



**KERNFORSCHUNGSANLAGE JÜLICH GMBH**

Institut für Reaktorentwicklung

**KERNFORSCHUNGSZENTRUM KARLSRUHE**

Institut für Kernphysik

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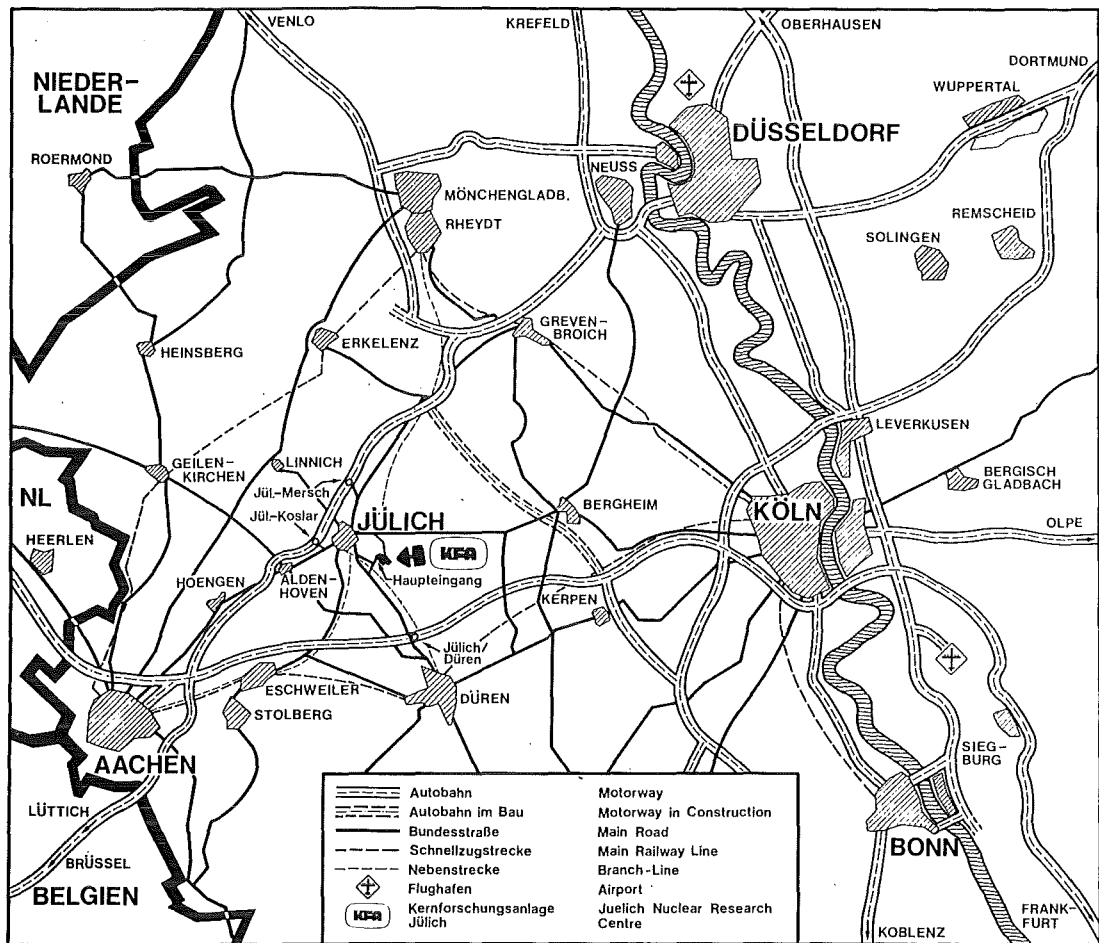
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# **VALIDATION OF THE INTRA-NUCLEAR- CASCADE-EVAPORATION MODEL FOR PARTICLE PRODUCTION**

by

D. Filges<sup>1)</sup>, S. Cierjacks<sup>2)</sup>, Y. Hino<sup>3)</sup>, T.W. Armstrong<sup>4)</sup>, P. Cloth<sup>1)</sup>

<sup>1)</sup> Institut für Reaktorentwicklung, Kernforschungsanlage Jülich

<sup>2)</sup> Institut für Kernphysik, Kernforschungszentrum Karlsruhe

Guest Scientists:

<sup>3)</sup> Radiation & Radioactivity Metrology Section,  
Electrotechnical Laboratory, Japan

<sup>4)</sup> Armstrong & Associates, La Jolla, California

## ABSTRACT

The intranuclear-cascade-evaporation model of HETC/KFA-1 has been used to predict the neutron production from nonelastic interactions of protons with several target materials: U, Pb, Ta, In, Nb, Fe, Al and C. These model predictions for a 590 MeV proton beam were compared with measurements of Cierjacks et al. /1/ made at the SIN cyclotron. In general the model predicts approximately the correct neutron production in the evaporation region, whereas in the high energy region ( $E_n > 20$  MeV) there are systematic discrepancies between measurement and model predictions, which tend to increase with increasing neutron energy and increasing emission angle.



## CONTENTS

Introduction	1
Calculational Procedure	1
Neutron Cross Section Measurements	5
Comparisons of Measured and Calculated Neutron Data	7
Charged Particle Production Cross Section	8
Conclusions	8
References	9
Figures 1 - 13	11
Appendix A	
Comparison of Calculated Evaporation Spectra for Different Angular Intervalls ( $0-60^\circ$ , $50-120^\circ$ , $120-180^\circ$ ) and all Targets	
Appendix B	
Comparison of Calculated and Measured Double Differential Neutron Production Cross Sections at $23^\circ$ for all Targets (Except Uranium)	
Appendix C	
Calculated Differential Particle Production Cross Section ( $n, p, d, t, He-3, He-4, \pi^+, \pi^-$ and $\pi^0$ ) for all Targets	
Appendix D	
Differential Neutron Yields versus Neutron Emission Angle for Five Energy Groups	

Appendix E

Tables of Experimental Data: Double Differential Neutron  
Production Cross Sections of 590 MeV Protons

Appendix F

Tables of Calculated Data: Double Differential Neutron  
Production Cross Sections for 590 MeV Protons

Appendix G

Inelastic Cross Sections for 590 MeV Protons as a Function  
of Mass Number

Appendix H

Secondary Particle Yields vs Mass Number

Appendix I

Differential Neutron Yields of 590 MeV Protons versus Neutron  
Emission Angle and Energy

Appendix J

Calculated Differential Particle Production Cross Sections for  
590 MeV Protons

## INTRODUCTION

As part of a study to assess the state-of-the-art of high-energy models for spallation neutron source applications, the intranuclear-cascade-evaporation model has been used to predict the double differential neutron production cross sections for nonelastic collisions of protons with uranium, lead, tantalum, indium, niobium, iron, aluminium and carbon nuclei. The purpose here is to compare these model calculations with experimental data for neutrons produced in thin targets. These model validations are useful for the evaluation of reliable high-energy transport cross section data for advanced shielding code systems for SNQ target and accelerator requirements.

## CALCULATIONAL PROCEDURE

The calculations are made using the HETC/KFA-1 /2/ code system with the so-called "thin target setup" for 590 MeV protons. For uranium the Rutherford and Appleton Laboratory high energy fission model (RAL) /2/ with  $B_0 = 8$  MeV and isotropic production of secondary evaporation particles in the lab system was used /2/. For all other targets the variable  $B_0$ -option of HETC/KFA-1, without high energy fission and a non-isotropic emission for evaporation, was assumed.

All cases were run with about 30000 real collisions per target with 1 hour computer time on an IBM-3033 computer. The cases discussed here were measured by Cierjacks et al. /1/. The final evaluation of the measured data for materials U, Pb, Ta, In, Nb, Fe, Al and C measured at angles of  $23^\circ$ ,  $30^\circ$ ,  $90^\circ$  and  $150^\circ$  were compared with the calculations. The material input data for HETC/KFA-1 are given in Table I. The energy and angle grids for the analysis are shown in Table II.

Table I Material Input Data

Target	Z	A	$N_A$ (Atoms/cm <sup>3</sup> x 10 <sup>-24</sup> )
U	92	238	0.0483
Pb	82	207	0.0329
Ta	73	181	0.0552
In	49	115	0.0382
Nb	41	93	0.0554
Fe	26	56	0.0846
Al	13	27	0.0602
C	6	12	0.1104

Table II Energy and Angle Grid for Analysis of HETC/KFA-1 Results

Energy Grid (MeV)	$\Phi$ Grid (0°)
0.0	0
0.15	5
0.2	10
0.3	15
0.4	20
0.6	25
0.8	35
1.0	40
1.5	50
2.0	65
3.0	80
4.0	100
6.0	120
8.0	140
10.0	160
	180

27  $\Delta E$  Intervals      15  $\Delta\Phi$  Intervals

For evaporation particles the following angle grid is used:

Calculated Evap.	Angle in Experiment
0° - 60°	23° / 30°
60° - 120°	90°
120° - 150°	150°

The following quantities were evaluated from the HETC/KFA-1 calculations:

- double-differential yield spectra for each particle type

$$Y_i(E, \Phi), (\text{MeV}^{-1} \cdot \text{sr}^{-1} \text{ per incident proton})$$

where  $i$  = emitted particle type

$$= n(\text{evap+cascade}), p(\text{evap+cascade}), \\ d, t, {}^3\text{He}, \alpha, \pi^+, \pi^0, \pi^-.$$

- marginal distributions, summed over angle:

$$Y_i(E), (\text{MeV}^{-1} \text{ per proton})$$

- marginal distributions, summed over energy:

$$Y_i(\Phi), (\text{sr}^{-1} \text{ per proton})$$

- total yield, over all energies and angles:

$$Y_i, (\text{per proton})$$

To compare with the experimental data in terms of cross sections, the "yield spectra" must be multiplied by the inelastic cross section  $\sigma_{in}$ , computed by HETC, which can be obtained in the following way:

From HETC the value for the macroscopic geometric cross section,  $\Sigma_G$ , is given in units of  $\text{cm}^{-1}$ .

Then, in units of barns:

$$\sigma_{in} = \Sigma_{in}/N_a = 1/N_a \times \Sigma_G \times C$$

where  $N_a$  = atom density value used in HETC

$C$  = fraction of total collisions ("real" plus "pseudo")  
which are "real" collisions (i.e., the "transparency"  
of the nucleus is  $1-C$ )

This leads to the relation

$$d^2\sigma/dE d\Omega \text{ (b/MeV.sr)} = Y_n(E, \Phi) \sigma_{in}.$$

In Table III the calculated  $\sigma_{in}$  for the various target nuclei are given (see also Fig. 13, page 37).

Table III Calculated  $\sigma_{in}$  for various targets

Target Nucleus	$\sigma_{in}$ (barn)
U-238	1.849
Pb-207	1.683
Ta-181	1.563
In-115	1.183
Nb-93	1.035
Fe-56	0.7486
Al-27	0.4622
C-12	0.2629

## NEUTRON CROSS SECTION MEASUREMENTS

A detailed description of the experimental method and the off-line analysis involved in the determination of double differential cross sections has been given elsewhere /1/. In brief, the time-of-flight technique employing a special micropulse structure of the SIN cyclotron beam was used for energy determinations of neutron emission spectra. A thin cylindrical NE213 liquid scintillator of 4.5 cm diameter used for its n- $\gamma$  pulse shape discrimination properties served as the main neutron detector. In order to eliminate charged particles (also produced in the target) from the data a suitable plastic scintillator was placed in front of the main detector, and used as a veto counter. The measurements at laboratory angles of 30 $^{\circ}$ , 90 $^{\circ}$  and 150 $^{\circ}$  involved a highly collimated neutron beam and a flight path of about 1.3 m, while the measurements at 23 $^{\circ}$  were performed with an open geometry set-up over a flight path of 2.3 m. The overall reliability of both methods, the "collimated beam" and the "open geometry" technique has been tested at 90 $^{\circ}$  where the two spectra measurements gave within the stated uncertainties the same results. The incident proton beam current was measured throughout the experiments by a proton beam monitor. The monitor involved a thin graphite scatterer placed in the proton beam far upstream of the neutron producing target, and forward scattered protons at 30 $^{\circ}$  were detected by a plastic scintillator telescope. This monitor was calibrated to absolute proton flux by counting individual protons in the direct beam at highly reduced current. The neutron detection efficiency of the main counter was calculated by the Monte Carlo code of Cecil et al. /3/ and measured in an auxiliary experiment /4/ employing the associated particle method.

The measured fractional energy resolutions  $\Delta E_n/E_n$  achieved in the experiments are given in Table IV.

Table IV Fractional Energy Resolutions

$E_n$ (MeV)	$\Delta E_n/E_n$ (%)	
	2.3 m Flight Path	1.3 m Flight Path
1	1.8	3.2
5	1.9	3.3
10	2.3	4.1
50	4.5	8.0
100	6.5	11.5
300	13.0	23.0
500	19.1	33.8

Due to the smooth energy dependence of the spectra the experimental data have been evaluated in energy bins of  $\pm 8$  % constant fractional width. Therefore, the energy uncertainties given in the tables of Appendix E refer to the off-line binning except for the highest bin numbers where the experimental energy resolutions exceed the energy bin intervals. The angle uncertainties in the measurements are typically  $\pm 0.5^\circ$ ; the angular acceptance of the neutron counter is approximately  $1.3 \times 10^{-4}$  sr at  $30^\circ$ ,  $90^\circ$  and  $150^\circ$ , and  $9.6 \times 10^{-5}$  sr at  $23^\circ$ . Typical total uncertainties of 11 % have been estimated for the absolute neutron production cross sections given in the Appendix. These estimates include contributions from counting statistics (0.1 - 3 %), proton flux measurements (3 %), neutron detection efficiencies (10 %), target sample thicknesses (2 %) and background determinations (3-10 %).



## COMPARISONS OF MEASURED AND CALCULATED NEUTRON DATA

Figures 1a-1d show comparisons of calculated and measured double differential neutron cross sections of thin uranium targets at  $30^\circ$ ,  $90^\circ$  and  $150^\circ$ , Figures 2a-2d of lead, Figures 3a-3d of tantalum, Figures 4a-4d of indium, Figures 5a-5d of niobium, Figures 6a-6d of iron, Figures 7a-7d of aluminum and Figures 8a-8d of carbon. In addition to these comparisons results of general interest from the calculations, such as yields over all angles and total yields vs. atomic mass number, are given in Figures 9-12 (see pg 35, 36, Figures in Appendix D and tabulated values in Appendices H, I and J). In Appendix A calculational results of evaporation spectra for different angular intervals are shown. In Appendix B double differential neutron cross sections at  $23^\circ$  for all target materials (except uranium for which no data have been taken) are compared with the measured data. The separate treatment of  $23^\circ$  data is mainly due to the fact that a surprisingly large change in the shapes of the experimental evaporation spectra was found at the transition from  $30^\circ$  to  $23^\circ$ . For the calculated results, the spectra at  $23^\circ$  and  $30^\circ$  are very similar. While the nuclear model contains numerous approximations (e.g., pre-compound nucleus emission effects are not taken into account), it does not seem likely that there are physics effects associated with the interaction which would explain the large measured difference in spectra between  $23^\circ$  and  $30^\circ$ . In addition, background contributions from room scattered neutrons could not fully satisfactorily be investigated in the  $23^\circ$  runs. Therefore, it appeared unreasonable at this stage to draw specific conclusions from the corresponding discrepancies between experiments and calculations. The experimental data of Cierjacks et al. are tabulated in Appendix E, and the calculated neutron cross sections are tabulated in Appendix F.

## CHARGED PARTICLE PRODUCTION CROSS SECTIONS

Also low energy charged particle production from nuclear collisions is very important for predictions related to radiation effects and material selection for high current spallation facilities /5/ /6/. The nuclear models /2/ used are capable of calculating the spatial dependent production of low-energy particles such as  $^1\text{H}$ ,  $^2\text{H}$ ,  $^3\text{H}$ ,  $^3\text{He}$  and  $^4\text{He}$ , but very little has been done to check calculations against experiments. Together with our evaluation of neutron production measurements of Cierjacks et al. /1/ we obtained HETC/KFA-1 calculated low energy charged particle cross sections, and this information is plotted and tabulated here (see Appendices C and J).

## CONCLUSIONS

The HETC/KFA-1 code predicts the correct neutron production in the evaporation region for elements heavier than iron with larger differences for the lighter elements. A major deficiency of the present models seemed to be the underestimate of the high-energy neutrons and protons. The present comparisons show an underestimation at high energies ( $\gtrsim 100$  MeV) by a factor of 2-3 for small angles (e.g.  $30^\circ$ ), with much worse agreement at higher angles  $90^\circ$  and  $150^\circ$ . There are several possibilities for suitable model modifications which can, in principle, improve the agreement between measurements and calculations at high energies and large emission angles. But, before embarking in such a major undertaking it appears appropriate to await further experimental results. New data taken at SIN for the production of secondary protons, deuterons, tritons and charged pions ( $\pi^+$ ,  $\pi^-$ ) are presently evaluated and will be available in due time. New systematic neutron production cross section

measurements are underway at the LAMPF facility. These measurements (prepared by a KFA-LANL (P-9) collaboration) are expected to provide an additional independent set of neutron production cross sections from 800 MeV proton bombardment.

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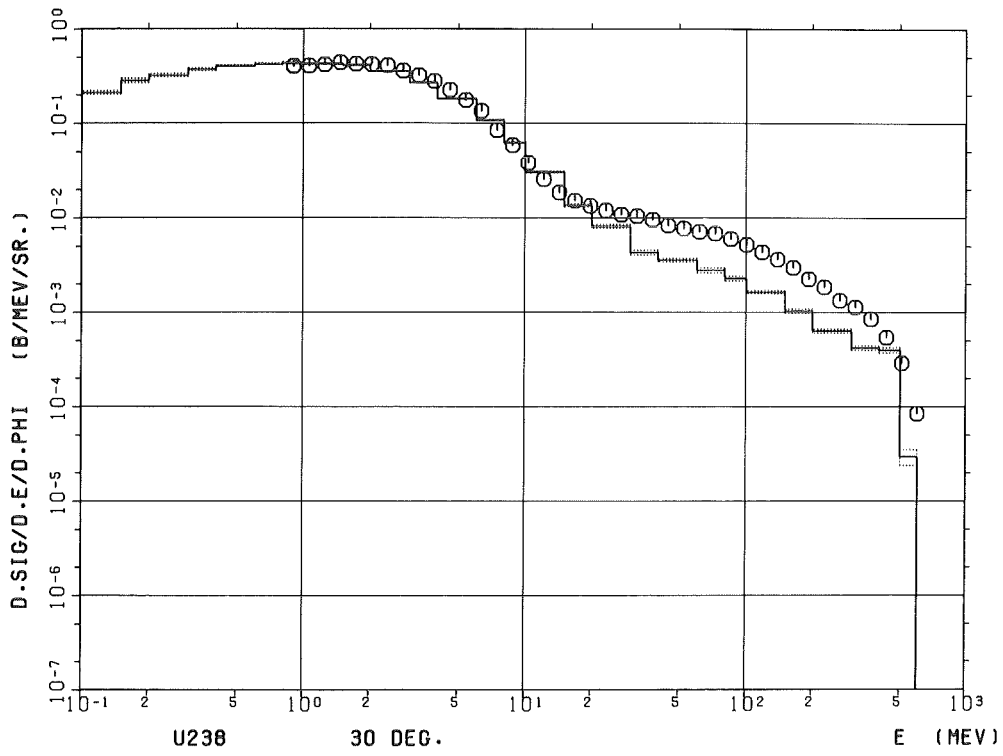
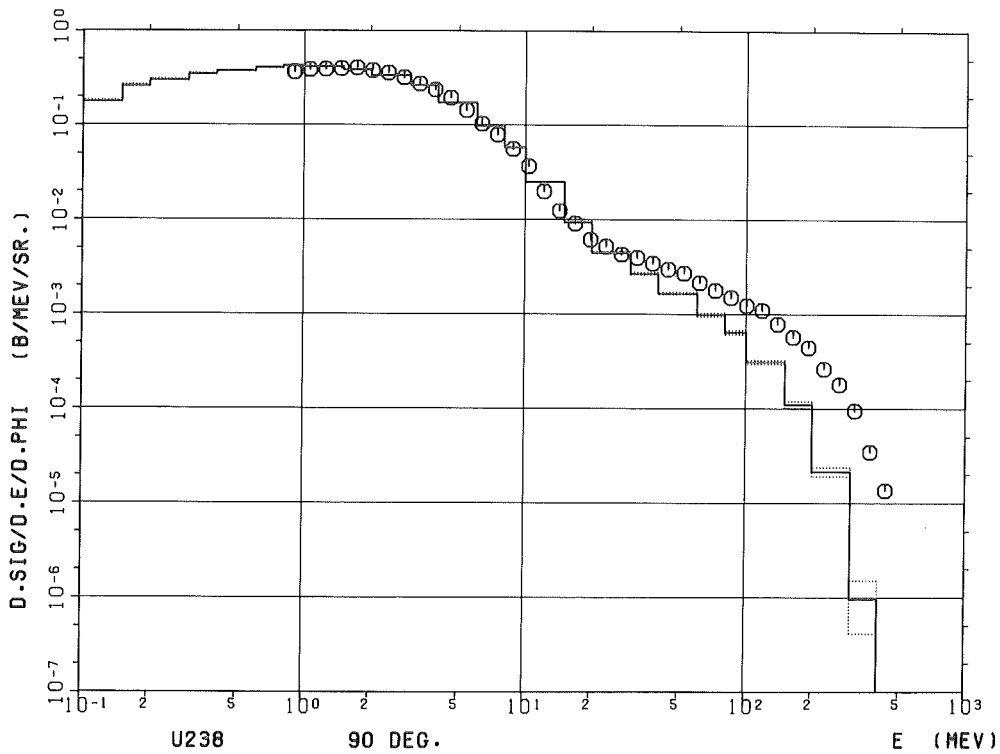
## Figure 1a - 1d

Comparison of calculated and measured  
double differential neutron cross sections  
from a thin uranium (U-238) target bombarded  
by 590 MeV protons

## Legend

⊙ Experiments

⊞ Calculations Including Errors

Figure 1a Uranium (U-238)  $30^\circ$ Figure 1b Uranium (U-238)  $90^\circ$

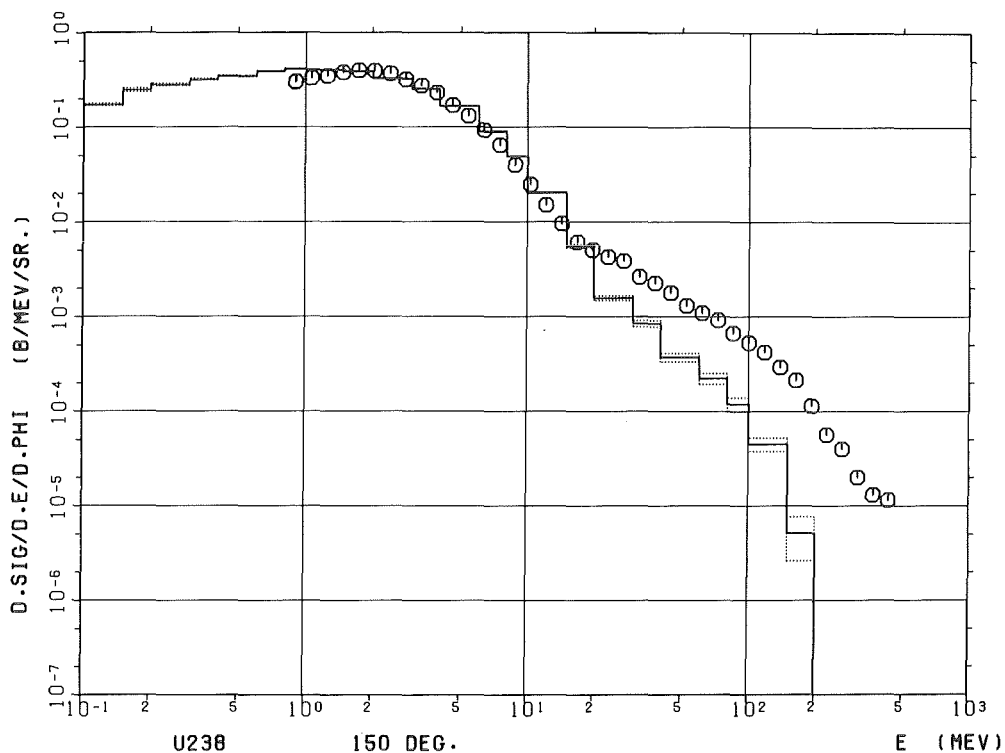


Figure 1c Uranium (U-238) 150°

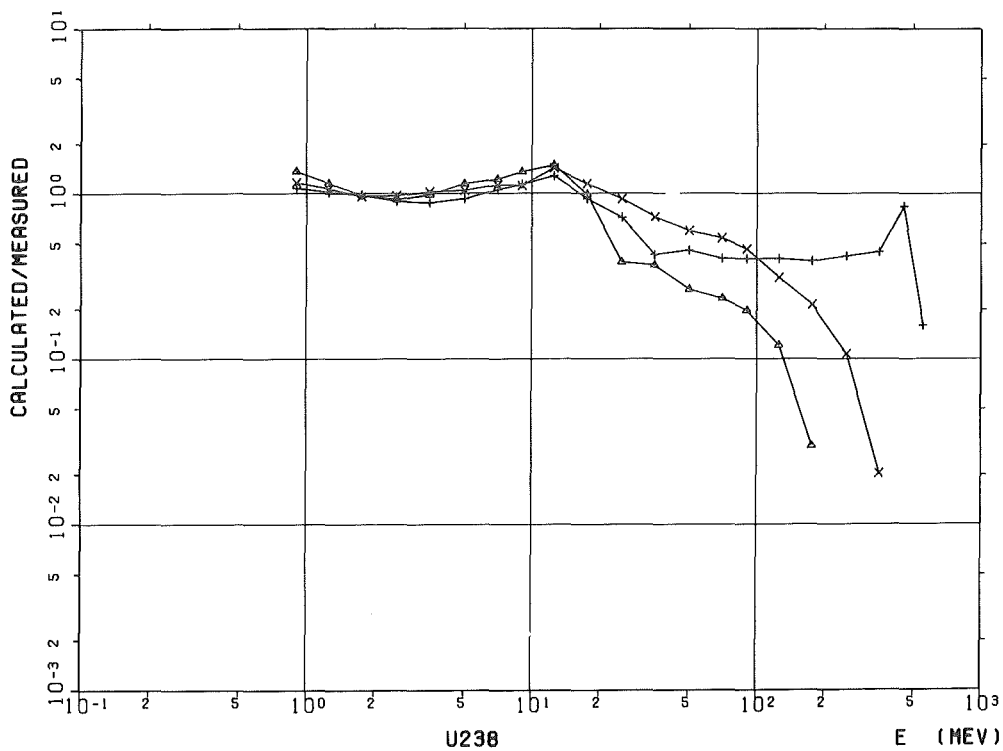


Figure 1d Ratio of calculated to measured U-238 cross section

## Figure 2a - 2d

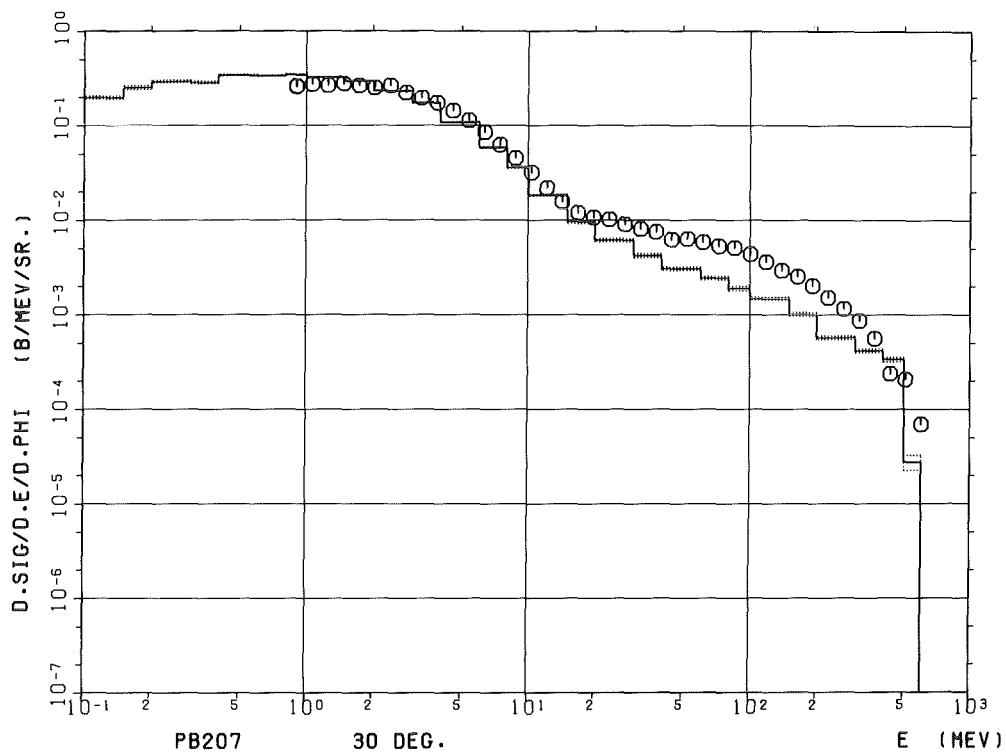
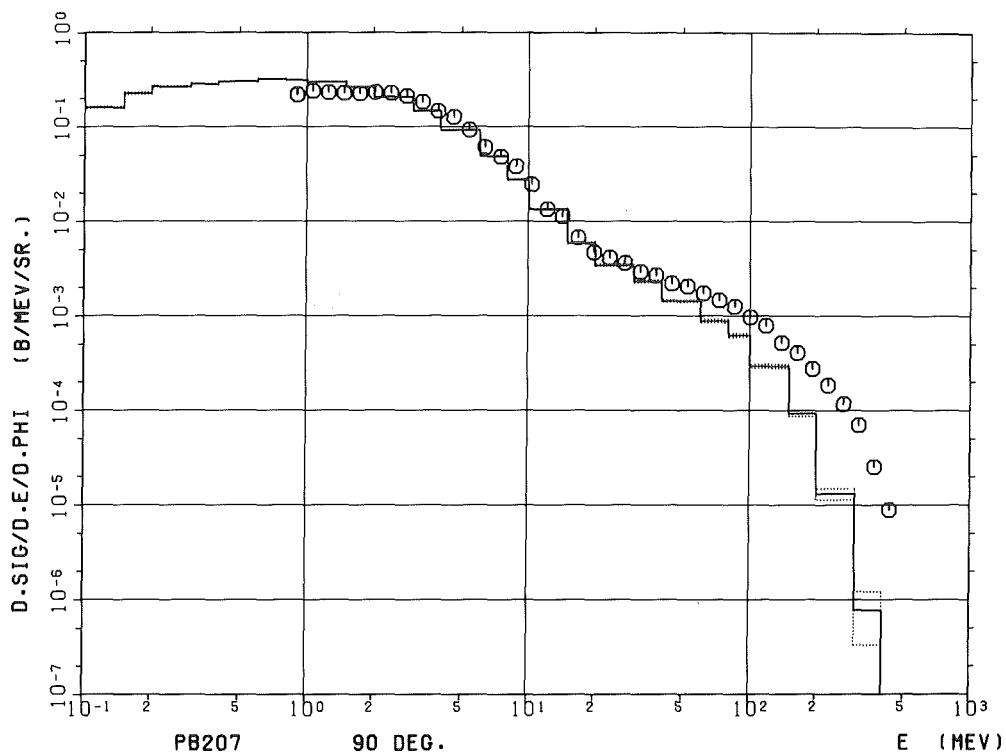
Comparison of calculated and measured  
double differential neutron cross sections  
from a thin lead (Pb-207) target bombarded  
by 590 MeV protons

## Legend

⊙ Experiments

⊘ Calculations Including Errors



Figure 2a Lead ( $Pb-207$ )  $30^\circ$ Figure 2b Lead ( $Pb-207$ )  $90^\circ$

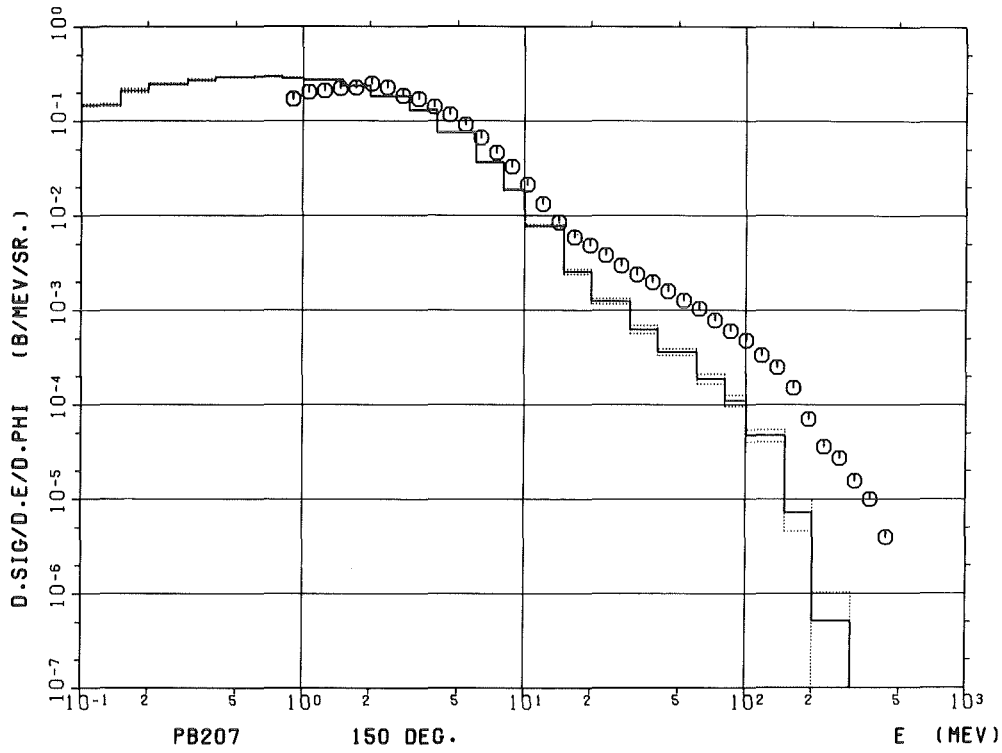


Figure 2c Lead (Pb-207) 150°

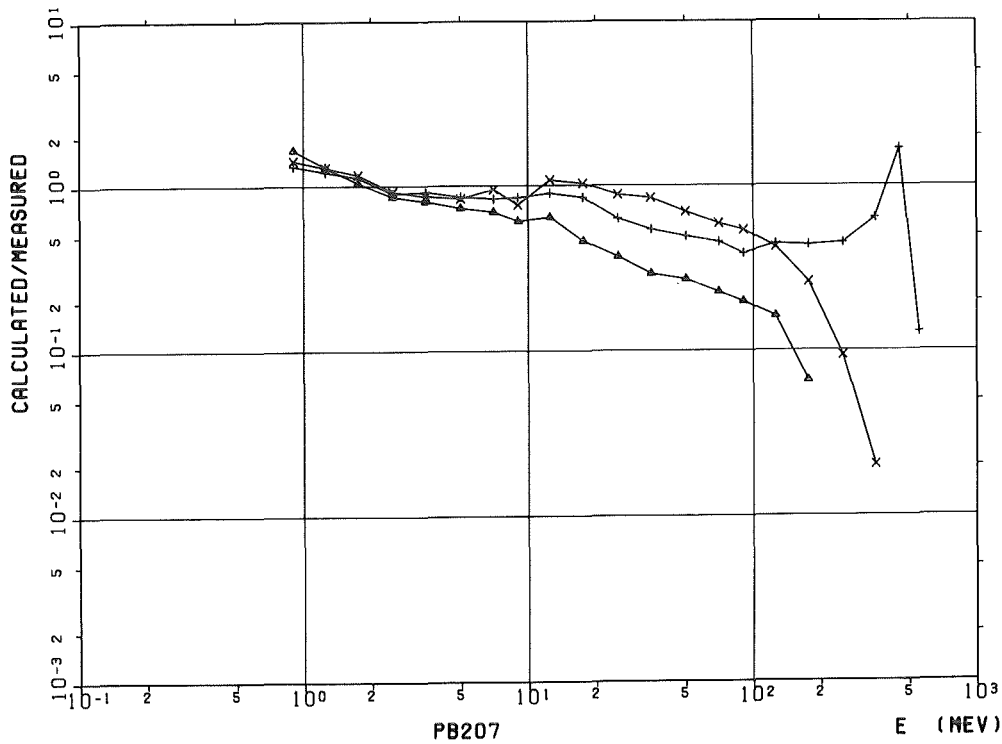


Figure 2d Ratio of calculated to measured Pb-207 cross section

## Figure 3a - 3d

Comparison of calculated and measured  
double differential neutron cross sections  
from a thin tantalum (Ta-181) target bombarded  
by 590 MeV protons

## Legend

⊙ Experiments

⋮ Calculations Including Errors

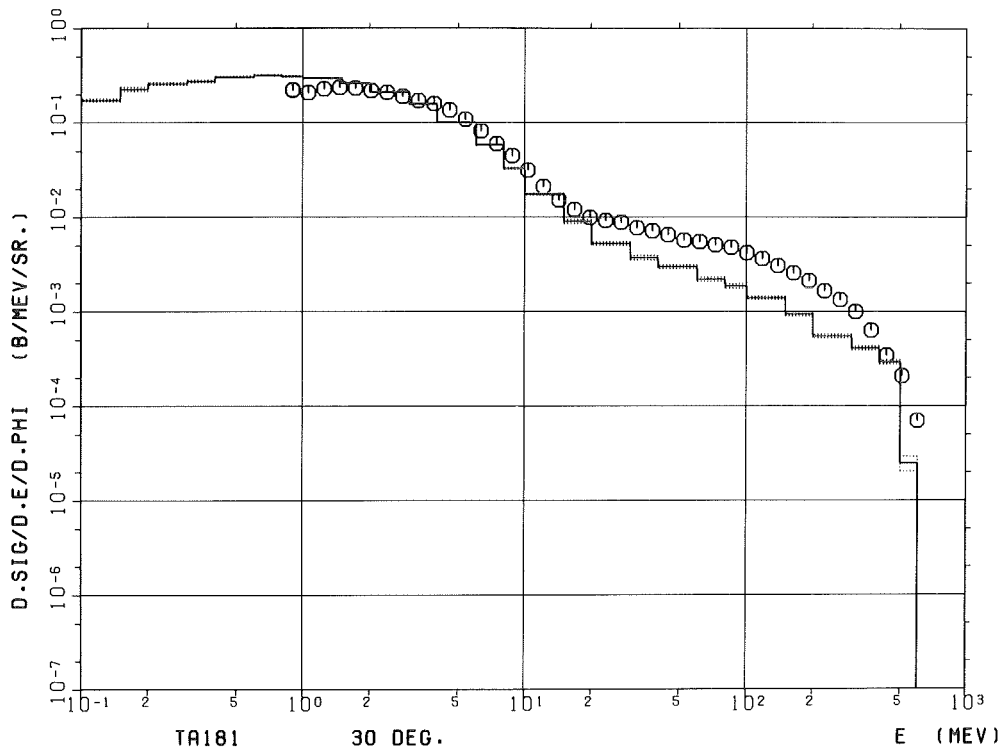


Figure 3a Tantalum (Ta-181) 30°

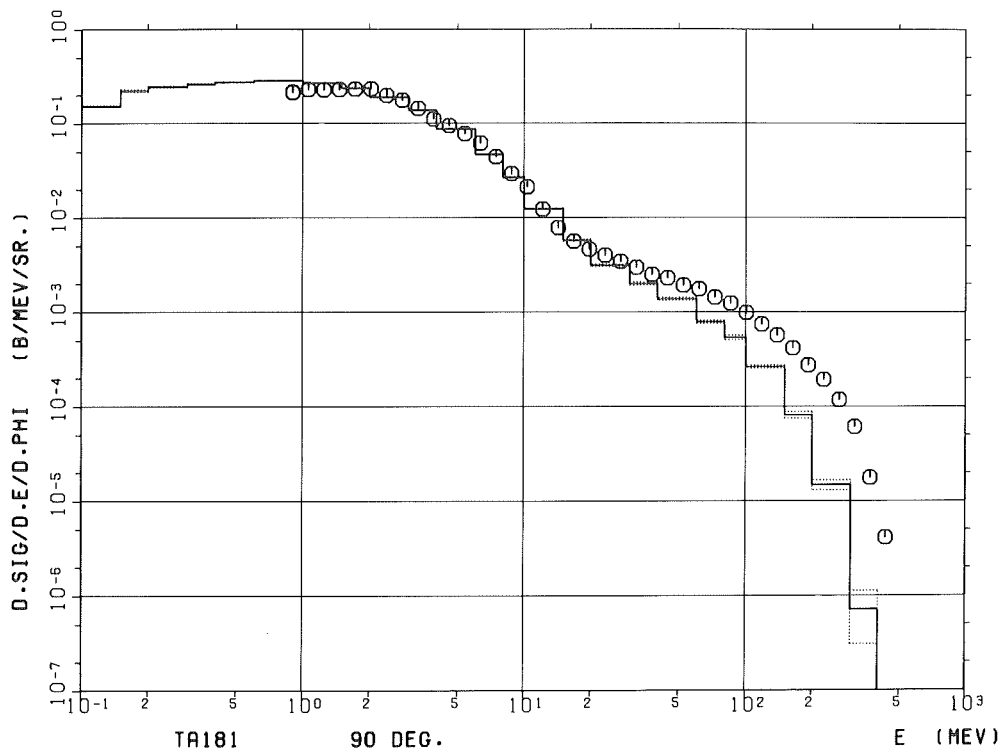


Figure 3b Tantalum (Ta-181) 90°

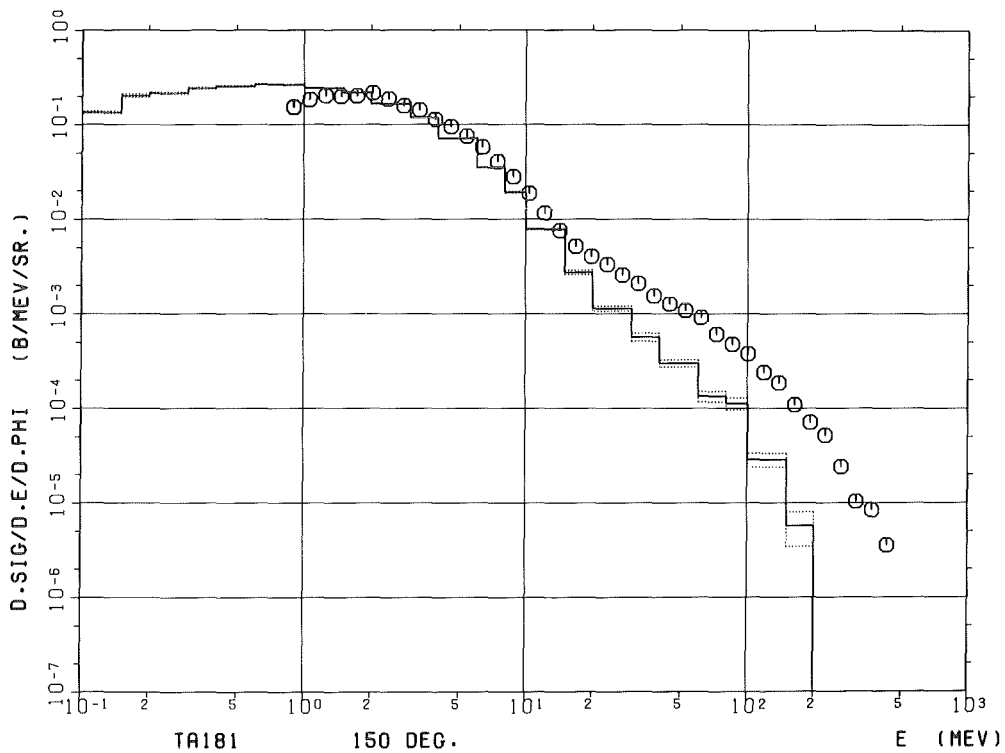


Figure 3c Tantalum (Ta-181) 150°

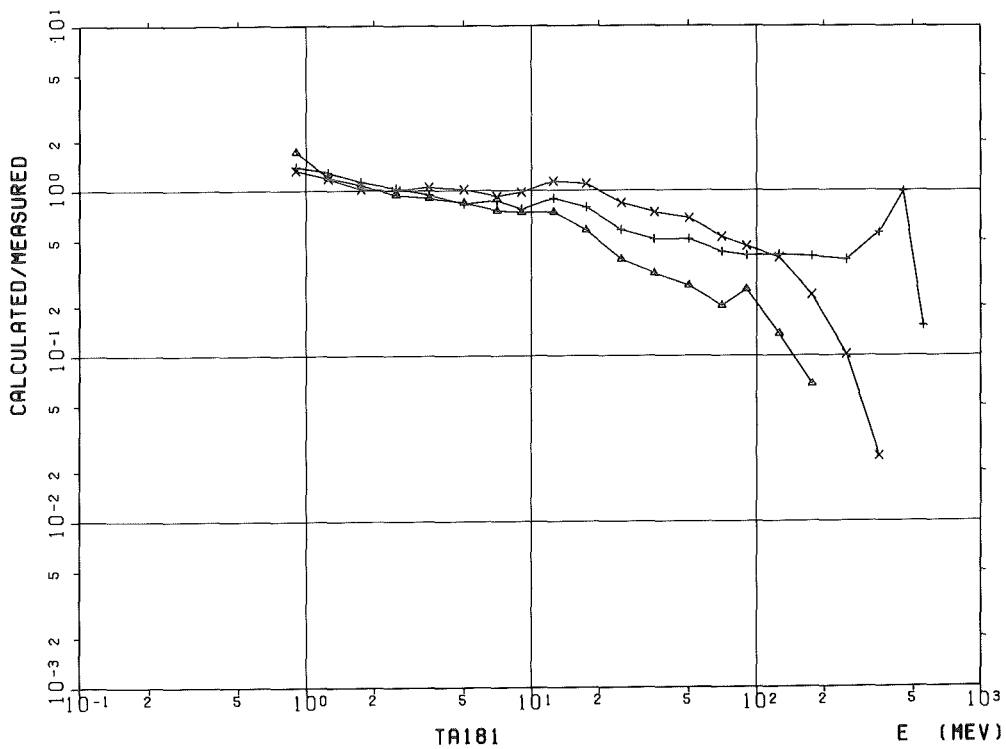


Figure 3d Ratio of calculated to measured Ta-181 cross section

## Figure 4a - 4d

Comparison of calculated and measured  
double differential neutron cross sections  
from a thin indium (In-115) target bombarded  
by 590 MeV protons

## Legend

⊙ Experiments

⊞ Calculations Including Errors

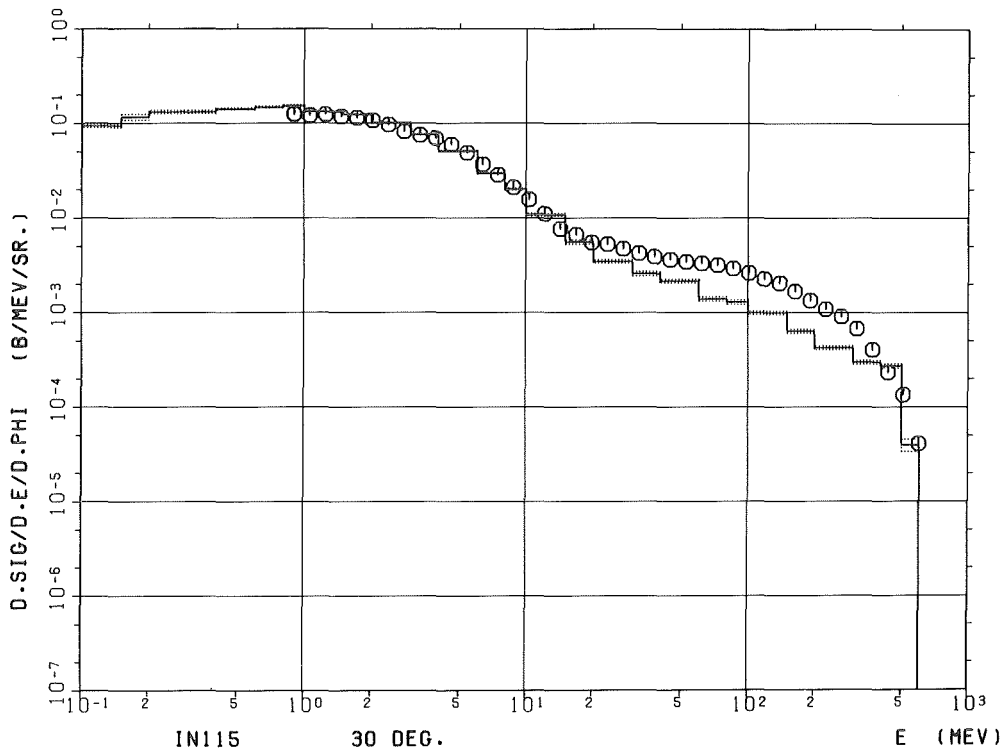


Figure 4a Indium (In-115) 30°

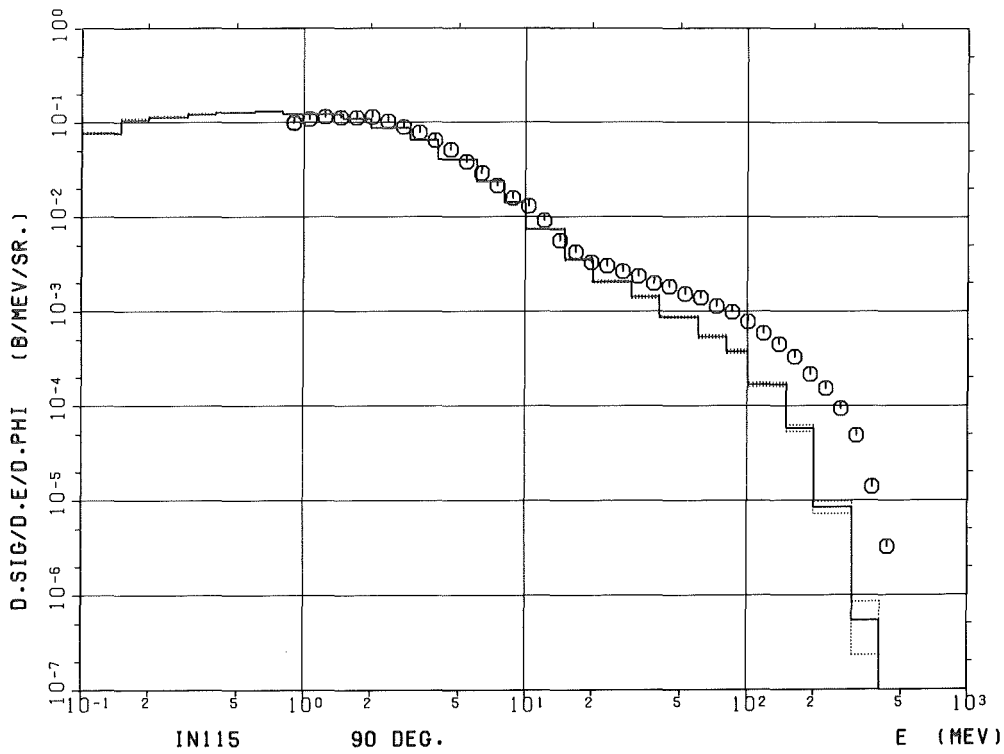


Figure 4b Indium (In-115) 90°

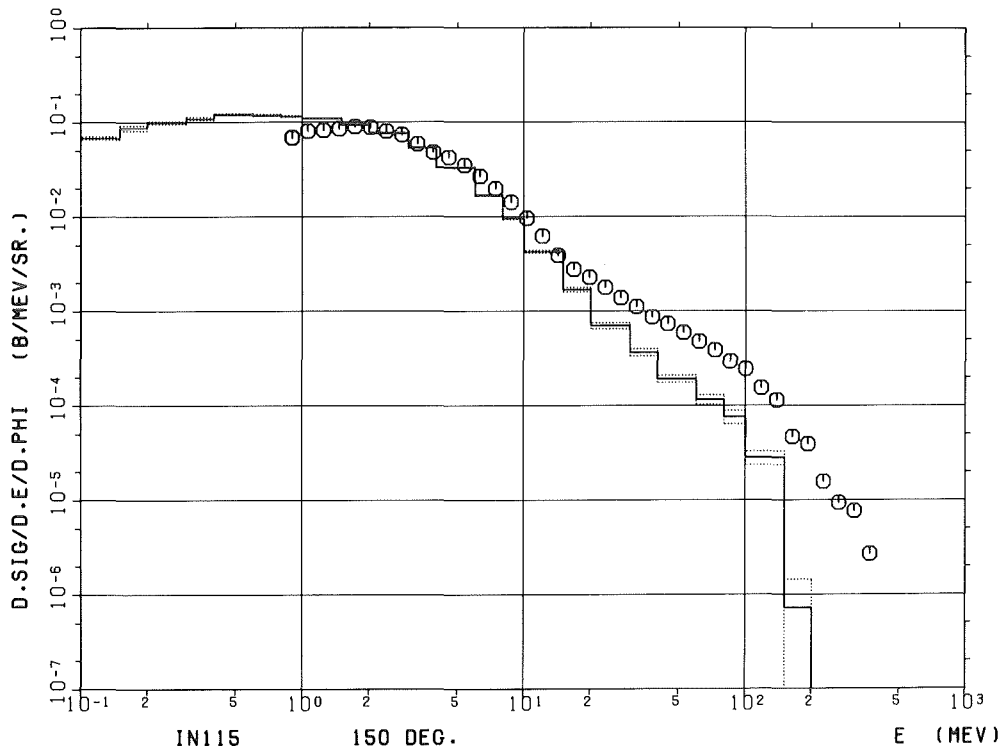


Figure 4c Indium (In-115) 150°

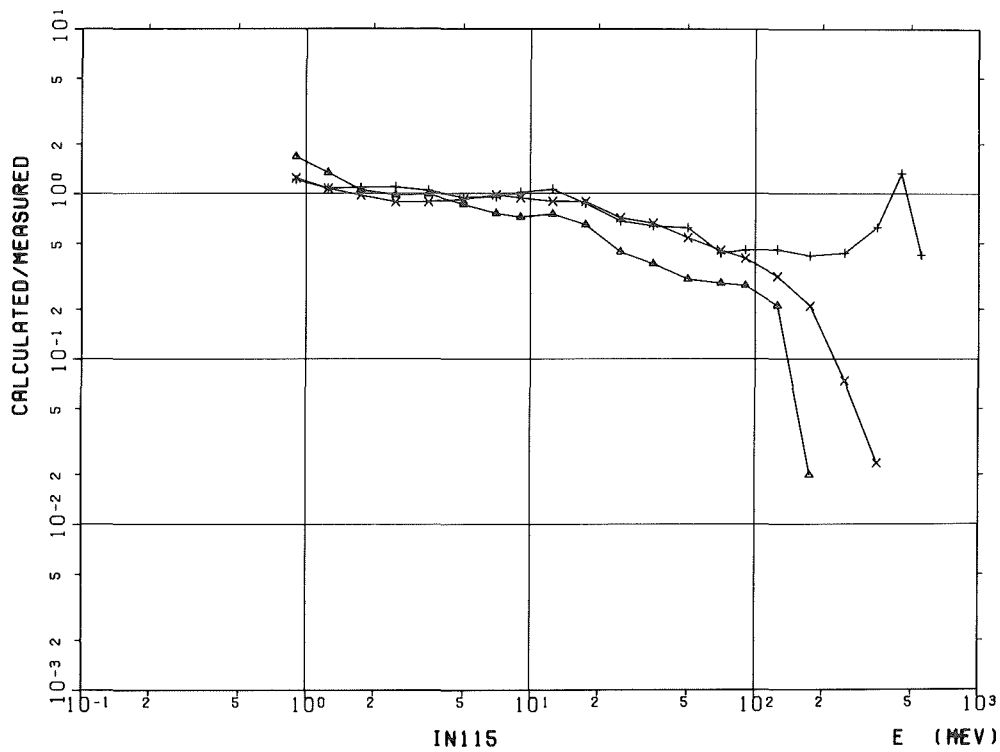


Figure 4d Ratio of calculated to measured In-115 cross section



## Figure 5a - 5d

Comparison of calculated and measured  
double differential neutron cross sections  
from a thin niobium (Nb-93) target bombarded  
by 590 MeV protons

## Legend

⊙ Experiments

⋮ Calculations Including Errors

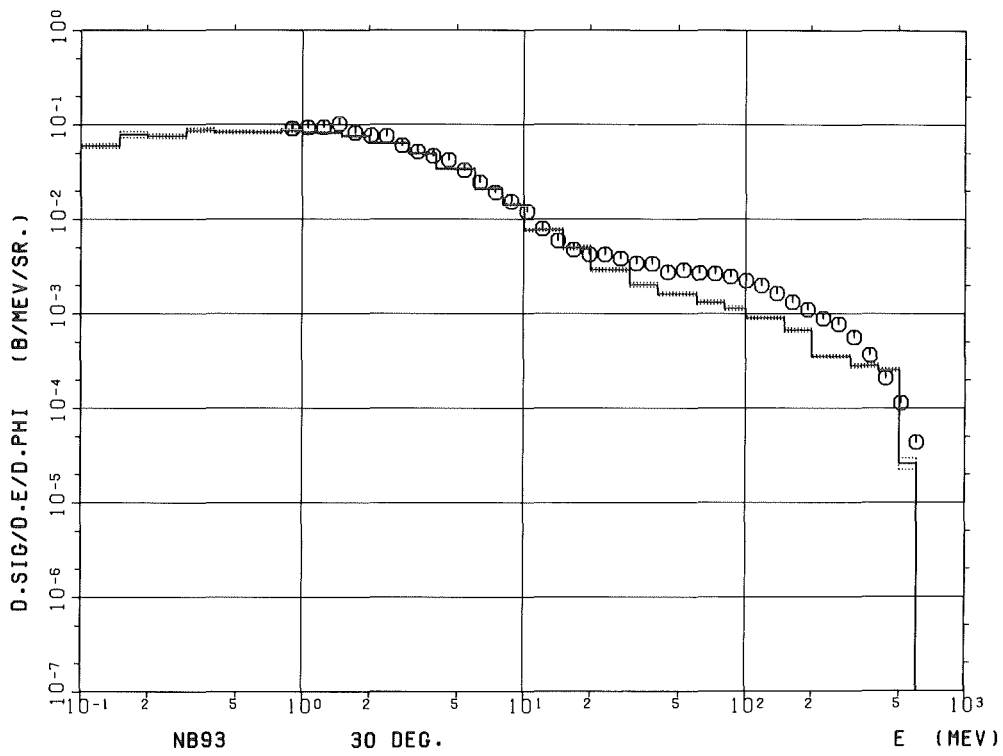


Figure 5a Niobium (Nb-93) 30°

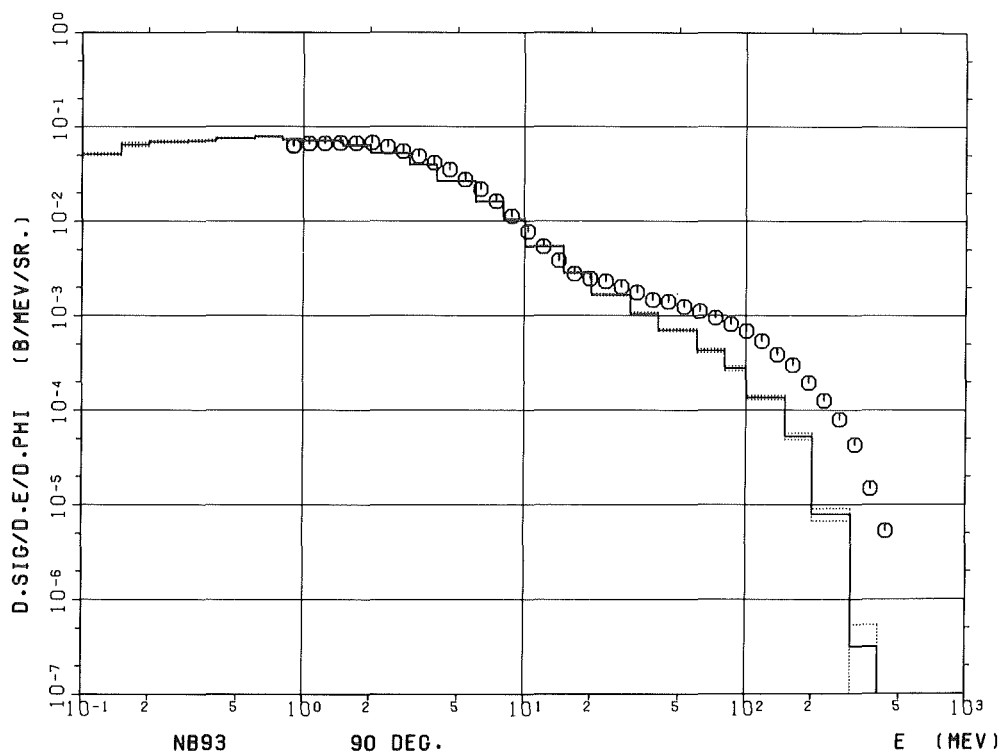


Figure 5b Niobium (Nb-93) 90°

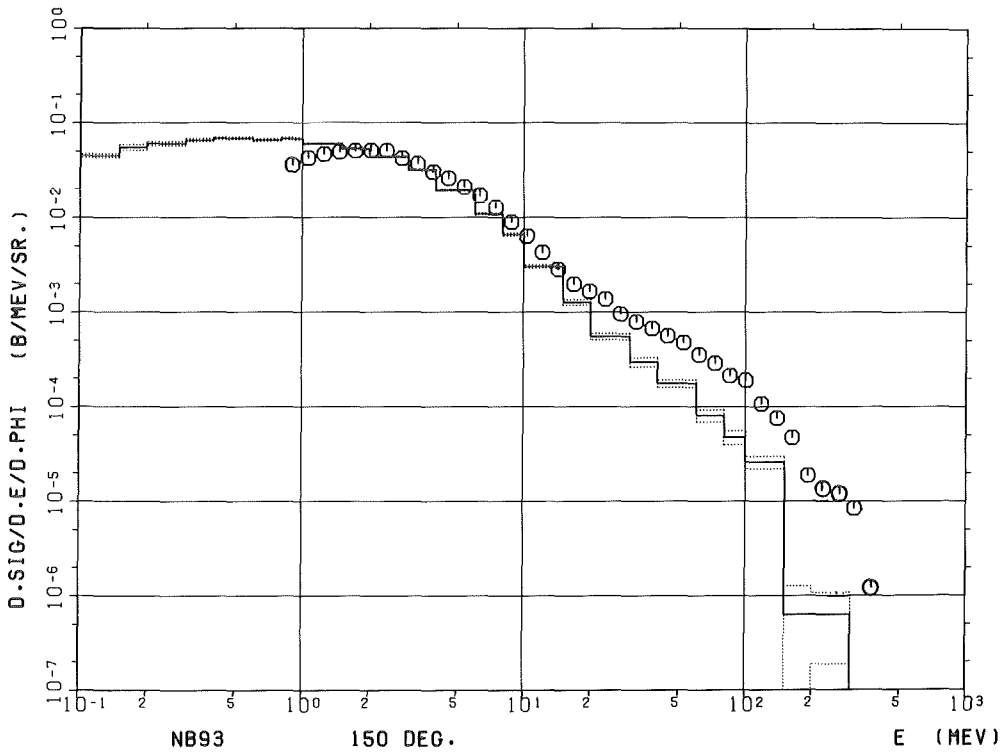


Figure 5c Niobium (Nb-93) 150°

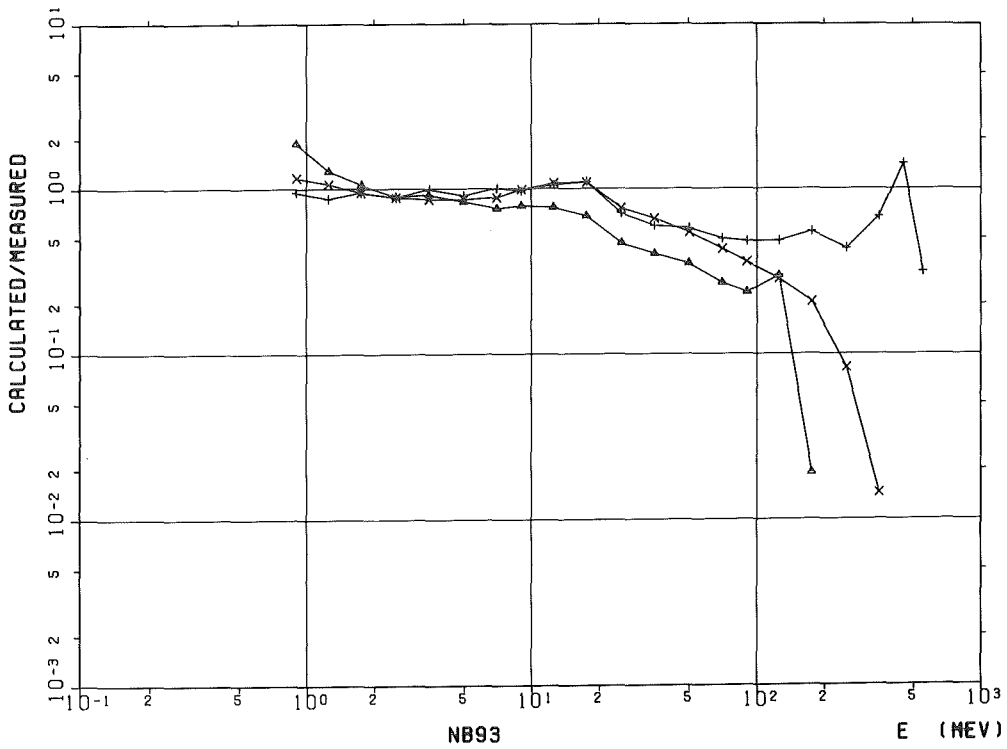


Figure 5d Ratio of calculated to measured Nb-93 cross section

## Figure 6a - 6d

Comparison of calculated and measured  
double differential neutron cross sections  
from a thin iron (Fe-56) target bombarded  
by 590 MeV protons

## Legend

⊙ Experiments

⋮ Calculations Including Errors

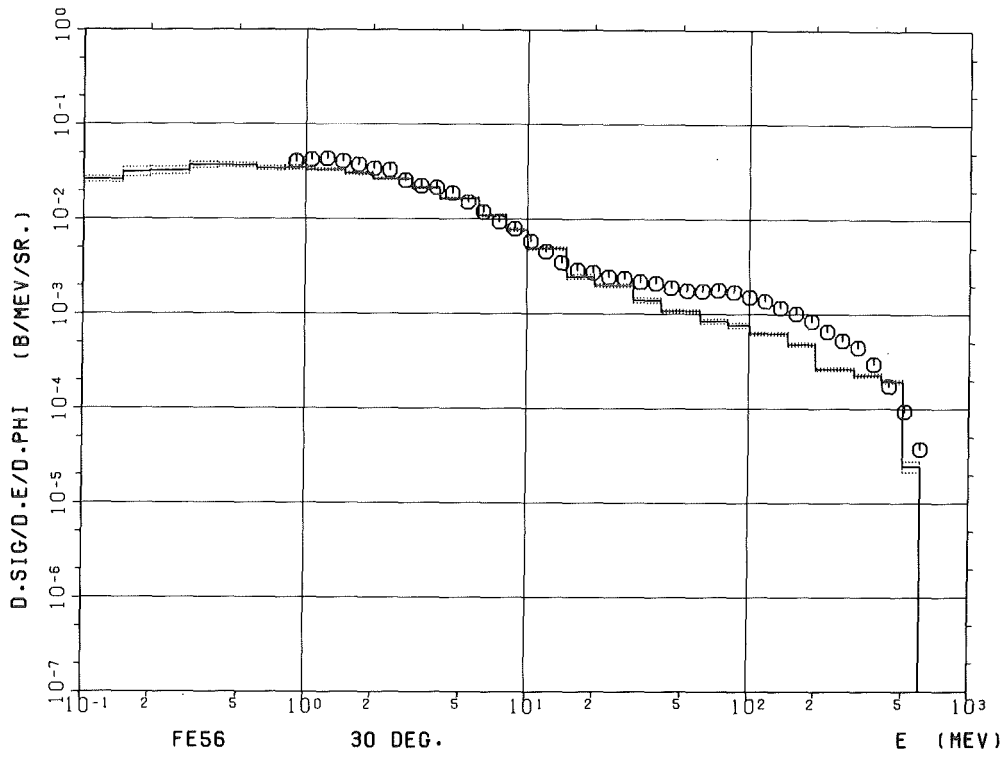


Figure 6a Iron (Fe-56) 30°

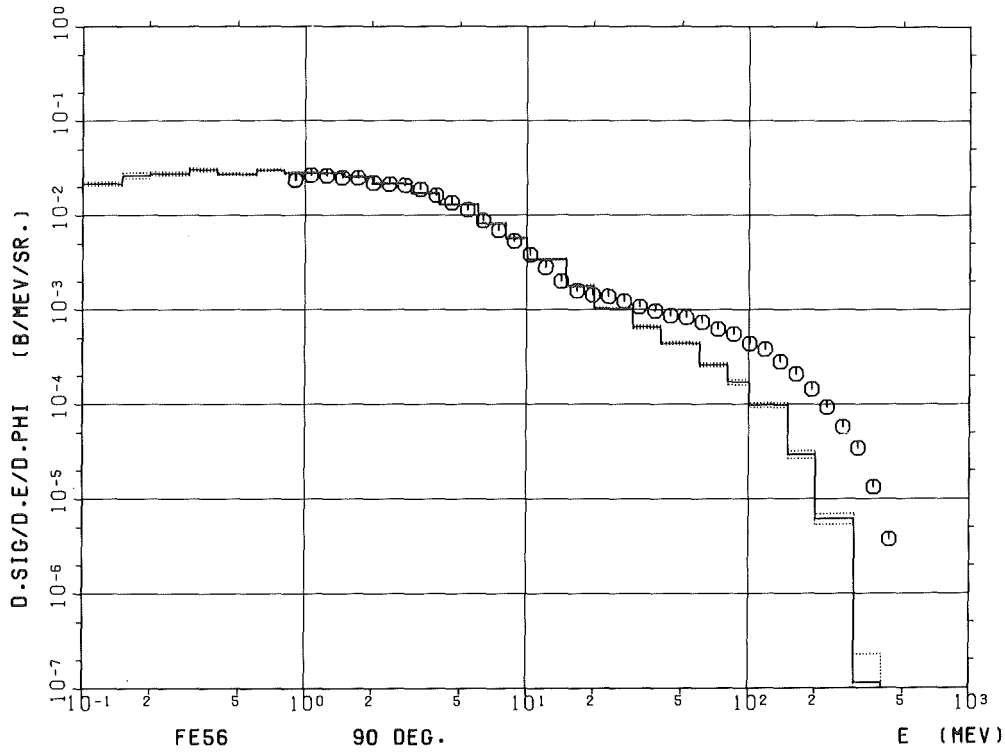


Figure 6b Iron (Fe-56) 90°

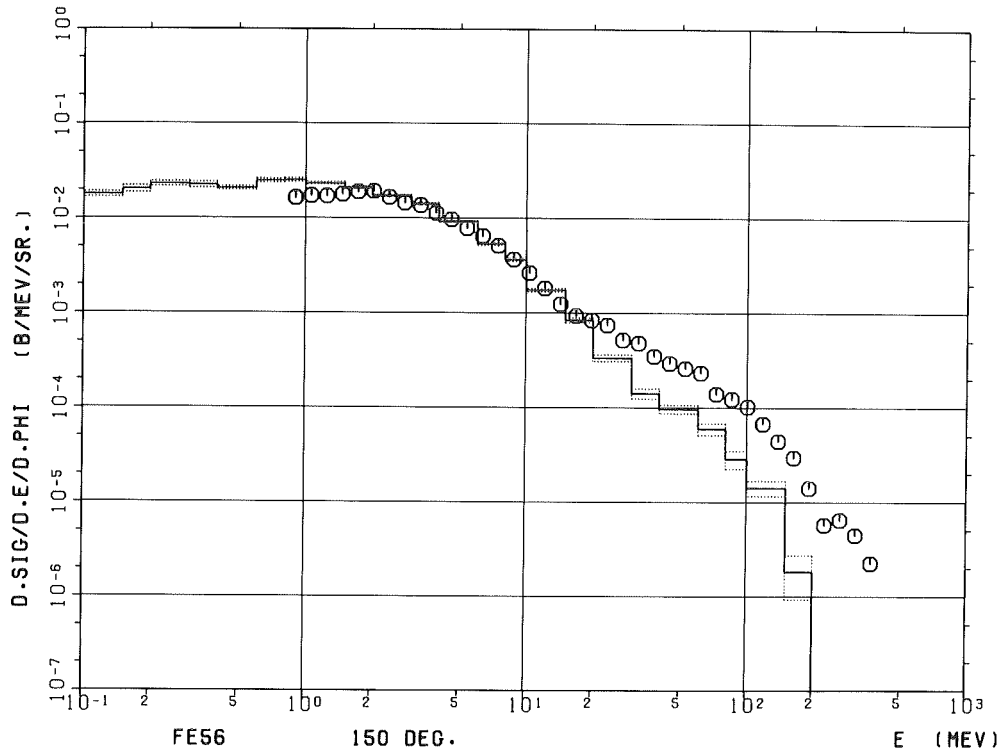


Figure 6c Iron (Fe-56) 150°

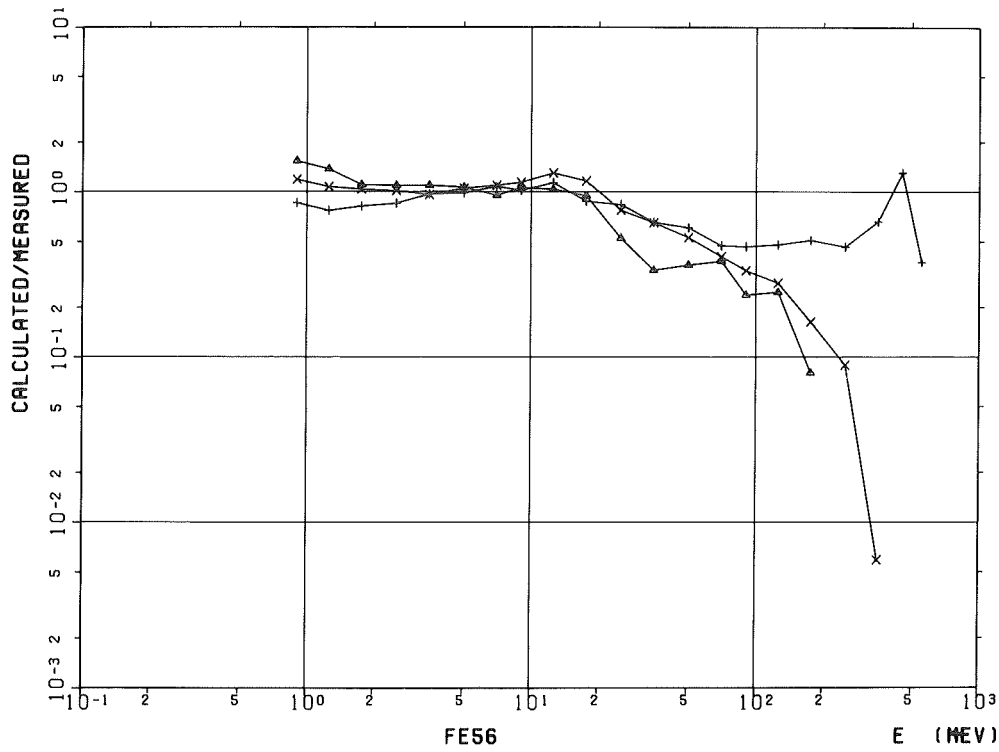


Figure 6d Ratio of calculated to measured Fe-56 cross section

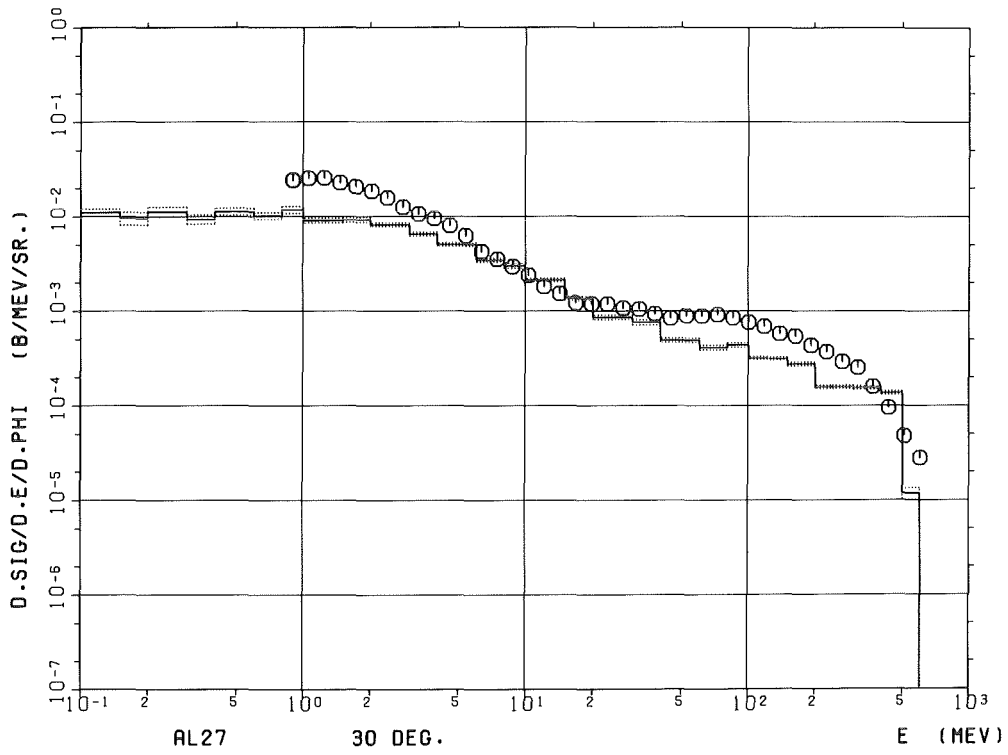
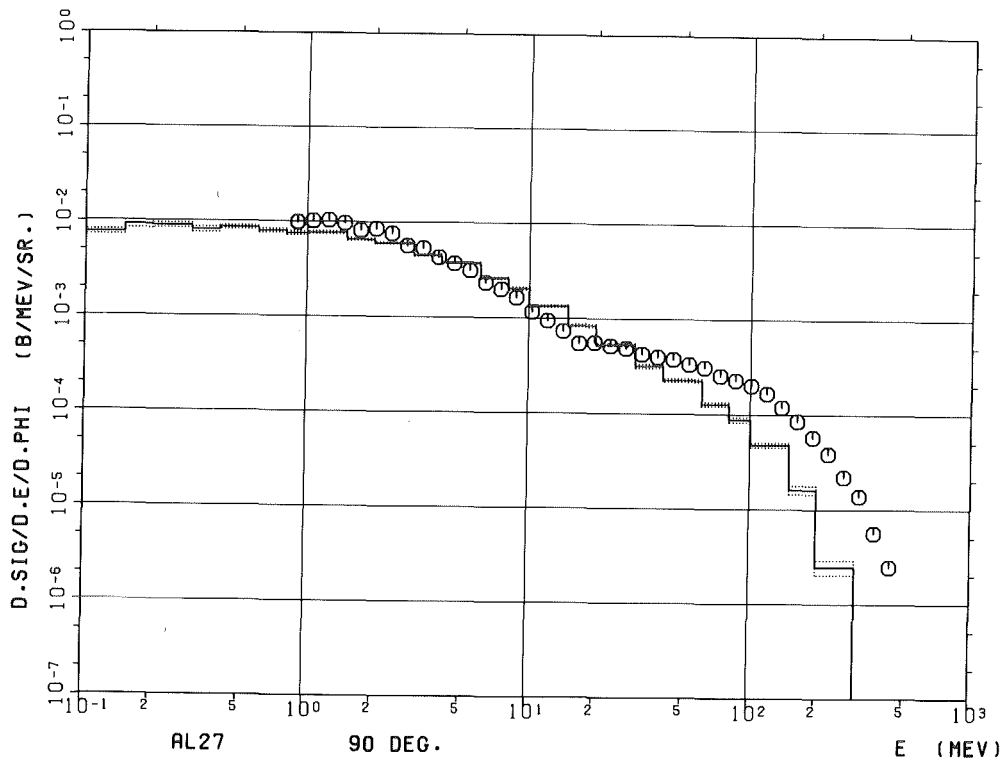
## Figure 7a - 7d

Comparison of calculated and measured  
double differential neutron cross sections  
from a thin aluminum (Al-27) target bombarded  
by 590 MeV protons

## Legend

⊙ Experiments

⊞ Calculations Including Errors

Figure 7a Aluminum ( $Al-27$ )  $30^\circ$ Figure 7b Aluminum ( $Al-27$ )  $90^\circ$



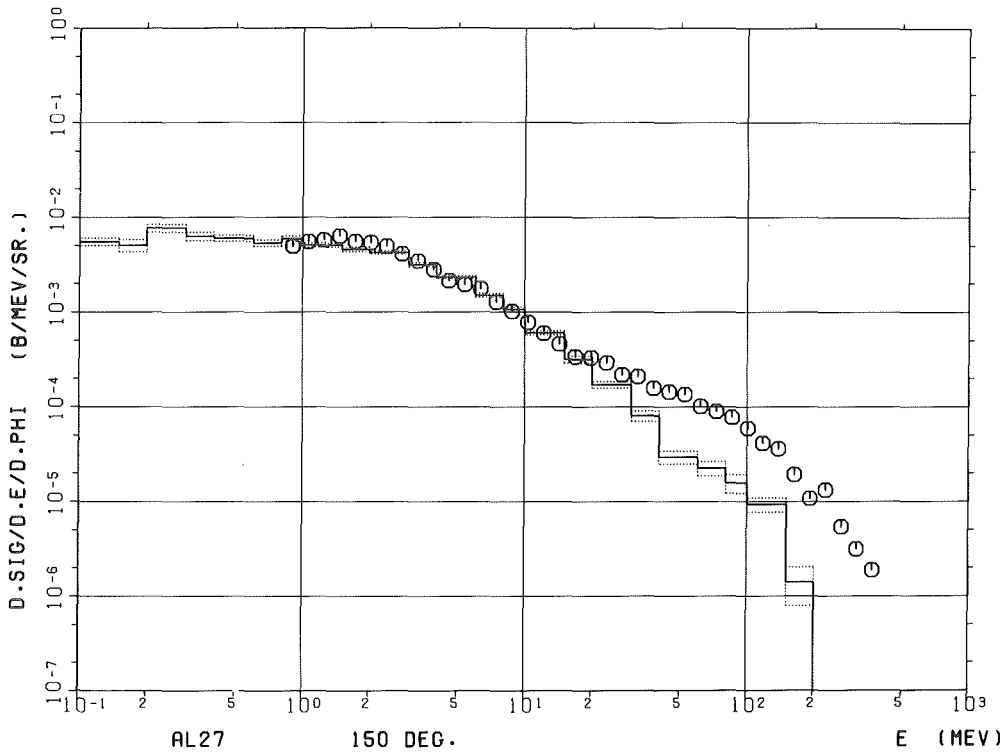


Figure 7c Aluminum (Al-27) 150°

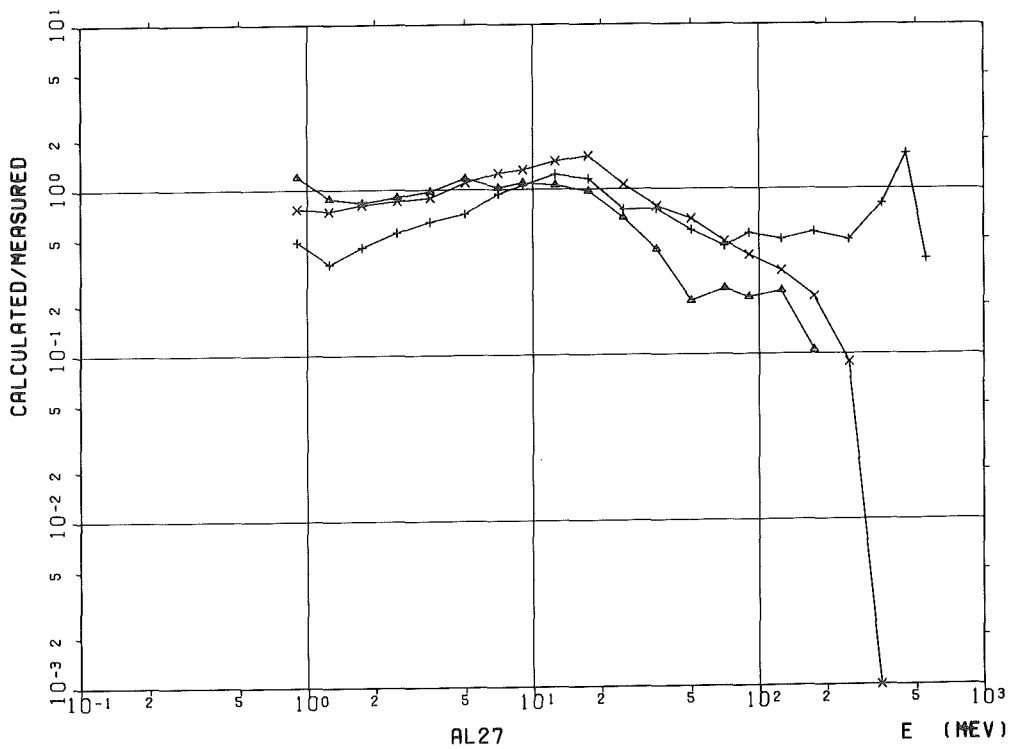


Figure 7d Ratio of calculated to measured Al-27 cross section

## Figure 8a - 8d

Comparison of calculated and measured  
double differential neutron cross sections  
from a thin carbon (C-12) target bombarded  
by 590 MeV protons

## Legend

⊙ Experiments

⋮ Calculations Including Errors

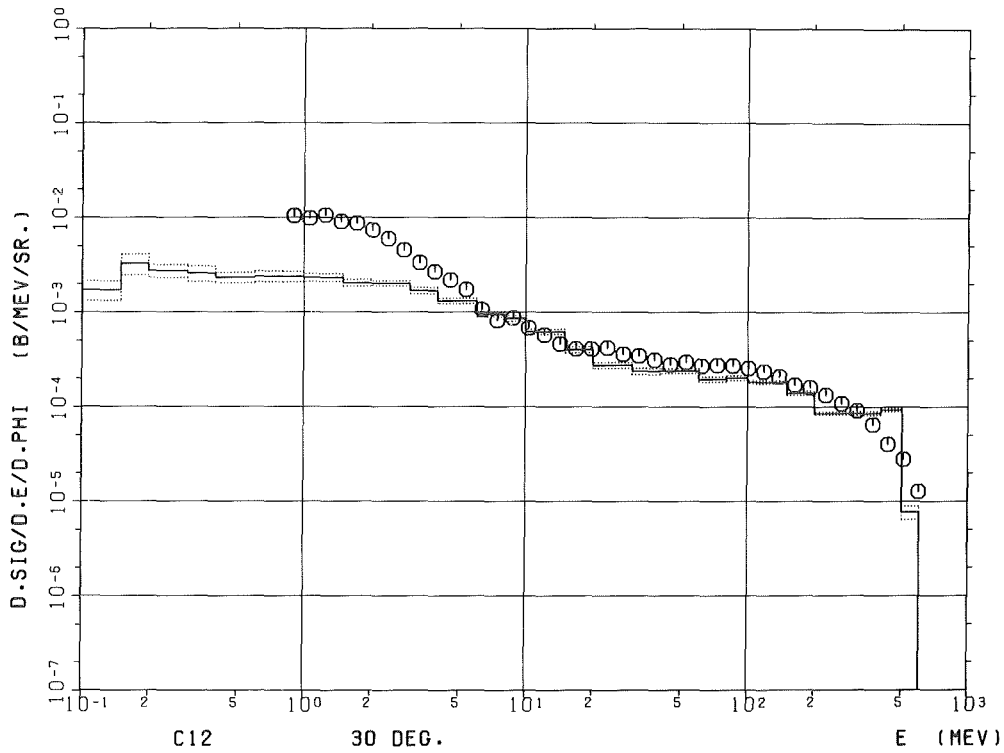


Figure 8a Carbon (C-12) 30°

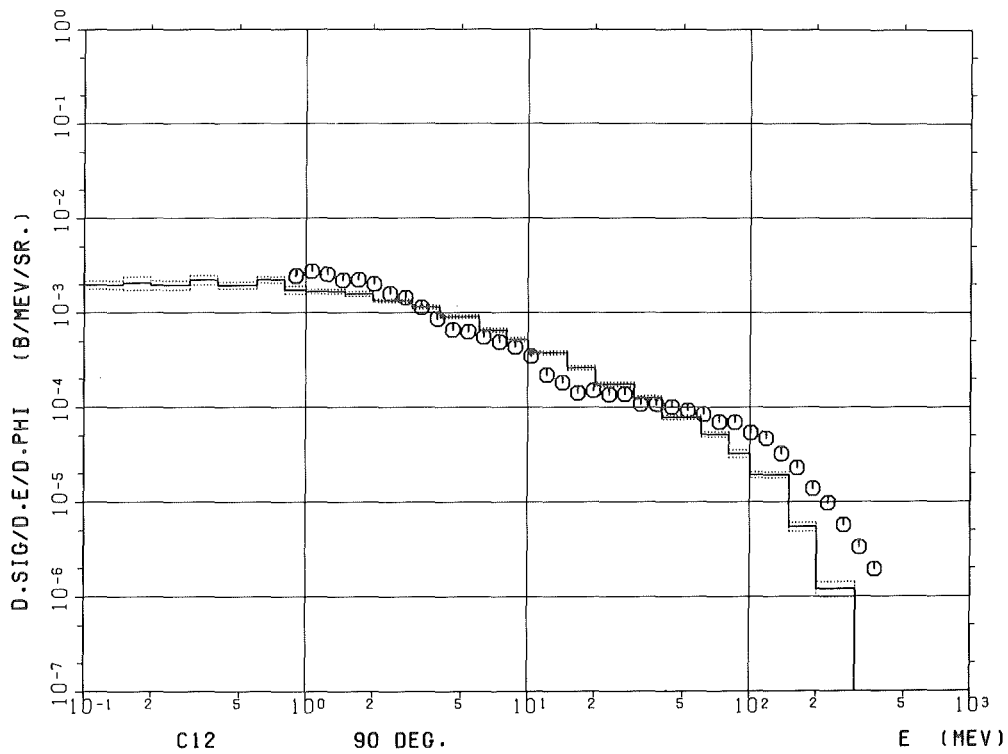


Figure 8b Carbon (C-12) 90°

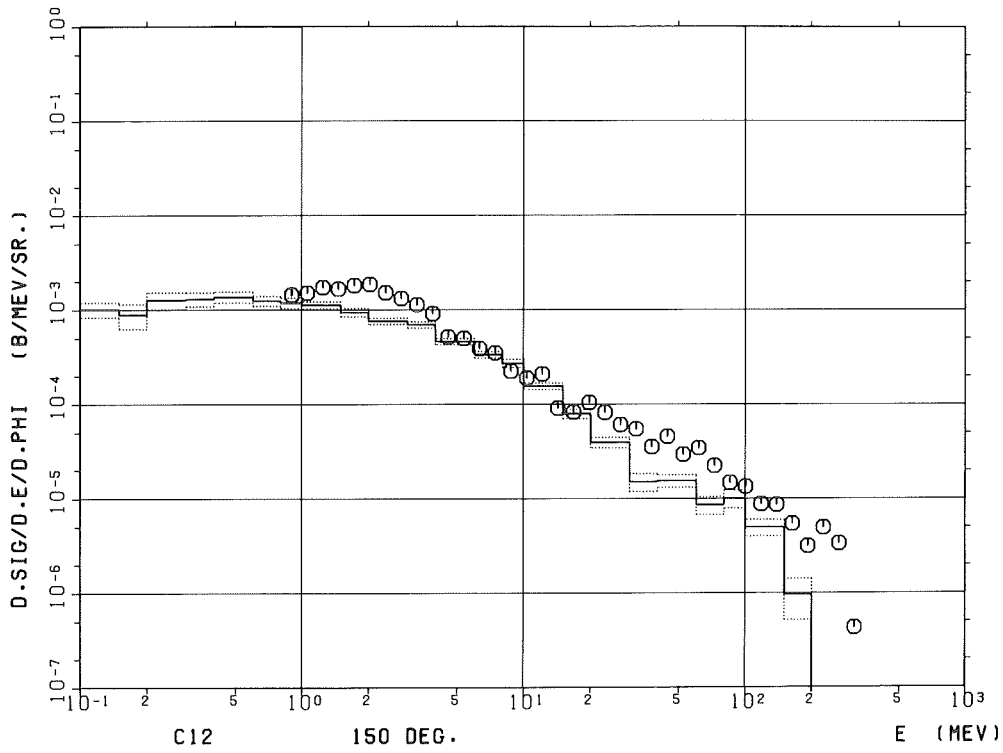


Figure 8c Carbon (C-12) 150°

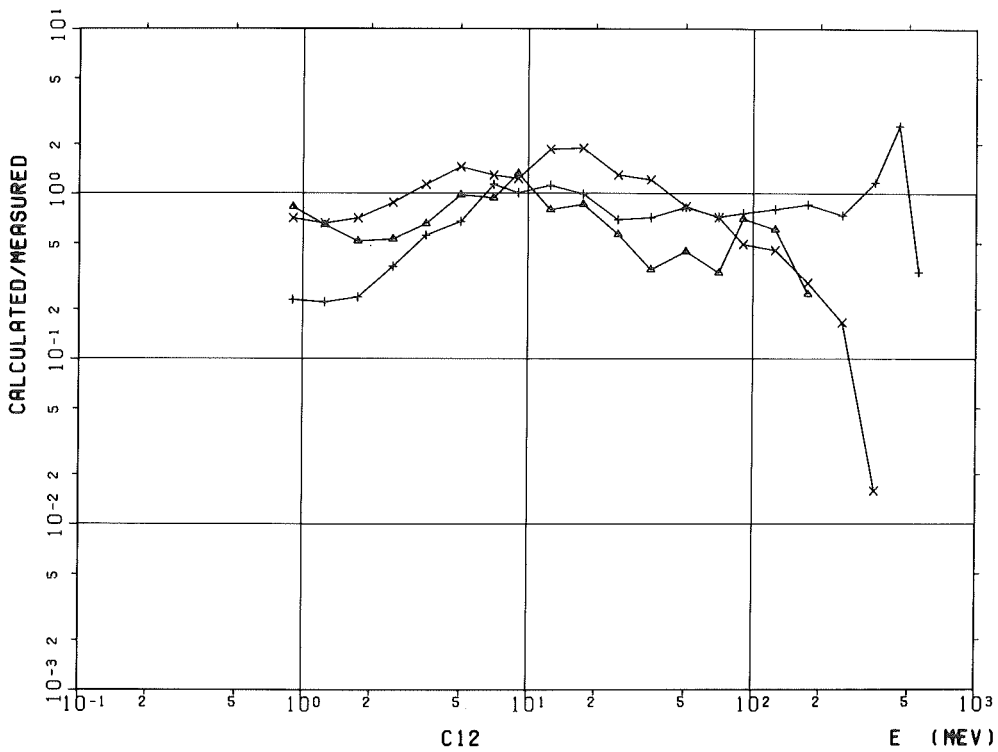


Figure 8d Ratio of calculated to measured C-12 cross section

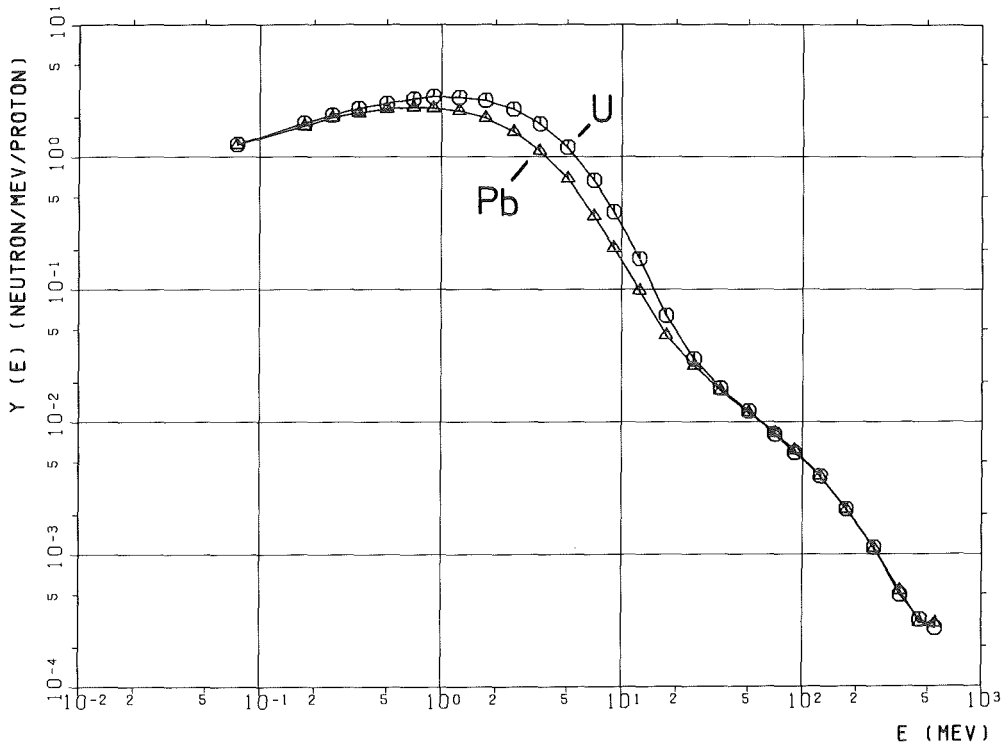


Figure 9 Comparison of calculated neutron spectra (yields over all angles) for U-238 and Pb-207

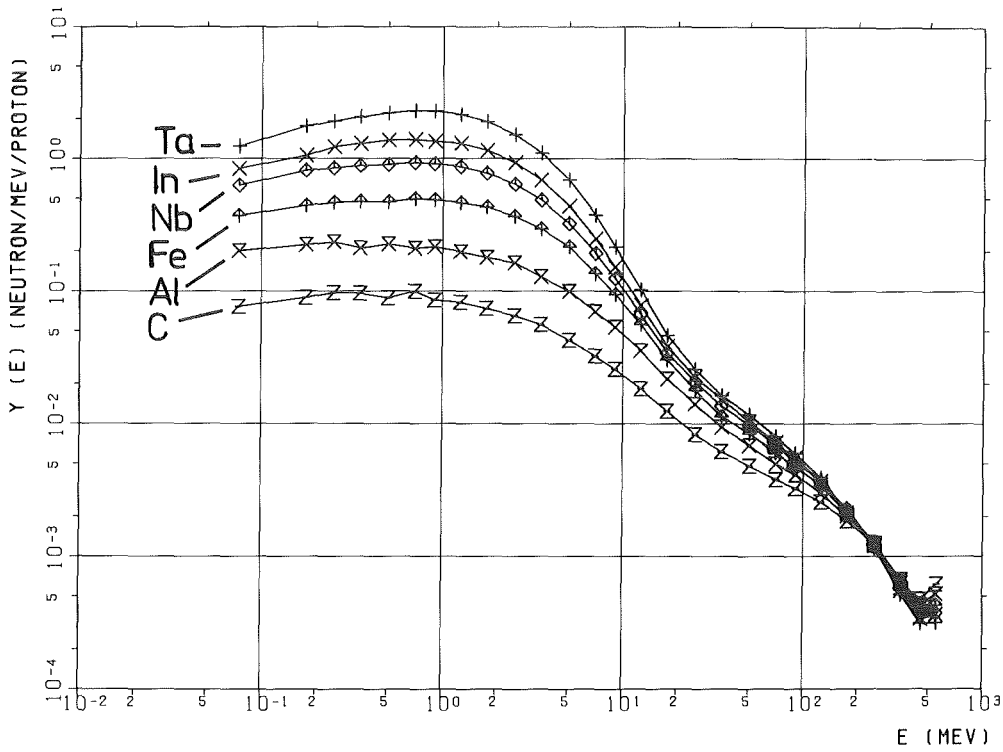


Figure 10 Comparison of calculated neutron spectra (yields over all angles) for Ta-181, In-115, Nb-93, Fe-56, Al-27 and C-12

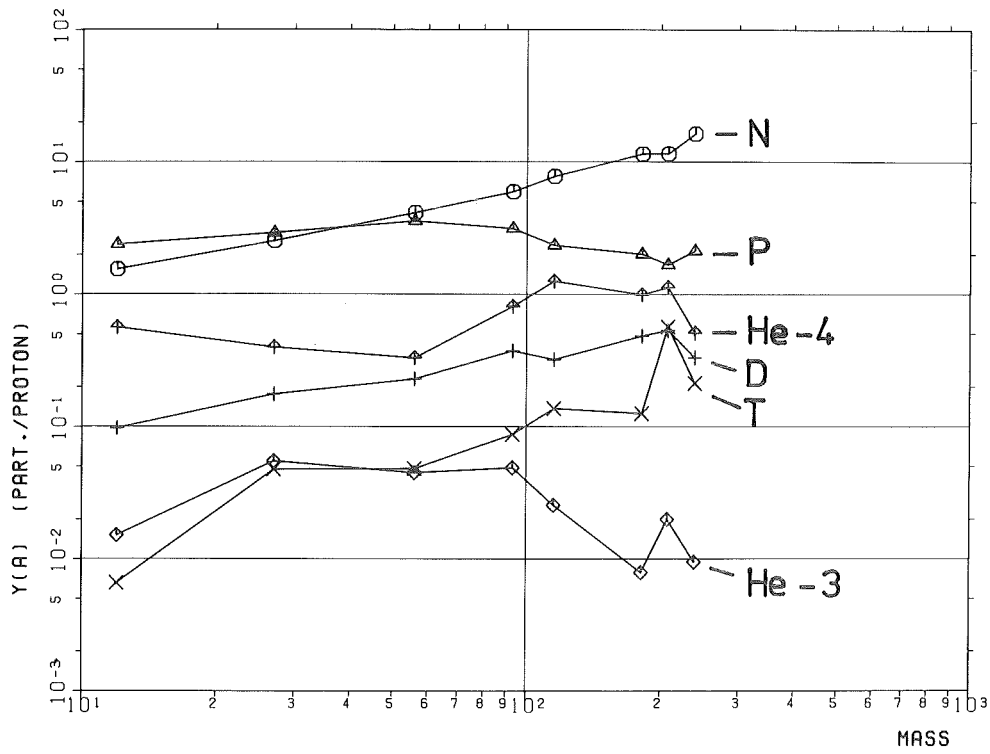


Figure 11 Total yields of n,p,d,t,He-3 and He-4 vs. mass number

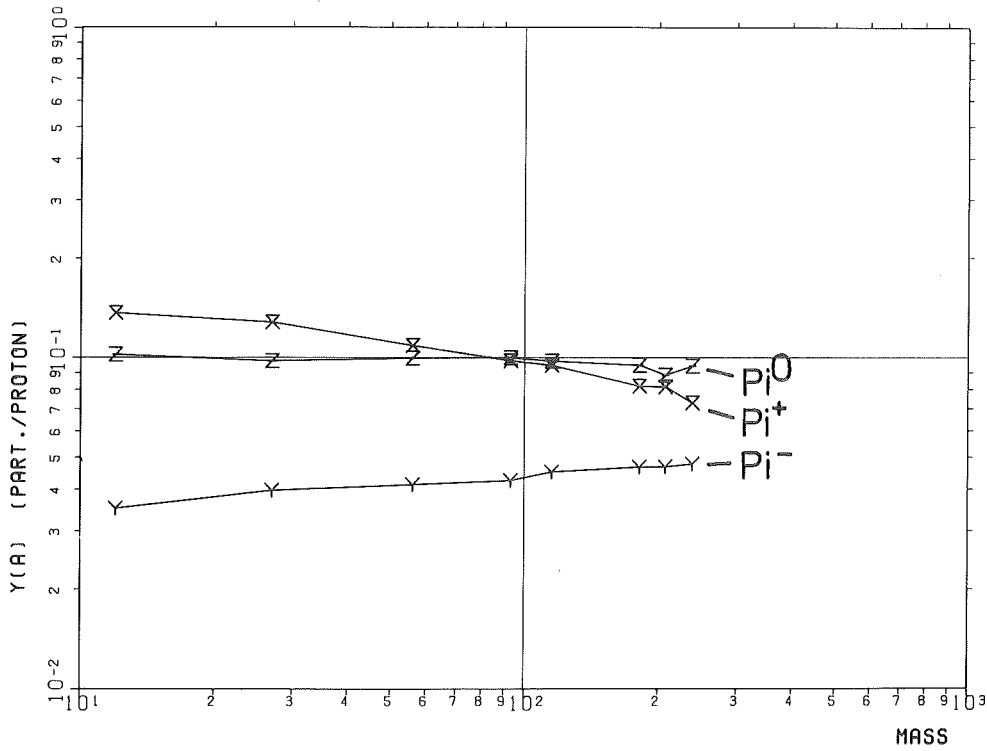


Figure 12 Total yields of  $\pi^+$ ,  $\pi^-$  and  $\pi^0$  vs. mass number

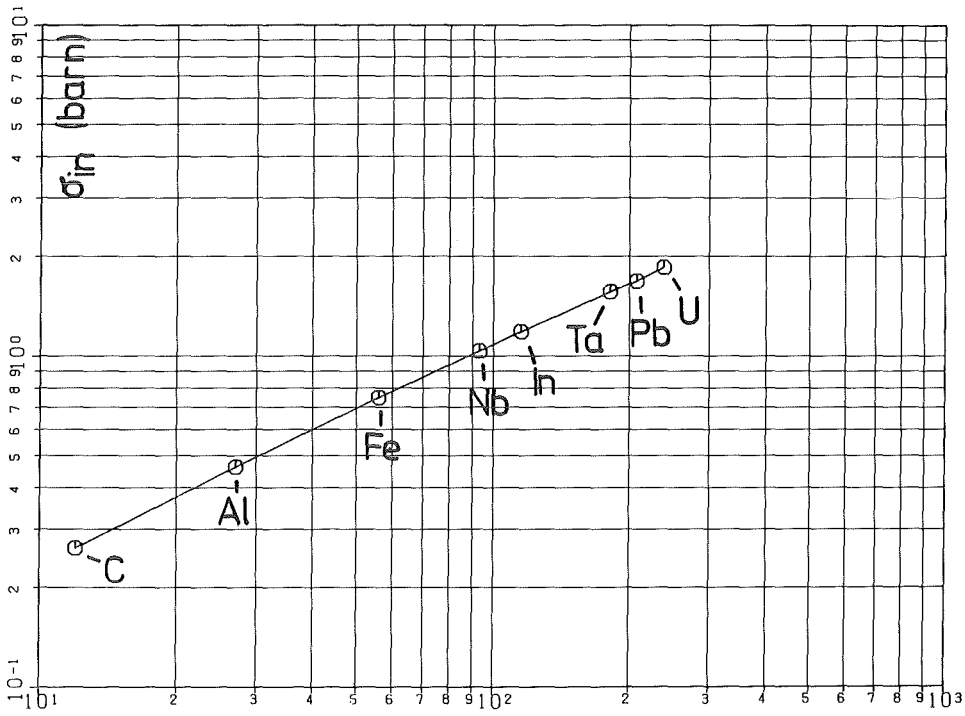


Figure 13 Calculated inelastic cross section  $\sigma_{in}$  vs. mass number

## APPENDIX A

### Comparison of Calculated Evaporation Spectra for Different Angular Intervalls ( $0^{\circ}$ - $60^{\circ}$ , $60^{\circ}$ - $120^{\circ}$ , $120^{\circ}$ - $180^{\circ}$ ) and all Targets

It should be noted that for target materials lighter than indium the cross sections for the interval ( $120^{\circ}$ - $180^{\circ}$ ) is significantly smaller than those for the other two regions, while this is opposite for the heavier targets



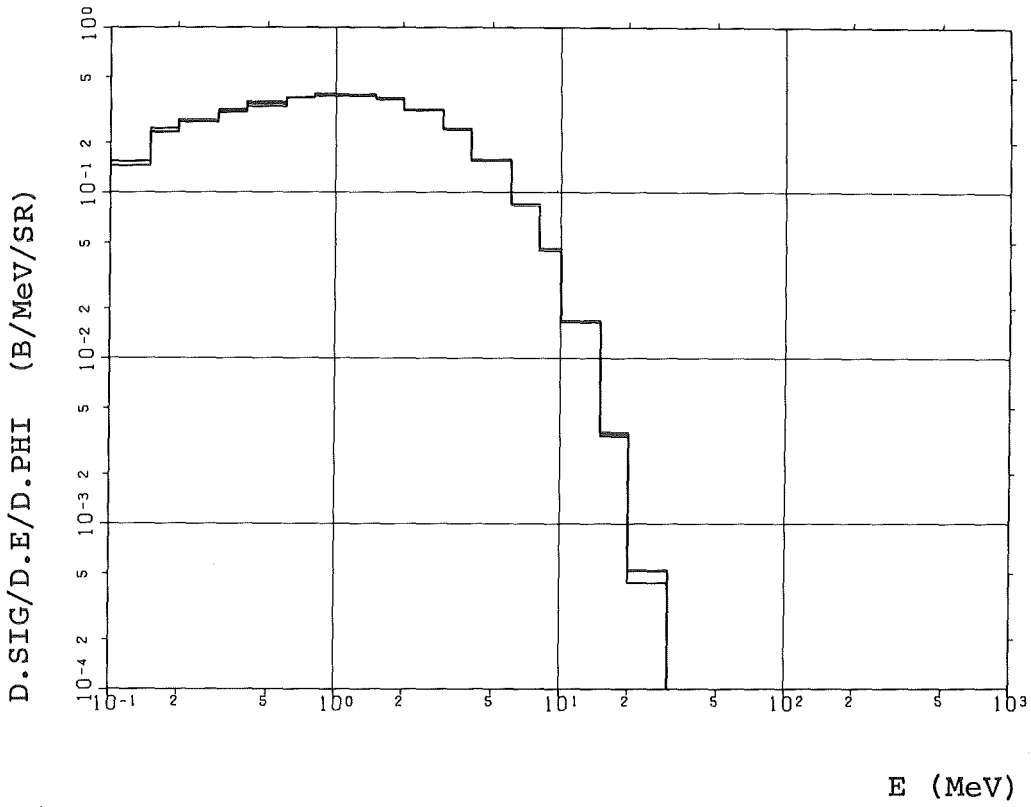


Figure A.1 Uranium (U-238)

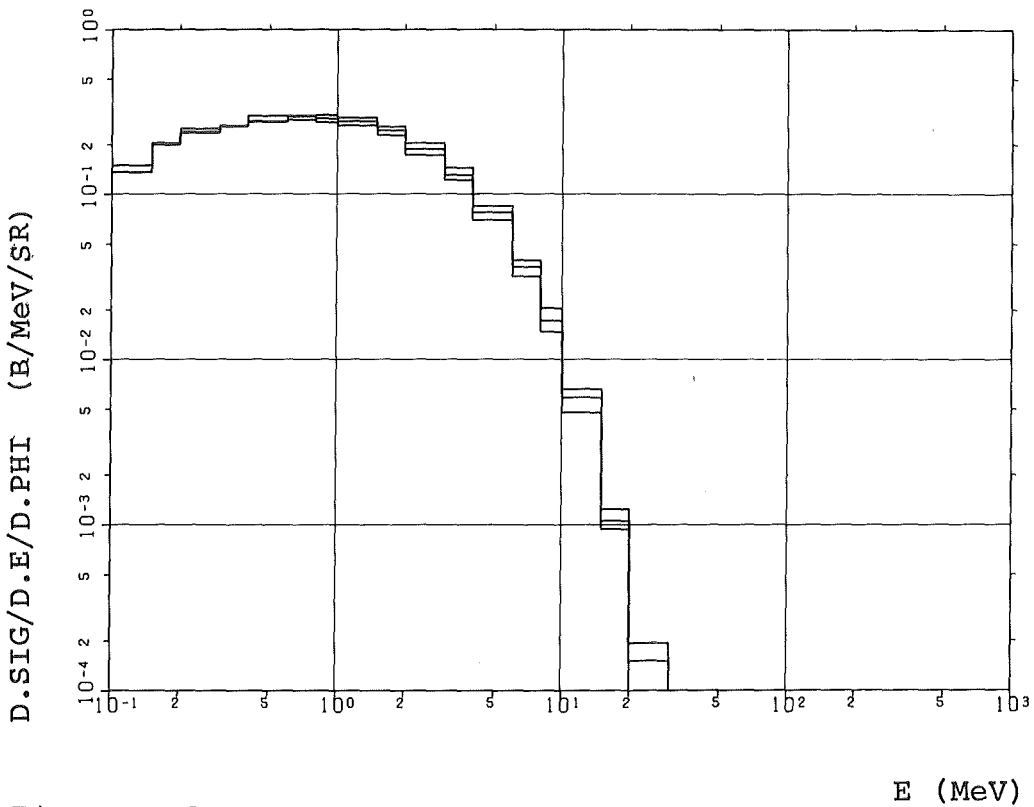


Figure A.2 Lead (Pb-207)

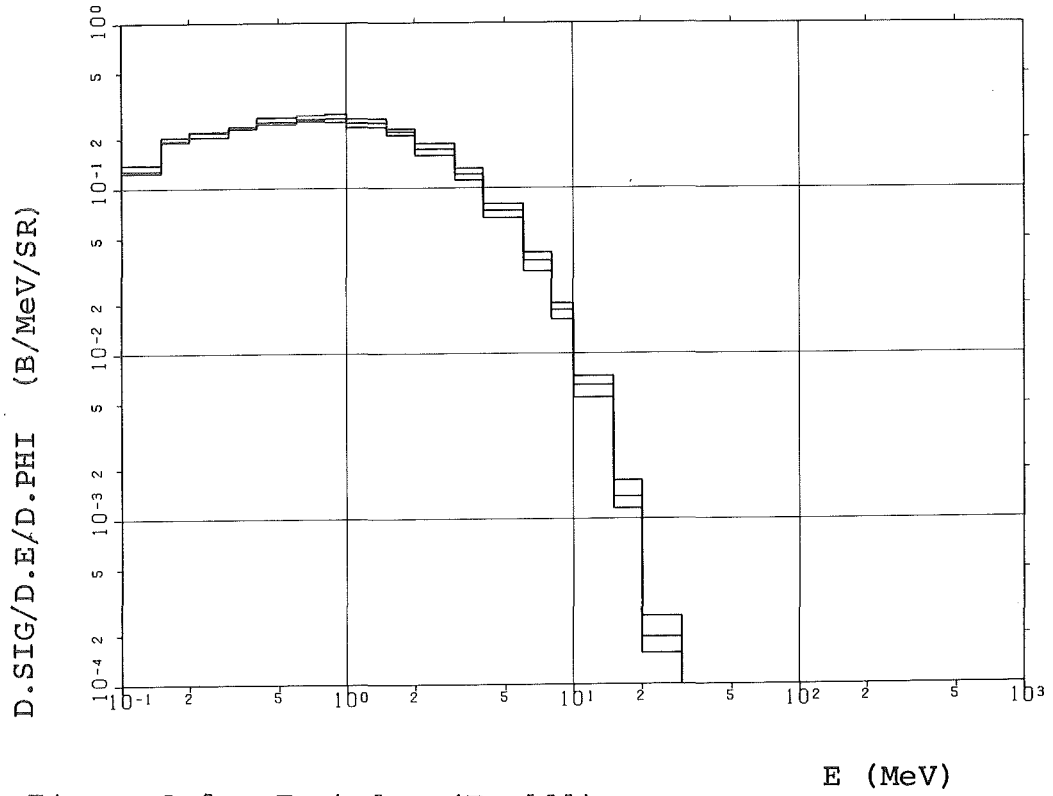


Figure A.3 Tantalum (Ta-181)

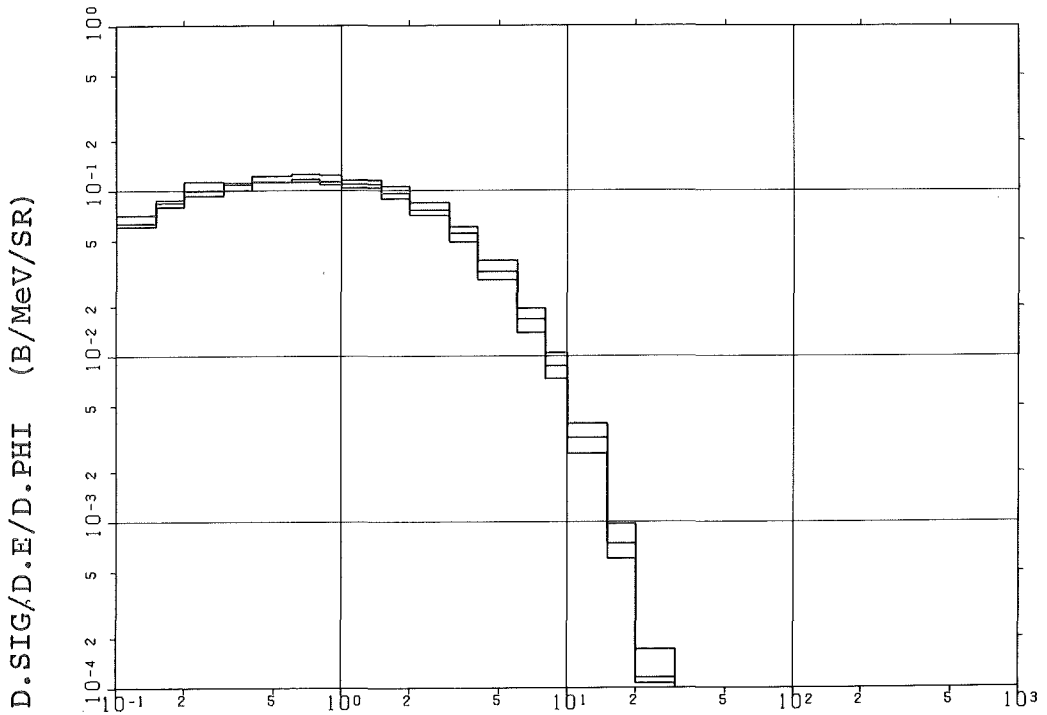
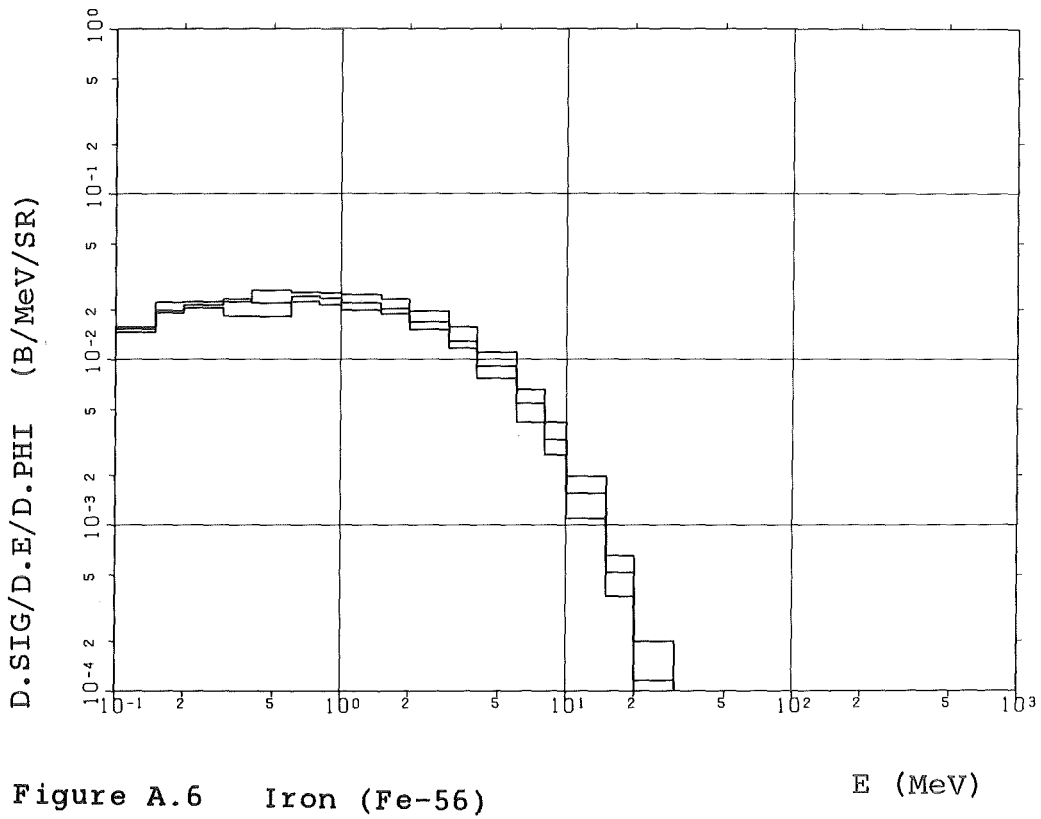
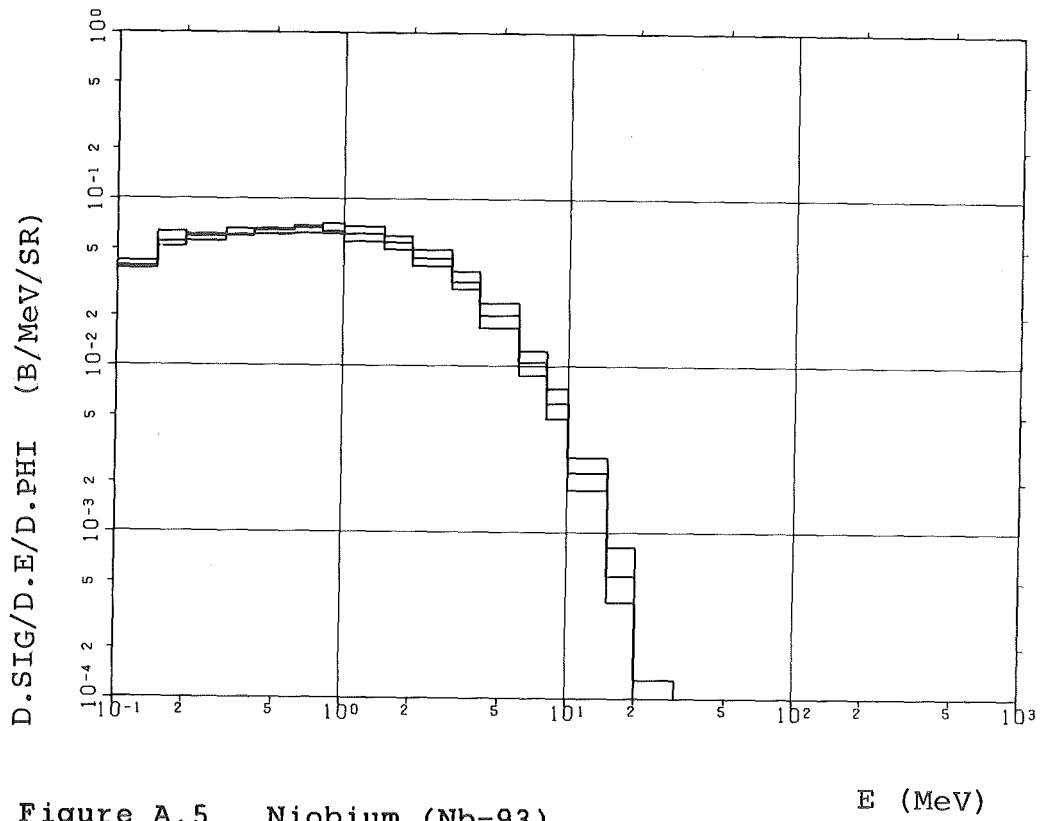
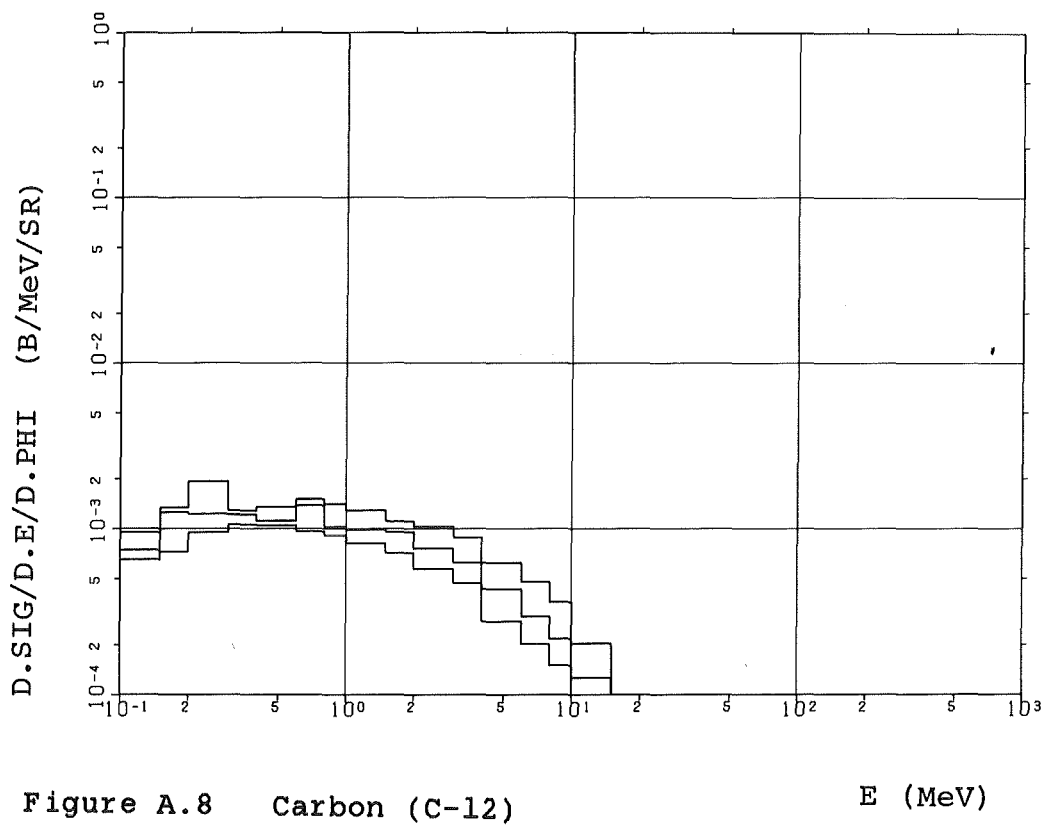
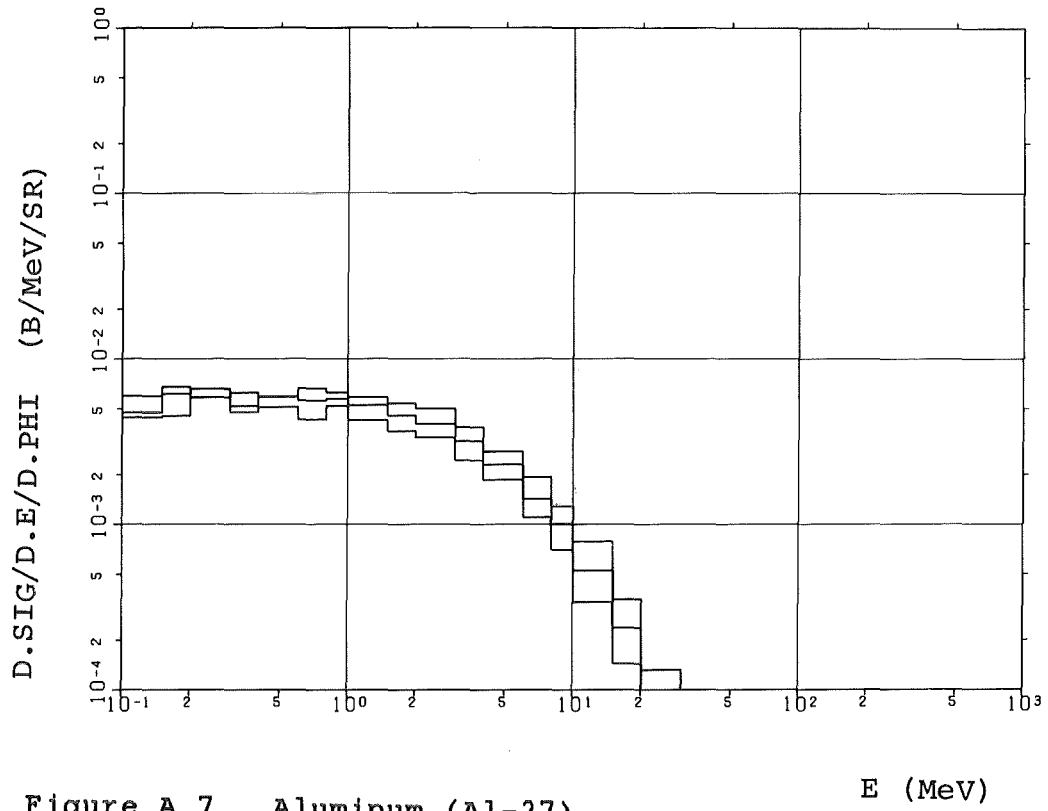


Figure A.4 Indium (In-115)

E (MeV)





APPENDIX B

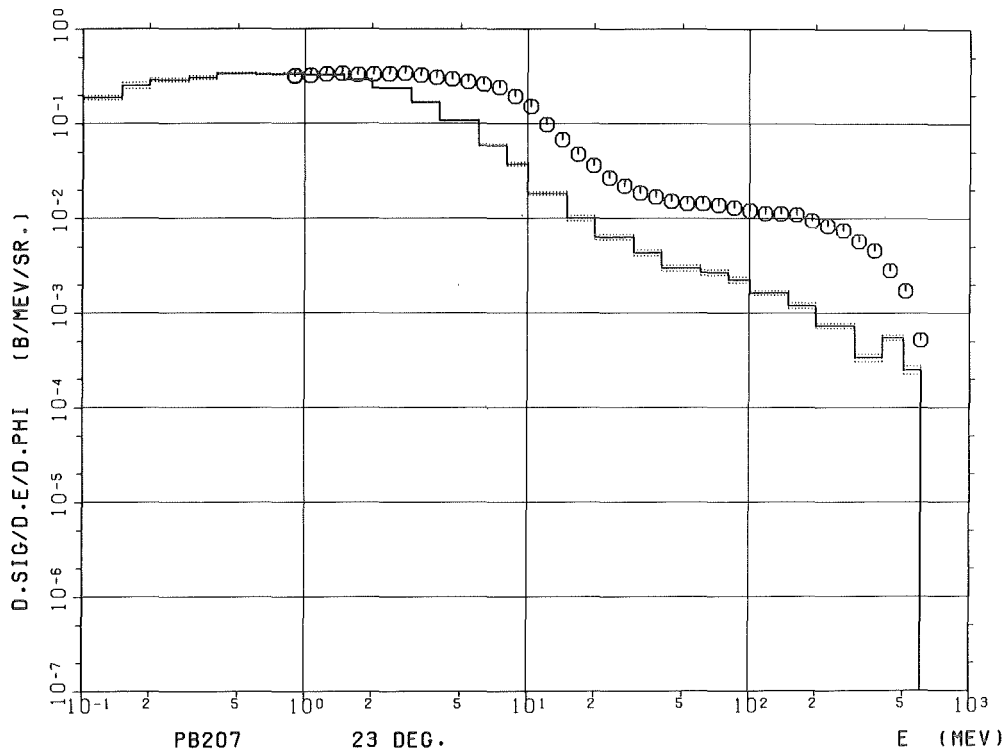
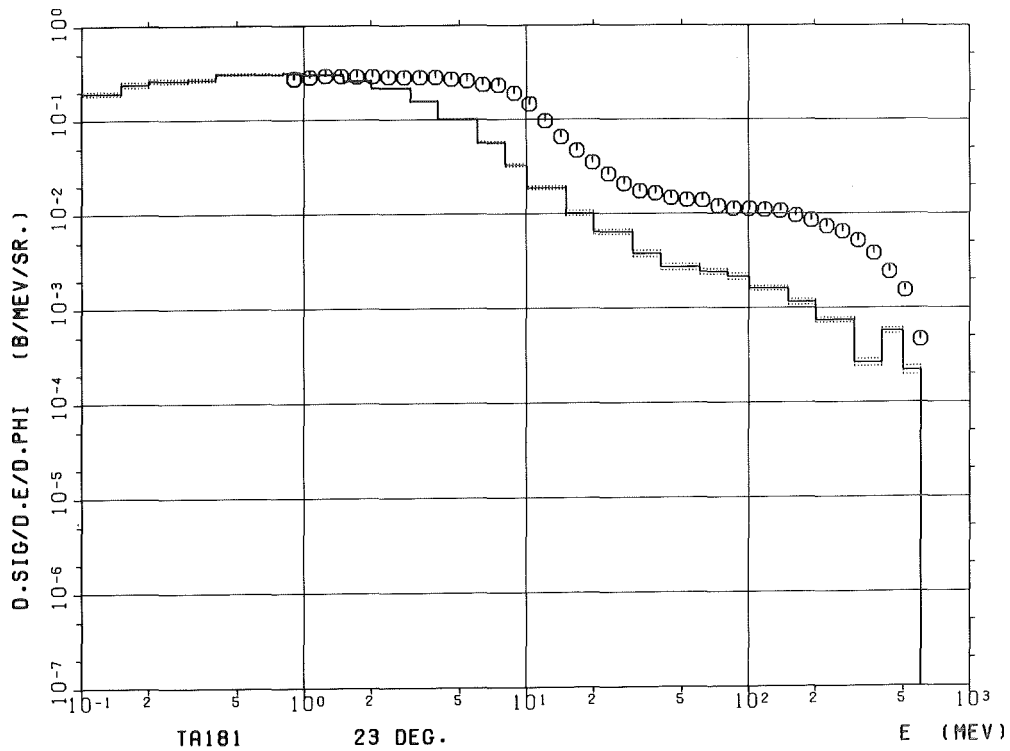
Comparison of Calculated and Measured Double  
Differential Neutron Production Cross Sections  
at  $23^\circ$  for all Targets (Except Uranium)

Legend

Figures B.1-B.7

⊙ Experiments

⋮ Calculations Including Errors

Figure B.1 Lead (Pb-207),  $23^\circ$ Figure B.2 Tantalum (Ta-181),  $23^\circ$

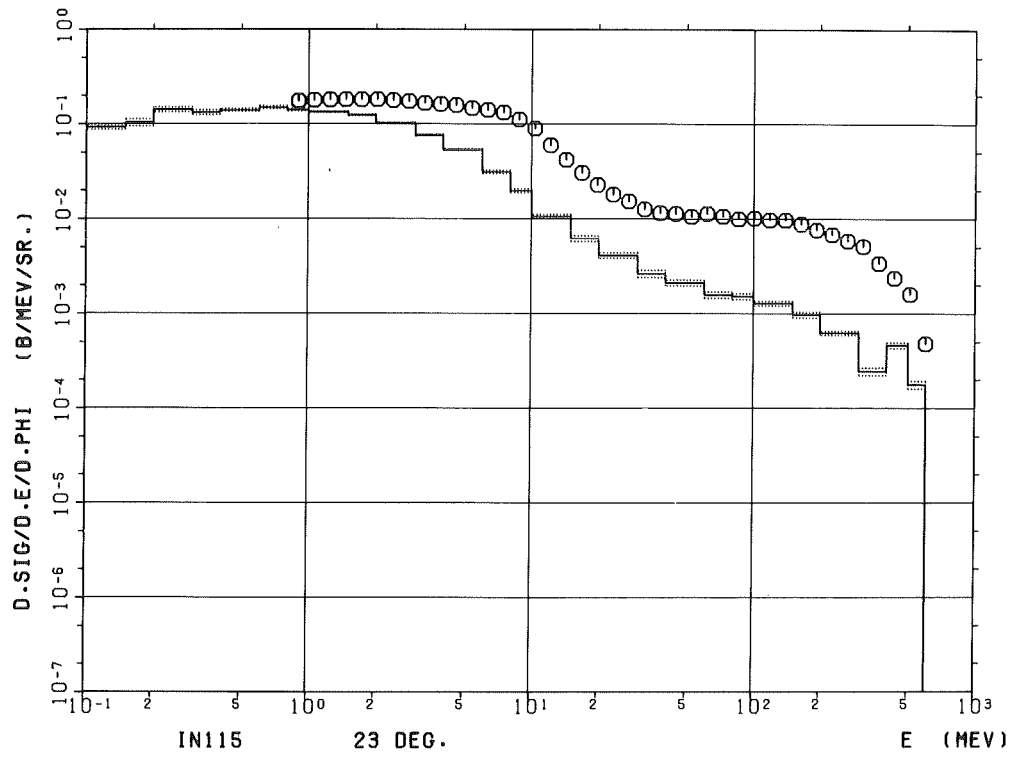


Figure B.3 Indium (In-115), 23°

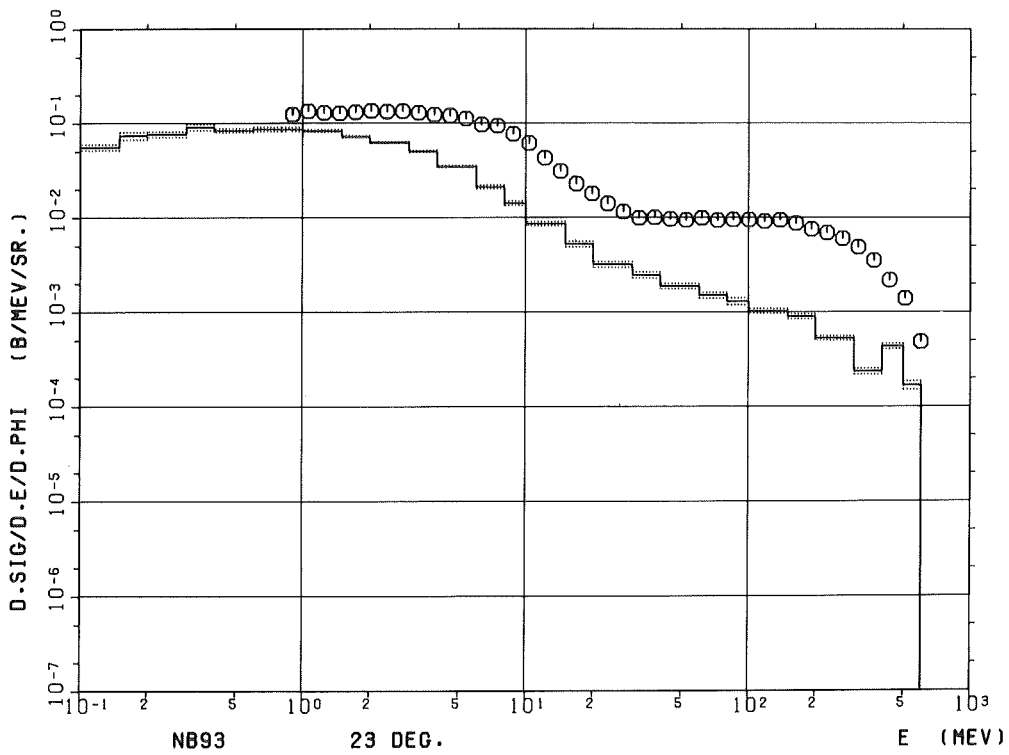


Figure B.4 Niobium (Nb-93), 23°

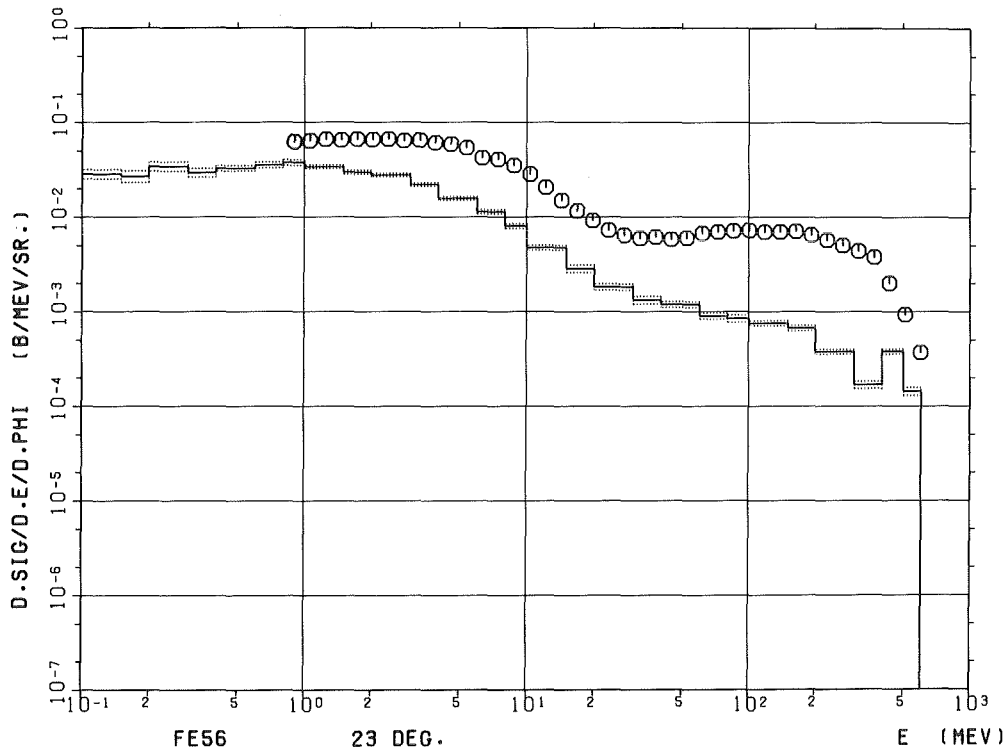


Figure B.5 Iron ( $Fe-56$ ),  $23^\circ$

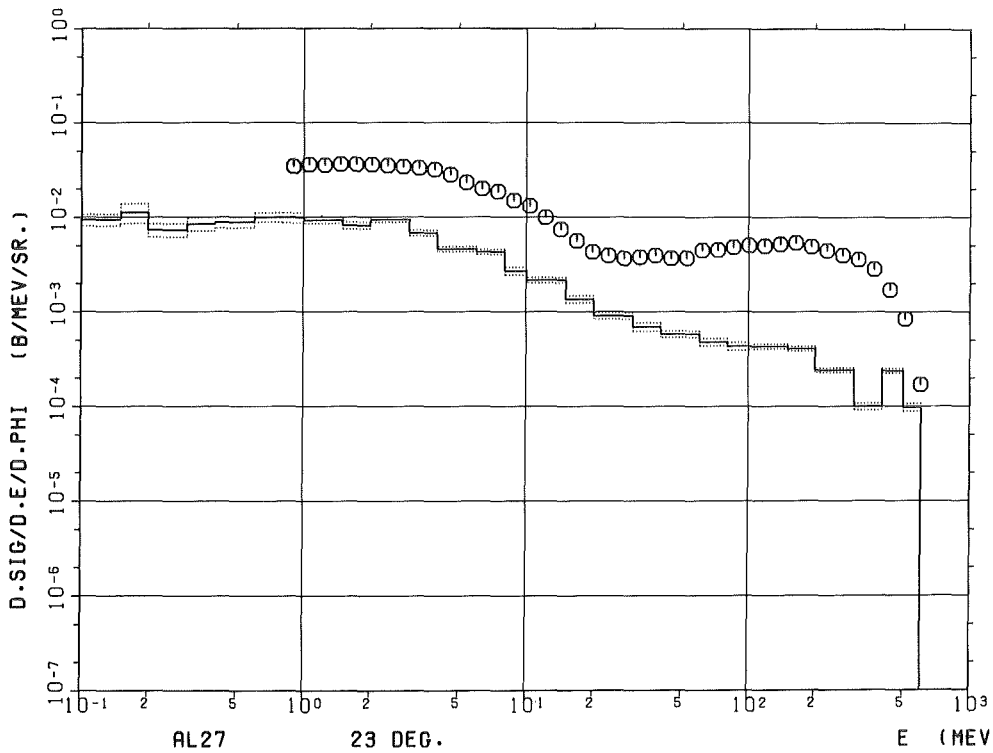


Figure B.6 Aluminum ( $Al-27$ ),  $23^\circ$



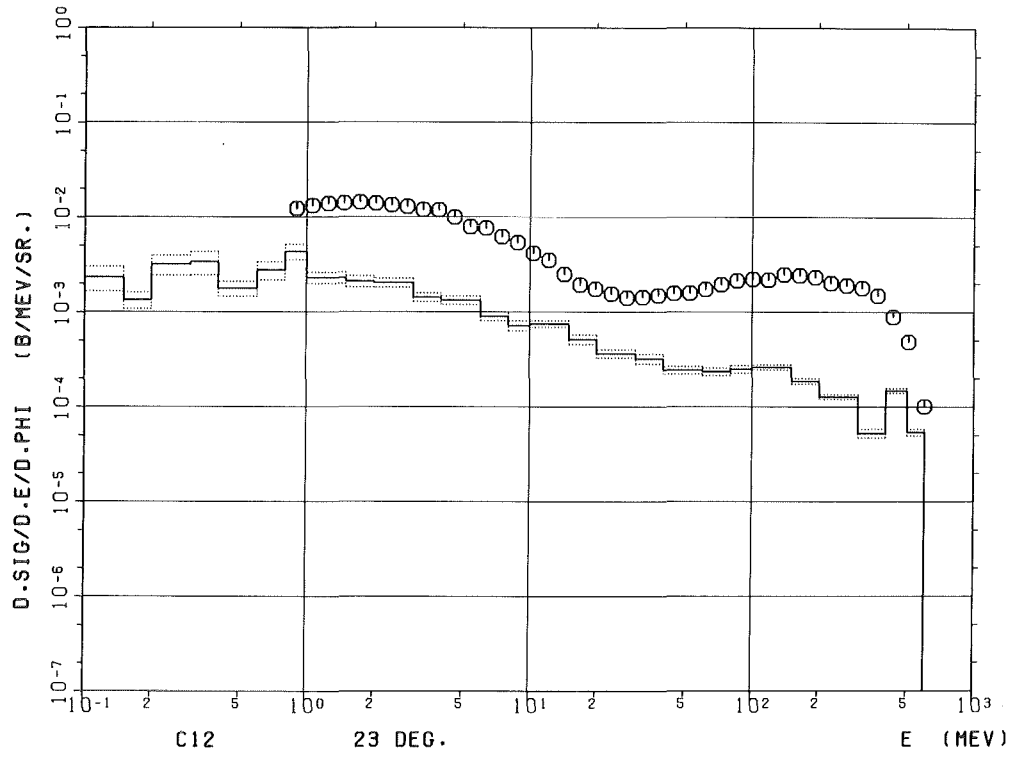


Figure B.7 Carbon (C-12),  $23^\circ$

APPENDIX C

Calculated Differential Particle Production Cross Section  
(n,p,d,t,He-3, He-4,  $\pi^+$ ,  $\pi^-$  and  $\pi^0$ )  
for all Targets  
(For Numerical Values see Appendix J)

Legend

Figures 1a-8a

○ neutrons

△ protons

+ He-3

X He-4

Figures 1b-8b

+ deuterons

X tritons

Figures 1c-8c

X  $\pi^+$

Y  $\pi^-$

Z  $\pi^0$

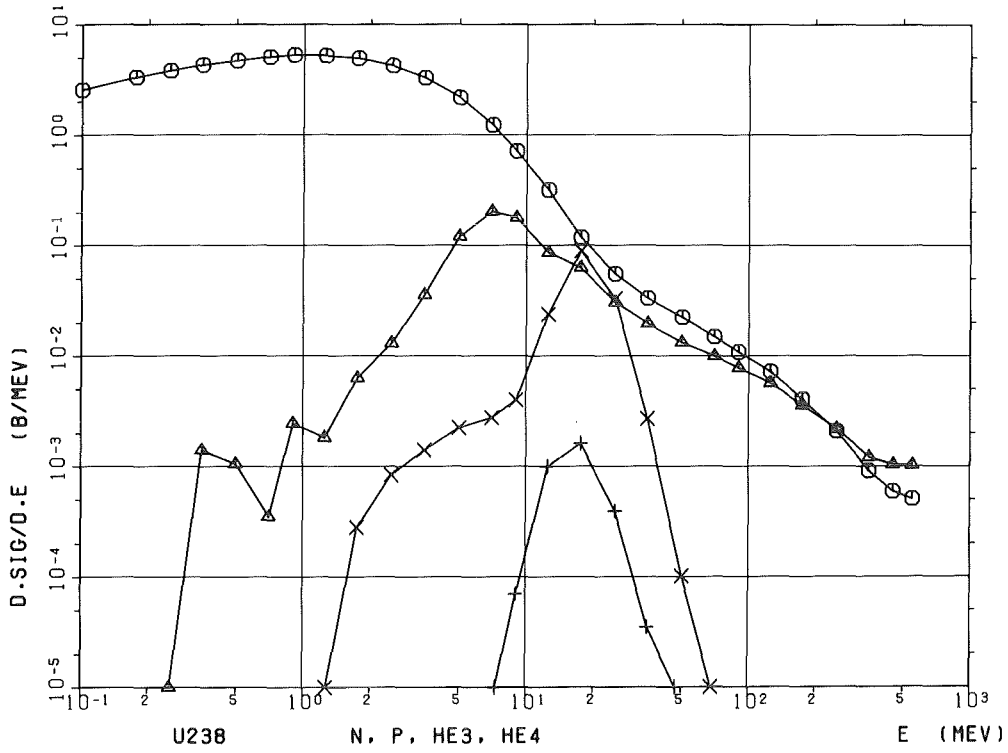


Figure C.1a Uranium (U-238), n,p,He-3 and He-4

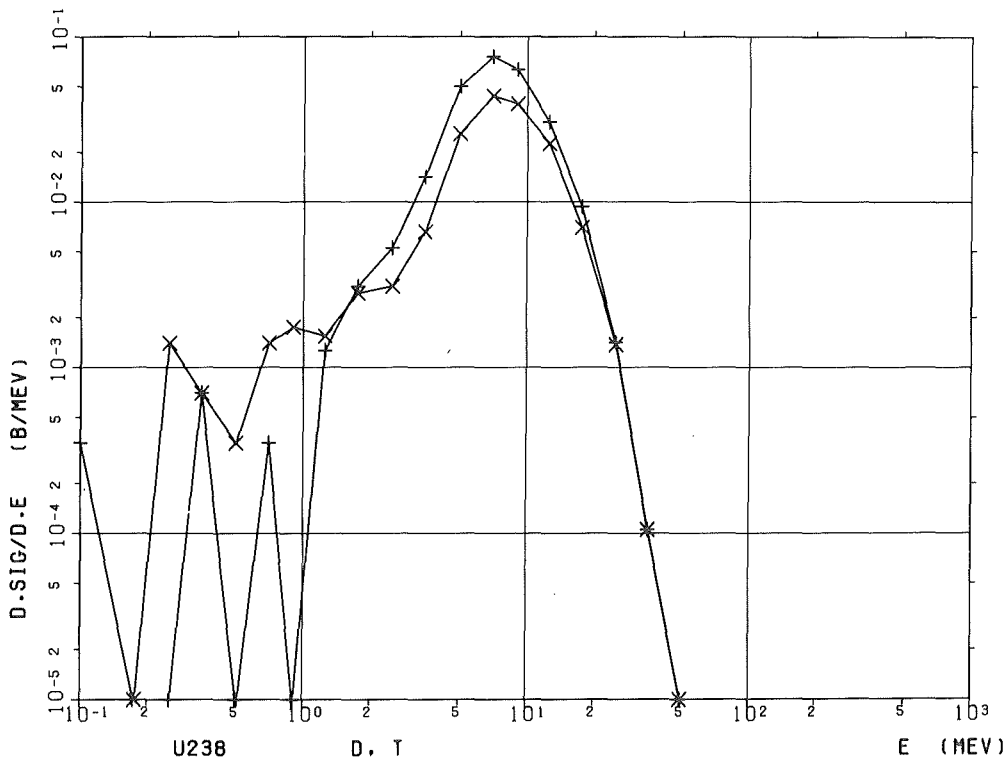


Figure C.1b Uranium (U-238), d and t

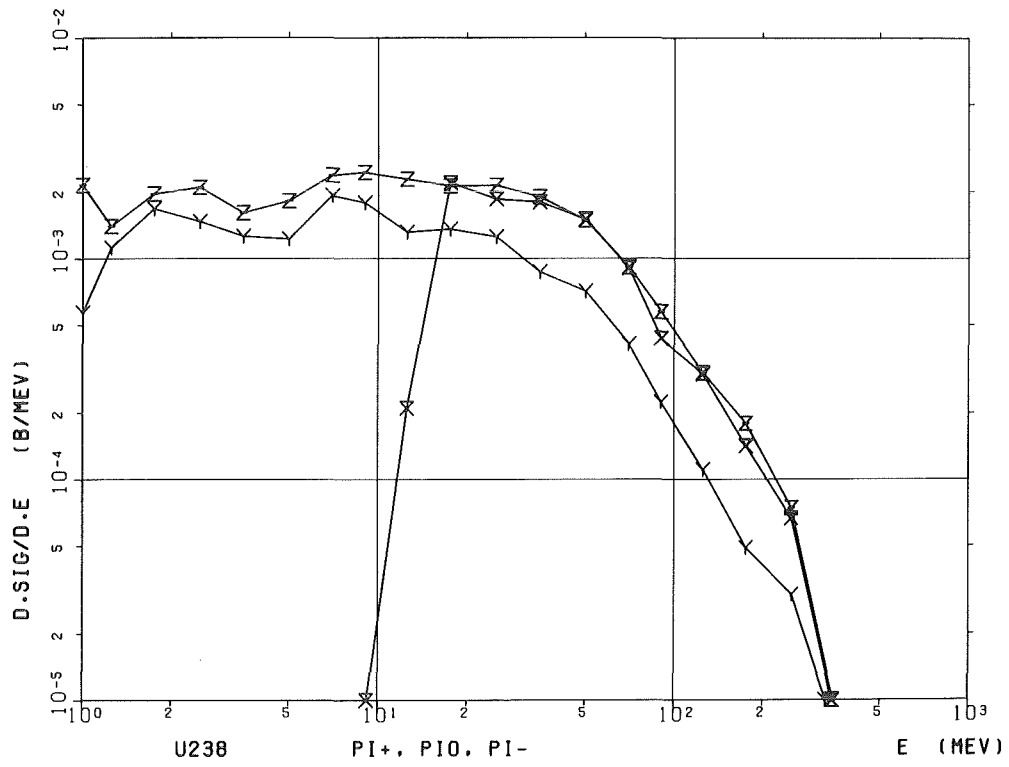


Figure C.1c Uranium (U-238),  $\pi^+$ ,  $\pi^-$  and  $\pi^0$

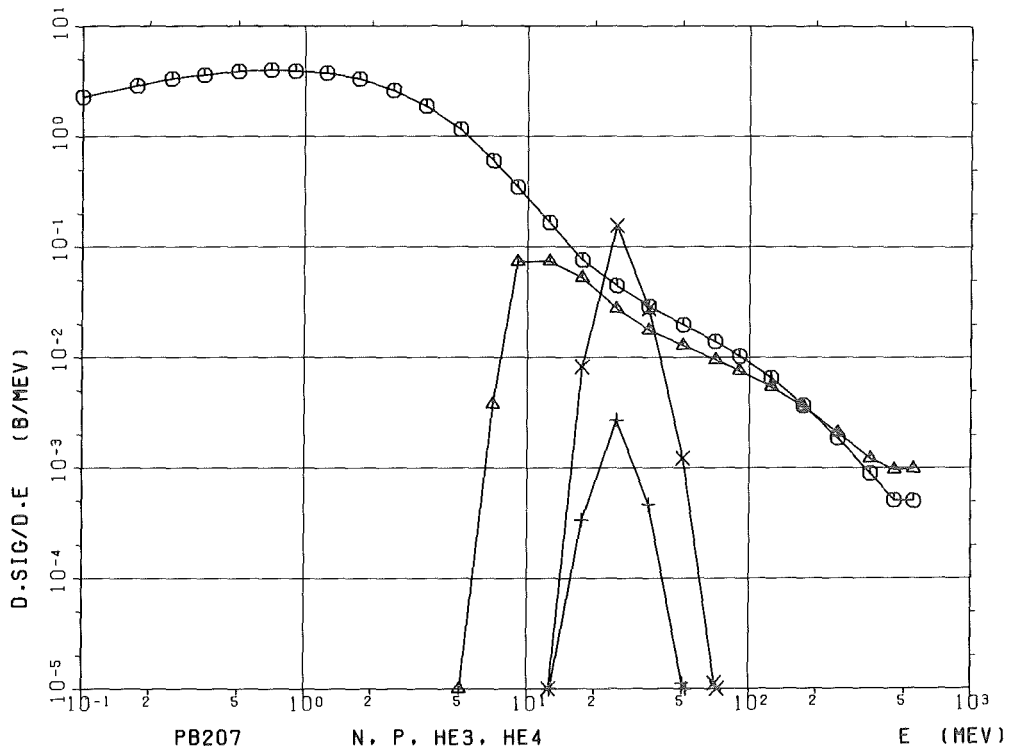


Figure C.2a Lead (Pb-207), n,p,He-3 and He-4

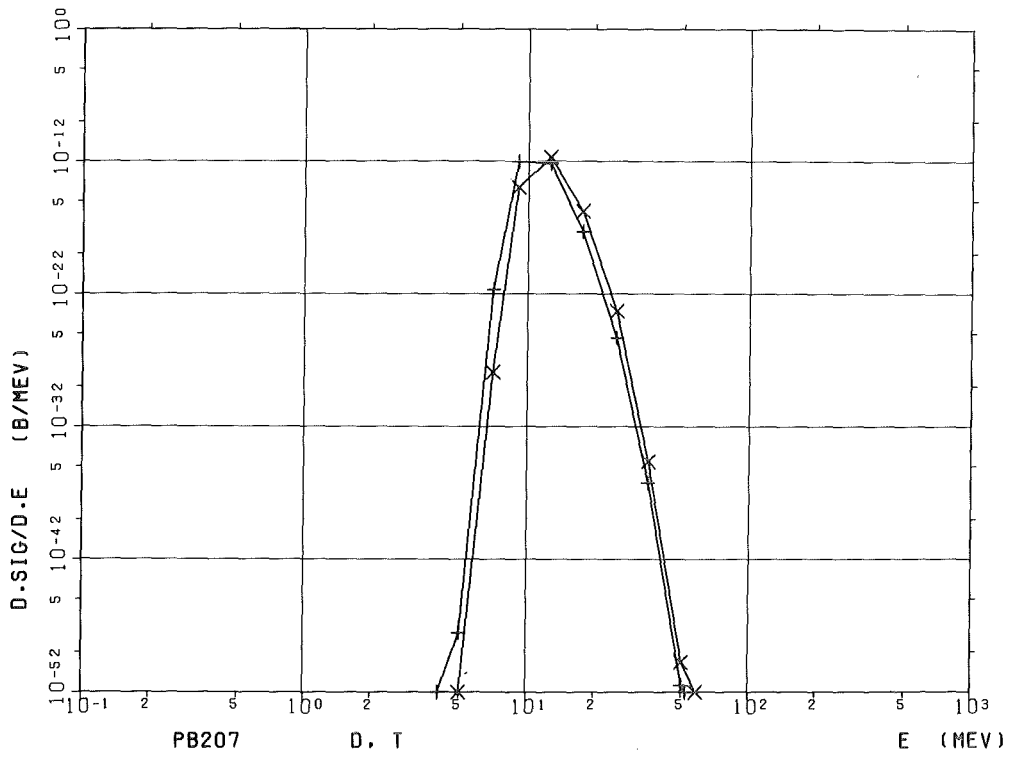


Figure C.2b Lead (Pb-207), d and t

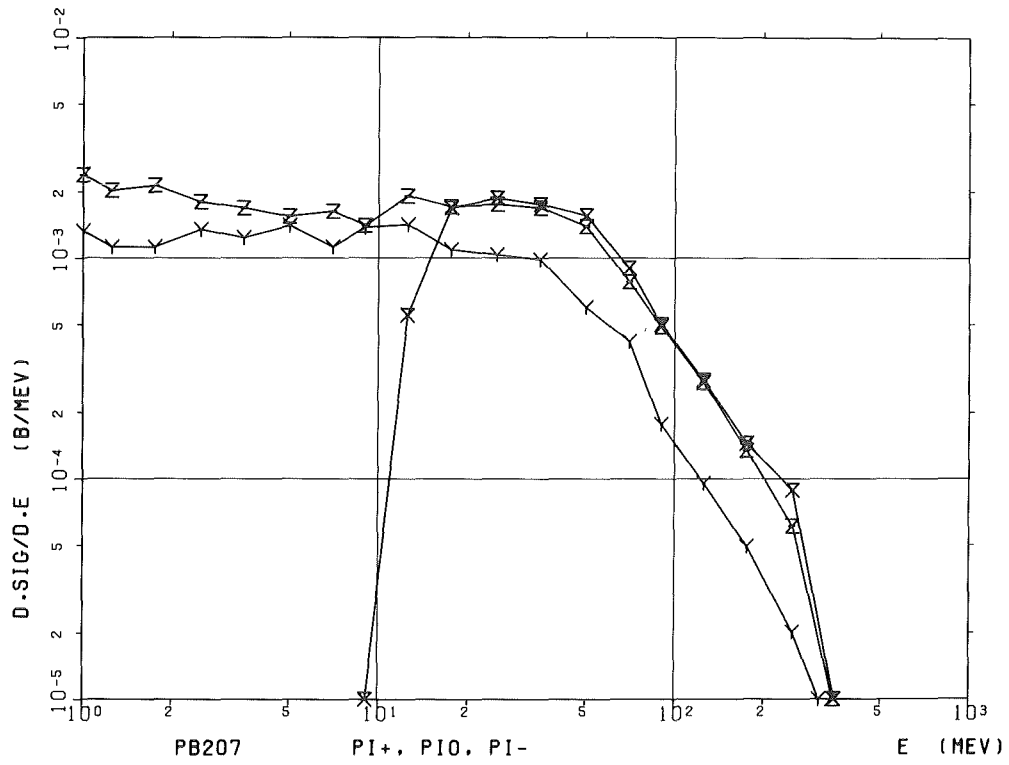


Figure C.2c Lead (Pb-207),  $\pi^+$ ,  $\pi^-$  and  $\pi^0$

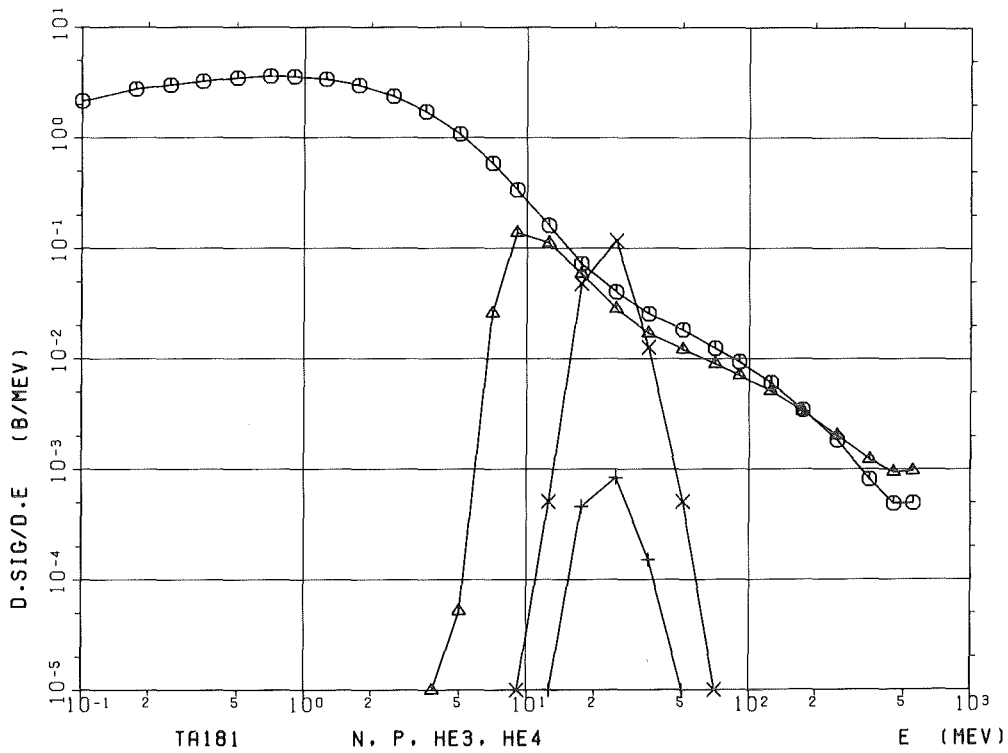


Figure C.3a Tantalum (Ta-181), n,p,He-3 and He-4

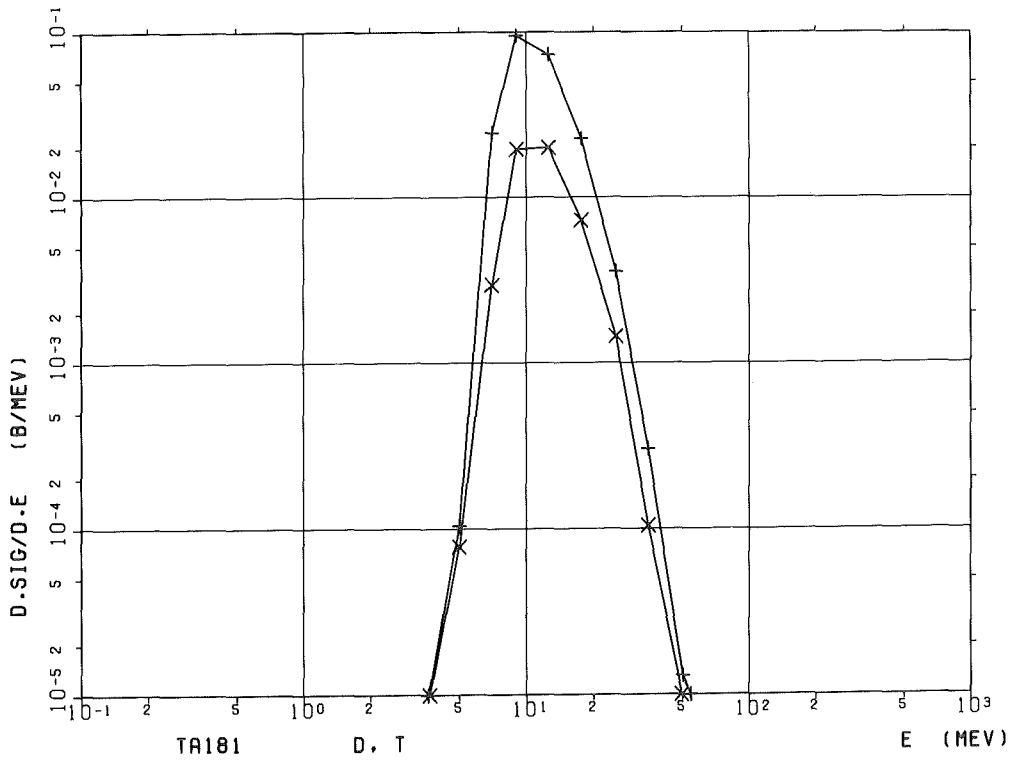


Figure C.3b Tantalum (Ta-181), d and t

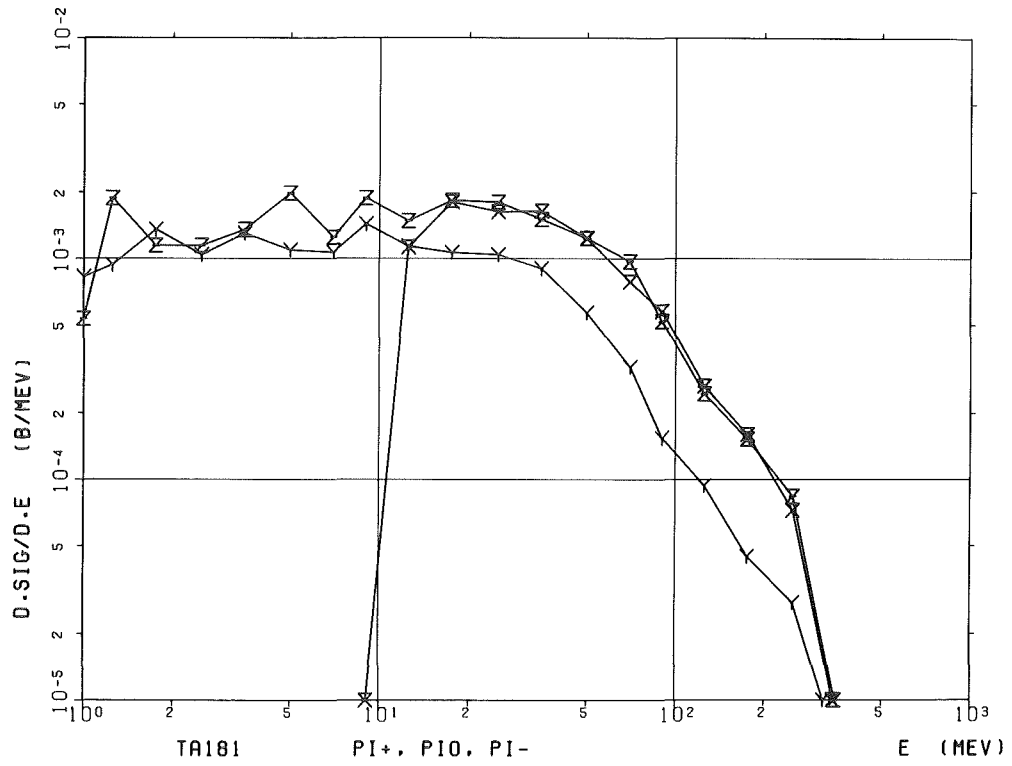
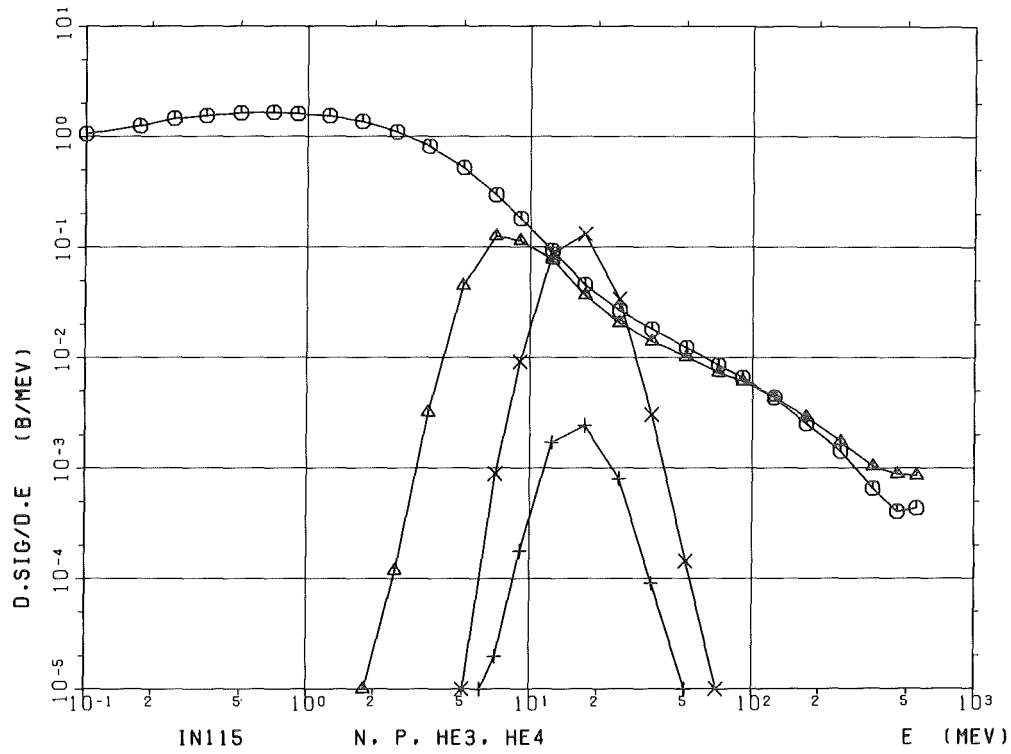


Figure C.3c Tantalum (Ta-181),  $\pi^+$ ,  $\pi^-$  and  $\pi^0$





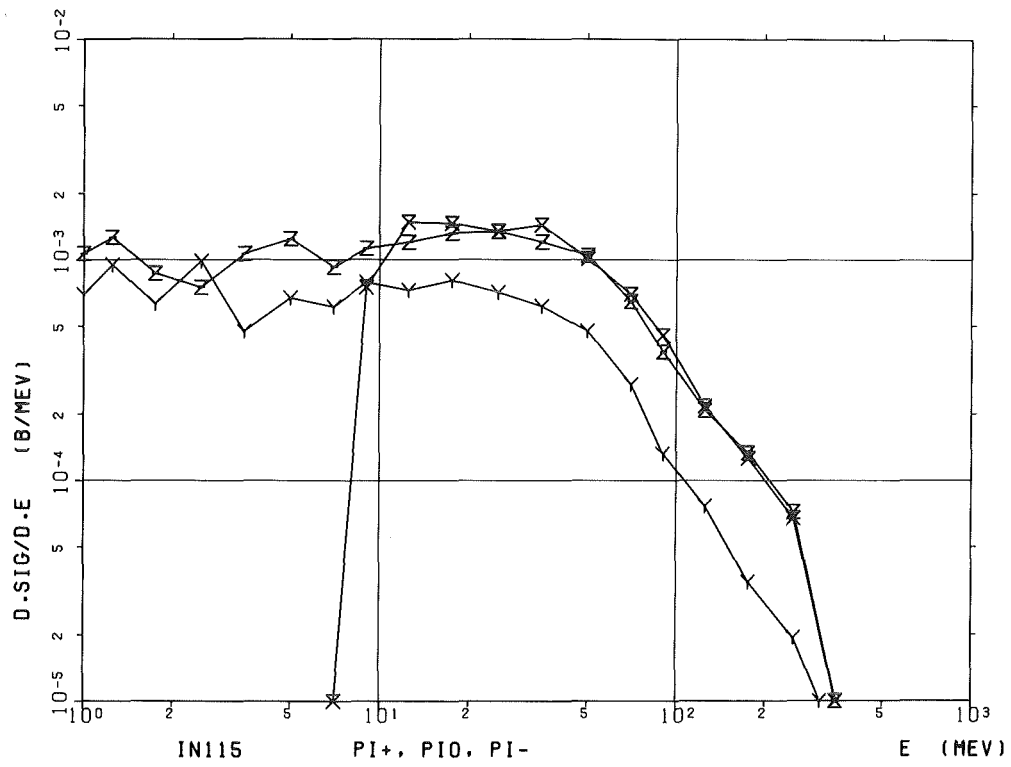


Figure C.4c Indium (In-115),  $\pi^+$ ,  $\pi^-$  and  $\pi^0$

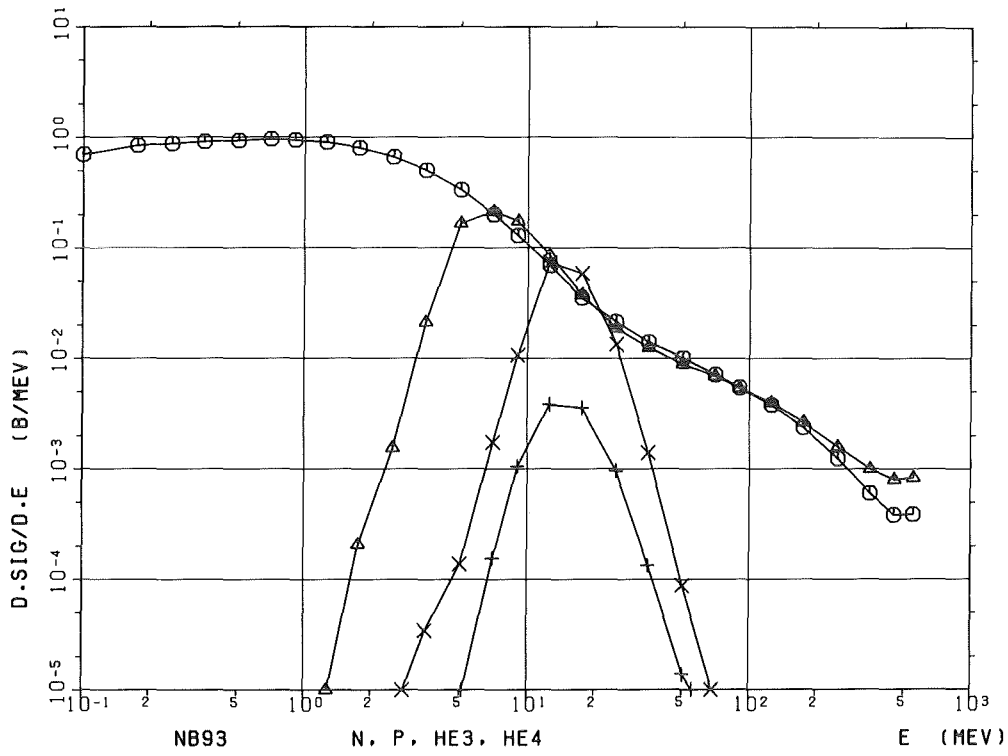


Figure C.5a Niobium (Nb-93), n,p,He-3 and He-4

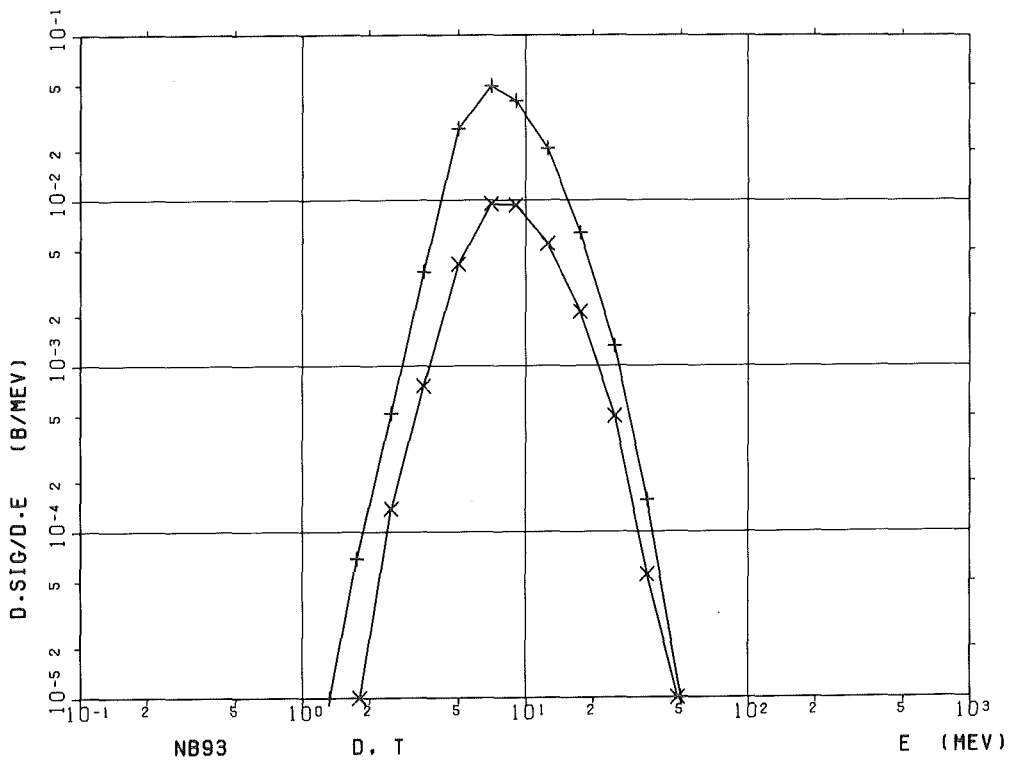


Figure C.5b Niobium (Nb-93), d and t

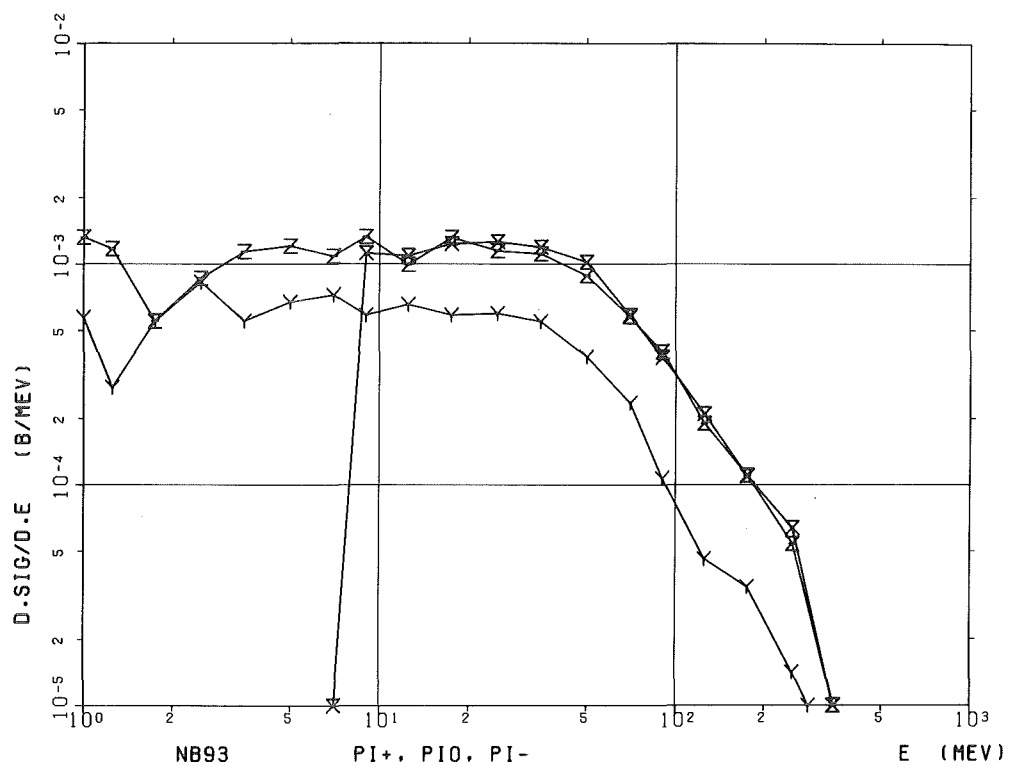


Figure C.5c Niobium (Nb-93),  $\pi^+$ ,  $\pi^-$  and  $\pi^0$

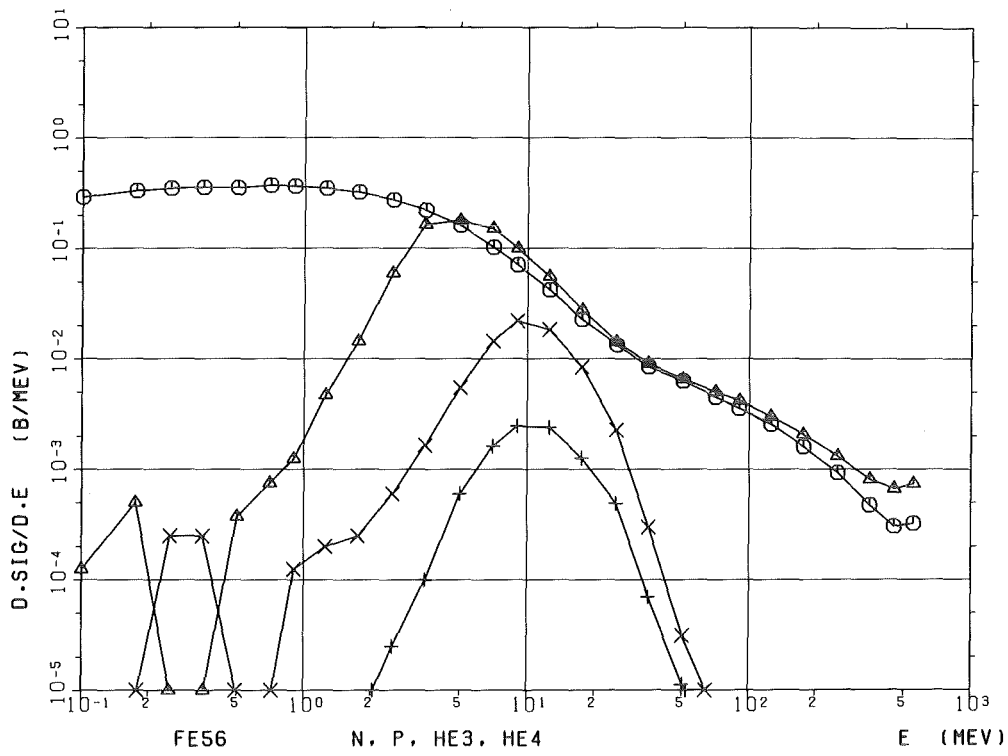


Figure C.6a Iron (Fe-56), n,p,He-3 and He-4

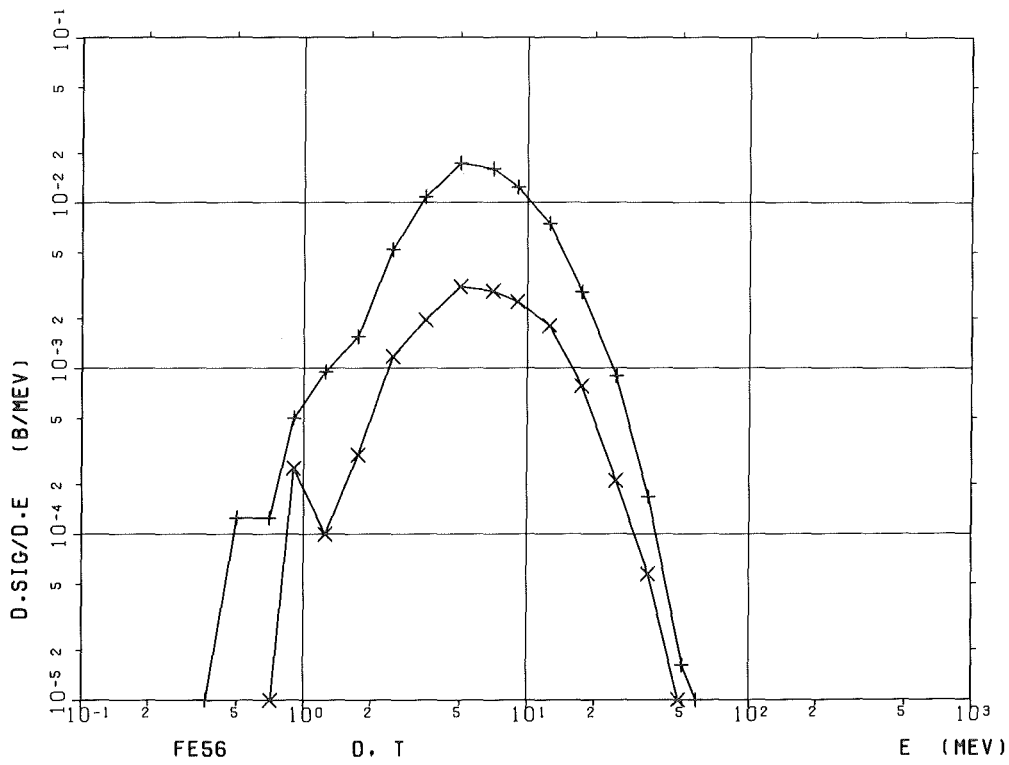


Figure C.6b Iron (Fe-56), d and t

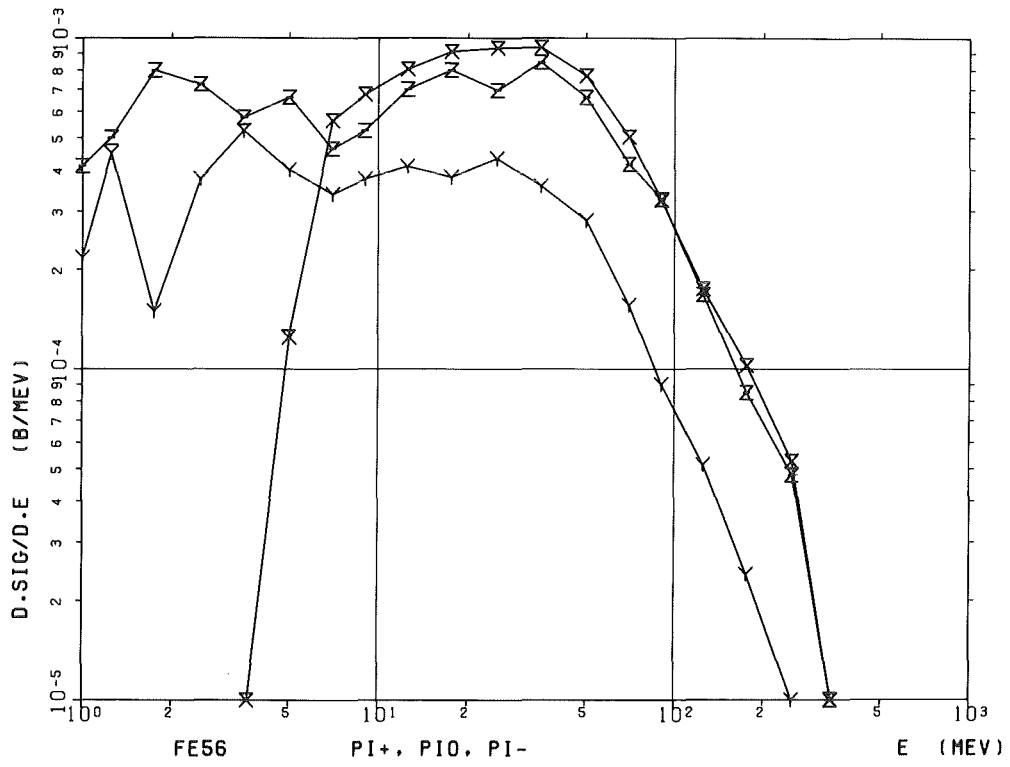


Figure C.6c Iron (Fe-56),  $\pi^+$ ,  $\pi^-$  and  $\pi^0$

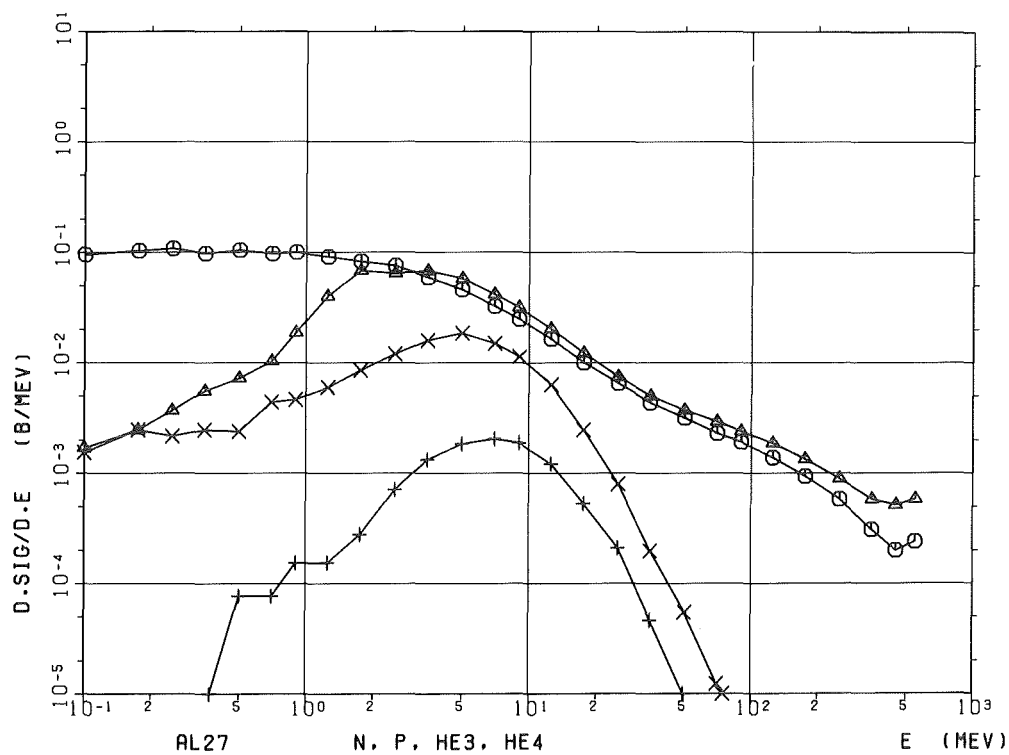


Figure C.7a Aluminum (Al-27), n,p,He-3 and He-4

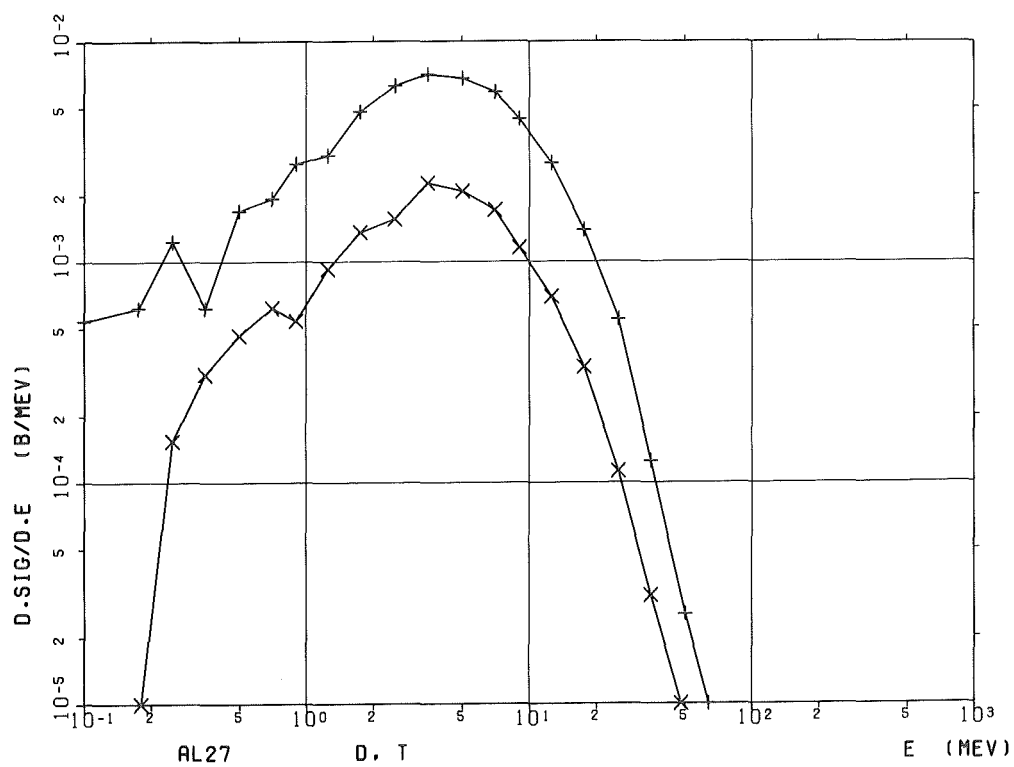


Figure C.7b Aluminum (Al-27), d and t

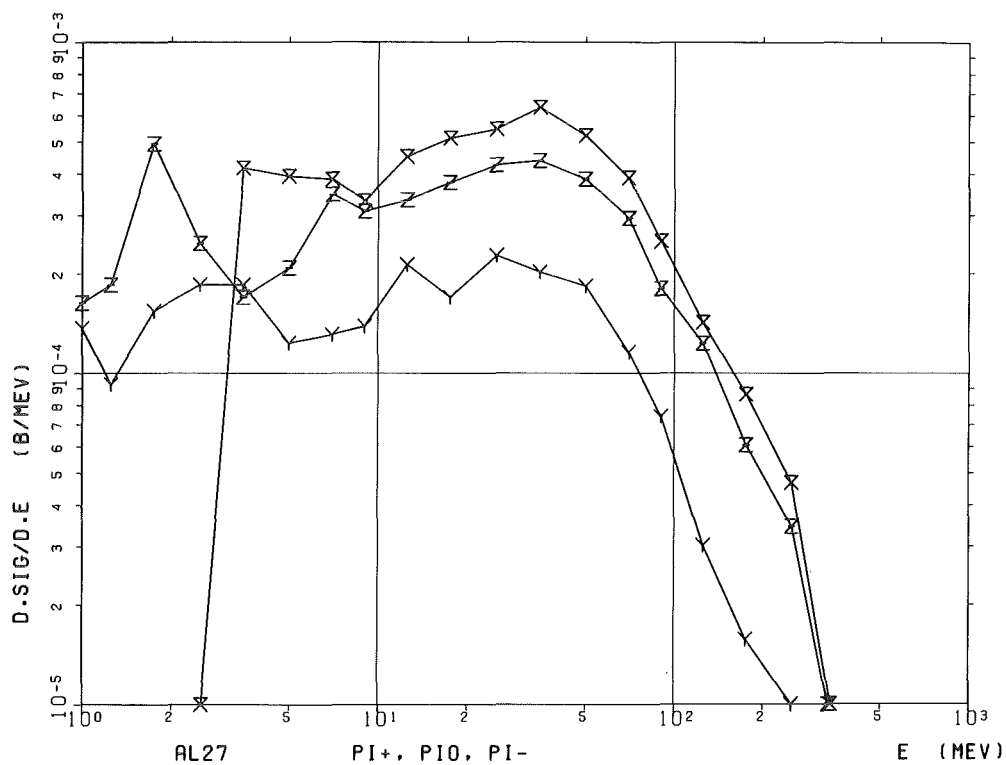


Figure C.7c Aluminum (Al-27),  $\pi^+$ ,  $\pi^-$  and  $\pi^0$



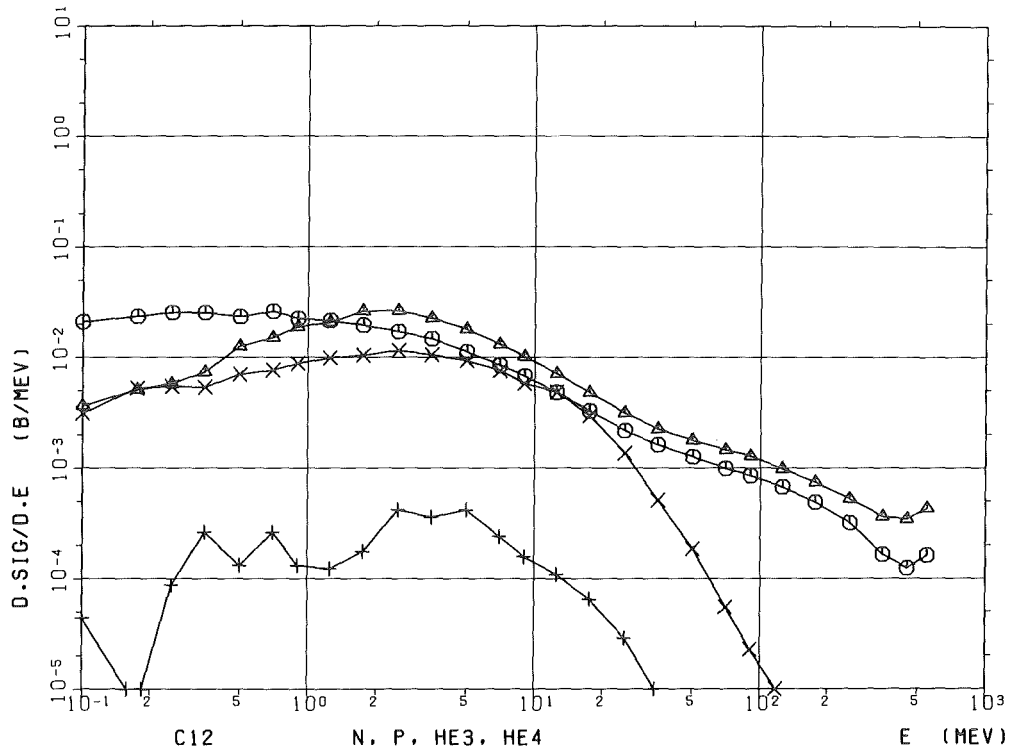


Figure C.8a Carbon (C-12), n,p,He-3 and He-4

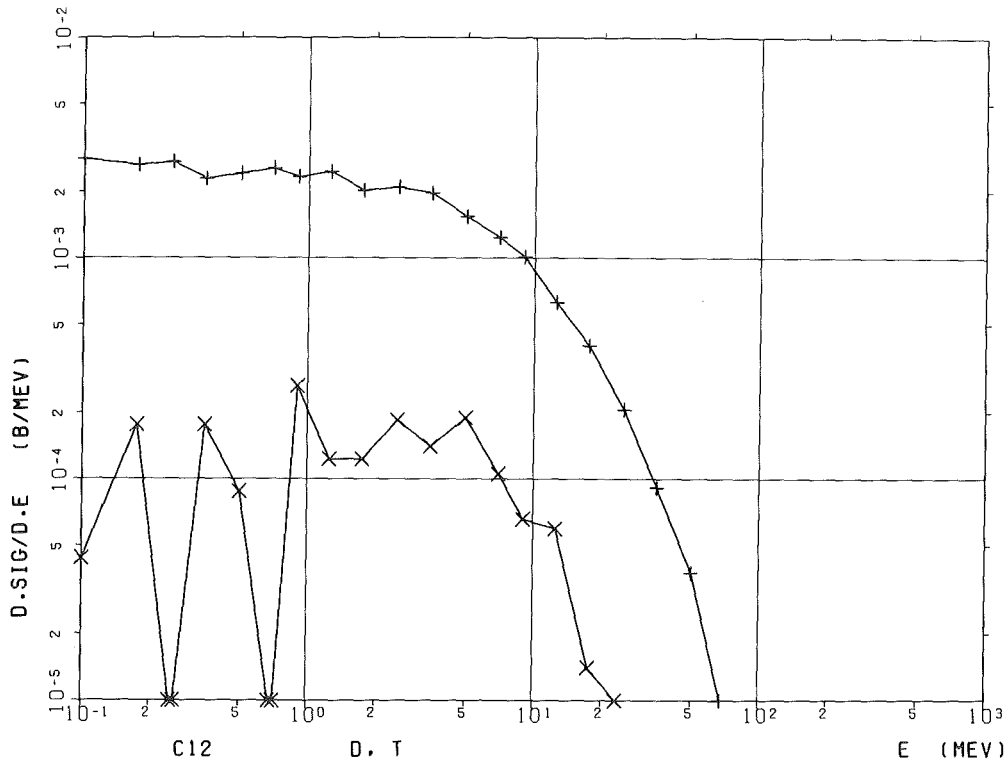


Figure C.8b Carbon (C-12), d and t

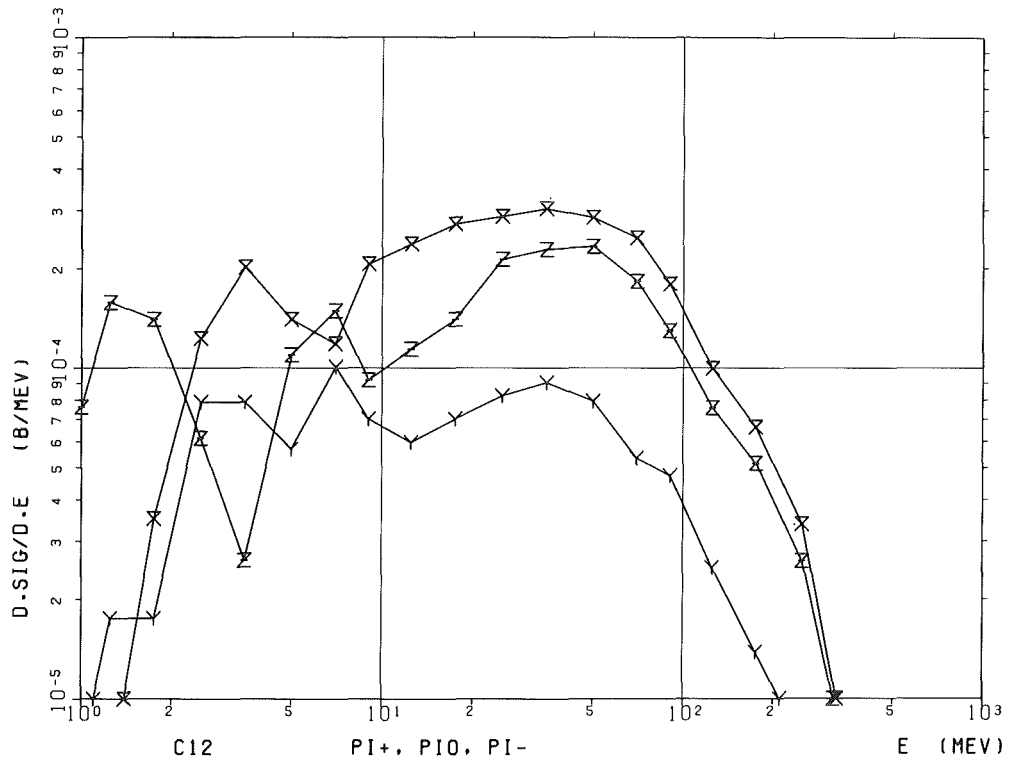


Figure C.8c Carbon (C-12),  $\pi^+$ ,  $\pi^-$  and  $\pi^0$

## APPENDIX D

Differential Neutron Yields versus Neutron  
Emission Angle for Five Energy Groups  
(For Numerical Values see Appendix I)

### Legend

- ⊙ Energy group 590-500 MeV
- △ Energy group 500-200 MeV
- + Energy group 200-100 MeV
- x Energy group 100- 60 MeV
- ◇ Energy group 60- 15 MeV

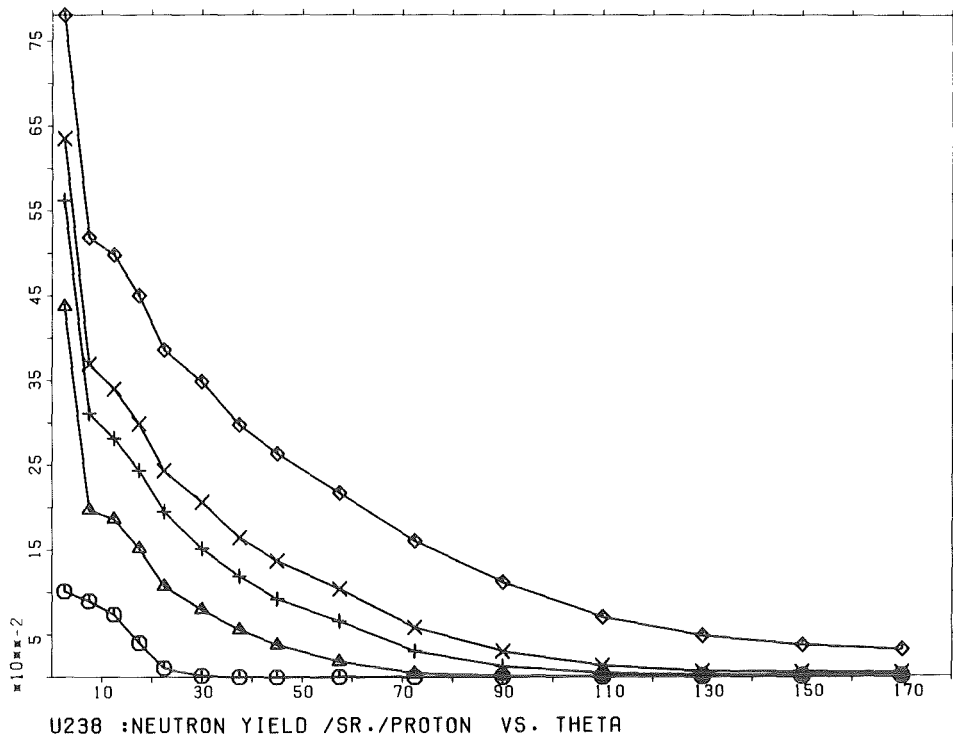


Figure D.1 Neutron yield for Uranium (U-238) vs. emission angle

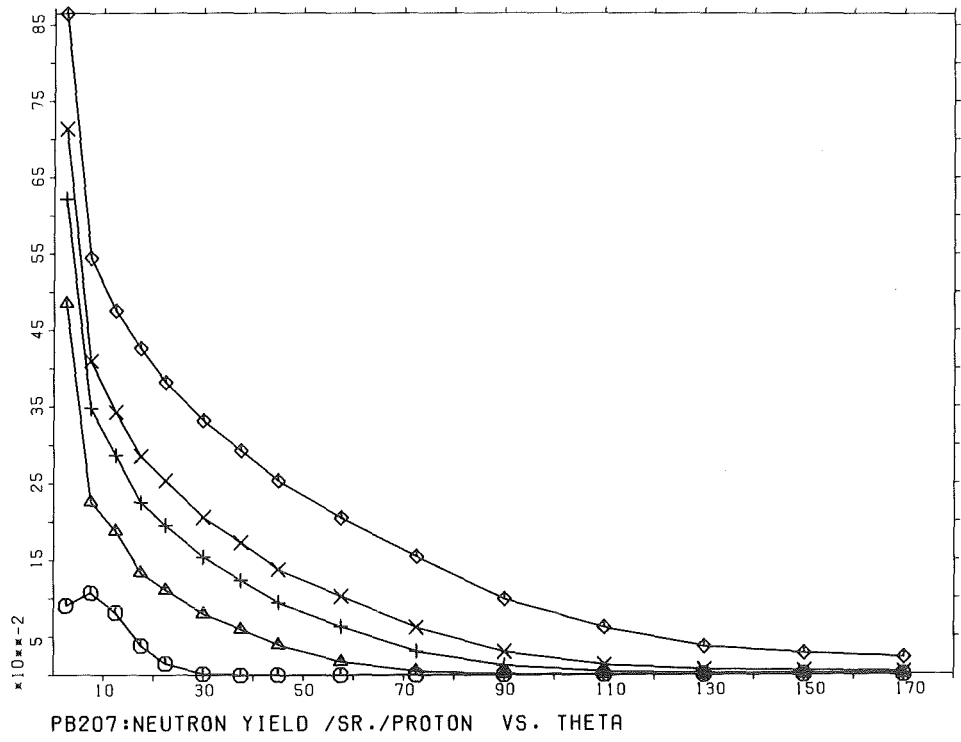


Figure D.2 Neutron yield for Lead (Pb-207) vs. emission angle

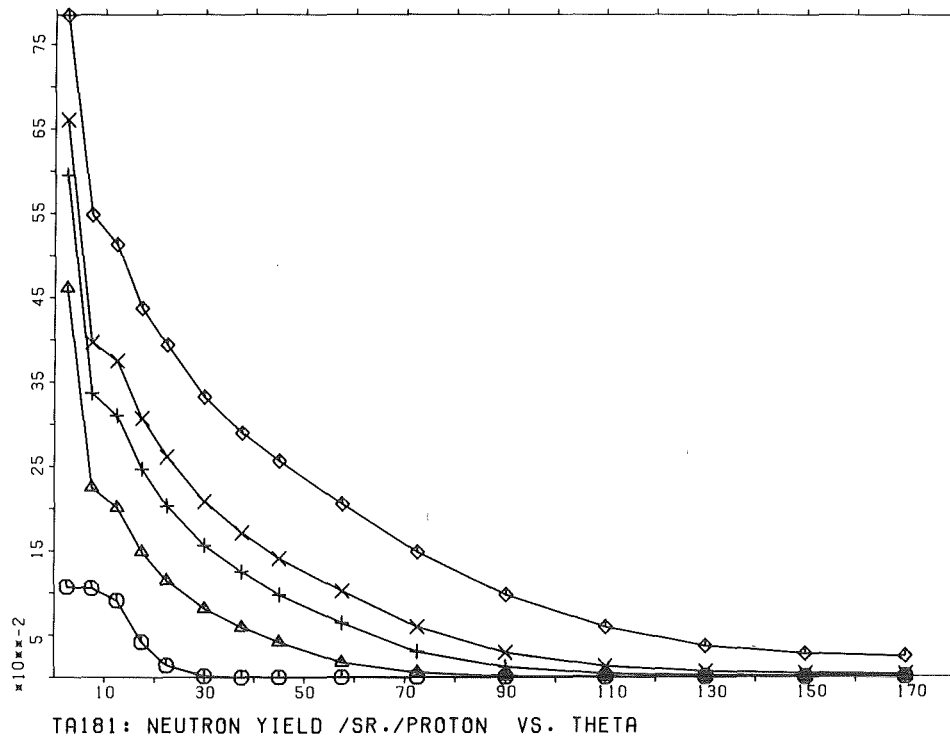


Figure D.3 Neutron yield for Tantalum (Ta-181) vs. emission angle

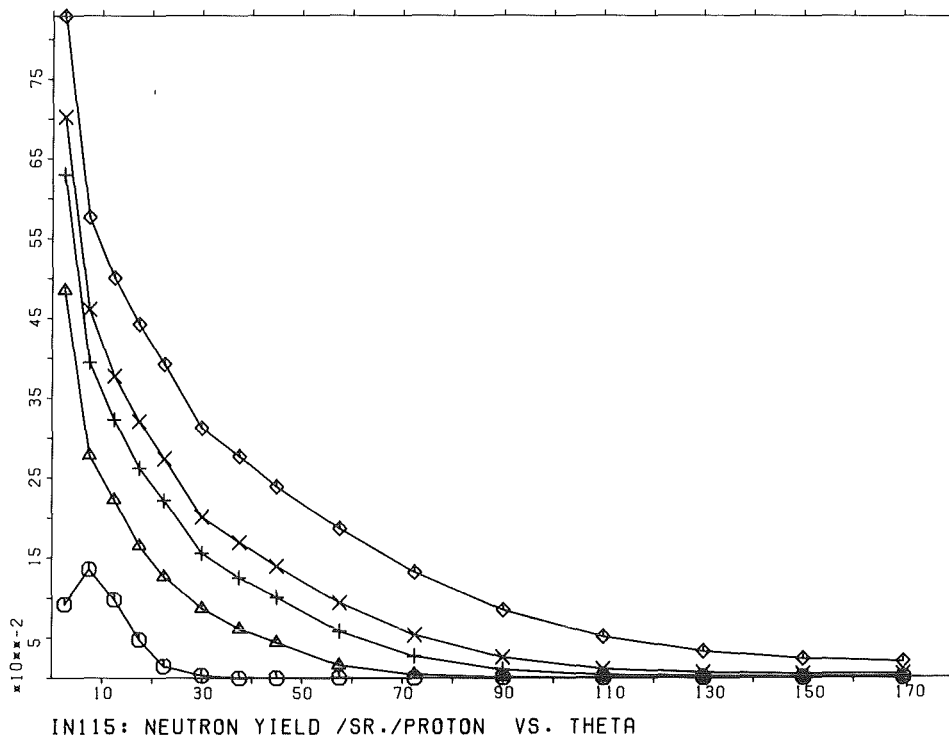


Figure D.4 Neutron yield for Indium (In-115) vs. emission angle

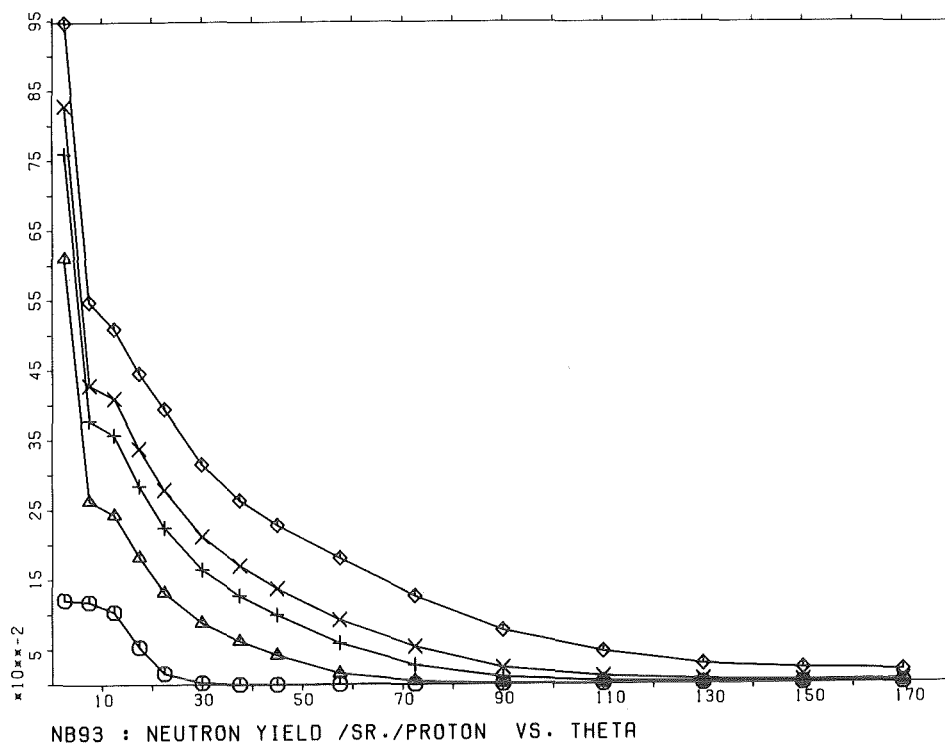


Figure D.5 Neutron yield for Niobium (Nb-93) vs. emission angle

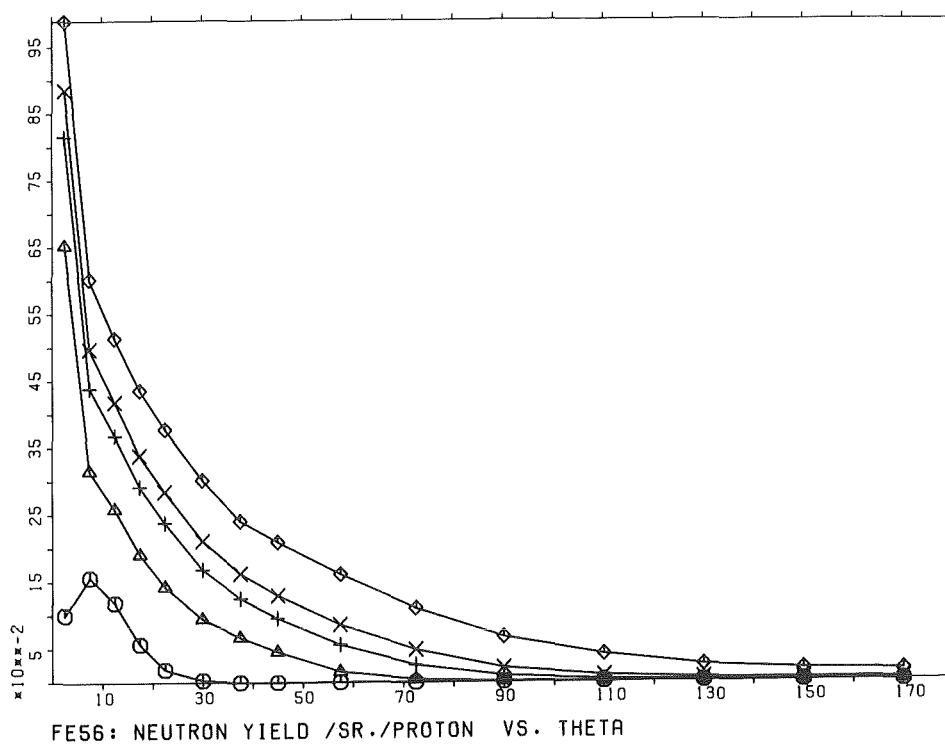


Figure D.6 Neutron yield for Iron (Fe-56) vs. emission angle

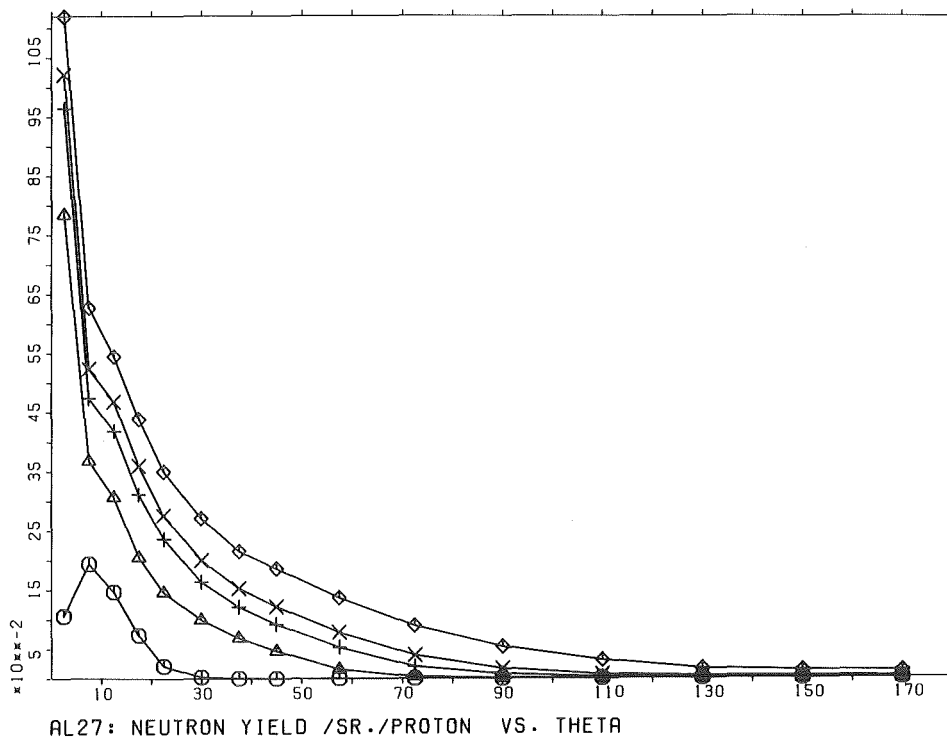


Figure D.7 Neutron yield for Aluminum (Al-27) vs. emission angle

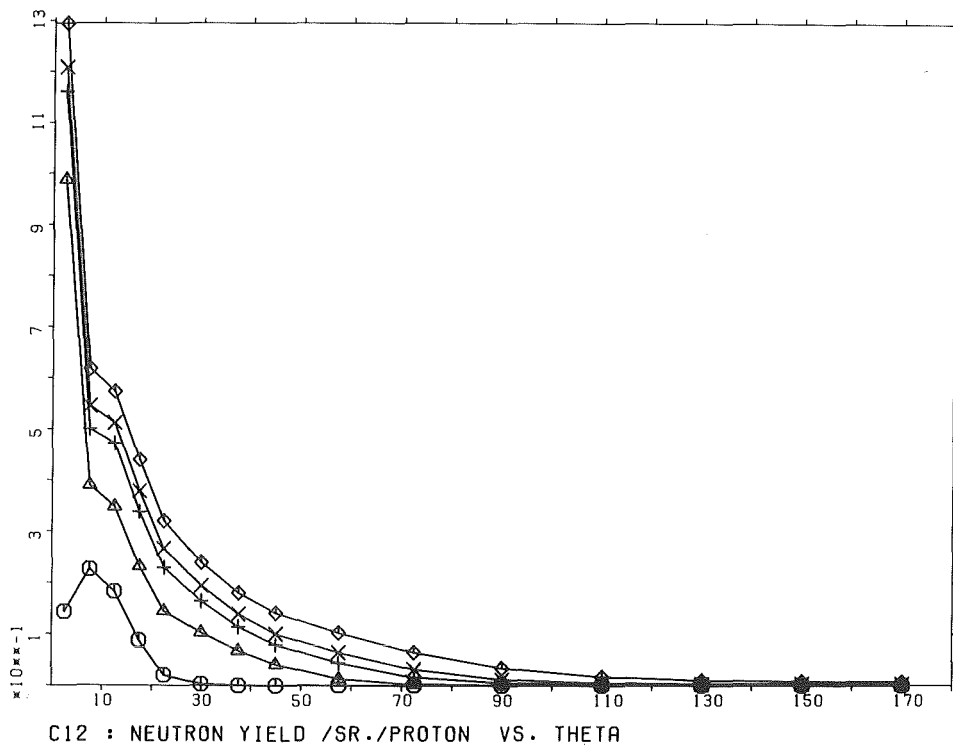


Figure D.8 Neutron yield for Carbon (C-12) vs. emission angle

APPENDIX E

Tables of Experimental Data:  
Double Differential Neutron Production Cross Sections  
of 590 MeV Protons



Table E.1 Target Material: Uranium (U-238)  
Angle: 30°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1σ)
1	0.899	0.08	0.07	.4013E+00	.4487E-01
2	1.057	0.09	0.08	.4059E+00	.4539E-01
3	1.244	0.11	0.09	.4161E+00	.4652E-01
4	1.463	0.13	0.11	.4392E+00	.4910E-01
5	1.722	0.15	0.13	.4231E+00	.4730E-01
6	2.026	0.18	0.15	.4189E+00	.4683E-01
7	2.383	0.21	0.18	.4076E+00	.4557E-01
8	2.804	0.24	0.21	.3578E+00	.4000E-01
9	3.299	0.29	0.25	.3202E+00	.3580E-01
10	3.881	0.34	0.30	.2777E+00	.3105E-01
11	4.566	0.40	0.35	.2246E+00	.2511E-01
12	5.373	0.46	0.41	.1749E+00	.1956E-01
13	6.321	0.55	0.48	.1346E+00	.1504E-01
14	7.436	0.64	0.57	.8428E-01	.9423E-02
15	8.749	0.76	0.67	.5840E-01	.6530E-02
16	10.293	0.89	0.79	.3794E-01	.4242E-02
17	12.108	1.05	0.93	.2550E-01	.2851E-02
18	14.244	1.23	1.09	.1848E-01	.2066E-02
19	16.758	1.45	1.28	.1516E-01	.1696E-02
20	19.716	1.71	1.51	.1333E-01	.1491E-02
21	23.195	2.01	1.77	.1197E-01	.1338E-02
22	27.288	2.36	2.09	.1078E-01	.1205E-02
23	32.105	2.78	2.45	.1040E-01	.1164E-02
24	37.769	3.27	2.89	.9517E-02	.1065E-02
25	44.434	3.85	3.39	.8300E-02	.9284E-03
26	52.275	4.55	4.01	.7712E-02	.8627E-03
27	61.499	5.89	5.13	.7097E-02	.7939E-03
28	72.350	7.63	6.55	.6801E-02	.7608E-03
29	85.115	9.91	8.39	.5956E-02	.6664E-03
30	100.131	12.92	10.74	.5170E-02	.5785E-03
31	117.796	16.89	13.75	.4333E-02	.4848E-03
32	138.577	22.16	17.64	.3620E-02	.4052E-03
33	163.023	29.23	22.65	.2964E-02	.3318E-03
34	191.780	38.76	29.12	.2241E-02	.2510E-03
35	225.607	51.76	37.48	.1846E-02	.2068E-03
36	265.399	69.69	48.30	.1328E-02	.1489E-03
37	312.205	94.78	62.33	.1124E-02	.1261E-03
38	367.263	130.58	80.55	.8445E-03	.9487E-04
39	432.024	182.87	104.21	.5419E-03	.6103E-04
40	508.198	261.75	134.93	.2898E-03	.3285E-04
41	597.797	386.19	174.82	.8462E-04	.9898E-05

Table E.2 Target Material: Uranium (U-238)  
Angle: 90°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.3636E+00	.4065E-01
2	1.057	0.09	0.08	.3848E+00	.4302E-01
3	1.244	0.11	0.09	.3887E+00	.4345E-01
4	1.463	0.13	0.11	.3947E+00	.4413E-01
5	1.722	0.15	0.13	.4023E+00	.4498E-01
6	2.026	0.18	0.15	.3775E+00	.4221E-01
7	2.383	0.21	0.18	.3552E+00	.3972E-01
8	2.804	0.24	0.21	.3167E+00	.3541E-01
9	3.299	0.29	0.25	.2714E+00	.3034E-01
10	3.881	0.34	0.30	.2350E+00	.2627E-01
11	4.566	0.40	0.35	.1940E+00	.2169E-01
12	5.373	0.46	0.41	.1427E+00	.1595E-01
13	6.321	0.55	0.48	.1030E+00	.1151E-01
14	7.436	0.64	0.57	.7866E-01	.8795E-02
15	8.749	0.76	0.67	.5547E-01	.6202E-02
16	10.293	0.89	0.79	.3652E-01	.4084E-02
17	12.108	1.05	0.93	.1977E-01	.2211E-02
18	14.244	1.23	1.09	.1236E-01	.1382E-02
19	16.758	1.45	1.28	.9059E-02	.1013E-02
20	19.716	1.71	1.51	.6125E-02	.6852E-03
21	23.195	2.01	1.77	.5209E-02	.5829E-03
22	27.288	2.36	2.09	.4272E-02	.4781E-03
23	32.105	2.78	2.45	.3934E-02	.4402E-03
24	37.769	3.27	2.89	.3438E-02	.3848E-03
25	44.434	3.87	3.41	.2977E-02	.3332E-03
26	52.275	4.99	4.35	.2697E-02	.3020E-03
27	61.499	6.46	5.56	.2148E-02	.2406E-03
28	72.350	8.38	7.10	.1780E-02	.1995E-03
29	85.115	10.90	9.08	.1492E-02	.1673E-03
30	100.131	14.22	11.62	.1230E-02	.1379E-03
31	117.796	18.61	14.88	.1097E-02	.1231E-03
32	138.577	24.46	19.06	.7838E-03	.8808E-04
33	163.023	32.30	24.45	.5708E-03	.6426E-04
34	191.780	42.92	31.40	.4427E-03	.4994E-04
35	225.607	57.44	40.37	.2632E-03	.2987E-04
36	265.399	77.55	51.95	.1799E-03	.2056E-04
37	312.205	105.87	66.94	.9474E-04	.1103E-04
38	367.263	146.57	86.35	.3473E-04	.4307E-05
39	432.024	206.62	111.49	.1363E-04	.1919E-05
40	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0

Table E.3 Target Material: Uranium (U-238)  
Angle: 150°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.2999E+00	.3353E-01
2	1.057	0.09	0.08	.3272E+00	.3658E-01
3	1.244	0.11	0.09	.3454E+00	.3862E-01
4	1.463	0.13	0.11	.3742E+00	.4184E-01
5	1.722	0.15	0.13	.3927E+00	.4390E-01
6	2.026	0.18	0.15	.3902E+00	.4362E-01
7	2.383	0.21	0.18	.3657E+00	.4089E-01
8	2.804	0.24	0.21	.3176E+00	.3551E-01
9	3.299	0.29	0.25	.2730E+00	.3052E-01
10	3.881	0.34	0.30	.2306E+00	.2579E-01
11	4.566	0.40	0.35	.1694E+00	.1894E-01
12	5.373	0.46	0.41	.1308E+00	.1462E-01
13	6.321	0.55	0.48	.9272E-01	.1037E-01
14	7.436	0.64	0.57	.6431E-01	.7190E-02
15	8.749	0.76	0.67	.3972E-01	.4441E-02
16	10.293	0.89	0.79	.2464E-01	.2755E-02
17	12.108	1.05	0.93	.1508E-01	.1686E-02
18	14.244	1.23	1.09	.9561E-02	.1069E-02
19	16.758	1.45	1.28	.6106E-02	.6831E-03
20	19.716	1.71	1.51	.5044E-02	.5644E-03
21	23.195	2.01	1.77	.4248E-02	.4754E-03
22	27.288	2.36	2.09	.3858E-02	.4318E-03
23	32.105	2.78	2.45	.2623E-02	.2937E-03
24	37.769	3.27	2.89	.2224E-02	.2491E-03
25	44.434	3.85	3.39	.1781E-02	.1996E-03
26	52.275	4.73	4.15	.1302E-02	.1460E-03
27	61.499	6.12	5.31	.1090E-02	.1223E-03
28	72.350	7.94	6.78	.9150E-03	.1027E-03
29	85.115	10.32	8.67	.6704E-03	.7540E-04
30	100.131	13.45	11.10	.5287E-03	.5955E-04
31	117.796	17.59	14.22	.4199E-03	.4739E-04
32	138.577	23.10	18.23	.2921E-03	.3311E-04
33	163.023	30.49	23.40	.2136E-03	.2432E-04
34	191.780	40.46	30.07	.1139E-03	.1317E-04
35	225.607	54.08	38.68	.5660E-04	.6761E-05
36	265.399	72.89	49.82	.3986E-04	.4884E-05
37	312.205	99.29	64.25	.2003E-04	.2649E-05
38	367.263	137.06	82.97	.1307E-04	.1856E-05
39	432.024	192.46	107.24	.1151E-04	.1676E-05
40	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0

Table E.4 Target Material: Lead (Pb-207)  
Angle: 23°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.3175E+00	.3549E-01
2	1.057	0.09	0.08	.3204E+00	.3583E-01
3	1.244	0.11	0.09	.3306E+00	.3696E-01
4	1.463	0.13	0.11	.3348E+00	.3743E-01
5	1.722	0.15	0.13	.3262E+00	.3647E-01
6	2.026	0.18	0.15	.3296E+00	.3685E-01
7	2.383	0.21	0.18	.3316E+00	.3707E-01
8	2.804	0.24	0.21	.3379E+00	.3778E-01
9	3.299	0.29	0.25	.3211E+00	.3590E-01
10	3.881	0.34	0.30	.3060E+00	.3421E-01
11	4.566	0.40	0.35	.2941E+00	.3288E-01
12	5.372	0.47	0.41	.2755E+00	.3081E-01
13	6.321	0.55	0.48	.2593E+00	.2899E-01
14	7.436	0.64	0.57	.2405E+00	.2688E-01
15	8.749	0.76	0.67	.1935E+00	.2163E-01
16	10.293	0.89	0.79	.1509E+00	.1687E-01
17	12.108	1.05	0.93	.9747E-01	.1090E-01
18	14.244	1.23	1.09	.6748E-01	.7545E-02
19	16.758	1.45	1.28	.4737E-01	.5297E-02
20	19.716	1.71	1.51	.3597E-01	.4022E-02
21	23.195	2.01	1.77	.2667E-01	.2982E-02
22	27.288	2.36	2.09	.2187E-01	.2446E-02
23	32.105	2.78	2.45	.1847E-01	.2066E-02
24	37.769	3.27	2.89	.1680E-01	.1879E-02
25	44.434	3.85	3.39	.1511E-01	.1690E-02
26	52.275	4.53	3.99	.1430E-01	.1599E-02
27	61.499	5.33	4.70	.1431E-01	.1601E-02
28	72.350	6.27	5.52	.1373E-01	.1536E-02
29	85.115	7.38	6.50	.1292E-01	.1445E-02
30	100.131	8.68	7.64	.1205E-01	.1348E-02
31	117.796	10.22	8.98	.1126E-01	.1259E-02
32	138.577	12.44	10.88	.1119E-01	.1252E-02
33	163.023	16.30	14.03	.1092E-01	.1222E-02
34	191.780	21.45	18.12	.9486E-02	.1061E-02
35	225.607	28.36	23.47	.8311E-02	.9296E-03
36	265.398	37.75	30.45	.7461E-02	.8347E-03
37	312.205	50.59	39.59	.5737E-02	.6419E-03
38	367.263	68.40	51.62	.4585E-02	.5131E-03
39	432.024	93.44	67.46	.2830E-02	.3169E-03
40	508.199	129.32	88.37	.1724E-02	.1932E-03
41	597.797	181.86	116.03	.5225E-03	.5887E-04

Table E.5 Target Material: Lead (Pb-207)  
Angle: 30°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.2590E+00	.2895E-01
2	1.057	0.09	0.08	.2734E+00	.3056E-01
3	1.244	0.11	0.09	.2650E+00	.2962E-01
4	1.463	0.13	0.11	.2762E+00	.3088E-01
5	1.722	0.15	0.13	.2641E+00	.2952E-01
6	2.026	0.18	0.15	.2497E+00	.2791E-01
7	2.383	0.21	0.18	.2639E+00	.2950E-01
8	2.804	0.24	0.21	.2216E+00	.2478E-01
9	3.299	0.29	0.25	.1953E+00	.2184E-01
10	3.881	0.34	0.30	.1729E+00	.1933E-01
11	4.566	0.40	0.35	.1429E+00	.1598E-01
12	5.373	0.46	0.41	.1129E+00	.1262E-01
13	6.321	0.55	0.48	.8511E-01	.9516E-02
14	7.436	0.64	0.57	.6255E-01	.6994E-02
15	8.749	0.76	0.67	.4518E-01	.5051E-02
16	10.293	0.89	0.79	.3184E-01	.3561E-02
17	12.108	1.05	0.93	.2195E-01	.2455E-02
18	14.244	1.23	1.09	.1568E-01	.1753E-02
19	16.758	1.45	1.28	.1196E-01	.1337E-02
20	19.716	1.71	1.51	.1066E-01	.1192E-02
21	23.195	2.01	1.77	.1019E-01	.1140E-02
22	27.288	2.36	2.09	.9021E-02	.1009E-02
23	32.105	2.78	2.45	.8063E-02	.9017E-03
24	37.769	3.27	2.89	.7506E-02	.8394E-03
25	44.434	3.85	3.39	.6214E-02	.6950E-03
26	52.275	4.55	4.01	.6339E-02	.7090E-03
27	61.499	5.89	5.13	.5837E-02	.6528E-03
28	72.350	7.63	6.55	.5300E-02	.5928E-03
29	85.115	9.91	8.39	.5076E-02	.5678E-03
30	100.131	12.92	10.74	.4379E-02	.4898E-03
31	117.796	16.89	13.75	.3630E-02	.4060E-03
32	138.577	22.16	17.64	.2927E-02	.3275E-03
33	163.023	29.23	22.65	.2529E-02	.2830E-03
34	191.780	38.76	29.12	.2021E-02	.2262E-03
35	225.607	51.76	37.48	.1518E-02	.1700E-03
36	265.399	69.69	48.30	.1158E-02	.1297E-03
37	312.205	94.78	62.33	.8674E-03	.9720E-04
38	367.263	130.58	80.55	.5605E-03	.6288E-04
39	432.024	182.87	104.21	.2386E-03	.2690E-04
40	508.198	261.75	134.93	.2081E-03	.2349E-04
41	597.797	386.19	174.82	.6948E-04	.7989E-05

Table E.6 Target Material: Lead (Pb-207)  
Angle: 90°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.2174E+00	.2430E-01
2	1.057	0.09	0.08	.2391E+00	.2674E-01
3	1.244	0.11	0.09	.2307E+00	.2579E-01
4	1.463	0.13	0.11	.2262E+00	.2529E-01
5	1.722	0.15	0.13	.2251E+00	.2517E-01
6	2.026	0.18	0.15	.2318E+00	.2591E-01
7	2.383	0.21	0.18	.2266E+00	.2533E-01
8	2.804	0.24	0.21	.2101E+00	.2349E-01
9	3.299	0.29	0.25	.1829E+00	.2045E-01
10	3.881	0.34	0.30	.1467E+00	.1640E-01
11	4.566	0.40	0.35	.1271E+00	.1421E-01
12	5.373	0.46	0.41	.9267E-01	.1036E-01
13	6.321	0.55	0.48	.6120E-01	.6843E-02
14	7.436	0.64	0.57	.4794E-01	.5360E-02
15	8.749	0.76	0.67	.3799E-01	.4248E-02
16	10.293	0.89	0.79	.2455E-01	.2745E-02
17	12.108	1.05	0.93	.1341E-01	.1499E-02
18	14.244	1.23	1.09	.1125E-01	.1258E-02
19	16.758	1.45	1.28	.6731E-02	.7528E-03
20	19.716	1.71	1.51	.4688E-02	.5244E-03
21	23.195	2.01	1.77	.4107E-02	.4594E-03
22	27.288	2.36	2.09	.3600E-02	.4027E-03
23	32.105	2.78	2.45	.2904E-02	.3249E-03
24	37.769	3.27	2.89	.2673E-02	.2990E-03
25	44.434	3.87	3.41	.2196E-02	.2458E-03
26	52.275	4.99	4.35	.2050E-02	.2295E-03
27	61.499	6.46	5.56	.1730E-02	.1937E-03
28	72.350	8.38	7.10	.1459E-02	.1633E-03
29	85.115	10.90	9.08	.1255E-02	.1406E-03
30	100.131	14.22	11.62	.9669E-03	.1083E-03
31	117.796	18.61	14.88	.7864E-03	.8815E-04
32	138.577	24.46	19.06	.5196E-03	.5832E-04
33	163.023	32.30	24.45	.4075E-03	.4579E-04
34	191.780	42.92	31.40	.2746E-03	.3093E-04
35	225.607	57.44	40.37	.1849E-03	.2090E-04
36	265.399	77.55	51.95	.1170E-03	.1330E-04
37	312.205	105.87	66.94	.6998E-04	.8045E-05
38	367.263	146.57	86.35	.2534E-04	.3048E-05
39	432.024	206.62	111.49	.8891E-05	.1197E-05
40	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.

Table E.7 Target Material: Lead (Pb-207)  
Angle: 150°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.1707E+00	.1908E-01
2	1.057	0.09	0.08	.2014E+00	.2252E-01
3	1.244	0.11	0.09	.2081E+00	.2327E-01
4	1.463	0.13	0.11	.2209E+00	.2469E-01
5	1.722	0.15	0.13	.2246E+00	.2511E-01
6	2.026	0.18	0.15	.2474E+00	.2766E-01
7	2.383	0.21	0.18	.2251E+00	.2517E-01
8	2.804	0.24	0.21	.1839E+00	.2056E-01
9	3.299	0.29	0.25	.1698E+00	.1899E-01
10	3.881	0.34	0.30	.1407E+00	.1574E-01
11	4.566	0.40	0.35	.1167E+00	.1305E-01
12	5.373	0.46	0.41	.9103E-01	.1018E-01
13	6.321	0.55	0.48	.6631E-01	.7414E-02
14	7.436	0.64	0.57	.4600E-01	.5143E-02
15	8.749	0.76	0.67	.3275E-01	.3662E-02
16	10.293	0.89	0.79	.2121E-01	.2372E-02
17	12.108	1.05	0.93	.1327E-01	.1484E-02
18	14.244	1.23	1.09	.8446E-02	.9445E-03
19	16.758	1.45	1.28	.5896E-02	.6594E-03
20	19.716	1.71	1.51	.4844E-02	.5417E-03
21	23.195	2.01	1.77	.3794E-02	.4244E-03
22	27.288	2.36	2.09	.2955E-02	.3306E-03
23	32.105	2.78	2.45	.2374E-02	.2656E-03
24	37.769	3.27	2.89	.1972E-02	.2208E-03
25	44.434	3.85	3.39	.1581E-02	.1770E-03
26	52.275	4.73	4.15	.1263E-02	.1414E-03
27	61.499	6.12	5.31	.1038E-02	.1162E-03
28	72.350	7.94	6.78	.7801E-03	.8744E-04
29	85.115	10.32	8.67	.6038E-03	.6773E-04
30	100.131	13.45	11.10	.4798E-03	.5387E-04
31	117.796	17.59	14.22	.3317E-03	.3731E-04
32	138.577	23.10	18.23	.2490E-03	.2806E-04
33	163.023	30.49	23.40	.1505E-03	.1705E-04
34	191.780	40.46	30.07	.7030E-04	.8080E-05
35	225.607	54.08	38.68	.3595E-04	.4237E-05
36	265.399	72.89	49.82	.2724E-04	.3262E-05
37	312.205	99.29	64.25	.1565E-04	.1961E-05
38	367.263	137.06	82.97	.1005E-04	.1329E-05
39	432.024	192.46	107.24	.3964E-05	.6282E-06
40	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.

Table E.8 Target Material: Tantalum (Ta-181)  
Angle: 23°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.2730E+00	.3052E-01
2	1.057	0.09	0.08	.2829E+00	.3163E-01
3	1.244	0.11	0.09	.2925E+00	.3270E-01
4	1.463	0.13	0.11	.2900E+00	.3242E-01
5	1.722	0.15	0.13	.2869E+00	.3207E-01
6	2.026	0.18	0.15	.2878E+00	.3217E-01
7	2.383	0.21	0.18	.2825E+00	.3158E-01
8	2.804	0.24	0.21	.2808E+00	.3139E-01
9	3.299	0.29	0.25	.2803E+00	.3134E-01
10	3.881	0.34	0.30	.2807E+00	.3138E-01
11	4.566	0.40	0.35	.2686E+00	.3003E-01
12	5.372	0.47	0.41	.2576E+00	.2881E-01
13	6.321	0.55	0.48	.2347E+00	.2624E-01
14	7.436	0.64	0.57	.2304E+00	.2576E-01
15	8.749	0.76	0.67	.1897E+00	.2121E-01
16	10.293	0.89	0.79	.1459E+00	.1631E-01
17	12.108	1.05	0.93	.9654E-01	.1079E-01
18	14.244	1.23	1.09	.6525E-01	.7296E-02
19	16.758	1.45	1.28	.4689E-01	.5243E-02
20	19.716	1.71	1.51	.3502E-01	.3916E-02
21	23.195	2.01	1.77	.2634E-01	.2945E-02
22	27.288	2.36	2.09	.2072E-01	.2316E-02
23	32.105	2.78	2.45	.1737E-01	.1942E-02
24	37.769	3.27	2.89	.1647E-01	.1842E-02
25	44.434	3.85	3.39	.1474E-01	.1648E-02
26	52.275	4.53	3.99	.1401E-01	.1566E-02
27	61.499	5.33	4.70	.1378E-01	.1541E-02
28	72.350	6.27	5.52	.1200E-01	.1342E-02
29	85.115	7.38	6.50	.1126E-01	.1259E-02
30	100.131	8.68	7.64	.1120E-01	.1252E-02
31	117.796	10.22	8.98	.1092E-01	.1221E-02
32	138.577	12.44	10.88	.1064E-01	.1189E-02
33	163.023	16.30	14.03	.9508E-02	.1063E-02
34	191.780	21.45	18.12	.8444E-02	.9443E-03
35	225.607	28.36	23.47	.7290E-02	.8153E-03
36	265.398	37.75	30.45	.6432E-02	.7193E-03
37	312.205	50.59	39.59	.5174E-02	.5787E-03
38	367.263	68.40	51.62	.3791E-02	.4241E-03
39	432.024	93.44	67.46	.2417E-02	.2704E-03
40	508.199	129.32	88.37	.1536E-02	.1720E-03
41	597.797	181.86	116.03	.4623E-03	.5191E-04



Table E.9 Target Material: Tantalum (Ta-181)  
Angle: 30°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1σ)
1	0.899	0.08	0.07	.2203E+00	.2463E-01
2	1.057	0.09	0.08	.2066E+00	.2310E-01
3	1.244	0.11	0.09	.2264E+00	.2531E-01
4	1.463	0.13	0.11	.2343E+00	.2620E-01
5	1.722	0.15	0.13	.2308E+00	.2581E-01
6	2.026	0.18	0.15	.2168E+00	.2424E-01
7	2.383	0.21	0.18	.2085E+00	.2332E-01
8	2.804	0.24	0.21	.1887E+00	.2110E-01
9	3.299	0.29	0.25	.1700E+00	.1900E-01
10	3.881	0.34	0.30	.1576E+00	.1762E-01
11	4.566	0.40	0.35	.1350E+00	.1510E-01
12	5.373	0.46	0.41	.1081E+00	.1209E-01
13	6.321	0.55	0.48	.8144E-01	.9106E-02
14	7.436	0.64	0.57	.5961E-01	.6665E-02
15	8.749	0.76	0.67	.4462E-01	.4989E-02
16	10.293	0.89	0.79	.3132E-01	.3502E-02
17	12.108	1.05	0.93	.2102E-01	.2350E-02
18	14.244	1.23	1.09	.1516E-01	.1696E-02
19	16.758	1.45	1.28	.1202E-01	.1344E-02
20	19.716	1.71	1.51	.9896E-02	.1107E-02
21	23.195	2.01	1.77	.9186E-02	.1027E-02
22	27.288	2.36	2.09	.8795E-02	.9835E-03
23	32.105	2.78	2.45	.7691E-02	.8601E-03
24	37.769	3.27	2.89	.7149E-02	.7994E-03
25	44.434	3.85	3.39	.6479E-02	.7245E-03
26	52.275	4.55	4.01	.5677E-02	.6349E-03
27	61.499	5.89	5.13	.5476E-02	.6124E-03
28	72.350	7.63	6.55	.5076E-02	.5677E-03
29	85.115	9.91	8.39	.4773E-02	.5337E-03
30	100.131	12.92	10.74	.4181E-02	.4677E-03
31	117.796	16.89	13.75	.3623E-02	.4052E-03
32	138.577	22.16	17.64	.3054E-02	.3416E-03
33	163.023	29.23	22.65	.2559E-02	.2863E-03
34	191.780	38.76	29.12	.2120E-02	.2372E-03
35	225.607	51.76	37.48	.1655E-02	.1852E-03
36	265.399	69.69	48.30	.1335E-02	.1494E-03
37	312.205	94.78	62.33	.9981E-03	.1117E-03
38	367.263	130.58	80.55	.6342E-03	.7105E-04
39	432.024	182.87	104.21	.3440E-03	.3861E-04
40	508.198	261.75	134.93	.2087E-03	.2348E-04
41	597.797	386.19	174.82	.7017E-04	.7993E-05

Table E.10 Target Material: Tantalum (Ta-181)  
Angle: 90°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.2131E+00	.2382E-01
2	1.057	0.09	0.08	.2283E+00	.2553E-01
3	1.244	0.11	0.09	.2259E+00	.2526E-01
4	1.463	0.13	0.11	.2277E+00	.2546E-01
5	1.722	0.15	0.13	.2310E+00	.2582E-01
6	2.026	0.18	0.15	.2314E+00	.2587E-01
7	2.383	0.21	0.18	.1969E+00	.2202E-01
8	2.804	0.24	0.21	.1754E+00	.1961E-01
9	3.299	0.29	0.25	.1434E+00	.1603E-01
10	3.881	0.34	0.30	.1105E+00	.1235E-01
11	4.566	0.40	0.35	.9419E-01	.1053E-01
12	5.373	0.46	0.41	.7745E-01	.8660E-02
13	6.321	0.55	0.48	.6141E-01	.6866E-02
14	7.436	0.64	0.57	.4395E-01	.4914E-02
15	8.749	0.76	0.67	.2912E-01	.3256E-02
16	10.293	0.89	0.79	.2105E-01	.2353E-02
17	12.108	1.05	0.93	.1224E-01	.1369E-02
18	14.244	1.23	1.09	.7822E-02	.8747E-03
19	16.758	1.45	1.28	.5618E-02	.6283E-03
20	19.716	1.71	1.51	.4614E-02	.5160E-03
21	23.195	2.01	1.77	.3974E-02	.4444E-03
22	27.288	2.36	2.09	.3417E-02	.3822E-03
23	32.105	2.78	2.45	.2967E-02	.3319E-03
24	37.769	3.27	2.89	.2491E-02	.2786E-03
25	44.434	3.87	3.41	.2291E-02	.2562E-03
26	52.275	4.99	4.35	.1921E-02	.2149E-03
27	61.499	6.46	5.56	.1751E-02	.1959E-03
28	72.350	8.38	7.10	.1430E-02	.1601E-03
29	85.115	10.90	9.08	.1238E-02	.1385E-03
30	100.131	14.22	11.62	.9821E-03	.1100E-03
31	117.796	18.61	14.88	.7410E-03	.8300E-04
32	138.577	24.46	19.06	.5675E-03	.6360E-04
33	163.023	32.30	24.45	.4154E-03	.4659E-04
34	191.780	42.92	31.40	.2733E-03	.3071E-04
35	225.607	57.44	40.37	.1929E-03	.2171E-04
36	265.399	77.55	51.95	.1178E-03	.1332E-04
37	312.205	105.87	66.94	.6098E-04	.6965E-05
38	367.263	146.57	86.35	.1771E-04	.2124E-05
39	432.024	206.62	111.49	.4126E-05	.5919E-06
40	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0

Table E.11 Target Material: Tantalum (Ta-181)  
Angle: 150°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.1526E+00	.1706E-01
2	1.057	0.09	0.08	.1827E+00	.2042E-01
3	1.244	0.11	0.09	.2013E+00	.2250E-01
4	1.463	0.13	0.11	.1981E+00	.2215E-01
5	1.722	0.15	0.13	.2003E+00	.2240E-01
6	2.026	0.18	0.15	.2154E+00	.2408E-01
7	2.383	0.21	0.18	.1865E+00	.2085E-01
8	2.804	0.24	0.21	.1579E+00	.1765E-01
9	3.299	0.29	0.25	.1413E+00	.1579E-01
10	3.881	0.34	0.30	.1130E+00	.1264E-01
11	4.566	0.40	0.35	.9498E-01	.1062E-01
12	5.373	0.46	0.41	.7524E-01	.8412E-02
13	6.321	0.55	0.48	.5767E-01	.6448E-02
14	7.436	0.64	0.57	.4052E-01	.4531E-02
15	8.749	0.76	0.67	.2800E-01	.3130E-02
16	10.293	0.89	0.79	.1868E-01	.2088E-02
17	12.108	1.05	0.93	.1162E-01	.1300E-02
18	14.244	1.23	1.09	.7574E-02	.8469E-03
19	16.758	1.45	1.28	.5170E-02	.5782E-03
20	19.716	1.71	1.51	.4030E-02	.4507E-03
21	23.195	2.01	1.77	.3323E-02	.3717E-03
22	27.288	2.36	2.09	.2566E-02	.2870E-03
23	32.105	2.78	2.45	.2094E-02	.2343E-03
24	37.769	3.27	2.89	.1549E-02	.1733E-03
25	44.434	3.85	3.39	.1269E-02	.1421E-03
26	52.275	4.73	4.15	.1081E-02	.1210E-03
27	61.499	6.12	5.31	.9107E-03	.1020E-03
28	72.350	7.94	6.78	.6082E-03	.6815E-04
29	85.115	10.32	8.67	.4752E-03	.5328E-04
30	100.131	13.45	11.10	.3768E-03	.4228E-04
31	117.796	17.59	14.22	.2403E-03	.2701E-04
32	138.577	23.10	18.23	.1857E-03	.2091E-04
33	163.023	30.49	23.40	.1092E-03	.1236E-04
34	191.780	40.46	30.07	.7103E-04	.8089E-05
35	225.607	54.08	38.68	.5181E-04	.5940E-05
36	265.399	72.89	49.82	.2415E-04	.2846E-05
37	312.205	99.29	64.25	.1039E-04	.1303E-05
38	367.263	137.06	82.97	.8402E-05	.1078E-05
39	432.024	192.46	107.24	.3568E-05	.5273E-06
40	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0

Table E.12 Target Material: Indium (In-115)  
Angle: 23°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.1743E+00	.1949E-01
2	1.057	0.09	0.08	.1778E+00	.1988E-01
3	1.244	0.11	0.09	.1796E+00	.2008E-01
4	1.463	0.13	0.11	.1811E+00	.2025E-01
5	1.722	0.15	0.13	.1806E+00	.2019E-01
6	2.026	0.18	0.15	.1811E+00	.2025E-01
7	2.383	0.21	0.18	.1777E+00	.1987E-01
8	2.804	0.24	0.21	.1733E+00	.1937E-01
9	3.299	0.29	0.25	.1656E+00	.1851E-01
10	3.881	0.34	0.30	.1621E+00	.1812E-01
11	4.566	0.40	0.35	.1578E+00	.1764E-01
12	5.372	0.47	0.41	.1469E+00	.1642E-01
13	6.321	0.55	0.48	.1401E+00	.1567E-01
14	7.436	0.64	0.57	.1317E+00	.1473E-01
15	8.749	0.76	0.67	.1110E+00	.1241E-01
16	10.293	0.89	0.79	.8925E-01	.9978E-02
17	12.108	1.05	0.93	.5943E-01	.6645E-02
18	14.244	1.23	1.09	.4183E-01	.4677E-02
19	16.758	1.45	1.28	.3052E-01	.3412E-02
20	19.716	1.71	1.51	.2273E-01	.2542E-02
21	23.195	2.01	1.77	.1798E-01	.2011E-02
22	27.288	2.36	2.09	.1524E-01	.1704E-02
23	32.105	2.78	2.45	.1261E-01	.1410E-02
24	37.769	3.27	2.89	.1151E-01	.1288E-02
25	44.434	3.85	3.39	.1132E-01	.1265E-02
26	52.275	4.53	3.99	.1052E-01	.1177E-02
27	61.499	5.33	4.70	.1134E-01	.1268E-02
28	72.350	6.27	5.52	.1059E-01	.1185E-02
29	85.115	7.38	6.50	.9916E-02	.1109E-02
30	100.131	8.68	7.64	.1012E-01	.1132E-02
31	117.796	10.22	8.98	.9744E-02	.1090E-02
32	138.577	12.44	10.88	.9676E-02	.1082E-02
33	163.023	16.30	14.03	.8809E-02	.9851E-03
34	191.780	21.45	18.12	.7631E-02	.8534E-03
35	225.607	28.36	23.47	.6812E-02	.7617E-03
36	265.398	37.75	30.45	.5845E-02	.6536E-03
37	312.205	50.59	39.59	.5123E-02	.5729E-03
38	367.263	68.40	51.62	.3385E-02	.3786E-03
39	432.024	93.44	67.46	.2366E-02	.2647E-03
40	508.199	129.32	88.37	.1598E-02	.1788E-03
41	597.797	181.86	116.03	.4809E-03	.5391E-04

Table E.13 Target Material: Indium (In-115)  
Angle: 30°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.1250E+00	.1398E-01
2	1.057	0.09	0.08	.1208E+00	.1350E-01
3	1.244	0.11	0.09	.1240E+00	.1386E-01
4	1.463	0.13	0.11	.1177E+00	.1316E-01
5	1.722	0.15	0.13	.1145E+00	.1280E-01
6	2.026	0.18	0.15	.1071E+00	.1198E-01
7	2.383	0.21	0.18	.9639E-01	.1078E-01
8	2.804	0.24	0.21	.8192E-01	.9159E-02
9	3.299	0.29	0.25	.7497E-01	.8381E-02
10	3.881	0.34	0.30	.6912E-01	.7728E-02
11	4.566	0.40	0.35	.5960E-01	.6663E-02
12	5.373	0.46	0.41	.4889E-01	.5466E-02
13	6.321	0.55	0.48	.3671E-01	.4105E-02
14	7.436	0.64	0.57	.2845E-01	.3181E-02
15	8.749	0.76	0.67	.2099E-01	.2347E-02
16	10.293	0.89	0.79	.1560E-01	.1745E-02
17	12.108	1.05	0.93	.1102E-01	.1232E-02
18	14.244	1.23	1.09	.7628E-02	.8530E-03
19	16.758	1.45	1.28	.6661E-02	.7449E-03
20	19.716	1.71	1.51	.5505E-02	.6156E-03
21	23.195	2.01	1.77	.5271E-02	.5894E-03
22	27.288	2.36	2.09	.4715E-02	.5273E-03
23	32.105	2.78	2.45	.4241E-02	.4742E-03
24	37.769	3.27	2.89	.3892E-02	.4352E-03
25	44.434	3.85	3.39	.3622E-02	.4050E-03
26	52.275	4.55	4.01	.3430E-02	.3836E-03
27	61.499	5.89	5.13	.3314E-02	.3707E-03
28	72.350	7.63	6.55	.3160E-02	.3535E-03
29	85.115	9.91	8.39	.2925E-02	.3271E-03
30	100.131	12.92	10.74	.2611E-02	.2920E-03
31	117.796	16.89	13.75	.2260E-02	.2528E-03
32	138.577	22.16	17.64	.2045E-02	.2288E-03
33	163.023	29.23	22.65	.1672E-02	.1871E-03
34	191.780	38.76	29.12	.1338E-02	.1498E-03
35	225.607	51.76	37.48	.1085E-02	.1214E-03
36	265.399	69.69	48.30	.9069E-03	.1015E-03
37	312.205	94.78	62.33	.6714E-03	.7517E-04
38	367.263	130.58	80.55	.3984E-03	.4465E-04
39	432.024	182.87	104.21	.2325E-03	.2610E-04
40	508.198	261.75	134.93	.1347E-03	.1517E-04
41	597.797	386.19	174.82	.4104E-04	.4699E-05

Table E.14 Target Material: Indium (In-115)  
Angle: 90°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1σ)
1	0.899	0.08	0.07	.9837E-01	.1100E-01
2	1.057	0.09	0.08	.1082E+00	.1209E-01
3	1.244	0.11	0.09	.1138E+00	.1272E-01
4	1.463	0.13	0.11	.1117E+00	.1249E-01
5	1.722	0.15	0.13	.1118E+00	.1250E-01
6	2.026	0.18	0.15	.1142E+00	.1277E-01
7	2.383	0.21	0.18	.1023E+00	.1144E-01
8	2.804	0.24	0.21	.8888E-01	.9937E-02
9	3.299	0.29	0.25	.7787E-01	.8706E-02
10	3.881	0.34	0.30	.6410E-01	.7166E-02
11	4.566	0.40	0.35	.5121E-01	.5726E-02
12	5.373	0.46	0.41	.3796E-01	.4244E-02
13	6.321	0.55	0.48	.2895E-01	.3237E-02
14	7.436	0.64	0.57	.2127E-01	.2379E-02
15	8.749	0.76	0.67	.1568E-01	.1753E-02
16	10.293	0.89	0.79	.1297E-01	.1451E-02
17	12.108	1.05	0.93	.9076E-02	.1015E-02
18	14.244	1.23	1.09	.5578E-02	.6237E-03
19	16.758	1.45	1.28	.4202E-02	.4699E-03
20	19.716	1.71	1.51	.3284E-02	.3672E-03
21	23.195	2.01	1.77	.3023E-02	.3381E-03
22	27.288	2.36	2.09	.2643E-02	.2957E-03
23	32.105	2.78	2.45	.2349E-02	.2628E-03
24	37.769	3.27	2.89	.1972E-02	.2206E-03
25	44.434	3.87	3.41	.1813E-02	.2028E-03
26	52.275	4.99	4.35	.1521E-02	.1701E-03
27	61.499	6.46	5.56	.1386E-02	.1551E-03
28	72.350	8.38	7.10	.1132E-02	.1267E-03
29	85.115	10.90	9.08	.9799E-03	.1097E-03
30	100.131	14.22	11.62	.7775E-03	.8704E-04
31	117.796	18.61	14.88	.5866E-03	.6570E-04
32	138.577	24.46	19.06	.4493E-03	.5035E-04
33	163.023	32.30	24.45	.3289E-03	.3688E-04
34	191.780	42.92	31.40	.2164E-03	.2431E-04
35	225.607	57.44	40.37	.1527E-03	.1718E-04
36	265.399	77.55	51.95	.9328E-04	.1054E-04
37	312.205	105.87	66.94	.4871E-04	.5557E-05
38	367.263	146.57	86.35	.1402E-04	.1675E-05
39	432.024	206.62	111.49	.3254E-05	.4623E-06
40	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0

Table E.15 Target Material: Indium (In-115)  
Angle: 150°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.6838E-01	.7645E-02
2	1.057	0.09	0.08	.8020E-01	.8967E-02
3	1.244	0.11	0.09	.8190E-01	.9157E-02
4	1.463	0.13	0.11	.8496E-01	.9499E-02
5	1.722	0.15	0.13	.8936E-01	.9991E-02
6	2.026	0.18	0.15	.8799E-01	.9837E-02
7	2.383	0.21	0.18	.7997E-01	.8941E-02
8	2.804	0.24	0.21	.7338E-01	.8205E-02
9	3.299	0.29	0.25	.5882E-01	.6576E-02
10	3.881	0.34	0.30	.4780E-01	.5344E-02
11	4.566	0.40	0.35	.4222E-01	.4721E-02
12	5.373	0.46	0.41	.3463E-01	.3872E-02
13	6.321	0.55	0.48	.2655E-01	.2968E-02
14	7.436	0.64	0.57	.1968E-01	.2200E-02
15	8.749	0.76	0.67	.1416E-01	.1583E-02
16	10.293	0.89	0.79	.9573E-02	.1070E-02
17	12.108	1.05	0.93	.6183E-02	.6913E-03
18	14.244	1.23	1.09	.3868E-02	.4326E-03
19	16.758	1.45	1.28	.2755E-02	.3081E-03
20	19.716	1.71	1.51	.2272E-02	.2542E-03
21	23.195	2.01	1.77	.1775E-02	.1986E-03
22	27.288	2.36	2.09	.1378E-02	.1541E-03
23	32.105	2.78	2.45	.1109E-02	.1241E-03
24	37.769	3.27	2.89	.8640E-03	.9671E-04
25	44.434	3.85	3.39	.7311E-03	.8185E-04
26	52.275	4.73	4.15	.5903E-03	.6611E-04
27	61.499	6.12	5.31	.4743E-03	.5314E-04
28	72.350	7.94	6.78	.3854E-03	.4320E-04
29	85.115	10.32	8.67	.2928E-03	.3285E-04
30	100.131	13.45	11.10	.2436E-03	.2735E-04
31	117.796	17.59	14.22	.1544E-03	.1737E-04
32	138.577	23.10	18.23	.1143E-03	.1290E-04
33	163.023	30.49	23.40	.4683E-04	.5347E-05
34	191.780	40.46	30.07	.3931E-04	.4505E-05
35	225.607	54.08	38.68	.1576E-04	.1871E-05
36	265.399	72.89	49.82	.9380E-05	.1155E-05
37	312.205	99.29	64.25	.7693E-05	.9655E-06
38	367.263	137.06	82.97	.2703E-05	.3986E-06
39	0.0	0.0	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0

Table E.16 Target Material: Niobium (Nb-93)  
Angle: 23°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.1233E+00	.1378E-01
2	1.057	0.09	0.08	.1337E+00	.1495E-01
3	1.244	0.11	0.09	.1288E+00	.1439E-01
4	1.463	0.13	0.11	.1273E+00	.1423E-01
5	1.722	0.15	0.13	.1309E+00	.1464E-01
6	2.026	0.18	0.15	.1345E+00	.1504E-01
7	2.383	0.21	0.18	.1323E+00	.1480E-01
8	2.804	0.24	0.21	.1339E+00	.1497E-01
9	3.299	0.29	0.25	.1285E+00	.1437E-01
10	3.881	0.34	0.30	.1223E+00	.1367E-01
11	4.566	0.40	0.35	.1198E+00	.1340E-01
12	5.372	0.47	0.41	.1113E+00	.1244E-01
13	6.321	0.55	0.48	.9607E-01	.1074E-01
14	7.436	0.64	0.57	.9332E-01	.1043E-01
15	8.749	0.76	0.67	.7668E-01	.8573E-02
16	10.293	0.89	0.79	.6113E-01	.6834E-02
17	12.108	1.05	0.93	.4263E-01	.4766E-02
18	14.244	1.23	1.09	.3089E-01	.3454E-02
19	16.758	1.45	1.28	.2267E-01	.2535E-02
20	19.716	1.71	1.51	.1784E-01	.1994E-02
21	23.195	2.01	1.77	.1399E-01	.1564E-02
22	27.288	2.36	2.09	.1148E-01	.1284E-02
23	32.105	2.78	2.45	.9866E-02	.1103E-02
24	37.769	3.27	2.89	.1000E-01	.1118E-02
25	44.434	3.85	3.39	.9598E-02	.1073E-02
26	52.275	4.53	3.99	.9354E-02	.1046E-02
27	61.499	5.33	4.70	.9826E-02	.1099E-02
28	72.350	6.27	5.52	.9325E-02	.1043E-02
29	85.115	7.38	6.50	.9468E-02	.1059E-02
30	100.131	8.68	7.64	.9456E-02	.1057E-02
31	117.796	10.22	8.98	.9074E-02	.1015E-02
32	138.577	12.44	10.88	.9406E-02	.1052E-02
33	163.023	16.30	14.03	.8650E-02	.9672E-03
34	191.780	21.45	18.12	.7509E-02	.8397E-03
35	225.607	28.36	23.47	.6888E-02	.7702E-03
36	265.398	37.75	30.45	.5992E-02	.6701E-03
37	312.205	50.59	39.59	.4861E-02	.5436E-03
38	367.263	68.40	51.62	.3509E-02	.3925E-03
39	432.024	93.44	67.46	.2176E-02	.2434E-03
40	508.199	129.32	88.37	.1391E-02	.1556E-03
41	597.797	181.86	116.03	.4849E-03	.5433E-04



Table E.17 Target Material: Niobium (Nb-93)  
Angle: 30°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1σ)
1	0.899	0.08	0.07	.9049E-01	.1012E-01
2	1.057	0.09	0.08	.9290E-01	.1039E-01
3	1.244	0.11	0.09	.9371E-01	.1048E-01
4	1.463	0.13	0.11	.1011E+00	.1131E-01
5	1.722	0.15	0.13	.8145E-01	.9106E-02
6	2.026	0.18	0.15	.7632E-01	.8533E-02
7	2.383	0.21	0.18	.7535E-01	.8425E-02
8	2.804	0.24	0.21	.5985E-01	.6691E-02
9	3.299	0.29	0.25	.5156E-01	.5765E-02
10	3.881	0.34	0.30	.4642E-01	.5190E-02
11	4.566	0.40	0.35	.4208E-01	.4705E-02
12	5.373	0.46	0.41	.3276E-01	.3663E-02
13	6.321	0.55	0.48	.2448E-01	.2737E-02
14	7.436	0.64	0.57	.1911E-01	.2136E-02
15	8.749	0.76	0.67	.1528E-01	.1709E-02
16	10.293	0.89	0.79	.1194E-01	.1335E-02
17	12.108	1.05	0.93	.7893E-02	.8826E-03
18	14.244	1.23	1.09	.5905E-02	.6603E-03
19	16.758	1.45	1.28	.4746E-02	.5308E-03
20	19.716	1.71	1.51	.4215E-02	.4713E-03
21	23.195	2.01	1.77	.4215E-02	.4713E-03
22	27.288	2.36	2.09	.3809E-02	.4260E-03
23	32.105	2.78	2.45	.3394E-02	.3795E-03
24	37.769	3.27	2.89	.3363E-02	.3761E-03
25	44.434	3.85	3.39	.2744E-02	.3069E-03
26	52.275	4.55	4.01	.2880E-02	.3220E-03
27	61.499	5.89	5.13	.2686E-02	.3004E-03
28	72.350	7.63	6.55	.2635E-02	.2947E-03
29	85.115	9.91	8.39	.2459E-02	.2750E-03
30	100.131	12.92	10.74	.2223E-02	.2486E-03
31	117.796	16.89	13.75	.1989E-02	.2224E-03
32	138.577	22.16	17.64	.1634E-02	.1828E-03
33	163.023	29.23	22.65	.1321E-02	.1477E-03
34	191.780	38.76	29.12	.1102E-02	.1233E-03
35	225.607	51.76	37.48	.8873E-03	.9930E-04
36	265.399	69.69	48.30	.7743E-03	.8666E-04
37	312.205	94.78	62.33	.5604E-03	.6274E-04
38	367.263	130.58	80.55	.3644E-03	.4083E-04
39	432.024	182.87	104.21	.2094E-03	.2351E-04
40	508.198	261.75	134.93	.1137E-03	.1280E-04
41	597.797	386.19	174.82	.4335E-04	.4936E-05

Table E.18 Target Material: Niobium (Nb-93)  
Angle: 90°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1σ)
1	0.899	0.08	0.07	.6281E-01	.7022E-02
2	1.057	0.09	0.08	.6627E-01	.7410E-02
3	1.244	0.11	0.09	.6680E-01	.7468E-02
4	1.463	0.13	0.11	.6716E-01	.7508E-02
5	1.722	0.15	0.13	.6704E-01	.7495E-02
6	2.026	0.18	0.15	.6753E-01	.7551E-02
7	2.383	0.21	0.18	.6110E-01	.6832E-02
8	2.804	0.24	0.21	.5487E-01	.6135E-02
9	3.299	0.29	0.25	.4850E-01	.5422E-02
10	3.881	0.34	0.30	.4141E-01	.4630E-02
11	4.566	0.40	0.35	.3507E-01	.3922E-02
12	5.373	0.46	0.41	.2742E-01	.3066E-02
13	6.321	0.55	0.48	.2172E-01	.2429E-02
14	7.436	0.64	0.57	.1623E-01	.1815E-02
15	8.749	0.76	0.67	.1128E-01	.1262E-02
16	10.293	0.89	0.79	.7724E-02	.8637E-03
17	12.108	1.05	0.93	.5353E-02	.5986E-03
18	14.244	1.23	1.09	.3829E-02	.4282E-03
19	16.758	1.45	1.28	.2755E-02	.3081E-03
20	19.716	1.71	1.51	.2445E-02	.2735E-03
21	23.195	2.01	1.77	.2289E-02	.2560E-03
22	27.288	2.36	2.09	.2010E-02	.2248E-03
23	32.105	2.78	2.45	.1759E-02	.1968E-03
24	37.769	3.27	2.89	.1463E-02	.1637E-03
25	44.434	3.87	3.41	.1400E-02	.1566E-03
26	52.275	4.99	4.35	.1240E-02	.1388E-03
27	61.499	6.46	5.56	.1112E-02	.1244E-03
28	72.350	8.38	7.10	.9496E-03	.1063E-03
29	85.115	10.90	9.08	.8108E-03	.9074E-04
30	100.131	14.22	11.62	.6847E-03	.7664E-04
31	117.796	18.61	14.88	.5356E-03	.5997E-04
32	138.577	24.46	19.06	.3858E-03	.4323E-04
33	163.023	32.30	24.45	.2991E-03	.3353E-04
34	191.780	42.92	31.40	.1939E-03	.2177E-04
35	225.607	57.44	40.37	.1256E-03	.1413E-04
36	265.399	77.55	51.95	.7960E-04	.8989E-05
37	312.205	105.87	66.94	.4286E-04	.4881E-05
38	367.263	146.57	86.35	.1486E-04	.1749E-05
39	432.024	206.62	111.49	.5306E-05	.6767E-06
40	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0

Table E.19 Target Material: Niobium (Nb-93)  
Angle: 150°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.3593E-01	.4018E-02
2	1.057	0.09	0.08	.4218E-01	.4715E-02
3	1.244	0.11	0.09	.4648E-01	.5197E-02
4	1.463	0.13	0.11	.4910E-01	.5490E-02
5	1.722	0.15	0.13	.5015E-01	.5607E-02
6	2.026	0.18	0.15	.5087E-01	.5687E-02
7	2.383	0.21	0.18	.5045E-01	.5641E-02
8	2.804	0.24	0.21	.4206E-01	.4702E-02
9	3.299	0.29	0.25	.3683E-01	.4118E-02
10	3.881	0.34	0.30	.3005E-01	.3360E-02
11	4.566	0.40	0.35	.2587E-01	.2892E-02
12	5.373	0.46	0.41	.2101E-01	.2349E-02
13	6.321	0.55	0.48	.1694E-01	.1894E-02
14	7.436	0.64	0.57	.1279E-01	.1430E-02
15	8.749	0.76	0.67	.8941E-02	.9997E-03
16	10.293	0.89	0.79	.6333E-02	.7081E-03
17	12.108	1.05	0.93	.4263E-02	.4767E-03
18	14.244	1.23	1.09	.2835E-02	.3171E-03
19	16.758	1.45	1.28	.1980E-02	.2215E-03
20	19.716	1.71	1.51	.1654E-02	.1850E-03
21	23.195	2.01	1.77	.1374E-02	.1537E-03
22	27.288	2.36	2.09	.9580E-03	.1072E-03
23	32.105	2.78	2.45	.7900E-03	.8841E-04
24	37.769	3.27	2.89	.6702E-03	.7502E-04
25	44.434	3.85	3.39	.5595E-03	.6264E-04
26	52.275	4.73	4.15	.4725E-03	.5292E-04
27	61.499	6.12	5.31	.3528E-03	.3954E-04
28	72.350	7.94	6.78	.2885E-03	.3235E-04
29	85.115	10.32	8.67	.2126E-03	.2386E-04
30	100.131	13.45	11.10	.1900E-03	.2133E-04
31	117.796	17.59	14.22	.1073E-03	.1209E-04
32	138.577	23.10	18.23	.7592E-04	.8577E-05
33	163.023	30.49	23.40	.4739E-04	.5387E-05
34	191.780	40.46	30.07	.1885E-04	.2196E-05
35	225.607	54.08	38.68	.1563E-04	.1908E-05
36	265.399	72.89	49.82	.1239E-04	.1512E-05
37	312.205	99.29	64.25	.8421E-05	.1027E-05
38	367.263	137.06	82.97	.1197E-06	.1473E-07
39	0.0	0.0	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0

Table E.20 Target Material: Iron (Fe-56)  
Angle: 23°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1σ)
1	0.899	0.08	0.07	.6259E-01	.6998E-02
2	1.057	0.09	0.08	.6383E-01	.7136E-02
3	1.244	0.11	0.09	.6591E-01	.7368E-02
4	1.463	0.13	0.11	.6498E-01	.7266E-02
5	1.722	0.15	0.13	.6655E-01	.7441E-02
6	2.026	0.18	0.15	.6580E-01	.7357E-02
7	2.383	0.21	0.18	.6639E-01	.7423E-02
8	2.804	0.24	0.21	.6395E-01	.7150E-02
9	3.299	0.29	0.25	.6480E-01	.7245E-02
10	3.881	0.34	0.30	.6088E-01	.6807E-02
11	4.566	0.40	0.35	.5877E-01	.6571E-02
12	5.372	0.47	0.41	.5402E-01	.6040E-02
13	6.321	0.55	0.48	.4291E-01	.4798E-02
14	7.436	0.64	0.57	.4063E-01	.4542E-02
15	8.749	0.76	0.67	.3499E-01	.3912E-02
16	10.293	0.89	0.79	.2841E-01	.3177E-02
17	12.108	1.05	0.93	.2055E-01	.2298E-02
18	14.244	1.23	1.09	.1496E-01	.1673E-02
19	16.758	1.45	1.28	.1162E-01	.1299E-02
20	19.716	1.71	1.51	.9196E-02	.1028E-02
21	23.195	2.01	1.77	.7268E-02	.8126E-03
22	27.288	2.36	2.09	.6416E-02	.7175E-03
23	32.105	2.78	2.45	.5949E-02	.6652E-03
24	37.769	3.27	2.89	.6155E-02	.6882E-03
25	44.434	3.85	3.39	.5817E-02	.6504E-03
26	52.275	4.53	3.99	.5997E-02	.6706E-03
27	61.499	5.33	4.70	.6722E-02	.7516E-03
28	72.350	6.27	5.52	.6973E-02	.7797E-03
29	85.115	7.38	6.50	.7127E-02	.7969E-03
30	100.131	8.68	7.64	.7241E-02	.8096E-03
31	117.796	10.22	8.98	.6966E-02	.7789E-03
32	138.577	12.44	10.88	.6966E-02	.7789E-03
33	163.023	16.30	14.03	.7091E-02	.7929E-03
34	191.780	21.45	18.12	.6493E-02	.7261E-03
35	225.607	28.36	23.47	.5726E-02	.6402E-03
36	265.398	37.75	30.45	.5033E-02	.5628E-03
37	312.205	50.59	39.59	.4405E-02	.4926E-03
38	367.263	68.40	51.62	.3776E-02	.4222E-03
39	432.024	93.44	67.46	.2005E-02	.2243E-03
40	508.199	129.32	88.37	.9324E-03	.1043E-03
41	597.797	181.86	116.03	.3725E-03	.4174E-04

Table E.21 Target Material: Iron (Fe-56)  
Angle: 30°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1σ)
1	0.899	0.08	0.07	.4048E-01	.4525E-02
2	1.057	0.09	0.08	.4193E-01	.4688E-02
3	1.244	0.11	0.09	.4299E-01	.4806E-02
4	1.463	0.13	0.11	.4054E-01	.4533E-02
5	1.722	0.15	0.13	.3732E-01	.4173E-02
6	2.026	0.18	0.15	.3400E-01	.3801E-02
7	2.383	0.21	0.18	.3278E-01	.3665E-02
8	2.804	0.24	0.21	.2555E-01	.2857E-02
9	3.299	0.29	0.25	.2226E-01	.2489E-02
10	3.881	0.34	0.30	.2129E-01	.2380E-02
11	4.566	0.40	0.35	.1868E-01	.2088E-02
12	5.373	0.46	0.41	.1513E-01	.1691E-02
13	6.321	0.55	0.48	.1186E-01	.1326E-02
14	7.436	0.64	0.57	.9389E-02	.1050E-02
15	8.749	0.76	0.67	.7904E-02	.8838E-03
16	10.293	0.89	0.79	.5822E-02	.6510E-03
17	12.108	1.05	0.93	.4538E-02	.5075E-03
18	14.244	1.23	1.09	.3450E-02	.3858E-03
19	16.758	1.45	1.28	.2881E-02	.3222E-03
20	19.716	1.71	1.51	.2726E-02	.3049E-03
21	23.195	2.01	1.77	.2455E-02	.2746E-03
22	27.288	2.36	2.09	.2358E-02	.2637E-03
23	32.105	2.78	2.45	.2174E-02	.2431E-03
24	37.769	3.27	2.89	.2108E-02	.2357E-03
25	44.434	3.85	3.39	.1894E-02	.2118E-03
26	52.275	4.55	4.01	.1758E-02	.1966E-03
27	61.499	5.89	5.13	.1738E-02	.1944E-03
28	72.350	7.63	6.55	.1777E-02	.1988E-03
29	85.115	9.91	8.39	.1708E-02	.1911E-03
30	100.131	12.92	10.74	.1507E-02	.1685E-03
31	117.796	16.89	13.75	.1368E-02	.1530E-03
32	138.577	22.16	17.64	.1172E-02	.1311E-03
33	163.023	29.23	22.65	.1010E-02	.1130E-03
34	191.780	38.76	29.12	.8409E-03	.9409E-04
35	225.607	51.76	37.48	.6539E-03	.7319E-04
36	265.399	69.69	48.30	.5328E-03	.5964E-04
37	312.205	94.78	62.33	.4448E-03	.4980E-04
38	367.263	130.58	80.55	.2964E-03	.3321E-04
39	432.024	182.87	104.21	.1733E-03	.1945E-04
40	508.198	261.75	134.93	.9411E-04	.1060E-04
41	597.797	386.19	174.82	.3751E-04	.4267E-05

Table E.22 Target Material: Iron (Fe-56)  
Angle: 90°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.2350E-01	.2628E-02
2	1.057	0.09	0.08	.2639E-01	.2951E-02
3	1.244	0.11	0.09	.2610E-01	.2918E-02
4	1.463	0.13	0.11	.2481E-01	.2774E-02
5	1.722	0.15	0.13	.2475E-01	.2767E-02
6	2.026	0.18	0.15	.2179E-01	.2437E-02
7	2.383	0.21	0.18	.2124E-01	.2375E-02
8	2.804	0.24	0.21	.2065E-01	.2309E-02
9	3.299	0.29	0.25	.1868E-01	.2089E-02
10	3.881	0.34	0.30	.1613E-01	.1803E-02
11	4.566	0.40	0.35	.1357E-01	.1517E-02
12	5.373	0.46	0.41	.1138E-01	.1273E-02
13	6.321	0.55	0.48	.8695E-02	.9723E-03
14	7.436	0.64	0.57	.6893E-02	.7708E-03
15	8.749	0.76	0.67	.5290E-02	.5916E-03
16	10.293	0.89	0.79	.3797E-02	.4246E-03
17	12.108	1.05	0.93	.2789E-02	.3118E-03
18	14.244	1.23	1.09	.1990E-02	.2225E-03
19	16.758	1.45	1.28	.1580E-02	.1767E-03
20	19.716	1.71	1.51	.1427E-02	.1596E-03
21	23.195	2.01	1.77	.1377E-02	.1540E-03
22	27.288	2.36	2.09	.1230E-02	.1376E-03
23	32.105	2.78	2.45	.1068E-02	.1194E-03
24	37.769	3.27	2.89	.9628E-03	.1077E-03
25	44.434	3.87	3.41	.8606E-03	.9629E-04
26	52.275	4.99	4.35	.8243E-03	.9224E-04
27	61.499	6.46	5.56	.7349E-03	.8223E-04
28	72.350	8.38	7.10	.6201E-03	.6940E-04
29	85.115	10.90	9.08	.5472E-03	.6125E-04
30	100.131	14.22	11.62	.4367E-03	.4890E-04
31	117.796	18.61	14.88	.3800E-03	.4256E-04
32	138.577	24.46	19.06	.2806E-03	.3145E-04
33	163.023	32.30	24.45	.2075E-03	.2328E-04
34	191.780	42.92	31.40	.1436E-03	.1613E-04
35	225.607	57.44	40.37	.9341E-04	.1052E-04
36	265.399	77.55	51.95	.5763E-04	.6517E-05
37	312.205	105.87	66.94	.3449E-04	.3929E-05
38	367.263	146.57	86.35	.1335E-04	.1565E-05
39	432.024	206.62	111.49	.3747E-05	.4878E-06
40	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0

Table E.23 Target Material: Iron (Fe-56)  
Angle: 150°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.1629E-01	.1821E-02
2	1.057	0.09	0.08	.1720E-01	.1923E-02
3	1.244	0.11	0.09	.1700E-01	.1901E-02
4	1.463	0.13	0.11	.1783E-01	.1993E-02
5	1.722	0.15	0.13	.1883E-01	.2105E-02
6	2.026	0.18	0.15	.1912E-01	.2137E-02
7	2.383	0.21	0.18	.1655E-01	.1850E-02
8	2.804	0.24	0.21	.1444E-01	.1615E-02
9	3.299	0.29	0.25	.1361E-01	.1522E-02
10	3.881	0.34	0.30	.1129E-01	.1263E-02
11	4.566	0.40	0.35	.9663E-02	.1080E-02
12	5.373	0.46	0.41	.7817E-02	.8740E-03
13	6.321	0.55	0.48	.6458E-02	.7221E-03
14	7.436	0.64	0.57	.5099E-02	.5701E-03
15	8.749	0.76	0.67	.3661E-02	.4094E-03
16	10.293	0.89	0.79	.2627E-02	.2938E-03
17	12.108	1.05	0.93	.1815E-02	.2030E-03
18	14.244	1.23	1.09	.1237E-02	.1384E-03
19	16.758	1.45	1.28	.9293E-03	.1040E-03
20	19.716	1.71	1.51	.8356E-03	.9350E-04
21	23.195	2.01	1.77	.7420E-03	.8303E-04
22	27.288	2.36	2.09	.5158E-03	.5774E-04
23	32.105	2.78	2.45	.4777E-03	.5349E-04
24	37.769	3.27	2.89	.3476E-03	.3893E-04
25	44.434	3.85	3.39	.2927E-03	.3280E-04
26	52.275	4.73	4.15	.2586E-03	.2898E-04
27	61.499	6.12	5.31	.2319E-03	.2600E-04
28	72.350	7.94	6.78	.1392E-03	.1564E-04
29	85.115	10.32	8.67	.1231E-03	.1384E-04
30	100.131	13.45	11.10	.1020E-03	.1148E-04
31	117.796	17.59	14.22	.6760E-04	.7632E-05
32	138.577	23.10	18.23	.4420E-04	.5015E-05
33	163.023	30.49	23.40	.2963E-04	.3387E-05
34	191.780	40.46	30.07	.1406E-04	.1645E-05
35	225.607	54.08	38.68	.5741E-05	.7125E-06
36	265.399	72.89	49.82	.6457E-05	.7930E-06
37	312.205	99.29	64.25	.4462E-05	.5686E-06
38	367.263	137.06	82.97	.2249E-05	.3174E-06
39	0.0	0.0	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0

Table E.24 Target Material: Aluminum (Al-27)  
Angle: 23°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.3456E-01	.3864E-02
2	1.057	0.09	0.08	.3607E-01	.4032E-02
3	1.244	0.11	0.09	.3532E-01	.3948E-02
4	1.463	0.13	0.11	.3641E-01	.4071E-02
5	1.722	0.15	0.13	.3645E-01	.4075E-02
6	2.026	0.18	0.15	.3613E-01	.4040E-02
7	2.383	0.21	0.18	.3510E-01	.3925E-02
8	2.804	0.24	0.21	.3421E-01	.3825E-02
9	3.299	0.29	0.25	.3305E-01	.3695E-02
10	3.881	0.34	0.30	.3189E-01	.3566E-02
11	4.566	0.40	0.35	.2805E-01	.3136E-02
12	5.372	0.47	0.41	.2324E-01	.2599E-02
13	6.321	0.55	0.48	.1990E-01	.2225E-02
14	7.436	0.64	0.57	.1827E-01	.2042E-02
15	8.749	0.76	0.67	.1491E-01	.1667E-02
16	10.293	0.89	0.79	.1312E-01	.1467E-02
17	12.108	1.05	0.93	.9937E-02	.1111E-02
18	14.244	1.23	1.09	.7407E-02	.8282E-03
19	16.758	1.45	1.28	.5614E-02	.6277E-03
20	19.716	1.71	1.51	.4285E-02	.4791E-03
21	23.195	2.01	1.77	.3919E-02	.4383E-03
22	27.288	2.36	2.09	.3668E-02	.4101E-03
23	32.105	2.78	2.45	.3788E-02	.4236E-03
24	37.769	3.27	2.89	.3942E-02	.4408E-03
25	44.434	3.85	3.39	.3665E-02	.4098E-03
26	52.275	4.53	3.99	.3692E-02	.4129E-03
27	61.499	5.33	4.70	.4455E-02	.4982E-03
28	72.350	6.27	5.52	.4509E-02	.5042E-03
29	85.115	7.38	6.50	.4815E-02	.5384E-03
30	100.131	8.68	7.64	.5060E-02	.5659E-03
31	117.796	10.22	8.98	.4949E-02	.5534E-03
32	138.577	12.44	10.88	.5175E-02	.5787E-03
33	163.023	16.30	14.03	.5359E-02	.5993E-03
34	191.780	21.45	18.12	.4892E-02	.5470E-03
35	225.607	28.36	23.47	.4442E-02	.4967E-03
36	265.398	37.75	30.45	.3957E-02	.4425E-03
37	312.205	50.59	39.59	.3578E-02	.4001E-03
38	367.263	68.40	51.62	.2829E-02	.3163E-03
39	432.024	93.44	67.46	.1712E-02	.1915E-03
40	508.199	129.32	88.37	.8434E-03	.9437E-04
41	597.797	181.86	116.03	.1707E-03	.1916E-04



Table E.25 Target Material: Aluminum (Al-27)  
Angle: 30°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1σ)
1	0.899	0.08	0.07	.2420E-01	.2705E-02
2	1.057	0.09	0.08	.2541E-01	.2841E-02
3	1.244	0.11	0.09	.2555E-01	.2856E-02
4	1.463	0.13	0.11	.2268E-01	.2536E-02
5	1.722	0.15	0.13	.2065E-01	.2308E-02
6	2.026	0.18	0.15	.1852E-01	.2070E-02
7	2.383	0.21	0.18	.1574E-01	.1760E-02
8	2.804	0.24	0.21	.1253E-01	.1401E-02
9	3.299	0.29	0.25	.1059E-01	.1184E-02
10	3.881	0.34	0.30	.9529E-02	.1065E-02
11	4.566	0.40	0.35	.8032E-02	.8981E-03
12	5.373	0.46	0.41	.6264E-02	.7004E-03
13	6.321	0.55	0.48	.4253E-02	.4756E-03
14	7.436	0.64	0.57	.3522E-02	.3939E-03
15	8.749	0.76	0.67	.2944E-02	.3292E-03
16	10.293	0.89	0.79	.2382E-02	.2664E-03
17	12.108	1.05	0.93	.1809E-02	.2023E-03
18	14.244	1.23	1.09	.1524E-02	.1704E-03
19	16.758	1.45	1.28	.1219E-02	.1363E-03
20	19.716	1.71	1.51	.1187E-02	.1328E-03
21	23.195	2.01	1.77	.1185E-02	.1326E-03
22	27.288	2.36	2.09	.1072E-02	.1199E-03
23	32.105	2.78	2.45	.1046E-02	.1170E-03
24	37.769	3.27	2.89	.9341E-03	.1045E-03
25	44.434	3.85	3.39	.8403E-03	.9401E-04
26	52.275	4.55	4.01	.8891E-03	.9947E-04
27	61.499	5.89	5.13	.8832E-03	.9881E-04
28	72.350	7.63	6.55	.9128E-03	.1021E-03
29	85.115	9.91	8.39	.8447E-03	.9450E-04
30	100.131	12.92	10.74	.7578E-03	.8479E-04
31	117.796	16.89	13.75	.6850E-03	.7665E-04
32	138.577	22.16	17.64	.5739E-03	.6423E-04
33	163.023	29.23	22.65	.5416E-03	.6061E-04
34	191.780	38.76	29.12	.4324E-03	.4841E-04
35	225.607	51.76	37.48	.3715E-03	.4160E-04
36	265.399	69.69	48.30	.2915E-03	.3266E-04
37	312.205	94.78	62.33	.2532E-03	.2837E-04
38	367.263	130.58	80.55	.1595E-03	.1789E-04
39	432.024	182.87	104.21	.9565E-04	.1076E-04
40	508.198	261.75	134.93	.4812E-04	.5443E-05
41	597.797	386.19	174.82	.2787E-04	.3180E-05

Table E.26 Target Material: Aluminum (Al-27)  
Angle: 90°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.9798E-02	.1095E-02
2	1.057	0.09	0.08	.1014E-01	.1134E-02
3	1.244	0.11	0.09	.1035E-01	.1158E-02
4	1.463	0.13	0.11	.9650E-02	.1079E-02
5	1.722	0.15	0.13	.8103E-02	.9060E-03
6	2.026	0.18	0.15	.8468E-02	.9469E-03
7	2.383	0.21	0.18	.7598E-02	.8496E-03
8	2.804	0.24	0.21	.5647E-02	.6314E-03
9	3.299	0.29	0.25	.5327E-02	.5956E-03
10	3.881	0.34	0.30	.4269E-02	.4773E-03
11	4.566	0.40	0.35	.3693E-02	.4130E-03
12	5.373	0.46	0.41	.3116E-02	.3484E-03
13	6.321	0.55	0.48	.2327E-02	.2602E-03
14	7.436	0.64	0.57	.1996E-02	.2232E-03
15	8.749	0.76	0.67	.1635E-02	.1828E-03
16	10.293	0.89	0.79	.1163E-02	.1301E-03
17	12.108	1.05	0.93	.9434E-03	.1055E-03
18	14.244	1.23	1.09	.7348E-03	.8222E-04
19	16.758	1.45	1.28	.5436E-03	.6084E-04
20	19.716	1.71	1.51	.5570E-03	.6233E-04
21	23.195	2.01	1.77	.5144E-03	.5758E-04
22	27.288	2.36	2.09	.4868E-03	.5449E-04
23	32.105	2.78	2.45	.4252E-03	.4760E-04
24	37.769	3.27	2.89	.3967E-03	.4441E-04
25	44.434	3.87	3.41	.3761E-03	.4211E-04
26	52.275	4.99	4.35	.3332E-03	.3732E-04
27	61.499	6.46	5.56	.3104E-03	.3476E-04
28	72.350	8.38	7.10	.2534E-03	.2840E-04
29	85.115	10.90	9.08	.2281E-03	.2556E-04
30	100.131	14.22	11.62	.2004E-03	.2247E-04
31	117.796	18.61	14.88	.1657E-03	.1859E-04
32	138.577	24.46	19.06	.1193E-03	.1341E-04
33	163.023	32.30	24.45	.8494E-04	.9560E-05
34	191.780	42.92	31.40	.5763E-04	.6507E-05
35	225.607	57.44	40.37	.3866E-04	.4386E-05
36	265.399	77.55	51.95	.2210E-04	.2534E-05
37	312.205	105.87	66.94	.1382E-04	.1608E-05
38	367.263	146.57	86.35	.5634E-05	.6909E-06
39	432.024	206.62	111.49	.2471E-05	.3341E-06
40	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0

Table E.27 Target Material: Aluminum (Al-27)  
Angle: 150°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.4963E-02	.5549E-03
2	1.057	0.09	0.08	.5538E-02	.6192E-03
3	1.244	0.11	0.09	.5756E-02	.6437E-03
4	1.463	0.13	0.11	.6351E-02	.7101E-03
5	1.722	0.15	0.13	.5571E-02	.6230E-03
6	2.026	0.18	0.15	.5420E-02	.6060E-03
7	2.383	0.21	0.18	.4959E-02	.5545E-03
8	2.804	0.24	0.21	.4108E-02	.4593E-03
9	3.299	0.29	0.25	.3466E-02	.3876E-03
10	3.881	0.34	0.30	.2812E-02	.3145E-03
11	4.566	0.40	0.35	.2149E-02	.2404E-03
12	5.373	0.46	0.41	.1957E-02	.2189E-03
13	6.321	0.55	0.48	.1762E-02	.1970E-03
14	7.436	0.64	0.57	.1279E-02	.1431E-03
15	8.749	0.76	0.67	.1012E-02	.1132E-03
16	10.293	0.89	0.79	.7801E-03	.8728E-04
17	12.108	1.05	0.93	.6002E-03	.6717E-04
18	14.244	1.23	1.09	.4606E-03	.5156E-04
19	16.758	1.45	1.28	.3380E-03	.3785E-04
20	19.716	1.71	1.51	.3313E-03	.3711E-04
21	23.195	2.01	1.77	.2918E-03	.3268E-04
22	27.288	2.36	2.09	.2184E-03	.2448E-04
23	32.105	2.78	2.45	.2093E-03	.2346E-04
24	37.769	3.27	2.89	.1595E-03	.1790E-04
25	44.434	3.85	3.39	.1437E-03	.1613E-04
26	52.275	4.73	4.15	.1356E-03	.1523E-04
27	61.499	6.12	5.31	.1013E-03	.1139E-04
28	72.350	7.94	6.78	.8981E-04	.1010E-04
29	85.115	10.32	8.67	.7777E-04	.8759E-05
30	100.131	13.45	11.10	.5934E-04	.6698E-05
31	117.796	17.59	14.22	.4142E-04	.4695E-05
32	138.577	23.10	18.23	.3619E-04	.4110E-05
33	163.023	30.49	23.40	.1935E-04	.2227E-05
34	191.780	40.46	30.07	.1081E-04	.1271E-05
35	225.607	54.08	38.68	.1325E-04	.1544E-05
36	265.399	72.89	49.82	.5434E-05	.6683E-06
37	312.205	99.29	64.25	.3159E-05	.4122E-06
38	367.263	137.06	82.97	.1898E-05	.2686E-06
39	0.0	0.0	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0

Table E.28 Target Material: Carbon (C-12)  
Angle: 23°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.1232E-01	.1377E-02
2	1.057	0.09	0.08	.1323E-01	.1479E-02
3	1.244	0.11	0.09	.1387E-01	.1551E-02
4	1.463	0.13	0.11	.1404E-01	.1570E-02
5	1.722	0.15	0.13	.1432E-01	.1601E-02
6	2.026	0.18	0.15	.1396E-01	.1561E-02
7	2.383	0.21	0.18	.1344E-01	.1502E-02
8	2.804	0.24	0.21	.1290E-01	.1443E-02
9	3.299	0.29	0.25	.1193E-01	.1334E-02
10	3.881	0.34	0.30	.1184E-01	.1324E-02
11	4.566	0.40	0.35	.9967E-02	.1114E-02
12	5.372	0.47	0.41	.7919E-02	.8855E-03
13	6.321	0.55	0.48	.7661E-02	.8566E-03
14	7.436	0.64	0.57	.6222E-02	.6958E-03
15	8.749	0.76	0.67	.5373E-02	.6008E-03
16	10.293	0.89	0.79	.4155E-02	.4647E-03
17	12.108	1.05	0.93	.3510E-02	.3925E-03
18	14.244	1.23	1.09	.2499E-02	.2794E-03
19	16.758	1.45	1.28	.1931E-02	.2160E-03
20	19.716	1.71	1.51	.1747E-02	.1954E-03
21	23.195	2.01	1.77	.1549E-02	.1732E-03
22	27.288	2.36	2.09	.1409E-02	.1576E-03
23	32.105	2.78	2.45	.1428E-02	.1597E-03
24	37.769	3.27	2.89	.1493E-02	.1669E-03
25	44.434	3.85	3.39	.1565E-02	.1751E-03
26	52.275	4.53	3.99	.1583E-02	.1770E-03
27	61.499	5.33	4.70	.1727E-02	.1931E-03
28	72.350	6.27	5.52	.1937E-02	.2167E-03
29	85.115	7.38	6.50	.2136E-02	.2389E-03
30	100.131	8.68	7.64	.2210E-02	.2472E-03
31	117.796	10.22	8.98	.2176E-02	.2434E-03
32	138.577	12.44	10.88	.2476E-02	.2769E-03
33	163.023	16.30	14.03	.2422E-02	.2708E-03
34	191.780	21.45	18.12	.2312E-02	.2585E-03
35	225.607	28.36	23.47	.2013E-02	.2251E-03
36	265.398	37.75	30.45	.1902E-02	.2127E-03
37	312.205	50.59	39.59	.1789E-02	.2001E-03
38	367.263	68.40	51.62	.1486E-02	.1663E-03
39	432.024	93.44	67.46	.8888E-03	.9943E-04
40	508.199	129.32	88.37	.4844E-03	.5422E-04
41	597.797	181.86	116.03	.1012E-03	.1138E-04

Table E.29 Target Material: Carbon (C-12)  
Angle: 30°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1σ)
1	0.899	0.08	0.07	.1046E-01	.1169E-02
2	1.057	0.09	0.08	.9801E-02	.1096E-02
3	1.244	0.11	0.09	.1056E-01	.1181E-02
4	1.463	0.13	0.11	.9026E-02	.1009E-02
5	1.722	0.15	0.13	.8683E-02	.9709E-03
6	2.026	0.18	0.15	.7372E-02	.8243E-03
7	2.383	0.21	0.18	.5981E-02	.6688E-03
8	2.804	0.24	0.21	.4529E-02	.5064E-03
9	3.299	0.29	0.25	.3325E-02	.3718E-03
10	3.881	0.34	0.30	.2668E-02	.2984E-03
11	4.566	0.40	0.35	.2182E-02	.2440E-03
12	5.373	0.46	0.41	.1729E-02	.1934E-03
13	6.321	0.55	0.48	.1061E-02	.1187E-03
14	7.436	0.64	0.57	.8162E-03	.9132E-04
15	8.749	0.76	0.67	.8673E-03	.9703E-04
16	10.293	0.89	0.79	.6793E-03	.7600E-04
17	12.108	1.05	0.93	.5737E-03	.6420E-04
18	14.244	1.23	1.09	.4620E-03	.5170E-04
19	16.758	1.45	1.28	.4101E-03	.4590E-04
20	19.716	1.71	1.51	.4096E-03	.4585E-04
21	23.195	2.01	1.77	.4191E-03	.4691E-04
22	27.288	2.36	2.09	.3605E-03	.4036E-04
23	32.105	2.78	2.45	.3452E-03	.3865E-04
24	37.769	3.27	2.89	.3132E-03	.3507E-04
25	44.434	3.85	3.39	.2780E-03	.3114E-04
26	52.275	4.55	4.01	.2959E-03	.3314E-04
27	61.499	5.89	5.13	.2710E-03	.3035E-04
28	72.350	7.63	6.55	.2747E-03	.3077E-04
29	85.115	9.91	8.39	.2707E-03	.3032E-04
30	100.131	12.92	10.74	.2545E-03	.2851E-04
31	117.796	16.89	13.75	.2354E-03	.2637E-04
32	138.577	22.16	17.64	.2085E-03	.2337E-04
33	163.023	29.23	22.65	.1700E-03	.1906E-04
34	191.780	38.76	29.12	.1598E-03	.1792E-04
35	225.607	51.76	37.48	.1331E-03	.1494E-04
36	265.399	69.69	48.30	.1081E-03	.1214E-04
37	312.205	94.78	62.33	.9117E-04	.1025E-04
38	367.263	130.58	80.55	.6479E-04	.7300E-05
39	432.024	182.87	104.21	.4032E-04	.4564E-05
40	508.198	261.75	134.93	.2799E-04	.3185E-05
41	597.797	386.19	174.82	.1273E-04	.1478E-05

Table E.30 Target Material: Carbon (C-12)  
Angle: 90°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.2441E-02	.2730E-03
2	1.057	0.09	0.08	.2732E-02	.3055E-03
3	1.244	0.11	0.09	.2549E-02	.2851E-03
4	1.463	0.13	0.11	.2198E-02	.2458E-03
5	1.722	0.15	0.13	.2224E-02	.2487E-03
6	2.026	0.18	0.15	.2008E-02	.2246E-03
7	2.383	0.21	0.18	.1590E-02	.1779E-03
8	2.804	0.24	0.21	.1445E-02	.1616E-03
9	3.299	0.29	0.25	.1134E-02	.1269E-03
10	3.881	0.34	0.30	.8557E-03	.9572E-04
11	4.566	0.40	0.35	.6568E-03	.7349E-04
12	5.373	0.46	0.41	.6269E-03	.7014E-04
13	6.321	0.55	0.48	.5503E-03	.6158E-04
14	7.436	0.64	0.57	.4883E-03	.5465E-04
15	8.749	0.76	0.67	.4330E-03	.4847E-04
16	10.293	0.89	0.79	.3456E-03	.3869E-04
17	12.108	1.05	0.93	.2188E-03	.2452E-04
18	14.244	1.23	1.09	.1814E-03	.2034E-04
19	16.758	1.45	1.28	.1417E-03	.1590E-04
20	19.716	1.71	1.51	.1500E-03	.1683E-04
21	23.195	2.01	1.77	.1357E-03	.1523E-04
22	27.288	2.36	2.09	.1371E-03	.1538E-04
23	32.105	2.78	2.45	.1076E-03	.1208E-04
24	37.769	3.27	2.89	.1071E-03	.1203E-04
25	44.434	3.87	3.41	.1005E-03	.1129E-04
26	52.275	4.99	4.35	.9265E-04	.1041E-04
27	61.499	6.46	5.56	.8428E-04	.9479E-05
28	72.350	8.38	7.10	.6999E-04	.7881E-05
29	85.115	10.90	9.08	.6952E-04	.7829E-05
30	100.131	14.22	11.62	.5374E-04	.6064E-05
31	117.796	18.61	14.88	.4680E-04	.5288E-05
32	138.577	24.46	19.06	.3227E-04	.3663E-05
33	163.023	32.30	24.45	.2293E-04	.2619E-05
34	191.780	42.92	31.40	.1381E-04	.1599E-05
35	225.607	57.44	40.37	.9737E-05	.1143E-05
36	265.399	77.55	51.95	.5710E-05	.6920E-06
37	312.205	105.87	66.94	.3330E-05	.4245E-06
38	367.263	146.57	86.35	.1965E-05	.2698E-06
39	0.0	0.0	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0

Table E.31 Target Material: Carbon (C-12)  
Angle: 150°

	energy (MeV)	+error	-error	x-section (b/sr/MeV)	error (1 $\sigma$ )
1	0.899	0.08	0.07	.1440E-02	.1611E-03
2	1.057	0.09	0.08	.1509E-02	.1687E-03
3	1.244	0.11	0.09	.1737E-02	.1943E-03
4	1.463	0.13	0.11	.1666E-02	.1864E-03
5	1.722	0.15	0.13	.1814E-02	.2029E-03
6	2.026	0.18	0.15	.1867E-02	.2088E-03
7	2.383	0.21	0.18	.1522E-02	.1702E-03
8	2.804	0.24	0.21	.1323E-02	.1480E-03
9	3.299	0.29	0.25	.1132E-02	.1266E-03
10	3.881	0.34	0.30	.9109E-03	.1019E-03
11	4.566	0.40	0.35	.5161E-03	.5776E-04
12	5.373	0.46	0.41	.4975E-03	.5568E-04
13	6.321	0.55	0.48	.3886E-03	.4350E-04
14	7.436	0.64	0.57	.3497E-03	.3916E-04
15	8.749	0.76	0.67	.2242E-03	.2512E-04
16	10.293	0.89	0.79	.1892E-03	.2121E-04
17	12.108	1.05	0.93	.2094E-03	.2347E-04
18	14.244	1.23	1.09	.9102E-04	.1023E-04
19	16.758	1.45	1.28	.8278E-04	.9311E-05
20	19.716	1.71	1.51	.1042E-03	.1170E-04
21	23.195	2.01	1.77	.8188E-04	.9210E-05
22	27.288	2.36	2.09	.6082E-04	.6855E-05
23	32.105	2.78	2.45	.5460E-04	.6160E-05
24	37.769	3.27	2.89	.3533E-04	.4005E-05
25	44.434	3.85	3.39	.4559E-04	.5153E-05
26	52.275	4.73	4.15	.2941E-04	.3344E-05
27	61.499	6.12	5.31	.3439E-04	.3900E-05
28	72.350	7.94	6.78	.2230E-04	.2548E-05
29	85.115	10.32	8.67	.1475E-04	.1704E-05
30	100.131	13.45	11.10	.1342E-04	.1555E-05
31	117.796	17.59	14.22	.8760E-05	.1034E-05
32	138.577	23.10	18.23	.8632E-05	.1019E-05
33	163.023	30.49	23.40	.5435E-05	.6611E-06
34	191.780	40.46	30.07	.3154E-05	.4047E-06
35	225.607	54.08	38.68	.4941E-05	.6057E-06
36	265.399	72.89	49.82	.3368E-05	.4288E-06
37	312.205	99.29	64.25	.4299E-06	.8766E-07
38	0.0	0.0	0.0	0.0	0.0
39	0.0	0.0	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0

APPENDIX F

Tables of Calculated Data:  
Double Differential Neutron Production Cross Sections  
for 590 MeV Protons



Table F.1 Target Material: Uranium (U-238)  
 Angle: 0 - 5°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.0140E-03	1.3466E-04	1.8747E-03	2.4896E-04
4.5000E 02	3.0100E-04	7.2842E-05	5.5649E-04	1.3467E-04
3.5000E 02	1.2670E-03	1.4178E-04	2.3424E-03	2.6212E-04
2.5000E 02	1.7900E-03	1.4929E-04	3.3093E-03	2.7600E-04
1.7500E 02	1.3620E-03	2.2527E-04	2.5181E-03	4.1649E-04
1.2500E 02	1.1410E-03	1.8929E-04	2.1095E-03	3.4996E-04
9.0000E 01	1.5840E-03	3.3280E-04	2.9285E-03	6.1528E-04
7.0000E 01	2.0600E-03	4.9316E-04	3.8085E-03	9.1176E-04
5.0000E 01	1.8226E-03	3.9829E-04	3.3696E-03	7.3636E-04
3.5000E 01	3.3378E-03	7.1232E-04	6.1710E-03	1.3169E-03
2.5000E 01	3.6079E-03	6.7601E-04	6.6703E-03	1.2498E-03
1.7500E 01	7.9420E-03	1.3117E-03	1.4683E-02	2.4250E-03
1.2500E 01	1.8587E-02	1.8040E-03	3.4364E-02	3.3352E-03
9.0000E 00	3.3636E-02	2.8241E-03	6.2186E-02	5.2212E-03
7.0000E 00	5.3771E-02	2.4246E-03	9.9412E-02	4.4826E-03
5.0000E 00	1.0213E-01	3.7268E-03	1.8882E-01	6.8901E-03
3.5000E 00	1.4147E-01	4.4878E-03	2.6155E-01	8.2970E-03
2.5000E 00	1.9783E-01	6.5079E-03	3.6575E-01	1.2032E-02
1.7500E 00	2.2288E-01	8.5181E-03	4.1206E-01	1.5748E-02
1.2500E 00	2.3789E-01	9.7553E-03	4.3981E-01	1.8036E-02
9.0000E-01	2.1502E-01	8.8817E-03	3.9753E-01	1.6420E-02
7.0000E-01	2.3349E-01	1.6006E-02	4.3168E-01	2.9592E-02
5.0000E-01	1.9882E-01	8.6116E-03	3.6758E-01	1.5921E-02
3.5000E-01	1.8764E-01	1.6559E-02	3.4691E-01	3.0615E-02
2.5000E-01	1.6394E-01	1.6366E-02	3.0309E-01	3.0258E-02
1.7500E-01	1.6339E-01	3.2190E-02	3.0208E-01	5.9512E-02
7.5000E-02	9.4000E-02	1.0911E-02	1.7379E-01	2.0172E-02

Table F.2 Target Material: Uranium (U-238)  
Angle: 5 - 10°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	9.0000E-04	6.2460E-05	1.6639E-03	1.1548E-04
4.5000E 02	1.7470E-04	3.1324E-05	3.2298E-04	5.7911E-05
3.5000E 02	3.1770E-04	3.4947E-05	5.8736E-04	6.4610E-05
2.5000E 02	5.8240E-04	5.4454E-05	1.0767E-03	1.0068E-04
1.7500E 02	1.0170E-03	9.6005E-05	1.8802E-03	1.7749E-04
1.2500E 02	1.2600E-03	1.0861E-04	2.3295E-03	2.0080E-04
9.0000E 01	1.2440E-03	1.8424E-04	2.2999E-03	3.4062E-04
7.0000E 01	1.6680E-03	2.0616E-04	3.0838E-03	3.8116E-04
5.0000E 01	2.3566E-03	2.8296E-04	4.3569E-03	5.2313E-04
3.5000E 01	2.8698E-03	4.0142E-04	5.3058E-03	7.4215E-04
2.5000E 01	3.9339E-03	4.3591E-04	7.2730E-03	8.0590E-04
1.7500E 01	6.7930E-03	7.7059E-04	1.2559E-02	1.4247E-03
1.2500E 01	1.6811E-02	9.5696E-04	3.1080E-02	1.7692E-03
9.0000E 00	3.4720E-02	1.6333E-03	6.4190E-02	3.0197E-03
7.0000E 00	5.7230E-02	1.6744E-03	1.0581E-01	3.0956E-03
5.0000E 00	9.6880E-02	2.1584E-03	1.7911E-01	3.9905E-03
3.5000E 00	1.4521E-01	3.6129E-03	2.6846E-01	6.6796E-03
2.5000E 00	1.9684E-01	4.0695E-03	3.6392E-01	7.5237E-03
1.7500E 00	2.2294E-01	6.4152E-03	4.1217E-01	1.1861E-02
1.2500E 00	2.2950E-01	4.8853E-03	4.2430E-01	9.0319E-03
9.0000E-01	2.3092E-01	9.3577E-03	4.2692E-01	1.7301E-02
7.0000E-01	2.2298E-01	8.0833E-03	4.1225E-01	1.4944E-02
5.0000E-01	2.0943E-01	8.4420E-03	3.8719E-01	1.5608E-02
3.5000E-01	2.0357E-01	1.3484E-02	3.7636E-01	2.4930E-02
2.5000E-01	1.7987E-01	1.3247E-02	3.3254E-01	2.4490E-02
1.7500E-01	1.3170E-01	5.6499E-03	2.4349E-01	1.0446E-02
7.5000E-02	9.7560E-02	7.4606E-03	1.8037E-01	1.3793E-02

Table F.3 Target Material: Uranium (U-238)  
Angle: 10 - 15°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	7.4070E-04	4.9331E-05	1.3694E-03	9.1202E-05
4.5000E 02	1.5640E-04	2.1708E-05	2.8915E-04	4.0134E-05
3.5000E 02	3.6400E-04	3.0867E-05	6.7296E-04	5.7067E-05
2.5000E 02	6.0340E-04	4.5557E-05	1.1156E-03	8.4225E-05
1.7500E 02	9.1310E-04	7.5057E-05	1.6881E-03	1.3876E-04
1.2500E 02	9.8980E-04	7.9184E-05	1.8299E-03	1.4640E-04
9.0000E 01	1.3090E-03	1.5027E-04	2.4201E-03	2.7782E-04
7.0000E 01	1.6120E-03	1.5653E-04	2.9803E-03	2.8938E-04
5.0000E 01	2.1236E-03	1.8152E-04	3.9261E-03	3.3559E-04
3.5000E 01	3.1718E-03	3.4836E-04	5.8641E-03	6.4405E-04
2.5000E 01	4.3999E-03	3.9635E-04	8.1345E-03	7.3277E-04
1.7500E 01	7.9880E-03	6.5976E-04	1.4768E-02	1.2198E-03
1.2500E 01	1.6233E-02	6.8540E-04	3.0012E-02	1.2672E-03
9.0000E 00	3.4190E-02	1.3897E-03	6.3210E-02	2.5692E-03
7.0000E 00	5.8140E-02	1.4671E-03	1.0749E-01	2.7124E-03
5.0000E 00	9.6840E-02	1.7036E-03	1.7904E-01	3.1496E-03
3.5000E 00	1.4061E-01	2.2207E-03	2.5996E-01	4.1057E-03
2.5000E 00	1.8559E-01	2.6075E-03	3.4312E-01	4.8207E-03
1.7500E 00	2.2433E-01	4.2951E-03	4.1474E-01	7.9408E-03
1.2500E 00	2.2663E-01	4.2030E-03	4.1899E-01	7.7706E-03
9.0000E-01	2.2147E-01	6.4913E-03	4.0945E-01	1.2001E-02
7.0000E-01	2.2734E-01	6.8933E-03	4.2031E-01	1.2744E-02
5.0000E-01	2.2442E-01	7.6003E-03	4.1491E-01	1.4051E-02
3.5000E-01	1.7499E-01	5.7880E-03	3.2353E-01	1.0701E-02
2.5000E-01	1.8641E-01	1.2017E-02	3.4463E-01	2.2217E-02
1.7500E-01	1.5086E-01	1.2308E-02	2.7891E-01	2.2755E-02
7.5000E-02	1.1111E-01	7.6356E-03	2.0542E-01	1.4117E-02

Table F.4 Target Material: Uranium (U-238)

Angle: 15 - 20°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	4.0680E-04	2.9696E-05	7.5209E-04	5.4903E-05
4.5000E 02	3.1710E-04	3.1298E-05	5.8625E-04	5.7863E-05
3.5000E 02	2.1600E-04	2.2831E-05	3.9934E-04	4.2210E-05
2.5000E 02	5.8140E-04	3.6512E-05	1.0749E-03	6.7503E-05
1.7500E 02	8.3650E-04	5.5042E-05	1.5465E-03	1.0176E-04
1.2500E 02	1.0020E-03	6.5030E-05	1.8525E-03	1.2023E-04
9.0000E 01	1.3100E-03	1.2995E-04	2.4219E-03	2.4025E-04
7.0000E 01	1.4360E-03	1.2938E-04	2.6549E-03	2.3920E-04
5.0000E 01	2.1146E-03	1.4587E-04	3.9095E-03	2.6968E-04
3.5000E 01	3.0208E-03	2.3331E-04	5.5849E-03	4.3134E-04
2.5000E 01	4.0959E-03	2.4842E-04	7.5725E-03	4.5927E-04
1.7500E 01	7.5750E-03	4.9580E-04	1.4005E-02	9.1664E-04
1.2500E 01	1.6894E-02	5.5485E-04	3.1234E-02	1.0258E-03
9.0000E 00	3.2978E-02	1.3138E-03	6.0970E-02	2.4290E-03
7.0000E 00	5.6420E-02	1.1133E-03	1.0431E-01	2.0583E-03
5.0000E 00	9.8500E-02	1.4358E-03	1.8211E-01	2.6546E-03
3.5000E 00	1.4650E-01	2.2570E-03	2.7085E-01	4.1727E-03
2.5000E 00	1.9089E-01	2.7081E-03	3.5292E-01	5.0067E-03
1.7500E 00	2.2000E-01	3.8479E-03	4.0674E-01	7.1140E-03
1.2500E 00	2.3883E-01	4.4772E-03	4.4155E-01	8.2774E-03
9.0000E-01	2.3468E-01	6.4899E-03	4.3388E-01	1.1999E-02
7.0000E-01	2.1444E-01	5.4139E-03	3.9646E-01	1.0009E-02
5.0000E-01	2.1733E-01	6.8903E-03	4.0180E-01	1.2739E-02
3.5000E-01	1.9478E-01	8.4049E-03	3.6011E-01	1.5539E-02
2.5000E-01	1.8487E-01	9.3202E-03	3.4179E-01	1.7231E-02
1.7500E-01	1.4549E-01	1.1687E-02	2.6898E-01	2.1607E-02
7.5000E-02	1.1102E-01	6.8032E-03	2.0525E-01	1.2578E-02

Table F.5 Target Material: Uranium (U-238)  
Angle: 20 - 25°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.0650E-04	1.2503E-05	1.9690E-04	2.3116E-05
4.5000E 02	3.6300E-04	2.1490E-05	6.7111E-04	3.9730E-05
3.5000E 02	1.7700E-04	1.5293E-05	3.2724E-04	2.8273E-05
2.5000E 02	4.2800E-04	2.8077E-05	7.9129E-04	5.1908E-05
1.7500E 02	7.6570E-04	5.3522E-05	1.4156E-03	9.8952E-05
1.2500E 02	9.8960E-04	5.7991E-05	1.8296E-03	1.0721E-04
9.0000E 01	9.8420E-04	9.7829E-05	1.8196E-03	1.8087E-04
7.0000E 01	1.4270E-03	1.2472E-04	2.6382E-03	2.3058E-04
5.0000E 01	1.9146E-03	1.1101E-04	3.5397E-03	2.0524E-04
3.5000E 01	2.2138E-03	1.8950E-04	4.0930E-03	3.5034E-04
2.5000E 01	4.4339E-03	2.4793E-04	8.1974E-03	4.5837E-04
1.7500E 01	7.5560E-03	4.8580E-04	1.3970E-02	8.9814E-04
1.2500E 01	1.6665E-02	5.2772E-04	3.0810E-02	9.7565E-04
9.0000E 00	3.4330E-02	1.0644E-03	6.3469E-02	1.9678E-03
7.0000E 00	5.6410E-02	1.0039E-03	1.0429E-01	1.8560E-03
5.0000E 00	9.7090E-02	1.5270E-03	1.7950E-01	2.8232E-03
3.5000E 00	1.4361E-01	2.2457E-03	2.6551E-01	4.1518E-03
2.5000E 00	1.8932E-01	2.4274E-03	3.5001E-01	4.4878E-03
1.7500E 00	2.2201E-01	3.8348E-03	4.1045E-01	7.0897E-03
1.2500E 00	2.2931E-01	3.9854E-03	4.2395E-01	7.3682E-03
9.0000E-01	2.3780E-01	7.1766E-03	4.3964E-01	1.3268E-02
7.0000E-01	2.2708E-01	5.7294E-03	4.1983E-01	1.0592E-02
5.0000E-01	2.2250E-01	6.4806E-03	4.1136E-01	1.1981E-02
3.5000E-01	2.0792E-01	9.3535E-03	3.8440E-01	1.7293E-02
2.5000E-01	1.6977E-01	7.5983E-03	3.1387E-01	1.4048E-02
1.7500E-01	1.5698E-01	1.0813E-02	2.9022E-01	1.9991E-02
7.5000E-02	1.1233E-01	6.4727E-03	2.0768E-01	1.1967E-02

Table F.6 Target Material: Uranium (U-238)

Angle: 25 - 35°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.5910E-05	3.0308E-06	2.9414E-05	5.6034E-06
4.5000E 02	2.1370E-04	1.3527E-05	3.9509E-04	2.5009E-05
3.5000E 02	2.2620E-04	1.1808E-05	4.1820E-04	2.1830E-05
2.5000E 02	3.4240E-04	1.6743E-05	6.3303E-04	3.0955E-05
1.7500E 02	5.5610E-04	2.9473E-05	1.0281E-03	5.4490E-05
1.2500E 02	8.8260E-04	3.1067E-05	1.6317E-03	5.7438E-05
9.0000E 01	1.2310E-03	6.9305E-05	2.2759E-03	1.2813E-04
7.0000E 01	1.5010E-03	8.8709E-05	2.7750E-03	1.6401E-04
5.0000E 01	1.9236E-03	7.6922E-05	3.5564E-03	1.4221E-04
3.5000E 01	2.3138E-03	1.3110E-04	4.2778E-03	2.4237E-04
2.5000E 01	4.3899E-03	1.8968E-04	8.1160E-03	3.5069E-04
1.7500E 01	7.3310E-03	2.7917E-04	1.3554E-02	5.1613E-04
1.2500E 01	1.6441E-02	3.6696E-04	3.0396E-02	6.7843E-04
9.0000E 00	3.3641E-02	6.7400E-04	6.2195E-02	1.2461E-03
7.0000E 00	5.8130E-02	7.9839E-04	1.0747E-01	1.4761E-03
5.0000E 00	9.7920E-02	1.0084E-03	1.8103E-01	1.8644E-03
3.5000E 00	1.4533E-01	1.6978E-03	2.6869E-01	3.1389E-03
2.5000E 00	1.9151E-01	1.9204E-03	3.5406E-01	3.5504E-03
1.7500E 00	2.2242E-01	3.2065E-03	4.1121E-01	5.9282E-03
1.2500E 00	2.2861E-01	2.8568E-03	4.2265E-01	5.2816E-03
9.0000E-01	2.3338E-01	5.1320E-03	4.3147E-01	9.4881E-03
7.0000E-01	2.2774E-01	4.7826E-03	4.2105E-01	8.8420E-03
5.0000E-01	2.1753E-01	4.4806E-03	4.0217E-01	8.2838E-03
3.5000E-01	2.0016E-01	6.5271E-03	3.7006E-01	1.2067E-02
2.5000E-01	1.7369E-01	6.5426E-03	3.2112E-01	1.2096E-02
1.7500E-01	1.5245E-01	7.9845E-03	2.8185E-01	1.4762E-02
7.5000E-02	1.1388E-01	4.4870E-03	2.1054E-01	8.2956E-03

Table F.7 Target Material: Uranium (U-238)  
Angle: 35 - 40°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.1350E-06	1.1350E-06	2.0984E-06	2.0984E-06
4.5000E 02	5.5620E-05	8.6711E-06	1.0283E-04	1.6031E-05
3.5000E 02	2.1570E-04	1.5897E-05	3.9879E-04	2.9390E-05
2.5000E 02	2.8830E-04	1.7269E-05	5.3301E-04	3.1927E-05
1.7500E 02	4.6540E-04	3.0903E-05	8.6043E-04	5.7133E-05
1.2500E 02	7.9920E-04	4.6114E-05	1.4776E-03	8.5255E-05
9.0000E 01	1.0100E-03	6.7468E-05	1.8673E-03	1.2473E-04
7.0000E 01	1.2660E-03	7.5707E-05	2.3406E-03	1.3997E-04
5.0000E 01	1.8116E-03	9.6709E-05	3.3493E-03	1.7880E-04
3.5000E 01	2.3608E-03	1.6149E-04	4.3647E-03	2.9856E-04
2.5000E 01	3.7889E-03	1.8528E-04	7.0049E-03	3.4254E-04
1.7500E 01	7.0080E-03	3.8931E-04	1.2956E-02	7.1975E-04
1.2500E 01	1.6414E-02	4.3076E-04	3.0346E-02	7.9639E-04
9.0000E 00	3.4520E-02	8.2614E-04	6.3821E-02	1.5274E-03
7.0000E 00	5.6010E-02	9.0449E-04	1.0355E-01	1.6722E-03
5.0000E 00	9.7930E-02	1.2250E-03	1.8105E-01	2.2648E-03
3.5000E 00	1.4344E-01	1.8185E-03	2.6519E-01	3.3621E-03
2.5000E 00	1.8997E-01	2.1513E-03	3.5122E-01	3.9774E-03
1.7500E 00	2.2045E-01	3.3217E-03	4.0757E-01	6.1411E-03
1.2500E 00	2.2663E-01	3.2657E-03	4.1899E-01	6.0376E-03
9.0000E-01	2.2980E-01	5.3346E-03	4.2485E-01	9.8626E-03
7.0000E-01	2.2507E-01	5.2385E-03	4.1611E-01	9.6850E-03
5.0000E-01	2.1474E-01	4.8101E-03	3.9701E-01	8.8929E-03
3.5000E-01	2.0358E-01	7.8230E-03	3.7638E-01	1.4463E-02
2.5000E-01	1.7421E-01	7.0376E-03	3.2208E-01	1.3011E-02
1.7500E-01	1.4986E-01	8.3559E-03	2.7706E-01	1.5448E-02
7.5000E-02	1.0614E-01	4.9773E-03	1.9623E-01	9.2021E-03

Table F.8 Target Material: Uranium (U-238)  
Angle: 40 - 50°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	1.8590E-05	3.0952E-06	3.4369E-05	5.7225E-06
3.5000E 02	1.0030E-04	6.8104E-06	1.8543E-04	1.2591E-05
2.5000E 02	2.6170E-04	1.3137E-05	4.8383E-04	2.4288E-05
1.7500E 02	4.3820E-04	1.8536E-05	8.1014E-04	3.4269E-05
1.2500E 02	6.5050E-04	2.2898E-05	1.2026E-03	4.2333E-05
9.0000E 01	9.7820E-04	4.8421E-05	1.8085E-03	8.9520E-05
7.0000E 01	1.2670E-03	5.0933E-05	2.3424E-03	9.4166E-05
5.0000E 01	1.7006E-03	5.9333E-05	3.1441E-03	1.0969E-04
3.5000E 01	2.3878E-03	1.1060E-04	4.4147E-03	2.0447E-04
2.5000E 01	3.4989E-03	1.1823E-04	6.4688E-03	2.1859E-04
1.7500E 01	6.6760E-03	2.4287E-04	1.2343E-02	4.4901E-04
1.2500E 01	1.6154E-02	3.0268E-04	2.9865E-02	5.5960E-04
9.0000E 00	3.3643E-02	6.3741E-04	6.2199E-02	1.1784E-03
7.0000E 00	5.6370E-02	7.3101E-04	1.0422E-01	1.3515E-03
5.0000E 00	9.7610E-02	9.3226E-04	1.8046E-01	1.7236E-03
3.5000E 00	1.4411E-01	1.6095E-03	2.6643E-01	2.9756E-03
2.5000E 00	1.8983E-01	1.9155E-03	3.5096E-01	3.5414E-03
1.7500E 00	2.1948E-01	2.9796E-03	4.0577E-01	5.5087E-03
1.2500E 00	2.2762E-01	2.7994E-03	4.2082E-01	5.1756E-03
9.0000E-01	2.2544E-01	4.5343E-03	4.1679E-01	8.3830E-03
7.0000E-01	2.2503E-01	4.4709E-03	4.1604E-01	8.2657E-03
5.0000E-01	2.1413E-01	4.0206E-03	3.9588E-01	7.4332E-03
3.5000E-01	1.9528E-01	5.6979E-03	3.6103E-01	1.0534E-02
2.5000E-01	1.7060E-01	5.4780E-03	3.1541E-01	1.0128E-02
1.7500E-01	1.5224E-01	7.4257E-03	2.8146E-01	1.3729E-02
7.5000E-02	1.0887E-01	3.9484E-03	2.0128E-01	7.2999E-03



Table F.9 Target Material: Uranium (U-238)  
 Angle: 50 - 65°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	3.2860E-06	8.8656E-07	6.0752E-06	1.6391E-06
3.5000E 02	3.0390E-05	2.7381E-06	5.6185E-05	5.0623E-06
2.5000E 02	1.5010E-04	6.2742E-06	2.7750E-04	1.1600E-05
1.7500E 02	3.4010E-04	1.3400E-05	6.2878E-04	2.4774E-05
1.2500E 02	6.1500E-04	1.9372E-05	1.1370E-03	3.5816E-05
9.0000E 01	8.1870E-04	3.6596E-05	1.5136E-03	6.7658E-05
7.0000E 01	1.0750E-03	3.5797E-05	1.9875E-03	6.6182E-05
5.0000E 01	1.4836E-03	4.5384E-05	2.7429E-03	8.3905E-05
3.5000E 01	2.0258E-03	7.1233E-05	3.7454E-03	1.3170E-04
2.5000E 01	3.2219E-03	9.6261E-05	5.9566E-03	1.7797E-04
1.7500E 01	6.1940E-03	1.6661E-04	1.1451E-02	3.0803E-04
1.2500E 01	1.5696E-02	2.5806E-04	2.9019E-02	4.7711E-04
9.0000E 00	3.2468E-02	4.8243E-04	6.0027E-02	8.9192E-04
7.0000E 00	5.6600E-02	6.2035E-04	1.0464E-01	1.1469E-03
5.0000E 00	9.6110E-02	8.3448E-04	1.7769E-01	1.5428E-03
3.5000E 00	1.4290E-01	1.4625E-03	2.6419E-01	2.7039E-03
2.5000E 00	1.8716E-01	1.7009E-03	3.4602E-01	3.1446E-03
1.7500E 00	2.1795E-01	2.8429E-03	4.0295E-01	5.2559E-03
1.2500E 00	2.2389E-01	2.4688E-03	4.1393E-01	4.5642E-03
9.0000E-01	2.2572E-01	4.3348E-03	4.1731E-01	8.0142E-03
7.0000E-01	2.2288E-01	3.9802E-03	4.1206E-01	7.3586E-03
5.0000E-01	2.1404E-01	3.7975E-03	3.9572E-01	7.0208E-03
3.5000E-01	1.9371E-01	5.4284E-03	3.5813E-01	1.0036E-02
2.5000E-01	1.7028E-01	4.7053E-03	3.1481E-01	8.6992E-03
1.7500E-01	1.5141E-01	6.6206E-03	2.7993E-01	1.2240E-02
7.5000E-02	1.0845E-01	3.3823E-03	2.0050E-01	6.2531E-03

Table F.10 Target Material: Uranium (U-238)

Angle: 65 - 80°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	4.3590E-06	9.8382E-07	8.0589E-06	1.8189E-06
2.5000E 02	4.0200E-05	2.9105E-06	7.4322E-05	5.3809E-06
1.7500E 02	1.5210E-04	7.6963E-06	2.8120E-04	1.4229E-05
1.2500E 02	3.7140E-04	1.1402E-05	6.8664E-04	2.1080E-05
9.0000E 01	5.9810E-04	2.4462E-05	1.1058E-03	4.5226E-05
7.0000E 01	8.1240E-04	3.3308E-05	1.5020E-03	6.1580E-05
5.0000E 01	1.2146E-03	4.1885E-05	2.2456E-03	7.7437E-05
3.5000E 01	1.8344E-03	6.2954E-05	3.3915E-03	1.1639E-04
2.5000E 01	2.9209E-03	8.9606E-05	5.4002E-03	1.6566E-04
1.7500E 01	6.0140E-03	1.5769E-04	1.1119E-02	2.9153E-04
1.2500E 01	1.4367E-02	2.0007E-04	2.6562E-02	3.6989E-04
9.0000E 00	3.1887E-02	4.0351E-04	5.8953E-02	7.4601E-04
7.0000E 00	5.3689E-02	4.7609E-04	9.9260E-02	8.8020E-04
5.0000E 00	9.5310E-02	6.9522E-04	1.7621E-01	1.2853E-03
3.5000E 00	1.4423E-01	1.0963E-03	2.6665E-01	2.0269E-03
2.5000E 00	1.8302E-01	1.2568E-03	3.3837E-01	2.3235E-03
1.7500E 00	2.1359E-01	1.7508E-03	3.9489E-01	3.2369E-03
1.2500E 00	2.2803E-01	1.9471E-03	4.2158E-01	3.5998E-03
9.0000E-01	2.3058E-01	2.8188E-03	4.2630E-01	5.2114E-03
7.0000E-01	2.1810E-01	2.8576E-03	4.0322E-01	5.2832E-03
5.0000E-01	2.0042E-01	2.6580E-03	3.7054E-01	4.9140E-03
3.5000E-01	1.8427E-01	3.8017E-03	3.4068E-01	7.0285E-03
2.5000E-01	1.7247E-01	3.9525E-03	3.1886E-01	7.3073E-03
1.7500E-01	1.4659E-01	4.4373E-03	2.7102E-01	8.2037E-03
7.5000E-02	9.9480E-02	2.5533E-03	1.8392E-01	4.7205E-03

Table F.11 Target Material: Uranium (U-238)  
 Angle: 80 - 100°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	5.2080E-07	2.9722E-07	9.6285E-07	5.4950E-07
2.5000E 02	1.1630E-05	1.2828E-06	2.1502E-05	2.3716E-06
1.7500E 02	5.9370E-05	4.8980E-06	1.0976E-04	9.0555E-06
1.2500E 02	1.6800E-04	7.8120E-06	3.1060E-04	1.4443E-05
9.0000E 01	3.4630E-04	1.7073E-05	6.4024E-04	3.1564E-05
7.0000E 01	5.3290E-04	2.2115E-05	9.8522E-04	4.0887E-05
5.0000E 01	8.9720E-04	2.7170E-05	1.6587E-03	5.0232E-05
3.5000E 01	1.4484E-03	4.7789E-05	2.6779E-03	8.8352E-05
2.5000E 01	2.4099E-03	6.1426E-05	4.4554E-03	1.1356E-04
1.7500E 01	5.0670E-03	1.1497E-04	9.3679E-03	2.1256E-04
1.2500E 01	1.3437E-02	1.6841E-04	2.4842E-02	3.1135E-04
9.0000E 00	3.1142E-02	3.6308E-04	5.7575E-02	6.7126E-04
7.0000E 00	5.2646E-02	4.7040E-04	9.7332E-02	8.6968E-04
5.0000E 00	9.3117E-02	6.2719E-04	1.7215E-01	1.1595E-03
3.5000E 00	1.4214E-01	1.0471E-03	2.6279E-01	1.9359E-03
2.5000E 00	1.8141E-01	1.1860E-03	3.3539E-01	2.1926E-03
1.7500E 00	2.0803E-01	1.6751E-03	3.8461E-01	3.0970E-03
1.2500E 00	2.2421E-01	1.8763E-03	4.1452E-01	3.4688E-03
9.0000E-01	2.2862E-01	2.7492E-03	4.2267E-01	5.0827E-03
7.0000E-01	2.1754E-01	2.8513E-03	4.0219E-01	5.2714E-03
5.0000E-01	2.0060E-01	2.5947E-03	3.7087E-01	4.7971E-03
3.5000E-01	1.8655E-01	3.6871E-03	3.4489E-01	6.8166E-03
2.5000E-01	1.6169E-01	3.5297E-03	2.9893E-01	6.5257E-03
1.7500E-01	1.4008E-01	3.9171E-03	2.5898E-01	7.2419E-03
7.5000E-02	9.5800E-02	2.3325E-03	1.7711E-01	4.3123E-03

Table F.12 Target Material: Uranium (U-238)

Angle: 100 - 120°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	1.1080E-06	4.3910E-07	2.0485E-06	8.1181E-07
1.7500E 02	1.2190E-05	2.0565E-06	2.2537E-05	3.8020E-06
1.2500E 02	7.1670E-05	5.2821E-06	1.3250E-04	9.7655E-06
9.0000E 01	1.5790E-04	1.1100E-05	2.9193E-04	2.0522E-05
7.0000E 01	2.9460E-04	1.5555E-05	5.4466E-04	2.8758E-05
5.0000E 01	5.3450E-04	2.0826E-05	9.8819E-04	3.8504E-05
3.5000E 01	9.3135E-04	3.2132E-05	1.7219E-03	5.9406E-05
2.5000E 01	1.7139E-03	5.0701E-05	3.1687E-03	9.3736E-05
1.7500E 01	4.0440E-03	9.8873E-05	7.4765E-03	1.8280E-04
1.2500E 01	1.2475E-02	1.6046E-04	2.3064E-02	2.9666E-04
9.0000E 00	2.9380E-02	3.3188E-04	5.4318E-02	6.1359E-04
7.0000E 00	5.1286E-02	4.6458E-04	9.4818E-02	8.5891E-04
5.0000E 00	9.1288E-02	6.1458E-04	1.6877E-01	1.1362E-03
3.5000E 00	1.3898E-01	1.0047E-03	2.5694E-01	1.8575E-03
2.5000E 00	1.7885E-01	1.1541E-03	3.3066E-01	2.1337E-03
1.7500E 00	2.0605E-01	1.6649E-03	3.8095E-01	3.0780E-03
1.2500E 00	2.2268E-01	1.8307E-03	4.1169E-01	3.3846E-03
9.0000E-01	2.2357E-01	2.6630E-03	4.1334E-01	4.9234E-03
7.0000E-01	2.1410E-01	2.7348E-03	3.9583E-01	5.0562E-03
5.0000E-01	1.9681E-01	2.5284E-03	3.6386E-01	4.6745E-03
3.5000E-01	1.8036E-01	3.7525E-03	3.3345E-01	6.9377E-03
2.5000E-01	1.5958E-01	3.4577E-03	2.9503E-01	6.3926E-03
1.7500E-01	1.3699E-01	3.9867E-03	2.5327E-01	7.3707E-03
7.5000E-02	9.3110E-02	2.2009E-03	1.7214E-01	4.0689E-03

Table F.13 Target Material: Uranium (U-238)

Angle: 120 - 140°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	2.2660E-07	2.2660E-07	4.1894E-07	4.1894E-07
1.7500E 02	6.3450E-06	1.9219E-06	1.1731E-05	3.5532E-06
1.2500E 02	3.0360E-05	3.4094E-06	5.6130E-05	6.3033E-06
9.0000E 01	7.4780E-05	8.4127E-06	1.3825E-04	1.5553E-05
7.0000E 01	1.4050E-04	1.2659E-05	2.5976E-04	2.3404E-05
5.0000E 01	3.4280E-04	1.9480E-05	6.3377E-04	3.6016E-05
3.5000E 01	5.6814E-04	3.3778E-05	1.0504E-03	6.2450E-05
2.5000E 01	1.1734E-03	4.9472E-05	2.1694E-03	9.1463E-05
1.7500E 01	3.5590E-03	1.1852E-04	6.5799E-03	2.1911E-04
1.2500E 01	1.1581E-02	1.9490E-04	2.1411E-02	3.6033E-04
9.0000E 00	2.7324E-02	4.1801E-04	5.0517E-02	7.7282E-04
7.0000E 00	4.9580E-02	5.5951E-04	9.1663E-02	1.0344E-03
5.0000E 00	9.0515E-02	7.7616E-04	1.6734E-01	1.4350E-03
3.5000E 00	1.3656E-01	1.3114E-03	2.5248E-01	2.4245E-03
2.5000E 00	1.7628E-01	1.5938E-03	3.2590E-01	2.9466E-03
1.7500E 00	2.0867E-01	2.1971E-03	3.8578E-01	4.0620E-03
1.2500E 00	2.1713E-01	2.4329E-03	4.0143E-01	4.4979E-03
9.0000E-01	2.2297E-01	3.8744E-03	4.1223E-01	7.1630E-03
7.0000E-01	2.1046E-01	3.1113E-03	3.8909E-01	5.7521E-03
5.0000E-01	1.8936E-01	3.4299E-03	3.5009E-01	6.3413E-03
3.5000E-01	1.7515E-01	4.1520E-03	3.2382E-01	7.6762E-03
2.5000E-01	1.5417E-01	4.2585E-03	2.8503E-01	7.8731E-03
1.7500E-01	1.4081E-01	6.1053E-03	2.6033E-01	1.1287E-02
7.5000E-02	9.2424E-02	2.6632E-03	1.7087E-01	4.9238E-03

Table F.14 Target Material: Uranium (U-238)

Angle: 140 - 160°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	0.0000	0.0000	0.0000	0.0000
1.7500E 02	2.7770E-06	1.3643E-06	5.1341E-06	2.5224E-06
1.2500E 02	2.4300E-05	4.0168E-06	4.4926E-05	7.4262E-06
9.0000E 01	6.4230E-05	1.0964E-05	1.1875E-04	2.0270E-05
7.0000E 01	1.1980E-04	1.5706E-05	2.2149E-04	2.9037E-05
5.0000E 01	2.0020E-04	2.0707E-05	3.7013E-04	3.8284E-05
3.5000E 01	4.5634E-04	3.4670E-05	8.4368E-04	6.4098E-05
2.5000E 01	8.4510E-04	4.6514E-05	1.5624E-03	8.5995E-05
1.7500E 01	2.9890E-03	1.1773E-04	5.5261E-03	2.1766E-04
1.2500E 01	1.0965E-02	2.0739E-04	2.0272E-02	3.8342E-04
9.0000E 00	2.6480E-02	4.1095E-04	4.8956E-02	7.5977E-04
7.0000E 00	4.8358E-02	5.5795E-04	8.9404E-02	1.0315E-03
5.0000E 00	8.9464E-02	7.7845E-04	1.6540E-01	1.4392E-03
3.5000E 00	1.3698E-01	1.3338E-03	2.5324E-01	2.4660E-03
2.5000E 00	1.7482E-01	1.6196E-03	3.2321E-01	2.9942E-03
1.7500E 00	2.0754E-01	2.1929E-03	3.8371E-01	4.0543E-03
1.2500E 00	2.1510E-01	2.4578E-03	3.9768E-01	4.5441E-03
9.0000E-01	2.2064E-01	3.8954E-03	4.0792E-01	7.2017E-03
7.0000E-01	2.0855E-01	3.1684E-03	3.8557E-01	5.8578E-03
5.0000E-01	1.8624E-01	3.4755E-03	3.4432E-01	6.4255E-03
3.5000E-01	1.7110E-01	4.1802E-03	3.1632E-01	7.7284E-03
2.5000E-01	1.5149E-01	4.2885E-03	2.8008E-01	7.9286E-03
1.7500E-01	1.3304E-01	6.0093E-03	2.4596E-01	1.1110E-02
7.5000E-02	9.3540E-02	2.8014E-03	1.7294E-01	5.1792E-03

Table F.15 Target Material: Uranium (U-238)  
 Angle: 160 - 180°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	e (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	0.0000	0.0000	0.0000	0.0000
1.7500E 02	5.9980E-06	3.4231E-06	1.1089E-05	6.3285E-06
1.2500E 02	1.2000E-05	4.7556E-06	2.2186E-05	8.7921E-06
9.0000E 01	6.9970E-05	1.8654E-05	1.2936E-04	3.4487E-05
7.0000E 01	9.9960E-05	2.4340E-05	1.8481E-04	4.5000E-05
5.0000E 01	1.5050E-04	2.7423E-05	2.7825E-04	5.0700E-05
3.5000E 01	3.7834E-04	5.9929E-05	6.9947E-04	1.1080E-04
2.5000E 01	7.2730E-04	6.7737E-05	1.3446E-03	1.2523E-04
1.7500E 01	2.6027E-03	1.3359E-04	4.8119E-03	2.4698E-04
1.2500E 01	1.0486E-02	2.4781E-04	1.9386E-02	4.5815E-04
9.0000E 00	2.5849E-02	4.7892E-04	4.7790E-02	8.8543E-04
7.0000E 00	4.8369E-02	6.3295E-04	8.9425E-02	1.1702E-03
5.0000E 00	8.8319E-02	8.5156E-04	1.6328E-01	1.5744E-03
3.5000E 00	1.3510E-01	1.3745E-03	2.4977E-01	2.5413E-03
2.5000E 00	1.7470E-01	1.6850E-03	3.2298E-01	3.1153E-03
1.7500E 00	2.0540E-01	2.3204E-03	3.7974E-01	4.2899E-03
1.2500E 00	2.1520E-01	2.6369E-03	3.9786E-01	4.8752E-03
9.0000E-01	2.1950E-01	4.1473E-03	4.0581E-01	7.6675E-03
7.0000E-01	2.0980E-01	3.7591E-03	3.8787E-01	6.9499E-03
5.0000E-01	1.8560E-01	3.8450E-03	3.4313E-01	7.1087E-03
3.5000E-01	1.7350E-01	4.7544E-03	3.2076E-01	8.7900E-03
2.5000E-01	1.5320E-01	5.1132E-03	2.8323E-01	9.4532E-03
1.7500E-01	1.3140E-01	6.4932E-03	2.4293E-01	1.2005E-02
7.5000E-02	9.0024E-02	3.2995E-03	1.6644E-01	6.1001E-03

Table F.16 Target Material: Lead (Pb-207)

Angle: 0 - 5°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	9.0620E-04	1.1101E-04	1.5256E-03	1.8688E-04
4.5000E 02	2.0910E-04	5.0017E-05	3.5202E-04	8.4203E-05
3.5000E 02	1.3660E-03	1.2526E-04	2.2997E-03	2.1088E-04
2.5000E 02	2.3700E-03	1.7206E-04	3.9899E-03	2.8967E-04
1.7500E 02	1.1430E-03	1.9454E-04	1.9242E-03	3.2750E-04
1.2500E 02	1.5890E-03	2.1054E-04	2.6751E-03	3.5445E-04
9.0000E 01	1.9520E-03	3.8474E-04	3.2862E-03	6.4771E-04
7.0000E 01	2.6490E-03	3.9364E-04	4.4596E-03	6.6269E-04
5.0000E 01	1.7430E-03	3.6237E-04	2.9343E-03	6.1005E-04
3.5000E 01	3.2124E-03	6.8245E-04	5.4081E-03	1.1489E-03
2.5000E 01	4.1578E-03	7.4923E-04	6.9996E-03	1.2613E-03
1.7500E 01	8.5432E-03	1.4340E-03	1.4382E-02	2.4141E-03
1.2500E 01	1.2001E-02	1.3356E-03	2.0204E-02	2.2485E-03
9.0000E 00	2.4650E-02	2.8817E-03	4.1498E-02	4.8513E-03
7.0000E 00	3.7480E-02	3.1535E-03	6.3098E-02	5.3089E-03
5.0000E 00	6.2630E-02	2.7438E-03	1.0544E-01	4.6192E-03
3.5000E 00	1.1060E-01	5.4820E-03	1.8619E-01	9.2289E-03
2.5000E 00	1.4311E-01	5.6078E-03	2.4093E-01	9.4407E-03
1.7500E 00	1.6295E-01	5.7565E-03	2.7433E-01	9.6911E-03
1.2500E 00	1.8893E-01	6.8744E-03	3.1806E-01	1.1573E-02
9.0000E-01	1.8567E-01	7.5759E-03	3.1258E-01	1.2754E-02
7.0000E-01	1.9621E-01	1.5795E-02	3.3032E-01	2.6591E-02
5.0000E-01	2.0448E-01	1.4049E-02	3.4424E-01	2.3651E-02
3.5000E-01	1.8078E-01	2.0139E-02	3.0434E-01	3.3905E-02
2.5000E-01	1.7588E-01	1.9985E-02	2.9609E-01	3.3644E-02
1.7500E-01	1.4848E-01	2.8235E-02	2.4997E-01	4.7533E-02
7.5000E-02	1.2582E-01	1.8520E-02	2.1182E-01	3.1179E-02



Table F.17 Target Material: Lead (Pb-207)  
 Angle: 5 - 10°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.0720E-03	7.3003E-05	1.8047E-03	1.2290E-04
4.5000E 02	1.4440E-04	2.6223E-05	2.4310E-04	4.4146E-05
3.5000E 02	4.2860E-04	4.2731E-05	7.2155E-04	7.1938E-05
2.5000E 02	6.1500E-04	5.6949E-05	1.0354E-03	9.5873E-05
1.7500E 02	1.0250E-03	1.0045E-04	1.7256E-03	1.6911E-04
1.2500E 02	1.4160E-03	1.0464E-04	2.3838E-03	1.7617E-04
9.0000E 01	1.4210E-03	1.9283E-04	2.3923E-03	3.2463E-04
7.0000E 01	1.6770E-03	1.8464E-04	2.8232E-03	3.1084E-04
5.0000E 01	2.0970E-03	2.4220E-04	3.5303E-03	4.0775E-04
3.5000E 01	2.3814E-03	2.6897E-04	4.0091E-03	4.5282E-04
2.5000E 01	4.2618E-03	4.3886E-04	7.1747E-03	7.3881E-04
1.7500E 01	5.2092E-03	6.0087E-04	8.7697E-03	1.0116E-03
1.2500E 01	1.2301E-02	8.2806E-04	2.0709E-02	1.3940E-03
9.0000E 00	2.1185E-02	1.3476E-03	3.5665E-02	2.2687E-03
7.0000E 00	3.4020E-02	1.7703E-03	5.7273E-02	2.9804E-03
5.0000E 00	6.4760E-02	1.8806E-03	1.0902E-01	3.1661E-03
3.5000E 00	1.0554E-01	3.0860E-03	1.7768E-01	5.1953E-03
2.5000E 00	1.3897E-01	3.2753E-03	2.3396E-01	5.5140E-03
1.7500E 00	1.7137E-01	4.3925E-03	2.8850E-01	7.3948E-03
1.2500E 00	1.9829E-01	5.2600E-03	3.3382E-01	8.8552E-03
9.0000E-01	2.0665E-01	8.8100E-03	3.4790E-01	1.4832E-02
7.0000E-01	1.9859E-01	9.5255E-03	3.3433E-01	1.6036E-02
5.0000E-01	1.9989E-01	8.3165E-03	3.3651E-01	1.4001E-02
3.5000E-01	1.8551E-01	1.2790E-02	3.1231E-01	2.1532E-02
2.5000E-01	1.9925E-01	1.6528E-02	3.3544E-01	2.7824E-02
1.7500E-01	1.5787E-01	1.8886E-02	2.6577E-01	3.1795E-02
7.5000E-02	1.1038E-01	8.4416E-03	1.8582E-01	1.4211E-02

Table F.18 Target Material: Lead (Pb-207)

Angle: 10 - 15°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	8.1480E-04	4.8318E-05	1.3717E-03	8.1343E-05
4.5000E 02	1.9390E-04	2.7301E-05	3.2643E-04	4.5961E-05
3.5000E 02	2.8940E-04	2.7522E-05	4.8720E-04	4.6333E-05
2.5000E 02	5.8160E-04	3.7281E-05	9.7912E-04	6.2762E-05
1.7500E 02	8.8220E-04	6.4048E-05	1.4852E-03	1.0782E-04
1.2500E 02	1.0900E-03	7.9788E-05	1.8350E-03	1.3432E-04
9.0000E 01	1.4190E-03	1.2388E-04	2.3889E-03	2.0855E-04
7.0000E 01	1.3910E-03	1.3020E-04	2.3417E-03	2.1919E-04
5.0000E 01	2.1350E-03	1.6995E-04	3.5943E-03	2.8610E-04
3.5000E 01	2.6744E-03	2.5677E-04	4.5024E-03	4.3227E-04
2.5000E 01	3.4868E-03	3.0700E-04	5.8700E-03	5.1684E-04
1.7500E 01	5.6252E-03	5.5894E-04	9.4700E-03	9.4098E-04
1.2500E 01	1.1220E-02	6.1906E-04	1.8889E-02	1.0422E-03
9.0000E 00	1.9967E-02	1.1144E-03	3.3614E-02	1.8761E-03
7.0000E 00	3.4220E-02	1.3469E-03	5.7609E-02	2.2675E-03
5.0000E 00	6.2020E-02	1.3307E-03	1.0441E-01	2.2403E-03
3.5000E 00	9.9560E-02	2.4401E-03	1.6761E-01	4.1079E-03
2.5000E 00	1.3962E-01	2.4978E-03	2.3505E-01	4.2050E-03
1.7500E 00	1.7203E-01	3.7653E-03	2.8961E-01	6.3388E-03
1.2500E 00	1.9243E-01	3.8443E-03	3.2396E-01	6.4719E-03
9.0000E-01	2.0258E-01	6.9911E-03	3.4104E-01	1.1770E-02
7.0000E-01	1.9778E-01	5.9475E-03	3.3296E-01	1.0013E-02
5.0000E-01	1.9767E-01	6.1885E-03	3.3278E-01	1.0418E-02
3.5000E-01	1.7538E-01	8.9216E-03	2.9525E-01	1.5019E-02
2.5000E-01	1.7329E-01	8.9456E-03	2.9173E-01	1.5060E-02
1.7500E-01	1.5994E-01	1.5085E-02	2.6926E-01	2.5396E-02
7.5000E-02	1.0924E-01	6.5217E-03	1.8391E-01	1.0979E-02

Table F.19 Target Material: Lead (Pb-207)

Angle: 15 - 20°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	3.8630E-04	2.7273E-05	6.5034E-04	4.5914E-05
4.5000E 02	2.8110E-04	2.3331E-05	4.7323E-04	3.9278E-05
3.5000E 02	2.1640E-04	2.0168E-05	3.6431E-04	3.3954E-05
2.5000E 02	4.5700E-04	3.4458E-05	7.6936E-04	5.8010E-05
1.7500E 02	8.2510E-04	6.2130E-05	1.3891E-03	1.0460E-04
1.2500E 02	9.9900E-04	6.5135E-05	1.6818E-03	1.0965E-04
9.0000E 01	1.2130E-03	1.0553E-04	2.0421E-03	1.7766E-04
7.0000E 01	1.8000E-03	1.3752E-04	3.0303E-03	2.3151E-04
5.0000E 01	2.3760E-03	1.7083E-04	4.0000E-03	2.8760E-04
3.5000E 01	2.7554E-03	2.2166E-04	4.6387E-03	3.7317E-04
2.5000E 01	3.5928E-03	2.8188E-04	6.0485E-03	4.7454E-04
1.7500E 01	6.0342E-03	4.4598E-04	1.0159E-02	7.5080E-04
1.2500E 01	1.0225E-02	4.7536E-04	1.7214E-02	8.0026E-04
9.0000E 00	2.2920E-02	1.0547E-03	3.8586E-02	1.7755E-03
7.0000E 00	3.5770E-02	1.1110E-03	6.0219E-02	1.8703E-03
5.0000E 00	6.5250E-02	1.2872E-03	1.0985E-01	2.1670E-03
3.5000E 00	1.0250E-01	2.2059E-03	1.7256E-01	3.7137E-03
2.5000E 00	1.3678E-01	2.3180E-03	2.3027E-01	3.9023E-03
1.7500E 00	1.6919E-01	3.2163E-03	2.8483E-01	5.4147E-03
1.2500E 00	1.9687E-01	3.4911E-03	3.3143E-01	5.8773E-03
9.0000E-01	2.0600E-01	5.7704E-03	3.4680E-01	9.7144E-03
7.0000E-01	1.9451E-01	5.1506E-03	3.2746E-01	8.6710E-03
5.0000E-01	1.9885E-01	5.5462E-03	3.3476E-01	9.3370E-03
3.5000E-01	1.8526E-01	8.7430E-03	3.1188E-01	1.4719E-02
2.5000E-01	1.8036E-01	9.3134E-03	3.0364E-01	1.5679E-02
1.7500E-01	1.3678E-01	9.1315E-03	2.3027E-01	1.5373E-02
7.5000E-02	1.0886E-01	6.2117E-03	1.8327E-01	1.0457E-02

Table F.20 Target Material: Lead (Pb-207)

Angle: 20 - 25°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.4940E-04	1.5119E-05	2.5151E-04	2.5453E-05
4.5000E 02	3.2580E-04	1.9874E-05	5.4848E-04	3.3457E-05
3.5000E 02	2.0020E-04	1.8298E-05	3.3704E-04	3.0805E-05
2.5000E 02	4.3540E-04	2.5732E-05	7.3300E-04	4.3320E-05
1.7500E 02	7.1190E-04	4.6558E-05	1.1985E-03	7.8381E-05
1.2500E 02	9.6930E-04	5.0404E-05	1.6318E-03	8.4854E-05
9.0000E 01	1.3270E-03	9.8463E-05	2.2340E-03	1.6576E-04
7.0000E 01	1.5890E-03	1.0599E-04	2.6751E-03	1.7843E-04
5.0000E 01	1.7640E-03	1.2701E-04	2.9697E-03	2.1382E-04
3.5000E 01	2.5634E-03	1.8189E-04	4.3155E-03	3.0621E-04
2.5000E 01	3.7538E-03	2.4073E-04	6.3195E-03	4.0527E-04
1.7500E 01	5.9482E-03	3.9732E-04	1.0014E-02	6.6889E-04
1.2500E 01	1.0843E-02	4.3662E-04	1.8254E-02	7.3505E-04
9.0000E 00	2.2110E-02	9.8016E-04	3.7222E-02	1.6501E-03
7.0000E 00	3.4980E-02	9.2920E-04	5.8889E-02	1.5643E-03
5.0000E 00	6.3590E-02	1.1547E-03	1.0705E-01	1.9439E-03
3.5000E 00	9.9340E-02	1.9032E-03	1.6724E-01	3.2041E-03
2.5000E 00	1.3939E-01	2.0852E-03	2.3466E-01	3.5105E-03
1.7500E 00	1.7150E-01	3.0114E-03	2.8872E-01	5.0696E-03
1.2500E 00	1.9286E-01	2.8893E-03	3.2468E-01	4.8642E-03
9.0000E-01	1.9856E-01	4.9575E-03	3.3428E-01	8.3459E-03
7.0000E-01	1.9596E-01	4.7037E-03	3.2990E-01	7.9186E-03
5.0000E-01	1.9964E-01	4.8277E-03	3.3609E-01	8.1275E-03
3.5000E-01	1.7991E-01	7.5424E-03	3.0288E-01	1.2698E-02
2.5000E-01	1.7025E-01	7.4574E-03	2.8662E-01	1.2555E-02
1.7500E-01	1.4920E-01	1.1130E-02	2.5118E-01	1.8737E-02
7.5000E-02	1.1089E-01	5.3773E-03	1.8668E-01	9.0527E-03

Table F.21 Target Material: Lead (Pb-207)

Angle: 25 - 35°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.6430E-05	2.9788E-06	2.7660E-05	5.0147E-06
4.5000E 02	1.9900E-04	1.0527E-05	3.3502E-04	1.7722E-05
3.5000E 02	2.4770E-04	1.0874E-05	4.1700E-04	1.8306E-05
2.5000E 02	3.3970E-04	1.4879E-05	5.7188E-04	2.5049E-05
1.7500E 02	6.0020E-04	2.5088E-05	1.0104E-03	4.2236E-05
1.2500E 02	8.7900E-04	3.0501E-05	1.4798E-03	5.1349E-05
9.0000E 01	1.1230E-03	6.0979E-05	1.8906E-03	1.0266E-04
7.0000E 01	1.4490E-03	5.9699E-05	2.4394E-03	1.0050E-04
5.0000E 01	1.8170E-03	7.4315E-05	3.0589E-03	1.2511E-04
3.5000E 01	2.5014E-03	1.2158E-04	4.2111E-03	2.0468E-04
2.5000E 01	3.6388E-03	1.4797E-04	6.1259E-03	2.4910E-04
1.7500E 01	5.7152E-03	2.4221E-04	9.6215E-03	4.0776E-04
1.2500E 01	1.0891E-02	2.6889E-04	1.8335E-02	4.5268E-04
9.0000E 00	2.1413E-02	6.0767E-04	3.6049E-02	1.0230E-03
7.0000E 00	3.4770E-02	6.7813E-04	5.8535E-02	1.1416E-03
5.0000E 00	6.4050E-02	7.7787E-04	1.0783E-01	1.3095E-03
3.5000E 00	1.0261E-01	1.5814E-03	1.7274E-01	2.6622E-03
2.5000E 00	1.3754E-01	1.4798E-03	2.3155E-01	2.4913E-03
1.7500E 00	1.7457E-01	2.4635E-03	2.9389E-01	4.1473E-03
1.2500E 00	1.9156E-01	2.3160E-03	3.2249E-01	3.8991E-03
9.0000E-01	2.0366E-01	3.8784E-03	3.4286E-01	6.5293E-03
7.0000E-01	1.9843E-01	3.9632E-03	3.3406E-01	6.6721E-03
5.0000E-01	2.0125E-01	4.2229E-03	3.3880E-01	7.1093E-03
3.5000E-01	1.6873E-01	5.7099E-03	2.8406E-01	9.6126E-03
2.5000E-01	1.7296E-01	5.5898E-03	2.9118E-01	9.4104E-03
1.7500E-01	1.4860E-01	7.2395E-03	2.5017E-01	1.2188E-02
7.5000E-02	1.1705E-01	4.4343E-03	1.9705E-01	7.4651E-03

Table F.22 Target Material: Lead (Pb-207)  
Angle: 35 - 40°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	7.0930E-05	7.6888E-06	1.1941E-04	1.2944E-05
3.5000E 02	2.2780E-04	1.2051E-05	3.8350E-04	2.0287E-05
2.5000E 02	3.0370E-04	1.7615E-05	5.1128E-04	2.9654E-05
1.7500E 02	4.9150E-04	3.2537E-05	8.2744E-04	5.4776E-05
1.2500E 02	7.8320E-04	4.1823E-05	1.3185E-03	7.0409E-05
9.0000E 01	1.0890E-03	7.7537E-05	1.8333E-03	1.3053E-04
7.0000E 01	1.3740E-03	8.1753E-05	2.3131E-03	1.3763E-04
5.0000E 01	1.7130E-03	8.6506E-05	2.8838E-03	1.4563E-04
3.5000E 01	2.4924E-03	1.4526E-04	4.1960E-03	2.4455E-04
2.5000E 01	3.3918E-03	1.8605E-04	5.7101E-03	3.1322E-04
1.7500E 01	5.2912E-03	2.6665E-04	8.9077E-03	4.4890E-04
1.2500E 01	1.0908E-02	3.3861E-04	1.8364E-02	5.7006E-04
9.0000E 00	2.0991E-02	7.5536E-04	3.5338E-02	1.2716E-03
7.0000E 00	3.4030E-02	8.0309E-04	5.7289E-02	1.3520E-03
5.0000E 00	6.3920E-02	9.6006E-04	1.0761E-01	1.6163E-03
3.5000E 00	1.0249E-01	1.8531E-03	1.7254E-01	3.1197E-03
2.5000E 00	1.3618E-01	1.8206E-03	2.2926E-01	3.0650E-03
1.7500E 00	1.7058E-01	2.6476E-03	2.8717E-01	4.4573E-03
1.2500E 00	1.8918E-01	2.5268E-03	3.1848E-01	4.2538E-03
9.0000E-01	2.0068E-01	4.4777E-03	3.3784E-01	7.5382E-03
7.0000E-01	1.9678E-01	4.5606E-03	3.3128E-01	7.6777E-03
5.0000E-01	1.9508E-01	3.9741E-03	3.2842E-01	6.6904E-03
3.5000E-01	1.7488E-01	6.3423E-03	2.9441E-01	1.0677E-02
2.5000E-01	1.6998E-01	6.1689E-03	2.8616E-01	1.0385E-02
1.7500E-01	1.3658E-01	7.0406E-03	2.2993E-01	1.1853E-02
7.5000E-02	1.1328E-01	5.0452E-03	1.9071E-01	8.4935E-03

Table F.23 Target Material: Lead (Pb-207)  
 Angle: 40 - 50°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	4.3040E-07	4.3040E-07	7.2458E-07	7.2458E-07
4.5000E 02	1.9370E-05	3.0198E-06	3.2609E-05	5.0838E-06
3.5000E 02	1.1020E-04	7.1410E-06	1.8552E-04	1.2022E-05
2.5000E 02	2.6340E-04	1.0905E-05	4.4343E-04	1.8358E-05
1.7500E 02	4.3470E-04	1.9257E-05	7.3182E-04	3.2419E-05
1.2500E 02	6.6710E-04	2.5350E-05	1.1231E-03	4.2676E-05
9.0000E 01	9.6200E-04	3.8095E-05	1.6195E-03	6.4133E-05
7.0000E 01	1.2050E-03	4.8320E-05	2.0286E-03	8.1347E-05
5.0000E 01	1.6290E-03	6.5649E-05	2.7424E-03	1.1052E-04
3.5000E 01	2.2604E-03	9.2711E-05	3.8054E-03	1.5608E-04
2.5000E 01	3.3218E-03	1.0467E-04	5.5922E-03	1.7621E-04
1.7500E 01	5.4282E-03	1.9925E-04	9.1384E-03	3.3544E-04
1.2500E 01	1.0604E-02	2.6067E-04	1.7852E-02	4.3883E-04
9.0000E 00	2.1462E-02	5.8023E-04	3.6131E-02	9.7682E-04
7.0000E 00	3.4640E-02	6.7443E-04	5.8316E-02	1.1354E-03
5.0000E 00	6.2650E-02	7.9238E-04	1.0547E-01	1.3340E-03
3.5000E 00	9.8900E-02	1.3086E-03	1.6650E-01	2.2030E-03
2.5000E 00	1.3871E-01	1.4276E-03	2.3352E-01	2.4033E-03
1.7500E 00	1.7065E-01	2.2251E-03	2.8729E-01	3.7459E-03
1.2500E 00	1.9407E-01	2.2246E-03	3.2672E-01	3.7452E-03
9.0000E-01	1.9979E-01	3.5539E-03	3.3635E-01	5.9830E-03
7.0000E-01	1.9273E-01	3.3685E-03	3.2446E-01	5.6709E-03
5.0000E-01	1.9855E-01	3.5432E-03	3.3426E-01	5.9650E-03
3.5000E-01	1.7528E-01	5.6838E-03	2.9508E-01	9.5687E-03
2.5000E-01	1.6823E-01	4.9975E-03	2.8321E-01	8.4132E-03
1.7500E-01	1.4212E-01	6.1996E-03	2.3926E-01	1.0437E-02
7.5000E-02	1.1016E-01	3.8156E-03	1.8545E-01	6.4236E-03

Table F.24 Target Material: Lead (Pb-207)

Angle: 50 - 65°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	1.9280E-06	6.5706E-07	3.2458E-06	1.1062E-06
3.5000E 02	3.6380E-05	2.9541E-06	6.1246E-05	4.9731E-06
2.5000E 02	1.3690E-04	5.3391E-06	2.3047E-04	8.9884E-06
1.7500E 02	3.2140E-04	1.2663E-05	5.4108E-04	2.1318E-05
1.2500E 02	5.9610E-04	1.8121E-05	1.0035E-03	3.0507E-05
9.0000E 01	8.6990E-04	2.9925E-05	1.4645E-03	5.0378E-05
7.0000E 01	1.0960E-03	3.5182E-05	1.8451E-03	5.9228E-05
5.0000E 01	1.4470E-03	4.1239E-05	2.4360E-03	6.9427E-05
3.5000E 01	1.7954E-03	6.3231E-05	3.0226E-03	1.0645E-04
2.5000E 01	3.1508E-03	9.5508E-05	5.3044E-03	1.6079E-04
1.7500E 01	4.7842E-03	1.4165E-04	8.0542E-03	2.3847E-04
1.2500E 01	9.9820E-03	1.9732E-04	1.6805E-02	3.3218E-04
9.0000E 00	2.0630E-02	4.1408E-04	3.4731E-02	6.9710E-04
7.0000E 00	3.3022E-02	5.1146E-04	5.5592E-02	8.6105E-04
5.0000E 00	6.2080E-02	6.7840E-04	1.0451E-01	1.1421E-03
3.5000E 00	9.9290E-02	1.1748E-03	1.6715E-01	1.9777E-03
2.5000E 00	1.3632E-01	1.2478E-03	2.2949E-01	2.1006E-03
1.7500E 00	1.6857E-01	1.9416E-03	2.8379E-01	3.2687E-03
1.2500E 00	1.8902E-01	1.9588E-03	3.1821E-01	3.2976E-03
9.0000E-01	1.9677E-01	3.4183E-03	3.3126E-01	5.7547E-03
7.0000E-01	1.9265E-01	3.2922E-03	3.2433E-01	5.5423E-03
5.0000E-01	1.9696E-01	3.3442E-03	3.3158E-01	5.6299E-03
3.5000E-01	1.7435E-01	4.9282E-03	2.9352E-01	8.2967E-03
2.5000E-01	1.6559E-01	4.3474E-03	2.7877E-01	7.3189E-03
1.7500E-01	1.3988E-01	5.3258E-03	2.3549E-01	8.9660E-03
7.5000E-02	1.0760E-01	3.3240E-03	1.8114E-01	5.5960E-03



Table F.25 Target Material: Lead (Pb-207)

Angle: 65 - 80°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	3.6220E-06	8.5950E-07	6.0976E-06	1.4470E-06
2.5000E 02	4.5810E-05	3.3899E-06	7.7121E-05	5.7070E-06
1.7500E 02	1.6190E-04	8.0626E-06	2.7256E-04	1.3573E-05
1.2500E 02	3.5800E-04	1.3067E-05	6.0269E-04	2.1998E-05
9.0000E 01	6.5200E-04	2.8558E-05	1.0976E-03	4.8077E-05
7.0000E 01	9.1630E-04	3.0421E-05	1.5426E-03	5.1214E-05
5.0000E 01	1.2360E-03	3.5102E-05	2.0808E-03	5.9095E-05
3.5000E 01	1.8757E-03	6.3506E-05	3.1577E-03	1.0691E-04
2.5000E 01	2.6509E-03	8.2526E-05	4.4627E-03	1.3893E-04
1.7500E 01	4.4318E-03	1.1652E-04	7.4609E-03	1.9616E-04
1.2500E 01	8.6140E-03	1.5500E-04	1.4502E-02	2.6095E-04
9.0000E 00	1.7202E-02	3.1891E-04	2.8960E-02	5.3688E-04
7.0000E 00	3.0057E-02	4.0387E-04	5.0601E-02	6.7992E-04
5.0000E 00	5.6390E-02	4.6698E-04	9.4932E-02	7.8616E-04
3.5000E 00	8.9160E-02	9.3734E-04	1.5010E-01	1.5780E-03
2.5000E 00	1.2517E-01	9.6511E-04	2.1072E-01	1.6248E-03
1.7500E 00	1.5809E-01	1.5233E-03	2.6614E-01	2.5645E-03
1.2500E 00	1.7877E-01	1.5360E-03	3.0096E-01	2.5859E-03
9.0000E-01	1.8649E-01	2.5767E-03	3.1396E-01	4.3379E-03
7.0000E-01	1.9319E-01	2.2144E-03	3.2524E-01	3.7279E-03
5.0000E-01	1.8320E-01	2.4154E-03	3.0842E-01	4.0662E-03
3.5000E-01	1.7743E-01	3.6425E-03	2.9870E-01	6.1322E-03
2.5000E-01	1.5994E-01	3.6730E-03	2.6926E-01	6.1835E-03
1.7500E-01	1.4063E-01	4.4622E-03	2.3675E-01	7.5121E-03
7.5000E-02	9.7770E-02	2.4032E-03	1.6460E-01	4.0457E-03

Table F.26 Target Material: Lead (Pb-207)  
Angle: 80 - 100°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	4.5830E-07	2.6192E-07	7.7155E-07	4.4094E-07
2.5000E 02	7.7910E-06	1.0526E-06	1.3116E-05	1.7720E-06
1.7500E 02	5.4990E-05	3.5798E-06	9.2576E-05	6.0267E-06
1.2500E 02	1.7440E-04	7.9178E-06	2.9360E-04	1.3330E-05
9.0000E 01	3.6890E-04	1.6932E-05	6.2104E-04	2.8506E-05
7.0000E 01	5.2320E-04	2.1137E-05	8.8081E-04	3.5585E-05
5.0000E 01	8.5090E-04	2.4251E-05	1.4325E-03	4.0826E-05
3.5000E 01	1.3697E-03	4.3077E-05	2.3059E-03	7.2520E-05
2.5000E 01	2.0319E-03	6.0249E-05	3.4206E-03	1.0143E-04
1.7500E 01	3.5008E-03	8.9875E-05	5.8936E-03	1.5131E-04
1.2500E 01	7.9570E-03	1.3706E-04	1.3396E-02	2.3075E-04
9.0000E 00	1.6278E-02	2.7974E-04	2.7404E-02	4.7094E-04
7.0000E 00	2.8932E-02	3.5094E-04	4.8707E-02	5.9081E-04
5.0000E 00	5.4679E-02	4.3820E-04	9.2052E-02	7.3771E-04
3.5000E 00	8.7017E-02	8.7964E-04	1.4649E-01	1.4809E-03
2.5000E 00	1.2211E-01	8.9677E-04	2.0557E-01	1.5097E-03
1.7500E 00	1.5645E-01	1.4551E-03	2.6338E-01	2.4497E-03
1.2500E 00	1.7695E-01	1.4368E-03	2.9790E-01	2.4189E-03
9.0000E-01	1.8422E-01	2.4587E-03	3.1013E-01	4.1393E-03
7.0000E-01	1.8978E-01	2.0486E-03	3.1949E-01	3.4488E-03
5.0000E-01	1.7872E-01	2.2328E-03	3.0087E-01	3.7590E-03
3.5000E-01	1.6810E-01	3.3062E-03	2.8300E-01	5.5661E-03
2.5000E-01	1.5759E-01	3.5460E-03	2.6530E-01	5.9698E-03
1.7500E-01	1.3374E-01	3.7708E-03	2.2515E-01	6.3481E-03
7.5000E-02	9.4900E-02	2.0938E-03	1.5976E-01	3.5249E-03

Table F.27 Target Material: Lead (Pb-207)  
 Angle: 100 - 120°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	9.7540E-07	3.8801E-07	1.6421E-06	6.5322E-07
1.7500E 02	1.3980E-05	2.1795E-06	2.3535E-05	3.6692E-06
1.2500E 02	6.9580E-05	4.8010E-06	1.1714E-04	8.0825E-06
9.0000E 01	1.5690E-04	1.0983E-05	2.6414E-04	1.8490E-05
7.0000E 01	2.8530E-04	1.4208E-05	4.8030E-04	2.3919E-05
5.0000E 01	5.2670E-04	2.2332E-05	8.8670E-04	3.7596E-05
3.5000E 01	8.7891E-04	3.5506E-05	1.4796E-03	5.9774E-05
2.5000E 01	1.5529E-03	5.5047E-05	2.6142E-03	9.2672E-05
1.7500E 01	2.7458E-03	8.6286E-05	4.6225E-03	1.4526E-04
1.2500E 01	6.8620E-03	1.3209E-04	1.1552E-02	2.2238E-04
9.0000E 00	1.4801E-02	2.7795E-04	2.4917E-02	4.6793E-04
7.0000E 00	2.6461E-02	3.2049E-04	4.4547E-02	5.3954E-04
5.0000E 00	5.2507E-02	4.1973E-04	8.8395E-02	7.0661E-04
3.5000E 00	8.5145E-02	8.5164E-04	1.4334E-01	1.4337E-03
2.5000E 00	1.1999E-01	8.6705E-04	2.0200E-01	1.4597E-03
1.7500E 00	1.5389E-01	1.4318E-03	2.5907E-01	2.4105E-03
1.2500E 00	1.7456E-01	1.4789E-03	2.9387E-01	2.4897E-03
9.0000E-01	1.8162E-01	2.4082E-03	3.0576E-01	4.0543E-03
7.0000E-01	1.8685E-01	1.9892E-03	3.1457E-01	3.3489E-03
5.0000E-01	1.7717E-01	2.2832E-03	2.9827E-01	3.8437E-03
3.5000E-01	1.6655E-01	3.3441E-03	2.8039E-01	5.6298E-03
2.5000E-01	1.5294E-01	3.4388E-03	2.5747E-01	5.7892E-03
1.7500E-01	1.3328E-01	3.7237E-03	2.2438E-01	6.2689E-03
7.5000E-02	9.4420E-02	2.1314E-03	1.5896E-01	3.5882E-03

Table F.28 Target Material: Lead (Pb-207)

Angle: 120 - 140°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	1.9940E-07	1.9940E-07	3.3569E-07	3.3569E-07
1.7500E 02	6.7800E-06	1.6089E-06	1.1414E-05	2.7086E-06
1.2500E 02	2.8710E-05	3.7208E-06	4.8333E-05	6.2640E-06
9.0000E 01	7.6770E-05	9.1663E-06	1.2924E-04	1.5432E-05
7.0000E 01	1.5350E-04	1.1896E-05	2.5842E-04	2.0027E-05
5.0000E 01	2.9710E-04	1.4736E-05	5.0017E-04	2.4808E-05
3.5000E 01	5.5938E-04	3.2232E-05	9.4172E-04	5.4263E-05
2.5000E 01	8.7390E-04	3.6330E-05	1.4712E-03	6.1162E-05
1.7500E 01	2.0307E-03	8.6745E-05	3.4187E-03	1.4603E-04
1.2500E 01	5.0550E-03	1.3523E-04	8.5101E-03	2.2767E-04
9.0000E 00	1.2013E-02	2.7387E-04	2.0224E-02	4.6106E-04
7.0000E 00	2.2898E-02	3.7774E-04	3.8549E-02	6.3593E-04
5.0000E 00	4.6245E-02	5.3031E-04	7.7853E-02	8.9278E-04
3.5000E 00	7.8092E-02	8.6108E-04	1.3147E-01	1.4496E-03
2.5000E 00	1.0860E-01	1.1788E-03	1.8283E-01	1.9846E-03
1.7500E 00	1.4154E-01	1.6466E-03	2.3828E-01	2.7720E-03
1.2500E 00	1.6236E-01	1.6914E-03	2.7333E-01	2.8475E-03
9.0000E-01	1.7007E-01	3.0479E-03	2.8632E-01	5.1311E-03
7.0000E-01	1.7657E-01	3.4079E-03	2.9726E-01	5.7372E-03
5.0000E-01	1.7187E-01	2.6817E-03	2.8934E-01	4.5147E-03
3.5000E-01	1.6456E-01	4.2673E-03	2.7704E-01	7.1839E-03
2.5000E-01	1.4857E-01	3.8500E-03	2.5012E-01	6.4815E-03
1.7500E-01	1.2618E-01	5.6080E-03	2.1242E-01	9.4411E-03
7.5000E-02	8.9411E-02	2.6287E-03	1.5052E-01	4.4254E-03

Table F.29 Target Material: Lead (Pb-207)  
Angle 140 - 160°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	3.0550E-07	3.0550E-07	5.1431E-07	5.1431E-07
1.7500E 02	4.2770E-06	1.5667E-06	7.2003E-06	2.6375E-06
1.2500E 02	2.8110E-05	4.2024E-06	4.7323E-05	7.0748E-06
9.0000E 01	6.5690E-05	9.0192E-06	1.1059E-04	1.5184E-05
7.0000E 01	1.1150E-04	1.3703E-05	1.8771E-04	2.3070E-05
5.0000E 01	2.1390E-04	1.7240E-05	3.6010E-04	2.9024E-05
3.5000E 01	3.7078E-04	3.6690E-05	6.2421E-04	6.1768E-05
2.5000E 01	7.3760E-04	4.7120E-05	1.2417E-03	7.9326E-05
1.7500E 01	1.5119E-03	8.8942E-05	2.5453E-03	1.4973E-04
1.2500E 01	4.6290E-03	1.3900E-04	7.7929E-03	2.3400E-04
9.0000E 00	1.1127E-02	2.7057E-04	1.8732E-02	4.5550E-04
7.0000E 00	2.1713E-02	3.7654E-04	3.6554E-02	6.3390E-04
5.0000E 00	4.4770E-02	5.3265E-04	7.5370E-02	8.9672E-04
3.5000E 00	7.7040E-02	8.6788E-04	1.2970E-01	1.4611E-03
2.5000E 00	1.0821E-01	1.2018E-03	1.8217E-01	2.0232E-03
1.7500E 00	1.3996E-01	1.6703E-03	2.3562E-01	2.8120E-03
1.2500E 00	1.6100E-01	1.7534E-03	2.7105E-01	2.9518E-03
9.0000E-01	1.6807E-01	3.0440E-03	2.8294E-01	5.1245E-03
7.0000E-01	1.7469E-01	3.4774E-03	2.9409E-01	5.8542E-03
5.0000E-01	1.7167E-01	2.7216E-03	2.8901E-01	4.5818E-03
3.5000E-01	1.6075E-01	4.3235E-03	2.7063E-01	7.2786E-03
2.5000E-01	1.4531E-01	3.8465E-03	2.4463E-01	6.4756E-03
1.7500E-01	1.2431E-01	5.5955E-03	2.0928E-01	9.4200E-03
7.5000E-02	8.7288E-02	2.7548E-03	1.4695E-01	4.6377E-03

Table F.30 Target Material: Lead (Pb-207)

Angle: 160 - 180°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	0.0000	0.0000	0.0000	0.0000
1.7500E 02	5.2780E-06	3.0164E-06	8.8855E-06	5.0781E-06
1.2500E 02	1.0560E-05	4.2008E-06	1.7778E-05	7.0720E-06
9.0000E 01	7.4770E-05	1.7743E-05	1.2588E-04	2.9870E-05
7.0000E 01	6.5980E-05	1.5782E-05	1.1108E-04	2.6570E-05
5.0000E 01	1.3640E-04	2.3979E-05	2.2963E-04	4.0369E-05
3.5000E 01	3.0018E-04	5.1905E-05	5.0536E-04	8.7382E-05
2.5000E 01	6.0170E-04	7.4110E-05	1.0130E-03	1.2476E-04
1.7500E 01	1.4736E-03	1.4170E-04	2.4808E-03	2.3855E-04
1.2500E 01	4.3740E-03	1.8998E-04	7.3636E-03	3.1984E-04
9.0000E 00	1.0706E-02	3.5202E-04	1.8024E-02	5.9263E-04
7.0000E 00	2.0935E-02	4.4369E-04	3.5244E-02	7.4695E-04
5.0000E 00	4.4743E-02	6.1591E-04	7.5325E-02	1.0369E-03
3.5000E 00	7.5197E-02	9.7847E-04	1.2659E-01	1.6472E-03
2.5000E 00	1.0694E-01	1.3293E-03	1.8003E-01	2.2379E-03
1.7500E 00	1.3827E-01	1.7527E-03	2.3278E-01	2.9507E-03
1.2500E 00	1.5903E-01	1.8268E-03	2.6772E-01	3.0754E-03
9.0000E-01	1.6634E-01	3.2507E-03	2.8003E-01	5.4726E-03
7.0000E-01	1.7658E-01	3.8515E-03	2.9727E-01	6.4839E-03
5.0000E-01	1.6968E-01	3.1888E-03	2.8565E-01	5.3683E-03
3.5000E-01	1.6100E-01	4.7638E-03	2.7104E-01	8.0199E-03
2.5000E-01	1.4448E-01	4.1841E-03	2.4323E-01	7.0440E-03
1.7500E-01	1.2700E-01	6.5398E-03	2.1380E-01	1.1010E-02
7.5000E-02	9.0153E-02	3.2286E-03	1.5177E-01	5.4354E-03

Table F.31 Target Material: Tantalum (Ta-181)

Angle: 0 - 5°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.0740E-03	1.2040E-04	1.6782E-03	1.8813E-04
4.5000E 02	3.0670E-04	7.3025E-05	4.7925E-04	1.1411E-04
3.5000E 02	1.2130E-03	1.3828E-04	1.8954E-03	2.1608E-04
2.5000E 02	2.0220E-03	1.6034E-04	3.1596E-03	2.5055E-04
1.7500E 02	1.2270E-03	2.2184E-04	1.9173E-03	3.4665E-04
1.2500E 02	1.4500E-03	2.2243E-04	2.2658E-03	3.4757E-04
9.0000E 01	1.7430E-03	3.3413E-04	2.7236E-03	5.2212E-04
7.0000E 01	1.5340E-03	3.5144E-04	2.3970E-03	5.4916E-04
5.0000E 01	2.2310E-03	3.5562E-04	3.4862E-03	5.5569E-04
3.5000E 01	3.4977E-03	6.3811E-04	5.4655E-03	9.9711E-04
2.5000E 01	2.3965E-03	5.1396E-04	3.7448E-03	8.0311E-04
1.7500E 01	4.1560E-03	8.7828E-04	6.4942E-03	1.3724E-03
1.2500E 01	9.3960E-03	1.1303E-03	1.4682E-02	1.7662E-03
9.0000E 00	2.4730E-02	2.8230E-03	3.8643E-02	4.4112E-03
7.0000E 00	3.5172E-02	2.3823E-03	5.4960E-02	3.7226E-03
5.0000E 00	6.2390E-02	2.6369E-03	9.7491E-02	4.1204E-03
3.5000E 00	9.6740E-02	4.1404E-03	1.5117E-01	6.4698E-03
2.5000E 00	1.3404E-01	4.9319E-03	2.0945E-01	7.7066E-03
1.7500E 00	1.6452E-01	7.3799E-03	2.5708E-01	1.1532E-02
1.2500E 00	1.7885E-01	5.7919E-03	2.7947E-01	9.0504E-03
9.0000E-01	2.0688E-01	1.4130E-02	3.2327E-01	2.2080E-02
7.0000E-01	2.1045E-01	1.5554E-02	3.2885E-01	2.4304E-02
5.0000E-01	1.9888E-01	1.4029E-02	3.1077E-01	2.1922E-02
3.5000E-01	1.6044E-01	1.4417E-02	2.5070E-01	2.2528E-02
2.5000E-01	1.5344E-01	1.4559E-02	2.3977E-01	2.2749E-02
1.7500E-01	1.8587E-01	3.9553E-02	2.9044E-01	6.1805E-02
7.5000E-02	1.3524E-01	2.0511E-02	2.1133E-01	3.2050E-02

Table F.32 Target Material: Tantalum (Ta-181)  
Angle: 5 - 10°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.0580E-03	6.3163E-05	1.6532E-03	9.8698E-05
4.5000E 02	2.1900E-04	3.2083E-05	3.4221E-04	5.0134E-05
3.5000E 02	3.0280E-04	3.4004E-05	4.7315E-04	5.3135E-05
2.5000E 02	6.7090E-04	6.3266E-05	1.0483E-03	9.8859E-05
1.7500E 02	1.0810E-03	9.8911E-05	1.6892E-03	1.5456E-04
1.2500E 02	1.1550E-03	1.0603E-04	1.8048E-03	1.6568E-04
9.0000E 01	1.3510E-03	1.6617E-04	2.1111E-03	2.5966E-04
7.0000E 01	1.6540E-03	2.2279E-04	2.5845E-03	3.4814E-04
5.0000E 01	2.3060E-03	2.1584E-04	3.6034E-03	3.3727E-04
3.5000E 01	3.4137E-03	4.0201E-04	5.3343E-03	6.2818E-04
2.5000E 01	3.9395E-03	4.7645E-04	6.1558E-03	7.4451E-04
1.7500E 01	6.3070E-03	6.9423E-04	9.8553E-03	1.0848E-03
1.2500E 01	1.1458E-02	7.3224E-04	1.7904E-02	1.1442E-03
9.0000E 00	2.3600E-02	1.5879E-03	3.6877E-02	2.4813E-03
7.0000E 00	3.9390E-02	1.9132E-03	6.1551E-02	2.9896E-03
5.0000E 00	6.6150E-02	2.0631E-03	1.0337E-01	3.2238E-03
3.5000E 00	1.0050E-01	3.2306E-03	1.5704E-01	5.0482E-03
2.5000E 00	1.3361E-01	2.7731E-03	2.0878E-01	4.3332E-03
1.7500E 00	1.7109E-01	5.1267E-03	2.6735E-01	8.0110E-03
1.2500E 00	1.8727E-01	4.8192E-03	2.9263E-01	7.5305E-03
9.0000E-01	2.0695E-01	8.3118E-03	3.2338E-01	1.2988E-02
7.0000E-01	1.9657E-01	7.3296E-03	3.0716E-01	1.1453E-02
5.0000E-01	2.0361E-01	8.6219E-03	3.1816E-01	1.3473E-02
3.5000E-01	1.5582E-01	7.5161E-03	2.4348E-01	1.1745E-02
2.5000E-01	1.5814E-01	1.0093E-02	2.4711E-01	1.5772E-02
1.7500E-01	1.4874E-01	1.4037E-02	2.3242E-01	2.1935E-02
7.5000E-02	1.1983E-01	1.0649E-02	1.8725E-01	1.6639E-02



Table F.33 Target Material: Tantalum (Ta-181)

Angle: 10 - 15°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	9.1030E-04	4.6789E-05	1.4224E-03	7.3113E-05
4.5000E 02	2.2200E-04	2.7461E-05	3.4690E-04	4.2911E-05
3.5000E 02	2.3040E-04	2.7786E-05	3.6002E-04	4.3419E-05
2.5000E 02	6.4900E-04	3.7382E-05	1.0141E-03	5.8414E-05
1.7500E 02	8.5410E-04	7.3367E-05	1.3346E-03	1.1464E-04
1.2500E 02	1.3210E-03	9.0488E-05	2.0642E-03	1.4140E-04
9.0000E 01	1.5590E-03	1.3813E-04	2.4361E-03	2.1584E-04
7.0000E 01	1.6860E-03	1.5730E-04	2.6345E-03	2.4580E-04
5.0000E 01	2.0930E-03	1.6284E-04	3.2705E-03	2.5445E-04
3.5000E 01	2.4567E-03	2.5762E-04	3.8389E-03	4.0256E-04
2.5000E 01	4.1835E-03	3.3254E-04	6.5371E-03	5.1962E-04
1.7500E 01	5.9220E-03	5.3830E-04	9.2537E-03	8.4115E-04
1.2500E 01	1.1062E-02	5.7586E-04	1.7285E-02	8.9984E-04
9.0000E 00	2.3280E-02	1.2338E-03	3.6377E-02	1.9279E-03
7.0000E 00	3.6790E-02	1.2511E-03	5.7488E-02	1.9550E-03
5.0000E 00	6.4590E-02	1.4598E-03	1.0093E-01	2.2810E-03
3.5000E 00	9.9920E-02	2.4585E-03	1.5613E-01	3.8416E-03
2.5000E 00	1.3359E-01	2.2506E-03	2.0875E-01	3.5167E-03
1.7500E 00	1.6073E-01	3.6871E-03	2.5116E-01	5.7615E-03
1.2500E 00	1.8512E-01	3.4845E-03	2.8927E-01	5.4449E-03
9.0000E-01	1.9305E-01	5.7562E-03	3.0166E-01	8.9946E-03
7.0000E-01	1.9948E-01	6.0775E-03	3.1171E-01	9.4968E-03
5.0000E-01	1.9629E-01	6.1464E-03	3.0672E-01	9.6044E-03
3.5000E-01	1.7179E-01	9.7369E-03	2.6844E-01	1.5215E-02
2.5000E-01	1.7884E-01	1.2065E-02	2.7946E-01	1.8852E-02
1.7500E-01	1.6382E-01	1.4318E-02	2.5598E-01	2.2374E-02
7.5000E-02	1.3372E-01	9.2214E-03	2.0895E-01	1.4409E-02

Table F.34 Target Material: Tantalum (Ta-181)

Angle: 15 - 20°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	4.2060E-04	2.9274E-05	6.5723E-04	4.5743E-05
4.5000E 02	2.8920E-04	2.3396E-05	4.5190E-04	3.6559E-05
3.5000E 02	2.1230E-04	1.8937E-05	3.3174E-04	2.9591E-05
2.5000E 02	5.6830E-04	3.7906E-05	8.8802E-04	5.9231E-05
1.7500E 02	8.7360E-04	6.1065E-05	1.3651E-03	9.5419E-05
1.2500E 02	1.0840E-03	6.7533E-05	1.6939E-03	1.0553E-04
9.0000E 01	1.4460E-03	1.0975E-04	2.2595E-03	1.7150E-04
7.0000E 01	1.5470E-03	1.4480E-04	2.4173E-03	2.2626E-04
5.0000E 01	1.9210E-03	1.3678E-04	3.0018E-03	2.1372E-04
3.5000E 01	2.9447E-03	2.5599E-04	4.6014E-03	4.0000E-04
2.5000E 01	3.7655E-03	2.4011E-04	5.8840E-03	3.7519E-04
1.7500E 01	5.0530E-03	4.4441E-04	7.8958E-03	6.9443E-04
1.2500E 01	1.1896E-02	5.3302E-04	1.8589E-02	8.3290E-04
9.0000E 00	2.2789E-02	9.8512E-04	3.5610E-02	1.5394E-03
7.0000E 00	3.5918E-02	1.1892E-03	5.6125E-02	1.8582E-03
5.0000E 00	6.3880E-02	1.4070E-03	9.9819E-02	2.1985E-03
3.5000E 00	9.8550E-02	1.9509E-03	1.5399E-01	3.0484E-03
2.5000E 00	1.3447E-01	2.0261E-03	2.1012E-01	3.1660E-03
1.7500E 00	1.6725E-01	3.1731E-03	2.6134E-01	4.9583E-03
1.2500E 00	1.8631E-01	3.2887E-03	2.9113E-01	5.1390E-03
9.0000E-01	2.1035E-01	6.4482E-03	3.2869E-01	1.0076E-02
7.0000E-01	2.0492E-01	6.0215E-03	3.2021E-01	9.4093E-03
5.0000E-01	1.8718E-01	4.7156E-03	2.9249E-01	7.3685E-03
3.5000E-01	1.6672E-01	7.1194E-03	2.6052E-01	1.1125E-02
2.5000E-01	1.6175E-01	7.6221E-03	2.5275E-01	1.1910E-02
1.7500E-01	1.5032E-01	1.0176E-02	2.3489E-01	1.5902E-02
7.5000E-02	1.0899E-01	5.7697E-03	1.7031E-01	9.0157E-03

Table F.35 Target Material: Tantalum (Ta-181)

Angle: 20 - 25°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.3980E-04	1.4679E-05	2.1845E-04	2.2937E-05
4.5000E 02	3.6550E-04	2.5000E-05	5.7113E-04	3.9065E-05
3.5000E 02	1.6840E-04	1.4769E-05	2.6314E-04	2.3078E-05
2.5000E 02	4.7350E-04	2.7936E-05	7.3989E-04	4.3654E-05
1.7500E 02	7.3730E-04	5.2643E-05	1.1521E-03	8.2260E-05
1.2500E 02	1.0300E-03	5.5723E-05	1.6095E-03	8.7073E-05
9.0000E 01	1.3750E-03	1.0587E-04	2.1486E-03	1.6544E-04
7.0000E 01	1.5410E-03	1.0340E-04	2.4080E-03	1.6157E-04
5.0000E 01	1.7400E-03	1.3207E-04	2.7189E-03	2.0637E-04
3.5000E 01	2.4127E-03	1.8843E-04	3.7701E-03	2.9444E-04
2.5000E 01	4.0905E-03	2.3977E-04	6.3918E-03	3.7467E-04
1.7500E 01	6.4920E-03	4.0830E-04	1.0144E-02	6.3800E-04
1.2500E 01	1.2061E-02	5.2292E-04	1.8846E-02	8.1712E-04
9.0000E 00	2.0905E-02	7.8511E-04	3.2666E-02	1.2268E-03
7.0000E 00	3.6440E-02	9.9235E-04	5.6941E-02	1.5506E-03
5.0000E 00	6.4350E-02	1.2137E-03	1.0055E-01	1.8966E-03
3.5000E 00	1.0008E-01	1.7737E-03	1.5638E-01	2.7715E-03
2.5000E 00	1.3745E-01	2.0099E-03	2.1478E-01	3.1407E-03
1.7500E 00	1.6502E-01	3.3810E-03	2.5786E-01	5.2831E-03
1.2500E 00	1.9185E-01	3.3120E-03	2.9978E-01	5.1753E-03
9.0000E-01	2.0045E-01	5.2524E-03	3.1322E-01	8.2074E-03
7.0000E-01	1.9467E-01	4.9264E-03	3.0419E-01	7.6980E-03
5.0000E-01	1.9563E-01	5.4436E-03	3.0569E-01	8.5062E-03
3.5000E-01	1.7034E-01	6.7853E-03	2.6617E-01	1.0603E-02
2.5000E-01	1.6651E-01	8.6031E-03	2.6019E-01	1.3443E-02
1.7500E-01	1.5235E-01	9.5663E-03	2.3806E-01	1.4948E-02
7.5000E-02	1.2267E-01	5.9516E-03	1.9168E-01	9.3000E-03

Table F.36 Target Material: Tantalum (Ta-181)  
Angle: 25 - 35°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.5830E-05	2.8209E-06	2.4736E-05	4.4079E-06
4.5000E 02	1.8690E-04	9.5693E-06	2.9205E-04	1.4953E-05
3.5000E 02	2.6300E-04	1.2598E-05	4.1096E-04	1.9685E-05
2.5000E 02	3.5060E-04	1.5777E-05	5.4785E-04	2.4653E-05
1.7500E 02	6.0380E-04	2.6869E-05	9.4350E-04	4.1986E-05
1.2500E 02	8.9240E-04	3.2216E-05	1.3945E-03	5.0340E-05
9.0000E 01	1.1900E-03	6.0095E-05	1.8595E-03	9.3904E-05
7.0000E 01	1.4030E-03	6.8326E-05	2.1923E-03	1.0677E-04
5.0000E 01	1.8990E-03	8.5265E-05	2.9674E-03	1.3323E-04
3.5000E 01	2.3687E-03	1.2421E-04	3.7014E-03	1.9409E-04
2.5000E 01	3.3495E-03	1.4037E-04	5.2339E-03	2.1935E-04
1.7500E 01	5.7520E-03	2.6037E-04	8.9881E-03	4.0686E-04
1.2500E 01	1.1181E-02	2.8914E-04	1.7471E-02	4.5181E-04
9.0000E 00	2.0884E-02	5.6507E-04	3.2633E-02	8.8298E-04
7.0000E 00	3.7100E-02	6.3445E-04	5.7972E-02	9.9139E-04
5.0000E 00	6.3810E-02	8.3204E-04	9.9709E-02	1.3001E-03
3.5000E 00	1.0008E-01	1.4112E-03	1.5638E-01	2.2051E-03
2.5000E 00	1.3434E-01	1.4401E-03	2.0992E-01	2.2503E-03
1.7500E 00	1.6618E-01	2.4224E-03	2.5967E-01	3.7852E-03
1.2500E 00	1.8730E-01	2.3119E-03	2.9267E-01	3.6126E-03
9.0000E-01	1.9635E-01	3.9678E-03	3.0682E-01	6.2001E-03
7.0000E-01	2.0056E-01	4.2040E-03	3.1339E-01	6.5692E-03
5.0000E-01	1.9322E-01	4.1144E-03	3.0193E-01	6.4291E-03
3.5000E-01	1.7389E-01	5.3644E-03	2.7172E-01	8.3824E-03
2.5000E-01	1.6385E-01	5.7098E-03	2.5603E-01	8.9221E-03
1.7500E-01	1.4349E-01	6.5370E-03	2.2422E-01	1.0215E-02
7.5000E-02	1.0987E-01	3.7014E-03	1.7168E-01	5.7837E-03

Table F.37 Target Material: Tantalum (Ta-181)  
 Angle: 35 - 40°

energy (MeV)	yield (1/sr/MeV)	error (1σ)	x-section (b/sr/MeV)	error (1σ)
5.5000E 02	9.9890E-07	9.9890E-07	1.5609E-06	1.5609E-06
4.5000E 02	6.3930E-05	7.3136E-06	9.9897E-05	1.1428E-05
3.5000E 02	2.2680E-04	1.5082E-05	3.5440E-04	2.3567E-05
2.5000E 02	3.0370E-04	1.9710E-05	4.7456E-04	3.0799E-05
1.7500E 02	4.9150E-04	3.1161E-05	7.6802E-04	4.8692E-05
1.2500E 02	8.2510E-04	4.1502E-05	1.2893E-03	6.4852E-05
9.0000E 01	1.0740E-03	7.6576E-05	1.6782E-03	1.1966E-04
7.0000E 01	1.2240E-03	8.0784E-05	1.9126E-03	1.2623E-04
5.0000E 01	1.8980E-03	1.0439E-04	2.9658E-03	1.6312E-04
3.5000E 01	2.3897E-03	1.4195E-04	3.7342E-03	2.2181E-04
2.5000E 01	3.0825E-03	1.5601E-04	4.8167E-03	2.4378E-04
1.7500E 01	5.1250E-03	2.7261E-04	8.0083E-03	4.2598E-04
1.2500E 01	1.0949E-02	3.8278E-04	1.7109E-02	5.9814E-04
9.0000E 00	2.0572E-02	6.0916E-04	3.2146E-02	9.5187E-04
7.0000E 00	3.5850E-02	8.3751E-04	5.6019E-02	1.3087E-03
5.0000E 00	6.3680E-02	9.7589E-04	9.9506E-02	1.5249E-03
3.5000E 00	9.8770E-02	1.5984E-03	1.5434E-01	2.4977E-03
2.5000E 00	1.3488E-01	1.6896E-03	2.1076E-01	2.6402E-03
1.7500E 00	1.6518E-01	2.6468E-03	2.5811E-01	4.1359E-03
1.2500E 00	1.8948E-01	2.7574E-03	2.9608E-01	4.3087E-03
9.0000E-01	2.0297E-01	4.8514E-03	3.1716E-01	7.5807E-03
7.0000E-01	1.9208E-01	4.0485E-03	3.0014E-01	6.3262E-03
5.0000E-01	1.9348E-01	4.3730E-03	3.0233E-01	6.8333E-03
3.5000E-01	1.6948E-01	5.7789E-03	2.6483E-01	9.0302E-03
2.5000E-01	1.6747E-01	7.0754E-03	2.6169E-01	1.1056E-02
1.7500E-01	1.4209E-01	6.9165E-03	2.2203E-01	1.0808E-02
7.5000E-02	1.1274E-01	4.8680E-03	1.7617E-01	7.6068E-03

Table F.38 Target Material: Tantalum (Ta-181)

Angle: 40 - 50°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	4.3040E-07	4.3040E-07	6.7254E-07	6.7254E-07
4.5000E 02	1.8080E-05	2.8150E-06	2.8252E-05	4.3988E-06
3.5000E 02	1.3260E-04	8.1549E-06	2.0720E-04	1.2743E-05
2.5000E 02	2.6560E-04	9.9600E-06	4.1503E-04	1.5563E-05
1.7500E 02	4.2700E-04	1.8446E-05	6.6723E-04	2.8824E-05
1.2500E 02	6.9380E-04	2.9625E-05	1.0841E-03	4.6292E-05
9.0000E 01	8.9740E-04	4.4332E-05	1.4023E-03	6.9272E-05
7.0000E 01	1.2530E-03	4.9493E-05	1.9579E-03	7.7338E-05
5.0000E 01	1.5490E-03	5.5454E-05	2.4205E-03	8.6653E-05
3.5000E 01	2.1437E-03	9.3402E-05	3.3498E-03	1.4595E-04
2.5000E 01	3.4535E-03	1.1547E-04	5.3964E-03	1.8044E-04
1.7500E 01	5.7120E-03	2.2476E-04	8.9256E-03	3.5121E-04
1.2500E 01	1.0923E-02	2.5889E-04	1.7068E-02	4.0455E-04
9.0000E 00	2.0391E-02	4.5539E-04	3.1863E-02	7.1159E-04
7.0000E 00	3.5687E-02	5.9074E-04	5.5764E-02	9.2310E-04
5.0000E 00	6.2900E-02	7.4478E-04	9.8287E-02	1.1638E-03
3.5000E 00	9.8050E-02	1.2516E-03	1.5321E-01	1.9557E-03
2.5000E 00	1.3536E-01	1.3805E-03	2.1151E-01	2.1572E-03
1.7500E 00	1.6075E-01	2.1083E-03	2.5119E-01	3.2944E-03
1.2500E 00	1.8612E-01	2.2602E-03	2.9083E-01	3.5318E-03
9.0000E-01	1.9858E-01	3.9740E-03	3.1030E-01	6.2098E-03
7.0000E-01	1.9841E-01	3.7333E-03	3.1004E-01	5.8336E-03
5.0000E-01	1.9015E-01	3.5560E-03	2.9713E-01	5.5565E-03
3.5000E-01	1.6802E-01	4.8408E-03	2.6255E-01	7.5643E-03
2.5000E-01	1.6102E-01	5.2482E-03	2.5161E-01	8.2008E-03
1.7500E-01	1.5076E-01	6.3434E-03	2.3558E-01	9.9122E-03
7.5000E-02	1.1287E-01	3.6735E-03	1.7637E-01	5.7403E-03

Table F.39 Target Material: Tantalum (Ta-181)

Angle: 50 - 65°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	1.4460E-06	5.7522E-07	2.2595E-06	8.9884E-07
3.5000E 02	2.8430E-05	2.5701E-06	4.4425E-05	4.0160E-06
2.5000E 02	1.4580E-04	6.0799E-06	2.2783E-04	9.5004E-06
1.7500E 02	3.3400E-04	1.2425E-05	5.2191E-04	1.9415E-05
1.2500E 02	6.0100E-04	1.5686E-05	9.3912E-04	2.4511E-05
9.0000E 01	8.3850E-04	2.7587E-05	1.3102E-03	4.3107E-05
7.0000E 01	1.0550E-03	3.6714E-05	1.6485E-03	5.7369E-05
5.0000E 01	1.4950E-03	4.6046E-05	2.3361E-03	7.1951E-05
3.5000E 01	1.9167E-03	5.7415E-05	2.9951E-03	8.9717E-05
2.5000E 01	2.9245E-03	8.6225E-05	4.5698E-03	1.3473E-04
1.7500E 01	4.9730E-03	1.4520E-04	7.7708E-03	2.2689E-04
1.2500E 01	1.0425E-02	1.9568E-04	1.6290E-02	3.0576E-04
9.0000E 00	2.1000E-02	3.8187E-04	3.2815E-02	5.9671E-04
7.0000E 00	3.5110E-02	4.8429E-04	5.4863E-02	7.5675E-04
5.0000E 00	6.2260E-02	7.0580E-04	9.7287E-02	1.1029E-03
3.5000E 00	9.7970E-02	1.1941E-03	1.5309E-01	1.8659E-03
2.5000E 00	1.3434E-01	1.2658E-03	2.0992E-01	1.9780E-03
1.7500E 00	1.6124E-01	2.0329E-03	2.5195E-01	3.1767E-03
1.2500E 00	1.8572E-01	2.0413E-03	2.9021E-01	3.1897E-03
9.0000E-01	1.9442E-01	3.6010E-03	3.0380E-01	5.6269E-03
7.0000E-01	1.9825E-01	3.4747E-03	3.0979E-01	5.4296E-03
5.0000E-01	1.9052E-01	3.2655E-03	2.9771E-01	5.1027E-03
3.5000E-01	1.6698E-01	4.2587E-03	2.6092E-01	6.6547E-03
2.5000E-01	1.5805E-01	4.6476E-03	2.4697E-01	7.2623E-03
1.7500E-01	1.5082E-01	5.9211E-03	2.3567E-01	9.2523E-03
7.5000E-02	1.1142E-01	3.1845E-03	1.7410E-01	4.9761E-03

Table F.40 Target Material: Tantalum (Ta-181)

Angle: 65 - 80°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	2.1310E-07	2.1310E-07	3.3299E-07	3.3299E-07
3.5000E 02	4.9010E-06	9.0129E-07	7.6583E-06	1.4084E-06
2.5000E 02	4.9860E-05	3.4304E-06	7.7911E-05	5.3603E-06
1.7500E 02	1.6150E-04	9.2539E-06	2.5236E-04	1.4460E-05
1.2500E 02	3.2770E-04	1.0585E-05	5.1206E-04	1.6540E-05
9.0000E 01	5.8920E-04	2.3450E-05	9.2068E-04	3.6643E-05
7.0000E 01	8.9180E-04	3.0500E-05	1.3935E-03	4.7659E-05
5.0000E 01	1.2200E-03	3.4282E-05	1.9064E-03	5.3569E-05
3.5000E 01	1.6527E-03	5.8885E-05	2.5825E-03	9.2014E-05
2.5000E 01	2.5676E-03	7.5230E-05	4.0121E-03	1.1755E-04
1.7500E 01	4.4110E-03	1.3967E-04	6.8926E-03	2.1825E-04
1.2500E 01	9.3890E-03	1.6526E-04	1.4671E-02	2.5824E-04
9.0000E 00	1.8603E-02	3.2625E-04	2.9069E-02	5.0979E-04
7.0000E 00	3.1351E-02	4.4614E-04	4.8989E-02	6.9715E-04
5.0000E 00	5.6254E-02	4.8023E-04	8.7902E-02	7.5041E-04
3.5000E 00	8.8920E-02	8.5968E-04	1.3895E-01	1.3433E-03
2.5000E 00	1.2237E-01	9.5840E-04	1.9122E-01	1.4976E-03
1.7500E 00	1.5238E-01	1.3471E-03	2.3811E-01	2.1050E-03
1.2500E 00	1.7468E-01	1.5695E-03	2.7295E-01	2.4525E-03
9.0000E-01	1.8228E-01	2.4204E-03	2.8483E-01	3.7821E-03
7.0000E-01	1.8599E-01	2.3880E-03	2.9063E-01	3.7315E-03
5.0000E-01	1.7584E-01	2.4755E-03	2.7477E-01	3.8683E-03
3.5000E-01	1.6976E-01	3.5972E-03	2.6527E-01	5.6209E-03
2.5000E-01	1.5777E-01	3.5562E-03	2.4653E-01	5.5570E-03
1.7500E-01	1.4190E-01	4.2384E-03	2.2173E-01	6.6229E-03
7.5000E-02	9.8640E-02	2.1086E-03	1.5413E-01	3.2948E-03



Table F.41 Target Material: Tantalum (Ta-181)  
 Angle: 80 - 100°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	4.5830E-07	2.6192E-07	7.1614E-07	4.0927E-07
2.5000E 02	9.4710E-06	1.1233E-06	1.4799E-05	1.7552E-06
1.7500E 02	5.1940E-05	4.1552E-06	8.1161E-05	6.4929E-06
1.2500E 02	1.6830E-04	6.1429E-06	2.6299E-04	9.5990E-06
9.0000E 01	3.4220E-04	1.7829E-05	5.3472E-04	2.7859E-05
7.0000E 01	5.0260E-04	1.8295E-05	7.8536E-04	2.8587E-05
5.0000E 01	8.8060E-04	2.9588E-05	1.3760E-03	4.6234E-05
3.5000E 01	1.2747E-03	4.6792E-05	1.9919E-03	7.3118E-05
2.5000E 01	1.9876E-03	6.2235E-05	3.1058E-03	9.7249E-05
1.7500E 01	3.6780E-03	9.4529E-05	5.7472E-03	1.4771E-04
1.2500E 01	7.9230E-03	1.2297E-04	1.2380E-02	1.9215E-04
9.0000E 00	1.7041E-02	2.7108E-04	2.6628E-02	4.2359E-04
7.0000E 00	2.9829E-02	3.5224E-04	4.6611E-02	5.5041E-04
5.0000E 00	5.5378E-02	4.3645E-04	8.6534E-02	6.8199E-04
3.5000E 00	8.7495E-02	7.8843E-04	1.3672E-01	1.2320E-03
2.5000E 00	1.2054E-01	8.7043E-04	1.8836E-01	1.3601E-03
1.7500E 00	1.5073E-01	1.2657E-03	2.3553E-01	1.9778E-03
1.2500E 00	1.7075E-01	1.5104E-03	2.6681E-01	2.3601E-03
9.0000E-01	1.8083E-01	2.2286E-03	2.8256E-01	3.4824E-03
7.0000E-01	1.8027E-01	2.3541E-03	2.8169E-01	3.6785E-03
5.0000E-01	1.7442E-01	2.3873E-03	2.7255E-01	3.7303E-03
3.5000E-01	1.6608E-01	3.4670E-03	2.5952E-01	5.4175E-03
2.5000E-01	1.5542E-01	3.3166E-03	2.4286E-01	5.1825E-03
1.7500E-01	1.4141E-01	4.1905E-03	2.2097E-01	6.5480E-03
7.5000E-02	9.6970E-02	1.9022E-03	1.5153E-01	2.9724E-03

Table F.42 Target Material: Tantalum (Ta-181)

Angle: 100 - 120°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	2.4380E-06	6.2730E-07	3.8096E-06	9.8021E-07
1.7500E 02	1.5930E-05	2.1920E-06	2.4892E-05	3.4252E-06
1.2500E 02	6.2100E-05	4.2104E-06	9.7037E-05	6.5791E-06
9.0000E 01	1.7560E-04	1.2327E-05	2.7439E-04	1.9262E-05
7.0000E 01	2.6250E-04	1.3807E-05	4.1018E-04	2.1576E-05
5.0000E 01	5.0720E-04	2.1099E-05	7.9255E-04	3.2970E-05
3.5000E 01	7.7421E-04	3.8626E-05	1.2098E-03	6.0357E-05
2.5000E 01	1.4226E-03	5.1570E-05	2.2230E-03	8.0583E-05
1.7500E 01	2.8690E-03	9.1993E-05	4.4831E-03	1.4375E-04
1.2500E 01	7.0810E-03	1.1729E-04	1.1065E-02	1.8328E-04
9.0000E 00	1.6042E-02	2.6214E-04	2.5067E-02	4.0961E-04
7.0000E 00	2.8570E-02	3.4714E-04	4.4643E-02	5.4244E-04
5.0000E 00	5.2925E-02	4.0815E-04	8.2700E-02	6.3778E-04
3.5000E 00	8.4575E-02	7.7474E-04	1.3216E-01	1.2106E-03
2.5000E 00	1.1822E-01	8.7108E-04	1.8473E-01	1.3611E-03
1.7500E 00	1.4824E-01	1.2708E-03	2.3164E-01	1.9858E-03
1.2500E 00	1.6815E-01	1.4750E-03	2.6275E-01	2.3048E-03
9.0000E-01	1.7743E-01	2.2412E-03	2.7725E-01	3.5021E-03
7.0000E-01	1.7822E-01	2.3695E-03	2.7849E-01	3.7026E-03
5.0000E-01	1.7149E-01	2.3403E-03	2.6797E-01	3.6569E-03
3.5000E-01	1.6283E-01	3.3082E-03	2.5444E-01	5.1694E-03
2.5000E-01	1.5070E-01	3.1987E-03	2.3548E-01	4.9982E-03
1.7500E-01	1.3603E-01	3.9357E-03	2.1256E-01	6.1499E-03
7.5000E-02	9.6000E-02	1.9782E-03	1.5001E-01	3.0911E-03

Table F.43 Target Material: Tantalum (Ta-181)  
 Angle: 120 - 140°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	3.9880E-07	2.8056E-07	6.2316E-07	4.3840E-07
1.7500E 02	6.3810E-06	1.7675E-06	9.9709E-06	2.7619E-06
1.2500E 02	2.6720E-05	3.0033E-06	4.1753E-05	4.6930E-06
9.0000E 01	9.1730E-05	8.8152E-06	1.4334E-04	1.3775E-05
7.0000E 01	1.5450E-04	1.1804E-05	2.4142E-04	1.8445E-05
5.0000E 01	2.7073E-04	1.6302E-05	4.2304E-04	2.5473E-05
3.5000E 01	4.8709E-04	3.3946E-05	7.6112E-04	5.3044E-05
2.5000E 01	9.5018E-04	4.2654E-05	1.4847E-03	6.6651E-05
1.7500E 01	2.0785E-03	7.9061E-05	3.2479E-03	1.2354E-04
1.2500E 01	5.7040E-03	1.2603E-04	8.9131E-03	1.9694E-04
9.0000E 00	1.3132E-02	2.8542E-04	2.0520E-02	4.4599E-04
7.0000E 00	2.3899E-02	3.3630E-04	3.7345E-02	5.2551E-04
5.0000E 00	4.6876E-02	5.8864E-04	7.3248E-02	9.1982E-04
3.5000E 00	7.6943E-02	8.8945E-04	1.2023E-01	1.3899E-03
2.5000E 00	1.0686E-01	1.0562E-03	1.6698E-01	1.6504E-03
1.7500E 00	1.4062E-01	1.6908E-03	2.1973E-01	2.6421E-03
1.2500E 00	1.5711E-01	2.0153E-03	2.4551E-01	3.1491E-03
9.0000E-01	1.6718E-01	2.8479E-03	2.6124E-01	4.4502E-03
7.0000E-01	1.7018E-01	2.7394E-03	2.6592E-01	4.2806E-03
5.0000E-01	1.6358E-01	3.4727E-03	2.5561E-01	5.4264E-03
3.5000E-01	1.5777E-01	3.8464E-03	2.4653E-01	6.0104E-03
2.5000E-01	1.3848E-01	3.8027E-03	2.1638E-01	5.9420E-03
1.7500E-01	1.3237E-01	5.5834E-03	2.0684E-01	8.7246E-03
7.5000E-02	8.6892E-02	2.6052E-03	1.3578E-01	4.0709E-03

Table F.44 Target Material: Tantalum (Ta-181)

Angle: 140 - 160°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	0.0000	0.0000	0.0000	0.0000
1.7500E 02	3.6660E-06	1.4583E-06	5.7285E-06	2.2788E-06
1.2500E 02	1.8330E-05	3.0703E-06	2.8642E-05	4.7976E-06
9.0000E 01	7.1800E-05	1.0289E-05	1.1219E-04	1.6077E-05
7.0000E 01	8.5540E-05	1.0923E-05	1.3366E-04	1.7069E-05
5.0000E 01	1.9143E-04	1.6731E-05	2.9913E-04	2.6144E-05
3.5000E 01	3.6289E-04	3.5872E-05	5.6705E-04	5.6054E-05
2.5000E 01	7.2498E-04	4.3459E-05	1.1329E-03	6.7909E-05
1.7500E 01	1.7465E-03	9.0609E-05	2.7291E-03	1.4159E-04
1.2500E 01	5.0110E-03	1.2938E-04	7.8302E-03	2.0217E-04
9.0000E 00	1.2342E-02	2.8123E-04	1.9286E-02	4.3945E-04
7.0000E 00	2.2504E-02	3.3088E-04	3.5165E-02	5.1703E-04
5.0000E 00	4.5591E-02	5.8078E-04	7.1240E-02	9.0752E-04
3.5000E 00	7.5933E-02	9.0071E-04	1.1865E-01	1.4074E-03
2.5000E 00	1.0549E-01	1.0722E-03	1.6484E-01	1.6755E-03
1.7500E 00	1.3911E-01	1.6686E-03	2.1737E-01	2.6074E-03
1.2500E 00	1.5487E-01	2.0255E-03	2.4200E-01	3.1650E-03
9.0000E-01	1.6763E-01	2.9441E-03	2.6194E-01	4.6004E-03
7.0000E-01	1.6943E-01	2.7735E-03	2.6475E-01	4.3338E-03
5.0000E-01	1.6206E-01	3.4694E-03	2.5324E-01	5.4213E-03
3.5000E-01	1.5443E-01	3.8570E-03	2.4131E-01	6.0269E-03
2.5000E-01	1.3783E-01	3.8457E-03	2.1538E-01	6.0093E-03
1.7500E-01	1.2912E-01	5.4996E-03	2.0176E-01	8.5937E-03
7.5000E-02	8.6098E-02	2.6428E-03	1.3454E-01	4.1296E-03

Table F.45 Target Material: Tantalum (Ta-181)  
Angle: 160 - 180°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	0.0000	0.0000	0.0000	0.0000
1.7500E 02	3.5190E-06	2.4756E-06	5.4988E-06	3.8684E-06
1.2500E 02	1.9350E-05	5.5322E-06	3.0236E-05	8.6445E-06
9.0000E 01	3.5190E-05	1.1993E-05	5.4988E-05	1.8740E-05
7.0000E 01	7.4770E-05	1.8812E-05	1.1684E-04	2.9396E-05
5.0000E 01	1.8083E-04	2.7321E-05	2.8257E-04	4.2691E-05
3.5000E 01	2.8119E-04	4.6392E-05	4.3938E-04	7.2492E-05
2.5000E 01	5.9128E-04	6.5126E-05	9.2393E-04	1.0177E-04
1.7500E 01	1.7415E-03	1.4949E-04	2.7213E-03	2.3359E-04
1.2500E 01	4.5320E-03	1.5444E-04	7.0817E-03	2.4133E-04
9.0000E 00	1.2171E-02	3.7282E-04	1.9018E-02	5.8256E-04
7.0000E 00	2.2949E-02	4.6998E-04	3.5860E-02	7.3440E-04
5.0000E 00	4.4693E-02	6.2599E-04	6.9837E-02	9.7817E-04
3.5000E 00	7.4927E-02	9.9342E-04	1.1708E-01	1.5523E-03
2.5000E 00	1.0526E-01	1.2133E-03	1.6448E-01	1.8959E-03
1.7500E 00	1.3810E-01	1.8771E-03	2.1580E-01	2.9331E-03
1.2500E 00	1.5398E-01	2.1980E-03	2.4061E-01	3.4346E-03
9.0000E-01	1.6558E-01	3.1572E-03	2.5873E-01	4.9334E-03
7.0000E-01	1.7046E-01	3.2427E-03	2.6636E-01	5.0670E-03
5.0000E-01	1.6284E-01	3.7870E-03	2.5445E-01	5.9175E-03
3.5000E-01	1.5180E-01	4.0672E-03	2.3720E-01	6.3553E-03
2.5000E-01	1.3666E-01	4.2167E-03	2.1354E-01	6.5890E-03
1.7500E-01	1.2944E-01	6.2097E-03	2.0226E-01	9.7032E-03
7.5000E-02	8.1926E-02	2.6594E-03	1.2802E-01	4.1555E-03

Table F.46 Target Material: Indium (In-115)  
 Angle: 0 - 5°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	9.2010E-04	1.1418E-04	1.0888E-03	1.3513E-04
4.5000E 02	2.5090E-04	6.0668E-05	2.9691E-04	7.1794E-05
3.5000E 02	1.3380E-03	1.3420E-04	1.5834E-03	1.5881E-04
2.5000E 02	2.3420E-03	1.8572E-04	2.7715E-03	2.1978E-04
1.7500E 02	1.6730E-03	2.0595E-04	1.9798E-03	2.4372E-04
1.2500E 02	1.2270E-03	1.6969E-04	1.4520E-03	2.0082E-04
9.0000E 01	1.6730E-03	3.4497E-04	1.9798E-03	4.0824E-04
7.0000E 01	1.9520E-03	3.2989E-04	2.3100E-03	3.9039E-04
5.0000E 01	2.5790E-03	4.6112E-04	3.0520E-03	5.4569E-04
3.5000E 01	2.5185E-03	5.3819E-04	2.9804E-03	6.3689E-04
2.5000E 01	2.2353E-03	5.3816E-04	2.6453E-03	6.3686E-04
1.7500E 01	5.5612E-03	1.1934E-03	6.5811E-03	1.4123E-03
1.2500E 01	9.1530E-03	1.1438E-03	1.0832E-02	1.3536E-03
9.0000E 00	1.9962E-02	2.5768E-03	2.3623E-02	3.0493E-03
7.0000E 00	2.6139E-02	2.6445E-03	3.0933E-02	3.1295E-03
5.0000E 00	4.7360E-02	2.9377E-03	5.6046E-02	3.4765E-03
3.5000E 00	7.6010E-02	5.7713E-03	8.9950E-02	6.8298E-03
2.5000E 00	7.8291E-02	3.1835E-03	9.2649E-02	3.7673E-03
1.7500E 00	1.0355E-01	6.2258E-03	1.2254E-01	7.3676E-03
1.2500E 00	1.1437E-01	6.7807E-03	1.3535E-01	8.0243E-03
9.0000E-01	1.1157E-01	7.3509E-03	1.3203E-01	8.6990E-03
7.0000E-01	1.1984E-01	1.0049E-02	1.4182E-01	1.1892E-02
5.0000E-01	1.3805E-01	1.5428E-02	1.6337E-01	1.8258E-02
3.5000E-01	1.0763E-01	1.4301E-02	1.2737E-01	1.6924E-02
2.5000E-01	1.2316E-01	1.9862E-02	1.4575E-01	2.3505E-02
1.7500E-01	9.8970E-02	2.8075E-02	1.1712E-01	3.3224E-02
7.5000E-02	7.8430E-02	1.3253E-02	9.2814E-02	1.5684E-02

Table F.47 Target Material: Indium (In-115)  
 Angle: 5 - 10°

energy (MeV)	yield (1/sr/MeV)	error (1σ)	x-section (b/sr/MeV)	error (1σ)
5.5000E 02	1.3600E-03	8.0240E-05	1.6094E-03	9.4956E-05
4.5000E 02	1.9100E-04	3.0407E-05	2.2603E-04	3.5984E-05
3.5000E 02	4.2400E-04	5.4230E-05	5.0176E-04	6.4175E-05
2.5000E 02	8.1070E-04	5.8370E-05	9.5938E-04	6.9075E-05
1.7500E 02	1.1270E-03	1.0368E-04	1.3337E-03	1.2270E-04
1.2500E 02	1.2020E-03	1.0457E-04	1.4224E-03	1.2375E-04
9.0000E 01	1.4210E-03	1.7166E-04	1.6816E-03	2.0314E-04
7.0000E 01	1.8870E-03	2.1116E-04	2.2331E-03	2.4988E-04
5.0000E 01	2.0030E-03	1.9870E-04	2.3703E-03	2.3514E-04
3.5000E 01	2.3855E-03	3.3432E-04	2.8231E-03	3.9563E-04
2.5000E 01	2.8003E-03	3.7046E-04	3.3139E-03	4.3840E-04
1.7500E 01	4.7352E-03	6.2549E-04	5.6036E-03	7.4020E-04
1.2500E 01	8.8890E-03	8.3062E-04	1.0519E-02	9.8296E-04
9.0000E 00	1.8130E-02	1.5680E-03	2.1455E-02	1.8556E-03
7.0000E 00	2.6400E-02	1.4123E-03	3.1242E-02	1.6714E-03
5.0000E 00	4.5530E-02	1.8155E-03	5.3880E-02	2.1485E-03
3.5000E 00	6.0238E-02	2.1898E-03	7.1286E-02	2.5915E-03
2.5000E 00	8.4830E-02	2.6598E-03	1.0039E-01	3.1476E-03
1.7500E 00	1.1011E-01	4.6674E-03	1.3030E-01	5.5234E-03
1.2500E 00	1.2000E-01	4.6031E-03	1.4201E-01	5.4473E-03
9.0000E-01	1.2091E-01	6.4136E-03	1.4308E-01	7.5898E-03
7.0000E-01	1.1988E-01	5.9777E-03	1.4187E-01	7.0740E-03
5.0000E-01	1.1485E-01	5.5653E-03	1.3591E-01	6.5860E-03
3.5000E-01	1.1233E-01	9.7185E-03	1.3293E-01	1.1501E-02
2.5000E-01	1.2323E-01	1.1552E-02	1.4583E-01	1.3671E-02
1.7500E-01	8.9730E-02	1.3523E-02	1.0619E-01	1.6004E-02
7.5000E-02	7.5370E-02	7.1348E-03	8.9193E-02	8.4433E-03

Table F.48 Target Material: Indium (In-115)

Angle: 10 - 15°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	9.8060E-04	5.0795E-05	1.1604E-03	6.0111E-05
4.5000E 02	2.2200E-04	2.2688E-05	2.6271E-04	2.6849E-05
3.5000E 02	3.2310E-04	2.9725E-05	3.8236E-04	3.5177E-05
2.5000E 02	7.0240E-04	4.9800E-05	8.3122E-04	5.8933E-05
1.7500E 02	9.2160E-04	7.8059E-05	1.0906E-03	9.2375E-05
1.2500E 02	1.0790E-03	7.2617E-05	1.2769E-03	8.5934E-05
9.0000E 01	1.2220E-03	1.3784E-04	1.4461E-03	1.6312E-04
7.0000E 01	1.5170E-03	1.6429E-04	1.7952E-03	1.9442E-04
5.0000E 01	1.9390E-03	1.4639E-04	2.2946E-03	1.7324E-04
3.5000E 01	2.1725E-03	2.8186E-04	2.5710E-03	3.3355E-04
2.5000E 01	3.5723E-03	3.4509E-04	4.2275E-03	4.0838E-04
1.7500E 01	5.3162E-03	5.3184E-04	6.2912E-03	6.2938E-04
1.2500E 01	8.8050E-03	5.6444E-04	1.0420E-02	6.6796E-04
9.0000E 00	1.6820E-02	1.1013E-03	1.9905E-02	1.3033E-03
7.0000E 00	2.5933E-02	1.1551E-03	3.0689E-02	1.3669E-03
5.0000E 00	4.5230E-02	1.3833E-03	5.3525E-02	1.6370E-03
3.5000E 00	6.2720E-02	1.8196E-03	7.4223E-02	2.1533E-03
2.5000E 00	8.2840E-02	1.9630E-03	9.8033E-02	2.3231E-03
1.7500E 00	1.0141E-01	2.7184E-03	1.2001E-01	3.2169E-03
1.2500E 00	1.1506E-01	3.2288E-03	1.3616E-01	3.8210E-03
9.0000E-01	1.1865E-01	5.2316E-03	1.4041E-01	6.1911E-03
7.0000E-01	1.2276E-01	5.0860E-03	1.4527E-01	6.0187E-03
5.0000E-01	1.1303E-01	4.2307E-03	1.3376E-01	5.0066E-03
3.5000E-01	1.1336E-01	1.0487E-02	1.3415E-01	1.2410E-02
2.5000E-01	1.2057E-01	8.6693E-03	1.4268E-01	1.0259E-02
1.7500E-01	8.2330E-02	8.5705E-03	9.7429E-02	1.0142E-02
7.5000E-02	8.4190E-02	7.1972E-03	9.9630E-02	8.5172E-03



Table F.49 Target Material: Indium (In-115)

Angle: 15 - 20°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	4.8330E-04	3.0110E-05	5.7194E-04	3.5632E-05
4.5000E 02	2.8510E-04	2.6343E-05	3.3739E-04	3.1175E-05
3.5000E 02	2.4470E-04	2.2317E-05	2.8958E-04	2.6409E-05
2.5000E 02	6.4310E-04	4.0194E-05	7.6104E-04	4.7565E-05
1.7500E 02	8.4940E-04	5.8184E-05	1.0052E-03	6.8855E-05
1.2500E 02	1.0880E-03	6.3974E-05	1.2875E-03	7.5707E-05
9.0000E 01	1.3140E-03	1.0709E-04	1.5550E-03	1.2673E-04
7.0000E 01	1.5980E-03	1.1697E-04	1.8911E-03	1.3843E-04
5.0000E 01	1.7190E-03	1.3752E-04	2.0343E-03	1.6274E-04
3.5000E 01	2.6995E-03	2.4562E-04	3.1946E-03	2.9067E-04
2.5000E 01	3.2583E-03	2.2550E-04	3.8559E-03	2.6685E-04
1.7500E 01	5.5532E-03	4.3669E-04	6.5716E-03	5.1678E-04
1.2500E 01	9.7290E-03	4.9438E-04	1.1513E-02	5.8505E-04
9.0000E 00	1.7205E-02	9.7801E-04	2.0360E-02	1.1574E-03
7.0000E 00	2.4671E-02	9.4601E-04	2.9196E-02	1.1195E-03
5.0000E 00	4.5060E-02	1.2793E-03	5.3324E-02	1.5139E-03
3.5000E 00	6.3660E-02	1.7394E-03	7.5335E-02	2.0584E-03
2.5000E 00	8.6690E-02	2.0103E-03	1.0259E-01	2.3790E-03
1.7500E 00	1.0417E-01	2.6314E-03	1.2327E-01	3.1140E-03
1.2500E 00	1.1625E-01	3.0703E-03	1.3757E-01	3.6334E-03
9.0000E-01	1.1876E-01	4.2288E-03	1.4054E-01	5.0043E-03
7.0000E-01	1.2410E-01	4.7027E-03	1.4686E-01	5.5652E-03
5.0000E-01	1.2140E-01	4.4904E-03	1.4366E-01	5.3139E-03
3.5000E-01	1.1796E-01	7.3383E-03	1.3959E-01	8.6841E-03
2.5000E-01	1.1146E-01	6.9649E-03	1.3190E-01	8.2422E-03
1.7500E-01	9.1310E-02	9.4551E-03	1.0806E-01	1.1189E-02
7.5000E-02	8.2760E-02	5.8478E-03	9.7938E-02	6.9203E-03

Table F.50 Target Material: Indium (In-115)

Angle: 20 - 25°

energy (MeV)	yield (l/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.4940E-04	1.4073E-05	1.7680E-04	1.6655E-05
4.5000E 02	3.8930E-04	2.6667E-05	4.6070E-04	3.1558E-05
3.5000E 02	2.0660E-04	1.8553E-05	2.4449E-04	2.1955E-05
2.5000E 02	5.2600E-04	2.6195E-05	6.2247E-04	3.0999E-05
1.7500E 02	8.1680E-04	5.4971E-05	9.6660E-04	6.5052E-05
1.2500E 02	1.0810E-03	5.9131E-05	1.2793E-03	6.9975E-05
9.0000E 01	1.2790E-03	9.5797E-05	1.5136E-03	1.1337E-04
7.0000E 01	1.3270E-03	1.0045E-04	1.5704E-03	1.1888E-04
5.0000E 01	1.7800E-03	1.2478E-04	2.1064E-03	1.4766E-04
3.5000E 01	2.2185E-03	1.9818E-04	2.6254E-03	2.3452E-04
2.5000E 01	3.4653E-03	2.2983E-04	4.1008E-03	2.7198E-04
1.7500E 01	5.2072E-03	3.5806E-04	6.1622E-03	4.2373E-04
1.2500E 01	8.9550E-03	3.9260E-04	1.0597E-02	4.6460E-04
9.0000E 00	1.6599E-02	7.5369E-04	1.9643E-02	8.9192E-04
7.0000E 00	2.6312E-02	1.0121E-03	3.1138E-02	1.1978E-03
5.0000E 00	4.5050E-02	1.1720E-03	5.3312E-02	1.3869E-03
3.5000E 00	6.4110E-02	1.4834E-03	7.5868E-02	1.7554E-03
2.5000E 00	8.5940E-02	1.6371E-03	1.0170E-01	1.9374E-03
1.7500E 00	1.0455E-01	2.3750E-03	1.2372E-01	2.8106E-03
1.2500E 00	1.1258E-01	2.2906E-03	1.3323E-01	2.7107E-03
9.0000E-01	1.1890E-01	4.1710E-03	1.4071E-01	4.9359E-03
7.0000E-01	1.2576E-01	4.5368E-03	1.4882E-01	5.3688E-03
5.0000E-01	1.1750E-01	4.2612E-03	1.3905E-01	5.0427E-03
3.5000E-01	1.1117E-01	6.3463E-03	1.3156E-01	7.5102E-03
2.5000E-01	1.1912E-01	6.8886E-03	1.4097E-01	8.1520E-03
1.7500E-01	8.6980E-02	7.7064E-03	1.0293E-01	9.1197E-03
7.5000E-02	7.7850E-02	4.5404E-03	9.2128E-02	5.3731E-03

Table F.51 Target Material: Indium (In-115)  
 Angle: 25 - 35°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	3.3480E-05	4.9216E-06	3.9620E-05	5.8242E-06
4.5000E 02	2.2950E-04	1.1567E-05	2.7159E-04	1.3688E-05
3.5000E 02	2.5080E-04	1.0809E-05	2.9680E-04	1.2792E-05
2.5000E 02	3.5790E-04	1.4853E-05	4.2354E-04	1.7577E-05
1.7500E 02	5.3690E-04	2.5234E-05	6.3537E-04	2.9862E-05
1.2500E 02	8.4240E-04	3.4286E-05	9.9689E-04	4.0574E-05
9.0000E 01	1.0870E-03	5.9676E-05	1.2864E-03	7.0621E-05
7.0000E 01	1.1780E-03	6.2669E-05	1.3940E-03	7.4163E-05
5.0000E 01	1.8200E-03	7.3892E-05	2.1538E-03	8.7444E-05
3.5000E 01	2.1765E-03	1.1403E-04	2.5757E-03	1.3495E-04
2.5000E 01	2.9323E-03	1.1833E-04	3.4701E-03	1.4004E-04
1.7500E 01	4.7052E-03	2.4874E-04	5.5681E-03	2.9435E-04
1.2500E 01	9.1290E-03	2.7724E-04	1.0803E-02	3.2808E-04
9.0000E 00	1.7029E-02	5.3149E-04	2.0152E-02	6.2896E-04
7.0000E 00	2.5024E-02	5.6275E-04	2.9613E-02	6.6596E-04
5.0000E 00	4.2920E-02	6.9563E-04	5.0791E-02	8.2321E-04
3.5000E 00	6.4370E-02	1.1150E-03	7.6175E-02	1.3195E-03
2.5000E 00	8.5260E-02	1.2305E-03	1.0090E-01	1.4562E-03
1.7500E 00	1.0495E-01	1.8104E-03	1.2420E-01	2.1424E-03
1.2500E 00	1.1237E-01	1.9319E-03	1.3298E-01	2.2862E-03
9.0000E-01	1.2834E-01	3.3966E-03	1.5188E-01	4.0195E-03
7.0000E-01	1.2477E-01	3.2506E-03	1.4765E-01	3.8468E-03
5.0000E-01	1.1933E-01	3.0818E-03	1.4121E-01	3.6470E-03
3.5000E-01	1.1073E-01	4.3012E-03	1.3104E-01	5.0900E-03
2.5000E-01	1.1111E-01	4.3906E-03	1.3149E-01	5.1958E-03
1.7500E-01	9.7870E-02	6.9692E-03	1.1582E-01	8.2473E-03
7.5000E-02	7.9320E-02	3.4778E-03	9.3867E-02	4.1156E-03

Table F.52 Target Material: Indium (In-115)

Angle: 35 - 40°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.9980E-06	1.4056E-06	2.3644E-06	1.6634E-06
4.5000E 02	6.1930E-05	7.3449E-06	7.3288E-05	8.6919E-06
3.5000E 02	2.4770E-04	1.3871E-05	2.9313E-04	1.6415E-05
2.5000E 02	3.0670E-04	1.6930E-05	3.6295E-04	2.0035E-05
1.7500E 02	5.2740E-04	3.0800E-05	6.2412E-04	3.6449E-05
1.2500E 02	7.5120E-04	3.7560E-05	8.8897E-04	4.4448E-05
9.0000E 01	9.8400E-04	7.3210E-05	1.1645E-03	8.6636E-05
7.0000E 01	1.2190E-03	8.2282E-05	1.4426E-03	9.7373E-05
5.0000E 01	1.6730E-03	9.7870E-05	1.9798E-03	1.1582E-04
3.5000E 01	2.1375E-03	1.5538E-04	2.5296E-03	1.8388E-04
2.5000E 01	2.8513E-03	1.6183E-04	3.3742E-03	1.9151E-04
1.7500E 01	4.7972E-03	2.6188E-04	5.6770E-03	3.0991E-04
1.2500E 01	8.6320E-03	2.8775E-04	1.0215E-02	3.4052E-04
9.0000E 00	1.5605E-02	5.5703E-04	1.8467E-02	6.5919E-04
7.0000E 00	2.4771E-02	7.0350E-04	2.9314E-02	8.3252E-04
5.0000E 00	4.2910E-02	8.9885E-04	5.0780E-02	1.0637E-03
3.5000E 00	6.2210E-02	1.3768E-03	7.3619E-02	1.6293E-03
2.5000E 00	8.4810E-02	1.4158E-03	1.0036E-01	1.6754E-03
1.7500E 00	1.0499E-01	2.0673E-03	1.2424E-01	2.4465E-03
1.2500E 00	1.1362E-01	2.3571E-03	1.3446E-01	2.7894E-03
9.0000E-01	1.1859E-01	3.5417E-03	1.4034E-01	4.1912E-03
7.0000E-01	1.1989E-01	3.5942E-03	1.4188E-01	4.2534E-03
5.0000E-01	1.2418E-01	4.4307E-03	1.4695E-01	5.2433E-03
3.5000E-01	1.1467E-01	5.3796E-03	1.3570E-01	6.3662E-03
2.5000E-01	1.2125E-01	5.7649E-03	1.4349E-01	6.8222E-03
1.7500E-01	8.5080E-02	6.0982E-03	1.0068E-01	7.2166E-03
7.5000E-02	7.9150E-02	4.0648E-03	9.3666E-02	4.8102E-03

Table F.53 Target Material: Indium (In-115)  
 Angle: 40 - 50°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	2.2810E-05	3.0246E-06	2.6993E-05	3.5793E-06
3.5000E 02	1.2780E-04	7.7702E-06	1.5124E-04	9.1953E-06
2.5000E 02	2.9530E-04	1.1162E-05	3.4946E-04	1.3209E-05
1.7500E 02	4.4850E-04	1.8433E-05	5.3075E-04	2.1814E-05
1.2500E 02	6.7920E-04	2.6828E-05	8.0376E-04	3.1749E-05
9.0000E 01	8.6940E-04	4.6513E-05	1.0288E-03	5.5043E-05
7.0000E 01	1.0800E-03	4.7520E-05	1.2781E-03	5.6235E-05
5.0000E 01	1.4330E-03	5.6603E-05	1.6958E-03	6.6984E-05
3.5000E 01	1.9855E-03	8.0100E-05	2.3497E-03	9.4790E-05
2.5000E 01	2.8133E-03	1.1122E-04	3.3293E-03	1.3162E-04
1.7500E 01	4.4972E-03	1.8166E-04	5.3220E-03	2.1497E-04
1.2500E 01	8.4890E-03	2.1182E-04	1.0046E-02	2.5067E-04
9.0000E 00	1.5419E-02	4.2292E-04	1.8247E-02	5.0048E-04
7.0000E 00	2.4773E-02	5.2072E-04	2.9316E-02	6.1623E-04
5.0000E 00	4.2390E-02	6.4122E-04	5.0164E-02	7.5882E-04
3.5000E 00	6.3320E-02	9.8714E-04	7.4933E-02	1.1682E-03
2.5000E 00	8.4280E-02	1.1707E-03	9.9737E-02	1.3854E-03
1.7500E 00	1.0321E-01	1.5947E-03	1.2214E-01	1.8872E-03
1.2500E 00	1.1202E-01	1.6899E-03	1.3256E-01	1.9998E-03
9.0000E-01	1.2053E-01	2.9464E-03	1.4263E-01	3.4868E-03
7.0000E-01	1.2139E-01	2.8761E-03	1.4365E-01	3.4036E-03
5.0000E-01	1.2042E-01	2.9751E-03	1.4250E-01	3.5208E-03
3.5000E-01	1.1220E-01	4.2182E-03	1.3278E-01	4.9918E-03
2.5000E-01	1.1551E-01	4.3139E-03	1.3669E-01	5.1051E-03
1.7500E-01	8.5720E-02	4.9474E-03	1.0144E-01	5.8547E-03
7.5000E-02	7.8200E-02	3.2939E-03	9.2542E-02	3.8980E-03

Table F.54 Target Material: Indium (In-115)

Angle: 50 - 65°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	1.9280E-06	6.5706E-07	2.2816E-06	7.7757E-07
3.5000E 02	3.2050E-05	2.9871E-06	3.7928E-05	3.5349E-06
2.5000E 02	1.2670E-04	5.2074E-06	1.4994E-04	6.1624E-06
1.7500E 02	3.0510E-04	1.1167E-05	3.6105E-04	1.3215E-05
1.2500E 02	5.4220E-04	1.4802E-05	6.4164E-04	1.7517E-05
9.0000E 01	8.0360E-04	2.7162E-05	9.5098E-04	3.2143E-05
7.0000E 01	9.7230E-04	3.7822E-05	1.1506E-03	4.4759E-05
5.0000E 01	1.3110E-03	4.1165E-05	1.5514E-03	4.8715E-05
3.5000E 01	1.8355E-03	6.3453E-05	2.1722E-03	7.5091E-05
2.5000E 01	2.6693E-03	7.3567E-05	3.1588E-03	8.7059E-05
1.7500E 01	4.2862E-03	1.2018E-04	5.0723E-03	1.4223E-04
1.2500E 01	8.1360E-03	1.6842E-04	9.6281E-03	1.9931E-04
9.0000E 00	1.5101E-02	3.3324E-04	1.7870E-02	3.9435E-04
7.0000E 00	2.4356E-02	4.5258E-04	2.8823E-02	5.3558E-04
5.0000E 00	4.1803E-02	5.7334E-04	4.9470E-02	6.7849E-04
3.5000E 00	6.1860E-02	7.7662E-04	7.3205E-02	9.1905E-04
2.5000E 00	8.3050E-02	1.0712E-03	9.8281E-02	1.2676E-03
1.7500E 00	1.0166E-01	1.4340E-03	1.2030E-01	1.6970E-03
1.2500E 00	1.1229E-01	1.5551E-03	1.3288E-01	1.8403E-03
9.0000E-01	1.2038E-01	2.6149E-03	1.4246E-01	3.0945E-03
7.0000E-01	1.2000E-01	2.5045E-03	1.4201E-01	2.9638E-03
5.0000E-01	1.1778E-01	2.5529E-03	1.3938E-01	3.0211E-03
3.5000E-01	1.1176E-01	3.8201E-03	1.3226E-01	4.5207E-03
2.5000E-01	1.0998E-01	3.5869E-03	1.3015E-01	4.2447E-03
1.7500E-01	8.5550E-02	4.1551E-03	1.0124E-01	4.9172E-03
7.5000E-02	7.5580E-02	2.6772E-03	8.9441E-02	3.1682E-03

Table F.55 Target Material: Indium (In-115)  
 Angle: 65 - 80°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	2.1310E-07	2.1310E-07	2.5218E-07	2.5218E-07
3.5000E 02	1.7050E-06	5.8106E-07	2.0177E-06	6.8763E-07
2.5000E 02	4.1760E-05	2.7729E-06	4.9419E-05	3.2814E-06
1.7500E 02	1.3470E-04	6.9505E-06	1.5940E-04	8.2252E-06
1.2500E 02	3.2130E-04	1.2274E-05	3.8023E-04	1.4525E-05
9.0000E 01	5.5190E-04	2.5222E-05	6.5312E-04	2.9847E-05
7.0000E 01	7.7780E-04	2.8156E-05	9.2045E-04	3.3320E-05
5.0000E 01	1.0985E-03	3.8542E-05	1.3000E-03	4.5610E-05
3.5000E 01	1.5706E-03	4.9654E-05	1.8587E-03	5.8760E-05
2.5000E 01	2.2266E-03	7.2305E-05	2.6350E-03	8.5566E-05
1.7500E 01	3.6730E-03	1.0690E-04	4.3466E-03	1.2651E-04
1.2500E 01	7.1040E-03	1.5129E-04	8.4069E-03	1.7903E-04
9.0000E 00	1.3226E-02	2.6515E-04	1.5652E-02	3.1378E-04
7.0000E 00	2.0897E-02	3.2325E-04	2.4729E-02	3.8253E-04
5.0000E 00	3.5353E-02	3.9317E-04	4.1837E-02	4.6527E-04
3.5000E 00	5.6532E-02	6.6563E-04	6.6900E-02	7.8771E-04
2.5000E 00	7.5420E-02	7.3640E-04	8.9252E-02	8.7145E-04
1.7500E 00	9.2220E-02	1.0095E-03	1.0913E-01	1.1947E-03
1.2500E 00	1.0483E-01	1.1528E-03	1.2406E-01	1.3642E-03
9.0000E-01	1.0764E-01	1.8597E-03	1.2738E-01	2.2008E-03
7.0000E-01	1.1370E-01	1.9625E-03	1.3455E-01	2.3224E-03
5.0000E-01	1.1224E-01	1.9525E-03	1.3282E-01	2.3106E-03
3.5000E-01	1.0872E-01	2.7887E-03	1.2866E-01	3.3002E-03
2.5000E-01	9.6870E-02	2.8889E-03	1.1464E-01	3.4187E-03
1.7500E-01	8.5360E-02	3.5370E-03	1.0101E-01	4.1856E-03
7.5000E-02	6.7680E-02	1.9478E-03	8.0092E-02	2.3050E-03

Table F.56 Target Material: Indium (In-115)

Angle: 80 - 100°

energy (MeV)	yield (l/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	4.5830E-07	2.6192E-07	5.4235E-07	3.0995E-07
2.5000E 02	7.1800E-06	1.0734E-06	8.4968E-06	1.2703E-06
1.7500E 02	4.8880E-05	3.8615E-06	5.7845E-05	4.5697E-06
1.2500E 02	1.4150E-04	6.7920E-06	1.6745E-04	8.0376E-06
9.0000E 01	3.1620E-04	1.4197E-05	3.7419E-04	1.6801E-05
7.0000E 01	4.5520E-04	1.8299E-05	5.3868E-04	2.1655E-05
5.0000E 01	7.3073E-04	2.1252E-05	8.6475E-04	2.5150E-05
3.5000E 01	1.1986E-03	4.3177E-05	1.4184E-03	5.1096E-05
2.5000E 01	1.7336E-03	5.2177E-05	2.0516E-03	6.1746E-05
1.7500E 01	2.9820E-03	8.2141E-05	3.5289E-03	9.7205E-05
1.2500E 01	6.2450E-03	1.3307E-04	7.3903E-03	1.5748E-04
9.0000E 00	1.1981E-02	2.1824E-04	1.4178E-02	2.5827E-04
7.0000E 00	1.9951E-02	2.7195E-04	2.3610E-02	3.2182E-04
5.0000E 00	3.3944E-02	3.4873E-04	4.0169E-02	4.1269E-04
3.5000E 00	5.4946E-02	6.1962E-04	6.5023E-02	7.3326E-04
2.5000E 00	7.3508E-02	6.5184E-04	8.6989E-02	7.7138E-04
1.7500E 00	9.2330E-02	9.6009E-04	1.0926E-01	1.1362E-03
1.2500E 00	1.0299E-01	1.1029E-03	1.2188E-01	1.3052E-03
9.0000E-01	1.0327E-01	1.7167E-03	1.2220E-01	2.0315E-03
7.0000E-01	1.1031E-01	1.8065E-03	1.3054E-01	2.1378E-03
5.0000E-01	1.0732E-01	1.7850E-03	1.2700E-01	2.1123E-03
3.5000E-01	1.0282E-01	2.3970E-03	1.2168E-01	2.8366E-03
2.5000E-01	9.6090E-02	2.5613E-03	1.1371E-01	3.0311E-03
1.7500E-01	8.9130E-02	3.5520E-03	1.0548E-01	4.2034E-03
7.5000E-02	6.5040E-02	1.6826E-03	7.6968E-02	1.9912E-03



Table F.57 Target Material: Indium (In-115)  
Angle: 100 - 120°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	1.3000E-06	4.4304E-07	1.5384E-06	5.2429E-07
1.7500E 02	1.3330E-05	2.1728E-06	1.5775E-05	2.5713E-06
1.2500E 02	5.8520E-05	4.0788E-06	6.9252E-05	4.8269E-06
9.0000E 01	1.4060E-04	1.0447E-05	1.6639E-04	1.2362E-05
7.0000E 01	2.2920E-04	1.3041E-05	2.7123E-04	1.5433E-05
5.0000E 01	4.0123E-04	1.7154E-05	4.7482E-04	2.0300E-05
3.5000E 01	8.0231E-04	3.6243E-05	9.4945E-04	4.2890E-05
2.5000E 01	1.2876E-03	4.7650E-05	1.5238E-03	5.6388E-05
1.7500E 01	2.2740E-03	7.6546E-05	2.6910E-03	9.0584E-05
1.2500E 01	5.2560E-03	1.0384E-04	6.2199E-03	1.2288E-04
9.0000E 00	1.0702E-02	2.0209E-04	1.2665E-02	2.3915E-04
7.0000E 00	1.8709E-02	2.4488E-04	2.2140E-02	2.8979E-04
5.0000E 00	3.2540E-02	3.4878E-04	3.8508E-02	4.1274E-04
3.5000E 00	5.3144E-02	5.7466E-04	6.2891E-02	6.8005E-04
2.5000E 00	7.1196E-02	6.4640E-04	8.4253E-02	7.6495E-04
1.7500E 00	8.8878E-02	9.1076E-04	1.0518E-01	1.0778E-03
1.2500E 00	1.0127E-01	1.0729E-03	1.1985E-01	1.2697E-03
9.0000E-01	1.0354E-01	1.6837E-03	1.2253E-01	1.9925E-03
7.0000E-01	1.0723E-01	1.7225E-03	1.2690E-01	2.0384E-03
5.0000E-01	1.0614E-01	1.8219E-03	1.2561E-01	2.1561E-03
3.5000E-01	1.0272E-01	2.4532E-03	1.2156E-01	2.9031E-03
2.5000E-01	9.4270E-02	2.5950E-03	1.1156E-01	3.0709E-03
1.7500E-01	8.5550E-02	3.3730E-03	1.0124E-01	3.9917E-03
7.5000E-02	6.4380E-02	1.6029E-03	7.6187E-02	1.8968E-03

Table F.58 Target Material: Indium (In-115)

Angle: 120 - 140°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	1.9940E-07	1.9940E-07	2.3597E-07	2.3597E-07
1.7500E 02	5.1850E-06	1.3481E-06	6.1359E-06	1.5953E-06
1.2500E 02	3.5100E-05	3.8575E-06	4.1537E-05	4.5649E-06
9.0000E 01	7.1790E-05	8.6292E-06	8.4956E-05	1.0212E-05
7.0000E 01	1.5160E-04	1.2871E-05	1.7940E-04	1.5231E-05
5.0000E 01	2.7226E-04	1.6127E-05	3.2219E-04	1.9084E-05
3.5000E 01	4.5200E-04	3.0413E-05	5.3490E-04	3.5990E-05
2.5000E 01	7.9209E-04	3.6453E-05	9.3736E-04	4.3139E-05
1.7500E 01	1.7072E-03	7.4989E-05	2.0203E-03	8.8742E-05
1.2500E 01	4.0690E-03	1.0627E-04	4.8152E-03	1.2576E-04
9.0000E 00	9.0060E-03	2.4381E-04	1.0658E-02	2.8852E-04
7.0000E 00	1.4881E-02	3.0128E-04	1.7610E-02	3.5653E-04
5.0000E 00	2.8607E-02	4.4020E-04	3.3853E-02	5.2094E-04
3.5000E 00	4.6484E-02	7.0925E-04	5.5009E-02	8.3932E-04
2.5000E 00	6.5254E-02	9.0313E-04	7.7221E-02	1.0688E-03
1.7500E 00	8.1771E-02	1.2605E-03	9.6768E-02	1.4917E-03
1.2500E 00	9.4021E-02	1.1954E-03	1.1126E-01	1.4146E-03
9.0000E-01	9.8838E-02	2.3696E-03	1.1696E-01	2.8042E-03
7.0000E-01	1.0149E-01	2.4370E-03	1.2010E-01	2.8840E-03
5.0000E-01	1.0289E-01	2.1964E-03	1.2176E-01	2.5993E-03
3.5000E-01	9.1838E-02	3.2654E-03	1.0868E-01	3.8643E-03
2.5000E-01	8.5190E-02	2.9343E-03	1.0081E-01	3.4724E-03
1.7500E-01	7.4848E-02	4.4231E-03	8.8575E-02	5.2343E-03
7.5000E-02	5.8522E-02	2.2259E-03	6.9255E-02	2.6341E-03

Table F.59 Target Material: Indium (In-115)

Angle: 140 - 160°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	0.0000	0.0000	0.0000	0.0000
1.7500E 02	6.1100E-07	6.1100E-07	7.2306E-07	7.2306E-07
1.2500E 02	2.3830E-05	3.8748E-06	2.8200E-05	4.5854E-06
9.0000E 01	6.4160E-05	1.0452E-05	7.5927E-05	1.2368E-05
7.0000E 01	9.7760E-05	1.1389E-05	1.1569E-04	1.3478E-05
5.0000E 01	1.6146E-04	1.4151E-05	1.9107E-04	1.6746E-05
3.5000E 01	3.0780E-04	2.7095E-05	3.6426E-04	3.2064E-05
2.5000E 01	5.8819E-04	4.3689E-05	6.9606E-04	5.1702E-05
1.7500E 01	1.4176E-03	7.7181E-05	1.6776E-03	9.1335E-05
1.2500E 01	3.5780E-03	1.1346E-04	4.2342E-03	1.3427E-04
9.0000E 00	8.0790E-03	2.5441E-04	9.5607E-03	3.0107E-04
7.0000E 00	1.4124E-02	3.1277E-04	1.6714E-02	3.7013E-04
5.0000E 00	2.7777E-02	4.3428E-04	3.2871E-02	5.1393E-04
3.5000E 00	4.5181E-02	7.4079E-04	5.3467E-02	8.7665E-04
2.5000E 00	6.4567E-02	9.2822E-04	7.6408E-02	1.0985E-03
1.7500E 00	7.9385E-02	1.2350E-03	9.3944E-02	1.4615E-03
1.2500E 00	9.2509E-02	1.2159E-03	1.0947E-01	1.4389E-03
9.0000E-01	9.6654E-02	2.3982E-03	1.1438E-01	2.8381E-03
7.0000E-01	9.9645E-02	2.4724E-03	1.1792E-01	2.9258E-03
5.0000E-01	1.0163E-01	2.3513E-03	1.2027E-01	2.7826E-03
3.5000E-01	9.1792E-02	3.4232E-03	1.0863E-01	4.0510E-03
2.5000E-01	8.3298E-02	2.8866E-03	9.8575E-02	3.4160E-03
1.7500E-01	7.2769E-02	4.5525E-03	8.6115E-02	5.3874E-03
7.5000E-02	5.7524E-02	2.2454E-03	6.8074E-02	2.6573E-03

Table F.60 Target Material: Indium (In-115)

Angle: 160 - 180°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	0.0000	0.0000	0.0000	0.0000
1.7500E 02	1.7590E-06	1.7590E-06	2.0816E-06	2.0816E-06
1.2500E 02	2.4630E-05	6.1353E-06	2.9147E-05	7.2605E-06
9.0000E 01	7.0370E-05	1.7367E-05	8.3276E-05	2.0552E-05
7.0000E 01	9.6760E-05	2.0329E-05	1.1451E-04	2.4058E-05
5.0000E 01	1.1546E-04	1.9417E-05	1.3664E-04	2.2978E-05
3.5000E 01	2.7800E-04	4.6360E-05	3.2899E-04	5.4862E-05
2.5000E 01	5.1239E-04	6.2554E-05	6.0636E-04	7.4026E-05
1.7500E 01	1.0526E-03	1.0028E-04	1.2456E-03	1.1867E-04
1.2500E 01	3.3230E-03	1.7021E-04	3.9324E-03	2.0143E-04
9.0000E 00	7.4740E-03	3.1107E-04	8.8447E-03	3.6812E-04
7.0000E 00	1.3835E-02	3.6466E-04	1.6372E-02	4.3154E-04
5.0000E 00	2.7419E-02	5.6380E-04	3.2448E-02	6.6720E-04
3.5000E 00	4.3967E-02	7.9902E-04	5.2031E-02	9.4556E-04
2.5000E 00	6.3113E-02	9.8617E-04	7.4688E-02	1.1670E-03
1.7500E 00	7.8749E-02	1.3903E-03	9.3191E-02	1.6452E-03
1.2500E 00	9.2486E-02	1.4131E-03	1.0945E-01	1.6722E-03
9.0000E-01	9.7178E-02	2.6739E-03	1.1500E-01	3.1643E-03
7.0000E-01	9.9748E-02	2.7450E-03	1.1804E-01	3.2485E-03
5.0000E-01	9.7989E-02	2.3481E-03	1.1596E-01	2.7788E-03
3.5000E-01	9.0618E-02	3.7859E-03	1.0724E-01	4.4802E-03
2.5000E-01	8.1929E-02	3.1730E-03	9.6955E-02	3.7549E-03
1.7500E-01	7.0789E-02	4.7177E-03	8.3772E-02	5.5830E-03
7.5000E-02	5.3556E-02	2.2498E-03	6.3378E-02	2.6624E-03

Table F.61 Target Material: Niobium (Nb-93)  
Angle 0 - 5°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.2130E-03	1.1839E-04	1.2551E-03	1
4.5000E 02	2.2310E-04	5.5061E-05	2.3084E-04	5.6972E-05
3.5000E 02	1.8260E-03	1.3531E-04	1.8894E-03	1.4000E-04
2.5000E 02	2.8440E-03	2.0676E-04	2.9427E-03	2.1393E-04
1.7500E 02	1.6450E-03	2.2092E-04	1.7021E-03	2.2859E-04
1.2500E 02	1.3380E-03	1.8785E-04	1.3844E-03	1.9437E-04
9.0000E 01	1.5340E-03	3.2229E-04	1.5872E-03	3.3348E-04
7.0000E 01	1.8820E-03	4.0670E-04	1.9473E-03	4.2081E-04
5.0000E 01	2.2315E-03	4.5289E-04	2.3090E-03	4.6861E-04
3.5000E 01	9.9924E-04	3.5750E-04	1.0339E-03	3.6991E-04
2.5000E 01	3.4712E-03	6.9004E-04	3.5916E-03	7.1399E-04
1.7500E 01	6.0853E-03	1.4671E-03	6.2964E-03	1.5180E-03
1.2500E 01	6.9020E-03	1.0784E-03	7.1415E-03	1.1158E-03
9.0000E 00	1.2628E-02	1.9094E-03	1.3066E-02	1.9756E-03
7.0000E 00	2.2330E-02	2.8817E-03	2.3105E-02	2.9817E-03
5.0000E 00	3.1315E-02	2.3035E-03	3.2402E-02	2.3834E-03
3.5000E 00	4.1157E-02	2.8150E-03	4.2585E-02	2.9127E-03
2.5000E 00	6.6080E-02	4.7695E-03	6.8373E-02	4.9350E-03
1.7500E 00	7.4430E-02	6.7322E-03	7.7013E-02	6.9658E-03
1.2500E 00	9.1000E-02	9.0247E-03	9.4158E-02	9.3378E-03
9.0000E-01	8.9510E-02	1.2129E-02	9.2616E-02	1.2550E-02
7.0000E-01	7.3341E-02	7.2777E-03	7.5886E-02	7.5303E-03
5.0000E-01	7.7710E-02	9.9856E-03	8.0406E-02	1.0332E-02
3.5000E-01	1.1933E-01	2.7591E-02	1.2347E-01	2.8548E-02
2.5000E-01	5.8990E-02	2.3183E-03	6.1037E-02	2.3987E-03
1.7500E-01	6.1330E-02	3.5265E-03	6.3458E-02	3.6488E-03
7.5000E-02	5.9400E-02	1.3192E-02	6.1461E-02	1.3650E-02

Table F.62 Target Material: Niobium (Nb-93)

Angle: 5 - 10°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.1830E-03	7.3583E-05	1.2240E-03	7.6136E-05
4.5000E 02	2.1430E-04	3.0645E-05	2.2174E-04	3.1708E-05
3.5000E 02	4.5660E-04	4.4884E-05	4.7244E-04	4.6441E-05
2.5000E 02	7.7340E-04	5.9320E-05	8.0024E-04	6.1378E-05
1.7500E 02	1.2210E-03	9.6215E-05	1.2634E-03	9.9553E-05
1.2500E 02	1.0810E-03	9.7074E-05	1.1185E-03	1.0044E-04
9.0000E 01	1.1650E-03	1.9735E-04	1.2054E-03	2.0420E-04
7.0000E 01	1.3510E-03	1.7887E-04	1.3979E-03	1.8508E-04
5.0000E 01	2.0505E-03	2.2284E-04	2.1217E-03	2.3057E-04
3.5000E 01	2.1203E-03	3.0620E-04	2.1939E-03	3.1682E-04
2.5000E 01	3.3862E-03	4.2148E-04	3.5037E-03	4.3611E-04
1.7500E 01	4.7013E-03	5.6646E-04	4.8644E-03	5.8612E-04
1.2500E 01	7.6590E-03	8.1366E-04	7.9248E-03	8.4190E-04
9.0000E 00	1.4505E-02	1.4871E-03	1.5008E-02	1.5387E-03
7.0000E 00	1.9790E-02	1.4021E-03	2.0477E-02	1.4508E-03
5.0000E 00	3.0870E-02	1.3786E-03	3.1941E-02	1.4264E-03
3.5000E 00	4.7690E-02	2.2450E-03	4.9345E-02	2.3229E-03
2.5000E 00	5.7744E-02	2.3467E-03	5.9748E-02	2.4281E-03
1.7500E 00	7.1680E-02	3.7377E-03	7.4167E-02	3.8673E-03
1.2500E 00	7.3364E-02	2.8093E-03	7.5910E-02	2.9068E-03
9.0000E-01	8.9570E-02	7.0169E-03	9.2678E-02	7.2604E-03
7.0000E-01	8.2680E-02	7.1434E-03	8.5549E-02	7.3913E-03
5.0000E-01	8.2410E-02	6.6252E-03	8.5270E-02	6.8551E-03
3.5000E-01	8.6850E-02	1.0547E-02	8.9864E-02	1.0913E-02
2.5000E-01	9.1600E-02	1.2168E-02	9.4778E-02	1.2590E-02
1.7500E-01	7.0648E-02	9.9630E-03	7.3099E-02	1.0309E-02
7.5000E-02	5.6340E-02	7.0203E-03	5.8295E-02	7.2639E-03

Table F.63 Target Material: Niobium (Nb-93)

Angle: 10 - 15°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.0420E-03	5.5747E-05	1.0782E-03	5.7681E-05
4.5000E 02	2.1920E-04	2.9241E-05	2.2681E-04	3.0256E-05
3.5000E 02	3.3720E-04	3.4833E-05	3.4890E-04	3.6041E-05
2.5000E 02	8.3170E-04	4.4496E-05	8.6056E-04	4.6040E-05
1.7500E 02	1.0730E-03	7.7900E-05	1.1102E-03	8.0603E-05
1.2500E 02	1.2080E-03	8.7942E-05	1.2499E-03	9.0994E-05
9.0000E 01	1.3060E-03	1.2342E-04	1.3513E-03	1.2770E-04
7.0000E 01	1.3210E-03	1.3527E-04	1.3668E-03	1.3996E-04
5.0000E 01	1.6305E-03	1.5567E-04	1.6871E-03	1.6107E-04
3.5000E 01	1.9053E-03	2.2965E-04	1.9715E-03	2.3762E-04
2.5000E 01	2.7382E-03	2.7488E-04	2.8332E-03	2.8441E-04
1.7500E 01	4.1023E-03	4.1797E-04	4.2446E-03	4.3248E-04
1.2500E 01	8.5080E-03	5.6601E-04	8.8032E-03	5.8565E-04
9.0000E 00	1.3373E-02	8.7526E-04	1.3837E-02	9.0563E-04
7.0000E 00	1.9878E-02	9.8218E-04	2.0568E-02	1.0163E-03
5.0000E 00	3.2784E-02	1.2240E-03	3.3922E-02	1.2664E-03
3.5000E 00	4.5690E-02	1.8258E-03	4.7275E-02	1.8892E-03
2.5000E 00	6.0320E-02	2.0273E-03	6.2413E-02	2.0977E-03
1.7500E 00	7.2310E-02	3.0135E-03	7.4819E-02	3.1181E-03
1.2500E 00	8.6700E-02	3.6517E-03	8.9708E-02	3.7784E-03
9.0000E-01	8.4050E-02	5.2736E-03	8.6966E-02	5.4566E-03
7.0000E-01	7.6204E-02	4.1649E-03	7.8848E-02	4.3094E-03
5.0000E-01	8.0630E-02	5.7074E-03	8.3428E-02	5.9054E-03
3.5000E-01	8.3230E-02	7.6838E-03	8.6118E-02	7.9504E-03
2.5000E-01	7.0230E-02	6.0005E-03	7.2667E-02	6.2087E-03
1.7500E-01	8.9430E-02	1.2806E-02	9.2533E-02	1.3250E-02
7.5000E-02	5.5790E-02	5.3904E-03	5.7726E-02	5.5775E-03

Table F.64 Target Material: Niobium (Nb-93)

Angle: 15 - 20°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	5.3590E-04	3.4994E-05	5.5450E-04	3.6209E-05
4.5000E 02	3.7010E-04	2.4723E-05	3.8294E-04	2.5580E-05
3.5000E 02	2.8110E-04	2.5215E-05	2.9085E-04	2.6090E-05
2.5000E 02	6.3900E-04	3.7573E-05	6.6117E-04	3.8877E-05
1.7500E 02	9.2220E-04	5.8099E-05	9.5420E-04	6.0115E-05
1.2500E 02	1.1120E-03	6.2049E-05	1.1506E-03	6.4203E-05
9.0000E 01	1.2740E-03	1.0523E-04	1.3182E-03	1.0888E-04
7.0000E 01	1.3950E-03	1.1565E-04	1.4434E-03	1.1966E-04
5.0000E 01	1.7495E-03	1.1578E-04	1.8102E-03	1.1980E-04
3.5000E 01	1.9443E-03	1.9792E-04	2.0118E-03	2.0479E-04
2.5000E 01	3.0572E-03	2.6883E-04	3.1633E-03	2.7815E-04
1.7500E 01	4.5083E-03	3.9941E-04	4.6647E-03	4.1327E-04
1.2500E 01	8.9080E-03	5.3025E-04	9.2171E-03	5.4864E-04
9.0000E 00	1.2916E-02	7.9771E-04	1.3364E-02	8.2539E-04
7.0000E 00	1.9555E-02	8.8435E-04	2.0234E-02	9.1503E-04
5.0000E 00	3.1545E-02	9.2361E-04	3.2640E-02	9.5566E-04
3.5000E 00	4.7110E-02	1.5453E-03	4.8745E-02	1.5989E-03
2.5000E 00	6.1510E-02	1.7424E-03	6.3644E-02	1.8029E-03
1.7500E 00	7.0640E-02	2.6338E-03	7.3091E-02	2.7252E-03
1.2500E 00	8.2490E-02	2.8421E-03	8.5352E-02	2.9407E-03
9.0000E-01	8.5790E-02	4.7986E-03	8.8767E-02	4.9651E-03
7.0000E-01	8.3560E-02	5.0137E-03	8.6459E-02	5.1877E-03
5.0000E-01	7.6910E-02	4.3975E-03	7.9579E-02	4.5501E-03
3.5000E-01	7.7720E-02	5.8335E-03	8.0417E-02	6.0359E-03
2.5000E-01	7.5170E-02	5.9817E-03	7.7778E-02	6.1892E-03
1.7500E-01	7.3460E-02	7.7777E-03	7.6009E-02	8.0476E-03
7.5000E-02	5.5640E-02	4.5794E-03	5.7571E-02	4.7383E-03



Table F.65 Target Material: Niobium (Nb-93)

Angle: 20 - 25°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.6210E-04	1.6437E-05	1.6772E-04	1.7007E-05
4.5000E 02	4.1950E-04	2.7351E-05	4.3406E-04	2.8300E-05
3.5000E 02	2.2720E-04	1.7085E-05	2.3508E-04	1.7678E-05
2.5000E 02	5.1010E-04	2.6168E-05	5.2780E-04	2.7076E-05
1.7500E 02	8.6450E-04	5.3080E-05	8.9450E-04	5.4922E-05
1.2500E 02	9.8840E-04	5.5647E-05	1.0227E-03	5.7578E-05
9.0000E 01	1.2470E-03	1.0662E-04	1.2903E-03	1.1032E-04
7.0000E 01	1.4460E-03	1.0440E-04	1.4962E-03	1.0802E-04
5.0000E 01	1.8125E-03	1.1851E-04	1.8754E-03	1.2262E-04
3.5000E 01	2.3753E-03	1.7270E-04	2.4578E-03	1.7869E-04
2.5000E 01	3.0652E-03	2.1494E-04	3.1716E-03	2.2240E-04
1.7500E 01	5.0463E-03	3.5025E-04	5.2214E-03	3.6240E-04
1.2500E 01	8.2820E-03	4.0904E-04	8.5694E-03	4.2323E-04
9.0000E 00	1.3646E-02	7.3785E-04	1.4119E-02	7.6346E-04
7.0000E 00	2.0292E-02	8.8160E-04	2.0996E-02	9.1219E-04
5.0000E 00	3.3360E-02	9.9876E-04	3.4518E-02	1.0334E-03
3.5000E 00	4.8290E-02	1.3265E-03	4.9966E-02	1.3725E-03
2.5000E 00	6.0040E-02	1.4452E-03	6.2123E-02	1.4954E-03
1.7500E 00	6.9140E-02	2.0982E-03	7.1539E-02	2.1710E-03
1.2500E 00	7.9890E-02	2.5295E-03	8.2662E-02	2.6173E-03
9.0000E-01	8.2900E-02	4.0344E-03	8.5777E-02	4.1744E-03
7.0000E-01	8.3060E-02	4.1847E-03	8.5942E-02	4.3299E-03
5.0000E-01	8.0460E-02	3.7577E-03	8.3252E-02	3.8881E-03
3.5000E-01	8.7400E-02	6.6897E-03	9.0433E-02	6.9219E-03
2.5000E-01	7.3290E-02	5.1246E-03	7.5833E-02	5.3025E-03
1.7500E-01	7.0865E-02	6.4908E-03	7.3324E-02	6.7160E-03
7.5000E-02	5.3520E-02	3.8682E-03	5.5377E-02	4.0025E-03

Table F.66 Target Material: Niobium (Nb-93)

Angle: 25 - 35°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	2.4960E-05	3.4719E-06	2.5826E-05	3.5924E-06
4.5000E 02	2.4590E-04	1.1213E-05	2.5443E-04	1.1602E-05
3.5000E 02	2.7210E-04	1.3088E-05	2.8154E-04	1.3542E-05
2.5000E 02	3.4210E-04	1.2863E-05	3.5397E-04	1.3309E-05
1.7500E 02	6.4770E-04	3.0377E-05	6.7017E-04	3.1431E-05
1.2500E 02	8.7290E-04	3.3257E-05	9.0319E-04	3.4411E-05
9.0000E 01	1.1020E-03	5.3667E-05	1.1402E-03	5.5530E-05
7.0000E 01	1.2690E-03	6.2688E-05	1.3130E-03	6.4864E-05
5.0000E 01	1.5645E-03	7.2259E-05	1.6188E-03	7.4766E-05
3.5000E 01	1.9533E-03	1.0606E-04	2.0211E-03	1.0974E-04
2.5000E 01	2.8032E-03	1.3601E-04	2.9005E-03	1.4073E-04
1.7500E 01	4.8173E-03	2.4966E-04	4.9844E-03	2.5832E-04
1.2500E 01	7.4440E-03	2.7594E-04	7.7023E-03	2.8552E-04
9.0000E 00	1.3777E-02	4.6636E-04	1.4255E-02	4.8254E-04
7.0000E 00	2.0270E-02	5.5995E-04	2.0973E-02	5.7938E-04
5.0000E 00	3.2750E-02	6.4533E-04	3.3886E-02	6.6772E-04
3.5000E 00	4.7630E-02	1.0463E-03	4.9283E-02	1.0826E-03
2.5000E 00	6.1470E-02	1.1713E-03	6.3603E-02	1.2119E-03
1.7500E 00	7.3040E-02	1.7399E-03	7.5574E-02	1.8003E-03
1.2500E 00	7.9060E-02	1.7625E-03	8.1803E-02	1.8237E-03
9.0000E-01	8.3210E-02	3.0460E-03	8.6097E-02	3.1517E-03
7.0000E-01	8.0070E-02	3.1420E-03	8.2848E-02	3.2510E-03
5.0000E-01	8.0510E-02	3.2171E-03	8.3304E-02	3.3287E-03
3.5000E-01	8.4260E-02	4.2153E-03	8.7184E-02	4.3616E-03
2.5000E-01	7.2990E-02	3.6741E-03	7.5523E-02	3.8016E-03
1.7500E-01	7.5940E-02	5.5892E-03	7.8575E-02	5.7831E-03
7.5000E-02	5.7450E-02	3.0030E-03	5.9443E-02	3.1072E-03

Table F.67 Target Material: Niobium (Nb-93)

Angle: 35 - 40°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	2.9970E-06	1.7128E-06	3.1010E-06	1.7722E-06
4.5000E 02	6.1930E-05	7.7474E-06	6.4079E-05	8.0163E-06
3.5000E 02	2.4770E-04	1.7933E-05	2.5629E-04	1.8556E-05
2.5000E 02	3.1270E-04	1.6417E-05	3.2355E-04	1.6986E-05
1.7500E 02	5.2740E-04	3.2330E-05	5.4570E-04	3.3451E-05
1.2500E 02	7.7520E-04	4.0853E-05	8.0210E-04	4.2271E-05
9.0000E 01	9.4400E-04	6.8818E-05	9.7676E-04	7.1205E-05
7.0000E 01	1.1990E-03	7.6856E-05	1.2406E-03	7.9523E-05
5.0000E 01	1.4935E-03	8.7939E-05	1.5454E-03	9.0991E-05
3.5000E 01	1.8213E-03	1.2702E-04	1.8845E-03	1.3143E-04
2.5000E 01	2.4632E-03	1.5475E-04	2.5487E-03	1.6012E-04
1.7500E 01	4.1043E-03	2.1346E-04	4.2467E-03	2.2086E-04
1.2500E 01	7.6350E-03	3.2984E-04	7.8999E-03	3.4129E-04
9.0000E 00	1.3794E-02	6.1892E-04	1.4273E-02	6.4039E-04
7.0000E 00	1.9162E-02	6.7305E-04	1.9827E-02	6.9641E-04
5.0000E 00	3.1741E-02	7.9451E-04	3.2842E-02	8.2207E-04
3.5000E 00	4.8070E-02	1.3273E-03	4.9738E-02	1.3733E-03
2.5000E 00	6.0850E-02	1.4391E-03	6.2961E-02	1.4891E-03
1.7500E 00	7.4280E-02	2.0831E-03	7.6857E-02	2.1554E-03
1.2500E 00	8.0690E-02	1.9358E-03	8.3490E-02	2.0030E-03
9.0000E-01	8.4080E-02	3.5675E-03	8.6997E-02	3.6913E-03
7.0000E-01	8.1350E-02	3.2660E-03	8.4173E-02	3.3793E-03
5.0000E-01	7.6760E-02	3.0652E-03	7.9423E-02	3.1716E-03
3.5000E-01	7.8540E-02	4.4683E-03	8.1265E-02	4.6233E-03
2.5000E-01	7.9970E-02	5.1127E-03	8.2745E-02	5.2901E-03
1.7500E-01	6.9322E-02	5.2841E-03	7.1727E-02	5.4675E-03
7.5000E-02	5.7460E-02	3.7527E-03	5.9454E-02	3.8829E-03

Table F.68 Target Material: Niobium (Nb-93)

Angle: 40 - 50°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	8.6080E-07	6.0557E-07	8.9067E-07	6.2659E-07
4.5000E 02	2.0230E-05	2.8990E-06	2.0932E-05	2.9995E-06
3.5000E 02	1.2050E-04	6.2660E-06	1.2468E-04	6.4834E-06
2.5000E 02	2.8150E-04	9.6554E-06	2.9127E-04	9.9905E-06
1.7500E 02	4.5540E-04	1.9400E-05	4.7120E-04	2.0073E-05
1.2500E 02	6.9470E-04	2.5704E-05	7.1881E-04	2.6596E-05
9.0000E 01	8.6300E-04	4.4444E-05	8.9295E-04	4.5987E-05
7.0000E 01	1.0330E-03	4.9377E-05	1.0688E-03	5.1091E-05
5.0000E 01	1.2915E-03	5.1901E-05	1.3363E-03	5.3702E-05
3.5000E 01	1.7403E-03	8.3405E-05	1.8007E-03	8.6299E-05
2.5000E 01	2.6562E-03	1.0544E-04	2.7484E-03	1.0910E-04
1.7500E 01	4.1103E-03	1.6278E-04	4.2529E-03	1.6842E-04
1.2500E 01	7.4630E-03	2.0463E-04	7.7220E-03	2.1173E-04
9.0000E 00	1.3400E-02	4.1274E-04	1.3865E-02	4.2707E-04
7.0000E 00	1.9338E-02	4.4194E-04	2.0009E-02	4.5727E-04
5.0000E 00	3.2139E-02	5.7834E-04	3.3254E-02	5.9841E-04
3.5000E 00	4.6900E-02	9.5383E-04	4.8527E-02	9.8692E-04
2.5000E 00	5.9930E-02	1.0848E-03	6.2010E-02	1.1224E-03
1.7500E 00	6.9840E-02	1.4272E-03	7.2263E-02	1.4767E-03
1.2500E 00	7.9680E-02	1.6277E-03	8.2445E-02	1.6842E-03
9.0000E-01	8.0220E-02	2.6416E-03	8.3003E-02	2.7333E-03
7.0000E-01	8.1860E-02	2.6805E-03	8.4700E-02	2.7735E-03
5.0000E-01	7.4960E-02	2.3556E-03	7.7561E-02	2.4374E-03
3.5000E-01	7.6470E-02	3.4355E-03	7.9123E-02	3.5547E-03
2.5000E-01	7.4480E-02	3.4541E-03	7.7064E-02	3.5739E-03
1.7500E-01	7.8550E-02	5.2352E-03	8.1276E-02	5.4169E-03
7.5000E-02	5.5440E-02	2.4975E-03	5.7364E-02	2.5842E-03

Table F.69 Target Material: Niobium (Nb-93)  
Angle: 50 - 65°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	2.6510E-06	8.9948E-07	2.7430E-06	9.3070E-07
3.5000E 02	2.9880E-05	2.4502E-06	3.0917E-05	2.5352E-06
2.5000E 02	1.2600E-04	6.1236E-06	1.3037E-04	6.3361E-06
1.7500E 02	3.2670E-04	1.2382E-05	3.3804E-04	1.2812E-05
1.2500E 02	5.3590E-04	1.6666E-05	5.5450E-04	1.7245E-05
9.0000E 01	7.7590E-04	3.1269E-05	8.0282E-04	3.2354E-05
7.0000E 01	8.9030E-04	3.5879E-05	9.2119E-04	3.7124E-05
5.0000E 01	1.3245E-03	4.0783E-05	1.3705E-03	4.2198E-05
3.5000E 01	1.7923E-03	6.4031E-05	1.8545E-03	6.6253E-05
2.5000E 01	2.4312E-03	6.6303E-05	2.5156E-03	6.8604E-05
1.7500E 01	3.9153E-03	1.3277E-04	4.0512E-03	1.3738E-04
1.2500E 01	7.2600E-03	1.8981E-04	7.5119E-03	1.9639E-04
9.0000E 00	1.2726E-02	3.2842E-04	1.3168E-02	3.3982E-04
7.0000E 00	1.8737E-02	4.1731E-04	1.9387E-02	4.3179E-04
5.0000E 00	3.1709E-02	4.7555E-04	3.2809E-02	4.9206E-04
3.5000E 00	4.4881E-02	7.9196E-04	4.6438E-02	8.1944E-04
2.5000E 00	5.7863E-02	8.8828E-04	5.9871E-02	9.1910E-04
1.7500E 00	6.9070E-02	1.2447E-03	7.1467E-02	1.2879E-03
1.2500E 00	7.9360E-02	1.3954E-03	8.2114E-02	1.4438E-03
9.0000E-01	8.2460E-02	2.3899E-03	8.5321E-02	2.4728E-03
7.0000E-01	7.9860E-02	2.4055E-03	8.2631E-02	2.4890E-03
5.0000E-01	7.7260E-02	2.2059E-03	7.9941E-02	2.2825E-03
3.5000E-01	7.9220E-02	3.1967E-03	8.1969E-02	3.3076E-03
2.5000E-01	7.3690E-02	2.9609E-03	7.6247E-02	3.0637E-03
1.7500E-01	7.8680E-02	4.3339E-03	8.1410E-02	4.4843E-03
7.5000E-02	5.7520E-02	2.3213E-03	5.9516E-02	2.4018E-03

Table F.70 Target Material: Niobium (Nb-93)

Angle: 65 - 80°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	2.1310E-07	2.1310E-07	2.2049E-07	2.2049E-07
3.5000E 02	4.6880E-06	8.8697E-07	4.8507E-06	9.1775E-07
2.5000E 02	4.0700E-05	2.8734E-06	4.2112E-05	2.9731E-06
1.7500E 02	1.4490E-04	7.2740E-06	1.4993E-04	7.5264E-06
1.2500E 02	3.1450E-04	1.3398E-05	3.2541E-04	1.3863E-05
9.0000E 01	5.2630E-04	2.2420E-05	5.4456E-04	2.3198E-05
7.0000E 01	7.9270E-04	2.6318E-05	8.2021E-04	2.7231E-05
5.0000E 01	1.0613E-03	2.8966E-05	1.0981E-03	2.9972E-05
3.5000E 01	1.4394E-03	6.2176E-05	1.4894E-03	6.4334E-05
2.5000E 01	2.1002E-03	6.9247E-05	2.1731E-03	7.1649E-05
1.7500E 01	3.1613E-03	1.0437E-04	3.2710E-03	1.0799E-04
1.2500E 01	6.1010E-03	1.3627E-04	6.3127E-03	1.4100E-04
9.0000E 00	1.0713E-02	2.7834E-04	1.1085E-02	2.8800E-04
7.0000E 00	1.6414E-02	3.1402E-04	1.6984E-02	3.2491E-04
5.0000E 00	2.6681E-02	3.7408E-04	2.7607E-02	3.8706E-04
3.5000E 00	3.9865E-02	5.7834E-04	4.1248E-02	5.9841E-04
2.5000E 00	5.1941E-02	6.9533E-04	5.3743E-02	7.1946E-04
1.7500E 00	6.3020E-02	1.0968E-03	6.5207E-02	1.1349E-03
1.2500E 00	7.0970E-02	9.8820E-04	7.3433E-02	1.0225E-03
9.0000E-01	7.3900E-02	1.7720E-03	7.6464E-02	1.8335E-03
7.0000E-01	7.6550E-02	1.6072E-03	7.9206E-02	1.6630E-03
5.0000E-01	7.1839E-02	1.6331E-03	7.4332E-02	1.6897E-03
3.5000E-01	7.0240E-02	2.3644E-03	7.2677E-02	2.4465E-03
2.5000E-01	7.1250E-02	2.3705E-03	7.3722E-02	2.4528E-03
1.7500E-01	6.7430E-02	3.3547E-03	6.9770E-02	3.4711E-03
7.5000E-02	5.2790E-02	1.8479E-03	5.4622E-02	1.9120E-03

Table F.71 Target Material: Niobium (Nb-93)  
 Angle: 80 - 100°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	3.0550E-07	2.1492E-07	3.1610E-07	2.2238E-07
2.5000E 02	7.6380E-06	1.1388E-06	7.9030E-06	1.1783E-06
1.7500E 02	5.1020E-05	4.1224E-06	5.2790E-05	4.2655E-06
1.2500E 02	1.3110E-04	6.5288E-06	1.3565E-04	6.7553E-06
9.0000E 01	2.6730E-04	1.5530E-05	2.7657E-04	1.6069E-05
7.0000E 01	4.1020E-04	1.9402E-05	4.2443E-04	2.0076E-05
5.0000E 01	6.7846E-04	2.3332E-05	7.0201E-04	2.4141E-05
3.5000E 01	1.0144E-03	3.9115E-05	1.0496E-03	4.0473E-05
2.5000E 01	1.6022E-03	4.8683E-05	1.6578E-03	5.0372E-05
1.7500E 01	2.7453E-03	8.3151E-05	2.8406E-03	8.6036E-05
1.2500E 01	5.2030E-03	1.1087E-04	5.3835E-03	1.1472E-04
9.0000E 00	1.0048E-02	2.2653E-04	1.0397E-02	2.3440E-04
7.0000E 00	1.5621E-02	2.6172E-04	1.6163E-02	2.7080E-04
5.0000E 00	2.5588E-02	3.2426E-04	2.6476E-02	3.3551E-04
3.5000E 00	3.8176E-02	5.2169E-04	3.9501E-02	5.3979E-04
2.5000E 00	5.0484E-02	6.0742E-04	5.2236E-02	6.2850E-04
1.7500E 00	6.1404E-02	9.6999E-04	6.3535E-02	1.0036E-03
1.2500E 00	6.8961E-02	9.0328E-04	7.1354E-02	9.3463E-04
9.0000E-01	7.0748E-02	1.5225E-03	7.3203E-02	1.5753E-03
7.0000E-01	7.5790E-02	1.5083E-03	7.8420E-02	1.5606E-03
5.0000E-01	7.2650E-02	1.6244E-03	7.5171E-02	1.6808E-03
3.5000E-01	6.8360E-02	2.1849E-03	7.0732E-02	2.2607E-03
2.5000E-01	6.7024E-02	2.0337E-03	6.9350E-02	2.1043E-03
1.7500E-01	6.2535E-02	3.0691E-03	6.4705E-02	3.1756E-03
7.5000E-02	4.9430E-02	1.5067E-03	5.1145E-02	1.5590E-03

Table F.72 Target Material: Niobium (Nb-93)

Angle: 100 - 120°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	9.7540E-07	3.8801E-07	1.0092E-06	4.0148E-07
1.7500E 02	1.3980E-05	2.3221E-06	1.4465E-05	2.4026E-06
1.2500E 02	6.1120E-05	4.4373E-06	6.3241E-05	4.5913E-06
9.0000E 01	1.2270E-04	9.6319E-06	1.2696E-04	9.9662E-06
7.0000E 01	2.3000E-04	1.4697E-05	2.3798E-04	1.5207E-05
5.0000E 01	3.5626E-04	1.7731E-05	3.6863E-04	1.8346E-05
3.5000E 01	6.9993E-04	3.4052E-05	7.2421E-04	3.5234E-05
2.5000E 01	1.1562E-03	4.6618E-05	1.1964E-03	4.8236E-05
1.7500E 01	1.9613E-03	7.6913E-05	2.0294E-03	7.9582E-05
1.2500E 01	4.5570E-03	8.9509E-05	4.7151E-03	9.2615E-05
9.0000E 00	8.6820E-03	1.9420E-04	8.9833E-03	2.0094E-04
7.0000E 00	1.4232E-02	2.4647E-04	1.4726E-02	2.5502E-04
5.0000E 00	2.4322E-02	3.1216E-04	2.5166E-02	3.2299E-04
3.5000E 00	3.6447E-02	4.6554E-04	3.7712E-02	4.8170E-04
2.5000E 00	4.8934E-02	6.0311E-04	5.0632E-02	6.2404E-04
1.7500E 00	5.9740E-02	9.1066E-04	6.1813E-02	9.4225E-04
1.2500E 00	6.6255E-02	8.7016E-04	6.8554E-02	9.0036E-04
9.0000E-01	6.8176E-02	1.4574E-03	7.0542E-02	1.5079E-03
7.0000E-01	7.3068E-02	1.4329E-03	7.5603E-02	1.4826E-03
5.0000E-01	7.0535E-02	1.5749E-03	7.2982E-02	1.6295E-03
3.5000E-01	6.4498E-02	2.0413E-03	6.6736E-02	2.1121E-03
2.5000E-01	6.4553E-02	2.0553E-03	6.6793E-02	2.1266E-03
1.7500E-01	6.1823E-02	2.7240E-03	6.3968E-02	2.8186E-03
7.5000E-02	4.8210E-02	1.4699E-03	4.9883E-02	1.5209E-03



Table F.73 Target Material: Niobium (Nb-93)  
 Angle: 120 - 140°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	0.0000	0.0000	0.0000	0.0000
1.7500E 02	3.9880E-06	1.2024E-06	4.1264E-06	1.2441E-06
1.2500E 02	3.4700E-05	3.6574E-06	3.5904E-05	3.7843E-06
9.0000E 01	6.8800E-05	7.9808E-06	7.1187E-05	8.2577E-06
7.0000E 01	1.2660E-04	1.1141E-05	1.3099E-04	1.1527E-05
5.0000E 01	2.2430E-04	1.4894E-05	2.3208E-04	1.5410E-05
3.5000E 01	3.4206E-04	2.7982E-05	3.5393E-04	2.8953E-05
2.5000E 01	7.4472E-04	4.3121E-05	7.7056E-04	4.4617E-05
1.7500E 01	1.3522E-03	6.4715E-05	1.3991E-03	6.6960E-05
1.2500E 01	3.2670E-03	1.0539E-04	3.3804E-03	1.0905E-04
9.0000E 00	6.8500E-03	2.1056E-04	7.0877E-03	2.1787E-04
7.0000E 00	1.1551E-02	2.6621E-04	1.1952E-02	2.7545E-04
5.0000E 00	1.9919E-02	3.6187E-04	2.0610E-02	3.7443E-04
3.5000E 00	3.2376E-02	6.3022E-04	3.3499E-02	6.5209E-04
2.5000E 00	4.3594E-02	7.9257E-04	4.5107E-02	8.2007E-04
1.7500E 00	5.3304E-02	1.0374E-03	5.5154E-02	1.0734E-03
1.2500E 00	5.8864E-02	1.1305E-03	6.0907E-02	1.1697E-03
9.0000E-01	6.5762E-02	2.0059E-03	6.8044E-02	2.0755E-03
7.0000E-01	6.4985E-02	1.9760E-03	6.7240E-02	2.0446E-03
5.0000E-01	6.4683E-02	1.9257E-03	6.6927E-02	1.9925E-03
3.5000E-01	6.5549E-02	2.3228E-03	6.7823E-02	2.4034E-03
2.5000E-01	6.0370E-02	2.7722E-03	6.2465E-02	2.8684E-03
1.7500E-01	5.5055E-02	3.6292E-03	5.6965E-02	3.7551E-03
7.5000E-02	4.2895E-02	1.8005E-03	4.4383E-02	1.8629E-03

Table F.74 Target Material: Niobium (Nb-93)

Angle: 140 - 160°

energy (MeV)	yield (l/sr/MeV)	error (1σ)	x-section (b/sr/MeV)	error (1σ)
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	6.1100E-07	4.2984E-07	6.3220E-07	4.4475E-07
1.7500E 02	6.1100E-07	6.1100E-07	6.3220E-07	6.3220E-07
1.2500E 02	2.5050E-05	3.7951E-06	2.5919E-05	3.9268E-06
9.0000E 01	4.5830E-05	7.6765E-06	4.7420E-05	7.9429E-06
7.0000E 01	7.7910E-05	1.1383E-05	8.0613E-05	1.1778E-05
5.0000E 01	1.6960E-04	1.5637E-05	1.7548E-04	1.6180E-05
3.5000E 01	2.8516E-04	3.2007E-05	2.9506E-04	3.3118E-05
2.5000E 01	5.3212E-04	4.0647E-05	5.5058E-04	4.2058E-05
1.7500E 01	1.2225E-03	8.2150E-05	1.2649E-03	8.5001E-05
1.2500E 01	2.9230E-03	1.0768E-04	3.0244E-03	1.1142E-04
9.0000E 00	6.3730E-03	2.3591E-04	6.5941E-03	2.4410E-04
7.0000E 00	1.0523E-02	2.7373E-04	1.0888E-02	2.8323E-04
5.0000E 00	1.8740E-02	3.7371E-04	1.9390E-02	3.8668E-04
3.5000E 00	3.0662E-02	6.3578E-04	3.1726E-02	6.5784E-04
2.5000E 00	4.1998E-02	7.8861E-04	4.3455E-02	8.1597E-04
1.7500E 00	5.1220E-02	1.0435E-03	5.2997E-02	1.0797E-03
1.2500E 00	5.7715E-02	1.1639E-03	5.9718E-02	1.2043E-03
9.0000E-01	6.5385E-02	2.0454E-03	6.7654E-02	2.1164E-03
7.0000E-01	6.3208E-02	1.9931E-03	6.5401E-02	2.0623E-03
5.0000E-01	6.5974E-02	2.0066E-03	6.8263E-02	2.0762E-03
3.5000E-01	6.3153E-02	2.3043E-03	6.5344E-02	2.3842E-03
2.5000E-01	5.8067E-02	2.7732E-03	6.0082E-02	2.8694E-03
1.7500E-01	5.2925E-02	3.5809E-03	5.4761E-02	3.7051E-03
7.5000E-02	4.3298E-02	1.9819E-03	4.4800E-02	2.0507E-03

Table F.75 Target Material: Niobium (Nb-93)

Angle: 160 - 180°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	0.0000	0.0000	0.0000	0.0000
1.7500E 02	1.7590E-06	1.7590E-06	1.8200E-06	1.8200E-06
1.2500E 02	1.7590E-05	5.3034E-06	1.8200E-05	5.4874E-06
9.0000E 01	5.7180E-05	1.6130E-05	5.9164E-05	1.6690E-05
7.0000E 01	1.1000E-04	2.2869E-05	1.1382E-04	2.3663E-05
5.0000E 01	1.4070E-04	2.5678E-05	1.4558E-04	2.6569E-05
3.5000E 01	2.1216E-04	4.1706E-05	2.1952E-04	4.3153E-05
2.5000E 01	4.7812E-04	6.1047E-05	4.9471E-04	6.3166E-05
1.7500E 01	8.7730E-04	9.1257E-05	9.0774E-04	9.4424E-05
1.2500E 01	2.7880E-03	1.5242E-04	2.8847E-03	1.5771E-04
9.0000E 00	5.9230E-03	2.5880E-04	6.1285E-03	2.6778E-04
7.0000E 00	1.0453E-02	3.2522E-04	1.0816E-02	3.3651E-04
5.0000E 00	1.8493E-02	4.2457E-04	1.9135E-02	4.3930E-04
3.5000E 00	3.0517E-02	6.9685E-04	3.1576E-02	7.2103E-04
2.5000E 00	4.2257E-02	9.3090E-04	4.3723E-02	9.6320E-04
1.7500E 00	5.2142E-02	1.3047E-03	5.3951E-02	1.3500E-03
1.2500E 00	5.8486E-02	1.3655E-03	6.0515E-02	1.4128E-03
9.0000E-01	6.4858E-02	2.4082E-03	6.7108E-02	2.4918E-03
7.0000E-01	6.6158E-02	2.3971E-03	6.8454E-02	2.4803E-03
5.0000E-01	6.4818E-02	2.2868E-03	6.7067E-02	2.3661E-03
3.5000E-01	6.1209E-02	2.4887E-03	6.3333E-02	2.5751E-03
2.5000E-01	5.9068E-02	3.3112E-03	6.1118E-02	3.4261E-03
1.7500E-01	5.1629E-02	3.7584E-03	5.3420E-02	3.8888E-03
7.5000E-02	4.1472E-02	2.2516E-03	4.2911E-02	2.3298E-03

Table F.76 Target Material: Iron (Fe-56)  
Angle: 0 - 5°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.0040E-03	1.0693E-04	7.5156E-04	8.0042E-05
4.5000E 02	5.4370E-04	8.3838E-05	4.0700E-04	6.2759E-05
3.5000E 02	2.2310E-03	1.6933E-04	1.6701E-03	1.2676E-04
2.5000E 02	2.7460E-03	2.0925E-04	2.0556E-03	1.5663E-04
1.7500E 02	1.7570E-03	2.0838E-04	1.3152E-03	1.5599E-04
1.2500E 02	1.5060E-03	2.1867E-04	1.1273E-03	1.6369E-04
9.0000E 01	1.6730E-03	3.4497E-04	1.2524E-03	2.5824E-04
7.0000E 01	1.8120E-03	3.6548E-04	1.3564E-03	2.7359E-04
5.0000E 01	1.9594E-03	3.2989E-04	1.4668E-03	2.4695E-04
3.5000E 01	2.1271E-03	5.3806E-04	1.5923E-03	4.0277E-04
2.5000E 01	2.4963E-03	5.8540E-04	1.8687E-03	4.3821E-04
1.7500E 01	3.6602E-03	9.3033E-04	2.7399E-03	6.9642E-04
1.2500E 01	7.0840E-03	1.0304E-03	5.3029E-03	7.7132E-04
9.0000E 00	1.3914E-02	2.4901E-03	1.0416E-02	1.8640E-03
7.0000E 00	1.5719E-02	2.5367E-03	1.1767E-02	1.8989E-03
5.0000E 00	2.3035E-02	2.6878E-03	1.7243E-02	2.0120E-03
3.5000E 00	3.7650E-02	4.5750E-03	2.8184E-02	3.4247E-03
2.5000E 00	3.7210E-02	3.8418E-03	2.7854E-02	2.8758E-03
1.7500E 00	3.9155E-02	4.8431E-03	2.9310E-02	3.6254E-03
1.2500E 00	3.5618E-02	2.9082E-03	2.6663E-02	2.1770E-03
9.0000E-01	4.0501E-02	7.0889E-03	3.0318E-02	5.3065E-03
7.0000E-01	5.4700E-02	1.2019E-02	4.0947E-02	8.9969E-03
5.0000E-01	3.4800E-02	1.4094E-03	2.6050E-02	1.0550E-03
3.5000E-01	4.3650E-02	1.4043E-02	3.2675E-02	1.0512E-02
2.5000E-01	2.9710E-02	1.7648E-03	2.2240E-02	1.3211E-03
1.7500E-01	2.9500E-02	2.3541E-03	2.2083E-02	1.7622E-03
7.5000E-02	3.9530E-02	1.3128E-02	2.9591E-02	9.8276E-03

Table F.77 Target Material: Iron (Fe-56)

Angle: 5 - 10°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.5650E-03	8.1223E-05	1.1715E-03	6.0801E-05
4.5000E 02	1.8640E-04	3.2452E-05	1.3953E-04	2.4293E-05
3.5000E 02	4.1000E-04	4.6002E-05	3.0691E-04	3.4436E-05
2.5000E 02	9.9240E-04	7.3041E-05	7.4288E-04	5.4676E-05
1.7500E 02	1.2110E-03	1.0717E-04	9.0652E-04	8.0227E-05
1.2500E 02	1.2580E-03	1.1498E-04	9.4170E-04	8.6071E-05
9.0000E 01	1.3050E-03	1.8244E-04	9.7688E-04	1.3657E-04
7.0000E 01	1.6310E-03	2.0273E-04	1.2209E-03	1.5176E-04
5.0000E 01	1.6844E-03	1.9890E-04	1.2609E-03	1.4889E-04
3.5000E 01	2.3191E-03	2.9984E-04	1.7360E-03	2.2445E-04
2.5000E 01	2.7813E-03	3.4706E-04	2.0820E-03	2.5980E-04
1.7500E 01	3.9472E-03	5.1580E-04	2.9548E-03	3.8611E-04
1.2500E 01	7.6550E-03	6.5941E-04	5.7303E-03	4.9361E-04
9.0000E 00	1.1606E-02	1.4032E-03	8.6879E-03	1.0504E-03
7.0000E 00	1.6901E-02	1.4757E-03	1.2652E-02	1.1046E-03
5.0000E 00	2.2357E-02	1.3141E-03	1.6736E-02	9.8368E-04
3.5000E 00	3.0704E-02	1.9569E-03	2.2984E-02	1.4648E-03
2.5000E 00	3.2583E-02	2.0677E-03	2.4391E-02	1.5478E-03
1.7500E 00	3.7313E-02	2.5122E-03	2.7931E-02	1.8806E-03
1.2500E 00	4.5880E-02	3.3544E-03	3.4344E-02	2.5110E-03
9.0000E-01	4.7510E-02	6.5996E-03	3.5565E-02	4.9402E-03
7.0000E-01	5.0100E-02	6.9503E-03	3.7503E-02	5.2028E-03
5.0000E-01	4.4118E-02	4.7998E-03	3.3025E-02	3.5930E-03
3.5000E-01	6.6980E-02	1.2815E-02	5.0139E-02	9.5928E-03
2.5000E-01	3.9028E-02	6.7886E-03	2.9215E-02	5.0817E-03
1.7500E-01	3.8818E-02	9.6108E-03	2.9058E-02	7.1943E-03
7.5000E-02	3.3360E-02	6.2227E-03	2.4972E-02	4.6581E-03

Table F.78 Target Material: Iron (Fe-56)  
Angle: 10 - 15°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.1910E-03	5.4429E-05	8.9155E-04	4.0744E-05
4.5000E 02	2.2200E-04	2.5663E-05	1.6618E-04	1.9211E-05
3.5000E 02	4.1020E-04	3.3021E-05	3.0706E-04	2.4719E-05
2.5000E 02	7.6420E-04	4.6616E-05	5.7206E-04	3.4895E-05
1.7500E 02	9.6650E-04	6.9685E-05	7.2349E-04	5.2164E-05
1.2500E 02	1.2250E-03	8.9425E-05	9.1700E-04	6.6941E-05
9.0000E 01	1.3060E-03	1.2668E-04	9.7763E-04	9.4830E-05
7.0000E 01	1.1940E-03	1.2692E-04	8.9379E-04	9.5010E-05
5.0000E 01	1.6794E-03	1.5935E-04	1.2572E-03	1.1929E-04
3.5000E 01	1.5251E-03	1.9756E-04	1.1416E-03	1.4789E-04
2.5000E 01	2.7663E-03	2.9079E-04	2.0708E-03	2.1767E-04
1.7500E 01	3.7942E-03	3.7294E-04	2.8402E-03	2.7917E-04
1.2500E 01	6.6690E-03	4.5241E-04	4.9922E-03	3.3866E-04
9.0000E 00	1.1730E-02	9.6245E-04	8.7807E-03	7.2046E-04
7.0000E 00	1.3946E-02	8.6970E-04	1.0440E-02	6.5103E-04
5.0000E 00	2.3661E-02	1.1890E-03	1.7712E-02	8.9006E-04
3.5000E 00	2.8506E-02	1.4974E-03	2.1339E-02	1.1209E-03
2.5000E 00	3.5332E-02	1.6006E-03	2.6448E-02	1.1982E-03
1.7500E 00	4.0343E-02	2.3960E-03	3.0200E-02	1.7936E-03
1.2500E 00	4.4630E-02	2.6932E-03	3.3409E-02	2.0160E-03
9.0000E-01	5.0390E-02	5.1670E-03	3.7720E-02	3.8679E-03
7.0000E-01	4.3624E-02	4.3140E-03	3.2656E-02	3.2293E-03
5.0000E-01	4.3229E-02	3.6372E-03	3.2360E-02	2.7227E-03
3.5000E-01	5.2190E-02	7.8474E-03	3.9068E-02	5.8743E-03
2.5000E-01	3.8139E-02	5.1303E-03	2.8550E-02	3.8404E-03
1.7500E-01	5.1980E-02	1.1317E-02	3.8911E-02	8.4713E-03
7.5000E-02	3.0306E-02	4.2612E-03	2.2686E-02	3.1898E-03

Table F.79 Target Material: Iron (Fe-56)

Angle: 15 - 20°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	5.7030E-04	3.5473E-05	4.2691E-04	2.6554E-05
4.5000E 02	3.7410E-04	3.0040E-05	2.8004E-04	2.2487E-05
3.5000E 02	2.7100E-04	2.2303E-05	2.0286E-04	1.6696E-05
2.5000E 02	6.9570E-04	3.5968E-05	5.2078E-04	2.6924E-05
1.7500E 02	9.6260E-04	5.5061E-05	7.2057E-04	4.1217E-05
1.2500E 02	1.0520E-03	7.6691E-05	7.8749E-04	5.7408E-05
9.0000E 01	1.0820E-03	9.7704E-05	8.0995E-04	7.3139E-05
7.0000E 01	1.2540E-03	1.1687E-04	9.3871E-04	8.7487E-05
5.0000E 01	1.4434E-03	1.1964E-04	1.0805E-03	8.9555E-05
3.5000E 01	1.9771E-03	2.1110E-04	1.4800E-03	1.5802E-04
2.5000E 01	2.6513E-03	2.1245E-04	1.9847E-03	1.5904E-04
1.7500E 01	4.3912E-03	4.1557E-04	3.2871E-03	3.1109E-04
1.2500E 01	6.5060E-03	3.9739E-04	4.8702E-03	2.9747E-04
9.0000E 00	1.1009E-02	7.4941E-04	8.2410E-03	5.6098E-04
7.0000E 00	1.4714E-02	8.3337E-04	1.1014E-02	6.2384E-04
5.0000E 00	2.1546E-02	7.9526E-04	1.6129E-02	5.9530E-04
3.5000E 00	2.9211E-02	1.3307E-03	2.1866E-02	9.9612E-04
2.5000E 00	3.4958E-02	1.4989E-03	2.6168E-02	1.1220E-03
1.7500E 00	4.3330E-02	2.4058E-03	3.2436E-02	1.8009E-03
1.2500E 00	4.5370E-02	2.4229E-03	3.3963E-02	1.8137E-03
9.0000E-01	4.2630E-02	3.4903E-03	3.1912E-02	2.6127E-03
7.0000E-01	5.4010E-02	4.9358E-03	4.0430E-02	3.6948E-03
5.0000E-01	4.7940E-02	3.6957E-03	3.5886E-02	2.7665E-03
3.5000E-01	4.1840E-02	5.8677E-03	3.1320E-02	4.3924E-03
2.5000E-01	4.5890E-02	5.7897E-03	3.4352E-02	4.3340E-03
1.7500E-01	3.7589E-02	6.1583E-03	2.8138E-02	4.6099E-03
7.5000E-02	3.8470E-02	5.0771E-03	2.8797E-02	3.8005E-03

Table F.80 Target Material: Iron (Fe-56)

Angle: 20 - 25°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.9230E-04	1.8384E-05	1.4395E-04	1.3762E-05
4.5000E 02	5.0690E-04	3.0211E-05	3.7945E-04	2.2615E-05
3.5000E 02	2.2570E-04	1.9455E-05	1.6895E-04	1.4564E-05
2.5000E 02	5.0370E-04	2.8560E-05	3.7705E-04	2.1379E-05
1.7500E 02	8.9620E-04	5.9149E-05	6.7087E-04	4.4277E-05
1.2500E 02	1.0070E-03	6.0118E-05	7.5381E-04	4.5002E-05
9.0000E 01	1.1280E-03	1.0107E-04	8.4439E-04	7.5657E-05
7.0000E 01	1.2000E-03	8.7120E-05	8.9828E-04	6.5215E-05
5.0000E 01	1.5884E-03	1.1496E-04	1.1890E-03	8.6053E-05
3.5000E 01	1.7681E-03	1.6780E-04	1.3235E-03	1.2561E-04
2.5000E 01	2.4423E-03	1.8375E-04	1.8282E-03	1.3755E-04
1.7500E 01	3.7962E-03	3.4592E-04	2.8417E-03	2.5895E-04
1.2500E 01	6.3410E-03	3.7282E-04	4.7467E-03	2.7908E-04
9.0000E 00	1.0714E-02	6.3144E-04	8.0202E-03	4.7268E-04
7.0000E 00	1.5184E-02	7.4781E-04	1.1366E-02	5.5979E-04
5.0000E 00	2.0947E-02	8.6242E-04	1.5680E-02	6.4558E-04
3.5000E 00	2.9501E-02	1.2614E-03	2.2084E-02	9.4427E-04
2.5000E 00	3.7020E-02	1.4801E-03	2.7712E-02	1.1080E-03
1.7500E 00	3.9689E-02	1.8644E-03	2.9710E-02	1.3956E-03
1.2500E 00	4.5220E-02	2.0321E-03	3.3850E-02	1.5211E-03
9.0000E-01	5.0220E-02	3.6760E-03	3.7593E-02	2.7517E-03
7.0000E-01	4.7300E-02	3.4535E-03	3.5407E-02	2.5852E-03
5.0000E-01	4.3540E-02	2.8688E-03	3.2593E-02	2.1475E-03
3.5000E-01	3.9245E-02	4.1563E-03	2.9378E-02	3.1113E-03
2.5000E-01	4.5600E-02	5.1055E-03	3.4135E-02	3.8218E-03
1.7500E-01	3.5856E-02	5.0533E-03	2.6841E-02	3.7827E-03
7.5000E-02	3.7890E-02	4.3383E-03	2.8363E-02	3.2476E-03



Table F.81 Target Material: Iron (Fe-56)

Angle: 25 - 35°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	3.2870E-05	4.2764E-06	2.4605E-05	3.2012E-06
4.5000E 02	2.6110E-04	1.2716E-05	1.9545E-04	9.5185E-06
3.5000E 02	3.0250E-04	1.3219E-05	2.2644E-04	9.8955E-06
2.5000E 02	3.5180E-04	1.4705E-05	2.6335E-04	1.1008E-05
1.7500E 02	6.3910E-04	2.7993E-05	4.7841E-04	2.0954E-05
1.2500E 02	8.3150E-04	3.3094E-05	6.2244E-04	2.4773E-05
9.0000E 01	1.0200E-03	6.3546E-05	7.6354E-04	4.7569E-05
7.0000E 01	1.1170E-03	6.2664E-05	8.3615E-04	4.6908E-05
5.0000E 01	1.4404E-03	5.6639E-05	1.0783E-03	4.2398E-05
3.5000E 01	1.8621E-03	1.0832E-04	1.3939E-03	8.1087E-05
2.5000E 01	2.6693E-03	1.0906E-04	1.9982E-03	8.1643E-05
1.7500E 01	3.2952E-03	1.8816E-04	2.4667E-03	1.4085E-04
1.2500E 01	6.5430E-03	2.4661E-04	4.8979E-03	1.8461E-04
9.0000E 00	1.0297E-02	4.6564E-04	7.7080E-03	3.4857E-04
7.0000E 00	1.4622E-02	4.6869E-04	1.0946E-02	3.5085E-04
5.0000E 00	2.1944E-02	5.2445E-04	1.6427E-02	3.9259E-04
3.5000E 00	2.8346E-02	8.0851E-04	2.1219E-02	6.0522E-04
2.5000E 00	3.5373E-02	9.4055E-04	2.6479E-02	7.0407E-04
1.7500E 00	4.0286E-02	1.3257E-03	3.0157E-02	9.9240E-04
1.2500E 00	4.4030E-02	1.4535E-03	3.2960E-02	1.0880E-03
9.0000E-01	4.6310E-02	2.4099E-03	3.4666E-02	1.8040E-03
7.0000E-01	4.5660E-02	2.2358E-03	3.4180E-02	1.6737E-03
5.0000E-01	4.9100E-02	2.5249E-03	3.6755E-02	1.8901E-03
3.5000E-01	4.9190E-02	3.6444E-03	3.6822E-02	2.7281E-03
2.5000E-01	4.3100E-02	3.9402E-03	3.2263E-02	2.9495E-03
1.7500E-01	4.1670E-02	4.6899E-03	3.1193E-02	3.5107E-03
7.5000E-02	3.4740E-02	2.3920E-03	2.6005E-02	1.7906E-03

Table F.82 Target Material: Iron (Fe-56)  
 Angle: 35 - 40°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	3.9960E-06	1.9676E-06	2.9913E-06	1.4729E-06
4.5000E 02	6.8930E-05	8.4853E-06	5.1599E-05	6.3518E-06
3.5000E 02	2.7470E-04	1.6509E-05	2.0563E-04	1.2358E-05
2.5000E 02	3.2770E-04	1.6254E-05	2.4531E-04	1.2167E-05
1.7500E 02	4.8150E-04	2.9131E-05	3.6044E-04	2.1806E-05
1.2500E 02	6.8130E-04	3.9243E-05	5.1000E-04	2.9376E-05
9.0000E 01	8.1910E-04	6.2907E-05	6.1315E-04	4.7090E-05
7.0000E 01	1.0340E-03	7.3517E-05	7.7402E-04	5.5033E-05
5.0000E 01	1.1514E-03	7.4615E-05	8.6192E-04	5.5855E-05
3.5000E 01	1.5541E-03	1.2512E-04	1.1633E-03	9.3664E-05
2.5000E 01	2.2933E-03	1.4463E-04	1.7167E-03	1.0827E-04
1.7500E 01	3.3092E-03	2.3250E-04	2.4772E-03	1.7404E-04
1.2500E 01	6.2390E-03	2.8038E-04	4.6703E-03	2.0988E-04
9.0000E 00	9.5950E-03	4.4870E-04	7.1825E-03	3.3588E-04
7.0000E 00	1.3543E-02	5.5625E-04	1.0138E-02	4.1639E-04
5.0000E 00	2.2262E-02	6.3400E-04	1.6665E-02	4.7459E-04
3.5000E 00	3.1010E-02	9.6362E-04	2.3213E-02	7.2134E-04
2.5000E 00	3.4751E-02	1.1227E-03	2.6014E-02	8.4044E-04
1.7500E 00	4.1180E-02	1.7261E-03	3.0826E-02	1.2921E-03
1.2500E 00	4.3220E-02	1.6797E-03	3.2353E-02	1.2574E-03
9.0000E-01	4.6020E-02	2.8103E-03	3.4449E-02	2.1037E-03
7.0000E-01	4.5780E-02	2.7859E-03	3.4270E-02	2.0854E-03
5.0000E-01	4.6790E-02	2.8458E-03	3.5026E-02	2.1303E-03
3.5000E-01	3.9699E-02	3.4581E-03	2.9717E-02	2.5886E-03
2.5000E-01	3.9699E-02	3.4906E-03	2.9717E-02	2.6130E-03
1.7500E-01	3.9489E-02	4.9692E-03	2.9560E-02	3.7198E-03
7.5000E-02	3.4260E-02	3.0637E-03	2.5646E-02	2.2934E-03

Table F.83 Target Material: Iron (Fe-56)

Angle: 40 - 50°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	2.1520E-05	2.8363E-06	1.6109E-05	2.1232E-06
3.5000E 02	1.2870E-04	6.9627E-06	9.6341E-05	5.2120E-06
2.5000E 02	3.0900E-04	1.0413E-05	2.3131E-04	7.7951E-06
1.7500E 02	4.1410E-04	1.8924E-05	3.0998E-04	1.4166E-05
1.2500E 02	5.8790E-04	2.2810E-05	4.4008E-04	1.7075E-05
9.0000E 01	8.0270E-04	4.3587E-05	6.0088E-04	3.2628E-05
7.0000E 01	8.9960E-04	4.8308E-05	6.7341E-04	3.6162E-05
5.0000E 01	1.1564E-03	5.2892E-05	8.6567E-04	3.9593E-05
3.5000E 01	1.5121E-03	7.3979E-05	1.1319E-03	5.5379E-05
2.5000E 01	2.2153E-03	1.0414E-04	1.6583E-03	7.7955E-05
1.7500E 01	3.7642E-03	1.5808E-04	2.8178E-03	1.1834E-04
1.2500E 01	6.0580E-03	1.9466E-04	4.5348E-03	1.4572E-04
9.0000E 00	1.0370E-02	3.5984E-04	7.7627E-03	2.6936E-04
7.0000E 00	1.3676E-02	4.0274E-04	1.0237E-02	3.0148E-04
5.0000E 00	2.1922E-02	4.9894E-04	1.6410E-02	3.7349E-04
3.5000E 00	2.8711E-02	7.1128E-04	2.1492E-02	5.3244E-04
2.5000E 00	3.3937E-02	8.0819E-04	2.5404E-02	6.0498E-04
1.7500E 00	4.1980E-02	1.2397E-03	3.1425E-02	9.2797E-04
1.2500E 00	4.2041E-02	1.1922E-03	3.1471E-02	8.9247E-04
9.0000E-01	4.5580E-02	2.2487E-03	3.4120E-02	1.6833E-03
7.0000E-01	4.3044E-02	1.9313E-03	3.2221E-02	1.4457E-03
5.0000E-01	4.2547E-02	1.8795E-03	3.1849E-02	1.4069E-03
3.5000E-01	4.3050E-02	2.7639E-03	3.2226E-02	2.0690E-03
2.5000E-01	4.3480E-02	2.7493E-03	3.2548E-02	2.0581E-03
1.7500E-01	4.1550E-02	4.0061E-03	3.1103E-02	2.9988E-03
7.5000E-02	3.2130E-02	1.9913E-03	2.4052E-02	1.4906E-03

Table F.84 Target Material: Iron (Fe-56)

Angle: 50 - 65°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	2.4100E-06	8.0325E-07	1.8041E-06	6.0129E-07
3.5000E 02	3.2770E-05	2.8346E-06	2.4531E-05	2.1219E-06
2.5000E 02	1.2430E-04	5.8421E-06	9.3047E-05	4.3732E-06
1.7500E 02	2.9110E-04	1.1120E-05	2.1791E-04	8.3241E-06
1.2500E 02	5.0650E-04	1.5094E-05	3.7915E-04	1.1299E-05
9.0000E 01	7.2770E-04	2.7653E-05	5.4473E-04	2.0700E-05
7.0000E 01	7.7830E-04	3.3233E-05	5.8261E-04	2.4878E-05
5.0000E 01	1.1204E-03	3.6228E-05	8.3872E-04	2.7119E-05
3.5000E 01	1.3641E-03	5.4890E-05	1.0211E-03	4.1089E-05
2.5000E 01	2.1573E-03	6.3444E-05	1.6149E-03	4.7493E-05
1.7500E 01	3.4652E-03	1.3308E-04	2.5939E-03	9.9622E-05
1.2500E 01	6.0780E-03	1.5350E-04	4.5498E-03	1.1490E-04
9.0000E 00	9.6450E-03	3.0638E-04	7.2200E-03	2.2935E-04
7.0000E 00	1.3917E-02	3.3324E-04	1.0418E-02	2.4946E-04
5.0000E 00	2.0983E-02	4.0563E-04	1.5707E-02	3.0364E-04
3.5000E 00	2.8462E-02	6.1572E-04	2.1306E-02	4.6091E-04
2.5000E 00	3.4253E-02	6.8647E-04	2.5641E-02	5.1387E-04
1.7500E 00	3.9754E-02	9.8394E-04	2.9759E-02	7.3655E-04
1.2500E 00	4.2131E-02	1.0744E-03	3.1538E-02	8.0426E-04
9.0000E-01	4.3409E-02	1.6772E-03	3.2495E-02	1.2555E-03
7.0000E-01	4.2705E-02	1.6679E-03	3.1968E-02	1.2485E-03
5.0000E-01	4.7570E-02	1.9191E-03	3.5609E-02	1.4366E-03
3.5000E-01	3.7903E-02	2.1619E-03	2.8373E-02	1.6183E-03
2.5000E-01	4.0550E-02	2.4196E-03	3.0355E-02	1.8112E-03
1.7500E-01	4.1550E-02	3.2982E-03	3.1103E-02	2.4689E-03
7.5000E-02	3.1860E-02	1.6969E-03	2.3849E-02	1.2703E-03

Table F.85 Target Material: Iron (Fe-56)

Angle: 65 - 80°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	4.9010E-06	1.1272E-06	3.6687E-06	8.4381E-07
2.5000E 02	3.8360E-05	2.5164E-06	2.8715E-05	1.8837E-06
1.7500E 02	1.2910E-04	7.1005E-06	9.6640E-05	5.3152E-06
1.2500E 02	3.0090E-04	1.1795E-05	2.2524E-04	8.8296E-06
9.0000E 01	4.5390E-04	2.1787E-05	3.3978E-04	1.6309E-05
7.0000E 01	6.8720E-04	2.7763E-05	5.1442E-04	2.0782E-05
5.0000E 01	9.1247E-04	3.1611E-05	6.8305E-04	2.3663E-05
3.5000E 01	1.1162E-03	4.3185E-05	8.3557E-04	3.2327E-05
2.5000E 01	1.8204E-03	5.6778E-05	1.3627E-03	4.2502E-05
1.7500E 01	2.7968E-03	9.2113E-05	2.0936E-03	6.8953E-05
1.2500E 01	5.1210E-03	1.2694E-04	3.8334E-03	9.5023E-05
9.0000E 00	7.9940E-03	2.3779E-04	5.9841E-03	1.7800E-04
7.0000E 00	1.2220E-02	2.9643E-04	9.1475E-03	2.2190E-04
5.0000E 00	1.7960E-02	3.0375E-04	1.3444E-02	2.2738E-04
3.5000E 00	2.4013E-02	4.6200E-04	1.7975E-02	3.4584E-04
2.5000E 00	3.0230E-02	4.9305E-04	2.2629E-02	3.6908E-04
1.7500E 00	3.4486E-02	7.8532E-04	2.5815E-02	5.8787E-04
1.2500E 00	3.7799E-02	8.2469E-04	2.8295E-02	6.1734E-04
9.0000E-01	4.0912E-02	1.3560E-03	3.0625E-02	1.0151E-03
7.0000E-01	3.9611E-02	1.2602E-03	2.9652E-02	9.4332E-04
5.0000E-01	3.9620E-02	1.2442E-03	2.9658E-02	9.3136E-04
3.5000E-01	4.1050E-02	1.9020E-03	3.0729E-02	1.4238E-03
2.5000E-01	4.0900E-02	2.0341E-03	3.0617E-02	1.5227E-03
1.7500E-01	3.5690E-02	2.5896E-03	2.6716E-02	1.9385E-03
7.5000E-02	3.3050E-02	1.5482E-03	2.4740E-02	1.1589E-03

Table F.86 Target Material: Iron (Fe-56)

Angle: 80 - 100°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	1.5280E-07	1.5280E-07	1.1438E-07	1.1438E-07
2.5000E 02	8.2490E-06	1.0732E-06	6.1750E-06	8.0336E-07
1.7500E 02	3.9110E-05	3.6372E-06	2.9277E-05	2.7227E-06
1.2500E 02	1.3050E-04	7.5168E-06	9.7688E-05	5.6268E-06
9.0000E 01	2.2760E-04	1.4680E-05	1.7037E-04	1.0989E-05
7.0000E 01	3.4680E-04	1.4947E-05	2.5960E-04	1.1189E-05
5.0000E 01	5.8677E-04	2.1510E-05	4.3924E-04	1.6102E-05
3.5000E 01	8.7512E-04	3.8425E-05	6.5509E-04	2.8764E-05
2.5000E 01	1.3644E-03	4.0461E-05	1.0213E-03	3.0288E-05
1.7500E 01	2.3598E-03	8.0251E-05	1.7665E-03	6.0074E-05
1.2500E 01	4.5290E-03	1.0353E-04	3.3903E-03	7.7501E-05
9.0000E 00	7.6070E-03	1.9653E-04	5.6944E-03	1.4711E-04
7.0000E 00	1.0870E-02	2.3302E-04	8.1369E-03	1.7443E-04
5.0000E 00	1.7278E-02	2.6204E-04	1.2934E-02	1.9615E-04
3.5000E 00	2.2767E-02	4.1760E-04	1.7043E-02	3.1260E-04
2.5000E 00	2.8749E-02	4.5799E-04	2.1521E-02	3.4284E-04
1.7500E 00	3.3957E-02	6.8185E-04	2.5419E-02	5.1041E-04
1.2500E 00	3.7225E-02	7.5349E-04	2.7866E-02	5.6404E-04
9.0000E-01	3.7297E-02	1.1327E-03	2.7919E-02	8.4791E-04
7.0000E-01	3.9807E-02	1.1227E-03	2.9798E-02	8.4044E-04
5.0000E-01	3.6207E-02	1.0587E-03	2.7103E-02	7.9250E-04
3.5000E-01	4.0291E-02	1.6084E-03	3.0161E-02	1.2040E-03
2.5000E-01	3.6579E-02	1.6326E-03	2.7382E-02	1.2221E-03
1.7500E-01	3.4931E-02	2.4764E-03	2.6148E-02	1.8538E-03
7.5000E-02	2.8659E-02	1.2576E-03	2.1453E-02	9.4143E-04

Table F.87 Target Material: Iron (Fe-56)

Angle: 100 - 120°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	6.5020E-07	3.2016E-07	4.8672E-07	2.3966E-07
1.7500E 02	1.3330E-05	2.1728E-06	9.9784E-06	1.6265E-06
1.2500E 02	4.8770E-05	3.7943E-06	3.6508E-05	2.8403E-06
9.0000E 01	1.0570E-04	9.9781E-06	7.9124E-05	7.4693E-06
7.0000E 01	2.0240E-04	1.4168E-05	1.5151E-04	1.0606E-05
5.0000E 01	3.1447E-04	1.4360E-05	2.3541E-04	1.0749E-05
3.5000E 01	5.5602E-04	2.8999E-05	4.1622E-04	2.1707E-05
2.5000E 01	9.5740E-04	3.5083E-05	7.1668E-04	2.6262E-05
1.7500E 01	2.0278E-03	6.9289E-05	1.5179E-03	5.1868E-05
1.2500E 01	3.8220E-03	9.4704E-05	2.8610E-03	7.0893E-05
9.0000E 00	6.5880E-03	1.8845E-04	4.9316E-03	1.4107E-04
7.0000E 00	9.9160E-03	2.1644E-04	7.4228E-03	1.6202E-04
5.0000E 00	1.5863E-02	2.6127E-04	1.1875E-02	1.9558E-04
3.5000E 00	2.1942E-02	3.9445E-04	1.6425E-02	2.9527E-04
2.5000E 00	2.8148E-02	4.4416E-04	2.1071E-02	3.3249E-04
1.7500E 00	3.2557E-02	6.4565E-04	2.4371E-02	4.8331E-04
1.2500E 00	3.5107E-02	7.0998E-04	2.6280E-02	5.3147E-04
9.0000E-01	3.6231E-02	1.1079E-03	2.7121E-02	8.2932E-04
7.0000E-01	3.8442E-02	1.1139E-03	2.8777E-02	8.3381E-04
5.0000E-01	3.5845E-02	1.0609E-03	2.6832E-02	7.9416E-04
3.5000E-01	3.7485E-02	1.6139E-03	2.8060E-02	1.2081E-03
2.5000E-01	3.3532E-02	1.5691E-03	2.5101E-02	1.1746E-03
1.7500E-01	3.2613E-02	2.5445E-03	2.4413E-02	1.9047E-03
7.5000E-02	2.7454E-02	1.1915E-03	2.0551E-02	8.9190E-04

Table F.88 Target Material: Iron (Fe-56)  
 Angle: 120 - 140°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	5.9820E-07	3.4187E-07	4.4779E-07	2.5591E-07
1.7500E 02	3.1910E-06	1.0875E-06	2.3887E-06	8.1406E-07
1.2500E 02	2.4330E-05	3.0996E-06	1.8213E-05	2.3203E-06
9.0000E 01	5.8830E-05	7.6420E-06	4.4038E-05	5.7206E-06
7.0000E 01	9.7710E-05	1.0787E-05	7.3143E-05	8.0750E-06
5.0000E 01	1.9952E-04	1.4901E-05	1.4936E-04	1.1154E-05
3.5000E 01	3.1489E-04	2.2381E-05	2.3572E-04	1.6754E-05
2.5000E 01	6.0030E-04	3.1735E-05	4.4937E-04	2.3756E-05
1.7500E 01	1.3102E-03	6.3401E-05	9.8078E-04	4.7460E-05
1.2500E 01	2.6700E-03	8.9604E-05	1.9987E-03	6.7075E-05
9.0000E 00	5.0780E-03	1.9418E-04	3.8012E-03	1.4536E-04
7.0000E 00	7.2190E-03	2.2473E-04	5.4039E-03	1.6823E-04
5.0000E 00	1.3131E-02	2.6966E-04	9.8295E-03	2.0186E-04
3.5000E 00	1.9000E-02	5.0944E-04	1.4223E-02	3.8135E-04
2.5000E 00	2.4088E-02	5.2396E-04	1.8032E-02	3.9222E-04
1.7500E 00	2.9128E-02	7.8800E-04	2.1804E-02	5.8987E-04
1.2500E 00	3.1046E-02	8.6691E-04	2.3240E-02	6.4894E-04
9.0000E-01	3.3625E-02	1.3924E-03	2.5171E-02	1.0423E-03
7.0000E-01	3.4695E-02	1.5609E-03	2.5972E-02	1.1685E-03
5.0000E-01	2.9973E-02	1.1934E-03	2.2437E-02	8.9335E-04
3.5000E-01	2.8687E-02	1.9646E-03	2.1474E-02	1.4707E-03
2.5000E-01	3.3452E-02	1.9383E-03	2.5041E-02	1.4509E-03
1.7500E-01	3.2292E-02	2.6502E-03	2.4173E-02	1.9838E-03
7.5000E-02	2.6230E-02	1.5361E-03	1.9635E-02	1.1499E-03



Table F.89 Target Material: Iron (Fe-56)  
 Angle: 140 - 160°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	0.0000	0.0000	0.0000	0.0000
1.7500E 02	2.4440E-06	1.2034E-06	1.8295E-06	9.0085E-07
1.2500E 02	1.8940E-05	3.4395E-06	1.4178E-05	2.5747E-06
9.0000E 01	3.8190E-05	8.2338E-06	2.8588E-05	6.1635E-06
7.0000E 01	7.9430E-05	1.1176E-05	5.9459E-05	8.3659E-06
5.0000E 01	1.2892E-04	1.3431E-05	9.6507E-05	1.0054E-05
3.5000E 01	1.8789E-04	2.3394E-05	1.4065E-04	1.7512E-05
2.5000E 01	4.4570E-04	3.5889E-05	3.3364E-04	2.6865E-05
1.7500E 01	1.1198E-03	6.7411E-05	8.3825E-04	5.0462E-05
1.2500E 01	2.3235E-03	9.3310E-05	1.7393E-03	6.9849E-05
9.0000E 00	4.8620E-03	1.9222E-04	3.6395E-03	1.4389E-04
7.0000E 00	7.1270E-03	2.3776E-04	5.3350E-03	1.7798E-04
5.0000E 00	1.2313E-02	2.7894E-04	9.2171E-03	2.0881E-04
3.5000E 00	1.8850E-02	5.2024E-04	1.4111E-02	3.8943E-04
2.5000E 00	2.2950E-02	5.4779E-04	1.7180E-02	4.1006E-04
1.7500E 00	2.7810E-02	7.7817E-04	2.0818E-02	5.8252E-04
1.2500E 00	3.1125E-02	9.6573E-04	2.3299E-02	7.2292E-04
9.0000E-01	3.3481E-02	1.4868E-03	2.5063E-02	1.1130E-03
7.0000E-01	3.3071E-02	1.5436E-03	2.4756E-02	1.1555E-03
5.0000E-01	2.7551E-02	1.1961E-03	2.0624E-02	8.9538E-04
3.5000E-01	2.9799E-02	2.1859E-03	2.2307E-02	1.6363E-03
2.5000E-01	3.0631E-02	1.8274E-03	2.2929E-02	1.3680E-03
1.7500E-01	2.6921E-02	2.2423E-03	2.0152E-02	1.6785E-03
7.5000E-02	2.3727E-02	1.5163E-03	1.7761E-02	1.1350E-03

Table F.90 Target Material: Iron (Fe-56)

Angle: 160 - 180°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	0.0000	0.0000	0.0000	0.0000
1.7500E 02	1.7590E-06	1.7590E-06	1.3167E-06	1.3167E-06
1.2500E 02	2.6390E-05	6.3125E-06	1.9755E-05	4.7253E-06
9.0000E 01	3.5190E-05	1.1993E-05	2.6342E-05	8.9774E-06
7.0000E 01	7.0370E-05	1.9492E-05	5.2677E-05	1.4591E-05
5.0000E 01	1.2092E-04	2.2442E-05	9.0519E-05	1.6799E-05
3.5000E 01	1.7209E-04	3.4177E-05	1.2882E-04	2.5584E-05
2.5000E 01	3.5320E-04	4.8232E-05	2.6439E-04	3.6105E-05
1.7500E 01	9.5400E-04	8.6138E-05	7.1414E-04	6.4480E-05
1.2500E 01	2.1130E-03	1.1764E-04	1.5817E-03	8.8063E-05
9.0000E 00	4.4127E-03	2.3314E-04	3.3032E-03	1.7452E-04
7.0000E 00	6.7860E-03	3.1231E-04	5.0798E-03	2.3378E-04
5.0000E 00	1.2155E-02	3.4626E-04	9.0989E-03	2.5920E-04
3.5000E 00	1.7045E-02	5.6043E-04	1.2759E-02	4.1952E-04
2.5000E 00	2.2575E-02	6.3399E-04	1.6899E-02	4.7459E-04
1.7500E 00	2.7699E-02	9.8385E-04	2.0735E-02	7.3648E-04
1.2500E 00	2.9587E-02	1.0503E-03	2.2148E-02	7.8621E-04
9.0000E-01	3.1959E-02	1.7990E-03	2.3924E-02	1.3467E-03
7.0000E-01	3.3669E-02	1.8668E-03	2.5204E-02	1.3974E-03
5.0000E-01	2.8588E-02	1.6544E-03	2.1400E-02	1.2385E-03
3.5000E-01	2.8698E-02	2.5928E-03	2.1482E-02	1.9409E-03
2.5000E-01	3.0789E-02	2.3278E-03	2.3048E-02	1.7425E-03
1.7500E-01	3.3347E-02	4.0818E-03	2.4963E-02	3.0555E-03
7.5000E-02	2.5315E-02	2.3112E-03	1.8950E-02	1.7301E-03

Table F.91 Target Material: Aluminum (Al-27)  
 Angle: 0 - 5°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.0600E-03	1.2709E-04	4.8996E-04	5.8747E-05
4.5000E 02	5.0190E-04	8.9740E-05	2.3199E-04	4.1480E-05
3.5000E 02	2.6350E-03	1.8893E-04	1.2180E-03	8.7329E-05
2.5000E 02	3.6530E-03	2.0493E-04	1.6885E-03	9.4726E-05
1.7500E 02	2.2030E-03	2.5775E-04	1.0183E-03	1.1914E-04
1.2500E 02	1.3940E-03	1.9614E-04	6.4435E-04	9.0660E-05
9.0000E 01	1.4640E-03	3.0202E-04	6.7670E-04	1.3960E-04
7.0000E 01	1.3956E-03	3.1323E-04	6.4508E-04	1.4479E-04
5.0000E 01	1.6189E-03	2.9481E-04	7.4831E-04	1.3627E-04
3.5000E 01	2.5939E-03	5.7364E-04	1.1990E-03	2.6515E-04
2.5000E 01	2.9344E-03	5.4991E-04	1.3564E-03	2.5419E-04
1.7500E 01	2.1558E-03	6.1209E-04	9.9647E-04	2.8293E-04
1.2500E 01	5.6060E-03	9.7479E-04	2.5913E-03	4.5058E-04
9.0000E 00	5.5630E-03	1.6969E-03	2.5714E-03	7.8434E-04
7.0000E 00	8.3410E-03	1.6701E-03	3.8555E-03	7.7199E-04
5.0000E 00	8.0330E-03	1.2066E-03	3.7131E-03	5.5773E-04
3.5000E 00	1.2522E-02	2.4056E-03	5.7880E-03	1.1119E-03
2.5000E 00	1.6367E-02	3.9382E-03	7.5653E-03	1.8204E-03
1.7500E 00	1.7207E-02	3.9615E-03	7.9536E-03	1.8311E-03
1.2500E 00	1.8247E-02	3.9592E-03	8.4343E-03	1.8300E-03
9.0000E-01	2.0451E-02	7.0265E-03	9.4531E-03	3.2479E-03
7.0000E-01	1.4320E-02	8.4774E-04	6.6191E-03	3.9185E-04
5.0000E-01	2.6730E-02	9.8404E-03	1.2355E-02	4.5485E-03
3.5000E-01	1.3480E-02	1.1067E-03	6.2309E-03	5.1155E-04
2.5000E-01	1.2630E-02	1.2036E-03	5.8380E-03	5.5636E-04
1.7500E-01	1.4640E-02	1.7246E-03	6.7670E-03	7.9716E-04
7.5000E-02	3.1460E-02	1.3105E-02	1.4542E-02	6.0576E-03

Table F.92 Target Material: Aluminum (Al-27)

Angle: 5 - 10°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.9430E-03	8.9572E-05	8.9811E-04	4.1403E-05
4.5000E 02	1.8640E-04	2.7308E-05	8.6160E-05	1.2622E-05
3.5000E 02	5.7770E-04	4.9162E-05	2.6703E-04	2.2724E-05
2.5000E 02	9.7370E-04	6.3583E-05	4.5007E-04	2.9390E-05
1.7500E 02	1.0900E-03	1.0006E-04	5.0383E-04	4.6252E-05
1.2500E 02	1.0340E-03	1.0247E-04	4.7795E-04	4.7364E-05
9.0000E 01	1.1410E-03	1.5700E-04	5.2740E-04	7.2571E-05
7.0000E 01	1.3296E-03	1.7915E-04	6.1458E-04	8.2808E-05
5.0000E 01	1.8329E-03	2.0570E-04	8.4723E-04	9.5083E-05
3.5000E 01	2.3209E-03	3.2772E-04	1.0728E-03	1.5148E-04
2.5000E 01	2.7544E-03	3.1424E-04	1.2732E-03	1.4525E-04
1.7500E 01	3.1848E-03	5.0807E-04	1.4721E-03	2.3484E-04
1.2500E 01	5.1500E-03	5.9101E-04	2.3805E-03	2.7318E-04
9.0000E 00	7.4340E-03	1.1043E-03	3.4362E-03	5.1042E-04
7.0000E 00	8.5850E-03	9.3019E-04	3.9682E-03	4.2996E-04
5.0000E 00	1.0834E-02	1.0756E-03	5.0078E-03	4.9716E-04
3.5000E 00	1.7192E-02	2.0797E-03	7.9467E-03	9.6130E-04
2.5000E 00	1.7778E-02	2.0557E-03	8.2175E-03	9.5020E-04
1.7500E 00	1.7221E-02	2.2906E-03	7.9601E-03	1.0588E-03
1.2500E 00	1.5465E-02	1.6832E-03	7.1484E-03	7.7805E-04
9.0000E-01	2.0468E-02	4.0898E-03	9.4609E-03	1.8904E-03
7.0000E-01	2.3638E-02	4.6658E-03	1.0926E-02	2.1567E-03
5.0000E-01	2.6770E-02	5.6202E-03	1.2374E-02	2.5978E-03
3.5000E-01	2.2798E-02	6.6480E-03	1.0538E-02	3.0729E-03
2.5000E-01	1.2630E-02	1.2036E-03	5.8380E-03	5.5636E-04
1.7500E-01	3.3280E-02	1.3226E-02	1.5383E-02	6.1135E-03
7.5000E-02	1.9082E-02	4.4507E-03	8.8203E-03	2.0572E-03

Table F.93 Target Material: Aluminum (Al-27)  
 Angle: 10 - 15°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.4690E-03	6.6839E-05	6.7902E-04	3.0895E-05
4.5000E 02	2.2760E-04	2.3534E-05	1.0520E-04	1.0878E-05
3.5000E 02	4.3550E-04	3.6234E-05	2.0130E-04	1.6748E-05
2.5000E 02	9.3560E-04	5.6042E-05	4.3246E-04	2.5904E-05
1.7500E 02	1.0900E-03	6.5727E-05	5.0383E-04	3.0381E-05
1.2500E 02	1.1460E-03	7.5750E-05	5.2972E-04	3.5014E-05
9.0000E 01	1.1520E-03	1.2845E-04	5.3249E-04	5.9372E-05
7.0000E 01	1.3366E-03	1.2536E-04	6.1781E-04	5.7945E-05
5.0000E 01	1.0979E-03	1.2133E-04	5.0749E-04	5.6081E-05
3.5000E 01	1.6869E-03	2.0097E-04	7.7973E-04	9.2896E-05
2.5000E 01	2.1394E-03	2.1273E-04	9.8889E-04	9.8332E-05
1.7500E 01	3.2348E-03	4.0395E-04	1.4952E-03	1.8672E-04
1.2500E 01	4.5680E-03	4.1670E-04	2.1115E-03	1.9261E-04
9.0000E 00	6.4280E-03	6.9041E-04	2.9712E-03	3.1913E-04
7.0000E 00	8.5140E-03	8.0453E-04	3.9354E-03	3.7188E-04
5.0000E 00	1.1842E-02	1.0156E-03	5.4737E-03	4.6946E-04
3.5000E 00	1.1150E-02	9.7570E-04	5.1539E-03	4.5100E-04
2.5000E 00	1.7252E-02	1.2992E-03	7.9744E-03	6.0051E-04
1.7500E 00	1.9497E-02	2.3271E-03	9.0121E-03	1.0757E-03
1.2500E 00	1.7727E-02	1.7012E-03	8.1939E-03	7.8633E-04
9.0000E-01	2.4720E-02	3.9307E-03	1.1426E-02	1.8169E-03
7.0000E-01	1.5725E-02	1.6409E-03	7.2686E-03	7.5849E-04
5.0000E-01	1.9814E-02	3.1826E-03	9.1586E-03	1.4711E-03
3.5000E-01	1.9099E-02	4.1050E-03	8.8281E-03	1.8974E-03
2.5000E-01	1.2630E-02	1.2036E-03	5.8380E-03	5.5636E-04
1.7500E-01	2.5880E-02	8.0932E-03	1.1963E-02	3.7409E-03
7.5000E-02	2.2236E-02	4.1889E-03	1.0278E-02	1.9363E-03

Table F.94 Target Material: Aluminum (Al-27)

Angle: 15 - 20°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	7.3610E-04	3.7320E-05	3.4025E-04	1.7251E-05
4.5000E 02	3.7410E-04	2.4803E-05	1.7292E-04	1.1465E-05
3.5000E 02	2.4670E-04	2.0649E-05	1.1403E-04	9.5445E-06
2.5000E 02	6.9770E-04	3.7606E-05	3.2250E-04	1.7383E-05
1.7500E 02	1.0270E-03	7.1376E-05	4.7471E-04	3.2992E-05
1.2500E 02	1.0960E-03	6.1705E-05	5.0660E-04	2.8522E-05
9.0000E 01	1.1830E-03	1.0860E-04	5.4682E-04	5.0198E-05
7.0000E 01	1.2356E-03	1.3068E-04	5.7113E-04	6.0406E-05
5.0000E 01	1.2799E-03	1.0697E-04	5.9162E-04	4.9446E-05
3.5000E 01	1.5209E-03	1.7346E-04	7.0300E-04	8.0180E-05
2.5000E 01	2.2674E-03	2.0797E-04	1.0481E-03	9.6129E-05
1.7500E 01	3.1478E-03	3.0201E-04	1.4550E-03	1.3960E-04
1.2500E 01	4.4120E-03	3.6102E-04	2.0394E-03	1.6687E-04
9.0000E 00	7.0220E-03	6.7140E-04	3.2458E-03	3.1034E-04
7.0000E 00	8.7090E-03	6.6542E-04	4.0256E-03	3.0757E-04
5.0000E 00	1.1200E-02	6.5573E-04	5.1770E-03	3.0310E-04
3.5000E 00	1.1778E-02	8.6048E-04	5.4441E-03	3.9774E-04
2.5000E 00	1.7261E-02	1.1597E-03	7.9785E-03	5.3606E-04
1.7500E 00	2.0124E-02	1.7437E-03	9.3019E-03	8.0601E-04
1.2500E 00	1.7928E-02	1.4665E-03	8.2869E-03	6.7788E-04
9.0000E-01	2.2580E-02	3.0390E-03	1.0437E-02	1.4047E-03
7.0000E-01	1.9376E-02	2.3717E-03	8.9562E-03	1.0963E-03
5.0000E-01	2.0879E-02	2.8739E-03	9.6509E-03	1.3284E-03
3.5000E-01	1.5502E-02	2.3051E-03	7.1655E-03	1.0655E-03
2.5000E-01	2.2740E-02	4.5898E-03	1.0511E-02	2.1216E-03
1.7500E-01	2.6770E-02	7.1436E-03	1.2374E-02	3.3020E-03
7.5000E-02	1.6915E-02	2.4606E-03	7.8186E-03	1.1374E-03

Table F.95 Target Material: Aluminum (Al-27)

Angle: 20 - 25°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	2.1130E-04	1.9820E-05	9.7669E-05	9.1614E-06
4.5000E 02	5.1170E-04	2.7785E-05	2.3652E-04	1.2843E-05
3.5000E 02	2.1610E-04	1.7418E-05	9.9888E-05	8.0510E-06
2.5000E 02	5.2120E-04	2.8405E-05	2.4091E-04	1.3130E-05
1.7500E 02	8.8040E-04	4.7365E-05	4.0695E-04	2.1894E-05
1.2500E 02	9.2800E-04	5.2061E-05	4.2895E-04	2.4064E-05
9.0000E 01	9.3760E-04	8.9916E-05	4.3339E-04	4.1562E-05
7.0000E 01	1.0346E-03	9.0702E-05	4.7822E-04	4.1925E-05
5.0000E 01	1.2549E-03	9.4084E-05	5.8006E-04	4.3488E-05
3.5000E 01	1.4989E-03	1.5331E-04	6.9283E-04	7.0866E-05
2.5000E 01	1.9544E-03	1.4978E-04	9.0338E-04	6.9233E-05
1.7500E 01	2.9228E-03	2.5039E-04	1.3510E-03	1.1574E-04
1.2500E 01	4.6580E-03	2.9447E-04	2.1531E-03	1.3611E-04
9.0000E 00	5.7940E-03	5.3979E-04	2.6782E-03	2.4951E-04
7.0000E 00	9.2440E-03	5.4417E-04	4.2728E-03	2.5153E-04
5.0000E 00	9.9150E-03	6.0476E-04	4.5830E-03	2.7954E-04
3.5000E 00	1.4696E-02	9.9675E-04	6.7929E-03	4.6073E-04
2.5000E 00	2.0325E-02	1.3031E-03	9.3948E-03	6.0232E-04
1.7500E 00	1.7669E-02	1.5094E-03	8.1671E-03	6.9768E-04
1.2500E 00	1.9980E-02	1.5802E-03	9.2354E-03	7.3040E-04
9.0000E-01	2.1425E-02	2.5525E-03	9.9033E-03	1.1798E-03
7.0000E-01	2.1471E-02	2.4376E-03	9.9245E-03	1.1267E-03
5.0000E-01	1.9146E-02	2.5747E-03	8.8498E-03	1.1901E-03
3.5000E-01	1.8247E-02	2.9405E-03	8.4343E-03	1.3592E-03
2.5000E-01	1.5808E-02	2.5391E-03	7.3069E-03	1.1737E-03
1.7500E-01	2.4175E-02	5.7156E-03	1.1174E-02	2.6419E-03
7.5000E-02	2.0286E-02	2.8443E-03	9.3768E-03	1.3147E-03

Table F.96 Target Material: Aluminum (Al-27)

Angle: 25 - 35°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	2.5570E-05	3.5875E-06	1.1819E-05	1.6582E-06
4.5000E 02	2.9520E-04	1.2871E-05	1.3645E-04	5.9492E-06
3.5000E 02	3.3420E-04	1.3836E-05	1.5448E-04	6.3954E-06
2.5000E 02	3.4090E-04	1.4045E-05	1.5757E-04	6.4920E-06
1.7500E 02	5.9410E-04	2.7150E-05	2.7461E-04	1.2550E-05
1.2500E 02	6.8900E-04	2.5700E-05	3.1848E-04	1.1879E-05
9.0000E 01	9.4350E-04	5.0949E-05	4.3611E-04	2.3550E-05
7.0000E 01	8.8419E-04	4.8287E-05	4.0870E-04	2.2320E-05
5.0000E 01	1.0629E-03	5.6820E-05	4.9131E-04	2.6264E-05
3.5000E 01	1.6369E-03	1.0507E-04	7.5661E-04	4.8567E-05
2.5000E 01	1.8494E-03	1.0113E-04	8.5485E-04	4.6744E-05
1.7500E 01	2.9408E-03	1.5460E-04	1.3593E-03	7.1459E-05
1.2500E 01	4.5990E-03	1.7957E-04	2.1258E-03	8.3002E-05
9.0000E 00	6.4880E-03	3.8660E-04	2.9989E-03	1.7870E-04
7.0000E 00	7.4460E-03	3.4155E-04	3.4418E-03	1.5788E-04
5.0000E 00	1.0933E-02	4.4201E-04	5.0536E-03	2.0431E-04
3.5000E 00	1.4062E-02	6.2855E-04	6.4999E-03	2.9054E-04
2.5000E 00	1.7668E-02	8.0299E-04	8.1667E-03	3.7117E-04
1.7500E 00	1.9908E-02	1.1199E-03	9.2021E-03	5.1766E-04
1.2500E 00	1.9609E-02	1.1168E-03	9.0639E-03	5.1622E-04
9.0000E-01	2.5350E-02	2.1219E-03	1.1718E-02	9.8079E-04
7.0000E-01	2.1929E-02	1.7420E-03	1.0136E-02	8.0520E-04
5.0000E-01	2.4360E-02	2.0895E-03	1.1260E-02	9.6585E-04
3.5000E-01	2.0176E-02	2.2113E-03	9.3259E-03	1.0221E-03
2.5000E-01	2.4200E-02	2.9513E-03	1.1186E-02	1.3642E-03
1.7500E-01	2.0727E-02	3.1758E-03	9.5806E-03	1.4679E-03
7.5000E-02	2.3830E-02	2.0790E-03	1.1015E-02	9.6099E-04



Table F.97 Target Material: Aluminum (Al-27)

Angle: 35 - 40°

energy (MeV)	yield (1/sr/MeV)	error (1σ)	x-section (b/sr/MeV)	error (1σ)
5.5000E 02	4.9950E-06	2.1883E-06	2.3088E-06	1.0115E-06
4.5000E 02	8.2910E-05	9.8414E-06	3.8323E-05	4.5490E-06
3.5000E 02	2.7870E-04	1.6388E-05	1.2882E-04	7.5748E-06
2.5000E 02	3.2070E-04	1.7350E-05	1.4824E-04	8.0196E-06
1.7500E 02	4.0560E-04	3.0379E-05	1.8748E-04	1.4042E-05
1.2500E 02	6.4730E-04	3.4566E-05	2.9920E-04	1.5977E-05
9.0000E 01	8.0420E-04	6.0235E-05	3.7173E-04	2.7842E-05
7.0000E 01	7.8079E-04	6.0784E-05	3.6091E-04	2.8096E-05
5.0000E 01	9.6992E-04	6.8939E-05	4.4833E-04	3.1865E-05
3.5000E 01	1.3439E-03	1.1010E-04	6.2118E-04	5.0893E-05
2.5000E 01	1.6644E-03	1.2232E-04	7.6933E-04	5.6542E-05
1.7500E 01	2.6198E-03	1.9337E-04	1.2109E-03	8.9381E-05
1.2500E 01	4.5790E-03	2.5219E-04	2.1165E-03	1.1657E-04
9.0000E 00	6.2710E-03	4.2120E-04	2.8986E-03	1.9469E-04
7.0000E 00	7.4060E-03	4.4167E-04	3.4233E-03	2.0415E-04
5.0000E 00	1.0437E-02	5.1677E-04	4.8243E-03	2.3887E-04
3.5000E 00	1.2036E-02	7.0091E-04	5.5634E-03	3.2398E-04
2.5000E 00	1.7683E-02	8.5722E-04	8.1736E-03	3.9623E-04
1.7500E 00	1.9222E-02	1.3471E-03	8.8850E-03	6.2265E-04
1.2500E 00	1.9063E-02	1.4022E-03	8.8115E-03	6.4812E-04
9.0000E-01	2.1472E-02	2.0408E-03	9.9250E-03	9.4332E-04
7.0000E-01	1.8316E-02	1.6041E-03	8.4662E-03	7.4148E-04
5.0000E-01	1.7285E-02	1.6503E-03	7.9896E-03	7.6281E-04
3.5000E-01	2.3469E-02	3.2086E-03	1.0848E-02	1.4831E-03
2.5000E-01	1.7625E-02	2.4975E-03	8.1468E-03	1.1544E-03
1.7500E-01	1.6638E-02	2.6394E-03	7.6906E-03	1.2200E-03
7.5000E-02	2.2194E-02	2.9652E-03	1.0259E-02	1.3706E-03

Table F.98 Target Material: Aluminum (Al-27)

Angle: 40 - 50°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	8.6080E-07	6.0557E-07	3.9789E-07	2.7991E-07
4.5000E 02	2.4530E-05	2.9485E-06	1.1338E-05	1.3629E-06
3.5000E 02	1.4290E-04	7.9309E-06	6.6053E-05	3.6659E-06
2.5000E 02	2.9870E-04	1.2605E-05	1.3807E-04	5.8265E-06
1.7500E 02	3.7880E-04	2.0152E-05	1.7509E-04	9.3149E-06
1.2500E 02	5.3370E-04	2.2255E-05	2.4669E-04	1.0287E-05
9.0000E 01	6.9080E-04	3.7096E-05	3.1931E-04	1.7147E-05
7.0000E 01	8.0429E-04	4.7047E-05	3.7177E-04	2.1746E-05
5.0000E 01	1.0339E-03	4.1532E-05	4.7791E-04	1.9197E-05
3.5000E 01	1.2169E-03	6.8972E-05	5.6248E-04	3.1881E-05
2.5000E 01	1.8654E-03	8.5338E-05	8.6224E-04	3.9446E-05
1.7500E 01	2.5008E-03	1.1684E-04	1.1559E-03	5.4005E-05
1.2500E 01	4.0950E-03	1.5071E-04	1.8928E-03	6.9661E-05
9.0000E 00	5.9170E-03	2.8496E-04	2.7350E-03	1.3172E-04
7.0000E 00	7.8390E-03	3.2180E-04	3.6234E-03	1.4875E-04
5.0000E 00	1.0354E-02	3.6710E-04	4.7859E-03	1.6968E-04
3.5000E 00	1.3763E-02	5.5242E-04	6.3617E-03	2.5534E-04
2.5000E 00	1.5740E-02	5.5865E-04	7.2755E-03	2.5822E-04
1.7500E 00	1.6795E-02	8.9935E-04	7.7631E-03	4.1571E-04
1.2500E 00	1.9126E-02	9.4129E-04	8.8406E-03	4.3509E-04
9.0000E-01	2.1443E-02	1.4660E-03	9.9116E-03	6.7765E-04
7.0000E-01	2.0991E-02	1.4143E-03	9.7027E-03	6.5373E-04
5.0000E-01	2.1614E-02	1.5937E-03	9.9906E-03	7.3666E-04
3.5000E-01	2.1658E-02	2.1165E-03	1.0011E-02	9.7830E-04
2.5000E-01	1.9517E-02	2.0827E-03	9.0213E-03	9.6270E-04
1.7500E-01	2.4109E-02	3.2098E-03	1.1144E-02	1.4837E-03
7.5000E-02	2.0904E-02	1.7473E-03	9.6624E-03	8.0764E-04

Table F.99 Target Material: Aluminum (Al-27)

Angle: 50 - 65°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	2.6510E-06	8.3162E-07	1.2254E-06	3.8440E-07
3.5000E 02	2.5300E-05	2.5249E-06	1.1694E-05	1.1671E-06
2.5000E 02	1.2890E-04	5.7489E-06	5.9581E-05	2.6573E-06
1.7500E 02	2.9060E-04	1.3048E-05	1.3432E-04	6.0311E-06
1.2500E 02	4.5250E-04	1.3077E-05	2.0916E-04	6.0447E-06
9.0000E 01	5.8910E-04	2.6922E-05	2.7230E-04	1.2444E-05
7.0000E 01	6.9069E-04	3.0127E-05	3.1926E-04	1.3926E-05
5.0000E 01	9.0262E-04	3.3728E-05	4.1722E-04	1.5590E-05
3.5000E 01	1.1159E-03	5.7256E-05	5.1579E-04	2.6465E-05
2.5000E 01	1.6804E-03	5.7903E-05	7.7673E-04	2.6765E-05
1.7500E 01	2.4728E-03	9.5975E-05	1.1430E-03	4.4362E-05
1.2500E 01	3.9720E-03	1.2544E-04	1.8360E-03	5.7981E-05
9.0000E 00	5.6300E-03	2.1972E-04	2.6024E-03	1.0156E-04
7.0000E 00	7.4600E-03	2.3401E-04	3.4482E-03	1.0817E-04
5.0000E 00	9.7130E-03	2.7397E-04	4.4896E-03	1.2664E-04
3.5000E 00	1.3063E-02	4.1900E-04	6.0381E-03	1.9368E-04
2.5000E 00	1.5971E-02	4.8731E-04	7.3823E-03	2.2525E-04
1.7500E 00	1.6931E-02	8.0897E-04	7.8260E-03	3.7393E-04
1.2500E 00	1.8790E-02	7.8055E-04	8.6853E-03	3.6079E-04
9.0000E-01	1.8661E-02	1.1711E-03	8.6257E-03	5.4133E-04
7.0000E-01	2.1187E-02	1.2321E-03	9.7933E-03	5.6951E-04
5.0000E-01	2.0380E-02	1.2944E-03	9.4202E-03	5.9833E-04
3.5000E-01	2.1191E-02	1.6892E-03	9.7951E-03	7.8080E-04
2.5000E-01	1.9136E-02	1.8508E-03	8.8452E-03	8.5549E-04
1.7500E-01	2.0905E-02	2.3722E-03	9.6629E-03	1.0965E-03
7.5000E-02	2.0259E-02	1.4448E-03	9.3643E-03	6.6783E-04

Table F.100 Target Material: Aluminum (Al-27)

Angle: 65 - 80°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	1.9180E-06	6.1299E-07	8.8656E-07	2.8334E-07
2.5000E 02	3.0040E-05	2.4062E-06	1.3885E-05	1.1122E-06
1.7500E 02	9.8870E-05	6.6638E-06	4.5701E-05	3.0802E-06
1.2500E 02	2.4040E-04	1.0409E-05	1.1112E-04	4.8115E-06
9.0000E 01	4.0590E-04	2.2446E-05	1.8762E-04	1.0375E-05
7.0000E 01	5.5883E-04	2.5852E-05	2.5831E-04	1.1950E-05
5.0000E 01	7.5454E-04	3.0721E-05	3.4877E-04	1.4200E-05
3.5000E 01	1.0135E-03	4.7021E-05	4.6849E-04	2.1734E-05
2.5000E 01	1.4080E-03	4.8269E-05	6.5082E-04	2.2311E-05
1.7500E 01	2.0975E-03	7.0970E-05	9.6953E-04	3.2804E-05
1.2500E 01	3.1910E-03	1.0296E-04	1.4750E-03	4.7591E-05
9.0000E 00	4.7770E-03	1.8761E-04	2.2081E-03	8.6719E-05
7.0000E 00	5.9930E-03	2.0859E-04	2.7701E-03	9.6417E-05
5.0000E 00	8.1910E-03	2.1555E-04	3.7861E-03	9.9632E-05
3.5000E 00	1.1238E-02	3.9925E-04	5.1945E-03	1.8455E-04
2.5000E 00	1.3538E-02	4.0646E-04	6.2577E-03	1.8788E-04
1.7500E 00	1.5376E-02	6.0773E-04	7.1072E-03	2.8091E-04
1.2500E 00	1.6818E-02	6.2107E-04	7.7738E-03	2.8708E-04
9.0000E-01	1.7794E-02	9.3395E-04	8.2249E-03	4.3170E-04
7.0000E-01	1.8249E-02	9.0521E-04	8.4352E-03	4.1841E-04
5.0000E-01	1.9422E-02	9.9798E-04	8.9774E-03	4.6129E-04
3.5000E-01	1.7156E-02	1.2471E-03	7.9300E-03	5.7646E-04
2.5000E-01	2.1891E-02	1.4239E-03	1.0119E-02	6.5816E-04
1.7500E-01	1.8374E-02	1.8258E-03	8.4930E-03	8.4395E-04
7.5000E-02	1.6510E-02	1.0634E-03	7.6314E-03	4.9155E-04

Table F.101 Target Material: Aluminum (Al-27)

Angle: 80 - 100°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	5.3460E-06	9.5586E-07	2.4711E-06	4.4183E-07
1.7500E 02	3.4830E-05	3.6328E-06	1.6099E-05	1.6792E-06
1.2500E 02	1.0300E-04	5.7371E-06	4.7610E-05	2.6519E-06
9.0000E 01	1.8940E-04	1.2008E-05	8.7546E-05	5.5504E-06
7.0000E 01	2.7623E-04	1.3735E-05	1.2768E-04	6.3487E-06
5.0000E 01	4.9084E-04	2.0670E-05	2.2688E-04	9.5542E-06
3.5000E 01	6.8615E-04	3.2682E-05	3.1716E-04	1.5107E-05
2.5000E 01	1.1488E-03	4.0104E-05	5.3101E-04	1.8537E-05
1.7500E 01	1.8205E-03	6.5366E-05	8.4149E-04	3.0214E-05
1.2500E 01	2.9030E-03	9.1902E-05	1.3419E-03	4.2480E-05
9.0000E 00	4.4030E-03	1.6329E-04	2.0352E-03	7.5479E-05
7.0000E 00	5.6330E-03	1.5007E-04	2.6037E-03	6.9367E-05
5.0000E 00	8.1400E-03	1.8894E-04	3.7625E-03	8.7333E-05
3.5000E 00	9.7570E-03	2.9974E-04	4.5100E-03	1.3855E-04
2.5000E 00	1.2969E-02	3.7377E-04	5.9947E-03	1.7277E-04
1.7500E 00	1.4101E-02	4.8596E-04	6.5179E-03	2.2462E-04
1.2500E 00	1.6605E-02	5.8910E-04	7.6753E-03	2.7230E-04
9.0000E-01	1.6255E-02	7.6657E-04	7.5135E-03	3.5433E-04
7.0000E-01	1.7187E-02	7.9341E-04	7.9443E-03	3.6674E-04
5.0000E-01	1.8515E-02	8.2663E-04	8.5582E-03	3.8209E-04
3.5000E-01	1.7453E-02	1.1195E-03	8.0673E-03	5.1746E-04
2.5000E-01	1.9261E-02	1.1051E-03	8.9030E-03	5.1079E-04
1.7500E-01	1.9676E-02	1.7742E-03	9.0948E-03	8.2009E-04
7.5000E-02	1.6370E-02	9.7522E-04	7.5667E-03	4.5077E-04

Table F.102 Target Material: Aluminum (Al-27)  
 Angle: 100 - 120°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	8.1280E-07	3.5609E-07	3.7570E-07	1.6459E-07
1.7500E 02	8.7780E-06	1.7196E-06	4.0575E-06	7.9485E-07
1.2500E 02	3.6090E-05	3.2625E-06	1.6682E-05	1.5080E-06
9.0000E 01	8.6160E-05	9.0123E-06	3.9826E-05	4.1658E-06
7.0000E 01	1.2813E-04	8.9015E-06	5.9226E-05	4.1146E-06
5.0000E 01	2.7204E-04	1.2998E-05	1.2574E-04	6.0080E-06
3.5000E 01	4.5415E-04	2.6997E-05	2.0992E-04	1.2479E-05
2.5000E 01	7.4370E-04	3.1823E-05	3.4376E-04	1.4710E-05
1.7500E 01	1.3513E-03	5.9280E-05	6.2461E-04	2.7401E-05
1.2500E 01	2.2330E-03	7.1220E-05	1.0322E-03	3.2920E-05
9.0000E 00	3.5290E-03	1.2673E-04	1.6312E-03	5.8579E-05
7.0000E 00	4.7320E-03	1.4563E-04	2.1873E-03	6.7313E-05
5.0000E 00	7.0760E-03	1.6766E-04	3.2707E-03	7.7495E-05
3.5000E 00	9.5520E-03	3.1177E-04	4.4152E-03	1.4411E-04
2.5000E 00	1.1843E-02	3.1983E-04	5.4742E-03	1.4784E-04
1.7500E 00	1.3369E-02	5.1168E-04	6.1795E-03	2.3651E-04
1.2500E 00	1.5286E-02	5.5146E-04	7.0656E-03	2.5490E-04
9.0000E-01	1.6180E-02	7.7276E-04	7.4789E-03	3.5719E-04
7.0000E-01	1.5402E-02	7.8683E-04	7.1193E-03	3.6370E-04
5.0000E-01	1.7262E-02	8.8216E-04	7.9790E-03	4.0776E-04
3.5000E-01	1.4441E-02	9.9066E-04	6.6751E-03	4.5791E-04
2.5000E-01	1.6658E-02	1.0059E-03	7.6998E-03	4.6495E-04
1.7500E-01	1.7812E-02	1.7015E-03	8.2332E-03	7.8650E-04
7.5000E-02	1.3511E-02	8.4311E-04	6.2452E-03	3.8971E-04

Table F.103 Target Material: Aluminum (Al-27)

Angle: 120 - 140°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	1.9940E-07	1.9940E-07	9.2169E-08	9.2169E-08
1.7500E 02	4.7860E-06	1.4205E-06	2.2122E-06	6.5659E-07
1.2500E 02	2.2330E-05	3.2713E-06	1.0322E-05	1.5121E-06
9.0000E 01	4.9390E-05	6.5930E-06	2.2830E-05	3.0475E-06
7.0000E 01	6.7800E-05	8.1292E-06	3.1339E-05	3.7576E-06
5.0000E 01	1.2784E-04	1.0715E-05	5.9093E-05	4.9529E-06
3.5000E 01	2.0590E-04	1.8868E-05	9.5173E-05	8.7213E-06
2.5000E 01	4.3020E-04	2.4230E-05	1.9885E-04	1.1200E-05
1.7500E 01	7.1870E-04	4.9294E-05	3.3220E-04	2.2785E-05
1.2500E 01	1.4840E-03	6.8076E-05	6.8595E-04	3.1467E-05
9.0000E 00	2.6140E-03	1.4321E-04	1.2083E-03	6.6196E-05
7.0000E 00	3.9070E-03	1.6397E-04	1.8059E-03	7.5791E-05
5.0000E 00	5.9250E-03	1.9160E-04	2.7387E-03	8.8562E-05
3.5000E 00	7.3260E-03	3.0754E-04	3.3863E-03	1.4215E-04
2.5000E 00	9.8180E-03	3.4864E-04	4.5382E-03	1.6115E-04
1.7500E 00	1.0646E-02	5.2321E-04	4.9209E-03	2.4184E-04
1.2500E 00	1.1383E-02	5.2167E-04	5.2616E-03	2.4113E-04
9.0000E-01	1.3982E-02	8.5017E-04	6.4629E-03	3.9297E-04
7.0000E-01	1.2475E-02	9.2061E-04	5.7663E-03	4.2553E-04
5.0000E-01	1.4420E-02	9.4727E-04	6.6654E-03	4.3785E-04
3.5000E-01	1.3281E-02	1.4152E-03	6.1389E-03	6.5416E-04
2.5000E-01	1.7211E-02	1.5362E-03	7.9554E-03	7.1008E-04
1.7500E-01	1.1755E-02	1.7149E-03	5.4335E-03	7.9269E-04
7.5000E-02	1.1676E-02	9.4111E-04	5.3970E-03	4.3501E-04

Table F.104 Target Material: Aluminum (Al-27)

Angle: 140 - 160°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	0.0000	0.0000	0.0000	0.0000
1.7500E 02	3.0550E-06	1.3384E-06	1.4121E-06	6.1865E-07
1.2500E 02	2.0160E-05	3.4796E-06	9.3186E-06	1.6084E-06
9.0000E 01	3.4140E-05	7.7183E-06	1.5781E-05	3.5676E-06
7.0000E 01	4.8880E-05	8.3731E-06	2.2594E-05	3.8703E-06
5.0000E 01	6.3814E-05	1.0029E-05	2.9497E-05	4.6358E-06
3.5000E 01	1.7410E-04	2.1836E-05	8.0474E-05	1.0093E-05
2.5000E 01	3.6990E-04	2.8878E-05	1.7098E-04	1.3348E-05
1.7500E 01	6.8460E-04	6.0754E-05	3.1644E-04	2.8082E-05
1.2500E 01	1.3086E-03	6.7338E-05	6.0487E-04	3.1126E-05
9.0000E 00	2.3113E-03	1.4221E-04	1.0684E-03	6.5732E-05
7.0000E 00	3.2374E-03	1.5899E-04	1.4964E-03	7.3491E-05
5.0000E 00	5.0500E-03	1.7450E-04	2.3343E-03	8.0660E-05
3.5000E 00	6.8410E-03	3.4868E-04	3.1621E-03	1.6117E-04
2.5000E 00	9.2120E-03	3.8510E-04	4.2581E-03	1.7801E-04
1.7500E 00	9.9100E-03	5.5409E-04	4.5807E-03	2.5612E-04
1.2500E 00	1.1022E-02	5.6977E-04	5.0947E-03	2.6336E-04
9.0000E-01	1.2870E-02	8.5489E-04	5.9489E-03	3.9516E-04
7.0000E-01	1.1575E-02	8.9927E-04	5.3503E-03	4.1567E-04
5.0000E-01	1.3016E-02	9.4471E-04	6.0164E-03	4.3667E-04
3.5000E-01	1.3651E-02	1.4467E-03	6.3099E-03	6.6871E-04
2.5000E-01	1.6664E-02	1.5943E-03	7.7026E-03	7.3693E-04
1.7500E-01	1.0983E-02	1.6112E-03	5.0767E-03	7.4472E-04
7.5000E-02	1.1993E-02	1.1046E-03	5.5435E-03	5.1060E-04



Table F.105 Target Material: Aluminum (Al-27)

Angle: 160 - 180°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	0.0000	0.0000	0.0000	0.0000
1.7500E 02	0.0000	0.0000	0.0000	0.0000
1.2500E 02	1.4070E-05	5.4085E-06	6.5036E-06	2.5000E-06
9.0000E 01	3.5720E-05	1.3537E-05	1.6511E-05	6.2574E-06
7.0000E 01	4.8380E-05	1.3832E-05	2.2363E-05	6.3935E-06
5.0000E 01	7.0224E-05	1.8149E-05	3.2460E-05	8.3892E-06
3.5000E 01	1.3880E-04	3.2791E-05	6.4157E-05	1.5157E-05
2.5000E 01	3.4470E-04	4.5907E-05	1.5933E-04	2.1220E-05
1.7500E 01	5.9340E-04	7.8806E-05	2.7429E-04	3.6427E-05
1.2500E 01	1.1389E-03	1.0245E-04	5.2643E-04	4.7356E-05
9.0000E 00	2.1768E-03	1.8458E-04	1.0062E-03	8.5320E-05
7.0000E 00	2.7779E-03	1.7134E-04	1.2840E-03	7.9197E-05
5.0000E 00	5.1990E-03	2.8410E-04	2.4031E-03	1.3132E-04
3.5000E 00	6.5720E-03	4.2360E-04	3.0378E-03	1.9580E-04
2.5000E 00	8.5460E-03	4.3949E-04	3.9502E-03	2.0314E-04
1.7500E 00	1.0533E-02	7.8540E-04	4.8687E-03	3.6303E-04
1.2500E 00	1.0772E-02	6.7544E-04	4.9791E-03	3.1221E-04
9.0000E-01	1.4269E-02	1.3312E-03	6.5956E-03	6.1533E-04
7.0000E-01	1.1043E-02	1.1219E-03	5.1044E-03	5.1856E-04
5.0000E-01	1.4109E-02	1.3430E-03	6.5216E-03	6.2076E-04
3.5000E-01	1.2049E-02	1.6434E-03	5.5694E-03	7.5965E-04
2.5000E-01	1.4220E-02	1.3594E-03	6.5729E-03	6.2837E-04
1.7500E-01	1.1520E-02	2.2250E-03	5.3249E-03	1.0285E-03
7.5000E-02	1.0135E-02	9.7679E-04	4.6849E-03	4.5150E-04

Table F.106 Target Material: Carbon (C-12)  
 Angle: 0 - 5°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.4360E-03	1.4618E-04	3.7748E-04	3.8428E-05
4.5000E 02	4.4610E-04	7.8960E-05	1.1727E-04	2.0756E-05
3.5000E 02	2.9970E-03	2.0619E-04	7.8782E-04	5.4202E-05
2.5000E 02	5.0050E-03	2.6276E-04	1.3157E-03	6.9072E-05
1.7500E 02	2.1470E-03	2.3059E-04	5.6438E-04	6.0615E-05
1.2500E 02	1.3110E-03	1.7934E-04	3.4462E-04	4.7144E-05
9.0000E 01	1.3245E-03	2.9207E-04	3.4818E-04	7.6778E-05
7.0000E 01	1.0471E-03	2.6914E-04	2.7524E-04	7.0748E-05
5.0000E 01	1.4773E-03	2.8534E-04	3.8833E-04	7.5008E-05
3.5000E 01	1.9955E-03	4.8629E-04	5.2456E-04	1.2783E-04
2.5000E 01	1.5500E-03	4.6485E-04	4.0745E-04	1.2219E-04
1.7500E 01	4.2648E-03	1.0505E-03	1.1211E-03	2.7616E-04
1.2500E 01	1.8896E-03	5.5038E-04	4.9672E-04	1.4468E-04
9.0000E 00	4.8590E-03	1.5294E-03	1.2773E-03	4.0203E-04
7.0000E 00	6.0070E-03	1.6668E-03	1.5791E-03	4.3816E-04
5.0000E 00	5.8510E-03	1.5312E-03	1.5381E-03	4.0250E-04
3.5000E 00	7.5450E-03	2.3970E-03	1.9834E-03	6.3009E-04
2.5000E 00	3.9150E-03	2.1102E-04	1.0291E-03	5.5470E-05
1.7500E 00	4.2020E-03	2.9246E-04	1.1046E-03	7.6879E-05
1.2500E 00	7.6900E-03	2.8058E-03	2.0215E-03	7.3756E-04
9.0000E-01	5.3580E-03	5.3580E-04	1.4085E-03	1.4085E-04
7.0000E-01	2.6640E-02	1.1962E-02	7.0029E-03	3.1445E-03
5.0000E-01	1.2117E-02	6.9875E-03	3.1852E-03	1.8368E-03
3.5000E-01	4.8810E-03	7.2971E-04	1.2831E-03	1.9182E-04
2.5000E-01	7.3210E-03	9.2610E-04	1.9245E-03	2.4345E-04
1.7500E-01	5.0930E-03	1.0059E-03	1.3388E-03	2.6441E-04
7.5000E-02	2.1066E-02	1.3085E-02	5.5376E-03	3.4397E-03

Table F.107 Target Material: Carbon (C-12)

Angle: 5 - 10 °

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	2.2690E-03	1.0437E-04	5.9645E-04	2.7437E-05
4.5000E 02	2.0970E-04	3.2021E-05	5.5124E-05	8.4174E-06
3.5000E 02	5.0780E-04	4.6870E-05	1.3349E-04	1.2321E-05
2.5000E 02	9.1780E-04	6.7642E-05	2.4126E-04	1.7781E-05
1.7500E 02	1.1180E-03	9.7266E-05	2.9389E-04	2.5568E-05
1.2500E 02	1.0810E-03	1.1134E-04	2.8416E-04	2.9269E-05
9.0000E 01	1.3745E-03	1.7230E-04	3.6132E-04	4.5293E-05
7.0000E 01	8.8626E-04	1.3561E-04	2.3297E-04	3.5649E-05
5.0000E 01	1.2943E-03	1.8832E-04	3.4022E-04	4.9504E-05
3.5000E 01	1.5805E-03	2.5693E-04	4.1547E-04	6.7539E-05
2.5000E 01	1.9730E-03	2.8056E-04	5.1864E-04	7.3751E-05
1.7500E 01	2.2248E-03	3.9838E-04	5.8483E-04	1.0472E-04
1.2500E 01	2.8246E-03	4.1181E-04	7.4250E-04	1.0825E-04
9.0000E 00	3.9360E-03	7.3790E-04	1.0347E-03	1.9397E-04
7.0000E 00	3.4560E-03	6.0642E-04	9.0848E-04	1.5941E-04
5.0000E 00	6.0930E-03	9.2710E-04	1.6017E-03	2.4371E-04
3.5000E 00	6.6240E-03	1.2083E-03	1.7412E-03	3.1763E-04
2.5000E 00	9.0400E-03	1.4804E-03	2.3763E-03	3.8914E-04
1.7500E 00	8.8610E-03	2.0620E-03	2.3293E-03	5.4202E-04
1.2500E 00	1.1425E-02	2.4101E-03	3.0033E-03	6.3355E-04
9.0000E-01	5.3580E-03	5.3580E-04	1.4085E-03	1.4085E-04
7.0000E-01	1.9710E-02	5.5871E-03	5.1812E-03	1.4687E-03
5.0000E-01	1.9126E-02	5.5819E-03	5.0276E-03	1.4673E-03
3.5000E-01	4.8810E-03	7.2971E-04	1.2831E-03	1.9182E-04
2.5000E-01	7.3210E-03	9.2610E-04	1.9245E-03	2.4345E-04
1.7500E-01	1.4411E-02	9.3721E-03	3.7882E-03	2.4636E-03
7.5000E-02	5.5820E-03	3.1358E-03	1.4673E-03	8.2430E-04

Table F.108 Target Material: Carbon (C-12)

Angle: 10 - 15°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.8350E-03	6.6427E-05	4.8237E-04	1.7462E-05
4.5000E 02	1.9110E-04	2.0715E-05	5.0234E-05	5.4454E-06
3.5000E 02	4.4670E-04	3.0152E-05	1.1742E-04	7.9261E-06
2.5000E 02	1.0140E-03	5.0193E-05	2.6655E-04	1.3194E-05
1.7500E 02	1.3430E-03	9.4816E-05	3.5303E-04	2.4924E-05
1.2500E 02	1.1180E-03	8.0496E-05	2.9389E-04	2.1160E-05
9.0000E 01	1.0685E-03	1.1139E-04	2.8088E-04	2.9282E-05
7.0000E 01	9.4226E-04	1.0382E-04	2.4769E-04	2.7290E-05
5.0000E 01	1.1513E-03	1.2896E-04	3.0263E-04	3.3899E-05
3.5000E 01	1.2795E-03	1.8875E-04	3.3634E-04	4.9616E-05
2.5000E 01	1.5330E-03	2.0226E-04	4.0298E-04	5.3167E-05
1.7500E 01	2.0468E-03	2.9485E-04	5.3804E-04	7.7508E-05
1.2500E 01	2.7976E-03	3.2697E-04	7.3540E-04	8.5952E-05
9.0000E 00	3.9030E-03	6.7962E-04	1.0260E-03	1.7865E-04
7.0000E 00	4.0730E-03	5.2806E-04	1.0707E-03	1.3881E-04
5.0000E 00	5.3160E-03	5.8653E-04	1.3974E-03	1.5418E-04
3.5000E 00	8.4200E-03	1.1703E-03	2.2134E-03	3.0764E-04
2.5000E 00	6.7250E-03	8.7310E-04	1.7678E-03	2.2951E-04
1.7500E 00	7.5740E-03	1.3729E-03	1.9910E-03	3.6089E-04
1.2500E 00	7.1500E-03	1.1511E-03	1.8795E-03	3.0258E-04
9.0000E-01	5.3580E-03	5.3580E-04	1.4085E-03	1.4085E-04
7.0000E-01	7.1350E-03	1.5041E-03	1.8756E-03	3.9538E-04
5.0000E-01	1.0765E-02	2.8081E-03	2.8298E-03	7.3815E-04
3.5000E-01	1.0500E-02	4.0197E-03	2.7601E-03	1.0567E-03
2.5000E-01	1.5750E-02	4.9054E-03	4.1402E-03	1.2895E-03
1.7500E-01	5.0930E-03	1.0059E-03	1.3388E-03	2.6441E-04
7.5000E-02	6.2220E-03	2.6703E-03	1.6356E-03	7.0195E-04

Table F.109 Target Material: Carbon (C-12)

Angle: 15 - 20°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	8.8370E-04	3.9590E-05	2.3230E-04	1.0407E-05
4.5000E 02	4.6110E-04	3.1355E-05	1.2121E-04	8.2422E-06
3.5000E 02	2.3860E-04	1.9995E-05	6.2721E-05	5.2560E-06
2.5000E 02	7.4220E-04	4.3864E-05	1.9510E-04	1.1531E-05
1.7500E 02	1.1080E-03	6.8142E-05	2.9126E-04	1.7912E-05
1.2500E 02	1.0190E-03	6.4604E-05	2.6786E-04	1.6983E-05
9.0000E 01	9.2063E-04	8.8699E-05	2.4201E-04	2.3316E-05
7.0000E 01	1.0931E-03	9.6099E-05	2.8733E-04	2.5261E-05
5.0000E 01	1.0343E-03	1.0315E-04	2.7188E-04	2.7114E-05
3.5000E 01	1.4795E-03	1.5582E-04	3.8892E-04	4.0961E-05
2.5000E 01	1.4910E-03	1.6379E-04	3.9194E-04	4.3055E-05
1.7500E 01	2.1408E-03	2.7908E-04	5.6275E-04	7.3361E-05
1.2500E 01	2.7156E-03	2.7523E-04	7.1385E-04	7.2350E-05
9.0000E 00	3.3960E-03	4.4024E-04	8.9271E-04	1.1573E-04
7.0000E 00	3.4430E-03	3.8687E-04	9.0506E-04	1.0170E-04
5.0000E 00	5.5010E-03	5.6319E-04	1.4460E-03	1.4805E-04
3.5000E 00	6.1940E-03	7.2838E-04	1.6282E-03	1.9147E-04
2.5000E 00	7.3530E-03	8.4268E-04	1.9329E-03	2.2152E-04
1.7500E 00	7.0330E-03	1.0774E-03	1.8488E-03	2.8323E-04
1.2500E 00	9.3510E-03	1.3106E-03	2.4581E-03	3.4451E-04
9.0000E-01	1.2436E-02	2.6475E-03	3.2690E-03	6.9594E-04
7.0000E-01	1.2808E-02	2.6477E-03	3.3668E-03	6.9599E-04
5.0000E-01	7.1680E-03	1.5012E-03	1.8843E-03	3.9461E-04
3.5000E-01	8.9260E-03	2.9377E-03	2.3464E-03	7.7224E-04
2.5000E-01	9.3430E-03	2.2240E-03	2.4560E-03	5.8462E-04
1.7500E-01	9.1380E-03	4.1682E-03	2.4021E-03	1.0957E-03
7.5000E-02	5.1720E-03	1.9450E-03	1.3596E-03	5.1128E-04

Table F.110 Target Material: Carbon (C-12)

Angle: 20 - 25°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	2.0500E-04	1.6174E-05	5.3888E-05	4.2518E-06
4.5000E 02	5.6250E-04	3.1106E-05	1.4786E-04	8.1769E-06
3.5000E 02	2.0020E-04	2.0901E-05	5.2627E-05	5.4942E-06
2.5000E 02	4.8310E-04	2.8116E-05	1.2699E-04	7.3910E-06
1.7500E 02	7.0560E-04	4.6640E-05	1.8548E-04	1.2260E-05
1.2500E 02	9.9160E-04	6.0190E-05	2.6066E-04	1.5822E-05
9.0000E 01	9.4603E-04	8.8689E-05	2.4868E-04	2.3314E-05
7.0000E 01	8.9096E-04	8.1696E-05	2.3421E-04	2.1475E-05
5.0000E 01	9.2696E-04	8.7015E-05	2.4367E-04	2.2874E-05
3.5000E 01	1.2195E-03	1.4235E-04	3.2057E-04	3.7421E-05
2.5000E 01	1.3800E-03	1.3604E-04	3.6276E-04	3.5760E-05
1.7500E 01	1.9498E-03	2.2972E-04	5.1254E-04	6.0387E-05
1.2500E 01	2.8406E-03	2.2644E-04	7.4671E-04	5.9524E-05
9.0000E 00	2.7250E-03	3.3280E-04	7.1632E-04	8.7483E-05
7.0000E 00	3.4140E-03	3.5439E-04	8.9744E-04	9.3157E-05
5.0000E 00	5.0670E-03	5.2085E-04	1.3320E-03	1.3692E-04
3.5000E 00	5.4290E-03	5.6724E-04	1.4271E-03	1.4911E-04
2.5000E 00	7.7290E-03	8.4488E-04	2.0317E-03	2.2209E-04
1.7500E 00	8.0160E-03	1.0786E-03	2.1072E-03	2.8353E-04
1.2500E 00	8.7160E-03	1.1752E-03	2.2912E-03	3.0892E-04
9.0000E-01	1.6478E-02	3.0389E-03	4.3316E-03	7.9883E-04
7.0000E-01	1.0497E-02	2.2715E-03	2.7593E-03	5.9710E-04
5.0000E-01	6.7350E-03	1.2164E-03	1.7704E-03	3.1976E-04
3.5000E-01	1.2826E-02	3.5564E-03	3.3716E-03	9.3486E-04
2.5000E-01	1.2088E-02	2.8774E-03	3.1776E-03	7.5639E-04
1.7500E-01	5.0930E-03	1.0059E-03	1.3388E-03	2.6441E-04
7.5000E-02	8.8320E-03	2.5649E-03	2.3217E-03	6.7423E-04

Table F.111 Target Material: Carbon (C-12)

Angle: 25 - 35°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	2.9220E-05	4.6986E-06	7.6811E-06	1.2351E-06
4.5000E 02	3.5370E-04	1.4749E-05	9.2977E-05	3.8771E-06
3.5000E 02	3.2500E-04	1.4722E-05	8.5433E-05	3.8701E-06
2.5000E 02	3.2440E-04	1.2230E-05	8.5275E-05	3.2149E-06
1.7500E 02	5.3080E-04	2.6699E-05	1.3953E-04	7.0184E-06
1.2500E 02	6.9150E-04	2.6208E-05	1.8177E-04	6.8892E-06
9.0000E 01	7.6443E-04	4.5455E-05	2.0095E-04	1.1949E-05
7.0000E 01	7.4366E-04	4.7235E-05	1.9549E-04	1.2417E-05
5.0000E 01	9.1106E-04	5.2572E-05	2.3949E-04	1.3820E-05
3.5000E 01	9.0180E-04	6.9627E-05	2.3706E-04	1.8303E-05
2.5000E 01	1.0447E-03	7.5016E-05	2.7462E-04	1.9719E-05
1.7500E 01	1.5298E-03	1.1677E-04	4.0214E-04	3.0696E-05
1.2500E 01	2.3576E-03	1.4104E-04	6.1974E-04	3.7075E-05
9.0000E 00	3.2610E-03	2.2909E-04	8.5722E-04	6.0221E-05
7.0000E 00	3.6210E-03	2.5544E-04	9.5185E-04	6.7148E-05
5.0000E 00	4.9830E-03	3.1544E-04	1.3099E-03	8.2920E-05
3.5000E 00	6.4070E-03	5.0410E-04	1.6842E-03	1.3251E-04
2.5000E 00	7.6280E-03	4.5643E-04	2.0052E-03	1.1998E-04
1.7500E 00	7.7320E-03	6.5080E-04	2.0325E-03	1.7108E-04
1.2500E 00	8.7980E-03	8.3350E-04	2.3127E-03	2.1910E-04
9.0000E-01	9.0100E-03	1.1293E-03	2.3685E-03	2.9685E-04
7.0000E-01	9.0780E-03	1.1795E-03	2.3863E-03	3.1007E-04
5.0000E-01	8.7980E-03	1.1037E-03	2.3127E-03	2.9014E-04
3.5000E-01	9.7510E-03	1.8130E-03	2.5632E-03	4.7659E-04
2.5000E-01	1.0365E-02	1.6236E-03	2.7246E-03	4.2680E-04
1.7500E-01	1.2397E-02	3.0747E-03	3.2588E-03	8.0825E-04
7.5000E-02	6.5340E-03	1.5325E-03	1.7176E-03	4.0285E-04

Table F.112 Target Material: Carbon (C-12)

Angle: 35 - 40 °

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	1.9980E-06	1.4056E-06	5.2521E-07	3.6949E-07
4.5000E 02	7.4920E-05	9.1327E-06	1.9694E-05	2.4007E-06
3.5000E 02	2.8970E-04	1.8483E-05	7.6153E-05	4.8586E-06
2.5000E 02	3.1370E-04	1.6971E-05	8.2462E-05	4.4612E-06
1.7500E 02	3.7560E-04	2.9259E-05	9.8734E-05	7.6914E-06
1.2500E 02	5.5140E-04	3.2533E-05	1.4495E-04	8.5518E-06
9.0000E 01	5.7993E-04	5.3481E-05	1.5245E-04	1.4059E-05
7.0000E 01	6.6536E-04	5.6404E-05	1.7490E-04	1.4827E-05
5.0000E 01	7.9246E-04	5.9576E-05	2.0831E-04	1.5661E-05
3.5000E 01	7.5280E-04	9.4744E-05	1.9789E-04	2.4905E-05
2.5000E 01	1.0051E-03	9.8814E-05	2.6421E-04	2.5975E-05
1.7500E 01	1.5598E-03	1.4468E-04	4.1002E-04	3.8031E-05
1.2500E 01	2.3526E-03	2.0300E-04	6.1843E-04	5.3363E-05
9.0000E 00	3.2720E-03	3.7815E-04	8.6011E-04	9.9404E-05
7.0000E 00	4.2220E-03	3.5935E-04	1.1098E-03	9.4464E-05
5.0000E 00	4.4140E-03	3.6035E-04	1.1603E-03	9.4726E-05
3.5000E 00	6.4600E-03	5.7415E-04	1.6981E-03	1.5093E-04
2.5000E 00	7.2120E-03	5.7275E-04	1.8958E-03	1.5056E-04
1.7500E 00	7.9980E-03	1.0141E-03	2.1024E-03	2.6658E-04
1.2500E 00	8.4980E-03	8.8058E-04	2.2339E-03	2.3148E-04
9.0000E-01	7.8550E-03	1.2181E-03	2.0648E-03	3.2020E-04
7.0000E-01	1.0725E-02	1.5988E-03	2.8193E-03	4.2028E-04
5.0000E-01	9.1420E-03	1.4438E-03	2.4032E-03	3.7954E-04
3.5000E-01	1.0875E-02	2.8695E-03	2.8587E-03	7.5432E-04
2.5000E-01	1.1317E-02	2.1747E-03	2.9749E-03	5.7166E-04
1.7500E-01	7.0910E-03	2.2369E-03	1.8640E-03	5.8802E-04
7.5000E-02	6.4720E-03	1.6470E-03	1.7013E-03	4.3295E-04



Table F.113 Target Material: Carbon (C-12)  
 Angle: 40 - 50°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	8.6080E-07	6.0557E-07	2.2628E-07	1.5919E-07
4.5000E 02	1.6790E-05	2.6595E-06	4.4136E-06	6.9911E-07
3.5000E 02	1.0980E-04	6.7417E-06	2.8863E-05	1.7722E-06
2.5000E 02	2.8450E-04	1.0214E-05	7.4786E-05	2.6848E-06
1.7500E 02	3.4090E-04	1.7590E-05	8.9612E-05	4.6240E-06
1.2500E 02	4.2090E-04	1.9488E-05	1.1064E-04	5.1227E-06
9.0000E 01	5.0193E-04	3.0289E-05	1.3194E-04	7.9621E-06
7.0000E 01	5.6916E-04	3.5741E-05	1.4962E-04	9.3953E-06
5.0000E 01	6.6316E-04	3.6403E-05	1.7432E-04	9.5692E-06
3.5000E 01	8.4840E-04	5.8385E-05	2.2302E-04	1.5348E-05
2.5000E 01	1.1072E-03	6.4729E-05	2.9105E-04	1.7015E-05
1.7500E 01	1.5488E-03	1.0384E-04	4.0713E-04	2.7298E-05
1.2500E 01	2.2376E-03	1.1108E-04	5.8820E-04	2.9199E-05
9.0000E 00	2.6870E-03	2.1065E-04	7.0633E-04	5.5373E-05
7.0000E 00	4.1710E-03	2.6610E-04	1.0964E-03	6.9949E-05
5.0000E 00	4.6690E-03	2.4598E-04	1.2273E-03	6.4660E-05
3.5000E 00	6.0320E-03	4.1335E-04	1.5856E-03	1.0866E-04
2.5000E 00	7.1430E-03	4.2953E-04	1.8777E-03	1.1291E-04
1.7500E 00	6.9570E-03	5.6861E-04	1.8288E-03	1.4947E-04
1.2500E 00	8.6900E-03	6.1164E-04	2.2843E-03	1.6078E-04
9.0000E-01	8.3710E-03	9.7159E-04	2.2005E-03	2.5540E-04
7.0000E-01	9.8190E-03	1.0041E-03	2.5811E-03	2.6394E-04
5.0000E-01	9.2350E-03	1.0216E-03	2.4276E-03	2.6855E-04
3.5000E-01	1.1337E-02	1.7080E-03	2.9802E-03	4.4898E-04
2.5000E-01	9.0430E-03	1.2556E-03	2.3771E-03	3.3007E-04
1.7500E-01	1.1119E-02	2.4257E-03	2.9228E-03	6.3764E-04
7.5000E-02	5.3450E-03	9.6646E-04	1.4050E-03	2.5405E-04

Table F.114 Target Material: Carbon (C-12)

Angle: 50 - 65°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	4.8190E-07	3.3902E-07	1.2668E-07	8.9117E-08
3.5000E 02	1.9520E-05	2.2643E-06	5.1312E-06	5.9522E-07
2.5000E 02	1.0840E-04	5.0081E-06	2.8495E-05	1.3165E-06
1.7500E 02	2.6650E-04	1.1006E-05	7.0055E-05	2.8933E-06
1.2500E 02	3.5710E-04	1.2891E-05	9.3871E-05	3.3887E-06
9.0000E 01	4.7523E-04	2.0039E-05	1.2492E-04	5.2677E-06
7.0000E 01	5.3236E-04	2.2805E-05	1.3994E-04	5.9947E-06
5.0000E 01	6.8196E-04	2.6514E-05	1.7927E-04	6.9698E-06
3.5000E 01	7.5670E-04	3.9651E-05	1.9891E-04	1.0423E-05
2.5000E 01	1.0355E-03	4.4997E-05	2.7220E-04	1.1828E-05
1.7500E 01	1.3868E-03	7.7523E-05	3.6455E-04	2.0379E-05
1.2500E 01	2.1526E-03	9.8664E-05	5.6585E-04	2.5936E-05
9.0000E 00	3.0610E-03	1.7137E-04	8.0464E-04	4.5049E-05
7.0000E 00	4.0060E-03	1.9201E-04	1.0531E-03	5.0475E-05
5.0000E 00	4.3780E-03	1.9886E-04	1.1508E-03	5.2273E-05
3.5000E 00	5.6520E-03	2.8182E-04	1.4857E-03	7.4082E-05
2.5000E 00	6.9510E-03	3.1878E-04	1.8272E-03	8.3796E-05
1.7500E 00	7.8160E-03	4.6744E-04	2.0546E-03	1.2288E-04
1.2500E 00	8.4200E-03	4.8484E-04	2.2134E-03	1.2745E-04
9.0000E-01	8.9720E-03	8.4388E-04	2.3585E-03	2.2183E-04
7.0000E-01	9.4650E-03	8.6505E-04	2.4881E-03	2.2740E-04
5.0000E-01	8.1580E-03	7.7000E-04	2.1445E-03	2.0241E-04
3.5000E-01	9.7000E-03	1.3500E-03	2.5498E-03	3.5488E-04
2.5000E-01	1.2381E-02	1.4774E-03	3.2546E-03	3.8837E-04
1.7500E-01	7.0210E-03	1.3831E-03	1.8456E-03	3.6358E-04
7.5000E-02	4.7250E-03	7.0688E-04	1.2421E-03	1.8582E-04

Table F.115 Target Material: Carbon (C-12)

Angle: 65 - 80°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	1.0650E-06	4.6658E-07	2.7996E-07	1.2265E-07
2.5000E 02	1.8750E-05	2.1037E-06	4.9288E-06	5.5301E-07
1.7500E 02	7.5860E-05	5.5378E-06	1.9941E-05	1.4557E-06
1.2500E 02	1.9310E-04	9.1336E-06	5.0760E-05	2.4010E-06
9.0000E 01	3.2820E-04	1.8281E-05	8.6274E-05	4.8054E-06
7.0000E 01	4.3440E-04	2.2162E-05	1.1419E-04	5.8256E-06
5.0000E 01	5.1591E-04	2.6574E-05	1.3562E-04	6.9855E-06
3.5000E 01	7.5210E-04	4.2352E-05	1.9770E-04	1.1133E-05
2.5000E 01	9.0796E-04	4.8409E-05	2.3868E-04	1.2725E-05
1.7500E 01	1.2910E-03	7.4372E-05	3.3936E-04	1.9550E-05
1.2500E 01	1.7347E-03	7.7162E-05	4.5600E-04	2.0283E-05
9.0000E 00	2.2236E-03	1.3404E-04	5.8452E-04	3.5236E-05
7.0000E 00	2.8190E-03	1.3405E-04	7.4103E-04	3.5237E-05
5.0000E 00	3.9160E-03	1.7445E-04	1.0294E-03	4.5858E-05
3.5000E 00	5.2260E-03	3.0649E-04	1.3738E-03	8.0568E-05
2.5000E 00	5.6560E-03	2.5124E-04	1.4868E-03	6.6042E-05
1.7500E 00	6.5270E-03	4.1644E-04	1.7158E-03	1.0947E-04
1.2500E 00	6.8560E-03	3.9115E-04	1.8022E-03	1.0282E-04
9.0000E-01	7.4150E-03	7.4849E-04	1.9492E-03	1.9676E-04
7.0000E-01	8.8740E-03	7.1793E-04	2.3327E-03	1.8872E-04
5.0000E-01	7.3340E-03	7.6403E-04	1.9279E-03	2.0084E-04
3.5000E-01	7.5980E-03	1.0061E-03	1.9973E-03	2.6448E-04
2.5000E-01	8.5050E-03	9.8124E-04	2.2357E-03	2.5794E-04
1.7500E-01	9.4630E-03	1.5258E-03	2.4875E-03	4.0108E-04
7.5000E-02	7.0170E-03	8.2537E-04	1.8446E-03	2.1697E-04

Table F.116 Target Material: Carbon (C-12)

Angle: 80 - 100°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	1.5280E-07	1.5280E-07	4.0167E-08	4.0166E-08
2.5000E 02	4.5830E-06	8.5473E-07	1.2047E-06	2.2468E-07
1.7500E 02	2.0770E-05	2.2515E-06	5.4598E-06	5.9184E-07
1.2500E 02	7.3320E-05	5.1177E-06	1.9274E-05	1.3453E-06
9.0000E 01	1.2300E-04	1.1230E-05	3.2333E-05	2.9520E-06
7.0000E 01	1.9630E-04	1.2110E-05	5.1600E-05	3.1834E-06
5.0000E 01	2.9781E-04	1.5541E-05	7.8285E-05	4.0854E-06
3.5000E 01	4.7580E-04	2.5021E-05	1.2507E-04	6.5774E-06
2.5000E 01	6.6326E-04	3.2575E-05	1.7435E-04	8.5631E-06
1.7500E 01	9.9110E-04	5.0873E-05	2.6053E-04	1.3373E-05
1.2500E 01	1.4288E-03	6.3303E-05	3.7559E-04	1.6640E-05
9.0000E 00	1.9656E-03	1.0432E-04	5.1670E-04	2.7423E-05
7.0000E 00	2.4770E-03	1.1977E-04	6.5113E-04	3.1483E-05
5.0000E 00	3.4500E-03	1.3834E-04	9.0690E-04	3.6365E-05
3.5000E 00	4.3720E-03	2.0206E-04	1.1493E-03	5.3115E-05
2.5000E 00	5.0860E-03	2.0156E-04	1.3370E-03	5.2984E-05
1.7500E 00	5.9810E-03	3.4470E-04	1.5722E-03	9.0612E-05
1.2500E 00	6.3420E-03	3.4045E-04	1.6671E-03	8.9493E-05
9.0000E-01	6.5720E-03	6.3192E-04	1.7276E-03	1.6611E-04
7.0000E-01	8.4600E-03	6.4535E-04	2.2239E-03	1.6964E-04
5.0000E-01	7.3760E-03	5.9651E-04	1.9389E-03	1.5680E-04
3.5000E-01	8.4340E-03	9.5246E-04	2.2170E-03	2.5037E-04
2.5000E-01	7.4190E-03	8.2522E-04	1.9502E-03	2.1693E-04
1.7500E-01	7.8300E-03	1.2524E-03	2.0583E-03	3.2921E-04
7.5000E-02	7.4780E-03	7.3490E-04	1.9657E-03	1.9318E-04

Table F.117 Target Material: Carbon (C-12)

Angle: 100 - 120 °

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	0.0000	0.0000	0.0000	0.0000
1.7500E 02	6.8280E-06	1.6851E-06	1.7949E-06	4.4298E-07
1.2500E 02	2.0160E-05	2.3466E-06	5.2995E-06	6.1686E-07
9.0000E 01	4.8770E-05	6.6376E-06	1.2820E-05	1.7448E-06
7.0000E 01	9.1016E-05	9.2497E-06	2.3925E-05	2.4315E-06
5.0000E 01	1.4841E-04	1.1443E-05	3.9012E-05	3.0081E-06
3.5000E 01	1.9950E-04	1.8185E-05	5.2443E-05	4.7804E-06
2.5000E 01	3.8106E-04	2.0835E-05	1.0017E-04	5.4768E-06
1.7500E 01	7.3890E-04	4.2608E-05	1.9423E-04	1.1200E-05
1.2500E 01	1.1222E-03	5.0872E-05	2.9499E-04	1.3373E-05
9.0000E 00	1.7217E-03	9.8138E-05	4.5258E-04	2.5797E-05
7.0000E 00	2.1330E-03	9.2413E-05	5.6070E-04	2.4293E-05
5.0000E 00	3.1750E-03	1.4622E-04	8.3461E-04	3.8437E-05
3.5000E 00	3.7530E-03	1.7529E-04	9.8655E-04	4.6079E-05
2.5000E 00	4.5280E-03	2.0175E-04	1.1903E-03	5.3033E-05
1.7500E 00	5.5800E-03	3.6772E-04	1.4668E-03	9.6663E-05
1.2500E 00	6.1180E-03	3.4715E-04	1.6082E-03	9.1255E-05
9.0000E-01	5.8500E-03	4.8512E-04	1.5378E-03	1.2752E-04
7.0000E-01	7.2840E-03	5.3086E-04	1.9147E-03	1.3955E-04
5.0000E-01	6.3570E-03	5.0016E-04	1.6711E-03	1.3148E-04
3.5000E-01	6.5660E-03	7.8237E-04	1.7260E-03	2.0566E-04
2.5000E-01	5.9690E-03	6.9432E-04	1.5691E-03	1.8252E-04
1.7500E-01	6.7260E-03	1.0649E-03	1.7681E-03	2.7993E-04
7.5000E-02	6.8590E-03	7.1705E-04	1.8030E-03	1.8849E-04

Table F.118 Target Material: Carbon (C-12)

Angle: 120 - 140°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	3.9880E-07	2.8056E-07	1.0483E-07	7.3750E-08
1.7500E 02	3.1910E-06	1.2266E-06	8.3882E-07	3.2244E-07
1.2500E 02	1.8350E-05	2.8020E-06	4.8237E-06	7.3657E-07
9.0000E 01	2.9910E-05	5.3958E-06	7.8624E-06	1.4184E-06
7.0000E 01	3.4430E-05	5.7333E-06	9.0507E-06	1.5071E-06
5.0000E 01	6.9922E-05	7.5577E-06	1.8380E-05	1.9867E-06
3.5000E 01	1.2219E-04	1.4537E-05	3.2120E-05	3.8214E-06
2.5000E 01	2.3031E-04	2.2043E-05	6.0542E-05	5.7945E-06
1.7500E 01	4.1420E-04	4.0798E-05	1.0888E-04	1.0724E-05
1.2500E 01	6.3690E-04	4.3811E-05	1.6742E-04	1.1517E-05
9.0000E 00	1.2610E-03	1.0094E-04	3.3148E-04	2.6534E-05
7.0000E 00	1.4771E-03	1.0630E-04	3.8828E-04	2.7944E-05
5.0000E 00	1.9374E-03	1.1658E-04	5.0928E-04	3.0645E-05
3.5000E 00	3.0190E-03	2.0873E-04	7.9360E-04	5.4868E-05
2.5000E 00	3.5710E-03	2.3786E-04	9.3871E-04	6.2527E-05
1.7500E 00	3.9520E-03	3.5422E-04	1.0389E-03	9.3114E-05
1.2500E 00	4.6140E-03	3.6291E-04	1.2129E-03	9.5398E-05
9.0000E-01	5.2430E-03	6.2866E-04	1.3782E-03	1.6526E-04
7.0000E-01	5.2560E-03	6.0351E-04	1.3816E-03	1.5865E-04
5.0000E-01	5.6740E-03	6.3238E-04	1.4915E-03	1.6623E-04
3.5000E-01	5.0290E-03	7.7141E-04	1.3220E-03	2.0278E-04
2.5000E-01	4.8040E-03	7.8627E-04	1.2628E-03	2.0669E-04
1.7500E-01	4.3540E-03	1.1057E-03	1.1445E-03	2.9066E-04
7.5000E-02	4.6900E-03	7.0553E-04	1.2329E-03	1.8546E-04

Table F.119 Target Material: Carbon (C-12)

Angle: 140 - 160°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	0.0000	0.0000	0.0000	0.0000
1.7500E 02	3.6660E-06	1.6974E-06	9.6368E-07	4.4618E-07
1.2500E 02	1.8940E-05	3.7539E-06	4.9788E-06	9.8679E-07
9.0000E 01	3.8190E-05	8.2338E-06	1.0039E-05	2.1644E-06
7.0000E 01	3.2610E-05	6.9879E-06	8.5723E-06	1.8369E-06
5.0000E 01	5.8642E-05	8.9237E-06	1.5415E-05	2.3458E-06
3.5000E 01	5.7368E-05	1.2406E-05	1.5080E-05	3.2610E-06
2.5000E 01	1.4961E-04	1.8807E-05	3.9328E-05	4.9437E-06
1.7500E 01	3.0030E-04	3.4414E-05	7.8940E-05	9.0465E-06
1.2500E 01	5.8960E-04	4.7546E-05	1.5499E-04	1.2498E-05
9.0000E 00	1.0313E-03	1.0262E-04	2.7110E-04	2.6975E-05
7.0000E 00	1.2733E-03	1.0380E-04	3.3471E-04	2.7287E-05
5.0000E 00	1.7527E-03	1.3251E-04	4.6073E-04	3.4833E-05
3.5000E 00	2.6384E-03	2.0400E-04	6.9356E-04	5.3626E-05
2.5000E 00	2.8777E-03	2.1665E-04	7.5646E-04	5.6951E-05
1.7500E 00	3.5714E-03	3.6222E-04	9.3881E-04	9.5218E-05
1.2500E 00	4.2590E-03	3.7001E-04	1.1196E-03	9.7265E-05
9.0000E-01	4.5170E-03	6.0014E-04	1.1874E-03	1.5776E-04
7.0000E-01	4.7300E-03	5.6777E-04	1.2434E-03	1.4925E-04
5.0000E-01	5.2010E-03	6.9198E-04	1.3672E-03	1.8190E-04
3.5000E-01	4.9485E-03	8.2380E-04	1.3008E-03	2.1655E-04
2.5000E-01	4.8300E-03	9.7078E-04	1.2697E-03	2.5519E-04
1.7500E-01	3.3700E-03	9.8949E-04	8.8587E-04	2.6011E-04
7.5000E-02	3.8470E-03	6.9410E-04	1.0113E-03	1.8246E-04

Table F.120 Target Material: Carbon  
 Angle: 160 - 180°

energy (MeV)	yield (1/sr/MeV)	error (1 $\sigma$ )	x-section (b/sr/MeV)	error (1 $\sigma$ )
5.5000E 02	0.0000	0.0000	0.0000	0.0000
4.5000E 02	0.0000	0.0000	0.0000	0.0000
3.5000E 02	0.0000	0.0000	0.0000	0.0000
2.5000E 02	0.0000	0.0000	0.0000	0.0000
1.7500E 02	3.5190E-06	2.4756E-06	9.2504E-07	6.5076E-07
1.2500E 02	1.5830E-05	5.0593E-06	4.1612E-06	1.3299E-06
9.0000E 01	3.5190E-05	1.1993E-05	9.2504E-06	3.1525E-06
7.0000E 01	4.8910E-05	1.3842E-05	1.2857E-05	3.6386E-06
5.0000E 01	4.1712E-05	1.2696E-05	1.0965E-05	3.3374E-06
3.5000E 01	6.1268E-05	2.1194E-05	1.6105E-05	5.5713E-06
2.5000E 01	1.2798E-04	2.6291E-05	3.3642E-05	6.9111E-06
1.7500E 01	2.2870E-04	4.4957E-05	6.0118E-05	1.1818E-05
1.2500E 01	6.1230E-04	7.2803E-05	1.6096E-04	1.9138E-05
9.0000E 00	8.3690E-04	1.1935E-04	2.2000E-04	3.1374E-05
7.0000E 00	1.0771E-03	1.5410E-04	2.8314E-04	4.0509E-05
5.0000E 00	1.5778E-03	1.6191E-04	4.1476E-04	4.2560E-05
3.5000E 00	2.6627E-03	2.9866E-04	6.9994E-04	7.8508E-05
2.5000E 00	3.1426E-03	3.2093E-04	8.2609E-04	8.4363E-05
1.7500E 00	3.7720E-03	5.0470E-04	9.9154E-04	1.3267E-04
1.2500E 00	4.5050E-03	5.4885E-04	1.1842E-03	1.4428E-04
9.0000E-01	3.8878E-03	6.3266E-04	1.0220E-03	1.6631E-04
7.0000E-01	4.9810E-03	8.5914E-04	1.3094E-03	2.2584E-04
5.0000E-01	4.4188E-03	6.7202E-04	1.1616E-03	1.7665E-04
3.5000E-01	4.9117E-03	1.0854E-03	1.2911E-03	2.8533E-04
2.5000E-01	8.0060E-03	2.0259E-03	2.1045E-03	5.3255E-04
1.7500E-01	2.7590E-03	7.7831E-04	7.2526E-04	2.0459E-04
7.5000E-02	4.5880E-03	1.1373E-03	1.2060E-03	2.9896E-04



APPENDIX G

Inelastic Cross Sections for 590 MeV Protons  
as a Function of Mass Number

Table G.1 Inelastic cross section for protons of 590 MeV  
as a function of mass number

mass number	inelastic cross section (barn)
2.380E+02	1.849E+00
2.070E+02	1.683E+00
1.810E+02	1.563E+00
1.150E+02	1.183E+00
9.300E+01	1.035E+00
5.600E+01	7.486E-01
2.700E+01	4.622E-01
1.200E+01	2.629E-01

APPENDIX H

Secondary Particle Yields vs Mass Number

Table H.1 Particle yield vs mass number

mass number	neutrons	protons	deuterons	tritons
2.380E+02	1.626E+01	2.121E+00	3.308E-01	2.117E-01
2.070E+02	1.151E+01	1.666E+00	5.334E-01	5.670E-01
1.810E+02	1.144E+01	2.003E+00	4.823E-01	1.257E-01
1.150E+02	7.731E+00	2.336E+00	3.196E-01	1.367E-01
9.300E+01	5.920E+00	3.122E+00	3.724E-01	8.710E-02
5.600E+01	4.116E+00	3.555E+00	2.281E-01	4.810E-02
2.700E+01	2.519E+00	2.903E+00	1.753E-01	4.740E-02
1.200E+01	1.541E+00	2.373E+00	9.700E-02	6.570E-03

mass number	helium-3	helium-4	$\pi^+$	$\pi^0$	$\pi^-$
2.380E+02	9.470E-03	5.084E-01	7.290E-02	9.420E-02	4.770E-02
2.070E+02	1.990E-02	1.125E+00	8.150E-02	8.850E-02	4.680E-02
1.810E+02	7.900E-03	9.901E-01	8.190E-02	9.480E-02	4.670E-02
1.150E+02	2.540E-02	1.250E+00	9.460E-02	9.750E-02	4.510E-02
9.300E+01	4.870E-02	8.078E-01	9.760E-02	9.990E-02	4.250E-02
5.600E+01	4.480E-02	3.287E-01	1.087E-01	9.950E-02	4.130E-02
2.700E+01	5.480E-02	3.955E-01	1.278E-01	9.760E-02	3.970E-02
1.200E+01	1.510E-02	5.606E-01	1.363E-01	1.020E-01	3.500E-02

APPENDIX I

Differential Neutron Yields of  
590 MeV Protons versus Neutron Emission  
Angle and Energy

Table I.1 Target Material: Uranium (U-238)  
neutrons/sr/proton

energy (MeV)	emission angles (degrees)				
	0-5	5-10	10-15	15-20	20-25
> 500.00	1.014E-01	9.000E-02	7.407E-02	4.068E-02	1.065E-02
> 200.00	4.372E-01	1.975E-01	1.864E-01	1.521E-01	1.074E-01
> 100.00	5.623E-01	3.113E-01	2.816E-01	2.441E-01	1.952E-01
> 60.00	6.352E-01	3.696E-01	3.400E-01	2.990E-01	2.434E-01
> 15.00	7.808E-01	5.187E-01	4.981E-01	4.503E-01	3.860E-01

Table I.1 Continuation

energy (MeV)	emission angles (degrees)				
	25-35	35-40	40-50	50-65	65-80
> 500.00	1.591E-03	1.135E-04	0.000	0.000	0.000
> 200.00	7.982E-02	5.608E-02	3.806E-02	1.838E-02	4.456E-03
> 100.00	1.518E-01	1.193E-01	9.249E-02	6.613E-02	3.063E-02
> 60.00	2.064E-01	1.648E-01	1.374E-01	1.040E-01	5.884E-02
> 15.00	3.486E-01	2.976E-01	2.637E-01	2.171E-01	1.608E-01

Table I.1 Continuation

energy (MeV)	emission angles (degrees)				
	80-100	100-120	120-140	140-160	160-180
> 500.00	0.000	0.000	0.000	0.000	0.000
> 200.00	1.215E-03	1.108E-04	2.266E-05	0.000	0.000
> 100.00	1.258E-02	4.304E-03	1.858E-03	1.354E-03	8.999E-04
> 60.00	3.017E-02	1.335E-02	6.164E-03	5.034E-03	4.298E-03
> 15.00	1.120E-01	7.072E-02	4.823E-02	3.700E-02	3.138E-02

Table I.2 Target Material: Lead (Pb-207)  
neutrons/sr/proton

energy (MeV)	emission angles (degrees)				
	0-5	5-10	10-15	15-20	20-25
> 500.00	9.062E-02	1.072E-01	8.148E-02	3.863E-02	1.494E-02
> 200.00	4.851E-01	2.260E-01	1.880E-01	1.341E-01	1.111E-01
> 100.00	6.217E-01	3.480E-01	2.866E-01	2.253E-01	1.951E-01
> 60.00	7.137E-01	4.100E-01	3.428E-01	2.855E-01	2.535E-01
> 15.00	8.650E-01	5.444E-01	4.752E-01	4.267E-01	3.817E-01

Table I.2 Continuation

energy (MeV)	emission angles (degrees)				
	25-35	35-40	40-50	50-65	65-80
> 500.00	1.643E-03	0.000	4.304E-05	0.000	0.000
> 200.00	8.028E-02	6.024E-02	3.934E-02	1.752E-02	4.943E-03
> 100.00	1.542E-01	1.240E-01	9.443E-02	6.340E-02	3.094E-02
> 60.00	2.057E-01	1.732E-01	1.378E-01	1.027E-01	6.230E-02
> 15.00	3.320E-01	2.928E-01	2.533E-01	2.050E-01	1.544E-01

Table I.2 Continuation

energy (MeV)	emission angles (degrees)				
	80-100	100-120	120-140	140-160	160-180
> 500.00	0.000	0.000	0.000	0.000	0.000
> 200.00	8.249E-04	9.754E-05	1.994E-05	3.055E-05	0.000
> 100.00	1.229E-02	4.276E-03	1.794E-03	1.650E-03	7.919E-04
> 60.00	3.014E-02	1.312E-02	6.400E-03	5.194E-03	3.607E-03
> 15.00	9.867E-02	6.170E-02	3.683E-02	2.811E-02	2.272E-02

Table I.3 Target Material: Tantalum (Ta-181)  
neutrons/sr/proton)

energy (MeV)	emission angles (degrees)				
	0-5	5-10	10-15	15-20	20-25
> 500.00	1.074E-01	1.058E-01	9.103E-02	4.206E-02	1.398E-02
> 200.00	4.616E-01	2.251E-01	2.012E-01	1.490E-01	1.147E-01
> 100.00	5.954E-01	3.369E-01	3.099E-01	2.469E-01	2.031E-01
> 60.00	6.610E-01	3.970E-01	3.748E-01	3.068E-01	2.614E-01
> 15.00	7.853E-01	5.482E-01	5.127E-01	4.376E-01	3.937E-01

Table I.3 Continuation

energy (MeV)	emission angles (degrees)				
	25-35	35-40	40-50	50-65	65-80
> 500.00	1.583E-03	9.989E-05	4.304E-05	0.000	0.000
> 200.00	8.163E-02	5.954E-02	4.167E-02	1.757E-02	5.497E-03
> 100.00	1.564E-01	1.254E-01	9.771E-02	6.432E-02	2.996E-02
> 60.00	2.083E-01	1.713E-01	1.407E-01	1.022E-01	5.958E-02
> 15.00	3.322E-01	2.896E-01	2.562E-01	2.054E-01	1.482E-01

Table I.3 Continuation

energy (MeV)	emission angles (degrees)				
	80-100	100-120	120-140	140-160	160-180
> 500.00	0.000	0.000	0.000	0.000	0.000
> 200.00	9.929E-04	2.438E-04	3.988E-05	0.000	0.000
> 100.00	1.200E-02	4.145E-03	1.695E-03	1.100E-03	1.143E-03
> 60.00	2.890E-02	1.291E-02	6.620E-03	4.247E-03	3.343E-03
> 15.00	9.753E-02	5.936E-02	3.680E-02	2.769E-02	2.439E-02



Table I.4 Target Material: Indium (In-115)  
neutrons/sr/protons

energy (MeV)	emission angles (degrees)				
	0-5	5-10	10-15	15-20	20-25
> 500.00	9.201E-02	1.360E-01	9.806E-02	4.833E-02	1.494E-02
> 200.00	4.851E-01	2.786E-01	2.228E-01	1.656E-01	1.271E-01
> 100.00	6.301E-01	3.950E-01	3.228E-01	2.625E-01	2.220E-01
> 60.00	7.026E-01	4.612E-01	3.776E-01	3.207E-01	2.741E-01
> 15.00	8.295E-01	5.768E-01	5.004E-01	4.425E-01	3.926E-01

Table I.4 Continuation

energy (MeV)	emission angles (degrees)				
	25-35	35-40	40-50	50-65	65-80
> 500.00	3.348E-03	1.998E-04	0.000	0.000	0.000
> 200.00	8.717E-02	6.183E-02	4.459E-02	1.607E-02	4.368E-03
> 100.00	1.561E-01	1.258E-01	1.010E-01	5.843E-02	2.717E-02
> 60.00	2.014E-01	1.698E-01	1.400E-01	9.395E-02	5.376E-02
> 15.00	3.124E-01	2.772E-01	2.391E-01	1.866E-01	1.321E-01

Table I.4 Continuation

energy (MeV)	emission angles (degrees)				
	80-100	100-120	120-140	140-160	160-180
> 500.00	0.000	0.000	0.000	0.000	0.000
> 200.00	7.638E-04	1.300E-04	1.994E-05	0.000	0.000
> 100.00	1.028E-02	3.722E-03	2.034E-03	1.222E-03	1.319E-03
> 60.00	2.571E-02	1.112E-02	6.502E-03	4.460E-03	4.662E-03
> 15.00	8.456E-02	5.141E-02	3.292E-02	2.374E-02	2.014E-02

Table I.5 Target Material: Niobium (Nb-93)  
neutrons/sr/proton

energy (MeV)	emission angles (degrees)				
	0-5	5-10	10-15	15-20	20-25
> 500.00	1.213E-01	1.183E-01	1.042E-01	5.359E-02	1.621E-02
> 200.00	6.106E-01	2.627E-01	2.430E-01	1.826E-01	1.319E-01
> 100.00	7.598E-01	3.778E-01	3.571E-01	2.843E-01	2.245E-01
> 60.00	8.281E-01	4.281E-01	4.096E-01	3.377E-01	2.784E-01
> 15.00	9.478E-01	5.477E-01	5.092E-01	4.452E-01	3.943E-01

Table I.5 Continuation

energy (MeV)	emission angles (degrees)				
	25-35	35-40	40-50	50-65	65-80
> 500.00	2.496E-03	2.997E-04	8.608E-05	0.000	0.000
> 200.00	8.851E-02	6.253E-02	4.231E-02	1.585E-02	4.560E-03
> 100.00	1.645E-01	1.277E-01	9.981E-02	5.898E-02	2.753E-02
> 60.00	2.120E-01	1.705E-01	1.377E-01	9.231E-02	5.391E-02
> 15.00	3.149E-01	2.638E-01	2.281E-01	1.806E-01	1.263E-01

Table I.5 Continuation

energy (MeV)	emission angles (degrees)				
	80-100	100-120	120-140	140-160	160-180
> 500.00	0.000	0.000	0.000	0.000	0.000
> 200.00	7.943E-04	9.754E-05	0.000	6.110E-05	0.000
> 100.00	9.900E-03	3.853E-03	1.934E-03	1.344E-03	9.674E-04
> 60.00	2.345E-02	1.091E-02	5.842E-03	3.819E-03	4.311E-03
> 15.00	7.691E-02	4.640E-02	2.796E-02	2.150E-02	1.841E-02

Table I.6 Target Material: Iron (Fe-56)  
neutrons/sr/proton

energy (MeV)	emission angles (degrees)				
	0-5	5-10	10-15	15-20	20-25
> 500.00	1.004E-01	1.565E-01	1.191E-01	5.703E-02	1.923E-02
> 200.00	6.525E-01	3.154E-01	2.587E-01	1.911E-01	1.429E-01
> 100.00	8.156E-01	4.388E-01	3.683E-01	2.918E-01	2.380E-01
> 60.00	8.853E-01	4.975E-01	4.183E-01	3.386E-01	2.846E-01
> 15.00	9.890E-01	6.020E-01	5.138E-01	4.357E-01	3.774E-01

Table I.6 Continuation

energy (MeV)	emission angles (degrees)				
	25-35	35-40	40-50	50-65	65-80
> 500.00	3.287E-03	3.996E-04	0.000	0.000	0.000
> 200.00	9.483E-02	6.753E-02	4.592E-02	1.595E-02	4.326E-03
> 100.00	1.684E-01	1.257E-01	9.602E-02	5.583E-02	2.583E-02
> 60.00	2.111E-01	1.627E-01	1.301E-01	8.595E-02	4.865E-02
> 15.00	3.017E-01	2.408E-01	2.093E-01	1.609E-01	1.102E-01

Table I.6 Continuation

energy (MeV)	emission angles (degrees)				
	80-100	100-120	120-140	140-160	160-180
> 500.00	0.000	0.000	0.000	0.000	0.000
> 200.00	8.402E-04	6.502E-05	5.982E-05	0.000	0.000
> 100.00	9.321E-03	3.170E-03	1.436E-03	1.069E-03	1.407E-03
> 60.00	2.081E-02	9.332E-03	4.567E-03	3.422E-03	3.519E-03
> 15.00	6.674E-02	4.089E-02	2.426E-02	1.793E-02	1.596E-02

Table I.7 Target Material: Aluminum (Al-27)  
neutrons/sr/proton

energy (MeV)	emission angles (degrees)				
	0-5	5-10	10-15	15-20	20-25
> 500.00	1.060E-01	1.943E-01	1.469E-01	7.361E-02	2.113E-02
> 200.00	7.850E-01	3.681E-01	3.068E-01	2.055E-01	1.460E-01
> 100.00	9.648E-01	4.743E-01	4.186E-01	3.116E-01	2.364E-01
> 60.00	1.022E 00	5.237E-01	4.683E-01	3.600E-01	2.759E-01
> 15.00	1.120E 00	6.270E-01	5.447E-01	4.392E-01	3.501E-01

Table I.7 Continuation

energy (MeV)	emission angles (degrees)				
	25-35	35-40	40-50	50-65	65-80
> 500.00	2.557E-03	4.995E-04	8.608E-05	0.000	0.000
> 200.00	9.959E-02	6.873E-02	4.670E-02	1.569E-02	3.196E-03
> 100.00	1.637E-01	1.214E-01	9.232E-02	5.284E-02	2.016E-02
> 60.00	2.003E-01	1.531E-01	1.222E-01	7.844E-02	3.945E-02
> 15.00	2.711E-01	2.157E-01	1.862E-01	1.368E-01	8.925E-02

Table I.7 Continuation

energy (MeV)	emission angles (degrees)				
	80-100	100-120	120-140	140-160	160-180
> 500.00	0.000	0.000	0.000	0.000	0.000
> 200.00	5.346E-04	8.128E-05	1.994E-05	0.000	0.000
> 100.00	7.426E-03	2.325E-03	1.376E-03	1.161E-03	7.035E-04
> 60.00	1.674E-02	6.610E-03	3.720E-03	2.821E-03	2.385E-03
> 15.00	5.401E-02	3.079E-02	1.623E-02	1.296E-02	1.159E-02

Table I.8 Target Material: Carbon (C-12)  
neutrons/sr/proton

energy (MeV)	emission angles (degrees)				
	0-5	5-10	10-15	15-20	20-25
> 500.00	1.436E-01	2.269E-01	1.835E-01	8.837E-02	2.050E-02
> 200.00	9.884E-01	3.904E-01	3.487E-01	2.326E-01	1.451E-01
> 100.00	1.161E 00	5.004E-01	4.717E-01	3.389E-01	2.299E-01
> 60.00	1.209E 00	5.456E-01	5.119E-01	3.792E-01	2.667E-01
> 15.00	1.295E 00	6.181E-01	5.733E-01	4.403E-01	3.210E-01

Table I.8 Continuation

energy (MeV)	emission angles (degrees)				
	25-35	35-40	40-50	50-65	65-80
> 500.00	2.922E-03	1.998E-04	8.608E-05	0.000	0.000
> 200.00	1.032E-01	6.803E-02	4.120E-02	1.284E-02	1.981E-03
> 100.00	1.643E-01	1.144E-01	7.929E-02	4.402E-02	1.543E-02
> 60.00	1.945E-01	1.393E-01	1.007E-01	6.417E-02	3.068E-02
> 15.00	2.398E-01	1.805E-01	1.413E-01	1.027E-01	6.406E-02

Table I.8 Continuation

energy (MeV)	emission angles (degrees)				
	80-100	100-120	120-140	140-160	160-180
> 500.00	0.000	0.000	0.000	0.000	0.000
> 200.00	4.736E-04	0.000	3.988E-05	0.000	0.000
> 100.00	5.178E-03	1.349E-03	1.117E-03	1.130E-03	9.674E-04
> 60.00	1.156E-02	4.145E-03	2.404E-03	2.546E-03	2.649E-03
> 15.00	3.387E-02	1.661E-02	9.398E-03	7.290E-03	6.520E-03

APPENDIX J

Calculated Differential Particle Production  
Cross Sections for 590 MeV Protons

Table J.1 Target Material: Uranium (U-238)  
 $d\sigma/dE$  (barns/MeV)

energy (MeV)	neutrons	protons	deuterons	tritons
550.00	5.084E-04	1.025E-03	0.000	0.000
450.00	5.938E-04	1.040E-03	0.000	0.000
350.00	9.103E-04	1.213E-03	0.000	0.000
250.00	2.084E-03	2.183E-03	0.000	0.000
175.00	4.049E-03	3.577E-03	0.000	0.000
125.00	7.190E-03	5.646E-03	0.000	0.000
90.00	1.080E-02	7.752E-03	0.000	0.000
70.00	1.488E-02	9.917E-03	0.000	0.000
50.00	2.227E-02	1.320E-02	3.502E-06	3.502E-06
35.00	3.302E-02	1.954E-02	1.050E-04	1.050E-04
25.00	5.515E-02	3.047E-02	1.415E-03	1.372E-03
17.50	1.174E-01	6.277E-02	9.342E-03	6.988E-03
12.50	3.163E-01	8.589E-02	3.032E-02	2.246E-02
9.00	7.094E-01	1.772E-01	6.295E-02	3.901E-02
7.00	1.227E 00	2.028E-01	7.539E-02	4.356E-02
5.00	2.172E 00	1.202E-01	4.975E-02	2.566E-02
3.50	3.276E 00	3.564E-02	1.415E-02	6.584E-03
2.50	4.226E 00	1.302E-02	5.252E-03	3.082E-03
1.75	4.916E 00	6.303E-03	3.082E-03	2.801E-03
1.25	5.189E 00	1.821E-03	1.260E-03	1.541E-03
0.90	5.260E 00	2.451E-03	0.000	1.751E-03
0.70	5.042E 00	3.502E-04	3.502E-04	1.401E-03
0.50	4.665E 00	1.050E-03	0.000	3.502E-04
0.35	4.291E 00	1.401E-03	7.003E-04	7.003E-04
0.25	3.804E 00	0.000	0.000	1.401E-03
0.17	3.313E 00	0.000	0.000	0.000
0.07	2.292E 00	0.000	4.668E-04	0.000

Table J.1 Continuation

energy (MeV)	helim-3	helium-4
550.00	0.000	0.000
450.00	0.000	0.000
350.00	0.000	0.000
250.00	0.000	0.000
175.00	0.000	0.000
125.00	0.000	0.000
90.00	0.000	0.000
70.00	0.000	0.000
50.00	3.502E-06	1.015E-04
35.00	3.502E-05	2.690E-03
25.00	3.921E-04	3.272E-02
17.50	1.611E-03	8.895E-02
12.50	9.945E-04	2.378E-02
9.00	7.003E-05	3.992E-03
7.00	0.000	2.766E-03
5.00	0.000	2.241E-03
3.50	0.000	1.401E-03
2.50	0.000	8.403E-04
1.75	0.000	2.801E-04
1.25	0.000	0.000
0.90	0.000	0.000
0.70	0.000	0.000
0.50	0.000	0.000
0.35	0.000	0.000
0.25	0.000	0.000
0.17	0.000	0.000
0.07	0.000	0.000



Table J.1 Continuation

energy (MeV)	$\pi^+$	$\pi^0$	$\pi^-$
550.00	0.000	0.000	0.000
450.00	0.000	0.000	0.000
350.00	6.303E-06	8.403E-06	4.202E-06
250.00	6.652E-05	7.423E-05	3.012E-05
175.00	1.415E-04	1.793E-04	4.903E-05
125.00	2.997E-04	3.039E-04	1.106E-04
90.00	4.341E-04	5.742E-04	2.241E-04
70.00	9.033E-04	9.139E-04	4.097E-04
50.00	1.506E-03	1.492E-03	7.109E-04
35.00	1.800E-03	1.899E-03	8.684E-04
25.00	1.856E-03	2.143E-03	1.253E-03
17.50	2.198E-03	2.130E-03	1.358E-03
12.50	2.100E-04	2.283E-03	1.316E-03
9.00	0.000	2.451E-03	1.786E-03
7.00	0.000	2.381E-03	1.926E-03
5.00	0.000	1.821E-03	1.226E-03
3.50	0.000	1.611E-03	1.260E-03
2.50	0.000	2.100E-03	1.471E-03
1.75	0.000	1.962E-03	1.681E-03
1.25	0.000	1.401E-03	1.121E-03
0.90	0.000	2.451E-03	3.502E-04
0.70	0.000	3.502E-04	1.401E-03
0.50	0.000	7.003E-04	1.751E-03
0.35	0.000	7.003E-04	2.100E-03
0.25	0.000	7.003E-04	1.401E-03
0.17	0.000	0.000	0.000
0.07	0.000	1.401E-03	9.338E-04

Table J.2 Target Material: Lead (Pb-207)  
 $d\sigma/dE$  (barns/MeV)

energy (MeV)	neutrons	protons	deuterons	tritons
<sup>3</sup> 550.00	5.039E-04	9.810E-04	0.000	0.000
450.00	5.106E-04	9.613E-04	0.000	0.000
350.00	8.911E-04	1.215E-03	0.000	0.000
250.00	1.865E-03	2.086E-03	0.000	0.000
175.00	3.678E-03	3.561E-03	0.000	0.000
125.00	6.544E-03	5.384E-03	0.000	0.000
90.00	1.026E-02	7.542E-03	0.000	0.000
70.00	1.388E-02	9.498E-03	0.000	0.000
50.00	1.968E-02	1.279E-02	1.122E-05	1.683E-05
35.00	2.891E-02	1.764E-02	3.759E-04	5.443E-04
25.00	4.461E-02	2.755E-02	4.635E-03	7.379E-03
17.50	7.576E-02	5.231E-02	2.936E-02	4.180E-02
12.50	1.648E-01	7.383E-02	9.621E-02	1.068E-01
9.00	3.452E-01	7.320E-02	9.919E-02	6.330E-02
7.00	6.011E-01	3.759E-03	1.072E-02	2.554E-03
5.00	1.153E 00	0.000	2.806E-05	0.000
3.50	1.864E 00	0.000	0.000	0.000
2.50	2.598E 00	0.000	0.000	0.000
1.75	3.297E 00	0.000	0.000	0.000
1.25	3.737E 00	0.000	0.000	0.000
0.90	3.902E 00	0.000	0.000	0.000
0.70	3.974E 00	0.000	0.000	0.000
0.50	3.865E 00	0.000	0.000	0.000
0.35	3.596E 00	0.000	0.000	0.000
0.25	3.326E 00	0.000	0.000	0.000
0.17	2.862E 00	0.000	0.000	0.000
0.07	2.072E 00	0.000	0.000	0.000

Table J.2 Continuation

energy (MeV)	helium-3	helium-4
550.00	0.000	0.000
450.00	0.000	0.000
350.00	0.000	0.000
250.00	0.000	0.000
175.00	0.000	0.000
125.00	0.000	0.000
90.00	0.000	0.000
70.00	0.000	1.122E-05
50.00	1.122E-05	1.220E-03
35.00	4.658E-04	2.752E-02
25.00	2.699E-03	1.554E-01
17.50	3.367E-04	8.194E-03
12.50	0.000	0.000
9.00	0.000	0.000
7.00	0.000	0.000
5.00	0.000	0.000
3.50	0.000	0.000
2.50	0.000	0.000
1.75	0.000	0.000
1.25	0.000	0.000
0.90	0.000	0.000
0.70	0.000	0.000
0.50	0.000	0.000
0.35	0.000	0.000
0.25	0.000	0.000
0.17	0.000	0.000
0.07	0.000	0.000

Table J.2 Continuation

energy (MeV)	$\pi^+$	$\pi^0$	$\pi^-$
550.00	0.000	0.000	0.000
450.00	0.000	0.000	0.000
350.00	8.417E-06	6.734E-06	2.806E-06
250.00	8.867E-05	6.116E-05	2.020E-05
175.00	1.448E-04	1.347E-04	4.938E-05
125.00	2.795E-04	2.727E-04	9.540E-05
90.00	4.995E-04	4.882E-04	1.768E-04
70.00	8.978E-04	7.800E-04	4.180E-04
50.00	1.554E-03	1.389E-03	5.976E-04
35.00	1.746E-03	1.683E-03	9.820E-04
25.00	1.864E-03	1.746E-03	1.032E-03
17.50	1.683E-03	1.705E-03	1.089E-03
12.50	5.500E-04	1.907E-03	1.414E-03
9.00	0.000	1.403E-03	1.375E-03
7.00	0.000	1.627E-03	1.122E-03
5.00	0.000	1.543E-03	1.403E-03
3.50	0.000	1.683E-03	1.234E-03
2.50	0.000	1.796E-03	1.347E-03
1.75	0.000	2.133E-03	1.122E-03
1.25	0.000	2.020E-03	1.122E-03
0.90	0.000	2.525E-03	1.403E-03
0.70	0.000	1.403E-03	1.122E-03
0.50	0.000	1.403E-03	1.965E-03
0.35	0.000	5.611E-04	5.611E-04
0.25	0.000	5.611E-04	5.611E-04
0.17	0.000	3.367E-03	1.122E-03
0.07	0.000	1.496E-03	1.122E-03

Table J.3 Target Material: Tantalum (Ta-181)  
 $d\sigma/dE$  (barns/ MeV)

energy (MeV)	neutrons	protons	deuterons	tritons
550.00	4.958E-04	9.672E-04	0.000	0.000
450.00	4.902E-04	9.402E-04	0.000	0.000
350.00	8.105E-04	1.225E-03	0.000	0.000
250.00	1.830E-03	2.027E-03	0.000	0.000
175.00	3.452E-03	3.358E-03	0.000	0.000
125.00	6.064E-03	5.111E-03	0.000	0.000
90.00	9.357E-03	7.032E-03	0.000	0.000
70.00	1.242E-02	8.969E-03	0.000	0.000
50.00	1.827E-02	1.212E-02	1.302E-05	7.813E-06
35.00	2.544E-02	1.701E-02	3.020E-04	1.042E-04
25.00	4.023E-02	2.820E-02	3.552E-03	1.443E-03
17.50	7.244E-02	5.871E-02	2.258E-02	7.230E-03
12.50	1.601E-01	1.112E-01	7.268E-02	1.992E-02
9.00	3.358E-01	1.378E-01	9.469E-02	1.945E-02
7.00	5.854E-01	2.581E-02	2.442E-02	2.942E-03
5.00	1.077E 00	5.208E-05	1.042E-04	7.813E-05
3.50	1.716E 00	0.000	0.000	0.000
2.50	2.366E 00	0.000	0.000	0.000
1.75	2.967E 00	0.000	0.000	0.000
1.25	3.366E 00	0.000	0.000	0.000
0.90	3.565E 00	0.000	0.000	0.000
0.70	3.592E 00	0.000	0.000	0.000
0.50	3.454E 00	0.000	0.000	0.000
0.35	3.227E 00	0.000	0.000	0.000
0.25	2.994E 00	0.000	0.000	0.000
0.17	2.752E 00	0.000	0.000	0.000
0.07	1.939E 00	0.000	0.000	0.000

Table J.3 Continuation

energy (MeV)	helium-3	helium-4
550.00	0.000	0.000
450.00	0.000	0.000
350.00	0.000	0.000
250.00	0.000	0.000
175.00	0.000	0.000
125.00	0.000	0.000
90.00	0.000	0.000
70.00	0.000	7.813E-06
50.00	7.813E-06	5.078E-04
35.00	1.511E-04	1.261E-02
25.00	8.386E-04	1.169E-01
17.50	4.583E-04	4.786E-02
12.50	0.000	5.105E-04
9.00	0.000	0.000
7.00	0.000	0.000
5.00	0.000	0.000
3.50	0.000	0.000
2.50	0.000	0.000
1.75	0.000	0.000
1.25	0.000	0.000
0.90	0.000	0.000
0.70	0.000	0.000
0.50	0.000	0.000
0.35	0.000	0.000
0.25	0.000	0.000
0.17	0.000	0.000
0.07	0.000	0.000

Table J.3 Continuation

energy (MeV)	$\pi^+$	$\pi^0$	$\pi^-$
550.00	0.000	0.000	0.000
450.00	0.000	0.000	0.000
350.00	5.208E-06	8.333E-06	1.563E-06
250.00	7.239E-05	8.386E-05	2.761E-05
175.00	1.594E-04	1.521E-04	4.480E-05
125.00	2.636E-04	2.438E-04	9.376E-05
90.00	5.755E-04	5.183E-04	1.536E-04
70.00	7.840E-04	9.688E-04	3.230E-04
50.00	1.234E-03	1.234E-03	5.677E-04
35.00	1.636E-03	1.505E-03	9.011E-04
25.00	1.625E-03	1.797E-03	1.042E-03
17.50	1.802E-03	1.833E-03	1.063E-03
12.50	1.125E-03	1.479E-03	1.135E-03
9.00	0.000	1.875E-03	1.432E-03
7.00	0.000	1.250E-03	1.068E-03
5.00	0.000	1.980E-03	1.094E-03
3.50	0.000	1.354E-03	1.302E-03
2.50	0.000	1.146E-03	1.042E-03
1.75	0.000	1.146E-03	1.354E-03
1.25	0.000	1.875E-03	9.376E-04
0.90	0.000	0.000	7.813E-04
0.70	0.000	1.563E-03	2.083E-03
0.50	0.000	7.813E-04	1.824E-03
0.35	0.000	2.083E-03	1.563E-03
0.25	0.000	1.042E-03	1.563E-03
0.17	0.000	1.042E-03	0.000
0.07	0.000	6.944E-04	1.389E-03

Table J.4 Target Material: Indium (In-115)  
 $d\sigma/dE$  (barns/MeV)

energy (MeV)	neutrons	protons	deuterons	tritons
550.00	4.328E-04	8.548E-04	0.000	0.000
450.00	4.044E-04	8.836E-04	0.000	0.000
350.00	6.524E-04	1.035E-03	0.000	0.000
250.00	1.420E-03	1.732E-03	0.000	0.000
175.00	2.527E-03	2.898E-03	0.000	0.000
125.00	4.335E-03	4.376E-03	0.000	0.000
90.00	6.554E-03	6.106E-03	0.000	0.000
70.00	8.536E-03	7.299E-03	0.000	0.000
50.00	1.228E-02	1.017E-02	7.890E-06	3.944E-06
35.00	1.810E-02	1.400E-02	1.538E-04	6.311E-05
25.00	2.652E-02	2.044E-02	1.554E-03	7.771E-04
17.50	4.534E-02	3.653E-02	7.479E-03	3.976E-03
12.50	9.264E-02	7.652E-02	2.345E-02	1.173E-02
9.00	1.801E-01	1.136E-01	4.304E-02	1.927E-02
7.00	2.948E-01	1.251E-01	4.473E-02	1.491E-02
5.00	5.177E-01	4.453E-02	1.450E-02	3.077E-03
3.50	8.130E-01	3.195E-03	1.499E-03	1.183E-04
2.50	1.100E 00	1.183E-04	2.761E-04	7.890E-05
1.75	1.363E 00	0.000	0.000	0.000
1.25	1.534E 00	0.000	0.000	0.000
0.90	1.596E 00	0.000	0.000	0.000
0.70	1.648E 00	0.000	0.000	0.000
0.50	1.629E 00	0.000	0.000	0.000
0.35	1.538E 00	0.000	0.000	0.000
0.25	1.451E 00	0.000	0.000	0.000
0.17	1.248E 00	0.000	0.000	0.000
0.07	9.938E-01	0.000	0.000	0.000



Table J.4 Continuation

energy (MeV)	helium-3	helium-4
550.00	0.000	0.000
450.00	0.000	0.000
350.00	0.000	0.000
250.00	0.000	0.000
175.00	0.000	0.000
125.00	0.000	0.000
90.00	0.000	0.000
70.00	0.000	1.973E-06
50.00	7.890E-06	1.440E-04
35.00	9.073E-05	3.041E-03
25.00	7.968E-04	3.375E-02
17.50	2.414E-03	1.305E-01
12.50	1.704E-03	8.712E-02
9.00	1.775E-04	9.132E-03
7.00	1.973E-05	8.875E-04
5.00	0.000	0.000
3.50	0.000	0.000
2.50	0.000	0.000
1.75	0.000	0.000
1.25	0.000	0.000
0.90	0.000	0.000
0.70	0.000	0.000
0.50	0.000	0.000
0.35	0.000	0.000
0.25	0.000	0.000
0.17	0.000	0.000
0.07	0.000	0.000

Table J.4 Continuation

energy (MeV)	$\pi^+$	$\pi^0$	$\pi^-$
550.00	0.000	0.000	0.000
450.00	0.000	0.000	0.000
350.00	8.678E-06	9.073E-06	3.156E-06
250.00	6.745E-05	7.219E-05	1.932E-05
175.00	1.263E-04	1.334E-04	3.471E-05
125.00	2.169E-04	2.083E-04	7.653E-05
90.00	4.536E-04	3.826E-04	1.322E-04
70.00	6.962E-04	6.470E-04	2.722E-04
50.00	1.010E-03	1.045E-03	4.754E-04
35.00	1.435E-03	1.203E-03	6.154E-04
25.00	1.341E-03	1.341E-03	7.100E-04
17.50	1.459E-03	1.317E-03	8.047E-04
12.50	1.476E-03	1.199E-03	7.258E-04
9.00	7.494E-04	1.124E-03	7.890E-04
7.00	0.000	9.270E-04	6.115E-04
5.00	0.000	1.243E-03	6.706E-04
3.50	0.000	1.065E-03	4.734E-04
2.50	0.000	7.494E-04	9.861E-04
1.75	0.000	8.678E-04	6.311E-04
1.25	0.000	1.263E-03	9.467E-04
0.90	0.000	9.861E-04	5.917E-04
0.70	0.000	1.577E-03	7.890E-04
0.50	0.000	1.973E-04	7.890E-04
0.35	0.000	1.577E-03	3.944E-04
0.25	0.000	0.000	3.944E-04
0.17	0.000	3.944E-03	7.890E-04
0.07	0.000	1.577E-03	5.259E-04

Table J.5 Target Material: Niobium (Nb-93)  
 $d\sigma/dE$  (barns/MeV)

energy (MeV)	neutrons	protons	deuterons	tritons
550.00	3.880E-04	8.274E-04	0.000	0.000
450.00	3.836E-04	7.985E-04	0.000	0.000
350.00	6.050E-04	9.967E-04	0.000	0.000
250.00	1.243E-03	1.591E-03	0.000	0.000
175.00	2.377E-03	2.648E-03	0.000	0.000
125.00	3.782E-03	3.969E-03	0.000	0.000
90.00	5.434E-03	5.372E-03	0.000	0.000
70.00	7.142E-03	6.919E-03	0.000	0.000
50.00	1.007E-02	8.829E-03	6.898E-06	3.449E-06
35.00	1.405E-02	1.250E-02	1.552E-04	5.518E-05
25.00	2.144E-02	1.869E-02	1.317E-03	4.967E-04
17.50	3.531E-02	3.783E-02	6.340E-03	2.118E-03
12.50	6.940E-02	8.554E-02	2.050E-02	5.450E-03
9.00	1.289E-01	1.741E-01	3.992E-02	9.330E-03
7.00	1.997E-01	2.126E-01	4.906E-02	9.485E-03
5.00	3.339E-01	1.655E-01	2.703E-02	4.105E-03
3.50	5.022E-01	2.124E-02	3.691E-03	7.587E-04
2.50	6.620E-01	1.552E-03	5.173E-04	1.379E-04
1.75	8.004E-01	2.069E-04	6.898E-05	0.000
1.25	8.976E-01	0.000	0.000	0.000
0.90	9.436E-01	0.000	0.000	0.000
0.70	9.620E-01	0.000	0.000	0.000
0.50	9.325E-01	0.000	0.000	0.000
0.35	9.119E-01	0.000	0.000	0.000
0.25	8.757E-01	0.000	0.000	0.000
0.17	8.409E-01	0.000	0.000	0.000
0.07	6.501E-01	0.000	0.000	0.000

Table J.5 Continuation

energy (MeV)	helium-3	helium-4
550.00	0.000	0.000
450.00	0.000	0.000
350.00	0.000	0.000
250.00	0.000	0.000
175.00	0.000	0.000
125.00	0.000	0.000
90.00	0.000	0.000
70.00	0.000	1.725E-06
50.00	1.379E-05	8.795E-05
35.00	1.345E-04	1.400E-03
25.00	9.553E-04	1.338E-02
17.50	3.552E-03	5.843E-02
12.50	3.808E-03	7.379E-02
9.00	1.052E-03	1.068E-02
7.00	1.552E-04	1.741E-03
5.00	0.000	1.379E-04
3.50	0.000	3.449E-05
2.50	0.000	0.000
1.75	0.000	0.000
1.25	0.000	0.000
0.90	0.000	0.000
0.70	0.000	0.000
0.50	0.000	0.000
0.35	0.000	0.000
0.25	0.000	0.000
0.17	0.000	0.000
0.07	0.000	0.000

Table J.5 Continuation

energy (MeV)	$\pi^+$	$\pi^0$	$\pi^-$
550.00	0.000	0.000	0.000
450.00	0.000	0.000	0.000
350.00	6.898E-06	7.587E-06	1.725E-06
250.00	6.381E-05	5.415E-05	1.414E-05
175.00	1.097E-04	1.104E-04	3.449E-05
125.00	2.090E-04	1.897E-04	4.622E-05
90.00	3.777E-04	4.001E-04	1.069E-04
70.00	5.864E-04	5.777E-04	2.346E-04
50.00	1.019E-03	8.847E-04	3.794E-04
35.00	1.190E-03	1.110E-03	5.484E-04
25.00	1.259E-03	1.145E-03	5.967E-04
17.50	1.234E-03	1.317E-03	5.864E-04
12.50	1.089E-03	9.933E-04	6.553E-04
9.00	1.121E-03	1.327E-03	5.864E-04
7.00	0.000	1.086E-03	7.243E-04
5.00	0.000	1.207E-03	6.725E-04
3.50	0.000	1.138E-03	5.518E-04
2.50	0.000	8.622E-04	8.278E-04
1.75	0.000	5.518E-04	5.518E-04
1.25	0.000	1.172E-03	2.759E-04
0.90	0.000	1.379E-03	6.898E-04
0.70	0.000	0.000	5.173E-04
0.50	0.000	8.622E-04	3.449E-04
0.35	0.000	1.035E-03	6.898E-04
0.25	0.000	1.035E-03	3.449E-04
0.17	0.000	1.379E-03	6.898E-04
0.07	0.000	2.299E-04	2.299E-04

Table J.6 Target Material: Iron (Fe-56)  
 $d\sigma/dE$  (barns/MeV)

energy (MeV)	neutrons	protons	deuterons	tritons
550.00	3.226E-04	7.394E-04	0.000	0.000
450.00	3.044E-04	6.677E-04	0.000	0.000
350.00	4.744E-04	8.114E-04	0.000	0.000
250.00	9.290E-04	1.315E-03	0.000	0.000
175.00	1.607E-03	2.071E-03	0.000	0.000
125.00	2.561E-03	3.017E-03	0.000	0.000
90.00	3.548E-03	4.193E-03	0.000	0.000
70.00	4.501E-03	5.025E-03	0.000	0.000
50.00	6.309E-03	6.554E-03	1.622E-05	2.495E-06
35.00	8.444E-03	9.085E-03	1.672E-04	5.739E-05
25.00	1.334E-02	1.423E-02	8.930E-04	2.096E-04
17.50	2.270E-02	2.774E-02	2.869E-03	7.785E-04
12.50	4.187E-02	5.540E-02	7.421E-03	1.802E-03
9.00	7.061E-02	9.909E-02	1.234E-02	2.508E-03
7.00	1.018E-01	1.509E-01	1.592E-02	2.907E-03
5.00	1.612E-01	1.780E-01	1.727E-02	3.094E-03
3.50	2.202E-01	1.634E-01	1.076E-02	1.946E-03
2.50	2.736E-01	5.956E-02	5.190E-03	1.173E-03
1.75	3.216E-01	1.442E-02	1.547E-03	2.994E-04
1.25	3.469E-01	4.691E-03	9.484E-04	9.978E-05
0.90	3.648E-01	1.248E-03	4.991E-04	2.495E-04
0.70	3.707E-01	7.486E-04	1.248E-04	0.000
0.50	3.520E-01	3.743E-04	1.248E-04	0.000
0.35	3.548E-01	0.000	0.000	0.000
0.25	3.479E-01	0.000	0.000	0.000
0.17	3.309E-01	4.991E-04	0.000	0.000
0.07	2.771E-01	0.000	0.000	0.000

Table J.6 Continuation

energy (MeV)	helium-3	helium-4
550.00	0.000	0.000
450.00	0.000	0.000
350.00	0.000	0.000
250.00	0.000	0.000
175.00	0.000	0.000
125.00	0.000	0.000
90.00	0.000	0.000
70.00	0.000	0.000
50.00	1.123E-05	3.119E-05
35.00	6.986E-05	2.994E-04
25.00	4.916E-04	2.266E-03
17.50	1.258E-03	8.421E-03
12.50	2.390E-03	1.828E-02
9.00	2.458E-03	2.201E-02
7.00	1.622E-03	1.441E-02
5.00	5.989E-04	5.465E-03
3.50	9.978E-05	1.647E-03
2.50	2.495E-05	5.989E-04
1.75	0.000	2.495E-04
1.25	0.000	1.996E-04
0.90	0.000	1.248E-04
0.70	0.000	0.000
0.50	0.000	0.000
0.35	0.000	2.495E-04
0.25	0.000	2.495E-04
0.17	0.000	0.000
0.07	0.000	0.000

Table J.6 Continuation

energy (MeV)	$\pi^+$	$\pi^0$	$\pi^-$
550.00	0.000	0.000	0.000
450.00	0.000	0.000	0.000
350.00	4.991E-06	5.739E-06	1.248E-06
250.00	5.265E-05	4.791E-05	9.978E-06
175.00	1.023E-04	8.481E-05	2.395E-05
125.00	1.742E-04	1.677E-04	5.140E-05
90.00	3.232E-04	3.256E-04	8.983E-05
70.00	5.015E-04	4.155E-04	1.559E-04
50.00	7.673E-04	6.612E-04	2.807E-04
35.00	9.357E-04	8.436E-04	3.568E-04
25.00	9.305E-04	6.937E-04	4.317E-04
17.50	9.080E-04	7.987E-04	3.793E-04
12.50	8.032E-04	6.986E-04	4.092E-04
9.00	6.737E-04	5.240E-04	3.743E-04
7.00	5.614E-04	4.616E-04	3.369E-04
5.00	1.248E-04	6.612E-04	3.992E-04
3.50	0.000	5.739E-04	5.240E-04
2.50	0.000	7.236E-04	3.743E-04
1.75	0.000	7.987E-04	1.497E-04
1.25	0.000	4.991E-04	4.491E-04
0.90	0.000	3.743E-04	1.248E-04
0.70	0.000	3.743E-04	3.743E-04
0.50	0.000	4.991E-04	1.248E-04
0.35	0.000	2.495E-04	2.495E-04
0.25	0.000	0.000	2.495E-04
0.17	0.000	0.000	0.000
0.07	0.000	6.654E-04	4.991E-04



Table J.7 Target Material: Aluminum (Al-27)  
 $d\sigma/dE$  (barns/MeV)

energy (MeV)	neutrons	protons	deuterons	tritons
550.00	2.407E-04	5.833E-04	0.000	0.000
450.00	2.003E-04	5.149E-04	0.000	0.000
350.00	3.082E-04	5.819E-04	0.000	0.000
250.00	5.806E-04	8.916E-04	0.000	0.000
175.00	9.383E-04	1.340E-03	0.000	0.000
125.00	1.382E-03	1.872E-03	3.082E-07	0.000
90.00	1.913E-03	2.390E-03	0.000	0.000
70.00	2.290E-03	2.933E-03	3.082E-06	0.000
50.00	3.165E-03	3.726E-03	2.542E-05	6.933E-06
35.00	4.348E-03	5.006E-03	1.248E-04	3.082E-05
25.00	6.510E-03	7.457E-03	5.468E-04	1.125E-04
17.50	1.004E-02	1.220E-02	1.387E-03	3.328E-04
12.50	1.638E-02	2.028E-02	2.789E-03	6.933E-04
9.00	2.476E-02	3.159E-02	4.422E-03	1.156E-03
7.00	3.240E-02	4.160E-02	5.861E-03	1.710E-03
5.00	4.586E-02	5.773E-02	6.762E-03	2.080E-03
3.50	5.929E-02	6.795E-02	7.040E-03	2.265E-03
2.50	7.540E-02	6.420E-02	6.254E-03	1.556E-03
1.75	8.260E-02	6.804E-02	4.775E-03	1.356E-03
1.25	9.109E-02	3.981E-02	3.020E-03	9.245E-04
0.90	9.955E-02	1.872E-02	2.773E-03	5.394E-04
0.70	9.684E-02	1.032E-02	1.926E-03	6.161E-04
0.50	1.046E-01	7.243E-03	1.695E-03	4.622E-04
0.35	9.738E-02	5.547E-03	6.161E-04	3.082E-04
0.25	1.082E-01	3.698E-03	1.233E-03	1.541E-04
0.17	1.032E-01	2.465E-03	6.161E-04	0.000
0.07	9.286E-02	1.438E-03	5.135E-04	0.000

Table J.7 Continuation

energy (MeV)	helium-3	helium-4
550.00	0.000	0.000
450.00	0.000	0.000
350.00	0.000	0.000
250.00	0.000	0.000
175.00	0.000	0.000
125.00	0.000	0.000
90.00	0.000	2.311E-06
70.00	1.541E-06	1.233E-05
50.00	8.473E-06	5.468E-05
35.00	4.622E-05	1.972E-04
25.00	2.095E-04	7.964E-04
17.50	5.302E-04	2.468E-03
12.50	1.214E-03	6.319E-03
9.00	1.880E-03	1.130E-02
7.00	2.042E-03	1.492E-02
5.00	1.841E-03	1.847E-02
3.50	1.325E-03	1.590E-02
2.50	7.086E-04	1.199E-02
1.75	2.773E-04	8.505E-03
1.25	1.541E-04	5.977E-03
0.90	1.541E-04	4.622E-03
0.70	7.705E-05	4.391E-03
0.50	7.705E-05	2.388E-03
0.35	0.000	2.465E-03
0.25	0.000	2.157E-03
0.17	0.000	2.465E-03
0.07	0.000	1.233E-03

Table J.7 Continuation

energy (MeV)	$\pi^+$	$\pi^0$	$\pi^-$
550.00	0.000	0.000	0.000
450.00	0.000	1.541E-07	0.000
350.00	5.856E-06	5.084E-06	3.082E-07
250.00	4.668E-05	3.451E-05	1.002E-05
175.00	8.630E-05	6.069E-05	1.572E-05
125.00	1.420E-04	1.229E-04	3.020E-05
90.00	2.504E-04	1.803E-04	7.396E-05
70.00	3.883E-04	2.935E-04	1.156E-04
50.00	5.209E-04	3.852E-04	1.834E-04
35.00	6.332E-04	4.376E-04	2.019E-04
25.00	5.454E-04	4.252E-04	2.265E-06
17.50	5.117E-04	3.759E-04	1.695E-04
12.50	4.499E-04	3.328E-04	2.126E-04
9.00	3.313E-04	3.082E-04	1.387E-04
7.00	3.852E-04	3.467E-04	1.309E-04
5.00	3.929E-04	2.080E-04	1.233E-04
3.50	4.160E-04	1.695E-04	1.849E-04
2.50	0.000	2.465E-04	1.849E-04
1.75	0.000	4.932E-04	1.541E-04
1.25	0.000	1.849E-04	9.245E-05
0.90	0.000	1.541E-04	1.541E-04
0.70	0.000	2.311E-04	7.705E-05
0.50	0.000	7.705E-05	0.000
0.35	0.000	0.000	0.000
0.25	0.000	0.000	0.000
0.17	0.000	3.082E-04	3.082E-04
0.07	0.000	2.054E-04	1.027E-04

Table J.8 Target Material: Carbon (C-12)  
 $d\sigma/dE$  (barns/MeV)

energy (MeV)	neutrons	protons	deuterons	tritons
550.00	1.631E-04	4.322E-04	0.000	0.000
450.00	1.248E-04	3.454E-04	0.000	0.000
350.00	1.659E-04	3.641E-04	0.000	0.000
250.00	3.212E-04	5.273E-04	0.000	0.000
175.00	4.887E-04	7.421E-04	0.000	0.000
125.00	6.732E-04	9.850E-04	2.103E-06	0.000
90.00	8.548E-04	1.282E-03	3.504E-06	0.000
70.00	9.936E-04	1.459E-03	6.133E-06	0.000
50.00	1.263E-03	1.782E-03	3.767E-05	4.382E-07
35.00	1.620E-03	2.253E-03	9.114E-05	0.000
25.00	2.181E-03	3.150E-03	2.050E-04	8.761E-06
17.50	3.279E-03	4.802E-03	3.996E-04	1.402E-05
12.50	4.822E-03	7.116E-03	6.275E-04	5.959E-05
9.00	6.774E-03	1.017E-02	1.008E-03	6.572E-05
7.00	8.527E-03	1.317E-02	1.231E-03	1.051E-04
5.00	1.120E-02	1.791E-02	1.533E-03	1.884E-04
3.50	1.468E-02	2.256E-02	1.963E-03	1.402E-04
2.50	1.712E-02	2.650E-02	2.085E-03	1.840E-04
1.75	1.943E-02	2.618E-02	2.015E-03	1.227E-04
1.25	2.152E-02	2.075E-02	2.453E-03	1.227E-04
0.90	2.247E-02	1.884E-02	2.322E-03	2.629E-04
0.70	2.611E-02	1.511E-02	2.541E-03	0.000
0.50	2.335E-02	1.257E-02	2.410E-03	8.761E-05
0.35	2.532E-02	7.360E-03	2.278E-03	1.753E-04
0.25	2.550E-02	5.783E-03	2.715E-03	0.000
0.17	2.348E-02	5.081E-03	2.629E-03	1.753E-04
0.07	2.009E-02	3.154E-03	2.863E-03	0.000

Table J.8 Continuation

energy (MeV)	helium-3	helium-4
550.00	0.000	0.000
450.00	0.000	0.000
350.00	0.000	0.000
250.00	0.000	0.000
175.00	0.000	8.761E-07
125.00	0.000	6.309E-06
90.00	0.000	2.278E-05
70.00	0.000	5.520E-05
50.00	1.753E-06	1.858E-04
35.00	7.896E-06	5.108E-04
25.00	2.892E-05	1.367E-03
17.50	6.485E-05	2.962E-03
12.50	1.086E-04	4.842E-03
9.00	1.577E-04	5.788E-03
7.00	2.410E-04	7.592E-03
5.00	4.161E-04	9.306E-03
3.50	3.593E-04	1.051E-02
2.50	4.206E-04	1.152E-02
1.75	1.753E-04	1.043E-02
1.25	1.227E-04	9.850E-03
0.90	1.314E-04	8.806E-03
0.70	2.629E-04	7.668E-03
0.50	1.314E-04	7.011E-03
0.35	2.629E-04	5.344E-03
0.25	8.761E-05	5.433E-03
0.17	0.000	5.257E-03
0.07	5.841E-05	2.395E-03

Table J.8 Continuation

energy (MeV)	$\pi^+$	$\pi^0$	$\pi^-$
550.00	0.000	0.000	0.000
450.00	0.000	0.000	0.000
350.00	2.541E-06	2.541E-06	6.133E-07
250.00	3.373E-05	2.611E-05	5.783E-06
175.00	6.624E-05	5.152E-05	1.384E-05
125.00	9.955E-05	7.571E-05	2.489E-05
90.00	1.792E-04	1.297E-04	4.732E-05
70.00	2.471E-04	1.827E-04	5.344E-05
50.00	2.844E-04	2.326E-04	7.931E-05
35.00	3.023E-04	2.278E-04	9.024E-05
25.00	2.865E-04	2.129E-04	8.236E-05
17.50	2.715E-04	1.402E-04	7.011E-05
12.50	2.366E-04	1.139E-04	5.959E-05
9.00	2.059E-04	9.200E-05	7.011E-05
7.00	1.183E-04	1.490E-04	1.008E-04
5.00	1.402E-04	1.095E-04	5.696E-05
3.50	2.015E-04	2.629E-05	7.886E-05
2.50	1.227E-04	6.133E-05	7.886E-05
1.75	3.504E-05	1.402E-04	1.753E-05
1.25	0.000	1.577E-04	1.753E-05
0.90	0.000	4.382E-05	0.000
0.70	0.000	1.314E-04	0.000
0.50	0.000	1.314E-04	8.761E-05
0.35	0.000	0.000	0.000
0.25	0.000	0.000	8.761E-05
0.17	0.000	0.000	0.000
0.07	0.000	1.168E-04	0.000