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Combined Analysis of the High-Energy Cosmic Neutrino Flux at the IceCube Detector

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With the discovery of a high-energy astrophysical neutrino flux, the IceCube Neutrino Observatory, located at the geographical South Pole, has opened the field of neutrino astronomy. While evidence for extraterrestrial neutrinos has been found in multiple searches, it was not yet possible to identify their sources; they appear as an isotropic excess. Nevertheless, it is possible to constrain the properties of the sources by measuring the energy spectrum and the flavor composition of the flux, which has been done in several analyses. Typically, these analyses concentrate on specific event classes, such as events with interaction vertices inside the instrumented volume or throughgoing, ν_μ -induced tracks from the Northern hemisphere. Here, we present the latest results from a global analysis, combining the event samples of multiple individual searches, thus covering all detection channels. We derive the energy spectrum and flavor composition of the astrophysical neutrino flux. In addition, we show projected constraints on the astrophysical flux that can be obtained with 10 years of IceCube data.

Collaboration

IceCube

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