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Elastic α -scattering with exotic nuclei: pushing forward on p-process understanding

The production of p-nuclei remains a significant open problem in nuclear astrophysics, representing one of the most challenging research frontiers in the field. The α -nuclear potential serves as a critical parameter for modulating p-nuclei synthesis, being known as one of the key parameters to reduce uncertainties in the high atomic mass region of the p-process network. [1,2]

In this contribution, I will present the first experimental measurement of α -particle scattering on exotic heavy nuclei. The experiment was conducted at the HIE-ISOLDE facility at CERN, utilizing Sn isotopes with masses $A = 108, 109, 110$, and 112 . I will discuss the experimental setup, highlighting the innovative Si:He targets [3] that enabled this experiment. The data will be compared to global α -potential models from the literature, highlighting the need to further experimentally explore the unstable isotope regions of the astrophysical p-process.

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).

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