Abstract Submitted
for the APR21 Meeting of
The American Physical Society

High-precision mass spectrometry approaching the nuclear driplines: an investigation of Ne isotopes near the N = 20 Island of Inversion ANDREW JACOBS, University of British Columbia, ELEANOR DUNLING, University of York, TOBIAS MURBOECK, TRIUMF, COULTER WALLS, University of Manitoba, JENS DILLING, ANIA KWIATKOWSKI, TRIUMF, TITAN COLLABORATION — Mass spectrometry is a common technique used to probe the limits of nuclear existence. By measuring the binding energies of exotic nuclei, crucial clues pertaining to the evolution of nuclear shells, the emergence of deformation, and the existence of exotic structures can be discovered. However, the production rates and half-lives of the isotopes of interest drop sharply as they become increasingly exotic while background production rates remain high. This leads to the obstruction of the isotopes of interest inhibiting their measurement. To overcome this, the Multiple-Reflection Time-of-Flight Mass Spectrometer (MR-ToF-MS) was installed at TRIUMF's Ion Trap for Atomic and Nuclear science (TITAN) and performed its first on-line commissioning in 2017. Due to its high sensitivity and background suppression, the TITAN MR-ToF-MS has enabled mass spectrometry of previously inaccessible isotopes. Since its installation, the TITAN MR-ToF-MS has undergone several upgrades to improve the key performance factors of sensitivity, background suppression, and mass accuracy. These upgrades have allowed for access to more exotic nuclides resulting in measurement campaigns approaching the proton dripline and tracking the so-called 'archipelago' of shell-breaking effects, such as Ne isotopes approaching N = 20.

Andrew Jacobs
University of British Columbia

Date submitted: 08 Jan 2021 Electronic form version 1.4