

Neutrino constraints on inelastic dark matter captured in the Sun

We study the possibility for large volume underground neutrino experiments to detect the neutrino flux from captured inelastic dark matter in the Sun. The neutrino spectrum has two components: a mono-energetic “spike” from pion and kaon decays at rest and a broad-spectrum “shoulder” from prompt primary meson decays. We focus on detecting the shoulder neutrinos from annihilation of hadrophilic inelastic dark matter with masses in the range 4-100 GeV. We find the region of parameter space that these neutrino experiments are more sensitive to than the direct-detection experiments. For dark matter annihilation to heavy-quarks, the projected sensitivity of DUNE is weaker than current (future) Super (Hyper) Kamiokande experiments, while for the light-quark channel, only the spike is observable and DUNE will be the most sensitive experiment.

Working Group

WG 6: Detectors

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Track Classification: WG5: Neutrino Beyond PMNS