ID de Contribution: **19** Type: **Non spécifié**

Nuclear low-lying spectrum and shape coexistence

mardi 11 juillet 2023 14:00 (30 minutes)

The nucleus is a strongly correlated quantum many-body system. The large number of nucleons and the complex interaction between nucleons make the nucleus exhibit rich deformation characteristics, such as spherical, quadrupole deformation, octupole deformation, etc., and even shape coexistence occurs in specific regions. Nuclear shapes and related collective motions are reflected in the nuclear low-lying spectra, which can be measured directly in the experiments. Theoretically, we have developed microscopic collective Hamiltonian based on the covariant density functional theory (CDFT), and applied to the description of nuclear low-lying spectra and shape coexistence.
1) Using the five-dimensional collective Hamiltonian model based on CDFT (5DCH-CDFT), the mass, low-lying spectrum and quadrupole shape invariants of even-even nuclei are systematically studied. The known shape coexistence nuclear regions are reproduced, and new coexistence nuclear regions are predicted.
2) The quadrupole-octupole collective Hamiltonian (QOCH) and the core-quasiparticle coupling (CQC) model including octupole coupling based on CDFT are used to systematically study the octupole shape evolution and the parity-doublet structures of odd-A nuclei of actinide nuclei.
3) Very recently, we have established a seven-dimensional collective Hamiltonian including both octupole and triaxial degrees of freedom based on a multi-dimensional constraint CDFT. An illustrative calculation is done for the nucleus ^{144}Ba.

Author: LI, Zhipan (School of Physical Science and Technology, Southwest University, Chongqing 400715, China)

Orateur: LI, Zhipan (School of Physical Science and Technology, Southwest University, Chongqing 400715, China)

Classification de Session: Session