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P2.026 Probing new physics with atmospheric neutrinos at KM3NeT-ORCA

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In this poster, we will present the prospects of ORCA searches for new physics phenomena, such as sterile neutrinos and non-standard interactions, using atmospheric neutrinos. ORCA is one of the detectors in the KM3NeT project which are currently under construction in the Mediterranean Sea with the goals of measuring the Neutrino Mass Hierarchy (NMH), and searching for astrophysical high energy neutrino sources. The ORCA detector will be densely instrumented with 2070 optical modules separated from each other by 9 m vertically and 20m horizontally, to enable the study of atmospheric neutrinos ranging from a few GeV to ~ 100 GeV. In this energy range, refraction in the earth's matter significantly alters the effective neutrino flavour mixing. These matter effects can generate resonant neutrino flavour transitions which are the main driver of ORCA's sensitivity to the NMH. The impact of strong matter effects may also be exploited to search for new physics phenomena. In the presence of light sterile neutrinos that mix with active neutrinos, other resonances and suppressions may occur. Additionally, one may use neutrino oscillations to probe the properties of the coherent forward scattering which may be altered by new interactions beyond the Standard Model.