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Configuration studies for a cubic-kilometre deep-sea neutrino telescope – KM3NeT – with a new fast and flexible approach

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Abstract content

Theoretical predictions for neutrino fluxes indicate that km3 scale detectors are needed to detect certain astrophysical sources. The three Mediterranean experiments, ANTARES, NEMO and NESTOR are working together on a design study, KM3NeT, for a large deep-sea neutrino telescope. A detector placed in the Mediterranean Sea will survey a large part of the Galactic disc, including the Galactic Centre. It will complement the Ice Cube telescope currently under construction at the South Pole. Furthermore, better optical properties of sea water, compared to Antarctic ice, will allow a better angular resolution and hence better background rejection.

The main work presented in this paper is to evaluate different km3 scale detector geometries in order to optimize the muon neutrino sensitivity between 1 and 100 TeV. For this purpose, we have developed a detailed simulation – based on the Mathematica software - for the muon track production, the light transmission in water, the environmental background (potassium and bioluminescence) and the detector response. To compare different geometries, we have used the effective neutrino area and the angular resolution obtained after the full standard reconstruction chain.

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

KM3Net Consortium

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 1413-1416

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