

739th ASRC Seminar

Date: Dec. 4 (Tue), 13:30~

Location: Room 302, ASRC Bldg.

Speaker: Prof. S. K. Chamoli

(Department of Physics & Astrophysics, University of Delhi, India)

Title: Nuclear structure studies with lifetime measurements in nuclei of mass $A \sim 160 - 190$ at IUAC, Delhi

Abstract:

The nuclei of mass $A \sim 160 - 190$ are important from structural point of view. The nuclei near the lower edge of this mass region (e.g. Tm, Hf, Lu, etc.) are found to have stable axially deformed shapes near the ground, but possess some very exotic phenomena like triaxially strongly deformed (TSD) bands and wobbling at high spins. On the other hand, for nuclei near the upper end of the region (e.g. Pt, Au, Pb, etc.), shape coexistence and (or) shape transition is a more common phenomena. One of the factors responsible for this transition from axially deformed shapes to co-existing prolate-oblate shapes in nuclei of this mass region, is the involvement of low- Ω , high- j Nilsson orbitals like $\pi h_{9/2}[541]1/2^-$ and $\pi i_{13/2}[660]1/2^+$. Over the period of time the nuclei of this mass region have been probed experimentally and theoretically and the role of these deformation driving orbitals have been established. In India, due to sharp development in the field of particle accelerators and radiation detection capabilities in the last one decade or so, a big boost in nuclear structure research has been observed. Particularly at the Inter University Accelerator Center (IUAC), Delhi, some new initiatives like development of LINear ACcelerator (LINAC) facilities, the development of Indian National Gamma Array (INGA, array of 24 Clover detectors) for gamma array detection and National Array for Neutron Detection (NAND, array of 102 big size Neutron detectors) for neutron detection have been taken. Additionally, the Hybrid mass Reaction Analyzer (HYRA) and Plunger Setup at IUAC, Delhi have also come up over the last one decade or so. With these new initiatives, a dedicated research program focusing on the structure studies in nuclei of mass $A \sim 160 - 190$ has been taken up by our group here in IUAC Delhi from last one decade or so. Primarily we studied the nuclei of this mass region with recoil distance Doppler shift (RDDS) technique of lifetime measurement of excited nuclear states and resolved many structural issues.

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