

Constructing confidence intervals with Profiled Feldman-Cousins method for NOvA's neutrino oscillation measurement

NOvA is a long-baseline neutrino oscillation experiment that looks for the disappearance of muon (anti)neutrinos and the appearance of electron (anti)neutrinos in a beam of muon (anti)neutrinos. In addition to using Bayesian methods, NOvA employs a classical maximum-likelihood estimation to measure neutrino mixing parameters, determine the neutrino mass ordering, and search for CP violation in the lepton sector. To construct robust frequentist confidence intervals, we have developed a Monte Carlo-based method by extending the Feldman-Cousins method in the presence of nuisance parameters.

In this talk, we will describe the details of this Profiled Feldman-Cousins method, elucidating it in the context of the oscillation measurements at NOvA. We will present the impact of this method on the latest oscillation results from the NOvA, based on ten years of data collection with the NuMI beam at Fermilab.

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