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## Measurement of the Astrophysical Diffuse Flux Spectrum using Muon Neutrino Events with a Contained Vertex in IceCube

*Wednesday, August 10, 2022 2:00 PM (20 minutes)*

The IceCube Neutrino Observatory is a cubic kilometer-sized detector designed to detect astrophysical neutrinos. However, cosmic rays interacting in the atmosphere produce a significant number of muons in the southern equatorial sky. This work outlines a new dataset with large background rejection and high signal efficiency using a boosted decision tree. This dataset is also effective at rejecting atmospheric neutrinos that are often accompanied with muons; this so-called self-veto effect allows us to reject atmospheric neutrinos in the southern sky significantly. We search for muon neutrinos that undergo a charged current interaction within the detector volume resulting in a neutrino energy resolution of  $\sim 25\%$ . In addition, our selection techniques target muon neutrinos giving us a median angular resolution of 1 degree. The excellent signal purity and event properties of this dataset allow us to measure the astrophysical diffuse flux between 5 TeV and 1 PeV. We show this as a measurement of the astrophysical diffuse flux modeled as a single power law. We also show measurements of the flux assuming more complex models such as broken and piecewise power laws.

### Collaboration name

IceCube Collaboration

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