



# NUSTAR monthly Seminar

Meng Wang

Institute of Modern Physics, Lanzhou, China

<https://indico.gsi.de/event/18300/>

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## Recent progress of mass measurements for short-lived nuclides at CSRe-Lanzhou

Accurate nuclear masses not only provide indispensable information on nuclear structure, but also deliver important input data for applications in nuclear astrophysics. The challenge today is to obtain accurate masses of nuclei located far away from the valley of stability. Recently, we have developed a brand new technique, the  $B\rho$ -defined isochronous mass spectrometry (IMS), at the cooler storage ring CSRe in Lanzhou [1,2]. Using the simultaneously determined revolution times and velocities of the stored ions, the relation between ions' magnetic rigidities and orbit lengths is established, allowing to determine the magnetic rigidity of any stored ion according to its orbit length. Consequently,  $m/q$  values of the unknown-mass nuclides are determined. High mass resolving power has been achieved covering a large  $m/q$ -range over the full  $B\rho$ -acceptance of the storage ring, starting a new era of the IMS. By using the  $B\rho$ -defined IMS, the masses of  $^{70}\text{Kr}$ ,  $^{66}\text{Se}$ ,  $^{64}\text{As}$ ,  $^{62}\text{Ge}$  were measured for the first time and the mass precision was improved for some other nuclides. The new mass results were used to study relevant problems in nuclear structure and astrophysics [3,4].

A new research facility, the High Intensity Heavy-ion Accelerator Facility (HIAF), is under construction and the commissioning is planned in the end of 2025. The current status of HIAF will be presented in the talk.

1. M. Wang et al., Phys. Rev. C 106, L051301 (2022)
2. M. Zhang et al., Eur. Phys. J. A 59, 27 (2023)
3. X. Zhou et al., Nature Physics 19, 1091–1097 (2023)
4. M. Wang et al., Phys. Rev. Lett. 130, 192501 (2023)

Convener: Y. Litvinov  
Secretary: R. Krause / D. Press  
Organized by: T. Dickel