Abstract Submitted
for the APR17 Meeting of
The American Physical Society

Using the Enhanced Starting Track Event Selection to Improve IceCube's Measurement of Neutrinos From the Southern Hemisphere KYLE JERO, University of Wisconsin Madison, ICECUBE COLLABORATION — The IceCube analyses that identify the astrophysical neutrino flux from the southern hemisphere must reject muons and neutrinos from the atmosphere. To do this, the analyses use the outer regions of the detector to identify and reject penetrating muon tracks produced by cosmic ray interactions with the atmosphere. By doing so they can remove atmospheric neutrinos and muons. By using the outer regions of the detector the analyses must also reduce the fiducial volume to the inner part of the detector. Here we will discuss a method that is optimized for finding muon neutrinos with a contained vertex. This selection utilizes the high quality directional information of muons to veto through-going events on a case by case basis. Once a direction and vertex have been determined, the likelihood for not seeing a hit on digital optical modules (DOMs) passed by the incident neutrino can be calculated based on the observed hits. This opens most of the instrumented volume up for neutrino detection. The results of this technique will provide identifiable astrophysical neutrinos above 10 TeV originating from the southern. This region is interesting for galactic sources and currently has the weakest sensitivity to neutrino point sources. Expectations from an initial data sample and simulation assuming potential diffuse and galactic fluxes will be shown. In addition to aiding in the understanding interesting southern sky sources, these new events can also assist in providing insight to astrophysical neutrino flavor ratios and the diffuse astrophysical flux.

Kyle Jero
University of Wisconsin Madison

Date submitted: 30 Sep 2016 Electronic form version 1.4