PPEG – summary & plans

Patrick Huber

Center for Neutrino Physics at Virginia Tech

9th IDS-NF plenary meeting October 8-10, 2012, FNAL, US

Physics case

PPEG will formulate the "physics case" for the RDR

- Re-hash the IDR section
- Add a discussion of physics topics beyond three flavor oscillation
 - Non-standard interactions possibly partial update for 10 GeV
 - Other BSM physics literature survey
 - Near-detector physics use S. Mishra's HiRes list of topics, *e.g.* $\sin^2 \theta_W$
- Summarize relevant new developments like Planck data *etc*.

Near detectors for PPEG

Due to resource constraints we will **not** be able to include the near detectors in great detail in the oscillation analysis

- Assume that the absolute flux will be constrained by the ν -e elastic scattering to 1% (per year, statistically limited)
- Assume the relative flux between near and far detector will be constrained to about 0.2-0.3% using a beam transfer matrix – previous results need to be updated
- Background uncertainties of less than 10-20%, systematics study in progress

Near detectors, continued

The following issues are known and believed to be solved by a HiRes like detector but need more detailed work (not for the RDR), like for example

- Wrong sign muons from pion decays
- Nuclear effects in energy reconstruction for QE events
- Verification of energy resolution
- Verification of energy scale

. . .

Staging

- Energy staging not useful since at 5 GeV and 1300 km there is a significant deterioration in CP precision for some values of the CP phase. Energy staging also would imply to change the baseline between stages and thus also to have 2 decay rings.
- Luminosity staging
 - Keep detector at 100 kt driven by relatively low detector cost
 - What are the accelerator inspired luminosity stages?

Open Issues

- Need *final* MIND performance from the Detector WG at least 4 weeks prior to first draft of RDR – will be taken care off
- What performance indicators do we want to use, CPV discovery, CP precision? How do we quantify mass hierarchy? Linear scale in θ_{13} ? – task for PPEG
- Flux at near detector from Accelerator WG task for Accelerator WG
- Flux error from Accelerator WG 1%?

Summary

- Near detector issues have been clarified and remaining action items have been defined and assigned
- Far detector work is progressing well and expected to be available on time
- Update of (some) NSI studies
- Support of staging studies
- Goal for IDS-NF # 10 to come up with a list of possible performance indicators