Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Maximizing the KURF Materials Screening Sensitivity using a Cosmic Ray Veto[1] STEPHANIE TOOLE, California State University, Northridge, CAMILLO MARIANI, Virginia Polytechnic Institute and State University, JESSICA CHRISTIAN, University of Maryland, Baltimore County — Secondary muons are high-energy particles created from the interaction of cosmic rays with Earth's atmosphere. Muons are a major source of high-energy background interference for underground particle detectors as they are difficult to shield. Virginia Tech has a high-purity germanium (HPGe) detector housed at the Kimballton Underground Research Facility (KURF) in Ripplemead, VA at about 300 m.w.e underground. While muons are partially shielded by the rock overburden at KURF, our team worked to integrate the HPGe detector with a two-layer muon detector to further veto persistent radiation caused by muon events. After installing the muon detector on top of the HPGe detector, we developed a readout program integrating both the HPGe detector readout system and the muon veto. We have added remote control capabilities and a logic gate redundancy to increase efficiency and select low energy events with increased photoelectron sensitivity. We calibrated the muon veto using various radioactive sources to determine the separation between gammas and muons in the energy range optimal for the HPGe detector. Ongoing analysis aims to enhance the integration and analyzing of radioisotopic samples in high-purity environments.

[1]NSF grant number 1757087

Stephanie Toole
California State University, Northridge

Date submitted: 07 Jan 2020 Electronic form version 1.4