

Frontiers in Gamma Ray Spectroscopy

FIG18

Contribution ID : 23



Structure at low and high spins of ^{66}Zn nuclei

Content :

In the mass region $A \sim 60-80$, nuclei excited by heavy-ion induced nuclear reactions have revealed a variety of excitation modes, which so far cannot be explained completely in a single theoretical nuclear model. Describing the collective phenomena for the less deformed Zn isotopes with vibrational modes which for the heavier, more deformed nuclei Se and Kr converts into a rotational description. Starting from ^{56}Ni as a closed core, deformation increases with the addition of proton and/or neutron pairs [1]. In this mass region, $1g_{9/2}$ (high angular momentum intruder) orbital plays a significant role among the degree of freedom excited in the states of high angular momentum [2]. The aim of present investigation is to provide detailed information on excited states of ^{66}Zn nucleus, and of course to understand the microscopic and macroscopic structure of the same.

Excited states of ^{66}Zn nucleus have been investigated using the reaction $^{56}\text{Fe}(^{12}\text{C}, 2p)^{66}\text{Zn}$ at an incident beam energy of 62 MeV using the Indian National Gamma Array (INGA) [3] performed at Tata Institute of Fundamental Research (TIFR), Mumbai. INGA at the time of experiment consisted of fifteen Compton suppressed clover detectors arranged in six different angles [40° (2), 65° (2), 90° (4), 115° (2), 140° (2) and 157° (3)] with respect to beam direction. Symmetric and angle dependent $E_\gamma - E_\gamma$ matrices were made using MultipARAMeter time-stamped based COincidence Search program (MARCOS) developed at TIFR, with the 100ns coincidence time window and the matrices were analyzed using the analysis software RADWARE [4] and in-house developed Collection and Analysis of Nuclear Data using Linux nEtwork (CANDLE) software [5].

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Session classification : --not yet classified--

Track classification : --not yet classified--

Type : Poster