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Data-Driven cross checks for ν_e selection efficiency in NOvA

NOvA is a long-baseline neutrino oscillation experiment that consists of two functionally equivalent detectors and utilizes Fermilab's NuMI beam. NOvA uses a convolutional neural network for particle identification with a validation process that includes several data-driven techniques. Muon-Removed Electron-Added studies involve selecting ν_μ charged current candidates from data and simulation and replacing the muon with a simulated electron of similar energy. For Muon-Removed Bremsstrahlung and Muon-Removed Decay-in-Flight studies we remove muonic hits from cosmic muons that have either experienced Bremsstrahlung radiation or decayed in flight, producing samples of pure electromagnetic showers. Each sample is then evaluated by our classifier to obtain selection efficiencies. Our previous analysis showed good agreement in the ν_e selection efficiency using these techniques. We present here the same techniques applied to the latest results which include improvements to the simulation and reconstruction algorithms.

Mini-abstract

Cross-checking the selection efficiency for NOvA's neural network using data-driven techniques

Experiment/Collaboration

NOvA

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