Contribution ID: **5** Type: **not specified**

The missing link in the Sn chain: Coulomb excitation of 102Sn

Tuesday, 16 September 2014 12:05 (20 minutes)

Abstract: Recent experiments using both low- and intermediate-energy Coulomb excitation of the unstable isotopes 106,108,110Sn [1-4] indicate a larger than expected collectivity of the first 2+ state in these isotopes. A new experiment for stable 114Sn in inverse kinematics has also further corroborated this picture by confirming the result of an earlier measurement but with a five-fold improvement in precision [5]. A series of experiments on 104Sn have shown a decreasing B(E2) trend towards 100Sn [6-8]. In particular the experiment at RIBF was of unprecedented accuracy [7]. These experimental results are currently not well reproduced by state-of-the-art large-scale shell-model (LSSM) calculations. With this proposal we aim to expand the measurements of the reduced transition probabilities for the first 2+ state in the Sn isotopic chain to 102Sn as well as to measure corresponding quantities in neutron deficient Cd isotopes. The purpose is to investigate correlations across the shell gap and thus to test the robustness of the 100Sn shell closure with respect to quadrupole response. The measurement of the B(E2) value in 102Sn which should exhibit a local minimum will finally answer the question of the similarity of the shell closure in 100Sn to the one in 56Ni. Such a minimum is not observed the N=3, fp shell for the Ni isotopes and for the N = 50 isotones above Z = 28 [9]. The combination of high-efficiency of the DALI2 setup, and increased intensity of 124Xe primary beam puts RIBF in a world-unique position as the only facility where a precision measurement of this kind can be carried out in the near future.

[1] A. Banu et al., Phys. Rev. C. 72, 061305(R) (2005)
[2] J. Cederkall et al., Phys. Rev. Lett. 98, 172501 (2007).
[3] C. Vaman, et al., Phys. Rev. Lett. 99, 162501 (2007).
[4] A. Ekstrőm et al., Phys. Rev. Lett. 101 012502 (2008).
[5] P. Doornenbal et al., Phys. Rev. C 78, 031303(R) (2008).
[6] G. Guastalla et al., Phys. Rev. Lett. 110, 172501 (2013).
[7] P. Doornenbal et al., http://arxiv.org/pdf/1305.2877v1.pdf., and PRC(R) submitted.
[8] V. M. Bader et al., Phys. Rev. C 88, 051301(R) (2013).
[9] T. Faestermann, M. Górska, and H. Grawe, Progr. Part.
Nucl. Phys. 68, 85 (2013) and ENSDF.

Primary author: GORSKA, Magdalena (GSI)

Co-authors: Prof. CEDERKALL, Joakim (Lund University); DOORNENBAL, Pieter (RIKEN)

Presenters: GORSKA, Magdalena (GSI); DOORNENBAL, Pieter (RIKEN)

Session Classification: Session 6