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Oscillation research with KM3NeT/ORCA

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ORCA is the low energy neutrino detector of the KM3NeT experiment, designed for the detection of GeV atmospheric neutrinos. It is currently under construction in the French Mediterranean Sea at a depth of 2450m. The main goal is the study of neutrino oscillations in order to further constrain mixing parameters and eventually determine the neutrino mass ordering (NMO).

This talk will give an overview about the latest sensitivity studies concerning low energy neutrino physics as well as on-going analyses of current data.

The full ORCA detector will consist of 115 detection units (DU) for measuring the Cherenkov light induced by particle showers triggered by neutrino interactions in the sea water.

Recent publications report its capability to resolve the NMO within 5 years of data-taking - potentially earlier by combining ORCA + JUNO data, measurement of ν_{τ} -appearance and its sensitivity to light sterile neutrino mixing parameters.

Since January 2020, six ORCA detection units have been taking data. First analyses of data acquired with approximately one year of the ORCA sub-array already show clear evidence of neutrino oscillation. Current analyses of the latest data and the expected deployment of up to 12 additional strings by the end of 2022 will further increase the reported sensitivities.

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