## The $\alpha$ -nuclear potentials along the Sn isotopic chain

Wednesday 16 October 2024 10:50 (20 minutes)

The lack of knowledge of  $\alpha$ -nuclear potentials in unstable nuclei constitutes one of the main uncertainties associated to the modeling of the production of heavy p-nuclei [1,2]. Global parametrizations used to model the elastic scattering cross section of  $\alpha$  particles on radioactive nuclei may differ up to a factor of 2, with a corresponding impact in the determination of  $(\gamma, \alpha)$  reaction rates. This highlights the need of experimental data in the region around the heavy p-nuclei to solve this issue.

In this talk I will present the joint efforts for a detailed study of the mass dependence of the  $\alpha$ -nuclear potentials along the tin isotopic chain, including the first measurement of the elastic scattering of  $\alpha$ -particles on exotic heavy nuclei. The radioactive beam experiment was performed at the HIE-ISOLDE facility at CERN. It profited from the use of innovative thin silicon films with high amounts of He [3] and the high intensity beams for the isotopes 108, 109 and 110-Sn produced at ISOLDE. Further detailed angular distributions were measured on the stable isotopes 116Sn and 118Sn at the ATOMKI facility. I will introduce both experimental setups and the current status of the analysis of the data. The results from these efforts will provide the first precise study of  $\alpha$ -nuclear potentials along the isotopic chain with the highest number of stable isotopes in nature, improving the knowledge of this nuclear quantity and as such reducing the uncertainties in network calculation studies.

## References:

- [1] A. Simon, et al. J. Phys. G 44, 064006 (2017)
- [2] W. Rapp, et al. Astrophys. J. 653, 474 (2006).
- [3] V. Godinho, et al. ACS Omega 1(6), 1229 (2016)

## Length of presentation requested

Oral presentation: 17 min + 3 min questions

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Nuclear Theory and Experiments

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