Contribution ID: **169** Type: **not specified**

Analysis of Neutral Current Interactions in MINOS: A Search for Sterile Neutrinos

Monday 27 July 2009 17:30 (15 minutes)

A search for disappearance of active neutrinos over a baseline of 735 km was conducted using the NuMI neutrino beam and the MINOS detectors. The data analyzed correspond to an exposure of 3.18x10ˆ20 protons-on-target.
The data are fitted to neutrino oscillation models in which mixing with one sterile neutrino is assumed. A comparison of the neutral-current-like spectrum at the far detector with the expectation derived from the near detector measurement shows that the fraction of disappearing muon neutrinos converting to a sterile state is less than 52% at the 90% confidence level. In addition, the possibility of decay of active neutrinos into sterile species occurring concurrently with neutrino oscillations was analyzed. Pure neutrino decay is disfavored at 5.4σ as an alternate explanation to oscillations for the depletion of muon neutrinos at 735 km.
In this talk, the methodology employed in the analysis of neutral current neutrino events observed in MINOS is described and newly obtained results are presented.

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Session Classification: Neutrino Physics I

Track Classification: Neutrino Physics