Contribution ID: **21** Type: **Oral**

Collectivity of the 4+ state in 70Zn studied via Coulomb excitation

Wednesday, 12 June 2013 10:00 (15 minutes)

Shell evolution in the vicinity of 68Ni has recently attracted many theoretical and experimental investigations. By now it has been clearly established that the presumed subshell closure at N=40 is not very pronounced. While the intruder character of the 1g9/2 and 2d5/2 neutron orbital induces collectivity by pair excitations from the fp shell into the g9/2 orbital, the parity change hinders quadrupole excitations and therefore mimics the properties of a doubly magic nucleus in 68Ni, i.e., a high 2+1 energy and a low B(E2; 2+ $\longrightarrow$ 0+) value. Adding valence nucleons to the N=40 open shell leads to a rapid increase of collectivity, with an interplay of both collective and single-particle degrees of freedom. Such rapid changes indicate underlying complex effects and make this region ideal for testing theoretical calculations.

While measurements of B(E2; 2+-> 0+) values are useful to investigate the evolution of collectivity along isotopic chains, even more insight into the collective behavior can be gained by measuring lifetimes of higher-lying states. Almost all stable and neutron-rich Zn isotopes present an anomalously low B(E2; 4+ $\longrightarrow$ 2+)/ B(E2; 2+ $\longrightarrow$ 0+) ratio of 1 or less, which is normally observed only around closed shells. A strong increase of collectivity of the 4+ state was observed for 70Zn [2] and could not be explained in the framework of nuclear structure models. A recent lifetime measurement [2] yielded a considerably longer lifetime of this state, yet its accuracy was not sufficient to draw firm conclusions. Given the complex scheme of low-lying states in 70Zn including many nearly degenerate transitions, Coulomb excitation seemed a more appropriate method to study this nucleus. A dedicated Coulomb excitation measurement has been recently performed at the Heavy Ion Laboratory, University of Warsaw, to measure B(E2; 4+ $\longrightarrow$ 2+) in 70Zn. For this study, the EAGLE array coupled to a compact setup of 48 PIN-diodes was used. The preliminary result will be presented.

[1] D. Muecher et al, PRC 79 (2009) 054310

[2] C. Louchart et al, PRC, accepted for publication.

Primary author: Dr ZIELINSKA, Magda (CEA Saclay)

Co-authors: Dr DROUART, Antoine (CEA Saclay); Dr CLEMENT, Emmanuel (GANIL, Caen); Dr IWANICKI, Jedrzej (Heavy Ion Laboratory, University of Warsaw); Dr SREBRNY, Julian (Heavy Ion Laboratory University of Warsaw); Mrs HADYNSKA-KLEK, Katarzyna (University of Warsaw); Dr WRZOSEK-LIPSKA, Katarzyna (KU Leuven); Ms KESTELOOT, Nele (IKS KU Leuven, SCK Mol); Dr NAPIORKOWSKI, Pawel (University of Warsaw, Heavy Ion Laboratory)

Presenter: Dr ZIELINSKA, Magda (CEA Saclay)

Session Classification: Session 9