



Contribution ID: 51

Type: **Short talk (15min. + 5 min. Q/A)**

End-to-End Machine Learning Reconstruction for the Short Baseline Near Detector

Wednesday 29 October 2025 16:05 (15 minutes)

The Short-Baseline Near Detector (SBND) is a 100-ton scale Liquid Argon Time Projection Chamber (LArTPC) neutrino detector positioned in the Booster Neutrino Beam (BNB) at Fermilab, as part of the Short-Baseline Neutrino (SBN) program. Recent inroads in Computer Vision (CV) and Machine Learning (ML) have motivated a new approach to the analysis of particle imaging detector data. SBND data can therefore be reconstructed using an end-to-end, ML-based data reconstruction chain for LArTPCs. The scalable particle imaging with neural embeddings (SPINE) reconstruction chain is a multi-task network cascade which combines point-level feature extraction using Sparse Convolutional Neural Networks (CNN) and particle superstructure formation using Graph Neural Networks (GNN). SPINE has been trained using a particle bomb simulation that is propagated through SBND's detector simulation suite. This talk will demonstrate neutrino selections that utilize SPINE at SBND.

Presenter: CARLSON, Bear

Session Classification: Experiments - SBN