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Development of Pelletron Accelerator for High Precision Calibration of Silicon Detectors EMMANUEL ANEKE, Georgia Institute of Technology, CLAY FOGLEMAN, ALBERT YOUNG, North Carolina State University — Neutron beta decay (NBD) is the decay of a neutron into a proton by the emission of an electron and electron antineutrino. When we measure the emitted electron, it can have any energy from 0 keV to 783 keV. The emitted electron energies are difficult to precisely measure because of bremsstrahlung, the emission of electromagnetic radiation produced by the deceleration of an electron hitting an atomic nucleus. For the next generation of beta decay measurements, the precision of current bremsstrahlung simulations are not sufficiently precise, motivating direct measurement of the bremsstrahlung loss to calibrate NBD electron energy measurements. We are developing a pulsed and tunable Pelletron accelerator (mostly from spare parts) to provide these measurements. The development of our Pelletron system is the first concern before any bremsstrahlung measurements are made. Our project is to improve the performance of an N_2 purge and implement a suppressor electrode to reduce arcing, understand possible sources of coronal discharge loss, make a first detection of the electron beam, and start to develop a test beamline. These first steps were successful, greatly reducing charge loss and arcing, and confirming the production of over 200 keV electron beams.

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