

Constraining the atmospheric neutrino oscillation parameters and the 3+1 sterile neutrino model with the ANTARES neutrino telescope

Using the ANTARES neutrino telescope data set, from 2007 to 2016, a measurement of the atmospheric neutrino oscillation parameters is presented. Constraints on the 3+1 model, which foresees the existence of one sterile neutrino, are derived as well. Up-going atmospheric neutrinos which traverse the Earth are affected by the phenomenon of neutrino oscillations, which suppresses the observed flux of ν_μ induced events. For vertical up-going neutrinos the first oscillation maximum is reached at an energy of around 24 GeV, which is above the ANTARES energy threshold and, thus, can be detected. Combining two different track reconstruction procedures, and accounting for a complete 3-flavour description of the oscillation probability through the Earth, a two-dimensional fit of the event rate as a function of reconstructed energy and zenith angle is performed, and constraints on both the standard atmospheric neutrinos oscillation parameters and the 3+1 model are derived.

Authorship annotation

On behalf of the ANTARES Collaboration

Session and Location

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Poster included in proceedings:

yes

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