

Time Slicing of Neutrino Fluxes in Oscillation Experiments at Fermilab

Upcoming long baseline neutrino experiments aim to increase proton beam power and utilize large-scale detectors to overcome limited event statistics. The DUNE experiment at LBNF focuses on testing the three neutrino flavor paradigm and searching for CP violation through oscillation signatures. To achieve DUNE's scientific objectives, minimizing systematic errors, particularly those related to neutrino-nucleus interactions, is crucial. The “stroboscopic approach” is introduced as an innovative technique that leverages the correlation between true neutrino energy and measured arrival time, enabling access to energy information at the Far detector. This approach requires short proton bunch lengths, fast timing, and synchronization between detector and proton timing. Understanding cross sections is vital for the DUNE experiment and US accelerator-based neutrino beams can benefit from this technique.

Primary author: GANGULY, Sudeshna (Fermilab)

Presenter: GANGULY, Sudeshna (Fermilab)

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