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COMPILATION OF PHENOMENOLOGICAL OPTICAL-MODEL PARAMETERS* 1954-1975

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Presented here is a compilation, with bibliography, of optical-model parameters determined by fitting elastic-scattering angular distributions for various incident particles including heavy ions. It includes parameters from previous compilations back to 1954 and from an extensive literature search in the leading journals and publications in nuclear physics up to June 1975.

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INTRODUCTION

This compilation of phenomenological optical-model parameters obtained by fitting elastic-scattering data includes two compilations* previously published in Nuclear Data Tables. We hope that any major work published before July 1975 which reports optical-model parameters is given in this present publication either in the main tables or in the tabular bibliographies.

Since this endeavor is undertaken as a service to the physics community, we welcome any suggestions aimed at making the compilation more useful or any criticism as to its deficiencies. Since it is almost inevitable, unfortunately, that in such publications some mistakes or omissions will occur, we will appreciate having them pointed out to us so that they can be corrected in future editions. It is evident that in many publications the authors did not report some of the results of their studies in a form suitable for inclusion in our compilation; we strongly encourage such authors to communicate to us these results, particularly when the studies are documented in internal reports or are part of a published study.

We believe that consistency is one of the main problems faced in the kind of compilation which extends over so many years of work. How can one be sure that the evaluation of the fit given with some parameters is fair compared to the evaluation made more than a year earlier on similar data in another publication? What is the "reasonable" number of parameter sets to report for each angular distribution when sometimes 10 or 15 sets are given for a single data set? Which parameters are worthwhile to report? Which are not?

Maybe some users of this compilation will be annoyed by the number of occasions we refer them to the original publication. We believe that the final decision on which set of parameters is most appropriate to a given need can be made only after one refers to the conditions under which each parameter set was determined.

Scope

In the main part of the compilation we include only optical-model parameters, for the more standard forms of the potentials, as determined from a fit to elastic-scattering data. We exclude optical-model parameters determined in some other contexts, for instance, the generation of wavefunctions for distorted-wave calculations, or transmission coefficients for statistical-model calculations not obtained from a fit to elastic-scattering data. We do not include systematically diagonal potentials used in coupled-channel calculations; these are strongly affected by the off-diagonal potentials, and the problem is further complicated with the need to specify the diagonal potentials in all the channels which are coupled. The rationale for excluding these parameters from the main tables is that few of the analyses were made with extensive investigation of parameter space. The extent to which parameter space is searched for a best fit varies greatly throughout the literature. At least a limited search was required on some parameters for all the potentials presented in the main tables. For example, if the prediction of certain parameters is compared with experimental data and there is no evidence of a parameter search, the parameters are not included.

With the above rules the results of some analyses are difficult to enter in the tables. It appears to us at the moment that a tabular bibliography is the best way to handle this problem.

Tabular Bibliography

The tabular bibliography, which follows the standard compilation for each incident particle, includes:

(1) In general, any study of such a nature that the results could not be entered in the main compilation. Such studies often deal with the establishment of average spherical-model parameters over a limited energy range for a limited number of nuclei and include some search over parameter space.

(2) References to publications in which the optical-model parameters have been reported only graphically as functions of energy or mass number.

(3) A few 1975 references which could have been included in the compilation but were noted too late to be included in the tables which were already in their final form.

Literature Coverage

The compilation is based upon an extensive literature search in the following publications: Nuclear Physics and Physical Review from 1964 to the end of June 1975, Physics Letters B, Physical Review Letters, Zeitschrift für Physik, Journal of Physical Society of Japan, and Soviet Journal of Nuclear Physics from 1967 to the end of 1973. We also used cross references, found in these main sources of reference, to various other publications and reports.

Since we aimed to accomplish a comprehensive review of all optical-model parameters that could be used in various calculations, we went back to the previously published compilations:

*Compilation of Phenomenological Optical-Model Parameters, 1969–1970, NUCLEAR DATA TABLES **10**, 539 (1972) and Compilation of Phenomenological Optical-Model Parameters, 1969–1972, NUCLEAR DATA TABLES **13**, 293 (1974)

1. "Phenomenological Optical-Model Parameters" by D. R. Winner and R. M. Drisko.[1] This compilation covers protons, deuterons, tritons, He-3, alpha particles, and heavy ions. It covers the literature from 1954 to April 1964.

2. "The Deuteron-Nucleus Optical Potential" by P. E. Hodgson.[2] This review article includes a compilation of deuteron optical-model parameters. It covers the literature to the end of 1965 and makes use of the Winner-Drisko[1] compilation.

3. "The Helion and Triton Optical Potentials" by P. E. Hodgson.[3] A compilation of He-3 and triton optical-model parameters is included in this review. It covers the literature up to the middle of 1967 and makes use of the Winner-Drisko[1] compilation.

We are not aware of any extensive compilations of optical-model parameters for neutrons. However, we found useful a compilation of references with a short abstract of each article by L. Wallin et al.[4] This bibliography covers the literature up to the end of 1963.

When parameters from these previous compilations are used directly in our tables without study of the original paper, it is so indicated by a note referring to the specific compilation (W65 if from Ref. 1, H66 if from Ref. 2, and H68 if from Ref. 3). In such cases no information could be given regarding the agreement between the optical-model calculations and the data, but this does not mean that no curve is available in the paper from which these parameters were taken.

Optical-Model Potential Definition

The optical-model potential is defined as follows:

$$U(r) = V_c - Vf(x_0) + \left(\frac{h}{m_\pi c}\right)^2 V_{so}(\sigma \cdot l)\frac{1}{r}\frac{d}{dr}f(x_{so})$$

$$-i[Wf(x_W) - 4W_D\frac{d}{dx_D}f(x_D)] \quad (1)$$

where

$$V_c = ZZ'e^2/r, r \geq R_c$$
$$= (ZZ'e^2/2R_c)(3 - r^2/R_c^2), r \leq R_c, \quad (2)$$
$$R_c = r_c A^{1/3};$$

$$f(x_i) = (1 + e^{x_i})^{-1} \text{ where } x_i = (r - r_i A^{1/3})/a_i; \quad (3)$$

$$\left(\frac{h}{m_\pi c}\right)^2 = 2.000 \text{ (fermi)}^2. \quad (4)$$

The operator σ is defined in terms of the spin angular momentum s as follows:

$s = (h/2)\sigma$ for neutrons, protons, He-3, and tritons;
$s = h\sigma$ for deuterons; (5)
$s = 0$ for α-particles.

A is the mass number of the target nucleus.

For heavy ions the factor $A^{1/3}$ is sometimes replaced by $(A_1^{1/3} + A_2^{1/3})$ where A_1 and A_2 are the mass numbers of the incident and target particles, respectively. To avoid confusion in this case, it is preferable to quote the value of $r_i A^{1/3}$ instead of the radius parameter r_i. We have adopted this convention in the heavy-ion parameter compilation.

$V_c(r)$ is the coulomb potential of a spherical, uniform charge distribution of radius R_c.

The functions $f(x_0)$, $f(x_W)$, $f(x_D)$, and $f(x_{so})$ are Woods-Saxon form factors with appropriate radius and diffusivity parameters.

The imaginary, absorptive potential can be either volume ($W \neq 0$, $W_D = 0$), surface ($W = 0$, $W_D \neq 0$), or volume-plus-surface ($W \neq 0$, $W_D \neq 0$).

Surface absorption can have either a "derivative-Woods-Saxon" shape as in Formula (1) or a Gaussian shape. In this case the surface absorption term will be:

$$W_D \exp(-x_D^2),\ x_D = (r - r_D A^{1/3})/a_D. \quad (6)$$

The factor 4 which was introduced in the "derivative-Woods-Saxon" surface absorption term is justified in order to obtain the maximum value of the form factor equal to unity (at $r = r_D A^{1/3}$). Since the maximum value of the form factor for volume absorption (at $r = 0$) is nearly unity, this choice facilitates the comparison of volume and surface absorption through the comparison of the parameters W and W_D.

Practically all optical-model analyses published in 1963 and after were performed with computer codes which automatically adjusted some of the parameters of the model to minimize a quantity called χ^2. The mathematical techniques for solving the Schrödinger equation and the methods of parameter adjustment were described in detail by Melkanoff et al.[5] The most frequently used definition of χ^2 is

$$\chi^2 = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{X_i^{\text{exp}} - X_i^{\text{th}}}{\Delta X_i^{\text{exp}}}\right)^2 \quad (7)$$

where X_i stands for differential cross sections, polarization, or reaction cross sections; for neutrons it may also include total cross sections; N is the number of data points.

Since the errors ΔX_i assigned to the data vary greatly from one experiment to another and since the shape of the curve also should be taken into account, the value of χ^2 cannot give a satisfactory measure of the quality of the fits but is useful to compare the fits given by different sets of parameters relative to a single set of data. Since this compilation involves many sources of data and different search codes which do not always have the same definition for χ^2, we decided to report instead a subjective evaluation of the quality of the fit

when the theoretical curve and the corresponding data were plotted.

Ambiguities of Parameters

The potential parameters as determined from data fitting are not unique. The significance of parameters fitting only one angular distribution differs from that of a more general set of parameters which give a satisfactory agreement with several sets of data simultaneously. In any case we can find some "continuous" kinds of ambiguity (within certain regions of parameter space) or some "discrete" kinds.

The "continuous" kind of parameter ambiguity is due mostly to the well known Vr_0^n and $W_D a_D$ ambiguities coupled with the ability of the automatic parameter search codes to readjust the "free" parameters when a constraint is applied to the others.[6]

The "discrete" kind of ambiguity has been first shown in deuteron analyses.[7,8] Different families of potentials have been obtained which give equivalent fits to the data and have nearly the same scattering matrix elements S_l, but the partial waves show one more half wavelength inside the well for each deeper well depth. The same behavior has been shown for tritons,[9] helium-3,[10] and α-particles.[11,12]

There are arguments that under some conditions the depth of the real well for a given parameter radius should be roughly proportional to the number of nucleons in the incident particle. This means that at intermediate energies (15 MeV $< E <$ 40 MeV), if r_0 is kept at a value between 1 and 1.25 F, the real well depth should be around 45 MeV for neutrons and protons, 90 MeV for deuterons, 150 MeV for tritons and helium-3, and 200 MeV for α-particles.

The parameter ambiguities involved in heavy-ion studies with optical-model potentials were first pointed out by Igo.[13] It is now common knowledge that only the outermost tail of the potential (around the nuclear barrier) is felt and therefore the central depth of these potentials is not well determined. However, the optical model represents a convenient way of parameterizing the scattering and of correlating different sets of data, since it has mass, charge, and energy dependence automatically built into it. It is capable of describing both the strong absorption limit and the case in which the colliding ions easily interpenetrate.

Some emphasis has been given to these points in recent publications,[14-17] and they should be consulted for more information.

Because of the various kinds of parameter ambiguity in most optical-model analyses, several sets of parameters are frequently reported for a given set of data. We have tabulated up to three or four parameter sets selecting the ones with the most physical significance, the ones which give the better fit to the data (lower χ^2), and perferably those for which the corresponding theoretical curve is shown compared with the data in the publication.

Parameter Systematics

Sometimes optical-model parameter studies are made in order to determine an "average set" of optical-model parameters applicable over a certain range of energy and mass number. The motivations behind these studies are too varied to detail here and certainly affect to some degree the end results. Furthermore these parameter systematics may be strongly affected by the data sets selected, or available, and the methodology used to arrive at the average set. Many review articles and books on nuclear reactions discuss these average sets of optical-model parameters. Also we refer the reader to a book[18] on the subject as a compact source of references to such studies. Results of parameter systematic studies are often used to generate wavefunctions or transmission coefficients needed in the analysis of various nuclear reactions. For various reasons it is probably best in such cases to use parameter sets which were determined systematically over a small range of energies and mass numbers, in the region of interest, rather than to use uncritically best-fit parameters to a single angular distribution or results of systematics established over a large range of energies and mass numbers. This is so, in particular because the parameters obtained from a single angular distribution may be strongly affected by systematic experimental errors and particular reaction mechanisms occurring at a given energy for a particular nucleus. It is sometimes possible to detect the presence of such effects if one compares the data with predictions of systematic parameter studies or compares the parameters obtained by fitting the data with results of systematic studies.

One of the problems most frequently incurred with experimental data is that of absolute normalization. We have encountered several cases where errors in normalization of as much as a factor of 2 did not prevent good fits with an optical-model potential whose parameters did not appear to us pathological in nature. These errors were detected in the process of establishing the systematics. We also know of cases where normalization errors as large as 20% yielded a lower χ^2 by as much as a factor of 4, with quite different parameters, and other cases where the minimum in χ^2 occurred close to the given experimental normalization.

In the case of systematics established over large energy ranges and mass numbers, the parameterization selected may not be adequate over some mass-number or energy regions. In many systematic analyses it is not possible from the information given to determine the

extent of loss of goodness-of-fit of the global set over the best-fit parameters. In any event it is always difficult to judge the significance of the loss in goodness-of-fit in the particular application where these parameters are used. In systematic analyses usually the weakest point is the imaginary potential which seems to exhibit, for all incident particles, the greatest amount of variation from angular distribution to angular distribution, and is often the least well represented by a smooth variation as a function of energy and mass number.

In the interest of convenience we will give just below a few average parameter sets. Their mention here does not imply that they are better than all others but only that we are more familiar with their use in various applications. Any average parameter set should be used with caution, and the original papers should be consulted to determine the applicability in any given situation.

Neutrons

A systematic analysis for neutron potentials has been presented by Becchetti and Greenlees.[19] It is applicable to $A > 40$ and is determined on the basis of data up to 24 MeV. Below 5 MeV most angular distributions, in addition to shape-elastic scattering, contain compound-elastic contributions which must be estimated for optical-model analysis purposes. Becchetti and Greenlees estimated the compound elastic by adding an isotropic contribution whose magnitude was adjusted to minimize χ^2. A few of their parameters were determined from the neutron data, the others were fixed at the values obtained from their proton studies. This is unfortunate because the proton analysis was strongly influenced by the extensive data for 30 and 40 MeV, much higher than the neutron energies. The geometrical parameters they used are significantly different from those normally obtained from neutron data at these low energies. Consequently, it is not clear to what extent the results they obtained are biased to compensate for this effect. However, their neutron parameters, because of the good fits shown at 15 and 24 MeV and the similarity to their proton parameters, should be useful in distorted-wave method calculations where it is important to have similar neutron and proton optical-model potentials. Their best average neutron parameter sets are (for potentials in MeV, radii in fermis):

$$V = 56.3 - 0.32E - 24(N - Z)/A$$
$$r_0 = 1.17,\ a_0 = 0.75$$
$$W = 0.22E - 1.56, \text{ or zero, whichever is greater}$$
$$W_D = 13 - 0.25E - 12(N - Z)/A, \text{ or zero, whichever is greater}$$
$$r_W = r_D = 1.26,\ a_W = a_D = 0.58$$
$$V_{so} = 6.2,\ r_{so} = 1.01,\ a_{so} = 0.75.$$

At lower energies where the Becchetti-Greenlees potential may not be satisfactory, the local potential equivalent to the nonlocal potential of Perey and Buck[20] may be more adequate. The following potential by Wilmore and Hodgson[21] was used extensively in Hauser-Feshbach calculations with some success.

$$V = 47.01 - 0.267E - 0.0018E^2$$
$$r_0 = 1.322 - 7.6A \times 10^{-4} + 4A^2 \times 10^{-6} - 8A^3 \times 10^{-9}$$
$$a_0 = 0.66$$
$$W_D = 9.52 - 0.053E$$
$$r_D = 1.266 - 3.7A \times 10^{-4} + 2A^2 \times 10^{-6} - 4A^3 \times 10^{-9}$$
$$a_D = 0.48.$$

Wilmore and Hodgson obtained this local equivalent potential from an approximate formula in the paper of Perey and Buck, without the spin-orbit potential. We think that a spin-orbit potential of 7 MeV would be adequate if J-dependent transmission coefficients are required. A limited tabulation of transmission coefficients from the nonlocal potential of Perey and Buck is available[22] as well as a more extensive set of graphs.[23] Finally we should mention the systematics of Bjorklund and Fernbach[24] at 4.1, 7, and 14 MeV which were used extensively in Hauser-Feshbach calculations and a more recent systematic analysis at 8 MeV by Holmqvist and Wiedling[25] who used an extensive set of new data from Al to Pb. Except for the symmetry dependence in V which was carefully investigated in the Holmqvist and Wiedling paper, both studies obtain similar results regarding the geometrical parameters and average values of the well depths.

Protons

The systematic analysis of Becchetti and Greenlees[19] fitted well a large number of elastic differential cross sections and polarization data for $A > 40$ and $E < 50$ MeV. From our experience with systematics below 20 MeV we are inclined to think that the geometry they used is more adapted to data above 20 MeV. Nevertheless their parameters appear to give fairly good fits down to 10 MeV. The parameters are:

$$V = 54.0 - 0.32E + 24(N - Z)/A + 0.4(Z/A^{1/3})$$
$$r_0 = 1.17,\ a_0 = 0.75$$
$$W = 0.22E - 2.7, \text{ or zero, whichever is greater}$$
$$W_D = 11.8 - 0.25E + 12(N - Z)/A, \text{ or zero, whichever is greater}$$
$$r_W = r_D = 1.32,\ a_W = a_D = 0.51 + 0.7(N - Z)/A$$
$$V_{so} = 6.2,\ r_{so} = 1.01,\ a_{so} = 0.75.$$

A similar analysis extending from 30 to 60 MeV by Menet et al.[26] who used extensive reaction cross-section data to help determine the imaginary potential gave

$$V = 49.9 - 0.22E + 26.4(N - Z)/A + 0.4(Z/A^{1/3})$$
$$r_0 = 1.16,\ a_0 = 0.75$$
$$W = 1.2 + 0.09E$$
$$W_D = 4.2 - 0.05E + 15.5(N - Z)/A$$
$$r_W = r_D = 1.37,\ a_W = a_D = 0.74 - 0.008E + 1.0(N - Z)/A$$
$$V_{so} = 6.04,\ r_{so} = 1.064,\ a_{so} = 0.78$$
$$r_c = 1.25.$$

The comparison of these two sets of parameters, based on essentially the same data, indicates the extent to which such types of analysis give different results, particularly for the imaginary part of the potential.

Another set of parameters, which was used extensively at lower energies and which reproduced the data quite well, particularly for medium-weight nuclei $30 < A < 100$, has a geometry similar to that for the low-energy neutron parameters. It is from an early systematic study by Perey[27] and provides an alternative to the Becchetti-Greenlees potential below 20 MeV.

$$V = 53.3 - 0.55E + 27(N - Z)/A + 0.4(Z/A^{1/3})$$
$$r_0 = 1.25,\ a_0 = 0.65$$
$$W_D = 13.5 \pm 2.0$$
$$r_D = 1.25,\ a_D = 0.47$$
$$V_{so} = 7.5,\ r_{so} = 1.25,\ a_{so} = 0.47$$
$$r_c = 1.25.$$

Deuterons

The recent systematic analysis by Lohr and Haeberli[28] is particularly interesting since it covers both elastic differential cross sections and polarization. Unfortunately the energy range is limited to 8 to 13 MeV. The deduced parameters for $A > 40$ are:

$$V = 91.13 + 2.2(Z/A^{1/3})$$
$$r_0 = 1.05,\ a_0 = 0.86^*$$
$$W_D = 218/A^{2/3}$$
$$r_W = 1.43,\ a_W = 0.50 + 0.013A^{2/3}$$
$$V_{so} = 7.0,\ r_{so} = 0.75,\ a_{so} = 0.5$$
$$r_c = 1.3$$

*The value of this parameter is reported to be 0.80 in the Nuclear Physics publication but was corrected by Lohr and Haeberli to be 0.86.

The early analysis of Perey and Perey[7] is applicable below 25 MeV but should be used with caution below 12 MeV since both the real and imaginary potentials tend to increase rapidly at the lower energies. Also their potential does not have a spin-orbit potential since no polarization data were available then. However, their parameters, which have been used extensively in many stripping calculations, are:

$$V = 81.0 - 0.22E + 2.0(Z/A^{1/3})$$
$$r_0 = 1.15,\ a_0 = 0.81$$
$$W_D = 14.4 + 0.24E$$
$$r_D = 1.34,\ a_D = 0.68$$
$$r_c = 1.15.$$

Helium-3 and Tritons

A short report of Becchetti and Greenlees[29] gives the results of a He-3 systematic study for $A > 40$ and $E < 40$ MeV. Even though no details of the analysis are reported, we give here the parameters they obtained:

$$V = 151.9 - 0.17E + 50(N - Z)/A$$
$$r_0 = 1.20,\ a_0 = 0.72$$
$$W = 41.7 - 0.33E + 44(N - Z)/A$$
$$r_W = 1.40,\ a_W = 0.88$$
$$V_{so} = 2.5,\ a_{so} = 1.20,\ a_{so} = 0.72$$
$$r_c = 1.30.$$

In the same publication they also report a set of optical parameters for tritons. Since the only data analyzed to obtain these parameters were at 15 and 20 MeV, the energy dependence could not be determined and therefore was assumed to be the same as for He-3.

$$V = 165.0 - 0.17E - 6.4(N - Z)/A$$
$$r_0 = 1.20,\ a_0 = 0.72$$
$$W = 46.0 - 0.33E - 110(N - Z)/A$$
$$r_W = 1.40,\ a_W = 0.84$$
$$V_{so} = 2.5,\ r_{so} = 1.20,\ a_{so} = 0.72$$
$$r_c = 1.30.$$

Note that the spin-orbit parameters are not strongly justified and that equivalent fits to the data are obtained without any spin-orbit coupling.

Heavy Ions

There exist no general systematics of heavy-ion potentials. For a somewhat dated point of view of the situation, the proceedings of the heavy-ion scattering symposiums held at Argonne National Laboratory in 1971[30] and in Nashville in 1974[31] should be consulted.

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EXPLANATION OF TABLES

Optical-model parameters in each table are ordered by:

1. Increasing atomic number of the target nucleus
2. Increasing mass of separate isotopes (if parameters for a target of natural elements are reported, they will be tabulated before the isotopes)
3. Increasing energy of the incident particles

NUCLIDE	Atomic weight and symbol of the target nucleus
ENERGY	Energy of the incident particle in the laboratory system, in MeV
REAL POTENTIAL V, R, A	V, r_0, a_0 in Eqs. (1) and (3)
VOL. IMAG. POTENTIAL W, RW, AW	W, r_W, a_W in Eqs. (1) and (3)
SURF. IMAG. POTENTIAL WD, RD, AD	W_D, r_D, a_D in Eqs. (1) and (3) If the surface imaginary absorption is of a Gaussian type, the value of the well-depth parameter W_D is followed by the letter G
SPIN-ORBIT POTENTIAL VSO, RSO, ASO	V_{so}, r_{so}, a_{so} in Eqs. (1) and (3)
R**	A double asterisk following the R's in the heavy-ion table indicates that $R^{**} = r_i A^{1/3} = r_i'(A_1^{1/3} + A_2^{1/3})$
V, W, WD, VSO	Given in MeV
R, A, RW, . . .	Given in fermis
RC	r_c, Coulomb radius parameter, Eq. (2)
?	A question mark following the Coulomb radius parameter indicates that this parameter was not given in the publication and that we assume a reasonable value generally equal to the real radius parameter. This appears justified since the fit is not very sensitive to this parameter
*	An asterisk following a parameter indicates that this parameter was kept fixed during the search
ST	Neutron total cross sections, in millibarns

SR	Reaction cross sections, in millibarns. For the neutrons, σ_R reported in these tables are: $\sigma_R = \sigma_T - \sigma_{se}$ where σ_{se} is the shape elastic cross section calculated by the optical-model code which does not include the compound elastic cross section
FIT	Gives the nature of the data fitted
S	Differential cross-section data fitted
P	Differential polarization data fitted
	When the fits were shown in the paper, we have indicated our judgment of the goodness of the fit by: 1 very good or good, 2 acceptable, or 3 poor, which is a purely subjective evaluation unrelated to the χ^2's reported
S1P2	For example, indicates parameters obtained by fitting the differential elastic cross sections and the polarization simultaneously and that these parameters give a good fit to the differential elastic cross sections and an acceptable fit to the polarization
NOTE	The numbers refer to the notes following the tables
REF	References which follow each table
TABULAR BIBLIOGRAPHY	Follows each table. See the last paragraph under Scope for an explanation of the material noted here

TABLE I. Optical-Model Parameters Neutrons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	ST	SR	FIT	NOTE	REF.
3H	6.0	50.35	1.488*	0.144*	0.52	1.501*	0.378*				1.73	1.049*	0.289*			S1		SHE72
3H	9.0	47.36	1.488*	0.144*	1.49	1.501*	0.378*				2.47	1.049*	0.289*			S1		SHE72
3H	18.0	42.98	1.488*	0.144*	4.69	1.501*	0.378*				3.22	1.049*	0.289*			S1		SHE72
3H	19.5	42.07	1.488*	0.144*	5.46	1.501*	0.378*				3.07	1.049*	0.289*			S1		SHE72
3H	21.0	42.0	1.488*	0.144*	6.19	1.501*	0.378*				3.77	1.049*	0.289*			S1		SHE72
3H	22.1	41.60	1.488*	0.144*	7.63	1.501*	0.378*				5.94	1.049*	0.289*			P1		SHE72
3H	23.0	41.86	1.488*	0.144*	7.38	1.501*	0.378*				5.24	1.049*	0.289*			S1		SHE72
6LI	14.	42.79	1.4*	0.48				9.52G	1.4*	0.90	5.*	1.4*	0.48	1287	497	S1		LUT63
9BE	14.	40.67	1.4*	0.62				22.2G	1.4*	0.39	5.*	1.4*	0.62	1459	563	S1		LUT63
B	14.	42.36	1.35	0.55				9.44G	1.35	0.75	5.*	1.35	0.55	1493	570	S1		LUT63
B	14.	48.2	1.28	0.52				6.87G	1.28	0.70	4.72	1.28	0.52	1347	434	S1		FRA66
10B	9.72	45.56	1.31*	0.66*				9.08	1.26*	0.48*						S3		COO70
11B	9.72	47.1	1.31*	0.66*				8.38	1.26*	0.48*						S2		COO70
11B	14.1	49.2	1.27	0.52				15.8	1.35	0.16	4.96	1.27	0.42	1330	870	S1		ALD70
11B	14.1	48.0	1.27*	0.45				5.77	1.18	0.47*	5.66	1.27*	0.47*	1334	853	S3		ALD70
C	14.	52.1	1.25*	0.31				7.66G	1.25*	0.42	5.58	1.25*	0.31	1152	316	S1		FRA66
C	14.1	50.	1.25*	0.50	6.	1.25*	0.50	10.G	1.25*	0.35	6.*	1.25*	0.50	1280		S2	2	CLA64
12C	4.0	48.0	1.4*	0.4*				3.2	1.05*	0.4*	5.5*	1.20*	0.4*			P2	4	PEA72
12C	5.0	47.7	1.4*	0.4*				4.0	1.05*	0.4*	5.5*	1.20*	0.4*			S2	4	PEA72
12C	6.0	47.3	1.4*	0.4*				4.8	1.05*	0.4*	5.5*	1.20*	0.4*			S2	4	PEA72
12C	7.48	49.6	1.117	0.3				1.0	1.0	0.4	6.09	1.1	0.4			S2		MCD72
12C	7.48	51.0	1.12	0.204				1.2	1.05	0.45	6.35	1.15	0.3			S2		MCD72
12C	8.56	46.5	1.4*	0.4*				6.5*	1.05*	0.4*	5.5*	1.20*	0.4*			S2	4A	PEA72
12C	14.	50.46	1.23	0.51				6.76G	1.23	0.81	5.*	1.23	0.51	1305	474	S2		LUT63
12C	14.1	57.64	1.16	0.33				0.92	1.16	1.47	5.05	1.16	0.12		478	S2P2		SEN71
12C	14.1	56.07	1.15	0.54				11.98	1.49	0.13	5.72	1.08	0.24		404	S2P2		SEN71
12C	14.1	44.7	1.15*	0.4*				6.5*	1.05*	0.4*	5.5*	1.20*	0.4*			P3	4A	PEA72
12C	14.4	44.6	1.15*	0.4*				6.5*	1.05*	0.4*	5.5*	1.20*	0.4*			S2	4A	PEA72
12C	15.0	46.49	1.28	0.39				8.88	0.86	0.39	4.39	1.28	0.39	1270		S1		SPA71
12C	17.27	44.5	1.25*	0.49				7.9G	1.25*	0.71	7.2	1.25*	0.40*	1280	473	S3		DEC70
12C	18.25	43.7	1.25*	0.46				9.4G	1.25*	0.63	8.4	1.30*	1.74	1340	460	S2		DEC70
12C	18.25	42.7	1.25*	0.57				10.6G	1.25*	0.63	5.9	1.30*	0.60*	1320	458	S2		DEC70
14N	4.50	34.0	1.25*	0.52				10.0G	1.25*	0.98	9.0	1.25*	0.52			S2	5	JOH65
14N	6.02	37.7	1.40	0.50				2.3G	1.40	0.98	7.5	1.40	0.50	1420	220	S2	5	JOH65
14N	6.53	37.0	1.40	0.50				2.9G	1.40	0.98	7.7	1.40	0.50	1470	310	S2	5	JOH65
14N	6.8	48.4	1.2*	0.65*				4.16	1.2*	0.47*	7.0*	1.2*	0.65*	1328	634	S1	5	BAU67
14N	7.0	42.4	1.38	0.52				2.3G	1.38	0.96	7.3	1.38	0.52	1350	500	S1		JOH65
14N	7.4	48.2	1.2*	0.65*				2.84	1.2*	0.47*	7.0*	1.2*	0.65*	1336	494	S1		BAU67
14N	7.9	50.7	1.2*	0.65*				5.04	1.2*	0.47*	7.0*	1.2*	0.65*	1304	664	S1	5	BAU67
14N	8.0	42.0	1.35	0.55				3.3G	1.35	0.90	5.6	1.35	0.55	1370	500	S2		JOH65
14N	8.35	50.4	1.2*	0.65*				4.96	1.2*	0.47*	7.0*	1.2*	0.65*	1327	654	S1		BAU67
14N	8.6	49.9	1.2*	0.65*				4.74	1.2*	0.47*	7.0*	1.2*	0.65*	1348	636	S1		BAU67
14N	9.4	50.9	1.2*	0.65*				4.37	1.2*	0.47*	7.0*	1.2*	0.65*	1378	615	S1		BAU67
14N	10.1	50.6	1.2*	0.65*				4.60	1.2*	0.47*	7.0*	1.2*	0.65*	1432	627	S1		BAU67
14N	10.9	50.6	1.2*	0.65*				6.26	1.2*	0.47*	7.0*	1.2*	0.65*	1453	703	S2		BAU67
14N	11.5	50.1	1.2*	0.65*				6.04	1.2*	0.47*	7.0*	1.2*	0.65*	1483	679	S2		BAU67
14N	11.6	49.1	1.20	0.64				5.4G	1.20	0.79	4.1	1.20	0.64	1440	500	S1		JOH65
14N	12.2	49.2	1.2*	0.65*				5.99	1.2*	0.47*	7.0*	1.2*	0.65*	1534	676	S2		BAU67
14N	13.5	49.0	1.2*	0.65*				5.08	1.2*	0.47*	7.0*	1.2*	0.65*	1558	581	S2		BAU67
14N	14.	50.40	1.2*	0.64				7.97G	1.2*	0.79	5.*	1.2*	0.64	1442	588	S1		LUT63
14N	14.0	49.1	1.2*	0.65*				5.14	1.2*	0.47*	7.0*	1.2*	0.65*	1556	573	S2		BAU67
16O	14.	48.46	1.2*	0.71				7.06G	1.2*	1.0	5.*	1.2*	0.71	1577	684	S1		LUT63
16O	14.0	46.4	1.25*	0.655				4.36	1.15	0.47*	7.5*	1.25*	0.65*	1528	525	S2		BEA67
16O	14.0	46.8	1.24	0.651				5.50	1.17	0.344	9.74	1.05	0.866	1481	496	S2		BEA67
16O	14.1	48.9	1.21	0.61				3.15	1.21	0.61	5.68	1.21	0.61		550	S2P2		SEN71
16O	14.1	47.9	1.25	0.56				25.5	1.30	0.12	5.94	1.20	0.62		425	S2P2		SEN71
NA	1.	46.	1.25*	0.65*				5.0G*	1.25*	0.98*	10.*	1.25*	0.65*	3780	1460	S3	15	GIL63
NA	1.5	47.8	1.25*	0.43				8.3G	1.25*	0.98*	10.*	1.25*	0.43	2452		S1	10	KOR68
NA	14.8	42.4	1.25*	0.65*				6.4	1.25*	0.47*	6.0*	1.25*	0.65*			S2		KUI72
23NA	0.98	48.	1.40*	0.35*	5.	1.40*	0.35*							3810	1810	S2		TOW62
23NA	0.98	58.9	1.3*	0.35				7.0G	1.3*	0.98				3504	1527	S	6,14	MAD64
23NA	1.50	43.	1.40*	0.35*	5.5	1.40*	0.35*							2660	1170	S2		TOW62
23NA	2.52	42.5	1.40*	0.35*	6.	1.40*	0.35*							2230	1100	S2		TOW62
23NA	3.97	41.5	1.40*	0.35*	7.	1.40*	0.35*							1920	1090	S2		TOW62
MG	2.0	52.	1.22*	0.52*	3.12	1.22*	0.52*									S2	5	THO62
MG	3.0	52.	1.22*	0.52*	3.12	1.22*	0.52*									S3	5	THO62
MG	4.0	52.	1.22*	0.52*	3.12	1.22*	0.52*									S3	5	THO62
MG	5.0	52.	1.22*	0.52*	3.12	1.22*	0.52*									S2	5	THO62
MG	14.1	44.	1.25*	0.70	2.	1.25*	0.70	7.G	1.25*	1.10	6.*	1.25*	0.70	1770	980	S2		CLA64
MG	14.6	40.3	1.42*	0.6*				8.G*	1.42*	0.978*				1800	990	S2		BJO56

See page 8 for Explanation of Tables

TABLE I. Optical-Model Parameters Neutrons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	ST	SR	FIT	NOTE	REF.
AL	1.	40.	1.25*	0.65*				5.0G*	1.25*	0.98*	10.*	1.25*	0.65*	3520	1340	S3	15	GIL63
AL	1.5	47.4	1.25*	0.46				6.3G	1.25*	0.98*	10.*	1.25*	0.46	3204		S1	10	KOR68
AL	2.47	48.0	1.14	0.65				8.42	1.19	0.48*	8.0*	1.14	0.65	2530	1270	S2	2	HOL71
AL	3.00	47.9	1.13	0.72				7.35	1.08	0.48*	8.0*	1.13	0.72	2520	1250	S2	2	HOL71
AL	3.49	48.7	1.18	0.61				8.46	1.29	0.48*	8.0*	1.18	0.61	2360	1130	S1	2	HOL71
AL	4.00	49.1	1.20	0.62				7.99	1.26	0.48*	8.0*	1.20	0.62	2290	1090	S2	2	HOL71
AL	4.56	50.2	1.18	0.59				8.38	1.26	0.48*	8.0*	1.18	0.59	2060	1020	S1	2	HOL71
AL	6.09	47.8	1.20	0.67				8.23	1.23	0.48*	8.0*	1.20	0.67	1880	1070	S3	2	HOL71
AL	7.	45.5	1.25*	0.65*				9.5G	1.25*	0.98*	8.6	1.25*	0.65*			X3		BJO58
AL	7.05	49.1	1.20	0.68				7.90	1.20	0.48*	8.0*	1.20	0.68	1800	1040	S2	2	HOL71
AL	7.97	49.4	1.20	0.69				12.1	1.30	0.41	9.8	1.20	0.69			S1	2	BRA72
AL	8.05	49.9	1.22	0.65				7.14	1.24	0.48*	8.0*	1.22	0.65	1780	1010	S3		HOL71
AL	9.0	48.36	1.20*	0.65*				9.37	1.25*	0.47*	7.0	1.01*	0.65*			S1	5	VEL74
AL	9.05	47.0	1.20	0.72				11.3	1.27	0.47	8.8	1.20	0.72			S2	2	BRA72
AL	14.	44.	1.25*	0.65*				11.G	1.25*	0.98*	8.3	1.25*	0.65*			S3		BJO58
AL	24.	40.	1.25*	0.70*				11.G	1.25*	1.00*	7.4	1.25*	0.70*			S1	16	STU62
AL	99.4	23.9	1.25*	0.60*	10.4	1.25*	0.60*				3.6*	1.25*	0.60*				11	SCH68
AL	111.5	25.1	1.20*	0.65*	10.8	1.20*	0.65*				3.6*	1.25*	0.60*				11	SCH68
AL	121.4	23.1	1.20*	0.65*	11.4	1.20*	0.65*				3.6*	1.25*	0.60*				11	SCH68
AL	131.0	21.1	1.20*	0.65*	11.9	1.20*	0.65*				3.6*	1.25*	0.60*				11	SCH68
AL	142.1	19.4	1.20*	0.65*	12.2	1.20*	0.65*				3.6*	1.20*	0.65*				11	SCH68
AL	151.9	18.1	1.20*	0.65*	12.8	1.20*	0.65*				3.6*	1.20*	0.65*	679	399		11	SCH68
27AL	0.98	51.2	1.3*	0.35				9.2G	1.3*	0.98				3437	1479	S	6,14	MAD64
27AL	1.95	41.	1.27	0.65*				7.G	1.27	0.98*	9.5	1.27*	0.65*			S2P2	2	BRB64
27AL	3.99	40.	1.45*	0.35	6.71	1.45*	0.35*							2352	1099	S2	10	TOW62A
27AL	3.99	46.	1.25*	0.65				8.99G	1.25*	0.65*	9.5*	1.25*	0.65*	2327	1096	S2	10	TOW62A
27AL	24.	40.6	1.25*	0.65*				9.7G	1.25*	1.00*	5.6	1.25*	0.65*		810	S2P2	7	PIC65
SI	7.97	48.0	1.11	0.70				14.5	1.21	0.43	9.0	1.11	0.70			S2	2	BRA72
SI	9.0	51.17	1.20*	0.65*				10.17	1.25*	0.47*	7.6	1.01*	0.65*			S2	5	VEL74
SI	9.05	45.0	1.22	0.72				9.5	1.30	0.48	8.8	1.22	0.72			S2	2	BRA72
SI	9.8	52.0	1.15	0.78				12.1	1.25*	0.47*	4.9	1.15	0.78			S1	5	OBS73
SI	14.1	44.	1.25*	0.70	2.	1.25*	0.70	7.G	1.25*	1.10	6.*	1.25*	0.70	1830	1060	S2		CLA64
28SI	1.95	47.	1.27	0.65*				3.G	1.27	0.98*	9.5	1.27*	0.65*			S2P3	2	BRB64
28SI	14.7	48.6	1.27	0.60				12.1	1.23	0.45	6.0*	1.27	0.60			S2		HOH69
P	1.5	55.3	1.25*	0.54				7.9G	1.25*	0.98*	10.*	1.25*	0.54	2969		S1	10	KOR68
P	7.97	46.5	1.22	0.54				11.1	1.30	0.47	12.9	1.22	0.54			S2	2	BRA72
P	9.05	48.5	1.18	0.70				12.1	1.28	0.45	11.0	1.18	0.70			S1	2	BRA72
S	2.47	51.3	1.13	0.62				8.32	1.14	0.48*	8.0*	1.13	0.62	3040	1250	S3	2	HOL71
S	3.00	50.5	1.24	0.64				7.82	1.12	0.48*	8.0*	1.24	0.64	2400	1190	S3	2	HOL71
S	3.49	46.5	1.19	0.66				8.78	1.25	0.48*	8.0*	1.19	0.66	2680	1220	S2	2	HOL71
S	3.7	42.	1.50*	0.35*	5.04	1.50*	0.35*							3040	1170	S2	15	MAC59
S	4.00	44.4	1.10	0.67				8.54	1.49	0.48*	8.0*	1.10	0.67	2570	1310	S3	2	HOL71
S	4.56	52.8	1.22	0.60				7.94	1.19	0.48*	8.0*	1.22	0.60	2750	1130	S2	2	HOL71
S	6.09	47.2	1.23	0.74				8.25	1.14	0.48*	8.0*	1.23	0.74	2530	1290	S2	2	HOL71
S	7.05	47.7	1.23	0.63				9.62	1.29	0.48*	8.0*	1.23	0.63	2220	1200	S3	2	HOL71
S	7.97	48.5	1.22	0.60				9.1	1.33	0.51	10.4	1.22	0.60			S2	2	BRA72
S	8.05	49.6	1.22	0.68				8.20	1.18	0.48*	8.0*	1.22	0.68	2210	1190	S2		HOL71
S	9.05	47.0	1.24	0.70				8.5	1.24	0.60	3.8	1.24	0.70			S2	2	BRA72
S	9.8	49.5	1.20	0.74				10.3	1.25*	0.47*	4.2	1.20	0.74			S1	5	OBS73
S	14.1	44.	1.25*	0.70	2.	1.25*	0.70	7.G	1.25*	1.10	6.*	1.25*	0.70	1870	1110	S2		CLA64
40AR	14.0	47.3	1.25*	0.497				6.49	1.28	0.47*	7.5*	1.25*	0.65*	1844	1007	S2		BEA67
40AR	14.0	46.9	1.26	0.493				6.50	1.27	0.473	12.2	0.636	2.03	1876	957	S2		BEA67
K	1.49	51.5	1.25*	0.65*				4.	1.25*	0.4*				2657		S2	10	TOW65
K	2.38	49.8	1.25*	0.65*				5.	1.25*	0.4*				3411		S2	10	TOW65
K	3.00	47.4	1.25*	0.65*				8.	1.25*	0.4*				3417		S1	10	TOW65
K	3.76	51.1	1.25*	0.65*				11.	1.25*	0.4*				3456		S2	10	TOW65
K	14.	46.1	1.30	0.58				6.70G	1.30	0.88	2.09	1.30	0.58	1805	908	S2		FRA66
39K	2.06	50.	1.25*	0.65*				3.	1.30*	0.47*				3170		S2	5	REB67
39K	3.74	50.	1.25*	0.65*				6.	1.30*	0.47*	8.	1.25*	0.65*	3690		S1	5	REB67
39K	4.33	50.	1.25*	0.65*				6.	1.30*	0.47*	6.	1.25*	0.65*	3560		S1	5	REB67
39K	6.52	49.	1.25*	0.65*				10.	1.30*	0.47*	6.	1.25*	0.65*	2910		S2	5	REB67
39K	7.91	48.	1.25*	0.65*				7.	1.30*	0.47*	5.	1.25*	0.65*	2650		S2	5	REB67
CA	6.09	59.9	1.12	0.72				6.55	1.26	0.48*	8.0*	1.12	0.72	3110	1200	S2		HOL71
CA	7.05	55.7	1.12	0.72				5.25	1.36	0.48*	8.0*	1.12	0.72	2950	1190	S2		HOL71
CA	8.05	53.9	1.13	0.78				5.93	1.41	0.48*	8.0*	1.13	0.78	2860	1260	S2		HOL71
CA	14.	45.4	1.29	0.60				8.54G	1.29	0.90	2.57	1.29	0.60	1868	1033	S2		FRA66
CA	14.6	40.3	1.39*	0.6*				8.G*	1.39*	0.978*				2110	1230	S3		BJO56
40CA	2.06	51.	1.25*	0.65*				7.	1.30*	0.47*				3460		S2	5	REB67
40CA	3.29	51.	1.25*	0.65*				6.	1.30*	0.47*	2.	1.25*	0.65*	3770		S2	5	REB67
40CA	5.30	49.	1.25*	0.65*				4.	1.30*	0.47*	6.	1.25*	0.65*	3500		S1	5	REB67
40CA	5.88	49.	1.25*	0.65*				5.	1.30*	0.47*	7.	1.25*	0.65*	3240		S1	5	REB67
40CA	6.52	50.	1.25*	0.65*				6.	1.30*	0.47*	8.	1.25*	0.65*	3060		S2	5	REB67
40CA	7.91	48.	1.25*	0.65*				5.	1.30*	0.47*	4.	1.25*	0.65*	2780		S2	5	REB67

See page 8 for Explanation of Tables

TABLE I. Optical-Model Parameters Neutrons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	ST	SR	FIT	NOTE	REF.
TI	0.3	47.	1.25*	0.61				6.5G	1.25*	0.98*	11.5	1.25*	0.61	2728		S2	2	PAS70
TI	0.5	47.	1.25*	0.63				7.G	1.25*	0.98*	10.5	1.25*	0.63	2684		S1	2	PAS70
TI	0.87	45.75	1.27	0.62*				12.00	1.34	0.50*	6.00	1.27	0.62*			S1P3	5	COX72
TI	1.0	47.	1.25*	0.61				5.G	1.25*	0.98*	8.5	1.25*	0.61	2684		S1	2	PAS70
TI	1.5	50.	1.25*	0.51				5.5G	1.25*	0.98*	16.	1.25*	0.51	3216		S1	2	PAS70
TI	1.5	53.5	1.25*	0.41				11.5G	1.25*	0.98*	15.	1.25*	0.41	2700		P2	2	PAS70
TI	1.5	49.	1.25*	0.57				9.G	1.25*	0.98*	17.5	1.25*	0.57	3227		S2P2	2	PAS70
TI	1.5	49.	1.25*	0.55				7.4G	1.25*	0.98*	10.*	1.25*	0.55	3212		S2	10	KOR68
TI	2.0	49.	1.25*	0.55				6.G	1.25*	0.98*	10.0	1.25*	0.55	3546		S1	2	PAS70
TI	2.0	53.	1.25*	0.69				12.5G	1.25*	0.98*	2.5	1.25*	0.69	3406		P2	2	PAS70
TI	2.0	48.5	1.25*	0.59				8.G	1.25*	0.98*	10.5	1.25*	0.59	3535		S2P2	2	PAS70
TI	2.5	49.	1.25*	0.65				8.5G	1.25*	0.98*	8.5	1.25*	0.65	3702		S2	2	PAS70
TI	3.0	48.	1.25*	0.65				9.G	1.25*	0.98*	10.	1.25*	0.65	3688		S2	2	PAS70
TI	3.0	49.	1.25*	0.63				13.G	1.25*	0.98*	6.	1.25*	0.63	3440		P2	2	PAS70
TI	3.0	47.5	1.25*	0.67				12.G	1.25*	0.98*	7.5	1.25*	0.67	3630		S2P2	2	PAS70
TI	3.2	50.1	1.25*	0.65*				10.9	1.25*	0.48*	8.0*	1.12*	0.65*			S P1	6,2	ZIJ72
TI	3.2	50.1*	1.25*	0.65*				10.9*	1.25*	0.48*	9.2	1.41	0.38			S P	6,2	ZIJ72
TI	4.1	50.	1.25*	0.65*				7.G	1.25*	0.98*	9.5	1.25*	0.65*			S2		BJO58
TI	4.1	47.5	1.25*	0.69				8.G	1.25*	0.98*	12.	1.25*	0.69	3668		S2	2	PAS70
V	0.89	46.61	1.26*	0.62*				8.11	1.50	0.50*	3.30	1.26*	0.62*			S1P2	5	COX72
V	8.05	46.6	1.23	0.65				6.43	1.25	0.48*	8.0*	1.23	0.65	3100	1250	S2	3	HOL72
51V	1.00	50.	1.25*	0.5	2.	1.45*	0.6*									S	10	BAR68
51V	1.61	47.0	1.25*	0.65*				8.6	1.25*	0.45*						S1	10	TOW68
51V	2.35	48.6	1.25*	0.65*				9.6	1.25*	0.45*						S1	10	TOW68
51V	2.47	51.3	1.19	0.65				8.40	1.21	0.48*	8.0*	1.19	0.65	3580	1790	S1	2	HOL70
51V	3.00	49.	1.25*	0.5	5.	1.45*	0.6*									S1	10	BAR68
51V	3.00	47.4	1.26	0.66				8.40	1.23	0.48*	8.0*	1.26	0.66	3810	1730	S2	2	HOL70
51V	3.49	48.6	1.24	0.66				8.41	1.22	0.48*	8.0*	1.24	0.66	3710	1600	S1	2	HOL70
51V	4.00	48.1	1.25	0.66				8.30	1.21	0.48*	8.0*	1.25	0.66	3700	1510	S2	2	HOL70
51V	4.56	49.2	1.23	0.65				8.12	1.18	0.48*	8.0*	1.23	0.65	3600	1410	S2	2	HOL70
51V	5.50	52.3	1.19	0.65				7.90	1.17	0.48*	8.0*	1.19	0.65	3370	1290	S2		HOL70
51V	6.09	51.8	1.19	0.66				7.94	1.20	0.48*	8.0*	1.19	0.66	3280	1270	S2		HOL70
51V	7.05	50.7	1.21	0.64				7.94	1.20	0.48*	8.0*	1.21	0.64	3240	1280	S2		HOL70
51V	8.05	46.6	1.23	0.65				6.43	1.25	0.48*	8.0*	1.23	0.65	3100	1250	S2		HOL70
CR	0.3	46.	1.25*	0.57				5.G	1.25*	0.98*	7.	1.25*	0.57	2395		S1	2	PAS70
CR	0.5	44.5	1.25*	0.53				8.G	1.25*	0.98*	11.	1.25*	0.53	3021		S2	2	PAS70
CR	0.8	46.	1.25*	0.59				7.G	1.25*	0.98*	9.5	1.25*	0.59	2871		S1	2	PAS70
CR	1.	44.	1.25*	0.65*				5.0G*	1.25*	0.98*	10.*	1.25*	0.65*	3070	1610	S2	15	GIL63
CR	1.5	49.	1.25*	0.41				4.G	1.25*	0.98*	16.	1.25*	0.41	3062		S1	2	PAS70
CR	1.5	51.5	1.25*	0.55				11.G	1.25*	0.98*	6.5	1.25*	0.55	3156		P1	2	PAS70
CR	1.5	48.5	1.25*	0.41				13.G	1.25*	0.98*	9.5	1.25*	0.41	3025		S3P2	2	PAS70
CR	1.5	50.9	1.25*	0.37				2.3G	1.25*	0.98*	10.*	1.25*	0.37	3233		S2	10	KOR68
CR	2.0	49.	1.25*	0.55				6.5G	1.25*	0.98*	8.	1.25*	0.55	3462		S1	2	PAS70
CR	2.0	49.5	1.25*	0.79				9.G	1.25*	0.98*	5.5	1.25*	0.79	3906		P1	2	PAS70
CR	2.0	49.	1.25*	0.55				7.G	1.25*	0.98*	7.	1.25*	0.55	3485		S1P3	2	PAS70
CR	2.47	55.4	1.11	0.63				8.81	1.15	0.48*	8.0*	1.11	0.63	3340	1680	S2	2	HOL71
CR	2.5	48.5	1.25*	0.57				8.G	1.25*	0.98*	10.5	1.25*	0.57	3422		S2	2	PAS70
CR	3.0	47.5	1.25*	0.71				7.5G	1.25*	0.98*	15.5	1.25*	0.71	3531		S2	2	PAS70
CR	3.0	49.	1.25*	0.65				12.5G	1.25*	0.98*	5.	1.25*	0.65	3435		P2	2	PAS70
CR	3.0	48.5	1.25*	0.65				10.5G	1.25*	0.98*	7.	1.25*	0.65	3545		S3P2	2	PAS70
CR	3.00	50.9	1.19	0.66				8.33	1.15	0.48*	8.0*	1.19	0.66	3690	1690	S2	2	HOL71
CR	3.2	50.9	1.25*	0.65*				11.5	1.25*	0.48*	8.0*	1.12*	0.65*			S P2	6,2	ZIJ72
CR	3.2	50.9*	1.25*	0.65*				11.5*	1.25*	0.48*	4.4	1.33	0.29			S P	6,2	ZIJ72
CR	3.49	51.4	1.17	0.64				8.45	1.20	0.48*	8.0*	1.17	0.64	3530	1540	S2	2	HOL71
CR	4.00	50.2	1.21	0.66				8.15	1.16	0.48*	8.0*	1.21	0.66	3620	1470	S2	2	HOL71
CR	4.1	49.5	1.25*	0.67				9.5G	1.25*	0.98*	12.	1.25*	0.67	3446		S2	2	PAS70
CR	4.56	49.7	1.20	0.65				7.49	1.25	0.48*	8.0*	1.20	0.65	3680	1340	S2	2	HOL71
CR	5.50	51.7	1.19	0.68				8.74	1.18	0.48*	8.0*	1.19	0.68	3420	1390	S3		HOL71
CR	6.09	49.7	1.21	0.68				9.49	1.15	0.48*	8.0*	1.21	0.68	3410	1420	S3		HOL71
CR	7.05	48.0	1.24	0.64				9.77	1.23	0.48*	8.0*	1.24	0.64	3270	1420	S2		HOL71
CR	8.05	50.6	1.21	0.61				9.13	1.21	0.48*	8.0*	1.21	0.61	3070	1310	S2		HOL71
52CR	0.98	40.3	1.3*	0.75				2.4G	1.3*	1.75				3300	1702	S	6,14	MAD64
MN	2.47	51.1	1.19	0.65				8.58	1.21	0.48*	8.0*	1.19	0.65	3520	1790	S2	2	HOL71
MN	3.00	52.2	1.19	0.65				8.35	1.17	0.48*	8.0*	1.19	0.65	3460	1640	S3	2	HOL71
MN	3.49	52.2	1.18	0.67				8.09	1.10	0.48*	8.0*	1.18	0.67	3610	1540	S3	2	HOL71
MN	4.00	53.0	1.17	0.67				8.20	1.10	0.48*	8.0*	1.17	0.67	3520	1400	S2		HOL71
MN	4.56	54.2	1.15	0.66				8.22	1.11	0.48*	8.0*	1.15	0.66	3410	1370	S2		HOL71
MN	6.09	51.3	1.19	0.68				8.83	1.19	0.48*	8.0*	1.19	0.68	3450	1430	S3		HOL71
MN	7.05	53.1	1.17	0.67				8.54	1.18	0.48*	8.0*	1.17	0.67	3350	1380	S2		HOL71
MN	8.05	50.5	1.19	0.65				8.04	1.17	0.48*	8.0*	1.19	0.65	3210	1320	S2		HOL71

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TABLE I. Optical-Model Parameters Neutrons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	ST	SR	FIT	NOTE	REF.
FE	0.89	43.57	1.24	0.58				7.11	1.29	0.78	4.46	1.24	0.58			S1P3	5	COX72
FE	0.98	42.75	1.25*	0.65*				2.04G	1.25*	1.00*	10.*	1.25*	0.65*		1220	S3	5	GIL65
FE	1.	53.*	1.25*	0.6*				7.0G*	1.25*	1.0*	20.*	1.25*	0.6*				5,12	HOO62
FE	1.	43.	1.25*	0.65*				3.0G*	1.25*	0.98*	10.*	1.25*	0.65*	3090	1590	S3	15	GIL63
FE	1.5	49.7	1.25*	0.42				4.9G	1.25*	0.98*	10.*	1.25*	0.42	2806		S1	10	KOR68
FE	2.01	47.44	1.25*	0.65*				3.66G	1.25*	1.00*	10.*	1.25*	0.65*		1460	S2	2	GIL65
FE	2.5	39.	1.45*	0.35	7.8	1.45*	0.35									S2	15	BEY56
FE	2.96	51.1	1.21	0.61				10.80	1.15	0.48*	8.0*	1.21	0.61	3330	1660	S2	2	HOL71
FE	3.01	48.56	1.25*	0.65*				10.26G	1.25*	1.00*	10.*	1.25*	0.65*		1650	S1	2	GIL65
FE	3.2	48.3	1.25*	0.65*				9.6	1.25*	0.48*	8.0*	1.12*	0.65*			S P	2,6,7	ZIJ72
FE	3.7	42.	1.46*	0.35*	5.88	1.46*	0.35*							3490	1480	S2	15	MAC59
FE	3.95	53.8	1.16	0.63				9.84	1.05	0.48*	8.0*	1.16	0.63	3450	1480	S2	2	HOL71
FE	3.99	47.86	1.25*	0.65*				10.56G	1.25*	1.00*	10.*	1.25*	0.65*		1560	S1	5	GIL65
FE	4.	39.	1.45*	0.35	7.8	1.45*	0.35									S2	15	BEY56
FE	4.1	50.	1.25*	0.65*				7.G	1.25*	0.98*	9.5	1.25*	0.65*			S3		BJO58
FE	4.56	49.2	1.25	0.61				11.19	1.16	0.48*	8.0*	1.25	0.61	3430	1540	S2	2	HOL71
FE	5.96	50.57	1.19	0.71				10.67	1.14	0.48*	8.0*	1.19	0.71	3500	1560	S2		HOL71
FE	7.	39.	1.45*	0.35	7.8	1.45*	0.35									S2		BEY56
FE	7.	45.5	1.25*	0.65*				9.5G	1.25*	0.98*	8.6	1.25*	0.65*			S2		BJO58
FE	7.05	46.7	1.24	0.66				10.46	1.24	0.48*	8.0*	1.24	0.66	3360	1510	S2		HOL71
FE	8.05	49.3	1.23	0.64				10.45	1.20	0.48*	8.0*	1.23	0.64	3310	1460	S2		HOL71
FE	9.0	50.89	1.20*	0.65*				9.90	1.25*	0.47*	6.0	1.01*	0.65*			S1	5	VEL74
FE	14.	44.	1.25*	0.65*				11.G	1.25*	0.98*	8.3	1.25*	0.65*			S2		BJO58
FE	24.	40.	1.25*	0.70*				11.G	1.25*	1.00*	7.4	1.25*	0.70*			S2	16	STU62
56FE	0.98	45.9	1.3*	0.33				5.0G	1.3*	0.98*				2801	1504	S	6,14	MAD64
56FE	1.0	46.6	1.25*	0.4	2.	1.45*	0.6*									S	10	BAR68
56FE	1.37	50.96	1.20*	0.55*				9.33	1.20*	0.50*	10.0*	1.20*	0.55*	3225	1828	S1	2	TSU69
56FE	1.71	53.79	1.20*	0.55*				8.61	1.20*	0.50*	10.0*	1.20*	0.55*	3065	1697	S1	2	TSU69
56FE	1.81	46.4	1.241	0.631				15.1	1.264	0.255	14.6	1.241	0.631			S1	9,2	TOM73
56FE	1.95	47.	1.27	0.65*				7.G	1.27	0.98*	9.5	1.27*	0.65*			S2P2	2	BRE64
56FE	2.01	52.00	1.15	0.65*				7.59	1.15	0.30*	10.0*	1.15	0.65*	3538	1688	S1	2	TSU69
56FE	2.65	49.56	1.20*	0.65*				4.56	1.20*	0.50*	10.0*	1.20*	0.65*	3642	1475	S1	2	TSU69
56FE	3.0	52.	1.25*	0.4	5.	1.45*	0.6*									S	10	BAR68
56FE	3.26	49.29	1.20*	0.65*				7.16	1.20*	0.50*	10.0*	1.20*	0.65*	3608	1568	S1	2	TSU69
56FE	24.	38.9	1.25*	0.65*				9.5G	1.25*	1.00*	3.6	1.25*	0.65*		1163	S2P2	7	PIC65
CO	0.90	44.00	1.26*	0.62*				14.00	1.26*	0.75	10.00	1.26*	0.62*			S1P2	5	COX72
CO	1.46	45.3	1.34	0.57				8.69	1.34	0.48*	8.0*	1.34	0.57	3540	1770	S2	2	HOL71
CO	1.5	49.	1.25*	0.62				12.5G	1.25*	0.98*	10.*	1.25*	0.62	3305		S1	10	KOR68
CO	2.00	45.5	1.32	0.59				9.35	1.36	0.48*	8.0*	1.32	0.59	3490	1740	S2	2	HOL71
CO	2.47	48.8	1.24	0.65				11.78	1.22	0.48*	8.0*	1.24	0.65	3420	1830	S2	2	HOL71
CO	3.00	48.7	1.23	0.63				9.97	1.24	0.48*	8.0*	1.23	0.63	3450	1650	S2	2	HOL71
CO	3.49	48.9	1.22	0.65				11.70	1.20	0.48*	8.0*	1.22	0.65	3450	1680	S2	2	HOL71
CO	3.7	42.	1.46*	0.35*	6.09	1.46*	0.35*							3530	1580	S2	15	MAC59
CO	4.00	49.3	1.22	0.65				10.62	1.15	0.48*	8.0*	1.22	0.65	3500	1610	S2	2	HOL71
CO	4.56	48.3	1.23	0.65				11.17	1.20	0.48*	8.0*	1.23	0.65	3540	1630	S2	2	HOL71
CO	6.09	50.3	1.20	0.67				10.27	1.13	0.48*	8.0*	1.20	0.67	3530	1540	S2		HOL71
CO	7.05	49.1	1.22	0.66				10.22	1.11	0.48*	8.0*	1.22	0.66	3540	1520	S2		HOL71
CO	8.05	51.3	1.19	0.66				10.04	1.17	0.48*	8.0*	1.19	0.66	3360	1460	S2		HOL71
CO	9.0	50.48	1.20*	0.65*				9.88	1.25*	0.47*	5.9	1.01*	0.65*			S1	5	VEL74
59CO	1.95	47.	1.27	0.65*				7.G	1.27	0.98*	9.5	1.27*	0.65*			S1P1	2	BRE64
59CO	14.	42.7	1.25*	0.65*				7.5G	1.25*	1.00*	13.1	1.25*	0.65*		1224	S2		PIC65
59CO	14.3	43.42	1.25*	0.65*				7.17	1.25*	0.47*	7.5*	1.25*	0.65*	2500	1260	S2		ERR67
NI	0.85	46.00	1.24	0.62*				18.00	1.24	0.50*	6.00	1.24	0.62*			S1P3	5	COX72
NI	1.	53.*	1.25*	0.6*				7.0G*	1.25*	1.0*	20.*	1.25*	0.6*			2	5,12	HOO62
NI	1.5	47.1	1.25*	0.40				3.5G	1.25*	0.98*	10.*	1.25*	0.40	3149		S1	10	KOR68
NI	3.00	53.2	1.18	0.64				8.68	1.22	0.48*	8.0*	1.18	0.64	3270	1570	S2	2	HOL71
NI	3.2	48.4	1.25*	0.65*				9.6	1.25*	0.48*	8.0*	1.12*	0.65*			S P2	6,2	ZIJ72
NI	3.2	48.4*	1.25*	0.65*				9.6*	1.25*	0.48*	8.2	1.12	0.09			S P	6,2	ZIJ72
NI	3.49	54.1	1.14	0.66				8.37	1.11	0.48*	8.0*	1.14	0.66	3380	1510	S2	2	HOL71
NI	3.7	42.	1.46*	0.35*	6.09	1.46*	0.35*							3530	1580	S2	15	MAC59
NI	4.00	53.4	1.15	0.67				8.77	1.16	0.48*	8.0*	1.15	0.67	3360	1480	S2	2	HOL71
NI	4.56	50.0	1.17	0.72				10.09	1.15	0.48*	8.0*	1.17	0.72	3600	1610	S2	2	HOL71
NI	6.09	48.5	1.21	0.73				10.07	1.20	0.48*	8.0*	1.21	0.73	3680	1640	S3		HOL71
NI	7.05	51.5	1.18	0.71				11.3	1.18	0.48*	8.0*	1.18	0.71	3450	1590	S2		HOL71
NI	8.05	45.7	1.25	0.68				9.16	1.29	0.48*	8.0*	1.25	0.68	3590	1580	S3		HOL71
NI	9.0	51.42	1.20*	0.65*				9.80	1.25*	0.47*	5.3	1.01*	0.65*			S1	5	VEL74
NI	14.	44.	1.25*	0.65				10.7G	1.25*	0.98*	9.7	1.25*	0.65			S1		CLA67
58NI	2.01	50.0	1.20*	0.65*				5.67	1.20*	0.50*	10.0*	1.20*	0.65*	3430	1770	S1	2	TSU69
58NI	2.65	49.1	1.20*	0.70*				5.99	1.20*	0.47*	10.0*	1.20*	0.70*	3660	1630	S2	2	TSU69
58NI	3.26	52.0	1.19	0.65*				6.72	1.19	0.47*	10.0*	1.19	0.65*	3290	1450	S2	2	TSU69
CU	0.85	40.66	1.26*	0.62*				16.44	1.25	0.50*	6.60	1.26*	0.62*			S1P3	5	COX72
CU	1.	53.*	1.25*	0.6*				7.0G*	1.25*	1.0*	20.*	1.25*	0.6*			2	5,12	HOO62
CU	1.46	47.9	1.27	0.67				8.15	1.26	0.48*	8.0*	1.27	0.67	3530	1890	S1	2	HOL71
CU	1.5	50.1	1.25*	0.56				8.1G	1.25*	0.98*	10.*	1.25*	0.56	3115		S1	10	KOR68
CU	2.00	47.1	1.28	0.61				10.19	1.24	0.48*	8.0*	1.28	0.61	3360	1790	S2	2	HOL71
CU	2.47	49.1	1.23	0.69				9.42	1.18	0.48*	8.0*	1.23	0.69	3390	1830	S2	2	HOL71

See page 8 for Explanation of Tables

TABLE I. Optical-Model Parameters Neutrons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	ST	SR	FIT	NOTE	REF.
CU	3.00	48.6	1.24	0.67				9.73	1.20	0.48*	8.0*	1.24	0.67	3400	1780	S1	2	HOL71
CU	3.2	47.9	1.25*	0.65*				8.3	1.25*	0.48*	8.0*	1.12*	0.65*			S P	2,6,7	ZIJ72
CU	3.49	47.9	1.25	0.68				9.98	1.19	0.48*	8.0*	1.25	0.68	3550	1820	S1	2	HOL71
CU	3.7	42.	1.45*	0.35*	6.26	1.45*	0.35*							3650	1750	S2	15	MAC59
CU	4.00	47.4	1.24	0.69				10.19	1.20	0.48*	8.0*	1.24	0.69	3700	1810	S2	2	HOL71
CU	4.56	48.0	1.23	0.71				9.90	1.20	0.48*	8.0*	1.23	0.71	3780	1790	S2	2	HOL71
CU	6.09	47.8	1.23	0.69				10.10	1.20	0.48*	8.0*	1.23	0.69	3810	1700	S2		HOL71
CU	7.05	47.9	1.24	0.67				9.93	1.18	0.48*	8.0*	1.24	0.67	3760	1620	S2		HOL71
CU	8.05	47.5	1.22	0.68				10.11	1.18	0.48*	8.0*	1.22	0.68	3580	1570	S2		HOL71
CU	14.	44.	1.25*	0.65*				11.G	1.25*	0.98*	8.3	1.25*	0.65*			S1		BJO58
CU	99.4	23.9	1.25*	0.60*	10.4	1.25*	0.60*				3.6*	1.25*	0.60*				11	SCH68
CU	111.5	25.1	1.20*	0.65*	10.8	1.20*	0.65*				3.6*	1.25*	0.60*				11	SCH68
CU	121.4	23.1	1.20*	0.65*	11.4	1.20*	0.65*				3.6*	1.25*	0.60*				11	SCH68
CU	131.0	21.1	1.20*	0.65*	11.9	1.20*	0.65*				3.6*	1.25*	0.60*				11	SCH68
CU	142.1	19.4	1.20*	0.65*	12.2	1.20*	0.65*				3.6*	1.20*	0.65*				11	SCH68
CU	151.9	18.1	1.20*	0.65*	12.8	1.20*	0.65*				3.6*	1.20*	0.65*	1366	728		11	SCH68
64CU	15.	43.7	1.25*	0.65*				10.G	1.25*	1.00*	9.1	1.25*	0.65*		1384	S1		PIC65
ZN	0.87	50.00	1.26*	0.62*				20.00	1.26*	0.75	8.00	1.26*	0.62*			S1P1	5	COX72
ZN	1.	53.*	1.25*	0.6*				7.0G*	1.25*	1.0*	20.*	1.25*	0.6*			2	5,12	HOO62
ZN	1.5	47.4	1.25*	0.51				12.6G	1.25*	0.98*	10.*	1.25*	0.51	3234		S1	10	KOR68
ZN	2.47	56.3	1.16	0.65				10.65	1.19	0.48*	8.0*	1.16	0.65	2970	1690	S1	2	HOL71
ZN	3.00	52.5	1.19	0.67				10.75	1.18	0.48*	8.0*	1.19	0.67	3190	1780	S2	2	HOL71
ZN	3.2	46.6	1.25*	0.65*				6.6	1.25*	0.48*	8.0*	1.12*	0.65*			S P	2,6,7	ZIJ72
ZN	3.49	50.2	1.22	0.68				10.81	1.20	0.48*	8.0*	1.22	0.68	3410	1850	S2	2	HOL71
ZN	3.7	42.	1.45*	0.35*	6.30	1.45*	0.35*							3680	1790	S2	15	MAC59
ZN	4.00	50.0	1.21	0.68				10.88	1.20	0.48*	8.0*	1.21	0.68	3510	1820	S1	2	HOL71
ZN	4.1	50.	1.25*	0.65*				7.G	1.25*	0.98*	9.5	1.25*	0.65*			S3		BJO58
ZN	4.56	49.3	1.22	0.68				10.86	1.21	0.48*	8.0*	1.22	0.68	3640	1830	S2	2	HOL71
ZN	6.09	51.2	1.19	0.67				10.99	1.19	0.48*	8.0*	1.19	0.67	3590	1680	S2		HOL71
ZN	7.05	48.8	1.21	0.69				10.66	1.22	0.48*	8.0*	1.21	0.69	3710	1670	S2		HOL71
ZN	8.05	49.4	1.20	0.70				10.80	1.19	0.48*	8.0*	1.20	0.70	3620	1620	S2		HOL71
65ZN	14.	42.9	1.25*	0.65*				9.2G	1.25*	1.00*	12.7	1.25*	0.65*		1350	S2		PIC65
AS	8.05	49.0	1.22	0.67				9.73	1.17	0.48*	8.0*	1.22	0.67	3790	1610	S3		HOL71
SE	0.83	52.89	1.25	0.62*				20.00	1.25	0.50*	3.51	1.25	0.62*			S1P1	5	COX72
SR	3.2	49.5	1.25*	0.65*				5.8	1.25*	0.48*	8.0*	1.12*	0.65*			S P1	6,2	ZIJ72
SR	3.2	49.5*	1.25*	0.65*				5.8*	1.25*	0.48*	9.1	1.21	0.55			S P	6,2	ZIJ72
SR	14.8	44.2	1.25*	0.65*				10.3	1.25*	0.47*	6.0*	1.25*	0.65*			S2		KUI72
Y	0.89	48.85	1.26*	0.62*				15.74	1.26*	0.50*	10.80	1.26*	0.62*			S1P1	5	COX72
89Y	1.45	47.9	1.25*	0.65*				3.4	1.25*	0.46*						S	2	TOW69
89Y	2.35	49.7	1.25*	0.65*				5.5	1.25*	0.46*						S2	2	TOW69
89Y	3.20	48.4	1.25*	0.65*				5.9	1.25*	0.46*						S	2	TOW69
89Y	3.67	51.4	1.25*	0.65*				6.0	1.25*	0.46*						S	2	TOW69
89Y	6.04	46.7	1.25*	0.65*				6.9	1.25*	0.46*						S	2	TOW69
ZR	0.88	51.00	1.23	0.62*				8.00	1.32	0.50*	4.00	1.23	0.62*			S1P1	5	COX72
ZR	1.	50.	1.25*	0.65*				5.0G*	1.25*	0.98*	10.*	1.25*	0.65*	7360	2400	S1	15	GIL63
ZR	1.5	46.7	1.25*	0.74				5.2G	1.25*	0.98*	10.*	1.25*	0.74	5559		S1	10	KOR68
ZR	2.5	45.	1.33*	0.5	4.5	1.33*	0.5									S2	15	BEY56
ZR	3.2	49.1	1.25*	0.65*				5.9	1.25*	0.48*	8.0*	1.12*	0.65*			S P1	6,2	ZIJ72
ZR	3.2	49.1*	1.25*	0.65*				5.9*	1.25*	0.48*	6.5	1.20	0.29			S P	6,2	ZIJ72
ZR	4.1	45.	1.33*	0.5	4.5	1.33*	0.5									S2	15	BEY56
ZR	4.1	50.	1.25*	0.65*				7.G	1.25*	0.98*	9.5	1.25*	0.65*			S3		BJO58
ZR	7.	45.	1.33*	0.5	4.5	1.33*	0.5									S3		BEY56
ZR	7.	45.5	1.25*	0.65*				9.5G	1.25*	0.98*	8.6	1.25*	0.65*			S2		BJO58
ZR	7.	56.	1.11	0.80	4.5	1.11	0.80				0.4	1.11	0.80			S2		JAS58
ZR	14.	41.3	1.25*	0.62				10.3G	1.25*	0.98*	9.6	1.25*	0.62			S1		CLA67
90ZR	1.5	48.3	1.25*	0.65*				6.7	1.30*	0.47*	5.5*	1.25*	0.65*			S1	5	MCD74
91ZR	0.98	47.9	1.3*	0.79				17.6G	1.3*	0.66				7101	2973	S	6,14	MAD64
92ZR	1.5	48.3	1.25*	0.65*				6.7	1.30*	0.47*	5.5*	1.25*	0.65*			S1	5	MCD74
94ZR	1.5	48.3	1.25*	0.65*				6.7	1.30*	0.47*	5.5*	1.25*	0.65*			S1	5	MCD74
NB	0.88	51.00	1.25	0.62*				12.00	1.25	0.50*	4.00	1.25	0.62*			S1P2	5	COX72
NB	1.5	46.9	1.25*	0.76				8.6G	1.25*	0.98*	10.*	1.25*	0.76	5662		S2	10	KOR68
NB	8.05	48.8	1.22	0.68				9.76	1.13	0.48*	8.0*	1.22	0.68	4040	1840	S3		HOL71
MO	0.86	52.00	1.27	0.62*				16.00	1.27	0.50*	6.00	1.27	0.62*			S1P1	5	COX72
MO	1.	53.*	1.25*	0.6*				7.0G*	1.25*	1.0*	20.*	1.25*	0.6*			3	5,12	HOO62
MO	1.0	46.0	1.26*	0.62*				8.G	1.35*	0.5*						S2	5	SMI67
MO	1.5	47.3	1.25*	0.74				8.9G	1.25*	0.98*	10.*	1.25*	0.74	5779		S1	10	KOR68
MO	3.2	48.2	1.25*	0.65*				6.8	1.25*	0.48*	8.0*	1.12*	0.65*			S P2	6,2	ZIJ72
MO	3.2	48.2*	1.25*	0.65*				6.8*	1.25*	0.48*	7.3	1.19	0.23			S P	6,2	ZIJ72
MO	8.05	48.4	1.21	0.68				9.78	1.14	0.48*	8.0*	1.21	0.68	4050	1850	S3		HOL71

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TABLE I. Optical-Model Parameters Neutrons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	ST	SR	FIT	NOTE	REF.
92MO	1.5	48.3	1.25*	0.65*				6.7	1.30*	0.47*	5.5*	1.25*	0.65*			S1	5	MCD74
94MO	1.5	48.3	1.25*	0.65*				6.7	1.30*	0.47*	5.5*	1.25*	0.65*			S1	5	MCD74
96MO	1.5	48.3	1.25*	0.65*				6.7	1.30*	0.47*	5.5*	1.25*	0.65*			S1	5	MCD74
100MO	1.5	48.3	1.25*	0.65*				6.7	1.30*	0.47*	5.5*	1.25*	0.65*			S1	5	MCD74
AG	0.88	47.39	1.26*	0.62*				7.13	1.26*	1.45	3.44	1.26*	0.62*			S1P1	5	COX72
AG	1.5	47.5	1.25*	0.76				14.8G	1.25*	0.98*	10.*	1.25*	0.76	5854		S1	10	KOR68
AG	3.2	46.4	1.25*	0.65*				7.7	1.25*	0.48*	8.0*	1.12*	0.65*			S P	2,6,7	ZIJ72
108AG	14.5	43.7	1.25*	0.65*				10.8G	1.25*	1.00*	8.	1.25*	0.65*		1789	S		PIC65
CD	0.87	47.00	1.26*	0.62*				10.00	1.26*	0.50*	4.00	1.26*	0.62*			S1P1	5	COX72
CD	1.	53.*	1.25*	0.6*				7.0G*	1.25*	1.0*	20.*	1.25*	0.6*			2	5,12	HOO62
CD	1.	48.	1.25*	0.65*				5.0G*	1.25*	0.98*	10.*	1.25*	0.65*	7220	1850	S2	15	GIL63
CD	3.2	44.5	1.25*	0.65*				10.1	1.25*	0.48*	8.0*	1.12*	0.65*			S P	2,6,7	ZIJ72
CD	4.1	50.	1.25*	0.65*				7.G	1.25*	0.98*	9.5	1.25*	0.65*			S3		BJO58
CD	8.05	49.5	1.20	0.68				9.55	1.27	0.48*	8.0*	1.20	0.68	3970	1990	S2		HOL71
CD	14.6	40.3	1.33*	0.6*				8.G*	1.33*	0.978*				5000	1900	S2		BJO56
CD	99.4	23.9	1.25*	0.60*	10.4	1.25*	0.60*				3.6*	1.25*	0.60*				11	SCH68
CD	111.5	25.1	1.20*	0.65*	10.8	1.20*	0.65*				3.6*	1.25*	0.60*				11	SCH68
CD	121.4	23.1	1.20*	0.65*	11.4	1.20*	0.65*				3.6*	1.25*	0.60*				11	SCH68
CD	131.0	21.1	1.20*	0.65*	11.9	1.20*	0.65*				3.6*	1.25*	0.60*				11	SCH68
CD	142.1	19.4	1.20*	0.65*	12.2	1.20*	0.65*				3.6*	1.20*	0.65*				11	SCH68
CD	151.9	18.1	1.20*	0.65*	12.8	1.20*	0.65*				3.6*	1.20*	0.65*	2170	1092		11	SCH68
112CD	0.98	44.5	1.3*	0.68				9.9G	1.3*	1.00				6840	2396	S	6,14	MAD64
IN	1.5	48.3	1.25*	0.64				7.5G	1.25*	0.98*	10.*	1.25*	0.64	6032		S1	10	KOR68
IN	3.00	46.4	1.26	0.65				8.03	1.25	0.48*	8.0*	1.26	0.65	4530	2140	S1	2	HOL71
IN	3.49	45.7	1.27	0.65				7.90	1.26	0.48*	8.0*	1.27	0.65	4340	2210	S2	2	HOL71
IN	4.00	45.5	1.28	0.65				7.86	1.24	0.48*	8.0*	1.28	0.65	4180	2230	S2		HOL71
IN	4.56	46.5	1.27	0.65				7.99	1.23	0.48*	8.0*	1.27	0.65	4100	2250	S2		HOL71
IN	7.05	49.5	1.20	0.69				8.68	1.25	0.48*	8.0*	1.20	0.69	3870	2020	S2		HOL71
IN	8.05	46.0	1.24	0.66				8.15	1.26	0.48*	8.0*	1.24	0.66	4150	1930	S2		HOL71
SN	0.86	46.00	1.28	0.62*				10.00	1.28	0.50*	4.00	1.28	0.62*			S1P1	5	COX72
SN	1.	48.	1.25*	0.65*				5.0G*	1.25*	0.98*	10.*	1.25*	0.65*	6750	1690	S1	15	GIL63
SN	1.0	45.5	1.25*	0.62*				8.G	1.35*	0.5*						S1	5	SMI67
SN	1.5	48.2	1.25*	0.58				5.9G	1.25*	0.98*	10.*	1.25*	0.58	6023		S1	10	KOR68
SN	2.5	46.	1.35*	0.4	4.6	1.35*	0.4									S3	15	BEY56
SN	3.2	47.2	1.25*	0.65*				10.5	1.25*	0.48*	8.0*	1.12*	0.65*			S P2	6,2	ZIJ72
SN	3.2	47.2*	1.25*	0.65*				10.5*	1.25*	0.48*	4.2	0.82	0.63			S P	6,2	ZIJ72
SN	4.1	46.	1.35*	0.4	4.6	1.35*	0.4									S2		BEY56
SN	7.	46.	1.35*	0.4	4.6	1.35*	0.4									S2		BEY56
SN	7.	45.5	1.25*	0.65*				9.5G	1.25*	0.98*	8.6	1.25*	0.65*			S2		BJO58
SN	14.	44.	1.25*	0.65*				11.G	1.25*	0.98*	8.3	1.25*	0.65*			S2		BJO58
SN	24.	40.	1.25*	0.70*				11.G	1.25*	1.00*	7.4	1.25*	0.70*			S1	16	STU62
116SN	24.	40.	1.25*	0.65*	2.3	1.25*	0.65*	7.3G	1.25*	1.00*	9.4	1.25*	0.65*		1808	S2P2	7	PIC65
119SN	0.98	43.9	1.3*	0.75				8.4G	1.3*	1.06				7064	2556	S	6,14	MAD64
SB	0.87	48.00	1.27	0.62*				8.00	1.37	0.50*	5.00	1.27	0.62*			S1P1	5	COX72
SB	1.0	45.0	1.25*	0.62*				8.G	1.35*	0.5*						S2	5	SMI67
SB	1.5	47.4	1.25*	0.71				7.2G	1.25*	0.98*	10.*	1.25*	0.71	6479		S1	10	KOR68
SB	3.2	45.8	1.25*	0.65*				11.4	1.25*	0.48*	8.0*	1.12*	0.65*			S P	2,6,7	ZIJ72
SB	8.05	46.5	1.23	0.66				8.49	1.29	0.48*	8.0*	1.23	0.66	4170	2030	S2		HOL71
TE	1.0	44.5	1.25*	0.62*				8.G	1.35*	0.5*						S2	5	SMI67
TE	3.2	46.8	1.25*	0.65*				7.9	1.25*	0.48*	8.0*	1.12*	0.65*			S P	2,6,7	ZIJ72
I	0.89	46.00	1.26*	0.80				10.00	1.26*	0.75	2.00	1.26*	0.80			S2P3	5	COX72
I	1.5	44.8	1.25*	0.78				8.3G	1.25*	0.98*	10.*	1.25*	0.78	6672		S1	10	KOR68
CS	0.88	44.00	1.26*	0.80				6.00	1.26*	1.25	6.00	1.26*	0.80			S1P3	5	COX72
BA	0.88	46.00	1.26*	0.62*				10.00	1.26*	1.00	12.00	1.26*	0.62*			S2P2	5	COX72
BA	3.2	47.2	1.25*	0.65*				8.7	1.25*	0.48*	8.0*	1.12*	0.65*			S P1	6,2	ZIJ72
BA	3.2	47.2*	1.25*	0.65*				8.7*	1.25*	0.48*	8.9	1.30	0.27			S P	6,2	ZIJ72
LA	1.	44.	1.25*	0.65*				3.0G*	1.25*	0.98*	10.*	1.25*	0.65*	7230	1320	S2	15	GIL63
139LA	0.98	40.8	1.3*	0.80				2.5G	1.3*	1.67				7920	2213	S	6,14	MAD64
CE	0.87	45.91	1.26*	0.62*				14.47	1.34	1.00	17.49	1.26*	0.62*			S2P2	5	COX72
CE	1.	48.	1.25*	0.65*				3.0G*	1.25*	0.98*	10.*	1.25*	0.65*	6850	2240	S2	15	GIL63
140CE	0.98	43.4	1.3*	0.63				2.2G	1.3*	1.96				7106	2304	S	6,14	MAD64

See page 8 for Explanation of Tables

TABLE I. Optical-Model Parameters Neutrons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	ST	SR	FIT	NOTE	REF.
PR	0.88	44.00	1.26*	0.80				6.00	1.26*	1.00	6.00	1.26*	0.80			S1P3	5	COX72
PR	1.	48.	1.25*	0.65*				3.0G*	1.25*	0.98*	10.*	1.25*	0.65*	6970	2350	S1	15	GIL63
141PR	0.98	41.3	1.3*	0.76				3.5G	1.3*	1.76				7957	2908	S	6,14	MAD64
ND	1.	48.	1.25*	0.65*				5.0G*	1.25*	0.98*	10.*	1.25*	0.65*	7210	3220	S2	15	GIL63
144ND	0.98	48.2	1.3*	0.35				6.3G	1.3*	0.98				5905	2315	S	6,14	MAD64
SM	1.	46.	1.25*	0.65*				5.0G*	1.25*	0.98*	10.*	1.25*	0.65*	7160	2860	S1	15	GIL63
SM	1.5	43.1	1.25*	0.72				13.4G	1.25*	0.98*	10.*	1.25*	0.72	6802		S1	10	KOR68
150SM	0.98	41.0	1.3*	0.73				6.5G	1.3*	1.28				7781	3315	S	6,14	MAD64
GD	1.	46.	1.25*	0.65*				5.0G*	1.25*	0.98*	10.*	1.25*	0.65*	7590	3430	S2	15	GIL63
157GD	0.98	40.3	1.3*	0.62				20.4G	1.3*	0.98*				6740	2817	S	6,14	MAD64
DY	1.	44.	1.25*	0.65*				5.0G*	1.25*	0.98*	10.*	1.25*	0.65*	7620	3100	S2	15	GIL63
162DY	0.98	41.0	1.3*	0.56				18.6G	1.3*	0.95				6714	2689	S	6,14	MAD64
HO	1.	43.	1.25*	0.65*				5.0G*	1.25*	0.98*	10.*	1.25*	0.65*	7560	2860	S2	15	GIL63
165HO	0.35	40.*	1.25*	0.82*				16.*	1.25*	0.47*	7.*	1.25*	0.82*			S2	13	MEA71
165HO	0.35	45.9	1.25*	0.69*				3.48	1.25*	0.47*	7.3*	1.25*	0.69*			S1	8,13	MEA71
165HO	0.98	40.2	1.3*	0.55				37.2G	1.3*	0.74				6284	2385	S	6,14	MAD64
165HO	1.0	40.*	1.25*	0.82*				16.*	1.25*	0.47*	7.*	1.25*	0.82*			S2	13	MEA71
165HO	1.0	45.75	1.25*	0.69*				3.45	1.25*	0.47*	7.3*	1.25*	0.69*			S1	8,13	MEA71
ER	1.	44.	1.25*	0.65*				5.0G*	1.25*	0.98*	10.*	1.25*	0.65*	7870	3430	S2	15	GIL63
167ER	0.98	40.3	1.3*	0.64				23.9G	1.3*	0.93				6793	3005	S	6,14	MAD64
YB	1.	44.	1.25*	0.65*				5.0G*	1.25*	0.98*	10.*	1.25*	0.65*	7820	3520	S2	15	GIL63
YB	1.5	42.9	1.25*	0.72				16.7G	1.25*	0.98*	10.*	1.25*	0.72	6947		S2	10	KOR68
173YB	0.98	37.7	1.3*	0.72				22.8G	1.3*	0.95				7182	3380	S	6,14	MAD64
HF	8.05	45.2	1.22	0.66				6.74	1.26	0.48*	8.0*	1.22	0.66	4510	2220	S3		HOL71
TA	0.88	40.00	1.26*	0.62*				20.00	1.26*	1.20	8.00	1.26*	0.62*			S2P2	5	COX72
TA	1.	42.	1.25*	0.65*				5.0G*	1.25*	0.98*	10.*	1.25*	0.65*	7990	3540	S3	15	GIL63
TA	1.5	41.6	1.25*	0.79				15.3G	1.25*	0.98*	10.*	1.25*	0.79	7471		S2	10	KOR68
TA	7.	45.5	1.25*	0.65*				9.5G	1.25*	0.98*	8.6	1.25*	0.65*			S2		BJO58
181TA	0.41	43.8	1.33	0.64				12.1G	1.33	1.0*	7.0*	1.33	0.64			S1	10,13	AUE64
181TA	0.72	43.8	1.33	0.64				12.1G	1.33	1.0*	7.0*	1.33	0.64			S1	10,13	AUE64
181TA	0.98	69.1	0.88	1.00	20.2	0.88	1.00							7364	4381	S	6,14	MAD64
181TA	1.10	43.8	1.33	0.64				12.1G	1.33	1.0*	7.0*	1.33	0.64			S2	10,13	AUE64
181TA	2.47	45.0	1.25*	0.65*				13.9	1.25*	0.48*	6.0*	1.25*	0.65*	7010	3340	S	1	HOL70A
181TA	3.00	45.0	1.25*	0.65*				13.0	1.25*	0.48*	6.0*	1.25*	0.65*	6850	3280	S	1	HOL70A
181TA	3.49	44.9	1.25*	0.65*				12.6	1.25*	0.48*	6.0*	1.25*	0.65*	6680	3230	S	1	HOL70A
181TA	4.56	44.8	1.25*	0.65*				11.5	1.25*	0.48*	6.0*	1.25*	0.65*	6210	3030	S	1	HOL70A
181TA	6.09	44.7	1.25*	0.65*				11.0	1.25*	0.48*	6.0*	1.25*	0.65*	5550	2870	S	1	HOL70A
181TA	7.04	44.6	1.25*	0.65*				11.0	1.25*	0.48*	6.0*	1.25*	0.65*	5350	2830	S	1	HOL70A
181TA	8.05	44.5	1.25*	0.65*				10.6	1.25*	0.48*	6.0*	1.25*	0.65*	5210	2750	S	1	HOL70A
W	0.40	43.8	1.31*	0.49				13.2G	1.31*	1.0*	7.0*	1.31*	0.49			S1	10,13	AUE64
W	0.79	43.8	1.31*	0.49				13.2G	1.31*	1.0*	7.0*	1.31*	0.49			S1	10,13	AUE64
W	0.87	44.00	1.28	0.62*				20.00	1.28	1.25	9.00	1.28	0.62*			S2P2	5	COX72
W	1.25	43.8	1.31*	0.49				13.2G	1.31*	1.0*	7.0*	1.31*	0.49			S2	10,13	AUE64
W	1.5	42.5	1.25*	0.87				21.5G	1.25*	0.98*	10.*	1.25*	0.87	7177		S2	10	KOR68
W	3.2	50.4	1.25*	0.65*				9.3	1.25*	0.48*	8.0*	1.12*	0.65*			S P	2,6,7	ZIJ72
W	4.1	50.	1.25*	0.65*				7.G	1.25*	0.98*	9.5	1.25*	0.65*			S3		BJO58
184W	1.37	57.66	1.20*	0.65*				7.71	1.20*	0.70*	10.0*	1.20*	0.65*			S1	2	TSU69
184W	1.5	45.3	1.25*	0.65				20.3G	1.25*	0.98*	10.*	1.25*	0.65	6276		S2	10	KOR68
184W	2.01	46.79	1.20*	0.65*				10.06	1.20*	0.70*	10.0*	1.20*	0.65*			S2	2	TSU69
PT	1.5	47.6	1.25*	0.58				12.1G	1.25*	0.98*	10.*	1.25*	0.58	5831		S2	10	KOR68
AU	0.88	47.00	1.26*	0.62*				10.00	1.26*	1.00	8.00	1.26*	0.62*			S2P2	5	COX72
AU	1.5	46.6	1.25*	0.69				8.7G	1.25*	0.98*	10.*	1.25*	0.69	5921		S1	10	KOR68
AU	8.05	45.5	1.23	0.65				6.29	1.27	0.48*	8.0*	1.23	0.65	4930	2330	S2		HOL71
197AU	0.5	43.2	1.31*	0.58				4.0G	1.31*	1.0*	7.0*	1.31*	0.58			S2	10,13	AUE64
197AU	1.0	43.2	1.31*	0.58				4.0G	1.31*	1.0*	7.0*	1.31*	0.58	43.		S2	10,13	AUE64
197AU	1.4	43.2	1.31*	0.58				4.0G	1.31*	1.0*	7.0*	1.31*	0.58	43.		S2	10,13	AUE64
HG	0.88	44.00	1.26*	0.80				12.00	1.26*	0.50*	4.00	1.26*	0.80			S2P2	5	COX72
HG	1.5	45.8	1.25*	0.73				8.9G	1.25*	0.98*	10.*	1.25*	0.73	6125		S1	10	KOR68

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TABLE I. Optical-Model Parameters Neutrons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL. IMAG. POTENTIAL W	RW	AW	SURF. IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	ST	SR	FIT	NOTE	REF.
TL	1.5	47.2	1.25*	0.67				7.8G	1.25*	0.98*	10.*	1.25*	0.67	5771		S2	10	KOR68
TL	3.2	45.0	1.25*	0.65*				13.0	1.25*	0.48*	8.0*	1.12*	0.65*			S P	2,6,7	ZIJ72
PB	1.	51.	1.19	0.65*				3.0G*	1.19	0.98*	10.*	1.19	0.65*	4390	1280	S1	5	GIL63
PB	1.10	46.00	1.26*	0.62*				8.00	1.26*	0.50*	7.00	1.26*	0.62*			S2P2	5	COX72
PB	1.2	46.	1.31*	0.43				5.5G	1.31*	1.0*	7.0*	1.31*	0.43			S2	10	AUE64
PB	1.5	46.9	1.25*	0.52				5.3G	1.25*	0.98*	10.*	1.25*	0.52	5371		S1	10	KOR68
PB	2.2	46.	1.31*	0.43				5.5G	1.31*	1.0*	7.0*	1.31*	0.43			S3	10	AUE64
PB	3.2	46.6	1.25*	0.65*				6.9	1.25*	0.48*	8.0*	1.12*	0.65*			S P	2,6,7	ZIJ72
PB	7.	45.31	1.25*	0.65*				6.57	1.25*	0.47*	6.2	1.25*	0.65*			S2		PER62
PB	8.05	46.0	1.23	0.65				6.30	1.28	0.48*	8.0*	1.23	0.65	5390	2440	S2		HOL71
PB	14.	44.	1.25*	0.65*				11.G	1.25*	0.98*	8.3	1.25*	0.65*			S2		BJO58
PB	14.5	43.28	1.25*	0.65*				9.32	1.25*	0.47*	7.0	1.25*	0.65*			S1		PER62
PB	99.4	23.9	1.25*	0.60*	10.4	1.25*	0.60*				3.6*	1.25*	0.60*				11	SCH68
PB	111.5	25.1	1.20*	0.65*	10.8	1.20*	0.65*				3.6*	1.25*	0.60*				11	SCH68
PB	121.4	23.1	1.20*	0.65*	11.4	1.20*	0.65*				3.6*	1.25*	0.60*				11	SCH68
PB	131.0	21.1	1.20*	0.65*	11.9	1.20*	0.65*				3.6*	1.25*	0.60*				11	SCH68
PB	142.1	19.4	1.20*	0.65*	12.2	1.20*	0.65*				3.6*	1.20*	0.65*				11	SCH68
PB	151.9	18.1	1.20*	0.65*	12.8	1.20*	0.65*				3.6*	1.20*	0.65*	3512	1684		11	SCH68
208PB	0.98	45.3	1.3*	0.43*				1.0G	1.3*	0.69*				4421	230	S	6,14	MAD64
208PB	8.05	45.2	1.24	0.64				6.69	1.26	0.48*	8.0*	1.24	0.64	5330	2450	S2		HOL71
BI	0.92	43.50	1.30	0.62*				14.00	1.30	0.50*	8.00	1.30	0.62*			S1P1	5	COX72
BI	1.5	47.3	1.25*	0.38				3.9G	1.25*	0.98*	10.*	1.25*	0.38	5185		S1	10	KOR68
BI	2.5	44.	1.30*	0.5	3.3	1.30*	0.5									S2	15	BEY56
BI	3.2	46.2	1.25*	0.65*				8.2	1.25*	0.48*	8.0*	1.12*	0.65*			S P1	6,2	ZIJ72
BI	3.2	46.2*	1.25*	0.65*				8.2*	1.25*	0.48*	6.9	0.90	0.37			S P	6,2	ZIJ72
BI	4.1	44.	1.30*	0.5	3.3	1.30*	0.5									S2	15	BEY56
BI	4.1	50.	1.25*	0.65*				7.G	1.25*	0.98*	9.5	1.25*	0.65*			S3		BJO58
BI	6.09	44.1	1.26	0.66				6.26	1.28	0.48*	8.0*	1.26	0.66	6350	2540	S2		HOL71
BI	7.	44.	1.30*	0.5	3.3	1.30*	0.5									S2		BEY56
BI	7.	45.5	1.25*	0.65*				9.5G	1.25*	0.98*	8.6	1.25*	0.65*			S2		BJO58
BI	7.05	44.9	1.24	0.68				6.22	1.26	0.48*	8.0*	1.24	0.68	5780	2440	S2		HOL71
BI	8.05	44.5	1.25	0.65				6.21	1.28	0.48*	8.0*	1.25	0.65	5510	2460	S2		HOL71
BI	14.6	44.	1.30*	0.5	3.3	1.30*	0.5									S2		BEY56
BI	14.6	40.3	1.31*	0.6*				8.G*	1.31*	0.978*				5700	2300	S2		BJO56
BI	14.8	42.7	1.25*	0.65*				8.4	1.25*	0.47*	6.0*	1.25*	0.65*			S1		KUI72
BI	24.	40.	1.25*	0.70*				11.G	1.25*	1.00*	7.4	1.25*	0.70*			S2	16	STU62
209BI	0.90	46.3	1.29	0.50				3.78G	1.29	1.0*	7.0*	1.29	0.50			S2	10	AUE64
209BI	1.0	46.3	1.29	0.50				3.78G	1.29	1.0*	7.0*	1.29	0.50	46.		S2	10	AUE64
209BI	1.45	45.47	1.25*	0.65*				5.84	1.25*	0.48*	7.0*	1.25*	0.65*	5840		S2	2	TAN72
209BI	2.02	46.27	1.25*	0.65*				3.21	1.25*	0.48*	7.0*	1.25*	0.65*	6250		S1	2	TAN72
209BI	2.5	46.35	1.247	0.639				8.1	1.265	0.33	32.	1.247	0.639			S1	5	CRA67
209BI	2.55	46.02	1.25*	0.65*				3.32	1.25*	0.48*	7.0*	1.25*	0.65*	7330		S1	2	TAN72
209BI	3.06	46.11	1.25*	0.65*				3.59	1.25*	0.48*	7.0*	1.25*	0.65*	7760		S1	2	TAN72
209BI	3.55	46.04	1.25*	0.65*				5.77	1.25*	0.48*	7.0*	1.25*	0.65*	7560		S2	2	TAN72
209BI	14.	41.21	1.25*	0.65*				7.48	1.25*	0.47*	7.5*	1.25*	0.65*	5470	2290	S2		ERR67
209BI	14.1	39.9	1.30	0.75				11.4G	1.28	1.28	4.62	1.30	0.75			S2		MAT73
209BI	24.	41.2	1.25*	0.65*	2.8	1.25*	0.65*	5.1G	1.25*	1.00*	4.7	1.25*	0.65*		2527	S2P2	7	PIC65
TH	0.87	43.00	1.30	0.62*				20.00	1.34	0.50*	8.00	1.30	0.62*			S2P2	5	COX72
TH	1.5	44.7	1.25*	0.60				10.3G	1.25*	0.98*	10.*	1.25*	0.60	6258		S1	10	KOR68
232TH	0.56	41.3	1.32*	0.47*				7.28G	1.32*	1.0*	7.0*	1.32*	0.47*			S1	10	AUE64
232TH	0.70	41.3	1.32*	0.47*				7.28G	1.32*	1.0*	7.0*	1.32*	0.47*			S2	10	AUE64
232TH	1.0	41.3	1.32*	0.47*				7.28G	1.32*	1.0*	7.0*	1.32*	0.47*			S2	10	AUE64
U	0.87	42.70	1.26*	0.67				17.79	1.26*	0.75	5.31	1.26*	0.67			S2P1	5	COX72
U	1.	46.	1.25*	0.65*				5.0G*	1.25*	0.98*	10.*	1.25*	0.65*	7140	3580	S2	15	GIL63
235U	1.5	45.	1.25*	0.64				10.7G	1.25*	0.98*	10.*	1.25*	0.64	6447		S2	10	KOR68
238U	0.41	39.8	1.32*	0.47*				6.9G	1.32*	1.0*	15.0	1.32*	0.47*			S1	10,13	AUE64
238U	0.77	39.8	1.32*	0.47*				6.9G	1.32*	1.0*	15.0	1.32*	0.47*			S2	10,13	AUE64
238U	0.98	39.3	1.3*	0.83				16.3G	1.3*	1.05				7878	4595	S	6,14	MAD64
238U	1.25	39.8	1.32*	0.47*				6.9G	1.32*	1.0*	15.0	1.32*	0.47*			S2	10,13	AUE64
238U	1.5	43.4	1.25*	0.58				12.G	1.25*	0.98*	10.*	1.25*	0.58	6440		S1	10	KOR68
238U	99.4	23.9	1.25*	0.60*	10.4	1.25*	0.60*				3.6*	1.25*	0.60*				11	SCH68
238U	111.5	25.1	1.20*	0.65*	10.8	1.20*	0.65*				3.6*	1.25*	0.60*				11	SCH68
238U	121.4	23.1	1.20*	0.65*	11.4	1.20*	0.65*				3.6*	1.25*	0.60*				11	SCH68
238U	131.0	21.1	1.20*	0.65*	11.9	1.20*	0.65*				3.6*	1.25*	0.60*				11	SCH68
238U	142.1	19.4	1.20*	0.65*	12.2	1.20*	0.65*				3.6*	1.20*	0.65*				11	SCH68
238U	151.9	18.1	1.20*	0.65*	12.8	1.20*	0.65*				3.6*	1.20*	0.65*	3905	1857		11	SCH68

See page 8 for Explanation of Tables

TABLE I. Optical-Model Parameters Neutrons

NOTES

1. Nonspherical optical-model calculations performed in the coupled-channel adiabatic approximation with $\beta = 0.26$.
2. See publication for compound elastic contribution
3. The optical-model parameters for 20 natural elements at 8.05 MeV given in this publication are also given in reference HOL71
4. The parameters V and WD are given as a function of energy: V = (49.3-0.33 E) MeV
   WD = (0.8 E) MeV
4A. Same as note 4 except that WD was kept fixed at 6.5 MeV
5. Compound elastic contribution obtained by Hauser-Feshbach calculation
6. The normalization of the cross-section data is adjusted by the code
7. Polarization data for angles smaller than 80°
8. Deformed optical-model calculations performed with V = (46-0.25 E) MeV, W = (3.5-0.05 E) MeV and $\beta = 0.3$
9. Energy-averaged data from 1.4 to 2.2 MeV
10. Total cross-sections and differential elastic cross-sections were fitted simultaneously. Hauser-Feshbach calculations performed
11. Fits to total and reaction cross-sections only
12. Fit to the energy dependence of the polarization at 55° and 90°, and to the total cross-section
13. More data at nearby energies are fitted with this set of parameters. See publication
14. Total cross-sections and differential elastic cross-sections were fitted simultaneously. Isotropic compound elastic correction added
15. Isotropic compound elastic contribution added to the shape elastic
16. Data for angles smaller than 90°

Table I: Tabular Bibliography

Target Nuclei	Energy Range (MeV)	References
^{4}He	E < 20	SAT68
^{27}Al,Fe	1 to 4	AUE67
Al to Pb (36 nuclei)	3.2	BEC66
Si to U (8 nuclei)	1 to 15	WIL64
Ca	0.7 to 18	CAS62
40 < A < 150 (even isotopes)	E < 1	MOL63
Ti	0.3 to 1.5	BAR74
Ti to Bi (20 nuclei)	3.2	ZIJ74
Fe,Ni,Cu,Sn,Pb(*)	14.5	PYL69
^{54,56}Fe,^{59}Co,^{58,60}Ni(*)	14.7	TUT74
^{59}Co to ^{209}Bi (10 nuclei)	4	GOR67,GOR68
Zr,Nb,Mo,Cd	E < 1.0	ELW64
^{92,96,98,100}Mo	1.6 to 5.5	SMI75
^{238}U(**)	0.3 to 15	BAL64

*Folding model

**Coupled equation calculations performed

Table II: Tabular bibliography of data compared with optical model calculations performed with Bjorklund and Fernbach parameters from reference BJO58.

Target Nuclei	Energy (MeV)	References
Ag,In	6.7	MAL62
B,C,S	14	TES62
C,N,S,Mo,Cd,Te	14	STR62
Al,S,Ti,Co	14	STP59
Zn,Sn,Sb,Pb,Bi	14	RAY59
C,Al,Fe,Cu,Sn,Pb	14.5	COO58
Mg,Ca,Cd,Ta,Bi	14.6	CRO60
Mg,Al,Ni,Cu	14.7	BER58
Ta,Bi,Th,U	15.2	HUD62

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TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL. IMAG. POTENTIAL W	RW	AW	SURF. IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
3HE	31.0	47.1	1.25*	0.06	2.0	1.25*	2.86	0.16	1.25*	4.0	0.02	1.25*	0.06	1.2?	171	S2		KIM64
3HE	85.	15.36	1.416	0.148				10.11	1.506	0.308	4.83	1.416	0.148	1.3*	140	S1	5	VOT74
4HE	31.	48.8	1.2*	0.284	4.00	1.2*	0.621	1.00G	1.2*	0.9	5.2	1.2*	0.284	1.2*	69	S1		BUN64
4HE	31.	56.2	1.1*	0.35*				3.15	2.56	0.10*	4.26	1.1*	0.35*	1.1?	96	S2P2	4	THO70
4HE	31.	55.2	1.1*	0.35*				4.63	2.65	0.10*	4.19	1.1*	0.35*	1.1?	147	S P		THO70
4HE	40.	51.0	1.1*	0.35*				4.19	2.39	0.10*	2.75	1.1*	0.35*	1.1?	97	S2P3	4	THO70
4HE	40.	50.7	1.1*	0.35*				6.33	2.45	0.10*	3.20	1.1*	0.35*	1.1?	147	S P		THO70
4HE	46.	49.3	1.1*	0.35*				5.94	2.32	0.10*	2.17	1.1*	0.35*	1.1?	117	S2P3	4	THO70
4HE	46.	50.6	1.1*	0.35*				9.01	2.32	0.10*	2.25	1.1*	0.35*	1.1?	167	S P		THO70
4HE	47.	36.3	1.31	0.342				5.61	2.64	0.085	1.73	1.43	0.264	1.3*		S P		SAW70
4HE	55.	42.6	1.1*	0.35*				5.00	2.30	0.10*	2.63	1.1*	0.35*	1.1?	90	S2P3	4	THO70
4HE	55.	45.7	1.1*	0.35*				8.88	2.23	0.10*	2.76	1.1*	0.35*	1.1?	140	S P		THO70
4HE	85.	23.73	1.044	0.186				17.60	1.158	0.387	7.46	1.044	0.186	1.3*	192	S1	5,15	VOT74
4HE	1000.	30.	1.60*	0.31	153.	1.60*	0.31									S2	19	PAL67
6LI	25.9	59.15	1.05*	0.288				10.14	1.334	0.568	12.15	1.02*	0.20*	1.56*	434	S1		BRA72
6LI	29.9	54.48	1.05*	0.273				10.95	1.143	0.700	11.72	1.02*	0.20*	1.56*	465	S1		BRA72
6LI	31.	27.69	1.249	0.797	25.29	1.31	0.36	0.3	1.31	0.36	6.0*	1.249	0.797	1.25*		S		DEV69
6LI	33.6	44.56	1.124	0.578				6.92	1.124	0.685	7.38	1.124	0.578	1.12		S		KUL67
6LI	35.0	34.71	1.05*	0.670				2.93	1.848	0.695	3.37	1.02*	0.20*	1.56*	379	S1		BRA72
6LI	40.1	31.76	1.05*	0.727				2.42	1.934	0.678	2.74	1.02*	0.20*	1.56*	324	S1P2	16,11	BRA72
6LI	45.4	28.35	1.05*	0.757				2.63	1.969	0.611	2.36	1.02*	0.20*	1.56*	302	S1		BRA72
6LI	49.5	26.82	1.05*	0.825				1.69	1.841	0.630	1.88	1.02*	0.20*	1.56*	186	S1P2	17	BRA72
6LI	49.75	37.8	1.14	0.79				4.48	1.32	0.48	4.6	1.27	0.55	1.20*	188	S2P3	15	MAN71
6LI	155.	18.7	1.07	0.51				8.3	1.18	0.52	0.63	1.10	0.62	1.56*		S1P2	31	GEO68
7LI	33.6	46.45	1.187	0.478				6.34	1.187	0.727	7.18	1.187	0.478	1.19		S		KUL67
7LI	49.74	38.5	1.07	0.76				4.23	1.80	0.48	7.0	1.01	0.61	1.20*	284	S2P3		MAN71
7LI	49.74	36.7	1.21	0.55	5.62	1.73	1.22				4.9	1.0	0.53	1.20*	492	S2P2		MAN71
7LI	155.	20.5	1.10	0.42				8.5	1.23	0.50	0.90	1.18	0.48	1.49*		S1P3	31	GEO68
BE	49.4	40.22	1.097	0.712	18.07	0.416	0.142	3.02	1.432	0.652	3.12	0.955	0.436	1.2*	282	S P	15	CLA70C
9BE	5.0	50.0	1.38*	0.65*				11.9	1.50*	0.37*	7.3	1.35*	0.33*	1.33*		S3P3		LOY70
9BE	6.0	50.7	1.38*	0.65*				16.1	1.50*	0.37*	6.5	1.35*	0.33*	1.33*		S3P3		LOY70
9BE	6.	28.0	1.64	1.05				30.3	1.94	0.11	4.9*	1.64	0.27	1.09*		S2P2		WER71
9BE	6.4	47.4	1.39	0.56				11.4	1.41	0.58	9.5	1.30	0.28	1.5*		S2P		VAS74
9BE	7.0	49.1	1.38*	0.65*				18.9	1.50*	0.37*	4.8	1.35*	0.33*	1.33*		S3P3		LOY70
9BE	7.	32.4	1.54	1.01				21.9	1.81	0.18	4.9*	1.67	0.27	1.09*		S2P2		WER71
9BE	8.0	45.5	1.38*	0.65*				10.9	1.50*	0.37*	3.1	1.35*	0.33*	1.33*		S3P3		LOY70
9BE	8.	37.2	1.47	0.85				14.7	1.69	0.25	4.9*	1.55	0.28	1.09*		S1P1		WER71
9BE	9.0	44.1	1.38*	0.65*				11.4	1.50*	0.37*	4.1	1.35*	0.33*	1.33*		S2P2		LOY70
9BE	9.	40.5	1.39	0.78				13.0	1.625	0.28	4.9*	1.50	0.29	1.09*		S1P1		WER71
9BE	10.0	43.2	1.38*	0.65*				11.6	1.50*	0.37*	4.6	1.35*	0.33*	1.33*		S2P2		LOY70
9BE	10.	45.5	1.34	0.74				13.8	1.52	0.30	4.9*	1.40	0.29	1.09*		S1P1		WER71
9BE	11.0	41.9	1.38*	0.65*				10.2	1.50*	0.37*	4.5	1.35*	0.33*	1.33*		S2P2		LOY70
9BE	11.	48.3	1.29	0.70				12.7	1.51	0.31	4.9*	1.31	0.30	1.09*		S1P1		WER71
9BE	12.0	42.0	1.38*	0.65*				9.0	1.50*	0.37*	5.0	1.35*	0.33*	1.33*		S2P2		LOY70
9BE	12.	51.4	1.27	0.66				12.0	1.47	0.32	4.9*	1.24	0.30	1.09*		S1P1		WER71
9BE	13.0	55.0	1.24*	0.63*				12.5	1.36*	0.35*	4.9*	1.20*	0.31*	1.30*		S1P1		VOT73
9BE	14.0	55.0	1.24*	0.63*				13.0	1.36*	0.35*	4.9*	1.20*	0.31*	1.30*		S2		VOT73
9BE	14.5	53.4	1.23	0.63				10.4	1.38	0.32	4.9*	1.21	0.31	1.09*		P2		WER71
9BE	15.0	56.5	1.24*	0.63*				13.0	1.36*	0.35*	4.9*	1.20*	0.31*	1.30*		S2P2		VOT73
9BE	17.	58.0	1.22	0.62				16.0	1.35	0.33	4.9*	1.20	0.31	1.09*		S3		WER71
9BE	17.0	51.7	1.15*	0.57*				5.0G	1.55*	1.41*	5.4	1.075*	0.57*	1.15*	567	S2P2	11	MON73
9BE	17.	57.82	1.22*	0.625				15.63	1.37	0.33*				1.1*		S2		WER73
9BE	18.6	54.0	1.24*	0.63*				13.0	1.36*	0.35*	4.9*	1.20*	0.31*	1.30*		S3P3		VOT73
9BE	18.9	51.0	1.15*	0.57*	2.2	1.55*	0.97*	3.5G	1.55*	1.41*	5.7	1.075*	0.57*	1.15*	581	S2P2	11	MON73
9BE	21.0	48.9	1.15*	0.57*	0.9	1.55*	0.97*	4.1G	1.55*	1.41*	6.1	1.075*	0.57*	1.15*	525	S2		MON73
9BE	21.35	50.0	1.24*	0.63*				13.0	1.36*	0.35*	4.9*	1.20*	0.31*	1.30*		S 2		VOT73
9BE	25.0	46.8	1.15*	0.57*	1.7	1.55*	0.97*	3.4G	1.55*	1.41*	5.3	1.075*	0.57*	1.15*	500	S2		MON73
9BE	29.1	44.9	1.15*	0.57*	0.6	1.55*	0.97*	4.9G	1.55*	1.41*	9.6	1.075*	0.57*	1.15*	503	S2		MON73
9BE	30.3	50.2	1.21	0.61				14.6	1.26	0.34	4.9*	1.17	0.32	1.09*		P1		WER71
9BE	30.3	50.0	1.24*	0.63*	4.5	1.36*	0.35*	14.0	1.36*	0.35*	4.9*	1.20*	0.31*	1.30*		S3P3		VOT73
9BE	31.3	44.3	1.15*	0.57*	3.1	1.55*	0.97*	2.9G	1.55*	1.41*	8.9	1.075*	0.57*	1.15*	502	S3		MON73
9BE	33.6	48.92	1.139	0.613				6.44	1.139	0.616	6.30	1.139	0.613	1.14		S		KUL67
9BE	42.	41.9	0.967	0.487				3.28	1.253	1.662	3.27	0.967	0.487	1.2*	970	P1		SAT67A
9BE	45.5	66.9	0.801	0.710	4.96	2.049	0.629				2.95	0.801	0.710	1.2*	449	S1	15	SAT67A
9BE	45.5	24.8	1.342	0.548	4.15	2.175	0.532				7.45	1.342	0.548	1.2*	427	S1	15	SAT67A
9BE	49.65	32.3	1.26	0.63				2.27	1.31	0.96	4.9	1.20	0.56	1.20*	302	S2P2		MAN71
9BE	49.65	38.3	1.20	0.61	4.84	1.79	0.66				4.9	1.12	0.56	1.20*	335	S2P2		MAN71
9BE	160.	-5.40	1.018	0.489	14.17	1.633	0.385				2.31	1.018	0.489	1.89	257	S2	33,19	ROO65
9BE	160.	16.2	1.0	0.385	14.0	1.55	0.40				2.5*	1.0	0.385	1.30*	252	S2	12,19	ROO65
10B	8.5	52.0	1.17*	0.75*				5.43	1.523	0.523	6.2*	1.01*	0.75*	1.3*		S2	5	ZWI73
10B	33.6	53.99	1.097	0.548				6.22	1.097	0.644	6.31	1.097	0.548	1.1?		S2		KUL68
10B	49.5	46.64	1.11	0.68				20.93	0.78	0.53				1.2?		S1	1,15	SQU70
10B	49.5	53.22	0.97	0.65	6.77	1.47	1.08							1.2?		S1	1,15	SQU70
10B	49.5	40.66	1.11	0.58	5.34	1.68	1.06				6.44	0.75	0.59	1.2?		S1	1,15	SQU70
11B	17.	50.	1.13	0.7	13.3	1.13	0.7							1.2?		S3		PUG67
11B	30.3	45.18	1.09	0.59				3.38	1.30	1.01	7.79	0.98	0.57	1.29*		S2P3	8	KAR69A
11B	155.	14.2	1.44	0.44	5.79	1.18	0.85				2.27	0.97	0.48	1.28*		S2P3	31	GEO68

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TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
C	28.	37.2	1.33	0.578	5.02	1.33	0.513	3.13G	1.33	0.744	7.06	1.33	0.539	1.20*		S2		SAN70
C	28.	40.4	1.20*	0.70*	10.90	1.20*	0.48*				10.6	1.20*	0.70*	1.20*		S2		SAN70
C	29.	37.0	1.25*	0.65*	7.0	1.25*	0.65*	0.6	1.25*	0.47*	6.0*	1.25*	0.65*	1.25?		S2P3	23	CRA66
C	31.	55.05	0.917	0.582				4.10G	0.802	2.30	12.80	1.27	0.678	1.20*		S2		SAN70
C	31.	36.0	1.20*	0.70*	9.84	1.20*	0.48*				9.73	1.20*	0.70*	1.20*	329	S2		SAN70
C	31.	49.33	1.17*	0.75*	4.12*	1.32*	0.271	15.75G	1.32*	0.393	6.2*	1.01*	0.75*	1.20*		S		SAN70
C	49.	36.7	1.15	0.68				1.8	1.31	0.52	8.0	1.15	0.68	1.25?		S2P3	23	CRA66
C	49.4	33.43	1.23	0.661	6.88	0.778	0.949	3.43	0.958	0.454	3.77	0.683	0.247	1.2*	273	S2P2		CLA70C
C	49.4	37.53	1.10	0.731	21.00	0.368	0.187	2.93	1.450	0.503	3.92	0.902	0.391	1.2*	252	S2P3		CLA70C
12C	3.97	50.5	1.4*	0.4*				3.18	1.05*	0.4*	5.5*	1.20*	0.40*	1.25?		S2	18	PEA72
12C	4.25	50.4	1.4*	0.4*				3.40	1.05*	0.4*	5.5*	1.20*	0.40*	1.25?		P3	18	PEA72
12C	6.9	63.7	1.25*	0.33				6.0	1.25*	0.068	7.4	1.25*	0.33	1.25*	255	P2		GUR69
12C	7.0	51.3	1.25*	0.49				0.36	1.25*	0.065	2.5	1.25*	0.49	1.25*	30	S1		GUR69
12C	7.55	49.3	1.4*	0.4*				6.04	1.05*	0.4*	5.5*	1.20*	0.40*	1.25?		P1	18	PEA72
12C	7.88	49.2	1.4*	0.4*				6.30	1.05*	0.4*	5.5*	1.20*	0.40*	1.25?		S2	18	PEA72
12C	8.4	49.0	1.4*	0.4*				6.5*	1.05*	0.4*	5.5*	1.20*	0.40*	1.25?		S2	18	PEA72
12C	11.85	52.0	1.30	0.45				20.1G	1.30	0.25*	5.1	1.30	0.45	1.30	368	S1P2	11,15	NOD62
12C	12.07	53.0	1.30	0.33				17.6G	1.30	0.25*	6.6	1.30	0.33	1.30	335	S2P	11,15	NOD62
12C	12.25	58.1	1.25	0.30				15.7G	1.25	0.25*	6.3	1.25	0.30	1.25	281	S2P	11,15	NOD62
12C	12.43	51.9	1.30	0.35				19.4G	1.30	0.25*	6.0	1.30	0.35	1.30	344	S2P	11,15	NOD62
12C	12.67	51.5	1.30	0.34				19.2G	1.30	0.25*	6.0	1.30	0.34	1.30	339	S2P	11,15	NOD62
12C	13.06	51.1	1.30	0.42				19.9G	1.30	0.25*	4.0	1.30	0.42	1.30	346	S2P	11,15	NOD62
12C	13.21	50.6	1.30	0.41				27.4G	1.30	0.25*	3.6	1.30	0.41	1.30	381	S2P	11,15	NOD62
12C	13.35	48.6	1.30	0.40				27.1G	1.30	0.25*	5.7	1.30	0.40	1.30	393	S2P	11,15	NOD62
12C	13.48	52.1	1.25	0.42				26.9G	1.25	0.25*	6.6	1.25	0.42	1.25	382	S2P	11,15	NOD62
12C	13.64	56.8	1.20	0.40				23.3G	1.20	0.25*	5.9	1.20	0.40	1.20	336	S1P	11,15	NOD62
12C	13.92	55.4	1.20	0.44				21.7G	1.20	0.25*	5.6	1.20	0.44	1.20	340	S1P	11,15	NOD62
12C	14.0	49.2	1.24*	0.51	8.5	1.24*	0.51							1.24*		S	W65	GLA57
12C	14.0	58.2	1.20	0.40				19.9G	1.20	0.25*	6.0	1.20	0.40	1.20	317	S1P3	15	NOD62
12C	14.1	49.2	1.15*	0.4*				6.5*	1.05*	0.4*	5.5*	1.20*	0.40*	1.25?		P2	18	PEA72
12C	14.36	52.6	1.25	0.46				19.0G	1.25	0.25*	5.7	1.25	0.46	1.25	352	S1P	11,15	NOD62
12C	14.6	49.0	1.15*	0.4*				6.5*	1.05*	0.4*	5.5*	1.20*	0.40*	1.25?		S2	18	PEA72
12C	14.7	53.0	1.25	0.45				21.2G	1.25	0.25*	6.4	1.25	0.45	1.25	374	S1P	11,15	NOD62
12C	14.94	52.9	1.25	0.45				21.1G	1.25	0.25*	6.4	1.25	0.45	1.25	372	S1P	11,15	NOD62
12C	15.11	58.7	1.25	0.40				17.0G	1.25	0.25*	6.1	1.25	0.40	1.20	302	S1P	11,15	NOD62
12C	15.2	53.4	1.20	0.38				17.9G	1.20	0.25*	6.3	1.20	0.38	1.25	332	S2P	11,15	NOD62
12C	15.37	57.6	1.25	0.41				16.8G	1.25	0.25*	5.8	1.25	0.41	1.20	298	S1P	11,15	NOD62
12C	15.50	57.2	1.20	0.42				16.7G	1.20	0.25*	5.5	1.20	0.42	1.20	295	S1P	11,15	NOD62
12C	15.6	56.9	1.20	0.40				17.1G	1.20	0.25*	5.9	1.20	0.40	1.20	301	S2P	11,15	NOD62
12C	15.66	57.1	1.20	0.41				17.1G	1.20	0.25*	5.6	1.20	0.41	1.20	297	S1P	11,15	NOD62
12C	15.79	56.9	1.20	0.42				17.7G	1.20	0.25*	5.4	1.20	0.42	1.20	303	S1P	11,15	NOD62
12C	15.92	56.8	1.20	0.41				16.7G	1.20	0.25*	5.4	1.20	0.41	1.20	292	S1P	11,15	NOD62
12C	16.2	55.1	1.20	0.43				17.5G	1.20	0.25*	5.3	1.20	0.43	1.20	303	S2P3	15	NOD62
12C	16.6	48.3	1.15*	0.4*				6.5*	1.05*	0.4*	5.5*	1.20*	0.40*	1.25?		S2P2	18	PEA72
12C	16.7	56.1	1.20	0.44				19.1G	1.20	0.25*	5.2	1.20	0.44	1.20	317	S1P	11,15	NOD62
12C	17.4	53.1	1.24*	0.46	7.5	1.24*	0.46							1.24*		S	W65	GLA57
12C	17.4	55.9	1.20	0.39				17.7G	1.20	0.25*	5.5	1.20	0.39	1.20	297	S1P	11,15	NOD62
12C	17.8	51.4	1.20	0.50	2.	1.20	0.517	5.6G	1.20	0.75	4.1	1.20	0.50	1.20	387	S1P3	15	NOD62
12C	17.8	42.0	1.25*	0.45*				6.	1.25*	0.45*	3.0	1.25*	0.45*	1.25*	412	S3P3		BAU65
12C	18.4	49.9	1.24*	0.48	7.8	1.24*	0.48							1.24*		S	W65	GLA57
12C	18.4	54.4	1.20	0.51				9.9G	1.20	0.6	2.7	1.20	0.51	1.20	378	S1P	11,15	NOD62
12C	18.9	53.7	1.20	0.54	2.	1.20	0.172	18.3G	1.20	0.25*	2.7	1.20	0.54	1.20	376	S2P	11,15	NOD62
12C	19.3	47.4	1.15*	0.4*				6.5*	1.05*	0.4*	5.5*	1.20*	0.40*	1.25?		S2P3	18	PEA72
12C	19.4	48.9	1.24*	0.54	8.0	1.24*	0.54							1.24*		S	W65	GLA57
12C	19.4	51.0	1.25	0.49				23.2G	1.25	0.25*	4.8	1.25	0.49	1.25	372	S2P	11,15	NOD62
12C	26.2	48.48	1.07	0.634				3.33	1.34	0.682	7.34	1.01	0.485	1.20*		S P		KOL69A
12C	30.	50.4	1.15*	0.63				8.67	1.25*	0.42	8.0	1.04	0.47	1.25*	425	S2P2		FAN67
12C	30.3	36.50	1.25*	0.65*	8.45	1.25*	0.65*				12.*	1.25*	0.65*	1.25*	386	S2		BAR65
12C	30.4	51.35	1.026	0.655				3.86	1.163	0.830	7.82	1.026	0.655	1.1*		S3P3		GRE72
12C	30.4	45.40	1.070	0.662				3.86	1.431	0.628	6.13	0.982	0.489	1.1*		S3P3		GRE72
12C	30.6	50.	1.1	0.60	3.0	1.1	0.45	6.5	1.1	0.45	8.	1.1	0.60	1.1?		S P	W65	CRA63
12C	31.1	54.3	1.1	0.64	4.	1.1	0.69	6.49G	1.1	1.0	3.7	1.1	0.64	1.1		S	W65	DIC63
12C	40.	37.6	1.18*	0.7*	5.2	1.40*	0.7*				7.5*	1.18*	0.7*	1.2*	309	S		FRI65
12C	40.	38.6	1.17	0.646	5.9	1.4*	0.852				7.06	1.17	0.646	1.17	385	S1P3	16	SAW65
12C	40.	55.1	1.0*	0.619				6.95G	1.32	1.1*	8.06	1.0*	0.619	1.0*	386	S2P2	16	SAW65
12C	40.	43.8	1.15*	0.65				7.58	1.25*	0.38	5.83	0.95	0.40	1.25*	324	S P		FAN67
12C	40.	38.6	1.15*	0.73	7.15	1.25*	0.44				3.23	0.75	0.07	1.25*	251	S2P3		FAN67
12C	40.	38.38	1.182	0.624	2.94	1.910	0.016	5.12	1.910	0.016	6.18	1.109	0.517	1.25*	316	S2P3		FRI67
12C	40.	38.29	1.16*	0.75*	8.72	1.37*	0.63	1.18	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	316	S3P3		FRI67
12C	40.0	45.06	1.08	0.689				5.19	1.25	0.533	7.45	1.08	0.485	1.20*		S P		KOL69A
12C	45.5	36.2	1.142	0.680	14.4	0.580	0.928				3.45	0.644	0.238	1.2*	248	S2P3	11,15	SAT67A
12C	45.5	44.2	1.054	0.666	3.5	1.767	0.785				3.60	0.522	0.294	1.2*	350	S2P3	11,12	SAT67A
12C	46.3	35.8	1.185	0.651	6.4	1.205	0.988				6.61	1.185	0.651	1.2*	342	S1		SAT67A
12C	49.5	43.36	1.08	0.712				6.61	1.21	0.527	8.16	1.02	0.531	1.20*		S P		KOL69A
12C	49.5	38.55	1.08	0.712	4.14	1.23	0.722	2.73	1.23	0.722	10.80	1.08	0.63	1.25*	376	S2P3		RUS71
12C	49.5	37.06	1.11	0.704	24.58	0.333	0.171	3.14	1.43	0.539	4.77	0.886	0.418	1.25*	276	S1P2		RUS71
12C	50.	35.7	1.15*	0.67	5.84	1.25*	0.80				4.62	0.62	0.26	1.25*	268	S2P2		FAN67
12C	61.4	20.7	1.44	0.60				3.45	1.03	0.48				1.25*	141	S2		FUL69
12C	61.4	19.2	1.48	0.61	2.78	1.45	0.06							1.25*	111	S1		FUL69
12C	61.4	33.8	1.16*	0.75*	2.95	1.37*	0.63*	1.37	1.37*	0.63*				1.25*	243	S3		FUL69
12C	75.	25.44	1.13	0.49				8.51	1.45	0.45	0.72	1.86	0.40	1.33	376	S1P3	22	ROL66
12C	96.	20.0	1.1*	0.697	6.56	1.4*	0.697				9.32	1.1*	0.697	1.1*	237	S3	7	SAW65
12C	100.	25.6	1.02	0.65*	6.66	1.70	0.216				6.49	1.02	0.65*	1.33*	263	S3	7	HAY69

See page 8 for Explanation of Tables

TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
12C	152.	18.70	1.13	0.72	10.42	1.18	0.85				3.52	0.93	0.50	1.33	229	S2P2	12,31	ROL66
12C	152.	10.76	1.40	0.60	22.07	0.70	0.85	2.38	1.26	0.29	4.63	0.94	0.55	1.25*	235	S2P2	24	CLA72
12C	153.	18.7	1.13	0.72	10.42	1.18	0.85				3.52	0.93	0.50	1.30?	247	S3P3	31	TAT68
12C	156.	12.84	1.40	0.515	25.4	0.805	0.71				1.84	0.915	0.453	1.41	194	S2	12,13	COM74
12C	180.	27.3	0.938	0.571	10.1	1.28	0.715				4.06	0.938	0.571	0.94	214	S2P2	7	SAW65
12C	185.	18.	1.24	0.64	7.9	1.29	0.78				2.22	0.93	0.49	1.33		S P2	14	ING73
12C	1000.	20.	2.29*	0.45*	100.	2.29*	0.45*									S2	25	PAL67
13C	1.37	35.32	1.65	0.94				5.57	1.30	0.46	3.54	1.65	0.94	1.25*		S1		GER66
13C	1.55	50.49	1.16	1.13				7.41	1.09	0.57	12.1	1.16	1.13	1.25*		S1		GER66
13C	1.92	43.32	1.56	0.29							8.02	1.56	0.29	1.25*		S2		GER66
13C	2.20	66.51	1.13	0.64							1.99	1.13	0.64	1.25*		S1		GER66
13C	2.38	92.05	0.91	0.58				0.90	3.42	0.83	8.00	0.91	0.58	1.25*		S2		GER66
13C	6.9	62.8	1.25*	0.40				18.1	1.25*	0.067	10.4	1.25*	0.40	1.25*	424	P2		GUR69
13C	7.0	42.6	1.25*	0.57				11.6	1.25*	0.081	3.1	1.25*	0.57	1.25*	509	S2		GUR69
13C	12.2	48.0	1.27*	0.62				8.5	1.27*	0.48	5.5*	1.27*	0.62	1.27*		S	26	RIC68
13C	30.4	46.44	1.063	0.616				5.65	0.743	1.085	6.63	1.063	0.616	1.1*		S2P2		GRE72
13C	30.4	42.51	1.097	0.613				3.52	1.266	1.096	7.07	0.956	0.616	1.1*		S2P2		GRE72
14C	14.5	63.0	1.13*	0.65*				9.7	1.13*	0.51*	7.5*	1.13*	0.65*	1.25*		S2		CUR71
N	31.	45.66	1.23	0.619	2.16	1.17	0.459	11.29G	1.17	0.665	3.16	1.53	0.490	1.20*		S2		SAN70
N	31.	43.71	1.20*	0.70*	6.29	1.20*	0.48*	5.56G	1.20*	0.70*	6.22	1.20*	0.70*	1.20*	428	S2		SAN70
N	49.4	52.67	1.023	0.733	2.38	1.010	0.795	7.07	1.221	0.500	6.89	1.020	0.470	1.2*	420	S P		CLA70C
N	49.4	40.16	1.103	0.727	32.07	0.251	0.169	3.23	1.461	0.565	3.83	0.889	0.381	1.2*	327	S P		CLA70C
14N	8.6	46.66	1.25*	0.65*				1.74	1.25*	0.65*	6.19	1.25*	0.65*	1.25*	321	S	26	HAN73
14N	8.6	48.95	1.17*	0.75*				1.90	1.32*	0.51*	6.70	1.17*	0.75*	1.25*	386	S	26	HAN73
14N	8.6	49.84	1.205	0.605				1.61	1.03	0.53	5.32	1.205	0.605	1.25*	296	S1	26	HAN73
14N	10.6	48.26	1.25*	0.65*				2.73	1.25*	0.65*	6.42	1.25*	0.65*	1.25*	395	S	26	HAN73
14N	10.6	51.46	1.17*	0.75*				2.76	1.32*	0.51*	6.54	1.17*	0.75*	1.25*	451	S	26	HAN73
14N	10.6	51.71	1.205	0.605				2.44	1.03	0.53	6.48	1.205	0.605	1.25*	327	S2	26	HAN73
14N	12.2	49.0	1.27*	0.58				4.0	1.27*	0.49	5.5*	1.27*	0.58	1.27*		S2	26	RIC68
14N	12.6	48.99	1.25*	0.65*				3.75	1.25*	0.65*	4.67	1.25*	0.65*	1.25*	465	S	26	HAN73
14N	12.6	52.65	1.17*	0.75*				3.67	1.32*	0.51*	4.03	1.17*	0.75*	1.25*	515	S	26	HAN73
14N	12.6	51.61	1.205	0.605				3.59	1.03	0.53	5.83	1.205	0.605	1.25*	400	S2	26	HAN73
14N	14.5	60.4	1.13*	0.65*				5.5	1.13*	0.51*	7.5*	1.13*	0.65*	1.25*		S1		CUR71
14N	14.6	49.41	1.25*	0.65*				6.28	1.25*	0.65*	2.84	1.25*	0.65*	1.25*	595	S	26	HAN73
14N	14.6	56.93	1.17*	0.75*				5.63	1.32*	0.51*	2.31	1.17*	0.75*	1.25*	612	S	26	HAN73
14N	14.6	53.05	1.205	0.605				6.38	1.03	0.53	3.21	1.205	0.605	1.25*	535	S2	26	HAN73
14N	18.	56.21	1.10*	0.712				3.97	1.36*	0.50*	6.0*	1.10*	0.712	1.20?		S1		LUT72
14N	21.	53.3	1.11	0.64				7.14	1.40	0.36	5.68	0.983	0.34	1.25*	480	S2P1		BAR69
14N	21.	48.0	1.19*	0.70*				4.37	1.25*	0.64*	6.02	1.05*	0.55*	1.25*	528	S2P3		BAR69
14N	21.	45.6	1.25*	0.65*				6.09	1.25*	0.47*	7.02	1.25*	0.65*	1.25*	495	S2P3		BAR69
14N	21.	47.27	1.20*	0.688				4.32	1.36*	0.50*	6.0*	1.20*	0.688	1.20?		S2		LUT72
14N	23.	45.91	1.20*	0.660				3.96	1.36*	0.50*	6.0*	1.20*	0.660	1.20?		S2		LUT72
14N	26.	44.96	1.20*	0.610				4.31	1.36*	0.50*	65.0*	1.20*	0.610	1.20?		S2		LUT72
14N	31.0	46.7	1.20*	0.63	4.0	1.20*	0.345	12.4G	1.20*	0.5*	6.7	1.20*	0.63	1.2?	421	S2		KIM64
14N	49.4	38.52	1.13	0.766	6.95	1.33	0.433	1.75	1.33	0.433	8.77	1.07	0.632	1.25*	347	S2		RUS71
14N	49.4	33.91	1.17	0.706	12.85	0.778	0.065	3.37	1.33	0.488	5.97	1.03	0.59	1.25*	305	S1		RUS71
14N	155.	21.54	1.22	0.57	10.17	1.30	0.52				3.28	0.93	0.47	1.30*		S2P2	31	GEO68
15N	39.84	43.9	1.13	0.66	4.54	1.42	0.48	2.93	1.42	0.48	8.0*	1.13	0.66	1.15*		S2		SNE69A
O	31.	48.09	1.20*	0.70*				14.01G	1.20*	0.70*	5.47	1.20*	0.70*	1.20*	487	S3		SAN70
O	31.	43.24	1.17*	0.75*	4.12*	1.32*	0.486	4.33G	1.32*	0.705	6.2*	1.01*	0.75*	1.20*		S		SAN70
O	49.4	41.2	1.142	0.727	3.45	1.145	1.17	4.89	1.272	0.371	5.05	0.994	0.497	1.2*	441	S P		CLA70C
O	49.4	40.28	1.130	0.704	45.58	0.196	0.173	3.40	1.422	0.699	3.29	0.806	0.498	1.2*	431	S P		CLA70C
16O	8.49	50.7	1.175*	0.61*				1.0G	1.175*	1.225*	4.8*	1.175*	0.61*	1.17*	223	S1	34	HAR63
16O	8.66	52.6	1.25*	0.38				1.8G	1.25*	0.6	7.7	1.25*	0.38	1.25*	174	S1		DUK63
16O	8.99	53.0	1.175*	0.61*				1.3G	1.175*	1.225*	4.8*	1.175*	0.61*	1.17*	226	S3	34	HAR63
16O	9.42	52.3	1.25*	0.32				1.1G	1.25*	0.6	7.7	1.25*	0.32	1.25*	119	S1		DUK63
16O	9.49	50.5	1.175*	0.61*				2.0G	1.175*	1.225*	4.8*	1.175*	0.61*	1.17*	324	S2	34	HAR63
16O	10.2	51.6	1.25*	0.38				3.0G	1.25*	0.6	6.9	1.25*	0.38	1.25*	253	S1		DUK63
16O	10.2	51.0	1.25*	0.40				3.6G	1.25*	0.6	6.7	1.25*	0.40	1.25*		S2P3	12	DUK63
16O	10.20	52.1	1.175*	0.61*				2.3G	1.175*	1.225*	4.8*	1.175*	0.61*	1.17*	334	S2	32,34	HAR63
16O	10.5	52.4	1.25*	0.38				1.9G	1.25*	0.6	8.0	1.25*	0.38	1.25*	276	S1		DUK63
16O	10.74	53.5	1.175*	0.61*				2.0G	1.175*	1.225*	4.8*	1.175*	0.61*	1.17*	300	S1	34	HAR63
16O	10.8	49.4	1.25*	0.58				4.7G	1.25*	0.6	4.5	1.25*	0.58	1.25*	349	S2		DUK63
16O	11.1	46.6	1.25*	0.68				9.6G	1.25*	0.4	1.8	1.25*	0.68	1.25*	427	S2		DUK63
16O	11.30	51.6	1.175*	0.61*				1.4G	1.175*	1.225*	4.8*	1.175*	0.61*	1.17*	227	S2	34	HAR63
16O	11.4	47.5	1.25*	0.59				8.9G	1.25*	0.3	4.8	1.25*	0.59	1.25*	338	S2		DUK63
16O	11.9	49.4	1.25*	0.59				10.7G	1.25*	0.3	5.5	1.25*	0.59	1.25*	411	S2		DUK63
16O	11.90	53.6	1.175*	0.61*				2.15G	1.175*	1.225*	4.8*	1.175*	0.61*	1.17*	332	S2	34	HAR63
16O	12.60	51.3	1.175*	0.61*				2.9G	1.175*	1.225*	4.8*	1.175*	0.61*	1.17*	402	S2	34	HAR63
16O	12.9	49.0	1.25*	0.57				11.9G	1.25*	0.3	4.7	1.25*	0.57	1.25*	416	S1		DUK63
16O	13.05	52.3	1.175*	0.61*				2.95G	1.175*	1.225*	4.8*	1.175*	0.61*	1.17*	417	S1	34	HAR63
16O	13.9	49.8	1.25*	0.55				11.2G	1.25*	0.3	4.9	1.25*	0.55	1.25*	402	S1		DUK63
16O	14.1	50.0	1.25*	0.52				11.4G	1.25*	0.3	5.2	1.25*	0.52	1.25*	397	S1		DUK63
16O	14.3	49.7	1.25*	0.51				5.8G	1.25*	0.6	4.6	1.25*	0.51	1.25*	403	S1		DUK63
16O	14.5	49.4	1.25*	0.50	2.	1.25*	0.414	2.6G	1.25*	0.6	3.8	1.25*	0.50	1.25*	400	S1		DUK63
16O	14.7	50.4	1.25*	0.53	4.	1.25*	0.138	0.5G	1.25*	0.2	3.7	1.25*	0.53	1.25*	414	S1		DUK63
16O	15.2	47.7	1.25*	0.62	4.	1.25*	0.966	0.4G	1.25*	1.4	4.8	1.25*	0.62	1.25*	554	S1		DUK63
16O	15.6	49.0	1.25*	0.64	2.	1.25*	0.966	2.0G	1.25*	1.4	7.0	1.25*	0.64	1.25*	538	S1		DUK63

See page 8 for Explanation of Tables

TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
16O	16.0	49.0	1.25*	0.61				4.5G	1.25*	1.2	6.8	1.25*	0.61	1.25*	519	S2		DUK63
16O	16.4	45.7	1.25*	0.61				22.5G	1.25*	0.2	11.7	1.25*	0.61	1.25*	406	S2		DUK63
16O	17.0	47.5	1.25*	0.60				28.0G	1.25*	0.2	12.3	1.25*	0.60	1.25*	435	S2		DUK63
16O	17.4	47.6	1.25*	0.52				5.7G	1.25*	0.8	4.0	1.25*	0.52	1.25*	434	S2		DUK63
16O	17.5	47.3	1.25	0.64				5.3	1.24	0.45	11.7	1.25	0.64	1.25?		S2		REI69
16O	18.0	45.2	1.25*	0.54				4.1G	1.25*	1.2	2.4	1.25*	0.54	1.25*	475	S2		DUK63
16O	18.4	46.4	1.25*	0.57				4.8G	1.25*	1.2	2.3	1.25*	0.57	1.25*	516	S2		DUK63
16O	19.2	48.2	1.25*	0.62				9.1G	1.25*	0.8	3.9	1.25*	0.62	1.25*	537	S2		DUK63
16O	19.8	55.71	1.1*	0.645*				7.74	1.265*	0.544	1.45	1.065	0.126	1.1*		S P	9	KAR69
16O	20.4	56.16	1.1*	0.645*				6.81	1.265*	0.514	3.36	1.147	0.171	1.1*		S2P3	9	KAR69
16O	20.8	52.76	1.1*	0.645*				6.22	1.265*	0.553	4.49	1.109	0.666	1.1*		S P	9	KAR69
16O	20.8	46.9	1.23	0.56				11.0	1.28	0.26	2.1	1.07	0.10	1.38*		S P		BOY72
16O	21.	50.5	1.19	0.54				9.14	1.20	0.36	2.75	0.993	0.010	1.25*	490	S2P2		BAR69
16O	21.	47.2	1.19*	0.70*				4.94	1.25*	0.64*	1.10	1.05*	0.55*	1.25*	597	S2P3		BAR69
16O	21.	44.5	1.25*	0.65*				6.66	1.25*	0.47*	0.99	1.25*	0.65*	1.25*	551	S2P3		BAR69
16O	21.4	54.47	1.1*	0.645*				7.93	1.265*	0.545	1.81	1.055	0.118	1.1*		S P	9	KAR69
16O	22.1	53.08	1.1*	0.645*				5.88	1.265*	0.543	5.67	1.207	1.031	1.1*		S P	9	KAR69
16O	23.4	47.25	1.142*	0.726*				7.06G	1.268*	0.676*	4.09	1.114*	0.585*	1.25*	499	S3P		VOE69
16O	24.5	44.51	1.142*	0.726*				6.83G	1.268*	0.676*	5.41	1.114*	0.585*	1.25*	478	S3P		VOE69
16O	25.46	48.4	1.12*	0.69*				6.80	1.19	0.550	7.0*	1.12*	0.69*	1.15*	535	S3		SNE69
16O	27.3	48.43	1.142*	0.726*				7.28G	1.268*	0.676*	5.63	1.114*	0.585*	1.25*	482	S3P		VOE69
16O	30.1	47.50	1.142*	0.726*				8.35G	1.268*	0.676*	6.82	1.114*	0.585*	1.25*	496	S3P		VOE69
16O	30.3	36.31	1.25*	0.65*				4.11	1.25*	0.47*	12.*	1.25*	0.65*	1.25*	344	S2		BAR65
16O	30.4	44.22	1.142*	0.726*				3.97	1.268*	0.676*	5.73	1.114*	0.585*	1.25*		S3P3		GRE72
16O	31.0	53.7	1.10*	0.64				21.4G	1.10*	0.5*	6.8	1.10*	0.64	1.2?	420	S3		KIM64
16O	31.0	47.9	1.20*	0.62	2.0	1.20*	0.345	15.5G	1.20*	0.5*	6.1	1.20*	0.62	1.2?	452	S2	34	KIM64
16O	32.07	45.5	1.12*	0.69*				5.31	1.44	0.490	7.0*	1.12*	0.69*	1.15*	487	S3		SNE69
16O	34.1	47.02	1.142*	0.726*	2.31	1.268*	0.676*	6.52G	1.268*	0.676*	6.44	1.114*	0.585*	1.25*	489	S3P		VOE69
16O	35.20	45.0	1.12*	0.69*	0.91	1.45	0.450	5.70	1.45	0.450	7.0*	1.12*	0.69*	1.15*	498	S3		SNE69
16O	36.8	46.37	1.142*	0.726*	0.28	1.268*	0.676*	8.55G	1.268*	0.676*	7.98	1.114*	0.585*	1.25*	474	S2P		VOE69
16O	38.43	44.4	1.12*	0.69*	2.00	1.40	0.430	4.89	1.40	0.430	7.0*	1.12*	0.69*	1.15*	446	S3		SNE69
16O	39.7	46.58	1.142*	0.726*	2.25	1.268*	0.676*	7.65G	1.268*	0.676*	7.32	1.114*	0.585*	1.25*	490	S1P		VOE69
16O	39.7	48.8	1.09	0.74				8.5	1.32	0.45	8.5	1.05	0.60	1.38*		S P		BOY72
16O	42.1	43.10	1.142*	0.726*	2.83	1.268*	0.676*	6.25G	1.268*	0.676*	5.58	1.114*	0.585*	1.25*	453	S2P		VOE69
16O	43.1	44.67	1.142*	0.726*	3.15	1.268*	0.676*	6.32G	1.268*	0.676*	6.20*	1.114*	0.585*	1.25*	462	S2		VOE69
16O	45.13	42.7	1.12*	0.69*	3.11	1.28	0.415	5.65	1.28	0.415	7.0*	1.12*	0.69*	1.15*	407	S2		SNE69
16O	46.1	42.13	1.142*	0.726*	4.44	1.268*	0.676*	4.64G	1.268*	0.676*	6.20*	1.114*	0.585*	1.25*	434	S2		VOE69
16O	49.5	38.90	1.142*	0.726*	4.14	1.268*	0.676*	3.94G	1.268*	0.676*	6.20*	1.114*	0.585*	1.25*	390	S2		VOE69
16O	49.5	41.8	1.15*	0.7*	8.8	1.41	0.7*				5.3	1.18	0.7*	1.25*		S		NEL70
16O	50.	35.4	1.25*	0.65*	3.31	1.25*	0.65*	3.70	1.25*	0.47*	5.48	0.96	0.65*	1.25*	365	S2		FAN67
16O	52.5	36.85	1.142*	0.726*	5.49	1.268*	0.676*	3.63G	1.268*	0.676*	4.93	1.114*	0.585*	1.25*	405	S2P		VOE69
16O	65.8	41.3	1.078	0.687	8.30	1.575	0.457				7.96	0.918	0.580	1.25*		S2		LER72
16O	1000.	21.	2.60*	0.45*	120.	2.60*	0.45*									S2	25	PAL67
17O	9.56	46.5	1.25*	0.66				5.80	1.25*	0.34	5.1	1.25*	0.66	1.25*		S2		CRI75
17O	10.5	50.3	1.20*	0.69				5.77	1.20*	0.37	5.81	1.20*	0.69	1.20*		S1		CRI75
17O	11.	57.32	1.25*	0.425	7.69	1.207	0.254				10.5	1.25*	0.425	1.3*		S2		ALT67
17O	11.	44.7	1.25*	0.65*				3.42	1.25*	0.47*	12.3	1.25*	0.65*	1.25*		S	8	NAQ68
17O	65.8	37.9	1.142*	0.661	8.22	1.560	0.506				7.65	0.956*	0.590*	1.25*		S1	1	LER72
18O	66.5	37.8	1.142*	0.706	8.96	1.497	0.486				5.52	0.956*	0.590*	1.25*		S1	1	LER72
19F	30.	50.6	1.07	0.74				7.10	1.28	0.70	8.0	1.09	0.74	1.2?		S2	23	DSW73
20NE	18.2	47.45	1.185	0.721				7.5	0.942	0.568	5.1	1.042	0.488	1.18?		S2		BRA69
20NE	30.	44.3	1.10	0.73				7.00	1.38	0.60	7.8	1.09	0.74	1.2?		S2	23	DSW73
20NE	41.8	36.33	1.197	0.746	11.31	1.196	0.786	0.18	1.196	0.786				1.25*		S2		PAL70
21NE	30.	49.1	1.10	0.63				6.60	1.34	0.60	8.1	0.98	0.85	1.2?		S2	23	DSW73
22NE	14.0	41.7	1.25*	0.67				12.2	1.11	0.39	12.6	1.25*	0.65*	1.25*		S2		HUL69
23NA	8.0	46.8	1.25*	0.65*				10.0	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*		S1	5	HEL69
23NA	8.5	47.0	1.25*	0.65*				10.5	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*		S1	5	HEL69
23NA	9.0	47.3	1.25*	0.65*				11.0	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*		S1	5	HEL69
23NA	9.5	47.3	1.25*	0.65*				11.3	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*		S1	5	HEL69
23NA	10.0	47.5	1.25*	0.65*				11.5	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*		S1	5	HEL69
23NA	10.5	47.5	1.25*	0.65*				11.5	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*		S1	5	HEL69
23NA	11.0	47.5	1.25*	0.65*				11.3	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*		S1	5	HEL69
23NA	11.5	47.3	1.25*	0.65*				10.8	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*		S1	5	HEL69
23NA	12.0	46.8	1.25*	0.65*				10.0	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*		S1	5	HEL69
MG	49.5	42.	1.05*	0.81	9.7	1.48	0.52							1.2?		S		KOS69
MG	49.5	49.	1.15*	0.67				6.5	1.19	0.76				1.2?		S		KOS69
24MG	17.5	49.14	1.174	0.736				8.06	1.19	0.562	5.29	1.06	0.546	1.17?		S2		BRA69
24MG	20.3	47.8	1.21	0.61				8.46	1.14	0.54	5.15	0.97	0.32	1.20?	711	S1P3		BLA70
24MG	27.3	43.53	1.16	0.75				3.70	1.370	0.48				1.25*		S2	7	KUN69
24MG	30.5	41.5	1.19	0.70	4.60	1.72	0.52				6.6	1.19	0.70	1.3*		S		DUH68
24MG	30.5	41.6	1.2*	0.65	4.23	1.7*	0.59							1.3*		S1		DUH68
24MG	30.5	42.4	1.19	0.67	2.6	1.38	0.81	3.7G	1.38	1.17	6.7	1.19	0.67	1.25*	650	S1		EEN74
24MG	30.5	44.6	1.17	0.66				5.4G	1.30	1.42	7.0	1.17	0.66	1.25*	642	S1		EEN74
24MG	31.	41.00	1.23	0.647	3.04	1.29	0.766	4.07G	1.29	1.11	6.19	1.18	0.670	1.20*		S2		SAN70
24MG	31.	41.53	1.20*	0.70*	6.41	1.20*	0.48*	6.51G	1.20*	0.70*	6.70	1.20*	0.70*	1.20*	598	S3		SAN70
24MG	31.	41.92	1.17*	0.75*	4.12*	1.32*	1.04	1.56G	1.32*	1.51	6.2*	1.01*	0.75*	1.20*		S		SAN70

See page 8 for Explanation of Tables

TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
24MG	49.5	43.26	1.10*	0.731	6.13	1.292*	0.602	3.16	1.292*	0.602	6.24	1.003*	0.583	1.2?	601	S P2		LEW67
24MG	49.5	39.98	1.14	0.724	6.80	0.76	0.274	5.94	1.21	0.639	6.03	1.03	0.588	1.25*	593	S1P1		RUS67
24MG	49.5	44.73	1.10	0.725	5.64	1.285	0.608	3.635	1.285	0.608	6.41	1.00	0.60	1.25*	612	S2P2		RUS67
24MG	50.0	43.6	1.09	0.74	7.39	1.53	0.533				5.34	0.98	0.55	1.3*		S		DUH68
24MG	100.	22.1	1.27	0.68	7.23	1.50*	0.53*				9.89	1.00*	0.60*	1.25*		S1		HOR72
24MG	100.	27.0	1.21	0.44				12.1	1.25	0.56	6.04	0.79	0.66	1.25*		S1		HOR72
24MG	155.	18.3	1.27	0.74	10.29	1.20	0.86				2.44	0.97	0.62	1.33*	348	S2P1	31	WIL68
25MG	5.	57.2	1.25*	0.65*				15.4	1.25*	0.47*				1.25*		S2	26	GAL66
25MG	6.	49.6	1.25*	0.65*				20.*	1.25*	0.47*				1.25*		S2	26	GAL66
25MG	6.	37.0	1.25*	0.65*				33.8	1.25*	0.47*				1.25*		S2	26	GAL66
25MG	20.3	42.82	1.26	0.67				6.88	1.42	0.37	4.18	1.04	0.34	1.20?	665	S1P2		BLA70
26MG	13.9	52.6	1.27	0.66				6.6	1.20	0.66	6.1	1.27	0.66	1.25?		S	W65	WEI64
26MG	20.3	55.43	1.15	0.67				9.68	1.31	0.42	9.00	0.80	0.97	1.20?	744	S1P2		BLA70
26MG	31.	38.05	1.32	0.561	3.71	1.31	0.554	5.31G	1.31	0.803	1.84	1.96	0.393	1.20*		S1		SAN70
26MG	31.	46.13	1.20*	0.70*	4.75	1.20*	0.48*	9.55G	1.20*	0.70*	6.43	1.20*	0.70*	1.20*	659	S2		SAN70
26MG	31.	49.48	1.17*	0.75*	4.12*	1.32*	0.526	6.14G	1.32*	0.763	6.2*	1.01*	0.75*	1.20*		S		SAN70
26MG	33.6	49.8	1.16	0.64				6.50	1.16	0.64				1.16		S2		KOZ68
AL	9.4	50.9	1.25*	0.65*				6.35	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	679	S3	35	PER63
AL	17.0	48.02	1.17*	0.75*	1.04	1.32*	0.99	4.43G	1.32*	1.44	6.2*	1.01*	0.75*	1.20*	834	S2		SAN71
AL	22.2	43.5	1.25*	0.65*				9.02	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	758	S3	35	PER63
AL	22.2	43.83	1.20	0.70	7.93	1.20	0.48	6.37G	1.20	0.70	15.8	1.20	0.70	1.20*		S2		SAN71
AL	22.2	49.33	1.17*	0.75*	2.18	1.32*	0.59	9.23G	1.32*	0.86	6.2*	1.01*	0.75*	1.20*	785	S		SAN71
AL	24.5	43.51	1.21	0.71	3.80	1.81	0.41				7.67	1.15	0.58	1.20*		S1		SAN71
AL	24.5	47.9	1.17*	0.75*	2.69	1.32*	0.55	7.58G	1.32*	0.80	6.2*	1.01*	0.75*	1.20*	724	S		SAN71
AL	28.	47.1	1.207	0.71	5.8	1.27	0.287	15.2G	1.27	0.416	8.5	1.207	0.71	1.25?	708	S1		DIT69
AL	28.	53.1	1.10	0.70	4.3	0.913	1.29	4.83G	0.913	1.87	5.84	1.10	0.70	1.25?	764	S		DIT69
AL	28.	45.2	1.25	0.653	4.58	1.27	0.335	13.8G	1.27	0.485	9.25	1.12	0.635	1.20*		S1		SAN70
AL	28.	46.7	1.20*	0.70*	6.38	1.20*	0.48*	8.66G	1.20*	0.70*	8.27	1.20*	0.70*	1.20*		S1		SAN70
AL	28.0	45.2	1.15	1.12	4.58	1.27	0.45	13.8G	1.27	0.65	9.25	0.49	0.64	1.20*		S1		SAN71
AL	28.0	50.5	1.17*	0.75*	3.46	1.32*	0.35	15.1G	1.32*	0.512	6.2*	1.01*	0.75*	1.20*	719	S		SAN71
AL	30.0	63.15	0.89	0.95	15.7	1.20	0.35				10.0	1.32	0.84	1.20*		S1		SAN71
AL	30.0	50.2	1.17*	0.75*	3.90	1.32*	0.47	9.59G	1.32*	0.68	6.2*	1.01*	0.75*	1.20*	721	S		SAN71
AL	34.1	39.60	1.15	0.78	19.2	0.765	0.96				5.91	1.40	0.69	1.20*		S1		SAN71
AL	34.1	42.4	1.17*	0.75*	4.8	1.32*	1.10	1.30G	1.32*	1.60	6.2*	1.01*	0.75*	1.20*	766	S		SAN71
AL	39.8	40.9	1.15*	0.74	9.8	1.49	0.51							1.27		S		KOS69
AL	39.8	48.0	1.20*	0.64				7.1	1.02	0.70				1.27		S		KOS69
AL	40.0	40.0	1.16	0.69	7.1	1.40	0.74				9.37	1.19	0.75	1.20*		S1		SAN71
AL	40.0	40.4	1.17*	0.75*	6.1	1.32*	1.07	0.24G	1.32*	1.55	6.2*	1.01*	0.75*	1.20*	707	S		SAN71
AL	46.0	40.76	1.11	0.69				6.1G	0.876	2.3	10.8	1.12	0.76	1.20*		S1		SAN71
AL	46.0	38.9	1.17*	0.75*	7.4	1.32*	0.61				6.2*	1.01*	0.75*	1.20*	584	S		SAN71
AL	61.2	51.05	0.99	0.68				8.3G	1.13	1.64	11.86	0.94	0.73	1.20*		S1		SAN71
AL	61.2	36.5	1.17*	0.75*	10.7	1.32*	0.58				6.2*	1.01*	0.75*	1.20*	565	S		SAN71
27AL	9.1	47.	1.26	0.6	3.0	1.26	0.6	4.5	1.26	0.6	5.	1.26	0.6	1.25?		S P	W65	HOA61
27AL	9.8	40.4	1.45	0.19	9.2	1.45	0.19							1.45		S	W65	GLA57A
27AL	17.6	51.8	1.29*	0.48	8.6	1.29*	0.48							1.29		S	W65	GLA57A
27AL	20.3	51.34	1.17	0.67				10.08	1.37	0.34	7.14	0.90	0.80	1.20?	712	S2P2		BLA70
27AL	22.2	42.1	1.25*	0.65*	5.1	1.25*	0.65*	4.6G	1.25*	1.00*	11.3	1.25*	0.65*	1.25*	761	S1		PIC65
27AL	40.	39.7	1.18*	0.7*	7.04	1.40*	0.7*				7.5*	1.18*	0.7*	1.2*	638	S		FRI65
27AL	40.	35.6	1.23	0.665	6.19	1.4*	0.630				5.31	1.23	0.665	1.23	567	S1P2	16	SAW65
27AL	61.4	36.78	1.174	0.660	6.36	1.45	0.629	0.33	1.45	0.629	6.47*	1.089*	0.741*	1.25*	545	S2		PUL69
27AL	61.4	37.96	1.16*	0.75*	4.81	1.37*	0.63*	1.63	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	533	S3		PUL69
27AL	96.	28.0	1.06	0.687	5.26	1.61	0.334				8.57	1.06	0.687	1.06	410	S1	31	SAW65
27AL	156.	12.40	1.39	0.55	16.4	1.05	0.75				3.01	1.01	0.574	1.34	365	S1	12,22	COH74
27AL	287.	10.15	1.616	0.659	6.59	1.016	0.795				2.82	1.185	0.626	1.25*	146	S2P2	25	CLA72
SI	10.61	54.	1.21	0.40	4.5	1.21	0.40							1.3*		S	W65	COH61
SI	11.98	57.	1.11	0.62	8.5	1.11	0.62							1.3*		S	W65	COH61
SI	17.8	47.8	1.25*	0.65*				10.46	1.25*	0.47*	5.57	1.25*	0.65*	1.25*	837	S2P3		BAU66
SI	17.8	47.4	1.25*	0.65*				10.46	1.25*	0.47*	6.17	1.00	0.65*	1.25*	837	S2P2		BAU66
SI	24.5	48.5	1.17*	0.75*	2.69	1.32*	0.70	5.47G	1.32*	1.02	6.2*	1.01*	0.75*	1.20*	757	S2		SAN71
SI	28.	59.6	1.06	0.78	0.68	0.91	1.01	15.1G	0.91	1.47	2.8	1.06	0.78	1.25?	757	S1		DIT69
SI	28.	60.8	0.92	0.88	10.3	1.5	0.33	0.02G	1.5	0.48	12.5	0.92	0.88	1.25?	754	S		DIT69
SI	28.	50.0	1.20	0.700	2.72	1.20	0.483	18.7G	1.20	0.700	6.79	1.20	0.700	1.20*		S2		SAN70
SI	28.0	50.0	1.20	0.70	2.72	1.20	0.48	18.7G	1.20	0.70	6.8	0.70	0.70	1.20*		S2		SAN71
SI	28.0	49.1	1.17*	0.75*	3.46	1.32*	0.48	13.9G	1.32*	0.69	6.2*	1.01*	0.75*	1.20*	783	S		SAN71
SI	29.	44.6	1.20*	0.645*	3.3	1.20*	0.645*	4.1	1.25*	0.645*	6.0*	1.20*	0.645*	1.25?		S1P1		CRA66
SI	29.	43.9	1.20*	0.645*	1.9	1.20*	0.645*	4.1	1.25*	0.645*	6.0*	1.20*	0.645*	1.25?		S1P2	23	CRA66
SI	30.0	49.2	1.17*	0.75*	4.12	1.32*	0.45	12.0G	1.32*	0.654	6.2*	1.01*	0.75*	1.20*	710	S		SAN71
SI	30.3	48.3	1.15*	0.71	8.0	1.35	0.50	1.8G	1.35	0.72	5.1	1.15*	0.71	1.20*	700	S1		COL66
SI	30.5	45.19	1.19	0.68	9.02	1.29	0.53	2.06G	1.29	0.77	9.4	0.70	1.04	1.20*		S1		SAN71
SI	31.	45.19	1.19	0.684	9.02	1.29	0.532	2.06G	1.29	0.771	9.39	0.696	1.04	1.20*		S1		SAN70
SI	31.	46.90	1.20*	0.70*	6.38	1.20*	0.48*	9.06G	1.20*	0.70*	6.08	1.20*	0.70*	1.20*	704	S2		SAN70
SI	31.	49.23	1.17*	0.75*	4.12*	1.32*	0.377	12.03G	1.32*	0.546	6.2*	1.01*	0.75*	1.20*		S		SAN70
SI	34.1	49.0	1.12	0.69	2.58	1.06	1.10	5.50G	1.06	1.59	4.24	0.92	0.114	1.20*		S1		SAN71
SI	34.1	45.6	1.17*	0.75*	4.80	1.32*	0.57	5.35G	1.32*	0.820	6.2*	1.01*	0.75*	1.20*	686	S		SAN71
SI	40.0	43.3	1.17*	0.75*	6.1	1.32*	0.89	1.0G	1.32*	1.29	6.2*	1.01*	0.75*	1.20*	687	S2		SAN71
SI	46.0	43.5	1.17*	0.75*	7.42	1.32*	0.61	1.73G	1.32*	0.889	6.2*	1.01*	0.75*	1.20*	618	S2		SAN71
SI	49.	36.4	1.18	0.70*	6.8	1.18	0.70*	1.4	1.47*	0.61	5.4	1.18	0.70*	1.25?		S2P3	23	CRA66

See page 8 for Explanation of Tables

TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
28SI	17.13	51.52	1.17*	0.65*	3.75	1.33*	0.6*	2.92	1.33*	0.6*	6.51	0.94*	0.6*	1.2?		S1P1	19,27	LAM73
28SI	17.5	55.54	1.10	0.633				6.53	1.37	0.600	7.13	1.10	0.585	1.10?		S2		BRA69
28SI	17.5	48.2	1.25	0.59				11.7	1.10	0.47	4.9	1.25	0.59	1.25?		S2		REI69
28SI	19.04	51.58	1.17*	0.65*	5.16	1.33*	0.6*	2.3	1.33*	0.6*	8.26	0.94*	0.6*	1.2?		S1P1	19	LAM73
28SI	20.3	45.57	1.20	0.65				7.91	1.44	0.41	4.08	0.97	0.35	1.20?	760	S2P2		BLA70
28SI	20.84	49.96	1.17*	0.65*	4.48	1.33*	0.6*	2.59	1.33*	0.6*	8.46	0.94*	0.6*	1.2?		S2P1	19	LAM73
28SI	21.2	41.42	1.24*	0.673	9.8	1.28	0.703							1.25*		S2	15	BAR68
28SI	21.2	46.07	1.20*	0.688				14.9	0.86	0.614				1.25*		S2	15	BAR68
28SI	22.99	48.83	1.17*	0.65*	3.06	1.33*	0.6*	3.76	1.33*	0.6*	7.42	0.94*	0.6*	1.2?		S1P1	19	LAM73
28SI	24.93	47.77	1.17*	0.65*	1.36	1.33*	0.6*	5.26	1.33*	0.6*	6.58	0.94*	0.6*	1.2?		S2P1	19,27	LAM73
28SI	27.14	46.64	1.17*	0.65*	0.14	1.33*	0.6*	6.76	1.33*	0.6*	5.29	0.94*	0.6*	1.2?		S2P1	19	LAM73
28SI	27.6	41.69	1.23	0.71	8.53	1.43	0.37							1.30*	722	S1	15	JON68
28SI	27.6	44.77	1.20*	0.65				7.17	1.04	0.71				1.30*	736	S	15	JON68
28SI	28.98	46.01	1.17*	0.65*				6.74	1.33*	0.6*	4.62	0.94*	0.6*	1.2?		S2P2	19,27	LAM73
28SI	30.	44.30	1.16*	0.75*	0.96	1.37*	0.63*	3.97	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	717	S2P2	11	FRI67
28SI	30.3	50.9	1.106	0.687	3.92	1.339	0.543	3.63	1.339	0.543	6.01	0.930	0.546	1.2*	716	S P	11	SAT67
28SI	30.3	50.74	1.111	0.746	6.88	1.540	0.349	0.10	1.540	0.349	5.10*	1.15*	0.71*	1.20*		S1		PUT71
28SI	40.	41.11	1.178	0.709	3.19	1.560	0.486	1.98	1.560	0.486	6.47	1.089	0.741	1.25*	638	S2P2		FRI67
28SI	40.	42.38	1.16*	0.75*	4.00	1.37*	0.63*	1.96	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	630	S2P2		FRI67
28SI	40.	44.61	1.134	0.733	1.39	1.409	0.537	4.41	1.409	0.537	5.84	1.012	0.632	1.2*	645	S2P2	12	FRI67A
28SI	100.	21.7	1.27*	0.68*	6.18	1.55	0.42				9.54	1.08	0.61	1.25*		S1		HOR72
28SI	100.	27.3	1.21*	0.44*				12.6	1.25*	0.56*	3.05	0.78	0.67	1.25*		S2		HOR72
28SI	155.	22.7	1.24	0.75	11.	1.26	0.67				2.78	0.95	0.62	1.29*	394	S2P2	31	WIL68
31P	8.10	53.1	1.25*	0.65*				8.3	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*		S1	5	DAL69
S	17.8	49.3	1.25*	0.65*				10.50	1.25*	0.47*	6.00	1.25*	0.65*	1.25*	868	S2P2		BAU66
S	17.8	47.9	1.25*	0.65*				11.01	1.25*	0.47*	6.03	1.05	0.65*	1.25*	878	S2P1		BAU66
S	31.	51.43	1.07	0.774	7.35	1.33	0.648	1.24G	1.33	0.939	6.54	1.07	0.774	1.20*		S2		SAN70
S	31.	47.18	1.20*	0.70*	2.32	1.20*	0.48*	13.21G	1.20*	0.70*	5.06	1.20*	0.70*	1.20*	719	S3		SAN70
32S	17.5	52.14	1.15	0.654				6.12	1.32	0.547	5.56	0.85	0.41	1.15?		S2		BRA69
32S	17.5	44.1	1.28	0.57				7.2	1.02	0.54	12.3	1.28	0.57	1.25?		S2		REI69
32S	24.5	53.0	1.08	0.74				7.05	1.12	0.83	4.92	1.0	0.46	1.25*		S P		MAY71
32S	155.	19.0	1.26	0.74	10.57	1.25	0.81				2.96	0.99	0.64	1.30*		S1P1	31	WIL68
34S	6.03	55.	1.25*	0.50*				11.G	1.25*	1.05				1.25*		S2		ANT69
34S	24.5	52.9	1.12	0.69				7.23	1.19	0.78	7.19	0.84	0.81	1.25*		S P		MAY71
35CL	6.03	55.	1.25*	0.50*				11.G	1.25*	1.05				1.25*		S2		ANT69
36AR	8.75	50.71	1.24	0.62				7.82	1.26	0.53	4.44	1.24	0.70	1.25*		S1		SEN71
36AR	24.9	64.34	0.977	0.755	0.22	1.274	0.599	7.07	1.274	0.599	7.9*	1.00*	0.755*	0.98		S2	7	JOH68
36AR	33.6	47.1	1.18	0.66				6.87	1.18	0.66				1.18		S2		KOZ68
38AR	14.0	50.19	1.24	0.64				6.95	1.21	0.55	4.30	1.19	0.70	1.26*		S2		SEN72
40AR	9.7	53.6	1.265	0.487	7.5	1.265	0.487				8.5	1.265	0.487	1.26		S P	12,W5	NOD60
40AR	9.7	62.	1.20*	0.41	9.5	1.20*	0.41							1.20*		S	W65	GLA57A
40AR	10.	61.8	1.20*	0.415	8.8	1.20*	0.415				10.	1.20*	0.415	1.20*		S	12,W5	NOD60
40AR	14.1	48.84	1.25*	0.687				11.2	1.25*	0.452	7.5*	1.25*	0.687	1.25*		S1		GRA65
40AR	16.9	48.00	1.25*	0.65*				11.0	1.25*	0.47*				1.25*		S2		GRA65
40AR	21.	50.6	1.17	0.717				8.25	1.22	0.676	5.64	1.01	0.657	1.25*	1062	S2P2		BAR69
40AR	21.	49.3	1.19*	0.70*				8.37	1.25*	0.64*	4.97	1.05*	0.55*	1.25*	1047	S2P2		BAR69
40AR	21.	45.3	1.25*	0.65*				10.7	1.25*	0.47*	3.48	1.25*	0.65*	1.25*	944	S2P2		BAR69
40AR	24.9	48.85	1.18	0.793	2.0	1.343	0.470	8.2	1.343	0.470	6.0*	1.05*	0.7*	1.18		S1	1	JOH68
40AR	30.4	51.37	1.11	0.811	6.64	1.60	0.502				4.24	1.08	0.582	1.25*	980	S P		RUS71
40AR	30.4	47.44	1.14	0.74	3.46	1.34	0.71	3.93	1.34	0.71	6.31	1.11	0.869	1.25*	1018	S2P2		RUS71
40AR	49.4	48.03	1.11	0.734				8.06	1.16	0.743	7.07	0.987	0.686	1.25*	907	S P		RUS71
40AR	49.4	46.80	1.11	0.767	3.10	1.17	0.71	6.40	1.17	0.71	7.28	1.04	0.721	1.25*	878	S1P2		RUS71
40AR	49.4	46.04	1.12	0.771	6.10	0.751	0.612	7.30	1.18	0.683	6.56	1.01	0.660	1.25*	883	S1P2		RUS71
CA	26.3	49.81	1.12*	0.75*				5.65	1.33*	0.58*	4.53	1.06	0.75*	1.20*		S2P3	20	WAT67
40CA	9.6	58.68	1.25*	0.26				8.2*	1.25*	0.26	6.0*	1.25*	0.65*	1.25*		S		BER68
40CA	9.6	55.85	1.197	0.627				4.00G	1.182	1.217	4.81*	1.038*	0.511*	1.32*	543	S1	5	VOE71
40CA	9.6	57.86	1.152*	0.692*				3.28G	1.309*	1.162*	4.76*	1.014*	0.526*	1.32*	523	S	5	VOE71
40CA	9.86	44.84	1.352	0.657				10.18G	1.442	0.277	4.81*	1.038*	0.511*	1.32*	609	S	5	VOE71
40CA	9.86	59.65	1.152*	0.692*				2.42G	1.309*	1.162*	4.76*	1.014*	0.526*	1.32*	461	S	5	VOE71
40CA	10.37	56.60	1.201	0.619				5.62G	1.379	0.510	5.14	1.149	0.268	1.32*	529	S P2	5	VOE71
40CA	10.37	61.71	1.152*	0.692*				3.30G	1.309*	1.162*	6.01	1.014*	0.526*	1.32*	639	S P	5	VOE71
40CA	11.42	51.80	1.220	0.748				14.87G	1.442	0.351	4.81*	1.038*	0.511*	1.32*	722	S	5	VOE71
40CA	11.42	57.17	1.152*	0.692*				3.77G	1.309*	1.162*	4.76*	1.014*	0.526*	1.32*	635	S	5	VOE71
40CA	12.44	54.04	1.192	0.641				4.66G	1.391	1.058	4.81*	1.038*	0.511*	1.32*	723	S1	5	VOE71
40CA	12.44	56.88	1.152*	0.692*				4.59G	1.309*	1.162*	4.76*	1.014*	0.526*	1.32*	723	S		VOE71
40CA	13.40	57.40	1.113	0.648				4.78G	1.395	1.594	4.81*	1.038*	0.511*	1.32*	907	S	5	VOE71
40CA	13.49	55.59	1.152*	0.692*				6.74G	1.309*	1.162*	4.76*	1.014*	0.526*	1.32*	818	S	5	VOE71
40CA	13.98	50.43	1.254	0.599				4.88G	1.133	1.507	4.81*	1.038*	0.511*	1.32*	783	S	5	VOE71
40CA	13.98	56.16	1.152*	0.692*				6.59G	1.309*	1.162*	4.76*	1.014*	0.526*	1.32*	820	S	5	VOE71
40CA	14.08	51.59	1.21	0.67				6.85	1.39	0.41	6.04	0.85	0.24	1.32*	827	S3P2	4	LOM72
40CA	14.51	53.81	1.166	0.739				7.96G	1.296	0.927	4.12	1.125	0.278	1.32*	797	S P	5	VOE71
40CA	14.51	54.99	1.152*	0.692*				5.89G	1.309*	1.162*	5.05	1.014*	0.526*	1.32*	799	S P	5	VOE71
40CA	14.6	54.78	1.150	0.742				8.27G	1.279	0.957	4.14	1.088	0.401	1.32*	810	S1P	5	VOE71
40CA	14.6	54.03	1.152*	0.692*				6.19G	1.309*	1.162*	4.75	1.014*	0.526*	1.32*	811	S P	5	VOE71

See page 8 for Explanation of Tables

TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
40CA	15.57	67.13	0.963	0.848				6.94G	1.426	1.101	4.81*	1.038*	0.511*	1.32*	886	S		VOE71
40CA	15.57	52.99	1.152*	0.692*				5.96G	1.309*	1.162*	4.76*	1.014*	0.526*	1.32*	805	S	5	VOE71
40CA	15.65	54.3	1.21	0.57				5.8	0.90	0.59	7.8	0.87	0.53	1.32*		S2P2		BOY72
40CA	15.65	52.44	1.21	0.63				6.40	1.23	0.43	5.88	0.95	0.42	1.32*	717	S3P2	4	LOM72
40CA	15.97	55.52	1.135	0.651				5.52G	1.224	1.207	3.74	1.038*	0.511*	1.32*	732	S	5	VOE71
40CA	15.97	53.00	1.152*	0.692*				5.97G	1.309*	1.162*	4.76*	1.014*	0.526*	1.32*	804	S	5	VOE71
40CA	16.25	52.16	1.21	0.60				6.56	1.25	0.82	5.01	0.92	0.31	1.32*	697	S3P2	4	LOM72
40CA	16.57	51.40	1.200	0.671				9.50G	1.234	0.724	4.81*	1.065	0.199	1.32*	709	S P2		VOE71
40CA	16.57	53.39	1.152*	0.692*				6.14G	1.309*	1.162*	3.73	1.014*	0.526*	1.32*	815	S P	5	VOE71
40CA	17.3	47.90	1.25*	0.65*				11.47	1.25*	0.47*	8.*	1.25*	0.65*	1.25*		S2		GRA65
40CA	17.3	50.12	1.233	0.610				7.40G	1.062	1.168	5.04	1.076	0.476	1.32*	764	S1P	5	VOE71
40CA	17.3	53.91	1.152*	0.692*				6.31G	1.309*	1.162*	4.31	1.014*	0.526*	1.32*	812	S P	5	VOE71
40CA	17.57	48.35	1.244	0.587				6.95G	1.133	1.200	5.19	0.907	0.509	1.32*	769	S P		VOE71
40CA	17.57	52.63	1.152*	0.692*				7.51G	1.309*	1.162*	3.49	1.014*	0.526*	1.32*	857	S P	5	VOE71
40CA	17.8	48.0	1.25*	0.45*				8.	1.25*	0.45*	4.0	1.25*	0.45*	1.25*	726	S3P2	12	BAU65
40CA	17.8	55.94	1.178	0.657				8.21G	1.196	1.003	3.71	0.999	0.352	1.32*	754	S P	5	VOE71
40CA	17.8	57.22	1.152*	0.692*				5.36G	1.309*	1.162*	6.29	1.014*	0.526*	1.32*	738	S P	5	VOE71
40CA	18.57	49.03	1.233	0.569				7.34G	1.138	1.183	3.97	1.010	0.331	1.32*	788	S P1		VOE71
40CA	18.57	49.95	1.152*	0.692*				7.20G	1.309*	1.162*	4.19	1.014*	0.526*	1.32*	842	S P	5	VOE71
40CA	19.57	49.88	1.205	0.693				7.57G	1.191	1.285	4.81*	1.038*	0.511*	1.32*	869	S1		VOE71
40CA	19.57	47.25	1.152*	0.692*				7.15G	1.309*	1.162*	4.76*	1.014*	0.526*	1.32*	835	S		VOE71
40CA	20.58	50.98	1.178	0.726				7.98G	1.243	1.245	4.81*	1.038*	0.511*	1.32*	893	S1		BRA71
40CA	20.58	46.53	1.152*	0.692*				7.24G	1.309*	1.162*	4.76*	1.014*	0.526*	1.32*	835	S		VOE71
40CA	21.05	50.02	1.174	0.739				7.34G	1.277	1.251	4.30	0.837	1.024	1.32*	896	S1P2		BRA71
40CA	21.05	50.00	1.152*	0.692*				8.02G	1.309*	1.162*	6.48	1.014*	0.526*	1.32*	860	S P		VOE71
40CA	21.68	55.13	1.111	0.781				7.55G	1.242	1.323	4.81*	1.038*	0.511*	1.32*	901	S1		BRA71
40CA	21.68	46.57	1.152*	0.692*				7.70G	1.309*	1.162*	4.76*	1.014*	0.526*	1.32*	849	S		VOE71
40CA	23.55	55.96	1.036	0.816				4.80G	1.273	1.804	4.81*	1.038*	0.511*	1.32*	936	S2		BRA71
40CA	23.55	47.06	1.152*	0.692*				7.52G	1.309*	1.162*	4.76*	1.014*	0.526*	1.32*	839	S		VOE71
40CA	25.	48.92	1.16*	0.75*	2.10	1.37*	0.63*	4.07	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*		S2		GRU72
40CA	26.30	53.13	1.076	0.786				4.72G	1.269	1.831	4.20	1.038	0.512	1.32*	927	S2P2		BRA71
40CA	26.30	50.93	1.152*	0.692*				8.23G	1.309*	1.162*	6.23	1.014*	0.526*	1.32*	865	S P		VOE71
40CA	27.4	53.52	1.049	0.871	2.22	1.313	0.797	3.64G	1.313	1.687	4.81*	1.038*	0.511*	1.32*	943	S2		BRA71
40CA	27.4	50.59	1.152*	0.692*	2.02	1.309*	0.549*	7.81G	1.309*	1.162*	4.76*	1.014*	0.526*	1.32*	915	S		VOE71
40CA	30.	47.38	1.16*	0.75*	2.24	1.37*	0.63*	4.22	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	940	S2P2	11	FRI67
40CA	30.	47.86	1.16*	0.75*	2.40	1.37*	0.63*	4.18	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*		S1		GRU72
40CA	30.3	44.04	1.236	0.659	0.60	1.236	0.659	7.74	1.236	0.514	12.48	1.236	0.659	1.25*	849	S2	32	BAR65
40CA	30.3	43.44	1.25*	0.65*				8.77	1.25*	0.47*	12.*	1.25*	0.65*	1.25*	830	S2	32	BAR65
40CA	30.3	46.1	1.20*	0.7*	0.40	1.25*	0.7*	5.96	1.25*	0.7*	5.97	1.20*	0.7*	1.20*		S2P2	11	GRE66
40CA	30.3	47.2	1.172	0.703	1.78	1.288	0.653	4.83	1.288	0.653	4.03	1.009	0.446	1.2*	904	S P	11	SAT67
40CA	30.3	47.30	1.156	0.739	0.09	1.389	0.568	6.46	1.389	0.568	4.48	0.975	0.480	1.11*	926	S2P1	2	HNI71
40CA	30.3	46.61	1.163	0.740	0.02	1.400	0.539	6.51	1.400	0.539	4.41	0.978	0.464	1.11*	900	P	2	HNI71
40CA	30.3	56.07	1.030	0.861	4.50	1.722	0.193	0.58	1.722	0.193	4.41*	0.978*	0.464*	1.11*	881	S	2	HNI71
40CA	30.3	47.02	1.165	0.689				5.53G	1.249	1.672	5.37	1.093	0.613	1.32*	883	S2P2		VOE71
40CA	30.3	50.00	1.152*	0.692*	0.77	1.309*	0.549*	7.66G	1.309*	1.162*	5.56	1.014*	0.526*	1.32*	858	S P		VOE71
40CA	30.3	45.3	1.19	0.66				6.1	1.33	0.64	5.4	1.01	0.60	1.32*		S P		BOY72
40CA	35.	46.42	1.16*	0.75*	2.37	1.37*	0.63*	4.17	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*		S2		GRU72
40CA	35.8	51.92	1.058	0.778	0.36	1.319	0.709	5.64G	1.319	1.501	7.05	0.865	0.744	1.32*	858	S P		VOE71
40CA	35.8	46.64	1.152*	0.692*	2.07	1.309*	0.549*	5.65G	1.309*	1.162*	4.68	1.014*	0.526*	1.32*	796	S P		VOE71
40CA	40.	41.55	1.203	0.674	1.56	1.255	0.704	4.92	1.255	0.704	6.22	1.028	0.778	1.25*	858	S2P2		FRI67
40CA	40.	43.22	1.16*	0.75*	1.21	1.37*	0.63*	4.52	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	841	S2P2		FRI67
40CA	40.0	46.88	1.113	0.786	3.53	1.415	0.659	2.74G	1.415	1.395	4.73	0.963	0.621	1.32*	844	S P		VOE71
40CA	40.0	44.85	1.152*	0.692*	4.49	1.309*	0.549*	3.92G	1.309*	1.162*	4.32	1.014*	0.526*	1.32*	786	S P		VOE71
40CA	40.	44.51	1.16*	0.75*	1.71	1.37*	0.63*	4.42	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*		S2		GRU72
40CA	45.5	46.34	1.090	0.788	4.88	1.636	0.384	2.85G	1.636	0.813	6.12	1.001	0.692	1.32*	770	S2P2		VOE71
40CA	45.5	43.26	1.152*	0.692*	4.10	1.309*	0.549*	4.21G	1.309*	1.162*	4.94	1.014*	0.526*	1.32*	756	S P		VOE71
40CA	45.5	41.64	1.18*	0.7*	3.83	1.3*	0.6*	3.55	1.3*	0.6*	5.67	1.05*	0.7*	1.25*	778	S2P2	24	CLA72
40CA	48.0	38.55	1.178	0.724	4.66	1.564	0.495	0.76G	1.564	1.048	6.69	0.957	0.793	1.32*	951	S2P2	11	BRA71
40CA	49.0	35.87	1.200	0.712	3.79	1.508	0.546	1.05G	1.508	1.156	5.62	0.933	0.791	1.32*	676	P		VOE71
40CA	49.0	36.30	1.152*	0.692*	7.84	1.309*	0.549*	1.68G	1.309*	1.162*	6.27	1.014*	0.526*	1.32*	732	P		VOE71
40CA	55.0	38.70	1.182	0.720	7.87	1.341	0.578	1.48G	1.341	1.224	4.81*	1.038*	0.511*	1.32*	762	S		VOE71
40CA	55.0	39.48	1.152*	0.692*	7.34	1.309*	0.549*	1.81G	1.309*	1.162*	4.76*	1.014*	0.526*	1.32*	708	S		VOE71
40CA	61.4	38.03	1.16*	0.75*	1.45	1.37*	0.63*	4.44	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	744	S2		FUL69
40CA	61.4	38.90	1.149	0.995	7.31	1.376	0.450	1.21G	1.376	0.953	4.81*	1.038*	0.511*	1.32*	684	S2		VOE71
40CA	61.4	38.23	1.152*	0.692*	3.34	1.309*	0.549*	5.02G	1.309*	1.162*	4.76*	1.014*	0.526*	1.32*	699	S		VOE71
40CA	75.	22.97	1.20	0.53				13.23	1.20	0.56	0.91	1.69	0.39	1.32	816	S2P3	22	ROL66
40CA	76.0	33.47	1.149*	0.712*	11.73	1.318*	0.552*				5.26	1.038*	0.511*	1.32*	671	S P		VOE71
40CA	76.0	33.47	1.152*	0.436*	12.41	1.309*	0.511*				5.31	1.014*	0.526*	1.32*	693	S P		VOE71
40CA	153.	15.01	1.01	0.47	15.00	1.40	0.52				2.11	1.12	0.61	1.32	654	S1P2	12,31	ROL66
40CA	153.	10.80	1.005	0.309	16.02	1.372	0.513				3.55	1.067	0.612	1.32*	639	S P	12	VOE71
40CA	153.	-7.67	1.152*	0.436*	19.51	1.309*	0.511*				3.31	1.014*	0.526*	1.32*	639	S P		VOE71
40CA	155.	19.4	1.24	0.74	12.64	1.23	0.84				2.87	1.02	0.58	1.32*		S1P1	31	WIL68
40CA	156.	12.26	1.42	0.55	13.1	1.22	0.57				3.48	1.03	0.64	1.33	487	S1	12,19	COM74
40CA	160.	17.5	1.172	0.585	8.2	1.535	0.483				4.04	1.172	0.585	1.32	584	S1	33,19	ROO65
40CA	160.	14.54	1.17	0.51	10.*	1.50	0.50*				2.45*	1.17	0.51	1.3*	630	S2	12,19	ROO65
40CA	160.	17.13	1.193	0.486	10.69	1.473	0.478				3.39	1.038*	0.511*	1.32*	612	S	12	VOE71
40CA	160.	12.79	1.152*	0.436*	16.61	1.309*	0.511*				4.16	1.014*	0.526*	1.32*	601	S P	12	VOE71
40CA	180.	18.69	1.003	0.328	14.86	1.376	0.542				4.00	1.085	0.643	1.32*	614	S1P2	13,12	VOE71
40CA	180.	4.96	1.152*	0.436*	15.13	1.309*	0.511*				3.95	1.014*	0.526*	1.32*	551	S P	13,12	VOE71
40CA	185.	13.1	1.01	0.5*	11.1	1.52	0.47				3.29	1.17	0.63	1.32		S P2	14	ING73

See page 8 for Explanation of Tables

TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
42CA	9.0	52.4	1.209	0.678				6.9	1.363	0.305	7.5*	1.209	0.678	1.25*	638	S2	26	MAR66
42CA	9.0	49.5	1.25*	0.65*				5.0	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	654	S2	26	MAR66
42CA	12.0	53.6	1.217	0.600				17.1	1.264	0.310	7.5*	1.217	0.600	1.25*	701	S1		MAR66
42CA	12.0	49.5	1.25*	0.65*				9.5	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	846	S2		MAR66
42CA	22.9	46.9	1.18*	0.70*	1.30	1.30*	0.60*	6.80	1.30*	0.60*	6.0*	1.05*	0.7*	1.25*		S1		BAN68
42CA	22.9	43.4	1.25*	0.65*				10.53	1.25*	0.47*	7.5*	1.25*	0.47*	1.25*		S2		BAN68
42CA	26.5	40.2	1.25*	0.65*	8.99	1.25*	0.47*				12.0	1.25*	0.65*	1.25*		S1	1	SMI69
42CA	49.35	43.6	1.16	0.78	9.8	1.32	0.54	1.9	1.32	0.54	5.8	1.03	0.59	1.25*	870	S P	1	MAN71A
42CA	49.35	42.2	1.17*	0.75*	2.5	1.32*	0.63*	5.6	1.32*	0.63*	8.7	1.01*	0.75*	1.20*	900	S2P	1	MAN71A
44CA	9.0	50.8	1.233	0.720				11.8	1.366	0.290	7.5*	1.233	0.720	1.25*	759	S2		MAR66
44CA	9.0	50.3	1.25*	0.65*				8.3	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	778	S2		MAR66
44CA	10.75	51.9	1.25	0.56				9.6	1.26	0.44	5.98	0.89	0.33	1.29*		S1P1		LOM72
44CA	12.0	48.9	1.278	0.590				17.3	1.246	0.324	7.5*	1.278	0.590	1.25*	788	S1		MAR66
44CA	12.0	49.3	1.25*	0.65*				11.6	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	898	S2		MAR66
44CA	14.15	50.2	1.24	0.59				7.8	1.20	0.59	6.30	0.94	0.54	1.29*		S1P1		LOM72
44CA	15.61	53.2	1.18	0.60				6.3	1.24	0.70	6.80	0.85	0.47	1.29*		S1P1		LOM72
44CA	17.5	46.5	1.251	0.62				11.0	1.26	0.58	6.42	1.251	0.62	1.25*		S2	3	PET68A
44CA	22.9	49.3	1.18*	0.70*	2.36	1.30*	0.60*	6.80	1.30*	0.60*	6.0*	1.05*	0.7*	1.25*		S1		BAN68
44CA	22.9	45.5	1.25*	0.65*				11.95	1.25*	0.47*	7.5*	1.25*	0.47*	1.25*		S2		BAN68
44CA	49.35	43.1	1.16	0.74	8.6	1.29	0.61	2.7	1.29	0.61	7.2	1.00	0.64	1.25*	915	S P	1	MAN71A
44CA	49.35	42.4	1.17*	0.75*	0.8	1.32*	0.63*	6.9	1.32*	0.63*	8.2	1.01*	0.75*	1.20*	940	S2P2	1	MAN71A
48CA	9.0	51.4	1.240	0.630				8.6	1.194	0.642	7.5*	1.240	0.630	1.25*	916	S2		MAR66
48CA	9.0	50.4	1.25*	0.65*				13.2	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	874	S2		MAR66
48CA	10.0	56.76	1.17*	0.62*				5.68	1.32*	0.72*	5.80	1.07*	0.75*	1.25*		S1P1		LIE71
48CA	12.0	41.6	1.441	0.456				20.2	1.215	0.364	7.5*	1.441	0.456	1.25*	965	S1		MAR66
48CA	12.0	52.4	1.25*	0.65*				15.4	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	989	S2		MAR66
48CA	12.	52.4	1.25*	0.65*				16.0	1.25*	0.47*	5.4	1.12*	0.47*	1.25*		S2		TEL69
48CA	12.0	56.86	1.17*	0.62*				6.65	1.32*	0.72*	7.99	1.07*	0.75*	1.25*		S1P1		LIE71
48CA	14.03	52.8	1.19	0.68				9.3	1.36	0.59	8.46	0.83	1.04	1.24*		S1P1		LOM72
48CA	15.06	52.0	1.20	0.68				9.5	1.30	0.57	7.86	0.85	0.80	1.24*		S1P1		LOM72
48CA	15.63	50.1	1.24	0.65				11.2	1.31	0.49	6.67	0.93	0.74	1.24*		S1P1		LOM72
48CA	17.5	42.9	1.34	0.76				16.0	1.25*	0.50*	7.5*	1.34*	0.76*	1.24*		S2		PET68
48CA	25.	51.72	1.20*	0.68*	0.36	1.20*	0.68*	6.95	1.20*	0.68*				1.25*		S3		GRU72A
48CA	30.	45.93	1.20*	0.68*	0.15	1.20*	0.68*	6.57	1.20*	0.68*				1.25*		S3		GRU72A
48CA	35.	46.50	1.20*	0.68*	3.49	1.20*	0.68*	4.62	1.20*	0.68*				1.25*		S2		GRU72A
48CA	40.	46.58	1.20*	0.68*	4.13	1.20*	0.68*	4.57	1.20*	0.68*				1.25*		S2		GRU72A
45SC	6.9	54.6	1.25*	0.58				10.0G	1.25*	0.74*	14.0	1.25*	0.58	1.25*		S3		PRO70A
45SC	9.6	51.29	1.25*	0.56				8.2*	1.25*	0.56	6.0*	1.25*	0.65*	1.25*		S		BER68
45SC	10.5	46.61	1.285*	0.65*				13.38	1.285*	0.53*	8.53	1.285*	0.53*	1.25*	963	P1		PER68
45SC	17.5	46.5	1.251	0.62				11.0	1.26	0.58	6.42	1.251	0.62	1.25*		S2	3	PET68A
45SC	49.35	42.6	1.16	0.74	7.9	1.27	0.65	2.8	1.27	0.65	6.9	1.00	0.66	1.25*	910	S P	1	MAN71A
45SC	49.35	41.6	1.17*	0.75*	1.2	1.32*	0.63*	6.3	1.32*	0.63*	8.3	1.01*	0.75*	1.20*	930	S2P1	1	MAN71A
TI	12.0	51.3	1.25*	0.65*				13.1	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	922	S2	35	PER63
TI	14.3	49.9	1.25*	0.65*				13.6	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	975	S1	35	PER63
46TI	6.9	49.6	1.25*	0.54				3.0G	1.25*	0.74*	21.5	1.25*	0.54	1.25*		S3		PRO70A
46TI	17.5	46.5	1.251	0.62				11.0	1.26	0.58	6.42	1.251	0.62	1.25*		S2	3	PET68A
46TI	21.2	50.50	1.20	0.77				13.4	1.14	0.547				1.25*		S2		BAR68A
46TI	21.2	45.51	1.28	0.719				18.4	1.21	0.389	6.0	1.28	0.719	1.25*		S2		BAR68A
46TI	26.0	43.16	1.20*	0.84	6.98	1.52	0.44							1.3*		S1		JON68A
46TI	26.0	43.23	1.20*	0.78				7.67	1.075	0.75				1.3*		S2		JON68A
47TI	6.9	55.6	1.25*	0.38				6.5G	1.25*	0.74*	13.5	1.25*	0.38	1.25*		S2		PRO70A
48TI	6.9	53.6	1.25*	0.28				5.5G	1.25*	0.74*	18.0	1.25*	0.28	1.25*		S2		PRO70A
48TI	11.0	52.88	1.255	0.390				20.91	0.968	0.333	8.76	0.976	0.280	1.25*	693	S1P1	11	PER68
48TI	11.0	46.52	1.285*	0.65*				10.27	1.285*	0.53*	8.60	1.285*	0.53*	1.25*	925	S2P2	11	PER68
48TI	12.2	48.1	1.25*	0.65*				9.7	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*	905	S1	23	BUC63
48TI	14.3	47.4	1.25*	0.65*				11.0	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*	970	S1	23	BUC63
48TI	16.5	46.3	1.25*	0.60*				12.5	1.25*	0.47*	7.0	1.25*	0.60*	1.25*		S2	23	LUT74
48TI	18.0	45.8	1.25*	0.60*				11.4	1.25*	0.47*	8.0*	1.25*	0.60*	1.25*		S1	23	LUT74
48TI	18.6	50.3	1.25*	0.65*				11.0	1.25*	0.47*	5.6	1.09	0.47*	1.25*	993	S2P1	20	KOS67
48TI	18.6	60.05	1.1*	0.75*				8.28	1.35*	0.55*	5.7	0.95	0.55*	1.1*	1051	S2P1		KOS68
48TI	18.6	50.40	1.24*	0.65*				9.62	1.28*	0.5*	5.28	1.08	0.42*	1.25*	1003	S P	30	KOS68
48TI	20.0	45.2	1.25*	0.60*				11.0	1.25*	0.47*	8.0*	1.25*	0.60*	1.25*		S1	23	LUT74
48TI	22.0	44.6	1.25*	0.60*				10.9	1.25*	0.47*	8.0*	1.25*	0.60*	1.25*		S1	23	LUT74
48TI	24.0	44.0	1.25*	0.60*				10.8	1.25*	0.47*	8.0*	1.25*	0.60*	1.25*		S2	23	LUT74
48TI	156.	14.32	1.36	0.63	16.0	1.18	0.64				3.	1.04	0.60	1.29	604	S1	12,22	COM74
49TI	6.9	53.6	1.25*	0.58				2.0G	1.25*	0.74*	20.0	1.25*	0.58	1.25*		S2		PRO70A
49TI	10.5	46.80	1.285*	0.65*				12.98	1.285*	0.53*	8.59	1.285*	0.53*	1.25*	976	P1		PER68
49TI	14.5	51.18	1.20	0.620				9.22	1.341	0.609	7.71	1.20	0.620	1.3*	1067	S1P2	12	ALT67A
49TI	20.9	54.5	1.12	0.75				7.93	1.244	0.70	5.0	1.03	0.47*	1.25*	1153	S P		MAY71
50TI	6.9	52.1	1.25*	0.38				6.0G	1.25*	0.74*	16.0	1.25*	0.38	1.25*		S2		PRO70A
50TI	14.15	52.9	1.19	0.68				8.6	1.28	0.68	6.38	0.99	0.71	1.26*		S1P1		LOM72A
50TI	15.35	52.2	1.19	0.67				8.9	1.24	0.65	6.84	0.98	0.66	1.26*		S1P1		LOM72A
50TI	18.2	46.9	1.25*	0.65*				11.47	1.25*	0.47*				1.25*		S2		GRA65A
50TI	18.6	49.6	1.25*	0.65*				11.2	1.25*	0.47*	7.2	1.20	0.47*	1.25*	1006	S2P1	20	KOS67
50TI	18.6	58.98	1.1*	0.75*				8.41	1.35*	0.55*	5.75	1.00	0.55*	1.1*	1082	S P		KOS68
50TI	18.6	49.91	1.24*	0.65*				9.78	1.28*	0.5*	7.4	1.24	0.42*	1.25*	1012	S P	30	KOS68
50TI	39.9	44.85	1.16*	0.75*	7.82	1.37*	0.63*	1.14*	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*		S2	1	PRE70

See page 8 for Explanation of Tables

TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL. IMAG. POTENTIAL W	RW	AW	SURF. IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
V	22.2	46.0	1.25*	0.65*				12.0	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1032	S2	35	PER63
51V	6.9	56.6	1.25*	0.50				9.0G	1.25*	0.74*	12.5	1.25*	0.50	1.25*		S1		PRO70A
51V	7.5	55.	1.25*	0.65	4.	1.25*	0.65				-9.1	1.25*	0.65	1.25*		S	4,W65	SHO61
51V	7.5	55.	1.25*	0.55				4.G	1.25*	1.4	-9.1	1.25*	0.65	1.25*		S	4,W65	SHO61
51V	9.6	50.86	1.25*	0.62				8.2*	1.25*	0.62	6.0*	1.25*	0.65*	1.25*		S		BER68
51V	10.81	49.9	1.26	0.62				11.1	1.28	0.46	6.64	1.12	0.42	1.27*		S1P1		LOM72A
51V	11.0	50.05	1.240	0.666				8.37	1.270	0.620	7.87	1.303	0.619	1.25*	959	S1P1	11	PER68
51V	11.0	47.45	1.285*	0.65*				10.41	1.285*	0.53*	7.39	1.285*	0.53*	1.25*	941	S1P1	11	PER68
51V	15.20	50.3	1.21	0.69				8.6	1.29	0.61	6.57	1.01	0.64	1.27*		S2P1		LOM72A
51V	39.9	42.32	1.16*	0.75*	8.18	1.37*	0.63*	1.14*	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*		S2	1	PRE70
CR	12.0	51.3	1.25*	0.65*				12.8	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	911	S2	35	PER63
CR	14.3	50.0	1.25*	0.65*				13.4	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	981	S2	35	PER63
50CR	6.9	54.1	1.25*	0.18				2.5G	1.25*	0.74*	20.5	1.25*	0.18	1.25*		S2		PRO70A
50CR	10.	46.29	1.25*	0.772				11.60G	1.379	0.992	8.59	1.25*	0.772	1.3*	880	S1		AND64
50CR	22.9	49.63	1.17*	0.732				8.09	1.179	0.689	7.24	0.956	0.741	1.2*		S1		PET72
52CR	5.45	60.	1.23*	0.40				11.5G	1.23*	1.2*				1.23?		S	W65	VAN61
53CR	5.45	60.	1.23*	0.36				7.5G	1.23*	1.2*				1.23?		S	W65	VAN61
52CR	6.9	52.1	1.25*	0.30				5.0G	1.25*	0.74*	18.5	1.25*	0.30	1.25*		S2		PRO70A
52CR	10.	48.90	1.25*	0.666				12.10G	1.319	0.987	10.10	1.25*	0.666	1.3*	782	S1		AND64
52CR	10.77	45.8	1.33	0.57				13.7	1.32	0.39	6.67	1.06	0.47	1.27*		S1P1		LOM72A
52CR	11.0	48.85	1.260	0.658				11.07	1.285	0.461	9.63	1.278	0.482	1.25*	841	S1P1	11	PER68
52CR	11.0	47.11	1.285*	0.65*				8.96	1.285*	0.53*	9.95	1.285*	0.53*	1.25*	882	S1P1	11	PER68
52CR	12.0	50.2	1.25*	0.65*				10.8	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*	904	S1	23	BUC63
52CR	14.3	49.6	1.25*	0.65*				12.2	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*	983	S1	23	BUC63
52CR	15.35	51.6	1.19	0.67				7.5	1.26	0.69	5.70	1.02	0.45	1.27*		S1P1		LOM72A
52CR	16.5	51.5	1.25*	0.65*				9.7	1.25*	0.47*	4.6	1.07	0.47*	1.25*	1142	S2P1	20	KOS67
52CR	18.6	49.2	1.25*	0.65*				10.7	1.25*	0.47*	6.9	1.15	0.47*	1.25*	991	S2P1	20	KOS67
52CR	18.6	59.13	1.1*	0.75*				8.51	1.35*	0.55*	6.2	0.96	0.55*	1.1*	1080	S P		KOS68
52CR	18.6	48.9	1.24*	0.65*				9.31	1.28*	0.5*	6.36	1.13	0.42*	1.25*	1003	S P	30	KOS68
52CR	39.9	41.79	1.16*	0.75*	7.42	1.37*	0.63*	1.14*	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*		S2	1	PRE70
53CR	6.9	55.0	1.25*	0.42				9.0G	1.25*	0.74*	18.0	1.25*	0.42	1.25*		S2		PRO70A
53CR	10.	48.31	1.25*	0.760				8.38G	1.254	1.519	7.82	1.25*	0.760	1.3*	1000	S1	15	AND64
53CR	10.13	54.23	1.25*	0.541	9.16	1.25*	0.541							1.25*		S2		LEG66
53CR	10.27	54.44	1.25*	0.508	9.25	1.25*	0.508							1.25*		S2		LEG66
53CR	10.43	54.85	1.25*	0.490	9.22	1.25*	0.490							1.25*		S2		LEG66
53CR	10.66	54.32	1.25*	0.484	9.16	1.25*	0.484							1.25*		S2		LEG66
53CR	11.	48.41	1.25*	0.759				8.47G	1.219	1.219	7.75	1.25*	0.759	1.3*	1063	S1		AND64
53CR	11.13	50.83	1.25*	0.553	8.87	1.25*	0.553							1.25*		S2		LEG66
53CR	11.40	50.71	1.25*	0.547	9.01	1.25*	0.547							1.25*		S2		LEG66
53CR	11.70	53.40	1.25*	0.485	9.26	1.25*	0.485							1.25*		S2		LEG66
53CR	12.00	51.74	1.25*	0.534	8.79	1.25*	0.534							1.25*		S2		LEG66
53CR	16.6	52.2	1.18	0.74				9.12	1.28	0.63	5.8	1.08	0.47*	1.25*	1164	S P		MAY71
54CR	6.9	54.1	1.25*	0.42				13.5G	1.25*	0.74*	10.0	1.25*	0.42	1.25*		S2		PRO70A
54CR	10.	49.28	1.25*	0.576				3.25G	1.288	2.531	11.32	1.25*	0.576	1.3*	1007	S1		AND64
MN	22.2	45.9	1.25*	0.65*				12.4	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1060	S2	35	PER63
55MN	10.5	47.99	1.285*	0.65*				12.16	1.285*	0.53*	7.96	1.285*	0.53*	1.25*	961	P1		PER68
FE	14.3	49.8	1.25*	0.65*				14.0	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	982	S1	35	PER63
FE	17.3	48.37	1.238	0.690				12.20	1.284	0.456	8.76	1.238	0.690	1.25*	1037	S1		PER63
FE	17.3	48.0	1.25*	0.65*				11.5	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1005	S1	35	PER63
FE	17.8	48.5	1.25*	0.65*				10.89	1.25*	0.47*	7.17	1.25*	0.65*	1.25*	1002	S2P2		BAU66
FE	17.8	48.5	1.25*	0.65*				11.16	1.25*	0.47*	6.41	1.04	0.65*	1.25*	1013	S1P1		BAU66
54FE	9.8	54.8	1.17*	0.75*				11.4	1.32*	0.54	6.6	1.01*	0.75*	1.17?		S3P2	5	AHM70
54FE	9.8	53.0	1.22	0.62				23.1	1.17	0.26	7.7	1.0*	0.66*	1.25*		S2P3	4,26	GRE71
54FE	10.5	46.36	1.285*	0.65*				11.13	1.285*	0.53*	7.12	1.285*	0.53*	1.25*	908	P1		PER68
54FE	10.80	50.3	1.24	0.65				14.21	1.34	0.34	5.22	0.88	0.50	1.29*		S1P1		LOM72A
54FE	11.0	45.61	1.306	0.701				19.37	1.370	0.293	8.68	1.284	0.359	1.25*	787	S1P1	11	PER68
54FE	15.13	55.9	1.13	0.72				6.9	1.25	0.71	6.49	0.95	0.58	1.29*		S1P1		LOM72A
54FE	17.9	46.0	1.24	0.65*				11.27	1.28	0.47*				1.24		S2		GRA65A
54FE	18.6	47.7	1.25*	0.702				10.9G	1.25*	1.00*	7.0*	1.25*	0.702	1.25*		S1		ECC66
54FE	18.6	46.8	1.25*	0.729				11.7G	1.307	1.31	7.0*	1.25*	0.729	1.25*		S1		ECC66
54FE	18.6	50.3	1.25*	0.65*				12.1	1.25*	0.47*	5.02	1.15	0.47*	1.25*	1018	S2P1	20	KOS67
54FE	18.6	59.78	1.1*	0.75*				9.44	1.35*	0.55*	6.4	1.04	0.55*	1.1*	1105	S P		KOS68
54FE	18.6	49.8	1.24*	0.65*				9.87	1.28*	0.5*	6.0	1.16	0.42*	1.25*	1009	S P	30	KOS68
54FE	18.60	49.1	1.22	0.70				8.3	1.34	0.53	5.78	1.07	0.46	1.29*		S P		LOM72A
54FE	19.6	49.89	1.19	0.73				8.83	1.34	0.50	4.00*	1.06	0.22	1.20?		S2P1		HEN69
54FE	19.6	50.51	1.19	0.70				7.94	1.31	0.55	5.06	1.075	0.40	1.20?		S2P1		HEN69
54FE	19.6	48.82	1.22	0.66				8.04	1.30	0.54	6.00*	1.13	0.45	1.20?		S2P2		HEN69
54FE	30.3	44.3	1.188	0.686				7.39	1.075	0.849	6.37	1.188	0.686	1.25*		S P3		KAR70
54FE	30.3	45.15	1.190	0.70				7.07	1.054	0.841	6.56	1.104	0.627	1.25*		S P2		KAR70
54FE	30.4	52.6	1.12*	0.75*	3.0*	1.33*	0.58*	4.8	1.33*	0.58*	5.0*	1.12*	0.5	1.2*		S2P2		BAU67
54FE	30.4	53.26	1.103	0.776	6.65	1.357	0.573	2.02	1.357	0.573	6.87	1.103	0.776	1.12*		S2P2		GRE72
54FE	30.4	51.74	1.097	0.809	6.75	1.148	0.806	3.02	1.392	0.535	6.54	1.097	0.809	1.12*		S2P2		GRE72
54FE	30.4	50.40	1.111	0.790	2.99	1.296	0.616	4.35	1.397	0.545	6.73	0.958	0.709	1.12*		S1P1		GRE72

See page 8 for Explanation of Tables

TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
54FE	39.7	44.8	1.169	0.755	8.1	1.403	0.440				6.51	1.169	0.755	1.25*		S		STO64
54FE	40.	44.8	1.169	0.755	8.1	1.403	0.441				6.51	1.169	0.755	1.2*	938	S1	15	PRI65
54FE	40.	42.5	1.18*	0.7*	7.35	1.40*	0.7*				7.5*	1.18*	0.7*	1.2*	992	S	15	PRI65
54FE	40.	41.43	1.208	0.761	6.40	1.279	0.609	2.47	1.279	0.609	5.30	1.188	0.679	1.25*	990	S2P2		PRI67
54FE	40.	45.79	1.16*	0.75*	6.89	1.37*	0.63*	1.14	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1015	S2P2		PRI67
54FE	40.	47.61	1.104	0.800	5.06	1.587	0.583	0.12	1.587	0.583	4.41	1.045	0.659	1.2*	998	S2P2	12	PRI67A
54FE	49.35	40.7	1.20	0.63	0.8	1.26	0.55	7.5	1.26	0.55	8.2	1.17	0.62	1.25*	905	S	1	MAN71A
54FE	49.35	42.2	1.17*	0.75*	0.3	1.32*	0.63*	6.2	1.32*	0.63*	7.9	1.01*	0.75*	1.20*	960	S3	1	MAN71A
56FE	6.9	57.6	1.25*	0.44				12.5G	1.25*	0.74*	17.0	1.25*	0.44	1.25*		S P		PRO70
56FE	6.9	57.6	1.25*	0.44				10.5G	1.25*	0.74*	17.0	1.25*	0.44	1.25*		S2		PRO70A
56FE	9.6	51.14	1.25*	0.65				8.2*	1.25*	0.65	6.0*	1.25*	0.65*	1.25*		S		BER68
56FE	10.93	49.64	1.25*	0.65*				8.16	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*		S2	23	BEN64
56FE	11.0	45.34	1.322	0.652				12.87	1.297	0.484	7.79	1.323	0.517	1.25*	944	S1P1	11	PER68
56FE	11.0	47.80	1.285*	0.65*				11.27	1.285*	0.53*	7.51	1.285*	0.53*	1.25*	934	S1P1	11	PER68
56FE	11.66	49.58	1.25*	0.65*				9.08	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*		S1	23	BEN64
56FE	14.1	48.2	1.25*	0.65*				11.6	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*	980	S1	23	BUC63
56FE	17.3	47.6	1.25*	0.65*				10.0	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*	1007	S1	23	BUC63
56FE	18.6	49.6	1.25*	0.65*				11.8	1.25*	0.47*	6.18	1.13	0.47*	1.25*	1027	S2P1	20	KOS67
56FE	18.6	59.99	1.1*	0.75*				9.14	1.35*	0.55*	6.66	0.96	0.55*	1.1*	1123	S2P1		KOS68
56FE	18.6	49.9	1.24*	0.65*				11.26	1.28*	0.5*	6.3	1.12	0.42*	1.25*	1056	S P	30	KOS68
56FE	19.1	48.3	1.25*	0.710				11.5G	1.25*	1.00*	7.0*	1.25*	0.710	1.25*		S1		ECC66
56FE	19.1	47.4	1.25*	0.778				11.9G	1.298	1.30	7.0*	1.25*	0.778	1.25*		S1		ECC66
56FE	19.6	50.48	1.19	0.70				8.83	1.31	0.55	5.12	1.075	0.40	1.20?		S2P2		HEN69
56FE	22.2	45.	1.25*	0.65*				13.G	1.25*	1.00*	11.	1.25*	0.65*	1.25*	1016	S1		PIC65
56FE	30.	49.10	1.16*	0.75*	5.70	1.37*	0.63*	1.42	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1147	S		PRI67
56FE	30.3	46.69	1.189	0.686	2.16	1.189	0.686	6.49	1.189	0.648	13.16	1.189	0.686	1.25*	1072	S2		BAR65
56FE	30.3	42.95	1.25*	0.65*				10.35	1.25*	0.47*	12.*	1.25*	0.65*	1.25*	1015	S2		BAR65
56FE	30.3	46.4	1.20*	0.7*	2.7	1.25*	0.7*	5.2	1.25*	0.7*	5.8	1.20*	0.7*	1.20*		S1		GRE66
56FE	30.3	52.5	1.112	0.732	3.71	1.341	0.555	4.90	1.341	0.555	7.42	1.024	1.048	1.2*	1091	S1		SAT67
56FE	30.3	52.4	1.12*	0.75*	3.0*	1.33*	0.58*	5.40	1.33*	0.58*	6.40*	1.12*	0.75*	1.2*	1109	S1		SAT67
56FE	30.3	47.20	1.199	0.661				7.84	1.164	0.688	7.46	1.031	0.682	1.25*		S P2		KAR70
56FE	30.3	49.06	1.142	0.742	3.13	1.375	0.593	4.49	1.375	0.593	6.60	0.957	0.672	1.11*	1125	S1P1	2	HNI71
56FE	30.3	45.85	1.183	0.706	0.82	1.263	0.713	6.73	1.263	0.713	6.27	1.008	0.640	1.11*	1175	P	2	HNI71
56FE	30.3	52.40	1.122	0.733	2.38	1.289	0.615	5.93	1.289	0.615	6.27*	1.008*	0.640*	1.11*	1099	S	2	HNI71
56FE	39.7	43.5	1.173	0.736	6.5	1.451	0.758				6.37	1.173	0.736	1.2*		S		STO64
56FE	40.	44.3	1.180	0.703				7.6	1.028	0.805	7.43	1.180	0.703	1.2*	1015	S1	15	PRI65
56FE	40.	42.9	1.18*	0.7*	7.44	1.40*	0.7*				7.5*	1.18*	0.7*	1.2*	1024	S	15	PRI65
56FE	49.35	41.3	1.20	0.64	0.9	1.25	0.56	8.2	1.25	0.56	7.5	1.16	0.61	1.25*	965	S	1	MAN71A
56FE	49.35	41.7	1.17*	0.75*	0.9	1.32*	0.63*	6.1	1.32*	0.63*	7.2	1.01*	0.75*	1.20*	1010	S3	1	MAN71A
56FE	156.	12.01	1.38	0.55	17.2	1.13	0.73				3.	1.05	0.60	1.28	883	S1	12,22	COM74
57FE	10.5	47.80	1.285*	0.65*				12.98	1.285*	0.53*	9.02	1.285*	0.53*	1.25*	962	P1		PER68
57FE	17.3	46.6	1.24	0.64				14.45	1.36	0.48	6.4	1.16	0.39	1.25*	1056	S P		MAY71
58FE	6.9	56.6	1.25*	0.50				14.0G	1.25*	0.74*	11.5	1.25*	0.50	1.25*		S2		PRO70A
58FE	10.93	51.46	1.25*	0.65*				10.29	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*		S2	23	BEN64
58FE	11.0	48.16	1.285*	0.65*				11.51	1.285*	0.53*	5.53	1.285*	0.53*	1.25*	962	S1P1	11	PER68
58FE	11.66	50.94	1.25*	0.65*				10.60	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*		S1	23	BEN64
CO	17.3	47.64	1.245	0.739				13.27	1.282	0.433	10.32	1.245	0.739	1.25*	1079	S1		PER63
CO	17.3	48.4	1.25*	0.65*				11.8	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1020	S1	35	PER63
CO	17.8	48.4	1.25*	0.65*				10.28	1.25*	0.47*	8.00	1.25*	0.65*	1.25*	995	S2P2		BAU66
CO	17.8	48.2	1.25*	0.65*				10.53	1.25*	0.47*	6.84	1.09	0.65*	1.25*	1009	S1P1		BAU66
CO	22.2	46.0	1.25*	0.65*				11.6	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1064	S2	35	PER63
59CO	5.45	58.	1.23*	0.35				8.5G	1.23*	1.2*				1.23?		S	W65	VAN61
59CO	6.9	53.1	1.25*	0.72				15.0G	1.25*	0.74*	16.5	1.25*	0.72	1.25*		S P		PRO70
59CO	6.9	53.1	1.25*	0.74				15.0G	1.25*	0.74*	17.5	1.25*	0.74	1.25*		S1		PRO70A
59CO	9.8	49.0	1.27	0.70				11.8	1.35	0.47	5.3	1.0*	0.66*	1.25*		S1P1	4	GRE71
59CO	9.8	55.79	1.20*	0.65*				14.09	1.25*	0.47*	6.3	1.20*	0.65*	1.20*		P1		VEL74
59CO	11.0	45.41	1.313	0.682				11.72	1.354	0.500	6.43	1.307	0.587	1.25*	995	S1P1	11	PER68
59CO	11.0	48.23	1.285*	0.65*				11.33	1.285*	0.53*	6.84	1.285*	0.53*	1.25*	944	S1P1	11	PER68
59CO	14.4	49.00	1.25*	0.65*				13.64	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	995	S1		ERR67
59CO	17.	48.9	1.25*	0.65*				13.9G	1.25*	1.00*	8.8	1.25*	0.65*	1.25*	982	S2		PIC65
59CO	30.	47.13	1.16*	0.75*	1.78	1.37*	0.63*	4.97	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1150	S2P1	11	PRI67
59CO	30.3	48.85	1.170	0.694	1.87	1.170	0.694	6.38	1.170	0.696	13.97	1.170	0.694	1.25*	1104	S2	32	BAR65
59CO	30.3	44.55	1.25*	0.65*				10.80	1.25*	0.47*	12.*	1.25*	0.65*	1.25*	1053	S3	32	BAR65
59CO	30.3	47.8	1.20*	0.687	2.38	1.238	0.682	5.88	1.238	0.682	5.85	1.20*	0.687	1.20*	1156	S1P1	11	GRE66
59CO	30.3	47.5	1.20*	0.7*	2.8	1.25*	0.7*	5.7	1.25*	0.7*	5.8	1.20*	0.7*	1.20*		S1P1	11	GRE66
59CO	30.3	65.3	0.999	0.886	4.44	1.395	0.565	4.10	1.395	0.565	6.86	1.129	0.517	1.2*	1186	S2P1	11	SAT67
59CO	30.3	53.3	1.12*	0.75*	3.0*	1.33*	0.58*	5.45	1.33*	0.58*	6.35	1.12*	0.75*	1.2*	1140	S1P1	11	SAT67
59CO	30.3	49.38	1.133	0.759	2.88	1.386	0.651	4.18	1.386	0.651	6.54	0.970	0.636	1.11*	1193	S2P1	2	HNI71
59CO	30.3	47.53	1.147	0.742	1.76	1.247	0.862	5.66	1.247	0.862	5.78	1.005	0.548	1.11*	1320	P	2	HNI71
59CO	30.3	53.78	1.120	0.726	1.74	1.245	0.670	6.32	1.245	0.670	5.78*	1.005*	0.548*	1.11*	1134	S	2	HNI71
59CO	40.	45.65	1.151	0.759	6.06	1.397	0.718	1.12	1.397	0.718	6.01	1.010	0.846	1.25*	1111	S1P1		PRI67
59CO	40.	45.71	1.16*	0.75*	5.68	1.37*	0.63*	2.08	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1088	S1P1		PRI67

See page 8 for Explanation of Tables

TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL. IMAG. POTENTIAL W	RW	AW	SURF. IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
NI	9.4	52.3	1.25*	0.65*				15.8	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	769	S3	35	PER63
NI	9.9	47.7	1.325	0.580				16.2G	1.325	0.798				1.3?		S	W65	WIL63
NI	9.9	59.	1.20*	0.45	6.9	1.20*	0.45							1.20*		S	W65	GLA57A
NI	12.0	48.4	1.25*	0.65*				9.1	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*	882	S2	23	BUC63
NI	12.0	50.7	1.25*	0.65*				9.4	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	838	S2	35	PER63
NI	14.3	48.5	1.25*	0.65*				9.7	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*	954	S1	23	BUC63
NI	14.3	49.4	1.25*	0.65*				12.2	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	956	S1	35	PER63
NI	15.0	48.2	1.25*	0.65*				10.3	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*	975	S1	23	BUC63
NI	16.8	48.4	1.25*	0.65*				9.7	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*	989	S1	23	BUC63
NI	17.3	47.5	1.25*	0.65*				9.1	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*	982	S1	23	BUC63
NI	17.3	47.59	1.251	0.677				12.50	1.245	0.414	9.77	1.251	0.677	1.25*	974	S1		PER63
NI	17.3	47.7	1.25*	0.65*				10.4	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	979	S1	35	PER63
58NI	5.45	57.	1.23*	0.35				3.5G	1.23*	1.2*				1.23?		S	W65	VAN61
58NI	6.9	63.1	1.25*	0.14				8.0G	1.25*	0.74*	14.0	1.25*	0.14	1.25*		S1		PRO70A
58NI	9.0	54.4	1.25*	0.65*				8.7	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	672	S		MAR66
58NI	9.8	41.3	1.42	0.59				31.2	1.31	0.21	6.7	1.0*	0.66*	1.25*		S3P2	4,26	GRE71
58NI	10.	52.2	1.25*	0.65*				6.9	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	676	S		MAR66
58NI	10.5	47.68	1.285*	0.65*				11.39	1.285*	0.53*	7.20	1.285*	0.53*	1.25*	904	P1		PER68
58NI	11.	49.8	1.25*	0.65*				7.7	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	739	S		MAR66
58NI	11.66	48.57	1.25*	0.65*				6.65	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*		S2	23	BEN64
58NI	12.	49.6	1.25*	0.65*				8.7	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	810	S		MAR66
58NI	15.0	61.80	1.1*	0.7*				7.19	1.25*	0.7*	5.8	1.00*	0.7*	1.1*		S2		KOL69
58NI	16.0	50.36	1.228	0.600				14.07	1.227	0.401	6.90*	1.01*	0.75*	1.11*	873	S2	2,4	MAK72
58NI	17.7	46.94	1.25*	0.781				10.90	1.304	0.432	4.39	1.202	0.530	1.25*	1078	S2P2		JAR67
58NI	17.8	48.1	1.25*	0.65*				9.59	1.25*	0.47*	7.20	1.25*	0.65*	1.25*	962	S2P2		BAU66
58NI	17.8	48.1	1.25*	0.65*				9.97	1.25*	0.47*	6.44	1.13	0.65*	1.25*	975	S2P2		BAU66
58NI	18.6	47.5	1.25*	0.808				13.0G	1.25*	1.00*	7.0*	1.25*	0.808	1.25*		S2		ECC66
58NI	18.6	46.9	1.25*	0.823				12.5G	1.276	1.00	7.0*	1.25*	0.823	1.25*		S1		ECC66
58NI	18.6	48.6	1.25*	0.65*				10.0	1.25*	0.47*	7.05	1.16	0.47*	1.25*	974	S2P1	20	KOS67
58NI	18.6	58.96	1.1*	0.75*				8.3	1.35*	0.55*	6.3	0.96	0.55*	1.1*	1088	S P		KOS68
58NI	18.6	48.6	1.24*	0.65*				7.82	1.28*	0.5*	6.75	1.16	0.42*	1.25*	948	S P	30	KOS68
58NI	20.0	59.88	1.1*	0.7*				6.91	1.25*	0.7*	5.3	1.00*	0.7*	1.1*		S2		KOL69
58NI	21.	52.2	1.15	0.770				8.87	1.33	0.517	4.93	1.01	0.535	1.25*	1093	S1P1		BAR69
58NI	21.	49.8	1.19*	0.70*				7.08	1.25*	0.64*	5.18	1.05*	0.55*	1.25*	1084	S2P2		BAR69
58NI	21.	47.9	1.25*	0.65*				9.51	1.25*	0.47*	4.97	1.25*	0.65*	1.25*	995	S2P2		BAR69
58NI	24.5	51.8	1.17	0.71				9.13	1.26	0.51	5.0	1.12*	0.47*	1.25*	1018	S P		MAY71
58NI	26.3	52.44	1.12*	0.75*	0.63	1.33*	0.58*	6.51	1.33*	0.58*	5.07	0.97	0.75*	1.20*		S2P2	20	WAT67
58NI	30.	46.03	1.16*	0.75*	2.65	1.37*	0.63*	3.75	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1096	S2P2	11	FRI67
58NI	30.3	46.43	1.180	0.692	2.42	1.180	0.692	5.50	1.180	0.684	13.53	1.180	0.692	1.25*	1059	S2	32	BAR65
58NI	30.3	42.16	1.25*	0.65*				9.41	1.25*	0.47*	12.*	1.25*	0.65*	1.25*	988	S3	32	BAR65
58NI	30.3	48.1	1.20*	0.712	1.8	1.235	0.702	5.7	1.235	0.702	5.8	1.20*	0.712	1.20*	1117	S1P1	11	GRE66
58NI	30.3	47.0	1.20*	0.7*	3.4	1.25*	0.7*	4.4	1.25*	0.7*	4.4	1.20*	0.7*	1.20*		S1P1	11	GRE66
58NI	30.3	61.5	1.036	0.855	4.43	1.355	0.508	4.42	1.355	0.508	5.18	1.066	0.451	1.2*	1093	S2P1	11	SAT67
58NI	30.3	52.4	1.12*	0.75*	3.0*	1.33*	0.58*	4.93	1.33*	0.58*	6.01	1.12*	0.75*	1.2*	1093	S2P2	11	SAT67
58NI	30.3	48.62	1.148	0.748	3.27	1.370	0.550	4.31	1.370	0.550	6.16	0.995	0.612	1.11*	1090	S2P2	2	GRE70
58NI	30.3	45.70	1.180	0.715	0.75	1.277	0.717	6.32	1.277	0.717	5.78	1.012	0.597	1.11*	1172	P2	2	GRE70
58NI	30.3	53.36	1.105	0.770	3.37	1.336	0.551	4.76	1.336	0.551	5.78*	1.012*	0.597*	1.11*	1079	S1	2	GRE70
58NI	30.3	47.1	1.178	0.713				7.33	1.141	0.765	6.61	1.178	0.713	1.25*		S P3		KAR70
58NI	30.3	46.6	1.186	0.707				7.36	1.205	0.662	6.66	1.042	0.628	1.25*		S3P2		KAR70
58NI	30.3	54.29	1.105*	0.770*	3.41	1.336*	0.551*	4.71	1.336*	0.551*	5.78*	1.012*	0.597*	1.11*		S1		PUT71
58NI	30.3	53.85	1.099	0.772	3.99	1.382	0.516	4.04	1.382	0.516	6.19	1.099	0.772	1.20*		S1P2	11	VOS72
58NI	30.3	50.24	1.134	0.756	3.50	1.376	0.561	3.97	1.376	0.561	6.09	0.994	0.624	1.20*		S2P1	21	VOS72
58NI	39.6	43.43	1.208	0.701	3.42	1.241	0.504	6.20	1.241	0.504	6.50	1.094	0.663	1.2?		S2P2		LIE70
58NI	39.7	39.6	1.251	0.760	9.57	1.387	0.254				4.5	1.251	0.760	1.2*		S1		STO64
58NI	40.	44.5	1.165	0.747				10.8	1.027	0.604	10.3	1.165	0.747	1.2*	957	S1	15	FRI65
58NI	40.	42.7	1.18*	0.7*	7.27	1.40*	0.7*				7.5*	1.18*	0.7*	1.2*	1028	S	15	FRI65
58NI	40.	49.49	1.109	0.782	6.50	1.477	0.495	0.52	1.477	0.495	5.53	1.071	0.641	1.25*	1023	S2P2		FRI67
58NI	40.	45.05	1.16*	0.75*	6.63	1.37*	0.63*	1.22	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1046	S2P2		FRI67
58NI	40.	51.11	1.080	0.798	5.71	1.531	0.430	0.74	1.531	0.430	5.19	1.043	0.614	1.2*	1019	S2P2	12	FRI67A
58NI	40.	42.92	1.20*	0.70*	5.47	1.25*	0.67*	3.50	1.25*	0.67*	5.85	1.02	0.7*	1.27*		S2P3		LIN70
58NI	61.4	41.11	1.160	0.728	6.66	1.33	0.504	2.32	1.33	0.504	5.53*	1.071*	0.641*	1.25*	891	S2		FUL69
58NI	61.4	40.29	1.16*	0.75*	6.83	1.37*	0.63*	0.83	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	908	S2		FUL69
58NI	160.	11.29	1.127	0.648	9.86	1.49	0.316				3.40	1.27	0.648	1.25*	662	S1	33,19	ROO65
58NI	160.	14.2	1.20	0.52	10.*	1.45	0.50*				2.45*	1.20	0.52	1.3*	766	S2	12,19	ROO65
60NI	5.45	57.	1.23*	0.36				8.5G	1.23*	1.2*				1.23?		S	W65	VAN61
60NI	6.80	62.56	1.25*	0.373*				2.18	1.328*	0.47*				1.25*	121	S3		ELN67
60NI	6.80	63.67	1.25*	0.373*				2.95	1.328*	0.47*	8.99	1.25*	0.373*	1.25*	282	S2		ELN67
60NI	6.9	59.1	1.25*	0.42				7.0G	1.25*	0.74*	17.5	1.25*	0.42	1.25*		S2		PRO70A
60NI	8.00	55.65	1.25*	0.373*				12.91	1.328*	0.47*				1.25*	598	S3		ELN67
60NI	8.00	55.65	1.25*	0.373*				7.89	1.328*	0.47*	5.92	1.25*	0.373*	1.25*	546	S2		ELN67
60NI	9.0	52.1	1.25*	0.65*				13.7	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	738	S		MAR66
60NI	9.8	55.9	1.17*	0.75*				10.2	1.32*	0.56	7.7	1.01*	0.75*	1.17?		S2P1	5	AHM70
60NI	10.	51.2	1.25*	0.65*				12.2	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	790	S		MAR66
60NI	10.0	51.32	1.25*	0.65*				14.85	1.263*	0.47*				1.25*	815	S2		ELN67
60NI	11.	50.8	1.25*	0.65*				12.0	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	843	S		MAR66
60NI	11.0	50.59	1.25*	0.65*				14.94	1.263*	0.47*				1.25*	871	S2		ELN67
60NI	11.0	47.38	1.290	0.707				13.09	1.341	0.455	7.67	1.313	0.513	1.25*	950	S1P1	11	PER68
60NI	11.0	48.52	1.285*	0.65*				10.87	1.285*	0.53*	7.85	1.285*	0.53*	1.25*	923	S1P1	11	PER68
60NI	12.	50.4	1.25*	0.65*				12.2	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	891	S		MAR66
60NI	12.0	50.19	1.25*	0.65*				15.04	1.263*	0.47*				1.25*	918	S2		ELN67

See page 8 for Explanation of Tables

TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
60NI	14.0	60.81	1.1*	0.7*				7.72	1.25*	0.7*	3.2	1.00*	0.7*	1.1*		S2		KOL69
60NI	16.0	48.56	1.264	0.590				12.11	1.201	0.456	6.90*	1.01*	0.75*	1.11*	939	S2	2,4	MAK72
60NI	16.5	49.15	1.25*	0.65*				11.3	1.25*	0.47*	5.4	1.12	0.47*	1.25*	1424	S2P1	20	KOS67
60NI	17.8	47.3	1.25*	0.65*				9.82	1.25*	0.47*	7.01	1.25*	0.65*	1.25*	983	S P2		BAU66
60NI	17.8	47.3	1.25*	0.65*				9.85	1.25*	0.47*	6.07	1.06	0.65*	1.25*	993	S P2		BAU66
60NI	17.9	46.45	1.25*	0.846				11.90	1.279	0.465	5.48	1.253	0.502	1.25*	1185	S2P2		JAR67
60NI	18.6	47.1	1.25*	0.750				14.1G	1.25*	1.00*	7.0*	1.25*	0.750	1.25*		S2		ECC66
60NI	18.6	47.7	1.25*	0.856				16.7G	1.355	0.92	7.0*	1.25*	0.856	1.25*		S2		ECC66
60NI	18.6	51.0	1.25*	0.65*				11.0	1.25*	0.47*	6.15	1.09	0.47*	1.25*	1023	S1	20	KOS67
60NI	30.	48.22	1.16*	0.75*	3.21	1.37*	0.63*	4.11	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1180	S2P1	11	FRI67
60NI	30.	54.09	1.099	0.772	3.24	1.295	0.601	5.37	1.295	0.601	5.74	1.022	0.688	1.2*		S1		ASC70
60NI	30.3	48.46	1.175	0.690	1.83	1.175	0.690	6.48	1.175	0.700	13.91	1.175	0.690	1.25*	1119	S2	32	BAR65
60NI	30.3	43.96	1.25*	0.65*				10.76	1.25*	0.47*	12.*	1.25*	0.65*	1.25*	1053	S3	32	BAR65
60NI	30.3	48.2	1.20*	0.697	2.6	1.237	0.689	6.1	1.237	0.689	5.6	1.20*	0.697	1.20*	1159	S1P1	11	GRE66
60NI	30.3	47.6	1.20*	0.7*	2.8	1.25*	0.7*	5.5	1.25*	0.7*	5.4	1.20*	0.7*	1.20*		S1P1	11	GRE66
60NI	30.3	59.2	1.062	0.842	3.92	1.322	0.574	5.20	1.322	0.574	5.68	1.103	0.468	1.2*	1161	S2P1	11	SAT67
60NI	30.3	53.1	1.12*	0.75*	3.0*	1.33*	0.58*	5.48	1.33*	0.58*	6.15	1.12*	0.75*	1.2*	1144	S1P2	11	SAT67
60NI	30.8	59.5	1.1	0.82				10.5G	1.1	1.5	4.6	1.1	0.82	1.1		S	W65	DEV62
60NI	30.8	52.6	1.2	0.78	2.	1.2	0.69	15.4G	1.2	1.0	4.0	1.2	0.78	1.2		S	W65	DEV62
60NI	31.	59.51	1.10	0.800				9.01G	1.08	1.81	3.93	1.10	0.800	1.20*		S2		SAN70
60NI	31.	50.06	1.20*	0.70*	2.27	1.20*	0.48*	17.89G	1.20*	0.70*	7.37	1.20*	0.70*	1.20*	1001	S3		SAN70
60NI	31.	50.24	1.17*	0.75*	4.12*	1.32*	0.835	5.57G	1.32*	1.21	6.2*	1.01*	0.75*	1.20*		S		SAN70
60NI	39.6	44.34	1.199	0.706	3.20	1.245	0.521	6.36	1.245	0.521	6.17	1.077	0.668	1.2?		S2P2		LIE70
60NI	39.7	44.3	1.165	0.754	7.1	1.459	0.594				6.52	1.165	0.754	1.2*		S1	7	STO64
60NI	40.	44.7	1.184	0.707				9.9	1.056	0.653	7.54	1.184	0.707	1.2*	1021	S1	15	FRI65
60NI	40.	42.7	1.18*	0.7*	7.87	1.40*	0.7*				7.5*	1.18*	0.7*	1.2*	1085	S	15	FRI65
60NI	40.	48.28	1.120	0.769	5.41	1.470	0.597	1.58	1.470	0.597	7.03	0.979	0.856	1.25*	1126	S2P2		FRI67
60NI	40.	45.74	1.16*	0.75*	5.47	1.37*	0.63*	2.5	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1118	S2P2		FRI67
60NI	40.	51.59	1.081	0.815	4.70	1.410	0.525	3.55	1.410	0.525	7.03	0.975	0.789	1.2*	1104	S1P1	12	FRI67A
60NI	40.	43.05	1.20*	0.70*	2.84	1.25*	0.70*	5.15	1.25*	0.70*	6.72	0.99	0.74	1.27*		S2P3		LIN70
61NI	6.9	55.1	1.25*	0.54				11.5G	1.25*	0.74*	12.0	1.25*	0.54	1.25*		S2		PRO70A
61NI	16.6	51.4	1.21	0.73				11.1	1.32	0.49	6.2	1.15	0.47*	1.25*	1094	S P		MAY71
62NI	5.45	60.5	1.23*	0.36				7.0G	1.23*	1.2*				1.23?		S	W65	VAN61
62NI	6.9	55.5	1.25*	0.60				10.5G	1.25*	0.74*	10.0	1.25*	0.60	1.25*		S3		PRO70A
62NI	8.02	55.2	1.25*	0.65*				10.1	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*		S1		DAL69
62NI	8.02	55.2	1.25*	0.65*				10.8	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*		S1	5	DAL69
62NI	11.0	47.08	1.291	0.711				11.32	1.356	0.511	5.79	1.234	0.565	1.25*	1023	S1P1	11	PER68
62NI	11.0	48.87	1.285*	0.65*				11.15	1.285*	0.53*	5.62	1.285*	0.53*	1.25*	950	S1P1	11	PER68
62NI	12.	51.5	1.25*	0.65*				12.5	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	922	S		MAR66
62NI	12.	52.3	1.25*	0.65*				14.6	1.25*	0.47*	5.1	1.25*	0.47*	1.25*		S2		BEU69
62NI	16.0	50.92	1.214	0.751				13.08	1.323	0.457	6.90*	1.01*	0.75*	1.11*	1115	S2	2,4	MAK72
62NI	16.5	49.4	1.25*	0.65*				11.9	1.25*	0.47*	6.2	1.12	0.47*	1.25*	1401	S2P1	20	KOS67
62NI	18.6	49.6	1.25*	0.748				13.4G	1.25*	1.00*	7.0*	1.25*	0.748	1.25*		S2		ECC66
62NI	18.6	48.9	1.25*	0.782				14.7G	1.321	0.95	7.0*	1.25*	0.782	1.25*		S2		ECC66
62NI	18.6	50.8	1.25*	0.65*				11.8	1.25*	0.47*	6.12	1.15	0.47*	1.25*	1053	S2P1	20	KOS67
62NI	18.6	61.69	1.1*	0.75*				8.57	1.35*	0.55*	7.25	0.94	0.55*	1.1*	1137	S2P2		KOS68
62NI	18.6	51.2	1.24*	0.65*				9.83	1.28*	0.5*	5.7	1.16	0.42*	1.25*	1047	S P	30	KOS68
62NI	39.6	44.32	1.186	0.703	3.51	1.294	0.633	4.65	1.294	0.633	6.35	1.037	0.707	1.2?		S2P2		LIE70
62NI	156.	9.73	1.44	0.52	13.7	1.24	0.57				3.	1.05	0.60	1.25	699	S1	12,22	COH74
64NI	5.45	58.5	1.23*	0.40				5.5G	1.23*	1.2*				1.23?		S	W65	VAN61
64NI	6.9	51.6	1.25*	0.78				13.5G	1.25*	0.74*	19.0	1.25*	0.78	1.25*		S1		PRO70A
64NI	9.60	51.84	1.25*	0.65*				10.80	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*		S1	23	BEN64
64NI	9.8	54.2	1.20	0.76				10.6	1.35	0.52	5.8	1.0*	0.66*	1.25*		S1P1	4	GRE71
64NI	10.5	65.15	1.1*	0.7*				7.52	1.25*	0.7*	6.0	1.00*	0.7*	1.1*		S1		KOL69
64NI	11.0	50.12	1.271	0.663				12.14	1.298	0.50*	6.31	1.285	0.50*	1.25*	966	S1P1	11	PER68
64NI	11.0	49.09	1.285*	0.65*				11.39	1.285*	0.53*	6.11	1.285*	0.53*	1.25*	978	S1P1	11	PER68
64NI	11.7	50.71	1.25*	0.65*				11.43	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*		S1	23	BEN64
64NI	12.	50.9	1.25*	0.65*				13.3	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	946	S		MAR66
64NI	12.	52.2	1.25*	0.65*				14.0	1.25*	0.47*	8.0	1.25*	0.47*	1.25*		S2		BEU69
64NI	14.0	61.84	1.1*	0.7*				8.80	1.25*	0.7*	4.9	1.00*	0.7*	1.1*		S2		KOL69
64NI	16.0	52.46	1.199	0.743				11.53	1.305	0.513	6.90*	1.01*	0.75*	1.11*	1149	S1	2,4	MAK72
64NI	18.6	50.4	1.25*	0.65*				12.1	1.25*	0.47*	5.65	1.10	0.47*	1.25*	1081	S2P1	20	KOS67
64NI	18.6	60.57	1.1*	0.75*				10.39	1.35*	0.55*	7.5	1.03	0.55*	1.1*	1190	S P		KOS68
64NI	18.6	51.34	1.24*	0.65*				12.88	1.28*	0.5*	6.95	1.19	0.42*	1.25*	1125	S P	30	KOS68
64NI	22.2	47.1	1.25*	0.65*				12.2	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1139	S2	35	PER63
64NI	39.6	47.92	1.156	0.705	3.82	1.292	0.668	4.75	1.292	0.668	7.88	0.940	0.853	1.2?		S2P2		LIE70
CU	7.34	51.	1.3*	0.41				5.3G	1.3*	1.5	4.	1.3*	0.41	1.3*		S	W65	OLK63
CU	7.5	50.	1.27	0.55				6.5G	1.48	1.36	9.	1.27	0.55	1.25?		S	W65	HOD62
CU	7.5	55.	1.25	0.55	4.	1.25*	2.0				-4.6	1.25	0.55	1.25*		S P	4,W65	SHO61
CU	9.4	52.60	1.209	0.794				11.49	1.431	0.457	6.70	1.209	0.794	1.25*	919	S1P1		PER63
CU	9.4	53.5	1.25*	0.65*				14.3	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	785	S2	35	PER63
CU	9.75	53.	1.25	0.60	4.5	1.6	0.60				8.	1.25	0.60	1.25?		S	W65	HOD62
CU	9.75	54.9	1.26	0.518	8.0	1.26	0.518				3.5	1.26	0.518	1.26		S P	12,W5	HOD60
CU	10.2	48.	1.3*	0.62				8.3G	1.3*	1.5	2.	1.3*	0.62	1.3*		S P	W65	OLK63
CU	12.29	48.	1.3*	0.63				15.0G	1.3*	1.0	1.	1.3*	0.63	1.3*		S	W65	OLK63
CU	12.29	56.	1.2*	0.62				9.4G	1.2*	1.5	2.	1.2*	0.62	1.2*		S	W65	OLK63
CU	17.3	44.44	1.33*	0.5*	10.32	1.33*	0.5*							1.33*		S	W65	HOD63
CU	17.3	48.33	1.25*	0.65*				18.12G	1.25*	0.98*				1.25*		S	W65	HOD63
CU	17.3	46.	1.3*	0.67				20.0G	1.3*	0.75	7.	1.3*	0.67	1.3*		S P	W65	OLK63
CU	17.3	53.	1.2*	0.65				9.5G	1.2*	1.25	8.	1.2*	0.65	1.2*		S P	W65	OLK63
CU	17.3	45.67	1.301	0.668				17.66	1.305	0.343	8.02	1.301	0.668	1.25*	1035	S1		PER63
CU	17.3	48.7	1.25*	0.65*				10.9	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1008	S1	35	PER63

See page 8 for Explanation of Tables

TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
CU	17.8	49.4	1.25*	0.65*				10.34	1.25*	0.47*	5.69	1.25*	0.65*	1.25*	1015	S2P2		BAU66
CU	17.8	49.2	1.25*	0.65*				10.36	1.25*	0.47*	4.92	0.96	0.65*	1.25*	1029	S1P1		BAU66
CU	28.	55.7	1.10	0.74				6.71G	1.16	1.95	6.5	1.10	0.74	1.25?	1190	S1		DIT69
CU	28.	45.2	1.30	0.58	0.02	1.15	0.607	15.5G	1.15	0.88	1.96	1.30	0.58	1.25?	1054	S		DIT69
CU	28.	43.4	1.33	0.531	1.40	1.17	0.513	15.5G	1.17	0.743	6.64	0.87	0.863	1.20*		S1		SAN70
CU	28.	49.7	1.20*	0.70*	2.88	1.20*	0.48*	16.50G	1.20*	0.70*	8.30	1.20*	0.70*	1.20*		S2		SAN70
CU	30.3	46.27	1.177	0.733	2.01	1.177	0.733	4.97	1.177	0.882	13.12	1.177	0.733	1.25*	1241	S1		BAR65
CU	30.3	44.67	1.25*	0.65*				11.25	1.25*	0.47*	12.*	1.25*	0.65*	1.25*	1095	S3		BAR65
CU	30.3	47.7	1.20*	0.7*	1.8	1.25*	0.7*	6.1	1.25*	0.7*	5.8	1.20*	0.7*	1.20*		S1		GRE66
CU	30.3	52.8	1.110	0.692	2.62	1.280	0.602	6.23	1.280	0.602	7.46	1.269	0.971	1.2*	1140	S1		SAT67
CU	30.3	53.5	1.12*	0.75*	3.0*	1.33*	0.58*	5.91	1.33*	0.58*	6.40*	1.12*	0.75*	1.2*	1194	S1		SAT67
63CU	6.9	56.1	1.25*	0.68				15.5G	1.25*	0.74*	15.0	1.25*	0.68	1.25*		S2		PRO70A
63CU	7.0	53.1	1.25*	0.65*				12.9	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	546	S		MAR66
63CU	8.0	53.3	1.25*	0.65*				11.8	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	636	S		MAR66
63CU	9.0	52.8	1.25*	0.65*				11.9	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	720	S		MAR66
63CU	10.	52.7	1.25*	0.65*				12.5	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	803	S		MAR66
63CU	10.2	48.8	1.30	0.622				11.5G	1.30	1.20				1.30?		S	W65	WIL63
63CU	11.	52.5	1.25*	0.65*				12.6	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	866	S		MAR66
63CU	11.0	48.95	1.261	0.760				15.56	1.426	0.351	6.58	1.392	0.427	1.25*	940	S1P1	11	PER68
63CU	11.0	48.61	1.285*	0.65*				10.41	1.285*	0.53*	6.38	1.285*	0.53*	1.25*	923	S1P1	11	PER68
63CU	12.	51.5	1.25*	0.65*				11.7	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	899	S		MAR66
63CU	12.29	48.41	1.31*	0.534	7.78	1.31*	0.534				4.86	1.31*	0.534	1.3?	914	S1	12,20	THO64
63CU	18.6	50.0	1.25*	0.65*				12.0	1.25*	0.47*	5.4	1.12	0.47*	1.25*	1055	S2P1	20	KOS67
63CU	18.6	59.9	1.1*	0.75*				8.82	1.35*	0.55*	6.65	1.00	0.55*	1.1*	1137	S P		KOS68
63CU	18.6	50.58	1.24*	0.65*				10.17	1.28*	0.5*	5.6	1.16	0.42*	1.25*	1052	S P	30	KOS68
63CU	30.3	52.46	1.13	0.76	3.18	1.35	0.63	4.68	1.35	0.63	6.29	1.08	0.73	1.2*	1207	S1P2		THO71
63CU	30.3	49.09	1.16*	0.75*	3.47	1.37*	0.63*	4.07	1.37*	0.63*	6.32	1.06*	0.74*	1.2*	1216	S P		THO71
63CU	30.3	53.10	1.12*	0.75*	2.65	1.33*	0.58*	5.99	1.33*	0.58*	7.03	1.12*	0.75*	1.2*	1178	S P		THO71
63CU	49.3	45.33	1.15	0.75	6.62	1.34	0.63	2.28	1.34	0.63	6.53	1.03	0.79	1.2*	1093	S1P2		THO71
63CU	49.3	44.13	1.16*	0.75*	6.47	1.37*	0.63*	1.87	1.37*	0.63*	6.04	1.06*	0.74*	1.2*	1094	S P		THO71
63CU	49.3	47.68	1.12*	0.75*	6.44	1.33*	0.58*	2.96	1.33*	0.58*	6.81	1.12*	0.75*	1.2*	1074	S P		THO71
64CU	17.	49.7	1.25*	0.65*				12.5G	1.25*	1.00*	8.4	1.25*	0.65*	1.25*	977	S2P2		PIC65
64CU	96.	28.0	1.14	0.764	5.46	1.53	0.555				7.85	1.14	0.764	1.14	812	S1	31	SAW65
65CU	5.45	60.5	1.23*	0.36				6.0G	1.23*	1.2*				1.23?		S	W65	VAN61
65CU	6.9	54.1	1.25*	0.58				11.0G	1.25*	0.74*	8.0	1.25*	0.58	1.25*		S3		PRO70A
65CU	7.0	52.4	1.25*	0.65*				11.5	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	552	S		MAR66
65CU	8.0	52.3	1.25*	0.65*				11.0	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	641	S		MAR66
65CU	9.0	54.0	1.25*	0.65*				12.5	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	753	S		MAR66
65CU	10.	53.6	1.25*	0.65*				12.4	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	832	S		MAR66
65CU	11.	52.4	1.25*	0.65*				12.5	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	886	S		MAR66
65CU	11.0	50.20	1.283	0.627				11.09	1.265	0.500	7.30	1.267	0.437	1.25*	904	S1P1	11	PER68
65CU	11.0	49.00	1.285*	0.65*				10.00	1.285*	0.53*	7.56	1.285*	0.53*	1.25*	942	S1P1	11	PER68
65CU	12.	51.1	1.25*	0.65*				12.0	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	919	S		MAR66
65CU	12.29	49.08	1.31*	0.536	8.07	1.31*	0.536				5.75	1.31*	0.536	1.3?	948	S1	12,20	THO64
65CU	30.3	52.96	1.13	0.78	3.53	1.35	0.62	4.96	1.35	0.62	6.20	1.11	0.71	1.2*	1265	S1P2		THO71
65CU	30.3	49.75	1.16*	0.75*	3.47	1.37*	0.63*	4.50	1.37*	0.63*	6.31	1.06*	0.74*	1.2*	1265	S P		THO71
65CU	30.3	53.56	1.12*	0.75*	2.85	1.33*	0.58*	6.32	1.33*	0.58*	7.22	1.12*	0.75*	1.2*	1221	S P		THO71
65CU	40.	44.9	1.163	0.806				9.9	0.973	0.818	7.52	1.163	0.806	1.2*	1165	S1	15	FRI65
65CU	40.	45.1	1.18*	0.7*	9.45	1.40*	0.7*				7.5*	1.18*	0.7*	1.2*	1217	S	15	FRI65
65CU	49.3	45.03	1.16	0.74	6.33	1.34	0.66	2.48	1.34	0.66	6.69	1.02	0.78	1.2*	1144	S1P2		THO71
65CU	49.3	44.65	1.16*	0.75*	6.56	1.37*	0.63*	2.06	1.37*	0.63*	6.10	1.06*	0.74*	1.2*	1137	S P		THO71
65CU	49.3	48.27	1.12*	0.75*	6.74	1.33*	0.58*	3.05	1.33*	0.58*	6.89	1.12*	0.75*	1.2*	1113	S P		THO71
ZN	9.4	53.4	1.25*	0.65*				13.4	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	765	S1	35	PER63
ZN	11.9	50.0	1.25*	0.65*				10.6	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*	920	S1	23	BUC63
ZN	12.0	51.8	1.25*	0.65*				13.3	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	915	S1	35	PER63
ZN	14.3	49.0	1.25*	0.65*				11.8	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*	1001	S1	23	BUC63
ZN	14.3	50.5	1.25*	0.65*				13.4	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	994	S1	35	PER63
ZN	17.3	48.2	1.25*	0.65*				10.5	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*	1047	S1	23	BUC63
ZN	17.3	44.52	1.318	0.667				18.37	1.280	0.364	8.57	1.318	0.667	1.25*	1080	S1		PER63
ZN	17.3	48.7	1.25*	0.65*				12.4	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1036	S2	35	PER63
ZN	17.8	48.9	1.25*	0.65*				9.65	1.25*	0.47*	5.38	1.25*	0.65*	1.25*	997	S2P1		BAU66
ZN	17.8	48.7	1.25*	0.65*				10.15	1.25*	0.47*	5.58	1.05	0.65*	1.25*	1020	S2P1		BAU66
64ZN	5.45	60.	1.23*	0.40				5.5G	1.23*	1.2*				1.23?		S	W65	VAN61
64ZN	6.9	56.6	1.25*	0.54				11.0G	1.25*	0.74*	16.0	1.25*	0.54	1.25*		S2		PRO70A
64ZN	9.6	50.51	1.25*	0.65*				7.44	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*		S1	23	BEN64
64ZN	11.0	46.77	1.287	0.753				12.70	1.397	0.444	5.94	1.281	0.497	1.25*	991	S1P1	11	PER68
64ZN	11.0	48.70	1.285*	0.65*				10.61	1.285*	0.53*	5.76	1.285*	0.53*	1.25*	908	S1P1	11	PER68
64ZN	11.7	49.78	1.25*	0.65*				9.20	1.25*	0.47*	8.0*	1.25*	0.65*	1.25*		S1	23	BEN64
64ZN	22.2	45.5	1.25*	0.65*				13.7	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1110	S2	35	PER63
64ZN	26.	54.15	1.107	0.768				6.24	1.308	0.739				1.3*		S2		JOH68A
64ZN	30.5	51.97	1.126	0.760	2.57	1.065	0.753	5.829	1.270	0.694	6.45	1.065	0.753	1.11*	1230	S1P2	2	TAI71
64ZN	30.5	50.85	1.142*	0.766*	2.92	1.085*	0.699*	5.813	1.275*	0.665*	6.32	1.085*	0.699*	1.11*	1225	S1P2	2	TAI71
64ZN	39.6	45.53	1.160	0.731	3.83	1.301	0.647	4.04	1.301	0.647	6.15	1.013	0.716	1.2?		S2P2		LIE70
64ZN	49.1	46.20	1.12*	0.80*	6.13	1.31*	0.62*	3.06	1.32*	0.69*	6.17	1.01*	0.69*	1.25*	1136	S1P2	15	CAL67
64ZN	49.6	41.19	1.144	0.810	11.75	1.144	0.737	1.78	1.144	0.737	4.50*	1.144	0.810	1.25*		S1	20	EDW67
64ZN	49.6	39.97	1.184	0.799	14.01	1.184	0.799				2.22	1.184	0.799	1.25*		S1	20	EDW67
64ZN	49.6	42.51	1.16*	0.75*	6.87	1.37*	0.63*	1.70	1.37*	0.63*	6.04*	1.16*	0.75*	1.25*		S1	20	EDW67
64ZN	49.6	48.78	1.095*	0.822	8.37	1.296*	0.622	2.75	1.296*	0.622	6.66	1.005	0.667	1.2?	1128	S P2	12	LEW67
64ZN	49.6	44.36	1.139*	0.767	6.61	1.367*	0.646	2.14	1.367*	0.646	6.37	1.029*	0.728	1.2?	1129	S P2		LEW67
65ZN	17.	48.9	1.25*	0.65*	3.7	1.25*	0.65*	7.9G	1.25*	1.00*	7.9	1.25*	0.65*	1.25*	1049	S2		PIC65

See page 8 for Explanation of Tables

TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
66ZN	6.9	55.6	1.25*	0.64				16.0G	1.25*	0.74*	16.0	1.25*	0.64	1.25*		S2		PRO70A
66ZN	11.0	52.12	1.246	0.648				8.46	1.235	0.666	5.86	1.082	0.474	1.25*	961	S1P1	11	PER68
66ZN	11.0	49.19	1.285*	0.65*				10.81	1.285*	0.53*	5.84	1.285*	0.53*	1.25*	935	S1P1	11	PER68
66ZN	30.5	52.56	1.131	0.780	2.61	1.082	0.704	6.349	1.255	0.698	6.58*	1.082*	0.704*	1.11*	1277	S1	2	TAI71
66ZN	30.5	51.53	1.142*	0.766*	2.73	1.085*	0.699*	6.382	1.275*	0.665*	6.58*	1.085*	0.699*	1.11*	1268	S1	2	TAI71
66ZN	39.6	46.22	1.166	0.691	2.14	1.286	0.722	5.11	1.286	0.722	7.98	0.874	0.952	1.2?		S2P2		LIE70
66ZN	49.1	46.04	1.12*	0.80*	6.76	1.31*	0.62*	2.56	1.32*	0.69*	6.00	1.01*	0.69*	1.25*	1141	S1	15	CAL67
67ZN	6.9	53.1	1.25*	0.62				10.5G	1.25*	0.74*	7.0	1.25*	0.62	1.25*		S3		PRO70A
68ZN	5.45	59.5	1.23*	0.40				5.5G	1.23*	1.2*				1.23?		S	W65	VAN61
68ZN	6.9	55.0	1.25*	0.68				14.5G	1.25*	0.74*	14.0	1.25*	0.68	1.25*		S		PRO70A
68ZN	9.8	54.7	1.21	0.72				8.4	1.31	0.64	5.8	1.0*	0.66*	1.25*		S1P1	4	GRE71
68ZN	11.0	47.74	1.307	0.660				12.76	1.305	0.490	6.14	1.200	0.410	1.25*	987	S1P1	11	PER68
68ZN	11.0	49.25	1.285*	0.65*				11.29	1.285*	0.53*	5.17	1.285*	0.53*	1.25*	963	S1P1	11	PER68
68ZN	30.5	50.14	1.162	0.758	2.58	1.100	0.660	6.994	1.281	0.636	6.69	1.100	0.660	1.11*	1291	S1P1	2	TAI71
68ZN	30.5	51.58	1.142*	0.766*	2.42	1.085*	0.699*	6.864	1.275*	0.665*	6.76	1.085*	0.699*	1.11*	1301	S1P1	2	TAI71
68ZN	39.6	46.89	1.154	0.734	3.08	1.297	0.741	4.52	1.297	0.741	6.78	0.936	0.856	1.2?		S2P2		LIE70
68ZN	40.	47.43	1.155	0.751	6.94	1.318	0.689	0.28	1.318	0.689	5.72	1.040	0.720	1.25*	1262	S2P1		FRI67
68ZN	40.	46.60	1.16*	0.75*	6.70	1.37*	0.63*	2.46	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1250	S2P1		FRI67
68ZN	49.1	46.20	1.12*	0.80*	7.63	1.31*	0.62*	2.36	1.32*	0.69*	6.50	1.01*	0.69*	1.25*	1177	S1P2	15	CAL67
68ZN	61.4	38.27	1.208	0.750	8.57	1.24	0.773	2.28	1.24	0.773	5.72*	1.040*	0.720*	1.25*	1112	S2		FUL69
68ZN	61.4	42.51	1.16*	0.75*	7.99	1.37*	0.63*	1.39	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1122	S2		FUL69
70ZN	6.9	54.6	1.25*	0.72				15.0G	1.25*	0.74*	13.5	1.25*	0.72	1.25*		S2		PRO70A
70ZN	49.1	48.38	1.12*	0.80*	5.71	1.31*	0.62*	3.65	1.32*	0.69*	5.96	1.01*	0.69*	1.25*	1235	S2	15	CAL67
GA	9.6	52.86	1.25*	0.65				8.2*	1.25*	0.65	6.0*	1.25*	0.65*	1.25*		S		BER68
GA	17.8	50.7	1.25*	0.65*				8.96	1.25*	0.47*	4.17	1.25*	0.65*	1.25*	1008	S2P1		BAU66
GA	17.8	50.2	1.25*	0.65*				9.61	1.25*	0.47*	3.35	1.16	0.65*	1.25*	1028	S2P1		BAU66
70GE	11.0	49.62	1.285*	0.65*				11.21	1.285*	0.53*	5.00*	1.285*	0.53*	1.25*	930	S1		PER68
70GE	14.5	50.3	1.24*	0.65*				11.4	1.24*	0.57*	7.2*	1.24*	0.65*	1.25*		S2		CUR70
72GE	11.0	49.21	1.285*	0.65*				12.15	1.285*	0.53*	5.00*	1.285*	0.53*	1.25*	958	S1		PER68
72GE	14.5	50.4	1.24*	0.65*				11.5	1.24*	0.57*	7.2*	1.24*	0.65*	1.25*		S2		CUR70
73GE	12.3	50.4	1.23	0.65				12.1	1.23	0.65				1.25*		S2		HEY69
74GE	11.0	48.70	1.285*	0.65*				14.35	1.285*	0.53*	5.00*	1.285*	0.53*	1.25*	989	S1		PER68
74GE	14.5	50.3	1.24*	0.65*				11.6	1.24*	0.57*	7.2*	1.24*	0.65*	1.25*		S2		CUR70
76GE	11.0	48.64	1.285*	0.65*				14.52	1.285*	0.53*	4.70*	1.285*	0.53*	1.25*	1007	S1		PER68
76GE	14.5	50.8	1.24*	0.65*				11.7	1.24*	0.57*	7.2*	1.24*	0.65*	1.25*		S2		CUR70
76SE	6.4	49.7	1.25*	0.695				9.45	1.25*	1.21				1.25*	1035	S		HEN70
76SE	6.4	62.4	1.25*	0.611				1.28	1.25*	1.58	2.72	1.25*	0.14	1.25*		P		HEN70
77SE	13.0	51.4	1.27	0.55	10.	1.27	0.55							1.25?		S	W65	HIN62
78SE	6.4	51.3	1.25*	0.719				5.45	1.25*	1.16				1.25*	818	S		HEN70
78SE	6.4	62.6	1.25*	0.629				1.89	1.25*	0.97	0.77	1.25*	0.14	1.25*		S		HEN70
80SE	6.4	54.0	1.25*	0.692				6.72	1.25*	0.84				1.25*	540	S		HEN70
80SE	6.4	63.0	1.25*	0.590				3.80	1.25*	0.40	0.71	1.25*	0.58	1.25*		S		HEN70
82SE	6.4	53.5	1.25*	0.669				7.11	1.25*	0.87				1.25*	560	S		HEN70
82SE	6.4	62.0	1.25*	0.590				3.50	1.25*	0.49	1.12	1.25*	0.59	1.25*		S		HEN70
84KR	12.0	53.2	1.25*	0.646				14.9	1.25*	0.467	7.5*	1.25*	0.65*	1.25*		S1		ARO74
86KR	9.63	57.09	1.22	0.66				12.52	1.25*	0.48	6.0	1.25*	0.65*	1.25*		S2		HAR70
86KR	12.0	53.5	1.25*	0.604				10.6	1.25*	0.565	7.5*	1.25*	0.65	1.25*		S1		ARO74
86SR	12.	52.6	1.21	0.71				12.1	1.32	0.43	7.5*	1.21	0.71	1.25*		S1	8	RAM72
88SR	19.5	56.1	1.15	0.65*				8.5	1.25*	0.78	5.5	1.15	0.65*	1.25*		S	6	STA67
88SR	19.5	57.1	1.14	0.71				9.4	1.25*	0.74	6.0	1.14	0.71	1.25*		S	6	STA67
88SR	19.5	51.0	1.20*	0.70*				10.9	1.25*	0.65*	4.7	1.20*	0.70*	1.25*		S2	6	STA67
88SR	20.2	51.9	1.19*	0.78*				12.3	1.27*	0.59*	7.4*	1.25*	0.65*	1.25*		S3		PIC69
89Y	7.44	53.7	1.25*	0.67				7.4G	1.25*	1.07	5.5*	1.25*	0.67	1.25*		S1		BRA67
89Y	8.08	54.6	1.25*	0.61				5.2G	1.25*	1.26	5.5*	1.25*	0.61	1.25*		S1		BRA67
89Y	9.01	53.3	1.25*	0.63				6.2G	1.25*	1.49	5.5*	1.25*	0.63	1.25*		S1		BRA67
89Y	18.9	47.0	1.29	0.65*				16.9	1.25*	0.45	3.9	1.29	0.65*	1.25*		S	6	STA67
89Y	18.9	52.6	1.20*	0.70*				9.8	1.25*	0.65*	5.7	1.20*	0.70*	1.25*		S2	6	STA67
89Y	24.5	46.57	1.232	0.627				10.92	1.275	0.536	7.0*	1.232	0.627	1.31*		S1		BEN68
89Y	49.35	49.6	1.15	0.91	9.9	1.44	0.34	0.6	1.44	0.34	6.7	1.18	0.50	1.25*	1350	S P	1	MAN71A
89Y	49.35	45.5	1.17*	0.75*	0.2	1.32*	0.63*	8.6	1.32*	0.63*	7.5	1.01*	0.75*	1.20*	1400	S2P	1	MAN71A
89Y	156.	15.70	1.31	0.60	17.0	1.09	0.95				2.46	1.08	0.63	1.25	975	S2	12,19	COM74
90ZR	6.35	56.6	1.23*	0.60*				0.15	1.23*	0.75	6.25*	1.23*	0.65*	1.20*		S2	29	LIE68
90ZR	6.90	56.2	1.23*	0.60*				0.39	1.23*	0.90	6.25*	1.23*	0.65*	1.20*		S3	29	LIE68
90ZR	8.38	55.4	1.23*	0.60*				5.00	1.23*	0.68	6.25*	1.23*	0.65*	1.20*		S3	29	LIE68
90ZR	9.70	53.03	1.254	0.656				17.39	1.346	0.236	5.63	0.828	0.401	1.25*	591	S1P1	21	VOS72
90ZR	9.70	56.51	1.185	0.7*				8.96	1.326	0.47*	4.55	0.752	0.7*	1.25*		S1P1	20	VOS72
90ZR	9.8	51.3	1.27	0.67				14.0	1.37	0.29	6.3	1.0*	0.66*	1.25*		S1P1	4	GRE71

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TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
90ZR	10.75	53.5	1.22*	0.607				5.76	1.29	0.74	7.5	1.22*	0.607	1.25*		S2	3	CLA70A
90ZR	10.75	54.5	1.23*	0.60*				8.36	1.27	0.54	5.2	1.20*	0.42*	1.25*		S2	3	CLA70A
90ZR	10.75	55.0	1.25*	0.65*				14.5	1.25*	0.47*	6.8	1.20*	0.42*	1.25*		S2	3	CLA70A
90ZR	12.7	52.8	1.25*	0.65*				15.6	1.25*	0.412	6.0*	1.12*	0.47*	1.25*	878	S1		DIC68
90ZR	12.7	52.4	1.220	0.607				5.4	1.293	0.737	7.9	1.220	0.607	1.25*	964	S1		DIC68
90ZR	12.7	54.2	1.22*	0.607				5.4	1.29	0.737	7.9	1.22*	0.607	1.25*		S2	3	CLA70A
90ZR	12.7	54.6	1.25*	0.65*				14.8	1.25*	0.47*	6.8	1.20*	0.42*	1.25*		S2	3	CLA70A
90ZR	16.0	50.91	1.244	0.625				7.25	1.234	0.698	6.90*	1.01*	0.75*	1.11*	1139	S1	2,4	MAK72
90ZR	18.8	55.1	1.148	0.753				7.7	1.296	0.757	6.76	1.148	0.753	1.25*	1408	S1		GRA66
90ZR	18.8	54.2	1.166	0.716				8.5	1.298	0.681	6.42	1.166	0.716	1.25*	1326	S1	28	GRA66
90ZR	18.8	52.0*	1.2*	0.7*				9.25	1.25*	0.65*	6.2*	1.2*	0.7*	1.25*	1268	S1	28	GRA66
90ZR	18.8	52.0	1.20*	0.7*				9.25	1.25*	0.65*	6.2	1.20*	0.7*	1.25*	1268	S		STA66
90ZR	19.08	46.27	1.297	0.674				13.22	1.255	0.475	9.84	1.313	0.319	1.25*		S1	20	VOS72
90ZR	19.08	52.15	1.176	0.7*				13.62	1.070	0.424	15.47	1.266	0.7*	1.25*		S	20	VOS72
90ZR	20.25	48.20	1.24	0.618				8.05	1.29	0.60	5.75	1.07	0.53	1.25?	1240	S1P1	8	GLA69
90ZR	20.37	47.42	1.274	0.669				12.99	1.272	0.459	5.80	1.131	0.252	1.25*		S1	20	VOS72
90ZR	20.37	49.79	1.229	0.7*				13.77	1.257	0.456	7.21	1.236	0.7*	1.25*		S1	20	VOS72
90ZR	22.04	49.00	1.231	0.686				16.80	1.233	0.383	6.90	1.386	0.792	1.25*		S1	20	VOS72
90ZR	22.04	48.62	1.234	0.7*				18.13	1.238	0.361	7.79	1.360	0.7*	1.25*		S1	20	VOS72
90ZR	22.5	46.7	1.26*	0.664*	0.5*	1.23*	0.567*	10.6*	1.23*	0.567*	7.75*	1.26*	0.664*	1.26*		S1		BAL64
90ZR	22.5	51.6	1.186	0.778				11.1	1.268	0.587	7.36	1.186	0.778	1.25*	1362	S1		GRA66
90ZR	22.5	50.7	1.2*	0.7*				9.5	1.25*	0.65*	6.2*	1.2*	0.7*	1.25*	1338	S1		GRA66
90ZR	22.5	50.42	1.212	0.717				8.55	1.231	0.694	5.73	1.021	0.340	1.25*		S1	20	VOS72
90ZR	22.5	50.16	1.212	0.7*				9.71	1.271	0.611	6.82	1.094	0.7*	1.25*		S1	20	VOS72
90ZR	22.9	50.1	1.22	0.63				11.54	1.27	0.54	6.4	1.15*	0.5*	1.25*	1234	S P		MAY71
90ZR	40.	45.95	1.186	0.674	3.21	1.300	0.655	5.25	1.300	0.655	6.92	1.002	0.861	1.25*	1375	S1P1		FRI67
90ZR	40.	47.76	1.16*	0.75*	4.69	1.37*	0.63*	3.46	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1410	S1P1		FRI67
90ZR	40.0	48.64	1.171	0.722				9.91	1.066	0.774	7.21	1.022	0.858	1.25*		S2P2	21	VOS72
90ZR	40.0	52.82	1.104	0.816	6.13	1.585	0.459				6.72	0.942	0.828	1.25*		S1P1	21	VOS72
90ZR	40.0	50.98	1.123	0.639	5.48	1.408	0.545	3.04	1.408	0.545	7.03	0.964	0.810	1.25*		S1P1	21	VOS72
90ZR	49.35	45.8	1.18	0.73	6.5	1.31	0.60	3.0	1.31	0.60	6.0	1.07	0.74	1.25*	1310	S P		MAN71A
90ZR	49.35	45.8	1.17*	0.75*	6.2	1.32*	0.63*	2.4	1.32*	0.63*	5.7	1.01*	0.75*	1.20*	1300	S1P1		MAN71A
90ZR	61.4	39.52	1.201	0.693	5.12	1.40	0.534	2.54	1.40	0.534	6.92*	1.002*	0.861*	1.25*	1239	S2		FUL69
90ZR	61.4	42.86	1.16*	0.75*	4.66	1.37*	0.63*	3.99	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1279	S2		FUL69
90ZR	156.	11.95	1.41	0.56	12.0	1.25	0.43				2.0	1.08	0.71	1.25	801	S1	12,22	COM74
90ZR	185.	11.1	1.2*	0.62	10.6	1.43	0.43				1.9	1.16	0.7*	1.3*		S P2	14	ING73
91ZR	14.5	52.40	1.23*	0.623	4.54	1.627	0.388				12.47	1.23*	0.623	1.25*	1073	S2P1		FOR67
91ZR	14.5	51.72	1.23*	0.633				8.03	1.312	0.649	12.17	1.23*	0.633	1.25*	1107	S2P1		FOR67
91ZR	14.52	50.7	1.25*	0.608				4.85	1.25*	0.919	8.2	1.25*	0.608	1.25*		S1		AWA69
91ZR	14.52	50.0*	1.25*	0.65*				9.0*	1.25*	0.65*	6.2*	1.25*	0.65*	1.25*		S1		AWA69
91ZR	14.8	52.73	1.224	0.65*				9.35	1.254	0.65*	5.5	1.224	0.65*	1.22		S2P1		MIC69
91ZR	16.	55.63	1.190	0.65*				7.73	1.310	0.65*	7.05	1.190	0.65*	1.19		S2P2		MIC69
91ZR	18.7	52.13	1.20*	0.70*				9.48	1.25*	0.65*	6.20*	1.20*	0.70*	1.25*		S1		BLO69
91ZR	19.08	45.91	1.310	0.635				13.64	1.252	0.477	7.22	1.234	0.249	1.25*		S1	20	VOS72
91ZR	19.08	52.70	1.183	0.7*				12.69	1.145	0.499	11.07	1.291	0.7*	1.25*		S	20	VOS72
91ZR	20.37	52.95	1.191	0.668				9.20	1.254	0.653	4.95	1.129	0.061	1.25*		S1	20	VOS72
91ZR	20.37	51.52	1.201	0.7*				11.74	1.250	0.541	7.55	1.232	0.7*	1.25*		S1	20	VOS72
91ZR	22.04	49.09	1.230	0.691				12.95	1.252	0.481	7.63	1.258	0.738	1.25*		S1	20	VOS72
91ZR	22.04	49.33	1.225	0.7*				12.98	1.255	0.481	7.82	1.264	0.7*	1.25*		S1	20	VOS72
91ZR	22.5	46.9	1.26*	0.664*	0.5*	1.23*	0.567*	10.6*	1.23*	0.567*	7.75*	1.26*	0.664*	1.26*		S1		BAL64
91ZR	22.5	47.71	1.254	0.681				12.31	1.260	0.515	8.08	1.251	0.622	1.25*		S1	20	VOS72
91ZR	22.5	48.95	1.234	0.7*				11.72	1.257	0.544	7.85	1.230	0.7*	1.25*		S1	20	VOS72
91ZR	24.5	50.5	1.18	0.88				14.9	1.32	0.46	4.9	1.12*	0.47*	1.25*	1409	S P		MAY71
91ZR	49.35	46.5	1.15	0.78	8.9	1.36	0.64	0.9	1.36	0.64	6.2	1.05	0.71	1.25*	1380	S P		MAN71A
91ZR	49.35	44.1	1.17*	0.75*	2.0	1.32*	0.63*	5.7	1.32*	0.63*	5.9	1.01*	0.75*	1.20*	1320	S2P		MAN71A
92ZR	10.75	55.34	1.23*	0.60*				9.66	1.18	0.67	6.4	1.20*	0.42*	1.25*		S2	3	CLA70B
92ZR	12.7	52.2	1.25*	0.65*				12.3	1.25*	0.525	6.0*	1.12*	0.47*	1.25*	963	S1		DIC68
92ZR	12.7	54.5	1.231	0.596				9.2	1.181	0.668	6.4	1.231	0.596	1.25*	951	S1		DIC68
92ZR	12.7	55.08	1.23*	0.60*				9.66	1.18	0.67	6.4	1.20*	0.42*	1.25*		S2	3	CLA70B
92ZR	12.7	52.6	1.25*	0.65*				13.5	1.25*	0.47*	6.75	1.20*	0.42*	1.25*		S2	3	CLA70B
92ZR	18.6	61.86	1.1*	0.75*				11.24	1.35*	0.55*	5.3	0.76	0.55*	1.1*	1249	S P		KOS68
92ZR	18.6	51.49	1.24*	0.65*				12.27	1.28*	0.5*	6.78	1.20	0.42*	1.25*	1170	S P	30	KOS68
92ZR	19.4	50.9	1.20*	0.7*				10.3	1.25*	0.65*	6.2*	1.20*	0.7*	1.25*	1324	S2		STA66
92ZR	19.4	57.9	1.11	0.77				8.5	1.25*	0.77	6.8	1.11	0.77	1.11	1429	S1		STA66
92ZR	20.25	47.82	1.26	0.609				9.32	1.30	0.57	6.30	1.14	0.53	1.25?	1218	S1P1	8	GLA69
92ZR	20.37	51.48	1.208	0.683				9.19	1.214	0.699	5.05	1.129	0.055	1.25*		S1	20	VOS72
92ZR	20.37	49.50	1.234	0.7*				12.80	1.232	0.526	7.85	1.227	0.7*	1.25*		S1	20	VOS72
92ZR	22.04	46.17	1.279	0.718				17.07	1.284	0.417	7.25	1.256	0.687	1.25*		S1	20	VOS72
92ZR	22.04	45.49	1.293	0.7*				17.37	1.285	0.407	7.10	1.242	0.7*	1.25*		S1	20	VOS72
92ZR	22.5	46.7	1.26*	0.664*	0.5*	1.23*	0.567*	10.6*	1.23*	0.567*	7.75*	1.26*	0.664*	1.26*		S1		BAL64
92ZR	22.5	54.70	1.134	0.805				12.23	1.236	0.569	10.98	1.341	0.544	1.25*		S1	20	VOS72
92ZR	22.5	53.31	1.155	0.7*				11.17	1.256	0.614	7.57	1.339	0.7*	1.25*		S	20	VOS72
92ZR	49.35	45.5	1.14	0.78	8.7	1.35	0.70	1.7	1.35	0.70	5.9	1.04	0.67	1.25*	1460	S P		MAN71A
92ZR	49.35	43.1	1.17*	0.75*	0.6	1.32*	0.63*	7.5	1.32*	0.63*	5.1	1.01*	0.75*	1.20*	1380	S2P2		MAN71A
94ZR	12.7	51.8	1.15*	0.65*				8.6	1.25*	0.727	6.0*	1.12*	0.47*	1.25*	1122	S1		DIC68
94ZR	12.7	55.2	1.216	0.646				8.3	1.180	0.768	6.5	1.216	0.646	1.25*	1071	S1		DIC68
94ZR	19.4	50.9	1.20*	0.7*				11.1	1.25*	0.65*	6.2*	1.20*	0.7*	1.25*	1357	S2		STA66
94ZR	19.4	57.4	1.13	0.74				9.5	1.25*	0.74	6.7	1.13	0.74	1.13	1420	S1		STA66
94ZR	22.5	47.4	1.26*	0.664*	0.5*	1.23*	0.567*	10.6*	1.23*	0.567*	7.75*	1.26*	0.664*	1.26*		S1		BAL64
94ZR	49.35	46.2	1.15	0.78	8.1	1.36	0.67	2.1	1.36	0.67	5.9	1.06	0.72	1.25*	1475	S P		MAN71A
94ZR	49.35	45.2	1.17*	0.75*	6.1	1.32*	0.63*	3.8	1.32*	0.63*	5.7	1.01*	0.75*	1.20*	1420	S1P		MAN71A

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TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
96ZR	19.4	51.9	1.20*	0.70*				11.4	1.25*	0.65*	6.2	1.20*	0.70*	1.25*		S2		STA67A
96ZR	22.5	48.2	1.26*	0.664*	0.5*	1.23*	0.567*	10.6*	1.23*	0.567*	7.75*	1.26*	0.664*	1.26*		S2		BAL64
96ZR	49.35	46.6	1.16	0.75	7.2	1.36	0.66	2.2	1.36	0.66	6.6	1.03	0.82	1.25*	1465	S P		MAN71A
96ZR	49.35	45.9	1.17*	0.75*	6.3	1.32*	0.63*	3.4	1.32*	0.63*	6.3	1.01*	0.75*	1.20*	1430	S1P1		MAN71A
NB	22.2	47.7	1.25*	0.65*				13.6	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1209	S3	35	PER63
93NB	16.2	50.6	1.25*	0.678				14.1	1.25*	0.47	8.*	1.25*	0.678	1.25*		S	W65	SMI64
MO	17.8	49.2	1.25*	0.65*				15.53	1.25*	0.47*	3.27	1.25*	0.65*	1.25*	1146	S1P2		BAU66
MO	17.8	48.9	1.25*	0.65*				16.90	1.25*	0.47*	4.06	0.87	0.65*	1.25*	1155	S1P1		BAU66
92MO	12.5	53.73	1.222*	0.616*				6.00	1.218*	0.723	6.5*	1.222*	0.616*	1.25*		S2	7,29	BUR75
92MO	19.85	59.15	1.121	0.780	1.75	1.298	0.612	9.45	1.298	0.612	5.49	1.055	0.678	1.25*		S2		SIN72
92MO	20.25	47.73	1.24	0.616				7.88	1.33	0.60	5.94	1.03	0.53	1.25?	1221	S1P1	8	GLA69
92MO	30.3	51.76	1.161	0.773	3.14	1.357	0.616	4.35	1.357	0.616	6.46	1.004	0.594	1.25*		S2P2		SIN72
92MO	49.4	49.77	1.153	0.754	9.69	1.310	0.629	1.53	1.310	0.629	6.02	1.100	0.784	1.25*		S2		SIN72
94MO	12.5	53.99	1.222*	0.616*				7.14	1.218*	0.726	6.5*	1.222*	0.616*	1.25*		S2	7	BUR75
94MO	49.4	48.09	1.140	0.870	10.76	1.350	0.632	0.46	1.350	0.632	7.66	0.938	0.550	1.25*		S2		SIN72
96MO	12.5	54.50	1.222*	0.616*				8.12	1.218*	0.729	6.5*	1.222*	0.616*	1.25*		S2	7	BUR75
96MO	30.3	53.69	1.156	0.795	5.74	1.420	0.589	2.59	1.420	0.589	7.36	1.018	0.660	1.25*		S2P3		SIN72
96MO	49.4	49.99	1.150	0.740	8.77	1.300	0.660	1.97	1.300	0.660	7.09	1.047	0.748	1.25*		S2		SIN72
98MO	12.5	55.49	1.222*	0.616*				8.52	1.218*	0.729	6.5*	1.222*	0.616*	1.25*		S2	7	BUR75
98MO	14.7	55.14	1.18*	0.650				5.48	1.43	0.813	8.23	1.18*	0.65	1.25*	1412	S1		AWA72
98MO	14.7	55.16*	1.18*	0.740*				9.50*	1.28*	0.702*	7.68*	1.18*	0.74*	1.25*	1256	S1		AWA72
100MO	12.5	55.24	1.222*	0.616*				9.40	1.218*	0.730	6.5*	1.222*	0.616*	1.25*		S2	7	BUR75
100MO	14.7	55.16	1.18*	0.740				9.50	1.28	0.702	7.68	1.18*	0.740	1.25*	1272	S1		AWA72
100MO	19.85	57.25	1.132	0.740	1.35	1.370	0.672	8.68	1.370	0.672	6.27	1.106	0.652	1.25*		S2		SIN72
100MO	30.3	51.40	1.172	0.878	4.89	1.354	0.573	6.40	1.354	0.573	8.61	1.051	0.559	1.25*		S3P3		SIN72
100MO	49.4	52.89	1.140	0.830	5.81	1.200	1.150	5.13	1.200	1.150	7.42	1.002	0.870	1.25*		S2		SIN72
RH	17.2	57.66	1.150	0.687				8.21	1.263	0.738	8.16	1.150	0.687	1.25*	1268	S1		PER63
RH	17.2	50.6	1.25*	0.65*				16.2	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1127	S2	34,35	PER63
106PD	13.	56.0	1.156	0.80				10.5	1.355	0.584	6.*	1.156	0.804	1.25*	1105	S1		ROB66
106PD	13.	53.6	1.2*	0.7*				8.8	1.3*	0.7*	6.*	1.2*	0.7*	1.25*		S2		ROB66
108PD	12.	56.9	1.174	0.67				8.8	1.297	0.734	6.*	1.174	0.677	1.25*	1025	S1		ROB66
108PD	12.	54.4	1.2*	0.7*				9.6	1.3*	0.7*	6.*	1.2*	0.7*	1.25*		S1		ROB66
108PD	13.	56.1	1.181	0.69				9.2	1.274	0.748	6.*	1.181	0.690	1.25*	1127	S1		ROB66
108PD	13.	54.2	1.2*	0.7*				9.4	1.3*	0.7*	6.*	1.2*	0.7*	1.25*		S2		ROB66
AG	9.4	55.6	1.25*	0.65*				14.4	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	534	S1	35	PER63
AG	17.1	56.3	1.20*	0.56	12.8	1.20*	0.56							1.20*		S	W65	GLA57
AG	17.1	55.59	1.172	0.746				12.09	1.261	0.593	7.18	1.172	0.746	1.25*	1234	S1		PER63
AG	17.1	50.9	1.25*	0.65*				15.6	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1120	S2	34,35	PER63
AG	17.8	50.2	1.25*	0.65*				16.88	1.25*	0.47*	4.13	1.25*	0.65*	1.25*	1157	S1P2		BAU66
AG	17.8	49.8	1.25*	0.65*				17.45	1.25*	0.47*	4.78	1.06	0.65*	1.25*	1161	S1P1		BAU66
AG	28.	44.9	1.27	0.57	4.4	1.11	0.607	10.0G	1.11	0.88	11.9	1.27	0.57	1.25?	1269	S1		DIT69
AG	28.	49.2	1.21	0.63	5.0	1.22	1.06	3.9G	1.22	1.53	9.1	1.21	0.63	1.25?	1448	S		DIT69
AG	28.	54.4	1.13	0.702	2.58	1.10	1.09	7.0G	1.10	1.58	8.35	1.18	1.27	1.20*		S1		SAN70
AG	28.	49.6	1.20*	0.70*	5.21	1.20*	0.48*	11.20G	1.20*	0.70*	11.20	1.20*	0.70*	1.20*		S3		SAN70
107AG	12.94	54.3	1.21	0.68				9.3	1.24	0.71	6.0*	1.21	0.68	1.25*		S1	20	FOR67
108AG	17.	50.6	1.25*	0.65*	6.7	1.25*	0.65*	7.8G	1.25*	1.00*	5.6	1.25*	0.65*	1.25*	1173	S1P2		PIC65
109AG	13.0	54.4	1.21	0.70				10.35	1.29	0.64	6.0*	1.21	0.70	1.25*		S1		FOR70
110CD	16.0	54.90	1.2*	0.7*				10.85	1.25*	0.65*	6.0*	1.1*	0.7*	1.2*	1202	S1		MAK68
111CD	14.2	53.8	1.25*	0.65*				11.0G	1.25*	1.3*	7.0*	1.25*	0.65*	1.25*		S2		KOI67
112CD	13.	56.	1.2*	0.7*				9.5	1.25*	0.7*	6.*	1.2*	0.7*	1.25*		S1		STE68
112CD	14.7	54.0	1.25*	0.65*				11.0G	1.25*	1.3*	7.0*	1.25*	0.65*	1.25*		S2		KOI67
112CD	16.0	55.06	1.2*	0.7*				11.16	1.25*	0.65*	6.0*	1.1*	0.7*	1.2*	1222	S1		MAK68
113CD	14.2	55.5	1.25*	0.65*				13.5G	1.25*	1.3*	7.0*	1.25*	0.65*	1.25*		S2		KOI67
114CD	13.	55.	1.2*	0.7*				10.25	1.25*	0.7*	6.*	1.2*	0.7*	1.25*		S1		STE68
114CD	16.0	55.36	1.2*	0.7*				11.84	1.25*	0.65*	6.0*	1.1*	0.7*	1.2*	1246	S1		MAK68
114CD	49.6	35.40	1.238	0.779	10.16	1.238	0.748	1.063	1.238	0.748	4.68	1.238	0.779	1.25*		S1	20	EDW67
114CD	49.6	43.67	1.147	0.852	11.56	1.304	0.660				7.80	1.147	0.852	1.25*		S1	20	EDW67
114CD	49.6	44.22	1.16*	0.75*	7.51	1.37*	0.63*	1.50	1.37*	0.63*	6.04*	1.16*	0.75*	1.25*		S1	20	EDW67
114CD	50.	43.16	1.18	0.748	6.70	1.32	0.757	2.52	1.32	0.757	5.71	1.047	0.747	1.25*		S1P1		LEW68
114CD	55.16	37.	1.25*	0.65*				9.0	1.25*	0.65*	7.0	1.25*	0.65*	1.25*		S3		KOI68
116CD	12.	56.2	1.18	0.75				10.35	1.28	0.7	6.0*	1.18	0.75	1.25*		S1	8	DEY72
116CD	16.0	55.77	1.2*	0.7*				12.45	1.25*	0.65*	6.0*	1.1*	0.7*	1.2*	1269	S1		MAK68
116CD	22.2	49.5	1.25*	0.65*				15.7	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1314	S2	35	PER63
IN	17.8	50.4	1.25*	0.65*				15.77	1.25*	0.47*	3.75	1.25*	0.65*	1.25*	1161	S2P1		BAU66
IN	17.8	49.4	1.25*	0.65*				18.51	1.25*	0.47*	4.54	0.97	0.65*	1.25*	1177	S1P1		BAU66

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TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
SN	9.72	62.	1.20*	0.54	6.9	1.20*	0.54							1.20*		S	W65	GLA57A
SN	19.6	54.8	1.20*	0.445	10.2	1.20*	0.445							1.20*		S	W65	SMI62
SN	40.	46.3	1.18*	0.7*	9.52	1.40*	0.7*				7.5*	1.18*	0.7*	1.2*	4636	S	28	PRI65
112SN	9.8	52.51	1.25*	0.7*				11.04	1.31*	0.53*	7.5*	1.25*	0.7*	1.3*	586	S1		DUR65
112SN	16.	52.4	1.25*	0.625*				15.3	1.198	0.566	7.5*	1.25*	0.625*	1.25*		S1		MAK67
112SN	16.0	55.46	1.2*	0.7*				10.38	1.25*	0.65*	6.0*	1.1*	0.7*	1.2*	1166	S1		MAK68
116SN	9.8	52.24	1.25*	0.7*				10.08	1.31*	0.53*	7.5*	1.25*	0.7*	1.3*	601	S1		DUR65
116SN	16.0	55.25	1.2*	0.7*				10.73	1.25*	0.65*	6.0*	1.1*	0.7*	1.2*	1199	S1		MAK68
116SN	16.	50.91	1.249	0.686				11.72	1.288	0.556	6.56	1.155	0.517	1.22*		S P	10	BOY71
116SN	16.	52.97	1.221	0.675				9.08	1.280	0.661	6.24	1.162	0.458	1.22*		S P	10	BOY71
116SN	21.	53.9	1.18	0.71				10.6	1.26	0.660	5.24	1.07	0.448	1.25*	1423	S1P1		BAR69
116SN	21.	53.7	1.19*	0.70*				11.1	1.25*	0.64*	5.33	1.05*	0.55*	1.25*	1392	S1P1		BAR69
116SN	21.	49.5	1.25*	0.65*				14.7	1.25*	0.47*	5.74	1.25*	0.65*	1.25*	1253	S2P2		BAR69
116SN	22.2	48.7	1.25*	0.65*				14.5	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1267	S3	35	PER63
116SN	22.2	50.6	1.25*	0.65*	4.9	1.25*	0.65*	8.96	1.25*	1.00*	6.2	1.25*	0.65*	1.25*	1322	S1		PIC65
116SN	24.5	57.05	1.13*	0.715				10.64	1.33*	0.65*	6.1*	1.13*	0.75*	1.20*	1545	S	6	BEE70
116SN	39.6	51.89	1.119	0.851	4.10	1.396	0.625	4.09	1.396	0.625	6.54	1.013	0.739	1.2?		S1P2		LIE70
116SN	49.35	46.8	1.17*	0.75*	0.4	1.32*	0.63*	7.8	1.32*	0.63*	6.9	1.01*	0.75*	1.20*	1530	S2	1	MAN71A
116SN	61.4	41.93	1.197	0.687	3.80	1.24	0.808	5.01	1.24	0.808	6.11*	1.057*	0.800*	1.25*	1575	S2		FUL69
116SN	61.4	44.18	1.16*	0.75*	4.76	1.37*	0.63*	3.90	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1565	S2		FUL69
118SN	16.0	55.28	1.2*	0.7*				11.83	1.25*	0.65*	6.0*	1.1*	0.7*	1.2*	1229	S2		MAK68
118SN	16.	54.45	1.221	0.653				11.81	1.265	0.567	7.27	1.128	0.422	1.22*		S P	10	BOY71
118SN	16.	54.20	1.220	0.656				10.86	1.272	0.609	7.43	1.131	0.381	1.22*		S P	10	BOY71
118SN	24.5	56.05	1.13*	0.723				10.74	1.33*	0.65*	6.1*	1.13*	0.75*	1.20*	1568	S	6	BEE70
118SN	24.5	56.69	1.13*	0.726*				10.78	1.33*	0.65*	6.1*	1.13*	0.75*	1.20*	1571	S	6	BEE70
118SN	24.5	51.4	1.17	0.76				11.44	1.33	0.62	6.2	1.15	0.55	1.25*	1589	S P		MAY71
118SN	39.6	46.34	1.210	0.752	3.40	1.262	0.609	7.00	1.262	0.609	6.53	1.126	0.696	1.2?		S1P2		LIE70
118SN	49.35	45.4	1.24	0.67	0.5	1.12	0.61	13.5	1.12	0.61	8.0	1.13	0.62	1.25*	1520	S	1	MAN71A
118SN	49.35	47.5	1.17*	0.75*	5.9	1.32*	0.63*	4.6	1.32*	0.63*	7.6	1.01*	0.75*	1.20*	1630	S1	1	MAN71A
120SN	9.8	52.27	1.25*	0.7*				11.72	1.31*	0.53*	7.5*	1.25*	0.7*	1.3*	621	S1		DUR65
120SN	9.8	51.5	1.30	0.62				14.1	1.25	0.52	6.7	1.0*	0.66*	1.25*		S1P1	4	GRE71
120SN	12.38	54.18	1.244	0.703				14.29	1.256	0.538	6.8*	1.20*	0.60*	1.22*		S		ARK70
120SN	16.0	55.79	1.2*	0.7*				11.52	1.25*	0.65*	6.0*	1.1*	0.7*	1.2*	1239	S1		MAK68
120SN	16.	56.12	1.179	0.749				10.55	1.303	0.625	6.62	1.139	0.479	1.22*		S1P1	10	BOY71
120SN	16.	54.44	1.201	0.728				10.65	1.300	0.624	6.84	1.141	0.443	1.22*		S P	10	BOY71
120SN	16.0	52.71	1.236	0.710				13.87	1.282	0.513	6.90*	1.01*	0.75*	1.12*	1187	S1	2,4	MAK72
120SN	17.8	50.70	1.25*	0.665				13.22	1.230	0.556	7.40	1.25*	0.665	1.25*	1243	S1P		JAR67
120SN	24.5	57.43	1.13*	0.744				11.16	1.33*	0.65*	6.1*	1.13*	0.75*	1.20*	1609	S	6	BEE70
120SN	24.5	57.27	1.13*	0.739*				11.08	1.33*	0.65*	6.1*	1.13*	0.75*	1.20*	1605	S	6	BEE70
120SN	30.	51.08	1.16*	0.75*	4.18	1.37*	0.63*	5.26	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1668	S1P1	11	FRI67
120SN	30.3	47.48	1.234	0.658	1.39	1.234	0.658	12.93	1.234	0.510	13.24	1.234	0.658	1.25*	1481	S1	32	BAR65
120SN	30.3	46.20	1.25*	0.65*				16.99	1.25*	0.47*	12.*	1.25*	0.65*	1.25*	1467	S2	32	BAR65
120SN	30.3	51.1	1.20*	0.7*	1.2	1.25*	0.7*	8.7	1.25*	0.7*	6.0	1.20*	0.7*	1.20*		S1P1	11	GRE66
120SN	30.3	48.8	1.202	0.704	2.58	1.322	0.644	7.22	1.322	0.644	4.96	1.142	0.508	1.2*	1644	S1P1	11	SAT67
120SN	30.3	55.9	1.12*	0.75*	3.0*	1.33*	0.58*	7.25	1.33*	0.58*	6.36	1.12*	0.75*	1.2*	1652	S1P1	11	SAT67
120SN	30.3	51.39	1.158	0.772	2.62	1.326	0.696	6.09	1.326	0.696	6.25	1.005	0.728	1.12*	1675	S1P1	2	GRE70
120SN	30.3	48.18	1.177	0.756	0.01	1.217	0.956	7.94	1.217	0.956	5.71	1.031	0.684	1.12*	1883	P1	2	GRE70
120SN	30.3	51.21	1.176	0.706	2.34	1.309	0.679	7.11	1.309	0.697	5.71*	1.031*	0.684*	1.12*	1641	S1	2	GRE70
120SN	30.3	49.0	1.184	0.80				13.55	1.304	0.567	5.55	1.184	0.80	1.25*		S P2		KAR70
120SN	30.3	50.4	1.174	0.806				13.78	1.294	0.574	5.65	1.083	0.652	1.25*		S P2		KAR70
120SN	30.3	51.97	1.176*	0.706*	2.33	1.309*	0.679*	7.13	1.309*	0.679*	5.71*	1.031*	0.684*	1.12*		S1		PUT71
120SN	30.3	51.24	1.173	0.700	2.64	1.311	0.665	7.10	1.311	0.665	6.14	1.173	0.700	1.20*		S1P1	11	VOS72
120SN	30.3	51.82	1.155	0.773	2.77	1.330	0.700	5.96	1.330	0.700	6.27	1.009	0.736	1.20*		S1P1		VOS72
120SN	39.6	49.07	1.170	0.710	3.11	1.274	0.773	5.56	1.274	0.773	7.22	1.009	0.904	1.2?		S1P2		LIE70
120SN	40.	48.36	1.168	0.746	4.62	1.322	0.728	4.39	1.322	0.728	6.11	1.057	0.800	1.25*	1704	S1P1		FRI67
120SN	40.	48.77	1.16*	0.75*	4.72	1.37*	0.63*	4.62	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1691	S1P1		FRI67
120SN	49.35	46.2	1.08	0.56	0.4	1.10	0.82	10.8	1.10	0.82	9.1	1.41	0.65	1.25*	1550	S	1	MAN71A
120SN	49.35	48.2	1.17*	0.75*	0.65	1.32*	0.63*	8.2	1.32*	0.63*	7.1	1.01*	0.75*	1.20*	1610	S2	1	MAN71A
120SN	156.	18.20	1.29	0.72	7.25	1.32	0.54				2.53	1.105	0.65	1.22	902	S2	12,22	COM74
120SN	160.	37.64	1.00	0.71	16.09	1.342	0.512				4.53	1.00	0.71	1.20*	1339	S1	33,19	ROO65
120SN	160.	16.2	1.18	0.55	10.*	1.40	0.50*				2.5*	1.18	0.55	1.3*	1215	S3	12,19	ROO65
122SN	11.25	54.26	1.267	0.669				16.56	1.260	0.471	6.8*	1.20*	0.60*	1.22*		S		ARK70
122SN	16.0	56.14	1.2*	0.7*				11.75	1.25*	0.65*	6.0*	1.1*	0.7*	1.2*	1256	S1		MAK68
122SN	24.5	57.61	1.13*	0.749				11.26	1.33*	0.65*	6.1*	1.13*	0.75*	1.20*	1630	S	6	BEE70
122SN	24.5	57.35	1.13*	0.749*				11.26	1.33*	0.65*	6.1*	1.13*	0.75*	1.20*	1631	S	6	BEE70
122SN	39.6	51.35	1.131	0.771	3.54	1.376	0.685	4.63	1.376	0.685	7.27	0.933	0.984	1.2?		S1P2		LIE70
122SN	49.35	46.7	1.11	0.54	0.6	1.19	0.75	11.2	1.19	0.75	8.8	1.37	0.61	1.25*	1625	S	1	MAN71A
122SN	49.35	48.2	1.17*	0.75*	0.69	1.32*	0.63*	8.3	1.32*	0.63*	6.8	1.01*	0.75*	1.20*	1640	S2	1	MAN71A
124SN	9.8	52.74	1.25*	0.7*				12.96	1.31*	0.53*	7.5*	1.25*	0.7*	1.3*	649	S1		DUR65
124SN	11.54	54.14	1.268	0.648				12.92	1.219	0.592	6.8*	1.20*	0.60*	1.22*		S		ARK70
124SN	16.	54.6	1.25*	0.625*				16.3	1.173	0.580	7.5*	1.25*	0.625*	1.25*		S1		MAK67
124SN	16.0	56.37	1.2*	0.7*				12.22	1.25*	0.65*	6.0*	1.1*	0.7*	1.2*	1277	S1		MAK68
124SN	16.	55.35	1.205	0.709				13.12	1.258	0.594	6.85	1.149	0.604	1.22*		S P	10	BOY71
124SN	16.	56.11	1.188	0.741				13.35	1.270	0.587	6.95	1.158	0.590	1.22*		S P	10	BOY71
124SN	24.5	57.33	1.13*	0.787				11.53	1.33*	0.65*	6.1*	1.13*	0.75*	1.20*	1695	S	6	BEE70
124SN	24.5	57.36	1.13*	0.761*				12.21	1.33*	0.65*	6.1*	1.13*	0.75*	1.20*	1675	S	6	BEE70
124SN	39.6	49.42	1.158	0.779	4.40	1.359	0.666	4.43	1.359	0.666	6.94	1.002	0.922	1.2?		S1P2		LIE70
124SN	49.35	45.5	1.23	0.71	2.5	1.15	0.60	11.4	1.15	0.60	7.8	1.16	0.69	1.25*	1590	S	1	MAN71A
124SN	49.35	47.9	1.17*	0.75*	5.5	1.32*	0.63*	4.8	1.32*	0.63*	7.4	1.01*	0.75*	1.20*	1680	S1	1	MAN71A

See page 8 for Explanation of Tables

TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
122TE	51.9	45.77	1.16*	0.75*	5.33	1.37*	0.63*	3.22	1.37*	0.63*	6.04*	1.064*	0.74*	1.25*		S1	1	MAT75
124TE	12.	54.83	1.207	0.742				11.18	1.265	0.663	6.0*	1.207	0.742	1.25*		S1		RAO70
124TE	12.	54.79	1.25*	0.65*				15.46	1.25*	0.47*	7.5	1.25*	0.65*	1.25*		S1		RAO70
124TE	13.	51.61	1.25*	0.7*				10.60	1.253	0.701	6.26	1.25*	0.7*	1.25*		S1		LOV71
124TE	51.9	46.51	1.16*	0.75*	4.97	1.37*	0.63*	2.61	1.37*	0.63*	6.04*	1.064*	0.74*	1.25*		S1	1	MAT75
126TE	16.0	55.41	1.2*	0.75*				13.28	1.25*	0.625*	6.0*	1.1*	0.7*	1.2*	1275	S1		MAK68
126TE	51.9	47.27	1.16*	0.75*	6.14	1.37*	0.63*	2.87	1.37*	0.63*	6.04*	1.064*	0.74*	1.25*		S1	1	MAT75
128TE	16.0	55.87	1.2*	0.75*				13.46	1.25*	0.625*	6.0*	1.1*	0.7*	1.2*	1291	S1		MAK68
128TE	51.9	47.68	1.16*	0.75*	6.97	1.37*	0.63*	2.13	1.37*	0.63*	6.04*	1.064*	0.74*	1.25*		S1	1	MAT75
130TE	16.0	56.14	1.2*	0.75*				14.49	1.25*	0.625*	6.0*	1.1*	0.7*	1.2*	1315	S1		MAK68
130TE	51.9	47.81	1.16*	0.75*	5.82	1.37*	0.63*	3.39	1.37*	0.63*	6.04*	1.064*	0.74*	1.25*		S1	1	MAT75
136XE	10.56	57.02	1.25*	0.65*				11.64	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*		S2		MOO68
138BA	17.	50.98	1.25*	0.741				16.44	1.257	0.557				1.3*		S1		IPS73
LA	55.	41.0	1.25*	0.65*				19.56G	1.25*	1.09	2.0*	1.25*	0.65*	1.25*		S3	1	KAM67
139LA	29.3	50.41	1.208	0.658	1.81	1.274	0.712	7.19	1.274	0.712	6.11	1.208	0.658	1.20*		S1	1,8	HEL73
140CE	76.	27.37	1.23	0.56				11.98	1.22	0.76	1.03	1.52	0.45	1.20	4839	S2P2	22	ROL66
142CE	12.0	53.8	1.25*	0.65*				10.7	1.25*	0.65*	6.25*	1.25*	0.65*	1.25*		S1		LES72
141PR	29.3	50.4	1.211	0.652	1.81	1.267	0.715	7.05	1.267	0.715	6.03	1.211	0.652	1.20*		S1	1,8	HEL73
144ND	12.0	53.5	1.25*	0.65*				10.0	1.25*	0.65	6.25*	1.25*	0.65*	1.25*		S2		GAL73
144SM	30.	53.7	1.17*	0.71	2.13	1.27	0.65	7.5	1.27	0.65*	5.97	1.09	0.71	1.2*		S2	1	BAR71
144SM	30.0	53.55	1.147	0.668	3.51	1.372	0.614	4.16	1.372	0.614	7.42	1.147	0.668	1.25*		S1	1,8	HEL73
144SM	50.8	47.6	1.16*	0.75*	7.66	1.37*	0.63*	1.80	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1747	S1		FUL70
144SM	50.8	47.50	1.168	0.785	8.68	1.360	0.648	0.93	1.360	0.648	5.61*	1.075*	0.816*	1.25*	1738	S1	15	WOO72
148SM	24.5	54.	1.2*	0.74*	2.5	1.22	0.67*	8.5	1.22	0.67*	5.2	1.01	0.74*	1.21*		S1P1	23	KUR71
148SM	49.5	46.55	1.168	0.816	5.73	1.36*	0.63*	3.45	1.36*	0.63*	5.61	1.075	0.816	1.25*	1817	S1P1	7	WOO70
148SM	50.8	48.6	1.16*	0.75*	6.16	1.37*	0.63*	3.10	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1814	S2		FUL70
148SM	50.8	48.46	1.166	0.736	6.53	1.358	0.661	2.80	1.358	0.661	5.61*	1.075*	0.816*	1.25*	1817	S1	15	WOO72
149SM	55.	40.7	1.25*	0.65*				14.56G	1.25*	1.19	2.0*	1.25*	0.65*	1.25*		S3	1	KAM67
150SM	50.8	45.4	1.16*	0.75*	6.73	1.37*	0.63*	4.00	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1897	S2		FUL70
150SM	50.8	44.88	1.168	0.829	7.17	1.360	0.653	2.37	1.360	0.653	5.61*	1.075*	0.816*	1.25*	1843	S1	15	WOO72
152SM	24.5	50.*	1.16	0.76				10.0	1.37	0.63	6.0*	1.06	0.74*	1.21*		S2P2	23	BAR71a
152SM	24.5	48.	1.2*	0.74*	1.2	1.37	0.67*	8.5*	1.37	0.67*	5.2*	1.01*	0.74*	1.21*		S2P2	23	KUR71
152SM	50.8	45.7	1.16*	0.75*	7.60	1.37*	0.63*	4.00	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1938	S2		FUL70
152SM	50.8	45.01	1.165	0.824	7.71	1.364	0.715	2.36	1.364	0.715	5.61*	1.075*	0.816*	1.25*	1944	S2	15	WOO72
154SM	50.8	44.3	1.16*	0.75*	11.2	1.37*	0.63*	2.06	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1925	S2		FUL70
154SM	50.8	43.94	1.166	0.874	6.30	1.252	0.776	5.30	1.252	0.776	5.61*	1.075*	0.816*	1.25*	1968	S2	15	WOO72
GD	55.	36.5	1.25*	0.65*				12.3G	1.45*	1.41	2.0*	1.25*	0.65*	1.25*		S3	1	KAM67
DY	55.	36.5	1.25*	0.65*				12.3G	1.45*	1.41	2.0*	1.25*	0.65*	1.25*		S3	1	KAM67
TM	55.	36.5	1.25*	0.65*				13.3G	1.45*	1.41	2.0*	1.25*	0.65*	1.25*		S3	1	KAM67
176YB	19.	54.27	1.231	0.661				12.51	1.025	1.021				1.2?		S1	8	OOT73
TA	22.2	51.4	1.25*	0.65*				17.4	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1352	S3	35	PER63
181TA	10.71	57.1	1.23*	0.72*				14.64	1.30*	0.71	5.7*	0.95*	0.92*	1.19*		S2P2		RAT72
181TA	13.72	57.1	1.23*	0.72*				14.64	1.30*	0.71	5.7*	0.95*	0.92*	1.19*		S2P3		RAT72
181TA	40.	49.3	1.18*	0.7*	8.11	1.40*	0.7*				7.5*	1.18*	0.7*	1.2*	1888	S		FRI65
W	17.	51.9	1.25*	0.65*				11.2	1.25*	0.76*				1.25*		S1		SIE67A
PT	17.1	53.61	1.291	0.522				23.84	1.206	0.389	7.41	1.291	0.522	1.25*	918	S1		PER63
PT	17.1	54.0	1.25*	0.65*				19.2	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1007	S1	35	PER63
AU	9.4	58.8	1.25*	0.65*				5.0	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	149	S	35	PER63
AU	17.1	58.78	1.199	0.654				9.92	1.217	0.704	9.42	1.199	0.654	1.25*	1051	S1		PER63
AU	17.1	54.1	1.25*	0.65*				16.4	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	986	S1	35	PER63
AU	22.2	51.7	1.25*	0.65*				15.7	1.25*	0.47*	8.5*	1.25*	0.65*	1.25*	1325	S3	35	PER63
AU	28.	50.0	1.24	0.547	5.30	1.52	0.91	0.36G	1.52	1.32	8.6	1.24	0.547	1.25?	1926	S2		DIT69
AU	28.	50.0	1.24	0.565	2.83	1.22	1.60	4.78G	1.52	2.32	8.6	1.24	0.565	1.25?	1997	S		DIT69
AU	28.	49.4	1.22	0.608	7.13	1.14	0.475	6.68G	1.14	0.686	13.9	1.22	0.608	1.20*		S1		SAN70
AU	28.	47.9	1.20*	0.70*	7.42	1.20*	0.48*	4.78G	1.20*	0.70*	15.2	1.20*	0.70*	1.20*		S3		SAN70
AU	55.	43.6	1.25*	0.65*				18.3G	1.25*	1.19	2.0*	1.25*	0.65*	1.25*		S3	1	KAM67

See page 8 for Explanation of Tables

TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
197AU	10.0	68.5	1.17*	0.75*				2.5	1.32*	0.66*	6.2*	1.01*	0.75*	1.19*		S2		ECK75
197AU	11.0	66.5	1.17*	0.75*				3.0	1.32*	0.66*	6.2*	1.01*	0.75*	1.19*		S3		ECK75
197AU	12.96	58.91	1.23*	0.72*				14.20	1.30*	0.44*	5.7*	0.95*	0.92*	1.19*		S1P2		RAT72
197AU	13.76	58.33	1.23*	0.72*				15.38	1.30*	0.44*	5.7*	0.95*	0.92*	1.19*	656	S2P2		RAT72
197AU	17.	63.1	1.20*	0.55	8.2	1.20*	0.55							1.20*		S	W65	GLA57
197AU	17.	60.3	1.23*	0.55	7.9	1.23*	0.55							1.23*		S	W65	GLA57
PB	55.	43.4	1.25*	0.65*				18.3G	1.25*	1.21	2.0*	1.25*	0.65*	1.25*		S3	1	KAM67
206PB	49.35	51.5	1.18	0.78	7.1	1.19	0.65	7.0	1.19	0.65	6.8	1.15	0.80	1.25*	2015	S P	1	MAN71A
206PB	49.35	47.9	1.17*	0.75*	2.76	1.32*	0.63*	10.4	1.32*	0.63*	4.5	1.01*	0.75*	1.20*		S1P	1	MAN71A
207PB	12.98	58.38	1.23*	0.72*				11.87	1.30*	0.44*	5.7*	0.95*	0.92*	1.19*	501	S1P2		RAT72
207PB	20.2	52.62	1.25*	0.65*				9.69	1.25*	0.76	6.38	1.25*	0.65*	1.25*		S		GLA68
207PB	49.35	51.2	1.18	0.78	7.9	1.20	0.65	6.3	1.20	0.65	6.7	1.15	0.83	1.25*	2020	S P	1	MAN71A
207PB	49.35	48.4	1.17*	0.75*	0.34	1.32*	0.63*	13.3	1.32*	0.63*	3.8	1.01*	0.75*	1.20*	2238	S P	1	MAN71A
208PB	8.0	59.8	1.25*	0.65*	0.8	1.25*	0.65*				5.0*	1.25*	0.65*	1.25*		S1		MO 72
208PB	9.0	59.3	1.25*	0.65*	2.3	1.25*	0.65*				5.0*	1.25*	0.65*	1.25*		S1		MO 72
208PB	10.2	57.4	1.25*	0.65*	3.2	1.25*	0.65*				5.0*	1.25*	0.65*	1.25*		S1		MO 72
208PB	11.0	65.0	1.17*	0.75*				5.5	1.32*	0.66*	6.2*	1.01*	0.75*	1.19*		S1		ECK75
208PB	11.2	57.0	1.25*	0.65*	3.6	1.25*	0.65*				5.0*	1.25*	0.65*	1.25*		S1		MO 72
208PB	12.0	56.0	1.25*	0.65*	4.2	1.25*	0.65*				5.0*	1.25*	0.65*	1.25*		S1		MO 72
208PB	12.0	63.5	1.17*	0.75*				6.0	1.32*	0.66*	6.2*	1.01*	0.75*	1.19*		S1		ECK75
208PB	12.8	55.0	1.25*	0.65*	4.4	1.25*	0.65*				5.0*	1.25*	0.65*	1.25*		S1		MO 72
208PB	12.98	58.92	1.23*	0.72*				11.39	1.30*	0.44*	5.7*	0.95*	0.92*	1.19*	509	S1P1		RAT72
208PB	13.0	62.0	1.17*	0.75*				7.0	1.32*	0.66*	6.2*	1.01*	0.75*	1.19*		S1P2		ECK75
208PB	14.0	53.8	1.25*	0.65*	7.0	1.25*	0.65*				5.0*	1.25*	0.65*	1.25*		S1		MO 72
208PB	14.0	60.5	1.17*	0.75*				7.5	1.32*	0.66*	6.2*	1.01*	0.75*	1.19*		S2		ECK75
208PB	16.0	53.52	1.298	0.612				15.19	1.188	0.541	6.90*	1.01*	0.75*	1.13*	983	S1	2,4	MAK72
208PB	16.0	51.88	1.327	0.537				21.06	1.191	0.421	6.04*	1.064*	0.738*	1.18*	944	S1		VOE74
208PB	16.	61.68	1.183*	0.724*				6.28	1.273*	0.699*	6.18*	1.160*	0.677*	1.18*	967	S		VOE74
208PB	17.	53.5	1.25*	0.65*				7.5	1.25*	0.76*				1.25*		S	3,W65	PER64
208PB	17.0	66.26	1.14	0.59				4.6	1.30	0.99	2.8	1.14	0.59	1.14		S3		KIN70
208PB	21.0	53.75	1.219	0.743				10.93	1.302	0.654	6.04*	1.064*	0.738*	1.18*	1532	S1		VOE74
208PB	21.	57.30	1.183*	0.724*				10.42	1.273*	0.699*	6.18*	1.160*	0.677*	1.18*	1489	S		VOE74
208PB	24.1	55.12	1.191	0.773				10.30	1.283	0.765	6.04*	1.064*	0.738*	1.18*	1824	S1		VOE74
208PB	24.1	56.84	1.183*	0.724*				9.65	1.273*	0.699*	6.18*	1.160*	0.677*	1.18*	1635	S		VOE74
208PB	26.3	57.29	1.151	0.757				8.64	1.308	0.838	6.04*	1.064*	0.738*	1.18*	1990	S2		VOE74
208PB	26.3	55.97	1.183*	0.724*				8.92	1.273*	0.699*	6.18*	1.160*	0.677*	1.18*	1700	S		VOE74
208PB	26.3	59.91	1.12*	0.75*	5.66	1.33*	0.75*	4.81	1.33*	0.75*	4.50	0.80	0.75*	1.20*		S2P1	20	WAT67
208PB	30.	56.12	1.16*	0.75*	6.51	1.37*	0.63*	4.04	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	1920	S2P1	11	FRI67
208PB	30.0	69.55	1.03	0.77	4.5	1.58	0.51	3.5	1.58	0.51	6.1	1.03	0.77	1.03		S2P2		KIN70
208PB	30.3	53.84	1.192	0.667				12.56	1.192	0.752	10.26	1.192	0.667	1.25*	1840	S1	32	BAR65
208PB	30.3	48.81	1.25*	0.65*	10.49	1.25*	0.65*				12.*	1.25*	0.65*	1.25*	1793	S2	32	BAR65
208PB	30.3	53.4	1.20*	0.7*	4.0	1.25*	0.7*	7.6	1.25*	0.7*	5.1	1.20*	0.7*	1.20*		S1P1	11	GRE66
208PB	30.3	53.9	1.173	0.682	2.28	1.325	0.764	7.66	1.325	0.764	5.11	1.211	0.519	1.2*	2036	S1P1	11	SAT67
208PB	30.3	59.1	1.12*	0.75*	3.0*	1.33*	0.58*	8.12	1.33*	0.58*	5.20	1.12*	0.75*	1.2*	2066	S1P1	11	SAT67
208PB	30.3	52.80	1.184	0.689	2.29	1.274	0.746	7.92	1.274	0.746	5.96	1.159	0.599	1.13*	1916	S1P1	2	GRE70
208PB	30.3	52.48	1.190	0.674	2.63	1.279	0.703	7.59	1.279	0.703	5.71	1.147	0.585	1.13*	1857	P1	2	GRE70
208PB	30.3	52.27	1.202	0.676	1.90	1.268	0.752	8.58	1.268	0.752	5.71*	1.147*	0.585*	1.13*	1938	S1	2	GRE70
208PB	30.3	47.17	1.225	0.73	2.14	1.225	0.73	8.53	1.321	0.70	4.60	1.225	0.73	1.25*		S P2		KAR70
208PB	30.3	50.1	1.197	0.755	2.15	1.197	0.75	9.42	1.293	0.733	5.05	1.028	0.707	1.25*		S P2		KAR70
208PB	30.3	54.54	1.171	0.713	1.49	1.280	0.767	8.78	1.280	0.767	6.02	1.111	1.241	1.25*	1982	S1		PER71
208PB	30.3	52.25	1.190	0.703	2.32	1.282	0.743	8.08	1.282	0.743	6.02	1.18	0.602	1.25*	1943	S1P1		PER71
208PB	30.3	53.07	1.173	0.705	2.22	1.287	0.750	7.82	1.287	0.750	6.00	1.172	0.603	1.18*	1947	S2P1		VOE74
208PB	30.3	52.57	1.183*	0.724*	2.96	1.273*	0.699*	8.09	1.273*	0.699*	5.84	1.160*	0.677*	1.18*	1898	S P		VOE74
208PB	30.5	54.63	1.160	0.749	1.82	1.287	0.750	8.98	1.287	0.750	6.45	1.224	0.571	1.18*	1968	S1P2		VOE74
208PB	30.5	53.02	1.183*	0.724*	4.48	1.273*	0.699*	6.95	1.273*	0.699*	5.97	1.160*	0.677*	1.18*	1901	S P		VOE74
208PB	30.8	53.71	1.170	0.661	2.47	1.252	0.773	8.65	1.252	0.773	5.84	1.226	0.514	1.18*	1930	S1P1		VOE74
208PB	30.8	51.76	1.183*	0.724*	3.17	1.273*	0.699*	9.12	1.273*	0.699*	4.95	1.160*	0.677*	1.18*	1942	S P		VOE74
208PB	31.	52.6	1.20*	0.64	2.	1.20*	1.38	8.2G	1.20*	2.0	5.4	1.20*	0.64	1.20*		S	W65	DEV62
208PB	31.	53.2	1.20*	0.647				12.2	1.20*	0.776	4.2	1.20*	0.647	1.20*		S	W65	SAT63
208PB	31.	45.18	1.20*	0.70*	10.21	1.20*	0.48*	5.28G	1.20*	0.70*	17.03	1.20*	0.70*	1.20*	1571	S3		SAN70
208PB	31.	20.53	1.17*	0.75*	4.12*	1.32*	0.342	2.07G	1.32*	0.496	6.2*	1.01*	0.75*	1.20*		S		SAN70
208PB	35.0	53.84	1.160	0.739	4.29	1.286	0.702	6.46	1.286	0.702	6.04*	1.064*	0.738*	1.18*	1997	S1		VOE74
208PB	35.0	51.70	1.183*	0.724*	5.84	1.273*	0.699*	6.00	1.273*	0.699*	6.18*	1.160*	0.677*	1.18*	1980	S		VOE74
208PB	39.7	51.	1.20*	0.65*	8.0	1.428	0.704				6.6	1.20*	0.65*	1.2*		S2		STO64
208PB	40.	49.0	1.207	0.769				18.1	1.230	0.551	5.7	1.207	0.769	1.2*	1975	S1	15	FRI65
208PB	40.	51.3	1.18*	0.7*	8.58	1.40*	0.7*				7.5*	1.18*	0.7*	1.2*	2015	S	15	FRI65
208PB	40.	54.62	1.125	0.873	5.31	1.386	0.624	5.60	1.386	0.624	5.84	1.026	0.794	1.25*	2217	S1P1		FRI67
208PB	40.	52.76	1.16*	0.75*	6.12	1.37*	0.63*	4.31	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	2116	S1P1		FRI67
208PB	40.	53.82	1.148	0.755	5.20	1.254	0.754	5.39	1.254	0.754	6.77	1.261	1.093	1.25*	2051	S1		PER71
208PB	40.	50.14	1.193	0.717	4.38	1.303	0.680	6.56	1.303	0.680	5.89	1.119	0.741	1.25*	2095	S1P1		PER71
208PB	40.0	51.80	1.159	0.784	3.98	1.321	0.727	5.75	1.321	0.727	6.66	1.044	0.905	1.18*	2169	S1P2		VOE74
208PB	40.0	50.54	1.183*	0.724*	3.80	1.273*	0.699*	7.12	1.273*	0.699*	5.87	1.160*	0.677*	1.18*	2072	S P		VOE74
208PB	45.0	50.62	1.156	0.750	4.35	1.300	0.662	6.00	1.300	0.662	6.04*	1.064*	0.738*	1.18*	2086	S1		VOE74
208PB	45.0	47.23	1.183*	0.724*	6.19	1.273*	0.699*	4.28	1.273*	0.699*	6.18*	1.160*	0.677*	1.18*	2056	S		VOE74
208PB	47.3	48.26	1.183	0.712	4.31	1.275	0.705	5.74	1.275	0.705	6.04*	1.064*	0.738*	1.18*	2095	S1		VOE74
208PB	47.3	48.31	1.183*	0.724*	5.90	1.273*	0.699*	4.72	1.273*	0.699*	6.18*	1.160*	0.677*	1.18*	2089	S		VOE74
208PB	49.35	48.0	1.17*	0.75*	0.69	1.32*	0.63*	12.8	1.32*	0.63*	4.1	1.01*	0.75*	1.20*	2242	S1P2	1	MAN71A
208PB	49.4	47.52	1.168	0.810	4.09	1.233	0.777	5.51	1.233	0.777	5.93	1.133	0.790	1.18*	2115	S2P1	1	VOE74
208PB	49.4	46.44	1.183*	0.724*	7.76	1.273*	0.699*	3.20	1.273*	0.699*	6.50	1.160*	0.677*	1.18*	2067	S P		VOE74

See page 8 for Explanation of Tables

TABLE II. Optical-Model Parameters Protons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
208PB	55.	43.	1.25*	0.65*				18.G	1.25*	1.2*				1.25*		S2	1	YAG68
208PB	61.4	41.42	1.220	0.577	2.01	1.32	0.668	7.80	1.32	0.668	5.84*	1.026*	0.794*	1.25*	2162	S2		FUL69
208PB	61.4	47.12	1.16*	0.75*	5.98	1.37*	0.63*	4.15	1.37*	0.63*	6.04*	1.064*	0.738*	1.25*	2136	S2		FUL69
208PB	61.4	46.29	1.173	0.682	3.31	1.263	0.555	11.50	1.263	0.555	6.04*	1.064*	0.738*	1.18*	2073	S1		VOE74
208PB	61.4	44.57	1.183*	0.724*	3.75	1.273*	0.699*	5.95	1.273*	0.699*	6.18*	1.160*	0.677*	1.18*	2109	S		VOE74
208PB	155.	18.1	1.12	0.69	16.9	1.29	0.60				4.87	1.10	0.83	1.20*		S2P2	12,22	WIL69
208PB	156.	26.5	1.12	0.79	16.2	1.31	0.48				1.23	1.15	0.72	1.20	4808	S2	12,22	COM74
208PB	156.0	18.84	1.211	0.663	8.78	1.374	0.457				0.94	1.200	0.548	1.18*	1707	S1P2	22,12	VOE74
208PB	156.0	17.03	1.183*	0.724*	12.06	1.273*	0.699*				3.58	1.160*	0.677*	1.18*	1793	S P	22,12	VOE74
208PB	160.	28.70	1.118	0.702	17.60	1.308	0.530				0.35	1.118	0.702	1.20*	1866	S1	33,19	ROO65
208PB	160.	17.0	1.25	0.69	9.0	1.37	0.70				2.5*	1.25	0.69	1.3*	1771	S3	12,19	ROO65
208PB	160.0	29.50	1.062	0.791	13.88	1.321	0.546				2.14	1.143	0.605	1.18*	1890	S1P2	19,12	VOE74
208PB	160.0	8.63	1.183*	0.724*	11.92	1.273*	0.699*				3.90	1.160*	0.677*	1.18*	1765	S P	19,12	VOE74
208PB	185.0	12.11	1.238	0.836	18.58	1.232	0.642				2.70	1.082	0.578	1.18*	1828	S1P2	22,12	VOE74
208PB	185.0	10.26	1.183*	0.724*	13.33	1.273*	0.699*				3.04	1.160*	0.677*	1.18*	1801	S P	22,12	VOE74
208PB	1040.	-8.17	1.125	0.812	28.88	1.117	0.617							1.18*	1849	S1	25	VOE74
BI	55.	44.0	1.25*	0.65*				18.3G	1.25*	1.21	2.0*	1.25*	0.65*	1.25*		S3	1	KAN67
209BI	10.76	58.76	1.23*	0.72*				11.24	1.30*	0.44*	5.7*	0.95*	0.92*	1.19*	196	S2P2		RAT72
209BI	10.8	62.25	1.17*	0.75*				4.5	1.32*	0.66*	6.2*	1.01*	0.75*	1.19*		S2P2		ECK75
209BI	12.96	58.76	1.23*	0.72*				11.64	1.30*	0.44*	5.7*	0.95*	0.92*	1.19*	484	S1P1		RAT72
209BI	13.0	62.75	1.17*	0.75*				6.25	1.32*	0.66*	6.2*	1.01*	0.75*	1.19*		S2P2		ECK75
209BI	14.4	56.72	1.25*	0.65*				11.26	1.25*	0.47*	7.5*	1.25*	0.65*	1.25*	654	S1		ERR67
209BI	17.	53.5	1.25*	0.65*				7.5	1.25*	0.76*				1.25*		S	3,W65	PER64
209BI	22.2	52.2	1.25*	0.65*	8.4	1.25*	0.65*	5.G*	1.25*	1.00*	6.3	1.25*	0.65*	1.25*	1442	S2		PIC65
209BI	31.	50.14	1.20*	0.70*	6.77	1.20*	0.48*	6.48G	1.20*	0.70*	13.56	1.20*	0.70*	1.20*	1543	S2		SAN70
209BI	31.	25.03	1.17*	0.75*	4.12*	1.32*	1.43	0.97G	1.32*	2.07	6.2*	1.01*	0.75*	1.20*		S		SAN70
209BI	61.7	40.2	1.19	0.76	8.6	1.37	0.65				6.3	1.19	0.76	1.2*		S		BER71
209BI	78.	26.87	1.22	0.58				13.12	1.21	0.68	0.89	1.48	0.43	1.20	2094	S2P2	22	ROL66
209BI	153.	22.50	1.11	0.73	19.8	1.29	0.59				1.70	1.10	0.75	1.20	1906	S1P2	12,13	ROL66
209BI	156.	34.3	1.07	0.77	17.6	1.31	0.53				1.14	1.15	0.72	1.21	1886	S2	12,19	COM74
239PU	13.0	57.	1.42*	0.44				11.2	1.25*	0.67				1.25*		S2		WOL68
239PU	13.0	57.*	1.42*	0.46	5.99	1.25*	0.68							1.25*		S2		WOL68

NOTES

1. Data for angles smaller than 90°
2. The Coulomb potential has a Woods-Saxon form with $r_c = (1.106 + 1.053 \times 10^{-4}A)$ F and $a_c = 0.502$ F
3. More than one angular distribution has been used to determine these parameters
4. Restricted values of σ_R
5. Not strictly optical-model analysis performed. Other processes are involved
6. Data absolute normalization known to ±30%
7. Data for angles smaller than 100°
8. Arbitrary normalization of the cross-section data
9. a) Calculations performed with doubled experimental errors on the differential cross sections and halved on the polarization data
   b) This paper contains a more complete analysis with resonance parameters
10. Nuclear Radii study.
    First set of parameters: 2% uncertainties on differential cross sections.
    Second set of parameters: 10% uncertainties on differential cross sections, therefore gives a greater emphasis to polarization data
11. Polarization data measured at a slightly different energy than the differential cross-section data. See publication.
12. See publication for the value of the imaginary part of the spin-orbit potential.
13. Data for angles smaller than 65°
14. Polarization data for angles smaller than 50°
15. See publication for other sets of parameters fitting the same data.
16. Polarization data for angles smaller than 90°
17. A normalization factor of 0.316 was adopted for the differential cross-section data
18. The real well depth is a function of energy. See publication.
19. Data for angles smaller than 60°
20. Differential cross-section normalization adjusted by the code.
21. Both normalizations of the cross-section and polarization data are adjusted by the code.
22. Data for angles smaller than 45°
23. Coupled-channel calculations performed
24. Simultaneous fit to elastic cross-section polarization and triple-scattering data
25. Data for angles smaller than 30°
26. See publication for compound elastic contribution.
27. See publication for comparison of the curve obtained with these parameters and another set of data points.
28. Data renormalized. See publication.
29. Data for angles larger than 45°
30. Fits to differential elastic cross-sections and polarization are better or equivalent to those obtained with parameters from reference KØS67
31. Data for angles smaller than 70°
32. Polarization predictions compared with data at nearby energy. See publication.
33. Incident energy corrected to give the correct relativistic center-of-mass momentum, and see note 12.
34. Back-angle data not included in the search. See publication
35. The real well depth is a function of mass number and energy. See publication.

W65. As reported in a previous compilation, "Phenomenological Optical Model Parameters," D. R. Winner and R. M. Drisko, Technical Report, Department of Physics, University of Pittsburgh, June 1965.

See page 8 for Explanation of Tables

TABLE II. Optical-Model Parameters Protons

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Target Nuclei	Energy Range (MeV)	References
D to Zr (24 Nuclei)(*)	∿ 10	ROS61
^{4}He	E < 20	SAT68
^{4}He to Zn (18 nuclei)(*)	∿ 8	ROS61A
1 p-shell	10 to 50	WAT69
^{12}C(*)	5.4 to 20	ROS62
^{18}O	7.9 to 16.3	STE66
^{40}Ca	9.8 to 21.7	DIC71
^{40}Ca	30 to 45.5	GRO67
^{54}Fe to ^{120}Sn (14 nuclei)(**)	14.5	PYL69
^{59}Co to ^{65}Cu	6	ANT70
^{58}Ni to ^{208}Pb (6 nuclei)(**)	14.5, 30.3, 40.0	GRE68
^{88}Sr to ^{92}Mo	5 to 15	SCH75

*Calculations compared with $\sigma(\theta)$ and $P(\theta)$

**Folding model

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TABLE II. Optical-Model Parameters Protons

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See page 8 for Explanation of Tables

TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
1H	52.	65.8	1.25*	0.501				4.59	1.2	0.517				1.3*		S	3	HIN68
1H	52.	92.1	1.05*	0.50				7.67	1.02	0.511				1.3*		S	3	HIN68
3HE	24.0	80.2	2.36	0.502	3.7	2.36	0.502							1.3*	468	S	H66	SAT65
3HE	24.0	86.6	2.2*	0.55*	3.7	2.2*	0.55*							1.3*	397	S	H66	SAT65
3HE	24.7	102.7	1.967	0.778	5.44	1.967	0.778							1.3*	602	S	H66	SAT65
3HE	25.5	121.9	1.766	0.848	7.1	1.766	0.848							1.3*	672	S	H66	SAT65
3HE	26.2	92.5	2.193	0.562	3.3	2.193	0.562							1.3*	395	S	H66	SAT65
3HE	26.2	92.3	2.2*	0.55*	3.3	2.2*	0.55*							1.3*	394	S	H66	SAT65
3HE	27.0	93.0	2.190	0.548	3.21	2.190	0.548							1.3*	386	S	H66	SAT65
3HE	27.	40.4	1.90*	0.344				5.65	1.90*	0.350				1.3*		S		SAW70
3HE	52.	61.4	1.25*	0.599				9.03	1.01	0.598				1.3*		S	3	HIN68
3HE	52.	67.0	1.25*	0.59				8.10	1.25	0.630	6.*	1.25*	0.59	1.3*		S	3	HIN68
4HE	52.	73.2	1.25*	0.614				11.15	1.01	0.647				1.3*		S	3	HIN68
4HE	52.	70.0	1.25*	0.592				8.2	1.25	0.634	6.*	1.25*	0.592	1.3*		S	3	HIN68
LI	2.0	41.78	2.1*	0.417	9.42	2.1*	0.417							1.3?	830	S	H66	MAD62
LI	2.5	33.18	1.5*	0.11	7.11	1.5*	0.32							1.3?	482	S	H66	MAD62
LI	2.5	50.25	2.1*	0.32	6.76	2.1*	0.11							1.3?	507	S	H66	MAD62
LI	3.0	34.07	1.5*	0.72	5.71	1.5*	0.72							1.3?	1025	S	H66	MAD62
LI	3.5	34.91	1.5*	0.59	5.77	1.5*	0.59							1.3?	815	S	H66	MAD62
6LI	8.	92.5	2.17*	0.61*				18.1	2.35*	0.25*	8.6	2.17*	0.61*	2.17*		S2	10	BIN71
6LI	8.	125.8	0.870	1.00				3.1	2.17	0.73	8.2	0.870	1.00	1.38*		S2	10	BIN71
6LI	10.	95.9	2.17*	0.61*				20.4	2.35*	0.25*	8.7	2.17*	0.61*	2.17*		S2	10	BIN71
6LI	10.	142.9	0.908	0.88				3.7	2.26	0.67	5.7	0.908	0.88	1.38*		S1	10	BIN71
6LI	11.8	118.*	0.87	1.0				6.9	1.71	0.89	7.5	0.87	1.0	1.3*		S3		LUD68
6LI	11.8	78.*	1.04	0.95	30.*	0.85	0.85				12.5	1.04	0.95	1.3*		S2		LUD68
6LI	12.	100.6	2.17*	0.61*				23.9	2.35*	0.25*	7.5	2.17*	0.61*	2.17*		S3	10	BIN71
6LI	12.	138.7	0.870	1.00				5.8	2.49	0.57	6.1	0.870	1.00	1.38*		S3	10	BIN71
6LI	14.7	153.4	1.18	0.489	3.45	2.97	0.489							1.30*		S2		MAT69
7LI	11.8	118.*	1.00	0.94				6.87	1.98	0.59	8.5	1.00	0.94	1.3*		S3		LUD68
7LI	11.8	78.*	1.05	0.95	30.*	0.84	0.85				6.4	1.05	0.95	1.3*		S2		LUD68
7LI	12.	101.3	1.71	0.64				23.8	2.0	0.23*	7.0	1.71	0.64	1.71		S2	10	BIN71
7LI	12.	77.0	1.05	0.95	29.6	0.878	0.81				7.0	1.05	0.95	1.31*		S2	10	BIN71
7LI	14.7	127.0	0.60	1.04	16.78	1.19	1.04							1.30*		S2		MAT69
7LI	28.	73.0	1.186	0.836	22.2	1.390	0.743				-0.92	1.186	0.836	1.3*	789	S	H66	SAT65
7LI	28.	79.45	1.094	0.769				11.23	1.094	0.769				1.09		S		KUL67
7LI	28.	81.1	1.15*	0.81*				8.61	1.34*	0.873	6.0*	1.15*	0.81*	1.15*		S		DEV69
9BE	1.0	20.82	3.24	0.95	4.12	3.24	0.95							1.3*		S1	15	LOM72
9BE	1.2	20.46	2.2	0.72	6.67	2.2	0.72							1.3*		S1	15	LOM72
9BE	1.4	19.18	2.18	0.83	7.32	2.18	0.83							1.3*		S1	15	LOM72
9BE	1.6	17.20	2.27	0.75	6.16	2.27	0.75							1.3*		S2	15	LOM72
9BE	1.8	19.47	2.17	0.72	6.84	2.17	0.72							1.3*		S2	15	LOM72
9BE	2.0	18.96	2.22	0.64	6.5	2.22	0.64							1.3*		S2	15	LOM72
9BE	2.2	23.12	2.06	0.57	7.04	2.06	0.57							1.3*		S1	15	LOM72
9BE	6.3	103.2	1.15*	0.773				17.47	1.769	0.585				1.3*		S	9,8	DJA71A
9BE	6.3	102.0	1.15*	0.724				13.37	1.719	0.694	20.0*	0.9*	0.6	1.3*		S1	9,8	DJA71A
9BE	7.7	40.34	1.48	0.63	6.58	1.48	0.63							1.3?	866	S	H66	MAD62
9BE	7.8	89.6	1.162	0.931				18.8	1.526	0.427	15.22	1.162	0.931	1.3*	1160	S	H66	SAT65
9BE	7.8	58.5	0.8*	1.228	18.0	1.340	0.749				16.0*	0.8*	1.228	1.3*	1143	S	H66	SAT65
9BE	10.2	79.4	0.86	1.15	17.1	1.51	0.84							1.3?		S	H66	WES63
9BE	10.2	78.5	0.855	1.101	40.0	0.704	1.028				16.2	0.855	1.101	1.3*	1238	S	H66	SAT65
9BE	11.8	104.8	1.0*	1.024				9.1	1.921	0.564	12.0*	1.0*	1.024	1.3*	1255	S	H66	SAT65
9BE	11.8	138.3	0.713	1.083				9.1	1.921	0.555	12.54	0.713	1.083	1.3*	1236	S	H66	SAT65
9BE	11.8	78.0*	0.967	1.04	30.*	1.07	0.870				6.05	0.967	1.04	1.3*		S2		FIT67
9BE	11.8	50.0*	1.51	0.89				20.39	1.10	0.59	8.57	1.63	0.72	1.3?		S3P2		GRI71
9BE	12.6	149.	0.817	0.744				16.6	1.96	0.52	14.5	0.817	0.744	1.2?		P	12	ZAI71
9BE	12.8	43.1	1.677	0.758	19.4	1.806	0.279							1.3*	1026	S	H66	SAT65
9BE	12.8	109.4	1.0*	0.970	11.4	1.824	0.492				12.0*	1.0*	0.970	1.3*	1121	S	H66	SAT65
9BE	13.6	128.5	0.945	0.805				16.0	1.84	0.45*	6.0*	0.90*	0.90*	1.2?		S3		MAT72
9BE	15.	99.2	0.727	1.043	45.6	0.727	1.043							1.3*	1125	S	H66	SAT65
9BE	15.	65.0	1.27	0.89	56.1	2.15	0.38							1.25?		S2	10	PAR73
9BE	15.	83.1	1.005	0.992	33.3	1.106	0.827							1.25?		S2	10	PAR73
9BE	15.8	134.9	0.817	1.045				11.1	2.078	0.522	10.44	0.817	1.045	1.3*	1263	S	H66	SAT65
9BE	15.8	65.	1.25*	0.79				7.2	1.25*	1.025				1.3*		S2		CON66
9BE	24.	59.4	1.447	0.776	26.0	1.447	0.776							1.3*	1019	S	H66	SAT65
9BE	24.	59.9	1.363	0.783	42.3	0.831	1.052							1.3*	1087	S	H66	SAT65
9BE	27.7	74.03	1.239	0.736				11.67	1.239	0.736				1.24		S		KUL67
10B	2.5	26.94	1.5*	0.77	16.14	1.5*	0.77							1.3?	925	S	H66	MAD62
10B	3.0	77.0	1.15	0.81				29.8G	1.37	1.42				1.3?		S	H66	GAL65
10B	3.0	34.42	1.275	0.80	7.70	1.275	0.80							1.3?	941	S	H66	MAD62
10B	3.5	28.0	1.5*	0.48	4.6	1.5*	0.48							1.3?		S	H66	PUL64
10B	11.8	78.0*	0.921	0.943	30.*	0.867	0.731				6.00	0.921	0.943	1.3*		S2		FIT67
10B	15.0	99.2	1.05*	0.79				8.4	1.72	0.65	1.8	1.0*	0.81*	1.3*		S2P3		BUS74
10B	15.0	99.4	1.05*	0.81*				8.9	1.75*	0.62	1.4	1.0*	0.81*	1.3*		S2P3		BUS74
10B	28.	84.7	1.11*	0.609				5.29	1.37*	1.003				1.3*		S2	12	GAI68

See page 8 for Explanation of Tables

TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
11B	3.5	26.	1.51	0.43	5.3	1.51	0.43							1.3?		S	H66	PUL64
11B	5.5	109.	0.678	1.225				39.51G	2.055	0.813				1.3?		S	H66	GAL65
11B	11.8	118.*	0.895	0.902				4.82	1.62	0.775	5.8	0.895	0.902	1.3*		S2		FIT67
11B	12.6	95.9	1.043	1.003				17.3	1.905	0.374	7.3	1.043	1.003	1.2?		P	12	ZAI71
11B	13.6	124.0	0.9*	0.78				10.9	2.01	0.45*	6.0*	0.90*	0.90*	1.2?		S2		MAT72
C	25.9	85.3	1.11	0.71				9.53	1.37	0.67				1.11	890	S2	10,27	TJI65
12C	1.72	53.2	1.35	0.64	1.52	1.35	0.64							1.3?	170	S	H66	MAD62
12C	2.80	29.83	2.57	0.31	34.98	0.40	1.25							1.4*		S2		GER66
12C	2.8	112.5	0.90*	0.90*				4.25	2.861	0.493				1.3*	1310	S1	22	SAT66
12C	3.23	59.65	1.67	0.57	9.00	1.49	0.41							1.4*		S3		GER66
12C	3.23	123.6	0.90*	0.90*				6.36	2.132	0.489				1.3*	954	S2	22	SAT66
12C	3.5	30.0	1.70	0.10	4.5	1.70	0.10							1.3?		S	H66	PUL64
12C	3.70	55.68	1.80	0.53	5.72	1.97	0.14							1.4*		S3		GER66
12C	3.7	126.9	0.90*	0.90*				3.63	1.652	0.810				1.3*	1083	S2	22	SAT66
12C	4.66	70.	1.5*	0.65	6.2	1.5*	1.0							1.3*	1184	S3		COT68
12C	4.66	74.62	1.44	0.67	3.68	1.76	1.18							1.3*	1285	S3		COT68
12C	4.97	71.94	1.5*	0.69	7.38	1.5*	0.62							1.3*	1159	S3		COT68
12C	4.97	76.18	1.44	0.74	4.85	1.78	0.78							1.3*	1190	S3		COT68
12C	5.27	70.06	1.5*	0.72	9.45	1.5*	0.41							1.3*	1220	S3		COT68
12C	6.	124.7	0.90*	0.90*				4.38	2.452	0.264				1.3*	1158	S2	22	SAT66
12C	6.5	123.6	0.90*	0.90*				4.18	2.519	0.341				1.3*	1277	S3	22	SAT66
12C	7.	130.1	0.90*	0.90*				4.85	2.105	0.498				1.3*	1150	S2	22	SAT66
12C	7.6	32.	1.5*	0.534	6.46	1.5*	0.534							1.3?	910	S	H66	MAD62
12C	7.6	70.	1.5*	0.60	11.00	1.5*	0.60				8.*	1.5*	0.60	1.5*	990	S	H66	MEL62
12C	8.	132.0	0.90*	0.90*				7.73	1.665	0.569				1.3*	1099	S3	22	SAT66
12C	9.	133.6	0.90*	0.90*				13.8	2.052	0.276				1.3*	993	S2	22	SAT66
12C	9.0	118.9	1.0*	0.8*	4.03	1.0*	0.8*	4.03	2.0*	0.6*	8.14	1.0*	0.8*	1.5*	1152	S2	10	GUR70
12C	10.	130.4	0.90*	0.90*				6.88	1.899	0.562				1.3*	1159	S2	22	SAT66
12C	10.0	116.0	1.0*	0.8*	4.13	1.0*	0.8*	4.13	2.0*	0.6*	6.76	1.0*	0.8*	1.5*	1146	S2	10	GUR70
12C	10.0	83.1	1.270	0.807				7.53	1.91	0.563	7.06	0.962	0.266	1.3*		S3P3		WIL71
12C	10.0	128.	0.781	1.050				31.8	1.76	0.396	7.44	0.755	0.508	1.3*		P2		WIL71
12C	10.6	73.8	1.5*	0.65*	9.70	1.5*	0.65*	9.70G	1.5*	0.8*				1.5?		S	10,33	BAL66
12C	10.6	113.2	1.0*	0.8*	4.93	1.0*	0.8*	4.93	2.0*	0.6*	10.30	1.0*	0.8*	1.5*	1195	S1	10	GUR70
12C	11.0	74.7	1.5*	0.65*	9.40	1.5*	0.65*	9.40G	1.5*	0.8*				1.5?		S	10,33	BAL66
12C	11.	119.8	0.90*	0.90*				4.43	1.585	0.885				1.3*	1215	S1	22	SAT66
12C	11.0	113.7	1.0*	0.8*	4.75	1.0*	0.8*	4.75	2.0*	0.6*	7.02	1.0*	0.8*	1.5*	1179	S2	10	GUR70
12C	11.0	110.5	1.0*	0.8*	3.16	1.0*	0.8*	3.16	2.0*	0.6*	6.44	1.0*	0.8*	1.5*	1050	S	10	GUR70
12C	11.4	71.6	1.5*	0.65*	8.90	1.5*	0.65*	8.90G	1.5*	0.8*				1.5?		S	10,33	BAL66
12C	11.4	107.6	1.0*	0.8*	5.12	1.0*	0.8*	5.12	2.0*	0.6*	6.90	1.0*	0.8*	1.5*	1191	S2	10	GUR70
12C	11.8	119.0	0.90*	0.90*				5.63	1.588	0.770				1.3*	1155	S1	22	SAT66
12C	11.8	118.*	0.887	0.928				6.11	1.52	0.790	5.0	0.887	0.928	1.3*		S1		FIT67
12C	11.8	108.7	1.0*	0.8*	5.01	1.0*	0.8*	5.01	2.0*	0.6*	7.15	1.0*	0.8*	1.5*	1187	S2	10	GUR70
12C	11.8	110.4	1.0*	0.8*	4.43	1.0*	0.8*	4.43	2.0*	0.6*	7.26	1.0*	0.8*	1.5*	1156	S2	10	GUR70
12C	11.9	71.0	1.5*	0.65*	7.35	1.5*	0.65*	7.35G	1.5*	0.8*				1.5?		S	10,33	BAL66
12C	11.9	107.7	1.0*	0.8*	4.24	1.0*	0.8*	4.24	2.0*	0.6*	6.49	1.0*	0.8*	1.5*	1138	S2	10	GUR70
12C	12.1	118.0*	0.97	0.93				9.44	1.83	0.47	7.42	0.90	0.18	1.3?		S2P2		GRI71
12C	12.4	69.8	1.5*	0.65*	7.10	1.5*	0.65*	7.10G	1.5*	0.8*				1.5?		S	10,33	BAL66
12C	12.4	104.6	1.0*	0.8*	5.00	1.0*	0.8*	5.00	2.0*	0.6*	4.85	1.0*	0.8*	1.5*	1170	S2	10	GUR70
12C	12.8	83.46	1.33	0.67	14.94	1.33	0.67							1.3?	1005	S	H66	BUD63
12C	12.8	69.6	1.5*	0.65*	6.65	1.5*	0.65*	6.65G	1.5*	0.8*				1.5?		S	10,33	BAL66
12C	12.8	114.2	0.90*	0.90*				17.0	1.975	0.388				1.3*	1077	S1	22	SAT66
12C	12.8	105.6	1.0*	0.8*	4.93	1.0*	0.8*	4.93	2.0*	0.6*	4.64	1.0*	0.8*	1.5*	1166	S2	10	GUR70
12C	13.2	71.2	1.5*	0.65*	7.15	1.5*	0.65*	7.15G	1.5*	0.8*				1.5?		S	10,33	BAL66
12C	13.2	103.2	1.0*	0.8*	5.25	1.0*	0.8*	5.25	2.0*	0.6*	4.24	1.0*	0.8*	1.5*	1178	S2	10	GUR70
12C	13.6	122.5	0.9*	0.815				10.9	1.93	0.45*	6.0*	0.90*	0.90*	1.2?		S2		MAT72
12C	13.7	103.8	1.0*	0.8*	5.94	1.0*	0.8*	5.94	2.0*	0.6*	4.23	1.0*	0.8*	1.5*	1211	S1	10	GUR70
12C	13.9	73.1	1.5*	0.65*	8.65	1.5*	0.65*	8.65G	1.5*	0.8*				1.5?		S	10,33	BAL66
12C	13.9	101.6	1.0*	0.8*	6.07	1.0*	0.8*	6.07	2.0*	0.6*	4.18	1.0*	0.8*	1.5*	1212	S1	10	GUR70
12C	14.7	114.3	0.90*	0.90*				10.1	1.956	0.467				1.3*	1117	S1	22	SAT66
12C	15.0	117.1	0.900	0.982				14.0	1.800	0.405				1.3*		S		DEN66
12C	15.0	99.4	1.05*	0.94				10.6	1.86	0.46	2.5	1.0*	0.81*	1.3*		S2P2		BUS74
12C	15.0	102.8	1.05*	0.81*				6.3	1.75*	0.69	2.2	1.0*	0.81*	1.3*		S2P2		BUS74
12C	15.8	63.	1.25*	0.82				8.0	1.25*	0.930				1.3*		S3		COW66
12C	15.8	111.3	0.90*	0.90*				10.2	1.888	0.529				1.3*	1149	S2	22	SAT66
12C	15.9	111.7	0.90*	0.90*				11.2	1.920	0.449				1.3*	1080	S2	22	SAT66
12C	18.1	111.4	0.90*	0.90*				16.5	1.816	0.396				1.3*	994	S3	22	SAT66
12C	19.	106.5	0.90*	0.90*				8.13	1.613	0.714				1.3*	1131	S3	22	SAT66
12C	20.5	108.4	0.90*	0.840				7.46	1.742	0.624	8.54	1.1	0.476	1.3*	1034	S2P2	19	PER72
12C	25.2	109.0	0.90*	0.822				8.39	1.545	0.729	8.57	0.9	0.542	1.3*	1032	S2P2	20,19	PER72
12C	25.9	85.3	1.11	0.71				9.5	1.37	0.671				1.3?	890	S	H66	TJI65
12C	25.9	119.6	0.90*	0.90*				11.6	1.442	0.621				1.3*	953	S2	22	SAT66
12C	25.9	109.2	1.00*	0.90*				18.3	1.52	0.50*				1.0?		S2		HER70
12C	28.	111.9	0.90*	0.90*				10.5	0.846	0.956				1.3*	944	S	22	SAT66
12C	28.	88.02	1.11*	0.669	12.61	1.37	1.108							1.3*		S2	12	GAI68
12C	28.	89.36	1.11*	0.751				12.34	1.37*	0.66				1.3*		S	12	GAI68
12C	29.5	110.7	0.90*	0.801				9.20	1.420	0.794	9.32	0.9	0.551	1.3*	1020	S2P1	19	PER72
12C	34.2	107.0	0.90*	0.90*				11.3	1.506	0.612				1.3*	924	S2	22,12	SAT66
12C	34.4	92.41	1.038	0.788				9.75	1.426	0.693				1.3*		S1	12	NEW67
12C	34.4	92.47	1.023	0.806				9.70	1.445	0.683	6.76	1.023	0.806	1.3*		S1	12	NEW67
12C	52.	71.8	1.25*	0.70				11.0	1.25	0.70				1.3*		S1	3,10	HIN68
12C	80.	61.53	1.25*	0.667				10.57	1.096	0.84				1.3*		S	10	DUH71
12C	80.	60.67	1.25*	0.666				10.06	1.157	0.808	2.16	1.421	0.597	1.3*		S2	10	DUH71

See page 8 for Explanation of Tables

TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
13C	4.66	71.7	1.5*	0.53	5.47	1.5*	1.16							1.3*	1142	S2	10	COT68
13C	4.66	67.39	1.5*	0.68				7.09	1.5*	0.66				1.3*	1153	S2	10	COT68
13C	4.97	72.0	1.5*	0.6*				9.5	1.5*	0.6				1.3*	1014	S3	10	COT68
13C	4.97	74.4	1.5*	0.51				8.62	1.5*	0.63				1.3*	916	S2	10	COT68
13C	5.27	70.4	1.5*	0.6*				8.53	1.5*	0.6*				1.3*	1040	S3	10	COT68
13C	5.27	67.6	1.5*	0.70				6.94	1.5*	0.7				1.3*	1182	S3	10	COT68
13C	13.7	100.5	1.0*	0.8*	5.04	1.0*	0.8*	5.04	2.0*	0.6*	5.32	1.0*	0.8*	1.5*	1215	S2	10	GUR70
13C	15.0	114.9	0.900	0.964				12.57	1.800	0.393				1.3*		S		DEN66
13C	15.0	98.9	1.05*	0.88				10.7	1.76	0.44	4.0	1.0*	0.81*	1.3*		S1P3		BUS74
13C	15.0	98.4	1.05*	0.81*				8.0	1.75*	0.54	1.8	1.0*	0.81*	1.3*		S1P3		BUS74
14C	4.2	121.3	0.81*	1.07*				15.1	2.07	0.36*				0.81*		S2	15	COL73
14C	4.9	126.1	0.81*	1.07*				16.0	2.08	0.36*				0.81*		S2	15	COL73
14C	5.5	127.5	0.81*	1.07*				13.2	2.13	0.36*				0.81*		S2	15	COL73
14C	6.0	129.1	0.81*	1.07*				17.1	2.03	0.36*				0.81*		S2	15	COL73
14C	6.5	127.1	0.81*	1.07*				17.6	2.03	0.36*				0.81*		S2	15	COL73
14C	7.3	120.1	0.81*	1.07*				20.2	2.01	0.36*				0.81*		S2	15	COL73
14C	8.0	119.8	0.81*	1.07*				21.2	1.93	0.36*				0.81*		S2	15	COL73
14C	10.0	125.4	0.81*	1.07*				17.4	1.93	0.36*				0.81*		S2	15	COL73
14N	0.7	23.07	1.95*	0.728*	1.83	1.95*	0.728*							1.95*		S1	H66	SEI64
14N	0.9	22.21	1.95*	0.728*	2.54	1.95*	0.728*							1.95*		S1	H66	SEI64
14N	1.1	21.70	1.95*	0.728*	3.44	1.95*	0.728*							1.95*		S1	H66	SEI64
14N	1.3	21.40	1.95*	0.728*	3.69	1.95*	0.728*							1.95*		S1	H66	SEI64
14N	1.5	20.36	1.95*	0.728*	4.54	1.95*	0.728*							1.95*		S1	H66	SEI64
14N	1.7	19.73	1.95*	0.728*	5.46	1.95*	0.728*							1.95*		S1	H66	SEI64
14N	1.9	19.65	1.95*	0.728*	4.18	1.95*	0.728*							1.95*		S1	H66	SEI64
14N	2.1	20.13	1.95*	0.728*	4.01	1.95*	0.728*							1.95*		S1	H66	SEI64
14N	3.5	128.0	0.92	0.83				3.9	1.23	1.05	9.0*	0.9*	0.65*	1.3*		S1	10,17	MEI70
14N	3.5	120.0	1.50	0.64				19.2	1.73	0.35	9.0*	0.9*	0.65*	1.3*		S1	10,17	MEI70
14N	3.5	106.9	1.61	0.60				30.0	1.61	0.28	9.0*	0.9*	0.65*	1.3*		S1	10,17	MEI70
14N	5.0	110.9	1.56	0.61				13.13	1.28	0.54	13.75	1.00*	0.80*	1.3*		S2	13,17	FOG72
14N	10.5	117.9	0.81	1.07				19.61	1.84	0.35				0.81		S3		CUR69
14N	11.6	104.3	1.00*	0.946				9.31	1.785	0.396	7.09	0.805	0.41	1.3*		S2P3		BRO73
14N	11.6	108.7	1.012*	0.599				4.31	1.975	0.621	7.89	0.801	0.249	1.3*		S2P3		BRO73
14N	11.8	103.7	1.0*	0.880				16.1	1.938	0.298	12.0*	1.0*	0.880	1.3*	1011	S	H66	SAT65
14N	11.8	118.*	0.866	0.893				5.59	1.42	0.727	6.0	0.866	0.893	1.3*		S2		FIT67
14N	15.0	95.6	1.05*	0.85				6.5	1.76	0.50	5.0	1.0*	0.81*	1.3*		S1P2		BUS74
14N	15.0	96.0	1.05*	0.81*				5.4	1.75*	0.59	5.1	1.0*	0.81*	1.3*		S1P2		BUS74
14N	21.0	82.8	1.0*	1.092				6.99	1.935	0.485				1.3*	1120	S	H66	SAT65
14N	27.	87.8	1.051	0.635				6.1	0.935	1.005				1.3*	835	S	H66	SAT65
14N	28.	81.37	1.128	0.722				5.65	1.261	0.974				1.3*		S2	28	GAI68
14N	28.	116.4	0.8*	0.808				4.89	1.5*	0.902				1.3*		S	28	GAI68
14N	52.	68.9	1.25*	0.70				10.2	1.25	0.70				1.3*		S1	3,10	HIN68
15N	5.2	116.8	0.90	0.90				3.12	1.81	0.88	9.10	1.00	0.80	1.3*		S1	18,17	FOG72A
15N	5.2	120.2	1.46	0.61				18.8	1.04	0.49	8.64	1.00	0.80	1.3*		S2	18,17	FOG72A
15N	5.5	72.	1.40	0.70	8.0	1.35	0.80				10.	1.40	0.70	1.3*		S	21	BOH72
16O	2.28	74.5	1.4*	0.7*				10.3	1.4*	0.7*				1.4*		S1	17	DIE68
16O	2.43	74.9	1.4*	0.7*				9.8	1.4*	0.7*				1.4*		S	17	DIE68
16O	2.58	74.9	1.4*	0.7*				9.4	1.4*	0.7*				1.4*		S1	17	DIE68
16O	2.74	76.5	1.4*	0.7*				8.8	1.4*	0.7*				1.4*		S	17	DIE68
16O	2.86	75.1	1.4*	0.7*				8.5	1.4*	0.7*				1.4*		S1	17	DIE68
16O	3.00	75.8	1.4*	0.7*				8.4	1.4*	0.7*				1.4*		S	17	DIE68
16O	3.16	75.1	1.4*	0.7*				8.6	1.4*	0.7*				1.4*		S1	17	DIE68
16O	3.31	74.3	1.4*	0.7*				9.5	1.4*	0.7*				1.4*		S	17	DIE68
16O	4.00	101.	1.04	0.83				4.7	1.58	0.42	4.8	1.0*	0.8*	1.2*		S	22,17	DAV70
16O	4.50	101.	1.07	0.82				5.4	2.39	0.53	6.7	1.0*	0.8*	1.2*		S	22,17	DAV70
16O	5.00	101.	1.04	0.86				5.5	2.04	0.50	8.1	1.0*	0.8*	1.2*		S	22,17	DAV70
16O	5.25	102.	1.04	0.89				5.4	2.06	0.35	8.3	1.0*	0.8*	1.2*		S	22,17	DAV70
16O	5.50	104.	1.04	0.89				5.9	1.96	0.36	8.9	1.0*	0.8*	1.2*		S	22,17	DAV70
16O	6.00	100.	1.01	0.85				6.1	1.72	0.54	12.3	1.0*	0.8*	1.2*		S	22,17	DAV70
16O	7.85	118.	1.0*	0.6*				4.9	1.9*	0.6*	7.5	1.1*	0.37	1.3*		S2P3	7	THO69
16O	8.0	124.2	0.947	0.719				5.8	1.864	0.470	12.0	0.947	0.719	1.3*	936	S	H66	SAT65
16O	8.	112.1	1.012	0.713				5.71	1.873	0.618	8.26	0.991	0.377	1.3?		S1P2		KOC71
16O	9.3	113.8	1.03	0.56				5.3	1.87	0.48	16.4	0.99	0.45	1.3?		S2P3	14	COR72
16O	11.6	104.6	1.00*	0.830*				8.34	1.669	0.612	8.54	0.80*	0.40*	1.3*		S2P3		BRO73
16O	11.6	108.7	1.012*	0.532				3.68	1.99	0.815	9.08	0.991	0.378	1.3*		S3P3		BRO73
16O	11.8	149.2	0.746	0.875				6.0	1.380	0.908	12.2	0.746	0.875	1.3*	1232	S	H66	SAT65
16O	11.8	118.*	0.934	0.792				5.95	1.58	0.777	6.0	0.934	0.792	1.3*		S1		FIT67
16O	12.	81.34	1.25*	0.64	8.41	1.56	1.279				8.91	1.25*	0.64	1.3*		S2	5	ALT67
16O	12.	106.1	1.00*	0.68				4.61	1.82	0.76	8.16	1.00*	0.61	1.3*		S	29	NAQ68
16O	13.3	109.5	1.06	0.56				2.8	1.87	0.98	8.8	0.91	0.68	1.3?		S2P3	14	COR72
16O	13.6	156.5	0.542	1.135				11.0	1.13	0.67	10.0	0.542	1.15	1.2?		S3		MAT72
16O	15.0	107.5	0.884	0.915				6.55	1.593	0.684				1.3*		S		DEN66
16O	15.0	92.5	1.05*	0.82				4.3	1.71	0.78	7.0	1.0*	0.81*	1.3*		S1P2	3,28	BUS74
16O	15.0	92.6	1.05*	0.81*				4.3	1.75*	0.77	6.8	1.0*	0.81*	1.3*		S1P2	3,28	BUS74
16O	15.8	100.	1.25*	0.705				15.0	1.225	0.605				1.3*		S3		CON66
16O	16.3	70.6	1.318	0.586				9.6	1.523	0.577	9.22	1.318	0.586	1.3*	947	S	H66	SAT65
16O	25.4	94.79	1.05*	0.843				8.58	1.573	0.573	6.98	1.05*	0.843	1.3*		S1		COO74
16O	28.	89.27	1.053	0.752				6.52	1.361	0.812				1.3*		S2	12	GAI68
16O	34.4	92.94	1.036	0.787				8.91	1.355	0.727				1.3*		S1	12	NEW67
16O	34.4	92.84	1.028	0.796				8.84	1.409	0.697	7.57	1.028	0.796	1.3*		S1	12	NEW67

See page 8 for Explanation of Tables

TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
16O	52.	76.8	1.25*	0.75				11.9	1.25	0.75				1.3*		S2	3,10	HIN68
16O	52.	68.2	1.25*	0.693				12.2	1.25	0.75	6.*	1.25*	0.693	1.3*		S2	3,10	HIN68
16O	63.2	83.13	1.05*	0.782				8.78	1.290	0.776	4.41	1.05*	0.782	1.3*		S1		COO74
17O	15.0	85.3	1.100	0.902				9.0	1.600	0.509				1.3*		S		DEN66
18O	7.0	74.0	1.381	0.670	14.6	1.381	0.670				10.6	1.381	0.670	1.3*	1167	S	H66,5	SAT65
18O	12.3	96.7	1.0*	0.835				5.8	1.53	0.928	17.78	1.0*	0.835	1.3*	1446	S	H66	SAT65
18O	12.3	126.9	0.789	0.920				7.2	1.59	0.762	20.0	0.789	0.920	1.3*	1337	S	H66	SAT65
18O	15.0	86.3	1.105	0.939				9.92	1.608	0.598				1.3*		S		DEN66
19F	2.6	80.1	1.1*	0.972				14.8	1.6*	0.652				1.3*		S2		ZAB70
19F	3.0	76.3	1.1*	0.896				15.0	1.6*	0.504				1.3*		S2		ZAB70
19F	3.2	81.1	1.1*	0.943				15.1	1.6*	0.620				1.3*		S1		ZAB70
19F	3.6	80.2	1.1*	0.90				15.1	1.6*	0.503				1.3*		S2		ZAB70
19F	3.8	84.0	1.1*	0.886				15.0	1.6*	0.511				1.3*		S2		ZAB70
19F	3.95	81.6	1.1*	0.884				15.4	1.6*	0.469				1.3*		S2		ZAB70
19F	15.0	92.2	0.965	0.888				9.0	1.461	0.813				1.3*		S		DEN66
19F	15.0	79.6	1.164	0.821				15.43	1.583	0.613				1.3*		S3		DEH70
19F	15.0	94.3	1.027	0.806	7.49	2.175	0.560							1.3*		S		DEH70
20NE	11.6	92.63	1.00*	0.830*				15.84	1.465	0.591	4.83	0.80*	0.40*	1.3*		S2P3		BRO73
20NE	11.6	94.00	1.00*	0.830*				16.70	1.452	0.582	5.37	0.60*	0.20*	1.3*		S2P3		BRO73
20NE	52.	67.4	1.25*	0.80				11.7	1.25	0.80				1.3*		S2	28,3	HIN68
20NE	52.	67.5	1.25*	0.75				9.78	1.25*	0.825				1.3*		S2	24	DUD71
22NE	11.6	96.72	1.00*	0.830*				16.13	1.419	0.673	6.77	0.80*	0.40*	1.3*		S2P2		BRO73
22NE	11.6	97.05	1.00*	0.830*				16.39	1.417	0.661	6.53	0.60*	0.20*	1.3*		S2P2		BRO73
22NE	52.	68.3	1.25*	0.75				13.4	1.25	0.75				1.3*		S2	2,3	HIN68
22NE	52.	67.3	1.25*	0.75				13.4	1.25	0.782	6.*	1.25*	0.75	1.3*		S2	2,3	HIN68
23NA	2.6	86.0	1.1*	0.869				13.9	1.6*	0.701				1.3*		S2		ZAB70
23NA	3.0	84.6	1.1*	0.891				14.5	1.6*	0.643				1.3*		S2		ZAB70
23NA	3.6	77.8	1.1*	0.847				14.6	1.6*	0.566				1.3*		S2		ZAB70
23NA	4.0	77.0	1.1*	0.849				15.1	1.6*	0.553				1.3*		S1		ZAB70
MG	3.32	60.	1.5*	0.55	16.	1.5*	0.55				4.*	1.5*	0.55	1.5*	570	S	H66	MEL62
MG	3.73	60.	1.5*	0.51	14.	1.5*	0.51				4.*	1.5*	0.51	1.5*	600	S	H66	MEL62
MG	4.07	50.	1.5*	0.55	13.	1.5*	0.55				4.*	1.5*	0.55	1.5*		S	H66	MEL62
MG	4.07	49.82	1.5*	0.56	13.83	1.5*	0.56							1.3?		S	H66	MAD62
MG	4.07	56.7	1.4	0.625	15.4	1.4	0.625							1.3?		S	H66	PUL64
MG	7.0	117.6	1.05*	0.923				15.0	1.696	0.552	25.0	0.75	0.4	1.3*		S	8	DJA71
MG	8.65	71.0	1.177	0.828				16.8	1.468	0.697				1.3*		S	H66	SAT65
MG	9.97	71.8	1.110	0.882				19.9	1.490	0.610				1.3*		S	H66	SAT65
MG	10.1	83.5	1.5*	0.55	27.8	1.5*	0.55							1.3?	1180	S	H66	MAD62
MG	10.87	73.6	1.157	0.764				20.4	1.397	0.658				1.3*		S	H66	SAT65
MG	11.15	60.	1.5*	0.59	14.	1.5*	0.59				8.	1.5*	0.59	1.5*		S	H66	MEL62
MG	11.8	60.	1.5*	0.58	17.	1.5*	0.58				8.	1.5*	0.58	1.5*		S	H66	MEL62
MG	11.8	73.1	1.187	0.805				27.7	1.398	0.605				1.3*	1274	S2	10	PER63
MG	11.8	143.6	1.083	0.738				17.1	1.426	0.652	15.53	1.083	0.738	1.3*	1301	S2		PER66
MG	11.8	122.7	1.219	0.710				40.0	1.362	0.550				1.3*	1254	S2		PER66
MG	13.0	60.	1.5*	0.59	22.	1.5*	0.59				8.	1.5*	0.59	1.5*		S	H66	MEL62
MG	15.9	50.	1.5*	0.59	16.	1.5*	0.59				4.	1.5*	0.59	1.5*		S	H66	MEL62
MG	17.5	50.	1.5*	0.61	18.	1.5*	0.61				4.	1.5*	0.61	1.5*		S	H66	MEL62
MG	19.6	50.	1.5*	0.60	16.	1.5*	0.60				4.	1.5*	0.60	1.5*		S	H66	MEL62
MG	21.6	73.98	1.145	0.753				11.95	1.227	0.861	11.92	1.145	0.753	1.3*	1344	S2		PER66
MG	25.9	80.3	1.11	0.77				11.44	1.15	0.97				1.11	1420	S2	10	TJI65
MG	25.9	79.94	1.103	0.769				11.60	1.203	0.897	8.33	1.103	0.769	1.3*	1341	S2		PER66
MG	25.9	76.63	1.151	0.745				11.94	1.156	0.930				1.3*	1346	S2		PER66
MG	27.5	78.70	1.210	0.850				19.23G	1.027	2.076				1.3?	1275	S2	10	TES65
24MG	10.	183.8	0.909	0.719				14.87	1.370	0.753				0.91		S2		SCH73
24MG	10.	168.8	0.972*	0.697				15.31	1.349	0.760				0.97*		S2		SCH73
24MG	10.1	83.	1.5*	0.55	27.8	1.5*	0.55							1.5*		S2	H66	BUC62
24MG	10.95	92.7	1.0*	0.920				27.1	1.453	0.570				1.3*	1273	S	H66	SAT65
24MG	11.8	93.8	1.0*	0.866				29.2	1.362	0.614	12.0*	1.0*	0.866	1.3*	1259	S	H66	SAT65
24MG	11.8	74.8	1.171	0.807				26.9	1.400	0.598	12.24	1.171	0.807	1.3*	1263	S	H66	SAT65
24MG	11.8	87.48	1.055	0.85				29.2	1.369	0.738				1.25*		S		KUN69
24MG	12.1	87.27	1.05	0.86				19.56	1.516	0.630	9.75	0.84	0.46	1.3*		S3P3	10	BRO72
24MG	12.1	101.4	0.956	0.812				14.6	1.444	0.649	10.1	0.893	0.46	1.3*		S2	10	BRO72
24MG	12.1	89.8	1.203	0.698	39.3	0.903	0.539				11.21	1.00	0.585	1.3*		P3	10	BRO72
24MG	26.	98.9	1.0*	0.90*				28.9	1.443	0.5*				1.3*	1200	S	H66	SAT65
24MG	40.0	70.2	1.2*	0.75	12.3	1.7*	0.80							1.3*		S1	28	DUH68
24MG	40.0	173.6	1.0*	0.70	12.0	1.6*	0.98							1.3*		S1	28	DUH68
24MG	52.	67.5	1.25*	0.71				14.8	1.15	0.775				1.3*		S2	3	HIN68
26MG	10.0	73.9	1.63	0.52	23.8	1.63	0.52							1.3?		S	H66	GLO65
26MG	10.	114.8	1.248	0.612				27.47	1.148	0.782				1.25		S2		SCH73
26MG	10.	160.3	0.972*	0.727				23.55	1.277	0.739				0.97*		S2		SCH73

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TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL. IMAG. POTENTIAL W	RW	AW	SURF. IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
AL	11.8	101.1	1.115	0.823				20.6	1.545	0.465	9.78	1.115	0.823	1.3*	1209	S2		PER66
AL	11.8	120.4	0.955	0.920				28.0	1.524	0.478				1.3*	1241	S2		PER66
AL	15.	39.	1.30*	0.883				22.5	1.48	0.535				1.3*	1281	S1	28	PER64
27AL	4.07	80.	1.5*	0.60	15.	1.5*	0.60							1.37	844	S	H66	MAD62
27AL	6.0	97.06	1.20*	0.79*				24.24	1.53	0.46				1.3*		S1		CHE72
27AL	6.0	98.30	1.20*	0.79*				24.20	1.54	0.448	12.8	1.20*	0.79*	1.3*		S1		CHE72
27AL	7.0	112.0	1.05*	0.86*				14.68	1.573	0.625	9.0*	0.75*	0.40*	1.3*		S1P1		SCH68
27AL	7.0	110.6	1.05*	0.86*				14.20	1.58	0.64	7.0*	0.75*	0.5*	1.3*		S1P2		LOH74
27AL	9.0	110.4	1.05*	0.86*				17.58	1.567	0.577	7.0*	0.75*	0.40*	1.3*		S1P2		SCH68
27AL	9.0	108.7	1.05*	0.86*				18.80	1.55	0.57	7.0*	0.75*	0.5*	1.3*		S1P2		LOH74
27AL	10.1	63.2	1.547	0.563	12.2	1.547	0.563				23.6	1.547	0.563	1.3*		S	H66	SAT65
27AL	11.0	106.9	1.05*	0.86*				19.35	1.516	0.580	5.5*	0.75*	0.40*	1.3*		S2P2		SCH68
27AL	11.0	106.1	1.05*	0.86*				19.72	1.52	0.57	7.0*	0.75*	0.5*	1.3*		S1P2		LOH74
27AL	11.8	91.08	1.20*	0.78				27.40	1.51	0.48				1.3*	1260	S	26,10	JON68
27AL	11.8	90.99	1.20*	0.79				21.92	1.55	0.46	9.90	1.20*	0.79	1.3*	1217	S2	10	JON68
27AL	11.8	104.4	1.07*	0.850				23.1	1.54	0.483	6.0*	1.07*	0.850	1.3*		S2	3	FIT70
27AL	12.8	131.5	0.861	0.933				22.36	1.405	0.601	5.80	0.861	0.933	1.3*		S		CHA68
27AL	13.0	107.3	1.05*	0.86*				26.04	1.46	0.50	7.0*	0.75*	0.5*	1.3*		S2P2		LOH74
27AL	15.0	156.5	0.738	0.960				21.42	1.447	0.582	10.0	0.738	0.960	1.3*		S		CHA68
27AL	15.0	157.0	0.580	1.009				23.66	1.424	0.589				1.3*		S		CHA68
27AL	15.8	84.	1.25*	0.765				15.5	1.275	0.645				1.3*		S	34	COW66
27AL	17.0	112.5	0.96	0.82				10.60	1.32	0.79	14.00	0.82	1.17	1.3*	1340	S1	37	CHI74
27AL	17.0	92.0	1.1	0.82				7.94	1.23	0.97	5.63*	0.98*	1.0*	1.3*	1480	S2	37	CHI74
27AL	20.	103.6	1.02	0.85				11.82	1.413	0.695	8.19	1.02	0.856	1.25*		S2		DEL70
27AL	52.	69.8	1.25*	0.705				12.9	1.18	0.778				1.3*		S2	2,3	HIN68
27AL	52.	67.1	1.25*	0.737				12.5	1.22	0.754	7.	1.25*	0.737	1.3*		S2	2,3	HIN68
27AL	80.	63.23	1.25*	0.669				7.42	1.445	0.7				1.3*		S	10	DUH71
27AL	80.	60.97	1.25*	0.663				7.08	1.29	0.814	3.06	1.51	1.04	1.3*		S2	10	DUH71
SI	9.0	117.0	1.05*	0.86*				18.88	1.59	0.54	7.0*	0.75*	0.40*	1.3*		S1P3		SCH68
SI	9.0	115.6	1.05*	0.86*				19.2	1.555	0.57	7.0*	0.75*	0.5*	1.3*		S P	36	LOH74
SI	11.0	112.7	1.05*	0.86*				22.48	1.46	0.59	7.0*	0.75*	0.5*	1.3*		S2P2		LOH74
SI	11.8	188.5	0.651	1.047				16.6	1.518	0.564	11.21	0.651	1.047	1.3*	1331	S2		PER66
SI	11.8	179.7	0.656	1.086				26.3	1.488	0.535				1.3*	1344	S2		PER66
SI	11.8	113.5	1.05*	0.86*				21.04	1.47	0.53	7.0*	0.75*	0.5*	1.3*		S2P2	7	LOH74
SI	13.0	109.7	1.05*	0.86*				23.54	1.45	0.51	7.0*	0.75*	0.5*	1.3*		S2P2		LOH74
28SI	5.0	103.4	1.29	0.56				11.28	0.75	1.16				1.3*		S	32	GUR68
28SI	5.1	57.7	1.34	0.256				4.35	1.65	0.785				1.25*		S1	6	LAC70
28SI	5.1	102.1	1.21	0.684				11.0	1.41	0.741				1.25*		S2	6	LAC70
28SI	5.3	61.2	1.21	0.642				5.12	1.69	0.790				1.25*		S2	6	LAC70
28SI	5.3	102.1	1.23	0.705				11.7	1.51	0.614				1.25*		S2	6	LAC70
28SI	5.5	63.8	1.15	0.735				6.21	1.62	0.864				1.25*		S1	6	LAC70
28SI	5.5	105.5	1.21	0.698				11.7	1.33	0.815				1.25*		S1	6	LAC70
28SI	5.7	67.9	1.16	0.592				5.12	1.48	0.860				1.25*		S1	6	LAC70
28SI	5.7	101.8	1.21	0.744				13.2	1.54	0.553				1.25*		S2	6	LAC70
28SI	5.9	65.8	1.19	0.598				6.13	1.47	0.761				1.25*		S1	6	LAC70
28SI	5.9	105.4	1.23	0.626				10.3	1.39	0.661				1.25*		S2	6	LAC70
28SI	6.5	57.4	1.27	0.522				6.73	1.81	0.628				1.25*		S1	6	LAC70
28SI	6.5	97.2	1.29	0.606				11.2	1.63	0.625				1.25*		S1	6	LAC70
28SI	7.0	65.5	1.05*	0.877				10.6	1.539	0.758				1.3*		S3	8	DJA72
28SI	7.0	116.3	1.05*	0.811				14.4	1.465	0.739				1.3*		S3	8	DJA72
28SI	8.0	66.3	1.05*	1.013				15.7	1.701	0.485				1.3*		S2		DJA72
28SI	8.0	117.4	1.05*	0.912				19.7	1.688	0.463				1.3*		S2		DJA72
28SI	9.0	57.8	1.13	0.932				17.0	1.61	0.564				1.25*		S1		LAC70
28SI	9.0	100.0	1.16	0.838				23.6	1.60	0.510				1.25*		S1		LAC70
28SI	9.0	62.0	1.05*	0.970				15.2	1.638	0.555				1.3*		S2		DJA72
28SI	9.0	112.9	1.05*	0.870				19.1	1.615	0.531				1.3*		S2		DJA72
28SI	10.0	54.8	1.14	0.929				17.6	1.49	0.527				1.25*		S1	6	LAC70
28SI	10.0	98.1	1.17	0.809				26.8	1.49	0.469				1.25*		S1	6	LAC70
28SI	10.0	65.6	1.05*	0.932				18.6	1.565	0.484				1.3*		S2		DJA72
28SI	10.0	119.0	1.05*	0.832				23.5	1.555	0.455				1.3*		S2		DJA72
28SI	10.	179.9	0.749	0.927				19.31	1.586	0.533				0.75		S1		SCH73
28SI	10.	129.2	0.972*	0.863				20.31	1.580	0.515				0.97*		S2		SCH73
28SI	10.9	55.8	1.12	0.963				18.5	1.50	0.511				1.25*		S2	6	LAC70
28SI	10.9	93.8	1.20	0.823				29.0	1.50	0.448				1.25*		S2	6	LAC70
28SI	11.0	61.8	1.05*	0.944				20.0	1.485	0.511				1.3*		S3		DJA72
28SI	11.0	114.6	1.05*	0.833				26.9	1.461	0.512				1.3*		S3		DJA72
28SI	11.8	51.2	1.20	0.958				18.5	1.53	0.492				1.25*		S2	6	LAC70
28SI	11.8	96.6	1.14	0.918				31.2	1.51	0.515				1.25*		S3	6	LAC70
28SI	11.8	108.2	1.07*	0.858				20.8	1.488	0.535	12.0*	0.955	0.5*	1.3*		S2P2		GRI70
28SI	11.8	101.2*	1.05*	0.85*				18.6	1.486*	0.647*	12.0*	0.840*	0.46*	1.3*		S3P3		GRI70
28SI	11.8	102.0	1.07*	0.903				22.6	1.59	0.489	6.0*	1.07*	0.903	1.3*		S2	3	FIT70
28SI	12.8	51.1	1.18	0.972				18.6	1.55	0.480				1.25*		S2	6	LAC70
28SI	12.8	93.1	1.13	0.904				22.4	1.58	0.523				1.25*		S2	6	LAC70
28SI	18.0	203.5	0.602	0.980				24.35	1.330	0.600				1.30*		S2		MER69
28SI	18.0	123.0	0.890	0.945				27.31	1.385	0.539				1.30*		S3		MER69
28SI	52.	73.0	1.25*	0.75				12.3	1.25	0.75				1.3*		S	3	HIN68
28SI	52.	69.3	1.25*	0.78				13.1	1.24	0.75	6.6	1.25*	0.78	1.3*		S2	3	HIN68
29SI	11.8	102.8	1.07*	0.837				16.4	1.54	0.548	6.0*	1.07*	0.837	1.3*		S2	3	FIT70

See page 8 for Explanation of Tables

TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL. IMAG. POTENTIAL W	RW	AW	SURF. IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
30SI	10.0	99.2	1.149	0.699				17.35	1.42	0.63	7.0*	1.149	0.699	1.2*		S2		WIL68
30SI	10.	85.	1.23	0.73				14.	1.57	0.47	3.	1.20	0.70	1.22		S1	23,12	BER72
30SI	10.	124.0	0.972	0.868				18.16	1.556	0.551				0.97		S1		SCH73
30SI	10.	124.0	0.972*	0.868				18.16	1.556	0.551				C.97*		S1		SCH73
30SI	11.8	102.7	1.07*	0.852				16.1	1.53	0.574	6.0*	1.07*	0.852	1.3*		S2	3	FIT70
31SI	8.	108.5	1.05*	0.86*				14.9	1.55	0.61				1.3*		S1		WOL70
31SI	12.	105.3	1.05*	0.86*				16.7	1.51	0.57				1.3*		S1		WOL70
31P	9.8	68.71	1.488	0.5	14.09	1.488	0.5							1.2*		S1		LUC66
31P	9.8	113.7	1.450	0.496	18.44	1.450	0.496							1.2*		S1		LUC66
31P	10.5	106.4	0.62	1.61				17.66	1.84	0.42				0.62		S3		CUR69
S	11.8	154.6	0.785	0.953				14.6	1.567	0.534	5.91	0.785	0.953	1.3*	1281	S1		PER66
S	11.8	156.9	0.755	1.010				18.2	1.577	0.505				1.3*	1296	S2		PER66
32S	15.8	90.	1.25*	0.62				20.	1.30	0.580				1.3*		S	34	COW66
32S	18.0	110.9	1.005	0.874				20.51	1.417	0.585				1.30*		S2		MER69
32S	28.	95.38	1.11*	0.698				17.67	1.15	0.848				1.3*		S2	31	GAI68
32S	52.	73.4	1.25*	0.75				14.3	1.25	0.75				1.3*		S2	28,3	HIN68
32S	52.	70.2	1.25*	0.75				14.2	1.25	0.75	6.*	1.25*	0.75	1.3*		S2	28,3	HIN68
CL	2.8	93.2	1.1*	1.24				5.42	1.6*	1.30				1.3*		S1		ZAB70
CL	3.4	91.1	1.1*	0.956				5.82	1.6*	0.983				1.3*		S2		ZAB70
CL	4.0	92.5	1.1*	0.860				10.1	1.6*	0.697				1.3*		S2		ZAB70
36AR	8.68	111.5	1.04	0.90				13.19	1.56	0.50	5.07	1.04	0.90	1.25*		S2		SEN71
36AR	18.0	86.41	1.215	0.513				10.50	1.660	0.596				1.30*		S3		MER69
38AR	10.1	105.0	1.07	0.82				5.54	1.56	0.63	8.00	0.86	0.57	1.29*		S1		SEN72
38AR	11.8	102.5	1.07*	0.813				9.9	1.54	0.635	6.0*	1.07*	0.813	1.3*		S1	3	FIT70
40AR	10.95	54.2	1.11	1.035				13.71	1.495	0.583				1.3*	1415	S2	10	BAL64
40AR	11.8	101.2	1.07*	0.834				11.3	1.45	0.696	6.0*	1.07*	0.834	1.3*		S1	3	FIT70
40AR	52.	74.1	1.25*	0.75				14.4	1.25	0.75				1.3*		S2	2,3	HIN68
40AR	52.	71.1	1.25*	0.75				14.5	1.25	0.75	7.	1.25*	0.75	1.3*		S2	2,3	HIN68
40AR	52.	88.9	1.05*	0.85				11.7	1.3	0.779	7.	1.05*	0.85	1.3*		S2	2,3	HIN68
39K	12.8	101.7	1.08	0.81				14.2	1.50	0.60				1.3*		S2		ELB72
39K	12.8	101.1	1.088	0.882				11.4	1.562	0.570	8.5	0.987	0.600	1.3*		S1		ELB72
CA	11.15	65.6	1.00	1.030				13.87	1.519	0.507				1.3*	1229	S2		PER63
CA	11.15	109.1	1.033	0.899				18.73	1.507	0.466				1.3*	1221	S2		PER63
CA	11.15	67.5	0.974	1.054				14.57	1.516	0.489				1.3*	1214	S2	10	HAL64
CA	11.15	70.5	0.951	0.956				6.35	1.559	0.612	5.86	0.951	0.956	1.3*	1278	S1	10,27	HAL64
CA	11.8	109.7	1.031	0.809				10.3	1.508	0.596	8.16	1.031	0.809	1.3*	1266	S1		PER66
CA	11.8	104.5	1.077	0.820				20.8	1.471	0.423				1.3*	1124	S2		PER66
CA	12.1	56.6	1.116	0.928				14.05	1.494	0.499				1.3*	1208	S1	10	PER63
CA	25.5	81.3	1.26	0.67				6.68	1.34	1.07				1.26	1780	S2	10	TJI65
40CA	5.0	78.*	1.31	0.87				20.2	1.76	0.32				1.3*		S1		LEI68
40CA	5.0	125.*	1.24	0.83				22.1	1.75	0.32				1.3*		S1		LEI68
40CA	5.0	112.	1.05*	0.85*				8.5	1.66	0.45	9.0	0.9*	0.6*	1.30*	700	S1		SCH69
40CA	5.0	115.0	1.05*	0.86*				16.11	1.58	0.30	7.0*	0.75*	0.5*	1.3*		S2P3		LOH74
40CA	6.0	82.*	1.31	0.76				19.6	1.66	0.34				1.3*		S1		LEI68
40CA	6.0	126.*	1.28	0.72				23.1	1.66	0.32				1.3*		S1		LEI68
40CA	6.0	111.5	1.05*	0.85*				9.5	1.65	0.44	9.0	0.9*	0.6*	1.30*	850	S1		SCH69
40CA	6.5	76.*	1.39	0.67				17.5	1.60	0.44				1.3*		S2		LEI68
40CA	6.5	116.*	1.37	0.63				21.1	1.58	0.43				1.3*		S2		LEI68
40CA	6.5	111.	1.05*	0.85*				9.8	1.65	0.44	9.0	0.9*	0.6*	1.30*	920	S1		SCH69
40CA	7.	145.1	0.803	0.987				9.6	1.718	0.578				1.3*	1165	S1	10	BAS64
40CA	7.00	119.9	1.0*	0.742				12.24	1.510	0.611				1.3*		S3		BEL68
40CA	7.0	110.5	1.05*	0.85*				10.0	1.64	0.43	9.0	0.9*	0.6*	1.30*	1000	S1		SCH69
40CA	7.0	102.5	1.07*	0.879				13.3	1.656	0.481				1.37		S		FOR70
40CA	7.0	104.5	1.07*	0.925				12.0	1.753	0.462	15.0	1.07*	0.925	1.37		S	5	FOR70
40CA	7.0	109.4	1.05*	0.86*				9.26	1.66	0.56	7.0*	0.75*	0.5*	1.3*		S1P2		LOH74
40CA	7.20	119.3	1.0*	0.752				12.57	1.511	0.636				1.3*		S3		BEL68
40CA	7.5	92.6	1.15*	0.81*				14.42	1.702	0.550				1.3*		S		HAN68
40CA	7.5	124.2	1.0*	0.752				11.76	1.557	0.538				1.3*		S2		HAN68
40CA	8.	109.4	1.011	0.977				24.4	1.658	0.343				1.3*	1027	S2	10	BAS64
40CA	8.0	109.	1.05*	0.85*				10.3	1.63	0.42	9.0	0.9*	0.6*	1.30*	1120	S2		SCH69
40CA	8.0	100.4	1.07*	0.975				25.1	1.689	0.345				1.37		S		FOR70
40CA	8.0	106.0	1.07*	0.930				20.6	1.684	0.303	16.3	1.07*	0.930	1.37		S	5	FOR70
40CA	9.	114.3	0.974	0.932				17.1	1.611	0.453				1.3*	1143	S2	10	BAS64
40CA	9.0	107.5	1.05*	0.85*				10.5	1.62	0.42	8.5	0.9*	0.6*	1.30*	1200	S2		SCH69
40CA	9.0	100.5	1.07*	0.919				19.5	1.638	0.418				1.37		S2		FOR70
40CA	9.0	107.8	1.07*	0.830				12.0	1.603	0.533	12.3	1.07*	0.830	1.37		S2	5	FOR70
40CA	9.0	107.3	1.05*	0.86*				11.08	1.65	0.53	7.0*	0.75*	0.5*	1.3*		S2P2		LOH74
40CA	10.	124.8	0.924	0.920				15.4	1.559	0.498				1.3*	1189	S2	10	BAS64
40CA	10.0	106.5	1.05*	0.85*				10.7	1.61	0.41	8.0	0.9*	0.6*	1.30*	1260	S2		SCH69
40CA	10.	89.2	1.175*	0.830				19.01	1.534	0.470				1.3*		S	4	BRO70
40CA	10.0	112.0	1.07*	0.748				9.7	1.481	0.690	22.8	1.07*	0.748	1.37		S2	5,10	FOR70
40CA	11.	120.7	0.966	0.846				16.4	1.479	0.492				1.3*	1133	S1	10	BAS64
40CA	11.0	106.	1.05*	0.85*				10.9	1.60	0.40	7.5	0.9*	0.6*	1.30*	1300	S2		SCH69
40CA	11.0	105.0	1.05*	0.86*				9.19	1.61	0.62	7.0*	0.75*	0.5*	1.3*		S2P2		LOH74

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TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
40CA	11.8	103.1	1.07*	0.799				5.9	1.53	0.611	6.0*	1.07*	0.799	1.3*		S1	3	FIT70
40CA	12.	112.8	1.021	0.846				19.8	1.471	0.444				1.3*	1144	S2	10	HAS64
40CA	12.	118.1	0.997*	0.787*				14.9	1.422*	0.579*				1.3*	1176	S		HAR66
40CA	12.0	106.	1.05*	0.85*				11.0	1.59	0.40	7.0	0.9*	0.6*	1.30*	1340	S2		SCH69
40CA	12.0	106.0	1.07*	0.824				20.4	1.479	0.431				1.3?		S		FOR70
40CA	12.0	103.7	1.07*	0.823				10.0	1.562	0.591	9.04	1.07*	0.823	1.3?		S	5	FOR70
40CA	12.8	91.6	1.164	0.722				8.88	1.374	0.773	9.60	1.164	0.722	1.3*		S1		NIE66
40CA	12.8	106.	1.05*	0.85*				11.1	1.58	0.39	6.5	0.9*	0.6*	1.30*	1380	S2		SCH69
40CA	14.3	71.2	1.411	0.705				24.04	1.582	0.387				1.3*		S		CHA68
40CA	14.3	83.6	1.251	0.785				13.60	1.560	0.505	8.0*	1.251	0.785	1.3*		S		CHA68
40CA	14.3	106.	1.05*	0.85*				11.2	1.57	0.38	6.5	0.9*	0.6*	1.30*	1400	S2		SCH69
40CA	21.4	104.8	1.063	0.721				7.81	1.416	0.857	6.51	1.063	0.721	1.3*	1566	S2		PER66
40CA	21.4	106.	1.05*	0.85*				11.7	1.50	0.33	6.5	0.9*	0.6*	1.30*	1480	S2		SCH69
40CA	25.9	105.	1.05*	0.85*				12.0	1.45	0.30	6.5	0.9*	0.6*	1.30*	1490	S2		SCH69
40CA	28.	36.33	1.329	0.777				11.65	0.757	1.281				1.3*		S2	12	GAI68
40CA	28.	101.0	1.063	0.928				19.41	1.416	0.529				1.3*		S	12	GAI68
40CA	30.	93.	1.13*	0.8				10.23	1.39	0.75	5.07	0.9	0.56	1.3*		S1P1	35	ROC74
40CA	34.4	95.17	1.081	0.779				13.06	1.357	0.742				1.3*		S2	31	NEW67
40CA	34.4	95.44	1.075	0.804				11.81	1.340	0.764	6.31	1.075	0.804	1.3*		S1	31	NEW67
40CA	34.4	98.5	1.05*	0.85*				12.6	1.37	0.24	6.5	0.9*	0.6*	1.30*	1500	S2		SCH69
42CA	7.00	116.2	1.0*	0.755				12.67	1.513	0.655				1.3*		S2		BEL68
42CA	7.20	118.3	1.0*	0.765				12.72	1.476	0.656				1.3*		S2		BEL68
42CA	7.5	88.0	1.15*	0.81*				14.57	1.623	0.639				1.3*		S		HAN68
42CA	7.5	117.9	1.0*	0.756				12.74	1.508	0.646				1.3*		S2		HAN68
42CA	9.	119.1	0.952	0.855				15.3	1.511	0.537				1.3*	1169	S1		MAR66
42CA	9.	110.1	1.0*	0.9*				16.3	1.55*	0.47*				1.3*	1138	S		MAR66
42CA	9.0	109.1	1.00*	0.917				15.9	1.563	0.517				1.3?		S		FOR70
42CA	9.0	110.0	1.00*	0.901				11.3	1.598	0.585	7.7	1.00*	0.901	1.3?		S	5	FOR70
42CA	10.	88.5	1.175*	0.807				16.11	1.498	0.551				1.3*		S	4	BRO70
42CA	11.8	100.6	1.07*	0.815				10.2	1.49	0.666	6.0*	1.07*	0.815	1.3*		S1	3	FIT70
42CA	12.	114.6	0.995	0.833				16.2	1.410	0.548				1.3*	1224	S1		MAR66
42CA	12.	115.3	0.997*	0.787*				13.9	1.422*	0.579*				1.3*	1191	S2		MAR66
42CA	12.0	113.6	1.00*	0.831				16.3	1.416	0.552				1.3?		S		FOR70
42CA	12.0	111.8	1.00*	0.835				10.2	1.498	0.672	8.7	1.00*	0.835	1.3?		S	5	FOR70
42CA	12.	90.18	1.175*	0.764				16.87	1.431	0.548				1.3*		S	4	BRO70
43CA	7.	110.6	1.0*	0.9*				20.	1.55*	0.47*				1.3?	981	S	H66	BJE64
43CA	7.	129.0	0.883	0.864				6.3	1.816	0.691				1.3?	1342	S	H66	BJE64
43CA	8.5	115.5	1.0*	0.9*				17.5	1.55*	0.47*				1.3?	1116	S	H66	BJE64
43CA	8.5	109.3	0.991	0.986				13.3	1.686	0.535				1.3?	1343	S	H66	BJE64
44CA	7.00	114.1	1.0	0.764				12.8	1.44	0.672				1.3*		S1		RAP67
44CA	7.00	117.4	1.0*	0.750				12.68	1.420	0.667				1.3*		S2		BEL68
44CA	7.20	117.4	1.0*	0.729				12.63	1.454	0.657				1.3*		S2		BEL68
44CA	7.5	87.4	1.15*	0.81*				14.60	1.598	0.663				1.3*		S		HAN68
44CA	7.5	114.6	1.0*	0.773				13.05	1.449	0.652				1.3*		S1		HAN68
44CA	9.	170.7	0.739	0.909				13.7	1.411	0.637				1.3*	1158	S1		MAR66
44CA	9.	108.9	1.0*	0.9*				16.1	1.55*	0.47*				1.3*	1138	S		MAR66
44CA	10.	86.8	1.175*	0.819				19.22	1.456	0.523				1.3*		S	4	BRO70
44CA	11.8	99.4	1.07*	0.832				11.3	1.41	0.730	6.0*	1.07*	0.832	1.3*		S1	3	FIT70
44CA	12.	122.8	0.966	0.719				11.2	1.449	0.732				1.3*	1385	S1		MAR66
44CA	12.	113.9	0.997*	0.787*				14.6	1.422*	0.579*				1.3*	1218	S2		MAR66
44CA	12.	89.34	1.175*	0.752				17.06	1.351	0.627				1.3*		S	4	BRO70
46CA	7.0	116.2	1.00*	0.782				13.2	1.47	0.662				1.3*		S2		BEL66
46CA	7.00	113.6	1.0*	0.748				12.9	1.480	0.620				1.3*		S2		BEL68
46CA	7.20	118.2	1.0*	0.774				12.59	1.485	0.607				1.3*		S2		BEL68
48CA	2.5	95.0*	1.11	0.74				6.47	1.54	0.66	10.0*	0.91*	0.60*	1.30?		S1		ROY71
48CA	3.0	95.0*	1.18	0.66				7.21	1.60	0.66	10.0*	0.91*	0.60*	1.30?		S1		ROY71
48CA	3.5	95.0*	1.16	0.71				6.05	1.68	0.67	10.0*	0.91*	0.60*	1.30?		S1		ROY71
48CA	4.0	95.0*	1.19	0.67				6.37	1.46	0.66	10.0*	0.91*	0.60*	1.30?		S1		ROY71
48CA	4.5	95.0*	1.18	0.71				5.18	1.48	0.66	10.0*	0.91*	0.60*	1.30?		S1		ROY71
48CA	5.0	95.0*	1.22	0.64				13.8	1.26	0.65	10.0*	0.91*	0.60*	1.30?		S1		ROY71
48CA	5.5	95.0*	1.14	0.81				10.4	1.57	0.66	10.0*	0.91*	0.60*	1.30?		S1P3		ROY71
48CA	7.00	116.3	1.0*	0.862				13.0	1.420	0.659				1.3*		S2		BEL68
48CA	7.20	116.5	1.0*	0.796				12.73	1.401	0.639				1.3*		S2		BEL68
48CA	9.	127.6	0.962	0.772				13.5	1.427	0.564				1.3*	1036	S1		MAR66
48CA	9.	112.4	1.0*	0.9*				17.2	1.55*	0.47*				1.3*	1138	S		MAR66
48CA	10.	90.8	1.175*	0.757				14.58	1.361	0.660				1.3*		S	4	BRO70
48CA	11.8	104.3	1.07*	0.820				12.3	1.36	0.677	6.0*	1.07*	0.820	1.3*		S2	3	FIT70
48CA	12.	117.0	1.006	0.745				15.6	1.356	0.592				1.3*	1173	S2		MAR66
48CA	12.	104.8	0.997*	0.787*				13.3	1.422*	0.579*				1.3*	1244	S3		MAR66
48CA	12.	91.68	1.175*	0.777				16.40	1.408	0.579				1.3*		S	4	BRO70
48CA	17.0	112.6	0.91	0.86				14.00	1.52	0.53	7.23	0.75	0.98	1.3*	1460	S1	37	CHI74
48CA	17.0	84.3	1.1	0.82				16.04	1.52	0.51	5.63*	0.98*	1.0*	1.3*	1460	S2	37	CHI74
SC	13.6	72.0	1.35*	0.730				18.56	1.27	1.9*				1.3?	1597	S2		KOR69
45SC	7.5	88.3	1.15*	0.81*				16.60	1.515	0.560				1.3*		S1		HAN68
45SC	7.5	113.7	1.0*	0.785				12.56	1.418	0.648				1.3*		S1		HAN68
TI	4.07	55.	1.5	0.6	15.	1.5	0.6							1.5*	372	S	H66	SLA59
TI	11.8	48.5	1.206	0.815				12.14	1.443	0.668				1.3*	1380	S1	10	PER63
TI	11.8	72.2	1.335	0.691				21.66	1.403	0.552				1.3*	1337	S2	10	PER63
TI	11.8	49.8	1.183	0.817				12.06	1.434	0.671				1.3*	1384	S1	10	HAL64
TI	11.8	77.1	1.278	0.767				20.14	1.379	0.584				1.3*	1338	S2	10	HAL64

See page 8 for Explanation of Tables

TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	EC	SR	FIT	NOTE	REF.
TI	12.6	114.2	1.005	0.753				5.38	1.292	0.681	9.36	1.005	0.753	1.2?		P2	12	ZAI71
TI	12.8	46.7	1.240	0.797				12.24	1.369	0.673				1.3*	1366	S2	10	PER63
TI	12.8	77.6	1.283	0.706				18.95	1.324	0.622				1.3*	1377	S1	10	PER63
TI	15.	35.84	1.453	0.721				13.66	1.414	0.609				1.3*	1472	S2	10	PER63
TI	15.	74.0	1.329	0.710				20.33	1.333	0.645				1.3*	1514	S2	10	PER63
TI	15.	52.4	1.158	0.854				11.56	1.448	0.687				1.3*	1504	S1	10,2	EEB64
46TI	7.5	83.9	1.15*	0.81*				14.90	1.495	0.694				1.3*		S1	15	HAN68
46TI	7.5	112.8	1.0*	0.781				12.97	1.405	0.648				1.3*		S1	15	HAN68
46TI	9.0	102.9	1.05*	0.86*				17.48	1.39	0.62	7.0*	0.75*	0.5*	1.3*		S2P2	16	LOH74
46TI	9.15	83.03	1.175*	0.843				16.56	1.501	0.595				1.3*	1281	S	10	AIT67A
46TI	9.15	89.54	1.175*	0.772				12.28	1.442	0.702	12.05	1.175*	0.772	1.3*	1283	S	5	AL167A
46TI	11.0	102.4	1.05*	0.86*				14.65	1.43	0.60	7.0*	0.75*	0.5*	1.3*		S2P1	16	LOH74
46TI	11.8	97.4	1.07*	0.795				11.9	1.37	0.728	6.0*	1.07*	0.799	1.3*		S1	3	FIT70
46TI	13.0	103.7	1.05*	0.86*				16.03	1.38	0.66	7.0*	0.75*	0.5*	1.3*		S2P1	16	LOH74
46TI	13.6	93.	1.15*	0.780				18.5	1.32	0.68*				1.3?		S2		VER70
47TI	6.	41.	1.0*	0.90*	19.6	1.41*	0.65*							1.3?		S	H66	BAR64
47TI	13.6	93.	1.15*	0.775				17.0	1.30	0.68*				1.3?		S2		VER70
48TI	6.	99.	1.0*	0.90*	28.2	1.41*	0.65*							1.3?		S	H66	BAR64
48TI	6.0	88.9	1.15*	0.81*				17.6	1.44*	0.61*				1.3*		S1		SIE67
48TI	7.0	88.0	1.15*	0.81*				16.0	1.44*	0.61*				1.3*		S1		SIE67
48TI	7.5	88.8	1.15*	0.81*				14.45	1.494	0.675				1.3*		S1		HAN68
48TI	7.5	115.0	1.0*	0.804				13.00	1.410	0.650				1.3*		S1		HAN68
48TI	8.0	87.8	1.15*	0.81*				17.6	1.44*	0.61*				1.3*		S1		SIE67
48TI	9.0	87.8	1.15*	0.81*				17.4	1.44*	0.61*				1.3*		S1		SIE67
48TI	9.0	100.3	1.05*	0.86*				12.22	1.49	0.77	7.0*	0.75*	0.5*	1.3*		S2P2	16	LOH74
48TI	10.0	87.3	1.15*	0.81*				15.7	1.44*	0.61*				1.3*		S2		SIE67
48TI	11.0	87.3	1.15*	0.81*				16.2	1.44*	0.61*				1.3*		S2		SIE67
48TI	11.0	103.2	1.05*	0.86*				15.27	1.39	0.70	7.0*	0.75*	0.5*	1.3*		S2P1	16	LOH74
48TI	11.8	98.5	1.07*	0.802				12.3	1.40	0.717	6.0*	1.07*	0.802	1.3*		S1	3	FIT70
48TI	11.9	104.8	1.049	0.805				11.78	1.444	0.724	5.61	0.70*	0.40*	1.3*		S1P2	16,15	HEI72
48TI	11.9	81.4	1.273	0.647	10.88	1.616	0.542				5.11	0.70*	0.40*	1.3*		S2P2	15	HEI72
48TI	12.0	88.7	1.15*	0.81*				16.8	1.44*	0.61*				1.3*		S2		SIE67
48TI	13.0	102.8	1.05*	0.86*				14.09	1.40	0.75	7.0*	0.75*	0.5*	1.3*		S2P1	16	LOH74
48TI	13.6	93.	1.15*	0.770				18.5	1.29	0.68*				1.3?		S2		VER70
48TI	15.	96.9	1.13	0.69				12.6	1.32	0.76	5.13	0.7*	0.4*	1.3?		S1P1		BAK74
48TI	19.5	101.0	1.06	0.823				13.83	1.341	0.742				1.11*		S		SC073
48TI	21.5	65.6	0.909	1.068				14.08	1.419	0.685				1.3*	1613	S1	10,2	PER63
48TI	21.5	106.0	0.997	0.916				18.33	1.400	0.643				1.3*	1599	S	10,2	PER63
48TI	34.4	95.63	1.071	0.841				12.77	1.291	0.739				1.3*		S2	12	NEW67
48TI	34.4	95.36	1.068	0.812				12.45	1.295	0.762	7.75	1.068	0.812	1.3*		S1	12	NEW67
48TI	52.	72.5	1.25*	0.733				15.1	1.21	0.739				1.3*		S2	2,3	HIN68
48TI	52.	70.0	1.25*	0.744				13.2	1.25	0.759	7.9	1.25*	0.744	1.3*		S1	2,3	HIN68
48TI	52.	90.0	1.05*	0.85				12.5	1.29	0.76	7.9	1.05*	0.85	1.3*		S1	2,3	HIN68
48TI	52.0	74.6	1.25*	0.78				20.0	1.12	0.72				1.25?		S1	2	HER70
49TI	6.	95.	1.0*	0.90*	29.5	1.41*	0.65*							1.3?		S	H66	BAR64
49TI	11.9	105.8	1.058	0.772				10.90	1.468	0.700	5.06	0.70*	0.40*	1.3*		S2P2	16,15	HEI72
49TI	11.9	80.9	1.289	0.605	9.87	1.627	0.557				4.37	0.70*	0.40*	1.3*		S2P2	15	HEI72
49TI	13.6	91.5	1.15*	0.785				17.0	1.32	0.68*				1.3?		S2		VER70
49TI	21.6	50.9	1.131	0.868				10.3	1.465	0.69				1.3*		S	H66,2	HAL62
49TI	34.4	96.89	1.056	0.840				12.09	1.260	0.774				1.3*		S3	12	NEW67
49TI	34.4	95.59	1.087	0.800				11.89	1.280	0.771	7.37	1.087	0.800	1.3*		S1	12	NEW67
50TI	6.	106.	1.0*	0.90*	21.2	1.41*	0.65*							1.3?		S	H66	BAR64
50TI	11.8	102.2	1.07*	0.781				12.7	1.31	0.750	6.0*	1.07*	0.781	1.3*		S2	3	FIT70
50TI	11.9	105.2	1.052	0.816				10.97	1.475	0.722	5.06	0.70*	0.40*	1.3*		S2P2	16,15	HEI72
50TI	11.9	80.3	1.287	0.553	8.94	1.654	0.737				4.36	0.70*	0.40*	1.3*		S2P2	15	HEI72
50TI	13.6	90.	1.15*	0.805				17.0	1.33	0.68*				1.3?		S2		VER70
50TI	15.	108.0	1.05	0.77				9.8	1.34*	0.82*	4.27	0.7*	0.4*	1.3?		S1P1		BAK74
50TI	34.4	96.88	1.046	0.879				12.51	1.269	0.770				1.3*		S3	12	NEW67
50TI	34.4	95.72	1.091	0.784				11.72	1.297	0.777	8.15	1.091	0.784	1.3*		S1	12	NEW67
50TI	52.	71.3	1.25*	0.733				14.2	1.25	0.714	6.64	1.25*	0.733	1.3*		S1	2,3	HIN68
50TI	52.	89.0	1.05*	0.852				12.4	1.29	0.76	7.9	1.05*	0.852	1.3*		S1	2,3	HIN68
V	8.01	65.37	1.5*	0.531	11.59	1.5*	0.531							1.3*		S	H66	GAR63
V	8.46	65.82	1.5*	0.526	12.09	1.5*	0.526							1.3*		S	H66	GAR63
V	8.96	65.12	1.5*	0.558	14.49	1.5*	0.558							1.3*		S	H66	GAR63
V	9.45	65.71	1.5*	0.579	13.92	1.5*	0.579							1.3*		S	H66	GAR63
V	9.94	63.29	1.5*	0.576	14.79	1.5*	0.576							1.3*		S	H66	GAR63
V	10.46	61.53	1.5*	0.545	14.52	1.5*	0.545							1.3*		S	H66	GAR63
V	27.5	92.3	1.12	0.85	23.4	1.33	1.39							1.3?	1501	S	H66	MAY65
50V	7.50	116.8	1.0*	0.78				13.07	1.448	0.661				1.3*		S1		DEL67
50V	7.5	89.1	1.15*	0.81*				14.60	1.522	0.670				1.3*		S1		HAN68
50V	7.5	116.8	1.0*	0.780				13.07	1.448	0.661				1.3*		S1		HAN68
51V	7.5	87.1	1.15*	0.81*				14.40	1.432	0.754				1.3*		S1		HAN68
51V	7.5	114.4	1.0*	0.796				13.16	1.358	0.685				1.3*		S1		HAN68
51V	11.9	103.7	1.063	0.794				10.70	1.469	0.788	4.69	0.70*	0.40*	1.3*		S2P2	16,15	HEI72
51V	11.9	79.86	1.285	0.619	9.60	1.673	0.805				5.32	0.70*	0.40*	1.3*		S2P2	15	HEI72
51V	17.0	94.6	1.13	0.74				11.60	1.34	0.75	7.81	0.76	1.73	1.3*	1550	S1	37	CHI74
51V	17.0	97.1	1.1	0.82				13.42	1.42	0.66	5.63*	0.98*	1.0*	1.3*	1570	S2	37	CHI74
51V	27.5	81.80	1.225	0.790				21.50G	1.342	1.375				1.3?	1487	S3	10	TES65
51V	34.4	96.64	1.061	0.810				17.14	1.280	0.751				1.3*		S	31	NEW67
51V	34.4	95.71	1.067	0.823				13.54	1.306	0.771	7.30	1.067	0.823	1.3*		S1	31	NEW67

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TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
CR	11.15	97.4	0.739	1.132				19.08	1.281	0.609				1.3*	1233	S	10	HAL64
CR	11.15	46.2	1.260	0.842				15.92	1.434	0.577				1.3*	1314	S	10,27	HAL64
50CR	7.5	83.7	1.15*	0.81*				19.0	1.469	0.605				1.3*		S1	15	HAN68
50CR	7.5	110.4	1.0*	0.778				13.09	1.400	0.659				1.3*		S1	15	HAN68
50CR	7.5	102.	1.00*	0.88				24.3	1.41	0.64				1.30*		S1	15	ROB68
50CR	9.0	88.03	1.175*	0.683	10.05	1.735*	0.683							1.3?	1185	S	10	AND64
50CR	10.0	77.32	1.26	0.702				14.66G	1.107	2.189				1.3?	1221	S	10	AND64
50CR	10.0	43.98	1.275	0.791				9.97G	1.286	2.079				1.3?	1268	S	10	AND64
50CR	10.	83.3	1.175*	0.823				19.08	1.411	0.603				1.3*		S	4	BRO70
50CR	11.8	97.2	1.07*	0.837				13.9	1.42	0.671	6.0*	1.07*	0.837	1.3*		S1	3	FIT70
50CR	16.4	100.*	1.054	0.853				18.24	1.322	0.745				1.3*		S2		PET72
52CR	4.39	89.9	1.25*	0.158	15.05	1.25*	0.158							1.25*		S1		LEG66
52CR	4.53	89.8	1.25*	0.546	15.04	1.25*	0.546							1.25*		S1		LEG66
52CR	4.69	88.6	1.25*	0.489	15.10	1.25*	0.489							1.25*		S1		LEG66
52CR	4.93	90.1	1.25*	0.518	15.06	1.25*	0.518							1.25*		S1		LEG66
52CR	5.41	90.3	1.25*	0.546	15.01	1.25*	0.546							1.25*		S1		LEG66
52CR	5.72	87.8	1.25*	0.430	15.66	1.25*	0.430							1.25*		S1		LEG66
52CR	6.02	98.9	1.25*	0.434	17.72	1.25*	0.434							1.25*		S1		LEG66
52CR	6.33	90.2	1.25*	0.518	14.97	1.25*	0.518							1.25*		S1		LEG66
52CR	7.0	90.99	1.175*	0.714	9.14	1.735*	0.714							1.3?	1025	S	10	AND64
52CR	7.5	89.5	1.15*	0.81*				14.57	1.456	0.698				1.3*		S1		HAN68
52CR	7.5	113.1	1.0*	0.796				13.07	1.356	0.676				1.3*		S1		HAN68
52CR	7.50	114.2	1.0*	0.76				13.2	1.37	0.693				1.3*		S1		RAO68
52CR	8.0	91.01	1.175*	0.725	9.88	1.735*	0.725							1.3?	1192	S	10	AND64
52CR	9.0	91.29	1.175*	0.698	9.6	1.735*	0.698							1.3?	1242	S	10	AND64
52CR	10.0	90.76	1.175*	0.696	9.53	1.735*	0.696							1.3?	1316	S	10	AND64
52CR	10.0	45.54	1.275*	0.834				9.10G	1.383	2.044				1.3?	1392	S	10	AND64
52CR	10.	87.2	1.175*	0.792				17.17	1.402	0.658				1.3*		S	4	BRO70
52CR	11.0	79.90	1.35*	0.695	11.85	1.664	0.572							1.3?	1299	S	10	AND64
52CR	11.0	91.97	1.175*	0.633	9.61	1.735*	0.633							1.3?	1343	S	10	AND64
52CR	11.0	105.7	1.05*	0.85*				14.9	1.411	0.676	5.31	0.75*	0.4*	1.25*	1403	S P		MAY71
52CR	11.0	86.9	1.217	0.734				16.97	1.355	0.649	5.22	0.75*	0.4*	1.25*	1331	S P		MAY71
52CR	11.0	106.5	1.05*	0.86*				16.61	1.41	0.63	7.0*	0.75*	0.5*	1.3*		S2P2	16	LOH74
52CR	11.8	106.3	1.05*	0.86*				13.62	1.46	0.68	7.0*	0.75*	0.5*	1.3*		S2P1	16,7	LOH74
52CR	11.8	55.1	1.186	0.808				11.15	1.437	0.68	7.53	0.99	0.514	1.3*		S2P1	10	GRI70
52CR	11.8	106.2	1.051	0.849				13.25	1.455	0.698	11.65	0.74	0.461	1.3*		S2P1	10	GRI70
52CR	11.8	101.2	1.07*	0.807				13.0	1.41	0.669	6.0*	1.07*	0.807	1.3*		S1	3	FIT70
52CR	11.9	104.3	1.058	0.774				11.80	1.457	0.745	4.40	0.70*	0.40*	1.3*		S2P2	16,15	HEI72
52CR	11.9	80.06	1.275	0.610	9.92	1.652	0.728				4.86	0.70*	0.40*	1.3*		S3P2	15	HEI72
52CR	13.6	65.	1.48	0.46	15.	1.48	0.46							1.3?		S	H66	MAN64
52CR	15.	90.6	1.17	0.69				11.6	1.34*	0.82*	6.18	0.7*	0.4*	1.3?		S1P1		BAK74
52CR	15.	103.6	1.05*	0.87				13.99	1.39	0.74	11.88	0.62	0.41	1.3*		S2P1	14	IRS74
52CR	17.0	92.6	1.14	0.75				13.30	1.31	0.74	6.59	1.03	1.46	1.3*	1540	S1	37	CHI74
52CR	17.0	95.9	1.1	0.82				14.89	1.38	0.68	5.63*	0.98*	1.0*	1.3*	1570	S2	37	CHI74
52CR	34.4	96.23	1.099	0.770				18.15	1.304	0.680				1.3*		S2	12	NEW67
52CR	34.4	95.87	1.096	0.789				12.60	1.275	0.783	7.03	1.096	0.789	1.3*		S2	12	NEW67
53CR	9.0	90.76	1.175*	0.710	9.67	1.735*	0.710							1.3?	1281	S	10	AND64
53CR	9.0	107.2	1.05*	0.86*				17.17	1.34	0.70	7.0*	0.75*	0.5*	1.3*		S2P1	16	LOH74
53CR	10.0	90.88	1.175*	0.709	9.63	1.735*	0.709							1.3?	1359	S	10	AND64
53CR	10.0	46.00	1.275*	0.844				9.11G	1.379	2.059				1.3?	1420	S	10	AND64
53CR	10.	87.2	1.175*	0.817				17.97	1.412	0.640				1.3*		S	4	BRO70
53CR	10.0	103.0	1.05*	0.86*				13.26	1.43	0.76	7.0*	0.75*	0.5*	1.3*		S2P1	16	LOH74
53CR	11.0	104.7	1.05*	0.86*				14.56	1.39	0.75	7.0*	0.75*	0.5*	1.3*		S2P1	16	LOH74
53CR	11.8	101.7	1.07*	0.801				13.2	1.38	0.685	6.0*	1.07*	0.801	1.3*		S1	3	FIT70
53CR	13.0	103.0	1.05*	0.86*				13.13	1.44	0.77	7.0*	0.75*	0.5*	1.3*		S2P2	16	LOH74
53CR	13.5	90.8	1.15*	0.81*				18.8	1.34*	0.68*				1.3?		S	H66	SOR65
54CR	9.0	87.36	1.175*	0.747	9.61	1.735*	0.747							1.3?	1362	S	10	AND64
54CR	10.0	87.56	1.175*	0.743	9.84	1.735*	0.743							1.3?	1441	S	10	AND64
54CR	10.0	42.27	1.275*	0.829				8.72G	1.323	2.267				1.3?	1468	S	10	AND64
54CR	10.	85.5	1.175*	0.821				17.84	1.366	0.688				1.3*		S	4	BRO70
54CR	11.8	98.9	1.07*	0.827				13.4	1.41	0.696	6.0*	1.07*	0.827	1.3*		S1	3	FIT70
FE	11.15	51.5	1.156	0.979				15.76	1.433	0.658				1.3*	1452	S1	10	PER63
FE	11.15	78.5	1.225	0.843				24.11	1.399	0.586				1.3*	1410	S	10	PER63
FE	11.15	56.7	1.085	0.993				17.7	1.380	0.638				1.3*	1370	S2	10,27	HAL64
FE	11.8	58.5	1.10	0.864				13.40	1.381	0.718				1.3*	1385	S1	10	PER63
FE	11.8	95.5	1.112	0.795				19.03	1.325	0.676				1.3*	1349	S	10	PER63
FE	11.8	53.7	1.105	0.897				13.76	1.375	0.713				1.3*	1427	S1	10,27	HAL64
FE	11.8	58.4	1.103	0.836				13.31	1.353	0.733				1.3*	1392	S2	10	HAL64
FE	11.8	96.9	1.107	0.756				18.02	1.275	0.730				1.3*	1374	S2	10	HAL64
FE	11.8	96.9	1.11	0.76				18.02	1.275	0.73	6.0*	1.25*	0.73	1.3*		S1P3	30	BAX68
FE	15.0	59.4	1.105	0.884				13.40	1.389	0.712				1.3*	1532	S1	2	PER64
FE	15.0	51.9	1.185	0.873				13.23	1.420	0.703				1.3*	1576	S	27	PER64
FE	25.9	103.9	1.06	0.82				11.0	1.23	0.96				1.06	1850	S2	10,27	TJI65
FE	25.9	97.90	1.096	0.795				10.95	1.223	0.957	5.58	1.096	0.795	1.3*	1811	S2	27	PER66
FE	25.9	99.26	1.088	0.796				10.82	1.215	0.971				1.3*	1816	S3	27	PER66
FE	27.5	82.00	1.230	0.796				22.10G	1.270	1.488				1.3?	1526	S2		TES65

See page 8 for Explanation of Tables

TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL. IMAG. POTENTIAL W	RW	AW	SURF. IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
54FE	7.5	94.5	1.15*	0.81*				17.60	1.359	0.719				1.3*		S1		HAN68
54FE	7.5	117.0	1.0*	0.834				13.03	1.381	0.665				1.3*		S1		HAN68
54FE	8.0	105.0	1.05*	0.86*				15.29	1.44	0.75	7.0*	0.75*	0.5*	1.3*		S2P2	16	LOH74
54FE	10.0	106.5	1.05*	0.86*				19.98	1.38	0.62	7.0*	0.75*	0.5*	1.3*		S2P2	16	LOH74
54FE	12.0	105.8	1.05*	0.86*				14.33	1.44	0.70	7.0*	0.75*	0.5*	1.3*		S2P1	16	LOH74
54FE	12.3	105.6	1.05*	0.85*				14.00	1.430	0.695	6.8	0.90*	0.60*	1.3*		S2P1		BRO73A
54FE	12.3	105.2	1.05*	0.85*				13.62	1.430	0.708	5.1	0.65*	0.18*	1.3*		S2P2		BRO73A
54FE	12.3	105.2	1.05*	0.86*				14.49	1.43	0.69	7.0*	0.75*	0.5*	1.3*		S2P1	16	LOH74
54FE	14.5	92.58	1.15*	0.81*				16.55	1.384	0.651				1.15*	1499	S2	2	HJO68
54FE	15.	82.1	1.26	0.72				14.7	1.36	0.66	6.80	0.85	0.41	1.3?		S1P1		BAK74
54FE	17.0	90.6	1.17	0.71				12.00	1.30	0.78	7.13	0.64	0.71	1.3*	1540	S1	37	CHI74
54FE	17.0	97.5	1.1	0.82				15.82	1.37	0.66	5.63*	0.98*	1.0*	1.3*	1530	S2	37	CHI74
54FE	34.4	95.80	1.126	0.769				11.55	1.208	0.828				1.3*		S2	12	NEW67
54FE	34.4	96.67	1.097	0.799				12.25	1.270	0.783	7.07	1.097	0.799	1.3*		S2	12	NEW67
54FE	52.	72.3	1.25*	0.75				12.8	1.25	0.75				1.3*		S	28,3	HIN68
54FE	52.	71.5	1.25*	0.75				13.0	1.25	0.73	6.*	1.25*	0.75	1.3*		S1	28,3	HIN68
56FE	11.8	60.0	1.098	0.86				12.72	1.388	0.726	6.36	0.829	0.496	1.3*		S1P2	10	GRI70
56FE	11.8	105.7	1.031	0.858				15.42	1.391	0.707	8.1	0.928	0.437	1.3*		S1P2	10	GRI70
56FE	12.0	102.7	1.05*	0.85*				16.07	1.38	0.695	5.07	0.9*	0.6*	1.25*	1464	S P		BAY71
56FE	12.3	103.6	1.05*	0.85*				14.39	1.390	0.759	6.5	0.90*	0.60*	1.3*		S1P1		BRO73A
56FE	12.3	103.9	1.05*	0.85*				14.01	1.383	0.766	4.8	0.65*	0.18*	1.3*		S1P2		BRO73A
56FE	12.3	104.3	1.05*	0.86*				15.18	1.38	0.74	7.0*	0.75*	0.5*	1.3*		S2P	16	LOH74
56FE	14.5	93.18	1.15*	0.81*				16.87	1.377	0.667				1.15*	1559	S2	2	HJO68
56FE	15.	82.8	1.24	0.75				15.3	1.34	0.70	6.80	0.85	0.41*	1.3?		S1P1		BAK74
56FE	17.0	94.8	1.12	0.79				15.30	1.32	0.74	6.60	0.90	1.16	1.3*	1610	S1	37	CHI74
56FE	17.0	96.3	1.1	0.82				16.12	1.33	0.72	5.63*	0.98*	1.0*	1.3*	1610	S1	37	CHI74
56FE	30.	92.4	1.13*	0.76				12.34	1.34	0.78	5.33	0.9	0.606	1.3*		S1P1	35	ROC74
57FE	10.0	104.2	1.05*	0.86*				17.72	1.35	0.76	7.0*	0.75*	0.5*	1.3*		S1P1	16	LOH74
58FE	10.	86.55	1.175*	0.80				20.4	1.340	0.680				1.2?		S2	15	MCL72
58FE	12.3	103.0	1.05*	0.85*				13.98	1.400	0.790	6.8	0.90*	0.60*	1.3*		S2P1		BRO73A
58FE	12.3	103.6	1.05*	0.85*				13.79	1.396	0.792	4.3	0.65*	0.18*	1.3*		S2P2		BRO73A
58FE	12.3	103.3	1.05*	0.86*				15.16	1.39	0.76	7.0*	0.75*	0.5*	1.3*		S2P1	16	LOH74
CO	4.07	52.9	1.5*	0.682	17.4	1.5*	0.682							1.5?		S	H66	SMI62
59CO	13.6	73.	1.35*	0.685				17.G*	1.22	1.9*				1.3*	1469	S2		NEM67
59CO	17.0	104.6	1.05	0.86				16.10	1.36	0.68	7.47	0.93	1.63	1.3*	1620	S1	37	CHI74
59CO	17.0	98.7	1.1	0.82				16.94	1.35	0.68	5.63*	0.98*	1.0*	1.3*	1610	S2	37	CHI74
59CO	27.5	73.35	0.87	1.10				17.03G	1.28	1.69				1.3?	1551	S	10	TES65
59CO	27.5	82.00	1.225	0.780				22.10G	1.275	1.467				1.3?	1530	S2	10	TES65
NI	3.32	60.	1.5*	0.65	15.	1.5*	0.65							1.5*		S	H66	MEL62
NI	4.07	60.	1.5*	0.65	15.	1.5*	0.65							1.5*		S	H66	MEL62
NI	11.15	50.8	1.237	0.857				15.09	1.433	0.659				1.3*	1380	S1	10	PER63
NI	11.15	77.3	1.289	0.763				22.55	1.402	0.603				1.3*	1366	S1	10	PER63
NI	11.15	59.8	1.131	0.866	8.35	1.791	0.565							1.3*	1320	S	10	HAL64
NI	11.15	51.8	1.237	0.824				16.91	1.378	0.637				1.3*	1307	S1	10	HAL64
NI	11.7	56.1	1.17	0.88				13.8	1.45	0.67				1.17	1430	S1	10	TJI65
NI	11.8	53.2	1.202	0.869				13.71	1.463	0.667				1.3*	1432	S1	10	PER63
NI	11.8	76.3	1.305	0.746				20.70	1.424	0.608				1.3*	1414	S1	10	PER63
NI	11.8	60.5	1.121	0.860	7.59	1.834	0.537							1.3*	1357	S1	10	HAL64
NI	11.8	56.4	1.164	0.865				14.14	1.427	0.665				1.3*	1396	S1	10	HAL64
NI	11.8	79.5	1.274	0.739				20.37	1.389	0.625				1.3*	1396	S1	10	HAL64
NI	11.8	95.0	1.14	0.80				19.58	1.37	0.64	6.0*	1.5	0.64	1.3*		S1P3	30	BAK68
NI	13.5	44.8	1.322	0.816				15.65	1.409	0.652				1.3*	1502	S2	10,28	PER63
NI	13.5	70.0	1.378	0.714				25.79	1.403	0.543				1.3*	1472	S2	10,28	PER63
NI	21.6	71.74	1.29	0.7				14.50	1.36	0.68				1.3?		S	H66	BRO62
NI	21.6	56.6	1.10	0.91				14.3	1.37	0.68				1.10	1620	S1	10	TJI65
NI	21.6	96.31	1.119	0.735				12.63	1.261	0.842	6.37	1.119	0.735	1.3*	1689	S1		PER66
NI	21.6	101.4	1.064	0.856				19.52	1.330	0.683				1.3*	1640	S2		PER66
NI	25.8	58.3	1.04	1.01				15.8	1.41	0.64				1.04	1670	S3	10,27	TJI65
NI	25.9	103.6	1.048	0.825				11.88	1.232	0.888	6.62	1.048	0.825	1.3*	1749	S2		PER66
58NI	11.8	106.1	1.07*	0.807				16.6	1.35	0.629	6.0*	1.07*	0.807	1.3*		S1	3	PIT70
58NI	11.8	54.1	1.210	0.854				12.83	1.462	0.665	5.61	0.955	0.529	1.3*		S1P2	10	GRI70
58NI	11.8	107.4	1.051	0.850				15.1	1.437	0.730	9.6	0.870	0.480	1.3*		S2P2	10	GRI70
58NI	11.8	107.0	1.05*	0.86*				15.10	1.44	0.73	7.0*	0.75*	0.5*	1.3*		S1P1	16,7	LOH74
58NI	12.	121.7	0.928	1.004				19.1	1.438	0.584				1.3*	1391	S		MAR66
58NI	12.	118.4	0.931	1.046				20.5	1.467*	0.582*				1.3*	1453	S		MAR66
58NI	12.8	67.86	1.44*	0.562	14.41	1.54*	0.562							1.4?	1346	S	H66	BUD63
58NI	12.8	57.5	1.16	0.82				16.0	1.35	0.63				1.16	1300	S1	10	TJI65
58NI	13.6	72.	1.35*	0.730*				17.G*	1.22	1.9*				1.3*	1470	S2		NEM67
58NI	14.5	93.23	1.15*	0.81*				16.63	1.395	0.654				1.15*	1532	S2	2	HJO68
58NI	15.0	76.1	0.931	0.840				11.15	1.284	0.850				1.3*	1484	S2	10	PER63
58NI	15.0	98.6	1.105	0.709				16.49	1.170	0.831				1.3*	1436	S2	10	PER63
58NI	15.0	84.0	0.89	0.85				11.0	1.30	0.85				0.89	1540	S2	10	TJI65
58NI	15.0	114.3	1.31	0.53	27.6	1.10	1.09							1.3?		S2		HER70
58NI	15.	108.5	1.05*	0.85*				15.7	1.34*	0.69*	4.88	0.7*	0.41*	1.3?		S1P1		BAK74
58NI	17.0	96.5	1.12	0.80				15.20	1.34	0.69	6.67	0.87	1.62	1.3*	1550	S1	37	CHI74
58NI	17.0	99.0	1.1	0.82				15.57	1.37	0.67	5.63*	0.98*	1.0*	1.3*	1560	S1	37	CHI74
58NI	21.6	103.5	1.05*	0.85*				16.00	1.357	0.734	6.84	0.95	0.50	1.3*		S2P2		GRI70
58NI	21.6	102.0*	1.05*	0.85*				16.00*	1.32*	0.766*	6.8*	0.95*	0.50*	1.3*		S3P2		GRI70

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TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
58NI	25.9	51.2	1.14	0.83				13.6	1.39	0.68				1.14	1620	S3	10,27	TJI65
58NI	27.5	53.9	1.101	0.978				16.51	1.437	0.600				1.3*	1654	S2	10	PER63
56NI	27.5	81.6	1.234	0.776				23.49	1.404	0.559				1.3*	1641	S2	10	PER63
58NI	27.5	60.69	1.027	1.039				16.07G	1.33	1.539				1.3?	1512	S	10	TES65
58NI	27.5	82.27	1.227	0.780				22.11G	1.309	1.394				1.3?	1494	S2	10	TES65
58NI	52.	70.4	1.25*	0.742				14.0	1.24	0.714	7.	1.25*	0.742	1.3*		S1	28,3	HIN68
58NI	52.	93.1	1.05*	0.845				12.2	1.33	0.735	6.8	1.05*	0.845	1.3*		S2	28,3	HIN68
58NI	80.	66.5	1.25*	0.731				15.26	1.09	0.862	4.63	1.29	0.664	1.3*		S1	10	DUH71
56NI	80.	81.42	1.05*	0.85				13.41	1.026	0.972	9.46	1.194	0.984	1.3*		S1	10	DUH71
60NI	6.87	83.78	1.3*	0.73*				21.95	1.34*	0.65*				1.3*	913	S1		ELN67
60NI	7.5	104.	1.00*	0.959				24.7	1.41	0.655				1.3*		S2		COS66
60NI	7.88	81.85	1.3*	0.73*				22.00	1.34*	0.65*				1.3*	1078	S1		ELN67
60NI	8.9	112.9	1.05*	0.86*				16.14	1.37	0.72	7.0*	0.75*	0.40*	1.3*		S1P1		SCH68
60NI	8.9	111.2	1.05*	0.86*				16.26	1.37	0.74	7.0*	0.75*	0.5*	1.3*		S1P2	16	LOH74
60NI	9.89	78.86	1.3*	0.73*				21.28	1.34*	0.65*				1.3*	1301	S2		ELN67
60NI	10.86	78.32	1.3*	0.73*				21.91	1.34*	0.65*				1.3*	1377	S2		ELN67
60NI	10.9	110.8	1.05*	0.86*				19.21	1.32	0.69	5.5*	0.75*	0.40*	1.3*	1356	S1P2		SCH68
60NI	10.9	110.2	1.05*	0.86*				18.66	1.33	0.70	7.0*	0.75*	0.5*	1.3*		S2P2	16	LOH74
60NI	11.8	102.7	1.07*	0.866				15.7	1.42	0.644	6.0*	1.07*	0.866	1.3*		S1	3	FIT70
60NI	12.00	75.40	1.3*	0.73*				20.40	1.34*	0.65*				1.3*	1437	S2		ELN67
6CNI	12.	121.6	0.931	1.046				20.4	1.467*	0.582*				1.3*	1480	S		MAR66
60NI	12.	82.9	1.217	0.855				25.0	1.427	0.546				1.3*	1427	S		MAR66
6CNI	12.3	107.0	1.05*	0.85*				13.79	1.410	0.750	6.1	0.90*	0.60*	1.3*		S1P1		BRO73A
6CNI	12.3	107.4	1.05*	0.85*				13.62	1.408	0.748	4.3	0.65*	0.18*	1.3*		S1P1		BRO73A
60NI	12.3	107.6	1.05*	0.86*				14.36	1.40	0.73	7.0*	0.75*	0.5*	1.3*		S1P1	16,7	LOH74
60NI	12.8	73.8	1.38	0.58	19.0	1.38	0.58							1.4?	1284	S	H66	BUD63
6CNI	13.6	72.	1.35*	0.730*				17.G*	1.27	1.9*				1.3*	1529	S2		NEM67
60NI	15.	109.8	1.05*	0.85*				15.8	1.34	0.69	5.12	0.7*	0.41*	1.3?		S1P1		BAK74
6CNI	18.1	73.5	0.926	1.072				14.51	1.451	0.710				1.3*	1709	S1	10	PER63
6CNI	18.1	126.9	0.904	0.987				18.09	1.383	0.707				1.3*	1714	S2	10	PER63
60NI	18.1	83.3	0.87	1.10				14.9	1.41	0.70				0.87	1710	S1	10	TJI65
6CNI	34.4	96.15	1.098	0.839				12.35	1.274	0.781				1.3*		S2	12	NEW67
6CNI	34.4	96.63	1.079	0.816				13.47	1.282	0.782	6.45	1.079	0.816	1.3*		S1	12	NEW67
61NI	14.5	94.57	1.15*	0.81*				18.68	1.343	0.661				1.15*	1539	S2	2	HJO68
62NI	12.	87.9	1.162	0.931				21.0	1.480	0.582				1.3*	1545	S		MAR66
62NI	12.	126.3	0.931	1.046				20.5	1.467*	0.582*				1.3*	1512	S		MAR66
62NI	13.6	72.	1.35*	0.730*				17.G*	1.27	1.9*				1.3*	1556	S2		NEM67
62NI	14.5	93.26	1.15*	0.81*				17.83	1.383	0.663				1.15*	1585	S2	2	HJO68
62NI	14.5	93.00	1.15*	0.81*				18.00	1.34*	0.68*				1.15*	1570	S2	27	HJO68
62NI	15.	111.4	1.05*	0.85*				15.9	1.34	0.69*	5.97	0.7*	0.41*	1.3?		S1P1		BAK74
62NI	17.0	114.5	0.90	0.90				15.00	1.35	0.72	8.88	0.62	1.72	1.3*	1660	S1	37	CHI74
62NI	17.0	99.9	1.1	0.82				16.57	1.32	0.70	5.63*	0.98*	1.0*	1.3*	1610	S1	37	CHI74
64NI	12.	126.0	0.910	1.084				20.4	1.482	0.575				1.3*	1553	S		MAR66
64NI	12.	124.0	0.931	1.046				19.5	1.467*	0.582*				1.3*	1525	S		MAR66
64NI	13.6	72.	1.35*	0.730*				17.G*	1.27	1.9*				1.3*	1582	S2		NEM67
64NI	15.	112.4	1.05*	0.85*				14.9	1.34*	0.69*	6.63	0.7*	0.41*	1.3?		S1P1		BAK74
64NI	17.0	99.8	1.10	0.82				14.10	1.36	0.73	7.07	0.94	0.42	1.3*	1700	S1	37	CHI74
64NI	17.0	99.9	1.1	0.82				16.00	1.34	0.68	5.63*	0.98*	1.0*	1.3*	1630	S2	37	CHI74
64NI	52.	71.5	1.25*	0.783				14.1	1.25	0.774	6.74	1.25*	0.783	1.3*		S2	28,3	HIN68
64NI	52.	93.5	1.05*	0.898				13.1	1.33	0.864	6.7	1.05*	0.898	1.3*		S3	28,3	HIN68
CU	4.07	55.	1.5*	0.65	15.	1.5*	0.65							1.5*		S	H66	SLA59
CU	10.9	60.6	1.111	0.971				14.48	1.468	0.709				1.3*	1514	S1	10	PER63
CU	10.9	89.5	1.159	0.898				18.81	1.470	0.667				1.3*	1534	S1	10	PER63
CU	10.9	64.7	1.065	0.987				14.45	1.457	0.711				1.3*	1517	S1		HAL64
CU	11.8	58.5	1.153	0.879				13.32	1.434	0.708				1.3*	1476	S1	10	PER63
CU	11.8	90.7	1.172	0.822				18.34	1.410	0.661				1.3*	1468	S1	10	PER63
CU	11.8	60.6	1.133	0.868				13.16	1.414	0.716				1.3*	1476	S1	10	HAL64
CU	11.8	95.1	1.142	0.809				17.58	1.377	0.686				1.3*	1468	S1	10	HAL64
CU	15.0	73.3	0.982	1.118				14.70	1.409	0.710				1.3*	1722	S2	10	PER63
CU	15.0	64.9	1.080	0.976				13.52	1.459	0.702				1.3*	1696	S1	27	PER64
CU	15.0	83.5	0.918	0.952				13.73	1.336	0.730				1.3*	1503	S1	2	PER64
CU	21.6	68.3	0.984	1.049				17.15	1.373	0.668				1.3*	1709	S2	10	PER63
CU	21.6	107.8	1.039	0.819				13.00	1.321	0.799	7.25	1.039	0.819	1.3*	1770	S1		PER66
CU	21.6	102.8	1.055	0.892				21.06	1.348	0.676				1.3*	1735	S2		PER66
CU	27.5	83.0	1.23	0.76	22.6	1.27	1.61							1.3?	1642	S	H66	MAY65
63CU	12.	100.0	1.077	0.969				19.2	1.483	0.602				1.3*	1523	S		MAR66
63CU	12.	125.9	0.931	1.046				20.7	1.467*	0.582*				1.3*	1490	S		MAR66
63CU	13.6	96.0	1.24	0.54	26.0	1.24	0.54							1.3?		S	H66	MAN64
63CU	13.6	74.	1.35*	0.735				17.G*	1.27	1.9*				1.3*	1553	S2		NEM67
63CU	14.5	95.23	1.15*	0.81*				17.49	1.364	0.687				1.15*	1590	S2	2	HJO68
63CU	34.4	95.66	1.097	0.830				15.38	1.322	0.782				1.3*		S	31	NEW67
63CU	34.4	96.67	1.093	0.838				13.99	1.306	0.804	7.40	1.093	0.838	1.3*		S1	31	NEW67
65CU	12.	118.5	0.954	1.049				19.8	1.480	0.588				1.3*	1533	S		MAR66
65CU	12.	124.6	0.931	1.046				19.8	1.467*	0.582*				1.3*	1505	S		MAR66
65CU	13.6	64.	1.49	0.56	16.	1.49	0.56							1.3?		S	H66	MAN64
65CU	13.6	75.	1.35*	0.730				17.G*	1.27	1.9*				1.3*	1577	S2		NEM67
65CU	27.5	83.00	1.235	0.805				22.60G	1.290	1.569				1.3?	1675	S2		TES65
65CU	34.4	94.74	1.082	0.878				16.98	1.333	0.767				1.3*		S	31	NEW67
65CU	34.4	95.92	1.101	0.839				15.17	1.293	0.802	7.35	1.101	0.839	1.3*		S1	31	NEW67

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TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
ZN	11.8	65.1	1.097	0.851				14.29	1.371	0.761				1.3*	1451	S1	10	PER63
ZN	11.8	103.3	1.083	0.835				19.17	1.354	0.715				1.3*	1444	S1	10	PER63
ZN	11.8	65.9	1.095	0.824				13.98	1.348	0.774				1.3*	1460	S1	10	HAL64
ZN	11.8	103.6	1.096	0.771				18.10	1.297	0.767				1.3*	1460	S1	10	HAL64
ZN	11.9	58.4	1.5*	0.611	15.9	1.5*	0.611							1.5?		S	H66	SMI62
ZN	15.0	95.1	0.84	1.054				13.86	1.371	0.714				1.3*	1560	S1	2	PER64
ZN	21.6	61.6	1.071	0.973				16.42	1.345	0.709				1.3*	1732	S2		PER63
ZN	21.6	109.7	1.028	0.840				14.14	1.297	0.815	7.14	1.028	0.840	1.3*	1804	S1		PER66
ZN	21.6	106.5	1.038	0.886				20.32	1.307	0.736				1.3*	1765	S2		PER66
ZN	25.9	71.9	0.96	0.99				14.0	1.35	0.75				0.96	1790	S3	10	TJI65
ZN	25.9	114.9	0.986	0.883				14.60	1.283	0.802	6.90	0.986	0.883	1.3*	1805	S2		PER66
66ZN	14.5	96.23	1.15*	0.81*				19.25	1.273	0.719				1.15*	1581	S2	27	HJO68
68ZN	9.0	116.8	1.05*	0.86*				14.76	1.35	0.73	7.0*	0.75*	0.5*	1.3*		S P	16	LOH74
68ZN	11.0	112.5	1.05*	0.86*				13.71	1.41	0.76	7.0*	0.75*	0.5*	1.3*		S2P1	16	LOH74
68ZN	13.0	111.8	1.05*	0.86*				15.52	1.35	0.75	7.0*	0.75*	0.5*	1.3*		S2P1	16	LOH74
68ZN	14.5	96.23	1.15*	0.81*				19.25	1.273	0.719				1.15*	1606	S2	2	HJO68
68ZN	17.0	107.2	1.06	0.84				14.10	1.35	0.75	7.20	0.92	0.28	1.3*	1700	S1	37	CHI74
68ZN	17.0	100.5	1.1	0.82				17.42	1.32	0.68	5.63*	0.98*	1.0*	1.3*	1630	S2	37	CHI74
66ZN	80.	68.03	1.25*	0.712				16.9	1.128	0.81	5.54	1.25	1.22	1.3*		S1	10	DUH71
68ZN	80.	87.15	1.05*	0.838				13.33	1.02	1.025	4.47	1.47	0.952	1.3*		S1	10	DUH71
72GE	8.0	96.3	1.25	0.70				21.6	1.25	0.70				1.3*		S1		HEY69
72GE	8.0	68.8	1.21	0.73				18.1	1.21	0.73				1.3*		S1		HEY69
74GE	6.02	74.0	1.20*	0.70*				18.6	1.34*	0.65*				1.25*		S2		KAT73
76SE	7.8	75.8	1.48	0.55	16.	1.48	0.55							1.5?	867	S	H66	HIN62
76SE	9.84	65.0	1.42	0.548	15.98	1.42	0.548							1.5?		S	H66	PUL64
76SE	14.5	94.34	1.15*	0.81*				23.96	1.276	0.720				1.15*	1634	S2		HJO68
82SE	14.5	94.30	1.15*	0.81*				19.52	1.320	0.692				1.15*	1663	S2		HJO68
KR	10.95	114.2	0.688	1.281				11.01	1.501	0.794				1.3*	1719	S2	27	HAL64
KR	11.6	85.0	0.918	1.16				12.56	1.45	0.75				1.3?		S	H66	JAH65
KR	19.0	35.	1.5*	0.6	15.	1.5*	0.6							1.5?	1916	S	H66	ENG60
KR	19.5	35.	1.6*	0.52	9.5	1.6*	0.52							1.5?	1786	S	H66	HOD61
86KR	10.75	98.53	1.15*	0.81*				10.46	1.35	0.76	6.35	1.15*	0.81*	1.30*		S2		HAR70
87RB	6.	85.4	1.272	0.679				18.39	1.236	0.677				1.27		S2	10	TOR71
87RB	6.	94.8	1.15*	0.87*				22.8	1.34*	0.68*				1.15*		S2	10	TOR71
86SR	13.6	76.5	1.35*	0.700				15.5G	1.26	1.9*				1.3?	1521	S2		KOR69
88SR	7.0	96.05	1.15*	0.792				20.1	1.41	0.699				1.30*		S1		COS68
Y	15.0	52.2	1.321	0.706				14.15	1.33	0.616				1.3*	1452	S1	2	PER64
Y	15.0	55.	1.33*	0.57	12.	1.33*	0.57							1.3*	1245	S2	2	ELN65
Y	15.0	80.	1.33*	0.56	12.	1.33*	0.56							1.3*	1315	S2	2	ELN65
89Y	13.6	73.5	1.35*	0.685				15.0G	1.27	1.9*				1.3?	1490	S3		KOR69
89Y	17.0	98.2	1.14	0.81				13.30	1.35	0.69	7.28	1.05	0.51	1.3*	1670	S1	37	CHI74
89Y	17.0	103.7	1.1	0.82				15.47	1.32	0.66	5.63*	0.98*	1.0*	1.3*	1600	S2	37	CHI74
89Y	52.	97.0	1.05*	0.924				15.5	1.34	0.696	5.9	1.05*	0.924	1.3*		S2	3	HIN68
89Y	60.	96.1	1.05*	0.86*				12.5	1.21	0.91	9.6	0.90	0.87	1.2?		S2	28	HRE73
89Y	77.	85.1	1.05*	0.86*				13.1	1.10	0.95	11.8	1.10	0.97	1.2?		S1	28	HRE73
89Y	80.	71.58	1.25*	0.796				18.01	1.13	0.819	6.39	1.34	0.55	1.3*		S1	10	DUH71
89Y	80.	85.73	1.05*	0.952				14.55	1.14	0.884	12.26	1.18	0.844	1.3*		S1	10	DUH71
89Y	90.	80.6	1.05*	0.86*				13.8	1.09	0.96	11.8	1.11	0.96	1.2?		S1	28	HRE73
ZR	11.8	60.4	1.226	0.733				10.55	1.296	0.812				1.3*	1319	S1	10	PER63
ZR	11.8	85.4	1.272	0.679				18.39	1.236	0.677				1.3*	1237	S1	10	PER63
ZR	11.8	63.0	1.191	0.725				9.34	1.307	0.859				1.3*	1383	S1	10	HAL64
ZR	11.8	90.6	1.226	0.643				12.34	1.178	0.929				1.3*	1404	S1	10	HAL64
ZR	11.8	92.12	1.2*	0.681				12.12	1.260	0.863				1.2*		S1	10	SMI65
ZR	11.8	87.84	1.27*	0.565	8.81	1.527	0.985							1.3?	1407	S1	10	FOR67
ZR	15.0	68.1	1.098	0.911				11.66	1.404	0.682				1.3*	1572	S1	10	PER63
ZR	15.0	98.1	1.127	0.848				14.87	1.394	0.655				1.3*	1595	S1	10	PER63
ZR	25.9	66.3	1.07	1.01				16.3	1.38	0.64				1.07	1900	S2	10	TJI65
ZR	25.9	95.1	1.14	0.88				20.8	1.36	0.64				1.14	1900	S2	10	TJI65
ZR	25.9	100.8	1.099	0.835				13.14	1.344	0.747	6.53	1.099	0.835	1.3*	1956	S1		PER66
90ZR	5.5	94.80	1.20*	0.58				6.54	1.774	0.716				1.3*		S1P1	33	KNU73
90ZR	6.25	88.0	1.28	0.72				15.95	1.39*	0.70*				1.3*		S3	1	CLA70A
90ZR	7.4	85.6	1.28	0.72				15.95	1.39*	0.70*				1.3*		S2	1	CLA70A
90ZR	9.0	89.41	1.20*	0.55				5.28	1.919	0.749				1.3*		S1P2	33	KNU73
90ZR	9.0	102.6	1.05*	0.86*				6.66	1.91	0.83	7.0*	0.75*	0.5*	1.3*		S1P2	16	LOH74
90ZR	9.11	83.5	1.28	0.72				15.95	1.39*	0.70*				1.3*		S2	1	CLA70A
90ZR	11.	81.13	1.327	0.65*				19.91	1.186	0.65*				1.33		S2		MIC69
90ZR	11.	94.71	1.235	0.65*				21.17	1.046	0.65*	7.2	1.235	0.65*	1.23		S2		MIC69
90ZR	11.0	112.4	1.05*	0.86*				10.94	1.43	0.80	7.0*	0.75*	0.5*	1.3*		S2P2	16	LOH74
90ZR	13.0	108.7	1.05*	0.86*				9.26	1.50	0.87	7.0*	0.75*	0.5*	1.3*		S2P1	16	LOH74
90ZR	15.	112.9	1.05*	0.85				11.68	1.35	0.78	11.85	0.84	0.46	1.3*		S2P2	14	IRS74

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TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL. IMAG. POTENTIAL W	RW	AW	SURF. IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
90ZR	21.4	58.	1.18	0.90				14.8	1.41	0.59				1.3*	1726	S	H66	SAT65
90ZR	21.4	85.	1.25	0.76				20.5	1.38	0.54				1.3*	1706	S	H66	SAT65
90ZR	21.4	95.82	1.15*	0.81*				14.56	1.34*	0.68*	4.7	1.0*	0.5*	1.25*	1795	S P		MAY71
90ZR	21.4	91.98	1.188	0.732				15.54	1.315	0.668	4.98	1.0*	0.5*	1.4*	1718	S P		MAY71
90ZR	26.	99.8	1.105	0.870				15.8	1.357	0.665	12.76	1.105	0870	1.3*	1907	S	H66	SAT65
90ZR	28.8	96.4	1.13*	0.825				12.28	1.3	0.861	5.33	0.77	0.435	1.3*		S1P1	35	ROC74
90ZR	34.4	97.81	1.108	0.839				12.01	1.289	0.821				1.3*		S2	12	NEW67
90ZR	34.4	97.99	1.098	0.806				12.26	1.310	0.813	6.75	1.098	0.806	1.3*		S1	12	NEW67
90ZR	34.4	89.30	1.179	0.748				13.28	1.324	0.761	2.74	0.877	0.643	1.3*		S	23,12	VOS72
91ZR	34.4	97.42	1.119	0.747				12.88	1.263	0.862				1.3*		S2	12	NEW67
91ZR	34.4	98.53	1.093	0.800				13.52	1.287	0.817	6.53	1.093	0.800	1.3*		S1	12	NEW67
91ZR	34.4	97.57	1.113	0.775				13.10	1.304	0.796	3.59	0.399	0.662	1.3*		S	23,12	VOS72
92ZR	6.25	88.61	1.278	0.72*				15.85	1.29*	0.747				1.28		S2	1	CLA70B
92ZR	6.25	99.0	1.15*	0.61*				5.48	1.68	0.849	4.78	1.15*	0.61*	1.15*		S2		CLA70B
92ZR	7.5	87.08	1.278	0.72*				15.85	1.29*	0.747				1.28		S2	1	CLA70B
92ZR	11.0	82.77	1.278	0.72*				15.85	1.29*	0.747				1.28		S2	1	CLA70B
92ZR	21.4	61.	1.15	0.94				15.2	1.40	0.61				1.3*	1779	S	H66	SAT65
92ZR	21.4	90.	1.20	0.81				19.8	1.37	0.57				1.3*	1760	S	H66	SAT65
92ZR	34.4	97.93	1.102	0.845				12.54	1.268	0.828				1.3*		S2	12	NEW67
92ZR	34.4	97.92	1.099	0.818				12.78	1.280	0.827	6.17	1.099	0.818	1.3*		S1	12	NEW67
92ZR	34.4	100.39	1.077	0.838				11.72	1.162	1.014	4.36	1.394	0.649	1.3*		S	23,12	VOS72
94ZR	21.4	65.	1.10	0.98				14.1	1.40	0.66				1.3*	1863	S	H66	SAT65
94ZR	21.4	99.	1.12	0.87				17.2	1.36	0.65				1.3*	1843	S	H66	SAT65
94ZR	34.4	97.35	1.082	0.846				17.54	1.236	0.778				1.3*		S2	12	NEW67
94ZR	34.4	97.74	1.091	0.834				15.28	1.250	0.815	7.00	1.091	0.834	1.3*		S1	12	NEW67
96ZR	34.4	97.84	1.077	0.852				17.91	1.281	0.778				1.3*		S2	12	NEW67
96ZR	34.4	97.92	1.088	0.840				15.19	1.245	0.820	7.50	1.088	0.840	1.3*		S1	12	NEW67
NB	11.8	71.0	1.129	0.754				10.83	1.305	0.755				1.3*	1195	S1	10	PER63
NB	11.8	95.5	1.201	0.687				18.2	1.24	0.661				1.3*	1135	S1	10	PER63
NB	11.8	69.6	1.150	0.657				10.26	1.262	0.810				1.3*	1241	S1		HAL64
NB	15.0	56.9	1.271	0.731				13.56	1.324	0.672				1.3*	1467	S1	2	PER64
NB	15.0	85.	1.30*	0.56	12.	1.30*	0.56							1.3*	1260	S2	2	ELN65
93NB	11.8	64.1	1.165	0.807				12.9	1.366	0.804	9.74	0.800	0.400	1.3*		S2P3		GRI70
93NB	11.8	112.5	1.060	0.847				13.2	1.391	0.719	13.05	0.766	0.441	1.3*		S1P3		GRI70
93NB	11.8	113.5	1.05*	0.85*				12.88	1.393	0.735	13.0*	0.84*	0.46*	1.3*		S P		GRI70
93NB	11.8	110.8	1.05*	0.86*				11.46	1.45	0.74	7.0*	0.75*	0.5*	1.3*		S2P2	16,7	LOH74
93NB	13.6	73.5	1.35*	0.715				17.06	1.27	1.9*				1.37	1513	S2		KOR69
93NB	17.0	99.0	1.12	0.84				16.70	1.31	0.64	5.63	1.42	1.20	1.3*	1600	S1	37	CHI74
93NB	17.0	103.4	1.1	0.82				15.67	1.30	0.70	5.63*	0.98*	1.0*	1.3*	1640	S2	37	CHI74
93NB	34.4	98.62	1.094	0.801				14.62	1.282	0.829				1.3*		S2	12	NEW67
93NB	34.4	98.05	1.087	0.833				14.31	1.263	0.814	6.71	1.087	0.833	1.3*		S1	12	NEW67
93NB	52.	75.3	1.25*	0.718				11.7	1.25	0.95	6.*	1.25*	0.718	1.3*		S2	28,3	HIN68
93NB	52.	97.1	1.05*	0.893				15.5	1.28	0.75	6.*	1.05*	0.893	1.3*		S2	28,3	HIN68
MO	15.0	68.1	1.119	0.927				14.6*	1.359	0.688				1.3*	1591	S1	2	PER64
MO	15.0	85.	1.33*	0.60	14.	1.33*	0.60							1.3*	1399	S3	2	ELN65
92MO	14.5	95.40	1.15*	0.81*				16.61	1.333	0.684				1.15*	1523	S2		HJO68
92MO	21.14	87.1	1.23	0.724				16.98	1.30	0.667				1.20*		S1	2	TAK73
96MO	13.6	72.0	1.35*	0.715				17.06	1.27	1.9*				1.37	1518	S2		KOR69
100MO	14.5	96.05	1.15*	0.81*				20.12	1.242	0.778				1.15*	1672	S2		HJO68
100MO	17.0	110.0	1.04	0.86				15.50	1.27	0.85	5.64	0.94	1.00	1.3*	1880	S1	37	CHI74
100MO	17.0	101.2	1.1	0.82				16.06	1.25	0.84	5.63*	0.98*	1.0*	1.3*	1850	S1	37	CHI74
RU	13.6	70.5	1.35*	0.735				17.56	1.27	1.9*				1.37	1521	S2		KOR69
RH	11.8	50.5	1.350	0.618				17.99	1.222	0.795				1.3*	1225	S1	10	PER63
RH	11.8	77.0	1.307	0.639				22.64	1.225	0.728				1.3*	1199	S1	10	PER63
RH	15.0	78.5	0.996	1.036				12.02	1.453	0.877				1.3*	2028	S1	10	PER63
RH	15.0	110.5	1.028	0.973				15.11	1.409	0.853				1.3*	1981	S1	10	PER63
RH	15.0	71.3	1.146	0.911				16.16	1.383	0.7				1.3*	1660	S1	2,27	PER64
RH	21.6	63.6	1.130	0.882				18.26	1.283	0.705				1.3*	1793	S2	10	PER63
RH	21.6	94.2	1.160	0.778				25.20	1.230	0.676				1.3*	1747	S2	10	PER63
103RH	52.	75.5	1.25*	0.68				13.0	1.25	0.87	6.*	1.25*	0.68	1.3*		S3	3	HIN68
103RH	52.	98.3	1.05*	0.903				16.8	1.35	0.677	6.1	1.05*	0.903	1.3*		S3	3	HIN68
PD	11.8	66.2	1.128	0.843				21.36	1.245	0.745				1.3*	1218	S1	10	PER63
PD	11.8	77.7	1.322	0.654				37.20	1.213	0.617				1.3*	1173	S1	10	PER63
PD	15.0	68.1	1.114	0.864				5.97	1.47	0.908				1.3*	2035	S2	10	PER63
PD	15.0	103.2	1.093	0.850				12.41	1.409	0.904				1.3*	1993	S2	10	PER63
PD	15.0	71.3	1.146	0.911				14.60	1.353	0.771				1.3*	1678	S1	2,27	PER64
105PD	15.0	76.3	1.032	0.974				16.8	1.353	0.771				1.37		S	H66	SOR65
105PD	17.0	104.1	1.07	0.88				15.40	1.32	0.80	6.45	1.06	0.64	1.3*	1840	S1	37	CHI74
105PD	17.0	101.2	1.1	0.82				16.30	1.27	0.81	5.63*	0.98*	1.0*	1.3*	1780	S1	37	CHI74
AG	11.8	47.1	1.324	0.716				21.96	1.271	0.691				1.3*	1186	S1	10	PER63
AG	11.8	79.6	1.297	0.664				30.46	1.206	0.661				1.3*	1147	S1	10	PER63
AG	11.8	90.5	0.94	0.889				16.38	1.229	0.830				1.3*	1243	S1	6,10	HAL64
AG	11.8	114.2	1.035	0.791				21.30	1.186	0.817				1.3*	1240	S1	6,10	HAL64

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TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL. IMAG. POTENTIAL W	RW	AW	SURF. IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
AG	11.8	52.2	1.246	0.789				20.01	1.347	0.885	8.0	0.921	0.459	1.3*		S1P3		GRI70
AG	11.8	112.2	1.052	0.847				17.1	1.358	0.791	12.6	0.785	0.441	1.3*		S1P3		GRI70
AG	11.8	112.3	1.05*	0.85*				17.79	1.356	0.810	12.6*	0.84*	0.46*	1.3*		S P		GRI70
AG	11.8	110.9	1.05*	0.86*				20.80	1.31	0.79	7.0*	0.75*	0.5*	1.3*		S2P2	16	LOH74
AG	15.0	44.9	1.471	0.631				25.28	1.368	0.510				1.3*	1518	S1	2	PER64
AG	15.0	85.	1.33*	0.60	13.	1.33*	0.60							1.3*	1306	S1	2	ELN65
AG	21.6	67.8	1.095	0.910				18.61	1.270	0.704				1.3*	1785	S2	10	PER63
AG	21.6	97.8	1.133	0.800				25.47	1.220	0.680				1.3*	1748	S2	10	PER63
AG	21.6	74.0	1.05	0.94				17.7	1.20	0.71				1.05	1830	S2		TJI65
AG	25.3	61.3	1.13	0.94				19.6	1.33	0.66				1.13	1940	S3	10,27	TJI65
AG	25.3	109.9	1.011	0.953				21.8	1.307	0.662	7.75	1.011	0.953	1.3*	1943	S3	27	PER66
AG	25.3	111.3	1.002	0.961				25.4	1.283	0.660				1.3*	1932	S3	27	PER66
AG	27.5	86.10	1.250	0.776				24.60G	1.189	1.921				1.3?	1976	S2		TES65
107AG	12.	42.91	1.5*	0.66*				11.62	1.5*	0.66*				1.5?		S	H66	LUT64
107AG	12.	77.97	1.5*	0.60*				15.12	1.5*	0.66*				1.5?		S	H66	LUT64
107AG	13.5	95.	1.27	0.57	16.	1.27	0.57							1.3?		S	H66	MAN64
109AG	12.	42.91	1.5*	0.66*				11.62	1.5*	0.66*				1.5?		S	H66	LUT64
109AG	12.	77.97	1.5*	0.66*				15.12	1.5*	0.66*				1.5?		S	H66	LUT64
109AG	13.5	56.	1.6	0.56	11.	1.6	0.56							1.3?		S	H66	MAN64
CD	11.8	78.1	1.069	0.894				17.10	1.279	0.702				1.3*	1157	S1	10	PER63
CD	11.8	108.2	1.088	0.843				22.94	1.275	0.646				1.3*	1149	S1	10	PER63
CD	15.0	77.6	1.036	0.931				15.22	1.324	0.758				1.3*	1584	S1	2	PER64
112CD	17.0	109.6	1.04	0.89				15.30	1.31	0.80	6.15	1.00	0.76	1.3*	1840	S1	37	CHI74
112CD	17.0	102.7	1.1	0.82				16.08	1.26	0.82	5.63*	0.98*	1.0*	1.3*	1790	S2	37	CHI74
IN	11.8	78.2	1.019	1.021				10.74	1.324	0.781				1.3*	1515	S1	10	PER63
IN	11.8	113.6	1.003	0.996				13.11	1.488	0.752				1.3*	1494	S1	10	PER63
IN	11.8	59.6	1.242	0.851				10.8	1.480	0.777	9.47	0.962	0.514	1.3*		S1P3		GRI70
IN	11.8	114.1	1.045	0.853				11.36	1.383	0.821	12.19	0.800	0.441	1.3*		S1P3		GRI70
IN	11.8	113.5	1.05*	0.85*				11.2	1.388	0.815	12.2*	0.84*	0.46*	1.3*		S P		GRI70
IN	11.8	112.2	1.05*	0.86*				11.70	1.38	0.81	7.0*	0.75*	0.5*	1.3*		S2P2	16	LOH74
IN	15.0	54.1	1.268	0.715				15.27	1.236	0.723				1.3*	1417	S1	2	PER64
113IN	14.5	98.88	1.15*	0.81*				16.72	1.290	0.695				1.15*	1483	S2		HJO68
113IN	14.5	97.71	1.15*	0.81*				16.72	1.315	0.681				1.15*	1484	S2	27	HJO68
115IN	17.0	108.2	1.06	0.91				13.50	1.36	0.75	7.24	0.96	0.81	1.3*	1830	S1	37	CHI74
115IN	17.0	103.7	1.1	0.82				15.72	1.29	0.77	5.63*	0.98*	1.0*	1.3*	1740	S2	37	CHI74
SN	11.8	89.4	0.95*	0.635				6.72	1.889	0.801				1.3*	2265	S2	10	PER63
SN	11.8	110.9	1.0*	1.028				11.84	1.56*	0.836				1.3*	1817	S2	10	PER63
SN	11.8	115.1	0.781	0.964				7.70	1.805	0.865				1.3*	2229	S2	6,10	HAL64
SN	11.8	150.9	0.702	0.984				7.98	1.722	0.878				1.3*	2079	S2	10	HAL64
SN	13.5	77.4	1.036	1.06				11.6	1.479	0.812				1.3*	1820	S2	10	PER63
SN	13.5	73.5	1.385	0.727				22.11	1.357	0.654				1.3*	1614	S2	10	PER63
SN	15.	77.5	0.994	1.160				12.54	1.535	0.771				1.3*	2061	S2	10	PER63
SN	15.	109.3	1.013	1.071				14.54	1.505	0.768				1.3*	2043	S2	10	PER63
112SN	14.5	99.00	1.15*	0.81*				17.50	1.34*	0.68*				1.15*	1480	S2		HJO68
112SN	17.0	105.5	1.08	0.88				15.20	1.34	0.73	6.56	0.96	0.64	1.3*	1740	S1	37	CHI74
112SN	17.0	105.4	1.1	0.82				16.54	1.28	0.75	5.63*	0.98*	1.0*	1.3*	1650	S2	37	CHI74
112SN	20.	102.3	1.103	0.893				18.43	1.314	0.674				1.12*	1806	S1	11,10	WIN72
112SN	20.	136.1	1.132	0.819				22.97	1.295	0.643				1.12*	1795	S1	11,10	WIN72
112SN	27.	97.25	1.134	0.775				14.42	1.228	0.829	4.02	1.134	0.775	1.12*	2000	S1	11,10	WIN72
112SN	27.	137.4	1.136	0.712				17.14	1.144	0.887	5.06	1.136	0.712	1.12*	2021	S2	11,10	WIN72
117SN	12.0	116.1	1.05*	0.86*				10.38	1.41	0.84	7.0*	0.75*	0.5*	1.3*		S1P1	16	LOH74
118SN	13.6	58.	1.58	0.5	11.	1.58	0.5							1.5?		S	H66	MAN64
118SN	14.5	98.69	1.15*	0.81*				15.59	1.325	0.681				1.15*	1511	S2		HJO68
118SN	20.	102.6	1.080	0.941				16.79	1.347	0.699				1.12*	1950	S1	11,10	WIN72
118SN	20.	138.5	1.099	0.872				20.30	1.328	0.674				1.12*	1936	S1	11,10	WIN72
118SN	27.	96.34	1.137	0.783				14.55	1.253	0.807	3.96	1.137	0.783	1.12*	2066	S2	11,10	WIN72
118SN	27.	135.7	1.138	0.722				17.41	1.176	0.854	5.45	1.138	0.722	1.12*	2078	S2	11,10	WIN72
119SN	12.0	117.1	1.05*	0.86*				12.11	1.33	0.83	7.0*	0.75*	0.5*	1.3*		S1P1	16	LOH74
119SN	27.	96.8	1.129	0.808				13.35	1.189	0.904	4.29	1.129	0.808	1.12*	2127	S2	11,10	WIN72
119SN	27.	130.9	1.169	0.684				15.28	0.992	1.119	5.39	1.169	0.684	1.12*	2226	S2	11,10	WIN72
120SN	11.0	112.0	1.05*	0.86*				8.29	1.59	0.86	7.0*	0.75*	0.5*	1.3*		S2P2	16	LOH74
120SN	13.0	115.3	1.05*	0.86*				12.23	1.39	0.82	7.0*	0.75*	0.5*	1.3*		S2P1	16	LOH74
120SN	13.6	60.	1.59	0.53	11.	1.59	0.53							1.5?		S	H66	MAN64
120SN	15.0	75.3	1.104	0.668				10.29	1.247	0.94				1.3*	1582	S2	10	PER63
120SN	15.0	99.7	1.168	0.611				12.14	1.213	0.985				1.3*	1680	S2	10	PER63
120SN	17.0	105.7	1.07	0.90				12.20	1.39	0.78	8.47	1.16	0.29	1.3*	1910	S1	37	CHI74
120SN	17.0	104.6	1.1	0.82				14.66	1.30	0.77	5.63*	0.98*	1.0*	1.3*	1760	S2	37	CHI74
120SN	28.6	97.19	1.146	0.763				13.52	1.274	0.844	4.95	0.784	0.363	1.3*		S2P1	25	PER73
120SN	80.	72.17	1.25*	0.829				16.43	1.223	0.732	11.1	1.275	0.66	1.3*		S2	10	DUH71
120SN	80.	90.13	1.05*	0.958				16.24	1.246	0.738	12.34	1.16	0.895	1.3*		S1	10	DUH71
122SN	15.	113.4	1.05*	0.85				11.35	1.29	0.92	17.30	0.84	0.46	1.3*		S2P2	14	IRS74

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TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
124SN	14.5	99.07	1.15*	0.81*				16.45	1.316	0.677				1.15*	1541	S2		HJO68
124SN	17.0	102.2	1.11	0.87				12.20	1.38	0.75	7.99	0.89	0.96	1.3*	1890	S1	37	CHI74
124SN	17.0	105.1	1.1	0.82				13.85	1.31	0.77	5.63*	0.98*	1.0*	1.3*	1800	S2	37	CHI74
124SN	20.	107.5	1.062	0.951				17.01	1.333	0.698				1.12*	1982	S1	11,10	WIN72
124SN	20.	145.4	1.071	0.894				20.30	1.317	0.677				1.12*	1978	S1	11,10	WIN72
124SN	27.	99.83	1.110	0.844				14.57	1.245	0.799	7.47	1.110	0.844	1.12*	2126	S1	11,10	WIN72
124SN	27.	140.9	1.102	0.785				17.70	1.182	0.840	4.69	1.102	0.785	1.12*	2143	S2	11,10	WIN72
124TE	12.0	68.44	1.15*	0.854				13.01	1.37*	0.770				1.3*		S1	10	CHR70
124TE	12.0	96.83	1.15*	0.848				16.32	1.34*	0.752				1.3*		S1	10	CHR70
126TE	7.5	98.0	1.15*	0.81*				15.2	1.34*	0.68*				1.3*		S2		GRA68
126TE	7.5	126.3	1.15*	0.81*				18.5	1.34*	0.68*				1.3*		S1		GRA68
XE	10.95	44.7	1.55	0.557	10.1	1.55	0.597							1.57		S	H66	SMI62
XE	19.5	40.	1.55	0.6	13.	1.55	0.6							1.57		S	H66	ENG60
136XE	12.78	104.2	1.08	0.99				10.87	1.52	0.67	4.58	1.08	0.99	1.37		S2		MCO68
136XE	12.78	67.59	1.03	1.11				7.69	1.54	0.67	9.96	1.03	1.11	1.37		S2		MCO68
135BA	15.	98.3	1.15	0.81				15.3	1.34	0.68				1.37		S	H66	SOR65
138BA	7.5	95.4	1.15*	0.847				17.	1.332	0.692				1.3*		S1		RAP68
138BA	11.8	100.	1.18	0.8				14.	1.34	0.68				1.18		S2		WIE67
138BA	15.	98.76	1.15*	0.828				17.5	1.327	0.644				1.25*		S		BAK73
138BA	19.	94.04	1.20*	0.564				11.24	1.339	0.819				1.3*		S1		IPS73
CE	25.9	66.5	1.14	0.86				13.8	1.33	0.72				1.14	2070	S2	10	TJI65
CE	25.9	95.10	1.143	0.800				13.88	1.312	0.756	6.6	1.143	0.800	1.3*	2125	S1		PER66
CE	25.9	94.26	1.148	0.810				17.65	1.300	0.717				1.3*	2106	S2		PER66
140CE	11.8	98.	1.16	0.75				13.5	1.28	0.72				1.16		S		WIE67
140CE	52.	102.6	1.05*	0.924				15.5	1.27	0.801	6.8	1.05*	0.924	1.3*		S1	3	HIN68
142CE	12.6	100.8	1.15*	0.81*				16.2	1.34*	0.68*				1.25*		S1		LES72
141PR	22.7	96.15	1.158	0.755				13.68	1.30	0.706	6.00*	1.158	0.799	1.16		S2	2	HEL73
142ND	12.0	100.4	1.15*	0.842				19.35	1.39	0.537				1.25*		S1		VBA68
144ND	12.0	99.27	1.15*	0.867				24.04	1.39*	0.486				1.25*		S1		VBA68
144ND	12.0	99.64	1.15*	0.875				26.70	1.370	0.481				1.25*	967	S1		CHR69
144ND	12.6	101.5	1.15*	0.81*				14.9	1.34*	0.68*				1.25*		S1		GAL73
146ND	12.0	96.45	1.15*	0.855				22.73	1.39*	0.526				1.25*		S1		VBA68
146ND	12.0	96.54	1.15*	0.861				26.73	1.358	0.523				1.25*	1014	S1		CHR69
148ND	12.0	96.57	1.15*	0.900				22.99	1.39*	0.517				1.25*		S1		VBA68
148ND	12.0	96.85	1.15*	0.861				25.60	1.369	0.511				1.25*	1030	S1		CHR69
150ND	12.0	91.14	1.15*	0.935				19.34	1.39*	0.649				1.25*		S1		VBA68
150ND	12.0	90.98	1.15*	0.930				21.85	1.366	0.642				1.25*	1227	S1		CHR69
144SM	11.8	104.	1.23	0.85				14.5	1.31	0.75				1.23		S		WIE67
144SM	12.0	99.72	1.15*	0.850				20.76	1.379	0.535				1.25*	915	S1		CHR69
148SM	12.0	96.15	1.15*	0.904				25.81	1.379*	0.524				1.25*	993	S1		CHR69
149SM	15.	104.	1.15	0.81				17.0	1.34	0.68				1.37		S	H66	SOR65
152SM	12.0	91.82	1.15*	0.938				21.04	1.379*	0.581				1.25*	1110	S1		CHR69
154GD	12.0	91.95	1.15*	0.853				13.63	1.379*	0.724				1.25*	1140	S2		CHR69
154GD	12.0	93.60	1.15*	0.850				19.64	1.249	0.742				1.25*	1039	S1		CHR69
158GD	12.0	91.23	1.15*	0.928				13.43	1.379*	0.734				1.25*	1217	S2		CHR69
158GD	12.0	92.82	1.15*	0.863				18.60	1.258	0.743				1.25*	1105	S1		CHR69
160GD	12.0	89.51	1.15*	0.942				13.79	1.379*	0.750				1.25*	1268	S2		CHR69
160GD	12.0	90.34	1.15*	0.912				20.10	1.275	0.730				1.25*	1151	S1		CHR69
160DY	12.0	81.42	1.15*	0.939				14.57	1.379*	0.756				1.25*	1206	S1		CHR69
160DY	12.0	92.06	1.15*	0.915				17.67	1.310	0.787				1.25*	1177	S1		CHR69
162DY	12.0	90.01	1.15*	0.920				14.22	1.379*	0.757				1.25*	1194	S1		CHR69
162DY	12.0	90.20	1.15*	0.906				16.84	1.327	0.773				1.25*	1168	S1		CHR69
164DY	12.0	89.84	1.15*	0.938				13.93	1.379*	0.762				1.25*	1231	S1		CHR69
164DY	12.0	90.04	1.15*	0.910				18.62	1.283	0.790				1.25*	1176	S1		CHR69
ER	15.0	83.5	0.961	1.159				17.78	1.363	0.66				1.3*	1456	S1	2	PER64
ER	15.0	79.	1.33*	0.64	11.	1.33*	0.64							1.3*	1302	S2	2	ELW65
166ER	12.0	88.68	1.15*	0.943				14.37	1.379*	0.726				1.25*	1118	S1		CHR69
166ER	12.0	89.47	1.15*	0.909				18.39	1.284	0.776				1.25*	1087	S1		CHR69
168ER	12.0	90.31	1.15*	0.933				15.02	1.379*	0.667				1.25*	1051	S2		CHR69
168ER	12.0	91.13	1.15*	0.890				17.14	1.291	0.744				1.25*	1035	S1		CHR69
170ER	12.0	89.80	1.15*	0.936				13.45	1.379*	0.767				1.25*	1188	S1		CHR69
170ER	12.0	90.06	1.15*	0.895				14.44	1.310	0.851				1.25*	1203	S1		CHR69

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TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
YB	15.0	50.2	1.376	0.705				17.93	1.272	0.73				1.3*	1450	S1	2	PER64
172YB	12.	113.	1.15*	0.878				11.3	1.38	0.912				1.3*		S2		SIE67A
172YB	12.0	89.26	1.15*	0.952				15.25	1.379*	0.692				1.25*	1050	S1		CHR69
172YB	12.0	89.87	1.15*	0.909				19.58	1.267	0.780				1.25*	1043	S1		CHR69
174YB	12.	118.1	1.177	0.842				13.44	1.362	0.940				1.15*		S2		GAS69
180HF	12.0	89.60	1.15*	0.959				19.10	1.379*	0.607				1.25*	939	S1		CHR69
180HF	12.0	89.52	1.15*	0.953				19.56	1.365	0.620				1.25*	941	S1		CHR69
TA	11.8	75.2	1.00*	1.066				16.00	1.361	0.777				1.3*	917	S1	10	PER63
TA	11.8	124.7	1.018	1.002				21.58	1.364	0.701				1.3*	899	S1	10	PER63
TA	15.0	49.3	1.469	0.669				24.65	1.437	0.540				1.3*	1473	S2	10	PER63
TA	15.0	84.2	1.303	0.733				26.41	1.343	0.653				1.3*	1416	S2	10	PER63
TA	15.0	74.5	1.283	0.756				18.64	1.350	0.744				1.3*	1527	S1	2	PER64
TA	25.9	57.7	1.24	0.89				22.1	1.31	0.73				1.24	2340	S2	10	TJI65
TA	25.9	85.83	1.194	0.858				21.4	1.304	0.721	10.72	1.194	0.858	1.3*	2302	S2		PER66
TA	25.9	110.4	1.254	0.758				36.6	1.259	0.678				1.3*	2297	S2		PER66
181TA	52.	106.0	1.05*	0.95				17.2	1.3	0.80	6.*	1.05*	0.95	1.3*		S3	3	HIN68
W	15.0	114.5	0.936	1.112				25.67	1.33	0.593				1.3*	1268	S1	2	PER64
182W	12.	77.	1.3*	0.79*				20.4	1.37*	0.67*				1.3*		S1		SIE67A
186W	12.0	83.79	1.15*	0.928				13.39	1.379*	0.688				1.25*	916	S2		CHR69
186W	12.0	85.92	1.15*	0.892				20.96	1.258	0.756				1.25*	901	S1		CHR69
PT	15.0	55.3	1.445	0.512				14.13	1.094	1.177				1.3*	1608	S1	2	PER64
PT	21.6	78.7	1.069	1.005				14.84	1.364	0.819				1.3*	2233	S1	10	PER63
AU	11.8	58.9	1.430	0.577				10.39	1.146	1.058				1.3*	808	S1	10	PER63
AU	11.8	89.5	1.272	0.723				12.22	1.301	0.877				1.3*	808	S1	10	PER63
AU	13.5	87.9	1.019	1.170				11.84	1.502	0.747				1.3*	1416	S1	10	PER63
AU	13.5	114.7	1.024	1.135				13.78	1.502	0.718				1.3*	1415	S1	10	PER63
AU	15.0	89.7	1.011	1.113				13.09	1.455	0.693				1.3*	1477	S1	10	PER63
AU	15.0	77.0	1.363	0.763				22.92	1.442	0.561				1.3*	1435	S1	10	PER63
AU	15.0	86.7	1.054	0.789				6.93	1.37*	1.032				1.3*	1595	S1	10,2	PER63
AU	21.6	82.0	1.046	1.018				13.87	1.360	0.804				1.3*	2161	S1	10	PER63
AU	21.6	82.6	1.07	0.99				15.7	1.32	0.74				1.07	2010	S1		TJI65
AU	25.3	77.0	1.10	0.94				14.3	1.34	0.76				1.10	2270	S1	10	TJI65
AU	25.3	103.2	1.104	0.903				14.40	1.342	0.771	6.92	1.104	0.903	1.3*	2324	S1		PER66
AU	25.3	101.4	1.117	0.853				16.42	1.326	0.766				1.3*	2320	S1		PER66
AU	27.5	89.00	1.265	0.620				27.40G	0.936	2.899				1.32	2252	S2		TES65
197AU	52.	80.0	1.25*	0.668				13.2	1.25	0.97	6.*	1.25*	0.668	1.3*		S2	2,3	HIN68
197AU	52.	105.5	1.05*	0.94				16.1	1.3	0.82	6.*	1.05*	0.94	1.3*		S2	2,3	HIN68
PB	15.0	93.4	0.986	1.184				12.43	1.484	0.621				1.3*	1406	S1	10	PER63
PB	15.0	133.4	0.930	1.175				12.80	1.500	0.623				1.3*	1445	S1	10	PER63
206PB	11.8	109.6	1.059	1.018				9.7	1.442	0.741				1.3*	811	S1	H66	SAT65
206PB	11.8	80.0	1.320	0.764				15.2	1.409	0.622				1.3*	752	S1	H66	SAT65
206PB	12.5	73.0	1.400	0.680				23.5	1.360	0.65				1.3*	917	S1	H66	SAT65
206PB	12.5	57.0	1.380	0.690				18.0	1.360	0.66				1.3*	875	S1	H66	SAT65
206PB	14.0	108.6	1.057	1.059				12.7	1.478	0.636				1.3*		S	H66	SAT65
206PB	14.0	118.5	1.014	1.081	6.16	1.760	0.427							1.3*		S	H66	SAT65
206PB	21.3	102.0	1.120*	0.910*				15.2	1.32	0.76				1.3*	2042	S1	H66	SAT65
206PB	21.6	74.2	1.137	0.852				11.84	1.334	0.796				1.3*	2015	S1		PER63
208PB	8.7	68.27	1.25*	0.849				11.55	1.441	0.849				1.3*		S	10	VME69
208PB	8.7	111.3	1.25*	0.777				13.28	1.426	0.853				1.3*		S	10	VME69
208PB	10.2	70.35	1.25*	0.879				11.55	1.415	0.812				1.3*		S	10	VME69
208PB	10.2	116.3	1.25*	0.811				13.28	1.399	0.794				1.3*		S2	10	VME69
208PB	11.8	109.	1.063	1.038				5.8	1.501	0.728				1.3*	898	S1	H66	SAT65
208PB	11.8	78.3	1.336	0.794				16.6	1.470	0.598				1.3*	823	S1	H66	SAT65
208PB	12.0	99.27	1.15*	0.957				22.09	1.379*	0.628				1.25*	761	S1		CHR69
208PB	12.0	100.3	1.15*	0.973				15.37	1.450	0.559				1.25*	740	S1		CHR69
208PB	12.1	66.25	1.25*	0.873				11.44	1.441	0.700				1.3*		S	10	VME69
208PB	12.1	110.7	1.25*	0.796				13.28	1.433	0.706				1.3*		S	10	VME69
208PB	12.3	114.0	1.063	0.997				8.35	1.501	0.728	5.42	0.853	0.60*	1.25*		S1P1		VIG73
208PB	12.3	132.8	1.302	0.730				15.48	1.352	0.828	6.12	1.435	0.459	1.25*		S P		VIG73
208PB	12.3	119.2	1.05*	0.86*				6.02	1.50	0.93	7.0*	0.75*	0.5*	1.3*		S1P1	16,7	LOH74
208PB	14.0	68.73	1.25*	0.874				12.03	1.451	0.708				1.3*		S	10	VME69
208PB	14.0	109.2	1.25*	0.802				13.56	1.458	0.717				1.3*		S	10	VME69
208PB	15.8	66.20	1.25*	0.860				12.08	1.417	0.719				1.3*		S	10	VME69
208PB	15.8	109.5	1.25*	0.800				13.34	1.450	0.768				1.3*		S2	10	VME69
208PB	17.0	108.3	1.09	0.93				8.69	1.45	0.71	10.59	0.67	1.85	1.3*	1660	S1	37	CHI74
208PB	17.0	106.2	1.1	0.82				7.56	1.51	0.82	5.63*	0.98*	1.0*	1.3*	1890	S2	37	CHI74
208PB	18.7	103.5	1.10	0.91				11.48	1.39	0.81				1.30*		S2		JEA69

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TABLE III. Optical-Model Parameters Deuterons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	EC	SR	FIT	NOTE	REF.
208PB	20.0	100.0*	1.14	0.85				13.6	1.33	0.75				1.3*		S1		KOV74
208PB	21.3	102.	1.12*	0.91*				13.2	1.38	0.75				1.3*	2105	S	H66	SAT65
208PB	27.5	91.0	1.27	0.62*				27.60	1.0	2.18				1.3*	1979	S	H66	MAY65
208PB	27.5	91.00	1.265	0.517				27.60G	0.517	4.032				1.3?	2144	S2		TES65
208PB	28.8	100.	1.13*	0.85				12.31	1.37	0.815	5.71	1.0	0.45	1.3*		S1P1	35	ROC74
208PB	52.	93.	1.15*	0.8C				14.5	1.25	0.80	6.*	1.15*	0.80	1.3*		S1	3	HIN68
208PB	52.	79.8	1.25*	0.66				12.0	1.25	1.0	6.*	1.25*	0.66	1.3*		S2	3	HIN68
208PB	52.	91.	1.16*	0.83				14.25	1.25*	0.90	6.*	1.16*	0.83	1.3*	2932	S2		PAR69
208PB	80.	73.7	1.25*	0.818				14.74	1.099	1.028	9.59	1.296	0.599	1.3*		S2		DUH71
208PB	80.	94.73	1.05*	0.983				15.33	1.076	1.08	6.42	1.25	1.1	1.3*		S2		DUH71
209BI	12.8	32.48	1.72*	0.4C*	9.75	1.72*	0.40*							1.5?	1033	S	H66	BUD63
209BI	17.0	112.2	1.06	0.96				8.71	1.46	0.73	9.59	0.73	1.78	1.3*	1700	S1	37	CHI74
209BI	17.0	106.0	1.1	0.82				7.66	1.52	0.82	5.63*	0.98*	1.0*	1.3*	1900	S2	37	CHI74
209BI	52.	106.3	1.05*	0.96				17.0	1.3	0.81	6.*	1.05*	0.96	1.3*		S2	3	HIN68
209BI	52.	79.5	1.25*	0.65				12.2	1.25	1.0	6.*	1.25*	0.65	1.3*		S2	3	HIN68
232TH	17.0	104.0	1.08	0.95				10.20	1.37	0.86	13.47	1.08	0.44	1.3*	1730	S1	37	CHI74
232TH	17.0	101.6	1.1	0.82				10.61	1.33	1.02	5.63*	0.98*	1.0*	1.3*	1900	S1	37	CHI74
238U	52.	106.1	1.05*	0.793				16.4	1.2	0.88	7.6	1.05*	0.793	1.3*		S2	2,3	HIN68
239PU	15.0	50.	1.50	0.52	13.0	1.35*	0.74							1.5		S2		WOL68
239PU	15.0	57.	1.34	0.66				11.19	1.30*	0.79				1.34		S2		WOL68

NOTES

1. More than one angular distribution has been used to determine these parameters
2. Data for angles smaller than 90°
3. Calculations performed with spin $\frac{1}{2}$
4. Data for angles larger than 139° are not used in the search
5. See publication for the imaginary part of the spin-orbit potential
6. The most forward data points were not used in the search. See publication.
7. The differential polarization has been measured at a slightly different energy
8. This article contains an extensive study of tensor polarization data fitted with additional Hauser-Feshbach corrections and tensor interaction potentials
9. See publication for Hauser-Feshbach corrections
10. See publication for other sets of parameters fitting the same data
11. The Coulomb potential has a Woods-Saxon form but radius and diffuseness are not specified. We assume that r_c = (1.106 + 1.053 x 10^{-4}A) and a_c = 0.502 F as stated in other publications using the same code
12. Data for angles smaller than 80°
13. Energy-averaged data over 4.5, 5.0 and 5.5 MeV
14. See publication for other sets of parameters. More parameters are considered in order to get better agreement with tensors T_{20}, T_{21}, T_{22}
15. No data for angles smaller than 45°
16. See publication for an average parameter set which gives satisfactory fit to the data
17. Calculated compound elastic contribution subtracted from elastic-scattering data
18. Energy-averaged data over 5.0 and 5.5 MeV
19. See publication for average parameter sets fitting ^{12}C data at 20.5, 25.2 and 29.5 MeV
20. Elastic differential cross-section data measured at 25.9 MeV
21. Compound elastic contribution added to the optical-model calculation
22. See publication for an average parameter set over the energy range
23. The normalization of the cross-section data is adjusted by the code
24. Coupled-channel calculation performed
25. See publication for the fits obtained for the tensor component T_{20} and the quantity $T_{22}-(\frac{3}{2})^{1/2}T_{20}$
26. Data for angles larger than 135° are not used in the search
27. Data renormalized. See publication.
28. Data for angles smaller than 100°
29. Arbitrary normalization of the cross-section data
30. Polarization measurements at 12 MeV from the most abundant isotope
31. Data for angles smaller than 60°
32. See publication for parameters fitting the differential cross section of the same nucleus at nearby energies
33. Folding-model spin-orbit potential included. See publication.
34. Satisfactory fit to the data up to 120°
35. See publication for the value of the tensor interaction potential necessary to fit the quantity $T_{22}-(\frac{3}{2})^{1/2}T_{20}$
36. Average between 2 sets of parameters at the same energy
37. See publication for an A-dependent parameter set

H66. As reported in a previous review paper on deuterons by P. E. Hodgson, Adv. Phys. 15, 329 (1966)

See page 8 for Explanation of Tables

TABLE III. Optical-Model Parameters Deuterons

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Target Nuclei	Energy Range (MeV)	References
^{7}Li	1.0 to 2.6	LOM74
Ti Isotopes	2.5 to 10.0	WIL68A
^{60}Ni, ^{114}Cd	5 to 15	DIC65
^{138}Ba to ^{144}Sm	19	BOO75

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See page 8 for Explanation of Tables

TABLE IV. Optical-Model Parameters Tritons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
9BE	2.10	145.	0.85*	0.704*	1.91	2.06*	0.722*				8.93	0.85*	0.704*	1.40*		S1		HER69
10B	1.50	138.	0.85*	0.704*	3.98	2.06*	0.722*				8.10	0.85*	0.704*	1.40*		S1		HER69
11B	1.75	138.	0.85*	0.704*	1.94	2.06*	0.722*				8.92	0.85*	0.704*	1.40*		S1		HER69
11B	2.10	145.	0.85*	0.704*	3.78	2.06*	0.722*				8.26	0.85*	0.704*	1.40*		S1		HER69
12C	1.11	156.0	1.4*	0.7*	18.6	1.4*	0.7*							1.4*		S2		ETO69
12C	1.50	120.	0.85*	0.704*	1.01	2.06*	0.722*				8.56	0.85*	0.704*	1.40*		S1		HER69
12C	1.60	150.6	1.4*	0.7*	13.2	1.4*	0.7*							1.4*		S2		ETO69
12C	1.84	145.7	1.4*	0.7*	14.2	1.4*	0.7*							1.4*		S3		ETO69
12C	1.95	164.8	1.4*	0.7*	17.9	1.4*	0.7*							1.4*		S3		ETO69
12C	2.00	160.2	1.4*	0.7*	15.2	1.4*	0.7*							1.4*		S3		ETO69
12C	2.05	161.0	1.4*	0.7*	12.9	1.4*	0.7*							1.4*		S3		ETO69
12C	2.15	163.0	1.4*	0.7*	10.7	1.4*	0.7*							1.4*		S2		ETO69
12C	2.25	164.8	1.4*	0.7*	10.1	1.4*	0.7*							1.4*		S2		ETO69
12C	2.35	162.5	1.4*	0.7*	11.1	1.4*	0.7*							1.4*		S2		ETO69
12C	2.45	167.1	1.4*	0.7*	10.1	1.4*	0.7*							1.4*		S3		ETO69
12C	2.54	164.4	1.4*	0.7*	11.3	1.4*	0.7*							1.4*		S3		ETO69
12C	2.65	134.6	1.4*	0.7*	15.5	1.4*	0.7*							1.4*		S2		ETO69
12C	2.71	164.8	1.4*	0.7*	18.0	1.4*	0.7*							1.4*		S2		ETO69
12C	2.78	129.6	1.4*	0.7*	17.2	1.4*	0.7*							1.4*		S2		ETO69
12C	2.86	135.0	1.4*	0.7*	18.0	1.4*	0.7*							1.4*		S2		ETO69
12C	3.00	133.5	1.4*	0.7*	17.9	1.4*	0.7*							1.4*		S2		ETO69
12C	3.22	164.4	1.4*	0.7*	22.2	1.4*	0.7*							1.4*		S2		ETO69
12C	3.40	135.6	1.4*	0.7*	17.0	1.4*	0.7*							1.4*		S3		ETO69
12C	6.4	49.	1.8*	0.37	19.	1.8*	0.37							1.25?		S	H68	PUL64
12C	6.8	63.	1.8*	0.58	30.	1.8*	0.58							1.25?		S	H68	PUL64
12C	12.	102.4	1.4*	0.688	13.9	1.4*	0.688							1.25?	1129	S	H68	GLO65
12C	12.	160.5	1.4*	0.626	17.6	1.4*	0.626							1.25?	1144	S	H68	GLO65
12C	16.	130.	1.29	0.58	18.9	1.37	0.96							1.29		S3		KEA72
12C	20.	133.3	1.13	0.686	15.6	1.75	0.76							1.13		S2		KEA72
16O	6.8	68.	1.5	0.6	16.	1.5	0.6							1.25?		S	H68	PUL64
16O	12.	93.8	1.4*	0.615	14.7	1.4*	0.615							1.25?	1112	S	H68	GLO65
16O	12.	146.8	1.4*	0.551	18.4	1.4*	0.551							1.25?	1100	S	H68	GLO65
16O	12.	142.7	1.43	0.495	17.3	1.46	0.370				4.15	1.43	0.469	1.4*		S		PIG73
18O	6.4	70.	1.2	0.73	21.	1.2	0.73							1.25?		S	H68	PUL64
18O	7.2	30.	1.30	0.88	36.	1.30	0.88							1.25?		S	H68	PUL64
19F	2.00	150.	0.99*	0.829*	16.	1.81*	0.592*							1.40*		S1		HER69
19F	6.8	120.	1.33	0.70	44.	1.33	0.70							1.25?		S	H68	ROO65
20NE	2.00	150.	0.99*	0.829*	16.	1.81*	0.592*							1.40*		S1		HER69
24MG	10.	126.	1.4*	0.640	34.6	1.4*	0.640							1.25?	1338	S	H68	GLO65
24MG	10.	172.6	1.4*	0.603	33.6	1.4*	0.603							1.25?	1334	S	H68	GLO65
24MG	12.	82.6	1.4*	0.66	20.0	1.4*	0.66							1.25?	1271	S	H68	GLO66
24MG	12.	141.3	1.28	0.65	29.8	1.28	0.65							1.25?	1262	S	H68	GLO66
24MG	15.	165.4	1.16*	0.75	16.4	1.50*	0.82							1.2?		S2	4	GAR73
25MG	12.	135.6	1.31	0.65	22.3	1.59	0.64							1.25?	1348	S	H68	GLO66
25MG	12.	171.3	1.4*	0.54	29.3	1.4*	0.56							1.25?	1296	S	H68	GLO66
26MG	10.	126.0	1.4*	0.64	34.6	1.4*	0.64							1.25?		S	H68	GLO65
26MG	12.	113.8	1.47	0.59	24.0	1.47	0.59							1.25?	1367	S	H68	GLO66
26MG	12.	169.5	1.4*	0.58	30.6	1.4*	0.58							1.25?	1359	S	H68	GLO66
27AL	12.	81.2	1.4*	0.68	55.7	1.4*	0.68							1.25?	1415	S	H68	GLO66
27AL	12.	147.1	1.4*	0.61	54.1	1.4*	0.61							1.25?	1393	S	H68	GLO66
27AL	12.	141.4	1.14*	0.723	48.86	1.374	0.716							1.4*		S2		GRA73
27AL	12.	164.7	1.14*	0.688	80.71	1.142	0.779							1.4*		S2		GRA73
35CL	12.	142.1	1.4*	0.61				24.2	1.4*	0.61				1.25?	1464	S	H68,5	GLO66
35CL	12.	143.3	1.4*	0.59	53.3	1.4*	0.59							1.25?	1410	S	H68,5	GLO66
37CL	12.	98.3	1.4*	0.67	17.5	1.4*	0.67							1.25?	1489	S	H68	GLO66
37CL	12.	136.8	1.4*	0.63	20.6	1.4*	0.63							1.25?	1490	S	H68	GLO66
40CA	2.0	150.*	1.10*	0.80*	12.	1.60	0.65*							1.3*		S		GOL72
40CA	2.0	150.*	1.30*	0.65*	4.	1.30*	0.65*							1.3*		S		GOL72
40CA	2.5	150.*	1.10*	0.80*	18.	1.60	0.65*							1.3*		S		GOL72
40CA	2.5	150.*	1.30*	0.65*	10.	1.30*	0.65*							1.3*		S2		GOL72
40CA	3.0	150.*	1.10*	0.80*	17.	1.60	0.65*							1.3*		S		GOL72
40CA	3.0	150.*	1.30*	0.65*	17.	1.30*	0.65*							1.3*		S3		GOL72
40CA	3.5	150.*	1.10*	0.80*	23.	1.60	0.65*							1.3*		S		GOL72
40CA	3.5	150.*	1.30*	0.65*	20.	1.30*	0.65*							1.3*		S2		GOL72
40CA	6.8	153.	1.30	0.65	46.	1.30	0.65							1.25?		S	H68	ROO65
40CA	7.2	41.	1.4*	0.71	45.	1.4*	0.71							1.25?		S	H68	PUL64
40CA	7.2	107.	1.07	0.854	12.	1.81	0.592							1.25?		S	H68	BJE64
40CA	10.	152.9	1.24*	0.743	18.0	1.74	0.637							1.25?		S	H68	GLO67
40CA	12.	125.0	1.48	0.59	21.7	1.48	0.59							1.25?	1489	S	H68	GLO66
40CA	12.	133.4	1.4*	0.65				23.0	1.4*	0.65				1.25?	1569	S	H68,5	GLO66
40CA	12.	139.4	1.37	0.65	17.2	1.62	0.69							1.25?	1534	S	H68,5	GLO66
40CA	12.	157.0	1.24*	0.688	21.6	1.50	0.756							1.25?		S	H68	GLO67

See page 8 for Explanation of Tables

TABLE IV. Optical-Model Parameters Tritons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
40CA	20.	156.8	1.24*	0.656	15.98	1.592	0.857							1.25*		S2	5	FLY69
40CA	20.	172.7	1.16*	0.700	14.8	1.650	0.806							1.25*		S2	5	FLY69
40CA	20.	215.3	1.003	0.766	13.4	1.652	0.822				3.0*	1.003	0.766	1.4*	1626	S1	5	SAT69
40CA	20.	156.2	1.0*	0.8*	10.8	1.744	0.800				3.0*	1.0*	0.8*	1.4*	1628	S1	5	SAT69
40CA	20.	153.1	1.008	0.811	10.9	1.753	0.773				3.0*	1.008	0.811	1.4*	1626	S1	5	SAT69
40CA	20.	176.0	1.14*	0.710	14.68	1.669	0.799							1.4*		S2	2	URO71
44CA	12.	157.0	1.24*	0.696	23.9	1.46	0.802							1.25?		S	H68	GLO67
48CA	12.	151.2	1.24*	0.748	13.8	1.71	0.58							1.25?		S	H68	GLO67
48TI	12.	154.8	1.24*	0.705	17.9	1.60	0.756							1.25?		S	H68	GLO67
52CR	12.	151.9	1.24*	0.692	18.45	1.59	0.722							1.25?		S	H68	GLO67
52CR	15.0	152.	1.24*	0.651	22.0	1.49	0.808							1.25*	1680	S2		HAF67
52CR	15.0	144.	1.24*	0.678*	30.0	1.45*	0.841*							1.25*	1770	S2		HAF67
52CR	20.0	149.	1.24*	0.671	18.8	1.57	0.776							1.25*	1790	S1		HAF67
52CR	20.0	146.	1.24*	0.678*	25.6	1.45*	0.841*							1.25*	1820	S2		HAF67
52CR	20.	149.4	1.24*	0.671	19.29	1.562	0.772							1.25*		S1	5	FLY69
52CR	20.	150.7	1.24*	0.685*	18.85	1.432*	0.870*							1.25*		S3	5	FLY69
52CR	20.	169.4	1.14*	0.732	17.94	1.615	0.730							1.4*		S1	2	URO71
53CR	12.	151.	1.24	0.66	21.5	1.47	0.79							1.25?		S2	3	MAC72
54FE	20.	147.1	1.24*	0.653	21.62	1.494	0.847							1.25*		S1	5	FLY69
54FE	20.	142.4	1.24*	0.685*	26.77	1.432*	0.870*							1.25*		S2	5	FLY69
54FE	20.	167.1	1.14*	0.717	19.96	1.560	0.787							1.4*		S1	2	URO71
56FE	12.	147.4	1.24*	0.681	16.2	1.605	0.76							1.25?		S	H68	GLO67
57FE	12.	145.8	1.24*	0.635	22.6	1.42	0.88							1.25?		S2		MCL72
62NI	15.0	151.	1.24*	0.692	29.0	1.36	0.890							1.25*	1810	S1		HAF67
62NI	15.0	155.	1.24*	0.678*	21.9	1.45*	0.841*							1.25*	1760	S2		HAF67
62NI	20.0	152.	1.24*	0.680	26.7	1.43	0.853							1.25*	1910	S1		HAF67
62NI	20.0	153.	1.24*	0.678*	24.7	1.45*	0.841*							1.25*	1900	S1		HAF67
62NI	20.	148.8	1.24*	0.685*	26.52	1.432*	0.870*							1.25*		S1	5	FLY69
62NI	20.	154.3	1.24*	0.677	26.11	1.431	0.850							1.25*		S1	5	FLY69
62NI	20.0	149.0	1.274	0.656	27.	1.576	0.883	4.31	1.576	0.883				1.25*		S1	1	ASC70
62NI	20.	172.9	1.14*	0.746	21.96	1.527	0.789							1.4*		S1	2	URO71
64NI	20.0	154.	1.24*	0.672	23.7	1.37	0.901							1.25*	1920	S1		HAF67
64NI	20.0	154.	1.24*	0.678*	20.7	1.45*	0.841*							1.25*	1890	S1		HAF67
64NI	20.	155.1	1.24*	0.673	23.46	1.385	0.886							1.25*		S1	5	FLY69
64NI	20.	152.1	1.24*	0.685*	22.28	1.432*	0.870*							1.25*		S1	5	FLY69
64NI	20.	173.8	1.14*	0.747	20.03	1.505	0.799							1.4*		S1	2	URO71
87RB	15.	162.	1.19	0.75	13.4	1.60	0.69							1.25*		S1	1	TUC72
87RB	15.	122.	1.23	0.76	12.0	1.63	0.68							1.25*		S1	1	TUC72
86SR	15.0	152	1.24*	0.674	25.4	1.44	0.820							1.25*	1810	S2	1	RAG70
86SR	15.0	168	1.16*	0.726	24.1	1.48	0.794							1.25*	1810	S2		RAG70
86SR	15.0	252	1.16*	0.684*	32.1	1.41*	0.806*							1.25*	1810	S2		RAG70
90ZR	20.0	152.	1.24*	0.684	19.6	1.48	0.771							1.25*	1940	S1		HAF67
90ZR	20.0	151.	1.24*	0.678*	21.5	1.45*	0.841*							1.25*	2000	S1		HAF67
90ZR	20.	150.4	1.24*	0.67	20.5	1.46	0.79							1.40*		S	5	BAL69
90ZR	20.	152.9	1.24*	0.684	20.04	1.479	0.779							1.25*		S1	5	FLY69
90ZR	20.	151.1	1.24*	0.685*	24.06	1.432*	0.870*							1.25*		S2	5	FLY69
90ZR	20.	173.2	1.14*	0.751	18.62	1.526	0.746							1.4*		S2	2	URO71
92ZR	20.	159.1	1.24*	0.670	25.00	1.401	0.809							1.25*		S2	5	FLY69
92ZR	20.	154.4	1.24*	0.685*	22.90	1.432*	0.870*							1.25*		S2	5	FLY69
92ZR	20.	182.6	1.14*	0.743	21.60	1.481	0.775							1.4*		S2	2	URO71
94ZR	20.	153.4	1.24*	0.681	18.75	1.489	0.787							1.25*		S2	5	FLY69
94ZR	20.	150.8	1.24*	0.685*	22.69	1.432*	0.870*							1.25*		S2	5	FLY69
94ZR	20.	175.0	1.14*	0.754	16.81	1.553	0.760							1.4*		S2	2	URO71
96ZR	20.	154.0	1.24*	0.672	18.62	1.391	0.990							1.25*		S1	5	FLY69
96ZR	20.	153.9	1.24*	0.685*	17.76	1.432*	0.870*							1.25*		S2	5	FLY69
100MO	15.75	160.4	1.16	0.793	11.22	1.25*	0.812							1.25*		S		TAK73
100MO	15.75	173.5	1.22	0.73				30.45	1.22	0.868				1.25*		S		TAK73
116SN	20.0	153.	1.24*	0.695	20.8	1.42	0.889							1.25*	2120	S1		HAF67
116SN	20.0	156.	1.24*	0.678*	17.4	1.45*	0.841*							1.25*	2030	S2		HAF67
116SN	20.	154.1	1.24*	0.698	21.28	1.419	0.881							1.25*		S1	5	FLY69
116SN	20.	155.9	1.24*	0.685*	18.96	1.432*	0.870*							1.25*		S2	5	FLY69
118SN	20.	148.2	1.24*	0.680	18.82	1.445	0.895							1.25*		S1	5	FLY69
118SN	20.	148.7	1.24*	0.685*	19.70	1.432*	0.870*							1.25*		S1	5	FLY69
118SN	20.	168.5	1.14*	0.764	16.53	1.525	0.823							1.4*		S2	2	URO71
120SN	20.	147.0	1.24*	0.688	18.08	1.475	0.890							1.25*		S1	5	FLY69
120SN	20.	148.9	1.24*	0.685*	19.93	1.432*	0.870*							1.25*		S1	5	FLY69
122SN	20.	149.6	1.24*	0.706	21.88	1.378	0.903							1.25*		S1	5	FLY69
122SN	20.	149.9	1.24*	0.685*	17.16	1.432*	0.870*							1.25*		S2	5	FLY69
124SN	20.	149.6	1.24*	0.715	16.87	1.445	0.809							1.25*		S1	5	FLY69
124SN	20.	150.5	1.24*	0.685*	15.52	1.432*	0.870*							1.25*		S2	5	FLY69

See page 8 for Explanation of Tables

TABLE IV. Optical-Model Parameters Tritons

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
182W	20.	162.7	1.24*	0.705	26.24	1.218	1.035							1.25*		S1	5	FLY69
182W	20.	162.4	1.24*	0.685*	13.44	1.432*	0.870*							1.25*		S3	5	FLY69
207PB	20.	150.0	1.24*	0.675	13.51	1.405	0.998							1.25*		S1	5	FLY69
207PB	20.	150.3	1.24*	0.685*	11.99	1.432*	0.870*							1.25*		S2	5	FLY69
208PB	20.	148.7	1.24*	0.697	16.77	1.339	0.917							1.25*		S1	5	FLY69
208PB	20.	149.8	1.24*	0.685*	12.02	1.432*	0.870*							1.25*		S2	5	FLY69
208PB	20.	150.3	1.24*	0.707	13.9	1.42	0.816							1.25*		S1		IGO69
208PB	20.	169.6	1.14*	0.795	12.0	1.48	0.824							1.40*		S1		IGO69

NOTES

1. Data for angles smaller than 100°
2. See publication for optical-model parameters fitting triton and ^{3}He data simultaneously
3. a) Arbitrary normalization of the cross-section data
   b) Data for angles larger than 139° are not included in the search
4. Data for angles smaller than 80°
5. See publication for other sets of parameters fitting the same data

H68. As reported in a previous review paper by P. E. Hodgson, Adv. Phys. 17, 563 (1968)

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A > 40	15 to 20	BEC71

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See page 8 for Explanation of Tables

TABLE V. Optical-Model Parameters Helium-3

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
4HE	12.0	88.5	1.60*	0.30										1.60*		S2		DUN67
4HE	12.0	74.6	1.60*	0.70	6.20	1.60*	0.70				22.2	1.60*	0.70	1.60*		S3		DUN67
4HE	13.5	86.0	1.60*	0.30										1.60*		S2		DUN67
4HE	13.5	86.9	1.60*	0.70	7.04	1.60*	0.70				22.2	1.60*	0.70	1.60*		S2		DUN67
4HE	15.0	96.4	1.60*	0.67	10.16	1.60*	0.60							1.60*		S3		DUN67
4HE	15.0	96.4	1.60*	0.67	10.16	1.60*	0.60				21.9	1.60*	0.67	1.60*		S3		DUN67
4HE	16.5	96.4	1.63	0.66	10.16	1.68	0.53							1.60*		S3		DUN67
4HE	16.5	96.4	1.63	0.66	10.16	1.68	0.53				21.3	1.63	0.66	1.60*		S3		DUN67
4HE	18.0	102.1	1.70	0.72	9.49	1.60*	0.60							1.60*		S3		DUN67
4HE	18.0	102.1	1.60	0.72	9.49	1.70	0.60				20.2	1.60	0.72	1.60*		S3		DUN67
4HE	19.0	106.6	1.57	0.70	10.65	1.52	0.70							1.60*		S3		DUN67
4HE	19.0	106.6	1.57	0.70	10.65	1.52	0.70				21.0	1.57	0.70	1.60*		S3		DUN67
6LI	8.	105.1	1.70	0.28	90.2	1.70	0.84							1.3*	1211	S		LUD68
6LI	8.	140.*	1.2*	0.60	30.*	2.42	0.72				6.*	1.2*	0.7*	1.3*	1212	S3		LUD68
6LI	8.	140.*	1.2*	0.45				7.5*	2.69	0.36				1.3*	923	S2		LUD68
6LI	9.	103.1	1.88	0.34	97.0	1.88	0.65							1.3*	991	S		LUD68
6LI	9.	140.*	1.2*	0.53	30.*	2.48	0.60				6.*	1.2*	0.7*	1.3*	1052	S2		LUD68
6LI	9.	140.*	1.2*	0.42				7.5*	2.67	0.45				1.3*	997	S2		LUD68
6LI	10.	103.3	1.66	0.50	59.9	1.66	0.76							1.3*	1037	S		LUD68
6LI	10.	140.*	1.2*	0.58	30.*	2.00	0.74				6.*	1.2*	0.7*	1.3*	1032	S3		LUD68
6LI	10.	140.*	1.2*	0.29				7.5*	2.31	0.57				1.3*	954	S2		LUD68
6LI	11.	91.9	1.83	0.29	75.2	1.83	0.65							1.3*	950	S		LUD68
6LI	11.	140.*	1.2*	0.62	30.*	2.39	0.53				6.*	1.2*	0.7*	1.3*	936	S1		LUD68
6LI	11.	140.*	1.2*	0.43				7.5*	2.26	0.55				1.3*	892	S3		LUD68
6LI	12.	97.9	1.66	0.54	66.7	1.66	0.69							1.3*	1050	S		LUD68
6LI	12.	140.*	1.2*	0.75	30.*	2.30	0.52				6.*	1.2*	0.7*	1.3*	1015	S2		LUD68
6LI	12.	140.*	1.2*	0.28				7.5*	2.27	0.62				1.3*	1014	S3		LUD68
6LI	14.	93.4	1.67	0.55	59.6	1.67	0.61							1.3*	930	S		LUD68
6LI	14.	140.*	1.2*	0.70	30.*	2.11	0.54				6.*	1.2*	0.7*	1.3*	944	S2		LUD68
6LI	14.	140.*	1.2*	0.15				7.5*	2.19	0.65				1.3*	1008	S3		LUD68
6LI	16.	68.5	1.58	0.76	67.9	1.58	0.45							1.3*		S		LUD68
6LI	16.	140.*	1.2*	0.73	30.*	2.20	0.55				6.*	1.2*	0.7*	1.3*	1011	S2		LUD68
6LI	16.	140.*	1.2*	0.72				7.5*	1.32	1.12				1.3*	1272	S2		LUD68
6LI	18.	65.5	1.54	0.72	70.4	1.54	0.41							1.3*		S		LUD68
6LI	18.	140.*	1.2*	0.83	30.*	1.93	0.42				6.*	1.2*	0.7*	1.3*	949	S2		LUD68
6LI	18.	140.*	1.2*	0.38				7.5*	1.13	1.19				1.3*	1119	S2		LUD68
6LI	20.	69.7	1.55	0.71	71.0	1.55	0.41							1.3*		S		LUD68
6LI	20.	140.*	1.2*	0.75	30.*	1.90	0.46				6.*	1.2*	0.7*	1.3*	905	S3		LUD68
6LI	20.	140.*	1.2*	0.40				7.5*	0.74	1.46				1.3*	1303	S3		LUD68
6LI	217.	80.7	1.0	0.77	27.7	1.46	0.83							1.3?		S2	2	WIL73
7LI	9.7	150.8	1.20	0.708				8.26	1.37	0.527	3.03	1.20	0.708	1.3*		S		DIX70
7LI	9.7	161.6	1.17	0.654	6.76	1.31	0.769				2.76	1.17	0.654	1.3*		S		DIX70
7LI	9.7	131.5	1.07	0.675				12.61	1.17	0.455				1.2?		S3		WER73
7LI	11.0	124	1.15*	0.71	10.0	1.84	0.25							1.4*		S1		SCH70
9BE	4.0	185.	1.20*	0.44				14.6G	1.20*	0.96	5.5	1.20*	0.44	1.4*	334	S2		PAR69A
9BE	6.0	142.2	1.16	0.78	28.2	1.88	0.61							1.3*			16	EAR67
9BE	6.	169.	1.15*	0.62				13.G	1.15*	1.85				1.4?	741	S	H68	PAR68
9BE	6.	174.	1.15*	0.59				14.G	1.15*	1.55	5.5	1.15*	0.59	1.4?	653	S	H68	PAR68
9BE	6.0	145.0	1.25*	0.65*	9.25	2.23	0.43				6.0*	1.25*	0.65*	1.40*		S2		THO71
9BE	6.0	156.0	1.18	0.67	8.92	2.24	0.46				6.0*	1.18	0.67	1.40*		S2		THO71
9BE	6.0	165.0	1.10	0.73				13.7	1.88	0.48	6.0*	1.10	0.73	1.40*		S2		THO71
9BE	6.0	133.0	0.86	0.70	4.09	2.68	0.50				6.0*	0.86	0.70	1.40*		S2		THO71
9BE	6.1	180.	1.20*	0.46				15.0G	1.20*	1.20	4.0	1.20*	0.46	1.4*	472	S2		PAR69A
9BE	8.0	139.6	1.13	0.77	28.0	1.87	0.61							1.3*			16	EAR67
9BE	8.0	140.*	1.2*	0.76	30.*	2.12	0.45							1.3*		S3		LUD68
9BE	8.0	140.*	1.2*	0.65				7.5*	1.98	0.72				1.3*		S2		LUD68
9BE	8.	163.	1.15*	0.66				14.G	1.15*	1.37				1.4?	808	S	H68	PAR68
9BE	8.	162.	1.15*	0.67				14.G	1.15*	1.37	3.5	1.15*	0.67	1.4?	820	S	H68	PAR68
9BE	8.0	178.	1.20*	0.47				13.0G	1.20*	1.30	5.5	1.20*	0.47	1.4*	547	S2		PAR69A
9BE	8.0	158.2	1.07	0.728	5.96	2.54	0.508				7.34	1.07	0.728	1.07		S2		YOU72
9BE	10.	109.	1.6*	0.64	22.	1.6*	0.64							1.25*		S	14	CRO67
9BE	10.0	171.	1.20*	0.51				18.0G	1.20*	1.99	5.5	1.20*	0.51	1.4*	858	S2	9	PAR69A
9BE	13.2	141.2	1.156	0.758	16.4	1.535	0.990							1.07*		S3	9	BUF72
9BE	15.0	155.	1.20*	0.60				18.5G	1.20*	2.17	5.0	1.20*	0.60	1.4*	1046	S2		PAR69A
9BE	18.0	149.	1.20*	0.66				10.5G	1.20*	2.30	5.5	1.20*	0.66	1.4*	1058	S3		PAR69A
9BE	18.	140.*	1.27	0.63	16.5	1.51	1.04				5.0	1.14	0.63	1.3*		S2P2	20,24	MCE72
9BE	20.4	152.8	1.202	0.695	29.7	1.220	1.167							1.07*		S3	16	BUF72
9BE	22.2	62.7	1.432	0.746	21.8	1.525	1.055							1.07*		S2	16	BUF72
9BE	27.0	108.1	1.080	0.857	21.7	1.636	0.893							1.07*		S2	16	BUF72
9BE	31.6	69.5	1.18	0.76				20.3	1.18	0.76				1.4?		S	H68	WIL67
9BE	31.6	69.5	1.18	0.76				20.3	1.18	0.76	8.82	1.18	0.76	1.4?		S	H68	WIL67
9BE	217.	35.0	1.52	0.71	5.65	1.80	0.63							1.3?		S2	2	WIL73
10B	4.0	168.0	1.20*	0.78				21.0G	1.20*	1.90	5.5	1.20*	0.78	1.40*	740	S1	5	DUG70
10B	4.0	172.0	1.20*	0.73				16.CG	1.20*	1.80	5.0	1.20*	0.73	1.40*	665	S	5,6	DUG70
10B	4.0	163.0	1.20*	0.69*				12.0G	1.20*	1.90				1.40*	593	S	5	DUG70
10B	8.0	180.0	1.20*	0.72				24.0G	1.20*	1.75	5.5	1.20*	0.72	1.40*	940	S2	5	DUG70
10B	8.0	185.0	1.20*	0.71				16.5G	1.20*	1.85	5.5	1.20*	0.71	1.40*	948	S	5,6	DUG70
10B	8.0	189.0	1.20*	0.69*				16.5G	1.20*	1.90	5.5	1.20*	0.69*	1.40*	929	S	5	DUG70
10B	9.8	140.*	1.2*	0.78	30.*	2.15	0.30							1.3*		S2		LUD68
10B	9.8	140.*	1.2*	0.83				7.5*	1.85	0.55				1.3*		S3		LUD68
10B	9.8	85.	1.63	0.6	25.	1.63	0.6							1.4?		S	H68	PAT67

See page 8 for Explanation of Tables

TABLE V. Optical-Model Parameters Helium-3

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
10B	10.0	194.0	1.20*	0.71				12.5G	1.20*	1.90	5.5	1.20*	0.71	1.40*	992	S2	5	DUG70
10B	10.0	193.0	1.20*	0.74				11.0G	1.20*	2.10	5.5	1.20*	0.74	1.40*	1070	S	5,6	DUG70
10B	10.0	192.5	1.20*	0.69*				13.0G	1.20*	1.90	5.5	1.20*	0.69*	1.40*	964	S	5	DUG70
10B	12.0	201.5	1.20*	0.69				14.3G	1.20*	2.00				1.40*	1030	S2	5	DUG70
10B	12.0	200.0	1.20*	0.71				12.0G	1.20*	1.82	5.5	1.20*	0.71	1.40*	998	S2	5,6	DUG70
10B	12.0	200.0	1.20*	0.69*				16.0G	1.20*	1.90	3.5	1.20*	0.69*	1.40*	1006	S	5	DUG70
10B	13.2	83.7	0.950	0.917	23.7	1.872	0.650							1.07*		S2	9	BUF72
10B	14.	140.0	1.1*	0.80	12.5	2.33	0.26							1.25*		S2		NUS70
10B	14.	134.1	1.1*	0.83				33.4	1.84	0.38				1.25*		S2		NUS70
10B	15.0	213.0	1.20*	0.59				5.0G	1.20*	1.85	3.0	1.20*	0.59	1.40*	846	S3	5	DUG70
10B	15.0	211.0	1.20*	0.61				10.0G	1.20*	1.80	2.5	1.20*	0.61	1.40*	868	S	5,6	DUG70
10B	15.0	206.0	1.20*	0.69*				10.0G	1.20*	1.90	2.3	1.20*	0.69*	1.40*	980	S	5	DUG70
10B	17.2	151.3	1.067	0.858	15.4	1.894	0.470							1.07*		S1		BUF72
10B	18.0	195.0	1.20*	0.57				9.0G	1.20*	2.10	5.5	1.20*	0.57	1.40*	900	S3	5	DUG70
10B	18.0	221.0	1.20*	0.48				10.5G	1.20*	1.80	5.0	1.20*	0.48	1.40*	758	S	5,6	DUG70
10B	18.0	188.5	1.20*	0.69*				11.8G	1.20*	1.90	5.5	1.20*	0.69*	1.40*	981	S	5	DUG70
10B	24.3	102.2	1.064	0.879	11.1	1.862	0.606							1.07*		S2		BUF72
10B	24.3	103.3	1.079	0.815				7.9	1.705	0.726				1.07*		S2		BUF72
10B	32.46	104.4	1.15	0.78	26.6	1.14	0.91							0.53	928	S2	23	SQU68
10B	32.46	132.9	1.54	0.57	19.5	1.82	0.22							0.81	869	S1	23	SQU68
10B	32.46	171.0	1.25	0.58	12.8	1.78	0.94							0.86	1104	S	23	SQU68
11B	8.0	195.	1.20*	0.65				16.5G	1.20*	1.90	5.5	1.20*	0.65	1.4*	911	S2		PAR69A
11B	10.0	145.	1.16	0.595	9.13	0.95	1.83				4.75*	1.16	0.595	1.16*		S1		MIL69
11B	10.0	127.	1.25*	0.573	3.68	2.25	1.53				4.75*	1.25*	0.573	1.25*		S2		MIL69
11B	10.0	195.	1.20*	0.69				11.0G	1.20*	1.90	5.5	1.20*	0.69	1.4*	993	S2		PAR69A
11B	12.0	152.	1.018	0.75*	10.16	1.54	0.965				4.0*	1.018	0.75*	1.02*		S1		MIL69
11B	12.0	194.	1.20*	0.67				14.5G	1.20*	1.60	5.5	1.20*	0.67	1.4*	945	S2		PAR69A
11B	14.	143.9	1.1*	0.80	12.2	2.25	0.20							1.25*		S2		NUS70
11B	14.	139.0	1.1*	0.83				32.0	1.81	0.36				1.25*		S2		NUS70
11B	15.0	195.	1.20*	0.64				11.5G	1.20*	1.80	3.0	1.20*	0.64	1.4*	936	S3		PAR69A
11B	18.0	140.	1.018	0.754				8.14	1.34	0.804	4.0*	1.018	0.754	1.02*		S3		MIL69
11B	18.0	190.	1.20*	0.66				13.5G	1.20*	1.65	4.0	1.20*	0.66	1.4*	930	S2		PAR69A
11B	18.3	71.6	1.055	0.893	10.5	1.777	0.844							1.07*		S2	16	BUF72
11B	20.6	74.1	1.064	0.871	11.2	1.787	0.783							1.07*		S2	16	BUF72
11B	20.6	70.5	1.057	0.887	11.1	1.794	0.787							1.07*		S1	17	BUF72
11B	27.2	115.3	1.071	0.856	13.3	1.794	0.719							1.07*		S2		BUF72
11B	74.	98.9	1.16	0.73	30.48	1.29	0.88							1.3*		S2	9	ASP74
11B	74.	100.5	1.11	0.71				12.09	1.24	0.87				1.3*		S2	9	ASP74
C	29.	76.64	1.057	0.881	16.66	1.777	0.744							1.07*	1070	S	8	BAU67
C	29.	78.3*	0.92*	0.881*	8.24	2.15	0.774*							1.25*		S		SCO70
12C	3.70	149.7	1.29	0.62	14.9	2.04	0.20							1.4*		S2	14	SCH67
12C	3.70	110.0	1.20*	0.60	24.0	1.20*	0.60							1.4*	290	S		PAR68
12C	3.70	112.0	1.20*	0.58				26.0G	1.20*	0.92				1.4*	237	S1		PAR68
12C	3.70	110.0	1.20*	0.61				20.0G	1.20*	1.15	5.0	1.20*	0.61	1.4*	255	S1		PAR68
12C	5.03	133.0	1.20*	0.67	16.0	1.20*	0.67							1.4*	614	S		PAR68
12C	5.03	133.0	1.20*	0.68				12.0G	1.20*	1.43				1.4*	580	S1		PAR68
12C	5.03	132.0	1.20*	0.67				12.0G	1.20*	1.32	4.0	1.20*	0.67	1.4*	556	S1		PAR68
12C	5.5	100.*	1.06	0.72	30.0	1.77	0.64							1.06		S1	25	LAM68
12C	5.57	130.5	1.20*	0.62	21.0	1.20*	0.62							1.4*	584	S		PAR68
12C	5.57	126.5	1.20*	0.67				15.0G	1.20*	1.50				1.4*	604	S1		PAR68
12C	5.57	131.0	1.20*	0.64				16.5G	1.20*	1.35	3.0	1.20*	0.64	1.4*	561	S1		PAR68
12C	6.0	139.5	0.93*	0.81*	5.50	2.25	0.65*							1.4*		S2		WEL68
12C	6.00	121.0	1.20*	0.589	20.0	1.20*	0.589							1.4*	545	S		PAR68
12C	6.00	128.0	1.20*	0.555				22.5G	1.20*	0.98				1.4*	460	S1		PAR68
12C	6.00	125.0	1.20*	0.57				18.0G	1.20*	1.05	5.0	1.20*	0.57	1.4*	477	S2		PAR68
12C	7.00	128.0	1.20*	0.66	11.0	1.20*	0.66							1.4*	724	S		PAR68
12C	7.00	146.0	1.20*	0.49				8.5G	1.20*	1.55				1.4*	494	S		PAR68
12C	7.00	136.0	1.20*	0.60				7.5G	1.20*	1.32	9.0	1.20*	0.60	1.4*	544	S1		PAR68
12C	7.0	165.2	0.93*	0.81*	4.43	1.90	0.65*							1.4*		S3		WEL68
12C	8.00	125.4	1.20*	0.685	12.5	1.20*	0.685							1.4*	769	S		PAR68
12C	8.00	127.5	1.20*	0.67				15.0G	1.20*	1.02				1.4*	735	S2		PAR68
12C	8.0	165.	0.93*	0.81*	4.43	2.05	0.65*							1.4*		S2		WEL68
12C	8.5	60.47	1.97	0.51	10.26	1.97	0.51							1.4?	938	S	H68	SCH66
12C	8.50	135.0	1.20*	0.73	9.0	1.20*	0.73							1.4*	811	S	21	PAR68
12C	8.50	137.0	1.20*	0.71				13.0G	1.20*	0.92				1.4*	757	S1	21	PAR68
12C	8.50	136.0	1.20*	0.70				14.0G	1.20*	0.95	2.0	1.20*	0.70	1.4*	758	S1	21	PAR68
12C	10.	71.21	1.78	0.533	13.12	1.78	0.533							1.4?	983	S	H68	SCH66
12C	10.0	136.0	1.20*	0.58	31.0	1.20*	0.58							1.4*	719	S		PAR68
12C	10.0	126.0	1.20*	0.67				17.0G	1.20*	1.60				1.4*	806	S2		PAR68
12C	10.0	132.0	1.20*	0.63				16.0G	1.20*	1.35	9.0	1.20*	0.63	1.4*	733	S2		PAR68
12C	11.0	130	1.15*	0.70	4.2	2.61	0.36							1.4*		S1		SCH70
12C	12.0	147.5	1.20*	0.575	17.5	1.20*	0.575							1.4*	734	S		PAR68
12C	12.0	147.0	1.20*	0.58				19.0G	1.20*	1.00				1.4*	695	S3		PAR68
12C	12.0	149.0	1.20*	0.55				17.0G	1.20*	1.00	4.5	1.20*	0.55	1.4*	646	S3		PAR68
12C	13.9	50.35	1.442	0.776				6.16	1.442	0.776				1.2*		S		OBE68
12C	13.9	108.2	1.301	0.703				10.25	1.301	0.703				1.2*		S		OBE68
12C	13.9	189.1	1.212	0.663				14.41	1.212	0.663				1.2*		S		OBE68
12C	15.0	172.0	1.20*	0.71	25.0	1.20*	0.71							1.4*	1013	S		PAR68
12C	15.0	171.5	1.20*	0.74				14.7G	1.20*	1.67				1.4*	1014	S2		PAR68
12C	15.0	166.0	1.20*	0.78				16.0G	1.20*	1.55	9.5	1.20*	0.78	1.4*	1052	S2		PAR68
12C	15.	155.0	0.93	0.84	5.73	2.30	0.41							1.4*		S3		ZUR69
12C	16.	165.	1.26	0.8	9.96	2.16	0.8							1.4?		S	H68	FOR67

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TABLE V. Optical-Model Parameters Helium-3

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
12C	16.	125.8	1.58	0.635	9.41	2.12	0.831				15.37	1.58	0.635	1.58		S3		FOR68
12C	16.	127.9	1.58	0.684				13.49	1.55	0.684	15.88	1.58	0.684	1.58		S3		FOR68
12C	16.	187.7	1.55	0.603	11.90	2.04	0.872				18.87	1.55	0.603	1.55		S3		FOR68
12C	16.	184.5	1.58	0.636				19.31	1.46	0.636	19.49	1.58	0.636	1.58		S3		FOR68
12C	17.	165.	1.26	0.8	9.96	2.16	0.8							1.4?		S	H68	FOR67
12C	18.	165.	1.26	0.8	9.96	2.16	0.8							1.4?		S	H68	FOR67
12C	18.	129.2	1.205	0.667				7.0*	1.35*	1.026	4.0*	1.0*	0.5*	1.3*		S2	8	MCE70
12C	18.	150.*	1.07	0.69				6.65	1.40	1.02	4.0*	0.96	0.69	1.3*		S3P3	18	MCE71
12C	18.	130.*	1.20	0.67				7.0	1.35	1.03	4.0	1.08	0.67	1.3*		S2P3	20,24	MCE72
12C	20.0	71.04	1.156	0.761	12.95	1.733	0.727							1.07*	967	S3	24,14	WAR68
12C	20.0	207.7	1.200	0.614	19.63	1.656	0.624							1.07*	964	S3	24,14	WAR68
12C	20.	131.0	1.205	0.683				13.75	1.35*	0.78*	4.5*	1.0*	0.5*	1.3*		S2	8	MCE70
12C	20.	150.*	1.07	0.74				13.7	1.50	0.70	5.0*	0.96	0.74	1.3*		S3P3	18	MCE71
12C	20.	130.*	1.21	0.68				13.8	1.35	0.78	4.5	1.09	0.68	1.3*		S2P2	20,24	MCE72
12C	22.2	72.33	1.048	0.926	14.72	1.621	0.922							1.07*	1147	S2	24,14	WAR68
12C	22.2	128.4	1.125	0.771	17.36	1.508	0.938							1.07*	1163	S2	24,14	WAR68
12C	23.9	79.9	1.080	0.853	11.86	1.927	0.677							1.07*	1043	S2	24,14	WAR68
12C	23.9	134.1	1.184	0.693	17.70	1.634	0.804							1.07*	1078	S2	24,14	WAR68
12C	24.0	141.2	1.1*	0.656				11.1	1.299	0.911				1.4*	1192	S2	16	FUJ73
12C	24.0	139.9	1.1*	0.681				11.0	1.298	.921	3.61	1.1*	0.681	1.4*	1202	S2	16	FUJ73
12C	24.5	62.*	1.31	0.89	37.9	1.31	0.89							1.4?	1200	S	H68	SEN64
12C	25.3	62.*	1.50	0.75	39.0	1.50	0.75							1.4?	1158	S	H68	SEN64
12C	25.3	59.2	1.50*	0.75*	26.7	1.50*	0.75*							1.4?	1074	S	H68	SEN64
12C	26.8	62.*	1.34	0.82	43.9	1.34	0.82							1.4?	1130	S	H68	SEN64
12C	29.0	63.47	1.100	0.833	22.65	1.832	0.664							1.07*	1062	S	24,14	WAR68
12C	29.0	76.48	1.070	0.862	15.79	1.774	0.751							1.07*	1055	S	24,14	WAR68
12C	29.1	66.7	1.60	0.588	52.4	1.60	0.588							1.4?	1032	S	H68	GAR62
12C	29.2	135.1	1.1*	0.652				9.47	1.175	1.054				1.4*	1237	S2	16	FUJ73
12C	29.2	134.0	1.1*	0.660				10.7	1.323	.882	7.70	1.1*	0.660	1.4*	1131	S2	16	FUJ73
12C	34.7	126.5	1.1*	0.784				15.3	1.543	.615				1.4*	1033	S2	16	FUJ73
12C	34.7	124.6	1.1*	0.793				15.1	1.566	.605	4.75	1.1*	0.793	1.4*	1034	S2	16	FUJ73
12C	36.	127.1	1.03	0.87	2.34	1.38	0.85	11.5	1.38	0.85	1.70*	1.14*	0.69*	1.4*		S2		HUT68
12C	39.6	121.2	1.1*	0.80				14.1	1.268	.787				1.4*	1056	S2		FUJ73
12C	39.6	124.2	1.1*	0.808				14.7	1.661	.611	4.48	1.1*	0.808	1.4*	1027	S2		FUJ73
12C	42.	115.2	1.13	0.75	5.84	1.55	0.70	9.62	1.55	0.70	1.70*	1.14*	0.69*	1.4*		S2		HUT68
12C	42.	115.2	1.13	0.75	5.8	1.55	0.7	38.5	1.55	0.7	1.7*	1.14*	0.69*	1.4*		S2		SIN73
12C	42.	152.	1.40	0.50	23.0	1.36	1.04				1.7*	1.14*	0.69*	1.4*		S2		SIN73
12C	49.8	160.*	1.40	0.572	20.31	1.70	0.537							1.3*		S2	4	BAL69
12C	49.8	160.*	1.39	0.542	12.58	1.96	0.571							1.3*		S2	4	BAL69
12C	217.	68.0	1.22	0.77	20.7	1.58	0.67							1.3?		S1	2	WIL73
13C	6.0	173.9	0.93*	0.81*	4.55	2.26	0.65*							1.4*		S2	3	WEL68
13C	7.0	156.5	0.93*	0.81*	2.45	2.75	0.65*							1.4*		S3	3	WEL68
13C	8.0	161.4	0.93*	0.81*	4.73	2.56	0.65*							1.4*		S1	3	WEL68
13C	12.0	161.	0.93*	0.81	5.37	2.25*	0.65*				6.*	0.93*	0.81*	1.4*		S2	7,9	KEL66
13C	14.	140.9	1.1*	0.79	8.7	2.24	0.19							1.25*		S2		NUS70
13C	14.	139.5	1.1*	0.83				24.3	1.84	0.34				1.25*		S2		NUS70
13C	15.0	158.	0.93*	0.81	6.75	2.25*	0.65*				6.*	0.93*	0.81*	1.4*		S2	7	KEL66
13C	18.0	156.	0.93*	0.81	6.8	2.25*	0.65*				6.*	0.93*	0.81*	1.4*		S2	7	KEL66
13C	39.6	160.*	1.31	0.565	14.86	1.73	0.826							1.3*		S	4	BAL69
14C	4.5	165.8	0.928	0.789				3.97	2.218	0.609				1.4*		S	15	KEY72
14C	5.1	169.1	0.928*	0.798				6.25	2.099	0.465				1.4*		S	15	KEY72
14C	5.8	172.5	0.928*	0.780				8.54	1.980	0.321				1.4*		S	15	KEY72
14C	10.0	156.0	1.20*	0.70				39.0G	1.20*	1.60	2.5	1.20*	0.70	1.40*	943	S3	5	DUG70
14C	10.0	196.0	1.20*	0.63				16.5G	1.20*	1.15	2.0	1.20*	0.63	1.40*	863	S2	5,6	DUG70
14C	10.0	133.0	1.20*	0.65*				13.7G	1.20*	1.10				1.40*	807	S	5	DUG70
14C	12.0	160.0	1.20*	0.67				37.0G	1.20*	1.60	5.5	1.20*	0.67	1.40*	945	S2	4,5	DUG70
14C	12.0	190.0	1.20*	0.62				21.0G	1.20*	1.65	5.5	1.20*	0.62	1.40*	921	S2	4,5,6	DUG70
14C	12.0	143.0	1.20*	0.65*				13.0G	1.20*	1.10				1.40*	800	S	4,5	DUG70
14C	15.0	167.0	1.20*	0.65				34.0G	1.20*	1.05	5.5	1.20*	0.65	1.40*	896	S3	5	DUG70
14C	15.0	181.5	1.20*	0.69				25.0G	1.20*	1.45	4.0	1.20*	0.69	1.40*	999	S2	5,6	DUG70
14C	15.0	168.0	1.20*	0.65*				31.0G	1.20*	1.10	5.5	1.20*	0.65*	1.40*	898	S	5	DUG70
14C	18.0	175.0	1.20*	0.69				31.5G	1.20*	1.20	2.0	1.20*	0.69	1.40*	966	S3	5	DUG70
14C	18.0	182.0	1.20*	0.71				39.0G	1.20*	1.25	5.5	1.20*	0.71	1.40*	1004	S2	5,6	DUG70
14C	18.0	175.5	1.20*	0.65*				31.5G	1.20*	1.10				1.40*	906	S	5	DUG70
14C	44.8	160.*	1.31	0.569	12.58	1.82	0.795							1.3*		S2	4	BAL69
14N	4.5	175.8	0.921*	0.807*	7.56	2.20*	0.804*				6.41	0.921*	0.807*	1.20*		S2	3	KNU70
14N	7.0	63.01	1.335	0.725				10.87	1.254	0.744				1.33*		S2		KNU70
14N	7.0	162.3	0.921	0.807	6.11	2.20	0.804				6.08	0.921	0.807	1.20*		S3		KNU70
14N	13.9	39.02	1.672	0.662	7.40	1.672	0.662							1.2*		S		LUC68
14N	13.9	74.09	1.726	0.538	16.05	1.726	0.538							1.2*		S		LUC68
14N	13.9	126.9	1.616	0.527	22.14	1.616	0.527							1.2*		S		LUC68
14N	25.7	51.5	1.65	0.52	56.2	1.65	0.52							1.4?	1073	S	H68	SEN64
14N	29.0	61.9	1.62	0.57	60.0	1.62	0.57							1.4?	1088	S	H68	SEN62
14N	29.	169.	1.14	0.675	32.1	1.82	0.566							1.2?		S		HIE67
14N	44.6	160.*	1.29	0.565	11.37	1.78	0.811							1.3*		S2	4	BAL69
15N	11.0	168.55	1.25*	0.609	12.96	1.718	0.626				7.45*	1.25*	0.609	1.30*		S2		BOH70
15N	11.0	168.55	1.250	0.609	12.96	1.718	0.626				7.45*	1.3*	0.6*	1.3*		S2		BOH70A
15N	18.	103.0	1.272	0.649	8.89	1.863	0.929							1.25*		S2		LEM72
15N	18.	177.3	1.194	0.640	12.59	1.671	0.936							1.25*		S2		LEM72
15N	18.	273.1	1.137	0.692	16.69	1.541	0.924							1.25*		S2		LEM72
15N	39.8	160.*	1.23	0.595	12.44	1.80	0.858							1.3*		S	4	BAL69

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TABLE V. Optical-Model Parameters Helium-3

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL. IMAG. POTENTIAL W	RW	AW	SURF. IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
160	8.0	104.	1.5	0.7	21.5	1.5	0.7							1.4?		S	H68	ALP65
160	8.5	104.2	1.513	0.681	21.5	1.513	0.681							1.4?		S	H68	ALP65
160	9.0	104.5	1.525	0.65	21.35	1.525	0.65							1.4?		S	H68	ALP65
160	9.42	104.9	1.568	0.64	21.2	1.568	0.64							1.4?		S	H68	ALP65
160	9.80	175.	1.07*	0.854*	38.	1.81*	0.65*							1.40*		S3		BRA69
160	9.95	171.	1.07*	0.854*	48.	1.81*	0.65*							1.40*		S3		BRA69
160	10.	105.0	1.575	0.636	20.5	1.575	0.636							1.4?		S	H68	ALP65
160	10.21	94.	1.07*	0.854*	33.	1.81*	0.65*							1.40*		S3		BRA69
160	10.25	147.5	1.619	0.526	21.69	1.619	0.526							1.4*		S1	11,14	NUR69
160	10.25	152.1	1.576	0.570	17.36	1.576	0.570				9.1	1.576	0.570	1.4*		S2	14	NUR69
160	10.25	149.1	1.609	0.533	22.79	1.544	0.553							1.4*		S1	12,14	NUR69
160	10.25	177.5	1.403	0.628				23.27	1.487	0.598				1.4*		S2	12,14	NUR69
160	10.31	111.	1.07*	0.854*	31.	1.81*	0.65*							1.40*		S3		BRA69
160	10.46	129.	1.07*	0.854*	31.	1.81*	0.65*							1.40*		S3		BRA69
160	10.5	170.	1.03	0.893	20.0	2.06	0.510							1.2?		S		HIE67
160	10.72	155.	1.07*	0.854*	33.	1.81*	0.65*							1.40*		S3		BRA69
160	11.0	168.50	1.117	0.746	8.45	1.948	0.926				7.45*	1.3*	0.6*	1.3*		S3		BOH70A
160	11.0	517.3	0.417	0.768	4.91	2.21	0.853				7.45*	1.3*	0.6*	1.3*		S2		BOH70A
160	11.23	117.	1.07*	0.854*	9.4	1.81*	0.65*							1.40*		S3		BRA69
160	11.74	123.	1.07*	0.854*	10.6	1.81*	0.65*							1.40*		S3		BRA69
160	15.	158.0	0.96	0.80	6.75	2.25	0.65							1.4*		S3		ZUR69
160	16.6	122.8	1.546	0.568				18.9	1.546	0.55				1.4*		S2	4	LUT67
160	16.6	220.*	1.01	0.663	5.3	2.21	0.803							1.40*		S		MAN68
160	17.3	145.1	1.383	0.631				18.73	1.404	0.631	4.53	1.383	0.631	1.25*		S3		HAN68
160	17.3	159.7	1.302	0.615	19.76	1.383	0.929				4.10	1.302	0.615	1.25*		S3		HAN68
160	18.	130.*	1.07	0.79				9.17	1.67	0.72	4.0*	0.96	0.79	1.3*		S2P2	19	MCE71
160	18.	130.*	1.07	0.79				9.17	1.67	0.72	2.0	0.96	0.79	1.3*		S2P3	20,24	MCE72
160	25.8	220.*	1.29	0.633	10.4	1.93	0.837							1.40*		S		MAN68
160	28.9	64.8	1.60	0.58	65.6	1.60	0.58							1.4?	1143	S	H68	SEN62
160	29.	190.	1.14	0.675	11.2	2.17	0.426							1.2?		S		HIE67
170	11.0	166.30	1.153	0.694	14.71	1.675	0.562				7.45*	1.3*	0.6*	1.3*		S1		BOH70A
170	17.3	146.1	1.378	0.638				22.08	1.361	0.636				1.25*		S1		HAN68
170	17.3	158.3	1.307	0.635	21.72	1.351	0.928				5.37	1.307	0.635	1.25*		S1		HAN68
180	10.	170.	1.03	0.893				17.5	2.06	0.51				1.4?		S	H68	ERS65
180	11.0	164.87	1.156	0.694	20.13	1.711	0.634				7.45*	1.3*	0.6*	1.3*		S1		BOH70A
180	11.0	163.0	1.10*	0.80				44.60	1.44	0.525				1.2?		S2	14	GRE70
180	11.0	145.4	1.20*	0.77				49.30	1.44	0.510				1.2?		S2	14	GRE70
180	11.0	131.77	1.30*	0.73				51.67	1.47	0.480				1.2?		S2	14	GRE70
180	15.	179.0	1.14*	0.66	16.76	1.61	0.91							1.4*		S2		ZUR69
180	17.3	144.7	1.362	0.639				28.08	1.363	0.596				1.25*		S2		HAN68
180	17.3	156.3	1.298	0.618	25.54	1.308	0.910				7.39	1.298	0.618	1.25*		S2		HAN68
19F	6.	153.2	1.05*	0.829*	15.95	1.81*	0.592*							1.4?		S	H68	MAT66
19F	6.	201.5	1.05*	0.829*	25.9	1.81*	0.592*							1.4?		S	H68	MAT66
19F	8.	141.0	1.05*	0.829*	16.0	1.81*	0.592*							1.4?		S	H68	MAT66
19F	8.	183.3	1.05*	0.829*	23.23	1.81*	0.592*							1.4?		S	H68	MAT66
19F	11.0	56	1.15*	0.85	10.5	1.76	0.83							1.4*		S1		SCH70
19F	11.0	101	1.15*	0.77	15.5	1.56	0.81							1.4*		S1		SCH70
19F	11.0	155	1.15*	0.73	18.9	1.55	0.70							1.4*		S1		SCH70
19F	11.0	223	1.15*	0.69	25.9	1.40	0.68							1.4*		S1		SCH70
19F	11.0	148	1.15*	0.77				25.8	1.44	0.54				1.4*		S1		SCH70
19F	27.3	56.0	1.6	0.53	54.5	1.6	0.53							1.4?	1095	S	H68	GAR62
20NE	15.	177.0	1.14*	0.74	13.05	1.86	0.75							1.4*		S3		ZUR69
20NE	18.8	186.	1.07*	0.72*	18.	1.60	1.04*							1.4*		S2		KEM71
20NE	18.8	230.	1.07*	0.72*	18.	1.40	1.04*							1.4*		S		KEM71
20NE	28.5	147.4	1.225	0.745	22.02	1.225	0.745							1.25*		S3	4	HAN67
20NE	28.5	50.0	1.6*	0.60*	55.0	1.6	0.60							1.25*		S2	4	HAN67
22NE	9.74	115.7	1.07*	0.854*	17.2	1.81*	0.65*							1.4*		S2	14	BRA68
22NE	15.	165.2	1.14	0.723	13.2	1.860	0.707							1.4*		S2		JOY69
22NE	15.	165.0	1.14*	0.72	13.19	1.86	0.71							1.4*		S2		ZUR69
23NA	11.0	159	1.15*	0.74	20.2	1.64	0.63							1.4*		S1		SCH70
23NA	11.	121.	1.14*	0.723*	15.5	1.64*	0.66*							1.4*		S2		RON73
23NA	11.	167.7	1.14*	0.723*	19.	1.64*	0.66*							1.4*		S2		RON73
MG	29.	108.6	1.069	0.853	15.35	1.798	0.758							1.07*	1392	S	8	BAU67
MG	29.	50.98	1.15*	0.959	11.18	1.962	0.691							1.3*	1385	S2	10	BAU69
MG	29.	98.31	1.15*	0.800	11.22	1.912	0.771							1.3*	1428	S2	10	BAU69
MG	29.	155.7	1.15*	0.711	15.90	1.714	0.856							1.3*	1436	S2	10	BAU69
24MG	5.5	33.	1.6	0.7	38.	1.6	0.7*							1.4?	401	S	H68	HOD61
24MG	8.0	177.0	1.114	0.686	28.8	1.224	0.675							1.20?		S2	7	MCQ70
24MG	12.	95.7	1.07*	0.854*	14.5	1.81*	0.592							1.4?	988	S	H68	BAS64
24MG	12.	94.6	1.07*	0.854*	14.6	1.81*	0.592*				4.0	1.07*	0.854*	1.4?	985	S	H68	YNT64
24MG	12.	96.4	1.07*	0.854*	14.5	1.81*	0.592*				8.0	1.07*	0.854*	1.4?	985	S	H68	YNT64
24MG	15.	144.1	1.55	0.507	25.9	1.200	1.40							1.4*		S2		JOY69
24MG	15.	164.0	1.14*	0.69	14.7	1.60	1.08							1.4*		S2		ZUR69
24MG	15.	164.0	1.44*	0.49	25.9	1.20	1.40							1.4*		S2		ZUR69
24MG	18.	150.*	1.26	0.63	26.	1.38	1.10							1.4*		S2		KAT68
24MG	20.	150.*	1.18	0.69	23.2	1.50	1.08							1.4*		S2	9	KAT68
24MG	21.4	109.0	1.048	0.905	14.0	1.849	0.876							1.07*		S2		BUF72
24MG	26.7	166.1	1.075	0.833	19.3	1.728	0.869							1.07*		S2		BUF72

See page 8 for Explanation of Tables

TABLE V. Optical-Model Parameters Helium-3

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
24MG	29.	107.1	1.15	0.78	14.29	1.81	0.736							1.15	1342	S2	21	GRI67
24MG	35.0	94.9	1.20*	0.75	17.0	1.7*	0.84*							1.4?		S2	9	DUH68
24MG	35.0	120.7	1.00*	0.85	14.8	1.8*	0.79							1.4?		S	9	DUH68
24MG	35.7	150.0	1.15*	0.695	25.2	1.505	0.977							1.3*	1522	S2		ART71
24MG	47.5	95.5	1.20*	0.77	18.4	1.7*	0.84*							1.4?		S2	9	DUH68
24MG	47.5	119.9	1.00*	0.88	15.9	1.8*	0.76							1.4?		S	9	DUH68
25MG	20.5	109.0	1.051	0.886	15.0	1.851	0.731							1.07*		S2		BUF72
25MG	23.8	161.3	1.087	0.798	17.4	1.776	0.751							1.07*		S2		BUF72
25MG	33.0	167.1	1.10*	0.688	20.5	1.668	0.75*							1.4*		S2	4	DEH67
26MG	8.0	155.6	1.113	0.755	32.0	1.431	0.685							1.20?		S2	7	MCQ70
26MG	8.0	170.3	1.113	0.741	32.7	1.430	0.680							1.20?		S2	7	MCQ70
26MG	15.	173.0	1.113	0.742	36.4	1.431	0.748							1.4*		S3		JOY69
26MG	15.	155.0	1.14*	0.75	20.1	1.60	0.71							1.4*		S3		ZUR69
26MG	16.	98.7	1.177	0.775	27.98	1.508	0.812							1.3*		S2		DUH70
26MG	17.67	159.3	1.149	0.683	17.86	1.567	0.878							1.25*		S1	9	DEL70
26MG	17.67	145.2	1.23	0.646	19.9	1.468	0.931							1.25*		S2	9	DEL70
26MG	20.6	163.7	1.069	0.854	16.9	1.767	0.835							1.07*		S2		BUF72
26MG	24.2	105.8	1.028	0.911	15.9	1.794	0.830							1.07*		S2		BUF72
26MG	30.	102.6	1.174	0.748	27.96	1.505	0.890							1.3*		S2		DUH70
AL	29.	99.60	1.070	0.852	14.53	1.811	0.692							1.07*	1360	S2		BAU67
AL	29.	146.7	1.15*	0.705	31.13	1.473	0.844							1.3*	1415	S	10	BAU69
27AL	5.5	82.	1.6	0.7	30.	1.6	0.7							1.4?	471	S	H68	HOD61
27AL	5.5	91.9	1.07*	0.854*	21.8	1.8*	0.65*							1.4?	334	S	H68	BRA65
27AL	5.5	122.0	1.364	0.481	17.36	1.286	1.109							1.4?	386	S	H68	BRA65
27AL	7.	110.1	0.903	0.802	4.17	2.242	0.776							1.4?	735	S	H68	BRA65
27AL	7.	119.1	1.07*	0.854*	16.4	1.8*	0.65*							1.4?	637	S	H68	BRA65
27AL	8.	122.8	1.07*	0.854*	15.5	1.8*	0.65*							1.4?	779	S	H68	BRA65
27AL	8.	132.8	0.698	0.986	9.31	1.987	0.787							1.4?	905	S	H68	BRA65
27AL	9.	110.4	1.07*	0.854*	13.2	1.8*	0.65*							1.4?	855	S	H68	BRA65
27AL	9.	149.6	0.862	0.920	21.9	1.789	0.580							1.4?	787	S	H68	BRA65
27AL	9.	154.8	1.14*	0.723*	15.23	1.64*	0.72*							1.4*		S		RON73
27AL	9.	204.2	1.14*	0.723*	19.8	1.64*	0.72*							1.4*		S		RON73
27AL	10.	103.7	1.07*	0.854*	13.1	1.8*	0.65*							1.4?	925	S	H68	BRA65
27AL	10.	155.	1.08	0.80*	15.	1.78	0.60*							1.40*		S2		NUR68
27AL	10.	151.8	1.08*	0.80*	14.6	1.78*	0.60							1.08?		S	14	NUR70
27AL	10.	197.6	1.08*	0.80*	21.8	1.78*	0.60							1.08?		S	14	NUR70
27AL	10.	147.2	1.14*	0.723*	16.	1.64*	0.72*							1.4*		S		RON73
27AL	10.	195.9	1.14*	0.723*	22.6	1.64*	0.72*							1.4*		S		RON73
27AL	21.	130.*	1.17	0.71	21.2	1.59	0.85				4.0*	0.9*	0.71	1.3*		S2	9	LUD73
27AL	21.	170.*	0.97	0.80	19.5	1.676	0.788				4.0*	0.9*	0.80	1.3*	1354	S2	9	LUD73
27AL	21.8	94.5	1.061	0.876	14.6	1.843	0.718							1.07*		S2		BUF72
27AL	23.5	147.4	1.078	0.823	16.7	1.782	0.730							1.07*		S2		BUF72
27AL	29.	143.4	1.14	0.723	23.8	1.60*	0.81*							1.4*		S		WIL68
27AL	29.	164.8	1.03	0.76	29.77	1.52	0.81							1.3*		S	14	NEL70
27AL	29.	158.9	1.01	0.78	19.31	1.56	0.79				10.0*	1.01	0.78	1.3*		S	14	NEL70
27AL	29.3	45.	1.57	0.63	30.	1.57	0.63							1.4?	1258	S	H68	GRE61
27AL	29.6	104.2	1.43	0.593	28.1	1.35	0.976				10.3	1.43	0.593	1.25*	1500	S2	14	LUE69
27AL	29.6	163.2	1.37	0.560	35.8	1.21	1.06				12.7	1.37	0.560	1.25*	1510	S2	14	LUE69
27AL	35.7	163.2	1.15*	0.686	22.4	1.60*	0.829							1.3*	1443	S2		ART71
27AL	37.7	110.4	1.140	0.805	20.4	1.494	0.903							1.40*		S2	9	BAR68A
27AL	37.7	179.1	1.113	0.716	28.9	1.312	0.969							1.40*		S2	9	BAR68A
27AL	37.7	171.1	1.137	0.689	22.9	1.408	0.995				16.4	1.137	0.689	1.40*		S2	9	BAR68A
27AL	59.8	114.	1.15	0.826				18.8	1.18	0.820	2.29	1.15	0.826	1.3*		S1		FUL72
SI	12.	108.0	1.07*	0.854*	16.3	1.81*	0.65*							1.4?		S3		BRA69A
SI	12.	145.3	1.07*	0.854*	23.3	1.81*	0.65*							1.4?		S3		BRA69A
SI	12.	155.9	1.08*	0.800*	18.3	1.78*	0.60*							1.4?		S3		BRA69A
SI	29.	101.8	1.070	0.854	14.22	1.812	0.702							1.07*	1375	S2	23	BAU67
28SI	8.0	165.5	1.178	0.690	37.4	1.100*	1.080							1.20?		S2	7	MCQ70
28SI	10.	106.5	1.07*	0.854*	11.8	1.8*	0.65*							1.4?		S2		WIL67A
28SI	10.	150.5	1.14*	0.723*	13.08	1.64*	0.73*							1.4*		S		RON73
28SI	15.	152.	1.44	0.723	12.77	1.718	0.782							1.4*		S2	9	SWE67
28SI	18.	150.*	1.18	0.705	14.5	1.70	0.906							1.4*		S2		KAT68
28SI	20.	150.*	1.12	0.73	18.2	1.69	0.84							1.4*		S2	9	KAT68
28SI	20.	150.*	1.45	0.51	58.8	0.78	1.29							1.4*		S2	9	KAT68
28SI	21.	130.*	1.28	0.61	20.42	1.42	1.08				4.0*	0.9*	0.61	1.3*	1500	S2	9	LUD73
28SI	21.	150.*	1.146	0.70	17.55	1.60	0.946				4.0*	0.9*	0.70	1.3*	1443	S2	9	LUD73
28SI	21.	170.*	1.03	0.76	16.53	1.68	0.87				4.0*	0.9*	0.76	1.3*	1414	S2	9	LUD73
28SI	35.7	178.0	1.15*	0.694	23.1	1.60*	0.800							1.3*	1430	S2		ART71
28SI	37.7	115.9	1.14	0.84	14.37	1.78	0.59							1.4?		S	H68	JON68
28SI	37.7	181.8	1.11	0.76	17.04	1.68	0.65							1.4?		S	H68	JON68
28SI	217.	84.5	1.14	0.86	23.7	1.46	0.73							1.3?		S1	2	WIL73
29SI	15.	152.0	1.14*	0.71	14.0	1.67	0.78							1.4*		S1		ZUR69
29SI	15.	145.5	1.44*	0.61	17.05	1.82	0.38							1.4*		S2		ZUR69
30SI	7.0	170.0	1.178	0.722	34.4	1.549	0.668							1.20?		S	7	MCO70
30SI	8.0	145.0	1.300*	0.670	18.0	1.630	0.480							1.20?		S1	7,14	MCO70
30SI	12.	144.8	1.14*	0.72*	16.7	1.65	0.76							1.4*		S1		WOL70
30SI	15.	173.0*	1.07	0.795	18.6	1.657	0.762							1.4*		S2		MOR70
30SI	18.	150.*	1.14	0.69	20.5	1.48	0.97							1.4*		S2	9	KAT68
30SI	20.	150.*	1.08	0.76	17.8	1.70	0.77							1.4*		S1	9	KAT68

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TABLE V. Optical-Model Parameters Helium-3

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
31P	6.0	76.87	1.588	0.589	15.08	1.541	0.611							1.3*		S2	3,9	COI68
31P	6.0	116.1	1.530	0.582	19.47	1.502	0.597							1.3*		S2	3,9	COI68
31P	8.	146.2	1.14*	0.723*	18.04	1.64*	0.77*							1.4*		S		ROM73
31P	8.	197.	1.14*	0.723*	24.80	1.64*	0.77*							1.4*		S		ROM73
31P	12.0	154.9	1.07*	0.843	17.4	1.721	0.609							1.8*		S2		GBA68
31P	15.	133.	1.40	0.60	24.2	1.47	1.03				10.0*	1.40	0.60	1.4*		S2		VGA74A
32S	7.6	142.8	1.14*	0.723*	9.65	1.64*	0.79*							1.4*		S		ROM73
32S	7.6	184.5	1.14*	0.723*	13.7	1.64*	0.79*							1.4*		S		ROM73
32S	8.0	165.5	1.178	0.704	33.4	1.100*	1.020							1.20?		S2	7	MCQ70
32S	11.	133.5	1.14*	0.723*	12.7	1.64*	0.79*							1.4*		S2		ROM73
32S	11.	180.	1.14*	0.723*	15.1	1.64*	0.79*							1.4*		S2		ROM73
32S	15.	145.7	1.14*	0.69	12.7	1.69	0.78							1.4*		S1		ZUR69
32S	15.	199.2	1.14*	0.67	15.5	1.62	0.78							1.4*		S1		ZUR69
32S	18.	150.*	1.12	0.66	10.7	1.76	0.91							1.4*		S2	21	KAT68
32S	18.	144.2	1.14*	0.723*	16.9	1.64*	0.79*							1.4*		S		ROM73
32S	18.	190.	1.14*	0.723*	25.	1.64*	0.79*							1.4*		S		ROM73
32S	28.5	50.8	1.46	0.753	32.3	1.46	0.753							1.4?	1383	S		H68 GAR62
CL	11.0	177	1.15*	0.78	17.2	1.68	0.74							1.4*		S1		SCH70
CL	29.1	30.	1.60	0.65	25.	1.60	0.65							1.4?	1354	S		H68 AGU61
35CL	15.	133.5	1.34	0.70	26.7	1.47	0.88				10.0*	1.34	0.70	1.4*		S2		VGA74
37CL	11.	132.	1.14*	0.723*	11.5	1.64*	0.86*							1.4*		S2		ROM73
37CL	11.	175.5	1.14*	0.723*	13.6	1.64*	0.86*							1.4*		S2		ROM73
36AR	15.	173.0	1.14*	0.75	27.2	1.57	0.95							1.4*		S2		ZUR69
40AR	15.	173.0	1.14*	0.68	21.85	1.57	0.79							1.4*		S1		ZUR69
40AR	26.4	60.	1.20	0.79	74.4	1.20	0.79							1.4?	1364	S		H68 SEN64
39K	9.	181.	1.07*	0.854*	16.12	1.81	0.592*							1.4?		S	H68	BLA66
39K	11.0	137.2	1.20*	0.729	20.1	1.502	0.873							1.20?		S		POR70
39K	11.0	142.6	1.07*	0.882				24.3	1.382	0.809				1.20?		S		POR70
39K	11.	133.	1.14*	0.723*	10.60	1.64*	0.89*							1.4*		S2		ROM73
39K	11.	173.8	1.14*	0.723*	13.33	1.64*	0.89*							1.4*		S2		ROM73
39K	12.	268.8	0.617	0.962	8.9	1.880	0.771							1.4*	1036	S1		SET67
39K	14.	173.4	0.937	0.859	12.2	1.694	0.725							1.4*	1046	S1		SET67
39K	14.	160.6	1.0*	0.8*	8.2	1.801	0.792				7.*	1.0*	0.8*	1.4*	1102	S1		SET67
39K	16.	184.0	0.902	0.847	12.6	1.684	0.751							1.4*	1144	S2		SET67
39K	16.	160.3	1.0*	0.8*	8.6	1.778	0.779				7.*	1.0*	0.8*	1.4*	1176	S1		SET67
39K	29.3	180.0	1.145	0.721	13.00	1.580	0.755	3.68	1.580	0.755				1.40*		S2	9	CAG71
39K	29.3	129.0	1.140	0.755	22.18	1.624	0.689	0.18	1.624	0.689				1.40*		S3	9	CAG71
CA	18.8	181.86	1.145	0.709	15.05	1.644	0.785							1.30*		S1	1,14	NAK70
CA	18.8	181.9*	1.145*	0.709*				19.82	1.214	0.817				1.30*		S1	1,14	NAK70
CA	18.8	92.01	1.149*	0.794	7.60	1.857	0.717				4.55	1.149*	0.794	1.30*		S1	14	NAK70
CA	18.8	93.36	1.149*	0.800				10.73	1.380	0.789	4.37	1.149*	0.800	1.30*		S1	14	NAK70
CA	18.8	181.48	1.145*	0.713	14.55	1.611	0.764				6.97	1.145*	0.713	1.30*		S1	14	NAK70
CA	18.8	182.46	1.145*	0.705				19.41	1.207	0.822	3.98	1.145*	0.705	1.30*		S2	14	NAK70
CA	24.9	182.69	1.145*	0.700	16.77	1.633	0.669							1.30*		S2	1,14	NAK70
CA	24.9	182.7*	1.145*	0.700*				24.57	1.257	0.698				1.30*		S2	1,14	NAK70
CA	24.9	86.00	1.149*	0.840	8.10	1.843	0.609				2.83	1.149*	0.840	1.30*		S2	14	NAK70
CA	24.9	87.84	1.149*	0.848				11.96	1.423	0.704	3.00	1.149*	0.848	1.30*		S2	14	NAK70
CA	24.9	180.88	1.145*	0.691	14.02	1.633	0.748				4.17	1.145*	0.691	1.30*		S1	14	NAK70
CA	24.9	181.15	1.145*	0.705				18.67	1.235	0.751	4.29	1.145*	0.705	1.30*		S2	14	NAK70
CA	25.	100.2	1.47	0.60	13.2	1.32	1.12							1.30*		S1	2	YOU70A
CA	25.	157.2	1.31	0.65	14.2	1.56	0.95							1.30*		S1	2	YOU70A
CA	25.	178.4	1.19	0.72	10.3	1.77	0.83							1.30*		S1	2	YOU70A
CA	29.	98.47	1.053	0.905	10.50	1.835	0.693							1.07*	1465	S2	23	BAU67
CA	31.0	177.27	1.145*	0.702	13.92	1.692	0.778							1.30*		S2	1,14	NAK70
CA	31.0	177.3*	1.145*	0.702*				16.48	1.249	0.871				1.30*		S2	1,14	NAK70
CA	31.0	84.43	1.149*	0.770	8.68	1.848	0.662				2.62	1.149*	0.770	1.30*		S2	14	NAK70
CA	31.0	90.14	1.149*	0.777				11.25	1.399	0.761	2.67	1.149*	0.777	1.30*		S3	14	NAK70
CA	31.0	179.74	1.145*	0.674	13.56	1.714	0.769				4.05	1.145*	0.674	1.30*		S2	14	NAK70
CA	31.0	190.98	1.145*	0.656				17.01	1.218	0.856	4.10	1.145*	0.656	1.30*		S2	14	NAK70
CA	34.4	179.29	1.145*	0.696	12.69	1.744	0.826							1.30*		S1	1,14	NAK70
CA	34.4	179.3*	1.145*	0.696*				15.11	1.272	0.920				1.30*		S2	1,14	NAK70
CA	34.4	81.33	1.149*	0.776	8.16	1.919	0.702				2.04	1.149*	0.776	1.30*		S2	14	NAK70
CA	34.4	84.46	1.149*	0.708				9.13	1.400	0.971	1.71	1.149*	0.708	1.30*		S3	14	NAK70
CA	34.4	180.09	1.145*	0.653	13.19	1.750	0.843				5.39	1.145*	0.653	1.30*		S3	14	NAK70
CA	34.4	180.82	1.145*	0.678				16.04	1.277	0.883	3.48	1.145*	0.678	1.30*		S2	14	NAK70
CA	39.3	177.63	1.145*	0.698	13.37	1.714	0.900							1.30*		S2	1,14	NAK70
CA	39.3	177.6*	1.145*	0.698*				14.91	1.224	0.991				1.30*		S2	1,14	NAK70
CA	39.3	92.05	1.149*	0.863	11.44	1.794	0.758				7.49	1.149*	0.863	1.30*		S3	14	NAK70
CA	39.3	86.00	1.149*	0.708				10.24	1.228	1.076	2.24	1.149*	0.708	1.30*		S3	14	NAK70
CA	39.3	183.53	1.145*	0.645	17.31	1.582	0.969				3.86	1.145*	0.645	1.30*		S3	14	NAK70
CA	39.3	177.46	1.145*	0.700				17.71	1.271	0.864	3.84	1.145*	0.700	1.30*		S3	14	NAK70
40CA	8.0	186.	1.07*	0.854*	10.	1.81*	0.592*							1.4?		S		H68 CLI65
40CA	8.5	184.	1.07*	0.854*	11.	1.81*	0.592*							1.4?		S		H68 CLI65
40CA	9.0	181.	1.07*	0.854*	11.5	1.81*	0.592*							1.4?		S		H68 CLI65
40CA	9.5	177.6	1.07*	0.854*	12.3	1.81*	0.592*							1.4?		S		H68 CLI65
40CA	10.0	174.5	1.07*	0.854*	13.5	1.81*	0.592*							1.4?		S		H68 CLI65
40CA	11.	160.	1.14*	0.723*	11.	1.64*	0.91*							1.4*		S2		ROM73
40CA	12.0	106.3	1.07*	0.854*	7.43	1.81*	0.592*							1.4?		S		H68 YNT64
40CA	12.0	181.0	1.07*	0.854*	11.5	1.81*	0.592*				8.0	1.07*	0.854	1.4?		S		H68 ZUR66

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TABLE V. Optical-Model Parameters Helium-3

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
40CA	13.0	161.6	1.284*	0.686*	23.44	1.401	0.662							1.4*		S2		RAP71
40CA	13.0	184.3	1.14*	0.723*	16.36	1.469	0.862							1.4*		S2		RAP71
40CA	15.	171.0	1.14*	0.81	18.38	1.72	0.80							1.4*		S2		ZUB69
40CA	21.0	181.3	1.14*	0.757	17.92	1.639	0.677							1.4*		S2	13	URO71
40CA	22.	98.7	1.07*	0.854*	8.	1.944	0.692							1.4?	1410	S	H68	BAS64
40CA	22.	100.5	1.076	0.822	7.57	1.945	0.704							1.4?		S	H68	ARM65
40CA	22.	157.	1.18	0.707	11.5	1.96	0.830							1.2?		S		HIE67
40CA	37.7	177.	1.14	0.723	14.5	1.64	0.910							1.2?		S		HIE67
40CA	37.7	176.9	1.14*	0.723*	14.5	1.64*	0.91*							1.4*		S2	9	GIB67
40CA	37.7	176.9	1.164	0.654	15.47	1.617	0.975							1.4*		S2	9	GIB67
40CA	40.	177.0	1.14	0.72	14.5	1.64	0.91							1.30*		S		YOU70
40CA	51.4	176.	1.14	0.72	16.	1.60	0.81							1.4?		S	H68	RID68
40CA	73.2	176.	1.14	0.72	16.	1.60	0.81							1.4?		S	H68	RID68
40CA	81.5	176.	1.14	0.72	16.	1.60	0.81							1.4?		S	H68	RID68
40CA	217.	64.8	1.30	0.79	19.0	1.52	0.81							1.3?		S1	2	WIL73
42CA	13.0	144.9	1.284*	0.686*	23.23	1.482	0.665							1.4*		S2		RAP71
42CA	13.0	176.5	1.14*	0.723*	16.68	1.597	0.814							1.4*		S2		RAP71
44CA	13.0	144.6	1.284*	0.686*	23.05	1.554	0.663							1.4*		S2		RAP71
44CA	13.0	168.2	1.14*	0.723*	16.31	1.653	0.744							1.4*		S2		RAP71
46CA	13.0	142.9	1.284*	0.686*	22.95	1.525	0.673							1.4*		S2		RAP71
46CA	13.0	163.0	1.14*	0.723*	16.23	1.648	0.761							1.4*		S2		RAP71
48CA	13.0	146.9	1.284*	0.686*	23.46	1.601	0.676							1.4*		S2		RAP71
48CA	13.0	166.2	1.14*	0.723*	16.23	1.746	0.744							1.4*		S2		RAP71
48CA	15.0	130.4	1.362*	0.65	16.4	1.47	0.74				8.05	1.362*	0.65	1.40*		S1		POU69
48CA	15.0	170.2	1.14*	0.78	13.1	1.69	0.65				8.0*	1.14*	0.78	1.40*		S1		POU69
48CA	22.	97.3	1.07*	0.854*	9.	1.86	0.692*							1.4?	1507	S	H68	BAS64
48CA	22.	100.2	1.061	0.830	9.15	1.856	0.705							1.4?		S	H68	ARM65
45SC	12.	96.4*	1.07*	0.854*	10.	1.81*	0.592*							1.4?	812	S	H68	YNT64
45SC	13.0	173.8	1.14*	0.734	16.21	1.604	0.753							1.40*		S		RAO70
45SC	37.7	152.6	1.12	0.762	20.8	1.68	0.804							1.4*		S2	21	BAR68B
46TI	12.	96.4*	1.07*	0.854*	10.	1.81*	0.592*							1.4?	767	S	H68	YNT64
46TI	12.	96.4*	1.07*	0.854*	8.23	1.81*	0.592*							1.4?	750	S	H68	BAS64
46TI	12.0	167.9	1.07*	0.775	16.79	1.611	0.600							1.40*		S2	7	DOR67
46TI	37.7	128.9	1.102	0.768				22.97	1.187	0.846	2.0*	1.14*	0.69*	1.4*		S1	9	URO72
48TI	12.	96.4*	1.07*	0.854*	10.	1.81*	0.592*							1.4?	789	S	H68	YNT64
48TI	12.	96.4*	1.07*	0.854*	9.4	1.81*	0.592*							1.4?		S	H68	BAS64
48TI	13.0	169.9	1.14*	0.723	16.03	1.59	0.751							1.40*		S2		RAO70
48TI	19.47	164.5	1.148	0.752	23.10	1.567	0.686							1.4?		S	H68	HAF67
48TI	24.6	161.8	1.22*	0.695	20.9	1.506	0.80*							1.4*		S2	21	WES68
48TI	24.6	161.8	1.142	0.761				35.0	1.284	0.662				1.4*		S2	21	WES68
48TI	24.7	149.4	1.22*	0.695*	23.5	1.506*	0.80*	0.67*	1.506*	0.80*				1.4*		S		DRI68
48TI	25.	148.9	1.01	0.811	18.25	1.62	0.792							1.4*		S		SOU73
48TI	37.7	195.8	1.05*	0.743	21.61	1.590	0.814							1.40*		S2	14	URO71A
48TI	37.7	196.2	1.05*	0.739	21.58	1.582	0.826				2.0*	1.14*	0.69*	1.40*		S2	14	URO71A
48TI	37.7	141.3	1.05*	0.819				23.45	1.252	0.805				1.40*		S2	14	URO71A
48TI	37.7	126.5	1.121	0.769				20.91	1.244	0.848	2.0*	1.14*	0.69*	1.4*		S1		URO72
50TI	10.	168.0	1.07*	0.835	16.9	1.734	0.596							1.40*		S1		OBR67
50TI	12.	96.4*	1.07*	0.854*	10.	1.81*	0.592*							1.4?	810	S	H68	YNT64
50TI	12.	96.4*	1.07*	0.854*	8.38	1.81*	0.592*							1.4?		S	H68	BAS64
50TI	37.7	131.9	1.107	0.776				19.16	1.266	0.829	2.0*	1.14*	0.69*	1.4*		S1		URO72
V	20.	54.8	1.48	0.62*	11.9	1.48	0.62*				8.0*	1.48	0.62*	1.4?		S	H68	KLI64
50V	7.5	171.9	1.07*	0.933	16.89	1.763	0.614							1.4*		S2		DOR69
51V	12.	96.4*	1.07*	0.854*	10.	1.81*	0.592*							1.4?	780	S	H68	YNT64
51V	12.	96.4*	1.07*	0.854*	9.72	1.81*	0.592*							1.4?		S	H68	BAS64
51V	20.	99.1	1.07*	0.854*	9.22	1.815*	0.692*							1.4?	1326	S	H68	BAS64
51V	22.	93.8	1.07*	0.854*	10.55	1.815*	0.692*							1.4?	1447	S	H68	BAS64
51V	22.	99.6	1.069	0.795	10.8	1.775	0.711							1.4?		S	H68	ARM65
51V	29.	93.1	1.07*	0.854*	9.87	1.815*	0.692*							1.4?	1561	S	H68	BAS64
51V	29.6	112.8	1.24*	0.693	15.6	1.59	0.903				3.1	1.24*	0.693	1.25*	1640	S2	14	LUE69
51V	29.6	156.4	1.24*	0.580	20.8	1.44	1.03				3.8	1.24*	0.580	1.25*	1720	S2	14	LUE69
51V	29.6	158.1	1.24*	0.560	24.5	1.35	1.07							1.25*	1710	S3	14	LUE69
51V	37.7	150.3	1.021	0.834				21.37	1.272	0.785	2.0*	1.14*	0.69*	1.4*		S1		URO72
51V	59.8	140.	1.00	0.872				19.8	1.25	0.802	3.2	1.00	0.872	1.3*		S2		PUL73
CR	22.	133.	1.08	0.8	18.2	1.63	0.754				2.9*	1.08	0.8	1.4?		S	H68	BAS67
CR	22.	165.	1.14	0.723	20.2	1.6	0.81				2.9*	1.14	0.723	1.4?		S	H68	BAS67
50CR	12.0	168.4	1.07	0.825	16.83	1.675	0.602							1.40*		S2		RAP67
50CR	41.3	170.4	1.16*	0.683	19.17	1.589	0.827							1.3*		S2	4	PET72
52CR	11.	167.2	1.07*	0.804	16.92	1.730	0.597							1.40*		S2		OBR67
52CR	19.47	164.7	1.122	0.755	23.35	1.554	0.730							1.4?		S	H68	HAF67
52CR	19.5	142.4	1.362	0.65	12.67	1.755	0.781				8.05	1.362	0.65	1.4*		S2		STO67
52CR	19.5	165.	1.14	0.723	20.2	1.6	0.81				6.*	1.14	0.723	1.4*		S2		STO67
52CR	21.0	163.0	1.14*	0.710	16.88	1.689	0.782							1.4*		S1	13	URO71
52CR	22.	98.8	1.069	0.814	13.5	1.705	0.726							1.4?		S	H68	ARM65
52CR	59.8	130.	1.07	0.833				20.3	1.23	0.818	3.0*	1.07	0.833	1.3*		S2		PUL72
52CR	59.8	132.	1.06	0.847				20.5	1.23	0.804	2.5	1.06	0.847	1.3*		S2		PUL73
53CR	10.0	167.8	1.07*	0.807	16.81	1.663	0.606							1.4*		S2		LYN69
53CR	59.8	130.	1.09	0.830				20.2	1.27	0.770	3.3	1.09	0.830	1.3*		S2		PUL73

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TABLE V. Optical-Model Parameters Helium-3

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
54CR	10.0	165.36	1.07	0.757	16.84	1.59	0.586							1.40*		S2		RAP69
55MN	19.47	163.1	1.116	0.775	27.4	1.533	0.667							1.4?		S	H68	HAP67
54FE	12.	96.4*	1.07*	0.854*	10.	1.81*	0.596*							1.4?	630	S	H68	YNT64
54FE	12.	167.8	1.07*	0.827	16.93	1.740	0.596							1.40*		S1		OBR67
54FE	13.0	142.4	1.36	0.619	12.52	1.64	0.774							1.4*		S2		TRI68
54FE	13.0	167.8	1.069	0.845	16.82	1.659	0.603							1.4*		S2		TRI68
54FE	21.0	168.4	1.14*	0.711	19.30	1.581	0.825							1.4*		S1	13	URO71
54FE	22.	96.8	1.069	0.873	16.5	1.705	0.726							1.4?		S	H68	ARM65
56FE	12.	168.7	1.07	0.820	16.88	1.694	0.602							1.4*		S2		LYN72
56FE	22.	95.6	1.069	0.821	13.6	1.705	0.736							1.4?		S	H68	ARM65
56FE	22.	128.3	1.08*	0.816	21.37	1.56	0.734							1.25*	1340	S1		FLY67
56FE	29.	97.17	1.059	0.909	10.31	1.838	0.710							1.07*	1663	S1		BAU67
56FE	29.	123.3	1.15*	0.778	16.44	1.637	0.778							1.3*	1599	S1	10,14	BAU69
56FE	29.	167.8	1.15*	0.724	20.14	1.552	0.828							1.3*	1614	S1	10,14	BAU69
56FE	33.45	143.7	1.034	0.862				24.9	1.244	0.812				1.25*		S		MAR73
56FE	33.45	202.5	1.007	0.824				29.6	1.194	0.821				1.25*		S		MAR73
56FE	33.45	137.7	1.067	0.836				22.6	1.251	0.825	2.9	1.0*	0.45*	1.25*		S2		MAR73
56FE	33.45	200.8	1.015	0.814				27.0	1.202	0.835	3.4	1.0*	0.45*	1.25*		S2		MAR73
56FE	35.7	163.4	1.15*	0.695	20.4	1.60*	0.910							1.3*	1872	S1		ART71
56FE	37.7	174.2	1.14*	0.723*	16.8	1.60*	0.81*							1.4*		S2	4	GIB67
56FE	37.7	174.2	1.146	0.689	20.36	1.488	0.928							1.4*		S1	4	GIB67
56FE	53.4	185.4	1.095	0.745				27.1	1.210	0.790				1.25*	1731	S2	14	MAR72
56FE	53.4	186.7	1.090	0.739				25.9	1.194	0.821	2.5	1.097	0.45*	1.25*	1752	S2	14	MAR72
56FE	53.4	134.0	1.090	0.815				22.4	1.281	0.766	1.8	1.075	0.45*	1.25*	1730	S1	14	MAR72
56FE	53.4	186.0	1.09*	0.745*				24.2	1.161*	0.891*	3.1	1.09*	0.45*	1.25*	1826	S2	14	MAR72
57FE	10.5	167.	1.07	0.798	16.88	1.701	0.597							1.4*		S1		TRI69
58FE	22.	138.4	1.08	0.781	23.1	1.54	0.801							1.4?		S	H68	BLA65
58FE	22.	130.1	1.08*	0.770	18.78	1.56	0.787							1.25*	1380	S1		FLY67
58FE	37.7	141.3	1.045	0.833				24.35	1.219	0.851	2.0*	1.14*	0.69*	1.4*		S1		URO72
58FE	37.7	190.7	1.05*	0.767	25.70	1.522	0.834							1.40*		S2	14	URO71A
58FE	37.7	189.5	1.05*	0.769	23.56	1.547	0.836				2.0*	1.14*	0.69*	1.40*		S2	14	URO71A
58FE	37.7	140.2	1.05*	0.841				26.45	1.209	0.826				1.40*		S2	14	URO71A
59CO	29.5	110.3	1.24*	0.713	15.1	1.65	0.817				4.3	1.24*	0.713	1.25*	1660	S1	14	LUE69
59CO	29.5	150.7	1.24*	0.656	20.1	1.54	0.906				5.1	1.24*	0.656	1.25*	1720	S1	14	LUE69
59CO	29.5	153.2	1.24*	0.643	29.5	1.41	0.945							1.25*	1720	S2	14	LUE69
59CO	34.8	111.3	1.24*	0.682	17.9	1.58	0.899				4.3	1.24*	0.682	1.25*	1780	S2	14	LUE69
59CO	34.8	152.8	1.24*	0.628	23.7	1.46	0.994				5.4	1.24*	0.628	1.25*	1840	S2	14	LUE69
59CO	34.8	156.4	1.24*	0.625	32.3	1.36	1.01							1.25*	1850	S3	14	LUE69
59CO	34.8	128.*	1.14	0.772				20.5*	1.24	0.877	4.5	1.14	0.772	1.3*		S2		PUL73
59CO	37.7	131.2	1.100	0.801	22.44	1.596	0.730							1.40*		S2	22	BAR68
59CO	37.7	124.2	1.145	0.714	16.42	1.636	0.802				3.7	1.145	0.714	1.40*		S	22	BAR68
59CO	37.7	168.7	1.147	0.707	28.18	1.507	0.793							1.40*		S2	22	BAR68
59CO	37.7	169.4	1.150	0.668	20.72	1.557	0.858				4.4	1.150	0.668	1.40*		S2	22	BAR68
59CO	49.7	126.*	1.12	0.848				20.5*	1.28	0.803	4.1	1.12	0.848	1.3*		S2		PUL73
59CO	50.	140	1.01*	0.905*	14.6	1.72*	0.700*				4.26	1.06*	0.255*	1.25*		S2		HAP70
59CO	50.1	187.4	1.09*	0.745*				23.9	1.161*	0.891*	4.3	1.09*	0.45*	1.25*	1839	S1		MAR72
59CO	59.8	125.*	1.13	0.792				20.5*	1.28	0.754	3.6	1.13	0.792	1.3*		S2		PUL73
NI	20.	60.1	1.60	0.60	23.5	1.60	0.60				8.	1.60	0.60	1.4?		S	H68	KLI64
58NI	12.	96.4*	1.07*	0.854*	10.	1.81*	0.592*							1.4?	558	S	H68	YNT64
58NI	15.	107.5	1.07*	0.854*	15.1	1.70	0.754							1.4?		S	H68	FOU65
58NI	15.	180.0	0.73	0.96	30.0	1.56	0.864							1.4?		S	H68	FOU65
58NI	18.	106.1	1.07*	0.854*	19.2	1.70	0.754							1.4?		S	H68	FOU65
58NI	18.	180.0	1.06	0.733	35.0	1.50	0.835							1.4?		S	H68	FOU65
58NI	19.47	164.8	1.204	0.667	38.52	1.291	0.784							1.4?		S	H68	HAP67
58NI	22.	149.4	1.08*	0.767	18.18	1.63	0.765							1.25*	1370	S1		FLY67
58NI	24.15	88.5	1.408	0.646				24.1	1.271	0.806				1.4*	1546	S1	14	FUJ69
58NI	24.15	140.	1.290	0.676				31.2	1.224	0.795				1.4*	1529	S1	14	FUJ69
58NI	27.64	118.	1.188	0.778				25.2	1.285	0.752				1.4*	1542	S1	14	FUJ69
58NI	27.64	168.	1.145	0.756				30.4	1.238	0.755				1.4*	1537	S1	14	FUJ69
58NI	29.	68.1	1.508	0.611	14.45	1.508	0.611							1.4?		S	H68	BAS62
58NI	33.	137.0	1.08*	0.814	14.0	1.715	0.757							1.4?		S	H68	SIE65
58NI	33.	174.1	1.11*	0.765				25.32	1.218	0.833	4.25*	1.11*	0.45*	1.4*		S2		CAG72
58NI	33.	158.4	1.20*	0.709				29.06	1.162	0.853				1.4*		S2		CAG72
58NI	34.1	180.0	1.10	0.772	20.3	1.62	0.757							1.4*		S3		KAM69
58NI	34.1	174.1	1.14	0.723	19.2	1.60	0.810				4.75	1.14	0.723	1.4*		S2		KAM69
58NI	34.14	120.	1.18	0.774				23.6	1.275	0.781				1.4*	1664	S2	14	FUJ69
58NI	34.14	170.	1.158	0.737				28.4	1.215	0.802				1.4*	1677	S2	14	FUJ69
58NI	36.8	191.5	1.05*	0.825	19.05	1.635	0.745							1.40*		S		URO71A
58NI	36.8	191.6	1.05*	0.822	18.85	1.634	0.753				2.0*	1.14*	0.69*	1.40*		S		URO71A
58NI	37.4	193.0	1.05*	0.809	19.74	1.618	0.756							1.40*		S2	14	URO71A
58NI	37.4	193.1	1.05*	0.807	19.49	1.617	0.763				2.0*	1.14*	0.69*	1.40*		S2	14	URO71A
58NI	37.4	144.5	1.05*	0.871				24.10	1.278	0.773				1.40*		S2	14	URO71A
58NI	37.7	172.6	1.14*	0.723*	16.2	1.60*	0.81*							1.4*		S1	21	GIB67
58NI	37.7	172.6	1.147	0.712	20.16	1.562	0.802							1.4*		S1	21	GIB67
58NI	37.7	134.2	1.100	0.835				22.30	1.276	0.797	2.0*	1.14*	0.69*	1.4*		S2		URO72
58NI	38.1	193.3	1.05*	0.789	20.19	1.595	0.792							1.40*		S		URO71A
58NI	38.1	193.0	1.05*	0.790	20.15	1.592	0.794				2.0*	1.14*	0.69*	1.40*		S		URO71A

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TABLE V. Optical-Model Parameters Helium-3

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
58NI	43.7	171.7	1.14*	0.723*	17.2	1.60*	0.81*							1.4*		S2	9	GIB67
58NI	43.7	171.8	1.152	0.703	18.00	1.574	0.918							1.4*		S1	9	GIB67
58NI	51.3	170.8	1.14*	0.723*	17.0	1.60*	0.810*				2.93	1.14*	0.723*	1.4*	1763	S2	4,14	BIN68
58NI	51.3	209.1	0.992	0.828	16.58	1.66	0.700							1.4*	1703	S2	4,14	BIN68
58NI	51.3	190.8	1.06	0.775	15.88	1.64	0.764				2.92	1.06	0.775	1.4*	1746	S1	4,14	BIN68
58NI	51.4	170.	1.14	0.72	17.	1.60	0.81							1.4?		S	H68	RID68
58NI	73.2	170.	1.14	0.72	17.	1.60	0.81							1.4?		S	H68	RID68
58NI	81.5	170.	1.14	0.72	17.	1.60	0.81							1.4?		S	H68	RID68
58NI	217.	74.1	1.24	0.85	25.3	1.42	0.79							1.3?		S1	2	WIL73
60NI	29.5	109.5	1.24*	0.706	15.2	1.63	0.807				4.1	1.24*	0.706	1.25*	1620	S2	14	LUE69
60NI	29.5	149.6	1.24*	0.665	19.0	1.54	0.854				4.9	1.24*	0.665	1.25*	1590	S1	14	LUE69
60NI	29.5	150.9	1.24*	0.663	25.8	1.46	0.845							1.25*	1580	S2	14	LUE69
60NI	29.6	130.*	1.13	0.763				20.5*	1.25	0.885	3.0*	1.13	0.783	1.3*		S		FUL73A
60NI	33.	136.9	1.082*	0.796	16.4	1.654	0.797							1.4?		S	H68	SIE65
60NI	33.	179.0	1.11*	0.756				25.91	1.195	0.856	4.00*	1.11*	0.45*	1.4*		S2		CAG72
60NI	33.	178.8	1.11*	0.768				30.80	1.184	0.823				1.4*		S2		CAG72
60NI	35.1	110.6	1.24*	0.664	18.4	1.57	0.871				2.2	1.24*	0.664	1.25*	1740	S2	14	LUE69
60NI	35.1	150.6	1.24*	0.621	22.9	1.50	0.938				2.4	1.24*	0.621	1.25*	1800	S2	14	LUE69
60NI	35.1	149.5	1.24*	0.635	24.8	1.49	0.928							1.25*	1800	S2	14	LUE69
60NI	35.1	128.*	1.14	0.768				20.5	1.21	0.882	2.7	1.14	0.768	1.3*		S2		FUL73
60NI	35.1	130.*	1.13	0.769				20.5*	1.22	0.884	3.0*	1.13	0.769	1.3*		S		FUL73A
60NI	49.7	126.*	1.13	0.842				20.5	1.26	0.835	2.7	1.13	0.842	1.3*		S2		FUL73
60NI	49.7	130.*	1.11	0.854				20.5*	1.26	0.840	3.0*	1.11	0.854	1.3*		S		FUL73A
60NI	50.	143	1.01*	0.905*	15.0	1.72*	0.700*				3.24	1.06*	0.255*	1.25*		S2		HAF70
60NI	50.1	188.3	1.09*	0.745*				24.6	1.161*	0.891*	4.0	1.09*	0.45*	1.25*	1848	S1		MAR72
60NI	59.8	125.*	1.12	0.816				20.5*	1.24	0.828	2.8	1.12	0.816	1.3*		S2		FUL73
60NI	59.8	130.*	1.10	0.832				20.5*	1.23	0.834	3.0*	1.10	0.832	1.3*		S		FUL73A
60NI	71.1	123.*	1.12	0.837				20.5*	1.24	0.828	3.0	1.12	0.837	1.3*		S2		FUL73
60NI	71.1	130.*	1.08	0.864				20.5*	1.24	0.830	3.0*	1.08	0.864	1.3*		S		FUL73A
61NI	25.	178.5	1.14*	0.71*	19.52	1.54*	0.78*							1.4*		S1	9	RUN68
62NI	11.	164.7	1.07	0.727	16.86	1.63	0.57							1.40*		S2		SMI68
62NI	21.0	180.9	1.14*	0.747	20.92	1.560	0.790							1.4*		S1	13	URO71
62NI	25.	192.5	1.14*	0.71*	19.42	1.54*	0.78*							1.4*		S1	9	RUN68
62NI	30.	176.6	1.142	0.744				26.4	1.178	0.790				1.4*		S2	9	KUN69
62NI	33.	138.9	1.082*	0.816	17.2	1.635	0.815							1.4?		S	H68	SIE65
62NI	33.	181.3	1.11*	0.736				26.47	1.147	0.916	3.00*	1.11*	0.45*	1.4*		S1		CAG72
62NI	33.	186.6	1.08*	0.763	22.66	1.567	0.844							1.4*		S2		CAG72
62NI	33.	188.7	1.08*	0.770				29.08	1.161	0.812				1.4*		S2		CAG72
62NI	37.7	177.0	1.14	0.712	19.9	1.54	0.967							1.4?		S	H68	JON68
62NI	37.7	119.2	1.200	0.725				24.13	1.169	0.888	2.0*	1.14*	0.69*	1.4*		S1	9	URO72
64NI	21.0	180.0	1.14*	0.741	24.06	1.530	0.798							1.4*		S1	13	URO71
64NI	24.9	166.8	1.22*	0.695*	20.9	1.506	0.800	1.1*	1.506	0.800				1.4*		S1	26,9	DRI68
64NI	25.	187.4	1.14*	0.71*	18.60	1.54*	0.78*							1.4*		S1	9	RUN68
64NI	33.	140.6	1.082*	0.797	17.0	1.632	0.817							1.4?		S	H68	SIE65
64NI	33.	181.6	1.11*	0.760				25.36	1.139	0.926	3.50*	1.11*	0.45*	1.4*		S1		CAG72
64NI	33.	182.7	1.10*	0.758	20.90	1.542	0.905				3.50*	1.11*	0.45*	1.4*		S1		CAG72
CU	20.	55.2	1.48	0.63	16.4	1.48	0.63				1.49	1.48	0.63	1.4?		S	H68	KLI64
CU	29.1	20.	1.60	0.73	30.	1.60	0.73							1.4?	1739	S	H68	GRE61
63CU	29.	104.6	1.059	0.911	9.46	1.909	0.730							1.07*	1825	S1	9	BAU67
63CU	29.	130.1	1.15*	0.784	18.61	1.629	0.821							1.3*	1724	S1	10,14	BAU69
63CU	29.	173.8	1.15*	0.733	22.63	1.550	0.856							1.3*	1738	S1	10,14	BAU69
63CU	33.	181.9	1.11*	0.760				27.84	1.149	0.890	3.50*	1.11*	0.45*	1.4*		S2		CAG72
65CU	33.	197.2	1.05*	0.819				25.69	1.199	0.871	4.00*	1.05*	0.49*	1.4*		S2	14	CAG72
65CU	35.7	169.1	1.15*	0.740	20.2	1.60*	0.868							1.3*	1917	S1		ART71
ZN	29.	108.2	1.033	0.955	10.39	1.896	0.732							1.07*	1864	S1		BAU67
64ZN	12.	96.4*	1.07*	0.854*	10.	1.81*	0.592*							1.4?	506	S	H68	YNT64
64ZN	18.	43.16	1.67*	0.58*	15.33	1.67*	0.58*							1.4*		S2		FOU67
64ZN	19.47	163.9	1.216	0.690	27.37	1.418	0.820							1.4?		S	H68	HAF67
64ZN	19.5	165.	1.3*	0.723	24.	1.6*	0.81				8.0*	1.3*	0.723	1.40*		S1		BET67
64ZN	24.	156.5	1.22*	0.695*	24.6	1.50*	0.80*							1.3*		S	14	HAN71
64ZN	33.	182.4	1.11*	0.765				32.27	1.071	0.962	1.00*	1.11*	0.48*	1.4*		S1		CAG72
64ZN	33.	180.3	1.11*	0.766	28.62	1.469	0.933							1.4*		S1		CAG72
66ZN	24.	142.6	1.22*	0.695*	22.7	1.50*	0.80*							1.3*		S	14	HAN71
66ZN	33.	182.9	1.11*	0.759				29.18	1.089	0.972				1.4*		S1		CAG72
66ZN	33.	189.7	1.08*	0.733	24.49	1.510	0.927							1.4*		S2		CAG72
68ZN	24.	149.3	1.22*	0.695*	27.0	1.50*	0.80*							1.3*		S	14	HAN71
68ZN	33.	182.2	1.11*	0.780				27.67	1.147	0.909	2.00*	1.11*	0.48*	1.4*		S1		CAG72
68ZN	33.	181.4	1.107*	0.772	21.72	1.538	0.889				2.00*	1.107*	0.48*	1.4*		S2		CAG72
70ZN	24.	149.3	1.22*	0.695*	25.6	1.50*	0.80*							1.3*		S	14	HAN71
Y	20.0	141.6	1.235	0.692	22.2	1.536	0.795							1.4*		S1		PAR71
Y	29.	114.8	1.064	0.876	8.70	1.856	0.692							1.07*	1799	S1		BAU67
89Y	24.7	116.	1.243	0.7*	15.0*	1.55*	0.8*							1.4*	1426	S		VOU69
89Y	24.7	157.	1.198	0.7*	15.0*	1.55*	0.8*							1.4*	1428	S		VOU69
89Y	24.7	208.	1.153	0.7*	15.5*	1.55*	0.8*							1.4*	1435	S		VOU69
89Y	29.6	122.6	1.24*	0.530	15.1	1.53	1.03							1.25*	1830	S1	14	LUE69
89Y	29.6	149.8	1.24*	0.651	18.5	1.54	0.891							1.25*	1770	S1	14	LUE69

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TABLE V. Optical-Model Parameters Helium-3

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL. IMAG. POTENTIAL W	RW	AW	SURF. IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
89Y	43.7	175.1	1.14*	0.723*	14.88	1.60*	0.81*							1.4*		S1	21	GIB67
89Y	43.7	175.2	1.145	0.784	13.96	1.587	0.633							1.4*		S1	21	GIB67
89Y	217.	75.9	1.25	0.83	28.4	1.40	0.70							1.3?		S1	2	WIL73
90ZR	12.	96.4*	1.07*	0.854*	10.	1.81*	0.592*							1.4?	200	S	H68	YNT64
90ZR	21.0	170.6	1.14*	0.740	15.17	1.602	0.718							1.4*		S1	13	URO71
90ZR	24.	163.9	1.22*	0.695*	21.4	1.500	0.790	0.97*	1.500	0.790				1.4*		S1	26,9	DRI68
90ZR	25.	168.4	1.14*	0.71*	16.88	1.54*	0.78*							1.4*		S1	9	RUN68
90ZR	29.6	123.6	1.24*	0.571	22.5	1.27	1.13							1.25*	1670	S2	14	LUE69
90ZR	29.6	154.0	1.24*	0.587	21.6	1.38	1.04							1.25*	1730	S1	14	LUE69
90ZR	30.9	151.1	1.24*	0.69*	22.0	1.54	0.69*							1.4*		S	9	CAT69
90ZR	30.9	174.7	1.14*	0.72*	17.6	1.56	0.80*							1.4*		S1	9	CAT69
90ZR	37.7	203.7	1.05*	0.766	21.78	1.466	0.801							1.40*		S1	14	URO71A
90ZR	37.7	203.1	1.05*	0.766	19.65	1.497	0.806				2.0*	1.14*	0.69*	1.40*		S1	14	URO71A
90ZR	37.7	157.8	1.05*	0.813				23.70	1.191	0.845				1.40*		S1	14	URO71A
90ZR	37.7	161.1	1.033	0.816				21.34	1.215	0.876	2.0*	1.14*	0.69*	1.4*		S1		URO72
90ZR	43.7	170.0	1.14*	0.723*	17.42	1.60*	0.81*							1.4*		S2		GIB67
90ZR	43.7	170.1	1.156	0.689	18.32	1.537	0.876							1.4*		S1		GIB67
90ZR	217.	76.2	1.24	0.83	26.1	1.39	0.79							1.3?		S1	2	WIL73
91ZR	25.	177.3	1.14*	0.71*	15.50	1.54*	0.78*							1.4*		S1	9	RUN68
91ZR	30.9	151.1	1.24*	0.69*	20.8	1.56	0.69*							1.4*		S	9	CAT69
91ZR	30.9	174.6	1.14*	0.72*	17.8	1.56	0.80*							1.4*		S1	9	CAT69
91ZR	37.7	171.7	1.19	0.425	14.67	1.60	0.92							1.4?		S	H68	JON68
91ZR	37.7	133.4	1.146	0.705				21.60	1.132	0.946	2.0*	1.14*	0.69*	1.4*		S1		URO72
92ZR	21.0	171.5	1.14*	0.728	17.27	1.495	0.741							1.4*		S1	13	URO71
92ZR	25.	179.4	1.14*	0.71*	14.95	1.54*	0.78*							1.4*		S1	9	RUN68
92ZR	30.9	151.7	1.24*	0.69*	20.9	1.55	0.69*							1.4*		S	9	CAT69
92ZR	30.9	173.8	1.14*	0.72*	18.2	1.55	0.80*							1.4*		S1	9	CAT69
92ZR	51.3	197.	1.04	0.811	17.37	1.60	0.797							1.4*		S1	9,14	BIN67
92ZR	51.3	175.*	1.13	0.735	18.89	1.56	0.860							1.4*		S2	9,14	BIN67
94ZR	21.0	175.9	1.14*	0.731	17.87	1.522	0.768							1.4*		S1	13	URO71
94ZR	25.	176.4	1.14*	0.71*	14.5	1.54*	0.78*							1.4*		S1	9	RUN68
94ZR	30.9	151.2	1.24*	0.69*	19.5	1.57	0.69*							1.4*		S	9	CAT69
94ZR	30.9	174.8	1.14*	0.72*	17.6	1.54	0.80*							1.4*		S1	9	CAT69
96ZR	30.9	151.7	1.24*	0.69*	19.4	1.55	0.69*							1.4*		S	9	CAT69
96ZR	30.9	174.3	1.14*	0.72*	17.2	1.55	0.80*							1.4*		S1	9	CAT69
RH	20.	67.8	1.54	0.55	14.2	1.54	0.55				8.0*	1.54	0.55	1.4?		S	H68	KLI64
AG	29.	112.3	1.063	0.897	7.55	1.902	0.671							1.07*	1845	S1		BAU67
107AG	35.7	162.0	1.15*	0.735	17.1	1.60*	0.910							1.3*	2075	S1		ART71
114CD	29.7	120.3	1.24*	0.677	29.6	1.26	0.887							1.25*	1470	S1	14	LUE69
114CD	29.7	146.0	1.24*	0.652	32.0	1.19	0.927							1.25*	1460	S1	14	LUE69
IN	29.	92.26	1.067	0.863	7.84	1.805	0.692							1.07*	1684	S1		BAU67
115IN	29.8	121.1	1.24*	0.709	25.2	1.41	0.750							1.25*	1480	S1	14	LUE69
115IN	29.8	150.5	1.24*	0.661	22.8	1.41	0.891							1.25*	1640	S1	14	LUE69
115IN	35.3	91.6	1.24*	0.761	17.8	1.52	0.762							1.25*	1750	S2	14	LUE69
115IN	35.3	114.8	1.24*	0.718	23.6	1.47	0.850							1.25*	1880	S1	14	LUE69
115IN	35.3	147.3	1.24*	0.685	24.2	1.45	0.873							1.25*	1890	S1	14	LUE69
SN	20.	67.6	1.51	0.55	13.8	1.51	0.55				8.0*	1.51	0.55	1.4?		S	H68	KLI64
SN	29.	100.3	1.070	0.851	9.01	1.749	0.707							1.07*	1645	S1		BAU67
116SN	18.	170.*	1.14	0.723	20.*	1.6*	0.81	20.*	1.6*	0.81				1.14*		S1		CON68
116SN	29.5	118.1	1.24*	0.708	17.4	1.51	0.728							1.25*	1480	S1	14	LUE69
116SN	29.5	149.9	1.24*	0.673	21.4	1.46	0.756							1.25*	1480	S1	14	LUE69
116SN	35.2	114.4	1.24*	0.747	18.5	1.55	0.771							1.25*	1800	S2	14	LUE69
116SN	35.2	148.9	1.24*	0.668	26.1	1.40	0.877							1.25*	1780	S2	14	LUE69
118SN	21.0	184.3	1.14*	0.719	15.67	1.587	0.513							1.4*		S1	13	URO71
120SN	217.	70.9	1.27	0.86	28.9	1.40	0.69							1.3?		S1	2	WIL73
124SN	18.	170.*	1.14	0.723	20.*	1.6*	0.81	20.*	1.6*	0.81				1.14*		S1		CON68
138BA	19.47	165.0	1.361	0.507	41.7	0.828	1.360							1.4?		S	H68	HAF67
SM	20.	74.4	1.51	0.55	47.6	1.51	0.55				8.0*	1.51	0.55	1.4?		S	H68	KLI64
144SM	53.4	140.9	1.13*	0.802				28.3	1.185	0.832				1.25*		S2	14	WOO72
144SM	53.4	177.5	1.13*	0.761				32.5	1.144	0.855				1.25*		S2	14	WOO72
144SM	59.8	110.	1.10	0.960				22.0	1.27	0.840	2.5	1.10	0.960	1.3*		S2		FUL73
YB	20.	77.1	1.50	0.51	10.0	1.50	0.51				8.0*	1.50	0.51	1.4?		S	H68	KLI64
PB	20.	80.5	1.50	0.51	1.7	1.50	0.51				8.0*	1.50	0.51	1.4?		S	H68	KLI64
208PB	47.5	159.9	1.14*	0.723*	22.3	1.6*	0.927*							1.4*	2844	S1	14	PAR69
208PB	71.1	123.	1.11	0.736				24.4	1.07	0.972	2.6	1.11	0.736	1.3*		S2		FUL73
208PB	217.	78.0	1.25	0.86	24.1	1.43	0.81							1.3?		S1	2	WIL73
209BI	71.1	132.	1.06	0.776				25.1	1.06	0.949	3.1	1.06	0.776	1.3*		S2		FUL73

See page 8 for Explanation of Tables

TABLE V. Optical-Model Parameters Helium-3

NOTES

1. Fitting procedure truncated at 120°
2. Data for angles smaller than 45°
3. Absolute normalization of the data is unknown
4. Data for angles smaller than 80°
5. Data absolute normalization known to ±30%
6. A uniform 10% experimental error is used
7. Data absolute normalization known to ±20%
8. Fitting procedure truncated at 80°
9. Data for angles smaller than 100°
10. Differential elastic-scattering cross sections and total cross sections are fitted simultaneously
11. Our evaluation of goodness-of-fit does not take in account the unsatisfactory fit of the data at angles larger than 135°
12. Fitting procedure truncated at 135°
13. See publication for optical-model parameters corresponding to simultaneous fits of ^{3}He and triton data
14. See publication for other sets of parameters fitting the same data
15. No cross section data at angles smaller than 60°
16. Unsatisfactory fit of the data at backward angles. See publication
17. Fitting procedure truncated at 110°
18. Polarization data for angles smaller than 80°
19. Polarization data for angles smaller than 60°
20. Differential cross section and polarization data are not fitted simultaneously
21. Data for angles smaller than 90°
22. See publication for other sets of parameters fitting the same data up to 90° only
23. Normalization of cross section data adjusted by the code
24. Fitting procedure truncated at 90°
25. See publication for compound elastic contribution
26. Simultaneous fit to 20-MeV tritons elastic scattering data

H68. As reported in a previous review paper by P. E. Hodgson, Adv. Phys. 17, 563 (1968)

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^{12}C	28	BON75
^{15}N	16.5 to 37.7	PIG73
^{40}Ca to ^{53}Cr	29	MOR72
^{48}Ti to ^{138}Ba	19.5	BOC67
^{60}Ni	30 to 71	FUL73B
Sm Isotopes	40.9	PAL74

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See page 8 for Explanation of Tables

TABLE VI. Optical-Model Parameters Alphas

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
2H	166.	32.4	1.73	0.59	67.4	0.93	0.43							1.4*		S2	5	TAT70
3HE	42.	65.7	1.54	0.27	0.75	3.81	1.68				0.5	1.54	0.27	1.5?		S2		VIN70
3HE	42.	173.0	1.58	0.145	1.12	3.67	1.05				1.00	1.58	0.145	1.5?		S3		VIN70
4HE	23.1	117.	1.14*	0.6*	1.*	1.14*	0.6*							1.14*		S2	5,26	IGO60
4HE	34.2	117.	1.14*	0.6*	1.*	1.14*	0.6*							1.14*		S2	5,26	IGO60
4HE	34.2	122.	1.14*	0.6*	1.*	1.14*	0.6*							1.14*		S2	5,26	IGO60
4HE	36.85	125.	1.14*	0.5	1.*	1.14*	0.5							1.14*		S2	3,26	IGO60
4HE	38.83	122.	1.14*	0.6*	1.*	1.14*	0.6*							1.14*		S3	3,26	IGO60
4HE	39.5	92.	1.14*	0.6*	1.*	1.14*	0.6*							1.14*		S3	5,26	IGO60
4HE	40.1	92.	1.14*	0.6*	1.*	1.14*	0.6*							1.14*		S3	5,26	IGO60
4HE	40.77	92.	1.14*	0.6*	1.*	1.14*	0.6*							1.14*		S1	5,26	IGO60
4HE	47.10	107.	1.14*	0.7	1.*	1.14*	0.7							1.14*		S1	26	IGO60
6LI	12.54	189.5	1.93	0.60				7.1	1.93	0.60	10.8	1.93	0.60	1.93		S2	9	BIN71
6LI	12.54	189.4	1.94	0.59	7.7	1.94	0.59				11.1	1.94	0.59	1.94		S2	9	BIN71
6LI	14.04	195.5	1.95	0.54				8.1	1.95	0.54	12.0	1.95	0.54	1.95		S2	9	BIN71
6LI	14.04	195.6	1.95	0.53	8.7	1.95	0.53				10.5	1.95	0.53	1.95		S2	9	BIN71
6LI	15.54	196.1	1.976	0.49				10.1	1.976	0.49	8.8	1.976	0.49	1.98		S2	9	BIN71
6LI	15.54	196.6	1.98	0.48	9.2	1.98	0.48				8.9	1.98	0.48	1.98		S2	9	BIN71
6LI	17.04	193.4	1.99	0.47				12.5	1.99	0.47	10.7	1.99	0.47	1.99		S3	9	BIN71
6LI	17.04	194.9	2.00	0.44	10.2	2.00	0.44				8.3	2.00	0.44	2.00		S3	9	BIN71
6LI	18.54	194.2	2.00	0.43				18.2	2.00	0.43	10.2	2.00	0.43	2.00		S3	9	BIN71
6LI	18.54	195.8	2.02	0.40	13.5	2.02	0.40				8.6	2.02	0.40	2.02		S3	9	BIN71
6LI	29.4	72.63	1.36	0.765	23.8	1.34	0.765							1.3*		S2	3	MAT69
6LI	29.4	149.5	1.37	0.637	41.8	1.06	0.637							1.3*		S2	3	MAT69
6LI	104.	88.86	0.991	0.807	4.94	3.006	0.577							1.2*		S2	5	DEV72
6LI	166.	103.9	0.974	0.76	26.64	1.69	0.87							1.3?		S	13	BAC72
6LI	166.	102.5	0.979	0.82	11.77	2.26	0.95							1.3?		S	13	BAC72
7LI	12.0	143.6	1.68	0.73				4.5	1.68	0.73	5.1	1.68	0.73	1.68		S2	9	BIN71
7LI	12.0	148.0	1.69	0.72	6.6	1.69	0.72				5.4	1.69	0.72	1.69		S2	9	BIN71
7LI	14.0	148.9	1.71	0.63				7.3	1.71	0.63	8.8	1.71	0.63	1.71		S3	9	BIN71
7LI	14.0	154.9	1.69	0.64	9.8	1.69	0.64				16.8	1.69	0.64	1.69		S2	9	BIN71
7LI	16.0	150.4	1.68	0.60				8.0	1.68	0.60	17.8	1.68	0.60	1.68		S2	9	BIN71
7LI	16.0	142.3	1.66	0.61	6.8	1.66	0.61				19.6	1.66	0.61	1.66		S3	9	BIN71
7LI	18.0	151.1	1.725	0.57				8.6	1.725	0.57	3.0	1.725	0.57	1.72		S3	9	BIN71
7LI	18.0	150.2	1.73	0.56	9.9	1.73	0.56				7.5	1.73	0.56	1.73		S2	9	BIN71
7LI	29.4	68.20	1.62	0.657	19.8	1.17	0.657							1.3*		S3	5	MAT69
7LI	29.4	275.2	1.21	0.645	8.16	1.81	0.645							1.3*		S3	5	MAT69
7LI	42.	98.34	0.948	0.660	2.17	2.365	0.383	4.61	2.365	0.383				1.2*		S3		DEV72
7LI	42.	122.4	0.768	0.756				7.39	2.125	0.496				1.2*		S3		DEV72
7LI	42.	53.13	1.586	0.444	5.44	2.412	0.576							1.2*		S3		DEV72
9BE	8.76	128.4	1.72	0.50	3.35	1.72	0.50							1.7?		S3		BRA67
9BE	8.76	50.85	1.72*	0.50*	1.42	1.72*	0.50*							1.7?		S3		BRA67
9BE	9.27	38.5	0.915	1.29	9.07	0.915	1.29							1.7?		S3		BRA67
9BE	9.27	54.0	1.72*	0.50*	2.13	1.72*	0.50*							1.7?		S3		BRA67
9BE	9.5	45.0	1.846*	0.52	2.0	1.846*	0.52				1.5	1.846*	0.52	1.4*		S2		TAY65
9BE	10.0	46.5	1.846*	0.61	2.2	1.846*	0.61				1.8	1.846*	0.61	1.4*		S3		TAY65
9BE	10.13	154.0	1.618	0.428	2.97	1.618	0.428							1.7?		S3		BRA67
9BE	10.13	52.9	1.72*	0.50*	1.96	1.72*	0.50*							1.7?		S3		BRA67
9BE	10.5	50.7	1.846*	0.63	2.4	1.846*	0.63				1.8	1.846*	0.63	1.4*		S3		TAY65
9BE	11.0	50.0	1.846*	0.55	2.5	1.846*	0.55				1.8	1.846*	0.55	1.4*		S3		TAY65
9BE	11.5	51.2	1.846*	0.58	2.6	1.846*	0.58				1.8	1.846*	0.58	1.4*		S3		TAY65
9BE	12.0	52.0	1.846*	0.55	2.7	1.846*	0.55				2.0	1.846*	0.55	1.4*		S3		TAY65
9BE	12.5	54.0	1.846*	0.55	3.3	1.846*	0.55				2.7	1.846*	0.55	1.4*		S3		TAY65
9BE	13.0	54.1	1.846*	0.58	4.2	1.846*	0.58				2.6	1.846*	0.58	1.4*		S3		TAY65
9BE	14.05	57.0	1.846*	0.58	4.8	1.846*	0.58				2.4	1.846*	0.58	1.4*		S2		TAY65
9BE	14.86	58.0	1.846*	0.60	4.8	1.846*	0.60				2.2	1.846*	0.60	1.4*		S3		TAY65
9BE	15.7	60.0	1.846*	0.59	4.2	1.846*	0.59				1.5	1.846*	0.59	1.4*		S3		TAY65
9BE	16.55	60.1	1.846*	0.58	5.0	1.846*	0.58				1.6	1.846*	0.58	1.4*		S3		TAY65
9BE	17.5	60.7	1.846*	0.54	4.7	1.846*	0.54				1.6	1.846*	0.54	1.4*		S3		TAY65
9BE	18.4	61.0	1.846*	0.56	5.0	1.846*	0.56				2.1	1.846*	0.56	1.4*		S3		TAY65
9BE	19.47	60.9	1.846*	0.53	4.5	1.846*	0.53				2.4	1.846*	0.53	1.4*		S2		TAY65
9BE	20.0	61.0	1.846*	0.58	4.6	1.846*	0.58				1.9	1.846*	0.58	1.4*		S3		TAY65
9BE	48.	70.9	1.550	0.660	23.87	1.550	0.660							1.25*		S2		LI 68
9BE	48.	148.9	1.491	0.587	29.52	1.491	0.587							1.25*		S2		LI 68
9BE	48.	207.1	1.545	0.475	26.98	1.545	0.475							1.25*		S3		LI 68
9BE	48.	71.77	1.544	0.691	50.8	0.953	0.918							1.2*		S2		DEV72
9BE	48.	67.15	1.669	0.653				22.44	1.066	0.720				1.2*		S2		DEV72
9BE	104.	65.87	1.483	0.655	34.9	1.057	1.054							1.2*		S1	5	DEV72
10B	22.5	212.1	1.373	0.520	4.83	1.699	0.563							1.34		S3		DAV72
C	24.7	251.8	1.444	0.484	12.56	1.444	0.484							1.34*	859	S3		MAK70
C	40.	30.	1.92*	0.5*	10.	1.92*	0.5*							1.22*		S2	5,26	IGO57
12C	8.76	66.0	1.80	0.353	0.00	1.80	0.353							1.7?		S1		BRA67
12C	8.76	144.5	1.74*	0.38*	0.03	1.74*	0.38*							1.7?		S1		BRA67
12C	9.33	88.6	1.42	0.39	0.22	1.42	0.39							1.7?		S1		BRA67
12C	9.33	148.8	1.74*	0.38*	0.68	1.74*	0.38*							1.7?		S2		BRA67

See page 8 for Explanation of Tables

TABLE VI. Optical-Model Parameters Alphas

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL. IMAG. POTENTIAL W	RW	AW	SURF. IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
12C	11.00	80.	2.07	0.55				4.0	2.07	0.3				1.4?	599	S3		CAR64
12C	11.00	125.	1.87	0.5				3.0	1.87	0.3				1.4?	613	S3		CAR64
12C	12.10	150.	2.07	0.5	1.5	2.07	0.5							1.4?	558	S3		CAR64
12C	12.10	200.	1.97	0.6				4.0	1.87	0.3				1.4?	491	S3		CAR64
12C	14.00	100.	1.77	0.6				4.0	1.77	0.6				1.4?	897	S3		CAR64
12C	14.00	110.	1.97	0.6				4.0	1.97	0.3				1.4?	647	S3		CAR64
12C	16.00	125.	1.97	0.5				1.5	1.97	0.5				1.4?	620	S3		CAR64
12C	17.00	75.	1.77	0.6				4.0	1.77	0.6				1.4?	928	S3		CAR64
12C	17.00	110.	1.87	0.5				4.0	1.87	0.3				1.4?	483	S3		CAR64
12C	18.00	200.	1.97	0.5				4.0	1.87	0.3				1.4?	414	S3		CAR64
12C	18.0	105.4	1.598	0.736	5.74	1.598	0.736							1.2*		S		OBE68
12C	18.0	159.0	1.540	0.709	6.16	1.540	0.709							1.2*		S		OBE68
12C	27.2	52.5	1.90*	0.60*	6.0	1.9	0.6*							1.22*		S3		NEM67
12C	27.2	52.5	1.90*	0.60*				6.53	1.5	0.593				1.22*		S3		NEM67
12C	32.5	11.18	2.46	0.022	3.73	2.55	0.002							2.4?	961	S3		BUR72
12C	41.	37.16	1.846	0.452	13.27	1.846	0.452							1.25*	891	S3	10	BAR71
12C	41.	199.1	1.262	0.650	42.17	1.262	0.650							1.25*	963	S3	10	BAR71
12C	42.	24.	1.99	0.42	13.	1.99	0.42							1.4?		S	W65	MCD62
12C	42.	38.	1.84	0.41	21.	1.84	0.41							1.4?		S	W65	MCD62
12C	56.	115.8	1.5*	0.555	24.0	1.5*	0.4							1.4?	819	S2	5	GAI69
12C	56.	151.9	1.24*	0.665	28.05	1.24*	0.64							1.4?	816	S2	5	GAI69
12C	56.	216.8	1.3*	0.58	28.05	1.5*	0.32							1.4?	798	S2	5	GAI69
12C	104.	74.21	1.433	0.692	30.23	1.433	0.692							1.43?		S3	18	HAU69
12C	104.	114.0	1.22	0.80	13.8	1.91	0.50							1.26*		S		SMI73
12C	139.	108.1	1.22	0.76	16.9	1.85	0.47							1.26*		S1	5	SMI73
12C	166.	85.0	1.34	0.70	17.7	1.77	0.52							1.3*		S2	5	TAT70
12C	166.	100.9	1.21	0.76	14.7	1.86	0.48							1.3*		S2	5	TAT70
13C	15.	213.8	1.2*	0.56										1.2*		S2	8	COK71
13C	18.	226.0	1.33	0.49	2.5	1.16	0.9*							1.3*		S3	8	COK71
13C	20.	209.7	1.05	0.49										1.4*		S2	8	COK71
13C	28.4	199.3	1.2*	0.56	8.76	1.4	0.9*							1.2*		S3	8	COK71
14N	19.2	54.87	1.748	0.569	5.17	1.748	0.569							1.2*		S		LUC68
14N	19.2	94.55	1.649	0.579	5.88	1.649	0.579							1.2*		S		LUC68
14N	19.2	149.8	1.537	0.572	7.03	1.537	0.572							1.2*		S		LUC68
14N	19.2	154.1	1.43	0.56				4.74	1.81	0.65				1.43		S		JOH70
14N	29.98	130.0	1.369	0.625*	44.92	1.364	0.350							1.30*		S3	5	LOW72
14N	29.98	187.4	1.268	0.625*	28.76	1.539	0.145							1.30*		S2	5	LOW72
14N	40.5	195.*	1.28	0.654	21.00	1.28	0.654							1.3*		S2	5	BAL69
14N	56.	104.7	1.5*	0.605	23.0	1.5*	0.555							1.4?	934	S		GAI69
14N	56.	160.8	1.5*	0.535	27.55	1.5*	0.39							1.4?	922	S		GAI69
14N	56.	196.3	1.3*	0.635	27.0	1.5*	0.52							1.4?	932	S		GAI69
O	24.7	43.9	1.912	0.451	3.85	1.912	0.451							1.3*	959	S3		MCF66
16O	10.05	150.*	1.93	0.5*				3.0	1.93	0.5*				1.4?		S3	W65	DAV63
16O	11.97	135.	1.87	0.5*				3.0	1.87	0.5*				1.4?		S3	W65	DAV63
16O	13.37	150.*	1.97	0.5*				5.0	1.97	0.5*				1.4?		S3	W65	DAV63
16O	15.20	135.	1.87	0.5*				5.0	1.87	0.5*				1.4?		S3	W65	DAV63
16O	17.22	150.*	1.93	0.5*				7.5	1.93	0.5*				1.4?		S3	W65	DAV63
16O	18.30	125.	1.97	0,5*				5.0	1.97	0.5*				1.4?		S3	W65	DAV63
16O	19.90	125.	1.97	0.5*				5.0	1.97	0.5*				1.4?		S3	W65	DAV63
18O	21.4	53.1	1.64	0.76				32.9	1.77	0.37				1.4?		S2		LUT66
19F	25.0	100.6	1.48	0.683	9.65	1.95	0.543							1.4?		S1	5,21	KRI73
19F	25.0	144.7	1.47	0.606	16.53	1.46	0.806							1.4?		S	5,21	KRI73
19F	25.0	204.3	1.42	0.596	17.06	1.57	0.688							1.4?		S	5,21	KRI73
NE	50.9	140.	1.50	0.58	32.	1.46	0.35							1.4?		S	6,10	KOS69
NE	50.9	202.	1.47	0.55	32.	1.38	0.55							1.4?		S	6,10	KOS69
20NE	16.8	56.90	1.73*	0.584	5.18	1.73*	0.464							1.73*		S3		FRI71
20NE	16.8	82.63	1.73*	0.565	6.34	1.73*	0.523							1.73*		S3		FRI71
20NE	16.8	48.68	1.81*	0.587	9.18	1.81*	0.464							1.81*		S2	11	FRI71
20NE	16.8	73.54	1.81*	0.536	10.26	1.81*	0.521							1.81*		S2	11	FRI71
20NE	18.0	52.74	1.735	0.556	7.04	1.735	0.556							1.2*	1102	S	13	LUC66
20NE	18.0	81.93	1.698	0.540	8.31	1.698	0.540							1.2*	1126	S	13	LUC66
20NE	22.0	57.55	1.649	0.694	3.61	2.331	0.231							1.5?		S	13	TAK71
20NE	27.4	47.	1.806	0.592	7.4	1.806	0.592							1.25*		S	5	HAN67
20NE	27.4	191.2	1.525	0.541	32.97	1.525	0.541							1.25*		S2	5	HAN67
20NE	28.	57.5	1.750	0.560	13.2	1.750	0.560							1.4*	1214	S2	5	SAT65
20NE	104.	110.6	1.22	0.82	17.9	1.77	0.63							1.3?		S1	4	REB72
22NE	104.	101.5	1.33	0.76	18.8	1.79	0.55							1.3?		S2	5	REB72
23NA	18.4	54.94	1.656	0.589	10.36	1.656	0.589							1.2*	1159	S	13	LUC66
23NA	18.4	90.15	1.549	0.579	10.80	1.549	0.579							1.2*	1118	S	13	LUC66
23NA	21.4	51.2*	1.710	0.568	20.50	1.710	0.568				2.74	1.710	0.568	1.65*		S2	11,19	LEG74

See page 8 for Explanation of Tables

TABLE VI. Optical-Model Parameters Alphas

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
MG	24.7	20.8	1.853	0.497	6.78	1.853	0.497							1.3*	1121	S2	10	MCP66
MG	24.7	200.8	1.425	0.557	16.5	1.425	0.557							1.3*	1153	S3	10	MCP66
MG	24.7	185.1	1.496	0.511	15.45	1.496	0.511							1.34*	1152	S3		MAK70
24MG	4.0	110.0	1.80*	0.48	5.0*	1.80*	0.48							1.33*		S2		SO 66
24MG	5.0	110.0	1.80*	0.48	5.0*	1.80*	0.48							1.33*		S2		SO 66
24MG	12.30	113.3	1.62	0.65	3.2	1.62	0.65							1.33*		S2		SO 66
24MG	12.57	115.0	1.80*	0.45	4.0	1.80*	0.45							1.33*		S3		SO 66
24MG	12.70	106.0	1.80*	0.54	5.0*	1.80*	0.54							1.33*		S3		SO 66
24MG	13.0	107.0	1.80*	0.61	4.0	1.80*	0.61							1.33*		S3		SO 66
24MG	13.44	106.0	1.80*	0.52	5.0*	1.80*	0.52							1.33*		S3		SO 66
24MG	13.70	106.1	1.80*	0.37	4.1	1.80*	0.37							1.33*		S2		SO 66
24MG	14.0	113.0	1.80*	0.55	4.5	1.80*	0.55							1.33*		S3		SO 66
24MG	15.02	88.0	1.80*	0.40	3.0	1.80*	0.40							1.33*		S3		SO 66
24MG	15.25	177.0	1.80*	0.36	4.5	1.80*	0.36							1.33*		S3		SO 66
24MG	18.8	190.8	1.43	0.608	9.91	1.78	0.39							1.43?				DRE70
24MG	22.2	51.2*	1.750	0.530	20.15	1.750	0.530							1.65*		S2	11	LEG74
24MG	22.9	192.6	1.43*	0.60*	11.5	1.76	0.41							1.43?				DRE70
24MG	28.	54.4	1.700	0.529	9.8	1.700	0.529							1.4*	1167	S2	5	SAT65
24MG	40.	125	1.55	0.542	30.7	1.59	0.393							1.3*		S2		SIN69
24MG	40.	152.	1.39	0.620	33.9	1.39	0.620							1.3*		S2		SIN69
24MG	42.	84.7	1.52*	0.606	12.9	1.80	0.538							1.52*		S2	5	DEH67
24MG	42.	47.05	1.635	0.561	21.11	1.635	0.561							1.25*	1179	S3	10	BAR71
24MG	42.	185.7	1.38	0.575	42.50	1.38	0.575							1.25*	1176	S2	10	BAR71
24MG	50.1	100.*	1.47	0.58	27.6	1.6*	0.47							1.3*		S3		DUH68
24MG	65.7	100.*	1.44	0.66	40.1	1.6*	0.48							1.3*		S2		DUH68
24MG	80.	92.0	1.40	0.709	47.9	1.40	0.709							1.3*		S1		SIN69
24MG	80.	120.	1.29	0.754	47.9	1.40	0.709							1.3*		S1		SIN69
24MG	81.0	100.*	1.38	0.69	31.7	1.6*	0.58							1.3*		S2		DUH68
24MG	104.	119.1	1.13	0.82	22.9	1.56	0.82							1.3?		S2	5	REB72
24MG	119.7	100.*	1.28	0.78	23.8	1.6*	0.71							1.3*		S2	5	DUH68
24MG	166.	97.7	1.30	0.77	26.5	1.63	0.53							1.4*		S1	4	BIM73
25MG	22.1	51.2*	1.694	0.585	11.13	1.694	0.585							1.65*		S2	11	LEG74
26MG	15.7	80.0	1.61	0.52*	13.5	1.61	0.52*							1.5?		S2	24,25	WUH74
26MG	15.7	116.0	1.56	0.52*	17.5	1.56	0.52*							1.5?		S2	24,25	WUH74
26MG	22.2	51.2*	1.701	0.570	10.84	1.701	0.570							1.65*		S2	11	LEG74
26MG	104.	95.6	1.30	0.71	39.3	1.28	0.90							1.3?		S2	5	REB72
AL	24.7	49.1	1.701	0.572	7.34	1.701	0.572							1.3*	1231	S	13	MCP66
AL	24.7	197.1	1.349	0.592	17.0	1.349	0.592							1.3*	1159	S		MCP66
AL	24.7	189.4	1.526	0.457	17.78	1.526	0.457							1.34*	1140	S3		MAK70
AL	40.	30.	1.78*	0.5*	12.	1.78*	0.5*							1.22*		S3	3,26	IGO57
27AL	8.7	73.3	2.8	0.30	10.0	2.8	0.30							2.5?		S2	20	BRA67
27AL	8.7	77.0	2.5*	0.31*	22.0	2.5*	0.31*							2.5?		S2	20	BRA67
27AL	9.34	158.0	2.0	0.31	13.0	2.0	0.31							2.5?		S2	20	BRA67
27AL	9.34	80.0	2.5*	0.31*	10.0	2.5*	0.31*							2.5?		S3	20	BRA67
27AL	10.13	12.8	2.6	0.30	3.8	2.6	0.30							2.5?		S3	20	BRA67
27AL	10.13	84.0	2.5*	0.31*	8.6	2.5*	0.31*							2.5?		S3	20	BRA67
27AL	22.0	51.2*	1.655	0.588	11.87	1.655	0.588							1.65*		S2	11	LEG74
27AL	24.9	218.	1.24	0.68	25.6	1.24	0.68							1.7*		S3	12,10	KEM72
27AL	24.9	215.	1.24	0.67	52.6	0.94	0.22							1.7*		S2	12,10	KEM72
27AL	25.9	218.	1.24	0.68	27.0	1.24	0.68							1.7*		S3	12,10	KEM72
27AL	25.9	215.	1.24	0.67	55.7	0.94	0.22							1.7*		S2	12,10	KEM72
27AL	27.2	30.*	1.737	0.52	9.44	1.737	0.52							1.22*		S3		NEM67
27AL	27.2	30.*	1.737	0.52				9.50	1.436	0.52				1.22*		S3		NEM67
27AL	27.5	218.	1.24	0.68	29.1	1.24	0.68							1.7*		S2	12,10	KEM72
27AL	27.5	215.	1.24	0.67	61.9	0.94	0.22							1.7*		S2	12,10	KEM72
27AL	27.5	164.4	1.229	0.746	22.15	1.229	0.746							1.34*	1251	S3	10	BOB71
27AL	28.	41.0	1.841	0.443	9.7	1.841	0.443							1.3*	1267	S2	5	SAT65
27AL	104.	107.4	1.31	0.748	22.2	1.65	0.543							1.3?		S1	5	HAU72
27AL	104.	187.8	1.21	0.685	37.9	1.27	0.833							1.3?		S1	5	HAU72
SI	24.7	24.9	1.802	0.540	9.0	1.802	0.540							1.3*	1219	S3		MCP66
SI	24.7	203.0	1.557	0.449	18.88	1.557	0.449							1.34*	1175	S3		MAK70
28SI	15.7	82.0	1.62	0.52*	13.5	1.62	0.52*							1.5?		S2	24,25	WUH74
28SI	15.7	121.0	1.52	0.52*	17.5	1.52	0.52*							1.5?		S2	24,25	WUH74
28SI	21.9	51.2*	1.682	0.627	14.10	1.682	0.627							1.65*		S3	11	LEG74
28SI	27.5	202.4	1.314	0.673	20.55	1.314	0.673							1.34*	1279	S3	10	BOB71
28SI	28.	52.5	1.657	0.555	8.6	1.657	0.555							1.4*	1179	S1	5	SAT65
28SI	104.	104.7	1.35	0.658	37.1	1.36	0.77							1.3?		S1	4	REB72
28SI	166.	109.7	1.25	0.81	24.6	1.63	0.51							1.4*		S2	4	TAT70
30SI	15.7	80.8	1.58	0.52*	13.0	1.58	0.52*							1.5?		S2	24,25	WUH74
30SI	15.7	121.0	1.55	0.52*	17.5	1.55	0.52*							1.5?		S2	24,25	WUH74
P	25.0	229.2	1.641	0.395	26.02	1.641	0.395							1.34*	1246	S3	7	MAK70
31P	20.5	62.78	1.780	0.440	9.61	1.780	0.440							1.2*	1178	S	13	LUC66
31P	20.5	100.4	1.664	0.448	12.58	1.664	0.448							1.2*	1124	S	13	LUC66

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TABLE VI. Optical-Model Parameters Alphas

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
S	24.4	137.8	1.607	0.407	22.56	1.607	0.407							1.34*	1185	S3		MAK70
32S	18.1	78.31	1.596	0.588	9.18	1.596	0.588							1.2*	1193	S	16	LUC66
32S	18.1	112.2	1.543	0.584	11.09	1.543	0.584							1.2*	1200	S	16	LUC66
32S	23.8	49.45	1.62	0.63	7.13	1.62	0.63							1.6?		S2		GRE67
32S	27.5	227.1	1.101	0.744	26.64	1.101	0.744							1.34*	1190	S3	10	BOB71
32S	27.9	57.6	1.63	0.525	10.6	1.63	0.525							1.4*		S2	5	KOK67
32S	56.	80.55	1.5*	0.575	20.75	1.50*	0.615							1.4?	1263	S2	4,10	GAI69
32S	56.	171.1	1.45*	0.52	23.60	1.5*	0.515							1.4?	1243	S2	4,10	GAI69
32S	56.	197.2	1.3*	0.61	26.90	1.5*	0.545							1.4?	1245	S2	4,10	GAI69
32S	166.	116.8	1.22	0.82	20.4	1.67	0.52							1.4*		S2	4	BIM73
34S	18.	206.0	1.40*	0.53	14.4	1.48	0.64							1.4*		S3		LEI70
AR	18.	100.	1.57	0.6	15.	1.57	0.6							1.17*		S2	10,26	IGO59
36AR	14.	182.2	1.48*	0.59*				36.4	1.73*	0.30*				1.54*		S2	19	WAL70
36AR	15.	180.7	1.48*	0.59*				36.5	1.73*	0.30*				1.54*		S2	19	WAL70
36AR	16.	179.0	1.48*	0.59*				36.2	1.73*	0.30*				1.54*		S2	19	WAL70
36AR	17.	180.5	1.48*	0.59*				36.6	1.73*	0.30*				1.54*		S2	19	WAL70
40AR	18.0	66.47	1.668	0.519	12.25	1.668	0.519							1.2*	1255	S2		LUC66
40AR	18.0	99.39	1.594	0.524	15.07	1.594	0.524							1.2*	1241	S2		LUC66
40AR	22.0	38.0	1.775	0.50*	9.0	1.775	0.50*							1.25*		S2		WAK70
40AR	27.6	57.5	1.61	0.540	14.0	1.61	0.540							1.4*		S2	5	KOK67
K	24.6	201.7	1.389	0.613	14.78	1.389	0.613							1.34*	1334	S2	7	MAK70
K	24.6	253.8	0.974	0.871	22.60	0.974	0.871							1.34*	1272	S3		MAK70
39K	27.5	215.8	1.111	0.785	22.25	1.111	0.785							1.34*	1287	S2	10	BOB71
CA	8.71	9.04	1.745	0.604	0.59	1.745	0.604							2.0?		S1		BRA67
CA	8.71	43.0	2.0*	0.35*	1.18	2.0*	0.35*							2.0?		S2		BRA67
CA	9.29	6.8	2.15	0.25	0.65	2.15	0.25							2.0?		S2		BRA67
CA	9.29	41.5	2.0*	0.35*	2.64	2.0*	0.35*							2.0?		S2		BRA67
CA	10.07	31.5	2.20	0.327	2.81	2.20	0.327							2.0?		S2		BRA67
CA	10.07	39.7	2.0*	0.35*	3.10	2.0*	0.35*							2.0?		S2		BRA67
CA	24.7	195.0	1.210	0.721	19.2	1.210	0.721							1.3*	1251	S3	10	MCF66
CA	24.7	211.1	1.140	0.790	28.8	0.750	1.142							1.3*	1369	S3	10	MCF66
CA	40.	210.0	1.41	0.59	20.2	1.66	0.35							1.30*		S	4	YOU70A
CA	40.	180.0	1.35	0.65	23.5	1.31	0.69							1.30*		S2	4	YOU70A
40CA	23.1	240.	1.21	0.67	22.5	1.33	0.44							1.33		S3	7	LAB69
40CA	24.0	49.38	1.667	0.574	9.58	1.843	0.475							1.56		S	5,17	VOI74
40CA	27.5	229.0	1.066	0.790	24.36	1.066	0.790							1.34*	1233	S3	10	BOB71
40CA	31.	50.03	1.652	0.585	12.39	1.652	0.585							1.5?		S2	5	LIP67
40CA	41.78	200.*	1.437	0.554	21.95	1.437	0.554							1.4?		S1	4	FER70
40CA	56.	74.3	1.5*	0.605	18.75	1.5*	0.63							1.4?	1382	S	10	GAI69
40CA	56.	158.9	1.4*	0.585	21.05	1.5*	0.54							1.4?	1364	S	10	GAI69
40CA	104.	113.5	1.30	0.764	19.8	1.62	0.559							1.3?		S1	5	HAU72
40CA	104.	219.3	1.21	0.713	98.8	1.40	0.544							1.3?		S	5	HAU72
40CA	142.	107.8	1.315	0.763	19.8	1.694	0.514							1.30*		S1	5	GOL74
40CA	166.	112.9	1.24	0.79	20.7	1.62	0.55							1.4*		S2	4	BIM73
41CA	24.0	49.38	1.667	0.574	9.58	1.843	0.475							1.56		S2	5,17	VOI74
42CA	30.5	54.6	1.622	0.599	16.3	1.700	0.603							1.4?		S1	5	JAC68
42CA	30.5	208.8	1.391	0.603	28.7	1.593	0.602							1.4?		S1	5	JAC68
42CA	31.	51.27	1.608	0.625	14.23	1.608	0.625							1.5?		S2	5	LIP67
42CA	41.76	200.*	1.426	0.555	28.42	1.426	0.555							1.4?		S1	4	FER70
42CA	42.	47.0	1.596	0.602	16.9	1.591	0.604							1.4?		S2	5,10	JAC68
42CA	42.	212.3	1.354	0.589	22.3	1.520	0.586							1.4?		S2	5,10	JAC68
43CA	25.5	52.58	1.573	0.606	11.02	1.658	0.552							1.65		S2	4,17	VOI74
44CA	25.5	52.58	1.573	0.606	11.02	1.658	0.552							1.65		S2	4,17	VOI74
44CA	31.	53.32	1.555	0.630	14.62	1.555	0.630							1.5?		S2	5	LIP67
44CA	41.76	200.*	1.396	0.573	40.69	1.396	0.573							1.4?		S1	4	FER70
44CA	166.	106.4	1.29	0.79	23.0	1.61	0.64							1.4*		S2	2	BIM73
48CA	31.	53.00	1.549	0.641	14.98	1.549	0.641							1.5?		S2	5	LIP67
48CA	41.77	200.*	1.354	0.586	52.04	1.354	0.586							1.4?		S1	4	FER70
48CA	166.	106.9	1.29	0.77	21.5	1.59	0.65							1.4*		S1	2	BIM73
45SC	41.	64.6	1.6*	0.538	14.3	1.6*	0.538							1.6		S1	5	PRI69
45SC	41.	103.6	1.515	0.544	17.5	1.515	0.544							1.51		S1	5	PRI69
45SC	41.	200.2	1.395	0.565	26.4	1.395	0.565							1.39		S1	5	PRI69
TI	27.5	192.1	1.337	0.614	25.78	1.337	0.614							1.34*	1363	S2	10	BOB71
TI	40.	30.	1.71*	0.5*	14.	1.71*	0.5*							1.22*		S2	5,26	IGO57
46TI	41.92	200.*	1.410	0.565	39.90	1.410	0.565							1.4?		S1	4	FER70
46TI	43.0	183.1	1.438	0.537	28.5	1.438	0.537							1.4*		S1	4	YNT67
46TI	43.0	139.2	1.476	0.540	24.8	1.476	0.540							1.4*		S1	4	YNT67
46TI	104.	115.6	1.30	0.74	20.3	1.68	0.65							1.3*		S1	4	REB74

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TABLE VI. Optical-Model Parameters Alphas

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
48TI	28.	48.0	1.617	0.516	12.9	1.617	0.516							1.3*	1347	S1	5	SAT65
48TI	31.	56.3	1.54	0.646	13.0	1.54	0.646							1.4?		S2	4	BER68
48TI	41.94	200.*	1.377	0.582	43.28	1.377	0.582							1.4?		S1	4	FER70
48TI	43.0	186.7	1.438*	0.526	26.0	1.438*	0.526							1.4*		S1	4	YNT67
48TI	43.0	145.9	1.458	0.540	23.4	1.458	0.540							1.4*		S1	4	YNT67
48TI	104.	121.2	1.26	0.76	22.7	1.58	0.64							1.3*		S1	4	REB74
50TI	30.5	183.7	1.4	0.564	26.6	1.4	0.564							1.3*		S2		STO67
50TI	30.5	61.4	1.546	0.588	16.7	1.490	0.579							1.4?		S2		JAC68
50TI	30.5	242.7	1.327	0.597	37.3	1.240	0.593							1.4?		S2		JAC68
50TI	41.92	200.*	1.378	0.569	38.39	1.378	0.569							1.4?		S1	4	FER70
50TI	43.0	182.7	1.438*	0.527	23.4	1.438*	0.527							1.5*		S1	4	YNT67
50TI	43.0	139.6	1.476*	0.527	20.3	1.476*	0.527							1.4*		S1	4	YNT67
50TI	44.	47.6	1.584	0.610	20.4	1.505	0.608							1.4?		S2	4,10	JAC68
50TI	44.	196.4	1.354	0.600	21.9	1.469	0.600							1.4?		S2	4,10	JAC68
50TI	104.	112.2	1.32	0.69	19.1	1.57	0.69							1.3*		S1	4	REB74
CR	24.7	193.5	1.383	0.550	26.88	1.383	0.550							1.4?	1290	S2	10	BUD67
CR	24.9	193.5	1.383	0.550	26.88	1.383	0.550							1.34*	1289	S2		MAK70
50CR	21.	226.2	1.33	0.60	31.4	1.33	0.60							1.40*		S3	14	LEM72
50CR	21.	217.7	1.37*	0.56*	31.4	1.37*	0.56*							1.40*		S3	14	LEM72
50CR	23.	184.3	1.40	0.56	24.8	1.40	0.56							1.40*		S3	14	LEM72
50CR	23.	206.2	1.37*	0.56*	27.7	1.37*	0.56*							1.40*		S3	14	LEM72
50CR	25.	185.6	1.40	0.57	25.4	1.40	0.57							1.40*		S3	14	LEM72
50CR	25.	217.0	1.37*	0.56*	29.9	1.37*	0.56*							1.40*		S3	14	LEM72
50CR	27.2	174.8	1.41	0.50	24.3	1.41	0.50							1.40*		S2	14	LEM72
50CR	27.2	189.0	1.37*	0.56*	29.1	1.37*	0.56*							1.40*		S	16,14	LEM72
50CR	27.2	89.0	1.46	0.58	16.3	1.46	0.58							1.4?		S2	10	SIM72
50CR	27.2	186.0	1.36	0.58	32.0	1.36	0.58							1.4?		S2	10	SIM72
50CR	29.6	210.5	1.28	0.63	29.7	1.28	0.63							1.40*		S	15,14	LEM72
50CR	29.6	190.7	1.37*	0.56*	25.4	1.37*	0.56*							1.40*		S3	14	LEM72
50CR	35.6	200.*	1.368	0.619	15.18	1.728	0.395							1.4*		S2	5	PET72
52CR	21.	189.3	1.36	0.57	24.9	1.36	0.57							1.40*		S1	14	LEM72
52CR	21.	186.6	1.37*	0.56*	24.9	1.37*	0.56*							1.40*		S1	14	LEM72
52CR	25.	211.4	1.34	0.57	30.1	1.34	0.57							1.40*		S2	14	LEM72
52CR	25.	203.9	1.37*	0.56*	29.0	1.37*	0.56*							1.40*		S	16,14	LEM72
52CR	29.6	174.4	1.43	0.48	23.4	1.43	0.48							1.40*		S2	14	LEM72
52CR	29.6	178.2	1.37*	0.56*	24.5	1.37*	0.56*							1.40*		S3	14	LEM72
52CR	41.96	200.*	1.413	0.539	26.29	1.413	0.539							1.4?		S1	4	FER70
MN	24.7	169.8	1.445	0.494	25.1	1.445	0.494							1.3*	1264	S	10	MCF66
MN	24.7	212.9	1.416	0.493	28.7	1.416	0.493							1.3*	1261	S1	10	MCF66
MN	24.7	211.2	1.419	0.495	26.64	1.419	0.495							1.34*	1266	S2		MAK70
FE	24.7	223.7	1.380	0.542	24.62	1.380	0.542							1.4?	1294	S2	10	BUD67
FE	24.9	223.0	1.382	0.540	24.62	1.382	0.540							1.34*	1295	S2		MAK70
54FE	8.0	42.5*	1.495*	0.57*	2.40	1.614*	0.57*							1.49*		S2		YAR73
54FE	8.5	42.5*	1.495*	0.57*	2.88	1.614*	0.57*							1.49*		S2		YAR73
54FE	9.0	42.5*	1.495*	0.57*	3.35	1.614*	0.57*							1.49*		S2		YAR73
54FE	9.5	42.5*	1.495*	0.57*	3.90	1.614*	0.57*							1.49*		S2		YAR73
54FE	10.0	42.5*	1.495*	0.57*	4.40	1.614*	0.57*							1.49*		S2		YAR73
54FE	10.5	42.5*	1.495*	0.57*	4.93	1.614*	0.57*							1.49*		S2		YAR73
54FE	11.0	42.5*	1.495*	0.57*	5.45	1.614*	0.57*							1.49*		S2		YAR73
54FE	11.5	42.5*	1.495*	0.57*	5.99	1.614*	0.57*							1.49*		S2		YAR73
54FE	12.0	42.5*	1.495*	0.57*	6.50	1.614*	0.57*							1.49*		S2		YAR73
54FE	12.5	42.5*	1.495*	0.57*	7.02	1.614*	0.57*							1.49*		S2		YAR73
54FE	13.0	42.5*	1.495*	0.57*	7.52	1.614*	0.57*							1.49*		S2		YAR73
54FE	15.0	42.5*	1.495*	0.57*	9.60	1.614*	0.57*							1.49*		S2		YAR73
54FE	21.	179.1	1.41	0.52	20.6	1.41	0.52							1.40*		S1	14	LEM72
54FE	21.	187.2	1.37*	0.56*	21.7	1.37*	0.56*							1.40*		S2	14	LEM72
54FE	23.	174.5	1.43	0.52	23.5	1.43	0.52							1.40*		S2	14	LEM72
54FE	23.	196.8	1.37*	0.56*	23.9	1.37*	0.56*							1.40*		S3	14	LEM72
54FE	25.	200.3	1.35	0.56	28.8	1.35	0.56							1.40*		S2	14	LEM72
54FE	25.	196.1	1.37*	0.56*	27.5	1.37*	0.56*							1.40*		S	16,14	LEM72
54FE	29.6	192.6	1.31	0.59	25.0	1.31	0.59							1.40*		S3	14	LEM72
54FE	29.6	179.1	1.37*	0.56*	24.1	1.37*	0.56*							1.40*		S3	14	LEM72
54FE	42.02	200.*	1.378	0.562	32.46	1.378	0.562							1.4?		S1	4	FER70
56FE	21.	182.3	1.37	0.55	23.0	1.37	0.55							1.40*		S3	14	LEM72
56FE	21.	213.4	1.37*	0.56*	24.8	1.37*	0.56*							1.40*		S3	14	LEM72
56FE	23.	229.4	1.20	0.67	29.6	1.20	0.67							1.40*		S3	14	LEM72
56FE	23.	186.7	1.37*	0.56*	26.1	1.37*	0.56*							1.40*		S3	14	LEM72
56FE	25.	197.9	1.39	0.53	27.3	1.39	0.53							1.40*		S3	14	LEM72
56FE	25.	205.6	1.37*	0.56*	27.1	1.37*	0.56*							1.40*		S3	14	LEM72
56FE	26.45	74.	1.53	0.60	13.	1.53	0.60							1.5?		S	W65	BLA62
56FE	27.2	223.1	1.30	0.59	29.1	1.30	0.59							1.40*		S	15,14	LEM72
56FE	27.2	214.3	1.37*	0.56*	27.4	1.37*	0.56*							1.40*		S	15,14	LEM72
56FE	27.2	93.0	1.44*	0.60*	20.0	1.44*	0.60*							1.4?		S2	10	SIM72
56FE	27.2	187.0	1.34*	0.57	25.0	1.34*	0.57							1.4?		S2	10	SIM72
56FE	29.6	187.0	1.31	0.61	26.7	1.31	0.61							1.40*		S3	14	LEM72
56FE	29.6	206.3	1.37*	0.56*	25.1	1.37*	0.56*							1.40*		S3	14	LEM72
56FE	42.08	200.*	1.350	0.588	44.60	1.350	0.588							1.4?		S1	3	FER70

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TABLE VI. Optical-Model Parameters Alphas

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
58FE	21.	66.28	1.564	0.564	13.69	1.565	0.503							1.4*	4274	S2	20,10	FUL68
58FE	21.	67.94	1.569*	0.533*	13.44	1.569*	0.388*							1.4*	4227	S	20,10	FUL68
58FE	64.3	41.22	1.57*	0.628	25.53	1.57*	0.585							1.5*		S1	5	DAR64
58FE	64.3	78.5	1.438	0.663	24.1	1.576	0.579							1.11*	4681	S1	22	WEI70
58FE	64.3	118.1	1.356	0.676	23.6	1.581	0.571							1.11*	4677	S1	22	WEI70
58FE	64.3	165.2	1.300	0.670	25.2	1.546	0.601							1.11*	4684	S1	22	WEI70
58FE	64.3	220.4	1.250	0.670	26.7	1.537	0.598							1.11*	4683	S1	22	WEI70
CO	24.7	164.7	1.442	0.520	22.4	1.442	0.520							1.3*	4300	S	10	MCF66
CO	24.7	206.8	1.410	0.519	25.8	1.410	0.519							1.3*	4294	S1	10	MCF66
CO	24.7	204.7	1.418	0.519	24.00	1.418	0.519							1.4?	4303	S1	10	BUD67
CO	24.7	204.7	1.418	0.519	24.0	1.418	0.519							1.34*	4303	S1		MAK70
59CO	27.5	175.3	1.458	0.484	26.02	1.458	0.484							1.34*	4332	S2	10	BOB71
59CO	28.	46.3	1.574	0.586	15.4	1.574	0.586							1.3*	4441	S1	5	SAT65
NI	8.85	60.	1.62	0.54	0.5	1.62	0.54							1.6?		S1		BRA67
NI	8.85	174.	1.62*	0.40*	0.65	1.62*	0.40*							1.6?		S1		BRA67
NI	9.26	32.	1.70	0.48	1.8	1.70	0.48							1.6?		S1		BRA67
NI	9.26	173.3	1.62*	0.40*	13.8	1.62*	0.40*							1.6?		S1		BRA67
NI	10.07	12.	1.72	0.48	1.6	1.72	0.48							1.6?		S1		BRA67
NI	10.07	165.0	1.62*	0.40*	11.4	1.62*	0.40*							1.6?		S1		BRA67
NI	24.7	43.9	1.612	0.534	10.4	1.612	0.534							1.3*	4292	S2	10	MCF66
NI	24.7	198.6	1.458	0.502	19.9	1.458	0.502							1.3*	4298	S1	10	MCF66
NI	24.7	200.5	1.451	0.504	20.11	1.451	0.504							1.4?	4285	S2	10	BUD67
NI	24.7	200.5	1.451	0.503	20.11	1.451	0.503							1.34*	4285	S2		MAK70
58NI	21.	67.43	1.586	0.522	12.78	1.586	0.409							1.4*	4158	S2	20,10	FUL68
58NI	21.	69.07	1.569*	0.533*	13.22	1.569*	0.388*							1.4*	4158	S	20,10	FUL68
58NI	21.	169.5	1.43	0.50	18.9	1.43	0.50							1.40*		S1	14	LEM72
58NI	21.	180.7	1.37*	0.56*	21.9	1.37*	0.56*							1.40*		S2	14	LEM72
58NI	23.	166.5	1.44	0.53	20.0	1.44	0.53							1.40*		S2	14	LEM72
58NI	23.	191.8	1.37*	0.56*	21.8	1.37*	0.56*							1.40*		S2	14	LEM72
58NI	25.	185.0	1.39	0.55	24.6	1.39	0.55							1.40*		S2	14	LEM72
58NI	25.	194.2	1.37*	0.56*	26.0	1.37*	0.56*							1.40*		S3	14	LEM72
58NI	27.2	210.3	1.31	0.59	26.7	1.31	0.59							1.40*		S	15,14	LEM72
58NI	27.2	200.7	1.37*	0.56*	24.9	1.37*	0.56*							1.40*		S	15,14	LEM72
58NI	27.2	93.0	1.44*	0.60*	20.0	1.44*	0.60*							1.4?		S2	10	SIM72
58NI	27.2	185.0	1.40	0.60*	20.0	1.40	0.60*							1.4?		S3	10	SIM72
58NI	28.	48.8	1.591	0.530	11.1	1.591	0.530							1.3*	4342	S1	5	SAT65
58NI	29.6	224.8	1.31	0.56	27.3	1.31	0.56							1.40*		S2	14	LEM72
58NI	29.6	195.8	1.37*	0.56*	23.1	1.37*	0.56*							1.40*		S	15,14	LEM72
58NI	32.3	103.6	1.406	0.637	14.1	1.626	0.443							1.4*		S2	10	COW74
58NI	32.3	135.4	1.425	0.575	21.5	1.576	0.345							1.4*		S2	10	COW74
58NI	34.4	46.33	1.633	0.534	15.43	1.476	0.534							1.25*		S1	5	INO68
58NI	34.4	228.5	1.416	0.530	51.97	0.971	0.530							1.25*		S2	5	INO68
58NI	42.	150.8	1.36	0.624	31.05	1.36	0.624							1.25*	4512	S3	10	BAR71
58NI	42.	41.45	1.52	0.684	10.07	1.71	0.559							1.25*	4541	S2	10	BAR71
58NI	42.12	200.*	1.375	0.566	27.86	1.375	0.566							1.4?		S1	4	FER70
58NI	43.	67.0	1.524	0.529	14.6	1.524	0.529							1.4*	4447	S	10,15	BRO65
58NI	43.	152.5	1.344	0.606	28.6	1.344	0.606							1.4*	4460	S	10,15	BRO65
58NI	50.2	105.3	1.456	0.571	22.3	1.456	0.571							1.5?	4533	S1	5	JAR67
58NI	50.2	144.5	1.417	0.563	25.4	1.417	0.563							1.5?	4525	S1	5	JAR67
58NI	50.2	188.2	1.385	0.557	28.8	1.385	0.557							1.5?	4519	S1	5	JAR67
58NI	50.2	95.1	1.555	0.516	19.6	1.692	0.246							1.11*		S1	22	WEI70
58NI	50.2	132.9	1.505	0.518	20.8	1.678	0.250							1.11*		S1	22	WEI70
58NI	50.2	178.4	1.450	0.540	20.7	1.687	0.251							1.11*		S1	22	WEI70
58NI	60.	173.1	1.279	0.719	22.17	1.588	0.531							1.3*	4634	S1	10	MAD74
58NI	60.	228.2	1.254	0.692	25.23	1.577	0.515							1.3*	4628	S1	10	MAD74
58NI	64.3	44.99	1.57*	0.565	20.91	1.57*	0.580							1.5*		S2	5	DAR64
58NI	64.3	111.4	1.423	0.625	20.0	1.661	0.420							1.11*	4591	S2	22	WEI70
58NI	64.3	158.9	1.357	0.629	21.0	1.641	0.438							1.11*	4592	S2	22	WEI70
58NI	64.3	209.4	1.316	0.625	22.3	1.631	0.437							1.11*	4590	S2	22	WEI70
58NI	104.	120.0	1.27	0.74	21.3	1.55	0.67							1.3*		S1	17,5	REB72A
58NI	139.	116.7	1.246	0.793	21.15	1.590	0.569							1.25?		S1	5	GOL72
58NI	139.	116.4	1.245	0.793	20.52	1.595	0.571							1.40*		S1	5	GOL73
58NI	139.	118.2	1.240	0.796	20.5	1.595	0.571							1.30*		S1	5	GOL74
58NI	166.	107.4	1.27	0.75	22.6	1.59	0.50							1.4*		S2	4	BIM73
60NI	16.6	45.9	1.45	0.55*	10.0	1.45	0.55*							1.45?		S2		HER70
60NI	21.	212.3	1.47	0.55	23.6	1.47	0.55							1.40*		S2	14	LEM72
60NI	21.	211.0	1.37*	0.56*	23.0	1.37*	0.56*							1.40*		S2	14	LEM72
60NI	23.	160.8	1.45	0.53	19.8	1.45	0.53							1.40*		S2	14	LEM72
60NI	23.	189.8	1.37*	0.56*	22.3	1.37*	0.56*							1.40*		S	16,14	LEM72
60NI	25.	202.3	1.33	0.59	30.8	1.33	0.59							1.40*		S3	14	LEM72
60NI	25.	227.4	1.37*	0.56*	30.9	1.37*	0.56*							1.40*		S	16,14	LEM72
60NI	27.2	211.2	1.34	0.56	26.8	1.34	0.56							1.40*		S2	14	LEM72
60NI	27.2	207.1	1.37*	0.56*	26.9	1.37*	0.56*							1.40*		S2	14	LEM72
60NI	27.2	93.0	1.44*	0.60*	20.0	1.44*	0.60*							1.4?		S2	10	SIM72
60NI	27.2	185.0	1.40	0.60*	21.7	1.40	0.60*							1.4?		S2	10	SIM72
60NI	28.	47.7	1.581	0.549	11.9	1.581	0.589							1.3*	4381	S1	5	SAT65
60NI	29.6	210.7	1.35	0.55	27.0	1.35	0.55							1.40*		S2	14	LEM72
60NI	29.6	200.1	1.37*	0.56*	25.5	1.37*	0.56*							1.40*		S	15,14	LEM72

See page 8 for Explanation of Tables

TABLE VI. Optical-Model Parameters Alphas

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
60NI	32.3	101.4	1.408	0.645	14.0	1.624	0.531							1.4*		S2	10	COW74
60NI	32.3	131.1	1.419	0.579	19.2	1.547	0.465							1.4*		S2	10	COW74
60NI	34.4	50.56	1.589	0.567	17.22	1.509	0.567							1.25*		S1	5	INO68
60NI	34.4	226.0	1.385	0.554	35.94	1.254	0.554							1.25*		S1	5	INO68
60NI	42.00	200.*	1.371	0.572	42.97	1.371	0.572							1.4?		S1	4	FER70
60NI	60.	163.3	1.299	0.666	24.86	1.518	0.577							1.3*	1624	S1	10	MAD74
60NI	60.	215.2	1.272	0.643	29.04	1.484	0.580							1.3*	1622	S1	10	MAD74
60NI	104.	113.1	1.325	0.68	22.4	1.52	0.72							1.3*		S1	17,5	REB72A
60NI	166.	103.8	1.28	0.71	25.3	1.51	0.63							1.4*		S2	4	BIM73
62NI	21.	67.89	1.555	0.526	12.81	1.555	0.338							1.4*	1189	S2	20,10	FUL68
62NI	21.	65.63	1.569*	0.533*	12.94	1.569*	0.388*							1.4*	1216	S	20,10	FUL68
62NI	21.	236.0	1.29	0.54	23.9	1.29	0.54							1.40*		S2	14	LEM72
62NI	21.	203.2	1.37*	0.56*	22.1	1.37*	0.56*							1.40*		S2	14	LEM72
62NI	23.	201.0	1.40	0.55	25.2	1.40	0.55							1.40*		S2	14	LEM72
62NI	23.	186.7	1.37*	0.56*	24.9	1.37*	0.56*							1.40*		S	16,14	LEM72
62NI	25.	204.2	1.33	0.59	25.3	1.33	0.59							1.40*		S3	14	LEM72
62NI	25.	196.8	1.37*	0.56*	25.5	1.37*	0.56*							1.40*		S	16,14	LEM72
62NI	29.6	195.3	1.40	0.53	26.5	1.40	0.53							1.40*		S	15,14	LEM72
62NI	29.6	200.2	1.37*	0.56*	26.9	1.37*	0.56*							1.40*		S	15,14	LEM72
62NI	32.3	101.3	1.408	0.645	14.0	1.624	0.531							1.4*		S2	10	COW74
62NI	32.3	134.6	1.399	0.582	21.2	1.478	0.598							1.4*		S2	10	COW74
62NI	33.	60.	1.550*	0.533*	11.4	1.652*	0.352*							1.4?		S1		TAM65
62NI	41.98	200.*	1.357	0.595	54.30	1.357	0.595							1.4?		S1	4	FER70
62NI	50.	70.	1.55*	0.533*	40.	1.652*	0.352*							1.4?		S1	4	TAM65
62NI	60.	162.3	1.300	0.663	27.72	1.486	0.624							1.3*	1686	S1	10	MAD74
62NI	60.	217.2	1.263	0.649	32.88	1.447	0.631							1.3*	1683	S1	10	MAD74
62NI	100.	73.	1.55*	0.533*	50.	1.652*	0.352*							1.4?		S1	2	TAM65
62NI	104.	117.5	1.28	0.70	22.3	1.525	0.71							1.3*		S1	17,5	REB72A
62NI	166.	115.7	1.20	0.80	21.6	1.53	0.64							1.4*		S2	4	BIM73
64NI	19.5	58.24	1.597	0.578	12.77	1.597	0.554							1.4*	1295	S2		IVA70
64NI	21.	64.37	1.570	0.528	13.91	1.570	0.359							1.4*	1235	S1	20,10	FUL68
64NI	21.	64.24	1.569*	0.533*	13.74	1.569*	0.388*							1.4*	1240	S	20,10	FUL68
64NI	21.	212.9	1.33	0.56	25.0	1.33	0.56							1.40*		S2	14	LEM72
64NI	21.	200.4	1.37*	0.56*	25.2	1.37*	0.56*							1.40*		S2	14	LEM72
64NI	23.	203.3	1.35	0.59	29.4	1.35	0.59							1.40*		S2	14	LEM72
64NI	23.	207.3	1.37*	0.56*	30.7	1.37*	0.56*							1.40*		S2	14	LEM72
64NI	25.	201.7	1.33	0.59	25.8	1.33	0.59							1.40*		S3	14	LEM72
64NI	25.	202.0	1.37*	0.56*	29.3	1.37*	0.56*							1.40*		S	15,14	LEM72
64NI	29.6	201.4	1.36	0.56	25.8	1.36	0.56							1.40*		S	15,14	LEM72
64NI	29.6	198.1	1.37*	0.56*	25.8	1.37*	0.56*							1.40*		S	15,14	LEM72
64NI	30.5	206.2	1.472	0.501	21.22	1.472	0.501							1.4?		S2	5	HEY68
64NI	32.3	96.7	1.436	0.614	14.6	1.590	0.580							1.4*		S2	10	COW74
64NI	32.3	133.4	1.406	0.574	24.2	1.366	0.652							1.4*		S2	10	COW74
64NI	60.	165.8	1.275	0.671	27.87	1.462	0.642							1.3*	1683	S1	10	MAD74
64NI	60.	224.1	1.235	0.659	30.57	1.441	0.644							1.3*	1680	S1	10	MAD74
64NI	104.	135.1	1.20	0.80	21.2	1.55	0.73							1.3*		S1	17,5	REB72A
CU	24.7	157.8	1.443	0.544	21.9	1.443	0.544							1.3*	1349	S	10,17	MCF66
CU	24.7	196.8	1.416	0.541	24.6	1.416	0.541							1.3*	1346	S1	10,17	MCF66
CU	24.7	193.2	1.436	0.534	22.84	1.436	0.534							1.4?	1356	S1	10	BUD67
CU	40.	46.8	1.67*	0.5*	13.	1.67*	0.5*							1.30*		S3	5,26	IGO57
CU	40.	49.3	1.70	0.5	11.	1.70	0.5							1.17*		S2	10,26	IGO59
63CU	19.5	59.22	1.641	0.500	12.12	1.641	0.307							1.4*	1175	S2		IVA70
65CU	19.5	59.26	1.586	0.581	12.16	1.586	0.598							1.4*	1272	S2		IVA70
ZN	24.7	200.4	1.394	0.572	25.13	1.394	0.572							1.4?	1368	S1	10	BUD67
64ZN	21.	67.30	1.570	0.525	11.89	1.570	0.312							1.4*	1171	S2	20,10	FUL68
64ZN	21.	67.12	1.569*	0.533*	12.30	1.569*	0.388*							1.4*	1179	S	20,10	FUL68
64ZN	21.	218.2	1.35	0.51	20.4	1.35	0.51							1.40*		S2	14	LEM72
64ZN	21.	204.4	1.37*	0.56*	20.0	1.37*	0.56*							1.40*		S3	14	LEM72
64ZN	23.	206.6	1.34	0.63	21.8	1.34	0.63							1.40*		S3	14	LEM72
64ZN	23.	214.3	1.37*	0.56*	21.1	1.37*	0.56*							1.40*		S3	14	LEM72
64ZN	25.	188.6	1.37	0.56	23.4	1.37	0.56							1.40*		S3	14	LEM72
64ZN	25.	191.3	1.37*	0.56*	25.0	1.37*	0.56*							1.40*		S3	14	LEM72
64ZN	27.2	176.1	1.38	0.57	26.9	1.38	0.57							1.40*		S	15,14	LEM72
64ZN	27.2	199.0	1.37*	0.56*	24.7	1.37*	0.56*							1.40*		S2	14	LEM72
64ZN	27.2	93.0	1.44*	0.60*	20.0	1.44*	0.60*							1.4?		S2	10	SIM72
64ZN	27.2	202.0	1.34*	0.60*	28.4	1.34*	0.60*							1.4?		S2	10	SIM72
64ZN	29.6	184.5	1.43	0.50	23.8	1.43	0.50							1.40*		S2	14	LEM72
64ZN	29.6	198.0	1.37*	0.56*	25.9	1.37*	0.56*							1.40*		S	15,14	LEM72
64ZN	31.0	45.05*	1.639	0.551	11.6*	1.639	0.551							1.64?		S2	5	ALP70
64ZN	44.4	60.	1.57	0.55	15.	1.57	0.55							1.5?		S	W65	BEU60
66ZN	19.5	65.19	1.558	0.539	10.85	1.558	0.539							1.4*	1138	S2		IVA70
66ZN	27.2	93.0	1.44*	0.60*	20.0	1.44*	0.60*							1.4?		S2	10	SIM72
66ZN	27.2	187.0	1.34*	0.60*	25.0	1.34*	0.60*							1.4?		S2	10	SIM72
66ZN	31.0	45.05	1.642	0.562	11.65	1.642	0.562							1.64?		S1	5	ALP70
68ZN	31.	46.05	1.58	0.619	12.29	1.58	0.619							1.58		S2	4	ALP71
70ZN	27.2	100.0	1.40	0.60*	42.3	1.40	0.60*							1.4?		S2	10	SIM72
70ZN	27.2	189.0	1.34*	0.60*	28.5	1.34*	0.60*							1.4?		S2	10	SIM72
70ZN	31.	38.57	1.64	0.578	12.13	1.64	0.578							1.64		S2	5	ALP71

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TABLE VI. Optical-Model Parameters Alphas

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	BW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
GE	23.4	225.9	1.370	0.599	27.55	1.370	0.599							1.34*	1391	S2		MAK70
GE	24.7	184.9	1.408	0.572	24.5	1.408	0.572							1.3*	1360	S	10,17	MCP66
GE	24.7	225.6	1.382	0.569	27.5	1.382	0.569							1.3*	1356	S1	10,17	MCP66
88SR	166.	116.0	1.27	0.76	22.6	1.50	0.76							1.4*		S2	2	BIM73
Y	20.0	52.93	1.568	0.528	10.28	1.569	0.485							1.4*		S1		PAR71
Y	20.0	146.1	1.464	0.515	18.25	1.470	0.449							1.4*		S1		PAR71
Y	20.0	177.2	1.443	0.514	19.84	1.459	0.445							1.4*		S1		PAR71
89Y	65.0	125.0*	1.365	0.635	54.78	1.365	0.635							1.4*	1922	S2	5,10	BIN69
ZR	24.7	153.6	1.468	0.523	19.8	1.468	0.523							1.3*	1316	S	10,21	MCP66
ZR	24.7	187.3	1.444	0.523	22.3	1.444	0.523							1.3*	1312	S2	10,21	MCP66
90ZR	31.	42.78	1.579	0.574	10.40	1.579	0.574							1.58		S1	3	MAR68
90ZR	40.0	109.5	1.491	0.509	15.15	1.570	0.309							1.3?		S	15,23	PER75
90ZR	59.1	116.0	1.372	0.645	20.42	1.479	0.627							1.3?		S	15,23	PER75
90ZR	65.	34.63	1.553	0.631	17.35	1.553	0.631							1.4*		S1	5	BIN66
90ZR	79.5	140.6	1.225	0.824	18.04	1.587	0.548							1.3?		S2	23	PER75
90ZR	99.5	131.6	1.237	0.804	19.55	1.570	0.563							1.3?		S2	23	PER75
90ZR	118.	130.0	1.231	0.821	20.03	1.572	0.568							1.3?		S2		PUT74
90ZR	142.	117.5	1.267	0.783	21.0	1.564	0.569							1.30*		S1	3	GOL74
90ZR	166.	118.4	1.24	0.79	21.7	1.54	0.59							1.4*		S2	4	BIM73
91ZR	65.	36.92	1.550	0.661	19.15	1.550	0.661							1.4*		S1	5	BIN66
92ZR	65.	34.36	1.554	0.662	18.92	1.554	0.662							1.4*		S1	5	BIN66
92ZR	65.	75.00*	1.426	0.661	39.34	1.426	0.661							1.4*		S1	5	BIN66
92ZR	65.0	79.66	1.397	0.699	22.04	1.547	0.595							1.4*	1968	S	10	BIN69
92ZR	65.0	212.6	1.267	0.663	98.45	1.261	0.673							1.4*	1982	S	10	BIN69
94ZR	65.0	125.0*	1.346	0.661	66.2	1.346	0.661							1.4*	2014	S2	5,10	BIN69
96ZR	65.0	125.0*	1.346	0.660	67.6	1.346	0.660							1.4*	2040	S2	5,10	BIN69
NB	40.	45.	1.64*	0.5*	13.5	1.64*	0.5*							1.30*		S3	5,26	IGO57
MO	40.	42.	1.63*	0.5*	9.5	1.63*	0.5*							1.30*		S2	5,26	IGO57
92MO	30.9	184.9	1.396*	0.562*	25.17	1.396*	0.562*							1.3*		S2	5	MAT72
92MO	31.	39.45	1.624	0.568	8.65	1.624	0.568							1.62		S1	5	MAR68
92MO	32.2	154.9	1.43	0.549	22.2	1.26	0.665							1.3*		S2	5,10	BUR75
92MO	166.	120.5	1.22	0.81	21.1	1.54	0.60							1.4*		S2	4	BIM73
94MO	30.9	185.4	1.396*	0.562*	25.62	1.396*	0.562*							1.3*		S1	5	MAT72
94MO	32.2	154.8	1.42	0.562	23.2	1.25	0.788							1.3*		S1	5,10	BUR75
96MO	30.9	185.9	1.396*	0.562*	26.09	1.396*	0.562*							1.3*		S1	5	MAT72
96MO	32.2	153.5	1.42	0.572	24.9	1.25	0.825							1.3*		S1	5,10	BUR75
98MO	30.9	186.4	1.396*	0.562*	26.45	1.396*	0.562*							1.3*		S1	5	MAT72
98MO	32.2	158.9	1.42	0.558	26.6	1.29	0.784							1.3*		S1	5,10	BUR75
100MO	30.9	186.9	1.396*	0.562*	26.90	1.396*	0.562*							1.3*		S1	5	MAT72
100MO	32.2	161.5	1.38	0.604	22.6	1.35	0.930							1.3*		S1	5,10	BUR75
AG	22.	50.*	1.57	0.6*	20.*	1.57	0.6*							1.57		S	W65	CHE57
AG	22.	150.*	1.49	0.6*	20.*	1.49	0.6*							1.49		S	W65	CHE57
AG	22.	35.	1.62*	0.5*	7.5	1.62*	0.5*							1.30*		S2	26	IGO57
AG	24.7	37.7	1.596	0.582	17.4	1.596	0.582							1.3*	1351	S	10	MCP66
AG	24.7	175.4	1.444	0.548	31.7	1.444	0.548							1.3*	1309	S1	10	MCP66
AG	24.7	206.3	1.430	0.547	30.05	1.430	0.547							1.34*	1306	S1		MAK70
AG	28.	51.1	1.484	0.597	9.4	1.484	0.597							1.3*	1329	S1	5	SAT65
AG	28.	50.2	1.499	0.599	9.8	1.499	0.599							1.3*	1362	S1	5,17	SAT65
AG	40.	37.	1.62*	0.5*	10.	1.62*	0.5*							1.30*		S2	5,26	IGO57
107AG	18.7	50.*	1.580	0.55	20.	1.580	0.55							1.4?		S2	10	ELN65
107AG	18.7	75.*	1.526	0.55	27.	1.526	0.55							1.4?		S2	10	ELN65
107AG	22.	50.*	1.580	0.60	20.	1.580	0.60							1.4?		S2	10	ELN65
107AG	22.	75.*	1.526	0.60	27.	1.526	0.60							1.4?		S2	10	ELN65
107AG	40.	50.*	1.580	0.61	29.	1.580	0.61							1.4?		S2	5,10	ELN65
107AG	40.	75.*	1.526	0.60	37.	1.526	0.60							1.4?		S2	5,10	ELN65
CD	28.	46.2	1.523	0.574	11.8	1.523	0.574							1.3*	1408	S1	5	SAT65
CD	28.	58.9	1.521	0.572	13.5	1.521	0.572							1.3*	1460	S1	5,17	SAT65
IN	24.7	34.8	1.590	0.598	16.7	1.590	0.598							1.3*	1350	S	10	MCP66
IN	24.7	179.8	1.418	0.569	39.9	1.418	0.569							1.3*	1309	S1	10	MCP66
IN	24.7	172.8	1.412	0.589	60.57	1.412	0.589							1.34*	1351	S1		MAK70
SN	24.7	45.4	1.562	0.556	11.0	1.562	0.556							1.3*	1261	S	10	MCP66
SN	24.7	219.3	1.395	0.549	31.8	1.395	0.549							1.3*	1253	S1	10	MCP66
SN	24.7	218.6	1.373	0.553	29.87	1.373	0.553							1.34*	1221	S1		MAK70
SN	28.	47.1	1.493	0.572	9.7	1.493	0.572							1.3*	1342	S1	5	SAT65
SN	28.	63.1	1.488	0.575	13.5	1.488	0.575							1.3*	1415	S1	5,17	SAT65
SN	166.	127.6	1.19	0.88	22.0	1.50	0.60							1.5*		S2	4	TAT70

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TABLE VI. Optical-Model Parameters Alphas

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R	A	VOL.IMAG. POTENTIAL W	RW	AW	SURF.IMAG. POTENTIAL WD	RD	AD	SPIN-ORBIT POTENTIAL VSO	RSO	ASO	RC	SR	FIT	NOTE	REF.
116SN	34.4	48.5*	1.52*	0.585*	13.0*	1.52*	0.585*							1.3*		S1	17,5	KUM68
116SN	40.	60.1	1.46*	0.712	18.7	1.46*	0.712							1.4?	1888	S2		BAR66
116SN	65.7	100.0*	1.352	0.667	53.7	1.352	0.667							1.4*	2082	S2	5,10	BIN69
116SN	65.7	200.0*	1.254	0.669	102.9	1.254	0.669							1.4*	2077	S2	5,10	BIN69
116SN	166.	121.5	1.21	0.84	21.9	1.51	0.63							1.20?		S2	4	BRI72
117SN	34.4	48.5*	1.52*	0.585*	13.0*	1.52*	0.585*							1.3*		S1	17,5	KUM68
118SN	34.4	48.5*	1.52*	0.585*	13.0*	1.52*	0.585*							1.3*		S1	17,5	KUM68
118SN	40.	61.8	1.46*	0.671	26.3	1.46*	0.671							1.4?	1896	S2		BAR66
118SN	166.	125.6	1.19	0.86	21.6	1.52	0.62							1.20?		S2	4	BRI72
119SN	34.4	48.5*	1.52*	0.585*	13.0*	1.52*	0.585*							1.3*		S1	17,5	KUM68
120SN	34.4	48.5*	1.52*	0.585*	13.0*	1.52*	0.585*							1.3*		S1	17,5	KUM68
120SN	40.	58.0	1.46*	0.708	28.0	1.46*	0.708							1.4?	1981	S2		BAR66
120SN	42.	42.85	1.47	0.724	22.80	1.52	0.605							1.25*	1887	S2	10	BAR71
120SN	42.	87.68	1.37	0.714	38.60	1.43	0.615							1.25*	1886	S	10	BAR71
120SN	166.	119.4	1.26	0.76	30.7	1.43	0.70							1.20?		S2	4	BRI72
122SN	40.	62.1	1.46*	0.684	30.3	1.46*	0.684							1.4?	1991	S2		BAR66
124SN	104.	60.0	1.383	0.742	40.88	1.383	0.742							1.38?		S2	4	HAU69
124SN	166.	119.3	1.26	0.77	28.8	1.45	0.67							1.20?		S2	4	BRI72
122TE	42.	36.64	1.50*	0.671	19.95	1.50*	0.671							1.5?	1881	S1		LEO67
124TE	42.	38.95	1.48*	0.672	21.20	1.48*	0.672							1.5?	1878	S1		LEO67
126TE	42.	39.65	1.48*	0.682	21.55	1.48*	0.682							1.5?	1915	S1		LEO67
128TE	42.	45.79	1.48*	0.655	22.75	1.48*	0.655							1.5?	1931	S1	5	LEO67
130TE	42.	34.13	1.50*	0.671	20.19	1.50*	0.671							1.5?	1959	S1	5	LEO67
140CE	45.	153.3	1.386	0.578	20.64	1.271	0.805							1.4?		S1	5	BAK70
140CE	45.	189.1	1.309	0.62*	24.2	1.435	0.62*							1.4*		S2		BAK72
144SM	50.	185.0	1.40*	0.52	25.8	1.33	0.49							1.4*		S2	5	BAR71A
HF	24.7	24.6	1.440	0.578	11.2	1.440	0.578							1.3*	575	S	10	MCP66
HF	24.7	188.6	1.284	0.532	23.7	1.284	0.532							1.3*	561	S1	10	MCP66
HF	24.7	207.5	1.388	0.520	46.49	1.388	0.520							1.34*	794	S3		MAK70
TA	40.	51.	1.58*	0.5*	9.	1.58*	0.5*							1.30*		S2	3,26	IGO57
W	24.7	35.2	1.448	0.573	4.96	1.448	0.573							1.3*	594	S	10	MCP66
W	24.7	249.5	1.236	0.592	27.5	1.236	0.592							1.3*	592	S1	10	MCP66
W	24.7	195.2	1.282	0.575	27.96	1.282	0.575							1.34*	607	S1		MAK70
AU	22.	30.	1.57*	0.5*	9.5	1.57*	0.5*							1.30*		S2	26	IGO57
AU	24.7	49.1	1.460	0.549	14.9	1.460	0.549							1.3*	564	S	10	MCP66
AU	24.7	168.7	1.378	0.517	21.6	1.378	0.517							1.3*	559	S1	10	MCP66
AU	24.7	191.8	1.423	0.483	32.46	1.423	0.483							1.34*	619	S2		MAK70
AU	40.	44.	1.57*	0.5*	10.	1.57*	0.5*							1.30*		S2	3,26	IGO57
PB	22.	30.	1.57*	0.5*	16.	1.57*	0.5*							1.30*		S2	26	IGO57
PB	40.	43.	1.57*	0.5*	7.6	1.57*	0.5*							1.30*		S2	3,26	IGO57
PB	48.	25.	1.47	0.6	15.	1.47	0.6							1.17*		S2	10,26	IGO59
PB	166.	118.0	1.25	0.71	23.1	1.39	0.81							1.5*		S2	4	TAT70
207PB	42.	187.	1.35	0.574	25.	1.35	0.574							1.3*		S1	5	SAT69
207PB	42.	135.	1.38	0.577	21.	1.38	0.577							1.3*		S1	5	SAT69
208PB	19.	96.44	1.376	0.625				32.0	1.216	0.42				1.20*		S2	12,14	BAR74
208PB	19.5	20.	1.22*	0.57*	38.	1.22*	0.57*							1.22*		S1		HUD74
208PB	20.	174.	1.47	0.47	16.83	1.47	0.47							1.4?		S3	12	BAR69
208PB	20.	96.44	1.376	0.625				32.0	1.216	0.42				1.20*		S2	12,14	BAR74
208PB	21.0	32.	1.22*	0.57*	15.	1.22*	0.57*							1.22*		S1		HUD74
208PB	22.	96.44	1.376	0.625				32.0	1.216	0.42				1.20*		S2	12,14	BAR74
208PB	22.5	33.	1.22*	0.57*	6.	1.22*	0.57*							1.22*		S1		HUD74
208PB	24.5	37.	1.22*	0.57*	5.	1.22*	0.57*							1.22*		S1		HUD74
208PB	25.5	41.	1.22*	0.57*	2.	1.22*	0.57*							1.22*		S1		HUD74
208PB	104.	60.0	1.392	0.656	43.85	1.392	0.656							1.39?		S2	4	HAU69
208PB	139.	110.0	1.315	0.705	21.27	1.509	0.673							1.40*		S2	5	GOL73
208PB	139.	155.0	1.282	0.677	23.26	1.478	0.733							1.40*		S1	5	GOL73
208PB	139.	200.0	1.261	0.657	24.50	1.462	0.767							1.40*		S2	5	GOL73
208PB	166.	119.9	1.26	0.74	21.3	1.45	0.80							1.4*		S1	4	BIM73
BI	24.7	58.8	1.454	0.560	5.83	1.454	0.560							1.3*	502	S	10	MCP66
BI	24.7	177.3	1.342	0.569	15.6	1.342	0.569							1.3*	500	S1	10	MCP66
209BI	19.	96.44	1.376	0.625				32.0	1.216	0.42				1.20*		S2	12,14	BAR74
209BI	20.	96.44	1.376	0.625				32.0	1.216	0.42				1.20*		S2	12,14	BAR74
209BI	20	174.	1.47	0.47	16.83	1.47	0.47							1.4?		S3	12	BAR69
209BI	22.	96.44	1.376	0.625				32.0	1.216	0.42				1.20*		S2	12,14	BAR74
209BI	22.	100.4	1.444	0.542				44.3	1.20	0.40				1.20*		S1		BAR74
209BI	104.	63.98	1.368	0.702	46.34	1.368	0.702							1.37?		S1	4	HAU69
TH	40.	50.	1.56*	0.5*	7.5	1.56*	0.5*							1.30*		S2	5,26	IGO57
U	24.7	43.1	1.413	0.550*	8.51	1.413	0.550*							1.3*	185	S	10	MCP66
U	24.7	225.8	1.304	0.515	24.3	1.304	0.515							1.3*	189	S1	10	MCP66

See page 8 for Explanation of Tables

TABLE VI. Optical-Model Parameters Alphas

NOTES

1. The Coulomb potential has a Woods-Saxon form with $r_c = (1.106 + 1.053 \times 10^{-4}A)$ F and $a_c = 0.502$ F
2. Data for angles smaller than 40°
3. Data for angles smaller than 100°
4. Data for angles smaller than 60°
5. Data for angles smaller than 90°
6. Because of the lack of details there is some uncertainty in the interpretation of some of the parameters describing the imaginary part of the potential
7. Data for angles larger than 90° are not used in the search
8. Data absolute normalization known to ±35%
9. An I.ℓ term is used in place of the usual spin-orbit term
10. See publication for other sets of parameters fitting the same data
11. ℓ-dependent absorption: see publication
12. These parameters are obtained from a global search on several angular distributions
13. These parameters give a good fit to the data up to 90°
14. Data measurements between 60° and 170°
15. Acceptable fit up to 120°
16. Acceptable fit up to 130°
17. See publication for data normalization
18. See publication for other sets of parameters with bell-shaped potentials
19. See publication for compound elastic contribution
20. Data at angles larger than 130° are not used in the search
21. Arbitrary normalization of cross section data
22. Notes 1, 5 and 10
23. See also reference PUT74
24. Energy averaged-data. See publication.
25. Hauser-Feshbach calculations performed
26. RC is the half-value parameter, divided by $A^{1/3}$ of a charge distribution having an exponential dependence on radial distance. See publication.

W65. As reported in a previous compilation by D. R. Winner and R. M. Drisko, "Phenomenological Optical Model Parameters," Technical Report, Department of Physics, University of Pittsburgh, June 1965

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Target Nuclei	Energy Range (MeV)	References
^{12}C	27 to 39	YAM74
^{32}S	10 to 17.5	ALD68
^{36,40}Ar, ^{41}K, Ca Isotopes	18 to 29	GAU69
^{40}Ca	5 to 12.5	JOH69
^{40}Ca	12 to 18	ROB68
^{42}Ca, ^{48}Ti, ^{52}Cr	16.0	BOC67
^{40}Ca to ^{60}Ni	19.5	BOC67
Ni Even-Isotopes	18 to 27	TRO74

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See page 8 for Explanation of Tables

TABLE VII. Optical-Model Parameters Heavy Ions

LITHIUM-6 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
6LI	6.0	53.9	2.40*	1.05*	4.1	2.40*	1.05*							2.40*		S2	7	PER73
6LI	7.0	81.8	5.41	0.545				5.964	8.74	0.449				5.41?		S2	7	YOU72
6LI	8.	109.	4.2	0.5				23.0	4.5	0.45				7.0*		S2	16,7	GRU73
6LI	10.	81.8	2.36*	1.15*	21.4	2.36*	1.15							2.36*		S2	7	CLE72
6LI	10.	109.	4.2	0.5				23.0	4.5	0.45				7.0*		S2	16,7	GRU73
6LI	10.	84.1	2.40*	1.05*	18.7	2.40*	1.05*							2.40*		S2	7	PER73
6LI	12.	9.8*	4.7*	0.76*	9.7	4.7*	0.76*							4.7*		S3		MOR70
6LI	12.	109.	4.2	0.5				23.0	4.5	0.45				7.0*		S2	16,7	GRU73
6LI	14.	56.6	2.36*	1.15*	25.9	2.36*	1.15							2.36*		S2	7	CLE72
6LI	14.	72.0	2.40*	1.05*	27.9	2.40*	1.05*							2.40*		S2	7	PER73
6LI	14.5	109.	4.2	0.5				23.0	4.5	0.45				7.0*		S2	16,7	GRU73
6LI	20.	9.8*	4.7*	0.76*	16.1	4.7*	0.76*							4.7*		S2		MOR70
6LI	28.	9.8*	4.7*	0.76*	12.2	4.7*	0.76*							4.7*		S3		MOR70
9BE	4.0	213.	3.23*	0.46*				3.3	4.89*	0.89*				3.23*		S2		VBE74
9BE	6.0	207.	3.23*	0.46*				3.5	4.89*	0.89*				3.23*		S1		VBE74
11B	28.0	481.	2.33*	0.66	11.0	4.68	0.93							5.55*		S2	11	BAS72
12C	4.5	148.*	3.37*	0.65*				6.9	3.37*	0.65*				3.37*		S2		POL72
12C	5.8	148.*	3.37*	0.65*				7.14	3.37*	0.65*				3.37*		S2	8	POL72
12C	6.4	148.*	3.37*	0.65*				7.25	3.37*	0.65*				3.37*		S2	8	POL72
12C	7.5	148.*	3.37*	0.65*				7.45	3.37*	0.65*				3.37*		S2	8	POL72
12C	9.0	148.*	3.37*	0.65*				7.74	3.37*	0.65*				3.37*		S2	8	POL72
12C	11.0	148.*	3.37*	0.65*				8.1	3.37*	0.65*				3.37*		S2	8	POL72
12C	13.0	171.0	3.04	0.67				7.24	3.33	0.72				3.04		S2		JOH70
12C	13.0	136.8	3.48	0.64				7.75	3.27	0.77				3.48		S2		JOH70
12C	13.0	173.7	2.85	0.64				6.55	3.89	0.80				2.85		S2		JOH70
12C	13.0	148.*	3.37*	0.65*				8.5	3.37*	0.65*				3.37*		S2		POL72
12C	13.0	403.*	3.21*	0.58*				18.0	3.21*	0.58*				3.21*		S2		POL72
12C	20.	35.0	3.25	1.04				8.46	4.97	0.49				5.72*		S		BET69
12C	20.	65.0	3.25	0.80	3.2	6.25	0.56							5.72*		S		BET69
12C	20.	232.*	2.86	0.755*	6.03	5.36	0.56							5.72*		S1	12	WAT72
12C	20.	232.*	2.86	0.755*				9.45	4.24	0.58				5.72*		S1	12	WAT72
12C	24.5	461.	2.40*	0.77	18.6	3.73	0.65							5.72*		S2		BAS72
12C	28.0	466.	2.40*	0.74	35.3	2.34	0.96							5.72*		S2		BAS72
12C	28.0	283.	3.55*	0.63	13.8	5.13	0.28							5.72*		S2		BAS72
12C	28.0	281.	3.55*	0.64				27.6	4.51	0.36				5.72*		S2		BAS72
12C	30.	245.	2.75*	0.8	12.5	4.01	1.0							3.2*	1410	S2		CHU71A
12C	30.6	461.	2.40*	0.76	13.3	4.56	0.61							5.72*		S2		BAS72
12C	30.6	201.	2.40*	0.91	7.4	5.29	0.54							5.72*		S2		BAS72
12C	30.6	276.	2.40*	0.85	9.0	5.06	0.56							5.72*		S2		BAS72
12C	30.6	363.	2.40*	0.80	10.9	4.83	0.58							5.72*		S2		BAS72
12C	34.	121.3	2.75*	0.888	9.6	4.97*	0.946							2.98*		S	9	SCH73
12C	34.	173.2	2.77*	0.802	8.9	4.97*	0.945							2.98*		S2	9	SCH73
12C	34.	243.8	2.77*	0.770	10.6	4.97*	0.945							2.98*		S	9	SCH73
12C	36.	173.2	2.77*	0.802	8.9	4.97*	0.945							2.98*		S2	9	SCH73
13C	20.	40.4	4.56	0.54				6.8	4.37	0.84				5.87*	1390	S3		BET69
13C	20.	37.1	4.77	0.33	2.2	7.82	0.45							5.87*	1510	S3		BET69
13C	20.	234.*	2.75	0.76*	6.07	6.02	0.60							5.87*		S2	9,12	WAT72
13C	20.	234.*	2.77	0.76*				10.3	4.58	0.64				5.87*		S2	9,12	WAT72
13C	28.0	444.	2.47*	0.71	13.2	4.53	0.87							5.87*		S2	11	BAS72
13C	34.	176.4	2.84*	0.773	10.4	5.10*	0.817							3.05*		S2	9	SCH73
13C	34.	245.2	2.84*	0.716	11.9	5.10*	0.749							3.05*		S	9	SCH73
14N	32.	114.2	3.37	0.79				20.3	4.46	0.57				3.37		S2	14	ZEI71
16O	20.	37.8	3.58	0.95				8.07	4.79	0.62				6.30*	1200	S2		BET69
16O	20.	60.3	3.70	0.75	4.6	5.77	0.85							6.30*	1280	S2		BET69
16O	20.	135.	2.70	0.929				10.5	4.86	0.585				6.3*		S2	2	SCH70
16O	20.	190.	2.67	0.868				11.2	4.76	0.611				6.3*		S2	2	SCH70
16O	20.	241.*	2.80	0.775*	6.67	5.75	0.70							6.30*		S2	12	WAT72
16O	20.	241.*	2.80	0.775*				9.51	4.31	0.74				6.30*		S2	12	WAT72
16O	29.8	410.	2.65*	0.75	10.0	5.54	0.63							6.30*		S2		BAS72
16O	29.8	187.	2.65*	0.89	6.6	6.07	0.54							6.30*		S2		BAS72
16O	29.8	253.	2.65*	0.83	7.7	5.92	0.57							6.30*		S2		BAS72
16O	29.8	327.	2.65*	0.79	8.7	5.75	0.60							6.30*		S2		BAS72
16O	30.	252.	3.28*	0.7	13.	4.41	1.2							3.5*	1700	S2		CHU71A
16O	36.	164.3	3.05*	0.826	10.6	5.08	1.064							3.28*		S3	9	SCH73
16O	36.	222.3	3.05*	0.800	11.8	5.08	1.035							3.28*		S	9	SCH73
19F	20.	35.5	3.79	0.92				7.94	4.57	0.89				6.67*	1510	S2		BET69
19F	20.	65.5	3.95	0.41	12.0	3.82	1.48							6.67*	1730	S1		BET69
19F	20.	246.*	3.15	0.795*	10.0	5.90	0.88							6.67*		S2	9,12	WAT72
19F	20.	246.*	3.15	0.795*				12.8	4.24	0.92				6.67*		S2	9,12	WAT72
24MG	20.	34.9	4.06	1.02				6.52	5.76	0.90				7.20*	1780	S1		BET69
24MG	20.	64.6	4.90	0.64	14.7	4.84	1.17							7.20*	1650	S1		BET69
24MG	20.	253.*	3.54	0.815*	8.64	7.31	0.86							7.20*		S2	9,12	WAT72
24MG	20.	253.*	3.56	0.815*				11.8	5.41	0.97				7.20*		S2	9,12	WAT72

See page 8 for Explanation of Tables

TABLE VII. Optical-Model Parameters Heavy Ions

LITHIUM-6 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
26MG	36.	161.9	3.58*	0.80	17.3	5.48	0.890							3.85*		S2	9	SCH73
26MG	36.	208.6	3.58*	0.75	19.8	5.30	0.89							3.85*		S	9	SCH73
28SI	20.	28.9	4.83	0.84				8.54	4.92	0.79				7.59*	1230	S1		BET69
28SI	20.	62.2	3.95	0.87	7.3	6.26	0.77							7.59*	1260	S1		BET69
28SI	20.	258.*	3.86	0.835*	9.51	7.36	0.77							7.60*		S2	12	WAT72
28SI	20.	258.*	3.86	0.835*				13.9	5.65	0.83				7.60*		S2	12	WAT72
28SI	30.	262.	3.65*	0.71	16.	5.32	1.15							4.3*		S2		CHU71
40CA	20.	32.6	6.19	0.64				7.4	5.85	1.00				8.55*	1620	S1		BET69
40CA	20.	72.6	4.68	0.87	6.9	7.87	0.81							8.55*	1590	S1		BET69
40CA	20.	270.*	3.88	0.89*	8.02	7.80	0.70							8.55*		S1	9,12	WAT72
40CA	20.	270.*	3.88	0.89*				13.7	5.98	0.76				8.55*		S1	9,12	WAT72
40CA	30.	240.	4.10*	0.76	12.	5.57	0.90							4.8*		S3		CHU71
40CA	30.	250.*	4.10*	0.70*	14.	5.81	0.88							4.10?		S		GAA73
40CA	30.	250.*	4.10*	0.70*				16.	4.10*	0.98				4.10?		S		GAA73
58NI	12.	152.*	5.38	0.75	6.32	9.02	0.61							5.4?	125	S2		PFE73
58NI	14.	152.*	4.99	0.83	2.07	9.37	0.41							5.4?	275	S2		PFE73
58NI	16.	152.*	5.50	0.73	4.63	8.21	0.53							5.4?	491	S2		PFE73
58NI	18.	152.*	5.53	0.71	7.83	7.51	0.56							5.4?	680	S2		PFE73
58NI	20.	152.*	5.46	0.69	10.3	7.01	0.56							5.4?	789	S2		PFE73
58NI	30.	240.	4.64*	0.82	18.	6.19	0.80							5.4*		S2		CHU71
118SN	18.	152.*	8.24	0.4	6.5	9.71	0.71							7.9?	88	S2		PFE73
118SN	19.	152.*	7.90	0.58	2.7	11.53	0.11							7.9?	124	S2		PFE73
118SN	20.	152.*	8.49	0.46	1.2	11.67	0.12							7.9?	216	S2		PFE73
118SN	21.	152.*	8.34	0.39	2.26	10.94	0.29							7.9?	266	S1		PFE73
118SN	22.5	152.*	8.53	0.33	2.8	10.69	0.49							7.9?	521	S1		PFE73
118SN	24.	152.*	8.63	0.29	3.05	10.45	0.56							7.9?	697	S2		PFE73
120SN	30.	240.	5.92*	0.80	18.	8.38	0.80							6.9*		S2		CHU71
197AU	30.	240.	6.98*	0.84	18.	10.2	0.70							8.15*		S2		CHU71
208PB	30.	250.	7.10*	0.50	13.5	10.1	0.91							8.3*		S2		CHU71

LITHIUM-7 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
7LI	7.3	40.	8.00	0.75	20.	8.00	0.75							8.0?		S	W65	BEN63
9BE	24.0	30.*	4.79	0.57	7.1	5.64	0.79							2.5*		S3		WEB72
9BE	24.0	152.*	2.87	0.75	6.72	5.66	0.76							2.5*		S		WEB72
9BE	24.0	60.*	2.67	0.88				17.4	3.87	0.78				2.5*		S2		WEB72
10B	24.0	30.*	8.97	0.61	10.3	4.06	1.14							2.5*		S		WEB72
10B	24.0	152.*	2.76	0.77	7.88	5.07	0.86							2.5*		S		WEB72
10B	24.0	60.*	2.31	1.1				16.7	4.00	0.68				2.5*		S		WEB72
12C	4.5	166.*	3.37*	0.65*				12.0	3.37*	0.65*				3.37*		S1		POL72
12C	5.8	166.*	3.37*	0.65*				14.0	3.37*	0.65*				3.37*		S1	8	POL72
12C	7.3	40.	8.00	0.51	20.	8.00	0.51							8.0?		S	W65	BEN63
12C	9.0	166.*	3.37*	0.65*				19.4	3.37*	0.65*				3.37*		S1	8	POL72
12C	11.0	166.*	3.37*	0.65*				22.6	3.37*	0.65*				3.37*		S1	8	POL72
12C	13.0	166.*	3.37*	0.65*				26.0	3.37*	0.65*				3.37*		S1		POL72
12C	15.0	30.*	4.62	0.7	4.8	6.57	0.88							2.5*		S3		WEB72
12C	15.0	150.*	3.40	0.67	13.9	4.90	0.76							2.5*		S3		WEB72
12C	15.0	60.*	3.02	0.88				8.3	4.28	0.81				2.5*		S2		WEB72
12C	21.1	141.4	3.71	0.59	13.6	4.53	0.90							5.72*		S		BET69
12C	21.1	50.	3.36	0.83				8.65	4.26	0.80				5.27*		S		PUH70
12C	21.1	30.*	4.66	0.59	7.8	4.81	0.99							2.5*		S1	9	WEB72
12C	21.1	152.*	2.73	0.77	8.85	5.11	0.89							2.5*		S3	9	WEB72
12C	21.1	70.*	3.74	0.69				9.8	3.80	0.88				2.5*		S1	9	WEB72
12C	36.	187.8	2.77*	0.824	12.9	4.97*	0.77							2.98*		S2	7	SCH73
12C	36.	245.0	2.77*	0.759	14.7	4.58*	0.909							2.98*		S	7	SCH73
13C	20.	30.7	4.84	0.64				8.3	4.86	0.70				5.87*	1440	S3		BET69
13C	20.	151.5	3.50	0.71	6.8	6.18	0.59							5.87*	1400	S3		BET69
13C	34.	166.4	2.84*	0.763	9.1	5.10*	0.95							3.05*		S2	1	SCH73
13C	34.	248.2	2.84*	0.755	12.7	4.70*	0.944							3.05*		S	1	SCH73
16O	20.	33.1	4.36	0.85				10.3	4.71	0.72				6.30*	1390	S2		BET69
16O	36.	189.5	3.05*	0.743	21.3	5.04*	0.821							3.28*		S2	7	SCH73
16O	36.	238.8	3.05*	0.709	19.2	5.04*	0.822							3.28*		S	7	SCH73
19F	20.	35.4	4.65	1.05				11.3	5.69	0.62				6.67*	1660	S3		BET69

See page 8 for Explanation of Tables

TABLE VII. Optical-Model Parameters Heavy Ions

LITHIUM-7 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
24MG	20.	34.0	4.95	0.90				11.4	5.47	0.74				7.20*	1500	S1		BET69
24MG	20.	100.5	6.31	0.46	28.3	5.79	1.10							7.20*	1320	S1		BET69
24MG	34.	197.9	3.48	0.77	30.8	4.75	0.92							3.74*		S	13	MOO74
24MG	34.	54.1	5.13	0.58	10.95	6.19	1.01							3.74*		S	13	MOO74
24MG	34.	213.5	3.48	0.88	14.54	6.02	0.78							3.74*		S	13	MOO74
28SI	20.	42.2	5.04	0.78				9.86	5.28	0.64				7.59*	1220	S2		BET69
28SI	36.	177.3	3.68*	0.775	9.4	6.38*	0.848							3.95*		S2	7	SCH73
28SI	36.	214.6	3.68*	0.83	14.4	6.38*	0.73							3.95*		S	7	SCH73
40CA	20.	31.0	5.88	0.81				13.3	5.78	0.80				8.55*	1370	S1		BET69
40CA	20.	173.0	5.33	0.62	20.7	3.69	0.97							8.55*	1420	S1		BET69
58NI	12.19	152.*	5.34	0.75	5.15	9.21	0.58							5.4?	118	S2		PFE73
58NI	14.22	152.*	5.11	0.79	3.65	9.60	0.49							5.4?	420	S2		PFE73
58NI	16.25	152.*	6.12	0.69	4.22	8.67	0.39							5.4?	589	S2		PFE73
58NI	18.28	152.*	5.50	0.71	10.24	7.28	0.52							5.4?	644	S2		PFE73
58NI	20.31	152.*	6.58	0.53	12.98	7.63	0.28							5.4?	868	S2		PFE73
118SN	16.13	152.*	8.29	0.6	3.9	10.59	0.51							7.9?		S		PFE73
118SN	18.15	152.*	7.26	0.6	2.81	10.99	0.45							7.9?	49	S3		PFE73
118SN	19.15	152.*	7.80	0.61	5.91	10.30	0.53							7.9?	135	S2		PFE73
118SN	20.16	152.*	8.24	0.39	5.82	9.47	0.57							7.9?	118	S1		PFE73
118SN	21.17	152.*	8.53	0.35	2.58	11.87	0.14							7.9?	458	S3		PFE73

BORON-10 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
12C	18.	100.*	5.11*	0.50*	10.	5.77*	0.22							6.22*		S3	3	VOO69
12C	18.	100.*	5.28*	0.48*	27.	5.59*	0.26							6.22*		S3	3	VOO69
12C	18.	100.*	5.11*	0.48*	35.	5.64	0.2*							6.22*		S3	3	VOO69
12C	18.	100.*	5.40	0.5*	18.	5.40	0.5*				5.0	5.40	0.5*	5.4?		S	18	ROB71A

BORON-11 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
12C	28.	50.*	5.82*	0.48*	15.	5.33	0.3*							6.32*		S	4	VOO69
12C	28.	100.*	5.37*	0.48*	17.	5.69*	0.26*							6.32*		S	4	VOO69
208PB	72.2	40.*	9.91	0.612	15.*	9.91	0.612							10.6*	1366	S2	13,16	FOR74
208PB	72.2	40.*	10.61	0.424	16.44	9.39	0.424							10.6*	1321	S2	13,16	FOR74

CARBON-12 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
11B	87.	100.*	4.60	0.70	26.00	4.96	0.44							6.31*		S	1	LIU71
12C	70.	62.3	6.58	0.522	37.	6.42	0.464							3.79*		S	6	KOH71
12C	127.	44.2	4.81	0.683	28.3	4.81	0.683							3.66		S2	6	BAS66
13C	87.	100.*	4.73	0.48	20.30	5.71	0.70							6.50*		S	6	LIU71
13C	87.	50.*	4.41	0.70	25.0*	5.47	0.53							6.50*		S	6	LIU71
26MG	46.	100.*	6.51	0.48	27.	7.14	0.22							6.5?		S1	7	CON73
28SI	49.3	55.*	6.60	0.462	10.	6.26	0.811							4.83*		S2	1	KOH71
28SI	70.	55.*	5.44	0.697	20.	6.27	0.671							4.83*		S2	6	KOH71
28SI	83.5	55.*	5.93	0.631	16.	6.40	0.776							4.83*		S2	6	KOH71
64NI	48.	120.*	7.57	0.50*	15.0	7.57	0.50*							7.57		S1	7	CUN74
197AU	121.	41.8*	10.2	0.49	16.4*	10.2	0.49							10.2*		S	W65	AUE63
208PB	116.	40.*	10.00	0.612	15.*	10.00	0.612							10.6*		S2	1	FOR74
208PB	116.	40.*	10.76*	0.45*	15.*	10.76*	0.45*							10.7*		S2	1	FOR74

See page 8 for Explanation of Tables

TABLE VII. Optical-Model Parameters Heavy Ions

CARBON-13 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
40CA	40.	33.6	7.33	0.55	18.	7.33	0.55							6.92*		S1	13	BON73
40CA	40.	33.4	7.33	0.55	18.	6.75	0.05	4.5	6.75	0.55				7.?		S1	1	BON74A
40CA	48.	33.6	7.33	0.55	18.	7.33	0.55							6.92*		S1	13	BON73
40CA	60.	33.6	7.33	0.55	18.	7.33	0.55							6.92*		S1	1	BON73
40CA	68.	33.6	7.33	0.55	18.	7.33	0.55							6.92*		S1	6	BON73
48CA	50.	70.*	7.326	0.5*	10.*	7.326	0.5*							7.5?		S1	1	SCH73A
94MO	51.	100.*	8.40	0.5*	40.	8.40	0.5*							8.40		S1	7	BON74
96MO	54.5	100.*	8.44*	0.5*	40.*	8.44	0.5*							8.44		S1	7	BON74

NITROGEN-14 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
9BE	12.8	50.*	5.88	0.45	10.	5.88	0.45							5.88		S2		KUE64
9BE	15.8	50.*	5.88	0.45	10.	5.88	0.45							5.88		S2		KUE64
9BE	27.3	50.	5.52	0.65				16.G	5.52	1.125				3.9		S	W65	BAS60
11B	41.	100.*	3.70	0.985	8.30	6.76	0.62							6.48*		S	1	LIU71
11B	41.	50.*	4.68	0.95	25.0*	6.11	0.60*							6.48*		S	1	LIU71
11B	77.	100.*	4.17	0.85	10.85	6.44	0.49							6.48*		S	1	LIU71
11B	77.	50.*	3.98	1.11	25.0*	6.02	0.50*							6.48*		S	1	LIU71
11B	113.	100.*	4.72	0.78	9.64	6.53	0.47							6.48*		S	6	LIU71
11B	113.	50.*	4.81	0.74	25.0*	6.48	0.45*							6.48*		S	6	LIU71
12C	17.3	50.*	5.59	0.49	4.	5.59	0.49							5.59		S2		KUE64
12C	19.5	50.*	5.59	0.49	4.	5.59	0.49							5.59		S2		KUE64
12C	21.3	100.*	5.70	0.5*	18.	5.70	0.5*							5.7?		S	18	ROB71A
12C	21.4	50.*	5.59	0.49	4.	5.59	0.49							5.59		S2		KUE64
12C	27.3	48.	6.00	0.575	5.75	6.00	0.575							4.2		S	W65	BAS60
12C	27.3	47.	6.00	0.645				9.G	6.00	1.25				4.2		S	W65	BAS60
12C	65.	55.*	5.71	0.484	15.	6.34	0.250							3.45*		S2	1	KOH71
12C	78.	100.*	4.00	0.84	8.0	6.96	0.18							6.58*		S2	1	VOE70
12C	78.	50.*	4.84	0.78	12.	6.49	0.20							6.58*		S2	1	VOE70
12C	78.	100.*	4.32	0.77	38.5	6.06	0.26							6.58*		S2	1	VOE70
12C	84.	65.*	5.71*	0.484*	20.	6.34*	0.250*							3.45*		S	1	KOH71
12C	88.	65.*	5.71*	0.484*	30.	6.34*	0.250*							3.45*		S	1	KOH71
13C	20.	100.*	5.85	0.5*	18.	5.85	0.5*							5.8?		S	18	ROB71A
14N	14.6	15.0	7.23*	0.5*	6.2	7.23*	0.5*							7.2?		S2		JAC69
14N	14.6	24.0	7.23*	0.5*	10.0	7.23*	0.5*							7.2?		S2		JAC69
14N	16.2	26.1	7.23*	0.5*	10.5	7.23*	0.5*							7.2?		S3		JAC69
14N	17.7	29.4	7.23*	0.5*	11.8	7.23*	0.5*							7.2?		S3		JAC69
16O	14.0	10.1	6.90	0.5*	3.0	6.90	0.5*							7.2?		S3		JAC69
16O	17.0	14.1	6.65	0.5*	4.0	6.65	0.5*							7.2?		S3		JAC69
16O	18.3	10.6	6.90	0.5*	3.3	6.90	0.5*							7.2?		S3		JAC69
27AL	65.	60.*	5.66	0.677	12.	6.80	0.569							4.51*		S1	6	KOH71
27AL	84.	65.*	5.52	0.792	14.	7.03	0.528							4.51*		S2	1	KOH71
27AL	88.	70.*	5.96	0.615	18.	6.60	0.738							4.51*		S2	1	KOH71
28SI	40.	20.0	7.36*	0.49*	6.0	7.36*	0.38*							7.4*		S2		SIE71
28SI	48.	21.0	7.36*	0.49*	7.25	7.36*	0.38*							7.4*		S2		SIE71
28SI	84.	60.*	6.25	0.527	14.	6.34	0.929							4.54*		S2	6	KOH71
40CA	28.0	17.	7.58*	0.60*	8.	7.58*	0.60*							7.58*		S2		WIL75
40CA	30.0	22.	7.58*	0.60*	6.	7.58*	0.60*							7.58*		S2		WIL75
40CA	32.0	19.	7.58*	0.60*	14.	7.58*	0.60*							7.58*		S2		WIL75
40CA	36.0	16.	7.58*	0.60*	4.	7.58*	0.60*							7.58*		S2	9	WIL75
48CA	50.	70.*	7.470	0.5*	10.*	7.470	0.5*							7.5?		S1	1	SCH73A
56FE	26.0	20.	7.80*	0.60*	11.	7.80*	0.60*							7.80*		S2		WIL75
56FE	28.0	30.	7.80*	0.60*	9.	7.80*	0.60*							7.80*		S2		WIL75
56FE	32.0	27.	7.80*	0.60*	9.	7.80*	0.60*							7.80*		S2		WIL75
56FE	36.0	22.	7.80*	0.60*	12.	7.80*	0.60*							7.80*		S2		WIL75
56FE	40.0	21.	7.80*	0.60*	16.	7.80*	0.60*							7.80*		S1		WIL75
58NI	84.	60.*	6.58	0.705	12.	7.52	0.516							6.22*		S2	6	KOH71
62NI	32.0	38.	7.96*	0.56*	19.	7.96*	0.56*							7.96*		S2		WIL75
62NI	36.0	27.	7.96*	0.56*	20.	7.96*	0.56*							7.96*		S2		WIL75
62NI	40.0	35.	7.96*	0.56*	16.	7.96*	0.56*							7.96*		S2		WIL75
62NI	42.0	41.	7.96*	0.56*	18.	7.96*	0.56*							7.96*		S1		WIL75

See page 8 for Explanation of Tables

TABLE VII. Optical-Model Parameters Heavy Ions

NITROGEN-14 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
70GE	34.0	43.	8.49*	0.50*	2.	8.49*	0.50*							8.49*		S2		WIL75
70GE	36.0	24.	8.49*	0.50*	20.	8.49*	0.50*							8.49*		S2		WIL75
70GE	38.0	35.	8.49*	0.50*	23.	8.49*	0.50*							8.49*		S2		WIL75
70GE	42.0	29.	8.49*	0.50*	34.	8.49*	0.50*							8.49*		S2		WIL75
70GE	45.0	33.	8.49*	0.50*	20.	8.49*	0.50*							8.49*		S2		WIL75
70GE	50.0	33.	8.49*	0.50*	35.	8.49*	0.50*							8.49*		S2	9	WIL75
74GE	32.0	8.2	8.59*	0.50*	30.	8.59*	0.50*							8.59*		S1		WIL75
74GE	36.0	26.	8.59*	0.50*	12.	8.59*	0.50*							8.59*		S1		WIL75
74GE	38.0	18.	8.59*	0.50*	20.	8.59*	0.50*							8.59*		S1		WIL75
74GE	40.0	22.	8.59*	0.50*	17.	8.59*	0.50*							8.59*		S1		WIL75
74GE	42.0	22.	8.59*	0.50*	28.	8.59*	0.50*							8.59*		S1		WIL75
74GE	45.0	28.	8.59*	0.50*	22.	8.59*	0.50*							8.59*		S1		WIL75
90ZR	36.0	25.	8.61*	0.60*	44.	8.61*	0.60*							8.61*		S1		WIL75
90ZR	40.0	22.	8.61*	0.60*	8.	8.61*	0.60*							8.61*		S1		WIL75
90ZR	43.0	28.	8.61*	0.60*	8.	8.61*	0.60*							8.61*		S1		WIL75
90ZR	45.0	28.	8.61*	0.60*	16.	8.61*	0.60*							8.61*		S1		WIL75
90ZR	50.0	30.	8.61*	0.60*	13.	8.61*	0.60*							8.61*		S1		WIL75
118SN	42.0	16.	9.14*	0.60*	12.	9.14*	0.60*							9.14*		S1		WIL75
118SN	46.0	7.	9.14*	0.60*	10.	9.14*	0.60*							9.14*		S1		WIL75
118SN	48.0	32.	9.14*	0.60*	8.	9.14*	0.60*							9.14*		S1		WIL75
118SN	50.0	24.	9.14*	0.60*	14.	9.14*	0.60*							9.14*		S1		WIL75
118SN	54.0	23.	9.14*	0.60*	19.	9.14*	0.60*							9.14*		S1		WIL75

NITROGEN-15 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
28SI	41.	20.5	7.42*	0.49*	4.50	7.42*	0.38*							7.4*		S2		SIE71
28SI	49.3	23.5	7.42*	0.49*	6.50	7.42*	0.38*							7.4*		S2		SIE71
89Y	49.5	100.*	8.44	0.5	25.	8.44	0.5							8.44		S2		ANA73

OXYGEN-16 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
6LI	36.	10.1	4.14	0.649	3.32	4.14	0.649							2.36*	463	S1	7	ORL71
7LI	36.	10.5	3.76	0.658	3.38	3.76	0.658							2.49*	396	S2	7	ORL71
10B	7.00	59.*	5.60*	0.57*	5.0	5.60*	0.57*							5.60*		S2		OKU68
10B	8.22	59.*	5.60*	0.57*	6.3	5.60*	0.57*							5.60*		S2		OKU68
10B	8.95	59.*	5.60*	0.57*	7.0	5.60*	0.57*							5.60*		S2		OKU68
10B	10.0	59.*	5.60*	0.57*	8.0	5.60*	0.57*							5.60*		S2		OKU68
10B	10.5	59.*	5.60*	0.57*	8.5	5.60*	0.57*							5.60*		S2		OKU68
11B	7.00	59.*	5.21*	0.58*	3.0	5.21*	0.58*							5.21*		S2		OKU68
11B	8.09	59.*	5.21*	0.58*	3.75	5.21*	0.58*							5.21*		S2		OKU68
11B	9.00	59.*	5.21*	0.58*	5.0	5.21*	0.58*							5.21*		S2		OKU68
11B	10.0	59.*	5.21*	0.58*	6.0	5.21*	0.58*							5.21*		S2		OKU68
11B	11.0	59.*	5.21*	0.58*	7.0	5.21*	0.58*							5.21*		S2		OKU68
11B	27.	100.*	5.74*	0.55*	15.	6.40*	0.55*							6.64*		S2		VOO69
11B	27.	100.*	5.64*	0.48*	25.	5.97*	0.26*							6.87*		S	10	SCH72
11B	30.	100.*	5.74*	0.55*	17.	6.40*	0.55*							6.64*		S3		VOO69
11B	30.	100.*	5.64*	0.48*	25.	5.97*	0.26*							6.87*		S	10	SCH72
11B	32.5	100.*	5.74*	0.55*	18.5	6.40*	0.55*							6.64*		S3		VOO69
11B	32.5	50.*	5.74*	0.63	6.0	6.93	0.52							6.64*		S3	3	VOO69
11B	32.5	88.*	6.21*	0.45	8.2	7.12*	0.15							6.64*		S2	3	VOO69
11B	32.5	100.*	5.68	0.55	30.	5.68	0.55				2.5	5.68	0.55	5.7?		S	18	ROB71A
11B	32.5	100.*	5.64*	0.48*	25.	5.97*	0.26*							6.87*		S	10	SCH72
11B	35.	100.*	5.74*	0.55*	20.	5.74	0.95							6.64*		S3		VOO69
11B	35.	100.*	5.64*	0.48*	27.	5.97*	0.26*							6.87*		S	10	SCH72
11B	60.	100.*	5.64*	0.48*	30.	5.97*	0.26*							6.87*		S	10	SCH72
12C	18.7	50.*	6.085	0.39	2.	6.085	0.39							6.08		S2		KUE64
12C	20.	100.*	9.19*	0.48*	10.	6.06*	0.26*							6.73*		S2	5,2	VOO69
12C	21.0	50.*	6.085	0.39	2.	6.085	0.39							6.08		S2		KUE64
12C	23.3	50.*	6.085	0.39	2.	6.085	0.39							6.08		S2		KUE64
12C	24.	100.*	9.19*	0.48*	13.	6.06*	0.26*							6.73*		S3	5,2	VOO69
12C	35.	100.*	6.20*	0.34	148.	1.30	0.38							6.73*		S3	3	VOO69
12C	36.	92.3	4.39	0.850				17.8	6.37	0.263				2.98*	1044	S2		ORL71
12C	36.	51.3	6.24*	0.533	2.45	6.24*	0.533							2.98*	893	S3		ORL71
12C	42.	100.*	9.19*	0.48*	27.	6.06*	0.26*							6.73*		S3	5,2	VOO69
12C	42.	25.*	5.53*	0.68	2.1	7.31	0.23							6.73*		S3	5,2	VOO69
12C	42.	100.*	5.72	0.5*	37.8	5.72	0.5*							5.7?		S	18	ROB71A
12C	65.	100.*	5.68	0.45	30.0*	6.01	0.18							6.97*		S2	4	GUT73A
12C	80.	100.*	5.24	0.54	30.0*	5.82	0.27							6.97*		S2	4	GUT73A
12C	168.	30.57	5.44	0.651	17.2	5.44	0.651							3.37		S2	6	BAS66

See page 8 for Explanation of Tables

TABLE VII. Optical-Model Parameters Heavy Ions

OXYGEN-16 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
18O	24.	100.*	6.42*	0.4*	30.*	6.84*	0.2*							6.4?		S2	17,18	GEL74
18O	28.	95.	6.42*	0.4*	30.*	6.84*	0.2*							6.4?		S2	18	GEL74
18O	32.	90.'	6.42*	0.4*	30.*	6.84*	0.2*							6.4?		S2	17,18	GEL74
26MG	40.	17.*	7.16*	0.42*	8.92	6.78*	0.25*							7.16?		S2		SIE70
26MG	45.	17.*	7.16*	0.42*	13.11	6.78*	0.25*							7.16?		S2		SIE70
26MG	45.	32.8	7.12*	0.50*	8.11	7.12*	0.5*							7.12*		S2	1	BAL75
26MG	50.	17.*	7.16*	0.42*	12.48	6.78*	0.25*							7.16?		S2		SIE70
26MG	60.	32.8	7.12*	0.50*	8.11	7.12*	0.5*							7.12*		S2	1	BAL75
27AL	42.	60.0	7.17*	0.438	8.02	7.17*	0.433							3.90*	1005	S2		ORL71
27AL	45.	32.8	7.18*	0.50*	8.11	7.18*	0.5*							7.18*		S2	1	BAL75
27AL	47.	44.9	7.17*	0.522	24.74	7.17*	0.522							3.90*	1303	S1	7	ORL71
27AL	60.	32.8	7.18*	0.50*	8.11	7.18*	0.5*							7.18*		S2	1	BAL75
28SI	33.0	16.75	7.51	0.49	7.0	7.51	0.38							7.51		S1	9	GAL73
28SI	36.0	16.75	7.51	0.49	7.0	7.51	0.38							7.51		S1	9	GAL73
28SI	38.0	16.75	7.51	0.49	7.0	7.51	0.38							7.51		S1	9	GAL73
28SI	40.	18.0	7.51*	0.49*	5.0	7.51*	0.38*							7.5*		S2		SIE71
28SI	55.	21.5	7.51*	0.49*	6.25	7.51*	0.38*							7.5*		S2		SIE71
30SI	45.	32.8	7.31*	0.50*	8.11	7.31*	0.5*							7.31*		S2	1	BAL75
30SI	60.	32.8	7.31*	0.50*	8.11	7.31*	0.5*							7.31*		S2	1	BAL75
32S	45.	100.*	6.95	0.5*	30.*	7.12	0.4*							7.?		S1	13	BRA73
40CA	40.	91.7	7.72*	0.406	43.7	7.72*	0.406							4.45*	572	S1		ORL71
40CA	40.	100.*	7.25	0.50*	24.4*	7.25	0.50*							7.25		S2		GRO72
40CA	47.	62.9	7.72*	0.399	4.46	7.72*	0.399							4.45*	797	S2		ORL71
48CA	40.	100.*	7.43	0.50	24.41	7.43	0.50							7.43		S1		GRO72
48CA	60.	32.8	8.0*	0.50*	8.11	8.0*	0.5*							8.0*		S2	13	BAL75
48TI	42.	60.3	8.0*	0.418	3.05	8.0*	0.418							4.72*	583	S1		ORL71
48TI	48.	60.2	8.0*	0.403	3.38	8.0*	0.403							4.72*	838	S2		ORL71
54FE	46.	100.*	7.27	0.55*	18.81	7.27	0.55*							7.27		S1	16	BON72
54FE	46.	200.*	6.89	0.55*	35.09	6.89	0.55*							6.89		S1	16	BON72
54FE	46.	300.*	6.67	0.55*	51.56	6.67	0.55*							6.67		S1	16	BON72
56FE	38.	27.	7.94*	0.6*	5.	7.94*	0.6*							7.94*		S1		OBS72
56FE	40.	25.	7.94*	0.6*	9.	7.94*	0.6*							7.94*		S1		OBS72
56FE	42.	24.	7.94*	0.6*	11.5	7.94*	0.6*							7.94*		S1		OBS72
56FE	44.	26.	7.94*	0.6*	12.	7.94*	0.6*							7.94*		S1		OBS72
56FE	46.	28.	7.94*	0.6*	11.5	7.94*	0.6*							7.94*		S2		OBS72
56FE	48.	27.	7.94*	0.6*	11.	7.94*	0.6*							7.94*		S1		OBS72
56FE	50.	30.	7.94*	0.6*	6.	7.94*	0.6*							7.94*		S2		OBS72
56FE	52.	28.	7.94*	0.6*	10.	7.94*	0.6*							7.94*		S1		OBS72
56FE	54.	28.	7.94*	0.6*	11.	7.94*	0.6*							7.94*		S1		OBS72
56FE	56.	24.	7.94*	0.6*	16.	7.94*	0.6*							7.94*		S1	7	OBS72
56FE	58.	24.	7.94*	0.6*	17.	7.94*	0.6*							7.94*		S1	7	OBS72
56FE	60.	30.	7.94*	0.6*	8.	7.94*	0.6*							7.94*		S1	7	OBS72
58NI	44.	22.69	8.31*	0.533	2.35	8.75*	0.375							4.84*		S1		CHR73
58NI	44.	29.43	8.31*	0.491	2.43	8.31*	0.491							4.84*		S1		CHR73
58NI	50.	23.65	8.31*	0.533	3.49	8.75*	0.375							4.84*		S2		CHR73
58NI	60.	25.25	8.31*	0.533	5.39	8.75*	0.375							4.84*		S1	7	CHR73
58NI	63.	70.*	7.54	0.57	82.1	7.54	1.18							7.54?		S1		ZIS75
58NI	71.5	70.*	7.54	0.57	82.1	7.54	1.18							7.54?		S1	13	ZIS75
58NI	81.	70.*	7.54	0.57	82.1	7.54	1.18							7.54?		S1	13	ZIS75
60NI	62.	70.*	8.36	0.4*	8.*	8.2*	0.5*							8.5?		S2	13	AUE73
62NI	62.	70.*	8.31	0.4*	8.*	8.2*	0.5*							8.5?		S2	13	AUE73
64NI	56.	100.*	7.97	0.50*	25.8	7.97	0.50*							7.97		S1	9	CUN74
64NI	56.	35.2	8.52	0.493	61.4	7.81	0.204							8.5?		S1		LEM74
64NI	56.	34.5	8.52*	0.493*	34.5	7.93	0.204*							8.5?		S1		LEM74
64NI	56.	35.3	8.52*	0.493*	19.67	8.10	0.204*							8.5?		S1		LEM74
64NI	62.	70.*	8.71	0.4*	9.*	8.71	0.4*							8.5?		S2	13	AUE73
66NI	62.	70.*	8.77	0.4*	9.*	8.77	0.4*							8.5?		S2	13	AUE73
70GE	42.	46.	8.30*	0.6*	4.	8.30*	0.6*							8.30*		S1		OBS72
70GE	44.	39.	8.30*	0.6*	16.	8.30*	0.6*							8.30*		S1		OBS72
70GE	46.	38.	8.30*	0.6*	22.	8.30*	0.6*							8.30*		S1		OBS72
70GE	48.	38.	8.30*	0.6*	19.	8.30*	0.6*							8.30*		S1		OBS72
70GE	50.	42.	8.30*	0.6*	17.	8.30*	0.6*							8.30*		S1		OBS72
70GE	52.	37.5	8.30*	0.6*	24.	8.30*	0.6*							8.30*		S1		OBS72
70GE	54.	41.	8.30*	0.6*	13.	8.30*	0.6*							8.30*		S1		OBS72
70GE	56.	38.	8.30*	0.6*	15.	8.30*	0.6*							8.30*		S1		OBS72
70GE	58.	41.	8.30*	0.6*	16.	8.30*	0.6*							8.30*		S1	9	OBS72
70GE	60.	37.	8.30*	0.6*	13.	8.30*	0.6*							8.30*		S1	9	OBS72

See page 8 for Explanation of Tables

TABLE VII. Optical-Model Parameters Heavy Ions

OXYGEN-16 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
74GE	40.	3.	8.40*	0.6*	52.	8.40*	0.6*							8.40*		S1		OBS72
74GE	42.	28.	8.40*	0.6*	42.	8.40*	0.6*							8.40*		S1		OBS72
74GE	44.	40.	8.40*	0.6*	33.	8.40*	0.6*							8.40*		S1		OBS72
74GE	46.	42.	8.40*	0.6*	20.	8.40*	0.6*							8.40*		S1		OBS72
74GE	48.	38.	8.40*	0.6*	13.	8.40*	0.6*							8.40*		S1		OBS72
74GE	50.	37.	8.40*	0.6*	14.	8.40*	0.6*							8.40*		S1		OBS72
74GE	52.	38.	8.40*	0.6*	18.	8.40*	0.6*							8.40*		S1		OBS72
74GE	54.	37.	8.40*	0.6*	28.	8.40*	0.6*							8.40*		S2		OBS72
74GE	56.	57.	8.40*	0.6*	18.	8.40*	0.6*							8.40*		S1		OBS72
88SR	52.	23.93	9.06*	0.568	3.70	9.76*	0.323							5.56*		S1		CHR73
88SR	56.	100.*	8.44	0.5	25.	8.44	0.5							8.44		S2		ANA73
88SR	56.	300.*	7.89	0.5	60.6	7.89	0.5							7.89		S2		ANA73
88SR	56.	600.*	8.93	0.3	15.2	8.93	0.3							8.93		S2		ANA73
88SR	60.	24.73	9.06*	0.568	5.30	9.76*	0.323							5.56*		S1	9	CHR73
90ZR	46.	84.	8.75*	0.5*	3.	8.75*	0.5*							8.75*		S1		OBS72
90ZR	48.	79.	8.75*	0.5*	2.	8.75*	0.5*							8.75*		S1		OBS72
90ZR	50.	82.	8.75*	0.5*	2.	8.75*	0.5*							8.75*		S1		OBS72
90ZR	52.	78.	8.75*	0.5*	15.	8.75*	0.5*							8.75*		S1		OBS72
90ZR	54.	76.	8.75*	0.5*	25.	8.75*	0.5*							8.75*		S1		OBS72
90ZR	56.	76.	8.75*	0.5*	15.	8.75*	0.5*							8.75*		S2		OBS72
90ZR	58.	75.	8.75*	0.5*	23.	8.75*	0.5*							8.75*		S1		OBS72
90ZR	60.	73.	8.75*	0.5*	17.	8.75*	0.5*							8.75*		S1		OBS72
116SN	64.	41.23	9.25*	0.5*	4.53	9.25*	0.5*							9.25?		S1		CON73A
116SN	66.0	41.23	9.54	0.50				4.53	9.54	0.50				9.54		S1		ROB71
120SN	55.0	39.92	9.81	0.45				4.42	9.81	0.45				9.81		S1		ROB71
120SN	55.0	799.	9.56	0.30				50.0	9.56	0.30				9.56		S		ROB71
120SN	65.7	39.12	9.84	0.45				4.42	9.84	0.45				9.84		S1		ROB71
120SN	65.7	797.	9.56	0.30				50.0	9.56	0.30				9.56		S		ROB71
142ND	70.	37.07	10.06*	0.527	2.87	11.45	0.156							6.52*		S		CHR73

OXYGEN-18 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
160	42.	17.5	6.94	0.56	5.7	6.79	0.5							6.94		S2	5	VAN74
160	52.	18.5	6.94	0.56	5.9	6.79	0.5							6.94		S2	3	VAN74
180	42.	11.4	7.06	0.6	5.2	7.06	0.6							7.06		S2	7	VAN74
180	52.	12.6	7.06	0.6	6.3	7.06	0.6							7.06		S2	7	VAN74
28SI	36.0	16.75	7.64	0.49	7.0	7.64	0.60							7.64		S1	9	GAL73
58NI	62.	70.*	8.52	0.4*	8.*	8.2*	0.5*							8.5?		S2	13	AUE73
58NI	63.4	70.*	8.63	0.38	149.	8.63	1.33							8.63?		S1	9	ZIS75
60NI	62.	70.*	8.68	0.4*	8.*	8.2*	0.5*							8.5?		S2	13	AUE73
62NI	62.	70.*	8.68	0.4*	9.*	8.68	0.4*							8.5?		S2	13,15	AUE73
64NI	62.	70.*	8.93	0.4*	9.*	8.93	0.4*							8.5?		S2	13	AUE73
116SN	67.0	39.69	9.75	0.50				4.53	9.75	0.50				9.75		S1		ROB71
120SN	66.7	38.86	9.78	0.51				4.52	9.78	0.51				9.78		S1		ROB71

FLUORINE-19 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
12C	40.	100.*	5.90*	0.48*	23.	6.25*	0.26*							6.94*		S3		VOO69
12C	40.0	100.*	5.90*	0.48*	25.	6.25*	0.26*							7.19*		S	10	SCH72
12C	60.	100.*	5.90*	0.48*	27.	6.25*	0.26*							6.94*		S3		VOO69
12C	60.	100.*	6.15	0.5*	33.	6.15	0.5*				0.4	6.15	0.5*	6.1?		S	18	ROB71A
12C	60.0	100.*	5.90*	0.48*	27.	6.25*	0.26*							7.19*		S	10	SCH72
12C	68.8	100.*	5.90*	0.48*	30.	6.25*	0.26*							7.19*		S	10	SCH72

See page 8 for Explanation of Tables

TABLE VII. Optical-Model Parameters Heavy Ions

SILICON-28 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
28SI	50.	100.*	7.36	0.49*	2.	7.78*	0.39*							7.30*		S1	9	HIL74
28SI	60.	100.*	7.30	0.49*	2.	7.78*	0.39*							7.30*		S1	9	HIL74
28SI	67.	100.*	7.36	0.49*	7.	7.78*	0.39*							7.30*		S1	9	HIL74
28SI	74.	100.*	7.30	0.49*	14.	7.78*	0.39*							7.30*		S1	9	HIL74
28SI	77.	100.*	7.36	0.49*	17.	7.78*	0.39*							7.30*		S1	9	HIL74

SULFUR-32 INCIDENT PARTICLE

NUCLIDE	ENERGY (MEV)	REAL POTENTIAL V	R**	A	VOL.IMAG. POTENTIAL W	RW**	AW	SURF.IMAG. POTENTIAL WD	RD**	AD	SPIN-ORBIT POTENTIAL VSO	RSO**	ASO	RC**	SR	FIT	NOTE	REF.
24MG	70.	100.*	7.44	0.488*	27.*	8.95	0.26*							8.47*	282	S	14	GUT73
24MG	75.	100.*	7.08	0.488*	27.*	6.72	0.26*							8.47*	263	S	14	GUT73
24MG	80.	100.*	7.08	0.488*	27.*	6.84	0.26*							8.47*	406	S	14	GUT73
24MG	80.	41.8*	7.34	0.49*	16.4*	8.39	0.49*							8.47*	650	S		GUT73
24MG	90.	26.8	7.42	0.5*	4.26	8.35	0.5*							8.47*	656	S	14	GUT73
24MG	110.	100.*	7.23	0.488*	27.*	7.59	0.26*							8.47*	1013	S		GUT73
24MG	110.	31.07	7.63	0.5*	5.11	7.93	0.5*							8.47*	1017	S2	7	GUT73
24MG	120.	100.*	7.50	0.5*	27.*	7.50	0.5*							8.47*	1320	S2	1	GUT73
27AL	67.	100.*	7.37	0.55	27.*	7.97	0.5*							8.64*	205	S1		GUT73
27AL	67.	22.83	8.36	0.5*	4.99	8.36	0.5*							8.64*	156	S		GUT73
27AL	73.	24.2	8.00	0.5*	5.41	8.00	0.5*							8.64*	308	S2		GUT73
27AL	82.5	100.*	7.50	0.48*	27.*	8.33	0.26*							8.64*	555	S2		GUT73
27AL	85.	100.*	7.40	0.48*	27.*	8.08	0.26*							8.64*	595	S2		GUT73
27AL	85.	41.8*	7.71	0.49*	16.4*	7.03	0.49*							8.64*	585	S		GUT73
27AL	110.	32.67	7.71	0.5*	5.43	8.64	0.5*							8.64*	1135	S2		GUT73
40CA	80.	41.8*	7.71	0.49*	16.4*	7.64	0.49*							9.23*	76	S1		GUT73
40CA	80.	100.*	7.81	0.55	27.*	7.69	0.5*							9.23*	63	S1		GUT73
40CA	80.	100.*	8.17	0.48*	27.*	8.90	0.26*							9.23*	62	S1		GUT73
40CA	82.5	100.*	7.81	0.55	27.*	7.69	0.5*							9.23*	130	S		GUT73
40CA	82.5	30.42	8.74	0.5*	7.27	8.74	0.5*							9.23*	187	S1		GUT73
40CA	85.	31.11	8.70	0.5*	7.48	8.70	0.5*							9.23*	266	S	14	GUT73

NOTES

1. Data for angles smaller than 60°
2. Absolute normalization of the data is unknown
3. Data for angles larger than 90° are not used in the search
4. Data for angles larger than 60° are not used in the search
5. Data for angles larger than 80° are not used in the search
6. Data for angles smaller than 45°
7. Data for angles smaller than 90°
8. The value of WD has been obtained assuming a linear variation of this parameter between 4.5 and 13 MeV
9. Data for angles smaller than 100°
10. The fixed parameters are from Ref. V0069. Parameter W is adjusted as a function of energy. Unacceptable fit to the data at backward angles.
11. See publication for a systematic study of the optical model parameters
12. The parameters V and A, of the real potential, were obtained from the superposition model
13. Data for angles smaller than 80°
14. Good fit to the data up to 90°
15. Data measured at energies between 60 and 64 MeV
16. See publication for other sets of parameters fitting the same data
17. Data for angles larger than 90°
18. Angular momentum dependent imaginary potential

W65. As reported in a previous compilation by D. R. Winner and R. M. Drisko, "Phenomenological Optical Model Parameters," Technical Report, Department of Physics, University of Pittsburgh, June 1965

See page 8 for Explanation of Tables

TABLE VII. Optical-Model Parameters Heavy Ions

TABULAR BIBLIOGRAPHY

Incident Nuclei	Target Nuclei	Energy Range (MeV)	References
^{6}Li	^{6}Li	15 to 36	WHA74
^{6}Li	^{12}C	20 to 63	BIN74
^{12}C	^{12}C	20 to 30	GOB71
^{16}O	^{16}O	12.5 to 35	MAH69
^{16}O	^{18}O	21 to 29	SIE71,SIE72
^{16}O	^{26}Mg	35 to 50	SIE71
^{16}O (*)	^{14,15}N,^{16}O,^{24}Mg	12 to 32	SIE71
^{16}O	^{24}Mg	47 to 72	SIW74
^{16}O	^{40}Ca to ^{96}Zr	60	BEC73
^{16}O	^{96}Zr	49	BEC73
^{24}Mg	^{24}Mg	45 to 66	EML75
^{28}Si	^{28}Si	66 to 72	EML75

*Excitation functions only

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