Abstract Submitted
for the DNP08 Meeting of
The American Physical Society

The Effects of Measurement Errors on Neutrino Angular Resolution in the IceCube Neutrino Detector LESLIE UPTON, Hampton University, ICECUBE COLLABORATION — The IceCube collaboration is actively pursuing neutrino detection to study astrophysical sources. These neutrinos are identified by the secondary muons detected within the IceCube detector array. The muon track is reconstructed using the information provided by the time information of Cherenkov photon illuminated digital optical modules (DOMs) within the detector. However, it is imperative to calculate how different measurement errors affect the reconstruction of the muon. A Monte Carlo simulation was developed in order to study these effects on the resolution of the muon reconstruction. The simulation, developed in ROOT, creates a muon in an array detector and uses time information from illuminated DOMs and Minuit to reconstruct the parameters of the muon without any knowledge of the original coordinates of the muon. Minuit provides precise results, with spikes around zero for the space angle between the original and reconstructed muon tracks. There are correlations between the number of illuminated DOMs, muon track length, and the angular resolution of the reconstructed track. Further work includes exploring photon statistics, energy dependence and more precise DOM information.

Leslie Upton
Hampton University

Date submitted: 14 Aug 2008 Electronic form version 1.4