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Status and Plans for Measurements of Neutrino-Argon Interactions at ICARUS

The ICARUS experiment, utilizing Liquid Argon Time Projection Chamber (LAr TPC) technology, has been installed at Fermilab (USA), following its initial operation in Italy and subsequent refurbishment at CERN. ICARUS has successfully been taking physics data at Fermilab since June 2022. While the experiment's primary objective is to function as the far detector of the Short Baseline Neutrino program (SBN), searching for hints of physics beyond three-flavour PMNS neutrino oscillations, ICARUS also offers other diverse physics capabilities, including searches beyond the standard model and measurements of cross-sections. In addition to being exposed to the common Booster Neutrino (BNB) beamline of the SBN experiment, ICARUS receives neutrinos from the Main Injector (NuMI) beam. Due to the off-axis angle between NuMI and ICARUS, coupled with contributions from both pion and kaon decays to neutrino fluxes, interactions of NuMI neutrinos within ICARUS can be detected over a range of several GeV in energy. Measurements of these interactions present unique opportunities to infer neutrino interaction cross sections on an argon nuclear target within an energy range that overlaps both the SBN oscillation search and a significant portion of the DUNE spectrum. This presentation will summarise the current status of ICARUS' neutrino cross-section measurements.

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