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Dark matter searches with the ANTARES neutrino telescope: constraints to CMSSM and mUED models

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ANTARES is the largest neutrino telescope Northern hemisphere. It consists of a three-dimensional array of 885 photomultipliers to collect the Cherenkov light induced by relativistic muons produced in CC interactions of high energy neutrinos. One of the main scientific goals of the experiment is the search for dark matter. We present here the analysis of the recently unblinded data taken during 2007 and 2008 to look for a WIMP signal in the Sun. WIMPs are one of the most popular scenarios to explain the dark matter content of the Universe. They would accumulate in massive objects like the Sun or the Galactic Center and their self-annihilation would produce (directly or indirectly) high energy neutrinos detectable by neutrino telescopes. Contrary to other indirect searches (like with gamma rays or positrons), the search for neutrinos in the Sun is free from other astrophysical contributions, so the explanation of a potential signal in terms of dark matter is much more robust. The results are interpreted within two theoretical frameworks: CMSSM and mUED.

Dark matter searches with neutrino telescopes has specific advantages with respect to other indirect searches. On the other hand, neutrino telescopes are particularly sensitive to spin-dependent cross-section, in contrast to direct search experiments. In particular, a potential signal from the Sun would can safely be interpreted as dark matter, contrary to excesses observed in cosmic rays or gamma rays, since there is no likely astrophysical alternative. We will present the results of the search for WIMPs in the Sun, using the recently unblinded data of 2007-2008. These results include limits in the muon and neutrino flux and also limits in the spin dependent cross section in the CMSSM and mUED frameworks. Moreover, an overview of the capabilities of other on-going analysis (Galactic Center, Sun with 2007-2011 data) will be also presented.

Primary author: Dr ZORNOZA GOMEZ, Juan de Dios (IFIC (ES))

Presenter: Dr ZORNOZA GOMEZ, Juan de Dios (IFIC (ES))

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