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Time Synchronization and Energy Calibration in the NOvA Detector

The NuMI Off-Axis ν_e Appearance (NOvA) experiment has been commissioning and operating its Far Detector in Ash River, MN for over a year. Upon completion this summer, the 14 kT detector will consist of more than 340,000 $4 \times 6 \text{ cm}^2 \times 15 \text{ m}$ cells of extruded PVC plastic filled with liquid scintillator and read out through avalanche photo-diodes (APDs). NOvA's neutrino oscillation analyses require precise correlation of events in the detector with the narrow $10 \mu\text{s}$ NuMI neutrino beam pulses. The technique to calibrate the timing system uses the abundant cosmic-ray muon flux at the detector's surface location to establish a precise network of timing offsets between the detector components spread over the 64 m spatial extent of the detector. Cosmic-rays are also used to measure the light yield and attenuation length within the detector cells and to establish the absolute energy scale of the detector. This poster will discuss results from the time synchronization and energy calibration performed with the cosmic-ray flux.

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Track Classification: Long Baseline Oscillations