

Towards a Design for a Large Scale Underwater Neutrino Telescope, Test Deployments, and the Site Studies

(For the KM3NeT collaboration)

The KM3NeT consortium has completed a Technical Design Report (TDR) for a proposed multi-cubic-kilometer sized underwater neutrino telescope that will be deployed in the Mediterranean Sea. Highlights of the contents of the TDR will be presented in three poster presentations. In this second of three presentations we will focus on the proposed design options for such a device, and also discuss some recent test deployments and studies at the possible sites.

A large underwater neutrino telescope is in essence a three dimensional lattice of light detecting devices (optical modules –OMs) deployed in the deep sea. The OMs register the Cherenkov light produced by the passage of charged secondaries (primarily muons) from neutrino interactions. The time and amplitude of the detected light pulses are used to reconstruct the muon trajectories and from these infer the neutrino directions. At this time, two alternative designs for the OMs and their arrangement are being considered: a multi-PMT OM option with many smaller pmts housed in a glass sphere and deployed as a single vertical string structures, and an alternative where the OMs are deployed in clusters with some lateral extent. Besides the two designs, recent deployment of test structures in the Ionian Sea will be described. The proposed sites (near the Peloponnese, Sicily, and Toulon) have been the subject of significant oceanographic studies to determine the relevant sea water and sea environmental parameters for the neutrino telescope.

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