Parameters Panel

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13:30 - 14:30 **Panel Discussion 2: Parameters Group**

Experiment, beam, facility each has parameters

Any appearance or disappearance analysis of long-baseline neutrinos will ultimately be comparing far-detector event rates to predictions for backgrounds and signal, with corrections applied if necessary for detector acceptances for the various event types. The predictions will rely upon a model whose parameters include the flavor-decomposed neutrino fluxes, differential interaction cross sections, detector geometry and response, and even the density profile of the Earth, all integrated over the running time of the experiment. Some of these parameters may be measured in-situ, some by a near detector or near detector suite, some by other experiments, and some may be extracted in the analysis itself as nuisance parameters, along with the neutrino oscillation parameters of interest.

There are also parameters that will help optimize the ultimate physics sensitivity---such as beam energy, angle, and spectrum---which need to be determined before any design decisions are finalized.

1 What are the most critical parameters that must be measured, for both appearance and disappearance experiments?

2 What design parameters (excluding detector mass and beam power) have the greatest influence on physics sensitivity?

3 Which of the model parameters do not need to be measured in-situ, by either a near detector or at the far detector, but instead can be taken from other experiments that might run before or in parallel with ELNBF?

4 How important are near-detector measurements?

5 How important are measurements of the beam flux?

6 Can a prediction of detector signal acceptance and background rejection (e.g., such as pi0 mis-id) be tested, without a LAr-TPC near detector module?

7 How will the model be tested?

8 Are in-situ calibrations of the far detector necessary, other than with cosmics?

9 Is the detector response model for the two proposed detector technologies equally simple and easy to calibrate, or does one have an advantage here?

10 Which parameters must we measure multiple ways so as to overconstrain them?

11 How will covariances between parameter uncertainties be determined, and how do they affect different physics goals?

12 Are there any nuisance parameters that we can float freely rather than measure and constrain, in particular when making comparisons between neutrino and antineutrino rates?