Argonne NATIONAL LABORATORY

PHY Seminar

## Physics Division Seminar

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## Triaxial Deformation, Shape Evolution, and the Emergence of Collectivity

**Host: Shaofei Zhu**

**Monday, October 9, 2017 – 203, R150, 3:30 PM**

**The study of shapes 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 20$^{th}$ century. A leading challenge has been to experimentally establish regions of oblate deformation, which are very limited, and triaxial deformation. Another challenge has been to understand the evolution of shell structure, the emergence of collectivity, and their connection to shapes. 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; low-energy $2_2^+$ states are consistent with such an interpretation. The stable Cd isotopes, adjacent to the semi-magic Sn isotopes, exhibit an onset of weakly deformed collectivity with multiple conflicting interpretations; they have traditionally been considered textbook examples of vibrational collectivity. Results from recent Coulomb-excitation and β-decay studies of $^{106}$Mo, $^{110}$Ru, and $^{110}$Cd will be presented. These experiments were conducted at the CARIBU-ATLAS facility of ANL using GRETINA-CHICO2 and at ORNL using CLARION and the High Flux Isotope Reactor (HFIR). A survey of the equipment, techniques, and results will be presented.**

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