

STATUS OF THE T2K FINE GRAINED DETECTOR

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The Tokai-to-Kamioka (T2K) long baseline neutrino experiment will study muon neutrino oscillations with higher sensitivity than any previous experiment, as well as search for electron neutrino appearance. An intense muon neutrino beam will be produced at the JPARC facility in Tokai and analyzed at two points along the beam path, the first a set of detectors 280 m from the production point (ND280) and the second the SK water Cerenkov detector 295 km away. The ND280 detectors will measure the neutrino beam composition and energy spectrum before oscillation can occur, as well as various neutrino interaction cross-sections. The ND280 tracker consists of two Fine Grained Detectors (FGDs) that provides target mass and primary particle tracking and three Time Projection Chambers (TPCs) for muon and secondary particle tracking and kinematic measurements. The two FGDs in the tracker consist of layers of plastic scintillator bars read out by wavelength shifting fibers coupled to Multi-Pixel Photon Counters (MPPCs). MPPC signals are sampled and shaped by AFTER ASICs then sent to a Crate Master Board (CMB) that co-ordinates the movement of data to a Data Concentrator Card (DCC) located outside of the detector. Improvements to the CMB data transfer scheme and pulse finding algorithms are being developed to achieve the target detector sampling rate of 20 Hz. The first FGD module has been constructed and tested in the TRIUMF particle beam using the full readout electronics system. This talk will report on the design and construction of the FGDs and show preliminary beam test results, including observed particle interactions within the FGD.

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