

A Search for Neutrino Sources with Cascade Events in IceCube

Authors: Steve Sclafani and Mirco Huennefeld for the IceCube Collaboration

Summary: This contribution describes the properties of a newly developed event selection and planned analyses to search for neutrino sources using 10 years of IceCube Cascades.

Event Selection:

- A new dataset has been constructed selecting 10 years of IceCube Cascade events.
- IceCube has traditionally used track-like events to look for sources of astrophysical neutrinos.
- Cascade events are more difficult to reconstruct, due to the scattering in the ice. However previous studies show they could be useful for southern sky, soft sources, galactic plane searches or extended sources due to the low background.
- This selection relies on deep learning classifiers to efficiently suppress background, resulting in lowering the energy threshold further.

Analyses:

- We will test emission from, galactic plane, from classes of galactic sources like Supernova Remnants, and from a catalog of mostly extragalactic sources.
- The resulting dataset represents a factor of 2-3 improvement in point source sensitivity when compared to previous IceCube Cascades.
- Sensitivity to diffuse galactic emission is improved by a factor of 3 when compared to previous IceCube cascades, and more when when compared to other analyses
- Only sensitivity is discussed here - results should be presented shortly