Int. Workshop “Shapes and Dynamics of Atomic Nuclei: Contemporary Aspects”
ed. Nikolay Minkov, Heron Press, Sofia 2021

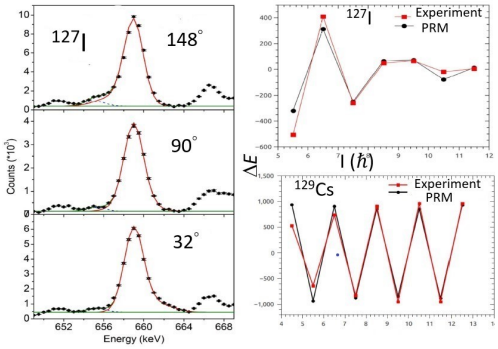
Shapes and symmetries in A$\sim$ 130 nuclei: A perspective through measured transition probabilities

Pragya Das, **Umakant Lamani**, **Himanshu Kumar Singh**
Physics Department, IIT Bombay, Powai, Mumbai-400076, India

Abstract

The triaxial nuclear shapes often give rise to signature splitting, and inversion can occur due to shape change. We investigated the triaxial nuclei – ^{126}I [1], ^{129}Cs [2] and ^{127}I – from the B(E2) values, by measuring the lifetimes (in ps) using Doppler Shift Attenuation Method (DSAM). The stable beams of ^{7}Li and ^{11}B, delivered by the Pelletron accelerators at TIFR (Mumbai, India) and IUAC (New Delhi, India), were bombarded on enriched targets of ^{124}Sn. The experimental set-up consisted of 15-18 Compton suppressed HPGe clover detectors.

The figure (left) presents an example of DSAM lineshapes for ^{127}I in the forward (32°), backward (148°), and 90° detectors. The right figure shows the signature splittings and inversion for $\pi g_{7/2}$ bands; however, no inversion occurs for ^{129}Cs. Our measured B(E2) values were within the range 0.1-0.6 e^2b^2. We compared the signature splittings, inversion and B(E2) values with the theoretical particle rotor model (PRM) estimates, and extracted the nuclear deformation (β, γ in Lund convention). There was a larger shape asymmetry found for ^{127}I (β=0.23, γ_{avg}=33°) than for ^{129}Cs (β=0.15, γ=18°) [2].



References

[1] Himanshu K. Singh, *et al.*, *Phys. Rev. C* **100** (2019) 064306.
[2] Umakant Lamani, *et al.*, *Nucl. Phys. A* **1014** (2021) 122220.