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Development of a Conversion Electron Source for Timing Measurements and the Determination of Angle Dependent Detector Response in the UCNA Experiment A.J. CETNAR, Grove City College, L. BROUSSARD, Duke University, R.W. PATTIE, A.R. YOUNG, NCSU, UCNA COLLABORATION — The beta-asymmetry from polarized neutron beta-decay is proportional to (v/c)Acosθ, where θ is the emission angle of the beta particles, A is the beta-asymmetry parameter with a small energy dependence, and v is the speed of the beta-particle. In the UCNA experiment, ideally, the average value of cosθ=1/2 and the detected energy of the electrons determines the v/c factor. Scattering and energy loss in non-active materials in the trajectory of the emitted electrons introduces an angular dependence to the efficiency and response of the detectors. This deviation is corrected in the UCNA experiment based on results from Monte Carlo simulations. In order to directly establish the angle dependent corrections, we have developed a timing source that can be placed in the 1T magnetic field in the beta spectrometer. An avalanche photodiode detects Auger electrons emitted in coincidence with conversion electrons from ^{113}Sn providing the time of flight for the conversion electrons. Because the conversion electrons are essentially monoenergetic, the time of flight is determined by the pitch angle of the trajectories in the magnetic field of the spectrometer. We present an evaluation of the performance of the timing source and expected response in the UCNA experiment.

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