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Mass measurement in the neutron-rich Mo region using the new ZD MRTOF system

The ZD MRTOF system at RIKEN BigRIPS is a new high-precision multi-reflection time-of-flight (MRTOF) mass spectrograph for low-energy radionuclides, which is located downstream of the ZeroDegree spectrometer. A novel helium-filled gas-catcher cell based on radiofrequency (RF) ion guides has been developed to thermalize and transport radioisotopes (RIs) produced via in-flight fission and fragmentation at relativistic energies [1]. The stopped RI ions were extracted from the gas cell as atomic or molecular ions and transported to the MRTOF mass spectrograph [2,3] for direct mass measurements with high resolving power. The first online commissioning experiment was performed in winter 2020. During the commissioning, many atomic masses were measured in a series of parasitic experiments, which provides valuable input for nuclear astrophysics and nuclear structure studies [3]. In this contribution, we would like to report the mass measurement results of ^{111,113}Ag, $^{111-113}Pd$,^{111,113}Rh,^{111-113}Ru, $and^{111,112}Mo$. We have obtained a good agreement with the previously known
Based on the systematics of two-neutron separation energies(S_{2n}}) around N = 70, we discuss our results in the context of the sudden onset of nuclear deformation in this region visible by S2n values, which maximizes for Sr, Y, and Zr isotopes [4]. Furthermore, we compare our data with global mass models and present new results from a Bayesian machine-learning approach.

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