Contribution ID: **20** Type: **Poster**

A Two Prong Selection for Quasi-Elastic Muon Neutrino Interactions in MINOS

Tuesday 19 May 2009 18:30 (2 hours)

The Main Injector Neutrino Oscillation Search (MINOS) is a two detector, long baseline neutrino oscillation experiment that uses the Neutrinos at the Main Injector (NuMI) beam at Fermilab. Both MINOS detectors are iron-scintillator tracking/sampling calorimeters. The MINOS near detector has recorded the world's largest dataset of neutrino interactions in the 0-10 GeV region. This high statistics data set can be used to make high precision measurements of neutrino interaction cross-sections.

The Q squared dependence in quasi-elastic scattering probes the axial form factor of the nucleon/nuclear target, and nuclear effects in neutrino scattering. There are curious discrepancies between recent measurements and older ones taken during the bubble chamber era. Two distinct methods for selecting quasi-elastic enhanced neutrino interactions in the MINOS near detector are presented with the resulting selection efficiency and purity. A method for selecting quasi-elastic enhanced neutrino interactions in the MINOS near detector which looks for two distinct prongs is presented with the resulting selection efficiency and purity.

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Session Classification: Poster session and cocktail reception

Track Classification: Poster session