Beitrag ID: **47** Typ: **Talk Early Career**

Study Of Nucleosynthesis Processes With ISOLTRAP

Montag, 18. August 2025 16:00 (30 Minuten)

There is an astute idea of the different processes that assemble heavy elements (Z > 26) in our universe, but the production sites of some of them remain unclear. The processes that generate the most exotic nuclei such as r-process, for rapid neutron capture, and rp-process, for rapid proton capture are difficult to thoroughly describe because of the lack of experimental nuclear properties of those regions. Indeed, said properties are key inputs to calculate nucleosynthesis processes.
During this talk, I will be presenting the work that revolves around nuclear mass measurements with the ISOLTRAP experiment [1] at CERN. I will focus on astrophysical motivations for mass measurements in two extremes of the nuclear chart near the magic proton number Z = 50. On the neutron-rich side, there are masses relevant to the r-process around the neutron magic number N = 82 as shown in sensitivity studies of different models [2]. On the neutron-deficient side, the region around 100Sn is a key area for the rp-process, as it is considered the "end point"of the process [3] with the Sn-Sb-Te cycle. In this context, I will be looking at the recently evaluated masses in the region including, the ones measured by ISOLTRAP, and their effect on the rp-process.
Then, I will present the measurement method at ISOLTRAP and its challenges. As we are going for more exotic nuclei over time, the current techniques of production and measurements are reaching their limits. That is why we are working on technical developments to overcome some of these issues, mainly contaminations, and low yield cases. These advances are/will be used during next measurements of some interesting nuclei for the mentioned nucleosynthesis processes, such as, 96-98Cd [4] and 126-129Ag [5].

[1] Lunney, D. et al., J. Phys. G: Nucl. Part. Phys. 44, 064008 (2017)
[2] M. R. Mumpower et al., 10.1103/PhysRevC.92.035807 (2015)
[3] H. Schatz et al., 10.1103/PhysRevLett.86.3471(2001)
[4] M. Mougeot et al. INTC-P-682 (2023)
[5] P. F. Giesel , M. Benhatchi et al., INTC-P-742 (2025)

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