Measurements program group plans

Jarek Nowak
Lancaster University

Donna Naples
Pittsburg University

Organization

- Meetings every two weeks on Wednesday at 8AM CDT
- Email list: CENF-LBNF-Test@cern.ch
- We will use indico for meetings.

Short-term goals

- Develop necessary tools for data analysis.
- Train a new generation of experts who will lead the analyses efforts for DUNE in the next decade.
- Get ready for data taking in spring 2018 (2.5 years).
- All the analysis need to start as soon as possible and they are included in the goals for the next 9 months.

Fundamental software tools (4 FTEs)

- Geometry (1 FTE)
  - important for correct simulation and analyses
  - reuse the FD and 35ton geometry when possible (APA, CPA, cryostat)
  - CAD->GDML conversion
- Single particle Monte Carlo (1 FTE)
  - the main MC for all analyses
  - develop/adapt tools to generate MC for various particles, energies and entry angles.
- Cosmic muons Monte Carlo (1 FTE)
  - about 68 muons in each beam event
  - develop/adapt appropriate Monte Carlo generator
  - overlap with the calibration group
- Overlays (1 FTE)
  - Merging the cosmic muons events with beam events (MC)
  - Some of the overlays code already exists (NOvA)

Reconstruction/Analysis (21 FTEs)

- **Shower calibration (6 FTE)**
  - E-M showers (π^0, γ, e)
  - Hadronic showers ($\pi^{\pm}$, $K^{\pm}$, p)
  - Various energies
- **Angular dependence (1FTE)**
  - Recombination using different angles of the beam and secondary particles
- **Bethe-Bloch parameterization of charged particles and PID (8FTE)**
  - Each particle, and for various energies and angles
- **Reconstruction effects (3 FTE)**
  - Difficult angles, 2D vs. 3D reconstructions (validation of reconstruction)
- **e/γ separation (1 FTE)**
  - wire pitch, vertex activity, etc.
- **Cross section measurements (2FTE)**
  - Elastic scattering, absorption, charge exchange

Other measurements (5FTEs)

- Supernova and Michel electrons (1 FTE)
- Charge sign determination (1FTE)
- Proton decay sensitivity and background samples (1FTE)
- Anti-proton annihilation (1FTE)
- Veto cosmic muons and beam halo (1FTE)

Summary

- There is very exciting time ahead of us.