Contribution ID: **16** Type: **not specified**

Identifying intime cosmic tracks and exiting neutrino tracks in the SBND experiment using PMT and CRT information

Wednesday, 18 August 2021 09:15 (15 minutes)

The Short Baseline Near Detector (SBND) is one of three detectors in the SBN program at Fermilab and will be using LArTPC technology to visualize neutrino interactions. The detector will have an active mass of ~112 tons of liquid argon and be stationed at ~110 m away from the Booster Neutrino Beam (BNB) target. The SBND experiment will investigate more into the low energy excess observed by the MiniBooNE and LSND experiments, which is the main goal of the SBN program and will either confirm or rule out the existence of eV-mass scale sterile neutrinos over 5 sigma confidence level. In addition, the experiment will be hosting the world's highest high precision cross section measurements in many different nue and numu exclusive channels for nu-Ar scattering in GeV energy regime. One of the notable features of the SBND detector is its state-of-the-art light detection system consisting of 120 Photo Multiplier Tubes (PMTs), 192 XArapucas and TPB (Tetra Phenyl Butadiene) coated reflective foils making SBND capable of tagging particle interactions to a few nano-second level precisions, while the Cosmic Ray Tagger (CRT) designed for the experiment will have 4-pi detector coverage and nano second scale timing resolution in identifying cosmic ray tracks. In this presentation, I will be presenting a Monte-Carlo level study we performed to distinguish between exiting neutrino tracks and incoming cosmic ray particles in SBND by using timing information in the PMT and CRT systems. We demonstrated that we can separate these two categories of tracks with high precision and reasonably good efficiency.

Primary author: Mr MEDDAGE, Varuna (University of Florida)

Presenter: Mr MEDDAGE, Varuna (University of Florida)

Session Classification: Wednesday