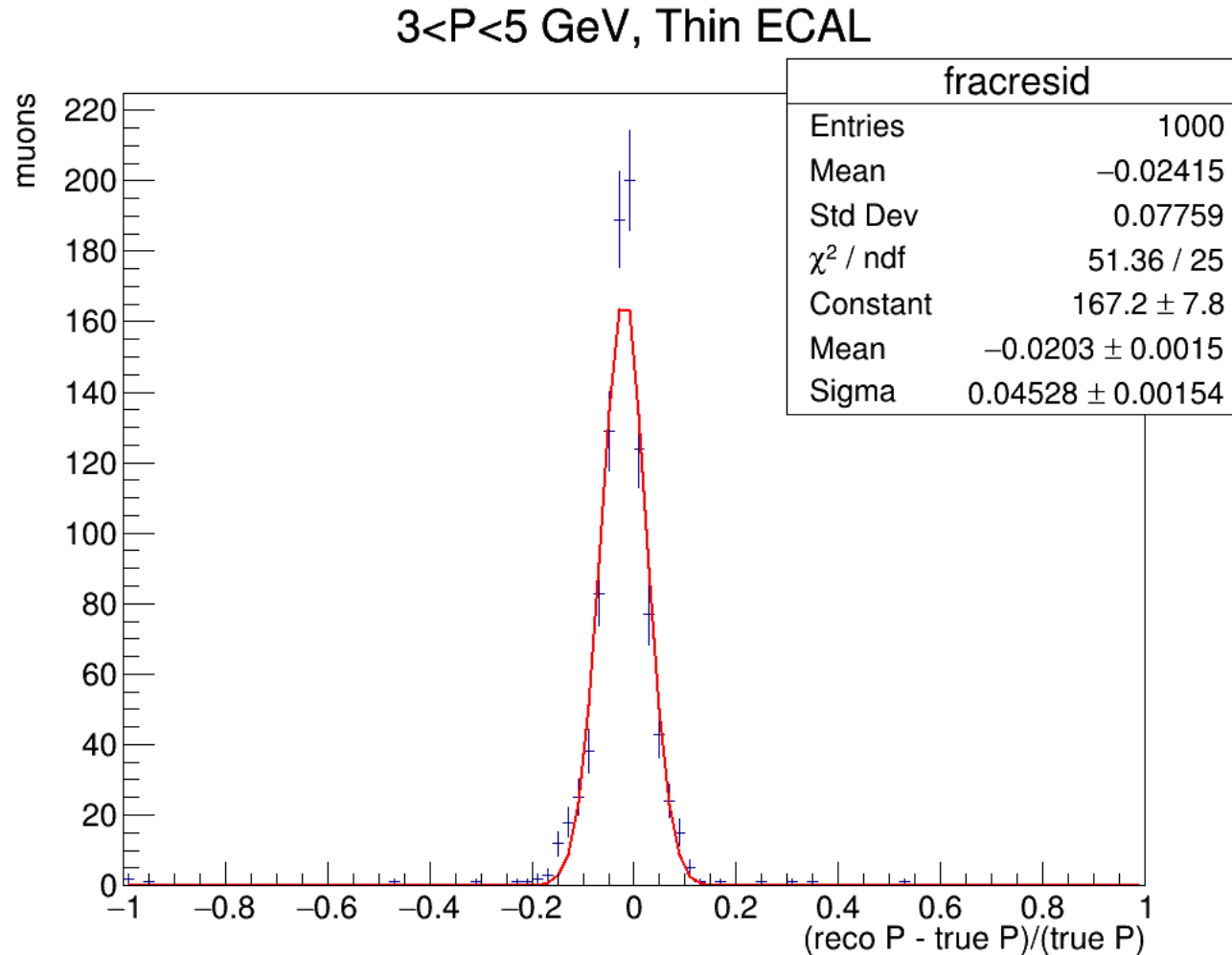
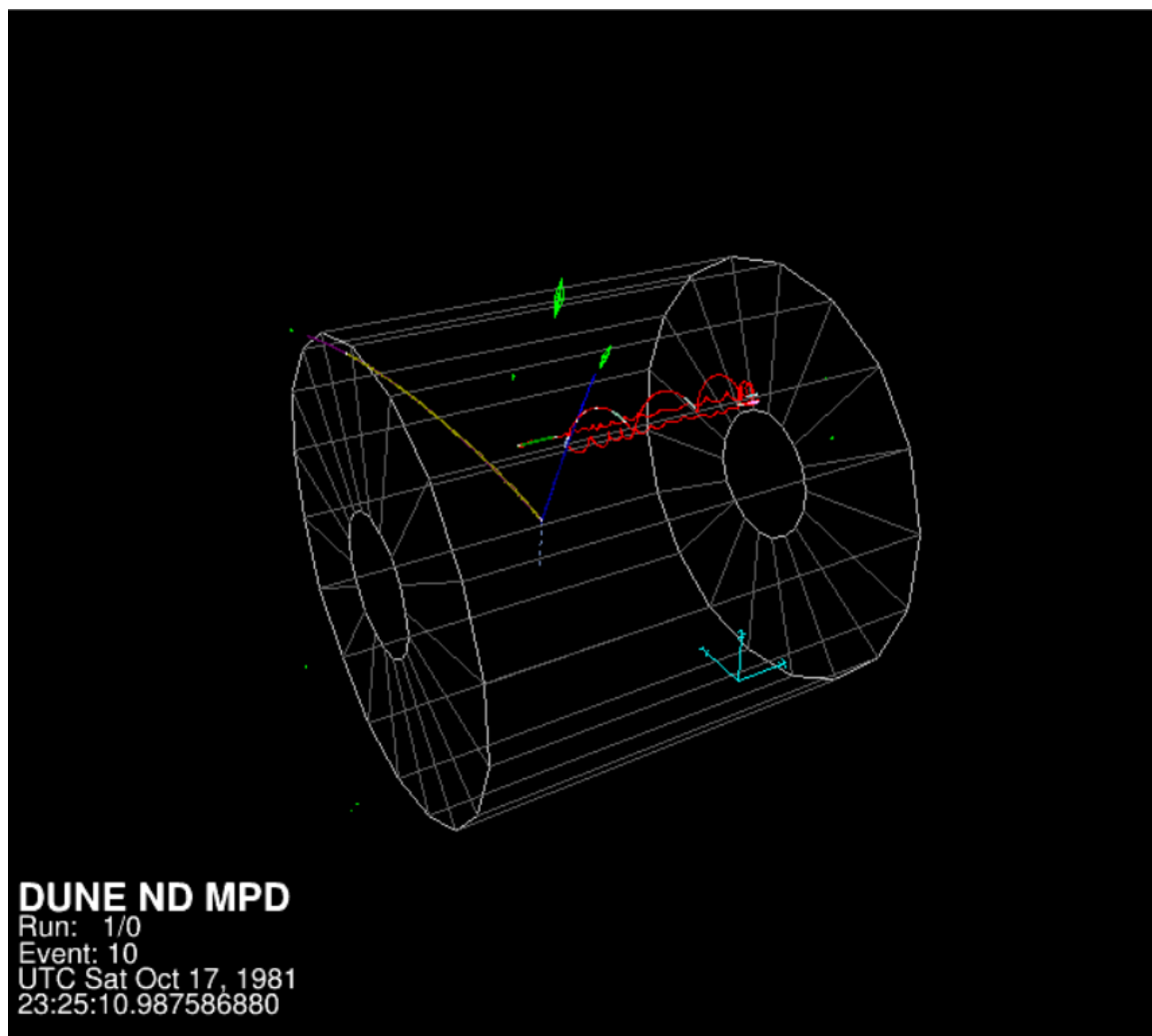


SIMULATION EXERCISE



- **Muon resolution garsoft simulation:** 1000 randomly generated upstream muons entering the Gas TPC with initial momentum $3 < P < 5$ GeV
- **Simulation Goal:** Reconstruct the muon momenta and produce a reconstruction resolution plot
- **Exercise goal:** Reproduce the resolution plot with a new randomly generated muon set

THE GARSOFT TUTORIAL

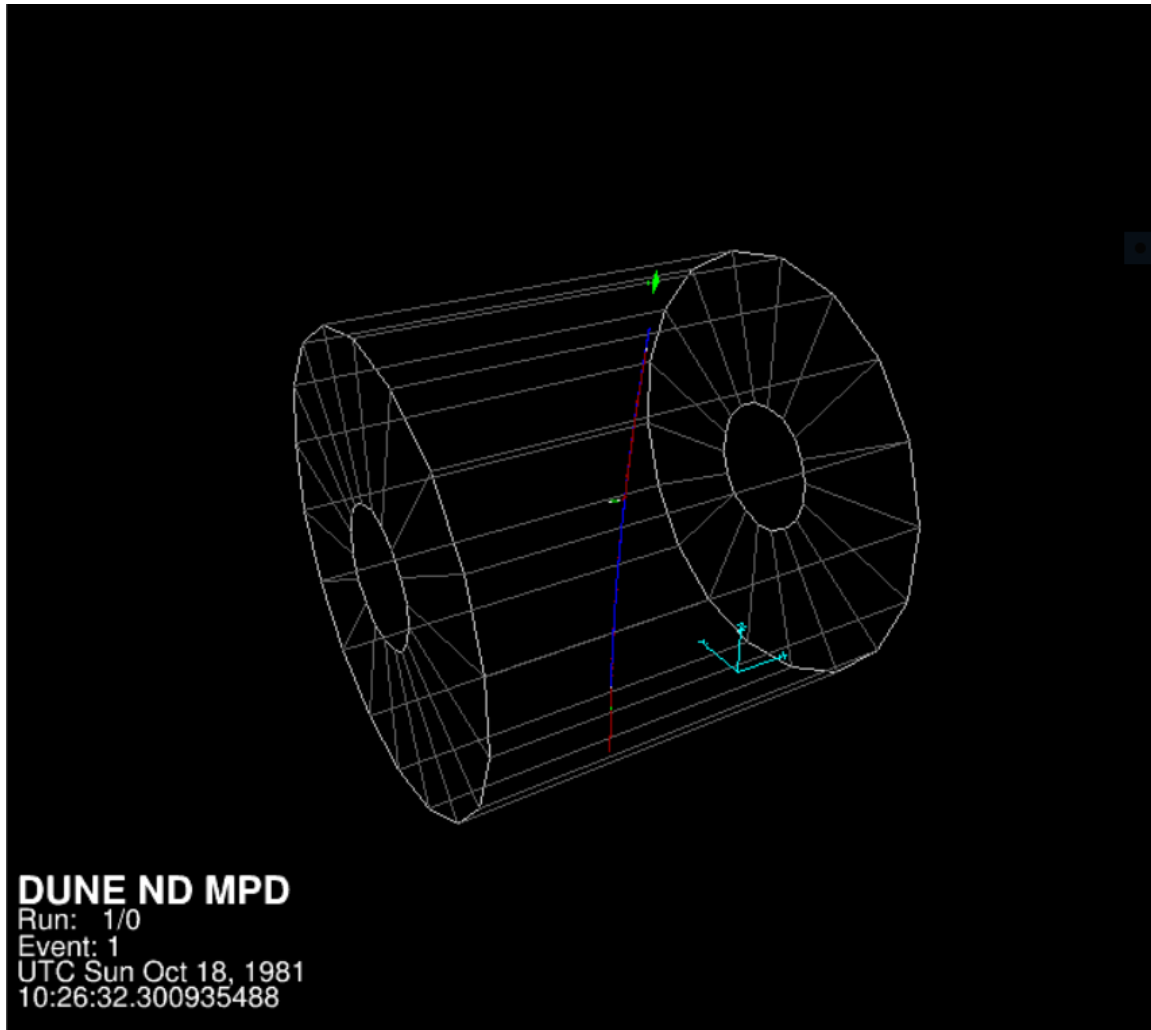


To familiarise with garsoft I firstly followed the garsoft tutorial which consists of four steps:

1. 1000 Event sample generation via GENIE MC generator ([prodgenie.fcl](#))
2. Readout simulation ([readoutsimjob.fcl](#))
3. Reconstruction ([recojob.fcl](#))
4. Creation of a simplified analysis root tree ([anajob.fcl](#))

Event from the tutorial production visualised with garsoft visual display ([evd.fcl](#))

REPRODUCING TOM'S SIMULATION

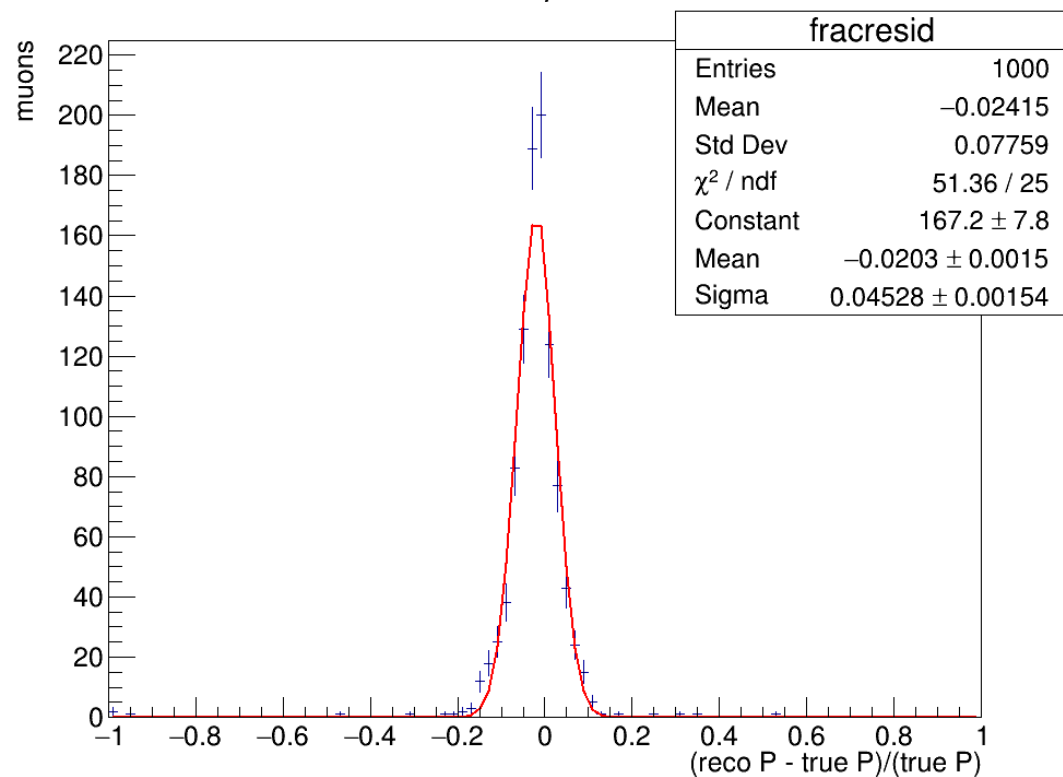


- Generate a text file (using Tom's root macro) with instructions to produce 1000 upstream muons entering the Gar detector : initial momentum on the z direction(i.e. parallel to flux) that varies between 3 GeV and 5 GeV respectively; fixed z coordinate at 1000 cm (in the ND hall coordinates) ; x and y coordinate that vary between -200 and 200 cm and -200 and 0 cm respectively
- Generate simulation using text file (different from Garsoft tutorial)
- Execute readout simulation, reconstruction and convert into analysis tree (same as GarSoft tutorial)
- Use root macro to produce resolution plot and compare with Tom's

Upstream muon visualised with garsoft visual display ([evd.fcl](#))

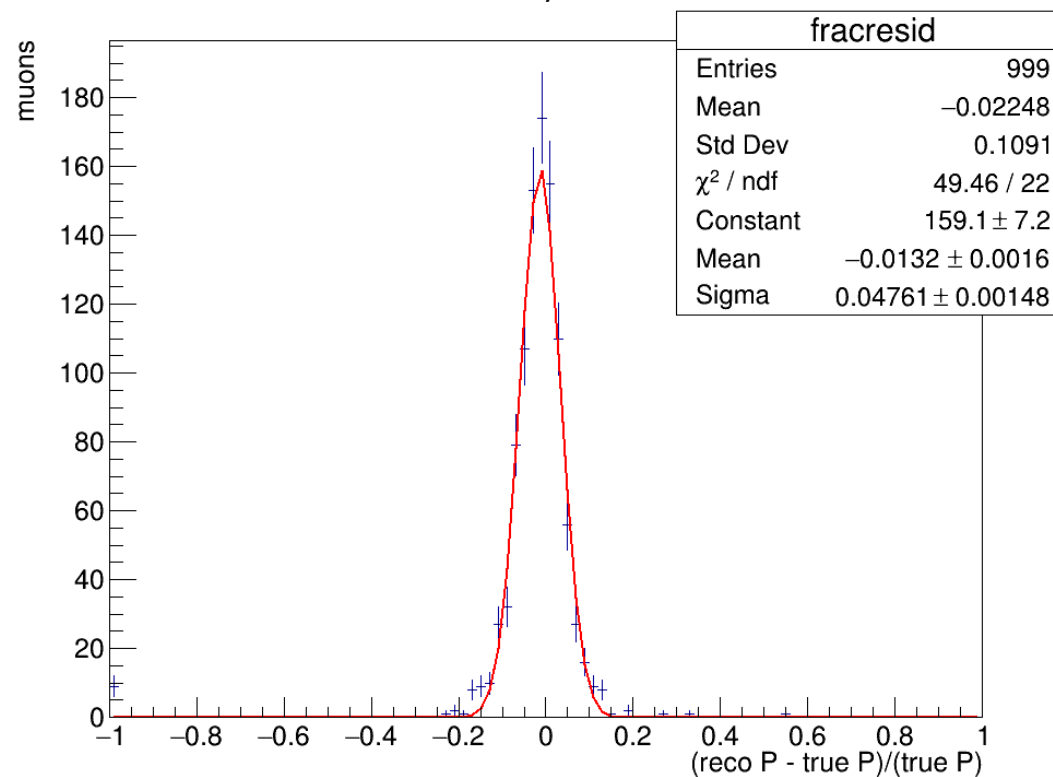
PLOTS COMPARISON

3<P<5 GeV, Thin ECAL



TOM'S PLOT

3<P<5 GeV, Thin ECAL



MY PLOT