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Neutrino Energy Estimation in the NOvA Experiment

NOvA is a long-baseline neutrino oscillation experiment that is designed to probe the neutrino mass hierarchy and mixing structure by looking for a ν_e appearance signal while measuring ν_μ disappearance. It uses two functionally identical liquid scintillator detectors 14mrad off-axis from the NuMI beamline at Fermilab, allowing for a tightly focused ν_μ flux peaking at around 2 GeV. In order to make oscillation parameter measurements with high precision, it is important to reconstruct neutrino energies with good resolution. NOvA takes advantage of its finely segmented detectors to isolate different components of the neutrino interaction, thus enabling a calorimetric energy estimate that is robust to different event topologies. This poster will describe this approach and also highlight promising improvements which use machine-learning techniques to get a better performance, both in terms of overall resolution and the response to systematic uncertainties.

Mini-abstract

Describing energy estimation for neutrino interactions at NOvA along with future improvements

Experiment/Collaboration

NOvA

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