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Description of Shape Transitions in Superheavy Nuclei within Covariant Density Functional Theory

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Abstract

A covariant energy density functional, adjusted to nuclear matter equation of state and empirical masses of deformed nuclei, is applied to study shapes of superheavy nuclei. Selfconsistent mean field calculations predict a variety of spherical, axial and triaxial shapes of long lived superheavy nuclei. Alpha decay energies and half lives are compared with available experimental information. A microscopic quadrupole collective hamiltonian, based on the relativistic energy density functional, is used to study the effect of explicit treatment of collective correlations in the calculations of Q_a values and half lives.