

Perspectives for measuring NuMI neutrino-Ar cross-section @ ICARUS and cosmic background constraints in the muon neutrino inclusive selection

Monday, 26 June 2023 14:45 (15 minutes)

Presently experimental neutrino physics is going through an exciting time due to the high-precision measurements, in massive detectors, expected from future experiments, e.g. DUNE. The ICARUS experiment is the far detector of the Short-Baseline Neutrino program (SBN) at Fermilab. This program consists of a near and far detector that use the LAr TPC technology and are located along the axis of the Booster Neutrino Beam (BNB), with the main goal to search for sterile neutrino signatures. In particular, ICARUS is sited 5.7° off-axis from the NuMI beamline. This feature provides a unique dataset before DUNE comes online. We expect to have neutrino interactions from a few hundred MeV to several GeV (an energy range close to the one we expect in DUNE). As part of the efforts to measure cross-section, we have studied the muon neutrino charge current inclusive channel, where we had focused on studying muons coming from muon neutrino interaction to try to distinguish them from the ones that come from cosmic interactions. This work will discuss the status of these studies and will highlight the cosmic background rejection procedure.

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Session Classification: Neutrinos: ANNIE, ICARUS, SBND (part 1)