

# Electron/Photon Truth-Based Studies and Plans

David Kaleko -- 071212

# Starting with GENIE Data

- Data (BNB, generator level) found in /uboone/data/SBL\_focus\_studies/ub470\_nu/
- Run through a filter based on FinalStateParticleFilter (Saima) to pick out  $\nu_e(\bar{\nu})$  CC events (intrinsic background), and  $\nu_x(\bar{\nu})$  NC events with  $\pi^0$  in final state (source of photons)
- Run through largeant + DAQ and analyzed
- Use fullosc\_ub470 sample (in progress...): higher  $\nu_e(\bar{\nu})$  statistics and signal and background comparisons

# Truth Studies

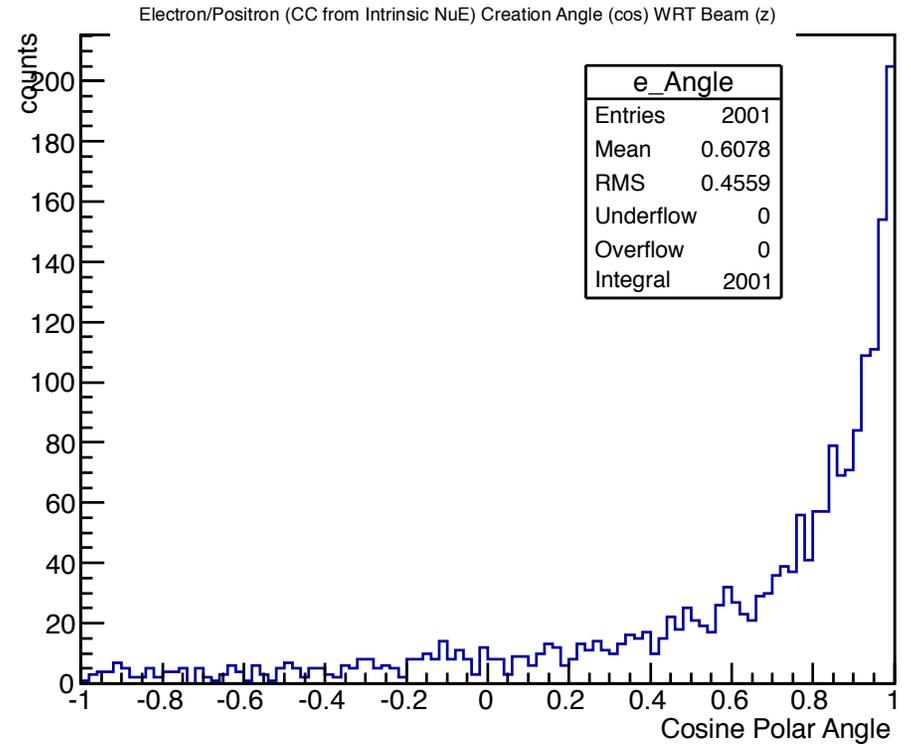
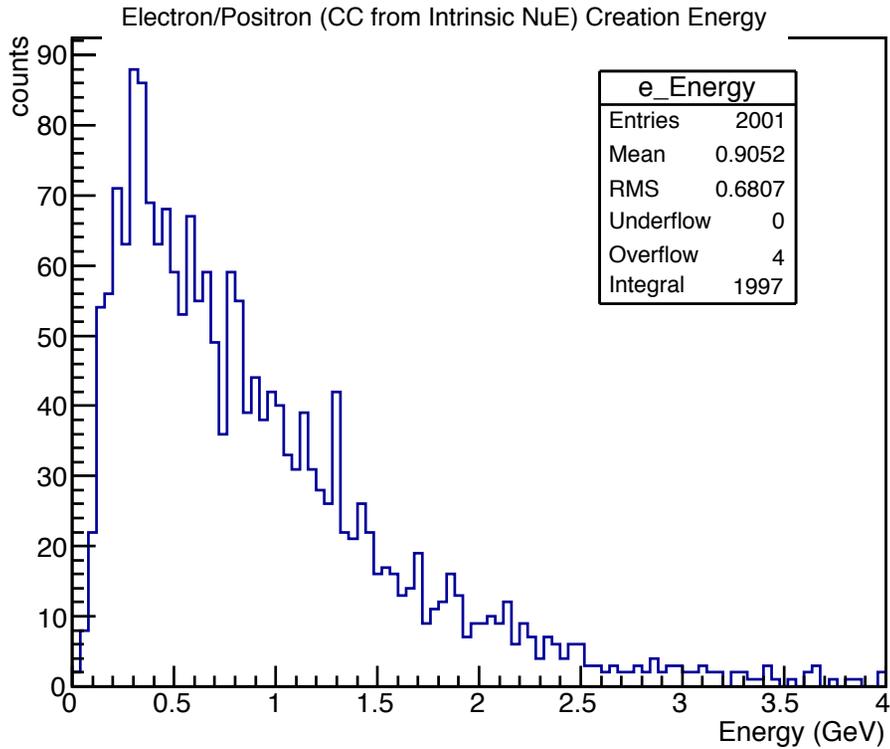
- End goals of truth studies:
  - Cross checks.
  - Identify variables of interest for reconstruction.
- Can study/consider (for PID):
  - Preshower track  $dE/dx$ , optimization studies of preshower track length.
  - $dE/dx$  vs  $x$  of showers (overlapping photons?).
  - Angular distribution of showers.
  - Other things TBD.

A note for the following slides:

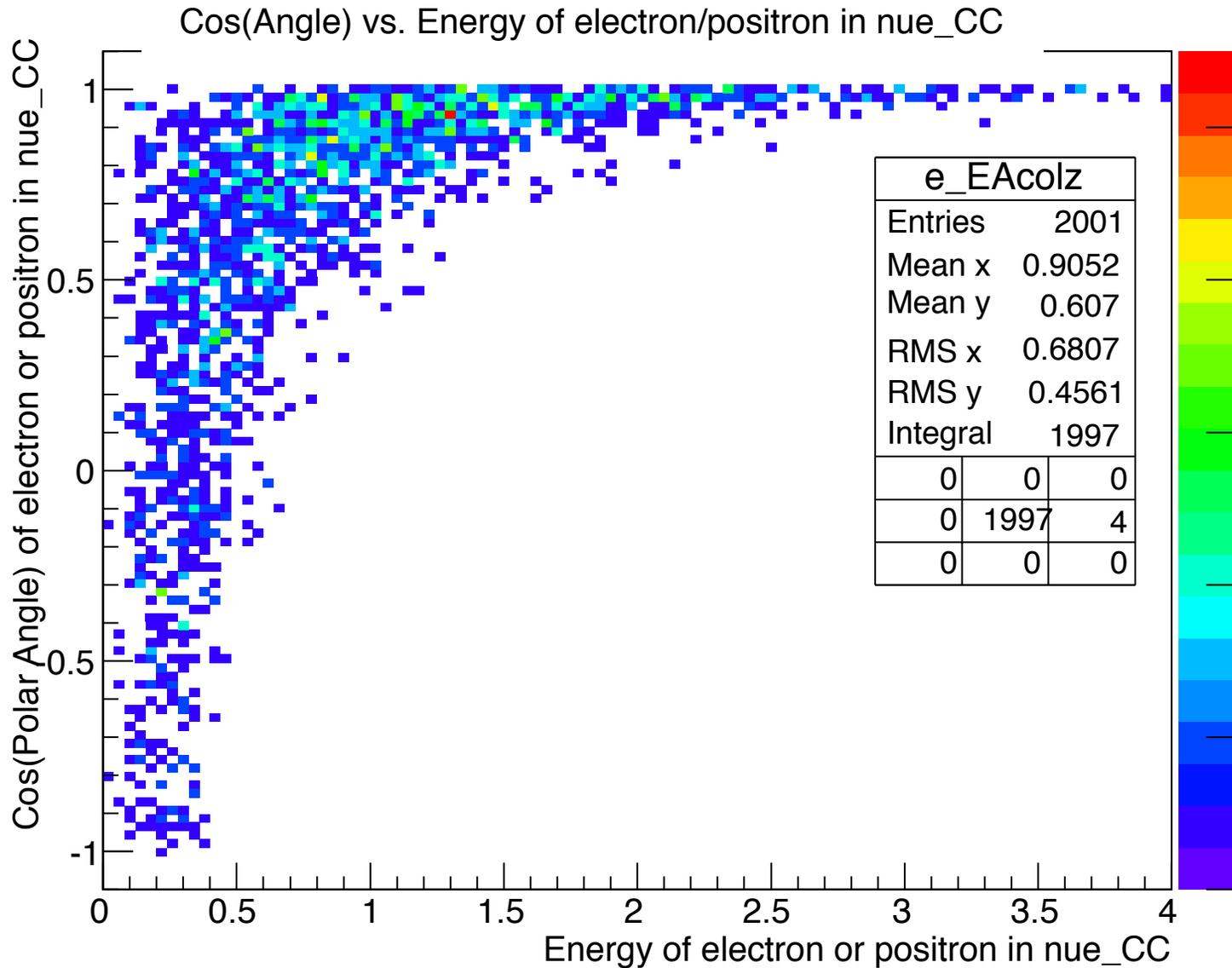
All plots shown today are  $\bar{\nu}_e$  (**bar**) events, and are  
**truth only**

$\pi^0$  plots coming soon!

# $e^-/e^+$ from CC- $\nu_e$ (bar) [TRUTH]



# $e^-/e^+$ from CC- $\nu_e$ (bar) [TRUTH]



# What I hope\* to show next week:

- Plots with higher statistics from fullosc sample.
- Plots for the NC pizero events, for comparison.
  - Specifically problematic pizero events where one of the gammas converts outside of active volume.
- True neutrino energy vs EnuCCQE (reproducing Ryan Patterson's work on MiniBooNE)
- Plots involving  $dE/dx$  vs.  $x$ , using truth trajectory but reconstructed wire pulses.
  - Reproducing first-2.2cm plots for e vs photons.

\*Might be optimistic, I'm at INSS summer school at Virginia Tech. I wouldn't dare try to code during one of Boris's talks!