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Coexistence of nuclear shapes: mean-field and beyond

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The microscopic self-consistent mean-field (SCMF) framework based on an universal energy density functionals provides an accurate global description of nuclear ground states and collective excitations, from relatively light systems to superheavy nuclei, and from the valley of beta-stability to the particle drip-lines.

Based on this framework, structure models have been developed that go beyond mean-field approximation and include collective correlations related to restoration of broken symmetries and fluctuation of collective variables (generator coordinate method, collective Hamiltonian model). These models have become standard tools for nuclear structure calculations, able to describe new data from radioactive-beam facilities and provide microscopic predictions for low-energy nuclear phenomena of both fundamental and practical significance. Recent applications of the SCMF framework for description of of shape evolution and coexistence will be presented.

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