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Benefits of MeV-scale reconstruction in LArTPCs

Liquid argon time projection chambers (LArTPCs) combine millimeter-scale particle tracking, calorimetric capabilities, and scalability - making them well-suited for observing neutrino interactions. A LArTPC feature that has received relatively less attention is their low energy threshold, which allows for the study of phenomena down to the MeV scale. We use truth-level Monte Carlo simulations to demonstrate the physics capabilities enabled by the reconstruction of topologically compact, isolated, low-energy 'blips' in large LArTPCs. These studies show how blip activity can serve as a useful signature in distinguishing supernova neutrino final states, and in final-state neutron tagging. Blip reconstruction also enables studies of final-state neutron production in charged- or neutral-current GeV-scale neutrino-nucleus interactions.

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