

# Frontiers in Gamma Ray Spectroscopy

## FIG18

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## Wobbling Motion in $A \sim 130$ Nuclei

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### Content :

Wobbling of triaxial even-even nuclei represents the quantized oscillations of the principal axes of an asymmetric top relative to the space-fixed angular momentum vector or, in the body fixed frame of reference, the oscillations of the angular momentum vector about the axis of the largest moment of inertia [1]. In transverse wobbling, the odd quasiproton, with predominantly particle nature, aligns its angular momentum vector  $j$  along the short axis of the triaxial rotor, i.e., perpendicular to the axis with the largest moment of inertia [2]. The result is a pair of bands corresponding to wobbling phonons  $n_w=0$  and  $n_w=1$ .

In a series of measurements with Gammasphere and INGA, we had identified “wobbler partner” bands in the nucleus  $^{135}\text{Pr}$ , the first observation of wobbling in a mass region other than near  $A \sim 160$  [3]. The nature of wobbler bands is confirmed by verifying the  $\Delta I=1, E2$  character of the inter-band transitions via angular distribution and polarization measurements. The transverse nature of wobbling is evidenced by the characteristic decrease in  $E_{\text{wobb}}$  [2].

In the isotone  $^{133}\text{La}$ , one observes longitudinal wobbling instead.

These observations are in accordance with Quasiparticle-triaxial-rotor (QTR) and Tilted-axis-tilting (TAT) calculations.

[1] A. Bohr and B. R. Mottelson, Nuclear Structure II (Benjamin, 1975).

[2] S. Frauendorf and F. Dönau, Phys. Rev. C 89, 014322 (2014).

[3] J. T. Matta et al., Phys. Rev. Lett. 114, 082501 (2015).

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