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Shape evolution in the $A \approx 100$ region studied by fission-fragment γ -ray spectroscopy: recent progress and perspectives

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Nuclear fission provides broad access to neutron-rich nuclei in the $A \approx 100$ region and enables detailed γ -ray spectroscopy across the $N \approx 60$ shape-transition landscape. This region is characterized by a sharp onset of deformation at $N = 60$ near $Z \approx 38 - 40$, an abrupt loss of collectivity when moving to lower Z , and an increasing role of triaxial degrees of freedom toward higher Z . These features provide stringent constraints on microscopic and configuration-mixing descriptions of shape evolution.

Selected recent results are presented using two complementary experimental strategies. Event-by-event isotopic identification in inverse-kinematics fission at GANIL with the VAMOS++ spectrometer coupled to the AGATA γ -ray tracking array provides clean, nucleus-resolved spectroscopy. Within this framework, prompt γ -ray spectroscopy along the neutron-rich Kr chain has been used to map the evolution of collectivity across $N \approx 60$ and to delineate the low- Z limit of this deformation region.

In parallel, high-fold $\gamma - \gamma$ coincidence spectroscopy with large γ arrays (e.g., FIPPS and Gammasphere) enables complex level schemes to be disentangled and weak branches or isomer-linked structures to be accessed. Br and Nb case studies are used to illustrate how combining isotopic identification and high-fold coincidence approaches yields a more complete picture of shape evolution and coexistence, and constrains the interplay between axial and triaxial structures on the high- Z side of the transition.

Type of contribution

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