SHAPE COEXISTENCE AROUND ^{68}NI

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Areas of rapid change in the structure of atomic nuclei with the addition or removal of a few nucleons provide important tests for our understanding of nuclear systems. In the region centered on ^{68}Ni ($Z = 28$), excitations across the shell gap can become energetically favored giving rise to low-energy intruder state configurations which compete with normal-order configurations. These intruder states exhibit features distinct from their normal-order configuration counterparts and have been theoretically predicted to be associated with different quadrupole characteristics, giving rise to a phenomenon called shape coexistence. A hallmark of this coexistence is the presence of low-energy 0^+ states in even-even nuclei. Low-energy 0^+ states have been identified in both ^{68,70}Ni. A drop in the energy of the state presumed to be associated with the proton cross-shell excitation is observed between $N = 40$ and $N = 42$ in agreement with theoretical predictions. Lifetime measurements of the low-energy 0^+ states enable B(E2) determinations which identify collective transitions. Indications for the systematic drop in energy of the proton cross-shell excitation have also been identified in the neighboring neutron-rich, odd-A Co isotopic chain based on the persistence of a low-spin, low-energy isomeric state. In this talk, I will present an overview of the intruder states in this region and their characteristics identified in a combination of beta-decay spectroscopy and multi-nucleon transfer reaction experiments performed at the National Superconducting Cyclotron Laboratory and Argonne National Laboratory.

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