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Neutrinos from the Sun can discover dark matter-electron scattering

We probe dark matter-electron scattering using high-energy neutrino observations from the Sun. Dark matter (DM) interacting with electrons can get captured inside the Sun. These captured DM may annihilate to produce different Standard Model (SM) particles. Neutrinos produced from these SM states can be observed in IceCube and DeepCore. Although there is no excess of neutrinos from the Solar direction, we find that the current data-sets of IceCube and DeepCore set the strongest constraint on DM-electron scattering cross section in the DM mass range 10 GeV to 10^5 GeV. Our work implies that future observations of the Sun by neutrino telescopes have the potential to discover DM-electron interactions.

Primary author: Dr LAHA, Ranjan (Indian Institute of Science)

Presenter: Dr LAHA, Ranjan (Indian Institute of Science)