Reconstructing Neutrino Interactions in MINERvA

BENJAMIN ZIEMER, UC Irvine — MINERvA is a high-statistics neutrino scattering experiment at Fermilab National Laboratory. The detector will be exposed to about $4 \times 10^{20}$ protons on target (POT) from the NuMI beamline starting early 2010. Before the FNAL shutdown in Spring '09, the MINERvA Tracking Prototype (TP) detector collected neutrino events from $10^{19}$ POT. This detector was comprised about 20% of the full MINERvA detector: a heavy nuclear target, twenty tracking planes, the full electromagnetic calorimeter and a reduced hadronic calorimeter. The fine grained nature of the detector yields coordinate residuals of 3.3mm, angular residuals of less than a degree and vertex residuals on the order of 4-6mm. Event topologies such as long muon tracks, short protons from both charged and neutral current reactions, multi-track pion production and inelastic showers have been seen in the data and have to be properly handled. This TP data is being used to finalize the reconstruction algorithms. I will review the current reconstruction program and the plans for its future application to full MINERvA data.

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