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## Fitting NOvA cross-section parameters with Markov Chain Monte Carlo

*Thursday, 19 August 2021 09:30 (15 minutes)*

The NuMI Off-Axis Neutrino Appearance (NOvA) experiment is an 810 km base-line neutrino oscillation experiment measuring the fundamental properties of neutrinos and antineutrinos, using the high statistics data from the Near Detector (ND) at Fermilab to produce predictions for the Far Detector (FD) in Minnesota. This talk presents progress towards an ND-only fit to NOvA's cross-section parameters with fake data through the Bayesian inference tool Markov Chain Monte Carlo (MCMC). With NOvA's ND simulation – a unique tune of GENIE v3 – and NOvA's cross-section parameters as input, MCMC obtains most probable values for each parameter to best agree with the ND fake data. MCMC provides a meaningful technique to fit NOvA's physics model parameters and to learn how they can be constrained with its ND data. This ongoing ND-fit work marks progress towards achieving the simultaneous two-detector fit to measure the neutrino oscillation parameters,  $\sin^2(\theta_{23})$ ,  $\Delta m_{23}^2$ , and  $\delta_{CP}$ .

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