



Contribution ID: 165

Type: Poster

Neutrino source searches and a realtime neutrino alert stream in the southern sky with IceCube starting tracks

IceCube analyses which look for an astrophysical neutrino signal in the southern sky face a large background of atmospheric muons and neutrinos created by cosmic ray air showers. By selecting events which appear to start in the detector, atmospheric muons and neutrinos with accompanying muons are rejected in the southern sky, producing a sample with high astrophysical neutrino purity at lower energies than northern sky samples. Our new selection method looks specifically for muon tracks from a neutrino interaction with a vertex contained inside the detector volume. This starting track event selection has a high astrophysical neutrino purity above 10 TeV at declinations less than -30° which makes it ideal for use as a southern sky realtime neutrino alert stream. We will discuss neutrino point source searches using this event selection and look at the advantages of the starting track alert stream for multimessenger astrophysics.

Mini-abstract

New selection of starting tracks in IceCube for searches of southern astrophysical neutrino sources.

Experiment/Collaboration

IceCube Collaboration

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Session Classification: Poster Session 1