Abstract Submitted
for the DNP10 Meeting of
The American Physical Society

Filtering, Processing, and Analysis of aCORN Project Data ANDREW PORTUGUESE, Hamilton College — The aCORN collaboration seeks to measure the electron-antineutrino correlation in free neutron beta decay characterized by the dimensionless parameter "*little a*" within a 1% relative uncertainty. Cold neutrons decay in the apparatus, and in-coincidence proton and electron detection allows the measurement of the beta electron energy as well as the proton time-of-flight (TOF). The configuration of the apparatus permits coincidence detection in two distinct decay cases, distinguished by the proton TOF, and the experimental asymmetry of these cases enables precise determination of a. Since many decays must be used, a data acquisition system with high throughput is necessary to acquire, filter, process, and store all gathered coincidence data in a usable form. aCORN utilizes a Pixie-16 data acquisition system to digitize signals in a 12-bit ADC at a rate of up to 100 MHz. Digitized detector events are time sorted, coincidences are identified, and each fully absorbed electron energy event is stored with its corresponding proton TOF. The analysis code can be adapted to store any other detected data. The principles of the aCORN data handling system will be discussed in this presentation.

Brian Collett
Hamilton College

Date submitted: 26 Jul 2010 Electronic form version 1.4