STATUS
Forward Tracking

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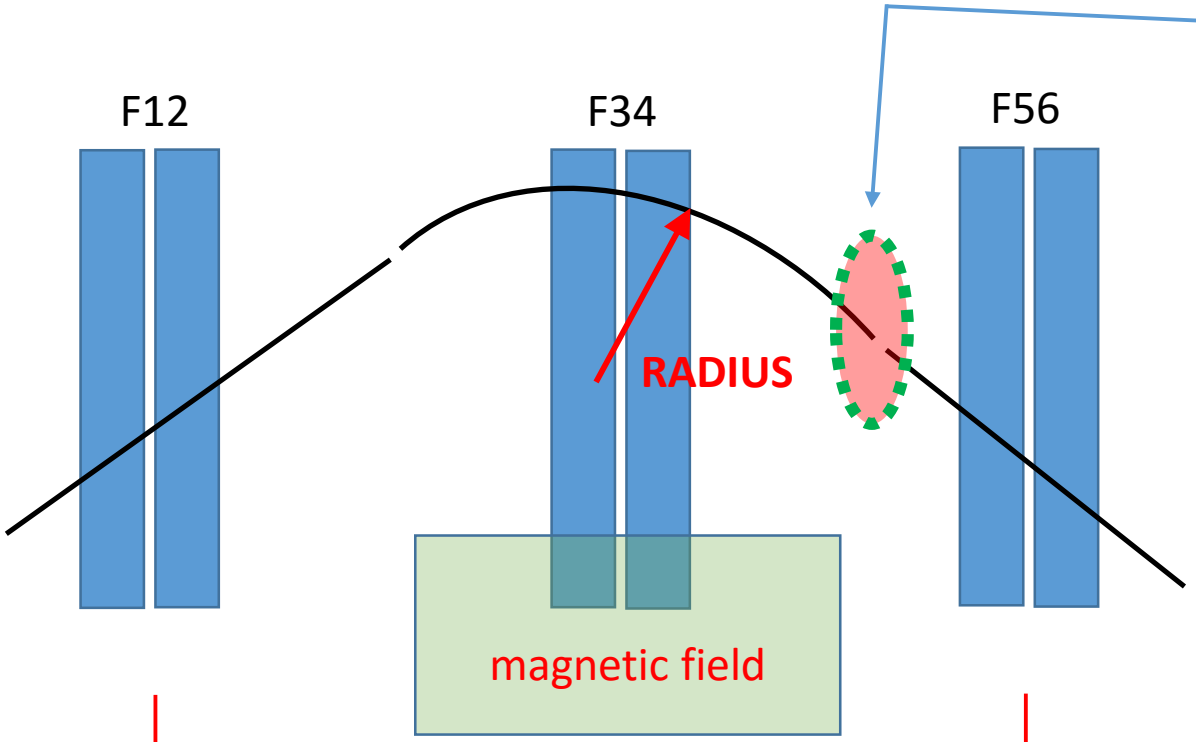
Test suite: MC simulations

- **1, 3 or 5 miuon tracks**
  - **constant momentum: 0.55, 2.55, 5.55 GeV/c**
- **Evaluation of track candidate to be passed to Kalman filter**
- **Implementation into PandaROOT**

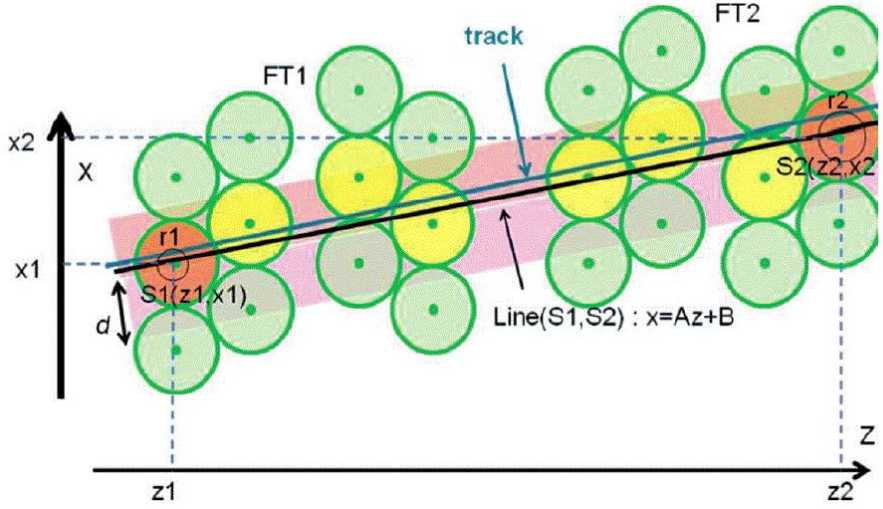
→ for details, see TDR document prepared by Jerzy Smyrski

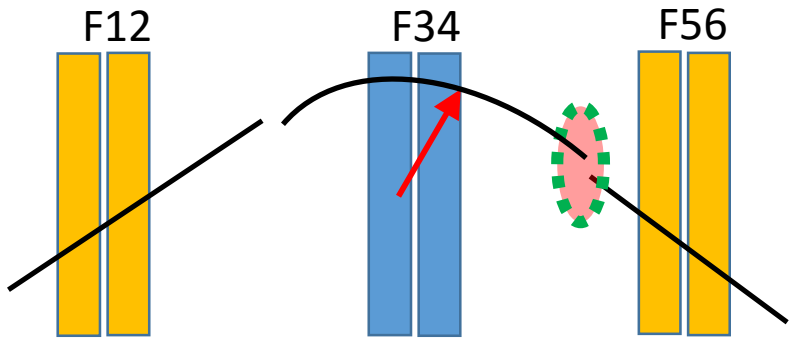
Detector scheme

- stand alone track candidate program (written by Joanna Plazek) before implementation to PandaROOT

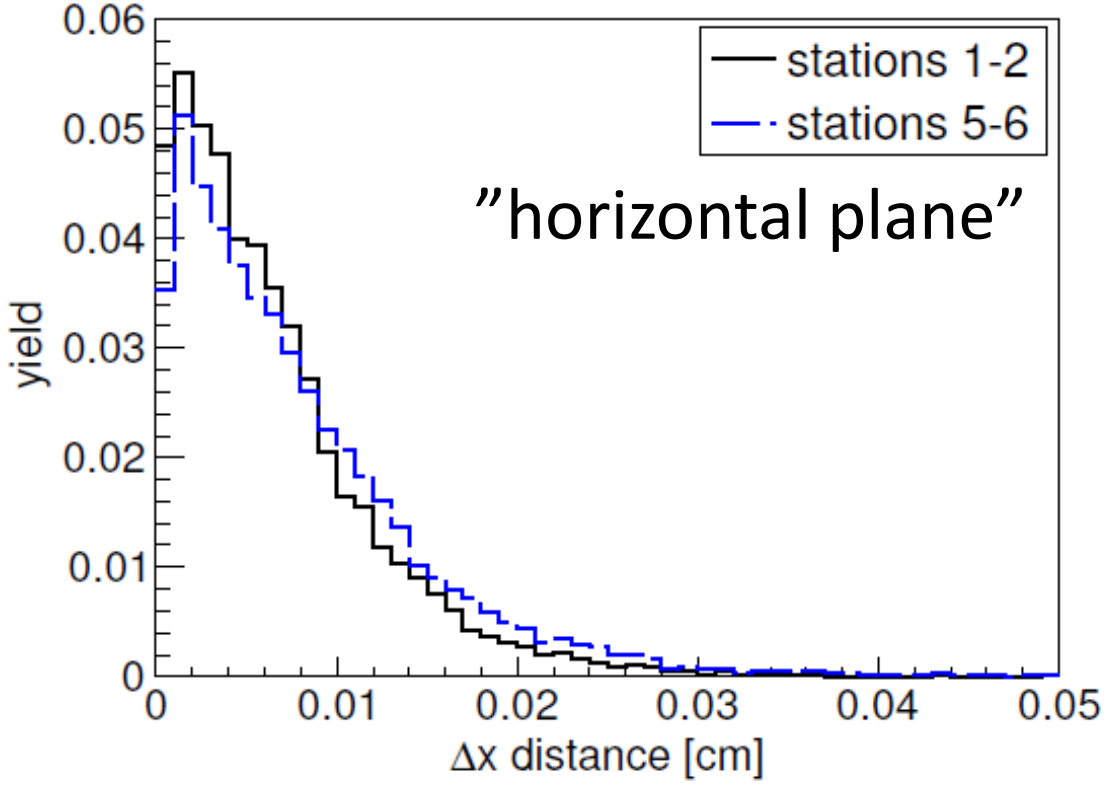


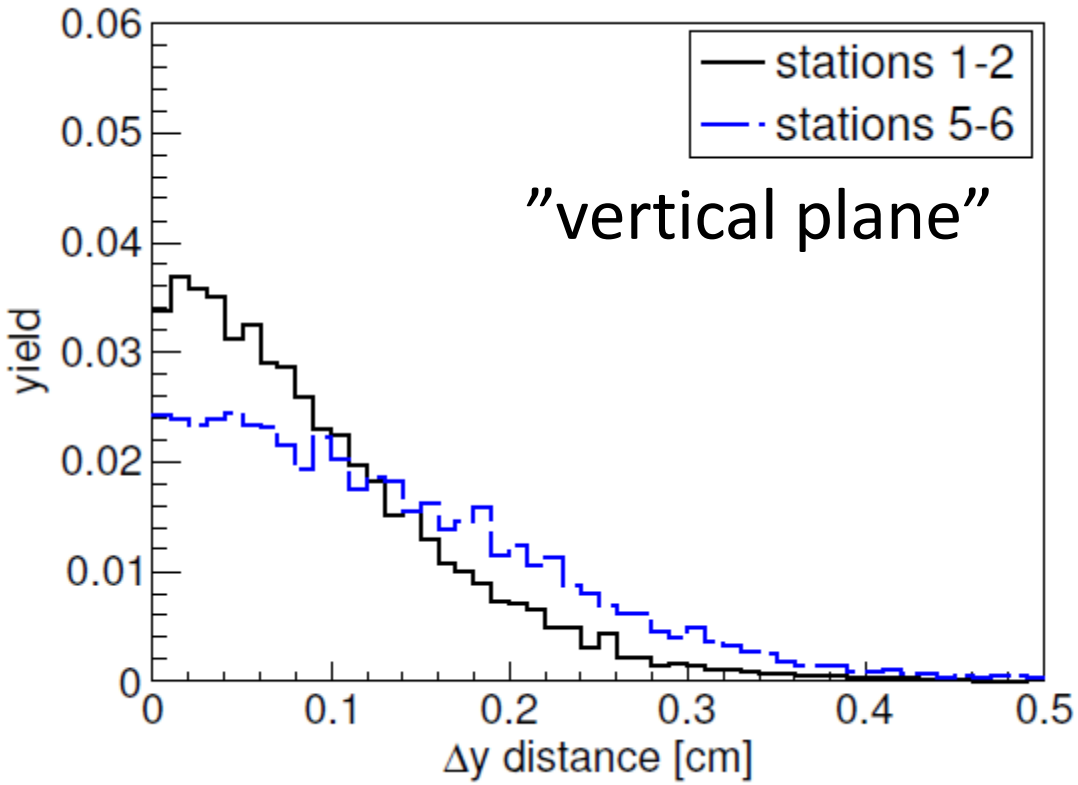
”horizontal plane”

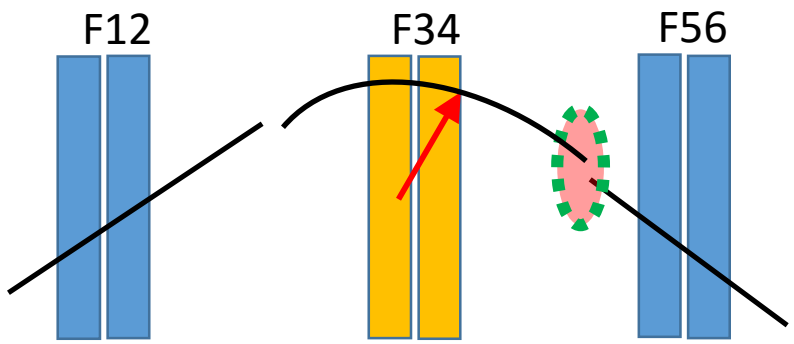




1 track (constant 2.55 GeV/c) distance within the straws (MC-REC)

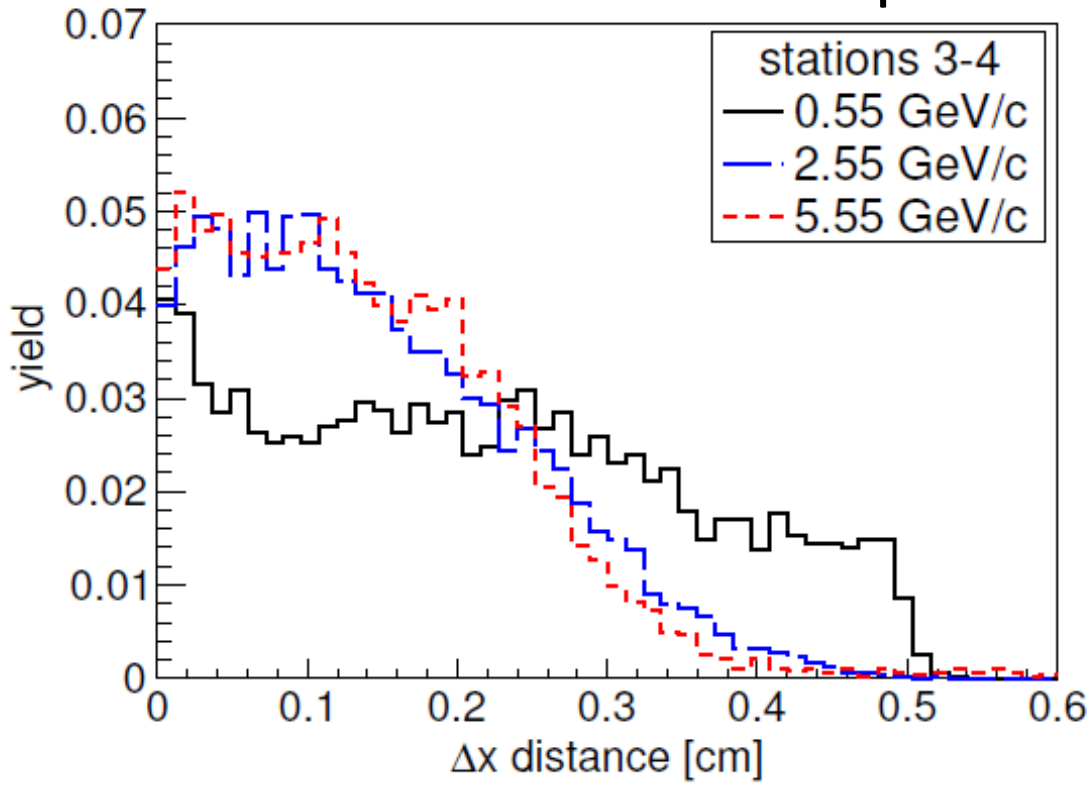




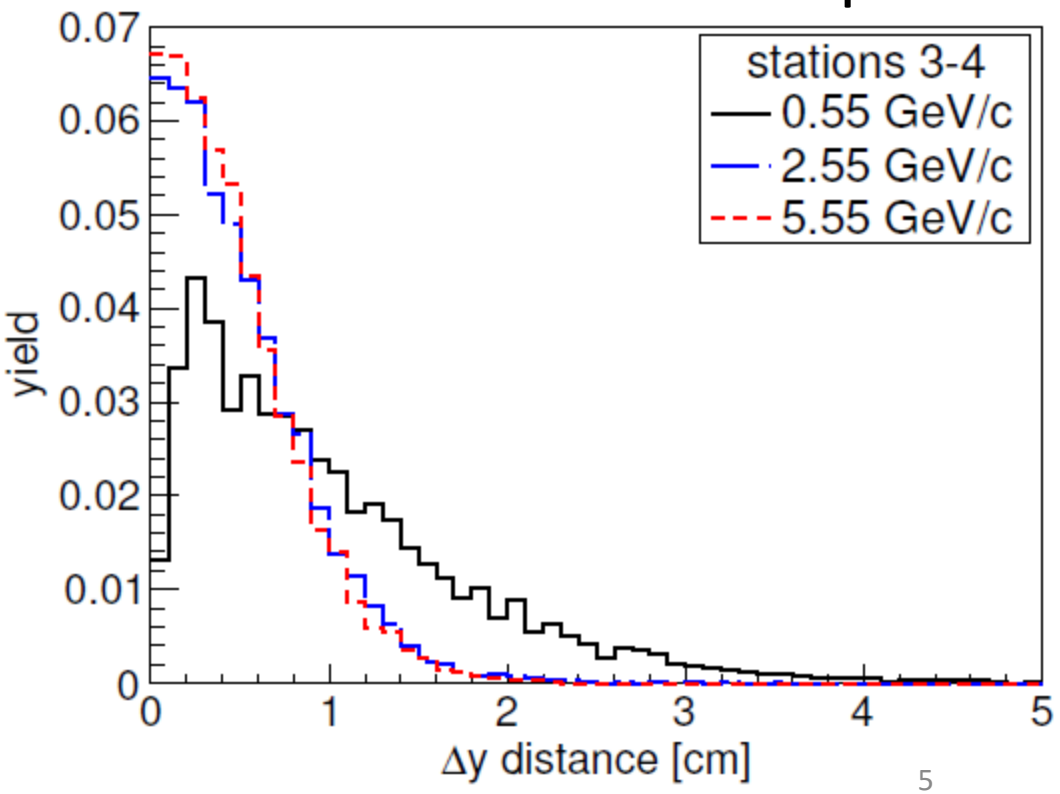


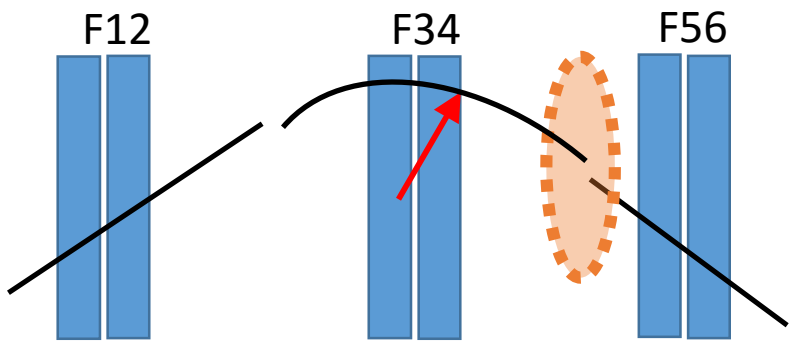
1 track (constant 2.55 GeV/c) distance within the straws (inside magn. field)

”horizontal plane”

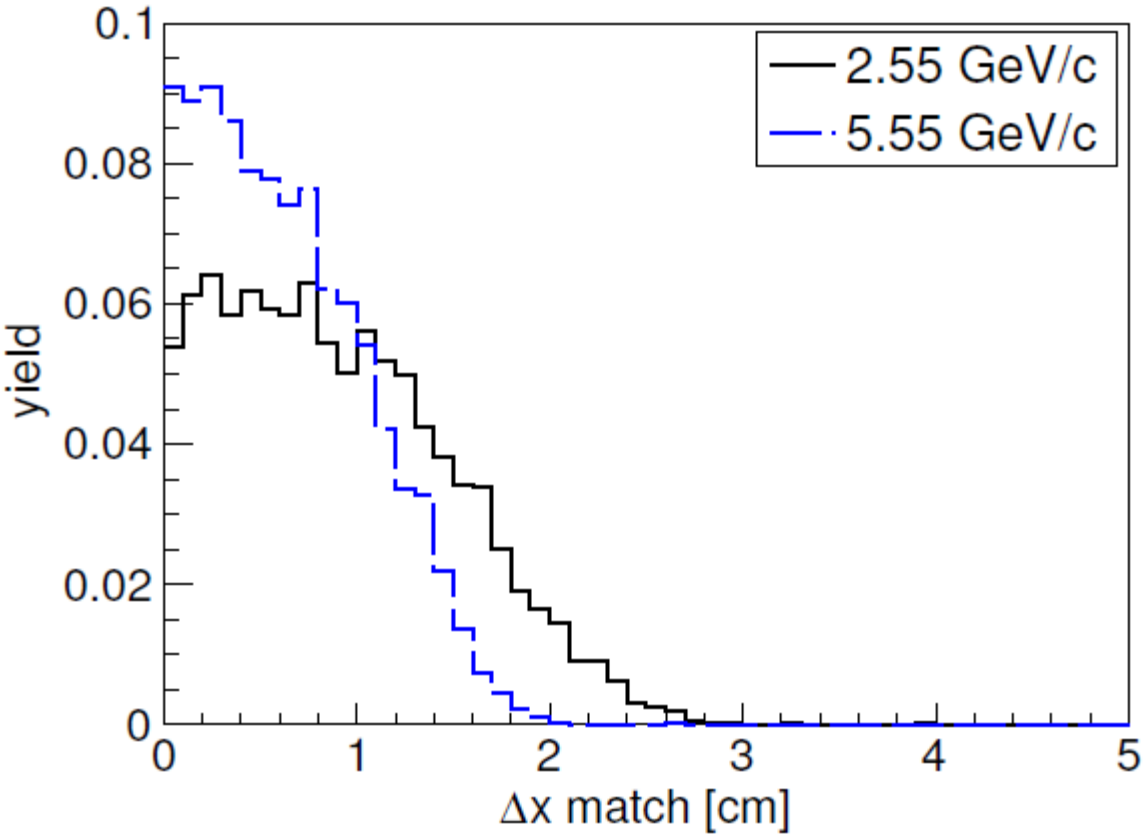


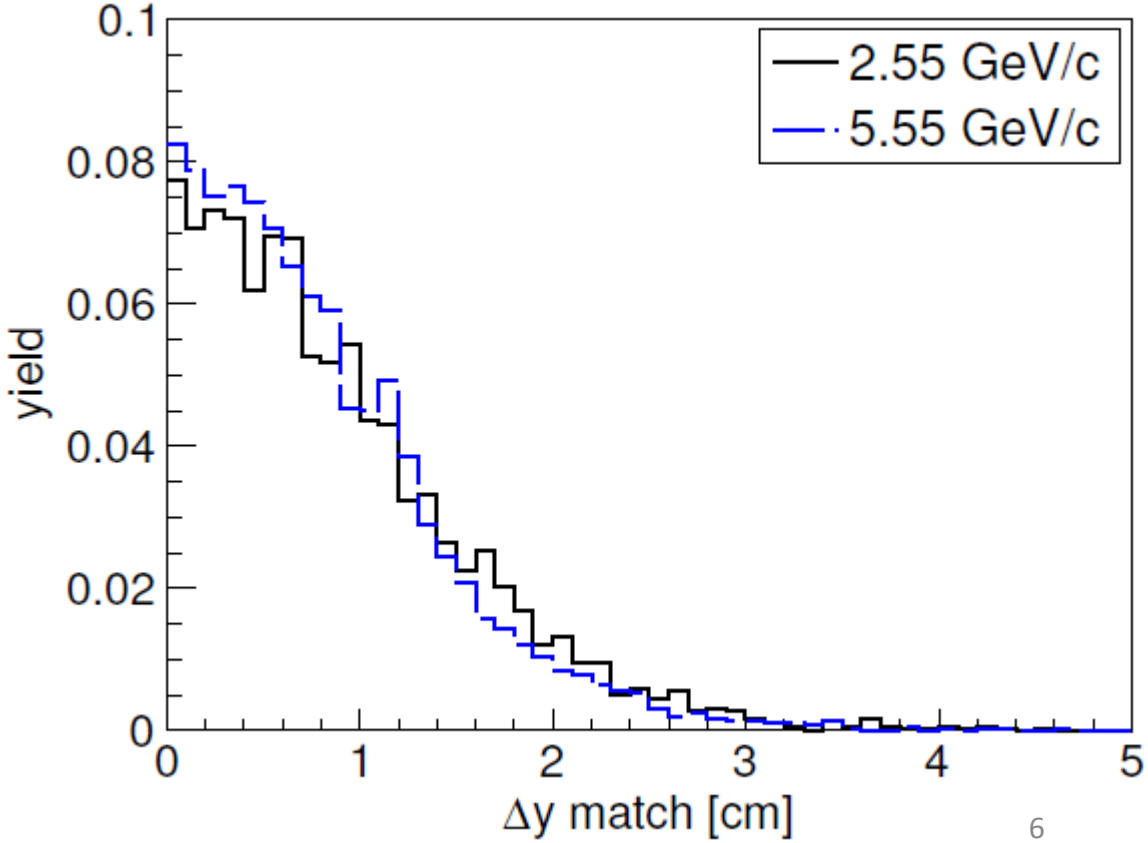
”vertical plane”



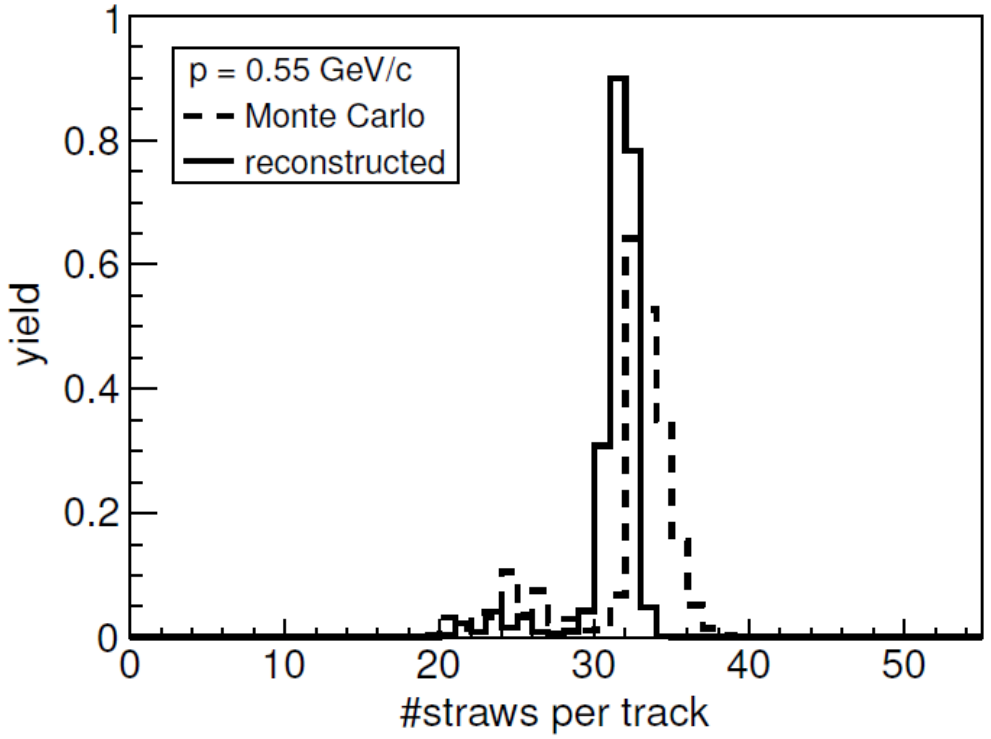


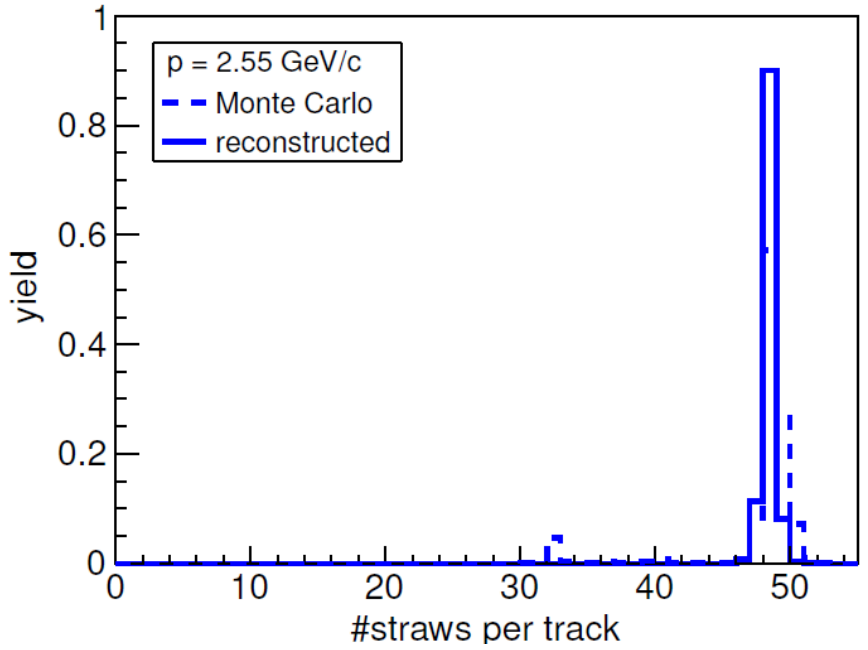
Matching (1234-56) (p = 2.55, 5.55 GeV/c)

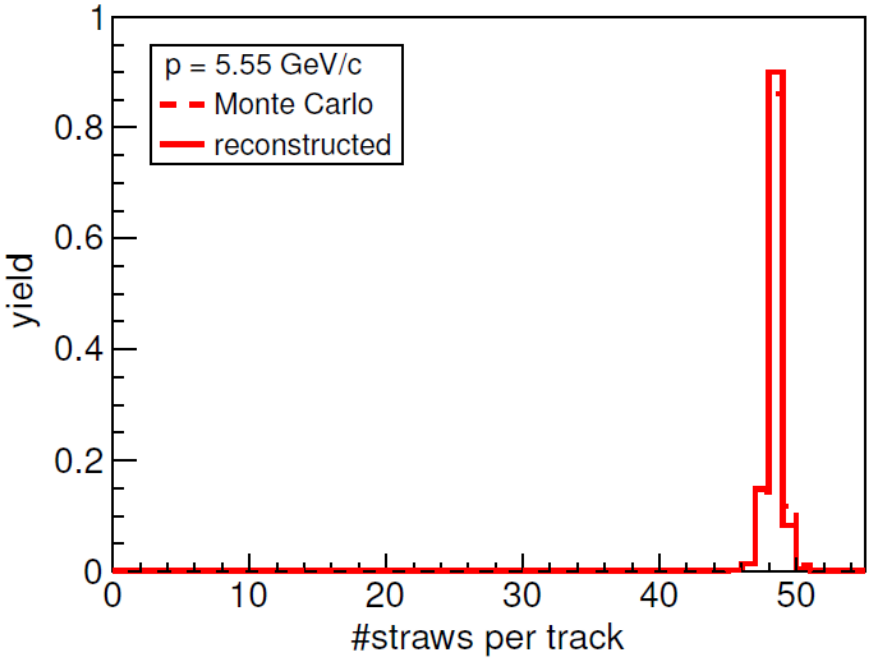




Number of straws per track (1234) (p = 0.55 GeV/c)

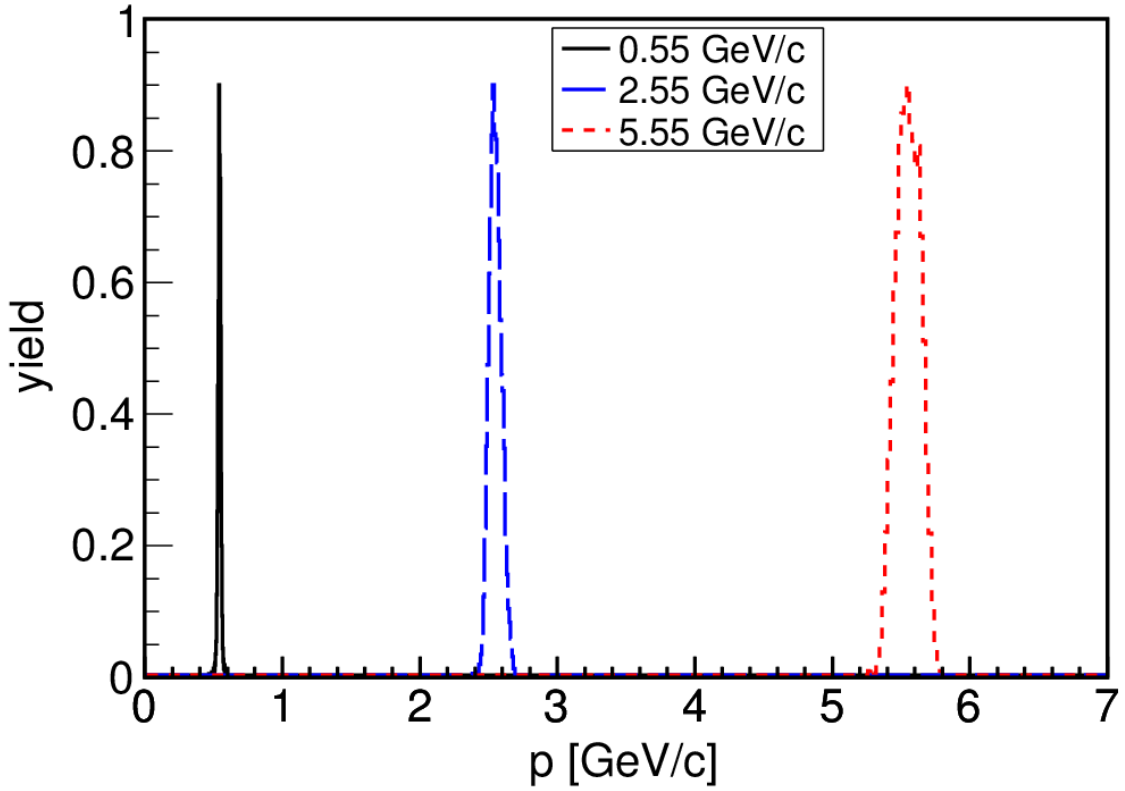






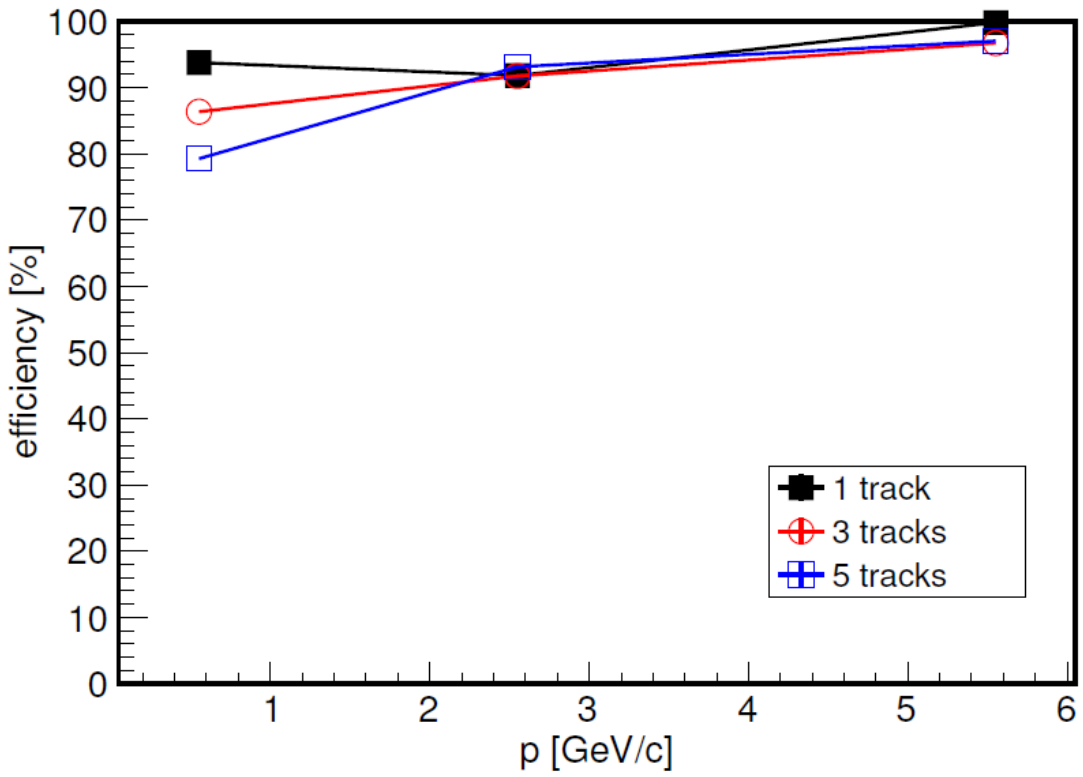
straws per track (12345) (p = 2.55, 5.55 GeV/c)

Reconstructed momenta (0.55, 2.55, 5.55 GeV/c)



$$\frac{\sigma}{p_{mean}} \sim 1.5 - 2\%$$

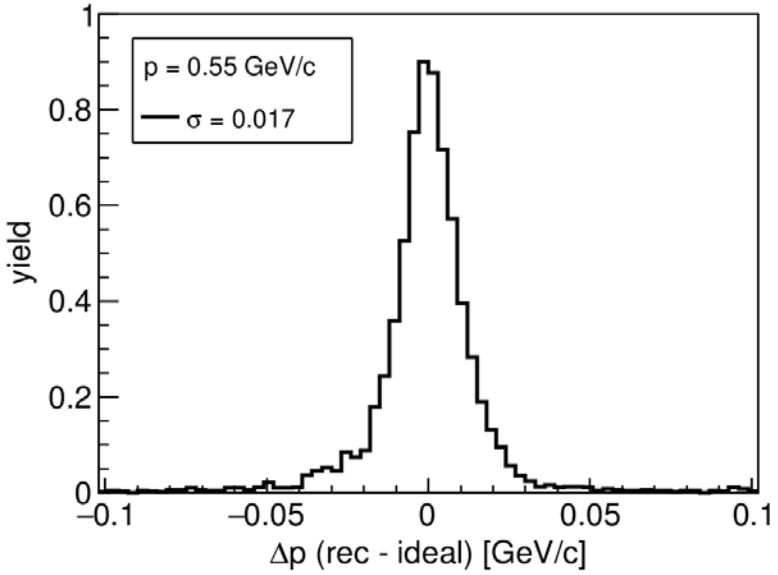
Algorithm efficiency (1, 3, 5 tracks)

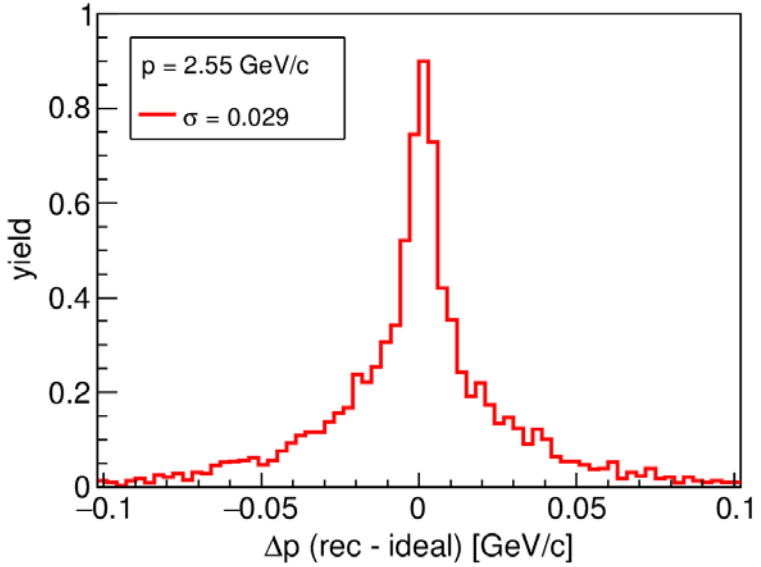


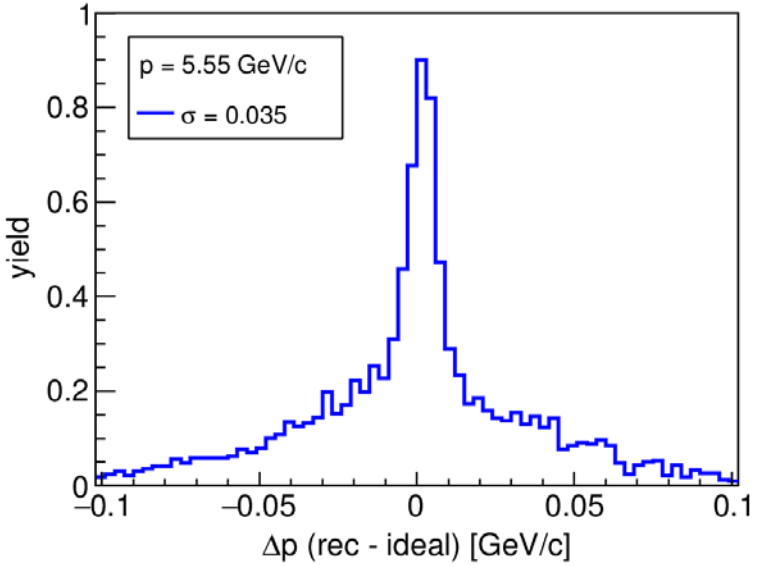
→ **algorithm capable to deliver track candidate**

Momentum reconstruction $\theta \in (2.5^o - 5^o)$

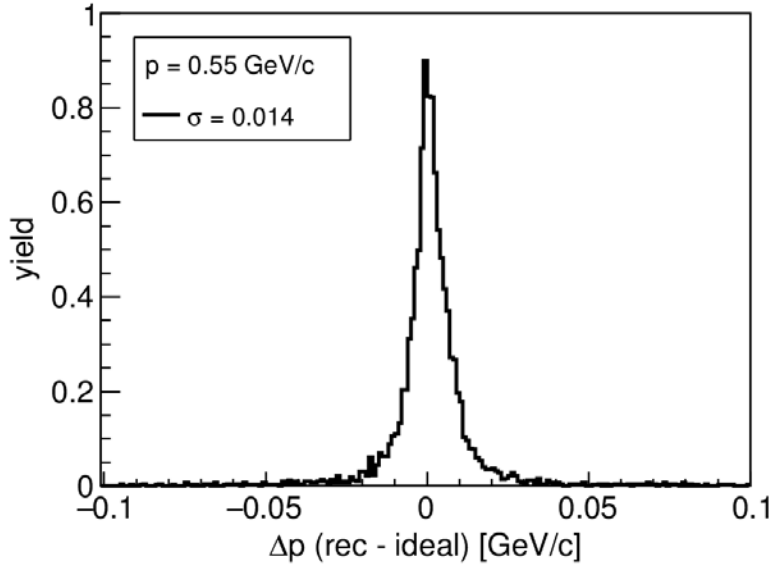
$$\Delta p = |\vec{p}_{rec}| - |\vec{p}_{ideal}|$$

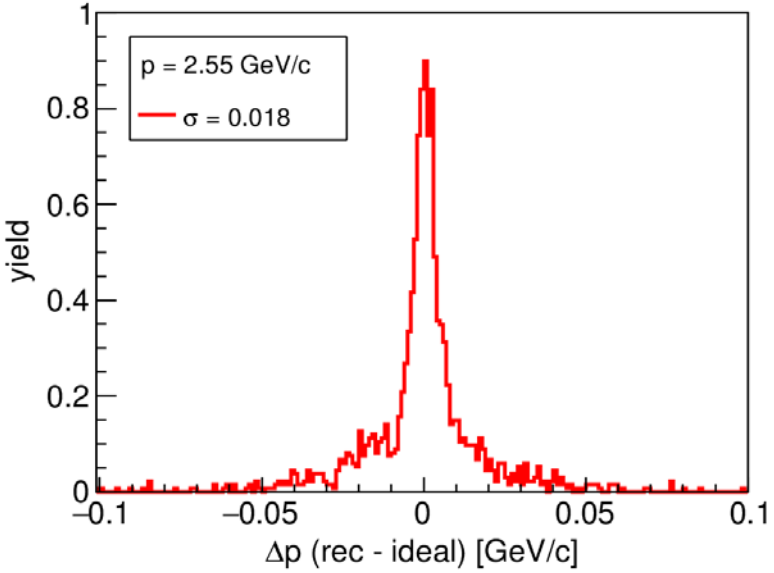


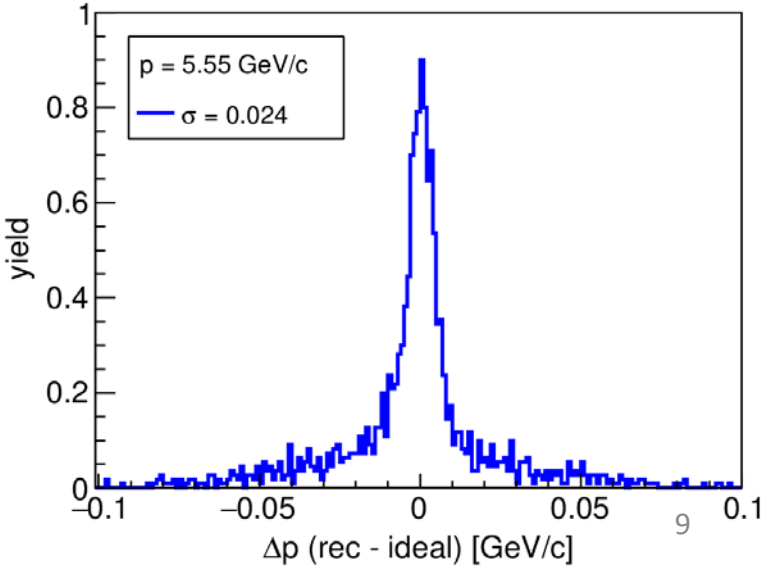




beam pipe +



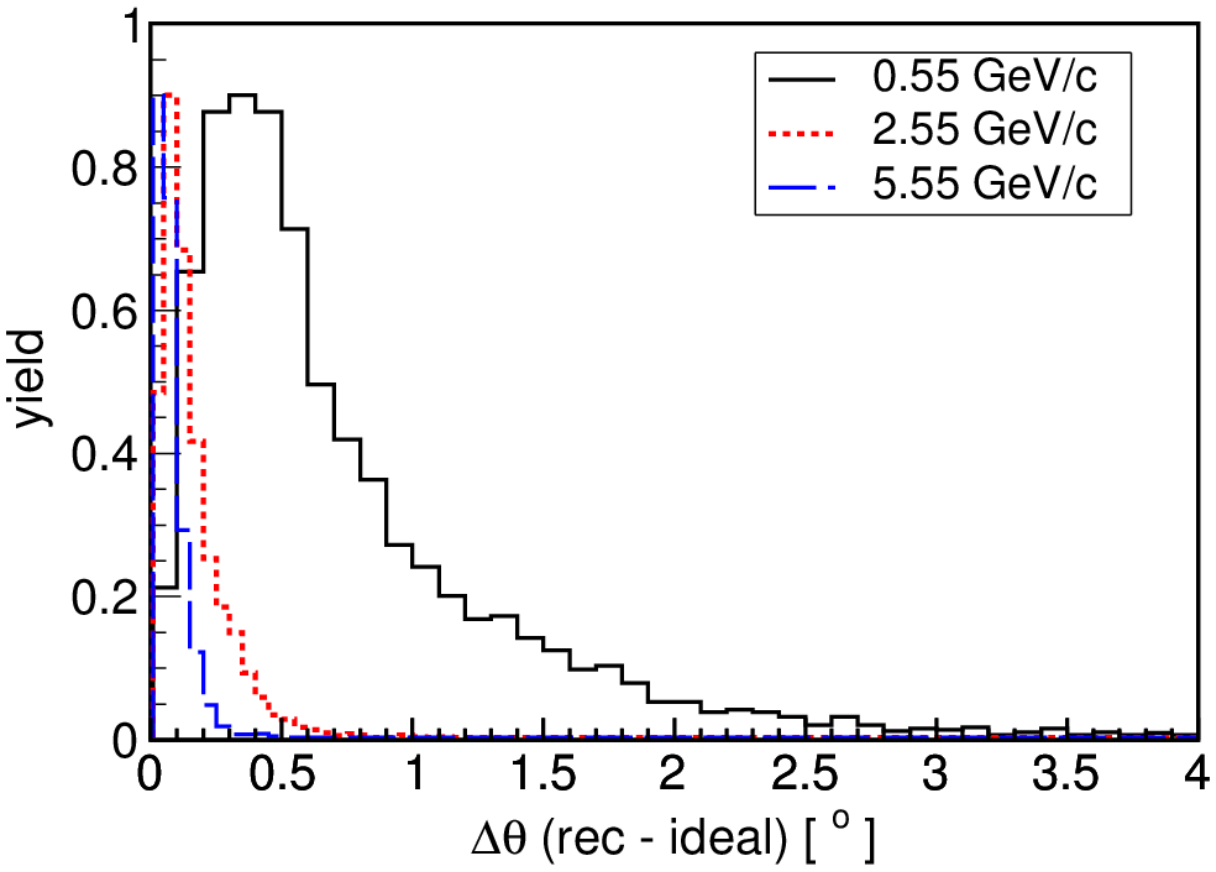




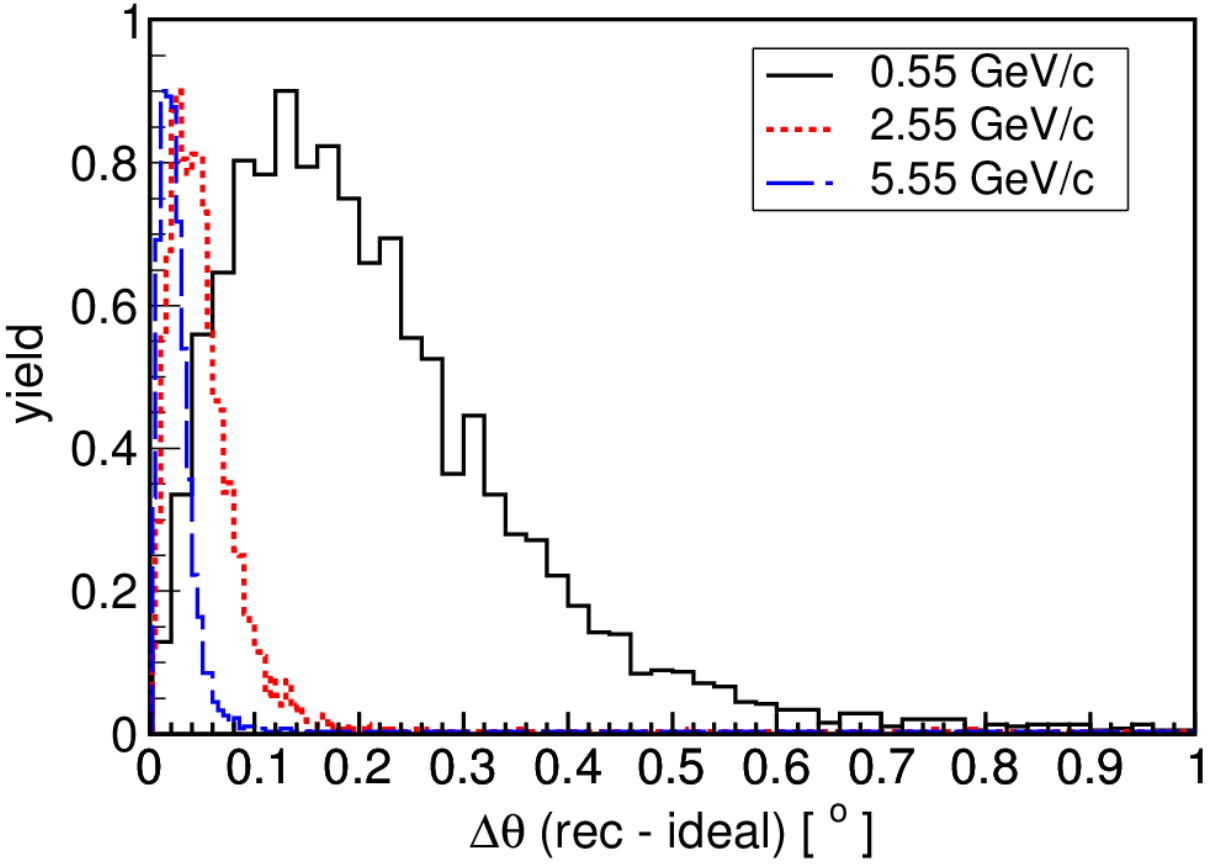
beam pipe –

Opening angle $\sphericalangle\,|\theta(rec - ideal)|$

beam pipe +



beam pipe –



Efficiency / ghost / clone evaluation

$$e = \frac{N_{REC}}{N_{MC}}$$

$$e = \frac{N_g}{N_{MC}}$$

$$c = \frac{N_c}{N_{MC}}$$

p (GeV/c)	Track mult.	Recon. eff.	Ghost fract.	Clone fract.
0.55	1	96%	9%	0%
0.55	3	97%	9%	9%
0.55	5	98%	9%	17%
2.55	1	92%	6%	0%
2.55	3	93%	5%	1%
2.55	5	92%	5%	1%
5.55	1	97%	2%	0%
5.55	3	96%	3%	0%
5.55	5	95%	3%	1%

Summary

- track candidate finder performance evaluated
- track identification efficiency in most cases > 90%
- reconstructed momentum with 1σ ~ 1.5-2% (mom. dependent)
- the code implemented into PandaRoot (based on the PndFtsTrackerIdeal reconstructor)
- performance evaluation
- TO DO: code cleaning / refactoring / releasing some hard-wired limitation (i.e. max nr of straws per track)