Spectroscopy of ^{114}Sn via (p,t) Reaction

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Two neutron transfer reactions as (p,t) are a very effective tool to investigate the structure of the tin isotopes. Among these nuclei of special interest is ^{114}Sn for which the lowest single particle levels, $d_{5/2}$ and $g_{7/2}$, are filled.

On the theoretical side, the tin isotopes have long been the subject of shell model studies, and in recent years calculations have been carried out making use of realistic effective interactions.

We have carried out an experimental study in which the levels of ^{114}Sn have been populated via ^{116}Sn(p,t)^{114}Sn reaction at 25 MeV bombarding energy [1].

Accurate measurements of the differential cross sections for transitions to 59 levels of the ^{114}Sn nucleus up to an excitation energy of about 4.1 MeV, in a high resolution experiment, allowed us to confirm and identify spin and parity for many levels. Exploiting the noticeable dependence of the transferred angular momentum displayed by the differential angular distributions, the knowledge of the ^{114}Sn level scheme was improved. In particular, 18 new attributions of spin and parity are given and the uncertainty in spin-parity assignment is removed for 5 levels. In the Table the excitation energies of the levels of ^{114}Sn measured in the present experiment and the attributed spin and parity values are reported. In the same Table we also report the energies, spin-parity assignements adopted so far [2].

References

[1] P. Guazzoni *et al.*, Jahresbericht 1998, p. 14

[2] J. Blachot and G. Marguier, Nucl. Data Sheets **75** (1995) 739

Adopted		**Pres. experim.**	
E_{exc} (keV)	J^π	E_{exc} (MeV)	J^π
0	0^+	0.0	0^+
1299.92	2^+	1.300	2^+
1953.2	0^+	1.954	0^+
2156.2	0^+	2.154	0^+
2187.5	4^+	2.188	4^+
2239.0	2^+		
2274.7	3^-	2.274	3^-
2421.2	0^+	2.417	0^+
2454.3	2^+	2.451	2^+
2514.7	$3^+,4^+$	2.510	3^-
2576?	2^+	2.576	2^+
2614.3	4^+	2.613	4^+
2765.6	4^+	2.765	4^+
2815.1	5^-	2.816	5^-
2859.9	4^+	2.860	4^+
2905.1	4^+	2.906	3^-
2915.7	2^+	2.916	2^+
2943.5	2^+	2.943	2^+
3025	$2,3^+$		
3027	0^+	3.028	0^+
3028.1	$2,3^+$		
3087.4	7^-	3.088	7^-
3149.8	6^+	3.149	6^+
3186.1	2^+	3.186	2^+
3188.4	6^+	3.190	6^+
3190.3	$(8)^-$		
3204	0^+		
3207.8	4^+	3.206	4^+
3211.8	(1,2)		
3225.9	$2^+,3^+$	3.225	3^-
3242.0	5^-		
		3.242	$5^- + 6^+$
3244.1	$(4,5,6)^-$		
3308.4	0^+	3.309	0^+
3325.5	2^+	3.325	2^+
3357.2	4^+	3.358	4^+
3363.1	$4^-,5^-,6^-$	3.363	5^-
3397.2	(4^-)	3.397	6^+
3422.7	0^+	3.422	0^+
3448.4		3.448	4^+
3451.7		3.452	0^+
3471.4	6^+	3.473	6^+
3478.9	(2^+)	3.477	2^+
		3.486	5^-
3510.5	9^-		
		3.515	$3^- + 9^-$
3514.19	$2^+,3^+$		
3525.1	3^-	3.526	3^-
3548	0^+	3.549	0^+
3561.2	2^+		
		3.561	$2^+ + 7^-$
3566.4	(7^-)		
		3.587	4^+
3658.7		3.654	4^+
		3.680	4^+
3690		3.696	2^+
3717.5			
3722	2^+	3.727	2^+
3740.0		3.740	0^+
3759	0^+	3.765	0^+
3781.9	2^+		
		3.786	4^+
		3.800	2^+
3870.7	8^+		
		3.871	5^-
3872	2^+	3.876	2^+
3928			
		3.939	3^-
3956	2^+		
		3.971	2^+
3971.4	8^-		
3976			
		3.988	3^-
3991.4	$2^+,3^+,4^+$		
		4.000	4^+
4029.8			
4046.8	(5^-)	4.044	5^-
		4.057	6^+
4088.9	$(8)^+$		
		4.095	2^+
4119	4^+	4.118	4^+
4136		4.136	4^+