Contribution ID: **68** Type: **oral**

Isomer spectroscopy of 127Cd and 125Cd

Monday, 7 June 2010 10:00 (20 minutes)

The isomeric decays in 127Cd and 125Cd having two proton holes and three and five neutron holes respectively in the doubly magic 132Sn core have been studied. To date even mass heavy Cd isotopes have been investigated in detail [1,2]. The obtained sytematics exhibits evolution of single particle energies and addresses the onset of deformation when removing particles from the core nucleus. The experiment was performed at GSI, Darmstadt to investigate the structure of excited states in odd mass neutron rich Cd isotopes. Isomeric decays in the nuclei of interest were observed in the fragmentation reaction of a 136Xe beam at energy 750MeV/u on a 9Be target of 4g/cm2 thickness. The Cd ions were selected using the standard Bρ-ΔE-Bρ method in the FRagment Separator (FRS). Event by event identification of the particles in terms of their mass A and charge Z was provided by the standard FRS detectors. Isomers populated in the reaction were implanted in a plastic catcher surrounded by 15 Ge cluster detectors from RISING array [3] to detect the γ decays. In 127Cd , excited states with pure neutron ν (h11/2 -2 d3/2 -1) character analogous to 129Sn have been observed, whereas in 125Cd apart from the previously observed (19/2)+ isomer reported in Ref. [4], a new isomeric state has been detected . The level schemes of these nuclei have been established based on the obtained intensity balance and life time information. The new experimental information provides vital input for the shell model description of the evolution of neutron hole energies in neutron-rich nuclei in the N=82, Z=50 region. Comparison of the experimental results with shell model calculations will be discussed.

[1] A. Jungclaus, et al., Phys. Rev. Lett. 99, 132501 (2007).
[2] L. Cáceres, et al., Phys. Rev. C 79, 011301(R) (2009).
[3] S. Pietri, et al., Nucl. Instrum. Methods Phys. Res. B 261, 1079 (2007).
[4] M. Hellström, et al., GSI 2003-1, p.5 (2003).

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Session Classification: Shell structure Far From Stability I

Track Classification: Shell structure far from stability