

# Angular Distribution in Fast Neutrons Induced Reactions on $^{64}\text{Zn}$ Isotope

C. Oprea<sup>1</sup>, A.I. Oprea<sup>2</sup>

<sup>1</sup>*County Center for Education 11 Mihai Eminescu st, 410019, Oradea, Bihor County Romania*

<sup>2</sup>*Frank Laboratory for Neutron Physics (FLNP) Joint Institute for Nuclear Research (JINR),  
141980 Dubna, 6 Joliot Curie st, Moscow Region, Russian Federation*

Cross sections, angular distributions, forward-backward asymmetry effect and alpha spectra in fast neutrons induced processes on  $^{64}\text{Zn}$  nucleus were investigated. Theoretical evaluations were realized using own authors codes and dedicated software for the investigation of the structure of atomic nuclei and nuclear reactions mechanisms. Contributions to the cross sections, angular correlations and alpha spectra of nuclear reactions mechanisms (direct, compound and pre-equilibrium ones) were obtained. Cross sections and angular distributions theoretical evaluations are in good agreement with existing experimental data from literature and those obtained in FLNP. Further, from the comparison of theoretical and experimental data, parameters of Woods-Saxon potential (volume, surface and spin-orbit each with real and imaginary part) were extracted. For neutrons energy of few MeV's, experimental forward-backward effect was observed. For this incident energy of neutrons only compound mechanism is acting and therefore the measured asymmetry cannot be explained by the presence of direct processes. The possible explanations of the existence of measured forward-backward effect are also analyzed.