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Search for secluded dark matter with 6 years of IceCube data — Christoph Toennis

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The IceCube neutrino observatory–installed in the Antarctic ice–is the largest neutrino telescope to date. It consists of 5,160 photomultiplier-tubes spread among 86 vertical strings making a total detector volume of more than a cubic kilometer. IceCube detects neutrinos via Cherenkov light emitted by charged relativistic particles produced when a neutrino interacts in or near the detector. The detector is particularly sensitive to high-energy neutrinos of due to its size and photosensor spacing. In this analysis we search for dark matter that annihilates into a metastable mediator that subsequently decays into Standard Model particles. These models yield an enhanced high-energy neutrino flux from dark matter annihilation inside the Sun compared to models without a mediator. Neutrino signals that are produced directly inside the Sun are strongly attenuated at higher energies due to interactions with the solar plasma. In the models considered here, the mediator can escape the Sun before producing any neutrinos, thereby avoiding attenuation. We present the results of an analysis of six years of IceCube data looking for dark matter in the Sun. We consider mediator lifetimes between 1 ms to 10 s and dark matter masses between 200 GeV and 75 TeV.

other Collaboration

Subcategory

Experimental Results

Keywords

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