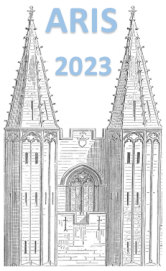

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Core-breaking effects around 100Sn: lifetime measurements in the most neutron-deficient Sn isotopes.

mardi 6 juin 2023 15:45 (15 minutes)

The long Sn isotopic chain is a formidable testing ground for nuclear models aiming at describing the evolution of the shell structure. Low-lying excited states roughly exhibits the typical behavior predicted by the generalized seniority scheme. However, the corresponding B(E2; $0^+ \longrightarrow 2^+$) values, approaching the N=Z=50 shell closure, have shown a presumed deviation from the expected parabolic behavior [1]. From a theoretical point of view, various attempts have been done to explain such experimental results, in particular by including core-breaking excitations in the shell-model calculations and promoting protons and neutrons from the g9/2 orbital across the shell gap [2]. From the experimental side, limited data are available beyond 104Sn and no lifetime information are known in this extremely neutron-deficient region, leading to a difficulty in a firm evaluation of any core-breaking effects.

In this contribution, we will report recent results on lifetime measurements in 102,103Sn. The experiment was performed in May 2021 at GSI using the AIDA Si active stopper surrounded by the EUROBALL HPGe and the FATIMA LaBr3 array. The nuclei of interest were identified in the FRS separator, following the production via fragmentation reactions of a 124Xe beam on a ^{9}Be target. The Sn isotopes have been stopped in the AIDA array and the decaying gamma rays collected by the FATIMA array, which allowed for a direct lifetime measurement with a precision up to few tens of ps. The analysis is ongoing and the preliminary results will be presented, together with their possible implications.

[1] G. Guastalla et al., Phys. Rev. Lett. 110, 172501 (2013); V.M. Bader et al., Phys. Rev. C 88, 051301(R) (2013); P. Doornenbal et al., Phys. Rev. C 90 (R), 061302 (2014).
[2] T. Togashi et al., Phys. Rev. Lett.121, 062501 (2018).

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