

High Energy Particle Seminar

Wednesday, March 11, 2019 / 705 Pupin Hall / 10:00 AM (SPECIAL TIME)

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Measurement of Inclusive Neutral Current π^0 Production Cross section with the NOvA Near Detector



NOvA (NuMI Off-axis ν_e Appearance) experiment is a long-baseline neutrino oscillation experiment. It uses two functionally identical detectors, the NOvA near detector (ND) at Fermilab and the NOvA far detector (FD) at a distance 810 km in northern Minnesota to measure ν_e appearance in a narrow-band beam of ν_μ peaked at 2 GeV in energy. Neutrino induced Neutral Current (NC) interactions with a π^0 in the final state are a significant background in the ν_e appearance measurement. The π^0 decay into two photons can fake the ν_e appearance signal either due to merging of two photon showers or one of the two photons escaping the detection. Therefore, a complete understanding of NC interactions with π^0 in the final state is very important. To constrain this background, a cross-section measurement of inclusive NC π^0 production using data from the NOvA ND has performed. It will also help in reducing the background uncertainties for current and future long-baseline neutrino oscillation experiments. An absolute cross-section measurement as well as differential cross-section measurement w.r.t π^0 kinematics including event identification techniques, background estimation study, unfolding results and expected uncertainties will be presented.