

Three-flavor oscillations and beyond the Standard Model physics with IceCube DeepCore

IceCube DeepCore is a subarray of the IceCube Neutrino Observatory that gives the detector sensitivity to GeV-scale atmospheric neutrinos by virtue of the closer spacing of its digital optical modules. With ten years of observation of GeV neutrinos over a range of long baselines, IceCube has placed competitive constraints on the atmospheric oscillation parameters $\sin^2(\theta_{23})$ and Δm_{32}^2 and on the sterile mixing matrix elements $|U_{\tau 4}|^2$ and $|U_{\mu 4}|^2$. Several additional analyses are underway that leverage DeepCore's atmospheric neutrino data. These include measurement of ν_τ appearance and several analyses that use the effect of Earth's matter on neutrino oscillation, including measurement of the neutrino mass ordering, validation of the broad features of the preliminary reference Earth model (PREM), and measurements constraining additional physics beyond the Standard Model.

Working Group

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