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The KM3NeT experiment and its prospects for multi-messenger physics

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The KM3NeT collaboration is building two underwater neutrino detectors in the Mediterranean: the ARCA (Astroparticle Research with Cosmics in the Abyss) and ORCA (Oscillation Research with Cosmics in the Abyss) detectors.
ARCA is located off the Sicilian coast of Capo Passero and aims to detect and identify astrophysical neutrino sources. The ORCA detector, located off the French coast of Toulon, has been optimised for the detection of atmospheric neutrinos in the GeV range, with the main aim of studying the fundamental properties of neutrinos. The two detectors, ARCA and ORCA, will allow the study of neutrino astronomy from MeV to tens of PeV.

The first detection units, which are strings containing the optical sensors, have already been deployed by the KM3NeT collaboration at the French and Italian sites. The two detectors are currently taking data in partial configurations and have already produced some physics results, demonstrating the great potential of the two detectors for the coming years.

The multi-messenger programme, which involves real-time analysis of interesting astrophysical sources seen by other experiments in gravitational waves, X-rays, gamma rays and other wavelengths, is already active. The sending of real-time neutrino alerts to the astronomy community to trigger follow-up observations of interesting neutrino events is ongoing.

The status, physics results and scientific perspectives of KM3NeT will be presented, with particular emphasis on the multi-messenger programme.

Primary author: Dr CONIGLIONE, Rosa (INFN - Laboratori Nazionali del Sud)

Presenter: Dr CONIGLIONE, Rosa (INFN - Laboratori Nazionali del Sud)

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