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Next Generation Beta Decay Studies: Refinements in Detector System Calibration and Response Function Measurements KENNETH JUTZ, NCSU/Triangle Universities Nuclear Laboratory — High precision β-decay studies provide constraints on extensions to the standard model of particle physics. In order to continue to provide competitive limits with LHC measurements for new tensor and scalar interactions, the uncertainties in neutron and nuclear β-decay studies must be pushed to the 0.1% level and below. In order to control the systematic errors in particle detection at these levels, new detector systems (highly-segmented, large area, thick Si detectors) are being implemented. In order to realize gains in detector response, new capabilities must be developed to calibrate the detectors and characterize their response function. As an alternative to conventional sources mounted on thin foils, an electron beam provides a regular grid of calibration and detector response measurements which are essentially unperturbed by scattering effects. We have developed a 1 MeV electron accelerator that will deliver electrons in a tunable range covering the energy spectrum of neutron β-decay. We present our efforts to implement this accelerator as well as our development of thin backing foils and detector systems in this poster.

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