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Multi-reflection time-of-flight mass spectrometer (MRTOF-MS) at RAON

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Nuclear mass is known as crucial information to determine the nuclear synthesis pathways occurring in specific stellar environments. These pathways significantly affect the isotopic abundance observed from astronomical observatories. In other words, the compiled mass database, provided through precise measurements, aids in the development of stellar evolution models and enables a deeper understanding of the evolution of stars.

A novel mass measurement device, the Multi-Reflection Time-of-Flight Mass Spectrometer (MRTOF-MS), is employed to study the nuclear mass of rare isotopes provided by RAON (Rare isotope Accelerator complex for ON-line experiments).

Currently installed in the ISOL beam line, the MRTOF-MS thermalizes the RI beams with low energy of less than 60 keV using a helium-buffer gas catcher. It minimizes the emittance of the ion bunches in the trap system and ultimately analyzes them after a few hundred reflections inside the MRTOF analyzer.

The entire system has been optimized using offline ion sources, and a high resolving power of around 100,000 has been achieved within less than 10 ms. The system is in the process of preparation for commissioning with an RI beam transported from the ISOL system.

In this presentation, the current status of the RAON MRTOF-MS, as well as future plans.

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