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Measurements of Atmospheric Neutrinos using the MINOS Detector

This talk presents the latest atmospheric neutrino results from the MINOS experiment. The results are based on a data set of 1657 live-days, and combine together observations of contained vertex neutrino interactions and neutrino-induced upward muons in the MINOS far detector. The measured curvature of muons in the MINOS magnetic field is used to separate neutrinos and anti-neutrinos, and the observed ratio of neutrinos to anti-neutrinos is compared to the Monte Carlo expectation. The data are separated into bins of L/E resolution, and a maximum likelihood fit to the observed L/E distributions is used to determine the oscillation parameters separately for neutrinos and anti-neutrinos. Confidence limits are placed on the difference between these oscillation parameters. The techniques and current status of an analysis using this data set to search for the neutrino mass hierarchy are also reported.

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