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MRTOF-MS at RAON: Construction and its applications

In the nuclear mass surface, the (two) proton- or (two) neutron-separation energies, deduced from the nuclear masses, actually the variations of them along the isotopic or isotonic chain illustrates the evolution of nuclear shell structure of the atomic nuclei. From the systematic study, we can obtain insights on the nuclear interaction between the nucleons.
To understand the stellar evolution and as its product the origin of the elements, the network calculation for the nuclear synthetic pathways is necessary, in which the nuclear mass database is indispensable.

The multi-reflection time-of-flight mass spectrograph (MRTOF-MS), proposed in 1990 [1], has been getting popular over many rare isotope beam facilities in the world. Its unique features - compactness, relatively short measurement time, and high mass resolution comparable to the Penning trap [2] are advantageous to study such short-lived nuclei of a few tens milli-second or longer.

A new rare isotope beam factory in Korea, RAON [3] will be able to provide various rare isotope beams for nuclear physics and the other applications. In the ISOL facility [4], one of RI beam production methods implemented in RAON, an MRTOF-MS has been recently constructed for the mass measurement study and other applications. In this presentation, current status of the MRTOF-MS, including the results obtained in the on-line experiments done with ISOL RI beams and other future applications, will be shared.

[Reference]
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