward-angle R amplitudes may be obtained by combining the available exact R amplitudes for the K shell with MFF amplitudes for the higher shells. For this purpose the present tabulations contain total-atom MFF amplitudes both with and without the K-shell contribution.

3. Numerical Calculations of Form Factors

For the pure Coulomb potential, i.e., $V(r) = -(Z\alpha)/r$ both the form factor and the MFF may be calculated by using the analytic expressions of Bethe and Levinger¹⁸ and Smend and Schumacher.¹⁹ The specialized versions for two electrons in the K shell are

$$f(q) = \frac{(2Z\alpha)^{2\gamma+1}}{\gamma q} \frac{\sin[2\gamma \arctan(q/2Z\alpha)]}{[(2Z\alpha)^2 + q^2]^\gamma} \quad (6)$$

and

$$g(q) = \frac{2}{q} (Z\alpha)^{4\gamma+1} \left(\frac{2mc^2}{E} \right)^{2\gamma+1} \times \text{Im} \left\{ \exp \left[(2Z\alpha - iq) \frac{Zamc^2}{E} \right] \right\} \times \Gamma \left(-2\gamma, (2Z\alpha - iq) \frac{Zamc^2}{E} \right) \quad (7)$$

$$(\gamma = \sqrt{1 - Z^2\alpha^2}),$$

respectively, where in the latter expression the incomplete gamma function may be represented via the gamma function and the confluent hypergeometric function.¹⁹ These analytical expressions for the form factor are very helpful for the purpose of interpolation or for checking the validity of the numerical procedures described as follows. The present tabulation is based on self-consistent wave functions. For a complete subshell the electronic charge distribution is of spherical symmetry. This means that the MFF may be written in the form

$$g(q) = 4\pi \int_0^\infty |\psi|^2 \frac{mc^2}{E - V(r)} r^2 \frac{\sin(qr)}{qr} dr. \quad (8)$$

The potential $V(r)$, the binding energy $\epsilon = E - mc^2$, and the electron density $|\psi|^2$ (i.e., the sum of the squared large and small components of the wave function) were calculated for all charge numbers $Z = 1$ to 100 using the relativistic self-consistent field program of Liberman *et al.*²⁰ Great care had to be taken to avoid numerical inaccuracies due to the rapid oscillation of the function $\sin(qr)$ for high momentum transfers q . This was achieved by approximating the function

$$\phi(r) = |\psi|^2 \frac{mc^2}{E - V(r)} r \quad (9)$$

by a cubic spline function

$$\phi_k(r) = \sum_{i=0}^3 C_{ik}(r - r_k)^i \quad (10)$$

for $r_k < r < r_{k+1}$ using the abscissas r_k as provided by the radial mesh of the program of Liberman *et al.*²⁰ This procedure leads to the relation

$$g(q) = \frac{4\pi}{q} \sum_{k=0}^3 \sum_{l=0}^3 C_{ik} \int_{r_k}^{r_{k+1}} (r - r_k)^l \sin(qr) dr, \quad (11)$$

where the four integrals are given by analytical expressions. The intervals (r_k, r_{k+1}) of the radial mesh increase strongly with k and, therefore, contain an increasing number of periods of $\sin(qr)$. Hence, the evaluation of $g(q)$ by using Eq. (11) largely reduces the errors due to round off and cancellation of terms as compared to the direct numerical integration of Eq. (8). This increase in accuracy was essential at high momentum transfers q where the direct numerical integration of Eq. (8) did not lead to meaningful numerical results. The numerical accuracy of $g(q)$ achieved in this way was found to be better than 0.01% for all Z and for all q .

For the determination of this accuracy the following checks have been carried out:

(i) The spline interpolation procedure was tested by applying it to $\chi(r) = |\psi|^2 r$ instead of $\phi(r) = |\psi|^2 \{(mc^2)/[E - V(r)]\}$ and by using the resulting spline function for calculating the normalization integral $\int \chi(r) r dr$. In all cases the result was equal to 1 within 0.01%.

(ii) The spline interpolation and integration procedure (9) to (11) was applied to the MFF calculated from hydrogen-like wave functions instead of DHFS wave functions. There was agreement with the analytical results¹⁹ within 0.01%.

To minimize errors due to round off, $g(q)$ was evaluated using double precision arithmetic.

4. Explanation and Discussion of Tables

The modified form factors $F_{MFF}(x, Z)$ listed in Table 1 are identical with the quantities $g(q)$ defined in Eq. (11) of the present work. These modified form factors $F_{MFF}(x, Z)$ should be used instead of the form factors $F(x, Z)$ of Refs. 21 and 22 at energies above 0.5 MeV for predicting Rayleigh scattering at forward angles. Here Rayleigh scattering is the dominating process up to few MeV. At very high energies (> 50 MeV) Rayleigh scattering is negligible^{23,24} even in the forward direction. Here, the dominating process is Delbrück scattering.^{23,24} At intermediate energies, around 10 MeV, both Rayleigh and Delbrück scattering have to be taken into consideration.²⁵

Table 2 shows nonrelativistic (FF), relativistic (RFF), and modified (MFF) form factors $F(x, Z)$ for a selected number of elements and momentum transfers. In addition, percent deviations of the FF and RFF from the MFF are given. As a general rule the MFF may be considered as an improved approximation of the exact scattering amplitudes as long as the three form factors are of the same order of magnitude. At higher momentum transfers where the differences are larger than 100% the MFF is no longer meaningful. Due to recent calculations²⁶ an increasing number of exact Rayleigh amplitudes have become available for the K shell. But only a few data have been calculated for the outer shells, i.e., L and higher shells. There is evidence²⁷ that for the outer shells the MFF is a useful approximation to the real parts of the scattering amplitudes up to momentum transfers of $x = 50 \text{ \AA}^{-1}$, i.e., up to the angles θ_{max} (50 \AA^{-1}) listed in Table 3. For larger momentum transfers the real parts of the outer shell scattering amplitudes may be calculated from the relativistic form factors (RFF) scaled in proportion to the ratio of K -shell RFF and K -shell exact amplitudes.^{1,27}

At very high momentum transfers where exact amplitudes are not available and where the MFF results of the present tabulation are not applicable, we recommend following the prescriptions given in Ref. 22.

Modified form factors for specific subshells may be obtained from the authors on request.

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MF}(x, z)$

| x sin(theta/2) /lambda | 1 H | 2 He | 3 Li | 4 Be | 5 B | | | | | |
|------------------------------|-----------|--------------------|-----------|--------------------|-----------|--------------------|-----------|--------------------|-----------|--------------------|
| | total | without K-shell |
| .0 | 1.000+000 | .000 | 2.000+000 | .000 | 3.000+000 | 1.000+000 | 3.999+000 | 2.000+000 | 4.999+000 | 3.000+000 |
| 1.0-002 | 9.978-001 | .000 | 1.998+000 | .000 | 2.986+000 | 9.873-001 | 3.986+000 | 1.987+000 | 4.986+000 | 2.987+000 |
| 2.0-002 | 9.912-001 | .000 | 1.992+000 | .000 | 2.947+000 | 9.501-001 | 3.948+000 | 1.950+000 | 4.949+000 | 2.951+000 |
| 3.0-002 | 9.804-001 | .000 | 1.983+000 | .000 | 2.885+000 | 8.915-001 | 3.886+000 | 1.890+000 | 4.887+000 | 2.891+000 |
| 4.0-002 | 9.655-001 | .000 | 1.971+000 | .000 | 2.804+000 | 8.158-001 | 3.803+000 | 1.810+000 | 4.805+000 | 2.809+000 |
| 5.0-002 | 9.469-001 | .000 | 1.954+000 | .000 | 2.711+000 | 7.285-001 | 3.702+000 | 1.712+000 | 4.703+000 | 2.710+000 |
| 6.0-002 | 9.249-001 | .000 | 1.935+000 | .000 | 2.609+000 | 6.350-001 | 3.587+000 | 1.601+000 | 4.585+000 | 2.594+000 |
| 7.0-002 | 8.998-001 | .000 | 1.913+000 | .000 | 2.506+000 | 5.405-001 | 3.461+000 | 1.480+000 | 4.454+000 | 2.466+000 |
| 8.0-002 | 8.722-001 | .000 | 1.887+000 | .000 | 2.404+000 | 4.492-001 | 3.329+000 | 1.353+000 | 4.314+000 | 2.329+000 |
| 9.0-002 | 8.424-001 | .000 | 1.859+000 | .000 | 2.308+000 | 3.643-001 | 3.194+000 | 1.224+000 | 4.167+000 | 2.186+000 |
| 1.0-001 | 8.108-001 | .000 | 1.828+000 | .000 | 2.219+000 | 2.881-001 | 3.059+000 | 1.095+000 | 4.016+000 | 2.039+000 |
| 1.1-001 | 7.779-001 | .000 | 1.795+000 | .000 | 2.139+000 | 2.216-001 | 2.926+000 | 9.704-001 | 3.863+000 | 1.891+000 |
| 1.2-001 | 7.442-001 | .000 | 1.761+000 | .000 | 2.067+000 | 1.652-001 | 2.799+000 | 8.511-001 | 3.712+000 | 1.744+000 |
| 1.3-001 | 7.099-001 | .000 | 1.724+000 | .000 | 2.004+000 | 1.185-001 | 2.678+000 | 7.389-001 | 3.563+000 | 1.601+000 |
| 1.4-001 | 6.755-001 | .000 | 1.686+000 | .000 | 1.949+000 | 8.083-002 | 2.565+000 | 6.351-001 | 3.418+000 | 1.462+000 |
| 1.5-001 | 6.413-001 | .000 | 1.647+000 | .000 | 1.901+000 | 5.111-002 | 2.460+000 | 5.401-001 | 3.279+000 | 1.329+000 |
| 1.6-001 | 6.075-001 | .000 | 1.606+000 | .000 | 1.859+000 | 2.827-002 | 2.364+000 | 4.543-001 | 3.145+000 | 1.202+000 |
| 1.7-001 | 5.743-001 | .000 | 1.565+000 | .000 | 1.822+000 | 1.122-002 | 2.276+000 | 3.776-001 | 3.019+000 | 1.082+000 |
| 1.8-001 | 5.421-001 | .000 | 1.523+000 | .000 | 1.789+000 | -1.086-003 | 2.196+000 | 3.097-001 | 2.899+000 | 9.701-001 |
| 1.9-001 | 5.109-001 | .000 | 1.481+000 | .000 | 1.759+000 | -9.565-003 | 2.124+000 | 2.502-001 | 2.787+000 | 8.656-001 |
| 2.0-001 | 4.808-001 | .000 | 1.439+000 | .000 | 1.731+000 | -1.503-002 | 2.060+000 | 1.986-001 | 2.682+000 | 7.686-001 |
| 2.2-001 | 4.244-001 | .000 | 1.354+000 | .000 | 1.680+000 | -1.955-002 | 1.951+000 | 1.162-001 | 2.493+000 | 5.972-001 |
| 2.4-001 | 3.733-001 | .000 | 1.271+000 | .000 | 1.633+000 | -1.877-002 | 1.863+000 | 5.740-002 | 2.332+000 | 4.541-001 |
| 2.5-001 | 3.497-001 | .000 | 1.230+000 | .000 | 1.609+000 | -1.728-002 | 1.826+000 | 3.526-002 | 2.260+000 | 3.923-001 |
| 2.6-001 | 3.275-001 | .000 | 1.190+000 | .000 | 1.586+000 | -1.536-002 | 1.792+000 | 1.719-002 | 2.194+000 | 3.366-001 |
| 2.8-001 | 2.870-001 | .000 | 1.111+000 | .000 | 1.539+000 | -1.093-002 | 1.734+000 | -8.781-003 | 2.078+000 | 2.418-001 |
| 3.0-001 | 2.513-001 | .000 | 1.036+000 | .000 | 1.491+000 | -6.369-003 | 1.686+000 | -2.415-002 | 1.981+000 | 1.664-001 |
| 3.2-001 | 2.200-001 | .000 | 9.648-001 | .000 | 1.442+000 | -2.150-003 | 1.643+000 | -3.182-002 | 1.899+000 | 1.077-001 |
| 3.4-001 | 1.927-001 | .000 | 8.974-001 | .000 | 1.393+000 | 1.521-003 | 1.605+000 | -3.406-002 | 1.829+000 | 6.272-002 |
| 3.5-001 | 1.804-001 | .000 | 8.653-001 | .000 | 1.368+000 | 3.129-003 | 1.588+000 | -3.370-002 | 1.799+000 | 4.467-002 |
| 3.6-001 | 1.690-001 | .000 | 8.341-001 | .000 | 1.343+000 | 4.585-003 | 1.571+000 | -3.259-002 | 1.771+000 | 2.919-002 |
| 3.8-001 | 1.483-001 | .000 | 7.749-001 | .000 | 1.293+000 | 7.061-003 | 1.537+000 | -2.873-002 | 1.720+000 | 4.957-003 |
| 4.0-001 | 1.304-001 | .000 | 7.196-001 | .000 | 1.243+000 | 9.005-003 | 1.505+000 | -2.343-002 | 1.677+000 | -1.182-002 |
| 4.2-001 | 1.149-001 | .000 | 6.682-001 | .000 | 1.194+000 | 1.049-002 | 1.473+000 | -1.740-002 | 1.639+000 | -2.270-002 |
| 4.4-001 | 1.014-001 | .000 | 6.204-001 | .000 | 1.145+000 | 1.158-002 | 1.441+000 | -1.114-002 | 1.604+000 | -2.897-002 |
| 4.5-001 | 9.533-002 | .000 | 5.978-001 | .000 | 1.121+000 | 1.200-002 | 1.425+000 | -8.036-003 | 1.588+000 | -3.072-002 |
| 4.6-001 | 8.967-002 | .000 | 5.761-001 | .000 | 1.097+000 | 1.235-002 | 1.409+000 | -4.993-003 | 1.573+000 | -3.172-002 |
| 4.8-001 | 7.947-002 | .000 | 5.351-001 | .000 | 1.051+000 | 1.286-002 | 1.376+000 | 8.139-004 | 1.544+000 | -3.184-002 |
| 5.0-001 | 7.059-002 | .000 | 4.971-001 | .000 | 1.005+000 | 1.315-002 | 1.343+000 | 6.137-003 | 1.516+000 | -3.004-002 |
| 5.5-001 | 5.298-002 | .000 | 4.144-001 | .000 | 8.974-001 | 1.321-002 | 1.259+000 | 1.694-002 | 1.451+000 | -2.069-002 |
| 6.0-001 | 4.032-002 | .000 | 3.464-001 | .000 | 7.988-001 | 1.267-002 | 1.175+000 | 2.418-002 | 1.388+000 | -8.801-003 |
| 6.5-001 | 3.109-002 | .000 | 2.907-001 | .000 | 7.097-001 | 1.183-002 | 1.091+000 | 2.847-002 | 1.325+000 | 2.571-003 |
| 7.0-001 | 2.428-002 | .000 | 2.448-001 | .000 | 6.299-001 | 1.086-002 | 1.009+000 | 3.059-002 | 1.260+000 | 1.216-002 |
| 8.0-001 | 1.533-002 | .000 | 1.756-001 | .000 | 4.958-001 | 8.885-003 | 8.567-001 | 3.091-002 | 1.130+000 | 2.520-002 |
| 9.0-001 | 1.009-002 | .000 | 1.280-001 | .000 | 3.912-001 | 7.126-003 | 7.223-001 | 2.862-002 | 1.003+000 | 3.160-002 |
| 1.0+000 | 6.878-003 | .000 | 9.468-002 | .000 | 3.101-001 | 5.672-003 | 6.068-001 | 2.531-002 | 8.839-001 | 3.353-002 |
| 1.1+000 | 4.836-003 | .000 | 7.111-002 | .000 | 2.472-001 | 4.515-003 | 5.091-001 | 2.181-002 | 7.745-001 | 3.271-002 |
| 1.2+000 | 3.491-003 | .000 | 5.421-002 | .000 | 1.985-001 | 3.611-003 | 4.274-001 | 1.859-002 | 6.762-001 | 3.048-002 |
| 1.3+000 | 2.579-003 | .000 | 4.192-002 | .000 | 1.604-001 | 2.908-003 | 3.594-001 | 1.577-002 | 5.892-001 | 2.771-002 |
| 1.4+000 | 1.944-003 | .000 | 3.287-002 | .000 | 1.306-001 | 2.358-003 | 3.031-001 | 1.333-002 | 5.131-001 | 2.481-002 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, F_{MFF}(x,z)--Continued

| x sin(theta/2) /lambda | 1 H | 2 He | 3 Li | 4 Be | 5 B | | | | | |
|------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|------------|------------|------------|------------|------------|
| | total without K-shell | total without K-shell | total without K-shell | total without K-shell | total without K-shell | | | | | |
| 1.5+000 | 1.492-003 | .000 | 2.609-002 | .000 | 1.071-001 | 1.926-003 | 2.563-001 | 1.127-002 | 4.468-001 | 2.198-002 |
| 1.6+000 | 1.163-003 | .000 | 2.095-002 | .000 | 8.837-002 | 1.582-003 | 2.176-001 | 9.543-003 | 3.894-001 | 1.936-002 |
| 1.7+000 | 9.198-004 | .000 | 1.699-002 | .000 | 7.342-002 | 1.308-003 | 1.853-001 | 8.111-003 | 3.398-001 | 1.700-002 |
| 1.8+000 | 7.365-004 | .000 | 1.390-002 | .000 | 6.138-002 | 1.089-003 | 1.585-001 | 6.911-003 | 2.970-001 | 1.492-002 |
| 1.9+000 | 5.965-004 | .000 | 1.145-002 | .000 | 5.163-002 | 9.133-004 | 1.361-001 | 5.908-003 | 2.601-001 | 1.308-002 |
| 2.0+000 | 4.880-004 | .000 | 9.505-003 | .000 | 4.368-002 | 7.705-004 | 1.173-001 | 5.074-003 | 2.282-001 | 1.147-002 |
| 2.2+000 | 3.358-004 | .000 | 6.681-003 | .000 | 3.177-002 | 5.572-004 | 8.807-002 | 3.784-003 | 1.769-001 | 8.871-003 |
| 2.4+000 | 2.383-004 | .000 | 4.824-003 | .000 | 2.357-002 | 4.111-004 | 6.710-002 | 2.864-003 | 1.385-001 | 6.909-003 |
| 2.5+000 | 2.029-004 | .000 | 4.140-003 | .000 | 2.044-002 | 3.558-004 | 5.887-002 | 2.506-003 | 1.230-001 | 6.117-003 |
| 2.6+000 | 1.737-004 | .000 | 3.574-003 | .000 | 1.780-002 | 3.094-004 | 5.182-002 | 2.199-003 | 1.095-001 | 5.431-003 |
| 2.8+000 | 1.296-004 | .000 | 2.705-003 | .000 | 1.366-002 | 2.366-004 | 4.053-002 | 1.711-003 | 8.732-002 | 4.309-003 |
| 3.0+000 | 9.854-005 | .000 | 2.080-003 | .000 | 1.064-002 | 1.836-004 | 3.208-002 | 1.348-003 | 7.029-002 | 3.451-003 |
| 3.3+000 | 6.747-005 | .000 | 1.435-003 | .000 | 7.489-003 | 1.289-004 | 2.304-002 | 9.627-004 | 5.159-002 | 2.515-003 |
| 3.5+000 | 5.337-005 | .000 | 1.139-003 | .000 | 6.015-003 | 1.033-004 | 1.871-002 | 7.785-004 | 4.240-002 | 2.059-003 |
| 3.6+000 | 4.770-005 | .000 | 1.021-003 | .000 | 5.412-003 | 9.282-005 | 1.692-002 | 7.030-004 | 3.855-002 | 1.868-003 |
| 3.9+000 | 3.466-005 | .000 | 7.500-004 | .000 | 4.000-003 | 6.847-005 | 1.267-002 | 5.238-004 | 2.929-002 | 1.412-003 |
| 4.0+000 | 3.133-005 | .000 | 6.798-004 | .000 | 3.633-003 | 6.213-005 | 1.155-002 | 4.775-004 | 2.681-002 | 1.290-003 |
| 4.2+000 | 2.578-005 | .000 | 5.612-004 | .000 | 3.015-003 | 5.150-005 | 9.652-003 | 3.979-004 | 2.258-002 | 1.083-003 |
| 4.6+000 | 1.791-005 | .000 | 3.901-004 | .000 | 2.125-003 | 3.623-005 | 6.879-003 | 2.822-004 | 1.631-002 | 7.782-004 |
| 5.0+000 | 1.282-005 | .000 | 2.813-004 | .000 | 1.538-003 | 2.616-005 | 5.023-003 | 2.054-004 | 1.203-002 | 5.718-004 |
| 5.4+000 | 9.408-006 | .000 | 2.073-004 | .000 | 1.139-003 | 1.935-005 | 3.746-003 | 1.529-004 | 9.051-003 | 4.285-004 |
| 5.5+000 | 8.739-006 | .000 | 1.925-004 | .000 | 1.060-003 | 1.799-005 | 3.492-003 | 1.429-004 | 8.452-003 | 4.002-004 |
| 5.8+000 | 7.056-006 | .000 | 1.553-004 | .000 | 8.601-004 | 1.462-005 | 2.846-003 | 1.161-004 | 6.925-003 | 3.269-004 |
| 6.0+000 | 6.155-006 | .000 | 1.358-004 | .000 | 7.525-004 | 1.276-005 | 2.496-003 | 1.017-004 | 6.092-003 | 2.874-004 |
| 6.2+000 | 5.393-006 | .000 | 1.194-004 | .000 | 6.611-004 | 1.120-005 | 2.198-003 | 8.955-005 | 5.379-003 | 2.533-004 |
| 6.6+000 | 4.189-006 | .000 | 9.286-005 | .000 | 5.159-004 | 8.731-006 | 1.722-003 | 7.008-005 | 4.236-003 | 1.991-004 |
| 7.0+000 | 3.301-006 | .000 | 7.310-005 | .000 | 4.083-004 | 6.932-006 | 1.367-003 | 5.556-005 | 3.377-003 | 1.584-004 |
| 7.4+000 | 2.636-006 | .000 | 5.860-005 | .000 | 3.270-004 | 5.539-006 | 1.098-003 | 4.458-005 | 2.722-003 | 1.275-004 |
| 8.0+000 | 1.920-006 | .000 | 4.269-005 | .000 | 2.392-004 | 4.054-006 | 8.063-004 | 3.267-005 | 2.007-003 | 9.383-005 |
| 9.0+000 | 1.187-006 | .000 | 2.653-005 | .000 | 1.487-004 | 2.508-006 | 5.035-004 | 2.037-005 | 1.260-003 | 5.876-005 |
| 1.0+001 | 7.702-007 | .000 | 1.728-005 | .000 | 9.687-005 | 1.635-006 | 3.291-004 | 1.330-005 | 8.269-004 | 3.850-005 |
| 1.1+001 | 5.194-007 | .000 | 1.165-005 | .000 | 6.554-005 | 1.107-006 | 2.232-004 | 9.011-006 | 5.626-004 | 2.616-005 |
| 1.2+001 | 3.616-007 | .000 | 8.066-006 | .000 | 4.574-005 | 7.721-007 | 1.561-004 | 6.298-006 | 3.945-004 | 1.832-005 |
| 1.4+001 | 1.889-007 | .000 | 4.134-006 | .000 | 2.399-005 | 4.048-007 | 8.212-005 | 3.310-006 | 2.083-004 | 9.659-006 |
| 1.6+001 | 1.064-007 | .000 | 2.340-006 | .000 | 1.357-005 | 2.288-007 | 4.655-005 | 1.876-006 | 1.184-004 | 5.486-006 |
| 1.8+001 | 6.336-008 | .000 | 1.433-006 | .000 | 8.109-005 | 1.367-007 | 2.788-005 | 1.123-006 | 7.110-005 | 3.292-006 |
| 2.0+001 | 3.935-008 | .000 | 8.960-007 | .000 | 5.053-005 | 8.519-008 | 1.741-005 | 7.010-007 | 4.450-005 | 2.059-006 |
| 2.2+001 | 2.521-008 | .000 | 5.686-007 | .000 | 3.249-005 | 5.476-008 | 1.122-005 | 4.516-007 | 2.874-005 | 1.330-006 |
| 2.5+001 | 1.341-008 | .000 | 3.040-007 | .000 | 1.744-005 | 2.942-008 | 6.047-006 | 2.434-007 | 1.555-005 | 7.193-007 |
| 2.8+001 | 7.302-009 | .000 | 1.668-007 | .000 | 9.620-007 | 1.623-008 | 3.355-006 | 1.350-007 | 8.673-006 | 4.011-007 |
| 3.1+001 | 3.968-009 | .000 | 9.138-008 | .000 | 5.323-007 | 8.975-009 | 1.872-006 | 7.533-008 | 4.877-006 | 2.256-007 |
| 3.5+001 | 1.615-009 | .000 | 3.836-008 | .000 | 2.289-007 | 3.859-009 | 8.221-007 | 3.311-008 | 2.184-006 | 1.011-007 |
| 4.0+001 | 2.681-010 | .000 | 7.744-009 | .000 | 5.258-008 | 8.896-010 | 2.099-007 | 8.463-009 | 6.064-007 | 2.811-008 |
| 4.5+001 | -3.150-010 | .000 | -5.427-009 | .000 | -2.439-008 | -4.099-010 | -5.913-008 | -2.360-009 | -9.158-008 | -4.133-009 |
| 5.0+001 | -5.581-010 | .000 | -1.145-008 | .000 | -5.757-008 | -9.693-010 | -1.767-007 | -7.091-009 | -4.002-007 | -1.841-008 |
| 6.0+001 | -6.596-010 | .000 | -1.382-008 | .000 | -7.347-008 | -1.237-009 | -2.364-007 | -9.492-009 | -5.645-007 | -2.602-008 |
| 7.0+001 | -6.033-010 | .000 | -1.275-008 | .000 | -6.827-008 | -1.150-009 | -2.216-007 | -8.905-009 | -5.347-007 | -2.466-008 |
| 8.0+001 | -5.199-010 | .000 | -1.098-008 | .000 | -5.899-008 | -9.938-010 | -1.919-007 | -7.712-009 | -4.643-007 | -2.142-008 |
| 9.0+001 | -4.412-010 | .000 | -9.326-009 | .000 | -5.001-008 | -8.423-010 | -1.627-007 | -6.536-009 | -3.935-007 | -1.815-008 |
| 1.0+002 | -3.745-010 | .000 | -7.893-009 | .000 | -4.228-008 | -7.121-010 | -1.374-007 | -5.519-009 | -3.320-007 | -1.531-008 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x,z)$ --Continued

| $x \sin(\theta/2) / \lambda$ | total | 6 C | without K-shell | 7 N | without K-shell | 8 O | without K-shell | 9 F | without K-shell | 10 Ne | without K-shell |
|------------------------------|-----------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| .0 | 5.998+000 | 4.000+000 | 6.997+000 | 4.999+000 | 7.996+000 | 5.999+000 | 8.995+000 | 6.999+000 | 9.993+000 | 7.998+000 | 7.998+000 |
| 1.0-002 | 5.987+000 | 3.989+000 | 6.987+000 | 4.990+000 | 7.987+000 | 5.990+000 | 8.987+000 | 6.997+000 | 9.986+000 | 7.991+000 | |
| 2.0-002 | 5.953+000 | 3.955+000 | 6.957+000 | 4.960+000 | 7.960+000 | 5.964+000 | 8.962+000 | 6.967+000 | 9.964+000 | 7.969+000 | |
| 3.0-002 | 5.898+000 | 3.901+000 | 6.908+000 | 4.911+000 | 7.916+000 | 5.920+000 | 8.922+000 | 6.927+000 | 9.927+000 | 7.932+000 | |
| 4.0-002 | 5.823+000 | 3.827+000 | 6.840+000 | 4.844+000 | 7.855+000 | 5.859+000 | 8.867+000 | 6.872+000 | 9.876+000 | 7.882+000 | |
| 5.0-002 | 5.729+000 | 3.735+000 | 6.756+000 | 4.760+000 | 7.778+000 | 5.783+000 | 8.796+000 | 6.802+000 | 9.811+000 | 7.817+000 | |
| 6.0-002 | 5.619+000 | 3.626+000 | 6.655+000 | 4.661+000 | 7.686+000 | 5.652+000 | 8.712+000 | 6.718+000 | 9.733+000 | 7.740+000 | |
| 7.0-002 | 5.495+000 | 3.504+000 | 6.540+000 | 4.547+000 | 7.580+000 | 5.587+000 | 8.614+000 | 6.621+000 | 9.643+000 | 7.650+000 | |
| 8.0-002 | 5.359+000 | 3.370+000 | 6.412+000 | 4.421+000 | 7.461+000 | 5.469+000 | 8.504+000 | 6.512+000 | 9.541+000 | 7.549+000 | |
| 9.0-002 | 5.214+000 | 3.227+000 | 6.274+000 | 4.285+000 | 7.332+000 | 5.341+000 | 8.383+000 | 6.392+000 | 9.427+000 | 7.436+000 | |
| 1.0-001 | 5.061+000 | 3.078+000 | 6.127+000 | 4.140+000 | 7.192+000 | 5.203+000 | 8.252+000 | 6.262+000 | 9.304+000 | 7.314+000 | |
| 1.1-001 | 4.904+000 | 2.923+000 | 5.972+000 | 3.987+000 | 7.044+000 | 5.057+000 | 8.111+000 | 6.123+000 | 9.172+000 | 7.182+000 | |
| 1.2-001 | 4.743+000 | 2.766+000 | 5.812+000 | 3.830+000 | 6.889+000 | 4.904+000 | 7.963+000 | 5.976+000 | 9.031+000 | 7.043+000 | |
| 1.3-001 | 4.582+000 | 2.608+000 | 5.649+000 | 3.669+000 | 6.729+000 | 4.745+000 | 7.808+000 | 5.823+000 | 8.883+000 | 6.896+000 | |
| 1.4-001 | 4.421+000 | 2.451+000 | 5.483+000 | 3.506+000 | 6.564+000 | 4.583+000 | 7.648+000 | 5.664+000 | 8.728+000 | 6.743+000 | |
| 1.5-001 | 4.262+000 | 2.296+000 | 5.316+000 | 3.342+000 | 6.396+000 | 4.417+000 | 7.483+000 | 5.501+000 | 8.568+000 | 6.584+000 | |
| 1.6-001 | 4.105+000 | 2.145+000 | 5.149+000 | 3.178+000 | 6.226+000 | 4.249+000 | 7.314+000 | 5.334+000 | 8.403+000 | 6.421+000 | |
| 1.7-001 | 3.953+000 | 1.997+000 | 4.983+000 | 3.016+000 | 6.055+000 | 4.081+000 | 7.143+000 | 5.165+000 | 8.235+000 | 6.254+000 | |
| 1.8-001 | 3.805+000 | 1.854+000 | 4.820+000 | 2.856+000 | 5.884+000 | 3.913+000 | 6.970+000 | 4.994+000 | 8.063+000 | 6.084+000 | |
| 1.9-001 | 3.663+000 | 1.717+000 | 4.659+000 | 2.700+000 | 5.714+000 | 3.746+000 | 6.797+000 | 4.823+000 | 7.890+000 | 5.913+000 | |
| 2.0-001 | 3.526+000 | 1.586+000 | 4.502+000 | 2.547+000 | 5.546+000 | 3.580+000 | 6.623+000 | 4.651+000 | 7.715+000 | 5.739+000 | |
| 2.2-001 | 3.271+000 | 1.343+000 | 4.201+000 | 2.254+000 | 5.216+000 | 3.257+000 | 6.277+000 | 4.311+000 | 7.363+000 | 5.392+000 | |
| 2.4-001 | 3.040+000 | 1.125+000 | 3.919+000 | 1.981+000 | 4.898+000 | 2.947+000 | 5.939+000 | 3.978+000 | 7.012+000 | 5.046+000 | |
| 2.5-001 | 2.934+000 | 1.026+000 | 3.786+000 | 1.853+000 | 4.746+000 | 2.758+000 | 5.773+000 | 3.815+000 | 6.839+000 | 4.874+000 | |
| 2.6-001 | 2.834+000 | 9.327-001 | 3.658+000 | 1.730+000 | 4.597+000 | 2.653+000 | 5.610+000 | 3.655+000 | 6.667+000 | 4.705+000 | |
| 2.8-001 | 2.652+000 | 7.652-001 | 3.418+000 | 1.501+000 | 4.313+000 | 2.377+000 | 5.294+000 | 3.346+000 | 6.330+000 | 4.373+000 | |
| 3.0-001 | 2.492+000 | 6.205-001 | 3.199+000 | 1.294+000 | 4.048+000 | 2.121+000 | 4.993+000 | 3.052+000 | 6.004+000 | 4.053+000 | |
| 3.2-001 | 2.352+000 | 4.968-001 | 3.002+000 | 1.109+000 | 3.801+000 | 1.884+000 | 4.708+000 | 2.775+000 | 5.690+000 | 3.745+000 | |
| 3.4-001 | 2.229+000 | 3.921-001 | 2.824+000 | 9.439-001 | 3.574+000 | 1.666+000 | 4.440+000 | 2.514+000 | 5.390+000 | 3.451+000 | |
| 3.5-001 | 2.175+000 | 3.462-001 | 2.742+000 | 8.686-001 | 3.467+000 | 1.565+000 | 4.312+000 | 2.391+000 | 5.245+000 | 3.310+000 | |
| 3.6-001 | 2.124+000 | 3.042-001 | 2.664+000 | 7.979-001 | 3.365+000 | 1.468+000 | 4.189+000 | 2.271+000 | 5.104+000 | 3.173+000 | |
| 3.8-001 | 2.032+000 | 2.312-001 | 2.522+000 | 6.697-001 | 3.173+000 | 1.287+000 | 3.955+000 | 2.046+000 | 4.834+000 | 2.909+000 | |
| 4.0-001 | 1.952+000 | 1.711-001 | 2.395+000 | 5.576-001 | 2.999+000 | 1.124+000 | 3.737+000 | 1.837+000 | 4.579+000 | 2.662+000 | |
| 4.2-001 | 1.883+000 | 1.223-001 | 2.283+000 | 4.603-001 | 2.840+000 | 9.775-001 | 3.535+000 | 1.645+000 | 4.339+000 | 2.430+000 | |
| 4.4-001 | 1.823+000 | 8.300-002 | 2.183+000 | 3.763-001 | 2.697+000 | 8.461-001 | 3.349+000 | 1.468+000 | 2.115+000 | 2.213+000 | |
| 4.5-001 | 1.796+000 | 6.651-002 | 2.137+000 | 3.388-001 | 2.630+000 | 7.858-001 | 3.261+000 | 1.386+000 | 4.008+000 | 2.110+000 | |
| 4.6-001 | 1.771+000 | 5.189-002 | 2.095+000 | 3.041-001 | 2.567+000 | 7.289-001 | 3.177+000 | 1.307+000 | 3.905+000 | 2.011+000 | |
| 4.8-001 | 1.725+000 | 2.767-002 | 2.016+000 | 2.426-001 | 2.449+000 | 6.247-001 | 3.019+000 | 1.160+000 | 3.709+000 | 1.824+000 | |
| 5.0-001 | 1.684+000 | 9.205-003 | 1.947+000 | 1.905-001 | 2.343+000 | 5.324-001 | 2.875+000 | 1.026+000 | 3.527+000 | 1.651+000 | |
| 5.5-001 | 1.599+000 | -1.790-002 | 1.806+000 | 9.402-002 | 2.123+000 | 3.473-001 | 2.565+000 | 7.447-001 | 3.126+000 | 1.274+000 | |
| 6.0-001 | 1.531+000 | -2.683-002 | 1.699+000 | 3.445-002 | 1.953+000 | 2.152-001 | 2.318+000 | 5.283-001 | 2.797+000 | 9.699-001 | |
| 6.5-001 | 1.471+000 | -2.559-002 | 1.616+000 | 2.543-004 | 1.822+000 | 1.235-001 | 2.121+000 | 3.646-001 | 2.527+000 | 7.271-001 | |
| 7.0-001 | 1.416+000 | -1.926-002 | 1.548+000 | -1.707-002 | 1.719+000 | 6.180-002 | 1.966+000 | 2.429-001 | 2.307+000 | 5.357-001 | |
| 8.0-001 | 1.310+000 | -2.211-003 | 1.438+000 | -2.349-002 | 1.568+000 | -2.493-003 | 1.741+000 | 9.005-002 | 1.982+000 | 2.717-001 | |
| 9.0-001 | 1.204+000 | 1.298-002 | 1.343+000 | -1.372-002 | 1.459+000 | -2.199-002 | 1.590+000 | 1.528-002 | 1.764+000 | 1.188-001 | |
| 1.0+000 | 1.099+000 | 2.363-002 | 1.253+000 | -3.295-004 | 1.369+000 | -2.091-002 | 1.480+000 | -1.579-002 | 1.613+000 | 3.538-002 | |
| 1.1+000 | 9.968-001 | 2.986-002 | 1.164+000 | 1.171-002 | 1.288+000 | -1.176-002 | 1.392+000 | -2.363-002 | 1.501+000 | -5.818-003 | |
| 1.2+000 | 8.990-001 | 3.263-002 | 1.076+000 | 2.076-002 | 1.209+000 | -7.653-004 | 1.315+000 | -2.010-002 | 1.413+000 | -2.230-002 | |
| 1.3+000 | 8.074-001 | 3.308-002 | 9.901-001 | 2.669-002 | 1.132+000 | 9.204-003 | 1.243+000 | -1.189-002 | 1.338+000 | -2.502-002 | |
| 1.4+000 | 7.230-001 | 3.213-002 | 9.076-001 | 3.004-002 | 1.057+000 | 1.708-002 | 1.175+000 | -2.634-003 | 1.271+000 | -2.072-002 | |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x,z)$ --Continued

| x | 6 C | 7 N | 8 O | 9 F | 10 Ne | | | | | |
|------------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|------------|
| $\sin(\theta/2)$ | total | without K-shell | | |
| /Lambda | | | | | | | | | | |
| 1.5+000 | 6.462-001 | 3.039-002 | 8.293-001 | 3.149-002 | 9.834-001 | 2.275-002 | 1.107+000 | 5.881-003 | 1.207+000 | -1.343-002 |
| 1.6+000 | 5.768-001 | 2.820-002 | 7.560-001 | 3.162-002 | 9.123-001 | 2.649-002 | 1.041+000 | 1.296-002 | 1.146+000 | -5.443-003 |
| 1.7+000 | 5.146-001 | 2.585-002 | 6.878-001 | 3.086-002 | 8.442-001 | 2.869-002 | 9.769-001 | 1.845-002 | 1.086+000 | 2.076-003 |
| 1.8+000 | 4.590-001 | 2.351-002 | 6.250-001 | 2.951-002 | 7.796-001 | 2.968-002 | 9.146-001 | 2.246-002 | 1.028+000 | 8.599-003 |
| 1.9+000 | 4.096-001 | 2.128-002 | 5.674-001 | 2.781-002 | 7.188-001 | 2.976-002 | 8.545-001 | 2.519-002 | 9.706-001 | 1.395-002 |
| 2.0+000 | 3.658-001 | 1.919-002 | 5.149-001 | 2.597-002 | 6.619-001 | 2.919-002 | 7.970-001 | 2.684-002 | 9.152-001 | 1.814-002 |
| 2.2+000 | 2.925-001 | 1.551-002 | 4.240-001 | 2.222-002 | 5.599-001 | 2.693-002 | 6.906-001 | 2.776-002 | 8.099-001 | 2.340-002 |
| 2.4+000 | 2.352-001 | 1.252-002 | 3.497-001 | 1.873-002 | 4.729-001 | 2.401-002 | 5.963-001 | 2.674-002 | 7.132-001 | 2.552-002 |
| 2.5+000 | 2.113-001 | 1.125-002 | 3.178-001 | 1.714-002 | 4.346-001 | 2.248-002 | 5.536-001 | 2.582-002 | 6.684-001 | 2.577-002 |
| 2.6+000 | 1.902-001 | 1.012-002 | 2.892-001 | 1.568-002 | 3.995-001 | 2.098-002 | 5.138-001 | 2.474-002 | 6.259-001 | 2.564-002 |
| 2.8+000 | 1.547-001 | 8.223-003 | 2.400-001 | 1.310-002 | 3.379-001 | 1.814-002 | 4.425-001 | 2.233-002 | 5.482-001 | 2.456-002 |
| 3.0+000 | 1.267-001 | 6.713-003 | 2.000-001 | 1.054-002 | 2.864-001 | 1.559-002 | 3.812-001 | 1.987-002 | 4.796-001 | 2.286-002 |
| 3.3+000 | 9.511-002 | 5.010-003 | 1.535-001 | 8.399-003 | 2.247-001 | 1.237-002 | 3.056-001 | 1.642-002 | 3.924-001 | 1.988-002 |
| 3.5+000 | 7.916-002 | 4.153-003 | 1.294-001 | 7.071-003 | 1.918-001 | 1.060-002 | 2.642-001 | 1.438-002 | 3.435-001 | 1.788-002 |
| 3.6+000 | 7.238-002 | 3.791-003 | 1.190-001 | 6.498-003 | 1.775-001 | 9.822-003 | 2.459-001 | 1.345-002 | 3.216-001 | 1.691-002 |
| 3.9+000 | 5.583-002 | 2.908-003 | 9.325-002 | 5.074-003 | 1.414-001 | 7.833-003 | 1.990-001 | 1.099-002 | 2.643-001 | 1.423-002 |
| 4.0+000 | 5.135-002 | 2.670-003 | 8.617-002 | 4.663-003 | 1.312-001 | 7.272-003 | 1.857-001 | 1.028-002 | 2.478-001 | 1.342-002 |
| 4.2+000 | 4.362-002 | 2.261-003 | 7.383-002 | 4.001-003 | 1.135-001 | 6.282-003 | 1.620-001 | 8.994-003 | 2.181-001 | 1.192-002 |
| 4.6+000 | 3.195-002 | 1.647-003 | 5.490-002 | 2.961-003 | 8.569-002 | 4.732-003 | 1.243-001 | 6.920-003 | 1.700-001 | 9.398-003 |
| 5.0+000 | 2.385-002 | 1.223-003 | 4.150-002 | 2.227-003 | 6.561-002 | 3.611-003 | 9.640-002 | 5.367-003 | 1.337-001 | 7.434-003 |
| 5.4+000 | 1.811-002 | 9.248-004 | 3.184-002 | 1.701-003 | 5.088-002 | 2.790-003 | 7.560-002 | 4.203-003 | 1.060-001 | 5.912-003 |
| 5.5+000 | 1.695-002 | 8.646-004 | 2.986-002 | 1.594-003 | 4.784-002 | 2.621-003 | 7.126-002 | 3.960-003 | 1.002-001 | 5.589-003 |
| 5.8+000 | 1.397-002 | 7.104-004 | 2.476-002 | 1.317-003 | 3.994-002 | 2.182-003 | 5.991-002 | 3.325-003 | 8.484-002 | 4.734-003 |
| 6.0+000 | 1.233-002 | 6.262-004 | 2.194-002 | 1.166-003 | 3.553-002 | 1.935-003 | 5.353-002 | 2.966-003 | 7.614-002 | 4.248-003 |
| 6.2+000 | 1.092-002 | 5.537-004 | 1.950-002 | 1.034-003 | 3.170-002 | 1.726-003 | 4.794-002 | 2.654-003 | 6.847-002 | 3.820-003 |
| 6.6+000 | 8.648-003 | 4.372-004 | 1.554-002 | 8.218-004 | 2.543-002 | 1.381-003 | 3.873-002 | 2.138-003 | 5.571-002 | 3.104-003 |
| 7.0+000 | 6.927-003 | 3.494-004 | 1.251-002 | 6.601-004 | 2.060-002 | 1.116-003 | 3.156-002 | 1.739-003 | 4.569-002 | 2.542-003 |
| 7.4+000 | 5.607-003 | 2.823-004 | 1.018-002 | 5.351-004 | 1.683-002 | 9.092-004 | 2.592-002 | 1.426-003 | 3.774-002 | 2.098-003 |
| 8.0+000 | 4.155-003 | 2.087-004 | 7.585-003 | 3.978-004 | 1.262-002 | 6.795-004 | 1.958-002 | 1.073-003 | 2.871-002 | 1.592-003 |
| 9.0+000 | 2.626-003 | 1.314-004 | 4.829-003 | 2.523-004 | 8.104-003 | 4.344-004 | 1.268-002 | 6.919-004 | 1.877-002 | 1.037-003 |
| 1.0+001 | 1.732-003 | 8.646-005 | 3.202-003 | 1.667-004 | 5.407-003 | 2.885-004 | 8.517-003 | 4.633-004 | 1.270-002 | 6.994-004 |
| 1.1+001 | 1.183-003 | 5.894-005 | 2.196-003 | 1.141-004 | 3.726-003 | 1.986-004 | 5.900-003 | 3.200-004 | 8.845-003 | 4.857-004 |
| 1.2+001 | 8.316-004 | 4.138-005 | 1.549-003 | 8.035-005 | 2.638-003 | 1.403-004 | 4.195-003 | 2.270-004 | 6.317-003 | 3.462-004 |
| 1.4+001 | 4.411-004 | 2.190-005 | 8.259-004 | 4.272-005 | 1.414-003 | 7.495-005 | 2.262-003 | 1.220-004 | 3.429-003 | 1.873-004 |
| 1.6+001 | 2.515-004 | 1.247-005 | 4.727-004 | 2.441-005 | 8.126-004 | 4.300-005 | 1.306-003 | 7.026-005 | 1.988-003 | 1.083-004 |
| 1.8+001 | 1.514-004 | 7.504-006 | 2.854-004 | 1.472-005 | 4.922-004 | 2.601-005 | 7.935-004 | 4.264-005 | 1.213-003 | 6.598-005 |
| 2.0+001 | 9.500-005 | 4.704-006 | 1.795-004 | 9.252-006 | 3.104-004 | 1.635-005 | 5.019-004 | 2.694-005 | 7.696-004 | 4.182-005 |
| 2.2+001 | 6.150-005 | 3.044-006 | 1.165-004 | 6.001-006 | 2.020-004 | 1.066-005 | 3.275-004 | 1.756-005 | 5.036-004 | 2.734-005 |
| 2.5+001 | 3.342-005 | 1.653-006 | 6.355-005 | 3.272-006 | 1.106-004 | 5.833-006 | 1.801-004 | 9.653-006 | 2.781-004 | 1.509-005 |
| 2.8+001 | 1.873-005 | 9.267-007 | 3.580-005 | 1.843-006 | 6.263-005 | 3.301-006 | 1.024-004 | 5.489-006 | 1.589-004 | 8.618-006 |
| 3.1+001 | 1.061-005 | 5.250-007 | 2.042-005 | 1.051-006 | 3.596-005 | 1.895-006 | 5.918-005 | 3.171-006 | 9.235-005 | 5.009-006 |
| 3.5+001 | 4.835-006 | 2.393-007 | 9.453-006 | 4.869-007 | 1.689-005 | 8.905-007 | 2.816-005 | 1.511-006 | 4.449-005 | 2.416-006 |
| 4.0+001 | 1.438-006 | 7.134-008 | 2.976-006 | 1.538-007 | 5.581-006 | 2.955-007 | 9.705-006 | 5.227-007 | 1.590-005 | 8.672-007 |
| 4.5+001 | -7.561-008 | -3.437-009 | 7.244-008 | 4.467-009 | 4.802-007 | 2.685-008 | 1.327-006 | 7.400-008 | 2.850-006 | 1.596-007 |
| 5.0+001 | -7.520-007 | -3.690-008 | -1.239-006 | -6.301-008 | -1.845-006 | -9.568-008 | -2.527-006 | -1.324-007 | -3.208-006 | -1.688-007 |
| 6.0+001 | -1.127-006 | -5.551-008 | -1.994-006 | -1.020-007 | -3.227-006 | -1.687-007 | -4.886-006 | -2.592-007 | -7.013-006 | -3.757-007 |
| 7.0+001 | -1.079-006 | -5.319-008 | -1.932-006 | -9.890-008 | -3.170-006 | -1.655-007 | -4.868-006 | -2.586-007 | -7.099-006 | -3.812-007 |
| 8.0+001 | -9.405-007 | -4.635-008 | -1.689-006 | -8.651-008 | -2.783-006 | -1.457-007 | -4.293-006 | -2.282-007 | -6.291-006 | -3.381-007 |
| 9.0+001 | -7.975-007 | -3.930-008 | -1.434-006 | -7.341-008 | -2.364-006 | -1.238-007 | -3.651-006 | -1.942-007 | -5.358-006 | -2.881-007 |
| 1.0+002 | -6.722-007 | -3.314-008 | -1.208-006 | -6.186-008 | -1.991-006 | -1.043-007 | -3.075-006 | -1.636-007 | -4.513-006 | -2.427-007 |

Table I. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, Z)$ --Continued

| x | 11 Na | 12 Mg | 13 Al | 14 Si | 15 P | | | |
|------------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|
| $\sin(\theta/2)$ | total | without K-shell |
| /lambda | | | | | | | | |
| .0 | 1.099+001 | 8.997+000 | 1.199+001 | 9.997+000 | 1.299+001 | 1.100+001 | 1.398+001 | 1.199+001 |
| 1.0-002 | 1.097+001 | 8.978+000 | 1.197+001 | 9.975+000 | 1.296+001 | 1.097+001 | 1.396+001 | 1.197+001 |
| 2.0-002 | 1.092+001 | 8.922+000 | 1.190+001 | 9.912+000 | 1.289+001 | 1.089+001 | 1.388+001 | 1.189+001 |
| 3.0-002 | 1.083+001 | 8.832+000 | 1.180+001 | 9.810+000 | 1.276+001 | 1.077+001 | 1.376+001 | 1.177+001 |
| 4.0-002 | 1.071+001 | 8.714+000 | 1.167+001 | 9.674+000 | 1.260+001 | 1.061+001 | 1.360+001 | 1.161+001 |
| 5.0-002 | 1.057+001 | 8.575+000 | 1.150+001 | 9.510+000 | 1.241+001 | 1.041+001 | 1.340+001 | 1.141+001 |
| 6.0-002 | 1.041+001 | 8.421+000 | 1.132+001 | 9.325+000 | 1.219+001 | 1.019+001 | 1.317+001 | 1.118+001 |
| 7.0-002 | 1.025+001 | 8.259+000 | 1.111+001 | 9.124+000 | 1.195+001 | 9.958+000 | 1.292+001 | 1.093+001 |
| 8.0-002 | 1.008+001 | 8.093+000 | 1.090+001 | 8.913+000 | 1.170+001 | 9.711+000 | 1.265+001 | 1.066+001 |
| 9.0-002 | 9.918+000 | 7.928+000 | 1.069+001 | 8.699+000 | 1.145+001 | 9.460+000 | 1.238+001 | 1.039+001 |
| 1.0-001 | 9.755+000 | 7.765+000 | 1.048+001 | 8.486+000 | 1.120+001 | 9.210+000 | 1.209+001 | 1.011+001 |
| 1.1-001 | 9.596+000 | 7.606+000 | 1.027+001 | 8.276+000 | 1.095+001 | 8.964+000 | 1.181+001 | 9.826+000 |
| 1.2-001 | 9.440+000 | 7.452+000 | 1.006+001 | 8.073+000 | 1.071+001 | 8.726+000 | 1.154+001 | 9.549+000 |
| 1.3-001 | 9.289+000 | 7.302+000 | 9.865+000 | 7.878+000 | 1.048+001 | 8.496+000 | 1.127+001 | 9.279+000 |
| 1.4-001 | 9.142+000 | 7.155+000 | 9.677+000 | 7.691+000 | 1.026+001 | 8.277+000 | 1.100+001 | 9.018+000 |
| 1.5-001 | 8.996+000 | 7.011+000 | 9.498+000 | 7.513+000 | 1.005+001 | 8.068+000 | 1.075+001 | 8.768+000 |
| 1.6-001 | 8.853+000 | 6.869+000 | 9.328+000 | 7.343+000 | 9.854+000 | 7.869+000 | 1.051+001 | 8.528+000 |
| 1.7-001 | 8.710+000 | 6.728+000 | 9.164+000 | 7.181+000 | 9.665+000 | 7.681+000 | 1.028+001 | 8.301+000 |
| 1.8-001 | 8.568+000 | 6.587+000 | 9.008+000 | 7.026+000 | 9.485+000 | 7.503+000 | 1.007+001 | 8.086+000 |
| 1.9-001 | 8.425+000 | 6.446+000 | 8.857+000 | 6.877+000 | 9.315+000 | 7.334+000 | 9.863+000 | 7.882+000 |
| 2.0-001 | 8.282+000 | 6.304+000 | 8.712+000 | 6.732+000 | 9.153+000 | 7.173+000 | 9.670+000 | 7.689+000 |
| 2.2-001 | 7.992+000 | 6.018+000 | 8.432+000 | 6.454+000 | 8.851+000 | 6.873+000 | 9.314+000 | 7.336+000 |
| 2.4-001 | 7.699+000 | 5.729+000 | 8.164+000 | 6.190+000 | 8.573+000 | 6.598+000 | 8.996+000 | 7.020+000 |
| 2.5-001 | 7.552+000 | 5.583+000 | 8.032+000 | 6.060+000 | 8.442+000 | 6.468+000 | 8.849+000 | 6.874+000 |
| 2.6-001 | 7.404+000 | 5.437+000 | 7.902+000 | 5.932+000 | 8.314+000 | 6.341+000 | 8.709+000 | 6.735+000 |
| 2.8-001 | 7.107+000 | 5.145+000 | 7.644+000 | 5.677+000 | 8.068+000 | 6.099+000 | 8.447+000 | 6.476+000 |
| 3.0-001 | 6.812+000 | 4.854+000 | 7.387+000 | 5.425+000 | 7.831+000 | 5.865+000 | 8.205+000 | 6.237+000 |
| 3.2-001 | 6.519+000 | 4.566+000 | 7.133+000 | 5.174+000 | 7.601+000 | 5.639+000 | 7.979+000 | 6.013+000 |
| 3.4-001 | 6.232+000 | 4.284+000 | 6.879+000 | 4.925+000 | 7.375+000 | 5.416+000 | 7.763+000 | 5.801+000 |
| 3.5-001 | 6.091+000 | 4.146+000 | 6.754+000 | 4.802+000 | 7.263+000 | 5.306+000 | 7.659+000 | 5.698+000 |
| 3.6-001 | 5.951+000 | 4.009+000 | 6.628+000 | 4.679+000 | 7.152+000 | 5.197+000 | 7.556+000 | 5.597+000 |
| 3.8-001 | 5.679+000 | 3.743+000 | 6.379+000 | 4.435+000 | 6.930+000 | 4.979+000 | 7.353+000 | 5.398+000 |
| 4.0-001 | 5.416+000 | 3.485+000 | 6.134+000 | 4.195+000 | 6.710+000 | 4.764+000 | 7.155+000 | 5.203+000 |
| 4.2-001 | 5.163+000 | 3.239+000 | 5.893+000 | 3.959+000 | 6.492+000 | 4.550+000 | 6.959+000 | 5.011+000 |
| 4.4-001 | 4.920+000 | 3.003+000 | 5.657+000 | 3.729+000 | 6.275+000 | 4.338+000 | 6.764+000 | 4.821+000 |
| 4.5-001 | 4.803+000 | 2.889+000 | 5.542+000 | 3.616+000 | 6.168+000 | 4.233+000 | 6.667+000 | 4.726+000 |
| 4.6-001 | 4.689+000 | 2.779+000 | 5.427+000 | 3.505+000 | 6.061+000 | 4.129+000 | 6.571+000 | 4.632+000 |
| 4.8-001 | 4.469+000 | 2.566+000 | 5.204+000 | 3.288+000 | 5.849+000 | 3.922+000 | 6.379+000 | 4.444+000 |
| 5.0-001 | 4.261+000 | 2.365+000 | 4.988+000 | 3.078+000 | 5.641+000 | 3.720+000 | 6.188+000 | 4.258+000 |
| 5.5-001 | 3.789+000 | 1.913+000 | 4.483+000 | 2.589+000 | 5.140+000 | 3.233+000 | 5.719+000 | 3.801+000 |
| 6.0-001 | 3.385+000 | 1.530+000 | 4.030+000 | 2.155+000 | 4.673+000 | 2.781+000 | 5.266+000 | 3.361+000 |
| 6.5-001 | 3.042+000 | 1.210+000 | 3.631+000 | 1.774+000 | 4.244+000 | 2.369+000 | 4.835+000 | 2.946+000 |
| 7.0-001 | 2.753+000 | 9.453-001 | 3.283+000 | 1.447+000 | 3.857+000 | 1.999+000 | 4.433+000 | 2.559+000 |
| 8.0-001 | 2.310+000 | 5.541-001 | 2.724+000 | 9.323-001 | 3.205+000 | 1.386+000 | 3.724+000 | 1.883+000 |
| 9.0-001 | 2.003+000 | 3.027-001 | 2.317+000 | 5.735-001 | 2.703+000 | 9.261-001 | 3.146+000 | 1.342+000 |
| 1.0+000 | 1.789+000 | 1.475-001 | 2.024+000 | 3.323-001 | 2.327+000 | 5.944-001 | 2.691+000 | 9.259-001 |
| 1.1+000 | 1.636+000 | 5.640-002 | 1.813+000 | 1.758-001 | 2.047+000 | 3.625-001 | 2.339+000 | 6.166-001 |
| 1.2+000 | 1.522+000 | 6.551-003 | 1.660+000 | 7.834-002 | 1.840+000 | 2.054-001 | 2.071+000 | 3.930-001 |
| 1.3+000 | 1.434+000 | -1.749-002 | 1.544+000 | 2.090-002 | 1.685+000 | 1.026-001 | 1.867+000 | 2.359-001 |
| 1.4+000 | 1.360+000 | -2.598-002 | 1.454+000 | -1.012-002 | 1.568+000 | 3.831-002 | 1.712+000 | 1.287-001 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x,z)$ --Continued

| x | 11 Na | 12 Mg | 13 Al | 14 Si | 15 P | | | |
|------------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| $\sin(\theta/2)$ | total | without K-shell |
| /lambda | | | | | | | | |
| 1.5+000 | 1.295+000 | -2.561-002 | 1.380+000 | -2.425-002 | 1.476+000 | 4.733-004 | 1.592+000 | 5.817-002 |
| 1.6+000 | 1.236+000 | -2.060-002 | 1.317+000 | -2.798-002 | 1.401+000 | -1.950-002 | 1.498+000 | 1.394-002 |
| 1.7+000 | 1.179+000 | -1.358-002 | 1.260+000 | -2.564-002 | 1.338+000 | -2.783-002 | 1.422+000 | -1.186-002 |
| 1.8+000 | 1.124+000 | -6.062-003 | 1.207+000 | -2.007-002 | 1.282+000 | -2.882-002 | 1.358+000 | -2.503-002 |
| 1.9+000 | 1.071+000 | 1.081-003 | 1.156+000 | -1.310-002 | 1.231+000 | -2.546-002 | 1.302+000 | -2.977-002 |
| 2.0+000 | 1.019+000 | 7.410-003 | 1.107+000 | -5.825-003 | 1.183+000 | -1.973-002 | 1.252+000 | -2.914-002 |
| 2.2+000 | 9.181-001 | 1.707-002 | 1.013+000 | 7.302-003 | 1.093+000 | -6.019-003 | 1.163+000 | -1.954-002 |
| 2.4+000 | 8.229-001 | 2.296-002 | 9.214-001 | 1.710-002 | 1.007+000 | 6.667-003 | 1.080+000 | -6.414-003 |
| 2.5+000 | 7.777-001 | 2.474-002 | 8.774-001 | 2.069-002 | 9.646-001 | 1.197-002 | 1.040+000 | -4.099-005 |
| 2.6+000 | 7.344-001 | 2.589-002 | 8.347-001 | 2.348-002 | 9.235-001 | 1.648-002 | 1.001+000 | 5.820-003 |
| 2.8+000 | 6.533-001 | 2.677-002 | 7.532-001 | 2.705-002 | 8.440-001 | 2.323-002 | 9.249-001 | 1.558-002 |
| 3.0+000 | 5.798-001 | 2.631-002 | 6.776-001 | 2.855-002 | 7.686-001 | 2.736-002 | 8.515-001 | 2.260-002 |
| 3.3+000 | 4.838-001 | 2.426-002 | 5.759-001 | 2.828-002 | 6.647-001 | 2.991-002 | 7.481-001 | 2.873-002 |
| 3.5+000 | 4.286-001 | 2.247-002 | 5.159-001 | 2.711-002 | 6.018-001 | 2.997-002 | 6.841-001 | 3.056-002 |
| 3.6+000 | 4.034-001 | 2.153-002 | 4.882-001 | 2.635-002 | 5.723-001 | 2.967-002 | 6.537-001 | 3.097-002 |
| 3.9+000 | 3.367-001 | 1.870-002 | 4.135-001 | 2.373-002 | 4.917-001 | 2.791-002 | 5.692-001 | 3.077-002 |
| 4.0+000 | 3.171-001 | 1.780-002 | 3.913-001 | 2.281-002 | 4.673-001 | 2.714-002 | 5.433-001 | 3.036-002 |
| 4.2+000 | 2.816-001 | 1.606-002 | 3.504-001 | 2.095-002 | 4.220-001 | 2.546-002 | 4.946-001 | 2.919-002 |
| 4.6+000 | 2.229-001 | 1.300-002 | 2.817-001 | 1.745-002 | 3.444-001 | 2.190-002 | 4.096-001 | 2.609-002 |
| 5.0+000 | 1.776-001 | 1.049-002 | 2.275-001 | 1.439-002 | 2.817-001 | 1.852-002 | 3.393-001 | 2.268-002 |
| 5.4+000 | 1.425-001 | 8.483-003 | 1.846-001 | 1.183-002 | 2.313-001 | 1.552-002 | 2.817-001 | 1.943-002 |
| 5.5+000 | 1.350-001 | 8.047-003 | 1.754-001 | 1.127-002 | 2.203-001 | 1.485-002 | 2.690-001 | 1.866-002 |
| 5.8+000 | 1.152-001 | 6.883-003 | 1.507-001 | 9.738-003 | 1.906-001 | 1.297-002 | 2.345-001 | 1.652-002 |
| 6.0+000 | 1.038-001 | 6.211-003 | 1.364-001 | 8.841-003 | 1.734-001 | 1.186-002 | 2.143-001 | 1.520-002 |
| 6.2+000 | 9.375-002 | 5.613-003 | 1.237-001 | 8.034-003 | 1.579-001 | 1.084-002 | 1.959-001 | 1.399-002 |
| 6.6+000 | 7.686-002 | 4.604-003 | 1.022-001 | 6.654-003 | 1.314-001 | 9.073-003 | 1.644-001 | 1.185-002 |
| 7.0+000 | 6.344-002 | 3.800-003 | 8.491-002 | 5.536-003 | 1.100-001 | 7.617-003 | 1.385-001 | 1.004-002 |
| 7.4+000 | 5.271-002 | 3.155-003 | 7.097-002 | 4.629-003 | 9.246-002 | 6.417-003 | 1.171-001 | 8.531-003 |
| 8.0+000 | 4.039-002 | 2.414-003 | 5.480-002 | 3.573-003 | 7.196-002 | 5.000-003 | 9.190-002 | 6.715-003 |
| 9.0+000 | 2.667-002 | 1.589-003 | 3.656-002 | 2.378-003 | 4.851-002 | 3.369-003 | 6.263-002 | 4.584-003 |
| 1.0+001 | 1.818-002 | 1.080-003 | 2.512-002 | 1.630-003 | 3.360-002 | 2.329-003 | 4.374-002 | 3.200-003 |
| 1.1+001 | 1.274-002 | 7.549-004 | 1.771-002 | 1.146-003 | 2.384-002 | 1.649-003 | 3.125-002 | 2.282-003 |
| 1.2+001 | 9.141-003 | 5.405-004 | 1.277-002 | 8.247-004 | 1.729-002 | 1.193-003 | 2.278-002 | 1.660-003 |
| 1.4+001 | 4.997-003 | 2.945-004 | 7.034-003 | 4.525-004 | 9.595-003 | 6.597-004 | 1.275-002 | 9.258-004 |
| 1.6+001 | 2.912-003 | 1.712-004 | 4.121-003 | 2.644-004 | 5.653-003 | 3.876-004 | 7.555-003 | 5.471-004 |
| 1.8+001 | 1.783-003 | 1.046-004 | 2.534-003 | 1.622-004 | 3.491-003 | 2.388-004 | 4.687-003 | 3.386-004 |
| 2.0+001 | 1.135-003 | 6.652-005 | 1.618-003 | 1.035-004 | 2.238-003 | 1.528-004 | 3.015-003 | 2.175-004 |
| 2.2+001 | 7.449-004 | 4.361-005 | 1.065-003 | 6.803-005 | 1.477-003 | 1.008-004 | 1.996-003 | 1.438-004 |
| 2.5+001 | 4.131-004 | 2.416-005 | 5.931-004 | 3.785-005 | 8.261-004 | 5.630-005 | 1.121-003 | 8.071-005 |
| 2.8+001 | 2.371-004 | 1.387-005 | 3.420-004 | 2.182-005 | 4.785-004 | 3.260-005 | 6.525-004 | 4.693-005 |
| 3.1+001 | 1.386-004 | 8.106-006 | 2.010-004 | 1.283-005 | 2.827-004 | 1.926-005 | 3.875-004 | 2.788-005 |
| 3.5+001 | 6.755-005 | 3.555-006 | 9.903-005 | 6.326-006 | 1.407-004 | 9.600-006 | 1.947-004 | 1.403-005 |
| 4.0+001 | 2.493-005 | 1.466-006 | 3.761-005 | 2.414-006 | 5.484-005 | 3.759-006 | 7.767-005 | 5.622-006 |
| 4.5+001 | 5.367-006 | 3.229-007 | 9.264-006 | 6.069-007 | 1.499-005 | 1.047-006 | 2.307-005 | 1.700-006 |
| 5.0+001 | -3.788-006 | -2.122-007 | -4.106-006 | -2.456-007 | -3.950-006 | -2.423-007 | -3.064-006 | -1.784-007 |
| 6.0+001 | -9.679-006 | -5.576-007 | -1.290-005 | -8.081-007 | -1.666-005 | -1.110-006 | -2.093-005 | -1.468-006 |
| 7.0+001 | -9.969-006 | -5.760-007 | -1.354-005 | -8.516-007 | -1.785-005 | -1.196-006 | -2.295-005 | -1.620-006 |
| 8.0+001 | -8.881-006 | -5.137-007 | -1.213-005 | -7.642-007 | -1.610-005 | -1.081-006 | -2.084-005 | -1.474-006 |
| 9.0+001 | -7.578-006 | -4.386-007 | -1.038-005 | -6.539-007 | -1.380-005 | -9.269-007 | -1.791-005 | -1.268-006 |
| 1.0+002 | -6.384-006 | -3.696-007 | -8.745-006 | -5.514-007 | -1.164-005 | -7.822-007 | -1.512-005 | -1.071-006 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, z)$ --Continued

| x | 16 S | 17 Cl | 18 Ar | 19 K | 20 Ca | | | | | |
|--------------------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------|
| $\sin(\theta/2)/\lambda$ | total | without K-shell | | |
| .0 | 1.598+001 | 1.399+001 | 1.698+001 | 1.499+001 | 1.797+001 | 1.599+001 | 1.897+001 | 1.699+001 | 1.996+001 | 1.798+001 |
| 1.0-002 | 1.596+001 | 1.397+001 | 1.695+001 | 1.497+001 | 1.795+001 | 1.597+001 | 1.893+001 | 1.695+001 | 1.993+001 | 1.794+001 |
| 2.0-002 | 1.589+001 | 1.390+001 | 1.689+001 | 1.491+001 | 1.789+001 | 1.591+001 | 1.883+001 | 1.684+001 | 1.981+001 | 1.783+001 |
| 3.0-002 | 1.578+001 | 1.379+001 | 1.679+001 | 1.480+001 | 1.780+001 | 1.581+001 | 1.866+001 | 1.668+001 | 1.962+001 | 1.764+001 |
| 4.0-002 | 1.563+001 | 1.364+001 | 1.665+001 | 1.466+001 | 1.766+001 | 1.558+001 | 1.844+001 | 1.646+001 | 1.937+001 | 1.739+001 |
| 5.0-002 | 1.544+001 | 1.346+001 | 1.647+001 | 1.448+001 | 1.749+001 | 1.551+001 | 1.819+001 | 1.621+001 | 1.908+001 | 1.710+001 |
| 6.0-002 | 1.523+001 | 1.324+001 | 1.626+001 | 1.427+001 | 1.729+001 | 1.531+001 | 1.791+001 | 1.593+001 | 1.875+001 | 1.677+001 |
| 7.0-002 | 1.498+001 | 1.299+001 | 1.602+001 | 1.403+001 | 1.706+001 | 1.508+001 | 1.762+001 | 1.563+001 | 1.840+001 | 1.642+001 |
| 8.0-002 | 1.471+001 | 1.272+001 | 1.576+001 | 1.377+001 | 1.681+001 | 1.482+001 | 1.731+001 | 1.533+001 | 1.804+001 | 1.606+001 |
| 9.0-002 | 1.442+001 | 1.243+001 | 1.547+001 | 1.349+001 | 1.653+001 | 1.454+001 | 1.701+001 | 1.503+001 | 1.769+001 | 1.571+001 |
| 1.0-001 | 1.411+001 | 1.213+001 | 1.517+001 | 1.318+001 | 1.623+001 | 1.425+001 | 1.671+001 | 1.473+001 | 1.733+001 | 1.535+001 |
| 1.1-001 | 1.380+001 | 1.182+001 | 1.485+001 | 1.287+001 | 1.592+001 | 1.393+001 | 1.640+001 | 1.442+001 | 1.698+001 | 1.500+001 |
| 1.2-001 | 1.348+001 | 1.150+001 | 1.453+001 | 1.254+001 | 1.559+001 | 1.351+001 | 1.610+001 | 1.412+001 | 1.665+001 | 1.467+001 |
| 1.3-001 | 1.316+001 | 1.118+001 | 1.420+001 | 1.221+001 | 1.526+001 | 1.327+001 | 1.580+001 | 1.382+001 | 1.632+001 | 1.434+001 |
| 1.4-001 | 1.284+001 | 1.086+001 | 1.386+001 | 1.188+001 | 1.491+001 | 1.293+001 | 1.549+001 | 1.352+001 | 1.600+001 | 1.402+001 |
| 1.5-001 | 1.253+001 | 1.055+001 | 1.353+001 | 1.155+001 | 1.457+001 | 1.259+001 | 1.519+001 | 1.321+001 | 1.570+001 | 1.372+001 |
| 1.6-001 | 1.222+001 | 1.024+001 | 1.320+001 | 1.122+001 | 1.423+001 | 1.225+001 | 1.489+001 | 1.291+001 | 1.539+001 | 1.342+001 |
| 1.7-001 | 1.192+001 | 9.938+000 | 1.288+001 | 1.090+001 | 1.389+001 | 1.191+001 | 1.458+001 | 1.260+001 | 1.510+001 | 1.312+001 |
| 1.8-001 | 1.163+001 | 9.648+000 | 1.256+001 | 1.058+001 | 1.355+001 | 1.157+001 | 1.428+001 | 1.230+001 | 1.481+001 | 1.284+001 |
| 1.9-001 | 1.135+001 | 9.369+000 | 1.225+001 | 1.027+001 | 1.322+001 | 1.124+001 | 1.397+001 | 1.199+001 | 1.453+001 | 1.255+001 |
| 2.0-001 | 1.108+001 | 9.101+000 | 1.195+001 | 9.970+000 | 1.289+001 | 1.091+001 | 1.367+001 | 1.169+001 | 1.425+001 | 1.227+001 |
| 2.2-001 | 1.058+001 | 8.601+000 | 1.138+001 | 9.03+000 | 1.227+001 | 1.029+001 | 1.307+001 | 1.110+001 | 1.370+001 | 1.172+001 |
| 2.4-001 | 1.013+001 | 8.150+000 | 1.086+001 | 8.882+000 | 1.168+001 | 9.706+000 | 1.250+001 | 1.052+001 | 1.316+001 | 1.119+001 |
| 2.5-001 | 9.918+000 | 7.942+000 | 1.061+001 | 8.639+000 | 1.141+001 | 9.432+000 | 1.222+001 | 1.024+001 | 1.290+001 | 1.093+001 |
| 2.6-001 | 9.720+000 | 7.745+000 | 1.038+001 | 8.08+000 | 1.114+001 | 9.158+000 | 1.195+001 | 9.974+000 | 1.264+001 | 1.067+001 |
| 2.8-001 | 9.357+000 | 7.384+000 | 9.954+000 | 7.981+000 | 1.065+001 | 8.676+000 | 1.143+001 | 9.455+000 | 1.214+001 | 1.017+001 |
| 3.0-001 | 9.033+000 | 7.062+000 | 9.569+000 | 7.598+000 | 1.020+001 | 8.229+000 | 1.094+001 | 8.970+000 | 1.165+001 | 9.684+000 |
| 3.2-001 | 8.743+000 | 6.774+000 | 9.224+000 | 7.255+000 | 9.795+000 | 7.826+000 | 1.049+001 | 8.521+000 | 1.119+001 | 9.225+000 |
| 3.4-001 | 8.482+000 | 6.516+000 | 8.915+000 | 6.948+000 | 9.430+000 | 7.463+000 | 1.008+001 | 8.109+000 | 1.076+001 | 8.792+000 |
| 3.5-001 | 8.361+000 | 6.396+000 | 8.773+000 | 6.807+000 | 9.262+000 | 7.296+000 | 9.883+000 | 7.916+000 | 1.055+001 | 8.586+000 |
| 3.6-001 | 8.246+000 | 6.282+000 | 8.639+000 | 6.674+000 | 9.103+000 | 7.138+000 | 9.698+000 | 7.733+000 | 1.035+001 | 8.386+000 |
| 3.8-001 | 8.030+000 | 6.069+000 | 8.390+000 | 6.427+000 | 8.810+000 | 6.847+000 | 9.354+000 | 7.390+000 | 9.972+000 | 8.008+000 |
| 4.0-001 | 7.830+000 | 5.872+000 | 8.164+000 | 6.204+000 | 8.546+000 | 6.585+000 | 9.041+000 | 7.080+000 | 9.620+000 | 7.659+000 |
| 4.2-001 | 7.644+000 | 5.689+000 | 7.958+000 | 6.001+000 | 8.308+000 | 6.349+000 | 8.758+000 | 6.799+000 | 9.296+000 | 7.337+000 |
| 4.4-001 | 7.467+000 | 5.515+000 | 7.769+000 | 5.815+000 | 8.092+000 | 6.136+000 | 8.502+000 | 6.545+000 | 8.999+000 | 7.041+000 |
| 4.5-001 | 7.381+000 | 5.431+000 | 7.679+000 | 5.726+000 | 7.992+000 | 6.037+000 | 8.383+000 | 6.427+000 | 8.860+000 | 6.903+000 |
| 4.6-001 | 7.298+000 | 5.349+000 | 7.593+000 | 5.641+000 | 7.896+000 | 5.942+000 | 8.269+000 | 6.315+000 | 8.726+000 | 6.771+000 |
| 4.8-001 | 7.134+000 | 5.189+000 | 7.427+000 | 5.478+000 | 7.715+000 | 5.764+000 | 8.058+000 | 6.105+000 | 8.477+000 | 6.523+000 |
| 5.0-001 | 6.974+000 | 5.033+000 | 7.269+000 | 5.324+000 | 7.548+000 | 5.600+000 | 7.864+000 | 5.914+000 | 8.249+000 | 6.298+000 |
| 5.5-001 | 6.585+000 | 4.653+000 | 6.899+000 | 4.962+000 | 7.171+000 | 5.231+000 | 7.444+000 | 5.501+000 | 7.759+000 | 5.814+000 |
| 6.0-001 | 6.204+000 | 4.282+000 | 6.548+000 | 4.620+000 | 6.832+000 | 4.900+000 | 7.088+000 | 5.152+000 | 7.358+000 | 5.419+000 |
| 6.5-001 | 5.827+000 | 3.916+000 | 6.204+000 | 4.286+000 | 6.513+000 | 4.539+000 | 6.771+000 | 4.843+000 | 7.018+000 | 5.086+000 |
| 7.0-001 | 5.456+000 | 3.557+000 | 5.864+000 | 3.956+000 | 6.201+000 | 4.287+000 | 6.475+000 | 4.556+000 | 6.718+000 | 4.794+000 |
| 8.0-001 | 4.746+000 | 2.873+000 | 5.196+000 | 3.312+000 | 5.587+000 | 5.693+000 | 5.909+000 | 4.008+000 | 6.177+000 | 4.269+000 |
| 9.0-001 | 4.102+000 | 2.258+000 | 4.564+000 | 2.705+000 | 4.986+000 | 3.116+000 | 5.353+000 | 3.473+000 | 5.663+000 | 3.774+000 |
| 1.0+000 | 3.542+000 | 1.729+000 | 3.986+000 | 2.156+000 | 4.416+000 | 2.570+000 | 4.809+000 | 2.951+000 | 5.156+000 | 3.288+000 |
| 1.1+000 | 3.070+000 | 1.290+000 | 3.479+000 | 1.678+000 | 3.893+000 | 2.075+000 | 4.292+000 | 2.458+000 | 4.659+000 | 2.814+000 |
| 1.2+000 | 2.682+000 | 9.388-001 | 3.046+000 | 1.277+000 | 3.430+000 | 1.640+000 | 3.815+000 | 2.008+000 | 4.187+000 | 2.365+000 |
| 1.3+000 | 2.370+000 | 6.642-001 | 2.685+000 | 9.502-001 | 3.029+000 | 1.271+000 | 3.388+000 | 1.610+000 | 3.749+000 | 1.953+000 |
| 1.4+000 | 2.121+000 | 4.548-001 | 2.388+000 | 6.894-001 | 2.690+000 | 9.640-001 | 3.016+000 | 1.266+000 | 3.354+000 | 1.585+000 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x,z)$ --Continued

| x | 16 S | 17 Cl | 18 Ar | 19 K | 20 Ca | | | |
|------------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| $\sin(\theta/2)$ | total | without K-shell |
| /lambda | | | | | | | | |
| 1.5+000 | 1.925+000 | 2.987-001 | 2.148+000 | 4.861-001 | 2.407+000 | 7.152-001 | 2.696+000 | 9.778-001 |
| 1.6+000 | 1.769+000 | 1.848-001 | 1.954+000 | 3.308-001 | 2.175+000 | 5.175-001 | 2.426+000 | 7.399-001 |
| 1.7+000 | 1.646+000 | 1.040-001 | 1.799+000 | 2.145-001 | 1.984+000 | 3.632-001 | 2.200+000 | 5.474-001 |
| 1.8+000 | 1.546+000 | 4.824-002 | 1.674+000 | 1.294-001 | 1.829+000 | 2.450-001 | 2.013+000 | 3.944-001 |
| 1.9+000 | 1.466+000 | 1.136-002 | 1.572+000 | 6.858-002 | 1.703+000 | 1.561-001 | 1.859+000 | 2.748-001 |
| 2.0+000 | 1.399+000 | -1.165-002 | 1.489+000 | 2.655-002 | 1.599+000 | 9.071-002 | 1.731+000 | 1.828-001 |
| 2.2+000 | 1.291+000 | -3.051-002 | 1.361+000 | -1.851-002 | 1.442+000 | 1.137-002 | 1.538+000 | 6.228-002 |
| 2.4+000 | 1.205+000 | -2.931-002 | 1.265+000 | -3.191-002 | 1.329+000 | -2.328-002 | 1.402+000 | 1.712-005 |
| 2.5+000 | 1.166+000 | -2.507-002 | 1.224+000 | -3.196-002 | 1.283+000 | -3.031-002 | 1.348+000 | -1.675-002 |
| 2.6+000 | 1.129+000 | -1.968-002 | 1.186+000 | -2.940-002 | 1.242+000 | -3.288-002 | 1.301+000 | -2.688-002 |
| 2.8+000 | 1.059+000 | -7.726-003 | 1.115+000 | -2.000-002 | 1.168+000 | -2.956-002 | 1.221+000 | -3.355-002 |
| 3.0+000 | 9.913-001 | 3.621-003 | 1.050+000 | -8.600-003 | 1.103+000 | -2.045-002 | 1.153+000 | -2.955-002 |
| 3.3+000 | 8.940-001 | 1.708-002 | 9.560-001 | 7.226-003 | 1.012+000 | -4.209-003 | 1.063+000 | -1.547-002 |
| 3.5+000 | 8.318-001 | 2.339-002 | 8.959-001 | 1.564-002 | 9.536-001 | 5.708-003 | 1.006+000 | -4.997-003 |
| 3.6+000 | 8.017-001 | 2.580-002 | 8.666-001 | 1.911-002 | 9.252-001 | 1.009-002 | 9.787-001 | -1.220-005 |
| 3.9+000 | 7.154-001 | 3.053-002 | 7.817-001 | 2.681-002 | 8.426-001 | 2.066-002 | 8.987-001 | 1.295-002 |
| 4.0+000 | 6.881-001 | 3.141-002 | 7.545-001 | 2.857-002 | 8.159-001 | 2.334-002 | 8.727-001 | 1.650-002 |
| 4.2+000 | 6.360-001 | 3.238-002 | 7.021-001 | 3.107-002 | 7.641-001 | 2.755-002 | 8.220-001 | 2.243-002 |
| 4.6+000 | 5.414-001 | 3.200-002 | 6.055-001 | 3.296-002 | 6.669-001 | 3.219-002 | 7.257-001 | 3.009-002 |
| 5.0+000 | 4.597-001 | 2.985-002 | 5.202-001 | 3.219-002 | 5.794-001 | 3.328-002 | 6.372-001 | 3.341-002 |
| 5.4+000 | 3.901-001 | 2.694-002 | 4.460-001 | 3.001-002 | 5.019-001 | 3.224-002 | 5.574-001 | 3.387-002 |
| 5.5+000 | 3.744-001 | 2.617-002 | 4.291-001 | 2.934-002 | 4.841-001 | 3.178-002 | 5.389-001 | 3.369-002 |
| 5.8+000 | 3.311-001 | 2.385-002 | 3.822-001 | 2.722-002 | 4.341-001 | 3.008-002 | 4.865-001 | 3.263-002 |
| 6.0+000 | 3.052-001 | 2.233-002 | 3.538-001 | 2.575-002 | 4.036-001 | 2.878-002 | 4.542-001 | 3.162-002 |
| 6.2+000 | 2.815-001 | 2.087-002 | 3.277-001 | 2.428-002 | 3.753-001 | 2.742-002 | 4.240-001 | 3.046-002 |
| 6.6+000 | 2.398-001 | 1.814-002 | 2.813-001 | 2.143-002 | 3.246-001 | 2.462-002 | 3.694-001 | 2.787-002 |
| 7.0+000 | 2.048-001 | 1.572-002 | 2.419-001 | 1.881-002 | 2.810-001 | 2.191-002 | 3.220-001 | 2.518-002 |
| 7.4+000 | 1.754-001 | 1.361-002 | 2.085-001 | 1.645-002 | 2.437-001 | 1.939-002 | 2.810-001 | 2.255-002 |
| 8.0+000 | 1.399-001 | 1.096-002 | 1.676-001 | 1.342-002 | 1.975-001 | 1.605-002 | 2.296-001 | 1.895-002 |
| 9.0+000 | 9.744-002 | 7.703-003 | 1.181-001 | 9.589-003 | 1.408-001 | 1.166-002 | 1.655-001 | 1.403-002 |
| 1.0+001 | 6.926-002 | 5.493-003 | 8.469-002 | 6.919-003 | 1.019-001 | 8.523-003 | 1.209-001 | 1.039-002 |
| 1.1+001 | 5.018-002 | 3.981-003 | 6.180-002 | 5.060-003 | 7.489-002 | 6.293-003 | 8.952-002 | 7.747-003 |
| 1.2+001 | 3.699-002 | 2.933-003 | 4.583-002 | 3.754-003 | 5.588-002 | 4.704-003 | 6.721-002 | 5.835-003 |
| 1.4+001 | 2.106-002 | 1.666-003 | 2.634-002 | 2.154-003 | 3.241-002 | 2.728-003 | 3.935-002 | 3.422-003 |
| 1.6+001 | 1.264-002 | 9.972-004 | 1.591-002 | 1.298-003 | 1.971-002 | 1.656-003 | 2.410-002 | 2.094-003 |
| 1.8+001 | 7.917-003 | 6.231-004 | 1.001-002 | 8.154-004 | 1.247-002 | 1.046-003 | 1.533-002 | 1.330-003 |
| 2.0+001 | 5.132-003 | 4.032-004 | 6.518-003 | 5.298-004 | 8.151-003 | 6.826-004 | 1.006-002 | 8.715-004 |
| 2.2+001 | 3.421-003 | 2.685-004 | 4.360-003 | 3.539-004 | 5.472-003 | 4.576-004 | 6.779-003 | 5.864-004 |
| 2.5+001 | 1.939-003 | 1.320-004 | 2.482-003 | 2.013-004 | 3.130-003 | 2.614-004 | 3.896-003 | 3.366-004 |
| 2.8+001 | 1.138-003 | 8.915-005 | 1.464-003 | 1.186-004 | 1.853-003 | 1.547-004 | 2.317-003 | 2.001-004 |
| 3.1+001 | 6.828-004 | 5.349-005 | 8.822-004 | 7.151-005 | 1.123-003 | 9.375-005 | 1.410-003 | 1.218-004 |
| 3.5+001 | 3.492-004 | 2.740-005 | 4.549-004 | 3.693-005 | 5.835-004 | 4.881-005 | 7.386-004 | 6.391-005 |
| 4.0+001 | 1.451-004 | 1.144-005 | 1.924-004 | 1.570-005 | 2.509-004 | 2.110-005 | 3.225-004 | 2.806-005 |
| 4.5+001 | 4.886-005 | 3.918-006 | 6.805-005 | 5.643-006 | 9.258-005 | 7.907-006 | 1.235-004 | 1.091-005 |
| 5.0+001 | 2.183-006 | 2.635-007 | 7.330-006 | 7.251-007 | 1.478-005 | 1.415-006 | 2.510-005 | 2.415-006 |
| 6.0+001 | -3.082-005 | -2.331-006 | -3.625-005 | -2.820-006 | -4.185-005 | -3.332-006 | -4.748-005 | -3.880-006 |
| 7.0+001 | -3.564-005 | -2.723-006 | -4.324-005 | -3.408-006 | -5.168-005 | -4.183-006 | -6.097-005 | -5.085-006 |
| 8.0+001 | -3.287-005 | -2.520-006 | -4.023-005 | -3.183-006 | -4.854-005 | -3.947-006 | -5.785-005 | -4.852-006 |
| 9.0+001 | -2.841-005 | -2.182-006 | -3.490-005 | -2.766-006 | -4.227-005 | -3.444-006 | -5.058-005 | -4.253-006 |
| 1.0+002 | -2.404-005 | -1.847-006 | -2.956-005 | -2.346-006 | -3.586-005 | -2.926-006 | -4.299-005 | -3.620-006 |

Table 1. Modified Dirac-Bartree-Fock-Slater atomic form factor, $F_{MFF}(x,z)$ --Continued

| | x | 21 Sc | | 22 Ti | | 23 V | | 24 Cr | | 25 Mn | |
|---------|-----|--------------|------------------------|--------------|------------------------|--------------|------------------------|--------------|------------------------|--------------|------------------------|
| | | total | without K-shell |
| .0 | | 2.096+001 | 1.898+001 | 2.196+001 | 1.998+001 | 2.295+001 | 2.098+001 | 2.395+001 | 2.197+001 | 2.494+001 | 2.297+001 |
| 1.0-002 | | 2.092+001 | 1.894+001 | 2.192+001 | 1.994+001 | 2.292+001 | 2.094+001 | 2.392+001 | 2.194+001 | 2.491+001 | 2.294+001 |
| 2.0-002 | | 2.081+001 | 1.883+001 | 2.181+001 | 1.984+001 | 2.282+001 | 2.084+001 | 2.383+001 | 2.185+001 | 2.482+001 | 2.285+001 |
| 3.0-002 | | 2.063+001 | 1.865+001 | 2.164+001 | 1.967+001 | 2.265+001 | 2.068+001 | 2.368+001 | 2.171+001 | 2.467+001 | 2.270+001 |
| 4.0-002 | | 2.039+001 | 1.841+001 | 2.141+001 | 1.944+001 | 2.244+001 | 2.046+001 | 2.349+001 | 2.152+001 | 2.447+001 | 2.250+001 |
| 5.0-002 | | 2.010+001 | 1.813+001 | 2.114+001 | 1.916+001 | 2.217+001 | 2.020+001 | 2.325+001 | 2.128+001 | 2.422+001 | 2.226+001 |
| 6.0-002 | | 1.978+001 | 1.780+001 | 2.082+001 | 1.885+001 | 2.186+001 | 1.989+001 | 2.297+001 | 2.100+001 | 2.394+001 | 2.197+001 |
| 7.0-002 | | 1.943+001 | 1.745+001 | 2.048+001 | 1.850+001 | 2.153+001 | 1.955+001 | 2.267+001 | 2.070+001 | 2.362+001 | 2.165+001 |
| 8.0-002 | | 1.907+001 | 1.709+001 | 2.012+001 | 1.814+001 | 2.117+001 | 1.920+001 | 2.234+001 | 2.037+001 | 2.328+001 | 2.131+001 |
| 9.0-002 | | 1.869+001 | 1.672+001 | 1.974+001 | 1.777+001 | 2.080+001 | 1.883+001 | 2.200+001 | 2.003+001 | 2.292+001 | 2.095+001 |
| 1.0-001 | | 1.832+001 | 1.634+001 | 1.936+001 | 1.739+001 | 2.042+001 | 1.845+001 | 2.165+001 | 1.967+001 | 2.255+001 | 2.058+001 |
| 1.1-001 | | 1.796+001 | 1.598+001 | 1.899+001 | 1.701+001 | 2.004+001 | 1.807+001 | 2.128+001 | 1.931+001 | 2.217+001 | 2.020+001 |
| 1.2-001 | | 1.760+001 | 1.562+001 | 1.862+001 | 1.664+001 | 1.966+001 | 1.769+001 | 2.092+001 | 1.855+001 | 2.179+001 | 1.982+001 |
| 1.3-001 | | 1.725+001 | 1.527+001 | 1.825+001 | 1.628+001 | 1.929+001 | 1.732+001 | 2.056+001 | 1.859+001 | 2.141+001 | 1.944+001 |
| 1.4-001 | | 1.691+001 | 1.493+001 | 1.790+001 | 1.592+001 | 1.892+001 | 1.695+001 | 2.019+001 | 1.822+001 | 2.103+001 | 1.906+001 |
| 1.5-001 | | 1.658+001 | 1.460+001 | 1.755+001 | 1.557+001 | 1.856+001 | 1.659+001 | 1.983+001 | 1.786+001 | 2.065+001 | 1.868+001 |
| 1.6-001 | | 1.626+001 | 1.428+001 | 1.721+001 | 1.524+001 | 1.821+001 | 1.624+001 | 1.947+001 | 1.750+001 | 2.028+001 | 1.831+001 |
| 1.7-001 | | 1.594+001 | 1.397+001 | 1.688+001 | 1.490+001 | 1.786+001 | 1.589+001 | 1.911+001 | 1.714+001 | 1.992+001 | 1.795+001 |
| 1.8-001 | | 1.564+001 | 1.366+001 | 1.656+001 | 1.458+001 | 1.753+001 | 1.555+001 | 1.876+001 | 1.679+001 | 1.956+001 | 1.759+001 |
| 1.9-001 | | 1.534+001 | 1.336+001 | 1.624+001 | 1.427+001 | 1.719+001 | 1.522+001 | 1.841+001 | 1.644+001 | 1.920+001 | 1.723+001 |
| 2.0-001 | | 1.504+001 | 1.307+001 | 1.593+001 | 1.396+001 | 1.687+001 | 1.490+001 | 1.806+001 | 1.610+001 | 1.885+001 | 1.689+001 |
| 2.2-001 | | 1.447+001 | 1.250+001 | 1.533+001 | 1.335+001 | 1.624+001 | 1.427+001 | 1.738+001 | 1.542+001 | 1.817+001 | 1.621+001 |
| 2.4-001 | | 1.392+001 | 1.194+001 | 1.474+001 | 1.277+001 | 1.563+001 | 1.366+001 | 1.672+001 | 1.475+001 | 1.751+001 | 1.555+001 |
| 2.5-001 | | 1.364+001 | 1.167+001 | 1.446+001 | 1.249+001 | 1.533+001 | 1.336+001 | 1.640+001 | 1.443+001 | 1.719+001 | 1.522+001 |
| 2.6-001 | | 1.338+001 | 1.141+001 | 1.418+001 | 1.221+001 | 1.504+001 | 1.307+001 | 1.607+001 | 1.411+001 | 1.687+001 | 1.491+001 |
| 2.8-001 | | 1.286+001 | 1.089+001 | 1.364+001 | 1.167+001 | 1.447+001 | 1.250+001 | 1.545+001 | 1.348+001 | 1.625+001 | 1.429+001 |
| 3.0-001 | | 1.236+001 | 1.039+001 | 1.311+001 | 1.114+001 | 1.391+001 | 1.195+001 | 1.484+001 | 1.288+001 | 1.565+001 | 1.369+001 |
| 3.2-001 | | 1.188+001 | 9.908+000 | 1.260+001 | 1.064+001 | 1.338+001 | 1.142+001 | 1.426+001 | 1.230+001 | 1.507+001 | 1.310+001 |
| 3.4-001 | | 1.142+001 | 9.452+000 | 1.212+001 | 1.016+001 | 1.287+001 | 1.091+001 | 1.370+001 | 1.174+001 | 1.450+001 | 1.254+001 |
| 3.5-001 | | 1.120+001 | 9.233+000 | 1.189+001 | 9.924+000 | 1.263+001 | 1.066+001 | 1.343+001 | 1.147+001 | 1.423+001 | 1.227+001 |
| 3.6-001 | | 1.098+001 | 9.020+000 | 1.166+001 | 9.697+000 | 1.238+001 | 1.042+001 | 1.317+001 | 1.121+001 | 1.396+001 | 1.200+001 |
| 3.8-001 | | 1.058+001 | 8.614+000 | 1.122+001 | 9.262+000 | 1.192+001 | 9.957+000 | 1.266+001 | 1.070+001 | 1.344+001 | 1.148+001 |
| 4.0-001 | | 1.020+001 | 8.234+000 | 1.081+001 | 8.852+000 | 1.148+001 | 9.517+000 | 1.218+001 | 1.022+001 | 1.294+001 | 1.098+001 |
| 4.2-001 | | 9.839+000 | 7.880+000 | 1.043+001 | 8.467+000 | 1.106+001 | 9.102+000 | 1.172+001 | 9.765+000 | 1.247+001 | 1.051+001 |
| 4.4-001 | | 9.509+000 | 7.551+000 | 1.006+001 | 8.107+000 | 1.067+001 | 8.711+000 | 1.129+001 | 9.337+000 | 1.201+001 | 1.006+001 |
| 4.5-001 | | 9.354+000 | 7.397+000 | 9.893+000 | 7.936+000 | 1.048+001 | 8.524+000 | 1.109+001 | 9.133+000 | 1.180+001 | 9.842+000 |
| 4.6-001 | | 9.204+000 | 7.248+000 | 9.728+000 | 7.772+000 | 1.030+001 | 8.344+000 | 1.089+001 | 8.936+000 | 1.159+001 | 9.631+000 |
| 4.8-001 | | 8.923+000 | 6.969+000 | 9.415+000 | 7.461+000 | 9.956+000 | 8.002+000 | 1.051+001 | 8.560+000 | 1.118+001 | 9.228+000 |
| 5.0-001 | | 8.665+000 | 6.713+000 | 9.126+000 | 7.173+000 | 9.635+000 | 7.683+000 | 1.016+001 | 8.210+000 | 1.080+001 | 8.847+000 |
| 5.5-001 | | 8.107+000 | 6.160+000 | 8.495+000 | 6.548+000 | 8.930+000 | 6.982+000 | 9.384+000 | 7.436+000 | 9.942+000 | 7.995+000 |
| 6.0-001 | | 7.653+000 | 5.712+000 | 7.981+000 | 6.039+000 | 8.349+000 | 6.406+000 | 8.739+000 | 6.796+000 | 9.219+000 | 7.276+000 |
| 6.5-001 | | 7.277+000 | 5.342+000 | 7.558+000 | 5.621+000 | 7.870+000 | 5.933+000 | 8.205+000 | 6.267+000 | 8.614+000 | 6.675+000 |
| 7.0-001 | | 6.956+000 | 5.028+000 | 7.204+000 | 5.274+000 | 7.473+000 | 5.541+000 | 7.763+000 | 5.830+000 | 8.109+000 | 6.175+000 |
| 8.0-001 | | 6.410+000 | 4.498+000 | 6.629+000 | 4.713+000 | 6.848+000 | 4.929+000 | 7.077+000 | 5.156+000 | 7.330+000 | 5.407+000 |
| 9.0-001 | | 5.920+000 | 4.025+000 | 6.146+000 | 4.245+000 | 6.353+000 | 4.448+000 | 6.555+000 | 4.646+000 | 6.758+000 | 4.847+000 |
| 1.0+000 | | 5.445+000 | 3.569+000 | 5.695+000 | 3.811+000 | 5.913+000 | 4.024+000 | 6.113+000 | 4.219+000 | 6.301+000 | 4.403+000 |
| 1.1+000 | | 4.976+000 | 3.120+000 | 5.252+000 | 3.388+000 | 5.493+000 | 3.621+000 | 5.705+000 | 3.827+000 | 5.899+000 | 4.016+000 |
| 1.2+000 | | 4.519+000 | 2.685+000 | 4.816+000 | 2.972+000 | 5.080+000 | 3.226+000 | 5.309+000 | 3.448+000 | 5.520+000 | 3.652+000 |
| 1.3+000 | | 4.084+000 | 2.273+000 | 4.393+000 | 2.569+000 | 4.673+000 | 2.839+000 | 4.919+000 | 3.076+000 | 5.149+000 | 3.299+000 |
| 1.4+000 | | 3.680+000 | 1.894+000 | 3.990+000 | 2.190+000 | 4.279+000 | 2.466+000 | 4.538+000 | 2.714+000 | 4.785+000 | 2.952+000 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, Z)$ --Continued

| x | 21 Sc | 22 Ti | 23 V | 24 Cr | 25 Mn | | | | | |
|--------------------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| $\sin(\theta/2)/\lambda$ | total | without K-shell |
| 1.5+000 | 3.313+000 | 1.554+000 | 3.616+000 | 1.839+000 | 3.905+000 | 2.114+000 | 4.170+000 | 2.367+000 | 4.428+000 | 2.614+000 |
| 1.6+000 | 2.987+000 | 1.255+000 | 3.274+000 | 1.523+000 | 3.556+000 | 1.789+000 | 3.821+000 | 2.040+000 | 4.084+000 | 2.290+000 |
| 1.7+000 | 2.702+000 | 9.976-001 | 2.969+000 | 1.244+000 | 3.238+000 | 1.494+000 | 3.496+000 | 1.737+000 | 3.758+000 | 1.985+000 |
| 1.8+000 | 2.455+000 | 7.802-001 | 2.699+000 | 1.001+000 | 2.950+000 | 1.232+000 | 3.198+000 | 1.462+000 | 3.452+000 | 1.702+000 |
| 1.9+000 | 2.244+000 | 5.991-001 | 2.464+000 | 7.938-001 | 2.695+000 | 1.003+000 | 2.928+000 | 1.216+000 | 3.171+000 | 1.443+000 |
| 2.0+000 | 2.065+000 | 4.506-001 | 2.261+000 | 6.192-001 | 2.471+000 | 8.053-001 | 2.686+000 | 9.999-001 | 2.916+000 | 1.211+000 |
| 2.2+000 | 1.786+000 | 2.348-001 | 1.937+000 | 3.551-001 | 2.105+000 | 4.956-001 | 2.285+000 | 6.503-001 | 2.480+000 | 8.240-001 |
| 2.4+000 | 1.587+000 | 1.015-001 | 1.703+000 | 1.819-001 | 1.834+000 | 2.818-001 | 1.978+000 | 3.980-001 | 2.139+000 | 5.336-001 |
| 2.5+000 | 1.510+000 | 5.742-002 | 1.611+000 | 1.213-001 | 1.726+000 | 2.036-001 | 1.855+000 | 3.024-001 | 1.999+000 | 4.199-001 |
| 2.6+000 | 1.444+000 | 2.477-002 | 1.533+000 | 7.442-002 | 1.634+000 | 1.411-001 | 1.748+000 | 2.239-001 | 1.877+000 | 3.245-001 |
| 2.8+000 | 1.338+000 | -1.488-002 | 1.407+000 | 1.235-002 | 1.487+000 | 5.348-002 | 1.577+000 | 1.090-001 | 1.679+000 | 1.799-001 |
| 3.0+000 | 1.255+000 | -3.135-002 | 1.312+000 | -1.965-002 | 1.379+000 | 2.772-003 | 1.447+000 | 3.711-002 | 1.528+000 | 8.421-002 |
| 3.3+000 | 1.156+000 | -3.231-002 | 1.203+000 | -3.434-002 | 1.252+000 | -2.985-002 | 1.306+000 | -1.725-002 | 1.365+000 | 4.270-003 |
| 3.5+000 | 1.100+000 | -2.528-002 | 1.143+000 | -3.204-002 | 1.188+000 | -3.450-002 | 1.234+000 | -3.111-002 | 1.284+000 | -2.102-002 |
| 3.6+000 | 1.073+000 | -2.078-002 | 1.116+000 | -2.897-002 | 1.159+000 | -3.380-002 | 1.203+000 | -3.378-002 | 1.250+000 | -2.804-002 |
| 3.9+000 | 9.967-001 | -6.246-003 | 1.040+000 | -1.621-002 | 1.081+000 | -2.497-002 | 1.121+000 | -3.137-002 | 1.161+000 | -3.443-002 |
| 4.0+000 | 9.722-001 | -1.553-003 | 1.016+000 | -1.152-002 | 1.057+000 | -2.081-002 | 1.097+000 | -2.840-002 | 1.136+000 | -3.327-002 |
| 4.2+000 | 9.243-001 | 7.101-003 | 9.692-001 | -2.331-003 | 1.011+000 | -1.191-002 | 1.050+000 | -2.087-002 | 1.088+000 | -2.814-002 |
| 4.6+000 | 8.321-001 | 2.065-002 | 8.793-001 | 1.342-002 | 9.230-001 | 5.119-003 | 9.634-001 | -3.931-003 | 1.002+000 | -1.262-002 |
| 5.0+000 | 7.449-001 | 2.917-002 | 7.938-001 | 2.451-002 | 8.395-001 | 1.846-002 | 8.817-001 | 1.102-002 | 9.214-001 | 3.298-003 |
| 5.4+000 | 6.637-001 | 3.362-002 | 7.131-001 | 3.125-002 | 7.599-001 | 2.749-002 | 8.036-001 | 2.215-002 | 8.451-001 | 1.629-002 |
| 5.5+000 | 6.444-001 | 3.423-002 | 6.938-001 | 3.236-002 | 7.408-001 | 2.914-002 | 7.847-001 | 2.432-002 | 8.265-001 | 1.896-002 |
| 5.8+000 | 5.891-001 | 3.517-002 | 6.381-001 | 3.460-002 | 6.851-001 | 3.281-002 | 7.295-001 | 2.948-002 | 7.721-001 | 2.561-002 |
| 6.0+000 | 5.545-001 | 3.517-002 | 6.028-001 | 3.533-002 | 6.496-001 | 3.436-002 | 6.940-001 | 3.192-002 | 7.369-001 | 2.898-002 |
| 6.2+000 | 5.216-001 | 3.481-002 | 5.692-001 | 3.557-002 | 6.154-001 | 3.532-002 | 6.597-001 | 3.367-002 | 7.027-001 | 3.159-002 |
| 6.6+000 | 4.611-001 | 3.330-002 | 5.066-001 | 3.496-002 | 5.515-001 | 3.583-002 | 5.949-001 | 3.552-002 | 6.376-001 | 3.489-002 |
| 7.0+000 | 4.072-001 | 3.115-002 | 4.503-001 | 3.339-002 | 4.932-001 | 3.504-002 | 5.353-001 | 3.570-002 | 5.771-001 | 3.619-002 |
| 7.4+000 | 3.596-001 | 2.870-002 | 4.000-001 | 3.127-002 | 4.407-001 | 3.343-002 | 4.810-001 | 3.479-002 | 5.213-001 | 3.610-002 |
| 8.0+000 | 2.987-001 | 2.494-002 | 3.349-001 | 2.770-002 | 3.718-001 | 3.024-002 | 4.089-001 | 3.222-002 | 4.466-001 | 3.430-002 |
| 9.0+000 | 2.202-001 | 1.923-002 | 2.497-001 | 2.186-002 | 2.804-001 | 2.446-002 | 3.118-001 | 2.678-002 | 3.442-001 | 2.934-002 |
| 1.0+001 | 1.638-001 | 1.466-002 | 1.875-001 | 1.693-002 | 2.125-001 | 1.927-002 | 2.384-001 | 2.149-002 | 2.657-001 | 2.400-002 |
| 1.1+001 | 1.232-001 | 1.117-002 | 1.420-001 | 1.305-002 | 1.622-001 | 1.504-002 | 1.834-001 | 1.703-002 | 2.060-001 | 1.925-002 |
| 1.2+001 | 9.364-002 | 8.554-003 | 1.087-001 | 1.008-002 | 1.249-001 | 1.173-002 | 1.422-001 | 1.340-002 | 1.607-001 | 1.533-002 |
| 1.4+001 | 5.591-002 | 5.137-003 | 6.553-002 | 6.135-003 | 7.607-002 | 7.235-003 | 8.747-002 | 8.380-003 | 9.988-002 | 9.731-003 |
| 1.6+001 | 3.473-002 | 3.195-003 | 4.102-002 | 3.849-003 | 4.797-002 | 4.580-003 | 5.558-002 | 5.357-003 | 6.395-002 | 6.282-003 |
| 1.8+001 | 2.234-002 | 2.053-003 | 2.653-002 | 2.489-003 | 3.121-002 | 2.982-003 | 3.637-002 | 3.512-003 | 4.210-002 | 4.148-003 |
| 2.0+001 | 1.479-002 | 1.358-003 | 1.765-002 | 1.655-003 | 2.086-002 | 1.993-003 | 2.443-002 | 2.359-003 | 2.841-002 | 2.801-003 |
| 2.2+001 | 1.004-002 | 9.210-004 | 1.202-002 | 1.127-003 | 1.427-002 | 1.362-003 | 1.677-002 | 1.620-003 | 1.959-002 | 1.932-003 |
| 2.5+001 | 5.826-003 | 5.338-004 | 7.012-003 | 6.563-004 | 8.360-003 | 7.976-004 | 9.879-003 | 9.534-004 | 1.160-002 | 1.143-003 |
| 2.8+001 | 3.496-003 | 3.202-004 | 4.227-003 | 3.955-004 | 5.062-003 | 4.828-004 | 6.009-003 | 5.798-004 | 7.084-002 | 6.984-004 |
| 3.1+001 | 2.147-003 | 1.967-004 | 2.607-003 | 2.440-004 | 3.136-003 | 2.993-004 | 3.739-003 | 3.610-004 | 4.428-002 | 4.368-004 |
| 3.5+001 | 1.141-003 | 1.047-004 | 1.395-003 | 1.308-004 | 1.690-003 | 1.616-004 | 2.028-003 | 1.962-004 | 2.417-003 | 2.389-004 |
| 4.0+001 | 5.123-004 | 4.729-005 | 6.345-004 | 5.984-005 | 7.778-004 | 7.480-005 | 9.442-004 | 9.189-005 | 1.138-002 | 1.132-004 |
| 4.5+001 | 2.087-004 | 1.954-005 | 2.653-004 | 2.538-005 | 3.331-004 | 3.248-005 | 4.131-004 | 4.076-005 | 5.077-004 | 5.118-005 |
| 5.0+001 | 5.684-005 | 5.644-006 | 7.966-005 | 8.019-006 | 1.082-004 | 1.104-005 | 1.431-004 | 1.471-005 | 1.858-004 | 1.945-005 |
| 6.0+001 | -5.797-005 | -4.922-006 | -6.231-005 | -5.332-006 | -6.568-005 | -5.631-006 | -6.771-005 | -5.746-006 | -6.811-005 | -5.730-006 |
| 7.0+001 | -8.181-005 | -7.177-006 | -9.318-005 | -8.312-006 | -1.051-004 | -9.506-006 | -1.173-004 | -1.068-005 | -1.299-004 | -1.201-005 |
| 8.0+001 | -7.944-005 | -7.023-006 | -9.168-005 | -8.253-006 | -1.048-004 | -9.588-006 | -1.189-004 | -1.096-005 | -1.339-004 | -1.256-005 |
| 9.0+001 | -7.009-005 | -6.219-006 | -8.130-005 | -7.349-006 | -9.349-005 | -8.591-006 | -1.066-004 | -9.886-006 | -1.208-004 | -1.141-005 |
| 1.0+002 | -5.981-005 | -5.317-006 | -6.954-005 | -6.301-006 | -8.017-005 | -7.386-006 | -9.168-005 | -8.527-006 | -1.042-004 | -9.876-006 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x,z)$ --Continued

| x sin(theta/2) /lambda | 26 Fe | 27 Co | 28 Ni | 29 Cu | 30 Zr | | | | | |
|------------------------------|-----------|--------------------|-----------|--------------------|-----------|--------------------|-----------|--------------------|-----------|--------------------|
| | total | without K-shell |
| -0 | 2.593+001 | 2.397+001 | 2.693+001 | 2.496+001 | 2.792+001 | 2.596+001 | 2.892+001 | 2.696+001 | 2.991+001 | 2.795+001 |
| 1.0-002 | 2.590+001 | 2.394+001 | 2.690+001 | 2.494+001 | 2.790+001 | 2.593+001 | 2.889+001 | 2.693+001 | 2.988+001 | 2.793+001 |
| 2.0-002 | 2.582+001 | 2.385+001 | 2.682+001 | 2.485+001 | 2.782+001 | 2.585+001 | 2.882+001 | 2.686+001 | 2.981+001 | 2.783+001 |
| 3.0-002 | 2.568+001 | 2.371+001 | 2.668+001 | 2.472+001 | 2.768+001 | 2.572+001 | 2.870+001 | 2.675+001 | 2.969+001 | 2.773+001 |
| 4.0-002 | 2.548+001 | 2.352+001 | 2.650+001 | 2.453+001 | 2.751+001 | 2.555+001 | 2.855+001 | 2.659+001 | 2.952+001 | 2.757+001 |
| 5.0-002 | 2.525+001 | 2.328+001 | 2.627+001 | 2.430+001 | 2.729+001 | 2.532+001 | 2.835+001 | 2.639+001 | 2.932+001 | 2.736+001 |
| 6.0-002 | 2.497+001 | 2.301+001 | 2.600+001 | 2.404+001 | 2.703+001 | 2.507+001 | 2.812+001 | 2.616+001 | 2.907+001 | 2.712+001 |
| 7.0-002 | 2.466+001 | 2.270+001 | 2.570+001 | 2.374+001 | 2.674+001 | 2.478+001 | 2.786+001 | 2.590+001 | 2.880+001 | 2.684+001 |
| 8.0-002 | 2.433+001 | 2.236+001 | 2.538+001 | 2.341+001 | 2.642+001 | 2.446+001 | 2.757+001 | 2.561+001 | 2.850+001 | 2.654+001 |
| 9.0-002 | 2.398+001 | 2.201+001 | 2.503+001 | 2.307+001 | 2.608+001 | 2.412+001 | 2.726+001 | 2.530+001 | 2.818+001 | 2.622+001 |
| 1.0-001 | 2.361+001 | 2.165+001 | 2.467+001 | 2.271+001 | 2.573+001 | 2.377+001 | 2.693+001 | 2.497+001 | 2.784+001 | 2.588+001 |
| 1.1-001 | 2.324+001 | 2.127+001 | 2.430+001 | 2.234+001 | 2.536+001 | 2.340+001 | 2.659+001 | 2.463+001 | 2.748+001 | 2.552+001 |
| 1.2-001 | 2.286+001 | 2.089+001 | 2.392+001 | 2.196+001 | 2.499+001 | 2.303+001 | 2.624+001 | 2.428+001 | 2.712+001 | 2.516+001 |
| 1.3-001 | 2.247+001 | 2.051+001 | 2.354+001 | 2.158+001 | 2.461+001 | 2.265+001 | 2.588+001 | 2.392+001 | 2.674+001 | 2.479+001 |
| 1.4-001 | 2.209+001 | 2.013+001 | 2.316+001 | 2.120+001 | 2.423+001 | 2.227+001 | 2.552+001 | 2.356+001 | 2.637+001 | 2.441+001 |
| 1.5-001 | 2.171+001 | 1.975+001 | 2.278+001 | 2.082+001 | 2.385+001 | 2.189+001 | 2.515+001 | 2.319+001 | 2.599+001 | 2.403+001 |
| 1.6-001 | 2.134+001 | 1.937+001 | 2.240+001 | 2.044+001 | 2.347+001 | 2.151+001 | 2.477+001 | 2.282+001 | 2.560+001 | 2.365+001 |
| 1.7-001 | 2.096+001 | 1.900+001 | 2.202+001 | 2.006+001 | 2.309+001 | 2.113+001 | 2.440+001 | 2.244+001 | 2.522+001 | 2.327+001 |
| 1.8-001 | 2.060+001 | 1.863+001 | 2.165+001 | 1.969+001 | 2.271+001 | 2.075+001 | 2.402+001 | 2.206+001 | 2.484+001 | 2.289+001 |
| 1.9-001 | 2.024+001 | 1.827+001 | 2.128+001 | 1.932+001 | 2.234+001 | 2.038+001 | 2.365+001 | 2.169+001 | 2.446+001 | 2.251+001 |
| 2.0-001 | 1.988+001 | 1.791+001 | 2.092+001 | 1.895+001 | 2.197+001 | 2.001+001 | 2.327+001 | 2.131+001 | 2.409+001 | 2.213+001 |
| 2.2-001 | 1.912+001 | 1.721+001 | 2.020+001 | 1.824+001 | 2.124+001 | 1.928+001 | 2.252+001 | 2.057+001 | 2.334+001 | 2.138+001 |
| 2.4-001 | 1.850+001 | 1.653+001 | 1.950+001 | 1.754+001 | 2.053+001 | 1.857+001 | 2.178+001 | 1.982+001 | 2.260+001 | 2.065+001 |
| 2.5-001 | 1.816+001 | 1.620+001 | 1.916+001 | 1.720+001 | 2.017+001 | 1.822+001 | 2.141+001 | 1.946+001 | 2.224+001 | 2.029+001 |
| 2.6-001 | 1.784+001 | 1.587+001 | 1.882+001 | 1.686+001 | 1.983+001 | 1.787+001 | 2.105+001 | 1.909+001 | 2.188+001 | 1.993+001 |
| 2.8-001 | 1.719+001 | 1.523+001 | 1.816+001 | 1.620+001 | 1.915+001 | 1.719+001 | 2.033+001 | 1.827+001 | 2.117+001 | 1.922+001 |
| 3.0-001 | 1.657+001 | 1.461+001 | 1.751+001 | 1.555+001 | 1.848+001 | 1.652+001 | 1.962+001 | 1.767+001 | 2.047+001 | 1.852+001 |
| 3.2-001 | 1.596+001 | 1.400+001 | 1.688+001 | 1.493+001 | 1.783+001 | 1.588+001 | 1.893+001 | 1.698+001 | 1.979+001 | 1.784+001 |
| 3.4-001 | 1.537+001 | 1.341+001 | 1.627+001 | 1.432+001 | 1.720+001 | 1.525+001 | 1.826+001 | 1.630+001 | 1.912+001 | 1.717+001 |
| 3.5-001 | 1.505+001 | 1.313+001 | 1.598+001 | 1.402+001 | 1.689+001 | 1.494+001 | 1.793+001 | 1.597+001 | 1.880+001 | 1.685+001 |
| 3.6-001 | 1.481+001 | 1.285+001 | 1.568+001 | 1.373+001 | 1.659+001 | 1.464+001 | 1.760+001 | 1.565+001 | 1.847+001 | 1.652+001 |
| 3.8-001 | 1.426+001 | 1.230+001 | 1.511+001 | 1.316+001 | 1.600+001 | 1.404+001 | 1.697+001 | 1.501+001 | 1.784+001 | 1.589+001 |
| 4.0-001 | 1.372+001 | 1.178+001 | 1.456+001 | 1.261+001 | 1.542+001 | 1.347+001 | 1.635+001 | 1.440+001 | 1.722+001 | 1.527+001 |
| 4.2-001 | 1.323+001 | 1.128+001 | 1.403+001 | 1.208+001 | 1.487+001 | 1.292+001 | 1.576+001 | 1.381+001 | 1.662+001 | 1.468+001 |
| 4.4-001 | 1.275+001 | 1.080+001 | 1.353+001 | 1.157+001 | 1.434+001 | 1.239+001 | 1.519+001 | 1.324+001 | 1.605+001 | 1.410+001 |
| 4.5-001 | 1.252+001 | 1.057+001 | 1.328+001 | 1.133+001 | 1.408+001 | 1.213+001 | 1.491+001 | 1.296+001 | 1.576+001 | 1.382+001 |
| 4.6-001 | 1.229+001 | 1.034+001 | 1.304+001 | 1.109+001 | 1.383+001 | 1.188+001 | 1.464+001 | 1.269+001 | 1.549+001 | 1.354+001 |
| 4.8-001 | 1.186+001 | 9.908+000 | 1.258+001 | 1.063+001 | 1.334+001 | 1.139+001 | 1.412+001 | 1.217+001 | 1.495+001 | 1.300+001 |
| 5.0-001 | 1.145+001 | 9.498+000 | 1.214+001 | 1.019+001 | 1.287+001 | 1.092+001 | 1.362+001 | 1.167+001 | 1.443+001 | 1.249+001 |
| 5.5-001 | 1.052+001 | 8.571+000 | 1.114+001 | 9.191+000 | 1.180+001 | 9.853+000 | 1.247+001 | 1.053+001 | 1.323+001 | 1.129+001 |
| 6.0-001 | 9.722+000 | 7.780+000 | 1.027+001 | 8.328+000 | 1.086+001 | 8.919+000 | 1.146+001 | 9.521+000 | 1.216+001 | 1.022+001 |
| 6.5-001 | 9.049+000 | 7.111+000 | 9.529+000 | 7.590+000 | 1.005+001 | 8.113+000 | 1.058+001 | 8.648+000 | 1.122+001 | 9.281+000 |
| 7.0-001 | 8.484+000 | 6.549+000 | 8.900+000 | 6.965+000 | 9.357+000 | 7.423+000 | 9.830+000 | 7.856+000 | 1.039+001 | 8.461+000 |
| 8.0-001 | 7.609+000 | 5.685+000 | 7.920+000 | 5.995+000 | 8.265+000 | 6.340+000 | 8.631+000 | 6.706+000 | 9.067+000 | 7.142+000 |
| 9.0-001 | 6.974+000 | 5.063+000 | 7.213+000 | 5.299+000 | 7.476+000 | 5.560+000 | 7.759+000 | 5.842+000 | 8.088+000 | 6.172+000 |
| 1.0+000 | 6.485+000 | 4.588+000 | 6.683+000 | 4.780+000 | 6.890+000 | 4.985+000 | 7.114+000 | 5.208+000 | 7.365+000 | 5.457+000 |
| 1.1+000 | 6.079+000 | 4.192+000 | 6.255+000 | 4.364+000 | 6.432+000 | 4.539+000 | 6.619+000 | 4.723+000 | 6.817+000 | 4.920+000 |
| 1.2+000 | 5.707+000 | 3.834+000 | 5.881+000 | 4.004+000 | 6.048+000 | 4.167+000 | 6.215+000 | 4.331+000 | 6.383+000 | 4.497+000 |
| 1.3+000 | 5.351+000 | 3.494+000 | 5.533+000 | 3.671+000 | 5.702+000 | 3.835+000 | 5.862+000 | 3.991+000 | 6.018+000 | 4.144+000 |
| 1.4+000 | 5.001+000 | 3.161+000 | 5.197+000 | 3.350+000 | 5.374+000 | 3.522+000 | 5.537+000 | 3.680+000 | 5.693+000 | 3.831+000 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFP}(x, Z)$ --Continued

| x | 26 Fe | 27 Co | 28 Ni | 29 Cu | 30 Zn | | | | | |
|------------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| $\sin(\theta/2)$ | total | without K-shell |
| /lambda | | | | | | | | | | |
| 1.5+000 | 4.658+000 | 2.835+000 | 4.866+000 | 3.036+000 | 5.056+000 | 3.218+000 | 5.226+000 | 3.383+000 | 5.388+000 | 3.540+000 |
| 1.6+000 | 4.322+000 | 2.518+000 | 4.542+000 | 2.729+000 | 4.743+000 | 2.922+000 | 4.923+000 | 3.095+000 | 5.094+000 | 3.261+000 |
| 1.7+000 | 4.000+000 | 2.215+000 | 4.226+000 | 2.431+000 | 4.436+000 | 2.632+000 | 4.625+000 | 2.813+000 | 4.807+000 | 2.988+000 |
| 1.8+000 | 3.693+000 | 1.929+000 | 3.923+000 | 2.147+000 | 4.138+000 | 2.352+000 | 4.334+000 | 2.539+000 | 4.525+000 | 2.722+000 |
| 1.9+000 | 3.406+000 | 1.663+000 | 3.634+000 | 1.878+000 | 3.852+000 | 2.084+000 | 4.053+000 | 2.275+000 | 4.250+000 | 2.463+000 |
| 2.0+000 | 3.141+000 | 1.420+000 | 3.364+000 | 1.628+000 | 3.580+000 | 1.831+000 | 3.782+000 | 2.022+000 | 3.983+000 | 2.214+000 |
| 2.2+000 | 2.680+000 | 1.004+000 | 2.884+000 | 1.191+000 | 3.087+000 | 1.379+000 | 3.283+000 | 1.561+000 | 3.484+000 | 1.749+000 |
| 2.4+000 | 2.309+000 | 6.808-001 | 2.486+000 | 8.384-001 | 2.669+000 | 1.003+000 | 2.850+000 | 1.169+000 | 3.039+000 | 1.343+000 |
| 2.5+000 | 2.154+000 | 5.505-001 | 2.317+000 | 6.928-001 | 2.488+000 | 8.444-001 | 2.660+000 | 9.990-001 | 2.841+000 | 1.164+000 |
| 2.6+000 | 2.017+000 | 4.389-001 | 2.167+000 | 5.661-001 | 2.325+000 | 7.039-001 | 2.487+000 | 8.469-001 | 2.658+000 | 1.001+000 |
| 2.8+000 | 1.792+000 | 2.648-001 | 1.915+000 | 3.632-001 | 2.049+000 | 4.735-001 | 2.188+000 | 5.922-001 | 2.338+000 | 7.233-001 |
| 3.0+000 | 1.619+000 | 1.443-001 | 1.720+000 | 2.171-001 | 1.830+000 | 3.021-001 | 1.948+000 | 3.969-001 | 2.076+000 | 5.043-001 |
| 3.3+000 | 1.431+000 | 3.600-002 | 1.505+000 | 7.833-002 | 1.587+000 | 1.315-001 | 1.677+000 | 1.947-001 | 1.775+000 | 2.692-001 |
| 3.5+000 | 1.339+000 | -2.748-003 | 1.400+000 | 2.436-002 | 1.467+000 | 6.084-002 | 1.542+000 | 1.067-001 | 1.624+000 | 1.626-001 |
| 3.6+000 | 1.300+000 | -1.511-002 | 1.356+000 | 5.775-003 | 1.417+000 | 3.526-002 | 1.485+000 | 7.360-002 | 1.560+000 | 1.213-001 |
| 3.9+000 | 1.203+000 | -3.296-002 | 1.247+000 | -2.605-002 | 1.295+000 | -1.285-002 | 1.348+000 | 7.345-003 | 1.405+000 | 3.484-002 |
| 4.0+000 | 1.176+000 | -3.439-002 | 1.217+000 | -3.079-002 | 1.262+000 | -2.165-002 | 1.310+000 | -6.151-003 | 1.363+000 | 1.593-002 |
| 4.2+000 | 1.125+000 | -3.297-002 | 1.164+000 | -3.443-002 | 1.203+000 | -3.168-002 | 1.245+000 | -2.385-002 | 1.291+000 | -1.064-002 |
| 4.4+000 | 1.038+000 | -2.081-002 | 1.072+000 | -2.762-002 | 1.107+000 | -3.235-002 | 1.142+000 | -3.422-002 | 1.178+000 | -3.281-002 |
| 5.0+000 | 9.584-001 | -5.040-003 | 9.932-001 | -1.325-002 | 1.026+000 | -2.081-002 | 1.059+000 | -2.718-002 | 1.091+000 | -3.173-002 |
| 5.4+000 | 8.835-001 | 9.248-003 | 9.196-001 | 1.635-003 | 9.535-001 | -6.190-003 | 9.855-001 | -1.393-002 | 1.016+000 | -2.083-002 |
| 5.5+000 | 8.653-001 | 1.235-002 | 9.017-001 | 5.048-003 | 9.359-001 | -2.609-003 | 9.681-001 | -1.039-002 | 9.991-001 | -1.750-002 |
| 5.8+000 | 8.119-001 | 2.035-002 | 8.493-001 | 1.420-002 | 8.844-001 | 7.363-003 | 9.173-001 | -6.221-005 | 9.488-001 | -7.233-003 |
| 6.0+000 | 7.772-001 | 2.463-002 | 8.152-001 | 1.931-002 | 8.510-001 | 1.319-002 | 8.844-001 | 6.264-003 | 9.164-001 | -5.945-004 |
| 6.2+000 | 7.434-001 | 2.811-002 | 7.819-001 | 2.364-002 | 8.182-001 | 1.829-002 | 8.522-001 | 1.198-002 | 8.847-001 | 5.613-003 |
| 6.6+000 | 6.784-001 | 3.298-002 | 7.174-001 | 3.010-002 | 7.546-001 | 2.630-002 | 7.896-001 | 2.140-002 | 8.231-001 | 1.629-002 |
| 7.0+000 | 6.175-001 | 3.556-002 | 6.565-001 | 3.406-002 | 6.939-001 | 3.168-002 | 7.295-001 | 2.818-002 | 7.639-001 | 2.444-002 |
| 7.4+000 | 5.608-001 | 3.645-002 | 5.992-001 | 3.606-002 | 6.365-001 | 3.490-002 | 6.722-001 | 3.266-002 | 7.070-001 | 3.021-002 |
| 8.0+000 | 4.839-001 | 3.567-002 | 5.208-001 | 3.649-002 | 5.571-001 | 3.671-002 | 5.922-001 | 3.600-002 | 6.269-001 | 3.518-002 |
| 9.0+000 | 3.770-001 | 3.150-002 | 4.101-001 | 3.338-002 | 4.432-001 | 3.493-002 | 4.759-001 | 3.583-002 | 5.088-001 | 3.679-002 |
| 1.0+001 | 2.936-001 | 2.631-002 | 3.223-001 | 2.852-002 | 3.514-001 | 3.058-002 | 3.806-001 | 3.223-002 | 4.104-001 | 3.405-002 |
| 1.1+001 | 2.294-001 | 2.142-002 | 2.537-001 | 2.359-002 | 2.787-001 | 2.572-002 | 3.041-001 | 2.761-002 | 3.304-001 | 2.973-002 |
| 1.2+001 | 1.801-001 | 1.725-002 | 2.004-001 | 1.922-002 | 2.216-001 | 2.122-002 | 2.434-001 | 2.308-002 | 2.661-001 | 2.520-002 |
| 1.4+001 | 1.131-001 | 1.112-002 | 1.272-001 | 1.259-002 | 1.421-001 | 1.414-002 | 1.577-001 | 1.567-002 | 1.743-001 | 1.742-002 |
| 1.6+001 | 7.300-002 | 7.253-003 | 8.274-002 | 8.303-003 | 9.318-002 | 9.429-003 | 1.042-001 | 1.057-002 | 1.161-001 | 1.193-002 |
| 1.8+001 | 4.835-002 | 4.825-003 | 5.514-002 | 5.566-003 | 6.248-002 | 6.372-003 | 7.034-002 | 7.203-003 | 7.883-002 | 8.177-003 |
| 2.0+001 | 3.278-002 | 3.277-003 | 3.757-002 | 3.803-003 | 4.279-002 | 4.380-003 | 4.842-002 | 4.982-003 | 5.454-002 | 5.692-003 |
| 2.2+001 | 2.270-002 | 2.270-003 | 2.612-002 | 2.646-003 | 2.987-002 | 3.062-003 | 3.394-002 | 3.501-003 | 3.840-002 | 4.020-003 |
| 2.5+001 | 1.350-002 | 1.351-003 | 1.562-002 | 1.584-003 | 1.796-002 | 1.843-003 | 2.052-002 | 2.120-003 | 2.333-002 | 2.449-003 |
| 2.8+001 | 8.288-003 | 8.291-004 | 9.632-003 | 9.767-004 | 1.112-002 | 1.142-003 | 1.277-002 | 1.320-003 | 1.459-002 | 1.533-003 |
| 3.1+001 | 5.203-003 | 5.209-004 | 6.073-003 | 6.164-004 | 7.044-003 | 7.242-004 | 8.118-003 | 8.408-004 | 9.315-003 | 9.805-004 |
| 3.5+001 | 2.858-003 | 2.868-004 | 3.356-003 | 3.415-004 | 3.916-003 | 4.037-004 | 4.540-003 | 4.716-004 | 5.240-003 | 5.532-004 |
| 4.0+001 | 1.359-003 | 1.372-004 | 1.612-003 | 1.651-004 | 1.899-003 | 1.970-004 | 2.223-003 | 2.323-004 | 2.588-003 | 2.751-004 |
| 4.5+001 | 6.178-004 | 6.320-005 | 7.452-004 | 7.730-005 | 8.919-004 | 9.371-005 | 1.059-003 | 1.121-004 | 1.250-003 | 1.346-004 |
| 5.0+001 | 2.369-004 | 2.510-005 | 2.976-004 | 3.189-005 | 3.691-004 | 3.998-005 | 4.522-004 | 4.928-005 | 5.491-004 | 6.074-005 |
| 6.0+001 | -6.640-005 | -5.433-006 | -6.215-005 | -4.830-006 | -5.486-005 | -3.856-006 | -4.402-005 | -2.436-006 | -2.906-005 | -5.136-007 |
| 7.0+001 | -1.425-004 | -1.328-005 | -1.551-004 | -1.454-005 | -1.673-004 | -1.575-005 | -1.788-004 | -1.681-005 | -1.898-004 | -1.792-005 |
| 8.0+001 | -1.496-004 | -1.419-005 | -1.660-004 | -1.590-005 | -1.831-004 | -1.768-005 | -2.006-004 | -1.942-005 | -2.187-004 | -2.140-005 |
| 9.0+001 | -1.360-004 | -1.299-005 | -1.520-004 | -1.468-005 | -1.690-004 | -1.647-005 | -1.867-004 | -1.828-005 | -2.055-004 | -2.036-005 |
| 1.0+002 | -1.176-004 | -1.128-005 | -1.320-004 | -1.280-005 | -1.473-004 | -1.443-005 | -1.634-004 | -1.608-005 | -1.806-004 | -1.800-005 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, z)$ --Continued

| x | 31 Ga | 32 Ge | 33 As | 34 Se | 35 Br | | | | | |
|------------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|
| $\sin(\theta/2)$ | total | without K-shell |
| /lambda | | | | | | | | | | |
| .0 | 3.090+001 | 2.895+001 | 3.189+001 | 2.994+001 | 3.289+001 | 3.094+001 | 3.388+001 | 3.193+001 | 3.487+001 | 3.293+001 |
| 1.0-002 | 3.087+001 | 2.892+001 | 3.186+001 | 2.991+001 | 3.286+001 | 3.091+001 | 3.385+001 | 3.190+001 | 3.484+001 | 3.290+001 |
| 2.0-002 | 3.078+001 | 2.883+001 | 3.177+001 | 2.982+001 | 3.276+001 | 3.081+001 | 3.375+001 | 3.181+001 | 3.475+001 | 3.281+001 |
| 3.0-002 | 3.063+001 | 2.868+001 | 3.162+001 | 2.967+001 | 3.261+001 | 3.066+001 | 3.360+001 | 3.165+001 | 3.460+001 | 3.266+001 |
| 4.0-002 | 3.044+001 | 2.848+001 | 3.141+001 | 2.946+001 | 3.240+001 | 3.045+001 | 3.340+001 | 3.145+001 | 3.440+001 | 3.245+001 |
| 5.0-002 | 3.020+001 | 2.824+001 | 3.116+001 | 2.921+001 | 3.214+001 | 3.019+001 | 3.314+001 | 3.119+001 | 3.414+001 | 3.220+001 |
| 6.0-002 | 2.992+001 | 2.796+001 | 3.086+001 | 2.891+001 | 3.184+001 | 2.989+001 | 3.283+001 | 3.089+001 | 3.384+001 | 3.190+001 |
| 7.0-002 | 2.961+001 | 2.766+001 | 3.053+001 | 2.858+001 | 3.150+001 | 2.955+001 | 3.249+001 | 3.055+001 | 3.350+001 | 3.156+001 |
| 8.0-002 | 2.928+001 | 2.732+001 | 3.018+001 | 2.823+001 | 3.113+001 | 2.918+001 | 3.212+001 | 3.017+001 | 3.312+001 | 3.118+001 |
| 9.0-002 | 2.893+001 | 2.697+001 | 2.980+001 | 2.785+001 | 3.074+001 | 2.879+001 | 3.171+001 | 2.977+001 | 3.271+001 | 3.077+001 |
| 1.0-001 | 2.856+001 | 2.661+001 | 2.941+001 | 2.746+001 | 3.033+001 | 2.838+001 | 3.129+001 | 2.935+001 | 3.228+001 | 3.034+001 |
| 1.1-001 | 2.819+001 | 2.624+001 | 2.901+001 | 2.706+001 | 2.991+001 | 2.796+001 | 3.085+001 | 2.891+001 | 3.183+001 | 2.989+001 |
| 1.2-001 | 2.781+001 | 2.586+001 | 2.861+001 | 2.666+001 | 2.948+001 | 2.753+001 | 3.040+001 | 2.845+001 | 3.136+001 | 2.942+001 |
| 1.3-001 | 2.743+001 | 2.548+001 | 2.820+001 | 2.625+001 | 2.904+001 | 2.710+001 | 2.995+001 | 2.800+001 | 3.089+001 | 2.895+001 |
| 1.4-001 | 2.705+001 | 2.510+001 | 2.780+001 | 2.585+001 | 2.861+001 | 2.666+001 | 2.949+001 | 2.754+001 | 3.041+001 | 2.847+001 |
| 1.5-001 | 2.667+001 | 2.472+001 | 2.739+001 | 2.544+001 | 2.818+001 | 2.623+001 | 2.903+001 | 2.709+001 | 2.993+001 | 2.799+001 |
| 1.6-001 | 2.629+001 | 2.434+001 | 2.699+001 | 2.504+001 | 2.775+001 | 2.581+001 | 2.858+001 | 2.663+001 | 2.946+001 | 2.752+001 |
| 1.7-001 | 2.591+001 | 2.396+001 | 2.660+001 | 2.465+001 | 2.733+001 | 2.539+001 | 2.813+001 | 2.619+001 | 2.898+001 | 2.704+001 |
| 1.8-001 | 2.553+001 | 2.358+001 | 2.621+001 | 2.426+001 | 2.692+001 | 2.497+001 | 2.769+001 | 2.575+001 | 2.852+001 | 2.658+001 |
| 1.9-001 | 2.516+001 | 2.321+001 | 2.582+001 | 2.387+001 | 2.651+001 | 2.457+001 | 2.726+001 | 2.532+001 | 2.806+001 | 2.612+001 |
| 2.0-001 | 2.479+001 | 2.284+001 | 2.544+001 | 2.349+001 | 2.612+001 | 2.417+001 | 2.684+001 | 2.489+001 | 2.761+001 | 2.567+001 |
| 2.2-001 | 2.406+001 | 2.210+001 | 2.470+001 | 2.275+001 | 2.535+001 | 2.340+001 | 2.602+001 | 2.408+001 | 2.674+001 | 2.480+001 |
| 2.4-001 | 2.334+001 | 2.139+001 | 2.399+001 | 2.204+001 | 2.461+001 | 2.266+001 | 2.525+001 | 2.330+001 | 2.592+001 | 2.398+001 |
| 2.5-001 | 2.298+001 | 2.103+001 | 2.363+001 | 2.169+001 | 2.425+001 | 2.231+001 | 2.487+001 | 2.293+001 | 2.553+001 | 2.359+001 |
| 2.6-001 | 2.263+001 | 2.068+001 | 2.329+001 | 2.134+001 | 2.390+001 | 2.195+001 | 2.451+001 | 2.257+001 | 2.515+001 | 2.321+001 |
| 2.8-001 | 2.194+001 | 1.999+001 | 2.261+001 | 2.066+001 | 2.322+001 | 2.127+001 | 2.381+001 | 2.187+001 | 2.441+001 | 2.247+001 |
| 3.0-001 | 2.126+001 | 1.931+001 | 2.195+001 | 2.000+001 | 2.256+001 | 2.062+001 | 2.314+001 | 2.120+001 | 2.372+001 | 2.178+001 |
| 3.2-001 | 2.060+001 | 1.865+001 | 2.130+001 | 1.935+001 | 2.192+001 | 1.998+001 | 2.250+001 | 2.056+001 | 2.306+001 | 2.112+001 |
| 3.4-001 | 1.994+001 | 1.800+001 | 2.067+001 | 1.872+001 | 2.130+001 | 1.936+001 | 2.188+001 | 1.994+001 | 2.243+001 | 2.050+001 |
| 3.5-001 | 1.962+001 | 1.768+001 | 2.035+001 | 1.841+001 | 2.100+001 | 1.906+001 | 2.158+001 | 1.964+001 | 2.213+001 | 2.019+001 |
| 3.6-001 | 1.931+001 | 1.736+001 | 2.005+001 | 1.810+001 | 2.070+001 | 1.876+001 | 2.129+001 | 1.935+001 | 2.183+001 | 1.990+001 |
| 3.8-001 | 1.868+001 | 1.673+001 | 1.944+001 | 1.749+001 | 2.011+001 | 1.816+001 | 2.071+001 | 1.877+001 | 2.126+001 | 1.932+001 |
| 4.0-001 | 1.807+001 | 1.612+001 | 1.884+001 | 1.690+001 | 1.953+001 | 1.759+001 | 2.014+001 | 1.820+001 | 2.070+001 | 1.876+001 |
| 4.2-001 | 1.747+001 | 1.553+001 | 1.826+001 | 1.631+001 | 1.896+001 | 1.702+001 | 1.959+001 | 1.765+001 | 2.016+001 | 1.822+001 |
| 4.4-001 | 1.689+001 | 1.495+001 | 1.769+001 | 1.574+001 | 1.840+001 | 1.647+001 | 1.905+001 | 1.711+001 | 1.963+001 | 1.770+001 |
| 4.5-001 | 1.661+001 | 1.467+001 | 1.740+001 | 1.546+001 | 1.813+001 | 1.619+001 | 1.878+001 | 1.685+001 | 1.937+001 | 1.744+001 |
| 4.6-001 | 1.633+001 | 1.439+001 | 1.713+001 | 1.519+001 | 1.786+001 | 1.592+001 | 1.852+001 | 1.658+001 | 1.912+001 | 1.718+001 |
| 4.8-001 | 1.578+001 | 1.384+001 | 1.658+001 | 1.464+001 | 1.733+001 | 1.539+001 | 1.800+001 | 1.607+001 | 1.861+001 | 1.668+001 |
| 5.0-001 | 1.525+001 | 1.331+001 | 1.605+001 | 1.411+001 | 1.680+001 | 1.487+001 | 1.749+001 | 1.556+001 | 1.812+001 | 1.618+001 |
| 5.5-001 | 1.401+001 | 1.207+001 | 1.480+001 | 1.286+001 | 1.555+001 | 1.362+001 | 1.626+001 | 1.433+001 | 1.692+001 | 1.499+001 |
| 6.0-001 | 1.289+001 | 1.095+001 | 1.364+001 | 1.170+001 | 1.438+001 | 1.245+001 | 1.510+001 | 1.317+001 | 1.578+001 | 1.385+001 |
| 6.5-001 | 1.189+001 | 9.955+000 | 1.259+001 | 1.066+001 | 1.331+001 | 1.138+001 | 1.401+001 | 1.208+001 | 1.470+001 | 1.277+001 |
| 7.0-001 | 1.100+001 | 9.071+000 | 1.165+001 | 9.721+000 | 1.232+001 | 1.040+001 | 1.301+001 | 1.108+001 | 1.368+001 | 1.176+001 |
| 8.0-001 | 9.549+000 | 7.625+000 | 1.008+001 | 8.156+000 | 1.065+001 | 8.728+000 | 1.125+001 | 9.331+000 | 1.187+001 | 9.953+000 |
| 9.0-001 | 8.458+000 | 6.542+000 | 8.874+000 | 6.958+000 | 9.334+000 | 7.419+000 | 9.835+000 | 7.921+000 | 1.037+001 | 8.457+000 |
| 1.0+000 | 7.646+000 | 5.739+000 | 7.966+000 | 6.058+000 | 8.325+000 | 6.418+000 | 8.726+000 | 6.819+000 | 9.165+000 | 7.260+000 |
| 1.1+000 | 7.036+000 | 5.138+000 | 7.282+000 | 5.383+000 | 7.559+000 | 5.660+000 | 7.872+000 | 5.973+000 | 8.222+000 | 6.324+000 |
| 1.2+000 | 6.562+000 | 4.674+000 | 6.757+000 | 4.868+000 | 6.973+000 | 5.084+000 | 7.217+000 | 5.327+000 | 7.492+000 | 5.601+000 |
| 1.3+000 | 6.176+000 | 4.299+000 | 6.340+000 | 4.461+000 | 6.515+000 | 4.635+000 | 6.709+000 | 4.828+000 | 6.925+000 | 5.044+000 |
| 1.4+000 | 5.842+000 | 3.978+000 | 5.991+000 | 4.123+000 | 6.143+000 | 4.274+000 | 6.304+000 | 4.433+000 | 6.479+000 | 4.607+000 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, z)$ —Continued

| x | 31 Ga | | | 32 Ge | | | 33 As | | | 34 Se | | | 35 Br | | |
|----------------------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|-------|-----------------|-------|-----------------|-------|
| $\sin(\theta/2) / \lambda$ | total | without K-shell | total | without K-shell | total | without K-shell | total |
| 1.5+000 | 5.539+000 | 3.667+000 | 5.684+000 | 3.828+000 | 5.825+000 | 3.967+000 | 5.968+000 | 4.107+000 | 6.117+000 | 4.254+000 | | | | | |
| 1.6+000 | 5.252+000 | 3.414+000 | 5.400+000 | 3.557+000 | 5.540+000 | 3.693+000 | 5.675+000 | 3.826+000 | 5.810+000 | 3.958+000 | | | | | |
| 1.7+000 | 4.974+000 | 3.150+000 | 5.129+000 | 3.299+000 | 5.273+000 | 3.439+000 | 5.409+000 | 3.571+000 | 5.539+000 | 3.698+000 | | | | | |
| 1.8+000 | 4.702+000 | 2.892+000 | 4.865+000 | 3.050+000 | 5.017+000 | 3.196+000 | 5.157+000 | 3.332+000 | 5.289+000 | 3.460+000 | | | | | |
| 1.9+000 | 4.435+000 | 2.640+000 | 4.607+000 | 2.806+000 | 4.767+000 | 2.959+000 | 4.914+000 | 3.102+000 | 5.052+000 | 3.235+000 | | | | | |
| 2.0+000 | 4.174+000 | 2.395+000 | 4.353+000 | 2.567+000 | 4.521+000 | 2.728+000 | 4.677+000 | 2.878+000 | 4.821+000 | 3.017+000 | | | | | |
| 2.2+000 | 3.673+000 | 1.933+000 | 3.865+000 | 2.111+000 | 4.044+000 | 2.281+000 | 4.214+000 | 2.443+000 | 4.372+000 | 2.595+000 | | | | | |
| 2.4+000 | 3.227+000 | 1.518+000 | 3.413+000 | 1.693+000 | 3.595+000 | 1.865+000 | 3.771+000 | 2.031+000 | 3.940+000 | 2.192+000 | | | | | |
| 2.5+000 | 3.023+000 | 1.332+000 | 3.205+000 | 1.502+000 | 3.385+000 | 1.671+000 | 3.561+000 | 1.837+000 | 3.731+000 | 1.998+000 | | | | | |
| 2.6+000 | 2.832+000 | 1.161+000 | 3.009+000 | 1.324+000 | 3.185+000 | 1.488+000 | 3.360+000 | 1.652+000 | 3.530+000 | 1.813+000 | | | | | |
| 2.8+000 | 2.495+000 | 8.626-001 | 2.656+000 | 1.009+000 | 2.821+000 | 1.160+000 | 2.987+000 | 1.314+000 | 3.154+000 | 1.468+000 | | | | | |
| 3.0+000 | 2.213+000 | 6.215-001 | 2.356+000 | 7.477-001 | 2.506+000 | 8.813-001 | 2.659+000 | 1.021+000 | 2.816+000 | 1.164+000 | | | | | |
| 3.3+000 | 1.883+000 | 3.544-001 | 1.998+000 | 4.498-001 | 2.121+000 | 5.546-001 | 2.251+000 | 6.677-001 | 2.387+000 | 7.879-001 | | | | | |
| 3.5+000 | 1.714+000 | 2.288-001 | 1.812+000 | 3.050-001 | 1.918+000 | 3.909-001 | 2.032+000 | 4.859-001 | 2.152+000 | 5.891-001 | | | | | |
| 3.6+000 | 1.642+000 | 1.789-001 | 1.732+000 | 2.463-001 | 1.830+000 | 3.232-001 | 1.936+000 | 4.054-001 | 2.049+000 | 5.041-001 | | | | | |
| 3.9+000 | 1.466+000 | 7.057-002 | 1.538+000 | 1.149-001 | 1.614+000 | 1.679-001 | 1.698+000 | 2.297-001 | 1.788+000 | 3.001-001 | | | | | |
| 4.0+000 | 1.421+000 | 4.572-002 | 1.485+000 | 8.351-002 | 1.555+000 | 1.296-001 | 1.632+000 | 1.842-001 | 1.716+000 | 2.472-001 | | | | | |
| 4.2+000 | 1.340+000 | 8.955-003 | 1.394+000 | 3.547-002 | 1.454+000 | 6.933-002 | 1.519+000 | 1.109-001 | 1.591+000 | 1.603-001 | | | | | |
| 4.6+000 | 1.216+000 | -2.731-002 | 1.256+000 | -1.707-002 | 1.300+000 | -1.545-003 | 1.348+000 | 1.963-002 | 1.401+000 | 4.750-002 | | | | | |
| 5.0+000 | 1.123+000 | -3.405-002 | 1.156+000 | -3.348-002 | 1.191+000 | -2.946-002 | 1.227+000 | -2.142-002 | 1.267+000 | -8.825-003 | | | | | |
| 5.4+000 | 1.046+000 | -2.682-002 | 1.076+000 | -3.132-002 | 1.106+000 | -3.385-002 | 1.136+000 | -3.388-002 | 1.168+000 | -3.090-002 | | | | | |
| 5.5+000 | 1.029+000 | -2.396-002 | 1.058+000 | -2.922-002 | 1.087+000 | -3.280-002 | 1.117+000 | -3.422-002 | 1.147+000 | -3.296-002 | | | | | |
| 5.8+000 | 9.786-001 | -1.437-002 | 1.007+000 | -2.099-002 | 1.035+000 | -2.672-002 | 1.063+000 | -3.111-002 | 1.090+000 | -3.373-002 | | | | | |
| 6.0+000 | 9.465-001 | -7.718-003 | 9.752-001 | -1.468-002 | 1.003+000 | -2.115-002 | 1.030+000 | -2.675-002 | 1.056+000 | -3.106-002 | | | | | |
| 6.2+000 | 9.153-001 | -1.252-003 | 9.442-001 | -8.235-003 | 9.718-001 | -1.505-002 | 9.984-001 | -2.136-002 | 1.024+000 | -2.682-002 | | | | | |
| 6.6+000 | 8.547-001 | 1.040-002 | 8.845-001 | 4.022-003 | 9.127-001 | -2.647-003 | 9.395-001 | -9.369-003 | 9.652-001 | -1.588-002 | | | | | |
| 7.0+000 | 7.964-001 | 1.980-002 | 8.271-001 | 1.448-002 | 8.562-001 | 8.609-003 | 8.837-001 | 2.341-003 | 9.098-001 | -4.133-003 | | | | | |
| 7.4+000 | 7.402-001 | 2.685-002 | 7.717-001 | 2.274-002 | 8.016-001 | 1.795-002 | 8.300-001 | 1.257-002 | 8.568-001 | 6.738-003 | | | | | |
| 8.0+000 | 6.603-001 | 3.353-002 | 6.925-001 | 3.115-002 | 7.233-001 | 2.807-002 | 7.527-001 | 2.430-002 | 7.807-001 | 1.991-002 | | | | | |
| 9.0+000 | 5.416-001 | 3.716-002 | 5.726-001 | 3.699-002 | 6.034-001 | 3.625-002 | 6.333-001 | 3.491-002 | 6.622-001 | 3.297-002 | | | | | |
| 1.0+001 | 4.401-001 | 3.550-002 | 4.697-001 | 3.662-002 | 4.990-001 | 3.736-002 | 5.279-001 | 3.768-002 | 5.562-001 | 3.754-002 | | | | | |
| 1.1+001 | 3.569-001 | 3.165-002 | 3.837-001 | 3.339-002 | 4.106-001 | 3.491-002 | 4.374-001 | 3.617-002 | 4.641-001 | 3.713-002 | | | | | |
| 1.2+001 | 2.894-001 | 2.722-002 | 3.131-001 | 2.917-002 | 3.371-001 | 3.102-002 | 3.614-001 | 3.273-002 | 3.858-001 | 3.427-002 | | | | | |
| 1.4+001 | 1.915-001 | 1.920-002 | 2.093-001 | 2.100-002 | 2.277-001 | 2.283-002 | 2.467-001 | 2.466-002 | 2.661-001 | 2.646-002 | | | | | |
| 1.6+001 | 1.286-001 | 1.328-002 | 1.417-001 | 1.472-002 | 1.554-001 | 1.422-002 | 1.697-001 | 1.778-002 | 1.845-001 | 1.937-002 | | | | | |
| 1.8+001 | 8.786-002 | 9.205-003 | 9.744-002 | 1.030-002 | 1.076-001 | 1.146-002 | 1.182-001 | 1.249-002 | 1.294-001 | 1.397-002 | | | | | |
| 2.0+001 | 6.110-002 | 6.450-003 | 6.812-002 | 7.268-003 | 7.560-002 | 8.145-003 | 8.353-002 | 9.081-003 | 9.192-002 | 1.007-002 | | | | | |
| 2.2+001 | 4.320-002 | 4.579-003 | 4.838-002 | 5.187-003 | 5.392-002 | 5.846-003 | 5.985-002 | 6.555-003 | 6.615-002 | 7.314-003 | | | | | |
| 2.5+001 | 2.640-002 | 2.807-003 | 2.972-002 | 3.200-003 | 3.331-002 | 3.629-003 | 3.717-002 | 4.097-003 | 4.132-002 | 4.603-003 | | | | | |
| 2.8+001 | 1.658-002 | 1.766-003 | 1.875-002 | 2.023-003 | 2.111-002 | 2.307-003 | 2.367-002 | 2.618-003 | 2.644-002 | 2.958-003 | | | | | |
| 3.1+001 | 1.063-002 | 1.135-003 | 1.208-002 | 1.306-003 | 1.366-002 | 1.496-003 | 1.538-002 | 1.706-003 | 1.725-002 | 1.936-003 | | | | | |
| 3.5+001 | 6.016-003 | 6.441-004 | 6.873-003 | 7.458-004 | 7.816-003 | 8.594-004 | 8.851-003 | 9.856-004 | 9.981-003 | 1.125-003 | | | | | |
| 4.0+001 | 2.997-003 | 3.230-004 | 3.453-003 | 3.772-004 | 3.958-003 | 4.183-004 | 4.518-003 | 5.068-004 | 5.134-003 | 5.832-004 | | | | | |
| 4.5+001 | 1.467-003 | 1.601-004 | 1.710-003 | 1.892-004 | 1.984-003 | 2.224-004 | 2.289-003 | 2.599-004 | 2.629-003 | 3.022-004 | | | | | |
| 5.0+001 | 6.607-004 | 7.402-005 | 7.883-004 | 8.943-005 | 9.336-004 | 1.072-004 | 1.098-003 | 1.276-004 | 1.283-003 | 1.510-004 | | | | | |
| 6.0+001 | -9.339-006 | 2.024-006 | 1.580-005 | 5.273-006 | 4.707-005 | 9.343-006 | 8.522-005 | 1.435-005 | 1.311-004 | 2.041-005 | | | | | |
| 7.0+001 | -1.995-004 | -1.887-005 | -2.079-004 | -1.964-005 | -2.146-004 | -2.018-005 | -2.191-004 | -2.043-005 | -2.210-004 | -2.034-005 | | | | | |
| 8.0+001 | -2.370-004 | -2.339-005 | -2.555-004 | -2.540-005 | -2.739-004 | -2.740-005 | -2.920-004 | -2.938-005 | -3.098-004 | -3.131-005 | | | | | |
| 9.0+001 | -2.249-004 | -2.251-005 | -2.450-004 | -2.475-005 | -2.658-004 | -2.708-005 | -2.870-004 | -2.949-005 | -3.086-004 | -3.195-005 | | | | | |
| 1.0+002 | -1.986-004 | -2.001-005 | -2.174-004 | -2.214-005 | -2.371-004 | -2.438-005 | -2.575-004 | -2.672-005 | -2.785-004 | -2.917-005 | | | | | |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, z)$ --Continued

| x | 36 Kr | 37 Rb | 38 Sr | 39 Y | 40 Zr | | | | | |
|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------|-----------|-----------|-----------|-----------|
| sin(theta/2) /lambda | total without K-shell | | | | | |
| .0 | 3.586+001 | 3.392+001 | 3.685+001 | 3.491+001 | 3.784+001 | 3.591+001 | 3.883+001 | 3.690+001 | 3.982+001 | 3.789+001 |
| 1.0-002 | 3.583+001 | 3.389+001 | 3.680+001 | 3.487+001 | 3.778+001 | 3.586+001 | 3.878+001 | 3.685+001 | 3.977+001 | 3.784+001 |
| 2.0-002 | 3.574+001 | 3.380+001 | 3.666+001 | 3.473+001 | 3.763+001 | 3.570+001 | 3.862+001 | 3.670+001 | 3.962+001 | 3.770+001 |
| 3.0-002 | 3.560+001 | 3.366+001 | 3.644+001 | 3.451+001 | 3.739+001 | 3.545+001 | 3.838+001 | 3.645+001 | 3.938+001 | 3.746+001 |
| 4.0-002 | 3.540+001 | 3.346+001 | 3.616+001 | 3.422+001 | 3.706+001 | 3.513+001 | 3.805+001 | 3.612+001 | 3.906+001 | 3.714+001 |
| 5.0-002 | 3.515+001 | 3.321+001 | 3.582+001 | 3.388+001 | 3.667+001 | 3.474+001 | 3.766+001 | 3.573+001 | 3.868+001 | 3.675+001 |
| 6.0-002 | 3.485+001 | 3.291+001 | 3.544+001 | 3.351+001 | 3.624+001 | 3.431+001 | 3.721+001 | 3.529+001 | 3.823+001 | 3.631+001 |
| 7.0-002 | 3.451+001 | 3.257+001 | 3.504+001 | 3.311+001 | 3.578+001 | 3.385+001 | 3.674+001 | 3.481+001 | 3.775+001 | 3.583+001 |
| 8.0-002 | 3.413+001 | 3.219+001 | 3.463+001 | 3.269+001 | 3.531+001 | 3.337+001 | 3.623+001 | 3.431+001 | 3.724+001 | 3.532+001 |
| 9.0-002 | 3.372+001 | 3.178+001 | 3.420+001 | 3.226+001 | 3.482+001 | 3.289+001 | 3.572+001 | 3.379+001 | 3.671+001 | 3.479+001 |
| 1.0-001 | 3.329+001 | 3.135+001 | 3.376+001 | 3.183+001 | 3.434+001 | 3.241+001 | 3.521+001 | 3.328+001 | 3.618+001 | 3.425+001 |
| 1.1-001 | 3.283+001 | 3.089+001 | 3.332+001 | 3.139+001 | 3.386+001 | 3.193+001 | 3.470+001 | 3.277+001 | 3.564+001 | 3.372+001 |
| 1.2-001 | 3.235+001 | 3.042+001 | 3.288+001 | 3.094+001 | 3.339+001 | 3.146+001 | 3.419+001 | 3.225+001 | 3.511+001 | 3.316+001 |
| 1.3-001 | 3.187+001 | 2.993+001 | 3.243+001 | 3.049+001 | 3.293+001 | 3.100+001 | 3.369+001 | 3.176+001 | 3.458+001 | 3.266+001 |
| 1.4-001 | 3.138+001 | 2.944+001 | 3.197+001 | 3.004+001 | 3.247+001 | 3.054+001 | 3.320+001 | 3.128+001 | 3.406+001 | 3.214+001 |
| 1.5-001 | 3.088+001 | 2.894+001 | 3.151+001 | 2.958+001 | 3.202+001 | 3.008+001 | 3.272+001 | 3.080+001 | 3.356+001 | 3.163+001 |
| 1.6-001 | 3.038+001 | 2.844+001 | 3.105+001 | 2.912+001 | 3.157+001 | 2.964+001 | 3.225+001 | 3.032+001 | 3.306+001 | 3.113+001 |
| 1.7-001 | 2.988+001 | 2.795+001 | 3.059+001 | 2.865+001 | 3.112+001 | 2.919+001 | 3.179+001 | 2.986+001 | 3.257+001 | 3.064+001 |
| 1.8-001 | 2.939+001 | 2.746+001 | 3.012+001 | 2.819+001 | 3.068+001 | 2.875+001 | 3.133+001 | 2.940+001 | 3.209+001 | 3.016+001 |
| 1.9-001 | 2.891+001 | 2.697+001 | 2.966+001 | 2.772+001 | 3.024+001 | 2.831+001 | 3.088+001 | 2.895+001 | 3.161+001 | 2.965+001 |
| 2.0-001 | 2.844+001 | 2.650+001 | 2.920+001 | 2.726+001 | 2.980+001 | 2.787+001 | 3.044+001 | 2.851+001 | 3.115+001 | 2.923+001 |
| 2.2-001 | 2.752+001 | 2.558+001 | 2.829+001 | 2.636+001 | 2.894+001 | 2.701+001 | 2.957+001 | 2.764+001 | 3.024+001 | 2.832+001 |
| 2.4-001 | 2.664+001 | 2.471+001 | 2.741+001 | 2.548+001 | 2.809+001 | 2.616+001 | 2.872+001 | 2.679+001 | 2.937+001 | 2.744+001 |
| 2.5-001 | 2.623+001 | 2.429+001 | 2.699+001 | 2.505+001 | 2.768+001 | 2.575+001 | 2.830+001 | 2.637+001 | 2.894+001 | 2.702+001 |
| 2.6-001 | 2.582+001 | 2.388+001 | 2.657+001 | 2.464+001 | 2.727+001 | 2.534+001 | 2.789+001 | 2.596+001 | 2.852+001 | 2.666+001 |
| 2.8-001 | 2.504+001 | 2.311+001 | 2.576+001 | 2.383+001 | 2.647+001 | 2.454+001 | 2.709+001 | 2.516+001 | 2.770+001 | 2.576+001 |
| 3.0-001 | 2.431+001 | 2.238+001 | 2.500+001 | 2.307+001 | 2.570+001 | 2.377+001 | 2.631+001 | 2.439+001 | 2.691+001 | 2.495+001 |
| 3.2-001 | 2.363+001 | 2.169+001 | 2.428+001 | 2.235+001 | 2.497+001 | 2.304+001 | 2.557+001 | 2.365+001 | 2.616+001 | 2.423+001 |
| 3.4-001 | 2.298+001 | 2.105+001 | 2.360+001 | 2.167+001 | 2.426+001 | 2.233+001 | 2.486+001 | 2.293+001 | 2.543+001 | 2.351+001 |
| 3.5-001 | 2.267+001 | 2.073+001 | 2.327+001 | 2.134+001 | 2.392+001 | 2.200+001 | 2.451+001 | 2.259+001 | 2.508+001 | 2.316+001 |
| 3.6-001 | 2.237+001 | 2.043+001 | 2.296+001 | 2.103+001 | 2.359+001 | 2.167+001 | 2.418+001 | 2.225+001 | 2.474+001 | 2.282+001 |
| 3.8-001 | 2.178+001 | 1.985+001 | 2.235+001 | 2.042+001 | 2.296+001 | 2.103+001 | 2.353+001 | 2.160+001 | 2.407+001 | 2.215+001 |
| 4.0-001 | 2.122+001 | 1.929+001 | 2.177+001 | 1.984+001 | 2.235+001 | 2.043+001 | 2.291+001 | 2.099+001 | 2.344+001 | 2.152+001 |
| 4.2-001 | 2.068+001 | 1.875+001 | 2.122+001 | 1.929+001 | 2.178+001 | 1.985+001 | 2.232+001 | 2.040+001 | 2.284+001 | 2.092+001 |
| 4.4-001 | 2.016+001 | 1.823+001 | 2.069+001 | 1.876+001 | 2.123+001 | 1.930+001 | 2.176+001 | 1.984+001 | 2.227+001 | 2.035+001 |
| 4.5-001 | 1.991+001 | 1.797+001 | 2.043+001 | 1.850+001 | 2.097+001 | 1.904+001 | 2.149+001 | 1.957+001 | 2.200+001 | 2.008+001 |
| 4.6-001 | 1.966+001 | 1.772+001 | 2.018+001 | 1.825+001 | 2.071+001 | 1.878+001 | 2.123+001 | 1.930+001 | 2.173+001 | 1.981+001 |
| 4.8-001 | 1.916+001 | 1.723+001 | 1.968+001 | 1.776+001 | 2.020+001 | 1.828+001 | 2.072+001 | 1.879+001 | 2.121+001 | 1.929+001 |
| 5.0-001 | 1.868+001 | 1.675+001 | 1.921+001 | 1.728+001 | 1.972+001 | 1.779+001 | 2.022+001 | 1.830+001 | 2.071+001 | 1.875+001 |
| 5.5-001 | 1.752+001 | 1.559+001 | 1.806+001 | 1.614+001 | 1.857+001 | 1.665+001 | 1.908+001 | 1.716+001 | 1.956+001 | 1.764+001 |
| 6.0-001 | 1.641+001 | 1.448+001 | 1.698+001 | 1.505+001 | 1.750+001 | 1.558+001 | 1.801+001 | 1.609+001 | 1.850+001 | 1.658+001 |
| 6.5-001 | 1.534+001 | 1.342+001 | 1.594+001 | 1.402+001 | 1.648+001 | 1.456+001 | 1.701+001 | 1.509+001 | 1.750+001 | 1.559+001 |
| 7.0-001 | 1.433+001 | 1.241+001 | 1.494+001 | 1.302+001 | 1.551+001 | 1.359+001 | 1.605+001 | 1.414+001 | 1.656+001 | 1.465+001 |
| 8.0-001 | 1.250+001 | 1.058+001 | 1.311+001 | 1.119+001 | 1.369+001 | 1.178+001 | 1.426+001 | 1.235+001 | 1.480+001 | 1.289+001 |
| 9.0-001 | 1.093+001 | 9.019+000 | 1.150+001 | 9.591+000 | 1.207+001 | 1.016+001 | 1.263+001 | 1.073+001 | 1.318+001 | 1.128+001 |
| 1.0+000 | 9.640+000 | 7.736+000 | 1.014+001 | 8.239+000 | 1.066+001 | 8.760+000 | 1.119+001 | 9.289+000 | 1.172+001 | 9.819+000 |
| 1.1+000 | 8.609+000 | 6.712+000 | 9.031+000 | 7.134+000 | 9.481+000 | 7.586+000 | 9.952+000 | 8.053+000 | 1.044+001 | 8.545+000 |
| 1.2+000 | 7.799+000 | 5.910+000 | 8.142+000 | 6.253+000 | 8.518+000 | 6.629+000 | 8.921+000 | 7.033+000 | 9.347+000 | 7.461+000 |
| 1.3+000 | 7.168+000 | 5.286+000 | 7.441+000 | 5.560+000 | 7.746+000 | 5.865+000 | 8.080+000 | 6.200+000 | 8.443+000 | 6.563+000 |
| 1.4+000 | 6.673+000 | 4.800+000 | 6.890+000 | 5.017+000 | 7.134+000 | 5.261+000 | 7.406+000 | 5.533+000 | 7.706+000 | 5.833+000 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, z)$ --Continued

| x | ^{36}Kr | | ^{37}Rb | | ^{38}Sr | | ^{39}Y | | ^{40}Zr | |
|--------------------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|-----------------|-----------------|------------------|-----------------|
| $\sin(\theta/2)/\lambda$ | total | without K-shell | total | without K-shell | total | without K-shell | total | without K-shell | total | without K-shell |
| 1.5+000 | 6.277+000 | 4.413+000 | 6.452+000 | 4.588+000 | 6.648+000 | 4.784+000 | 6.868+000 | 5.003+000 | 7.112+000 | 5.247+000 |
| 1.6+000 | 5.949+000 | 4.096+000 | 6.097+000 | 4.242+000 | 6.258+000 | 4.402+000 | 6.436+000 | 4.580+000 | 6.635+000 | 4.778+000 |
| 1.7+000 | 5.668+000 | 3.825+000 | 5.799+000 | 3.954+000 | 5.936+000 | 4.090+000 | 6.085+000 | 4.237+000 | 6.248+000 | 4.400+000 |
| 1.8+000 | 5.415+000 | 3.583+000 | 5.538+000 | 3.704+000 | 5.662+000 | 3.826+000 | 5.791+000 | 3.953+000 | 5.930+000 | 4.091+000 |
| 1.9+000 | 5.180+000 | 3.360+000 | 5.301+000 | 3.478+000 | 5.420+000 | 3.594+000 | 5.538+000 | 3.710+000 | 5.660+000 | 3.830+000 |
| 2.0+000 | 4.955+000 | 3.147+000 | 5.079+000 | 3.267+000 | 5.197+000 | 3.382+000 | 5.311+000 | 3.493+000 | 5.424+000 | 3.604+000 |
| 2.2+000 | 4.520+000 | 2.738+000 | 4.657+000 | 2.869+000 | 4.783+000 | 2.991+000 | 4.900+000 | 3.105+000 | 5.011+000 | 3.212+000 |
| 2.4+000 | 4.099+000 | 2.344+000 | 4.248+000 | 2.487+000 | 4.388+000 | 2.621+000 | 4.516+000 | 2.744+000 | 4.634+000 | 2.858+000 |
| 2.5+000 | 3.895+000 | 2.154+000 | 4.049+000 | 2.301+000 | 4.194+000 | 2.440+000 | 4.328+000 | 2.568+000 | 4.452+000 | 2.687+000 |
| 2.6+000 | 3.696+000 | 1.969+000 | 3.853+000 | 2.119+000 | 4.003+000 | 2.262+000 | 4.142+000 | 2.395+000 | 4.271+000 | 2.519+000 |
| 2.8+000 | 3.318+000 | 1.622+000 | 3.478+000 | 1.773+000 | 3.633+000 | 1.920+000 | 3.779+000 | 2.059+000 | 3.917+000 | 2.190+000 |
| 3.0+000 | 2.973+000 | 1.310+000 | 3.130+000 | 1.456+000 | 3.284+000 | 1.600+000 | 3.433+000 | 1.740+000 | 3.576+000 | 1.875+000 |
| 3.3+000 | 2.527+000 | 9.141-001 | 2.670+000 | 1.044+000 | 2.815+000 | 1.177+000 | 2.958+000 | 1.310+000 | 3.099+000 | 1.441+000 |
| 3.5+000 | 2.278+000 | 6.996-001 | 2.409+000 | 8.159-001 | 2.543+000 | 9.369-001 | 2.678+000 | 1.060+000 | 2.813+000 | 1.184+000 |
| 3.6+000 | 2.167+000 | 6.066-001 | 2.291+000 | 7.154-001 | 2.419+000 | 8.297-001 | 2.549+000 | 9.473-001 | 2.681+000 | 1.067+000 |
| 3.9+000 | 1.886+000 | 3.769-001 | 1.989+000 | 4.651-001 | 2.098+000 | 5.582-001 | 2.211+000 | 6.567-001 | 2.327+000 | 7.598-001 |
| 4.0+000 | 1.807+000 | 3.165-001 | 1.903+000 | 3.974-001 | 2.006+000 | 4.834-001 | 2.113+000 | 5.752-001 | 2.224+000 | 6.722-001 |
| 4.2+000 | 1.669+000 | 2.177-001 | 1.753+000 | 2.826-001 | 1.843+000 | 3.549-001 | 1.938+000 | 4.335-001 | 2.038+000 | 5.180-001 |
| 4.6+000 | 1.458+000 | 8.180-002 | 1.521+000 | 1.228-001 | 1.589+000 | 1.705-001 | 1.662+000 | 2.247-001 | 1.740+000 | 2.852-001 |
| 5.0+000 | 1.310+000 | 8.803-003 | 1.357+000 | 3.174-002 | 1.408+000 | 6.029-002 | 1.463+000 | 9.457-002 | 1.523+000 | 1.346-001 |
| 5.4+000 | 1.202+000 | -2.441-002 | 1.238+000 | -1.402-002 | 1.277+000 | 6.407-004 | 1.319+000 | 1.990-002 | 1.365+000 | 4.397-002 |
| 5.5+000 | 1.179+000 | -2.854-002 | 1.214+000 | -2.055-002 | 1.250+000 | -8.618-003 | 1.290+000 | 7.617-003 | 1.333+000 | 2.839-002 |
| 5.8+000 | 1.119+000 | -3.412-002 | 1.148+000 | -3.186-002 | 1.180+000 | -2.657-002 | 1.213+000 | -1.788-002 | 1.248+000 | -5.468-003 |
| 6.0+000 | 1.083+000 | -3.369-002 | 1.111+000 | -3.419-002 | 1.139+000 | -3.222-002 | 1.169+000 | -2.740-002 | 1.201+000 | -1.940-002 |
| 6.2+000 | 1.050+000 | -3.105-002 | 1.076+000 | -3.362-002 | 1.103+000 | -3.423-002 | 1.131+000 | -3.249-002 | 1.160+000 | -2.808-002 |
| 6.6+000 | 9.901-001 | -2.188-002 | 1.015+000 | -2.699-002 | 1.039+000 | -3.096-002 | 1.063+000 | -3.346-002 | 1.089+000 | -3.419-002 |
| 7.0+000 | 9.348-001 | -1.060-002 | 9.589-001 | -1.672-002 | 9.824-001 | -2.230-002 | 1.005+000 | -2.711-002 | 1.028+000 | -3.085-002 |
| 7.4+000 | 8.824-001 | 5.939-004 | 9.068-001 | -5.577-003 | 9.303-001 | -1.164-002 | 9.530-001 | -1.743-002 | 9.751-001 | -2.270-002 |
| 8.0+000 | 8.073-001 | 1.497-002 | 8.327-001 | 9.681-003 | 8.569-001 | 4.122-003 | 8.801-001 | -1.655-003 | 9.023-001 | -7.454-003 |
| 9.0+000 | 6.900-001 | 3.042-002 | 7.169-001 | 2.739-002 | 7.426-001 | 2.388-002 | 7.672-001 | 1.983-002 | 7.907-001 | 1.535-002 |
| 1.0+001 | 5.839-001 | 3.691-002 | 6.110-001 | 3.588-002 | 6.373-001 | 3.440-002 | 6.627-001 | 3.237-002 | 6.872-001 | 2.984-002 |
| 1.1+001 | 4.905-001 | 3.775-002 | 5.167-001 | 3.810-002 | 5.425-001 | 3.811-002 | 5.677-001 | 3.767-002 | 5.923-001 | 3.680-002 |
| 1.2+001 | 4.103-001 | 3.559-002 | 4.348-001 | 3.676-002 | 4.592-001 | 3.770-002 | 4.834-001 | 3.832-002 | 5.072-001 | 3.862-002 |
| 1.4+001 | 2.859-001 | 2.822-002 | 3.060-001 | 2.997-002 | 3.265-001 | 3.167-002 | 3.471-001 | 3.522-002 | 3.679-001 | 3.465-002 |
| 1.6+001 | 1.999-001 | 2.099-002 | 2.157-001 | 2.266-002 | 2.320-001 | 2.436-002 | 2.487-001 | 2.603-002 | 2.657-001 | 2.767-002 |
| 1.8+001 | 1.411-001 | 1.530-002 | 1.533-001 | 1.670-002 | 1.659-001 | 1.816-002 | 1.790-001 | 1.964-002 | 1.925-001 | 2.115-002 |
| 2.0+001 | 1.007-001 | 1.112-002 | 1.100-001 | 1.224-002 | 1.198-001 | 1.342-002 | 1.299-001 | 1.464-002 | 1.405-001 | 1.590-002 |
| 2.2+001 | 7.283-002 | 8.124-003 | 7.990-002 | 8.997-003 | 8.737-002 | 9.930-003 | 9.520-002 | 1.090-002 | 1.034-001 | 1.192-002 |
| 2.5+001 | 4.575-002 | 5.148-003 | 5.047-002 | 5.742-003 | 5.550-002 | 6.384-003 | 6.082-002 | 7.063-003 | 6.644-002 | 7.784-003 |
| 2.8+001 | 2.941-002 | 3.327-003 | 3.260-002 | 3.731-003 | 3.602-002 | 4.172-003 | 3.967-002 | 4.643-003 | 4.354-002 | 5.147-003 |
| 3.1+001 | 1.927-002 | 2.188-003 | 2.145-002 | 2.466-003 | 2.381-002 | 2.771-003 | 2.633-002 | 3.098-003 | 2.902-002 | 3.452-003 |
| 3.5+001 | 1.121-002 | 1.279-003 | 1.255-002 | 1.450-003 | 1.400-002 | 1.639-003 | 1.557-002 | 1.844-003 | 1.725-002 | 2.066-003 |
| 4.0+001 | 5.811-003 | 6.681-004 | 6.553-003 | 7.632-004 | 7.363-003 | 8.691-004 | 8.245-003 | 9.849-004 | 9.201-003 | 1.112-003 |
| 4.5+001 | 3.005-003 | 3.498-004 | 3.421-003 | 4.034-004 | 3.880-003 | 4.636-004 | 4.382-003 | 5.301-004 | 4.933-003 | 6.035-004 |
| 5.0+001 | 1.491-003 | 1.775-004 | 1.724-003 | 2.077-004 | 1.983-003 | 2.420-004 | 2.270-003 | 2.802-004 | 2.587-003 | 3.229-004 |
| 6.0+001 | 1.854-004 | 2.766-005 | 2.492-004 | 3.630-005 | 3.235-004 | 4.650-005 | 4.090-004 | 5.833-005 | 5.070-004 | 7.201-005 |
| 7.0+001 | -2.201-004 | -1.983-005 | -2.157-004 | -1.887-005 | -2.074-004 | -1.735-005 | -1.946-004 | -1.516-005 | -1.769-004 | -1.222-005 |
| 8.0+001 | -3.268-004 | -3.314-005 | -3.430-004 | -3.489-005 | -3.581-004 | -3.644-005 | -3.716-004 | -3.786-005 | -3.834-004 | -3.895-005 |
| 9.0+001 | -3.305-004 | -3.445-005 | -3.526-004 | -3.703-005 | -3.747-004 | -3.963-005 | -3.966-004 | -4.218-005 | -4.181-004 | -4.468-005 |
| 1.0+002 | -3.003-004 | -3.170-005 | -3.226-004 | -3.436-005 | -3.454-004 | -3.713-005 | -3.686-004 | -3.992-005 | -3.921-004 | -4.275-005 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, z)$ --Continued

| | <i>x</i> | 41 Nb | 42 Mo | 43 Tc | 44 Ru | 45 Rh | | | | |
|------------------|------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|
| $\sin(\theta/2)$ | $/\lambda$ | total | without K-shell | |
| .0 | 4.081+001 | 3.889+001 | 4.180+001 | 3.988+001 | 4.279+001 | 4.087+001 | 4.377+001 | 4.186+001 | 4.476+001 | 4.286+001 |
| 1.0-002 | 4.076+001 | 3.884+001 | 4.175+001 | 3.984+001 | 4.274+001 | 4.083+001 | 4.373+001 | 4.182+001 | 4.472+001 | 4.282+001 |
| 2.0-002 | 4.063+001 | 3.871+001 | 4.162+001 | 3.971+001 | 4.261+001 | 4.070+001 | 4.361+001 | 4.170+001 | 4.461+001 | 4.270+001 |
| 3.0-002 | 4.041+001 | 3.849+001 | 4.141+001 | 3.950+001 | 4.239+001 | 4.048+001 | 4.342+001 | 4.151+001 | 4.442+001 | 4.251+001 |
| 4.0-002 | 4.011+001 | 3.819+001 | 4.113+001 | 3.921+001 | 4.210+001 | 4.019+001 | 4.315+001 | 4.124+001 | 4.416+001 | 4.225+001 |
| 5.0-002 | 3.975+001 | 3.783+001 | 4.078+001 | 3.886+001 | 4.174+001 | 3.983+001 | 4.282+001 | 4.091+001 | 4.384+001 | 4.193+001 |
| 6.0-002 | 3.933+001 | 3.741+001 | 4.037+001 | 3.845+001 | 4.132+001 | 3.941+001 | 4.243+001 | 4.052+001 | 4.346+001 | 4.155+001 |
| 7.0-002 | 3.888+001 | 3.696+001 | 3.992+001 | 3.800+001 | 4.086+001 | 3.894+001 | 4.200+001 | 4.009+001 | 4.303+001 | 4.113+001 |
| 8.0-002 | 3.839+001 | 3.646+001 | 3.943+001 | 3.751+001 | 4.035+001 | 3.844+001 | 4.152+001 | 3.961+001 | 4.257+001 | 4.066+001 |
| 9.0-002 | 3.787+001 | 3.595+001 | 3.892+001 | 3.700+001 | 3.982+001 | 3.790+001 | 4.102+001 | 3.911+001 | 4.207+001 | 4.016+001 |
| 1.0-001 | 3.734+001 | 3.542+001 | 3.838+001 | 3.647+001 | 3.927+001 | 3.735+001 | 4.048+001 | 3.857+001 | 4.154+001 | 3.963+001 |
| 1.1-001 | 3.681+001 | 3.489+001 | 3.784+001 | 3.592+001 | 3.870+001 | 3.679+001 | 3.993+001 | 3.802+001 | 4.099+001 | 3.908+001 |
| 1.2-001 | 3.626+001 | 3.434+001 | 3.728+001 | 3.537+001 | 3.813+001 | 3.621+001 | 3.937+001 | 3.746+001 | 4.043+001 | 3.852+001 |
| 1.3-001 | 3.572+001 | 3.380+001 | 3.673+001 | 3.481+001 | 3.755+001 | 3.564+001 | 3.880+001 | 3.689+001 | 3.985+001 | 3.794+001 |
| 1.4-001 | 3.518+001 | 3.326+001 | 3.617+001 | 3.425+001 | 3.698+001 | 3.506+001 | 3.822+001 | 3.631+001 | 3.927+001 | 3.736+001 |
| 1.5-001 | 3.465+001 | 3.273+001 | 3.561+001 | 3.370+001 | 3.641+001 | 3.449+001 | 3.764+001 | 3.573+001 | 3.868+001 | 3.677+001 |
| 1.6-001 | 3.412+001 | 3.220+001 | 3.506+001 | 3.314+001 | 3.584+001 | 3.393+001 | 3.706+001 | 3.515+001 | 3.809+001 | 3.618+001 |
| 1.7-001 | 3.359+001 | 3.167+001 | 3.452+001 | 3.260+001 | 3.528+001 | 3.337+001 | 3.648+001 | 3.457+001 | 3.750+001 | 3.559+001 |
| 1.8-001 | 3.307+001 | 3.115+001 | 3.398+001 | 3.205+001 | 3.473+001 | 3.282+001 | 3.590+001 | 3.400+001 | 3.691+001 | 3.501+001 |
| 1.9-001 | 3.256+001 | 3.064+001 | 3.344+001 | 3.153+001 | 3.419+001 | 3.228+001 | 3.533+001 | 3.343+001 | 3.633+001 | 3.442+001 |
| 2.0-001 | 3.206+001 | 3.014+001 | 3.292+001 | 3.100+001 | 3.366+001 | 3.175+001 | 3.477+001 | 3.286+001 | 3.575+001 | 3.384+001 |
| 2.2-001 | 3.108+001 | 2.916+001 | 3.190+001 | 2.998+001 | 3.263+001 | 3.071+001 | 3.367+001 | 3.176+001 | 3.461+001 | 3.270+001 |
| 2.4-001 | 3.013+001 | 2.822+001 | 3.091+001 | 2.899+001 | 3.163+001 | 2.972+001 | 3.260+001 | 3.069+001 | 3.350+001 | 3.159+001 |
| 2.5-001 | 2.968+001 | 2.776+001 | 3.043+001 | 2.851+001 | 3.114+001 | 2.923+001 | 3.207+001 | 3.017+001 | 3.296+001 | 3.105+001 |
| 2.6-001 | 2.922+001 | 2.731+001 | 2.996+001 | 2.804+001 | 3.067+001 | 2.876+001 | 3.156+001 | 2.966+001 | 3.243+001 | 3.052+001 |
| 2.8-001 | 2.835+001 | 2.643+001 | 2.905+001 | 2.713+001 | 2.975+001 | 2.784+001 | 3.057+001 | 2.867+001 | 3.140+001 | 2.949+001 |
| 3.0-001 | 2.752+001 | 2.560+001 | 2.818+001 | 2.627+001 | 2.887+001 | 2.696+001 | 2.963+001 | 2.772+001 | 3.041+001 | 2.851+001 |
| 3.2-001 | 2.672+001 | 2.480+001 | 2.735+001 | 2.544+001 | 2.803+001 | 2.612+001 | 2.873+001 | 2.682+001 | 2.947+001 | 2.757+001 |
| 3.4-001 | 2.596+001 | 2.405+001 | 2.657+001 | 2.465+001 | 2.723+001 | 2.532+001 | 2.787+001 | 2.596+001 | 2.858+001 | 2.667+001 |
| 3.5-001 | 2.560+001 | 2.368+001 | 2.619+001 | 2.428+001 | 2.684+001 | 2.493+001 | 2.746+001 | 2.555+001 | 2.815+001 | 2.624+001 |
| 3.6-001 | 2.525+001 | 2.333+001 | 2.582+001 | 2.391+001 | 2.466+001 | 2.455+001 | 2.706+001 | 2.515+001 | 2.773+001 | 2.582+001 |
| 3.8-001 | 2.457+001 | 2.265+001 | 2.512+001 | 2.320+001 | 2.574+001 | 2.383+001 | 2.629+001 | 2.439+001 | 2.692+001 | 2.502+001 |
| 4.0-001 | 2.392+001 | 2.200+001 | 2.445+001 | 2.254+001 | 2.505+001 | 2.314+001 | 2.557+001 | 2.366+001 | 2.617+001 | 2.426+001 |
| 4.2-001 | 2.331+001 | 2.139+001 | 2.382+001 | 2.191+001 | 2.439+001 | 2.248+001 | 2.488+001 | 2.298+001 | 2.545+001 | 2.355+001 |
| 4.4-001 | 2.273+001 | 2.081+001 | 2.322+001 | 2.131+001 | 2.377+001 | 2.186+001 | 2.424+001 | 2.233+001 | 2.478+001 | 2.288+001 |
| 4.5-001 | 2.245+001 | 2.053+001 | 2.294+001 | 2.102+001 | 2.348+001 | 2.157+001 | 2.393+001 | 2.203+001 | 2.446+001 | 2.255+001 |
| 4.6-001 | 2.218+001 | 2.026+001 | 2.266+001 | 2.074+001 | 2.319+001 | 2.128+001 | 2.363+001 | 2.173+001 | 2.414+001 | 2.224+001 |
| 4.8-001 | 2.166+001 | 1.974+001 | 2.212+001 | 2.021+001 | 2.263+001 | 2.072+001 | 2.306+001 | 2.115+001 | 2.355+001 | 2.165+001 |
| 5.0-001 | 2.116+001 | 1.924+001 | 2.161+001 | 1.970+001 | 2.210+001 | 2.019+001 | 2.252+001 | 2.061+001 | 2.298+001 | 2.108+001 |
| 5.5-001 | 2.000+001 | 1.809+001 | 2.044+001 | 1.853+001 | 2.089+001 | 1.898+001 | 2.129+001 | 1.938+001 | 2.171+001 | 1.981+001 |
| 6.0-001 | 1.895+001 | 1.704+001 | 1.939+001 | 1.748+001 | 1.981+001 | 1.790+001 | 2.020+001 | 1.830+001 | 2.059+001 | 1.869+001 |
| 6.5-001 | 1.798+001 | 1.607+001 | 1.842+001 | 1.651+001 | 1.883+001 | 1.693+001 | 1.922+001 | 1.732+001 | 1.960+001 | 1.770+001 |
| 7.0-001 | 1.706+001 | 1.515+001 | 1.751+001 | 1.560+001 | 1.792+001 | 1.602+001 | 1.832+001 | 1.643+001 | 1.870+001 | 1.681+001 |
| 8.0-001 | 1.532+001 | 1.342+001 | 1.581+001 | 1.391+001 | 1.625+001 | 1.435+001 | 1.668+001 | 1.479+001 | 1.708+001 | 1.519+001 |
| 9.0-001 | 1.372+001 | 1.182+001 | 1.423+001 | 1.233+001 | 1.470+001 | 1.281+001 | 1.517+001 | 1.328+001 | 1.560+001 | 1.371+001 |
| 1.0+000 | 1.225+001 | 1.035+001 | 1.276+001 | 1.087+001 | 1.325+001 | 1.136+001 | 1.374+001 | 1.185+001 | 1.420+001 | 1.231+001 |
| 1.1+000 | 1.093+001 | 9.041+000 | 1.143+001 | 9.540+000 | 1.192+001 | 1.003+001 | 1.241+001 | 1.052+001 | 1.288+001 | 1.100+001 |
| 1.2+000 | 9.792+000 | 7.907+000 | 1.025+001 | 8.368+000 | 1.072+001 | 8.836+000 | 1.119+001 | 9.307+000 | 1.165+001 | 9.775+000 |
| 1.3+000 | 8.828+000 | 6.950+000 | 9.236+000 | 7.360+000 | 9.661+000 | 7.786+000 | 1.010+001 | 8.223+000 | 1.054+001 | 8.667+000 |
| 1.4+000 | 8.032+000 | 6.160+000 | 8.383+000 | 6.513+000 | 8.757+000 | 6.888+000 | 9.147+000 | 7.280+000 | 9.553+000 | 7.687+000 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MF}(x, z)$ --Continued

| x | 41 Nb | 42 Mo | 43 Tc | 44 Ru | 45 Rh | | | |
|------------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| $\sin(\theta/2)$ | total | without K-shell |
| /Lambda | | | | | | | | |
| 1.5+000 | 7.382+000 | 5.518+000 | 7.677+000 | 5.814+000 | 7.997+000 | 6.135+000 | 8.338+000 | 6.477-000 |
| 1.6+000 | 6.856+000 | 5.000+000 | 7.100+000 | 5.244+000 | 7.369+000 | 5.514+000 | 7.660+000 | 5.806+000 |
| 1.7+000 | 6.430+000 | 4.582+000 | 6.631+000 | 4.783+000 | 6.854+000 | 5.006+000 | 7.098+000 | 5.251+000 |
| 1.8+000 | 6.081+000 | 4.241+000 | 6.248+000 | 4.408+000 | 6.432+000 | 4.592+000 | 6.635+000 | 4.796+000 |
| 1.9+000 | 5.790+000 | 3.959+000 | 5.930+000 | 4.099+000 | 6.084+000 | 4.252+000 | 6.254+000 | 4.422-000 |
| 2.0+000 | 5.540+000 | 3.719+000 | 5.662+000 | 3.840+000 | 5.793+000 | 3.970+000 | 5.937+000 | 4.113+000 |
| 2.2+000 | 5.117+000 | 3.315+000 | 5.222+000 | 3.418+000 | 5.328+000 | 3.523+000 | 5.438+000 | 3.632+000 |
| 2.4+000 | 4.744+000 | 2.964+000 | 4.849+000 | 3.065+000 | 4.949+000 | 3.163+000 | 5.047+000 | 3.259+000 |
| 2.5+000 | 4.566+000 | 2.797+000 | 4.674+000 | 2.901+000 | 4.776+000 | 3.000+000 | 4.873+000 | 3.095+000 |
| 2.6+000 | 4.390+000 | 2.633+000 | 4.502+000 | 2.741+000 | 4.608+000 | 2.843+000 | 4.706+000 | 2.938+000 |
| 2.8+000 | 4.046+000 | 2.313+000 | 4.167+000 | 2.429+000 | 4.282+000 | 2.539+000 | 4.386+000 | 2.640+000 |
| 3.0+000 | 3.710+000 | 2.003+000 | 3.839+000 | 2.126+000 | 3.962+000 | 2.243+000 | 4.075+000 | 2.351+000 |
| 3.3+000 | 3.236+000 | 1.569+000 | 3.370+000 | 1.695+000 | 3.500+000 | 1.818+000 | 3.622+000 | 1.934+000 |
| 3.5+000 | 2.947+000 | 1.308+000 | 3.079+000 | 1.431+000 | 3.210+000 | 1.553+000 | 3.334+000 | 1.670+000 |
| 3.6+000 | 2.811+000 | 1.187+000 | 2.941+000 | 1.307+000 | 3.071+000 | 1.428+000 | 3.195+000 | 1.544+000 |
| 3.9+000 | 2.445+000 | 8.656-001 | 2.566+000 | 9.747-001 | 2.688+000 | 1.086+000 | 2.808+000 | 1.196+000 |
| 4.0+000 | 2.337+000 | 7.726-001 | 2.453+000 | 8.769-001 | 2.572+000 | 9.844-001 | 2.689+000 | 1.091-000 |
| 4.2+000 | 2.141+000 | 6.070-001 | 2.248+000 | 7.009-001 | 2.358+000 | 7.991-001 | 2.468+000 | 8.983-001 |
| 4.6+000 | 1.822+000 | 3.514-001 | 1.909+000 | 4.233-001 | 2.001+000 | 5.007+001 | 2.095+000 | 5.815-001 |
| 5.0+000 | 1.587+000 | 1.803-001 | 1.655+000 | 2.316-001 | 1.728+000 | 2.886-001 | 1.805+000 | 3.502-001 |
| 5.4+000 | 1.414+000 | 7.296-002 | 1.467+000 | 1.070-001 | 1.524+000 | 1.462-001 | 1.585+000 | 1.902-001 |
| 5.5+000 | 1.379+000 | 5.385-002 | 1.428+000 | 8.418-002 | 1.482+000 | 1.195-001 | 1.539+000 | 1.595-001 |
| 5.8+000 | 1.287+000 | 1.092-002 | 1.328+000 | 3.148-002 | 1.373+000 | 5.640-002 | 1.420+000 | 8.570-002 |
| 6.0+000 | 1.235+000 | -7.909-003 | 1.272+000 | 7.268-003 | 1.312+000 | 2.637-002 | 1.354+000 | 4.953-002 |
| 6.2+000 | 1.190+000 | -2.067-002 | 1.223+000 | -1.004-002 | 1.258+000 | 4.062-003 | 1.296+000 | 2.187-002 |
| 6.6+000 | 1.114+000 | -3.281-002 | 1.142+000 | -2.908-002 | 1.170+000 | -2.274-002 | 1.201+000 | -1.348-002 |
| 7.0+000 | 1.052+000 | -3.324-002 | 1.075+000 | -3.403-002 | 1.100+000 | -3.297-002 | 1.125+000 | -2.973-002 |
| 7.4+000 | 9.969-001 | -2.722-002 | 1.019+000 | -3.073-002 | 1.041+000 | -3.302-002 | 1.063+000 | -3.381-002 |
| 8.0+000 | 9.236-001 | -1.314-002 | 9.444-001 | -1.845-002 | 9.648-001 | -2.324-002 | 9.850-001 | -2.734-002 |
| 9.0+000 | 8.131-001 | 1.045-002 | 8.346-001 | 5.367-003 | 8.553-001 | 1.850-004 | 8.751-001 | -5.137-003 |
| 1.0+001 | 7.108-001 | 2.677-002 | 7.335-001 | 2.333-002 | 7.554-001 | 1.958-002 | 7.762-001 | 1.534-002 |
| 1.1+001 | 6.162-001 | 3.542-002 | 6.395-001 | 3.368-002 | 6.621-001 | 3.162-002 | 6.838-001 | 2.898-002 |
| 1.2+001 | 5.306-001 | 3.850-002 | 5.537-001 | 3.810-002 | 5.763-001 | 3.743-002 | 5.982-001 | 3.623-002 |
| 1.4+001 | 3.886-001 | 3.585-002 | 4.094-001 | 3.694-002 | 4.302-001 | 3.791-002 | 4.508-001 | 3.852-002 |
| 1.6+001 | 2.829-001 | 2.922-002 | 3.004-001 | 3.076-002 | 3.182-001 | 3.229-002 | 3.360-001 | 3.361-002 |
| 1.8+001 | 2.063-001 | 2.263-002 | 2.205-001 | 2.415-002 | 2.351-001 | 2.570-002 | 2.499-001 | 2.716-002 |
| 2.0+001 | 1.514-001 | 1.718-002 | 1.627-001 | 1.851-002 | 1.744-001 | 1.990-002 | 1.864-001 | 2.124-002 |
| 2.2+001 | 1.119-001 | 1.297-002 | 1.209-001 | 1.407-002 | 1.302-001 | 1.524-002 | 1.397-001 | 1.640-002 |
| 2.5+001 | 7.235-002 | 8.533-003 | 7.857-002 | 9.335-003 | 8.511-002 | 1.019-002 | 9.191-002 | 1.106-002 |
| 2.8+001 | 4.764-002 | 5.677-003 | 5.199-002 | 6.249-003 | 5.659-002 | 6.868-003 | 6.141-002 | 7.500-003 |
| 3.1+001 | 3.189-002 | 3.827-003 | 3.495-002 | 4.234-003 | 3.820-002 | 4.677-003 | 4.164-002 | 5.135-003 |
| 3.5+001 | 1.906-002 | 2.304-003 | 2.100-002 | 2.564-003 | 2.308-002 | 2.850-003 | 2.528-002 | 3.148-003 |
| 4.0+001 | 1.023-002 | 1.249-003 | 1.135-002 | 1.400-003 | 1.256-002 | 1.567-003 | 1.385-002 | 1.743-003 |
| 4.5+001 | 5.532-003 | 6.836-004 | 6.185-003 | 7.725-004 | 6.894-003 | 8.714-004 | 7.660-003 | 9.769-004 |
| 5.0+001 | 2.936-003 | 3.700-004 | 3.319-003 | 4.227-004 | 3.739-003 | 4.817-004 | 4.197-003 | 5.454-004 |
| 6.0+001 | 6.182-004 | 8.759-005 | 7.442-004 | 1.055-004 | 8.861-004 | 1.260-004 | 1.045-003 | 1.488-004 |
| 7.0+001 | -1.536-004 | -8.434-006 | -1.240-004 | -3.713-006 | -8.762-005 | 2.082-006 | -4.367-005 | 9.033-006 |
| 8.0+001 | -3.930-004 | -3.957-005 | -4.002-004 | -4.007-005 | -4.046-004 | -4.008-005 | -4.056-004 | -3.948-005 |
| 9.0+001 | -4.391-004 | -4.703-005 | -4.594-004 | -4.933-005 | -4.787-004 | -5.155-005 | -4.968-004 | -5.344-005 |
| 1.0+002 | -4.156-004 | -4.555-005 | -4.393-004 | -4.841-005 | -4.630-004 | -5.133-005 | -4.863-004 | -5.407-005 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, Z)$ --Continued

| x | 46 Pd | 47 Ag | 48 Cd | 49 In | 50 Sn | | | | | |
|------------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|
| $\sin(\theta/2)$ | total | without K-shell |
| .0 | 4.575+001 | 4.385+001 | 4.674+001 | 4.484+001 | 4.772+001 | 4.583+001 | 4.871+001 | 4.682+001 | 4.969+001 | 4.781+001 |
| 1.0-002 | 4.571+001 | 4.331+001 | 4.670+001 | 4.480+001 | 4.768+001 | 4.579+001 | 4.866+001 | 4.677+001 | 4.965+001 | 4.776+001 |
| 2.0-002 | 4.561+001 | 4.371+001 | 4.659+001 | 4.469+001 | 4.757+001 | 4.568+001 | 4.853+001 | 4.664+001 | 4.951+001 | 4.763+001 |
| 3.0-002 | 4.544+001 | 4.354+001 | 4.641+001 | 4.451+001 | 4.739+001 | 4.549+001 | 4.832+001 | 4.643+001 | 4.929+001 | 4.741+001 |
| 4.0-002 | 4.521+001 | 4.331+001 | 4.617+001 | 4.427+001 | 4.713+001 | 4.524+001 | 4.803+001 | 4.614+001 | 4.399+001 | 4.710+001 |
| 5.0-002 | 4.492+001 | 4.302+001 | 4.586+001 | 4.397+001 | 4.681+001 | 4.492+001 | 4.768+001 | 4.579+001 | 4.362+001 | 4.673+001 |
| 6.0-002 | 4.458+001 | 4.268+001 | 4.550+001 | 4.361+001 | 4.644+001 | 4.455+001 | 4.727+001 | 4.538+001 | 4.319+001 | 4.630+001 |
| 7.0-002 | 4.419+001 | 4.228+001 | 4.510+001 | 4.320+001 | 4.602+001 | 4.412+001 | 4.681+001 | 4.492+001 | 4.771+001 | 4.582+001 |
| 8.0-002 | 4.375+001 | 4.185+001 | 4.465+001 | 4.275+001 | 4.555+001 | 4.366+001 | 4.631+001 | 4.442+001 | 4.719+001 | 4.530+001 |
| 9.0-002 | 4.328+001 | 4.138+001 | 4.416+001 | 4.226+001 | 4.505+001 | 4.316+001 | 4.579+001 | 4.390+001 | 4.563+001 | 4.475+001 |
| 1.0-001 | 4.277+001 | 4.037+001 | 4.365+001 | 4.175+001 | 4.452+001 | 4.262+001 | 4.524+001 | 4.335+001 | 4.605+001 | 4.417+001 |
| 1.1-001 | 4.224+001 | 4.034+001 | 4.311+001 | 4.121+001 | 4.396+001 | 4.207+001 | 4.467+001 | 4.278+001 | 4.546+001 | 4.357+001 |
| 1.2-001 | 4.169+001 | 3.978+001 | 4.255+001 | 4.065+001 | 4.339+001 | 4.150+001 | 4.409+001 | 4.220+001 | 4.485+001 | 4.297+001 |
| 1.3-001 | 4.111+001 | 3.921+001 | 4.197+001 | 4.007+001 | 4.280+001 | 4.091+001 | 4.350+001 | 4.161+001 | 4.424+001 | 4.236+001 |
| 1.4-001 | 4.053+001 | 3.863+001 | 4.139+001 | 3.949+001 | 4.221+001 | 4.031+001 | 4.290+001 | 4.101+001 | 4.363+001 | 4.174+001 |
| 1.5-001 | 3.993+001 | 3.803+001 | 4.079+001 | 3.889+001 | 4.160+001 | 3.971+001 | 4.230+001 | 4.041+001 | 4.301+001 | 4.113+001 |
| 1.6-001 | 3.933+001 | 3.743+001 | 4.019+001 | 3.829+001 | 4.100+001 | 3.910+001 | 4.170+001 | 3.981+001 | 4.240+001 | 4.051+001 |
| 1.7-001 | 3.872+001 | 3.632+001 | 3.958+001 | 3.769+001 | 4.039+001 | 3.849+001 | 4.110+001 | 3.921+001 | 4.179+001 | 3.990+001 |
| 1.8-001 | 3.811+001 | 3.621+001 | 3.898+001 | 3.708+001 | 3.978+001 | 3.789+001 | 4.050+001 | 3.861+001 | 4.118+001 | 3.929+001 |
| 1.9-001 | 3.750+001 | 3.560+001 | 3.837+001 | 3.647+001 | 3.917+001 | 3.728+001 | 3.990+001 | 3.801+001 | 4.058+001 | 3.869+001 |
| 2.0-001 | 3.690+001 | 3.500+001 | 3.777+001 | 3.587+001 | 3.857+001 | 3.668+001 | 3.931+001 | 3.742+001 | 3.998+001 | 3.810+001 |
| 2.2-001 | 3.570+001 | 3.330+001 | 3.657+001 | 3.468+001 | 3.738+001 | 3.548+001 | 3.813+001 | 3.624+001 | 3.381+001 | 3.693+001 |
| 2.4-001 | 3.453+001 | 3.263+001 | 3.540+001 | 3.350+001 | 3.621+001 | 3.431+001 | 3.698+001 | 3.509+001 | 3.767+001 | 3.579+001 |
| 2.5-001 | 3.396+001 | 3.206+001 | 3.483+001 | 3.293+001 | 3.563+001 | 3.374+001 | 3.641+001 | 3.452+001 | 3.711+001 | 3.523+001 |
| 2.6-001 | 3.340+001 | 3.149+001 | 3.426+001 | 3.236+001 | 3.507+001 | 3.317+001 | 3.585+001 | 3.397+001 | 3.656+001 | 3.468+001 |
| 2.8-001 | 3.230+001 | 3.040+001 | 3.316+001 | 3.126+001 | 3.396+001 | 3.207+001 | 3.476+001 | 3.287+001 | 3.548+001 | 3.360+001 |
| 3.0-001 | 3.126+001 | 2.935+001 | 3.209+001 | 3.019+001 | 3.290+001 | 3.100+001 | 3.370+001 | 3.181+001 | 3.443+001 | 3.255+001 |
| 3.2-001 | 3.026+001 | 2.836+001 | 3.107+001 | 2.918+001 | 3.187+001 | 2.998+001 | 3.267+001 | 3.078+001 | 3.341+001 | 3.153+001 |
| 3.4-001 | 2.931+001 | 2.741+001 | 3.010+001 | 2.820+001 | 3.088+001 | 2.899+001 | 3.168+001 | 2.979+001 | 3.243+001 | 3.054+001 |
| 3.5-001 | 2.885+001 | 2.695+001 | 2.963+001 | 2.773+001 | 3.041+001 | 2.851+001 | 3.120+001 | 2.931+001 | 3.195+001 | 3.006+001 |
| 3.6-001 | 2.841+001 | 2.631+001 | 2.917+001 | 2.728+001 | 2.994+001 | 2.805+001 | 3.072+001 | 2.884+001 | 3.148+001 | 2.959+001 |
| 3.8-001 | 2.756+001 | 2.566+001 | 2.829+001 | 2.640+001 | 2.904+001 | 2.715+001 | 2.981+001 | 2.792+001 | 3.056+001 | 2.867+001 |
| 4.0-001 | 2.676+001 | 2.436+001 | 2.746+001 | 2.557+001 | 2.819+001 | 2.630+001 | 2.894+001 | 2.705+001 | 2.968+001 | 2.779+001 |
| 4.2-001 | 2.601+001 | 2.411+001 | 2.668+001 | 2.478+001 | 2.738+001 | 2.549+001 | 2.810+001 | 2.621+001 | 2.383+001 | 2.695+001 |
| 4.4-001 | 2.530+001 | 2.341+001 | 2.594+001 | 2.404+001 | 2.661+001 | 2.472+001 | 2.731+001 | 2.542+001 | 2.302+001 | 2.614+001 |
| 4.5-001 | 2.497+001 | 2.307+001 | 2.558+001 | 2.369+001 | 2.624+001 | 2.435+001 | 2.693+001 | 2.504+001 | 2.763+001 | 2.575+001 |
| 4.6-001 | 2.464+001 | 2.274+001 | 2.524+001 | 2.335+001 | 2.588+001 | 2.399+001 | 2.655+001 | 2.467+001 | 2.725+001 | 2.536+001 |
| 4.8-001 | 2.402+001 | 2.212+001 | 2.459+001 | 2.269+001 | 2.520+001 | 2.331+001 | 2.584+001 | 2.395+001 | 2.651+001 | 2.463+001 |
| 5.0-001 | 2.343+001 | 2.153+001 | 2.397+001 | 2.208+001 | 2.455+001 | 2.266+001 | 2.516+001 | 2.328+001 | 2.581+001 | 2.393+001 |
| 5.5-001 | 2.211+001 | 2.022+001 | 2.258+001 | 2.069+001 | 2.309+001 | 2.120+001 | 2.363+001 | 2.175+001 | 2.421+001 | 2.233+001 |
| 6.0-001 | 2.097+001 | 1.908+001 | 2.139+001 | 1.950+001 | 2.183+001 | 1.995+001 | 2.231+001 | 2.042+001 | 2.282+001 | 2.094+001 |
| 6.5-001 | 1.996+001 | 1.807+001 | 2.034+001 | 1.845+001 | 2.074+001 | 1.885+001 | 2.116+001 | 1.927+001 | 2.161+001 | 1.973+001 |
| 7.0-001 | 1.906+001 | 1.717+001 | 1.942+001 | 1.753+001 | 1.978+001 | 1.789+001 | 2.015+001 | 1.827+001 | 2.055+001 | 1.867+001 |
| 8.0-001 | 1.746+001 | 1.557+001 | 1.780+001 | 1.592+001 | 1.814+001 | 1.625+001 | 1.846+001 | 1.658+001 | 1.879+001 | 1.692+001 |
| 9.0-001 | 1.601+001 | 1.412+001 | 1.637+001 | 1.449+001 | 1.672+001 | 1.484+001 | 1.704+001 | 1.517+001 | 1.735+001 | 1.548+001 |
| 1.0+000 | 1.464+001 | 1.276+001 | 1.504+001 | 1.316+001 | 1.541+001 | 1.353+001 | 1.576+001 | 1.388+001 | 1.608+001 | 1.421+001 |
| 1.1+000 | 1.334+001 | 1.146+001 | 1.376+001 | 1.189+001 | 1.417+001 | 1.229+001 | 1.454+001 | 1.268+001 | 1.490+001 | 1.303+001 |
| 1.2+000 | 1.211+001 | 1.024+001 | 1.255+001 | 1.068+001 | 1.298+001 | 1.111+001 | 1.338+001 | 1.152+001 | 1.376+001 | 1.190+001 |
| 1.3+000 | 1.098+001 | 9.114+000 | 1.142+001 | 9.557+000 | 1.185+001 | 9.989+000 | 1.227+001 | 1.041+001 | 1.267+001 | 1.081+001 |
| 1.4+000 | 9.968+000 | 8.105+000 | 1.039+001 | 8.528+000 | 1.081+001 | 8.951+000 | 1.122+001 | 9.369+000 | 1.163+001 | 9.777+000 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, z)$ --Continued

| x sin(theta/2) /lambda | 46 Pd total | without K-shell | 47 Ag total | without K-shell | 48 Cd total | without K-shell | 49 In total | without K-shell | 50 Sn total | without K-shell |
|------------------------------|----------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|--------------------|
| 1.5+000 | 9.075+000 | 7.217+000 | 9.465+000 | 7.609+000 | 9.862+000 | 8.008+000 | 1.026+001 | 8.411+000 | 1.066+001 | 8.812+000 |
| 1.6+000 | 8.305+000 | 6.454+000 | 8.656+000 | 6.806+000 | 9.020+000 | 7.172+000 | 9.394+000 | 7.548+000 | 9.773+000 | 7.929+000 |
| 1.7+000 | 7.652+000 | 5.806+000 | 7.959+000 | 6.116+000 | 8.285+000 | 6.443+000 | 8.625+000 | 6.784+000 | 8.976+000 | 7.137+000 |
| 1.8+000 | 7.104+000 | 5.265+000 | 7.369+000 | 5.531+000 | 7.653+000 | 5.817+000 | 7.955+000 | 6.121+000 | 8.273+000 | 6.440+000 |
| 1.9+000 | 6.647+000 | 4.816+000 | 6.872+000 | 5.042+000 | 7.117+000 | 5.288+000 | 7.381+000 | 5.553+000 | 7.662+000 | 5.835+000 |
| 2.0+000 | 6.267+000 | 4.443+000 | 6.457+000 | 4.634+000 | 6.666+000 | 4.843+000 | 6.892+000 | 5.071+000 | 7.137+000 | 5.317+000 |
| 2.2+000 | 5.681+000 | 3.873+000 | 5.818+000 | 4.009+000 | 5.967+000 | 4.159+000 | 6.132+000 | 4.324+000 | 6.312+000 | 4.505+000 |
| 2.4+000 | 5.246+000 | 3.455+000 | 5.352+000 | 3.560+000 | 5.464+000 | 3.672+000 | 5.586+000 | 3.793+000 | 5.718+000 | 3.925+000 |
| 2.5+000 | 5.063+000 | 3.281+000 | 5.160+000 | 3.377+000 | 5.261+000 | 3.477+000 | 5.368+000 | 3.583+000 | 5.483+000 | 3.698+000 |
| 2.6+000 | 4.893+000 | 3.121+000 | 4.985+000 | 3.211+000 | 5.079+000 | 3.304+000 | 5.176+000 | 3.400+000 | 5.278+000 | 3.501+000 |
| 2.8+000 | 4.579+000 | 2.826+000 | 4.670+000 | 2.914+000 | 4.758+000 | 3.000+000 | 4.845+000 | 3.086+000 | 4.933+000 | 3.172+000 |
| 3.0+000 | 4.282+000 | 2.550+000 | 4.377+000 | 2.642+000 | 4.468+000 | 2.729+000 | 4.554+000 | 2.813+000 | 4.638+000 | 2.895+000 |
| 3.3+000 | 3.849+000 | 2.150+000 | 3.955+000 | 2.251+000 | 4.055+000 | 2.347+000 | 4.149+000 | 2.437+000 | 4.238+000 | 2.523+000 |
| 3.5+000 | 3.570+000 | 1.893+000 | 3.681+000 | 1.999+000 | 3.787+000 | 2.100+000 | 3.887+000 | 2.196+000 | 3.982+000 | 2.287+000 |
| 3.6+000 | 3.433+000 | 1.768+000 | 3.547+000 | 1.876+000 | 3.655+000 | 1.979+000 | 3.758+000 | 2.078+000 | 3.856+000 | 2.172+000 |
| 3.9+000 | 3.044+000 | 1.416+000 | 3.159+000 | 1.524+000 | 3.272+000 | 1.630+000 | 3.381+000 | 1.733+000 | 3.486+000 | 1.833+000 |
| 4.0+000 | 2.922+000 | 1.307+000 | 3.037+000 | 1.414+000 | 3.150+000 | 1.520+000 | 3.259+000 | 1.623+000 | 3.366+000 | 1.723+000 |
| 4.2+000 | 2.692+000 | 1.102+000 | 2.804+000 | 1.206+000 | 2.916+000 | 1.309+000 | 3.025+000 | 1.412+000 | 3.133+000 | 1.513+000 |
| 4.6+000 | 2.291+000 | 7.542+001 | 2.392+000 | 8.454+001 | 2.495+000 | 9.387+001 | 2.599+000 | 1.033+000 | 2.703+000 | 1.129+000 |
| 5.0+000 | 1.969+000 | 4.872+001 | 2.056+000 | 5.622+001 | 2.146+000 | 6.408+001 | 2.238+000 | 7.225+001 | 2.332+000 | 8.069+001 |
| 5.4+000 | 1.718+000 | 2.926+001 | 1.790+000 | 3.508+001 | 1.866+000 | 4.133+001 | .944+000 | 4.799+001 | 2.026+000 | 5.502+001 |
| 5.5+000 | 1.665+000 | 2.538+001 | 1.733+000 | 3.080+001 | 1.805+000 | 3.665+001 | .881+000 | 4.292+001 | 1.959+000 | 4.959+001 |
| 5.8+000 | 1.526+000 | 1.577+001 | 1.584+000 | 2.004+001 | 1.646+000 | 2.476+001 | .711+000 | 2.991+001 | 1.779+000 | 3.547+001 |
| 6.0+000 | 1.448+000 | 1.084+001 | 1.500+000 | 1.442+001 | 1.555+000 | 1.843+001 | .614+000 | 2.288+001 | 1.676+000 | 2.774+001 |
| 6.2+000 | 1.380+000 | 6.901+002 | 1.426+000 | 9.857+002 | 1.476+000 | 1.322+001 | 1.529+000 | 1.701+001 | 1.585+000 | 2.121+001 |
| 6.6+000 | 1.268+000 | 1.443+002 | 1.305+000 | 3.341+002 | 1.345+000 | 5.595+002 | .387+000 | 8.223+002 | 1.433+000 | 1.123+001 |
| 7.0+000 | 1.181+000 | -1.602+002 | 1.211+000 | -5.148+003 | 1.243+000 | 8.650+003 | 1.277+000 | 2.562+002 | 1.314+000 | 4.588+002 |
| 7.4+000 | 1.110+000 | -3.008+002 | 1.136+000 | -2.516+002 | 1.162+000 | -1.793+002 | .190+000 | -8.143+003 | 1.221+000 | 4.366+003 |
| 8.0+000 | 1.026+000 | -3.258+002 | 1.046+000 | -3.335+002 | 1.068+000 | -3.265+002 | .090+000 | -3.025+002 | 1.113+000 | -2.596+002 |
| 9.0+000 | 9.130+000 | -1.530+002 | 9.313+000 | -1.988+002 | 9.493+000 | -2.396+002 | 9.672+001 | -2.742+002 | 9.851+000 | -3.007+002 |
| 1.0+001 | 8.155+000 | 6.197+003 | 8.341+001 | 1.463+003 | 8.521+001 | -3.304+003 | 8.694+001 | -8.067+003 | 8.863+001 | -1.268+002 |
| 1.1+001 | 7.250+000 | 2.268+002 | 7.446+001 | 1.911+002 | 7.635+001 | 1.529+002 | 7.815+001 | 1.118+002 | 7.989+001 | 6.880+003 |
| 1.2+001 | 6.404+000 | 3.282+002 | 6.606+001 | 3.066+002 | 6.803+001 | 2.819+002 | 6.992+001 | 2.534+002 | 7.174+001 | 2.217+002 |
| 1.4+001 | 4.913+000 | 3.913+002 | 5.113+001 | 3.914+002 | 5.310+001 | 3.891+002 | 5.503+001 | 3.836+002 | 5.691+001 | 3.750+002 |
| 1.6+001 | 3.719+001 | 3.600+002 | 3.900+001 | 3.707+002 | 4.081+001 | 3.802+002 | 4.261+001 | 3.877+002 | 4.439+001 | 3.933+002 |
| 1.8+001 | 2.802+001 | 3.003+002 | 2.958+001 | 3.146+002 | 3.115+001 | 3.284+002 | 3.272+001 | 3.413+002 | 3.431+001 | 3.533+002 |
| 2.0+001 | 2.113+001 | 2.401+002 | 2.242+001 | 2.544+002 | 2.374+001 | 2.687+002 | 2.508+001 | 2.828+002 | 2.644+001 | 2.965+002 |
| 2.2+001 | 1.599+001 | 1.883+002 | 1.705+001 | 2.012+002 | 1.814+001 | 2.144+002 | 1.925+001 | 2.276+002 | 2.039+001 | 2.409+002 |
| 2.5+001 | 1.064+001 | 1.293+002 | 1.141+001 | 1.394+002 | 1.221+001 | 1.500+002 | 1.304+001 | 1.608+002 | 1.389+001 | 1.719+002 |
| 2.8+001 | 7.180+002 | 8.386+003 | 7.738+002 | 9.647+003 | 8.321+002 | 1.045+002 | 8.928+002 | 1.128+002 | 9.559+002 | 1.215+002 |
| 3.1+001 | 4.910+002 | 6.149+003 | 5.315+002 | 6.713+003 | 5.740+002 | 7.312+003 | 6.185+002 | 7.940+003 | 6.651+002 | 8.600+003 |
| 3.5+001 | 3.013+002 | 3.816+003 | 3.278+002 | 4.191+003 | 3.558+002 | 4.594+003 | 3.854+002 | 5.020+003 | 4.166+002 | 5.472+003 |
| 4.0+001 | 1.671+002 | 2.143+003 | 1.830+002 | 2.370+003 | 1.999+002 | 2.616+003 | 2.179+002 | 2.878+003 | 2.370+002 | 3.159+003 |
| 4.5+001 | 9.380+003 | 1.219+003 | 1.034+002 | 1.358+003 | 1.137+002 | 1.510+003 | 1.248+002 | 1.673+003 | 1.366+002 | 1.849+003 |
| 5.0+001 | 5.237+003 | 6.932+004 | 5.824+003 | 7.790+004 | 6.460+003 | 8.733+004 | 7.146+003 | 9.755+004 | 7.885+003 | 1.087+003 |
| 6.0+001 | 1.418+003 | 2.036+004 | 1.636+003 | 2.362+004 | 1.876+003 | 2.728+004 | 2.140+003 | 3.132+004 | 2.429+003 | 3.579+004 |
| 7.0+001 | 6.983+005 | 2.700+005 | 1.410+004 | 3.836+005 | 2.229+004 | 5.153+005 | 3.164+004 | 6.661+005 | 4.224+004 | 8.381+005 |
| 8.0+001 | -3.964+004 | -3.654+005 | -3.851+004 | -3.405+005 | -3.688+004 | -3.072+005 | -3.468+004 | -2.644+005 | -3.186+004 | -2.111+005 |
| 9.0+001 | -5.283+004 | -5.658+005 | -5.412+004 | -5.777+005 | -5.519+004 | -5.860+005 | -5.598+004 | -5.897+005 | -5.648+004 | -5.883+005 |
| 1.0+002 | -5.316+004 | -5.944+005 | -5.533+004 | -6.205+005 | -5.742+004 | -6.455+005 | -5.938+004 | -6.682+005 | -6.122+004 | -6.888+005 |

Table I. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MF}(x, z)$ --Continued

| x sin(theta/2) /lambda | 51 Sb | 52 Te | 53 J | 54 Xe | 55 Cs | | | | | |
|------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------|-----------|-----------|-----------|-----------|
| | total without K-shell | total without K-shell | total without K-shell | total without K-shell | total without K-shell | | | | | |
| .0 | 5.068+001 | 4.880+001 | 5.167+001 | 4.979+001 | 5.265+001 | 5.078+001 | 5.363+001 | 5.177+001 | 5.462+001 | 5.275+001 |
| 1.0-002 | 5.064+001 | 4.875+001 | 5.163+001 | 4.974+001 | 5.261+001 | 5.073+001 | 5.359+001 | 5.172+001 | 5.455+001 | 5.269+001 |
| 2.0-002 | 5.049+001 | 4.861+001 | 5.148+001 | 4.960+001 | 5.247+001 | 5.059+001 | 5.345+001 | 5.158+001 | 5.436+001 | 5.249+001 |
| 3.0-002 | 5.027+001 | 4.839+001 | 5.125+001 | 4.937+001 | 5.224+001 | 5.037+001 | 5.323+001 | 5.136+001 | 5.405+001 | 5.218+001 |
| 4.0-002 | 4.996+001 | 4.808+001 | 5.094+001 | 4.906+001 | 5.193+001 | 5.006+001 | 5.292+001 | 5.105+001 | 5.365+001 | 5.178+001 |
| 5.0-002 | 4.958+001 | 4.770+001 | 5.056+001 | 4.868+001 | 5.154+001 | 4.967+001 | 5.253+001 | 5.067+001 | 5.317+001 | 5.131+001 |
| 6.0-002 | 4.913+001 | 4.725+001 | 5.010+001 | 4.823+001 | 5.109+001 | 4.922+001 | 5.208+001 | 5.021+001 | 5.264+001 | 5.078+001 |
| 7.0-002 | 4.864+001 | 4.675+001 | 4.960+001 | 4.772+001 | 5.057+001 | 4.870+001 | 5.156+001 | 4.969+001 | 5.207+001 | 5.021+001 |
| 8.0-002 | 4.809+001 | 4.621+001 | 4.904+001 | 4.716+001 | 5.001+001 | 4.814+001 | 5.099+001 | 4.912+001 | 5.148+001 | 4.962+001 |
| 9.0-002 | 4.752+001 | 4.563+001 | 4.845+001 | 4.657+001 | 4.940+001 | 4.753+001 | 5.038+001 | 4.851+001 | 5.086+001 | 4.900+001 |
| 1.0-001 | 4.691+001 | 4.503+001 | 4.782+001 | 4.595+001 | 4.876+001 | 4.689+001 | 4.973+001 | 4.786+001 | 5.023+001 | 4.837+001 |
| 1.1-001 | 4.629+001 | 4.441+001 | 4.718+001 | 4.530+001 | 4.810+001 | 4.623+001 | 4.905+001 | 4.718+001 | 4.959+001 | 4.772+001 |
| 1.2-001 | 4.566+001 | 4.378+001 | 4.652+001 | 4.464+001 | 4.742+001 | 4.555+001 | 4.835+001 | 4.649+001 | 4.893+001 | 4.706+001 |
| 1.3-001 | 4.502+001 | 4.314+001 | 4.586+001 | 4.398+001 | 4.673+001 | 4.486+001 | 4.764+001 | 4.578+001 | 4.826+001 | 4.640+001 |
| 1.4-001 | 4.438+001 | 4.250+001 | 4.519+001 | 4.331+001 | 4.604+001 | 4.417+001 | 4.693+001 | 4.506+001 | 4.758+001 | 4.572+001 |
| 1.5-001 | 4.374+001 | 4.186+001 | 4.452+001 | 4.265+001 | 4.535+001 | 4.348+001 | 4.621+001 | 4.434+001 | 4.690+001 | 4.504+001 |
| 1.6-001 | 4.311+001 | 4.123+001 | 4.386+001 | 4.199+001 | 4.466+001 | 4.279+001 | 4.550+001 | 4.363+001 | 4.622+001 | 4.435+001 |
| 1.7-001 | 4.248+001 | 4.060+001 | 4.321+001 | 4.133+001 | 4.398+001 | 4.211+001 | 4.479+001 | 4.292+001 | 4.553+001 | 4.367+001 |
| 1.8-001 | 4.186+001 | 3.998+001 | 4.257+001 | 4.069+001 | 4.331+001 | 4.114+001 | 4.409+001 | 4.222+001 | 4.485+001 | 4.299+001 |
| 1.9-001 | 4.125+001 | 3.936+001 | 4.193+001 | 4.066+001 | 4.265+001 | 4.078+001 | 4.341+001 | 4.154+001 | 4.418+001 | 4.231+001 |
| 2.0-001 | 4.064+001 | 3.876+001 | 4.134+001 | 3.944+001 | 4.201+001 | 4.014+001 | 4.274+001 | 4.087+001 | 4.351+001 | 4.165+001 |
| 2.2-001 | 3.946+001 | 3.758+001 | 4.011+001 | 3.823+001 | 4.076+001 | 3.889+001 | 4.144+001 | 3.958+001 | 4.220+001 | 4.034+001 |
| 2.4-001 | 3.832+001 | 3.644+001 | 3.895+001 | 3.707+001 | 3.957+001 | 3.770+001 | 4.021+001 | 3.835+001 | 4.095+001 | 3.909+001 |
| 2.5-001 | 3.776+001 | 3.588+001 | 3.838+001 | 3.651+001 | 3.900+001 | 3.713+001 | 3.962+001 | 3.776+001 | 4.034+001 | 3.848+001 |
| 2.6-001 | 3.721+001 | 3.533+001 | 3.783+001 | 3.596+001 | 3.844+001 | 3.657+001 | 3.905+001 | 3.718+001 | 3.975+001 | 3.789+001 |
| 2.8-001 | 3.614+001 | 3.426+001 | 3.676+001 | 3.489+001 | 3.736+001 | 3.549+001 | 3.795+001 | 3.608+001 | 3.862+001 | 3.675+001 |
| 3.0-001 | 3.511+001 | 3.323+001 | 3.573+001 | 3.386+001 | 3.632+001 | 3.445+001 | 3.690+001 | 3.503+001 | 3.754+001 | 3.567+001 |
| 3.2-001 | 3.410+001 | 3.222+001 | 3.474+001 | 3.286+001 | 3.533+001 | 3.346+001 | 3.590+001 | 3.403+001 | 3.651+001 | 3.465+001 |
| 3.4-001 | 3.313+001 | 3.125+001 | 3.377+001 | 3.190+001 | 3.437+001 | 3.250+001 | 3.494+001 | 3.307+001 | 3.553+001 | 3.367+001 |
| 3.5-001 | 3.265+001 | 3.077+001 | 3.330+001 | 3.143+001 | 3.391+001 | 3.204+001 | 3.448+001 | 3.261+001 | 3.506+001 | 3.320+001 |
| 3.6-001 | 3.218+001 | 3.030+001 | 3.284+001 | 3.097+001 | 3.345+001 | 3.158+001 | 3.403+001 | 3.216+001 | 3.460+001 | 3.274+001 |
| 3.8-001 | 3.127+001 | 2.939+001 | 3.194+001 | 3.007+001 | 3.256+001 | 3.069+001 | 3.314+001 | 3.123+001 | 3.371+001 | 3.185+001 |
| 4.0-001 | 3.039+001 | 2.851+001 | 3.107+001 | 2.919+001 | 3.170+001 | 2.983+001 | 3.229+001 | 3.042+001 | 3.286+001 | 3.099+001 |
| 4.2-001 | 2.954+001 | 2.766+001 | 3.022+001 | 2.835+001 | 3.086+001 | 2.899+001 | 3.146+001 | 2.960+001 | 3.203+001 | 3.017+001 |
| 4.4-001 | 2.872+001 | 2.685+001 | 2.941+001 | 2.753+001 | 3.005+001 | 2.818+001 | 3.066+001 | 2.880+001 | 3.123+001 | 2.937+001 |
| 4.5-001 | 2.833+001 | 2.645+001 | 2.901+001 | 2.713+001 | 2.966+001 | 2.779+001 | 3.027+001 | 2.841+001 | 3.084+001 | 2.898+001 |
| 4.6-001 | 2.794+001 | 2.606+001 | 2.862+001 | 2.674+001 | 2.927+001 | 2.740+001 | 2.989+001 | 2.802+001 | 3.046+001 | 2.860+001 |
| 4.8-001 | 2.719+001 | 2.531+001 | 2.786+001 | 2.599+001 | 2.851+001 | 2.664+001 | 2.914+001 | 2.727+001 | 2.971+001 | 2.785+001 |
| 5.0-001 | 2.647+001 | 2.459+001 | 2.713+001 | 2.526+001 | 2.778+001 | 2.591+001 | 2.841+001 | 2.654+001 | 2.899+001 | 2.713+001 |
| 5.5-001 | 2.481+001 | 2.294+001 | 2.544+001 | 2.356+001 | 2.607+001 | 2.420+001 | 2.669+001 | 2.482+001 | 2.728+001 | 2.542+001 |
| 6.0-001 | 2.336+001 | 2.148+001 | 2.393+001 | 2.206+001 | 2.452+001 | 2.265+001 | 2.511+001 | 2.325+001 | 2.570+001 | 2.384+001 |
| 6.5-001 | 2.209+001 | 2.021+001 | 2.260+001 | 2.073+001 | 2.314+001 | 2.127+001 | 2.369+001 | 2.183+001 | 2.425+001 | 2.239+001 |
| 7.0-001 | 2.097+001 | 1.910+001 | 2.143+001 | 1.956+001 | 2.191+001 | 2.005+001 | 2.242+001 | 2.054+001 | 2.294+001 | 2.109+001 |
| 8.0-001 | 1.914+001 | 1.726+001 | 1.950+001 | 1.763+001 | 1.988+001 | 1.802+001 | 2.029+001 | 1.843+001 | 2.073+001 | 1.887+001 |
| 9.0-001 | 1.766+001 | 1.579+001 | 1.796+001 | 1.610+001 | 1.828+001 | 1.642+001 | 1.861+001 | 1.675+001 | 1.897+001 | 1.711+001 |
| 1.0+000 | 1.639+001 | 1.452+001 | 1.668+001 | 1.482+001 | 1.697+001 | 1.511+001 | 1.725+001 | 1.540+001 | 1.755+001 | 1.570+001 |
| 1.1+000 | 1.522+001 | 1.336+001 | 1.553+001 | 1.367+001 | 1.582+001 | 1.396+001 | 1.609+001 | 1.424+001 | 1.637+001 | 1.452+001 |
| 1.2+000 | 1.411+001 | 1.226+001 | 1.445+001 | 1.259+001 | 1.475+001 | 1.290+001 | 1.504+001 | 1.319+001 | 1.532+001 | 1.347+001 |
| 1.3+000 | 1.305+001 | 1.119+001 | 1.340+001 | 1.155+001 | 1.374+001 | 1.189+001 | 1.405+001 | 1.220+001 | 1.434+001 | 1.250+001 |
| 1.4+000 | 1.202+001 | 1.017+001 | 1.240+001 | 1.055+001 | 1.275+001 | 1.091+001 | 1.309+001 | 1.125+001 | 1.340+001 | 1.157+001 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, z)$ --Continued

| x | 51 Sb | 52 Te | 53 J | 54 Xe | 55 Cs | | | | | |
|--------------------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| $\sin(\theta/2)/\lambda$ | total | without K-shell |
| 1.5+000 | 1.105+001 | 9.207+000 | 1.144+001 | 9.592+000 | 1.180+001 | 9.964+000 | 1.216+001 | 1.032+001 | 1.249+001 | 1.066+001 |
| 1.6+000 | 1.015+001 | 8.312+000 | 1.053+001 | 8.693+000 | 1.090+001 | 9.067+000 | 1.126+001 | 9.431+000 | 1.161+001 | 9.782+000 |
| 1.7+000 | 9.334+000 | 7.498+000 | 9.697+000 | 7.863+000 | 1.006+001 | 8.228+000 | 1.042+001 | 8.590+000 | 1.077+001 | 8.945+000 |
| 1.8+000 | 8.602+000 | 6.771+000 | 8.941+000 | 7.112+000 | 9.285+000 | 7.459+000 | 9.632+000 | 7.809+000 | 9.378+000 | 8.157+000 |
| 1.9+000 | 7.958+000 | 6.133+000 | 8.267+000 | 6.444+000 | 8.586+000 | 6.765+000 | 8.913+000 | 7.095+000 | 9.244+000 | 7.428+000 |
| 2.0+000 | 7.398+000 | 5.579+000 | 7.675+000 | 5.858+000 | 7.965+000 | 6.149+000 | 8.266+000 | 6.453+000 | 8.576+000 | 6.765+000 |
| 2.2+000 | 6.507+000 | 4.701+000 | 6.719+000 | 4.914+000 | 6.947+000 | 5.143+000 | 7.189+000 | 5.387+000 | 7.445+000 | 5.645+000 |
| 2.4+000 | 5.862+000 | 4.069+000 | 6.019+000 | 4.227+000 | 6.190+000 | 4.399+000 | 6.375+000 | 4.586+000 | 6.575+000 | 4.787+000 |
| 2.5+000 | 5.607+000 | 3.823+000 | 5.743+000 | 3.958+000 | 5.890+000 | 4.107+000 | 6.051+000 | 4.268+000 | 6.225+000 | 4.443+000 |
| 2.6+000 | 5.388+000 | 3.610+000 | 5.505+000 | 3.728+000 | 5.633+000 | 3.856+000 | 5.772+000 | 3.996+000 | 5.923+000 | 4.148+000 |
| 2.8+000 | 5.023+000 | 3.261+000 | 5.116+000 | 3.355+000 | 5.216+000 | 3.454+000 | 5.322+000 | 3.560+000 | 5.437+000 | 3.676+000 |
| 3.0+000 | 4.720+000 | 2.976+000 | 4.803+000 | 3.057+000 | 4.887+000 | 3.141+000 | 4.974+000 | 3.227+000 | 5.066+000 | 3.319+000 |
| 3.3+000 | 4.323+000 | 2.605+000 | 4.404+000 | 2.684+000 | 4.482+000 | 2.761+000 | 4.559+000 | 2.836+000 | 4.635+000 | 2.911+000 |
| 3.5+000 | 4.073+000 | 2.374+000 | 4.158+000 | 2.457+000 | 4.239+000 | 2.535+000 | 4.317+000 | 2.611+000 | 4.392+000 | 2.684+000 |
| 3.6+000 | 3.949+000 | 2.261+000 | 4.038+000 | 2.346+000 | 4.121+000 | 2.427+000 | 4.201+000 | 2.504+000 | 4.277+000 | 2.578+000 |
| 3.9+000 | 3.587+000 | 1.929+000 | 3.683+000 | 2.021+000 | 3.775+000 | 2.108+000 | 3.862+000 | 2.192+000 | 3.944+000 | 2.272+000 |
| 4.0+000 | 3.468+000 | 1.821+000 | 3.567+000 | 1.915+000 | 3.661+000 | 2.005+000 | 3.751+000 | 2.090+000 | 3.836+000 | 2.172+000 |
| 4.2+000 | 3.237+000 | 1.611+000 | 3.339+000 | 1.707+000 | 3.437+000 | 1.801+000 | 3.531+000 | 1.890+000 | 3.521+000 | 1.976+000 |
| 4.6+000 | 2.806+000 | 1.225+000 | 2.908+000 | 1.320+000 | 3.009+000 | 1.414+000 | 3.107+000 | 1.507+000 | 3.203+000 | 1.597+000 |
| 5.0+000 | 2.428+000 | 8.934-001 | 2.524+000 | 9.814-001 | 2.621+000 | 1.070+000 | 2.717+000 | 1.160+000 | 2.313+000 | 1.249+000 |
| 5.4+000 | 2.110+000 | 6.238-001 | 2.196+000 | 7.004-001 | 2.284+000 | 7.794-001 | 2.374+000 | 8.603-001 | 2.464+000 | 9.426-001 |
| 5.5+000 | 2.040+000 | 5.660-001 | 2.123+000 | 6.393-001 | 2.209+000 | 7.154-001 | 2.296+000 | 7.937-001 | 2.384+000 | 8.737-001 |
| 5.8+000 | 1.851+000 | 4.143-001 | 1.925+000 | 4.776-001 | 2.002+000 | 5.442-001 | 2.082+000 | 6.138-001 | 2.163+000 | 6.859-001 |
| 6.0+000 | 1.741+000 | 3.301-001 | 1.810+000 | 3.866-001 | 1.881+000 | 4.467-001 | 1.955+000 | 5.101-001 | 2.031+000 | 5.765-001 |
| 6.2+000 | 1.644+000 | 2.581-001 | 1.707+000 | 3.080-001 | 1.772+000 | 3.617-001 | 1.840+000 | 4.189-001 | 1.911+000 | 4.793-001 |
| 6.6+000 | 1.481+000 | 1.462-001 | 1.533+000 | 1.838-001 | 1.587+000 | 2.253-001 | 1.645+000 | 2.704-001 | 1.705+000 | 3.190-001 |
| 7.0+000 | 1.354+000 | 6.950-002 | 1.396+000 | 9.659-002 | 1.440+000 | 1.272-001 | 1.488+000 | 1.613-001 | 1.538+000 | 1.988-001 |
| 7.4+000 | 1.253+000 | 1.971-002 | 1.287+000 | 3.806-002 | 1.324+000 | 5.951-002 | 1.363+000 | 8.414-002 | 1.405+000 | 1.120-001 |
| 8.0+000 | 1.138+000 | -1.962-002 | 1.164+000 | -1.105-002 | 1.191+000 | -9.766-005 | 1.221+000 | 1.339-002 | 1.252+000 | 2.951-002 |
| 9.0+000 | 1.003+000 | -3.179-002 | 1.022+000 | -3.238-002 | 1.041+000 | -3.170-002 | 1.061+000 | -2.959-002 | 1.082+000 | -2.588-002 |
| 1.0+001 | 9.028-001 | -1.706-002 | 9.190-001 | -2.106-002 | 9.351-001 | -2.457-002 | 9.512-001 | -2.747-002 | 9.574-001 | -2.959-002 |
| 1.1+001 | 8.157-001 | 2.458-003 | 8.320-001 | -2.013-003 | 8.477-001 | -6.456-003 | 8.630-001 | -1.079-002 | 8.780-001 | -1.488-002 |
| 1.2+001 | 7.350-001 | 1.873-002 | 7.519-001 | 1.503-002 | 7.683-001 | 1.114-002 | 7.840-001 | 7.095-003 | 7.993-001 | 2.992-003 |
| 1.4+001 | 5.876-001 | 3.636-002 | 6.055-001 | 3.492-002 | 6.230-001 | 3.318-002 | 6.400-001 | 3.116-002 | 6.566-001 | 2.889-002 |
| 1.6+001 | 4.616-001 | 3.971-002 | 4.791-001 | 3.988-002 | 4.964-001 | 3.983-002 | 5.134-001 | 3.956-002 | 5.302-001 | 3.909-002 |
| 1.8+001 | 3.591-001 | 3.643-002 | 3.750-001 | 3.742-002 | 3.909-001 | 3.829-002 | 4.068-001 | 3.902-002 | 4.226-001 | 3.963-002 |
| 2.0+001 | 2.782-001 | 3.099-002 | 2.921-001 | 3.229-002 | 3.061-001 | 3.353-002 | 3.203-001 | 3.471-002 | 3.345-001 | 3.584-002 |
| 2.2+001 | 2.155-001 | 2.543-002 | 2.274-001 | 2.676-002 | 2.394-001 | 2.808-002 | 2.516-001 | 2.938-002 | 2.540-001 | 3.067-002 |
| 2.5+001 | 1.477-001 | 1.833-002 | 1.567-001 | 1.950-002 | 1.660-001 | 2.068-002 | 1.755-001 | 2.189-002 | 1.353-001 | 2.312-002 |
| 2.8+001 | 1.021-001 | 1.305-002 | 1.089-001 | 1.399-002 | 1.160-001 | 1.496-002 | 1.232-001 | 1.596-002 | 1.307-001 | 1.699-002 |
| 3.1+001 | 7.138-002 | 9.294-003 | 7.646-002 | 1.002-002 | 8.175-002 | 1.078-002 | 8.725-002 | 1.157-002 | 9.297-002 | 1.240-002 |
| 3.5+001 | 4.495-002 | 5.951-003 | 4.839-002 | 6.458-003 | 5.201-002 | 6.994-003 | 5.579-002 | 7.558-003 | 5.975-002 | 8.155-003 |
| 4.0+001 | 2.572-002 | 3.460-003 | 2.786-002 | 3.781-003 | 3.012-002 | 4.124-003 | 3.251-002 | 4.488-003 | 3.502-002 | 4.876-003 |
| 4.5+001 | 1.492-002 | 2.039-003 | 1.627-002 | 2.243-003 | 1.769-002 | 2.462-003 | 1.921-002 | 2.698-003 | 2.082-002 | 2.951-003 |
| 5.0+001 | 8.678-003 | 1.207-003 | 9.529-003 | 1.338-003 | 1.044-002 | 1.480-003 | 1.142-002 | 1.633-003 | 1.246-002 | 1.799-003 |
| 6.0+001 | 2.746-003 | 4.073-004 | 3.091-003 | 4.617-004 | 3.466-002 | 5.215-004 | 3.873-003 | 5.870-004 | 4.314-003 | 6.590-004 |
| 7.0+001 | 5.419-004 | 1.033-004 | 6.758-004 | 1.254-004 | 8.253-004 | 1.502-004 | 9.914-004 | 1.780-004 | 1.175-003 | 2.091-004 |
| 8.0+001 | -2.836-004 | -1.462-005 | -2.412-004 | -6.845-006 | -1.906-004 | -2.362-006 | -1.314-004 | 1.312-005 | -6.253-005 | 2.561-005 |
| 9.0+001 | -5.663-004 | -5.812-005 | -5.641-004 | -5.676-005 | -5.576-004 | -5.467-005 | -5.464-004 | -5.176-005 | -5.302-004 | -4.795-005 |
| 1.0+002 | -6.288-004 | -7.067-005 | -6.437-004 | -7.216-005 | -6.563-004 | -7.327-005 | -6.666-004 | -7.397-005 | -6.741-004 | -7.422-005 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, z)$ --Continued

| x | 56 Ba | 57 La | 58 Ce | 59 Pr | 60 Nd | | | | | |
|------------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|
| $\sin(\theta/2)$ | total | without K-shell |
| .0 | 5.560+001 | 5.374+001 | 5.659+001 | 5.473+001 | 5.757+001 | 5.572+001 | 5.855+001 | 5.670+001 | 5.953+001 | 5.769+001 |
| 1.0-002 | 5.552+001 | 5.367+001 | 5.650+001 | 5.466+001 | 5.748+001 | 5.564+001 | 5.846+001 | 5.663+001 | 5.944+001 | 5.762+001 |
| 2.0-002 | 5.531+001 | 5.345+001 | 5.630+001 | 5.444+001 | 5.729+001 | 5.544+001 | 5.828+001 | 5.643+001 | 5.927+001 | 5.743+001 |
| 3.0-002 | 5.497+001 | 5.311+001 | 5.596+001 | 5.410+001 | 5.696+001 | 5.510+001 | 5.796+001 | 5.611+001 | 5.895+001 | 5.711+001 |
| 4.0-002 | 5.452+001 | 5.266+001 | 5.551+001 | 5.365+001 | 5.651+001 | 5.466+001 | 5.753+001 | 5.569+001 | 5.854+001 | 5.669+001 |
| 5.0-002 | 5.399+001 | 5.213+001 | 5.497+001 | 5.311+001 | 5.598+001 | 5.413+001 | 5.702+001 | 5.518+001 | 5.804+001 | 5.619+001 |
| 6.0-002 | 5.340+001 | 5.154+001 | 5.436+001 | 5.250+001 | 5.538+001 | 5.353+001 | 5.645+001 | 5.460+001 | 5.747+001 | 5.563+001 |
| 7.0-002 | 5.277+001 | 5.091+001 | 5.370+001 | 5.184+001 | 5.473+001 | 5.288+001 | 5.583+001 | 5.398+001 | 5.686+001 | 5.502+001 |
| 8.0-002 | 5.211+001 | 5.025+001 | 5.301+001 | 5.116+001 | 5.405+001 | 5.220+001 | 5.518+001 | 5.334+001 | 5.622+001 | 5.438+001 |
| 9.0-002 | 5.144+001 | 4.958+001 | 5.231+001 | 5.045+001 | 5.335+001 | 5.150+001 | 5.452+001 | 5.267+001 | 5.556+001 | 5.372+001 |
| 1.0-001 | 5.077+001 | 4.891+001 | 5.160+001 | 4.974+001 | 5.264+001 | 5.075+001 | 5.384+001 | 5.199+001 | 5.488+001 | 5.304+001 |
| 1.1-001 | 5.010+001 | 4.824+001 | 5.089+001 | 4.903+001 | 5.193+001 | 5.008+001 | 5.316+001 | 5.132+001 | 5.421+001 | 5.237+001 |
| 1.2-001 | 4.943+001 | 4.758+001 | 5.018+001 | 4.833+001 | 5.122+001 | 4.937+001 | 5.248+001 | 5.063+001 | 5.353+001 | 5.169+001 |
| 1.3-001 | 4.877+001 | 4.691+001 | 4.949+001 | 4.763+001 | 5.052+001 | 4.867+001 | 5.180+001 | 4.995+001 | 5.285+001 | 5.100+001 |
| 1.4-001 | 4.811+001 | 4.625+001 | 4.879+001 | 4.694+001 | 4.983+001 | 4.797+001 | 5.112+001 | 4.927+001 | 5.216+001 | 5.032+001 |
| 1.5-001 | 4.744+001 | 4.558+001 | 4.811+001 | 4.625+001 | 4.914+001 | 4.723+001 | 5.044+001 | 4.859+001 | 5.148+001 | 4.964+001 |
| 1.6-001 | 4.678+001 | 4.493+001 | 4.743+001 | 4.558+001 | 4.845+001 | 4.660+001 | 4.976+001 | 4.792+001 | 5.080+001 | 4.896+001 |
| 1.7-001 | 4.613+001 | 4.427+001 | 4.676+001 | 4.490+001 | 4.777+001 | 4.592+001 | 4.908+001 | 4.724+001 | 5.012+001 | 4.828+001 |
| 1.8-001 | 4.547+001 | 4.361+001 | 4.610+001 | 4.424+001 | 4.710+001 | 4.525+001 | 4.841+001 | 4.656+001 | 4.944+001 | 4.760+001 |
| 1.9-001 | 4.482+001 | 4.296+001 | 4.544+001 | 4.358+001 | 4.643+001 | 4.458+001 | 4.773+001 | 4.589+001 | 4.876+001 | 4.692+001 |
| 2.0-001 | 4.418+001 | 4.232+001 | 4.479+001 | 4.294+001 | 4.578+001 | 4.393+001 | 4.706+001 | 4.522+001 | 4.808+001 | 4.624+001 |
| 2.2-001 | 4.290+001 | 4.105+001 | 4.352+001 | 4.166+001 | 4.448+001 | 4.263+001 | 4.574+001 | 4.389+001 | 4.674+001 | 4.490+001 |
| 2.4-001 | 4.167+001 | 3.981+001 | 4.228+001 | 4.042+001 | 4.322+001 | 4.137+001 | 4.444+001 | 4.259+001 | 4.542+001 | 4.358+001 |
| 2.5-001 | 4.106+001 | 3.920+001 | 4.167+001 | 3.982+001 | 4.260+001 | 4.075+001 | 4.380+001 | 4.195+001 | 4.477+001 | 4.293+001 |
| 2.6-001 | 4.047+001 | 3.861+001 | 4.108+001 | 3.922+001 | 4.199+001 | 4.014+001 | 4.317+001 | 4.132+001 | 4.413+001 | 4.229+001 |
| 2.8-001 | 3.932+001 | 3.746+001 | 3.992+001 | 3.807+001 | 4.081+001 | 3.896+001 | 4.194+001 | 4.009+001 | 4.288+001 | 4.104+001 |
| 3.0-001 | 3.821+001 | 3.636+001 | 3.882+001 | 3.696+001 | 3.968+001 | 3.783+001 | 4.076+001 | 3.891+001 | 4.167+001 | 3.983+001 |
| 3.2-001 | 3.716+001 | 3.530+001 | 3.776+001 | 3.591+001 | 3.859+001 | 3.674+001 | 3.962+001 | 3.778+001 | 4.051+001 | 3.867+001 |
| 3.4-001 | 3.616+001 | 3.430+001 | 3.675+001 | 3.490+001 | 3.755+001 | 3.570+001 | 3.854+001 | 3.669+001 | 3.940+001 | 3.756+001 |
| 3.5-001 | 3.568+001 | 3.382+001 | 3.626+001 | 3.441+001 | 3.705+001 | 3.526+001 | 3.801+001 | 3.617+001 | 3.886+001 | 3.702+001 |
| 3.6-001 | 3.521+001 | 3.335+001 | 3.579+001 | 3.393+001 | 3.656+001 | 3.471+001 | 3.750+001 | 3.566+001 | 3.834+001 | 3.650+001 |
| 3.8-001 | 3.430+001 | 3.244+001 | 3.487+001 | 3.302+001 | 3.561+001 | 3.377+001 | 3.651+001 | 3.467+001 | 3.732+001 | 3.548+001 |
| 4.0-001 | 3.342+001 | 3.157+001 | 3.399+001 | 3.214+001 | 3.471+001 | 3.28C+001 | 3.557+001 | 3.372+001 | 3.635+001 | 3.451+001 |
| 4.2-001 | 3.259+001 | 3.073+001 | 3.315+001 | 3.130+001 | 3.385+001 | 3.200+001 | 3.466+001 | 3.282+001 | 3.542+001 | 3.358+001 |
| 4.4-001 | 3.179+001 | 2.993+001 | 3.235+001 | 3.049+001 | 3.302+001 | 3.117+001 | 3.380+001 | 3.195+001 | 3.453+001 | 3.269+001 |
| 4.5-001 | 3.140+001 | 2.954+001 | 3.196+001 | 3.010+001 | 3.262+001 | 3.077+001 | 3.338+001 | 3.153+001 | 3.410+001 | 3.226+001 |
| 4.6-001 | 3.101+001 | 2.916+001 | 3.157+001 | 2.972+001 | 3.222+001 | 3.037+001 | 3.297+001 | 3.112+001 | 3.367+001 | 3.184+001 |
| 4.8-001 | 3.027+001 | 2.841+001 | 3.082+001 | 2.897+001 | 3.145+001 | 2.961+001 | 3.217+001 | 3.032+001 | 3.285+001 | 3.101+001 |
| 5.0-001 | 2.954+001 | 2.769+001 | 3.010+001 | 2.825+001 | 3.072+001 | 2.887+001 | 3.140+001 | 2.955+001 | 3.206+001 | 3.022+001 |
| 5.5-001 | 2.784+001 | 2.598+001 | 2.840+001 | 2.654+001 | 2.897+001 | 2.712+001 | 2.958+001 | 2.774+001 | 3.021+001 | 2.837+001 |
| 6.0-001 | 2.626+001 | 2.440+001 | 2.681+001 | 2.496+001 | 2.736+001 | 2.551+001 | 2.791+001 | 2.607+001 | 2.850+001 | 2.666+001 |
| 6.5-001 | 2.480+001 | 2.295+001 | 2.535+001 | 2.350+001 | 2.587+001 | 2.402+001 | 2.637+001 | 2.453+001 | 2.692+001 | 2.508+001 |
| 7.0-001 | 2.347+001 | 2.162+001 | 2.400+001 | 2.215+001 | 2.449+001 | 2.264+001 | 2.495+001 | 2.311+001 | 2.546+001 | 2.363+001 |
| 8.0-001 | 2.118+001 | 1.933+001 | 2.165+001 | 1.980+001 | 2.207+001 | 2.023+001 | 2.247+001 | 2.063+001 | 2.291+001 | 2.108+001 |
| 9.0-001 | 1.934+001 | 1.749+001 | 1.973+001 | 1.788+001 | 2.009+001 | 1.825+001 | 2.043+001 | 1.859+001 | 2.081+001 | 1.898+001 |
| 1.0+000 | 1.786+001 | 1.602+001 | 1.819+001 | 1.634+001 | 1.849+001 | 1.666+001 | 1.879+001 | 1.695+001 | 1.911+001 | 1.728+001 |
| 1.1+000 | 1.664+001 | 1.480+001 | 1.692+001 | 1.508+001 | 1.719+001 | 1.536+001 | 1.745+001 | 1.562+001 | 1.773+001 | 1.590+001 |
| 1.2+000 | 1.558+001 | 1.374+001 | 1.584+001 | 1.401+001 | 1.610+001 | 1.426+001 | 1.634+001 | 1.451+001 | 1.659+001 | 1.476+001 |
| 1.3+000 | 1.462+001 | 1.278+001 | 1.488+001 | 1.305+001 | 1.513+001 | 1.330+001 | 1.537+001 | 1.354+001 | 1.560+001 | 1.378+001 |
| 1.4+000 | 1.370+001 | 1.186+001 | 1.398+001 | 1.215+001 | 1.423+001 | 1.241+001 | 1.448+001 | 1.265+001 | 1.471+001 | 1.289+001 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MF}(x, z)$ --Continued

| x | 56 Ba | 57 La | 58 Ce | 59 Pr | 60 Nd | | | | | |
|--------------------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|------------|
| $\sin(\theta/2)/\lambda$ | total | without K-shell | | |
| 1.5+000 | 1.281+001 | 1.098+001 | 1.311+001 | 1.128+001 | 1.338+001 | 1.156+001 | 1.363+001 | 1.181+001 | 1.388+001 | 1.206+001 |
| 1.6+000 | 1.194+001 | 1.012+001 | 1.226+001 | 1.044+001 | 1.255+001 | 1.073+001 | 1.281+001 | 1.100+001 | 1.307+001 | 1.126+001 |
| 1.7+000 | 1.111+001 | 9.289+000 | 1.144+001 | 9.621+000 | 1.174+001 | 9.925+000 | 1.202+001 | 1.020+001 | 1.229+001 | 1.048+001 |
| 1.8+000 | 1.032+001 | 8.500+000 | 1.065+001 | 8.837+000 | 1.096+001 | 9.147+000 | 1.124+001 | 9.435+000 | 1.153+001 | 9.722+000 |
| 1.9+000 | 9.576+000 | 7.762+000 | 9.905+000 | 8.095+000 | 1.021+001 | 8.405+000 | 1.050+001 | 8.695+000 | 1.079+001 | 8.988+000 |
| 2.0+000 | 8.891+000 | 7.083+000 | 9.209+000 | 7.403+000 | 9.510+000 | 7.707+000 | 9.795+000 | 7.994+000 | 1.008+001 | 8.287+000 |
| 2.2+000 | 7.713+000 | 5.915+000 | 7.991+000 | 6.195+000 | 8.263+000 | 6.469+000 | 8.527+000 | 6.736+000 | 8.801+000 | 7.013+000 |
| 2.4+000 | 6.789+000 | 5.002+000 | 7.016+000 | 5.231+000 | 7.245+000 | 5.463+000 | 7.475+000 | 5.694+000 | 7.717+000 | 5.933+000 |
| 2.5+000 | 6.413+000 | 4.632+000 | 6.614+000 | 4.835+000 | 6.821+000 | 5.044+000 | 7.031+000 | 5.256+000 | 7.253+000 | 5.480+000 |
| 2.6+000 | 6.087+000 | 4.313+000 | 6.264+000 | 4.492+000 | 6.449+000 | 4.678+000 | 6.639+000 | 4.869+000 | 6.841+000 | 5.073+000 |
| 2.8+000 | 5.562+000 | 3.801+000 | 5.697+000 | 3.937+000 | 5.842+000 | 4.083+000 | 5.994+000 | 4.236+000 | 6.156+000 | 4.400+000 |
| 3.0+000 | 5.163+000 | 3.416+000 | 5.268+000 | 3.521+000 | 5.381+000 | 3.634+000 | 5.501+000 | 3.756+000 | 5.629+000 | 3.885+000 |
| 3.3+000 | 4.712+000 | 2.987+000 | 4.791+000 | 3.065+000 | 4.874+000 | 3.149+000 | 4.963+000 | 3.237+000 | 5.055+000 | 3.330+000 |
| 3.5+000 | 4.465+000 | 2.756+000 | 4.537+000 | 2.827+000 | 4.611+000 | 2.901+000 | 4.688+000 | 2.977+000 | 4.767+000 | 3.056+000 |
| 3.6+000 | 4.350+000 | 2.649+000 | 4.421+000 | 2.719+000 | 4.493+000 | 2.790+000 | 4.567+000 | 2.863+000 | 4.641+000 | 2.937+000 |
| 3.9+000 | 4.022+000 | 2.347+000 | 4.097+000 | 2.419+000 | 4.168+000 | 2.489+000 | 4.239+000 | 2.559+000 | 4.308+000 | 2.626+000 |
| 4.0+000 | 3.916+000 | 2.250+000 | 3.992+000 | 2.324+000 | 4.066+000 | 2.395+000 | 4.137+000 | 2.465+000 | 4.206+000 | 2.532+000 |
| 4.2+000 | 3.706+000 | 2.058+000 | 3.787+000 | 2.136+000 | 3.864+000 | 2.210+000 | 3.938+000 | 2.282+000 | 4.009+000 | 2.351+000 |
| 4.6+000 | 3.296+000 | 1.685+000 | 3.384+000 | 1.770+000 | 3.469+000 | 1.851+000 | 3.550+000 | 1.928+000 | 3.628+000 | 2.003+000 |
| 5.0+000 | 2.907+000 | 1.337+000 | 2.999+000 | 1.423+000 | 3.088+000 | 1.507+000 | 3.174+000 | 1.589+000 | 3.258+000 | 1.668+000 |
| 5.4+000 | 2.554+000 | 1.026+000 | 2.644+000 | 1.109+000 | 2.732+000 | 1.191+000 | 2.819+000 | 1.272+000 | 2.905+000 | 1.352+000 |
| 5.5+000 | 2.473+000 | 9.549-001 | 2.562+000 | 1.036+000 | 2.649+000 | 1.117+000 | 2.735+000 | 1.197+000 | 2.820+000 | 1.277+000 |
| 5.8+000 | 2.246+000 | 7.602-001 | 2.330+000 | 8.358-001 | 2.413+000 | 9.118-001 | 2.496+000 | 9.879-001 | 2.579+000 | 1.065+000 |
| 6.0+000 | 2.109+000 | 6.455-001 | 2.189+000 | 7.164-001 | 2.269+000 | 7.882-001 | 2.348+000 | 8.608-001 | 2.429+000 | 9.348-001 |
| 6.2+000 | 1.984+000 | 5.427-001 | 2.059+000 | 6.084-001 | 2.135+000 | 6.756-001 | 2.211+000 | 7.441-001 | 2.289+000 | 8.144-001 |
| 6.6+000 | 1.768+000 | 3.709-001 | 1.833+000 | 4.258-001 | 1.900+000 | 4.829-001 | 1.968+000 | 5.420-001 | 2.038+000 | 6.037-001 |
| 7.0+000 | 1.591+000 | 2.398-001 | 1.647+000 | 2.839-001 | 1.704+000 | 3.307-001 | 1.763+000 | 3.799-001 | 1.825+000 | 4.321-001 |
| 7.4+000 | 1.449+000 | 1.430-001 | 1.495+000 | 1.772-001 | 1.544+000 | 2.142-001 | 1.595+000 | 2.539-001 | 1.648+000 | 2.966-001 |
| 8.0+000 | 1.285+000 | 4.834-002 | 1.321+000 | 6.995-002 | 1.358+000 | 9.420-002 | 1.397+000 | 1.211-001 | 1.439+000 | 1.508-001 |
| 9.0+000 | 1.103+000 | -2.045-002 | 1.126+000 | -1.316-002 | 1.151+000 | -3.950-003 | 1.176+000 | 7.253-003 | 1.204+000 | 2.062-002 |
| 1.0+001 | 9.839-001 | -3.084-002 | 1.001+000 | -3.107-002 | 1.018+000 | -3.016-002 | 1.036+000 | -2.802-002 | 1.055+000 | -2.452-002 |
| 1.1+001 | 8.928-001 | -1.865-002 | 9.075-001 | -2.202-002 | 9.222-001 | -2.487-002 | 9.370-001 | -2.708-002 | 9.519-001 | -2.861-002 |
| 1.2+001 | 8.142-001 | -1.125-003 | 3.286-001 | -5.212-003 | 8.427-001 | -9.171-003 | 8.565-001 | -1.293-002 | 8.702-001 | -1.642-002 |
| 1.4+001 | 6.726-001 | 2.639-002 | 6.881-001 | 2.364-002 | 7.032-001 | 2.067-002 | 7.178-001 | 1.752-002 | 7.319-001 | 1.422-002 |
| 1.6+001 | 5.466-001 | 3.840-002 | 5.627-001 | 3.746-002 | 5.785-001 | 3.626-002 | 5.939-001 | 3.483-002 | 6.089-001 | 3.318-002 |
| 1.8+001 | 4.384-001 | 4.010-002 | 4.540-001 | 4.040-002 | 4.694-001 | 4.050-002 | 4.846-001 | 4.041-002 | 4.996-001 | 4.015-002 |
| 2.0+001 | 3.488-001 | 3.690-002 | 3.631-001 | 3.785-002 | 3.774-001 | 3.867-002 | 3.916-001 | 3.937-002 | 4.058-001 | 3.997-002 |
| 2.2+001 | 2.766-001 | 3.194-002 | 2.893-001 | 3.316-002 | 3.020-001 | 3.431-002 | 3.149-001 | 3.539-002 | 3.278-001 | 3.642-002 |
| 2.5+001 | 1.953-001 | 2.436-002 | 2.054-001 | 2.561-002 | 2.158-001 | 2.684-002 | 2.263-001 | 2.805-002 | 2.369-001 | 2.926-002 |
| 2.8+001 | 1.385-001 | 1.806-002 | 1.464-001 | 1.915-002 | 1.546-001 | 2.025-002 | 1.629-001 | 2.136-002 | 1.714-001 | 2.249-002 |
| 3.1+001 | 9.889-002 | 1.327-002 | 1.050-001 | 1.416-002 | 1.113-001 | 1.507-002 | 1.179-001 | 1.600-002 | 1.246-001 | 1.697-002 |
| 3.5+001 | 6.389-002 | 8.784-003 | 6.820-002 | 9.439-003 | 7.268-002 | 1.012-002 | 7.732-002 | 1.082-002 | 8.215-002 | 1.156-002 |
| 4.0+001 | 3.766-002 | 5.290-003 | 4.044-002 | 5.726-003 | 4.335-002 | 6.183-003 | 4.639-002 | 6.661-003 | 4.957-002 | 7.167-003 |
| 4.5+001 | 2.253-002 | 3.222-003 | 2.433-002 | 3.510-003 | 2.623-002 | 3.815-003 | 2.823-002 | 4.136-003 | 3.034-002 | 4.479-003 |
| 5.0+001 | 1.357-002 | 1.977-003 | 1.474-002 | 2.169-003 | 1.600-002 | 2.372-003 | 1.732-002 | 2.589-003 | 1.873-002 | 2.822-003 |
| 6.0+001 | 4.791-003 | 7.377-004 | 5.305-003 | 8.233-004 | 5.858-003 | 9.157-004 | 6.452-003 | 1.015-003 | 7.089-003 | 1.124-003 |
| 7.0+001 | 1.378-003 | 2.437-004 | 1.601-003 | 2.820-004 | 1.846-003 | 3.242-004 | 2.112-003 | 3.705-004 | 2.403-003 | 4.215-004 |
| 8.0+001 | 1.656-005 | 3.999-005 | 1.067-004 | 5.641-005 | 2.088-004 | 7.502-005 | 3.235-004 | 9.598-005 | 4.519-004 | 1.196-004 |
| 9.0+001 | -5.083-004 | -4.313-005 | -4.802-004 | -3.716-005 | -4.454-004 | -2.994-005 | -4.033-004 | -2.134-005 | -3.534-004 | -1.126-005 |
| 1.0+002 | -6.786-004 | -7.394-005 | -6.796-004 | -7.301-005 | -6.768-004 | -7.134-005 | -6.697-004 | -6.887-005 | -6.581-004 | -6.557-005 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{NFF}(x,z)$ --Continued

| x sin(theta/2) /lambda | 61 Pm | 62 Sm | 63 Eu | 64 Gd | 65 Tb | | | | | |
|------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------|-----------|-----------|-----------|-----------|
| | total without K-shell | total without K-shell | total without K-shell | total without K-shell | total without K-shell | | | | | |
| .0 | 6.051+001 | 5.868+001 | 5.149+001 | 5.966+001 | 6.247+001 | 6.065+001 | 6.346+001 | 6.163+001 | 6.443+001 | 6.262+001 |
| 1.0-002 | 6.043+001 | 5.861+001 | 5.142+001 | 5.960+001 | 6.241+001 | 6.059+001 | 6.340+001 | 6.157+001 | 6.438+001 | 6.256+001 |
| 2.0-002 | 6.026+001 | 5.842+001 | 5.124+001 | 5.941+001 | 6.223+001 | 6.040+001 | 6.321+001 | 6.139+001 | 6.420+001 | 6.238+001 |
| 3.0-002 | 5.995+001 | 5.811+001 | 5.094+001 | 5.911+001 | 6.193+001 | 6.011+001 | 6.291+001 | 6.109+001 | 6.391+001 | 6.210+001 |
| 4.0-002 | 5.954+001 | 5.770+001 | 5.054+001 | 5.871+001 | 6.154+001 | 5.971+001 | 6.251+001 | 6.069+001 | 6.353+001 | 6.171+001 |
| 5.0-002 | 5.905+001 | 5.721+001 | 5.006+001 | 5.822+001 | 6.106+001 | 5.923+001 | 6.203+001 | 6.021+001 | 6.307+001 | 6.125+001 |
| 6.0-002 | 5.849+001 | 5.665+001 | 5.951+001 | 5.768+001 | 6.052+001 | 5.869+001 | 6.148+001 | 5.966+001 | 6.255+001 | 6.073+001 |
| 7.0-002 | 5.789+001 | 5.605+001 | 5.891+001 | 5.708+001 | 5.993+001 | 5.811+001 | 6.087+001 | 5.905+001 | 6.197+001 | 6.016+001 |
| 8.0-002 | 5.725+001 | 5.541+001 | 5.828+001 | 5.645+001 | 5.931+001 | 5.748+001 | 6.023+001 | 5.841+001 | 6.136+001 | 5.955+001 |
| 9.0-002 | 5.660+001 | 5.476+001 | 5.763+001 | 5.580+001 | 5.867+001 | 5.684+001 | 5.957+001 | 5.775+001 | 6.073+001 | 5.891+001 |
| 1.0-001 | 5.593+001 | 5.409+001 | 5.697+001 | 5.514+001 | 5.801+001 | 5.618+001 | 5.889+001 | 5.706+001 | 6.008+001 | 5.826+001 |
| 1.1-001 | 5.525+001 | 5.342+001 | 5.630+001 | 5.446+001 | 5.734+001 | 5.551+001 | 5.819+001 | 5.637+001 | 5.942+001 | 5.760+001 |
| 1.2-001 | 5.457+001 | 5.274+001 | 5.562+001 | 5.379+001 | 5.666+001 | 5.484+001 | 5.750+001 | 5.568+001 | 5.875+001 | 5.694+001 |
| 1.3-001 | 5.389+001 | 5.206+001 | 5.494+001 | 5.311+001 | 5.599+001 | 5.416+001 | 5.680+001 | 5.498+001 | 5.808+001 | 5.626+001 |
| 1.4-001 | 5.321+001 | 5.137+001 | 5.426+001 | 5.243+001 | 5.531+001 | 5.348+001 | 5.610+001 | 5.428+001 | 5.740+001 | 5.558+001 |
| 1.5-001 | 5.253+001 | 5.069+001 | 5.357+001 | 5.174+001 | 5.462+001 | 5.280+001 | 5.541+001 | 5.359+001 | 5.672+001 | 5.490+001 |
| 1.6-001 | 5.184+001 | 5.001+001 | 5.289+001 | 5.106+001 | 5.394+001 | 5.211+001 | 5.471+001 | 5.289+001 | 5.604+001 | 5.422+001 |
| 1.7-001 | 5.116+001 | 4.932+001 | 5.220+001 | 5.037+001 | 5.325+001 | 5.143+001 | 5.402+001 | 5.220+001 | 5.535+001 | 5.353+001 |
| 1.8-001 | 5.048+001 | 4.864+001 | 5.152+001 | 4.969+001 | 5.256+001 | 5.074+001 | 5.333+001 | 5.151+001 | 5.466+001 | 5.284+001 |
| 1.9-001 | 4.979+001 | 4.796+001 | 5.083+001 | 4.900+001 | 5.188+001 | 5.005+001 | 5.264+001 | 5.082+001 | 5.397+001 | 5.215+001 |
| 2.0-001 | 4.911+001 | 4.728+001 | 5.015+001 | 4.832+001 | 5.119+001 | 4.936+001 | 5.195+001 | 5.013+001 | 5.328+001 | 5.146+001 |
| 2.2-001 | 4.776+001 | 4.592+001 | 4.879+001 | 4.695+001 | 4.982+001 | 4.799+001 | 5.059+001 | 4.877+001 | 5.189+001 | 5.008+001 |
| 2.4-001 | 4.642+001 | 4.459+001 | 4.744+001 | 4.561+001 | 4.846+001 | 4.663+001 | 4.924+001 | 4.742+001 | 5.052+001 | 4.870+001 |
| 2.5-001 | 4.577+001 | 4.393+001 | 4.677+001 | 4.494+001 | 4.779+001 | 4.596+001 | 4.858+001 | 4.675+001 | 4.984+001 | 4.802+001 |
| 2.6-001 | 4.512+001 | 4.328+001 | 4.611+001 | 4.428+001 | 4.712+001 | 4.529+001 | 4.791+001 | 4.609+001 | 4.916+001 | 4.734+001 |
| 2.8-001 | 4.384+001 | 4.201+001 | 4.482+001 | 4.299+001 | 4.581+001 | 4.399+001 | 4.661+001 | 4.479+001 | 4.782+001 | 4.600+001 |
| 3.0-001 | 4.261+001 | 4.078+001 | 4.357+001 | 4.174+001 | 4.454+001 | 4.271+001 | 4.535+001 | 4.453+001 | 4.652+001 | 4.470+001 |
| 3.2-001 | 4.143+001 | 3.959+001 | 4.236+001 | 4.053+001 | 4.331+001 | 4.148+001 | 4.412+001 | 4.230+001 | 4.525+001 | 4.343+001 |
| 3.4-001 | 4.029+001 | 3.845+001 | 4.120+001 | 3.937+001 | 4.212+001 | 4.030+001 | 4.293+001 | 4.110+001 | 4.402+001 | 4.220+001 |
| 3.5-001 | 3.974+001 | 3.790+001 | 4.063+001 | 3.880+001 | 4.155+001 | 3.972+001 | 4.235+001 | 4.053+001 | 4.342+001 | 4.160+001 |
| 3.6-001 | 3.920+001 | 3.736+001 | 4.008+001 | 3.825+001 | 4.098+001 | 3.916+001 | 4.178+001 | 3.996+001 | 4.283+001 | 4.102+001 |
| 3.8-001 | 3.815+001 | 3.632+001 | 3.901+001 | 3.718+001 | 3.989+001 | 3.806+001 | 4.067+001 | 3.885+001 | 4.169+001 | 3.987+001 |
| 4.0-001 | 3.716+001 | 3.532+001 | 3.799+001 | 3.616+001 | 3.884+001 | 3.701+001 | 3.961+001 | 3.779+001 | 4.059+001 | 3.878+001 |
| 4.2-001 | 3.620+001 | 3.437+001 | 3.701+001 | 3.518+001 | 3.783+001 | 3.601+001 | 3.859+001 | 3.677+001 | 3.954+001 | 3.772+001 |
| 4.4-001 | 3.529+001 | 3.345+001 | 3.607+001 | 3.424+001 | 3.687+001 | 3.504+001 | 3.761+001 | 3.579+001 | 3.852+001 | 3.671+001 |
| 4.5-001 | 3.484+001 | 3.301+001 | 3.561+001 | 3.378+001 | 3.640+001 | 3.457+001 | 3.713+001 | 3.531+001 | 3.803+001 | 3.622+001 |
| 4.6-001 | 3.441+001 | 3.257+001 | 3.516+001 | 3.333+001 | 3.594+001 | 3.411+001 | 3.667+001 | 3.485+001 | 3.755+001 | 3.573+001 |
| 4.8-001 | 3.356+001 | 3.173+001 | 3.430+001 | 3.247+001 | 3.505+001 | 3.323+001 | 3.576+001 | 3.394+001 | 3.661+001 | 3.480+001 |
| 5.0-001 | 3.275+001 | 3.092+001 | 3.346+001 | 3.163+001 | 3.419+001 | 3.237+001 | 3.489+001 | 3.307+001 | 3.571+001 | 3.390+001 |
| 5.5-001 | 3.085+001 | 2.901+001 | 3.151+001 | 2.968+001 | 3.219+001 | 3.036+001 | 3.285+001 | 3.103+001 | 3.360+001 | 3.179+001 |
| 6.0-001 | 2.909+001 | 2.726+001 | 2.971+001 | 2.788+001 | 3.034+001 | 2.852+001 | 3.098+001 | 2.916+001 | 3.166+001 | 2.985+001 |
| 6.5-001 | 2.748+001 | 2.565+001 | 2.806+001 | 2.623+001 | 2.865+001 | 2.682+001 | 2.926+001 | 2.744+001 | 2.988+001 | 2.807+001 |
| 7.0-001 | 2.599+001 | 2.416+001 | 2.653+001 | 2.470+001 | 2.708+001 | 2.526+001 | 2.766+001 | 2.585+001 | 2.823+001 | 2.642+001 |
| 8.0-001 | 2.337+001 | 2.154+001 | 2.383+001 | 2.201+001 | 2.431+001 | 2.249+001 | 2.484+001 | 2.302+001 | 2.532+001 | 2.350+001 |
| 9.0-001 | 2.120+001 | 1.937+001 | 2.160+001 | 1.977+001 | 2.201+001 | 2.019+001 | 2.246+001 | 2.065+001 | 2.287+001 | 2.106+001 |
| 1.0+000 | 1.943+001 | 1.761+001 | 1.977+001 | 1.795+001 | 2.012+001 | 1.830+001 | 2.050+001 | 1.869+001 | 2.085+001 | 1.904+001 |
| 1.1+000 | 1.801+001 | 1.618+001 | 1.829+001 | 1.647+001 | 1.859+001 | 1.677+001 | 1.891+001 | 1.710+001 | 1.920+001 | 1.739+001 |
| 1.2+000 | 1.683+001 | 1.501+001 | 1.708+001 | 1.526+001 | 1.733+001 | 1.552+001 | 1.760+001 | 1.580+001 | 1.786+001 | 1.605+001 |
| 1.3+000 | 1.583+001 | 1.401+001 | 1.606+001 | 1.425+001 | 1.629+001 | 1.448+001 | 1.652+001 | 1.472+001 | 1.675+001 | 1.495+001 |
| 1.4+000 | 1.494+001 | 1.312+001 | 1.516+001 | 1.335+001 | 1.538+001 | 1.357+001 | 1.559+001 | 1.379+001 | 1.580+001 | 1.400+001 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, F_{MFF}(x,Z)--Continued

| x sin(theta/2) /lambda | 61 Pm | 62 Sm | 63 Eu | 64 Gd | 65 Tb | | | | | |
|------------------------------|------------|--------------------|------------|--------------------|------------|--------------------|------------|--------------------|------------|--------------------|
| | total | without K-shell |
| 1.5+000 | 1.411+001 | 1.230+001 | 1.434+001 | 1.253+001 | 1.455+001 | 1.275+001 | 1.476+001 | 1.296+001 | 1.497+001 | 1.317+001 |
| 1.6+000 | 1.332+001 | 1.151+001 | 1.356+001 | 1.175+001 | 1.378+001 | 1.198+001 | 1.400+001 | 1.220+001 | 1.420+001 | 1.241+001 |
| 1.7+000 | 1.255+001 | 1.075+001 | 1.280+001 | 1.100+001 | 1.303+001 | 1.124+001 | 1.326+001 | 1.147+001 | 1.347+001 | 1.168+001 |
| 1.8+000 | 1.180+001 | 9.997+000 | 1.206+001 | 1.026+001 | 1.231+001 | 1.051+001 | 1.255+001 | 1.076+001 | 1.277+001 | 1.098+001 |
| 1.9+000 | 1.107+001 | 9.271+000 | 1.134+001 | 9.544+000 | 1.160+001 | 9.806+000 | 1.185+001 | 1.006+001 | 1.208+001 | 1.030+001 |
| 2.0+000 | 1.037+001 | 8.573+000 | 1.064+001 | 8.851+000 | 1.091+001 | 9.120+000 | 1.117+001 | 9.387+000 | 1.141+001 | 9.629+000 |
| 2.2+000 | 9.074+000 | 7.288+000 | 9.343+000 | 7.561+000 | 9.610+000 | 7.830+000 | 9.879+000 | 8.103+000 | 1.013+001 | 8.353+000 |
| 2.4+000 | 7.962+000 | 6.186+000 | 8.210+000 | 6.437+000 | 8.460+000 | 6.690+000 | 8.717+000 | 6.950+000 | 8.957+000 | 7.193+000 |
| 2.5+000 | 7.481+000 | 5.711+000 | 7.714+000 | 5.946+000 | 7.950+000 | 6.185+000 | 8.196+000 | 6.433+000 | 8.427+000 | 6.668+000 |
| 2.6+000 | 7.050+000 | 5.285+000 | 7.266+000 | 5.502+000 | 7.486+000 | 5.725+000 | 7.717+000 | 5.959+000 | 7.938+000 | 6.183+000 |
| 2.8+000 | 6.327+000 | 4.573+000 | 6.506+000 | 4.753+000 | 6.692+000 | 4.942+000 | 6.889+000 | 5.141+000 | 7.084+000 | 5.338+000 |
| 3.0+000 | 5.766+000 | 4.023+000 | 5.910+000 | 4.169+000 | 6.063+000 | 4.323+000 | 6.225+000 | 4.487+000 | 6.389+000 | 4.654+000 |
| 3.3+000 | 5.153+000 | 3.429+000 | 5.256+000 | 3.533+000 | 5.366+000 | 3.644+000 | 5.484+000 | 3.763+000 | 5.606+000 | 3.887+000 |
| 3.5+000 | 4.848+000 | 3.137+000 | 4.934+000 | 3.223+000 | 5.024+000 | 3.314+000 | 5.119+000 | 3.410+000 | 5.219+000 | 3.512+000 |
| 3.6+000 | 4.717+000 | 3.013+000 | 4.796+000 | 3.092+000 | 4.878+000 | 3.175+000 | 4.965+000 | 3.262+000 | 5.056+000 | 3.355+000 |
| 3.9+000 | 4.376+000 | 2.694+000 | 4.444+000 | 2.761+000 | 4.513+000 | 2.830+000 | 4.582+000 | 2.899+000 | 4.655+000 | 2.973+000 |
| 4.0+000 | 4.273+000 | 2.599+000 | 4.340+000 | 2.665+000 | 4.407+000 | 2.731+000 | 4.473+000 | 2.797+000 | 4.543+000 | 2.867+000 |
| 4.2+000 | 4.077+000 | 2.418+000 | 4.144+000 | 2.483+000 | 4.209+000 | 2.548+000 | 4.273+000 | 2.611+000 | 4.338+000 | 2.675+000 |
| 4.6+000 | 3.703+000 | 2.076+000 | 3.774+000 | 2.145+000 | 3.843+000 | 2.212+000 | 3.909+000 | 2.277+000 | 3.974+000 | 2.340+000 |
| 5.0+000 | 3.339+000 | 1.746+000 | 3.417+000 | 1.82C+000 | 3.492+000 | 1.893+000 | 3.564+000 | 1.963+000 | 3.634+000 | 2.030+000 |
| 5.4+000 | 2.988+000 | 1.431+000 | 3.070+000 | 1.505+000 | 3.150+000 | 1.585+000 | 3.228+000 | 1.659+000 | 3.302+000 | 1.730+000 |
| 5.5+000 | 2.904+000 | 1.356+000 | 2.986+000 | 1.434+000 | 3.067+000 | 1.510+000 | 3.145+000 | 1.585+000 | 3.221+000 | 1.657+000 |
| 5.8+000 | 2.662+000 | 1.142+000 | 2.744+000 | 1.218+000 | 2.824+000 | 1.294+000 | 2.904+000 | 1.370+000 | 2.982+000 | 1.443+000 |
| 6.0+000 | 2.510+000 | 1.009+000 | 2.591+000 | 1.084+000 | 2.671+000 | 1.159+000 | 2.750+000 | 1.233+000 | 2.828+000 | 1.306+000 |
| 6.2+000 | 2.367+000 | 8.858-001 | 2.446+000 | 9.575-001 | 2.524+000 | 1.030+000 | 2.603+000 | 1.104+000 | 2.680+000 | 1.176+000 |
| 6.6+000 | 2.109+000 | 6.673-001 | 2.182+000 | 7.325-001 | 2.255+000 | 7.991-001 | 2.330+000 | 8.671-001 | 2.404+000 | 9.349-001 |
| 7.0+000 | 1.889+000 | 4.868-001 | 1.954+000 | 5.437-001 | 2.021+000 | 6.026+001 | 2.089+000 | 6.636-001 | 2.158+000 | 7.253-001 |
| 7.4+000 | 1.703+000 | 3.421-001 | 1.761+000 | 3.901-001 | 1.820+000 | 4.405+001 | 1.881+000 | 4.936-001 | 1.943+000 | 5.479-001 |
| 8.0+000 | 1.483+000 | 1.834-001 | 1.529+000 | 2.186-001 | 1.577+000 | 2.564+001 | 1.627+000 | 2.970+001 | 1.678+000 | 3.396-001 |
| 9.0+000 | 1.232+000 | 3.620-002 | 1.263+000 | 5.403-002 | 1.295+000 | 7.418-002 | 1.329+000 | 9.678-002 | 1.365+000 | 1.215-001 |
| 1.0+001 | 1.075+000 | -1.957-002 | 1.096+000 | -1.305-002 | 1.118+000 | -4.877-003 | 1.141+000 | 5.077-003 | 1.165+000 | 1.677-002 |
| 1.1+001 | 9.672-001 | -2.931-002 | 9.828-001 | -2.910-002 | 9.989-001 | -2.788-002 | 1.016+000 | -2.554-002 | 1.033+000 | -2.200-002 |
| 1.2+001 | 8.837-001 | -1.957-002 | 8.972-001 | -2.229-002 | 9.108-001 | -2.449-002 | 9.245-001 | -2.610-002 | 9.384-001 | -2.700-002 |
| 1.4+001 | 7.456-001 | 1.081-002 | 7.589-001 | 7.324-003 | 7.719-001 | 3.808-003 | 7.845-001 | 3.009-004 | 7.969-001 | -3.128-003 |
| 1.6+001 | 6.235-001 | 3.132-002 | 6.377-001 | 2.925-002 | 6.516-001 | 2.699-002 | 6.651-001 | 2.455-002 | 6.782-001 | 2.195-002 |
| 1.8+001 | 5.144-001 | 3.970-002 | 5.289-001 | 3.907-002 | 5.432-001 | 3.824-002 | 5.572-001 | 3.723-002 | 5.709-001 | 3.602-002 |
| 2.0+001 | 4.199-001 | 4.044-002 | 4.340-001 | 4.078-002 | 4.479-001 | 4.097-002 | 4.616-001 | 4.103-002 | 4.752-001 | 4.092-002 |
| 2.2+001 | 3.407-001 | 3.738-002 | 3.537-001 | 3.826-002 | 3.666-001 | 3.905-002 | 3.796-001 | 3.977-002 | 3.925-001 | 4.035-002 |
| 2.5+001 | 2.477-001 | 3.046-002 | 2.587-001 | 3.163-002 | 2.697-001 | 3.278-002 | 2.809-001 | 3.391-002 | 2.921-001 | 3.497-002 |
| 2.8+001 | 1.201-001 | 2.363-002 | 1.890-001 | 2.479-002 | 1.981-001 | 2.595-002 | 2.074-001 | 2.712-002 | 2.167-001 | 2.827-002 |
| 3.1+001 | 1.315-001 | 1.796-002 | 1.386-001 | 1.898-002 | 1.459-001 | 2.001-002 | 1.533-001 | 2.108-002 | 1.610-001 | 2.214-002 |
| 3.5+001 | 8.716-002 | 1.233-002 | 9.233-002 | 1.312-002 | 9.769-002 | 1.394-002 | 1.032-001 | 1.480-002 | 1.089-001 | 1.567-002 |
| 4.0+001 | 5.290-002 | 7.698-003 | 5.636-002 | 8.255-003 | 5.997-002 | 8.839-003 | 6.374-002 | 9.453-003 | 6.764-002 | 1.009-002 |
| 4.5+001 | 3.255-002 | 4.843-003 | 3.488-002 | 5.227-003 | 3.732-002 | 5.633-003 | 3.987-002 | 6.063-003 | 4.254-002 | 6.512-003 |
| 5.0+001 | 2.021-002 | 3.070-003 | 2.178-002 | 3.334-003 | 2.344-002 | 3.615-003 | 2.519-002 | 3.915-003 | 2.702-002 | 4.230-003 |
| 6.0+001 | 7.771-003 | 1.241-003 | 8.500-003 | 1.367-003 | 9.279-003 | 1.503-003 | 1.011-002 | 1.650-003 | 1.099-002 | 1.807-003 |
| 7.0+001 | 2.719-003 | 4.775-004 | 3.062-003 | 5.386-004 | 3.434-003 | 6.054-004 | 3.835-003 | 6.785-004 | 4.268-003 | 7.574-004 |
| 8.0+001 | 5.950-004 | 1.460-004 | 7.535-004 | 1.754-004 | 9.286-004 | 2.081-004 | 1.121-003 | 2.444-004 | 1.333-003 | 2.844-004 |
| 9.0+001 | -2.949-004 | 4.510-007 | -2.272-004 | 1.393-005 | -1.496-004 | 2.936-005 | -6.139-005 | 4.691-005 | 3.829-005 | 6.673-005 |
| 1.0+002 | -6.413-004 | -6.132-005 | -6.192-004 | -5.601-005 | -5.910-004 | -4.953-005 | -5.563-004 | -4.180-005 | -5.144-004 | -3.263-005 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, Z)$ --Continued

| x | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | | | | | |
|--------------------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------|
| $\sin(\theta/2)/\lambda$ | total | without K-shell | | |
| .0 | 6.541+001 | 6.360+001 | 6.639+001 | 6.459+001 | 6.737+001 | 6.557+001 | 6.835+001 | 6.655+001 | 6.933+001 | 6.753+001 |
| 1.0-002 | 6.536+001 | 6.354+001 | 6.634+001 | 6.453+001 | 6.731+001 | 6.551+001 | 6.828+001 | 6.650+001 | 6.926+001 | 6.748+001 |
| 2.0-002 | 6.518+001 | 6.337+001 | 6.616+001 | 6.436+001 | 6.715+001 | 6.535+001 | 6.813+001 | 6.633+001 | 6.911+001 | 6.732+001 |
| 3.0-002 | 6.490+001 | 6.309+001 | 6.589+001 | 6.408+001 | 6.688+001 | 6.508+001 | 6.786+001 | 6.607+001 | 6.885+001 | 6.706+001 |
| 4.0-002 | 6.453+001 | 6.272+001 | 6.552+001 | 6.372+001 | 6.652+001 | 6.471+001 | 6.751+001 | 6.571+001 | 6.850+001 | 6.671+001 |
| 5.0-002 | 6.407+001 | 6.226+001 | 6.508+001 | 6.327+001 | 6.608+001 | 6.427+001 | 6.708+001 | 6.528+001 | 6.807+001 | 6.628+001 |
| 6.0-002 | 6.356+001 | 6.175+001 | 6.457+001 | 6.276+001 | 6.557+001 | 6.377+001 | 6.658+001 | 6.478+001 | 6.758+001 | 6.579+001 |
| 7.0-002 | 6.299+001 | 6.118+001 | 6.401+001 | 6.220+001 | 6.502+001 | 6.322+001 | 6.603+001 | 6.424+001 | 6.705+001 | 6.525+001 |
| 8.0-002 | 6.239+001 | 6.058+001 | 6.341+001 | 6.160+001 | 6.443+001 | 6.263+001 | 6.545+001 | 6.365+001 | 6.647+001 | 6.468+001 |
| 9.0-002 | 6.176+001 | 5.995+001 | 6.279+001 | 6.098+001 | 6.381+001 | 6.201+001 | 6.484+001 | 6.304+001 | 6.586+001 | 6.407+001 |
| 1.0-001 | 6.112+001 | 5.330+001 | 6.215+001 | 6.034+001 | 6.318+001 | 6.138+001 | 6.421+001 | 6.241+001 | 6.524+001 | 6.345+001 |
| 1.1-001 | 6.046+001 | 5.865+001 | 6.150+001 | 5.969+001 | 6.253+001 | 6.073+001 | 6.356+001 | 6.177+001 | 6.460+001 | 6.281+001 |
| 1.2-001 | 5.979+001 | 5.798+001 | 6.083+001 | 5.903+001 | 6.187+001 | 6.007+001 | 6.291+001 | 6.111+001 | 6.395+001 | 6.216+001 |
| 1.3-001 | 5.912+001 | 5.731+001 | 6.017+001 | 5.836+001 | 6.121+001 | 5.941+001 | 6.225+001 | 6.045+001 | 6.329+001 | 6.150+001 |
| 1.4-001 | 5.845+001 | 5.564+001 | 5.949+001 | 5.769+001 | 6.054+001 | 5.874+001 | 6.158+001 | 5.978+001 | 6.262+001 | 6.083+001 |
| 1.5-001 | 5.777+001 | 5.596+001 | 5.881+001 | 5.701+001 | 5.986+001 | 5.805+001 | 6.091+001 | 5.911+001 | 6.195+001 | 6.016+001 |
| 1.6-001 | 5.709+001 | 5.527+001 | 5.813+001 | 5.633+001 | 5.918+001 | 5.738+001 | 6.023+001 | 5.843+001 | 6.127+001 | 5.948+001 |
| 1.7-001 | 5.640+001 | 5.459+001 | 5.745+001 | 5.564+001 | 5.850+001 | 5.670+001 | 5.955+001 | 5.775+001 | 6.059+001 | 5.880+001 |
| 1.8-001 | 5.571+001 | 5.390+001 | 5.676+001 | 5.495+001 | 5.781+001 | 5.601+001 | 5.886+001 | 5.706+001 | 5.991+001 | 5.812+001 |
| 1.9-001 | 5.502+001 | 5.321+001 | 5.607+001 | 5.426+001 | 5.712+001 | 5.532+001 | 5.817+001 | 5.637+001 | 5.922+001 | 5.743+001 |
| 2.0-001 | 5.433+001 | 5.251+001 | 5.537+001 | 5.357+001 | 5.642+001 | 5.462+001 | 5.747+001 | 5.568+001 | 5.852+001 | 5.673+001 |
| 2.2-001 | 5.294+001 | 5.113+001 | 5.398+001 | 5.218+001 | 5.503+001 | 5.323+001 | 5.608+001 | 5.428+001 | 5.713+001 | 5.534+001 |
| 2.4-001 | 5.156+001 | 4.974+001 | 5.260+001 | 5.079+001 | 5.364+001 | 5.184+001 | 5.468+001 | 5.289+001 | 5.573+001 | 5.394+001 |
| 2.5-001 | 5.087+001 | 4.906+001 | 5.191+001 | 5.010+001 | 5.295+001 | 5.114+001 | 5.399+001 | 5.219+001 | 5.503+001 | 5.324+001 |
| 2.6-001 | 5.019+001 | 4.837+001 | 5.122+001 | 4.941+001 | 5.225+001 | 5.045+001 | 5.329+001 | 5.150+001 | 5.434+001 | 5.255+001 |
| 2.8-001 | 4.884+001 | 4.703+001 | 4.986+001 | 4.805+001 | 5.089+001 | 4.909+001 | 5.192+001 | 5.012+001 | 5.295+001 | 5.116+001 |
| 3.0-001 | 4.752+001 | 4.571+001 | 4.853+001 | 4.672+001 | 4.954+001 | 4.774+001 | 5.056+001 | 4.877+001 | 5.159+001 | 4.980+001 |
| 3.2-001 | 4.623+001 | 4.442+001 | 4.722+001 | 4.542+001 | 4.823+001 | 4.642+001 | 4.923+001 | 4.744+001 | 5.025+001 | 4.846+001 |
| 3.4-001 | 4.498+001 | 4.317+001 | 4.596+001 | 4.415+001 | 4.694+001 | 4.514+001 | 4.794+001 | 4.614+001 | 4.894+001 | 4.715+001 |
| 3.5-001 | 4.437+001 | 4.256+001 | 4.534+001 | 4.354+001 | 4.632+001 | 4.452+001 | 4.730+001 | 4.551+001 | 4.830+001 | 4.651+001 |
| 3.6-001 | 4.378+001 | 4.197+001 | 4.473+001 | 4.293+001 | 4.570+001 | 4.391+001 | 4.668+001 | 4.488+001 | 4.766+001 | 4.587+001 |
| 3.8-001 | 4.261+001 | 4.080+001 | 4.355+001 | 4.174+001 | 4.450+001 | 4.270+001 | 4.546+001 | 4.366+001 | 4.642+001 | 4.463+001 |
| 4.0-001 | 4.149+001 | 3.968+001 | 4.241+001 | 4.060+001 | 4.333+001 | 4.153+001 | 4.427+001 | 4.248+001 | 4.522+001 | 4.343+001 |
| 4.2-001 | 4.041+001 | 3.860+001 | 4.131+001 | 3.950+001 | 4.221+001 | 4.041+001 | 4.313+001 | 4.134+001 | 4.406+001 | 4.227+001 |
| 4.4-001 | 3.938+001 | 3.757+001 | 4.025+001 | 3.844+001 | 4.113+001 | 3.933+001 | 4.203+001 | 4.023+001 | 4.294+001 | 4.115+001 |
| 4.5-001 | 3.887+001 | 3.706+001 | 3.973+001 | 3.793+001 | 4.061+001 | 3.881+001 | 4.149+001 | 3.970+001 | 4.239+001 | 4.060+001 |
| 4.6-001 | 3.838+001 | 3.557+001 | 3.923+001 | 3.742+001 | 4.009+001 | 3.829+001 | 4.097+001 | 3.917+001 | 4.186+001 | 4.007+001 |
| 4.8-001 | 3.742+001 | 3.561+001 | 3.825+001 | 3.644+001 | 3.909+001 | 3.729+001 | 3.994+001 | 3.815+001 | 4.081+001 | 3.902+001 |
| 5.0-001 | 3.650+001 | 3.469+001 | 3.730+001 | 3.550+001 | 3.812+001 | 3.632+001 | 3.895+001 | 3.716+001 | 3.980+001 | 3.801+001 |
| 5.5-001 | 3.433+001 | 3.252+001 | 3.508+001 | 3.328+001 | 3.585+001 | 3.405+001 | 3.663+001 | 3.484+001 | 3.743+001 | 3.564+001 |
| 6.0-001 | 3.235+001 | 3.054+001 | 3.305+001 | 3.124+001 | 3.377+001 | 3.197+001 | 3.450+001 | 3.270+001 | 3.525+001 | 3.346+001 |
| 6.5-001 | 3.052+001 | 2.871+001 | 3.117+001 | 2.937+001 | 3.185+001 | 3.005+001 | 3.253+001 | 3.074+001 | 3.323+001 | 3.145+001 |
| 7.0-001 | 2.883+001 | 2.702+001 | 2.944+001 | 2.764+001 | 3.007+001 | 2.828+001 | 3.072+001 | 2.893+001 | 3.138+001 | 2.959+001 |
| 8.0-001 | 2.584+001 | 2.403+001 | 2.637+001 | 2.457+001 | 2.692+001 | 2.513+001 | 2.749+001 | 2.570+001 | 2.807+001 | 2.628+001 |
| 9.0-001 | 2.332+001 | 2.151+001 | 2.378+001 | 2.198+001 | 2.426+001 | 2.246+001 | 2.475+001 | 2.296+001 | 2.525+001 | 2.346+001 |
| 1.0+000 | 2.123+001 | 1.943+001 | 2.162+001 | 1.982+001 | 2.203+001 | 2.024+001 | 2.245+001 | 2.066+001 | 2.288+001 | 2.110+001 |
| 1.1+000 | 1.952+001 | 1.772+001 | 1.985+001 | 1.806+001 | 2.020+001 | 1.841+001 | 2.055+001 | 1.876+001 | 2.092+001 | 1.914+001 |
| 1.2+000 | 1.813+001 | 1.533+001 | 1.841+001 | 1.661+001 | 1.870+001 | 1.691+001 | 1.900+001 | 1.721+001 | 1.930+001 | 1.753+001 |
| 1.3+000 | 1.698+001 | 1.519+001 | 1.722+001 | 1.543+001 | 1.747+001 | 1.568+001 | 1.772+001 | 1.594+001 | 1.798+001 | 1.620+001 |
| 1.4+000 | 1.601+001 | 1.422+001 | 1.623+001 | 1.444+001 | 1.644+001 | 1.465+001 | 1.666+001 | 1.488+001 | 1.689+001 | 1.511+001 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, z)$ --Continued

| x | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | | | | | |
|------------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|------------|
| $\sin(\theta/2)$ | total | without K-shell | | |
| /lambda | | | | | | | | | | |
| 1.5+000 | 1.517+001 | 1.338+001 | 1.537+001 | 1.358+001 | 1.557+001 | 1.372+001 | 1.576+001 | 1.399+001 | 1.596+001 | 1.419+001 |
| 1.6+000 | 1.440+001 | 1.261+001 | 1.459+001 | 1.281+001 | 1.479+001 | 1.301+001 | 1.497+001 | 1.320+001 | 1.516+001 | 1.339+001 |
| 1.7+000 | 1.368+001 | 1.189+001 | 1.388+001 | 1.209+001 | 1.407+001 | 1.229+001 | 1.425+001 | 1.248+001 | 1.444+001 | 1.267+001 |
| 1.8+000 | 1.298+001 | 1.120+001 | 1.319+001 | 1.141+001 | 1.339+001 | 1.161+001 | 1.358+001 | 1.181+001 | 1.376+001 | 1.200+001 |
| 1.9+000 | 1.231+001 | 1.053+001 | 1.252+001 | 1.075+001 | 1.273+001 | 1.096+001 | 1.293+001 | 1.116+001 | 1.312+001 | 1.136+001 |
| 2.0+000 | 1.165+001 | 9.869+000 | 1.187+001 | 1.010+001 | 1.209+001 | 1.032+001 | 1.230+001 | 1.053+001 | 1.250+001 | 1.074+001 |
| 2.2+000 | 1.037+001 | 8.605+000 | 1.061+001 | 8.849+000 | 1.085+001 | 9.086+000 | 1.107+001 | 9.314+000 | 1.129+001 | 9.535+000 |
| 2.4+000 | 9.202+000 | 7.441+000 | 9.444+000 | 7.686+000 | 9.681+000 | 7.927+000 | 9.913+000 | 8.163+000 | 1.014+001 | 8.393+000 |
| 2.5+000 | 8.666+000 | 6.909+000 | 8.903+000 | 7.149+000 | 9.137+000 | 7.387+000 | 9.368+000 | 7.622+000 | 9.595+000 | 7.852+000 |
| 2.6+000 | 8.167+000 | 6.414+000 | 8.396+000 | 6.647+000 | 8.624+000 | 6.878+000 | 8.851+000 | 7.109+000 | 9.076+000 | 7.336+000 |
| 2.8+000 | 7.286+000 | 5.543+000 | 7.493+000 | 5.753+000 | 7.702+000 | 5.965+000 | 7.913+000 | 6.179+000 | 8.125+000 | 6.394+000 |
| 3.0+000 | 6.562+000 | 4.829+000 | 6.741+000 | 5.010+000 | 6.925+000 | 5.196+000 | 7.112+000 | 5.387+000 | 7.303+000 | 5.581+000 |
| 3.3+000 | 5.736+000 | 4.019+000 | 5.872+000 | 4.157+000 | 6.015+000 | 4.301+000 | 6.163+000 | 4.452+000 | 6.317+000 | 4.608+000 |
| 3.5+000 | 5.325+000 | 3.619+000 | 5.437+000 | 3.733+000 | 5.555+000 | 3.852+000 | 5.678+000 | 3.978+000 | 5.808+000 | 4.109+000 |
| 3.6+000 | 5.152+000 | 3.452+000 | 5.254+000 | 3.555+000 | 5.361+000 | 3.663+000 | 5.473+000 | 3.778+000 | 5.591+000 | 3.898+000 |
| 3.9+000 | 4.730+000 | 3.048+000 | 4.808+000 | 3.127+000 | 4.890+000 | 3.210+000 | 4.975+000 | 3.296+000 | 5.065+000 | 3.387+000 |
| 4.0+000 | 4.613+000 | 2.937+000 | 4.686+000 | 3.011+000 | 4.761+000 | 3.087+000 | 4.840+000 | 3.167+000 | 4.922+000 | 3.251+000 |
| 4.2+000 | 4.402+000 | 2.740+000 | 4.468+000 | 2.805+000 | 4.535+000 | 2.873+000 | 4.603+000 | 2.942+000 | 4.575+000 | 3.015+000 |
| 4.6+000 | 4.036+000 | 2.402+000 | 4.098+000 | 2.462+000 | 4.158+000 | 2.522+000 | 4.218+000 | 2.582+000 | 4.277+000 | 2.642+000 |
| 5.0+000 | 3.700+000 | 2.095+000 | 3.765+000 | 2.158+000 | 3.827+000 | 2.219+000 | 3.888+000 | 2.279+000 | 3.946+000 | 2.337+000 |
| 5.4+000 | 3.374+000 | 1.800+000 | 3.444+000 | 1.867+000 | 3.512+000 | 1.933+000 | 3.576+000 | 1.996+000 | 3.639+000 | 2.057+000 |
| 5.5+000 | 3.294+000 | 1.727+000 | 3.365+000 | 1.795+000 | 3.434+000 | 1.862+000 | 3.500+000 | 1.927+000 | 3.564+000 | 1.989+000 |
| 5.8+000 | 3.057+000 | 1.515+000 | 3.131+000 | 1.585+000 | 3.203+000 | 1.655+000 | 3.273+000 | 1.722+000 | 3.340+000 | 1.787+000 |
| 6.0+000 | 2.904+000 | 1.379+000 | 2.979+000 | 1.450+000 | 3.053+000 | 1.520+000 | 3.124+000 | 1.588+000 | 3.193+000 | 1.655+000 |
| 6.2+000 | 2.756+000 | 1.247+000 | 2.832+000 | 1.319+000 | 2.906+000 | 1.389+000 | 2.978+000 | 1.458+000 | 3.049+000 | 1.526+000 |
| 6.6+000 | 2.478+000 | 1.004+000 | 2.552+000 | 1.073+000 | 2.625+000 | 1.141+000 | 2.698+000 | 1.210+000 | 2.770+000 | 1.278+000 |
| 7.0+000 | 2.227+000 | 7.886-001 | 2.298+000 | 8.529-001 | 2.368+000 | 9.179-001 | 2.439+000 | 9.834-001 | 2.509+000 | 1.049+000 |
| 7.4+000 | 2.007+000 | 6.044-001 | 2.072+000 | 6.625-001 | 2.138+000 | 7.219-001 | 2.204+000 | 7.825-001 | 2.271+000 | 8.440-001 |
| 8.0+000 | 1.732+000 | 3.847-001 | 1.787+000 | 4.319-001 | 1.844+000 | 4.812-001 | 1.902+000 | 5.324-001 | 1.962+000 | 5.852-001 |
| 9.0+000 | 1.403+000 | 1.487-001 | 1.442+000 | 1.782-001 | 1.483+000 | 2.100-001 | 1.526+000 | 2.441-001 | 1.571+000 | 2.803-001 |
| 1.0+001 | 1.191+000 | 3.038-002 | 1.218+000 | 4.593-002 | 1.247+000 | 6.347-002 | 1.277+000 | 8.303-002 | 1.308+000 | 1.046-001 |
| 1.1+001 | 1.051+000 | -1.717-002 | 1.071+000 | -1.095-002 | 1.091+000 | -3.281-003 | 1.112+000 | 5.925-003 | 1.134+000 | 1.673-002 |
| 1.2+001 | 9.527-001 | -2.714-002 | 9.674-001 | -2.642-002 | 9.826-001 | -2.475-002 | 9.983-001 | -2.206-002 | 1.315+000 | -1.826-002 |
| 1.4+001 | 8.090-001 | -6.447-003 | 8.210-001 | -9.593-003 | 8.328-001 | -1.251-002 | 8.446-001 | -1.514-002 | 8.563-001 | -1.741-002 |
| 1.6+001 | 6.910-001 | 1.922-002 | 7.034-001 | 1.638-002 | 7.154-001 | 1.346-002 | 7.272-001 | 1.048-002 | 7.387-001 | 7.486-003 |
| 1.8+001 | 5.843-001 | 3.463-002 | 5.974-001 | 3.306-002 | 6.102-001 | 3.133-002 | 6.227-001 | 2.944-002 | 6.349-001 | 2.740-002 |
| 2.0+001 | 4.887-001 | 4.067-002 | 5.019-001 | 4.025-002 | 5.149-001 | 3.969-002 | 5.278-001 | 3.896-002 | 5.404-001 | 3.807-002 |
| 2.2+001 | 4.053-001 | 4.084-002 | 4.181-001 | 4.122-002 | 4.308-001 | 4.148-002 | 4.434-001 | 4.162-002 | 4.358-001 | 4.164-002 |
| 2.5+001 | 3.035-001 | 3.600-002 | 3.148-001 | 3.693-002 | 3.263-001 | 3.790-002 | 3.377-001 | 3.876-002 | 3.492-001 | 3.955-002 |
| 2.8+001 | 2.263-001 | 2.942-002 | 2.359-001 | 3.056-002 | 2.457-001 | 3.169-002 | 2.556-001 | 3.281-002 | 2.656-001 | 3.389-002 |
| 3.1+001 | 1.688-001 | 2.323-002 | 1.768-001 | 2.433-002 | 1.849-001 | 2.544-002 | 1.932-001 | 2.656-002 | 2.016-001 | 2.768-002 |
| 3.5+001 | 1.148-001 | 1.657-002 | 1.208-001 | 1.750-002 | 1.270-001 | 1.845-002 | 1.334-001 | 1.943-002 | 1.399-001 | 2.042-002 |
| 4.0+001 | 7.169-002 | 1.075-002 | 7.589-002 | 1.144-002 | 8.025-002 | 1.216-002 | 8.475-002 | 1.291-002 | 8.941-002 | 1.368-002 |
| 4.5+001 | 4.533-002 | 6.986-003 | 4.825-002 | 7.484-003 | 5.129-002 | 8.006-003 | 5.445-002 | 8.554-003 | 5.774-002 | 9.127-003 |
| 5.0+001 | 2.895-002 | 4.566-003 | 3.098-002 | 4.921-003 | 3.310-002 | 5.296-003 | 3.533-002 | 5.692-003 | 3.766-002 | 6.109-003 |
| 6.0+001 | 1.193-002 | 1.975-003 | 1.293-002 | 2.156-003 | 1.398-002 | 2.349-003 | 1.510-002 | 2.555-003 | 1.629-002 | 2.775-003 |
| 7.0+001 | 4.733-003 | 8.433-004 | 5.234-003 | 9.364-004 | 5.771-003 | 1.037-003 | 6.346-003 | 1.146-003 | 6.961-003 | 1.264-003 |
| 8.0+001 | 1.564-003 | 3.285-004 | 1.817-003 | 3.769-004 | 2.092-003 | 4.301-004 | 2.391-003 | 4.883-004 | 2.714-003 | 5.518-004 |
| 9.0+001 | 1.502-004 | 8.904-005 | 2.752-004 | 1.140-004 | 4.142-004 | 1.420-004 | 5.682-004 | 1.730-004 | 7.379-004 | 2.074-004 |
| 1.0+002 | -4.650-004 | -2.194-005 | -4.073-004 | -9.565-006 | -3.406-004 | -4.641-006 | -2.644-004 | 2.084-005 | -1.780-004 | 3.920-005 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, z)$ --Continued

| x | $\sin(\theta/2)$ | 71 Lu | 72 Hf | 73 Ta | 74 U | 75 Re | | | | |
|------------|------------------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|
| $/\lambda$ | total | without K-shell | total | without K-shell | total | without K-shell | total | without K-shell | total | without K-shell |
| .0 | 7.030+001 | 6.852+001 | 7.128+001 | 6.950+001 | 7.225+001 | 7.048+001 | 7.323+001 | 7.146+001 | 7.420+001 | 7.244+001 |
| 1.0-002 | 7.023+001 | 6.846+001 | 7.121+001 | 6.944+001 | 7.219+001 | 7.042+001 | 7.318+001 | 7.141+001 | 7.416+001 | 7.239+001 |
| 2.0-002 | 7.008+001 | 6.830+001 | 7.106+001 | 6.928+001 | 7.204+001 | 7.027+001 | 7.302+001 | 7.125+001 | 7.400+001 | 7.224+001 |
| 3.0-002 | 6.981+001 | 6.803+001 | 7.080+001 | 6.902+001 | 7.178+001 | 7.001+001 | 7.277+001 | 7.100+001 | 7.375+001 | 7.199+001 |
| 4.0-002 | 6.945+001 | 6.767+001 | 7.044+001 | 6.866+001 | 7.143+001 | 6.966+001 | 7.242+001 | 7.065+001 | 7.341+001 | 7.165+001 |
| 5.0-002 | 6.901+001 | 6.723+001 | 7.000+001 | 6.822+001 | 7.100+001 | 6.922+001 | 7.199+001 | 7.022+001 | 7.299+001 | 7.122+001 |
| 6.0-002 | 6.851+001 | 6.672+001 | 6.949+001 | 6.771+001 | 7.049+001 | 6.872+001 | 7.149+001 | 6.972+001 | 7.249+001 | 7.073+001 |
| 7.0-002 | 6.795+001 | 6.617+001 | 6.893+001 | 6.715+001 | 6.993+001 | 6.815+001 | 7.093+001 | 6.916+001 | 7.193+001 | 7.017+001 |
| 8.0-002 | 6.736+001 | 6.557+001 | 6.832+001 | 6.654+001 | 6.932+001 | 6.754+001 | 7.032+001 | 6.855+001 | 7.132+001 | 6.956+001 |
| 9.0-002 | 6.673+001 | 6.495+001 | 6.768+001 | 6.590+001 | 6.867+001 | 6.689+001 | 6.967+001 | 6.790+001 | 7.067+001 | 6.890+001 |
| 1.0-001 | 6.609+001 | 6.430+001 | 6.702+001 | 6.524+001 | 6.799+001 | 6.622+001 | 6.898+001 | 6.721+001 | 6.998+001 | 6.821+001 |
| 1.1-001 | 6.543+001 | 6.364+001 | 6.634+001 | 6.456+001 | 6.730+001 | 6.552+001 | 6.828+001 | 6.651+001 | 6.926+001 | 6.750+001 |
| 1.2-001 | 6.476+001 | 6.298+001 | 6.565+001 | 6.387+001 | 6.659+001 | 6.481+001 | 6.755+001 | 6.578+001 | 6.853+001 | 6.677+001 |
| 1.3-001 | 6.409+001 | 6.230+001 | 6.496+001 | 6.318+001 | 6.587+001 | 6.410+001 | 6.682+001 | 6.505+001 | 6.778+001 | 6.602+001 |
| 1.4-001 | 6.341+001 | 6.162+001 | 6.426+001 | 6.248+001 | 6.515+001 | 6.338+001 | 6.608+001 | 6.431+001 | 6.703+001 | 6.527+001 |
| 1.5-001 | 6.273+001 | 6.094+001 | 6.356+001 | 6.177+001 | 6.443+001 | 6.265+001 | 6.534+001 | 6.357+001 | 6.627+001 | 6.451+001 |
| 1.6-001 | 6.204+001 | 6.026+001 | 6.285+001 | 6.107+001 | 6.371+001 | 6.193+001 | 6.460+001 | 6.283+001 | 6.551+001 | 6.375+001 |
| 1.7-001 | 6.136+001 | 5.957+001 | 6.215+001 | 6.037+001 | 6.299+001 | 6.121+001 | 6.386+001 | 6.209+001 | 6.475+001 | 6.299+001 |
| 1.8-001 | 6.067+001 | 5.889+001 | 6.145+001 | 5.967+001 | 6.227+001 | 6.049+001 | 6.312+001 | 6.135+001 | 6.400+001 | 6.223+001 |
| 1.9-001 | 5.998+001 | 5.820+001 | 6.076+001 | 5.898+001 | 6.156+001 | 5.978+001 | 6.239+001 | 6.062+001 | 6.325+001 | 6.148+001 |
| 2.0-001 | 5.929+001 | 5.751+001 | 6.006+001 | 5.828+001 | 6.085+001 | 5.907+001 | 6.166+001 | 5.989+001 | 6.250+001 | 6.074+001 |
| 2.2-001 | 5.791+001 | 5.613+001 | 5.867+001 | 5.689+001 | 5.944+001 | 5.766+001 | 6.022+001 | 5.845+001 | 6.103+001 | 5.926+001 |
| 2.4-001 | 5.653+001 | 5.475+001 | 5.729+001 | 5.551+001 | 5.804+001 | 5.627+001 | 5.881+001 | 5.704+001 | 5.958+001 | 5.781+001 |
| 2.5-001 | 5.584+001 | 5.406+001 | 5.660+001 | 5.482+001 | 5.735+001 | 5.558+001 | 5.810+001 | 5.634+001 | 5.887+001 | 5.710+001 |
| 2.6-001 | 5.516+001 | 5.337+001 | 5.592+001 | 5.414+001 | 5.666+001 | 5.489+001 | 5.741+001 | 5.564+001 | 5.816+001 | 5.640+001 |
| 2.8-001 | 5.379+001 | 5.201+001 | 5.456+001 | 5.278+001 | 5.531+001 | 5.353+001 | 5.604+001 | 5.427+001 | 5.677+001 | 5.501+001 |
| 3.0-001 | 5.244+001 | 5.066+001 | 5.322+001 | 5.144+001 | 5.397+001 | 5.219+001 | 5.469+001 | 5.292+001 | 5.541+001 | 5.365+001 |
| 3.2-001 | 5.111+001 | 4.933+001 | 5.191+001 | 5.013+001 | 5.265+001 | 5.088+001 | 5.337+001 | 5.160+001 | 5.408+001 | 5.232+001 |
| 3.4-001 | 4.981+001 | 4.803+001 | 5.061+001 | 4.883+001 | 5.136+001 | 4.959+001 | 5.208+001 | 5.031+001 | 5.278+001 | 5.102+001 |
| 3.5-001 | 4.917+001 | 4.739+001 | 4.997+001 | 4.819+001 | 5.073+001 | 4.895+001 | 5.145+001 | 4.968+001 | 5.214+001 | 5.038+001 |
| 3.6-001 | 4.854+001 | 4.675+001 | 4.934+001 | 4.756+001 | 5.010+001 | 4.832+001 | 5.082+001 | 4.905+001 | 5.151+001 | 4.975+001 |
| 3.8-001 | 4.730+001 | 4.551+001 | 4.811+001 | 4.633+001 | 4.887+001 | 4.709+001 | 4.959+001 | 4.782+001 | 5.028+001 | 4.852+001 |
| 4.0-001 | 4.609+001 | 4.431+001 | 4.690+001 | 4.512+001 | 4.766+001 | 4.589+001 | 4.839+001 | 4.662+001 | 4.908+001 | 4.732+001 |
| 4.2-001 | 4.492+001 | 4.314+001 | 4.573+001 | 4.395+001 | 4.649+001 | 4.472+001 | 4.722+001 | 4.545+001 | 4.791+001 | 4.615+001 |
| 4.4-001 | 4.379+001 | 4.201+001 | 4.460+001 | 4.282+001 | 4.536+001 | 4.359+001 | 4.608+001 | 4.431+001 | 4.678+001 | 4.501+001 |
| 4.5-001 | 4.324+001 | 4.145+001 | 4.404+001 | 4.226+001 | 4.480+001 | 4.303+001 | 4.553+001 | 4.376+001 | 4.622+001 | 4.446+001 |
| 4.6-001 | 4.270+001 | 4.091+001 | 4.350+001 | 4.172+001 | 4.426+001 | 4.248+001 | 4.498+001 | 4.321+001 | 4.567+001 | 4.391+001 |
| 4.8-001 | 4.164+001 | 3.985+001 | 4.243+001 | 4.065+001 | 4.319+001 | 4.141+001 | 4.391+001 | 4.214+001 | 4.460+001 | 4.284+001 |
| 5.0-001 | 4.061+001 | 3.883+001 | 4.140+001 | 3.962+001 | 4.215+001 | 4.038+001 | 4.287+001 | 4.111+001 | 4.357+001 | 4.181+001 |
| 5.5-001 | 3.820+001 | 3.642+001 | 3.896+001 | 3.719+001 | 3.970+001 | 3.793+001 | 4.042+001 | 3.865+001 | 4.111+001 | 3.935+001 |
| 6.0-001 | 3.599+001 | 3.420+001 | 3.672+001 | 3.494+001 | 3.744+001 | 3.567+001 | 3.815+001 | 3.638+001 | 3.883+001 | 3.707+001 |
| 6.5-001 | 3.394+001 | 3.216+001 | 3.465+001 | 3.287+001 | 3.535+001 | 3.358+001 | 3.604+001 | 3.427+001 | 3.672+001 | 3.496+001 |
| 7.0-001 | 3.205+001 | 3.027+001 | 3.273+001 | 3.095+001 | 3.341+001 | 3.164+001 | 3.408+001 | 3.232+001 | 3.475+001 | 3.299+001 |
| 8.0-001 | 2.867+001 | 2.689+001 | 2.930+001 | 2.752+001 | 2.993+001 | 2.816+001 | 3.056+001 | 2.880+001 | 3.120+001 | 2.944+001 |
| 9.0-001 | 2.579+001 | 2.401+001 | 2.635+001 | 2.458+001 | 2.693+001 | 2.516+001 | 2.751+001 | 2.575+001 | 2.811+001 | 2.635+001 |
| 1.0+000 | 2.335+001 | 2.158+001 | 2.385+001 | 2.207+001 | 2.436+001 | 2.259+001 | 2.488+001 | 2.312+001 | 2.542+001 | 2.367+001 |
| 1.1+000 | 2.132+001 | 1.954+001 | 2.174+001 | 1.997+001 | 2.219+001 | 2.042+001 | 2.265+001 | 2.089+001 | 2.312+001 | 2.137+001 |
| 1.2+000 | 1.964+001 | 1.787+001 | 2.000+001 | 1.823+001 | 2.037+001 | 1.861+001 | 2.077+001 | 1.901+001 | 2.118+001 | 1.942+001 |
| 1.3+000 | 1.826+001 | 1.649+001 | 1.856+001 | 1.679+001 | 1.888+001 | 1.711+001 | 1.921+001 | 1.745+001 | 1.955+001 | 1.780+001 |
| 1.4+000 | 1.713+001 | 1.536+001 | 1.738+001 | 1.561+001 | 1.764+001 | 1.588+001 | 1.791+001 | 1.616+001 | 1.820+001 | 1.645+001 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, z)$ --Continued

| x sin(theta/2) /lambda | 71 Lu total without K-shell | 72 lf total without K-shell | 73 Ta total without K-shell | 74 W total without K-shell | 75 Re total without K-shell |
|------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------|--------------------------------------|
| 1.5+000 | 1.617+001 | 1.440+001 | 1.632+001 | 1.462+001 | 1.661+001 |
| 1.6+000 | 1.535+001 | 1.358+001 | 1.554+001 | 1.378+001 | 1.573+001 |
| 1.7+000 | 1.461+001 | 1.285+001 | 1.479+001 | 1.303+001 | 1.497+001 |
| 1.8+000 | 1.394+001 | 1.218+001 | 1.412+001 | 1.236+001 | 1.429+001 |
| 1.9+000 | 1.330+001 | 1.154+001 | 1.342+001 | 1.173+001 | 1.365+001 |
| 2.0+000 | 1.269+001 | 1.093+001 | 1.287+001 | 1.112+001 | 1.305+001 |
| 2.2+000 | 1.150+001 | 9.751+000 | 1.171+001 | 9.961+000 | 1.190+001 |
| 2.4+000 | 1.036+001 | 8.622+000 | 1.059+001 | 8.846+000 | 1.080+001 |
| 2.5+000 | 9.823+000 | 8.083+000 | 1.005+001 | 8.311+000 | 1.027+001 |
| 2.6+000 | 9.303+000 | 7.567+000 | 9.527+000 | 7.796+000 | 9.749+000 |
| 2.8+000 | 8.342+000 | 6.114+000 | 8.560+000 | 6.836+000 | 8.778+000 |
| 3.0+000 | 7.502+000 | 5.782+000 | 7.704+000 | 5.988+000 | 7.908+000 |
| 3.3+000 | 6.478+000 | 4.773+000 | 6.646+000 | 4.943+000 | 6.819+000 |
| 3.5+000 | 5.944+000 | 4.248+000 | 6.087+000 | 4.393+000 | 6.236+000 |
| 3.6+000 | 5.715+000 | 4.124+000 | 5.846+000 | 4.158+000 | 5.983+000 |
| 3.9+000 | 5.159+000 | 3.483+000 | 5.258+000 | 3.585+000 | 5.363+000 |
| 4.0+000 | 5.009+000 | 3.329+000 | 5.100+000 | 3.431+000 | 5.196+000 |
| 4.2+000 | 4.748+000 | 3.089+000 | 4.825+000 | 3.168+000 | 4.906+000 |
| 4.6+000 | 4.337+000 | 2.702+000 | 4.398+000 | 2.763+000 | 4.459+000 |
| 5.0+000 | 4.004+000 | 2.394+000 | 4.060+000 | 2.450+000 | 4.115+000 |
| 5.4+000 | 3.700+000 | 2.117+000 | 3.758+000 | 2.174+000 | 3.814+000 |
| 5.5+000 | 3.626+000 | 2.049+000 | 3.685+000 | 2.108+000 | 3.742+000 |
| 5.8+000 | 3.406+000 | 1.851+000 | 3.469+000 | 1.912+000 | 3.529+000 |
| 6.0+000 | 3.261+000 | 1.720+000 | 3.326+000 | 1.784+000 | 3.389+000 |
| 6.2+000 | 3.118+000 | 1.592+000 | 3.185+000 | 1.657+000 | 3.250+000 |
| 6.6+000 | 2.841+000 | 1.345+000 | 2.910+000 | 1.412+000 | 2.978+000 |
| 7.0+000 | 2.579+000 | 1.115+000 | 2.649+000 | 1.181+000 | 2.718+000 |
| 7.4+000 | 2.339+000 | 9.066-001 | 2.407+000 | 9.697-001 | 2.474+000 |
| 8.0+000 | 2.023+000 | 6.399-001 | 2.085+000 | 6.959-001 | 2.147+000 |
| 9.0+000 | 1.618+000 | 3.189-001 | 1.666+000 | 3.596-001 | 1.716+000 |
| 1.0+001 | 1.342+000 | 1.284-001 | 1.377+000 | 1.543-001 | 1.414+000 |
| 1.1+001 | 1.158+000 | 2.925-002 | 1.183+000 | 4.350-002 | 1.209+000 |
| 1.2+001 | 1.032+000 | -1.327-002 | 1.050+000 | -7.003-003 | 1.069+000 |
| 1.4+001 | 8.681-001 | -1.927-002 | 8.801-001 | -2.066-002 | 8.922-001 |
| 1.6+001 | 7.500-001 | 4.502-003 | 7.610-001 | 1.571-003 | 7.719-001 |
| 1.8+001 | 6.468-001 | 2.523-002 | 6.584-001 | 2.295-002 | 6.697-001 |
| 2.0+001 | 5.527-001 | 3.704-002 | 5.649-001 | 3.585-002 | 5.768-001 |
| 2.2+001 | 4.682-001 | 4.153-002 | 4.803-001 | 4.129-002 | 4.924-001 |
| 2.5+001 | 3.606-001 | 4.029-002 | 3.721-001 | 4.094-002 | 3.835-001 |
| 2.8+001 | 2.757-001 | 3.497-002 | 2.858-001 | 3.601-002 | 2.960-001 |
| 3.1+001 | 2.102-001 | 2.882-002 | 2.189-001 | 2.995-002 | 2.277-001 |
| 3.5+001 | 1.466-001 | 2.145-002 | 1.535-001 | 2.249-002 | 1.605-001 |
| 4.0+001 | 9.422-002 | 1.449-002 | 9.918-002 | 1.532-002 | 1.043-001 |
| 4.5+001 | 6.117-002 | 9.728-003 | 6.473-002 | 1.036-002 | 6.842-002 |
| 5.0+001 | 4.010-002 | 6.551-003 | 4.265-002 | 7.016-003 | 4.530-002 |
| 6.0+001 | 1.754-002 | 3.011-003 | 1.886-002 | 3.262-003 | 2.026-002 |
| 7.0+001 | 7.618-003 | 1.391-003 | 8.320-003 | 1.527-003 | 9.067-003 |
| 8.0+001 | 3.065-003 | 6.212-004 | 3.443-003 | 6.969-004 | 3.850-003 |
| 9.0+001 | 9.248-004 | 2.456-004 | 1.130-003 | 2.877-004 | 1.353-003 |
| 1.0+002 | -8.047-005 | 5.995-005 | 2.886-005 | 8.326-005 | 1.508-004 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, z)$ --Continued

| x | 76 Os | | 77 Ir | | 78 Pt | | 79 Au | | 80 Hg | |
|--------------------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|
| $\sin(\theta/2)/\lambda$ | total | without K-shell |
| .0 | 7.518+001 | 7.342+001 | 7.615+001 | 7.440+001 | 7.713+001 | 7.538+001 | 7.810+001 | 7.636+001 | 7.907+001 | 7.734+001 |
| 1.0-002 | 7.515+001 | 7.337+001 | 7.612+001 | 7.435+001 | 7.710+001 | 7.534+001 | 7.807+001 | 7.632+001 | 7.903+001 | 7.729+001 |
| 2.0-002 | 7.498+001 | 7.322+001 | 7.596+001 | 7.421+001 | 7.694+001 | 7.520+001 | 7.792+001 | 7.618+001 | 7.889+001 | 7.715+001 |
| 3.0-002 | 7.474+001 | 7.298+001 | 7.572+001 | 7.397+001 | 7.672+001 | 7.497+001 | 7.770+001 | 7.596+001 | 7.866+001 | 7.693+001 |
| 4.0-002 | 7.440+001 | 7.264+001 | 7.539+001 | 7.364+001 | 7.640+001 | 7.466+001 | 7.739+001 | 7.565+001 | 7.835+001 | 7.662+001 |
| 5.0-002 | 7.398+001 | 7.223+001 | 7.498+001 | 7.323+001 | 7.601+001 | 7.427+001 | 7.701+001 | 7.527+001 | 7.796+001 | 7.622+001 |
| 6.0-002 | 7.349+001 | 7.174+001 | 7.450+001 | 7.274+001 | 7.555+001 | 7.380+001 | 7.655+001 | 7.481+001 | 7.750+001 | 7.576+001 |
| 7.0-002 | 7.294+001 | 7.118+001 | 7.395+001 | 7.219+001 | 7.502+001 | 7.328+001 | 7.603+001 | 7.429+001 | 7.697+001 | 7.523+001 |
| 8.0-002 | 7.233+001 | 7.057+001 | 7.334+001 | 7.159+001 | 7.444+001 | 7.269+001 | 7.545+001 | 7.371+001 | 7.638+001 | 7.464+001 |
| 9.0-002 | 7.168+001 | 6.992+001 | 7.269+001 | 7.094+001 | 7.380+001 | 7.206+001 | 7.482+001 | 7.308+001 | 7.574+001 | 7.400+001 |
| 1.0-001 | 7.098+001 | 6.923+001 | 7.200+001 | 7.024+001 | 7.313+001 | 7.138+001 | 7.415+001 | 7.241+001 | 7.505+001 | 7.332+001 |
| 1.1-001 | 7.026+001 | 6.851+001 | 7.127+001 | 6.952+001 | 7.242+001 | 7.067+001 | 7.344+001 | 7.170+001 | 7.433+001 | 7.260+001 |
| 1.2-001 | 5.952+001 | 6.776+001 | 7.053+001 | 6.877+001 | 7.168+001 | 6.993+001 | 7.270+001 | 7.096+001 | 7.358+001 | 7.184+001 |
| 1.3-001 | 5.877+001 | 6.701+001 | 6.976+001 | 6.801+001 | 7.092+001 | 6.917+001 | 7.194+001 | 7.020+001 | 7.280+001 | 7.107+001 |
| 1.4-001 | 5.800+001 | 6.624+001 | 6.898+001 | 6.723+001 | 7.014+001 | 6.840+001 | 7.116+001 | 6.942+001 | 7.201+001 | 7.027+001 |
| 1.5-001 | 5.722+001 | 6.547+001 | 6.820+001 | 6.645+001 | 6.935+001 | 6.761+001 | 7.036+001 | 6.862+001 | 7.120+001 | 6.946+001 |
| 1.6-001 | 5.645+001 | 6.469+001 | 6.741+001 | 6.566+001 | 6.855+001 | 6.681+001 | 6.955+001 | 6.781+001 | 7.038+001 | 6.864+001 |
| 1.7-001 | 5.567+001 | 6.391+001 | 6.662+001 | 6.486+001 | 6.775+001 | 6.600+001 | 6.873+001 | 6.699+001 | 6.955+001 | 6.782+001 |
| 1.8-001 | 5.490+001 | 6.314+001 | 6.583+001 | 6.407+001 | 6.694+001 | 6.519+001 | 6.791+001 | 6.617+001 | 6.872+001 | 6.699+001 |
| 1.9-001 | 5.413+001 | 6.237+001 | 6.504+001 | 6.329+001 | 6.613+001 | 6.439+001 | 6.709+001 | 6.535+001 | 6.789+001 | 6.616+001 |
| 2.0-001 | 5.337+001 | 6.161+001 | 6.426+001 | 6.251+001 | 6.533+001 | 6.358+001 | 6.627+001 | 6.453+001 | 6.706+001 | 6.533+001 |
| 2.2-001 | 5.186+001 | 6.010+001 | 6.271+001 | 6.096+001 | 6.373+001 | 6.198+001 | 6.464+001 | 6.290+001 | 6.542+001 | 6.368+001 |
| 2.4-001 | 5.038+001 | 5.862+001 | 6.120+001 | 5.944+001 | 6.216+001 | 6.041+001 | 6.304+001 | 6.129+001 | 6.380+001 | 6.207+001 |
| 2.5-001 | 5.965+001 | 5.789+001 | 6.045+001 | 5.870+001 | 6.138+001 | 5.963+001 | 6.224+001 | 6.050+001 | 6.301+001 | 6.127+001 |
| 2.6-001 | 5.893+001 | 5.717+001 | 5.972+001 | 5.796+001 | 6.062+001 | 5.887+001 | 6.146+001 | 5.972+001 | 6.222+001 | 6.048+001 |
| 2.8-001 | 5.751+001 | 5.575+001 | 5.827+001 | 5.652+001 | 5.912+001 | 5.737+001 | 5.993+001 | 5.819+001 | 6.068+001 | 5.894+001 |
| 3.0-001 | 5.613+001 | 5.437+001 | 5.687+001 | 5.511+001 | 5.766+001 | 5.591+001 | 5.844+001 | 5.670+001 | 5.918+001 | 5.744+001 |
| 3.2-001 | 5.479+001 | 5.303+001 | 5.550+001 | 5.375+001 | 5.624+001 | 5.449+001 | 5.699+001 | 5.525+001 | 5.772+001 | 5.599+001 |
| 3.4-001 | 5.347+001 | 5.172+001 | 5.417+001 | 5.242+001 | 5.487+001 | 5.312+001 | 5.559+001 | 5.385+001 | 5.632+001 | 5.458+001 |
| 3.5-001 | 5.283+001 | 5.107+001 | 5.352+001 | 5.177+001 | 5.420+001 | 5.246+001 | 5.491+001 | 5.317+001 | 5.563+001 | 5.390+001 |
| 3.6-001 | 5.220+001 | 5.044+001 | 5.288+001 | 5.113+001 | 5.354+001 | 5.180+001 | 5.424+001 | 5.250+001 | 5.496+001 | 5.323+001 |
| 3.8-001 | 5.096+001 | 4.920+001 | 5.163+001 | 4.987+001 | 5.226+001 | 5.052+001 | 5.294+001 | 5.120+001 | 5.365+001 | 5.191+001 |
| 4.0-001 | 4.975+001 | 4.799+001 | 5.041+001 | 4.866+001 | 5.103+001 | 4.928+001 | 5.169+001 | 4.995+001 | 5.238+001 | 5.065+001 |
| 4.2-001 | 4.858+001 | 4.682+001 | 4.923+001 | 4.748+001 | 4.983+001 | 4.809+001 | 5.047+001 | 4.873+001 | 5.116+001 | 4.943+001 |
| 4.4-001 | 4.744+001 | 4.569+001 | 4.809+001 | 4.634+001 | 4.868+001 | 4.693+001 | 4.931+001 | 4.757+001 | 4.998+001 | 4.825+001 |
| 4.5-001 | 4.689+001 | 4.513+001 | 4.753+001 | 4.578+001 | 4.812+001 | 4.637+001 | 4.874+001 | 4.700+001 | 4.941+001 | 4.768+001 |
| 4.6-001 | 4.634+001 | 4.458+001 | 4.699+001 | 4.523+001 | 4.756+001 | 4.582+001 | 4.818+001 | 4.644+001 | 4.885+001 | 4.712+001 |
| 4.8-001 | 4.527+001 | 4.351+001 | 4.591+001 | 4.416+001 | 4.649+001 | 4.474+001 | 4.710+001 | 4.536+001 | 4.775+001 | 4.602+001 |
| 5.0-001 | 4.423+001 | 4.248+001 | 4.487+001 | 4.312+001 | 4.545+001 | 4.370+001 | 4.605+001 | 4.431+001 | 4.670+001 | 4.496+001 |
| 5.5-001 | 4.177+001 | 4.002+001 | 4.241+001 | 4.066+001 | 4.299+001 | 4.125+001 | 4.358+001 | 4.185+001 | 4.421+001 | 4.247+001 |
| 6.0-001 | 3.949+001 | 3.774+001 | 4.013+001 | 3.838+001 | 4.072+001 | 3.898+001 | 4.131+001 | 3.957+001 | 4.192+001 | 4.018+001 |
| 6.5-001 | 3.737+001 | 3.562+001 | 3.801+001 | 3.626+001 | 3.862+001 | 3.687+001 | 3.921+001 | 3.747+001 | 3.980+001 | 3.807+001 |
| 7.0-001 | 3.540+001 | 3.365+001 | 3.604+001 | 3.429+001 | 3.665+001 | 3.491+001 | 3.725+001 | 3.551+001 | 3.783+001 | 3.610+001 |
| 8.0-001 | 3.183+001 | 3.008+001 | 3.245+001 | 3.071+001 | 3.308+001 | 3.134+001 | 3.368+001 | 3.194+001 | 3.425+001 | 3.252+001 |
| 9.0-001 | 2.870+001 | 2.695+001 | 2.930+001 | 2.755+001 | 2.991+001 | 2.817+001 | 3.050+001 | 2.876+001 | 3.106+001 | 2.933+001 |
| 1.0+000 | 2.597+001 | 2.422+001 | 2.653+001 | 2.478+001 | 2.710+001 | 2.536+001 | 2.767+001 | 2.593+001 | 2.822+001 | 2.649+001 |
| 1.1+000 | 2.362+001 | 2.186+001 | 2.412+001 | 2.238+001 | 2.464+001 | 2.290+001 | 2.517+001 | 2.343+001 | 2.569+001 | 2.396+001 |
| 1.2+000 | 2.161+001 | 1.986+001 | 2.205+001 | 2.031+001 | 2.251+001 | 2.078+001 | 2.299+001 | 2.125+001 | 2.347+001 | 2.174+001 |
| 1.3+000 | 1.992+001 | 1.817+001 | 2.030+001 | 1.856+001 | 2.070+001 | 1.896+001 | 2.111+001 | 1.938+001 | 2.154+001 | 1.982+001 |
| 1.4+000 | 1.851+001 | 1.676+001 | 1.883+001 | 1.709+001 | 1.917+001 | 1.743+001 | 1.953+001 | 1.780+001 | 1.990+001 | 1.818+001 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MF}(x, z)$ --Continued

| x | 76 Os | 77 Ir | 78 Pt | 79 Au | 80 Hg | | | |
|--------------------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|
| $\sin(\theta/2)/\lambda$ | total | without K-shell |
| 1.5+000 | 1.734+001 | 1.559+001 | 1.761+001 | 1.567+001 | 1.789+001 | 1.616+001 | 1.819+001 | 1.646+001 |
| 1.6+000 | 1.636+001 | 1.462+001 | 1.659+001 | 1.485+001 | 1.682+001 | 1.509+001 | 1.708+001 | 1.535+001 |
| 1.7+000 | 1.553+001 | 1.379+001 | 1.572+001 | 1.399+001 | 1.592+001 | 1.419+001 | 1.614+001 | 1.441+001 |
| 1.8+000 | 1.480+001 | 1.306+001 | 1.498+001 | 1.324+001 | 1.515+001 | 1.343+001 | 1.465+001 | 1.362+001 |
| 1.9+000 | 1.415+001 | 1.242+001 | 1.432+001 | 1.259+001 | 1.448+001 | 1.275+001 | 1.465+001 | 1.293+001 |
| 2.0+000 | 1.356+001 | 1.182+001 | 1.372+001 | 1.199+001 | 1.387+001 | 1.215+001 | 1.403+001 | 1.231+001 |
| 2.2+000 | 1.245+001 | 1.072+001 | 1.262+001 | 1.089+001 | 1.278+001 | 1.106+001 | 1.294+001 | 1.122+001 |
| 2.4+000 | 1.140+001 | 9.677+000 | 1.158+001 | 9.866+000 | 1.176+001 | 1.005+001 | 1.193+001 | 1.022+001 |
| 2.5+000 | 1.089+001 | 9.168+000 | 1.108+001 | 9.366+000 | 1.127+001 | 9.558+000 | 1.145+001 | 9.741+000 |
| 2.6+000 | 1.039+001 | 8.670+000 | 1.059+001 | 8.875+000 | 1.078+001 | 9.074+000 | 1.097+001 | 9.265+000 |
| 2.8+000 | 9.422+000 | 7.713+000 | 9.631+000 | 7.926+000 | 9.835+000 | 8.135+000 | 1.003+001 | 8.338+000 |
| 3.0+000 | 8.530+000 | 6.829+000 | 8.737+000 | 7.040+000 | 8.943+000 | 7.249+000 | 9.146+000 | 7.456+000 |
| 3.3+000 | 7.366+000 | 5.676+000 | 7.555+000 | 5.869+000 | 7.747+000 | 6.064+000 | 7.940+000 | 6.261+000 |
| 3.5+000 | 6.717+000 | 5.035+000 | 6.888+000 | 5.209+000 | 7.062+000 | 5.387+000 | 7.240+000 | 5.569+000 |
| 3.6+000 | 6.431+000 | 4.753+000 | 6.591+000 | 4.917+000 | 6.756+000 | 5.085+000 | 6.925+000 | 5.257+000 |
| 3.9+000 | 5.713+000 | 4.049+000 | 5.841+000 | 4.179+000 | 5.975+000 | 4.316+000 | 6.114+000 | 4.459+000 |
| 4.0+000 | 5.515+000 | 3.286+000 | 5.633+000 | 3.977+000 | 5.757+000 | 4.103+000 | 5.286+000 | 4.235+000 |
| 4.2+000 | 5.174+000 | 3.524+000 | 5.274+000 | 3.626+000 | 5.378+000 | 3.733+000 | 5.488+000 | 3.846+000 |
| 4.6+000 | 4.657+000 | 3.027+000 | 4.728+000 | 3.101+000 | 4.803+000 | 3.178+000 | 4.882+000 | 3.259+000 |
| 5.0+000 | 4.280+000 | 2.673+000 | 4.336+000 | 2.730+000 | 4.394+000 | 2.789+000 | 4.454+000 | 2.851+000 |
| 5.4+000 | 3.974+000 | 2.390+000 | 4.025+000 | 2.442+000 | 4.076+000 | 2.493+000 | 4.127+000 | 2.545+000 |
| 5.5+000 | 3.903+000 | 2.325+000 | 3.954+000 | 2.377+000 | 4.005+000 | 2.427+000 | 4.055+000 | 2.478+000 |
| 5.8+000 | 3.698+000 | 2.138+000 | 3.750+000 | 2.190+000 | 3.801+000 | 2.241+000 | 3.851+000 | 2.291+000 |
| 6.0+000 | 3.564+000 | 2.017+000 | 3.619+000 | 2.071+000 | 3.671+000 | 2.123+000 | 3.721+000 | 2.173+000 |
| 6.2+000 | 3.432+000 | 1.898+000 | 3.489+000 | 1.953+000 | 3.542+000 | 2.007+000 | 3.595+000 | 2.059+000 |
| 6.6+000 | 3.172+000 | 1.664+000 | 3.232+000 | 1.723+000 | 3.290+000 | 1.780+000 | 3.346+000 | 1.835+000 |
| 7.0+000 | 2.918+000 | 1.437+000 | 2.981+000 | 1.499+000 | 3.043+000 | 1.558+000 | 3.102+000 | 1.617+000 |
| 7.4+000 | 2.674+000 | 1.222+000 | 2.739+000 | 1.284+000 | 2.802+000 | 1.345+000 | 2.865+000 | 1.405+000 |
| 8.0+000 | 2.338+000 | 9.293-001 | 2.401+000 | 9.889-001 | 2.464+000 | 1.048+000 | 2.527+000 | 1.108+000 |
| 9.0+000 | 1.874+000 | 5.409-001 | 1.929+000 | 5.902-001 | 1.984+000 | 6.406-001 | 2.041+000 | 6.923-001 |
| 1.0+001 | 1.534+000 | 2.783-001 | 1.577+000 | 3.142-001 | 1.621+000 | 3.518-001 | 1.667+000 | 3.913-001 |
| 1.1+001 | 1.296+000 | 1.187-001 | 1.328+000 | 1.421-001 | 1.361+000 | 1.674-001 | 1.396+000 | 1.946-001 |
| 1.2+001 | 1.132+000 | 3.213-002 | 1.155+000 | 4.573-002 | 1.180+000 | 6.094-002 | 1.206+000 | 7.780-002 |
| 1.4+001 | 9.304-001 | -1.999-002 | 9.440-001 | -1.793-002 | 9.582-001 | -1.496-002 | 9.729-001 | -1.104-002 |
| 1.6+001 | 8.038-001 | -8.752-003 | 8.143-001 | -1.074-002 | 8.250-001 | -1.240-002 | 8.357-001 | -1.366-002 |
| 1.8+001 | 7.022-001 | 1.307-002 | 7.126-001 | 1.053-002 | 7.228-001 | 8.027-003 | 7.328-001 | 5.601-003 |
| 2.0+001 | 6.109-001 | 2.973-002 | 6.219-001 | 2.790-002 | 6.325-001 | 2.596-002 | 6.430-001 | 2.396-002 |
| 2.2+001 | 5.274-001 | 3.901-002 | 5.387-001 | 3.811-002 | 5.497-001 | 3.705-002 | 5.606-001 | 3.591-002 |
| 2.5+001 | 4.175-001 | 4.268-002 | 4.286-001 | 4.288-002 | 4.397-001 | 4.295-002 | 4.507-001 | 4.295-002 |
| 2.8+001 | 3.270-001 | 3.976-002 | 3.374-001 | 4.057-002 | 3.477-001 | 4.130-002 | 3.581-001 | 4.200-002 |
| 3.1+001 | 2.548-001 | 3.439-002 | 2.640-001 | 3.546-002 | 2.733-001 | 3.649-002 | 2.827-001 | 3.752-002 |
| 3.5+001 | 1.824-001 | 2.682-002 | 1.900-001 | 2.794-002 | 1.977-001 | 2.904-002 | 2.055-001 | 3.016-002 |
| 4.0+001 | 1.205-001 | 1.891-002 | 1.263-001 | 1.988-002 | 1.321-001 | 2.085-002 | 1.381-001 | 2.186-002 |
| 4.5+001 | 8.030-002 | 1.315-002 | 8.454-002 | 1.391-002 | 8.890-002 | 1.470-002 | 9.342-002 | 1.552-002 |
| 5.0+001 | 5.397-002 | 9.120-003 | 5.709-002 | 9.710-003 | 6.033-002 | 1.032-002 | 6.370-002 | 1.057-002 |
| 6.0+001 | 2.490-002 | 4.434-003 | 2.661-002 | 4.773-003 | 2.840-002 | 5.129-003 | 3.028-002 | 5.568-003 |
| 7.0+001 | 1.161-002 | 2.184-003 | 1.256-002 | 2.378-003 | 1.357-002 | 2.585-003 | 1.463-002 | 2.867-003 |
| 8.0+001 | 5.266-003 | 1.070-003 | 5.807-003 | 1.183-003 | 6.386-003 | 1.304-003 | 7.005-003 | 1.436-003 |
| 9.0+001 | 2.152-003 | 5.020-004 | 2.465-003 | 5.687-004 | 2.802-003 | 6.412-004 | 3.168-003 | 7.242-004 |
| 1.0+002 | 6.015-004 | 2.067-004 | 7.833-004 | 2.464-004 | 9.823-004 | 2.901-004 | 1.200-003 | 3.383-004 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, z)$ --Continued

| x sin(theta/2) /lambda | 81 Tl total | 81 Tl without K-shell | 82 Pb total | 82 Pb without K-shell | 83 Bi total | 83 Bi without K-shell | 84 Po total | 84 Po without K-shell | 85 At total | 85 At without K-shell |
|------------------------------|----------------|-----------------------------|----------------|-----------------------------|----------------|-----------------------------|----------------|-----------------------------|----------------|-----------------------------|
| .0 | 8.004+001 | 7.831+001 | 8.101+001 | 7.929+001 | 8.198+001 | 8.027+001 | 8.295+001 | 8.124+001 | 8.392+001 | 8.222+001 |
| 1.0+002 | 7.998+001 | 7.826+001 | 8.094+001 | 7.923+001 | 8.190+001 | 8.021+001 | 8.287+001 | 8.118+001 | 8.384+001 | 8.216+001 |
| 2.0+002 | 7.984+001 | 7.811+001 | 8.080+001 | 7.908+001 | 8.176+001 | 8.004+001 | 8.273+001 | 8.102+001 | 8.369+001 | 8.199+001 |
| 3.0+002 | 7.955+001 | 7.786+001 | 8.054+001 | 7.882+001 | 8.149+001 | 7.977+001 | 8.245+001 | 8.074+001 | 8.341+001 | 8.171+001 |
| 4.0+002 | 7.925+001 | 7.752+001 | 8.019+001 | 7.846+001 | 8.112+001 | 7.940+001 | 8.207+001 | 8.036+001 | 8.303+001 | 8.133+001 |
| 5.0+002 | 7.882+001 | 7.709+001 | 7.975+001 | 7.802+001 | 8.066+001 | 7.894+001 | 8.160+001 | 7.989+001 | 8.255+001 | 8.085+001 |
| 6.0+002 | 7.833+001 | 7.660+001 | 7.923+001 | 7.751+001 | 8.012+001 | 7.840+001 | 8.105+001 | 7.934+001 | 8.199+001 | 8.029+001 |
| 7.0+002 | 7.774+001 | 7.604+001 | 7.865+001 | 7.693+001 | 7.951+001 | 7.780+001 | 8.042+001 | 7.871+001 | 8.136+001 | 7.965+001 |
| 8.0+002 | 7.715+001 | 7.542+001 | 7.801+001 | 7.629+001 | 7.885+001 | 7.713+001 | 7.974+001 | 7.803+001 | 8.066+001 | 7.895+001 |
| 9.0+002 | 7.649+001 | 7.476+001 | 7.732+001 | 7.560+001 | 7.814+001 | 7.642+001 | 7.900+001 | 7.729+001 | 7.990+001 | 7.820+001 |
| 1.0+003 | 7.575+001 | 7.406+001 | 7.660+001 | 7.488+001 | 7.739+001 | 7.567+001 | 7.823+001 | 7.652+001 | 7.911+001 | 7.741+001 |
| 1.1+003 | 7.505+001 | 7.332+001 | 7.584+001 | 7.412+001 | 7.661+001 | 7.490+001 | 7.743+001 | 7.572+001 | 7.829+001 | 7.658+001 |
| 1.2+003 | 7.430+001 | 7.257+001 | 7.507+001 | 7.334+001 | 7.581+001 | 7.410+001 | 7.661+001 | 7.489+001 | 7.744+001 | 7.573+001 |
| 1.3+003 | 7.352+001 | 7.179+001 | 7.427+001 | 7.255+001 | 7.500+001 | 7.328+001 | 7.577+001 | 7.406+001 | 7.657+001 | 7.487+001 |
| 1.4+003 | 7.272+001 | 7.099+001 | 7.346+001 | 7.174+001 | 7.417+001 | 7.246+001 | 7.492+001 | 7.321+001 | 7.570+001 | 7.399+001 |
| 1.5+003 | 7.192+001 | 7.019+001 | 7.264+001 | 7.092+001 | 7.334+001 | 7.162+001 | 7.406+001 | 7.235+001 | 7.482+001 | 7.312+001 |
| 1.6+003 | 7.110+001 | 6.937+001 | 7.182+001 | 7.009+001 | 7.250+001 | 7.079+001 | 7.321+001 | 7.150+001 | 7.394+001 | 7.224+001 |
| 1.7+003 | 7.028+001 | 6.855+001 | 7.099+001 | 6.927+001 | 7.167+001 | 6.995+001 | 7.236+001 | 7.064+001 | 7.307+001 | 7.136+001 |
| 1.8+003 | 6.946+001 | 6.773+001 | 7.016+001 | 6.844+001 | 7.083+001 | 6.912+001 | 7.151+001 | 6.980+001 | 7.220+001 | 7.049+001 |
| 1.9+003 | 6.864+001 | 6.691+001 | 6.934+001 | 6.761+001 | 7.000+001 | 6.829+001 | 7.067+001 | 6.895+001 | 7.134+001 | 6.963+001 |
| 2.0+003 | 6.781+001 | 6.609+001 | 6.851+001 | 6.679+001 | 6.918+001 | 6.746+001 | 6.983+001 | 6.812+001 | 7.049+001 | 6.878+001 |
| 2.2+003 | 6.610+001 | 6.445+001 | 6.688+001 | 6.516+001 | 6.755+001 | 6.583+001 | 6.819+001 | 6.648+001 | 6.882+001 | 6.712+001 |
| 2.4+003 | 6.457+001 | 6.284+001 | 6.527+001 | 6.355+001 | 6.595+001 | 6.423+001 | 6.658+001 | 6.487+001 | 6.720+001 | 6.550+001 |
| 2.5+003 | 6.378+001 | 6.205+001 | 6.448+001 | 6.276+001 | 6.516+001 | 6.344+001 | 6.580+001 | 6.409+001 | 6.641+001 | 6.471+001 |
| 2.6+003 | 6.295+001 | 6.126+001 | 6.370+001 | 6.198+001 | 6.438+001 | 6.266+001 | 6.502+001 | 6.331+001 | 5.563+001 | 6.393+001 |
| 2.8+003 | 6.145+001 | 5.972+001 | 6.216+001 | 6.044+001 | 6.285+001 | 6.114+001 | 6.350+001 | 6.179+001 | 5.411+001 | 6.241+001 |
| 3.0+003 | 5.994+001 | 5.822+001 | 6.067+001 | 5.894+001 | 6.136+001 | 5.965+001 | 6.202+001 | 6.031+001 | 6.264+001 | 6.093+001 |
| 3.2+003 | 5.848+001 | 5.676+001 | 5.921+001 | 5.749+001 | 5.991+001 | 5.820+001 | 6.058+001 | 5.887+001 | 6.121+001 | 5.950+001 |
| 3.4+003 | 5.707+001 | 5.534+001 | 5.780+001 | 5.607+001 | 5.850+001 | 5.679+001 | 5.918+001 | 5.747+001 | 5.982+001 | 5.811+001 |
| 3.5+003 | 5.638+001 | 5.465+001 | 5.710+001 | 5.538+001 | 5.782+001 | 5.610+001 | 5.849+001 | 5.678+001 | 5.914+001 | 5.743+001 |
| 3.6+003 | 5.570+001 | 5.397+001 | 5.642+001 | 5.470+001 | 5.714+001 | 5.542+001 | 5.782+001 | 5.611+001 | 5.846+001 | 5.676+001 |
| 3.8+003 | 5.438+001 | 5.265+001 | 5.509+001 | 5.337+001 | 5.581+001 | 5.409+001 | 5.649+001 | 5.478+001 | 5.715+001 | 5.545+001 |
| 4.0+003 | 5.310+001 | 5.137+001 | 5.381+001 | 5.209+001 | 5.452+001 | 5.280+001 | 5.521+001 | 5.350+001 | 5.587+001 | 5.417+001 |
| 4.2+003 | 5.186+001 | 5.013+001 | 5.256+001 | 5.084+001 | 5.327+001 | 5.155+001 | 5.396+001 | 5.225+001 | 5.463+001 | 5.292+001 |
| 4.4+003 | 5.067+001 | 4.894+001 | 5.136+001 | 4.964+001 | 5.206+001 | 5.034+001 | 5.275+001 | 5.103+001 | 5.342+001 | 5.171+001 |
| 4.5+003 | 5.009+001 | 4.836+001 | 5.078+001 | 4.905+001 | 5.147+001 | 4.975+001 | 5.215+001 | 5.044+001 | 5.283+001 | 5.112+001 |
| 4.6+003 | 4.952+001 | 4.779+001 | 5.020+001 | 4.848+001 | 5.089+001 | 4.917+001 | 5.157+001 | 4.986+001 | 5.224+001 | 5.054+001 |
| 4.8+003 | 4.841+001 | 4.668+001 | 4.908+001 | 4.736+001 | 4.975+001 | 4.804+001 | 5.043+001 | 4.872+001 | 5.110+001 | 4.940+001 |
| 5.0+003 | 4.734+001 | 4.561+001 | 4.800+001 | 4.627+001 | 4.866+001 | 4.694+001 | 4.933+001 | 4.762+001 | 4.999+001 | 4.829+001 |
| 5.5+003 | 4.482+001 | 4.309+001 | 4.545+001 | 4.372+001 | 4.608+001 | 4.436+001 | 4.672+001 | 4.501+001 | 4.737+001 | 4.566+001 |
| 6.0+003 | 4.251+001 | 4.078+001 | 4.311+001 | 4.139+001 | 4.371+001 | 4.199+001 | 4.432+001 | 4.261+001 | 4.494+001 | 4.324+001 |
| 6.5+003 | 4.038+001 | 3.865+001 | 4.095+001 | 3.923+001 | 4.153+001 | 3.981+001 | 4.211+001 | 4.040+001 | 4.270+001 | 4.100+001 |
| 7.0+003 | 3.839+001 | 3.667+001 | 3.896+001 | 3.723+001 | 3.951+001 | 3.780+001 | 4.007+001 | 3.836+001 | 4.063+001 | 3.893+001 |
| 8.0+003 | 3.481+001 | 3.308+001 | 3.535+001 | 3.363+001 | 3.589+001 | 3.417+001 | 3.642+001 | 3.471+001 | 3.694+001 | 3.524+001 |
| 9.0+003 | 3.162+001 | 2.990+001 | 3.216+001 | 3.044+001 | 3.269+001 | 3.098+001 | 3.321+001 | 3.150+001 | 3.371+001 | 3.201+001 |
| 1.0+000 | 2.877+001 | 2.704+001 | 2.930+001 | 2.758+001 | 2.983+001 | 2.812+001 | 3.034+001 | 2.864+001 | 3.084+001 | 2.914+001 |
| 1.1+000 | 2.622+001 | 2.449+001 | 2.674+001 | 2.502+001 | 2.725+001 | 2.554+001 | 2.776+001 | 2.605+001 | 2.826+001 | 2.656+001 |
| 1.2+000 | 2.396+001 | 2.224+001 | 2.445+001 | 2.273+001 | 2.494+001 | 2.323+001 | 2.543+001 | 2.373+001 | 2.592+001 | 2.422+001 |
| 1.3+000 | 2.195+001 | 2.027+001 | 2.244+001 | 2.072+001 | 2.296+001 | 2.119+001 | 2.336+001 | 2.166+001 | 2.382+001 | 2.213+001 |
| 1.4+000 | 2.029+001 | 1.857+001 | 2.069+001 | 1.898+001 | 2.111+001 | 1.940+001 | 2.153+001 | 1.983+001 | 2.196+001 | 2.027+001 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x,z)$ --Continued

| x sin(theta/2) /lambda | 81 Tl | | 82 Pb | | 83 Bi | | 84 Po | | 85 At | |
|------------------------------|-----------|--------------------|-----------|--------------------|-----------|--------------------|-----------|--------------------|-----------|--------------------|
| | total | without K-shell |
| 1.5+000 | 1.885+001 | 1.713+001 | 1.920+001 | 1.7+9+001 | 1.956+001 | 1.786+001 | 1.994+001 | 1.824+001 | 2.033+001 | 1.864+001 |
| 1.6+000 | 1.763+001 | 1.591+001 | 1.793+001 | 1.622+001 | 1.824+001 | 1.654+001 | 1.857+001 | 1.688+001 | 1.892+001 | 1.722+001 |
| 1.7+000 | 1.661+001 | 1.489+001 | 1.686+001 | 1.515+001 | 1.713+001 | 1.542+001 | 1.741+001 | 1.571+001 | 1.771+001 | 1.601+001 |
| 1.8+000 | 1.574+001 | 1.403+001 | 1.595+001 | 1.425+001 | 1.618+001 | 1.448+001 | 1.642+001 | 1.473+001 | 1.667+001 | 1.499+001 |
| 1.9+000 | 1.500+001 | 1.329+001 | 1.518+001 | 1.3+8+001 | 1.538+001 | 1.368+001 | 1.558+001 | 1.389+001 | 1.580+001 | 1.411+001 |
| 2.0+000 | 1.435+001 | 1.264+001 | 1.451+001 | 1.281+001 | 1.468+001 | 1.299+001 | 1.486+001 | 1.317+001 | 1.505+001 | 1.336+001 |
| 2.2+000 | 1.323+001 | 1.153+001 | 1.338+001 | 1.168+001 | 1.353+001 | 1.183+001 | 1.367+001 | 1.198+001 | 1.382+001 | 1.214+001 |
| 2.4+000 | 1.225+001 | 1.055+001 | 1.240+001 | 1.071+001 | 1.254+001 | 1.086+001 | 1.268+001 | 1.100+001 | 1.282+001 | 1.114+001 |
| 2.5+000 | 1.178+001 | 1.008+001 | 1.194+001 | 1.024+001 | 1.209+001 | 1.040+001 | 1.223+001 | 1.055+001 | 1.237+001 | 1.069+001 |
| 2.6+000 | 1.132+001 | 9.625+000 | 1.148+001 | 9.793+000 | 1.164+001 | 9.955+000 | 1.179+001 | 1.011+001 | 1.193+001 | 1.026+001 |
| 2.8+000 | 1.041+001 | 8.726+000 | 1.059+001 | 8.910+000 | 1.076+001 | 9.087+000 | 1.093+001 | 9.257+000 | 1.109+001 | 9.421+000 |
| 3.0+000 | 9.540+000 | 7.859+000 | 9.730+000 | 8.054+000 | 9.915+000 | 8.243+000 | 1.009+001 | 8.427+000 | 1.027+001 | 8.604+000 |
| 3.3+000 | 8.327+000 | 6.656+000 | 8.519+000 | 6.852+000 | 8.709+000 | 7.046+000 | 8.897+000 | 7.239+000 | 9.081+000 | 7.427+000 |
| 3.5+000 | 7.605+000 | 5.941+000 | 7.789+000 | 6.129+000 | 7.974+000 | 6.313+000 | 8.158+000 | 6.507+000 | 8.342+000 | 6.695+000 |
| 3.6+000 | 7.274+000 | 5.614+000 | 7.452+000 | 5.796+000 | 7.632+000 | 5.979+000 | 7.812+000 | 6.164+000 | 7.993+000 | 6.349+000 |
| 3.9+000 | 6.408+000 | 4.759+000 | 6.562+000 | 4.917+000 | 6.720+000 | 5.079+000 | 6.881+000 | 5.244+000 | 7.046+000 | 5.412+000 |
| 4.0+000 | 6.161+000 | 4.516+000 | 6.306+000 | 4.665+000 | 6.455+000 | 4.813+000 | 6.609+000 | 4.975+000 | 6.765+000 | 5.135+000 |
| 4.2+000 | 5.725+000 | 4.089+000 | 5.851+000 | 4.218+000 | 5.982+000 | 4.353+000 | 6.119+000 | 4.492+000 | 6.259+000 | 4.637+000 |
| 4.6+000 | 5.053+000 | 3.435+000 | 5.146+000 | 3.530+000 | 5.243+000 | 3.630+000 | 5.345+000 | 3.735+000 | 5.452+000 | 3.845+000 |
| 5.0+000 | 4.581+000 | 2.981+000 | 4.648+000 | 3.031+000 | 4.720+000 | 3.125+000 | 4.794+000 | 3.202+000 | 4.873+000 | 3.283+000 |
| 5.4+000 | 4.231+000 | 2.652+000 | 4.285+000 | 2.707+000 | 4.340+000 | 2.764+000 | 4.397+000 | 2.823+000 | 4.456+000 | 2.884+000 |
| 5.5+000 | 4.156+000 | 2.581+000 | 4.207+000 | 2.634+000 | 4.260+000 | 2.689+000 | 4.314+000 | 2.745+000 | 4.370+000 | 2.803+000 |
| 5.8+000 | 3.948+000 | 2.389+000 | 3.995+000 | 2.438+000 | 4.043+000 | 2.488+000 | 4.092+000 | 2.537+000 | 4.141+000 | 2.588+000 |
| 6.0+000 | 3.819+000 | 2.272+000 | 3.866+000 | 2.320+000 | 3.913+000 | 2.368+000 | 3.959+000 | 2.415+000 | 4.006+000 | 2.463+000 |
| 6.2+000 | 3.695+000 | 2.159+000 | 3.743+000 | 2.207+000 | 3.790+000 | 2.255+000 | 3.836+000 | 2.302+000 | 3.881+000 | 2.348+000 |
| 6.6+000 | 3.454+000 | 1.941+000 | 3.505+000 | 1.992+000 | 3.554+000 | 2.041+000 | 3.602+000 | 2.089+000 | 3.648+000 | 2.136+000 |
| 7.0+000 | 3.218+000 | 1.729+000 | 3.272+000 | 1.733+000 | 3.325+000 | 1.835+000 | 3.376+000 | 1.887+000 | 3.426+000 | 1.936+000 |
| 7.4+000 | 2.986+000 | 1.522+000 | 3.044+000 | 1.579+000 | 3.100+000 | 1.634+000 | 3.155+000 | 1.688+000 | 3.208+000 | 1.741+000 |
| 8.0+000 | 2.651+000 | 1.226+000 | 2.712+000 | 1.235+000 | 2.772+000 | 1.343+000 | 2.830+000 | 1.400+000 | 2.888+000 | 1.456+000 |
| 9.0+000 | 2.156+000 | 7.988-001 | 2.214+000 | 8.532-001 | 2.273+000 | 9.081-001 | 2.331+000 | 9.634-001 | 2.389+000 | 1.019+000 |
| 1.0+001 | 1.763+000 | 4.756-001 | 1.813+000 | 5.200+001 | 1.863+000 | 5.659-001 | 1.915+000 | 6.130-001 | 1.968+000 | 6.613-001 |
| 1.1+001 | 1.471+000 | 2.546-001 | 1.510+000 | 2.874-001 | 1.551+000 | 3.220-001 | 1.593+000 | 3.582-001 | 1.637+000 | 3.962-001 |
| 1.2+001 | 1.261+000 | 1.167-001 | 1.291+000 | 1.388-001 | 1.323+000 | 1.626-001 | 1.355+000 | 1.882-001 | 1.389+000 | 2.155-001 |
| 1.4+001 | 1.005+000 | -6.670-005 | 1.022+000 | 7.151-003 | 1.039+000 | 1.556-002 | 1.058+000 | 2.525-002 | 1.078+000 | 3.626-002 |
| 1.6+001 | 6.576-001 | -1.478-002 | 8.690-001 | -1.452-002 | 8.806-001 | -1.364-002 | 8.927-001 | -1.209-002 | 9.052-001 | -9.794-003 |
| 1.8+001 | 7.526-001 | 1.110-003 | 7.624-001 | -8.838-004 | 7.721-001 | -2.664-003 | 7.819-001 | -4.180-003 | 7.918-001 | -5.384-003 |
| 2.0+001 | 6.633-001 | 1.984-002 | 6.731-001 | 1.774-002 | 6.828-001 | 1.564-002 | 6.924-001 | 1.358-002 | 7.018-001 | 1.158-002 |
| 2.2+001 | 5.819-001 | 3.332-002 | 5.922-001 | 3.188-002 | 6.023-001 | 3.034-002 | 6.122-001 | 2.874-002 | 6.220-001 | 2.708-002 |
| 2.5+001 | 4.723-001 | 4.266-002 | 4.830-001 | 4.234-002 | 4.935-001 | 4.192-002 | 5.038-001 | 4.140-002 | 5.140-001 | 4.078-002 |
| 2.8+001 | 3.788-001 | 4.321-002 | 3.892-001 | 4.370-002 | 3.994-001 | 4.411-002 | 4.097-001 | 4.444-002 | 4.198-001 | 4.470-002 |
| 3.1+001 | 3.016-001 | 3.950-002 | 3.112-001 | 4.042-002 | 3.207-001 | 4.131-002 | 3.303-001 | 4.215-002 | 3.400-001 | 4.294-002 |
| 3.5+001 | 2.215-001 | 3.244-002 | 2.297-001 | 3.357-002 | 2.379-001 | 3.469-002 | 2.463-001 | 3.581-002 | 2.548-001 | 3.691-002 |
| 4.0+001 | 1.506-001 | 2.396-002 | 1.570-001 | 2.504-002 | 1.636-001 | 2.614-002 | 1.703-001 | 2.725-002 | 1.771-001 | 2.838-002 |
| 4.5+001 | 1.029-001 | 1.726-002 | 1.078-001 | 1.817-002 | 1.129-001 | 1.911-002 | 1.181-001 | 2.008-002 | 1.235-001 | 2.107-002 |
| 5.0+001 | 7.082-002 | 1.235-002 | 7.457-002 | 1.338-002 | 7.846-002 | 1.384-002 | 8.247-002 | 1.463-002 | 8.662-002 | 1.545-002 |
| 6.0+001 | 3.432-002 | 6.336-003 | 3.647-002 | 6.783-003 | 3.873-002 | 7.254-003 | 4.109-002 | 7.751-003 | 4.355-002 | 8.273-003 |
| 7.0+001 | 1.696-002 | 3.299-003 | 1.822-002 | 3.558-003 | 1.955-002 | 3.856-003 | 2.095-002 | 4.161-003 | 2.242-002 | 4.486-003 |
| 8.0+001 | 8.370-003 | 1.731-003 | 9.120-003 | 1.896-003 | 9.919-003 | 2.072-003 | 1.077-002 | 2.262-003 | 1.167-002 | 2.465-003 |
| 9.0+001 | 3.985-003 | 9.006-004 | 4.440-003 | 1.032-003 | 4.929-003 | 1.112-003 | 5.454-003 | 1.231-003 | 6.015-003 | 1.360-003 |
| 1.0+002 | 1.696-003 | 4.495-004 | 1.977-003 | 5.132-004 | 2.281-003 | 5.828-004 | 2.611-003 | 6.589-004 | 2.967-003 | 7.418-004 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MF}(x, z)$ --Continued

| x | 86 Rn | 87 Fr | 88 Ra | 89 Ac | 90 Th | | | | | |
|------------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|
| $\sin(\theta/2)$ | total | without K-shell |
| /lambda | | | | | | | | | | |
| .0 | 8.489+001 | 8.319+001 | 8.586+001 | 8.417+001 | 8.683+001 | 8.514+001 | 8.780+001 | 8.612+001 | 8.876+001 | 8.709+001 |
| 1.0-002 | 8.481+001 | 8.313+001 | 8.575+001 | 8.409+001 | 8.683+001 | 8.507+001 | 8.781+001 | 8.605+001 | 8.884+001 | 8.704+001 |
| 2.0-002 | 8.466+001 | 8.296+001 | 8.556+001 | 8.387+001 | 8.650+001 | 8.481+001 | 8.746+001 | 8.578+001 | 8.843+001 | 8.676+001 |
| 3.0-002 | 8.438+001 | 8.268+001 | 8.520+001 | 8.351+001 | 8.611+001 | 8.442+001 | 8.706+001 | 8.538+001 | 8.804+001 | 8.636+001 |
| 4.0-002 | 8.400+001 | 8.230+001 | 8.473+001 | 8.304+001 | 8.559+001 | 8.391+001 | 8.653+001 | 8.485+001 | 8.750+001 | 8.583+001 |
| 5.0-002 | 8.352+001 | 8.182+001 | 8.416+001 | 8.247+001 | 8.497+001 | 8.329+001 | 8.589+001 | 8.421+001 | 8.686+001 | 8.516+001 |
| 6.0-002 | 8.295+001 | 8.125+001 | 8.353+001 | 8.183+001 | 8.427+001 | 8.259+001 | 8.517+001 | 8.349+001 | 8.612+001 | 8.445+001 |
| 7.0-002 | 8.231+001 | 8.061+001 | 8.283+001 | 8.114+001 | 8.352+001 | 8.183+001 | 8.438+001 | 8.270+001 | 8.531+001 | 8.364+001 |
| 8.0-002 | 8.159+001 | 7.990+001 | 8.210+001 | 8.040+001 | 8.273+001 | 8.104+001 | 8.355+001 | 8.187+001 | 8.445+001 | 8.276+001 |
| 9.0-002 | 8.083+001 | 7.913+001 | 8.133+001 | 7.964+001 | 8.191+001 | 8.022+001 | 8.269+001 | 8.101+001 | 8.356+001 | 8.186+001 |
| 1.0-001 | 8.002+001 | 7.832+001 | 8.053+001 | 7.884+001 | 8.107+001 | 7.939+001 | 8.181+001 | 8.013+001 | 8.265+001 | 8.096+001 |
| 1.1-001 | 7.918+001 | 7.748+001 | 7.971+001 | 7.802+001 | 8.023+001 | 7.854+001 | 8.093+001 | 7.925+001 | 8.173+001 | 8.006+001 |
| 1.2-001 | 7.830+001 | 7.661+001 | 7.887+001 | 7.718+001 | 7.938+001 | 7.770+001 | 8.005+001 | 7.837+001 | 8.081+001 | 7.913+001 |
| 1.3-001 | 7.742+001 | 7.572+001 | 7.802+001 | 7.633+001 | 7.853+001 | 7.684+001 | 7.917+001 | 7.749+001 | 7.989+001 | 7.821+001 |
| 1.4-001 | 7.652+001 | 7.482+001 | 7.715+001 | 7.546+001 | 7.767+001 | 7.599+001 | 7.829+001 | 7.661+001 | 7.897+001 | 7.736+001 |
| 1.5-001 | 7.561+001 | 7.391+001 | 7.628+001 | 7.459+001 | 7.682+001 | 7.513+001 | 7.741+001 | 7.573+001 | 7.807+001 | 7.635+001 |
| 1.6-001 | 7.471+001 | 7.301+001 | 7.540+001 | 7.371+001 | 7.596+001 | 7.427+001 | 7.654+001 | 7.486+001 | 7.717+001 | 7.556+001 |
| 1.7-001 | 7.381+001 | 7.211+001 | 7.452+001 | 7.283+001 | 7.510+001 | 7.342+001 | 7.568+001 | 7.400+001 | 7.629+001 | 7.461+001 |
| 1.8-001 | 7.292+001 | 7.122+001 | 7.364+001 | 7.195+001 | 7.425+001 | 7.256+001 | 7.482+001 | 7.314+001 | 7.541+001 | 7.374+001 |
| 1.9-001 | 7.204+001 | 7.034+001 | 7.276+001 | 7.107+001 | 7.339+001 | 7.171+001 | 7.397+001 | 7.229+001 | 7.455+001 | 7.287+001 |
| 2.0-001 | 7.116+001 | 6.947+001 | 7.189+001 | 7.020+001 | 7.254+001 | 7.086+001 | 7.312+001 | 7.144+001 | 7.369+001 | 7.202+001 |
| 2.2-001 | 6.946+001 | 6.776+001 | 7.018+001 | 6.849+001 | 7.086+001 | 6.918+001 | 7.145+001 | 6.977+001 | 7.201+001 | 7.034+001 |
| 2.4-001 | 6.782+001 | 6.612+001 | 6.852+001 | 6.683+001 | 6.922+001 | 6.753+001 | 6.981+001 | 6.813+001 | 7.038+001 | 6.870+001 |
| 2.5-001 | 6.702+001 | 6.532+001 | 6.771+001 | 6.602+001 | 6.841+001 | 6.672+001 | 6.901+001 | 6.733+001 | 6.957+001 | 6.790+001 |
| 2.6-001 | 6.623+001 | 6.454+001 | 6.691+001 | 6.522+001 | 6.761+001 | 6.592+001 | 6.822+001 | 6.654+001 | 6.878+001 | 6.711+001 |
| 2.8-001 | 6.471+001 | 6.301+001 | 6.536+001 | 6.367+001 | 6.605+001 | 6.436+001 | 6.666+001 | 6.498+001 | 6.724+001 | 6.556+001 |
| 3.0-001 | 6.323+001 | 6.153+001 | 6.387+001 | 6.217+001 | 6.454+001 | 6.285+001 | 6.516+001 | 6.348+001 | 6.574+001 | 6.406+001 |
| 3.2-001 | 6.180+001 | 6.100+001 | 6.242+001 | 6.073+001 | 6.308+001 | 6.139+001 | 6.370+001 | 6.202+001 | 6.428+001 | 6.261+001 |
| 3.4-001 | 6.042+001 | 5.872+001 | 6.103+001 | 5.934+001 | 6.167+001 | 5.998+001 | 6.228+001 | 6.060+001 | 6.287+001 | 6.120+001 |
| 3.5-001 | 5.974+001 | 5.804+001 | 6.035+001 | 5.866+001 | 6.098+001 | 5.929+001 | 6.159+001 | 5.992+001 | 6.219+001 | 6.051+001 |
| 3.6-001 | 5.908+001 | 5.738+001 | 5.968+001 | 5.799+001 | 6.030+001 | 5.862+001 | 6.092+001 | 5.924+001 | 6.151+001 | 5.984+001 |
| 3.8-001 | 5.777+001 | 5.607+001 | 5.838+001 | 5.668+001 | 5.898+001 | 5.730+001 | 5.960+001 | 5.792+001 | 6.019+001 | 5.852+001 |
| 4.0-001 | 5.650+001 | 5.481+001 | 5.711+001 | 5.542+001 | 5.771+001 | 5.602+001 | 5.832+001 | 5.664+001 | 5.891+001 | 5.724+001 |
| 4.2-001 | 5.527+001 | 5.357+001 | 5.588+001 | 5.418+001 | 5.647+001 | 5.479+001 | 5.708+001 | 5.540+001 | 5.768+001 | 5.600+001 |
| 4.4-001 | 5.407+001 | 5.237+001 | 5.468+001 | 5.299+001 | 5.527+001 | 5.359+001 | 5.588+001 | 5.420+001 | 5.548+001 | 5.480+001 |
| 4.5-001 | 5.348+001 | 5.178+001 | 5.409+001 | 5.240+001 | 5.469+001 | 5.300+001 | 5.529+001 | 5.361+001 | 5.589+001 | 5.422+001 |
| 4.6-001 | 5.290+001 | 5.120+001 | 5.351+001 | 5.182+001 | 5.411+001 | 5.242+001 | 5.471+001 | 5.303+001 | 5.531+001 | 5.364+001 |
| 4.8-001 | 5.176+001 | 5.106+001 | 5.238+001 | 5.068+001 | 5.297+001 | 5.129+001 | 5.358+001 | 5.190+001 | 5.418+001 | 5.251+001 |
| 5.0-001 | 5.065+001 | 4.895+001 | 5.127+001 | 4.958+001 | 5.187+001 | 5.019+001 | 5.248+001 | 5.080+001 | 5.308+001 | 5.140+001 |
| 5.5-001 | 4.801+001 | 4.631+001 | 4.864+001 | 4.695+001 | 4.924+001 | 4.756+001 | 4.985+001 | 4.817+001 | 5.045+001 | 4.877+001 |
| 6.0-001 | 4.556+001 | 4.387+001 | 4.618+001 | 4.449+001 | 4.678+001 | 4.510+001 | 4.738+001 | 4.571+001 | 4.798+001 | 4.631+001 |
| 5.5-001 | 4.330+001 | 4.160+001 | 4.390+001 | 4.221+001 | 4.449+001 | 4.281+001 | 4.508+001 | 4.340+001 | 4.567+001 | 4.400+001 |
| 7.0-001 | 4.120+001 | 3.951+001 | 4.178+001 | 4.009+001 | 4.236+001 | 4.068+001 | 4.293+001 | 4.126+001 | 4.351+001 | 4.183+001 |
| 8.0-001 | 3.747+001 | 3.577+001 | 3.800+001 | 3.631+001 | 3.854+001 | 3.685+001 | 3.907+001 | 3.739+001 | 3.960+001 | 3.793+001 |
| 9.0-001 | 3.421+001 | 3.252+001 | 3.471+001 | 3.303+001 | 3.522+001 | 3.353+001 | 3.571+001 | 3.404+001 | 3.621+001 | 3.454+001 |
| 1.0+000 | 3.133+001 | 2.964+001 | 3.182+001 | 3.013+001 | 3.230+001 | 3.061+001 | 3.277+001 | 3.110+001 | 3.324+001 | 3.157+001 |
| 1.1+000 | 2.874+001 | 2.705+001 | 2.922+001 | 2.753+001 | 2.969+001 | 2.801+001 | 3.015+001 | 2.848+001 | 3.061+001 | 2.894+001 |
| 1.2+000 | 2.640+001 | 2.471+001 | 2.687+001 | 2.518+001 | 2.733+001 | 2.565+001 | 2.779+001 | 2.612+001 | 2.824+001 | 2.657+001 |
| 1.3+000 | 2.429+001 | 2.260+001 | 2.474+001 | 2.306+001 | 2.520+001 | 2.352+001 | 2.564+001 | 2.397+001 | 2.609+001 | 2.442+001 |
| 1.4+000 | 2.240+001 | 2.071+001 | 2.283+001 | 2.115+001 | 2.327+001 | 2.159+001 | 2.370+001 | 2.203+001 | 2.413+001 | 2.246+001 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x,z)$ --Continued

| x sin(theta/2) /lambda | 86 Rn | 87 Fr | 88 Ra | 89 Ac | 90 Th | | | | | |
|------------------------------|-----------|--------------------|-----------|--------------------|-----------|--------------------|-----------|--------------------|-----------|--------------------|
| | total | without K-shell |
| 1.5+000 | 2.073+001 | 1.904+001 | 2.113+001 | 1.945+001 | 2.154+001 | 1.986+001 | 2.195+001 | 2.028+001 | 2.236+001 | 2.070+001 |
| 1.6+000 | 1.927+001 | 1.758+001 | 1.964+001 | 1.796+001 | 2.001+001 | 1.833+001 | 2.039+001 | 1.872+001 | 2.077+001 | 1.911+001 |
| 1.7+000 | 1.802+001 | 1.633+001 | 1.834+001 | 1.666+001 | 1.867+001 | 1.700+001 | 1.902+001 | 1.735+001 | 1.937+001 | 1.771+001 |
| 1.8+000 | 1.694+001 | 1.526+001 | 1.722+001 | 1.554+001 | 1.751+001 | 1.584+001 | 1.782+001 | 1.615+001 | 1.813+001 | 1.647+001 |
| 1.9+000 | 1.603+001 | 1.434+001 | 1.627+001 | 1.459+001 | 1.652+001 | 1.485+001 | 1.678+001 | 1.512+001 | 1.706+001 | 1.540+001 |
| 2.0+000 | 1.524+001 | 1.356+001 | 1.545+001 | 1.377+001 | 1.567+001 | 1.400+001 | 1.590+001 | 1.423+001 | 1.614+001 | 1.448+001 |
| 2.2+000 | 1.397+001 | 1.230+001 | 1.413+001 | 1.246+001 | 1.430+001 | 1.263+001 | 1.447+001 | 1.287+001 | 1.465+001 | 1.299+001 |
| 2.4+000 | 1.296+001 | 1.129+001 | 1.309+001 | 1.143+001 | 1.323+001 | 1.157+001 | 1.337+001 | 1.172+001 | 1.351+001 | 1.186+001 |
| 2.5+000 | 1.250+001 | 1.083+001 | 1.264+001 | 1.097+001 | 1.277+001 | 1.111+001 | 1.290+001 | 1.125+001 | 1.304+001 | 1.139+001 |
| 2.6+000 | 1.207+001 | 1.040+001 | 1.221+001 | 1.054+001 | 1.234+001 | 1.068+001 | 1.247+001 | 1.082+001 | 1.260+001 | 1.095+001 |
| 2.8+000 | 1.124+001 | 9.578+000 | 1.139+001 | 9.728+000 | 1.152+001 | 9.872+000 | 1.166+001 | 1.007+001 | 1.179+001 | 1.015+001 |
| 3.0+000 | 1.043+001 | 8.775+000 | 1.059+001 | 8.940+000 | 1.074+001 | 9.097+000 | 1.089+001 | 9.249+000 | 1.103+001 | 9.395+000 |
| 3.3+000 | 9.261+000 | 7.612+000 | 9.437+000 | 7.793+000 | 9.607+000 | 7.968+000 | 9.772+000 | 8.138+000 | 9.931+000 | 8.302+000 |
| 3.5+000 | 8.524+000 | 6.881+000 | 8.703+000 | 7.065+000 | 8.879+000 | 7.245+000 | 9.051+000 | 7.423+000 | 9.219+000 | 7.596+000 |
| 3.6+000 | 8.173+000 | 6.534+000 | 8.352+000 | 6.717+000 | 8.528+000 | 6.898+000 | 8.702+000 | 7.076+000 | 8.872+000 | 7.252+000 |
| 3.9+000 | 7.212+000 | 5.583+000 | 7.381+000 | 5.755+000 | 7.550+000 | 5.929+000 | 7.719+000 | 6.103+000 | 7.888+000 | 6.277+000 |
| 4.0+000 | 6.925+000 | 5.299+000 | 7.088+000 | 5.466+000 | 7.252+000 | 5.635+000 | 7.418+000 | 5.804+000 | 7.584+000 | 5.975+000 |
| 4.2+000 | 6.404+000 | 4.785+000 | 6.553+000 | 4.938+000 | 6.704+000 | 5.094+000 | 6.859+000 | 5.252+000 | 7.016+000 | 5.414+000 |
| 4.6+000 | 5.564+000 | 3.961+000 | 5.681+000 | 4.081+000 | 5.802+000 | 4.206+000 | 5.928+000 | 4.336+000 | 6.058+000 | 4.470+000 |
| 5.0+000 | 4.956+000 | 3.369+000 | 5.043+000 | 3.459+000 | 5.135+000 | 3.554+000 | 5.231+000 | 3.654+000 | 5.332+000 | 3.758+000 |
| 5.4+000 | 4.518+000 | 2.949+000 | 4.583+000 | 3.017+000 | 4.652+000 | 3.088+000 | 4.724+000 | 3.162+000 | 4.799+000 | 3.241+000 |
| 5.5+000 | 4.428+000 | 2.863+000 | 4.489+000 | 2.927+000 | 4.553+000 | 2.993+000 | 4.620+000 | 3.063+000 | 4.690+000 | 3.136+000 |
| 5.8+000 | 4.191+000 | 2.640+000 | 4.242+000 | 2.693+000 | 4.295+000 | 2.749+000 | 4.350+000 | 2.804+000 | 4.408+000 | 2.867+000 |
| 6.0+000 | 4.053+000 | 2.512+000 | 4.100+000 | 2.561+000 | 4.149+000 | 2.611+000 | 4.199+000 | 2.663+000 | 4.250+000 | 2.717+000 |
| 6.2+000 | 3.926+000 | 2.395+000 | 3.971+000 | 2.442+000 | 4.017+000 | 2.489+000 | 4.063+000 | 2.537+000 | 4.110+000 | 2.586+000 |
| 6.6+000 | 3.693+000 | 2.182+000 | 3.737+000 | 2.228+000 | 3.781+000 | 2.272+000 | 3.823+000 | 2.316+000 | 3.866+000 | 2.361+000 |
| 7.0+000 | 3.474+000 | 1.984+000 | 3.520+000 | 2.031+000 | 3.565+000 | 2.076+000 | 3.608+000 | 2.121+000 | 3.651+000 | 2.164+000 |
| 7.4+000 | 3.259+000 | 1.792+000 | 3.309+000 | 1.842+000 | 3.357+000 | 1.850+000 | 3.403+000 | 1.934+000 | 3.448+000 | 1.982+000 |
| 8.0+000 | 2.944+000 | 1.511+000 | 2.998+000 | 1.564+000 | 3.051+000 | 1.616+000 | 3.102+000 | 1.667+000 | 3.152+000 | 1.717+000 |
| 9.0+000 | 2.447+000 | 1.074+000 | 2.505+000 | 1.130+000 | 2.562+000 | 1.185+000 | 2.618+000 | 1.239+000 | 2.673+000 | 1.293+000 |
| 1.0+001 | 2.021+000 | 7.106+001 | 2.075+000 | 7.608+001 | 2.129+000 | 8.116+001 | 2.183+000 | 8.630+001 | 2.237+000 | 9.146+001 |
| 1.1+001 | 1.681+000 | 4.356+001 | 1.727+000 | 4.766+001 | 1.774+000 | 5.190+001 | 1.822+000 | 5.625+001 | 1.871+000 | 6.072+001 |
| 1.2+001 | 1.425+000 | 2.446+001 | 1.462+000 | 2.753+001 | 1.500+000 | 3.078+001 | 1.539+000 | 3.418+001 | 1.580+000 | 3.773+001 |
| 1.4+001 | 1.099+000 | 4.864+002 | 1.121+000 | 6.245+002 | 1.144+000 | 7.771+002 | 1.168+000 | 9.445+002 | 1.193+000 | 1.127+001 |
| 1.6+001 | 9.182+001 | -6.695+003 | 9.318+001 | -2.727+003 | 9.459+001 | 2.168+003 | 9.608+001 | 8.040+003 | 9.764+001 | 1.495+002 |
| 1.8+001 | 8.018+001 | -6.228+003 | 8.119+001 | -6.652+003 | 8.222+001 | -6.666+003 | 8.329+001 | -6.045+003 | 8.438+001 | -4.913+003 |
| 2.0+001 | 7.111+001 | 9.670+003 | 7.204+001 | 7.904+003 | 7.296+001 | 6.312+003 | 7.389+001 | 4.921+003 | 7.482+001 | 3.777+003 |
| 2.2+001 | 6.315+001 | 2.539+002 | 6.410+001 | 2.368+002 | 6.503+001 | 2.199+002 | 6.594+001 | 2.033+002 | 6.685+001 | 1.872+002 |
| 2.5+001 | 5.241+001 | 4.006+002 | 5.341+001 | 3.926+002 | 5.438+001 | 3.838+002 | 5.535+001 | 3.743+002 | 5.630+001 | 3.642+002 |
| 2.8+001 | 4.299+001 | 4.486+002 | 4.399+001 | 4.496+002 | 4.498+001 | 4.458+002 | 4.597+001 | 4.491+002 | 4.694+001 | 4.476+002 |
| 3.1+001 | 3.496+001 | 4.368+002 | 3.592+001 | 4.438+002 | 3.688+001 | 4.552+002 | 3.784+001 | 4.559+002 | 3.879+001 | 4.611+002 |
| 3.5+001 | 2.633+001 | 3.800+002 | 2.719+001 | 3.908+002 | 2.806+001 | 4.014+002 | 2.893+001 | 4.118+002 | 2.981+001 | 4.219+002 |
| 4.0+001 | 1.840+001 | 2.953+002 | 1.911+001 | 3.069+002 | 1.983+001 | 3.166+002 | 2.056+001 | 3.304+002 | 2.131+001 | 3.422+002 |
| 4.5+001 | 1.290+001 | 2.209+002 | 1.346+001 | 2.315+002 | 1.404+001 | 2.422+002 | 1.463+001 | 2.532+002 | 1.523+001 | 2.644+002 |
| 5.0+001 | 9.090+002 | 1.630+002 | 9.532+002 | 1.719+002 | 9.986+002 | 1.810+002 | 1.046+001 | 1.905+002 | 1.094+001 | 2.002+002 |
| 6.0+001 | 4.611+002 | 8.822+003 | 4.879+002 | 9.400+003 | 5.157+002 | 1.001+002 | 5.447+002 | 1.064+002 | 5.748+002 | 1.131+002 |
| 7.0+001 | 2.397+002 | 4.830+003 | 2.560+002 | 5.197+003 | 2.731+002 | 5.585+003 | 2.911+002 | 5.996+003 | 3.100+002 | 6.431+003 |
| 8.0+001 | 1.262+002 | 2.682+003 | 1.364+002 | 2.916+003 | 1.471+002 | 3.164+003 | 1.584+002 | 3.430+003 | 1.704+002 | 3.714+003 |
| 9.0+001 | 6.614+003 | 1.499+003 | 7.257+003 | 1.650+003 | 7.938+003 | 1.811+003 | 8.668+003 | 1.985+003 | 9.444+003 | 2.172+003 |
| 1.0+002 | 3.350+003 | 8.318+004 | 3.765+003 | 9.302+004 | 4.207+003 | 1.036+003 | 4.685+003 | 1.152+003 | 5.197+003 | 1.277+003 |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x,z)$ --Continued

| | x | 91 Pa | | 92 U | | 93 Mp | | 94 Pu | | 95 Am | |
|--------------------------|-----------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|
| $\sin(\theta/2)/\lambda$ | | total | without K-shell |
| .0 | 8.973+001 | 8.806+001 | 9.069+001 | 8.903+001 | 9.166+001 | 9.000+001 | 9.262+001 | 9.098+001 | 9.359+001 | 9.195+001 | |
| 1.0-002 | 8.981+001 | 8.801+001 | 9.082+001 | 8.900+001 | 9.181+001 | 8.997+001 | 9.278+001 | 9.095+001 | 9.375+001 | 9.192+001 | |
| 2.0-002 | 8.940+001 | 8.774+001 | 9.038+001 | 8.872+001 | 9.135+001 | 8.970+001 | 9.233+001 | 9.068+001 | 9.330+001 | 9.166+001 | |
| 3.0-002 | 8.902+001 | 8.736+001 | 9.000+001 | 8.834+001 | 9.098+001 | 8.933+001 | 9.197+001 | 9.033+001 | 9.295+001 | 9.131+001 | |
| 4.0-002 | 8.851+001 | 8.684+001 | 8.950+001 | 8.783+001 | 9.048+001 | 8.883+001 | 9.150+001 | 8.985+001 | 9.248+001 | 9.084+001 | |
| 5.0-002 | 8.788+001 | 8.622+001 | 8.888+001 | 8.722+001 | 8.987+001 | 8.822+001 | 9.091+001 | 8.927+001 | 9.191+001 | 9.027+001 | |
| 6.0-002 | 8.717+001 | 8.550+001 | 8.817+001 | 8.651+001 | 8.918+001 | 8.752+001 | 9.024+001 | 8.860+001 | 9.125+001 | 8.961+001 | |
| 7.0-002 | 8.639+001 | 8.472+001 | 8.740+001 | 8.574+001 | 8.841+001 | 8.675+001 | 8.951+001 | 8.786+001 | 9.052+001 | 8.888+001 | |
| 8.0-002 | 8.555+001 | 8.389+001 | 8.657+001 | 8.491+001 | 8.758+001 | 8.593+001 | 8.871+001 | 8.707+001 | 8.973+001 | 8.809+001 | |
| 9.0-002 | 8.469+001 | 8.302+001 | 8.570+001 | 8.404+001 | 8.672+001 | 8.507+001 | 8.788+001 | 8.623+001 | 8.391+001 | 8.726+001 | |
| 1.0-001 | 8.380+001 | 8.213+001 | 8.482+001 | 8.315+001 | 8.584+001 | 8.412+001 | 8.702+001 | 8.537+001 | 8.305+001 | 8.641+001 | |
| 1.1-001 | 8.290+001 | 8.123+001 | 8.391+001 | 8.225+001 | 8.493+001 | 8.328+001 | 8.614+001 | 8.449+001 | 8.716+001 | 8.552+001 | |
| 1.2-001 | 8.199+001 | 8.032+001 | 8.300+001 | 8.134+001 | 8.402+001 | 8.236+001 | 8.524+001 | 8.359+001 | 8.627+001 | 8.463+001 | |
| 1.3-001 | 8.108+001 | 7.941+001 | 8.208+001 | 8.042+001 | 8.309+001 | 8.144+001 | 8.433+001 | 8.268+001 | 8.335+001 | 8.371+001 | |
| 1.4-001 | 8.017+001 | 7.850+001 | 8.116+001 | 7.950+001 | 8.217+001 | 8.052+001 | 8.341+001 | 8.176+001 | 8.443+001 | 8.279+001 | |
| 1.5-001 | 7.926+001 | 7.760+001 | 8.024+001 | 7.858+001 | 8.124+001 | 7.959+001 | 8.249+001 | 8.084+001 | 8.350+001 | 8.186+001 | |
| 1.6-001 | 7.836+001 | 7.669+001 | 7.933+001 | 7.767+001 | 8.032+001 | 7.867+001 | 8.156+001 | 7.991+001 | 8.257+001 | 8.093+001 | |
| 1.7-001 | 7.746+001 | 7.580+001 | 7.842+001 | 7.676+001 | 7.940+001 | 7.775+001 | 8.063+001 | 7.898+001 | 8.163+001 | 7.999+001 | |
| 1.8-001 | 7.657+001 | 7.491+001 | 7.751+001 | 7.585+001 | 7.848+001 | 7.685+001 | 7.970+001 | 7.805+001 | 8.369+001 | 7.905+001 | |
| 1.9-001 | 7.569+001 | 7.402+001 | 7.661+001 | 7.495+001 | 7.757+001 | 7.592+001 | 7.877+001 | 7.712+001 | 7.376+001 | 7.812+001 | |
| 2.0-001 | 7.481+001 | 7.314+001 | 7.572+001 | 7.406+001 | 7.666+001 | 7.501+001 | 7.784+001 | 7.619+001 | 7.382+001 | 7.718+001 | |
| 2.2-001 | 7.307+001 | 7.141+001 | 7.396+001 | 7.230+001 | 7.487+001 | 7.322+001 | 7.600+001 | 7.435+001 | 7.595+001 | 7.531+001 | |
| 2.4-001 | 7.138+001 | 6.971+001 | 7.223+001 | 7.057+001 | 7.311+001 | 7.146+001 | 7.418+001 | 7.253+001 | 7.511+001 | 7.347+001 | |
| 2.5-001 | 7.054+001 | 6.887+001 | 7.138+001 | 6.972+001 | 7.224+001 | 7.059+001 | 7.329+001 | 7.164+001 | 7.420+001 | 7.256+001 | |
| 2.6-001 | 6.972+001 | 6.805+001 | 7.054+001 | 6.888+001 | 7.139+001 | 6.973+001 | 7.240+001 | 7.075+001 | 7.330+001 | 7.166+001 | |
| 2.8-001 | 6.811+001 | 6.644+001 | 6.889+001 | 6.723+001 | 6.971+001 | 6.806+001 | 7.067+001 | 6.902+001 | 7.154+001 | 6.990+001 | |
| 3.0-001 | 6.655+001 | 6.488+001 | 6.730+001 | 6.564+001 | 6.809+001 | 6.643+001 | 6.898+001 | 6.734+001 | 6.982+001 | 6.818+001 | |
| 3.2-001 | 6.504+001 | 6.337+001 | 6.576+001 | 6.410+001 | 6.651+001 | 6.486+001 | 6.736+001 | 6.571+001 | 6.317+001 | 6.653+001 | |
| 3.4-001 | 6.358+001 | 6.191+001 | 6.427+001 | 6.261+001 | 6.499+001 | 6.340+001 | 6.579+001 | 6.414+001 | 6.656+001 | 6.492+001 | |
| 3.5-001 | 6.287+001 | 6.120+001 | 6.355+001 | 6.189+001 | 6.426+001 | 6.260+001 | 6.503+001 | 6.338+001 | 6.579+001 | 6.415+001 | |
| 3.6-001 | 6.217+001 | 6.050+001 | 6.284+001 | 6.118+001 | 6.353+001 | 6.188+001 | 6.428+001 | 6.263+001 | 6.502+001 | 6.338+001 | |
| 3.8-001 | 6.081+001 | 5.915+001 | 6.145+001 | 5.979+001 | 6.212+001 | 6.047+001 | 6.283+001 | 6.118+001 | 6.354+001 | 6.190+001 | |
| 4.0-001 | 5.950+001 | 5.784+001 | 6.012+001 | 5.846+001 | 6.076+001 | 5.911+001 | 6.143+001 | 5.978+001 | 6.211+001 | 6.047+001 | |
| 4.2-001 | 5.824+001 | 5.657+001 | 5.884+001 | 5.718+001 | 5.946+001 | 5.720+001 | 6.009+001 | 5.844+001 | 6.075+001 | 5.911+001 | |
| 4.4-001 | 5.702+001 | 5.535+001 | 5.760+001 | 5.594+001 | 5.820+001 | 5.654+001 | 5.880+001 | 5.715+001 | 5.943+001 | 5.779+001 | |
| 4.5-001 | 5.642+001 | 5.475+001 | 5.699+001 | 5.534+001 | 5.758+001 | 5.593+001 | 5.817+001 | 5.652+001 | 5.879+001 | 5.715+001 | |
| 4.6-001 | 5.583+001 | 5.417+001 | 5.640+001 | 5.474+001 | 5.698+001 | 5.533+001 | 5.756+001 | 5.591+001 | 5.816+001 | 5.653+001 | |
| 4.8-001 | 5.469+001 | 5.302+001 | 5.524+001 | 5.358+001 | 5.581+001 | 5.415+001 | 5.636+001 | 5.471+001 | 5.595+001 | 5.531+001 | |
| 5.0-001 | 5.358+001 | 5.191+001 | 5.412+001 | 5.246+001 | 5.467+001 | 5.302+001 | 5.520+001 | 5.356+001 | 5.577+001 | 5.413+001 | |
| 5.5-001 | 5.093+001 | 4.927+001 | 5.146+001 | 4.980+001 | 5.199+001 | 5.033+001 | 5.248+001 | 5.084+001 | 5.302+001 | 5.138+001 | |
| 6.0-001 | 4.847+001 | 4.680+001 | 4.898+001 | 4.733+001 | 4.950+001 | 4.784+001 | 4.997+001 | 4.833+001 | 5.048+001 | 4.884+001 | |
| 6.5-001 | 4.616+001 | 4.449+001 | 4.667+001 | 4.501+001 | 4.718+001 | 4.552+001 | 4.764+001 | 4.599+001 | 4.813+001 | 4.649+001 | |
| 7.0-001 | 4.400+001 | 4.234+001 | 4.451+001 | 4.285+001 | 4.501+001 | 4.336+001 | 4.547+001 | 4.383+001 | 4.595+001 | 4.431+001 | |
| 8.0-001 | 4.011+001 | 3.845+001 | 4.061+001 | 3.895+001 | 4.110+001 | 3.945+001 | 4.156+001 | 3.992+001 | 4.203+001 | 4.039+001 | |
| 9.0-001 | 3.672+001 | 3.505+001 | 3.721+001 | 3.555+001 | 3.769+001 | 3.604+001 | 3.815+001 | 3.651+001 | 3.861+001 | 3.698+001 | |
| 1.0+000 | 3.374+001 | 3.208+001 | 3.422+001 | 3.256+001 | 3.469+001 | 3.304+001 | 3.516+001 | 3.351+001 | 3.561+001 | 3.397+001 | |
| 1.1+000 | 3.110+001 | 2.943+001 | 3.156+001 | 2.991+001 | 3.203+001 | 3.038+001 | 3.249+001 | 3.085+001 | 3.294+001 | 3.131+001 | |
| 1.2+000 | 2.871+001 | 2.705+001 | 2.917+001 | 2.752+001 | 2.963+001 | 2.798+001 | 3.009+001 | 2.845+001 | 3.053+001 | 2.890+001 | |
| 1.3+000 | 2.655+001 | 2.489+001 | 2.700+001 | 2.534+001 | 2.744+001 | 2.580+001 | 2.790+001 | 2.626+001 | 2.834+001 | 2.670+001 | |
| 1.4+000 | 2.457+001 | 2.291+001 | 2.501+001 | 2.336+001 | 2.544+001 | 2.380+001 | 2.589+001 | 2.425+001 | 2.632+001 | 2.469+001 | |

Table 1. Modified Dirac-Hartree-Fock-Slater atomic form factor, $F_{MFF}(x, Z)$ --Continued

| x | 91 Pa | 92 U | 93 Np | 94 Pu | 95 Am | | | | | |
|------------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|
| $\sin(\theta/2)$ | total | without K-shell |
| /lambda | | | | | | | | | | |
| 1.5+000 | 2.278+001 | 2.112+001 | 2.320+001 | 2.154+001 | 2.362+001 | 2.197+001 | 2.404+001 | 2.240+001 | 2.446+001 | 2.283+001 |
| 1.6+000 | 2.116+001 | 1.950+001 | 2.155+001 | 1.990+001 | 2.195+001 | 2.031+001 | 2.235+001 | 2.072+001 | 2.276+001 | 2.113+001 |
| 1.7+000 | 1.972+001 | 1.806+001 | 2.008+001 | 1.843+001 | 2.045+001 | 1.881+001 | 2.083+001 | 1.919+001 | 2.121+001 | 1.958+001 |
| 1.8+000 | 1.845+001 | 1.680+001 | 1.878+001 | 1.713+001 | 1.912+001 | 1.748+001 | 1.946+001 | 1.783+001 | 1.981+001 | 1.818+001 |
| 1.9+000 | 1.734+001 | 1.569+001 | 1.753+001 | 1.599+001 | 1.794+001 | 1.630+001 | 1.825+001 | 1.661+001 | 1.857+001 | 1.694+001 |
| 2.0+000 | 1.638+001 | 1.473+001 | 1.654+001 | 1.499+001 | 1.691+001 | 1.527+001 | 1.718+001 | 1.555+001 | 1.747+001 | 1.584+001 |
| 2.2+000 | 1.483+001 | 1.318+001 | 1.533+001 | 1.339+001 | 1.523+001 | 1.360+001 | 1.544+001 | 1.381+001 | 1.567+001 | 1.404+001 |
| 2.4+000 | 1.366+001 | 1.202+001 | 1.381+001 | 1.217+001 | 1.397+001 | 1.234+001 | 1.413+001 | 1.250+001 | 1.430+001 | 1.268+001 |
| 2.5+000 | 1.317+001 | 1.153+001 | 1.331+001 | 1.167+001 | 1.345+001 | 1.182+001 | 1.359+001 | 1.197+001 | 1.374+001 | 1.212+001 |
| 2.6+000 | 1.272+001 | 1.108+001 | 1.285+001 | 1.122+001 | 1.298+001 | 1.135+001 | 1.311+001 | 1.149+001 | 1.325+001 | 1.163+001 |
| 2.8+000 | 1.191+001 | 1.028+001 | 1.233+001 | 1.040+001 | 1.215+001 | 1.053+001 | 1.227+001 | 1.065+001 | 1.239+001 | 1.078+001 |
| 3.0+000 | 1.116+001 | 9.531+000 | 1.129+001 | 9.664+000 | 1.141+001 | 9.793+000 | 1.153+001 | 9.917+000 | 1.165+001 | 1.004+001 |
| 3.3+000 | 1.008+001 | 8.456+000 | 1.022+001 | 8.606+000 | 1.036+001 | 8.750+000 | 1.049+001 | 8.886+000 | 1.062+001 | 9.020+000 |
| 3.5+000 | 9.377+000 | 7.758+000 | 9.531+000 | 7.918+000 | 9.681+000 | 8.073+000 | 9.822+000 | 8.220+000 | 9.961+000 | 8.364+000 |
| 3.6+000 | 9.033+000 | 7.417+000 | 9.192+000 | 7.581+000 | 9.345+000 | 7.740+000 | 9.492+000 | 7.891+000 | 9.635+000 | 8.040+000 |
| 3.9+000 | 8.051+000 | 6.444+000 | 8.213+000 | 6.611+000 | 8.373+000 | 6.776+000 | 8.528+000 | 6.936+000 | 8.681+000 | 7.094+000 |
| 4.0+000 | 7.744+000 | 6.140+000 | 7.906+000 | 6.306+000 | 8.065+000 | 6.471+000 | 8.221+000 | 6.631+000 | 8.375+000 | 6.791+000 |
| 4.2+000 | 7.169+000 | 5.572+000 | 7.325+000 | 5.732+000 | 7.481+000 | 5.892+000 | 7.534+000 | 6.050+000 | 7.788+000 | 6.209+000 |
| 4.6+000 | 6.189+000 | 4.604+000 | 6.324+000 | 4.744+000 | 6.461+000 | 4.885+000 | 6.599+000 | 5.028+000 | 6.740+000 | 5.173+000 |
| 5.0+000 | 5.436+000 | 3.866+000 | 5.544+000 | 3.978+000 | 5.656+000 | 4.093+000 | 5.770+000 | 4.212+000 | 5.869+000 | 4.335+000 |
| 5.4+000 | 4.878+000 | 3.323+000 | 4.961+000 | 3.410+000 | 5.048+000 | 3.500+000 | 5.138+000 | 3.594+000 | 5.232+000 | 3.692+000 |
| 5.5+000 | 4.764+000 | 3.213+000 | 4.841+000 | 3.294+000 | 4.922+000 | 3.378+000 | 5.307+000 | 3.466+000 | 5.095+000 | 3.559+000 |
| 5.8+000 | 4.469+000 | 2.930+000 | 4.532+000 | 2.996+000 | 4.598+000 | 3.066+000 | 4.567+000 | 3.138+000 | 4.740+000 | 3.214+000 |
| 6.0+000 | 4.304+000 | 2.774+000 | 4.360+000 | 2.832+000 | 4.418+000 | 2.894+000 | 4.479+000 | 2.958+000 | 4.543+000 | 3.025+000 |
| 6.2+000 | 4.159+000 | 2.637+000 | 4.209+000 | 2.690+000 | 4.261+000 | 2.745+000 | 4.315+000 | 2.802+000 | 4.372+000 | 2.861+000 |
| 6.6+000 | 3.909+000 | 2.406+000 | 3.953+000 | 2.451+000 | 3.997+000 | 2.497+000 | 4.042+000 | 2.545+000 | 4.088+000 | 2.594+000 |
| 7.0+000 | 3.693+000 | 2.208+000 | 3.734+000 | 2.251+000 | 3.775+000 | 2.293+000 | 3.816+000 | 2.336+000 | 3.857+000 | 2.380+000 |
| 7.4+000 | 3.491+000 | 2.026+000 | 3.534+000 | 2.069+000 | 3.575+000 | 2.112+000 | 3.615+000 | 2.154+000 | 3.655+000 | 2.195+000 |
| 8.0+000 | 3.200+000 | 1.765+000 | 3.246+000 | 1.812+000 | 3.291+000 | 1.857+000 | 3.335+000 | 1.901+000 | 3.377+000 | 1.945+000 |
| 9.0+000 | 2.727+000 | 1.346+000 | 2.780+000 | 1.398+000 | 2.832+000 | 1.449+000 | 2.882+000 | 1.499+000 | 2.931+000 | 1.548+000 |
| 1.0+001 | 2.292+000 | 9.663+001 | 2.346+000 | 1.018+000 | 2.399+000 | 1.070+000 | 2.452+000 | 1.121+000 | 2.505+000 | 1.173+000 |
| 1.1+001 | 1.920+000 | 6.527+001 | 1.970+000 | 6.992+001 | 2.020+000 | 7.464+001 | 2.070+000 | 7.942+001 | 2.121+000 | 8.426+001 |
| 1.2+001 | 1.622+000 | 4.141+001 | 1.664+000 | 4.524+001 | 1.708+000 | 4.920+001 | 1.753+000 | 5.327+001 | 1.798+000 | 5.746+001 |
| 1.4+001 | 1.220+000 | 1.324+001 | 1.248+000 | 1.536+001 | 1.277+000 | 1.764+001 | 1.307+000 | 2.007+001 | 1.338+000 | 2.266+001 |
| 1.6+001 | 9.928+001 | 2.292+002 | 1.010+000 | 3.204+002 | 1.028+000 | 4.234+002 | 1.047+000 | 5.385+002 | 1.067+000 | 6.664+002 |
| 1.8+001 | 8.551+001 | -3.157+003 | 8.668+001 | -7.222+004 | 8.790+001 | 2.442+003 | 8.917+001 | 6.392+003 | 9.050+001 | 1.118+002 |
| 2.0+001 | 7.576+001 | 2.924+003 | 7.671+001 | 2.403+003 | 7.767+001 | 2.257+003 | 7.866+001 | 2.536+003 | 7.967+001 | 3.285+003 |
| 2.2+001 | 6.775+001 | 1.720+002 | 6.865+001 | 1.579+002 | 6.954+001 | 1.453+002 | 7.044+001 | 1.345+002 | 7.133+001 | 1.258+002 |
| 2.5+001 | 5.723+001 | 3.535+002 | 5.816+001 | 3.425+002 | 5.907+001 | 3.313+002 | 5.997+001 | 3.200+002 | 6.086+001 | 3.090+002 |
| 2.8+001 | 4.791+001 | 4.453+002 | 4.886+001 | 4.423+002 | 4.981+001 | 4.386+002 | 5.074+001 | 4.343+002 | 5.167+001 | 4.295+002 |
| 3.1+001 | 3.975+001 | 4.656+002 | 4.069+001 | 4.695+002 | 4.164+001 | 4.727+002 | 4.258+001 | 4.754+002 | 4.351+001 | 4.774+002 |
| 3.5+001 | 3.069+001 | 4.316+002 | 3.157+001 | 4.410+002 | 3.247+001 | 4.502+002 | 3.336+001 | 4.589+002 | 3.425+001 | 4.673+002 |
| 4.0+001 | 2.206+001 | 3.541+002 | 2.282+001 | 3.660+002 | 2.360+001 | 3.779+002 | 2.438+001 | 3.898+002 | 2.517+001 | 4.016+002 |
| 4.5+001 | 1.585+001 | 2.759+002 | 1.648+001 | 2.875+002 | 1.712+001 | 2.994+002 | 1.778+001 | 3.114+002 | 1.845+001 | 3.237+002 |
| 5.0+001 | 1.143+001 | 2.103+002 | 1.194+001 | 2.206+002 | 1.247+001 | 2.313+002 | 1.300+001 | 2.422+002 | 1.356+001 | 2.535+002 |
| 6.0+001 | 6.061+002 | 1.200+002 | 6.386+002 | 1.273+002 | 6.724+002 | 1.349+002 | 7.073+002 | 1.428+002 | 7.436+002 | 1.511+002 |
| 7.0+001 | 3.297+002 | 6.890+003 | 3.504+002 | 7.375+003 | 3.721+002 | 7.888+003 | 3.947+002 | 8.427+003 | 4.184+002 | 8.997+003 |
| 8.0+001 | 1.831+002 | 4.016+003 | 1.964+002 | 4.338+003 | 2.105+002 | 4.681+003 | 2.253+002 | 5.045+003 | 2.410+002 | 5.433+003 |
| 9.0+001 | 1.027+002 | 2.373+003 | 1.155+002 | 2.588+003 | 1.208+002 | 2.819+003 | 1.307+002 | 3.067+003 | 1.412+002 | 3.332+003 |
| 1.0+002 | 5.747+003 | 1.412+003 | 6.354+003 | 1.558+003 | 6.965+003 | 1.716+003 | 7.636+003 | 1.887+003 | 8.355+003 | 2.070+003 |

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Table 3: Angular ranges between 0° and Θ_{\max} , where the use of the modified form factor is recommended.

| Photon Energy [MeV] | Θ_{\max} ($x=50 \text{ \AA}^{-1}$) |
|---------------------|---|
| 0.62 (or less) | 180° |
| 1.0 | 76.6° |
| 2.0 | 36.1° |
| 5.0 | 14.2° |
| 10.0 | 7.1° |
| 20.0 | 3.6° |

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- ¹L. Kissel, R. H. Pratt, and S. C. Roy, Phys. Rev. A **22**, 1970–2004 (1980).
²P. Papatzacos and K. Mork, Phys. Rev. **21C**, 81–118 (1975); Phys. Rev. D **12**, 206–218 (1975).
³M. Schumacher, F. Smend, P. Rullhusen, W. Mückenheim, and H. G. Börner, in Neutron-Capture Gamma-Ray and Related Topics, Inst. Phys. Conf. Ser. No. 62, 598–612 (1982).
⁴P. Rullhusen, W. Mückenheim, F. Smend, M. Schumacher, G. P. A. Berg,

- K. Mork, and L. Kissel, Phys. Rev. C **23**, 1375–1383 (1981).
⁵R. Leicht, M. Hammen, K. P. Schelhaas, and B. Ziegler, Nucl. Phys. A **362**, 111–127 (1981).
⁶P. Rullhusen, U. Zurmühl, W. Mückenheim, F. Smend, M. Schumacher, and H. G. Börner, Nucl. Phys. A **382**, 79–96 (1982).
⁷E. G. Fuller and E. Hayward, in *Nuclear Reactions*, edited by P. M. Endt and P. B. Smith (North Holland, Amsterdam, 1962), Vol. 2, Chap. 3.
⁸W. R. Johnson and K. Cheng, Phys. Rev. A **13**, 692–698 (1976).
⁹M. Schumacher and A. Stoffregen, Z. Phys. A **283**, 15–19 (1977).
¹⁰M. Schumacher and P. Rullhusen, Nucl. Instrum. Meth. **166**, 85–90 (1979).
¹¹M. L. Goldberger and F. E. Low, Phys. Rev. **176**, 1778–1781 (1968).
¹²V. Florescu and M. Gavrilă, Phys. Rev. A **14**, 211–235 (1976).
¹³G. E. Brown and D. F. Mayers, Proc. R. Soc. London Ser. A **242**, 89–95 (1957).
¹⁴W. Franz, Z. Phys. **95**, 652–668 (1935); **98**, 314–320 (1936).
¹⁵J. S. Levinger and M. L. Rustgi, Phys. Rev. **103**, 439–442 (1956).
¹⁶G. E. Brown and J. B. Woodward, Proc. Phys. Soc. London Sect. A **65**, 977–980 (1952).
¹⁷M. Schumacher, F. Smend, and I. Borchert, Phys. Rev. C **13**, 2318–2323 (1976).
¹⁸H. A. Bethe, as quoted in J. S. Levinger, Phys. Rev. **87**, 656–662 (1952).
¹⁹F. Smend and M. Schumacher, Nucl. Phys. A **223**, 423–428 (1974).
²⁰D. A. Liberman, D. T. Cromer, and J. T. Waber, Comp. Phys. Commun. **2**, 107–113 (1971).
²¹J. H. Hubbell, Wm. J. Veigle, E. A. Briggs, R. T. Brown, D. T. Cromer, and R. J. Howerton, J. Phys. Chem. Ref. Data **4**, 471–538 (1975).
²²J. H. Hubbell and I. Øverbø, J. Phys. Chem. Ref. Data **8**, 69–105 (1979).
²³J. Moffat and M. W. Stringfellow, Proc. R. Soc. London Ser. A **254**, 242–258 (1960).
²⁴G. Jarlskog, L. Jönsson, S. Prünster, H. D. Schulz, H. J. Willutzki, and G. G. Winter, Phys. Rev. D **8**, 3818–3828 (1973).
²⁵S. Kahane, K. Moreh, and O. Shahal, Phys. Rev. C **18**, 1217–1222 (1978).
²⁶Kissel and Lynn (private communication).
²⁷Kissel, Lynn, S. C. Roy, and R. H. Pratt, International Conference on X-Ray and Atomic Inner-Shell Physics, August 23–27, 1982, Eugene, Oregon, USA.