The ^{121}Sb(p,t)^{119}Sb Reaction at 21 MeV

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For the ^{121}Sb(p,t)^{119}Sb reaction the measured differential cross sections display two kinds of shapes: one exhibit relevant angular structure, significant to allow a single L transfers to be distinguished, the others, rather featureless, originate from the incoherent superposition of several L transfers. Transferred angular momentum L has been assigned by comparing the shapes of the experimental angular distributions to DWBA calculations. Angular momentum transfers L and parities are assigned for all the 59 observed transitions. Generally we are able to fit the angular distributions of many observed transitions assuming only one L transfer. Eleven transitions display a quite smooth angular structure, distinctive of more L transfer contributions (see for example Fig. 1 and Fig. 2). These contributions have been incoherently added with a weighting factor proportional to $2L+1$ [1].

In table 1 the adopted energies, spins and parities of the ^{119}Sb levels are presented in comparison with the results of the present work: the energies, the transferred angular momentum L, the spin and parity range, and the integrated cross sections from 10^o to 65^o. Our quoted energies are estimated to have an uncertainty of ±3 keV. Absolute cross sections are estimated with a systematic uncertainty of ±15% and reported with the statistical error.

References

[1] J. Ball, Phys. Rev. **C6** (1972) 2139

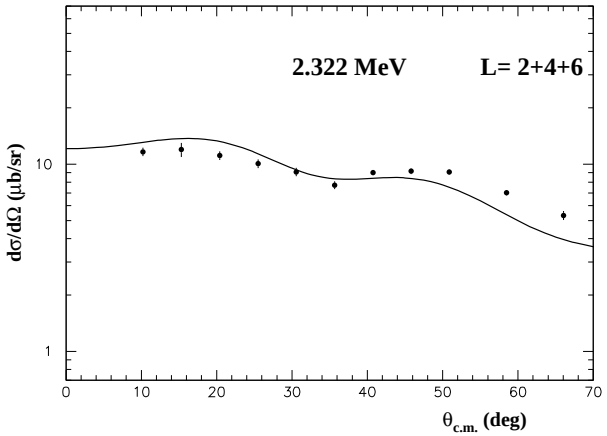

Fig. 1: Comparison between experimental and DWBA results

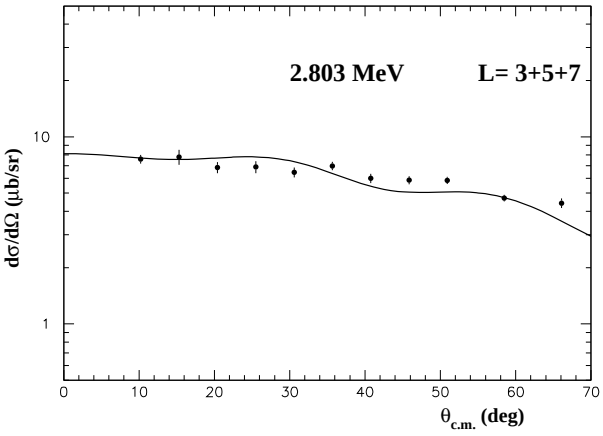

Fig. 2: Comparison between experimental and DWBA results

Table 1: Levels of ^{119}Sb

Adopted		Present experiment			
E_{exc} (keV)	J^π	E_{exc} (MeV)	L_{tran}	J^π	σ_{int} (μb)
0.0	$5/2^+$	0.0	0	$5/2^+$	2371± 17
270.52	$7/2^+$	0.271	4	$(3/2 - 13/2)^+$	5.0± 0.9
644.03	$1/2^+$	0.644	2	$(1/2 - 9/2)^+$	26± 2
699.88	$3/2^+$,$5/2^+$	0.700	2	$(1/2 - 9/2)^+$	8.8± 1.2
970.90	$9/2^+$				
1048.42	$7/2^+$	1.048	2	$(1/2 - 9/2)^+$	149± 5
1212.74	$9/2^+$	1.213	2	$(1/2 - 9/2)^+$	159± 5
1249.74	$9/2^+$	1.250	2	$(1/2 - 9/2)^+$	29± 2
1327.25	$(1/2^-)$				
1338.61	$3/2^+$	1.334	2	$(1/2 - 9/2)^+$	44± 3
1340.75	$11/2^+$				
1366.34	$11/2^-$	1.366	5	$(5/2 - 15/2)^-$	29± 2
1407.35	$11/2^+$				
1413.21	$3/2^-$	1.413	3	$(1/2 - 11/2)^-$	3.8± 0.8
1450					
1469	$3/2^+$,$5/2^+$	1.469	2	$(1/2 - 9/2)^+$	28± 2
1482	$1/2^-$				
1487.61	$(3/2^+)$				
1547					
1646.5	$1/2^+$				
		1.646	0	$5/2^+$	25± 1
1660	$(7/2^+)$				
		1.662	2	$(1/2 - 9/2)^+$	3.5± 0.5
1665	$(3/2^+,5/2^+)$				

Adopted		Present experiment			
E_{exc} (keV)	J^{π}	E_{exc} (MeV)	L_{tran}	J^{π}	σ_{int} (μb)
1675.72	$13/2^+$	1.675	4	$(3/2 - 13/2)^+$	0.8± 0.2
1730		1.727	2	$(1/2 - 9/2)^+$	1.7± 0.4
1749.64	$3/2^+$	1.750	2	$(1/2 - 9/2)^+$	41± 2
1821.14	$1/2^+$	1.821	2	$(1/2 - 9/2)^+$	3.0± 0.4
1848.2					
1875.32	$(1/2^+,3/2)$	1.875	2	$(1/2 - 9/2)^+$	5.3± 0.6
1970	$7/2^+,9/2^+$	1.968	4	$(3/2 - 13/2)^+$	2.0± 0.4
1982.0					
		2.019	4	$(3/2 - 13/2)^+$	2.8± 0.4
2037.61	$15/2^+$				
		2.038	5	$(5/2 - 15/2)^-$	3.4± 0.5
2043					
2067		2.068	4	$(3/2 - 13/2)^+$	27± 1
2094.38		2.094	2+4+6	$(7/2,9/2)^+$	14± 1
2100					
2114	$1/2^+,3/2^+,5/2^+$	2.114	4	$(3/2 - 13/2)^+$	12± 1
2129.82	$9/2^-$	2.130	3	$(1/2 - 11/2)^-$	53± 2
2130					
2138.38	$13/2^+$	2.138	6	$(7/2 - 17/2)^+$	3.0± 0.5
2159		2.162	3	$(1/2 - 11/2)^-$	2.1± 0.4
2187		2.194	2+4+6	$(7/2,9/2)^+$	40± 2
2202.35	$13/2^+$	2.202	6	$(7/2 - 17/2)^+$	11± 1
2223					
2226.06	$11/2^-$	2.232	3	$(1/2 - 11/2)^-$	64± 2
2258					
2269.1	$1/2^+,3/2^+,5/2^+$				
2278.93	$13/2^-$				
2283.7	$9/2^-$	2.282	3	$(1/2 - 11/2)^-$	19± 2
2298		2.294	2	$(1/2 - 9/2)^+$	3.1± 0.4
2314.02	$(15/2)^-$				
2320		2.322	2+4+6	$(7/2,9/2)^+$	33± 2
2327					
		2.339	3	$(1/2 - 11/2)^-$	11± 1
2355					
2360.20	$9/2^-$				
2379.60	(9/2,13/2)				
2384		2.380	2+4+6	$(7/2,9/2)^+$	22± 1
		2.403	3	$(1/2 - 11/2)^-$	23± 1
		2.412	3+5+7	$(9/2,11/2)^-$	11± 1
2415.53	$1/2^+$				
2419.34	$17/2^+$	2.419	6	$(7/2 - 17/2)^+$	2.4± 0.4
		2.448	0	$5/2^+$	13± 1
2455					
2475.44	$15/2^-$				
		2.475	3+5+7	$(9/2,11/2)^-$	8.2± 0.7
		2.490	4	$(3/2 - 13/2)^+$	5.2± 0.6
2505.24	$15/2^-$				
2508		2.514	1	$(3/2 - 7/2)^-$	17± 1
		2.527	0	$5/2^+$	33± 2
2539		2.539	2	$(1/2 - 9/2)^+$	23± 1
2553.6	$(19/2^-)$	2.554	3	$(1/2 - 11/2)^-$	20± 1
2561					
		2.586	3+5+7	$(9/2,11/2)^-$	13± 1
2624		2.622	3+5+7	$(9/2,11/2)^-$	14± 1
		2.637	2	$(1/2 - 9/2)^+$	11± 1
		2.670	3+5+7	$(9/2,11/2)^-$	15± 1
		2.687	3+5+7	$(9/2,11/2)^-$	7.3± 0.7
2707.74	$17/2^-$				
2708	$1/2^+,3/2^+,5/2^+$				
		2.728	2	$(1/2 - 9/2)^+$	11± 1
2747.68					
2749					
		2.755	4	$(3/2 - 13/2)^+$	6.1± 0.6
2769.08	$(17/2^+)$				
		2.777	3	$(1/2 - 11/2)^-$	7.6± 0.7
		2.788	3	$(1/2 - 11/2)^-$	8.2± 0.7
		2.803	3+5+7	$(9/2,11/2)^-$	23± 1
		2.815	9	$(13/2 - 23/2)^-$	12± 1
		2.829	3	$(1/2 - 11/2)^-$	5.2± 0.6
2841.7	$(21/2^-)$				
2841.7	$(27/2^+)$				
2848.99	$19/2^+$				
		2.849	5	$(5/2 - 15/2)^-$	23± 1
2862					
		2.874	2	$(1/2 - 9/2)^+$	7.5± 0.7
2885					