^{119}In Nuclear Spectroscopy by Means of Reactions ^{122}Sn($\vec{p},\alpha$)^{119}In

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We have experimentally investigated via ($\vec{p},\alpha$) reactions the concept of homologous states in the regions with A $\sim$ 208 [1] and A $\sim$ 90 [2,3] and detailed theoretical studies on the properties of homologous states in these A regions [2,3,4] were also done in the framework of the shell model. In order to investigate the spectator role of the unpaired nucleon in a different mass region we have studied the ^{122}Sn($\vec{p},\alpha$)^{119}In reaction and we plan to also study the ^{123}Sb($\vec{p},\alpha$)^{120}Sn reaction. The angular distributions of cross sections $\sigma(\theta)$ and analyzing powers $A_y(\theta)$ of the triton pick-up reaction ^{122}Sn($\vec{p},\alpha$)^{119}In have been measured using the 26 MeV proton beam of the Garching HVEC MP Tandem, the polarized source, the Q3D magnetic spectrograph and the light ion focal plane detector with cathode periodic readout. Transitions to 25 levels of ^{119}In were observed up to an excitation energy of 2.6 MeV. A DWBA analysis of $\sigma(\theta)$ and $A_y(\theta)$ was carried out assuming a semimicroscopic triton cluster pickup mechanism. Fig.s 1,2 show the comparison between experimental and calculated $\sigma(\theta)$ and $A_y(\theta)$ for some ^{119}In levels. The calculations have been done in finite range approximation with the code TWOFNR, using a proton-triton interaction potential of Gaussian form. The table summarizes the optical model parameters.

An unambiguous attribution of spin and parity was made for 20 of the 25 observed levels, and comparing the experimental results to Nuclear Data Sheet [5] we have done 7 new J$^{\pi}$ attributions.

References

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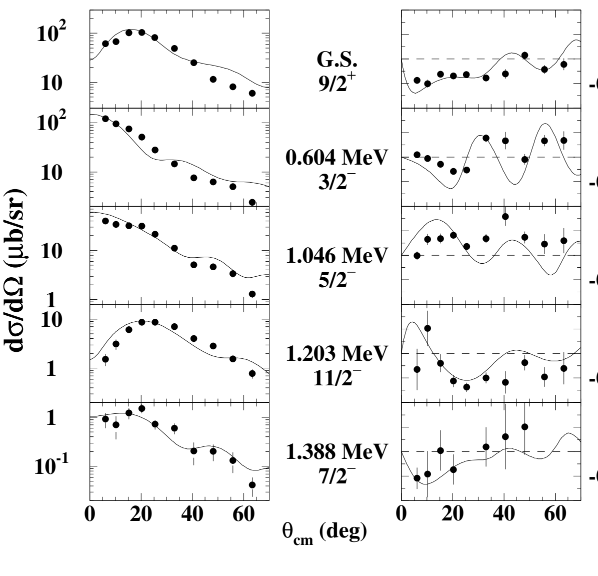

Fig. 1: Angular distributions of $\sigma(\theta)$ and $A_y(\theta)$ for some of the observed levels.

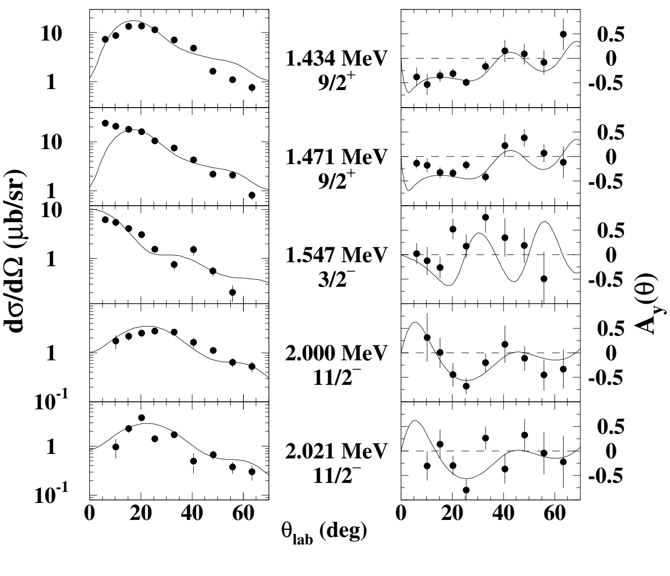

Fig. 2: Angular distributions of $\sigma(\theta)$ and $A_y(\theta)$ for some of the observed levels.

	V_r	r_r	a_r	W_v	r_w	a_w	W_d	r_d	a_d	V_{so}	r_{so}	a_{so}	r_c
	(MeV)	(fm)	(fm)	(MeV)	(fm)	(fm)	(MeV)	(fm)	(fm)	(MeV)	(fm)	(fm)	(fm)
p	52.0	1.25	0.65				8.	1.3	0.6	6.00	1.25	0.70	1.25
α	179.8	1.418	0.569	39.9	1.418	0.569							1.30
B.S.		1.45	0.4										

Table 1: Optical model parameters.