

## **Nuclear structure studies with Indian National Gamma Array and future developments at IUAC**

R. P. Singh\*

*Inter University Accelerator Centre, Aruna Asaf Ali Marg, New Delhi - 110067, India.*

Study of nuclear structure exhibits a variety of modes of nuclear excitations with single particle like, at one extreme and highly collective excitations at the other. The various modes of excitations reflect different underlying structures nuclei adopt to for a given situation of spin, iso-spin and excitation energy. Trying to understand and reconcile these large variety of underlying structures (and symmetries) in a finite quantal system, like nuclei, is of great interest to physicists.

At IUAC we have produced and populated nuclei in different regions of spin, iso-spin and excitation energy using stable heavy ion beams from our 16 MV Pelletron and LINAC accelerators. We have probed their structures by studying the gamma ray emission from the excited nuclear states. The gamma ray spectrometer called Indian National Gamma detector Array (INGA) (a national collaboration) /1/ has given further impetus to these studies due to enhanced photo-peak detection efficiency for gamma rays. In recent years our group in collaboration with universities and institutes have probed the various dynamical symmetries like chirality, shears and quadrupole deformations and the interplay between them. I would discuss some of the recent results from these studies.

Further, at IUAC we are working on combining the INGA spectrometer with our hybrid gas-filled mass analyser HYRA /2/ for study of heavy nuclei in the forthcoming INGA-HYRA campaign. Some of these developments would also be discussed.

I would like to acknowledge the great effort by our collaborators from universities and research institutions in various experimental campaigns at IUAC.

### **References:**

- /1/ S. Muralithar et al., Nucl. Inst. And Meth. In Physics Research A 622, 281 (2010).
- /2/ N. Madhavan et al., Pramana Vol. 75, 317 (2010).

\* e-mail : [rps@iuac.res.in](mailto:rps@iuac.res.in)