WOBBLING MOTION IN ODD-MASS LU ISOTOPES: REDEFINING THE BAND STURCTURE FOR TRIAXIAL NUCLEI

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The wobbling motion, a unique fingerprint for highly triaxial deformation in nuclei, is described for odd-mass Lu isotopes within a Particle Rotor Model where an even-even core is coupled to a single j-shell nucleon. Compared to the previous work that aimed to describe the wobbling states in Lu isotopes (where the Triaxial Strongly Deformed (TSD) bands were defined as zero (ground), one, two and three phonon wobbling bands, namely, TSD1, TSD2 TSD3 and TSD4), this new approach redefines the deformed states as two ground bands (zero phonon) for a coupling of the core's angular momentum R with the single particle angular momentum $j=i(13/2)$ equal to $I=R+j$, with $R=0,2,4,\ldots$ for TSD1 and $I=R+j$ and $R=1,3,5,\ldots$ for TSD2, a one-wobbling phonon band for TSD3 and another ground band for TSD4, where this time the core couples to a different particle with angular momentum $j=h(11/2)$. In this model, the moments of inertia (MOI) of the even-mass core are considered as free parameters, and they differ with respect to the odd-particle's angular momentum j, so the MOIs for TSD4 are different. The results for both excitation energies and transition probabilities are compared with the available experimental data for all the studied isotopes and the agreement between the two is fairly accurate. A phase diagram for the whole deformed system is also schematically developed, which represents the start of an outgoing fully consistent study that tries to locate regions where the *transversal wobbling* mode arises and also where wobbling motion is totally forbidden.