WIDG

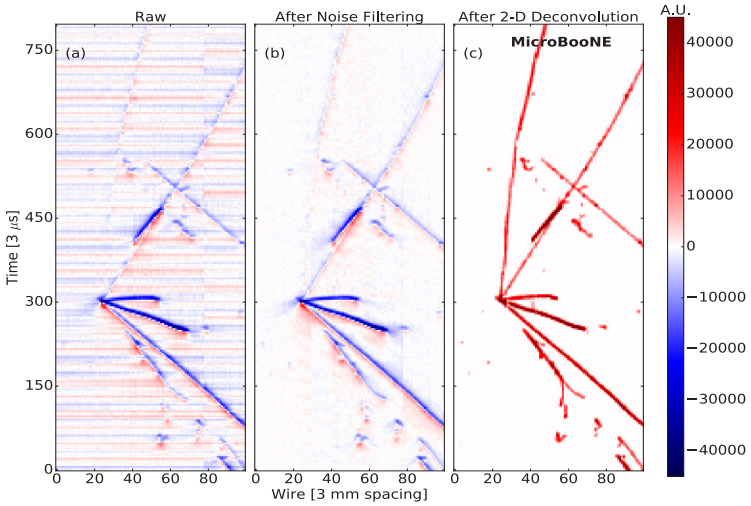
Wright Laboratory

Hanyu Wei

Brookhaven National Laboratory

April 3, 2018 at 12:00 p.m. in WLC-245

Ionization Charge Extraction in the MicroBooNE LArTPC



The single-phase liquid argon time projection chamber (LArTPC) provides a large amount of detailed information in the form of fine-grained drifted ionization charge from particle traces. MicroBooNE is a 85 metric tonne single-phase LArTPC and the first detector taking data in the Short Baseline Neutrino (SBN) program, located at Fermilab, which will examine a rich assortment of physics topics, such as searches for a light sterile neutrino and measurements of neutrino-Argon interaction cross sections.

MicroBooNE pioneered the usage of ultra-low noise cryogenic electronics and other advanced cryostat and cryogenics techniques. With a successful construction and operation, MicroBooNE has sustained greater than 96% uptime over the course of the past 2.5 years and produced the first set of results from a LArTPC using fully automated reconstruction tools as well as fruitful R&D accomplishments for future LArTPCs.
In this talk, I'll focus on a robust ionization charge extraction method developed in MicroBooNE that accurately converts the raw digitized TPC waveforms into the number of ionization electrons for induction and collection anode type wire planes. The long-range induction of ionization electrons passing through the wire planes is taken into account and the amplified equivalent noise charge in induction plane is mitigated. This work provides a solid foundation to fully utilize the capabilities of LArTPC. Performance and application on MicroBooNE data will be shown. Further improvement will be discussed.

Lunch is served in WLC-245 starting at 11:45 a.m. RSVP requested.

Sponsored by the Flint Fund, Yale Wright Laboratory, Yale University, and the Yale Physics Department.