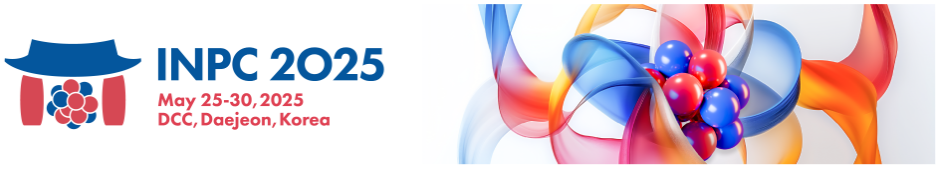


Contribution ID: **12** Type: **Contributed Oral Presentation**

# Present status on high-precision atomic mass measurements using MRTOF-MS at RIBF

*Friday, 30 May 2025 11:25 (15 minutes)*

One of the pillars for the study of exotic nuclides and astrophysical processes is the precise knowledge of the nuclear binding energy, which is directly and model-independently deduced from atomic-mass data. Tackling the increasing challenge to determine the mass of isotopes having low production yields and short half-lives, multi-reflection time-of-flight (MRTOF) mass spectrometry has grown from an initially rarely-used technology to the world's most commonly-used method for measurements with a relative mass precision down to $\delta m/m = 10^{-8}$. This technology has been developed at RIKEN's RIBF facility for about two decades in combination with gas-filled ion catchers for low-energy access of isotopes produced by the in-flight method.
In the recent past, three independent systems operating at different access points at RIBF, have provided substantial data in the medium- and heavy-mass region of the nuclear chart, reaching out to the superheavy nuclides. Recent achievements like high mass resolving power [1] followed by installations of α/β-TOF detectors [2] and in-MRTOF ion selection have tremendously increased the selectivity of the systems, allowing for background-free identification of the rarest isotopes.
In this contribution, I will give a short overview about the success of MRTOF atomic mass measurements using BigRIPS in the recent past [3-5], and further focus on new achievements from 2024. An outlook will be given for instrumentation, with a view to new MRTOF systems, and the combination with established methods for decay spectroscopy.

References:
[1] M. Rosenbusch *et al.*, Nucl. Instrum. Meth. A 1047, 167824 (2023).
[2] T. Niwase *et al.*, Theo. Exp. Phys. 2023(3), 031H01 (2023).
[3] S. Iimura *et al.*, Phys. Rev. Lett. 130, 012501 (2023).
[4] D. S. Hou *et al.*, Phys. Rev. C 108, 054312 (2023).
[5] W. Xian, S. Chen *et al.*, Phys. Rev. C. 109, 035804 (2023).

**Primary authors:** ROSENBUSCH, M. (RIKEN Nishina Center); Dr XIAN, W. (University of Hong Kong); Mr YAP, J. M. (University of Hong Kong); Dr FU, C. (University of Hong Kong); Dr HOU, D. S. (Institute of Modern Physics, Chinese Academy of Sciences); TAKAMINE, A. (Kyushu University); Dr IIMURA, S. (Rikkyo University); NIWASE, T. (Kyushu University); Dr ISHIYAMA, H. (RIKEN Nishina Center); Prof. WADA, M. (Institute of Modern Physics, Chinese Academy of Sciences); Dr CHEN, S. (University of York); Mr GAO, T. (University of Hong Kong); Dr HIRAYAMA, Y. (WNSC-IPNS-KEK); Dr ITO, Y. (JAEA); Mr JEUNG, T. T. (University of Tokyo); Dr KIMURA, S. (WNSC-IPNS-KEK); Dr KOJIMA, T. (RIKEN Nishina Center); Prof. LEE, J. (University of Hong Kong); Prof. MICHIMASA, S. (RIKEN Nishina Center); Prof. MIYATAKE, H. (WNSC-IPNS-KEK); Dr MOON, J. Y. (IBS Korea); Dr MUKAI, M. (WNSC-IPNS-KEK); Dr NAIMI, S. (IJCLab Orsay); Dr NISHIMURA, S. (RIKEN Nishina Center); Dr PHONG, V. H. (RIKEN Nishina Center); Dr SCHURY, P. (WNSC-IPNS-KEK); Dr SONODA, T. (RIKEN Nishina Center); Prof. WATANABE, Y. X. (WNSC-IPNS-KEK); Prof. WOLLNIK, H. (Mexico State University); Mr ZHA, S. (University of Hong Kong)

**Presenter:** ROSENBUSCH, M. (RIKEN Nishina Center)

**Session Classification:** Parallel Session

**Track Classification:** Nuclear Structure