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P2.025 Tomography of the Earth from the study of atmospheric neutrino oscillations with KM3NeT-ORCA

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KM3NeT-ORCA is a planned water-Cherenkov neutrino detector designed for studying the oscillations of atmospheric neutrinos and measuring the neutrino mass hierarchy. ORCA will be able to reconstruct interacting neutrinos of all flavours with a large range of baselines and energies, and an effective mass of several megatons. Neutrinos crossing the Earth undergo matter effects, modifying the pattern of their oscillations. The study of the neutrino angular and energy distribution in ORCA can therefore provide tomographic information on the Earth interior with an independent technique, complementary to the standard geophysics methods. In particular, the sensitivity to the electron density may allow to constrain the chemical composition of inner layers such as the outer core, for which no direct geophysical measurements are possible. We present here a study of the sensitivity of the ORCA detector to the electron density inside the Earth, including systematic uncertainties related to oscillation parameters, neutrino flux, cross-sections and detector performance, as well as degeneracies in the measurements of different layers.