



Charged Current Working Group:
Part 3
Future & Planning

CC WG

MINOS Collaboration Meeting
October 2005



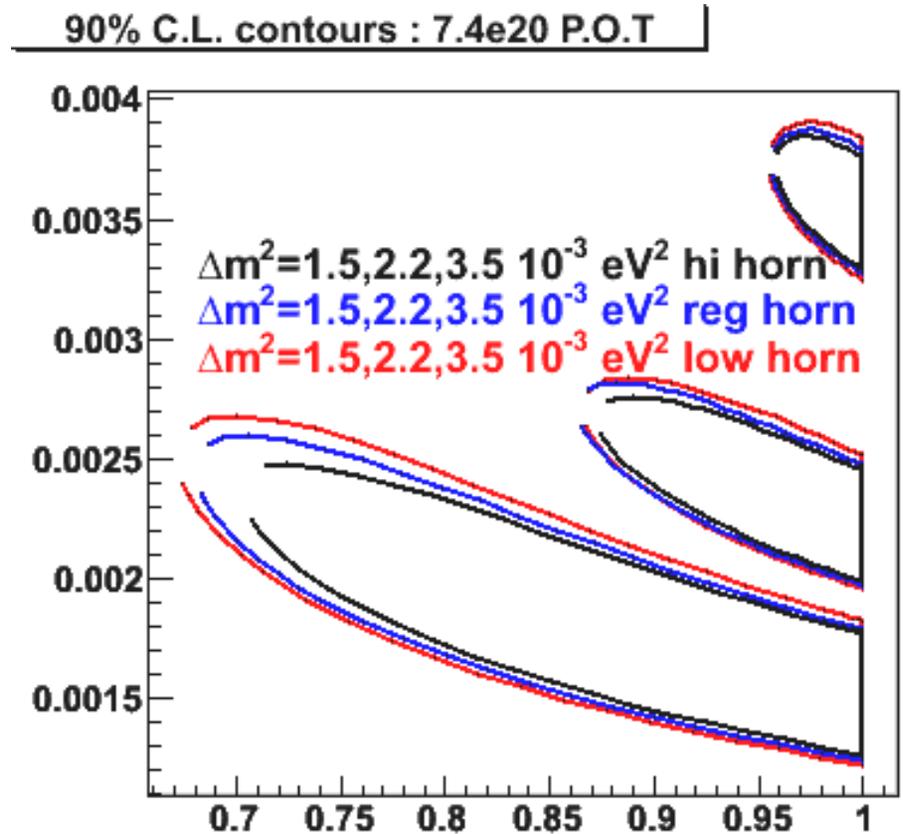
Outline

- Horn current optimization
- Horn-off systematics data proposal
- Effects of big errors vs POT
 - > When are we safe
- Plan of getting the box open



Horn Current Variations CC Sensitivity

- Favor a higher current
- Not a huge effects
- Stress on the beam hardware might be a bigger effect



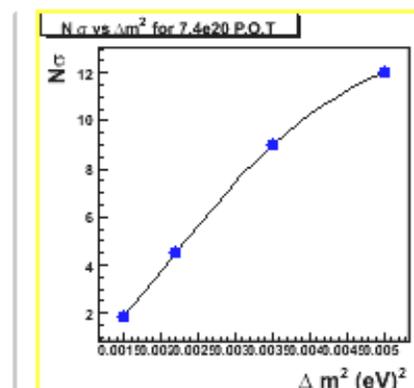
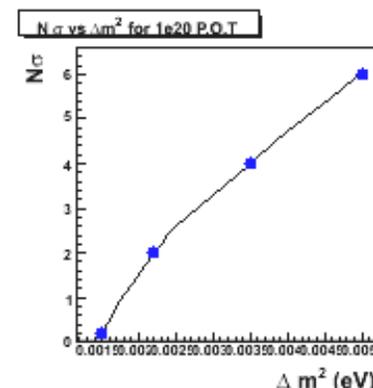
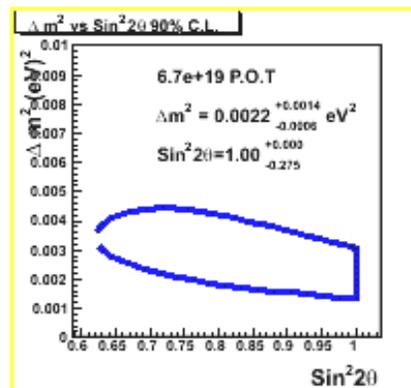
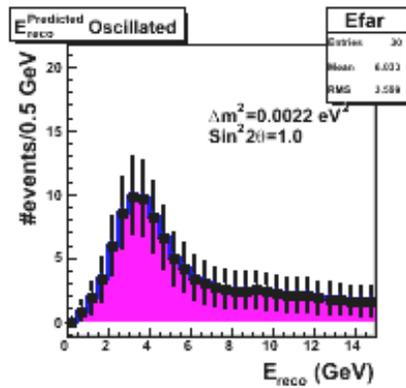
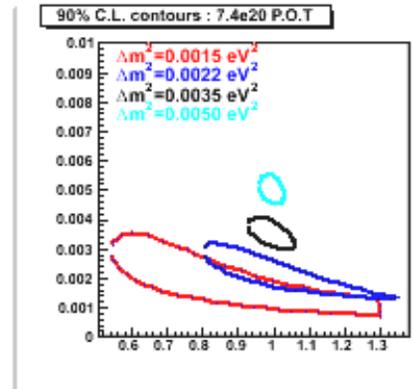
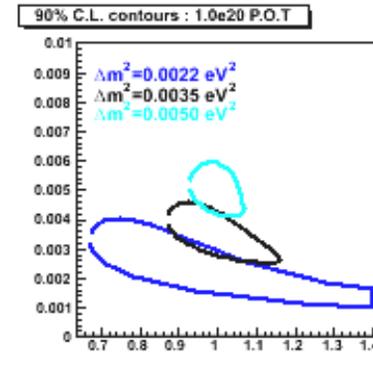
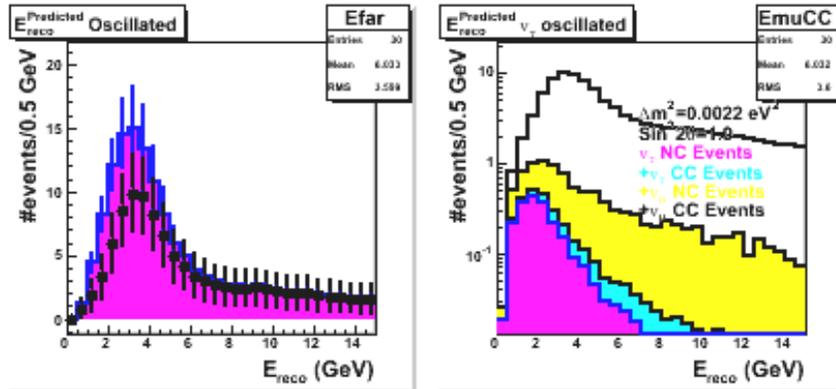


Beam systematics

- ND/CC/Beam systematics WGs recommend a $5e18$ of horn off data before we turn off for the shutdown
 - > Enough data to get 10% check of HE tail flux and extrapolation to lower energies



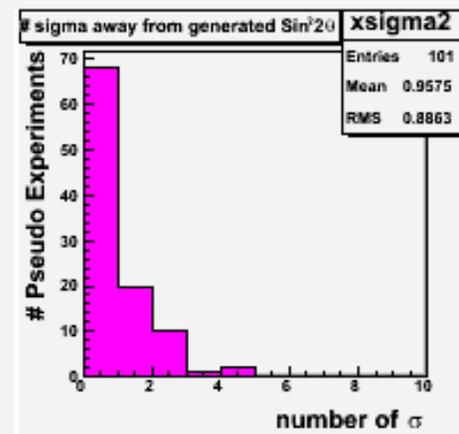
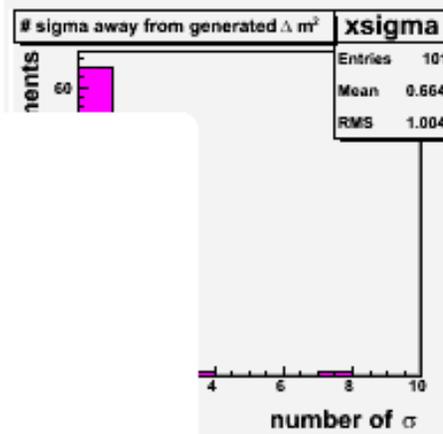
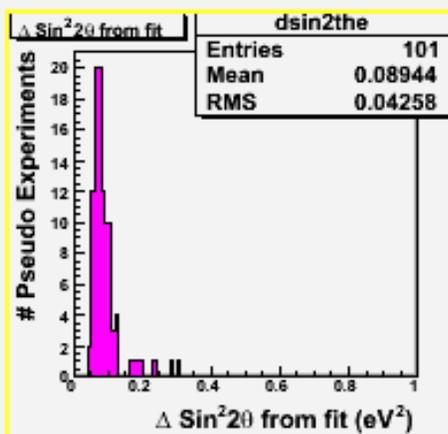
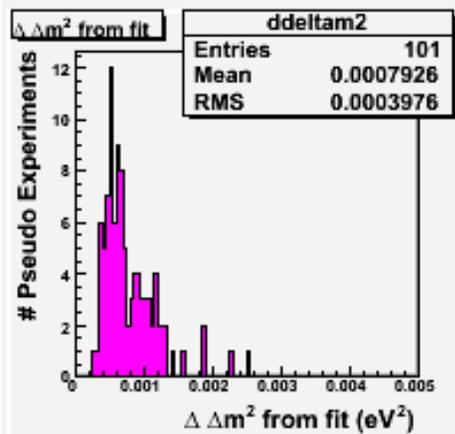
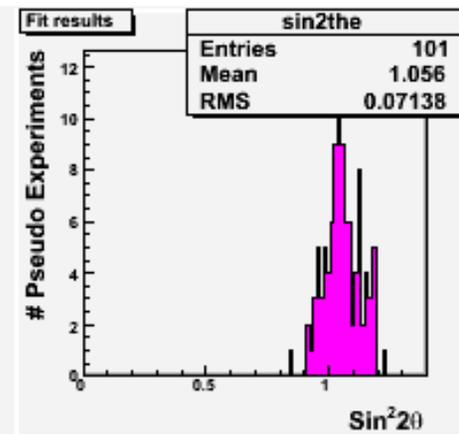
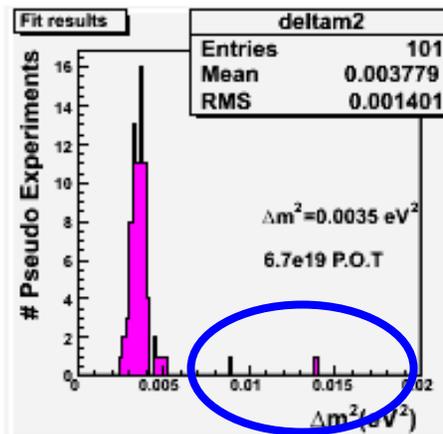
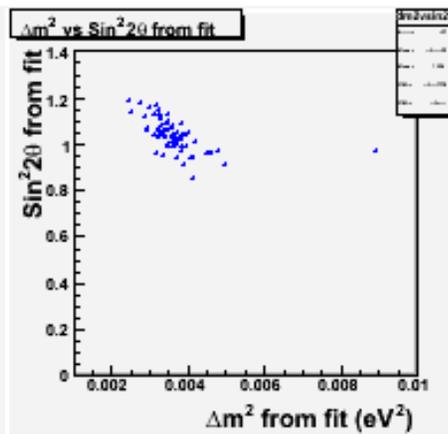
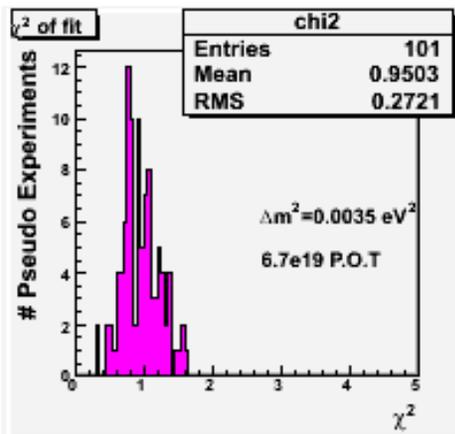
Example of some fits to Frame for of WG Summary





Examples at $6.7e19$

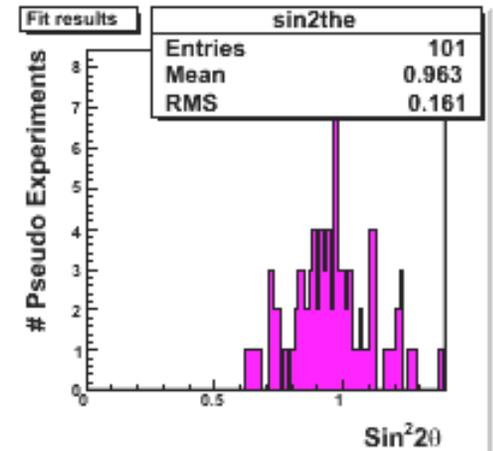
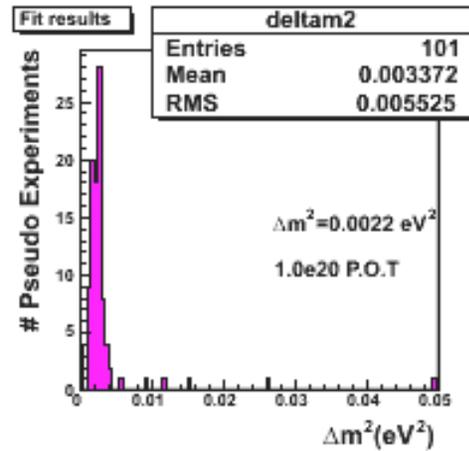
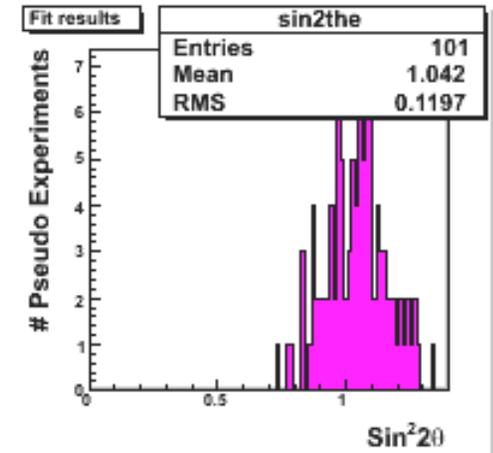
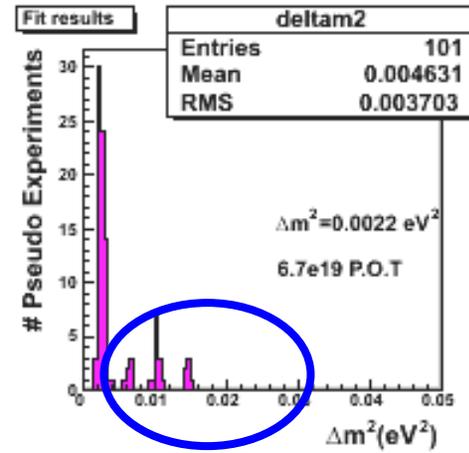
- Using 100 pseudo-experiments





Effects of ND/FD Exposure Error

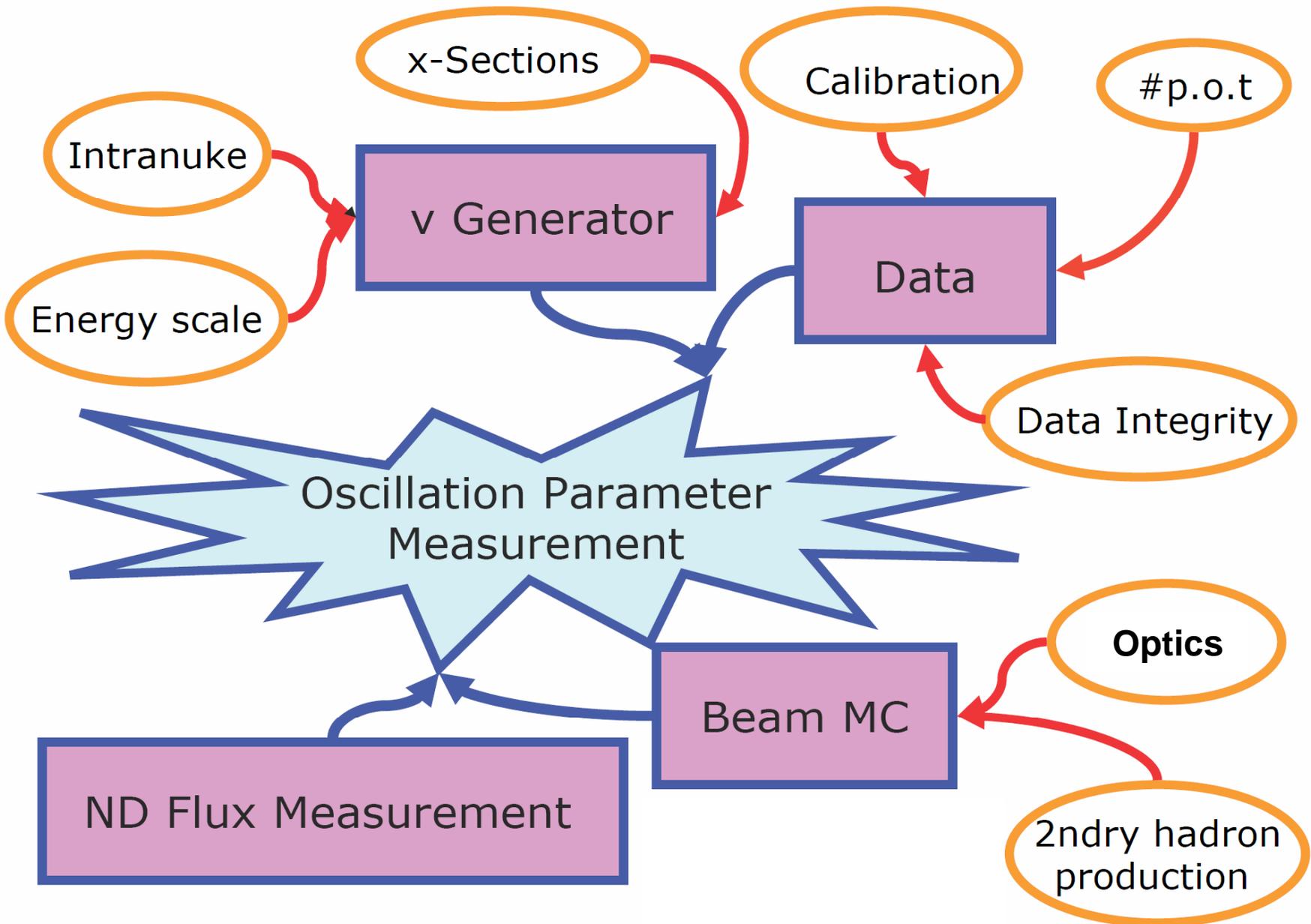
- Errors in #P.O.T can give false information
- Fitting with a another DoF solves this
- Plots to right have a 10% exposure miscalibration





Jenny's Conclusion

- Effects of even “ridiculous” calibration and normalization problems should not hurt us at $1e20$ POT
- At what value of Δm^2 do we decide to raise the beam energy?
 - > $0.005eV^2$ is the right branch point for LE10 & pME
 - > But continuously variable horn position, so could think about something in between





ND Flux Measurement

- Measurement of DIS at high energy (Donna, Debdatta, Mike)
- QE identification (Mark, Mike)
- Verification using x versus q^2 bins (Mike)
- Kaon content from Mini-Boone (Beam WG)
- Inverse muon decay (Peter)
- Fitting ND by bin in kinematic space (Masaki)



Summary of Status

- Most of the pieces of the puzzle are nearing conclusion
 - > Large amount of effort is apparent
 - > People are working hard & in the right direction
 - > Have a reasonable plan to convergence in the next few months
- That said
 - > No obvious show stoppers at a level preventing an analysis by Oxford with expected significance at $1e20$ POT
 - > Think we are OK with our expected levels of ND agreement
 - > Would like to have public results and document for the February



ExComm Goal:

Open box in 2nd week of December

Outline of Process to make goal

- Paper on the process for opening the box
 - > Draft in 3-4 weeks
 - > Convergence & discussion
 - > Needed before processed data is analyzed
- Preopening checks
 - > Define and iterate
 - > Presentation of plots
 - > Understanding of any possible effects on biases and sensitivity
 - > Proceed via phone meetings
- New MC release & processed
 - > Done by beginning of December
- Post-box data cross checks
- Results for Oxford
 - > If there are warts define plan to address in short term
- Public in February
 - > Justify beam tune for restart after spring shutdown



Envisioned Analysis Program

- Fit with Petyt method
 - > Others as cross checks
- Errors
 - > Beam errors include hadron production parameterized
 - > Define set of cross section reweighting parameters (and other nuisance parameters)
 - > Error due to nuclear rescattering / neutrino energy scale
 - > Calibration (track, shower) errors a scale errors
 - > Reconstruction error as parameterization
 - ND/FD fixes to first order
 - > Add an error beyond calibration?
 - > Understanding of any possible effects on biases and sensitivity