

New results on the indirect search for dark matter using the ANTARES neutrino telescope

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Neutrino telescopes have a wide scientific scope. One of their main goals is the detection of dark matter, for which they have specific advantages. The understanding of the nature of dark matter requires a multi-front approach since we still do not know many of their properties. Neutrino telescopes offer the possibility of look at several kinds of sources, not all of them available to other indirect searches. In this work we provide an overview of the results obtained by the ANTARES neutrino telescope, which has been taking data for almost ten years. It is installed in the Mediterranean Sea at a depth of 2475 m, off the coast of Toulon (France).

The results presented in this work include searches for neutrino excess from several astrophysical sources. One of the most interesting ones is the Sun. Dark matter particles by the solar system would scatter with nuclei of the Sun, lose energy and accumulate in its centre. Among the final products of their annihilations, only neutrinos could escape. Therefore, a detection of high energy neutrinos from the Sun would be a very clean indication of dark matter, since no significant astrophysical backgrounds are expected, contrary to other indirect searches. Moreover, the limits from neutrino telescopes for spin-dependent cross section are the most restrictive ones. Another interesting source is the Galactic Centre, for which ANTARES has a better visibility than IceCube, due to its geographical location. This search gives limits on the annihilation cross section. Other dark matter searches carried out in ANTARES include the Earth and dwarf galaxies. Results with the most recent data sample will be presented, for the first time.

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