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Contribution ID: **3221** Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

(G*) Beam Development and Composition at TRIUMF with the TITAN MR-TOF Mass Spectrometer

Wednesday, 8 June 2022 12:00 (15 minutes)

For many rare isotope experiments it is important to know what isotopic species are being produced and their relative abundances. To this end, TRIUMF's Ion Trap for Atomic and Nuclear science (TITAN) was used in the commissioning of a new proton-to-neutron (P2N) converter target at TRIUMF. To determine relative rates of species in the produced rare isotope beam the TITAN multi-reflection time-of-flight (MR-TOF) mass spectrometer was employed. The TITAN MR-TOF provided ratios of isobaric beam components at several target temperatures and proton intensities. Key to the success of this program is the excellent mass accuracy $\left(\frac{\delta m}{m} \sim 10^{-7}\right)$, sensitivity and dynamic range $(10^4 - 10^8)$ of the TITAN MR-TOF. The short measurement time of the TITAN MR-TOF for mass determination also allowed for several first time isotopic mass measurements.

The TITAN MR-TOF has also been used for identifying and measuring rates of species in beam for an implantation experiment in collaboration with Lawerence Livermore National Lab (LLNL). This experiment aims to determine the half-life of the isotopic chronometer ^{146}Sm. TITAN was employed to measure and identify contaminants in the beam throughout the implantation, in the hopes of making an unambiguous measurement of the ^{146}Sm half-life and resolve experimental discrepancies in previous measurements.

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