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Measuring 40Ar-solar neutrino charged-current interactions in the DEAP-3600 dark matter detector

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The DEAP-3600 dark matter detector, located 2 km underground at SNOLAB, has 3.3 tonnes of liquid argon (LAr) and initially began data collection in 2016. Due to its ultra-low backgrounds and large exposure, the DEAP-3600 detector is sensitive to charged-current interactions from ^{8}B solar neutrino absorbing on ^{40}Ar. While this reaction has never been measured before, it offers large LAr experiments powerful sensitivity to solar and supernova neutrinos. Due to a Fermi transition and several Gamow-Teller transitions, this reaction has an unusually high cross section for charged-current neutrino-nucleus interactions, and reactions passing through an excited state of the daughter ^{40}K nucleus provide a channel that separates it from background. In this talk, we will present the current status of this search in DEAP-3600, the experimental challenges that must be overcome to observe it, and exciting physics that it can probe.

Collaboration you are representing

DEAP-3600

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