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MARLEY: Model of Argon Reaction Low Energy Yields STEVEN GARDINER, KYLE BILTON, CHRISTOPHER GRANT, EMILIJA PANTIC, ROBERT SVOBODA, University of California, Davis — Core-collapse supernovae are sources of tremendous numbers of neutrinos with energies of up to about 50 MeV. In recent years, there has been growing interest in building detectors that are sensitive to supernova neutrinos. Such detectors can provide information about the initial stages of stellar collapse, early warning signals for light emission from supernovae, and opportunities to study neutrino oscillation physics over astronomical distances. In an effort to enable supernova neutrino detection in next-generation experiments like DUNE, the CAPTAIN collaboration plans to make the first direct measurement of cross sections for neutrino interactions on argon in the supernova energy regime. To help predict neutrino event signatures in the CAPTAIN liquid argon time projection chamber (LArTPC), we have developed a first-of-its-kind Monte Carlo event generator called MARLEY (Model of Argon Reaction Low Energy Yields). This generator attempts to model the complicated nuclear structure dependence of low-energy neutrino-nucleus reactions in sufficient detail for use in LArTPC simulations. In this talk we present some preliminary results calculated using MARLEY and discuss how the current version of the generator may be improved and expanded.

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