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A combined analysis of the diffuse astrophysical neutrino flux using IceCube's high-energy through-going muon tracks and cascades

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The IceCube Neutrino Observatory has been observing a diffuse flux of high-energy astrophysical neutrinos in multiple detection channels since 2013. These detection channels are complementary with respect to event topologies such as muon tracks and cascades, the sensitive energy range, and backgrounds. In this analysis we combine two of these channels, through-going muon tracks and contained cascades, into a single fit of IceCube's high energy neutrino data which will lead the way towards a global picture of the astrophysical neutrino flux. The complementary properties of the two event samples reduce the overall uncertainties in signal and background, allowing for a consistent measurement of the astrophysical neutrino flux properties: measuring the energy spectrum and flavor composition as well as challenging the widely used single power-law flux model. We will present an approach for this combined fit with a decade of IceCube data.

Collaboration name

IceCube

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