Software updates

December 3rd 2024

Central momentum updates

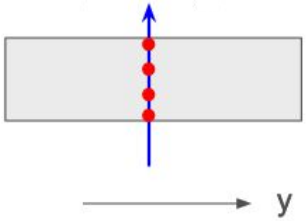
- Have updated the Geant4 setup macro to have to new optimized central momenta:
  - 11.0 MeV for the electron arm
  - 17.2 MeV for the positron arm

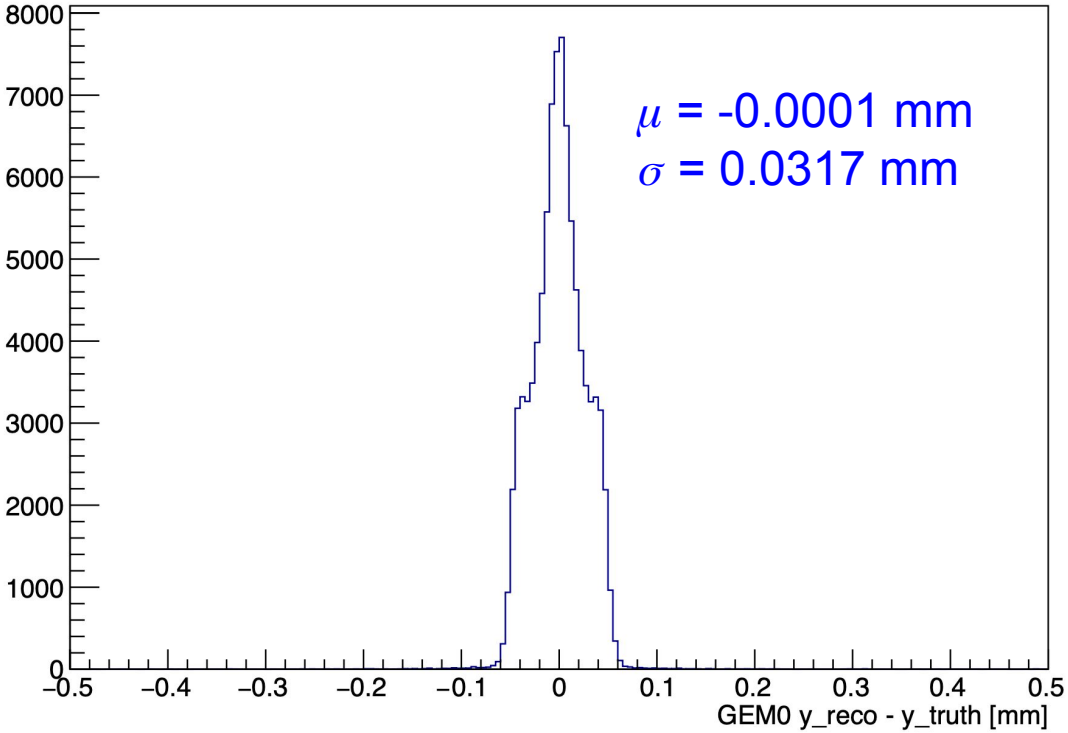
GEM digi/reco

- Implemented earlier in the year, but had some outstanding issues to work out
- Status from last collaboration meeting:
  - Truth location defined to be the location at the centre plane of the GEM (i.e. z = 0 in the GEM coordinates)
  - G4 simulation was modified to store multiple hits in the GEM for each e-/e+ passing through the GEM
  - Following slides show the plots from that meeting

Current validation plots

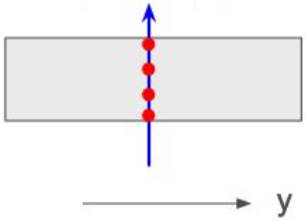
- Resolution plots (N = 100k)

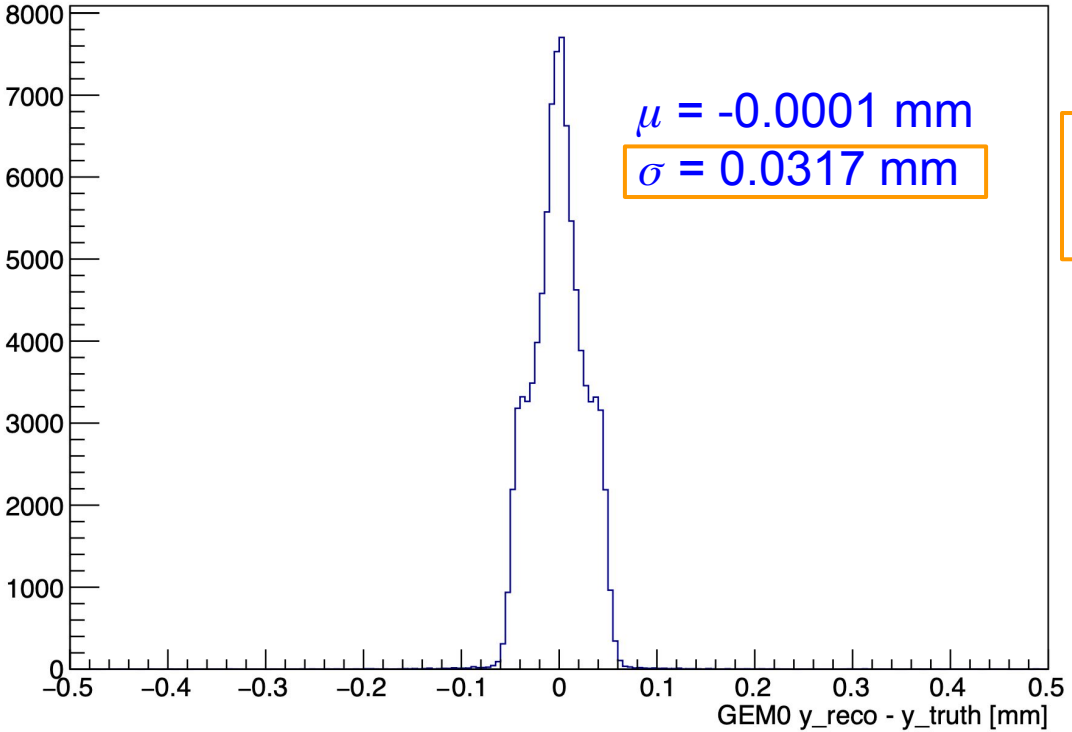




Current validation plots

- Resolution plots (N = 100k)

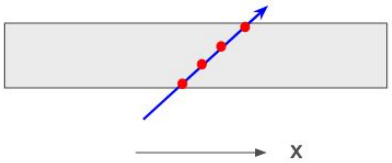


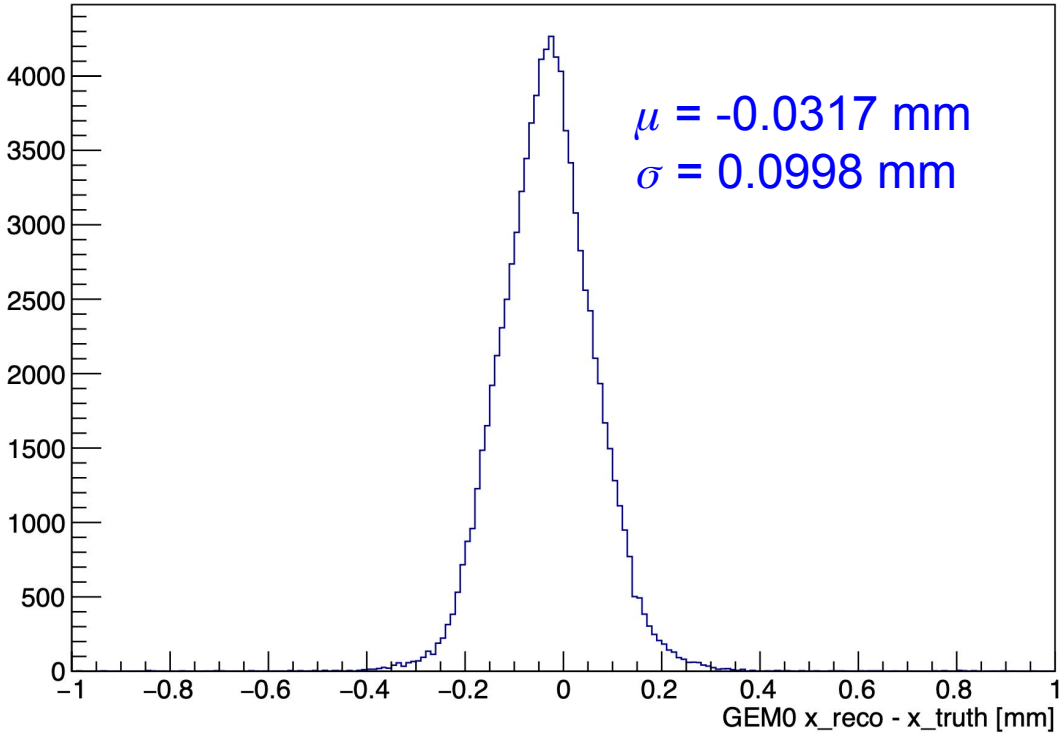


Still a little smaller than expected

Current validation plots

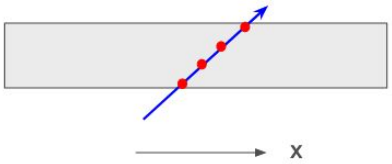
- Resolution plots (N = 100k)

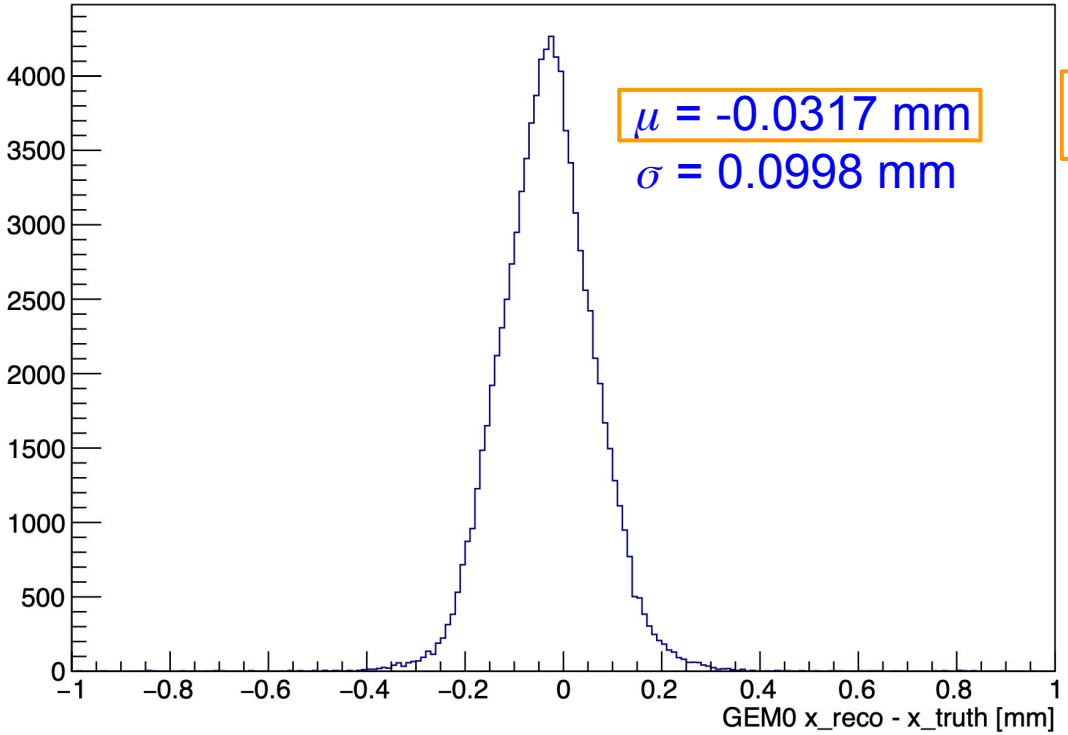




Current validation plots

- Resolution plots (N = 100k)

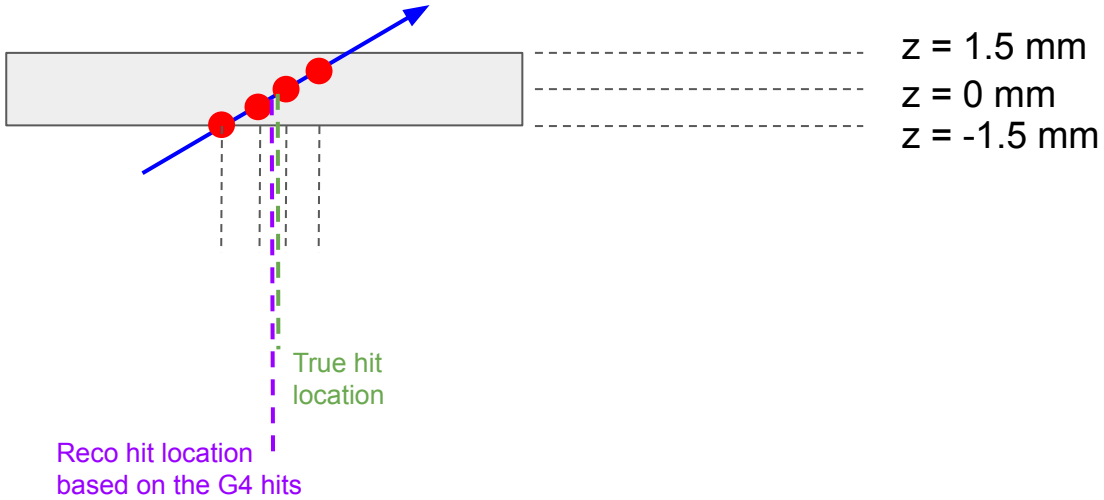




Noticeable bias

Bias solved (mostly)

- Not present in y as it is the non-dispersive direction, but present in x
- Due to how hits are saved in G4
  - Hit is automatically saved when particle enters the volume but not when it exits



- Easiest solution (I think): just skip saving the first hit in G4

Updated distributions

- A tiny bias still exists, but much smaller
- Resolution is still too small, based on the previously quoted values it should be ~100 microns in y
  - Currently 2.20e-5 mm