Contribution ID: **70** Type: **Invited**

Probing nuclear structure with hydrogen-induced reactions : recent studies at the Radioactive Isotope Beam Factory, RIKEN (Invited)

Monday, 11 July 2016 15:30 (25 minutes)

Magic numbers of nucleons are not universal across the nuclear landscape and evolve as a function of neutron-to-proton ratio. The past years have produced vigorous work on the study of structure evolution : some historial magic numbers have been shown to disappear away from stability, while new magic numbers have been claimed. The role of different facets of the NN and NNN interactions to explain the nuclear structure evolution with isospin have been shown to be importante. Despite continuous efforts, the picture of the nuclear shell structure is not yet established experimentally nor theoretically.

Spectroscopy via reactions such as quasifree scattering, (in)elastic scattering and nucleon transfer with simple-structure targets (proton, deuteron, triton) are believed to provide reliable spectroscopic information from the measured cross sections to individual final states. Along this line, recent studies performed at the RIBF will be presented.

The medium-mass and heavy mass short lived nuclei are poorly known experimentaly and have to be further investigated in the coming years. First observables such as first 2+ excited states in even-even nuclei are key to explore ne regions of the nuclear landscape and draw a first picture of nuclear structure. The Radioactive Isotope Beam Factory in Japan has been for the last decade the main player in this important area. The SEASTAR collaboration performed the in-beam gamma spectroscopy of key neutron-rich nuclei at the limit of what can be done today with the use of the MINOS device [1] in combination with the DALI2 scintillator array [2]. Nuclei of interest have been produced by one and two-proton removal form a thick liquid hydrogen target. An overview of the program and recent results [3] will be shown.

Inelastic scattering data shed new light on the role of neutron excitations in the collectivity of light Sn isotopes [4], that has been interpreted with help of new QRPA calculations with the Gogny D1S force [5]. Inclusive cross sections for C and H induced knockout come out to be very similar (2.1 and 2.6 mb, respectively) [6]. New transitions have been observed in 102,104Sn [7].

[1] A. Obertelli et al., Eur. Phys. J. A 50, 8 (2014).

[2] S. Takeuchi et al., Nucl. Instr. Meth. A 763, 596 (2014).

[3] C. Santamaria et al., Phys. Rev. Lett. 115, 192501 (2015).

[4] A. Corsi et al., Phys. Lett. B 735, 127 (2014).

[5] M. Martini, S. Péru, M. Dupuis, Phys.Rev. C 83, 034309 (2011).

[6] L. Audirac et al., Phys. Rev. C 88, 041602(R) (2013).

[7] A. Corsi et al., in preparation (2016).

Primary authors: Dr OBERTELLI, Alexandre (CEA Saclay, RIKEN Nishina Center); Dr CORSI, Anna (CEA Saclay); Dr DOORNENBAL, Pieter (RIKEN Nishina Center)

Co-author: SEASTAR COLLABORATION, - (-)

Presenter: Dr OBERTELLI, Alexandre (CEA Saclay, RIKEN Nishina Center)