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Recent progress on wire-cell tomographic reconstruction for LArTPC

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The Deep Underground Neutrino Experiment (DUNE) will use the state-of-the-art massive Liquid Argon Time Projection Chambers (LArTPCs) to search for CP violation in the neutrino sector, proton decay, and supernova neutrinos. The 3D reconstruction of the particle trajectories in LArTPCs relies on multiple wire planes, which can be challenging due to the intrinsic ambiguity of identifying where along the wire the charge is deposited. In this talk, we present a novel 3D reconstruction method “Wire-Cell” inspired by the concept of tomography. Based on the independent measurements of the same charge from the three planes of wires, the 3D images of ionization charge can be efficiently reconstructed following the principle of compressed sensing utilizing mathematical techniques such as the L1 regularization. Current status and future prospects of the development will be reported.

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