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Unraveling Neutrinos with KM3NeT

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Neutrinos are interesting elusive particles that can provide significant insights into our Universe. Their neutral, stable, and weakly interacting nature, make them ideal messengers to explore the deep Universe. However, the flux of high energy neutrinos is quite low, necessitating the development of large detectors. The KM3NeT collaboration addresses this challenge by building two undersea neutrino telescopes to investigate phenomena across the GeV to the PeV energy ranges. These experiments, named ARCA (Astroparticle Research with Cosmics in the Abyss) and ORCA (Oscillation Research with Cosmics in the Abyss), are located in Sicily at a depth of 3500m and in Toulon at a depth of 2500m, respectively. ARCA is tailored for detecting high-energy astrophysical neutrinos, while ORCA focuses on the study of the atmospheric neutrino flux to measure neutrino properties.

The Physics program covered by KM3NeT is very broad and includes the study of cosmic neutrinos, the measurement of neutrino properties (oscillation parameters, mass ordering, etc), the detection of supernovae, the search for dark matter, among others.

Both ARCA and ORCA are composed of multi-PMT modules that had been designed and assembled in several integration sites across Europe and Morocco. The module design ensures excellent resolution capabilities, position and time calibration.

This talk aims to give an overview of KM3NeT telescopes technology, construction, goals, current status and preliminary results.

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