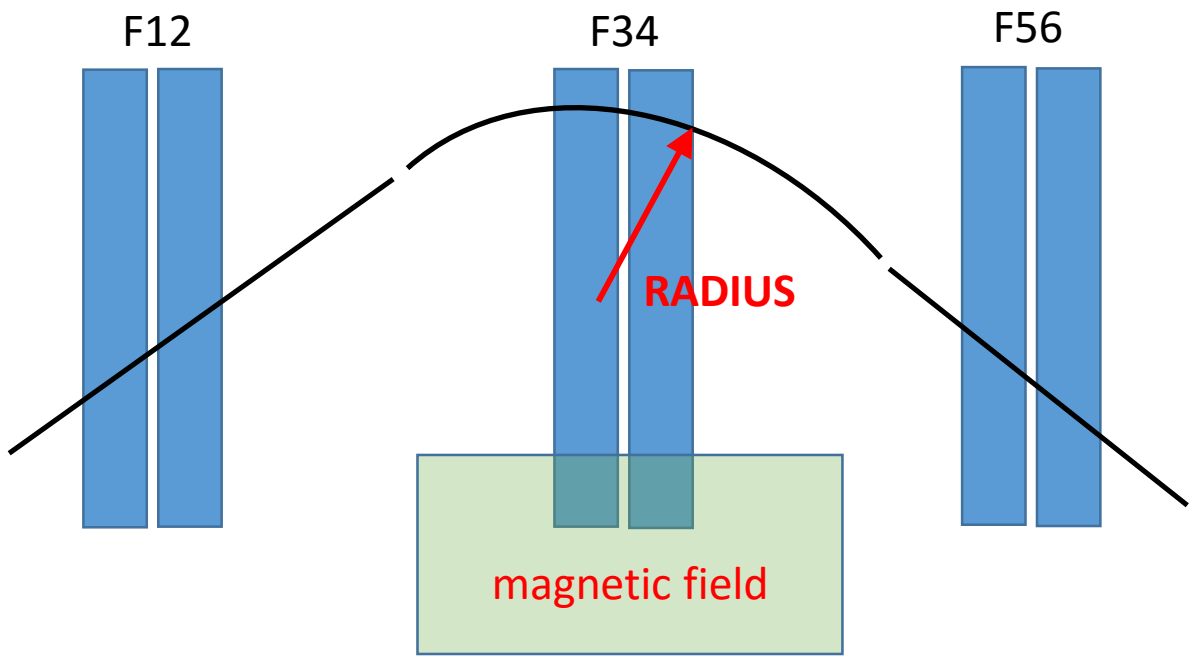
Forward Tracking Algorithm evaluation

Witold Przygoda (Jagiellonian University, Krakow)

Test suite

- validation of the stand alone track candidate program (written by Joanna Plazek) before implementation to PandaROOT
- track is identified based on:

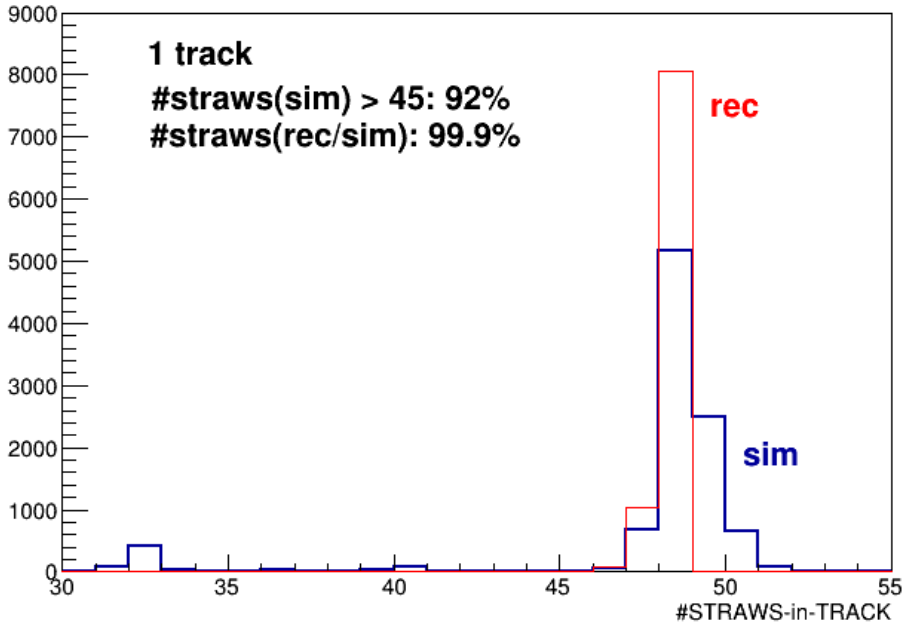


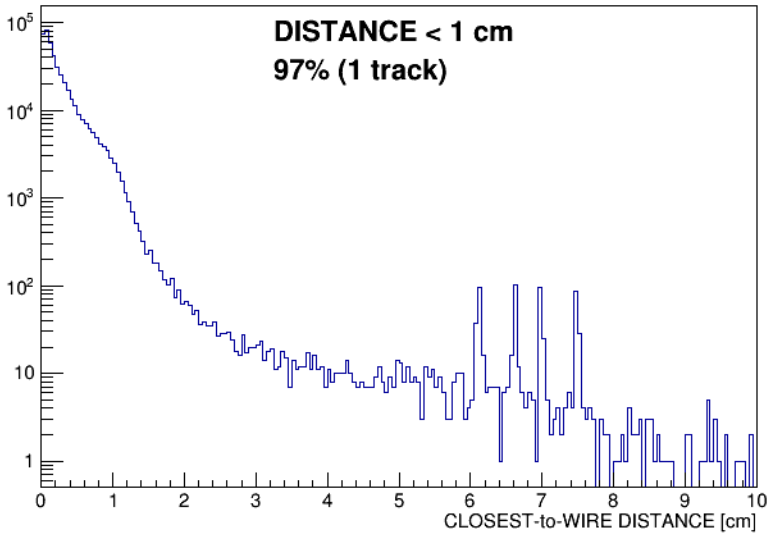
48 straw layers

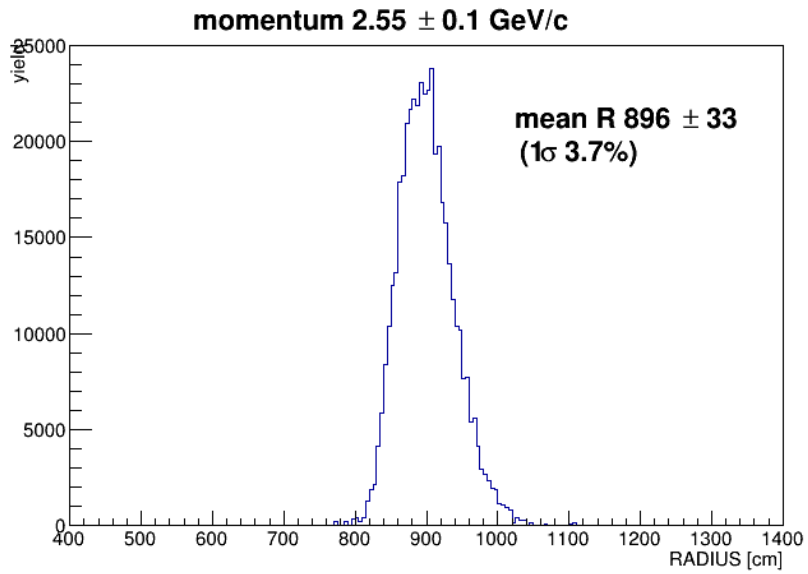
MC simulations

- 1, 3 or 5 miuon tracks
- constant momentum: 0.55, 2.55, 5.55 GeV/c
- physical reacion: $pp \rightarrow \Lambda\overline{\Lambda}$ followed by the decays FTS acceptance covers $\overline{\Lambda} \rightarrow \bar{p}\pi^{+}$
  - the advantage: variable particle momentum
- **GOAL**: evaluate efficiency and features of track candidate which will be passed to Kalman filter

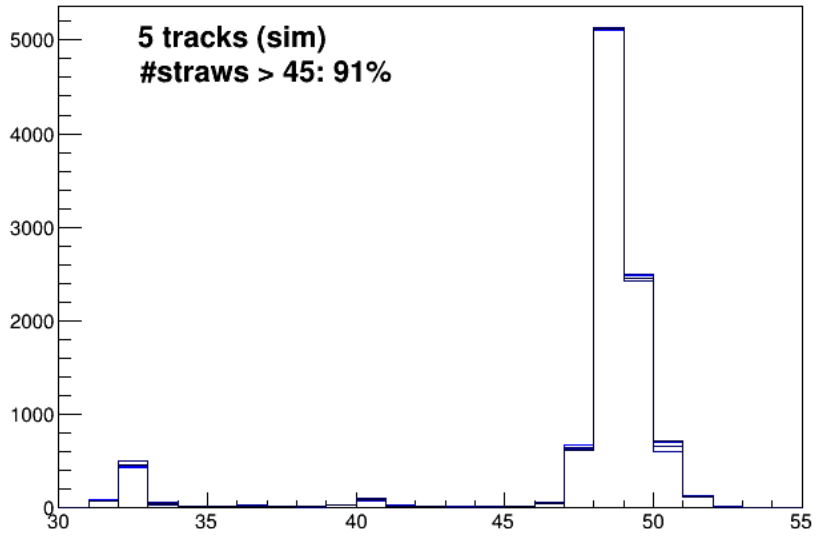
Simplest case: 1 track (constant 2.55 GeV/c)

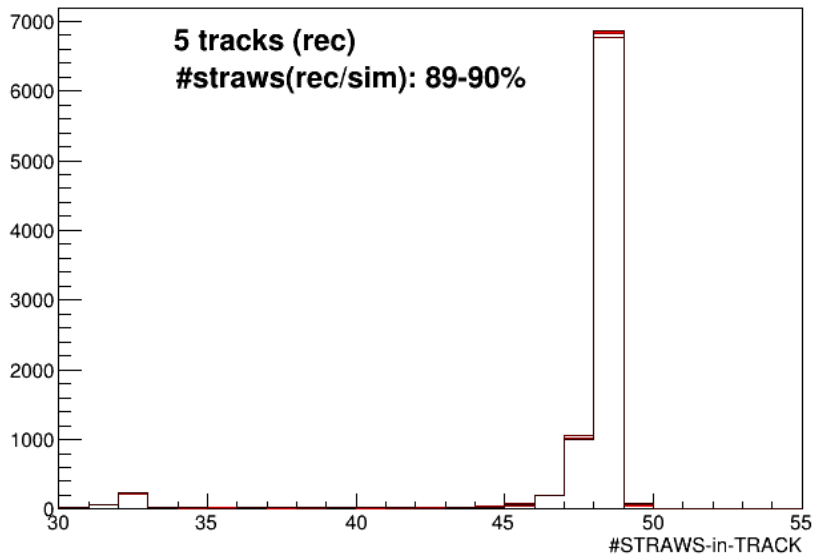


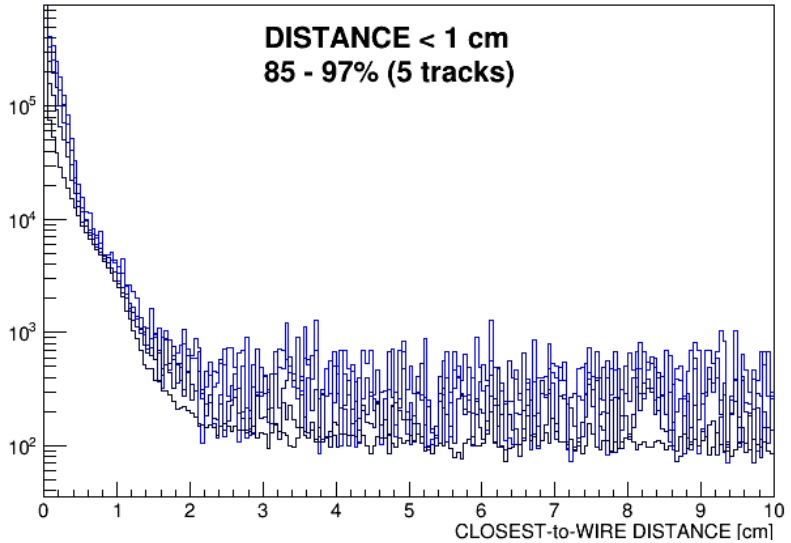


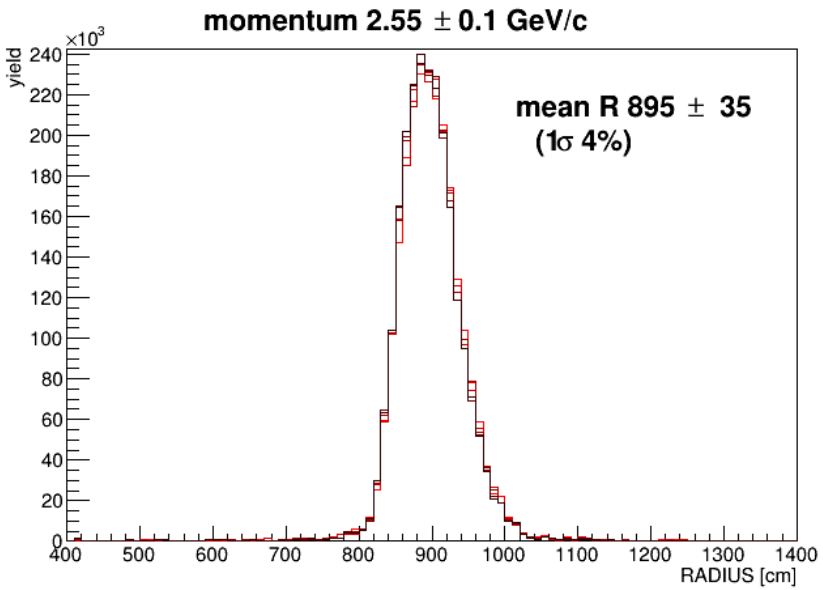


Multitrack case: 5 tracks (constant 2.55 GeV/c)

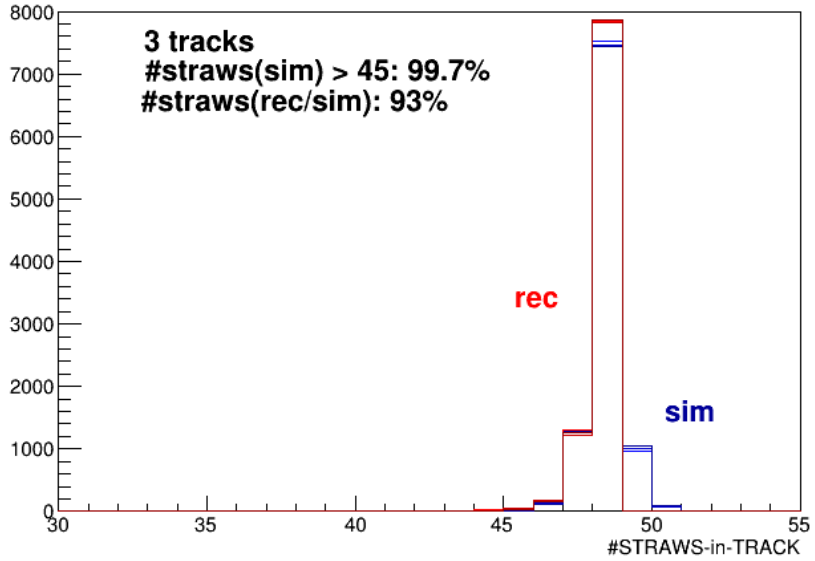


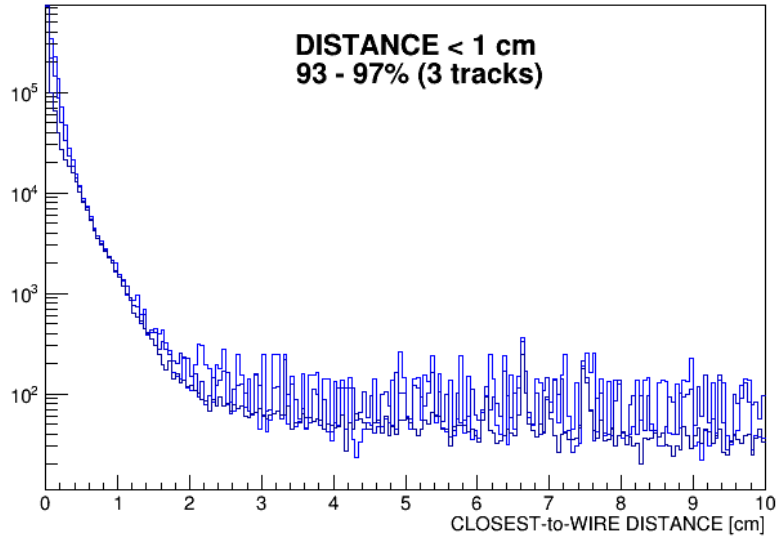


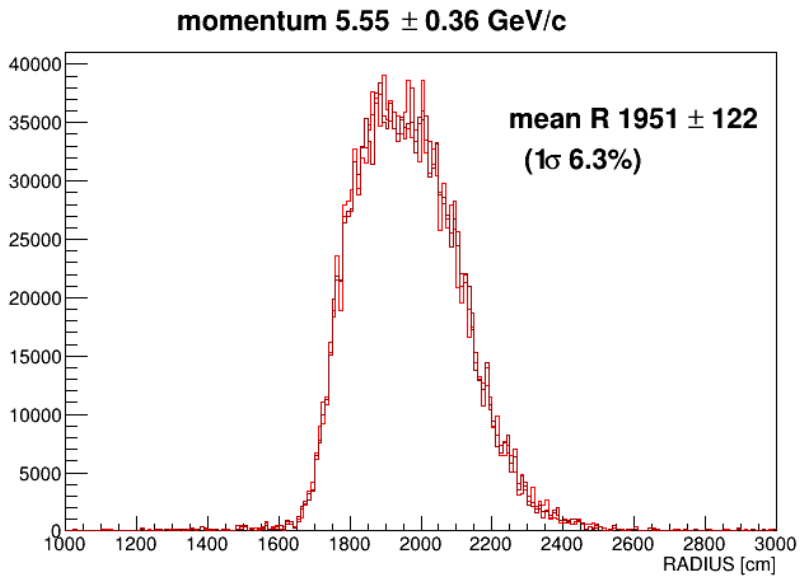




High mom. case: 3 tracks (constant 5.55 GeV/c)

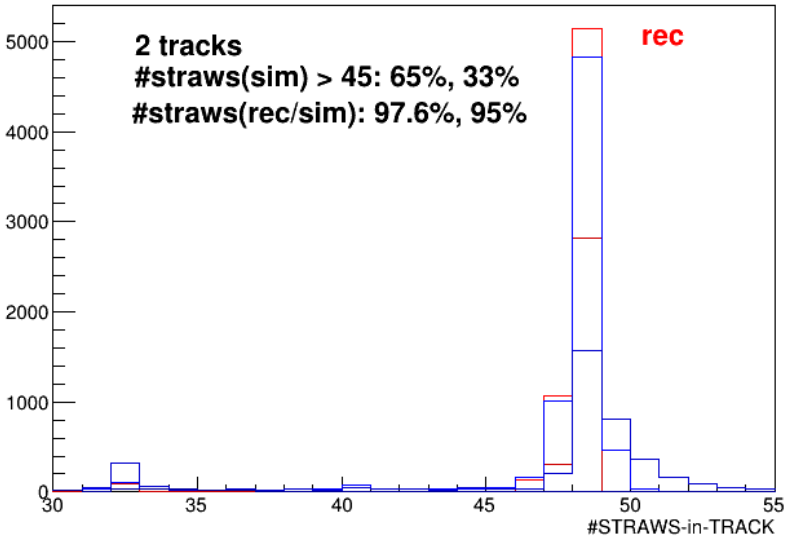


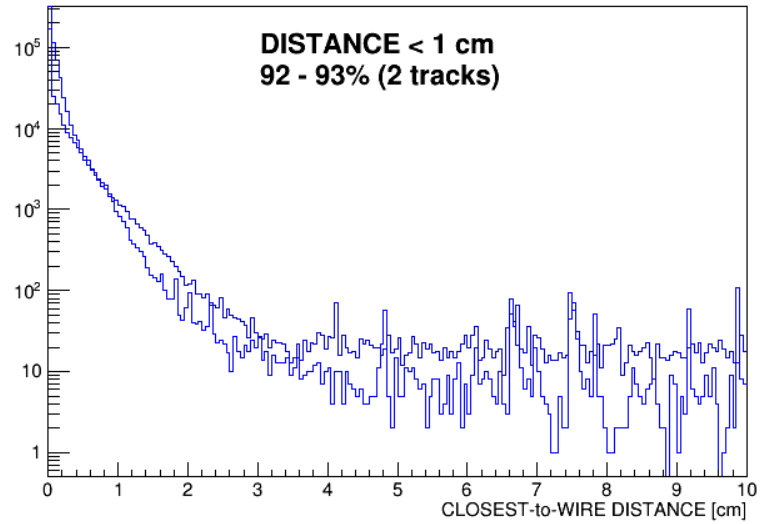


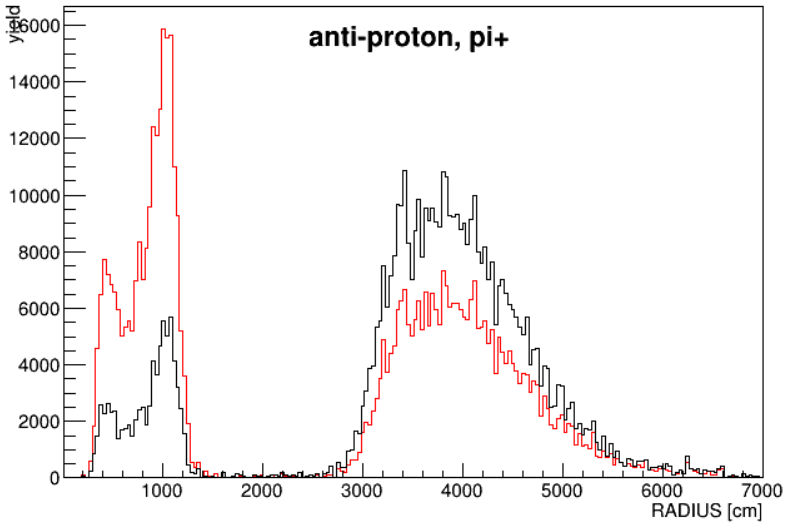


Physical case: 2 tracks (variable momentum)

Decay $\overline{\Lambda} \rightarrow \bar{p} + \pi^+$







Summary

- track candidate finder performance evaluated
- track identification efficiency in most cases > 90%
- reconstructed circle radius with 1σ ~ 3-6% (mom. dep.)
  good (expected) value of the reconstructed momentum
  - it will be also demonstrated on physical observables (needs a bit of upgrade on simulated information, now in ascii file)
  - it will be tested also with the nosie on and more particles (kaons+pions)
- fast track: implementation into FTS track finder reconstructor in order to pass the candidate to Kalman filter and evaluate track finder in the full package (TDR document input)