

Appendix A

A.1 Tables of Measured Fusion Cross Sections

Table A.1: Fusion cross section for the system $^{37}\text{Cl}+^{116}\text{Sn}$. The error shown is statistical. The beam energy given is corrected for the energy loss in the target.

E_{lab} (MeV)	E_{cm} (MeV)	σ_{fus} (mb)	$\delta\sigma_{fus}$ (mb)
SET 1			
129.25	97.99	13.53	0.3
130.25	98.75	21.89	0.3
130.75	99.13	24.02	0.4
131.26	99.51	31.58	0.5
131.77	99.90	37.04	0.5
132.26	100.28	45.61	0.5
133.26	101.03	57.72	0.5
133.77	101.42	62.23	0.6
134.76	102.17	74.78	0.6
135.76	102.93	89.15	0.7
136.76	103.69	114.19	0.9
137.78	104.46	125.25	1.1
138.78	105.22	147.65	1.3
139.27	105.59	151.69	1.2
140.27	106.35	174.48	1.4
140.78	106.73	191.93	1.6
141.27	107.11	193.98	1.7
142.27	107.87	223.34	2.0
			...continued

E_{lab} (MeV)	E_{cm} (MeV)	σ_{fus} (mb)	$\delta\sigma_{fus}$ (mb)
continued...			
143.27	108.63	230.36	1.9
144.27	109.38	251.58	1.9
145.28	110.14	279.07	2.2
146.28	110.90	292.30	2.5
147.28	111.66	323.47	2.7
149.28	113.18	352.04	3.1
151.28	114.69	398.89	3.6
SET 2			
127.25	96.47	3.52	0.2
128.25	97.23	6.32	0.2
128.75	97.61	10.12	0.2
129.26	98.00	12.07	0.3
129.77	98.39	16.33	0.3
130.27	98.76	22.75	0.3
131.27	99.53	32.93	0.3
131.79	99.92	35.93	0.4
132.78	100.67	47.15	0.5
133.79	101.44	60.14	0.5
134.79	102.19	81.35	0.8
135.81	102.97	94.49	0.9
136.82	103.73	113.42	1.1
137.31	104.11	121.75	1.0
138.32	104.87	143.25	1.3
138.83	105.26	153.17	1.4
139.33	105.63	158.30	1.4
140.33	106.39	181.09	1.6
141.34	107.16	195.95	1.7
142.35	107.92	215.10	1.8
143.35	108.69	243.35	2.0
144.36	109.45	261.11	2.3
145.37	110.21	281.89	2.4
147.38	111.74	314.02	2.9
149.39	113.26	376.44	3.5
			...continued

E_{lab} (MeV)	E_{cm} (MeV)	σ_{fus} (mb)	$\delta\sigma_{fus}$ (mb)
continued...			
SET 3			
126.11	95.62	1.63	0.1
127.12	96.38	3.25	0.1
127.62	96.76	4.41	0.1
128.13	97.15	6.59	0.2
128.65	97.54	9.12	0.2
129.14	97.91	13.26	0.3
130.15	98.68	22.10	0.3
130.67	99.07	25.42	0.3
131.67	99.83	35.06	0.3
132.68	100.59	47.17	0.4
133.69	101.36	63.51	0.6
134.71	102.13	76.52	0.8
135.72	102.89	95.90	1.0
136.21	103.27	104.44	0.9
137.22	104.04	122.34	1.2
137.74	104.43	132.25	1.3
138.23	104.80	140.27	1.3
139.24	105.57	163.96	1.6
140.25	106.33	174.41	1.6
141.26	107.09	194.97	1.7
142.27	107.86	215.37	1.9
143.28	108.63	235.87	2.2
144.29	109.39	264.31	2.3
146.31	110.93	291.31	2.9
148.32	112.46	346.44	3.3

Table A.2: Fusion cross section for the system $^{16}\text{O}+^{112}\text{Sn}$. The error shown is statistical. The beam energy given is corrected for the energy loss in the target.

E_{lab} (MeV)	E_{cm} (MeV)	σ_{fus} (mb)	$\delta\sigma_{fus}$ (mb)
69.89	61.16	530.86	4.2
68.91	60.29	478.82	4.0
67.92	59.43	454.23	4.0
67.00	58.63	416.28	3.9
65.89	57.66	373.78	3.4
64.89	56.78	324.59	3.0
64.40	56.35	307.34	2.8
63.90	55.91	274.31	2.5
63.40	55.48	257.41	2.3
62.90	55.04	227.19	2.2
62.40	54.60	211.11	2.0
61.89	54.16	191.65	1.8
61.32	53.65	166.86	1.6
60.89	53.28	146.85	2.0
60.39	52.85	125.38	1.2
59.89	52.41	107.63	1.1
59.39	51.98	87.89	1.0
58.90	51.54	68.07	0.8
58.40	51.10	51.64	0.7
57.89	50.66	38.15	0.6
57.39	50.22	25.10	0.5
56.89	49.78	15.71	0.4
56.39	49.35	8.22	0.3
55.90	48.91	4.83	0.2
55.40	48.48	2.19	0.2
54.89	48.03	1.22	0.1
54.39	47.59	0.47	0.05
53.89	47.16	0.28	0.03
53.39	46.72	0.24	0.05
52.39	45.85	0.09	0.04

Table A.3: Fusion cross section for the system $^{16}\text{O}+^{116}\text{Sn}$. The error shown is statistical. The beam energy given is corrected for the energy loss in the target.

E_{lab} (MeV)	E_{cm} (MeV)	σ_{fus} (mb)	$\delta\sigma_{fus}$ (mb)
69.89	61.42	573.66	4.6
68.90	60.55	530.97	4.2
67.91	59.68	508.04	4.5
66.99	58.87	459.67	3.8
65.89	57.90	424.97	3.4
64.88	57.02	398.95	3.5
64.39	56.59	344.99	3.1
63.89	56.15	343.86	3.1
63.39	55.71	308.04	2.8
62.89	55.27	297.48	2.7
62.39	54.83	265.91	2.4
61.89	54.39	242.40	2.1
61.31	53.88	199.97	1.9
60.89	53.51	197.68	1.8
60.39	53.07	178.84	1.5
59.89	52.63	149.02	1.5
59.39	52.19	123.88	1.1
58.89	51.76	100.78	1.1
58.39	51.32	79.68	0.9
57.89	50.88	61.81	0.9
57.39	50.44	45.82	0.8
56.89	49.99	33.33	0.7
56.39	49.56	22.09	0.5
55.89	49.12	13.74	0.4
55.39	48.68	7.34	0.3
54.89	48.24	3.04	0.2
54.39	47.79	1.62	0.1
53.89	47.36	0.77	0.06
53.39	46.92	0.43	0.05
52.89	46.48	0.22	0.04
52.39	46.04	0.13	0.03
51.39	45.16	0.34	0.09

Table A.4: Fusion cross section for the system $^{32}\text{S}+^{112}\text{Sn}$. The error shown is statistical. The beam energy given is corrected for the energy loss in the target.

E_{lab} (MeV)	E_{cm} (MeV)	σ_{fus} (mb)	$\delta\sigma_{fus}$ (mb)
139.69	108.66	314.89	4.2
138.69	107.87	299.54	4.2
137.71	107.11	300.01	3.0
136.95	106.52	292.16	3.3
136.21	105.94	270.07	2.7
135.45	105.35	265.43	2.7
134.69	104.76	245.28	3.7
133.94	104.17	236.66	2.3
133.19	103.59	226.91	2.3
132.44	103.01	211.59	2.2
131.69	102.43	195.18	2.1
130.93	101.83	177.74	2.0
130.16	101.24	160.07	2.0
129.44	100.68	148.15	1.6
128.70	100.10	134.39	1.8
127.93	99.50	116.66	1.5
127.19	98.93	91.29	1.1
126.44	98.34	80.58	0.8
125.69	97.76	67.43	0.7
124.94	97.18	54.98	0.7
124.20	96.60	45.89	0.6
123.44	96.01	35.63	0.5
122.69	95.43	26.56	0.5
121.94	94.84	19.91	0.3
121.19	94.26	14.74	0.3
120.49	93.67	9.34	0.2
119.69	93.09	5.56	0.1
118.93	92.49	3.41	0.1
118.18	91.92	1.92	0.08
117.44	91.34	1.01	0.07
116.70	90.77	0.47	0.04
116.19	90.37	0.35	0.03
115.68	89.98	0.16	0.03
115.18	89.59	0.14	0.04

Table A.5: Fusion cross section for the system $^{32}\text{S}+^{116}\text{Sn}$. The error shown is statistical. The beam energy given is corrected for the energy loss in the target.

E_{lab} (MeV)	E_{cm} (MeV)	σ_{fus} (mb)	$\delta\sigma_{fus}$ (mb)
139.68	109.48	354.36	2.9
136.93	107.32	347.57	5.1
134.68	105.56	320.99	4.4
132.42	103.79	282.44	3.9
130.14	102.00	233.82	3.9
129.42	101.44	216.36	3.5
126.42	99.09	137.64	1.5
124.18	97.33	90.03	1.2
122.67	96.15	60.75	1.1
121.17	94.97	38.40	0.6
119.66	93.79	22.67	0.5
118.16	92.61	10.40	0.3
116.68	91.45	4.47	0.2
116.17	91.05	2.85	0.1
115.66	90.65	1.85	0.1
115.16	90.26	1.12	0.1
114.67	89.87	0.74	0.07
114.16	89.48	0.46	0.08

Table A.6: Fusion cross section for the system $^{32}\text{S}+^{120}\text{Sn}$. The error shown is statistical. The beam energy given is corrected for the energy loss in the target.

E_{lab} (MeV)	E_{cm} (MeV)	σ_{fus} (mb)	$\delta\sigma_{fus}$ (mb)
139.82	110.38	455.76	3.7
138.81	109.58	426.75	4.7
137.83	108.81	410.56	4.1
137.07	108.21	402.40	4.1
136.33	107.63	378.92	3.9
135.57	107.03	369.02	3.7
134.82	106.43	352.82	7.1
134.06	105.84	333.32	3.4
133.31	105.25	317.49	3.1
132.56	104.65	301.12	2.9
131.81	104.06	283.62	3.1
131.05	103.46	280.69	4.5
130.28	102.85	266.28	3.7
129.56	102.29	242.39	2.5
128.83	101.70	225.48	2.7
128.06	101.09	212.67	2.9
127.32	100.51	188.03	2.1
126.56	99.92	172.57	1.7
125.82	99.33	155.07	1.5
125.07	98.74	141.52	1.3
124.33	98.15	129.08	1.2
123.57	97.55	110.89	1.5
122.81	96.96	94.32	1.3
122.06	96.36	80.13	1.1
121.31	95.77	67.94	0.9
120.56	95.18	53.84	0.7
119.81	94.59	44.69	0.6
119.05	93.99	35.25	0.5
118.31	93.39	25.65	0.4
117.56	92.81	18.72	0.4
116.82	92.23	13.40	0.3
			...continued

E_{lab} (MeV)	E_{cm} (MeV)	σ_{fus} (mb)	$\delta\sigma_{fus}$ (mb)
continued ...			
116.31	91.82	10.39	0.3
115.81	91.43	7.98	0.2
115.31	91.03	5.59	0.2
114.81	90.64	3.81	0.1
114.31	90.24	2.99	0.2
113.81	89.85	2.10	0.2
113.31	89.45	1.46	0.1
112.81	89.06	0.66	0.09
112.29	88.66	0.57	0.08
111.81	88.27	0.29	0.05