The ^{118}Sn(p,t)^{116}Sn Reaction at 24.6 MeV

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The even tin isotopes, ranging from ^{112}Sn to ^{124}Sn, offer an excellent opportunity for detailed theoretical and experimental investigations. In recent years we reported the results for the ^{122,116,112}Sn(p,t) reactions [1,2,3] and in this contribution we have extended our study to the ^{118}Sn(p,t)^{116}Sn reaction, measured in a high resolution experiment at 24.6 MeV proton incident energy [4]. 55 transitions to the final states of ^{116}Sn up to an excitation energy E_x=3.843 MeV have been measured, of which 6 have been observed for the first time.

A DWBA analysis of the experimental angular distributions from 10^o to 55^o, performed in finite range approximation, assuming a semimicroscopic dineutron cluster pickup mechanism, allows to extract the transferred angular momentum and to assign spin and parity values to all the observed levels of ^{116}Sn. The obtained results have been listed in the table: the adopted energies, spins and parities of the ^{116}Sn levels [5] are compared with the results of the present experiment. The integrated cross sections from 10^o to 55^o are also reported. Absolute cross sections, estimated with a systematic uncertainty of ±15% are reported with the statistical error.

References

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[2] P. Guazzoni *et al.*, Phys.Rev. **C69** (2004) 024619
[3] P. Guazzoni *et al.*, Phys.Rev. **C74** (2006) 054605
[4] P. Guazzoni *et al.*, jbJBRef200513
[5] J. Blachot, Nucl. Data Sheets **92** (2001) 455

Adopted		Present experiment		
E_{exc} (keV)	J^π	E_{exc} (MeV)	J^π	σ_{int} (μb)
0.0	0^+	0.000	0^+	1345 ± 24
1293.560	2^+	1.294	2^+	433 ± 13
1756.864	0^+	1.757	0^+	39 ± 1
2027.48	0^+	2.027	0^+	17 ± 1
2112.323	2^+	2.112	2^+	2.5 ± 0.4
2225.379	2^+	2.225	2^+	8 ± 1
2266.159	3^-	2.266	3^-	165 ± 3
2365.975	5^-	2.366	5^-	59 ± 2
2390.879	4^+	2.391	4^+	52 ± 2
2529.202	4^+	2.530	4^+	71 ± 2
2545.71	(0^+)	2.546	0^+	3.6 ± 0.4
2585.564	1^+	2.585	1^-	1.5 ± 0.3
2650.438	2^+	2.650	2^+	8 ± 1
2790.55	$(0)^+$	2.790	4^+	6 ± 1
2801.28	4^+	2.801	4^+	152 ± 3
2843.82	2^+	2.843	2^+	11 ± 1
2908.85	7^-	2.907	7^-	18 ± 1
2960.03	2^+	2.960	2^+	8 ± 1
2996.27	3^+			
3016.44	$6(^-)$			
3032.70	6^+			
3046.40	4^+	3.046	4^+	13 ± 1
3088.63	2^+	3.088	2^+	48 ± 2
3096.93	4^+	3.096	4^+	16 ± 1
3105.18	5^-	3.105	5^-	6 ± 1
3157.73	3^-,4	3.157	4^+	2.2 ± 0.4
3179.68	3^+			
3184	3^-	3.179	3^-	2.5 ± 0.4
3194.32	0^+	3.194	0^+	15 ± 1
3210.00	7^-	3.210	7^-	2.0 ± 0.3
3227.45	(2^+)	3.227	2^+	62 ± 2
3227.95	8^-			
3228.06	2^+			
		3.236	2^+	6 ± 1
3236.02	0^+			
		3.251	6^+	1.5 ± 0.3
3257.67	3^-,4^-,5^-			
3277.6	6^+			
		3.278	4^+	4.0 ± 0.5
3288.99	LE 4			
3309.0	6^-			
3314.99	3^+			
3333.78	1^-	3.333	1^-	5 ± 1
		3.344	5^-	3.0 ± 0.4
3344.34	2^+			
3350.5	(5^+)			
		3.371	3^-	3.1 ± 0.4
3371.42	3^+			

Adopted		Present experiment		
E_{exc} (keV)	J^π	E_{exc} (MeV)	J^π	σ_{int} (μb)
3379.8	3^+			
3416.2	2^+	3.416	2^+	92 ± 2
3427.91	4^-			
3453.2	4,5			
		3.453	3^-+5^-	9 ± 1
3469.61	2^+	3.469	2^+	26 ± 1
3492.98	8^+			
		3.493	7^-	2.3 ± 0.3
3507.25	5^-			
3508.33	2^+			
3510	4^+	3.506	4^+	20 ± 1
3513.6	$(2)^+$	3.514	4^+	8 ± 1
3522.66	9^-	3.522	9^-	6 ± 1
3547.16	10^+			
		3.549	$(8^+,9^-)$+3^-	2.0 ± 0.3
3551.7	3^+			
3572.77	2^+,3	3.572	3^-	7 ± 1
3576.2	4+,5			
3586.63	2^+	3.586	2^+	1.7 ± 0.3
3593.76	3^+			
3616.3	4^-			
3624.6	4^+	3.624	4^+	23 ± 1
3640.7	$4,5^+$			
		3.648	6^+	55 ± 2
3648.1	3^-,5^-			
3658.05	2^+			
		3.679	7^-	7 ± 1
		3.699	1^-	4.2 ± 0.5
3706.9	3^+			
3711.89	$(1)^+$			
		3.712	7^-	1.9 ± 0.3
3712.4	8^+			
		3.724	0^+	2.1 ± 0.3
3730.6	LE 3			
3739	3^+			
		3.739	6^+	26 ± 1
3742.90	3^-			
3747.9	LE 3	3.747	3^-	4.5 ± 0.5
		3.771	4^+	4.7 ± 0.5
3776.78	1^+			
3787.2	(6^-)			
3797	$^+$			
3805.5	4^+			
		3.805	4^++2^+	12 ± 1
3806.02	2^+			
3809.3	2^+,3			
3836.67	0^+	3.836	0^+	11 ± 1
3843.66	2^+,3	3.843	2^+	2.2 ± 0.4