Quadrupole-octupole dynamics of alternate parity bands in heavy even-even nuclei

R. Budaca[1,2], **P. Buganu**[1], **A. I. Budaca**[1]

[1]Horia Hulubei" National Institute for R&D in Physics and Nuclear Engineering,
 RO-077125 Bucharest-Măgurele, Romania
[2]Academy of Romanian Scientists, RO-050044 Bucharest, Romania

Abstract

A unified description of alternate parity bands associated with dynamic or stable octupole deformation is achieved through a phenomenological model [1] based on an axially symmetric version of the quadrupole-octupole Bohr Hamiltonian [2, 3]. The smooth variation of the two model parameters allows a systematic description of the alternate parity bands within the isotopic chains of Ra, Th, U, and Pu nuclei. The numerical applications reveal that Ra and Th nuclei from the A = 224–228 mass region undergo transitions between static and dynamic octupole deformation at different critical spins. The model also predicts a specific spin dependence of the electromagnetic properties for these transitional nuclei.

References

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