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Results of neutrino point source searches with 2008-2014 IceCube data above 10 TeV

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The emphasis on point source searches for astrophysical neutrinos has recently been strengthened by the unambiguous detection of high-energy astrophysical neutrinos by IceCube. So far the limited statistics and angular resolution of the relevant analyses do not resolve more than an isotropic emission of astrophysical neutrinos. We present the results of searches for point source neutrino emission using six years of integrated IceCube livetime, of which three years use the completed IceCube detector. Focusing on track-like events induced by charged-current muon-neutrinos, we attain a large statistics sample of more than 650,000 event candidates on the full sky with median angular resolution from 1° down to 0.4° , improving with higher energy. For the Southern hemisphere, the main background consists of bundles of muons created in extensive air-showers, whereas the Northern Hemisphere is dominated by neutrinos created in extensive air showers. With the hard energy spectrum observed in the diffuse astrophysical flux, a possible signal can be identified at high neutrino energy. Using an unbinned likelihood maximisation search for local clustering, IceCube is sensitive to sources in the Northern sky substantially below $10^{-12} \text{ TeV}^{-1} \text{ cm}^{-2} \text{ s}^{-1}$ for a benchmark E^{-2} -spectrum. We report about the status of these searches and the implications on the nature of the observed flux as well as single source candidates.

Collaboration

IceCube

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