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Searching for TeV gamma-ray emission associated with IceCube high-energy neutrinos using VERITAS

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A potential clue to finding the long-sought-after sources of cosmic rays is the recent observation of an astrophysical flux of high-energy neutrinos by the IceCube detector, since these possibly originate in hadronic interactions near cosmic-ray accelerators. While the neutrino sky map shows no indication of point sources so far, it is possible to utilize the sensitivity of TeV Cherenkov telescopes, such as VERITAS, to search for hadronic gamma-ray emission at the neutrino locations.

Over the last 2 years, the positions of neutrino events detected by IceCube have been observed using the VERITAS array. Observations have been limited to muon neutrino events, since their typical angular reconstruction uncertainty is below 1° , smaller than the 3.5° diameter of the VERITAS field of view. The location of VERITAS further constrains the neutrino event positions that can be observed to those located in the northern sky, or at moderate southern declinations. The list of observed positions was selected from published results and a set of high-energy muon tracks provided by IceCube. We present the current status and some preliminary results from this program.

Collaboration

IceCube & VERITAS

Registration number following "ICRC2015-I/"

534

Author: Dr SANTANDER, Marcos (Barnard College, Columbia University)**Presenter:** Dr SANTANDER, Marcos (Barnard College, Columbia University)**Session Classification:** Parallel GA01 EGAL**Track Classification:** GA-EX