Contribution ID: **67** Type: **Poster**

Wire Plane Transparency: Commissioning the Time Projection Chambers for the Short Baseline Near Detector

Monday 7 April 2025 19:40 (20 minutes)

The Short Baseline Near Detector (SBND) serves as the near detector for Fermilab's Short Baseline Neutrino (SBN) programme. It is a 112-ton Liquid Argon Time Projection Chamber (LArTPC) designed to study neutrino-argon interactions and search for new physics phenomena such as sterile neutrinos. Situated just 110 m from the Booster Neutrino Beam (BNB), SBND just began its first physics run and is expected to record over two million neutrino interactions annually. Commissioning the time projection chambers of the SBND is crucial for optimising detector performance. Each of the two anodes is composed of three charge-sensing wire planes which detect drifting ionisation electrons from charge particles traversing the detector. The wire planes, arranged with different 2D orientations, facilitate the 3D reconstruction of neutrino interactions. Electron transport induces signals on the first two planes, with the signal being collected by the rear plane. The first two induction planes require transparency to ensure all drift electrons reach the collection plane. This transparency depends on the bias voltages applied to the wires and the spacing between them. Fine-tuning these bias voltages ensures the optimisation of wire plane transparency. In this poster, I will demonstrate how transparency can be assessed by analysing the waveforms from cosmic-ray muon tracks traversing the detector at specific orientations.

Author: MCCUSKER, Bethany (Lancaster University)

Presenter: MCCUSKER, Bethany (Lancaster University)

Session Classification: Poster session

Track Classification: Neutrino Physics