

Status, recent results and outlook of the KM3NeT neutrino telescope in the Mediterranean Sea

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The KM3NeT neutrino telescope is a research infrastructure currently under construction in the Mediterranean Sea. It consists of two deep-sea detectors: ORCA, near Toulon, France, and ARCA, off the coast of Sicily, Italy. ORCA is designed for precision study of atmospheric neutrinos in the GeV range, whereas for ARCA the aim is to detect and study cosmic neutrinos of higher energies. KM3NeT offers an infrastructure in the Northern Hemisphere, with a good view towards the Galactic Center.

The first detection units of ORCA and ARCA are taking data. In this presentation a selection of recent results will be shown, with emphasis on searches for astrophysical neutrinos. KM3NeT recently detected a cosmic neutrino with an energy of more than 200 PeV, and its detection and interpretation is discussed. KM3NeT searches for neutrino point sources and for a diffuse flux, from the full sky as well as from the galactic plane, are shown. Stacking analyses involving various sources including blazars, active galactic nuclei, Seyfert galaxies and starburst galaxies are presented. Further searches include those for neutrinos from transient events including fast radio bursts, gravitational wave events, microquasars or tidal disruption events.

In the context of multi-messenger astronomy, KM3NeT deploys a rapid analysis response to external alerts and results will be shown. KM3NeT also generates alerts; an alert system for core-collapse supernova neutrinos is already operational, and alert generation for high energy cosmic neutrino candidates is expected to be operational soon.

We will conclude with an outlook towards detector completion and future scientific capabilities of the full infrastructure.

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