

Tuesday

Apr. 17th

At 3:45pm



Gamma – Ray Spectroscopy at the Limits

Abstract:

The study of nuclei far from stability is one of the most active and challenging areas of nuclear structure physics. Studies of the most exotic neutron-rich isotopes require an unprecedented combination of beam intensities and detection sensitivity, which will soon be realized here in the United States at the Facility for Rare Isotope Beams, with γ -ray spectrometers such as GRETA. I will present an update on the status of FRIB and GRETA, and highlight a few examples of the compelling physics to come. I will also discuss nuclear structure information accessible today, in particular that of one of the most exotic neutronrich nuclei currently accessible to experiment, ^{40}Mg , which lies at the intersection of the nucleon magic number $N=28$ and the dripline, and is expected to have a large prolate deformation similar to that observed in the neighboring lighter isotopes ^{32}Mg – ^{38}Mg . In addition, the occupation of the weakly bound $p_{3/2}$ state may lead to the appearance of an extended neutron halo. Thus ^{40}Mg offers an exciting possibility and a rare opportunity to investigate the coupling of weakly bound valence particles to a deformed core, and the influence of near threshold effects on collective rotational motion. I will present the results of an experiment carried out at RIBF RIKEN to study low-lying states in ^{40}Mg populated in a 1-proton removal reaction from a ^{41}Al secondary beam. The observed excitation spectrum is shown to reveal unexpected properties as compared to both neighboring (more bound) Mg isotopes and theoretical model predictions.

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Room 228

Refreshments will be
served at 3:30pm



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