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A MC simulation of neutrino showers and their detection with the Pierre Auger Observatory

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Abstract content

High energetic neutrinos coming from space can interact either in the atmosphere or in the Earth. In the first scenario neutrino may initiate extensive air showers (EAS) in the atmosphere, but due to their very small interaction cross section in air only very inclined EAS might be detectable by large detectors. In the second scenario neutrino may interact inside the Earth and produce a charge lepton which after several interactions emerges from the Earth and decays above the ground. Among the three neutrino species, the showers initiated by tau neutrinos are the most promising to be detected. In this paper we present a study about the possibility to detect neutrino induced extensive air showers at the Pierre Auger Observatory. The Monte Carlo simulations performed take into account the details of the neutrino propagation inside the Earth, the air as well as the surrounding mountains which are modelled by a digital elevation map. Details on the sensitivity with respect to the incoming direction as well as the aperture, the total observable event rates on the basis of various assumptions of the incoming neutrino flux and an upper limit for ultra high energy neutrinos, above 0.1 EeV, are calculated.

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

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olive, 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 1479-1482

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