Octupole shapes in non-zero-seniority states of well-deformed nuclei

L. Bonneau[1], **N. Minkov**[2], **Meng-Hock Koh**[3,4], **J. Bartel**[5], **H. Molique**[5], **N. Kontowicz**[1], **P. Quentin**[1]

[1]LP2I Bordeaux, UMR 5797, Université de Bordeaux, CNRS, F-33170, Gradignan, France

[2]Institute of Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences, Tzarigrad Road 72, BG-1784 Sofia, Bulgaria

[3]Department of Physics, Faculty of Science, Universiti Teknologi Malaysia, 81310 Johor Bahru, Johor, Malaysia

[4]UTM Centre for Industrial and Applied Mathematics, 81310 Johor Bahru, Johor, Malaysia

[5]IPHC, UMR 7178, Université de Strasbourg, CNRS, F-67000 Strasbourg, France

Abstract

Following the Skyrme-Hartree-Fock-BCS approach to two-quasiparticle states describing K-isomers of Reference [1], we search for octupole deformation in such states of even-A nuclei and one-quasiparticle states of odd-mass nuclei in the rare-earth region around $A \sim 154$ and in the actinide region around $A \sim 234$. In particular we investigate the mechanism favoring the appearance of such shapes and its potential interplay with the time-reversal symmetry breaking of the involved mean-field solutions. We find that, despite many observed parity-doublet bands [2], no octupole equilibrium shape develops in relevant two-quasiparticle configurations of ^{154}Eu as in Reference [3]. In contrast static intrinsic reflection asymmetry is found in actinide nuclei with mass number $A \sim 230$. Interestingly the 6^- K-isomer in ^{234}U is calculated to have an equilibrium octupole shape as found in Reference [4], contrary to the ground state shape.

References

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