Abstract Submitted
for the HAW09 Meeting of
The American Physical Society

**Detecting Protons in the aCORN Neutron Beta Decay Experiment**[1] ANNA E. WALKER, Covenant College, EDWARD J. STEPHENSON, Indiana University — The aCORN experiment will measure the angular correlation coefficient "little a" between the electron and the anti- neutrino in neutron beta decay. The goal is to reduce the error on $a = -0.104 \pm 0.004$ (PDG value) to less than 0.001 to check the completeness of the $V - A$ model of the weak interaction and the value of $V_{ud}$ in the CKM matrix. The aCORN apparatus selects electrons and protons that, after a +2 kV acceleration, have oppositely directed momenta by restricting the acceptance using a series of tungsten collimators and a co-axial 350-G magnetic field. The lack of transverse anti-neutrino momentum for the selected decays creates two event groups with the anti- neutrino momentum either parallel or anti-parallel to the electron momentum and whose rate asymmetry measures $a$. These groups are distinguished using proton time of flight to a silicon detector. Proton detector electronics was tested for installation in a confined tube where it will be cooled with liquid nitrogen and mounted on a −30-kV acceleration platform to separate the proton signal from noise. An optical link transfers the signal to the data acquisition system. Spectra of 60-keV gamma rays from $^{241}$Am were used as a test signal.

[1]Supported in part by NSF REU.

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Date submitted: 31 Jul 2009 Electronic form version 1.4