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Searching for Dark Matter from the Sun with Ten Years of IceCube Data

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Dark matter's existence (DM) has been well-established by repeated experiments over many length scales. Even though DM is expected to make up 85% of the current matter content of the Universe, its nature remains unknown. One broad class of corpuscular DM motivated by Standard Model (SM) extensions is weakly interacting massive particles (WIMPs). WIMPs generically have a non-zero cross-section with SM nuclei, so they can scatter off nuclei in large celestial bodies such as the Sun, thereby losing energy and becoming gravitationally bound. After repeated scatterings, WIMPs sink to the solar center, leading to an excess of WIMPs there. Furthermore, WIMPs can annihilate to unstable SM particles, eventually yielding stable SM particles. Only neutrinos can escape the dense solar core. Thus, neutrino observatories may look for these neutrinos as evidence of WIMPs. In this talk, I will present the current status of IceCube's solar WIMP search, which covers the mass range from 10 GeV to 1 TeV.

Collaboration name

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