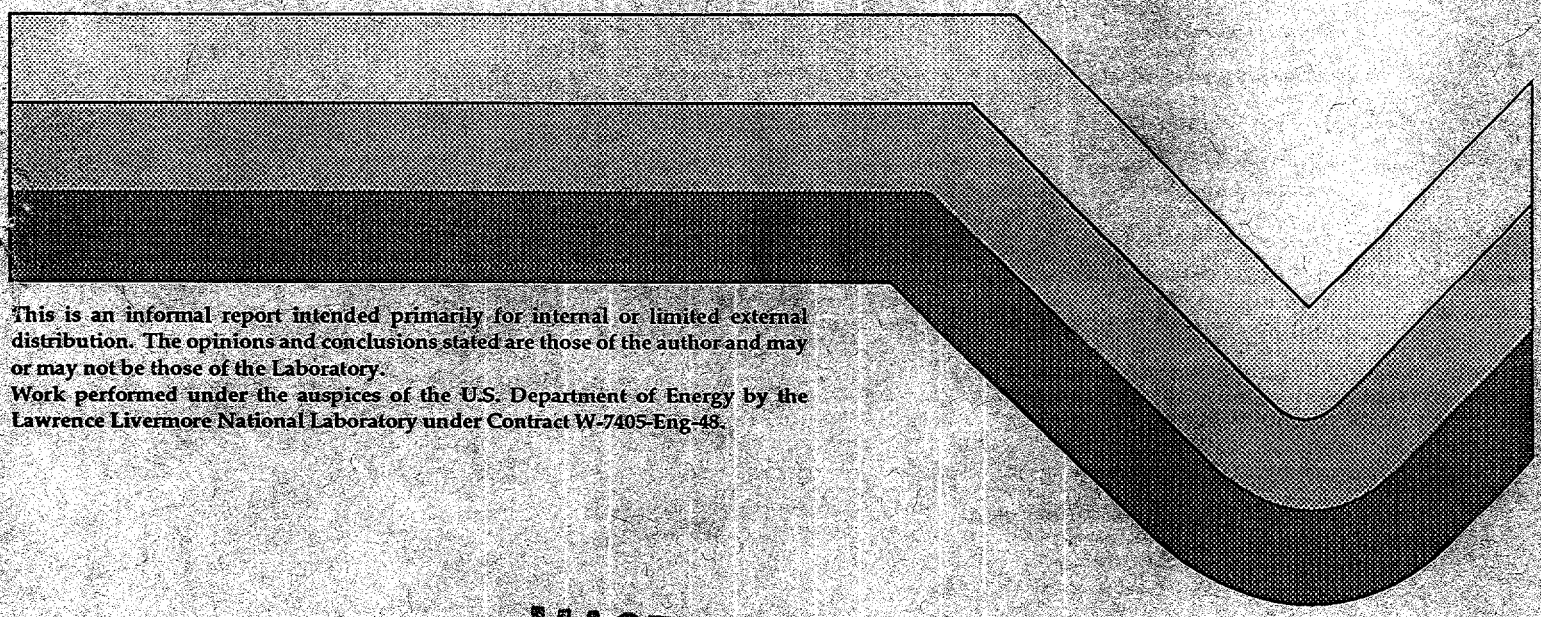
UCRL-ID-122753

Evaluated cross sections libraries and kerma factors for neutrons up to 100 MeV on ^{40}Ca and ^{31}P

M. B. Chadwick
University of California
Lawrence Livermore National Laboratory
Nuclear Data Group
Livermore, CA 94550

November, 1995



Work performed under the auspices of the U.S. Department of Energy by the Lawrence Livermore National Laboratory under Contract W-7405-Eng-48.

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We present evaluations of the interaction of 20 to 100 MeV neutrons with calcium and phosphorus, which follows on from our previous work on carbon, nitrogen, and oxygen [1, 2]. Our aim is to accurately represent integrated cross sections, inclusive emission spectra, and kerma factors, in a data library which can be used in radiation transport calculations. We apply the GNASH nuclear model code, which includes Hauser-Feshbach, preequilibrium, and direct reaction mechanisms, and use experimental measurements to optimize the calculations. Total, elastic, and nonelastic cross sections, angle-energy correlated emission spectra for light ejectiles with A$\leq$4 and gamma-rays, and average energy depositions, are determined. The expected accuracy of the calculated cross sections and kerma factors is discussed.

I. INTRODUCTION

In previous reports [1, 2] we described the calculation and evaluation of neutron cross sections on carbon, nitrogen, and oxygen, up to 100 MeV. These evaluated data files are being utilized by the LLNL PEREGRINE code to calculate absorbed dose in the body in All-Particle Monte Carlo simulations of fast neutron radiotherapy. While the overall percentages (by mass) of calcium and phosphorus in the body are small (approximately 1 %), their abundances in bone are significantly higher (approximately 11 % for phosphorus, 21 % for calcium). In this report we describe evaluated 100 MeV neutron libraries for the most abundant isotopes of these two elements, ^{40}Ca and ^{31}P.

Compared to carbon, nitrogen, and oxygen, there are relatively few experimental measurements of neutron reactions on calcium and phosphorus. In particular, no experimental data exist for the inclusive emission spectra of light ejectiles for incident neutrons between 20 and 100 MeV. This is in contrast to the situation for C, N, and O, where charged-particle production cross sections have been measured at UC-Davis [3], Louvain-la-Neuve (for carbon and oxygen) [4], and Los Alamos (for carbon) [5]. For this reason, there are larger uncertainties in the present calcium and phosphorus evaluations, which are based almost exclusively on the results of model calculation. However, the impact on uncertainties in absorbed dose calculations will be rather small, due to the relatively small abundances of calcium and phosphorus in the body.

These evaluations are available as electronic databases in the Lawrence Livermore National Laboratory (LLNL) Evaluated Nuclear Data Library (ENDL) format, and we plan to translate the library into the ENDF format. They can be used together with existing evaluations for neutrons below 20 MeV, such as the ENDL evaluation by Howerton [6].

In Sec. II we describe our evaluation methods. In Sec. III we give discuss our results and compare them with experimental data where they exist, and in Sec. IV, kerma factors derived from our evaluated cross sections are compared with those from other calculations.

II. EVALUATION METHODS

The evaluation represents inclusive emission spectra of the secondary particles which need to be transported in radiation transport calculations (neutrons, gammas, and light charged particles with $A \leq 4$), as well as the total kinetic energy given to heavier charged particles, which is assumed to be deposited locally. This representation of the data is adequate for calculations of transport and absorbed dose. The libraries are fully angle-energy correlated, and describe the emission spectra at various angles, all in the laboratory frame of reference. We have omitted triton and helium-3 emission reactions since measurements on other target nuclei [3] show these cross sections to be small.

The evaluations are based mainly on model calculations using the GNASH code

system [7], with elastic scattering and transmission coefficients being obtained from the SCAT2 code [8]. Full details of our evaluation techniques are given in Refs. [1, 2]. However, in our evaluations of C, N, and O, there were measurements of inclusive charged-particle production spectra which enabled us to optimize the calculations by pre-evaluating primary preequilibrium spectra, and inputting these spectra into the FKK-GNASH code. Since similar measurements do not exist for Ca and P, the present results were obtained directly from GNASH calculations, where the exciton model preequilibrium results for n, p, d, and α were obtained using default modeling parameters. We discuss later the accuracy of such model calculations.

We determine total, elastic, and nonelastic scattering cross sections using optical model analyses, which are also needed for generating transmission coefficients. For calcium, our work uses the spherical optical potential developed by Islam and Finlay of Ohio University [9], from 20 to 60 MeV . Above this energy we use the global medium-energy potential of Madland [10], and below 20 we use the Wilmore-Hodgson potential [11]. For phosphorus we use the Wilmore-Hodgson potential below 20 MeV, and the Madland medium energy potential above this energy. In addition to neutrons, optical potentials are also needed for the other ejectiles for calculating transmission coefficients for their decay. Proton potentials were obtained from the neutron potentials using the Lane model isospin transformation, namely $(N-Z)/A \rightarrow -(N-Z)/A$, with a Coulomb correction to the real central potential of $0.4Z/A^{1/3}$. Potentials for deuterons and alphas up to high energies were obtained using the method of Watanabe, as implemented by Madland [10].

The GNASH code uses Hauser-Feshbach theory to calculate equilibrium emission of particles and gamma rays, conserving angular momentum and parity in an open-ended sequence of decay chains. Gamma, neutron, proton, deuteron, and alpha particle decay channels were included. Transmission coefficients for equilibrium particle decay were obtained using the optical potentials described above, and gamma-ray transmission coefficients were obtained from the generalized Lorentzian model of Kopecky and Uhl [12] Nuclear level densities were determined using the Ignatyuk model [13], as implemented by Arthur *et al.* [7]. Pairing energies were obtained from the Cook systematics. This continuum level density formulation is matched continuously onto discrete low-lying levels at the lower excitation energies. Discrete level information (energy, spin, parity, gamma-ray branching ratios) is tabulated for each nuclide in an input file. Continuum angular distributions are obtained using the phenomenological Kalbach systematics [14].

III. RESULTS AND COMPARISONS WITH EXPERIMENTS

A. Total, Elastic, and Reaction Cross Sections

Table I shows the evaluated total, elastic, and reaction (nonelastic) cross sections for calcium and phosphorus, based on our optical model calculations. Between 20 and 100 MeV, the optical models we use provide a reasonably good description of

measured calcium reaction cross section data (see the dashed line in Fig. 1). But since an accurate description of the reaction cross section is important for determining secondary particle spectra, for calcium we slightly modify the calculated results to better describe the experimental data to give the full lines shown in Fig. 1, and renormalize the calculated transmission coefficients accordingly. Although DeJuren did not measure the nonelastic cross section for calcium [15], Fig. 1 shows a datum point determined from the systematic dependence of his results. Since nonelastic cross section data has not been measured for phosphorus we use the optical model results here (Fig. 2).

The evaluated calcium total cross section was obtained by slightly modifying the optical model results to agree with data, principally the new high-accuracy results of Finlay *et al.* [16], see Fig. 3. Only one measurement of the total cross section exists for phosphorus, at 28.5 MeV, and so for phosphorus we take the total cross section directly from the optical model calculations, see Fig. 4. The elastic scattering angular distribution differential cross sections were obtained from our optical model calculations, renormalized to the difference between evaluated total and reaction cross sections.

Measurements by Takahashi *et al.* at 14 MeV show that inelastic neutron scattering on calcium to the low-lying 2+ and 3- states is important. Therefore we take the Takahashi results at 14 MeV, and extend them to higher incident energies with a $1/E_{inc}$ variation predicted by the Kalka model [18].

B. Accuracy of inclusive production spectra?

No inclusive particle production spectra measurements exist to validate our results. However, we have the following expectations:

- For neutrons, protons and gamma-ray ejectiles, we expect that our calculations are fairly accurate. This expectation is based on the following:

  1. Our model calculations for C, N, O generally accounted for experimental data well [1, 2].
  2. Our benchmarking model calculations for the Nuclear Energy Agency Code Intercomparison, using the GNASH code, accounted for experimental data well [19].
  3. The nonelastic cross section, which has a scaling effect on the magnitude of inclusive emission spectra, is described fairly accurately (at least for calcium, where we have data).
  4. The ratio of calculated neutrons to proton differential cross sections in the preequilibrium regime approximately follows the systematics of Kalend *et al.* [20] (a ratio of about 2:1).

5. We have performed a GNASH calculation of the 14 MeV ^{40}Ca(n, xn) reaction, where data does exist, and Fig. 5 shows that our results agree reasonably well with Takahashi's measurements [17].

- While we expect that calculated alpha and deuteron emission cross sections are reasonably accurate at low emission energies, we expect the preequilibrium cross sections to be less accurate. However, since these cross sections are small compared to those of protons and neutrons, the impact of these deficiencies on kerma factors and absorbed dose is expected to be small.These expectations are based on the following:

  1. Our model calculations of equilibrium-emission of alphas and deuterons from C, N, O generally accounted for experimental data well [1, 2].
  2. Preequilibrium modeling of cluster emission is notoriously difficult.
  3. Comparisons of the high-energy alpha emission with data from other reactions suggests our preequilibrium alpha emission may be overestimated by a factor of two at the higher incident energies (for instance, in comparisons between our 90 MeV ^{40}Ca$(n, x\alpha)$ cross section and data at 90 MeV for ^{27}Al(p, α) and ^{58}Ni(p, α) [21]. Calcium lies in mass between these nuclei, and even though the data is for proton-induced reactions, there is a suggestion that our model calculations overestimate preequilibrium alpha emission.) However, these cross sections are more than an order of magnitude below the proton preequilibrium spectra, and so the impact of possible deficiencies on calculated total kerma factors is expected to be small.

The appendix contains numerical tabulations of the angle-integrated emission spectra for light particles and gamma rays, for the incident neutron energies tabulated in the libraries. They also contain, at the bottom of each column, the total production cross sections, average energies, and kerma factors. Lack of space prohibits a tabulation of the double-differential cross sections; however, these cross sections can be easily obtained from the evaluated files.

IV. KERMA FACTORS

Kerma factors are a measure of the kinetic of secondary charged-particles following a neutron reaction, and are important for determining absorbed dose in radiotherapy, and heating effects when neutrons interact with matter. We partition the calculated kerma factors into contributions from light charged particle ejectiles with A $\leq$ 4 (obtained from lab-frame emission spectra), elastic recoils (obtained from elastic scattering angular distributions), and non-elastic heavy recoils (from the calculated recoil production cross sections along with energy-balance). Full details of the methods we use are given in Ref. [1].

The partial kerma factor for a certain secondary charged-particle type is obtained from the product of the cross section (in b) and the average energy (in MeV), in units of b.MeV/atom. To convert to the SI unit of Gy.m^2 (where 1 Gray (Gy) = 1J/1Kg) we multiply by 0.241439 $\times 10^{-15}$ for calcium and 0.3115065 $\times 10^{-15}$ for phosphorus, which are the product of three factors: the number of atoms per Kg of ^{16}O (6.0221367 / M_A) $\times$ 10^{26} (where M_A=39.962591 for Ca, 30.973762 for P); J/MeV (1.60217733 $\times 10^{-13}$); and m^2/b (10^{-28}).

Our calculated partial and total kerma factors, derived from the evaluated cross sections, are given in the appendix tables. No experimental data exist for calcium and phosphorus kerma factors. We show our results in Figs. 7 and 8, compared with other calculations. The Howerton calculations are derived from the Livermore evaluated data files below 20 MeV [6], while the Caswell and Coyne [22] calculations are obtained from the ENDF/B-IV data base, with extensions to 30 MeV made by extending partial cross sections above 20 MeV (using a technique which is some cases is not accurate). Dimbylow's calculation was based on an early version of the GNASH code [23], and Morstin's calculation used a version of HETC intranuclear cascade code [24].

The kerma factors extrapolated by Caswell and Coyne above 20 MeV are probably not accurate since the cross sections from which they are derived are based on rather crude extrapolations (and also these authors were faced with the difficulty that in some cases the ENDF evaluations did not include all the charge-particle decay channels needed). Since there are no experimental data points to validate our results, the calculated kerma factors are necessarily less well known than for C, N, O, where we expect our evaluations to be accurate to better than 10 %. By observing the variation among the various model calculations, we expect our evaluated total kerma factors for calcium and phosphorus to have an uncertainty of about 20 %. Still, the overall uncertainties in kerma factors for body tissues, due to the uncertainties in these Ca and P evaluations, are much smaller due to the small abundances of these elements in the body.

V. ACKNOWLEDGMENTS

I wish to thank H. Barschall, M. Blann, W. Chandler, L. Cox, P. DeLuca, C. Hartmann-Siantar, R. Howerton, J. Rathkopf, D. Resler, R. White, and P. Young, for many useful discussions.

REFERENCES

[1] M.B. Chadwick, M. Blann, L.J. Cox, P.G. Young, and A.S. Meigooni, accepted for publication by Nuclear Science and Engineering (1995); M.B. Chadwick, M. Blann, L.J. Cox, P.G. Young, and A.S. Meigooni, Lawrence Livermore National Laboratory report UCRL-ID-120829 (1995).

[2] M.B. Chadwick and P.G. Young, Lawrence Livermore National Laboratory report UCRL-ID-122436; and submitted to Nucl. Sci. Eng. (1995).

[3] T.S. Subramanian, J.L. Romero, F.P. Brady, J.W. Watson, D.H. Fitzgerald, R. Garrett, G.A. Needham, J.L. Ullmann, C.I. Zanelli, D.J. Brenner, and R.E. Prael, Phys. Rev. C **28**, 521 (1983).

[4] I. Slypen, V. Corcalciuc, and J.P. Meulders, Phys. Rev. C **51**. 1303 (1995); S. Benck, V. Corcalciuc, and J.P. Meulders (to be published).

[5] R.C. Haight, T.M. Lee, S.M. Sterbenz, *et al.*, proceedings of the *International Conference on Nuclear Data for Science and Technology*, Gatlinburg, Tennessee, May 9-13, 1994, ed. J.K. Dickens (American Nuclear Society, 1994) p. 311.

[6] R.J. Howerton, Lawrence Livermore National Laboratory document UCRL-50400 **27** (1986)*revised.*

[7] P.G. Young, E.D. Arthur, and M.B. Chadwick, Los Alamos National Laboratory document LA-MS-12343 (1992); M.B. Chadwick and P.G. Young, Phys. Rev. C **47**, 2255 (1993).

[8] O. Bersillon, Bruyeres-le-Chatel progress report CEA-N-2037, p. 111 (1978).

[9] M.S. Islam, R.W. Finlay, J.S. Petler, J. Rapaport, R. Alarcon, and J. Wierzbicki, Phys. Med. Biol. **33**, 315 (1988).

[10] D.G. Madland, in *Proceedings of a Specialists' Meeting on Preequilibrium Reactions*, Semmering, Austria, 10-12 Feb. 1988, edited by B. Strohmaier (NEA Report NEANDC-245, 1988) p. 103.

[11] D. Wilmore and P.E. Hodgson, Nucl. Phys. **55**, 673 (1964).

[12] J. Kopecky and M. Uhl, Phys. Rev. C **41**, 1941 (1990).

[13] A.V. Ignatyuk, G.N. Smirenkin, and A.S. Tishin, Sov. J. Nucl. Phys. **21**, 255 (1975).

[14] C. Kalbach, Phys. Rev. C **37**, 2350 (1988).

[15] J. Dejuren and N. Knable, Phys. Rev. **77**, 606 (1950).

[16] R.W. Finlay, W.P. Abfalterer, G. Fink, E. Montei, T. Adami, P.W. Lisowski, G.L. Morgan, and R.C. Haight, Phys. Rev. C **47**, 237 (1993).

[17] A. Takahashi *et al.*, Oktavian Report No. A-92-01, 1992.

[18] H. Kalka, M. Torjman, D. Seeliger, Phys. Rev. C **40**, 1619 (1989).

[19] M. Blann, H. Gruppelaar, P. Nagel, and J. Rodens, *International Code Comparison for Intermediate Energy Nuclear Data*, OECD publication, Nuclear Energy Agency, Paris, 1994.

[20] A.M. Kalend *et al.*, Phys. Rev. C **28**, 105 (1983).
[21] J.R. Wu, C.C. Chang, and H.D. Holmgren, University of Maryland report NSF-3-78 (1978).
[22] R.S. Caswell, J.J. Coyne, M.L. Randolph, Radiat. Res. **83**, 217 (1980).
[23] P.J. Dimbylow, Phys. Med. Biol. **27**, 989 (1982).
[24] K. Morstin, A. Dydejczyk, J. Booz, in *Nuclear and Atomic Data for Radiotherapy and Related Radiobiology*, International Atomic Energy Agency report STI/PUB/741 (IAEA, Vienna, 1987).

TABLES

TABLE I. Evaluated total, elastic, and nonelastic (reaction) cross sections (in mb) for n+^{40}Ca and ^{31}P, for various laboratory neutron energies.

	^{40}Ca+n			^{31}P+n		
Energy (MeV)	Total	Elastic	Nonelastic	Total	Elastic	Nonelastic
20	2116	954	1162	1710	876	834
23	2120	980	1140	1796	989	807
27	2168	1065	1103	1884	1118	766
30	2208	1133	1075	1923	1185	738
35	2246	1227	1019	1947	1246	701
40	2276	1323	953	1926	1256	670
50	2212	1363	849	1808	1187	621
60	2064	1312	752	1650	1069	581
70	1916	1248	668	1491	943	548
80	1733	1099	634	1346	826	520
90	1581	975	606	1218	721	497
100	1403	821	582	1108	630	478

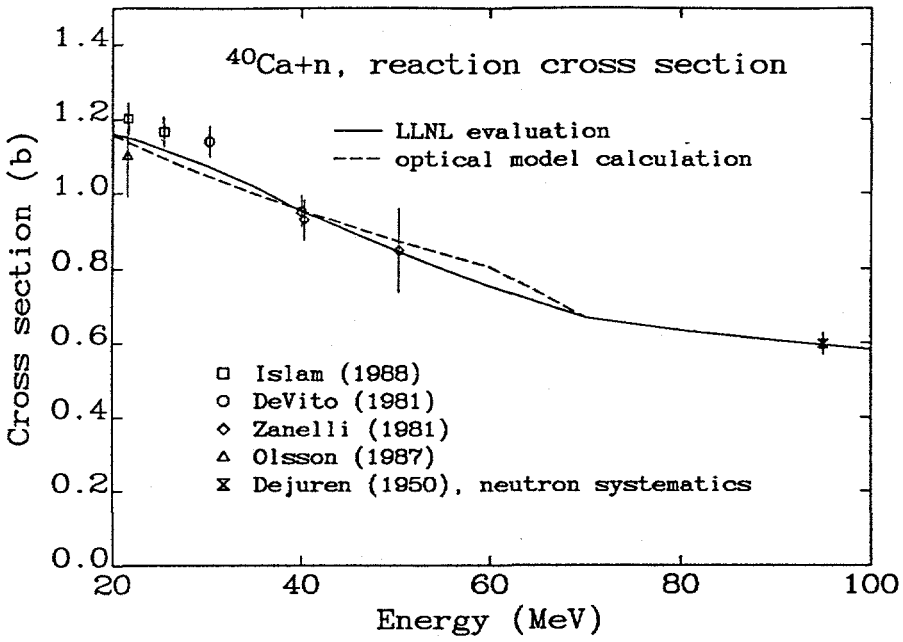


Fig. 1. Nonelastic cross section for neutrons on calcium. The experimental data were taken from the Brookhaven NNDC CSISRS file.

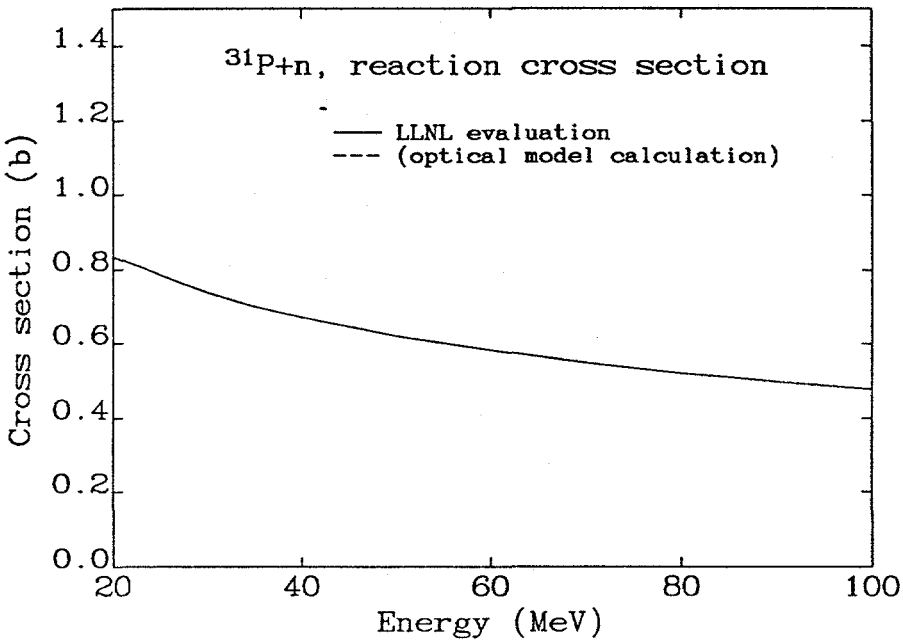


Fig. 2. Nonelastic cross section for neutrons on phosphorus. Since no experimental data exist, the optical model results were used for this evaluation.

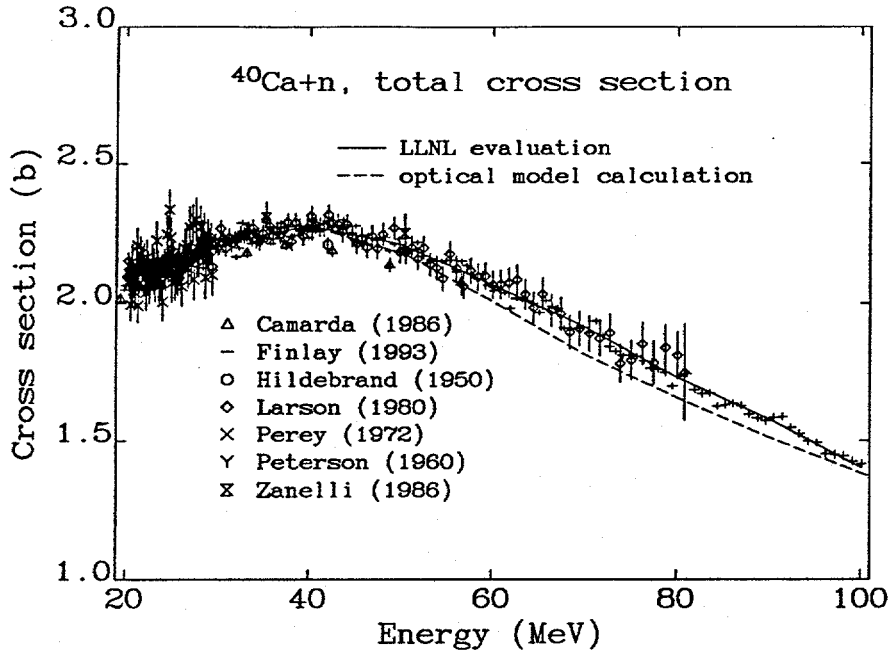


Fig. 3. Total cross section for neutrons on calcium. The experimental data were taken from the Brookhaven NNDC CSISRS file.

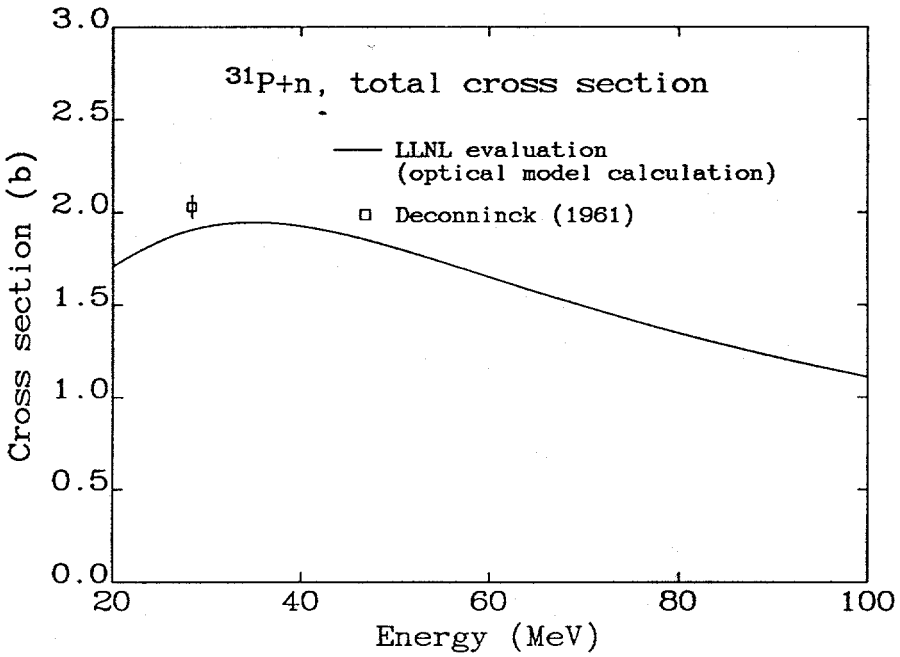


Fig. 4. Total cross section for neutrons on phosphorus. The experimental data were taken from the Brookhaven NNDC CSISRS file.

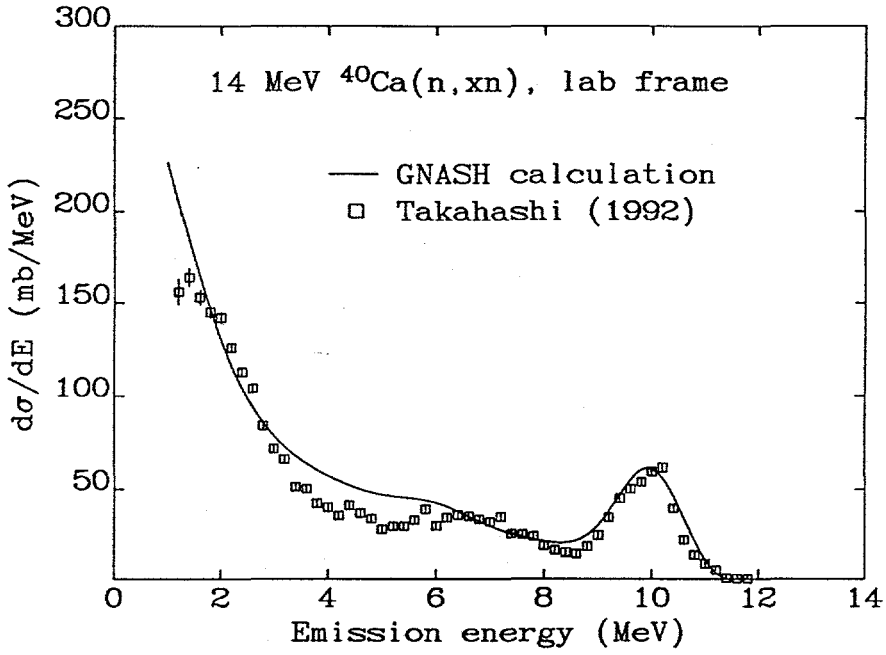


Fig. 5. Calculated 14 MeV $^{40}\mathrm{Ca}(n,xn)$ emission spectrum compared with data of Takahashi *et al.*. While 14 MeV is below the energies considered in this work, a comparison of the calculated results with these data provides some indication of the accuracy of the calculations.

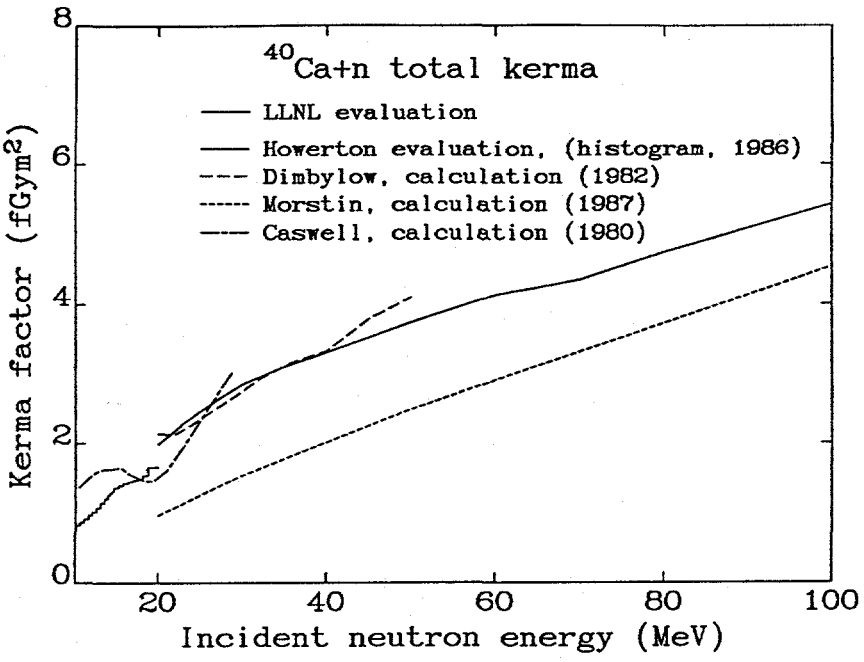


Fig. 6. Total kerma factor for neutrons on calcium compared with other calculations and evaluations.

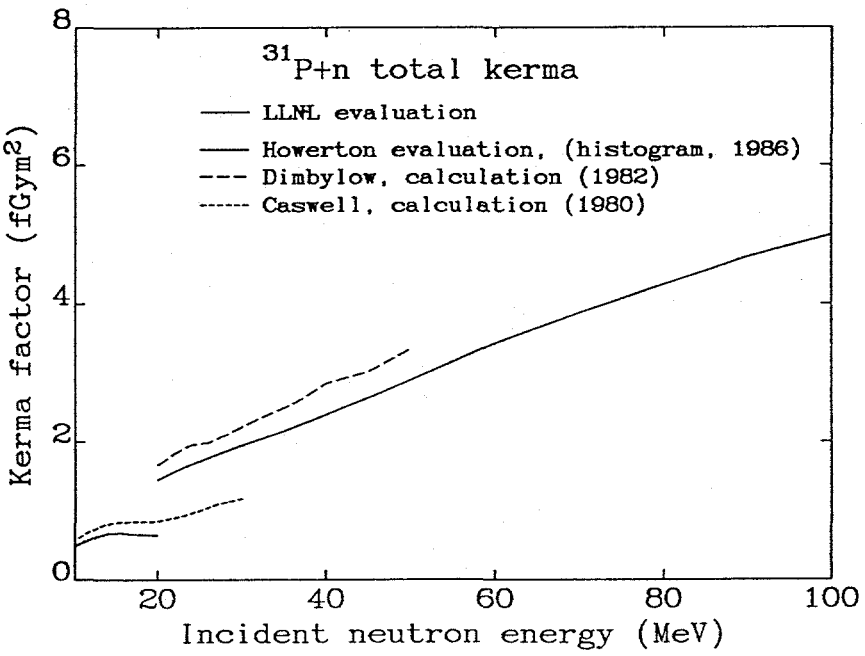


Fig. 7. Total kerma factor for neutrons on phosphorus compaared with other calculations and evaluations.

6 Appendix : Tabulations of Libraries for Calcium and Phosphorus

In the appendix we show tables giving numerical values for the Ca and P angle-integrated emission spectra for $A \leq 4$ ejectiles, for incident energies of 20, 23, 27, 30, 35, 40, 50, 60, 70, 80, 90, and 100 MeV. For completeness, at the end of each emission spectrum we also indicate the production cross section, the average kinetic energy, and the partial kerma factors. These are then combined with the elastic and recoil nonelastic kerma factors to give the total kerma factor.

Incident Energy: $E_n = 20.00$MeV

Energy (MeV)	Lab angle–integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.82E+02	4.15E+01	1.39E-02	2.97E-01	4.40E+02
2.00	1.35E+02	9.37E+01	2.30E-01	1.92E+00	2.23E+02
3.00	1.02E+02	1.53E+02	1.08E+00	6.75E+00	3.68E+02
4.00	7.24E+01	1.57E+02	2.27E+00	2.06E+01	2.10E+02
5.00	5.29E+01	1.34E+02	3.26E+00	3.56E+01	5.07E+01
6.00	4.20E+01	9.73E+01	4.40E+00	4.05E+01	2.66E+01
7.00	3.51E+01	6.57E+01	5.69E+00	3.61E+01	1.25E+01
8.00	3.01E+01	4.56E+01	5.43E+00	2.71E+01	2.69E+00
9.00	2.58E+01	3.32E+01	5.58E+00	1.89E+01	2.46E+00
10.00	2.20E+01	2.48E+01	6.52E+00	1.36E+01	3.82E-02
11.00	2.06E+01	1.91E+01	6.61E+00	1.06E+01	1.43E-02
12.00	2.16E+01	1.54E+01	3.03E+00	8.61E+00	1.02E-02
13.00	1.45E+01	1.26E+01	3.44E+00	7.12E+00	6.42E-03
14.00	9.85E+00	1.03E+01	1.02E+00	5.83E+00	4.74E-03
15.00	2.04E+01	9.34E+00	3.48E-03	4.71E+00	4.60E-03
16.00	4.87E+01	9.14E+00	0.00E+00	3.53E+00	5.49E-03
17.00	1.51E+01	5.36E+00	0.00E+00	2.26E+00	7.61E-03
18.00	4.40E-02	2.05E+00	0.00E+00	1.36E+00	1.17E-02
19.00	0.00E+00	4.92E-01	0.00E+00	6.68E-01	1.79E-02
20.00	2.88E-03	5.14E-02	0.00E+00	3.46E-01	2.11E-02
21.00	0.00E+00	0.00E+00	0.00E+00	7.98E-02	1.65E-02
22.00	0.00E+00	0.00E+00	0.00E+00	2.17E-03	1.06E-02
23.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.32E-03
24.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.83E-03
25.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.00E-03
σ_{prod} (b)	8.50E-01	9.30E-01	4.86E-02	2.47E-01	1.34E+00
E_{av} (MeV)	5.52E+00	5.48E+00	8.72E+00	7.79E+00	2.53E+00
K (fGy· m^2)	0.00E+00	1.23E+00	1.02E-01	4.62E-01	0.00E+00
$\Sigma_{A<4}K_A$					1.79E+00
K_{recoil} non-elastic ($A > 4$)					1.50E-01
K_{recoil} elastic					4.87E-02
K_{total}					1.99E+00

Incident Energy: $E_n = 23.00$MeV

Energy (MeV)	Lab angle–integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.51E+02	3.81E+01	1.64E-02	2.23E-01	4.41E+02
2.00	1.26E+02	1.02E+02	2.37E-01	2.20E+00	3.16E+02
3.00	9.97E+01	1.80E+02	1.07E+00	8.40E+00	3.48E+02
4.00	7.43E+01	1.70E+02	2.20E+00	2.03E+01	1.90E+02
5.00	5.62E+01	1.36E+02	3.06E+00	3.28E+01	5.72E+01
6.00	4.49E+01	1.01E+02	3.58E+00	4.04E+01	3.24E+01
7.00	3.74E+01	7.25E+01	3.91E+00	3.98E+01	1.11E+01
8.00	3.21E+01	5.22E+01	4.24E+00	3.15E+01	4.21E+00
9.00	2.79E+01	3.78E+01	4.97E+00	2.17E+01	1.61E-01
10.00	2.43E+01	2.80E+01	6.13E+00	1.45E+01	2.05E-02
11.00	2.14E+01	2.17E+01	5.71E+00	1.02E+01	1.36E-02
12.00	1.89E+01	1.76E+01	5.43E+00	7.92E+00	1.05E-02
13.00	1.66E+01	1.46E+01	5.49E+00	6.50E+00	6.87E-03
14.00	1.60E+01	1.23E+01	6.04E+00	5.52E+00	5.19E-03
15.00	1.70E+01	1.05E+01	2.86E+00	4.71E+00	5.10E-03
16.00	1.13E+01	8.95E+00	3.03E+00	3.98E+00	6.05E-03
17.00	7.98E+00	7.55E+00	1.10E+00	3.31E+00	8.22E-03
18.00	1.61E+01	6.78E+00	4.25E-03	2.78E+00	1.23E-02
19.00	4.09E+01	6.66E+00	0.00E+00	2.17E+00	1.82E-02

Incident Energy: $E_n = 23.00$MeV: cont.

Energy (MeV)	Lab angle–integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
20.00	1.58E+01	3.98E+00	0.00E+00	1.29E+00	2.10E-02
21.00	5.53E-02	1.58E+00	0.00E+00	7.36E-01	1.61E-02
22.00	0.00E+00	4.38E-01	0.00E+00	3.93E-01	1.02E-02
23.00	0.00E+00	5.27E-02	0.00E+00	2.00E-01	6.55E-03
24.00	0.00E+00	0.00E+00	0.00E+00	4.49E-02	4.46E-03
25.00	0.00E+00	0.00E+00	0.00E+00	1.24E-03	3.23E-03
26.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-03
27.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.02E-03
28.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E-03
σ_{prod} (b)	8.56E-01	1.03E+00	5.91E-02	2.62E-01	1.40E+00
E_{av} (MeV)	6.39E+00	5.76E+00	1.04E+01	8.06E+00	2.48E+00
K (fGy· m^2)	0.00E+00	1.43E+00	1.48E-01	5.08E-01	0.00E+00
$\Sigma_{A<4} K_A$					2.08E+00
K_{recoil} non-elastic ($A > 4$)					1.60E-01
K_{recoil} elastic					4.74E-02
K_{total}					2.29E+00

Incident Energy: $E_n = 27.00$MeV

Energy (MeV)	Lab angle–integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.42E+02	3.89E+01	1.82E-02	1.12E-01	3.96E+02
2.00	1.22E+02	1.14E+02	2.58E-01	1.30E+00	4.59E+02
3.00	9.58E+01	1.98E+02	1.11E+00	8.05E+00	2.83E+02
4.00	7.19E+01	1.91E+02	2.19E+00	2.27E+01	1.65E+02
5.00	5.55E+01	1.51E+02	2.94E+00	3.37E+01	5.12E+01
6.00	4.51E+01	1.08E+02	3.32E+00	3.62E+01	3.42E+01
7.00	3.82E+01	7.59E+01	3.51E+00	3.35E+01	1.00E+01
8.00	3.33E+01	5.45E+01	3.63E+00	2.76E+01	5.46E+00
9.00	2.93E+01	4.03E+01	3.73E+00	2.08E+01	2.36E-01
10.00	2.60E+01	3.08E+01	3.83E+00	1.50E+01	2.02E-02
11.00	2.34E+01	2.45E+01	3.94E+00	1.07E+01	1.35E-02
12.00	2.12E+01	2.01E+01	4.17E+00	7.88E+00	1.05E-02
13.00	1.93E+01	1.69E+01	4.72E+00	6.12E+00	7.07E-03
14.00	1.77E+01	1.45E+01	5.83E+00	5.04E+00	5.43E-03
15.00	1.60E+01	1.26E+01	5.32E+00	4.34E+00	5.42E-03
16.00	1.44E+01	1.11E+01	4.81E+00	3.82E+00	6.53E-03
17.00	1.28E+01	9.72E+00	5.16E+00	3.38E+00	8.91E-03
18.00	1.23E+01	8.44E+00	5.07E+00	2.97E+00	1.32E-02
19.00	1.35E+01	7.21E+00	2.44E+00	2.57E+00	1.93E-02
20.00	9.83E+00	6.15E+00	2.55E+00	2.19E+00	2.16E-02
21.00	8.57E+00	5.29E+00	1.20E+00	1.85E+00	1.61E-02
22.00	1.83E+01	4.83E+00	7.20E-03	1.61E+00	1.00E-02
23.00	2.73E+01	5.05E+00	0.00E+00	1.31E+00	6.31E-03
24.00	1.14E+01	3.27E+00	0.00E+00	7.49E-01	4.24E-03
25.00	8.49E-02	1.34E+00	0.00E+00	4.44E-01	3.03E-03
26.00	0.00E+00	4.34E-01	0.00E+00	2.25E-01	2.29E-03
27.00	0.00E+00	6.46E-02	0.00E+00	7.09E-02	1.80E-03
28.00	0.00E+00	0.00E+00	0.00E+00	2.16E-02	1.47E-03
29.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.23E-03
30.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.94E-04
31.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.02E-03
32.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.24E-04
σ_{prod} (b)	8.85E-01	1.15E+00	6.98E-02	2.54E-01	1.40E+00
E_{av} (MeV)	7.33E+00	6.10E+00	1.25E+01	8.44E+00	2.42E+00
K (fGy· m^2)	0.00E+00	1.70E+00	2.10E-01	5.16E-01	0.00E+00
$\Sigma_{A<4} K_A$					2.42E+00
K_{recoil} non-elastic ($A > 4$)					1.60E-01
K_{recoil} elastic					4.65E-02
K_{total}					2.63E+00

Incident Energy: $E_n = 30.00$MeV

Energy (MeV)	Lab angle–integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.37E+02	3.36E+01	1.59E-02	7.30E-02	3.96E+02
2.00	1.20E+02	1.06E+02	2.34E-01	1.01E+00	5.42E+02
3.00	9.34E+01	1.89E+02	1.01E+00	7.01E+00	2.59E+02
4.00	6.94E+01	1.94E+02	2.03E+00	2.14E+01	1.53E+02
5.00	5.38E+01	1.58E+02	2.76E+00	3.41E+01	4.64E+01
6.00	4.41E+01	1.14E+02	3.12E+00	3.79E+01	3.10E+01
7.00	3.78E+01	7.97E+01	3.27E+00	3.41E+01	9.36E+00
8.00	3.32E+01	5.66E+01	3.34E+00	2.64E+01	5.77E+00
9.00	2.96E+01	4.17E+01	3.38E+00	1.86E+01	2.34E-01
10.00	2.67E+01	3.19E+01	3.43E+00	1.28E+01	1.95E-02
11.00	2.43E+01	2.55E+01	3.48E+00	9.18E+00	1.31E-02
12.00	2.23E+01	2.12E+01	3.55E+00	6.94E+00	1.04E-02
13.00	2.07E+01	1.81E+01	3.63E+00	5.50E+00	7.09E-03
14.00	1.93E+01	1.58E+01	3.73E+00	4.57E+00	5.48E-03
15.00	1.80E+01	1.40E+01	3.94E+00	3.94E+00	5.51E-03
16.00	1.66E+01	1.25E+01	4.45E+00	3.49E+00	6.70E-03
17.00	1.52E+01	1.12E+01	5.60E+00	3.16E+00	9.20E-03
18.00	1.38E+01	9.87E+00	5.19E+00	2.87E+00	1.37E-02
19.00	1.26E+01	8.63E+00	4.26E+00	2.59E+00	1.99E-02
20.00	1.14E+01	7.62E+00	4.62E+00	2.33E+00	2.21E-02
21.00	1.08E+01	6.82E+00	4.82E+00	2.06E+00	1.63E-02
22.00	1.18E+01	6.08E+00	2.45E+00	1.79E+00	1.00E-02
23.00	9.07E+00	5.33E+00	2.27E+00	1.53E+00	6.26E-03
24.00	7.48E+00	4.63E+00	1.30E+00	1.30E+00	4.16E-03
25.00	1.58E+01	4.18E+00	1.27E-02	1.17E+00	2.95E-03
26.00	2.49E+01	4.49E+00	0.00E+00	9.77E-01	2.21E-03
27.00	1.22E+01	2.96E+00	0.00E+00	5.27E-01	1.73E-03
28.00	1.71E-01	1.13E+00	0.00E+00	2.88E-01	1.40E-03
29.00	1.77E-03	4.40E-01	0.00E+00	1.60E-01	1.16E-03
30.00	0.00E+00	7.59E-02	0.00E+00	4.55E-02	9.86E-04
31.00	0.00E+00	1.13E-03	0.00E+00	1.31E-02	8.55E-04
32.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.43E-05
33.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.73E-04
34.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.16E-04
35.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.95E-04
σ_{prod} (b)	9.11E-01	1.19E+00	7.59E-02	2.48E-01	1.44E+00
E_{av} (MeV)	8.17E+00	6.56E+00	1.42E+01	8.63E+00	2.36E+00
K (fGy· m^2)	0.00E+00	1.87E+00	2.59E-01	5.14E-01	0.00E+00
$\Sigma_{A<4} K_A$					2.64E+00
K_{recoil} non-elastic ($A > 4$)					1.60E-01
K_{recoil} elastic					4.56E-02
K_{total}					2.85E+00

Incident Energy: $E_n = 35.00$MeV

Energy (MeV)	Lab angle–integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.28E+02	4.07E+01	1.72E-02	3.36E-02	3.92E+02
2.00	1.15E+02	9.17E+01	2.28E-01	7.43E-01	5.94E+02
3.00	9.16E+01	1.46E+02	9.08E-01	5.73E+00	2.43E+02
4.00	6.81E+01	1.69E+02	1.74E+00	1.84E+01	1.28E+02
5.00	5.21E+01	1.48E+02	2.32E+00	3.12E+01	4.16E+01
6.00	4.20E+01	1.14E+02	2.59E+00	3.73E+01	2.64E+01
7.00	3.55E+01	8.32E+01	2.69E+00	3.58E+01	9.20E+00
8.00	3.12E+01	6.02E+01	2.72E+00	2.94E+01	2.77E+00
9.00	2.79E+01	4.41E+01	2.72E+00	2.12E+01	1.96E-01

Incident Energy: $E_n = 35.00$MeV: cont.

Energy (MeV)	Lab angle-integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
10.00	2.54E+01	3.32E+01	2.72E+00	1.42E+01	1.84E-02
11.00	2.36E+01	2.61E+01	2.73E+00	9.35E+00	1.26E-02
12.00	2.22E+01	2.16E+01	2.76E+00	6.36E+00	1.02E-02
13.00	2.10E+01	1.85E+01	2.81E+00	4.64E+00	7.11E-03
14.00	2.00E+01	1.64E+01	2.87E+00	3.68E+00	5.54E-03
15.00	1.91E+01	1.48E+01	2.94E+00	3.14E+00	5.60E-03
16.00	1.83E+01	1.35E+01	3.02E+00	2.82E+00	6.86E-03
17.00	1.73E+01	1.24E+01	3.11E+00	2.60E+00	9.47E-03
18.00	1.64E+01	1.13E+01	3.21E+00	2.43E+00	1.41E-02
19.00	1.57E+01	1.02E+01	3.33E+00	2.28E+00	2.05E-02
20.00	1.49E+01	9.32E+00	3.54E+00	2.13E+00	2.25E-02
21.00	1.40E+01	8.61E+00	3.98E+00	1.99E+00	1.64E-02
22.00	1.30E+01	7.98E+00	5.08E+00	1.84E+00	9.99E-03
23.00	1.18E+01	7.38E+00	4.84E+00	1.69E+00	6.18E-03
24.00	1.07E+01	6.80E+00	4.19E+00	1.53E+00	4.07E-03
25.00	9.50E+00	6.21E+00	3.58E+00	1.38E+00	2.86E-03
26.00	8.36E+00	5.61E+00	3.03E+00	1.22E+00	2.12E-03
27.00	6.90E+00	5.01E+00	1.93E+00	1.06E+00	1.63E-03
28.00	6.03E+00	4.41E+00	1.82E+00	9.06E-01	1.31E-03
29.00	8.54E+00	3.83E+00	1.29E+00	7.78E-01	1.08E-03
30.00	2.19E+01	3.31E+00	2.62E-02	7.16E-01	9.06E-04
31.00	1.81E+01	2.52E+00	0.00E+00	5.95E-01	7.77E-04
32.00	1.55E+00	1.65E+00	0.00E+00	3.08E-01	6.78E-04
33.00	3.79E-02	1.01E+00	0.00E+00	1.83E-01	6.00E-04
34.00	0.00E+00	4.32E-01	0.00E+00	6.90E-02	5.37E-04
35.00	0.00E+00	8.91E-02	0.00E+00	5.68E-03	4.85E-04
36.00	0.00E+00	2.74E-03	0.00E+00	2.24E-03	4.43E-04
37.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.10E-05
38.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.76E-04
39.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.48E-04
40.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.39E-04
σ_{prod} (b)	9.36E-01	1.15E+00	7.87E-02	2.48E-01	1.44E+00
E_{av} (MeV)	9.41E+00	7.41E+00	1.69E+01	8.98E+00	2.28E+00
K (fGy· m^2)	0.00E+00	2.05E+00	3.21E-01	5.36E-01	0.00E+00
$\Sigma_{A<4}K_A$					2.91E+00
K_{recoil} non-elastic ($A > 4$)					1.50E-01
K_{recoil} elastic					4.39E-02
K_{total}					3.10E+00

Incident Energy: $E_n = 40.00$MeV

Energy (MeV)	Lab angle-integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.27E+02	3.53E+01	1.79E-02	6.70E-02	3.47E+02
2.00	1.11E+02	8.63E+01	2.38E-01	7.10E-01	5.43E+02
3.00	8.70E+01	1.42E+02	9.11E-01	5.66E+00	2.23E+02
4.00	6.50E+01	1.60E+02	1.69E+00	1.76E+01	1.16E+02
5.00	4.97E+01	1.40E+02	2.17E+00	2.92E+01	3.83E+01
6.00	3.97E+01	1.07E+02	2.33E+00	3.47E+01	2.40E+01
7.00	3.30E+01	7.91E+01	2.33E+00	3.31E+01	7.58E+00
8.00	2.84E+01	5.80E+01	2.26E+00	2.78E+01	1.08E+00
9.00	2.51E+01	4.30E+01	2.18E+00	2.07E+01	2.87E-01
10.00	2.28E+01	3.26E+01	2.11E+00	1.43E+01	1.87E-02
11.00	2.11E+01	2.56E+01	2.06E+00	9.57E+00	1.19E-02
12.00	1.99E+01	2.10E+01	2.03E+00	6.46E+00	9.80E-03
13.00	1.90E+01	1.78E+01	2.02E+00	4.53E+00	6.96E-03

Incident Energy: $E_n = 40.00$MeV: cont.

Energy (MeV)	Lab angle-integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
14.00	1.83E+01	1.56E+01	2.04E+00	3.38E+00	5.45E-03
15.00	1.78E+01	1.41E+01	2.08E+00	2.71E+00	5.56E-03
16.00	1.73E+01	1.29E+01	2.13E+00	2.33E+00	6.85E-03
17.00	1.67E+01	1.20E+01	2.21E+00	2.10E+00	9.51E-03
18.00	1.63E+01	1.11E+01	2.30E+00	1.96E+00	1.42E-02
19.00	1.60E+01	1.02E+01	2.39E+00	1.86E+00	2.07E-02
20.00	1.57E+01	9.54E+00	2.50E+00	1.78E+00	2.24E-02
21.00	1.52E+01	9.03E+00	2.61E+00	1.70E+00	1.62E-02
22.00	1.46E+01	8.62E+00	2.73E+00	1.62E+00	9.84E-03
23.00	1.41E+01	8.23E+00	2.85E+00	1.54E+00	6.05E-03
24.00	1.34E+01	7.81E+00	3.00E+00	1.46E+00	3.96E-03
25.00	1.27E+01	7.37E+00	3.21E+00	1.37E+00	2.76E-03
26.00	1.19E+01	6.94E+00	3.66E+00	1.28E+00	2.03E-03
27.00	1.11E+01	6.52E+00	4.76E+00	1.18E+00	1.56E-03
28.00	1.02E+01	6.10E+00	4.90E+00	1.08E+00	1.24E-03
29.00	9.27E+00	5.66E+00	3.96E+00	9.80E-01	1.01E-03
30.00	8.32E+00	5.20E+00	4.18E+00	8.78E-01	8.43E-04
31.00	7.55E+00	4.74E+00	2.54E+00	7.75E-01	7.18E-04
32.00	6.39E+00	4.28E+00	3.49E-01	6.73E-01	6.22E-04
33.00	5.36E+00	3.80E+00	9.69E-01	5.78E-01	5.46E-04
34.00	6.72E+00	3.31E+00	8.53E-01	5.00E-01	4.86E-04
35.00	1.69E+01	2.95E+00	3.13E-02	4.69E-01	4.36E-04
36.00	1.79E+01	2.34E+00	0.00E+00	3.92E-01	3.95E-04
37.00	1.96E+00	1.39E+00	0.00E+00	1.90E-01	3.61E-04
38.00	6.65E-02	8.63E-01	0.00E+00	1.06E-01	3.32E-04
39.00	0.00E+00	4.33E-01	0.00E+00	4.36E-02	3.07E-04
40.00	0.00E+00	2.50E-02	0.00E+00	3.57E-03	2.86E-04
41.00	0.00E+00	0.00E+00	0.00E+00	1.37E-03	2.68E-04
42.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.14E-05
43.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.49E-04
44.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.49E-04
45.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.80E-04
σ_{prod} (b)	9.51E-01	1.13E+00	7.86E-02	2.37E-01	1.30E+00
E_{av} (MeV)	1.08E+01	8.17E+00	1.97E+01	9.30E+00	2.28E+00
K (fGy· m^2)	0.00E+00	2.22E+00	3.73E-01	5.31E-01	0.00E+00
$\Sigma_{A<4} K_A$					3.13E+00
K_{recoil} non-elastic ($A > 4$)					1.40E-01
K_{recoil} elastic					4.31E-02
K_{total}					3.31E+00

Incident Energy: $E_n = 50.00$MeV

Energy (MeV)	Lab angle-integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.27E+02	3.13E+01	1.99E-02	2.12E-01	2.73E+02
2.00	1.09E+02	7.89E+01	2.46E-01	1.58E+00	4.54E+02
3.00	8.48E+01	1.38E+02	8.67E-01	6.67E+00	1.99E+02
4.00	6.28E+01	1.51E+02	1.54E+00	1.65E+01	1.01E+02
5.00	4.74E+01	1.33E+02	1.93E+00	2.67E+01	3.34E+01
6.00	3.71E+01	1.05E+02	2.04E+00	3.25E+01	2.25E+01
7.00	3.01E+01	7.89E+01	2.00E+00	3.18E+01	5.41E+00
8.00	2.52E+01	5.85E+01	1.90E+00	2.73E+01	1.15E+00
9.00	2.17E+01	4.35E+01	1.79E+00	2.06E+01	9.44E-01
10.00	1.92E+01	3.28E+01	1.68E+00	1.43E+01	5.17E-02
11.00	1.75E+01	2.54E+01	1.59E+00	9.47E+00	2.72E-02
12.00	1.63E+01	2.05E+01	1.50E+00	6.21E+00	9.30E-03

Incident Energy: $E_n = 50.00$MeV: cont.

Energy (MeV)	Lab angle–integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
13.00	1.54E+01	1.71E+01	1.42E+00	4.16E+00	6.67E-03
14.00	1.48E+01	1.48E+01	1.36E+00	2.90E+00	5.27E-03
15.00	1.43E+01	1.31E+01	1.31E+00	2.16E+00	5.41E-03
16.00	1.39E+01	1.19E+01	1.26E+00	1.73E+00	6.74E-03
17.00	1.35E+01	1.09E+01	1.23E+00	1.48E+00	9.47E-03
18.00	1.33E+01	1.00E+01	1.21E+00	1.33E+00	1.43E-02
19.00	1.31E+01	9.29E+00	1.20E+00	1.25E+00	2.08E-02
20.00	1.30E+01	8.68E+00	1.20E+00	1.19E+00	2.24E-02
21.00	1.29E+01	8.26E+00	1.22E+00	1.15E+00	1.60E-02
22.00	1.28E+01	7.93E+00	1.25E+00	1.13E+00	9.64E-03
23.00	1.26E+01	7.64E+00	1.29E+00	1.10E+00	5.91E-03
24.00	1.25E+01	7.38E+00	1.35E+00	1.07E+00	3.85E-03
25.00	1.23E+01	7.13E+00	1.42E+00	1.05E+00	2.67E-03
26.00	1.22E+01	6.91E+00	1.51E+00	1.02E+00	1.94E-03
27.00	1.20E+01	6.69E+00	1.60E+00	9.89E-01	1.48E-03
28.00	1.19E+01	6.49E+00	1.71E+00	9.57E-01	1.16E-03
29.00	1.16E+01	6.31E+00	1.82E+00	9.22E-01	9.37E-04
30.00	1.14E+01	6.14E+00	1.94E+00	8.85E-01	7.75E-04
31.00	1.11E+01	5.97E+00	2.05E+00	8.46E-01	6.54E-04
32.00	1.08E+01	5.78E+00	2.17E+00	8.04E-01	5.60E-04
33.00	1.03E+01	5.58E+00	2.29E+00	7.61E-01	4.87E-04
34.00	9.85E+00	5.39E+00	2.42E+00	7.16E-01	4.29E-04
35.00	9.33E+00	5.19E+00	2.57E+00	6.70E-01	3.81E-04
36.00	8.77E+00	4.96E+00	2.81E+00	6.22E-01	3.42E-04
37.00	8.14E+00	4.70E+00	2.93E+00	5.73E-01	3.10E-04
38.00	7.41E+00	4.42E+00	2.71E+00	5.24E-01	2.82E-04
39.00	6.69E+00	4.15E+00	2.83E+00	4.74E-01	2.59E-04
40.00	6.04E+00	3.85E+00	3.33E+00	4.23E-01	2.39E-04
41.00	5.70E+00	3.51E+00	2.60E+00	3.72E-01	2.21E-04
42.00	5.32E+00	3.16E+00	4.42E-01	3.22E-01	2.06E-04
43.00	3.95E+00	2.80E+00	7.77E-01	2.74E-01	1.93E-04
44.00	4.46E+00	2.46E+00	9.86E-01	2.28E-01	1.81E-04
45.00	1.10E+01	2.25E+00	8.73E-02	1.81E-01	1.71E-04
46.00	1.66E+01	1.98E+00	1.09E-03	1.28E-01	1.62E-04
47.00	2.40E+00	1.16E+00	0.00E+00	8.27E-02	1.54E-04
48.00	2.03E-02	6.79E-01	0.00E+00	4.20E-02	1.46E-04
49.00	0.00E+00	1.50E-01	0.00E+00	1.21E-02	1.40E-04
50.00	0.00E+00	1.10E-02	0.00E+00	1.41E-03	1.34E-04
51.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E-04
52.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.20E-05
53.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.22E-04
54.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.16E-04
55.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-04
σ_{prod} (b)	9.69E-01	1.13E+00	7.34E-02	2.28E-01	1.09E+00
E_{av} (MeV)	1.33E+01	9.52E+00	2.52E+01	9.61E+00	2.33E+00
K (fGy· m^2)	0.00E+00	2.59E+00	4.45E-01	5.28E-01	0.00E+00
$\Sigma_{A<4} K_A$					3.56E+00
K_{recoil} non-elastic ($A > 4$)					1.40E-01
K_{recoil} elastic					3.93E-02
K_{total}					3.74E+00

Incident Energy: $E_n = 60.00$MeV

Energy (MeV)	Lab angle–integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.29E+02	2.31E+01	2.42E-02	1.11E-01	2.35E+02
2.00	1.17E+02	6.65E+01	2.96E-01	1.05E+00	3.81E+02
3.00	9.26E+01	1.25E+02	9.91E-01	5.35E+00	1.78E+02
4.00	6.88E+01	1.46E+02	1.70E+00	1.42E+01	8.58E+01
5.00	5.14E+01	1.35E+02	2.07E+00	2.42E+01	3.22E+01
6.00	3.93E+01	1.10E+02	2.11E+00	3.09E+01	1.88E+01
7.00	3.08E+01	8.49E+01	1.99E+00	3.15E+01	5.01E+00
8.00	2.49E+01	6.40E+01	1.82E+00	2.81E+01	1.33E+00
9.00	2.06E+01	4.80E+01	1.66E+00	2.22E+01	9.83E-01
10.00	1.76E+01	3.61E+01	1.51E+00	1.61E+01	1.26E-01
11.00	1.55E+01	2.77E+01	1.39E+00	1.10E+01	7.97E-02
12.00	1.41E+01	2.18E+01	1.29E+00	7.38E+00	8.81E-03
13.00	1.31E+01	1.77E+01	1.21E+00	4.93E+00	6.56E-03
14.00	1.23E+01	1.48E+01	1.14E+00	3.33E+00	5.24E-03
15.00	1.18E+01	1.27E+01	1.08E+00	2.33E+00	5.37E-03
16.00	1.13E+01	1.12E+01	1.02E+00	1.71E+00	6.70E-03
17.00	1.10E+01	1.01E+01	9.77E-01	1.32E+00	9.45E-03
18.00	1.06E+01	9.18E+00	9.37E-01	1.09E+00	1.43E-02
19.00	1.04E+01	8.41E+00	9.03E-01	9.46E-01	2.08E-02
20.00	1.03E+01	7.80E+00	8.73E-01	8.59E-01	2.21E-02
21.00	1.01E+01	7.36E+00	8.47E-01	8.05E-01	1.56E-02
22.00	9.97E+00	7.02E+00	8.26E-01	7.72E-01	9.33E-03
23.00	9.82E+00	6.73E+00	8.10E-01	7.50E-01	5.70E-03
24.00	9.69E+00	6.47E+00	7.98E-01	7.35E-01	3.70E-03
25.00	9.57E+00	6.23E+00	7.91E-01	7.23E-01	2.56E-03
26.00	9.48E+00	6.00E+00	7.88E-01	7.13E-01	1.85E-03
27.00	9.40E+00	5.80E+00	7.91E-01	7.04E-01	1.40E-03
28.00	9.32E+00	5.62E+00	8.00E-01	6.94E-01	1.10E-03
29.00	9.25E+00	5.46E+00	8.16E-01	6.83E-01	8.80E-04
30.00	9.18E+00	5.32E+00	8.38E-01	6.71E-01	7.23E-04
31.00	9.11E+00	5.18E+00	8.69E-01	6.58E-01	6.06E-04
32.00	9.04E+00	5.06E+00	9.09E-01	6.43E-01	5.16E-04
33.00	8.97E+00	4.95E+00	9.58E-01	6.28E-01	4.46E-04
34.00	8.88E+00	4.85E+00	1.02E+00	6.11E-01	3.90E-04
35.00	8.77E+00	4.75E+00	1.08E+00	5.93E-01	3.44E-04
36.00	8.65E+00	4.66E+00	1.16E+00	5.74E-01	3.07E-04
37.00	8.52E+00	4.57E+00	1.24E+00	5.54E-01	2.76E-04
38.00	8.37E+00	4.48E+00	1.33E+00	5.33E-01	2.50E-04
39.00	8.18E+00	4.38E+00	1.42E+00	5.11E-01	2.28E-04
40.00	7.96E+00	4.29E+00	1.52E+00	4.88E-01	2.09E-04
41.00	7.73E+00	4.19E+00	1.61E+00	4.64E-01	1.93E-04
42.00	7.49E+00	4.08E+00	1.71E+00	4.39E-01	1.79E-04
43.00	7.19E+00	3.96E+00	1.80E+00	4.14E-01	1.66E-04
44.00	6.83E+00	3.83E+00	1.91E+00	3.88E-01	1.55E-04
45.00	6.46E+00	3.69E+00	2.05E+00	3.62E-01	1.45E-04
46.00	6.07E+00	3.54E+00	2.31E+00	3.35E-01	1.37E-04
47.00	5.64E+00	3.36E+00	2.59E+00	3.07E-01	1.29E-04
48.00	5.14E+00	3.16E+00	2.29E+00	2.80E-01	1.22E-04
49.00	4.63E+00	2.97E+00	2.22E+00	2.52E-01	1.16E-04
50.00	4.17E+00	2.76E+00	2.33E+00	2.25E-01	1.10E-04
51.00	3.96E+00	2.52E+00	2.05E+00	1.97E-01	1.05E-04
52.00	4.02E+00	2.26E+00	8.87E-01	1.70E-01	1.00E-04

Incident Energy: $E_n = 60.00$MeV: cont.

Energy (MeV)	Lab angle–integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
53.00	2.91E+00	2.00E+00	1.01E+00	1.46E-01	9.61E-05
54.00	2.87E+00	1.76E+00	1.78E-01	1.26E-01	9.22E-05
55.00	6.24E+00	1.61E+00	2.13E-03	1.01E-01	8.87E-05
56.00	1.38E+01	1.60E+00	0.00E+00	6.44E-02	8.55E-05
57.00	4.14E+00	9.43E-01	0.00E+00	3.84E-02	8.25E-05
58.00	3.45E-02	3.62E-01	0.00E+00	1.61E-02	7.98E-05
59.00	0.00E+00	8.37E-02	0.00E+00	5.87E-03	7.72E-05
60.00	0.00E+00	7.97E-03	0.00E+00	0.00E+00	7.49E-05
61.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.28E-05
62.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.59E-05
63.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.85E-05
64.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.72E-05
65.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.26E-05
σ_{prod} (b)	9.94E-01	1.14E+00	6.95E-02	2.26E-01	9.38E-01
E_{av} (MeV)	1.47E+01	1.06E+01	2.97E+01	1.00E+01	2.35E+00
K (fGy· m^2)	0.00E+00	2.91E+00	4.97E-01	5.44E-01	0.00E+00
$\Sigma_{A<4} K_A$					3.95E+00
K_{recoil} non-elastic ($A > 4$)					1.40E-01
K_{recoil} elastic					3.56E-02
K_{total}					4.13E+00

Incident Energy: $E_n = 70.00$MeV

Energy (MeV)	Lab angle–integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.28E+02	1.78E+01	2.87E-02	6.14E-02	2.01E+02
2.00	1.17E+02	5.74E+01	3.36E-01	8.23E-01	3.19E+02
3.00	9.48E+01	1.12E+02	1.08E+00	4.84E+00	1.51E+02
4.00	7.16E+01	1.35E+02	1.80E+00	1.27E+01	7.37E+01
5.00	5.35E+01	1.29E+02	2.15E+00	2.18E+01	2.77E+01
6.00	4.07E+01	1.09E+02	2.16E+00	2.81E+01	1.66E+01
7.00	3.15E+01	8.58E+01	1.99E+00	2.92E+01	4.05E+00
8.00	2.49E+01	6.59E+01	1.78E+00	2.67E+01	1.73E+00
9.00	2.01E+01	5.00E+01	1.58E+00	2.18E+01	2.74E-01
10.00	1.67E+01	3.78E+01	1.41E+00	1.63E+01	1.72E-01
11.00	1.44E+01	2.90E+01	1.27E+00	1.15E+01	1.25E-01
12.00	1.28E+01	2.26E+01	1.15E+00	7.90E+00	8.36E-03
13.00	1.17E+01	1.81E+01	1.06E+00	5.37E+00	6.38E-03
14.00	1.09E+01	1.49E+01	9.87E-01	3.66E+00	5.12E-03
15.00	1.03E+01	1.26E+01	9.27E-01	2.53E+00	5.24E-03
16.00	9.79E+00	1.09E+01	8.75E-01	1.80E+00	6.54E-03
17.00	9.39E+00	9.67E+00	8.32E-01	1.32E+00	9.26E-03
18.00	9.08E+00	8.68E+00	7.95E-01	1.02E+00	1.41E-02
19.00	8.84E+00	7.88E+00	7.63E-01	8.26E-01	2.04E-02
20.00	8.67E+00	7.26E+00	7.34E-01	7.02E-01	2.15E-02
21.00	8.49E+00	6.80E+00	7.09E-01	6.24E-01	1.50E-02
22.00	8.32E+00	6.46E+00	6.87E-01	5.75E-01	8.96E-03
23.00	8.16E+00	6.17E+00	6.67E-01	5.44E-01	5.46E-03
24.00	8.00E+00	5.91E+00	6.50E-01	5.25E-01	3.54E-03
25.00	7.87E+00	5.67E+00	6.35E-01	5.12E-01	2.44E-03
26.00	7.75E+00	5.46E+00	6.21E-01	5.04E-01	1.77E-03
27.00	7.64E+00	5.26E+00	6.09E-01	4.99E-01	1.33E-03
28.00	7.54E+00	5.09E+00	5.99E-01	4.95E-01	1.04E-03
29.00	7.45E+00	4.92E+00	5.91E-01	4.91E-01	8.29E-04
30.00	7.36E+00	4.78E+00	5.84E-01	4.88E-01	6.78E-04
31.00	7.27E+00	4.64E+00	5.79E-01	4.84E-01	5.66E-04

Incident Energy: E_n = 70.00MeV: cont.

Energy (MeV)	Lab angle-integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
32.00	7.20E+00	4.51E+00	5.76E-01	4.79E-01	4.80E-04
33.00	7.12E+00	4.40E+00	5.76E-01	4.74E-01	4.12E-04
34.00	7.06E+00	4.29E+00	5.77E-01	4.69E-01	3.59E-04
35.00	6.99E+00	4.19E+00	5.82E-01	4.62E-01	3.16E-04
36.00	6.92E+00	4.09E+00	5.89E-01	4.55E-01	2.81E-04
37.00	6.85E+00	4.00E+00	6.00E-01	4.48E-01	2.52E-04
38.00	6.78E+00	3.92E+00	6.15E-01	4.39E-01	2.27E-04
39.00	6.72E+00	3.84E+00	6.35E-01	4.30E-01	2.06E-04
40.00	6.66E+00	3.77E+00	6.60E-01	4.20E-01	1.88E-04
41.00	6.60E+00	3.70E+00	6.91E-01	4.10E-01	1.73E-04
42.00	6.55E+00	3.64E+00	7.28E-01	3.99E-01	1.60E-04
43.00	6.49E+00	3.58E+00	7.72E-01	3.87E-01	1.48E-04
44.00	6.43E+00	3.52E+00	8.22E-01	3.75E-01	1.38E-04
45.00	6.36E+00	3.46E+00	8.79E-01	3.62E-01	1.28E-04
46.00	6.28E+00	3.41E+00	9.42E-01	3.49E-01	1.20E-04
47.00	6.20E+00	3.36E+00	1.01E+00	3.35E-01	1.13E-04
48.00	6.10E+00	3.30E+00	1.08E+00	3.21E-01	1.06E-04
49.00	5.96E+00	3.24E+00	1.16E+00	3.06E-01	1.01E-04
50.00	5.80E+00	3.18E+00	1.23E+00	2.91E-01	9.53E-05
51.00	5.63E+00	3.12E+00	1.30E+00	2.75E-01	9.04E-05
52.00	5.45E+00	3.05E+00	1.38E+00	2.59E-01	8.60E-05
53.00	5.22E+00	2.96E+00	1.45E+00	2.43E-01	8.20E-05
54.00	4.94E+00	2.86E+00	1.53E+00	2.27E-01	7.83E-05
55.00	4.66E+00	2.77E+00	1.65E+00	2.10E-01	7.50E-05
56.00	4.36E+00	2.65E+00	1.88E+00	1.93E-01	7.19E-05
57.00	4.03E+00	2.51E+00	2.25E+00	1.77E-01	6.90E-05
58.00	3.67E+00	2.36E+00	1.94E+00	1.60E-01	6.64E-05
59.00	3.29E+00	2.20E+00	1.68E+00	1.43E-01	6.40E-05
60.00	2.95E+00	2.04E+00	1.79E+00	1.26E-01	6.18E-05
61.00	2.78E+00	1.84E+00	1.61E+00	1.10E-01	5.97E-05
62.00	3.00E+00	1.63E+00	7.48E-01	9.46E-02	5.78E-05
63.00	2.47E+00	1.42E+00	8.09E-01	8.13E-02	5.60E-05
64.00	2.71E+00	1.22E+00	2.53E-01	7.26E-02	5.43E-05
65.00	6.33E+00	1.09E+00	3.03E-03	5.80E-02	5.28E-05
66.00	9.59E+00	1.12E+00	0.00E+00	3.16E-02	5.13E-05
67.00	4.37E+00	7.12E-01	0.00E+00	1.80E-02	5.00E-05
68.00	7.31E-02	2.67E-01	0.00E+00	7.78E-03	4.87E-05
69.00	1.24E-03	9.89E-02	0.00E+00	1.34E-03	4.76E-05
70.00	0.00E+00	1.64E-02	0.00E+00	0.00E+00	4.65E-05
71.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.53E-06
72.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.44E-05
73.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.42E-05
74.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.80E-05
75.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.30E-05
σ_{prod} (b)	9.90E-01	1.11E+00	6.56E-02	2.15E-01	7.95E-01
E_{av} (MeV)	1.60E+01	1.17E+01	3.37E+01	1.03E+01	2.36E+00
K (fGy· m^2)	0.00E+00	3.13E+00	5.32E-01	5.34E-01	0.00E+00
$\Sigma_{A<4}K_A$					4.19E+00
K_{recoil} non-elastic ($A > 4$)					1.30E-01
K_{recoil} elastic					3.17E-02
K_{total}					4.35E+00

Incident Energy: $E_n = 80.00$MeV

Energy (MeV)	Lab angle–integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.26E+02	1.73E+01	3.52E-02	2.20E-01	1.78E+02
2.00	1.22E+02	5.12E+01	4.02E-01	1.26E+00	2.86E+02
3.00	1.02E+02	1.01E+02	1.25E+00	5.31E+00	1.32E+02
4.00	7.83E+01	1.29E+02	2.08E+00	1.27E+01	6.23E+01
5.00	5.91E+01	1.29E+02	2.49E+00	2.10E+01	2.35E+01
6.00	4.50E+01	1.11E+02	2.49E+00	2.71E+01	1.43E+01
7.00	3.47E+01	9.01E+01	2.28E+00	2.85E+01	4.44E+00
8.00	2.71E+01	7.05E+01	2.00E+00	2.66E+01	1.40E+00
9.00	2.16E+01	5.43E+01	1.74E+00	2.24E+01	5.23E-01
10.00	1.76E+01	4.16E+01	1.51E+00	1.73E+01	1.55E-01
11.00	1.48E+01	3.20E+01	1.32E+00	1.26E+01	1.50E-01
12.00	1.28E+01	2.50E+01	1.17E+00	8.91E+00	8.31E-03
13.00	1.15E+01	1.99E+01	1.05E+00	6.21E+00	6.53E-03
14.00	1.05E+01	1.62E+01	9.52E-01	4.31E+00	5.27E-03
15.00	9.80E+00	1.34E+01	8.77E-01	3.01E+00	5.41E-03
16.00	9.25E+00	1.15E+01	8.16E-01	2.13E+00	6.76E-03
17.00	8.82E+00	9.96E+00	7.66E-01	1.54E+00	9.61E-03
18.00	8.48E+00	8.81E+00	7.25E-01	1.15E+00	1.47E-02
19.00	8.23E+00	7.91E+00	6.91E-01	8.81E-01	2.13E-02
20.00	8.04E+00	7.22E+00	6.61E-01	7.04E-01	2.23E-02
21.00	7.87E+00	6.73E+00	6.36E-01	5.87E-01	1.54E-02
22.00	7.70E+00	6.36E+00	6.14E-01	5.10E-01	9.17E-03
23.00	7.54E+00	6.06E+00	5.95E-01	4.58E-01	5.58E-03
24.00	7.39E+00	5.81E+00	5.78E-01	4.25E-01	3.62E-03
25.00	7.25E+00	5.58E+00	5.62E-01	4.03E-01	2.49E-03
26.00	7.12E+00	5.38E+00	5.48E-01	3.90E-01	1.79E-03
27.00	7.00E+00	5.19E+00	5.36E-01	3.81E-01	1.35E-03
28.00	6.89E+00	5.02E+00	5.25E-01	3.75E-01	1.05E-03
29.00	6.78E+00	4.87E+00	5.14E-01	3.72E-01	8.34E-04
30.00	6.68E+00	4.72E+00	5.05E-01	3.70E-01	6.80E-04
31.00	6.57E+00	4.59E+00	4.97E-01	3.68E-01	5.65E-04
32.00	6.48E+00	4.46E+00	4.89E-01	3.67E-01	4.77E-04
33.00	6.38E+00	4.34E+00	4.83E-01	3.66E-01	4.09E-04
34.00	6.29E+00	4.22E+00	4.77E-01	3.64E-01	3.55E-04
35.00	6.20E+00	4.11E+00	4.72E-01	3.62E-01	3.11E-04
36.00	6.12E+00	4.01E+00	4.68E-01	3.60E-01	2.76E-04
37.00	6.03E+00	3.91E+00	4.65E-01	3.58E-01	2.46E-04
38.00	5.95E+00	3.82E+00	4.62E-01	3.55E-01	2.21E-04
39.00	5.87E+00	3.73E+00	4.61E-01	3.51E-01	2.01E-04
40.00	5.80E+00	3.64E+00	4.60E-01	3.47E-01	1.83E-04
41.00	5.73E+00	3.56E+00	4.61E-01	3.43E-01	1.67E-04
42.00	5.68E+00	3.49E+00	4.63E-01	3.38E-01	1.54E-04
43.00	5.63E+00	3.41E+00	4.66E-01	3.33E-01	1.42E-04
44.00	5.58E+00	3.35E+00	4.72E-01	3.28E-01	1.32E-04
45.00	5.54E+00	3.28E+00	4.79E-01	3.22E-01	1.23E-04
46.00	5.50E+00	3.23E+00	4.89E-01	3.15E-01	1.15E-04
47.00	5.46E+00	3.17E+00	5.01E-01	3.08E-01	1.08E-04
48.00	5.42E+00	3.12E+00	5.17E-01	3.01E-01	1.01E-04
49.00	5.39E+00	3.07E+00	5.36E-01	2.93E-01	9.55E-05
50.00	5.35E+00	3.03E+00	5.60E-01	2.85E-01	9.02E-05
51.00	5.30E+00	2.98E+00	5.88E-01	2.77E-01	8.54E-05
52.00	5.26E+00	2.95E+00	6.22E-01	2.68E-01	8.10E-05

Incident Energy: $E_n = 80.00$MeV: cont.

Energy (MeV)	Lab angle-integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
53.00	5.21E+00	2.91E+00	6.61E-01	2.59E-01	7.70E-05
54.00	5.16E+00	2.87E+00	7.06E-01	2.49E-01	7.33E-05
55.00	5.09E+00	2.83E+00	7.56E-01	2.39E-01	6.99E-05
56.00	5.01E+00	2.80E+00	8.10E-01	2.29E-01	6.68E-05
57.00	4.93E+00	2.76E+00	8.69E-01	2.19E-01	6.39E-05
58.00	4.85E+00	2.71E+00	9.30E-01	2.08E-01	6.13E-05
59.00	4.73E+00	2.65E+00	9.93E-01	1.97E-01	5.89E-05
60.00	4.59E+00	2.59E+00	1.06E+00	1.86E-01	5.66E-05
61.00	4.44E+00	2.52E+00	1.12E+00	1.75E-01	5.45E-05
62.00	4.28E+00	2.44E+00	1.18E+00	1.64E-01	5.25E-05
63.00	4.09E+00	2.33E+00	1.24E+00	1.52E-01	5.07E-05
64.00	3.87E+00	2.23E+00	1.31E+00	1.41E-01	4.90E-05
65.00	3.63E+00	2.12E+00	1.41E+00	1.30E-01	4.75E-05
66.00	3.39E+00	2.00E+00	1.62E+00	1.19E-01	4.60E-05
67.00	3.14E+00	1.87E+00	2.06E+00	1.08E-01	4.46E-05
68.00	2.85E+00	1.75E+00	1.92E+00	9.71E-02	4.33E-05
69.00	2.56E+00	1.62E+00	1.59E+00	8.64E-02	4.21E-05
70.00	2.29E+00	1.50E+00	1.60E+00	7.60E-02	4.10E-05
71.00	2.09E+00	1.37E+00	7.23E-01	6.60E-02	3.99E-05
72.00	1.82E+00	1.22E+00	1.64E-01	5.67E-02	3.89E-05
73.00	1.69E+00	1.08E+00	4.12E-01	4.91E-02	3.80E-05
74.00	2.75E+00	9.42E-01	2.19E-01	4.54E-02	3.71E-05
75.00	7.94E+00	8.30E-01	3.89E-03	3.59E-02	3.62E-05
76.00	8.03E+00	6.53E-01	0.00E+00	1.77E-02	3.55E-05
77.00	6.99E-01	3.90E-01	0.00E+00	1.03E-02	3.47E-05
78.00	2.22E-02	2.32E-01	0.00E+00	3.41E-03	3.40E-05
79.00	0.00E+00	1.12E-01	0.00E+00	0.00E+00	3.34E-05
80.00	0.00E+00	7.01E-03	0.00E+00	0.00E+00	3.27E-05
81.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.93E-06
82.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.30E-05
83.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.98E-05
84.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.93E-05
85.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
σ_{prod} (b)	1.04E+00	1.13E+00	6.51E-02	2.19E-01	7.03E-01
E_{av} (MeV)	1.70E+01	1.27E+01	3.60E+01	1.05E+01	2.35E+00
K (fGy· m^2)	0.00E+00	3.47E+00	5.65E-01	5.54E-01	0.00E+00
$\Sigma_{A<4}K_A$					4.59E+00
K_{recoil} non-elastic ($A > 4$)					1.20E-01
K_{recoil} elastic					2.66E-02
K_{total}					4.74E+00

Incident Energy: $E_n = 90.00$MeV

Energy (MeV)	Lab angle-integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.24E+02	1.66E+01	4.05E-02	2.33E-01	1.61E+02
2.00	1.22E+02	4.91E+01	4.51E-01	1.39E+00	2.59E+02
3.00	1.04E+02	9.63E+01	1.38E+00	5.31E+00	1.20E+02
4.00	8.11E+01	1.22E+02	2.27E+00	1.21E+01	5.76E+01
5.00	6.20E+01	1.23E+02	2.73E+00	1.97E+01	2.09E+01
6.00	4.77E+01	1.09E+02	2.74E+00	2.52E+01	1.38E+01
7.00	3.70E+01	9.04E+01	2.51E+00	2.69E+01	3.55E+00
8.00	2.89E+01	7.21E+01	2.19E+00	2.56E+01	1.28E+00
9.00	2.28E+01	5.65E+01	1.88E+00	2.21E+01	7.63E-01
10.00	1.84E+01	4.38E+01	1.60E+00	1.76E+01	1.91E-01
11.00	1.52E+01	3.40E+01	1.38E+00	1.31E+01	1.51E-01

Incident Energy: $E_n = 90.00$MeV: cont.

Energy (MeV)	Lab angle–integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
12.00	1.30E+01	2.67E+01	1.19E+00	9.49E+00	8.19E-03
13.00	1.14E+01	2.13E+01	1.05E+00	6.76E+00	6.52E-03
14.00	1.03E+01	1.72E+01	9.36E-01	4.79E+00	5.32E-03
15.00	9.49E+00	1.42E+01	8.46E-01	3.39E+00	5.47E-03
16.00	8.86E+00	1.20E+01	7.75E-01	2.42E+00	6.89E-03
17.00	8.38E+00	1.03E+01	7.19E-01	1.75E+00	9.85E-03
18.00	8.01E+00	8.96E+00	6.73E-01	1.29E+00	1.51E-02
19.00	7.74E+00	7.95E+00	6.36E-01	9.68E-01	2.21E-02
20.00	7.54E+00	7.19E+00	6.05E-01	7.48E-01	2.30E-02
21.00	7.36E+00	6.64E+00	5.79E-01	5.97E-01	1.58E-02
22.00	7.19E+00	6.23E+00	5.57E-01	4.94E-01	9.38E-03
23.00	7.04E+00	5.91E+00	5.38E-01	4.23E-01	5.71E-03
24.00	6.90E+00	5.65E+00	5.22E-01	3.76E-01	3.70E-03
25.00	6.78E+00	5.43E+00	5.07E-01	3.43E-01	2.54E-03
26.00	6.66E+00	5.23E+00	4.94E-01	3.22E-01	1.83E-03
27.00	6.56E+00	5.05E+00	4.82E-01	3.08E-01	1.37E-03
28.00	6.46E+00	4.90E+00	4.71E-01	2.99E-01	1.06E-03
29.00	6.36E+00	4.76E+00	4.61E-01	2.93E-01	8.43E-04
30.00	6.26E+00	4.63E+00	4.52E-01	2.90E-01	6.85E-04
31.00	6.17E+00	4.52E+00	4.43E-01	2.88E-01	5.68E-04
32.00	6.07E+00	4.41E+00	4.36E-01	2.87E-01	4.78E-04
33.00	5.98E+00	4.30E+00	4.29E-01	2.87E-01	4.08E-04
34.00	5.89E+00	4.20E+00	4.23E-01	2.86E-01	3.53E-04
35.00	5.79E+00	4.10E+00	4.17E-01	2.86E-01	3.09E-04
36.00	5.70E+00	4.01E+00	4.12E-01	2.86E-01	2.73E-04
37.00	5.61E+00	3.92E+00	4.07E-01	2.86E-01	2.43E-04
38.00	5.52E+00	3.83E+00	4.03E-01	2.85E-01	2.18E-04
39.00	5.43E+00	3.74E+00	3.99E-01	2.84E-01	1.97E-04
40.00	5.34E+00	3.66E+00	3.96E-01	2.83E-01	1.79E-04
41.00	5.26E+00	3.57E+00	3.93E-01	2.82E-01	1.64E-04
42.00	5.19E+00	3.49E+00	3.90E-01	2.80E-01	1.50E-04
43.00	5.12E+00	3.41E+00	3.88E-01	2.78E-01	1.39E-04
44.00	5.06E+00	3.34E+00	3.87E-01	2.76E-01	1.29E-04
45.00	5.00E+00	3.27E+00	3.85E-01	2.73E-01	1.20E-04
46.00	4.94E+00	3.20E+00	3.85E-01	2.70E-01	1.12E-04
47.00	4.89E+00	3.13E+00	3.84E-01	2.67E-01	1.04E-04
48.00	4.84E+00	3.07E+00	3.85E-01	2.63E-01	9.80E-05
49.00	4.79E+00	3.01E+00	3.86E-01	2.60E-01	9.22E-05
50.00	4.75E+00	2.96E+00	3.87E-01	2.55E-01	8.69E-05
51.00	4.70E+00	2.90E+00	3.90E-01	2.51E-01	8.22E-05
52.00	4.66E+00	2.86E+00	3.93E-01	2.46E-01	7.78E-05
53.00	4.62E+00	2.81E+00	3.98E-01	2.41E-01	7.38E-05
54.00	4.58E+00	2.76E+00	4.04E-01	2.35E-01	7.02E-05
55.00	4.55E+00	2.72E+00	4.12E-01	2.30E-01	6.68E-05
56.00	4.51E+00	2.68E+00	4.21E-01	2.24E-01	6.37E-05
57.00	4.47E+00	2.64E+00	4.33E-01	2.17E-01	6.08E-05
58.00	4.44E+00	2.60E+00	4.48E-01	2.11E-01	5.82E-05
59.00	4.40E+00	2.56E+00	4.66E-01	2.04E-01	5.57E-05
60.00	4.36E+00	2.51E+00	4.88E-01	1.97E-01	5.35E-05
61.00	4.32E+00	2.47E+00	5.14E-01	1.89E-01	5.14E-05
62.00	4.28E+00	2.41E+00	5.44E-01	1.82E-01	4.94E-05
63.00	4.23E+00	2.36E+00	5.78E-01	1.74E-01	4.76E-05

Incident Energy: E_n = 90.00MeV: cont.

Energy (MeV)	Lab angle–integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
64.00	4.18E+00	2.30E+00	6.18E-01	1.67E-01	4.58E-05
65.00	4.11E+00	2.24E+00	6.61E-01	1.59E-01	4.42E-05
66.00	4.05E+00	2.18E+00	7.09E-01	1.51E-01	4.27E-05
67.00	3.98E+00	2.13E+00	7.60E-01	1.44E-01	4.13E-05
68.00	3.91E+00	2.08E+00	8.12E-01	1.36E-01	4.00E-05
69.00	3.83E+00	2.03E+00	8.66E-01	1.28E-01	3.88E-05
70.00	3.73E+00	1.99E+00	9.18E-01	1.20E-01	3.76E-05
71.00	3.63E+00	1.95E+00	9.69E-01	1.13E-01	3.66E-05
72.00	3.52E+00	1.90E+00	1.02E+00	1.05E-01	3.55E-05
73.00	3.39E+00	1.84E+00	1.07E+00	9.78E-02	3.46E-05
74.00	3.22E+00	1.79E+00	1.11E+00	9.04E-02	3.37E-05
75.00	3.04E+00	1.73E+00	1.17E+00	8.31E-02	3.28E-05
76.00	2.86E+00	1.66E+00	1.27E+00	7.58E-02	3.20E-05
77.00	2.66E+00	1.57E+00	1.26E+00	6.87E-02	3.12E-05
78.00	2.43E+00	1.48E+00	1.18E+00	6.17E-02	3.05E-05
79.00	2.19E+00	1.39E+00	1.27E+00	5.48E-02	2.98E-05
80.00	1.97E+00	1.29E+00	1.42E+00	4.80E-02	2.92E-05
81.00	1.86E+00	1.18E+00	8.80E-01	4.14E-02	2.86E-05
82.00	1.75E+00	1.05E+00	1.64E-01	3.50E-02	2.80E-05
83.00	1.38E+00	9.30E-01	3.81E-01	2.89E-02	2.74E-05
84.00	1.90E+00	8.13E-01	3.20E-01	2.24E-02	2.69E-05
85.00	5.77E+00	7.39E-01	1.43E-02	1.60E-02	2.64E-05
86.00	8.96E+00	6.46E-01	0.00E+00	1.06E-02	2.59E-05
87.00	1.29E+00	3.78E-01	0.00E+00	4.85E-03	2.55E-05
88.00	1.95E-02	2.17E-01	0.00E+00	1.26E-03	2.51E-05
89.00	0.00E+00	4.72E-02	0.00E+00	0.00E+00	2.47E-05
90.00	0.00E+00	3.57E-03	0.00E+00	0.00E+00	2.43E-05
91.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-05
92.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.41E-05
93.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.34E-05
94.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.80E-05
95.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
σ_{prod} (b)	1.06E+00	1.14E+00	6.44E-02	2.15E-01	6.38E-01
E_{av} (MeV)	1.85E+01	1.39E+01	3.80E+01	1.08E+01	2.36E+00
K (fGy· m^2)	0.00E+00	3.80E+00	5.90E-01	5.57E-01	0.00E+00
$\Sigma_{A<4} K_A$					4.95E+00
K_{recoil} non-elastic ($A > 4$)					1.10E-01
K_{recoil} elastic					2.29E-02
K_{total}					5.08E+00

Incident Energy: E_n = 100.00MeV

Energy (MeV)	Lab angle–integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.21E+02	1.40E+01	4.68E-02	1.21E-01	1.48E+02
2.00	1.22E+02	4.53E+01	5.02E-01	9.43E-01	2.33E+02
3.00	1.06E+02	9.10E+01	1.51E+00	4.52E+00	1.09E+02
4.00	8.39E+01	1.18E+02	2.48E+00	1.09E+01	5.21E+01
5.00	6.51E+01	1.20E+02	3.01E+00	1.81E+01	2.02E+01
6.00	5.06E+01	1.08E+02	3.05E+00	2.34E+01	1.20E+01
7.00	3.94E+01	9.10E+01	2.81E+00	2.54E+01	3.23E+00
8.00	3.09E+01	7.37E+01	2.46E+00	2.46E+01	1.19E+00
9.00	2.43E+01	5.85E+01	2.10E+00	2.17E+01	8.12E-01
10.00	1.95E+01	4.60E+01	1.78E+00	1.76E+01	1.81E-01
11.00	1.59E+01	3.61E+01	1.51E+00	1.35E+01	1.05E-01
12.00	1.34E+01	2.85E+01	1.29E+00	1.00E+01	7.92E-03

Incident Energy: $E_n = 100.00$MeV: cont.

Energy (MeV)	Lab angle-integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
13.00	1.16E+01	2.27E+01	1.11E+00	7.29E+00	6.48E-03
14.00	1.03E+01	1.83E+01	9.71E-01	5.28E+00	5.36E-03
15.00	9.29E+00	1.51E+01	8.59E-01	3.81E+00	5.54E-03
16.00	8.56E+00	1.26E+01	7.72E-01	2.76E+00	7.01E-03
17.00	8.00E+00	1.06E+01	7.02E-01	2.01E+00	1.01E-02
18.00	7.58E+00	9.17E+00	6.47E-01	1.49E+00	1.56E-02
19.00	7.27E+00	8.03E+00	6.03E-01	1.11E+00	2.28E-02
20.00	7.04E+00	7.16E+00	5.67E-01	8.46E-01	2.37E-02
21.00	6.85E+00	6.53E+00	5.37E-01	6.59E-01	1.62E-02
22.00	6.68E+00	6.07E+00	5.13E-01	5.26E-01	9.63E-03
23.00	6.54E+00	5.72E+00	4.92E-01	4.33E-01	5.86E-03
24.00	6.40E+00	5.44E+00	4.75E-01	3.68E-01	3.80E-03
25.00	6.29E+00	5.20E+00	4.60E-01	3.22E-01	2.61E-03
26.00	6.18E+00	5.00E+00	4.47E-01	2.90E-01	1.88E-03
27.00	6.09E+00	4.83E+00	4.35E-01	2.68E-01	1.40E-03
28.00	6.00E+00	4.68E+00	4.24E-01	2.54E-01	1.08E-03
29.00	5.91E+00	4.55E+00	4.15E-01	2.44E-01	8.58E-04
30.00	5.83E+00	4.43E+00	4.06E-01	2.37E-01	6.96E-04
31.00	5.74E+00	4.33E+00	3.98E-01	2.33E-01	5.74E-04
32.00	5.66E+00	4.23E+00	3.91E-01	2.31E-01	4.82E-04
33.00	5.58E+00	4.14E+00	3.85E-01	2.29E-01	4.10E-04
34.00	5.50E+00	4.05E+00	3.79E-01	2.29E-01	3.53E-04
35.00	5.42E+00	3.97E+00	3.73E-01	2.29E-01	3.08E-04
36.00	5.34E+00	3.89E+00	3.68E-01	2.29E-01	2.71E-04
37.00	5.26E+00	3.81E+00	3.63E-01	2.29E-01	2.41E-04
38.00	5.18E+00	3.74E+00	3.59E-01	2.29E-01	2.16E-04
39.00	5.10E+00	3.66E+00	3.55E-01	2.29E-01	1.94E-04
40.00	5.02E+00	3.59E+00	3.51E-01	2.30E-01	1.76E-04
41.00	4.94E+00	3.52E+00	3.48E-01	2.30E-01	1.61E-04
42.00	4.87E+00	3.45E+00	3.45E-01	2.29E-01	1.48E-04
43.00	4.80E+00	3.39E+00	3.42E-01	2.29E-01	1.36E-04
44.00	4.74E+00	3.32E+00	3.39E-01	2.28E-01	1.26E-04
45.00	4.67E+00	3.26E+00	3.37E-01	2.27E-01	1.17E-04
46.00	4.61E+00	3.20E+00	3.35E-01	2.26E-01	1.09E-04
47.00	4.55E+00	3.14E+00	3.34E-01	2.25E-01	1.02E-04
48.00	4.49E+00	3.08E+00	3.32E-01	2.23E-01	9.54E-05
49.00	4.43E+00	3.02E+00	3.31E-01	2.22E-01	8.97E-05
50.00	4.38E+00	2.96E+00	3.30E-01	2.19E-01	8.45E-05
51.00	4.32E+00	2.90E+00	3.29E-01	2.17E-01	7.98E-05
52.00	4.27E+00	2.85E+00	3.28E-01	2.15E-01	7.55E-05
53.00	4.22E+00	2.80E+00	3.28E-01	2.12E-01	7.15E-05
54.00	4.17E+00	2.74E+00	3.28E-01	2.09E-01	6.79E-05
55.00	4.12E+00	2.69E+00	3.28E-01	2.05E-01	6.46E-05
56.00	4.07E+00	2.65E+00	3.29E-01	2.02E-01	6.15E-05
57.00	4.03E+00	2.60E+00	3.29E-01	1.98E-01	5.87E-05
58.00	3.98E+00	2.55E+00	3.31E-01	1.94E-01	5.61E-05
59.00	3.94E+00	2.50E+00	3.32E-01	1.90E-01	5.36E-05
60.00	3.90E+00	2.45E+00	3.35E-01	1.85E-01	5.14E-05
61.00	3.86E+00	2.40E+00	3.38E-01	1.81E-01	4.93E-05
62.00	3.82E+00	2.34E+00	3.41E-01	1.76E-01	4.73E-05
63.00	3.79E+00	2.28E+00	3.46E-01	1.71E-01	4.55E-05
64.00	3.75E+00	2.23E+00	3.52E-01	1.65E-01	4.38E-05

Incident Energy: $E_n = 100.00$MeV: cont.

Energy (MeV)	Lab angle-integrated ^{40}Ca+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
65.00	3.72E+00	2.17E+00	3.59E-01	1.60E-01	4.21E-05
66.00	3.69E+00	2.11E+00	3.68E-01	1.55E-01	4.06E-05
67.00	3.66E+00	2.07E+00	3.79E-01	1.50E-01	3.92E-05
68.00	3.63E+00	2.02E+00	3.92E-01	1.44E-01	3.79E-05
69.00	3.61E+00	1.98E+00	4.08E-01	1.39E-01	3.67E-05
70.00	3.60E+00	1.95E+00	4.27E-01	1.33E-01	3.55E-05
71.00	3.58E+00	1.93E+00	4.50E-01	1.28E-01	3.44E-05
72.00	3.56E+00	1.91E+00	4.76E-01	1.22E-01	3.33E-05
73.00	3.55E+00	1.89E+00	5.06E-01	1.17E-01	3.24E-05
74.00	3.53E+00	1.87E+00	5.40E-01	1.12E-01	3.14E-05
75.00	3.50E+00	1.84E+00	5.78E-01	1.06E-01	3.06E-05
76.00	3.47E+00	1.83E+00	6.19E-01	1.01E-01	2.97E-05
77.00	3.43E+00	1.81E+00	6.63E-01	9.57E-02	2.89E-05
78.00	3.39E+00	1.78E+00	7.08E-01	9.05E-02	2.82E-05
79.00	3.32E+00	1.75E+00	7.53E-01	8.53E-02	2.75E-05
80.00	3.25E+00	1.73E+00	7.97E-01	8.02E-02	2.68E-05
81.00	3.16E+00	1.70E+00	8.39E-01	7.51E-02	2.62E-05
82.00	3.07E+00	1.66E+00	8.80E-01	7.00E-02	2.56E-05
83.00	2.95E+00	1.61E+00	9.19E-01	6.51E-02	2.50E-05
84.00	2.81E+00	1.56E+00	9.63E-01	6.01E-02	2.45E-05
85.00	2.65E+00	1.51E+00	1.03E+00	5.53E-02	2.40E-05
86.00	2.49E+00	1.45E+00	1.15E+00	5.04E-02	2.35E-05
87.00	2.32E+00	1.37E+00	1.23E+00	4.57E-02	2.30E-05
88.00	2.11E+00	1.29E+00	1.07E+00	4.10E-02	2.26E-05
89.00	1.90E+00	1.21E+00	1.10E+00	3.64E-02	2.22E-05
90.00	1.71E+00	1.12E+00	1.11E+00	3.19E-02	2.18E-05
91.00	1.62E+00	1.02E+00	8.54E-01	2.75E-02	2.14E-05
92.00	1.64E+00	9.15E-01	4.02E-01	2.35E-02	2.10E-05
93.00	1.18E+00	8.07E-01	4.14E-01	2.03E-02	2.07E-05
94.00	1.43E+00	7.06E-01	4.22E-02	1.60E-02	2.03E-05
95.00	3.65E+00	6.44E-01	0.00E+00	1.02E-02	2.00E-05
96.00	8.72E+00	6.40E-01	0.00E+00	5.95E-03	1.97E-05
97.00	2.63E+00	3.79E-01	0.00E+00	2.42E-03	1.94E-05
98.00	3.68E-02	1.52E-01	0.00E+00	0.00E+00	1.92E-05
99.00	0.00E+00	4.36E-02	0.00E+00	0.00E+00	1.89E-05
100.00	0.00E+00	6.00E-03	0.00E+00	0.00E+00	1.86E-05
101.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.46E-05
102.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.69E-05
103.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.17E-05
104.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.24E-05
105.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
σ_{prod} (b)	1.08E+00	1.14E+00	6.56E-02	2.09E-01	5.80E-01
E_{av} (MeV)	1.98E+01	1.49E+01	3.98E+01	1.11E+01	2.36E+00
K (fGy· m^2)	0.00E+00	4.12E+00	6.28E-01	5.58E-01	0.00E+00
$\Sigma_{A<4} K_A$					5.31E+00
K_{recoil} non-elastic ($A > 4$)					9.98E-02
K_{recoil} elastic					1.89E-02
K_{total}					5.42E+00

Incident Energy: $E_n = 20.00$MeV

Energy (MeV)	Lab angle-integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.63E+02	3.05E+01	9.45E-02	1.13E-01	2.41E+02
2.00	1.29E+02	7.27E+01	7.33E-01	2.19E+00	5.04E+02
3.00	1.01E+02	9.43E+01	1.99E+00	1.07E+01	1.91E+02
4.00	7.86E+01	8.05E+01	3.12E+00	2.25E+01	5.35E+01
5.00	6.09E+01	5.88E+01	4.46E+00	2.73E+01	3.57E+01
6.00	4.87E+01	4.10E+01	5.63E+00	2.40E+01	1.86E+01
7.00	4.09E+01	2.80E+01	5.27E+00	1.73E+01	1.02E+01
8.00	3.55E+01	2.02E+01	5.40E+00	1.15E+01	1.54E+00
9.00	3.13E+01	1.49E+01	5.53E+00	7.37E+00	4.17E-01
10.00	2.76E+01	1.11E+01	3.66E+00	4.66E+00	2.94E-01
11.00	2.49E+01	8.87E+00	4.51E+00	3.24E+00	6.78E-03
12.00	2.26E+01	8.34E+00	4.31E+00	2.24E+00	7.47E-03
13.00	1.83E+01	8.09E+00	1.66E+00	1.72E+00	7.00E-03
14.00	1.39E+01	4.43E+00	1.19E+00	1.25E+00	5.85E-03
15.00	1.12E+01	2.15E+00	4.66E-01	7.27E-01	5.53E-03
16.00	8.46E+00	1.93E+00	2.24E-03	3.63E-01	6.16E-03
17.00	5.28E+00	1.35E+00	0.00E+00	1.14E-01	7.66E-03
18.00	3.19E+00	7.24E-01	0.00E+00	6.87E-03	1.01E-02
19.00	1.42E+00	2.95E-01	0.00E+00	0.00E+00	1.37E-02
20.00	2.64E-01	5.39E-02	0.00E+00	0.00E+00	1.86E-02
21.00	1.45E-03	0.00E+00	0.00E+00	0.00E+00	1.72E-02
22.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.61E-02
23.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.18E-02
24.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-02
25.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.26E-02
σ_{prod} (b)	8.26E-01	4.88E-01	4.80E-02	1.37E-01	1.06E+00
E_{av} (MeV)	5.15E+00	4.93E+00	8.14E+00	6.26E+00	2.29E+00
K (fGy· m^2)	0.00E+00	7.50E-01	1.22E-01	2.67E-01	0.00E+00
$\Sigma_{A<4}K_A$					1.14E+00
K_{recoil} non-elastic ($A > 4$)					2.00E-01
K_{recoil} elastic					1.12E-01
K_{total}					1.45E+00

Incident Energy: $E_n = 23.00$MeV

Energy (MeV)	Lab angle-integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.64E+02	2.66E+01	9.56E-02	7.88E-02	2.63E+02
2.00	1.31E+02	5.85E+01	7.16E-01	1.67E+00	5.05E+02
3.00	1.04E+02	7.77E+01	1.85E+00	8.99E+00	2.05E+02
4.00	8.21E+01	7.13E+01	2.73E+00	2.00E+01	5.54E+01
5.00	6.29E+01	5.69E+01	3.22E+00	2.61E+01	4.06E+01
6.00	4.95E+01	4.32E+01	3.50E+00	2.48E+01	2.47E+01
7.00	4.07E+01	3.24E+01	3.84E+00	1.97E+01	1.15E+01
8.00	3.45E+01	2.41E+01	4.56E+00	1.43E+01	2.38E+00
9.00	3.01E+01	1.81E+01	5.56E+00	9.86E+00	5.25E-01
10.00	2.67E+01	1.38E+01	5.19E+00	6.41E+00	3.49E-01
11.00	2.38E+01	1.09E+01	4.76E+00	4.25E+00	6.26E-03
12.00	2.11E+01	8.84E+00	5.31E+00	2.86E+00	6.91E-03
13.00	1.87E+01	7.23E+00	4.15E+00	1.97E+00	6.80E-03
14.00	1.73E+01	6.17E+00	3.12E+00	1.45E+00	5.86E-03
15.00	1.64E+01	5.95E+00	3.35E+00	1.06E+00	5.66E-03
16.00	1.26E+01	6.28E+00	1.68E+00	7.19E-01	6.32E-03
17.00	9.71E+00	3.88E+00	1.08E+00	4.77E-01	7.82E-03
18.00	7.32E+00	1.69E+00	5.29E-01	2.97E-01	1.03E-02
19.00	5.28E+00	9.93E-01	4.45E-03	1.51E-01	1.39E-02

Incident Energy: $E_n = 23.00$MeV: cont.

Energy (MeV)	Lab angle–integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
20.00	3.49E+00	6.31E-01	0.00E+00	4.40E-02	1.86E-02
21.00	2.15E+00	4.19E-01	0.00E+00	2.60E-03	2.29E-02
22.00	1.09E+00	1.85E-01	0.00E+00	0.00E+00	2.40E-02
23.00	2.42E-01	3.51E-02	0.00E+00	0.00E+00	2.09E-02
24.00	2.88E-03	0.00E+00	0.00E+00	0.00E+00	1.62E-02
25.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.24E-02
26.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.02E-02
27.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.64E-03
28.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.61E-03
σ_{prod} (b)	8.64E-01	4.76E-01	5.52E-02	1.45E-01	1.11E+00
E_{av} (MeV)	5.55E+00	5.63E+00	9.81E+00	6.70E+00	2.32E+00
K (fGy· m^2)	0.00E+00	8.34E-01	1.69E-01	3.03E-01	0.00E+00
$\Sigma_{A<4} K_A$					1.31E+00
K_{recoil} non-elastic ($A > 4$)					2.10E-01
K_{recoil} elastic					1.13E-01
K_{total}					1.63E+00

Incident Energy: $E_n = 27.00$MeV

Energy (MeV)	Lab angle-integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.76E+02	2.64E+01	1.27E-01	3.24E-01	2.68E+02
2.00	1.25E+02	5.26E+01	7.94E-01	2.47E+00	4.83E+02
3.00	9.72E+01	6.79E+01	1.89E+00	8.88E+00	1.78E+02
4.00	7.81E+01	6.37E+01	2.69E+00	1.72E+01	5.15E+01
5.00	6.27E+01	5.26E+01	3.04E+00	2.22E+01	3.93E+01
6.00	5.12E+01	4.17E+01	3.14E+00	2.23E+01	2.68E+01
7.00	4.29E+01	3.31E+01	3.17E+00	1.88E+01	1.21E+01
8.00	3.64E+01	2.63E+01	3.20E+00	1.44E+01	3.28E+00
9.00	3.12E+01	2.12E+01	3.26E+00	1.02E+01	6.46E-01
10.00	2.73E+01	1.72E+01	3.35E+00	6.94E+00	3.56E-01
11.00	2.42E+01	1.40E+01	3.62E+00	4.69E+00	5.91E-03
12.00	2.15E+01	1.15E+01	4.13E+00	3.25E+00	6.53E-03
13.00	1.92E+01	9.58E+00	5.16E+00	2.33E+00	6.59E-03
14.00	1.72E+01	8.10E+00	4.80E+00	1.75E+00	5.76E-03
15.00	1.55E+01	6.93E+00	4.06E+00	1.36E+00	5.58E-03
16.00	1.39E+01	5.95E+00	4.29E+00	1.07E+00	6.32E-03
17.00	1.25E+01	5.02E+00	3.50E+00	8.63E-01	7.91E-03
18.00	1.13E+01	4.13E+00	2.75E+00	7.05E-01	1.04E-02
19.00	1.05E+01	3.42E+00	3.01E+00	5.60E-01	1.42E-02
20.00	8.40E+00	3.46E+00	1.74E+00	3.48E-01	1.88E-02
21.00	5.83E+00	2.45E+00	9.23E-01	2.10E-01	2.28E-02
22.00	4.43E+00	1.06E+00	5.93E-01	1.34E-01	2.34E-02
23.00	3.70E+00	6.64E-01	1.10E-02	6.57E-02	2.00E-02
24.00	2.65E+00	4.52E-01	0.00E+00	1.76E-02	1.53E-02
25.00	1.63E+00	3.54E-01	0.00E+00	1.01E-03	1.12E-02
26.00	8.98E-01	1.57E-01	0.00E+00	0.00E+00	8.38E-03
27.00	2.31E-01	4.61E-03	0.00E+00	0.00E+00	9.98E-04
28.00	6.31E-03	0.00E+00	0.00E+00	0.00E+00	5.01E-03
29.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.16E-03
30.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.46E-03
31.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.47E-03
32.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.30E-03
σ_{prod} (b)	9.02E-01	4.80E-01	6.32E-02	1.41E-01	1.06E+00
E_{av} (MeV)	6.14E+00	6.39E+00	1.19E+01	7.07E+00	2.31E+00
K (fGy· m^2)	0.00E+00	9.56E-01	2.35E-01	3.11E-01	0.00E+00
$\Sigma_{A<4} K_A$					1.50E+00
K_{recoil} non-elastic ($A > 4$)					2.10E-01
K_{recoil} elastic					1.07E-01
K_{total}					1.82E+00

Incident Energy: $E_n = 30.00$MeV

Energy (MeV)	Lab angle-integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.71E+02	2.61E+01	1.19E-01	2.36E-01	2.66E+02
2.00	1.25E+02	5.12E+01	7.57E-01	1.94E+00	4.82E+02
3.00	9.78E+01	6.59E+01	1.80E+00	7.51E+00	1.62E+02
4.00	7.80E+01	6.30E+01	2.57E+00	1.49E+01	5.02E+01
5.00	6.19E+01	5.26E+01	2.90E+00	1.94E+01	3.77E+01
6.00	5.00E+01	4.20E+01	2.97E+00	1.96E+01	2.38E+01
7.00	4.17E+01	3.35E+01	2.96E+00	1.68E+01	1.25E+01
8.00	3.57E+01	2.69E+01	2.93E+00	1.33E+01	3.32E+00
9.00	3.12E+01	2.18E+01	2.92E+00	9.91E+00	9.64E-01
10.00	2.78E+01	1.79E+01	2.93E+00	7.14E+00	4.18E-01
11.00	2.48E+01	1.50E+01	2.96E+00	5.10E+00	9.22E-03
12.00	2.21E+01	1.27E+01	3.02E+00	3.64E+00	6.71E-03
13.00	1.98E+01	1.09E+01	3.12E+00	2.62E+00	6.47E-03
14.00	1.79E+01	9.49E+00	3.35E+00	1.95E+00	5.65E-03
15.00	1.63E+01	8.29E+00	3.83E+00	1.52E+00	5.49E-03
16.00	1.50E+01	7.28E+00	4.95E+00	1.22E+00	6.24E-03
17.00	1.36E+01	6.33E+00	5.01E+00	1.00E+00	7.86E-03
18.00	1.20E+01	5.27E+00	3.75E+00	8.28E-01	1.04E-02
19.00	1.03E+01	4.11E+00	3.71E+00	6.84E-01	1.42E-02
20.00	9.06E+00	3.26E+00	3.89E+00	5.67E-01	1.89E-02
21.00	8.54E+00	2.85E+00	2.40E+00	4.80E-01	2.29E-02
22.00	8.74E+00	2.71E+00	2.00E+00	4.00E-01	2.33E-02
23.00	7.41E+00	2.05E+00	1.71E+00	2.45E-01	1.97E-02
24.00	5.00E+00	1.20E+00	4.91E-01	1.52E-01	1.49E-02
25.00	3.63E+00	9.35E-01	3.62E-01	8.01E-02	1.09E-02
26.00	2.87E+00	5.96E-01	1.12E-02	2.96E-02	8.02E-03
27.00	2.33E+00	3.84E-01	0.00E+00	9.41E-03	6.10E-03
28.00	1.43E+00	3.08E-01	0.00E+00	0.00E+00	4.78E-03
29.00	8.29E-01	1.62E-01	0.00E+00	0.00E+00	3.86E-03
30.00	2.37E-01	7.92E-03	0.00E+00	0.00E+00	9.14E-04
31.00	1.04E-02	0.00E+00	0.00E+00	0.00E+00	2.76E-03
32.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.21E-03
33.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.79E-03
34.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.17E-03
35.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.49E-03
σ_{prod} (b)	9.22E-01	4.95E-01	6.74E-02	1.31E-01	1.04E+00
E_{av} (MeV)	6.67E+00	6.84E+00	1.34E+01	7.49E+00	2.29E+00
K (fGy· m^2)	0.00E+00	1.05E+00	2.82E-01	3.07E-01	0.00E+00
$\Sigma_{A<4} K_A$					1.64E+00
K_{recoil} non-elastic ($A > 4$)					2.10E-01
K_{recoil} elastic					1.01E-01
K_{total}					1.95E+00

Incident Energy: $E_n = 35.00$MeV

Energy (MeV)	Lab angle-integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.57E+02	2.32E+01	1.07E-01	1.43E-01	2.60E+02
2.00	1.23E+02	4.75E+01	6.80E-01	1.54E+00	4.79E+02
3.00	9.66E+01	6.18E+01	1.58E+00	6.77E+00	1.47E+02
4.00	7.70E+01	6.00E+01	2.23E+00	1.36E+01	5.31E+01
5.00	6.13E+01	5.13E+01	2.51E+00	1.80E+01	3.73E+01
6.00	4.93E+01	4.17E+01	2.56E+00	1.83E+01	2.00E+01
7.00	4.06E+01	3.36E+01	2.51E+00	1.57E+01	1.31E+01
8.00	3.44E+01	2.71E+01	2.44E+00	1.22E+01	3.04E+00
9.00	2.98E+01	2.21E+01	2.39E+00	9.08E+00	8.06E-01

Incident Energy: $E_n = 35.00$MeV: cont.

Energy (MeV)	Lab angle–integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
10.00	2.64E+01	1.83E+01	2.35E+00	6.58E+00	4.22E-01
11.00	2.37E+01	1.55E+01	2.34E+00	4.77E+00	1.56E-02
12.00	2.15E+01	1.34E+01	2.36E+00	3.50E+00	7.16E-03
13.00	1.96E+01	1.18E+01	2.39E+00	2.62E+00	6.56E-03
14.00	1.81E+01	1.05E+01	2.44E+00	2.01E+00	5.64E-03
15.00	1.68E+01	9.53E+00	2.51E+00	1.59E+00	5.46E-03
16.00	1.57E+01	8.67E+00	2.58E+00	1.30E+00	6.22E-03
17.00	1.46E+01	7.82E+00	2.66E+00	1.08E+00	7.87E-03
18.00	1.33E+01	6.81E+00	2.76E+00	9.20E-01	1.05E-02
19.00	1.19E+01	5.63E+00	2.90E+00	7.96E-01	1.43E-02
20.00	1.06E+01	4.67E+00	3.11E+00	6.96E-01	1.91E-02
21.00	9.84E+00	4.16E+00	3.23E+00	6.09E-01	2.30E-02
22.00	9.23E+00	3.77E+00	3.24E+00	5.29E-01	2.32E-02
23.00	8.60E+00	3.38E+00	3.30E+00	4.55E-01	1.94E-02
24.00	7.96E+00	3.01E+00	3.28E+00	3.87E-01	1.45E-02
25.00	7.40E+00	2.68E+00	3.45E+00	3.29E-01	1.05E-02
26.00	7.05E+00	2.40E+00	2.46E+00	2.92E-01	7.70E-03
27.00	7.33E+00	2.30E+00	1.69E+00	2.53E-01	5.79E-03
28.00	6.67E+00	1.92E+00	1.78E+00	1.32E-01	4.50E-03
29.00	4.32E+00	1.11E+00	5.34E-01	7.40E-02	3.59E-03
30.00	3.37E+00	9.24E-01	4.63E-01	3.42E-02	2.95E-03
31.00	2.24E+00	6.49E-01	2.72E-02	1.16E-02	2.47E-03
32.00	1.46E+00	3.28E-01	0.00E+00	1.81E-03	2.11E-03
33.00	1.16E+00	1.58E-01	0.00E+00	0.00E+00	1.83E-03
34.00	6.80E-01	4.01E-02	0.00E+00	0.00E+00	1.61E-03
35.00	1.69E-01	2.90E-03	0.00E+00	0.00E+00	6.92E-04
36.00	1.16E-02	0.00E+00	0.00E+00	0.00E+00	1.24E-03
37.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.11E-03
38.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.07E-03
39.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.47E-04
40.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.55E-04
σ_{prod} (b)	9.39E-01	5.08E-01	6.89E-02	1.24E-01	1.01E+00
E_{av} (MeV)	7.66E+00	7.79E+00	1.62E+01	7.89E+00	2.28E+00
K (fGy· m^2)	0.00E+00	1.23E+00	3.47E-01	3.05E-01	0.00E+00
$\Sigma_{A<4} K_A$					1.88E+00
K_{recoil} non-elastic ($A > 4$)					1.90E-01
K_{recoil} elastic					9.00E-02
K_{total}					2.16E+00

Incident Energy: $E_n = 40.00$MeV

Energy (MeV)	Lab angle–integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.48E+02	2.07E+01	1.12E-01	7.05E-02	2.44E+02
2.00	1.24E+02	4.23E+01	6.81E-01	1.32E+00	4.65E+02
3.00	9.86E+01	5.67E+01	1.53E+00	6.35E+00	1.38E+02
4.00	7.74E+01	5.68E+01	2.12E+00	1.29E+01	5.68E+01
5.00	6.08E+01	4.97E+01	2.32E+00	1.72E+01	3.79E+01
6.00	4.84E+01	4.13E+01	2.29E+00	1.79E+01	1.94E+01
7.00	3.94E+01	3.37E+01	2.18E+00	1.56E+01	1.38E+01
8.00	3.30E+01	2.74E+01	2.05E+00	1.23E+01	3.10E+00
9.00	2.84E+01	2.24E+01	1.94E+00	9.16E+00	1.22E+00
10.00	2.49E+01	1.85E+01	1.85E+00	6.59E+00	4.55E-01
11.00	2.23E+01	1.56E+01	1.79E+00	4.70E+00	8.75E-02
12.00	2.01E+01	1.35E+01	1.76E+00	3.37E+00	6.88E-03
13.00	1.83E+01	1.19E+01	1.76E+00	2.47E+00	6.49E-03

Incident Energy: $E_n = 40.00$MeV: cont.

Energy (MeV)	Lab angle-integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
14.00	1.69E+01	1.07E+01	1.78E+00	1.86E+00	5.61E-03
15.00	1.59E+01	9.83E+00	1.82E+00	1.46E+00	5.43E-03
16.00	1.50E+01	9.06E+00	1.88E+00	1.19E+00	6.21E-03
17.00	1.41E+01	8.30E+00	1.95E+00	1.01E+00	7.87E-03
18.00	1.32E+01	7.41E+00	2.03E+00	8.76E-01	1.05E-02
19.00	1.20E+01	6.37E+00	2.13E+00	7.78E-01	1.44E-02
20.00	1.10E+01	5.50E+00	2.22E+00	7.00E-01	1.93E-02
21.00	1.05E+01	5.05E+00	2.33E+00	6.35E-01	2.32E-02
22.00	1.01E+01	4.72E+00	2.44E+00	5.77E-01	2.32E-02
23.00	9.72E+00	4.41E+00	2.57E+00	5.23E-01	1.93E-02
24.00	9.28E+00	4.12E+00	2.74E+00	4.72E-01	1.43E-02
25.00	8.84E+00	3.84E+00	3.03E+00	4.24E-01	1.03E-02
26.00	8.40E+00	3.56E+00	3.22E+00	3.77E-01	7.53E-03
27.00	7.92E+00	3.26E+00	2.97E+00	3.30E-01	5.63E-03
28.00	7.39E+00	2.96E+00	3.03E+00	2.86E-01	4.35E-03
29.00	6.88E+00	2.67E+00	3.02E+00	2.44E-01	3.45E-03
30.00	6.44E+00	2.39E+00	2.60E+00	2.09E-01	2.81E-03
31.00	6.17E+00	2.14E+00	2.51E+00	1.87E-01	2.34E-03
32.00	6.45E+00	2.03E+00	1.42E+00	1.64E-01	1.98E-03
33.00	6.39E+00	1.83E+00	2.33E-01	8.62E-02	1.71E-03
34.00	4.06E+00	1.17E+00	3.65E-01	4.19E-02	1.49E-03
35.00	2.85E+00	9.81E-01	4.84E-01	2.04E-02	1.32E-03
36.00	2.05E+00	5.40E-01	4.67E-02	5.01E-03	1.18E-03
37.00	1.43E+00	4.26E-01	0.00E+00	0.00E+00	1.07E-03
38.00	1.22E+00	1.83E-01	0.00E+00	0.00E+00	9.73E-04
39.00	2.63E-01	4.61E-02	0.00E+00	0.00E+00	8.93E-04
40.00	1.50E-01	4.57E-03	0.00E+00	0.00E+00	5.13E-04
41.00	2.32E-02	0.00E+00	0.00E+00	0.00E+00	7.38E-04
42.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.12E-04
43.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.55E-04
44.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.88E-04
45.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.40E-04
σ_{prod} (b)	9.58E-01	5.14E-01	6.92E-02	1.22E-01	9.81E-01
E_{av} (MeV)	8.65E+00	8.86E+00	1.88E+01	8.18E+00	2.31E+00
K (fGy· m^2)	0.00E+00	1.42E+00	4.04E-01	3.12E-01	0.00E+00
$\Sigma_{A<4} K_A$					2.13E+00
K_{recoil} non-elastic ($A > 4$)					1.90E-01
K_{recoil} elastic					7.99E-02
K_{total}					2.40E+00

Incident Energy: $E_n = 50.00$MeV

Energy (MeV)	Lab angle-integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.48E+02	1.55E+01	1.28E-01	6.68E-02	2.02E+02
2.00	1.21E+02	3.65E+01	7.07E-01	1.40E+00	4.01E+02
3.00	9.70E+01	5.26E+01	1.50E+00	6.44E+00	1.21E+02
4.00	7.75E+01	5.50E+01	2.04E+00	1.26E+01	5.05E+01
5.00	6.09E+01	4.95E+01	2.21E+00	1.66E+01	3.59E+01
6.00	4.79E+01	4.17E+01	2.15E+00	1.77E+01	1.61E+01
7.00	3.84E+01	3.43E+01	2.00E+00	1.58E+01	1.43E+01
8.00	3.16E+01	2.80E+01	1.83E+00	1.27E+01	3.99E+00
9.00	2.66E+01	2.29E+01	1.68E+00	9.59E+00	3.08E+00
10.00	2.28E+01	1.89E+01	1.54E+00	6.95E+00	8.37E-01
11.00	2.00E+01	1.58E+01	1.42E+00	4.95E+00	4.40E-01
12.00	1.77E+01	1.35E+01	1.32E+00	3.50E+00	4.33E-02

Incident Energy: $E_n = 50.00$MeV: cont.

Energy (MeV)	Lab angle–integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
13.00	1.60E+01	1.18E+01	1.24E+00	2.50E+00	1.03E-02
14.00	1.46E+01	1.05E+01	1.17E+00	1.81E+00	5.59E-03
15.00	1.36E+01	9.53E+00	1.12E+00	1.36E+00	5.41E-03
16.00	1.28E+01	8.74E+00	1.08E+00	1.05E+00	6.17E-03
17.00	1.21E+01	8.01E+00	1.06E+00	8.55E-01	7.87E-03
18.00	1.13E+01	7.25E+00	1.04E+00	7.23E-01	1.06E-02
19.00	1.04E+01	6.41E+00	1.04E+00	6.34E-01	1.47E-02
20.00	9.69E+00	5.67E+00	1.05E+00	5.72E-01	1.97E-02
21.00	9.32E+00	5.30E+00	1.08E+00	5.27E-01	2.37E-02
22.00	9.12E+00	5.07E+00	1.12E+00	4.93E-01	2.35E-02
23.00	8.93E+00	4.87E+00	1.17E+00	4.65E-01	1.93E-02
24.00	8.75E+00	4.69E+00	1.24E+00	4.41E-01	1.42E-02
25.00	8.57E+00	4.52E+00	1.31E+00	4.19E-01	1.02E-02
26.00	8.41E+00	4.36E+00	1.40E+00	3.98E-01	7.38E-03
27.00	8.25E+00	4.21E+00	1.50E+00	3.77E-01	5.49E-03
28.00	8.09E+00	4.06E+00	1.60E+00	3.57E-01	4.21E-03
29.00	7.94E+00	3.91E+00	1.71E+00	3.36E-01	3.32E-03
30.00	7.78E+00	3.75E+00	1.82E+00	3.14E-01	2.68E-03
31.00	7.59E+00	3.60E+00	1.94E+00	2.93E-01	2.21E-03
32.00	7.39E+00	3.45E+00	2.06E+00	2.71E-01	1.85E-03
33.00	7.19E+00	3.29E+00	2.20E+00	2.49E-01	1.58E-03
34.00	6.97E+00	3.12E+00	2.40E+00	2.26E-01	1.37E-03
35.00	6.71E+00	2.93E+00	2.73E+00	2.03E-01	1.20E-03
36.00	6.40E+00	2.74E+00	3.14E+00	1.81E-01	1.06E-03
37.00	6.08E+00	2.55E+00	2.70E+00	1.58E-01	9.51E-04
38.00	5.75E+00	2.35E+00	2.40E+00	1.36E-01	8.58E-04
39.00	5.38E+00	2.13E+00	2.14E+00	1.16E-01	7.80E-04
40.00	4.99E+00	1.92E+00	2.20E+00	9.65E-02	7.13E-04
41.00	4.66E+00	1.75E+00	2.34E+00	7.78E-02	6.57E-04
42.00	4.40E+00	1.74E+00	1.64E+00	5.27E-02	6.08E-04
43.00	3.60E+00	1.89E+00	5.64E-01	3.32E-02	5.66E-04
44.00	2.96E+00	1.03E+00	5.16E-01	1.47E-02	5.29E-04
45.00	2.39E+00	4.54E-01	1.14E-01	5.04E-03	4.96E-04
46.00	1.78E+00	3.96E-01	1.34E-03	1.42E-03	4.68E-04
47.00	1.12E+00	2.72E-01	0.00E+00	0.00E+00	4.42E-04
48.00	7.05E-01	1.50E-01	0.00E+00	0.00E+00	4.20E-04
49.00	3.21E-01	5.47E-02	0.00E+00	0.00E+00	4.00E-04
50.00	6.02E-02	7.64E-03	0.00E+00	0.00E+00	3.21E-04
51.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.87E-04
52.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.59E-04
53.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.26E-04
54.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.96E-04
55.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.58E-04
σ_{prod} (b)	9.81E-01	5.32E-01	7.04E-02	1.24E-01	8.50E-01
E_{av} (MeV)	1.03E+01	1.08E+01	2.44E+01	8.55E+00	2.38E+00
K (fGy· m^2)	0.00E+00	1.79E+00	5.36E-01	3.31E-01	0.00E+00
$\Sigma_{A<4}K_A$					2.66E+00
K_{recoil} non-elastic ($A > 4$)					1.80E-01
K_{recoil} elastic					6.37E-02
K_{total}					2.90E+00

Incident Energy: $E_n = 60.00$MeV

Energy (MeV)	Lab angle–integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.38E+02	1.40E+01	1.58E-01	1.75E-01	1.78E+02
2.00	1.14E+02	3.39E+01	8.25E-01	1.97E+00	3.40E+02
3.00	9.51E+01	5.15E+01	1.68E+00	7.36E+00	1.05E+02
4.00	7.83E+01	5.63E+01	2.24E+00	1.32E+01	4.35E+01
5.00	6.27E+01	5.19E+01	2.39E+00	1.71E+01	3.30E+01
6.00	4.99E+01	4.43E+01	2.29E+00	1.83E+01	1.53E+01
7.00	4.00E+01	3.67E+01	2.09E+00	1.68E+01	1.25E+01
8.00	3.25E+01	3.01E+01	1.87E+00	1.38E+01	4.39E+00
9.00	2.69E+01	2.45E+01	1.68E+00	1.07E+01	3.49E+00
10.00	2.27E+01	2.01E+01	1.50E+00	7.89E+00	1.48E+00
11.00	1.95E+01	1.67E+01	1.36E+00	5.68E+00	5.45E-01
12.00	1.69E+01	1.41E+01	1.24E+00	4.05E+00	1.05E-01
13.00	1.50E+01	1.21E+01	1.15E+00	2.87E+00	1.97E-02
14.00	1.35E+01	1.06E+01	1.06E+00	2.05E+00	5.63E-03
15.00	1.24E+01	9.51E+00	9.97E-01	1.48E+00	5.45E-03
16.00	1.15E+01	8.61E+00	9.41E-01	1.10E+00	6.22E-03
17.00	1.07E+01	7.80E+00	8.92E-01	8.46E-01	7.96E-03
18.00	9.97E+00	7.04E+00	8.50E-01	6.76E-01	1.08E-02
19.00	9.22E+00	6.27E+00	8.15E-01	5.63E-01	1.50E-02
20.00	8.53E+00	5.56E+00	7.85E-01	4.86E-01	2.03E-02
21.00	8.13E+00	5.15E+00	7.60E-01	4.34E-01	2.43E-02
22.00	7.90E+00	4.91E+00	7.39E-01	3.98E-01	2.38E-02
23.00	7.72E+00	4.71E+00	7.23E-01	3.73E-01	1.94E-02
24.00	7.55E+00	4.54E+00	7.13E-01	3.54E-01	1.42E-02
25.00	7.39E+00	4.38E+00	7.07E-01	3.39E-01	1.02E-02
26.00	7.25E+00	4.24E+00	7.07E-01	3.27E-01	7.34E-03
27.00	7.13E+00	4.11E+00	7.13E-01	3.17E-01	5.45E-03
28.00	7.02E+00	4.00E+00	7.26E-01	3.07E-01	4.16E-03
29.00	6.91E+00	3.89E+00	7.47E-01	2.98E-01	3.26E-03
30.00	6.82E+00	3.79E+00	7.76E-01	2.88E-01	2.62E-03
31.00	6.74E+00	3.69E+00	8.15E-01	2.79E-01	2.15E-03
32.00	6.67E+00	3.60E+00	8.63E-01	2.69E-01	1.80E-03
33.00	6.59E+00	3.52E+00	9.20E-01	2.59E-01	1.53E-03
34.00	6.53E+00	3.44E+00	9.88E-01	2.49E-01	1.32E-03
35.00	6.46E+00	3.36E+00	1.06E+00	2.38E-01	1.15E-03
36.00	6.40E+00	3.27E+00	1.15E+00	2.27E-01	1.01E-03
37.00	6.32E+00	3.19E+00	1.24E+00	2.15E-01	8.98E-04
38.00	6.24E+00	3.11E+00	1.33E+00	2.04E-01	8.05E-04
39.00	6.16E+00	3.02E+00	1.43E+00	1.92E-01	7.27E-04
40.00	6.07E+00	2.92E+00	1.53E+00	1.79E-01	6.61E-04
41.00	5.95E+00	2.82E+00	1.63E+00	1.67E-01	6.04E-04
42.00	5.81E+00	2.71E+00	1.74E+00	1.54E-01	5.56E-04
43.00	5.66E+00	2.60E+00	1.86E+00	1.41E-01	5.14E-04
44.00	5.50E+00	2.48E+00	2.04E+00	1.28E-01	4.77E-04
45.00	5.30E+00	2.34E+00	2.34E+00	1.15E-01	4.45E-04
46.00	5.07E+00	2.19E+00	2.86E+00	1.02E-01	4.17E-04
47.00	4.81E+00	2.04E+00	2.56E+00	8.93E-02	3.91E-04
48.00	4.55E+00	1.88E+00	2.17E+00	7.71E-02	3.69E-04
49.00	4.27E+00	1.70E+00	2.18E+00	6.58E-02	3.49E-04
50.00	3.99E+00	1.53E+00	1.71E+00	5.67E-02	3.31E-04
51.00	3.80E+00	1.38E+00	1.38E+00	4.68E-02	3.14E-04
52.00	3.83E+00	1.31E+00	1.37E+00	2.69E-02	3.00E-04

Incident Energy: $E_n = 60.00$MeV: cont.

Energy (MeV)	Lab angle-integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
53.00	3.20E+00	1.45E+00	6.56E-01	1.48E-02	2.86E-04
54.00	2.23E+00	1.09E+00	4.05E-01	7.46E-03	2.74E-04
55.00	1.68E+00	4.63E-01	1.73E-01	2.22E-03	2.63E-04
56.00	1.34E+00	2.81E-01	2.38E-03	0.00E+00	2.53E-04
57.00	1.01E+00	1.84E-01	0.00E+00	0.00E+00	2.44E-04
58.00	6.12E-01	1.40E-01	0.00E+00	0.00E+00	2.35E-04
59.00	3.36E-01	6.43E-02	0.00E+00	0.00E+00	6.86E-05
60.00	8.96E-02	2.58E-03	0.00E+00	0.00E+00	1.88E-04
61.00	3.34E-03	0.00E+00	0.00E+00	0.00E+00	2.40E-04
62.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.79E-04
63.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.38E-04
64.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.78E-04
65.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.37E-04
σ_{prod} (b)	9.94E-01	5.67E-01	7.06E-02	1.34E-01	7.37E-01
E_{av} (MeV)	1.21E+01	1.24E+01	2.89E+01	8.77E+00	2.42E+00
K (fGy· m^2)	0.00E+00	2.19E+00	6.36E-01	3.66E-01	0.00E+00
$\Sigma_{A<4} K_A$					3.20E+00
K_{recoil} non-elastic ($A > 4$)					1.80E-01
K_{recoil} elastic					5.18E-02
K_{total}					3.43E+00

Incident Energy: $E_n = 70.00$MeV

Energy (MeV)	Lab angle-integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.24E+02	1.43E+01	1.86E-01	1.20E-01	1.59E+02
2.00	1.11E+02	3.27E+01	9.22E-01	1.98E+00	2.93E+02
3.00	9.57E+01	4.98E+01	1.82E+00	7.39E+00	8.96E+01
4.00	7.96E+01	5.60E+01	2.39E+00	1.30E+01	3.84E+01
5.00	6.44E+01	5.32E+01	2.54E+00	1.68E+01	2.92E+01
6.00	5.15E+01	4.65E+01	2.41E+00	1.82E+01	1.49E+01
7.00	4.14E+01	3.90E+01	2.17E+00	1.72E+01	1.20E+01
8.00	3.37E+01	3.22E+01	1.92E+00	1.46E+01	4.65E+00
9.00	2.77E+01	2.63E+01	1.69E+00	1.15E+01	3.40E+00
10.00	2.31E+01	2.16E+01	1.49E+00	8.72E+00	1.44E+00
11.00	1.96E+01	1.78E+01	1.33E+00	6.42E+00	7.60E-01
12.00	1.68E+01	1.49E+01	1.20E+00	4.65E+00	1.05E-01
13.00	1.47E+01	1.27E+01	1.09E+00	3.34E+00	2.22E-02
14.00	1.30E+01	1.10E+01	1.00E+00	2.40E+00	5.60E-03
15.00	1.18E+01	9.75E+00	9.32E-01	1.73E+00	5.46E-03
16.00	1.08E+01	8.72E+00	8.73E-01	1.26E+00	6.23E-03
17.00	9.99E+00	7.83E+00	8.23E-01	9.36E-01	8.01E-03
18.00	9.26E+00	7.04E+00	7.80E-01	7.15E-01	1.09E-02
19.00	8.55E+00	6.28E+00	7.43E-01	5.65E-01	1.53E-02
20.00	7.89E+00	5.58E+00	7.11E-01	4.62E-01	2.07E-02
21.00	7.46E+00	5.14E+00	6.82E-01	3.92E-01	2.48E-02
22.00	7.21E+00	4.88E+00	6.56E-01	3.44E-01	2.41E-02
23.00	7.01E+00	4.67E+00	6.33E-01	3.11E-01	1.95E-02
24.00	6.82E+00	4.48E+00	6.13E-01	2.89E-01	1.42E-02
25.00	6.65E+00	4.32E+00	5.94E-01	2.73E-01	1.01E-02
26.00	6.49E+00	4.17E+00	5.78E-01	2.61E-01	7.32E-03
27.00	6.35E+00	4.03E+00	5.63E-01	2.53E-01	5.42E-03
28.00	6.22E+00	3.90E+00	5.50E-01	2.46E-01	4.13E-03
29.00	6.10E+00	3.79E+00	5.39E-01	2.41E-01	3.24E-03
30.00	6.00E+00	3.68E+00	5.31E-01	2.36E-01	2.59E-03
31.00	5.90E+00	3.58E+00	5.24E-01	2.31E-01	2.12E-03

Incident Energy: $E_n = 70.00$MeV: cont.

Energy (MeV)	Lab angle–integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
32.00	5.81E+00	3.49E+00	5.20E-01	2.27E-01	1.77E-03
33.00	5.74E+00	3.40E+00	5.19E-01	2.22E-01	1.50E-03
34.00	5.68E+00	3.32E+00	5.21E-01	2.18E-01	1.29E-03
35.00	5.62E+00	3.25E+00	5.27E-01	2.13E-01	1.12E-03
36.00	5.57E+00	3.18E+00	5.36E-01	2.08E-01	9.80E-04
37.00	5.53E+00	3.12E+00	5.50E-01	2.03E-01	8.68E-04
38.00	5.48E+00	3.06E+00	5.70E-01	1.97E-01	7.75E-04
39.00	5.44E+00	3.00E+00	5.95E-01	1.91E-01	6.98E-04
40.00	5.41E+00	2.95E+00	6.28E-01	1.85E-01	6.32E-04
41.00	5.37E+00	2.90E+00	6.67E-01	1.79E-01	5.76E-04
42.00	5.34E+00	2.85E+00	7.14E-01	1.72E-01	5.27E-04
43.00	5.30E+00	2.80E+00	7.69E-01	1.66E-01	4.86E-04
44.00	5.27E+00	2.75E+00	8.31E-01	1.59E-01	4.49E-04
45.00	5.23E+00	2.70E+00	9.01E-01	1.51E-01	4.17E-04
46.00	5.19E+00	2.64E+00	9.76E-01	1.44E-01	3.89E-04
47.00	5.14E+00	2.58E+00	1.06E+00	1.36E-01	3.64E-04
48.00	5.09E+00	2.52E+00	1.14E+00	1.29E-01	3.41E-04
49.00	5.03E+00	2.46E+00	1.22E+00	1.21E-01	3.21E-04
50.00	4.96E+00	2.39E+00	1.30E+00	1.13E-01	3.03E-04
51.00	4.87E+00	2.31E+00	1.39E+00	1.04E-01	2.87E-04
52.00	4.76E+00	2.22E+00	1.47E+00	9.62E-02	2.72E-04
53.00	4.64E+00	2.14E+00	1.56E+00	8.79E-02	2.59E-04
54.00	4.51E+00	2.04E+00	1.66E+00	7.96E-02	2.47E-04
55.00	4.34E+00	1.92E+00	1.82E+00	7.12E-02	2.35E-04
56.00	4.14E+00	1.80E+00	1.89E+00	6.30E-02	2.25E-04
57.00	3.93E+00	1.68E+00	1.79E+00	5.50E-02	2.16E-04
58.00	3.71E+00	1.55E+00	1.79E+00	4.74E-02	2.07E-04
59.00	3.48E+00	1.40E+00	1.67E+00	4.08E-02	2.00E-04
60.00	3.25E+00	1.25E+00	1.50E+00	3.62E-02	1.92E-04
61.00	3.11E+00	1.13E+00	1.42E+00	3.03E-02	1.86E-04
62.00	3.24E+00	1.06E+00	7.16E-01	1.53E-02	1.79E-04
63.00	3.08E+00	9.23E-01	1.24E-01	8.04E-03	1.74E-04
64.00	1.91E+00	5.44E-01	2.40E-01	2.95E-03	1.68E-04
65.00	1.43E+00	4.50E-01	1.83E-01	0.00E+00	1.63E-04
66.00	1.02E+00	3.57E-01	7.57E-03	0.00E+00	1.59E-04
67.00	5.91E-01	2.15E-01	0.00E+00	0.00E+00	1.54E-04
68.00	4.99E-01	8.13E-02	0.00E+00	0.00E+00	1.50E-04
69.00	3.07E-01	1.98E-02	0.00E+00	0.00E+00	7.27E-05
70.00	9.09E-02	1.79E-03	0.00E+00	0.00E+00	1.57E-04
71.00	8.47E-03	0.00E+00	0.00E+00	0.00E+00	1.30E-04
72.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.41E-04
73.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.32E-04
74.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.30E-04
75.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.22E-04
σ_{prod} (b)	1.01E+00	5.98E-01	6.73E-02	1.39E-01	6.47E-01
E_{av} (MeV)	1.39E+01	1.39E+01	3.19E+01	9.08E+00	2.45E+00
K (fGy· m^2)	0.00E+00	2.59E+00	6.68E-01	3.93E-01	0.00E+00
$\Sigma_{A<4} K_A$					3.65E+00
K_{recoil} non-elastic ($A > 4$)					1.70E-01
K_{recoil} elastic					4.30E-02
K_{total}					3.87E+00

Incident Energy: $E_n = 80.00$MeV

Energy (MeV)	Lab angle–integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.18E+02	1.15E+01	2.13E-01	1.19E-01	1.43E+02
2.00	1.09E+02	3.07E+01	1.02E+00	2.03E+00	2.53E+02
3.00	9.57E+01	4.86E+01	1.99E+00	7.22E+00	7.67E+01
4.00	8.08E+01	5.57E+01	2.62E+00	1.24E+01	3.32E+01
5.00	6.60E+01	5.38E+01	2.78E+00	1.59E+01	2.51E+01
6.00	5.32E+01	4.78E+01	2.65E+00	1.75E+01	1.24E+01
7.00	4.29E+01	4.06E+01	2.38E+00	1.69E+01	1.03E+01
8.00	3.49E+01	3.38E+01	2.08E+00	1.47E+01	3.83E+00
9.00	2.86E+01	2.78E+01	1.81E+00	1.19E+01	3.21E+00
10.00	2.37E+01	2.28E+01	1.57E+00	9.26E+00	1.10E+00
11.00	1.98E+01	1.88E+01	1.37E+00	6.97E+00	6.64E-01
12.00	1.68E+01	1.56E+01	1.21E+00	5.16E+00	9.32E-02
13.00	1.45E+01	1.32E+01	1.08E+00	3.78E+00	2.03E-02
14.00	1.27E+01	1.13E+01	9.79E-01	2.76E+00	5.59E-03
15.00	1.13E+01	9.89E+00	8.95E-01	2.01E+00	5.47E-03
16.00	1.02E+01	8.71E+00	8.28E-01	1.48E+00	6.24E-03
17.00	9.37E+00	7.73E+00	7.72E-01	1.09E+00	8.03E-03
18.00	8.63E+00	6.90E+00	7.25E-01	8.21E-01	1.10E-02
19.00	7.96E+00	6.14E+00	6.86E-01	6.30E-01	1.55E-02
20.00	7.34E+00	5.46E+00	6.53E-01	4.96E-01	2.11E-02
21.00	6.90E+00	5.00E+00	6.24E-01	4.02E-01	2.53E-02
22.00	6.65E+00	4.74E+00	5.98E-01	3.35E-01	2.45E-02
23.00	6.45E+00	4.54E+00	5.75E-01	2.89E-01	1.97E-02
24.00	6.27E+00	4.36E+00	5.55E-01	2.57E-01	1.43E-02
25.00	6.10E+00	4.21E+00	5.37E-01	2.34E-01	1.02E-02
26.00	5.95E+00	4.07E+00	5.20E-01	2.18E-01	7.31E-03
27.00	5.81E+00	3.94E+00	5.05E-01	2.07E-01	5.41E-03
28.00	5.67E+00	3.82E+00	4.91E-01	1.99E-01	4.12E-03
29.00	5.55E+00	3.71E+00	4.78E-01	1.93E-01	3.22E-03
30.00	5.44E+00	3.60E+00	4.66E-01	1.89E-01	2.58E-03
31.00	5.34E+00	3.50E+00	4.55E-01	1.85E-01	2.11E-03
32.00	5.24E+00	3.40E+00	4.46E-01	1.82E-01	1.75E-03
33.00	5.15E+00	3.32E+00	4.37E-01	1.80E-01	1.48E-03
34.00	5.08E+00	3.23E+00	4.29E-01	1.78E-01	1.27E-03
35.00	5.00E+00	3.15E+00	4.21E-01	1.75E-01	1.10E-03
36.00	4.94E+00	3.08E+00	4.15E-01	1.73E-01	9.61E-04
37.00	4.87E+00	3.01E+00	4.10E-01	1.71E-01	8.49E-04
38.00	4.82E+00	2.94E+00	4.06E-01	1.68E-01	7.56E-04
39.00	4.76E+00	2.88E+00	4.03E-01	1.65E-01	6.79E-04
40.00	4.71E+00	2.82E+00	4.02E-01	1.63E-01	6.13E-04
41.00	4.67E+00	2.77E+00	4.02E-01	1.60E-01	5.57E-04
42.00	4.63E+00	2.72E+00	4.03E-01	1.57E-01	5.09E-04
43.00	4.59E+00	2.67E+00	4.07E-01	1.53E-01	4.68E-04
44.00	4.56E+00	2.62E+00	4.13E-01	1.50E-01	4.32E-04
45.00	4.53E+00	2.58E+00	4.22E-01	1.46E-01	4.00E-04
46.00	4.51E+00	2.54E+00	4.34E-01	1.42E-01	3.72E-04
47.00	4.49E+00	2.50E+00	4.49E-01	1.38E-01	3.47E-04
48.00	4.47E+00	2.46E+00	4.69E-01	1.34E-01	3.24E-04
49.00	4.45E+00	2.42E+00	4.94E-01	1.30E-01	3.04E-04
50.00	4.43E+00	2.39E+00	5.25E-01	1.25E-01	2.87E-04
51.00	4.42E+00	2.36E+00	5.61E-01	1.21E-01	2.70E-04
52.00	4.40E+00	2.32E+00	6.04E-01	1.16E-01	2.56E-04

Incident Energy: E_n = 80.00MeV: cont.

Energy (MeV)	Lab angle–integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
53.00	4.38E+00	2.29E+00	6.53E-01	1.11E-01	2.42E-04
54.00	4.35E+00	2.25E+00	7.07E-01	1.06E-01	2.30E-04
55.00	4.33E+00	2.22E+00	7.68E-01	1.01E-01	2.19E-04
56.00	4.30E+00	2.17E+00	8.33E-01	9.56E-02	2.09E-04
57.00	4.26E+00	2.13E+00	9.01E-01	9.03E-02	2.00E-04
58.00	4.22E+00	2.09E+00	9.71E-01	8.48E-02	1.91E-04
59.00	4.17E+00	2.04E+00	1.04E+00	7.93E-02	1.83E-04
60.00	4.11E+00	1.98E+00	1.11E+00	7.37E-02	1.76E-04
61.00	4.03E+00	1.91E+00	1.18E+00	6.81E-02	1.69E-04
62.00	3.94E+00	1.85E+00	1.25E+00	6.24E-02	1.63E-04
63.00	3.84E+00	1.77E+00	1.33E+00	5.67E-02	1.57E-04
64.00	3.73E+00	1.69E+00	1.44E+00	5.11E-02	1.51E-04
65.00	3.59E+00	1.60E+00	1.62E+00	4.54E-02	1.46E-04
66.00	3.42E+00	1.50E+00	1.76E+00	3.98E-02	1.42E-04
67.00	3.24E+00	1.39E+00	1.56E+00	3.43E-02	1.37E-04
68.00	3.06E+00	1.28E+00	1.40E+00	2.88E-02	1.33E-04
69.00	2.86E+00	1.16E+00	1.21E+00	2.35E-02	1.29E-04
70.00	2.64E+00	1.04E+00	1.24E+00	1.81E-02	1.26E-04
71.00	2.43E+00	9.46E-01	1.21E+00	1.27E-02	1.23E-04
72.00	2.26E+00	9.30E-01	7.18E-01	9.20E-03	1.19E-04
73.00	1.92E+00	9.70E-01	2.62E-01	3.88E-03	1.16E-04
74.00	1.55E+00	4.68E-01	2.36E-01	0.00E+00	1.14E-04
75.00	1.22E+00	2.93E-01	2.69E-02	0.00E+00	1.11E-04
76.00	8.96E-01	2.33E-01	0.00E+00	0.00E+00	1.09E-04
77.00	5.56E-01	1.35E-01	0.00E+00	0.00E+00	1.06E-04
78.00	3.44E-01	7.21E-02	0.00E+00	0.00E+00	1.04E-04
79.00	1.48E-01	2.40E-02	0.00E+00	0.00E+00	8.57E-05
80.00	2.59E-02	3.07E-03	0.00E+00	0.00E+00	1.01E-04
81.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.57E-05
82.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.03E-04
83.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.61E-05
84.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.06E-04
85.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-04
σ_{prod} (b)	1.02E+00	6.17E-01	6.69E-02	1.40E-01	5.62E-01
E_{av} (MeV)	1.52E+01	1.54E+01	3.45E+01	9.40E+00	2.43E+00
K (fGy· m^2)	0.00E+00	2.96E+00	7.20E-01	4.11E-01	0.00E+00
$\Sigma_{A<4} K_A$					4.09E+00
K_{recoil} non-elastic ($A > 4$)					1.50E-01
K_{recoil} elastic					3.62E-02
K_{total}					4.27E+00

Incident Energy: E_n = 90.00MeV

Energy (MeV)	Lab angle–integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.17E+02	1.08E+01	2.42E-01	2.12E-01	1.31E+02
2.00	1.04E+02	2.86E+01	1.10E+00	2.33E+00	2.28E+02
3.00	9.11E+01	4.62E+01	2.08E+00	7.26E+00	6.85E+01
4.00	7.81E+01	5.41E+01	2.73E+00	1.19E+01	3.00E+01
5.00	6.47E+01	5.30E+01	2.91E+00	1.50E+01	2.29E+01
6.00	5.28E+01	4.76E+01	2.78E+00	1.64E+01	1.11E+01
7.00	4.29E+01	4.10E+01	2.50E+00	1.62E+01	9.05E+00
8.00	3.51E+01	3.45E+01	2.19E+00	1.44E+01	3.42E+00
9.00	2.89E+01	2.86E+01	1.89E+00	1.19E+01	2.35E+00
10.00	2.39E+01	2.36E+01	1.63E+00	9.40E+00	1.03E+00
11.00	1.99E+01	1.95E+01	1.41E+00	7.22E+00	4.08E-01

Incident Energy: $E_n = 90.00$MeV: cont.

Energy (MeV)	Lab angle–integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
12.00	1.68E+01	1.63E+01	1.23E+00	5.44E+00	8.04E-02
13.00	1.43E+01	1.37E+01	1.08E+00	4.06E+00	1.74E-02
14.00	1.24E+01	1.17E+01	9.62E-01	3.01E+00	5.48E-03
15.00	1.10E+01	1.01E+01	8.68E-01	2.23E+00	5.37E-03
16.00	9.82E+00	8.79E+00	7.92E-01	1.65E+00	6.16E-03
17.00	8.90E+00	7.72E+00	7.31E-01	1.23E+00	7.98E-03
18.00	8.15E+00	6.83E+00	6.81E-01	9.22E-01	1.10E-02
19.00	7.48E+00	6.04E+00	6.40E-01	7.02E-01	1.56E-02
20.00	6.87E+00	5.35E+00	6.05E-01	5.43E-01	2.14E-02
21.00	6.43E+00	4.85E+00	5.76E-01	4.29E-01	2.56E-02
22.00	6.17E+00	4.57E+00	5.51E-01	3.47E-01	2.47E-02
23.00	5.97E+00	4.36E+00	5.29E-01	2.88E-01	1.98E-02
24.00	5.80E+00	4.19E+00	5.09E-01	2.46E-01	1.43E-02
25.00	5.65E+00	4.04E+00	4.92E-01	2.16E-01	1.02E-02
26.00	5.51E+00	3.91E+00	4.76E-01	1.95E-01	7.32E-03
27.00	5.38E+00	3.79E+00	4.62E-01	1.79E-01	5.42E-03
28.00	5.27E+00	3.68E+00	4.48E-01	1.69E-01	4.12E-03
29.00	5.16E+00	3.59E+00	4.36E-01	1.61E-01	3.22E-03
30.00	5.06E+00	3.50E+00	4.25E-01	1.55E-01	2.58E-03
31.00	4.97E+00	3.41E+00	4.15E-01	1.52E-01	2.10E-03
32.00	4.88E+00	3.33E+00	4.05E-01	1.49E-01	1.75E-03
33.00	4.80E+00	3.25E+00	3.96E-01	1.46E-01	1.47E-03
34.00	4.73E+00	3.18E+00	3.88E-01	1.45E-01	1.26E-03
35.00	4.65E+00	3.11E+00	3.80E-01	1.43E-01	1.09E-03
36.00	4.59E+00	3.05E+00	3.73E-01	1.42E-01	9.50E-04
37.00	4.52E+00	2.98E+00	3.66E-01	1.41E-01	8.37E-04
38.00	4.45E+00	2.92E+00	3.60E-01	1.40E-01	7.45E-04
39.00	4.39E+00	2.86E+00	3.55E-01	1.39E-01	6.67E-04
40.00	4.33E+00	2.80E+00	3.49E-01	1.37E-01	6.01E-04
41.00	4.28E+00	2.74E+00	3.45E-01	1.36E-01	5.46E-04
42.00	4.23E+00	2.68E+00	3.40E-01	1.35E-01	4.98E-04
43.00	4.18E+00	2.63E+00	3.37E-01	1.33E-01	4.56E-04
44.00	4.13E+00	2.58E+00	3.33E-01	1.31E-01	4.20E-04
45.00	4.09E+00	2.53E+00	3.31E-01	1.30E-01	3.88E-04
46.00	4.05E+00	2.48E+00	3.29E-01	1.28E-01	3.61E-04
47.00	4.01E+00	2.43E+00	3.27E-01	1.26E-01	3.36E-04
48.00	3.98E+00	2.39E+00	3.26E-01	1.24E-01	3.14E-04
49.00	3.95E+00	2.35E+00	3.26E-01	1.21E-01	2.94E-04
50.00	3.92E+00	2.31E+00	3.27E-01	1.19E-01	2.76E-04
51.00	3.90E+00	2.27E+00	3.30E-01	1.16E-01	2.60E-04
52.00	3.88E+00	2.24E+00	3.33E-01	1.14E-01	2.45E-04
53.00	3.86E+00	2.21E+00	3.38E-01	1.11E-01	2.32E-04
54.00	3.84E+00	2.17E+00	3.45E-01	1.08E-01	2.20E-04
55.00	3.82E+00	2.14E+00	3.55E-01	1.05E-01	2.09E-04
56.00	3.81E+00	2.12E+00	3.67E-01	1.02E-01	1.99E-04
57.00	3.80E+00	2.09E+00	3.82E-01	9.87E-02	1.90E-04
58.00	3.79E+00	2.06E+00	4.01E-01	9.54E-02	1.81E-04
59.00	3.78E+00	2.04E+00	4.24E-01	9.19E-02	1.73E-04
60.00	3.76E+00	2.01E+00	4.52E-01	8.84E-02	1.66E-04
61.00	3.75E+00	1.99E+00	4.85E-01	8.47E-02	1.59E-04
62.00	3.74E+00	1.96E+00	5.22E-01	8.10E-02	1.53E-04
63.00	3.73E+00	1.94E+00	5.66E-01	7.73E-02	1.47E-04

Incident Energy: E_n = 90.00MeV: cont.

Energy (MeV)	Lab angle–integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
64.00	3.71E+00	1.91E+00	6.14E-01	7.35E-02	1.41E-04
65.00	3.69E+00	1.88E+00	6.66E-01	6.96E-02	1.36E-04
66.00	3.67E+00	1.85E+00	7.22E-01	6.57E-02	1.31E-04
67.00	3.63E+00	1.82E+00	7.81E-01	6.18E-02	1.27E-04
68.00	3.60E+00	1.78E+00	8.40E-01	5.78E-02	1.23E-04
69.00	3.56E+00	1.74E+00	9.00E-01	5.38E-02	1.19E-04
70.00	3.51E+00	1.69E+00	9.59E-01	4.98E-02	1.15E-04
71.00	3.44E+00	1.63E+00	1.02E+00	4.58E-02	1.12E-04
72.00	3.36E+00	1.57E+00	1.08E+00	4.17E-02	1.09E-04
73.00	3.27E+00	1.51E+00	1.15E+00	3.77E-02	1.06E-04
74.00	3.18E+00	1.44E+00	1.26E+00	3.38E-02	1.03E-04
75.00	3.06E+00	1.36E+00	1.46E+00	2.99E-02	1.00E-04
76.00	2.92E+00	1.27E+00	1.71E+00	2.61E-02	9.76E-05
77.00	2.76E+00	1.18E+00	1.41E+00	2.24E-02	9.52E-05
78.00	2.60E+00	1.09E+00	1.30E+00	1.90E-02	9.30E-05
79.00	2.43E+00	9.83E-01	1.24E+00	1.61E-02	9.09E-05
80.00	2.26E+00	8.78E-01	9.00E-01	1.29E-02	8.88E-05
81.00	2.13E+00	7.89E-01	7.69E-01	7.54E-03	8.69E-05
82.00	2.13E+00	7.49E-01	7.12E-01	4.32E-03	8.51E-05
83.00	1.79E+00	8.28E-01	2.78E-01	1.86E-03	8.34E-05
84.00	1.26E+00	5.94E-01	2.23E-01	0.00E+00	8.18E-05
85.00	9.46E-01	2.54E-01	5.34E-02	0.00E+00	8.03E-05
86.00	7.76E-01	1.55E-01	1.07E-03	0.00E+00	7.88E-05
87.00	5.49E-01	1.03E-01	0.00E+00	0.00E+00	7.74E-05
88.00	3.33E-01	7.65E-02	0.00E+00	0.00E+00	1.30E-05
89.00	1.78E-01	3.22E-02	0.00E+00	0.00E+00	7.39E-05
90.00	4.56E-02	1.14E-03	0.00E+00	0.00E+00	7.35E-05
91.00	1.54E-03	0.00E+00	0.00E+00	0.00E+00	7.17E-05
92.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.42E-05
93.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.38E-05
94.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.93E-05
95.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.19E-05
σ_{prod} (b)	1.01E+00	6.27E-01	6.64E-02	1.39E-01	5.08E-01
E_{av} (MeV)	1.69E+01	1.69E+01	3.72E+01	9.66E+00	2.41E+00
K (fGy· m^2)	0.00E+00	3.31E+00	7.69E-01	4.18E-01	0.00E+00
$\Sigma_{A<4}K_A$					4.50E+00
K_{recoil} non-elastic ($A > 4$)					1.40E-01
K_{recoil} elastic					3.09E-02
K_{total}					4.67E+00

Incident Energy: E_n = 100.00MeV

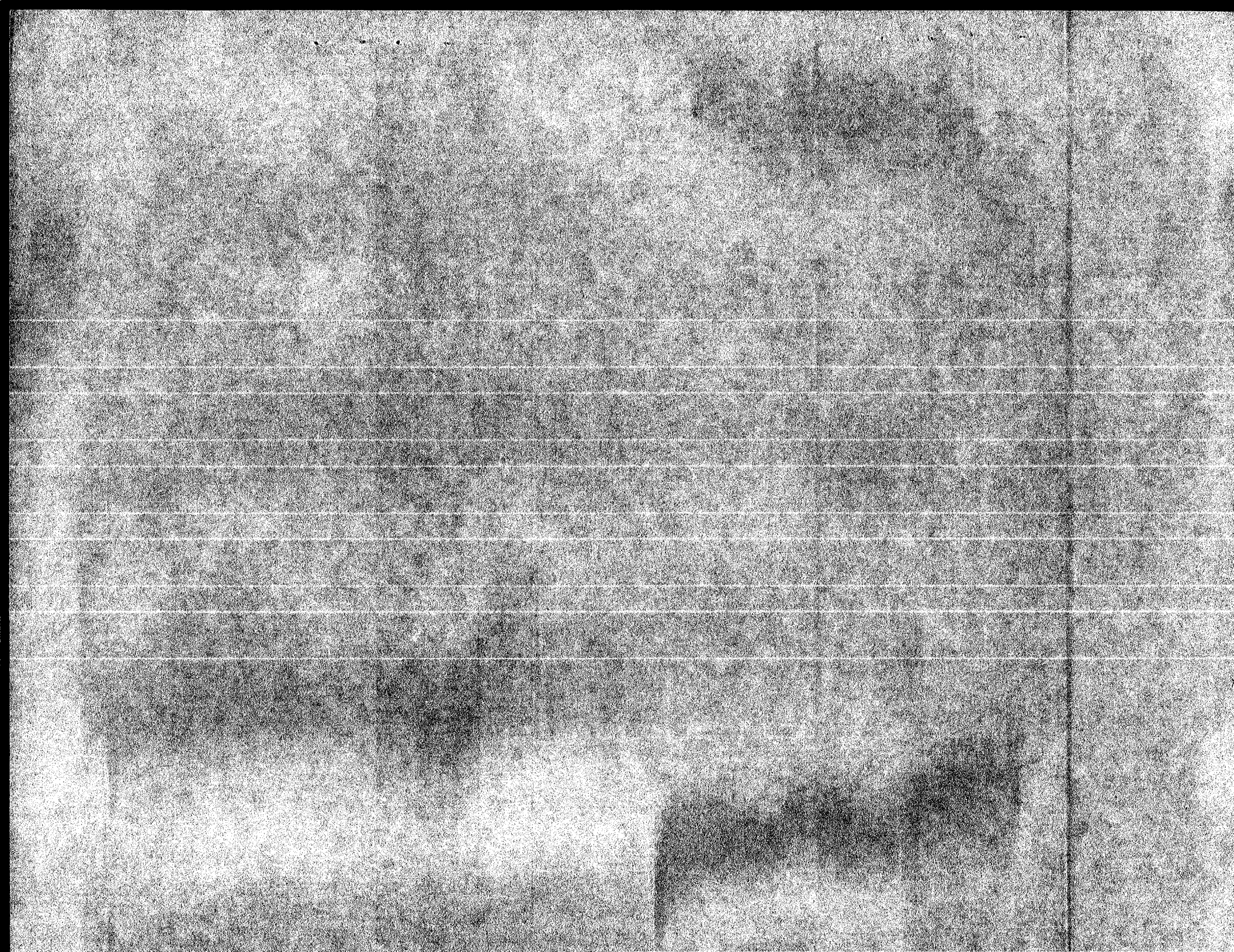
Energy (MeV)	Lab angle–integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
1.00	1.06E+02	9.72E+00	2.67E-01	1.99E-01	1.19E+02
2.00	1.01E+02	2.69E+01	1.17E+00	2.42E+00	2.07E+02
3.00	9.03E+01	4.40E+01	2.19E+00	7.17E+00	6.16E+01
4.00	7.79E+01	5.23E+01	2.88E+00	1.14E+01	2.75E+01
5.00	6.51E+01	5.21E+01	3.10E+00	1.42E+01	2.08E+01
6.00	5.35E+01	4.76E+01	2.99E+00	1.57E+01	1.02E+01
7.00	4.39E+01	4.15E+01	2.71E+00	1.56E+01	8.18E+00
8.00	3.60E+01	3.52E+01	2.37E+00	1.41E+01	3.47E+00
9.00	2.97E+01	2.95E+01	2.05E+00	1.19E+01	2.14E+00
10.00	2.46E+01	2.45E+01	1.76E+00	9.58E+00	9.43E-01
11.00	2.05E+01	2.04E+01	1.51E+00	7.49E+00	4.45E-01
12.00	1.72E+01	1.70E+01	1.31E+00	5.75E+00	7.18E-02

Incident Energy: E_n = 100.00MeV: cont.

Energy (MeV)	Lab angle-integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
13.00	1.45E+01	1.43E+01	1.14E+00	4.37E+00	1.67E-02
14.00	1.25E+01	1.21E+01	9.97E-01	3.29E+00	5.39E-03
15.00	1.09E+01	1.04E+01	8.85E-01	2.48E+00	5.31E-03
16.00	9.64E+00	8.99E+00	7.95E-01	1.86E+00	6.10E-03
17.00	8.64E+00	7.81E+00	7.23E-01	1.40E+00	7.94E-03
18.00	7.84E+00	6.85E+00	6.64E-01	1.06E+00	1.10E-02
19.00	7.14E+00	6.02E+00	6.16E-01	8.11E-01	1.57E-02
20.00	6.53E+00	5.29E+00	5.76E-01	6.26E-01	2.16E-02
21.00	6.06E+00	4.75E+00	5.43E-01	4.89E-01	2.60E-02
22.00	5.78E+00	4.43E+00	5.15E-01	3.88E-01	2.51E-02
23.00	5.57E+00	4.20E+00	4.91E-01	3.14E-01	1.99E-02
24.00	5.39E+00	4.02E+00	4.71E-01	2.60E-01	1.44E-02
25.00	5.23E+00	3.86E+00	4.53E-01	2.20E-01	1.02E-02
26.00	5.09E+00	3.72E+00	4.37E-01	1.91E-01	7.37E-03
27.00	4.97E+00	3.60E+00	4.23E-01	1.70E-01	5.45E-03
28.00	4.85E+00	3.50E+00	4.10E-01	1.54E-01	4.15E-03
29.00	4.75E+00	3.40E+00	3.99E-01	1.43E-01	3.24E-03
30.00	4.66E+00	3.32E+00	3.88E-01	1.35E-01	2.59E-03
31.00	4.58E+00	3.24E+00	3.79E-01	1.29E-01	2.11E-03
32.00	4.50E+00	3.16E+00	3.70E-01	1.25E-01	1.75E-03
33.00	4.43E+00	3.09E+00	3.61E-01	1.22E-01	1.47E-03
34.00	4.36E+00	3.03E+00	3.53E-01	1.20E-01	1.26E-03
35.00	4.30E+00	2.97E+00	3.46E-01	1.18E-01	1.08E-03
36.00	4.24E+00	2.92E+00	3.39E-01	1.17E-01	9.45E-04
37.00	4.19E+00	2.86E+00	3.33E-01	1.16E-01	8.31E-04
38.00	4.14E+00	2.81E+00	3.27E-01	1.15E-01	7.38E-04
39.00	4.08E+00	2.76E+00	3.21E-01	1.15E-01	6.60E-04
40.00	4.03E+00	2.71E+00	3.16E-01	1.14E-01	5.94E-04
41.00	3.98E+00	2.67E+00	3.11E-01	1.13E-01	5.38E-04
42.00	3.93E+00	2.62E+00	3.07E-01	1.13E-01	4.90E-04
43.00	3.89E+00	2.58E+00	3.02E-01	1.12E-01	4.48E-04
44.00	3.84E+00	2.53E+00	2.98E-01	1.11E-01	4.12E-04
45.00	3.80E+00	2.49E+00	2.95E-01	1.11E-01	3.80E-04
46.00	3.76E+00	2.45E+00	2.91E-01	1.10E-01	3.53E-04
47.00	3.72E+00	2.40E+00	2.88E-01	1.09E-01	3.28E-04
48.00	3.68E+00	2.36E+00	2.85E-01	1.08E-01	3.06E-04
49.00	3.64E+00	2.32E+00	2.83E-01	1.07E-01	2.86E-04
50.00	3.60E+00	2.28E+00	2.80E-01	1.05E-01	2.69E-04
51.00	3.57E+00	2.24E+00	2.78E-01	1.04E-01	2.53E-04
52.00	3.54E+00	2.20E+00	2.76E-01	1.03E-01	2.38E-04
53.00	3.51E+00	2.16E+00	2.75E-01	1.01E-01	2.25E-04
54.00	3.48E+00	2.13E+00	2.73E-01	9.96E-02	2.13E-04
55.00	3.45E+00	2.09E+00	2.72E-01	9.79E-02	2.02E-04
56.00	3.43E+00	2.06E+00	2.72E-01	9.61E-02	1.92E-04
57.00	3.40E+00	2.03E+00	2.72E-01	9.42E-02	1.83E-04
58.00	3.38E+00	2.00E+00	2.72E-01	9.23E-02	1.74E-04
59.00	3.36E+00	1.97E+00	2.74E-01	9.02E-02	1.66E-04
60.00	3.34E+00	1.94E+00	2.76E-01	8.80E-02	1.59E-04
61.00	3.33E+00	1.91E+00	2.79E-01	8.58E-02	1.52E-04
62.00	3.31E+00	1.89E+00	2.83E-01	8.34E-02	1.46E-04
63.00	3.30E+00	1.87E+00	2.88E-01	8.10E-02	1.40E-04
64.00	3.29E+00	1.84E+00	2.95E-01	7.85E-02	1.35E-04

Incident Energy: $E_n = 100.00$MeV: cont.

Energy (MeV)	Lab angle–integrated ^{31}P+n emission spectra: (mb/MeV)				
	$d\sigma_n/dE$	$d\sigma_p/dE$	$d\sigma_d/dE$	$d\sigma_\alpha/dE$	$d\sigma_\gamma/dE$
65.00	3.28E+00	1.82E+00	3.04E-01	7.60E-02	1.30E-04
66.00	3.27E+00	1.80E+00	3.15E-01	7.35E-02	1.25E-04
67.00	3.27E+00	1.78E+00	3.29E-01	7.08E-02	1.20E-04
68.00	3.26E+00	1.76E+00	3.46E-01	6.81E-02	1.16E-04
69.00	3.25E+00	1.74E+00	3.66E-01	6.54E-02	1.12E-04
70.00	3.25E+00	1.72E+00	3.91E-01	6.26E-02	1.09E-04
71.00	3.24E+00	1.70E+00	4.19E-01	5.98E-02	1.05E-04
72.00	3.23E+00	1.68E+00	4.53E-01	5.69E-02	1.02E-04
73.00	3.22E+00	1.66E+00	4.90E-01	5.40E-02	9.88E-05
74.00	3.20E+00	1.64E+00	5.32E-01	5.11E-02	9.59E-05
75.00	3.19E+00	1.62E+00	5.77E-01	4.82E-02	9.32E-05
76.00	3.17E+00	1.59E+00	6.25E-01	4.53E-02	9.06E-05
77.00	3.14E+00	1.56E+00	6.75E-01	4.24E-02	8.82E-05
78.00	3.11E+00	1.53E+00	7.25E-01	3.95E-02	8.59E-05
79.00	3.08E+00	1.49E+00	7.75E-01	3.66E-02	8.37E-05
80.00	3.04E+00	1.45E+00	8.23E-01	3.37E-02	8.16E-05
81.00	2.98E+00	1.40E+00	8.70E-01	3.09E-02	7.97E-05
82.00	2.91E+00	1.35E+00	9.15E-01	2.81E-02	7.78E-05
83.00	2.83E+00	1.30E+00	9.61E-01	2.53E-02	7.61E-05
84.00	2.75E+00	1.24E+00	1.02E+00	2.25E-02	7.44E-05
85.00	2.65E+00	1.17E+00	1.09E+00	1.98E-02	7.28E-05
86.00	2.52E+00	1.10E+00	1.07E+00	1.72E-02	7.13E-05
87.00	2.38E+00	1.02E+00	1.07E+00	1.48E-02	6.99E-05
88.00	2.25E+00	9.41E-01	1.07E+00	1.27E-02	6.85E-05
89.00	2.10E+00	8.51E-01	1.02E+00	1.12E-02	6.72E-05
90.00	1.95E+00	7.61E-01	9.64E-01	9.20E-03	6.60E-05
91.00	1.85E+00	6.83E-01	5.74E-01	4.53E-03	6.48E-05
92.00	1.92E+00	6.47E-01	5.38E-01	2.28E-03	6.37E-05
93.00	1.80E+00	5.51E-01	3.20E-01	0.00E+00	6.26E-05
94.00	1.15E+00	3.18E-01	1.47E-01	0.00E+00	6.16E-05
95.00	8.96E-01	2.55E-01	6.68E-02	0.00E+00	6.06E-05
96.00	5.97E-01	1.76E-01	1.49E-03	0.00E+00	5.97E-05
97.00	3.84E-01	8.64E-02	0.00E+00	0.00E+00	5.88E-05
98.00	3.00E-01	4.14E-02	0.00E+00	0.00E+00	2.88E-05
99.00	1.78E-01	1.09E-02	0.00E+00	0.00E+00	5.51E-05
100.00	4.84E-02	0.00E+00	0.00E+00	0.00E+00	5.69E-05
101.00	4.12E-03	0.00E+00	0.00E+00	0.00E+00	5.57E-05
102.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.68E-05
103.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.57E-05
104.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.05E-05
105.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.58E-05
σ_{prod} (b)	1.01E+00	6.34E-01	6.54E-02	1.39E-01	4.62E-01
E_{av} (MeV)	1.85E+01	1.84E+01	3.81E+01	9.92E+00	2.42E+00
K (fGy· m^2)	0.00E+00	3.63E+00	7.75E-01	4.29E-01	0.00E+00
$\Sigma_{A<4} K_A$					4.83E+00
K_{recoil} non-elastic ($A > 4$)					1.30E-01
K_{recoil} elastic					2.66E-02
K_{total}					4.99E+00



Technical Information Department · Lawrence Livermore National Laboratory
University of California · Livermore, California 94551