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Intermediate-energy Coulomb excitation of ^{72}Ni

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Transition strengths in the Ni isotopes between N=40 and N=50 have been recently subject of extensive experimental and theoretical investigations, aiming to understand whether the tensor forces act to reduce the Z=28 shell closure as the neutron g9/2 orbit is filled towards 78Ni.
The effect of the Z=28 shell gap quenching and its evolution from 68Ni towards 78Ni would be reflected as an enhancement in the quadrupole transition stregths, compared with the seniority scheme predictions for the neutron g9/2 subshell. In 70Ni, the large B(E2) value for the first 2+ excited state obtained by Coulomb excitation was interpreted as an evidence of a large neutron-induced polarization of the proton core. This interpretation was reinforced with a later inelastic proton scattering experiment on 74Ni, in which a large deformation parameter was found, pointing to an enhanced quadrupole collectivity.
In the last year however, a much lower B(E2) value was deduced for 74Ni in a Coulomb excitation experiment. In that work, both experimental and shell-model calculations using the residual LNPS interaction, restores the normal core polarization picture in the neutron rich Ni isotopic chain and suggests that the B(E2) strength predominantly corresponds to neutron excitation.
The known experimental transition strengths by Coulomb excitation are constrained to 70Ni and 74Ni so far. We report on preliminary results from the Coulomb excitation of 72Ni performed at the Radioactive Isotope Beam Factory at RIKEN, Japan. The BigRIPS fragment separator was used to select and purify a secondary beam of 72Ni at 183 MeV/u. Coulomb excitation of 72Ni was produced by impinging the beam on a 950 mg/cm2 Au target. In order to identify the reaction products after the target, the ZeroDegree spectrometer was used, while the gamma-rays were detected with the 186 NaI(TI) detector array DALI2.

Primary author: MODAMIO, Victor (University of Oslo, Norway.)

Presenter: MODAMIO, Victor (University of Oslo, Norway.)

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