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When the Fog Lifts: Constraining Light Mediators with CEvNS Signals

Wednesday, October 1, 2025 10:10 AM (20 minutes)

The recent observation of Coherent Elastic Neutrino–Nucleus Scattering (CEvNS) from solar ^8B neutrinos by dark matter direct detection experiments marks the first detection of the so-called “neutrino floor”. Far from being a mere background for dark matter searches, this signal opens a novel window to probe light new physics.

In this talk, I will present new constraints on light scalar and vector mediators coupling to neutrinos and quarks, derived from recent data from these experiments. I will show that they already provide competitive—and in some cases leading—bounds in the sub-GeV mass range. I will also discuss subdominant but non-negligible contributions from neutrino–electron scattering and the Migdal effect, which can noticeably impact the detected event rates.

These results highlight the growing potential of dark matter detectors as precision neutrino observatories, capable of testing a wide class of light mediator scenarios.

Neutrino Properties

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Neutrino Telescopes & Multi-messenger

BSM physics at dark matter direct detection

Neutrino Theory & Cosmology

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Data Science and Detector R&D

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