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Elastic Scattering and Inelastic Scattering of 88-MeV ^6Li

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Physics Division

ELASTIC SCATTERING AND INELASTIC SCATTERING OF 88-MEV ${}^6\text{Li}$

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ELASTIC SCATTERING AND INELASTIC SCATTERING OF 88-MEV ${}^6\text{Li}$

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ABSTRACT

Graphs and tables of differential cross sections are presented for the elastic scattering of 88-MeV ${}^6\text{Li}$ ions by targets of ${}^{24}\text{Mg}$, ${}^{25}\text{Mg}$, ${}^{26}\text{Mg}$, ${}^{27}\text{Al}$, ${}^{40}\text{Ca}$, ${}^{44}\text{Ca}$, ${}^{59}\text{Co}$, ${}^{60}\text{Ni}$, ${}^{197}\text{Au}$, ${}^{207}\text{Pb}$, ${}^{208}\text{Pb}$. Angular distributions were measured from $\sim 10^\circ$ c.m. in steps of 0.4° to $\sim 50^\circ$ c.m. and in larger steps to 60 or 70° c.m. Inelastic data for exciting the lowest 2^+ states of ${}^{24}\text{Mg}$, ${}^{26}\text{Mg}$, ${}^{44}\text{Ca}$ and ${}^{60}\text{Ni}$ were also obtained.

I. INTRODUCTION

The purpose of this technical memorandum is to provide a complete graphical and tabular compilation of recent experimental measurements at the Oak Ridge Isochronous Cyclotron of elastic scattering of 88 MeV ${}^6\text{Li}$. The targets used span a wide nuclear mass range and include ${}^{24,25,26}\text{Mg}$, ${}^{27}\text{Al}$, ${}^{40,44}\text{Ca}$, ${}^{59}\text{Co}$, ${}^{60}\text{Ni}$, ${}^{197}\text{Au}$, ${}^{206,208}\text{Pb}$. Angular distributions were measured in small angle steps from $\sim 10^\circ$ c.m. to 60 or 70° at which point the elastic cross sections range from 10^{-3} to 10^{-5} of the Rutherford values. Inelastic scattering cross sections for exciting the lowest 2^+ states of ${}^{24,26}\text{Mg}$, ${}^{44}\text{Ca}$ and ${}^{60}\text{Ni}$ were also obtained. The elastic data were analyzed using the optical model, with potentials of both Woods-

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Saxon and double-folding forms. Coupled-channels analyses were also performed for the $^{24,26}\text{Mg}$, ^{59}Co , and ^{60}Ni data. The experimental method as well as the analysis is presented in ref. 1. A brief description of the experimental method is given here.

The scattering of ^6Li is of interest because it is in the mass range ($A = 4-12$) of ions whose elastic scattering have been described as a transition² between that of light ions ($A \leq 4$) and that of heavy ions ($A \geq 12$). It is also of interest because optical model analysis of ^6Li elastic scattering data provided the first example³ of a serious failure of the double folding model which gives a good account of elastic scattering of a variety of heavy ions.⁴

Table I provides a compilation of ^6Li elastic scattering measurements including those reported here for energies ≥ 28 MeV. When the present measurements were planned there were data^{2,5} reported for only three targets (^{28}Si , $^{40,48}\text{Ca}$) for energies above 50 MeV. Since that time, data have been reported for a number of targets at 73.7 MeV⁶ (^{58}Ni , ^{90}Zr , ^{124}Sn , and ^{208}Pb) and at 99 MeV⁷ (^{12}C , ^{28}Si , ^{40}Ca , ^{58}Ni , ^{90}Zr , ^{208}Pb). The measurements in the present work include 9 targets not included in 73.7- and 99-MeV work. In contrast to the work of refs. 6,7 the present measurements include data for a number of sets of targets of neighboring mass.

II. EXPERIMENTAL

The targets were all self-supporting foils of the separated isotope. Particles scattered from the target were detected in two multi angle detectors. The principle detector was a position sensitive slice

detector⁸ (PSD) whose front face was divided into 50 gold contacts or "slices" connected by a resistor chain. One end of the detector was grounded and the other end was connected to a charge sensitive preamplifier to provide position, and hence angle signals. The rear contact of the detector was connected to another amplifier to provide the energy signal. The slices have a nominal 1 mm spacing and the detector was positioned about 150 mm from the target giving a total angular coverage of 18.4° for 48 slices. A second position sensitive detector subtended 26.4° in 23 slices. The forward angle measurements were performed with the 50 slice detector, which provided data at angular intervals of less than 0.4° . The two PSD detectors were mounted upon movable arms which could be independently rotated; the accuracy of the angular setting was about 0.05° . Each detector was electrically isolated from the scattering chamber to minimize noise, and was cooled by thermal contact with a copper block through which coolant liquid was pumped at about -20°C . The signals from the two PSDs were processed with a multiplexed fast ADC system connected to the SEL computer.⁹

Figure 1 illustrates the format of the data storage and reduction. The data were stored as two-parameter E vs P spectra on a magnetic disk. An interactive display unit and appropriate program was used to view the data and obtain projections of selected parts of the array. Figure 1a shows a display of part of the E vs P array for one run. Each vertical (E) band corresponds to one slice of the detector which covers one of the $\sim 0.4^\circ$ sector covered by the detector. Figure 1b shows an energy spectrum from one slice of the detector. The energy resolution is ~ 450 keV FWHM. In the E vs P array (Fig. 1a) the elastic peaks

are adequately separated from the peaks due to inelastic scattering to the lowest 2^+ level to permit a free form gate to be drawn around the elastic peaks for all the slices; fig. 1c shows the projection of the data inside such a gate. Each peak in fig. 1c corresponds to the elastic scattering events detected in one slice during the data run. The pronounced change in yield over the 18.4° sector covered by the detector and the structure in the angular distribution is clearly evident. The integrated counts for each slice in projections such as fig. 1c were used to compute the scattering cross section for the corresponding angle. The relative solid angles for all of the slices of the detector were obtained from a spectrum obtained with a ^{244}Cm alpha particle source located at the target position.

III. RESULTS

The data are presented graphically in Figs. 2-19 and listed in Table II. In the graphs elastic data are presented as the ratio of the measured cross section to the computed Rutherford scattering cross section (SIGMA/RUTH). For ^{197}Au , ^{206}Pb and ^{208}Pb both semi-logarithmic and linear plots are shown -- the latter to show details of the angular distributions at forward angles. The inelastic data are plotted as differential cross sections. The values of ELAB shown are the incident beam energies midway through the target foils.

The tabular listings of the elastic data include both cross sections (SIGMA) values of SIGMA/RUTH. Errors (in percent) are statistical uncertainties where they are larger than 5% are truncated to 5% where the

statistical errors are smaller. The differential cross sections for the calcium targets have the largest uncertainty with an overall error of $\pm 15\%$.

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Table I

⁶Li elastic scattering measurements at energies > 28 MeV. This compilation was obtained principally from the computerized Nuclear Structure Reference File of the ORNL Nuclear Data Project. The present data are also included in this table.

Target	Energy (MeV)	Reference	Target	Energy (MeV)	Reference
⁶ Li	28,32,33	10	⁴⁸ Ca	30	18
¹⁰ B	30	11		156	5
¹¹ B	28	12	⁵⁴ Fe	38,44,50	19
¹² C	28	12,13	⁵⁸ Ni	50.6	15
	30.6	13		73.7	6
	34	14		99	7
	36.4,40	13	⁵⁹ Co	88	Present Work
	50.6	15	⁶⁰ Ni	88	Present Work
	63	13	⁶³ Cu	28.1,30.1,32.1	20
	99	7	⁷⁴ Ge	50.6	15
¹³ C	28,34	14	⁹⁰ Zr	34	21
¹⁶ O	36	14		73.7	6
	50.6	15		99	7
¹⁹ F	34	16	²⁴ Sn	73.7	6
²⁴ Mg	88	Present Work	⁶⁶ Er	50.6	6
²⁵ Mg	88	Present Work	¹⁹⁷ Au	88	Present Work
²⁶ Mg	36	14	²⁰⁶ Pb	88	Present Work
	88	Present Work	²⁰⁸ Pb	50.6	15
²⁷ Al	88	Present Work		73.7	6
²⁸ Si	99	7		88	Present Work
	135	2		99	7
⁴⁰ Ca	28	17	²⁰⁹ Bi	44	22
	30	18	²³² Th	37.2	23
	34	17	²³⁸ U	37.2	23
	50.6	15			
	88	Present Work			
	99	7			
	156	5			
⁴⁴ Ca	28,34	17			
	88	Present Work			

Table II

Cross sections for elastic scattering of 88 MeV ${}^6\text{Li}$ from ${}^{24}\text{Mg}$, ${}^{25}\text{Mg}$, ${}^{26}\text{Mg}$, ${}^{27}\text{Al}$, ${}^{40}\text{Ca}$, ${}^{44}\text{Ca}$, ${}^{59}\text{Co}$, ${}^{60}\text{Ni}$, ${}^{197}\text{Au}$, ${}^{206}\text{Pb}$, ${}^{208}\text{Pb}$ and for inelastic scattering to lowest 2^+ level of ${}^{24}\text{Mg}$, ${}^{26}\text{Mg}$, ${}^{44}\text{Ca}$ and ${}^{60}\text{Ni}$.

THETA is the c.m. scattering angle in degrees; SIGMA is the differential cross section in millibarns/steradian; RUTH is the Rutherford scattering cross section in millibarns/steradian; and ERROR is the relative uncertainty in percent. If ERROR is > 5 it is the statistical error; where these were $< 5\%$ they were truncated to 5% when the data were punched on cards for use in optical model analyses. These cards were used to make the present listing.

87.6 MEV 6LI + 24MG ELASTIC

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
8.5	1.299E 03	1.134E 04	1.145E-01	5.
9.0	1.534E 03	9.028E 03	1.699E-01	5.
9.4	1.431E 03	7.589E 03	1.886E-01	5.
9.9	1.514E 03	6.171E 03	2.453E-01	5.
10.6	1.380E 03	4.699E 03	2.937E-01	9.
11.5	1.128E 03	3.395E 03	3.322E-01	5.
12.5	7.000E 02	2.435E 03	2.874E-01	9.
13.2	4.130E 02	1.960E 03	2.107E-01	5.
13.7	2.600E 02	1.691E 03	1.538E-01	5.
14.1	1.510E 02	1.508E 03	1.002E-01	5.
14.6	6.620E 01	1.312E 03	5.044E-02	5.
15.3	3.220E 01	1.089E 03	2.956E-02	5.
16.1	4.460E 01	8.896E 02	5.014E-02	5.
16.5	6.340E 01	8.069E 02	7.857E-02	5.
17.0	7.760E 01	7.167E 02	1.083E-01	5.
17.5	8.930E 01	6.388E 02	1.398E-01	5.
18.2	9.300E 01	5.467E 02	1.701E-01	5.
18.9	7.920E 01	4.708E 02	1.682E-01	5.
19.4	6.270E 01	4.245E 02	1.477E-01	5.
19.8	4.770E 01	3.915E 02	1.218E-01	5.
20.3	3.200E 01	3.547E 02	9.022E-02	9.
20.8	1.910E 01	3.221E 02	5.929E-02	5.
21.3	9.810E 00	2.933E 02	3.345E-02	10.
21.7	3.900E 00	2.725E 02	1.431E-02	5.
22.2	1.240E 00	2.490E 02	4.980E-03	5.
22.7	8.850E-01	2.281E 02	3.881E-03	7.
23.2	2.080E 00	2.093E 02	9.940E-03	5.
23.6	4.180E 00	1.956E 02	2.137E-02	5.
24.1	6.660E 00	1.801E 02	3.698E-02	5.
24.6	7.840E 00	1.661E 02	4.720E-02	5.
25.1	9.450E 00	1.535E 02	6.158E-02	5.
25.5	9.960E 00	1.442E 02	6.907E-02	10.
26.0	8.920E 00	1.336E 02	6.677E-02	5.
26.5	8.080E 00	1.240E 02	6.518E-02	5.
27.0	6.810E 00	1.152E 02	5.912E-02	5.
27.4	5.290E 00	1.087E 02	4.865E-02	5.
27.9	3.500E 00	1.013E 02	3.456E-02	5.
28.6	2.380E 00	9.191E 01	2.589E-02	5.
28.9	1.380E 00	8.823E 01	1.564E-02	9.
29.3	7.400E-01	8.361E 01	8.851E-03	7.
29.8	3.730E-01	7.826E 01	4.766E-03	10.
30.3	2.570E-01	7.333E 01	3.505E-03	12.
30.7	4.470E-01	6.967E 01	6.416E-03	9.
31.0	9.020E-01	6.707E 01	1.345E-02	5.
31.4	7.310E-01	6.380E 01	1.146E-02	15.
32.2	1.030E 00	5.784E 01	1.781E-02	5.
32.9	1.360E 00	5.320E 01	2.556E-02	10.
33.8	1.200E 00	4.790E 01	2.505E-02	5.
34.5	8.390E-01	4.424E 01	1.897E-02	15.
35.0	8.190E-01	4.184E 01	1.958E-02	9.

87.6 MEV 6LI + 24MG ELASTIC (CONTINUED)

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
35.4	7.660E-01	4.004E 01	1.913E-02	9.
35.8	5.640E-01	3.833E 01	1.471E-02	5.
36.4	4.000E-01	3.595E 01	1.113E-02	5.
36.8	3.000E-01	3.446E 01	8.706E-03	7.
37.2	2.260E-01	3.305E 01	6.838E-03	6.
37.8	1.690E-01	3.107E 01	5.438E-03	5.
38.2	1.560E-01	2.984E 01	5.228E-03	10.
38.6	1.400E-01	2.867E 01	4.884E-03	10.
39.1	1.360E-01	2.728E 01	4.985E-03	9.
39.5	1.530E-01	2.624E 01	5.832E-03	16.
40.2	1.940E-01	2.453E 01	7.910E-03	9.
41.0	1.850E-01	2.274E 01	8.134E-03	9.
42.0	1.680E-01	2.074E 01	8.100E-03	10.
42.6	1.770E-01	1.965E 01	9.009E-03	6.
43.5	1.350E-01	1.814E 01	7.441E-03	6.
44.4	8.240E-02	1.678E 01	4.909E-03	9.
45.2	6.130E-02	1.568E 01	3.908E-03	7.
46.2	3.520E-02	1.444E 01	2.438E-03	19.
46.7	2.560E-02	1.386E 01	1.847E-03	14.
47.7	1.470E-02	1.280E 01	1.149E-03	24.
48.6	1.070E-02	1.193E 01	8.970E-04	21.
49.2	1.780E-02	1.139E 01	1.563E-03	9.
50.0	2.040E-02	1.072E 01	1.902E-03	15.
50.6	1.340E-02	1.026E 01	1.307E-03	12.
51.4	1.340E-02	9.673E 00	1.385E-03	18.
51.9	9.100E-03	9.330E 00	9.753E-04	12.
52.7	1.150E-02	8.814E 00	1.305E-03	23.
53.3	4.800E-03	8.452E 00	5.679E-04	25.
54.7	4.300E-03	7.679E 00	5.600E-04	17.
55.9	5.800E-03	7.089E 00	8.182E-04	15.
57.3	5.900E-03	6.473E 00	9.114E-04	43.
58.6	4.000E-03	5.964E 00	6.707E-04	75.
60.0	5.300E-03	5.473E 00	9.683E-04	17.
61.3	4.400E-03	5.065E 00	8.687E-04	39.
62.6	3.300E-03	4.696E 00	7.027E-04	24.
64.0	3.600E-03	4.338E 00	8.299E-04	23.
65.4	2.300E-03	4.016E 00	5.727E-04	29.
66.7	4.100E-03	3.745E 00	1.095E-03	22.
68.0	3.000E-03	3.499E 00	8.575E-04	26.
69.4	5.000E-03	3.257E 00	1.535E-03	20.
70.7	2.700E-03	3.053E 00	8.844E-04	26.
72.0	3.300E-03	2.866E 00	1.151E-03	24.
73.3	2.200E-03	2.694E 00	8.165E-04	31.
74.6	2.100E-03	2.537E 00	8.278E-04	31.
75.8	1.300E-03	2.402E 00	5.411E-04	33.
77.1	1.200E-03	2.268E 00	5.291E-04	41.

87.6 MEV 6LI + 24MG INEL Q=-1.36 MEV

THETA	SIGMA	ERRØR	THETA	SIGMA	ERRØR
8.5	2.490E 02	5.	31.5	1.460E 00	8.
9.0	1.080E 02	5.	32.2	9.310E-01	7.
9.4	6.990E 01	5.	32.4	4.840E-01	9.
9.9	4.920E 01	5.	32.9	5.610E-01	6.
10.4	3.020E 01	6.	33.7	4.160E-01	7.
10.8	2.420E 01	6.	34.3	5.470E-01	6.
11.3	2.110E 01	6.	35.1	6.020E-01	6.
11.8	2.730E 01	6.	35.7	7.640E-01	6.
12.3	3.560E 01	5.	36.5	7.270E-01	6.
12.7	4.240E 01	5.	37.2	7.320E-01	9.
13.2	5.010E 01	5.	37.9	6.160E-01	6.
13.7	5.340E 01	5.	38.5	5.590E-01	11.
14.2	5.580E 01	5.	39.3	3.910E-01	17.
14.7	4.820E 01	5.	39.9	3.490E-01	9.
15.1	3.970E 01	6.	40.8	2.120E-01	13.
15.6	3.520E 01	5.	42.2	1.560E-01	15.
16.1	2.510E 01	6.	43.6	1.460E-01	16.
16.6	1.510E 01	8.	45.0	1.940E-01	14.
17.0	1.080E 01	8.	46.4	1.870E-01	14.
17.5	5.770E 00	11.	47.8	6.810E-02	23.
18.0	3.250E 00	13.	49.2	9.430E-02	20.
18.5	3.530E 00	15.	50.6	5.240E-02	26.
18.9	5.360E 00	7.	52.0	5.290E-02	26.
19.4	7.770E 00	5.	53.4	5.140E-02	26.
19.9	1.060E 01	5.	54.7	4.130E-02	29.
20.4	1.240E 01	5.	56.1	4.960E-02	28.
20.8	1.290E 01	5.	57.4	1.090E-02	58.
21.3	1.320E 01	6.	58.8	2.170E-02	41.
21.8	1.250E 01	7.			
22.3	1.130E 01	5.			
22.7	9.000E 00	5.			
23.2	7.040E 00	5.			
23.7	5.050E 00	6.			
24.2	3.510E 00	5.			
24.6	2.090E 00	5.			
25.1	1.430E 00	6.			
25.6	1.300E 00	12.			
26.7	1.390E 00	6.			
26.6	1.670E 00	12.			
24.2	2.250E 00	5.			
27.5	2.610E 00	7.			
28.0	3.060E 00	5.			
28.5	3.650E 00	5.			
28.9	3.360E 00	5.			
29.4	3.060E 00	5.			
29.9	3.080E 00	5.			
30.3	2.410E 00	5.			
30.8	1.920E 00	5.			

87.8 MEV 6LI + 25MG ELASTIC

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
8.4	1.158E 03	1.165E 04	9.942E-02	5.
8.9	1.388E 03	9.247E 03	1.501E-01	5.
9.3	1.391E 03	7.759E 03	1.793E-01	5.
9.8	1.399E 03	6.295E 03	2.222E-01	5.
10.5	1.336E 03	4.781E 03	2.795E-01	5.
11.4	1.054E 03	3.444E 03	3.060E-01	5.
12.1	7.520E 02	2.716E 03	2.769E-01	5.
12.6	5.280E 02	2.311E 03	2.285E-01	5.
13.1	3.620E 02	1.979E 03	1.829E-01	5.
13.6	2.220E 02	1.705E 03	1.302E-01	5.
14.0	1.250E 02	1.519E 03	8.228E-02	5.
14.5	6.260E 01	1.321E 03	4.738E-02	7.
15.0	3.610E 01	1.155E 03	3.127E-02	9.
15.5	4.340E 01	1.013E 03	4.283E-02	8.
15.9	6.170E 01	9.158E 02	6.737E-02	7.
16.4	8.030E 01	8.098E 02	9.916E-02	7.
17.1	9.300E 01	6.859E 02	1.356E-01	5.
18.1	9.160E 01	5.474E 02	1.673E-01	5.
18.7	6.400E 01	4.810E 02	1.331E-01	9.
19.2	4.960E 01	4.332E 02	1.145E-01	8.
19.7	3.570E 01	3.913E 02	9.124E-02	10.
20.2	2.350E 01	3.543E 02	6.632E-02	10.
20.6	1.390E 01	3.279E 02	4.240E-02	5.
21.1	7.490E 00	2.982E 02	2.512E-02	9.
21.6	3.730E 00	2.718E 02	1.372E-02	9.
22.0	3.130E 00	2.528E 02	1.238E-02	7.
22.5	3.500E 00	2.313E 02	1.513E-02	5.
23.0	5.160E 00	2.121E 02	2.433E-02	5.
23.5	7.340E 00	1.949E 02	3.767E-02	5.
23.9	9.010E 00	1.823E 02	4.942E-02	7.
24.4	9.530E 00	1.680E 02	5.672E-02	5.
24.9	9.390E 00	1.551E 02	6.053E-02	5.
25.3	9.760E 00	1.457E 02	6.699E-02	11.
25.8	8.270E 00	1.349E 02	6.130E-02	5.
26.3	6.840E 00	1.251E 02	5.468E-02	5.
26.8	5.880E 00	1.162E 02	5.061E-02	5.
27.2	4.170E 00	1.096E 02	3.804E-02	5.
27.7	2.940E 00	1.021E 02	2.881E-02	5.
28.2	3.650E 00	9.514E 01	3.836E-02	10.
28.6	1.520E 00	9.003E 01	1.688E-02	5.
29.3	9.620E-01	8.190E 01	1.175E-02	5.
30.0	1.060E 00	7.468E 01	1.419E-02	7.
30.5	1.070E 00	7.001E 01	1.528E-02	12.
31.2	1.350E 00	6.408E 01	2.107E-02	5.
31.9	1.410E 00	5.877E 01	2.399E-02	5.
32.6	1.570E 00	5.400E 01	2.907E-02	5.
33.3	1.300E 00	4.972E 01	2.615E-02	5.
34.0	1.180E 00	4.586E 01	2.573E-02	13.

87.8 MEV 6LI + 25MG ELASTIC (CONTINUED)

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
34.6	8.230E-01	4.285E 01	1.921E-02	13.
35.4	6.600E-01	3.922E 01	1.683E-02	14.
36.0	4.160E-01	3.675E 01	1.132E-02	5.
36.8	3.570E-01	3.376E 01	1.058E-02	21.
37.4	3.150E-01	3.171E 01	9.932E-03	6.
38.2	2.410E-01	2.923E 01	8.245E-03	13.
38.8	2.660E-01	2.753E 01	9.663E-03	6.
39.3	2.460E-01	2.621E 01	9.387E-03	13.
39.9	2.700E-01	2.473E 01	1.092E-02	6.
41.5	2.210E-01	2.127E 01	1.039E-02	7.
42.9	1.630E-01	1.874E 01	8.699E-03	9.
44.3	1.220E-01	1.658E 01	7.357E-03	9.
45.7	7.480E-02	1.474E 01	5.075E-03	11.
47.0	7.480E-02	1.326E 01	5.643E-03	11.
48.4	5.300E-02	1.187E 01	4.466E-03	13.
49.8	4.160E-02	1.066E 01	3.901E-03	15.
51.1	3.040E-02	9.684E 00	3.139E-03	17.
52.5	2.240E-02	8.757E 00	2.558E-03	20.
53.9	1.440E-02	7.943E 00	1.813E-03	24.
55.2	1.600E-02	7.274E 00	2.200E-03	24.
56.5	1.020E-02	6.677E 00	1.528E-03	29.
57.8	1.180E-02	6.143E 00	1.921E-03	27.
59.1	8.900E-03	5.664E 00	1.571E-03	32.

87.8 MEV 6LI + 26MG ELASTIC

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
7.6	5.355E 03	1.711E 04	3.129E-01	5.
8.0	3.051E 03	1.394E 04	2.188E-01	5.
8.5	2.209E 03	1.095E 04	2.018E-01	5.
8.9	1.686E 03	9.110E 03	1.851E-01	5.
9.4	1.655E 03	7.324E 03	2.260E-01	7.
9.8	1.682E 03	6.202E 03	2.713E-01	5.
10.3	1.665E 03	5.085E 03	3.275E-01	5.
10.7	1.545E 03	4.368E 03	3.536E-01	5.
11.2	1.380E 03	3.641E 03	3.791E-01	5.
11.7	1.182E 03	3.059E 03	3.863E-01	9.
12.1	9.148E 02	2.675E 03	3.419E-01	5.
12.6	6.061E 02	2.277E 03	2.662E-01	3.
13.1	4.294E 02	1.950E 03	2.202E-01	9.
13.6	2.498E 02	1.680E 03	1.487E-01	5.
14.0	1.358E 02	1.497E 03	9.077E-02	5.
14.5	6.251E 01	1.302E 03	4.803E-02	9.
15.0	3.980E 01	1.137E 03	3.500E-02	10.
15.4	4.341E 01	1.024E 03	4.238E-02	10.
15.9	6.773E 01	9.022E 02	7.508E-02	18.
16.4	8.407E 01	7.978E 02	1.054E-01	12.
16.8	1.149E 02	7.249E 02	1.586E-01	10.
17.3	1.244E 02	6.453E 02	1.929E-01	9.
17.8	1.092E 02	5.763E 02	1.896E-01	3.
18.3	1.159E 02	5.163E 02	2.245E-01	6.
18.7	9.082E 01	4.739E 02	1.917E-01	7.
19.1	6.403E 01	4.357E 02	1.469E-01	5.
19.6	5.111E 01	3.933E 02	1.299E-01	9.
20.1	2.945E 01	3.560E 02	8.273E-02	5.
20.6	1.719E 01	3.230E 02	5.323E-02	9.
21.0	7.533E 00	2.993E 02	2.517E-02	9.
21.5	2.489E 00	2.727E 02	9.126E-03	3.
22.0	1.121E 00	2.491E 02	4.501E-03	15.
22.4	2.432E 00	2.320E 02	1.048E-02	3.
22.9	5.244E 00	2.126E 02	2.467E-02	5.
23.4	8.132E 00	1.952E 02	4.165E-02	11.
23.8	1.064E 01	1.826E 02	5.827E-02	7.
24.3	1.225E 01	1.682E 02	7.284E-02	5.
24.8	1.244E 01	1.553E 02	8.015E-02	5.
25.2	1.349E 01	1.458E 02	9.253E-02	5.
25.7	1.149E 01	1.349E 02	8.518E-02	5.
26.2	9.595E 00	1.251E 02	7.670E-02	5.
26.6	7.666E 00	1.179E 02	6.504E-02	5.
27.1	5.329E 00	1.096E 02	4.864E-02	5.
27.6	3.439E 00	1.020E 02	3.372E-02	5.
28.0	2.061E 00	9.638E 01	2.139E-02	10.
28.4	1.140E 00	9.117E 01	1.250E-02	7.
28.9	4.968E-01	8.515E 01	5.835E-03	22.
29.4	4.389E-01	7.962E 01	5.512E-03	10.
29.8	5.405E-01	7.552E 01	7.158E-03	9.
30.4	1.044E 00	6.986E 01	1.494E-02	10.

87.8 MEV 6LI + 26MG ELASTIC (CONTINUED)

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
31.0	1.415E 00	6.473E 01	2.187E-02	15.
31.8	1.643E 00	5.861E 01	2.804E-02	9.
32.4	1.771E 00	5.449E 01	3.250E-02	15.
33.1	1.495E 00	5.014E 01	2.982E-02	12.
33.8	1.510E 00	4.623E 01	3.267E-02	9.
34.5	8.863E-01	4.269E 01	2.076E-02	10.
34.9	8.037E-01	4.083E 01	1.969E-02	5.
35.3	7.011E-01	3.906E 01	1.795E-02	5.
35.8	3.505E-01	3.699E 01	9.476E-03	11.
36.2	3.049E-01	3.544E 01	8.605E-03	7.
36.7	2.479E-01	3.361E 01	7.378E-03	12.
37.2	1.985E-01	3.190E 01	6.225E-03	5.
37.6	1.833E-01	3.061E 01	5.990E-03	9.
38.1	2.232E-01	2.909E 01	7.675E-03	8.
38.6	2.707E-01	2.767E 01	9.787E-03	5.
39.0	2.660E-01	2.659E 01	1.000E-02	7.
39.4	3.135E-01	2.557E 01	1.226E-02	12.
40.1	2.907E-01	2.390E 01	1.217E-02	5.
41.0	2.859E-01	2.195E 01	1.303E-02	12.
41.6	2.327E-01	2.076E 01	1.121E-02	16.
42.1	2.593E-01	1.984E 01	1.308E-02	9.
42.7	1.634E-01	1.879E 01	8.695E-03	12.
43.3	1.482E-01	1.782E 01	8.317E-03	11.
44.2	7.885E-02	1.648E 01	4.785E-03	14.
45.1	6.298E-02	1.526E 01	4.126E-03	29.
45.7	5.396E-02	1.452E 01	3.717E-03	10.
46.5	6.336E-02	1.360E 01	4.660E-03	11.
47.1	4.683E-02	1.295E 01	3.615E-03	11.
47.9	4.332E-02	1.216E 01	3.563E-03	24.
48.5	2.707E-02	1.160E 01	2.334E-03	20.
49.2	3.401E-02	1.099E 01	3.094E-03	23.
49.8	2.099E-02	1.051E 01	1.998E-03	19.
51.2	1.938E-02	9.471E 00	2.046E-03	13.
52.0	2.213E-02	8.940E 00	2.476E-03	19.
52.5	1.596E-02	8.627E 00	1.850E-03	11.
53.3	9.215E-03	8.156E 00	1.130E-03	50.
53.8	1.206E-02	7.879E 00	1.531E-03	17.
54.6	4.560E-03	7.461E 00	6.112E-04	46.
55.1	9.500E-03	7.214E 00	1.317E-03	12.
56.5	7.125E-03	6.578E 00	1.083E-03	13.
57.8	7.030E-03	6.052E 00	1.162E-03	13.
59.1	6.840E-03	5.580E 00	1.226E-03	19.
60.4	6.270E-03	5.156E 00	1.216E-03	15.
61.8	5.035E-03	4.747E 00	1.061E-03	17.
63.1	3.990E-03	4.404E 00	9.059E-04	19.
64.4	4.085E-03	4.094E 00	9.977E-04	19.
65.8	2.850E-03	3.793E 00	7.515E-04	23.
67.1	4.940E-03	3.539E 00	1.396E-03	19.
68.4	2.090E-03	3.307E 00	6.319E-04	26.

87.8 MEV 6LI + 26MG INEL Q=-1.91 MEV

THETA	SIGMA	ERROR	THETA	SIGMA	ERROR
3.0	1.140E 01	6.	34.9	6.213E-01	5.
8.4	2.414E 02	5.	35.4	6.232E-01	5.
8.8	7.334E 01	5.	35.9	5.595E-01	8.
9.3	4.750E 01	5.	36.3	6.137E-01	5.
9.8	4.161E 01	5.	36.8	5.595E-01	5.
10.2	2.470E 01	6.	37.3	4.759E-01	5.
10.7	1.957E 01	7.	37.7	4.693E-01	6.
11.2	1.577E 01	7.	38.2	3.942E-01	6.
11.6	1.767E 01	7.	38.7	3.068E-01	7.
12.1	2.470E 01	6.	39.1	3.040E-01	7.
12.6	2.831E 01	6.	39.5	2.156E-01	8.
13.0	3.334E 01	6.	40.2	1.776E-01	5.
13.7	3.648E 01	10.	41.1	1.311E-01	10.
14.7	2.907E 01	5.	41.7	1.425E-01	7.
15.6	1.966E 01	13.	42.2	1.558E-01	10.
16.6	8.873E 00	15.	43.1	1.757E-01	8.
17.5	3.695E 00	9.	43.9	1.833E-01	15.
18.2	3.344E 00	14.	44.5	1.510E-01	6.
18.6	4.702E 00	6.	45.0	1.776E-01	10.
19.1	5.880E 00	5.	45.8	8.787E-02	28.
19.6	8.483E 00	5.	46.6	1.092E-01	10.
20.1	9.500E 00	5.	47.2	7.885E-02	8.
20.5	1.016E 01	5.	48.0	5.605E-02	29.
21.0	1.016E 01	5.	48.6	5.548E-02	7.
21.5	9.595E 00	5.	49.4	4.161E-02	14.
21.9	8.037E 00	5.	49.9	3.952E-02	9.
22.4	6.868E 00	5.	50.7	4.113E-02	14.
22.9	5.310E 00	5.	51.3	4.142E-02	7.
23.3	3.914E 00	5.	52.1	3.553E-02	28.
23.8	2.755E 00	5.	52.6	3.486E-02	12.
24.3	1.482E 00	6.	53.2	2.432E-02	26.
24.7	1.111E 00	7.	53.7	2.745E-02	10.
25.2	1.045E 00	6.	54.0	2.555E-02	14.
25.7	1.064E 00	6.	54.7	1.558E-02	24.
26.2	1.444E 00	6.	55.3	2.261E-02	14.
26.6	1.900E 00	5.	56.6	1.672E-02	25.
27.1	2.232E 00	5.	57.9	1.244E-02	19.
27.6	2.346E 00	5.	59.2	1.140E-02	48.
28.0	2.669E 00	5.	60.6	1.453E-02	15.
28.5	2.650E 00	5.	61.9	1.206E-02	17.
29.0	2.118E 00	5.	63.3	1.216E-02	16.
29.4	2.185E 00	5.	64.6	6.080E-03	23.
29.9	1.852E 00	9.	65.9	7.790E-03	21.
30.6	1.320E 00	8.	67.2	7.505E-03	21.
31.3	8.331E-01	7.	68.6	8.550E-03	20.
32.0	4.512E-01	13.	69.9	7.030E-03	21.
32.7	3.638E-01	11.	71.2	7.125E-03	21.
33.3	4.056E-01	6.	72.4	4.750E-03	27.
34.0	4.389E-01	12.	73.7	5.890E-03	24.
34.5	4.883E-01	6.	75.0	2.945E-03	34.
			76.2	2.755E-03	36.

87.8 MEV 6LI + 27AL ELASTIC

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
8.3	1.456E 03	1.393E 04	1.045E-01	5.
8.8	2.238E 03	1.103E 04	2.029E-01	5.
9.4	1.978E 03	8.477E 03	2.333E-01	10.
10.4	1.809E 03	5.663E 03	3.194E-01	5.
11.3	1.405E 03	4.067E 03	3.455E-01	5.
12.4	7.115E 02	2.809E 03	2.533E-01	5.
12.9	4.778E 02	2.399E 03	1.992E-01	5.
13.4	3.011E 02	2.062E 03	1.460E-01	5.
13.8	1.681E 02	1.834E 03	9.167E-02	5.
14.3	8.873E 01	1.592E 03	5.573E-02	5.
14.8	5.994E 01	1.389E 03	4.317E-02	5.
15.2	6.061E 01	1.249E 03	4.853E-02	5.
15.7	7.562E 01	1.098E 03	6.887E-02	5.
16.2	1.007E 02	9.694E 02	1.039E-01	5.
16.6	1.235E 02	8.799E 02	1.404E-01	5.
17.3	1.301E 02	7.468E 02	1.743E-01	5.
18.0	1.140E 02	6.380E 02	1.787E-01	10.
18.5	9.025E 01	5.723E 02	1.577E-01	10.
18.9	7.125E 01	5.258E 02	1.355E-01	10.
19.4	5.225E 01	4.741E 02	1.102E-01	10.
19.9	3.325E 01	4.287E 02	7.757E-02	10.
20.3	1.757E 01	3.962E 02	4.436E-02	10.
20.8	7.866E 00	3.598E 02	2.186E-02	13.
21.3	3.857E 00	3.276E 02	1.178E-02	15.
21.7	2.983E 00	3.043E 02	9.802E-03	7.
22.1	4.712E 00	2.831E 02	1.664E-02	5.
22.7	6.954E 00	2.547E 02	2.730E-02	5.
23.1	1.035E 01	2.377E 02	4.355E-02	5.
23.6	1.254E 01	2.185E 02	5.739E-02	8.
24.1	1.349E 01	2.012E 02	6.706E-02	5.
24.5	1.444E 01	1.885E 02	7.659E-02	5.
25.0	1.358E 01	1.741E 02	7.803E-02	5.
25.5	1.140E 01	1.611E 02	7.078E-02	5.
26.0	9.424E 00	1.492E 02	6.316E-02	9.
26.4	7.315E 00	1.405E 02	5.205E-02	5.
26.8	4.873E 00	1.325E 02	3.679E-02	5.
27.3	3.372E 00	1.232E 02	2.738E-02	5.
27.8	2.080E 00	1.147E 02	1.813E-02	5.
28.2	1.358E 00	1.085E 02	1.252E-02	9.
28.7	8.417E-01	1.013E 02	8.312E-03	9.
29.2	9.595E-01	9.464E 01	1.014E-02	7.
29.6	9.690E-01	8.974E 01	1.080E-02	7.
30.3	1.510E 00	8.190E 01	1.844E-02	11.
31.0	1.881E 00	7.492E 01	2.511E-02	5.
31.7	1.890E 00	6.867E 01	2.753E-02	5.
32.4	1.947E 00	6.307E 01	3.088E-02	5.
33.0	1.605E 00	5.872E 01	2.734E-02	7.
33.9	9.690E-01	5.289E 01	1.832E-02	7.

87.8 MEV 6LI + 27AL ELASTIC (CONTINUED)

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
34.3	8.417E-01	5.054E 01	1.665E-02	13.
34.6	7.258E-01	4.886E 01	1.485E-02	9.
35.1	5.861E-01	4.622E 01	1.268E-02	5.
35.6	4.066E-01	4.375E 01	9.293E-03	5.
36.0	3.344E-01	4.190E 01	7.980E-03	5.
36.4	2.840E-01	4.015E 01	7.075E-03	8.
37.0	2.907E-01	3.769E 01	7.712E-03	14.
37.4	2.555E-01	3.616E 01	7.067E-03	8.
37.8	2.603E-01	3.471E 01	7.500E-03	8.
38.3	3.068E-01	3.300E 01	9.300E-03	12.
38.7	2.983E-01	3.170E 01	9.410E-03	9.
39.2	2.955E-01	3.018E 01	9.794E-03	20.
39.8	3.277E-01	2.847E 01	1.151E-02	5.
40.7	2.969E-01	2.613E 01	1.098E-02	7.
41.3	2.527E-01	2.470E 01	1.023E-02	8.
42.1	2.004E-01	2.296E 01	8.732E-03	8.
42.7	1.586E-01	2.175E 01	7.294E-03	5.
43.5	1.273E-01	2.026E 01	6.282E-03	19.
44.2	1.026E-01	1.907E 01	5.380E-03	7.
45.2	7.619E-02	1.752E 01	4.349E-03	8.
45.9	6.773E-02	1.653E 01	4.098E-03	7.
46.3	7.609E-02	1.599E 01	4.757E-03	5.
46.8	6.849E-02	1.536E 01	4.460E-03	12.
47.5	5.842E-02	1.452E 01	4.023E-03	11.
48.2	5.586E-02	1.374E 01	4.064E-03	9.
49.1	4.740E-02	1.282E 01	3.697E-03	6.
49.5	5.244E-02	1.244E 01	4.216E-03	9.
50.2	3.990E-02	1.180E 01	3.381E-03	5.
51.0	3.762E-02	1.112E 01	3.382E-03	6.
51.6	2.508E-02	1.065E 01	2.355E-03	8.
52.1	2.717E-02	1.027E 01	2.645E-03	13.
52.9	2.033E-02	9.707E 00	2.094E-03	20.
53.6	1.491E-02	9.245E 00	1.613E-03	18.
54.3	1.254E-02	8.812E 00	1.423E-03	63.
54.7	2.147E-02	8.576E 00	2.503E-03	8.
55.5	2.099E-02	8.129E 00	2.583E-03	9.
56.3	2.394E-02	7.713E 00	3.104E-03	14.
57.4	1.548E-02	7.184E 00	2.155E-03	22.
58.2	1.643E-02	6.830E 00	2.406E-03	13.
59.9	1.311E-02	6.150E 00	2.132E-03	18.
60.0	1.311E-02	6.113E 00	2.144E-03	11.
60.8	6.650E-03	5.827E 00	1.141E-03	14.
61.7	6.935E-03	5.526E 00	1.255E-03	24.
62.6	7.125E-03	5.245E 00	1.358E-03	13.
63.4	4.655E-03	5.011E 00	9.289E-04	33.
64.5	4.085E-03	4.712E 00	8.668E-04	20.

88.0 MEV 6LI + 40CA ELASTIC

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
12.3	7.535E 02	6.051E 03	1.245E-01	5.
12.9	5.835E 02	5.005E 03	1.166E-01	5.
13.3	5.455E 02	4.432E 03	1.231E-01	5.
13.7	5.560E 02	3.939E 03	1.412E-01	5.
14.1	5.481E 02	3.512E 03	1.561E-01	5.
14.6	5.145E 02	3.058E 03	1.683E-01	5.
15.0	4.658E 02	2.746E 03	1.696E-01	5.
15.5	3.907E 02	2.410E 03	1.621E-01	5.
15.9	3.117E 02	2.178E 03	1.431E-01	5.
16.4	2.257E 02	1.926E 03	1.172E-01	5.
16.8	1.525E 02	1.750E 03	8.713E-02	5.
17.2	1.016E 02	1.594E 03	6.375E-02	5.
17.7	6.057E 01	1.423E 03	4.258E-02	5.
18.1	3.921E 01	1.302E 03	3.011E-02	5.
18.6	3.560E 01	1.169E 03	3.047E-02	5.
19.0	3.882E 01	1.074E 03	3.614E-02	5.
19.4	4.449E 01	9.890E 02	4.499E-02	5.
19.9	5.222E 01	8.941E 02	5.840E-02	5.
20.3	5.960E 01	8.264E 02	7.212E-02	5.
20.8	5.750E 01	7.505E 02	7.661E-02	5.
21.2	5.133E 01	6.961E 02	7.374E-02	5.
21.6	4.832E 01	6.465E 02	7.474E-02	5.
22.1	3.762E 01	5.906E 02	6.371E-02	5.
22.5	2.658E 01	5.502E 02	4.830E-02	5.
23.0	1.681E 01	5.045E 02	3.332E-02	5.
23.5	9.571E 00	4.634E 02	2.065E-02	5.
23.9	4.787E 00	4.336E 02	1.104E-02	5.
24.4	2.142E 00	3.996E 02	5.361E-03	5.
24.8	2.622E 00	3.748E 02	6.996E-03	5.
25.2	4.039E 00	3.520E 02	1.148E-02	5.
25.7	5.577E 00	3.258E 02	1.712E-02	5.
26.1	7.085E 00	3.066E 02	2.311E-02	5.
26.5	7.559E 00	2.888E 02	2.617E-02	5.
27.0	8.131E 00	2.684E 02	3.030E-02	5.
27.4	7.504E 00	2.533E 02	2.962E-02	5.
27.9	6.720E 00	2.360E 02	2.848E-02	5.
28.3	5.340E 00	2.232E 02	2.393E-02	5.
28.7	3.887E 00	2.112E 02	1.840E-02	5.
29.2	3.306E 00	1.974E 02	1.674E-02	5.
29.6	1.424E 00	1.872E 02	7.607E-03	5.
30.0	8.174E-01	1.776E 02	4.602E-03	5.
30.5	4.094E-01	1.665E 02	2.459E-03	5.
30.9	3.028E-01	1.582E 02	1.913E-03	5.
31.3	4.258E-01	1.505E 02	2.829E-03	5.
31.8	7.368E-01	1.415E 02	5.207E-03	5.
32.2	1.127E 00	1.348E 02	8.365E-03	5.
32.6	1.346E 00	1.284E 02	1.048E-02	5.
33.1	1.879E 00	1.211E 02	1.552E-02	5.
33.5	1.644E 00	1.155E 02	1.423E-02	5.
33.9	1.354E 00	1.103E 02	1.228E-02	5.

98.0 MEV 6LI + 40CA ELASTIC (CONTINUED)

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
34.4	1.227E 00	1.042E 02	1.177E-02	5.
34.8	1.128E 00	9.966E 01	1.131E-02	5.
35.3	6.555E-01	9.431E 01	6.951E-03	5.
35.7	5.926E-01	9.028E 01	6.564E-03	5.
36.1	3.818E-01	8.647E 01	4.416E-03	5.
36.6	3.163E-01	8.199E 01	3.858E-03	5.
37.0	2.543E-01	7.862E 01	3.235E-03	5.
37.4	1.720E-01	7.543E 01	2.280E-03	5.
37.9	2.392E-01	7.166E 01	3.338E-03	5.
38.3	2.326E-01	6.882E 01	3.380E-03	5.
38.7	2.589E-01	6.613E 01	4.067E-03	5.
39.2	3.434E-01	6.294E 01	5.455E-03	5.
39.6	4.118E-01	6.053E 01	6.803E-03	5.
40.0	3.360E-01	5.824E 01	5.770E-03	5.
40.5	3.449E-01	5.554E 01	6.211E-03	5.
40.9	3.440E-01	5.348E 01	6.431E-03	5.
41.8	2.334E-01	4.921E 01	4.742E-03	5.
42.2	2.359E-01	4.745E 01	4.972E-03	5.
42.5	7.986E-02	4.619E 01	1.729E-03	5.
43.0	6.608E-02	4.417E 01	1.496E-03	5.
43.4	3.803E-02	4.264E 01	8.917E-04	5.
43.7	2.783E-02	4.154E 01	6.700E-04	7.
44.4	1.594E-02	3.910E 01	4.077E-04	7.
45.2	1.331E-02	3.654E 01	3.643E-04	7.
46.1	1.497E-02	3.391E 01	4.414E-04	7.
46.9	1.982E-02	3.178E 01	6.236E-04	5.
47.8	2.140E-02	2.958E 01	7.234E-04	5.
48.6	2.021E-02	2.779E 01	7.271E-04	5.
49.5	1.515E-02	2.594E 01	5.841E-04	7.
50.3	1.155E-02	2.443E 01	4.726E-04	7.
51.2	9.025E-03	2.287E 01	3.947E-04	9.
52.1	9.269E-03	2.143E 01	4.326E-04	9.
52.9	8.282E-03	2.025E 01	4.090E-04	9.
53.8	1.145E-02	1.902E 01	6.019E-04	9.
54.6	1.283E-02	1.801E 01	7.121E-04	7.
55.5	1.104E-02	1.696E 01	6.508E-04	9.
56.3	1.060E-02	1.609E 01	6.587E-04	9.
57.1	9.622E-03	1.528E 01	6.299E-04	9.
58.2	8.258E-03	1.425E 01	5.797E-04	10.
59.1	7.016E-03	1.347E 01	5.208E-04	10.
60.2	6.614E-03	1.260E 01	5.249E-04	11.
61.2	4.567E-03	1.187E 01	3.848E-04	13.
62.1	5.956E-03	1.126E 01	5.289E-04	11.
64.2	2.278E-03	9.995E 00	2.279E-04	17.
67.3	3.374E-03	8.454E 00	3.991E-04	15.
70.4	1.803E-03	7.219E 00	2.497E-04	19.

88.0 MEV 6LI + 44CA ELASTIC

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
12.3	4.515E 02	5.908E 03	7.643E-02	5.
12.7	5.064E 02	5.201E 03	9.738E-02	5.
13.1	4.501E 02	4.596E 03	9.791E-02	5.
13.6	4.911E 02	3.959E 03	1.240E-01	5.
14.0	4.665E 02	3.528E 03	1.322E-01	5.
14.4	4.296E 02	3.154E 03	1.362E-01	5.
14.9	3.801E 02	2.753E 03	1.381E-01	5.
15.3	3.040E 02	2.478E 03	1.227E-01	5.
15.7	2.373E 02	2.236E 03	1.061E-01	5.
16.2	1.558E 02	1.974E 03	7.890E-02	5.
16.6	1.043E 02	1.792E 03	5.818E-02	5.
17.0	6.190E 01	1.630E 03	3.797E-02	5.
17.5	4.345E 01	1.453E 03	2.990E-02	5.
18.0	3.140E 01	1.299E 03	2.416E-02	5.
18.4	3.280E 01	1.191E 03	2.754E-02	5.
18.8	3.924E 01	1.094E 03	3.588E-02	5.
19.3	4.557E 01	9.856E 02	4.623E-02	5.
19.7	5.069E 01	9.087E 02	5.579E-02	5.
20.2	5.055E 01	8.228E 02	6.143E-02	5.
20.6	4.460E 01	7.643E 02	5.836E-02	5.
21.0	3.930E 01	7.056E 02	5.570E-02	5.
21.5	3.222E 01	6.429E 02	5.011E-02	5.
21.9	2.342E 01	5.978E 02	3.918E-02	5.
22.3	1.442E 01	5.565E 02	2.591E-02	5.
22.8	9.253E 00	5.099E 02	1.815E-02	5.
23.2	4.870E 00	4.760E 02	1.023E-02	6.
23.6	2.905E 00	4.450E 02	6.528E-03	7.
24.1	2.102E 00	4.097E 02	5.131E-03	5.
24.5	3.256E 00	3.840E 02	8.479E-03	5.
24.9	4.649E 00	3.603E 02	1.291E-02	5.
25.4	5.719E 00	3.331E 02	1.717E-02	5.
25.8	6.589E 00	3.133E 02	2.103E-02	5.
26.2	6.690E 00	2.949E 02	2.269E-02	5.
26.7	6.209E 00	2.738E 02	2.268E-02	5.
27.1	5.185E 00	2.583E 02	2.008E-02	5.
27.5	4.015E 00	2.438E 02	1.646E-02	5.
28.0	3.002E 00	2.272E 02	1.321E-02	5.
28.4	1.872E 00	2.149E 02	8.711E-03	5.
28.8	1.142E 00	2.035E 02	5.614E-03	5.
29.2	4.164E-01	1.928E 02	2.160E-03	5.
29.7	2.190E-01	1.804E 02	1.214E-03	6.
30.1	1.494E-01	1.712E 02	8.730E-04	6.
30.5	2.994E-01	1.626E 02	1.841E-03	5.
31.0	5.264E-01	1.526E 02	3.450E-03	5.
31.4	7.681E-01	1.451E 02	5.292E-03	5.
31.8	9.042E-01	1.382E 02	6.545E-03	5.
32.3	1.104E 00	1.300E 02	8.496E-03	5.
32.7	1.134E 00	1.239E 02	9.153E-03	5.
33.1	1.144E 00	1.182E 02	9.676E-03	5.
33.6	8.987E-01	1.115E 02	8.033E-03	5.

88.0 MEV 6LI + 44CA ELASTIC (CONTINUED)

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
34.0	7.248E-01	1.065E 02	6.806E-03	5.
34.4	5.476E-01	1.018E 02	5.381E-03	5.
34.9	3.844E-01	9.624E 01	3.994E-03	5.
35.3	2.698E-01	9.208E 01	2.930E-03	5.
35.7	1.412E-01	8.815E 01	1.601E-03	7.
36.2	8.760E-02	8.353E 01	1.049E-03	8.
36.5	8.643E-02	8.091E 01	1.068E-03	9.
37.0	9.720E-02	7.677E 01	1.266E-03	8.
37.4	1.356E-01	7.365E 01	1.841E-03	7.
37.9	1.686E-01	6.997E 01	2.409E-03	7.
38.3	1.799E-01	6.720E 01	2.677E-03	6.
38.7	2.296E-01	6.457E 01	3.556E-03	6.
39.2	2.328E-01	6.146E 01	3.787E-03	6.
39.6	2.241E-01	5.911E 01	3.792E-03	6.
40.0	2.035E-01	5.687E 01	3.579E-03	6.
40.4	1.823E-01	5.474E 01	3.331E-03	6.
40.9	1.340E-01	5.222E 01	2.566E-03	7.
41.3	1.007E-01	5.031E 01	2.002E-03	8.
41.7	9.360E-02	4.849E 01	1.930E-03	8.
42.0	4.835E-02	4.718E 01	1.025E-03	5.
42.5	2.923E-02	4.510E 01	6.482E-04	6.
42.9	2.758E-02	4.352E 01	6.337E-04	7.
43.3	2.512E-02	4.200E 01	5.979E-04	7.
43.6	2.013E-02	4.091E 01	4.921E-04	7.
44.3	2.250E-02	3.851E 01	5.842E-04	6.
45.1	3.419E-02	3.598E 01	9.502E-04	5.
46.0	3.761E-02	3.339E 01	1.127E-03	3.
46.8	3.285E-02	3.128E 01	1.050E-03	5.
47.7	2.501E-02	2.911E 01	8.589E-04	5.
48.5	1.900E-02	2.735E 01	6.948E-04	6.
49.4	1.237E-02	2.552E 01	4.848E-04	7.
50.2	8.253E-03	2.403E 01	3.434E-04	8.
51.1	1.193E-02	2.249E 01	5.304E-04	7.
51.9	1.463E-02	2.122E 01	6.892E-04	7.
52.8	1.521E-02	1.991E 01	7.641E-04	6.
53.5	1.407E-02	1.896E 01	7.419E-04	6.
54.5	1.531E-02	1.771E 01	8.647E-04	6.
55.3	1.242E-02	1.678E 01	7.404E-04	7.
56.1	8.517E-03	1.592E 01	5.352E-04	8.
56.9	1.148E-02	1.511E 01	7.599E-04	7.
57.5	9.062E-03	1.454E 01	6.233E-04	9.
58.5	9.840E-03	1.365E 01	7.208E-04	9.
59.6	7.234E-03	1.276E 01	5.670E-04	10.
60.5	7.789E-03	1.208E 01	6.447E-04	10.
62.6	1.905E-03	1.068E 01	1.783E-04	18.
65.6	1.980E-03	9.037E 00	2.191E-04	18.
68.7	8.039E-04	7.677E 00	1.047E-04	25.

87.9 MEV 6LI + 44CA INEL Q=-1.16MEV

THETA	SIGMA	ERROR	THETA	SIGMA	ERROR
19.7	1.255E 00	10.	41.3	1.072E-01	9.
20.2	1.255E 00	10.	41.6	1.255E-01	5.
20.6	1.135E 00	10.	42.0	1.203E-01	5.
21.0	1.522E 00	8.	42.4	9.939E-02	5.
21.5	2.399E 00	8.	42.8	7.759E-02	5.
21.9	3.082E 00	6.	43.3	6.236E-02	5.
22.4	2.899E 00	6.	43.7	4.226E-02	5.
22.8	4.019E 00	6.	44.1	3.873E-02	5.
23.2	3.849E 00	6.	44.5	3.142E-02	5.
23.7	3.069E 00	6.	45.0	2.655E-02	6.
24.1	2.436E 00	7.	45.4	2.326E-02	6.
24.5	2.010E 00	8.	45.8	2.692E-02	6.
25.0	1.102E 00	11.	46.2	3.155E-02	5.
25.4	9.683E-01	11.	46.6	3.264E-02	5.
25.8	4.470E-01	16.	47.1	3.349E-02	5.
26.3	1.888E-01	25.	47.5	3.216E-02	6.
26.7	3.216E-01	19.	47.9	3.581E-02	5.
27.1	4.019E-01	16.	48.3	3.885E-02	5.
27.6	5.384E-01	15.	48.8	3.301E-02	5.
28.0	9.196E-01	12.	49.2	3.021E-02	5.
28.4	1.050E 00	10.	49.6	3.167E-02	5.
28.9	1.095E 00	10.	50.0	1.937E-02	6.
29.3	8.234E-01	12.	50.5	2.424E-02	6.
29.7	1.010E 00	11.	50.9	1.985E-02	7.
30.2	6.955E-01	13.	51.3	2.631E-02	6.
30.6	5.274E-01	15.	51.7	1.778E-02	7.
31.0	3.483E-01	19.	52.2	1.583E-02	8.
31.4	4.092E-01	17.	52.6	1.242E-02	8.
31.9	2.765E-01	21.	53.0	1.413E-02	8.
32.3	1.851E-01	7.	53.4	2.010E-02	7.
32.7	1.559E-01	6.	53.9	1.656E-02	7.
33.1	1.620E-01	6.	54.3	2.168E-02	7.
33.6	1.778E-01	5.	54.7	1.462E-02	8.
34.0	1.888E-01	5.	55.1	2.058E-02	7.
34.4	2.339E-01	5.	55.5	2.156E-02	7.
34.8	2.314E-01	5.	56.0	1.827E-02	7.
35.3	2.071E-01	5.	56.4	1.924E-02	7.
35.7	1.851E-01	5.	56.8	2.010E-02	7.
36.2	1.498E-01	5.	57.2	1.632E-02	7.
36.6	1.291E-01	6.	57.6	1.462E-02	8.
37.0	1.303E-01	6.	58.1	1.717E-02	7.
37.4	1.230E-01	7.	58.5	1.474E-02	8.
37.9	7.673E-02	8.	58.9	1.315E-02	8.
38.3	7.064E-02	8.	59.3	7.430E-03	11.
38.7	5.237E-02	10.	59.7	1.206E-02	9.
39.2	6.455E-02	9.	60.1	9.744E-03	9.
39.6	6.455E-02	9.	60.5	8.526E-03	10.
40.0	8.891E-02	10.	60.9	1.267E-02	9.
40.4	9.135E-02	10.	61.3	1.181E-02	8.
40.9	9.988E-02	9.			

87.8 MEV 6LI + 59CO ELASTIC

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
7.9	3.353E 04	5.947E 04	5.638E-01	5.
8.3	2.611E 04	4.883E 04	5.347E-01	5.
8.7	2.164E 04	4.046E 04	5.348E-01	5.
9.1	1.693E 04	3.381E 04	5.007E-01	5.
9.5	1.385E 04	2.848E 04	4.862E-01	5.
10.0	1.043E 04	2.321E 04	4.492E-01	5.
10.4	7.659E 03	1.985E 04	3.859E-01	5.
10.8	5.728E 03	1.707E 04	3.355E-01	5.
11.2	4.091E 03	1.477E 04	2.770E-01	5.
11.6	3.102E 03	1.284E 04	2.416E-01	5.
12.1	2.414E 03	1.085E 04	2.225E-01	5.
12.5	2.057E 03	9.534E 03	2.158E-01	5.
12.9	1.656E 03	8.409E 03	1.970E-01	5.
13.3	1.479E 03	7.446E 03	1.986E-01	5.
13.7	1.359E 03	6.618E 03	2.053E-01	5.
14.2	1.157E 03	5.738E 03	2.016E-01	5.
14.6	9.914E 02	5.137E 03	1.930E-01	5.
15.0	8.017E 02	4.614E 03	1.738E-01	5.
15.4	6.101E 02	4.155E 03	1.468E-01	5.
15.9	4.548E 02	3.660E 03	1.243E-01	5.
16.3	3.348E 02	3.316E 03	1.010E-01	5.
16.7	2.251E 02	3.011E 03	7.474E-02	5.
17.1	1.739E 02	2.741E 03	6.345E-02	5.
17.5	1.525E 02	2.501E 03	6.099E-02	5.
17.9	1.339E 02	2.286E 03	5.858E-02	5.
18.3	1.274E 02	2.094E 03	6.084E-02	5.
18.7	1.283E 02	1.922E 03	6.677E-02	5.
19.2	1.181E 02	1.731E 03	6.822E-02	5.
19.6	1.135E 02	1.596E 03	7.111E-02	5.
20.0	9.188E 01	1.473E 03	6.239E-02	5.
20.4	7.449E 01	1.362E 03	5.470E-02	5.
21.2	4.334E 01	1.170E 03	3.705E-02	5.
21.7	2.985E 01	1.067E 03	2.799E-02	5.
22.1	2.083E 01	9.923E 02	2.099E-02	5.
22.5	1.637E 01	9.245E 02	1.771E-02	5.
22.9	1.404E 01	8.623E 02	1.628E-02	5.
23.4	1.348E 01	7.919E 02	1.703E-02	5.
23.8	1.423E 01	7.407E 02	1.921E-02	5.
24.2	1.479E 01	6.936E 02	2.132E-02	5.
24.6	1.479E 01	6.502E 02	2.274E-02	5.
25.0	1.525E 01	6.102E 02	2.499E-02	5.
25.5	1.423E 01	5.645E 02	2.521E-02	5.
25.9	1.032E 01	5.310E 02	1.944E-02	5.
26.3	9.170E 00	4.999E 02	1.834E-02	5.
26.7	6.566E 00	4.711E 02	1.394E-02	5.
27.1	4.241E 00	4.444E 02	9.542E-03	5.
27.6	3.153E 00	4.137E 02	7.622E-03	5.
28.0	2.130E 00	3.910E 02	5.447E-03	5.
28.5	1.358E 00	3.648E 02	3.722E-03	5.
28.8	1.265E 00	3.501E 02	3.613E-03	5.
29.3	1.553E 00	3.273E 02	4.745E-03	5.
29.8	1.767E 00	3.063E 02	5.768E-03	5.
30.1	1.981E 00	2.946E 02	6.725E-03	5.
30.5	2.027E 00	2.798E 02	7.247E-03	5.

87.8 MEV 6LI + 59CO ELASTIC (CONTINUED)

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
30.9	1.776E 00	2.659E 02	6.680E-03	5.
31.3	1.758E 00	2.529E 02	6.951E-03	5.
31.7	1.432E 00	2.407E 02	5.951E-03	5.
32.2	1.014E 00	2.264E 02	4.477E-03	5.
32.5	7.970E-01	2.184E 02	3.649E-03	5.
32.9	5.245E-01	2.083E 02	2.519E-03	5.
33.5	3.134E-01	1.941E 02	1.614E-03	5.
33.8	2.260E-01	1.875E 02	1.205E-03	8.
34.2	1.516E-01	1.791E 02	8.462E-04	9.
34.7	1.739E-01	1.693E 02	1.027E-03	5.
35.0	1.934E-01	1.638E 02	1.181E-03	9.
35.4	2.818E-01	1.567E 02	1.798E-03	7.
35.8	2.929E-01	1.501E 02	1.952E-03	7.
36.2	2.855E-01	1.437E 02	1.986E-03	5.
36.7	3.060E-01	1.363E 02	2.244E-03	7.
37.1	2.995E-01	1.307E 02	2.291E-03	7.
37.5	2.734E-01	1.254E 02	2.180E-03	8.
37.9	2.278E-01	1.204E 02	1.892E-03	8.
38.3	1.534E-01	1.156E 02	1.327E-03	10.
38.8	1.534E-01	1.100E 02	1.395E-03	10.
39.2	8.026E-02	1.058E 02	7.589E-04	15.
39.6	6.454E-02	1.017E 02	6.346E-04	15.
39.9	4.845E-02	9.881E 01	4.904E-04	11.
40.4	3.115E-02	9.420E 01	3.307E-04	23.
40.8	3.980E-02	9.071E 01	4.388E-04	20.
41.2	4.278E-02	8.739E 01	4.896E-04	12.
41.7	3.227E-02	8.345E 01	3.867E-04	22.
42.1	4.929E-02	8.046E 01	6.126E-04	17.
42.4	6.082E-02	7.831E 01	7.767E-04	10.
42.9	4.362E-02	7.488E 01	5.825E-04	19.
43.4	5.980E-02	7.165E 01	8.346E-04	15.
43.7	4.650E-02	6.980E 01	6.662E-04	11.
44.2	6.305E-02	6.684E 01	9.433E-04	15.
44.6	3.413E-02	6.459E 01	5.284E-04	20.
44.9	1.600E-02	6.297E 01	2.540E-04	11.
45.4	2.604E-02	6.038E 01	4.313E-04	25.
45.8	1.386E-02	5.841E 01	2.372E-04	32.
46.1	1.023E-02	5.698E 01	1.795E-04	13.
47.3	7.161E-03	5.171E 01	1.385E-04	15.
47.9	5.859E-03	4.932E 01	1.188E-04	15.
48.5	9.579E-03	4.706E 01	2.035E-04	14.
49.8	8.463E-03	4.261E 01	1.986E-04	17.
51.0	4.650E-03	3.898E 01	1.193E-04	22.
52.2	1.581E-03	3.575E 01	4.423E-05	37.
53.4	1.953E-03	3.286E 01	5.944E-05	38.
54.7	2.232E-03	3.006E 01	7.425E-05	35.
55.9	2.046E-03	2.775E 01	7.373E-05	38.
57.2	1.395E-03	2.550E 01	5.470E-05	45.
58.4	2.046E-03	2.364E 01	8.655E-05	38.
59.6	1.488E-03	2.195E 01	6.778E-05	45.
60.9	1.209E-03	2.030E 01	5.955E-05	50.
63.3	8.370E-04	1.766E 01	4.739E-05	60.
65.8	9.300E-04	1.538E 01	6.045E-05	58.
68.1	5.580E-04	1.362E 01	4.095E-05	71.

87.8 MEV 6LI + 60NI ELASTIC

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
7.9	3.637E 04	6.376E 04	5.705E-01	5.
8.3	2.944E 04	5.235E 04	5.624E-01	5.
8.7	2.413E 04	4.338E 04	5.562E-01	5.
9.1	1.838E 04	3.625E 04	5.070E-01	5.
9.5	1.483E 04	3.053E 04	4.856E-01	5.
9.9	1.151E 04	2.590E 04	4.446E-01	5.
10.4	8.340E 03	2.128E 04	3.919E-01	5.
10.8	6.305E 03	1.831E 04	3.444E-01	5.
11.2	4.486E 03	1.583E 04	2.833E-01	5.
11.6	3.506E 03	1.377E 04	2.547E-01	5.
12.0	2.575E 03	1.203E 04	2.141E-01	5.
12.5	2.184E 03	1.022E 04	2.137E-01	5.
12.9	1.834E 03	9.016E 03	2.035E-01	5.
13.3	1.635E 03	7.983E 03	2.048E-01	5.
13.7	1.452E 03	7.095E 03	2.046E-01	5.
14.1	1.275E 03	6.327E 03	2.015E-01	5.
14.6	1.024E 03	5.508E 03	1.859E-01	5.
15.0	8.559E 02	4.946E 03	1.730E-01	5.
15.4	6.612E 02	4.455E 03	1.484E-01	5.
15.8	4.655E 02	4.023E 03	1.157E-01	5.
16.3	3.790E 02	3.555E 03	1.066E-01	5.
16.7	2.660E 02	3.228E 03	8.239E-02	5.
17.1	1.824E 02	2.939E 03	6.207E-02	5.
17.5	1.795E 02	2.681E 03	6.697E-02	5.
17.9	1.605E 02	2.451E 03	6.550E-02	5.
18.4	1.624E 02	2.197E 03	7.393E-02	5.
18.8	1.491E 02	2.018E 03	7.392E-02	5.
19.2	1.444E 02	1.856E 03	7.779E-02	5.
19.6	1.235E 02	1.711E 03	7.220E-02	5.
20.1	9.880E 01	1.548E 03	6.382E-02	5.
20.5	8.350E 01	1.432E 03	5.831E-02	7.
20.9	7.649E 01	1.327E 03	5.766E-02	7.
21.3	4.503E 01	1.231E 03	3.659E-02	9.
21.7	3.144E 01	1.144E 03	2.750E-02	10.
22.2	2.489E 01	1.045E 03	2.382E-02	12.
22.6	2.261E 01	9.740E 02	2.321E-02	13.
23.4	1.919E 01	8.490E 02	2.260E-02	13.
23.8	1.995E 01	7.941E 02	2.512E-02	13.
24.2	1.719E 01	7.436E 02	2.312E-02	10.
24.6	1.662E 01	6.971E 02	2.385E-02	12.
25.0	1.586E 01	6.542E 02	2.425E-02	12.
25.5	1.377E 01	6.052E 02	2.276E-02	15.
25.9	9.595E 00	5.693E 02	1.686E-02	15.
26.3	7.372E 00	5.360E 02	1.375E-02	15.
26.7	5.082E 00	5.051E 02	1.006E-02	15.
27.1	3.078E 00	4.765E 02	6.460E-03	5.
27.5	2.147E 00	4.499E 02	4.773E-03	5.
27.9	1.491E 00	4.251E 02	3.509E-03	7.
28.5	1.491E 00	3.911E 02	3.814E-03	5.
28.8	1.634E 00	3.754E 02	4.353E-03	7.
29.2	2.128E 00	3.556E 02	5.984E-03	5.
29.7	2.251E 00	3.328E 02	6.766E-03	5.
30.1	2.584E 00	3.158E 02	8.182E-03	5.
30.5	2.194E 00	3.000E 02	7.316E-03	5.
30.9	1.672E 00	2.851E 02	5.865E-03	5.

87.8 MEV 6LI + 60NI ELASTIC (CONTINUED)

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
31.3	1.909E 00	2.711E 02	7.043E-03	5.
31.7	1.491E 00	2.580E 02	5.780E-03	5.
32.2	8.084E-01	2.428E 02	3.330E-03	5.
32.5	6.602E-01	2.342E 02	2.820E-03	5.
32.9	3.876E-01	2.233E 02	1.736E-03	5.
33.3	1.976E-01	2.130E 02	9.276E-04	7.
33.7	1.273E-01	2.034E 02	6.260E-04	7.
34.2	1.083E-01	1.921E 02	5.639E-04	10.
34.6	1.548E-01	1.836E 02	8.434E-04	9.
34.8	2.318E-01	1.795E 02	1.291E-03	7.
35.0	2.270E-01	1.756E 02	1.293E-03	7.
35.4	3.239E-01	1.680E 02	1.928E-03	5.
35.8	3.866E-01	1.609E 02	2.403E-03	5.
36.1	3.562E-01	1.558E 02	2.287E-03	5.
36.6	3.914E-01	1.477E 02	2.650E-03	6.
37.0	3.420E-01	1.416E 02	2.415E-03	7.
37.4	2.593E-01	1.359E 02	1.909E-03	5.
37.9	2.137E-01	1.291E 02	1.656E-03	8.
38.3	1.311E-01	1.240E 02	1.057E-03	10.
38.6	8.037E-02	1.203E 02	6.680E-04	9.
39.1	4.721E-02	1.145E 02	4.123E-04	15.
39.5	1.900E-02	1.101E 02	1.725E-04	24.
39.9	9.025E-03	1.059E 02	8.519E-05	24.
40.4	2.584E-02	1.010E 02	2.559E-04	21.
40.8	2.650E-02	9.726E 01	2.725E-04	21.
41.1	3.363E-02	9.457E 01	3.556E-04	13.
41.6	5.529E-02	9.029E 01	6.124E-04	15.
42.0	6.811E-02	8.705E 01	7.825E-04	13.
42.4	6.764E-02	8.396E 01	8.057E-04	9.
42.9	6.517E-02	8.028E 01	8.117E-04	14.
43.3	7.467E-02	7.750E 01	9.635E-04	13.
43.6	5.111E-02	7.549E 01	6.771E-04	10.
44.1	5.196E-02	7.228E 01	7.189E-04	15.
44.5	3.600E-02	6.985E 01	5.155E-04	17.
44.9	1.615E-02	6.751E 01	2.392E-04	18.
45.4	1.311E-02	6.474E 01	2.025E-04	29.
46.0	5.700E-03	6.160E 01	9.253E-05	15.
46.6	3.135E-03	5.865E 01	5.345E-05	59.
47.2	8.265E-03	5.589E 01	1.479E-04	13.
47.8	9.500E-03	5.329E 01	1.783E-04	34.
48.4	1.064E-02	5.085E 01	2.093E-04	12.
49.3	1.615E-02	4.745E 01	3.404E-04	19.
49.7	3.990E-03	4.603E 01	8.668E-05	21.
50.9	2.850E-03	4.210E 01	6.769E-05	24.
53.4	2.850E-03	3.523E 01	8.091E-05	28.
55.9	2.460E-03	2.975E 01	8.270E-05	29.
57.1	3.638E-03	2.752E 01	1.322E-04	71.
58.3	6.365E-03	2.550E 01	2.496E-04	59.
59.6	1.634E-03	2.354E 01	6.942E-05	35.
60.8	1.634E-03	2.190E 01	7.463E-05	35.
62.0	3.638E-03	2.040E 01	1.783E-04	71.
64.5	3.638E-03	1.771E 01	2.055E-04	71.
65.7	6.365E-03	1.658E 01	3.838E-04	59.
66.9	6.365E-03	1.555E 01	4.093E-04	59.
68.1	4.560E-03	1.461E 01	3.122E-04	71.
69.2	4.560E-03	1.381E 01	3.302E-04	71.

87.8 MEV 6LI + 60NI INEL Q=-1.33 MEV

THETA	SIGMA	ERROR	THETA	SIGMA	ERROR
3.0	2.660E 01	6.	30.5	7.030E-02	25.
10.1	1.197E 02	8.	30.9	9.880E-02	10.
10.5	1.102E 02	8.	31.3	1.520E-01	8.
11.0	1.007E 02	8.	31.7	2.261E-01	7.
11.4	6.963E 01	9.	32.1	2.764E-01	6.
11.8	6.488E 01	9.	32.5	3.049E-01	6.
12.2	5.177E 01	10.	32.9	3.477E-01	6.
12.7	4.123E 01	5.	33.4	3.724E-01	6.
13.0	3.410E 01	11.	33.8	3.163E-01	6.
13.5	3.125E 01	5.	34.2	2.565E-01	7.
14.0	2.042E 01	6.	34.6	2.147E-01	7.
14.4	2.023E 01	6.	35.0	1.425E-01	9.
14.9	2.403E 01	6.	35.4	7.999E-02	12.
15.3	2.441E 01	6.	35.8	5.985E-02	13.
15.7	2.318E 01	6.	36.2	3.819E-02	18.
16.2	2.327E 01	6.	36.6	3.591E-02	17.
16.6	2.071E 01	6.	37.1	3.923E-02	16.
17.0	1.719E 01	6.	37.5	4.227E-02	17.
17.4	1.206E 01	7.	37.8	7.486E-02	12.
17.8	1.045E 01	8.	38.3	8.863E-02	12.
18.3	7.172E 00	8.	38.7	8.075E-02	11.
18.7	5.035E 00	9.	39.1	9.367E-02	12.
19.1	4.085E 00	10.	39.6	9.975E-02	11.
19.5	4.237E 00	10.	40.0	8.027E-02	11.
20.0	4.759E 00	9.	40.4	8.673E-02	12.
20.8	7.343E 00	8.	40.8	6.716E-02	13.
21.2	7.828E 00	8.	41.2	3.676E-02	17.
21.6	6.213E 00	8.	41.7	2.565E-02	21.
22.1	6.270E 00	9.	42.1	2.517E-02	20.
22.5	5.187E 00	9.	42.2	1.463E-02	29.
22.9	3.629E 00	10.	42.9	8.369E-03	36.
23.3	2.897E 00	11.	43.7	1.852E-02	9.
23.8	1.396E 00	6.	44.8	1.681E-02	9.
24.2	8.217E-01	8.	46.1	1.092E-02	11.
24.6	6.251E-01	8.	47.3	6.555E-03	14.
25.0	5.633E-01	10.	48.6	4.370E-03	17.
25.4	6.089E-01	9.	49.7	5.918E-03	19.
25.9	8.521E-01	7.	50.9	5.823E-03	19.
26.3	1.254E 00	7.	52.2	2.508E-03	28.
26.7	1.767E 00	6.	53.4	2.365E-03	29.
27.1	1.415E 00	6.	54.7	2.726E-03	27.
27.5	1.425E 00	6.	55.9	2.850E-03	27.
28.0	1.197E 00	7.	57.1	2.004E-03	32.
28.4	9.880E-01	7.	58.4	1.548E-03	36.
28.8	7.638E-01	9.	59.6	2.185E-03	31.
29.2	5.187E-01	10.	60.8	9.975E-04	45.
29.7	3.676E-01	12.	62.1	1.187E-03	41.
30.1	2.223E-01	15.	63.3	9.975E-04	45.
			64.5	8.189E-04	50.

87.8 MEV 6LI + 197AU ELASTIC

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
7.4	5.682E 05	5.784E 05	9.825E-01	5.
7.8	4.598E 05	4.687E 05	9.810E-01	5.
8.1	4.045E 05	4.031E 05	1.004E 00	5.
8.5	3.192E 05	3.325E 05	9.598E-01	5.
8.9	2.670E 05	2.768E 05	9.647E-01	5.
9.3	2.187E 05	2.322E 05	9.419E-01	5.
9.7	1.845E 05	1.963E 05	9.397E-01	5.
10.1	1.574E 05	1.671E 05	9.424E-01	5.
10.5	1.348E 05	1.431E 05	9.424E-01	5.
10.9	1.200E 05	1.233E 05	9.739E-01	5.
11.3	1.053E 05	1.068E 05	9.860E-01	5.
11.7	9.783E 04	9.294E 04	1.053E 00	5.
12.1	8.465E 04	8.128E 04	1.041E 00	5.
12.5	7.829E 04	7.140E 04	1.096E 00	5.
12.9	7.159E 04	6.298E 04	1.137E 00	5.
13.2	6.651E 04	5.747E 04	1.157E 00	5.
13.6	5.893E 04	5.103E 04	1.155E 00	5.
14.0	5.596E 04	4.547E 04	1.231E 00	5.
14.4	4.760E 04	4.065E 04	1.171E 00	5.
14.8	4.336E 04	3.645E 04	1.190E 00	5.
15.2	4.046E 04	3.278E 04	1.234E 00	5.
15.6	3.769E 04	2.957E 04	1.275E 00	5.
16.0	2.988E 04	2.673E 04	1.118E 00	5.
16.4	2.929E 04	2.424E 04	1.208E 00	5.
16.8	2.443E 04	2.202E 04	1.109E 00	5.
17.2	1.983E 04	2.006E 04	9.887E-01	5.
17.6	1.714E 04	1.831E 04	9.363E-01	5.
18.0	1.502E 04	1.675E 04	8.967E-01	5.
18.4	1.313E 04	1.535E 04	8.552E-01	5.
18.8	1.123E 04	1.410E 04	7.969E-01	5.
19.1	1.003E 04	1.324E 04	7.577E-01	5.
19.5	8.675E 03	1.219E 04	7.114E-01	5.
19.9	7.780E 03	1.125E 04	6.914E-01	5.
20.3	6.248E 03	1.040E 04	6.008E-01	5.
20.7	5.511E 03	9.627E 03	5.725E-01	5.
21.1	5.011E 03	8.925E 03	5.615E-01	5.
21.5	4.006E 03	8.286E 03	4.834E-01	5.
21.9	3.561E 03	7.704E 03	4.622E-01	5.
22.3	3.134E 03	7.172E 03	4.369E-01	5.
22.7	2.484E 03	6.686E 03	3.715E-01	5.
23.1	2.225E 03	6.241E 03	3.565E-01	5.
23.5	1.954E 03	5.832E 03	3.350E-01	5.
23.9	1.812E 03	5.457E 03	3.321E-01	5.
24.3	1.455E 03	5.111E 03	2.847E-01	5.
24.7	1.296E 03	4.793E 03	2.704E-01	5.
25.1	1.113E 03	4.499E 03	2.474E-01	5.
25.4	9.300E 02	4.294E 03	2.166E-01	5.
25.8	8.490E 02	4.038E 03	2.103E-01	5.

87.8 MEV 6LI + 197AU ELASTIC(CONTINUED)

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
26.2	7.340E 02	3.801E 03	1.931E-01	5.
26.8	5.380E 02	3.477E 03	1.547E-01	5.
27.4	4.610E 02	3.188E 03	1.446E-01	5.
28.0	3.700E 02	2.928E 03	1.264E-01	5.
28.6	2.720E 02	2.695E 03	1.009E-01	5.
29.2	2.390E 02	2.484E 03	9.620E-02	5.
29.8	1.950E 02	2.294E 03	8.499E-02	5.
30.3	1.500E 02	2.150E 03	6.977E-02	5.
30.9	1.270E 02	1.991E 03	6.377E-02	5.
32.1	8.530E 01	1.717E 03	4.969E-02	6.
32.7	6.860E 01	1.597E 03	4.295E-02	5.
33.8	4.660E 01	1.404E 03	3.318E-02	5.
35.0	3.250E 01	1.227E 03	2.649E-02	5.
36.2	2.140E 01	1.077E 03	1.988E-02	6.
37.4	1.420E 01	9.492E 02	1.496E-02	7.
38.6	1.050E 01	8.405E 02	1.249E-02	7.
39.8	5.480E 00	7.472E 02	7.334E-03	10.
41.0	4.430E 00	6.668E 02	6.544E-03	10.
42.2	3.090E 00	5.972E 02	5.174E-03	12.
43.4	1.570E 00	5.366E 02	2.926E-03	17.
44.6	1.200E 00	4.838E 02	2.480E-03	19.
45.7	6.410E-01	4.411E 02	1.453E-03	25.
46.9	5.750E-01	3.999E 02	1.438E-03	28.
48.1	2.100E-01	3.636E 02	5.775E-04	45.
49.2	1.660E-01	3.340E 02	4.970E-04	50.
50.4	1.310E-01	3.052E 02	4.293E-04	60.

87.7 MEV 6LI + 206PB ELASTIC

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
8.5	3.366E 05	3.582E 05	9.398E-01	5.
8.9	2.909E 05	2.981E 05	9.758E-01	5.
9.3	2.465E 05	2.501E 05	9.854E-01	5.
9.7	2.072E 05	2.114E 05	9.802E-01	5.
10.1	1.711E 05	1.799E 05	9.507E-01	5.
10.5	1.484E 05	1.541E 05	9.632E-01	5.
10.9	1.246E 05	1.328E 05	9.389E-01	5.
11.3	1.107E 05	1.150E 05	9.629E-01	5.
11.7	1.022E 05	1.001E 05	1.021E 00	5.
12.0	8.673E 04	9.049E 04	9.585E-01	5.
12.4	8.016E 04	7.941E 04	1.009E 00	5.
12.8	7.122E 04	6.997E 04	1.018E 00	5.
13.2	6.489E 04	6.190E 04	1.048E 00	5.
13.6	5.977E 04	5.496E 04	1.087E 00	5.
14.0	5.709E 04	4.897E 04	1.166E 00	5.
14.4	5.020E 04	4.378E 04	1.147E 00	5.
14.8	4.584E 04	3.926E 04	1.168E 00	5.
15.2	4.377E 04	3.531E 04	1.240E 00	5.
15.6	3.901E 04	3.184E 04	1.225E 00	5.
16.0	3.332E 04	2.880E 04	1.157E 00	5.
16.4	3.073E 04	2.610E 04	1.177E 00	5.
16.8	2.726E 04	2.372E 04	1.149E 00	5.
17.2	2.346E 04	2.161E 04	1.086E 00	5.
17.5	2.108E 04	2.017E 04	1.045E 00	5.
17.9	1.886E 04	1.844E 04	1.023E 00	5.
18.3	1.712E 04	1.689E 04	1.013E 00	5.
18.7	1.409E 04	1.551E 04	9.087E-01	5.
19.1	1.278E 04	1.426E 04	8.965E-01	5.
19.5	1.135E 04	1.313E 04	8.645E-01	5.
19.9	1.004E 04	1.212E 04	8.286E-01	5.
20.3	7.946E 03	1.120E 04	7.094E-01	5.
20.7	7.435E 03	1.037E 04	7.171E-01	5.
21.1	6.676E 03	9.613E 03	6.945E-01	5.
21.5	5.320E 03	8.925E 03	5.961E-01	5.
21.9	4.744E 03	8.298E 03	5.717E-01	5.
22.3	4.208E 03	7.725E 03	5.447E-01	5.
22.7	3.513E 03	7.202E 03	4.878E-01	5.
23.1	2.937E 03	6.722E 03	4.369E-01	5.
23.5	2.760E 03	6.282E 03	4.394E-01	5.
23.9	2.353E 03	5.877E 03	4.004E-01	5.
24.3	1.924E 03	5.505E 03	3.495E-01	5.
24.6	1.863E 03	5.245E 03	3.552E-01	5.
25.0	1.549E 03	4.923E 03	3.147E-01	5.
25.4	1.324E 03	4.624E 03	2.863E-01	5.
25.8	1.142E 03	4.349E 03	2.626E-01	5.
26.2	1.038E 03	4.094E 03	2.536E-01	5.
26.6	8.940E 02	3.857E 03	2.318E-01	5.
27.0	7.390E 02	3.637E 03	2.032E-01	5.

87.7 MEV 6LI + 206PB ELASTIC(CONTINUED)

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
27.4	6.570E 02	3.433E 03	1.914E-01	5.
27.8	6.000E 02	3.244E 03	1.850E-01	5.
28.2	4.780E 02	3.067E 03	1.558E-01	5.
28.6	3.970E 02	2.902E 03	1.368E-01	5.
29.2	3.270E 02	2.676E 03	1.222E-01	5.
29.7	2.700E 02	2.504E 03	1.078E-01	5.
30.3	2.180E 02	2.316E 03	9.414E-02	5.
30.9	1.670E 02	2.145E 03	7.786E-02	5.
31.5	1.410E 02	1.990E 03	7.086E-02	5.
32.1	1.120E 02	1.849E 03	6.058E-02	5.
32.7	9.430E 01	1.720E 03	5.482E-02	5.
33.8	6.880E 01	1.513E 03	4.548E-02	5.
35.0	4.440E 01	1.321E 03	3.361E-02	5.
36.2	2.910E 01	1.160E 03	2.510E-02	5.
37.4	2.150E 01	1.022E 03	2.103E-02	5.
38.6	1.470E 01	9.053E 02	1.624E-02	6.
39.8	1.070E 01	8.048E 02	1.330E-02	7.
40.9	5.640E 00	7.249E 02	7.780E-03	9.
42.1	3.750E 00	6.490E 02	5.778E-03	10.
43.3	3.660E 00	5.831E 02	6.277E-03	10.
44.5	1.750E 00	5.255E 02	3.330E-03	14.
45.7	8.770E-01	4.751E 02	1.846E-03	20.
46.9	1.210E 00	4.308E 02	2.809E-03	20.
48.0	5.800E-01	3.947E 02	1.469E-03	25.
49.2	2.700E-01	3.597E 02	7.505E-04	36.
50.3	2.100E-01	3.311E 02	6.342E-04	41.

87.8 MEV 6LI + 208PB ELASTIC

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
7.4	5.795E 05	6.212E 05	9.329E-01	5.
7.8	4.938E 05	5.034E 05	9.810E-01	5.
8.1	4.220E 05	4.329E 05	9.748E-01	5.
8.5	3.419E 05	3.571E 05	9.575E-01	5.
8.9	2.974E 05	2.972E 05	1.000E 00	5.
9.3	2.489E 05	2.494E 05	9.981E-01	5.
9.7	2.018E 05	2.108E 05	9.573E-01	5.
10.1	1.751E 05	1.794E 05	9.761E-01	5.
10.5	1.450E 05	1.537E 05	9.437E-01	5.
10.9	1.231E 05	1.324E 05	9.302E-01	5.
11.3	1.117E 05	1.147E 05	9.745E-01	5.
11.7	9.701E 04	9.982E 04	9.719E-01	5.
12.0	8.535E 04	9.024E 04	9.459E-01	5.
12.4	7.742E 04	7.918E 04	9.777E-01	5.
12.8	7.485E 04	6.977E 04	1.073E 00	5.
13.2	6.625E 04	6.173E 04	1.073E 00	5.
13.6	6.201E 04	5.481E 04	1.131E 00	5.
14.0	5.710E 04	4.884E 04	1.169E 00	5.
14.4	4.969E 04	4.366E 04	1.138E 00	5.
14.8	4.602E 04	3.915E 04	1.176E 00	5.
15.2	4.354E 04	3.521E 04	1.237E 00	5.
15.6	3.938E 04	3.175E 04	1.240E 00	5.
16.0	3.310E 04	2.871E 04	1.153E 00	5.
16.4	3.124E 04	2.603E 04	1.200E 00	5.
16.8	2.784E 04	2.365E 04	1.177E 00	5.
17.1	2.334E 04	2.205E 04	1.058E 00	5.
17.5	2.071E 04	2.012E 04	1.030E 00	5.
17.9	1.830E 04	1.839E 04	9.950E-01	5.
18.3	1.610E 04	1.685E 04	9.557E-01	5.
18.7	1.413E 04	1.546E 04	9.136E-01	5.
19.1	1.229E 04	1.422E 04	8.647E-01	5.
19.5	1.108E 04	1.310E 04	8.462E-01	5.
19.9	9.929E 03	1.209E 04	8.216E-01	5.
20.3	7.772E 03	1.117E 04	6.958E-01	5.
20.7	7.261E 03	1.034E 04	7.023E-01	5.
21.1	6.060E 03	9.586E 03	6.322E-01	5.
21.5	5.349E 03	8.900E 03	6.010E-01	5.
21.9	4.578E 03	8.274E 03	5.533E-01	5.
22.3	4.132E 03	7.703E 03	5.364E-01	5.
22.7	3.336E 03	7.181E 03	4.645E-01	5.
23.1	2.997E 03	6.703E 03	4.471E-01	5.
23.5	2.600E 03	6.264E 03	4.151E-01	5.
23.8	2.411E 03	5.958E 03	4.046E-01	5.
24.2	1.973E 03	5.579E 03	3.536E-01	5.
24.6	1.785E 03	5.231E 03	3.413E-01	5.
25.0	1.600E 03	4.909E 03	3.260E-01	5.
25.4	1.279E 03	4.611E 03	2.774E-01	5.
25.8	1.153E 03	4.337E 03	2.659E-01	5.
26.2	1.012E 03	4.082E 03	2.479E-01	5.
26.6	8.640E 02	3.846E 03	2.246E-01	5.
27.0	7.160E 02	3.627E 03	1.974E-01	5.
27.4	6.210E 02	3.424E 03	1.814E-01	5.

87.8 MEV 6LI + 208PB ELASTIC(CONTINUED)

THETA	SIGMA	RUTH	SIGMA/RUTH	ERROR
27.8	6.250E 02	3.235E 03	1.932E-01	5.
28.2	4.980E 02	3.058E 03	1.628E-01	5.
28.5	3.900E 02	2.934E 03	1.329E-01	5.
28.9	3.790E 02	2.778E 03	1.364E-01	5.
29.3	3.280E 02	2.633E 03	1.246E-01	5.
29.7	2.810E 02	2.497E 03	1.125E-01	5.
30.1	2.340E 02	2.370E 03	9.875E-02	5.
30.5	2.070E 02	2.251E 03	9.198E-02	5.
30.9	1.720E 02	2.139E 03	8.041E-02	5.
31.3	1.510E 02	2.034E 03	7.423E-02	5.
31.6	1.360E 02	1.960E 03	6.939E-02	5.
32.0	1.180E 02	1.866E 03	6.323E-02	5.
32.4	1.020E 02	1.778E 03	5.737E-02	5.
32.8	9.030E 01	1.695E 03	5.327E-02	5.
33.2	8.330E 01	1.617E 03	5.151E-02	5.
33.6	7.180E 01	1.544E 03	4.652E-02	5.
34.0	5.830E 01	1.474E 03	3.955E-02	5.
34.4	5.500E 01	1.409E 03	3.904E-02	5.
34.7	4.660E 01	1.362E 03	3.421E-02	5.
35.1	4.030E 01	1.303E 03	3.093E-02	5.
35.5	3.780E 01	1.247E 03	3.031E-02	5.
35.9	3.210E 01	1.194E 03	2.688E-02	5.
36.3	2.520E 01	1.144E 03	2.203E-02	5.
36.7	2.500E 01	1.097E 03	2.280E-02	5.
37.1	2.300E 01	1.052E 03	2.187E-02	5.
37.5	1.850E 01	1.009E 03	1.833E-02	5.
37.9	1.750E 01	9.686E 02	1.807E-02	5.
38.3	1.460E 01	9.302E 02	1.570E-02	5.
38.7	1.230E 01	8.938E 02	1.376E-02	5.
39.1	1.250E 01	8.591E 02	1.455E-02	7.
39.5	1.020E 01	8.262E 02	1.235E-02	7.
39.9	7.490E 00	7.948E 02	9.423E-03	8.
40.3	7.960E 00	7.650E 02	1.041E-02	8.
40.7	6.510E 00	7.366E 02	8.838E-03	8.
41.1	5.570E 00	7.095E 02	7.850E-03	9.
41.5	4.900E 00	6.837E 02	7.167E-03	10.
41.9	3.910E 00	6.591E 02	5.932E-03	10.
42.3	3.920E 00	6.356E 02	5.157E-03	10.
42.6	4.180E 00	6.187E 02	6.756E-03	10.
43.0	3.510E 00	5.970E 02	5.879E-03	11.
43.4	2.540E 00	5.764E 02	4.407E-03	12.
43.8	2.650E 00	5.566E 02	4.761E-03	12.
44.4	1.040E 00	5.285E 02	1.968E-03	10.
44.9	1.600E 00	5.065E 02	3.159E-03	15.
45.6	6.600E-01	4.777E 02	1.382E-03	10.
46.7	4.200E-01	4.365E 02	9.622E-04	14.
47.9	2.300E-01	3.967E 02	5.798E-04	19.
49.1	2.500E-01	3.615E 02	6.916E-04	19.
50.3	1.400E-01	3.302E 02	4.240E-04	22.
53.8	8.000E-02	2.571E 02	3.112E-04	30.
58.6	2.200E-02	1.878E 02	1.171E-04	60.
60.9	2.600E-02	1.633E 02	1.592E-04	50.

$^{26}\text{Mg} + ^6\text{Li}$ 87.8 MeV

Fig. 1. Illustrative data from the 50 slice detector. (a) is part of the two-dimensional array as it is stored on magnetic disc; (b) is an energy spectrum from one slice [not from the data array shown in (a)]; (c) is a projection of elastic scattering for one setting of the 50 slice detector. One setting of the detector encompasses 18.4° in the laboratory system.

6Li + 24MG ELASTIC

Fig. 2

6Li + 24MG INEL Q=-1.36 MEV

Fig. 3

6Li + 25MG ELASTIC

Fig. 4

6Li + 26MG ELASTIC

Fig. 5

6Li + 26MG INEL Q=-1.81 MEV

Fig. 6

6Li + 27Al ELASTIC

Fig. 7

6Li + 40CA ELASTIC

Fig. 8

6Li + 44CA ELASTIC

Fig. 9

6Li + 44CA INEL Q=-1.16MEV

Fig. 10

6Li + 59CO ELASTIC

Fig. 11

6Li + 60NI ELASTIC

Fig. 12

6Li + 60Ni INEL Q=-1.33 MEV

Fig. 13

6Li + 197Au ELASTIC

Fig. 14

6Li + 197Au ELASTIC

Fig. 15

6Li + 206PB ELASTIC

Fig. 16

6Li + 206PB ELASTIC

Fig. 17

6LI + 208PB ELASTIC

Fig. 18

6Li + 208PB ELASTIC

Fig. 19

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