

KM3NeT: Neutrino astronomy and oscillation research in the Mediterranean Sea

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Abstract content

The KM3NeT Collaboration is currently constructing the first phase of a next-generation neutrino telescope on two sites in the Mediterranean Sea: KM3NeT-FR near Toulon (France), and KM3NeT-IT near Capo Passero in Sicily (Italy). Each site will host a three-dimensional array of thousands of photosensors that will detect the Cherenkov light resulting from neutrino interactions in the vicinity of the detector. The KM3NeT detector relies on a novel design for its Digital Optical Modules, housing 31 three-inch photomultiplier tubes enclosed in a glass sphere, which provide enhanced photon counting and directionality performances.

Two configurations have been defined that are optimised for studies in different ranges of energy. KM3NeT-FR will be mainly dedicated to the study of oscillation effects and the measurement of the neutrino mass hierarchy with \sim GeV atmospheric neutrinos (ORCA). KM3NeT-IT will focus on high-energy (TeV-PeV) neutrino astronomy, aiming at the exploration of the all-flavour neutrino sky with unprecedented resolution (ARCA).

This contribution will present the status of the first phase of the KM3NeT detector implementation, and survey the physics potentialities of the telescope with respect to its twofold aim.

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