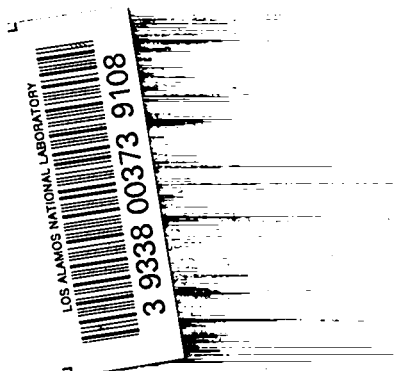


LA-3538-MS Vol. I

C. 3

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Calculations of Neutron Cross Sections
Using a Local Optical Potential
with Average Parameters



UNITED STATES
ATOMIC ENERGY COMMISSION
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The following Footnote should be inserted on page 8 , where indicated by the asterisk:

It should be emphasized that, above a few MeV, not all of the levels have been identified. This is especially true for the medium weight and heavy nuclei. When not all levels are included, the calculation of the cross section for compound elastic scattering is always an overestimate. Therefore, above ~ 2.5 MeV, the measured elastic scattering differential cross sections should lie between the curves for shape elastic and for shape-plus-compound elastic.

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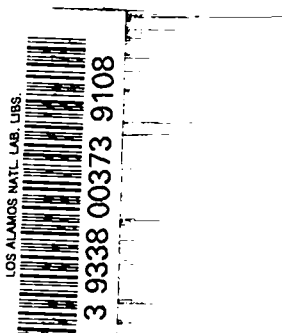
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Calculations of Neutron Cross Sections
Using a Local Optical Potential
with Average Parameters

by

Ferne P. Agee and Louis Rosen





Abstract

Neutron differential elastic scattering cross sections and total cross sections have been calculated for a large number of nuclides at selected energies between 0 and 16 MeV. Comparison is made with experimental data. The elements and energies were selected on the basis of the AEC's Nuclear Cross Sections Advisory Group request compilation.

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Li ⁷	45	Ga ⁶⁹	573
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B ¹¹	129	Nb ⁹³	599
C ¹²	165	Mo ⁹⁸	617
N ¹⁴	201	Rh ¹⁰³	621
O ¹⁶	269	Cd ¹¹⁴	625
Na ²³	343	In ¹¹⁵	631
Mg ²⁴	357	Sn ¹¹⁸	635
Al ²⁷	375	I ¹²⁷	641
Si ²⁸	389	W ¹⁸⁴	645
Cl ³⁵	421	Pb ²⁰⁸	661
K ³⁹	441	Bi ²⁰⁹	679
Ca ⁴⁰	463	Th ²³²	685
Ti ⁴⁸	471	U ²³⁴	697
Vi ⁵¹	487	U ²³⁵	707
Cr ⁵²	501	U ²³⁶	717
Mn ⁵⁵	517	U ²³⁷	727
Fe ⁵⁶	531	U ²³⁸	737
Ni ⁵⁸	547	Pu ²³⁹	749
Co ⁵⁹	565	Pu ²⁴⁰	759
		Total Cross Sections	767

INTRODUCTION

The increasing emphasis on nuclear energy during the past decade has spawned increasing requirements for cross sections of neutron interactions with a large number of nuclides and over an energy region extending from thermal to approximately 16 MeV. The cross section requirements are mounting much faster than our ability to satisfy them. It is, therefore, not unreasonable to resort, wherever feasible, to calculations as a temporary substitute for direct measurements.

In recent years, a number of models have proved to be remarkably reliable in reproducing neutron cross sections, both differential and integral. The optical model,¹ in particular, has enjoyed outstanding success. This model predicts differential elastic scattering cross sections, total reaction cross sections, and polarizations. Its utility is, however, marred by at least one perversity of nature. This has to do with so-called compound elastic scattering. From the standpoint of the user of cross section data, all elastic processes have the same significance--the target nucleus acquires kinetic energy only. When one measures the differential elastic cross sections, one measures all elastic processes and this is precisely what is required in application. However, we now know with certainty that at low neutron energies (below ~ 5 MeV), and for essentially all complex nuclei, there occurs a process which involves the formation of a compound nucleus with subsequent decay through the entrance channel. In other words, kinematically it is an elastic scattering process, but functionally it is a nonelastic interaction which proceeds through a compound nucleus. Any realistic model will recognize the above process for what it is--a nonelastic process; and the optical model does just that: it includes compound elastic

scattering in the reaction cross section. However, Hauser and Feshbach have shown how to take it back out again; but to do this, we need to know all the energy levels, and their properties, for all possible excitation energies of the residual nucleus. In general, such data are not available for energies above a few MeV. Above about 5 MeV there are usually so many open channels for decay of the compound nucleus that decay through the entrance channel is negligible, and shape elastic scattering dominates.

In this compendium we have calculated total cross sections and differential elastic scattering cross sections for neutrons on a large number of elements with the purpose of providing some of the information currently required in the nation's atomic energy program, as reflected by the latest edition of the NCSAG request compilation, WASH-1057.

One of the authors (L. Rosen) served a term as a member of NCSAG and has witnessed with dismay the rapid increase in the number of requests for cross section measurements, along with a decrease in the rate at which these requests are being satisfied. What follows is, therefore, an attempt to alleviate this situation by satisfying those requirements which do not require the highest accuracy. In order to permit the user to judge the precision and reliability of the calculations, comparisons are made with experimental data.

A word of caution: Neither the total reaction cross sections nor the differential elastic scattering cross sections can be reliably calculated with the optical model for mass numbers below ~ 20 . However, the optical model calculations should indicate the trends reasonably well, even for light nuclei.

CALCULATIONS

All the calculations were made with a local optical model potential, using average parameters. The parameters were obtained from a systematic study of the elastic scattering of polarized protons and from the fitting

of 14-MeV neutron elastic scattering data.² The potential so deduced contains six parameters and consists of a real and imaginary central potential and a spin-orbit potential of the Thomas type. The potential has the form:

$$V(r) = -Vf(r) - cWg(r) - V_s h(r) \vec{\sigma} \cdot \vec{\ell} .$$

The real central potential is assumed to have a radial dependence of the type proposed by Saxon and Woods³ and is characterized by a radius, R, and a diffuseness, a:

$$f(r) = \left[1 + \exp\left(\frac{r - R}{a}\right) \right]^{-1} ,$$

where $R = r_0 A^{1/3}$. The imaginary part of the potential is peaked at the surface and is characterized by a radius, R, and a width, b. It is of the form:

$$g(r) = -4b \frac{d}{dr} \left[1 + \exp\left(\frac{r - R}{b}\right) \right]^{-1} .$$

The form of the spin-orbit term is taken as:

$$h(r) = -\lambda \frac{1}{\pi} \frac{1}{r} \frac{df(r)}{dr} \vec{\sigma} \cdot \vec{\ell} ,$$

where λ_π is the pion (Compton wavelength); and $\vec{\sigma}$ is the Pauli matrix for the nucleon, with $s = (\hbar/2)\sigma$; and $\vec{\ell}$ is the orbital angular momentum in units of \hbar .

More complete details of the calculational method and the origin of the parameters herein used are given in Ref. 2.

The parameters used are as follows:

$$\begin{aligned} V &= 49.3 - 0.33E \text{ (MeV); where E is the neutron energy in the c.m.} \\ W &= 5.75 \text{ MeV} \quad \text{system} \\ r_0 &= 1.25 \text{ F} \\ a &= 0.65 \text{ F} \\ b &= 0.70 \text{ F} \\ V_s &= 5.5 \text{ MeV} \end{aligned}$$

Wherever energy levels are known below the incident neutron energy, compound elastic scattering calculations were performed. They are based on the Hauser-Feshbach theory,⁴ and the penetrabilities given by the above potential.*

RESULTS

Differential cross sections for shape elastic scattering and also for compound elastic scattering (where level structure and parameters are available in the NRC Data Sheets) were calculated at ~ 1 -MeV intervals in the energy region 0 to 16 MeV. The results are plotted in Figs. 1 - 334 and presented in tabular form on the facing pages. In all of the figures the solid curves represent shape elastic scattering, and the broken curves the sum of shape and compound elastic scattering. It is these latter curves which correspond to experimental elastic scattering measurements. Comparisons with experimental data are made whenever such data are available in BNL-400. These comparisons should help the user to assess the validity and reliability of the calculations. They also provide an empirical indication of how rapidly the cross section for compound elastic scattering diminishes with increasing energy. In general, for medium-weight and heavy nuclei, compound elastic scattering is of negligible significance above 5-MeV incident neutron energy for by then the level density in the residual nucleus is usually sufficiently high that neutron emission through the entrance channel has very small probability.

The differential shape elastic and compound elastic cross sections, labeled σ_{SE} and σ_{CE} , respectively, have been integrated over 4π steradians and the resultant partial total cross sections appear below the tables. In addition, the optical model calculations give the total cross section, $\sigma_T = \sigma_{SE} + \sigma_{CE} + \sigma_{n,n'} + \sigma_{n,2n} + \sigma_{n,p} + \dots$, and this value is also given beneath the aforementioned tables.

In Figs. 335 to 338 are presented comparisons of total cross section calculations with data compiled in BNL-325 (2nd edition). These comparisons can be used to assess the accuracy of the total elastic and

and total nonelastic cross sections which are derived from the results of the present calculations.

Finally, preceding each set of figures and tables, corresponding to a given element or isotope, are tabulated the energies at which elastic scattering calculations were made as well as the energy levels and level parameters used for the compound elastic scattering calculations.

REFERENCES

1. H. Feshbach, C. E. Porter, and V. Weisskopf, Phys. Rev. 96, 448 (1954); and H. Feshbach, Ann. Rev. Nucl. Sci. 8, 49 (1958).
2. L. Rosen, J. G. Beery, A. S. Goldhaber, and E. H. Auerbach, Ann. Phys. (N.Y.) 34, 96 (1965).
3. R. D. Woods and D. S. Saxon, Phys. Rev. 95, 577 (1954).
4. W. Hauser and H. Feshbach, Phys. Rev. 87, 366 (1952).



Li⁶

<u>Energy</u>	<u>Energy Levels</u> *
0.50	G.S. 1 ⁺
1.00	2.184 3 ⁺
2.00	3.560 0 ⁺
3.00	4.520 2 ⁺
4.00	5.350 1 ⁺
5.00	6.630 [1 ⁺]
6.00	7.400 [1 ⁺]
7.00	8.370 [1 ⁺]
8.00	9.300 [1 ⁺]
9.00	12.500 [1 ⁺]
10.00	
11.00	
12.00	
13.00	
14.00	
15.00	
16.00	

*Energy levels obtained from NRC 61-5, 6-23,
except [] values which are assumed.

Li^6 COSINE(G.M.)	0.50 MeV SHAPE ELASTIC	TOTAL ELASTIC
1.00000	8.69792E-02	2.32640E-01
0.90000	8.02496E-02	2.22907E-01
0.80000	7.37894E-02	2.13784E-01
0.70000	6.75983E-02	2.05263E-01
0.60000	6.16760E-02	1.97337E-01
0.50000	5.60225E-02	1.89998E-01
0.40000	5.06374E-02	1.83242E-01
0.30000	4.55207E-02	1.77062E-01
0.20000	4.06723E-02	1.71458E-01
0.10000	3.60920E-02	1.66424E-01
0.00000	3.17800E-02	1.61961E-01
-0.10000	2.77360E-02	1.58068E-01
-0.20000	2.39601E-02	1.54745E-01
-0.30000	2.04523E-02	1.51994E-01
-0.40000	1.72126E-02	1.49817E-01
-0.50000	1.42410E-02	1.48217E-01
-0.60000	1.15377E-02	1.47199E-01
-0.70000	9.10267E-03	1.46768E-01
-0.80000	6.93606E-03	1.46931E-01
-0.90000	5.03800E-03	1.47695E-01
-1.00000	3.40861E-03	1.49069E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 2.156
 σ_{SE} = .456
 σ_{CE} = 1.700

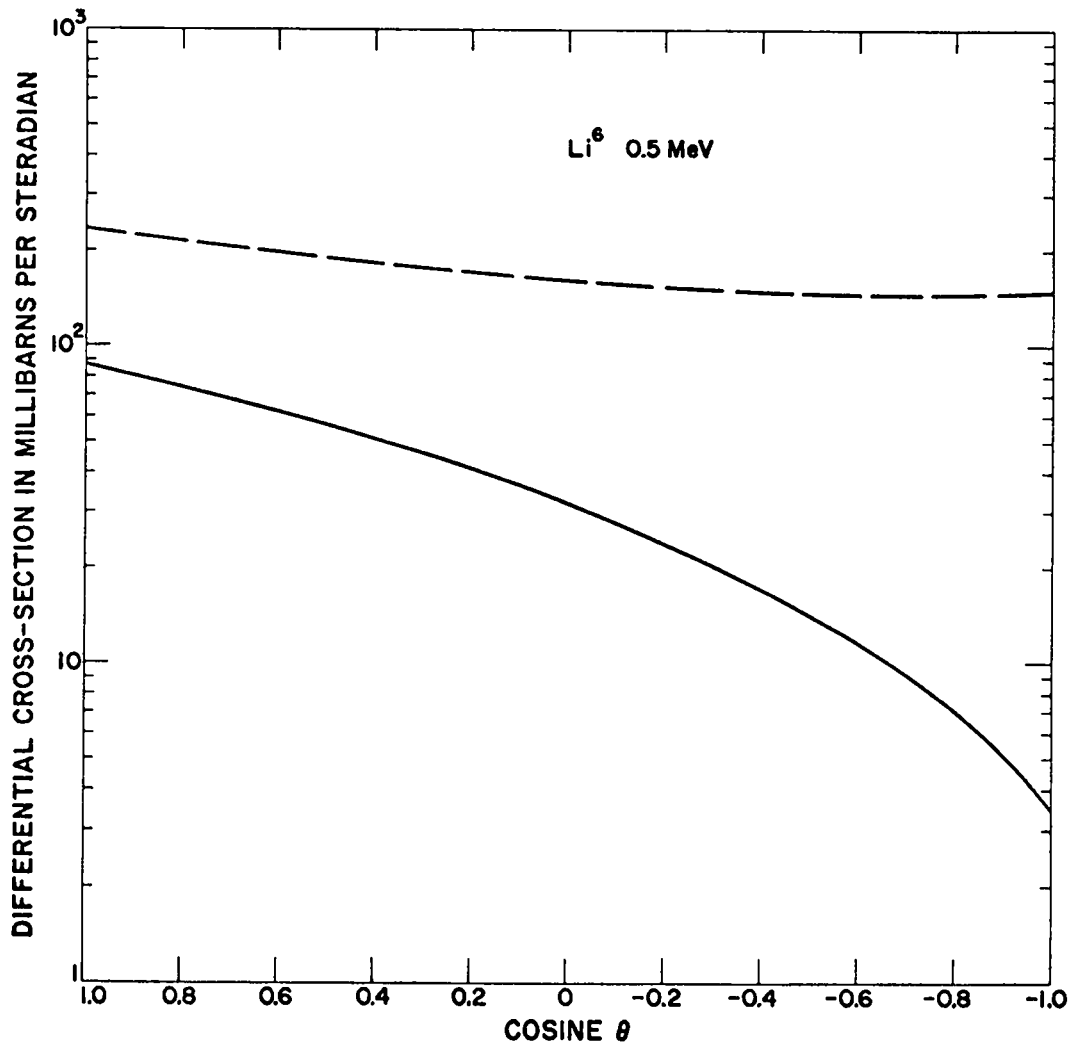


Figure 1

Li⁶

1.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.28193E-01	2.50606E-01
0.90000	1.14728E-01	2.33721E-01
0.80000	1.02019E-01	2.18024E-01
0.70000	9.00614E-02	2.03487E-01
0.60000	7.88546E-02	1.90086E-01
0.50000	6.83967E-02	1.77801E-01
0.40000	5.86868E-02	1.66617E-01
0.30000	4.97240E-02	1.56520E-01
0.20000	4.15081E-02	1.47500E-01
0.10000	3.40389E-02	1.39551E-01
0.00000	2.73168E-02	1.32670E-01
-0.10000	2.13425E-02	1.26855E-01
-0.20000	1.61168E-02	1.22109E-01
-0.30000	1.16410E-02	1.18437E-01
-0.40000	7.91658E-03	1.15847E-01
-0.50000	4.94526E-03	1.14350E-01
-0.60000	2.72911E-03	1.13960E-01
-0.70000	1.27040E-03	1.14696E-01
-0.80000	5.71640E-04	1.16577E-01
-0.90000	6.35586E-04	1.19628E-01
-1.00000	1.46520E-03	1.23878E-01

(SIGMAS IN BARNS/STERADIAN

$$\begin{aligned}\sigma_T &= 1.894 \\ \sigma_{SE} &= .500 \\ \sigma_{CE} &= 1.393\end{aligned}$$

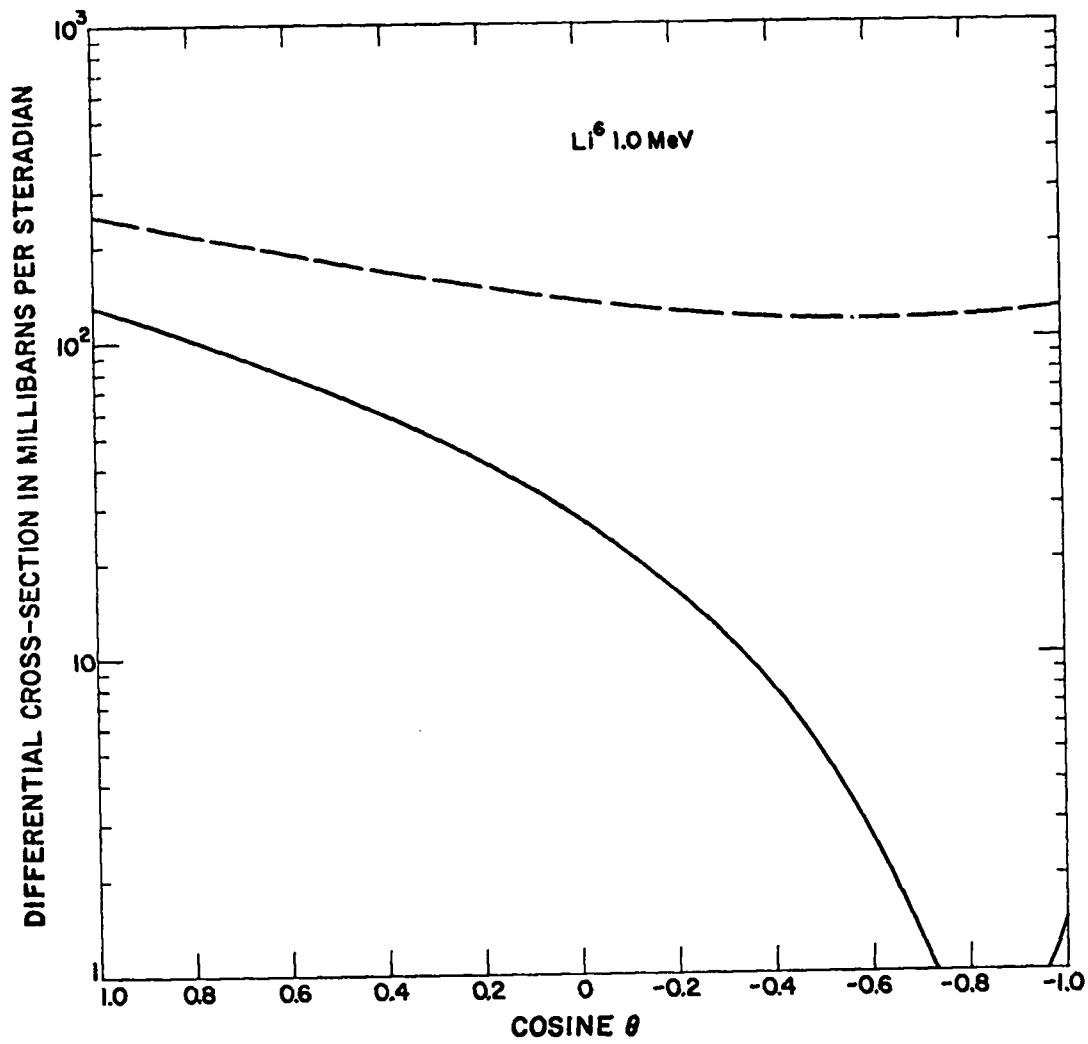


Figure 2

Li ⁶ COSINE(C.M.)	2.0 MeV SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.82572E-01	2.79909E-01
0.90000	1.58887E-01	2.52223E-01
0.80000	1.36996E-01	2.26962E-01
0.70000	1.16849E-01	2.04002E-01
0.60000	9.84016E-02	1.83235E-01
0.50000	8.16193E-02	1.64574E-01
0.40000	6.64724E-02	1.47945E-01
0.30000	5.29377E-02	1.33292E-01
0.20000	4.09973E-02	1.20571E-01
0.10000	3.06386E-02	1.09751E-01
0.00000	2.18538E-02	1.00814E-01
-0.10000	1.46395E-02	9.37523E-02
-0.20000	8.99642E-03	8.85705E-02
-0.30000	4.92931E-03	8.52840E-02
-0.40000	2.44635E-03	8.39192E-02
-0.50000	1.55909E-03	8.45136E-02
-0.60000	2.28218E-03	8.71159E-02
-0.70000	4.63311E-03	9.17865E-02
-0.80000	8.63208E-03	9.85982E-02
-0.90000	1.43017E-02	1.07637E-01
-1.00000	2.16670E-02	1.19005E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.672
 σ_{SE} = .608
 σ_{CE} = 1.064

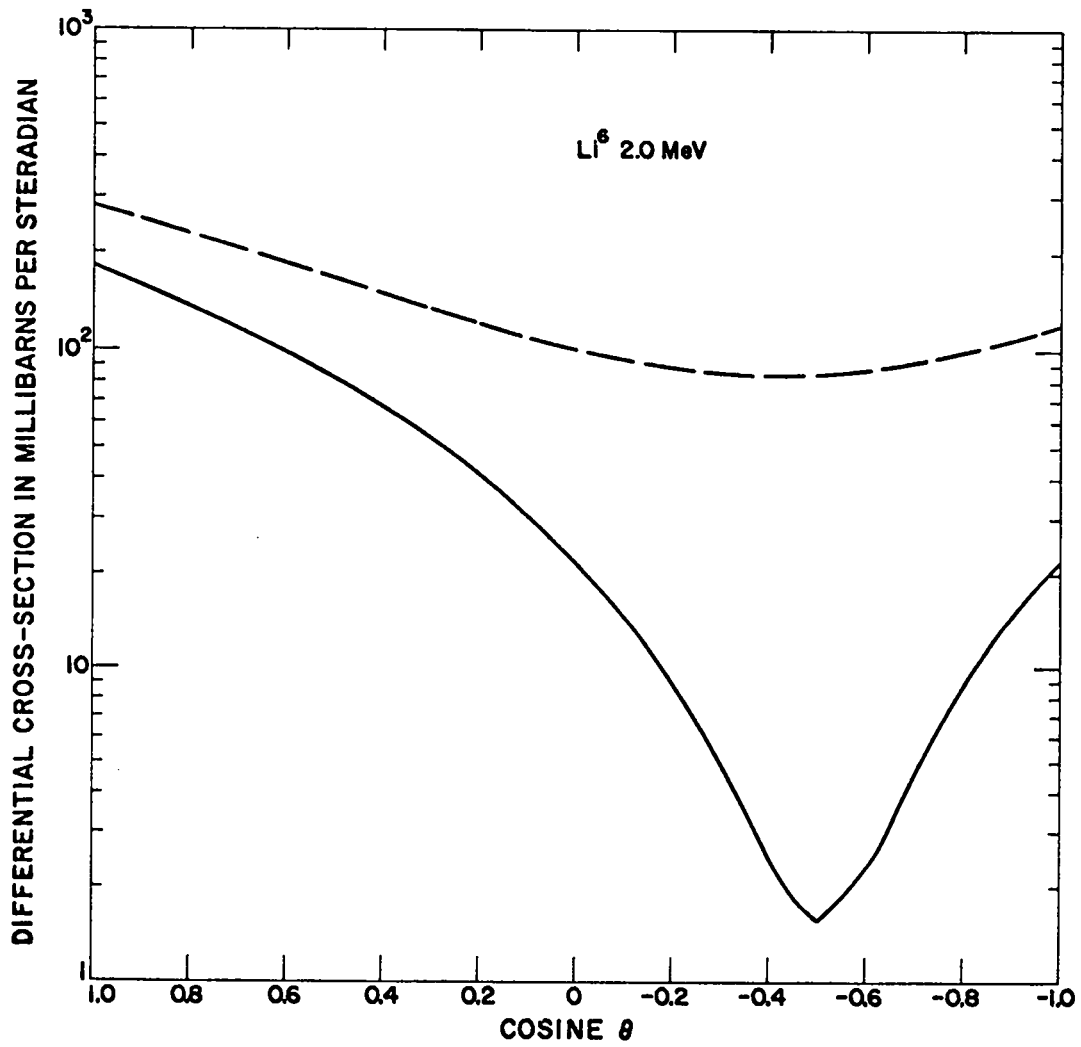


Figure 3

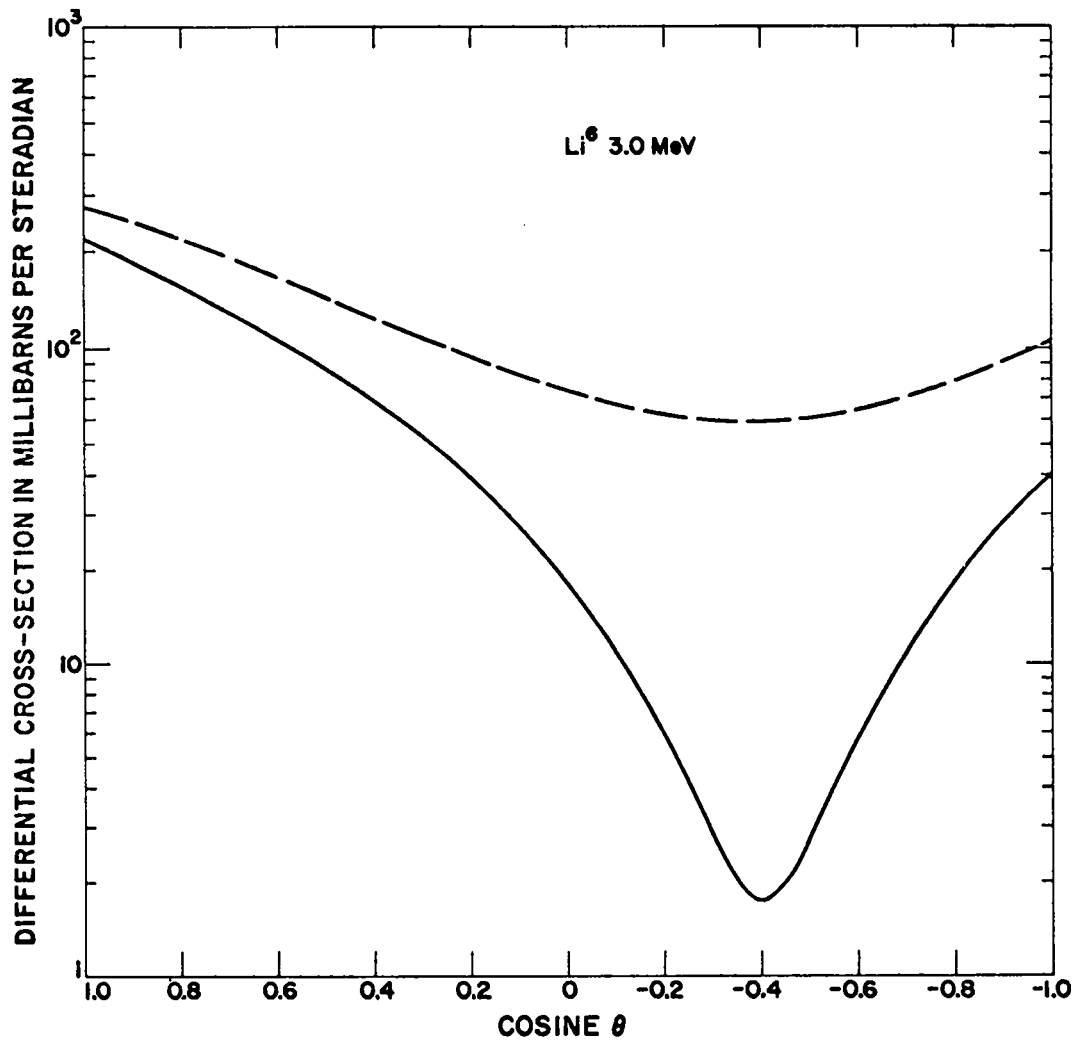


Figure 4

Li⁶

4.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.0n000	2.51987E-01	3.04047E-01
0.9n000	2.07906E-01	2.58081E-01
0.8n000	1.70087E-01	2.18702E-01
0.7n000	1.37685E-01	1.85022E-01
0.6n000	1.09987E-01	1.56288E-01
0.5n000	8.63947E-02	1.31874E-01
0.4n000	6.64137E-02	1.11256E-01
0.3n000	4.96388E-02	9.40089E-02
0.2n000	3.57440E-02	7.97884E-02
0.1n000	2.44729E-02	6.83267E-02
0.0n000	1.56308E-02	5.94219E-02
-0.1n000	9.07756E-03	5.29314E-02
-0.2n000	4.72115E-03	4.87656E-02
-0.3n000	2.51227E-03	4.68823E-02
-0.4n000	2.43955E-03	4.72822E-02
-0.5n000	4.52532E-03	5.00045E-02
-0.6n000	8.82188E-03	5.51233E-02
-0.7n000	1.54083E-02	6.27443E-02
-0.8n000	2.43873E-02	7.30022E-02
-0.9n000	3.58830E-02	8.60583E-02
-1.0n000	5.00386E-02	1.02099E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.551
 σ_{SE} = .727
 σ_{CE} = .582

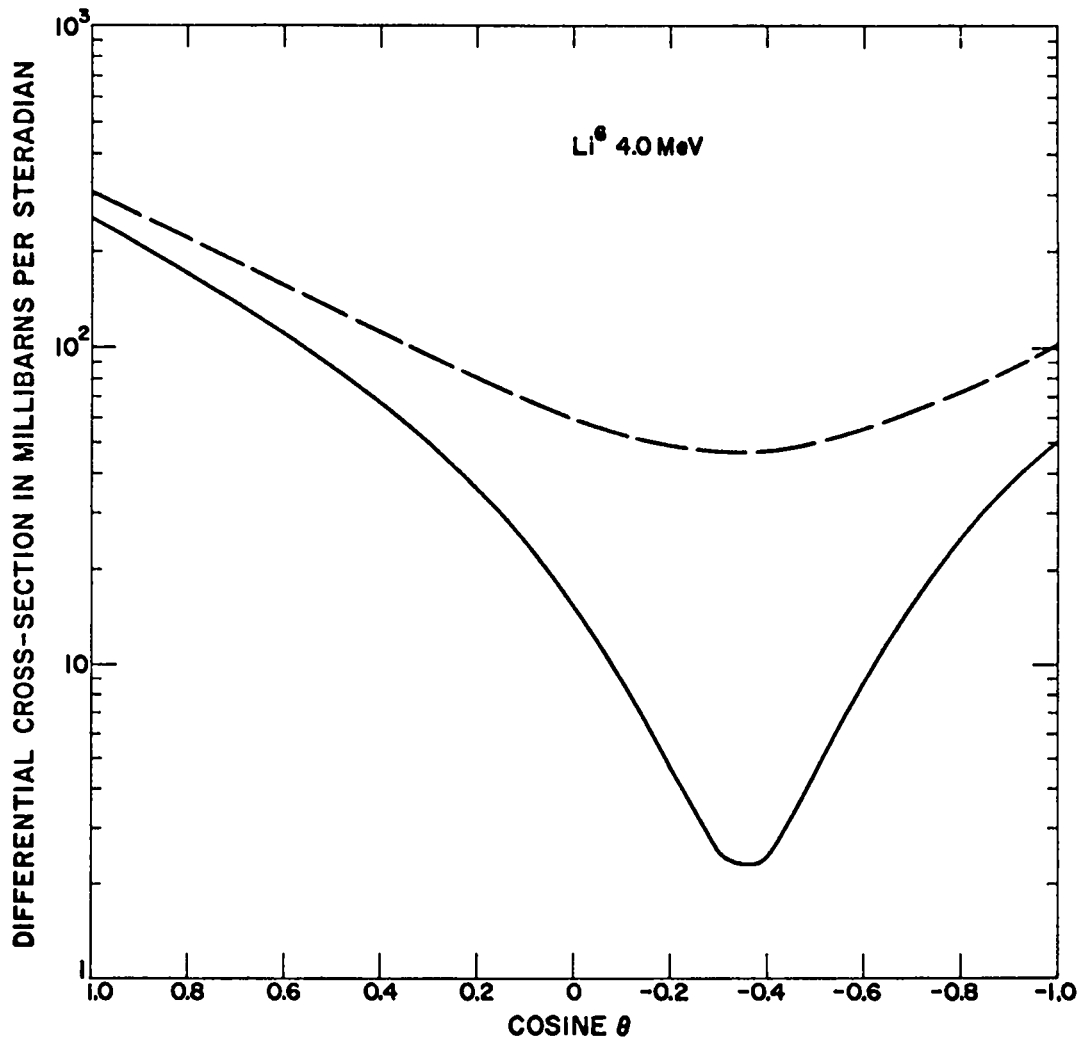


Figure 5

Li ⁶ COSINE(C.M.)	5.0 MeV SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.92023E-01	3.36086E-01
0.90000	2.32163E-01	2.73859E-01
0.80000	1.83169E-01	2.22939E-01
0.70000	1.43163E-01	1.81382E-01
0.60000	1.10588E-01	1.47573E-01
0.50000	8.41582E-02	1.20180E-01
0.40000	6.28210E-02	9.81083E-02
0.30000	4.57242E-02	8.04742E-02
0.20000	3.21866E-02	6.65709E-02
0.10000	2.16749E-02	5.58469E-02
0.00000	1.37826E-02	4.78850E-02
-0.10000	8.21324E-03	4.23852E-02
-0.20000	4.76562E-03	3.91499E-02
-0.30000	3.32098E-03	3.80710E-02
-0.40000	3.83241E-03	3.91197E-02
-0.50000	6.31557E-03	4.23369E-02
-0.60000	1.08407E-02	4.78258E-02
-0.70000	1.75259E-02	5.57445E-02
-0.80000	2.65312E-02	6.63015E-02
-0.90000	3.80531E-02	7.97496E-02
-1.00000	5.23208E-02	9.63831E-02

(SIGMAS IN BARNS/STERADIAN)

σ_T = 1.548
 σ_{SE} = .763
 σ_{CE} = .465

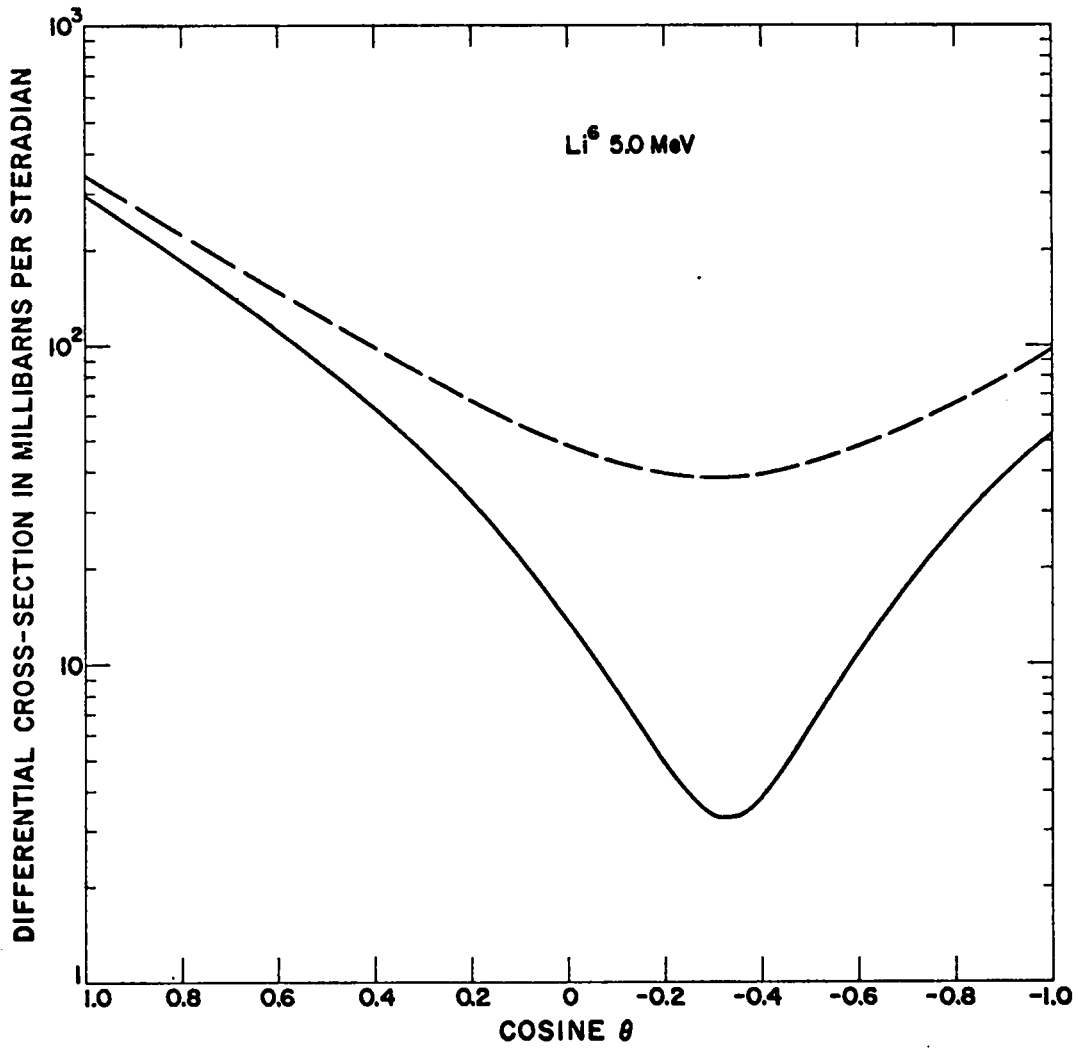


Figure 6

Li ⁶ COSINE(C.M.)	6.0 MeV SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.39147E-01	3.73913E-01
0.90000	2.59331E-01	2.91617E-01
0.80000	1.96678E-01	2.26986E-01
0.70000	1.47764E-01	1.76513E-01
0.60000	1.09802E-01	1.37340E-01
0.50000	8.05332E-02	1.07145E-01
0.40000	5.81356E-02	8.40577E-02
0.30000	4.11555E-02	6.65831E-02
0.20000	2.84458E-02	5.35425E-02
0.10000	1.91173E-02	4.40242E-02
0.00000	1.24977E-02	3.73429E-02
-0.10000	8.09823E-03	3.30052E-02
-0.20000	5.58531E-03	3.06819E-02
-0.30000	4.75713E-03	3.01847E-02
-0.40000	5.52395E-03	3.14460E-02
-0.50000	7.89154E-03	3.45032E-02
-0.60000	1.19471E-02	3.94842E-02
-0.70000	1.78476E-02	4.65965E-02
-0.80000	2.58092E-02	5.61173E-02
-0.90000	3.60993E-02	6.83852E-02
-1.00000	4.90285E-02	8.37941E-02

(SIGMAS IN BARNS/STERADIAN

$$\begin{aligned} \sigma_T &= 1.556 \\ \sigma_{SE} &= .793 \\ \sigma_{CE} &= .347 \end{aligned}$$

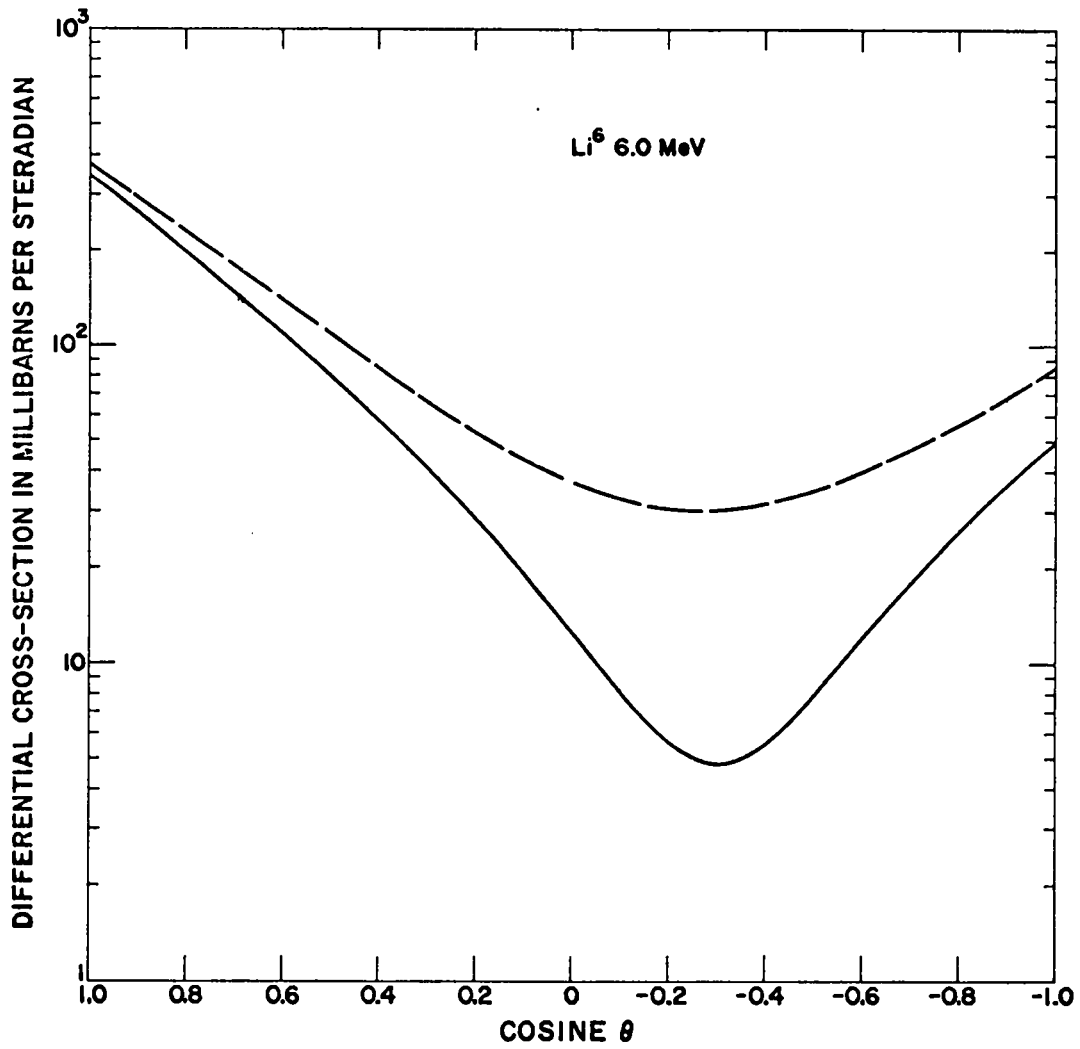


Figure 7

Li ⁶ COSINE(C.M.)	7.0 MeV SHAPE ELASTIC	TOTAL ELASTIC
1.0n000	3.90073E-01	4.18669E-01
0.9n000	2.87641E-01	3.13697E-01
0.8n000	2.09961E-01	2.34013E-01
0.7n000	1.51579E-01	1.74069E-01
0.6n000	1.08145E-01	1.29433E-01
0.5n000	7.62033E-02	9.65838E-02
0.4n000	5.30193E-02	7.27303E-02
0.3n000	3.64459E-02	5.56814E-02
0.2n000	2.48155E-02	4.37353E-02
0.1n000	1.68533E-02	3.55932E-02
0.0n000	1.16074E-02	3.02890E-02
-0.1n000	8.39258E-03	2.71325E-02
-0.2n000	6.74411E-03	2.56639E-02
-0.3n000	6.38033E-03	2.56159E-02
-0.4n000	7.17169E-03	2.68828E-02
-0.5n000	9.11515E-03	2.94956E-02
-0.6n000	1.23131E-02	3.36012E-02
-0.7n000	1.69556E-02	3.94451E-02
-0.8n000	2.33056E-02	4.73576E-02
-0.9n000	3.16867E-02	5.77426E-02
-1.0n000	4.24726E-02	7.10682E-02

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.562
 σ_{SE} = .819
 σ_{CE} = .269

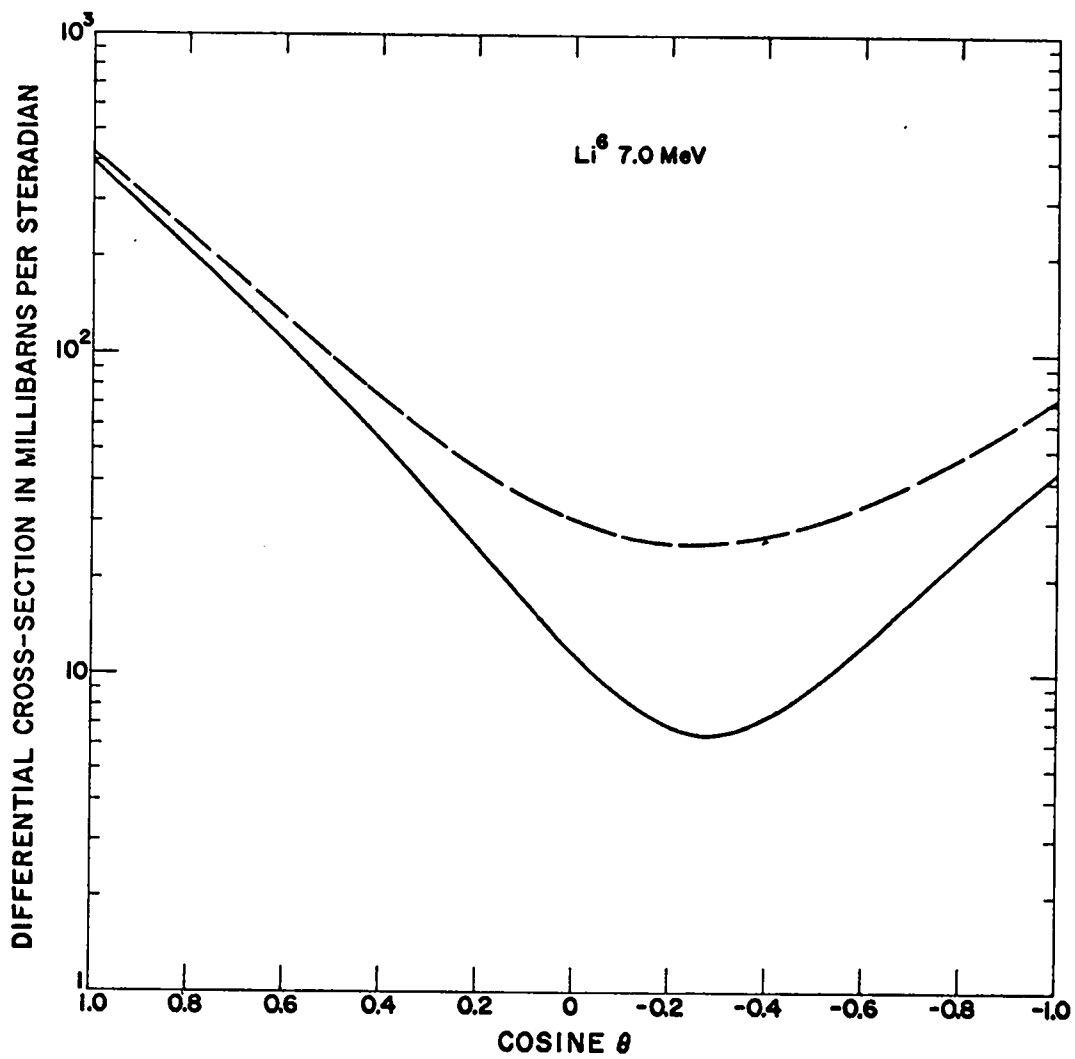


Figure 8

Li^6 COSINE(C.M.)	8.0 MeV SHAPE ELASTIC	TOTAL ELASTIC
1.00000	4.40728E-01	4.65598E-01
0.90000	3.14701E-01	3.37094E-01
0.80000	2.21872E-01	2.42325E-01
0.70000	1.54306E-01	1.73255E-01
0.60000	1.05822E-01	1.23620E-01
0.50000	7.16157E-02	8.85474E-02
0.40000	4.79647E-02	6.42597E-02
0.30000	3.20022E-02	4.78458E-02
0.20000	2.15415E-02	3.70859E-02
0.10000	1.49397E-02	3.03137E-02
0.00000	1.09894E-02	2.63081E-02
-0.10000	8.83435E-03	2.42084E-02
-0.20000	7.90182E-03	2.34462E-02
-0.30000	7.84858E-03	2.36922E-02
-0.40000	8.51750E-03	2.48124E-02
-0.50000	9.90247E-03	2.68341E-02
-0.60000	1.21199E-02	2.99175E-02
-0.70000	1.53854E-02	3.43338E-02
-0.80000	1.99951E-02	4.04477E-02
-0.90000	2.63100E-02	4.87031E-02
-1.00000	3.47435E-02	5.96139E-02

(SIGMAS IN BARNS/STERADIAN)

σ_T = 1.562
 σ_{SE} = .840
 σ_{CE} = .225

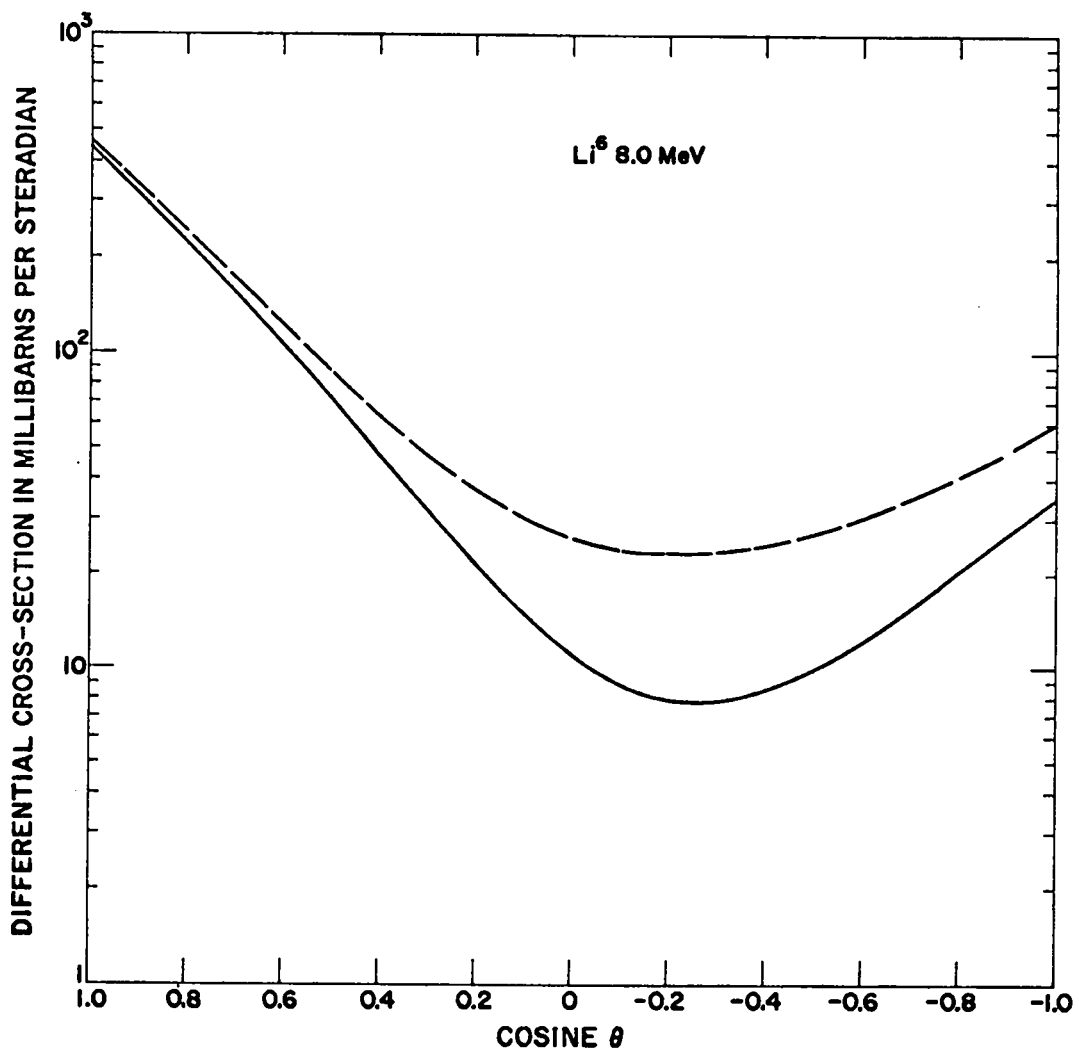


Figure 9

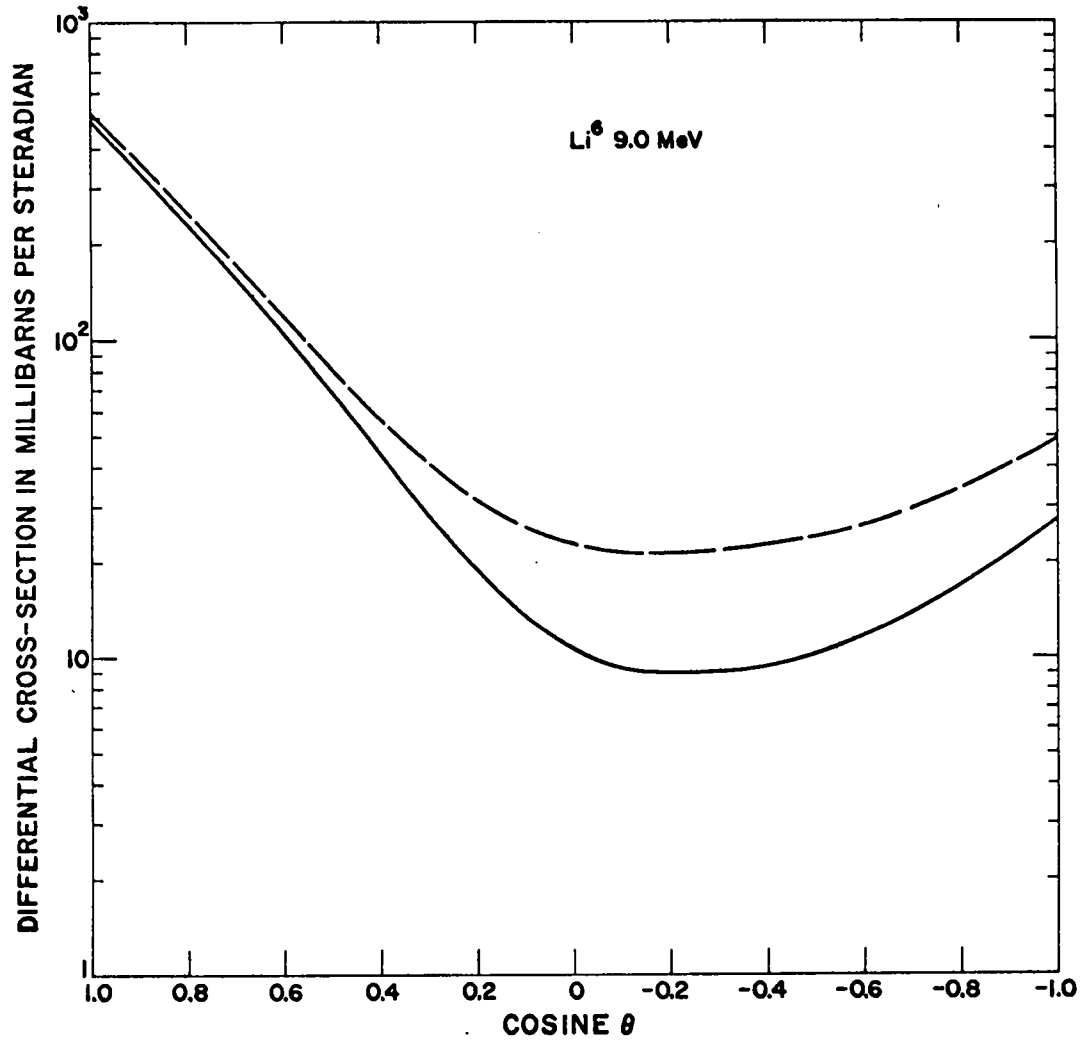


Figure 10

Li ⁶ COSINE(C.M.)	10.0 MeV SHAPE ELASTIC	TOTAL ELASTIC
1.00000	5.30318E-01	5.48421E-01
0.90000	3.58681E-01	3.74677E-01
0.80000	2.38440E-01	2.52818E-01
0.70000	1.55491E-01	1.68634E-01
0.60000	9.93994E-02	1.11609E-01
0.50000	6.24401E-02	7.39512E-02
0.40000	3.8981E-02	4.98974E-02
0.30000	2.45643E-02	3.52007E-02
0.20000	1.63634E-02	2.67589E-02
0.10000	1.20791E-02	2.23371E-02
0.00000	1.01483E-02	2.03616E-02
-0.10000	9.20669E-03	1.97646E-02
-0.20000	9.47188E-03	1.98674E-02
-0.30000	9.65433E-03	2.02908E-02
-0.40000	9.88950E-03	2.08888E-02
-0.50000	1.01860E-02	2.16971E-02
-0.60000	1.06865E-02	2.28957E-02
-0.70000	1.16373E-02	2.47806E-02
-0.80000	1.33668E-02	2.77446E-02
-0.90000	1.62686E-02	3.22641E-02
-1.00000	2.07892E-02	3.88924E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.537
 σ_{SE} = .864
 σ_{CE} = .155

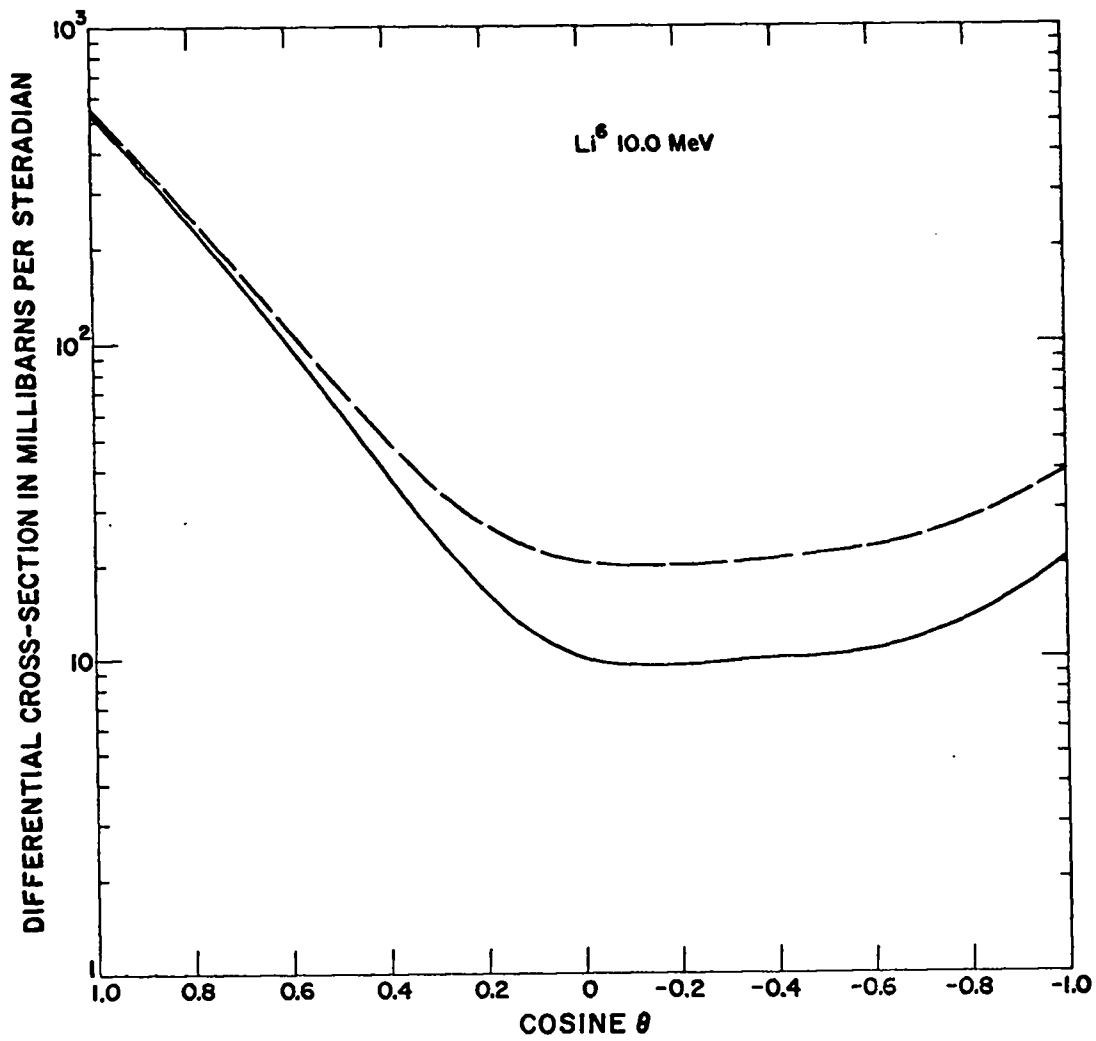


Figure 11

Li ⁶		11.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	5.67426E-01	5.82999E-01	
0.90000	3.74619E-01	3.88268E-01	
0.80000	2.42716E-01	2.54910E-01	
0.70000	1.53929E-01	1.65024E-01	
0.60000	9.54491E-02	1.05720E-01	
0.50000	5.80367E-02	6.76938E-02	
0.40000	3.50282E-02	4.42362E-02	
0.30000	2.16349E-02	3.05244E-02	
0.20000	1.44427E-02	2.31200E-02	
0.10000	1.10496E-02	1.96056E-02	
0.00000	9.80328E-03	1.83198E-02	
-0.10000	9.60739E-03	1.81634E-02	
-0.20000	9.77882E-03	1.84562E-02	
-0.30000	9.94179E-03	1.88312E-02	
-0.40000	9.94923E-03	1.91573E-02	
-0.50000	9.82454E-03	1.94817E-02	
-0.60000	9.71875E-03	1.99894E-02	
-0.70000	9.87937E-03	2.09746E-02	
-0.80000	1.06280E-02	2.28215E-02	
-0.90000	1.23449E-02	2.59938E-02	
-1.00000	1.54580E-02	3.10314E-02	

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.516
 σ_{SE} = .867
 σ_{CE} = .131

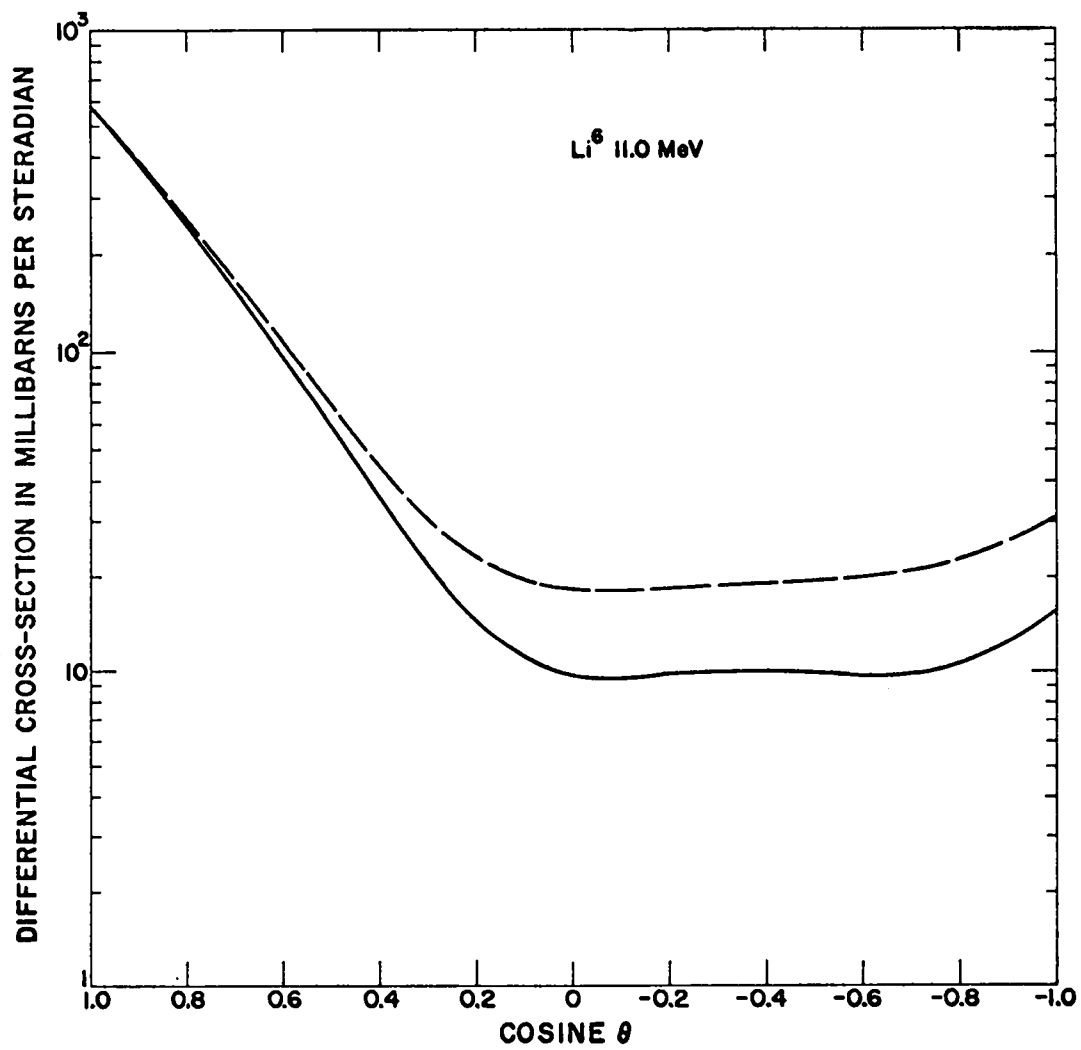


Figure 12

Li⁶

12.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	5.99619E-01	6.13203E-01
0.90000	3.86802E-01	3.98610E-01
0.80000	2.44606E-01	2.55094E-01
0.70000	1.51157E-01	1.60662E-01
0.60000	9.11413E-02	9.99157E-02
0.50000	5.37995E-02	6.20332E-02
0.40000	3.15708E-02	3.94096E-02
0.30000	1.91583E-02	2.67165E-02
0.20000	1.28798E-02	2.02510E-02
0.10000	1.02117E-02	1.74755E-02
0.00000	9.46360E-03	1.66924E-02
-0.10000	9.54633E-03	1.68101E-02
-0.20000	9.80361E-03	1.71747E-02
-0.30000	9.89093E-03	1.74492E-02
-0.40000	9.68781E-03	1.75265E-02
-0.50000	9.23505E-03	1.74687E-02
-0.60000	8.69000E-03	1.74644E-02
-0.70000	8.29549E-03	1.78006E-02
-0.80000	8.35857E-03	1.88463E-02
-0.90000	9.23636E-03	2.10441E-02
-1.00000	1.13282E-02	2.49116E-02

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.490
 σ_{SE} = .865
 σ_{CE} = .112

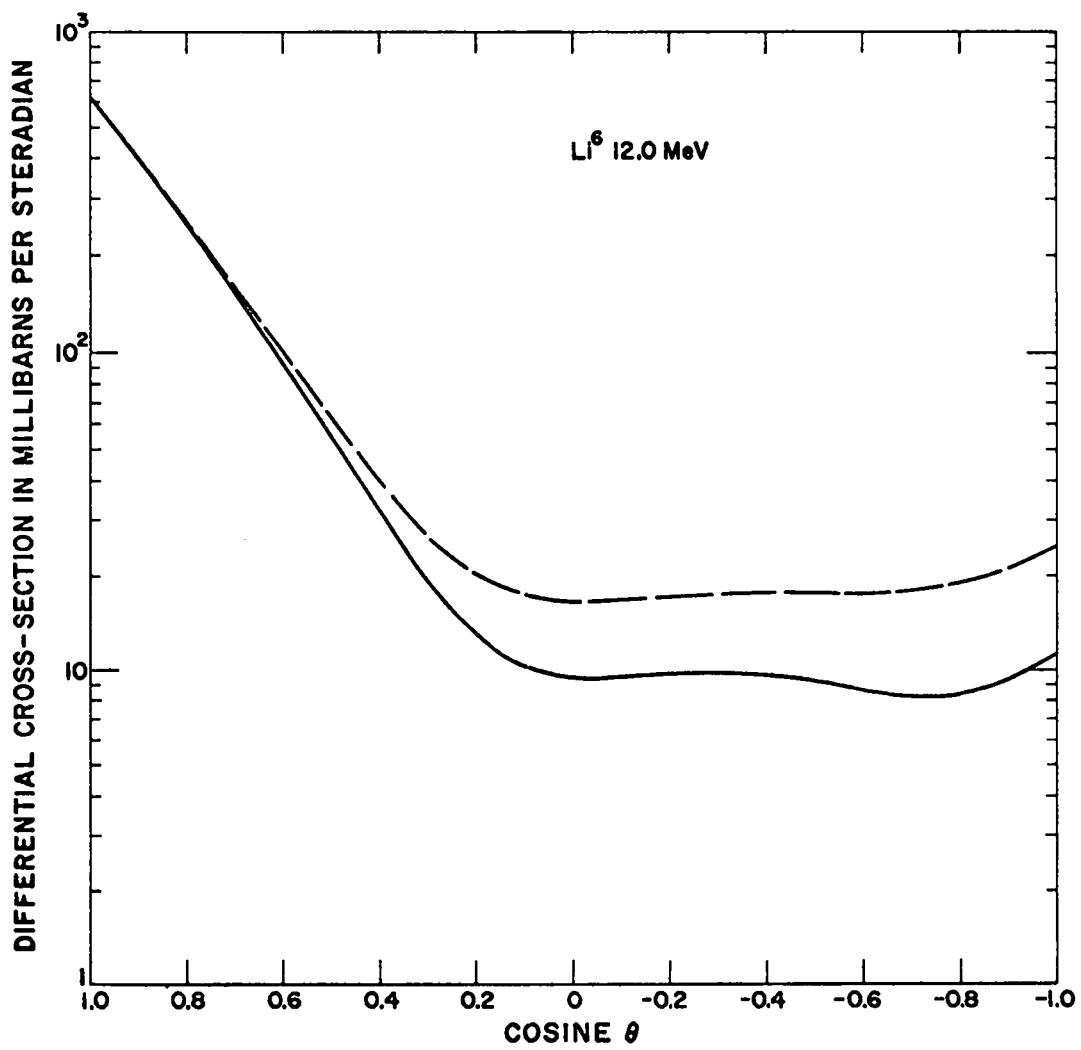


Figure 13

Li⁶

13.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	6.27827E-01	6.40010E-01
0.90000	3.95789E-01	4.06299E-01
0.80000	2.44437E-01	2.53727E-01
0.70000	1.47350E-01	1.55744E-01
0.60000	8.65432E-02	9.42775E-02
0.50000	4.97211E-02	5.69702E-02
0.40000	2.84722E-02	3.53677E-02
0.30000	1.70596E-02	2.37038E-02
0.20000	1.16021E-02	1.80782E-02
0.10000	9.51260E-03	1.58920E-02
0.00000	9.10853E-03	1.54564E-02
-0.10000	9.33962E-03	1.57190E-02
-0.20000	9.59678E-03	1.60728E-02
-0.30000	9.57788E-03	1.62221E-02
-0.40000	9.19370E-03	1.60892E-02
-0.50000	8.50261E-03	1.57518E-02
-0.60000	7.66559E-03	1.53998E-02
-0.70000	6.91574E-03	1.53095E-02
-0.80000	6.53792E-03	1.58275E-02
-0.90000	6.85552E-03	1.73657E-02
-1.00000	8.22198E-03	2.04047E-02

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.462
 σ_{SE} = .860
 σ_{CE} = .099

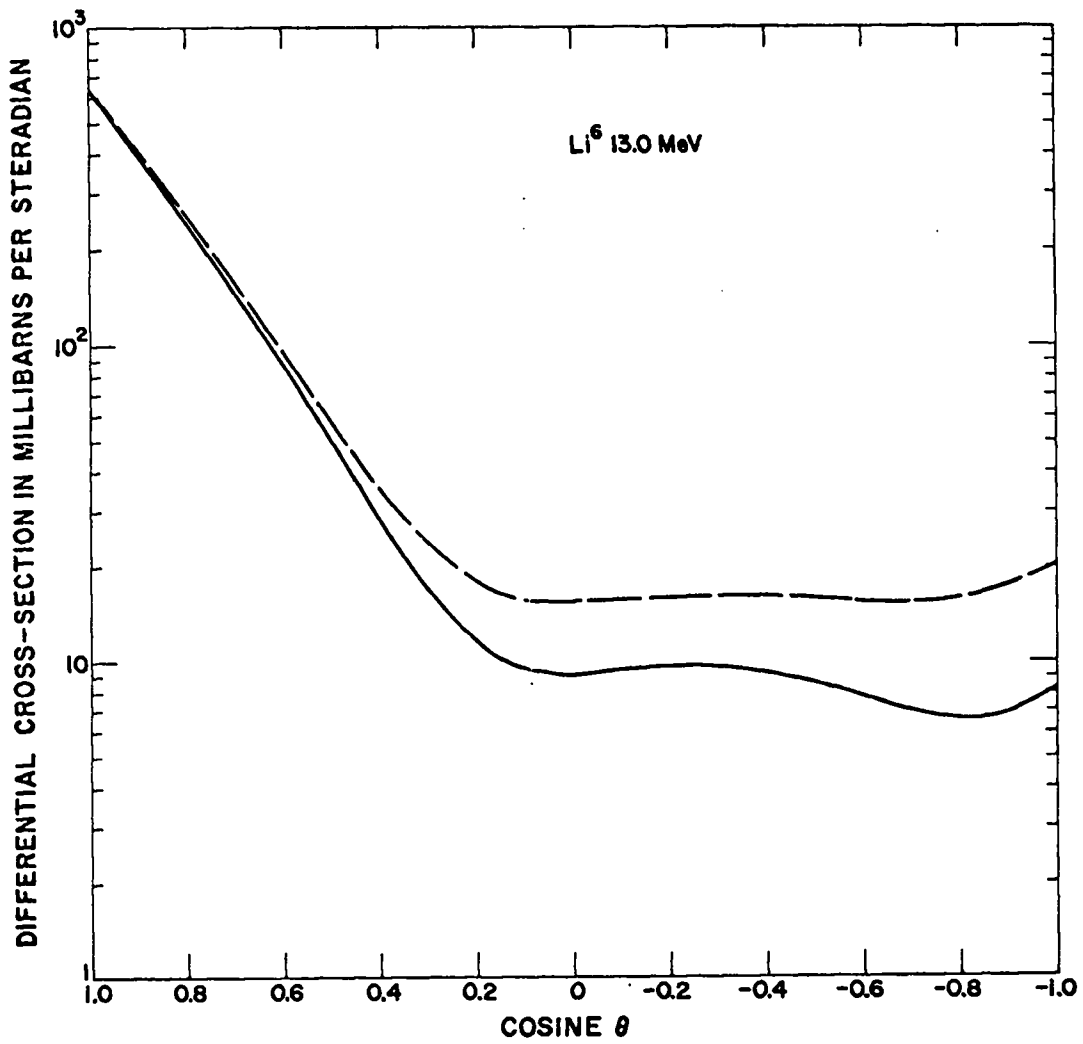


Figure 14

Li ⁶	14.0 MeV
COSINE (C.M.)	
1.00000	6.5280E-01
0.90000	4.0215E-01
0.80000	2.4261E-01
0.70000	1.4274E-01
0.60000	8.1755E-02
0.50000	4.5809E-02
0.40000	2.5688E-02
0.30000	1.5277E-02
0.20000	1.0556E-02
0.10000	8.9223E-03
0.00000	8.7380E-03
-0.10000	9.0174E-03
-0.20000	9.2139E-03
-0.30000	9.0752E-03
-0.40000	8.5444E-03
-0.50000	7.6949E-03
-0.60000	6.6859E-03
-0.70000	5.7344E-03
-0.80000	5.0967E-03
-0.90000	5.0568E-03
-1.00000	5.9200E-03

DSIGMAS IN BNS/STERAD

$$\begin{aligned} \sigma_T &= 1.433 \\ \sigma_{SE} &= .851 \end{aligned}$$

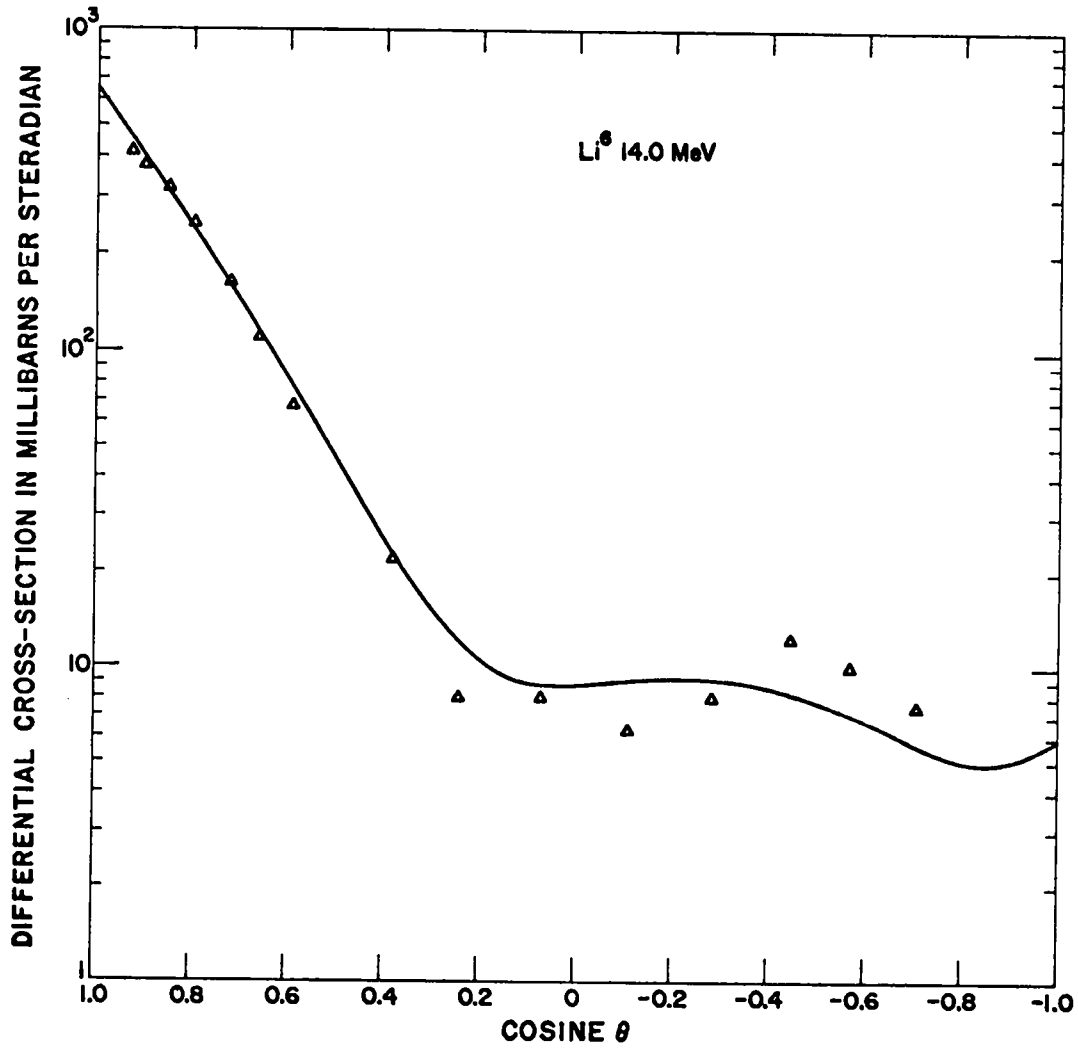


Figure 15

Li ⁶	15.0 MeV	16.0 MeV
COSINE (C.M.)		
1.00000	6.7497E-01	6.9495E-01
0.90000	4.0634E-01	4.0877E-01
0.80000	2.3949E-01	2.3536E-01
0.70000	1.3758E-01	1.3202E-01
0.60000	7.6898E-02	7.2039E-02
0.50000	4.2082E-02	3.8549E-02
0.40000	2.3175E-02	2.0907E-02
0.30000	1.3746E-02	1.2423E-02
0.20000	9.6835E-03	8.9422E-03
0.10000	8.4088E-03	7.9438E-03
0.00000	8.3539E-03	7.9499E-03
-0.10000	8.6131E-03	8.1453E-03
-0.20000	8.7112E-03	8.1286E-03
-0.30000	8.4490E-03	7.7527E-03
-0.40000	7.8026E-03	7.0227E-03
-0.50000	6.8576E-03	6.0332E-03
-0.60000	5.7682E-03	4.9294E-03
-0.70000	4.7309E-03	3.8854E-03
-0.80000	3.9692E-03	3.0918E-03
-0.90000	3.7244E-03	2.7500E-03
-1.00000	4.2513E-03	3.0724E-03
		DSIGMAS IN BNS/STERAD
σ_T =	1.403	1.373
σ_{SE} =	.839	.827

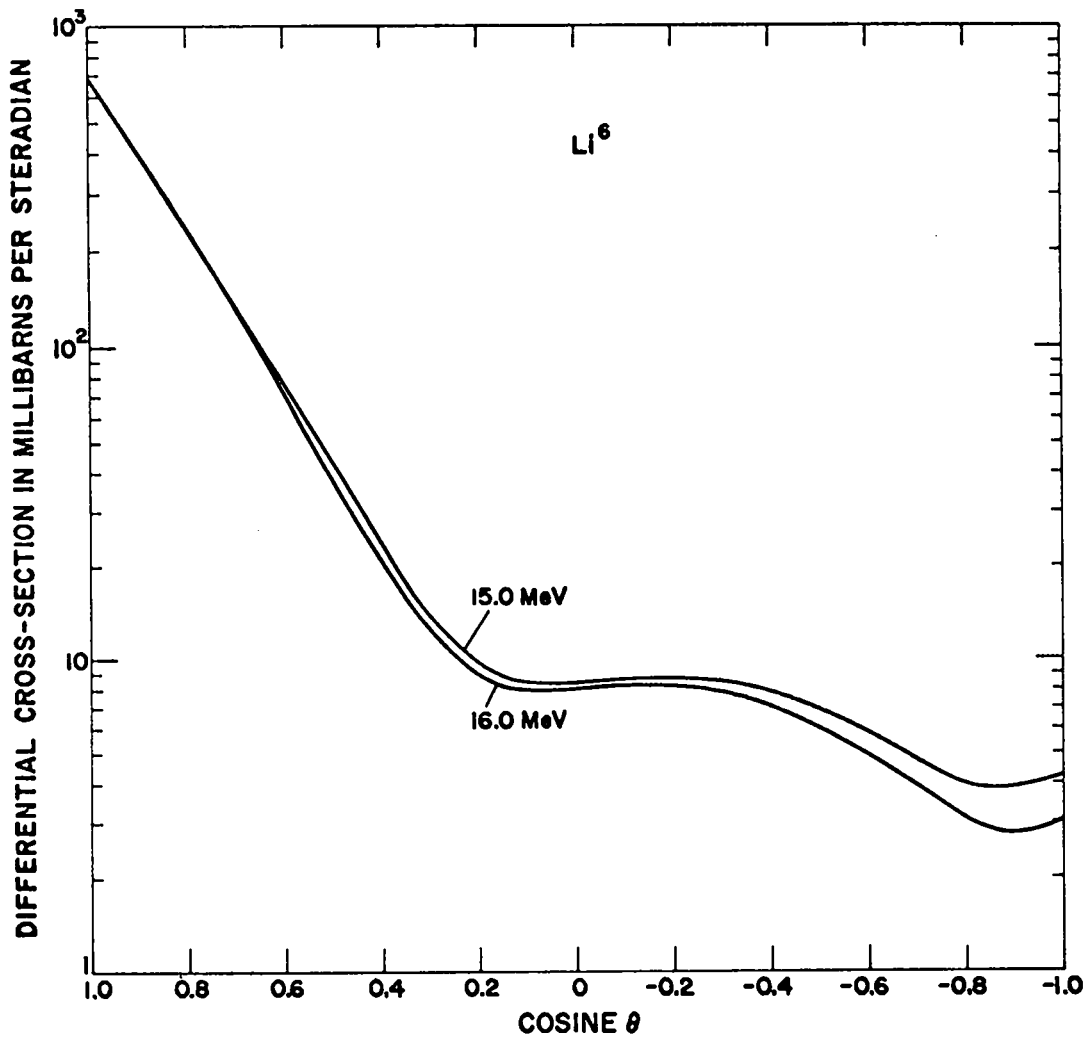


Figure 16



Li⁷

<u>Energy</u>	<u>Energy Levels</u> *
1.00	0.8 3/2 ⁻
1.45	0.478 1/2 ⁻
2.00	4.63 [3/2 ⁻]
3.00	6.54 [3/2 ⁻]
4.00	7.47 5/2 ⁻
4.21	9.60 [3/2 ⁻]
5.00	10.80 [3/2 ⁻]
6.00	12.40 [3/2 ⁻]
7.00	14.00 [3/2 ⁻]
8.00	
9.00	
10.00	
11.00	
12.00	
13.00	
14.00	
15.00	
16.00	

* Energy levels from NRC 61-5, 6-35,
except [] values which are assumed.

Li ⁷	1.0 MeV	
CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.09624E-01	2.04539E-01
0.90000	9.83061E-02	1.90925E-01
0.80000	8.76290E-02	1.78274E-01
0.70000	7.75920E-02	1.66556E-01
0.60000	6.81952E-02	1.55749E-01
0.50000	5.94394E-02	1.45833E-01
0.40000	5.13262E-02	1.36793E-01
0.30000	4.38580E-02	1.28617E-01
0.20000	3.70377E-02	1.21299E-01
0.10000	3.08688E-02	1.14834E-01
0.00000	2.53556E-02	1.09223E-01
-0.10000	2.05028E-02	1.04468E-01
-0.20000	1.63157E-02	1.00577E-01
-0.30000	1.28002E-02	9.75595E-02
-0.40000	9.96271E-03	9.54292E-02
-0.50000	7.81006E-03	9.42036E-02
-0.60000	6.34962E-03	9.39034E-02
-0.70000	5.58922E-03	9.45533E-02
-0.80000	5.53712E-03	9.61817E-02
-0.90000	6.20198E-03	9.88210E-02
-1.00000	7.59289E-03	1.02508E-01

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.771
 σ_{SE} = .458
 σ_{CE} = 1.098

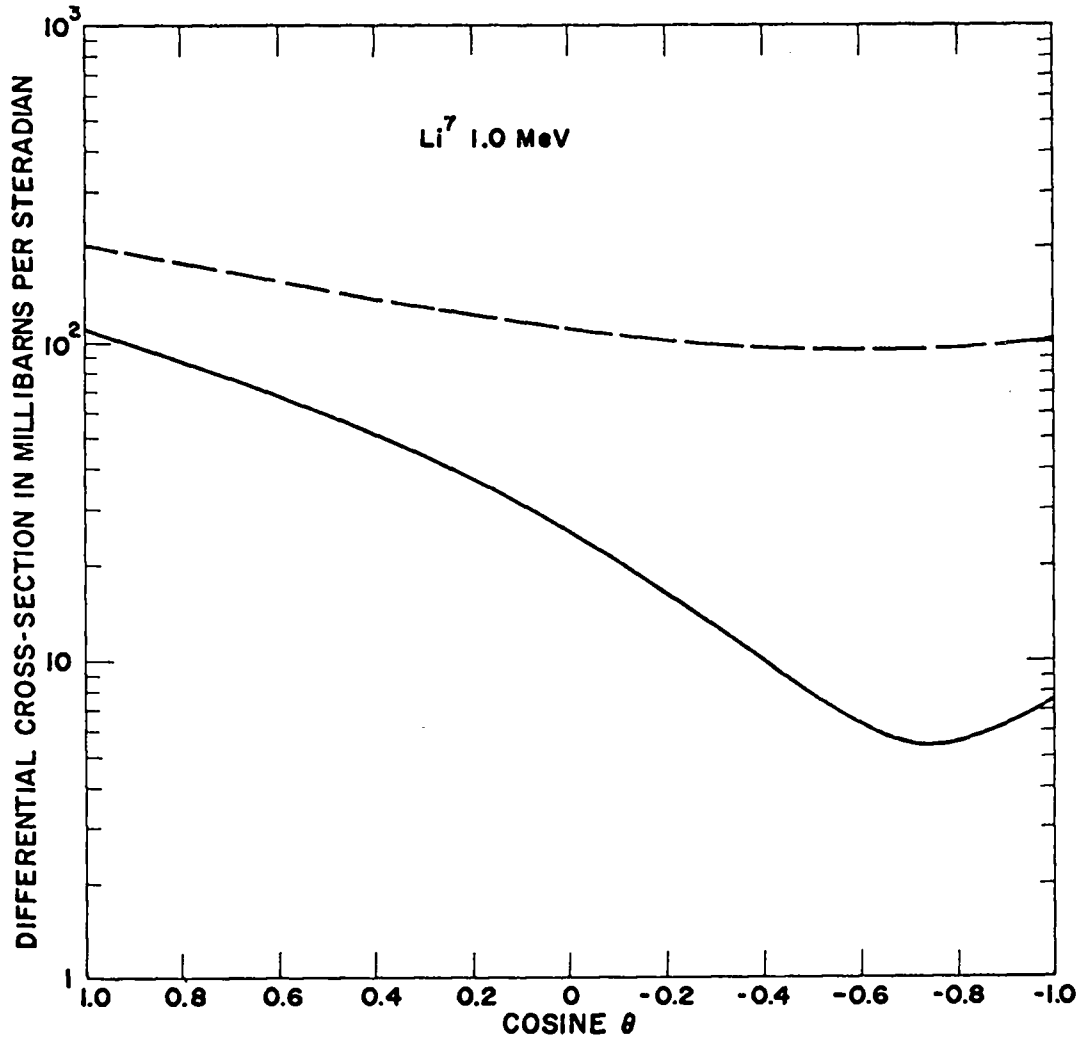


Figure 17

Li ⁷	1.45 MeV	
CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.29666E-01	2.10097E-01
0.90000	1.14102E-01	1.91889E-01
0.80000	9.95990E-02	1.75162E-01
0.70000	8.61414E-02	1.59851E-01
0.60000	7.37162E-02	1.45900E-01
0.50000	6.23143E-02	1.33265E-01
0.40000	5.19299E-02	1.21911E-01
0.30000	4.25604E-02	1.11811E-01
0.20000	3.42062E-02	1.02947E-01
0.10000	2.68702E-02	9.53110E-02
0.00000	2.05583E-02	8.88998E-02
-0.10000	1.52787E-02	8.37195E-02
-0.20000	1.10421E-02	7.97834E-02
-0.30000	7.86148E-03	7.71119E-02
-0.40000	5.75182E-03	7.57328E-02
-0.50000	4.73022E-03	7.56812E-02
-0.60000	4.81566E-03	7.69996E-02
-0.70000	6.02894E-03	7.97384E-02
-0.80000	8.39257E-03	8.39555E-02
-0.90000	1.19307E-02	8.97176E-02
-1.00000	1.66690E-02	9.71003E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.610
 σ_{SE} = .477
 σ_{CE} = .906

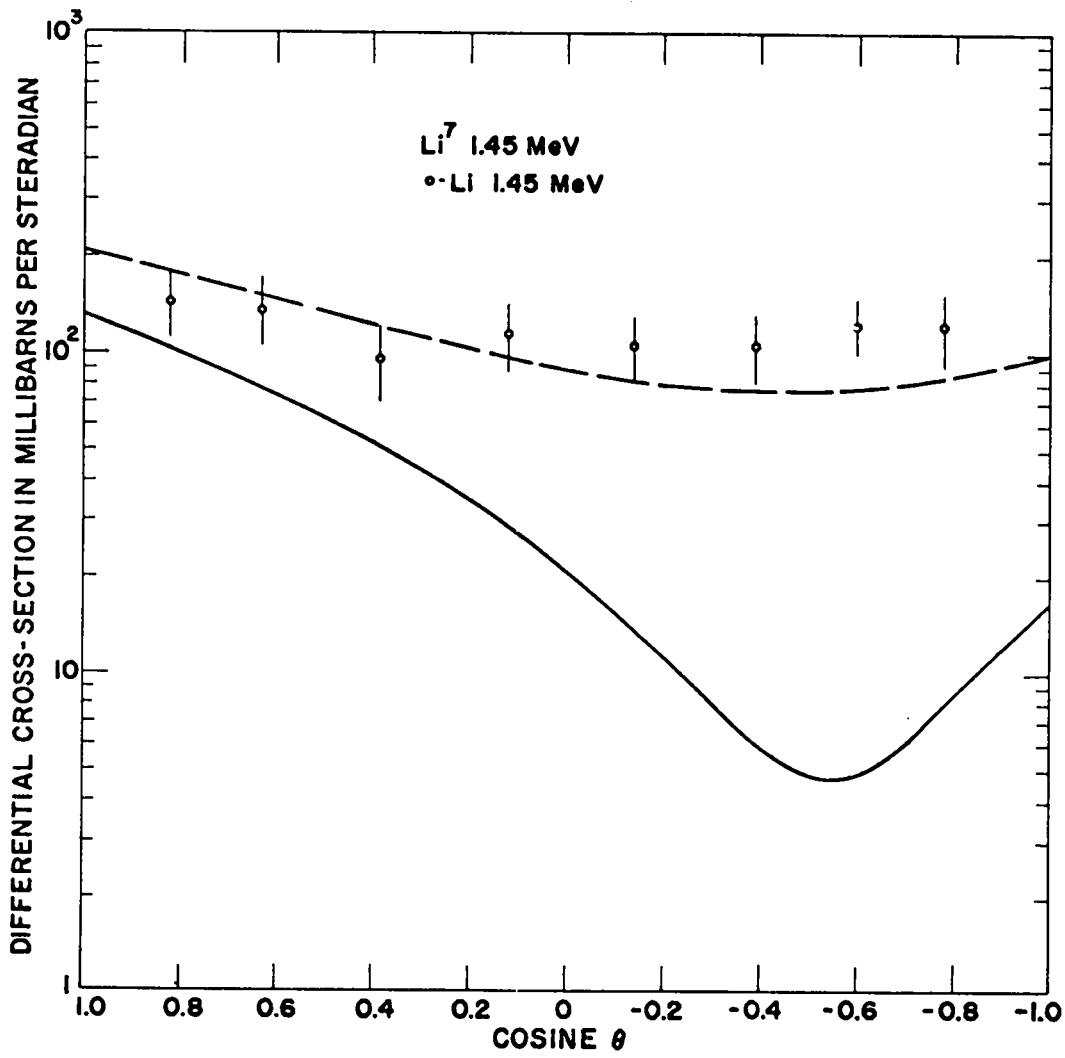


Figure 18

Li ⁷	2.0 MeV	
CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.50694E-01	2.22296E-01
0.90000	1.30147E-01	1.98611E-01
0.80000	1.11347E-01	1.77241E-01
0.70000	9.42094E-02	1.58014E-01
0.60000	7.86615E-02	1.40789E-01
0.50000	6.46454E-02	1.25448E-01
0.40000	5.21150E-02	1.11897E-01
0.30000	4.10361E-02	1.00063E-01
0.20000	3.13850E-02	8.98932E-02
0.10000	2.31481E-02	8.13533E-02
0.00000	1.63209E-02	7.44265E-02
-0.10000	1.09079E-02	6.91131E-02
-0.20000	6.92131E-03	6.54295E-02
-0.30000	4.38108E-03	6.34079E-02
-0.40000	3.31406E-03	6.30959E-02
-0.50000	3.75361E-03	6.45561E-02
-0.60000	5.73916E-03	6.78665E-02
-0.70000	9.31579E-03	7.31206E-02
-0.80000	1.45338E-02	8.04275E-02
-0.90000	2.14486E-02	8.99134E-02
-1.00000	3.01198E-02	1.01722E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.516
 σ_{SE} = .510
 σ_{CE} = .781

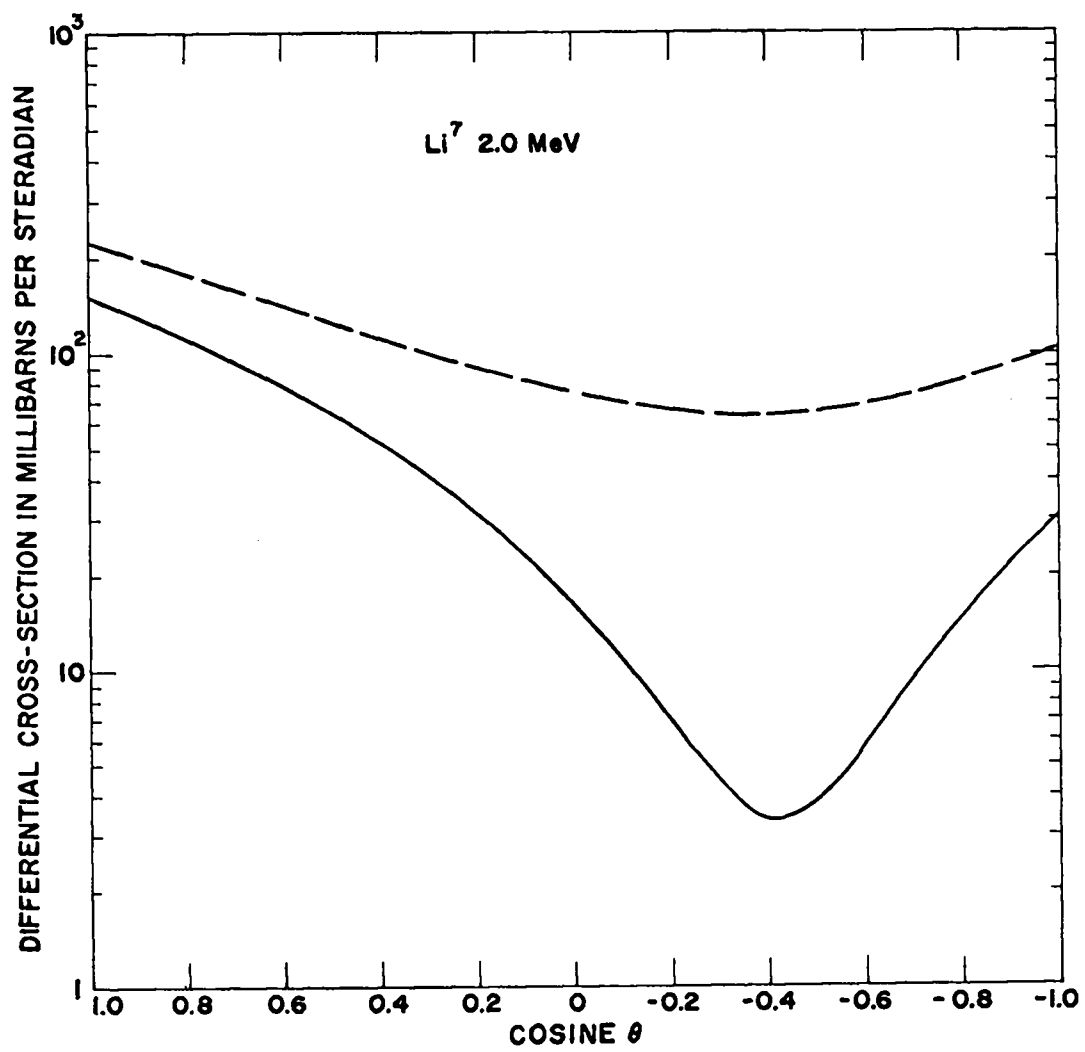


Figure 19

Li ⁷		3.0 MeV	
CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	1.89091E-01	2.54964E-01	
0.90000	1.57203E-01	2.18857E-01	
0.80000	1.29473E-01	1.87798E-01	
0.70000	1.05399E-01	1.61122E-01	
0.60000	8.45525E-02	1.38267E-01	
0.50000	6.65781E-02	1.18768E-01	
0.40000	5.11824E-02	1.02240E-01	
0.30000	3.81288E-02	8.83766E-02	
0.20000	2.72325E-02	7.69396E-02	
0.10000	1.83556E-02	6.77530E-02	
0.00000	1.14021E-02	6.06988E-02	
-0.10000	6.31484E-03	5.57123E-02	
-0.20000	3.07107E-03	5.27781E-02	
-0.30000	1.67986E-03	5.19277E-02	
-0.40000	2.17893E-03	5.32364E-02	
-0.50000	4.63213E-03	5.68217E-02	
-0.60000	9.12705E-03	6.28421E-02	
-0.70000	1.57729E-02	7.14962E-02	
-0.80000	2.46986E-02	8.30235E-02	
-0.90000	3.60511E-02	9.77052E-02	
-1.00000	4.99936E-02	1.15867E-01	

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.473
 σ_{SE} = .571
 σ_{CE} = .678

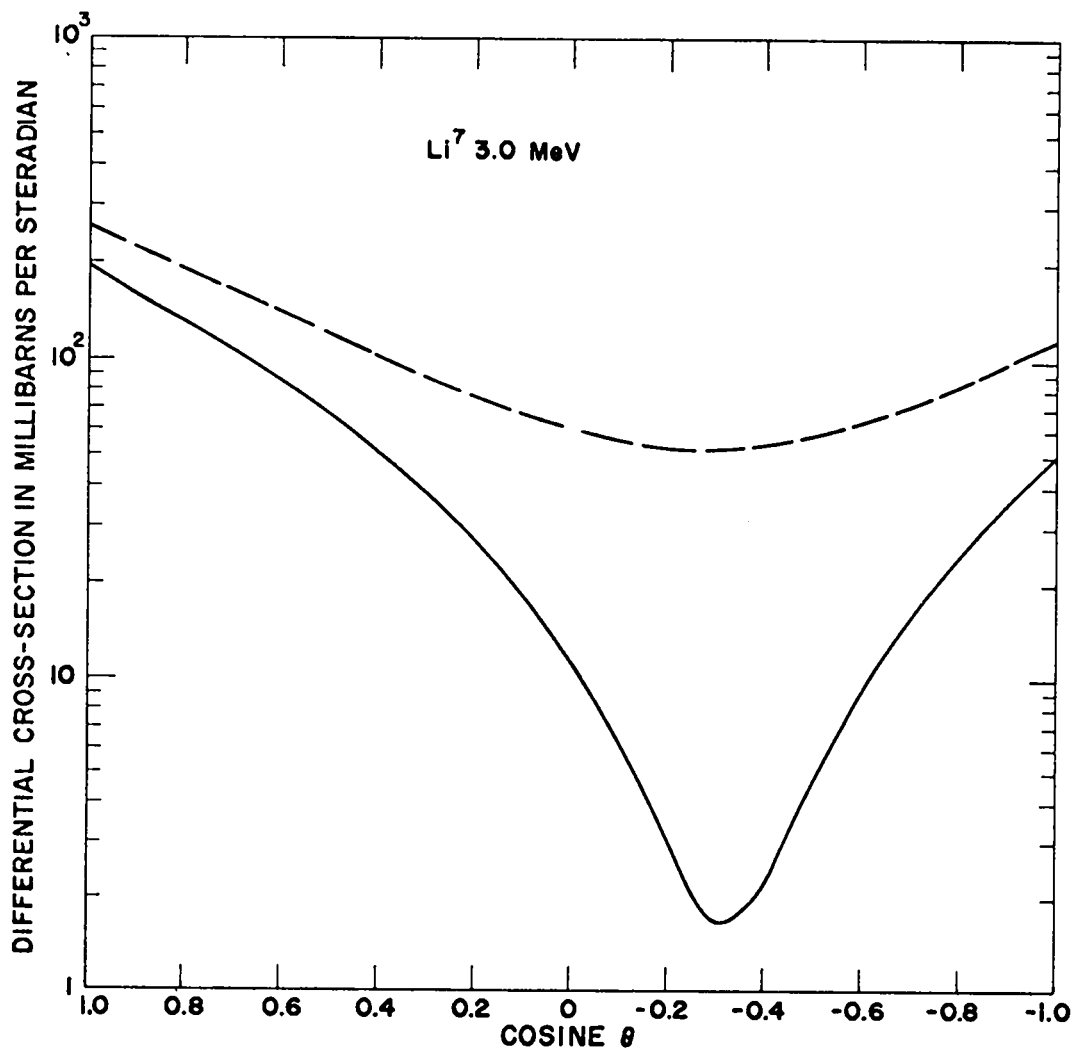


Figure 20

Li ⁷ CCSINE(C.M.)	4.0 MeV SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.38283E-01	3.03714E-01
0.90000	1.88761E-01	2.48859E-01
0.80000	1.48195E-01	2.04190E-01
0.70000	1.15074E-01	1.67947E-01
0.60000	8.81324E-02	1.38660E-01
0.50000	6.63124E-02	1.15110E-01
0.40000	4.87448E-02	9.62942E-02
0.30000	3.47242E-02	8.14053E-02
0.20000	2.36907E-02	6.98053E-02
0.10000	1.52124E-02	6.10086E-02
0.00000	8.97166E-03	5.46651E-02
-0.10000	4.75132E-03	5.05475E-02
-0.20000	2.42407E-03	4.85387E-02
-0.30000	1.94238E-03	4.86234E-02
-0.40000	3.32987E-03	5.08793E-02
-0.50000	6.67371E-03	5.54711E-02
-0.60000	1.21179E-02	6.26459E-02
-0.70000	1.98574E-02	7.27300E-02
-0.80000	3.01329E-02	8.61280E-02
-0.90000	4.32262E-02	1.03324E-01
-1.00000	5.94562E-02	1.24887E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.502
 σ_{SE} = .632
 σ_{CE} = .640

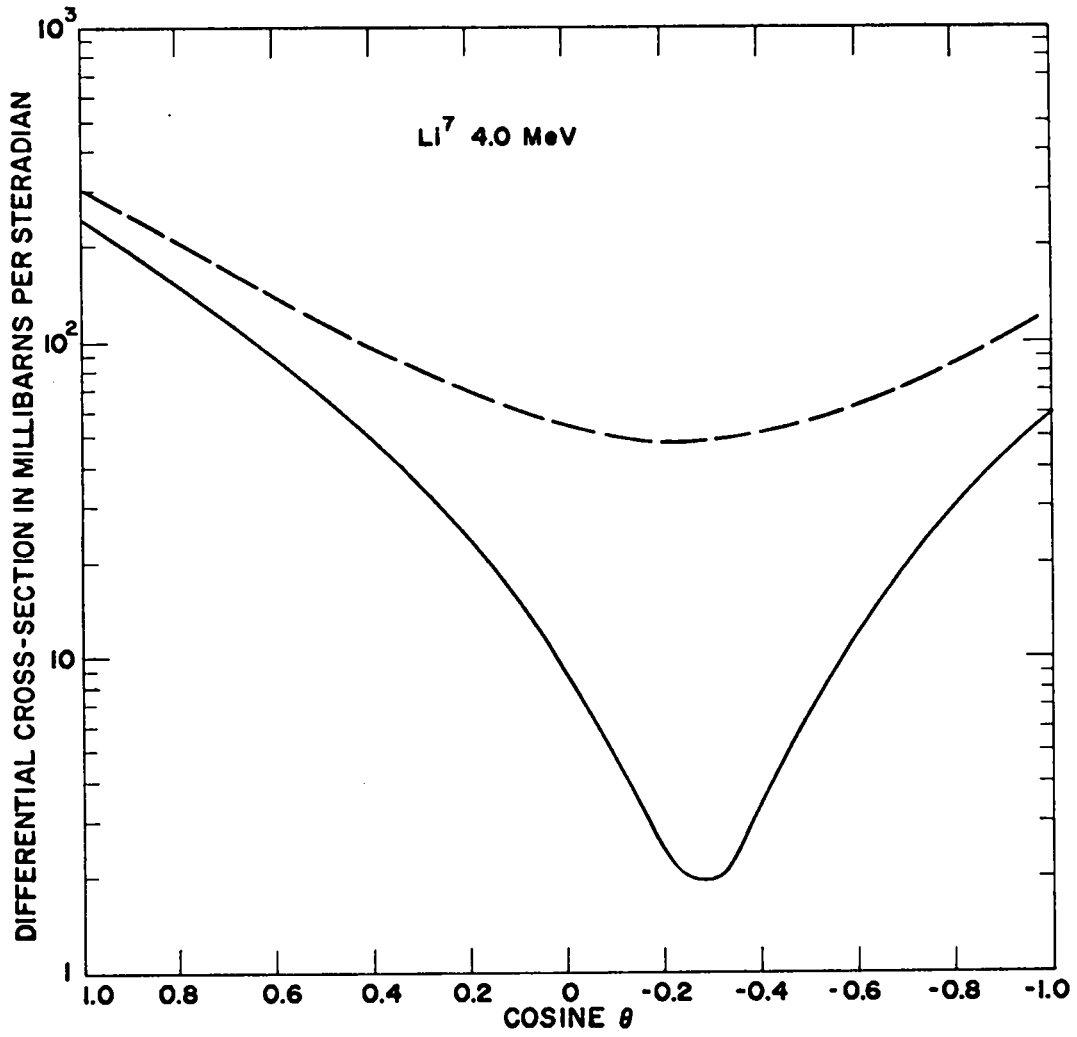


Figure 21

Li ⁷	4.21 MeV	
CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.50279E-01	3.15844E-01
0.90000	1.96165E-01	2.56184E-01
0.80000	1.52350E-01	2.08119E-01
0.70000	1.17023E-01	1.69572E-01
0.60000	8.86690E-02	1.38810E-01
0.50000	6.60291E-02	1.14401E-01
0.40000	4.80681E-02	9.51703E-02
0.30000	3.39475E-02	8.01700E-02
0.20000	2.30016E-02	6.86525E-02
0.10000	1.47166E-02	6.00470E-02
0.00000	8.71243E-03	5.39398E-02
-0.10000	4.72734E-03	5.00578E-02
-0.20000	2.60399E-03	4.82549E-02
-0.30000	2.27768E-03	4.85002E-02
-0.40000	3.76600E-03	5.08683E-02
-0.50000	7.15968E-03	5.55319E-02
-0.60000	1.26147E-02	6.27560E-02
-0.70000	2.03453E-02	7.28942E-02
-0.80000	3.06179E-02	8.63873E-02
-0.90000	4.37457E-02	1.03764E-01
-1.00000	6.00838E-02	1.25649E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.512
 σ_{SE} = .644
 σ_{CE} = .636

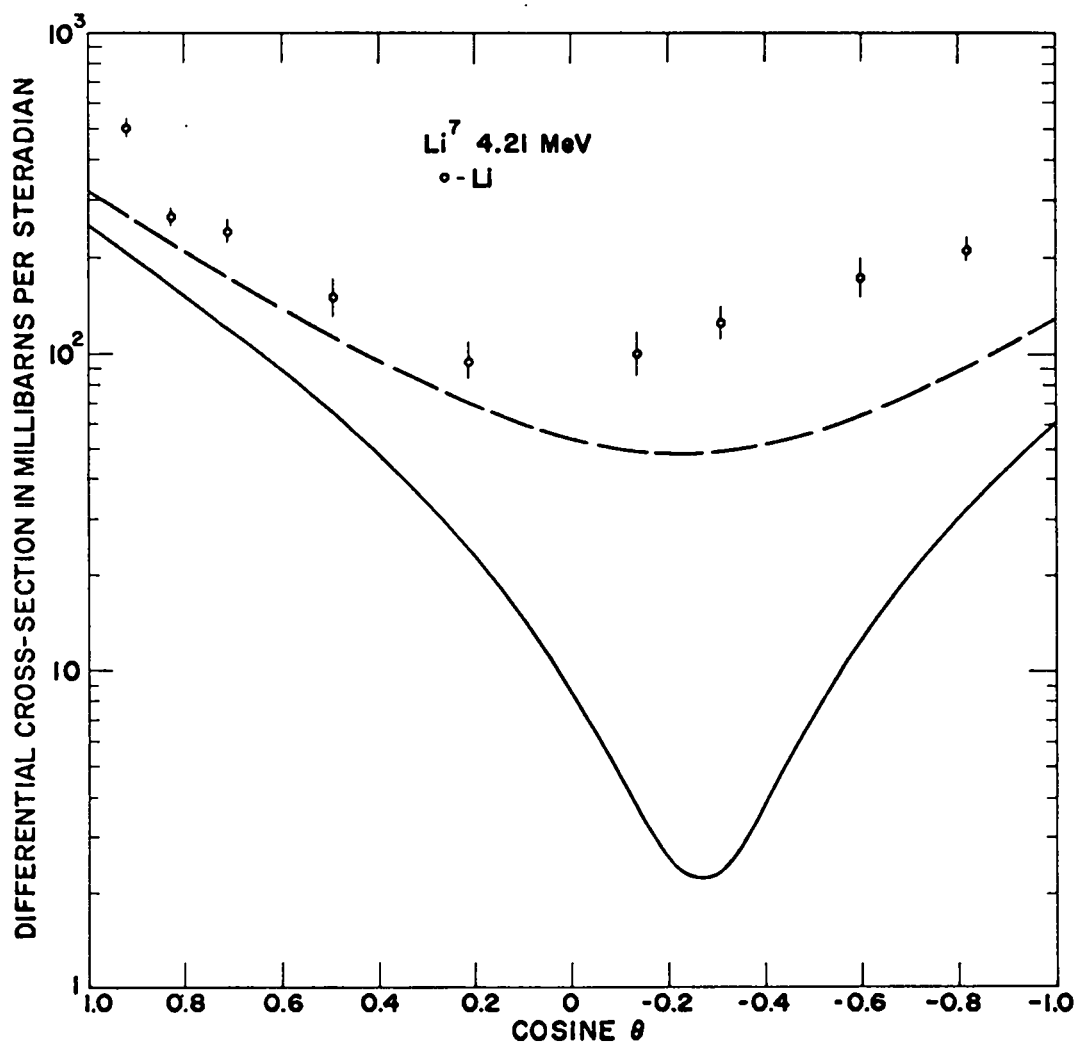


Figure 22

Li ⁷ CCSINE(C.M.)	5.0 MeV SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.00053E-01	3.66059E-01
0.90000	2.26241E-01	2.86019E-01
0.80000	1.68724E-01	2.23792E-01
0.70000	1.24288E-01	1.75832E-01
0.60000	9.02766E-02	1.39219E-01
0.50000	6.45060E-02	1.11561E-01
0.40000	4.52002E-02	9.09172E-02
0.30000	3.09312E-02	7.57329E-02
0.20000	2.05704E-02	6.47839E-02
0.10000	1.32472E-02	5.71336E-02
0.00000	8.31375E-03	5.20954E-02
-0.10000	5.31547E-03	4.92019E-02
-0.20000	3.96538E-03	4.81789E-02
-0.30000	4.12263E-03	4.89243E-02
-0.40000	5.77395E-03	5.14909E-02
-0.50000	9.01790E-03	5.60725E-02
-0.60000	1.40512E-02	6.29932E-02
-0.70000	2.11572E-02	7.27010E-02
-0.80000	3.06954E-02	8.57639E-02
-0.90000	4.30933E-02	1.02872E-01
-1.00000	5.88385E-02	1.24844E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.551
 σ_{SE} = .691
 σ_{CE} = .622

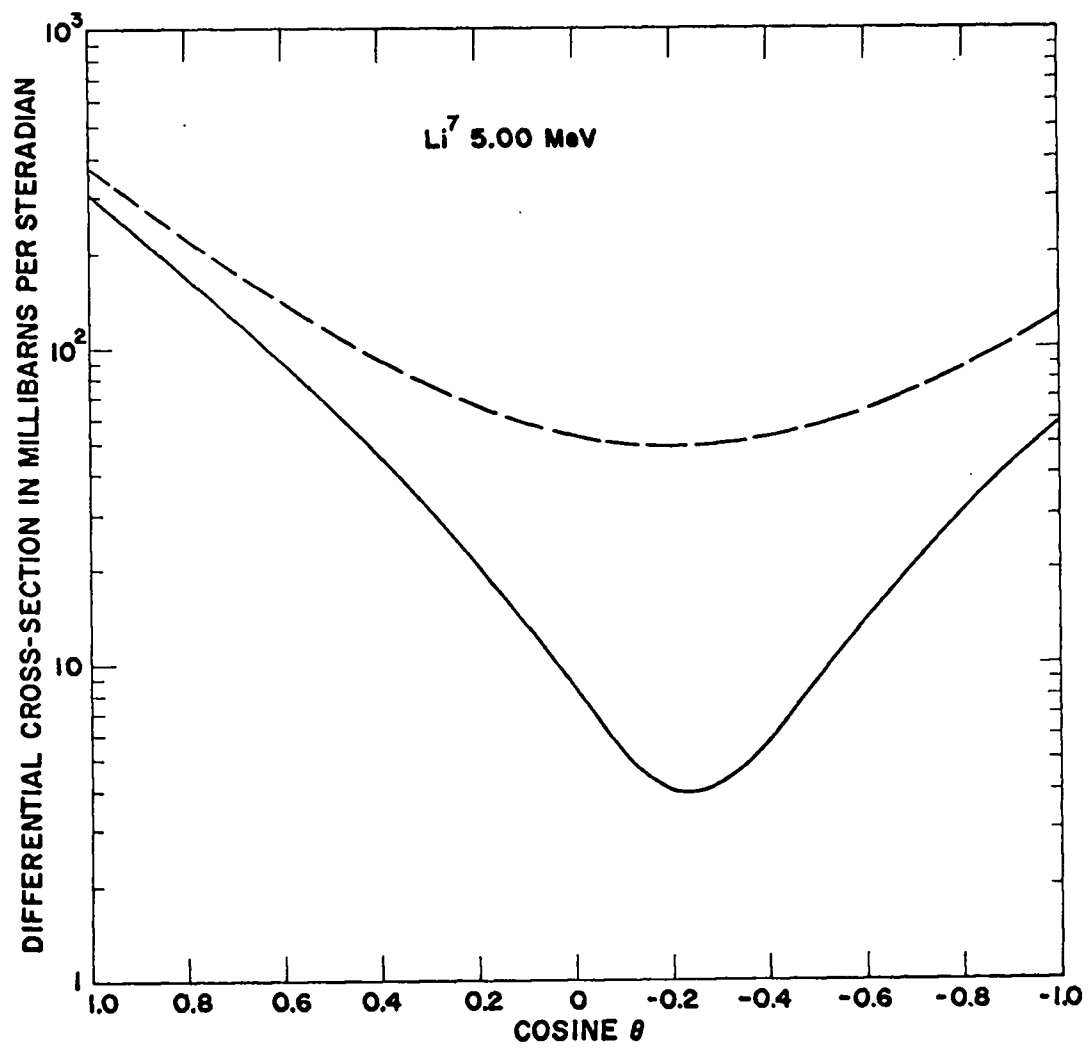


Figure 23

Li⁷

6.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.66268E-01	4.25548E-01
0.90000	2.64927E-01	3.17761E-01
0.80000	1.88899E-01	2.36926E-01
0.70000	1.32634E-01	1.77105E-01
0.60000	9.16409E-02	1.33513E-01
0.50000	6.23068E-02	1.02310E-01
0.40000	4.17468E-02	8.04348E-02
0.30000	2.76816E-02	6.54752E-02
0.20000	1.83381E-02	5.55598E-02
0.10000	1.23676E-02	4.92724E-02
0.00000	8.77869E-03	4.55822E-02
-0.10000	6.88139E-03	4.37862E-02
-0.20000	6.24143E-03	4.34631E-02
-0.30000	6.64196E-03	4.44356E-02
-0.40000	8.05176E-03	4.67397E-02
-0.50000	1.05986E-02	5.06014E-02
-0.60000	1.45467E-02	5.64186E-02
-0.70000	2.02782E-02	6.47490E-02
-0.80000	2.82772E-02	7.63038E-02
-0.90000	3.91158E-02	9.19504E-02
-1.00000	5.34434E-02	1.12724E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.587
 σ_{SE} = .747
 σ_{CE} = .534

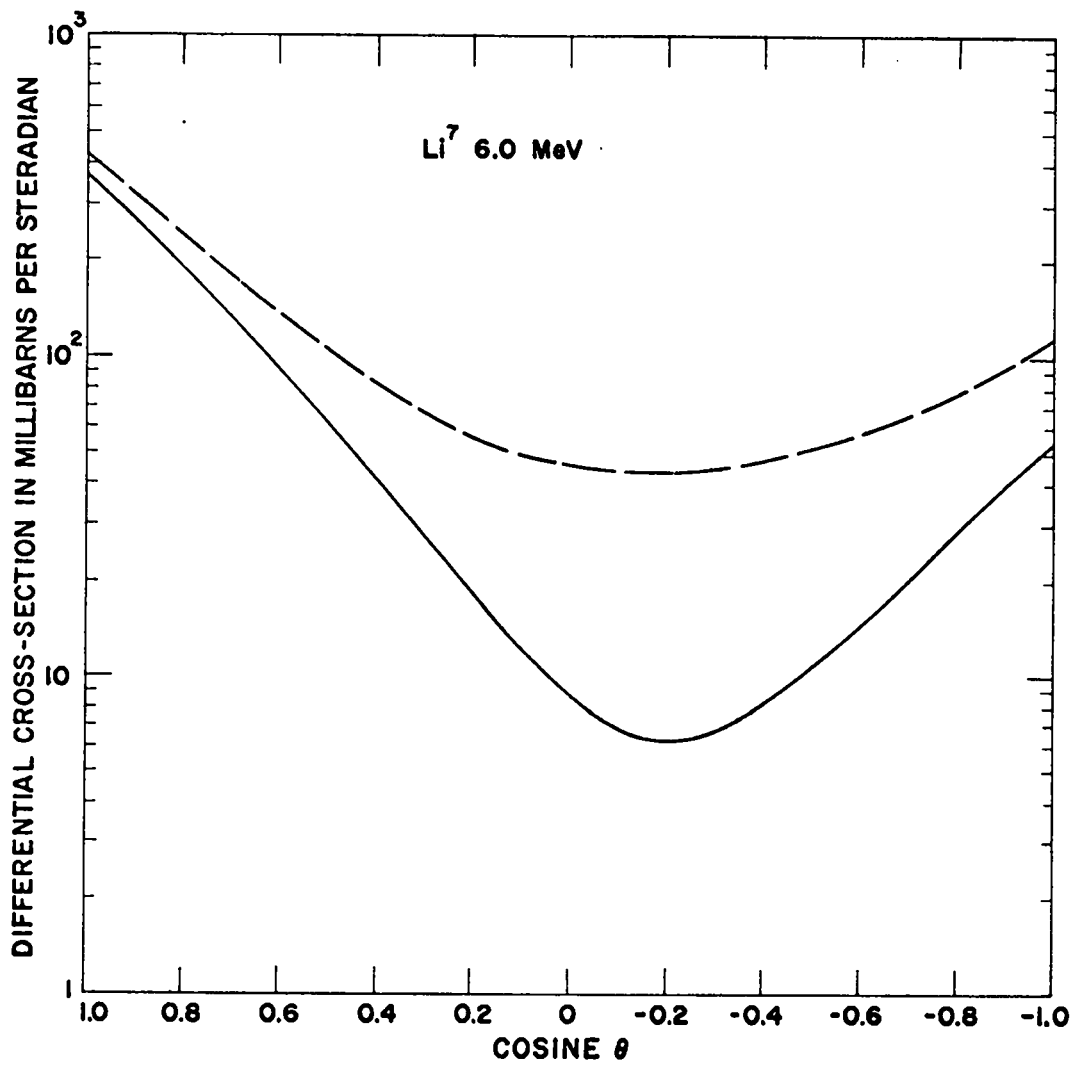


Figure 24

Li ⁷		7.0 MeV	
CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	4.36947E-01	4.92410E-01	
0.90000	3.04970E-01	3.53917E-01	
0.80000	2.08817E-01	2.52982E-01	
0.70000	1.40009E-01	1.80684E-01	
0.60000	9.18444E-02	1.29997E-01	
0.50000	5.90448E-02	9.53979E-02	
0.40000	3.74735E-02	7.25695E-02	
0.30000	2.39171E-02	5.81626E-02	
0.20000	1.59113E-02	4.96149E-02	
0.10000	1.16019E-02	4.50060E-02	
0.00000	9.63445E-03	4.29429E-02	
-0.10000	9.06557E-03	4.24697E-02	
-0.20000	9.29129E-03	4.29950E-02	
-0.30000	9.98936E-03	4.42349E-02	
-0.40000	1.10723E-02	4.61683E-02	
-0.50000	1.26491E-02	4.90022E-02	
-0.60000	1.49940E-02	5.31462E-02	
-0.70000	1.85204E-02	5.91959E-02	
-0.80000	2.37604E-02	6.79258E-02	
-0.90000	3.13466E-02	8.02936E-02	
-1.00000	4.19983E-02	9.74617E-02	

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.617
 σ_{SE} = .798
 σ_{CE} = .488

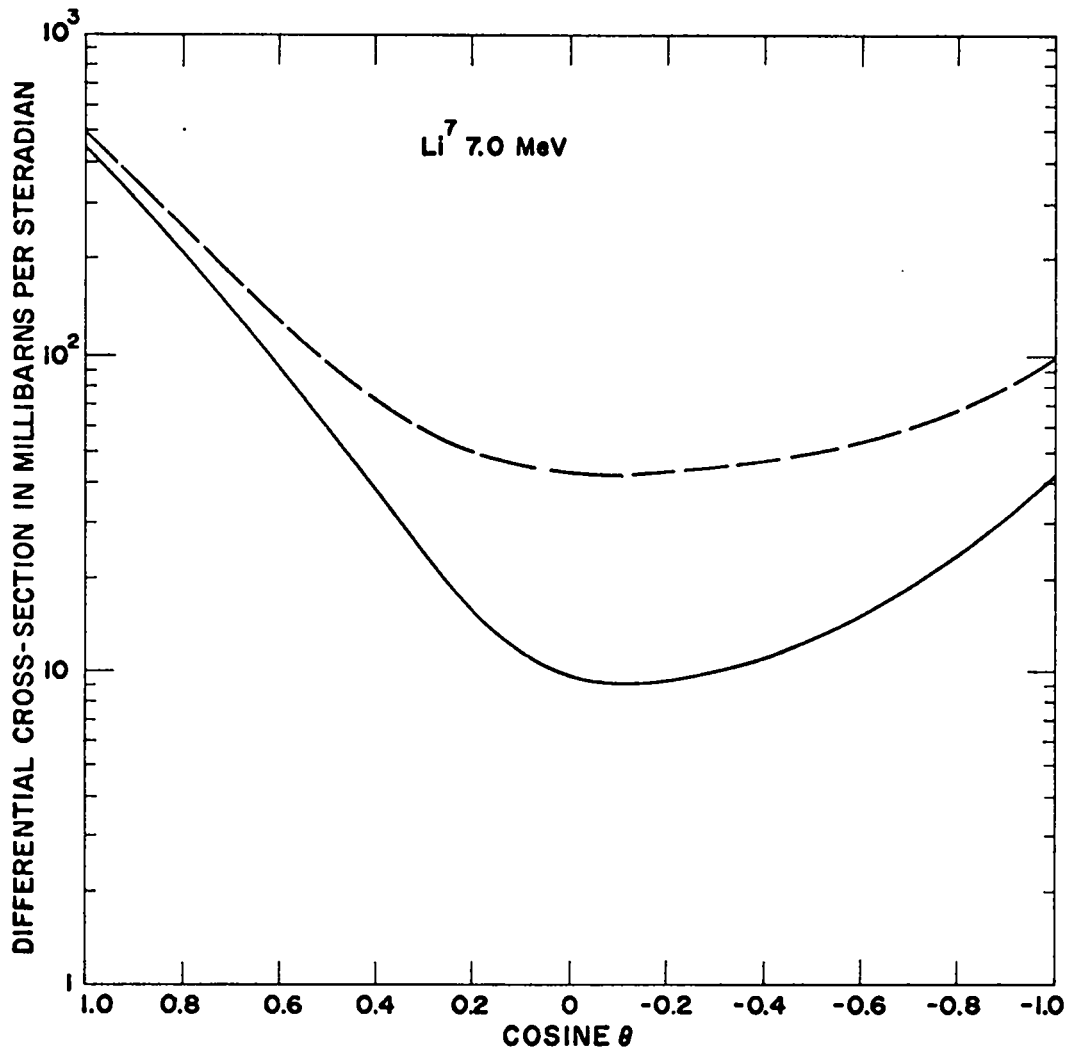


Figure 25

Li⁷

8.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	4.98810E-01	5.47937E-01
0.90000	3.38313E-01	3.81284E-01
0.80000	2.24320E-01	2.62843E-01
0.70000	1.45002E-01	1.80311E-01
0.60000	9.12475E-02	1.24244E-01
0.50000	5.60509E-02	8.73986E-02
0.40000	3.40511E-02	6.42431E-02
0.30000	2.11747E-02	5.05799E-02
0.20000	1.43631E-02	4.32633E-02
0.10000	1.13603E-02	3.99794E-02
0.00000	1.05490E-02	3.90779E-02
-0.10000	1.08219E-02	3.94409E-02
-0.20000	1.14817E-02	4.03818E-02
-0.30000	1.21614E-02	4.15666E-02
-0.40000	1.27620E-02	4.29540E-02
-0.50000	1.34030E-02	4.47507E-02
-0.60000	1.43834E-02	4.73794E-02
-0.70000	1.61501E-02	5.14588E-02
-0.80000	1.92740E-02	5.77973E-02
-0.90000	2.44302E-02	6.74014E-02
-1.00000	3.23833E-02	8.15105E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.623
 σ_{SE} = .836
 σ_{CE} = .423

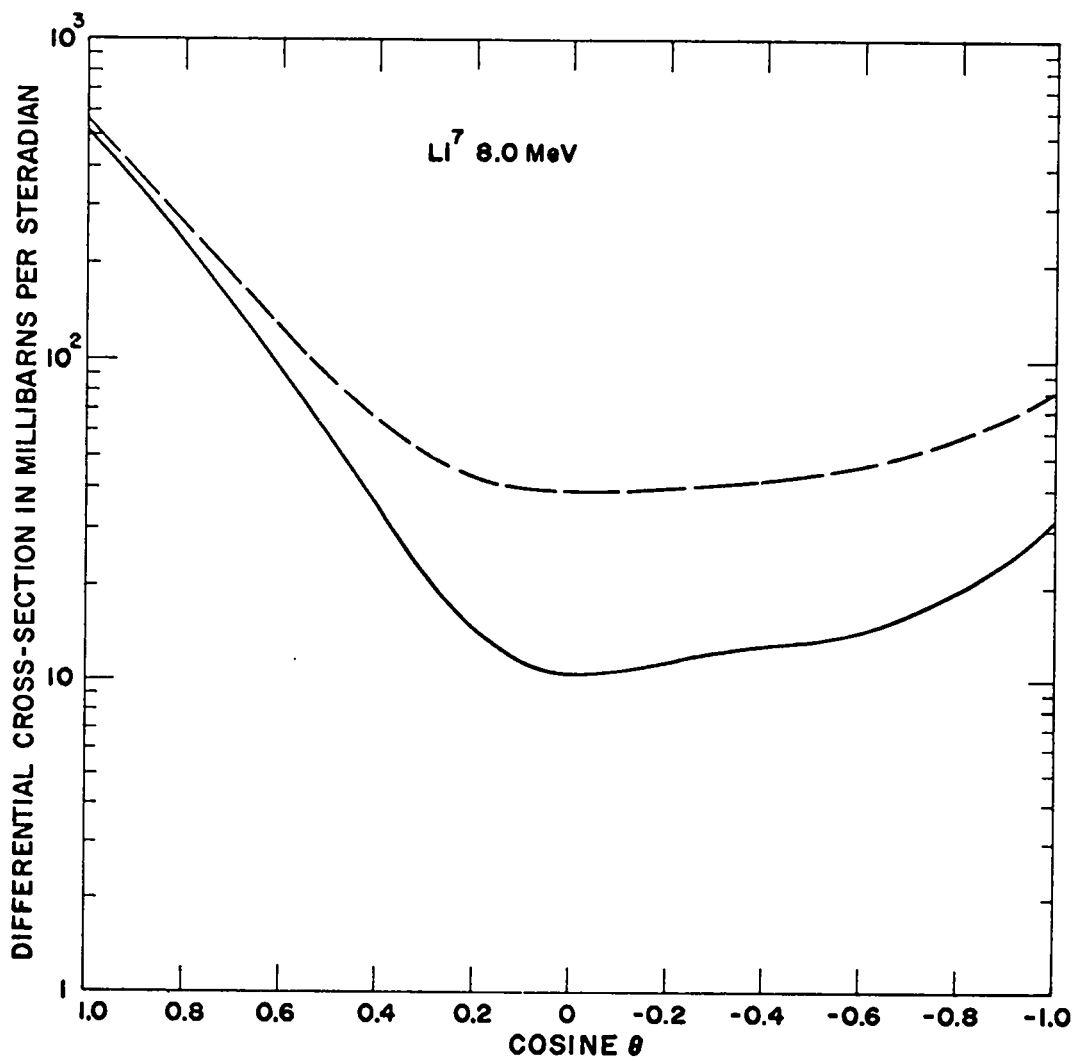


Figure 26

Li⁷

9.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	5.52989E-01	5.93456E-01
0.90000	3.65555E-01	4.00631E-01
0.80000	2.35697E-01	2.66968E-01
0.70000	1.47678E-01	1.76246E-01
0.60000	8.97264E-02	1.16372E-01
0.50000	5.30467E-02	7.83340E-02
0.40000	3.10897E-02	5.54290E-02
0.30000	1.90091E-02	4.27039E-02
0.20000	1.32564E-02	3.65375E-02
0.10000	1.12784E-02	3.43289E-02
0.00000	1.12872E-02	3.42638E-02
-0.10000	1.20877E-02	3.51383E-02
-0.20000	1.29452E-02	3.62263E-02
-0.30000	1.34848E-02	3.71797E-02
-0.40000	1.36150E-02	3.79542E-02
-0.50000	1.34687E-02	3.87560E-02
-0.60000	1.33593E-02	4.00051E-02
-0.70000	1.37470E-02	4.23143E-02
-0.80000	1.52134E-02	4.64843E-02
-0.90000	1.84429E-02	5.35195E-02
-1.00000	2.42092E-02	6.46764E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.616
 σ_{SE} = .863
 σ_{CE} = .342

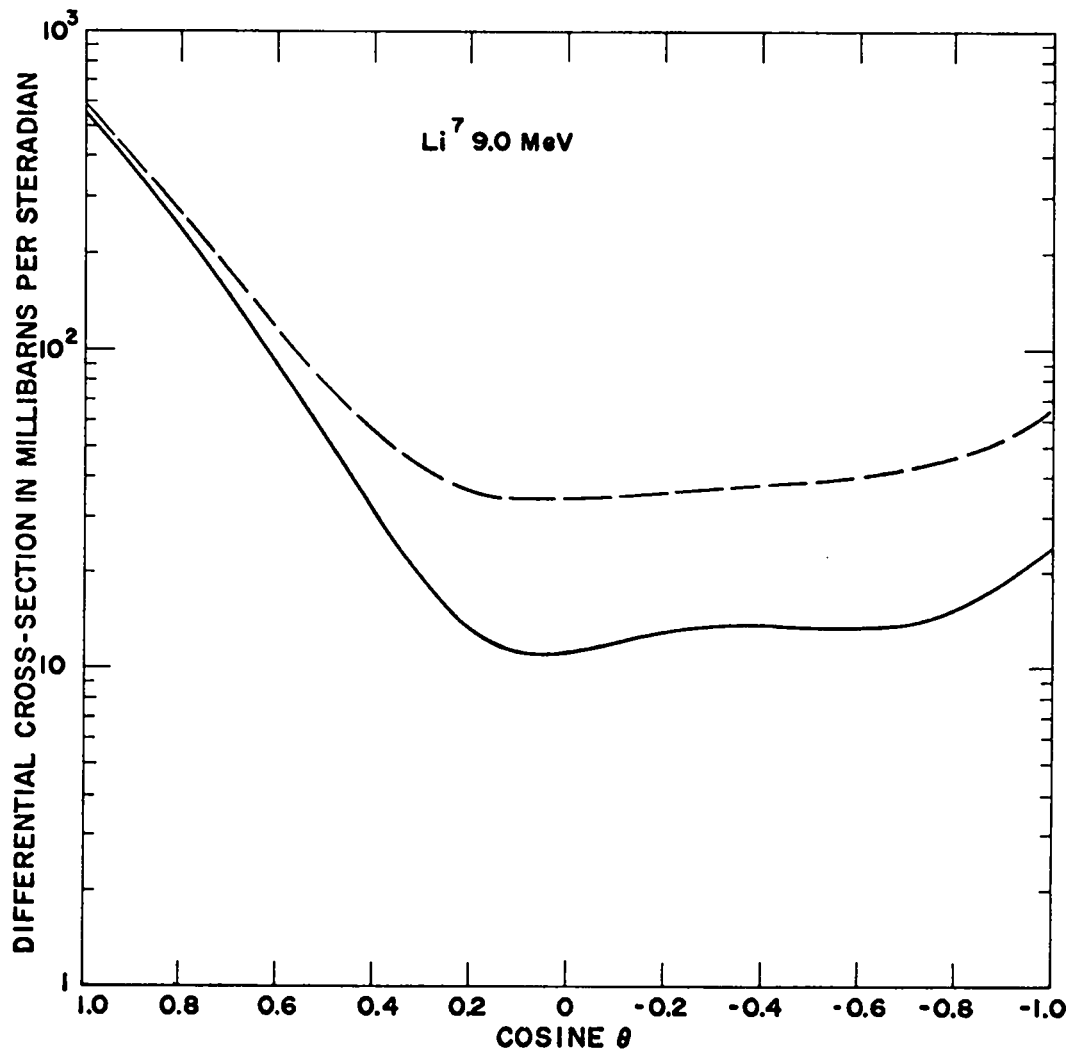


Figure 27

Li⁷

10.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	5.99760E-01	6.33701E-01
0.90000	3.87013E-01	4.16255E-01
0.80000	2.43248E-01	2.69251E-01
0.70000	1.48261E-01	1.72004E-01
0.60000	8.74036E-02	1.09558E-01
0.50000	5.00545E-02	7.10948E-02
0.40000	2.85331E-02	4.87968E-02
0.30000	1.73158E-02	3.70501E-02
0.20000	1.24709E-02	3.18634E-02
0.10000	1.12472E-02	3.04481E-02
0.00000	1.17722E-02	3.09114E-02
-0.10000	1.28304E-02	3.20312E-02
-0.20000	1.36989E-02	3.30913E-02
-0.30000	1.40269E-02	3.37611E-02
-0.40000	1.37458E-02	3.40095E-02
-0.50000	1.30040E-02	3.40443E-02
-0.60000	1.21186E-02	3.42734E-02
-0.70000	1.15420E-02	3.52840E-02
-0.80000	1.18368E-02	3.78397E-02
-0.90000	1.36595E-02	4.29019E-02
-1.00000	1.77490E-02	5.16895E-02

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.600
 σ_{SE} = .380
 σ_{CE} = .285

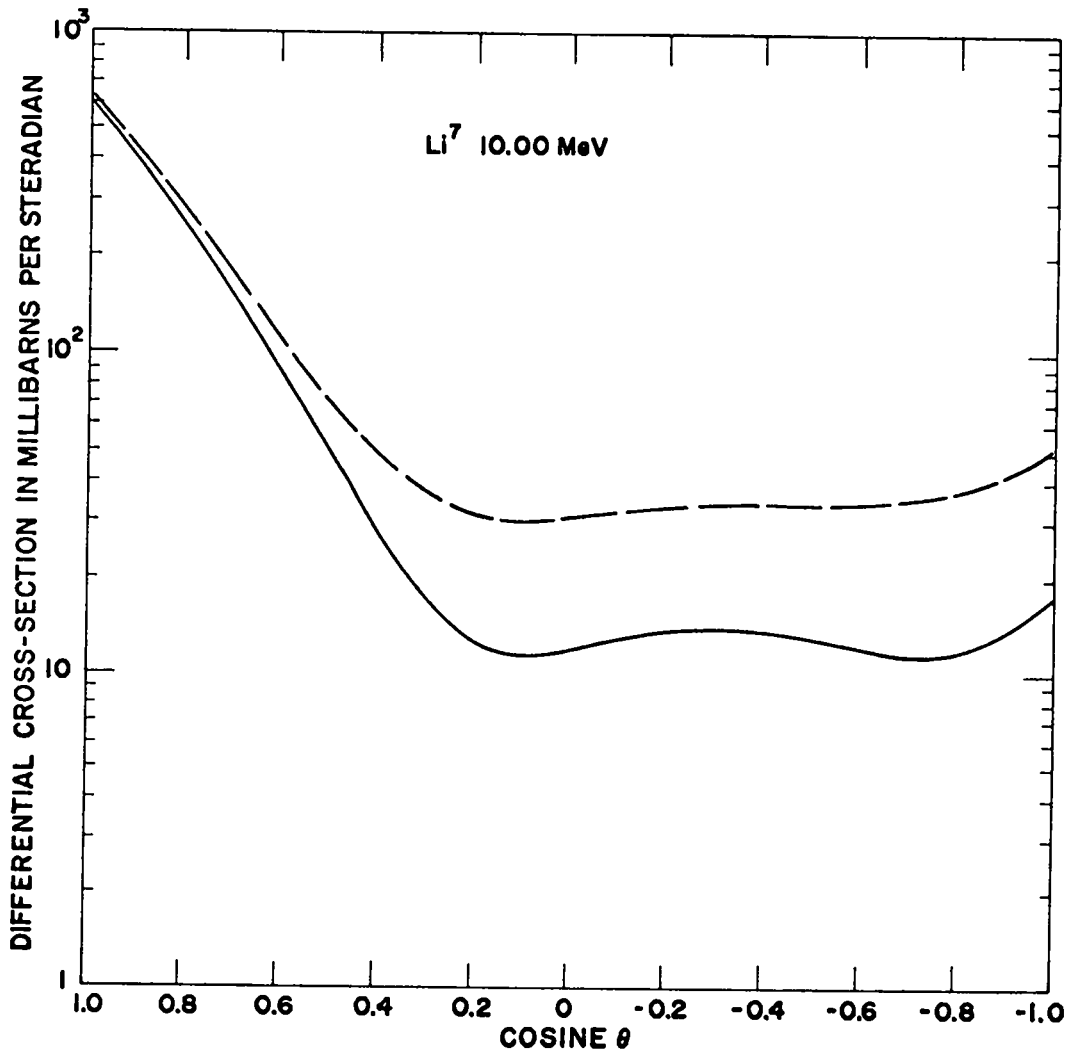


Figure 28

Li⁷

11.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	6.40453E-01	6.69714E-01
0.90000	4.03599E-01	4.28664E-01
0.80000	2.47567E-01	2.69808E-01
0.70000	1.47085E-01	1.67388E-01
0.60000	8.44059E-02	1.03362E-01
0.50000	4.70548E-02	6.50659E-02
0.40000	2.62774E-02	4.36255E-02
0.30000	1.59637E-02	3.28540E-02
0.20000	1.18937E-02	2.84839E-02
0.10000	1.12036E-02	2.76232E-02
0.00000	1.20058E-02	2.83701E-02
-0.10000	1.31176E-02	2.95372E-02
-0.20000	1.38654E-02	3.04556E-02
-0.30000	1.39451E-02	3.08355E-02
-0.40000	1.33222E-02	3.06703E-02
-0.50000	1.21608E-02	3.01719E-02
-0.60000	1.07751E-02	2.97310E-02
-0.70000	9.59534E-03	2.98986E-02
-0.80000	9.14663E-03	3.13876E-02
-0.90000	1.00347E-02	3.51000E-02
-1.00000	1.29379E-02	4.21994E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.578
 σ_{SE} = .389
 σ_{CE} = .244

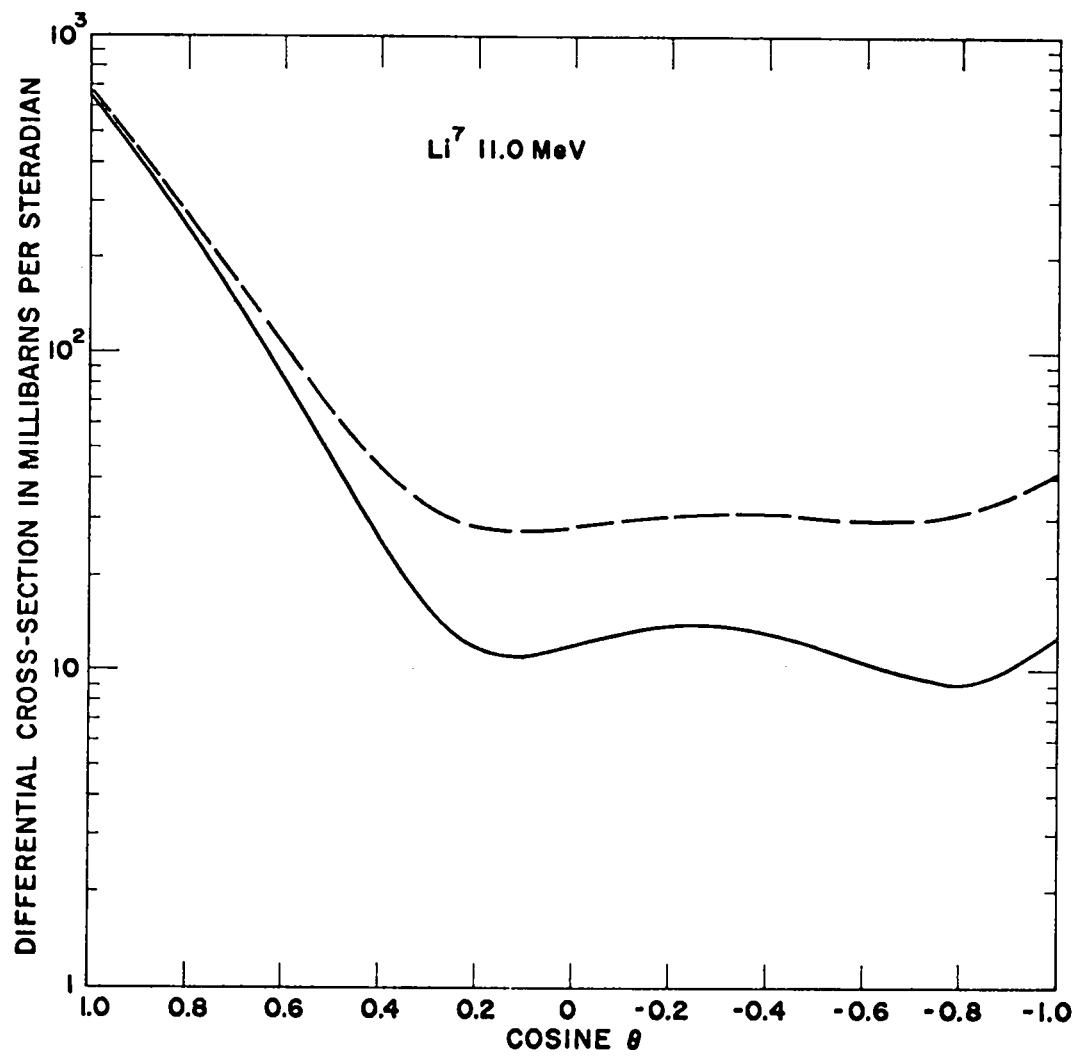


Figure 29

Li ⁷		12.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	6.76841E-01	7.02133E-01	
0.90000	4.16389E-01	4.37849E-01	
0.80000	2.49231E-01	2.68174E-01	
0.70000	1.44403E-01	1.61649E-01	
0.60000	8.07937E-02	9.68706E-02	
0.50000	4.40023E-02	5.92594E-02	
0.40000	2.42313E-02	3.89084E-02	
0.30000	1.48570E-02	2.91282E-02	
0.20000	1.14537E-02	2.54544E-02	
0.10000	1.11205E-02	2.49657E-02	
0.00000	1.20160E-02	2.58103E-02	
-0.10000	1.30335E-02	2.68787E-02	
-0.20000	1.35762E-02	2.75770E-02	
-0.30000	1.34009E-02	2.76720E-02	
-0.40000	1.25109E-02	2.71881E-02	
-0.50000	1.10835E-02	2.63405E-02	
-0.60000	9.42156E-03	2.54984E-02	
-0.70000	7.92311E-03	2.51691E-02	
-0.80000	7.06156E-03	2.60045E-02	
-0.90000	7.37481E-03	2.88345E-02	
-1.00000	9.45933E-03	3.47513E-02	

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.553
 σ_{SE} = .892
 σ_{CE} = .207

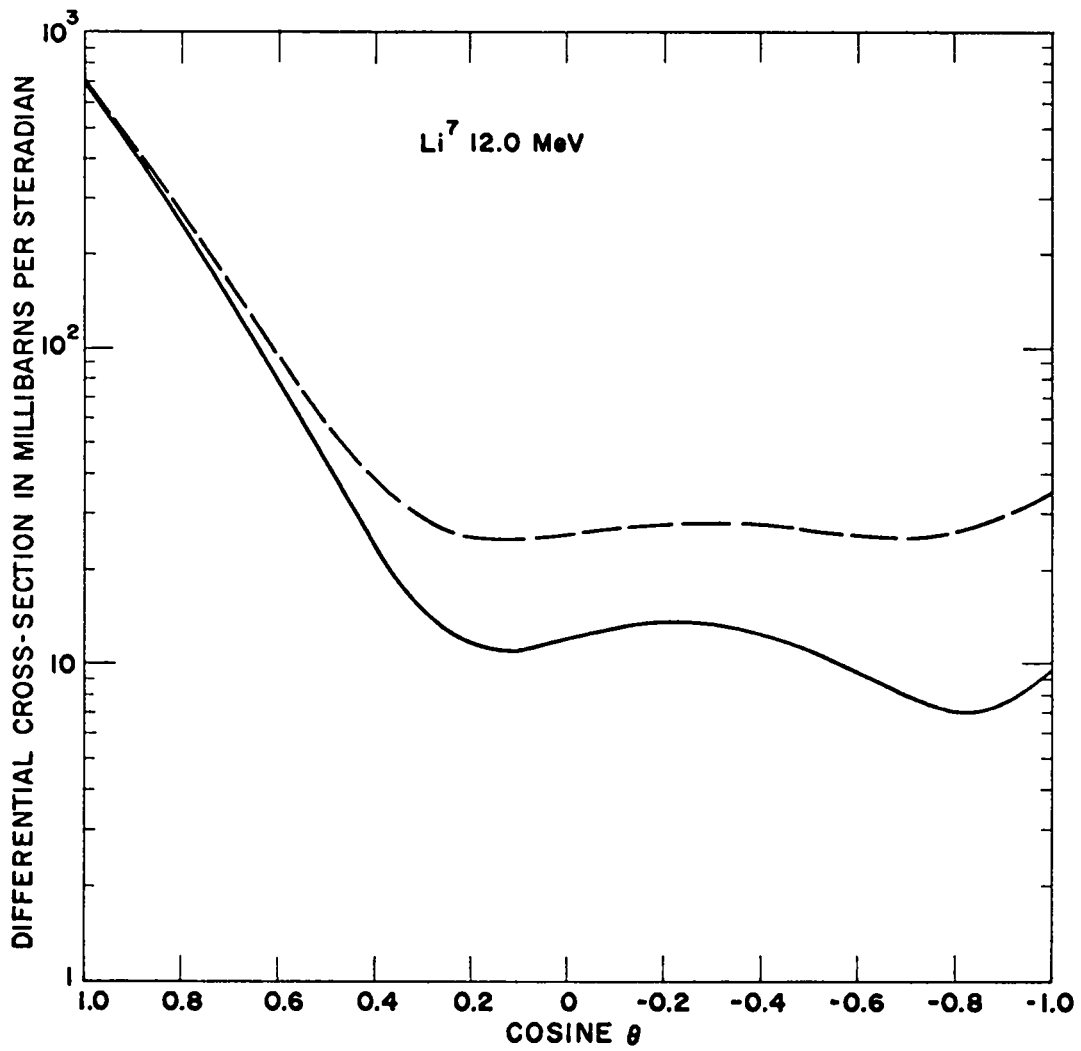


Figure 30

Li⁷

13.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	7.10081E-01	7.32358E-01
0.90000	4.26136E-01	4.44839E-01
0.80000	2.48810E-01	2.65221E-01
0.70000	1.40620E-01	1.55510E-01
0.60000	7.68031E-02	9.06529E-02
0.50000	4.09895E-02	5.41100E-02
0.40000	2.23901E-02	3.49906E-02
0.30000	1.39468E-02	2.61786E-02
0.20000	1.11044E-02	2.30874E-02
0.10000	1.09870E-02	2.28253E-02
0.00000	1.18432E-02	2.36339E-02
-0.10000	1.26715E-02	2.45098E-02
-0.20000	1.29670E-02	2.49500E-02
-0.30000	1.25531E-02	2.47849E-02
-0.40000	1.14696E-02	2.40701E-02
-0.50000	9.90092E-03	2.30215E-02
-0.60000	8.13067E-03	2.19805E-02
-0.70000	6.51465E-03	2.14041E-02
-0.80000	5.46558E-03	2.18763E-02
-0.90000	5.44581E-03	2.41491E-02
-1.00000	6.96532E-03	2.92420E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.527
 σ_{SE} = .891
 σ_{CE} = .179

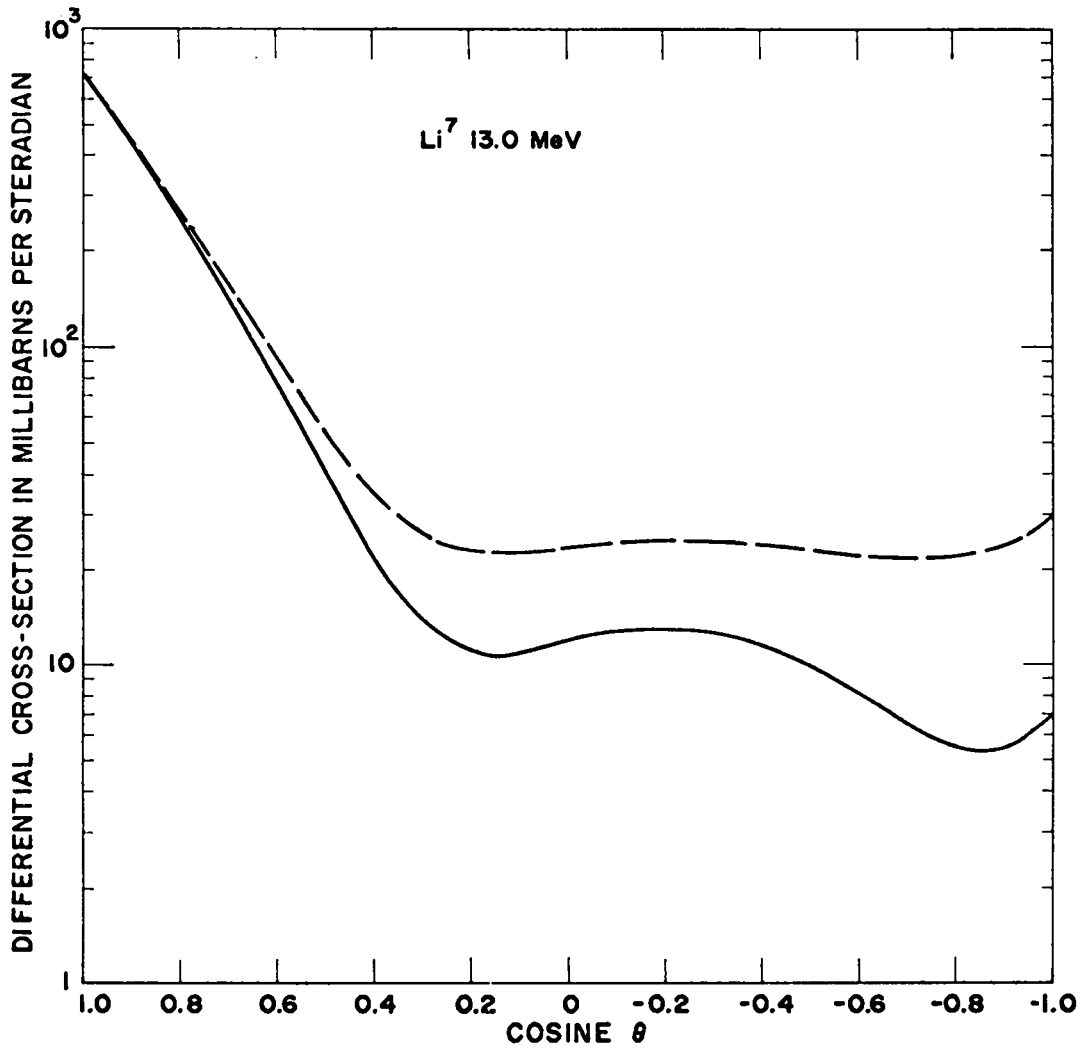


Figure 31

Li⁷

14.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	7.40650E-01	7.60774E-01
0.90000	4.33476E-01	4.50224E-01
0.80000	2.46833E-01	2.61459E-01
0.70000	1.36064E-01	1.49382E-01
0.60000	7.25714E-02	8.48667E-02
0.50000	3.80191E-02	4.96528E-02
0.40000	2.06883E-02	3.18470E-02
0.30000	1.31561E-02	2.39744E-02
0.20000	1.07960E-02	2.13822E-02
0.10000	1.07998E-02	2.12499E-02
0.00000	1.15348E-02	2.19400E-02
-0.10000	1.21206E-02	2.25708E-02
-0.20000	1.21524E-02	2.27387E-02
-0.30000	1.15217E-02	2.23401E-02
-0.40000	1.03029E-02	2.14615E-02
-0.50000	8.68313E-03	2.03168E-02
-0.60000	6.92194E-03	1.92172E-02
-0.70000	5.32816E-03	1.85659E-02
-0.80000	4.24929E-03	1.88755E-02
-0.90000	4.06819E-03	2.08163E-02
-1.00000	5.20484E-03	2.53292E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.501
 σ_{SE} = .886
 σ_{CE} = .159

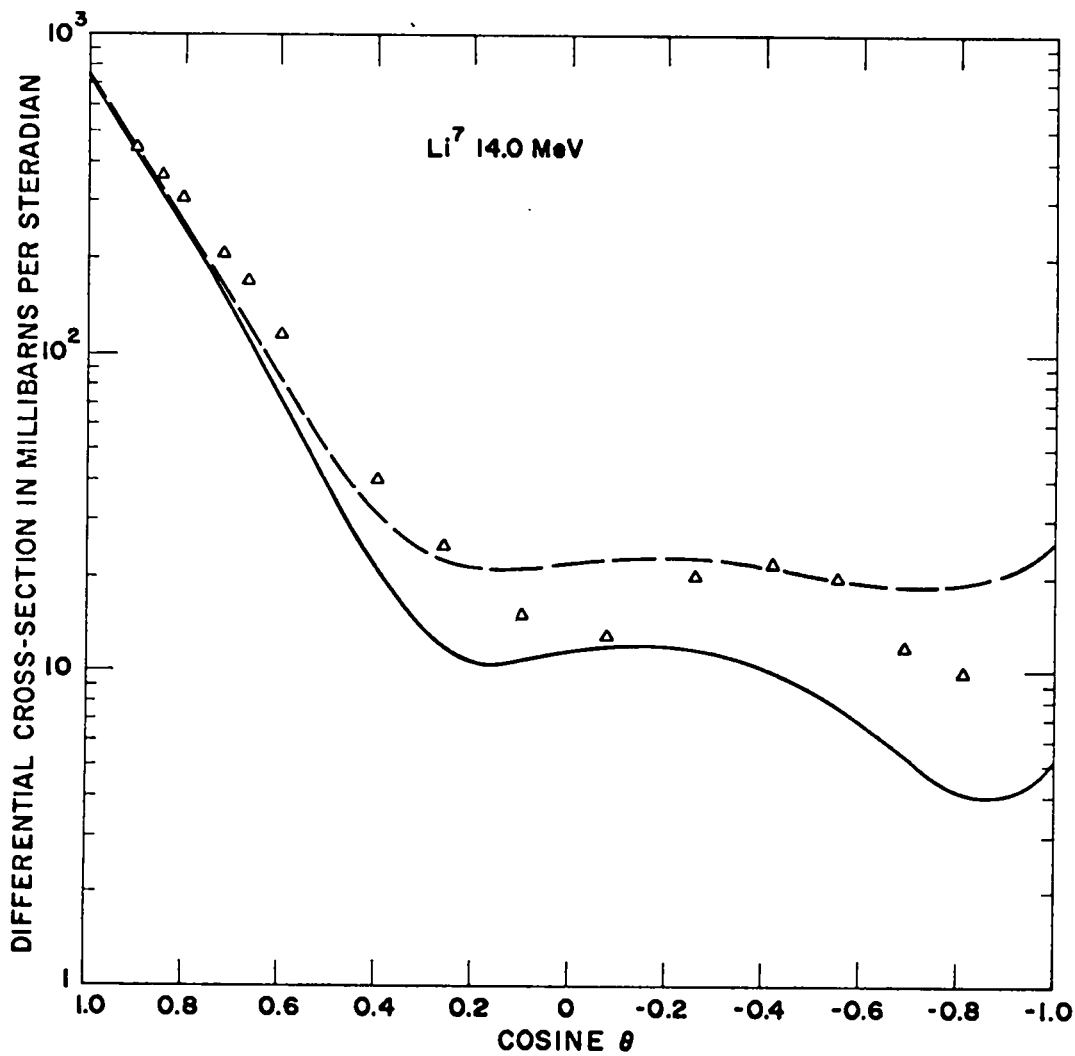


Figure 32

Li⁷

15.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	7.69373E-01	7.87635E-01
0.90000	4.38901E-01	4.53951E-01
0.80000	2.43594E-01	2.56663E-01
0.70000	1.30902E-01	1.42688E-01
0.60000	6.81783E-02	7.90990E-02
0.50000	3.51097E-02	4.54220E-02
0.40000	1.91066E-02	2.89796E-02
0.30000	1.24501E-02	2.20057E-02
0.20000	1.04991E-02	1.98365E-02
0.10000	1.05515E-02	1.97601E-02
0.00000	1.11142E-02	2.02802E-02
-0.10000	1.14366E-02	2.06453E-02
-0.20000	1.12136E-02	2.05510E-02
-0.30000	1.04004E-02	1.99560E-02
-0.40000	9.09997E-03	1.89729E-02
-0.50000	7.49738E-03	1.78097E-02
-0.60000	5.82386E-03	1.67445E-02
-0.70000	4.33941E-03	1.61256E-02
-0.80000	3.32705E-03	1.63951E-02
-0.90000	3.09475E-03	1.81451E-02
-1.00000	3.98395E-03	2.22464E-02

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.474
 σ_{SE} = .878
 σ_{CE} = .141

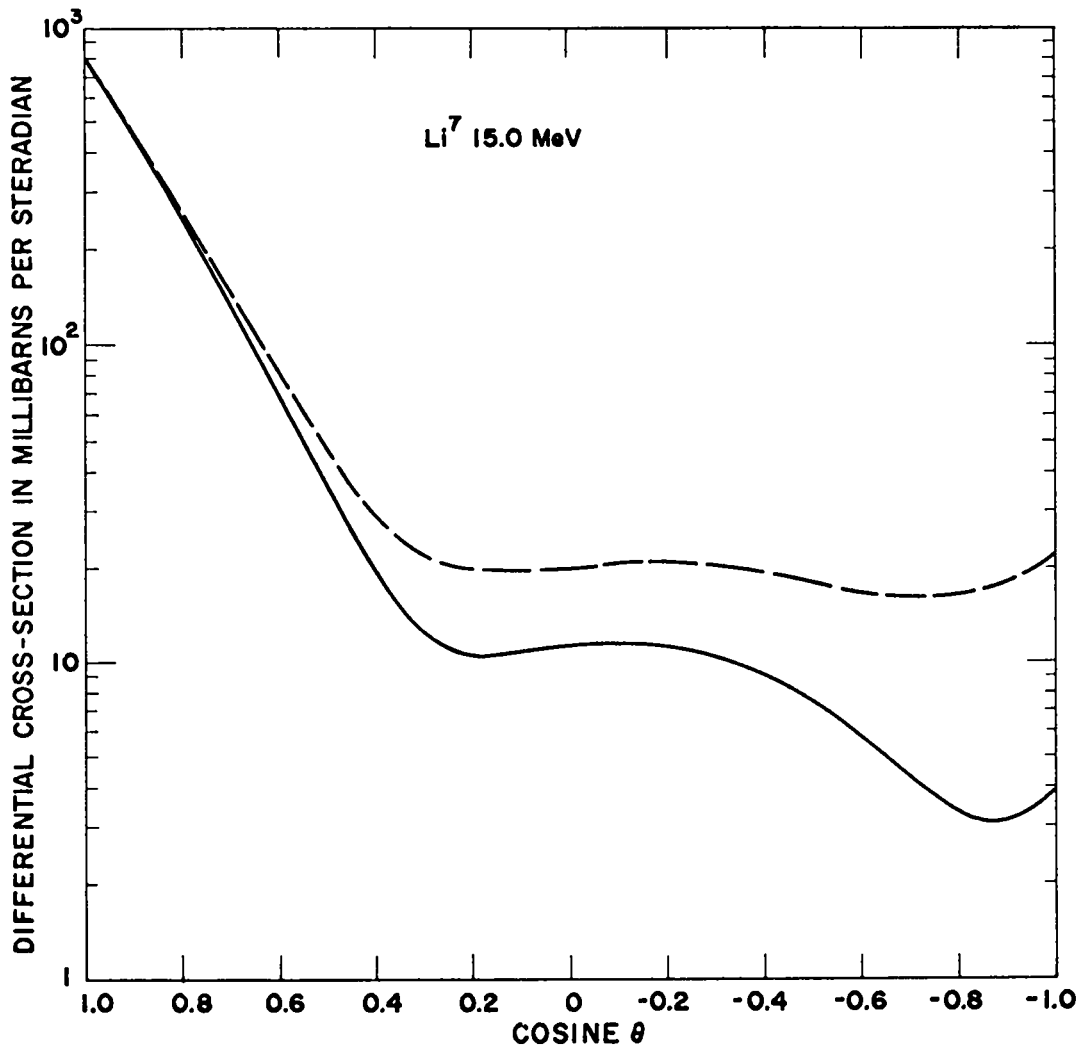


Figure 33

Li ⁷		16.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	7.96376E-01	8.13275E-01	
0.90000	4.42721E-01	4.56536E-01	
0.80000	2.39350E-01	2.51294E-01	
0.70000	1.25299E-01	1.36045E-01	
0.60000	6.37094E-02	7.36500E-02	
0.50000	3.22902E-02	4.16642E-02	
0.40000	1.76402E-02	2.66029E-02	
0.30000	1.18118E-02	2.04756E-02	
0.20000	1.02029E-02	1.86602E-02	
0.10000	1.02500E-02	1.85850E-02	
0.00000	1.06139E-02	1.89083E-02	
-0.10000	1.06747E-02	1.90097E-02	
-0.20000	1.02209E-02	1.86783E-02	
-0.30000	9.26336E-03	1.79272E-02	
-0.40000	7.92597E-03	1.68886E-02	
-0.50000	6.38649E-03	1.57604E-02	
-0.60000	4.84618E-03	1.47868E-02	
-0.70000	3.51778E-03	1.42639E-02	
-0.80000	2.62399E-03	1.45680E-02	
-0.90000	2.40245E-03	1.62177E-02	
-1.00000	3.11478E-03	2.00140E-02	

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.149
 σ_{SE} = .869
 σ_{CE} = .129

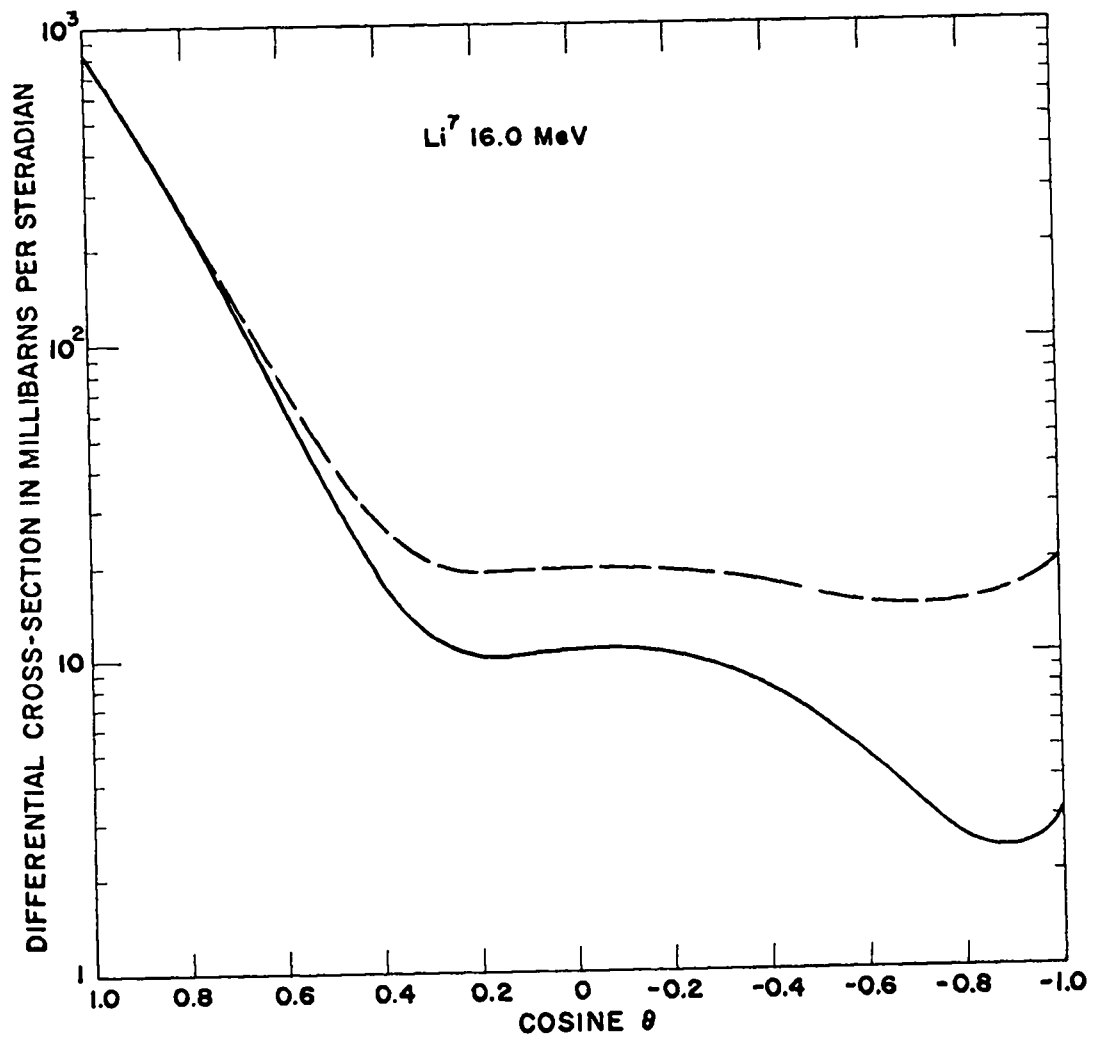


Figure 34

Be⁹

<u>Energy</u>	<u>Energy Levels</u> *
4.00	G.S. 3/2 ⁻
7.00	1.75 1/2 ⁽⁺⁾
8.00	2.43 (5/2 ⁻)
9.00	3.04 (3/2 ⁺)
10.00	4.74 [3/2 ⁻]
11.00	6.76 [3/2 ⁻]
12.00	7.94 [3/2 ⁻]
13.00	9.10 [3/2 ⁻]
14.00	
15.00	
16.00	

* Energy levels obtained from NRC 61-5, 6-71,
except [] values which are assumed.

Be ⁹ COSINE(C.M.)	4.0 MeV SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.76393E-01	3.38771E-01
0.95000	2.34341E-01	2.93271E-01
0.90000	1.97526E-01	2.53462E-01
0.85000	1.65431E-01	2.18777E-01
0.80000	1.37578E-01	1.88695E-01
0.75000	1.13528E-01	1.62733E-01
0.70000	9.28748E-02	1.40451E-01
0.65000	7.52481E-02	1.21442E-01
0.60000	6.03062E-02	1.05335E-01
0.55000	4.77372E-02	9.17890E-02
0.50000	3.72561E-02	8.04956E-02
0.45000	2.86041E-02	7.11729E-02
0.40000	2.15460E-02	6.35661E-02
0.35000	1.58697E-02	5.74455E-02
0.30000	1.13845E-02	5.26054E-02
0.25000	7.92008E-03	4.88622E-02
0.20000	5.32506E-03	4.60537E-02
0.15000	3.46626E-03	4.40380E-02
0.10000	2.22763E-03	4.26922E-02
0.05000	1.50929E-03	4.19114E-02
0.00000	1.22672E-03	4.16084E-02
-0.05000	1.30998E-03	4.17121E-02
-0.10000	1.70293E-03	4.21675E-02
-0.15000	2.36258E-03	4.29344E-02
-0.20000	3.25842E-03	4.39871E-02
-0.25000	4.37182E-03	4.53139E-02
-0.30000	5.69549E-03	4.69163E-02
-0.35000	7.23292E-03	4.88088E-02
-0.40000	8.99793E-03	5.10180E-02
-0.45000	1.10142E-02	5.35830E-02
-0.50000	1.33147E-02	5.65542E-02
-0.55000	1.59417E-02	5.99935E-02
-0.60000	1.89458E-02	6.39742E-02
-0.65000	2.23861E-02	6.85800E-02
-0.70000	2.63296E-02	7.39057E-02
-0.75000	3.08510E-02	8.00568E-02
-0.80000	3.60322E-02	8.71490E-02
-0.85000	4.19624E-02	9.53088E-02
-0.90000	4.87375E-02	1.04673E-01
-0.95000	5.64602E-02	1.15390E-01
-1.00000	6.52393E-02	1.27617E-01

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.621
 σ_{SE} = 5.605
 σ_{CE} = .576

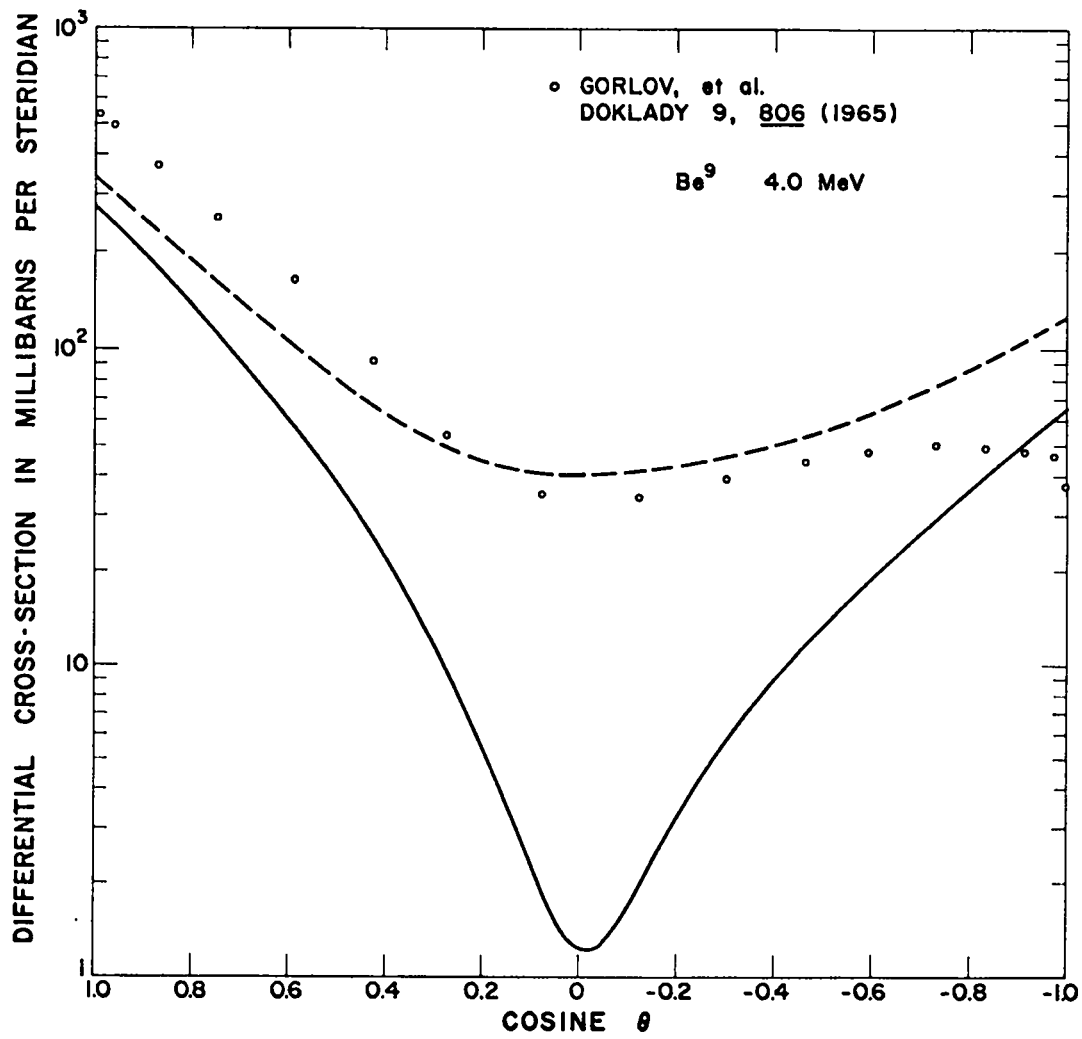


Figure 35

Be ⁹		7.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	5.06664E-01	5.40945E-01	
0.90000	3.26572E-01	3.56469E-01	
0.80000	2.01821E-01	2.29279E-01	
0.70000	1.18156E-01	1.43594E-01	
0.60000	6.45286E-02	8.85359E-02	
0.50000	3.23975E-02	5.53990E-02	
0.40000	1.51911E-02	3.74950E-02	
0.30000	7.89327E-03	2.97258E-02	
0.20000	6.72237E-03	2.82536E-02	
0.10000	8.88413E-03	3.02480E-02	
0.00000	1.23796E-02	3.36898E-02	
-0.10000	1.58564E-02	3.72203E-02	
-0.20000	1.84937E-02	4.00249E-02	
-0.30000	1.99129E-02	4.17454E-02	
-0.40000	2.01085E-02	4.24124E-02	
-0.50000	1.93955E-02	4.23970E-02	
-0.60000	1.83689E-02	4.23762E-02	
-0.70000	1.78727E-02	4.33107E-02	
-0.80000	1.89776E-02	4.64354E-02	
-0.90000	2.29641E-02	5.32612E-02	
-1.00000	3.13110E-02	6.55922E-02	

(DSIGMAS IN BARNS/ST-RADIAN

σ_T = 1.674
 σ_{SE} = .764
 σ_{CE} = .307

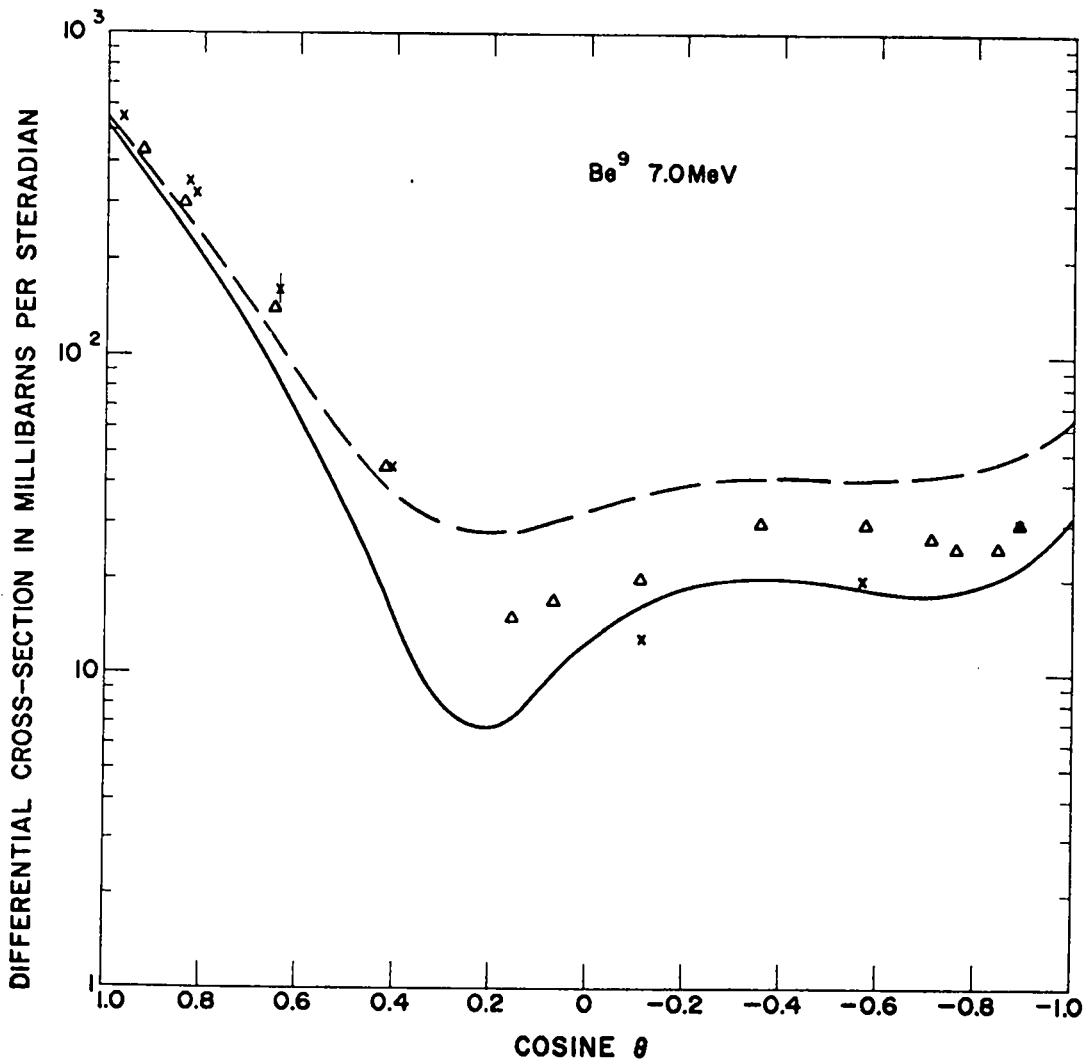


Figure 36

Be ⁹		8.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	5.66880E-01	5.95137E-01	
0.90000	3.56278E-01	3.81036E-01	
0.80000	2.14526E-01	2.36851E-01	
0.70000	1.22245E-01	1.42869E-01	
0.60000	6.49761E-02	8.44020E-02	
0.50000	3.19540E-02	5.05349E-02	
0.40000	1.51987E-02	3.31861E-02	
0.30000	8.83851E-03	2.64170E-02	
0.20000	8.60365E-03	2.59151E-02	
0.10000	1.14494E-02	2.86097E-02	
0.00000	1.52740E-02	3.23854E-02	
-0.10000	1.87087E-02	3.58690E-02	
-0.20000	2.09608E-02	3.82722E-02	
-0.30000	2.16988E-02	3.92773E-02	
-0.40000	2.09670E-02	3.89545E-02	
-0.50000	1.91242E-02	3.77052E-02	
-0.60000	1.68001E-02	3.62260E-02	
-0.70000	1.48656E-02	3.54892E-02	
-0.80000	1.44130E-02	3.67388E-02	
-0.90000	1.67444E-02	4.15025E-02	
-1.00000	2.33668E-02	5.16240E-02	

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 1.664$
 $\sigma_{SE} = .809$
 $\sigma_{CE} = .249$

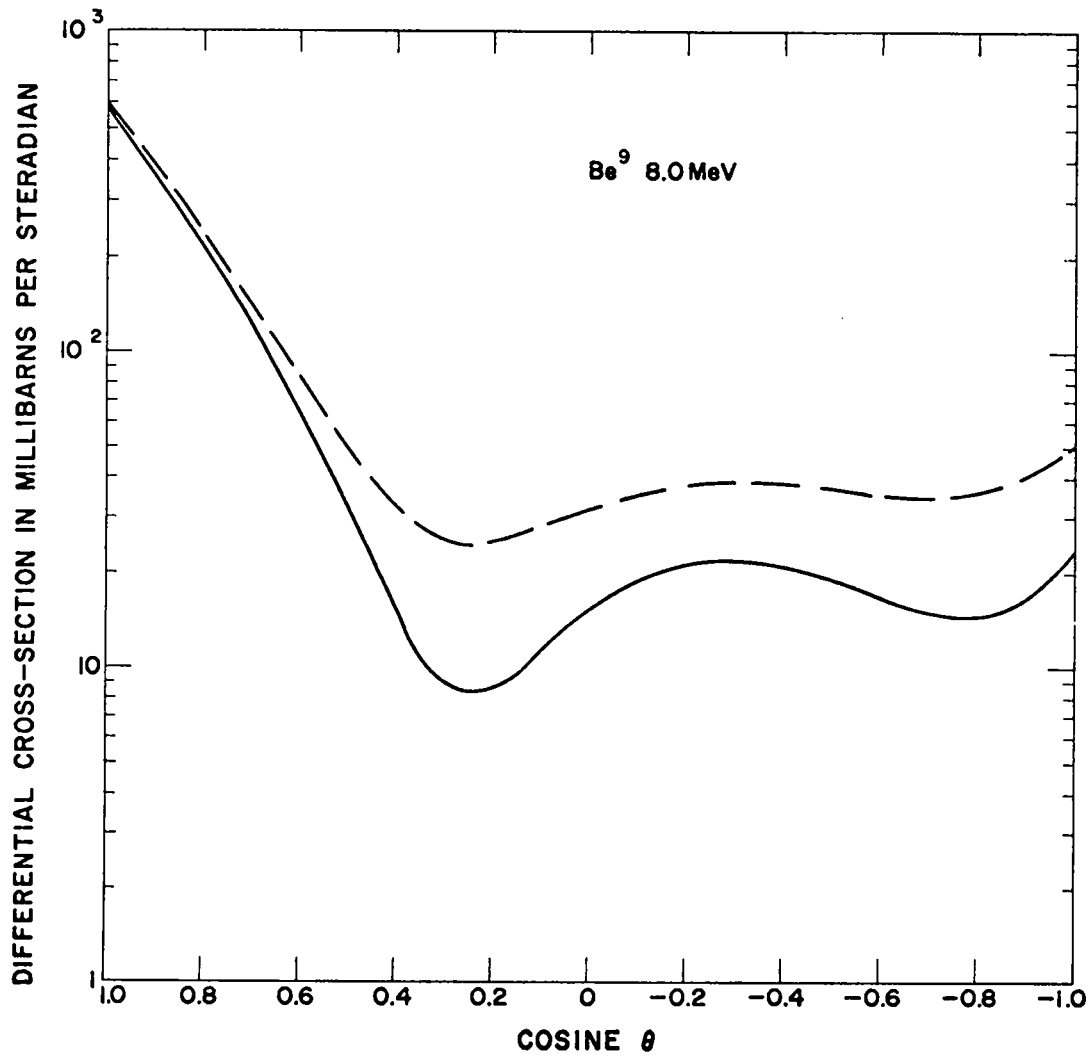


Figure 37

Be ⁹		9.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	6.21875E-01	6.46055E-01	
0.90000	3.80866E-01	4.01825E-01	
0.80000	2.23548E-01	2.42328E-01	
0.70000	1.24277E-01	1.41560E-01	
0.60000	6.46581E-02	8.08972E-02	
0.50000	3.15327E-02	4.70340E-02	
0.40000	1.55287E-02	3.05053E-02	
0.30000	1.00233E-02	2.46318E-02	
0.20000	1.03951E-02	2.47582E-02	
0.10000	1.34842E-02	2.77062E-02	
0.00000	1.72036E-02	3.13795E-02	
-0.10000	2.02593E-02	3.44814E-02	
-0.20000	2.19502E-02	3.63134E-02	
-0.30000	2.20263E-02	3.66348E-02	
-0.40000	2.05904E-02	3.55671E-02	
-0.50000	1.80309E-02	3.35322E-02	
-0.60000	1.49786E-02	3.12177E-02	
-0.70000	1.22806E-02	2.95634E-02	
-0.80000	1.09868E-02	2.97662E-02	
-0.90000	1.23457E-02	3.33045E-02	
-1.00000	1.78064E-02	4.19870E-02	

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.651
 σ_{SE} = .842
 σ_{CE} = .208

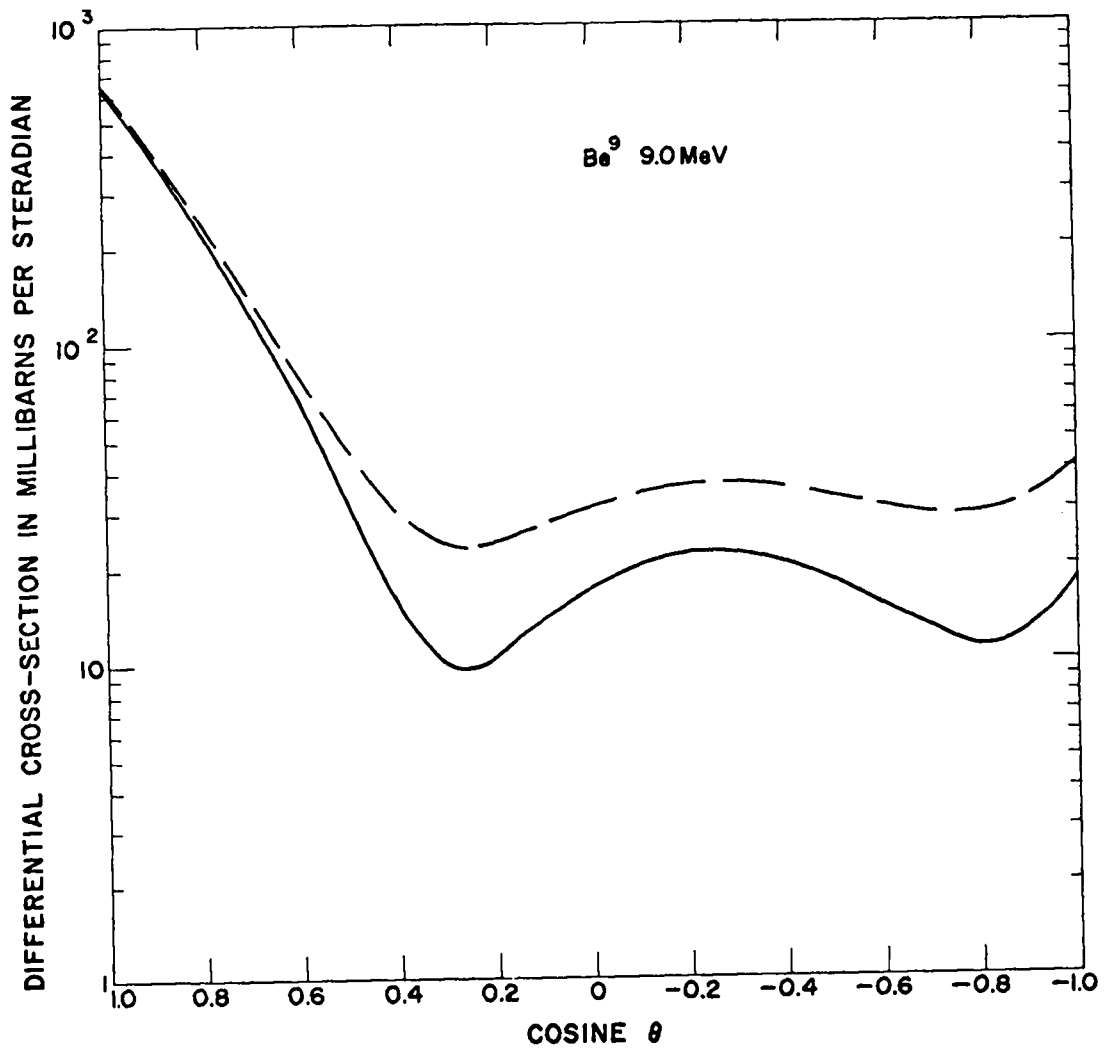


Figure 38

Be⁹

10.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	6.74680E-01	6.96144E-01
0.90000	4.01967E-01	4.20359E-01
0.80000	2.29660E-01	2.46029E-01
0.70000	1.24500E-01	1.39507E-01
0.60000	6.35224E-02	7.75884E-02
0.50000	3.09330E-02	4.43330E-02
0.40000	1.59411E-02	2.88624E-02
0.30000	1.12469E-02	2.38265E-02
0.20000	1.19871E-02	2.43350E-02
0.10000	1.49984E-02	2.72111E-02
0.00000	1.83037E-02	3.04718E-02
-0.10000	2.07547E-02	3.29674E-02
-0.20000	2.17874E-02	3.41353E-02
-0.30000	2.12552E-02	3.38349E-02
-0.40000	1.93204E-02	3.22416E-02
-0.50000	1.63849E-02	2.97849E-02
-0.60000	1.30510E-02	2.71171E-02
-0.70000	1.01013E-02	2.51084E-02
-0.80000	8.49298E-03	2.48624E-02
-0.90000	9.36073E-03	2.77527E-02
-1.00000	1.40248E-02	3.54881E-02

(DSIGMAS IN BARN/STERADIAN)

σ_T = 1.638
 σ_{SE} = .867
 σ_{Ce} = .181

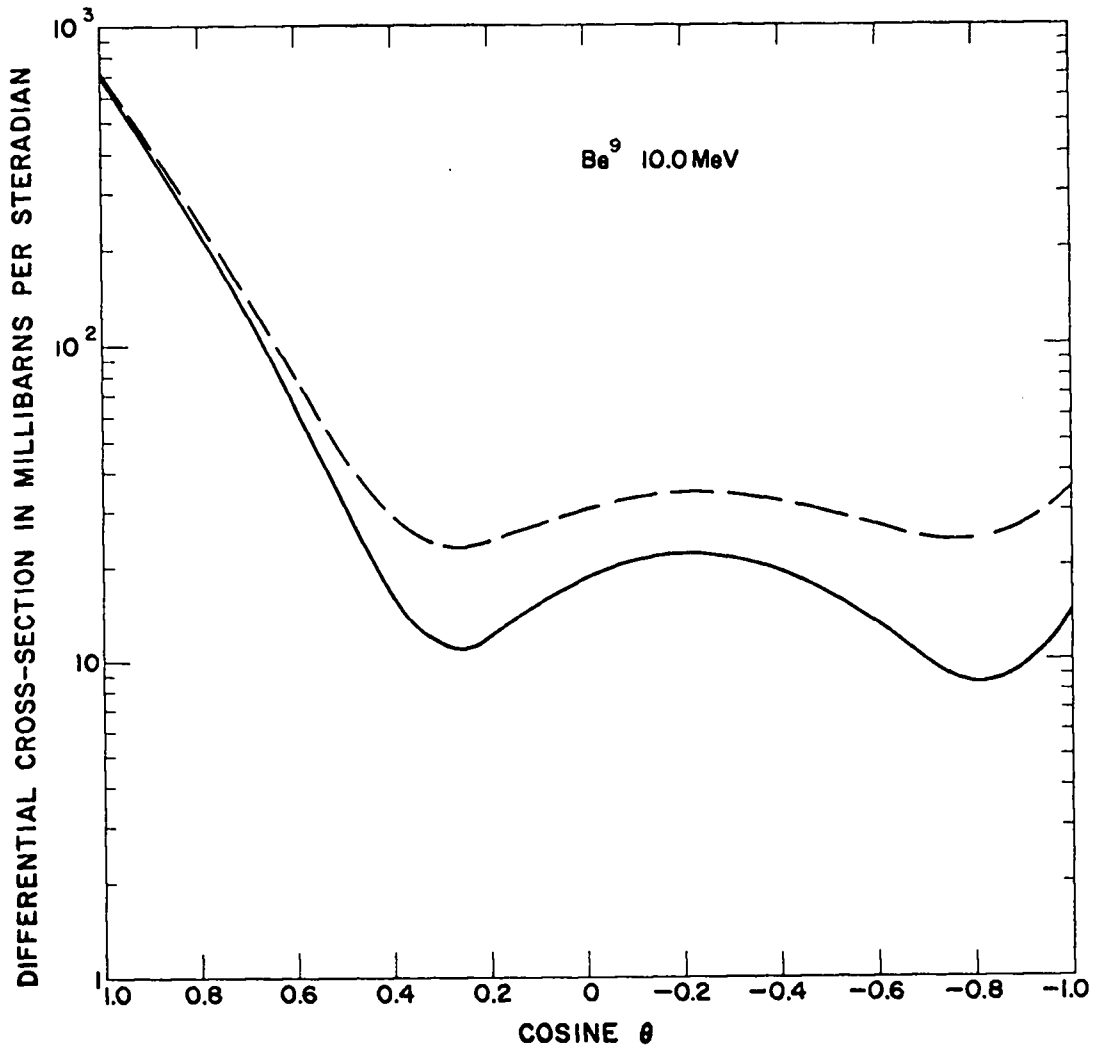


Figure 39

Be^9	11.0 MeV	12.0 MeV	13.0 MeV	15.0 MeV	16.0 MeV
COSINE (C.M.)					
1.00000	7.2644E-01	7.7786E-01	8.2903E-01	9.2874E-01	9.7586E-01
0.90000	4.2034E-01	4.3667E-01	4.5131E-01	4.7533E-01	4.8460E-01
0.80000	2.3343E-01	2.3537E-01	2.3581E-01	2.3305E-01	2.3020E-01
0.70000	1.2330E-01	1.2095E-01	1.1770E-01	1.0941E-01	1.0475E-01
0.60000	6.1763E-02	5.9460E-02	5.6728E-02	5.0573E-02	4.7390E-02
0.50000	3.0196E-02	2.9266E-02	2.8155E-02	2.5600E-02	2.4247E-02
0.40000	1.6387E-02	1.6757E-02	1.7005E-02	1.7086E-02	1.6922E-02
0.30000	1.2443E-02	1.3521E-02	1.4424E-02	1.5591E-02	1.5839E-02
0.20000	1.3362E-02	1.4497E-02	1.5366E-02	1.6294E-02	1.6366E-02
0.10000	1.6067E-02	1.6761E-02	1.7114E-02	1.6978E-02	1.6557E-02
0.00000	1.8761E-02	1.8740E-02	1.8345E-02	1.6833E-02	1.5841E-02
-0.10000	2.0486E-02	1.9692E-02	1.8544E-02	1.5754E-02	1.4282E-02
-0.20000	2.0838E-02	1.9384E-02	1.7639E-02	1.3942E-02	1.2180E-02
-0.30000	1.9780E-02	1.7883E-02	1.5794E-02	1.1694E-02	9.8649E-03
-0.40000	1.7525E-02	1.5446E-02	1.3292E-02	9.3037E-03	7.6150E-03
-0.50000	1.4470E-02	1.2452E-02	1.0479E-02	7.0278E-03	5.6347E-03
-0.60000	1.1164E-02	9.3785E-03	7.7515E-03	5.0924E-03	4.0713E-03
-0.70000	8.2957E-03	6.7998E-03	5.5615E-03	3.7184E-03	3.0490E-03
-0.80000	6.6953E-03	5.3991E-03	4.4400E-03	3.1591E-03	2.7096E-03
-0.90000	7.3490E-03	5.9881E-03	5.0261E-03	3.7427E-03	3.2575E-03
-1.00000	1.1414E-02	9.5318E-03	8.1006E-03	5.9180E-03	5.0023E-03
	DSIGMAS IN BNS/STERAD				
σ_T	1.627	1.616	1.604	1.581	1.567
σ_{SE}	.885	.899	.910	.922	.924

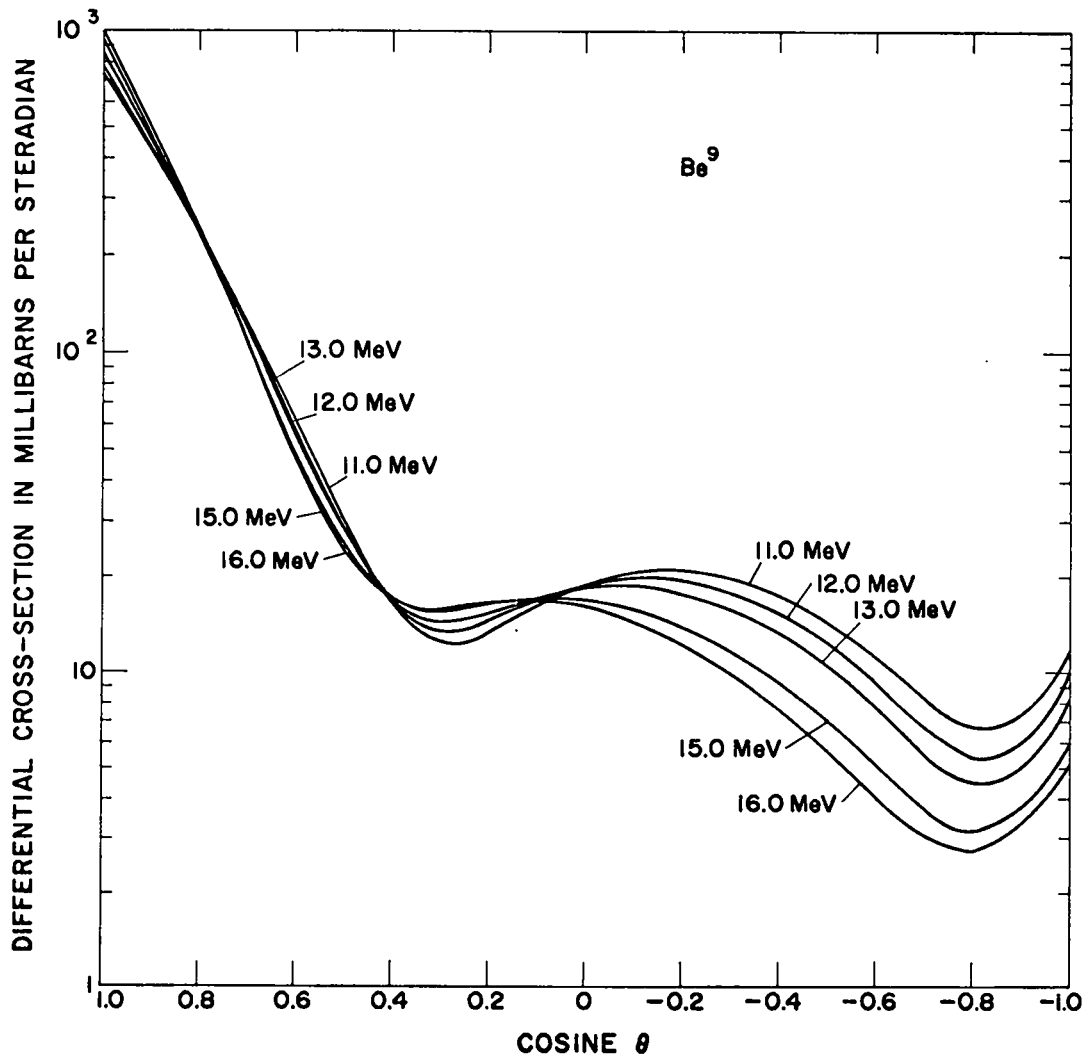


Figure 40

Be⁹

14.0 MeV

COSINE (C.M.)

1.00000	8.7961E-01
0.90000	4.6419E-01
0.80000	2.3499E-01
0.70000	1.1381E-01
0.60000	5.3742E-02
0.50000	2.6924E-02
0.40000	1.7114E-02
0.30000	1.5116E-02
0.20000	1.5963E-02
0.10000	1.7175E-02
0.00000	1.7687E-02
-0.10000	1.7198E-02
-0.20000	1.5786E-02
-0.30000	1.3690E-02
-0.40000	1.1209E-02
-0.50000	8.6469E-03
-0.60000	6.3149E-03
-0.70000	4.5446E-03
-0.80000	3.7193E-03
-0.90000	4.3116E-03
-1.00000	6.9283E-03

DSIGMAS IN BNS/STERAD

σ_T = 1.593
 σ_{SE} = .917

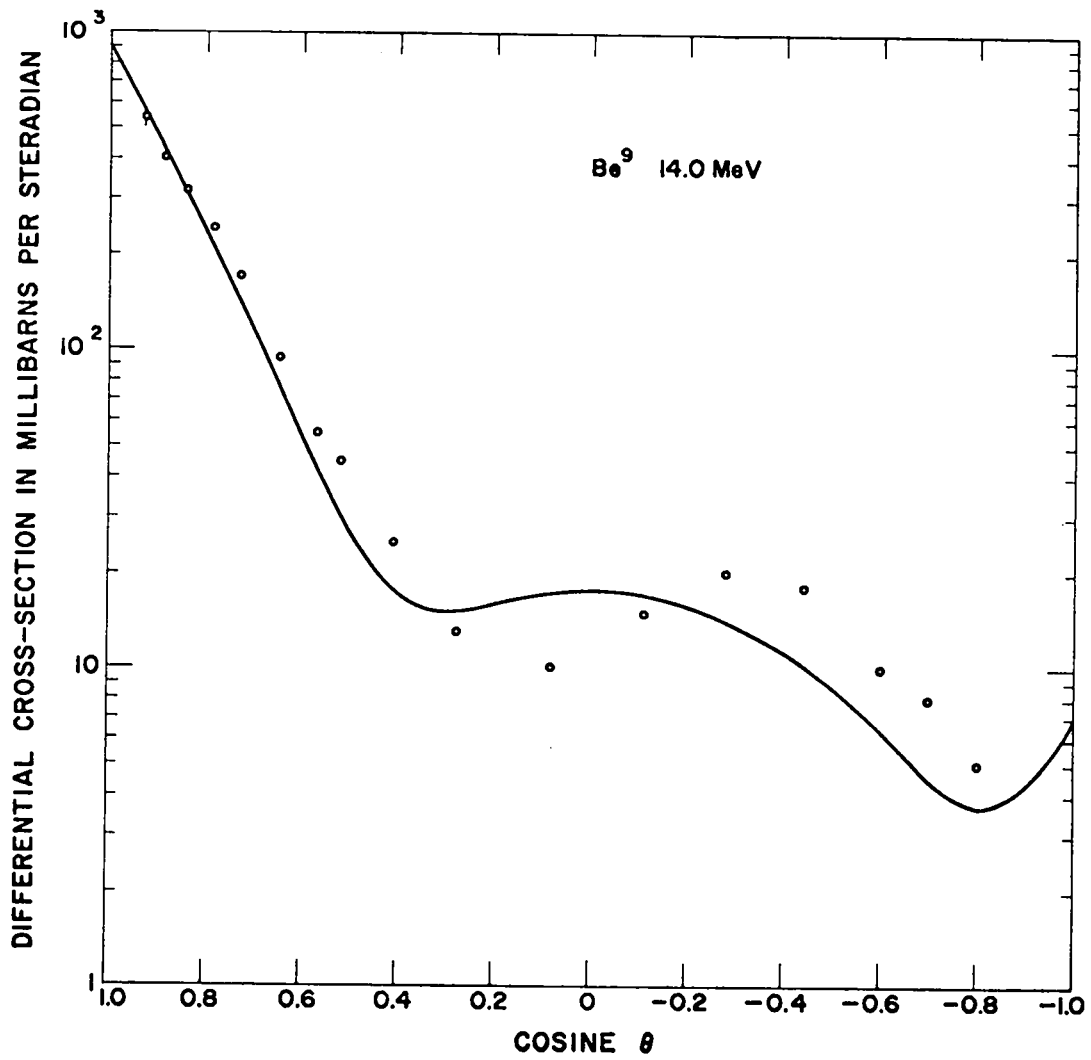
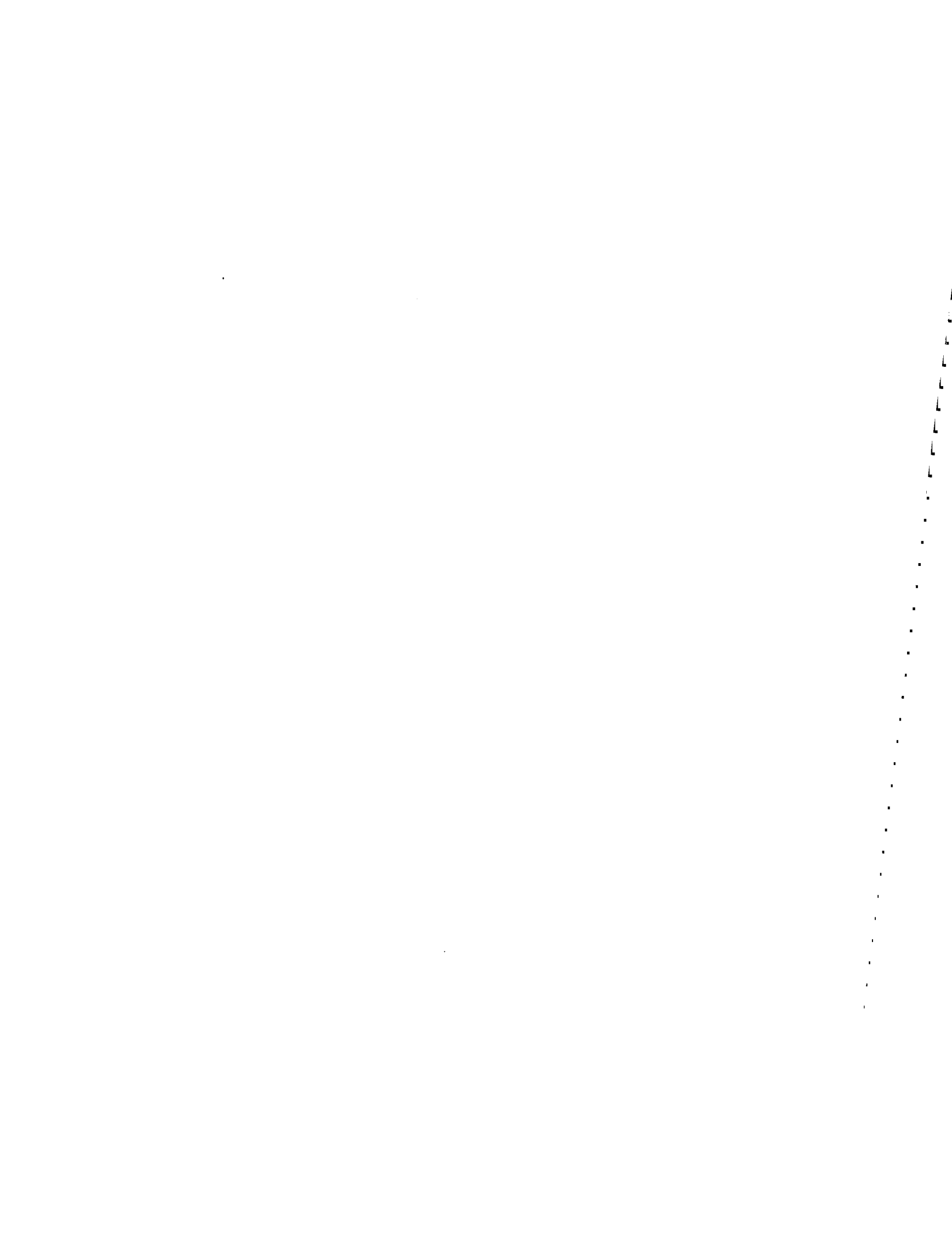


Figure 41



B¹⁰

<u>Energy</u>	<u>Energy Levels</u> *
1.00	G.S. 3 ⁺
1.50	0.717 1 ⁺
2.00	1.74 0 ⁺
3.00	2.15 1 ⁺
4.00	3.59 2 ⁺
5.00	4.77 (2 ⁺)
6.00	5.11 (2 ⁻)
7.00	5.16 (2 ⁺)
8.00	5.18 1(+)
9.00	5.92 2 ⁺
10.00	6.04 4 ⁺
11.00	6.88 1 ⁻
12.00	6.97 [3 ⁺]
13.00	7.48 2 ⁺
14.00	7.56 0 ⁺
15.00	7.78 2 ⁻
16.00	8.89 2 ⁺
	9.70 [3 ⁺]
	10.70 [3 ⁺]

* Energy levels obtained from NRC 61-5, 6-91,
except [] values which are assumed.

B^{10}	1.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.36769E-01	2.48373E-01
0.90000	1.25390E-01	2.34781E-01
0.80000	1.14889E-01	2.22469E-01
0.70000	1.05223E-01	2.11337E-01
0.60000	9.63543E-02	2.01298E-01
0.50000	8.82500E-02	1.92274E-01
0.40000	8.08802E-02	1.84200E-01
0.30000	7.42194E-02	1.77022E-01
0.20000	6.82459E-02	1.70695E-01
0.10000	6.29418E-02	1.65185E-01
0.00000	5.82928E-02	1.60468E-01
-0.10000	5.42879E-02	1.56531E-01
-0.20000	5.09198E-02	1.53369E-01
-0.30000	4.81843E-02	1.50987E-01
-0.40000	4.60804E-02	1.49400E-01
-0.50000	4.46102E-02	1.48634E-01
-0.60000	4.37788E-02	1.48722E-01
-0.70000	4.35944E-02	1.49709E-01
-0.80000	4.40676E-02	1.51648E-01
-0.90000	4.52122E-02	1.54603E-01
-1.00000	4.70444E-02	1.58648E-01

(DSIGMAS IN BARNS/STERADIAN)

$\sigma_T = 2.227$
 $\sigma_{SE} = .871$
 $\sigma_{CE} = 1.319$

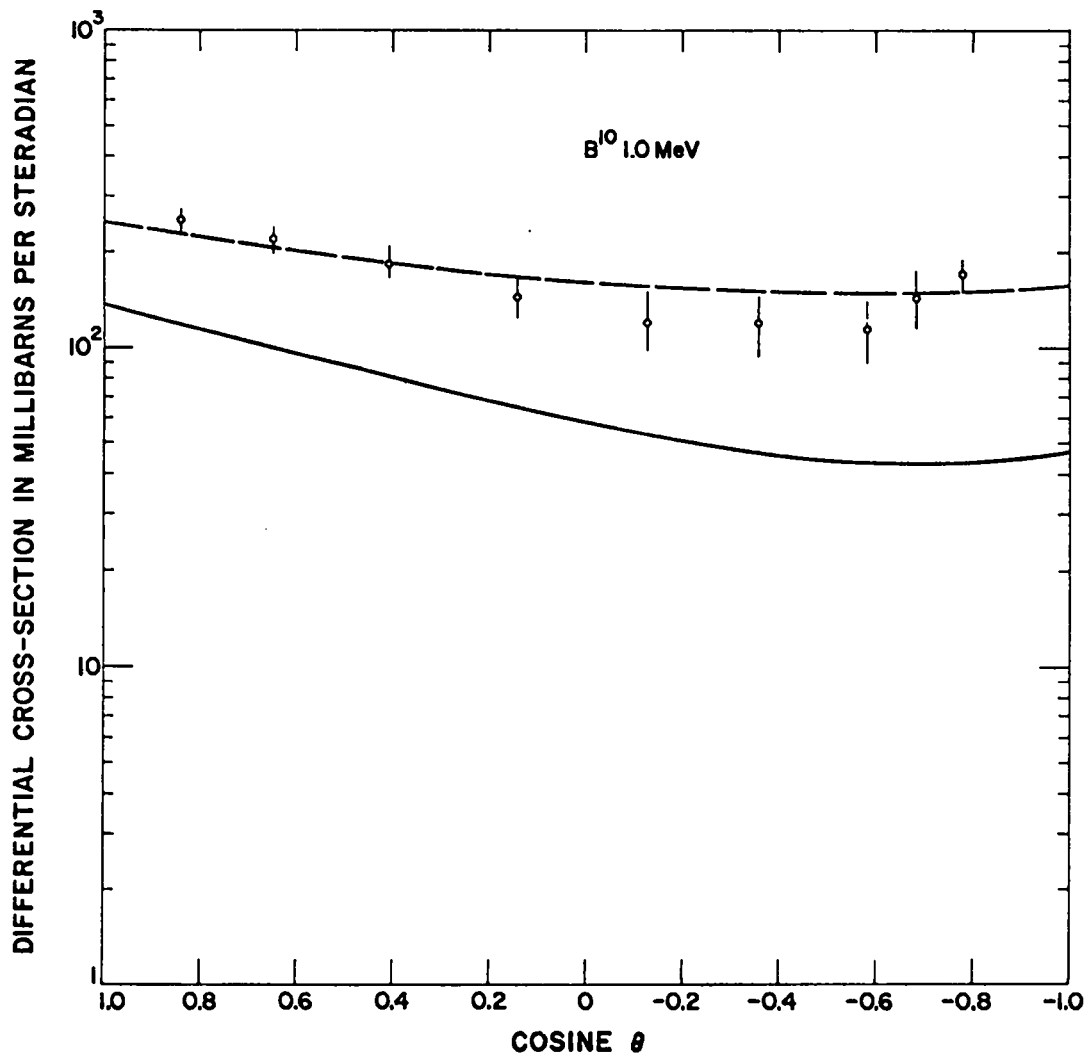


Figure 42

B^{10}	1.50 MeV	
CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.0n000	1.42610E-01	2.40190E-01
0.9n000	1.23741E-01	2.18199E-01
0.8n000	1.07081E-01	1.99061E-01
0.7n000	9.24299E-02	1.82468E-01
0.6n000	7.96086E-02	1.68148E-01
0.5n000	6.84596E-02	1.55862E-01
0.4n000	5.88456E-02	1.45407E-01
0.3n000	5.06482E-02	1.36611E-01
0.2n000	4.37677E-02	1.29332E-01
0.1n000	3.81217E-02	1.23459E-01
0.0n000	3.36446E-02	1.18908E-01
-0.1n000	3.02870E-02	1.15624E-01
-0.2n000	2.80147E-02	1.13579E-01
-0.3n000	2.68083E-02	1.12771E-01
-0.4n000	2.66624E-02	1.13224E-01
-0.5n000	2.75853E-02	1.14988E-01
-0.6n000	2.95981E-02	1.18137E-01
-0.7n000	3.27343E-02	1.22773E-01
-0.8n000	3.70394E-02	1.29020E-01
-0.9n000	4.25704E-02	1.37028E-01
-1.0n000	4.93953E-02	1.46976E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.873
 σ_{SE} = .673
 σ_{CE} = 1.115

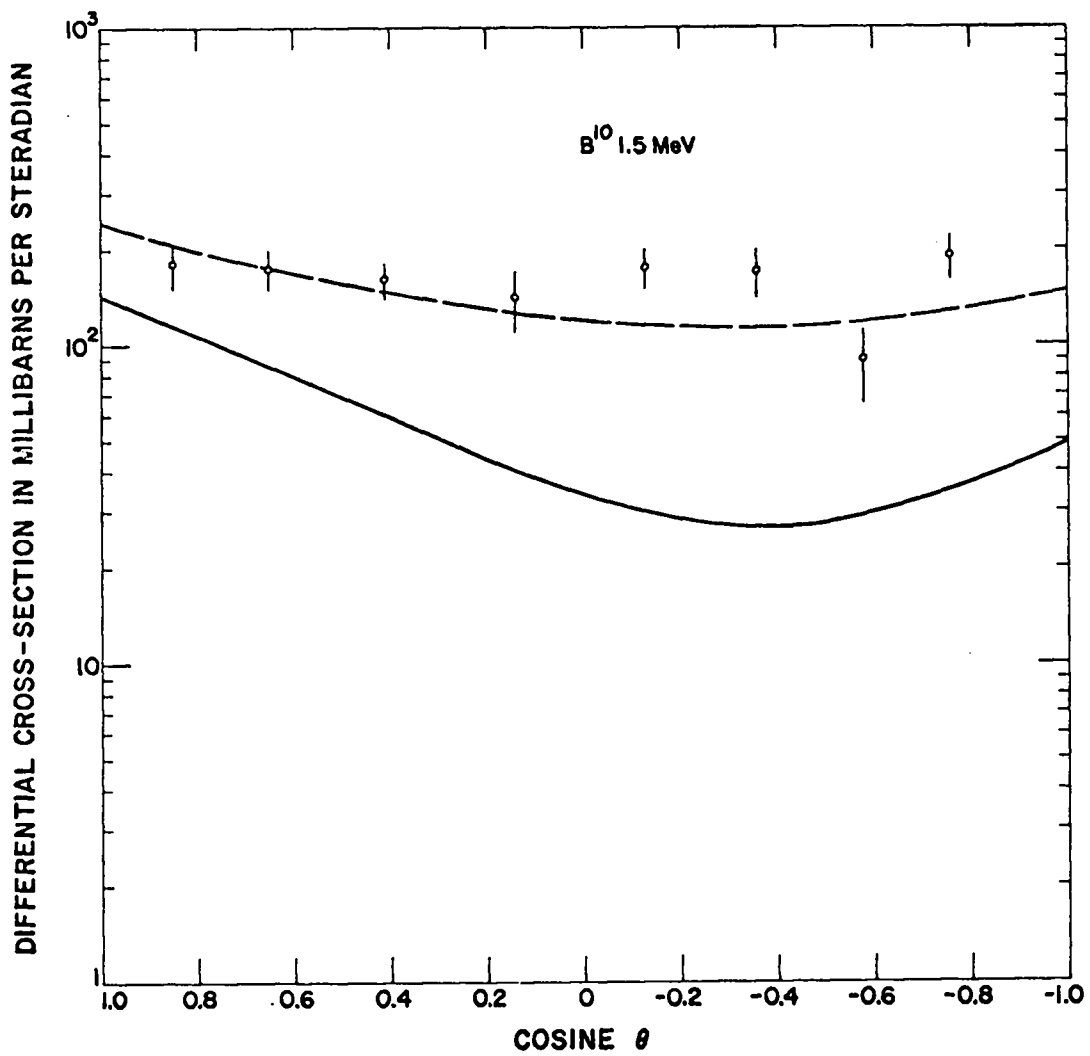


Figure 43

B ¹⁰		2.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	1.61112E-01	2.54715E-01	
0.90000	1.31873E-01	2.21390E-01	
0.80000	1.07180E-01	1.93515E-01	
0.70000	8.64590E-02	1.70352E-01	
0.60000	6.92038E-02	1.51253E-01	
0.50000	5.49705E-02	1.35655E-01	
0.40000	4.33742E-02	1.23075E-01	
0.30000	3.40859E-02	1.13102E-01	
0.20000	2.68288E-02	1.05400E-01	
0.10000	2.13760E-02	9.96969E-02	
0.00000	1.75471E-02	9.57876E-02	
-0.10000	1.52060E-02	9.35269E-02	
-0.20000	1.42586E-02	9.28294E-02	
-0.30000	1.46502E-02	9.36664E-02	
-0.40000	1.63640E-02	9.60643E-02	
-0.50000	1.94184E-02	1.00103E-01	
-0.60000	2.38659E-02	1.05915E-01	
-0.70000	2.97911E-02	1.13684E-01	
-0.80000	3.73093E-02	1.23644E-01	
-0.90000	4.65645E-02	1.36081E-01	
-1.00000	5.77289E-02	1.51331E-01	

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.734
 σ_{SE} = .576
 σ_{CE} = 1.035

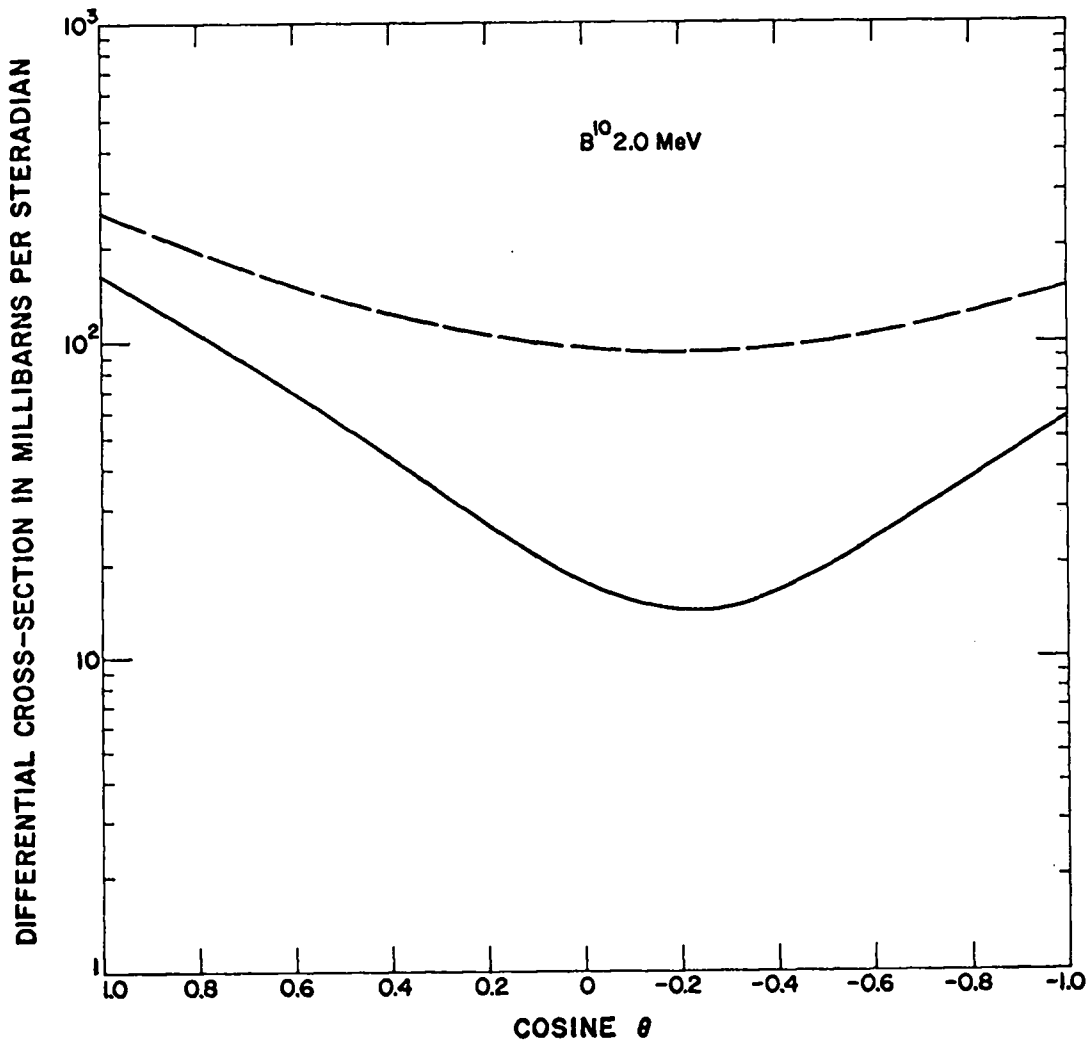


Figure 14

B¹⁰

3.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.24954E-01	3.15081E-01
0.90000	1.66489E-01	2.51127E-01
0.80000	1.20585E-01	2.01022E-01
0.70000	8.51050E-02	1.62376E-01
0.60000	5.81910E-02	1.33117E-01
0.50000	3.82426E-02	1.11468E-01
0.40000	2.38932E-02	9.59177E-02
0.30000	1.39909E-02	8.51974E-02
0.20000	7.58056E-03	7.82646E-02
0.10000	3.88789E-03	7.42829E-02
0.00000	2.30553E-03	7.26083E-02
-0.10000	2.38006E-03	7.27751E-02
-0.20000	3.80062E-03	7.44846E-02
-0.30000	6.38862E-03	7.75951E-02
-0.40000	1.00885E-02	8.21129E-02
-0.50000	1.49593E-02	8.81852E-02
-0.60000	2.11676E-02	9.60940E-02
-0.70000	2.89801E-02	1.06251E-01
-0.80000	3.87582E-02	1.19195E-01
-0.90000	5.09522E-02	1.35590E-01
-1.00000	6.60966E-02	1.56223E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.678
 σ_{SE} = .526
 σ_{CE} = .948

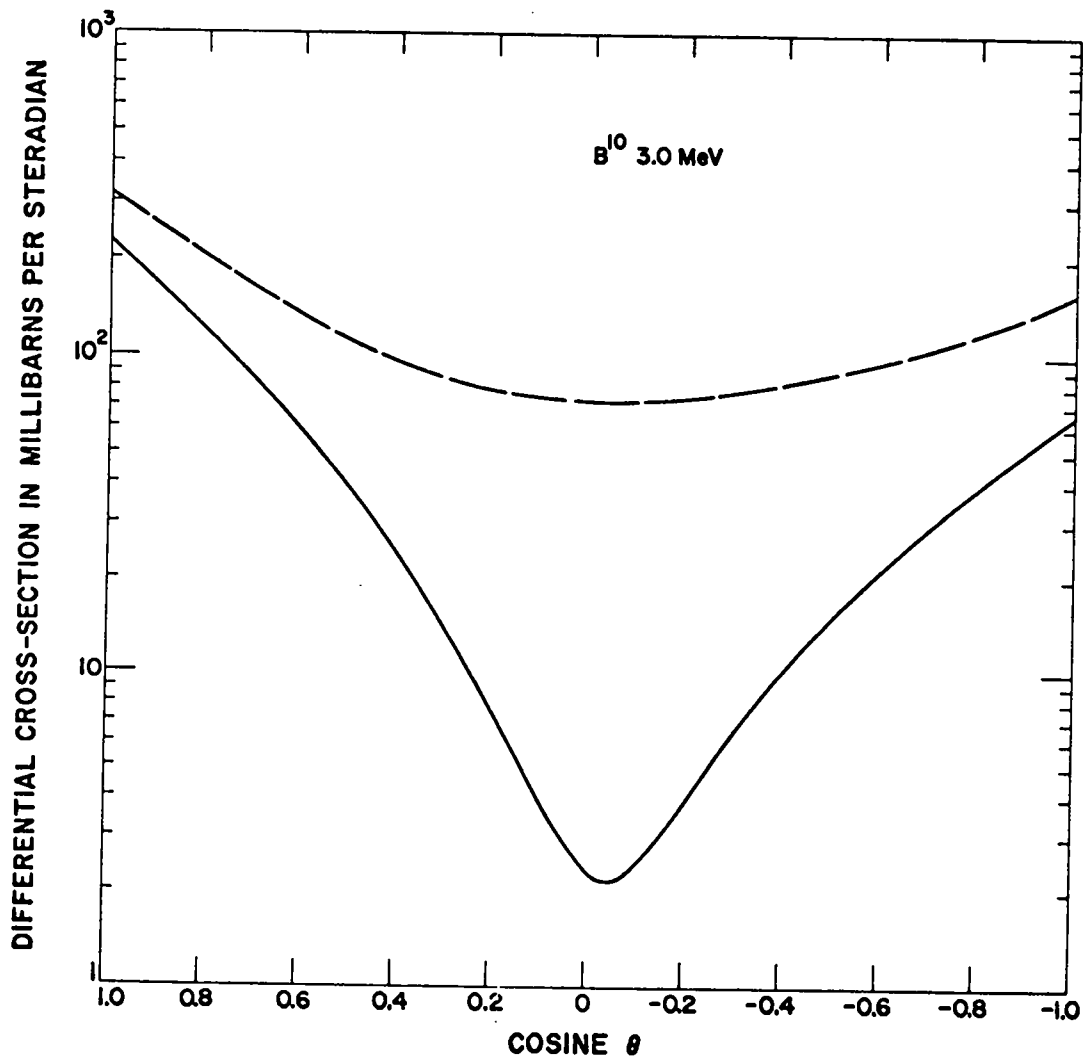


Figure 45

B^{10}	4.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.0n000	3.03879E-01	3.86548E-01
0.9n000	2.10565E-01	2.87392E-01
0.8n000	1.40775E-01	2.13159E-01
0.7n000	8.98790E-02	1.58923E-01
0.6n000	5.39425E-02	1.20511E-01
0.5n000	2.96452E-02	9.44122E-02
0.4n000	1.42086E-02	7.76947E-02
0.3n000	5.33359E-03	6.79406E-02
0.2n000	1.14736E-03	6.31880E-02
0.1n000	1.57666E-04	6.18828E-02
0.0n000	1.21329E-03	6.28372E-02
-0.1n000	3.47004E-03	6.51951E-02
-0.2n000	6.36155E-03	6.84022E-02
-0.3n000	9.57405E-03	7.21811E-02
-0.4n000	1.30246E-02	7.65107E-02
-0.5n000	1.68425E-02	8.16094E-02
-0.6n000	2.13527E-02	8.79213E-02
-0.7n000	2.70627E-02	9.61065E-02
-0.8n000	3.46496E-02	1.07034E-01
-0.9n000	4.49504E-02	1.21778E-01
-1.0n000	5.89527E-02	1.41621E-01

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.684
 σ_{SE} = .563
 σ_{CE} = .843

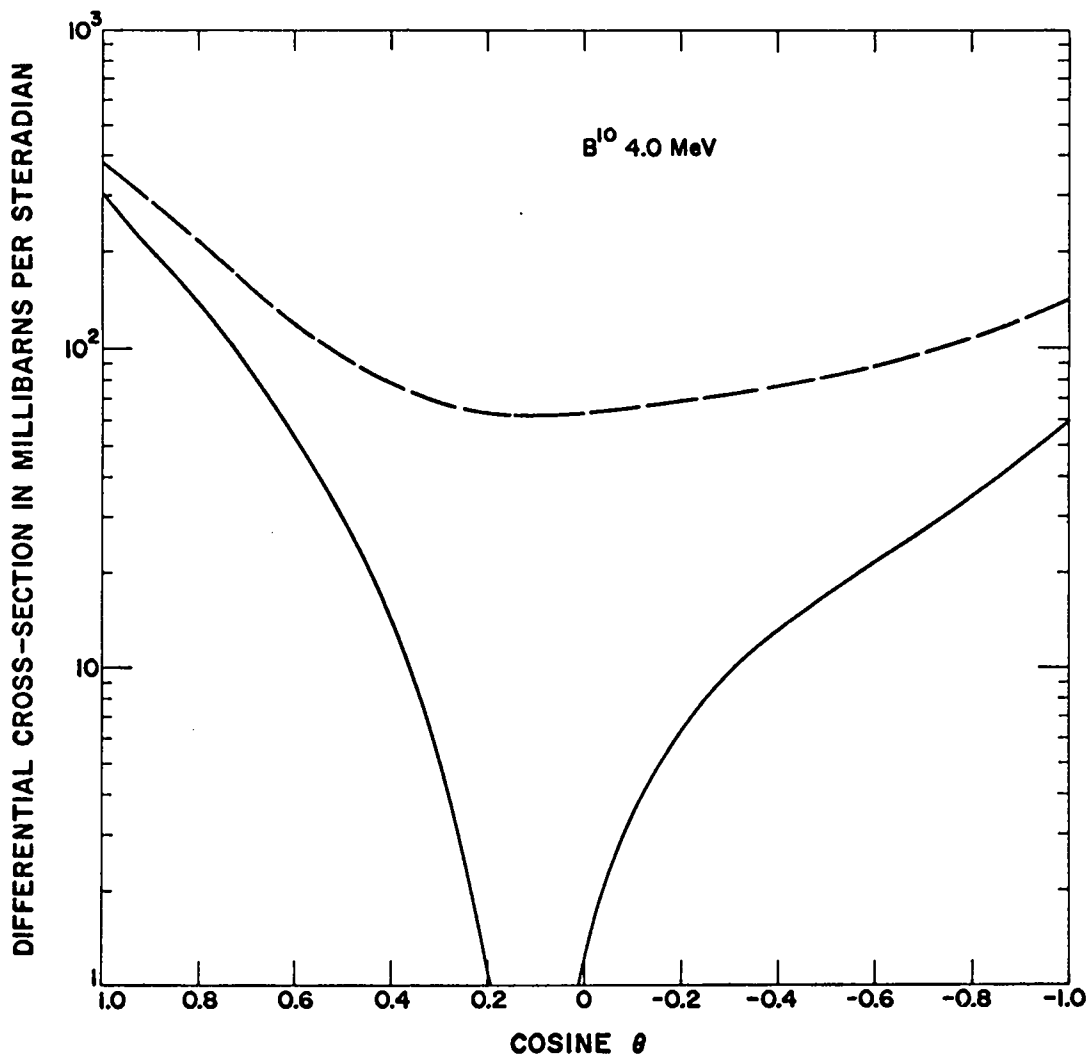


Figure 46

B¹⁰

5.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.80454E-01	4.52984E-01
0.90000	2.52705E-01	3.19612E-01
0.80000	1.60484E-01	2.23143E-01
0.70000	9.59869E-02	1.55456E-01
0.60000	5.27798E-02	1.09875E-01
0.50000	2.55806E-02	8.09309E-02
0.40000	1.00840E-02	6.41767E-02
0.30000	2.81488E-03	5.60303E-02
0.20000	1.00846E-03	5.36493E-02
0.10000	2.51094E-03	5.48273E-02
0.00000	5.69804E-03	5.79096E-02
-0.10000	9.40766E-03	6.17240E-02
-0.20000	1.28845E-02	6.55253E-02
-0.30000	1.57343E-02	6.89497E-02
-0.40000	1.78865E-02	7.19792E-02
-0.50000	1.95634E-02	7.49137E-02
-0.60000	2.12551E-02	7.83501E-02
-0.70000	2.36986E-02	8.31677E-02
-0.80000	2.78617E-02	9.05205E-02
-0.90000	3.49293E-02	1.01836E-01
-1.00000	4.62926E-02	1.18823E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.682
 σ_{SE} = .624
 σ_{CE} = .723

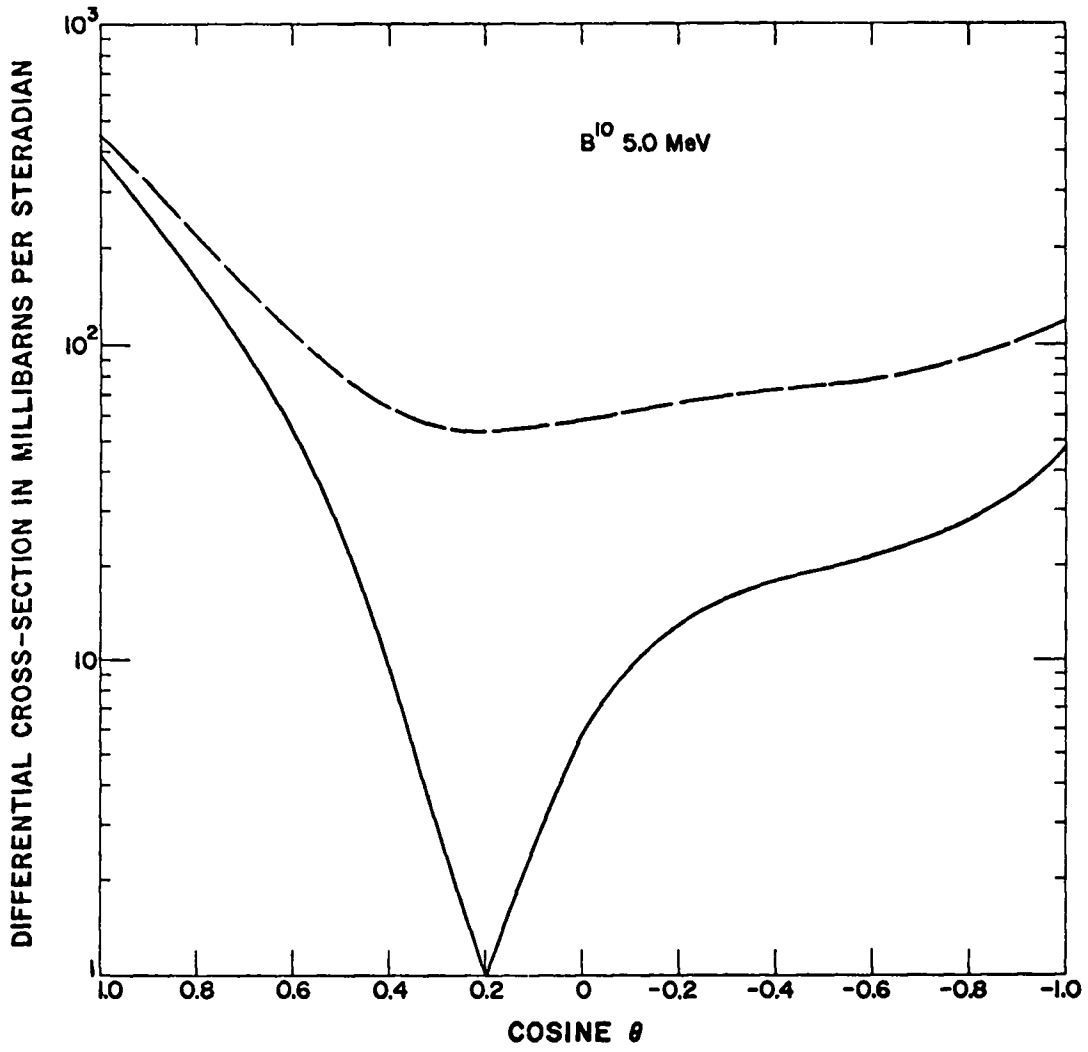


Figure 47

B¹⁰

6.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	4.49790E-C1	5.10128E-01
C.90000	2.89463E-C1	3.44612E-01
C.80000	1.77276E-C1	2.28559E-01
C.70000	1.01509E-C1	1.49904E-01
C.60000	5.28429E-C2	9.90860E-02
C.50000	2.38939E-C2	6.85415E-02
C.40000	8.83994E-C3	5.23214E-02
C.30000	3.12914E-C3	4.57835E-02
C.20000	3.24819E-C3	4.53516E-02
C.10000	6.53928E-C3	4.83275E-02
C.00000	1.10557E-C2	5.27413E-02
-C.10000	1.54482E-C2	5.72364E-02
-C.20000	1.88751E-C2	6.09786E-02
-C.30000	2.09328E-C2	6.35871E-02
-C.40000	2.16006E-C2	6.50821E-02
-C.50000	2.11991E-C2	6.58466E-02
-C.60000	2.03573E-C2	6.66004E-02
-C.70000	1.99890E-C2	6.83847E-02
-C.80000	2.12746E-C2	7.25571E-02
-C.90000	2.56485E-C2	8.07979E-02
-1.00000	3.47907E-C2	9.51284E-02

(DSIGMAS IN BARNS/STERADIAN

$$\sigma_T = 1.671$$

$$\sigma_{SE} = .684$$

$$\sigma_{CE} = .586$$

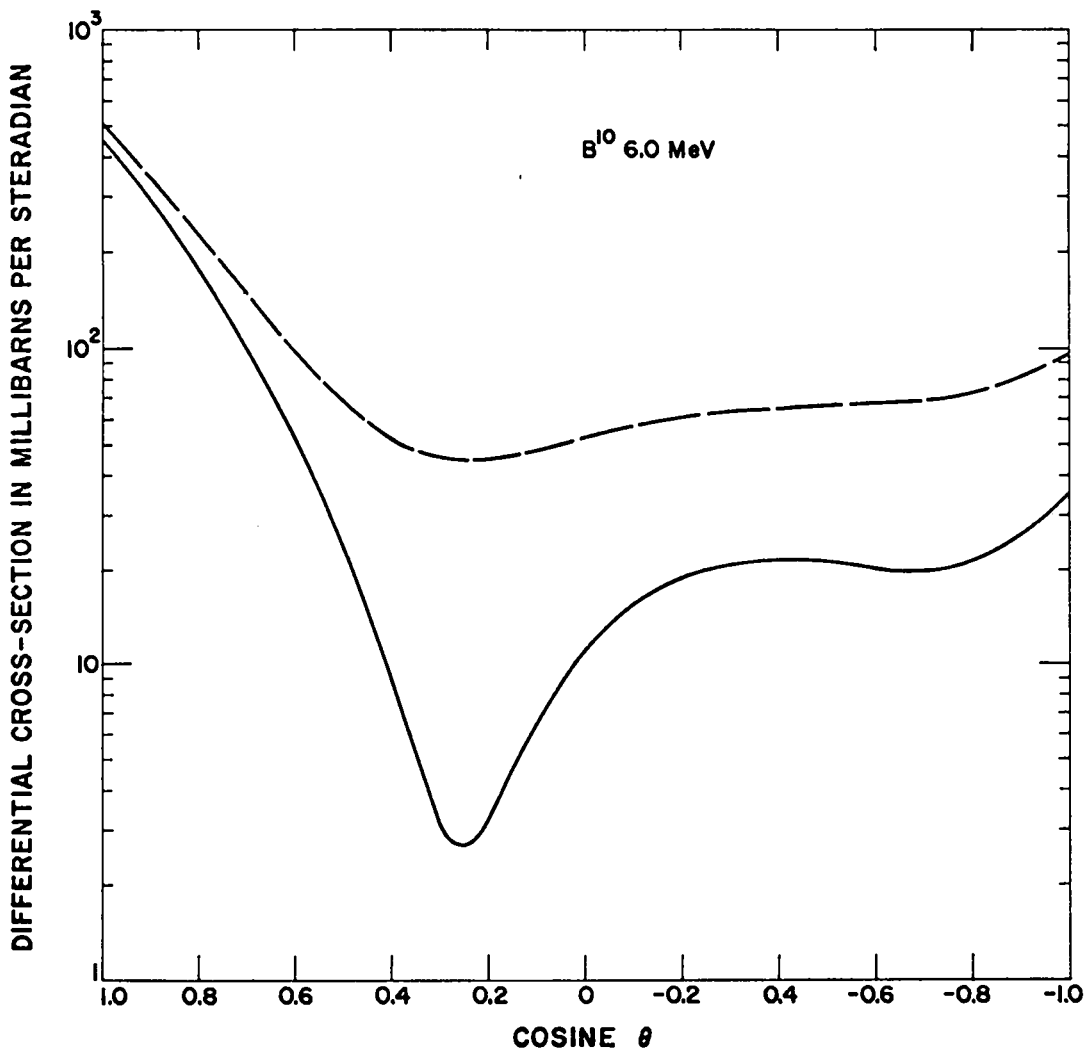


Figure 48

B¹⁰

7.0 MeV

COSINE (C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	5.13001E-C1	5.58217E-C1
0.90000	3.20963E-C1	3.61730E-01
0.80000	1.90774E-C1	2.28286E-01
0.70000	1.05754E-C1	1.40859E-01
0.60000	5.31860E-C2	8.65003E-02
0.50000	2.33971E-C2	5.53766E-C2
0.40000	9.06102E-C3	4.00545E-02
0.30000	4.66884E-C3	3.49533E-02
0.20000	6.12654E-C3	3.59324E-02
0.10000	1.04496E-C2	3.99786E-02
0.00000	1.55320E-C2	4.49703E-C2
-0.10000	1.99717E-C2	4.95007E-C2
-0.20000	2.29401E-C2	5.27460E-C2
-0.30000	2.40848E-C2	5.43693E-02
-0.40000	2.34581E-C2	5.44516E-02
-0.50000	2.14658E-C2	5.34453E-02
-0.60000	1.88314E-C2	5.21458E-C2
-0.70000	1.65722E-C2	5.16777E-02
-0.80000	1.59845E-C2	5.34963E-C2
-0.90000	1.86362E-C2	5.94036E-02
-1.00000	2.63655E-C2	7.15821E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.658
 σ_{SE} = .736
 σ_{CE} = .422

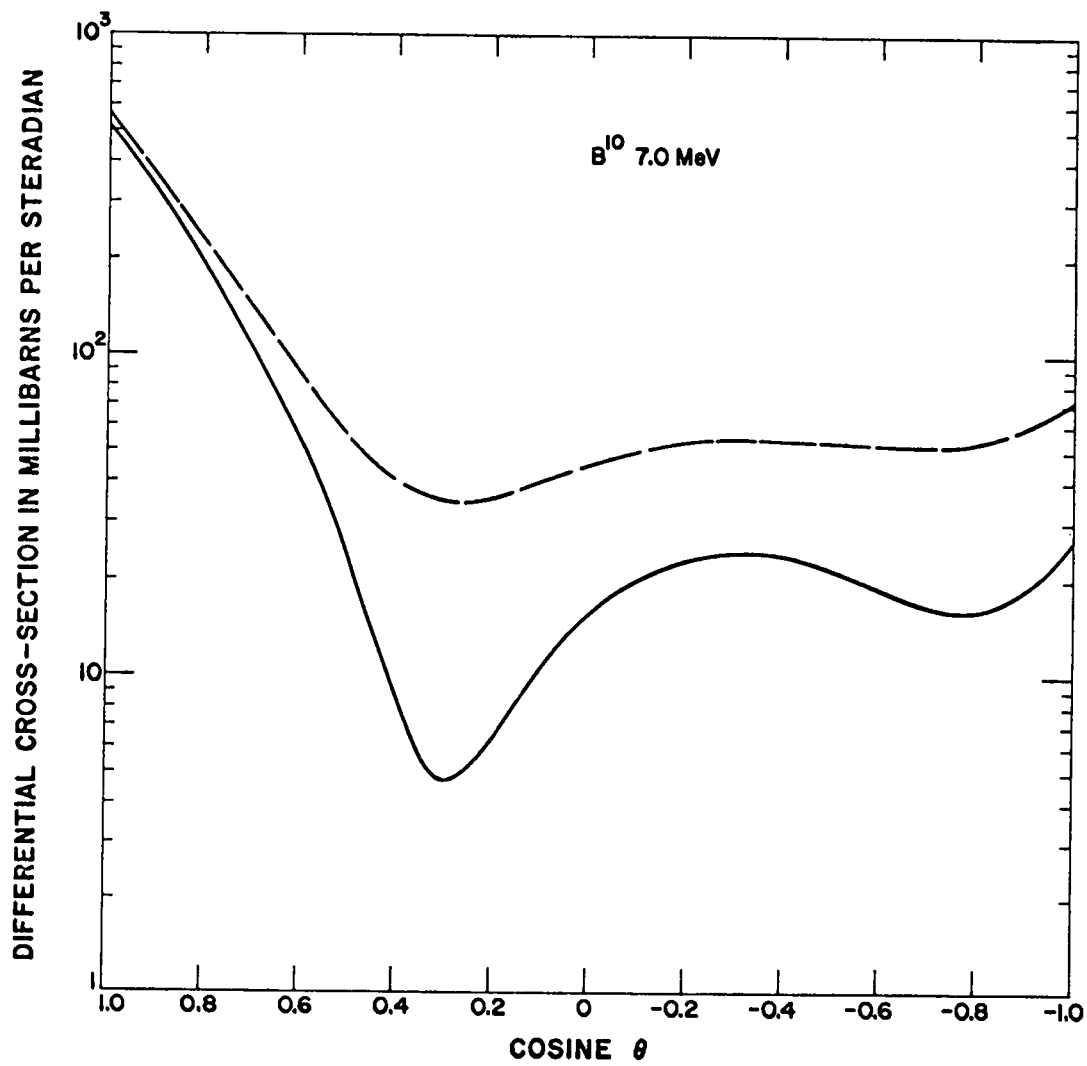


Figure 49

B¹⁰

8.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	5.72771E-01	6.07447E-01
0.90000	3.48319E-01	3.79182E-01
0.80000	2.01246E-01	2.29377E-01
0.70000	1.08521E-01	1.34672E-01
0.60000	5.33367E-02	7.80358E-02
0.50000	2.34653E-02	4.70938E-02
0.40000	1.00533E-02	3.28947E-02
0.30000	6.73877E-03	2.90140E-02
0.20000	9.00500E-03	3.08968E-02
0.10000	1.37081E-02	3.53771E-02
0.00000	1.87329E-02	4.03288E-02
-0.10000	2.27442E-02	4.44132E-02
-0.20000	2.50080E-02	4.68997E-02
-0.30000	2.52662E-02	4.75414E-02
-0.40000	2.36501E-02	4.64915E-02
-0.50000	2.06238E-02	4.42523E-02
-0.60000	1.69490E-02	4.16481E-02
-0.70000	1.36675E-02	3.98181E-02
-0.80000	1.20940E-02	4.02253E-02
-0.90000	1.38200E-02	4.46827E-02
-1.00000	2.07221E-02	5.53981E-02

(DSIGMAS IN BARNS/STERADIAN

$$\sigma_T = 1.648$$

$$\sigma_{SE} = .779$$

$$\sigma_{CE} = .314$$

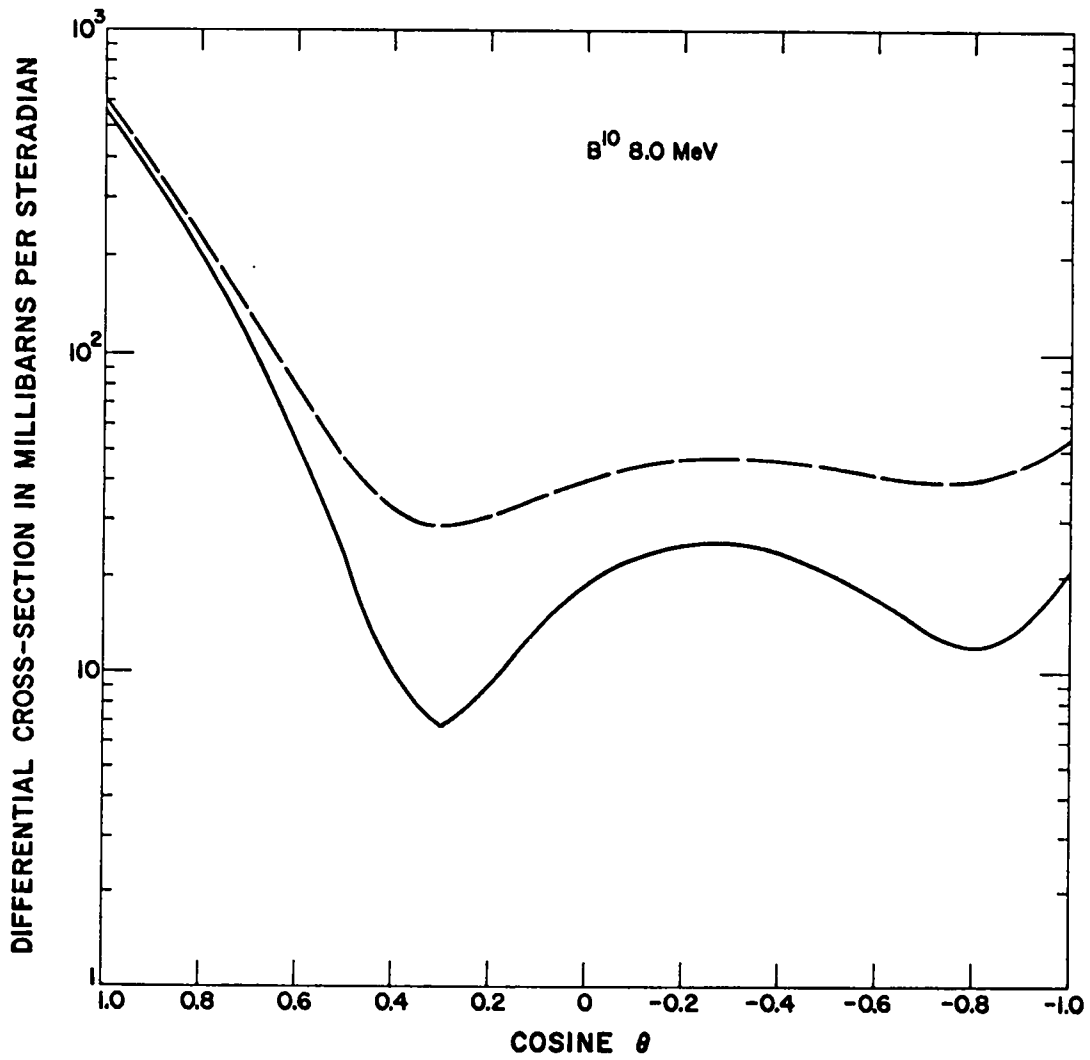


Figure 50

B^{10}	9.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	6.31858E-01	6.59178E-01
0.90000	3.72845E-01	3.96858E-01
0.80000	2.09200E-01	2.30921E-01
0.70000	1.09843E-01	1.29949E-01
0.60000	5.30540E-02	7.20006E-02
0.50000	2.37250E-02	4.18263E-02
0.40000	1.14209E-02	2.89015E-02
0.30000	9.00557E-03	2.60370E-02
0.20000	1.16717E-02	2.83959E-02
0.10000	1.62556E-02	3.27998E-02
0.00000	2.07563E-02	3.72410E-02
-0.10000	2.39998E-02	4.05440E-02
-0.20000	2.54095E-02	4.21338E-02
-0.30000	2.48516E-02	4.18831E-02
-0.40000	2.25364E-02	4.00171E-02
-0.50000	1.89588E-02	3.70601E-02
-0.60000	1.48678E-02	3.38144E-02
-0.70000	1.12564E-02	3.13621E-02
-0.80000	9.36610E-03	3.10872E-02
-0.90000	1.07008E-02	3.47140E-02
-1.00000	1.70467E-02	4.43677E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.642
 σ_{Se} = .815
 σ_{CE} = .242

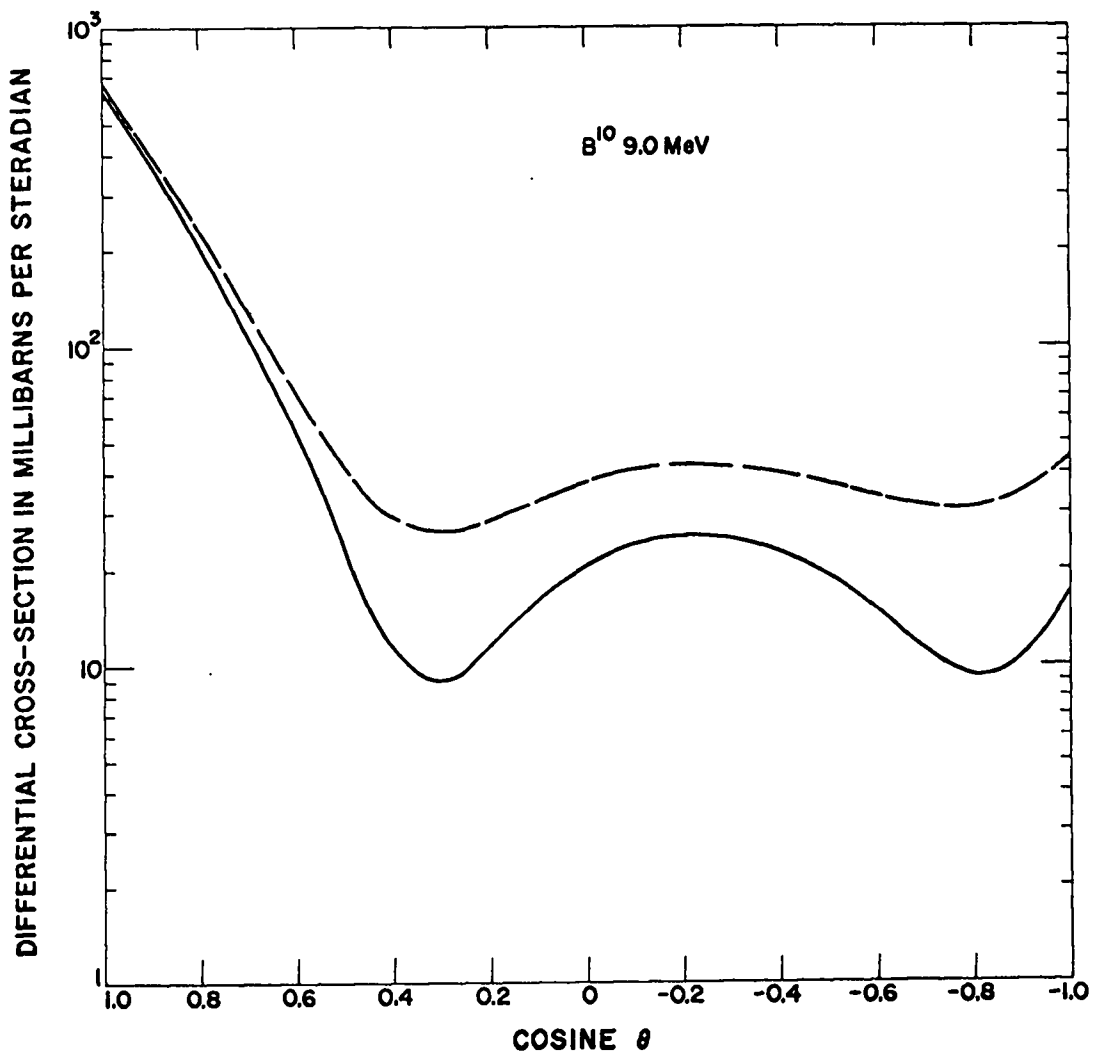


Figure 51

B ¹⁰		10.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	6.92116E-01	7.15059E-01	
0.90000	3.95484E-01	4.15397E-01	
0.80000	2.15088E-01	2.32966E-01	
0.70000	1.09864E-01	1.26348E-01	
0.60000	5.22792E-02	6.77826E-02	
0.50000	2.40019E-02	3.87987E-02	
0.40000	1.29560E-02	2.72349E-02	
0.30000	1.13027E-02	2.52046E-02	
0.20000	1.40608E-02	2.77025E-02	
0.10000	1.81648E-02	3.16527E-02	
0.00000	2.18248E-02	3.52617E-02	
-0.10000	2.40968E-02	3.75847E-02	
-0.20000	2.45997E-02	3.82414E-02	
-0.30000	2.33348E-02	3.72367E-02	
-0.40000	2.05785E-02	3.48574E-02	
-0.50000	1.68251E-02	3.16220E-02	
-0.60000	1.27647E-02	2.82681E-02	
-0.70000	9.28503E-03	2.57684E-02	
-0.80000	7.48863E-03	2.53668E-02	
-0.90000	8.71919E-03	2.86324E-02	
-1.00000	1.45921E-02	3.75359E-02	

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.639
 σ_{SE} = .845
 σ_{CE} = .198

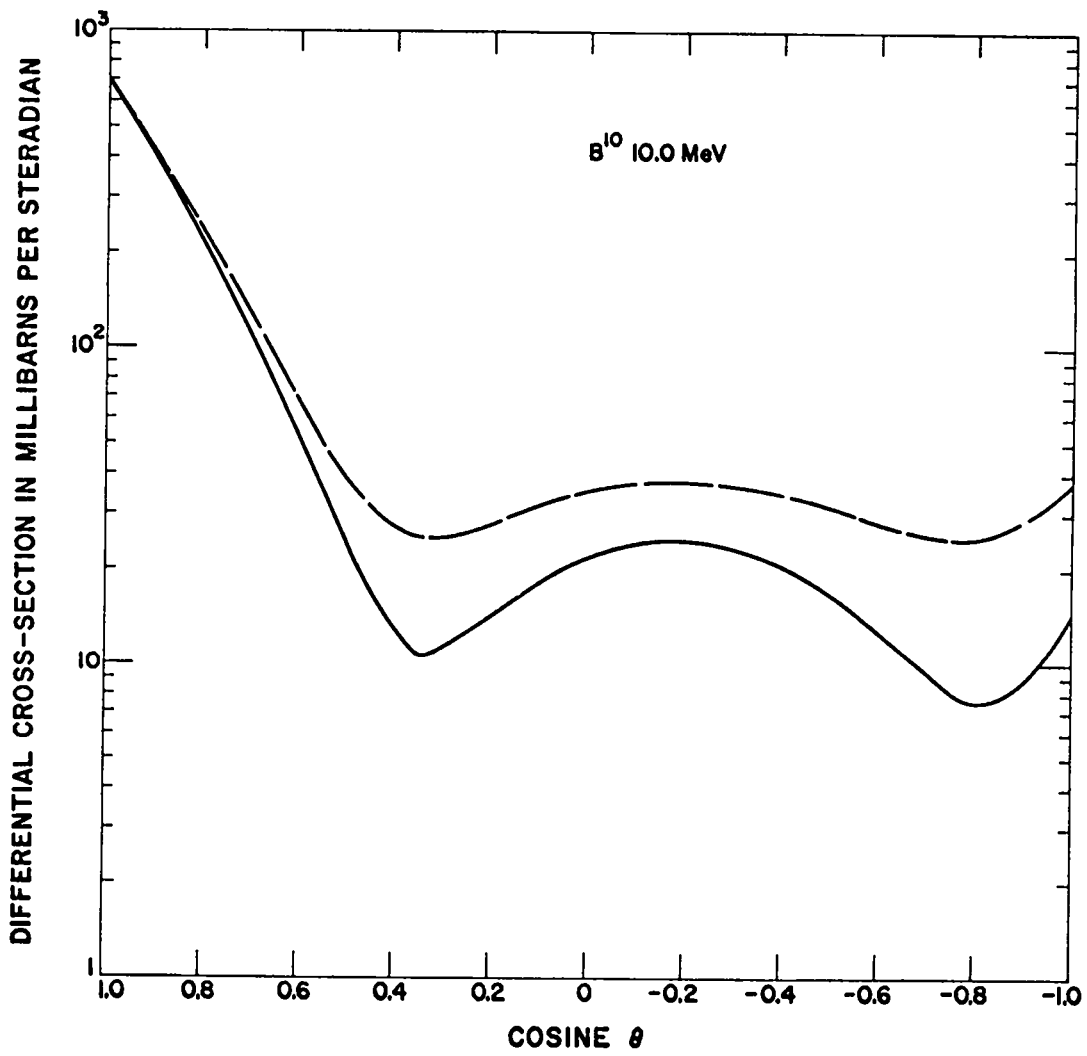


Figure 52

B10

11.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	7.54135E-01	7.74380E-01
0.90000	4.16759E-01	4.34119E-01
0.80000	2.19252E-01	2.34718E-01
0.70000	1.08718E-01	1.22911E-01
0.60000	5.09665E-02	6.42789E-02
0.50000	2.41366E-02	3.68196E-02
0.40000	1.44662E-02	2.66886E-02
0.30000	1.34809E-02	2.53668E-02
0.20000	1.61245E-02	2.77770E-02
0.10000	1.95213E-02	3.10352E-02
0.00000	2.21611E-02	3.36288E-02
-0.10000	2.33710E-02	3.48849E-02
-0.20000	2.29825E-02	3.46350E-02
-0.30000	2.11299E-02	3.30158E-02
-0.40000	1.81392E-02	3.03616E-02
-0.50000	1.44772E-02	2.71602E-02
-0.60000	1.07409E-02	2.40533E-02
-0.70000	7.67255E-03	2.18655E-02
-0.80000	6.19077E-03	2.16563E-02
-0.90000	7.43139E-03	2.47912E-02
-1.00000	1.27929E-02	3.30381E-02

(SIGMAS IN BARNS/STERADIAN)

σ_T = 1.638
 σ_{SE} = .870
 σ_{Ce} = .171

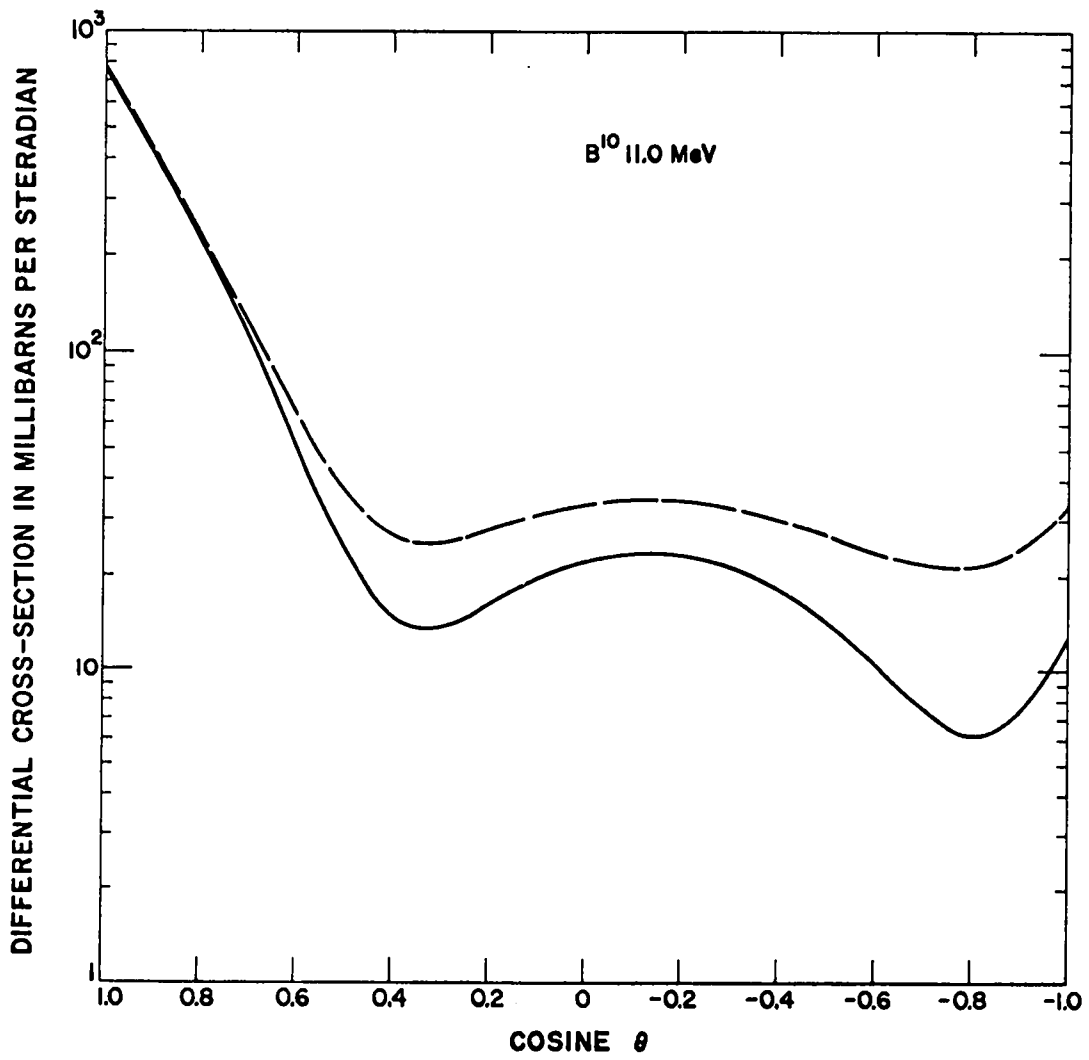


Figure 53

B^{10}	12.0 MeV	14.0 MeV	16.0 MeV
COSINE (C.M.)			
1.00000	8.1724E-01	9.4287E-01	1.0599E 00
0.90000	4.3661E-01	4.7136E-01	4.9764E-01
0.80000	2.2197E-01	2.2362E-01	2.2084E-01
0.70000	1.0671E-01	1.0075E-01	9.3243E-02
0.60000	4.9284E-02	4.5070E-02	4.0404E-02
0.50000	2.4134E-02	2.3577E-02	2.2465E-02
0.40000	1.5852E-02	1.7895E-02	1.8840E-02
0.30000	1.5425E-02	1.8269E-02	1.9560E-02
0.20000	1.7811E-02	1.9916E-02	2.0346E-02
0.10000	2.0385E-02	2.0815E-02	1.9821E-02
0.00000	2.1949E-02	2.0401E-02	1.7953E-02
-0.10000	2.2110E-02	1.8789E-02	1.5220E-02
-0.20000	2.0907E-02	1.6354E-02	1.2180E-02
-0.30000	1.8592E-02	1.3508E-02	9.2849E-03
-0.40000	1.5521E-02	1.0612E-02	6.8259E-03
-0.50000	1.2115E-02	7.9553E-03	4.9455E-03
-0.60000	8.8603E-03	5.7849E-03	3.6873E-03
-0.70000	6.3352E-03	4.3548E-03	3.0599E-03
-0.80000	5.2544E-03	3.9892E-03	3.1071E-03
-0.90000	6.5195E-03	5.1544E-03	3.9778E-03
-1.00000	1.1274E-02	8.5369E-03	5.9946E-03

DSIGMAS IN BNS/STERAD

σ_T =	1.637	1.632	1.618
σ_{SE} =	.892	.924	.944

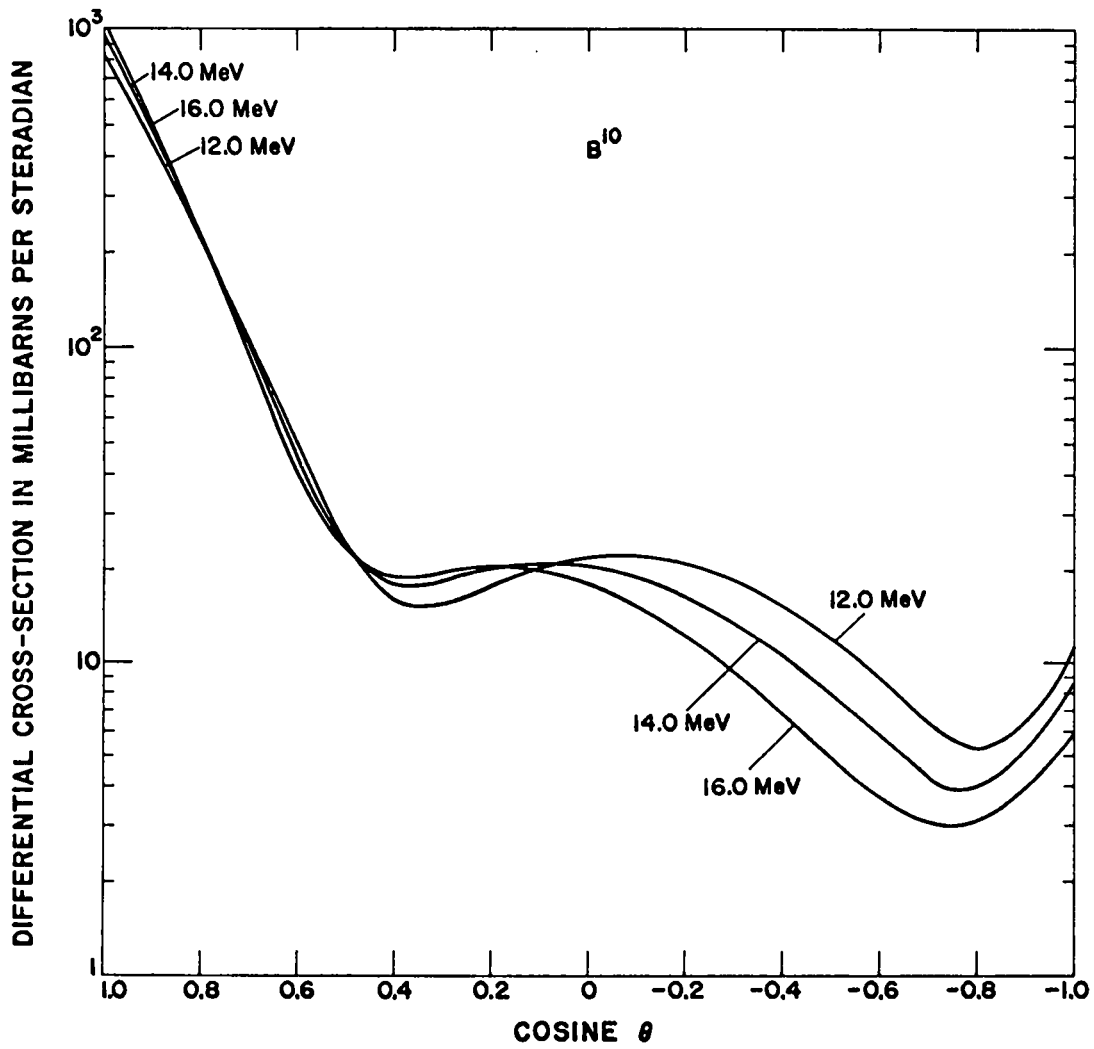


Figure 54

B^{10}	13.0 MeV	15.0 MeV
COSINE (C.M.)		
1.00000	8.8058E-01	1.0039E 00
0.90000	4.5491E-01	4.8547E-01
0.80000	2.2340E-01	2.2261E-01
0.70000	1.0400E-01	9.6947E-02
0.60000	4.7284E-02	4.2654E-02
0.50000	2.3942E-02	2.3078E-02
0.40000	1.7008E-02	1.8545E-02
0.30000	1.7037E-02	1.9137E-02
0.20000	1.9080E-02	2.0337E-02
0.10000	2.0803E-02	2.0468E-02
0.00000	2.1328E-02	1.9250E-02
-0.10000	2.0531E-02	1.6996E-02
-0.20000	1.8635E-02	1.4186E-02
-0.30000	1.5987E-02	1.1266E-02
-0.40000	1.2957E-02	8.5661E-03
-0.50000	9.9046E-03	6.3043E-03
-0.60000	7.1966E-03	4.6206E-03
-0.70000	5.2424E-03	3.6355E-03
-0.80000	4.5513E-03	3.5172E-03
-0.90000	5.7939E-03	4.5528E-03
-1.00000	9.8707E-03	7.2208E-03
	DSIGMAS IN BNS/STERAD	
σ_T =	1.636	1.628
σ_{SE} =	.910	.935

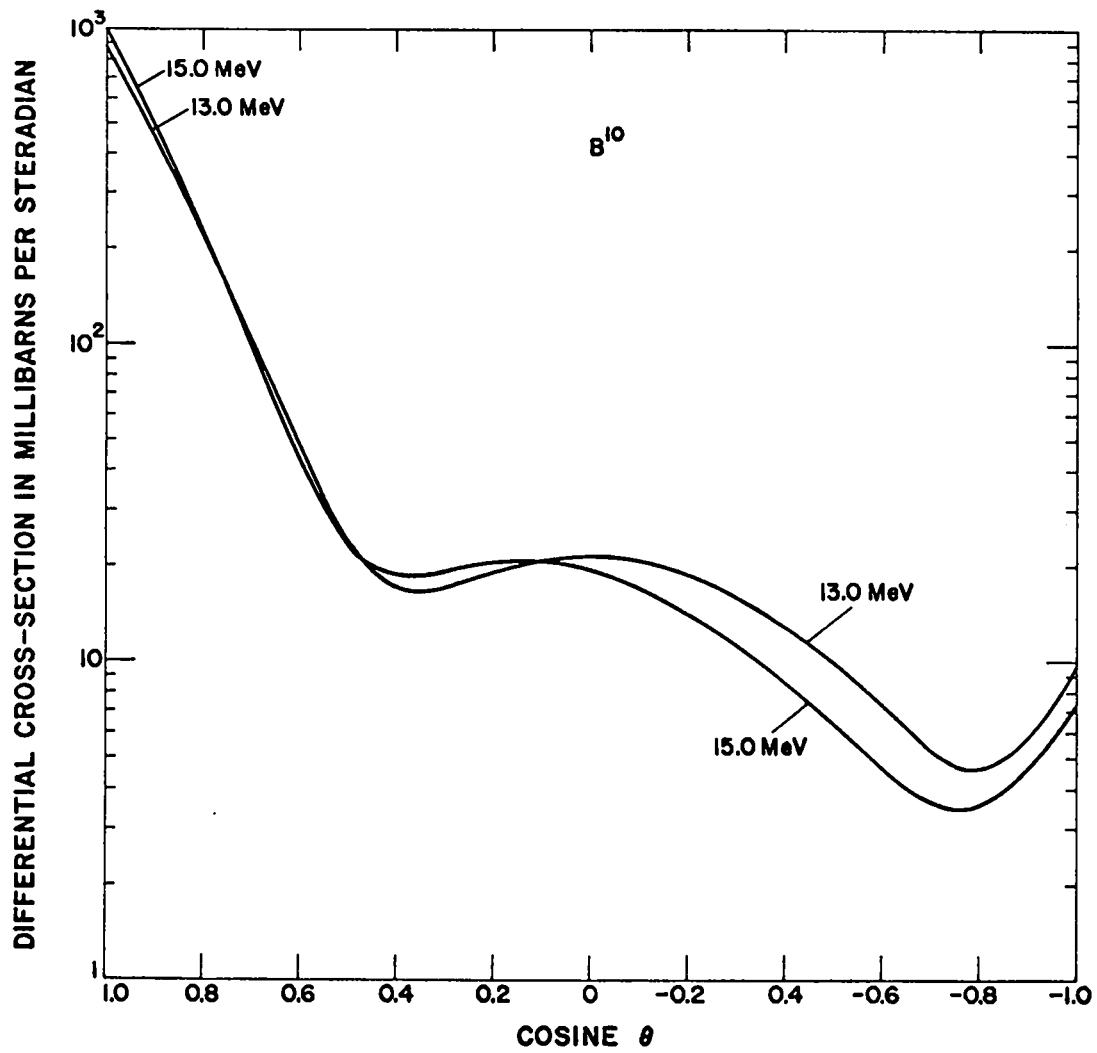


Figure 55



B¹¹

<u>Energy</u>	<u>Energy Levels</u> *			
1.00	G.S.	3/2 ⁻	11.46	[3/2 ⁻]
1.28	2.14	1/2 ⁻	11.68	(5/2 ⁺)
2.00	4.46	5/2 ⁻	11.97	(3/2 ⁻)
3.00	5.03	(1/2) ⁻	12.20	[3/2 ⁻]
4.00	6.76	(7/2 ⁻)	13.16	[3/2 ⁻]
5.00	6.81	(3/2 ⁺)	14.02	[3/2 ⁻]
6.00	7.30	(5/2) ^[-]	14.55	[3/2 ⁻]
7.00	7.99	[3/2 ⁻]	15.09	[3/2 ⁻]
8.00	8.57	(5/2) ^[-]		
9.00	8.92	5/2 ⁽⁻⁾		
10.00	9.19	7/2 ⁺		
11.00	9.28	5/2 ⁺		
12.00	9.87	[3/2 ⁻]		
13.00	10.26	[3/2 ⁻]		
14.00	10.32	[3/2 ⁻]		
15.00	10.61	[3/2 ⁻]		
16.00	11.00	[3/2 ⁻]		

*Energy levels obtained from NRC 61-5, 6-107,
except [] values which are assumed.

B¹¹

1.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.67210E-01	2.88591E-01
0.90000	1.53201E-01	2.70530E-01
0.80000	1.40411E-01	2.54448E-01
0.70000	1.28763E-01	2.40154E-01
0.60000	1.18188E-01	2.27480E-01
0.50000	1.08621E-01	2.16276E-01
0.40000	1.00005E-01	2.06416E-01
0.30000	9.22876E-02	1.97789E-01
0.20000	8.54227E-02	1.90306E-01
0.10000	7.93696E-02	1.83894E-01
0.00000	7.40930E-02	1.78500E-01
-0.10000	6.95628E-02	1.74088E-01
-0.20000	6.57539E-02	1.70637E-01
-0.30000	6.26461E-02	1.68148E-01
-0.40000	6.02242E-02	1.66635E-01
-0.50000	5.84774E-02	1.66133E-01
-0.60000	5.73996E-02	1.66691E-01
-0.70000	5.69891E-02	1.68380E-01
-0.80000	5.72483E-02	1.71286E-01
-0.90000	5.81841E-02	1.75513E-01
-1.00000	5.98070E-02	1.81188E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.467
 σ_{SE} = 1.093
 σ_{CE} = 1.374

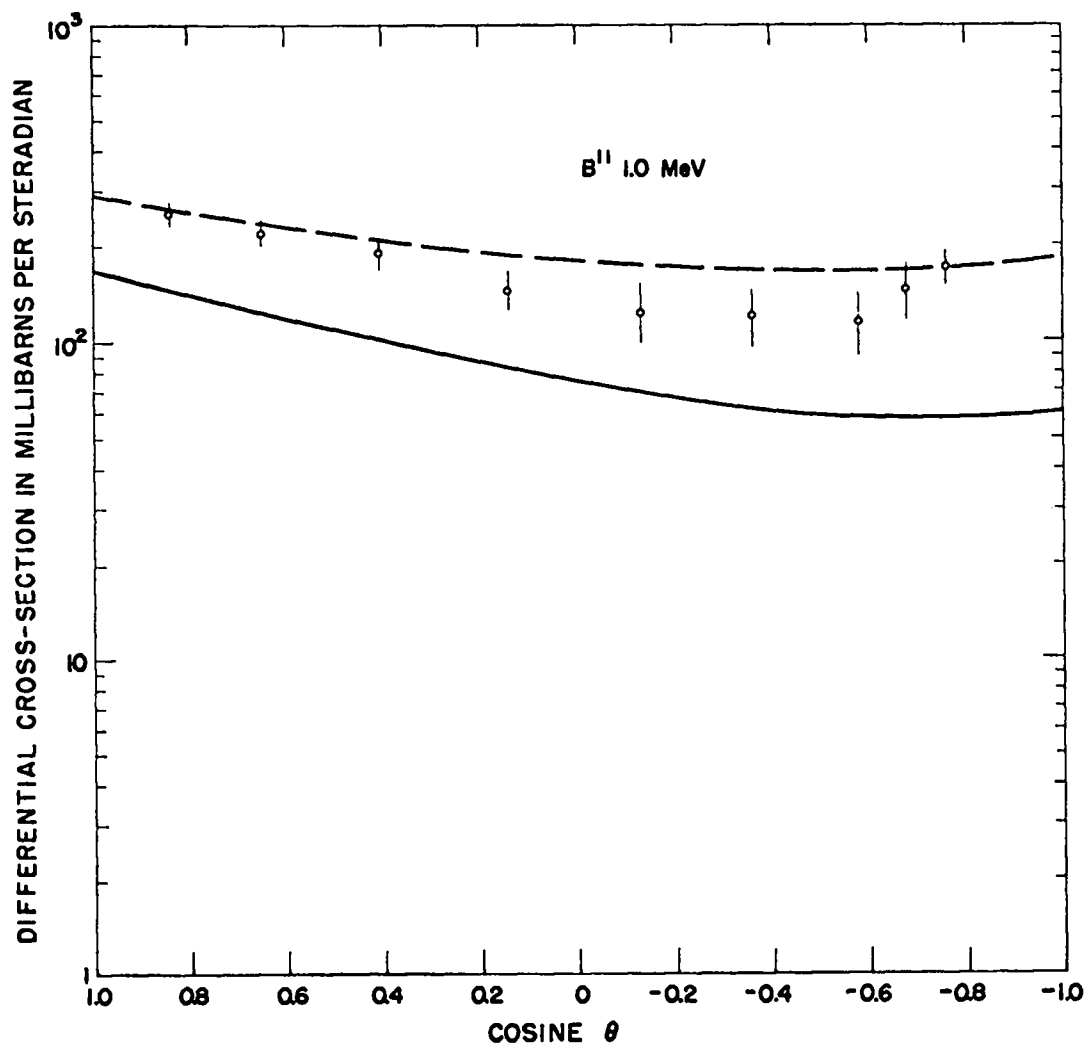


Figure 56

B¹¹

1.28 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.68302E-01	2.85471E-01
0.90000	1.49105E-01	2.61187E-01
0.80000	1.32052E-01	2.40065E-01
0.70000	1.16961E-01	2.21757E-01
0.60000	1.03667E-01	2.05954E-01
0.50000	9.20198E-02	1.92384E-01
0.40000	8.18858E-02	1.80813E-01
0.30000	7.31459E-02	1.71039E-01
0.20000	6.56957E-02	1.62895E-01
0.10000	5.94445E-02	1.56246E-01
0.00000	5.43150E-02	1.50986E-01
-0.10000	5.02428E-02	1.47044E-01
-0.20000	4.71761E-02	1.44376E-01
-0.30000	4.50751E-02	1.42969E-01
-0.40000	4.39117E-02	1.42839E-01
-0.50000	4.36688E-02	1.44033E-01
-0.60000	4.43403E-02	1.46627E-01
-0.70000	4.59808E-02	1.50727E-01
-0.80000	4.84548E-02	1.56468E-01
-0.90000	5.19367E-02	1.64019E-01
-1.00000	5.64106E-02	1.73579E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 2.205
 σ_{SE} = .917
 σ_{CE} = 1.288

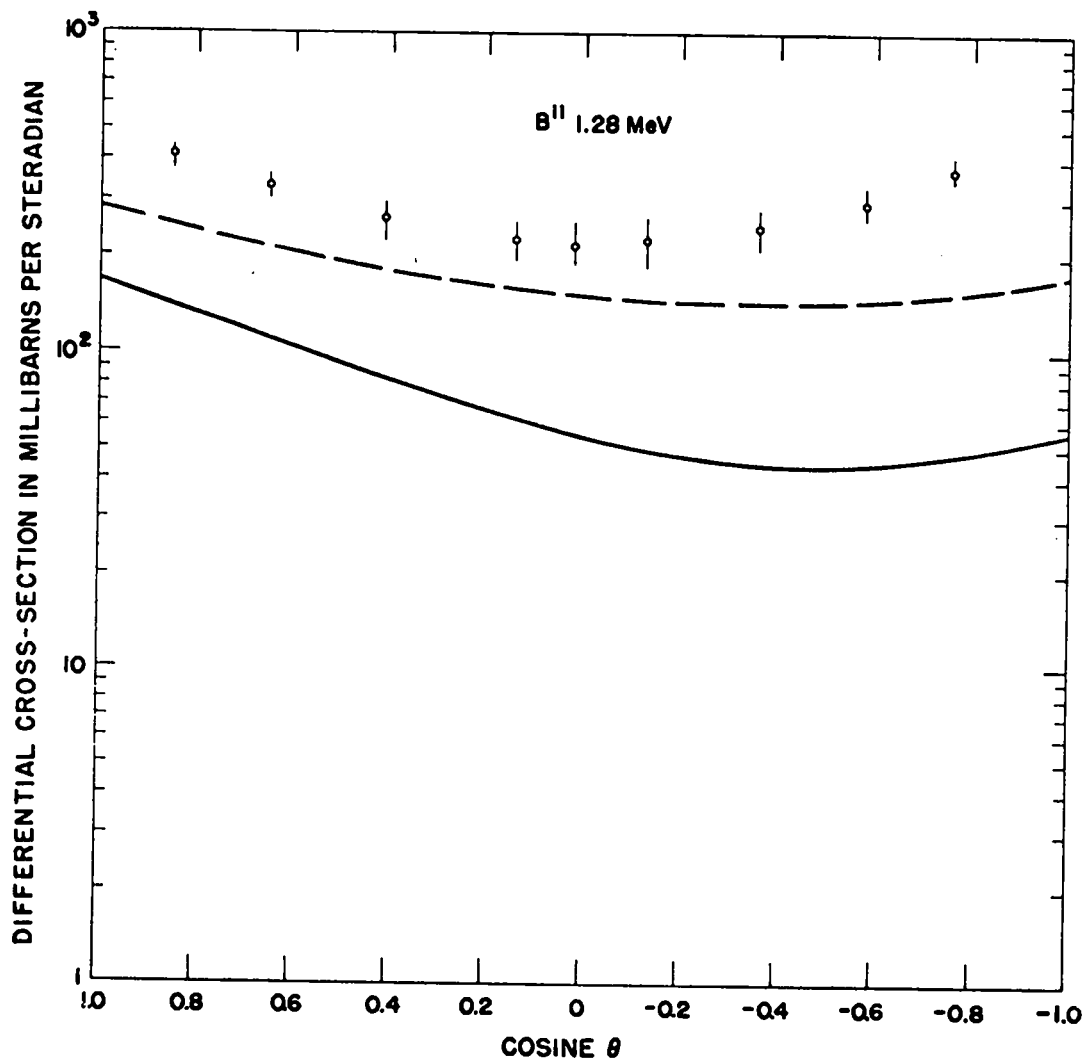


Figure 57

B¹¹

2.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.92325E-01	3.10859E-01
0.90000	1.55528E-01	2.66496E-01
0.80000	1.24894E-01	2.29963E-01
0.70000	9.96136E-02	2.00147E-01
0.60000	7.89639E-02	1.76064E-01
0.50000	6.23031E-02	1.56855E-01
0.40000	4.90744E-02	1.41777E-01
0.30000	3.87819E-02	1.30195E-01
0.20000	3.10067E-02	1.21576E-01
0.10000	2.53932E-02	1.15488E-01
0.00000	2.16479E-02	1.11590E-01
-0.10000	1.95358E-02	1.09631E-01
-0.20000	1.88777E-02	1.09447E-01
-0.30000	1.95475E-02	1.10960E-01
-0.40000	2.14695E-02	1.14172E-01
-0.50000	2.46160E-02	1.19166E-01
-0.60000	2.90053E-02	1.26105E-01
-0.70000	3.46997E-02	1.35233E-01
-0.80000	4.18032E-02	1.46872E-01
-0.90000	5.04601E-02	1.61427E-01
-1.00000	6.08533E-02	1.79387E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.899
 σ_{SE} = .672
 σ_{CE} = 1.227

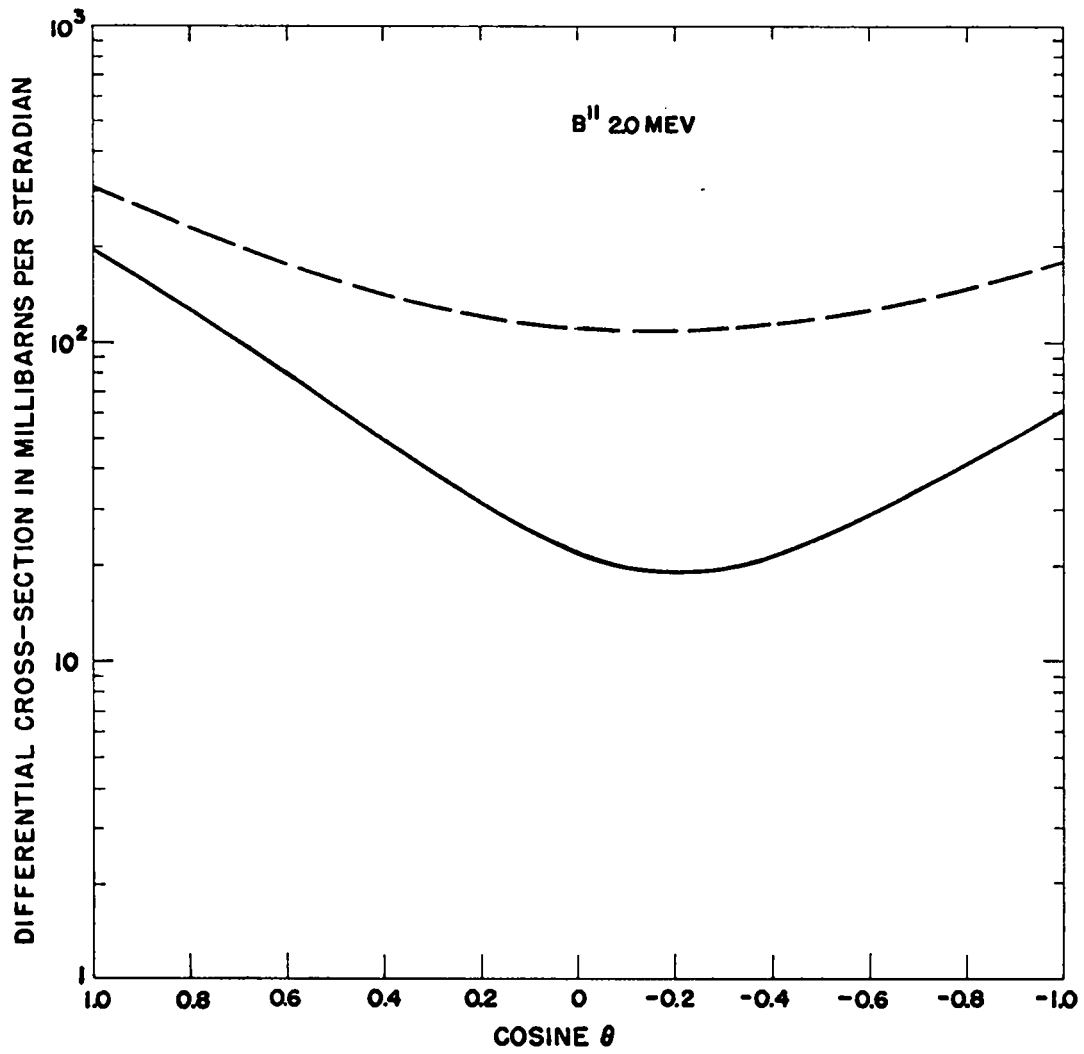


Figure 58

B¹¹

3.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.52185E-01	3.63885E-01
0.90000	1.83977E-01	2.86246E-01
0.80000	1.30954E-01	2.26003E-01
0.70000	9.05146E-02	1.80105E-01
0.60000	6.03890E-02	1.45916E-01
0.50000	3.86092E-02	1.21165E-01
0.40000	2.34832E-02	1.03921E-01
0.30000	1.35715E-02	9.25508E-02
0.20000	7.66693E-03	8.57048E-02
0.10000	4.77611E-03	8.22888E-02
0.00000	4.10313E-03	8.14473E-02
-0.10000	5.03514E-03	8.25478E-02
-0.20000	7.12943E-03	8.51673E-02
-0.30000	1.01020E-02	8.90813E-02
-0.40000	1.38174E-02	9.42548E-02
-0.50000	1.82795E-02	1.00836E-01
-0.60000	2.36238E-02	1.09150E-01
-0.70000	3.01096E-02	1.19780E-01
-0.80000	3.81145E-02	1.33163E-01
-0.90000	4.81278E-02	1.50397E-01
-1.00000	6.07462E-02	1.72446E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.769
 σ_{SE} = .566
 σ_{CE} = 1.085

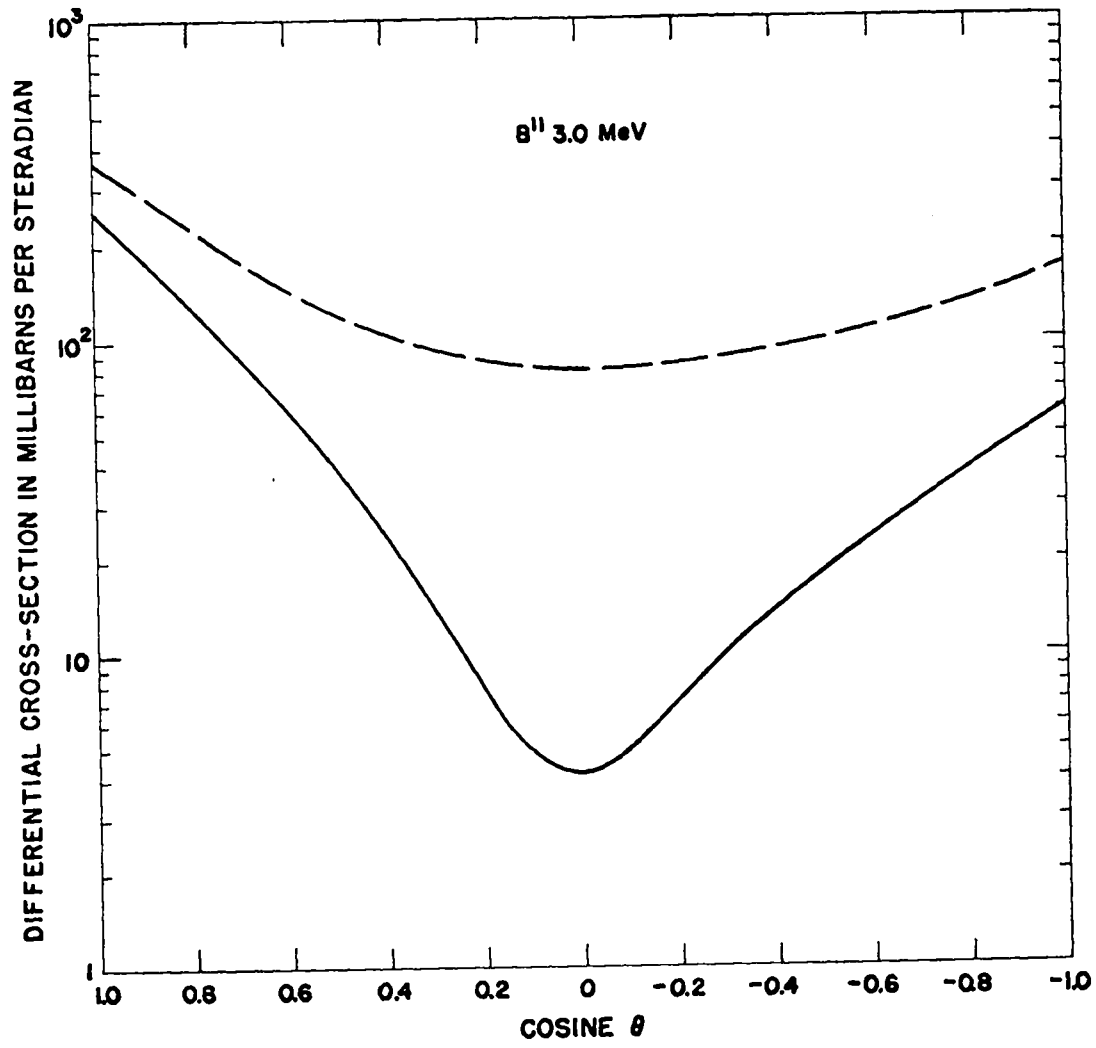


Figure 59

B¹¹

4.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.19961E-01	4.21920E-01
0.90000	2.18224E-01	3.10631E-01
0.80000	1.42869E-01	2.28054E-01
0.70000	8.86341E-02	1.68402E-01
0.60000	5.10552E-02	1.26801E-01
0.50000	2.63657E-02	9.91689E-02
0.40000	1.14096E-02	8.21031E-02
0.30000	3.56947E-03	7.28002E-02
0.20000	7.04888E-04	6.89833E-02
0.10000	1.09998E-03	6.88431E-02
0.00000	3.41921E-03	7.09899E-02
-0.10000	6.66990E-03	7.44130E-02
-0.20000	1.01704E-02	7.84488E-02
-0.30000	1.35235E-02	8.27542E-02
-0.40000	1.65933E-02	8.72868E-02
-0.50000	1.94868E-02	9.22900E-02
-0.60000	2.25370E-02	9.82831E-02
-0.70000	2.62905E-02	1.06058E-01
-0.80000	3.14952E-02	1.16680E-01
-0.90000	3.90917E-02	1.31498E-01
-1.00000	5.02053E-02	1.52164E-01

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.711
 σ_{SE} = .570
 σ_{CE} = .962

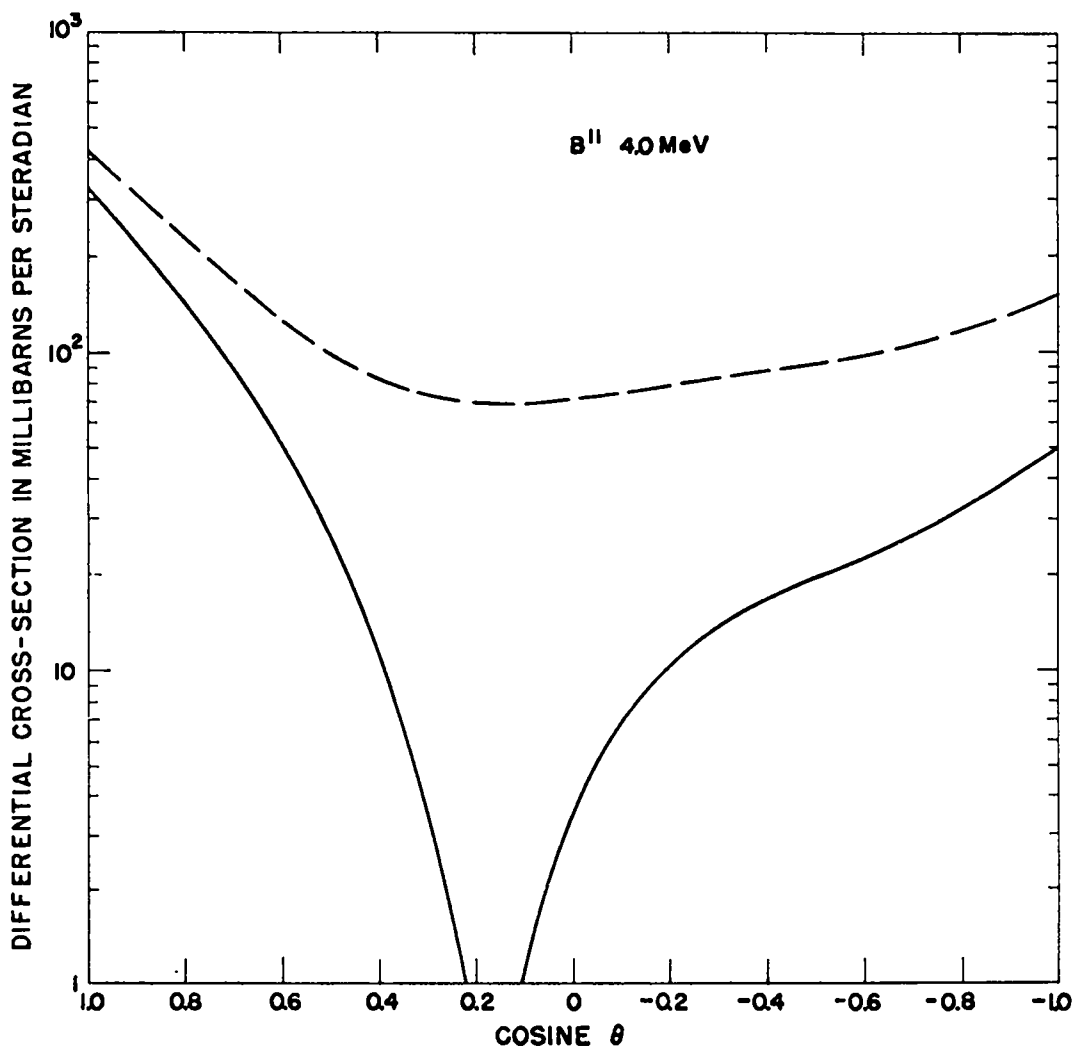


Figure 60

B¹¹

5.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.85892E-01	4.68664E-01
0.90000	2.51427E-01	3.25578E-01
0.80000	1.55574E-01	2.23354E-01
0.70000	8.96305E-02	1.52701E-01
0.60000	4.64704E-02	1.06071E-01
0.50000	2.02822E-02	7.73438E-02
0.40000	6.35304E-03	6.15839E-02
0.30000	8.93945E-04	5.48427E-02
0.20000	8.98258E-04	5.40027E-02
0.10000	4.02699E-03	5.66521E-02
0.00000	8.51616E-03	6.09859E-02
-0.10000	1.31022E-02	6.57272E-02
-0.20000	1.69619E-02	7.00662E-02
-0.30000	1.96649E-02	7.36136E-02
-0.40000	2.11355E-02	7.63663E-02
-0.50000	2.16231E-02	7.86847E-02
-0.60000	2.16788E-02	8.12793E-02
-0.70000	2.21377E-02	8.52083E-02
-0.80000	2.41059E-02	9.18855E-02
-0.90000	2.89509E-02	1.03102E-01
-1.00000	3.82949E-02	1.21067E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.676
 σ_{SE} = .610
 σ_{CE} = .758

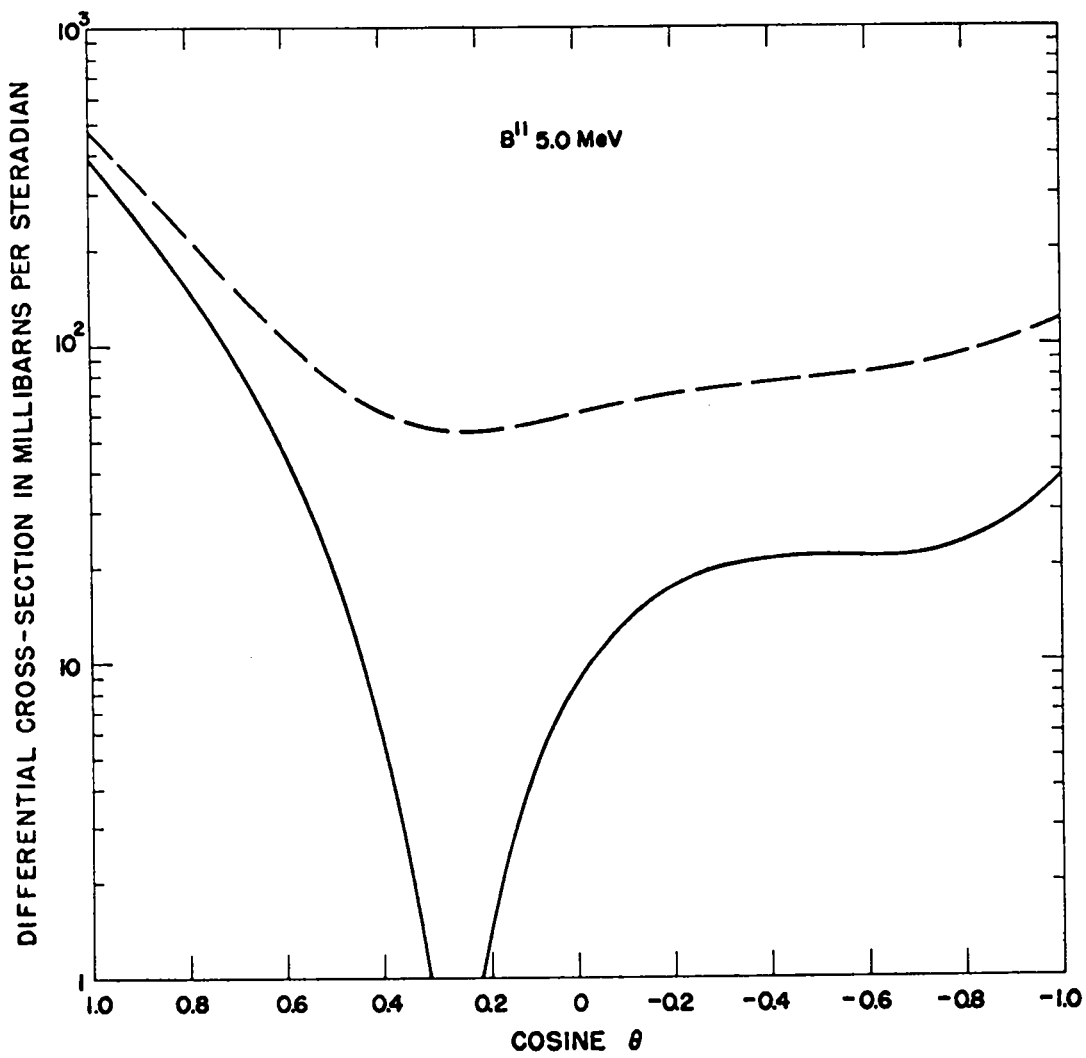


Figure 61

B¹¹

6.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	4.48337E-01	5.12517E-01
0.90000	2.81762E-01	3.38581E-01
0.80000	1.67212E-01	2.18741E-01
0.70000	9.14994E-02	1.39212E-01
0.60000	4.42902E-02	8.92406E-02
0.50000	1.75046E-02	6.04572E-02
0.40000	4.85259E-03	4.63710E-02
0.30000	1.47217E-03	4.19844E-02
0.20000	3.64834E-03	4.34944E-02
0.10000	8.59578E-03	4.80614E-02
0.00000	1.42913E-02	5.36331E-02
-0.10000	1.93458E-02	5.88114E-02
-0.20000	2.29065E-02	6.27526E-02
-0.30000	2.45842E-02	6.50964E-02
-0.40000	2.43987E-02	6.59170E-02
-0.50000	2.27405E-02	6.56932E-02
-0.60000	2.03438E-02	6.52941E-02
-0.70000	1.82683E-02	6.59804E-02
-0.80000	1.78900E-02	6.94190E-02
-0.90000	2.08964E-02	7.77151E-02
-1.00000	2.92871E-02	9.34675E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.650
 σ_{SE} = .658
 σ_{CE} = .573

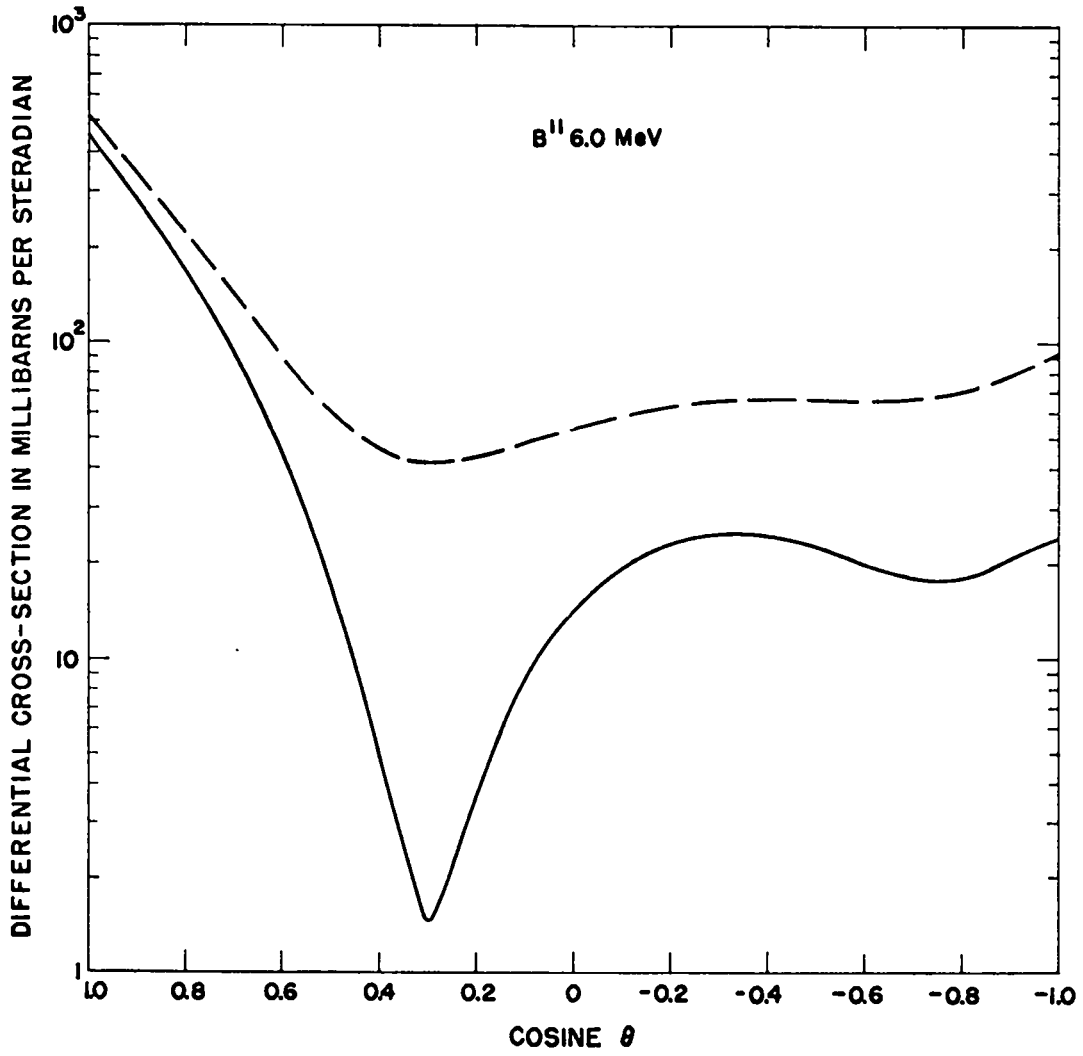


Figure 62

B¹¹

7.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	5.09447E-01	5.61932E-01
0.90000	3.09633E-01	3.55616E-01
0.80000	1.77311E-01	2.18800E-01
0.70000	9.33056E-02	1.31644E-01
0.60000	4.32874E-02	7.93848E-02
0.50000	1.65815E-02	5.10615E-02
0.40000	5.27002E-03	3.85764E-02
0.30000	3.52121E-03	3.59880E-02
0.20000	7.08735E-03	3.89856E-02
0.10000	1.29317E-02	4.44992E-02
0.00000	1.89531E-02	5.04118E-02
-0.10000	2.37841E-02	5.53516E-02
-0.20000	2.66464E-02	5.85447E-02
-0.30000	2.72479E-02	5.97146E-02
-0.40000	2.57138E-02	5.90202E-02
-0.50000	2.25419E-02	5.70219E-02
-0.60000	1.85768E-02	5.46742E-02
-0.70000	1.49994E-02	5.33382E-02
-0.80000	1.33270E-02	5.48156E-02
-0.90000	1.54215E-02	6.14049E-02
-1.00000	2.35051E-02	7.59905E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.635
 σ_{SE} = .705
 σ_{CE} = .461

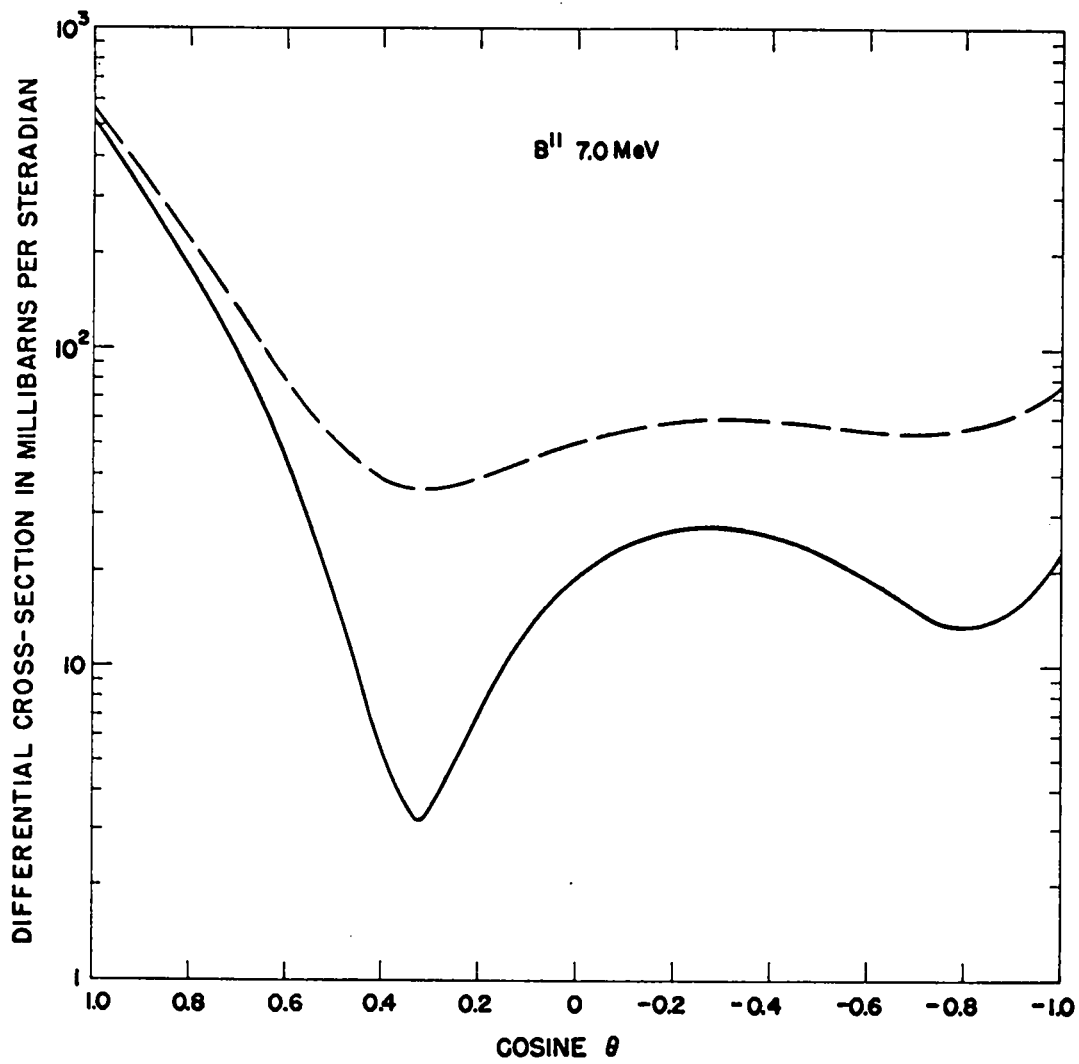


Figure 63

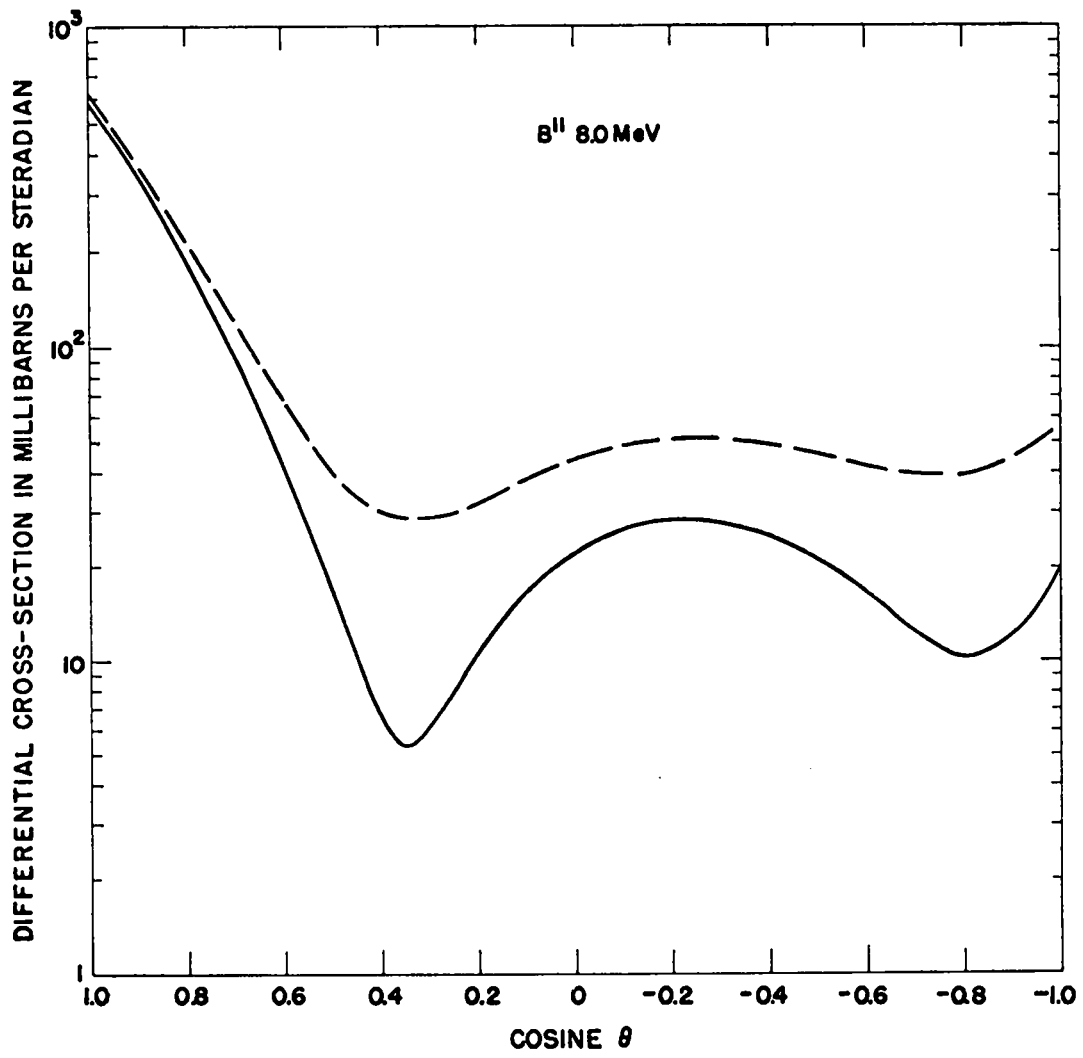


Figure 64

B¹¹

9.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	6.37539E-01	6.65601E-01
0.90000	3.61207E-01	3.85446E-01
0.80000	1.92849E-01	2.14583E-01
0.70000	9.50456E-02	1.15091E-01
0.60000	4.23156E-02	6.11832E-02
0.50000	1.74650E-02	3.54795E-02
0.40000	9.02526E-03	2.64049E-02
0.30000	9.46389E-03	2.63717E-02
0.20000	1.39362E-02	3.05118E-02
0.10000	1.94208E-02	3.57971E-02
0.00000	2.41259E-02	4.04355E-02
-0.10000	2.70891E-02	4.34653E-02
-0.20000	2.79142E-02	4.44898E-02
-0.30000	2.66071E-02	4.35149E-02
-0.40000	2.34813E-02	4.08609E-02
-0.50000	1.91137E-02	3.71283E-02
-0.60000	1.43365E-02	3.32041E-02
-0.70000	1.02533E-02	3.02985E-02
-0.80000	8.27334E-03	3.00067E-02
-0.90000	1.01555E-02	3.43946E-02
-1.00000	1.80602E-02	4.61225E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.633
 σ_{SE} = .785
 σ_{CE} = .241

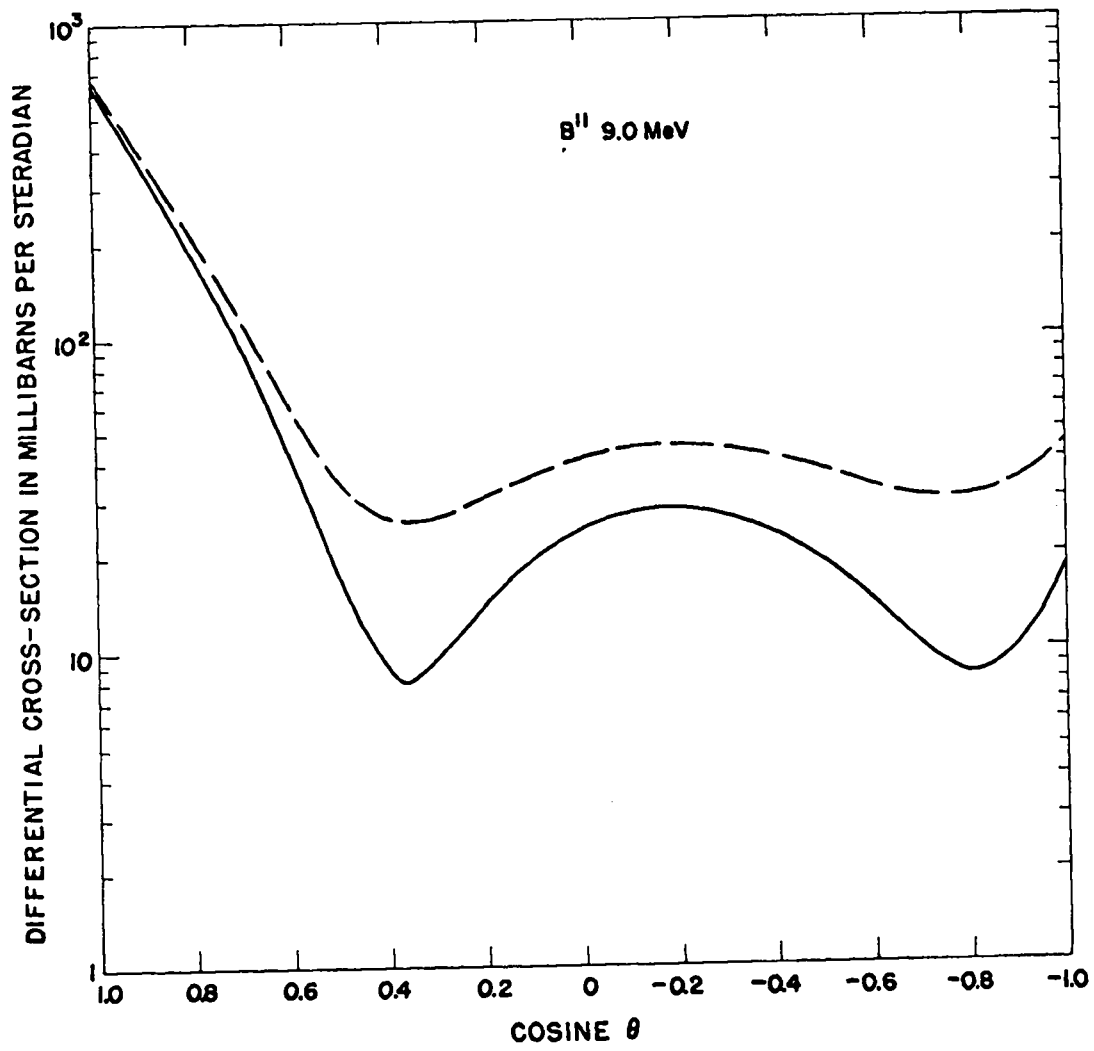


Figure 65

B¹¹

10.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	7.07638E-01	7.30253E-01
0.90000	3.86209E-01	4.05436E-01
0.80000	1.98660E-01	2.15715E-01
0.70000	9.47705E-02	1.10394E-01
0.60000	4.17547E-02	5.63973E-02
0.50000	1.84793E-02	3.24199E-02
0.40000	1.15597E-02	2.49792E-02
0.30000	1.27191E-02	2.57500E-02
0.20000	1.70088E-02	2.97643E-02
0.10000	2.16143E-02	3.42034E-02
0.00000	2.50633E-02	3.75966E-02
-0.10000	2.67107E-02	3.92998E-02
-0.20000	2.64141E-02	3.91696E-02
-0.30000	2.43422E-02	3.73732E-02
-0.40000	2.08744E-02	3.42939E-02
-0.50000	1.65632E-02	3.05037E-02
-0.60000	1.21400E-02	2.67826E-02
-0.70000	8.54843E-03	2.41716E-02
-0.80000	6.99635E-03	2.40516E-02
-0.90000	9.01773E-03	2.82451E-02
-1.00000	1.65399E-02	3.91541E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.641
 σ_{SE} = .821
 σ_{CE} = .188

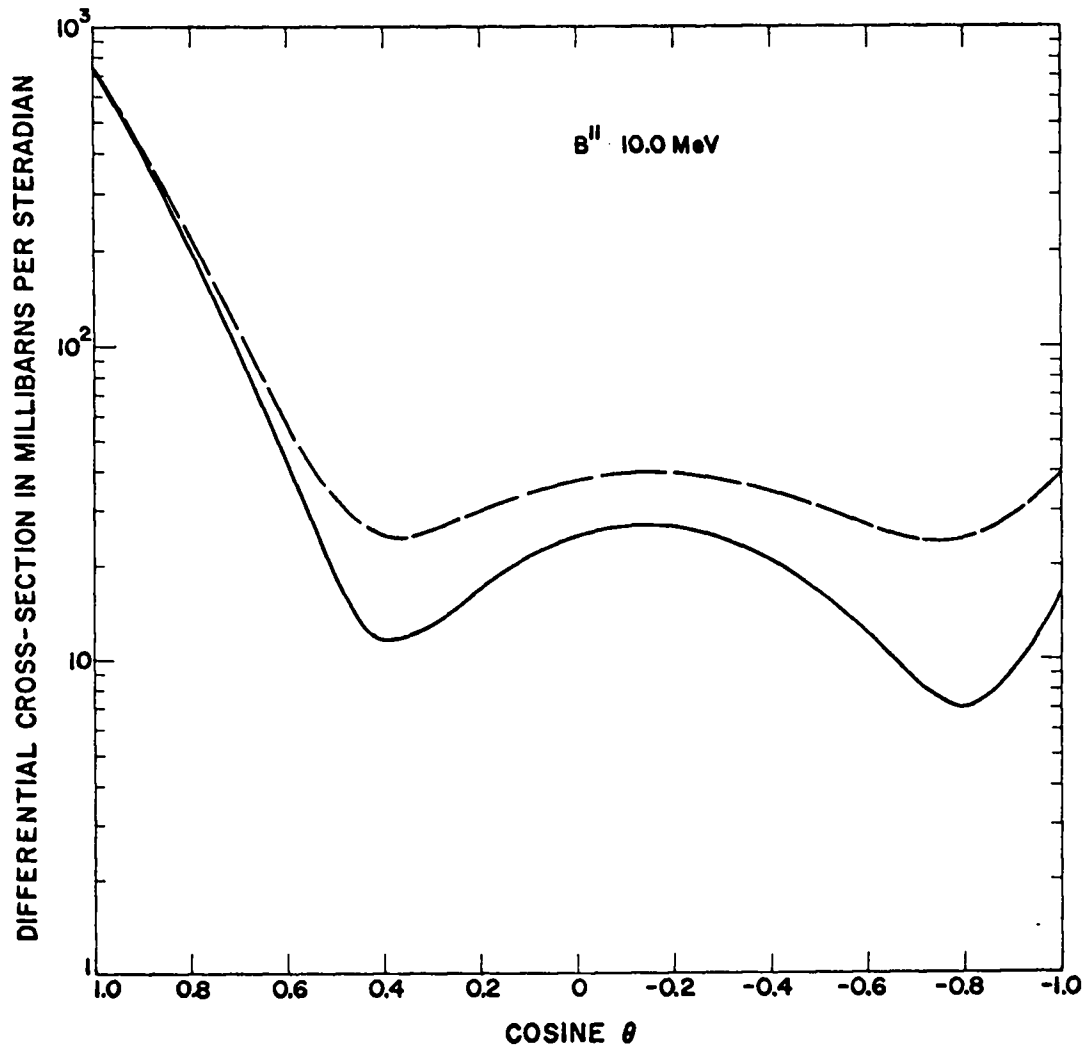


Figure 66

B¹¹

11.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	7.81477E-01	7.99014E-01
0.90000	4.10819E-01	4.25523E-01
0.80000	2.03347E-01	2.16266E-01
0.70000	9.37450E-02	1.05510E-01
0.60000	4.09298E-02	5.19195E-02
0.50000	1.94939E-02	2.99385E-02
0.40000	1.41011E-02	2.41464E-02
0.30000	1.58111E-02	2.55610E-02
0.20000	1.96755E-02	2.92168E-02
0.10000	2.31754E-02	3.25909E-02
0.00000	2.52169E-02	3.45903E-02
-0.10000	2.55011E-02	3.49166E-02
-0.20000	2.41436E-02	3.36849E-02
-0.30000	2.14620E-02	3.12119E-02
-0.40000	1.78756E-02	2.79209E-02
-0.50000	1.38783E-02	2.43228E-02
-0.60000	1.00604E-02	2.10502E-02
-0.70000	7.15985E-03	1.89248E-02
-0.80000	6.13235E-03	1.90518E-02
-0.90000	8.23116E-03	2.29352E-02
-1.00000	1.50927E-02	3.26300E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.652
 σ_{SE} = .853
 σ_{CE} = .142

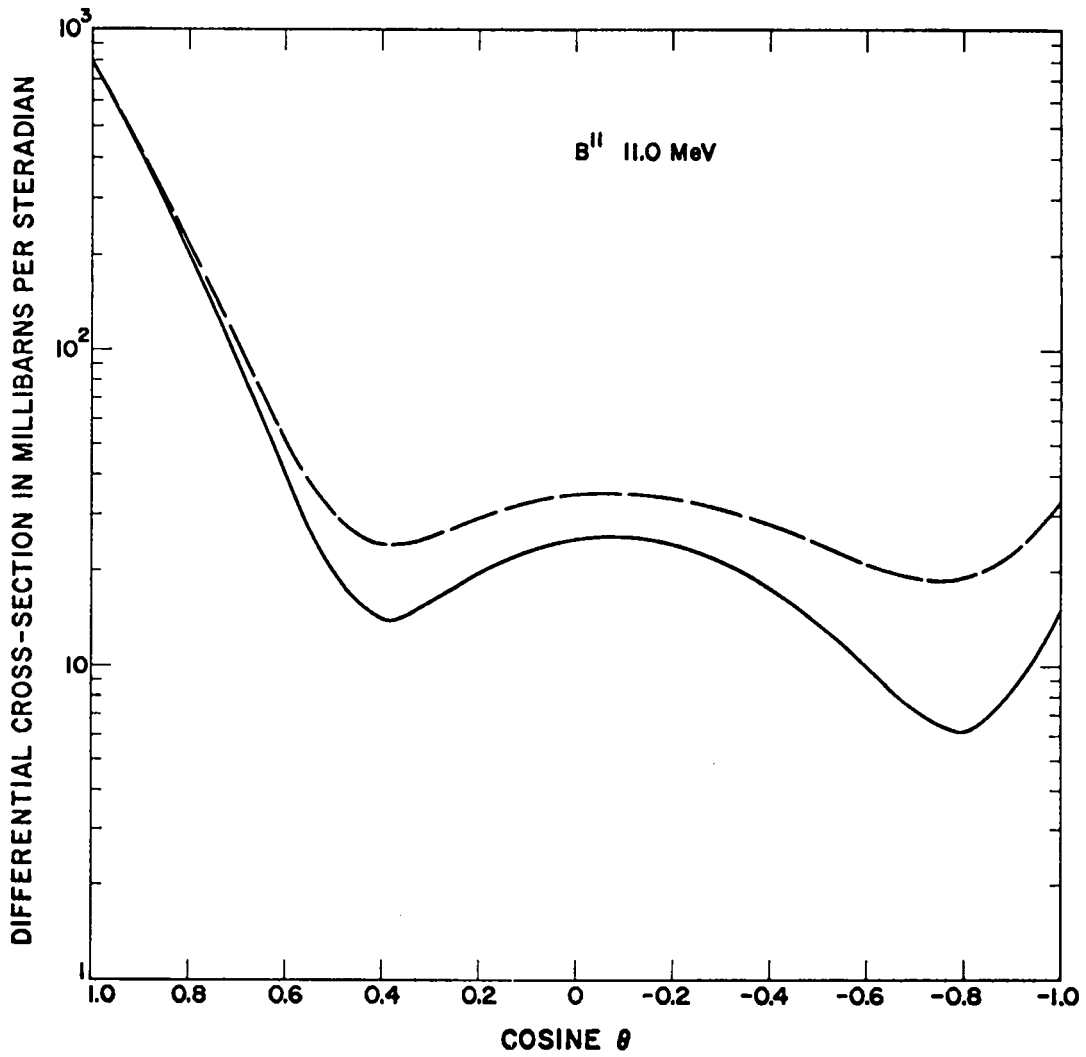


Figure 67

B¹¹ 12.0 MeV

CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	8.56744E-01	8.70652E-01
0.90000	4.34293E-01	4.45868E-01
0.80000	2.06939E-01	2.17062E-01
0.70000	9.21733E-02	1.01360E-01
0.60000	3.99278E-02	4.84829E-02
0.50000	2.04176E-02	2.85232E-02
0.40000	1.64470E-02	2.42185E-02
0.30000	1.85344E-02	2.60554E-02
0.20000	2.18245E-02	2.91669E-02
0.10000	2.41430E-02	3.13771E-02
0.00000	2.47879E-02	3.19856E-02
-0.10000	2.37951E-02	3.10292E-02
-0.20000	2.15147E-02	2.88572E-02
-0.30000	1.83862E-02	2.59072E-02
-0.40000	1.48431E-02	2.26146E-02
-0.50000	1.12995E-02	1.94051E-02
-0.60000	8.18733E-03	1.67424E-02
-0.70000	6.02346E-03	1.52101E-02
-0.80000	5.49450E-03	1.56173E-02
-0.90000	7.55064E-03	1.91259E-02
-1.00000	1.35043E-02	2.74123E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.661
 σ_{SE} = .883
 σ_{CE} = .110

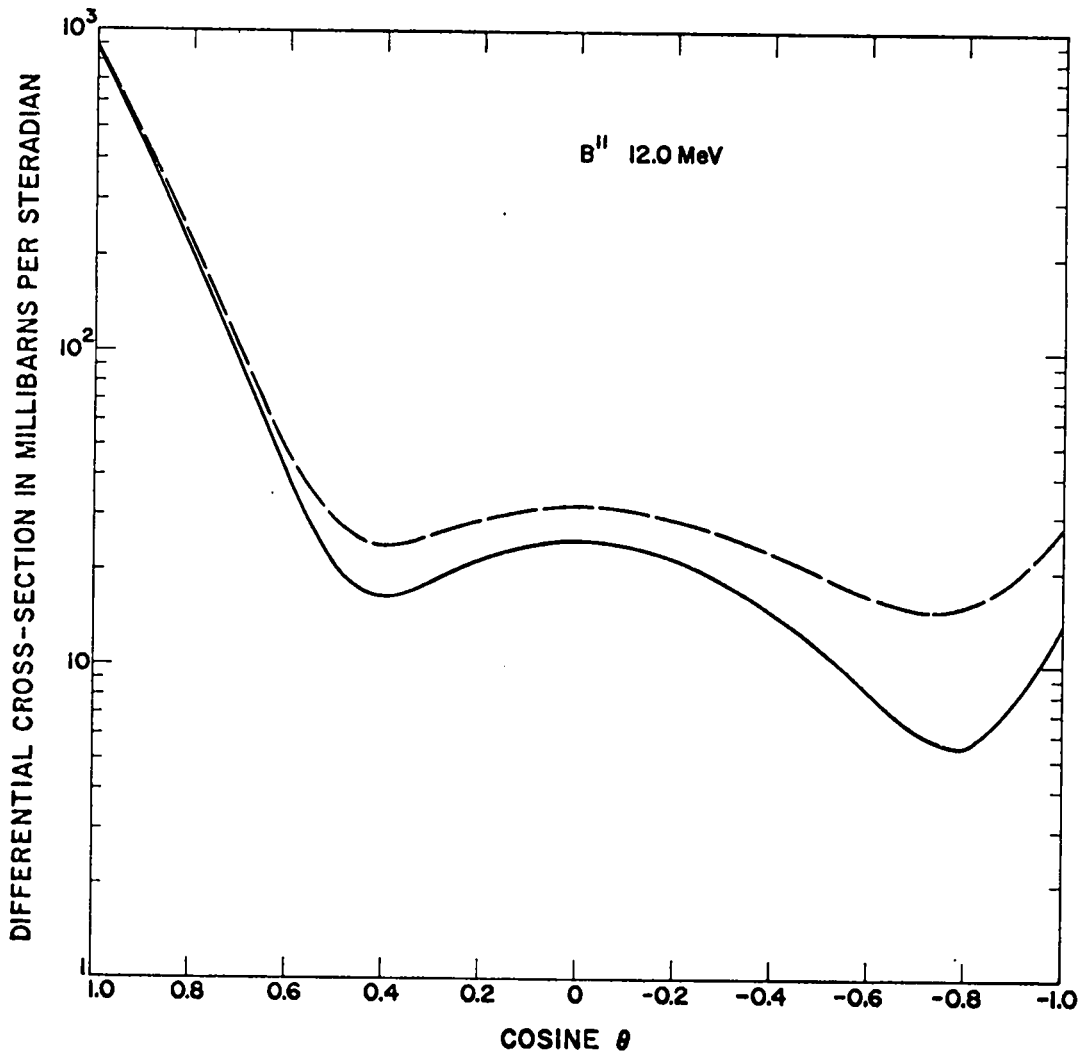


Figure 68

B¹¹

13.0 MeV

CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	9.31735E-01	9.42981E-01
0.90000	4.56092E-01	4.65383E-01
0.80000	2.09361E-01	2.17451E-01
0.70000	9.00813E-02	9.74013E-02
0.60000	3.87212E-02	4.55202E-02
0.50000	2.11368E-02	2.75621E-02
0.40000	1.84322E-02	2.45772E-02
0.30000	2.07329E-02	2.66663E-02
0.20000	2.33660E-02	2.91480E-02
0.10000	2.45320E-02	3.02221E-02
0.00000	2.39061E-02	2.95652E-02
-0.10000	2.18216E-02	2.75117E-02
-0.20000	1.88183E-02	2.46004E-02
-0.30000	1.54182E-02	2.13516E-02
-0.40000	1.20418E-02	1.81868E-02
-0.50000	9.00968E-03	1.54350E-02
-0.60000	6.59429E-03	1.33933E-02
-0.70000	5.10091E-03	1.24210E-02
-0.80000	4.96461E-03	1.30549E-02
-0.90000	6.85658E-03	1.61477E-02
-1.00000	1.17966E-02	2.30433E-02

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 1.667$
 $\sigma_{SE} = .908$
 $\sigma_{CE} = .088$

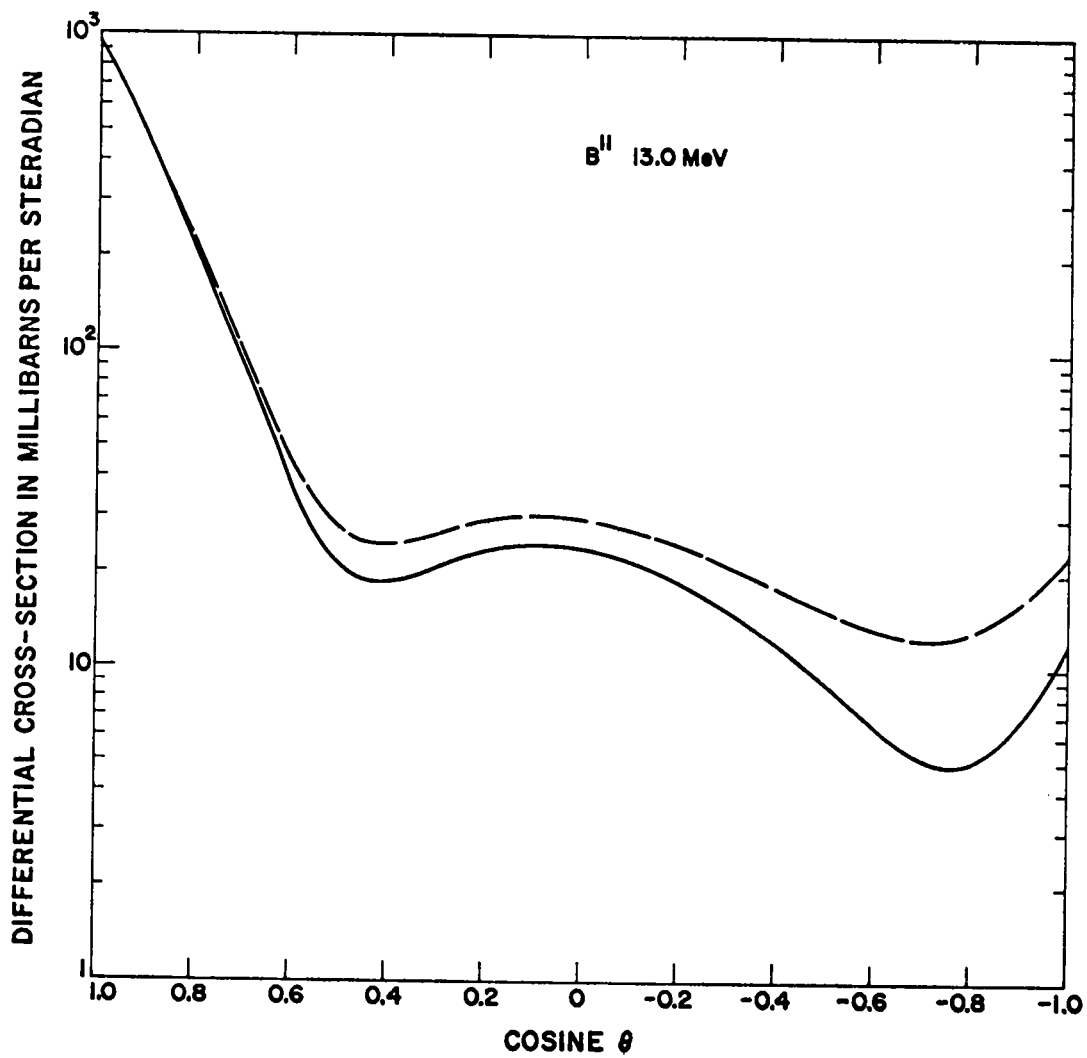


Figure 69

B¹¹

14.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.00450E 00	1.01402E 00
0.90000	4.75534E-01	4.83326E-01
0.80000	2.10612E-01	2.17362E-01
0.70000	8.76421E-02	9.37287E-02
0.60000	3.74164E-02	4.30541E-02
0.50000	2.16472E-02	2.69616E-02
0.40000	1.99873E-02	2.50583E-02
0.30000	2.23360E-02	2.72228E-02
0.20000	2.42765E-02	2.90315E-02
0.10000	2.43875E-02	2.90627E-02
0.00000	2.26840E-02	2.73322E-02
-0.10000	1.97413E-02	2.44165E-02
-0.20000	1.62348E-02	2.09899E-02
-0.30000	1.27267E-02	1.76135E-02
-0.40000	9.60034E-03	1.46713E-02
-0.50000	7.07862E-03	1.23930E-02
-0.60000	5.28911E-03	1.09268E-02
-0.70000	4.35362E-03	1.04402E-02
-0.80000	4.49090E-03	1.12409E-02
-0.90000	6.12710E-03	1.39187E-02
-1.00000	1.00127E-02	1.95275E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.670
 σ_{SE} = .929
 σ_{CE} = .073

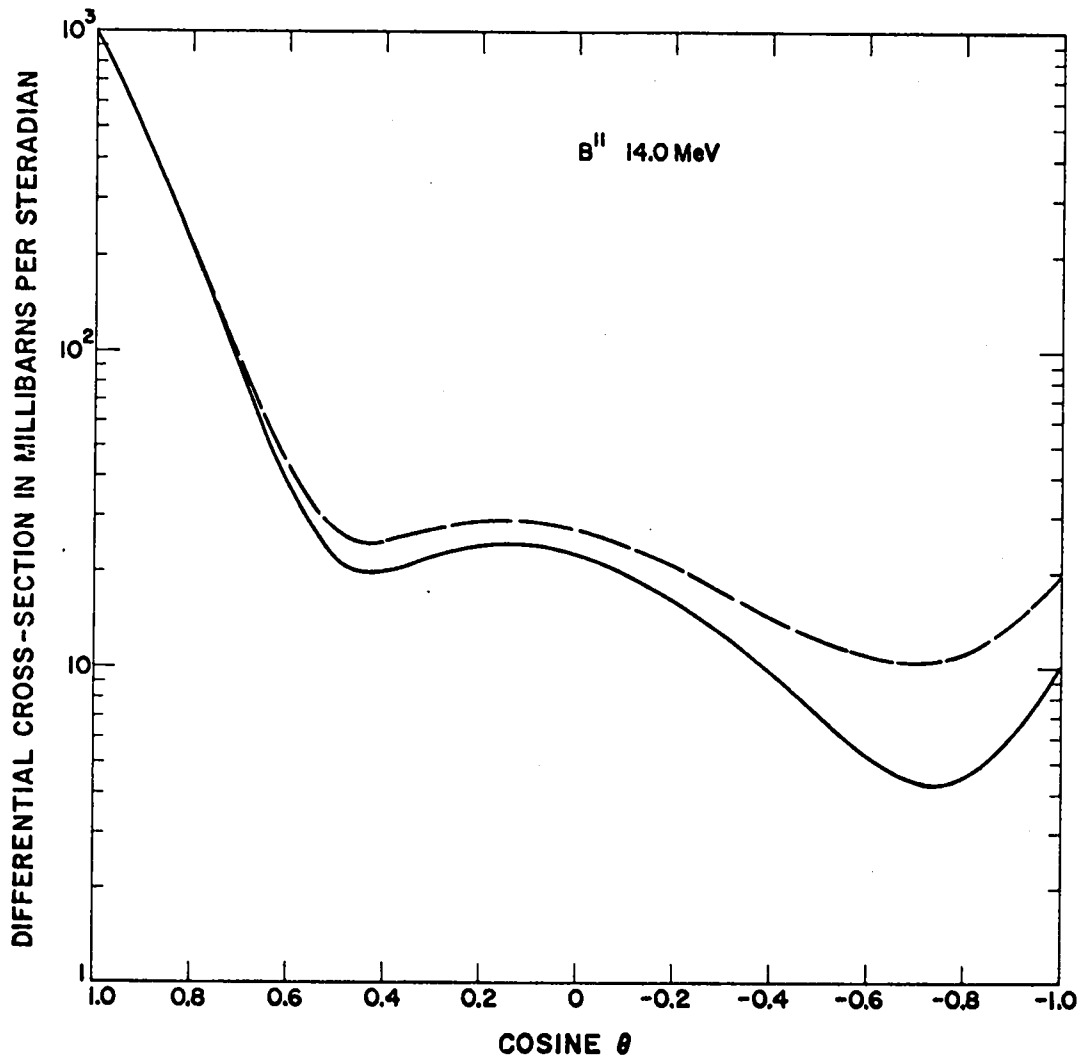


Figure 70

B¹¹

15.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.07353E 00	1.08186E 00
0.90000	4.92330E-01	4.99105E-01
0.80000	2.10708E-01	2.16554E-01
0.70000	8.49044E-02	9.01612E-02
0.60000	3.60367E-02	4.08955E-02
0.50000	2.19505E-02	2.65220E-02
0.40000	2.11117E-02	2.54669E-02
0.30000	2.33602E-02	2.75521E-02
0.20000	2.46019E-02	2.86774E-02
0.10000	2.37872E-02	2.77923E-02
0.00000	2.12228E-02	2.52043E-02
-0.10000	1.76647E-02	2.16698E-02
-0.20000	1.38672E-02	1.79427E-02
-0.30000	1.03925E-02	1.45844E-02
-0.40000	7.56783E-03	1.19230E-02
-0.50000	5.52101E-03	1.00926E-02
-0.60000	4.25626E-03	9.11508E-03
-0.70000	3.74843E-03	9.00524E-03
-0.80000	4.04546E-03	9.89059E-03
-0.90000	5.37421E-03	1.21489E-02
-1.00000	8.24786E-03	1.65845E-02

(DSIGMAS IN BARNS/STERADIAN

$$\begin{aligned} \sigma_T &= 1.669 \\ \sigma_{SE} &= .946 \\ \sigma_{CE} &= .063 \end{aligned}$$

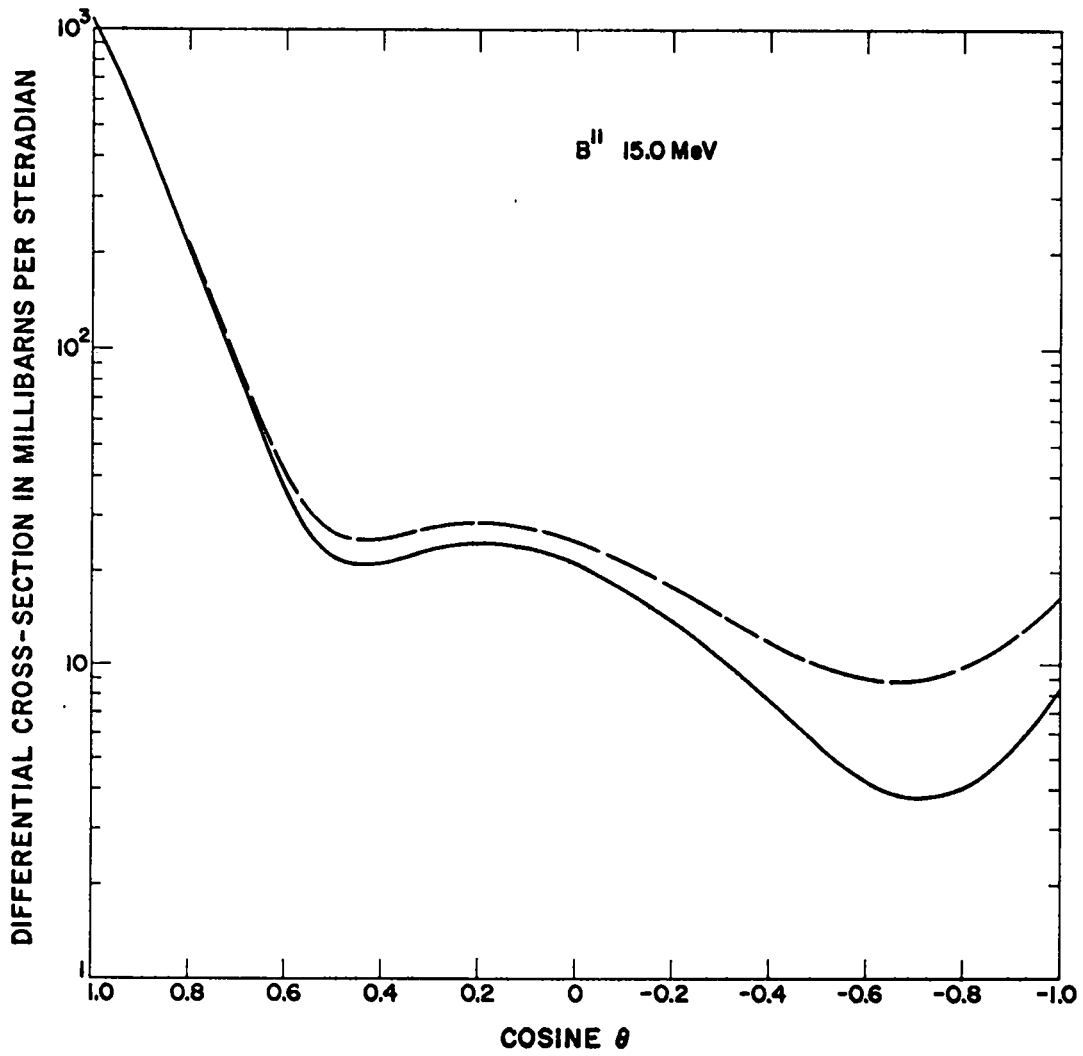


Figure 71

B¹¹

16.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.13856E 00	1.14599E 00
0.90000	5.06240E-01	5.12226E-01
0.80000	2.09680E-01	2.14820E-01
0.70000	8.19741E-02	8.65814E-02
0.60000	3.46466E-02	3.88938E-02
0.50000	2.20627E-02	2.60498E-02
0.40000	2.18108E-02	2.56026E-02
0.30000	2.38328E-02	2.74780E-02
0.20000	2.44013E-02	2.79429E-02
0.10000	2.28117E-02	2.62910E-02
0.00000	1.96055E-02	2.30640E-02
-0.10000	1.56585E-02	1.91378E-02
-0.20000	1.17544E-02	1.52960E-02
-0.30000	8.42474E-03	1.20700E-02
-0.40000	5.92920E-03	9.72098E-03
-0.50000	4.30757E-03	8.29469E-03
-0.60000	3.46336E-03	7.71053E-03
-0.70000	3.26031E-03	7.86767E-03
-0.80000	3.62204E-03	8.76193E-03
-0.90000	4.63095E-03	1.06168E-02
-1.00000	6.62340E-03	1.40515E-02

(DSIGMAS IN BARNS/STERADIAN

$$\begin{aligned}\sigma_T &= 1.664 \\ \sigma_{SE} &= .960 \\ \sigma_{CE} &= .055\end{aligned}$$

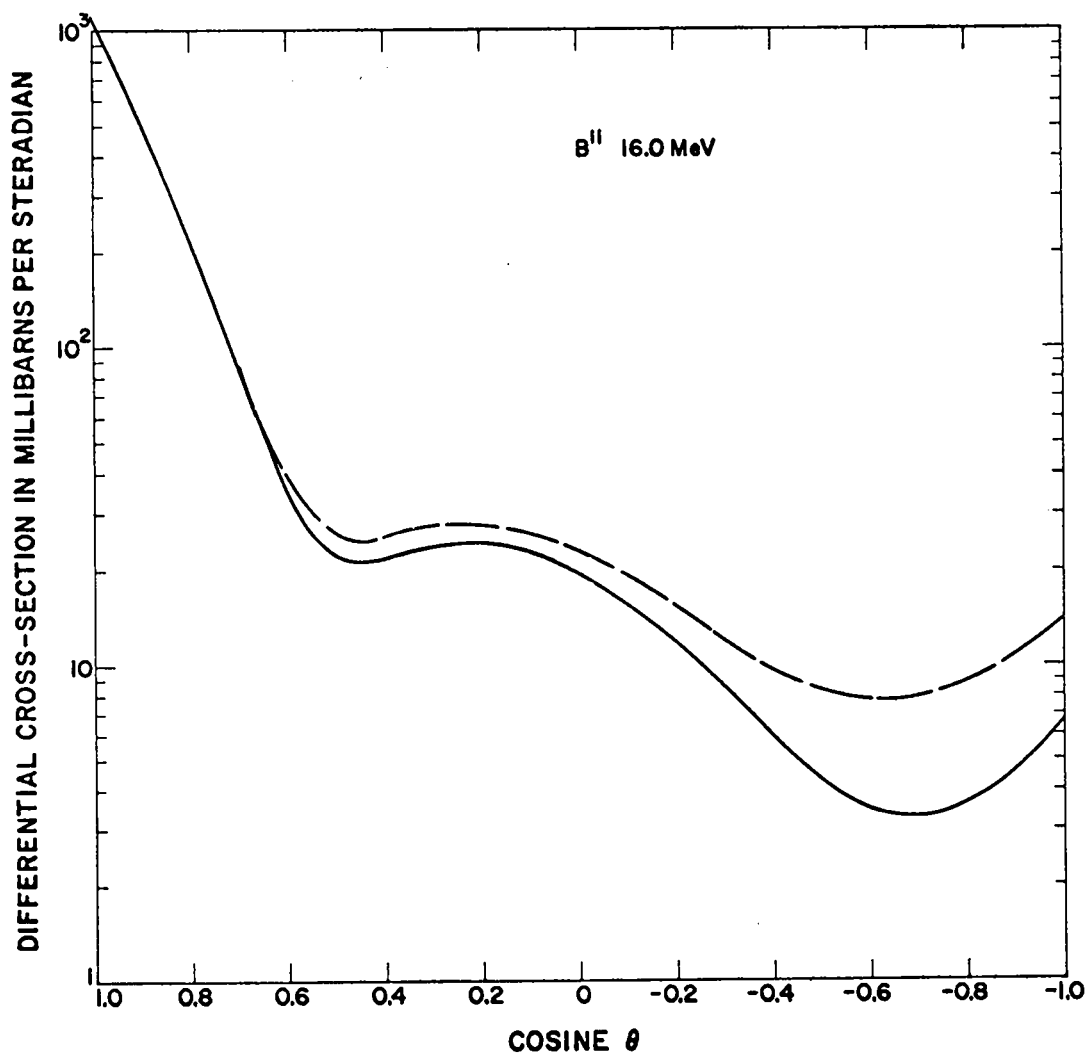


Figure 72

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CHICAGO, ILLINOIS 60637

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CHICAGO, ILLINOIS 60637

C^{12}

<u>Energy</u>	<u>Energy Levels</u> *
4.00	G.S. 0^+
5.00	4.433 2^+
6.00	7.656 0^+
6.04	9.640 3^-
7.00	10.100 (0^+)
7.58	10.840 (1^-)
8.00	11.830 (1^-)
9.00	12.710 (1^+)
10.00	13.340 $[0^+]$
11.00	14.080 $[0^+]$
12.00	14.710 $[0^+]$
13.00	15.110 1^+
14.00	
14.50	
14.80	
15.00	
16.00	

*Energy levels obtained from NRC 61-5, 6-133,
except [] values which are assumed.

C¹²

4.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.28914E-01	5.26355E-01
0.95000	2.71911E-01	4.43305E-01
0.90000	2.22727E-01	3.72669E-01
0.85000	1.80555E-01	3.12890E-01
0.80000	1.44653E-01	2.62595E-01
0.75000	1.14339E-01	2.20570E-01
0.70000	8.89849E-02	1.85739E-01
0.65000	6.80152E-02	1.57149E-01
0.60000	5.09010E-02	1.33949E-01
0.55000	3.71584E-02	1.15386E-01
0.50000	2.63445E-02	1.00787E-01
0.45000	1.80558E-02	8.95561E-02
0.40000	1.19245E-02	8.11636E-02
0.35000	7.61717E-03	7.51405E-02
0.30000	4.83213E-03	7.10725E-02
0.25000	3.29776E-03	6.85960E-02
0.20000	2.77073E-03	6.73931E-02
0.15000	3.03438E-03	6.71890E-02
0.10000	3.89730E-03	6.77482E-02
0.05000	5.19205E-03	6.88728E-02
0.00000	6.77387E-03	7.03999E-02
-0.05000	8.51968E-03	7.22004E-02
-0.10000	1.03271E-02	7.41780E-02
-0.15000	1.21133E-02	7.62680E-02
-0.20000	1.38148E-02	7.84372E-02
-0.25000	1.53859E-02	8.06841E-02
-0.30000	1.67988E-02	8.30392E-02
-0.35000	1.80425E-02	8.55658E-02
-0.40000	1.91224E-02	8.83615E-02
-0.45000	2.00599E-02	9.15601E-02
-0.50000	2.08919E-02	9.53341E-02
-0.55000	2.16704E-02	9.98976E-02
-0.60000	2.24624E-02	1.05510E-01
-0.65000	2.33492E-02	1.12483E-01
-0.70000	2.44264E-02	1.21181E-01
-0.75000	2.58035E-02	1.32035E-01
-0.80000	2.76041E-02	1.45546E-01
-0.85000	2.99652E-02	1.62301E-01
-0.90000	3.30374E-02	1.82980E-01
-0.95000	3.69847E-02	2.08378E-01
-1.00000	4.19844E-02	2.39425E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.728
 σ_{SE} = 5.822
 σ_{CE} = 1.146

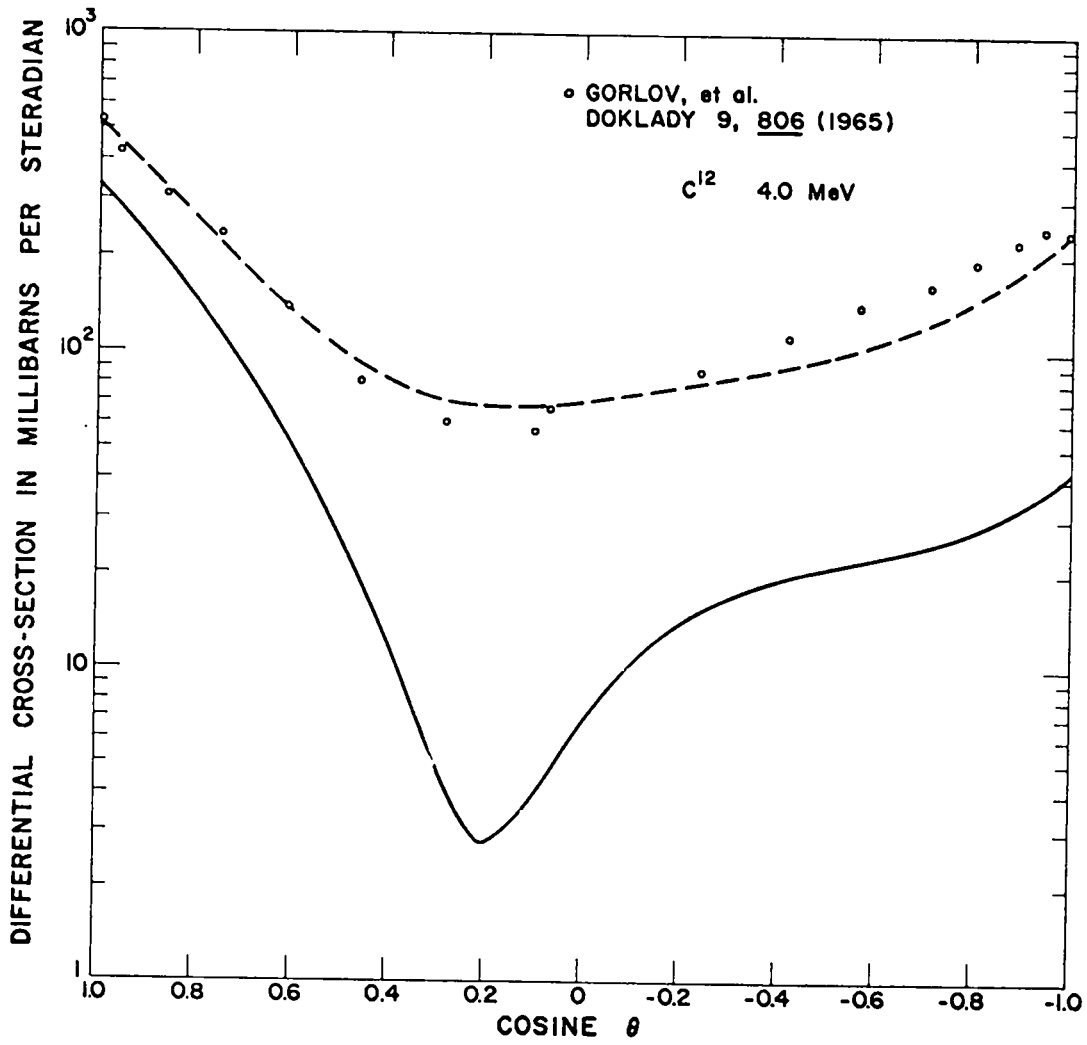


Figure 73

C¹²

5.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.85456E-01	5.08454E-01
0.90000	2.47517E-01	3.40573E-01
0.80000	1.50394E-01	2.24727E-01
0.70000	8.45847E-02	1.47076E-01
0.60000	4.23936E-02	9.72553E-02
0.50000	1.76062E-02	6.74260E-02
0.40000	5.22615E-03	5.16303E-02
0.30000	1.26648E-03	4.53368E-02
0.20000	2.58266E-03	4.51126E-02
0.10000	6.74044E-03	4.83842E-02
0.00000	1.19116E-02	5.32651E-02
-0.10000	1.67924E-02	5.84362E-02
-0.20000	2.05403E-02	6.30702E-02
-0.30000	2.27257E-02	6.67961E-02
-0.40000	2.32961E-02	6.97002E-02
-0.50000	2.25489E-02	7.23687E-02
-0.60000	2.11138E-02	7.59755E-02
-0.70000	1.99403E-02	8.24319E-02
-0.80000	2.02911E-02	9.46241E-02
-0.90000	2.37390E-02	1.16794E-01
-1.00000	3.21683E-02	1.55166E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.665
 σ_{SE} = .600
 σ_{CE} = .739

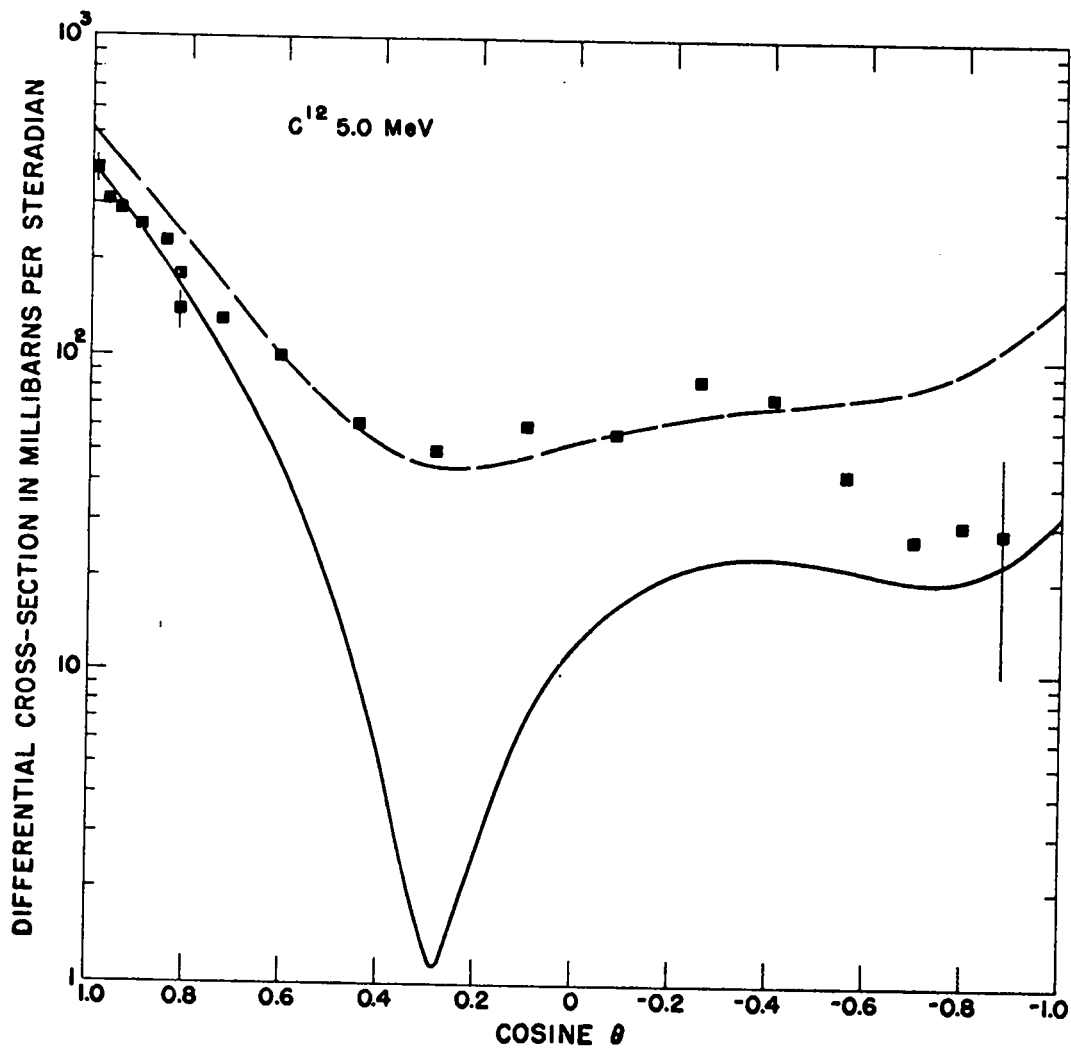


Figure 74

C¹²

6.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	4.42726E-01	5.25493E-01
0.90000	2.72082E-01	3.34614E-01
0.80000	1.56919E-01	2.06760E-01
0.70000	8.25052E-02	1.24346E-01
0.60000	3.74966E-02	7.42383E-02
0.50000	1.31768E-02	4.65928E-02
0.40000	2.87490E-03	3.40531E-02
0.30000	1.51661E-03	3.11584E-02
0.20000	5.28226E-03	3.38953E-02
0.10000	1.13468E-02	3.93583E-02
0.00000	1.76848E-02	4.54972E-02
-0.10000	2.29252E-02	5.09367E-02
-0.20000	2.62465E-02	5.48595E-02
-0.30000	2.73019E-02	5.69437E-02
-0.40000	2.61685E-02	5.73467E-02
-0.50000	2.33160E-02	5.67319E-02
-0.60000	1.95895E-02	5.63312E-02
-0.70000	1.62037E-02	5.80448E-02
-0.80000	1.47463E-02	6.45877E-02
-0.90000	1.71875E-02	7.97199E-02
-1.00000	2.58957E-02	1.08663E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.629
 σ_{SE} = .635
 σ_{CE} = .496

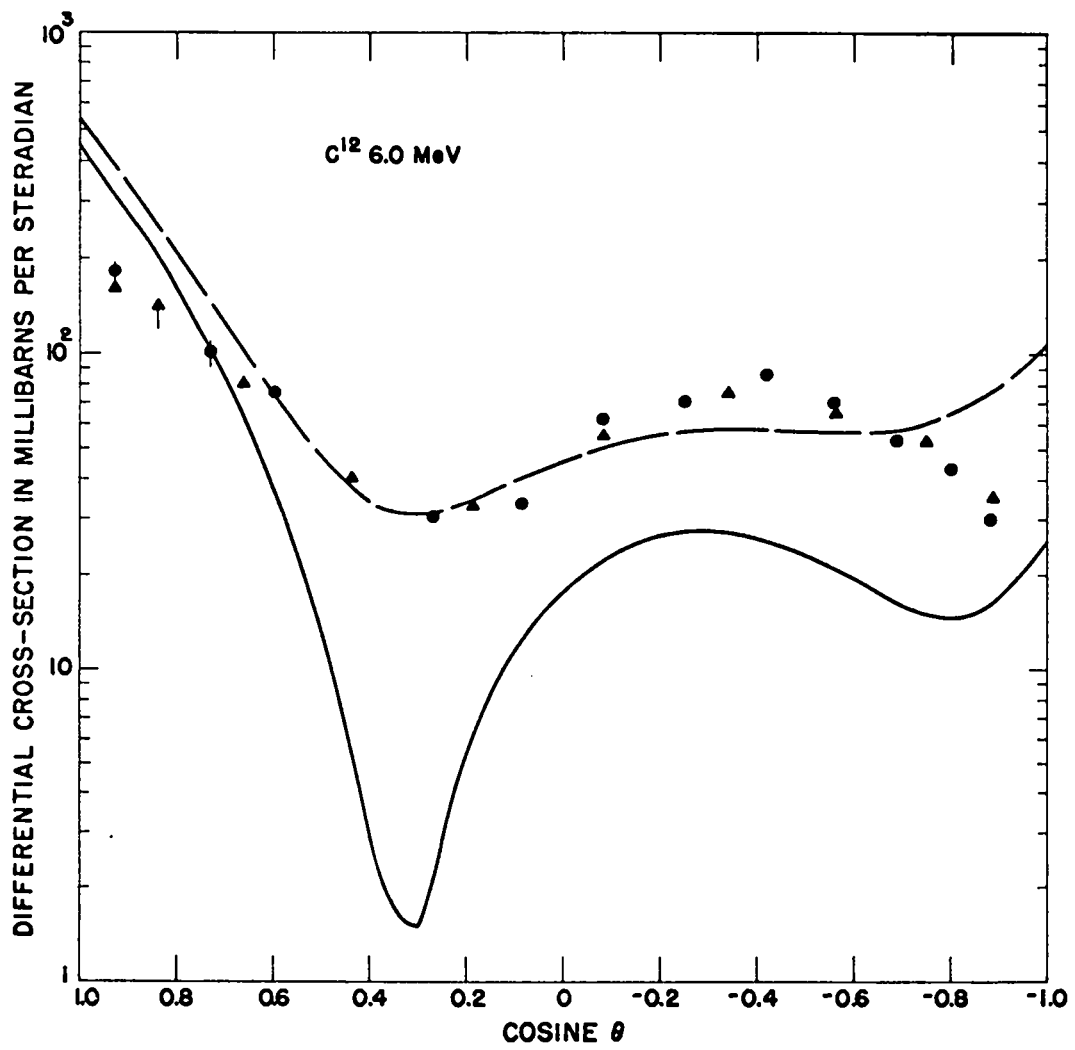


Figure 75

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	4.44999E-01	5.26923E-01
0.95000	3.50897E-01	4.21592E-01
0.90000	2.73019E-01	3.34839E-01
0.85000	2.09102E-01	2.63898E-01
0.80000	1.57158E-01	2.06390E-01
0.75000	1.15445E-01	1.60265E-01
0.70000	8.24362E-02	1.23750E-01
0.65000	5.67934E-02	9.53108E-02
0.60000	3.73449E-02	7.36205E-02
0.55000	2.30655E-02	5.75314E-02
0.50000	1.30595E-02	4.60524E-02
0.45000	6.54505E-03	3.83286E-02
0.40000	2.84098E-03	3.36243E-02
0.35000	1.35517E-03	3.13079E-02
0.30000	1.57437E-03	3.08382E-02
0.25000	3.05539E-03	3.17535E-02
0.20000	5.41742E-03	3.36615E-02
0.15000	8.33543E-03	3.62302E-02
0.10000	1.15344E-02	3.91811E-02
0.05000	1.47844E-02	4.22827E-02
0.00000	1.78964E-02	4.53452E-02
-0.05000	2.07186E-02	4.82168E-02
-0.10000	2.31334E-02	5.07801E-02
-0.15000	2.50551E-02	5.29499E-02
-0.20000	2.64273E-02	5.46714E-02
-0.25000	2.72215E-02	5.59197E-02
-0.30000	2.74357E-02	5.66995E-02
-0.35000	2.70930E-02	5.70457E-02
-0.40000	2.62412E-02	5.70246E-02
-0.45000	2.49517E-02	5.67352E-02
-0.50000	2.33194E-02	5.63122E-02
-0.55000	2.14624E-02	5.59283E-02
-0.60000	1.95220E-02	5.57975E-02
-0.65000	1.76624E-02	5.61798E-02
-0.70000	1.60715E-02	5.73854E-02
-0.75000	1.49607E-02	5.97812E-02
-0.80000	1.45653E-02	6.37982E-02
-0.85000	1.51454E-02	6.99418E-02
-0.90000	1.69860E-02	7.88058E-02
-0.95000	2.03977E-02	9.10923E-02
-1.00000	2.57174E-02	1.07641E-01

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 1.628$
 $\sigma_{SE} = .637$
 $\sigma_{CE} = .490$

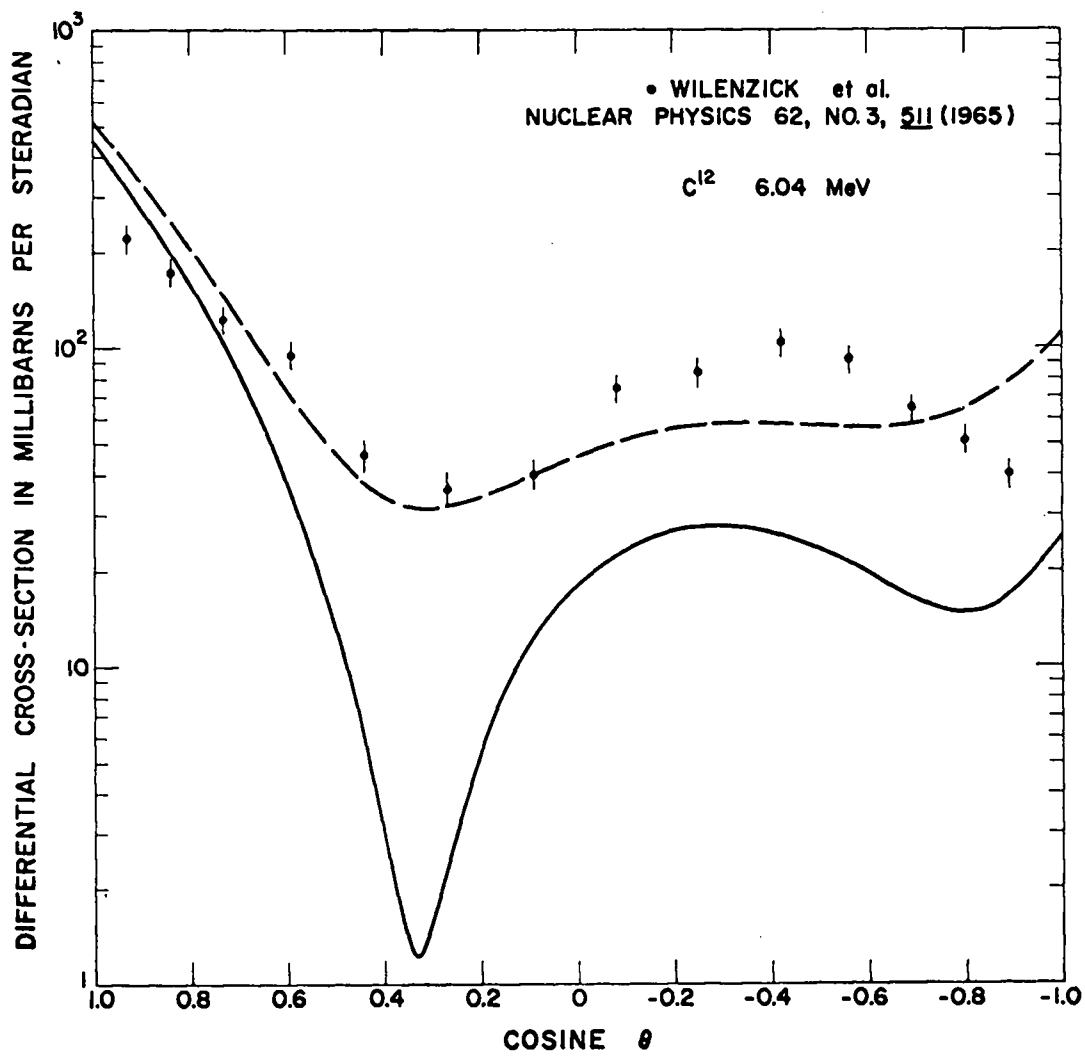


Figure 76

C¹²

7.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	5.03293E-01	5.70329E-01
0.90000	2.96744E-01	3.45365E-01
0.80000	1.63514E-01	2.01272E-01
0.70000	8.15561E-02	1.12928E-01
0.60000	3.47654E-02	6.23153E-02
0.50000	1.14342E-02	3.65667E-02
0.40000	3.10016E-03	2.65702E-02
0.30000	3.69460E-03	2.59454E-02
0.20000	8.91495E-03	3.02834E-02
0.10000	1.57669E-02	3.65868E-02
0.00000	2.22344E-02	4.28667E-02
-0.10000	2.70457E-02	4.78656E-02
-0.20000	2.95130E-02	5.08814E-02
-0.30000	2.94261E-02	5.16768E-02
-0.40000	2.69890E-02	5.04590E-02
-0.50000	2.27872E-02	4.79198E-02
-0.60000	1.77787E-02	4.53286E-02
-0.70000	1.33036E-02	4.46753E-02
-0.80000	1.11069E-02	4.88648E-02
-0.90000	1.33712E-02	6.19922E-02
-1.00000	2.27573E-02	8.97934E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.615
 σ_{SE} = .675
 σ_{CE} = .377

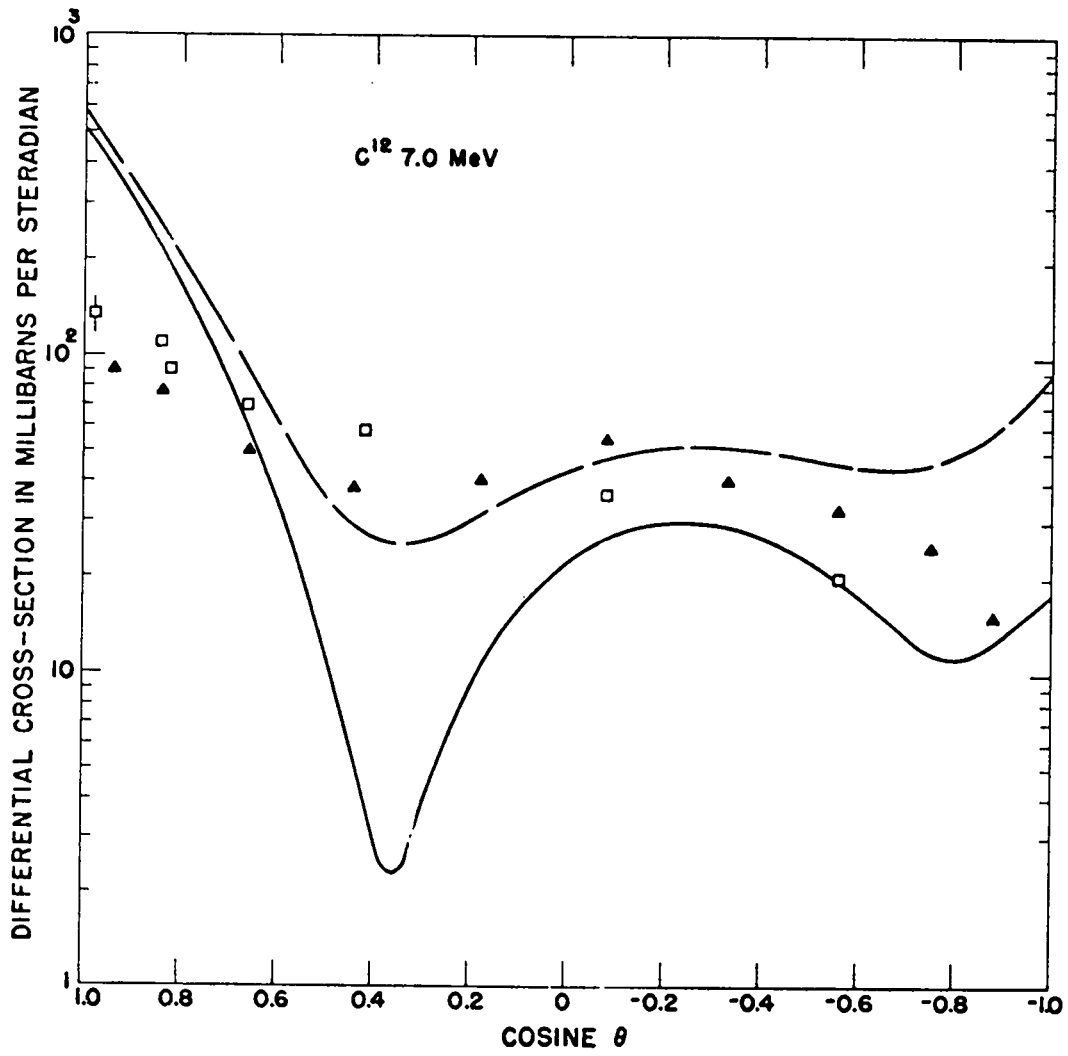


Figure 77

C ¹²		7.58 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	5.41122E-01	6.03347E-01	
0.90000	3.11409E-01	3.55225E-01	
0.80000	1.67273E-01	2.00675E-01	
0.70000	8.12344E-02	1.08823E-01	
0.60000	3.38058E-02	5.80904E-02	
0.50000	1.12678E-02	3.35168E-02	
0.40000	4.04261E-03	2.48631E-02	
0.30000	5.51549E-03	2.52299E-02	
0.20000	1.11838E-02	3.00516E-02	
0.10000	1.80488E-02	3.63693E-02	
0.00000	2.41870E-02	4.23168E-02	
-0.10000	2.84529E-02	4.67734E-02	
-0.20000	3.02814E-02	4.91492E-02	
-0.30000	2.95616E-02	4.92760E-02	
-0.40000	2.65661E-02	4.73865E-02	
-0.50000	2.19188E-02	4.41679E-02	
-0.60000	1.65939E-02	4.08785E-02	
-0.70000	1.19356E-02	3.95245E-02	
-0.80000	9.69506E-03	4.30969E-02	
-0.90000	1.20781E-02	5.58943E-02	
-1.00000	2.18028E-02	8.40276E-02	

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.615
 σ_{SE} = .698
 σ_{CE} = .336

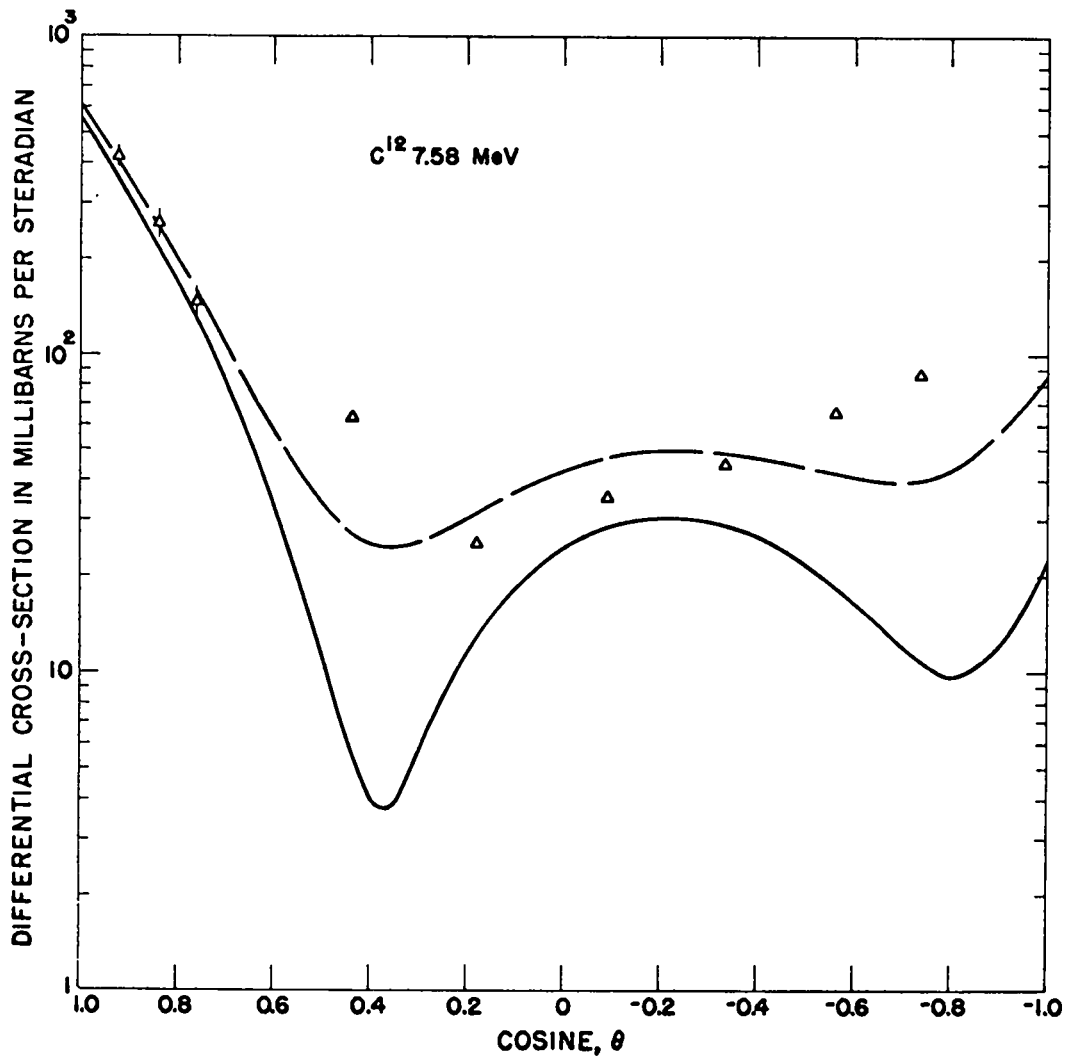


Figure 78

C¹²

8.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	5.70225E-01	6.30321E-01
0.90000	3.22355E-01	3.63752E-01
0.80000	1.69970E-01	2.01087E-01
0.70000	8.10376E-02	1.06630E-01
0.60000	3.32992E-02	5.58795E-02
0.50000	1.14327E-02	3.22005E-02
0.40000	5.00687E-03	2.44820E-02
0.30000	7.01972E-03	2.54508E-02
0.20000	1.28565E-02	3.04560E-02
0.10000	1.95556E-02	3.66032E-02
0.00000	2.52973E-02	4.21502E-02
-0.10000	2.90566E-02	4.61042E-02
-0.20000	3.03753E-02	4.79747E-02
-0.30000	2.92210E-02	4.76521E-02
-0.40000	2.59111E-02	4.53863E-02
-0.50000	2.10832E-02	4.18510E-02
-0.60000	1.56994E-02	3.82797E-02
-0.70000	1.10763E-02	3.66689E-02
-0.80000	8.93219E-03	4.00485E-02
-0.90000	1.14469E-02	5.28435E-02
-1.00000	2.13300E-02	8.14257E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.618
 σ_{SE} = .716
 σ_{CE} = .315

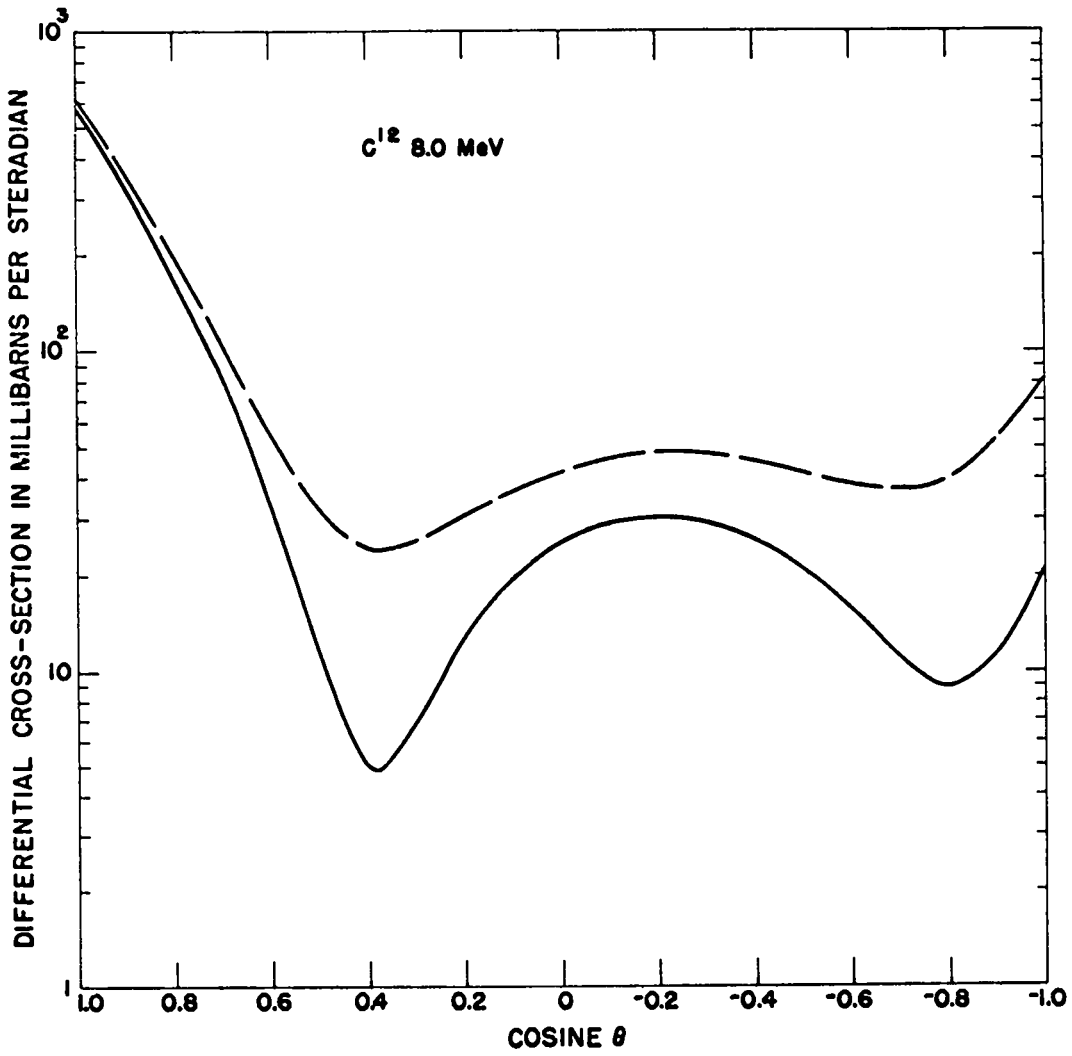


Figure 79

C¹²

9.0 MeV

CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	6.44629E-01	7.00934E-01
0.90000	3.49102E-01	3.85642E-01
0.80000	1.76107E-01	2.02414E-01
0.70000	8.05644E-02	1.01835E-01
0.60000	3.25710E-02	5.13819E-02
0.50000	1.25704E-02	3.00094E-02
0.40000	8.00778E-03	2.44302E-02
0.30000	1.10164E-02	2.65248E-02
0.20000	1.68255E-02	3.15371E-02
0.10000	2.26753E-02	3.68292E-02
0.00000	2.70882E-02	4.10406E-02
-0.10000	2.93904E-02	4.35442E-02
-0.20000	2.94124E-02	4.41240E-02
-0.30000	2.73148E-02	4.28232E-02
-0.40000	2.35028E-02	3.99252E-02
-0.50000	1.86047E-02	3.60438E-02
-0.60000	1.34939E-02	3.23048E-02
-0.70000	9.34211E-03	3.06126E-02
-0.80000	7.69234E-03	3.39995E-02
-0.90000	1.05464E-02	4.70861E-02
-1.00000	2.04597E-02	7.67651E-02

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.632
 σ_{SE} = .758
 σ_{CE} = .269

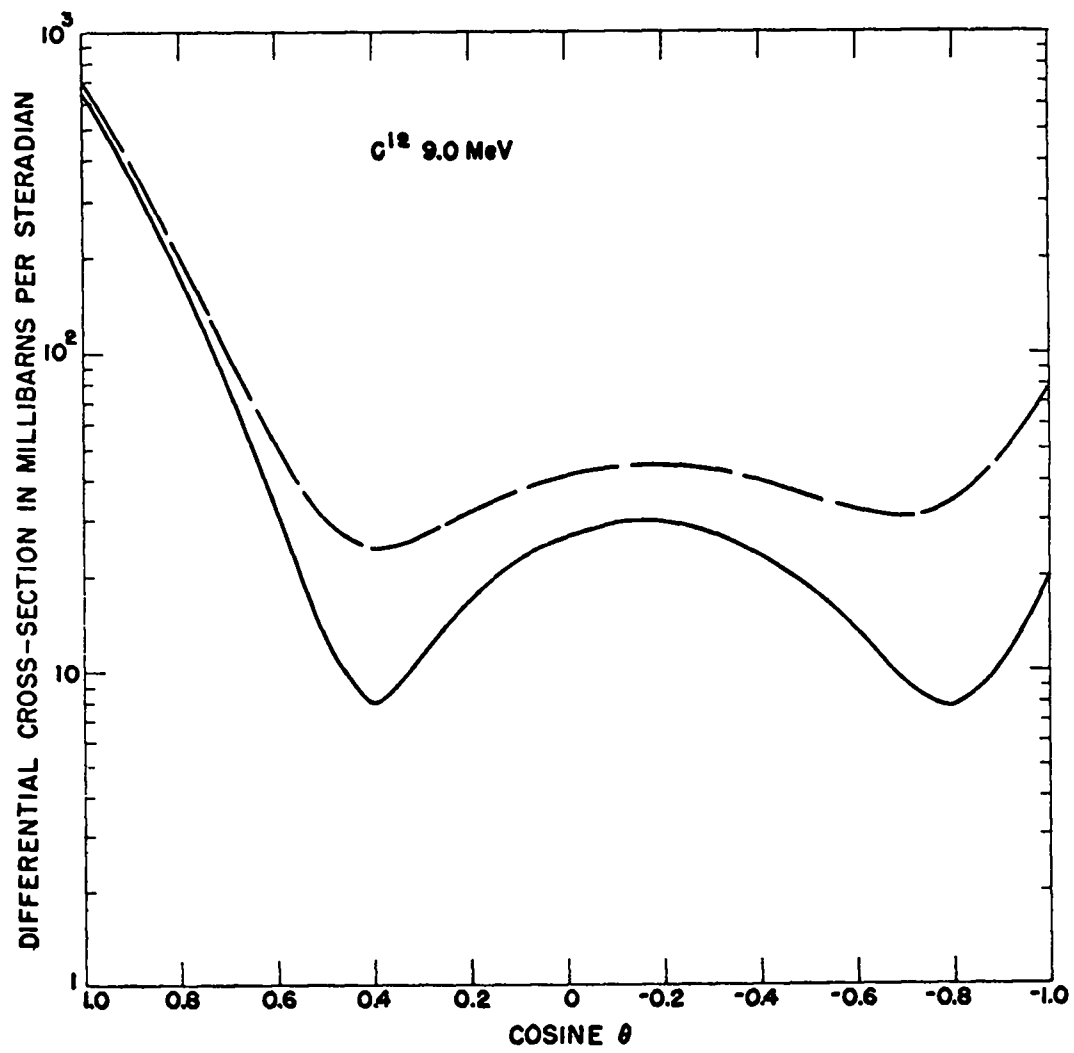


Figure 80

C ¹²		10.0 MeV	
COSINE(C.M.)	SHARP ELASTIC	TOTAL ELASTIC	
1.00000	7.26075E-01	7.80445E-01	
0.90000	3.76896E-01	4.10617E-01	
0.80000	1.81847E-01	2.05362E-01	
0.70000	7.98907E-02	9.87304E-02	
0.60000	3.21329E-02	4.89177E-02	
0.50000	1.42697E-02	3.00016E-02	
0.40000	1.15152E-02	2.64302E-02	
0.30000	1.52085E-02	2.93062E-02	
0.20000	2.05505E-02	3.38816E-02	
0.10000	2.51086E-02	3.78827E-02	
0.00000	2.78439E-02	4.04137E-02	
-0.10000	2.84947E-02	4.12688E-02	
-0.20000	2.72056E-02	4.05368E-02	
-0.30000	2.43238E-02	3.84215E-02	
-0.40000	2.03106E-02	3.52256E-02	
-0.50000	1.57319E-02	3.14638E-02	
-0.60000	1.13008E-02	2.80856E-02	
-0.70000	7.95571E-03	2.67954E-02	
-0.80000	6.95990E-03	3.04745E-02	
-0.90000	1.00155E-02	4.37364E-02	
-1.00000	1.93844E-02	7.37542E-02	

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.651
 σ_{SE} = .799
 σ_{CE} = .245

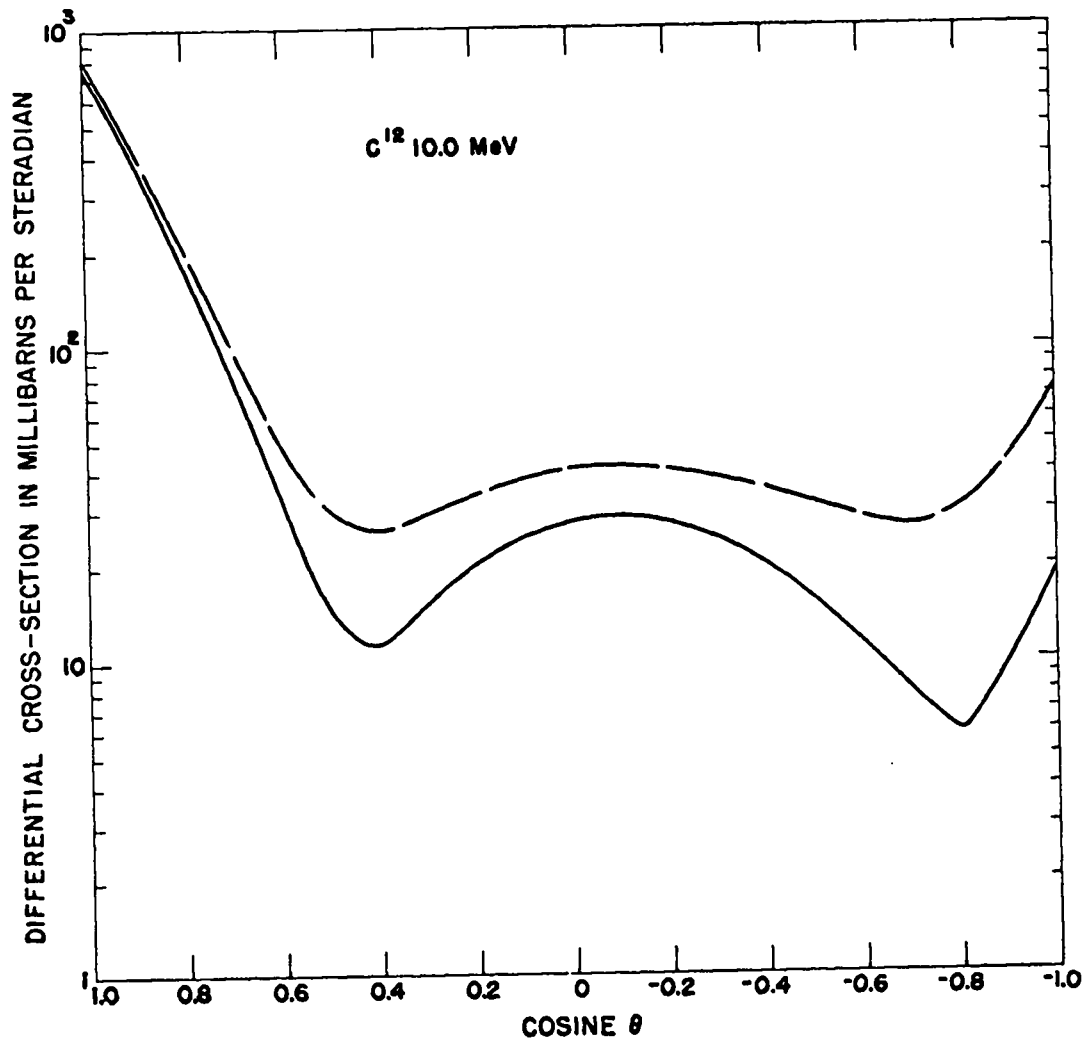


Figure 81

C12

11.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	8.11410E-01	8.51650E-01
0.90000	4.04615E-01	4.29855E-01
0.80000	1.86986E-01	2.84834E-01
0.70000	7.90081E-02	9.33897E-02
0.60000	3.18384E-02	4.46060E-02
0.50000	1.61821E-02	2.80699E-02
0.40000	1.50680E-02	2.62889E-02
0.30000	1.91664E-02	2.97688E-02
0.20000	2.37655E-02	3.38201E-02
0.10000	2.68354E-02	3.65844E-02
0.00000	2.78091E-02	3.73388E-02
-0.10000	2.68377E-02	3.65868E-02
-0.20000	2.43600E-02	3.44145E-02
-0.30000	2.08799E-02	3.14823E-02
-0.40000	1.68823E-02	2.81033E-02
-0.50000	1.28377E-02	2.47255E-02
-0.60000	9.26430E-03	2.20319E-02
-0.70000	6.82685E-03	2.12084E-02
-0.80000	6.45609E-03	2.43837E-02
-0.90000	9.48110E-03	3.47214E-02
-1.00000	1.77682E-02	5.80085E-02

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.670
 σ_{SE} = .838
 σ_{CE} = .185

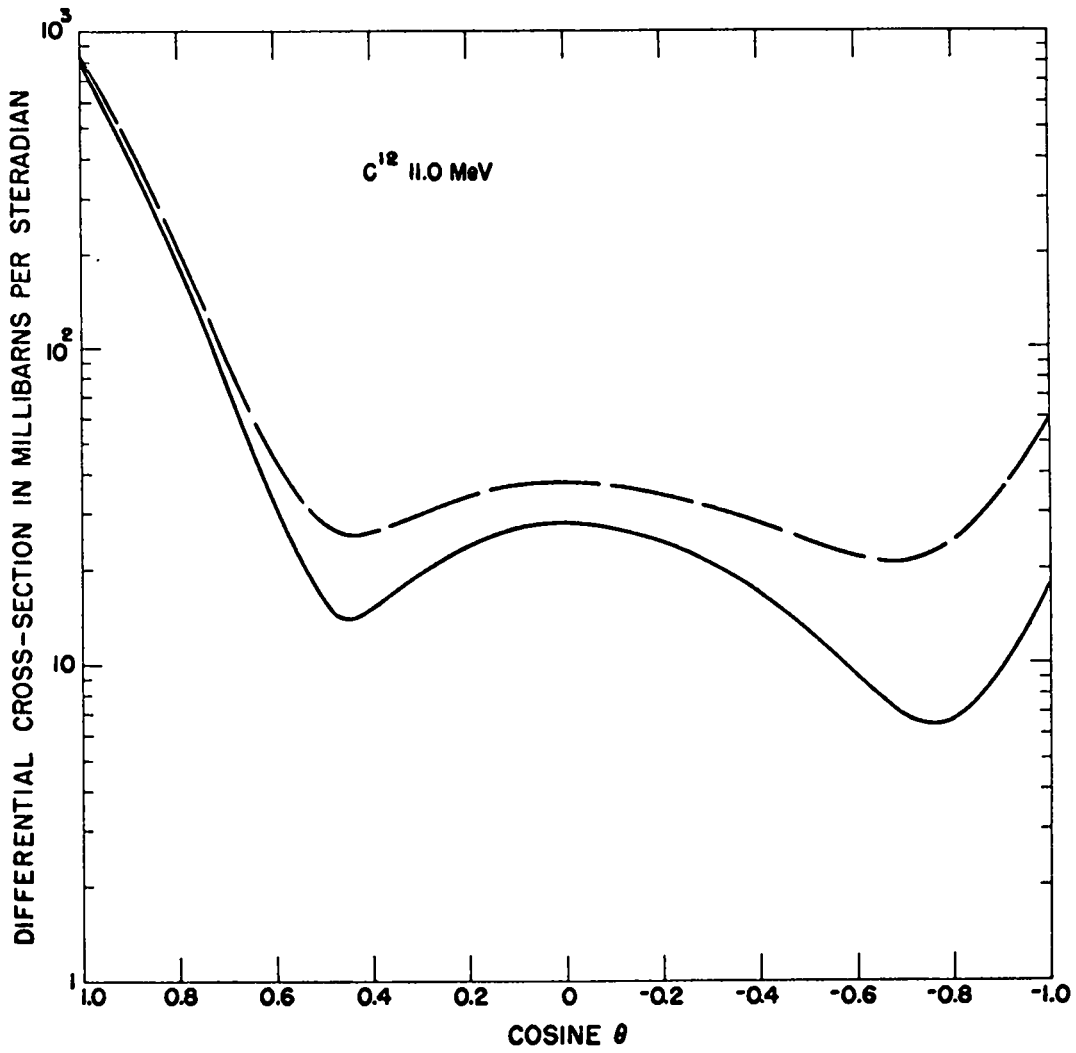


Figure 82

C¹²

12.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	8.97447E-01	9.31816E-01
0.90000	4.31093E-01	4.51716E-01
0.80000	1.91287E-01	2.05392E-01
0.70000	7.79074E-02	8.91306E-02
0.60000	3.15796E-02	4.15753E-02
0.50000	1.80342E-02	2.74131E-02
0.40000	1.82995E-02	2.72006E-02
0.30000	2.25455E-02	3.09733E-02
0.20000	2.62527E-02	3.42400E-02
0.10000	2.78259E-02	3.54957E-02
0.00000	2.71529E-02	3.47070E-02
-0.10000	2.47543E-02	3.24241E-02
-0.20000	2.13124E-02	2.92996E-02
-0.30000	1.74435E-02	2.58713E-02
-0.40000	1.36230E-02	2.25251E-02
-0.50000	1.02056E-02	1.95846E-02
-0.60000	7.50552E-03	1.75014E-02
-0.70000	5.91150E-03	1.71347E-02
-0.80000	6.02262E-03	2.01277E-02
-0.90000	8.79829E-03	2.94213E-02
-1.00000	1.57151E-02	5.00848E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.686
 σ_{SE} = .874
 σ_{CE} = .148

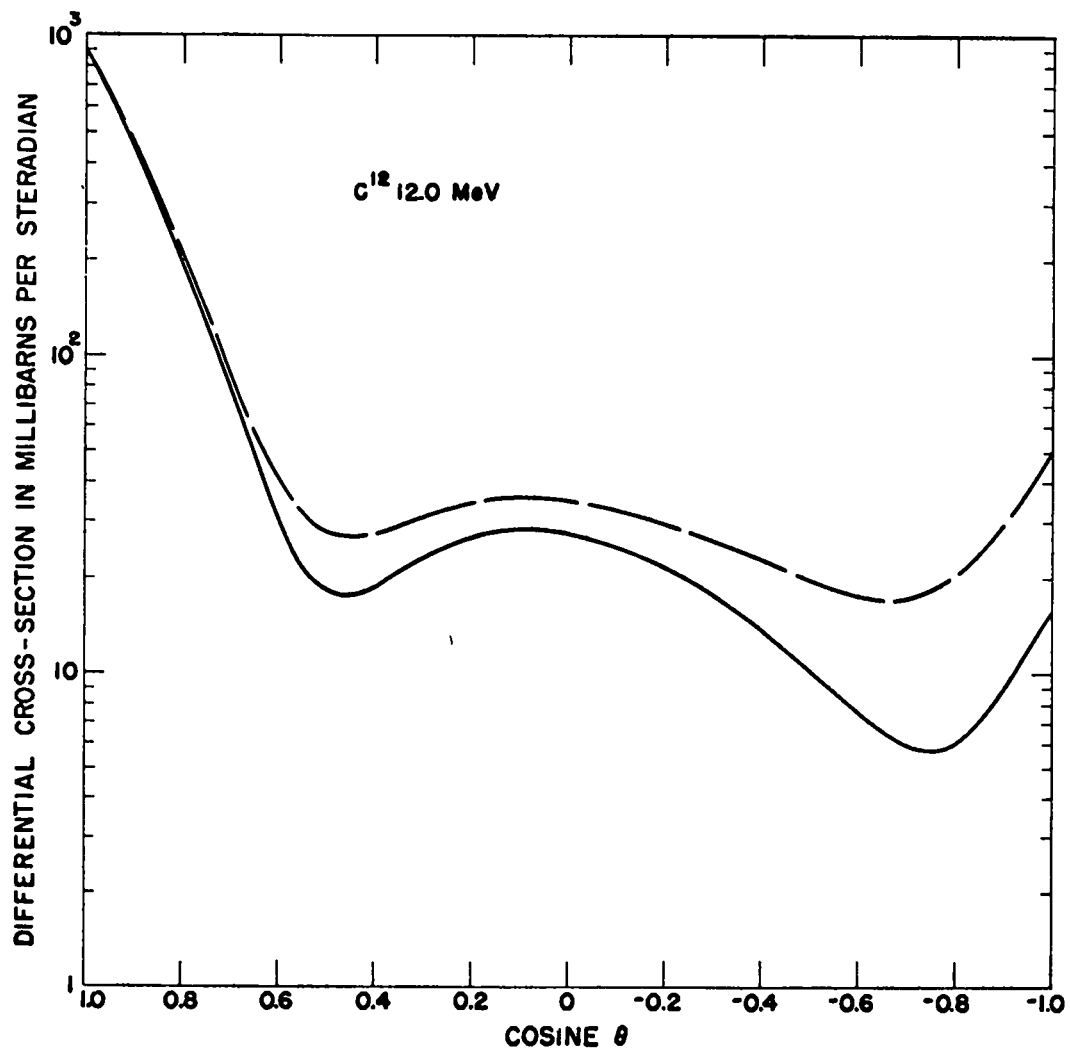


Figure 83

C¹²

13.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	9.81658E=01	1.01049E 00
0.90000	4.55363E=01	4.72104E-01
0.80000	1.94514E=01	2.05731E-01
0.70000	7.65571E=02	8.54362E-02
0.60000	3.12856E=02	3.92234E-02
0.50000	1.96626E=02	2.71475E-02
0.40000	2.09912E=02	2.81212E-02
0.30000	2.51469E=02	3.19140E-02
0.20000	2.78910E=02	3.43175E-02
0.10000	2.80726E=02	3.42533E-02
0.00000	2.59888E=02	3.20798E-02
-0.10000	2.24592E=02	2.86399E-02
-0.20000	1.83391E=02	2.47656E-02
-0.30000	1.43003E=02	2.10675E-02
-0.40000	1.07742E=02	1.79843E-02
-0.50000	7.99071E=03	1.54757E-02
-0.60000	6.07320E=03	1.40109E-02
-0.70000	5.16633E=03	1.40455E-02
-0.80000	5.58220E=03	1.67987E-02
-0.90000	7.95846E=03	2.46990E-02
-1.00000	1.34251E=02	4.22551E-02

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.697
 σ_{SE} = .906
 σ_{CE} = .119

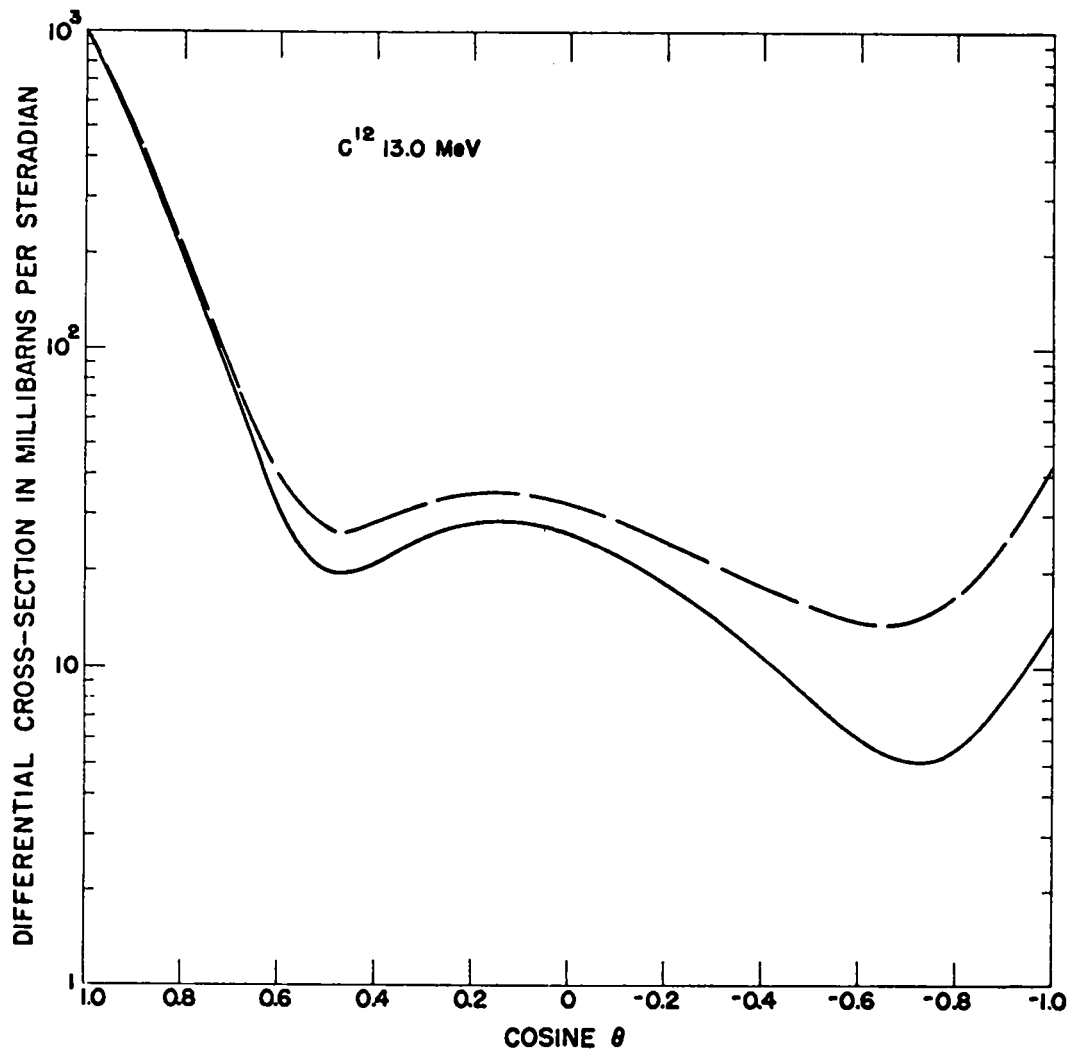


Figure 84

C¹²

14.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.06193E 00	1.08588E 00
0.90000	4.76700E-01	4.90160E-01
0.80000	1.96619E-01	2.05490E-01
0.70000	7.50662E-02	8.20786E-02
0.60000	3.10063E-02	3.72990E-02
0.50000	2.10297E-02	2.69803E-02
0.40000	2.30723E-02	2.87518E-02
0.30000	2.69209E-02	3.23258E-02
0.20000	2.86940E-02	3.38499E-02
0.10000	2.76635E-02	3.26358E-02
0.00000	2.44652E-02	2.93725E-02
-0.10000	2.01322E-02	2.51045E-02
-0.20000	1.56160E-02	2.07678E-02
-0.30000	1.15903E-02	1.69952E-02
-0.40000	8.41948E-03	1.40990E-02
-0.50000	6.21574E-03	1.21663E-02
-0.60000	4.94485E-03	1.12376E-02
-0.70000	4.55674E-03	1.15692E-02
-0.80000	5.12906E-03	1.40002E-02
-0.90000	7.01941E-03	2.04795E-02
-1.00000	1.10256E-02	3.49775E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.704
 σ_{SE} = .932
 σ_{CE} = .095

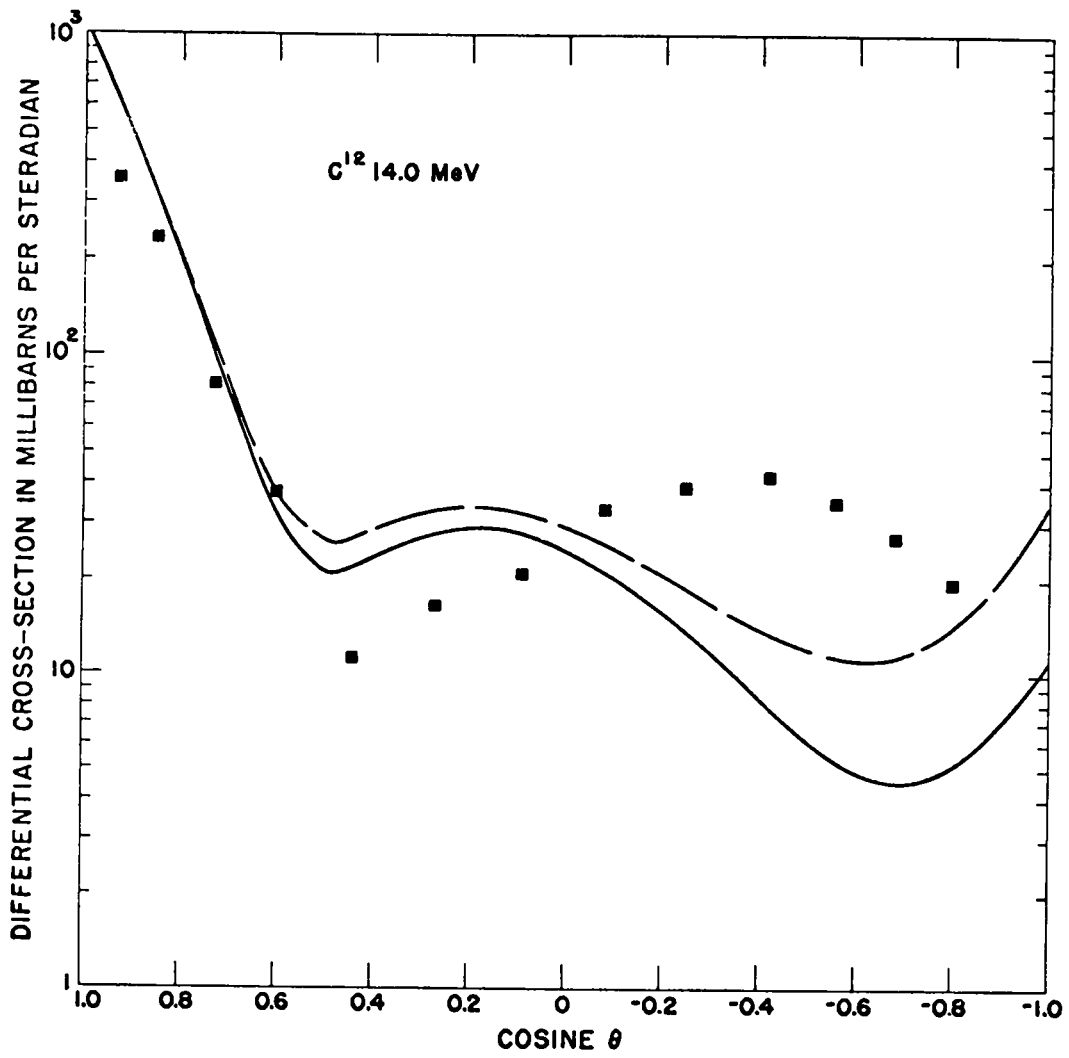


Figure 85

C¹²

14.5 MeV

CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.10023E 00	1.12233E 00
0.90000	4.86155E-01	4.98390E-01
0.80000	1.97179E-01	2.05199E-01
0.70000	7.42115E-02	8.05569E-02
0.60000	3.08346E-02	3.65363E-02
0.50000	2.16005E-02	2.69904E-02
0.40000	2.38902E-02	2.90310E-02
0.30000	2.75223E-02	3.24159E-02
0.20000	2.88189E-02	3.34901E-02
0.10000	2.72544E-02	3.17705E-02
0.00000	2.36075E-02	2.80681E-02
-0.10000	1.89877E-02	2.35038E-02
-0.20000	1.43683E-02	1.90395E-02
-0.30000	1.04074E-02	1.53009E-02
-0.40000	7.42900E-03	1.25698E-02
-0.50000	5.48973E-03	1.08797E-02
-0.60000	4.48807E-03	1.01898E-02
-0.70000	4.29509E-03	1.06405E-02
-0.80000	4.89562E-03	1.29154E-02
-0.90000	6.53644E-03	1.87714E-02
-1.00000	9.88155E-03	3.19755E-02

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 1.705$
 $\sigma_{SE} = .944$
 $\sigma_{CE} = .087$

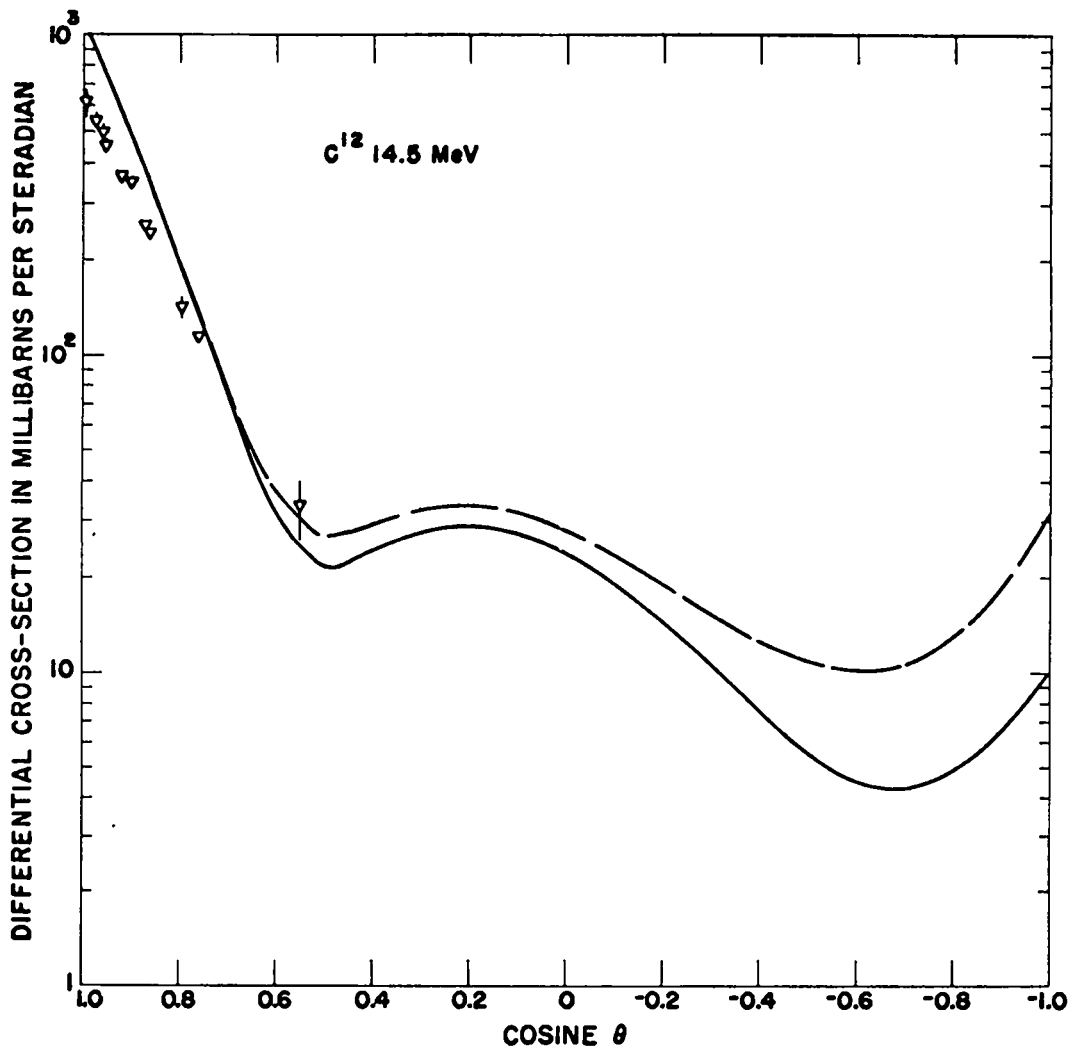


Figure 86

C¹²

14.8 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.12277E 00	1.14392E 00
0.90000	4.91507E-01	5.03116E-01
0.80000	1.97380E-01	2.04967E-01
0.70000	7.36708E-02	7.96790E-02
0.60000	3.07239E-02	3.61267E-02
0.50000	2.19060E-02	2.70112E-02
0.40000	2.43058E-02	2.91717E-02
0.30000	2.77861E-02	3.24180E-02
0.20000	2.88002E-02	3.32252E-02
0.10000	2.69406E-02	3.12231E-02
0.00000	2.30620E-02	2.72937E-02
-0.10000	1.83087E-02	2.25912E-02
-0.20000	1.36581E-02	1.80831E-02
-0.30000	9.75320E-03	1.43851E-02
-0.40000	6.89275E-03	1.17587E-02
-0.50000	5.10194E-03	1.02071E-02
-0.60000	4.24380E-03	9.64657E-03
-0.70000	4.14886E-03	1.01571E-02
-0.80000	4.75403E-03	1.23411E-02
-0.90000	6.24768E-03	1.78568E-02
-1.00000	9.22153E-03	3.03704E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.705
 σ_{SE} = .950
 σ_{CE} = .082

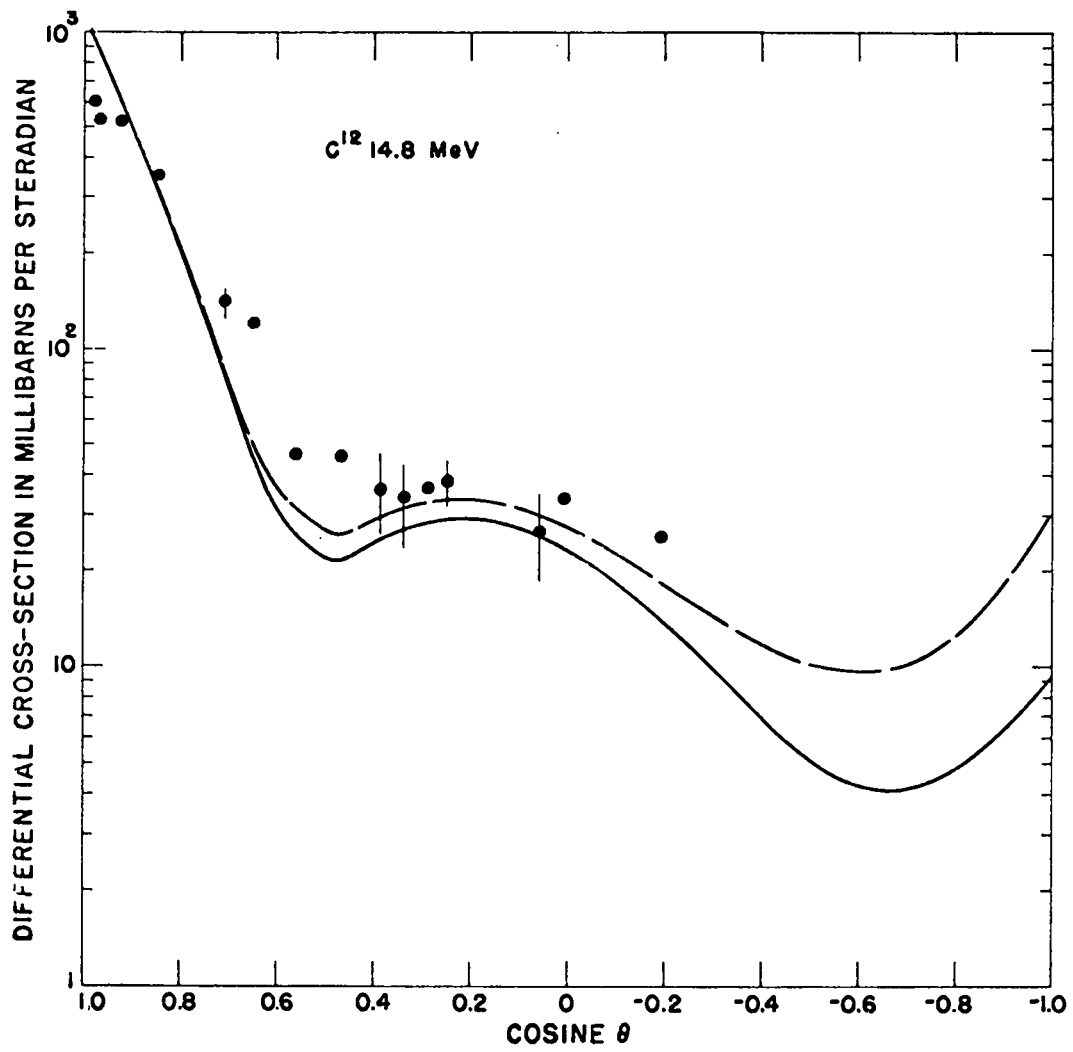


Figure 37

C¹²

15.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.13757E 00	1.15816E 00
0.90000	4.94929E-01	5.06165E-01
0.80000	1.97506E-01	2.04837E-01
0.70000	7.33423E-02	7.91535E-02
0.60000	3.06639E-02	3.58931E-02
0.50000	2.20939E-02	2.70339E-02
0.40000	2.45478E-02	2.92544E-02
0.30000	2.79219E-02	3.24023E-02
0.20000	2.87530E-02	3.30358E-02
0.10000	2.67077E-02	3.08555E-02
0.00000	2.26875E-02	2.67875E-02
-0.10000	1.78574E-02	2.20052E-02
-0.20000	1.31959E-02	1.74787E-02
-0.30000	9.33490E-03	1.38153E-02
-0.40000	6.55510E-03	1.12617E-02
-0.50000	4.86073E-03	9.80077E-03
-0.60000	4.09206E-03	9.32124E-03
-0.70000	4.05483E-03	9.86606E-03
-0.80000	4.65763E-03	1.19891E-02
-0.90000	6.05401E-03	1.72897E-02
-1.00000	8.78963E-03	2.93738E-02

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.705
 σ_{SE} = .954
 σ_{CE} = .080

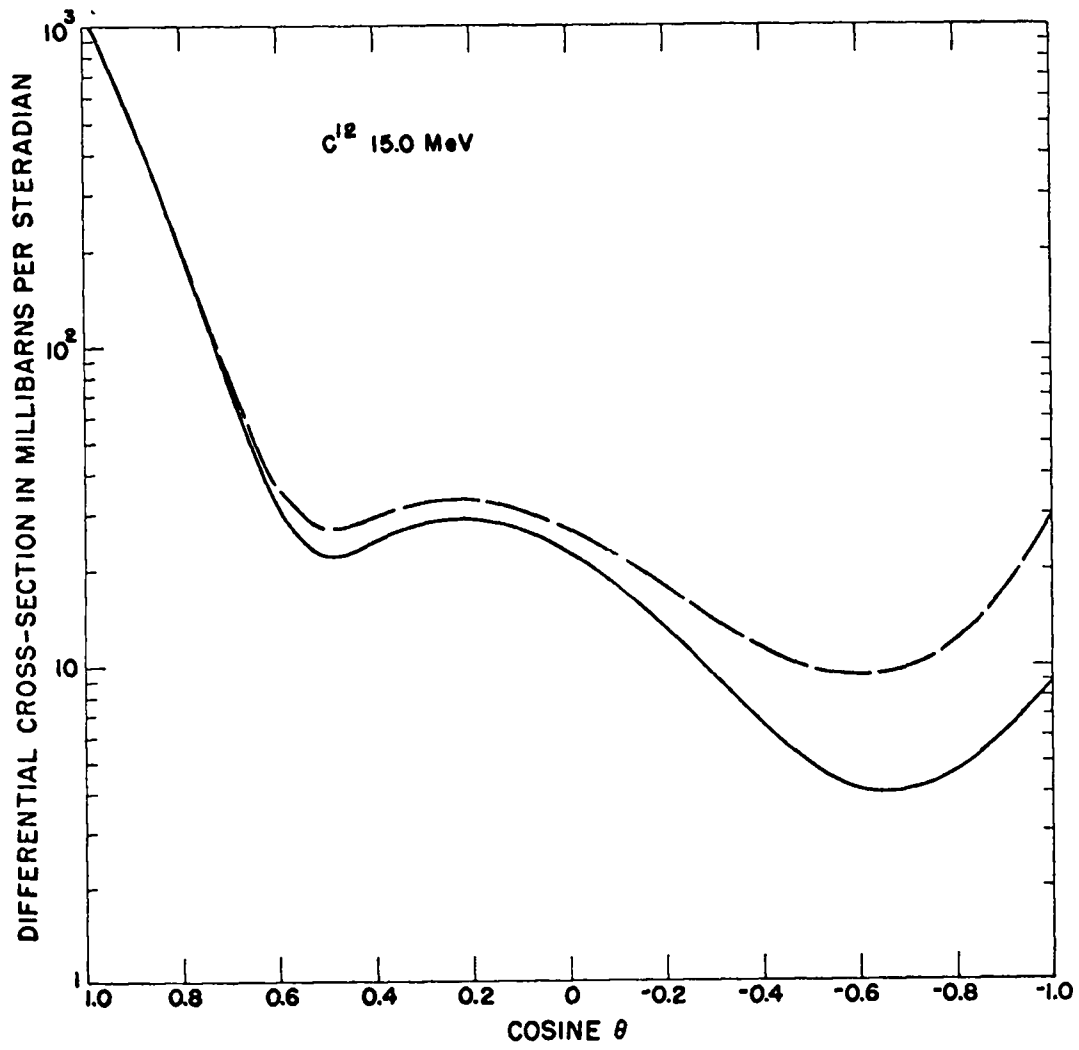


Figure 88

C¹²

16.0 MeV

CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.20876E 00	1.22706E 00
0.90000	5.09990E-01	5.19681E-01
0.80000	1.97154E-01	2.03418E-01
0.70000	7.13918E-02	7.63774E-02
0.60000	3.02733E-02	3.47744E-02
0.50000	2.28872E-02	2.71335E-02
0.40000	2.54820E-02	2.95173E-02
0.30000	2.82492E-02	3.20889E-02
0.20000	2.81908E-02	3.18694E-02
0.10000	2.53296E-02	2.89032E-02
0.00000	2.07585E-02	2.42959E-02
-0.10000	1.56980E-02	1.92717E-02
-0.20000	1.10955E-02	1.47741E-02
-0.30000	7.50784E-03	1.13475E-02
-0.40000	5.12513E-03	9.16046E-03
-0.50000	3.85922E-03	8.10550E-03
-0.60000	3.45880E-03	7.95992E-03
-0.70000	3.63410E-03	8.61979E-03
-0.80000	4.18405E-03	1.04476E-02
-0.90000	5.12324E-03	1.48140E-02
-1.00000	6.80563E-03	2.51097E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.703
 σ_{SE} = .970
 σ_{CE} = .069

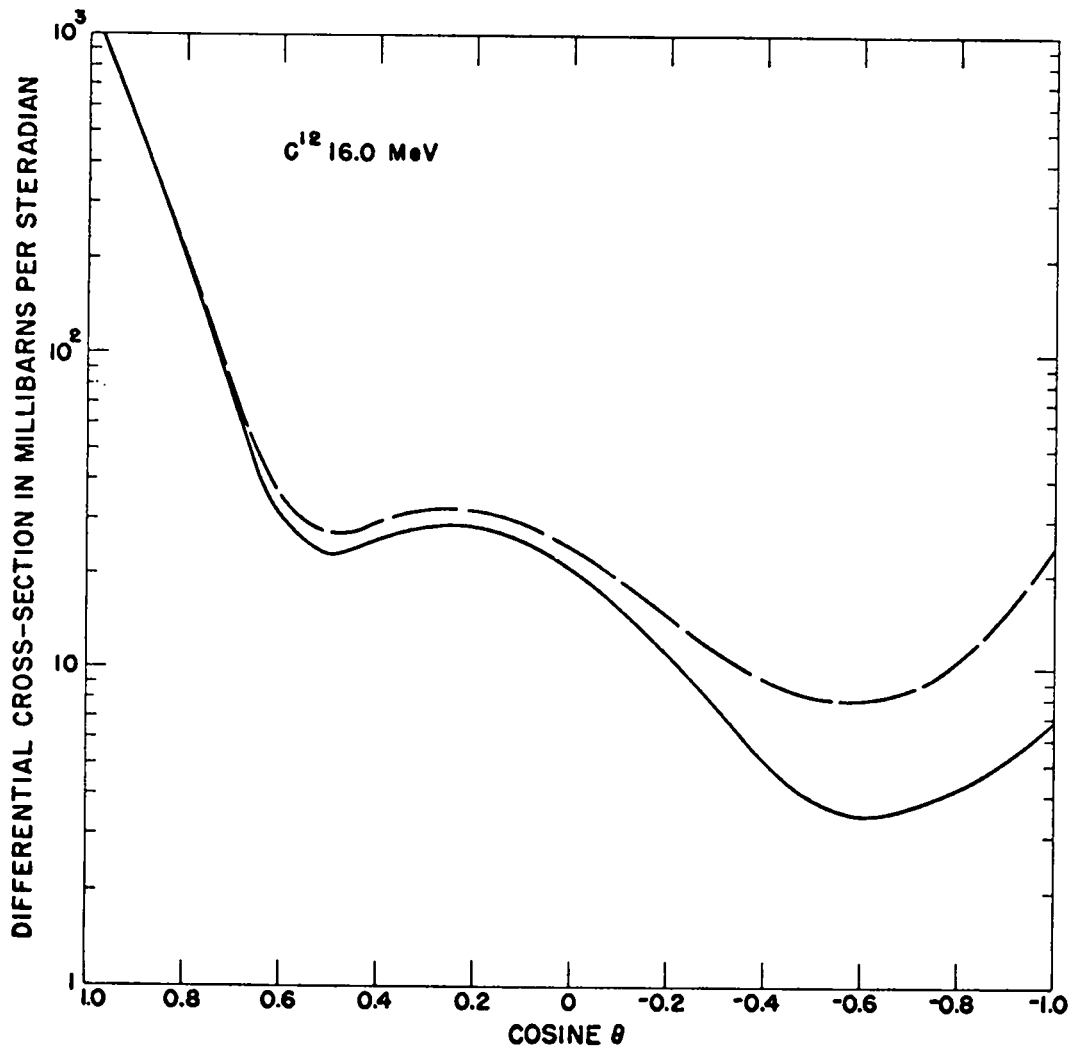


Figure 89

N^{14}

	<u>Energy</u>		<u>Energy Levels</u> *†		
1.00	4.30	G.S.	1 ⁺	8.63	0 ⁺
1.082	4.50	2.311	0 ⁺	8.71	0 ⁻
1.12	4.85	3.945	1 ⁺	8.91	3 ⁻
1.16	4.99	4.91	(0 ⁻)	8.99	1 ⁺
1.28	5.15	5.10	2 ⁽⁻⁾	9.17	2 ⁺
1.36	6.02	5.69	1 ⁽⁻⁾	9.41	[1 ⁺]
1.40	6.53	5.83	3 ⁽⁻⁾	9.51	2 ⁻
1.54	7.00	6.05	[1 ⁺]	9.71	1 ⁺
1.595	8.00	6.21	1 ⁽⁺⁾		
1.682	9.00	6.44	3 ⁽⁻⁾		
1.758	10.00	6.70	[1 ⁺]		
1.779	11.00	7.03	(2) ^[+]		
1.796	11.60	7.40	[1 ⁺]		
2.07	12.00	7.60	[1 ⁺]		
2.25	13.00	7.97	2 ⁻		
2.36	14.00	8.06	1 ⁻		
3.07	15.00	8.47	[1 ⁺]		
3.51	16.00				
4.05					

* Energy levels obtained from NRC 61-5, 6-185,

except [] values which are assumed.

† Only 25 levels accommodated in program.

N ¹⁴		1.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	2.46955E-01	3.76019E-01	
0.90000	2.25156E-01	3.47670E-01	
0.80000	2.05470E-01	3.22573E-01	
0.70000	1.87736E-01	3.00413E-01	
0.60000	1.71808E-01	2.80907E-01	
0.50000	1.57545E-01	2.63803E-01	
0.40000	1.44818E-01	2.48876E-01	
0.30000	1.33506E-01	2.35930E-01	
0.20000	1.23497E-01	2.24795E-01	
0.10000	1.14688E-01	2.15326E-01	
0.00000	1.06984E-01	2.07405E-01	
-0.10000	1.00298E-01	2.00936E-01	
-0.20000	9.45508E-02	1.95848E-01	
-0.30000	8.96709E-02	1.92095E-01	
-0.40000	8.55947E-02	1.89652E-01	
-0.50000	8.22655E-02	1.88523E-01	
-0.60000	7.96341E-02	1.88733E-01	
-0.70000	7.76579E-02	1.90334E-01	
-0.80000	7.63015E-02	1.93405E-01	
-0.90000	7.55358E-02	1.98049E-01	
-1.00000	7.53383E-02	2.04403E-01	

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 2.936$
 $\sigma_{SE} = 1.566$
 $\sigma_{CE} = 1.370$

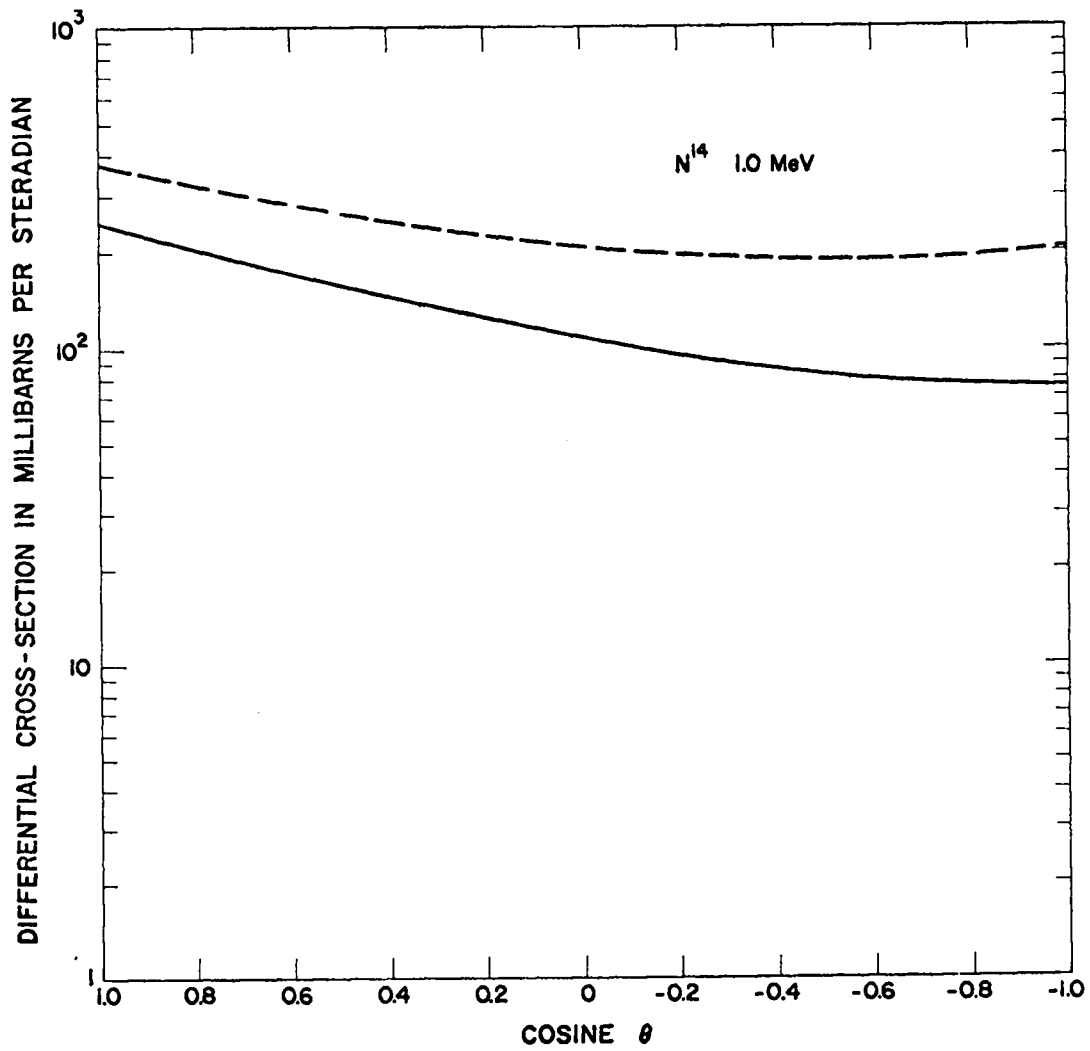


Figure 90

N¹⁴

1,082 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.48440E-01	3.77406E-01
0.90000	2.24409E-01	3.46464E-01
0.80000	2.02870E-01	3.19234E-01
0.70000	1.83622E-01	2.95343E-01
0.60000	1.66477E-01	2.74456E-01
0.50000	1.51261E-01	2.56276E-01
0.40000	1.37811E-01	2.40537E-01
0.30000	1.25978E-01	2.27006E-01
0.20000	1.15623E-01	2.15483E-01
0.10000	1.06619E-01	2.05795E-01
0.00000	9.88483E-02	1.97800E-01
-0.10000	9.22063E-02	1.91383E-01
-0.20000	8.65974E-02	1.86457E-01
-0.30000	8.19362E-02	1.82964E-01
-0.40000	7.81474E-02	1.80873E-01
-0.50000	7.51650E-02	1.80180E-01
-0.60000	7.29323E-02	1.80912E-01
-0.70000	7.14018E-02	1.83123E-01
-0.80000	7.05347E-02	1.86898E-01
-0.90000	7.03011E-02	1.92356E-01
-1.00000	7.06793E-02	1.99646E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 2.845
 σ_{SE} = 1.489
 σ_{CE} = 1.356

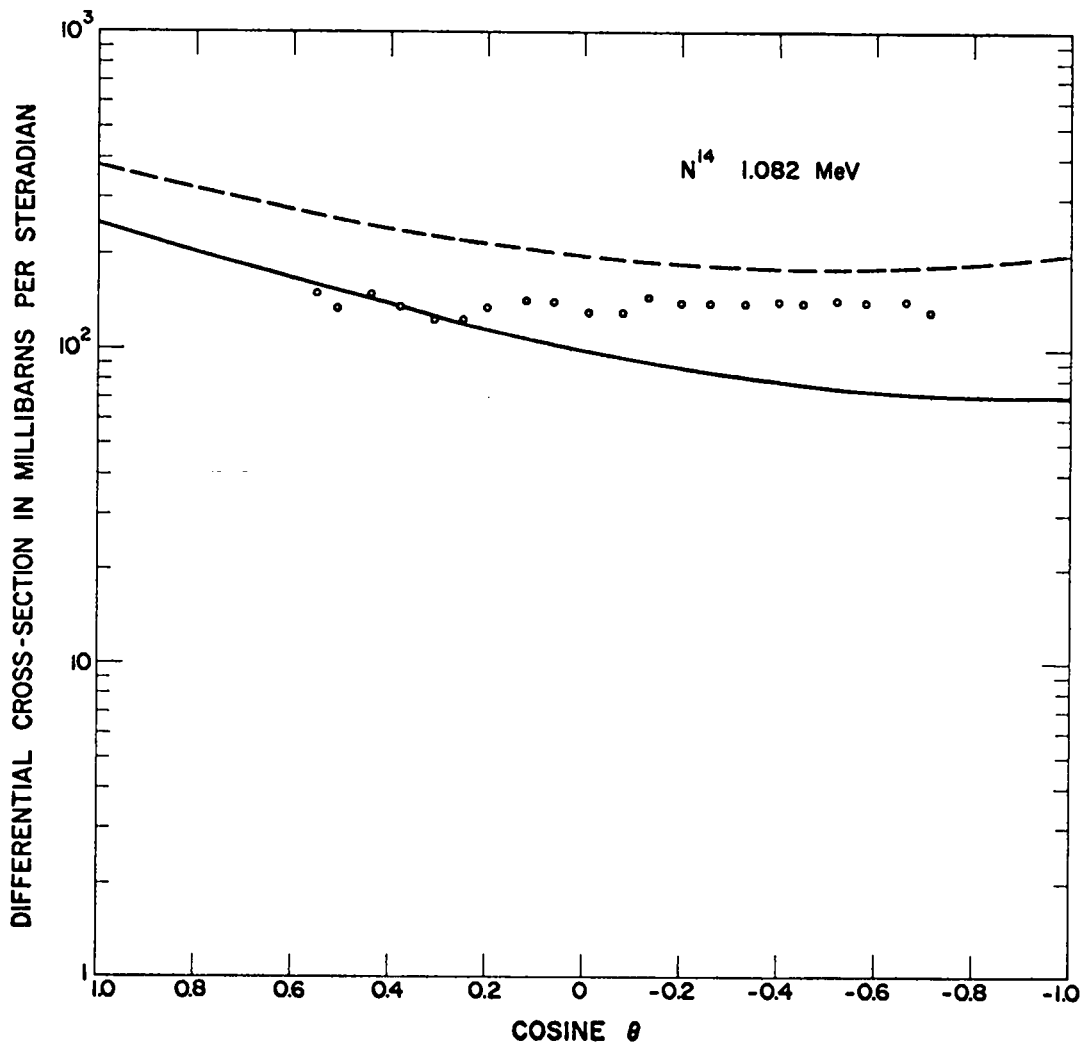


Figure 91

N¹⁴

1.12 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.49151E-01	3.78178E-01
0.90000	2.24078E-01	3.46028E-01
0.80000	2.01682E-01	3.17812E-01
0.70000	1.81741E-01	2.93130E-01
0.60000	1.64047E-01	2.71620E-01
0.50000	1.48409E-01	2.52961E-01
0.40000	1.34647E-01	2.36868E-01
0.30000	1.22596E-01	2.23091E-01
0.20000	1.12104E-01	2.11411E-01
0.10000	1.03032E-01	2.01645E-01
0.00000	9.52530E-02	1.93638E-01
-0.10000	8.86514E-02	1.87264E-01
-0.20000	8.31242E-02	1.82431E-01
-0.30000	7.85795E-02	1.79074E-01
-0.40000	7.49361E-02	1.77157E-01
-0.50000	7.21238E-02	1.76675E-01
-0.60000	7.00827E-02	1.77655E-01
-0.70000	6.87632E-02	1.80152E-01
-0.80000	6.81255E-02	1.84256E-01
-0.90000	6.81395E-02	1.90090E-01
-1.00000	6.87844E-02	1.97811E-01

(DSIGMAS IN BARNS/STERADIAN

$$\sigma_T = 2.807$$

$$\sigma_{SE} = 1.456$$

$$\sigma_{CE} = 1.351$$

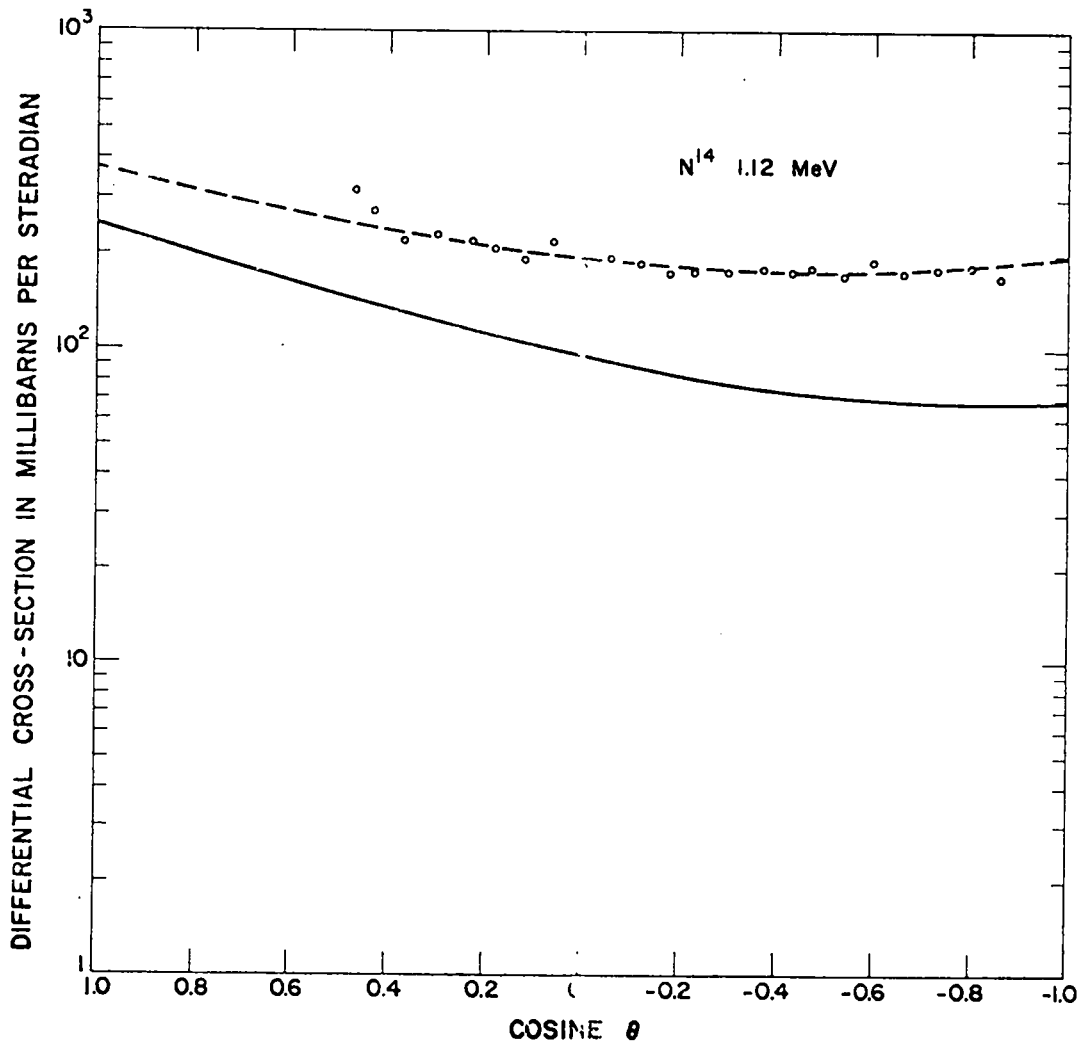


Figure 9?

N ¹⁴		1.16 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	2.50010E-01	3.79104E-01	
0.90000	2.23823E-01	3.45672E-01	
0.80000	2.00517E-01	3.16415E-01	
0.70000	1.79845E-01	2.90900E-01	
0.60000	1.61577E-01	2.68739E-01	
0.50000	1.45500E-01	2.49585E-01	
0.40000	1.31417E-01	2.33130E-01	
0.30000	1.19147E-01	2.19103E-01	
0.20000	1.08522E-01	2.07271E-01	
0.10000	9.93896E-02	1.97434E-01	
0.00000	9.16109E-02	1.89423E-01	
-0.10000	8.50610E-02	1.83105E-01	
-0.20000	7.96277E-02	1.78377E-01	
-0.30000	7.52116E-02	1.75168E-01	
-0.40000	7.17258E-02	1.73438E-01	
-0.50000	6.90955E-02	1.73180E-01	
-0.60000	6.72573E-02	1.74420E-01	
-0.70000	6.61595E-02	1.77215E-01	
-0.80000	6.57613E-02	1.81659E-01	
-0.90000	6.60331E-02	1.87882E-01	
-1.00000	6.69554E-02	1.96050E-01	

(DSIGMAS IN BARNS/STERADIAN

σ_T = 2.768
 σ_{SE} = 1.422
 σ_{CE} = 1.346

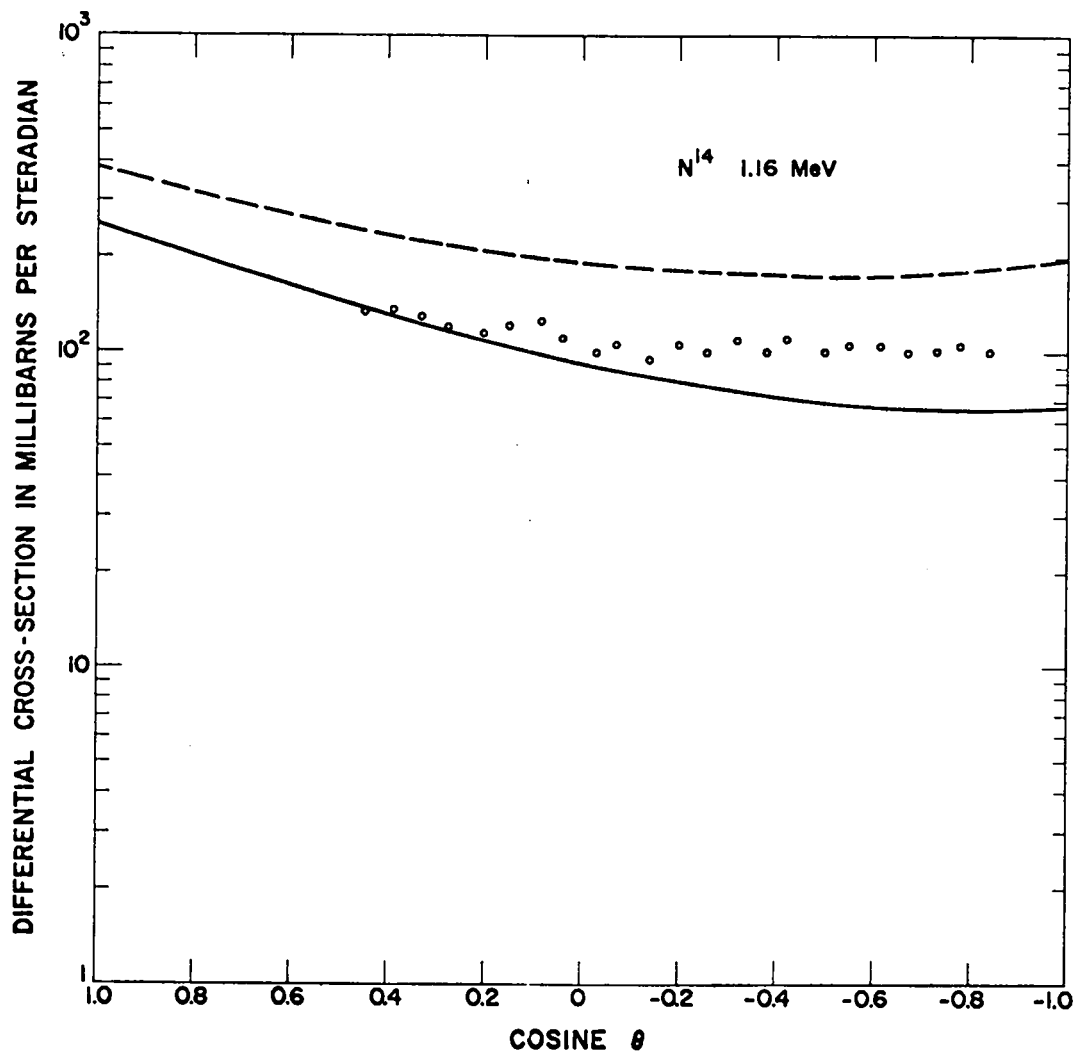


Figure 93

N¹⁴

1.28 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.52823E-01	3.82257E-01
0.90000	2.23247E-01	3.44951E-01
0.80000	1.97204E-01	3.12582E-01
0.70000	1.74364E-01	2.84613E-01
0.60000	1.54424E-01	2.60562E-01
0.50000	1.37100E-01	2.39998E-01
0.40000	1.22135E-01	2.22541E-01
0.30000	1.09291E-01	2.07856E-01
0.20000	9.83499E-02	1.95653E-01
0.10000	8.91167E-02	1.85683E-01
0.00000	8.14141E-02	1.77739E-01
-0.10000	7.50837E-02	1.71650E-01
-0.20000	6.99856E-02	1.67289E-01
-0.30000	6.59974E-02	1.64563E-01
-0.40000	6.30140E-02	1.63420E-01
-0.50000	6.09467E-02	1.63844E-01
-0.60000	5.97229E-02	1.65861E-01
-0.70000	5.92858E-02	1.69535E-01
-0.80000	5.95939E-02	1.74972E-01
-0.90000	6.06203E-02	1.82324E-01
-1.00000	6.23529E-02	1.91787E-01

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 2.663$
 $\sigma_{SE} = 1.329$
 $\sigma_{CE} = 1.334$

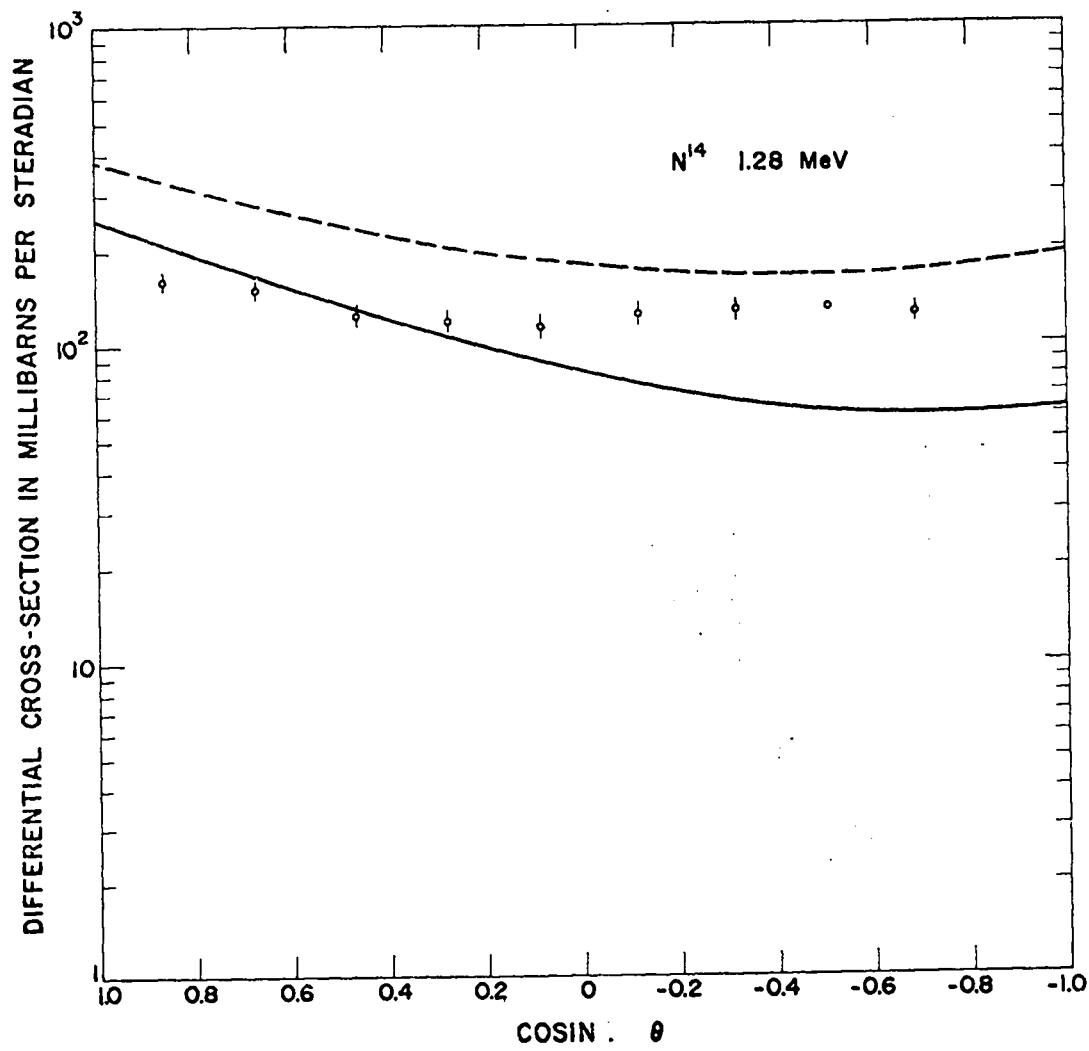


Figure 9h

N¹⁴

1.36 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.54910E-01	3.84646E-01
0.90000	2.23034E-01	3.44736E-01
0.80000	1.95162E-01	3.10303E-01
0.70000	1.70900E-01	2.80732E-01
0.60000	1.49886E-01	2.55470E-01
0.50000	1.31785E-01	2.34028E-01
0.40000	1.16293E-01	2.15969E-01
0.30000	1.03130E-01	2.00914E-01
0.20000	9.20419E-02	1.88529E-01
0.10000	8.28007E-02	1.78531E-01
0.00000	7.52008E-02	1.70683E-01
-0.10000	6.90603E-02	1.64791E-01
-0.20000	6.42192E-02	1.60706E-01
-0.30000	6.05392E-02	1.58323E-01
-0.40000	5.79026E-02	1.57579E-01
-0.50000	5.62120E-02	1.58454E-01
-0.60000	5.53894E-02	1.60974E-01
-0.70000	5.53759E-02	1.65208E-01
-0.80000	5.61311E-02	1.71272E-01
-0.90000	5.76323E-02	1.79334E-01
-1.00000	5.98746E-02	1.89611E-01

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 2.601
 σ_{SE} = 1.274
 σ_{CE} = 1.327

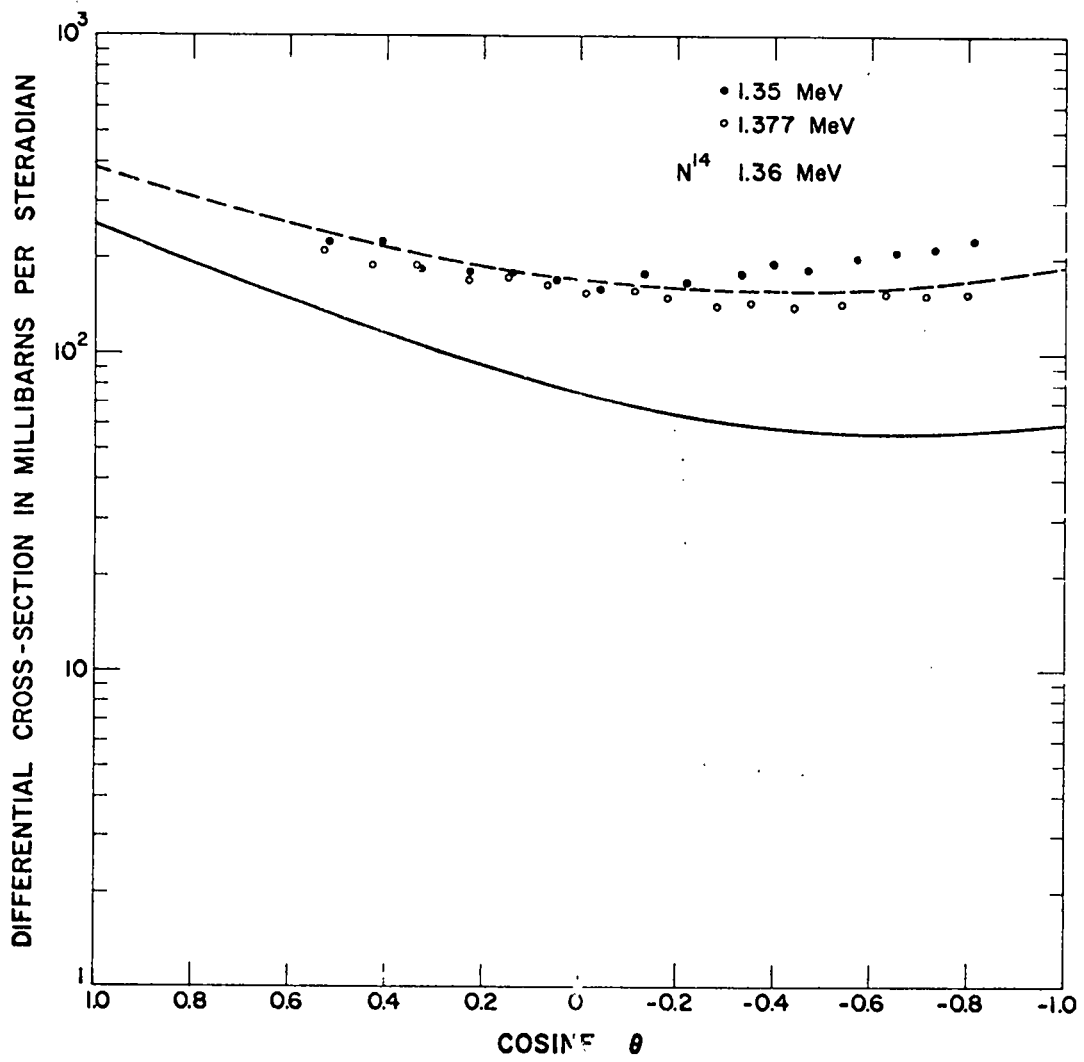


Figure 95

N¹⁴

1.40 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.55973E-01	3.85882E-01
0.90000	2.22937E-01	3.44663E-01
0.80000	1.94150E-01	3.09202E-01
0.70000	1.69184E-01	2.78840E-01
0.60000	1.47646E-01	2.52990E-01
0.50000	1.29175E-01	2.31128E-01
0.40000	1.13439E-01	2.12790E-01
0.30000	1.00137E-01	1.97570E-01
0.20000	8.89958E-02	1.85115E-01
0.10000	7.97689E-02	1.75122E-01
0.00000	7.22366E-02	1.67338E-01
-0.10000	6.62044E-02	1.61558E-01
-0.20000	6.15021E-02	1.57621E-01
-0.30000	5.79830E-02	1.55416E-01
-0.40000	5.55234E-02	1.54874E-01
-0.50000	5.40215E-02	1.55974E-01
-0.60000	5.33971E-02	1.58741E-01
-0.70000	5.35905E-02	1.63247E-01
-0.80000	5.45626E-02	1.69615E-01
-0.90000	5.62935E-02	1.78020E-01
-1.00000	5.87828E-02	1.88691E-01

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 2.571$
 $\sigma_{SE} = 1.247$
 $\sigma_{CE} = 1.324$

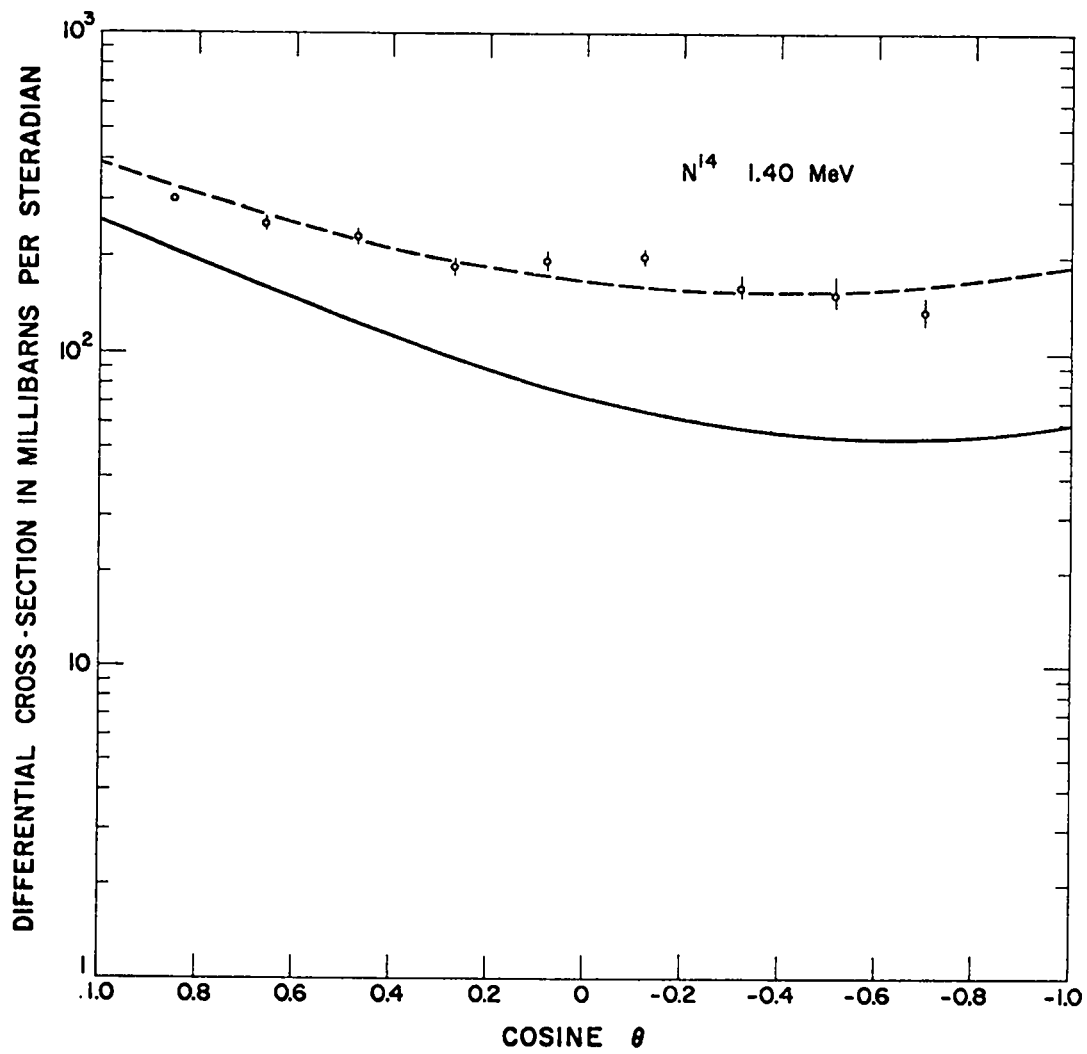


Figure 96

¹⁴N

1.54 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.59999E-01	3.90498E-01
0.90000	2.22845E-01	3.44676E-01
0.80000	1.90854E-01	3.05640E-01
0.70000	1.63464E-01	2.72571E-01
0.60000	1.40161E-01	2.44742E-01
0.50000	1.20475E-01	2.21506E-01
0.40000	1.03979E-01	2.02291E-01
0.30000	9.02837E-02	1.86596E-01
0.20000	7.90426E-02	1.73987E-01
0.10000	6.99441E-02	1.64091E-01
0.00000	6.27128E-02	1.56598E-01
-0.10000	5.71078E-02	1.51255E-01
-0.20000	5.29212E-02	1.47866E-01
-0.30000	4.99770E-02	1.46290E-01
-0.40000	4.81299E-02	1.46443E-01
-0.50000	4.72644E-02	1.48295E-01
-0.60000	4.72938E-02	1.51875E-01
-0.70000	4.81590E-02	1.57266E-01
-0.80000	4.98282E-02	1.64614E-01
-0.90000	5.22958E-02	1.74127E-01
-1.00000	5.55820E-02	1.86081E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 2.478
 σ_{SE} = 1.163
 σ_{CE} = 1.315

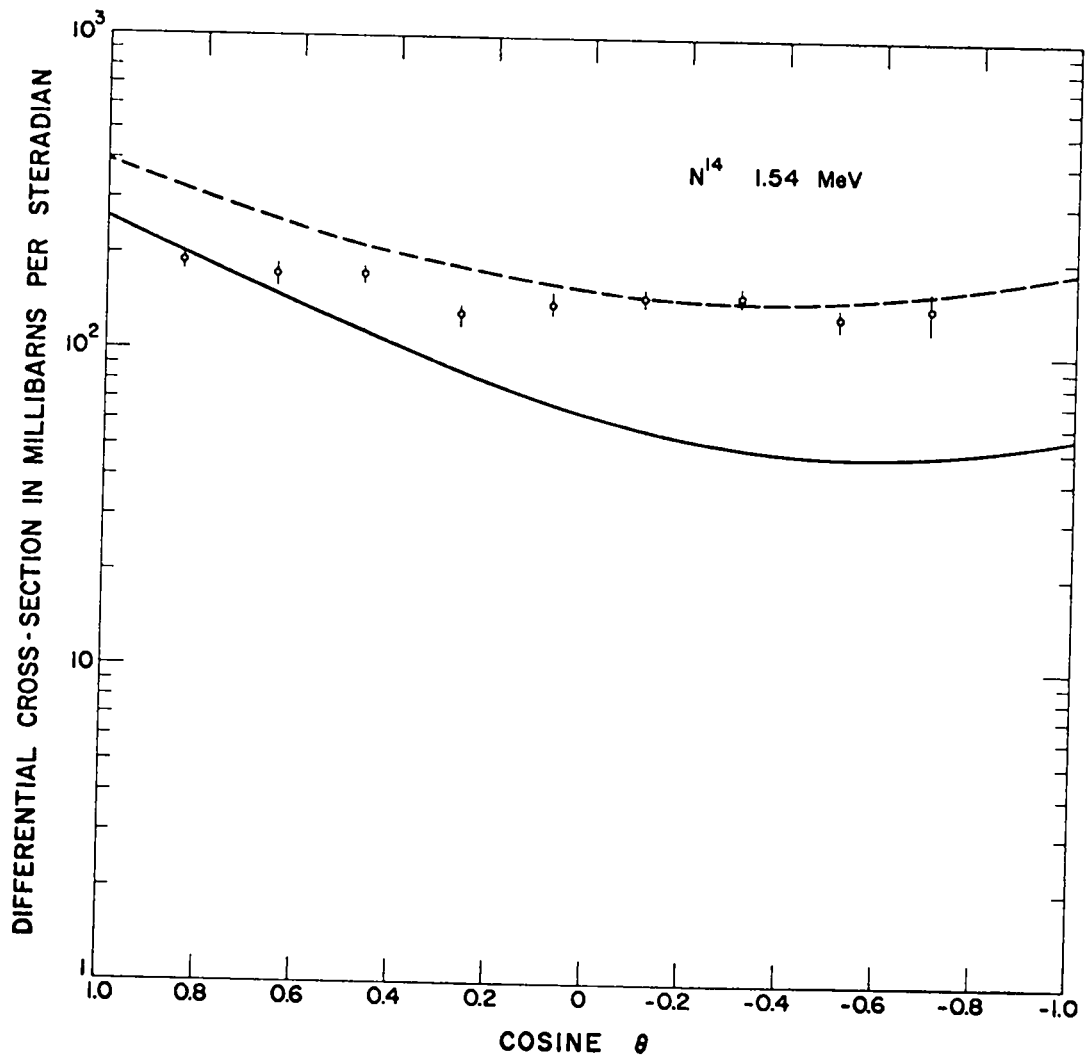


Figure 97

N ¹⁴		1.595 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	2.61639E-01	3.92425E-01	
0.90000	2.22852E-01	3.44787E-01	
0.80000	1.89608E-01	3.04358E-01	
0.70000	1.61288E-01	2.70252E-01	
0.60000	1.37323E-01	2.41682E-01	
0.50000	1.17198E-01	2.17946E-01	
0.40000	1.00441E-01	1.98428E-01	
0.30000	8.66311E-02	1.82586E-01	
0.20000	7.53864E-02	1.69952E-01	
0.10000	6.63687E-02	1.60125E-01	
0.00000	5.92797E-02	1.52771E-01	
-0.10000	5.38593E-02	1.47616E-01	
-0.20000	4.98842E-02	1.44450E-01	
-0.30000	4.71668E-02	1.43122E-01	
-0.40000	4.55537E-02	1.43540E-01	
-0.50000	4.49247E-02	1.45673E-01	
-0.60000	4.51915E-02	1.49550E-01	
-0.70000	4.62966E-02	1.55261E-01	
-0.80000	4.82129E-02	1.62963E-01	
-0.90000	5.09423E-02	1.72877E-01	
-1.00000	5.45151E-02	1.85301E-01	

(DSIGMAS IN BARNS/STERADIAN

σ_T = 2.445
 σ_{SE} = 1.133
 σ_{CE} = 1.312

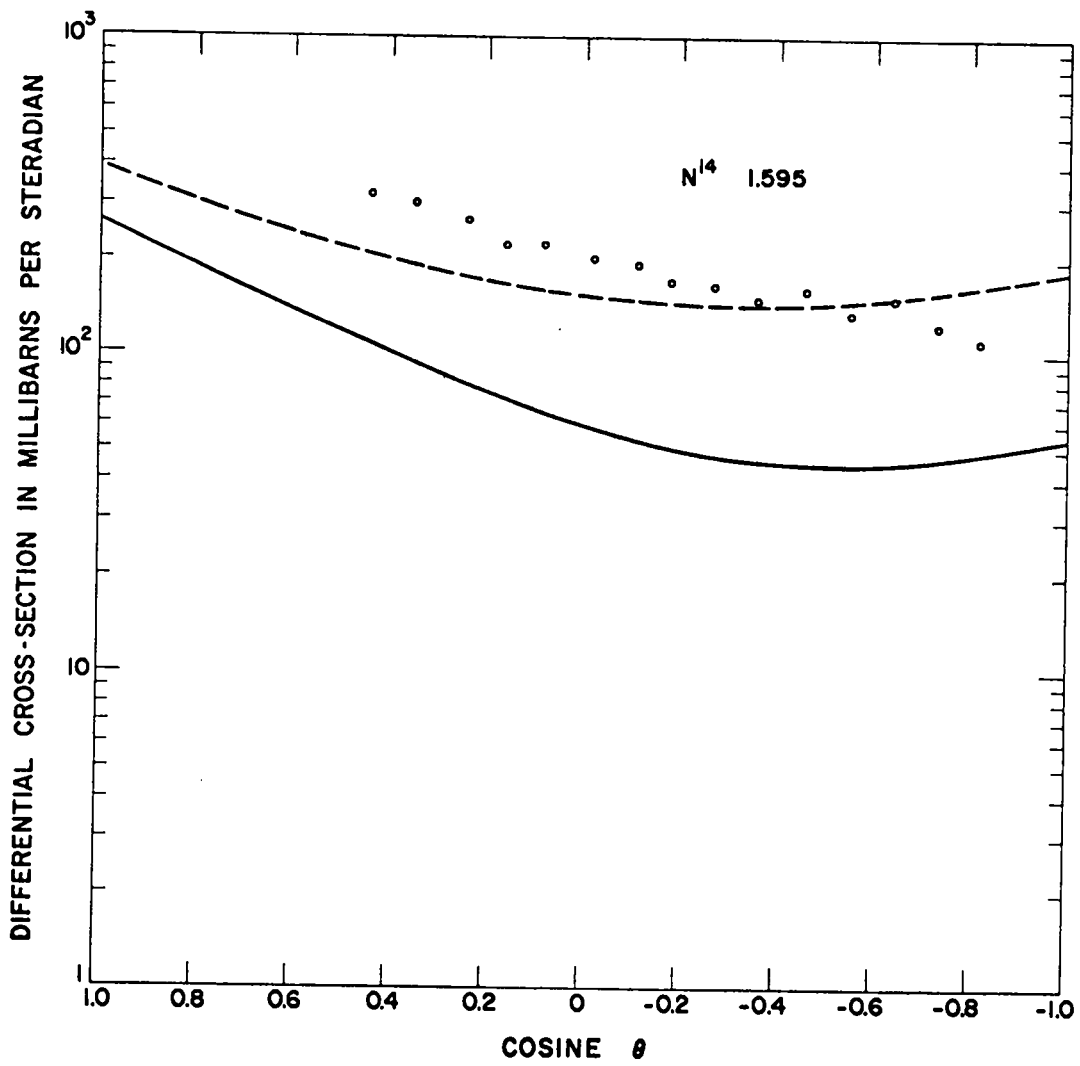


Figure 98

N¹⁴

1.682 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.64351E-01	3.95479E-01
0.90000	2.22953E-01	3.44961E-01
0.80000	1.87727E-01	3.02346E-01
0.70000	1.57953E-01	2.66633E-01
0.60000	1.32974E-01	2.36932E-01
0.50000	1.12194E-01	2.12455E-01
0.40000	9.50724E-02	1.92508E-01
0.30000	8.11238E-02	1.76484E-01
0.20000	6.99145E-02	1.63855E-01
0.10000	6.10605E-02	1.54175E-01
0.00000	5.42247E-02	1.47068E-01
-0.10000	4.91156E-02	1.42230E-01
-0.20000	4.54852E-02	1.39426E-01
-0.30000	4.31272E-02	1.38487E-01
-0.40000	4.18756E-02	1.39312E-01
-0.50000	4.16033E-02	1.41864E-01
-0.60000	4.22204E-02	1.46178E-01
-0.70000	4.36738E-02	1.52334E-01
-0.80000	4.59451E-02	1.60564E-01
-0.90000	4.90504E-02	1.71039E-01
-1.00000	5.30389E-02	1.84167E-01

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 2.396$
 $\sigma_{SE} = 1.088$
 $\sigma_{CE} = 1.308$

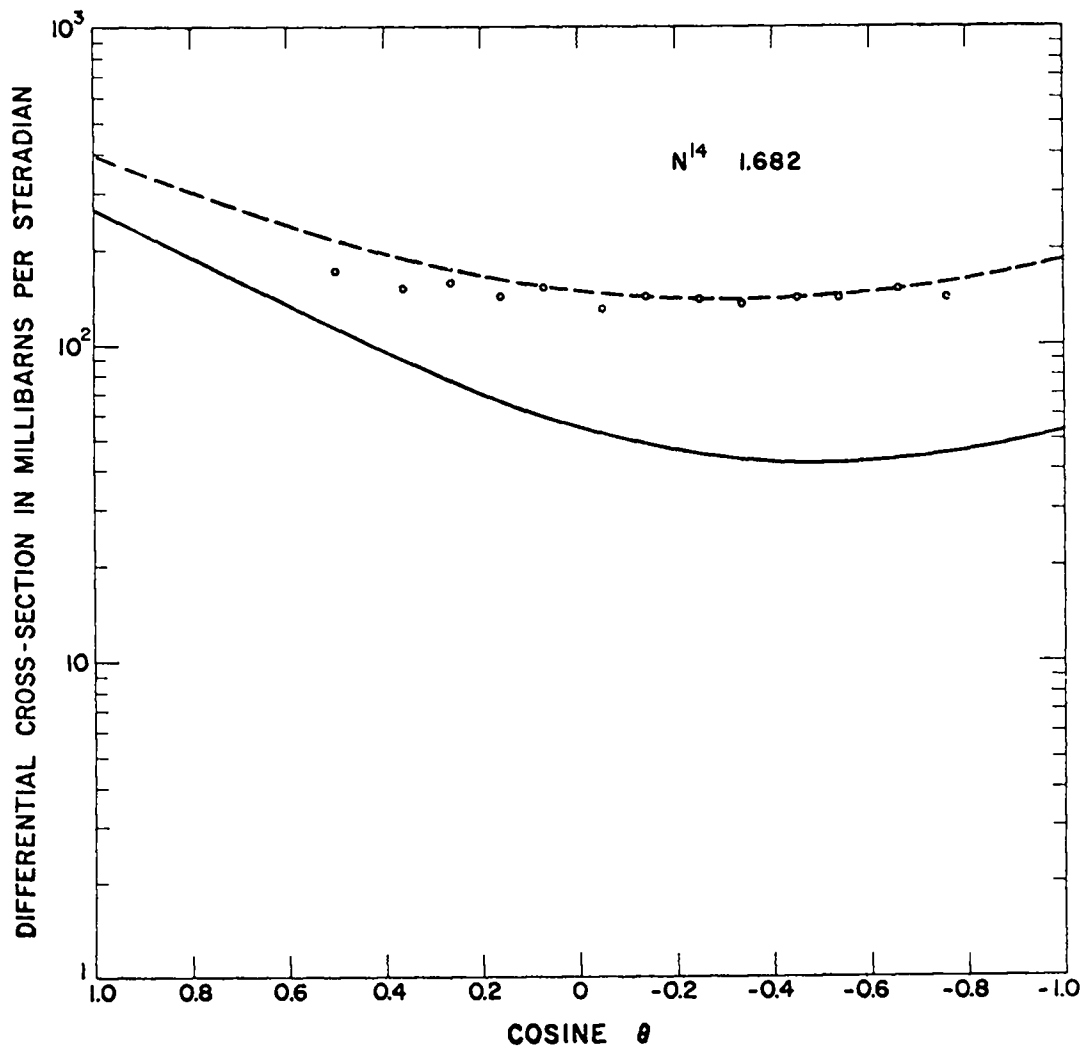


Figure 99

N^{11}

1.758 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.66766E-01	3.98195E-01
0.90000	2.23075E-01	3.45161E-01
0.80000	1.86130E-01	3.00657E-01
0.70000	1.55114E-01	2.63575E-01
0.60000	1.29288E-01	2.32931E-01
0.50000	1.07979E-01	2.07854E-01
0.40000	9.05814E-02	1.87579E-01
0.30000	7.65538E-02	1.71438E-01
0.20000	6.54125E-02	1.58853E-01
0.10000	5.67314E-02	1.49332E-01
0.00000	5.01389E-02	1.42464E-01
-0.10000	4.53148E-02	1.37915E-01
-0.20000	4.19892E-02	1.35430E-01
-0.30000	3.99396E-02	1.34824E-01
-0.40000	3.89896E-02	1.35987E-01
-0.50000	3.90070E-02	1.38882E-01
-0.60000	3.99023E-02	1.43545E-01
-0.70000	4.16273E-02	1.50088E-01
-0.80000	4.41740E-02	1.58702E-01
-0.90000	4.75730E-02	1.69659E-01
-1.00000	5.18930E-02	1.83323E-01

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 2.356$
 $\sigma_{SE} = 1.052$
 $\sigma_{CE} = 1.304$

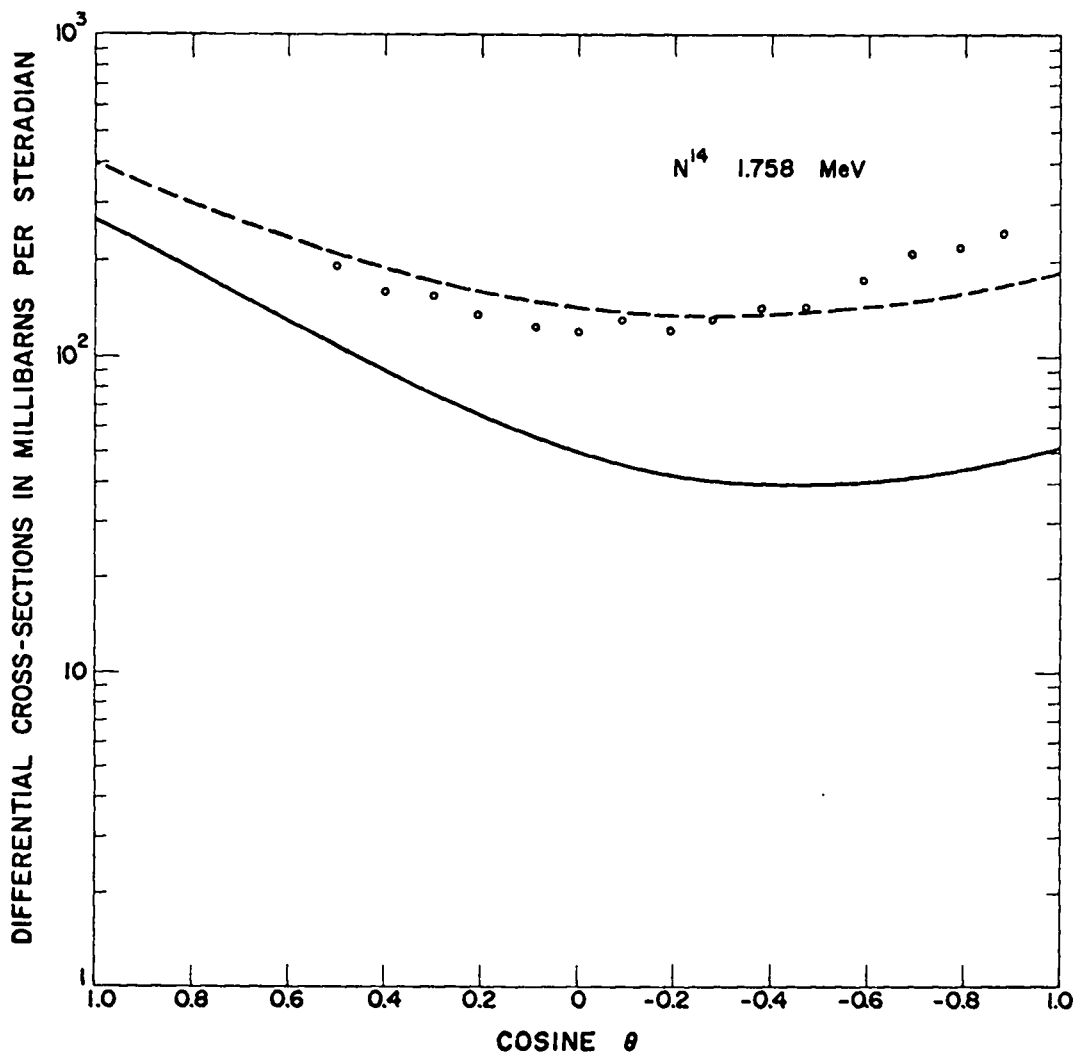


Figure 100

N¹⁴

1.779 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.67445E-01	3.98979E-01
0.90000	2.23118E-01	3.45246E-01
0.80000	1.85698E-01	3.00221E-01
0.70000	1.54343E-01	2.62764E-01
0.60000	1.28287E-01	2.31864E-01
0.50000	1.06837E-01	2.06626E-01
0.40000	8.93695E-02	1.86267E-01
0.30000	7.53252E-02	1.70099E-01
0.20000	6.42072E-02	1.57530E-01
0.10000	5.55774E-02	1.48056E-01
0.00000	4.90542E-02	1.41256E-01
-0.10000	4.43096E-02	1.36788E-01
-0.20000	4.10676E-02	1.34391E-01
-0.30000	3.91013E-02	1.33875E-01
-0.40000	3.82315E-02	1.35129E-01
-0.50000	3.83247E-02	1.38114E-01
-0.60000	3.92920E-02	1.42869E-01
-0.70000	4.10867E-02	1.49508E-01
-0.80000	4.37040E-02	1.58227E-01
-0.90000	4.71791E-02	1.69307E-01
-1.00000	5.15865E-02	1.83120E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 2.346
 σ_{SE} = 1.043
 σ_{CE} = 1.303

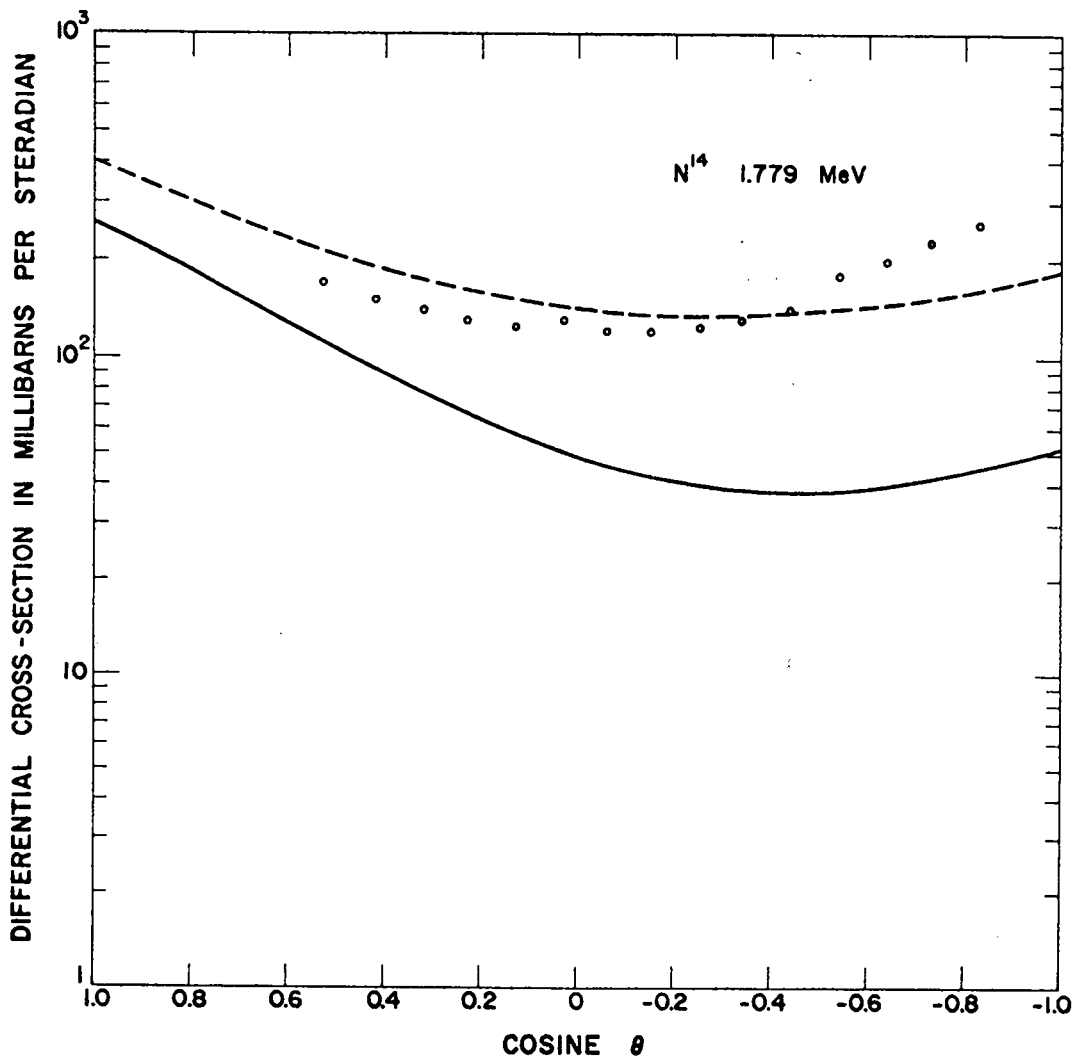


Figure 101

N ¹⁴		
COSINE(C.M.)	1.796 MeV SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.67990E-01	3.99599E-01
0.90000	2.23149E-01	3.45304E-01
0.80000	1.85348E-01	2.99861E-01
0.70000	1.53720E-01	2.62103E-01
0.60000	1.27481E-01	2.30999E-01
0.50000	1.05920E-01	2.05636E-01
0.40000	8.83985E-02	1.85211E-01
0.30000	7.43434E-02	1.69024E-01
0.20000	6.32463E-02	1.56471E-01
0.10000	5.46597E-02	1.47037E-01
0.00000	4.81939E-02	1.40293E-01
-0.10000	4.35144E-02	1.35891E-01
-0.20000	4.03403E-02	1.33565E-01
-0.30000	3.84411E-02	1.33121E-01
-0.40000	3.76353E-02	1.34447E-01
-0.50000	3.77888E-02	1.37504E-01
-0.60000	3.88126E-02	1.42331E-01
-0.70000	4.06618E-02	1.49045E-01
-0.80000	4.33342E-02	1.57847E-01
-0.90000	4.68689E-02	1.69024E-01
-1.00000	5.13452E-02	1.82954E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 2.337
 σ_{SE} = 1.035
 σ_{CE} = 1.302

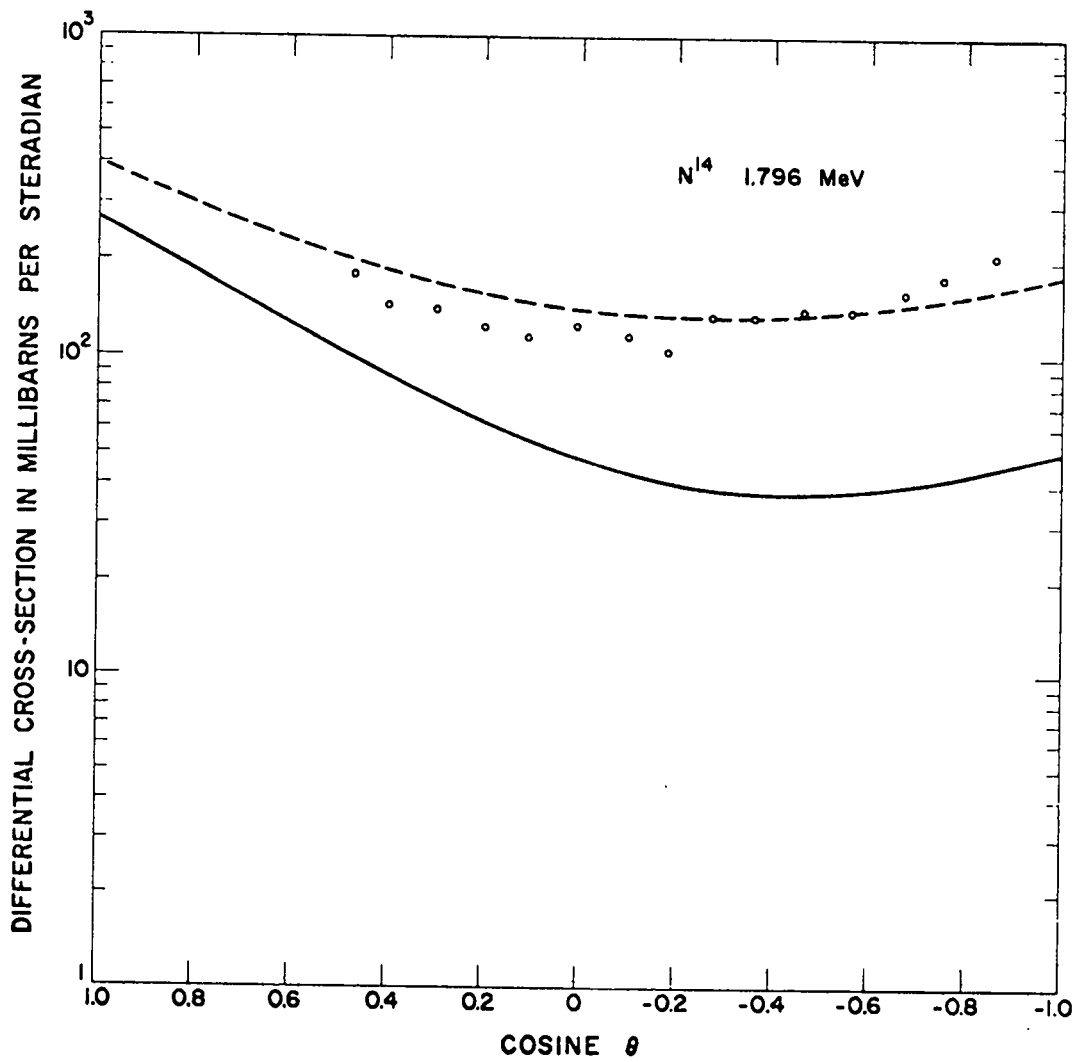


Figure 102

¹¹
N

2.07 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.77119E-01	4.09552E-01
0.90000	2.23908E-01	3.46184E-01
0.80000	1.84011E-01	2.94125E-01
0.70000	1.44157E-01	2.51753E-01
0.60000	1.15198E-01	2.17641E-01
0.50000	9.21091E-02	1.90535E-01
0.40000	7.39766E-02	1.69342E-01
0.30000	5.99917E-02	1.53113E-01
0.20000	4.94451E-02	1.41035E-01
0.10000	4.17210E-02	1.32421E-01
0.00000	3.62924E-02	1.26700E-01
-0.10000	3.27167E-02	1.23417E-01
-0.20000	3.06315E-02	1.22222E-01
-0.30000	2.97578E-02	1.22872E-01
-0.40000	2.98623E-02	1.25227E-01
-0.50000	3.08240E-02	1.29250E-01
-0.60000	3.25617E-02	1.35004E-01
-0.70000	3.50672E-02	1.42664E-01
-0.80000	3.83953E-02	1.52509E-01
-0.90000	4.26630E-02	1.64940E-01
-1.00000	4.80471E-02	1.80481E-01

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 2.217$
 $\sigma_{SE} = .928$
 $\sigma_{CE} = 1.289$

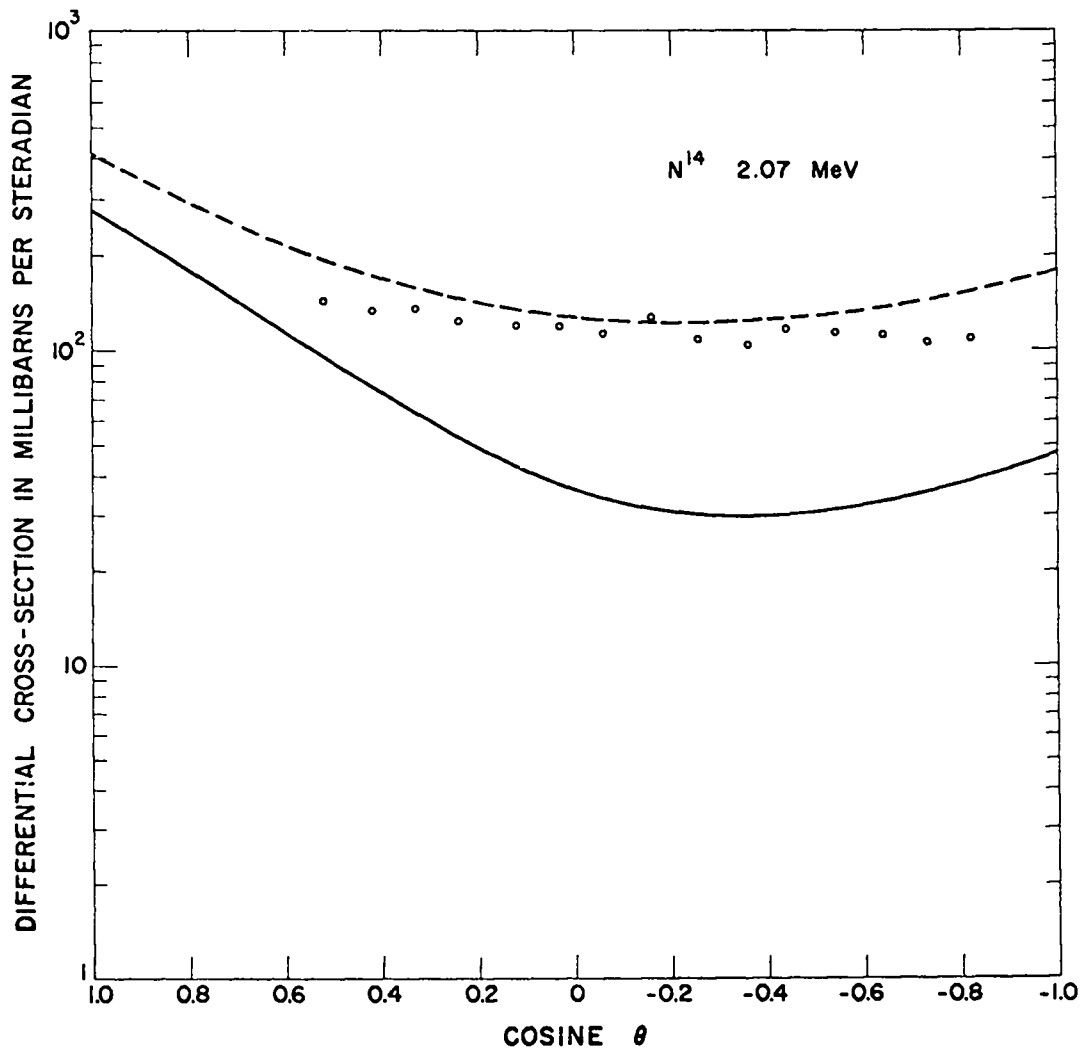


Figure 103

N^{11}_L

2.25 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.83335E-01	4.15990E-01
0.90000	2.24574E-01	3.46684E-01
0.80000	1.76763E-01	2.90429E-01
0.70000	1.38311E-01	2.45256E-01
0.60000	1.07796E-01	2.09439E-01
0.50000	8.39545E-02	1.81471E-01
0.40000	6.56671E-02	1.60043E-01
0.30000	5.19504E-02	1.44025E-01
0.20000	4.19486E-02	1.32454E-01
0.10000	3.49254E-02	1.24518E-01
0.00000	3.02574E-02	1.19550E-01
-0.10000	2.74277E-02	1.17020E-01
-0.20000	2.60206E-02	1.16526E-01
-0.30000	2.57168E-02	1.17791E-01
-0.40000	2.62888E-02	1.20664E-01
-0.50000	2.75978E-02	1.25114E-01
-0.60000	2.95896E-02	1.31232E-01
-0.70000	3.22922E-02	1.39238E-01
-0.80000	3.58131E-02	1.49480E-01
-0.90000	4.03372E-02	1.62447E-01
-1.00000	4.61247E-02	1.78780E-01

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 2.151$
 $\sigma_{SE} = .871$
 $\sigma_{CE} = 1.280$

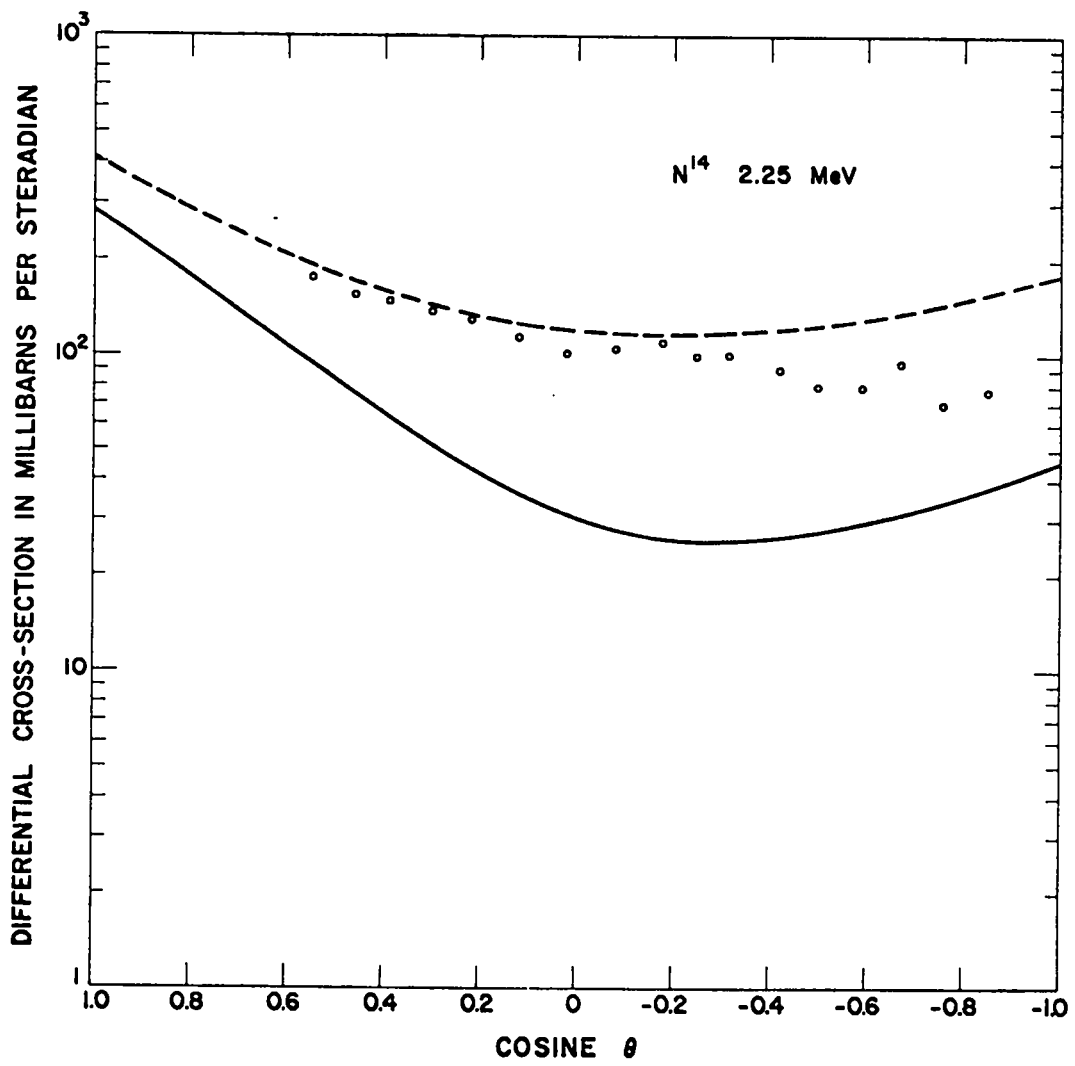


Figure 104

N^{14}

2.36 MeV

COSSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.87138E-01	4.19846E-01
0.90000	2.24996E-01	3.46940E-01
0.80000	1.74843E-01	2.88189E-01
0.70000	1.34879E-01	2.41395E-01
0.60000	1.03503E-01	2.04637E-01
0.50000	7.92923E-02	1.76242E-01
0.40000	6.09947E-02	1.54761E-01
0.30000	4.75144E-02	1.38950E-01
0.20000	3.79018E-02	1.27748E-01
0.10000	3.13446E-02	1.20266E-01
0.00000	2.71587E-02	1.15777E-01
-0.10000	2.47817E-02	1.13703E-01
-0.20000	2.37660E-02	1.13612E-01
-0.30000	2.37735E-02	1.15209E-01
-0.40000	2.45702E-02	1.18337E-01
-0.50000	2.60223E-02	1.22972E-01
-0.60000	2.80920E-02	1.29226E-01
-0.70000	3.08347E-02	1.37351E-01
-0.80000	3.43959E-02	1.47743E-01
-0.90000	3.90089E-02	1.60953E-01
-1.00000	4.49925E-02	1.77700E-01

(DSIGMAS IN BARNS/STERADIAN)

$$\begin{aligned}\sigma_T &= 2.114 \\ \sigma_{SE} &= .840 \\ \sigma_{CE} &= 1.274\end{aligned}$$

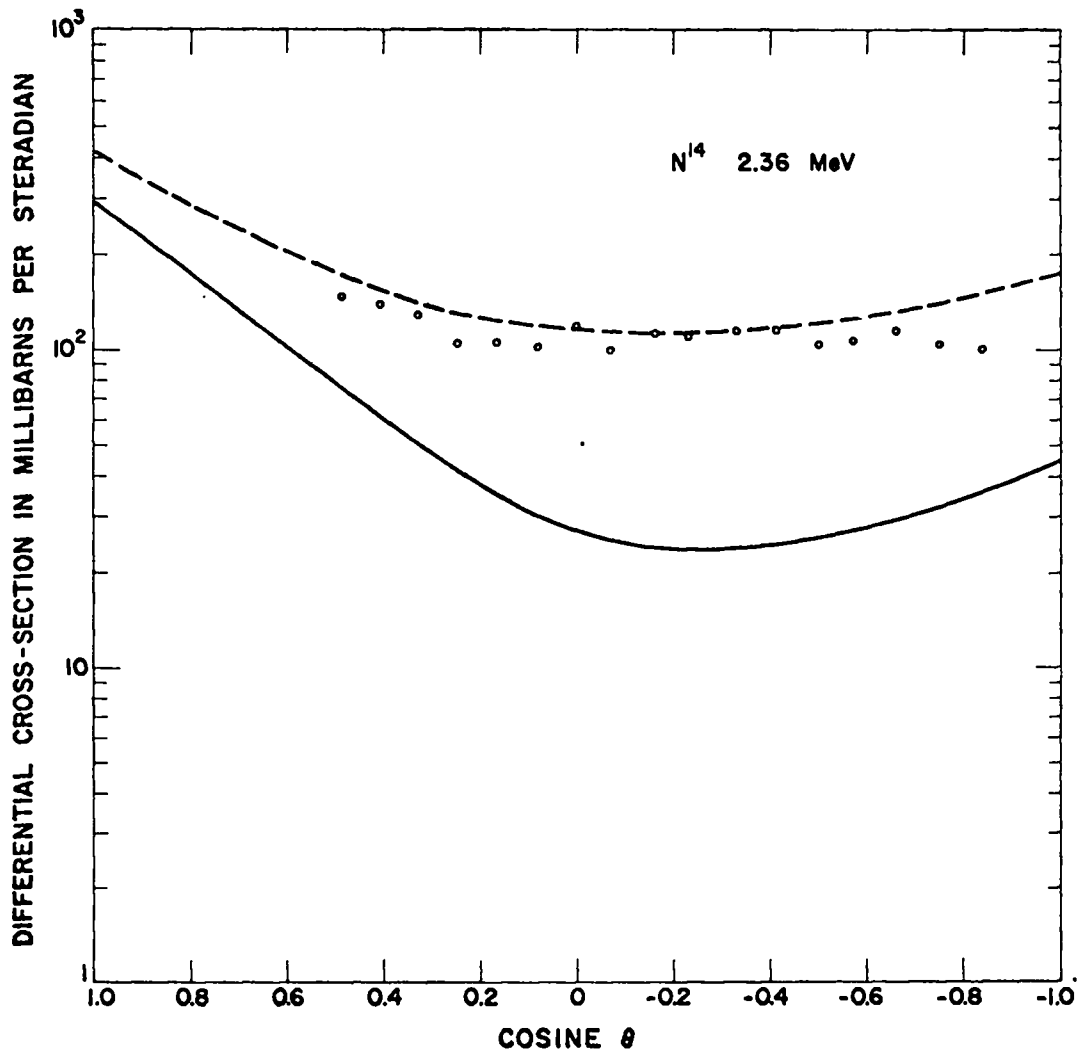


Figure 105

N^{14}

3.07 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.12034E-01	4.36909E-01
0.90000	2.28183E-01	3.41261E-01
0.80000	1.63749E-01	2.67577E-01
0.70000	1.15257E-01	2.11841E-01
0.60000	7.96954E-02	1.70631E-01
0.50000	5.44588E-02	1.41034E-01
0.40000	3.73098E-02	1.20582E-01
0.30000	2.63416E-02	1.07200E-01
0.20000	1.99471E-02	9.91603E-02
0.10000	1.67933E-02	9.50497E-02
0.00000	1.57988E-02	9.37412E-02
-0.10000	1.61152E-02	9.43716E-02
-0.20000	1.71124E-02	9.63256E-02
-0.30000	1.83651E-02	9.92236E-02
-0.40000	1.96427E-02	1.02915E-01
-0.50000	2.09013E-02	1.07476E-01
-0.60000	2.22767E-02	1.13212E-01
-0.70000	2.40798E-02	1.20663E-01
-0.80000	2.67926E-02	1.30621E-01
-0.90000	3.10659E-02	1.44144E-01
-1.00000	3.77178E-02	1.62593E-01

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 1.927$
 $\sigma_{SE} = .704$
 $\sigma_{CE} = 1.147$

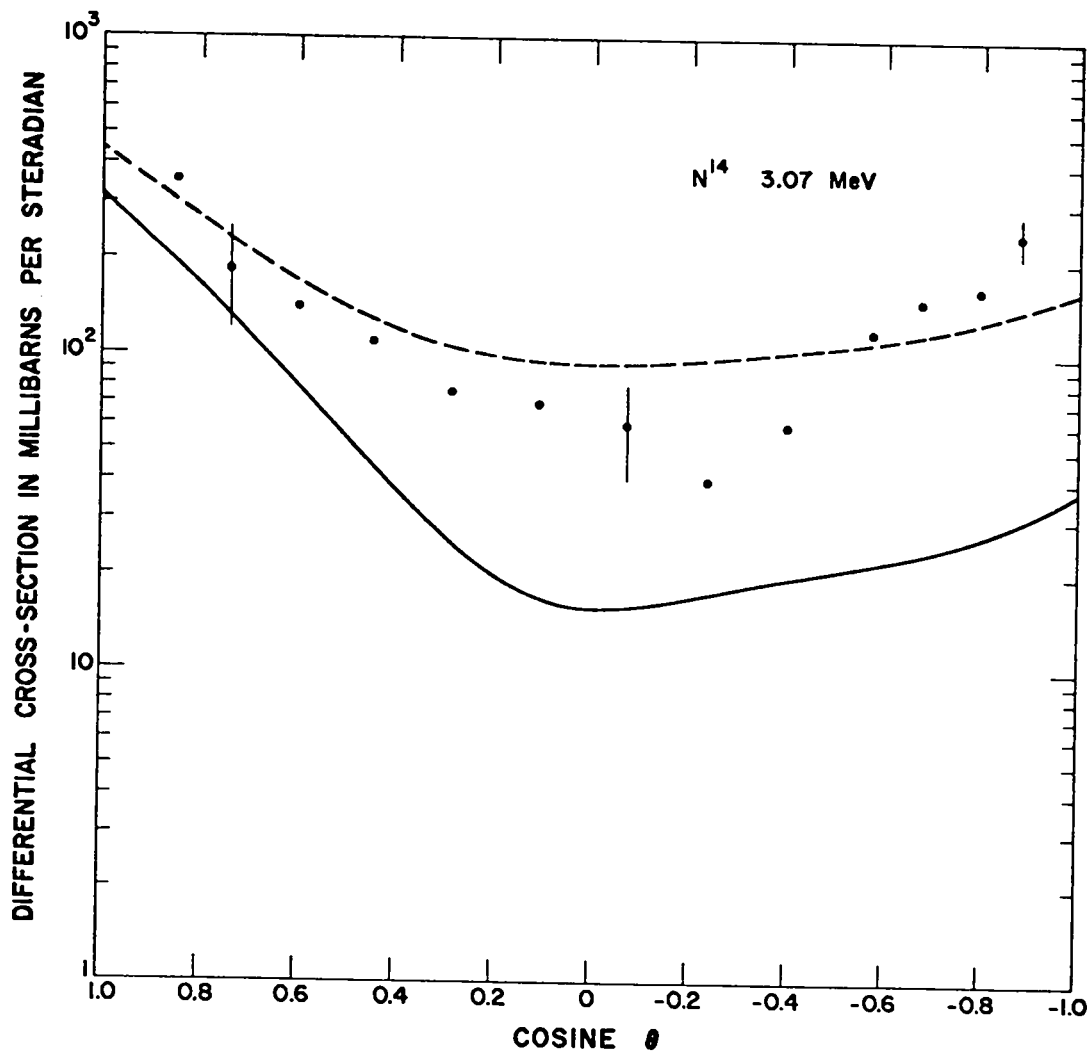


Figure 106

N^{14}

3.51 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.27410E-01	4.47571E-01
0.90000	2.30368E-01	3.38301E-01
0.80000	1.57819E-01	2.56308E-01
0.70000	1.04986E-01	1.96167E-01
0.60000	6.77989E-02	1.53333E-01
0.50000	4.27995E-02	1.24002E-01
0.40000	2.70683E-02	1.05002E-01
0.30000	1.81582E-02	9.37082E-02
0.20000	1.40419E-02	8.79684E-02
0.10000	1.30676E-02	8.60501E-02
0.00000	1.39232E-02	8.65960E-02
-0.10000	1.56069E-02	8.85895E-02
-0.20000	1.74037E-02	9.13302E-02
-0.30000	1.88668E-02	9.44169E-02
-0.40000	1.98040E-02	9.77378E-02
-0.50000	2.02659E-02	1.01468E-01
-0.60000	2.05396E-02	1.06073E-01
-0.70000	2.11428E-02	1.12323E-01
-0.80000	2.28214E-02	1.21310E-01
-0.90000	2.65486E-02	1.34482E-01
-1.00000	3.35256E-02	1.53686E-01

(DSIGMAS IN BARNS/STERADIAN)

$\sigma_T = 1.841$
 $\sigma_{SE} = .656$
 $\sigma_{CE} = 1.081$

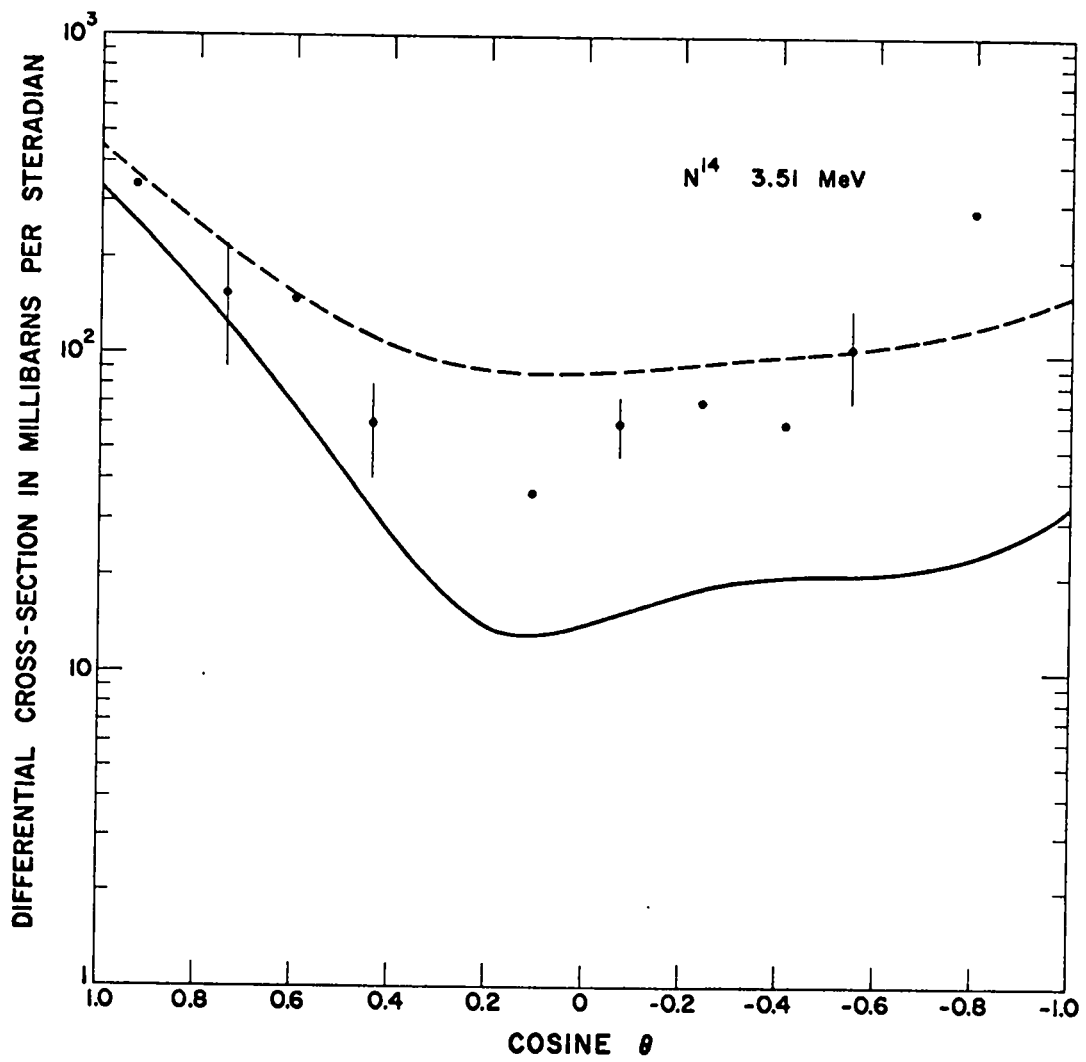


Figure 107

N¹⁴

4.05 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.46574E-01	4.61263E-01
0.90000	2.33482E-01	3.35421E-01
0.80000	1.51570E-01	2.43866E-01
0.70000	9.41412E-02	1.79102E-01
0.60000	5.56355E-02	1.35004E-01
0.50000	3.14479E-02	1.06567E-01
0.40000	1.77806E-02	8.97113E-02
0.30000	1.15225E-02	8.11351E-02
0.20000	1.01531E-02	7.81886E-02
0.10000	1.16643E-02	7.87832E-02
0.00000	1.45000E-02	8.13180E-02
-0.10000	1.75082E-02	8.46270E-02
-0.20000	1.99044E-02	8.79400E-02
-0.30000	2.12454E-02	9.08579E-02
-0.40000	2.14094E-02	9.33402E-02
-0.50000	2.05844E-02	9.57031E-02
-0.60000	1.92601E-02	9.86289E-02
-0.70000	1.82258E-02	1.03187E-01
-0.80000	1.85713E-02	1.10867E-01
-0.90000	2.16910E-02	1.23629E-01
-1.00000	2.92908E-02	1.43979E-01

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 1.758$
 $\sigma_{SE} = .620$
 $\sigma_{CE} = 1.005$

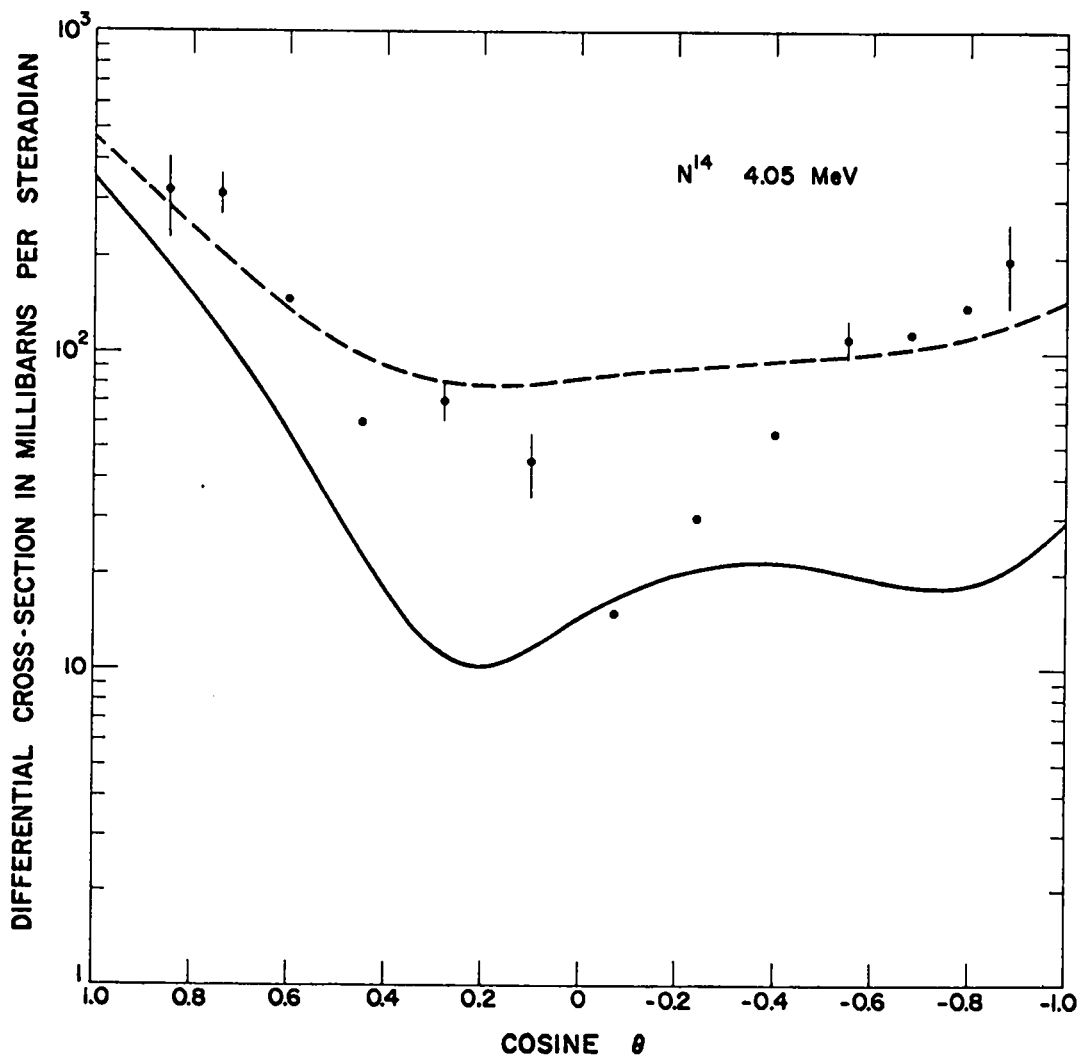


Figure 108

N¹⁴

4.30 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.55934E-01	4.64779E-01
0.90000	2.35282E-01	3.31171E-01
0.80000	1.49134E-01	2.35335E-01
0.70000	8.97539E-02	1.68657E-01
0.60000	5.08045E-02	1.24186E-01
0.50000	2.71050E-02	9.63133E-02
0.40000	1.44357E-02	8.05258E-02
0.30000	9.38115E-03	7.32089E-02
0.20000	9.20559E-03	7.14960E-02
0.10000	1.17541E-02	7.31513E-02
0.00000	1.53763E-02	7.64803E-02
-0.10000	1.88674E-02	8.02645E-02
-0.20000	2.14247E-02	8.37151E-02
-0.30000	2.26161E-02	8.64439E-02
-0.40000	2.23590E-02	8.84491E-02
-0.50000	2.09066E-02	9.01149E-02
-0.60000	1.88427E-02	9.22238E-02
-0.70000	1.70801E-02	9.59831E-02
-0.80000	1.68655E-02	1.03067E-01
-0.90000	1.97865E-02	1.15676E-01
-1.00000	2.77830E-02	1.36628E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.727
 σ_{SE} = .610
 σ_{CE} = .931

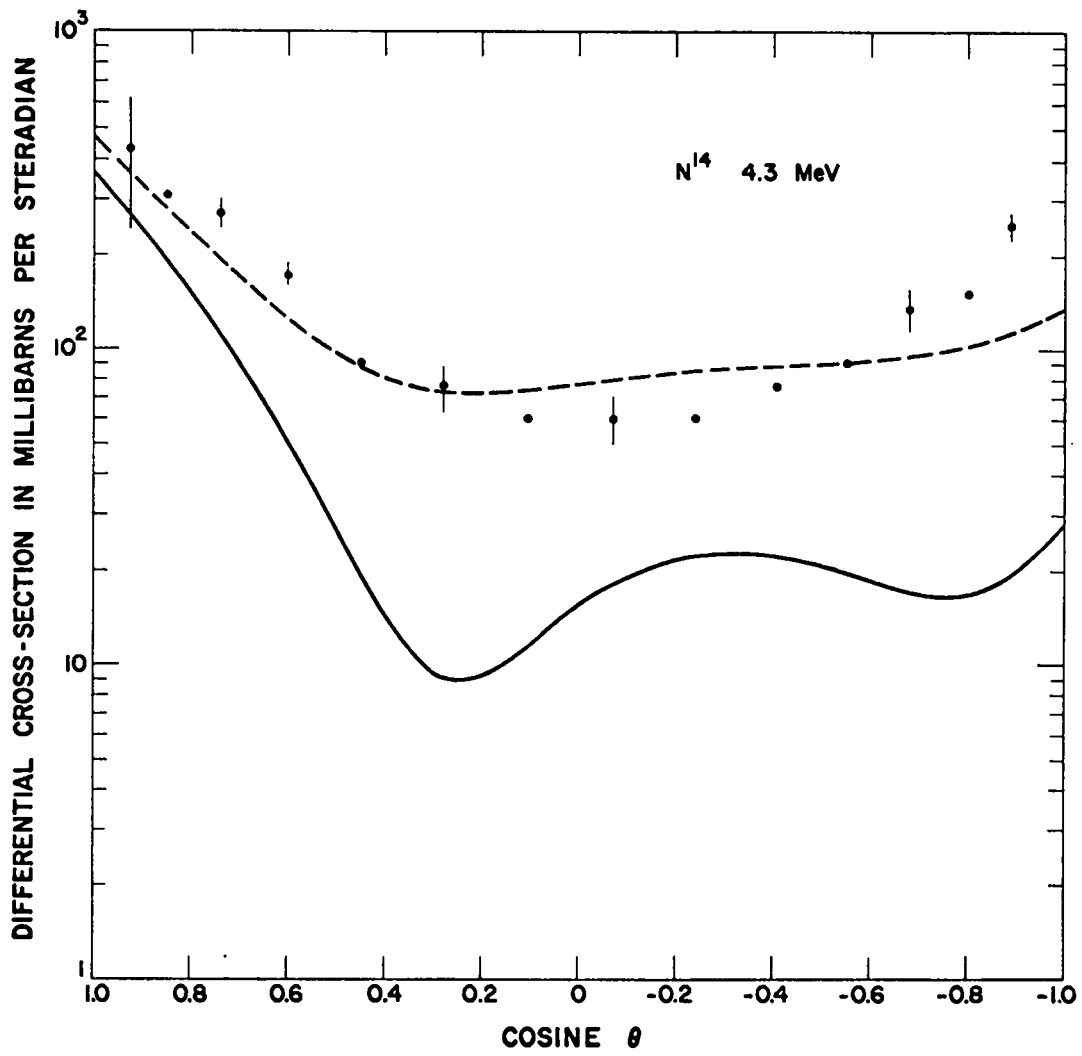


Figure 109

N^{14}

4.50 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.63690E-01	4.68171E-01
0.90000	2.36894E-01	3.28326E-01
0.80000	1.47382E-01	2.29157E-01
0.70000	8.65076E-02	1.61071E-01
0.60000	4.72647E-02	1.16412E-01
0.50000	2.39901E-02	8.90662E-02
0.40000	1.21205E-02	7.41661E-02
0.30000	7.99987E-03	6.78516E-02
0.20000	8.72836E-03	6.70911E-02
0.10000	1.20436E-02	6.95415E-02
0.00000	1.62298E-02	7.34439E-02
-0.10000	2.00487E-02	7.75466E-02
-0.20000	2.26895E-02	8.10522E-02
-0.30000	2.37332E-02	8.35850E-02
-0.40000	2.31298E-02	8.51754E-02
-0.50000	2.11846E-02	8.62607E-02
-0.60000	1.85538E-02	8.77006E-02
-0.70000	1.62455E-02	9.08087E-02
-0.80000	1.56270E-02	9.74013E-02
-0.90000	1.84361E-02	1.09869E-01
-1.00000	2.67956E-02	1.31277E-01

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.705
 σ_{SE} = .604
 σ_{CE} = .879

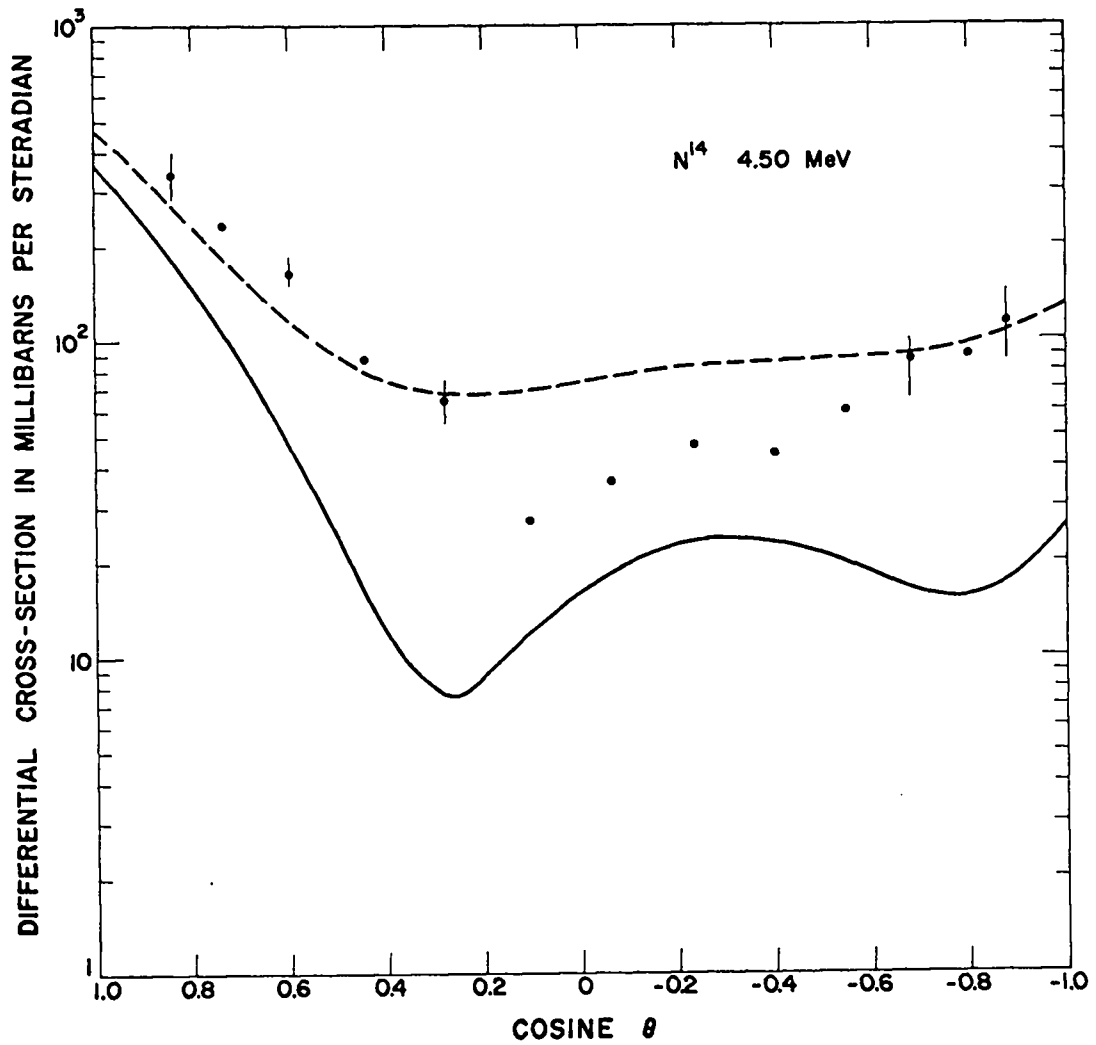


Figure 110

N¹⁴

4.85 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.77983E-01	4.76342E-01
0.90000	2.40121E-01	3.25337E-01
0.80000	1.44726E-01	2.20389E-01
0.70000	8.13478E-02	1.49993E-01
0.60000	4.17021E-02	1.05143E-01
0.50000	1.92266E-02	7.87926E-02
0.40000	8.74072E-03	6.54389E-02
0.30000	6.17489E-03	6.08033E-02
0.20000	8.36131E-03	6.15864E-02
0.10000	1.28731E-02	6.52832E-02
0.00000	1.79030E-02	7.00456E-02
-0.10000	2.21736E-02	7.45837E-02
-0.20000	2.48739E-02	7.80990E-02
-0.30000	2.56162E-02	8.02446E-02
-0.40000	2.44095E-02	8.11077E-02
-0.50000	2.16467E-02	8.12127E-02
-0.60000	1.81031E-02	8.15441E-02
-0.70000	1.49419E-02	8.35873E-02
-0.80000	1.37289E-02	8.93926E-02
-0.90000	1.64507E-02	1.01666E-01
-1.00000	2.55387E-02	1.23898E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.672
 σ_{SE} = .597
 σ_{CE} = .809

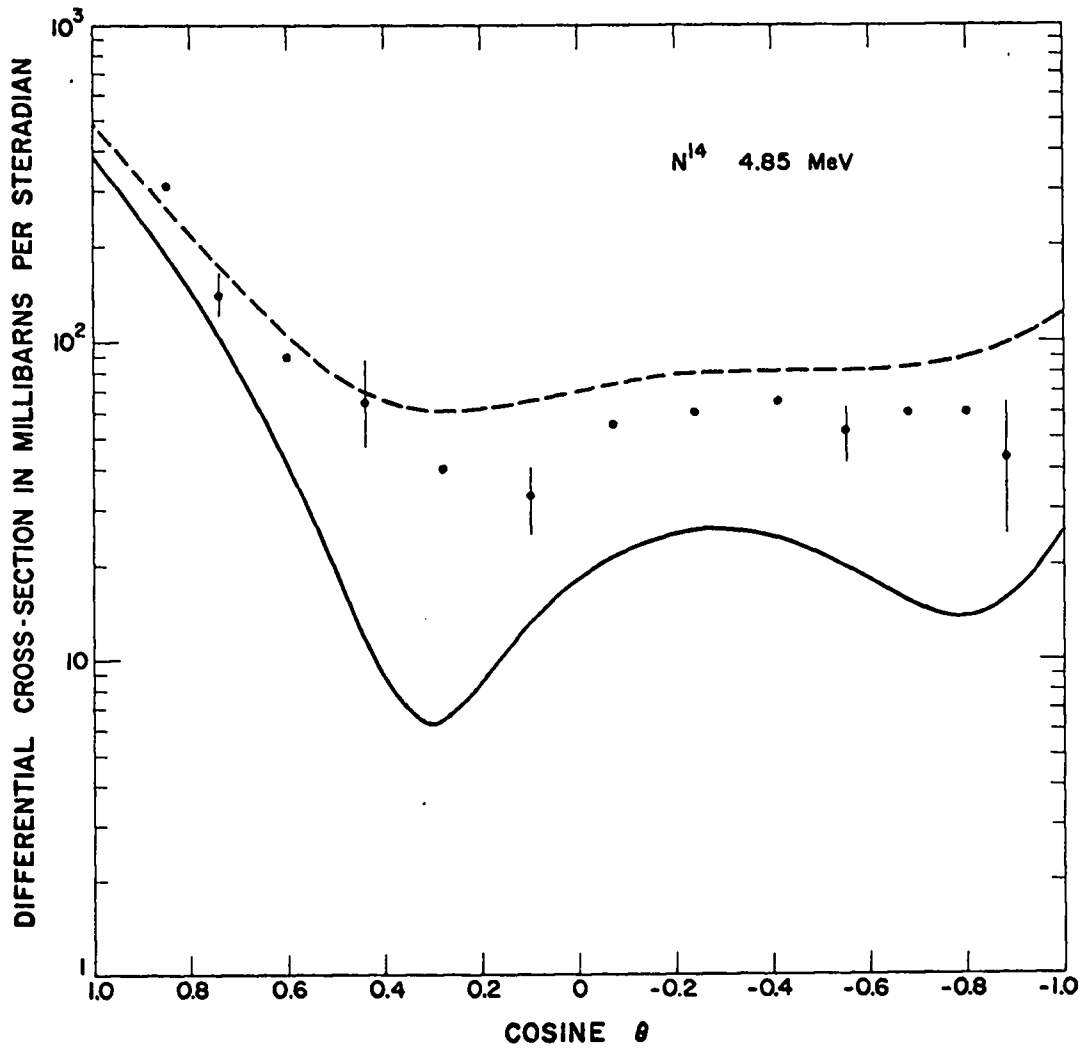


Figure 111

N^{11}

4.99 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.84151E-01	4.80304E-01
0.90000	2.41655E-01	3.24639E-01
0.80000	1.43848E-01	2.17333E-01
0.70000	7.94784E-02	1.46028E-01
0.60000	3.96958E-02	1.01129E-01
0.50000	1.75530E-02	7.51903E-02
0.40000	7.61194E-03	6.24459E-02
0.30000	5.63764E-03	5.84500E-02
0.20000	8.36082E-03	5.98027E-02
0.10000	1.32972E-02	6.39429E-02
0.00000	1.86115E-02	6.89960E-02
-0.10000	2.30186E-02	7.36644E-02
-0.20000	2.57128E-02	7.71547E-02
-0.30000	2.63217E-02	7.91341E-02
-0.40000	2.48787E-02	7.97126E-02
-0.50000	2.18097E-02	7.94471E-02
-0.60000	1.79335E-02	7.93669E-02
-0.70000	1.44705E-02	8.10202E-02
-0.80000	1.30596E-02	8.65443E-02
-0.90000	1.57809E-02	9.87645E-02
-1.00000	2.51839E-02	1.21337E-01

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.661
 σ_{SE} = .596
 σ_{CE} = .784

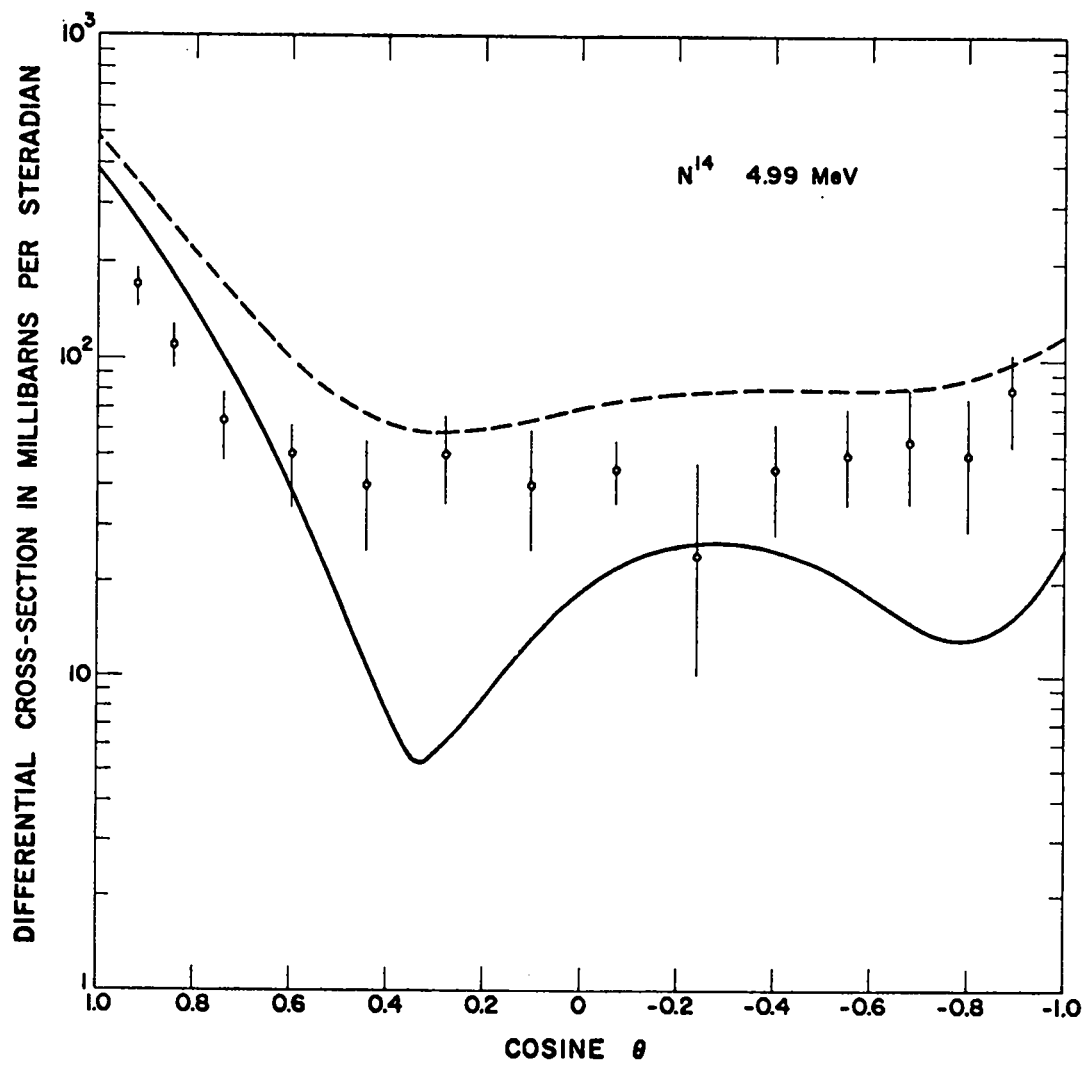


Figure 112

N¹⁴

5.15 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.91338E-01	4.85172E-01
0.90000	2.43471E-01	3.24099E-01
0.80000	1.42918E-01	2.14102E-01
0.70000	7.74483E-02	1.41788E-01
0.60000	3.75379E-02	9.68571E-02
0.50000	1.57852E-02	7.13947E-02
0.40000	6.45624E-03	5.93322E-02
0.30000	5.13084E-03	5.60372E-02
0.20000	8.43052E-03	5.80016E-02
0.10000	1.38124E-02	6.26075E-02
0.00000	1.94161E-02	6.79563E-02
-0.10000	2.39517E-02	7.27468E-02
-0.20000	2.66232E-02	7.61943E-02
-0.30000	2.70772E-02	7.79836E-02
-0.40000	2.53739E-02	7.82498E-02
-0.50000	2.19754E-02	7.75849E-02
-0.60000	1.77474E-02	7.70666E-02
-0.70000	1.39713E-02	7.83108E-02
-0.80000	1.23655E-02	8.35495E-02
-0.90000	1.51131E-02	9.57414E-02
-1.00000	2.48947E-02	1.18728E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.650
 σ_{SE} = .595
 σ_{CE} = .758

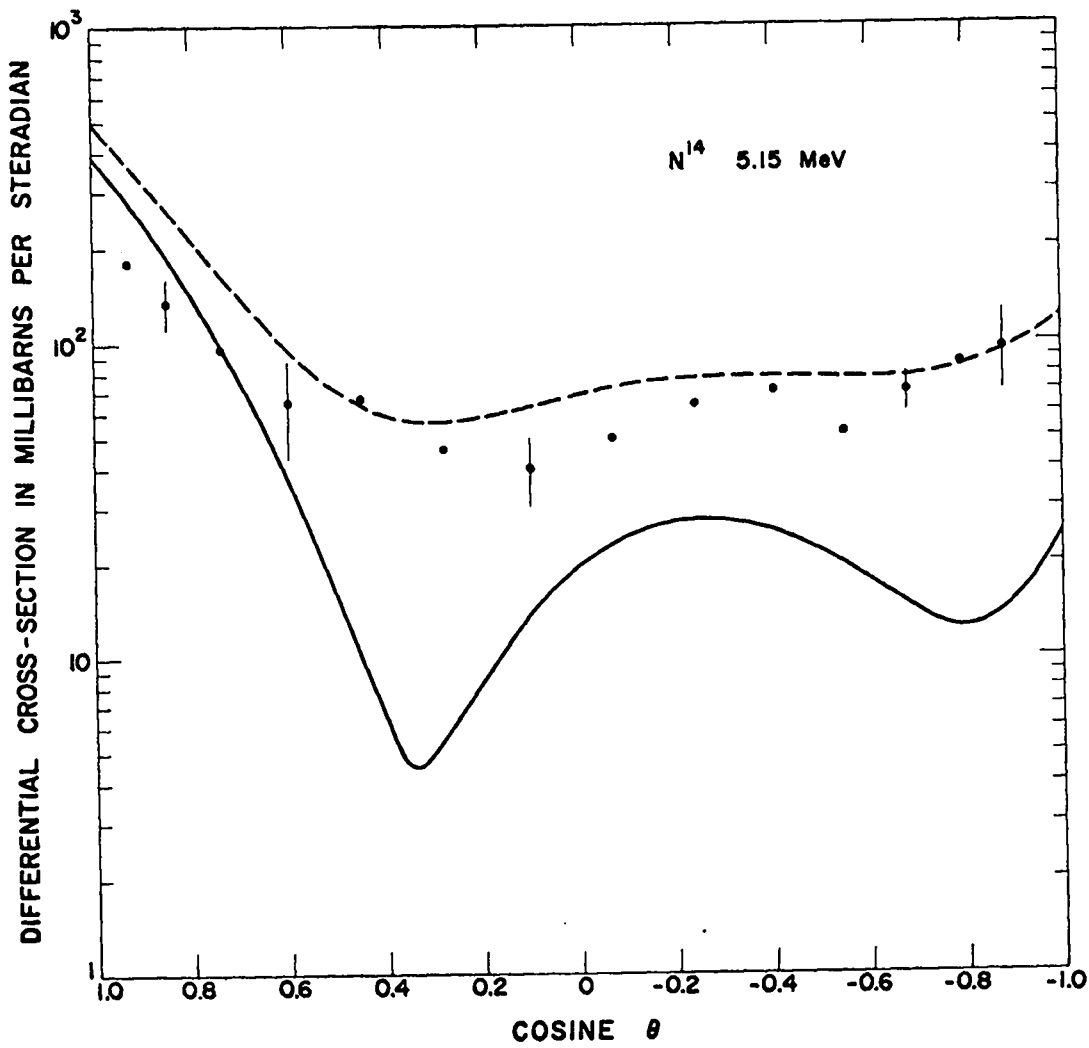


Figure 113

N^{14}

6.02 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	4.36258E-01	5.09534E-01
0.90000	2.55967E-01	3.17027E-01
0.80000	1.39657E-01	1.92469E-01
0.70000	6.83651E-02	1.15505E-01
0.60000	2.81092E-02	7.12673E-02
0.50000	8.63819E-03	4.89463E-02
0.40000	2.48042E-03	4.07285E-02
0.30000	4.22870E-03	4.10047E-02
0.20000	1.00072E-02	4.57861E-02
0.10000	1.70805E-02	5.22788E-02
0.00000	2.35727E-02	5.85799E-02
-0.10000	2.82720E-02	6.34702E-02
-0.20000	3.05023E-02	6.62812E-02
-0.30000	3.00460E-02	6.68220E-02
-0.40000	2.71071E-02	6.53551E-02
-0.50000	2.23048E-02	6.26129E-02
-0.60000	1.66925E-02	5.98506E-02
-0.70000	1.17939E-02	5.89340E-02
-0.80000	9.65456E-03	6.24666E-02
-0.90000	1.29045E-02	7.39644E-02
-1.00000	2.48288E-02	9.81051E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.613
 σ_{SE} = .602
 σ_{CE} = .557

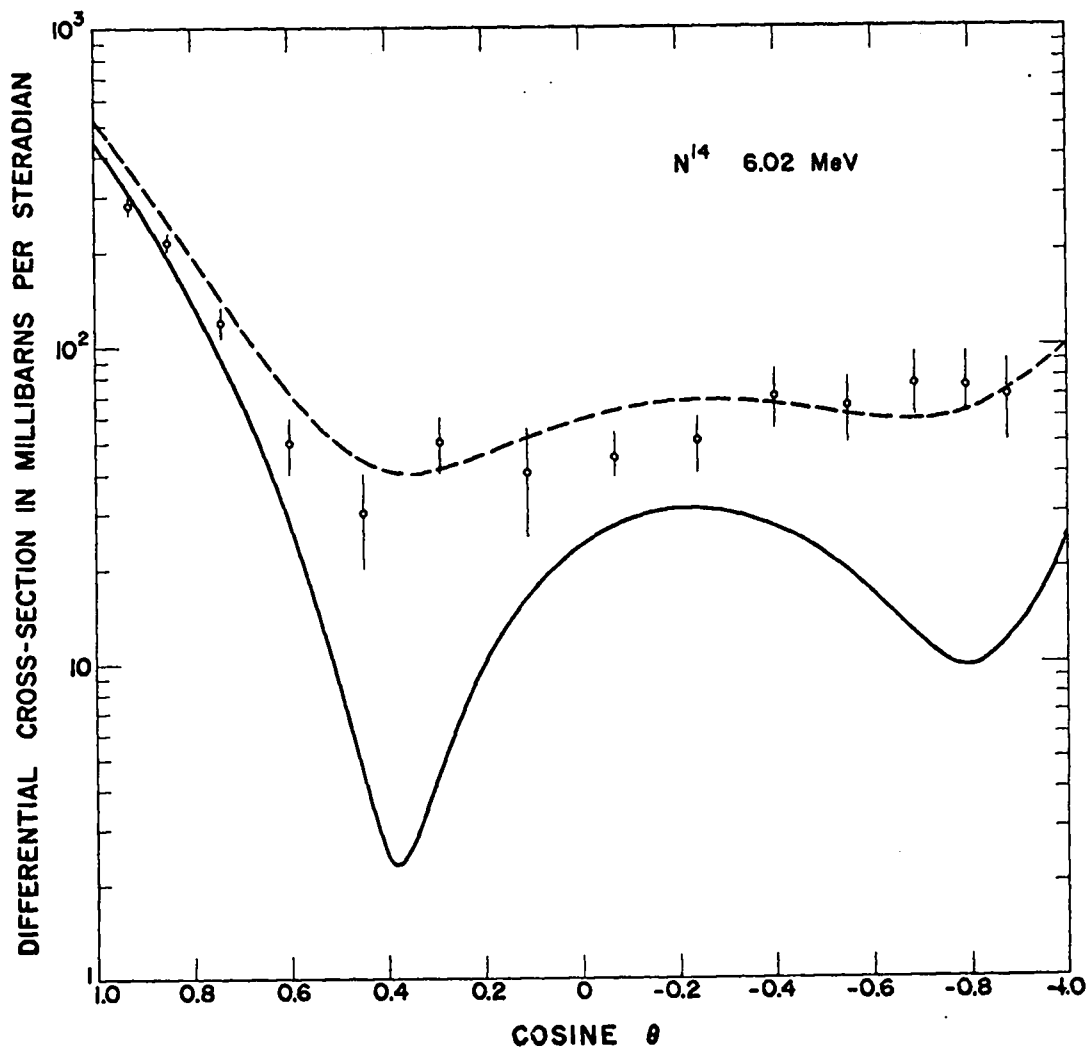


Figure 114

N^{14}

6.53 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	4.67935E-01	5.23310E-01
0.90000	2.65494E-01	3.11021E-01
0.80000	1.39037E-01	1.78115E-01
0.70000	6.43601E-02	9.91254E-02
0.60000	2.41530E-02	5.59601E-02
0.50000	6.14779E-03	3.58713E-02
0.40000	1.73425E-03	2.99636E-02
0.30000	4.93636E-03	3.20995E-02
0.20000	1.16623E-02	3.81016E-02
0.10000	1.91634E-02	4.51797E-02
0.00000	2.56525E-02	5.15293E-02
-0.10000	3.00439E-02	5.60601E-02
-0.20000	3.17862E-02	5.82254E-02
-0.30000	3.07659E-02	5.79291E-02
-0.40000	2.72657E-02	5.54951E-02
-0.50000	2.19630E-02	5.16865E-02
-0.60000	1.59614E-02	4.77685E-02
-0.70000	1.08458E-02	4.56111E-02
-0.80000	8.75582E-03	4.78333E-02
-0.90000	1.24739E-02	5.80004E-02
-1.00000	2.55241E-02	8.08985E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.606
 σ_{SE} = .614
 σ_{CE} = .413

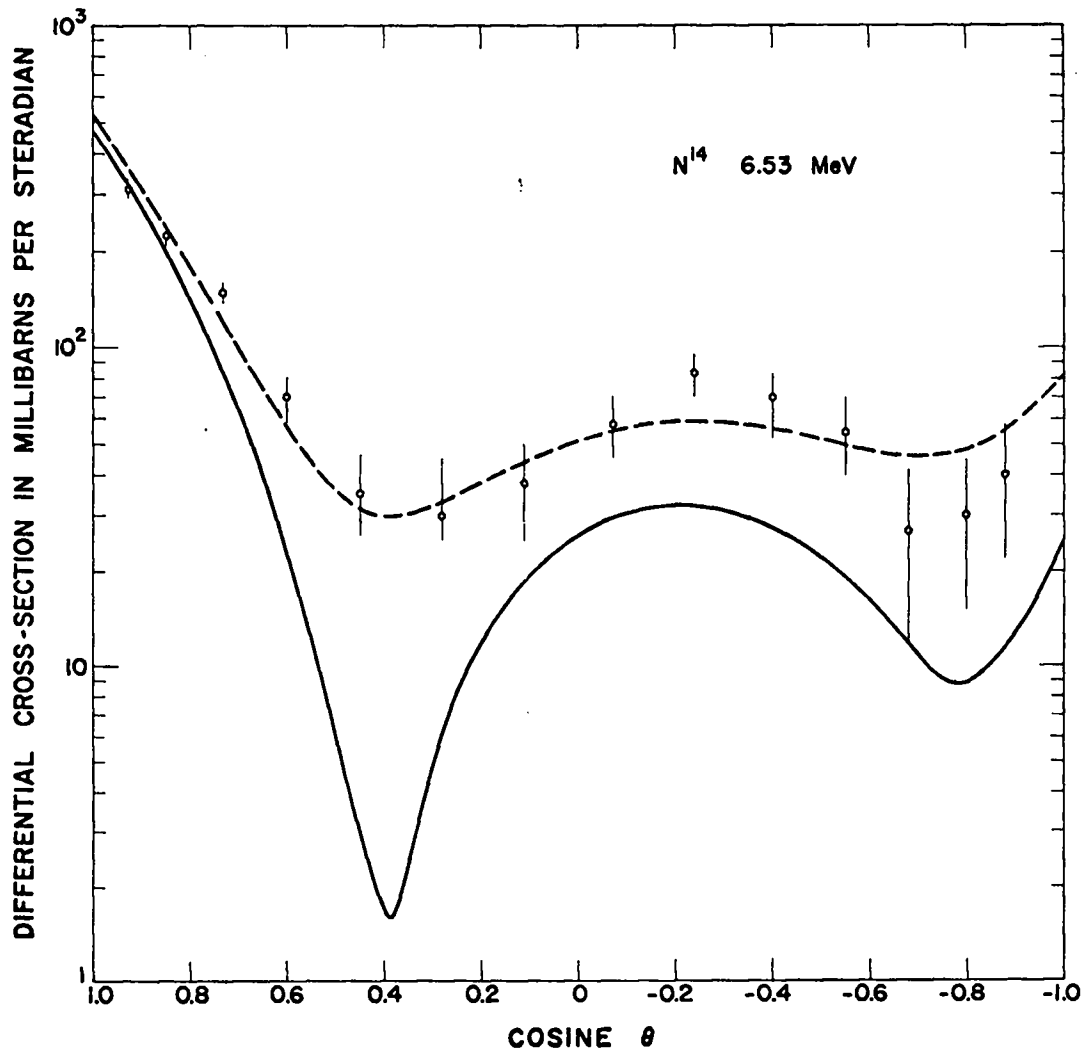


Figure 115

N^{11}

7.0 MeV

COSINE (C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	5.00843E-01	5.44771E-01
0.90000	2.75675E-01	3.11330E-01
0.80000	1.39176E-01	1.69535E-01
0.70000	6.13671E-02	8.82568E-02
0.60000	2.13631E-02	4.59107E-02
0.50000	4.79700E-03	2.77117E-02
0.40000	1.92738E-03	2.36763E-02
0.30000	6.26002E-03	2.71770E-02
0.20000	1.35526E-02	3.39035E-02
0.10000	2.11075E-02	4.11268E-02
0.00000	2.72804E-02	4.71902E-02
-0.10000	3.11510E-02	5.11703E-02
-0.20000	3.23152E-02	5.26660E-02
-0.30000	3.07693E-02	5.16863E-02
-0.40000	2.68628E-02	4.86117E-02
-0.50000	2.13030E-02	4.42177E-02
-0.60000	1.51990E-02	3.97466E-02
-0.70000	1.01352E-02	3.70250E-02
-0.80000	8.26726E-03	3.86266E-02
-0.90000	1.24347E-02	4.80894E-02
-1.00000	2.62868E-02	7.02146E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.607
 σ_{SE} = .628
 σ_{CE} = .320

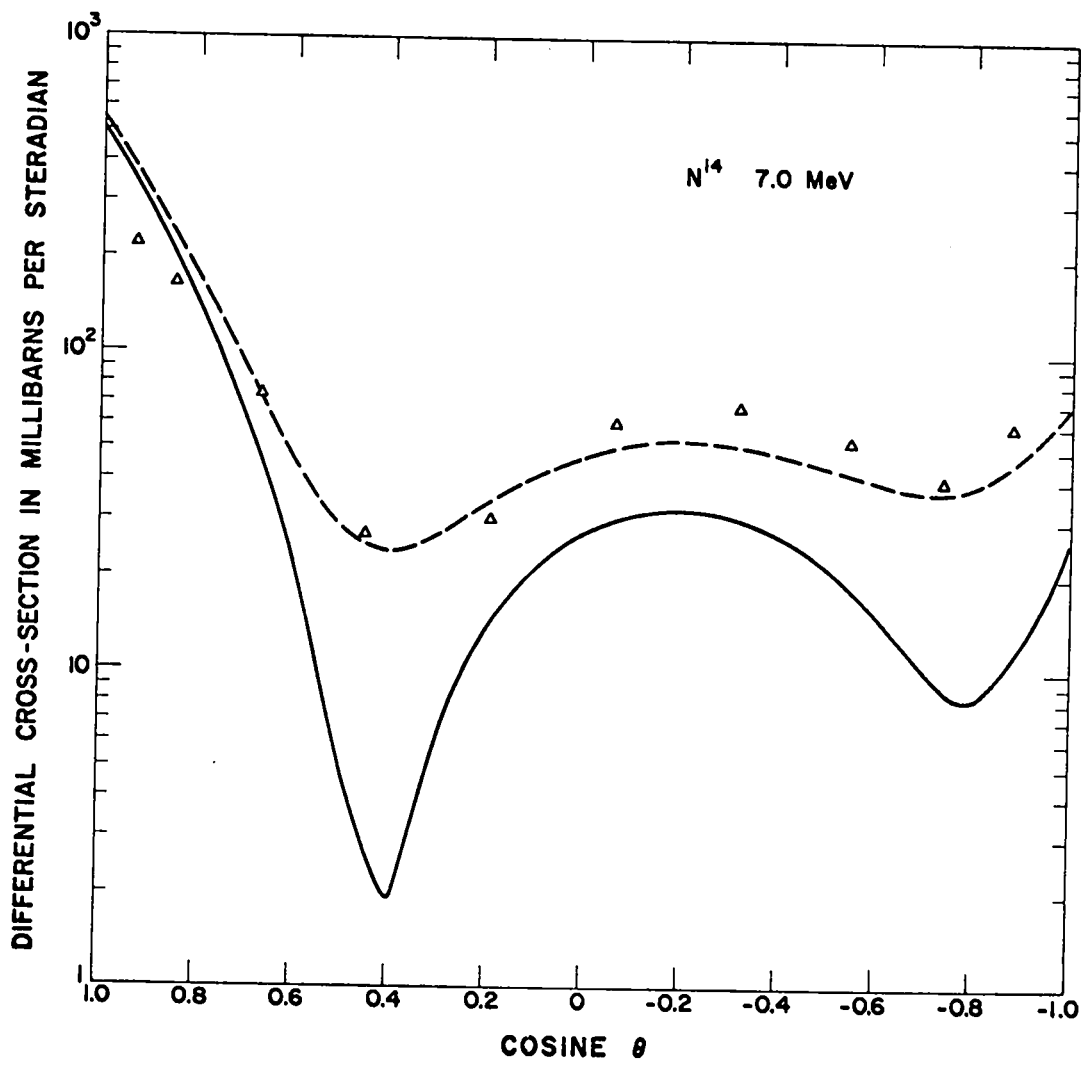


Figure 116

N^{14}

8.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	5.82408E-01	6.11732E-01
0.90000	3.01434E-01	3.24743E-01
0.80000	1.41348E-01	1.60937E-01
0.70000	5.67875E-02	7.40025E-02
0.60000	1.76517E-02	3.32941E-02
0.50000	4.38198E-03	1.89402E-02
0.40000	4.60257E-03	1.83907E-02
0.30000	1.07486E-02	2.39875E-02
0.20000	1.84056E-02	3.12703E-02
0.10000	2.51646E-02	3.78097E-02
0.00000	2.98502E-02	4.24227E-02
-0.10000	3.20197E-02	4.46648E-02
-0.20000	3.16591E-02	4.45238E-02
-0.30000	2.90218E-02	4.22607E-02
-0.40000	2.45728E-02	3.83609E-02
-0.50000	1.90079E-02	3.35662E-02
-0.60000	1.33291E-02	2.89715E-02
-0.70000	8.96026E-03	2.61753E-02
-0.80000	7.89185E-03	2.74803E-02
-0.90000	1.28470E-02	3.61552E-02
-1.00000	2.74623E-02	5.67864E-02

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 1.627$
 $\sigma_{SE} = .668$
 $\sigma_{CE} = .205$

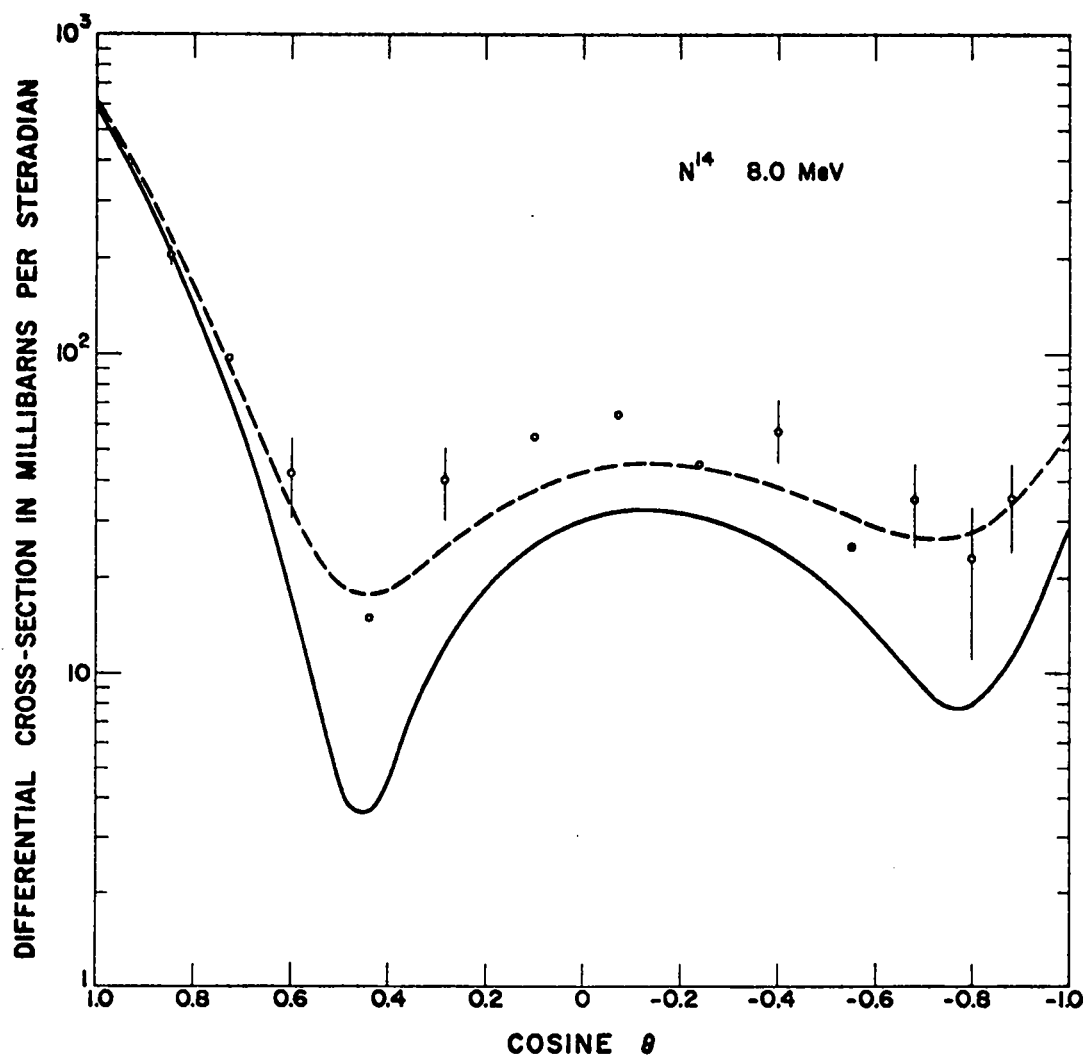


Figure 117

N^{14}

9.0 MeV

CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	6.75786E-01	6.97677E-01
0.90000	3.30977E-01	3.48058E-01
0.80000	1.45274E-01	1.59443E-01
0.70000	5.40565E-02	6.63967E-02
0.60000	1.62286E-02	2.73699E-02
0.50000	6.36266E-03	1.66846E-02
0.40000	9.31880E-03	1.90622E-02
0.30000	1.65701E-02	2.59027E-02
0.20000	2.37148E-02	3.27682E-02
0.10000	2.88139E-02	3.77036E-02
0.00000	3.13044E-02	4.01400E-02
-0.10000	3.13151E-02	4.02048E-02
-0.20000	2.92657E-02	3.83190E-02
-0.30000	2.56640E-02	3.49966E-02
-0.40000	2.10447E-02	3.07882E-02
-0.50000	1.60067E-02	2.63286E-02
-0.60000	1.13205E-02	2.24618E-02
-0.70000	8.08586E-03	2.04260E-02
-0.80000	7.92314E-03	2.20928E-02
-0.90000	1.31894E-02	3.02699E-02
-1.00000	2.72103E-02	4.91010E-02

(DSIGMAS IN BARNS/STERADIAN)

$\sigma_T = 1.657$
 $\sigma_{SE} = .715$
 $\sigma_{CE} = .147$

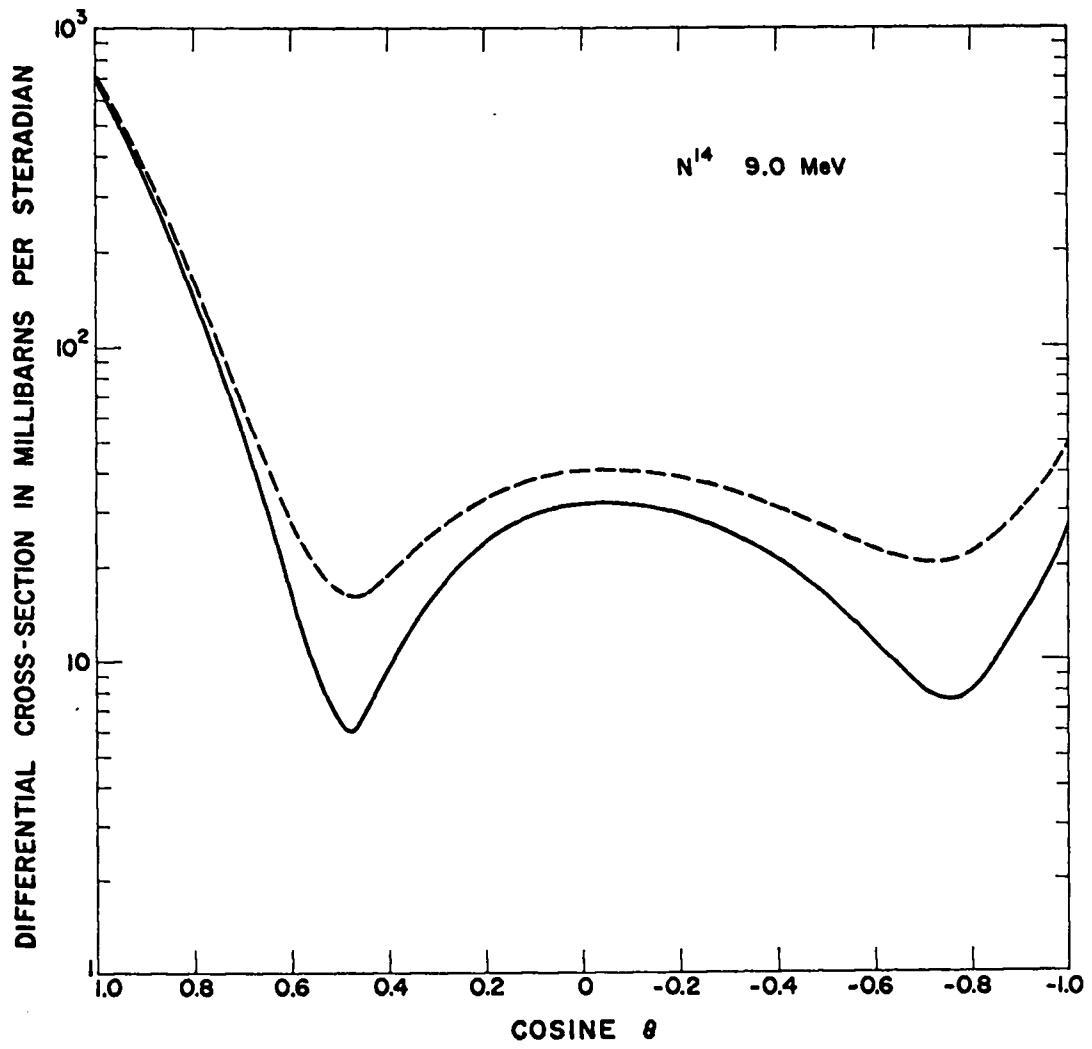


Figure 118

N ¹⁴		10.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	7.75207E-01	7.92337E-01	
0.90000	3.62092E-01	3.75235E-01	
0.80000	1.50197E-01	1.60974E-01	
0.70000	5.26660E-02	6.19763E-02	
0.60000	1.63143E-02	2.46748E-02	
0.50000	9.62394E-03	1.73417E-02	
0.40000	1.48024E-02	2.20703E-02	
0.30000	2.25498E-02	2.95004E-02	
0.20000	2.86353E-02	3.53710E-02	
0.10000	3.16839E-02	3.82941E-02	
0.00000	3.17789E-02	3.83476E-02	
-0.10000	2.96105E-02	3.62206E-02	
-0.20000	2.59964E-02	3.27322E-02	
-0.30000	2.16529E-02	2.86034E-02	
-0.40000	1.71353E-02	2.44032E-02	
-0.50000	1.28952E-02	2.06129E-02	
-0.60000	9.41410E-03	1.77746E-02	
-0.70000	7.39219E-03	1.67026E-02	
-0.80000	7.97161E-03	1.87485E-02	
-0.90000	1.29859E-02	2.61288E-02	
-1.00000	2.52275E-02	4.23574E-02	

(DSIGMAS IN BARNS/STERADIAN

σ_T	=	1.687
σ_{SE}	=	.765
σ_{CE}	=	.111

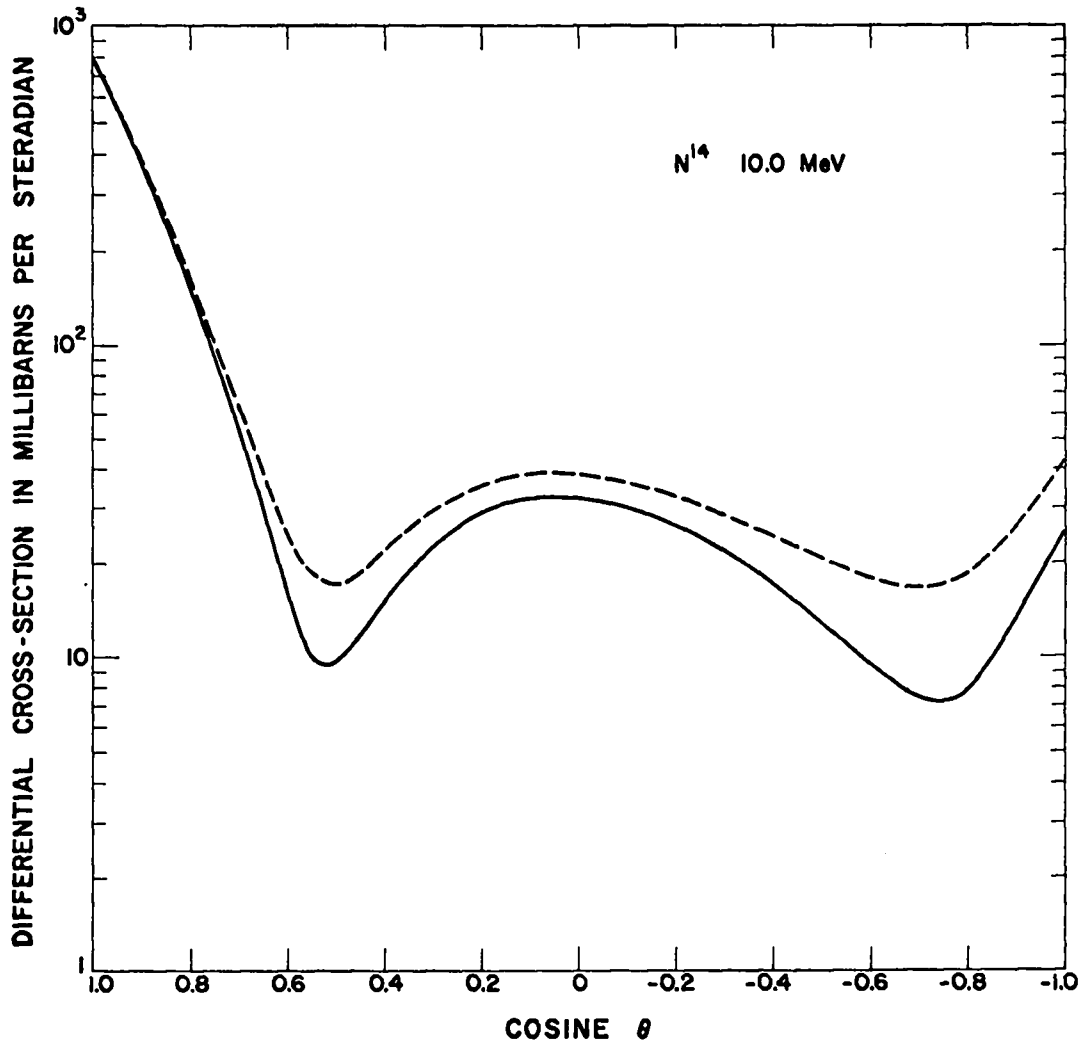


Figure 119

N_{th}	11.0 MeV	12.0 MeV	13.0 MeV	15.0 MeV	16.0 MeV
COSINE (C.M.)					
1.00000	8.7479E-01	9.7141E-01	1.0636E-01	1.2356E-00	1.3175E-00
0.90000	3.9243E-01	4.2051E-01	4.4557E-01	4.8621E-01	5.0220E-01
0.80000	1.5534E-01	1.6006E-01	1.6399E-01	1.6874E-01	1.6931E-01
0.70000	5.2211E-02	5.2285E-02	5.2651E-02	5.3392E-02	5.3405E-02
0.60000	1.7336E-02	1.8852E-02	2.0617E-02	2.4211E-02	2.5806E-02
0.50000	1.3327E-02	1.6939E-02	2.0213E-02	2.5453E-02	2.7422E-02
0.40000	2.0082E-02	2.4597E-02	2.8154E-02	3.2560E-02	3.3647E-02
0.30000	2.7790E-02	3.1808E-02	3.4509E-02	3.6512E-02	3.6217E-02
0.20000	3.2525E-02	3.5069E-02	3.6290E-02	3.5522E-02	3.3998E-02
0.10000	3.3497E-02	3.4155E-02	3.3786E-02	3.0724E-02	2.8456E-02
0.00000	3.1382E-02	3.0234E-02	2.8529E-02	2.4045E-02	2.1566E-02
-0.10000	2.7344E-02	2.4808E-02	2.2223E-02	1.7231E-02	1.4957E-02
-0.20000	2.2506E-02	1.9186E-02	1.6236E-02	1.1407E-02	9.6550E-03
-0.30000	1.7717E-02	1.4256E-02	1.1418E-02	7.4205E-03	6.0959E-03
-0.40000	1.3500E-02	1.0468E-02	8.1153E-03	5.1198E-03	4.2452E-03
-0.50000	1.0134E-02	7.9262E-03	6.2774E-03	4.3009E-03	3.7481E-03
-0.60000	7.8069E-03	6.5592E-03	5.6361E-03	4.4739E-03	4.0834E-03
-0.70000	6.8232E-03	6.3401E-03	5.9168E-03	5.1226E-03	4.7162E-03
-0.80000	7.8520E-03	7.5370E-03	7.0803E-03	5.8946E-03	5.2522E-03
-0.90000	1.2198E-02	1.0991E-02	9.5885E-03	6.8062E-03	5.6029E-03
-1.00000	2.2094E-02	1.8419E-02	1.4697E-02	8.4694E-03	6.1690E-03
	SIGMAS IN BNS/STERAD				
σ_T -	1.712	1.730	1.742	1.754	1.756
σ_{SE} -	.813	.857	.894	.953	.976

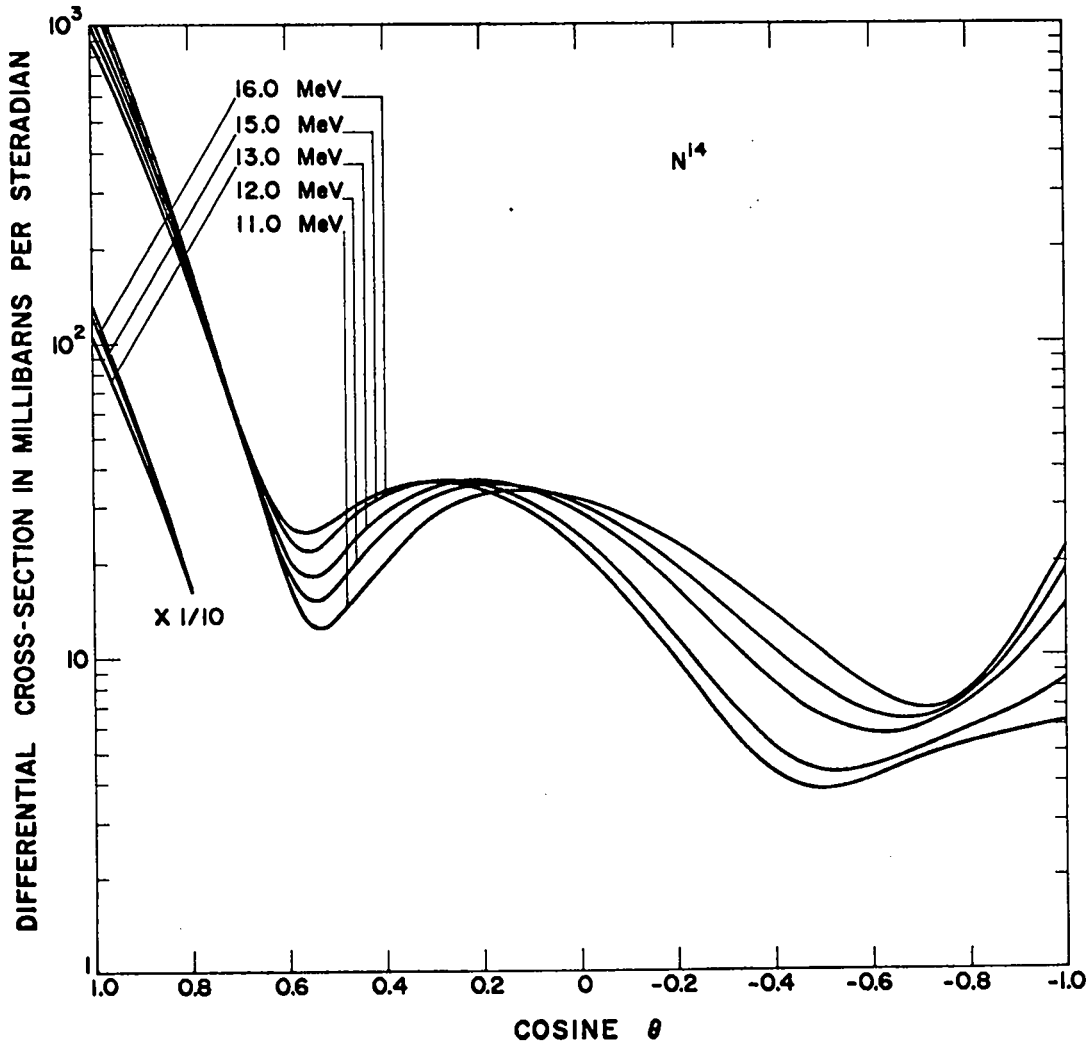


Figure 120

N^{11}

11.6 MeV

COSINE (C.M.)

1.00000	9.3328E-01
0.90000	4.0965E-01
0.80000	1.5828E-01
0.70000	5.2222E-02
0.60000	1.8210E-02
0.50000	1.5526E-02
0.40000	2.2900E-02
0.30000	3.0358E-02
0.20000	3.4216E-02
0.10000	3.4025E-02
0.00000	3.0771E-02
-0.10000	2.5838E-02
-0.20000	2.0476E-02
-0.30000	1.5568E-02
-0.40000	1.1599E-02
-0.50000	8.7394E-03
-0.60000	7.0159E-03
-0.70000	6.5244E-03
-0.80000	7.6828E-03
-0.90000	1.1508E-02
-1.00000	1.9915E-02

DSIGMAS IN BNS/STERAD

$\sigma_T = 1.724$
 $\sigma_{SE} = .840$

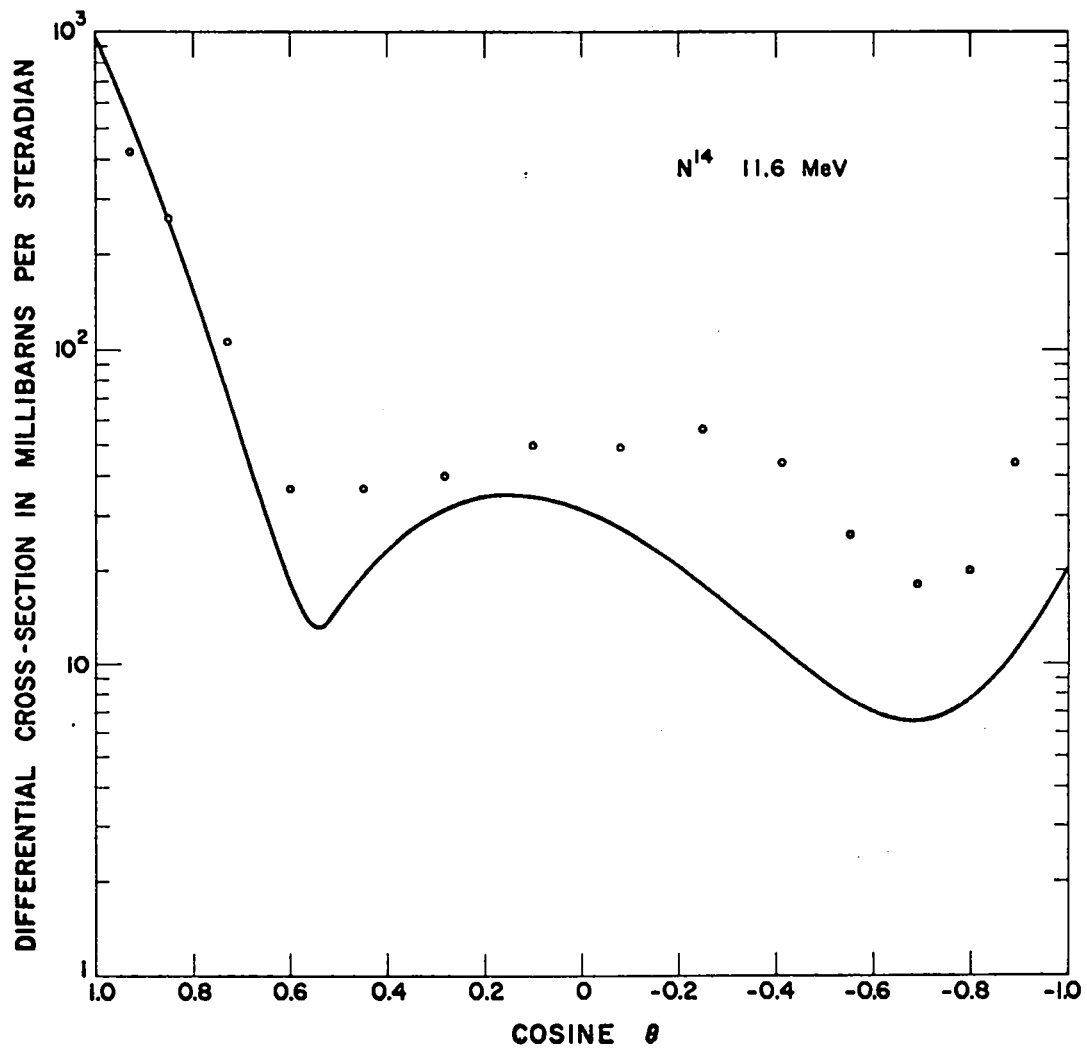


Figure 121

${}^N_{14}\text{Li}$	14.0 MeV
COSINE (C.M.)	
1.00000	1.1512E 00
0.90000	4.6740E-01
0.80000	1.6696E-01
0.70000	5.3111E-02
0.60000	2.2459E-02
0.50000	2.3059E-02
0.40000	3.0775E-02
0.30000	3.6017E-02
0.20000	3.6369E-02
0.10000	3.2574E-02
0.00000	2.6415E-02
-0.10000	1.9670E-02
-0.20000	1.3668E-02
-0.30000	9.1609E-03
-0.40000	6.3673E-03
-0.50000	5.1056E-03
-0.60000	4.9675E-03
-0.70000	5.5181E-03
-0.80000	6.5161E-03
-0.90000	8.1540E-03
-1.00000	1.1322E-02

DSIGMAS IN BNS/STERAD

$$\begin{aligned} \sigma_T &= 1.750 \\ \sigma_{SE} &= .926 \end{aligned}$$

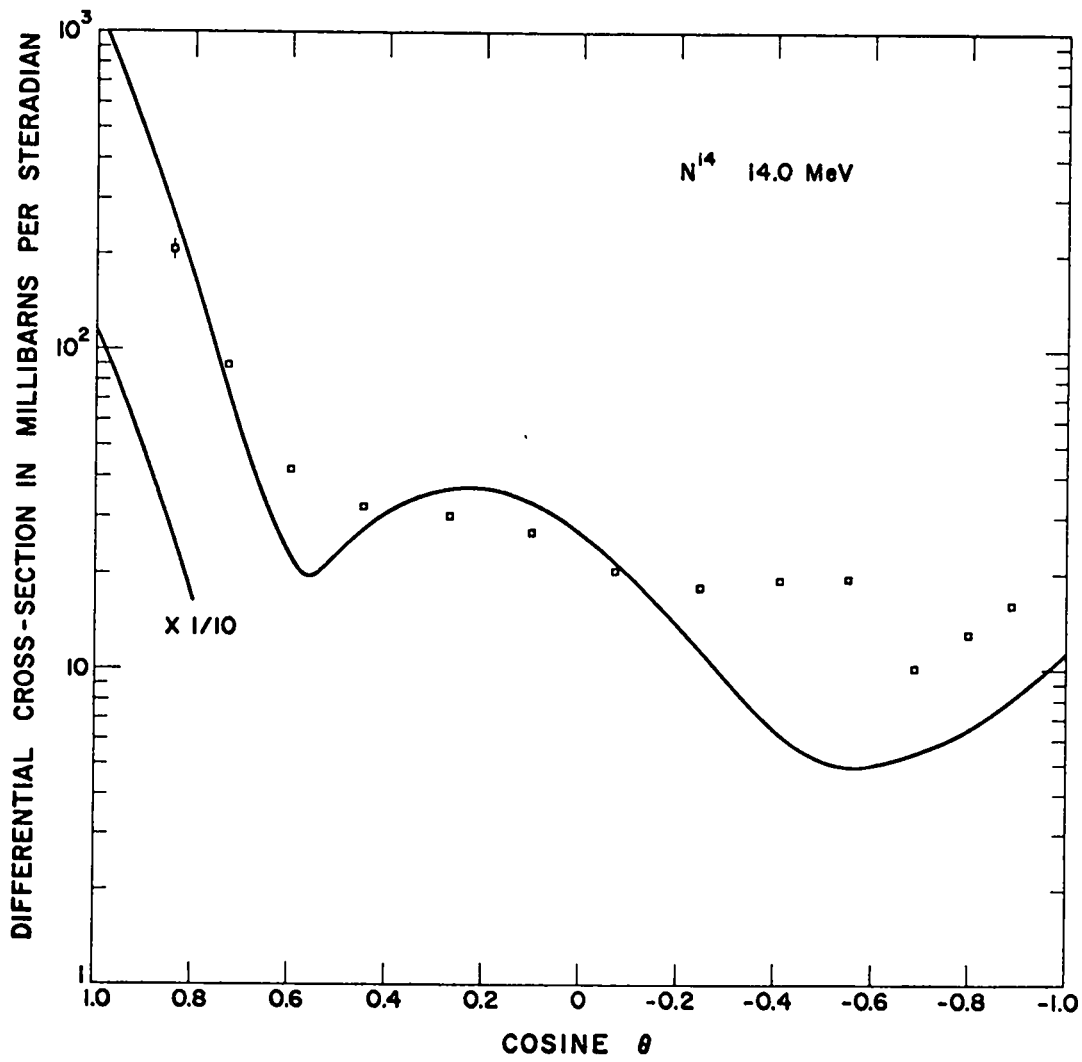
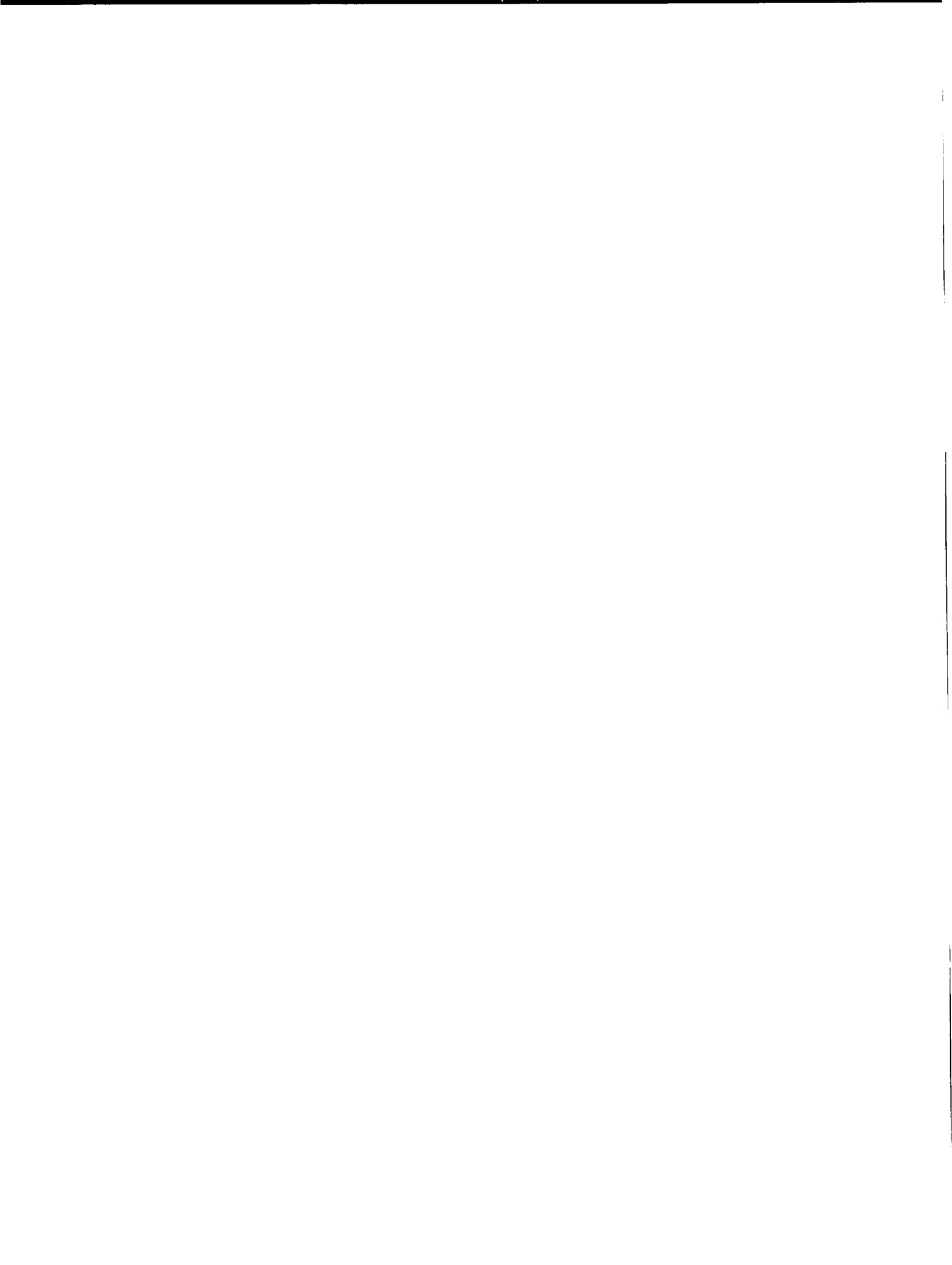


Figure 122



0^{16}

	<u>Energy</u>			<u>Energy Levels</u> *†	
1.00	4.85	G.S.	0^+	13.10	1^-
1.21	5.00	6.05	0^+	13.26	3^-
1.50	5.66	6.13	3^-	13.66	1^+
1.75	6.00	6.92	2^+	13.89	(4^+)
2.00	6.53	7.12	1^-	13.98	2^-
2.15	7.00	8.88	2^-	14.72	[0^+]
2.20	8.00	9.59	1^-		
2.34	9.00	9.85	2^+		
2.56	10.00	10.36	4^+		
2.76	11.00	10.95	0^-		
2.95	11.60	11.08	3^+		
3.00	12.00	11.26	0^+		
3.17	13.00	11.52	2^+		
3.29	14.00	11.63	3^-		
3.35	14.92	12.02	[0^+]		
4.00	15.50	12.44	1^-		
4.30	15.83	12.53	2^-		
4.50	16.00	12.79	0^-		
		12.97	2^-		

* Energy levels obtained from NRC 61-5, 6-229,
except [] values which are assumed.

† Only 25 levels accommodated in program.

0^{16}

1.0 MeV

CCSINE (C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.88132E-01	4.73756E-01
0.90000	2.61455E-01	4.22299E-01
0.80000	2.37346E-01	3.78372E-01
0.70000	2.15610E-01	3.40914E-01
0.60000	1.96065E-01	3.09028E-01
0.50000	1.78536E-01	2.81957E-01
0.40000	1.62863E-01	2.59072E-01
0.30000	1.48895E-01	2.39856E-01
0.20000	1.36491E-01	2.23894E-01
0.10000	1.25521E-01	2.10863E-01
0.00000	1.15862E-01	2.00531E-01
-0.10000	1.07404E-01	1.92747E-01
-0.20000	1.00044E-01	1.87446E-01
-0.30000	9.36875E-02	1.84649E-01
-0.40000	8.82507E-02	1.84460E-01
-0.50000	8.36568E-02	1.87078E-01
-0.60000	7.98379E-02	1.92801E-01
-0.70000	7.67340E-02	2.02038E-01
-0.80000	7.42934E-02	2.15319E-01
-0.90000	7.24718E-02	2.33316E-01
-1.00000	7.12329E-02	2.56857E-01

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 3.145$
 $\sigma_{SE} = 1.717$
 $\sigma_{CE} = 1.428$

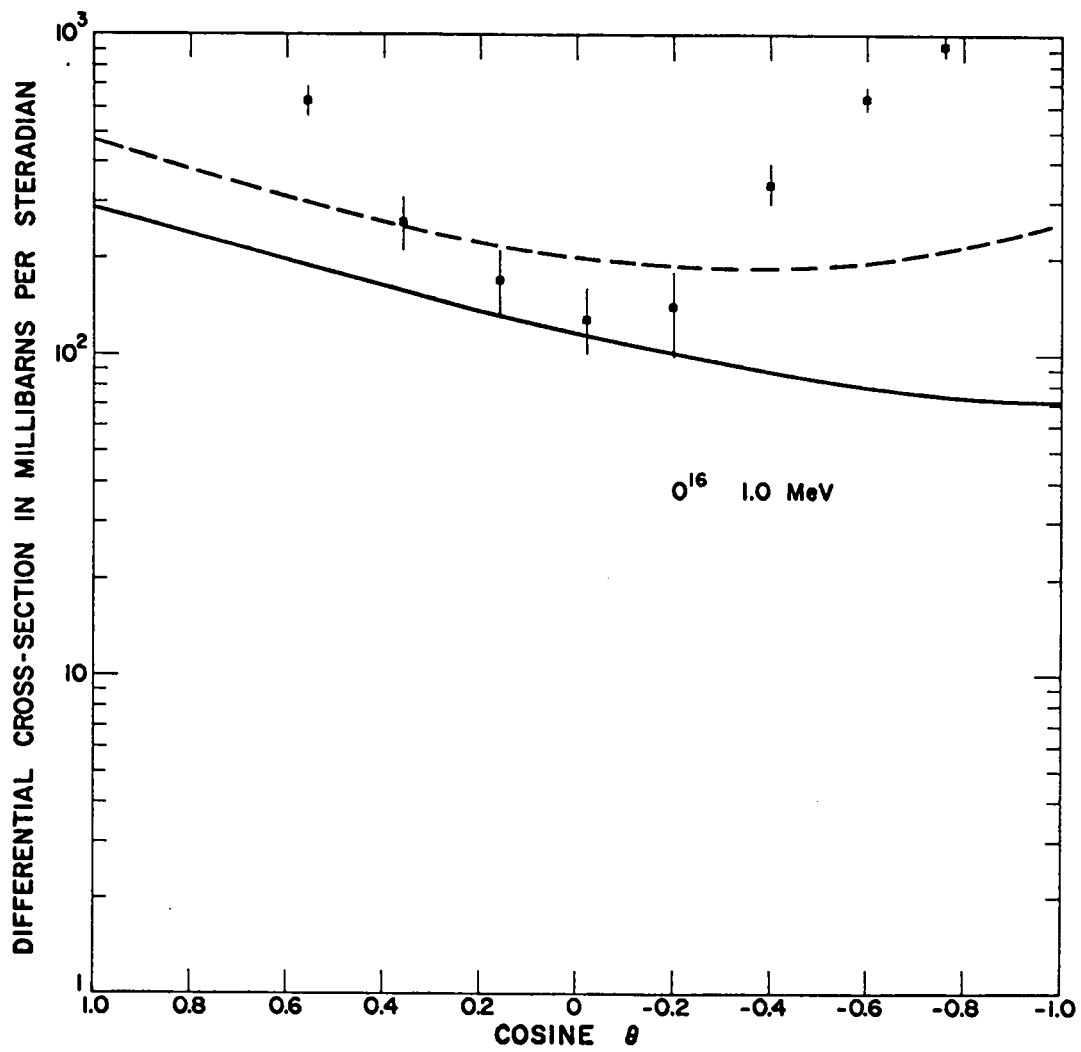


Figure 123

^{16}O

1.21 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	2.99456E-01	4.89269E-01
0.90000	2.65751E-01	4.28126E-01
0.80000	2.35821E-01	3.76598E-01
0.70000	2.09327E-01	3.33233E-01
0.60000	1.85957E-01	2.96811E-01
0.50000	1.65417E-01	2.66316E-01
0.40000	1.47436E-01	2.40905E-01
0.30000	1.31765E-01	2.19884E-01
0.20000	1.18173E-01	2.02695E-01
0.10000	1.06449E-01	1.88901E-01
0.00000	9.64010E-02	1.78177E-01
-0.10000	8.78542E-02	1.70306E-01
-0.20000	8.06523E-02	1.65174E-01
-0.30000	7.46555E-02	1.62774E-01
-0.40000	6.97408E-02	1.63209E-01
-0.50000	6.58013E-02	1.66701E-01
-0.60000	6.27458E-02	1.73600E-01
-0.70000	6.04984E-02	1.84483E-01
-0.80000	5.89984E-02	1.99776E-01
-0.90000	5.81996E-02	2.20573E-01
-1.00000	5.80704E-02	2.47883E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 2.952
 σ_{SE} = 1.544
 σ_{CE} = 1.408

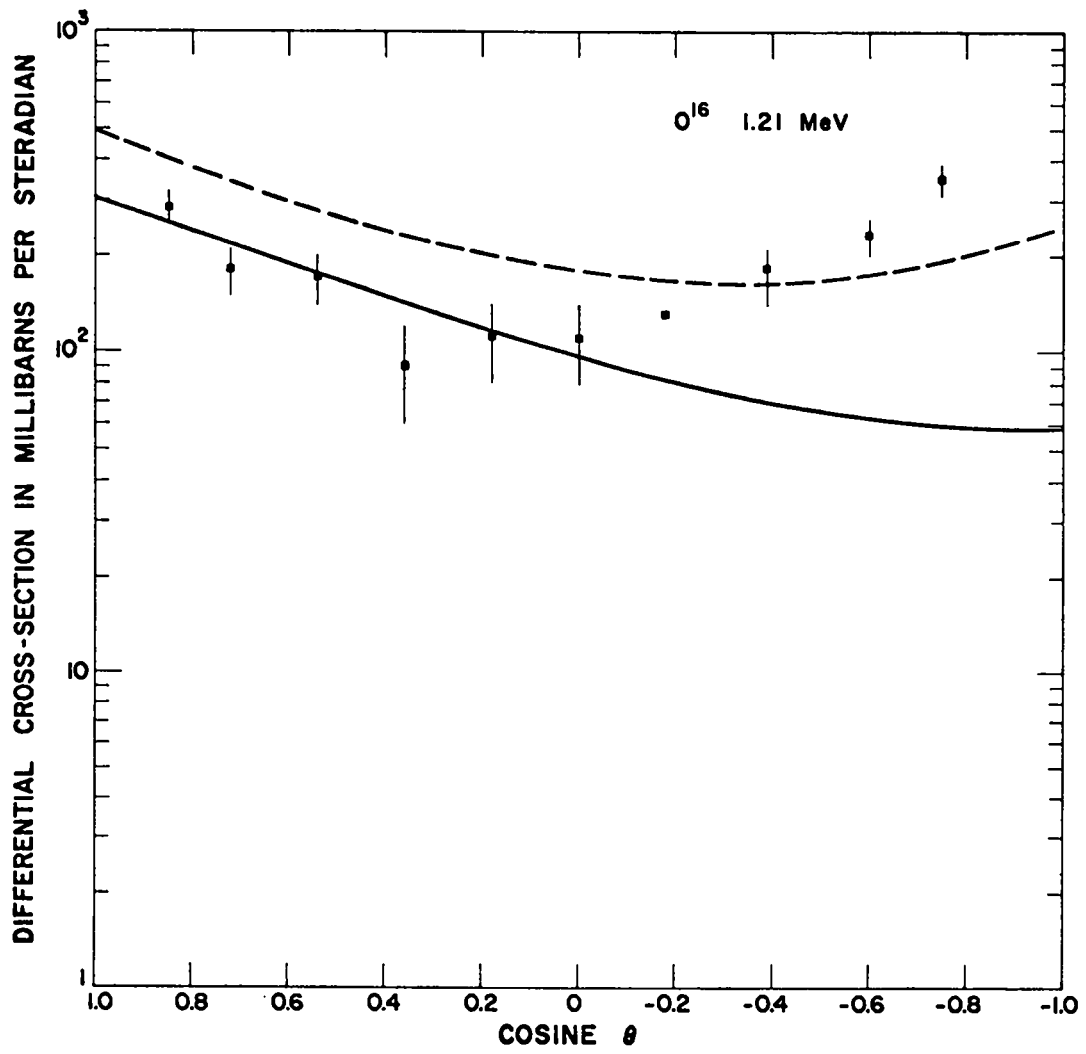


Figure 121

0¹⁶

1.50 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.13230E-01	5.07638E-01
0.90000	2.69843E-01	4.33635E-01
0.80000	2.32214E-01	3.72396E-01
0.70000	1.99728E-01	3.21817E-01
0.60000	1.71819E-01	2.80163E-01
0.50000	1.47966E-01	2.45997E-01
0.40000	1.27695E-01	2.18139E-01
0.30000	1.10575E-01	1.95622E-01
0.20000	9.62131E-02	1.77667E-01
0.10000	8.42593E-02	1.63659E-01
0.00000	7.43994E-02	1.53131E-01
-0.10000	6.63562E-02	1.45756E-01
-0.20000	5.98877E-02	1.41342E-01
-0.30000	5.47860E-02	1.39833E-01
-0.40000	5.08760E-02	1.41320E-01
-0.50000	4.80150E-02	1.46046E-01
-0.60000	4.60912E-02	1.54436E-01
-0.70000	4.50232E-02	1.67113E-01
-0.80000	4.47596E-02	1.84941E-01
-0.90000	4.52779E-02	2.09070E-01
-1.00000	4.65840E-02	2.40992E-01

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 2.737$
 $\sigma_{SE} = 1.352$
 $\sigma_{CE} = 1.385$

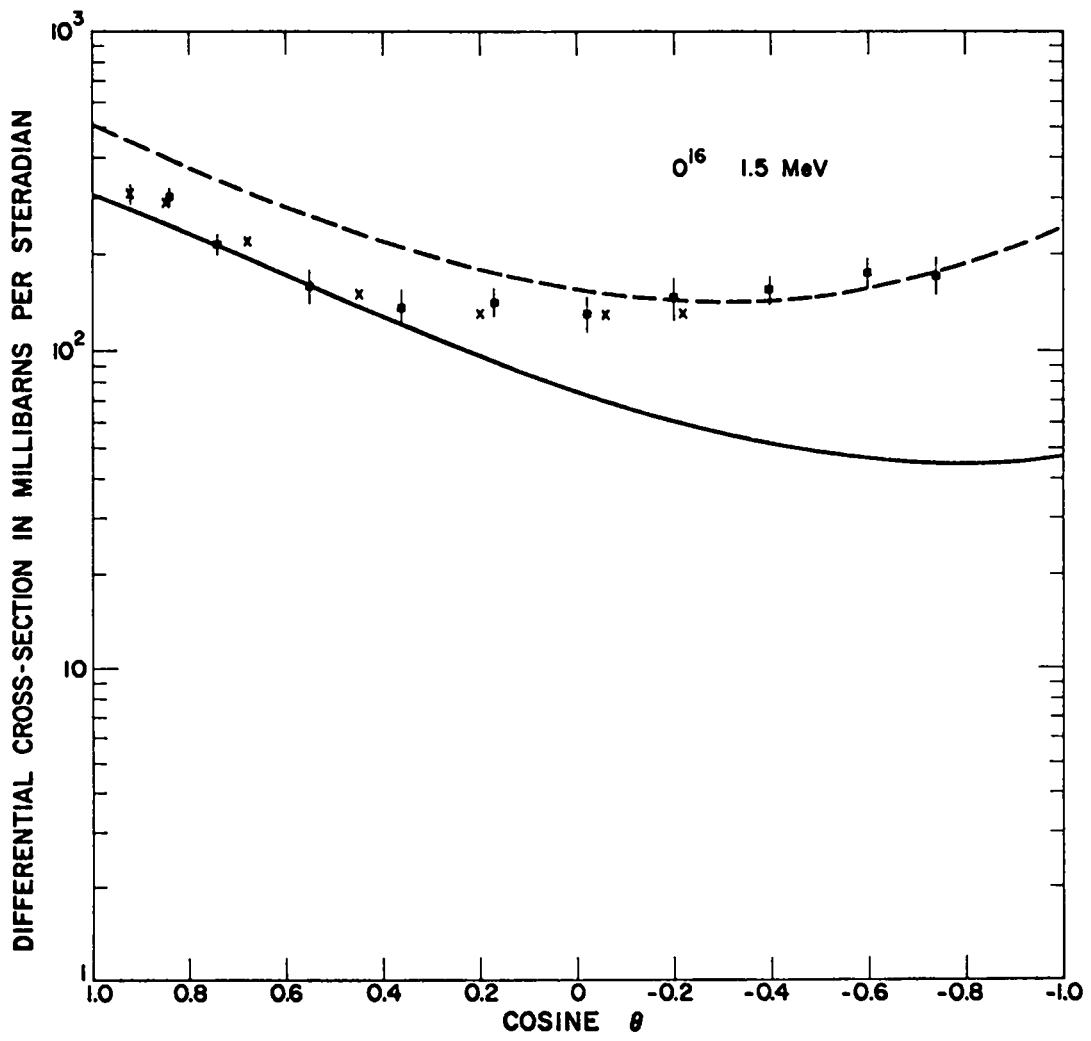


Figure 125

0^{16}

1.75 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.23154E-01	5.20140E-01
0.90000	2.71604E-01	4.35649E-01
0.80000	2.27778E-01	3.66852E-01
0.70000	1.90742E-01	3.10980E-01
0.60000	1.59644E-01	2.65775E-01
0.50000	1.33712E-01	2.29388E-01
0.40000	1.12248E-01	2.00311E-01
0.30000	9.46234E-02	1.77317E-01
0.20000	8.02787E-02	1.59418E-01
0.10000	6.87176E-02	1.45833E-01
0.00000	5.95050E-02	1.35964E-01
-0.10000	5.22647E-02	1.29380E-01
-0.20000	4.66768E-02	1.25816E-01
-0.30000	4.24757E-02	1.25169E-01
-0.40000	3.94489E-02	1.27512E-01
-0.50000	3.74345E-02	1.33110E-01
-0.60000	3.63205E-02	1.42451E-01
-0.70000	3.60433E-02	1.56282E-01
-0.80000	3.65870E-02	1.75660E-01
-0.90000	3.79818E-02	2.02027E-01
-1.00000	4.03041E-02	2.37290E-01

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 2.584
 σ_{SE} = 1.220
 σ_{CE} = 1.364

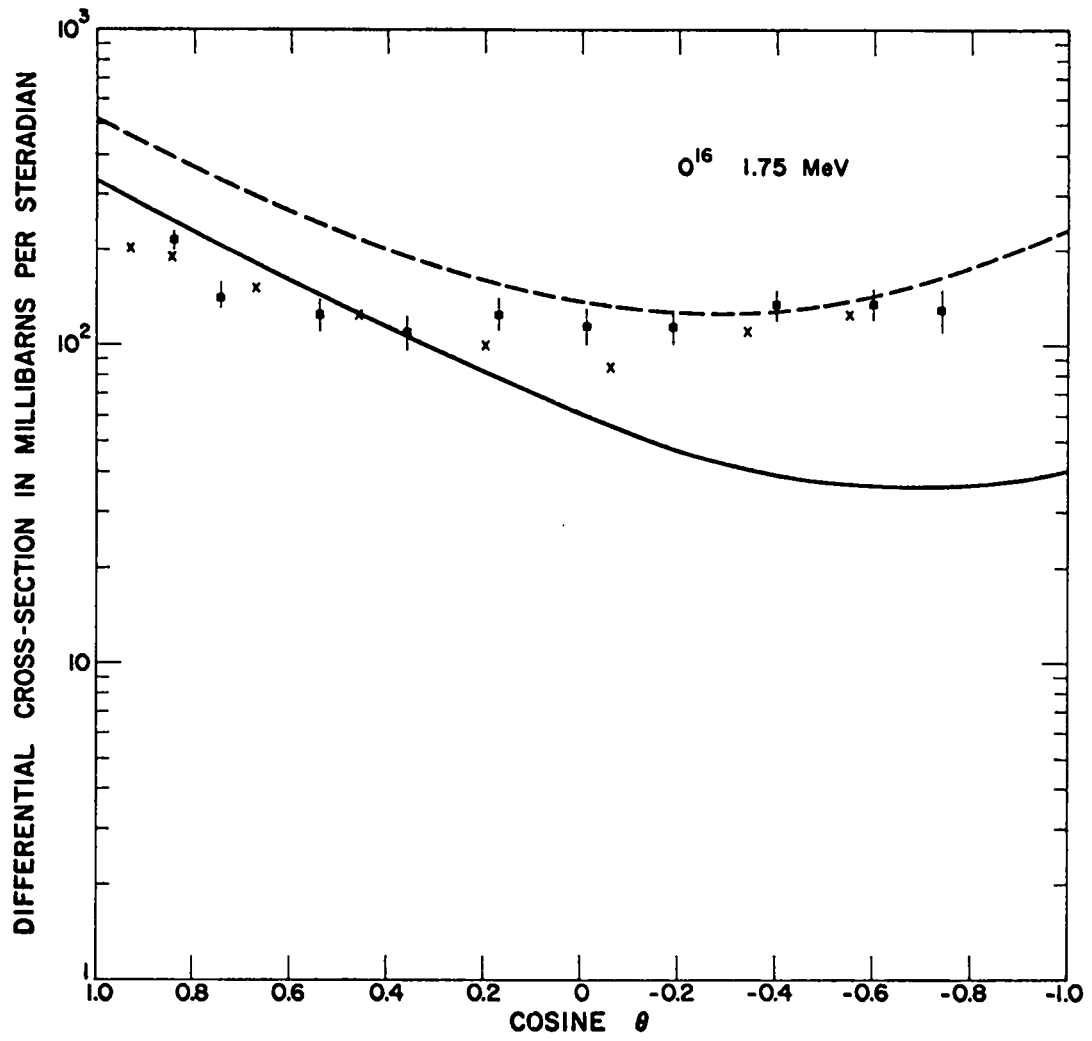


Figure 126

$^{16}_0$

2.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.32230E-01	5.29791E-01
0.90000	2.71801E-01	4.35370E-01
0.80000	2.22255E-01	3.59755E-01
0.70000	1.81264E-01	2.99408E-01
0.60000	1.47632E-01	2.51476E-01
0.50000	1.20286E-01	2.13651E-01
0.40000	9.82653E-02	1.84067E-01
0.30000	8.07168E-02	1.61218E-01
0.20000	6.68878E-02	1.43895E-01
0.10000	5.61216E-02	1.31145E-01
0.00000	4.78516E-02	1.22231E-01
-0.10000	4.15983E-02	1.16621E-01
-0.20000	3.69646E-02	1.13972E-01
-0.30000	3.36334E-02	1.14134E-01
-0.40000	3.13647E-02	1.17166E-01
-0.50000	2.99930E-02	1.23358E-01
-0.60000	2.94258E-02	1.33270E-01
-0.70000	2.96419E-02	1.47786E-01
-0.80000	3.06900E-02	1.68190E-01
-0.90000	3.26876E-02	1.96256E-01
-1.00000	3.58205E-02	2.34381E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 2.452
 σ_{SE} = 1.110
 σ_{CE} = 1.342

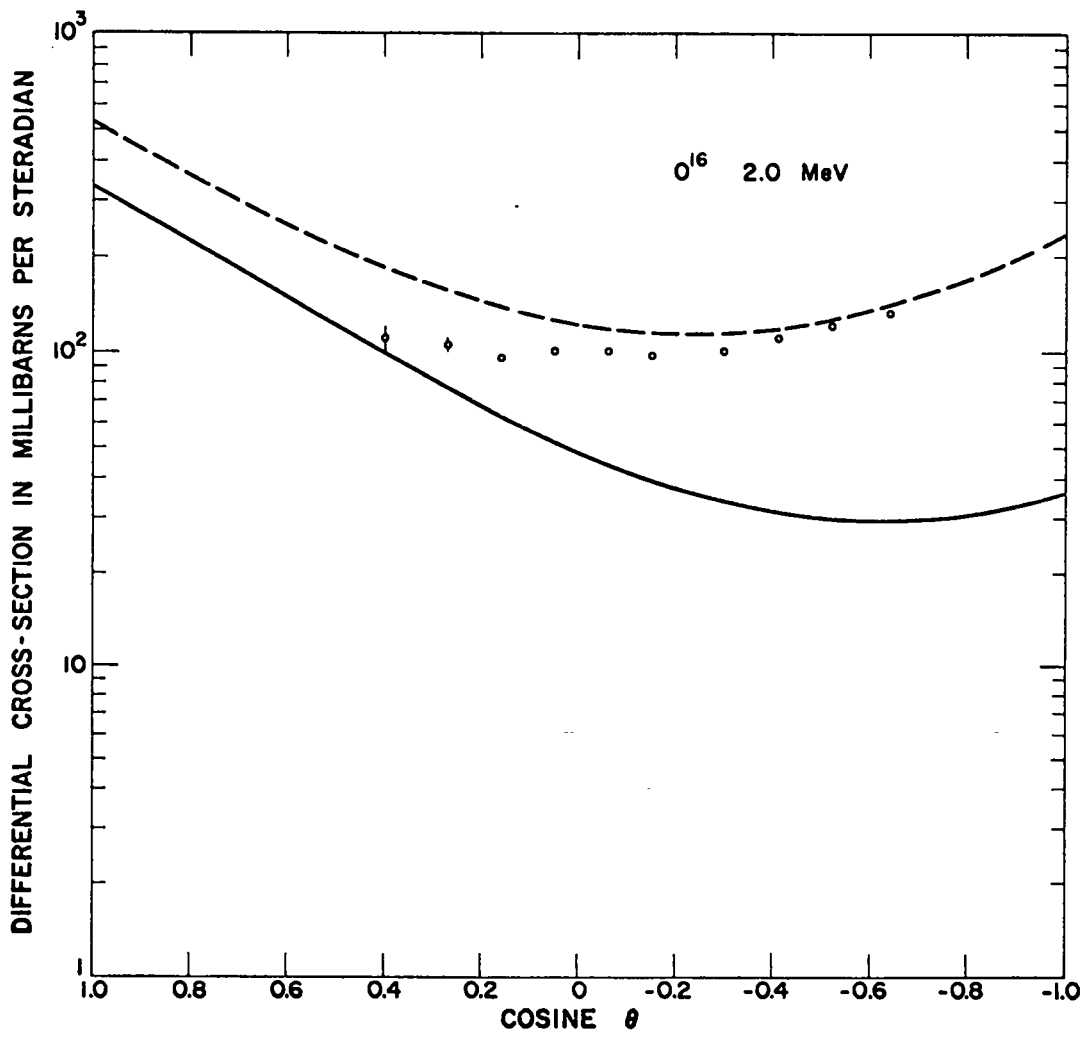


Figure 127

0¹⁶

2.15 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.35248E-01	5.34303E-01
0.90000	2.71243E-01	4.34179E-01
0.80000	2.18495E-01	3.54811E-01
0.70000	1.75407E-01	2.92149E-01
0.60000	1.40549E-01	2.42947E-01
0.50000	1.12646E-01	2.04601E-01
0.40000	9.05617E-02	1.75016E-01
0.30000	7.32966E-02	1.52509E-01
0.20000	5.99735E-02	1.35738E-01
0.10000	4.98333E-02	1.23640E-01
0.00000	4.22279E-02	1.15401E-01
-0.10000	3.66149E-02	1.10422E-01
-0.20000	3.25529E-02	1.08317E-01
-0.30000	2.96975E-02	1.08910E-01
-0.40000	2.77981E-02	1.12252E-01
-0.50000	2.66950E-02	1.18651E-01
-0.60000	2.63173E-02	1.28715E-01
-0.70000	2.66812E-02	1.43423E-01
-0.80000	2.78884E-02	1.64205E-01
-0.90000	3.01254E-02	1.93061E-01
-1.00000	3.36627E-02	2.32718E-01

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 2.381$
 $\sigma_{SE} = 1.054$
 $\sigma_{CE} = 1.327$

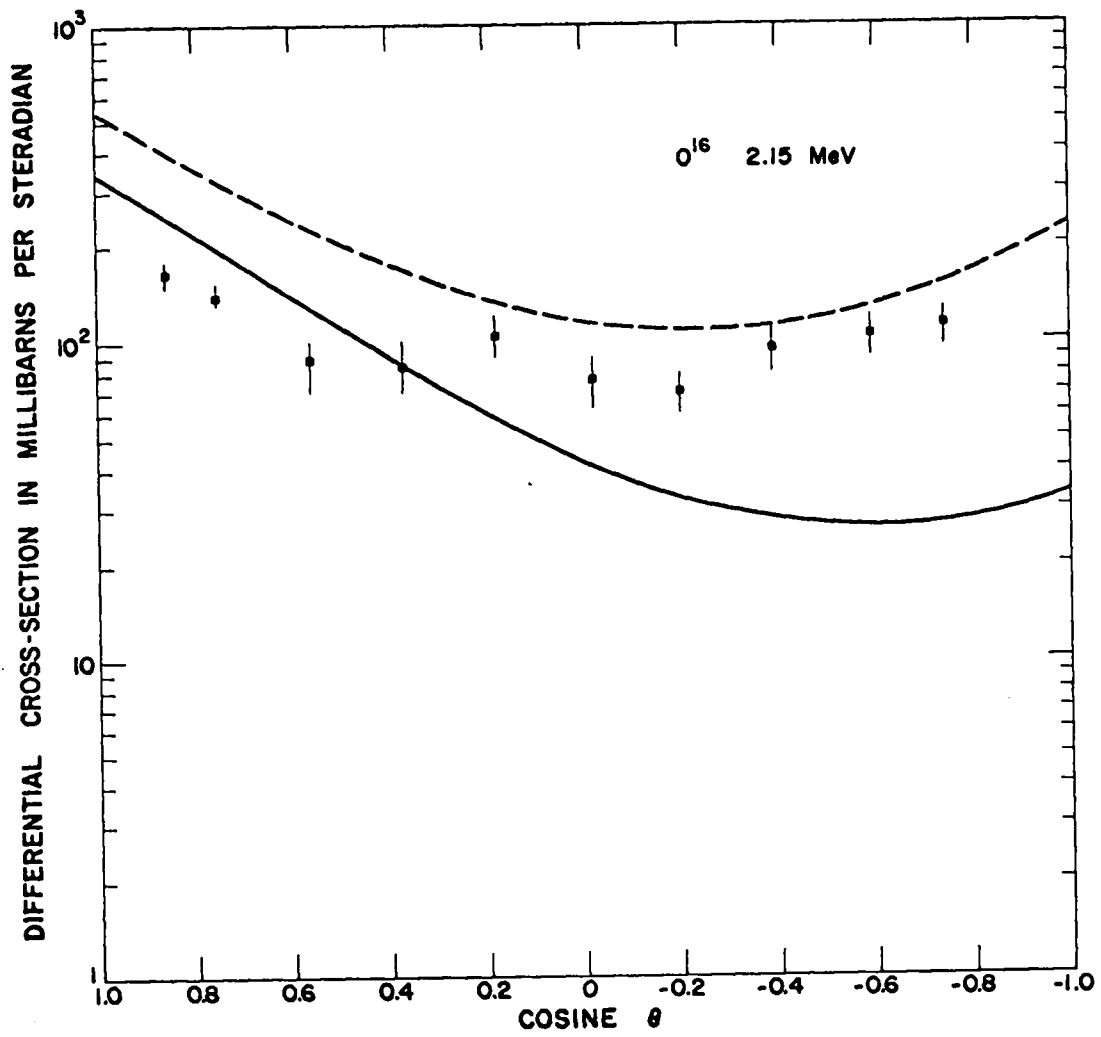


Figure 128

¹⁶O

2.20 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.36416E-01	5.35546E-01
0.90000	2.70916E-01	4.33567E-01
0.80000	2.17142E-01	3.53010E-01
0.70000	1.73404E-01	2.89641E-01
0.60000	1.38188E-01	2.40080E-01
0.50000	1.10149E-01	2.01619E-01
0.40000	8.80893E-02	1.72085E-01
0.30000	7.09582E-02	1.49736E-01
0.20000	5.78359E-02	1.33182E-01
0.10000	4.79284E-02	1.21328E-01
0.00000	4.05601E-02	1.13328E-01
-0.10000	3.51675E-02	1.08567E-01
-0.20000	3.12951E-02	1.06642E-01
-0.30000	2.85899E-02	1.07368E-01
-0.40000	2.67989E-02	1.10795E-01
-0.50000	2.57658E-02	1.17236E-01
-0.60000	2.54286E-02	1.27320E-01
-0.70000	2.58178E-02	1.42053E-01
-0.80000	2.70554E-02	1.62923E-01
-0.90000	2.93535E-02	1.92005E-01
-1.00000	3.30140E-02	2.32144E-01

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 2.358
 σ_{SE} = 1.036
 σ_{CE} = 1.322

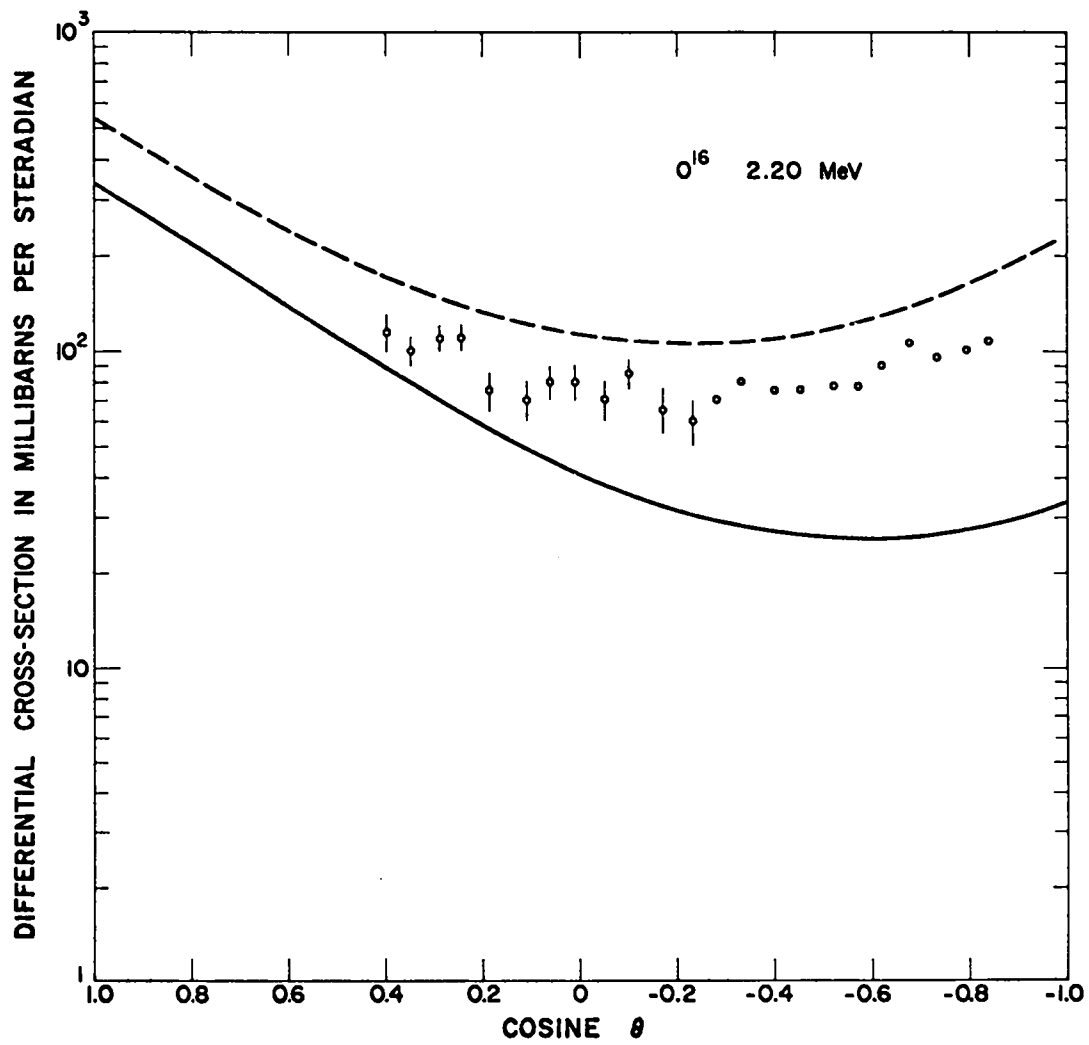


Figure 129

0¹⁶

2.34 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.39646E-01	5.38889E-01
0.90000	2.69992E-01	4.31782E-01
0.80000	2.13414E-01	3.47990E-01
0.70000	1.67938E-01	2.82753E-01
0.60000	1.31809E-01	2.32294E-01
0.50000	1.03472E-01	1.93608E-01
0.40000	8.15557E-02	1.64298E-01
0.30000	6.48609E-02	1.42452E-01
0.20000	5.23456E-02	1.26551E-01
0.10000	4.31167E-02	1.15401E-01
0.00000	3.64207E-02	1.08082E-01
-0.10000	3.16366E-02	1.03921E-01
-0.20000	2.82693E-02	1.02475E-01
-0.30000	2.59447E-02	1.03535E-01
-0.40000	2.44054E-02	1.07147E-01
-0.50000	2.35076E-02	1.13644E-01
-0.60000	2.32182E-02	1.23704E-01
-0.70000	2.36134E-02	1.38429E-01
-0.80000	2.48770E-02	1.59453E-01
-0.90000	2.73000E-02	1.89090E-01
-1.00000	3.12802E-02	2.30523E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 2.298
 σ_{SE} = .990
 σ_{CE} = 1.307

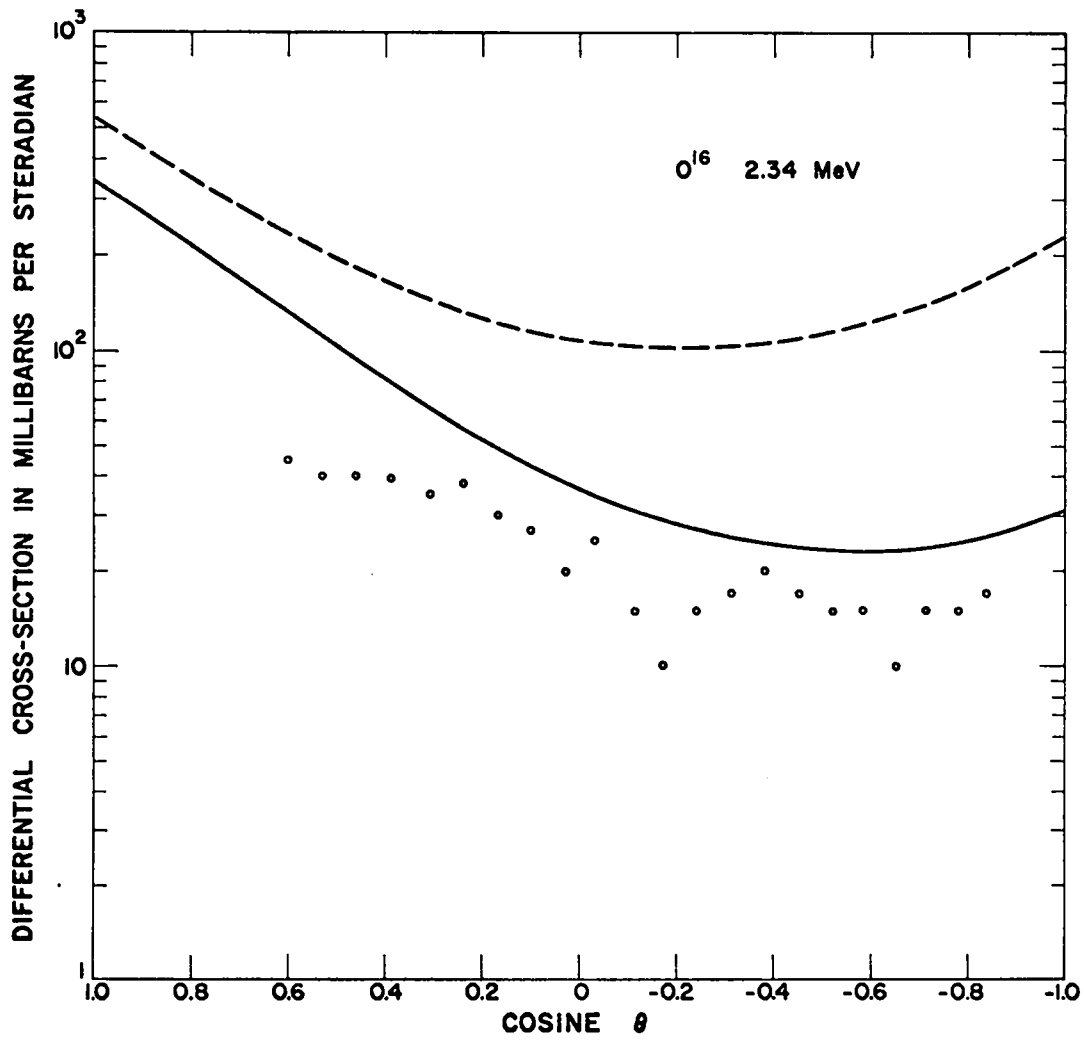


Figure 130

0¹⁶

2.56 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.43931E-01	5.43066E-01
0.90000	2.67924E-01	4.28116E-01
0.80000	2.07198E-01	3.39575E-01
0.70000	1.59288E-01	2.71776E-01
0.60000	1.22027E-01	2.20271E-01
0.50000	9.35093E-02	1.81562E-01
0.40000	7.20715E-02	1.52882E-01
0.30000	5.62709E-02	1.32048E-01
0.20000	4.48677E-02	1.17338E-01
0.10000	3.68104E-02	1.07402E-01
0.00000	3.12235E-02	1.01205E-01
-0.10000	2.73973E-02	9.79887E-02
-0.20000	2.47793E-02	9.72494E-02
-0.30000	2.29677E-02	9.87452E-02
-0.40000	2.17062E-02	1.02517E-01
-0.50000	2.08802E-02	1.08932E-01
-0.60000	2.05138E-02	1.18758E-01
-0.70000	2.07685E-02	1.33256E-01
-0.80000	2.19421E-02	1.54320E-01
-0.90000	2.44689E-02	1.84660E-01
-1.00000	2.89203E-02	2.28055E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 2.211
 σ_{SE} = .927
 σ_{CE} = 1.284

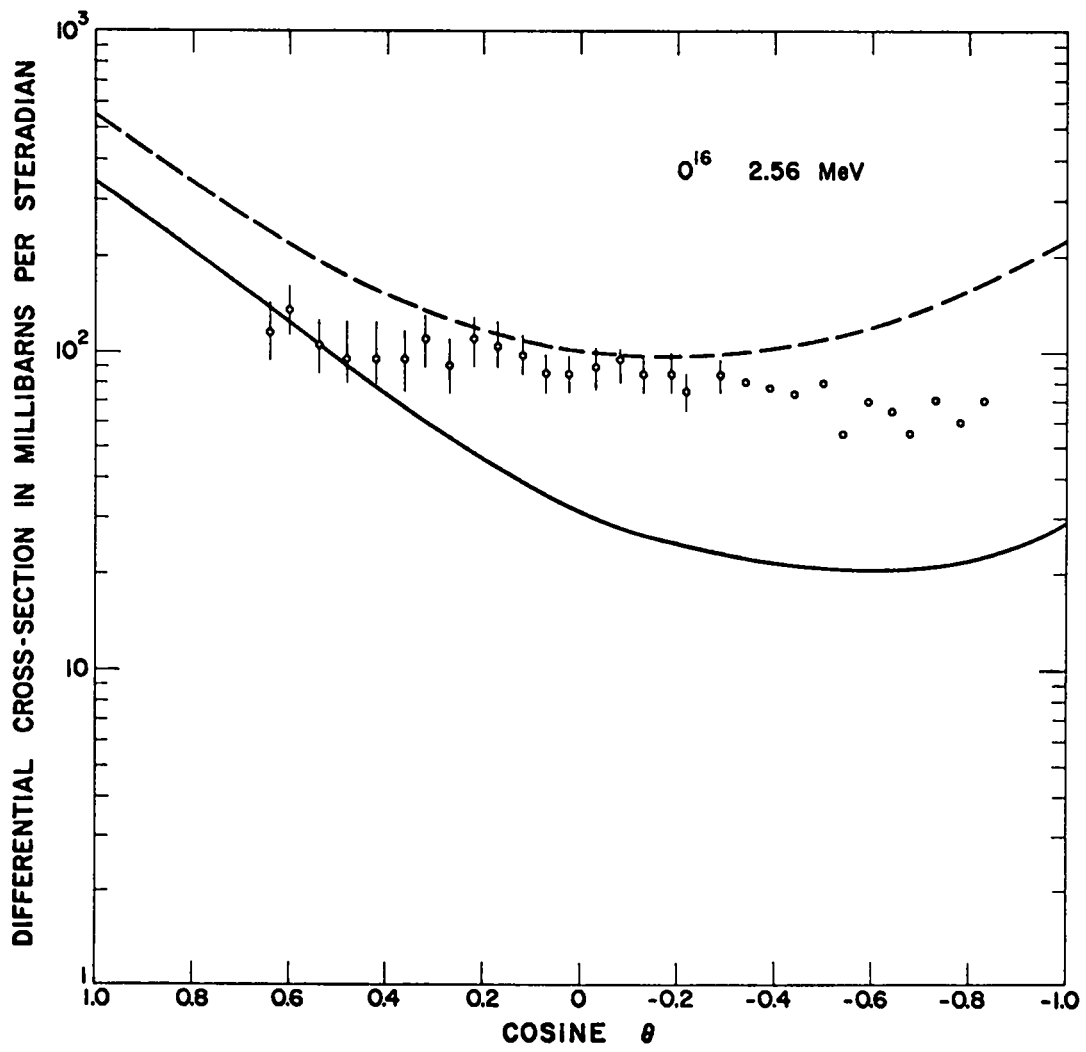


Figure 131

$^{16}_0$

2.76 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.47177E-01	5.46040E-01
0.90000	2.65552E-01	4.24127E-01
0.80000	2.01294E-01	3.31563E-01
0.70000	1.51448E-01	2.61769E-01
0.60000	1.13432E-01	2.09641E-01
0.50000	8.50037E-02	1.71199E-01
0.40000	6.42175E-02	1.43330E-01
0.30000	4.94020E-02	1.23599E-01
0.20000	3.91336E-02	1.10096E-01
0.10000	3.22162E-02	1.01338E-01
0.00000	2.76651E-02	9.61891E-02
-0.10000	2.46935E-02	9.38155E-02
-0.20000	2.27018E-02	9.36644E-02
-0.30000	2.12694E-02	9.54661E-02
-0.40000	2.01485E-02	9.92614E-02
-0.50000	1.92602E-02	1.05455E-01
-0.60000	1.86916E-02	1.14900E-01
-0.70000	1.86947E-02	1.29016E-01
-0.80000	1.96868E-02	1.49955E-01
-0.90000	2.22511E-02	1.80826E-01
-1.00000	2.71394E-02	2.26002E-01

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 2.140
 σ_{SE} = .877
 σ_{CE} = 1.263

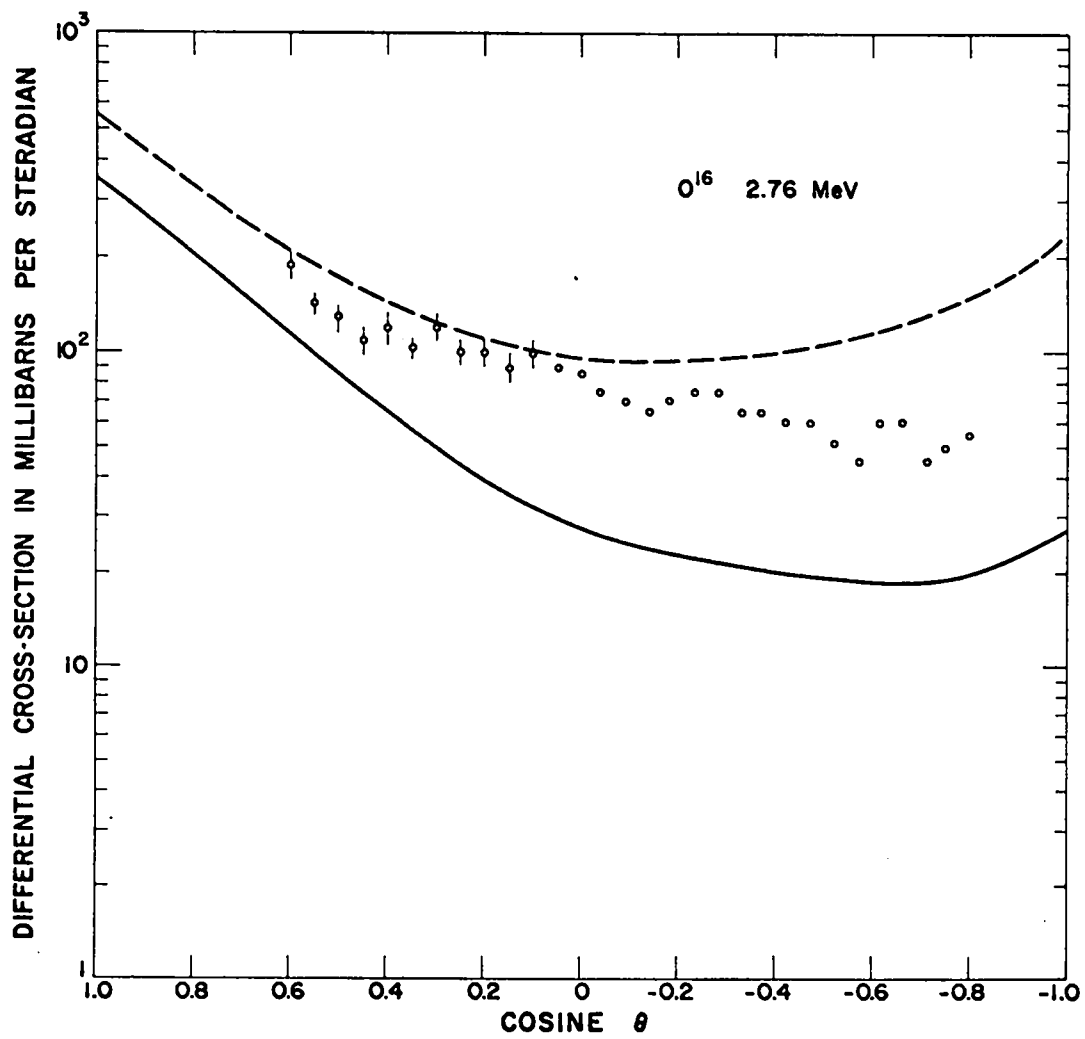


Figure 132

^{16}O

2.95 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.50019E-01	5.48422E-01
0.90000	2.63111E-01	4.19970E-01
0.80000	1.95646E-01	3.23784E-01
0.70000	1.44151E-01	2.52344E-01
0.60000	1.05620E-01	1.99868E-01
0.50000	7.74618E-02	1.61895E-01
0.40000	5.74567E-02	1.34970E-01
0.30000	4.36901E-02	1.16411E-01
0.20000	3.45782E-02	1.04135E-01
0.10000	2.87819E-02	9.65334E-02
0.00000	2.52153E-02	9.23790E-02
-0.10000	2.30224E-02	9.07739E-02
-0.20000	2.15641E-02	9.11212E-02
-0.30000	2.04077E-02	9.31287E-02
-0.40000	1.93204E-02	9.68401E-02
-0.50000	1.82645E-02	1.02698E-01
-0.60000	1.73951E-02	1.11643E-01
-0.70000	1.70600E-02	1.25252E-01
-0.80000	1.78005E-02	1.45938E-01
-0.90000	2.03544E-02	1.77213E-01
-1.00000	2.56597E-02	2.24062E-01

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 2.077$
 $\sigma_{SE} = .836$
 $\sigma_{CE} = 1.242$

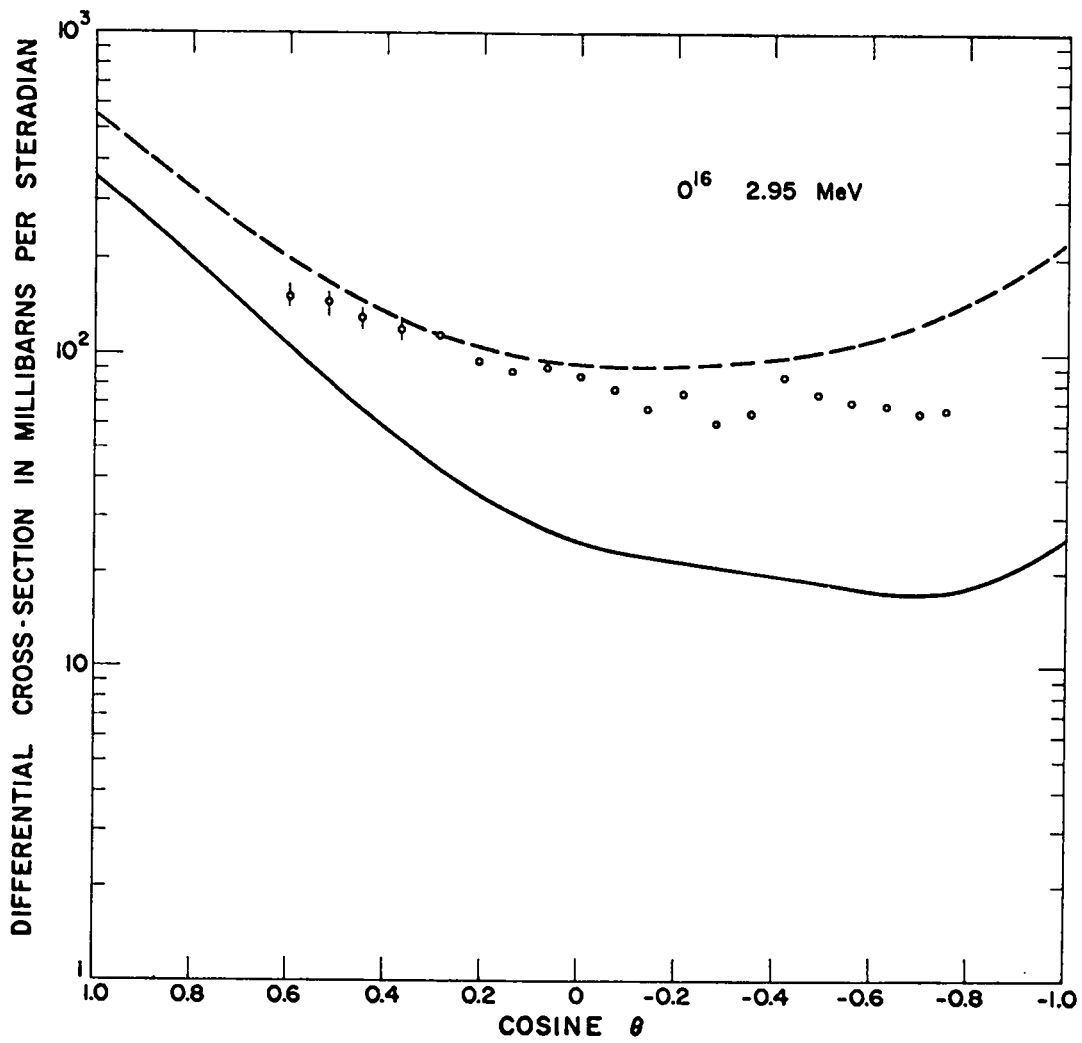


Figure 133

¹⁶O

3.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.50715E-01	5.49060E-01
0.90000	2.62432E-01	4.18879E-01
0.80000	1.94148E-01	3.21756E-01
0.70000	1.42245E-01	2.49906E-01
0.60000	1.03603E-01	1.97364E-01
0.50000	7.55350E-02	1.59535E-01
0.40000	5.57429E-02	1.32874E-01
0.30000	4.22698E-02	1.14633E-01
0.20000	3.34676E-02	1.02685E-01
0.10000	2.79678E-02	9.53890E-02
0.00000	2.46586E-02	9.14936E-02
-0.10000	2.26666E-02	9.00868E-02
-0.20000	2.13428E-02	9.05600E-02
-0.30000	2.02520E-02	9.26151E-02
-0.40000	1.91660E-02	9.62971E-02
-0.50000	1.80586E-02	1.02059E-01
-0.60000	1.71038E-02	1.10865E-01
-0.70000	1.66755E-02	1.24336E-01
-0.80000	1.73491E-02	1.44957E-01
-0.90000	1.99051E-02	1.76352E-01
-1.00000	2.53330E-02	2.23677E-01

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 2.062$
 $\sigma_{SE} = .825$
 $\sigma_{CE} = 1.237$

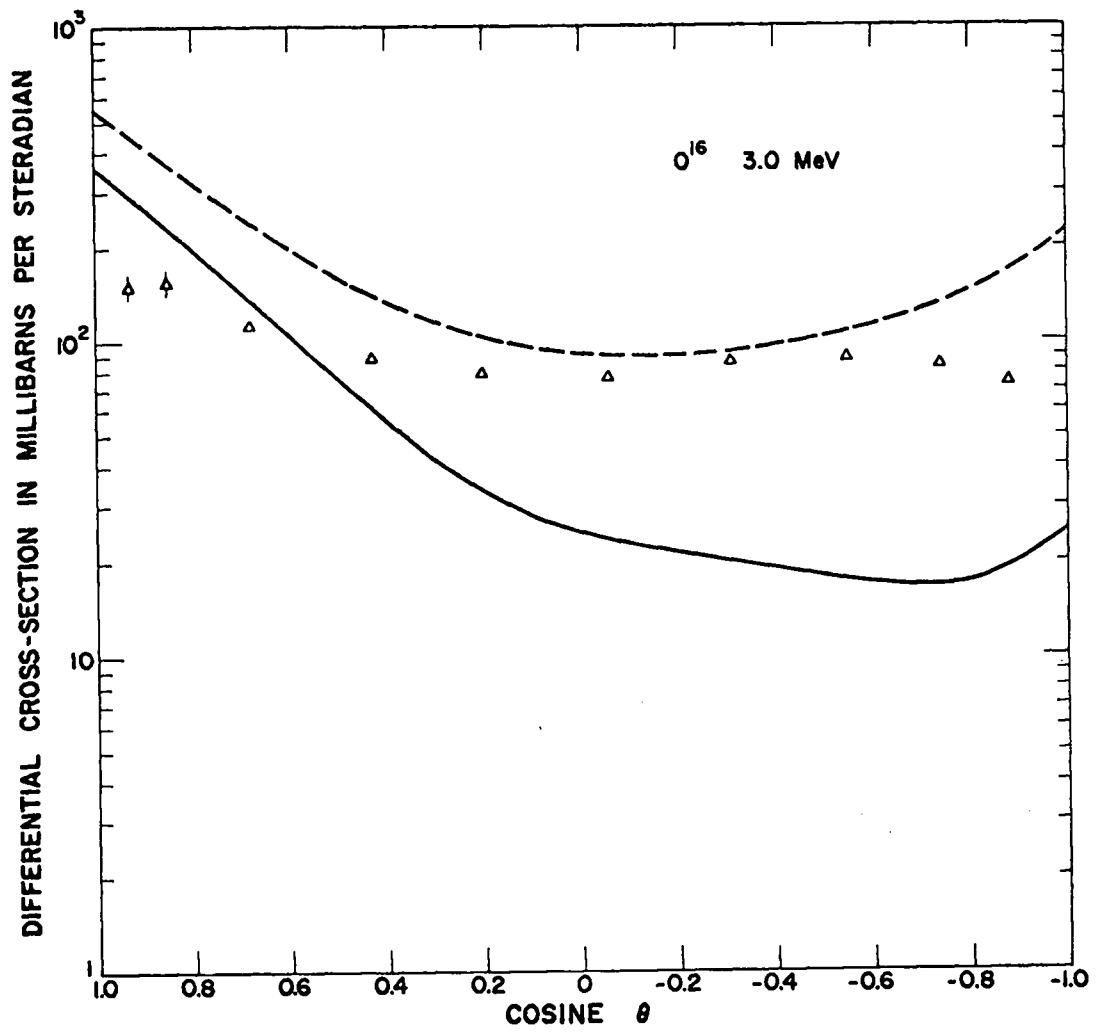


Figure 134

0¹⁶

3.17 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.53080E-01	5.51084E-01
0.90000	2.60106E-01	4.15034E-01
0.80000	1.89082E-01	3.14802E-01
0.70000	1.35869E-01	2.41666E-01
0.60000	9.69306E-02	1.89003E-01
0.50000	6.92509E-02	1.51758E-01
0.40000	5.02675E-02	1.26064E-01
0.30000	3.78182E-02	1.08953E-01
0.20000	3.00960E-02	9.81462E-02
0.10000	2.56128E-02	9.18944E-02
0.00000	2.31704E-02	8.88748E-02
-0.10000	2.18386E-02	8.81203E-02
-0.20000	2.09383E-02	8.89884E-02
-0.30000	2.00289E-02	9.11641E-02
-0.40000	1.89006E-02	9.46972E-02
-0.50000	1.75699E-02	1.00077E-01
-0.60000	1.62780E-02	1.08350E-01
-0.70000	1.54917E-02	1.21289E-01
-0.80000	1.59070E-02	1.41627E-01
-0.90000	1.84538E-02	1.73381E-01
-1.00000	2.43031E-02	2.22307E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 2.012
 σ_{SE} = .793
 σ_{CE} = 1.219

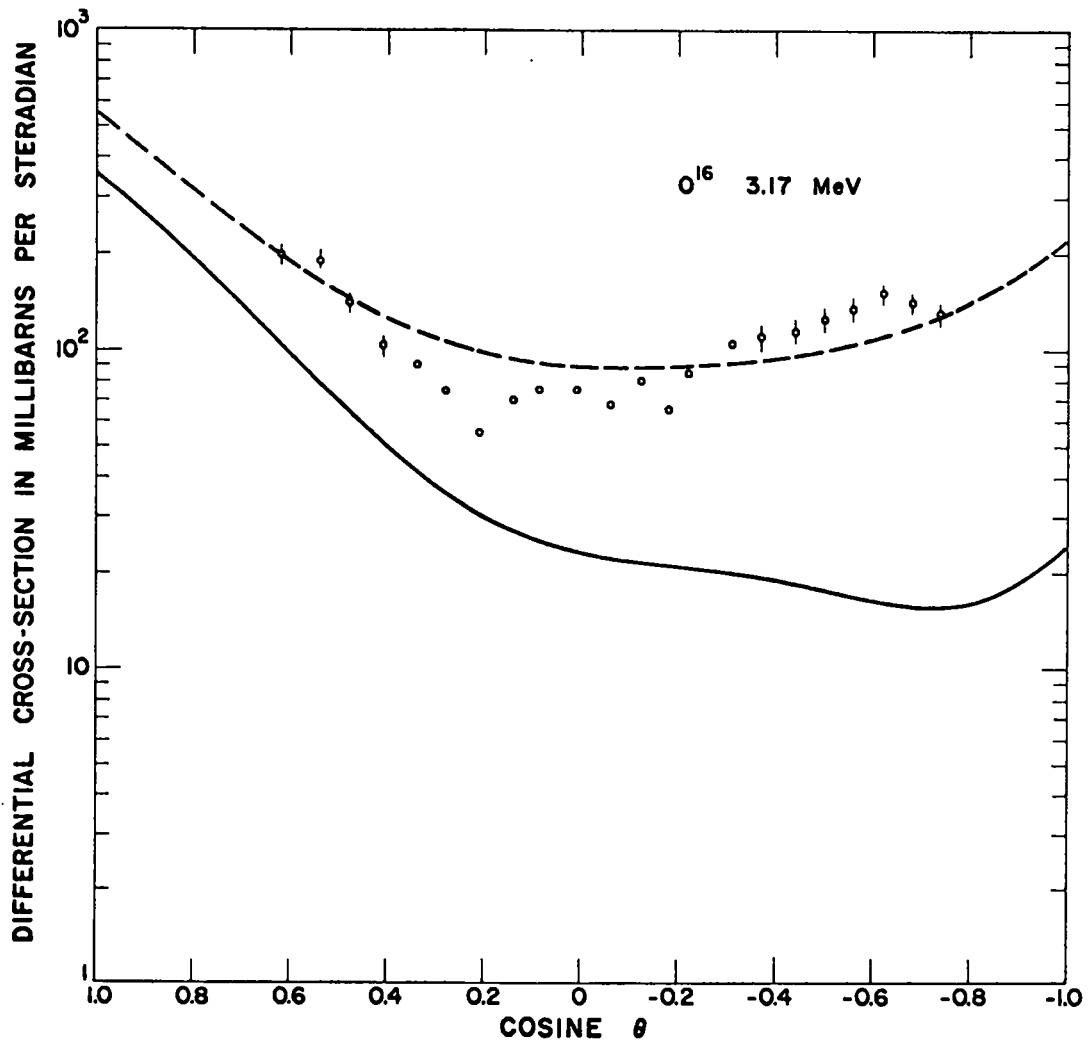


Figure 135

0^{16}

3.29 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.54802E-01	5.52568E-01
0.90000	2.58491E-01	4.12334E-01
0.80000	1.85560E-01	3.09942E-01
0.70000	1.31477E-01	2.35965E-01
0.60000	9.23895E-02	1.83287E-01
0.50000	6.50374E-02	1.46515E-01
0.40000	4.66665E-02	1.21549E-01
0.30000	3.49668E-02	1.05263E-01
0.20000	2.80191E-02	9.52718E-02
0.10000	2.42519E-02	8.97549E-02
0.00000	2.24089E-02	8.73397E-02
-0.10000	2.15221E-02	8.70250E-02
-0.20000	2.08935E-02	8.81462E-02
-0.30000	2.00812E-02	9.03774E-02
-0.40000	1.88908E-02	9.37729E-02
-0.50000	1.73711E-02	9.88485E-02
-0.60000	1.58131E-02	1.06710E-01
-0.70000	1.47518E-02	1.19240E-01
-0.80000	1.49715E-02	1.39353E-01
-0.90000	1.75121E-02	1.71355E-01
-1.00000	2.36779E-02	2.21444E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.979
 σ_{SE} = .773
 σ_{CE} = 1.206

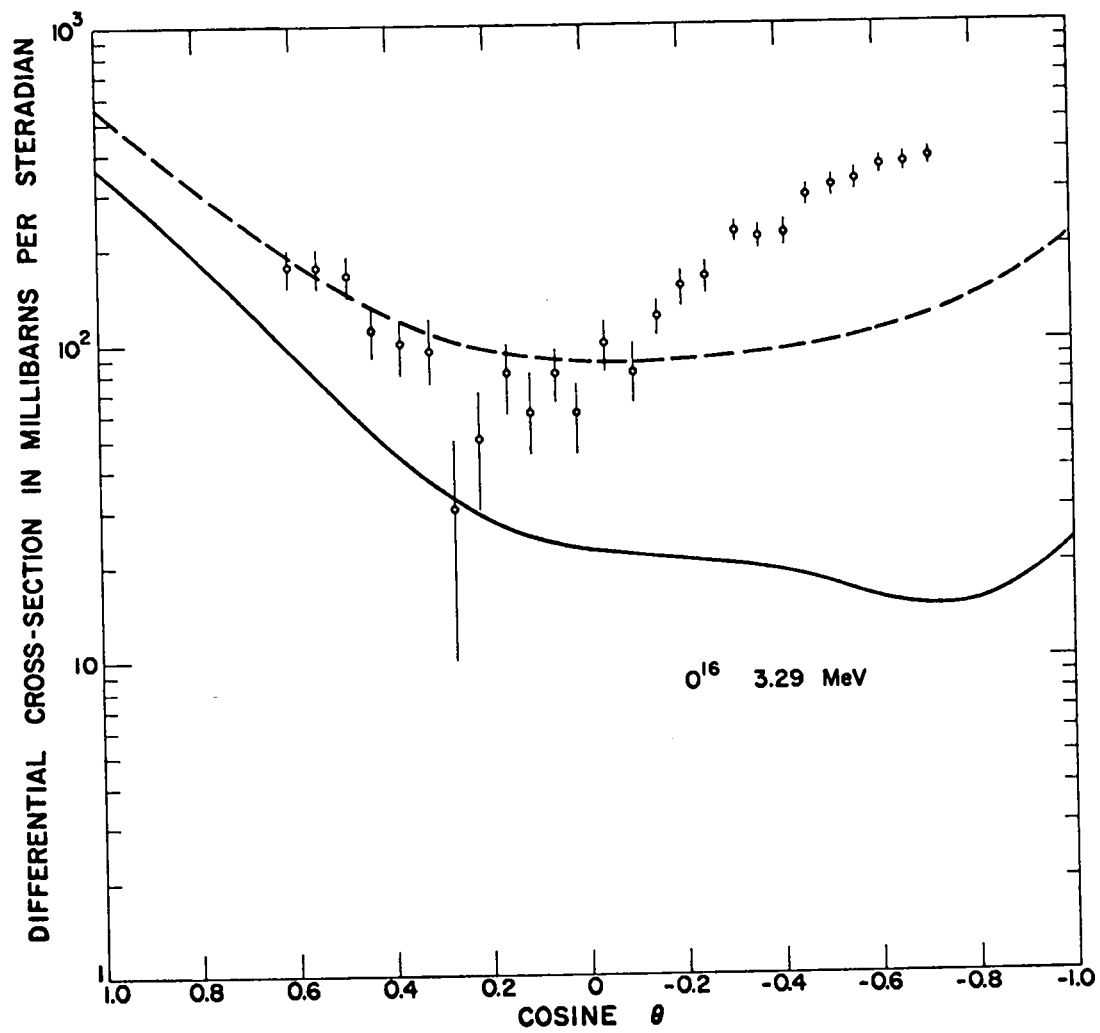


Figure 136

$^{16}_0$

3.35 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.55660E-01	5.53344E-01
0.90000	2.57687E-01	4.11010E-01
0.80000	1.83820E-01	3.07550E-01
0.70000	1.29319E-01	2.33170E-01
0.60000	9.01737E-02	1.80502E-01
0.50000	6.29973E-02	1.43979E-01
0.40000	4.49396E-02	1.19384E-01
0.30000	3.36169E-02	1.03512E-01
0.20000	2.70545E-02	9.39263E-02
0.10000	2.36404E-02	8.87711E-02
0.00000	2.20898E-02	8.66507E-02
-0.10000	2.14173E-02	8.65481E-02
-0.20000	2.09163E-02	8.77082E-02
-0.30000	2.01449E-02	9.00403E-02
-0.40000	1.89171E-02	9.33613E-02
-0.50000	1.72983E-02	9.82803E-02
-0.60000	1.56049E-02	1.05934E-01
-0.70000	1.44066E-02	1.18258E-01
-0.80000	1.45321E-02	1.38262E-01
-0.90000	1.70768E-02	1.70406E-01
-1.00000	2.34127E-02	2.21097E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.964
 σ_{SE} = .764
 σ_{CE} = 1.200

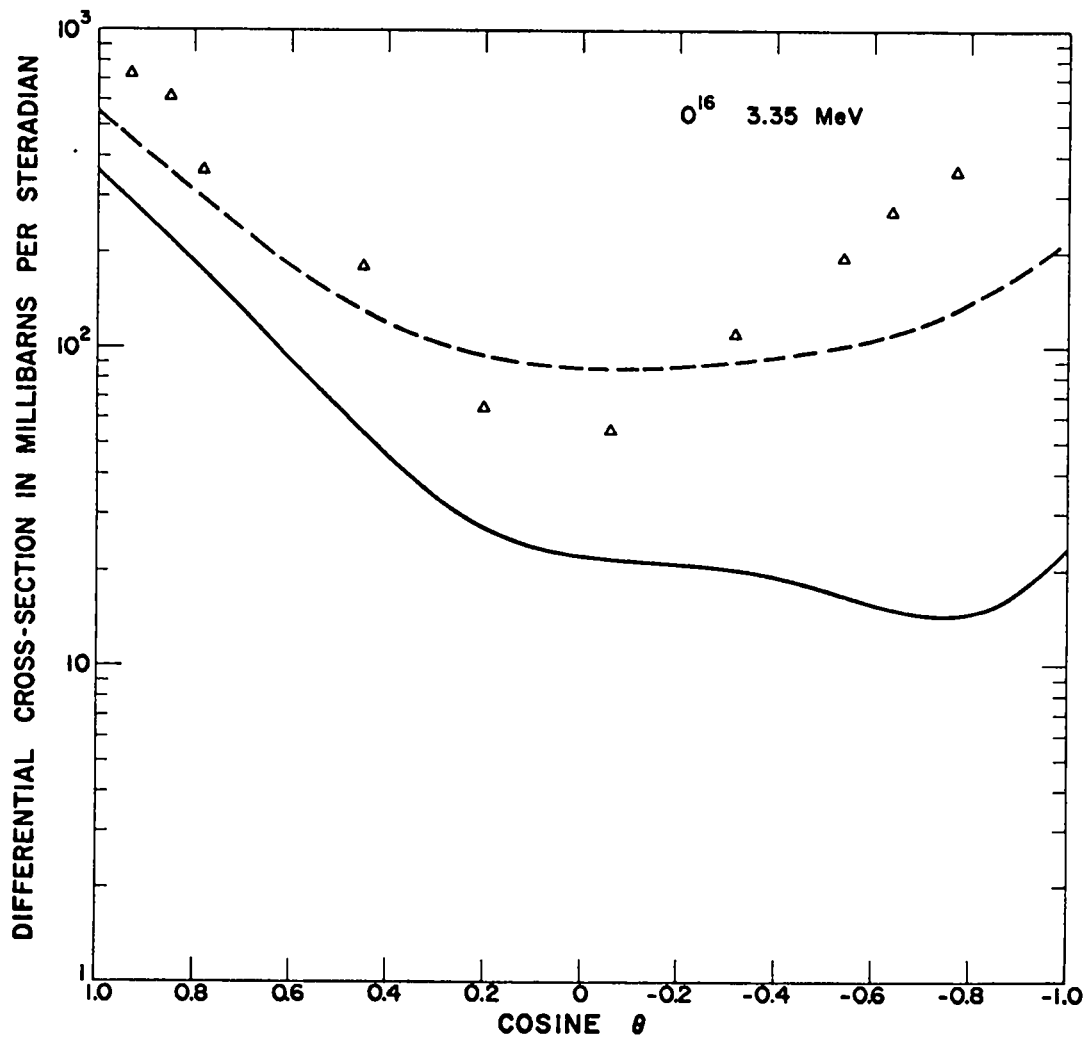


Figure 137

$^{16}_0$

4.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.67150E-01	5.65035E-01
0.90000	2.50258E-01	3.98555E-01
0.80000	1.66230E-01	2.83395E-01
0.70000	1.07597E-01	2.05061E-01
0.60000	6.83012E-02	1.53027E-01
0.50000	4.34296E-02	1.19631E-01
0.40000	2.90104E-02	9.92968E-02
0.30000	2.18449E-02	8.79608E-02
0.20000	1.93769E-02	8.26530E-02
0.10000	1.95927E-02	8.11953E-02
0.00000	2.09443E-02	8.19917E-02
-0.10000	2.22945E-02	8.38971E-02
-0.20000	2.28787E-02	8.61548E-02
-0.30000	2.22812E-02	8.83971E-02
-0.40000	2.04235E-02	9.07099E-02
-0.50000	1.75627E-02	9.37640E-02
-0.60000	1.42974E-02	9.90234E-02
-0.70000	1.15817E-02	1.09046E-01
-0.80000	1.07435E-02	1.27908E-01
-0.90000	1.35082E-02	1.61805E-01
-1.00000	2.20264E-02	2.19911E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.824
 σ_{SE} = .681
 σ_{CE} = 1.143

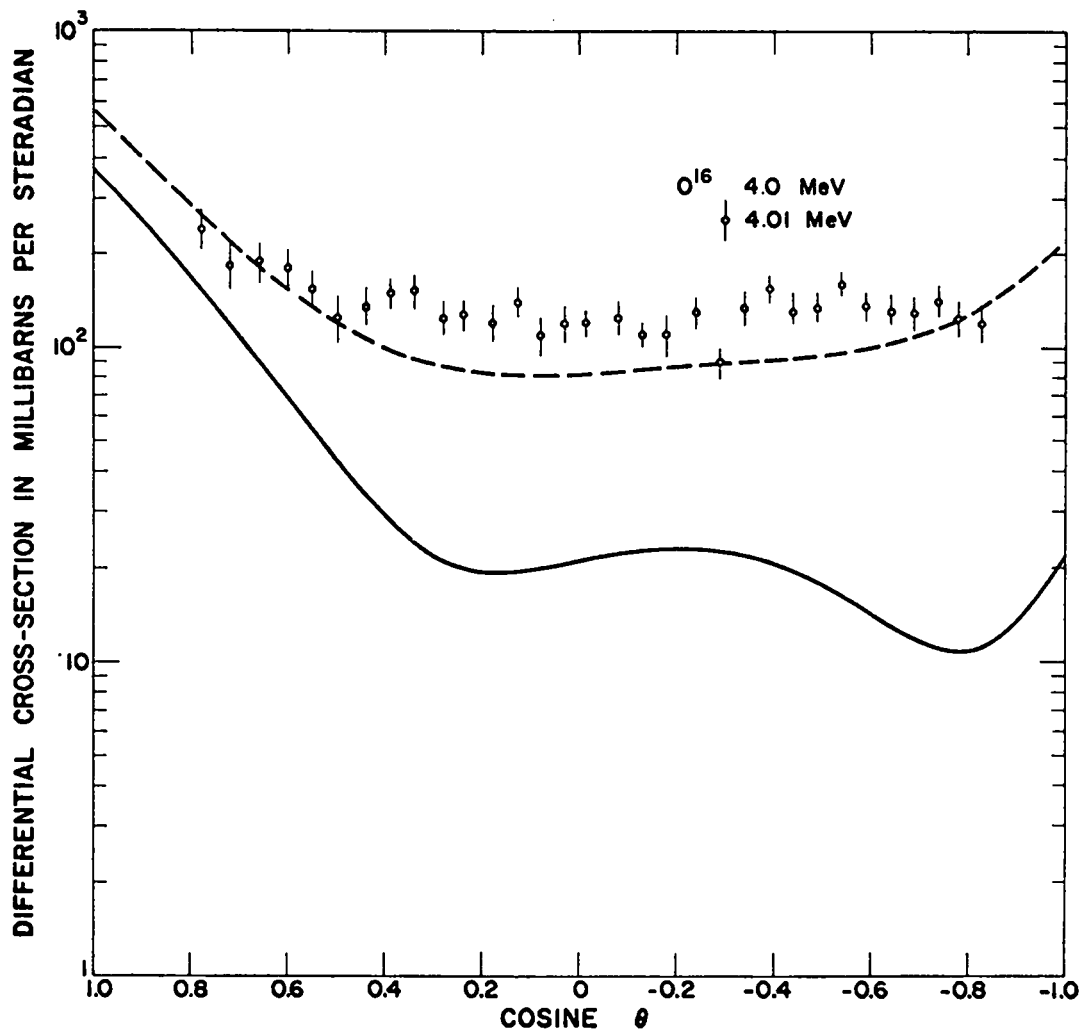


Figure 138

σ^{16}

4.3 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.74457E-01	5.73362E-01
0.90000	2.47953E-01	3.94505E-01
0.80000	1.59049E-01	2.73637E-01
0.70000	9.86336E-02	1.93575E-01
0.60000	5.94708E-02	1.42035E-01
0.50000	3.58208E-02	1.10236E-01
0.40000	2.31406E-02	9.19138E-02
0.30000	1.78477E-02	8.26833E-02
0.20000	1.71364E-02	7.91141E-02
0.10000	1.88380E-02	7.91564E-02
0.00000	2.13171E-02	8.10807E-02
-0.10000	2.33969E-02	8.37153E-02
-0.20000	2.43098E-02	8.62876E-02
-0.30000	2.36677E-02	8.84233E-02
-0.40000	2.14490E-02	9.02221E-02
-0.50000	1.79992E-02	9.24139E-02
-0.60000	1.40427E-02	9.66063E-02
-0.70000	1.07036E-02	1.05645E-01
-0.80000	9.53459E-03	1.24123E-01
-0.90000	1.25609E-02	1.59103E-01
-1.00000	2.22705E-02	2.21175E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.776
 σ_{SE} = .654
 σ_{CE} = 1.122

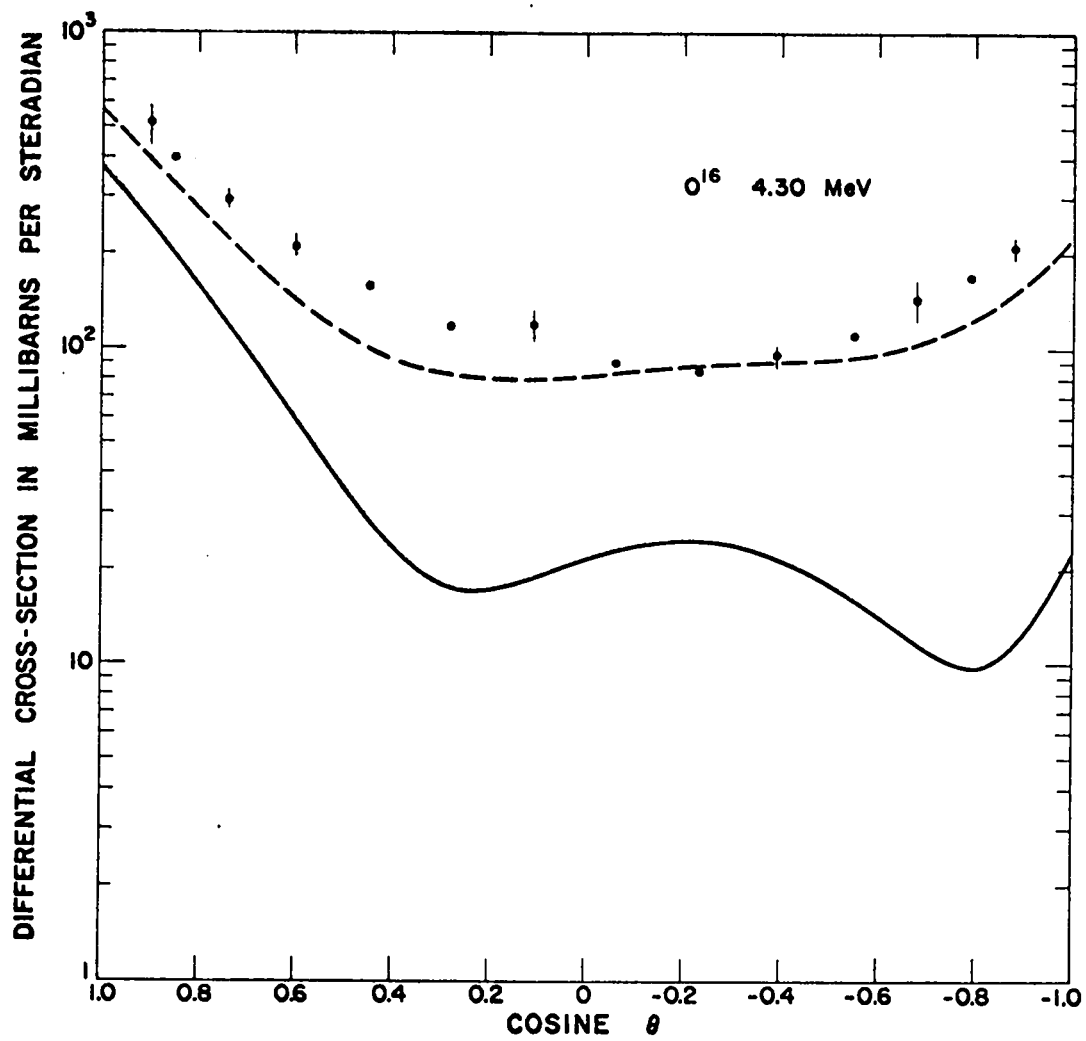


Figure 139

¹⁶O

4.5 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.80276E-01	5.80171E-01
0.90000	2.46935E-01	3.92526E-01
0.80000	1.54657E-01	2.67689E-01
0.70000	9.30680E-02	1.86477E-01
0.60000	5.40465E-02	1.35313E-01
0.50000	3.12473E-02	1.04610E-01
0.40000	1.97246E-02	8.76210E-02
0.30000	1.56374E-02	7.96095E-02
0.20000	1.60222E-02	7.72495E-02
0.10000	1.86213E-02	7.81927E-02
0.00000	2.17558E-02	8.07705E-02
-0.10000	2.42360E-02	8.38073E-02
-0.20000	2.53025E-02	8.65298E-02
-0.30000	2.45918E-02	8.85639E-02
-0.40000	2.21221E-02	9.00185E-02
-0.50000	1.82960E-02	9.16590E-02
-0.60000	1.39164E-02	9.51830E-02
-0.70000	1.02137E-02	1.03623E-01
-0.80000	8.88211E-03	1.21914E-01
-0.90000	1.21223E-02	1.57713E-01
-1.00000	2.26911E-02	2.22586E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.750
 σ_{SE} = .640
 σ_{CE} = 1.110

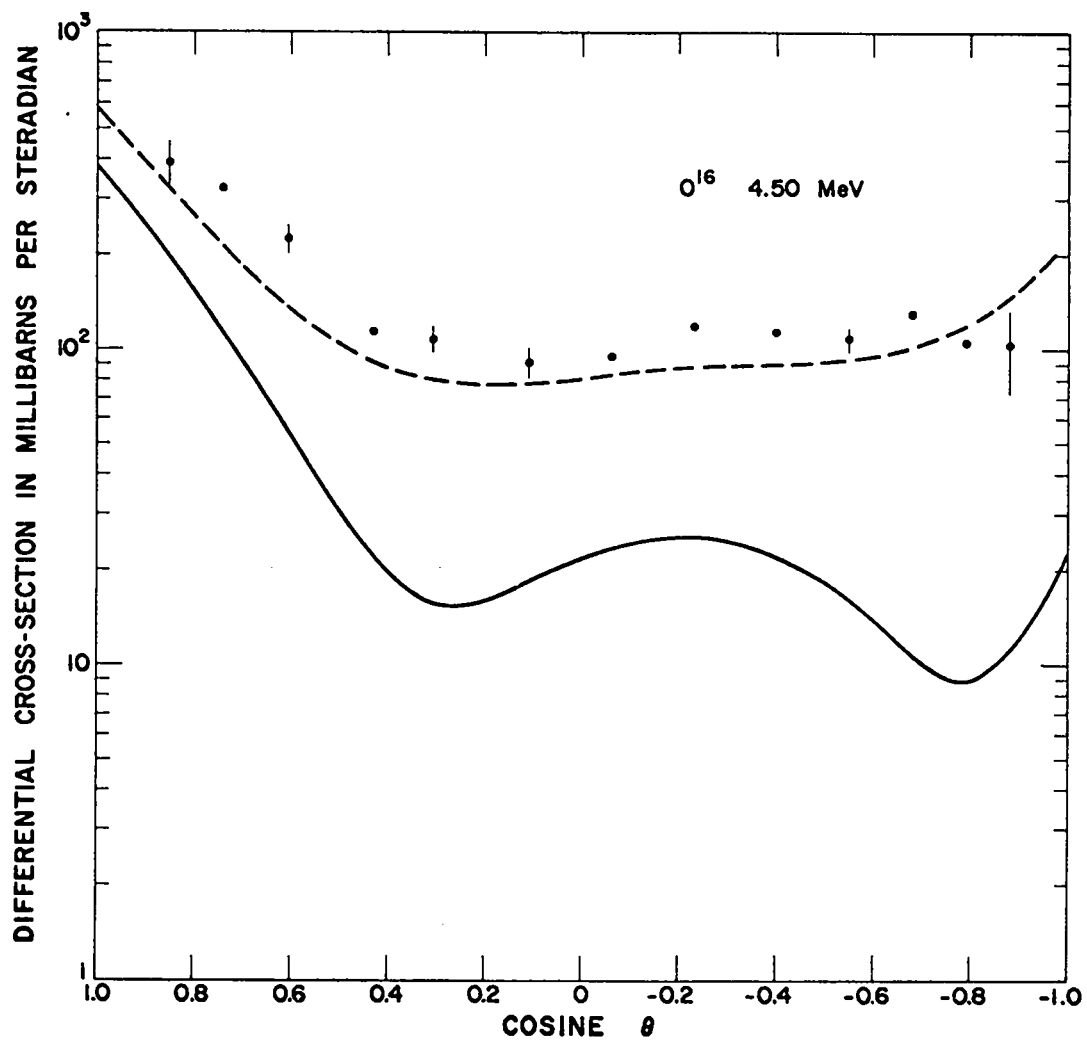


Figure 140

0^{16}

4.85 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.92538E-01	5.94816E-01
0.90000	2.46204E-01	3.90555E-01
0.80000	1.47685E-01	2.58349E-01
0.70000	8.40212E-02	1.75064E-01
0.60000	4.53207E-02	1.24611E-01
0.50000	2.40621E-02	9.58596E-02
0.40000	1.45468E-02	8.11664E-02
0.30000	1.24763E-02	7.53180E-02
0.20000	1.46292E-02	7.47699E-02
0.10000	1.86265E-02	7.71020E-02
0.00000	2.27256E-02	8.06440E-02
-0.10000	2.57586E-02	8.42401E-02
-0.20000	2.69929E-02	8.71336E-02
-0.30000	2.61175E-02	8.89592E-02
-0.40000	2.32207E-02	8.98403E-02
-0.50000	1.87970E-02	9.05946E-02
-0.60000	1.37726E-02	9.30626E-02
-0.70000	9.54483E-03	1.00587E-01
-0.80000	8.03479E-03	1.18699E-01
-0.90000	1.17486E-02	1.56099E-01
-1.00000	2.38470E-02	2.26125E-01

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 1.712
 σ_{SE} = .620
 σ_{CE} = 1.092

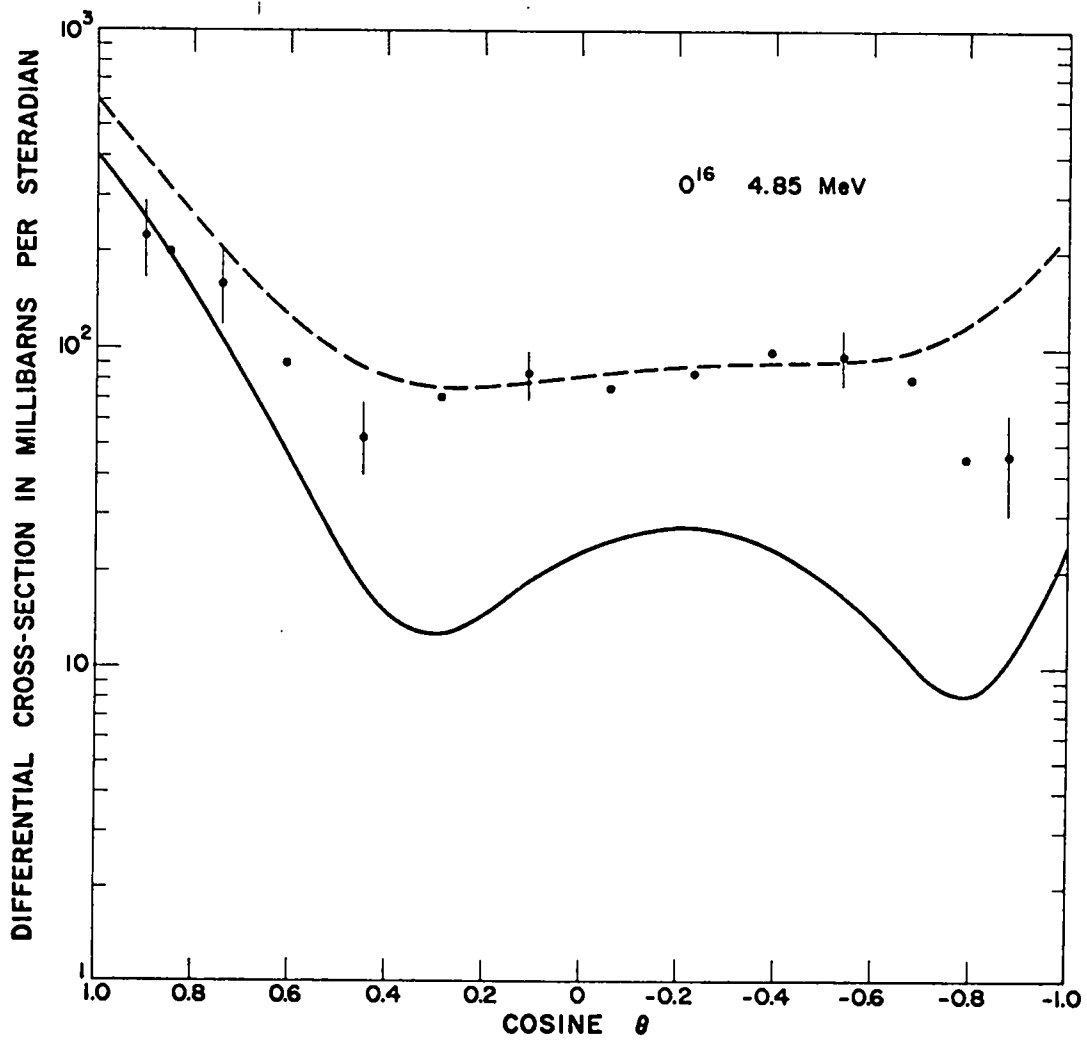


Figure 111

¹⁶O

5.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	3.98641E-01	6.02170E-01
0.90000	2.46311E-01	3.90289E-01
0.80000	1.44984E-01	2.54762E-01
0.70000	8.04266E-02	1.70570E-01
0.60000	4.18962E-02	1.20445E-01
0.50000	2.13177E-02	9.25432E-02
0.40000	1.26508E-02	7.88151E-02
0.30000	1.13997E-02	7.38423E-02
0.20000	1.42411E-02	7.39964E-02
0.10000	1.87485E-02	7.68398E-02
0.00000	2.31911E-02	8.07153E-02
-0.10000	2.63958E-02	8.44871E-02
-0.20000	2.76585E-02	8.74138E-02
-0.30000	2.66946E-02	8.91373E-02
-0.40000	2.36224E-02	8.97866E-02
-0.50000	1.89721E-02	9.07977E-02
-0.60000	1.37155E-02	9.22647E-02
-0.70000	9.31236E-03	9.94558E-02
-0.80000	7.77043E-03	1.17549E-01
-0.90000	1.17163E-02	1.55694E-01
-1.00000	2.44749E-02	2.28004E-01

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 1.699$
 $\sigma_{SE} = .613$
 $\sigma_{CE} = 1.086$

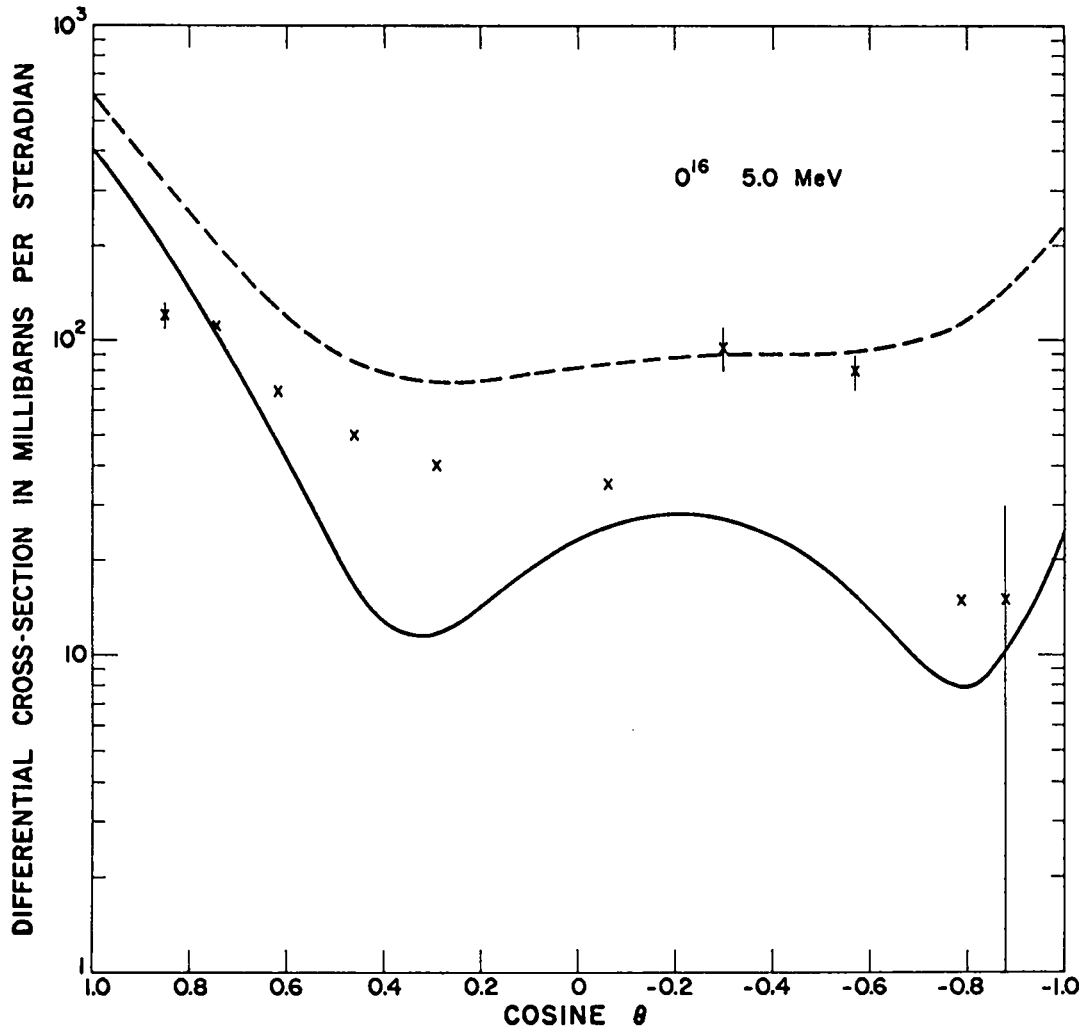


Figure 112

0¹⁶

5.66 MeV

GDSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	4.32081E-01	6.42215E-01
0.90000	2.49917E-01	3.93093E-01
0.80000	1.35099E-01	2.41715E-01
0.70000	6.65280E-02	1.53387E-01
0.60000	2.89664E-02	1.04869E-01
0.50000	1.15235E-02	8.07884E-02
0.40000	6.50193E-03	7.11692E-02
0.30000	8.52486E-03	6.96793E-02
0.20000	1.38851E-02	7.23847E-02
0.10000	2.00692E-02	7.68684E-02
0.00000	2.54203E-02	8.16299E-02
-0.10000	2.89083E-02	8.57074E-02
-0.20000	2.99869E-02	8.84866E-02
-0.30000	2.85184E-02	8.96728E-02
-0.40000	2.47506E-02	8.94178E-02
-0.50000	1.93381E-02	8.86030E-02
-0.60000	1.33951E-02	8.92976E-02
-0.70000	8.57633E-03	9.54358E-02
-0.80000	7.17833E-03	1.13795E-01
-0.90000	1.22580E-02	1.55434E-01
-1.00000	2.77648E-02	2.37899E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.663
 σ_{SE} = .596
 σ_{CE} = 1.067

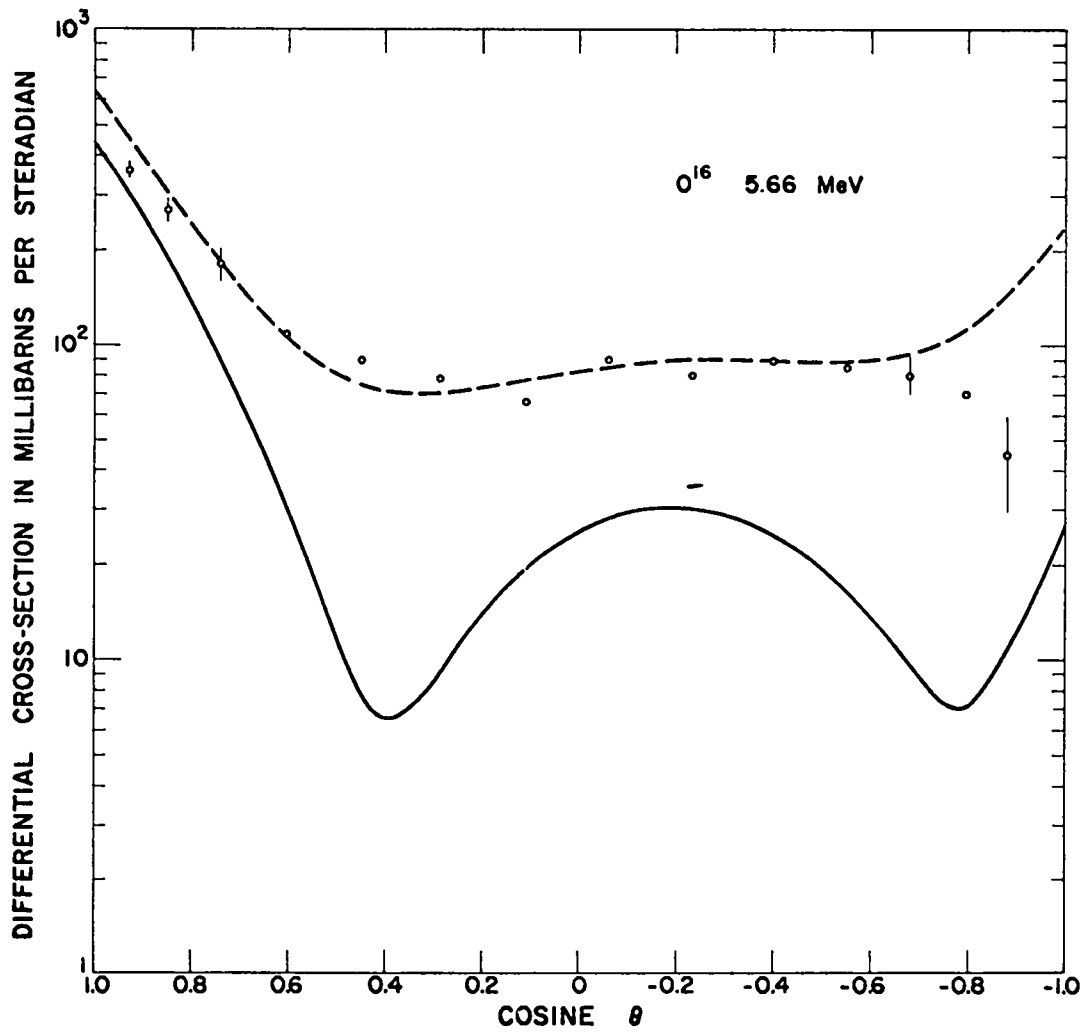


Figure 143

10^{-16}	6.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	4.53443E-01	6.67456E-01
0.90000	2.53638E-01	3.96823E-01
0.80000	1.31165E-01	2.36552E-01
0.70000	6.04998E-02	1.46034E-01
0.60000	2.35910E-02	9.84565E-02
0.50000	7.85164E-03	7.63942E-02
0.40000	4.64034E-03	6.87934E-02
0.30000	8.12579E-03	6.88533E-02
0.20000	1.44490E-02	7.25272E-02
0.10000	2.11165E-02	7.74703E-02
0.00000	2.65735E-02	8.23248E-02
-0.10000	2.99174E-02	8.62713E-02
-0.20000	3.07200E-02	8.87982E-02
-0.30000	2.89354E-02	8.96628E-02
-0.40000	2.48745E-02	8.90276E-02
-0.50000	1.92322E-02	8.77747E-02
-0.60000	1.31549E-02	8.80204E-02
-0.70000	8.34146E-03	9.38760E-02
-0.80000	7.16967E-03	1.12557E-01
-0.90000	1.28429E-02	1.56028E-01
-1.00000	2.95535E-02	2.43567E-01

(DSIGMAS IN BARNS/STERADIAN

$$\begin{aligned} \sigma_T &= 1.655 \\ \sigma_{SE} &= .594 \\ \sigma_{CE} &= 1.060 \end{aligned}$$

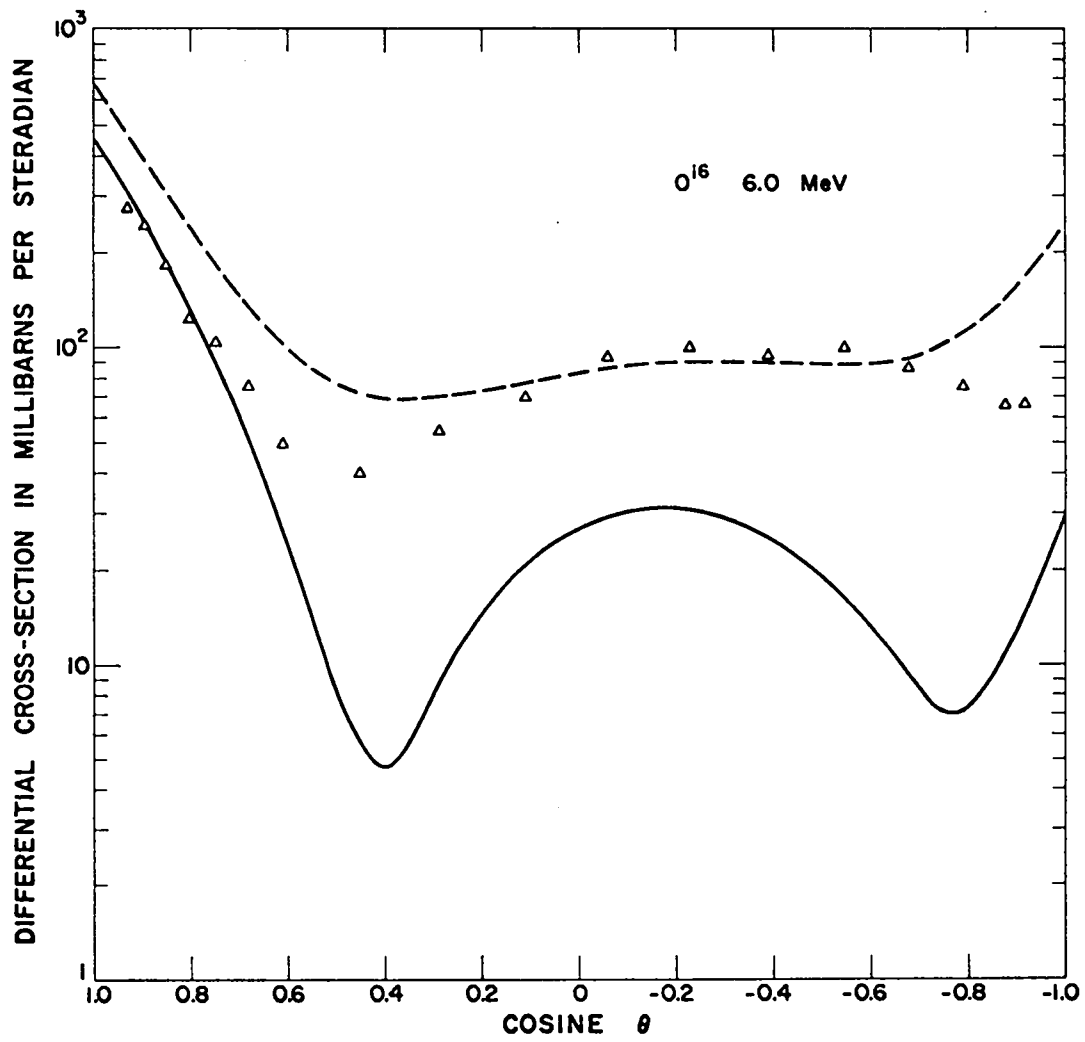


Figure 144

0¹⁶

6.53 MeV

CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	4.92160E-01	6.85178E-01
0.90000	2.61810E-01	3.89661E-01
0.80000	1.26474E-01	2.20129E-01
0.70000	5.25149E-02	1.28325E-01
0.60000	1.68292E-02	8.29984E-02
0.50000	3.85854E-03	6.42376E-02
0.40000	3.37276E-03	5.96974E-02
0.30000	8.83515E-03	6.20058E-02
0.20000	1.62137E-02	6.69677E-02
0.10000	2.31322E-02	7.23266E-02
0.00000	2.82810E-02	7.69331E-02
-0.10000	3.10261E-02	8.02205E-02
-0.20000	3.11705E-02	8.19245E-02
-0.30000	2.88323E-02	8.20029E-02
-0.40000	2.44130E-02	8.07377E-02
-0.50000	1.86356E-02	7.90146E-02
-0.60000	1.26361E-02	7.88053E-02
-0.70000	8.09909E-03	8.39095E-02
-0.80000	7.42471E-03	1.01080E-01
-0.90000	1.39239E-02	1.41775E-01
-1.00000	3.20338E-02	2.25052E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.652
 σ_{SE} = .599
 σ_{CE} = .939

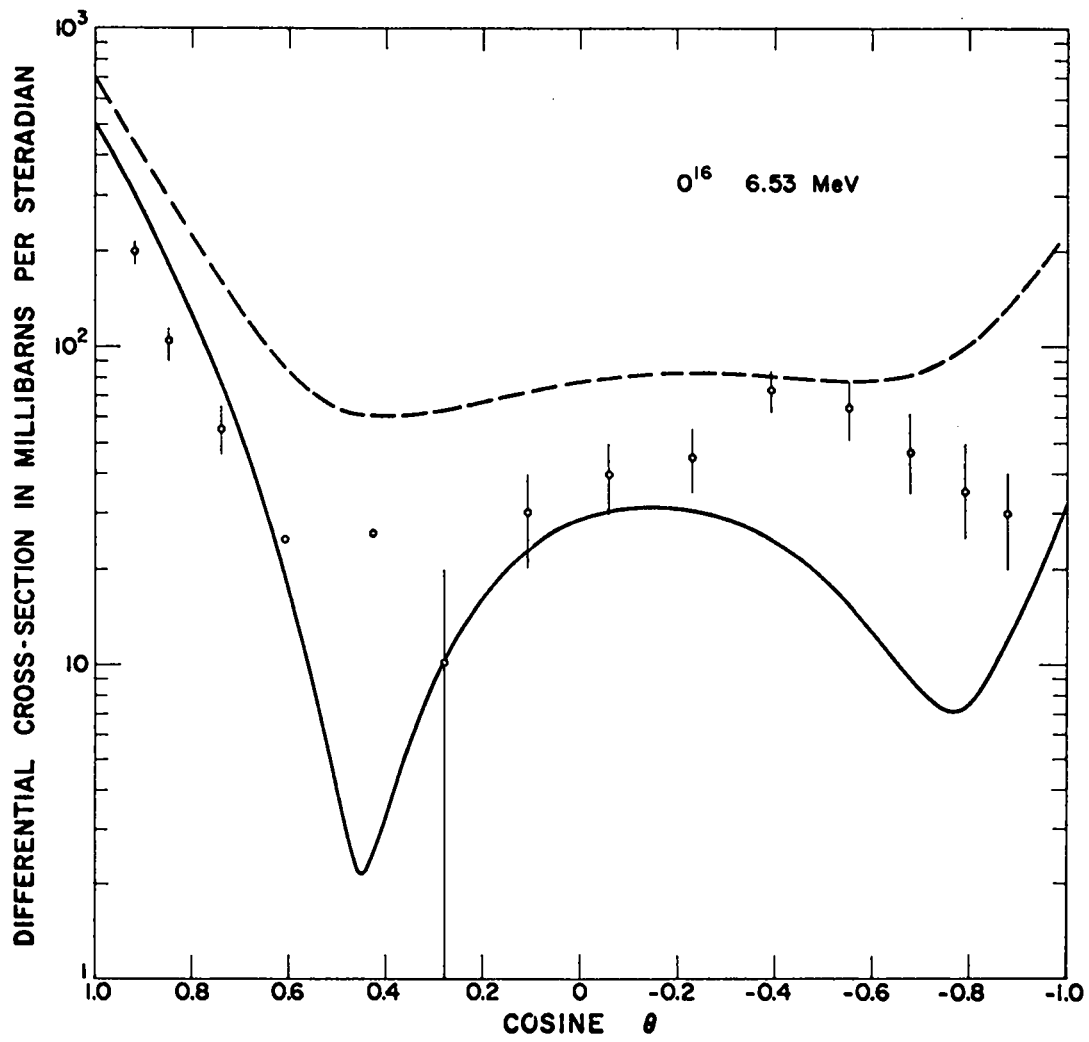


Figure 115

0^{16}	7.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	5.31115E-01	6.60932E-01
0.90000	2.71026E-01	3.59697E-01
0.80000	1.23582E-01	1.89713E-01
0.70000	4.67538E-02	1.00679E-01
0.60000	1.23440E-02	5.94783E-02
0.50000	1.89285E-03	4.48426E-02
0.40000	3.68728E-03	4.36274E-02
0.30000	1.05903E-02	4.81278E-02
0.20000	1.84830E-02	5.41441E-02
0.10000	2.51782E-02	5.96094E-02
0.00000	2.96494E-02	6.36508E-02
-0.10000	3.15576E-02	6.59887E-02
-0.20000	3.09450E-02	6.66041E-02
-0.30000	2.80863E-02	6.56238E-02
-0.40000	2.34517E-02	6.33918E-02
-0.50000	1.77544E-02	6.07041E-02
-0.60000	1.20652E-02	5.91995E-02
-0.70000	7.97765E-03	6.19034E-02
-0.80000	7.81406E-03	7.39497E-02
-0.90000	1.48635E-02	1.03534E-01
-1.00000	3.36461E-02	1.63463E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.658
 σ_{SE} = .610
 σ_{CE} = .658

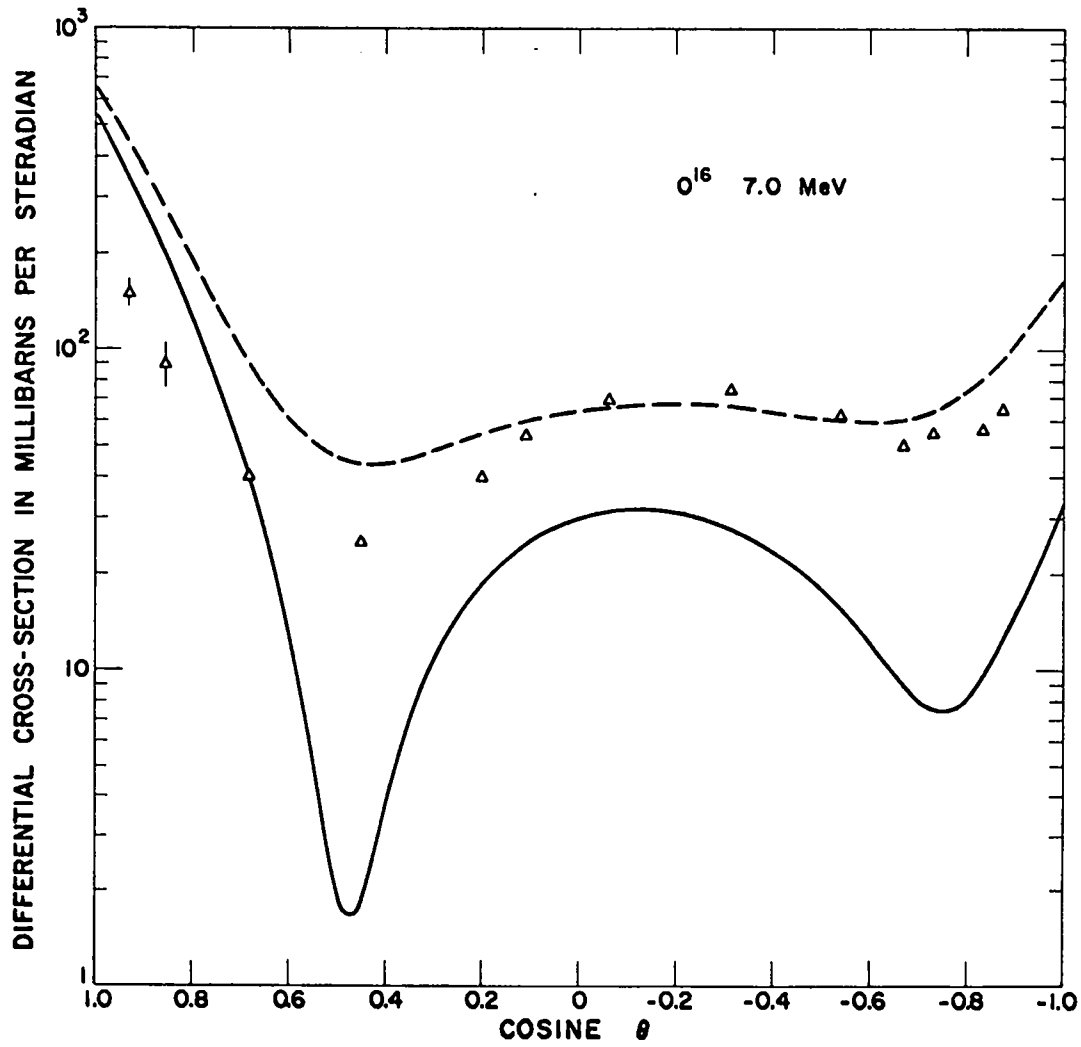


Figure 11/6

0^{16}

8.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	6.24292E-01	6.95011E-01
0.90000	2.95079E-01	3.39152E-01
0.80000	1.20665E-01	1.51598E-01
0.70000	3.80502E-02	6.30062E-02
0.60000	6.75803E-03	2.91031E-02
0.50000	1.62733E-03	2.26250E-02
0.40000	7.72375E-03	2.76546E-02
0.30000	1.67707E-02	3.56234E-02
0.20000	2.46710E-02	4.25114E-02
0.10000	2.98134E-02	4.69190E-02
0.00000	3.19440E-02	4.87804E-02
-0.10000	3.14470E-02	4.85526E-02
-0.20000	2.89213E-02	4.67616E-02
-0.30000	2.49743E-02	4.38270E-02
-0.40000	2.01748E-02	4.01056E-02
-0.50000	1.51237E-02	3.61214E-02
-0.60000	1.06134E-02	3.29585E-02
-0.70000	7.85513E-03	3.28111E-02
-0.80000	8.75802E-03	3.96912E-02
-0.90000	1.62505E-02	6.03230E-02
-1.00000	3.46349E-02	1.05353E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.680
 σ_{SE} = .646
 σ_{CE} = .324

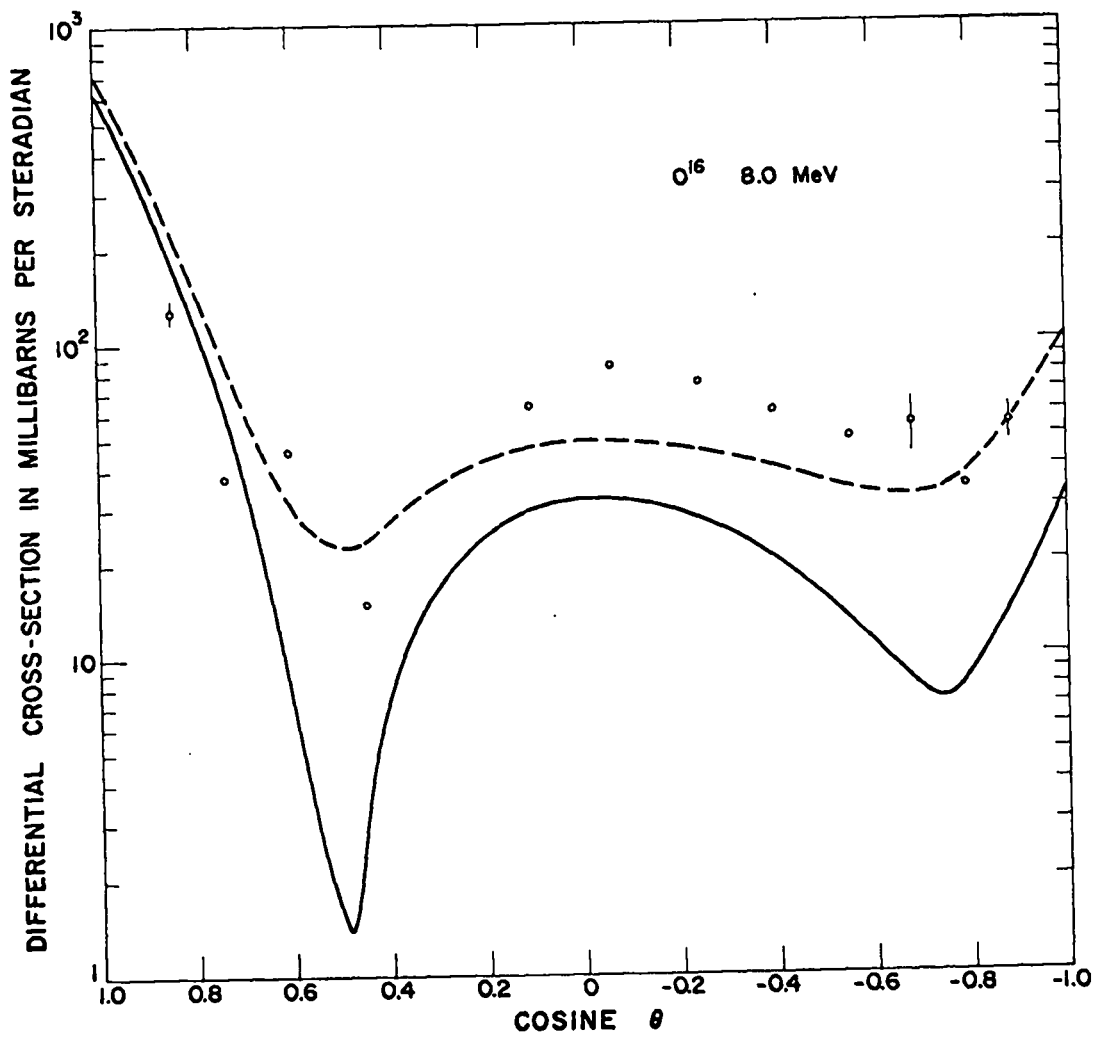


Figure 147

016

9.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	7.23857E-01	7.74390E-01
0.90000	3.22137E-01	3.52190E-01
0.80000	1.20979E-01	1.41364E-01
0.70000	3.32649E-02	4.95423E-02
0.60000	5.19265E-03	1.98731E-02
0.50000	4.80314E-03	1.87536E-02
0.40000	1.41908E-02	2.75363E-02
0.30000	2.42428E-02	3.69062E-02
0.20000	3.11186E-02	4.30991E-02
0.10000	3.39276E-02	4.53975E-02
0.00000	3.32346E-02	4.45151E-02
-0.10000	3.01376E-02	4.16074E-02
-0.20000	2.57453E-02	3.77258E-02
-0.30000	2.09327E-02	3.35961E-02
-0.40000	1.62940E-02	2.96395E-02
-0.50000	1.22362E-02	2.61867E-02
-0.60000	9.17610E-03	2.38566E-02
-0.70000	7.81236E-03	2.40897E-02
-0.80000	9.45842E-03	2.98431E-02
-0.90000	1.64226E-02	4.64750E-02
-1.00000	3.24297E-02	8.29231E-02

(DSIGMAS IN BARNS/STERADIAN)

$\sigma_T = 1.704$
 $\sigma_{SE} = .693$
 $\sigma_{CE} = .218$

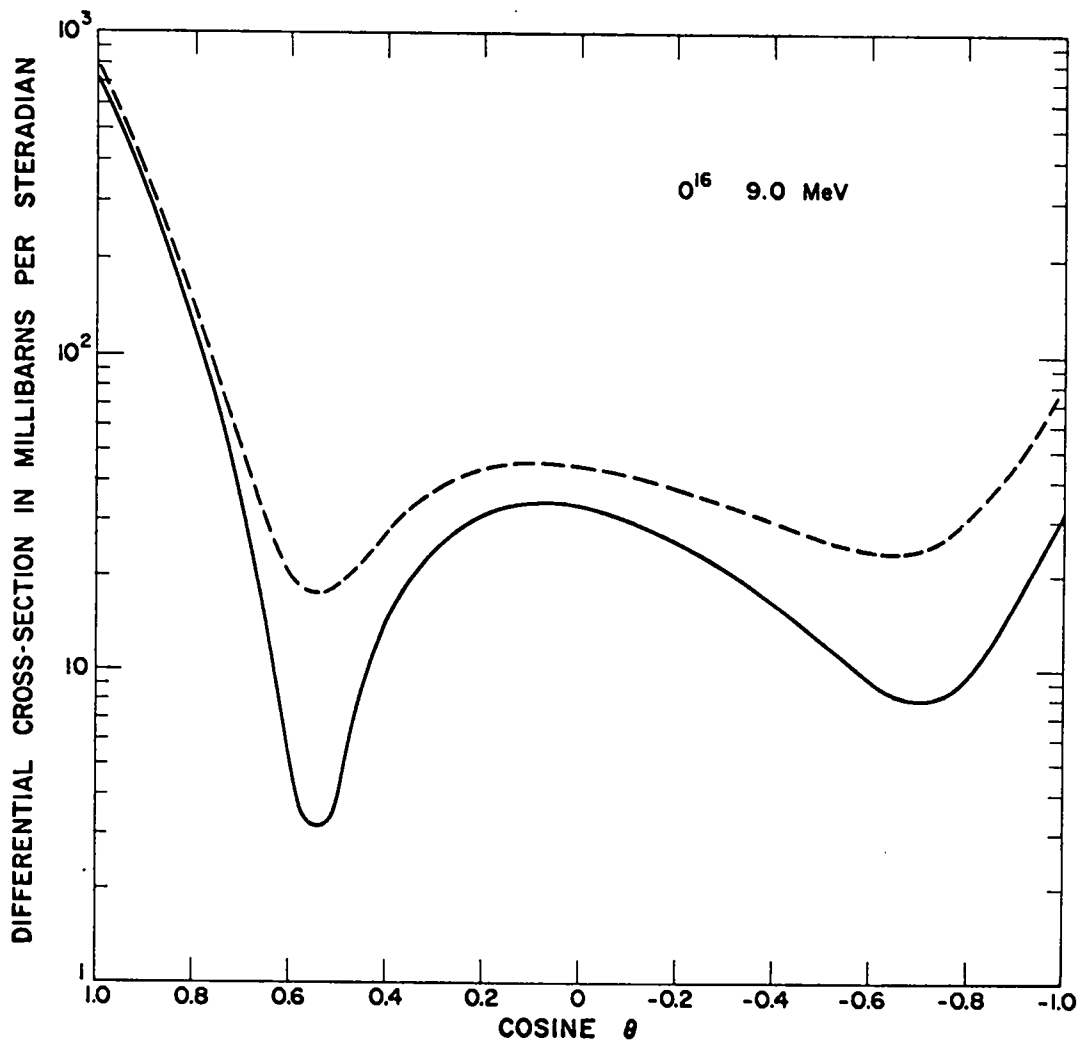


Figure 118

0⁻¹⁶

10.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	8.23190E-01	8.62843E-01
0.90000	3.49443E-01	3.72181E-01
0.80000	1.23317E-01	1.38370E-01
0.70000	3.13490E-02	4.33143E-02
0.60000	6.18652E-03	1.70525E-02
0.50000	9.53011E-03	1.99344E-02
0.40000	2.10380E-02	3.10360E-02
0.30000	3.11430E-02	4.06464E-02
0.20000	3.64428E-02	4.54350E-02
0.10000	3.67836E-02	4.53890E-02
0.00000	3.34577E-02	4.19193E-02
-0.10000	2.81394E-02	3.67448E-02
-0.20000	2.23067E-02	3.12988E-02
-0.30000	1.69896E-02	2.64930E-02
-0.40000	1.27365E-02	2.27345E-02
-0.50000	9.73028E-03	2.01345E-02
-0.60000	8.01040E-03	1.88764E-02
-0.70000	7.77189E-03	1.97372E-02
-0.80000	9.72542E-03	2.47785E-02
-0.90000	1.55089E-02	3.82464E-02
-1.00000	2.81458E-02	6.77988E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.723
 σ_{SE} = .741
 σ_{CE} = .164

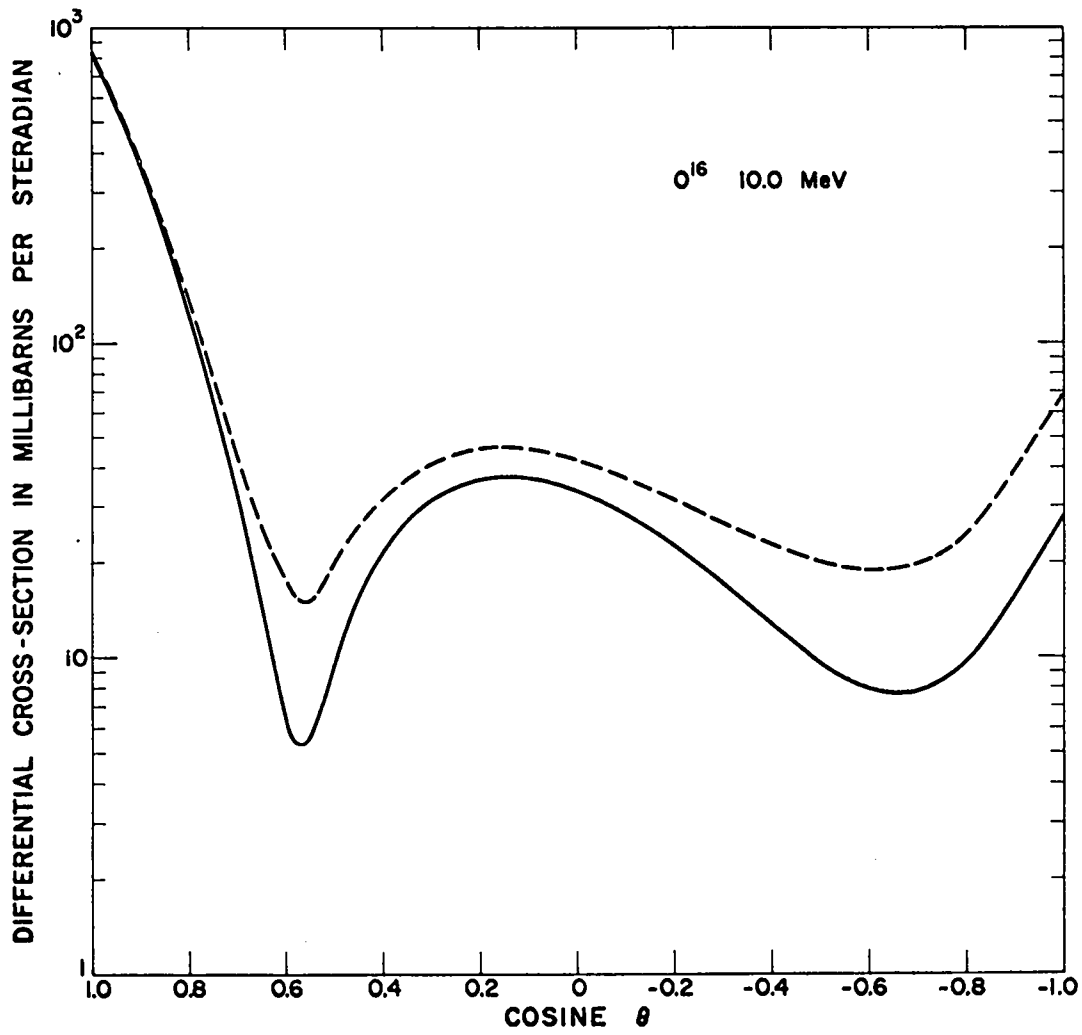


Figure 149

0¹⁶

11.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	9.20166E-01	9.50627E-01
0.90000	3.75557E-01	3.92431E-01
0.80000	1.26646E-01	1.37606E-01
0.70000	3.13239E-02	4.00068E-02
0.60000	8.65546E-03	1.65595E-02
0.50000	1.46443E-02	2.22248E-02
0.40000	2.71487E-02	3.44395E-02
0.30000	3.65476E-02	4.34886E-02
0.20000	4.00229E-02	4.66078E-02
0.10000	3.81104E-02	4.44291E-02
0.00000	3.26740E-02	3.88943E-02
-0.10000	2.57704E-02	3.20891E-02
-0.20000	1.90716E-02	2.56564E-02
-0.30000	1.36376E-02	2.05786E-02
-0.40000	9.91079E-03	1.72016E-02
-0.50000	7.85389E-03	1.54344E-02
-0.60000	7.18621E-03	1.50903E-02
-0.70000	7.69150E-03	1.63745E-02
-0.80000	9.58424E-03	2.05441E-02
-0.90000	1.39285E-02	3.08023E-02
-1.00000	2.31078E-02	5.35688E-02

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 1.738$
 $\sigma_{SE} = .788$
 $\sigma_{CE} = .120$

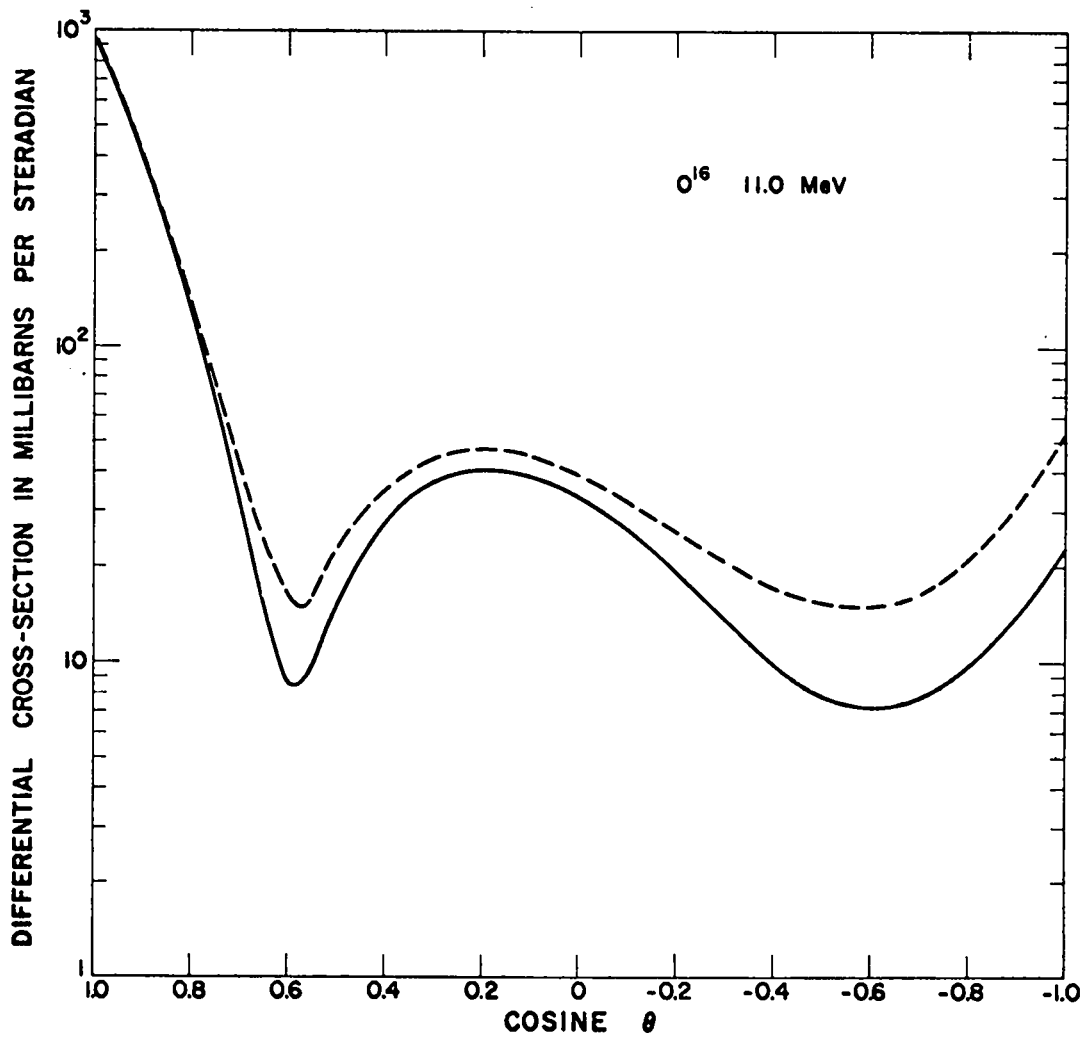


Figure 150

10^{-16}

11.6 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	9.77086E-01	1.00165E 00
0.90000	3.90363E-01	4.04040E-01
0.80000	1.28843E-01	1.37764E-01
0.70000	3.19431E-02	3.90038E-02
0.60000	1.05704E-02	1.69723E-02
0.50000	1.76485E-02	2.37701E-02
0.40000	3.02691E-02	3.61540E-02
0.30000	3.89606E-02	4.45729E-02
0.20000	4.13068E-02	4.66466E-02
0.10000	3.82174E-02	4.33549E-02
0.00000	3.18118E-02	3.68746E-02
-0.10000	2.42783E-02	2.94158E-02
-0.20000	1.73233E-02	2.26631E-02
-0.30000	1.19724E-02	1.75847E-02
-0.40000	8.58732E-03	1.44723E-02
-0.50000	7.01487E-03	1.31365E-02
-0.60000	6.82451E-03	1.32264E-02
-0.70000	7.61110E-03	1.46718E-02
-0.80000	9.35309E-03	1.82741E-02
-0.90000	1.28233E-02	2.65005E-02
-1.00000	2.00528E-02	4.46148E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.744
 σ_{SE} = .814
 σ_{CE} = .098

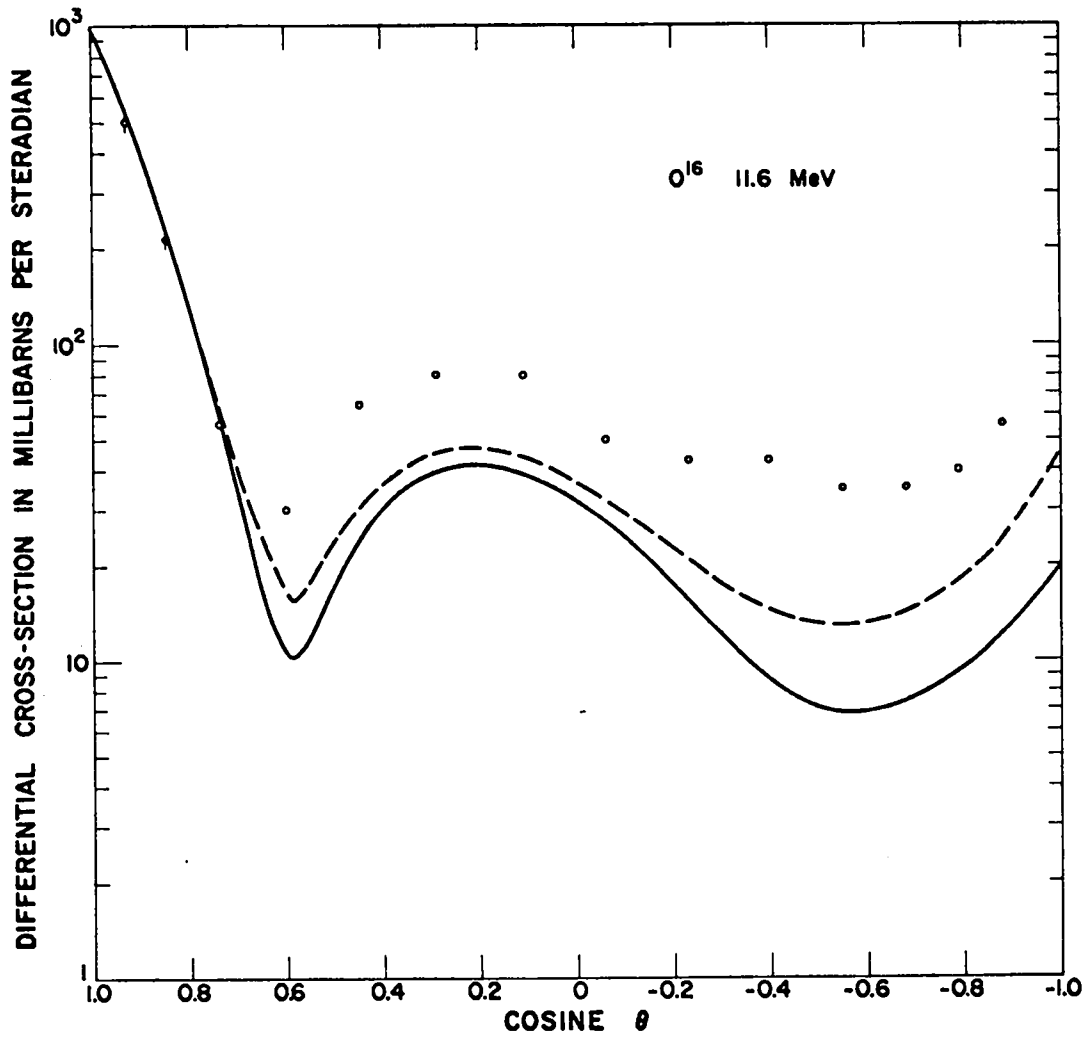


Figure 151

$^{16}_0$

12.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.01460E 00	1.03617E 00
0.90000	3.99772E-01	4.11720E-01
0.80000	1.30265E-01	1.38059E-01
0.70000	3.25141E-02	3.86874E-02
0.60000	1.19551E-02	1.75423E-02
0.50000	1.95880E-02	2.49141E-02
0.40000	3.21172E-02	3.72265E-02
0.30000	4.02414E-02	4.51135E-02
0.20000	4.18319E-02	4.64749E-02
0.10000	3.80320E-02	4.25080E-02
0.00000	3.10976E-02	3.55126E-02
-0.10000	2.32683E-02	2.77443E-02
-0.20000	1.62415E-02	2.08845E-02
-0.30000	1.10008E-02	1.58729E-02
-0.40000	7.84855E-03	1.29578E-02
-0.50000	6.56189E-03	1.18879E-02
-0.60000	6.62879E-03	1.22160E-02
-0.70000	7.54320E-03	1.37166E-02
-0.80000	9.15348E-03	1.69472E-02
-0.90000	1.20643E-02	2.40125E-02
-1.00000	1.80959E-02	3.96666E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.749
 σ_{SE} = .830
 σ_{CE} = .085

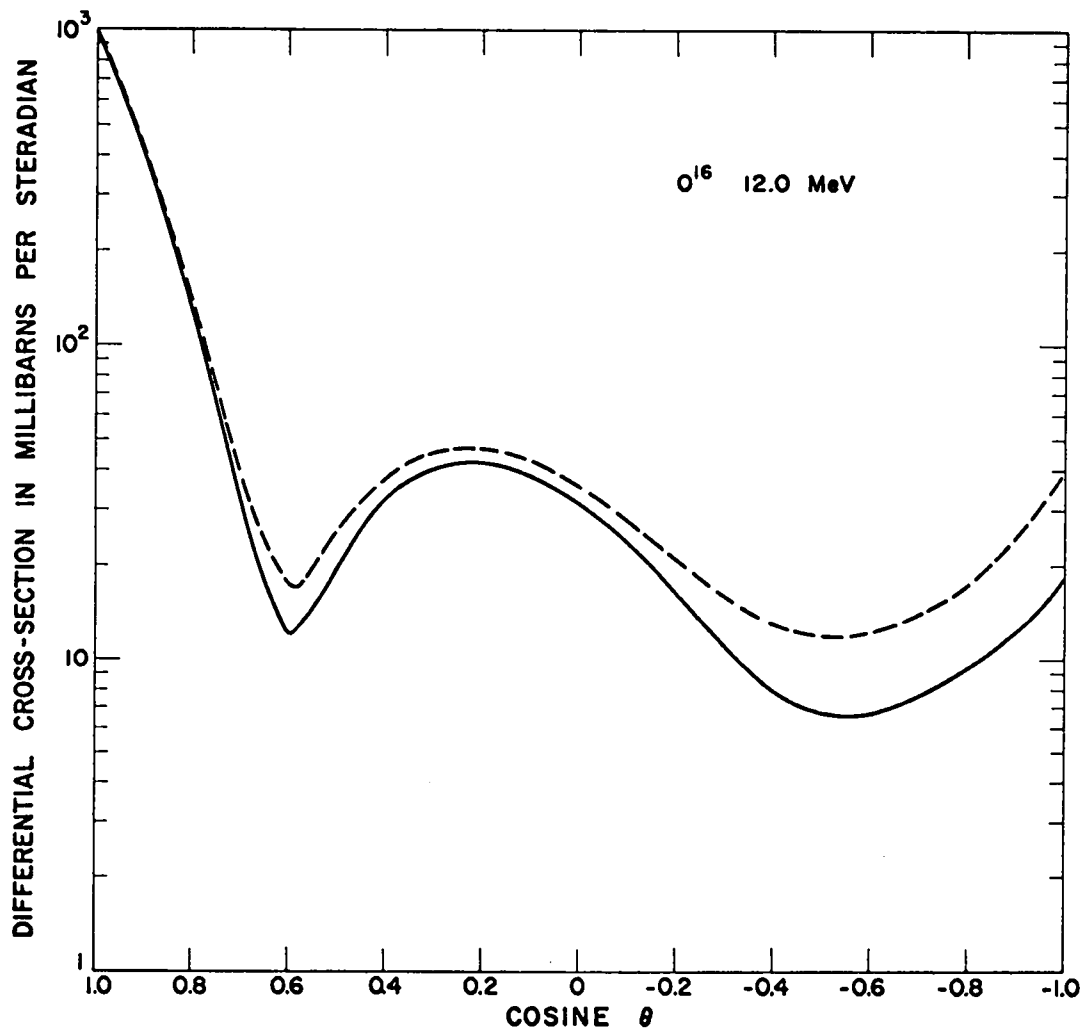


Figure 152

0¹⁶

13.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.10817E 00	1.12334E 00
0.90000	4.22183E-01	4.30489E-01
0.80000	1.33673E-01	1.39121E-01
0.70000	3.43087E-02	3.86516E-02
0.60000	1.56096E-02	1.95292E-02
0.50000	2.41157E-02	2.78253E-02
0.40000	3.59243E-02	3.94671E-02
0.30000	4.23698E-02	4.57526E-02
0.20000	4.20955E-02	4.53384E-02
0.10000	3.67750E-02	3.99218E-02
0.00000	2.88997E-02	3.20123E-02
-0.10000	2.07197E-02	2.38665E-02
-0.20000	1.38160E-02	1.70589E-02
-0.30000	9.00804E-03	1.23909E-02
-0.40000	6.43501E-03	9.97787E-03
-0.50000	5.72820E-03	9.43781E-03
-0.60000	6.23609E-03	1.01557E-02
-0.70000	7.29086E-03	1.16337E-02
-0.80000	8.51792E-03	1.39657E-02
-0.90000	1.01969E-02	1.85029E-02
-1.00000	1.36833E-02	2.88553E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.759
 σ_{SE} = .869
 σ_{CE} = .059

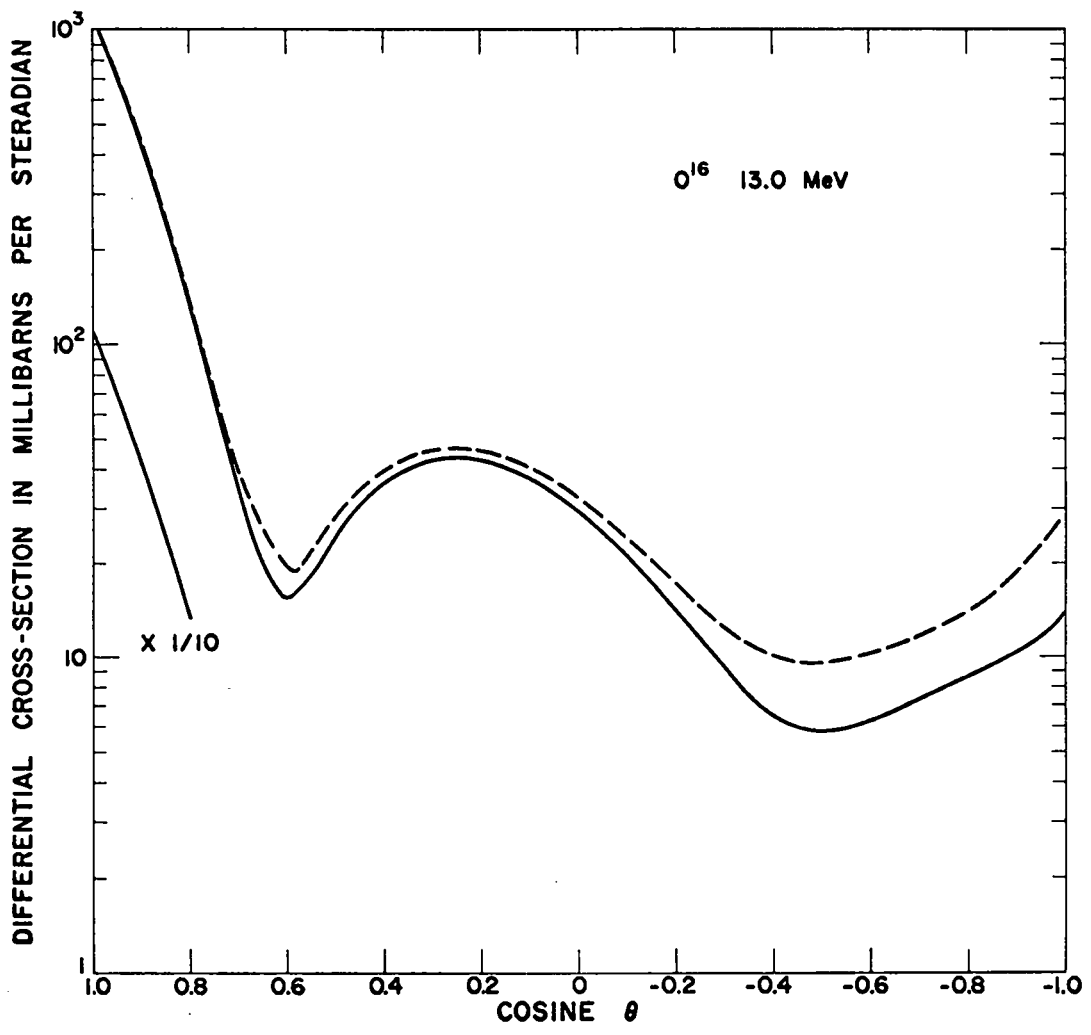


Figure 153

0¹⁶

14.0 MeV

CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.20284E 00	1.21369E 00
0.90000	4.42695E-01	4.48887E-01
0.80000	1.36492E-01	1.40518E-01
0.70000	3.63296E-02	3.95477E-02
0.60000	1.93612E-02	2.22706E-02
0.50000	2.81527E-02	3.09017E-02
0.40000	3.86878E-02	4.13091E-02
0.30000	4.31998E-02	4.57053E-02
0.20000	4.11515E-02	4.35617E-02
0.10000	3.46596E-02	3.70074E-02
0.00000	2.63095E-02	2.86357E-02
-0.10000	1.82237E-02	2.05715E-02
-0.20000	1.17636E-02	1.41738E-02
-0.30000	7.53058E-03	1.00361E-02
-0.40000	5.49823E-03	8.11955E-03
-0.50000	5.19498E-03	7.94398E-03
-0.60000	5.91043E-03	8.81990E-03
-0.70000	6.92229E-03	1.01404E-02
-0.80000	7.75396E-03	1.17791E-02
-0.90000	8.47701E-03	1.46692E-02
-1.00000	1.00741E-02	2.17201E-02

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.768
 σ_{SE} = .903
 σ_{CE} = .044

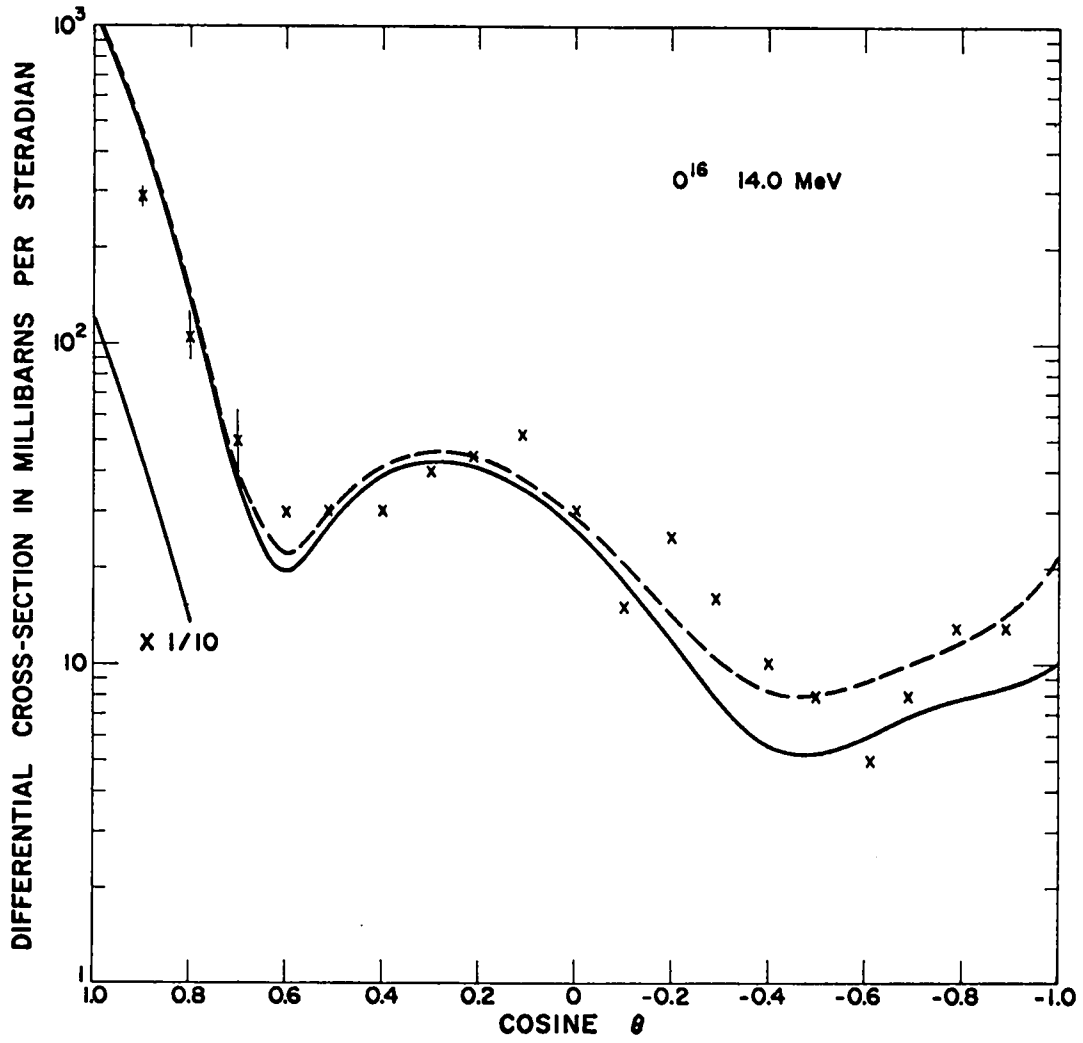


Figure 154

0¹⁶

14.92 MeV

GOSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	1.28923E 00	1.29833E 00
0.90000	4.59923E-01	4.64641E-01
0.80000	1.38362E-01	1.41423E-01
0.70000	3.81333E-02	4.05961E-02
0.60000	2.27264E-02	2.49543E-02
0.50000	3.14135E-02	3.35099E-02
0.40000	4.04434E-02	4.24361E-02
0.30000	4.30599E-02	4.49662E-02
0.20000	3.94982E-02	4.13401E-02
0.10000	3.22071E-02	3.40101E-02
0.00000	2.37519E-02	2.55420E-02
-0.10000	1.60427E-02	1.78457E-02
-0.20000	1.01758E-02	1.20177E-02
-0.30000	6.52784E-03	8.43417E-03
-0.40000	4.93096E-03	6.92365E-03
-0.50000	4.85936E-03	6.95573E-03
-0.60000	5.61027E-03	7.83818E-03
-0.70000	6.48632E-03	8.94912E-03
-0.80000	6.99615E-03	1.00572E-02
-0.90000	7.09193E-03	1.18101E-02
-1.00000	7.46160E-03	1.65565E-02

(DSIGMAS IN BARNS/STERADIAN

$\sigma_T = 1.777$
 $\sigma_{SE} = .933$
 $\sigma_{CE} = .034$

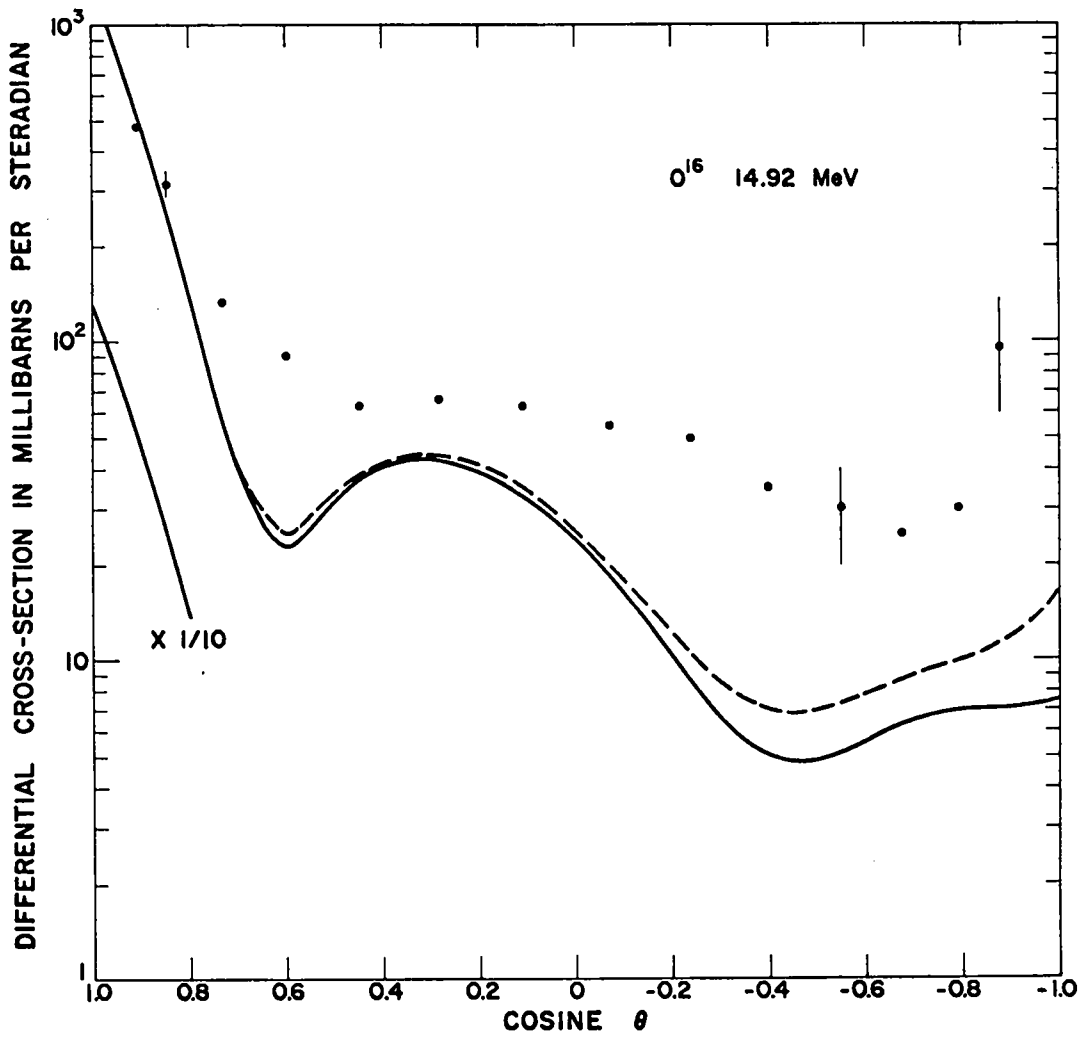


Figure 155

10^{16}

15.5 MeV

COSINE (C.M.)

1.00000	1.3450E 00
0.90000	4.7020E-01
0.80000	1.3930E-01
0.70000	3.9246E-02
0.60000	2.4765E-02
0.50000	3.3230E-02
0.40000	4.1200E-02
0.30000	4.2609E-02
0.20000	3.8168E-02
0.10000	3.0497E-02
0.00000	2.2106E-02
-0.10000	1.4737E-02
-0.20000	9.2992E-03
-0.30000	6.0248E-03
-0.40000	4.6660E-03
-0.50000	4.6825E-03
-0.60000	5.4010E-03
-0.70000	6.1655E-03
-0.80000	6.5002E-03
-0.90000	6.3092E-03
-1.00000	6.1408E-03

DSIGMAS IN BNS/STERAD

$\sigma_T = 1.782$
 $\sigma_{SE} = .950$

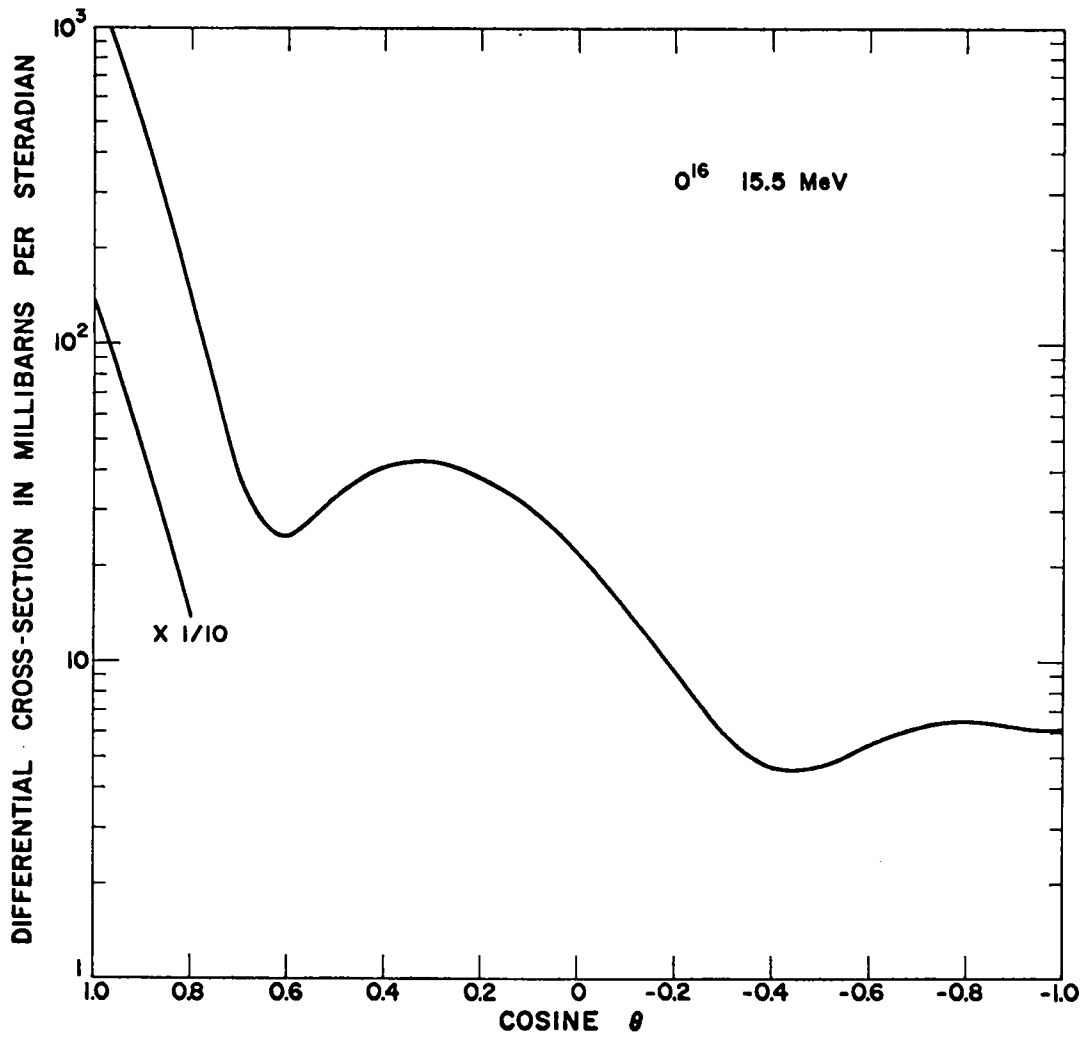


Figure 156

0¹⁶

15.83 MeV

COSINE (C.M.)

1.00000	1.3765E 00
0.90000	4.7556E-01
0.80000	1.3956E-01
0.70000	3.9780E-02
0.60000	2.5873E-02
0.50000	3.4198E-02
0.40000	4.1546E-02
0.30000	4.2268E-02
0.20000	3.7351E-02
0.10000	2.9499E-02
0.00000	2.1178E-02
-0.10000	1.4025E-02
-0.20000	8.8425E-03
-0.30000	5.7781E-03
-0.40000	4.5436E-03
-0.50000	4.5949E-03
-0.60000	5.2811E-03
-0.70000	5.9760E-03
-0.80000	6.2212E-03
-0.90000	5.9049E-03
-1.00000	5.5030E-03

DSIGMAS IN BNS/STERAD

$$\begin{aligned}\sigma_T &= 1.785 \\ \sigma_{SE} &= .959\end{aligned}$$

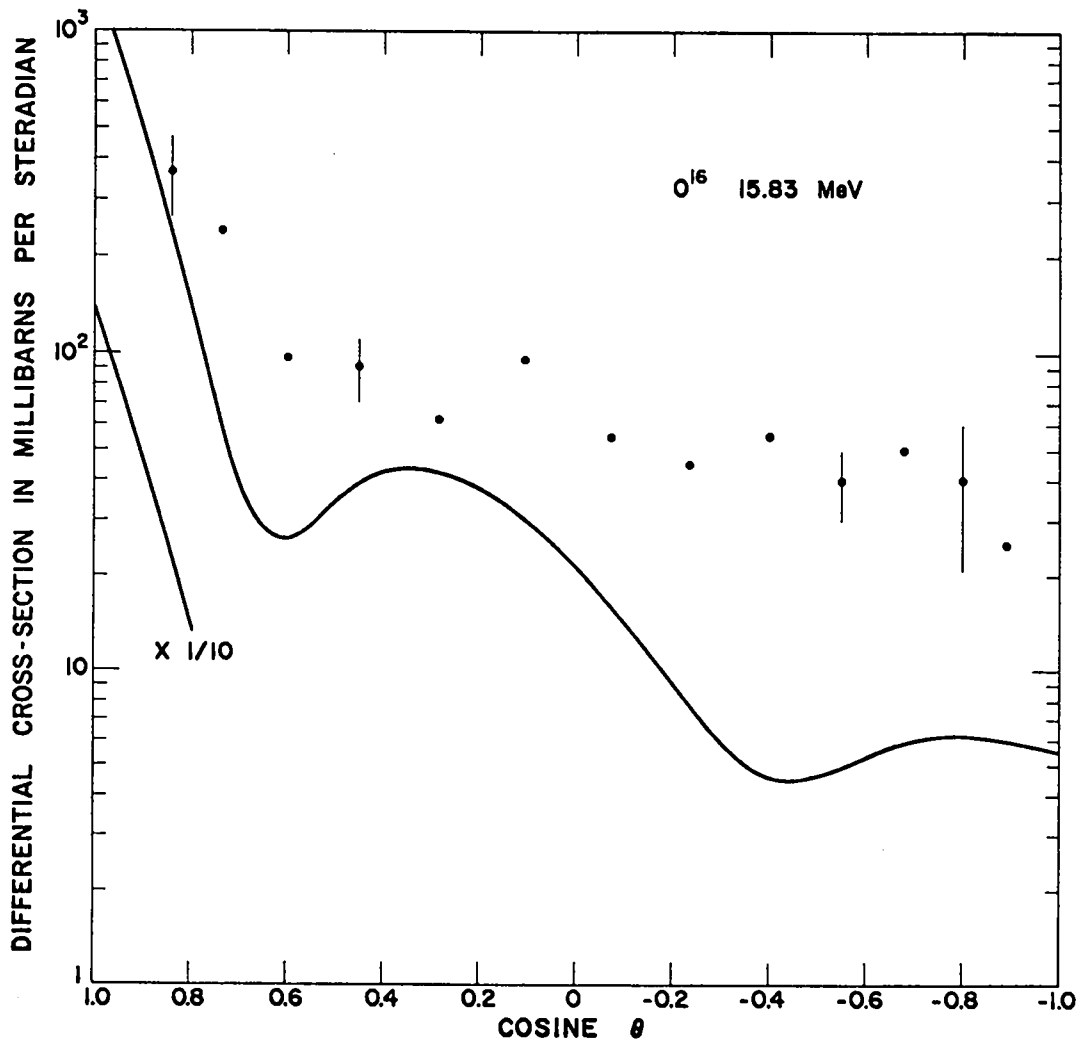


Figure 157

$^{16}_0$

16.0 MeV

COSINE (C.M.)

1.00000	1.3930E 00
0.90000	4.7839E-01
0.80000	1.3976E-01
0.70000	4.0083E-02
0.60000	2.6434E-02
0.50000	3.4662E-02
0.40000	4.1683E-02
0.30000	4.2059E-02
0.20000	3.6908E-02
0.10000	2.8974E-02
0.00000	2.0697E-02
-0.10000	1.3663E-02
-0.20000	8.6137E-03
-0.30000	5.6572E-03
-0.40000	4.4834E-03
-0.50000	4.5478E-03
-0.60000	5.2129E-03
-0.70000	5.8708E-03
-0.80000	6.0740E-03
-0.90000	5.7026E-03
-1.00000	5.1986E-03

DSIGMAS IN BNS/STERAD

σ_T = 1.787
 σ_{SE} = .964

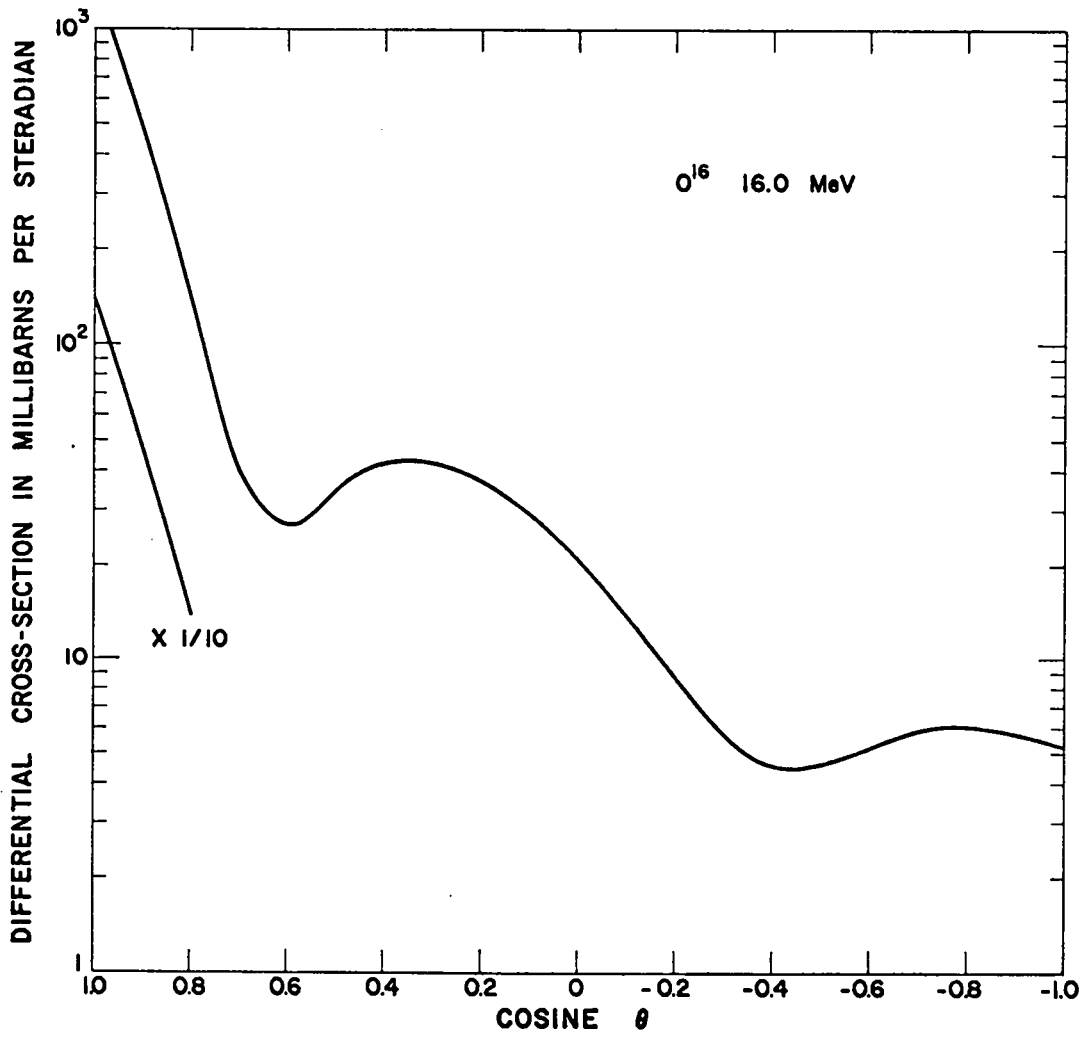


Figure 158

Na²³

<u>Energy</u>	<u>Energy Levels</u> *
3.97	G.S. $3/2^+$
4.00	0.438 $5/2^+$
5.00	2.08 $(7/2^+)$
6.00	2.39 $[3/2^+]$
7.00	2.64 $[5/2^+]$
8.00	2.70 $[7/2^+]$
9.00	2.98 $[3/2^+]$
10.00	3.68 $[5/2^+]$
11.00	3.85 $[7/2^+]$
12.00	3.92 $[3/2^+]$
13.00	4.43 $[5/2^+]$
14.00	4.78 $[7/2^+]$
15.00	
16.00	

* Energy levels obtained from NRC 59-4-24,
except [] levels which are assumed.

Na²³

3.97 MeV

CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	6.80411E-01	7.07751E-01
0.95000	5.60107E-01	5.86290E-01
0.90000	4.59756E-01	4.84973E-01
0.85000	3.76428E-01	4.00837E-01
0.80000	3.07563E-01	3.31294E-01
0.75000	2.50933E-01	2.74091E-01
0.70000	2.04603E-01	2.27274E-01
0.65000	1.66900E-01	1.89156E-01
0.60000	1.36383E-01	1.58281E-01
0.55000	1.11814E-01	1.33402E-01
0.50000	9.21366E-02	1.13455E-01
0.45000	7.64500E-02	9.75335E-02
0.40000	6.39933E-02	8.48723E-02
0.35000	5.41254E-02	7.48276E-02
0.30000	4.63102E-02	6.68611E-02
0.25000	4.01020E-02	6.05259E-02
0.20000	3.51335E-02	5.54539E-02
0.15000	3.11045E-02	5.13445E-02
0.10000	2.77724E-02	4.79550E-02
0.05000	2.49438E-02	4.50920E-02
0.00000	2.24674E-02	4.26041E-02
-0.05000	2.02275E-02	4.03757E-02
-0.10000	1.81394E-02	3.83221E-02
-0.15000	1.61447E-02	3.63847E-02
-0.20000	1.42081E-02	3.45285E-02
-0.25000	1.23146E-02	3.27385E-02
-0.30000	1.04681E-02	3.10190E-02
-0.35000	8.68963E-03	2.93919E-02
-0.40000	7.01725E-03	2.78963E-02
-0.45000	5.50587E-03	2.65893E-02
-0.50000	4.22791E-03	2.55462E-02
-0.55000	3.27445E-03	2.48623E-02
-0.60000	2.75683E-03	2.46546E-02
-0.65000	2.80873E-03	2.50646E-02
-0.70000	3.58871E-03	2.62605E-02
-0.75000	5.28313E-03	2.84414E-02
-0.80000	8.10949E-03	3.18404E-02
-0.85000	1.23201E-02	3.67294E-02
-0.90000	1.82062E-02	4.34232E-02
-0.95000	2.61022E-02	5.22848E-02
-1.00000	3.63906E-02	6.37307E-02

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 2.470
 σ_{SE} = 1.142
 σ_{CE} = .277

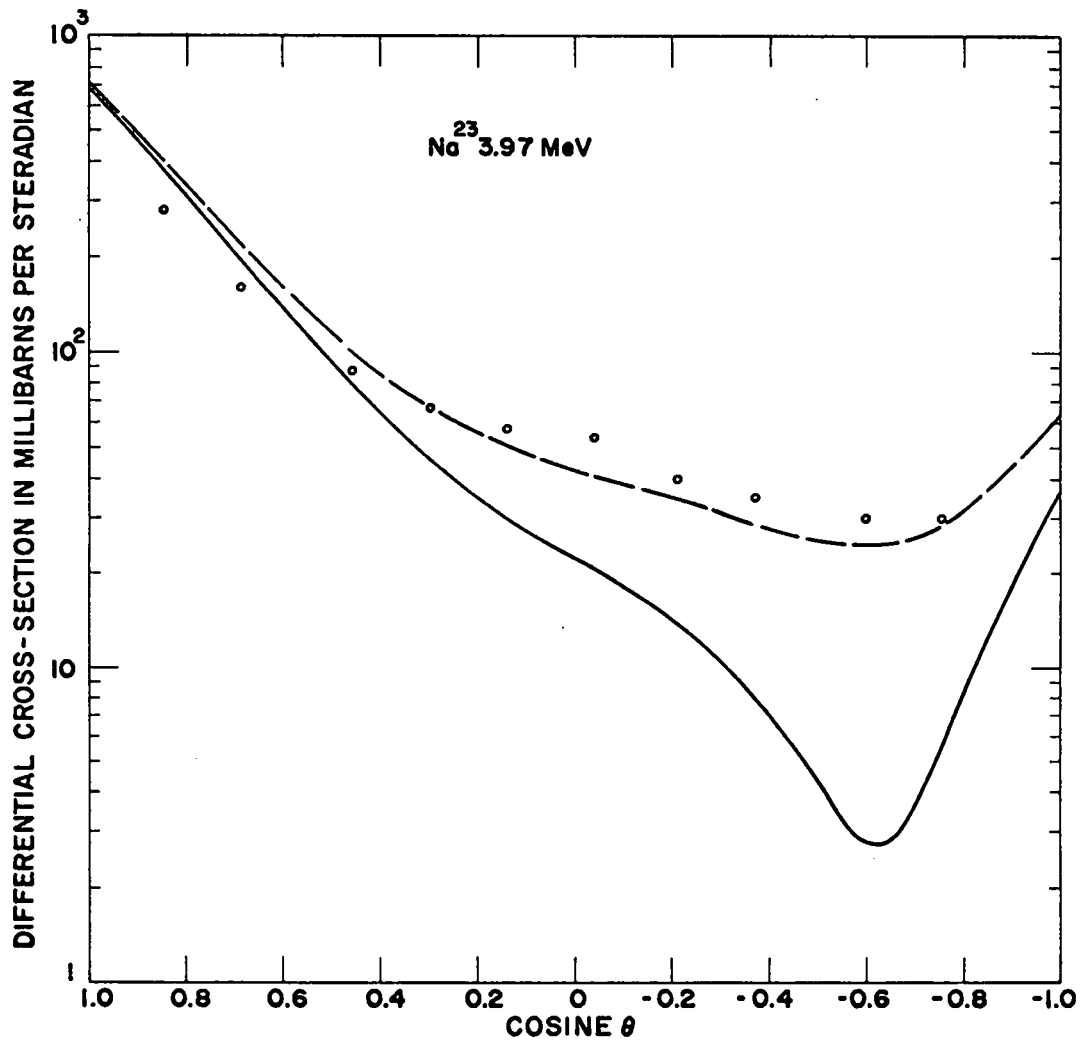


Figure 159

Na²³

4.0 MeV

CCSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	6.81072E-01	7.08180E-01
0.95000	5.59690E-01	5.85637E-01
0.90000	4.58588E-01	4.83569E-01
0.85000	3.74769E-01	3.98942E-01
0.80000	3.05616E-01	3.29111E-01
0.75000	2.48853E-01	2.71776E-01
0.70000	2.02507E-01	2.24944E-01
0.65000	1.64871E-01	1.86894E-01
0.60000	1.34480E-01	1.56145E-01
0.55000	1.10073E-01	1.31430E-01
0.50000	9.05785E-02	1.11666E-01
0.45000	7.50829E-02	9.59369E-02
0.40000	6.28158E-02	8.34661E-02
0.35000	5.31292E-02	7.36033E-02
0.30000	4.54823E-02	6.58056E-02
0.25000	3.94265E-02	5.96232E-02
0.20000	3.45929E-02	5.46863E-02
0.15000	3.06807E-02	5.06939E-02
0.10000	2.74476E-02	4.74036E-02
0.05000	2.47012E-02	4.46229E-02
0.00000	2.22915E-02	4.22017E-02
-0.05000	2.01045E-02	4.00261E-02
-0.10000	1.80570E-02	3.80130E-02
-0.15000	1.60925E-02	3.61058E-02
-0.20000	1.41775E-02	3.42709E-02
-0.25000	1.22987E-02	3.24954E-02
-0.30000	1.04614E-02	3.07847E-02
-0.35000	8.68832E-03	2.91624E-02
-0.40000	7.01869E-03	2.76690E-02
-0.45000	5.50872E-03	2.63627E-02
-0.50000	4.23203E-03	2.53200E-02
-0.55000	3.28090E-03	2.46374E-02
-0.60000	2.76791E-03	2.44334E-02
-0.65000	2.82813E-03	2.48505E-02
-0.70000	3.62172E-03	2.60590E-02
-0.75000	5.33696E-03	2.82598E-02
-0.80000	8.19366E-03	3.16885E-02
-0.85000	1.24470E-02	3.66199E-02
-0.90000	1.83917E-02	4.33726E-02
-0.95000	2.63666E-02	5.23143E-02
-1.00000	3.67593E-02	6.38670E-02

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 2.462
 σ_{SE} = 1.135
 σ_{CE} = .274

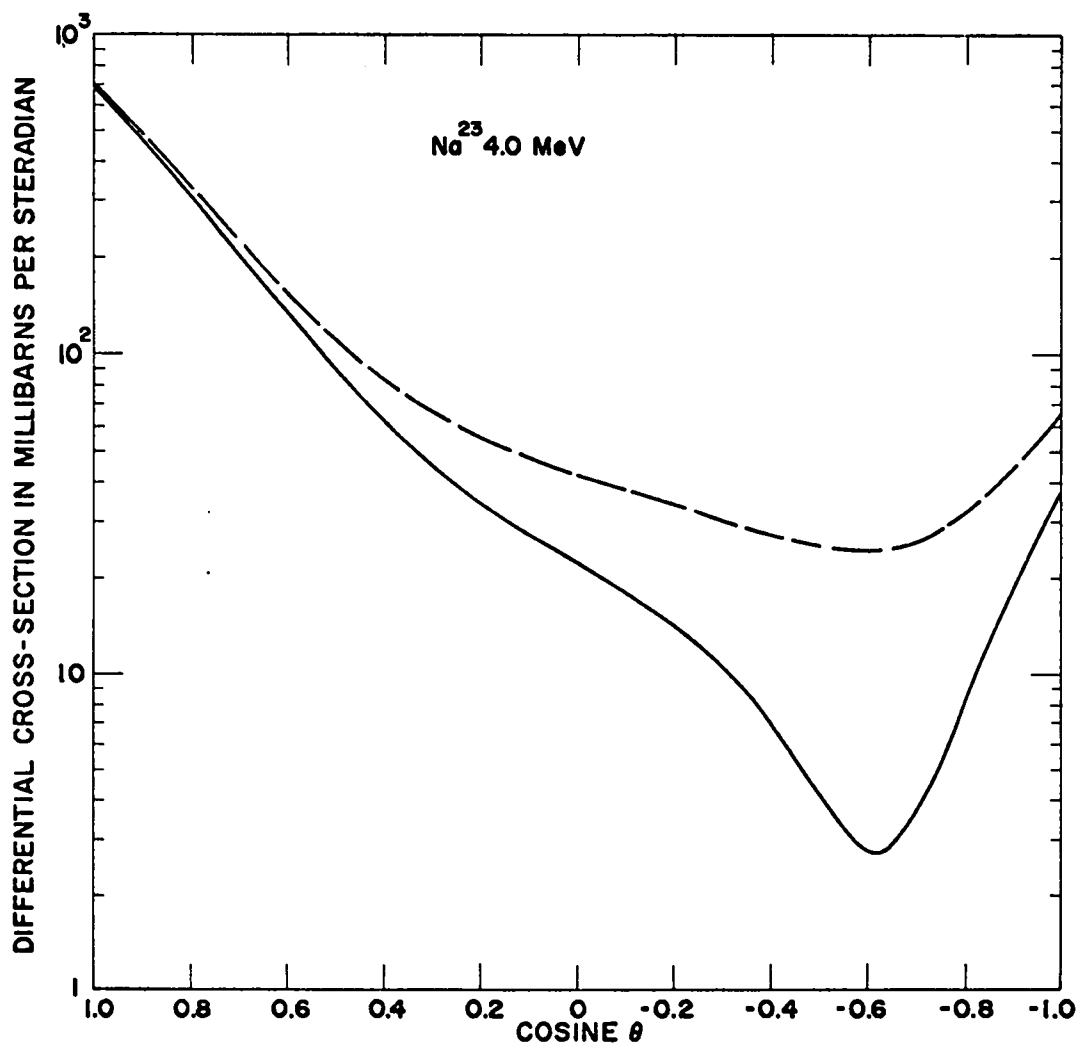


Figure 160

Na²³

5.0 MeV

COSINE (C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	7.00959E-01	7.20503E-01
0.95000	5.43934E-01	5.62431E-01
0.90000	4.19108E-01	4.36746E-01
0.85000	3.20773E-01	3.37706E-01
0.80000	2.44084E-01	2.60433E-01
0.75000	1.84940E-01	2.00804E-01
0.70000	1.39895E-01	1.55352E-01
0.65000	1.06063E-01	1.21176E-01
0.60000	8.10483E-02	9.58674E-02
0.55000	6.28732E-02	7.74391E-02
0.50000	4.99199E-02	6.42661E-02
0.45000	4.08775E-02	5.50322E-02
0.40000	3.46952E-02	4.86828E-02
0.35000	3.05417E-02	4.43841E-02
0.30000	2.77695E-02	4.14872E-02
0.25000	2.58837E-02	3.94961E-02
0.20000	2.45150E-02	3.80413E-02
0.15000	2.33965E-02	3.68557E-02
0.10000	2.23433E-02	3.57544E-02
0.05000	2.12357E-02	3.46178E-02
0.00000	2.00046E-02	3.33770E-02
-0.05000	1.86197E-02	3.20018E-02
-0.10000	1.70800E-02	3.04910E-02
-0.15000	1.54054E-02	2.88645E-02
-0.20000	1.36313E-02	2.71576E-02
-0.25000	1.18043E-02	2.54167E-02
-0.30000	9.97929E-03	2.36970E-02
-0.35000	8.21834E-03	2.20608E-02
-0.40000	6.59046E-03	2.05781E-02
-0.45000	5.17297E-03	1.93277E-02
-0.50000	4.05371E-03	1.83999E-02
-0.55000	3.33441E-03	1.79004E-02
-0.60000	3.13504E-03	1.79542E-02
-0.65000	3.59909E-03	1.87120E-02
-0.70000	4.89964E-03	2.03566E-02
-0.75000	7.24645E-03	2.31101E-02
-0.80000	1.08936E-02	2.72424E-02
-0.85000	1.61483E-02	3.30804E-02
-0.90000	2.33798E-02	4.10180E-02
-0.95000	3.30297E-02	5.15267E-02
-1.00000	4.56226E-02	6.51674E-02

(DSIGMAS IN BARNS/STERADIAN
LEVEL 1 (E-EN = 4.78987))

σ_T = 2.233
 σ_{SE} = .942
 σ_{CE} = .188

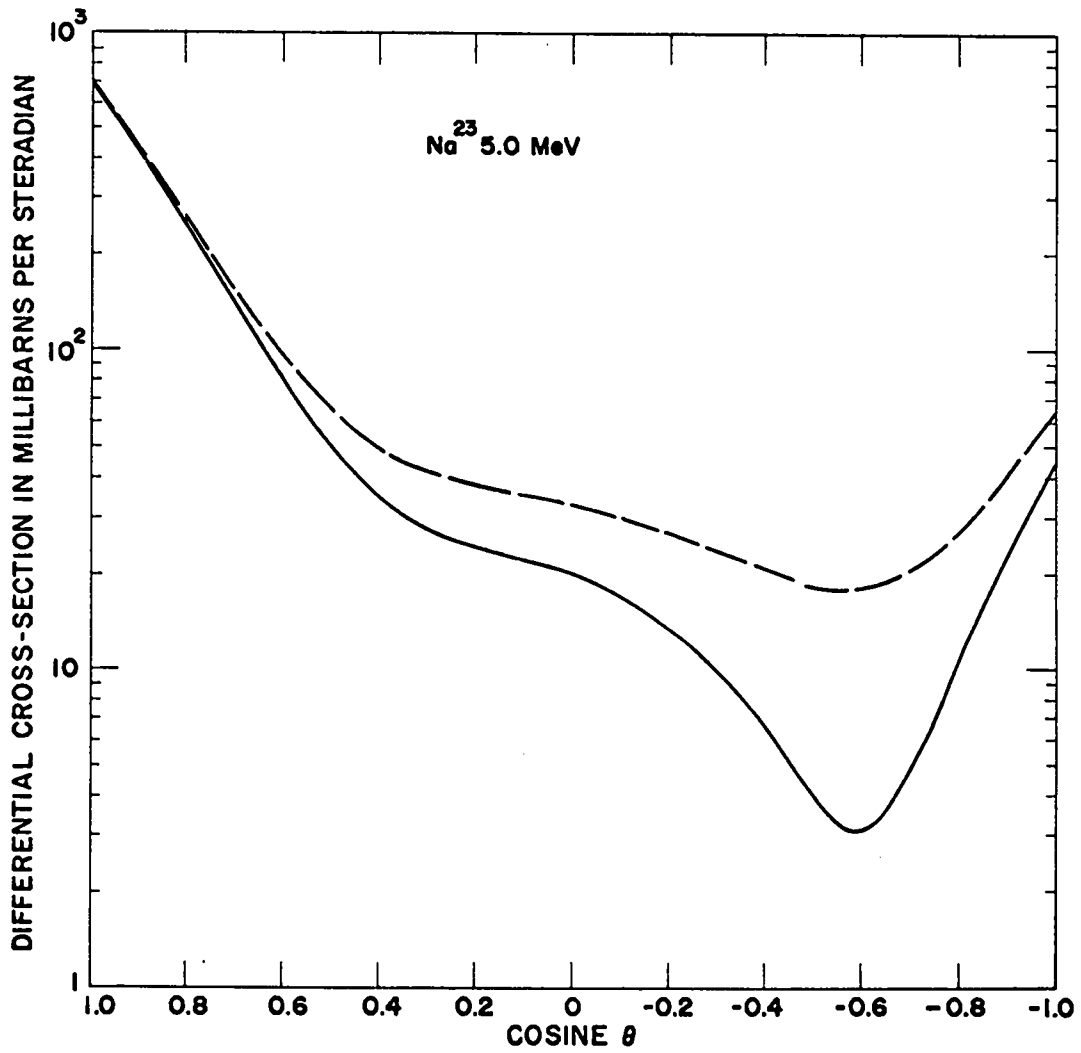


Figure 161

Na²³
 COSINE (C.M.)

6.0 MeV

8.0 MeV

10.0 MeV

12.0 MeV

1.00000
 0.95000
 0.90000
 0.85000
 0.80000
 0.75000
 0.70000
 0.65000
 0.60000
 0.55000
 0.50000
 0.45000
 0.40000
 0.35000
 0.30000
 0.25000
 0.20000
 0.15000
 0.10000
 0.05000
 0.00000
 -0.05000
 -0.10000
 -0.15000
 -0.20000
 -0.25000
 -0.30000
 -0.35000
 -0.40000
 -0.45000
 -0.50000
 -0.55000
 -0.60000
 -0.65000
 -0.70000
 -0.75000
 -0.80000
 -0.85000
 -0.90000
 -0.95000
 -1.00000

7.2095E-01
 5.2876E-01
 3.8241E-01
 2.7258E-01
 1.9159E-01
 1.3309E-01
 9.1894E-02
 6.3805E-02
 4.5438E-02
 3.4100E-02
 2.7679E-02
 2.4540E-02
 2.3444E-02
 2.3474E-02
 2.3977E-02
 2.4504E-02
 2.4773E-02
 2.4628E-02
 2.4008E-02
 2.2920E-02
 2.1418E-02
 1.9585E-02
 1.7521E-02
 1.5332E-02
 1.3118E-02
 1.0974E-02
 8.9857E-03
 7.2255E-03
 5.7578E-03
 4.6398E-03
 3.9276E-03
 3.6819E-03
 3.9762E-03
 4.9060E-03
 6.5994E-03
 9.2293E-03
 1.3026E-02
 1.8294E-02
 2.5425E-02
 3.4914E-02
 4.7384E-02

7.8461E-01
 5.1739E-01
 3.2940E-01
 2.0079E-01
 1.1599E-01
 6.2913E-02
 3.2236E-02
 1.6870E-02
 1.1491E-02
 1.2174E-02
 1.6092E-02
 2.1275E-02
 2.6409E-02
 3.0684E-02
 3.3663E-02
 3.5180E-02
 3.5265E-02
 3.4075E-02
 3.1844E-02
 2.8850E-02
 2.5378E-02
 2.1703E-02
 1.8072E-02
 1.4693E-02
 1.1728E-02
 9.2921E-03
 7.4505E-03
 6.2234E-03
 5.5912E-03
 5.5025E-03
 5.8841E-03
 6.6542E-03
 7.7370E-03
 9.0801E-03
 1.0674E-02
 1.2576E-02
 1.4933E-02
 1.8010E-02
 2.2221E-02
 2.8165E-02
 3.6659E-02

9.0775E-01
 5.4465E-01
 3.0794E-01
 1.5999E-01
 7.3018E-02
 2.6755E-02
 6.6296E-03
 2.3453E-03
 6.7875E-03
 1.5187E-02
 2.4483E-02
 3.2834E-02
 3.9258E-02
 4.3361E-02
 4.5133E-02
 4.4802E-02
 4.2742E-02
 3.9370E-02
 3.5127E-02
 3.0426E-02
 2.5634E-02
 2.1059E-02
 1.6945E-02
 1.3471E-02
 1.0746E-02
 8.8198E-03
 7.6823E-03
 7.2735E-03
 7.4900E-03
 8.1948E-03
 9.2283E-03
 1.0422E-02
 1.1613E-02
 1.2665E-02
 1.3489E-02
 1.4065E-02
 1.4482E-02
 1.4963E-02
 1.5911E-02
 1.7956E-02
 2.2005E-02

1.1042E 00
 6.1193E-01
 3.1321E-01
 1.4215E-01
 5.2740E-02
 1.3399E-02
 2.9017E-03
 7.3866E-03
 1.8142E-02
 2.9995E-02
 4.0145E-02
 4.7335E-02
 5.1263E-02
 5.2183E-02
 5.0628E-02
 4.7238E-02
 4.2649E-02
 3.7432E-02
 3.2058E-02
 2.6896E-02
 2.2211E-02
 1.8174E-02
 1.4881E-02
 1.2361E-02
 1.0596E-02
 9.5259E-03
 9.0659E-03
 9.1093E-03
 9.5357E-03
 1.0216E-02
 1.1018E-02
 1.1812E-02
 1.2476E-02
 1.2907E-02
 1.3033E-02
 1.2832E-02
 1.2351E-02
 1.1735E-02
 1.1260E-02
 1.1402E-02
 1.2833E-02

DSIGMAS IN BNS/STERAD

σ_T -
 σ_{SE} -

2.068
 .817

1.866
 .703

1.792
 .694

1.801
 .716

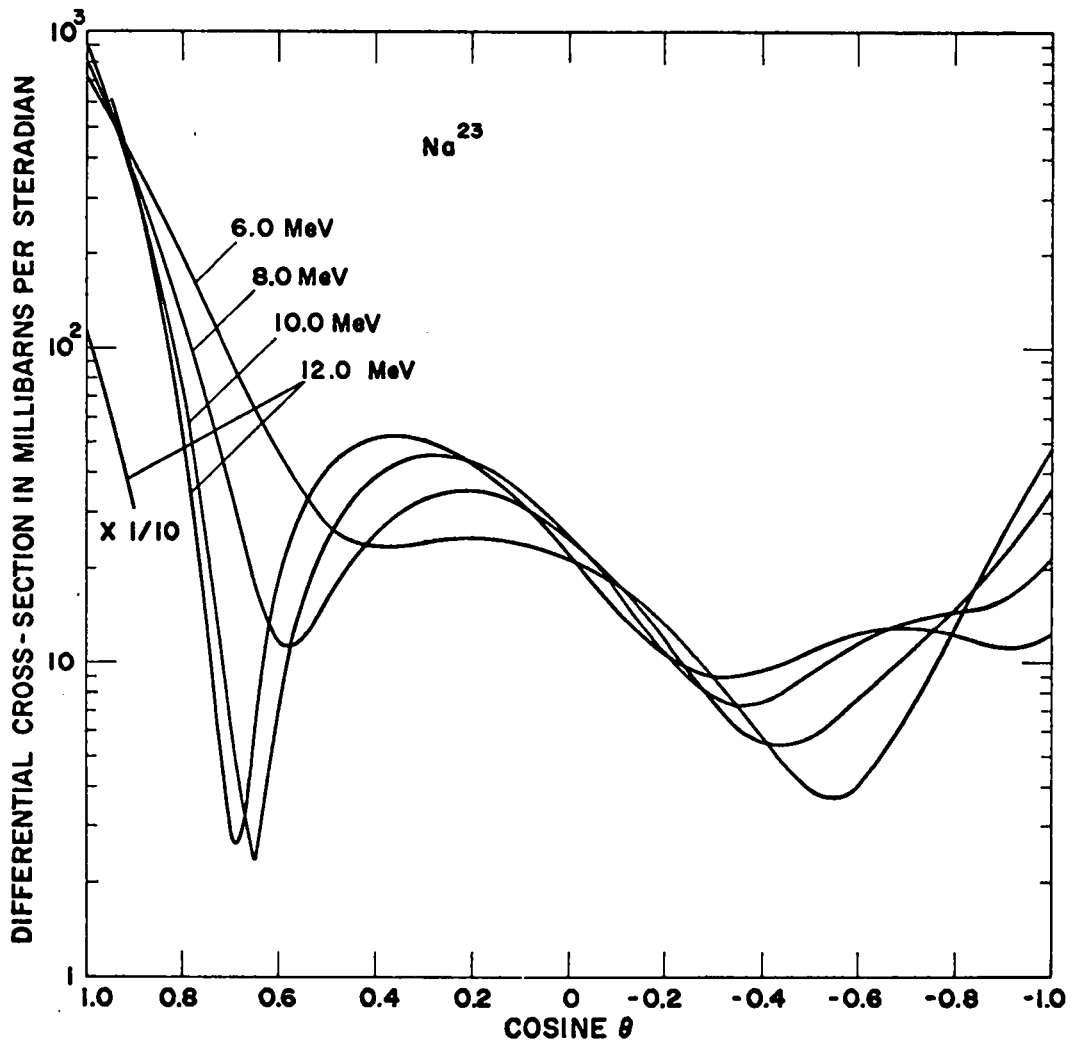


Figure 162

Na ²³	7.0 MeV	9.0 MeV	11.0 MeV	13.0 MeV
COSINE (C.M.)				
1.00000	7.4715E-01	8.3731E-01	9.9716E-01	1.2253E 00
0.95000	5.1892E-01	5.2581E-01	5.7376E-01	6.5702E-01
0.90000	3.5199E-01	3.1490E-01	3.0774E-01	3.2303E-01
0.85000	2.3246E-01	1.7699E-01	1.4873E-01	1.3927E-01
0.80000	1.4909E-01	9.1077E-02	6.0601E-02	4.8484E-02
0.75000	9.2917E-02	4.1362E-02	1.7819E-02	1.2434E-02
0.70000	5.6797E-02	1.6064E-02	2.6451E-03	6.2201E-03
0.65000	3.5119E-02	6.5347E-03	3.0337E-03	1.4176E-02
0.60000	2.3515E-02	6.5323E-03	1.1041E-02	2.6914E-02
0.55000	1.8636E-02	1.1654E-02	2.1640E-02	3.9220E-02
0.50000	1.7960E-02	1.8892E-02	3.1845E-02	4.8576E-02
0.45000	1.9628E-02	2.6278E-02	4.0057E-02	5.4127E-02
0.40000	2.2313E-02	3.2616E-02	4.5601E-02	5.5983E-02
0.35000	2.5109E-02	3.7268E-02	4.8385E-02	5.4751E-02
0.30000	2.7437E-02	3.9990E-02	4.8666E-02	5.1234E-02
0.25000	2.8966E-02	4.0809E-02	4.6882E-02	4.6249E-02
0.20000	2.9561E-02	3.9928E-02	4.3547E-02	4.0524E-02
0.15000	2.9213E-02	3.7651E-02	3.9175E-02	3.4651E-02
0.10000	2.8011E-02	3.4335E-02	3.4241E-02	2.9067E-02
0.05000	2.6105E-02	3.0347E-02	2.9157E-02	2.4066E-02
0.00000	2.3676E-02	2.6039E-02	2.4258E-02	1.9818E-02
-0.05000	2.0917E-02	2.1725E-02	1.9801E-02	1.6389E-02
-0.10000	1.8017E-02	1.7671E-02	1.5971E-02	1.3771E-02
-0.15000	1.5147E-02	1.4087E-02	1.2881E-02	1.1902E-02
-0.20000	1.2454E-02	1.1123E-02	1.0588E-02	1.0690E-02
-0.25000	1.0055E-02	8.8663E-03	9.0747E-03	1.0024E-02
-0.30000	8.0364E-03	7.3486E-03	8.3063E-03	9.7881E-03
-0.35000	6.4557E-03	6.5475E-03	8.1887E-03	9.8709E-03
-0.40000	5.3420E-03	6.3951E-03	8.6011E-03	1.0167E-02
-0.45000	4.7040E-03	6.7872E-03	9.3987E-03	1.0579E-02
-0.50000	4.5371E-03	7.5950E-03	1.0422E-02	1.1021E-02
-0.55000	4.8331E-03	8.6790E-03	1.1506E-02	1.1414E-02
-0.60000	5.5919E-03	9.9057E-03	1.2495E-02	1.1691E-02
-0.65000	6.8354E-03	1.1167E-02	1.3255E-02	1.1790E-02
-0.70000	8.6228E-03	1.2401E-02	1.3694E-02	1.1690E-02
-0.75000	1.1068E-02	1.3621E-02	1.3785E-02	1.1363E-02
-0.80000	1.4359E-02	1.4936E-02	1.3593E-02	1.0847E-02
-0.85000	1.8780E-02	1.6600E-02	1.3309E-02	1.0235E-02
-0.90000	2.4731E-02	1.9024E-02	1.3291E-02	9.7157E-03
-0.95000	3.2759E-02	2.2841E-02	1.4111E-02	9.6071E-03
-1.00000	4.3578E-02	2.8936E-02	1.6610E-02	1.0406E-02
	SIGMAS IN SNS/STERAD			
σ_T -	1.949	1.816	1.789	1.822
σ_{SE} -	.742	.689	.714	.784

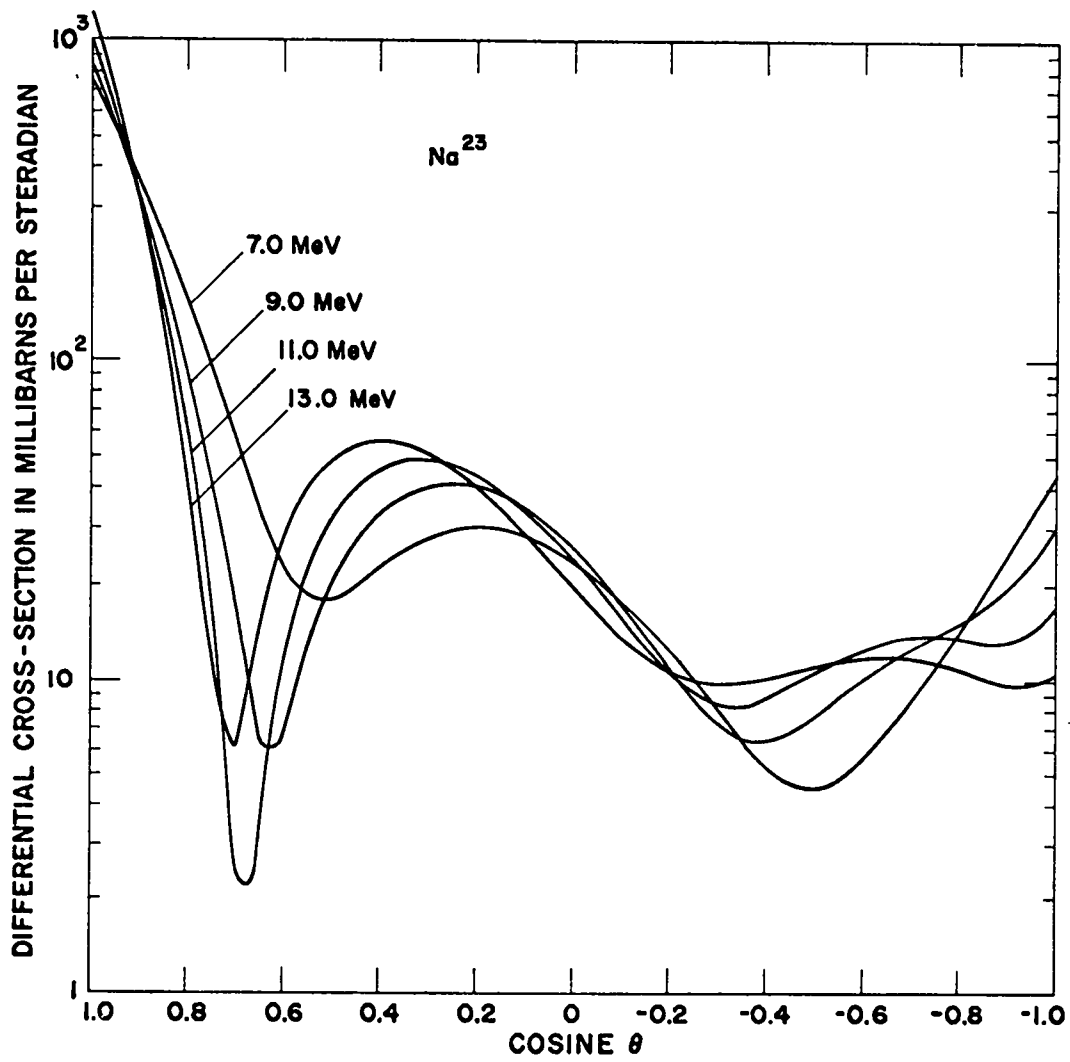


Figure 163

Na ²³	14.0 MeV	15.0 MeV	16.0 MeV
COSINE (C.M.)			
1.00000	1.3557E 00	1.4911E 00	1.6281E 00
0.95000	7.0667E-01	7.5855E-01	8.1064E-01
0.90000	3.3602E-01	3.5091E-01	3.6660E-01
0.85000	1.3930E-01	1.4142E-01	1.4495E-01
0.80000	4.7019E-02	4.7610E-02	4.9678E-02
0.75000	1.3940E-02	1.7098E-02	2.1303E-02
0.70000	1.1454E-02	1.7675E-02	2.4233E-02
0.65000	2.2181E-02	3.0422E-02	3.8245E-02
0.60000	3.6175E-02	4.4987E-02	5.2752E-02
0.55000	4.8285E-02	5.6380E-02	6.3016E-02
0.50000	5.6339E-02	6.2816E-02	6.7664E-02
0.45000	5.9914E-02	6.4304E-02	6.7112E-02
0.40000	5.9530E-02	6.1740E-02	6.2582E-02
0.35000	5.6124E-02	5.6346E-02	5.5515E-02
0.30000	5.0735E-02	4.9344E-02	4.7255E-02
0.25000	4.4320E-02	4.1783E-02	3.8891E-02
0.20000	3.7664E-02	3.4463E-02	3.1200E-02
0.15000	3.1346E-02	2.7927E-02	2.4662E-02
0.10000	2.5746E-02	2.2477E-02	1.9494E-02
0.05000	2.1069E-02	1.8221E-02	1.5711E-02
0.00000	1.7376E-02	1.5120E-02	1.3181E-02
-0.05000	1.4627E-02	1.3033E-02	1.1680E-02
-0.10000	1.2711E-02	1.1761E-02	1.0943E-02
-0.15000	1.1481E-02	1.1086E-02	1.0700E-02
-0.20000	1.0778E-02	1.0796E-02	1.0707E-02
-0.25000	1.0446E-02	1.0706E-02	1.0763E-02
-0.30000	1.0350E-02	1.0671E-02	1.0725E-02
-0.35000	1.0381E-02	1.0592E-02	1.0510E-02
-0.40000	1.0457E-02	1.0415E-02	1.0090E-02
-0.45000	1.0522E-02	1.0125E-02	9.4883E-03
-0.50000	1.0541E-02	9.7388E-03	8.7652E-03
-0.55000	1.0498E-02	9.2953E-03	8.0037E-03
-0.60000	1.0384E-02	8.8416E-03	7.2945E-03
-0.65000	1.0196E-02	8.4237E-03	6.7200E-03
-0.70000	9.9353E-03	8.0766E-03	6.3404E-03
-0.75000	9.6069E-03	7.8185E-03	6.1813E-03
-0.80000	9.2266E-03	7.6497E-03	6.2274E-03
-0.85000	8.8341E-03	7.5567E-03	6.4198E-03
-0.90000	8.5133E-03	7.5255E-03	6.6621E-03
-0.95000	8.4222E-03	7.5623E-03	6.8343E-03
-1.00000	8.8330E-03	7.7262E-03	6.8181E-03

DSIGMAS IN BNS/STERAD

σ_T =	1.846	1.870	1.892
σ_{SE} =	.827	.871	.914

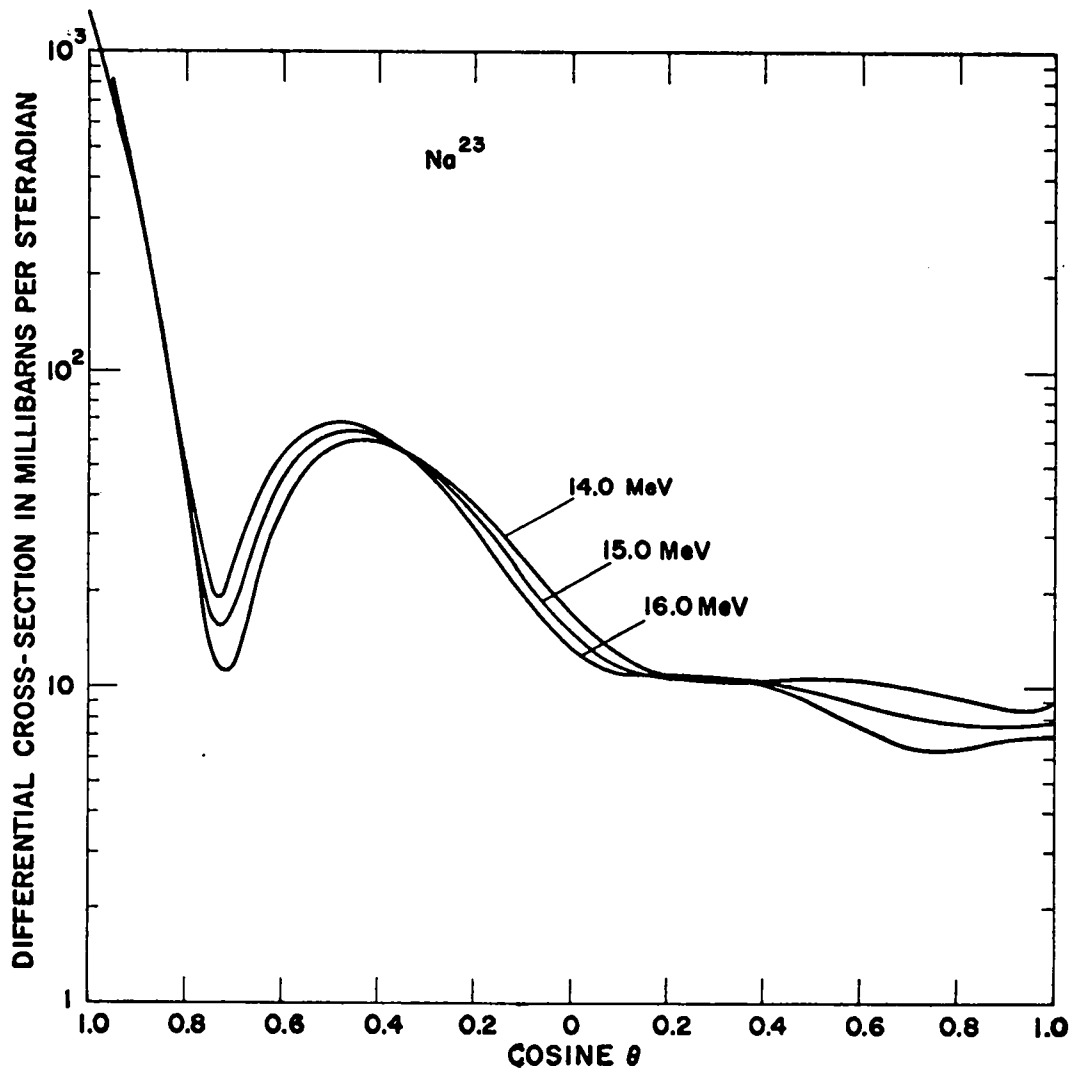


Figure 164





<u>Energy</u>	<u>Energy Levels</u> *
5.00	G.S. 0 ⁺
6.00	1.368 2 ⁺
7.00	4.12 4 ⁺
8.00	4.24 2 ⁺
9.00	5.22 3 ⁺
10.00	6.30 (1 ⁻)
11.00	7.50 (1) ⁺
12.00	
13.00	
14.00	
14.60	
15.00	
16.00	

*Energy levels obtained from NRC 59-6-10a,
except [] values which are assumed.

Mg²⁴

5.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	7.68721E-01	8.16126E-01
0.95000	5.98408E-01	6.38329E-01
0.90000	4.62866E-01	4.97039E-01
0.85000	3.55909E-01	3.85702E-01
0.80000	2.72289E-01	2.98768E-01
0.75000	2.07576E-01	2.31561E-01
0.70000	1.58049E-01	1.80162E-01
0.65000	1.20601E-01	1.41307E-01
0.60000	9.26504E-02	1.12292E-01
0.55000	7.20743E-02	9.09016E-02
0.50000	5.71366E-02	7.53287E-02
0.45000	4.64333E-02	6.41189E-02
0.40000	3.88414E-02	5.61134E-02
0.35000	3.34745E-02	5.04023E-02
0.30000	2.96442E-02	4.62826E-02
0.25000	2.68264E-02	4.32220E-02
0.20000	2.46321E-02	4.08281E-02
0.15000	2.27819E-02	3.88210E-02
0.10000	2.10847E-02	3.70101E-02
0.05000	1.94187E-02	3.52753E-02
0.00000	1.77162E-02	3.35496E-02
-0.05000	1.59501E-02	3.18067E-02
-0.10000	1.41237E-02	3.00492E-02
-0.15000	1.22616E-02	2.83007E-02
-0.20000	1.04033E-02	2.65994E-02
-0.25000	8.59813E-03	2.49937E-02
-0.30000	6.90210E-03	2.35405E-02
-0.35000	5.37592E-03	2.23037E-02
-0.40000	4.08454E-03	2.13565E-02
-0.45000	3.09801E-03	2.07836E-02
-0.50000	2.49342E-03	2.06856E-02
-0.55000	2.35797E-03	2.11853E-02
-0.60000	2.79321E-03	2.24352E-02
-0.65000	3.92007E-03	2.46261E-02
-0.70000	5.88508E-03	2.79982E-02
-0.75000	8.86731E-03	3.28527E-02
-0.80000	1.30863E-02	3.95660E-02
-0.85000	1.88108E-02	4.86044E-02
-0.90000	2.63685E-02	6.05415E-02
-0.95000	3.61561E-02	7.60769E-02
-1.00000	4.86509E-02	9.60562E-02

(DSIGMAS IN BARNS/STERADIAN)

$$\begin{aligned} \sigma_T &= 2.333 \\ \sigma_{SE} &= 1.028 \\ \sigma_{CE} &= .272 \end{aligned}$$

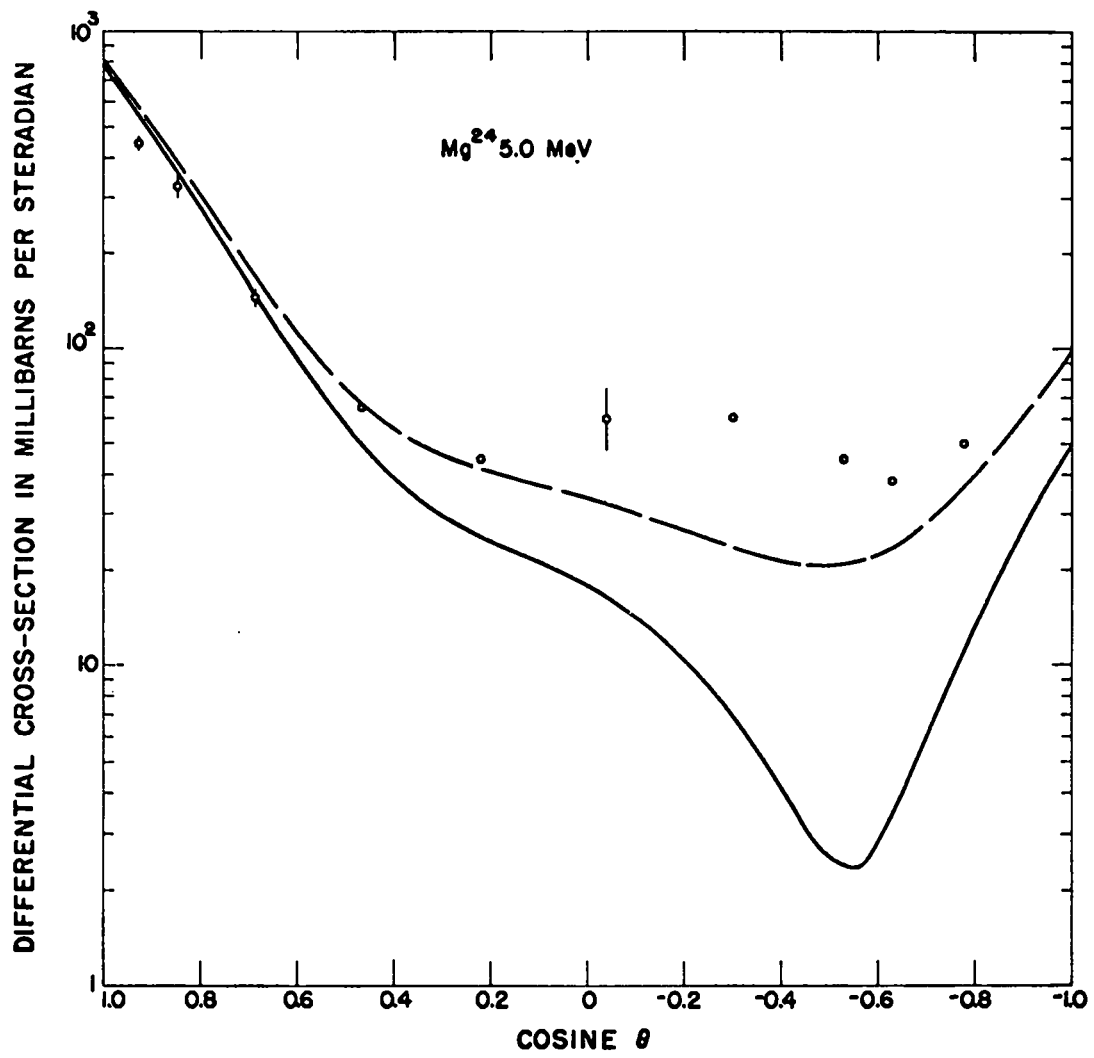


Figure 165

Mg ²⁴		6.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	7.80095E-01	8.14456E-01	
0.95000	5.74399E-01	6.03016E-01	
0.90000	4.17748E-01	4.42015E-01	
0.85000	3.00093E-01	3.21085E-01	
0.80000	2.13140E-01	2.31681E-01	
0.75000	1.50089E-01	1.66802E-01	
0.70000	1.05395E-01	1.20750E-01	
0.65000	7.45787E-02	8.89207E-02	
0.60000	5.40472E-02	6.76320E-02	
0.55000	4.09541E-02	5.39677E-02	
0.50000	3.30712E-02	4.56483E-02	
0.45000	2.86824E-02	4.09208E-02	
0.40000	2.64915E-02	3.84625E-02	
0.35000	2.55445E-02	3.73013E-02	
0.30000	2.51629E-02	3.67467E-02	
0.25000	2.48875E-02	3.63316E-02	
0.20000	2.44306E-02	3.57638E-02	
0.15000	2.36361E-02	3.48845E-02	
0.10000	2.24461E-02	3.36344E-02	
0.05000	2.08729E-02	3.20253E-02	
0.00000	1.89765E-02	3.01169E-02	
-0.05000	1.68460E-02	2.79983E-02	
-0.10000	1.45851E-02	2.57733E-02	
-0.15000	1.23011E-02	2.35494E-02	
-0.20000	1.00965E-02	2.14296E-02	
-0.25000	8.06365E-03	1.95078E-02	
-0.30000	6.28197E-03	1.78658E-02	
-0.35000	4.81683E-03	1.65737E-02	
-0.40000	3.72105E-03	1.56921E-02	
-0.45000	3.03801E-03	1.52764E-02	
-0.50000	2.80656E-03	1.53837E-02	
-0.55000	3.06775E-03	1.60813E-02	
-0.60000	3.87298E-03	1.74578E-02	
-0.65000	5.29390E-03	1.96359E-02	
-0.70000	7.43369E-03	2.27880E-02	
-0.75000	1.04399E-02	2.71538E-02	
-0.80000	1.45189E-02	3.30600E-02	
-0.85000	1.99514E-02	4.09436E-02	
-0.90000	2.71101E-02	5.13767E-02	
-0.95000	3.64779E-02	6.50952E-02	
-1.00000	4.86688E-02	8.30300E-02	

(DSIGMAS IN BARNS/STERADIAN

σ_T = 2.146
 σ_{SE} = .882
 σ_{CE} = .191

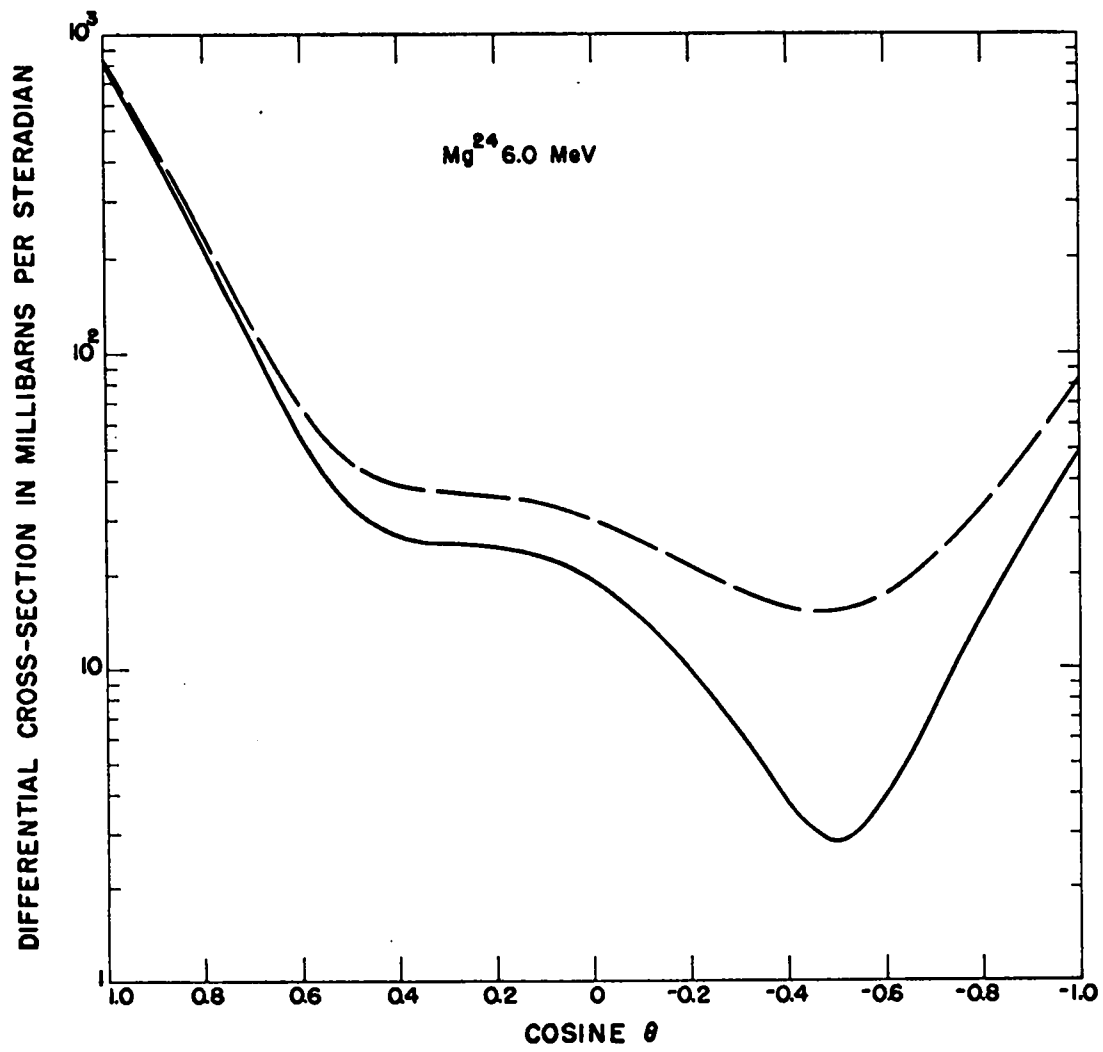


Figure 166

Mg²⁴

7.0 MeV

COSINE (C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	7.97903E-01	8.24627E-01
0.95000	5.55427E-01	5.77144E-01
0.90000	3.78533E-01	3.96570E-01
0.85000	2.52083E-01	2.67430E-01
0.80000	1.63945E-01	1.77331E-01
0.75000	1.04461E-01	1.16419E-01
0.70000	6.60063E-02	7.69246E-02
0.65000	4.26198E-02	5.27766E-02
0.60000	2.96942E-02	3.92896E-02
0.55000	2.37208E-02	3.28984E-02
0.50000	2.20755E-02	3.09389E-02
0.45000	2.28420E-02	3.14663E-02
0.40000	2.46648E-02	3.31057E-02
0.35000	2.66286E-02	3.49280E-02
0.30000	2.81581E-02	3.63485E-02
0.25000	2.89363E-02	3.70432E-02
0.20000	2.88376E-02	3.68818E-02
0.15000	2.78729E-02	3.58717E-02
0.10000	2.61462E-02	3.41141E-02
0.05000	2.38183E-02	3.17684E-02
0.00000	2.10798E-02	2.90241E-02
-0.05000	1.81288E-02	2.60790E-02
-0.10000	1.51547E-02	2.31226E-02
-0.15000	1.23260E-02	2.03247E-02
-0.20000	9.78261E-03	1.78268E-02
-0.25000	7.63131E-03	1.57382E-02
-0.30000	5.94395E-03	1.41343E-02
-0.35000	4.75894E-03	1.30584E-02
-0.40000	4.08502E-03	1.25259E-02
-0.45000	3.90742E-03	1.25317E-02
-0.50000	4.19636E-03	1.30597E-02
-0.55000	4.91775E-03	1.40954E-02
-0.60000	6.04604E-03	1.56415E-02
-0.65000	7.57931E-03	1.77361E-02
-0.70000	9.55652E-03	2.04748E-02
-0.75000	1.20770E-02	2.40356E-02
-0.80000	1.53225E-02	2.87084E-02
-0.85000	1.95810E-02	3.49278E-02
-0.90000	2.52737E-02	4.33112E-02
-0.95000	3.29844E-02	5.47015E-02
-1.00000	4.34910E-02	7.02153E-02

(DSIGMAS IN BARNS/STERADIAN)

σ_T = 2.010
 σ_{SE} = .790
 σ_{CE} = .138

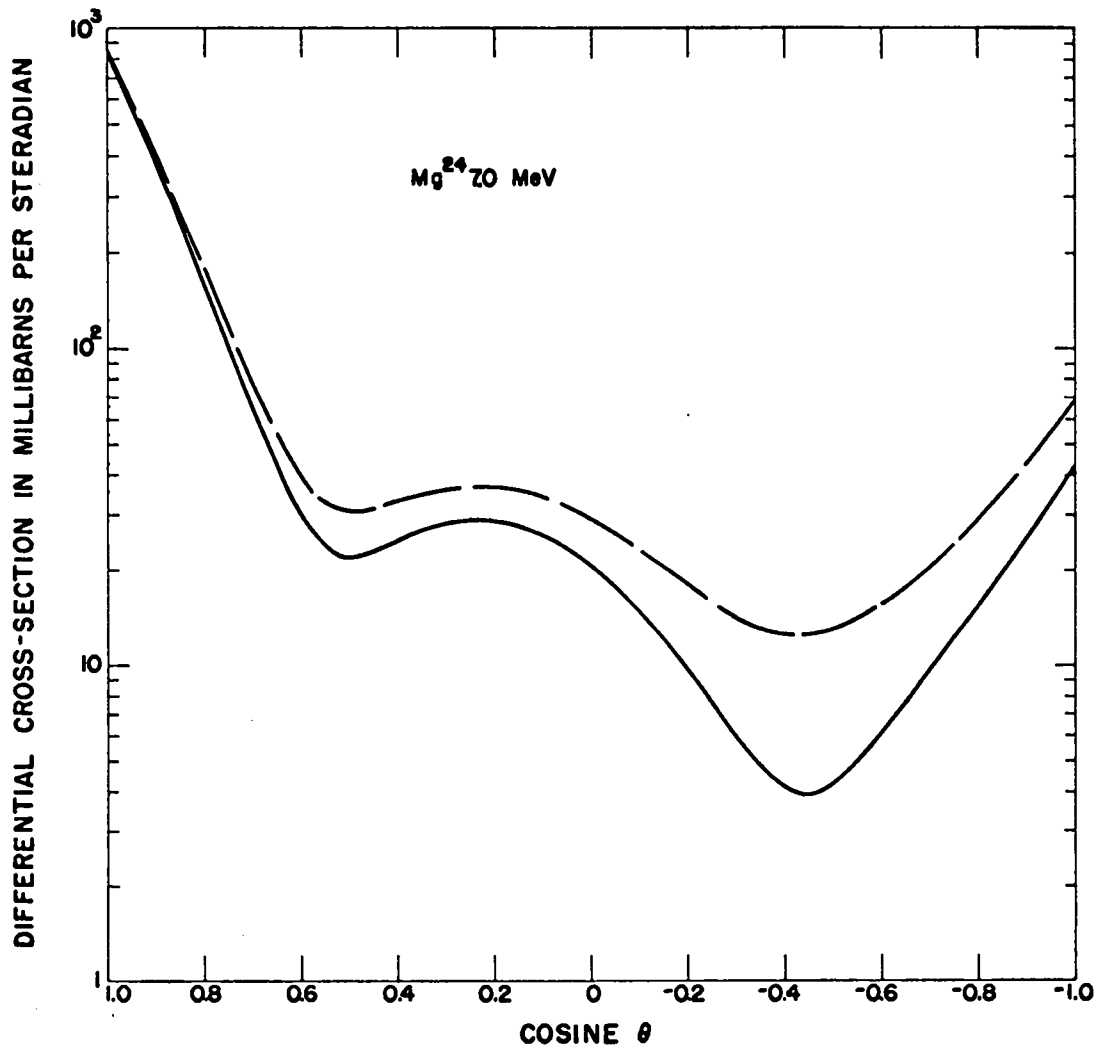


Figure 167

Mg ²⁴		8.0 MeV	
COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC	
1.00000	8.28307E-01	8.50934E-01	
0.95000	5.45220E-01	5.63021E-01	
0.90000	3.47304E-01	3.61709E-01	
0.85000	2.12712E-01	2.24738E-01	
0.80000	1.24461E-01	1.34821E-01	
0.75000	6.94631E-02	7.86512E-02	
0.70000	3.77280E-02	4.60836E-02	
0.65000	2.17245E-02	2.94800E-02	
0.60000	1.58584E-02	2.31737E-02	
0.55000	1.60528E-02	2.30395E-02	
0.50000	1.94098E-02	2.61482E-02	
0.45000	2.39392E-02	3.04894E-02	
0.40000	2.83424E-02	3.47508E-02	
0.35000	3.18389E-02	3.81424E-02	
0.30000	3.40301E-02	4.02583E-02	
0.25000	3.47910E-02	4.09673E-02	
0.20000	3.41852E-02	4.03278E-02	
0.15000	3.23993E-02	3.85213E-02	
0.10000	2.96913E-02	3.58020E-02	
0.05000	2.63520E-02	3.24571E-02	
0.00000	2.26749E-02	2.87784E-02	
-0.05000	1.89350E-02	2.50401E-02	
-0.10000	1.53735E-02	2.14841E-02	
-0.15000	1.21869E-02	1.83090E-02	
-0.20000	9.52193E-03	1.56645E-02	
-0.25000	7.47230E-03	1.36487E-02	
-0.30000	6.08008E-03	1.23083E-02	
-0.35000	5.33913E-03	1.16426E-02	
-0.40000	5.20136E-03	1.16098E-02	
-0.45000	5.58560E-03	1.21358E-02	
-0.50000	6.38888E-03	1.31274E-02	
-0.55000	7.50039E-03	1.44871E-02	
-0.60000	8.81800E-03	1.61333E-02	
-0.65000	1.02677E-02	1.80232E-02	
-0.70000	1.18257E-02	2.01814E-02	
-0.75000	1.35445E-02	2.27326E-02	
-0.80000	1.55812E-02	2.59412E-02	
-0.85000	1.82304E-02	3.02566E-02	
-0.90000	2.19604E-02	3.63659E-02	
-0.95000	2.74539E-02	4.52552E-02	
-1.00000	3.56529E-02	5.82796E-02	

(DSIGMAS IN BARNS/STERADIAN

σ_T = 1.915
 σ_{SE} = .735
 σ_{CE} = .107

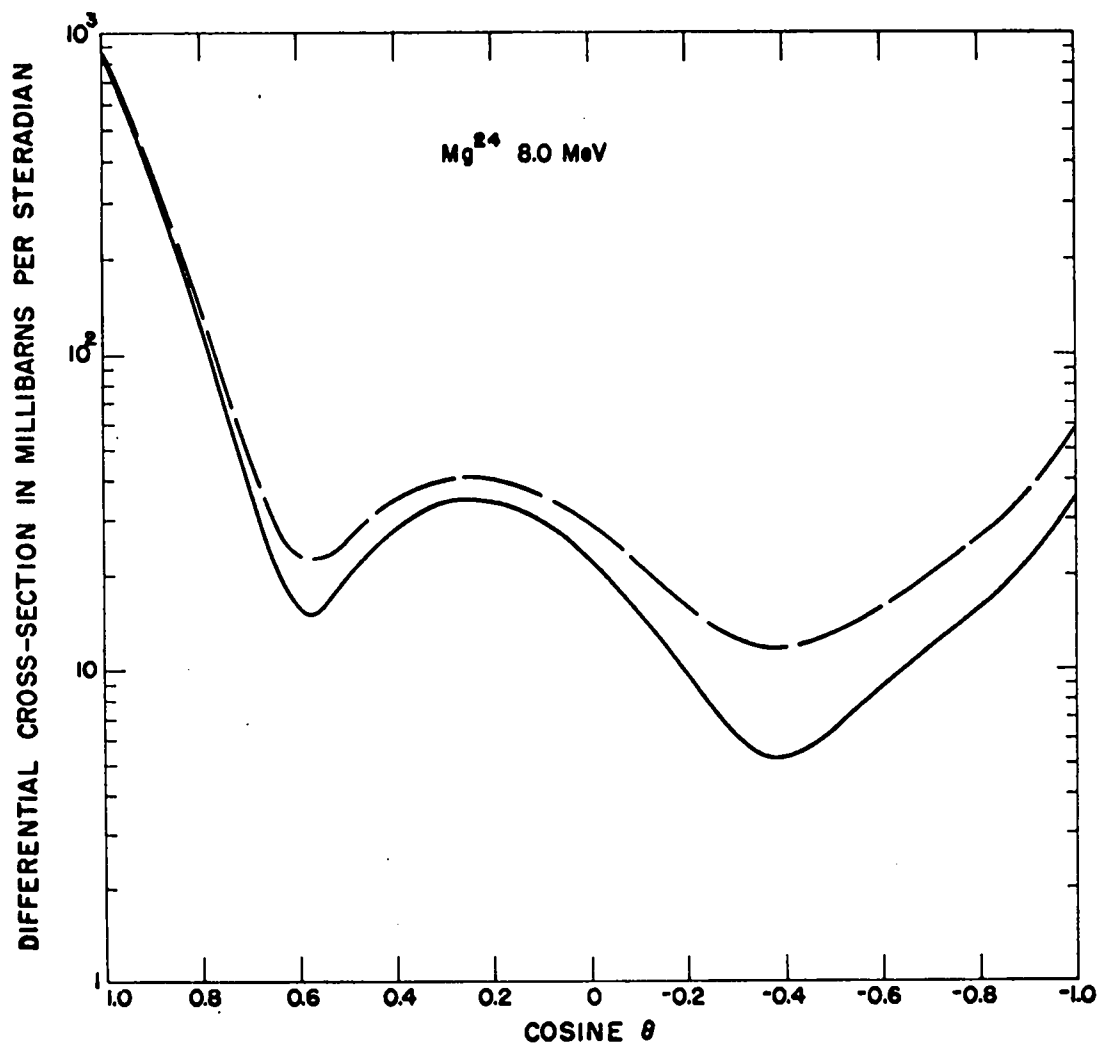


Figure 168

Mg ²⁴	9.0 MeV	10.0 MeV	11.0 MeV
COSINE (C.M.)			
1.00000	8.7643E-01	9.4566E-01	1.0363E 00
0.95000	5.4613E-01	5.5925E-01	5.8411E-01
0.90000	3.2484E-01	3.1103E-01	3.0509E-01
0.85000	1.8177E-01	1.5856E-01	1.4211E-01
0.80000	9.3789E-02	7.0876E-02	5.4637E-02
0.75000	4.3625E-02	2.5672E-02	1.4402E-02
0.70000	1.8585E-02	7.1326E-03	2.0769E-03
0.65000	9.4688E-03	4.2726E-03	4.7887E-03
0.60000	9.7395E-03	9.6546E-03	1.4261E-02
0.55000	1.4867E-02	1.8419E-02	2.5434E-02
0.50000	2.1819E-02	2.7551E-02	3.5451E-02
0.45000	2.8670E-02	3.5325E-02	4.2920E-02
0.40000	3.4293E-02	4.0904E-02	4.7388E-02
0.35000	3.8130E-02	4.4033E-02	4.8969E-02
0.30000	4.0014E-02	4.4826E-02	4.8086E-02
0.25000	4.0041E-02	4.3611E-02	4.5302E-02
0.20000	3.8465E-02	4.0821E-02	4.1208E-02
0.15000	3.5628E-02	3.6923E-02	3.6355E-02
0.10000	3.1910E-02	3.2372E-02	3.1223E-02
0.05000	2.7688E-02	2.7575E-02	2.6200E-02
0.00000	2.3311E-02	2.2882E-02	2.1579E-02
-0.05000	1.9084E-02	1.8572E-02	1.7567E-02
-0.10000	1.5254E-02	1.4854E-02	1.4293E-02
-0.15000	1.2010E-02	1.1867E-02	1.1813E-02
-0.20000	9.4751E-03	9.6834E-03	1.0131E-02
-0.25000	7.7092E-03	8.3161E-03	9.2020E-03
-0.30000	6.7143E-03	7.7229E-03	8.9420E-03
-0.35000	6.4381E-03	7.8144E-03	9.2384E-03
-0.40000	6.7828E-03	8.4622E-03	9.9557E-03
-0.45000	7.6150E-03	9.5081E-03	1.0942E-02
-0.50000	8.7776E-03	1.0775E-02	1.2039E-02
-0.55000	1.0106E-02	1.2082E-02	1.3086E-02
-0.60000	1.1444E-02	1.3256E-02	1.3936E-02
-0.65000	1.2667E-02	1.4157E-02	1.4469E-02
-0.70000	1.3706E-02	1.4698E-02	1.4607E-02
-0.75000	1.4578E-02	1.4875E-02	1.4342E-02
-0.80000	1.5415E-02	1.4801E-02	1.3767E-02
-0.85000	1.6511E-02	1.4748E-02	1.3111E-02
-0.90000	1.8357E-02	1.5194E-02	1.2786E-02
-0.95000	2.1697E-02	1.6879E-02	1.3446E-02
-1.00000	2.7585E-02	2.0873E-02	1.6052E-02
	DS IGMAS IN BNS/STERAD		
σ_T =	1.856	1.828	1.823
σ_{SE} =	.709	.705	.719

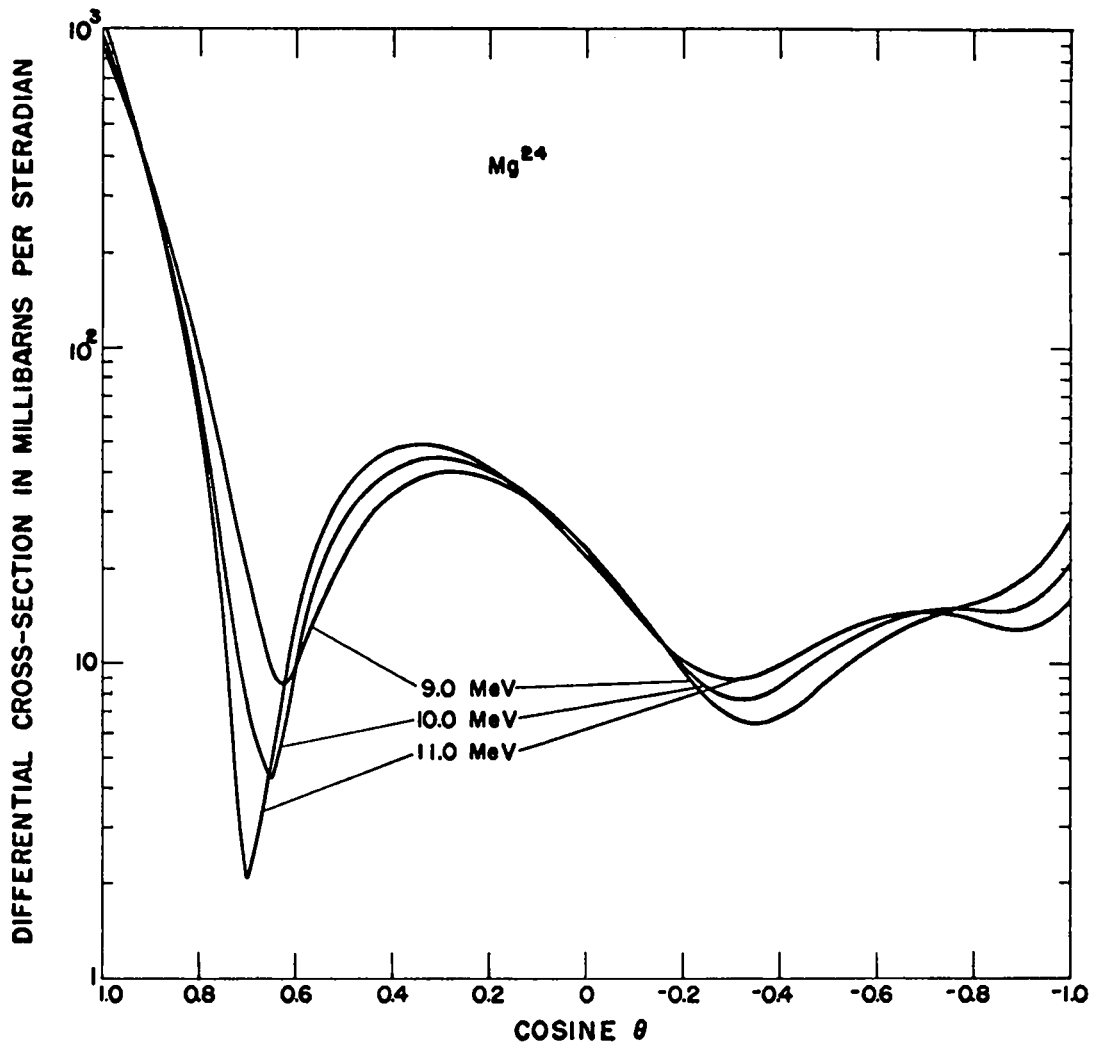


Figure 169

Mg ²⁴	12.0 MeV	13.0 MeV	15.0 MeV	16.0 MeV
COSINE (C.M.)				
1.00000	1.1450E 00	1.2664E 00	1.5280E 00	1.6628E 00
0.95000	6.1867E-01	6.6012E-01	7.5373E-01	8.0235E-01
0.90000	3.0573E-01	3.1144E-01	3.3275E-01	3.4539E-01
0.85000	1.3140E-01	1.2538E-01	1.2370E-01	1.2621E-01
0.80000	4.4016E-02	3.7966E-02	3.5734E-02	3.7861E-02
0.75000	8.6120E-03	7.0456E-03	1.2006E-02	1.6797E-02
0.70000	2.0643E-03	5.6231E-03	1.8189E-02	2.5414E-02
0.65000	9.5900E-03	1.7089E-02	3.4623E-02	4.2921E-02
0.60000	2.2165E-02	3.1806E-02	5.0958E-02	5.8902E-02
0.55000	3.4656E-02	4.4693E-02	6.2557E-02	6.9393E-02
0.50000	4.4488E-02	5.3549E-02	6.8109E-02	7.2668E-02
0.45000	5.0698E-02	5.7892E-02	6.8093E-02	7.0538E-02
0.40000	5.3284E-02	5.8186E-02	6.3801E-02	6.4312E-02
0.35000	5.2759E-02	5.5334E-02	5.6755E-02	5.5709E-02
0.30000	4.9860E-02	5.0363E-02	4.8377E-02	4.6238E-02
0.25000	4.5368E-02	4.4233E-02	3.9828E-02	3.7063E-02
0.20000	4.0000E-02	3.7749E-02	3.1945E-02	2.8970E-02
0.15000	3.4354E-02	3.1518E-02	2.5252E-02	2.2399E-02
0.10000	2.8892E-02	2.5947E-02	1.9992E-02	1.7497E-02
0.05000	2.3937E-02	2.1270E-02	1.6194E-02	1.4193E-02
0.00000	1.9690E-02	1.7574E-02	1.3721E-02	1.2265E-02
-0.05000	1.6250E-02	1.4839E-02	1.2341E-02	1.1405E-02
-0.10000	1.3637E-02	1.2967E-02	1.1768E-02	1.1273E-02
-0.15000	1.1812E-02	1.1821E-02	1.1712E-02	1.1541E-02
-0.20000	1.0694E-02	1.1242E-02	1.1906E-02	1.1922E-02
-0.25000	1.0181E-02	1.1075E-02	1.2130E-02	1.2191E-02
-0.30000	1.0153E-02	1.1175E-02	1.2227E-02	1.2199E-02
-0.35000	1.0490E-02	1.1422E-02	1.2101E-02	1.1874E-02
-0.40000	1.1066E-02	1.1719E-02	1.1723E-02	1.1214E-02
-0.45000	1.1765E-02	1.1993E-02	1.1116E-02	1.0280E-02
-0.50000	1.2470E-02	1.2193E-02	1.0347E-02	9.1786E-03
-0.55000	1.3079E-02	1.2281E-02	9.5079E-03	8.0434E-03
-0.60000	1.3497E-02	1.2234E-02	8.7015E-03	7.0159E-03
-0.65000	1.3650E-02	1.2039E-02	8.0234E-03	6.2238E-03
-0.70000	1.3496E-02	1.1695E-02	7.5468E-03	5.7609E-03
-0.75000	1.3034E-02	1.1218E-02	7.3112E-03	5.6699E-03
-0.80000	1.2334E-02	1.0654E-02	7.3157E-03	5.9286E-03
-0.85000	1.1564E-02	1.0103E-02	7.5195E-03	6.4422E-03
-0.90000	1.1032E-02	9.7426E-03	7.8510E-03	7.0434E-03
-0.95000	1.1234E-02	9.8755E-03	8.2282E-03	7.5013E-03
-1.00000	1.2919E-02	1.0981E-02	8.5915E-03	7.5430E-03
	US IGMAS IN BNS/STERAD			
σ_T -	1.833	1.850	1.889	1.907
σ_{SE} -	.746	.782	.864	.905

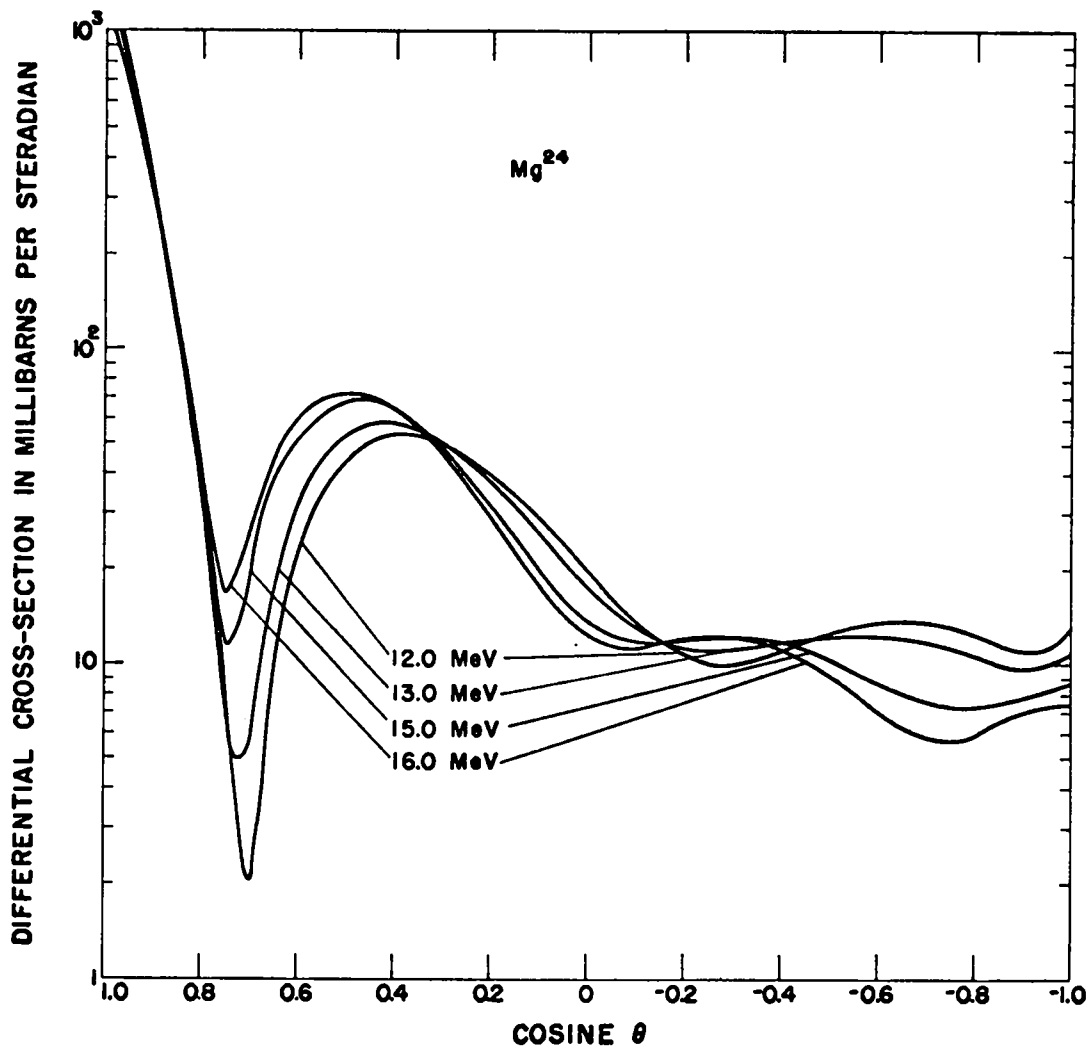


Figure 170

Mg²⁴

14.0 MeV

COSINE (C.M.)

1.00000	1.3953E 00
0.95000	7.0587E-01
0.90000	3.2089E-01
0.85000	1.2314E-01
0.80000	3.5513E-02
0.75000	8.5092E-03
0.70000	1.1357E-02
0.65000	2.5799E-02
0.60000	4.1747E-02
0.55000	5.4288E-02
0.50000	6.1648E-02
0.45000	6.3837E-02
0.40000	6.1760E-02
0.35000	5.6664E-02
0.30000	4.9809E-02
0.25000	4.2288E-02
0.20000	3.4945E-02
0.15000	2.8359E-02
0.10000	2.2866E-02
0.05000	1.8595E-02
0.00000	1.5518E-02
-0.05000	1.3498E-02
-0.10000	1.2333E-02
-0.15000	1.1798E-02
-0.20000	1.1669E-02
-0.25000	1.1750E-02
-0.30000	1.1885E-02
-0.35000	1.1963E-02
-0.40000	1.1919E-02
-0.45000	1.1731E-02
-0.50000	1.1411E-02
-0.55000	1.0992E-02
-0.60000	1.0520E-02
-0.65000	1.0041E-02
-0.70000	9.5965E-03
-0.75000	9.2168E-03
-0.80000	8.9250E-03
-0.85000	8.7467E-03
-0.90000	8.7290E-03
-0.95000	8.9710E-03
-1.00000	9.6675E-03

DSIGMAS IN BNS/STERAD

$$\begin{aligned}\sigma_T &= 1.869 \\ \sigma_{SE} &= .822\end{aligned}$$

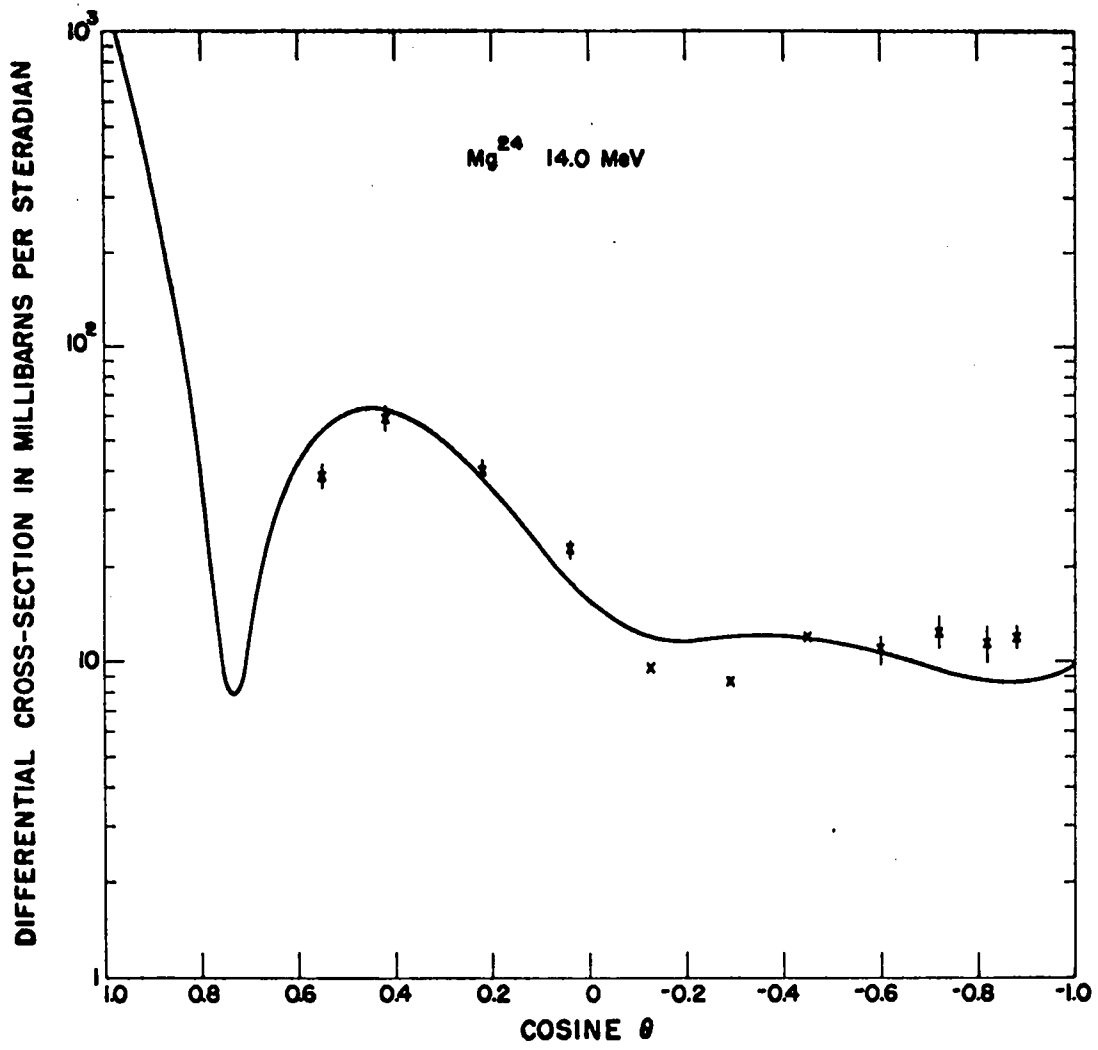


Figure 171

Mg²⁴
COSINE (C.M.)

14.60 MeV

1.00000	1.4658E 00
0.95000	7.3533E-01
0.90000	3.3184E-01
0.85000	1.2720E-01
0.80000	3.8071E-02
0.75000	1.1555E-02
0.70000	1.5224E-02
0.65000	3.0127E-02
0.60000	4.6000E-02
0.55000	5.8002E-02
0.50000	6.4525E-02
0.45000	6.5751E-02
0.40000	6.2733E-02
0.35000	5.6821E-02
0.30000	4.9332E-02
0.25000	4.1981E-02
0.20000	3.3805E-02
0.15000	2.7158E-02
0.10000	2.1736E-02
0.05000	1.7626E-02
0.00000	1.4758E-02
-0.05000	1.2956E-02
-0.10000	1.1988E-02
-0.15000	1.1603E-02
-0.20000	1.1563E-02
-0.25000	1.1663E-02
-0.30000	1.1748E-02
-0.35000	1.1716E-02
-0.40000	1.1517E-02
-0.45000	1.1147E-02
-0.50000	1.0641E-02
-0.55000	1.0056E-02
-0.60000	9.4588E-03
-0.65000	8.9161E-03
-0.70000	8.4794E-03
-0.75000	8.1798E-03
-0.80000	8.0258E-03
-0.85000	8.0083E-03
-0.90000	8.1147E-03
-0.95000	8.3535E-03
-1.00000	8.7916E-03

DSIGMAS IN BNS/STERAD

σ_T = 1.876
 σ_{SE} = .849

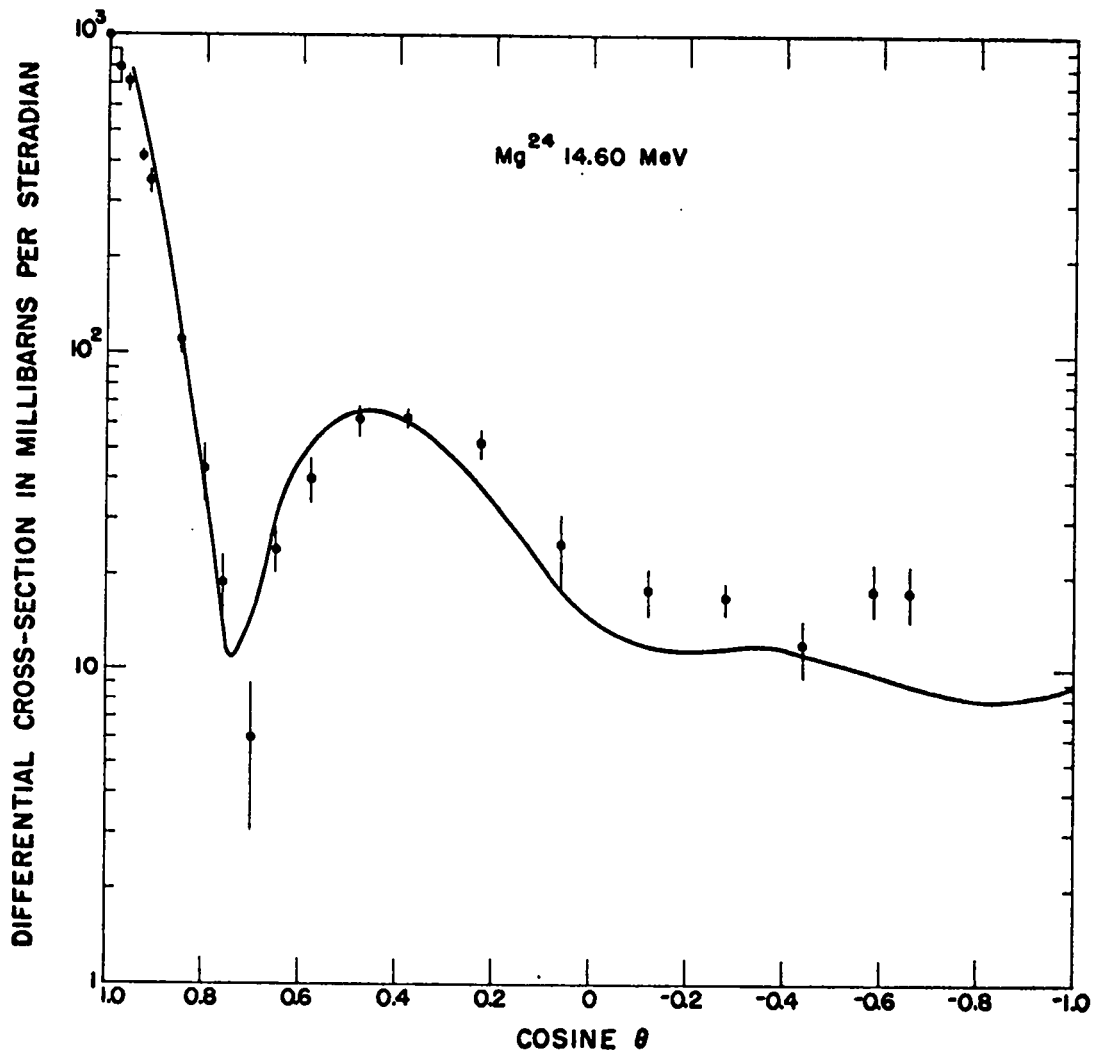
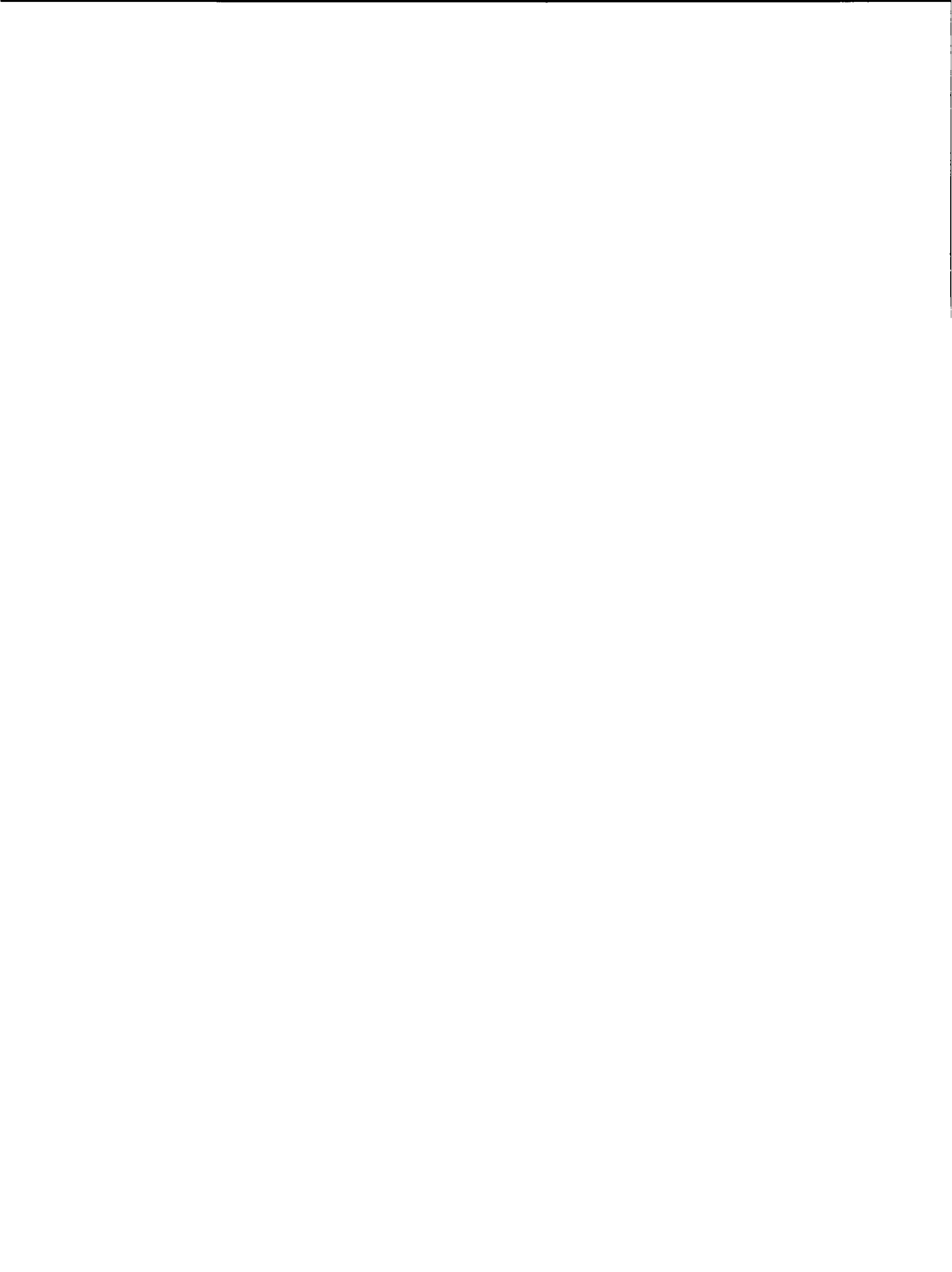


Figure 172



Al²⁷

<u>Energy</u>	<u>Energy Levels</u> *	
5.00	G.S.	5/2 ⁺
6.00	0.842	1/2 ⁺
7.00	1.013	3/2 ⁺
8.00	2.21	3/2 ⁽⁻⁾
9.00	2.73	5/2 ⁽⁺⁾
10.00	2.98	3/2 ^[+]
11.00	3.00	3/2 ^[+]
12.00	3.68	1/2 ^[+]
13.00	3.95	[5/2 ⁺]
14.00	4.05	1/2 ^[+]
14.70	4.40	[5/2 ⁺]
15.00	4.50	[5/2 ⁺]
16.00	4.58	[5/2 ⁺]
	4.81	[5/2 ⁺]

*Energy levels obtained from NRC 59-6-43,
except [] values which are assumed.

Al²⁷

5.0 MeV

COSINE(C.M.)	SHAPE ELASTIC	TOTAL ELASTIC
1.00000	9.16715E-01	9.67591E-01
0.93000	7.16216E-01	7.63274E-01
0.90000	5.56369E-01	6.00321E-01
0.85000	4.29874E-01	4.71277E-01
0.80000	3.30565E-01	3.69859E-01
0.75000	2.53260E-01	2.90793E-01
0.70000	1.93621E-01	2.29673E-01
0.65000	1.48041E-01	1.82839E-01
0.60000	1.13538E-01	1.47266E-01
0.55000	8.76647E-02	1.20477E-01
0.50000	6.84269E-02	1.00455E-01
0.45000	5.42177E-02	8.55736E-02
0.40000	4.37552E-02	7.45371E-02
0.35000	3.60301E-02	6.63253E-02
0.30000	3.02598E-02	6.01473E-02
0.25000	2.58494E-02	5.54015E-02
0.20000	2.23572E-02	5.16412E-02
0.15000	1.94651E-02	4.85443E-02
0.10000	1.69540E-02	4.58889E-02
0.05000	1.46818E-02	4.35309E-02
0.00000	1.25661E-02	4.13867E-02
-0.05000	1.05685E-02	3.94176E-02
-0.10000	8.68258E-03	3.76175E-02
-0.15000	6.92416E-03	3.60034E-02
-0.20000	5.32327E-03	3.46073E-02
-0.25000	3.91858E-03	3.34707E-02
-0.30000	2.75342E-03	3.26409E-02
-0.35000	1.87361E-03	3.21688E-02
-0.40000	1.32670E-03	3.21086E-02
-0.45000	1.16279E-03	3.25187E-02
-0.50000	1.43660E-03	3.34647E-02
-0.55000	2.21097E-03	3.50237E-02
-0.60000	3.56147E-03	3.72894E-02
-0.65000	5.58228E-03	4.03797E-02
-0.70000	8.39327E-03	4.44457E-02
-0.75000	1.21481E-02	4.96817E-02
-0.80000	1.70434E-02	5.63375E-02
-0.85000	2.33296E-02	6.47330E-02
-0.90000	3.13219E-02	7.52741E-02
-0.95000	4.14130E-02	8.84715E-02
-1.00000	5.40870E-02	1.04962E-01

(DSIGMAS IN BARNS/STERADIAN

σ_T = 2.538
 σ_{SE} = 1.203
 σ_{CE} = .431

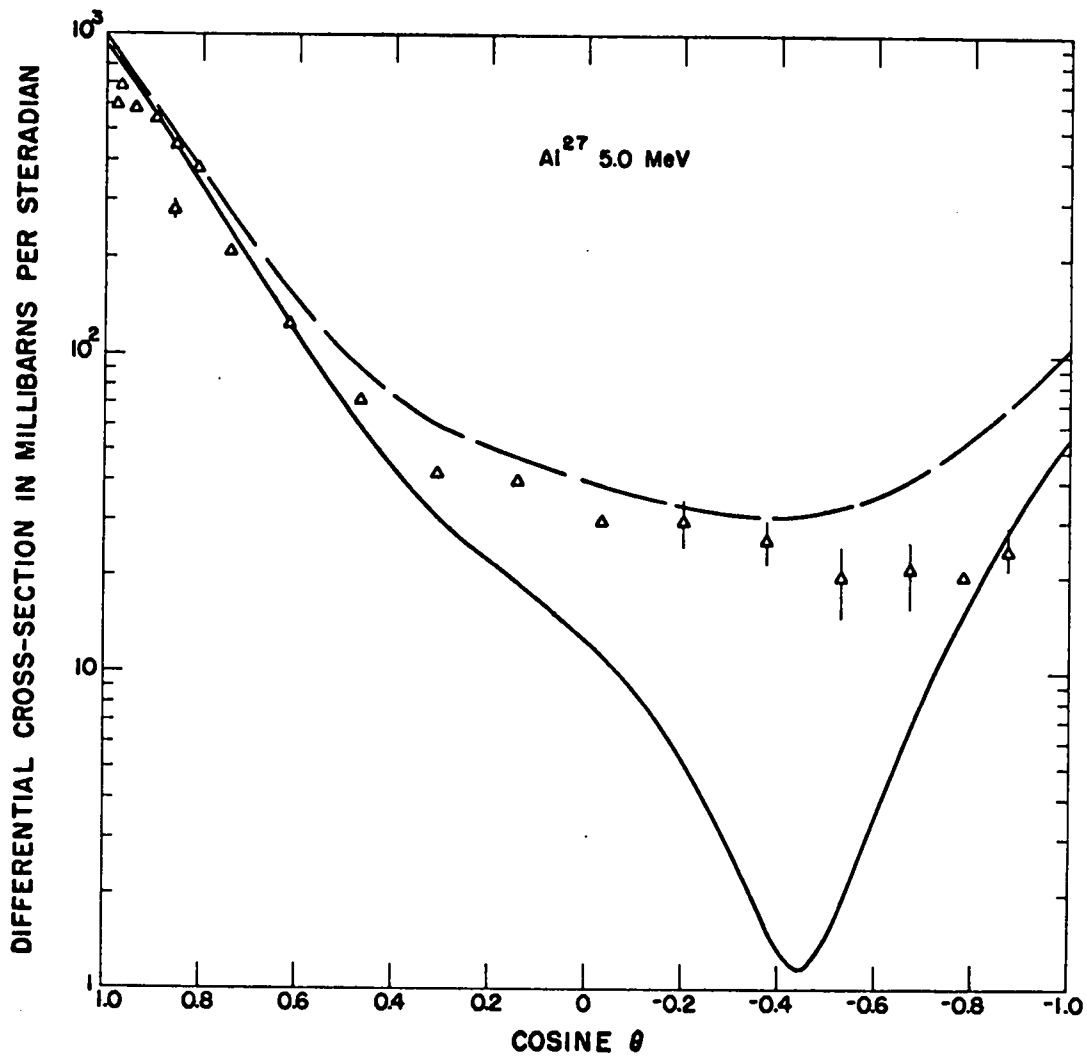


Figure 173

A_{127}	6.0 MeV	8.0 MeV	9.0 MeV	10.0 MeV	11.0 MeV
COSINE (C.M.)					
1.00000	9.1994E-01	9.4370E-01	9.8667E-01	1.0542E-01	1.1416E-01
0.95000	6.8101E-01	6.1949E-01	6.0683E-01	6.0827E-01	6.2144E-01
0.90000	4.9909E-01	3.9547E-01	3.5734E-01	3.2941E-01	3.1060E-01
0.85000	3.6224E-01	2.4476E-01	1.9943E-01	1.6353E-01	1.3640E-01
0.80000	2.6072E-01	1.4679E-01	1.0448E-01	7.1886E-02	4.8299E-02
0.75000	1.8657E-01	8.5993E-02	5.1601E-02	2.7231E-02	1.1844E-02
0.70000	1.3337E-01	5.0717E-02	2.5812E-02	1.0754E-02	4.1454E-03
0.65000	9.5965E-02	3.2355E-02	1.6549E-02	9.8231E-03	1.0510E-02
0.60000	7.0263E-02	2.4659E-02	1.6545E-02	1.6236E-02	2.1947E-02
0.55000	5.3042E-02	2.3188E-02	2.0960E-02	2.4924E-02	3.3341E-02
0.50000	4.1807E-02	2.4874E-02	2.6711E-02	3.2983E-02	4.2142E-02
0.45000	3.4632E-02	2.7677E-02	3.1962E-02	3.8960E-02	4.7416E-02
0.40000	3.0101E-02	3.0326E-02	3.5748E-02	4.2343E-02	4.9197E-02
0.35000	2.7167E-02	3.2099E-02	3.7692E-02	4.3190E-02	4.8039E-02
0.30000	2.5080E-02	3.2673E-02	3.7790E-02	4.1875E-02	4.4689E-02
0.25000	2.3358E-02	3.1993E-02	3.6271E-02	3.8920E-02	3.9965E-02
0.20000	2.1689E-02	3.0185E-02	3.3484E-02	3.4880E-02	3.4586E-02
0.15000	1.9907E-02	2.7477E-02	2.9826E-02	3.0273E-02	2.9147E-02
0.10000	1.7949E-02	2.4155E-02	2.5694E-02	2.5549E-02	2.4075E-02
0.05000	1.5825E-02	2.0517E-02	2.1453E-02	2.1064E-02	1.9682E-02
0.01000	1.3593E-02	1.6851E-02	1.7416E-02	1.7093E-02	1.6128E-02
-0.05000	1.1336E-02	1.3411E-02	1.3834E-02	1.3808E-02	1.3473E-02
-0.10000	9.1490E-03	1.0404E-02	1.0890E-02	1.1314E-02	1.1695E-02
-0.15000	7.1271E-03	7.9911E-03	8.7034E-03	9.6439E-03	1.0714E-02
-0.20000	5.3542E-03	6.2649E-03	7.3265E-03	8.7748E-03	1.0414E-02
-0.25000	3.8997E-03	5.2662E-03	6.7506E-03	8.6369E-03	1.0657E-02
-0.30000	2.8144E-03	4.4786E-03	6.9126E-03	9.1220E-03	1.1299E-02
-0.35000	2.1310E-03	5.3341E-03	7.7008E-03	1.0093E-02	1.2199E-02
-0.40000	1.8655E-03	6.2213E-03	8.9624E-03	1.1389E-02	1.3205E-02
-0.45000	2.0219E-03	7.4959E-03	1.0516E-02	1.2836E-02	1.4198E-02
-0.50000	2.5983E-03	8.9938E-03	1.2163E-02	1.4251E-02	1.5059E-02
-0.55000	3.5956E-03	1.0549E-02	1.3703E-02	1.5460E-02	1.5670E-02
-0.60000	5.0282E-03	1.2011E-02	1.4956E-02	1.6303E-02	1.5959E-02
-0.65000	6.9366E-03	1.3276E-02	1.5783E-02	1.6663E-02	1.5852E-02
-0.70000	9.4017E-03	1.4308E-02	1.6122E-02	1.6483E-02	1.5342E-02
-0.75000	1.2563E-02	1.5179E-02	1.6020E-02	1.5805E-02	1.4474E-02
-0.80000	1.6634E-02	1.6109E-02	1.5681E-02	1.4807E-02	1.3394E-02
-0.85000	2.1931E-02	1.7509E-02	1.5521E-02	1.3861E-02	1.2385E-02
-0.90000	2.8886E-02	2.0037E-02	1.6227E-02	1.3593E-02	1.1932E-02
-0.95000	3.8083E-02	2.4658E-02	1.8838E-02	1.4964E-02	1.2788E-02
-1.00000	5.0279E-02	3.2715E-02	2.4825E-02	1.9368E-02	1.6068E-02
	DSIGMAS IN BNS/STERAD				
σ_T	2.320	2.036	1.963	1.925	1.910
σ_{SE}	1.026	.816	.766	.744	.744

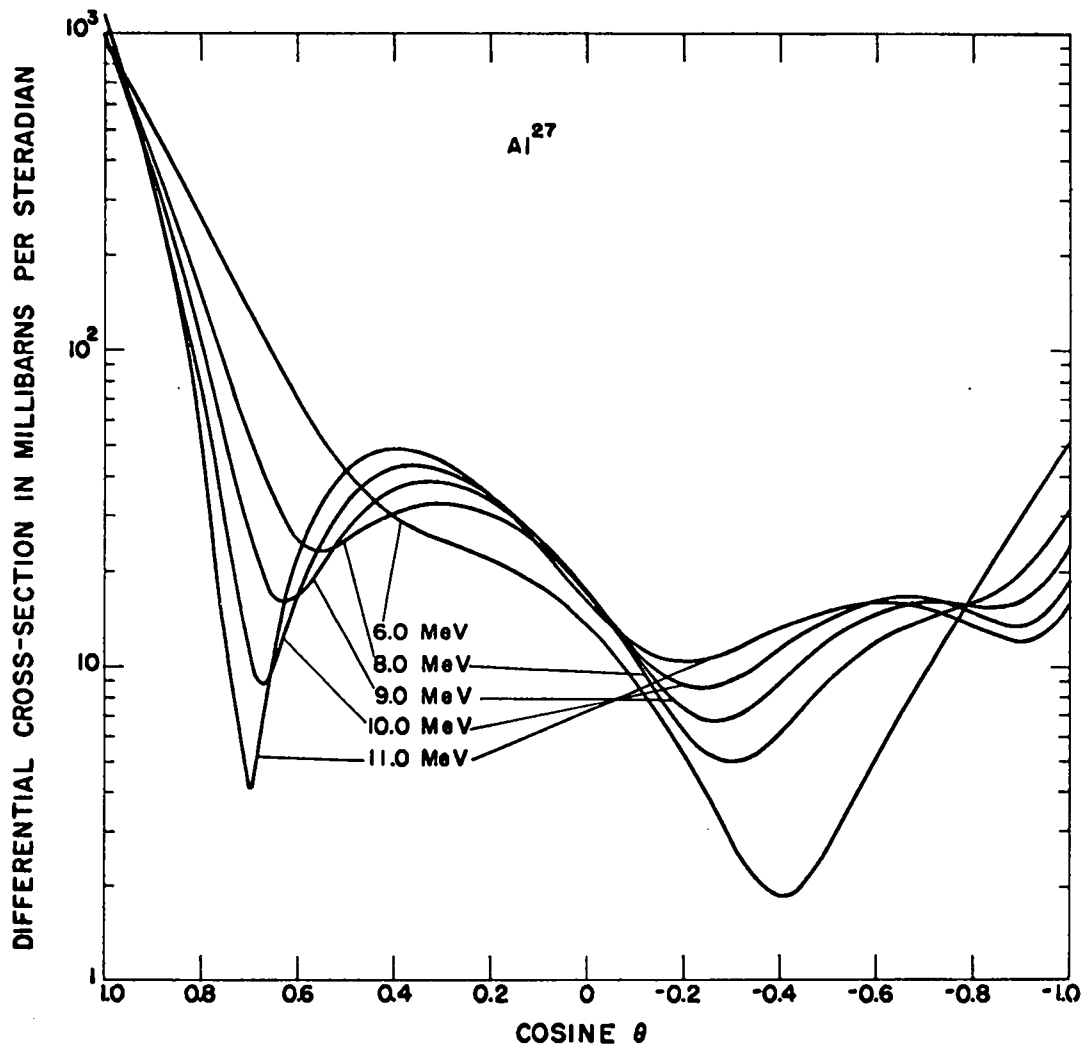


Figure 174

Al²⁷
COSINE (C.M.)

7.0 MeV

1.00000	9.2433E-01
0.95000	6.4580E-01
0.90000	4.4358E-01
0.85000	2.9945E-01
0.80000	1.9899E-01
0.75000	1.3086E-01
0.70000	8.6228E-02
0.65000	5.8295E-02
0.60000	4.1866E-02
0.55000	3.3047E-02
0.50000	2.8973E-02
0.45000	2.7585E-02
0.40000	2.7454E-02
0.35000	2.7636E-02
0.30000	2.7557E-02
0.25000	2.6914E-02
0.20000	2.5602E-02
0.15000	2.3655E-02
0.10000	2.1193E-02
0.05000	1.8388E-02
0.00000	1.5434E-02
-0.05000	1.2522E-02
-0.10000	9.8286E-03
-0.15000	7.4978E-03
-0.20000	5.6382E-03
-0.25000	4.3170E-03
-0.30000	3.5600E-03
-0.35000	3.3536E-03
-0.40000	3.6505E-03
-0.45000	4.3773E-03
-0.50000	5.4461E-03
-0.55000	6.7676E-03
-0.60000	8.2684E-03
-0.65000	9.9104E-03
-0.70000	1.1715E-02
-0.75000	1.3787E-02
-0.80000	1.6351E-02
-0.85000	1.9778E-02
-0.90000	2.4630E-02
-0.95000	3.1702E-02
-1.00000	4.2067E-02

DSIGMAS IN BNS/STERAD

σ_T = 2.153
 σ_{SE} = .901

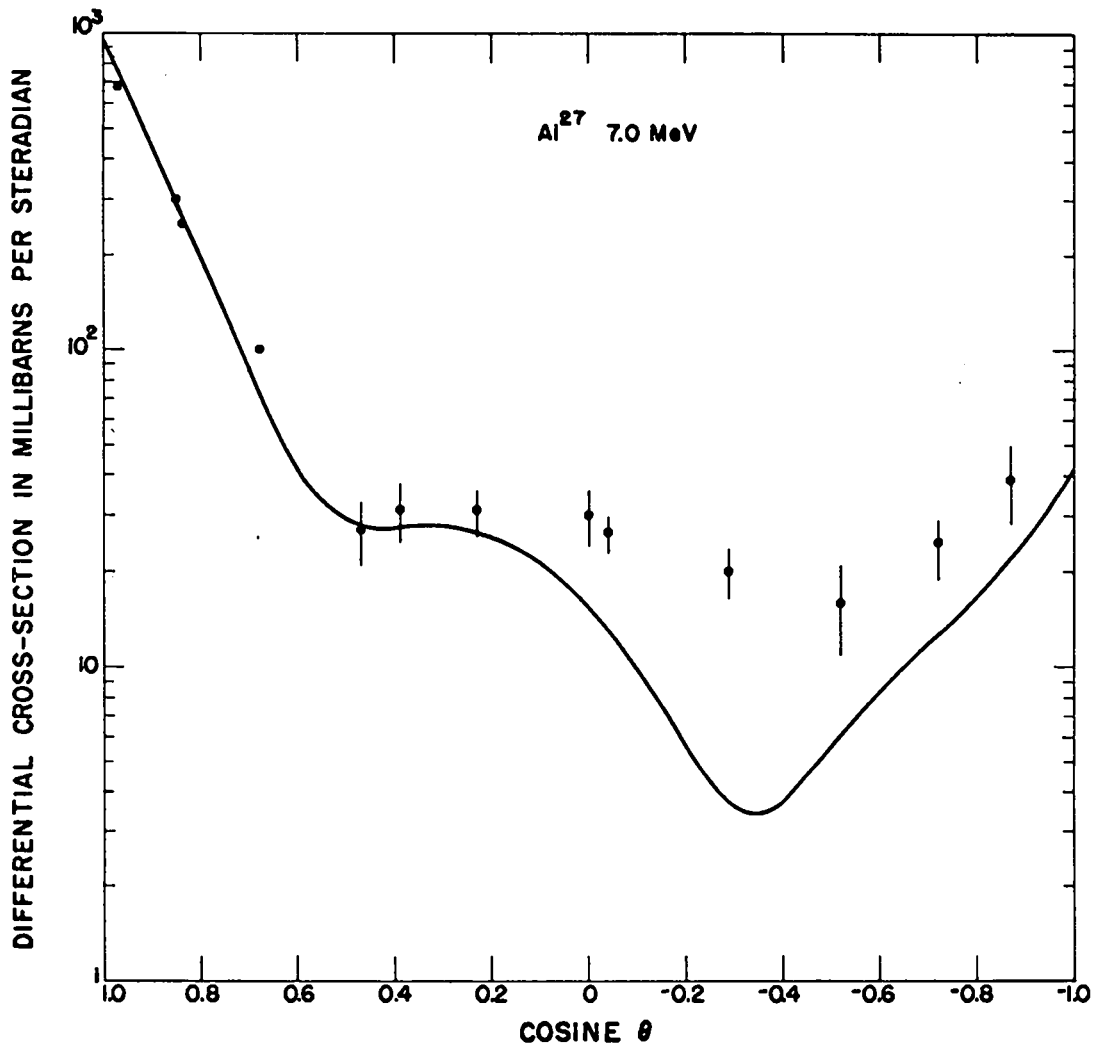


Figure 175

Al ²⁷	12.0 MeV	13.0 MeV	15.0 MeV	16.0 MeV
COSINE (C.M.)				
1.00000	1.2417E 00	1.3494E 00	1.5829E 00	1.7099E 00
0.95000	6.4304E-01	6.7049E-01	7.3801E-01	7.7687E-01
0.90000	2.9939E-01	2.9437E-01	2.9816E-01	3.0491E-01
0.85000	1.1705E-01	1.0428E-01	9.3578E-02	9.3373E-02
0.80000	3.2522E-02	2.3111E-02	1.7902E-02	1.9899E-02
0.75000	3.8020E-03	1.2405E-03	6.5344E-03	1.2368E-02
0.70000	3.9211E-03	7.8571E-03	2.1916E-02	3.0280E-02
0.65000	1.6289E-02	2.4761E-02	4.3613E-02	5.2555E-02
0.60000	3.1322E-02	4.2017E-02	6.1714E-02	6.9629E-02
0.55000	4.4040E-02	5.4933E-02	7.2499E-02	7.8438E-02
0.50000	5.2369E-02	6.1987E-02	7.5657E-02	7.9299E-02
0.45000	5.5972E-02	6.3442E-02	7.2542E-02	7.4032E-02
0.40000	5.5455E-02	6.0439E-02	6.5117E-02	6.4881E-02
0.35000	5.1847E-02	5.4420E-02	5.5363E-02	5.3940E-02
0.30000	4.6273E-02	4.6795E-02	4.4962E-02	4.2889E-02
0.25000	3.9763E-02	3.8755E-02	3.5180E-02	3.2913E-02
0.20000	3.3159E-02	3.1197E-02	2.6839E-02	2.4718E-02
0.15000	2.7074E-02	2.4712E-02	2.0366E-02	1.8605E-02
0.10000	2.1898E-02	1.9610E-02	1.5863E-02	1.4560E-02
0.05000	1.7824E-02	1.5969E-02	1.3186E-02	1.2345E-02
0.00000	1.4890E-02	1.3693E-02	1.2029E-02	1.1589E-02
-0.05000	1.3012E-02	1.2569E-02	1.1997E-02	1.1853E-02
-0.10000	1.2035E-02	1.2318E-02	1.2667E-02	1.2694E-02
-0.15000	1.1760E-02	1.2642E-02	1.3635E-02	1.3708E-02
-0.20000	1.1980E-02	1.3259E-02	1.4556E-02	1.4563E-02
-0.25000	1.2498E-02	1.3928E-02	1.5169E-02	1.5015E-02
-0.30000	1.3142E-02	1.4464E-02	1.5304E-02	1.4923E-02
-0.35000	1.3776E-02	1.4748E-02	1.4894E-02	1.4244E-02
-0.40000	1.4300E-02	1.4724E-02	1.3961E-02	1.3029E-02
-0.45000	1.4647E-02	1.4393E-02	1.2609E-02	1.1409E-02
-0.50000	1.4781E-02	1.3804E-02	1.1004E-02	9.5723E-03
-0.55000	1.4689E-02	1.3035E-02	9.3476E-03	7.7453E-03
-0.60000	1.4375E-02	1.2182E-02	7.8519E-03	6.1597E-03
-0.65000	1.3859E-02	1.1341E-02	6.7119E-03	5.0245E-03
-0.70000	1.3178E-02	1.0603E-02	6.0760E-03	4.4933E-03
-0.75000	1.2393E-02	1.0041E-02	6.0209E-03	4.6337E-03
-0.80000	1.1608E-02	9.7194E-03	6.5296E-03	5.3973E-03
-0.85000	1.1003E-02	9.7012E-03	7.4774E-03	6.5957E-03
-0.90000	1.0871E-02	1.0078E-02	8.6259E-03	7.8821E-03
-0.95000	1.1682E-02	1.1010E-02	9.6310E-03	8.7429E-03
-1.00000	1.4162E-02	1.2789E-02	1.0065E-02	8.5027E-03

DSIGMAS IN BNS/STERAD

σ_T -	1.90h	1.905	1.915	1.926
σ_{SE} -	.759	.78h	.8h8	.883

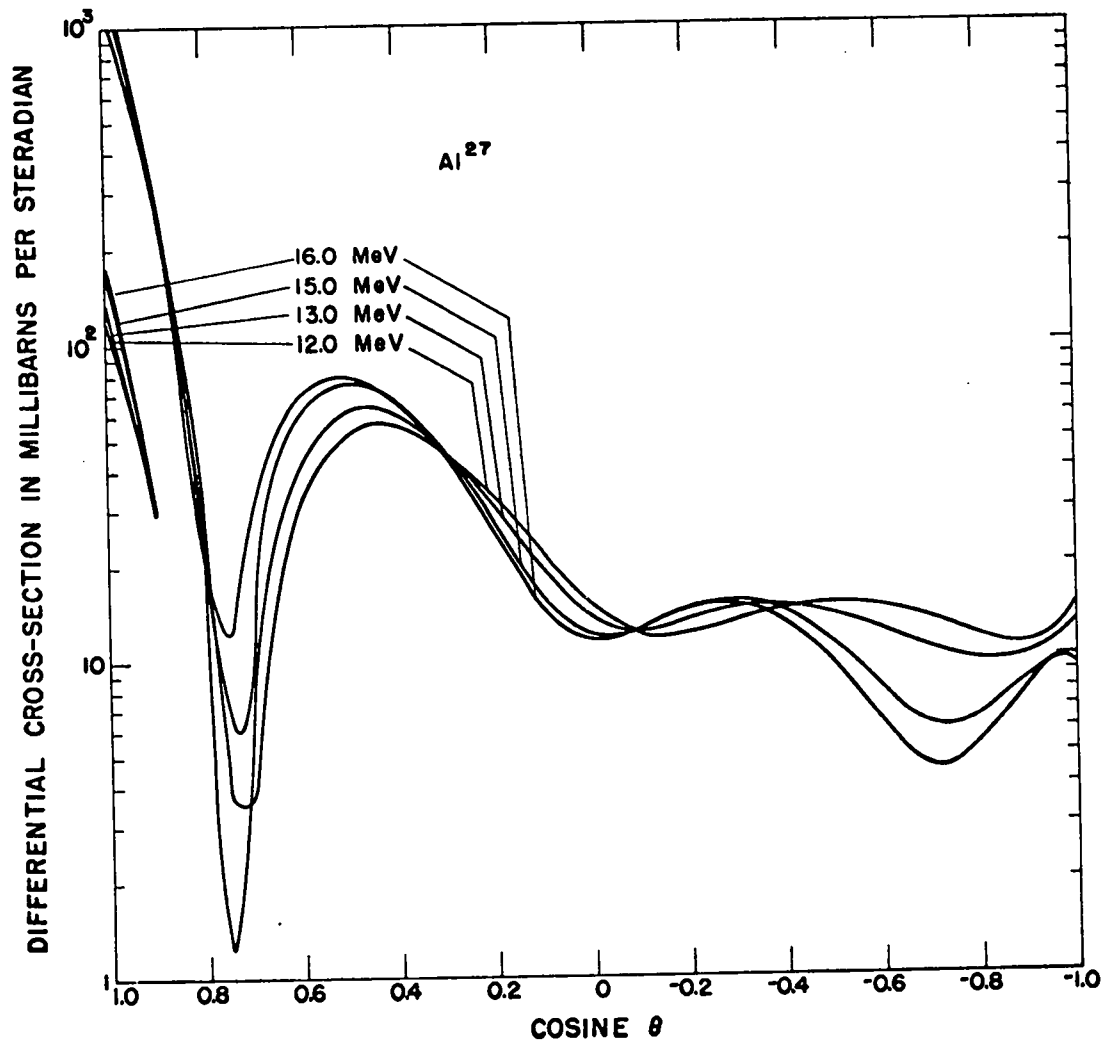


Figure 176

Al²⁷
COSINE (C.M.)

14.0 MeV

1.00000	1.4631E 00
0.95000	7.0244E-01
0.90000	2.9435E-01
0.85000	9.6868E-02
0.80000	1.8644E-02
0.75000	2.5458E-03
0.70000	1.4226E-02
0.65000	3.4199E-02
0.60000	5.2423E-02
0.55000	6.4630E-02
0.50000	6.9893E-02
0.45000	6.9045E-02
0.40000	6.3684E-02
0.35000	5.5573E-02
0.30000	4.6309E-02
0.25000	3.7162E-02
0.20000	2.9021E-02
0.15000	2.2413E-02
0.10000	1.7547E-02
0.05000	1.4387E-02
0.00000	1.2721E-02
-0.05000	1.2226E-02
-0.10000	1.2535E-02
-0.15000	1.3279E-02
-0.20000	1.4129E-02
-0.25000	1.4822E-02
-0.30000	1.5176E-02
-0.35000	1.5094E-02
-0.40000	1.4565E-02
-0.45000	1.3648E-02
-0.50000	1.2461E-02
-0.55000	1.1156E-02
-0.60000	9.9018E-03
-0.65000	8.8549E-03
-0.70000	8.1427E-03
-0.75000	7.8446E-03
-0.80000	7.9814E-03
-0.85000	8.5135E-03
-0.90000	9.3506E-03
-0.95000	1.0377E-02
-1.00000	1.1494E-02

DSIGMAS IN BNS/STERAD

σ_T = 1.901
 σ_{SE} = .814

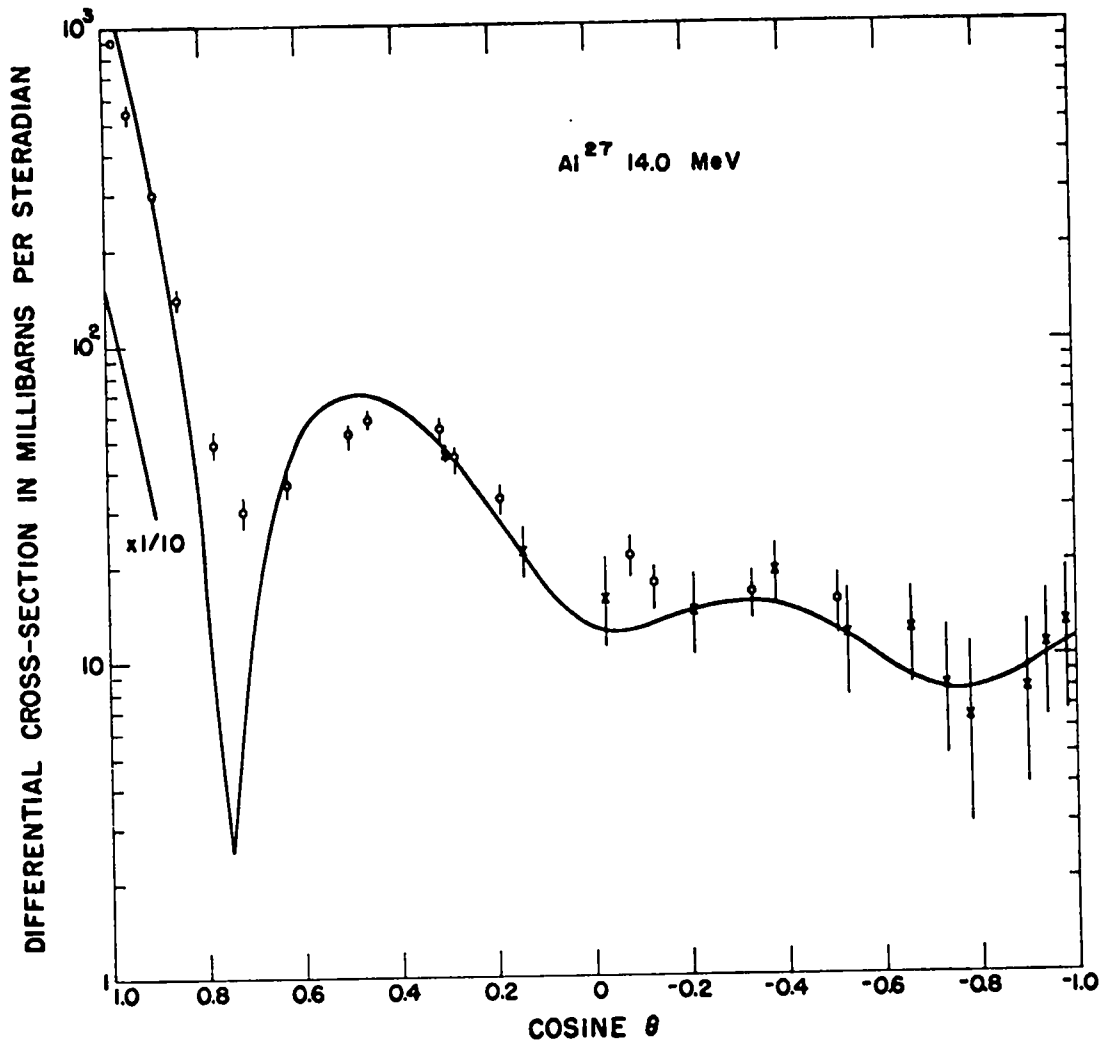


Figure 177

Al²⁷

14.7 MeV

COSINE (C.M.)

1.00000	1.5462E 00
0.95000	7.2698E-01
0.90000	2.9666E-01
0.85000	9.4187E-02
0.80000	1.7787E-02
0.75000	5.1054E-03
0.70000	1.9512E-02
0.65000	4.0824E-02
0.60000	5.9065E-02
0.55000	7.0341E-02
0.50000	7.4155E-02
0.45000	7.1709E-02
0.40000	6.4868E-02
0.35000	5.5557E-02
0.30000	4.5445E-02
0.25000	3.5805E-02
0.20000	2.7486E-02
0.15000	2.0948E-02
0.10000	1.6325E-02
0.05000	1.3505E-02
0.00000	1.2207E-02
-0.05000	1.2055E-02
-0.10000	1.2637E-02
-0.15000	1.3558E-02
-0.20000	1.4474E-02
-0.25000	1.5120E-02
-0.30000	1.5323E-02
-0.35000	1.5006E-02
-0.40000	1.4182E-02
-0.45000	1.2944E-02
-0.50000	1.1444E-02
-0.55000	9.8735E-03
-0.60000	8.4337E-03
-0.65000	7.3105E-03
-0.70000	6.6478E-03
-0.75000	6.5239E-03
-0.80000	6.9325E-03
-0.85000	7.7721E-03
-0.90000	8.8453E-03
-0.95000	9.8715E-03
-1.00000	1.0516E-02

DSIGMAS IN BNS/STERAD

σ_T = 1.913
 σ_{SE} = .837

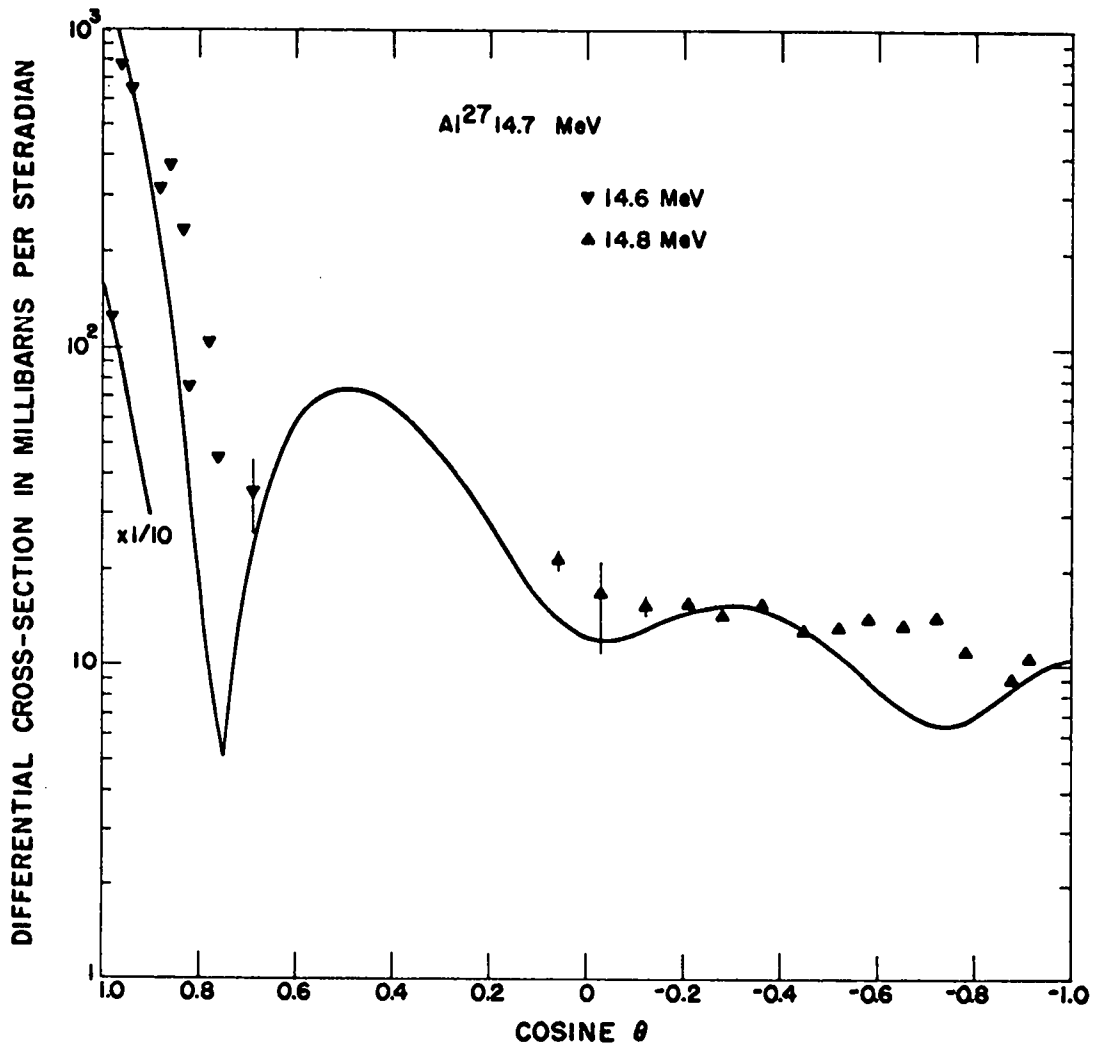


Figure 178