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Differential Limit on the High-Energy Cosmic Neutrino Flux with KM3NeT/ARCA21

Inspired by the detection of KM3NeT-230213A, the most energetic neutrino ever observed, we present a statistical analysis of the diffuse neutrino flux at the highest energies. To enhance the estimation of the muon background, we refine the modeling of atmospheric backgrounds and extend the capabilities of the MUPAGE generator with modifications optimized for ultra-high-energy neutrinos. Furthermore, we develop new event selection criteria and apply a likelihood ratio technique to evaluate the detector sensitivity to diffuse fluxes at extreme energies. Our analysis incorporates a range of cosmogenic neutrino models, including those from existing literature and additional scenarios generated within a simplified framework. This study provides new insights into the ultra-high-energy neutrino flux and demonstrates the potential of KM3NeT to explore this extreme energy regime.

Collaboration(s)

KM3NeT

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