

Investigating shape evolution and the emergence of collectivity through the synergy of Coulomb excitation and beta decay

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The study of shapes and collectivity in atomic nuclei has been a major focus of nuclear structure ever since the observation of large electric quadrupole moments in the first half of the 20th century. A leading challenge has been to experimentally establish regions of spherical shape and regions of prolate, triaxial, and oblate deformed shapes, with the later being very limited. Another challenge has been to understand the evolution of shell structure, the emergence of collectivity, and their connection to shapes. The Mo-Ru isotopes exhibit a rapid onset of collectivity and the neutron-rich Mo-Ru region is expected to exhibit triaxial deformation in the low-lying states, mediated by a relatively rare instance of prolate-to-oblate shape evolution. The stable Cd-Pd region exhibits a smooth onset of collectivity with multiple conflicting interpretations. Results from recent Coulomb-excitation and beta-decay studies of ¹⁰⁶Mo and ¹¹⁰Cd will be presented. These recent experiments were conducted at the CARIBU-ATLAS facility of ANL using GRETINA-CHICO2 and at ORNL using CLARION. A survey of the equipment, techniques, and results will be presented.

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