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Multi-Year Search for Ultra-High Energy Neutrinos with AMANDA-II

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Abstract content

AMANDA is a high volume neutrino telescope designed to search in the down-going direction for muons from astrophysical muon-neutrinos. It is possible to extend the range of AMANDA to search for neutrinos with extremely high energies. The atmospheric neutrino flux becomes negligible above 10^{15} eV, so this value serves as rough energy threshold for this search. Above 10^{16} eV the Earth is essentially opaque to neutrinos. This, combined with the limited overburden above AMANDA (roughly 1.5 km), means that ultra-high energy neutrinos will be concentrated at the horizon. The background for this analysis consists of bundles of downgoing, high energy muons from the decay of cosmic rays in the atmosphere. These bundles can be spread over areas as large as one third of the AMANDA array. Separation of signal from the background takes advantage of the fact that events from these bundles of muons have a lower light density than events from a single ultra-high energy muon. Using this as well as the differences in geometrical acceptance and hit topology it is possible to separate signal from background. Three years of data from 2000 - 2002 have been searched and the results will be presented. Methodology and results for a new search using 2003 data will also be presented.

If this papers is presented for a collaboration, please specify the collaboration

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Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 5 (HE part 2), pages 1429-1432

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