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Advances in Precision Mass Measurements at TITAN

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TRIUMF's Ion Trap for Atomic and Nuclear science (TITAN) at TRIUMF performs mass measurements of unstable nuclei relevant to nucleosynthesis to both high precision and accuracy. The nuclear binding energies given by these masses are important parameters in determining the path of the r-process and the final abundances of the chemical elements. Penning trap mass spectrometry has been used at TITAN to successfully determine binding energies of neutron-rich Rb, Sr, Cd, and In isotopes, both approaching and on the r-process path. Performing measurements on ions in high charge states enhances the precision such that isomers can be resolved that would otherwise be indistinguishable from the ground state. Future plans include improving such measurements by commissioning a Cooler Penning Trap. Furthermore, a Multi-Reflection Time-Of-Flight mass spectrometer has recently been commissioned which is capable of performing mass measurements with precisions, $\frac{\Delta m}{m}$, of a few 10^{-7} for very short-lived species. This enhances TITAN's capabilities for measurements of nuclei relevant to nuclear astrophysics. I will discuss recent results and the technical developments driving this endeavour.

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