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Various facets of shape coexistence in neutron-rich nuclei within a beyond-mean-field approach

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Neutron-rich nuclei in the A=100 mass region display a large variety of shape coexistence phenomena dominating their structure and dynamics. Multifaceted impact of shape coexistence is revealed in the structural evolution with spin, excitation energy, and neutron number, the appearance of the isomeric states, their exotic decay including allowed and first-forbidden β decay. We studied the effects of shape coexistence in 96Y and 96Zr on the allowed and first-forbidden β decay of low- and intermediate-spin isomers and exotic features of the populated states as well as on the first-forbidden β decay of the 0– ground state of 92Rb to 0+ ground state and 2+ states in 92Sr and the properties of the involved states.
Aiming to a simultaneous description of the impact of shape coexistence and mixing on different exotic phenomena we investigated the structure and dynamics of the involved neutron-rich nuclei in the frame of the beyond-mean-field complex Excited Vampir variational model using the effective interaction derived from a nuclear matter G matrix based on the charge-dependent Bonn CD potential in a large model space. Recent results on the comprehensive treatment of different identified characteristics concerning the structure and dynamics of these nuclei manifesting multiple shape coexistence will be presented and compared to available experimental data.

1. A. Petrovici and A. S. Mare, Phys. Rev. C 101, 024307 (2020).
2. A. Petrovici, Phys. Rev. C 109, 024303 (2024).

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