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Measuring the Neutrino Mass Ordering and other oscillation parameters with KM3NeT-ORCA

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ORCA (Oscillations Research with Cosmics in the Abyss) is the low-energy branch of KM3NeT, the next generation underwater Cherenkov neutrino detector in the Mediterranean. Its primary goal is to resolve the long-standing unsolved question of whether the neutrino mass ordering is normal or inverted by measuring matter oscillation effects with atmospheric neutrinos. The ORCA design foresees a dense configuration of KM3NeT detection units, optimised for studying the interactions of neutrinos in seawater at low (< 100 GeV) energies. To be deployed at the French KM3NeT site, at 2500 m depth ~40 km offshore Toulon, ORCA's multi-PMT optical modules will exploit the excellent optical properties of deep seawater to accurately reconstruct both cascade (mostly electron neutrinos) and track events (mostly muon neutrinos) with a few GeV of energy. The construction of the first detection units is proceeding. In this contribution we will report on the construction plan and will discuss the potentiality of the ORCA detector both in neutrino mass hierarchy studies and in obtaining new constraints on other key oscillation parameters.

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