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Michel Electron Reconstruction Using a Novel Deep-Learning-Based Multi-Level Event Reconstruction in ICARUS

Tuesday, 18 June 2024 17:30 (2 hours)

The ICARUS detector, situated on the Fermilab beamline as the Far Detector of the SBN (Short Baseline Neutrino) program, is the first large-scale operating LArTPC (Liquid Argon Time Projection Chamber). The mm-scale spatial resolution and precise timing of LArTPC enable voxelized 3D event reconstruction with high precision. A scalable deep-learning (DL)-based event reconstruction framework for LArTPC data has been developed, incorporating suitable choices of sparse tensor convolution and graph neural networks to fully utilize LArTPC's high-resolution imaging capabilities. Michel electrons, which are daughter electrons from the decay-at-rest of cosmic ray muons, have an energy spectrum that is theoretically well understood. The reconstruction of Michel electrons in LArTPC can demonstrate the capability of the system for low-energy electron reconstruction. This poster presents an end-to-end, deep-learning-based approach for Michel electron reconstruction in ICARUS.

Poster prize

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