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Probing for Gamma-Ray Emission near KM3-230213A Neutrino Event with VERITAS

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The recent announcement of the detection of the ultra-high-energy (UHE) neutrino event KM3-230213A by the KM3NeT telescope represents a critical opportunity to explore the origins of cosmic neutrinos and their potential gamma-ray counterparts. With an inferred neutrino energy exceeding 100 PeV, this event stands as the most energetic neutrino observed to date. The large offset from the galactic plane (˜11°) and presence of several blazars with temporally-correlated multi-wavelength counterparts within the 3° localization region raises the possibility of an extragalactic origin. Additionally, the event's apparent tension with IceCube constraints suggests that it could be transient in nature rather than cosmogenic. VERITAS conducted a targeted follow-up campaign to search for very-high-energy (VHE, >100 GeV) gamma-ray emission associated with KM3-230213A. Observations were performed in February and March 2025, using a four-point wobble strategy centered on the best-fit neutrino position, covering nearly the entire 90% confidence region. These observations probe potential hadronic gamma-ray emission from a common origin with the neutrino, placing constraints on particle-acceleration scenarios. We present the results of this search, including upper limits on VHE gamma-ray flux and their implications for possible source models of KM3-230213A.

Collaboration(s)

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