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GPU Based Nearline Analysis for the Nab Experiment[1] DAVID MATHEWS, University of Kentucky, THE NAB COLLABORATION COLLABORATION — The Nab neutron decay correlation experiment will use two 127-pixel silicon detectors digitized at 250 MS/s to record the energy and time-of-flight of electron-proton coincidences for full kinematic reconstruction of $\theta_{e\nu}$. Raw waveform data will be collected from 30 pixels per event at an anticipated rate of 50 kHz for offline analysis. While first-order timing and energy are available from the data acquisition firmware, higher resolution is desired for immediate analysis. We developed a GPU-based least-squares fitter which decompresses the raw datastream and fits the amplitude of multiple template waveforms and background noise in real time as part of the data acquisition pipeline. These same algorithms will be used on GPU farms for offline processing of the final results.

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