

# Frontiers in Gamma Ray Spectroscopy

## FIG18

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### Reinforce in low and intermediate states of the beta stable Ba and Xe nuclei near N=82 shell closure

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#### Content :

In A ~ 130 mass region, the nuclei show many interesting phenomena like shape coexistence, MR bands, chiral bands and spin isomers. They are  $\gamma$ -soft in the ground state with triaxial deformation. The  $^{134}\text{Ba}$  nucleus has already studied for low-spin states and seen to be one of the best candidate for E(5) critical point symmetry . In the previous experimental study, the  $10^+$ ,  $5^-$  and  $7^-$  isomeric states based on the configurations  $\nu[h_{11/2}^2] 10^+$  and  $\nu[s_{1/2}^1 h_{11/2}^1] 5^-$  or  $(\nu[d_{3/2} h_{11/2}]) 7^-$  are also observed. The other isotone of N=78 have been already studied for the intermediate and high spin states. The  $^{136}\text{Ce}$  and  $^{138}\text{Nd}$  nuclei exhibit many dipole bands at their high spin states having different shapes and phenomena. Recently, the  $^{132}\text{Xe}$  and  $^{133}\text{Xe}$  nuclei are investigated through multinucleon-transfer in the AGATA array coupled to the magnetic spectrometer PRISAMA and the GAMMASPHERE array along with CHICO.

In the first experiment, the  $^{134}\text{Ba}$  nucleus was populated using the reaction  $^{124}\text{Sn}(^{13}\text{C}, 3n)^{134}\text{Ba}$  at a beam energy of 48 MeV from the Pelletron accelerator at Tata Institute of Fundamental Research (TIFR), Mumbai. The  $^{124}\text{Sn}$  target of thickness 1.5 mg/cm<sup>2</sup> with the Au backing was used. The gamma-rays were detected using the Indian National Gamma Array (INGA). In the present study, the level scheme was extended upto a maximum spin of 20. In the intermediate excitation, three quadrupole bands were observed and the level of the gamma-band was re-confirmed at the low-excitation.

In the second experiment, the alpha induced fusion evaporation reaction is used to explore the intermediate states of  $^{132}\text{Xe}$  in INGA spectrometer at VEEC, Kolkata using seven HPGe clover clover detectors and one LEPS segmented detector. Both the nuclei ( $^{134}\text{Ba}$  and  $^{132}\text{Xe}$ ) have shown similar structure at low and intermediate spin.

The theoretical calculations to understand these bands are in progress.

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