

The UV Laser Calibration System for measuring the electric field in the SBND detector

Monday, 26 June 2023 17:15 (15 minutes)

The Short-Baseline Near Detector (SBND) is a LArTPC located approximately 110 meters from the target in Fermilab's Booster Neutrino Beam (BNB). It will measure neutrino cross sections and the un-oscillated neutrino flux to reduce uncertainties in the aid searches for anomalous oscillations.

The electric field is one of the key to detect the particle interaction inside the SBND-Time projection chamber(TPC), which may have distortions for several reasons, such as the space charge effect. The space charge effect comes from the abundant cosmic rays that ionize the argon, producing copious positive argon ions. A precise determination of the electric field distortion inside the TPC volume is required along a procedure to compensate for the distortion in the spatial coordinate. These spatial distortions, if not understood, would affect both the topological and calorimetric reconstruction of events in the detector. The UV calibration system is the detector system that will perform this measurement.

In this talk, I will give a brief explanation of the UV laser calibration system for SBND. I'll discuss the progress made in constructing and installing it at SBND, how we determine spatial distortion and electric field, and how we can fix them when analyzing data in a very simple and understandable manner.

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Session Classification: Neutrinos: SBND (part 2)