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Detecting the neutrino flux from inelastic dark matter in the Sun

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Neutrino emission from gravitational capture and subsequent annihilation of elastic dark matter in the Sun is largely constrained due to null results from direct-detection experiments. However, these limits are relaxed for inelastic dark matter. In this talk, we look at the sensitivity of a large volume detector, such as DUNE or Super-Kamiokande, to the neutrino flux originating from the Sun. We estimate the source-pointing resolution of DUNE at these energies which helps in reducing the atmospheric neutrino backgrounds. We find that the neutrino experiments can probe novel parameter space for 10-200 GeV dark matter with 10-200 keV mass-splitting when compared to direct-detection experiments. We present limits from Super-Kamiokande data as well as forecast the sensitivity of DUNE and Hyper-Kamiokande. For dark matter annihilation to light quarks, DUNE offers leading sensitivity whereas for annihilation to heavy quarks, the expected limits from DUNE and Super-Kamiokande are comparable.

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