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Highlights from ANTARES, and prospects for KM3NeT

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The ANTARES experiment has been running in its final configuration since 2008. It is the largest neutrino telescope in the Northern hemisphere. After the discovery of a cosmic neutrino diffuse flux by the IceCube detector, the search for its origin has become a key mission in high-energy astrophysics. Particularly interesting is the indication (although not significant with the present IceCube statistics) of an excess of signal events from the Southern sky region.

The ANTARES sensitivity is large enough to constrain the origin of the IceCube excess from regions extended up to 0.2 sr in the Southern sky. Assuming different spectral indexes for the energy spectrum of neutrino emitters, the Southern sky and in particular central regions of our Galaxy are studied searching for point-like objects, for extended regions of emission, and for signal from transient objects selected through multimessenger observations. The results of the unblinded analyses will be presented

ANTARES has also provided results on atmospheric neutrinos, searches for rare particles (such as magnetic monopoles and nuclearites in the cosmic radiation), multi-messenger studies of the sky in combination with different experiments, and Earth and Sea science. Of particular note are the searches for Dark Matter: the limits obtained for the spin-dependent WIMP-nucleon cross section overcome that of existing direct-detection experiments.

The presentation will conclude with an outlook to the next-generation experiment KM3NeT, which is already under construction. KM3NeT will consist of two components: ORCA, optimised for measuring atmospheric neutrino oscillation parameters in the few-GeV range; and ARCA, for studying astrophysical neutrinos at higher energies. The status of KM3NeT will be summarised and the resulting prospects for ORCA and ARCA discussed.

Collaboration

ANTARES

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