

Fine-Grained Tracker as a Near Detector for LBNE

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The reference design of the near detector for the LBNE experiment is a high-resolution Fine-Grained Tracker (FGT) capable of precisely measuring all four species of neutrinos: ν_μ , ν_e , $\bar{\nu}_\mu$ and $\bar{\nu}_e$. The FGT is composed of a Straw-Tube Tracker (STT) with transition-radiation capability surrounded by a high resolution electromagnetic calorimeter (ECAL) and embedded in a dipole magnet. Muon-ID detectors instrument the iron-yoke of the magnet and the downstream and upstream stations outside the magnet. The STT is instrumented with Ar and other nuclear targets. The goals of the FGT is to constrain the systematic errors, below the corresponding statistical error in the far detector, for all oscillation studies; and to conduct a panoply of precision measurements and searches in Neutrino physics. We present sensitivity studies – critical to constraining the systematics in oscillation searches – of measurements of (1) the absolute neutrino flux, (2) neutrino-nucleon quasi-elastic (QE) and (3) resonance (Res) interactions. In QE and Res emphasis is laid in identifying in situ measurables that help constrain nuclear effects such as initial state pair wise correlations and final state interactions.

WG3: Accelerator Physics (Yes/No)

No

WG2: Neutrino Scattering Physics (Yes/No)

Yes

WG4: Muon Physics (Yes/No)

No

WG1: Neutrino Oscillation Physics (Yes/No)

No

Type of presentation

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