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Indirect search for dark matter in the Galactic Centre combining ANTARES and IceCube

Dark matter particles accumulating in astrophysical environments can be indirectly searched through their annihilation into neutrinos.

Both ANTARES and IceCube have conducted independent searches for WIMPs in the Galactic Centre, obtaining comparable limits in the WIMP mass range $50 \text{ GeV}/c^2 - 1 \text{ TeV}/c^2$.

We performed a combined likelihood analysis of the two data samples, upon agreement for data exchange between the collaborations.

Four annihilation channels ($\tau^+\tau^-$, $b\bar{b}$, $\mu^+\mu^-$, W^+W^-) and two halo profiles (Navarro-Frenk-White, Burkert) were considered.

No dark matter signal was found unblinding the joint ANTARES and IceCube data set; combined limits are better up to a factor 2 with respect with the stand-alone ones.

This work has also permitted to unify the analysis techniques towards a common benchmark, relevant with the advent of the next-generation IceCube Gen-2 and KM3NeT, in construction in the Mediterranean Sea.

Mini-abstract

ANTARES and IceCube present combined limits on dark matter annihilation from the Galactic Centre.

Experiment/Collaboration

ANTARES and IceCube

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