

Angle Dependent Electron Lifetime Measurement and Millicharged Particle Detection in SBND

I worked on two separate projects both using SBND this fall. The first is measuring the electron lifetime coefficient τ due to impurities in the liquid argon in SBND. I built off existing analysis code written by Lan Nguyen to update it for more recent LArSoft versions and to bin throughgoing muon tracks used to measure the lifetimes according to angles that the tracks are at, and which CRTs matched the tracks. Using new and existing samples, I calculated electron lifetimes as a function of these angles. The second is millicharged particle detection. I had previously implemented millicharged particles in the LArSoft simulation library and developed scripts for finding faint tracks in the detector readout. This fall I worked on massively speeding up this detection by writing the code for GPUs, which both allows the whole input to be dealt with in reasonable time, and started simulating events with GPU.