

Reconstruction of the BNB and NuMI Neutrino Bunch Structure with ICARUS

ICARUS serves as the Far Detector of the Short Baseline Neutrino (SBN) program at Fermilab, sitting on-axis on the Booster Neutrino Beam (BNB) and 6° off-axis from the Neutrinos at the Main Injector (NuMI) beam. Neutrinos from both beams inherit the timing sub-structure of their parent proton spills, which is in turn derived from either the Booster's or the Main Injector's synchrotron acceleration. Since neutrino propagation introduces only a constant offset, their timing structure is preserved as they travel. Identifying this structure in data represents a powerful tool for selecting neutrino events and searching for physics beyond the Standard Model (BSM). This poster presents the preliminary reconstruction of the BNB and NuMI neutrino bunch structure with ICARUS data, exploiting only the precise timing of ICARUS optical readout system to both locate and assign a time to each interaction.

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