

# Influence of the octupole mode on nuclear high- $K$ isomeric properties

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The influence of the quadrupole-octupole deformations on the formation and magnetic properties of high- $K$  isomeric states in heavy even-even nuclei is discussed within a reflection-asymmetric deformed shell model with pairing correlations. The behaviour of the energies and magnetic dipole moments of two-quasiparticle (2qp) isomeric states is examined over a wide range in the plane of quadrupole and octupole deformations [1,2]. The effect of the octupole deformation on the s.p. orbitals which form the isomeric state as well as on the respective 2qp energy is evaluated. It is found that in a number of transuranium nuclei as  $^{234,236}\text{U}$ ,  $^{238,244}\text{Pu}$ ,  $^{244}\text{Cm}$  and rare-earths like  $^{154}\text{Nd}$  and  $^{154,156}\text{Gd}$  the magnetic moments of the neutron 2qp isomeric states exhibit a pronounced sensitivity to the octupole deformation. At the same time the respective 2qp energy surfaces show shallow minima at non-zero octupole deformation indicating a possible octupole softness of the system in the formation of high- $K$  isomeric states. Recently this behaviour of the 2qp isomeric energies was independently confirmed through configuration-constrained potential-energy-surface calculations in the nuclei  $^{232}\text{Th}$ ,  $^{234}\text{U}$  and  $^{236}\text{Pu}$  [3]. All these findings show the need of a deeper analysis in macroscopic-microscopic aspect as well as detailed experimental measurements of magnetic moments in heavy deformed nuclei.

## References

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