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Architecture and Performance of the Nab DAQ AARON SPROW, CHRISTOPHER CRAWFORD, University of Kentucky, NAB COLLABORATION
— The Nab experiment is being constructed to measure the electron-neutrino angular correlation in neutron beta decay. A precise time-of-flight measurement to determine the energy of a proton and a measurement of the energy deposited by an electron in coincidence are required to meet the target precision of $\Delta a/a \simeq 1 \times 10^{-3}$. Using the National Instruments PXIe-5171R, a new DAQ architecture, in which the level 2 trigger logic is removed by digitizing to continuous local ring buffers and migrating global coincidence logic to CPU software, has been developed. This new DAQ scheme results in a simpler, more flexible system. The full 2-chassis, 256-channel system has been constructed, and production grade firmware has been developed. The results of studies to characterize the DAQ performance and a discussion of improvements will be presented.

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