Time-of-flight Mass Measurement of Neturon-rich Nuclei

Zach Meisel[1,2,3], S. George[4], T. Ahn[1,2], D. Bazin[2], J. Browne[1,2,3], B.A. Brown[2,3], F. Carpino[5], H. Chung[5], A. Estrade[6], M. Famiano[5], A. Gade[2,3], M. Matos[7], W. Mittig[2,3], F. Montes[1,2], D. Morrissey[8], J. Pereira[1,2], H. Schatz[1,2,3], J. Schatz, M. Scott[2,3], D. Shapira[9], K. Smith[1,10], J. Stevens[1,2,3], W. Tan[11], O. Tarasov[2], S. Towers[5], K. Wimmer[2,12], J. Winkelbauer[2,3], J. Yurkon[2], R. Zegers[1,2]

[1] *Joint Institute for Nuclear Astrophysics, Michigan State University, East Lansing MI, USA*
[2] *National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing MI, USA*
[3] *Michigan State University, Department of Physics and Astronomy, East Lansing MI, USA*
[4] *Max-Planck-Institut für Kernphysik, Heidelberg, Germany*
[5] *Western Michigan University, Department of Physics, Kalamazoo MI, USA*
[6] *University of Edinburgh, Department of Physics, Edinburgh, United Kingdom*
[7] *International Atomic Energy Agency, Vienna, Austria*
[8] *Michigan State University, Department of Chemistry, East Lansing MI, USA*
[9] *Oak Ridge National Laboratory, Oak Ridge TN, USA*
[10] *University of Tennessee, Department of Physics, Knoxville TN, USA*
[11] *University of Notre Dame, Department of Physics, South Bend IN, USA*
[12] *Central Michigan University, Department of Physics, Mount Pleasant MI, USA*

Nuclear masses can be used to identify changes in nuclear structure by observing changing trends in the two-neutron separation energy and are necessary for accurate modeling of extreme astrophysical environments. Beyond the limit of known masses, theoretical predictions are relied upon, however these predictions often disagree. For example, in the region of ^{62}Ti, where an island of inversion is predicted, theoretical mass predictions disagree by several MeV. The Time-of-Flight Magnetic Rigidity (TOF-Bρ) method provides a way to measure the masses of nuclei far from the valley of beta-stability with sufficient precision to map general features in nuclear structure and substantially reduce nuclear physics uncertainties in astrophysics simulations. We recently performed a TOF-Bρ mass measurement at the National Superconducting Cyclotron Laboratory where significant progress has been made on the neutron-rich side of stability in the Sulfur to Zinc region. Preliminary data and details of the analysis procedure will be discussed.