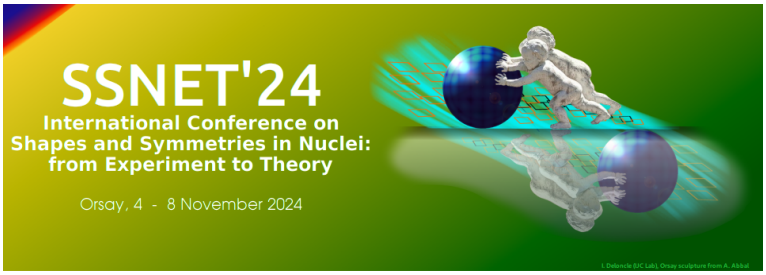

ID de Contribution: **106** Type: **Non spécifié**

Competition between Tetrahedral and Octahedral Symmetries in 152Sm Nucleus: A New set of experimental data from a dedicated experiment

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Symmetries play a determining role in physics, guiding the frontier research of quantum systems, in particular on the sub-atomic level. The results of the group theoretical analysis supported by realistic mean field calculations predict existence of tetrahedral symmetry in many atomic nuclei throughout the Mass Table. Corresponding nuclear configurations are associated with relatively strong shell energy effects related with tetrahedral magic numbers, which were identified long ago [1-3]. Tetrahedral symmetry has been of interest in molecular physics but there exist so far only one proposed structure in nuclear domain [4]. Experimental efforts are underway in identifying and understanding this exotic symmetry [5-7] and its relation with the octahedral symmetry both giving rise to the four-fold degeneracy of certain single nucleon levels.
VECC, Kolkata has few setups for gamma ray spectroscopic measurement aiming at nuclear structure studies using beams from cyclotrons. In addition, detectors can be augmented through national collaborations giving rise to different national campaigns.
In our recent efforts, we could identify two structures in 152Sm presenting symmetry competition, and symmetry breaking criteria. The newly observed band structure was investigated via high-resolution gamma spectroscopic techniques with neutron evaporation reaction, 150Nd (⊠, 2n) 152Sm @ 26 MeV beam. An array of twelve Clover HPGe detectors was used for the measurement. The mixed parity sequence with absence of E2 and presence of candidate E3 transitions encourage interpretation in terms of excited tetrahedral structure. We formulated arguments stipulating that this structure manifests tetrahedral symmetry accompanied by the octahedral symmetry breaking following the group representation theory calculations. Details of the experimental interpretation will be presented and discussed.
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