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Axial quadrupole and octupole dynamics in even-even and odd mass nuclei

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A quadrupole-octupole axially symmetric geometric model is proposed for the description of alternate parity bands in even-even nuclei [1,2] and parity doublet bands in odd mass nuclei [3]. The shape and the dynamical behaviour of the considered nuclei are ascertained from the phenomenology of the adopted model and the obtained parameters. The model parameters exhibit a regular evolution as a function of neutron number [3,4]. As a result, the quadrupole shape phase transition around N=90 is found to be accompanied by the increase of the vibrational character for the octupole deformation. A similar critical point is also identified in the A = 224–228 mass region of the Ra and Th nuclei. It marks different stages of the transition between static and dynamic octupole deformation with a specific spin dependence for the electromagnetic transitions. Model extrapolations are performed for various types of excited states, for which distinguishing spectral signatures are forwarded [5].

[1] R. Budaca, P. Buganu, A. I. Budaca, Phys. Rev. C 106, 014311 (2022).
[2] R. Budaca, A. I. Budaca, P. Buganu, Phys. Scr. 99, 035309 (2024).
[3] R. Budaca, At. Data Nucl. Data Tables, 101692 (2024).
[4] R. Budaca, P. Buganu, A. I. Budaca, Il Nuovo Cimento C 47, 25 (2024).
[5] R. Budaca, P. Buganu, A. I. Budaca, Eur. Phys. J. A 59, 242 (2023).

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