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Tau neutrino appearance measurement in KM3NeT/ORCA 6

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The KM3NeT/ORCA is a next-generation water Cherenkov neutrino telescope currently under construction in the Mediterranean Sea. By studying the oscillations of the atmospheric neutrino flux passing through the Earth, thanks to the detector geometry and its unprecedented statistics, KM3NeT/ORCA's primary physics goal is an early measurement of the neutrino mass ordering as well as the direct observation of tau neutrino appearance; the last, allowing for a test of the standard three-neutrino flavors paradigm.

Due to the detector's modular structure, neutrino oscillation analyses are already possible with a partially instrumented volume (currently, 6 Detection Units - KM3NeT/ORCA6 - equivalent to 5% of the final geometry). Given that the neutrino flux composition is dominated by muon neutrinos producing a track-like topology in the detector, the tau neutrino appearance can be measured on a statistical basis and observed as an excess into the shower-like topology. In this talk, a particular focus will be dedicated to the current analysis updates on the event reconstruction and selection between the two topologies; in addition, preliminary results on tau neutrino appearance in the KM3NeT/ORCA 6 geometry will be discussed.

Submitted on behalf of a Collaboration?

Yes

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