

Run 8 event reconstruction in the central tracker

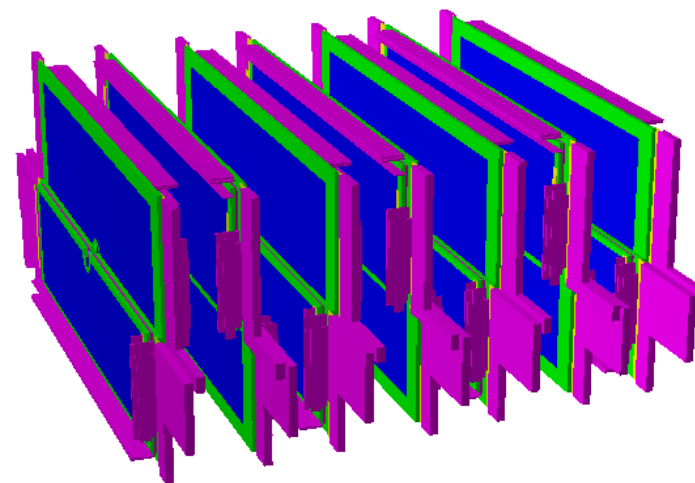
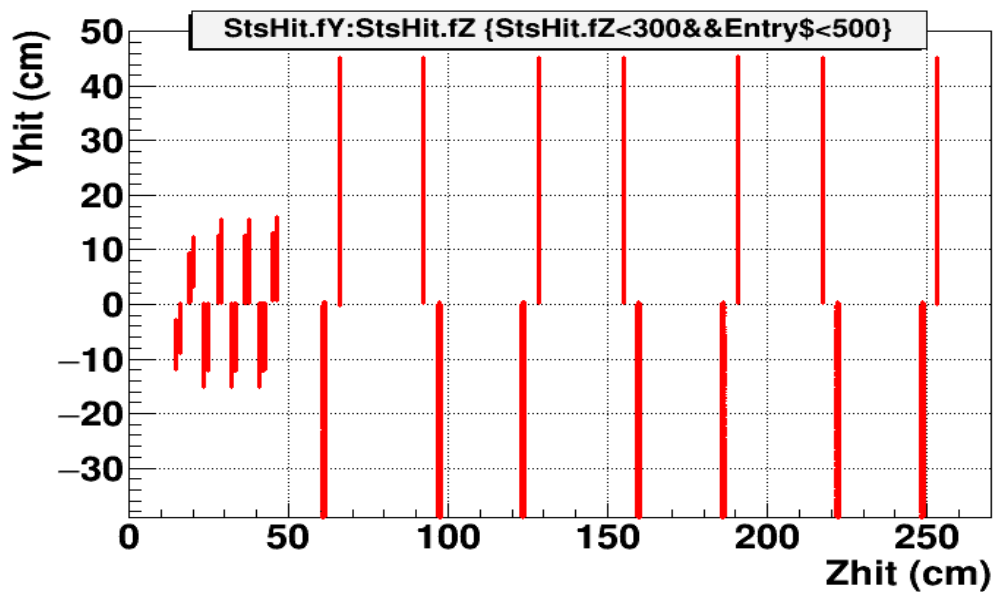
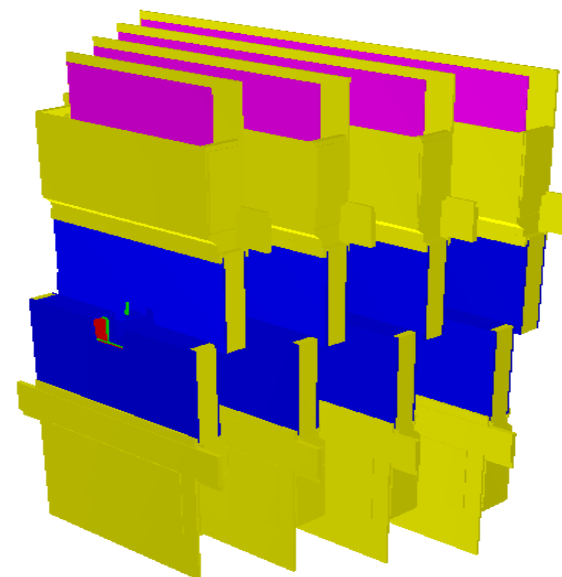
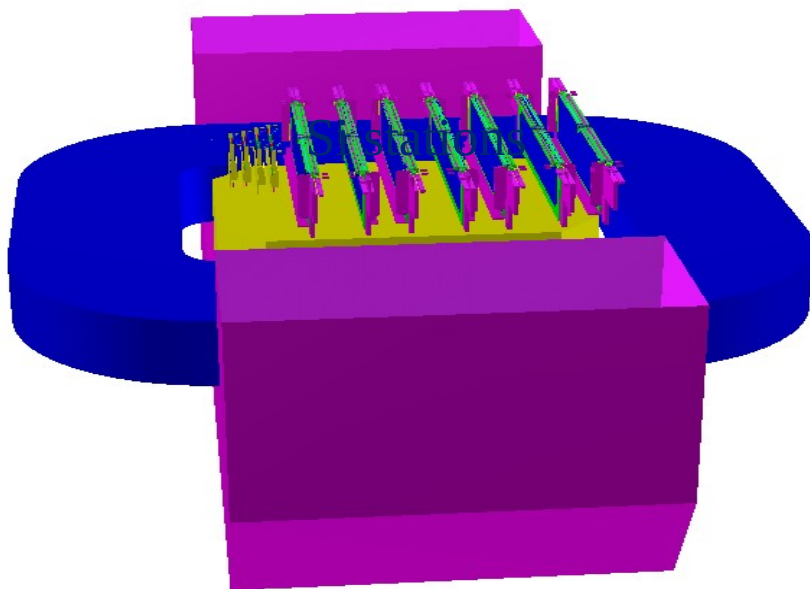
**J.Drnoyan, V.Vasendina, A.Zinchenko,
D.Zinchenko, R.Zinchenko**

VBLHEP, JINR, Dubna, Russia

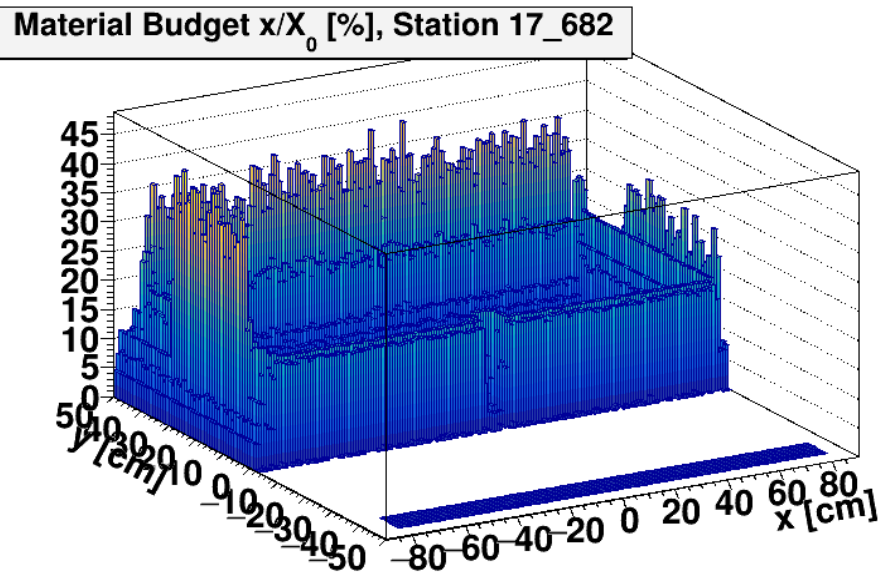
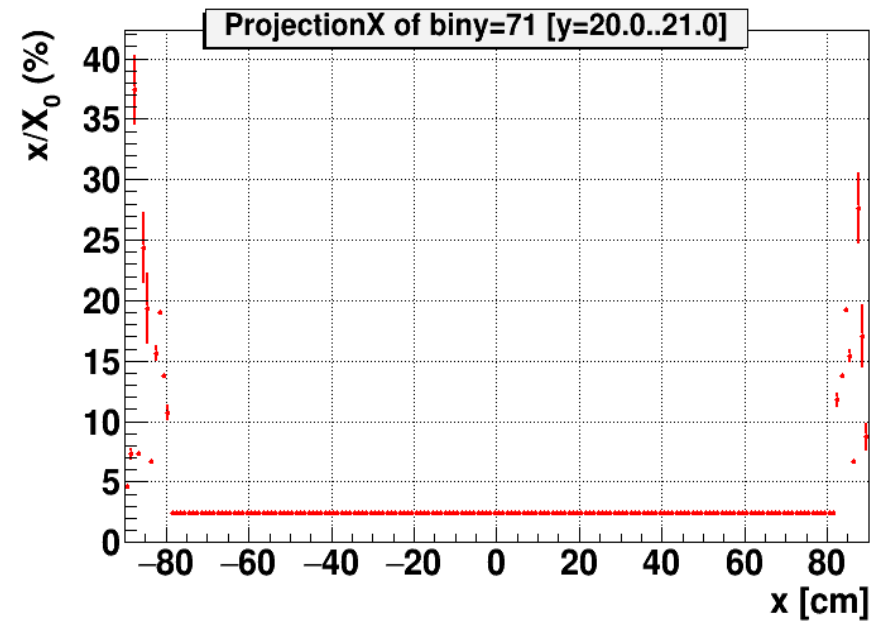
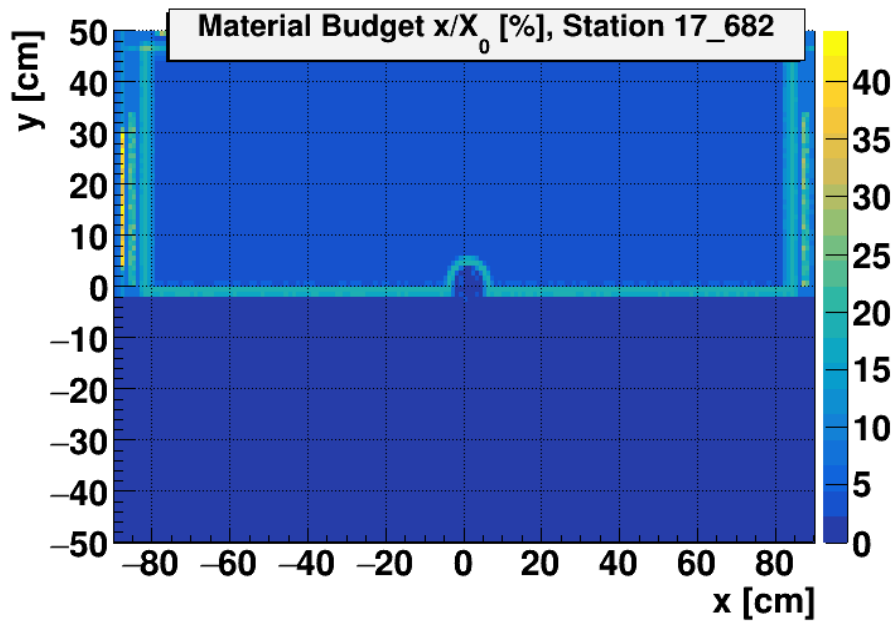


- ✓ BM@N configuration
- ✓ Track reconstruction
- ✓ Detector alignment / Lorentz corrections
- ✓ Coordinate resolution
- ✓ Detector efficiency
- ✓ Strangeness reconstruction:
 - ✓ Λ reconstruction
 - ✓ K_s^0 reconstruction
 - ✓ E^- reconstruction
- ✓ Summary and next steps

Detector geometry in Run 8

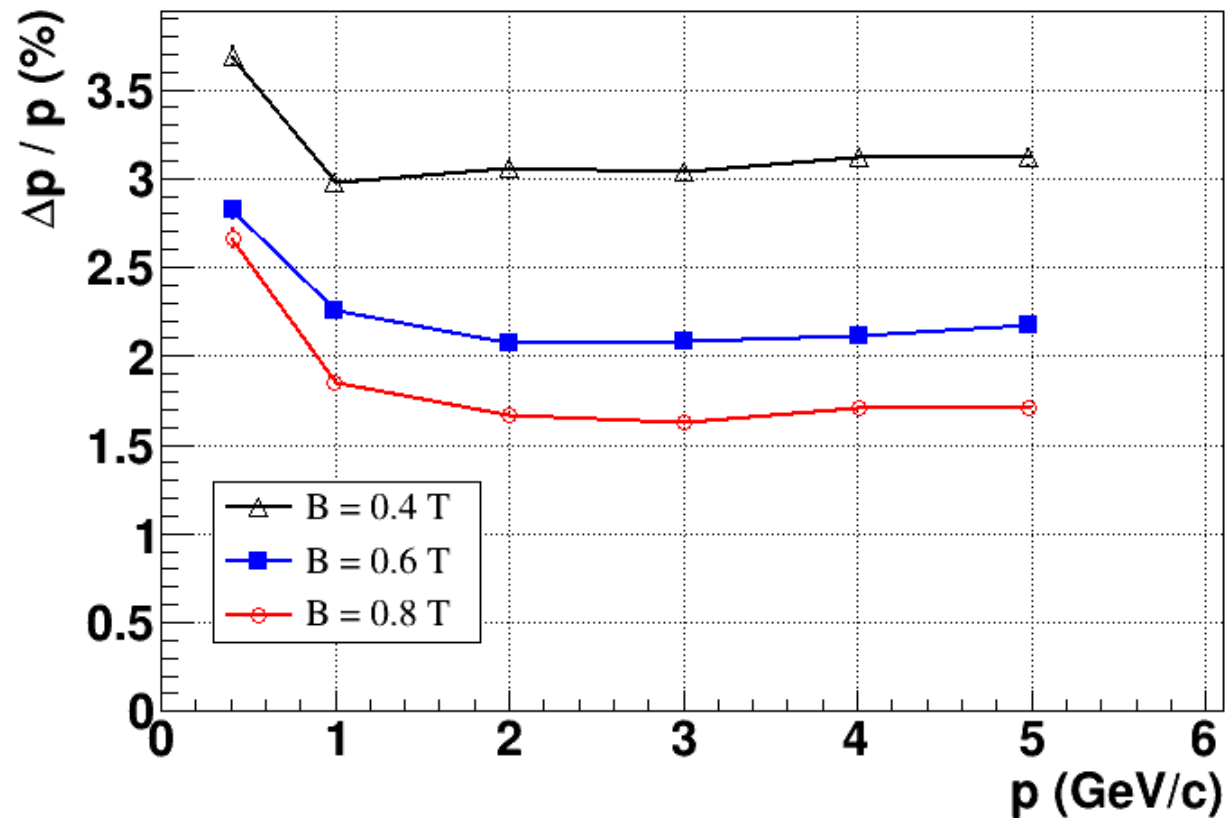


Material budget in GEM chamber



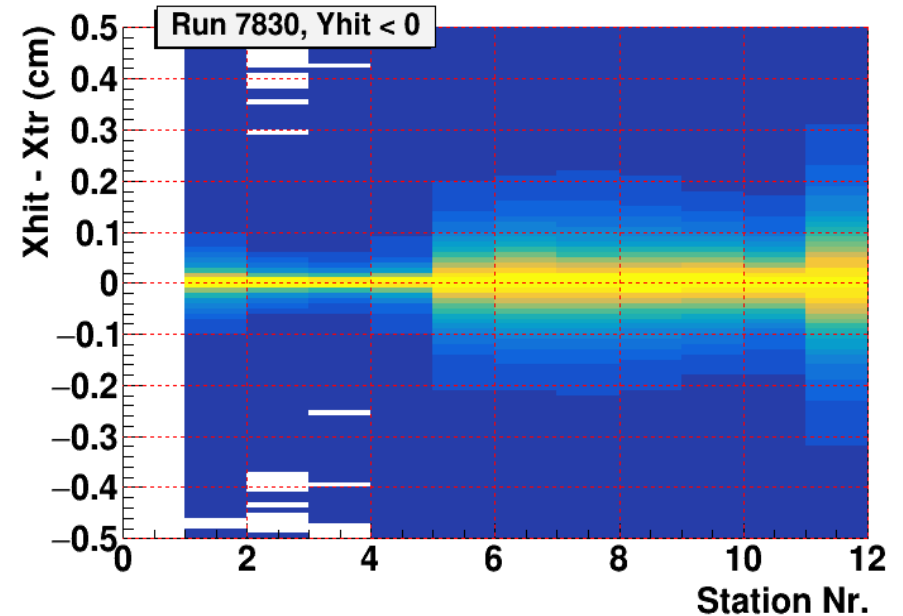
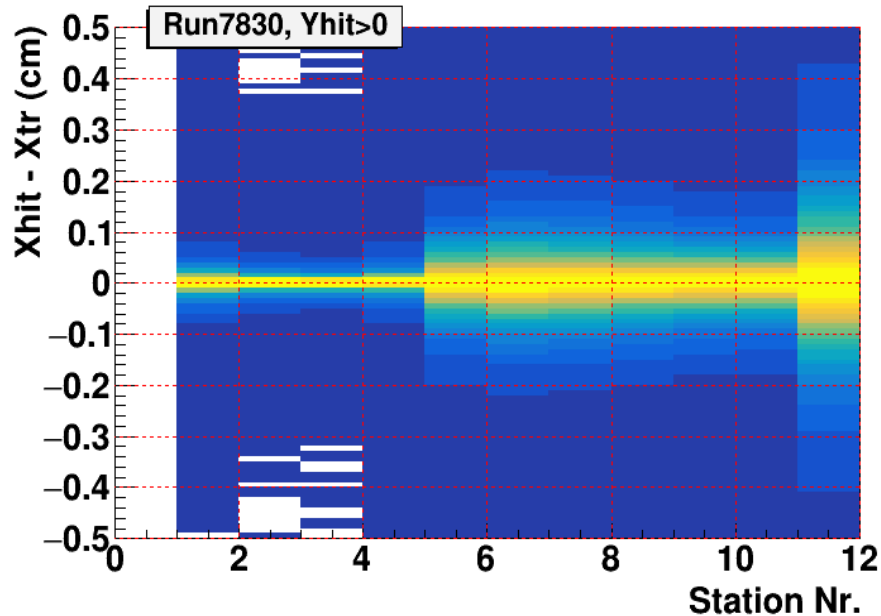
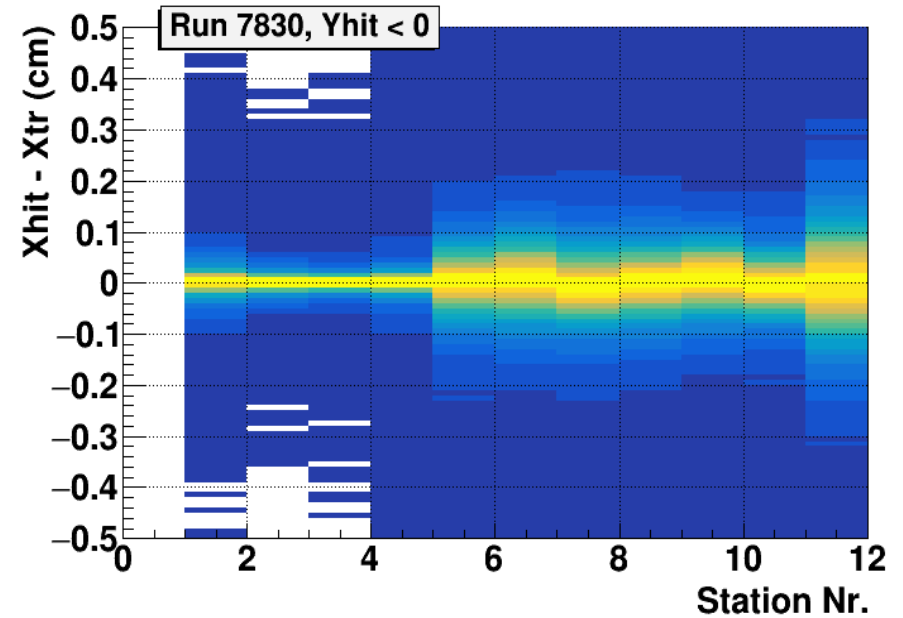
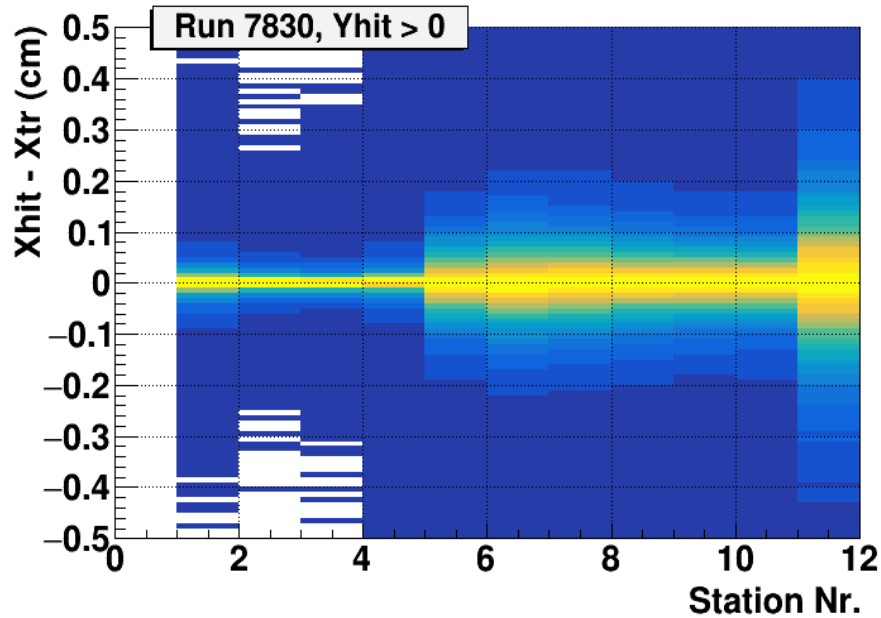
- ✓ CAT (L1) track reconstruction – legacy code from the CBM experiment
- ✓ Vector Finder (VF)– homemade (import substitution) package
- ✓ L1 demonstrates higher efficiency at 4 kG, VF at 6 and 8 kG
- ✓ VF allows missing stations on tracks (jump over station) – except for the next to the first one

Tracker performance

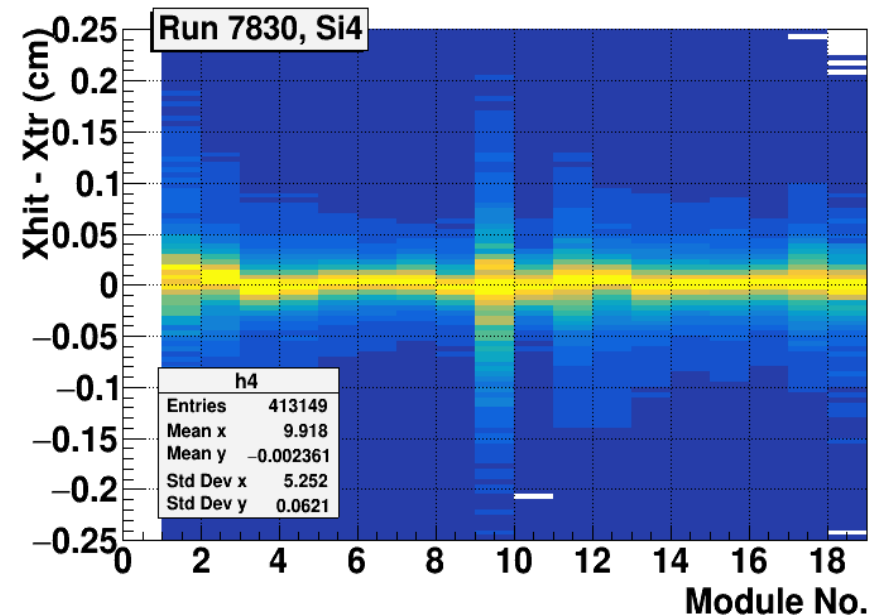
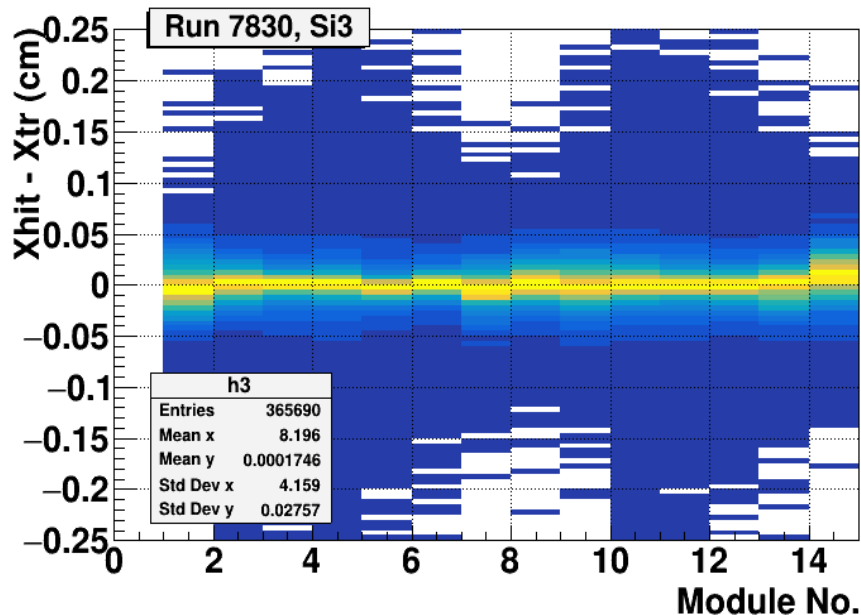
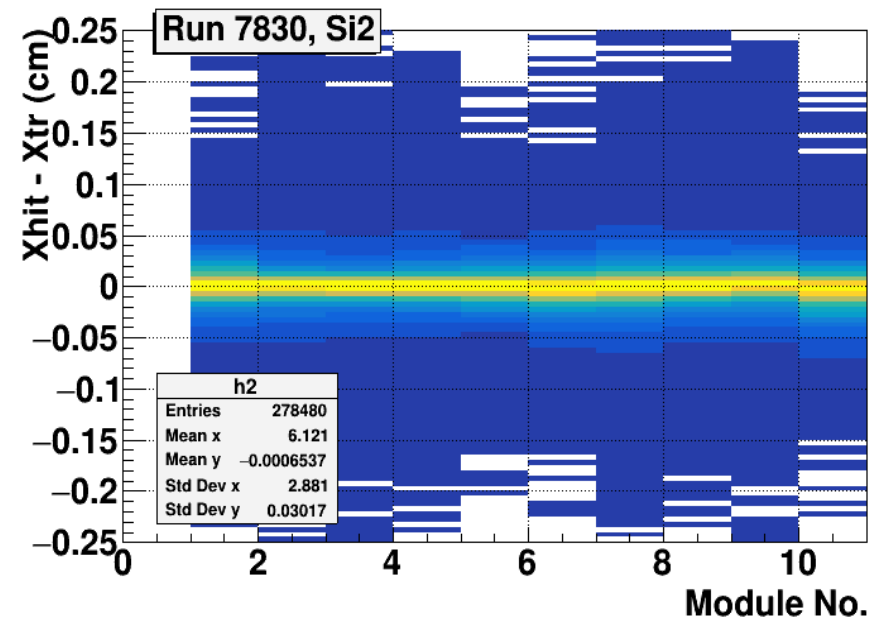
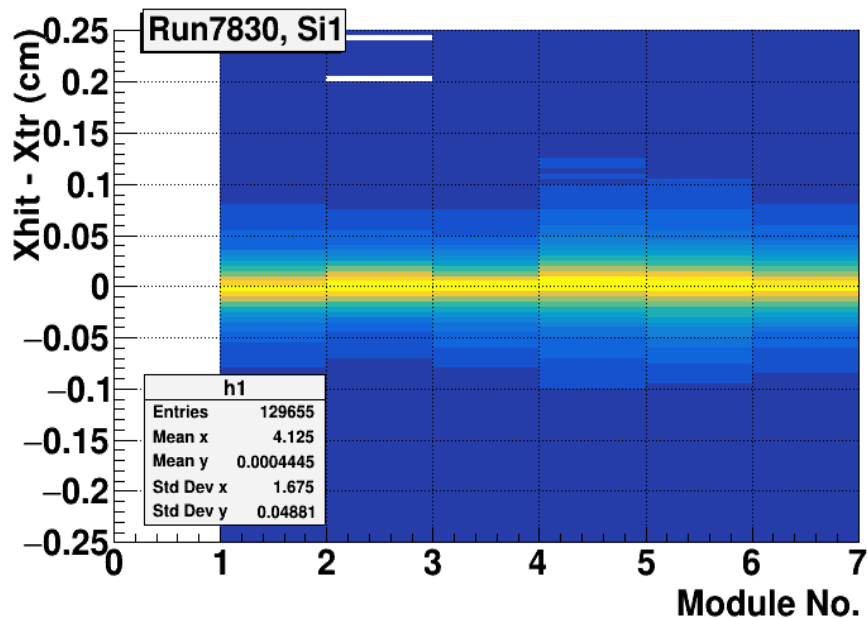


- ✓ **Runs:** 7830, 7842, 7843, 7873, 7876, 7877, 7878, 7880, 7885
- ✓ **Detectors:** 4 Si + 7 GEMs
- ✓ **Track reconstruction:** new Vector Finder
- ✓ **Vertex reconstruction:** new Vertex Finder
- ✓ **Magnetic field:** FieldMap_1900.root

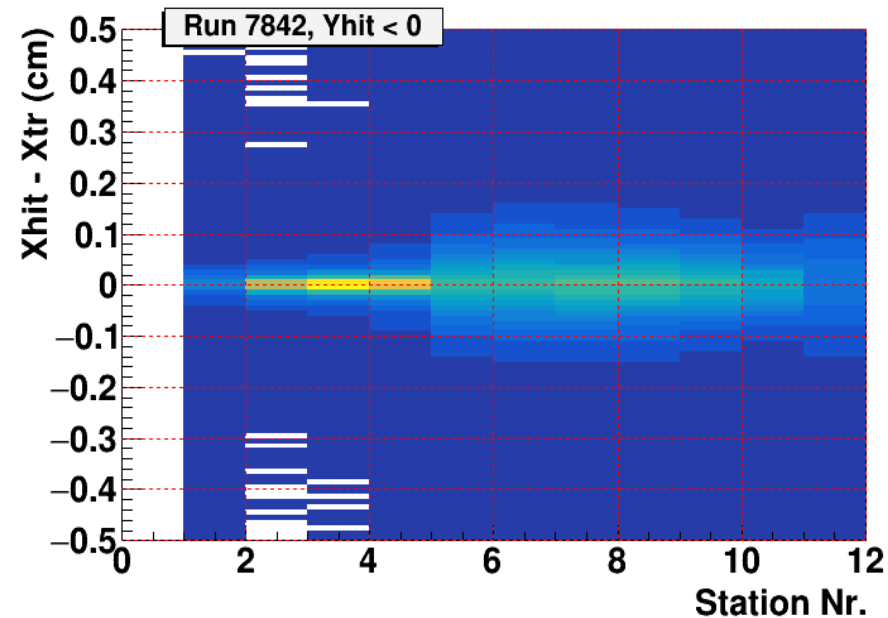
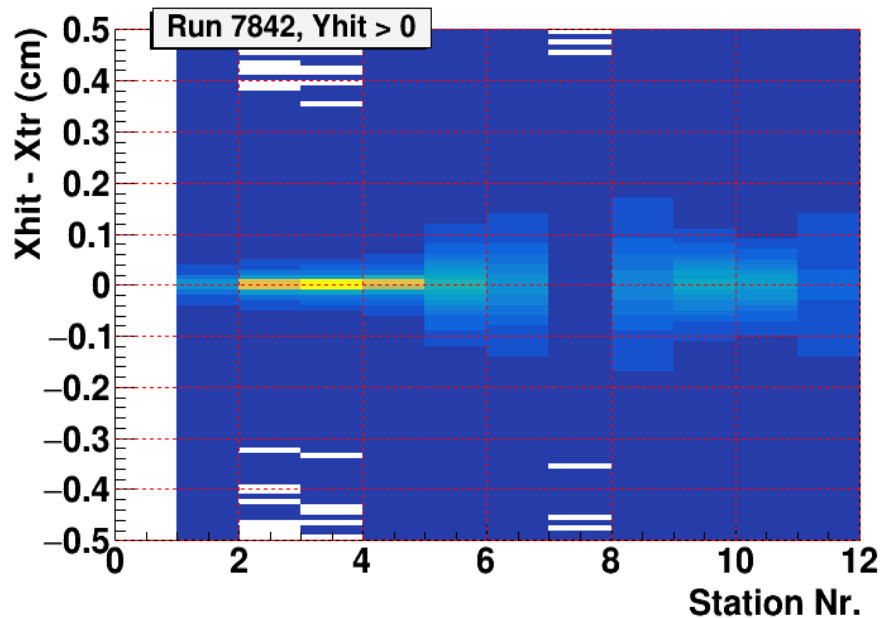
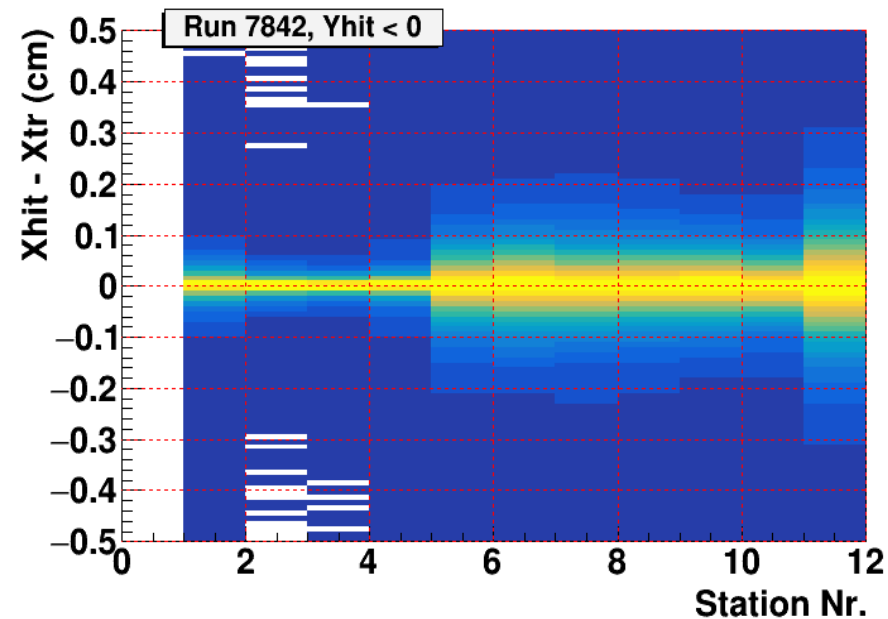
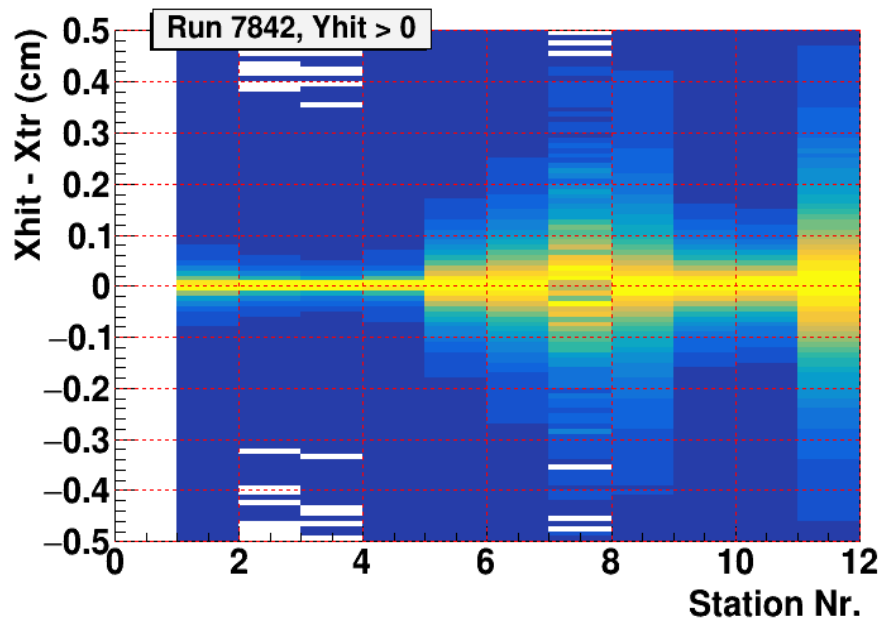
Run 7830 (B != 0, current alignment)



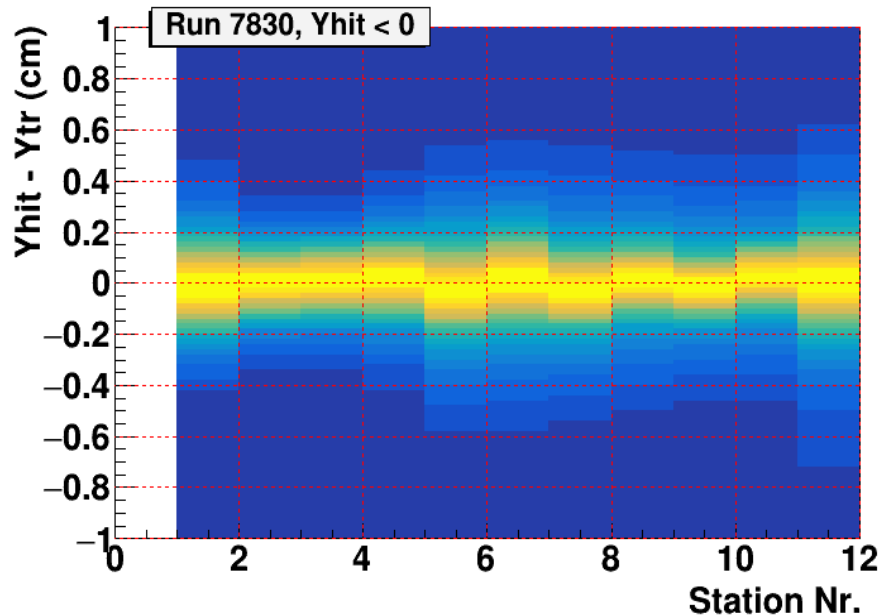
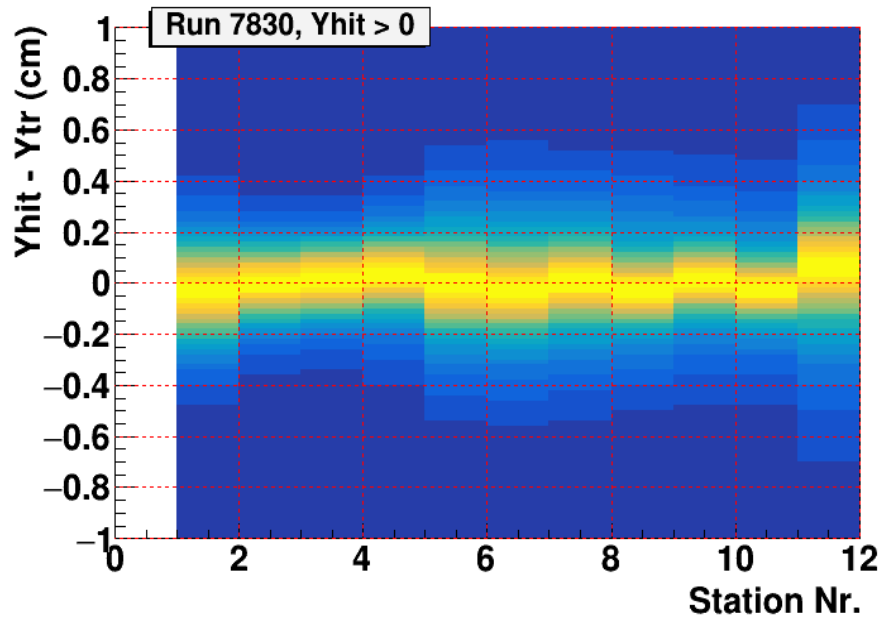
Run 7830 (B != 0, current alignment in Si)



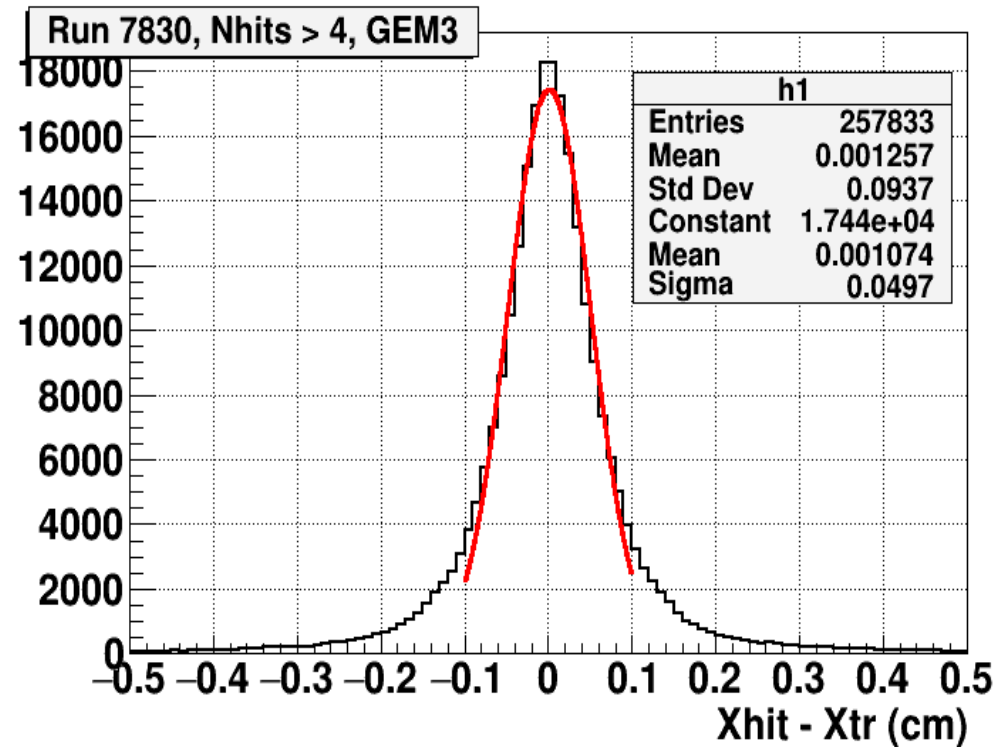
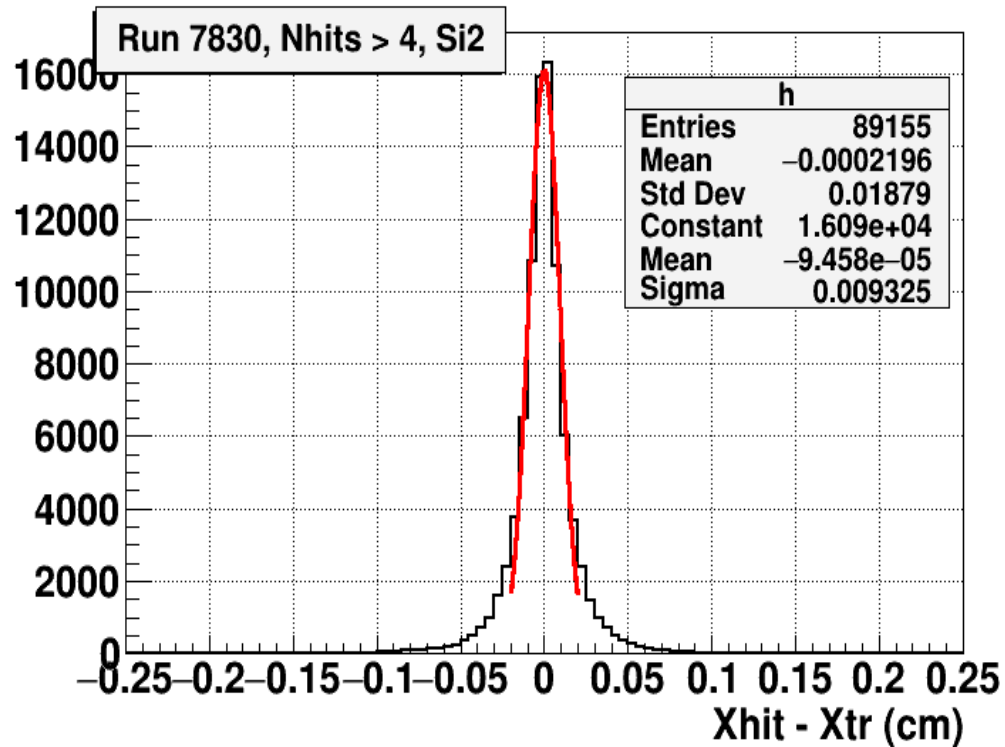
Run 7842 (B != 0, current alignment)



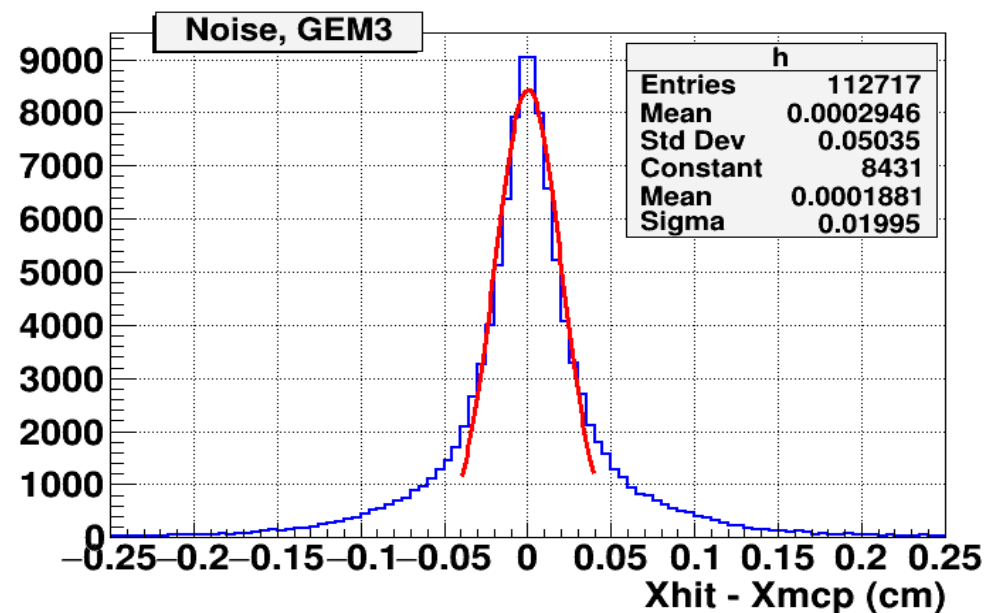
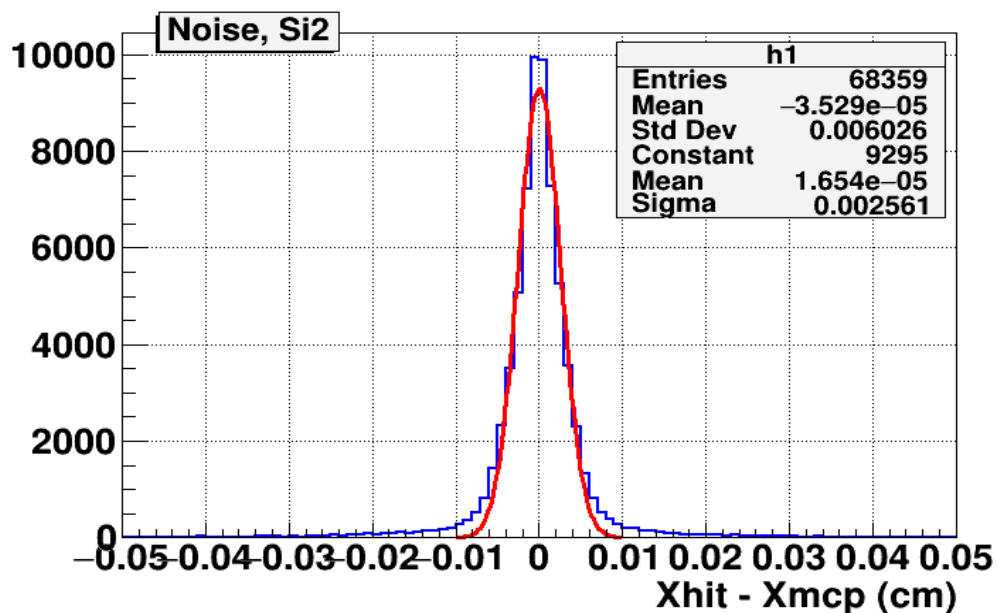
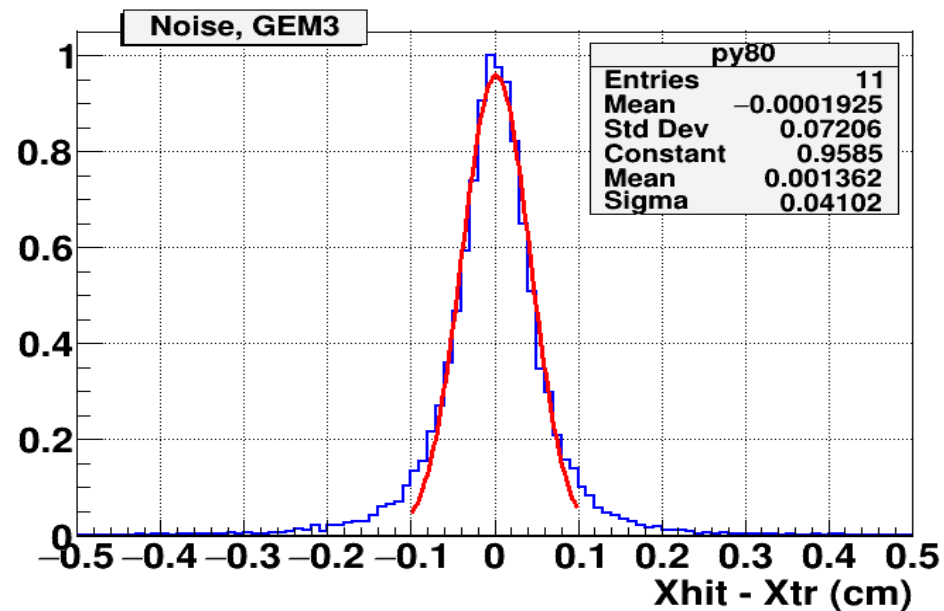
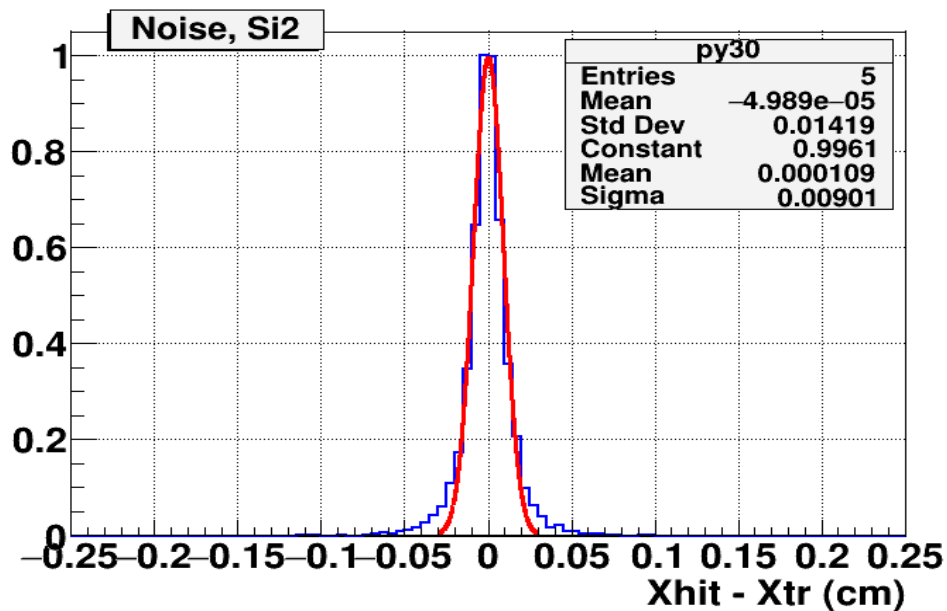
Run 7830 (B \neq 0, current alignment)



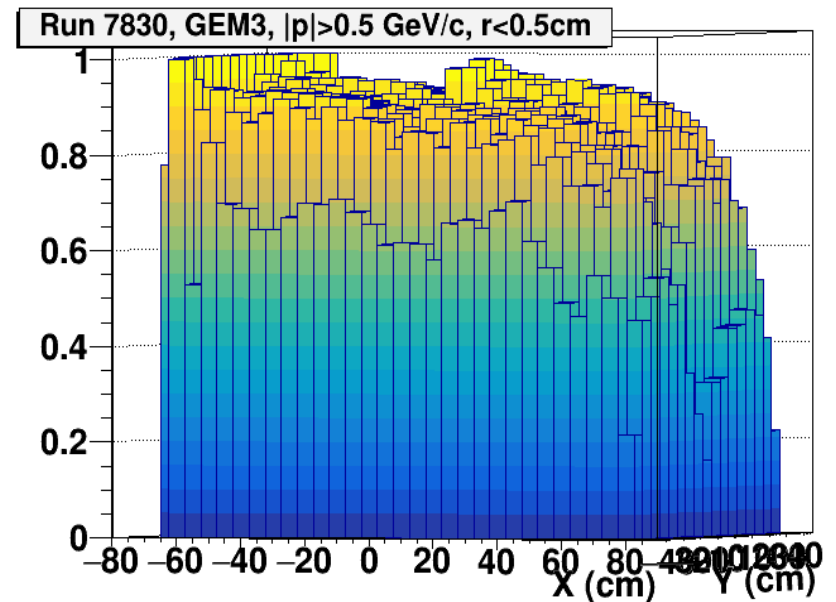
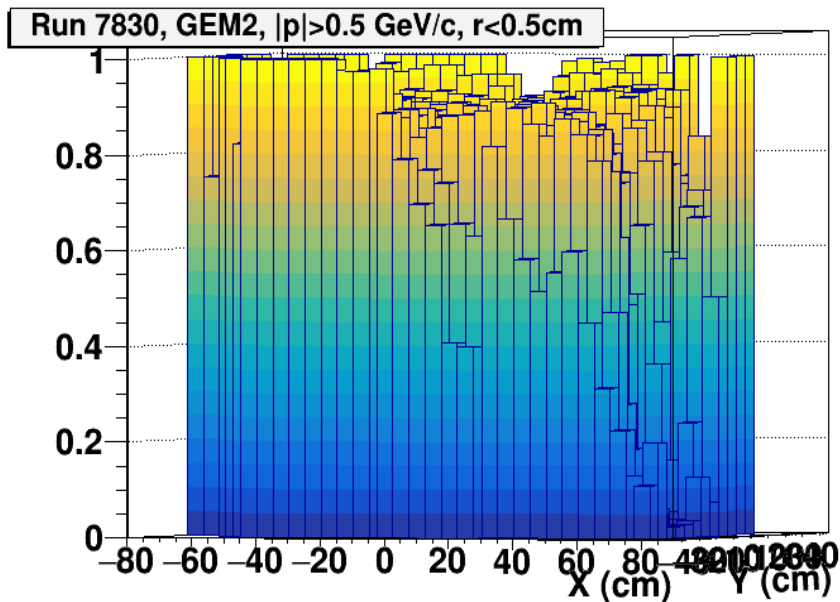
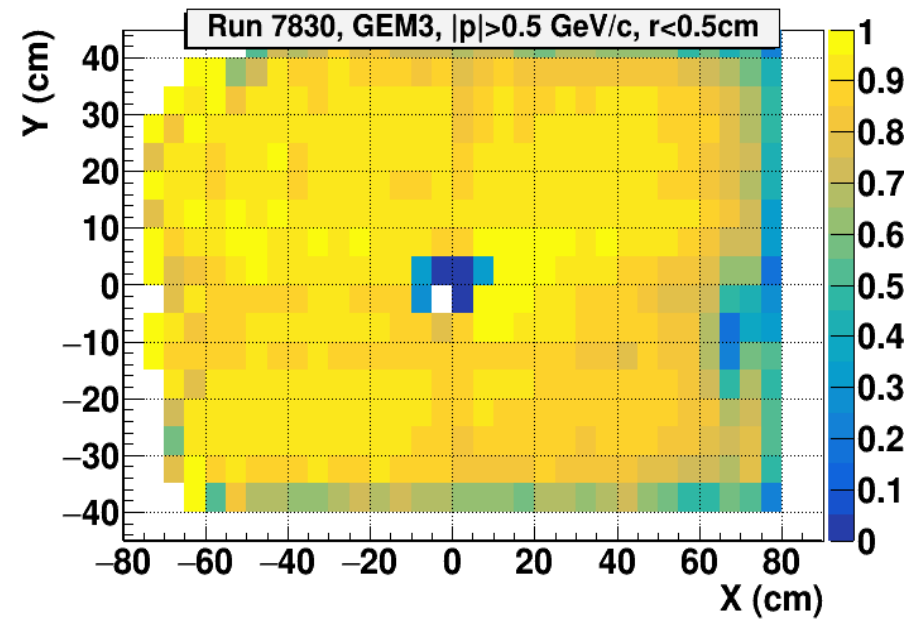
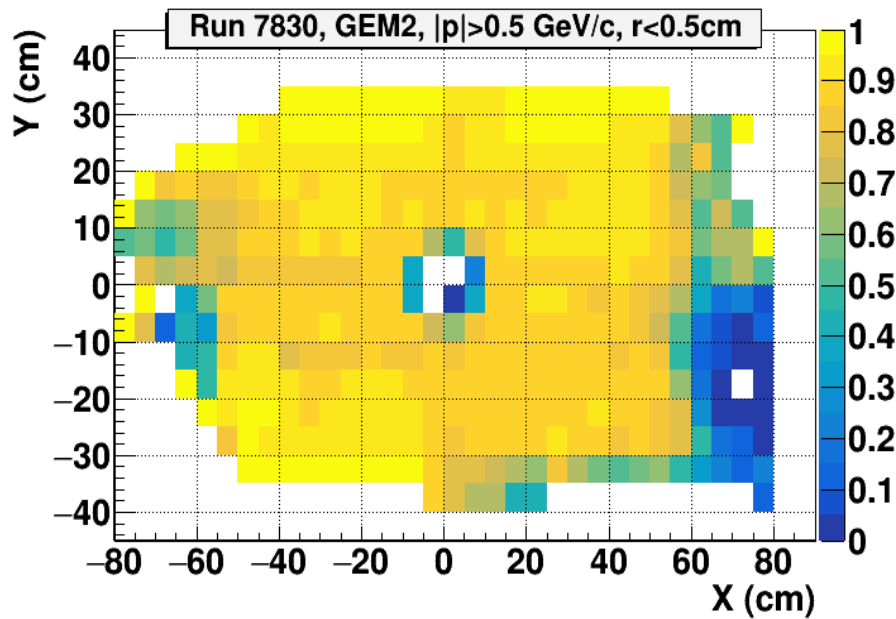
Run 7830 (hit-to-track residuals)



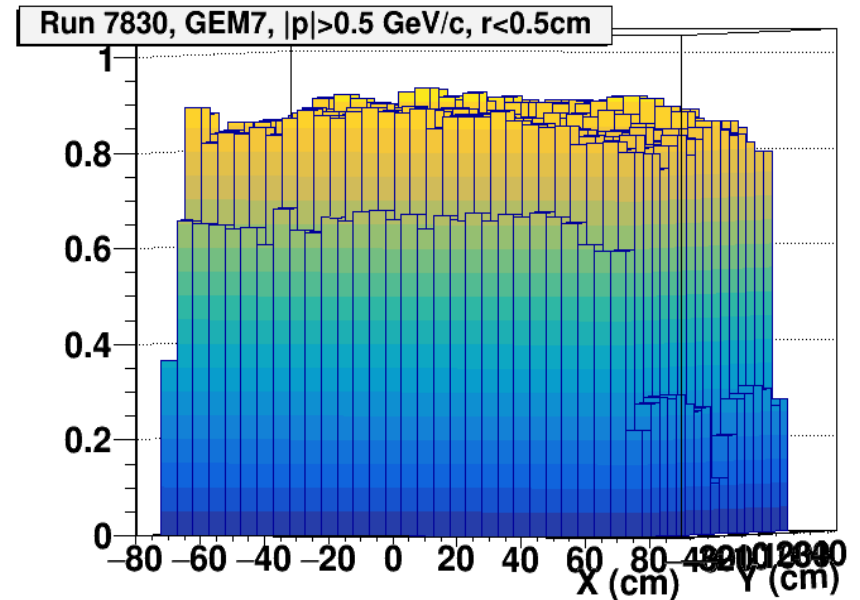
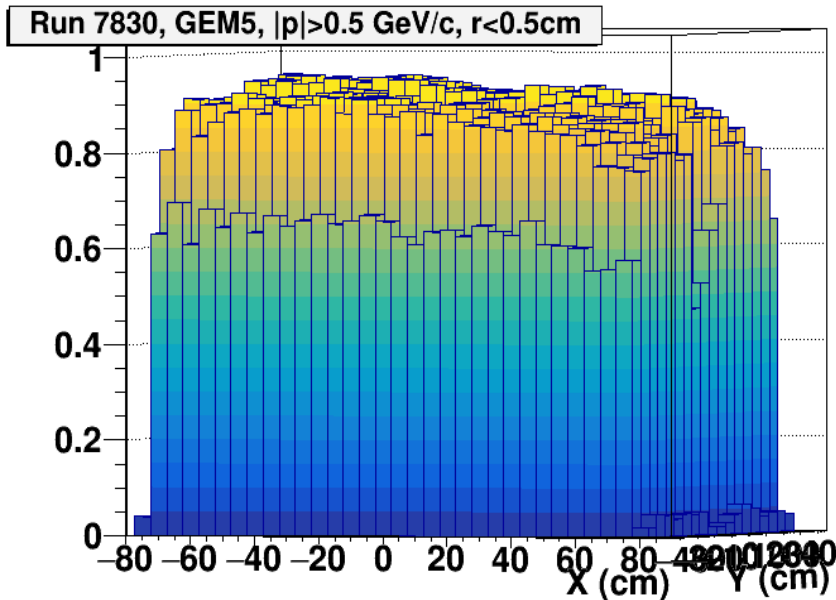
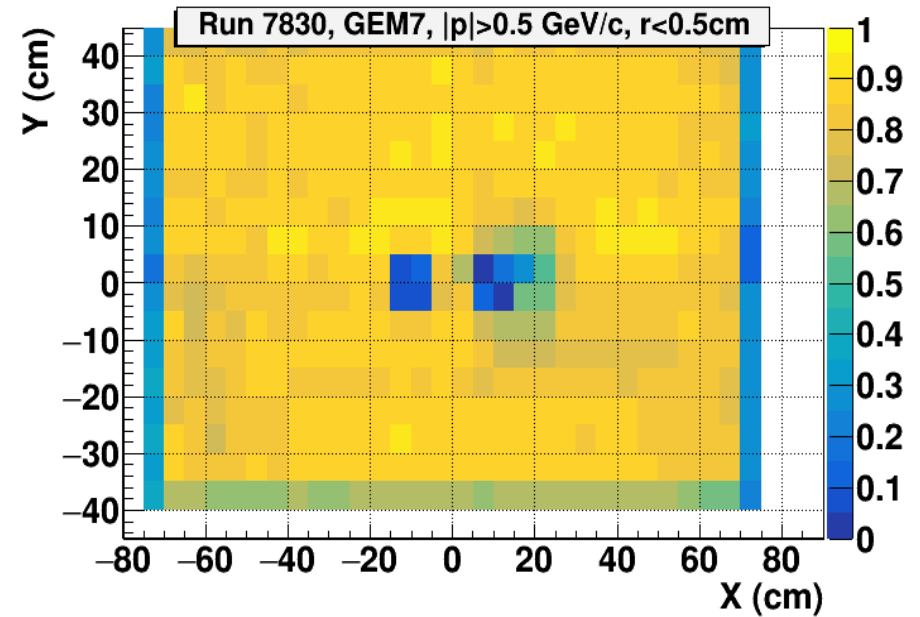
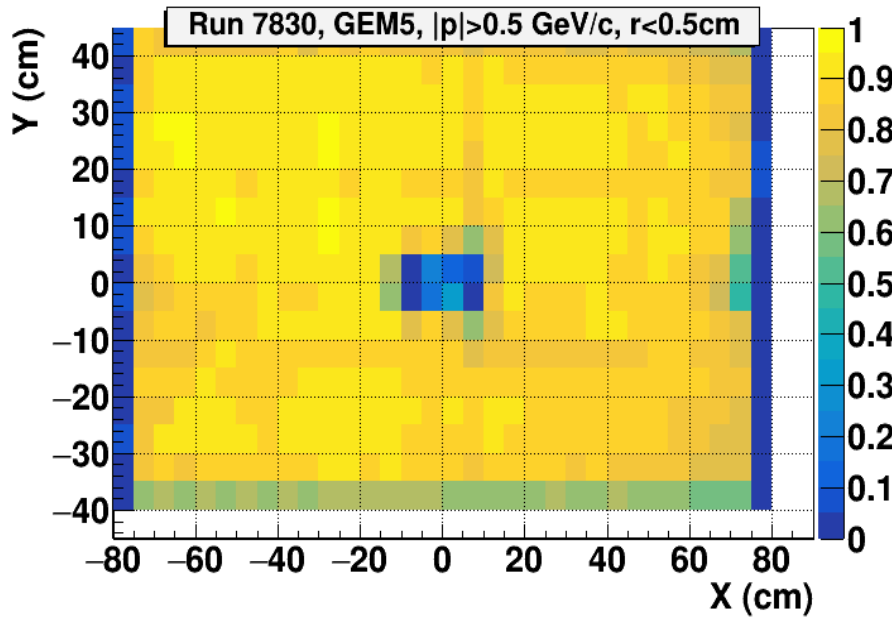
Hit-to-track vs hit-to-MCpoint residuals in MC



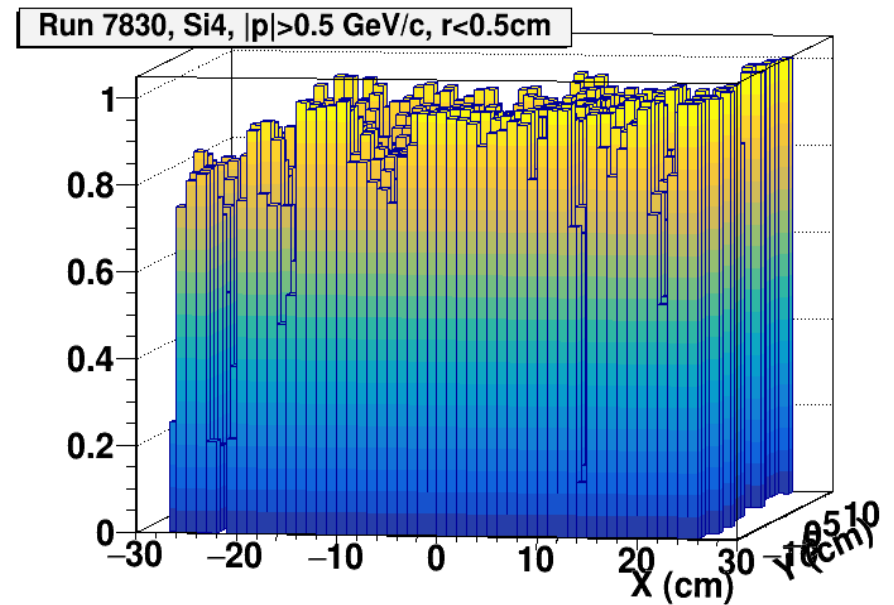
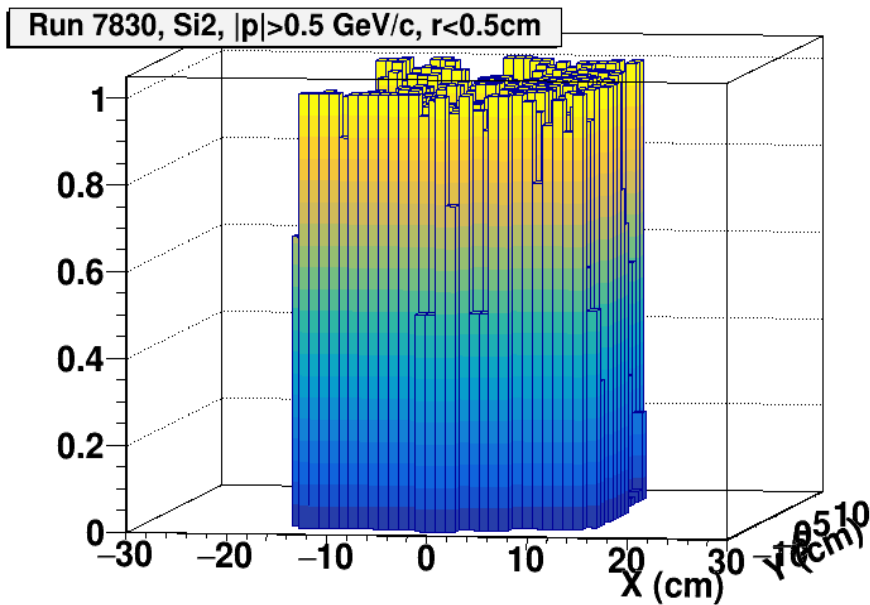
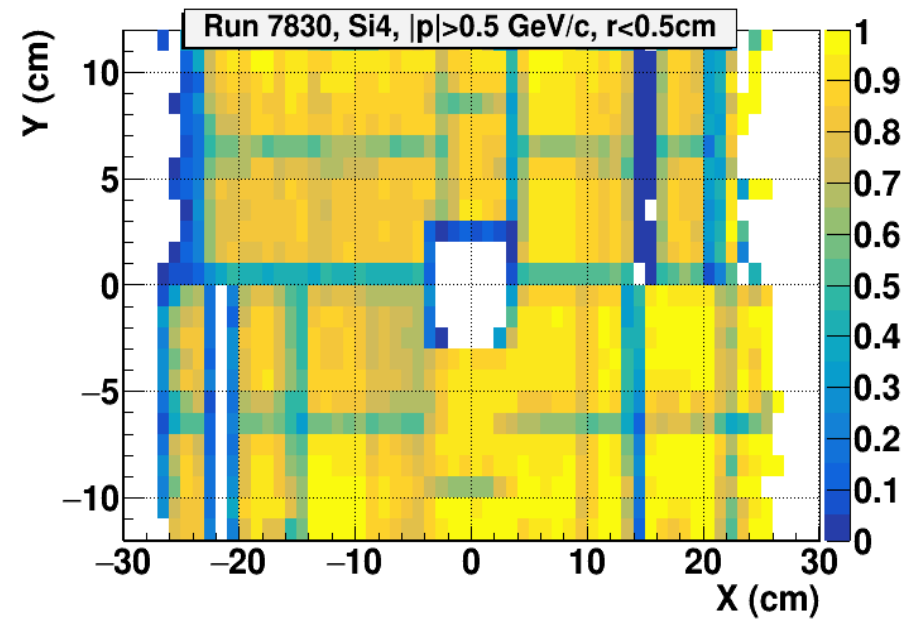
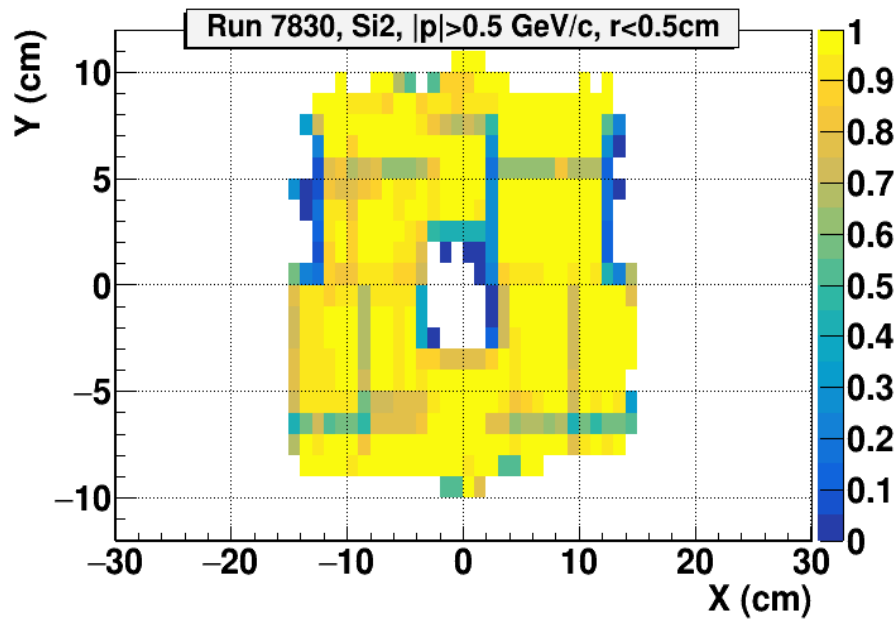
Detector efficiency (run 7830, 100k)



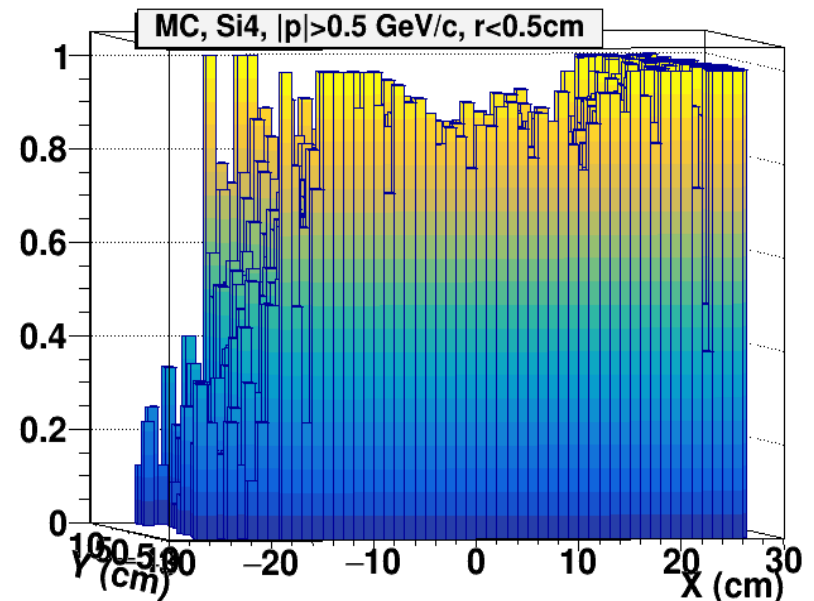
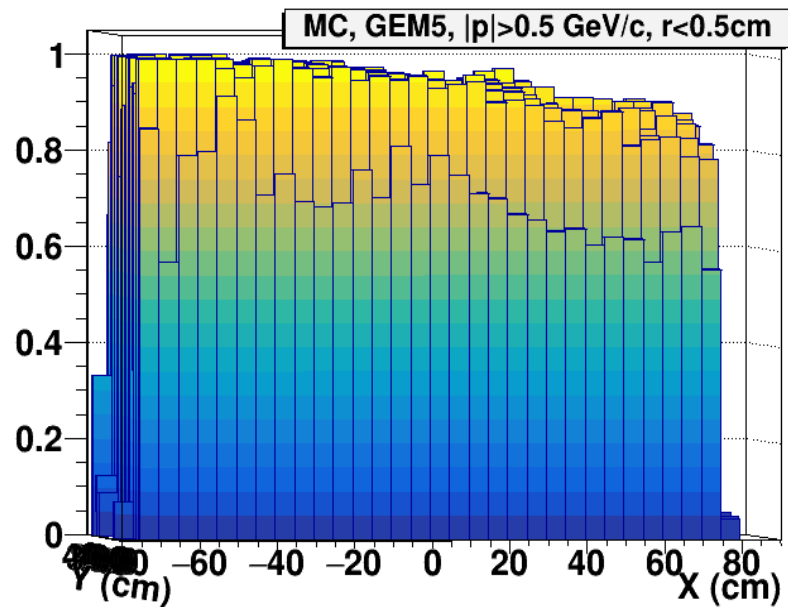
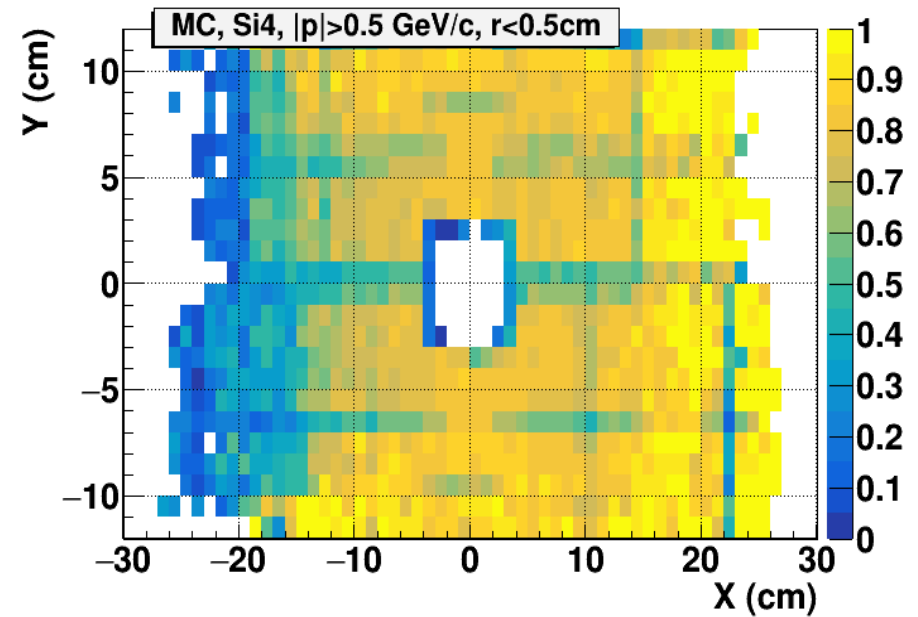
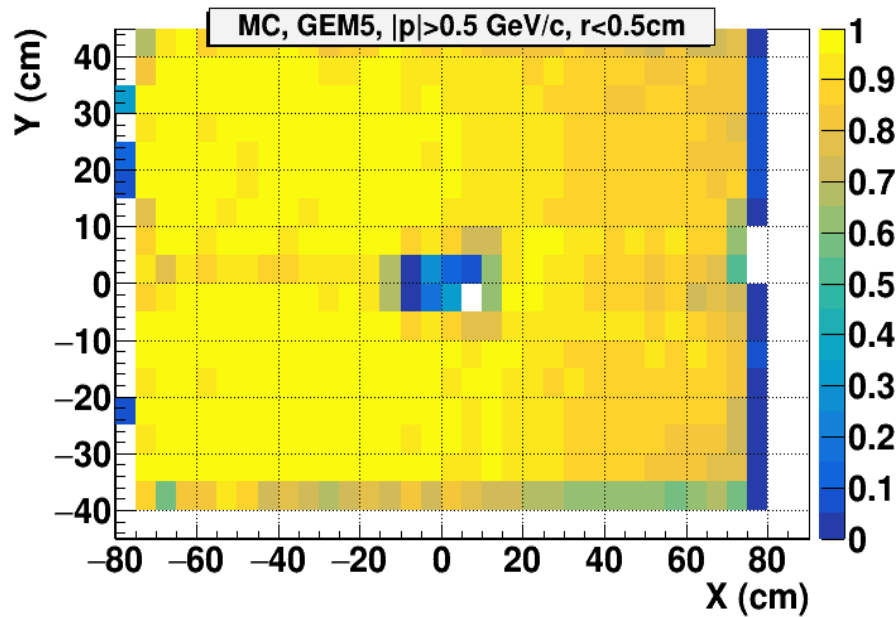
Detector efficiency (run 7830, 100k)



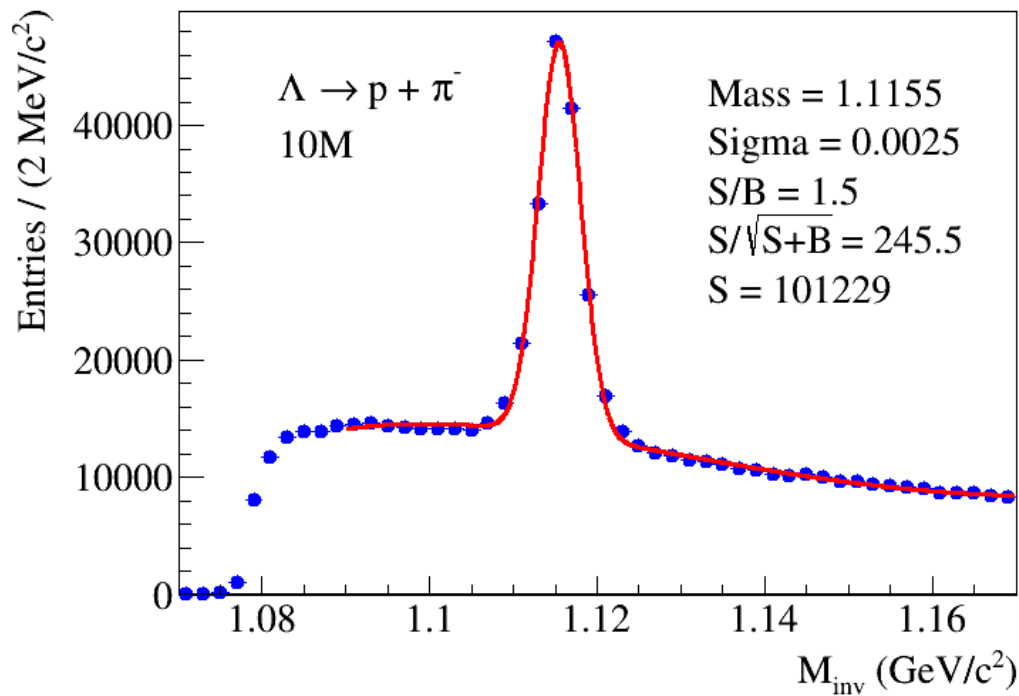
Detector efficiency (run 7830, 100k)



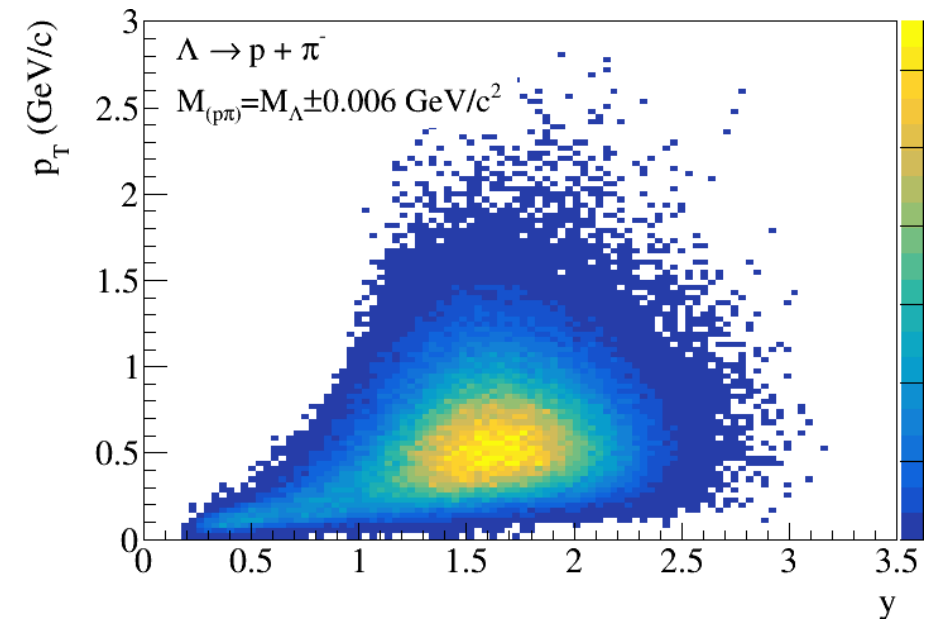
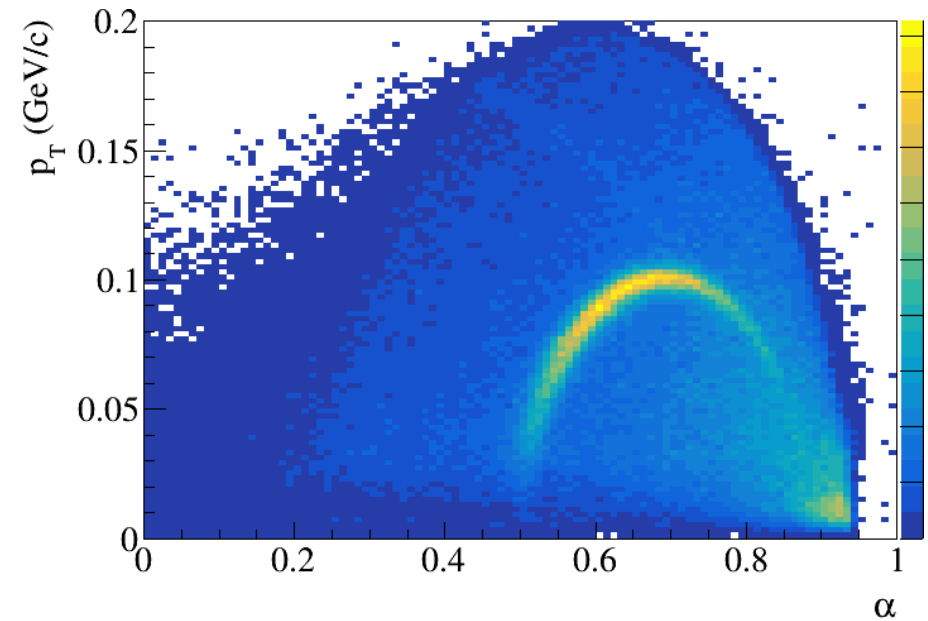
Detector efficiency (MC)



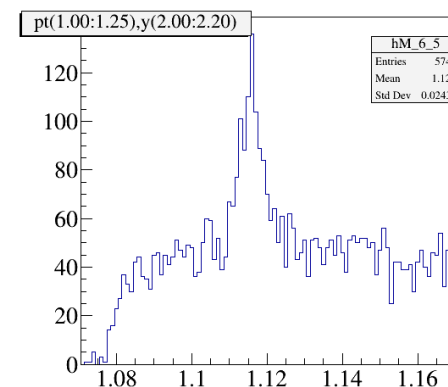
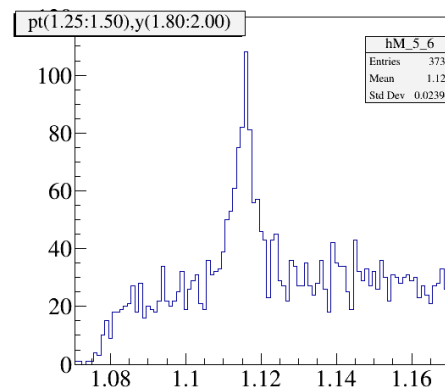
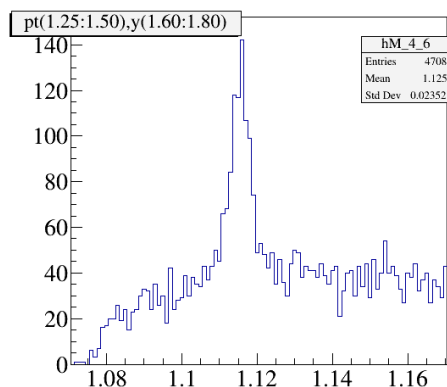
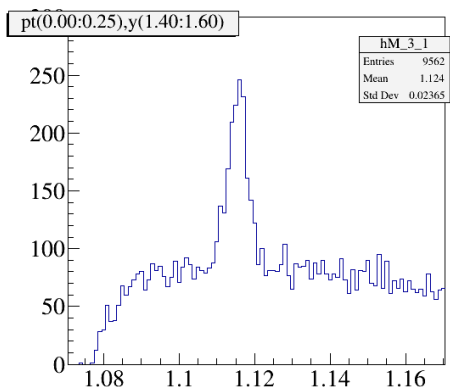
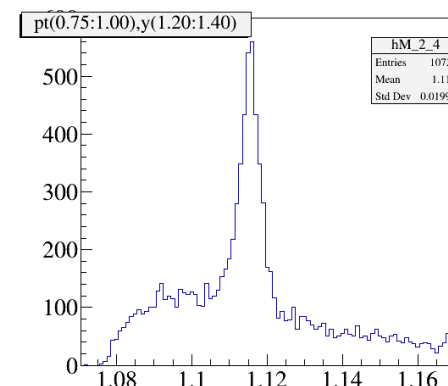
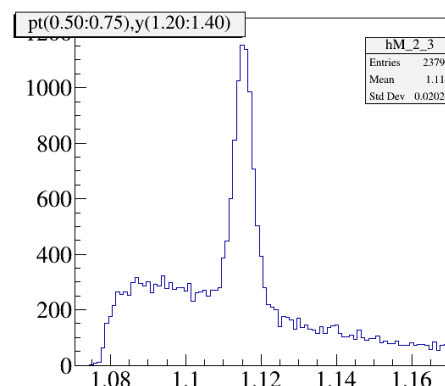
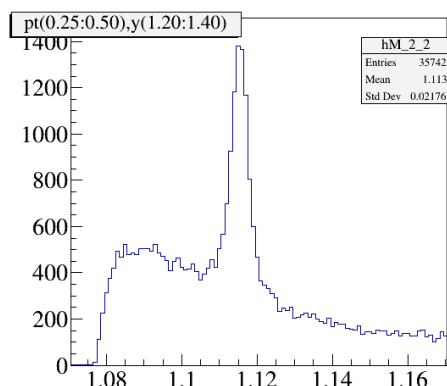
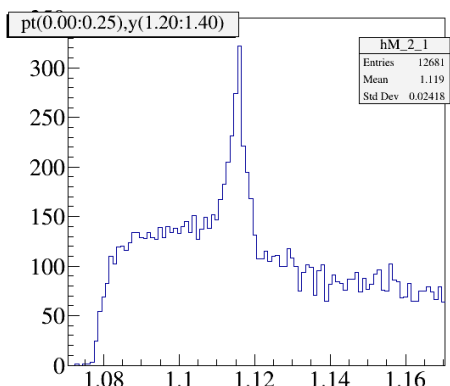
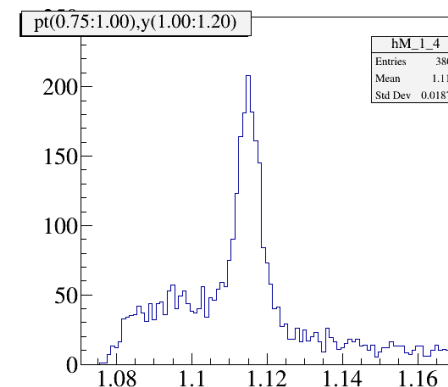
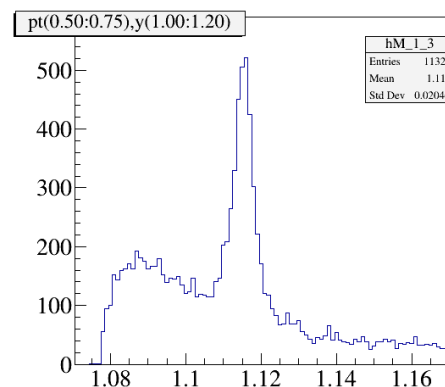
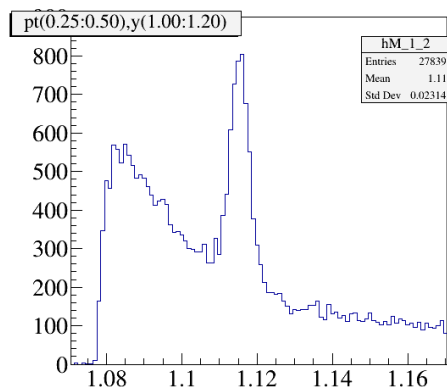
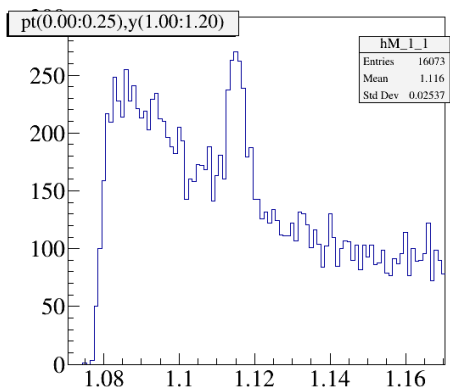
Λ reconstruction (10M)



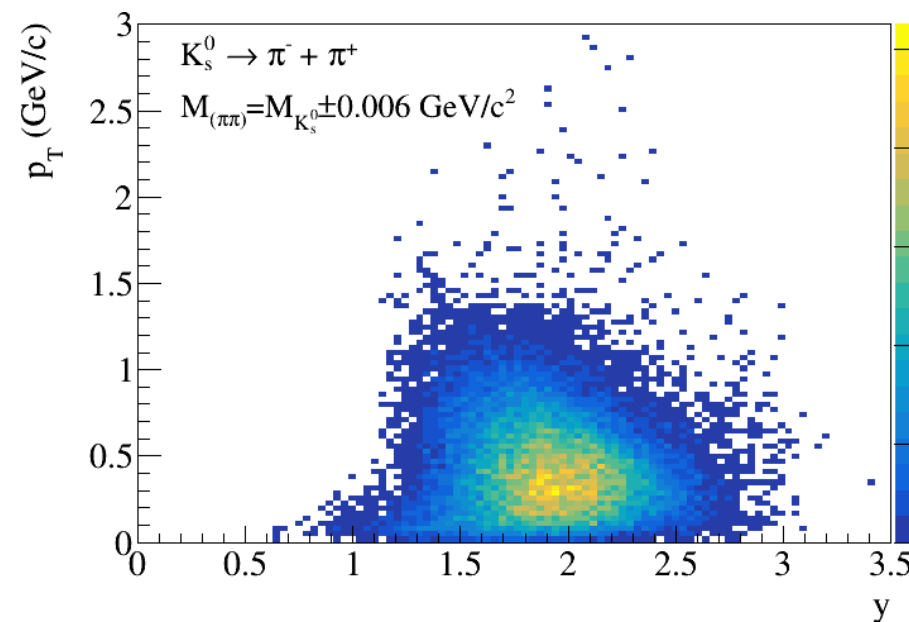
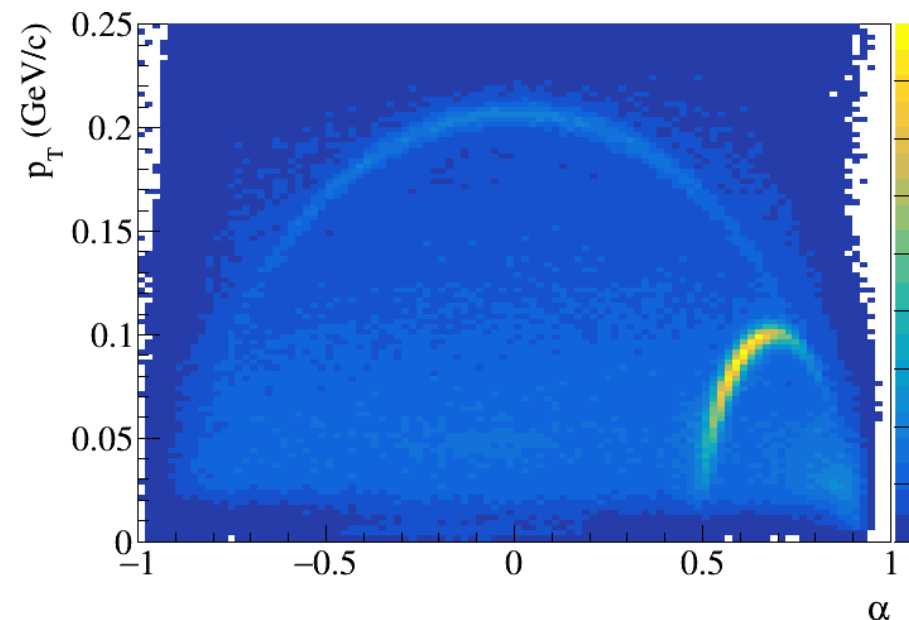
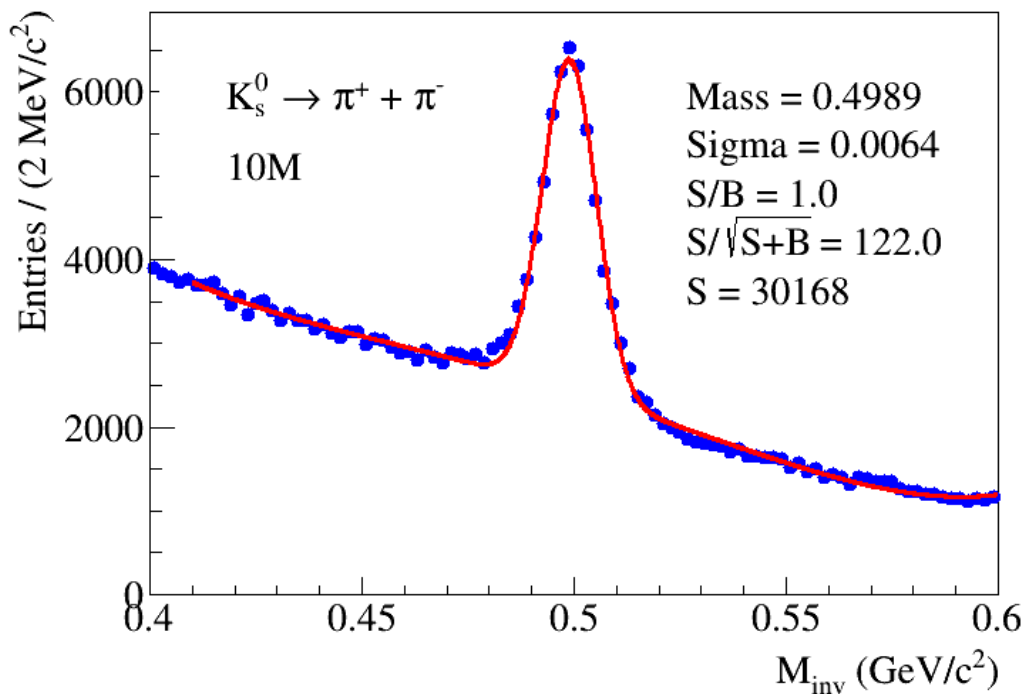
MC from 1 year ago: ~200000



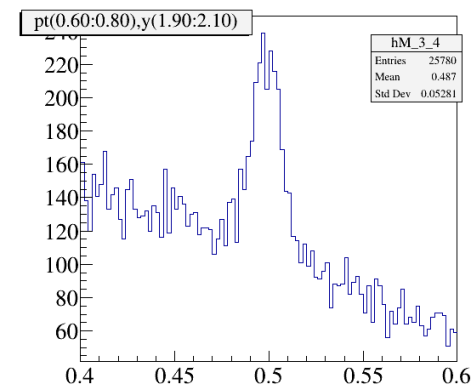
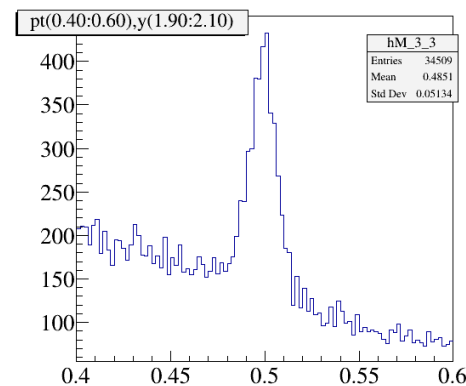
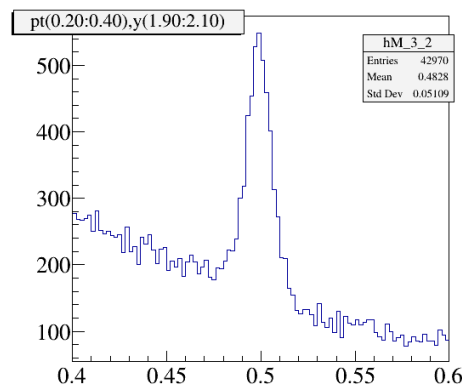
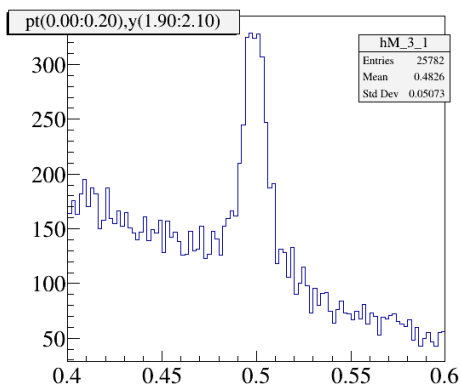
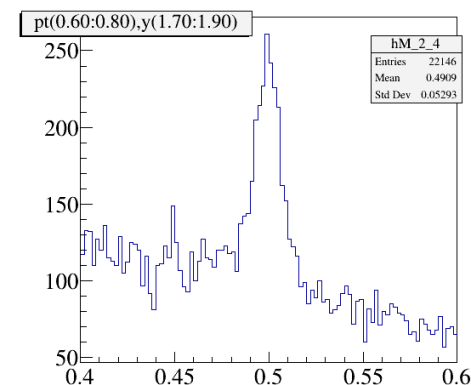
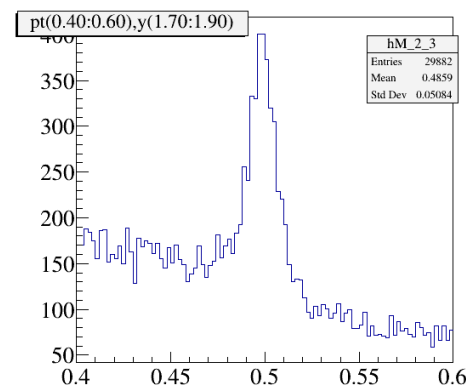
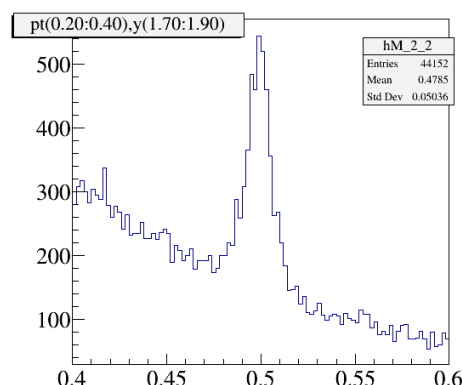
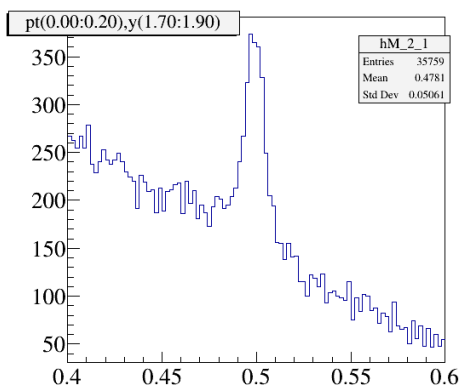
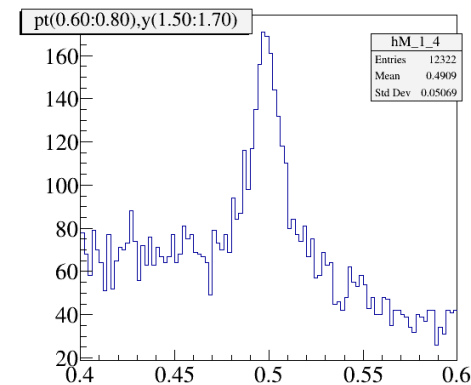
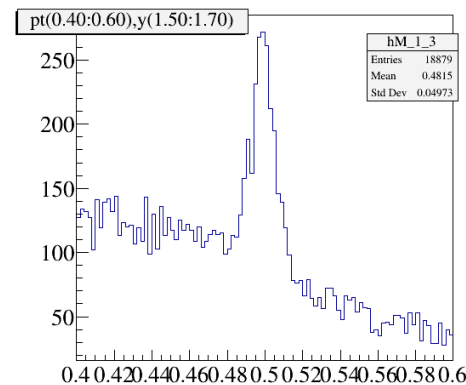
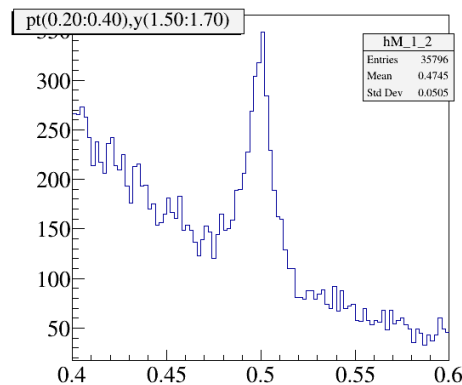
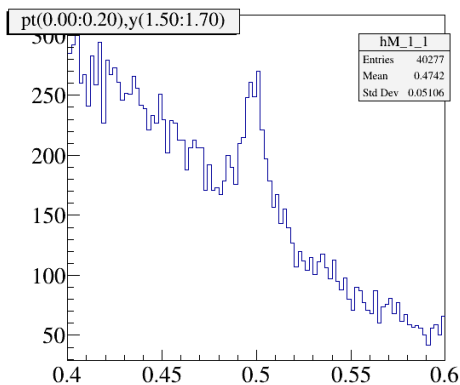
Λ invariant mass in pT-y bins

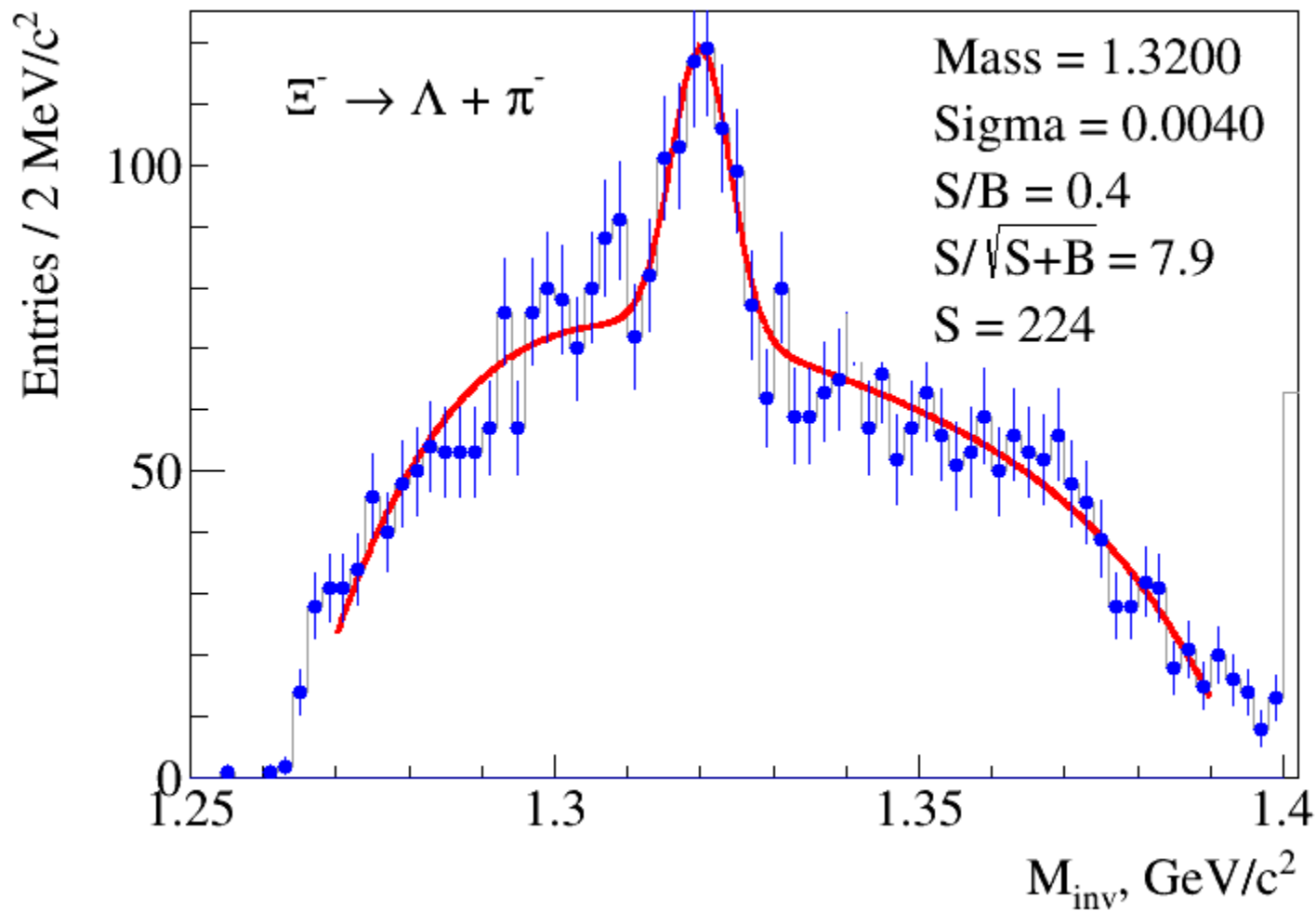


K_s^0 reconstruction (10M)



K_s^0 invariant mass in p_T - y bins



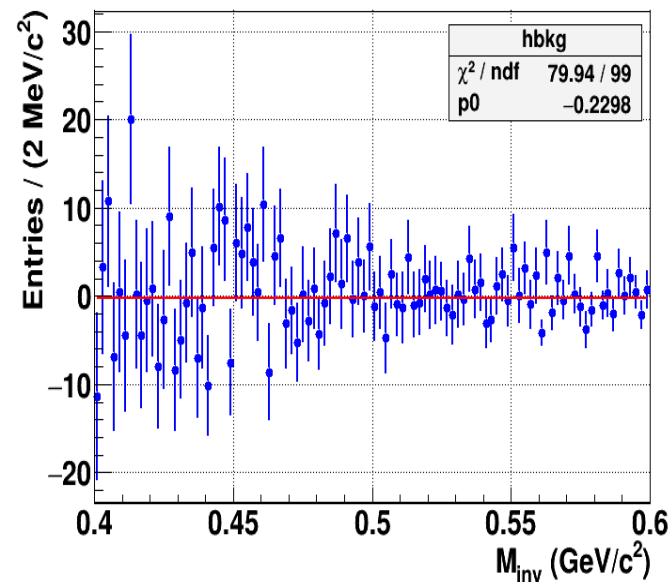
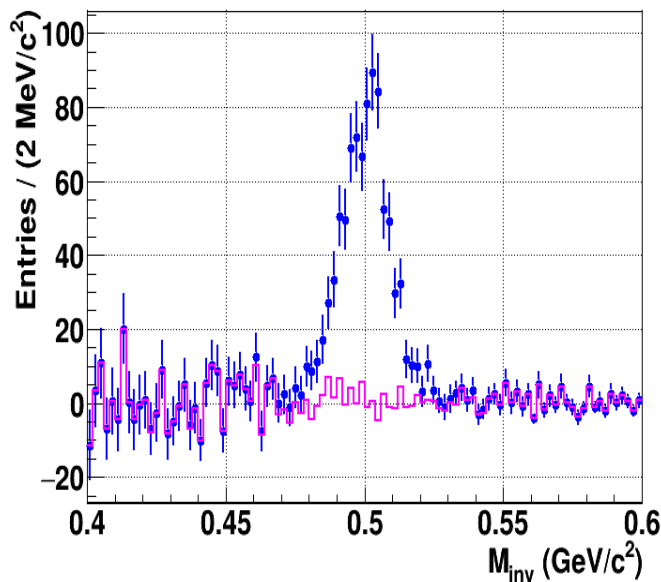
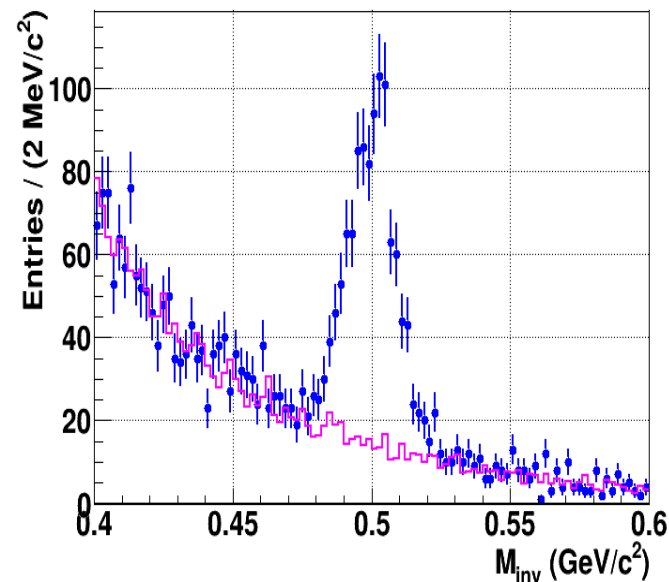
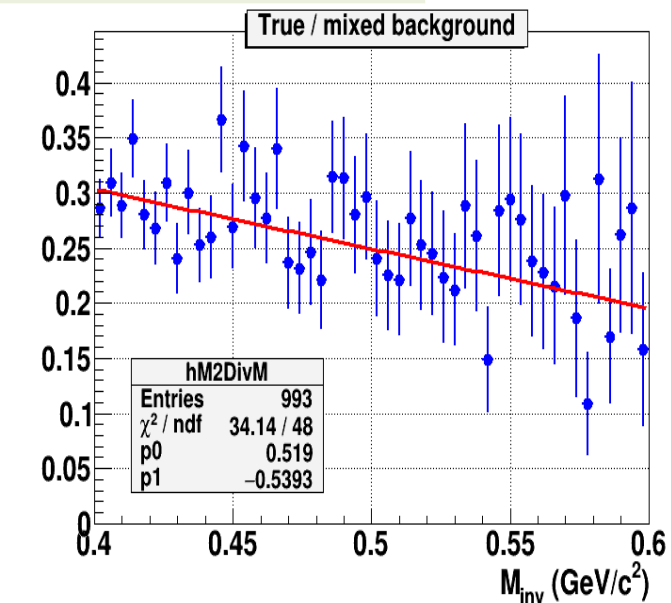
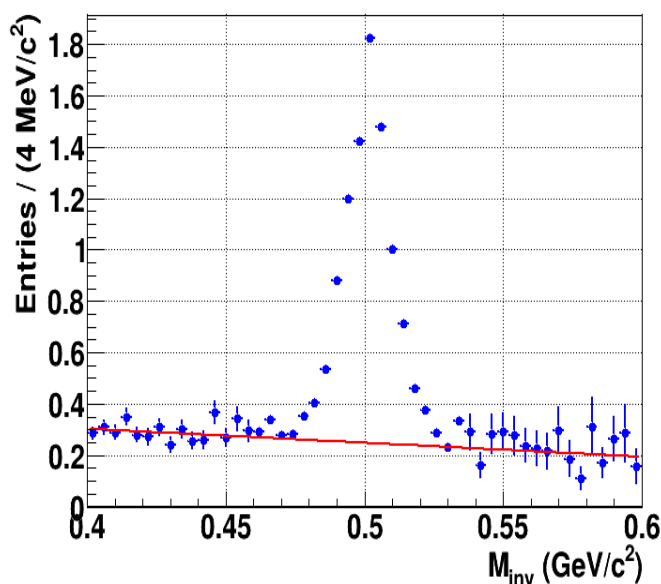
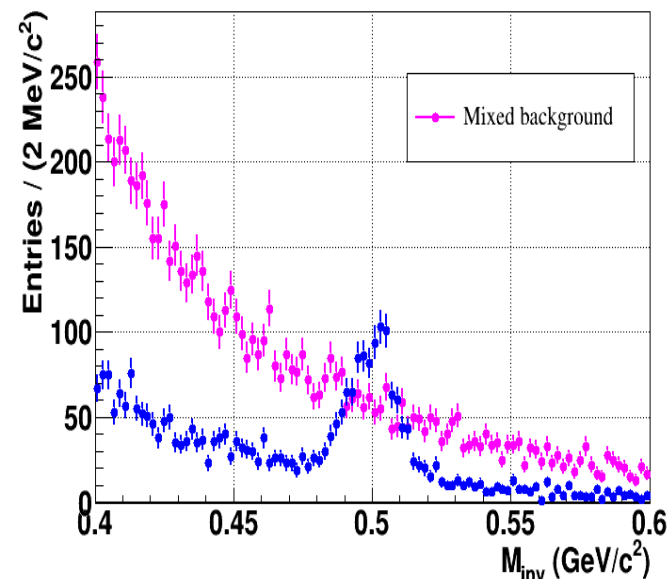


MC from 1 year ago: ~800

Event mixing for background estimation (MC)



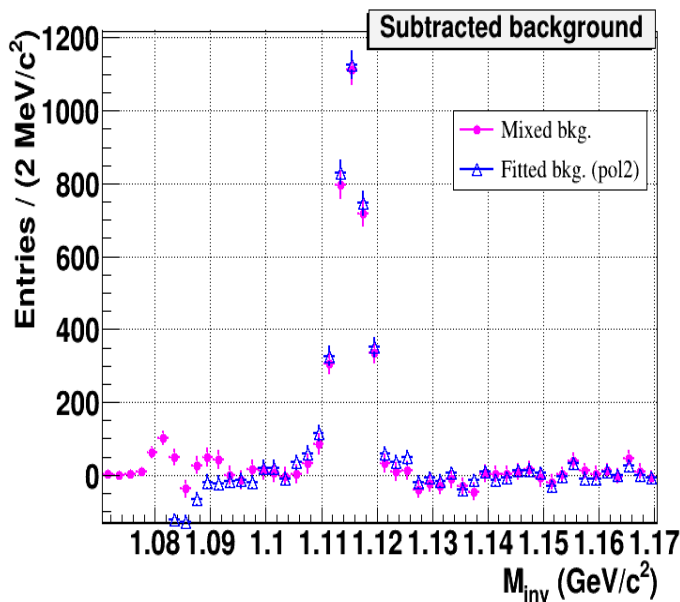
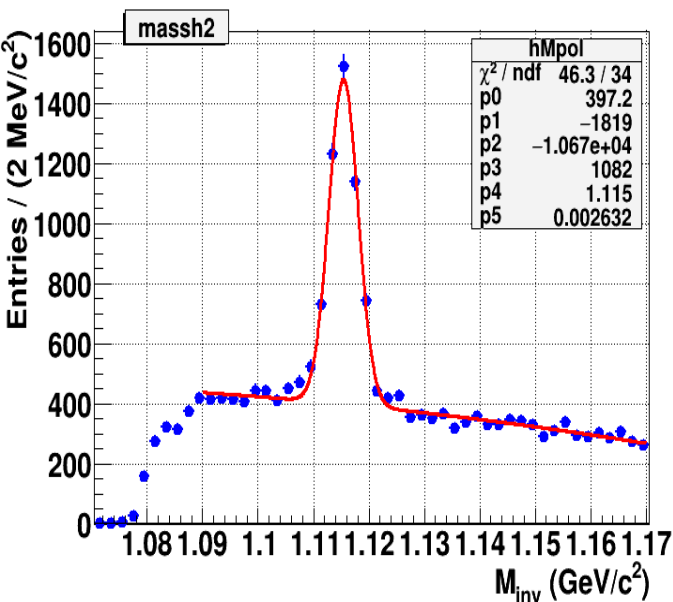
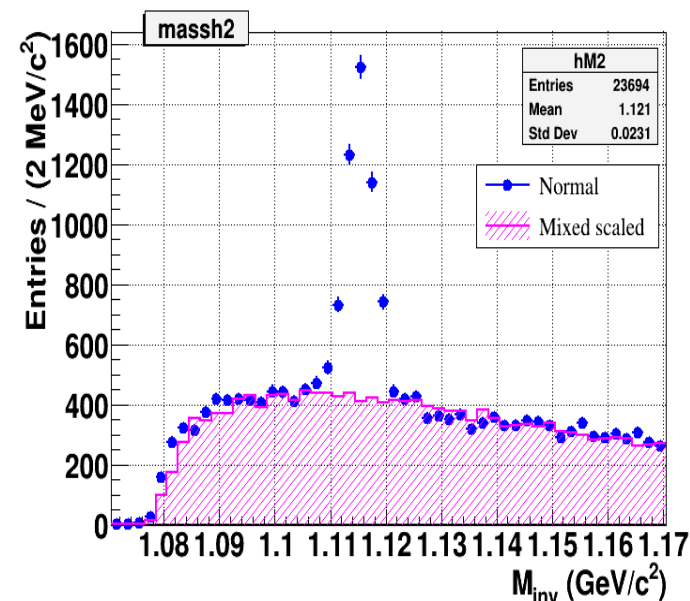
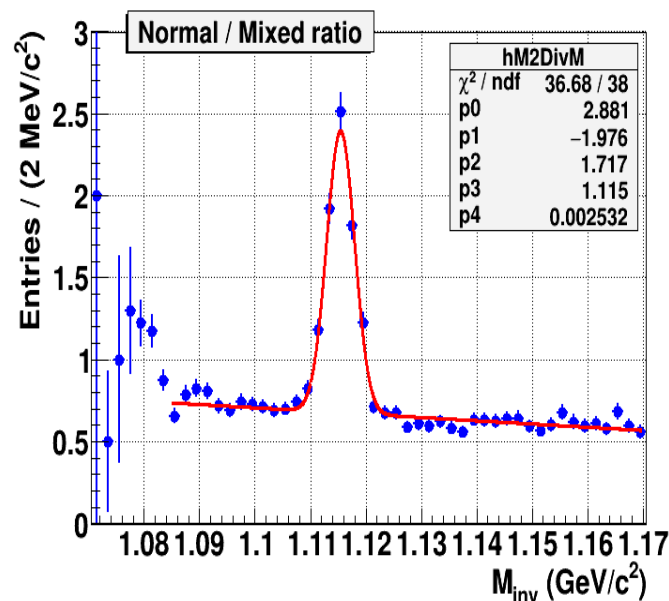
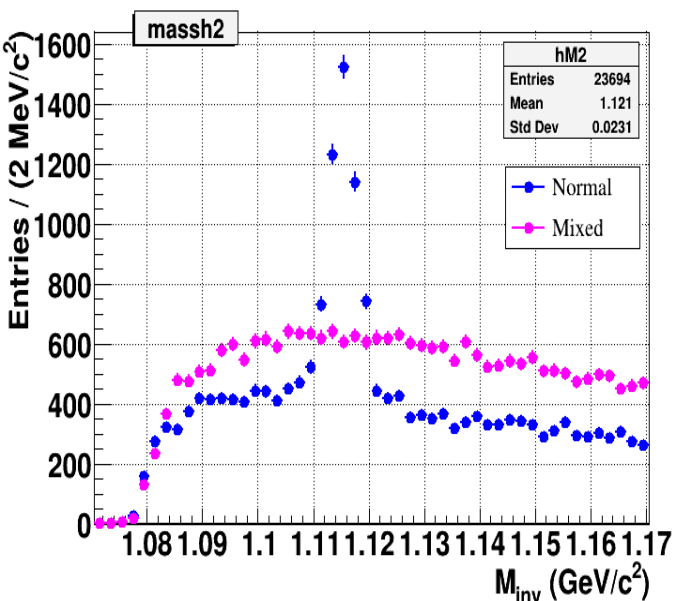
Adapted for BM@N by R.Zinchenko from MPD version by D.Suvarieva



Event mixing for background estimation (data)



Adapted for BM@N by R.Zinchenko from MPD version by D.Suvarieva (250k, run 7830)



- ✓ Vector Finder track reconstruction toolkit was optimized for BM@N setup
 - ✓ Detector alignment of ~ 150 μm in Si and ~ 500 μm in GEM was achieved
 - ✓ V0 reconstruction (Lambda and K0s) is working
 - ✓ Background subtraction procedure based on event mixing was implemented and tested on MC and real data
-
- ✓ Include in tracking one-dimensional (one-sided) hits
 - ✓ Possible alignment improvement
 - ✓ Add realistic effects to MC simulation (noise)