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## Towards the first measurement of low-energy electron neutrino charged-current scattering on argon with the CCM experiment

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The Coherent CAPTAIN-Mills (CCM) experiment, located at Los Alamos National Laboratory, employs a 10ton liquid argon detector to study neutrino interactions, search for dark matter candidates, and explore physics beyond the Standard Model.

In this work, we present ongoing efforts towards enabling the first measurement of low-energy chargedcurrent (CC) scattering of electron neutrinos on argon nuclei. In particular, this interaction has yet to be measured at low energies, and the absence of experimental data represents a challenge for future efforts to detect supernova neutrinos via this channel, such as in the DUNE experiment.

We describe the development and integration of a complete simulation framework, where electron neutrino interactions are modeled using the MARLEY event generator and injected into the detector geometry via the SIREN software package, followed by detailed detector simulation with Geant4 and event reconstruction with the CCMAnalysis framework. We present preliminary results of the expected signal characteristics, including energy deposition, photon production, and reconstruction observables, demonstrating the capabilities of CCM to detect and analyze low-energy CC events.

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