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Type: **Invited presentation**

Decay-correlated time-of-flight mass spectroscopy by MRTOF-MS

The multi-reflection time-of-flight mass spectrograph (MRTOF-MS) has proven to be a valuable tool for on-line atomic mass measurements. We have shown it to be capable of approaching $R_m=10^6$ with measurements times $t < 20$ ms, allowing high-precision determinations of the masses of even very short-lived species. The MRTOF-MS has been shown to be a particularly powerful tool for online measurements, as it can simultaneously analyze multiple ion species, maximizing the effective use of limited accelerator time.

By constructing specialized ion detectors that allow for precise determination of ion impact timing and can also detect radioactive decays, we have found that the MRTOF-MS can become an even more effective tool. Using decay-correlations we can perform half-life measurements simultaneous to mass measurements. At the same time, such decay-correlated time-of-flight measurements allows for a strong suppression of stable molecular background ions that are always extracted from even the cleanest gas stopping cell. This allows for high-confidence in measurements of very low yield species such as superheavy nuclides. It can also allow for confirmation the identity of exotic species whose masses have not been previously determined.

I will present recent results for decay-correlated time-of-flight mass spectroscopy measurements performed at WNSC facilities within RIKEN, for alpha- and beta-decaying nuclides. I will also present plans for future studies, including a new configuration that will allow for gamma-ray correlated mass spectroscopy at KISS.

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Classification de Session: Spectroscopy of heavy and superheavy elements

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