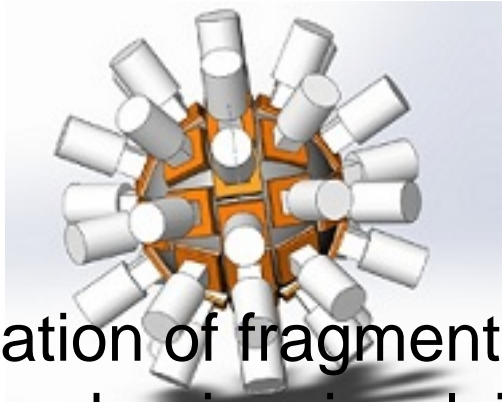


Frontiers in Gamma Ray Spectroscopy

FIG18

Contribution ID : 14



Investigation of fragment capture reaction mechanism involving weakly bound ${}^7\text{Li}$

Tuesday 13 Mar 2018 at 14:30 (00h15')

Content :

The dynamics of the reactions involving weakly bound nuclei is a topic of current interest [1-3]. The low breakup threshold of such nuclei leads to the breakup as well as fragment-capture reaction processes and consequently affect the reaction dynamics. Here, the fragment capture reaction mechanisms have been studied for ${}^7\text{Li} + {}^{93}\text{Nb}$ system. Exclusive particle- γ coincidence measurements were performed at energies near the Coulomb barrier to identify the various fragment capture processes uniquely [4]. The prompt γ -ray measurements were performed using Indian National Gamma Array (INGA). Three Si surface barrier telescopes were used for the detection of charged particles. The absolute cross-sections of t-capture, α -capture, 2n-stripping and complete fusion reactions were measured using the in-beam and off-beam γ -ray counting methods.

The measured cross-section of t-capture and α -capture could be explained by dynamical trajectory model calculations PLATYPUS [5], using the model parameters that reproduced the breakup and fusion data for the same system. The cross-sections for p-d- t-stripping, predicted from the Distorted wave Born approximation calculations were found to be negligible. These two results indicate the dominance of the two-step process, breakup followed by fusion, over the one-step process of cluster-stripping process [6].

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[2] A. Shrivastava et al., Phys. Lett. B 718, 931 (2013).

[3] N. Keeley et al., Prog. Part. Nucl. Phys. 63, 396 (2009).

[4] S. K. Pandit et al., Phys. Rev. C 96, 044616 (2017).

[5] A. Diaz Torres et al., Phys. Rev. Lett. 98, 152701 (2007).

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Session classification : --not yet classified--

Track classification : --not yet classified--

Type : Oral