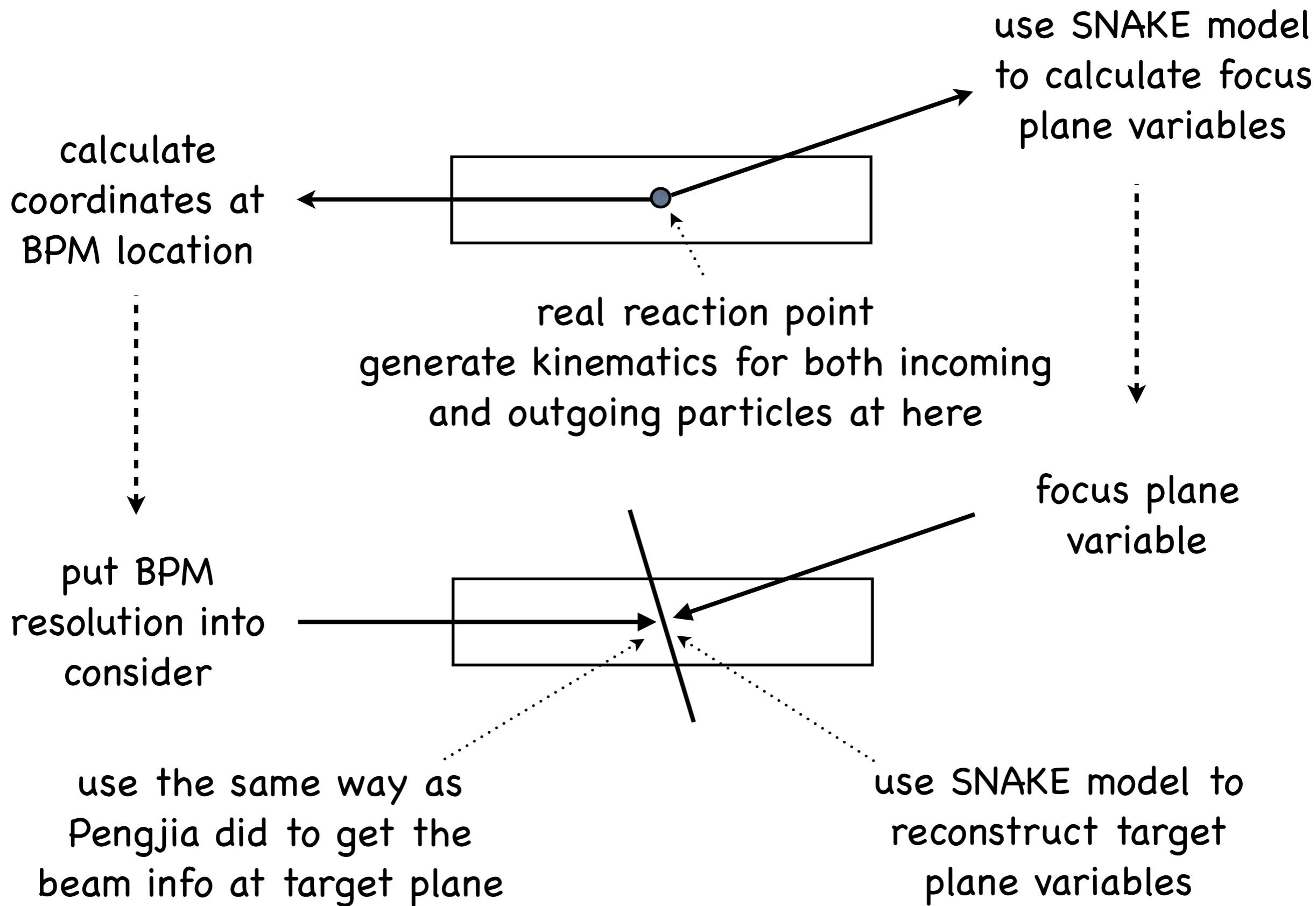


# Simulation Update

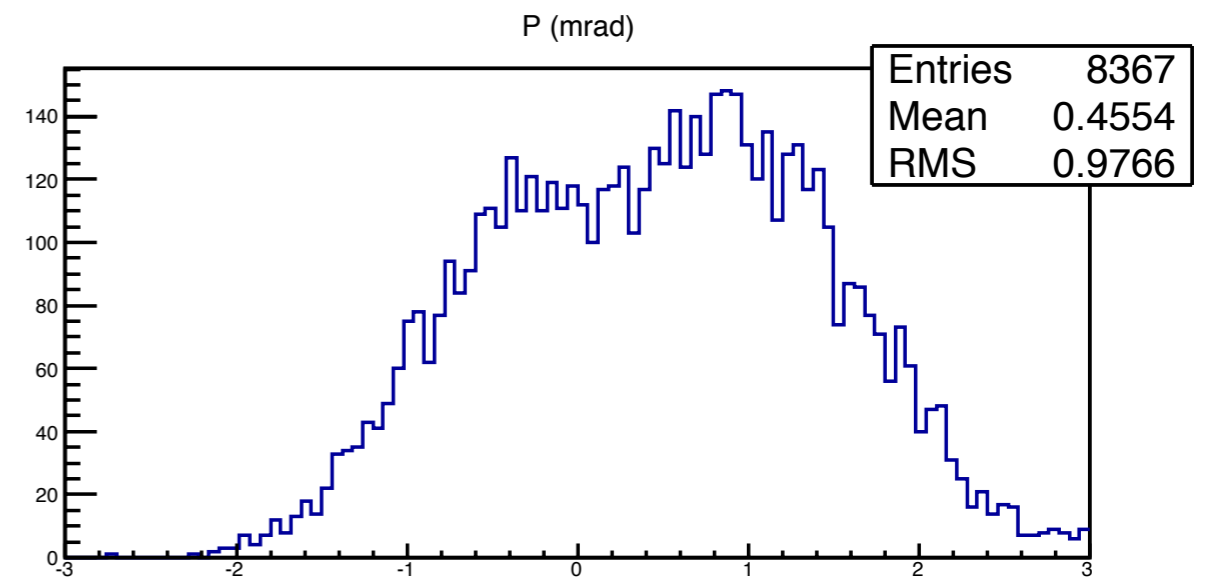
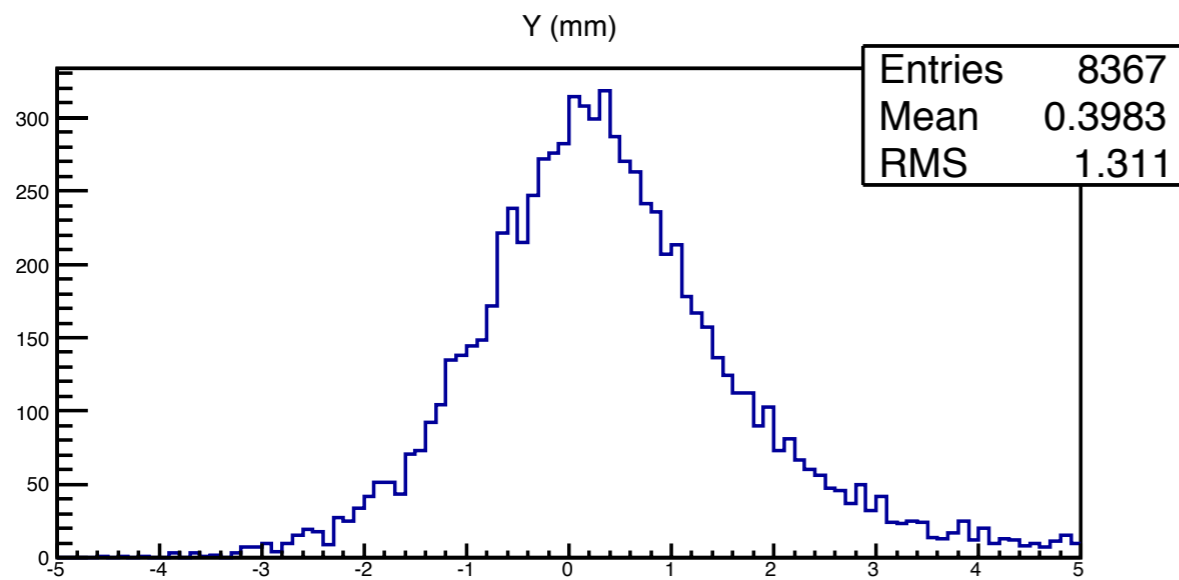
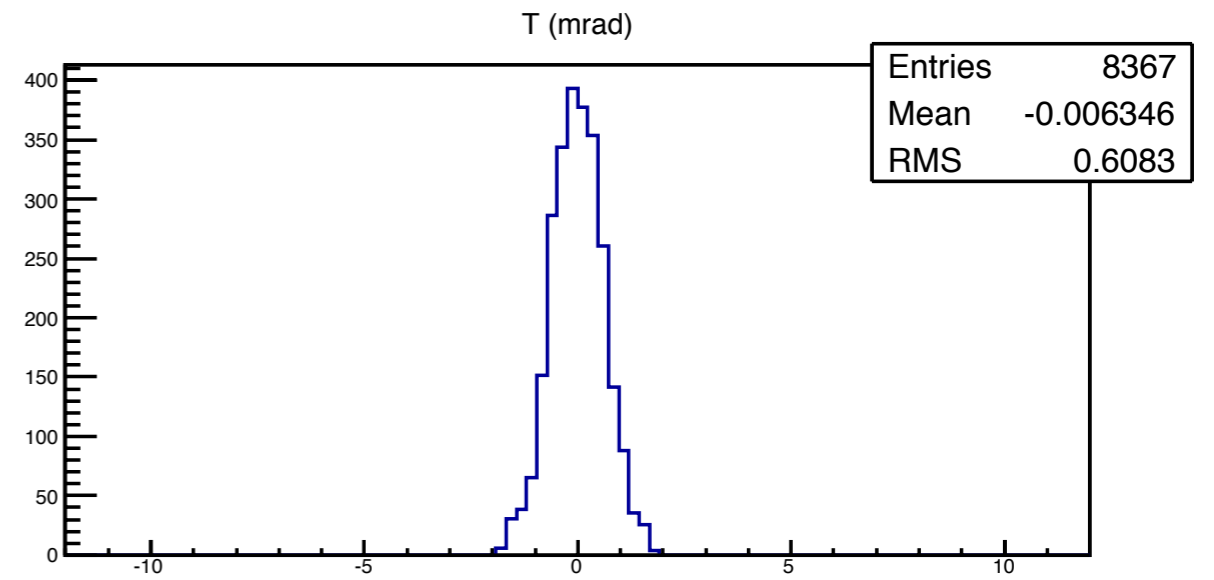
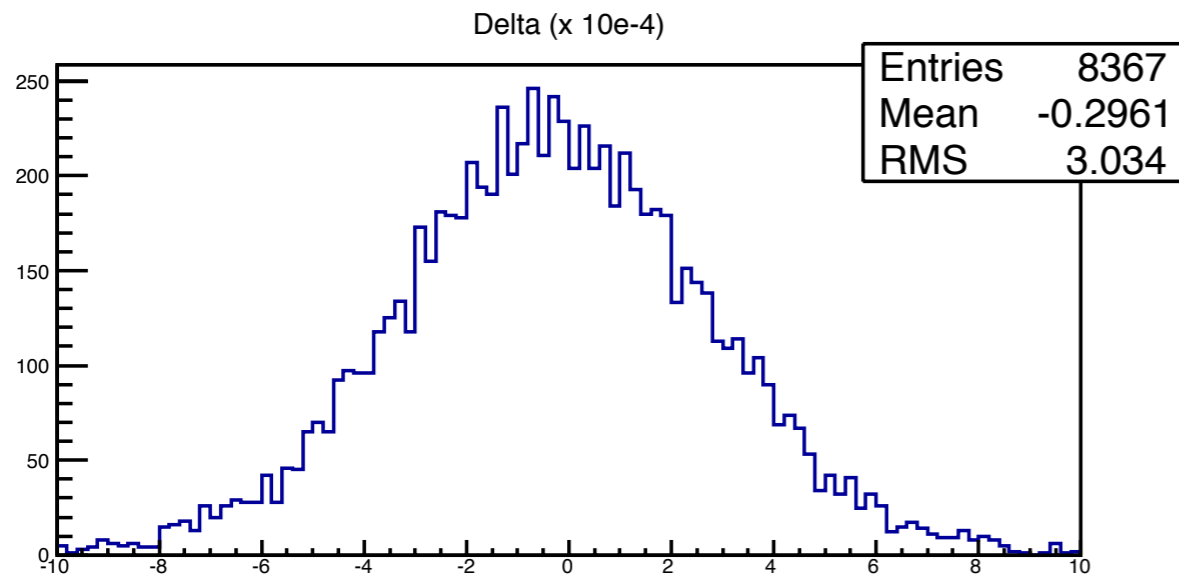
Chao Gu

# Simulation



# Simulation

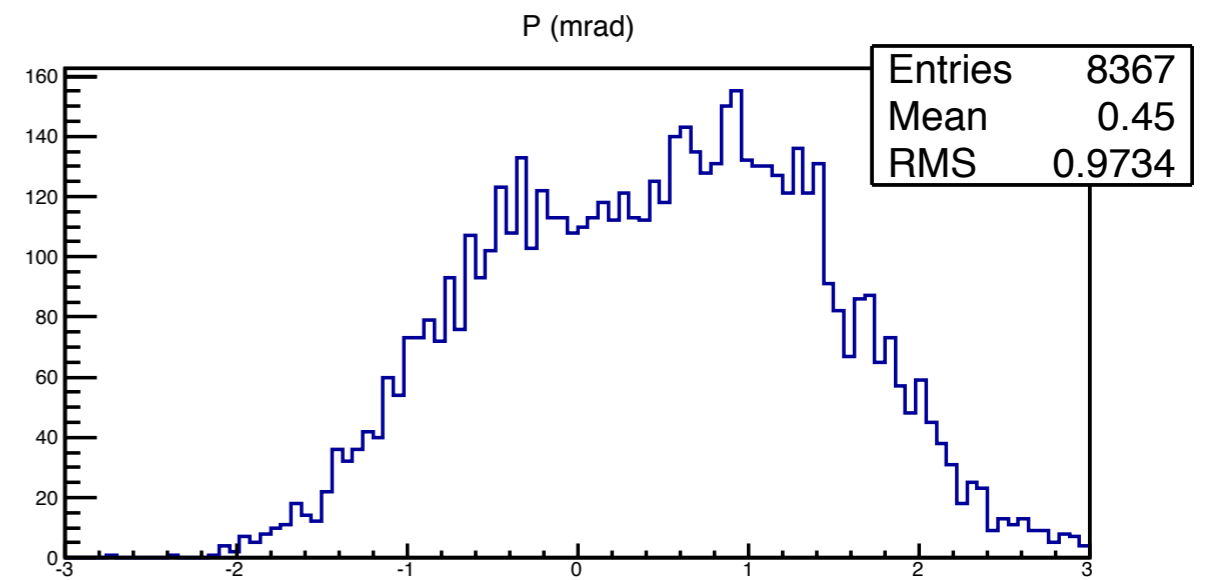
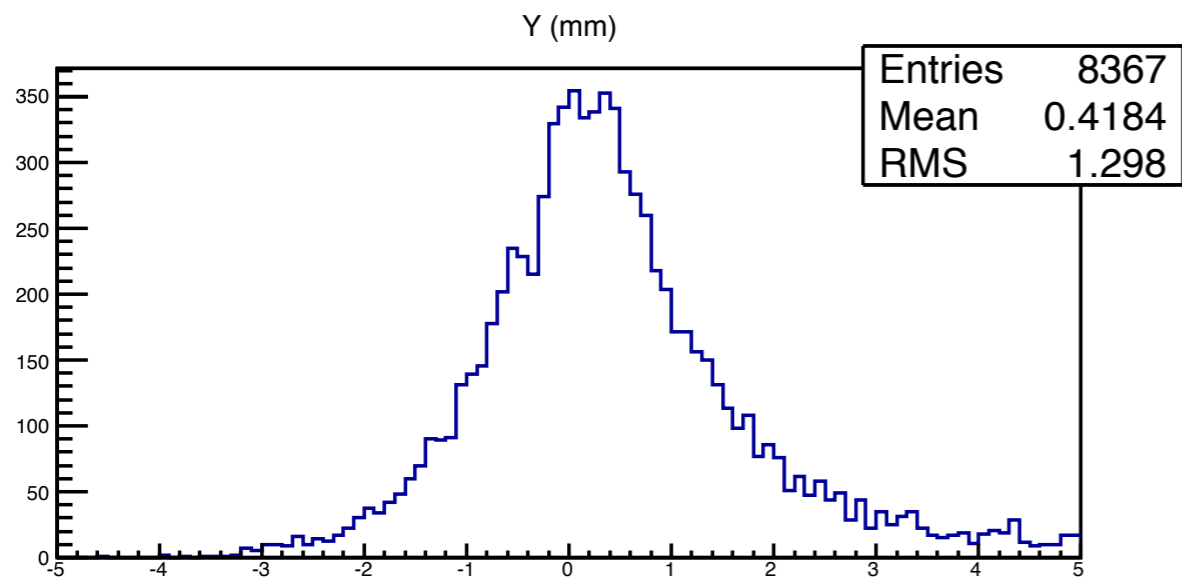
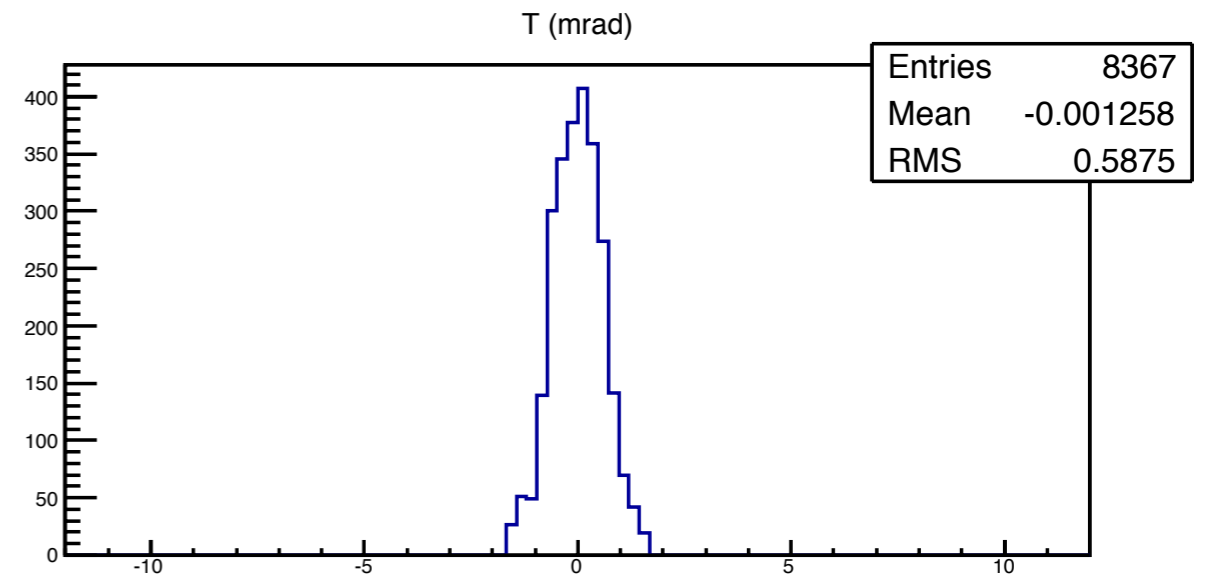
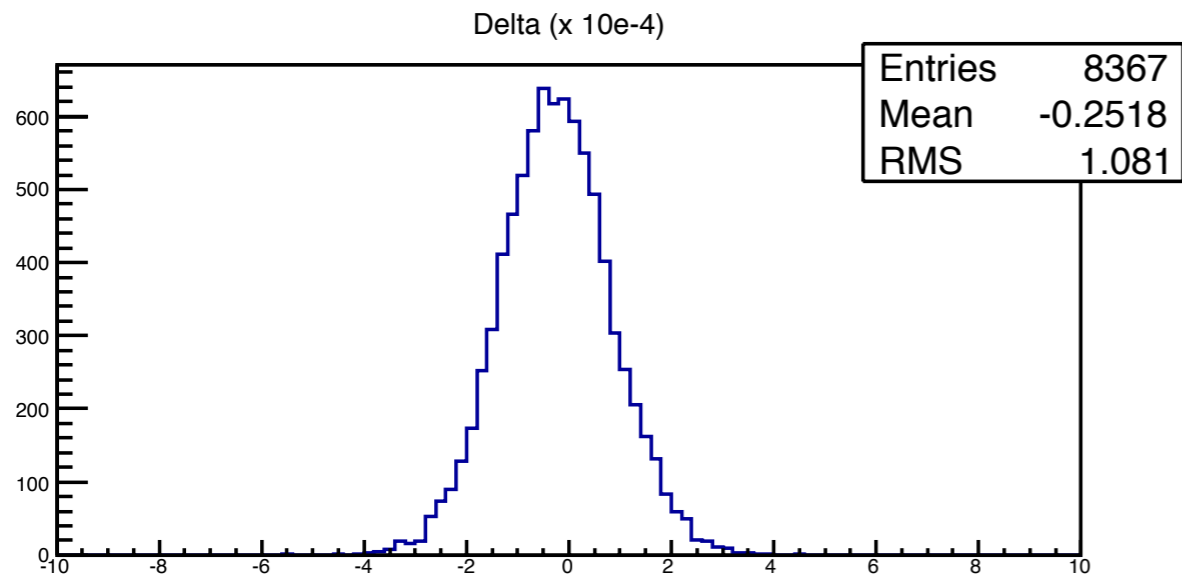
- Conditions
  - $E = 2.254\text{GeV}$
  - elastic setting
  - target at  $z = -13.6271\text{mm}$  (40mil C target)
  - no raster, no field (straight through optics)



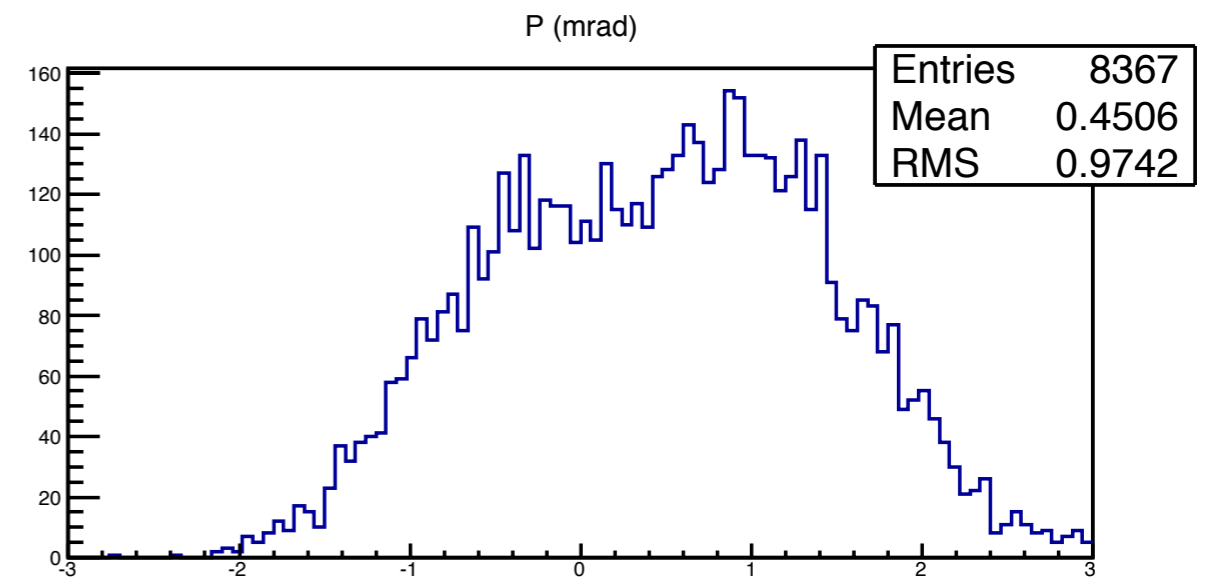
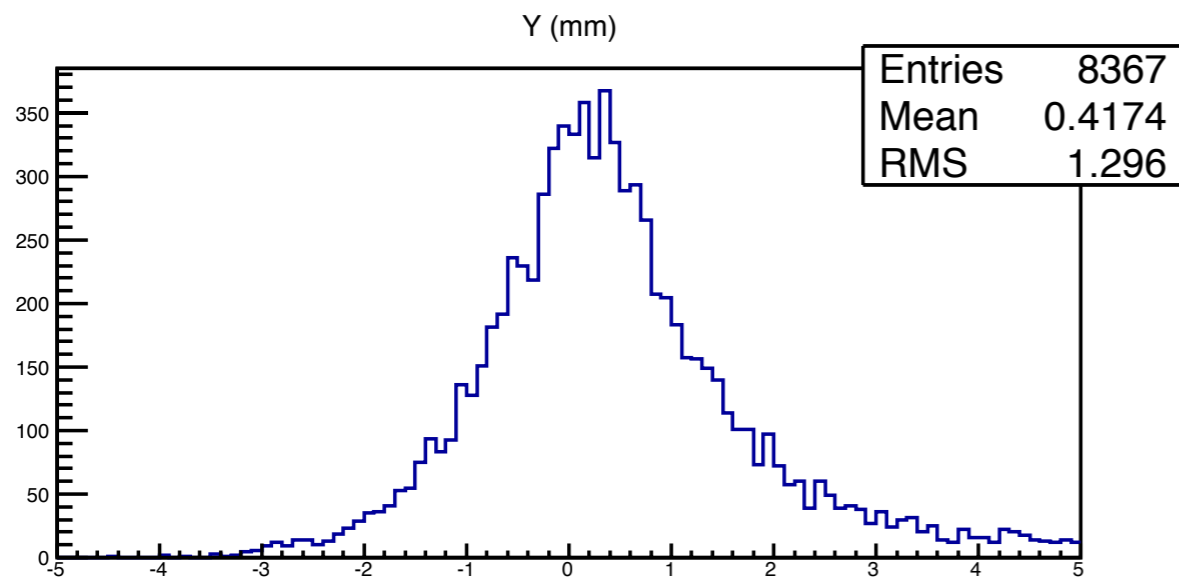
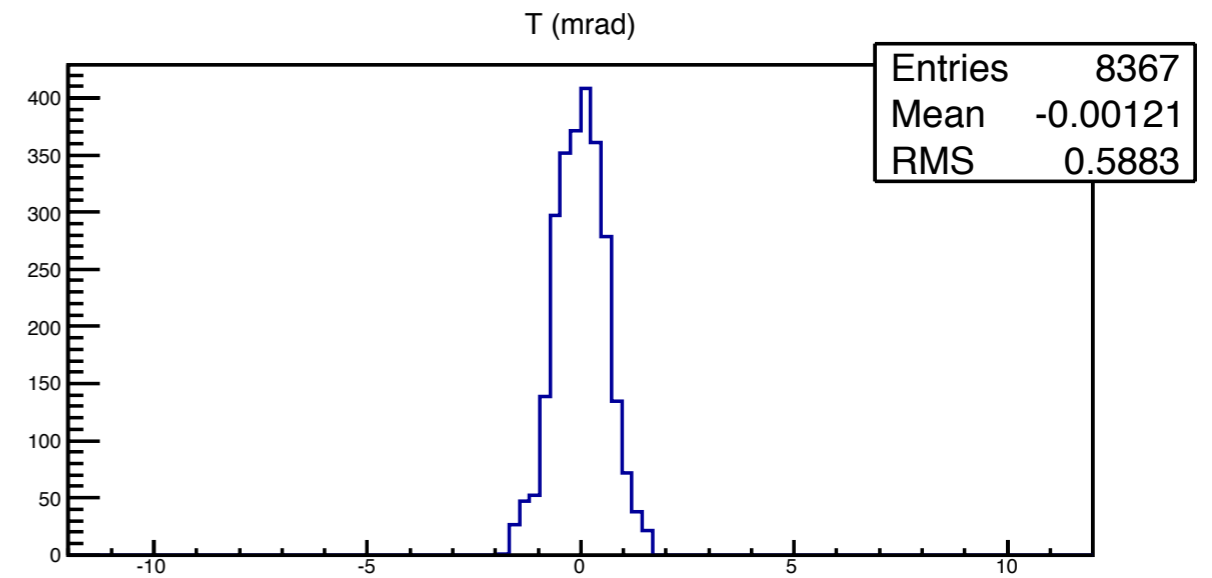
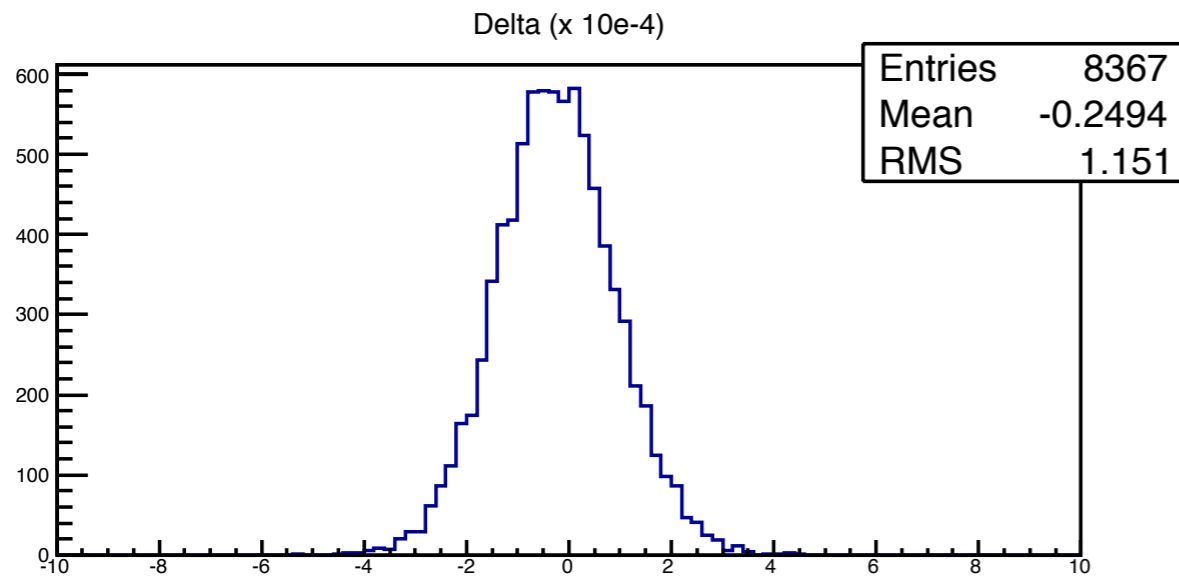
Reconstructed target variable uncertainty

BPMa res = 0.2mm

BPMb res = 0.4mm



Reconstructed target variable uncertainty  
assume BPM no res



Reconstructed target variable uncertainty  
assume only use BPMA

Conclusion is BPM res will contribute  $2e-4$  to delta reconstruction

# Simulation Package

- Modified event generator
  - Previous: generate particles with flat distribution, weight each particle with cross section when fill histogram
  - Most recent: can also generate particles follow the cross section distribution
  - more convenient
  - algorithm: Metropolis–Hastings algorithm (random walk)

# Simulation Package

- Physics models:
  - Inelastic XS:
    - QFS model with K. Slifer's radiative correction
    - P. Bosted's Fits
      - Add the same radiative correction
    - WISER model
    - EPC model (working)
  - Elastic XS
    - K. C. Stansfield's Form Factor
    - L. Cardman's charge distribution fit of C12
- Code is available as an obsolete library
  - will have some docs later



# Summary

- TODO:
  - Optimize the optics matrix of optics data taken on Mar 4th (with He in, better beam position)