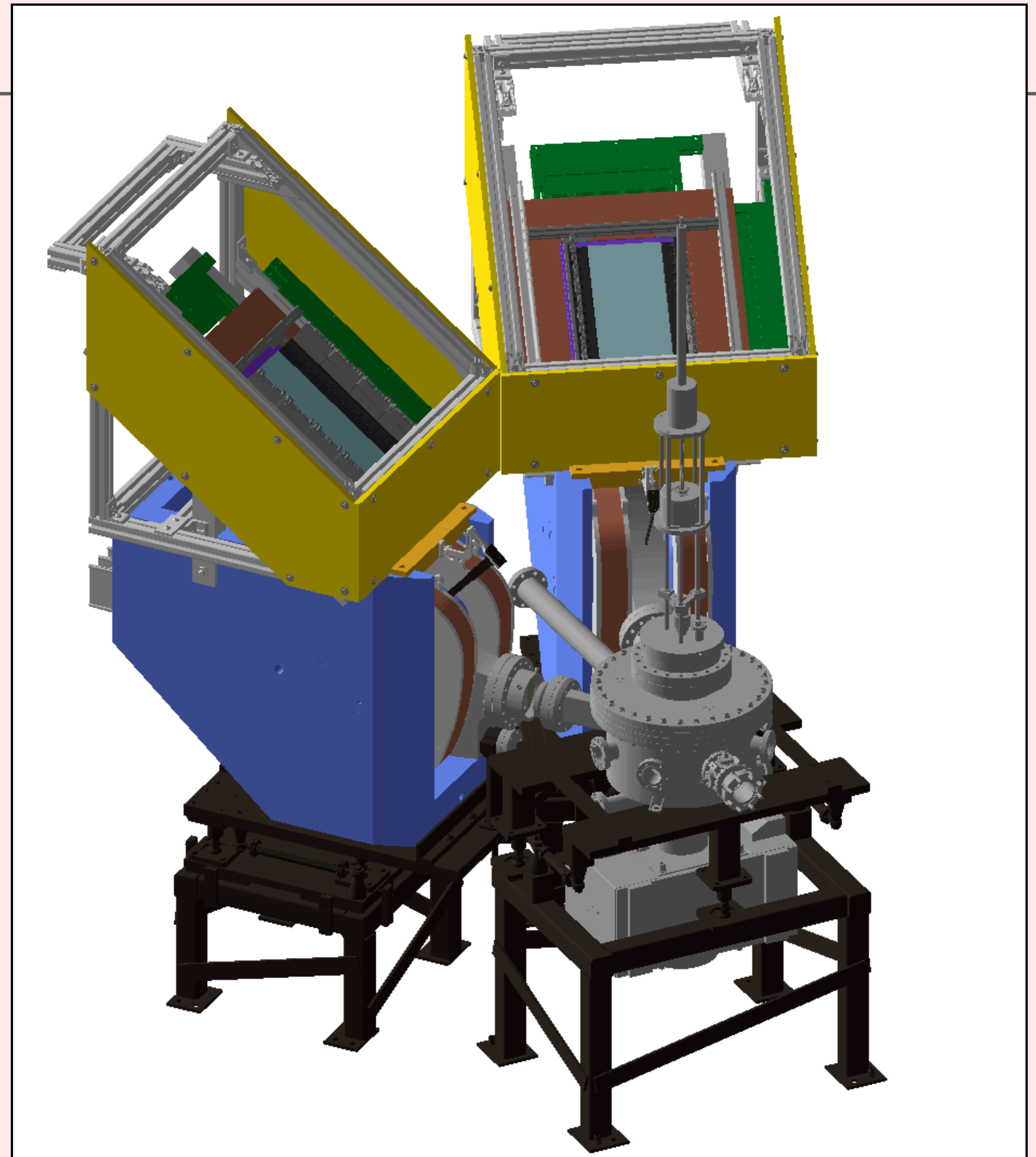
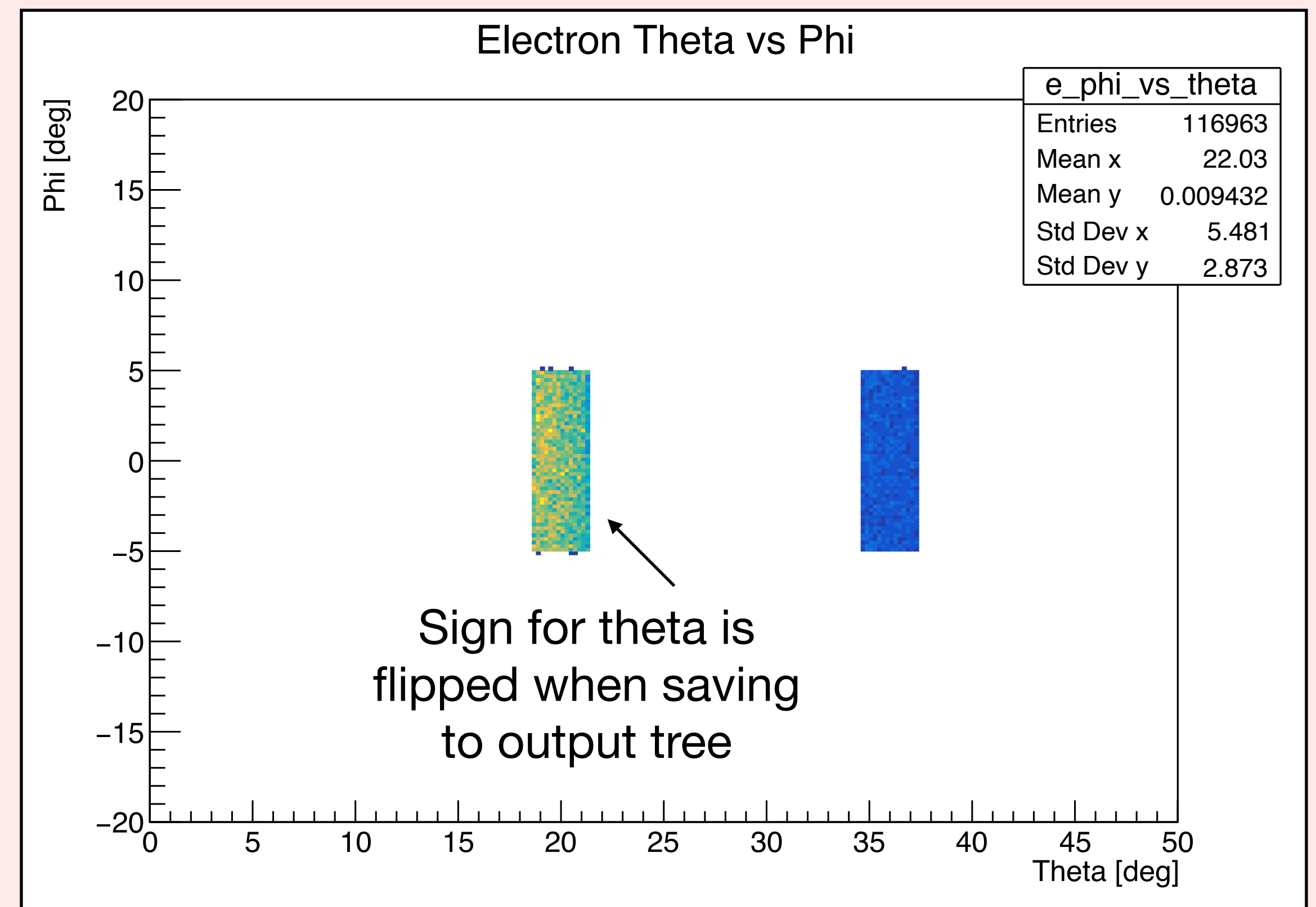
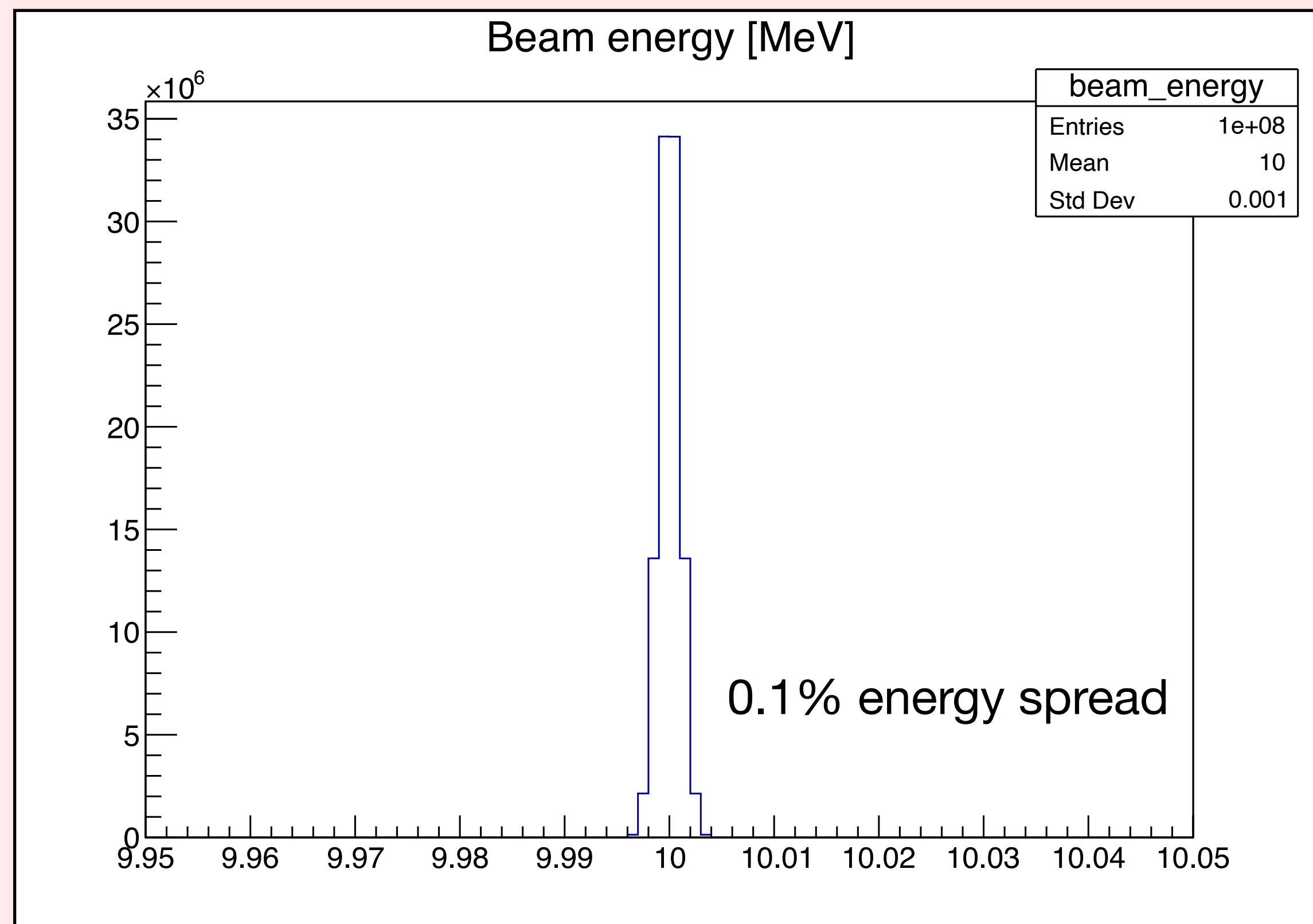


# Simulation geometry update

- ▶ Confirmed with Doug that north is beam right, south is beam left
- ▶ Pull request with survey information for the chambers are merged
- ▶ Would be good to add target chamber lead shielding (not in current solid work model)
- ▶ Added messenger for enable/disable structures
  - ▶ Default to only have detectors and target! (Fast loading for analysis)
  - ▶ Add necessary component for your simulation!!!
  - ▶ Command example can be found in vis.mac

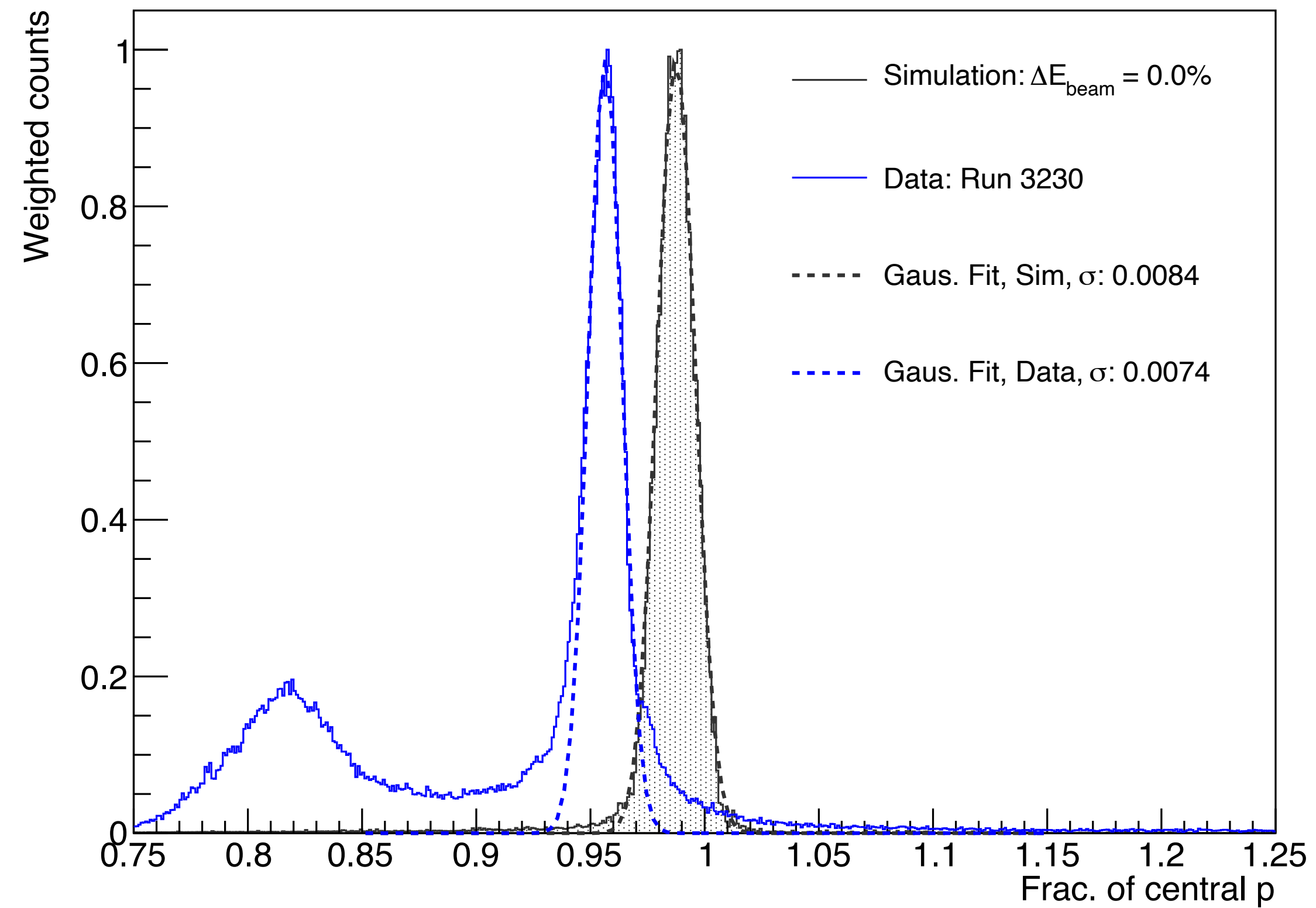


- ▶ New executable for running radgen eC and eAl simulation: darklight\_scattering
- ▶ Can run left side (larger angle) and right side (smaller) at the same time
- ▶ Generate events with different energies

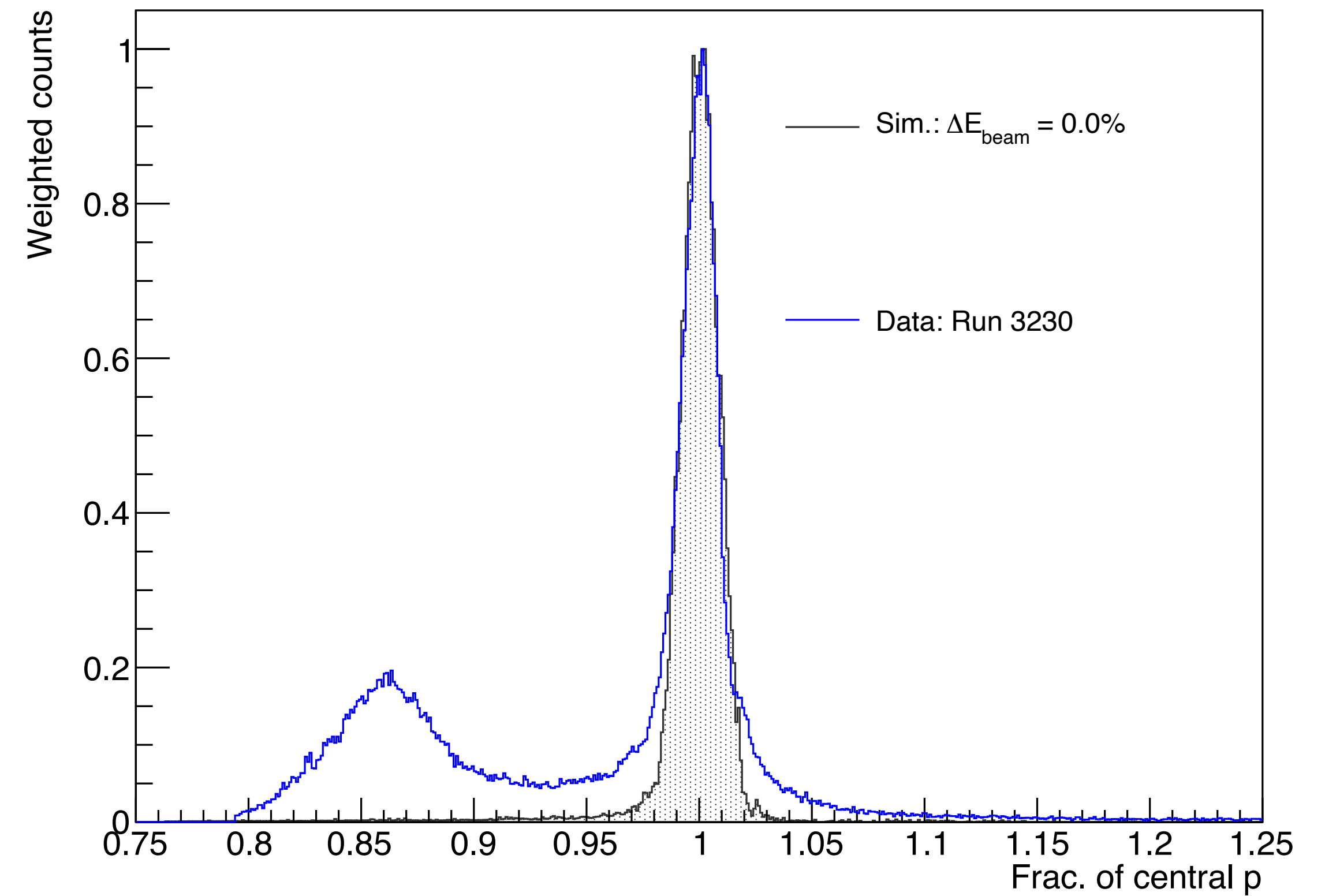


- ▶ 10x wider beam spot ( ie. 3 mm sigma in x, 6.5 mm sigma in y )

## Reconstructed Relative Momentum (Right Arm)



## Reconstructed Relative Momentum Shifted

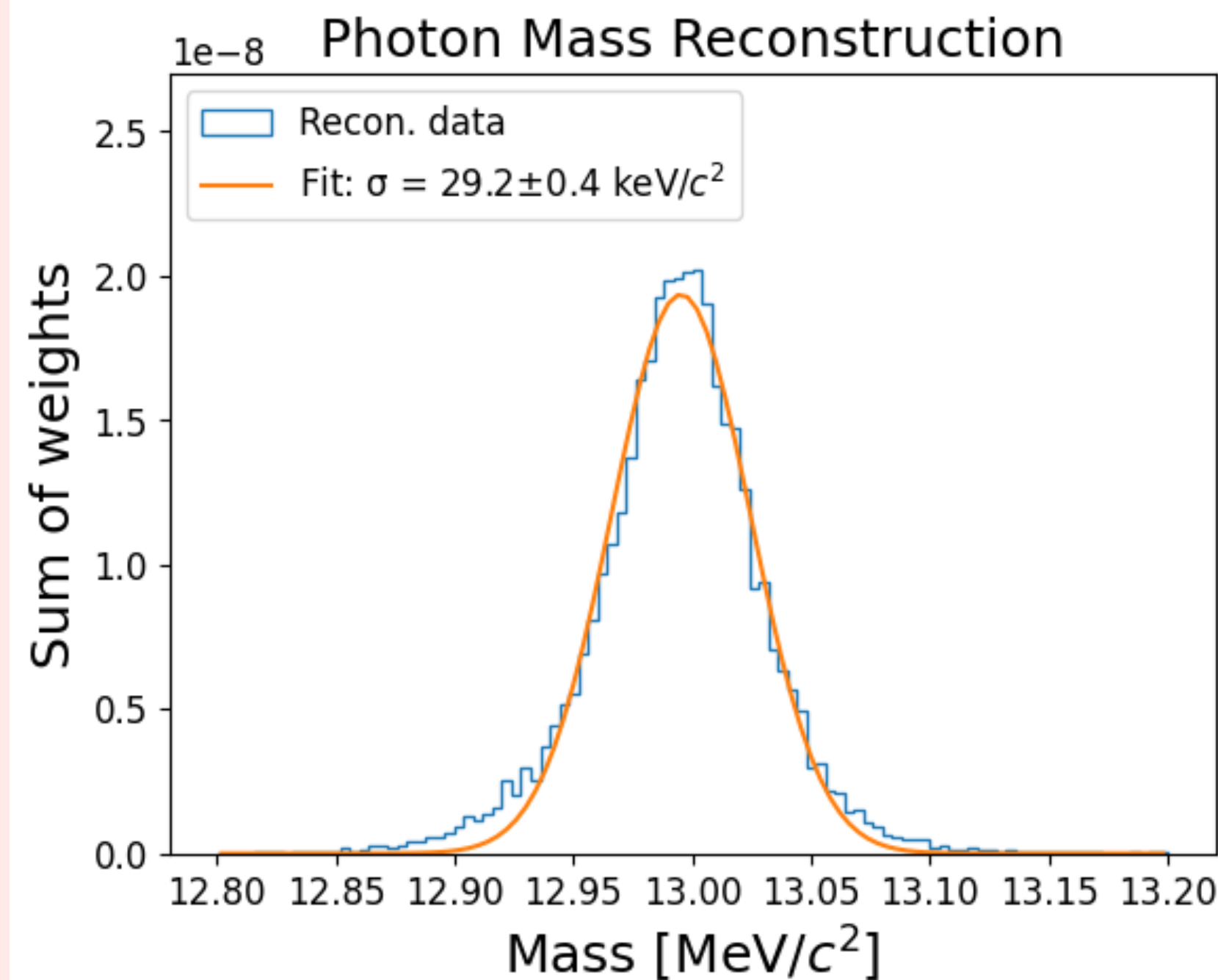


# Previous study: Reconstructed mass resolution

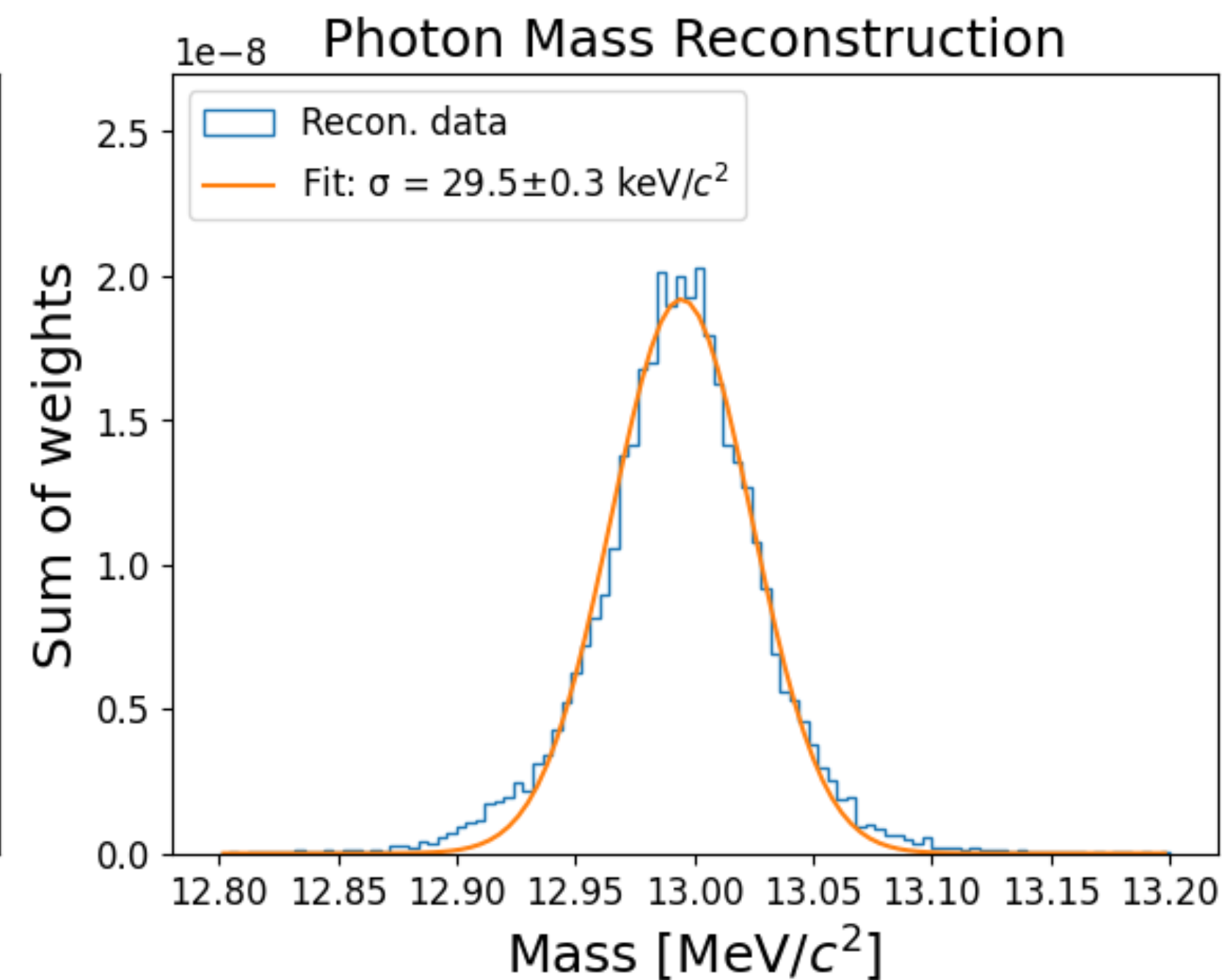
4

- Beam spot size has little effect on the reconstructed mass resolution
- Resolution is better than experimental requirement

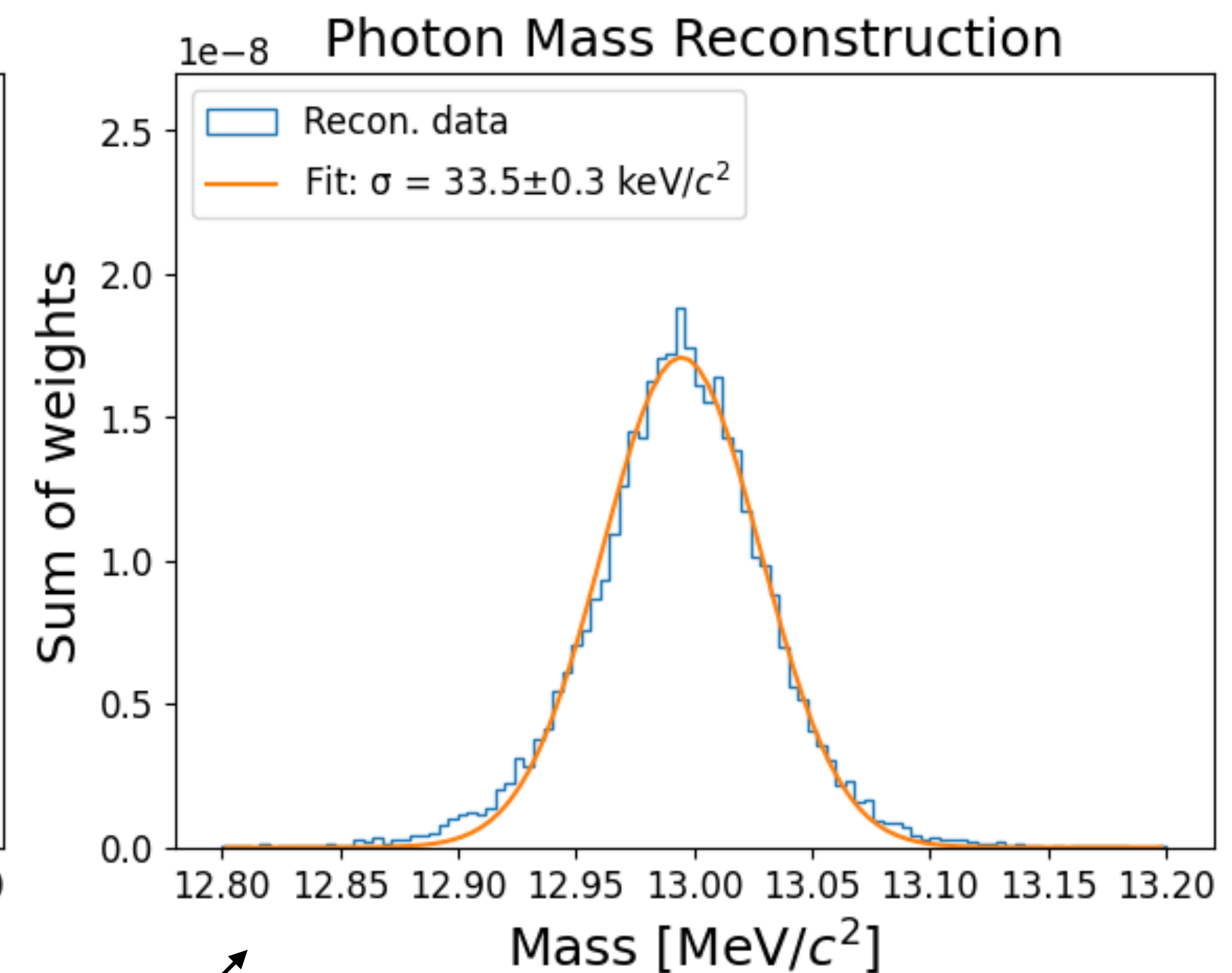
Nominal beam width (0.325, 0.650) mm



Beam width +0.4 mm in x

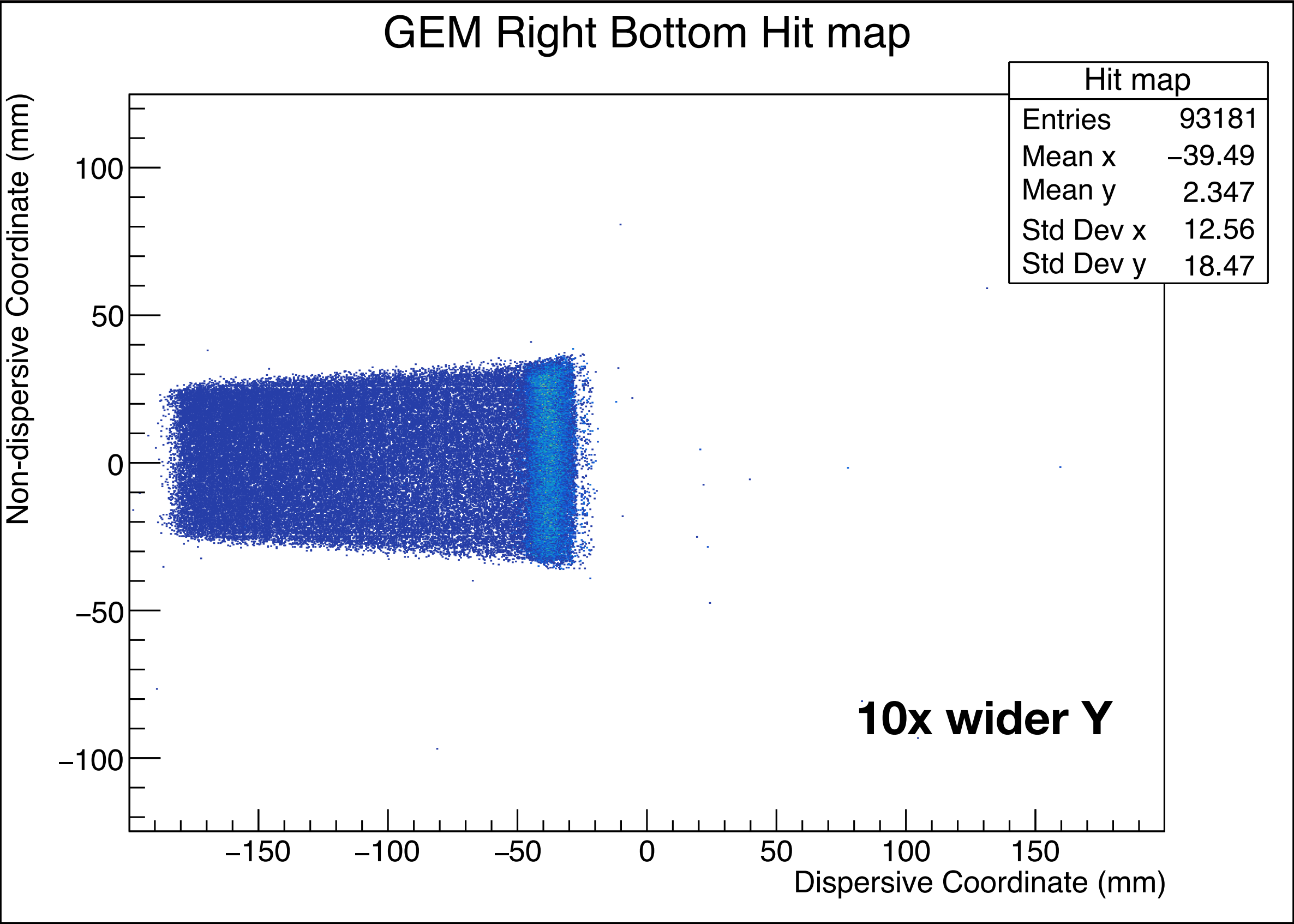
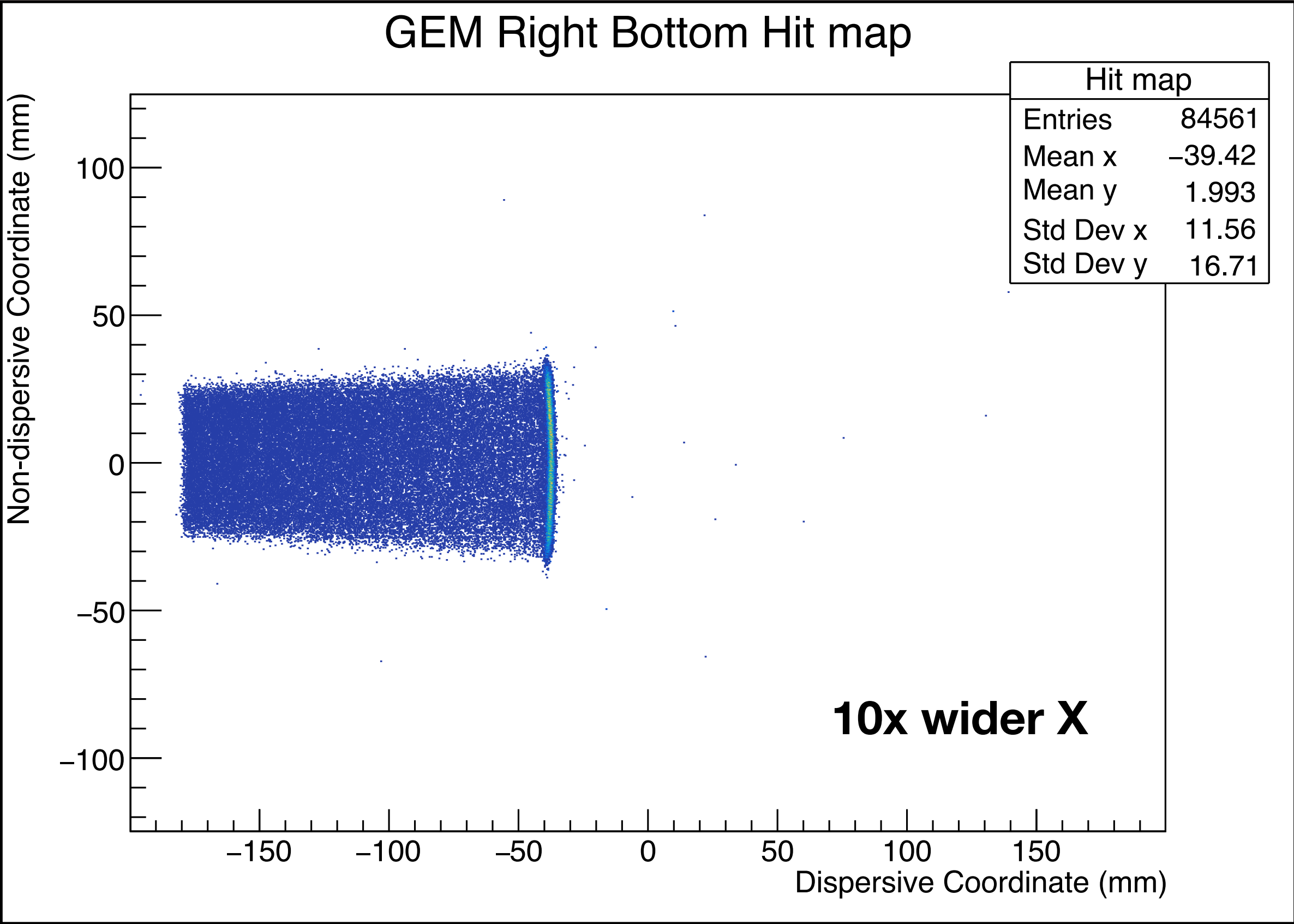


Beam width +0.4 mm in y

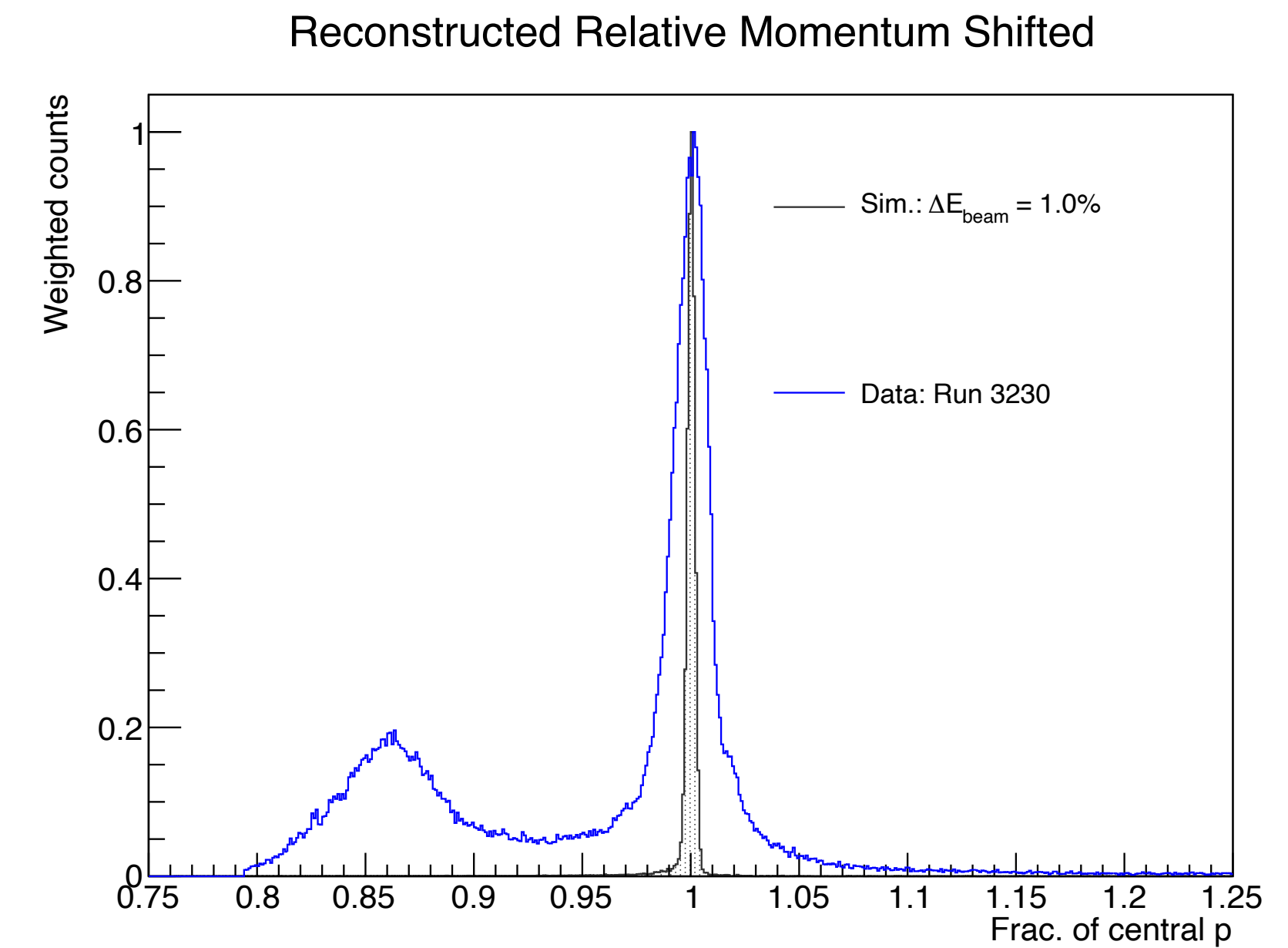
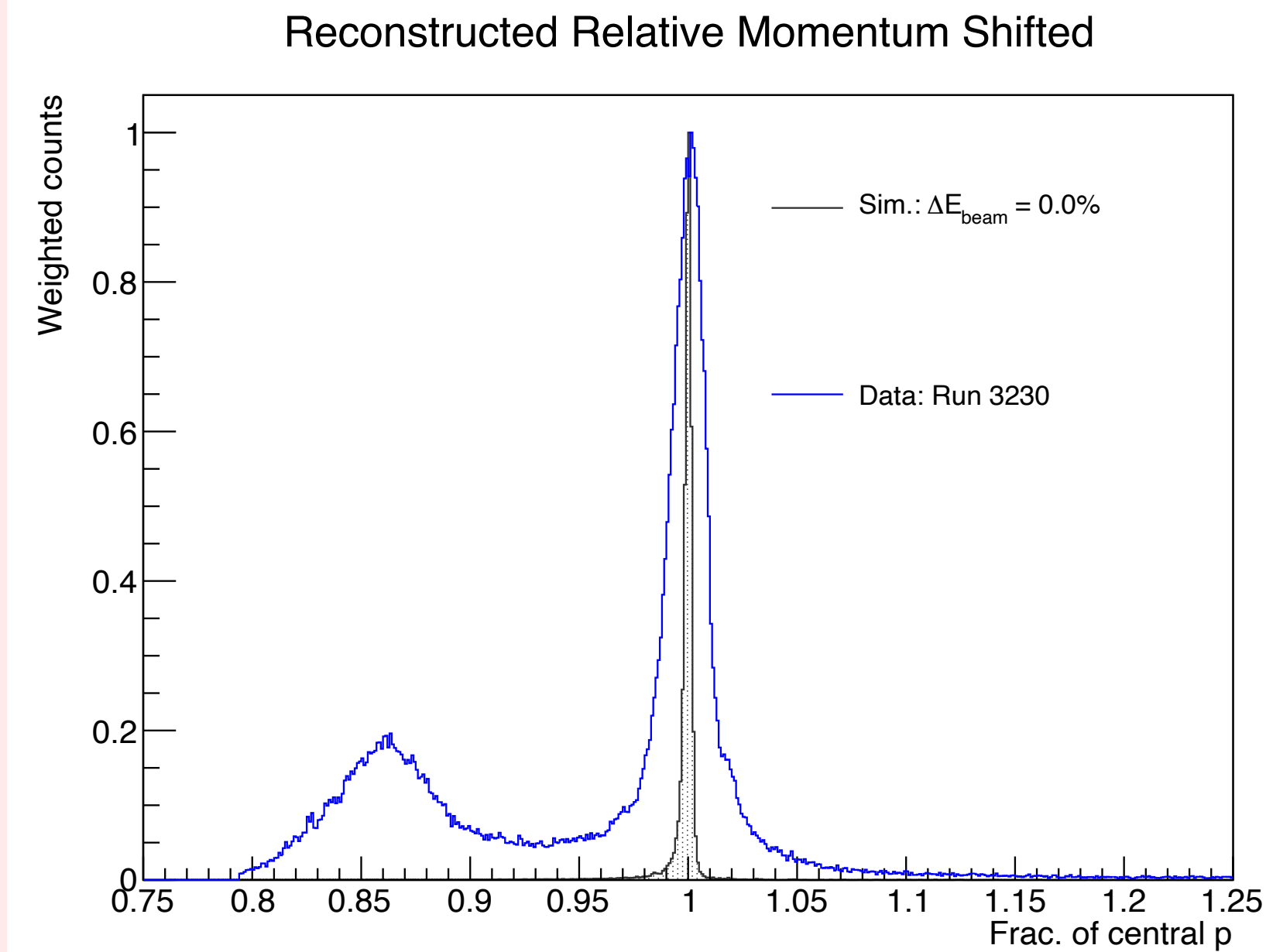


Effect in y is larger

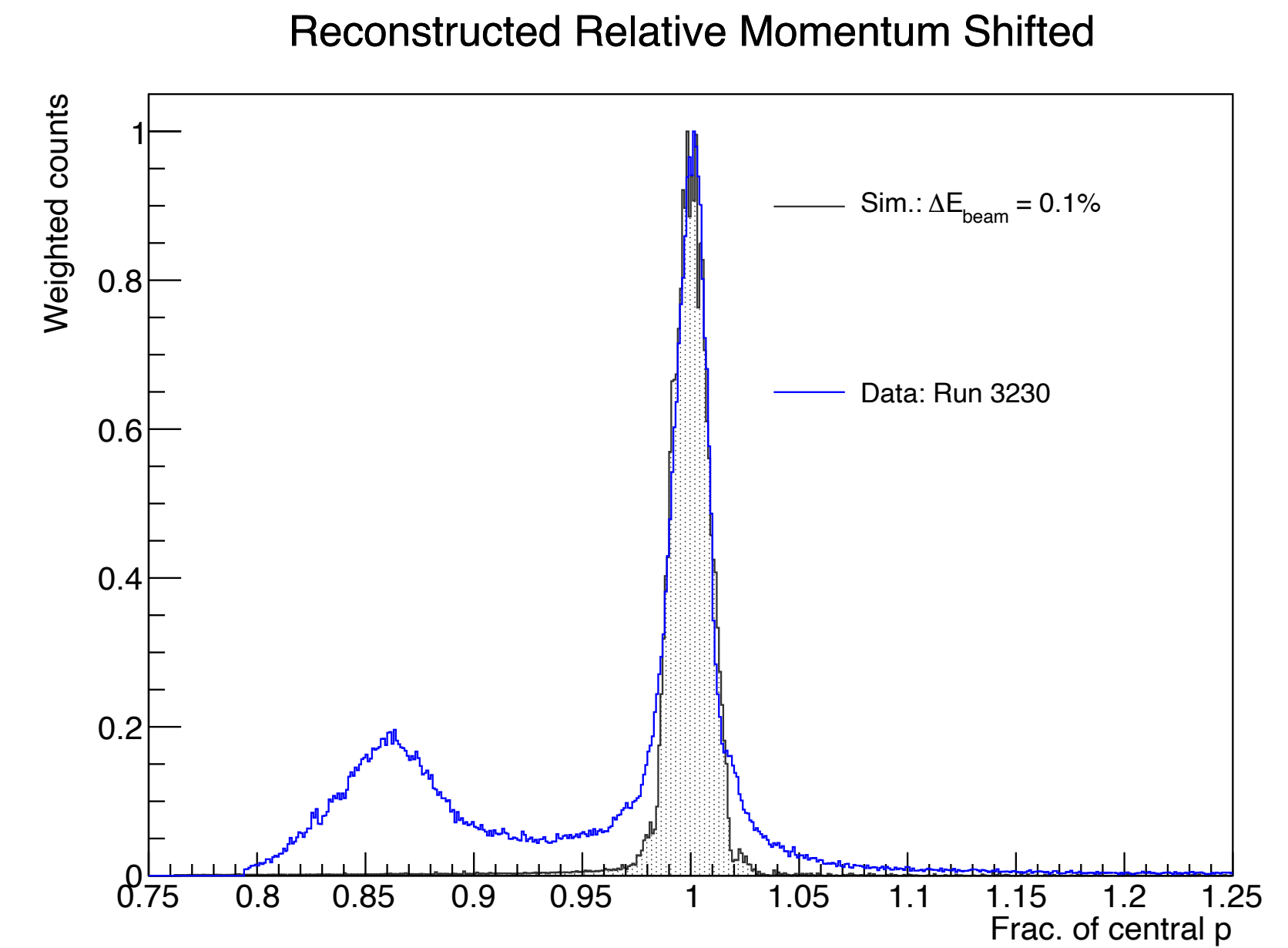
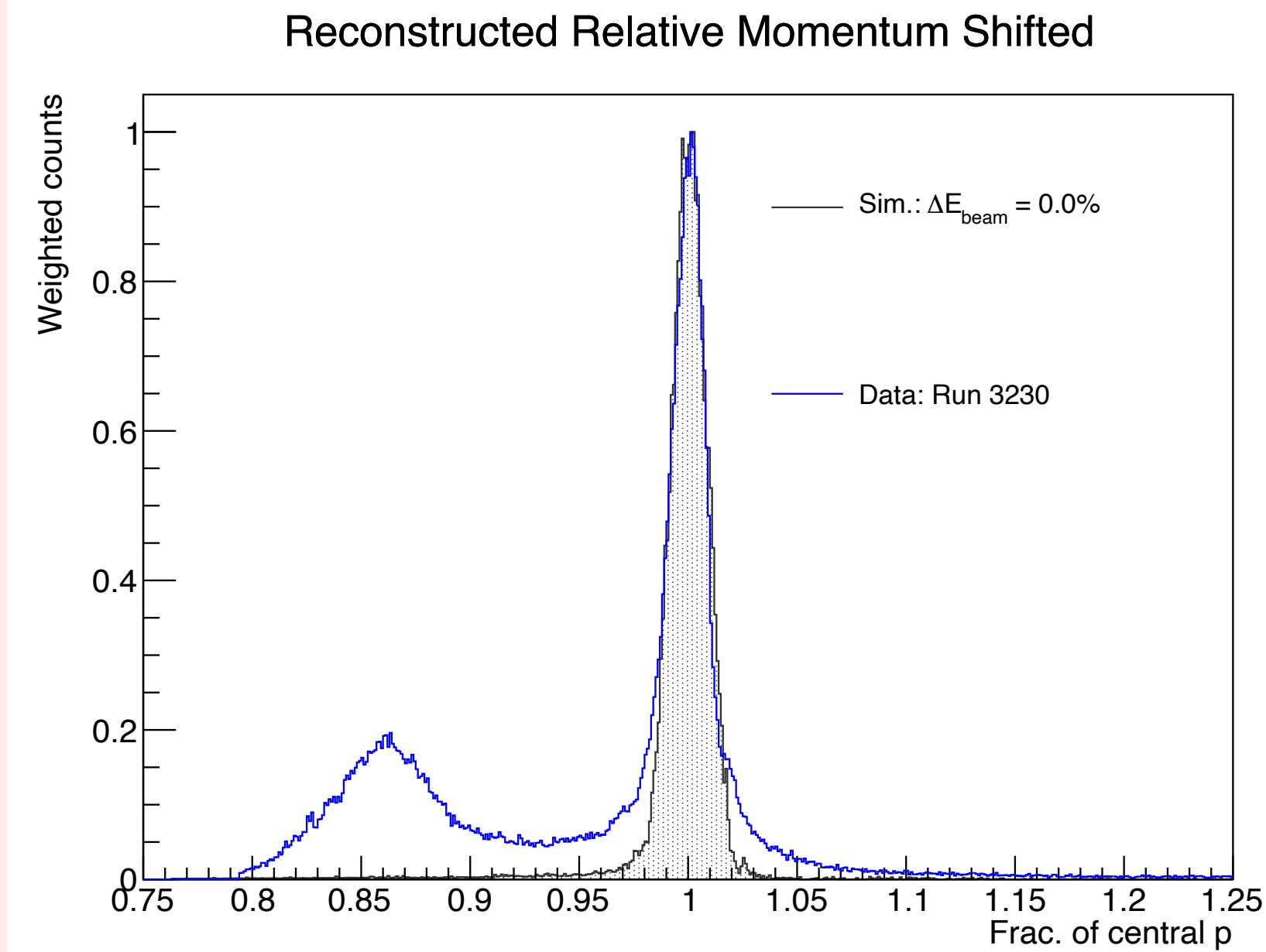




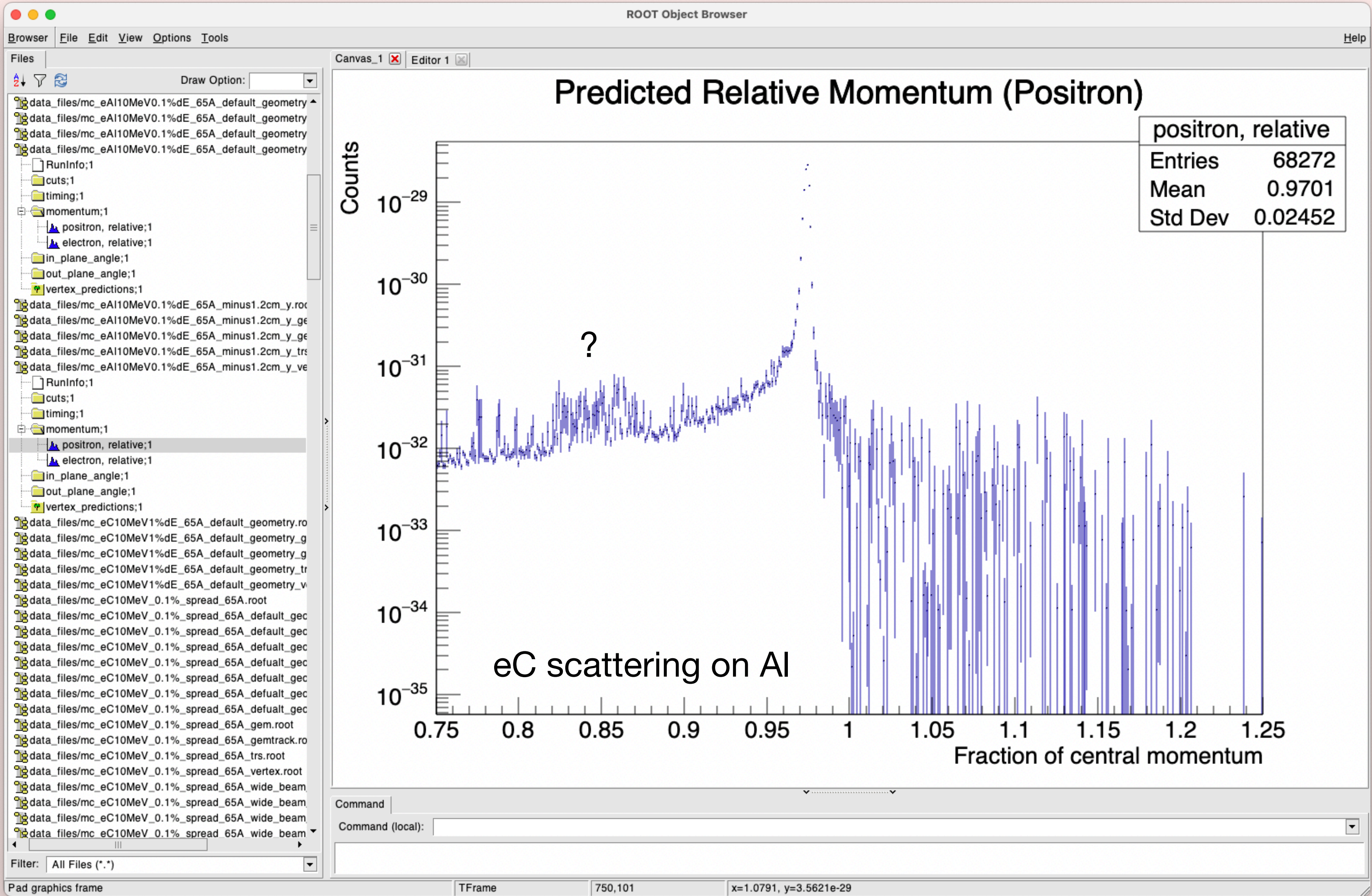
Original beam



Widen beam





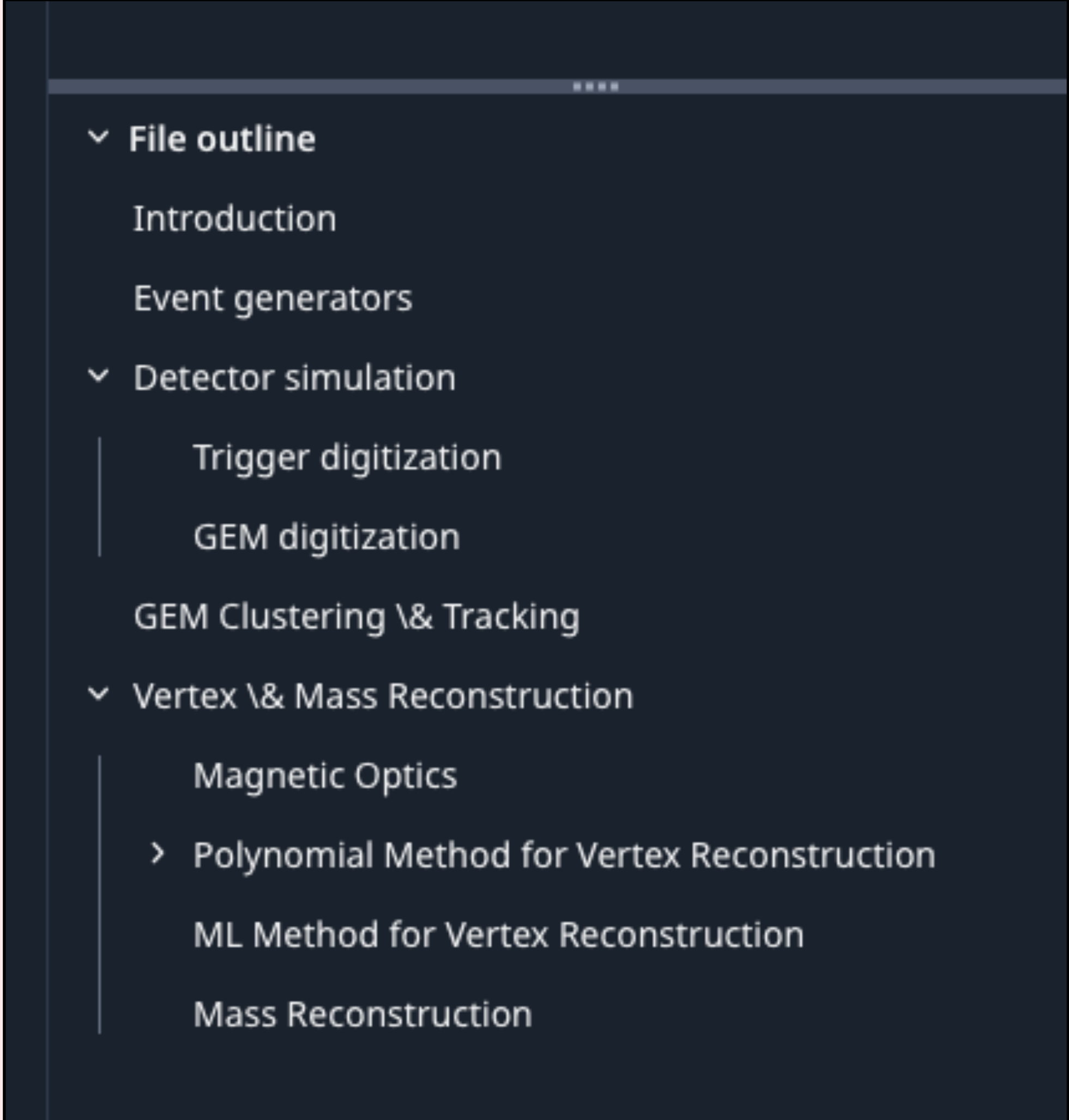




- ▶ Overleaf [link](#)

Currently plan to cover:

- ▶ Event generators
- ▶ Detector simulation and hit digitization
  - ▶ Trigger
  - ▶ GEM
- ▶ Vertex and Mass reconstruction
  - ▶ Traditional fitting approach
  - ▶ Machine learning algorithms
  - ▶ Projected mass resolution



A screenshot of a LaTeX Beamer presentation's file outline. The outline is displayed in a dark-themed sidebar with a light blue header bar. The header bar contains the text "XXXX" in a small font. The outline is structured as follows:

- ▼ File outline
  - Introduction
  - Event generators
- ▼ Detector simulation
  - Trigger digitization
  - GEM digitization
  - GEM Clustering \& Tracking
- ▼ Vertex \& Mass Reconstruction
  - Magnetic Optics
  - Polynomial Method for Vertex Reconstruction
  - ML Method for Vertex Reconstruction
  - Mass Reconstruction