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Exploring the ν_μ charged-current uncontained sample at the NOvA Far Detector

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NOvA is a long-baseline neutrino oscillation experiment based at Fermilab that uses two highly active liquid scintillator detectors located off-axis of the NuMI beam.

Latest results have excluded maximal mixing at 2.6σ via the

muon-neutrino disappearance channel, which use fully contained interactions of the type $\nu_\mu + X \rightarrow \mu + X'$.

We explore potential improvement of the neutrino oscillation parameters $\sin^2 2\theta_{23}$ and Δm_{32}^2

by including uncontained events where the muon is the only final-state particle exiting the detector.

Two main problems arise with this sample. First, the signal now mimics

the cosmic ray induced background. Second, the reconstructed energy

resolution decreases due to the escaping muon.

To address these questions, we explore the use of multivariate analysis techniques.

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