

Microscopic analysis of octupole shape phase transitions and critical points in neutron rich actinides within the density functional framework

Vaia Prassa¹

¹Department of Physics, University of Thessaly, 3rd Km Old National Road Lamia -Athens, Lamia, 35100, Greece.

Octupole constrained energy surfaces, and spectroscopic observables of four isotopic chains of: Cm, Cf, Fm and No with neutron numbers $186 \leq N \leq 200$ are analysed using a collective quadrupole - octupole Hamiltonian (QOCH). The parameters of the Hamiltonian are determined by axially reflection-asymmetric relativistic Hartree-Bogoliubov calculations based on the energy density functional DD-PC1, and a finite-range pairing interaction. The theoretical results suggest quantum phase transitions from non-octupole to octupole deformed shapes and to octupole vibrations with increasing neutron number. ^{288}Cm is possibly close to the critical point of a simultaneous phase transition from spherical to prolate deformed and from non-octupole to stable octupole deformed configurations.

[1] Vaia Prassa, Eur. Phys. J. **A** (to be published)