

Mass Measurements Using TAMUTRAP and Upgrades to its Control System

The TAMUTRAP facility, located in the Cyclotron Institute at Texas A&M University, is based on a novel, large-diameter cylindrical Penning trap where radioactive ions are confined. The main objective of this experiment is to test the Standard Model by making precise measurements of the β - ν angular correlation parameter on several isospin $T=2$ super-allowed proton emitters (e.g. ^{32}Ar). In order to efficiently load the ions into the Penning trap, a radio frequency quadrupole (RFQ) gas cooler and buncher is used. The following work focuses on the calibration process used in order to remotely control the pressure of the gas cooling system and several high voltage power supplies used throughout the beamline. Several LabVIEW VI's were designed for this purpose. Additionally, the mass of ^{23}Na was measured relative to ^{39}K to demonstrate the mass measurement capabilities of TAMUTRAP. The measured mass of ^{23}Na was $22.989774(11)$ u, which agrees with the literature value within a precision of 1.9×10^{-7} .