



NUSTAR monthly Seminar

Christine Hornung

GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt

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Search for new isotopes and studies of exotic nuclei in-flight and with stopped beams

Nuclear properties on the edges of our current knowledge provide access to unexpected and novel properties, which can be studied in state-of-the-art exotic ion beam facilities like the FRagment Separator FRS at GSI. In FAIR Phase-0, a series of experiments with exotic nuclei was performed with the FRS itself and at the FRS Ion Catcher [1]. In these experiments several methodological developments such as mass tagging [2], mean range bunging [3], a laser ablation carbon cluster ion source [4] and an advanced data analysis for multiple-reflection time-of-flight mass spectrometry were implemented. In my talk, I will present those methods together with obtained experimental results addressing different physics topics, for instance in the region below 100Sn [5] and on light lanthanides.

The search for new isotopes and the measurements of production cross sections give important information of the limits, which can be investigated by current methods in the laboratory, and are an important step in order to estimate the feasibility of future experimental opportunities. In this context, a new data management concept is under development and currently implemented, it is applied in the online & offline data analysis. Recent results, including new isotopes and production cross sections will be shown. Finally, I will give an outlook to future experiments in-flight and with stopped ions, especially with relevance for experiments at the Super-FRS at FAIR.

[1] doi:10.15120/GSI-2024-00534

[2] C. Hornung et al., NIM B 541 (2023) 257–259

[3] T. Dickel et al., NIM B 541 (2023) 275–278

[4] J. Yu et al., NIM A 1064 (2024) 169371

[5] A. Mollaebrahimi et al., PLB 839 (2023) 137833

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