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First Spectroscopy in 40Mg

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40Mg, with 12 protons and 28 neutrons, lies at the edge of the neutron drip-line and at the intersection of two established regions of nuclear deformation. It is the heaviest Mg isotope experimental accessible today. With the observed collapse of the N=28 neutron shell closure below 48Ca, 40Mg is expected to have a large static prolate deformation, and extends the “peninsula” of deformation reaching from N=20 to 28 in the Mg isotopes. In addition, valence neutrons are expected to occupy the low-l 1p3/2 state, and it is possible that the picture of 40Mg could be one of a well-deformed core surrounded by a neutron halo. With the convergence of effects relating to collective nuclear motion, single-particle effects, and potentially weak-binding, the structure of 40Mg provides a rare and important benchmark for nuclear theories extending to the dripline.
I will present first spectroscopic results for 40Mg, populated following one proton knockout from a secondary radioactive ion beam of 41Al at RIBF, and using the DALI2 gamma-ray detector.

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