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MAGNETIC MOMENT MEASUREMENT IN 72ZN USING THE TRANSIENT FIELD TECHNIQUE AND COULOMB EXCITATON IN INVERSE KINEMATICS

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Nuclear magnetic moments are sensitive probes of the single particle properties of the nuclear wave function. The magnetic moment operator, with its explicit dependence on protons or neutrons involved in the configuration of the state and on their angular momenta, serves as a stringent test of the proposed main configuration of the nuclear state, as well as of other admixtures. It is, therefore, necessary to study nuclear magnetic moments of nuclei that lie close to nuclear shell closures or, in general, to any place on the nuclear chart where the valence nucleons start filling a higher lying orbital in the next major shell. A good example is provided by the N = 40 region around 68Ni on the neutron-rich side of the nuclear chart, where the positive parity νg9/2 orbital dives into the negative parity fp shell. It is a long standing issue whether N = 40 has to be considered as a new (sub)shell closure or whether the peculiar effects observed in the region can be traced back to the parity change between νg9/2 and the fp shell which prevents 1p1h states from contributing to the wave functions of positive parity states.

In experiment IS483, performed at REX-ISOLDE in November 2011, the g factor of the first excited 2+ state in 72Zn, g(21+), was measured using the Transient Field (TF) technique in combination with Coulomb excitation in inverse kinematics on a thick multilayer target. This technique has been successfully employed in the past in a large number of stable ion beam experiments [1]. However, only recently it was applied for the first time using low-energy radioactive ion beams at Oak Ridge [2,3].

In this contribution we will present the newly constructed transient field reaction chamber used in IS483 in conjunction with four MINIBALL cluster detectors, discuss the status of the analysis and finally compare the experimental result to a number of different large-scale shell model calculations.

[1] K.-H. Speidel et al., Prog. Part. Nucl. Phys. 49 (2002) 91.
[2] N. Benczer-Koller et al., Phys. Lett. B 664 (2008) 241.
[3] G. Kumbartzki et al, Phys. Rev. C 86 (2012) 034319.

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