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Search for Astrophysical Tau Neutrinos with IceCube (20' + 5')

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High-energy (TeV-PeV) cosmic neutrinos are expected to be produced in extremely energetic astrophysical sources such as gamma ray bursts (GRBs) and active galactic nuclei (AGNs). The IceCube Neutrino Observatory at the South Pole has recently detected a diffuse astrophysical neutrino flux consistent with an all-flavor assumption. Identification of tau neutrinos among the flux is yet to occur. Though tau neutrino production is thought to be low at the source, equal fractions of neutrinos are expected at Earth due to averaged neutrino oscillations over astronomical distances. Above a few hundred TeV, tau neutrinos become resolvable in IceCube with negligible background from cosmic-ray induced atmospheric neutrinos. Identification of tau neutrinos among the observed flux is crucial to precise measurement of its flavor content, which could serve to test the fundamental neutrino properties over extremely long baselines, and possibly shed light on new physics beyond the Standard Model. I will present the analysis method and results from a recent search for astrophysical tau neutrinos in three years of IceCube data.

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