

ALPHA PARTICLES EMISSION IN FAST NEUTRONS PROCESSES ON ^{143}Nd NUCLEUS

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Nuclear reactions induced by fast neutrons starting from 0.5 MeV up to 25 MeV followed by alpha particles emission were investigated. Cross sections, angular correlations and related asymmetry effects were evaluated with Talys [1] and own computer codes. Contribution to the cross section of nuclear reaction mechanisms like direct, compound and pre-equilibrium together with discrete and continuum states of residual nuclei were determined. Theoretical evaluations are compared with existing experimental data. Further, parameters of nuclear potential in the incident and emergent channels are obtained. Using cross-section and angular correlation theoretical Talys data, forward-backward effects are obtained for different incident neutron energies and target dimensions. The Simulated forward-backward asymmetry coefficient is much lower than the experimentally measured effect [2]. The difference can be explained by the presence of other emergent channels including alpha particles and not by the existence of so-called non-statistical effects suggested in [2].

The present work was realized in the frame of the fast neutrons scientific program from FLNP JINR Dubna.

Primary authors: OPREA, Alexandru Ioan (JINR); Dr OPREA, Cristiana

Presenter: OPREA, Alexandru Ioan (JINR)

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