

Summary of Det-Response and Particle Passage-related Systematic Uncertainty Discussions

Summary of Yesterday's Main Charge: Use this as an opportunity to ensure ND and FD (Horizontal Drift and Vertical Drift) det. response are as correlated as possible.

“Two to Three Detectors with Simulations Diverge in an Oscillation Experiment and Does that Make a Difference” - Adapted from Robert Frost

- Hopefully like the original poem which says both paths are the same, the answer is no it does not make a difference.

Detector Response Questions:

- Do the various available simulations save the same underlying G4 information?
 - Can complete closure test comparing edep-sim to LArSoft
 - Ensure both have matching G4 physics lists for both charge and light simulations.
- Can we confirm that different LAr property parameters have similar results between simulations, and which are important?
 - Asked to do a particle gun study on all three LAr simulations to look for differences, specifically when using alternative recombination models/parameters.

To consider:

- We will have real tests of some parameters in the future through the various prototype experiments.
- Can use readout modification (in MicroBooNE called wire modification) to correct for MC/Data differences.

Other Topics

Agreed Upon:

- Far Detector simulated electron lifetime will be altered to at least 20 ms.
- Geant4RW should be used to evaluate uncertainty tied to final state particles re-scattering on argon in LBL analysis.
 - Need to talk to Jake Calcutt about implementation for neutrino events and ensuring info can be saved in CAF files.

Further Tasks:

- Broadly continue developing detector physics program for 2x2 ND-LAr and ProtoDUNEs.
- Connect with Calibration Consortium and understand the FD and ND plans, confirm they are aligned with results from ProtoDUNEs.