Overview of HK-LBL Near Detector and Flux Session

Mark Hartz
Kavli IPMU (WPI), University of Tokyo/TRIUMF

Motivation of Studies and Agenda Items

- For T2K, the dominant systematic effects are uncertainties on the neutrino interaction model not constrained by the near detector
  - Largely nuclear model uncertainties that we do not extrapolate from the carbon to oxygen nuclear targets
- A number of avenues to reduce the nuclear model uncertainties are available and being studied:
  - Event rate measurements on water in the T2K ND280 detector: this work is currently being done by T2K
  - New near detectors with a water target:
    - Development of WbLS by M. Yeh et. al. for active water detector
    - TITUS: intermediate water Cherenkov detector with a magnetized muon range detector and Gd doping
    - vPRISM: intermediate water Cherenkov detector covering 1-4 degrees of off-axis angle
  - High Pressure Gas TPC: better resolve the hadronic final states to constrain the nuclear model
- We should also investigate flux uncertainties to ensure systematic errors are controlled to the required level

Agenda Items:

- Water-based Liquid Scintillator & Isotope Loading (M. Yeh)
- Flux Uncertainties and Sensitivity Studies for Near Detectors (M. Hartz)
- TITUS detector talks:
  - TITUS Analysis with Gadolinium (D. Hadley)
  - A Magnetized Muon Range Detector the 2km TITUS Detector (M. Rayner)
- vPRISM talks:
  - Overview of the vPRISM detector (M. Wilking)
  - Short and Long Baseline Sensitivities with vPRISM (M. Scott)
- High Pressure Gas TPC R&D (M. Wascko)
  - Cancelled since Morgan is at Fermilab. See slides from the premeeting: http://indico.ipmu.jp/indico/getFile.py/access?contribId=77&sessionId=28&resId=0&materialId=slides&confId=34