

## TIM 2021 Abstract

### A Novel Approach for the Semi-Classical Description of the Wobbling Properties in Odd- $A$ Nuclei

#### Core ideas

- importance of triaxial nuclei in nuclear physics
- difficulty in identifying the triaxial signatures experimentally
- new features of the current approach:
  - parity partner bands in  $^{163}\text{Lu}$
  - wave function admits states with positive and negative parities

#### Abstract

The wobbling motion in odd- $A$  triaxial nuclei (i.e., nuclei without any symmetry axis) is described through a semi-classical approach, by applying the variational principle on the initial quantal Hamiltonian. In the current formalism, the triaxial system admits eigenfunctions of both positive and negative parities. This implies that a nucleus in which wobbling motion occurs might have two wobbling bands of opposite parity that emerge from the angular momentum coupling of the same odd-particle, but with different core states. Quantities such as excitation energies and wobbling frequencies are analytically obtained, with expressions that depend on the triaxiality parameter  $\gamma$  and the moments of inertia. The expression of the classical energy function is studied in terms of its coordinates, and the total angular momentum and the total energy are graphically represented as surfaces within the angular momentum space. Their intersection provides the trajectories of the system at which the wobbling motion has a stable character. As a case study, the developed formalism is applied to the odd- $A$  nucleus  $^{163}\text{Lu}$ .