Abstract Submitted
for the TSF19 Meeting of
The American Physical Society

Installation and Commission of TAMUTRAP Through Mass Measurement of Stable Isotopes[1] MARGARET MCDONOUGH, University of Dallas, DAN MELCONIAN, Texas A&M University, VELI KOLHINEN, PRAVEEN SHIDLING, The Cyclotron Institute — Texas A&M University's Cyclotron Institute recently built a Penning trap, coined TAMUTRAP, in order to test the current constraints on the weak interaction as it is described by the Standard Model. This summer, we removed the 90mm-diameter prototype trap and installed the two times larger, full-sized Penning trap. We commissioned the new trap by demonstrating its ability to measure the masses of stable isotopes to better than 60 parts per billion. These mass measurements enabled us to characterize and optimize operation of the trap to ensure proper ion manipulation before the complications of the planned beta decay experiment which will use short-lived radioactive ions. Mass measurements were performed using the time-of-flight ion cyclotron resonance technique: various radiofrequencies are applied to excite the ions in the trap, and when the applied frequency matches the resonant frequency of these ions, they accelerate and we observe a shorter time of flight to the micro-channel plate detector upon their exit from the trap. By analyzing the time of flight of the ions as a function of frequency, we determined the resonant cyclotron frequency of the ions, from which we deduced their masses to better than 60 parts per billion, in agreement with their known values.

[1]NSF grant PHY-1659847

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Date submitted: 08 Oct 2019 Electronic form version 1.4