

Spectroscopy of Neutron-Rich Al Isotopes at the Border of the Island of Inversion

Neutron-rich Al isotopes ($Z=13$) lie at the transition point between the classical shell gap $N=20$ and the Island of Inversion (IoI). Extended spectroscopy of the isotopes $^{32-35}\text{Al}$ was performed at NSCL. Each isotope has been produced via several reaction mechanisms (proton and neutron knockout, fragmentation, charge changing, inelastic scattering) which are sensitive either to the proton or neutron single-particle-like states or to collective states. The reaction products, i.e. fragments and prompt gamma-rays, were detected with the S800 Spectrograph and GRETINA, respectively.

Gamma-gamma coincidence analyses were performed and existing level schemes were updated. The $N=20$ nucleus ^{33}Al was produced via one- and two-proton and one-neutron knockout. A comparison of the cross sections for the populated states shows clearly states belonging either to the proton or neutron shells. The analysis of the parallel momentum distribution from one-neutron knockout offers complementary information to reported one-proton knockout data.

The preliminary results will be presented and compared to state-of-the-art shell model calculations.

Summary

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