国立研究開発法人理化学研究所　仁科加速器科学研究センター
第325回 RIBF核物理セミナー
RIKEN Nishina Center for Accelerator Based Science
The 325th RIBF Nuclear Physics Seminar

Bρ-defined isochronous mass spectrometry and mass measurements of short-lived nuclei at CSRe-Lanzhou

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A novel isochronous mass spectrometry, termed Bρ-defined IMS, has been established at the experimental cooler-storage ring CSRe in Lanzhou. It used two time-of-flight detectors installed in one of the straight sections of CSRe, thus enabling simultaneous measurements of the velocity and the revolution time of each stored short-lived ion. This allows for calculating the magnetic rigidity Bρ and the orbit length C for the well-known mass nuclei, giving a universal calibration curve, i.e., Bρ (C) function, which is then used to deduce the masses of all stored nuclides. The sensitivity to single stored ions, fast measurement time, and background-free characteristics of the method are ideally suited to address nuclides with very short lifetimes and small production yields. In the limiting case of just a single particle, the achieved mass resolving power allows one to determine its mass-over-charge ratio m/q with a remarkable precision of merely ~ 5 keV. Mass measurements for some f p-shell nuclides from fragmentation of 58Ni and 78Kr have been performed using the Bρ-defined IMS. New mass results and their impact on some issues in nuclear structure and nuclear astrophysics are presented and discussed in this seminar.

Jul 27th (Thu), 2023　13 : 30 ～
via Hybrid (Zoom + Nishina Hall)

＊ The talk will be given in English language.

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