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Novel Approach for Evaluating Detector Systematics in the MicroBooNE LArTPC

One of the primary challenges in current and future precision neutrino experiments using liquid argon time projection chambers (LArTPCs) is understanding detector effects and quantifying the associated systematic uncertainties. MicroBooNE consists of a LArTPC located on-axis in the Booster Neutrino Beam (BNB) at Fermilab, and has pioneered the evaluation of detector systematic uncertainties for such experiments. This poster presents a novel, data-driven technique for detector systematics evaluation based on low-level comparisons between data and simulation and describes its propagation to physics analyses. This method can be used to better understand detector uncertainties while remaining agnostic to the details of the detector model in simulation. We believe similar methods can be applied to future LArTPC experiments, including SBN and DUNE.

Mini-abstract

Data-driven, model-agnostic method for detector systematic uncertainties applicable to LArTPCs

Experiment/Collaboration

MicroBooNE

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