Abstract Submitted
for the APR20 Meeting of
The American Physical Society

DUNE-PRISM: Using Off-Axis Near Detector Measurements to Sidestep Neutrino Interaction Uncertainties DANIEL DOUGLAS, Michigan State Univ, DUNE COLLABORATION — The Deep Underground Neutrino Experiment (DUNE) is a next-generation neutrino oscillation experiment. DUNE plans to utilize a near detector (ND) which is capable of moving transverse to the direction of the neutrino beam. By moving to different off-axis angles, the neutrino rate at different true neutrino energies can be measured. In the current generation of experiments, data collected at an ND is unfolded to make a prediction of the oscillated neutrino flux, measured as an event rate at a far detector (FD). This unfolding relies on a good understanding of the relationship between the measured and true neutrino energy, which strongly depends on our models of neutrino interactions. These models contribute a significant amount of uncertainty to the overall measurement of oscillation parameters. By instead using a linear combination of off-axis ND fluxes which approximates the oscillated FD flux, we can more directly compare ND and FD data, reducing the contribution of these model uncertainties to the overall systematic error of the measurement. In this talk, I will discuss the mathematical methods for determining linear combinations and the improved sensitivity of an oscillation analysis which incorporates this new technique.

Daniel Douglas
Michigan State Univ

Date submitted: 08 Jan 2020 Electronic form version 1.4