

Abstract Submitted
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Search for sub-TeV WIMP-annihilation in the Sun¹ MEHR UN NISA, GARRETT NEER, Michigan State University, ICECUBE COLLABORATION — The Sun due to its high matter density, and abundant hydrogen content is an excellent target for studying spin dependent dark matter-proton scattering. The Sun can gravitationally trap Weakly Interacting Massive Particles (WIMPs) from the galactic halo, which then thermalize in the solar core. The captured dark matter (DM) in the Sun can annihilate into Standard Model particles including an observable flux of neutrinos. The IceCube Neutrino Observatory with its optimal sensitivity to TeVPeV neutrinos has performed several analyses constraining the spin-dependent DM-proton cross-section more than an order of magnitude stronger than direct detection experiments. However, the parameter space with DM masses below 50 GeV has remained uncharted territory for IceCube. This work for the first time utilizes special cuts and includes “starting events” to extend IceCubes sensitivity to WIMP masses down to 5 GeV. We present the results of a search for low-energy (<300 GeV) neutrinos correlated with the direction of the Sun using 7 years of IceCube data. Our observations exclude DM-proton scattering down to a few times 10^{-42} cm² for the nu-nu channel at 20 GeV, which are the worlds strongest constraints at these energies for DM annihilation directly to neutrinos.

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