

# Status of central tracker data analysis in Run 8

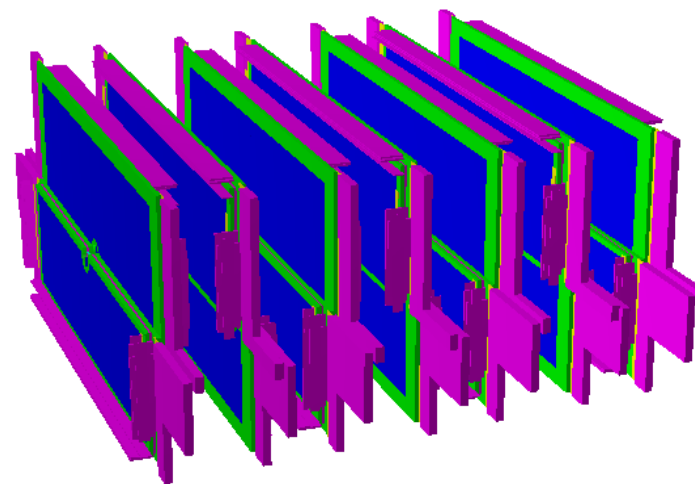
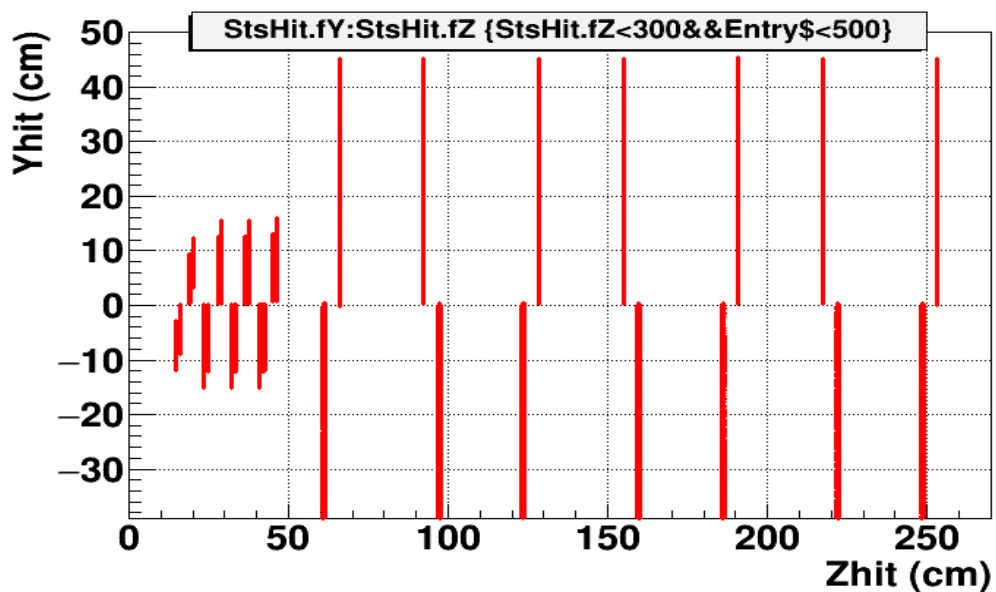
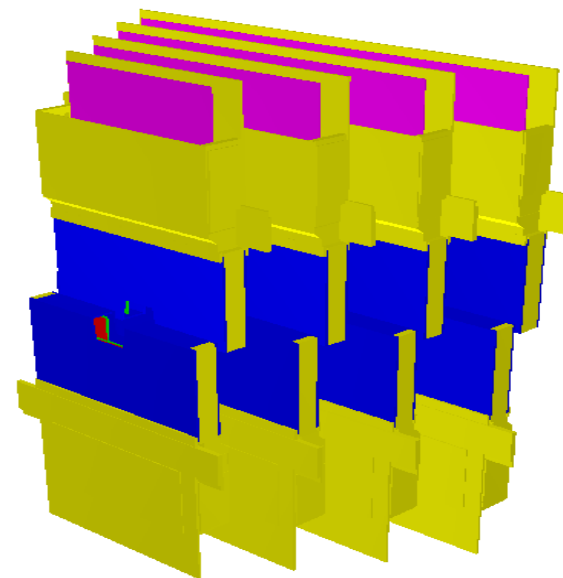
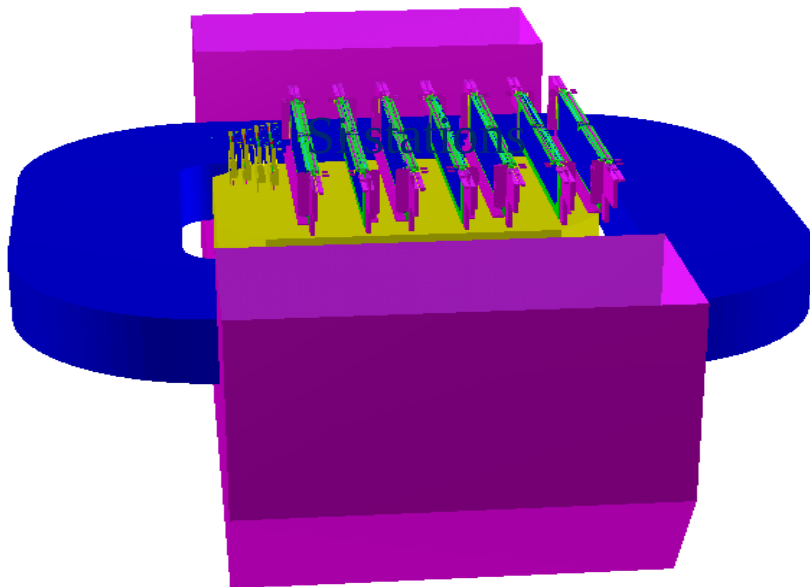
**J.Drnoyan, V.Vasendina, A.Zinchenko,  
D.Zinchenko, R.Zinchenko**

*VBLHEP, JINR, Dubna, Russia*



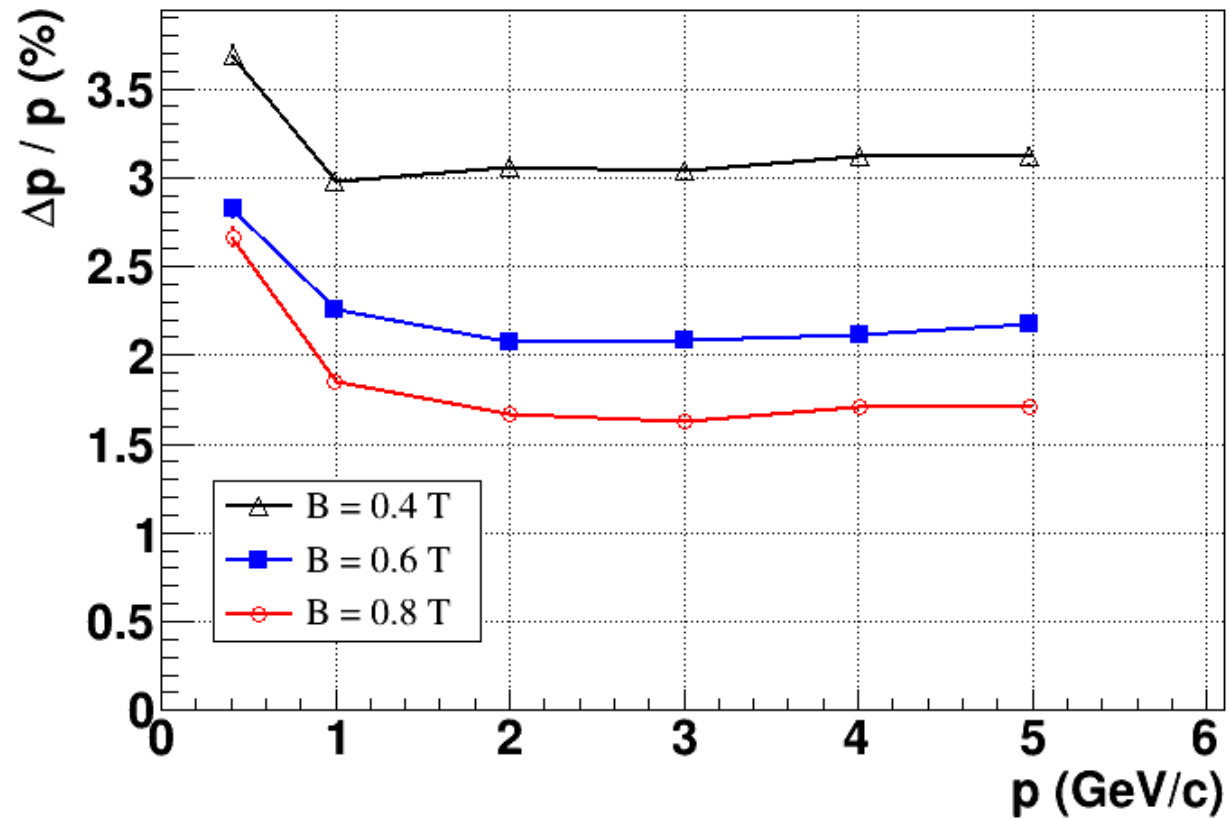
- ✓ BM@N configuration
- ✓ Track reconstruction
- ✓ Detector alignment / Lorentz corrections
- ✓ Coordinate resolution
- ✓ Detector efficiency
- ✓ V0 reconstruction
- ✓ Summary and next steps

# Detector geometry in Run 8



- ✓ CAT (L1) track reconstruction – legacy code from the CBM experiment
- ✓ Vector Finder (VF)– homemade (import substitution) package
- ✓ L1 demonstrates higher efficiency at 4 kG, VF at 6 and 8 kG
- ✓ VF allows missing stations on tracks (jump over station) – except for the next to the first one

# Tracker performance



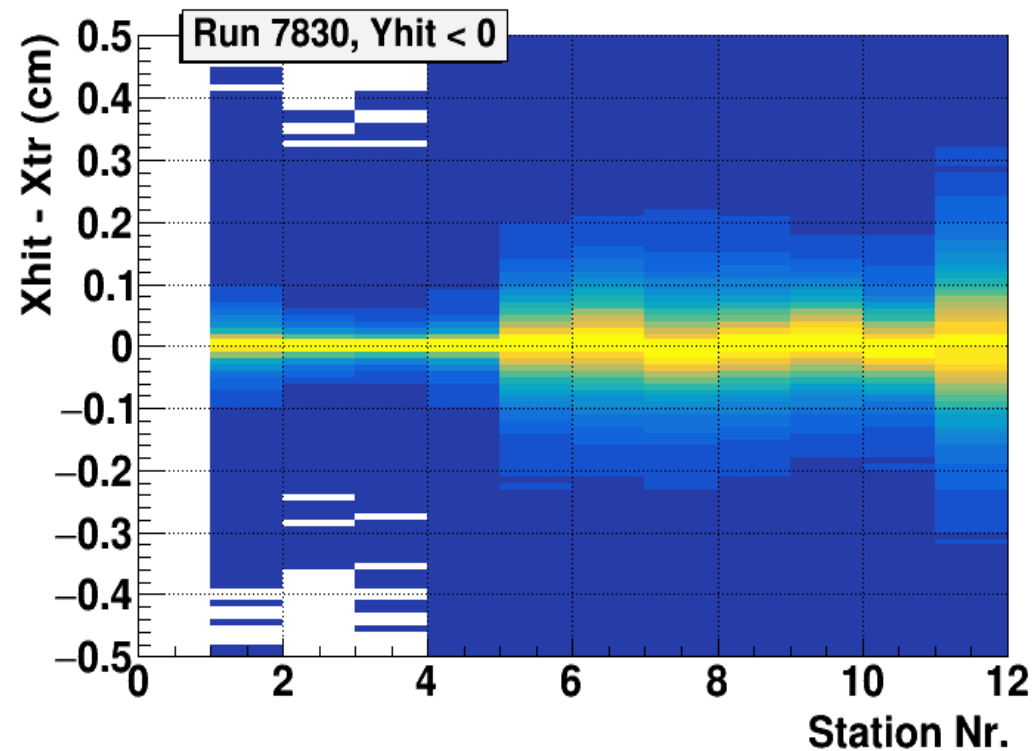
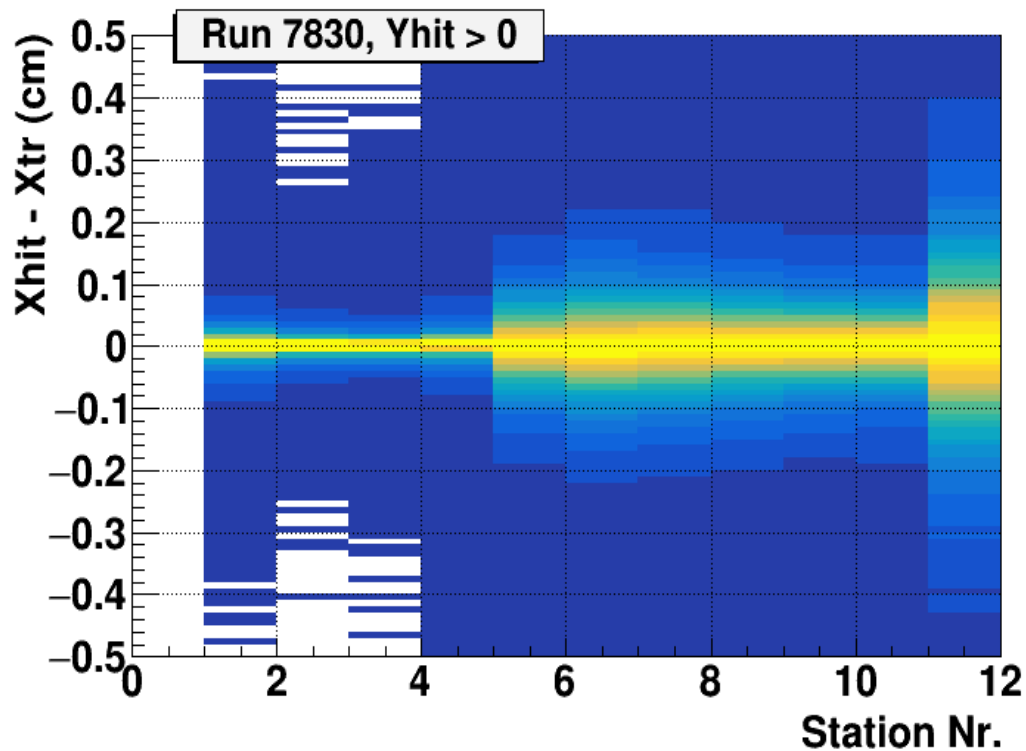
## *MC:*

- ✓ **Generator:** DCM-SMM, Xe+Cs @ 3.8A GeV, Min. bias
- ✓ **Transport:** GEANT4
- ✓ **Detectors:** 4 Si + 7 GEM + beam pipe (all materials)
- ✓ **Track reconstruction:** Vector Finder

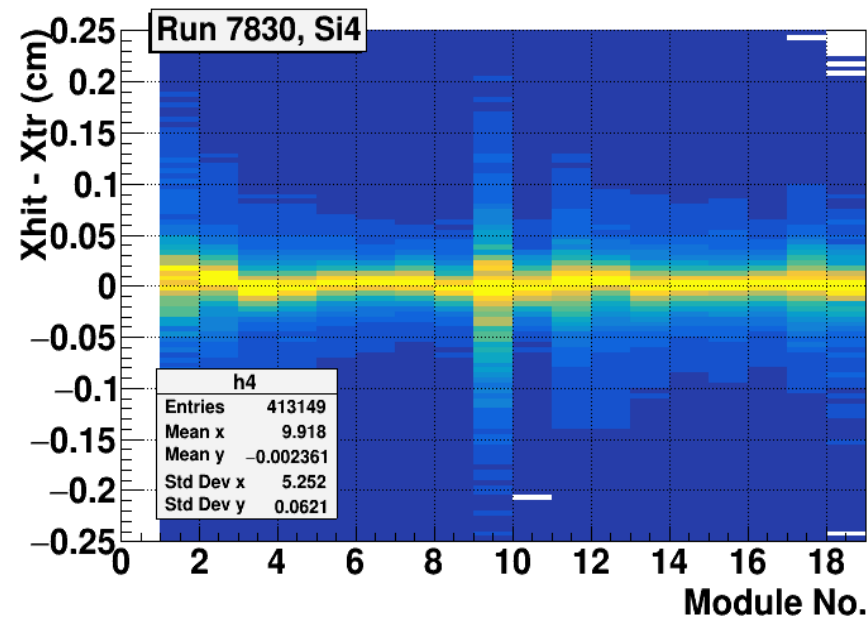
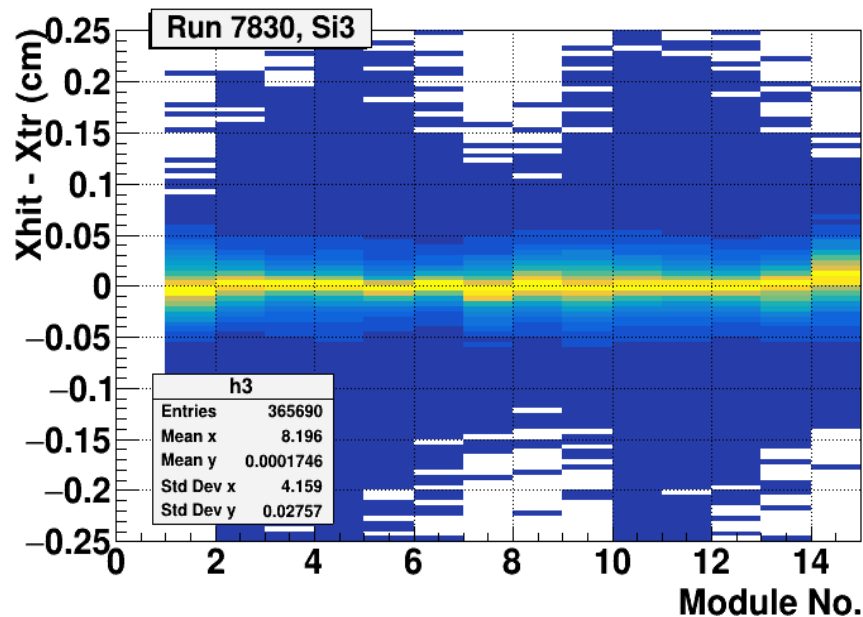
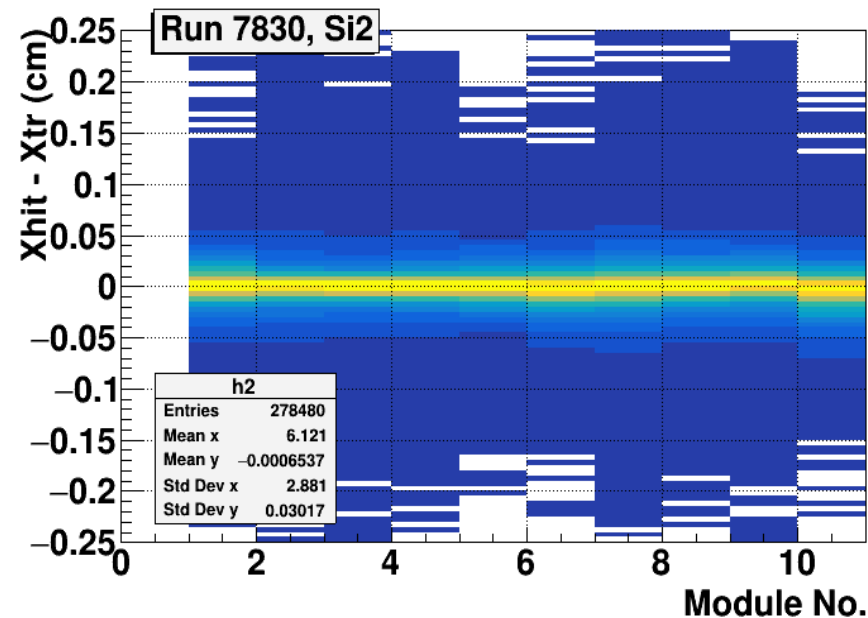
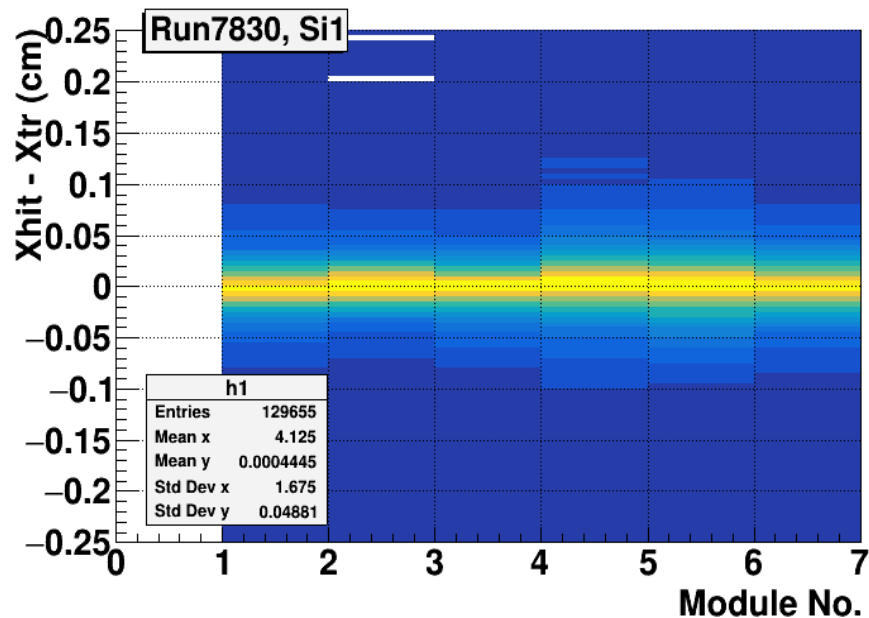
## *Data:*

- ✓ **Runs:** 7830 (950k), 8000 (500k )
- ✓ **Track reconstruction:** Vector Finder

# Run 7830 (B $\neq$ 0, current alignment)

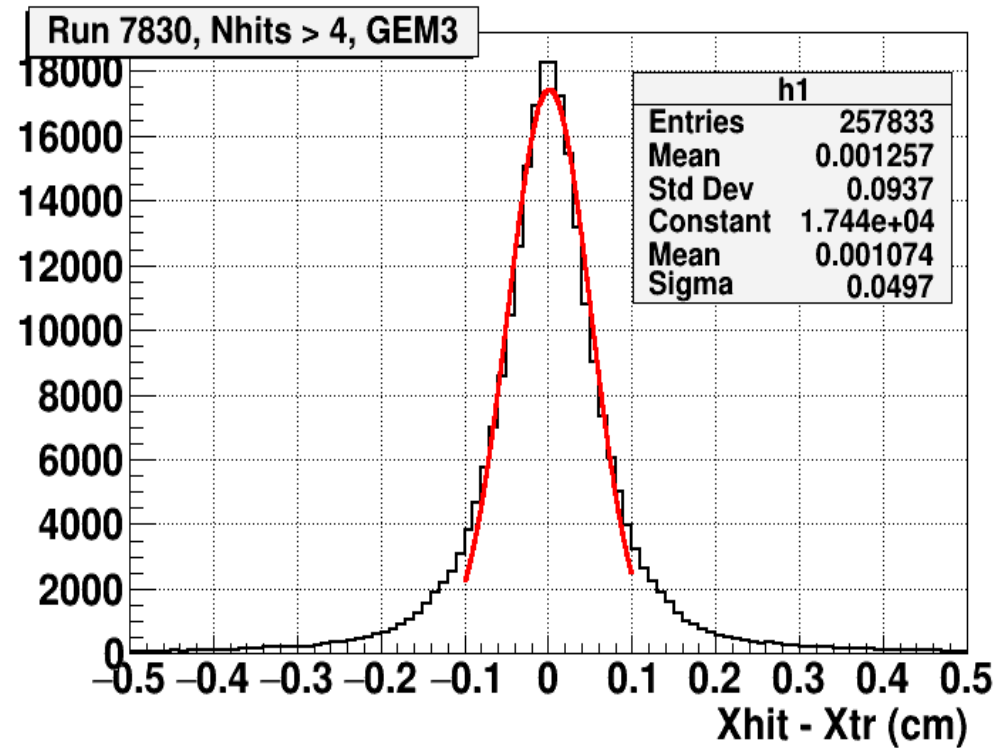
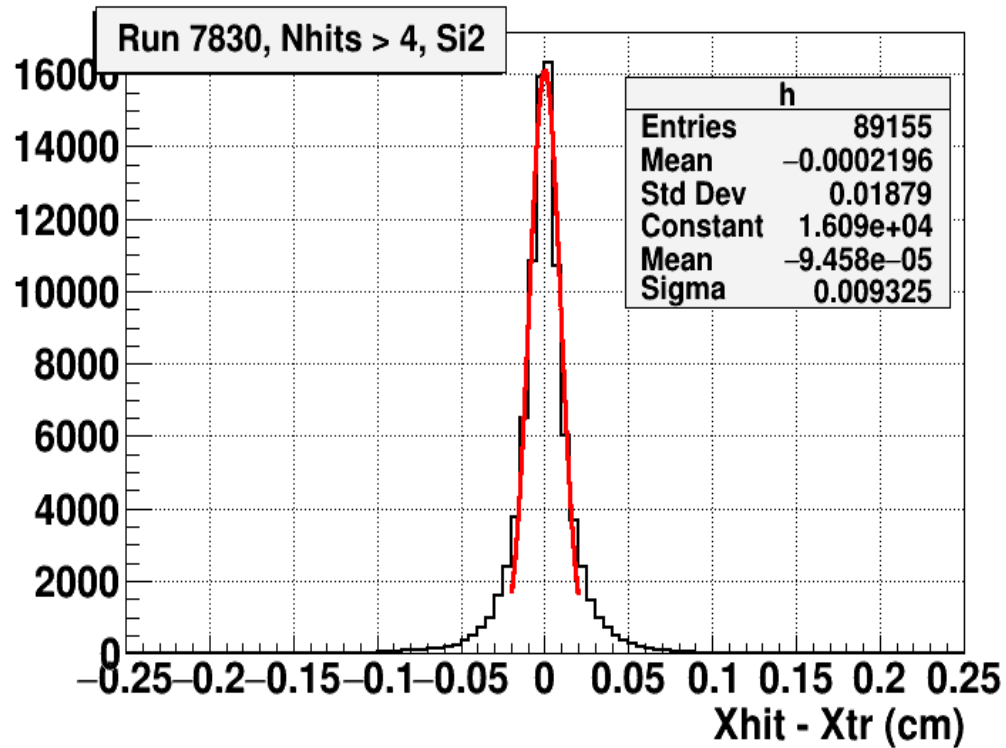


# Run 7830 (B != 0, current alignment in Si)

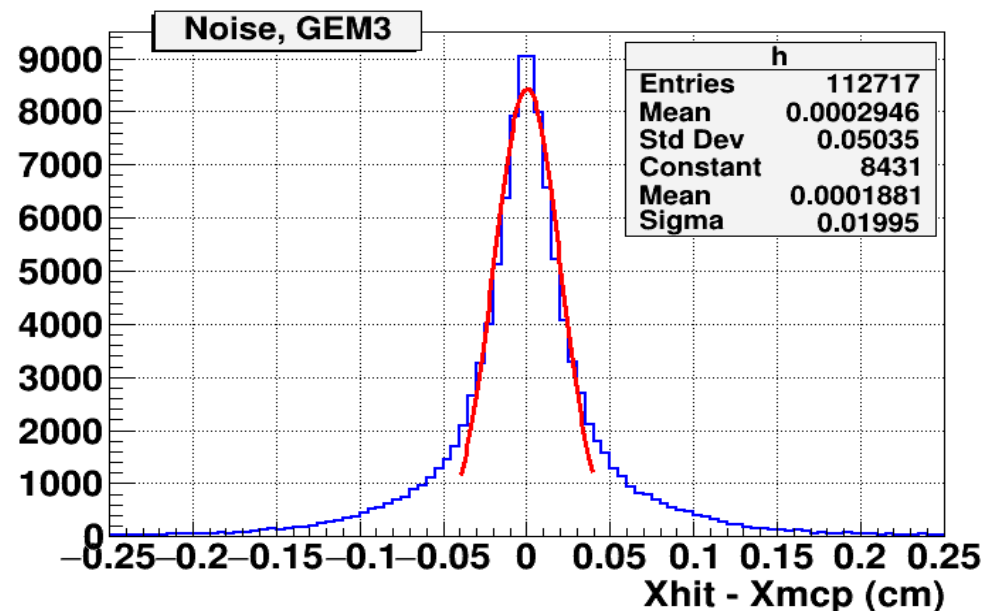
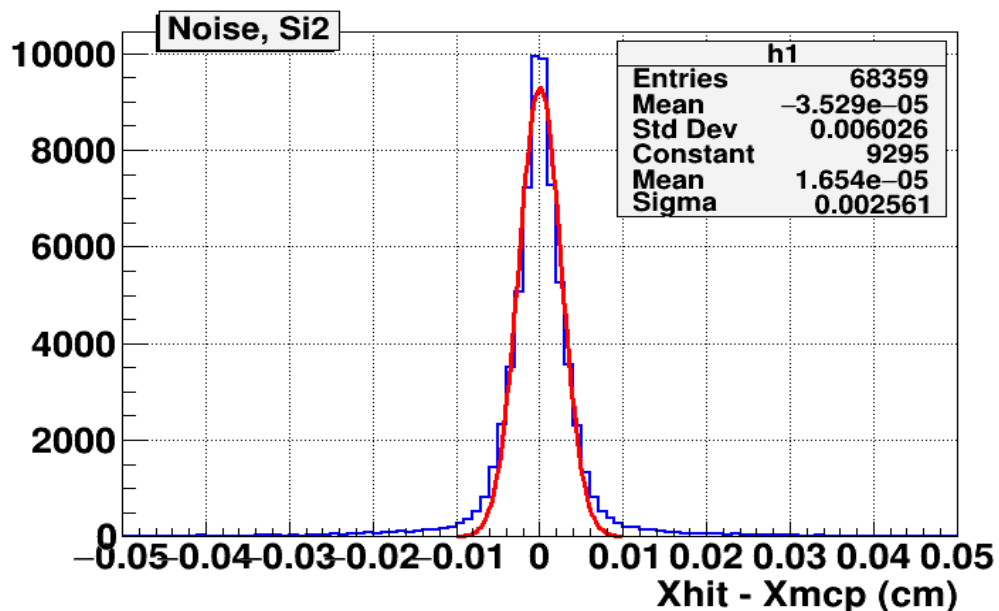
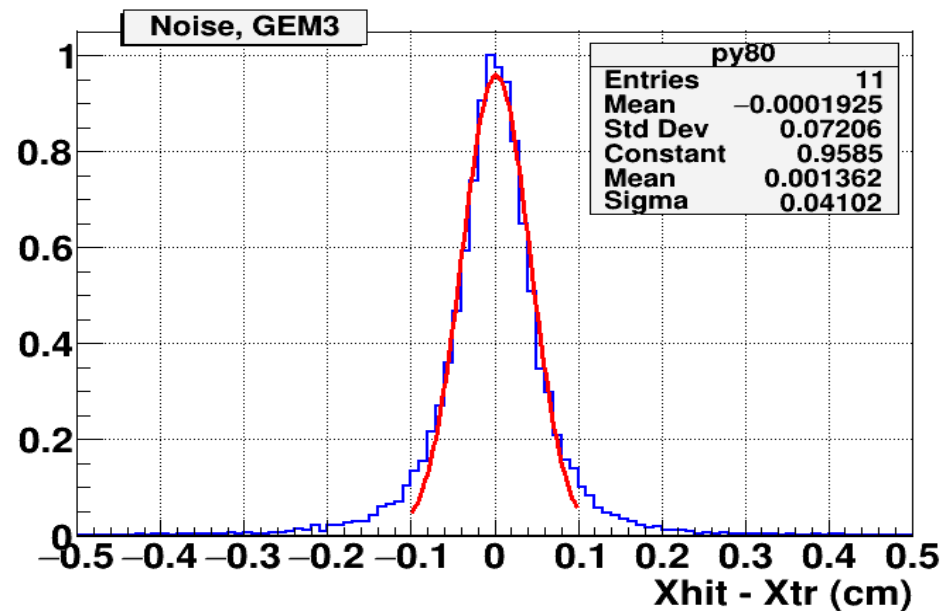
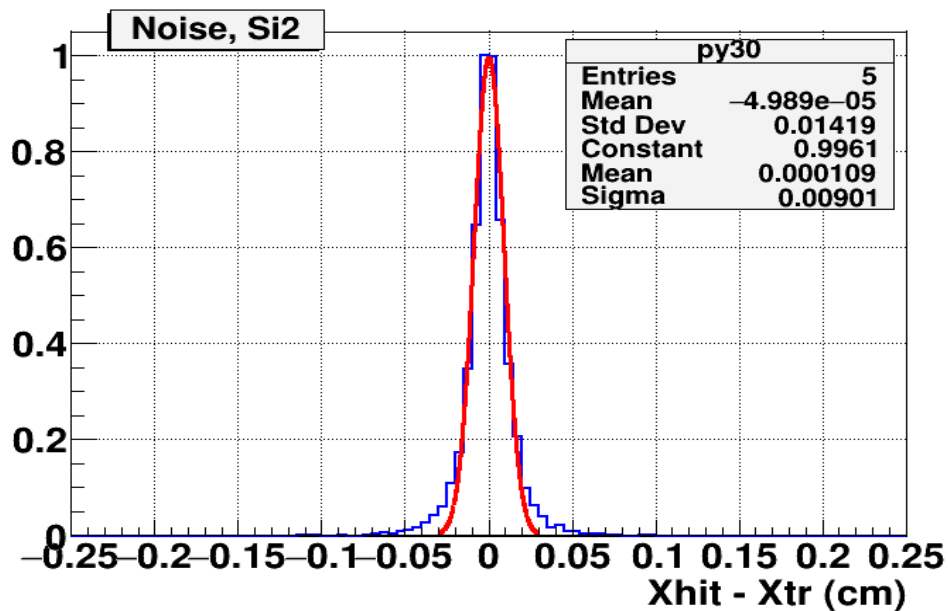




# Run 7830 (hit-to-track residuals)

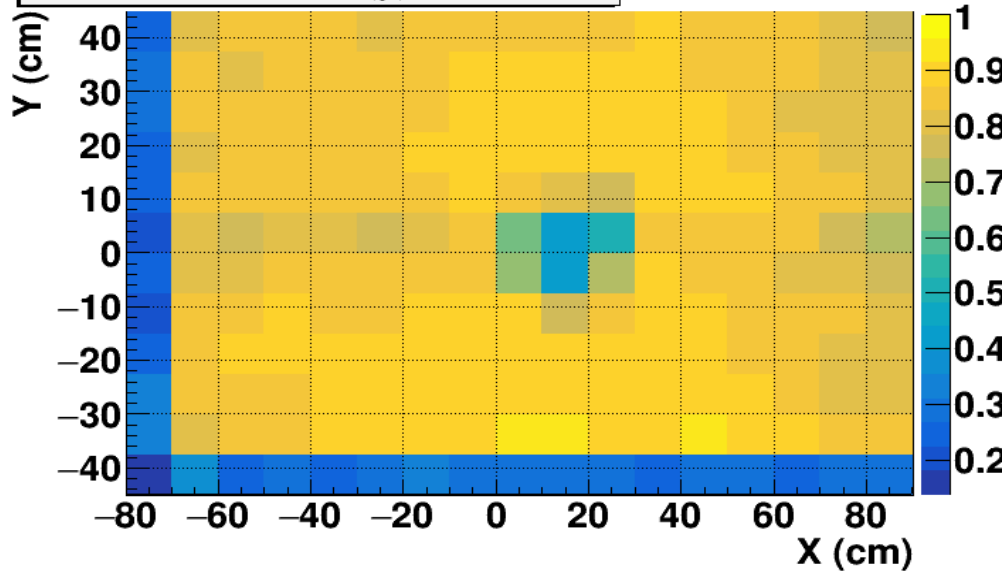


# Hit-to-track vs hit-to-MCpoint residuals in MC

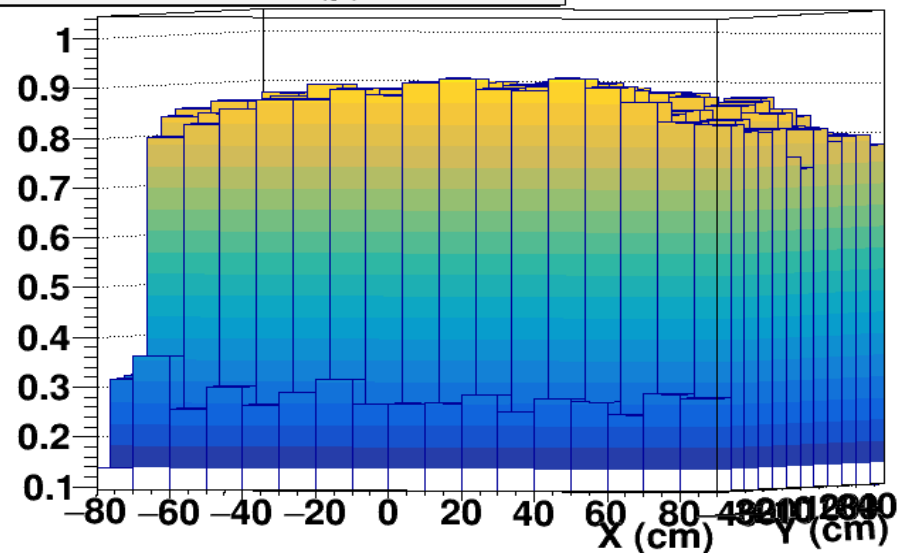


# Detector efficiency

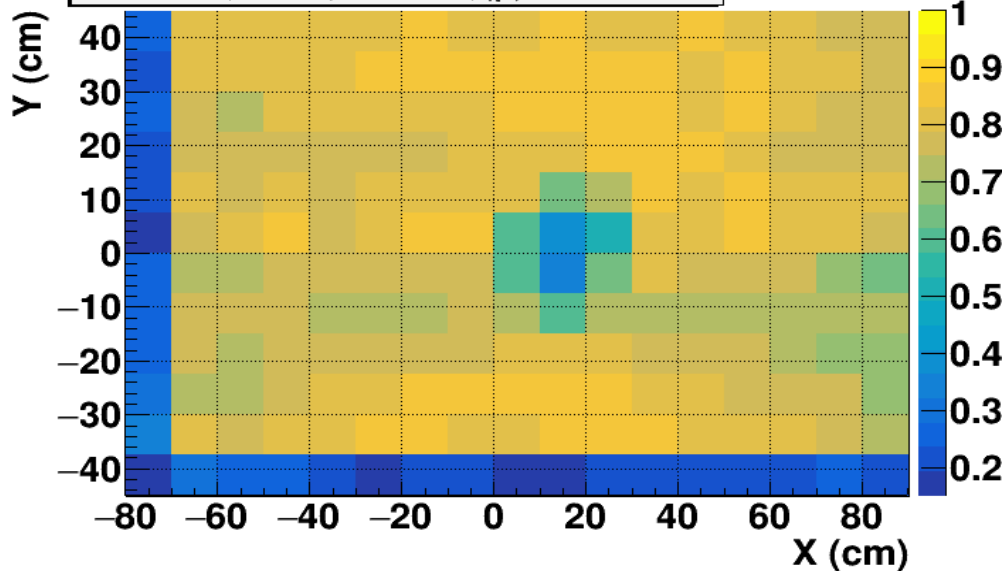
MC, GEM7, Nhits > 4, |p| > 0.5 GeV/c



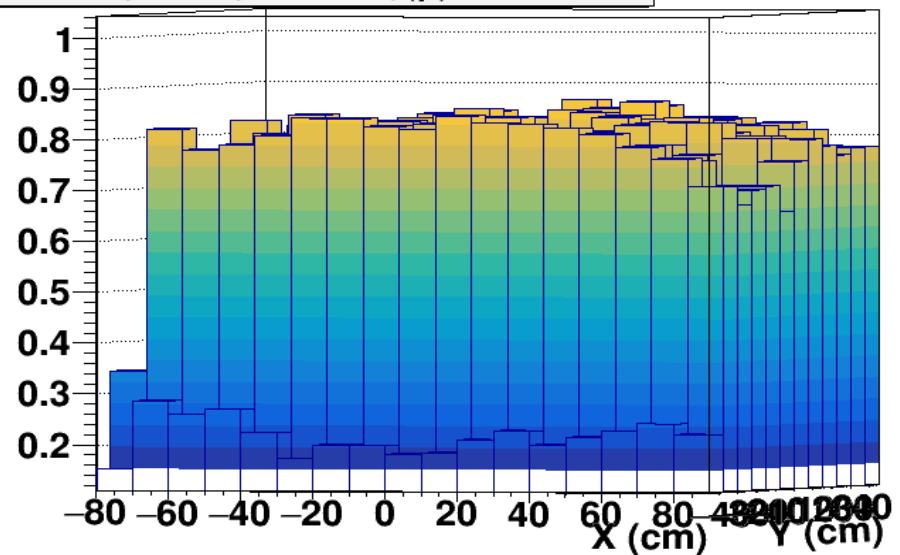
MC, GEM7, Nhits > 4, |p| > 0.5 GeV/c



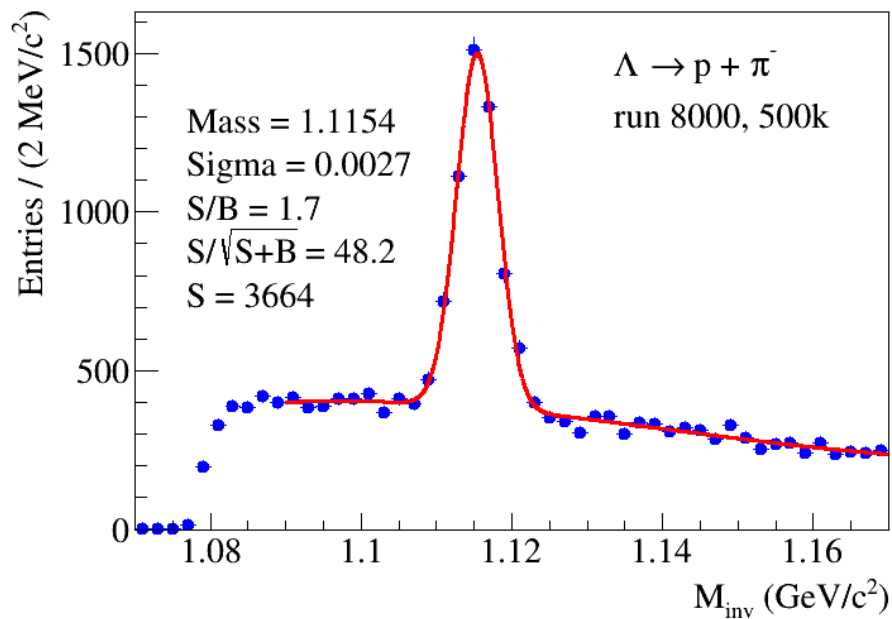
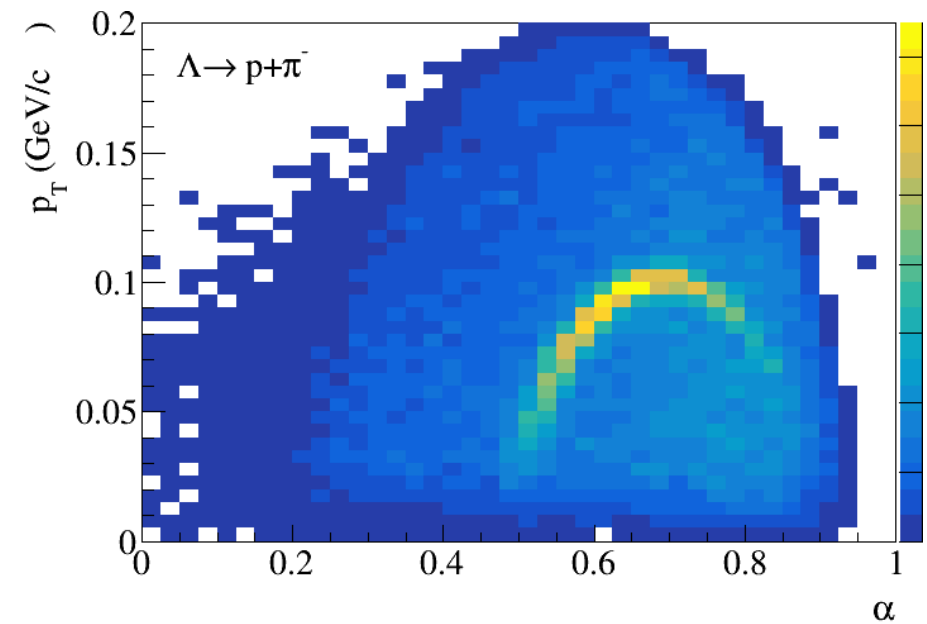
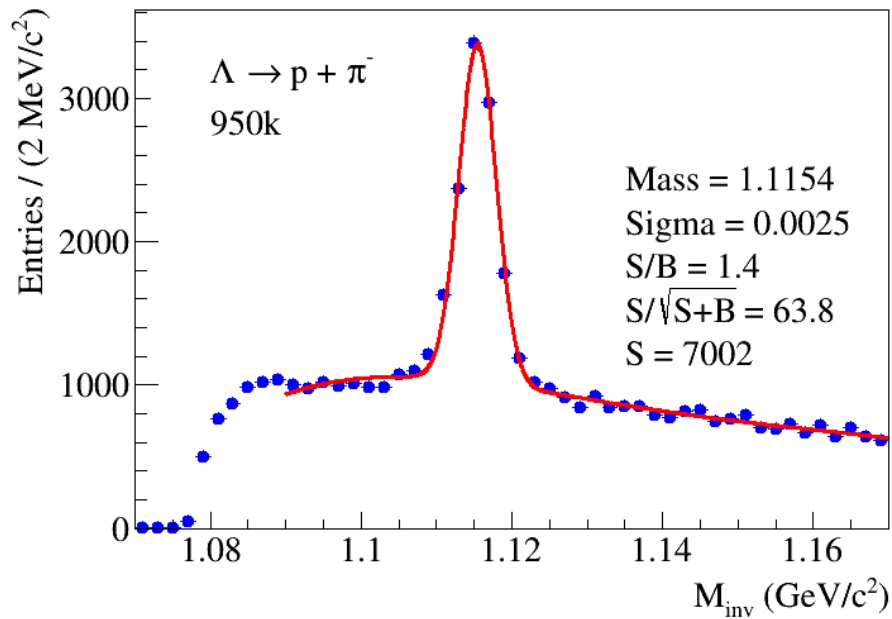
Run7830, GEM7, Nhits > 4, |p| > 0.5 GeV/c



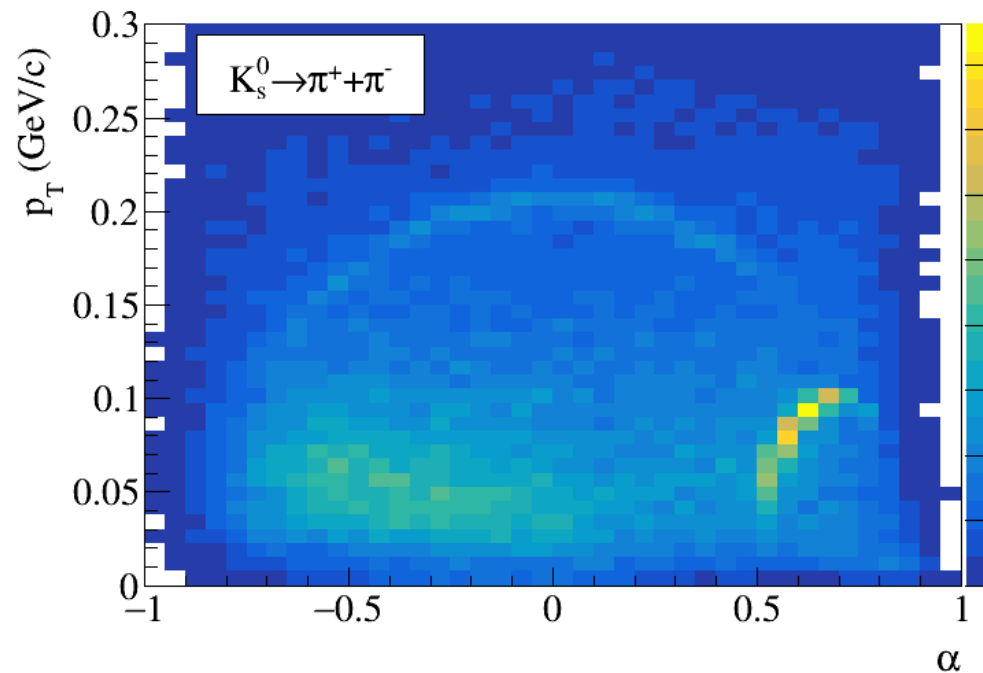
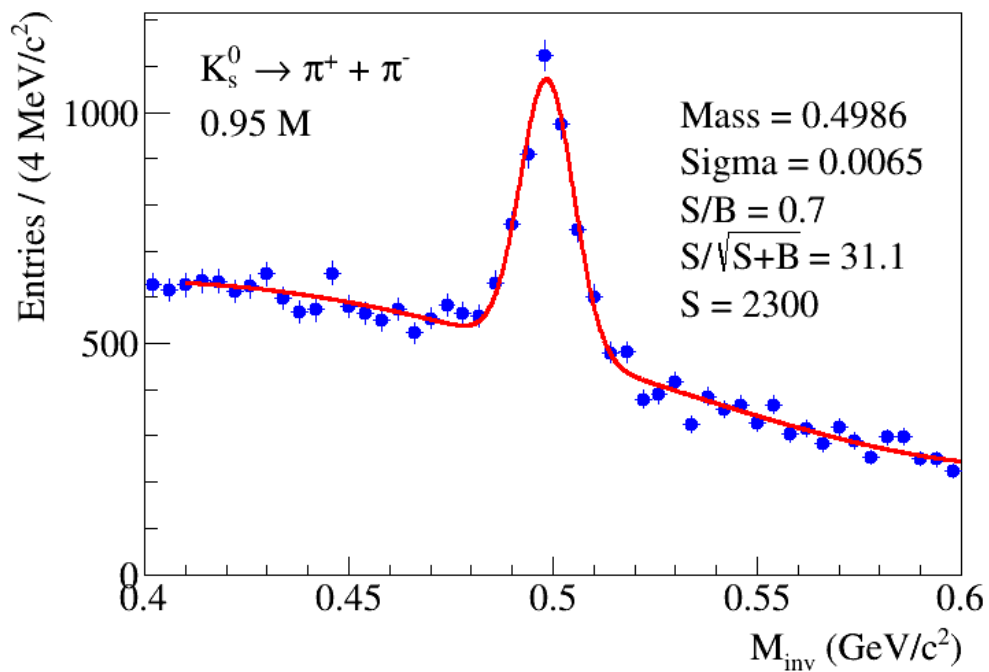
Run7830, GEM7, Nhits > 4, |p| > 0.5 GeV/c



# $\Lambda$ reconstruction (runs 7830 & 8000)



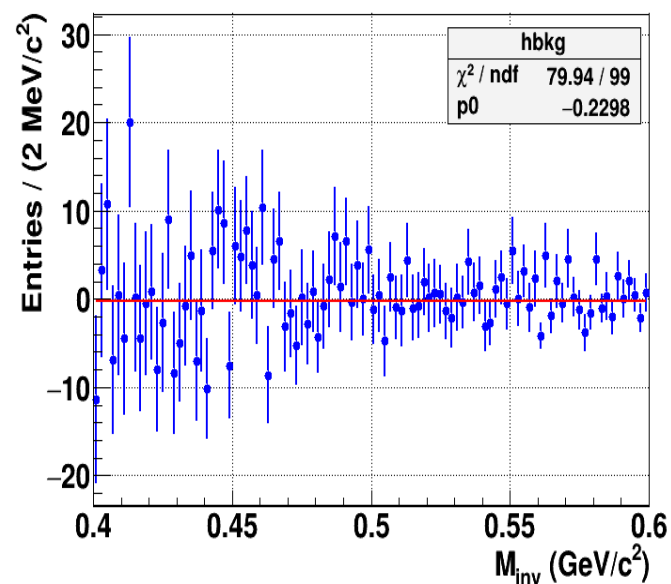
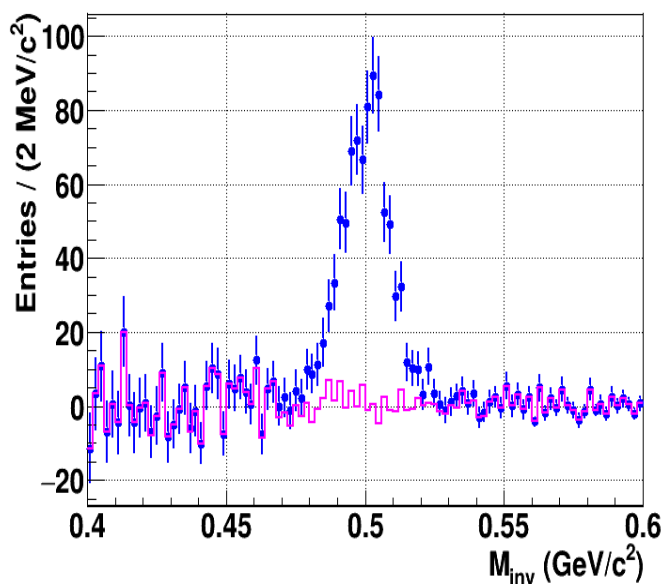
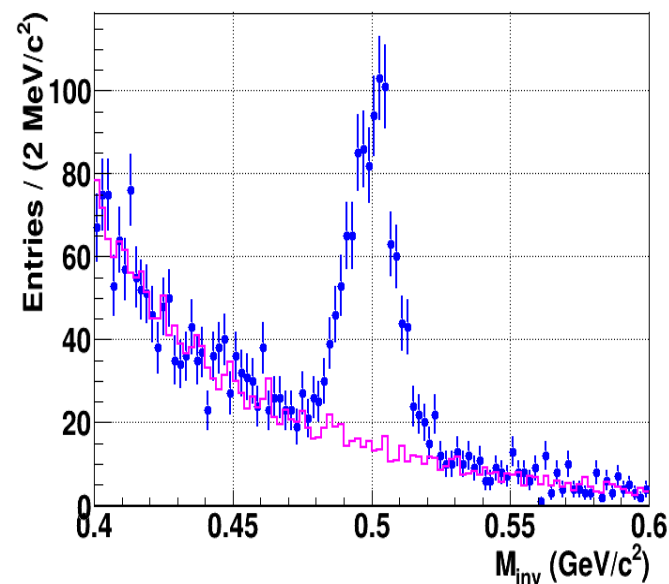
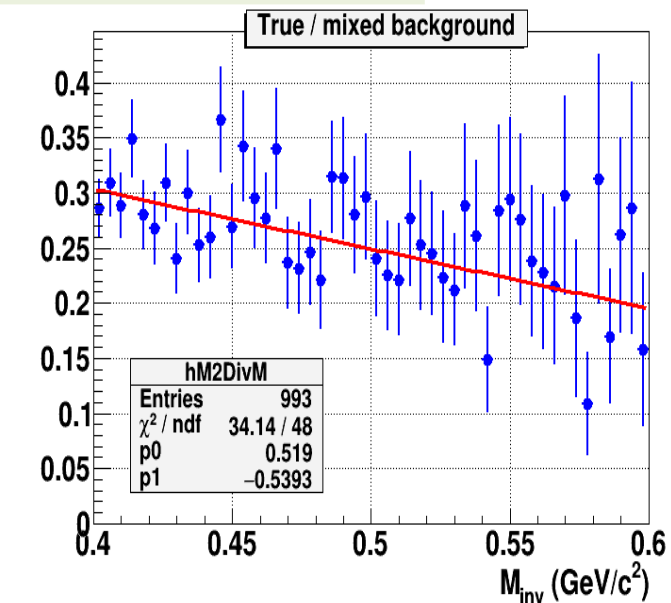
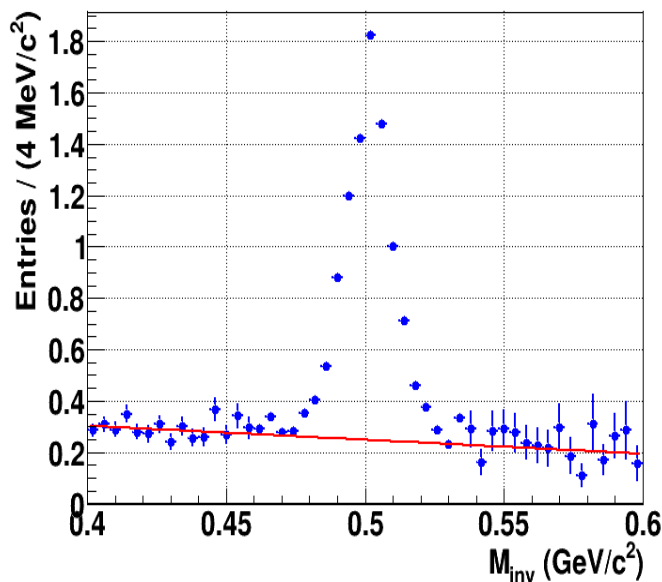
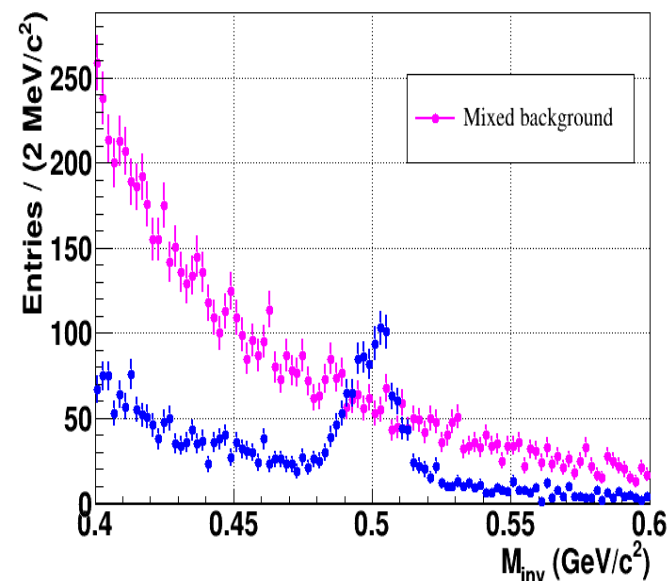
# $K_s^0$ reconstruction (run 7830)



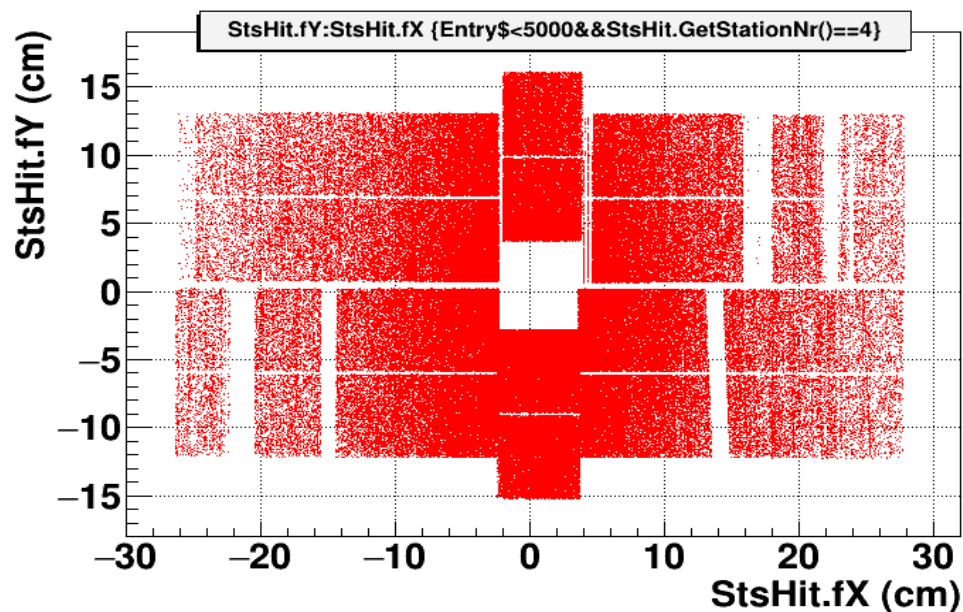
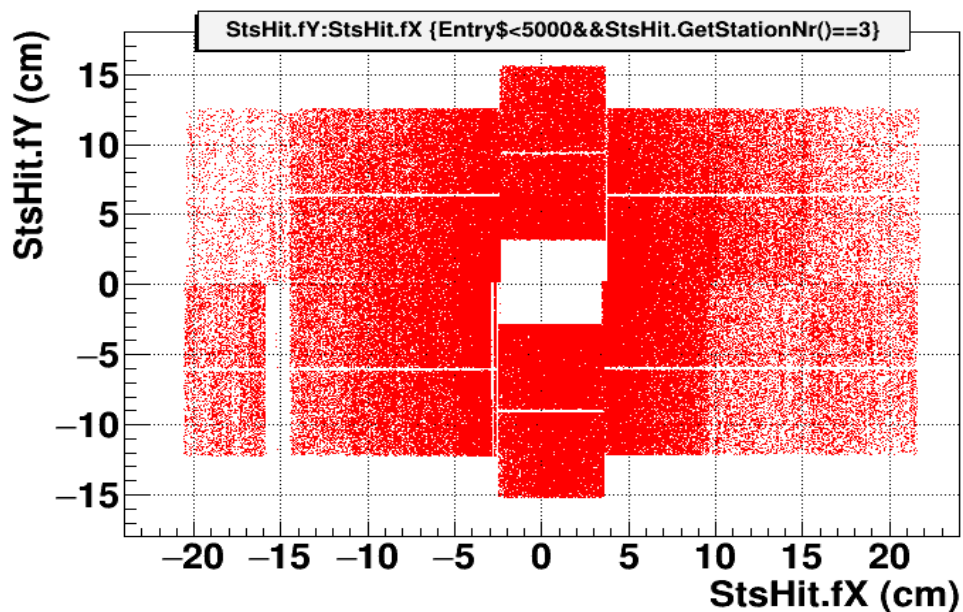
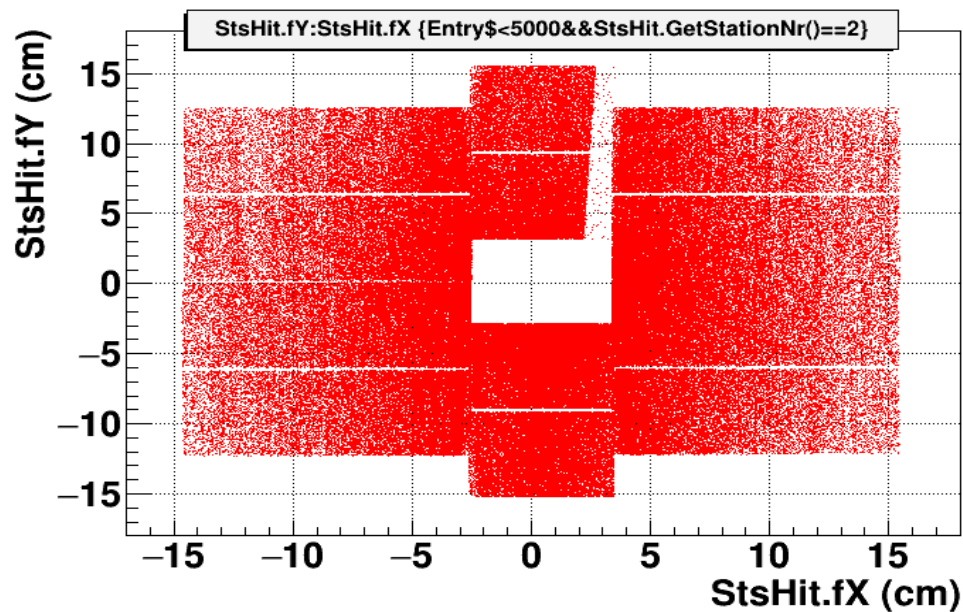
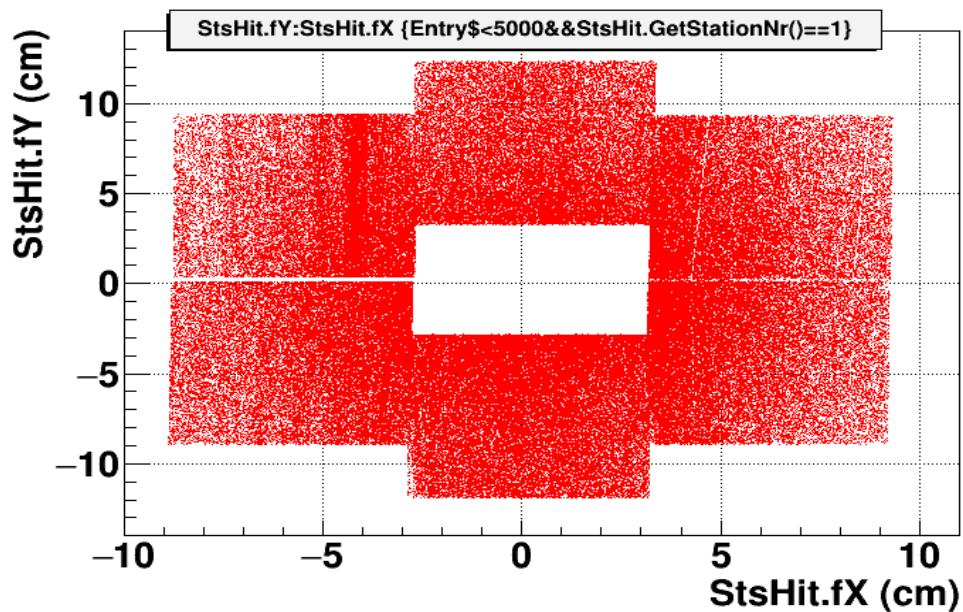
# Event mixing for background estimation



Adapted for BM@N by R.Zinchenko from MPD version by D.Suvarieva



# Detector efficiency



- ✓ Vector Finder track reconstruction toolkit was optimized for BM@N setup
  - ✓ Detector alignment of  $\sim 100$   $\mu\text{m}$  in Si and  $\sim 500$   $\mu\text{m}$  in GEM was achieved
  - ✓ V0 reconstruction (Lambda and K0s) is working
  - ✓ Background subtraction procedure based on event mixing was implemented and tested on MC data
- 
- ✓ Tune detector efficiency determination procedure
  - ✓ Include one-dimensional (one-sided) hits in tracking
  - ✓ Improve alignment
  - ✓ Add realistic effects to MC simulation (noise)
  - ✓ Look for  $\Xi^-$