EXTENSIVE STUDY OF THE POSITIVE AND NEGATIVE PARITY WOBBLING STATES FOR AN ODD-MASS TRIAXIAL NUCLEUS II: GEOMETRICAL INTERPRETATION

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Abstract. A new interpretation of the wobbling structure in ^{163}Lu is developed. Four wobbling bands are experimentally known in this isotope, where three are wobbling phonon excitations $TSD_{2,3,4}$, and the ground state band, which is TSD_1. In this work, a particle-triaxial rotor coupling is considered in a product space of single-particle and collective core states. The single-particle states describe a $j = i_{13/2}$ proton, while the core states characterize the triaxial rotor and are either of positive parity, when the bands $TSD_{1,2,3}$ are concerned or of negative parity for the TSD_4 band. There are five free parameters, three moments of inertia, the strength of the particle-core interaction, and the γ deformation. A very good description of all 62 experimental states is obtained, with a mean square error of about 80 keV. The newly obtained features evidenced in the present work enrich the knowledge about the wobbling properties of ^{163}Lu.

Key words: Nuclear Structure, Triaxial Nuclei, Wobbling Motion, Parity Symmetry, Signature Partners, Strong Deformation.

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