Overview of the recent development in the reconstruction

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Outlook

- TRD and TOF updates
- TPC updates
- ITS tracking
- Combined V0 finder
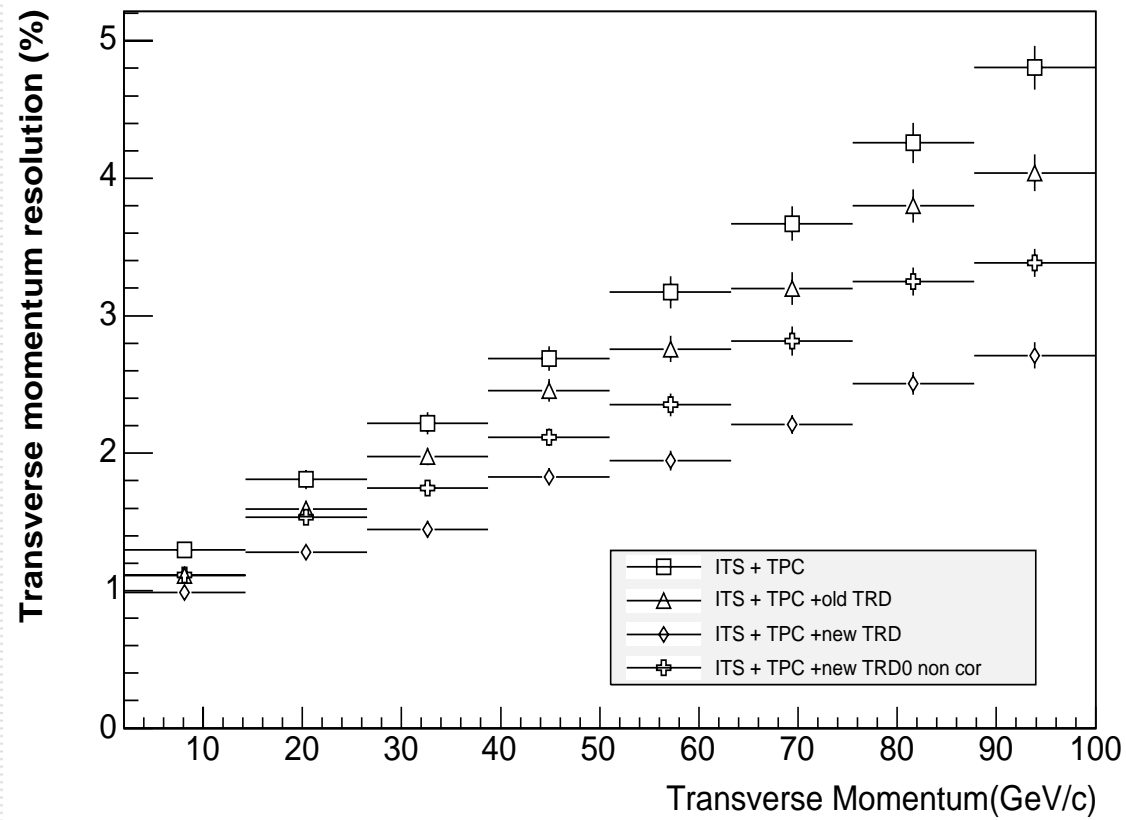
TRD tracking

- ☐ Currently optimized for high momenta tracks
  - ■ Expected performance reached
- ☐ Ongoing work on optimization for low momenta tracks
  - ■ Crucial for the TOF matching
  - ■ Down to which momenta TOF PID can be used?
  - ■ Problems with brick of material
    - ☐ Improvement on the material description necessary - TGeoManager
- ☐ New development in TRD simulation ➜
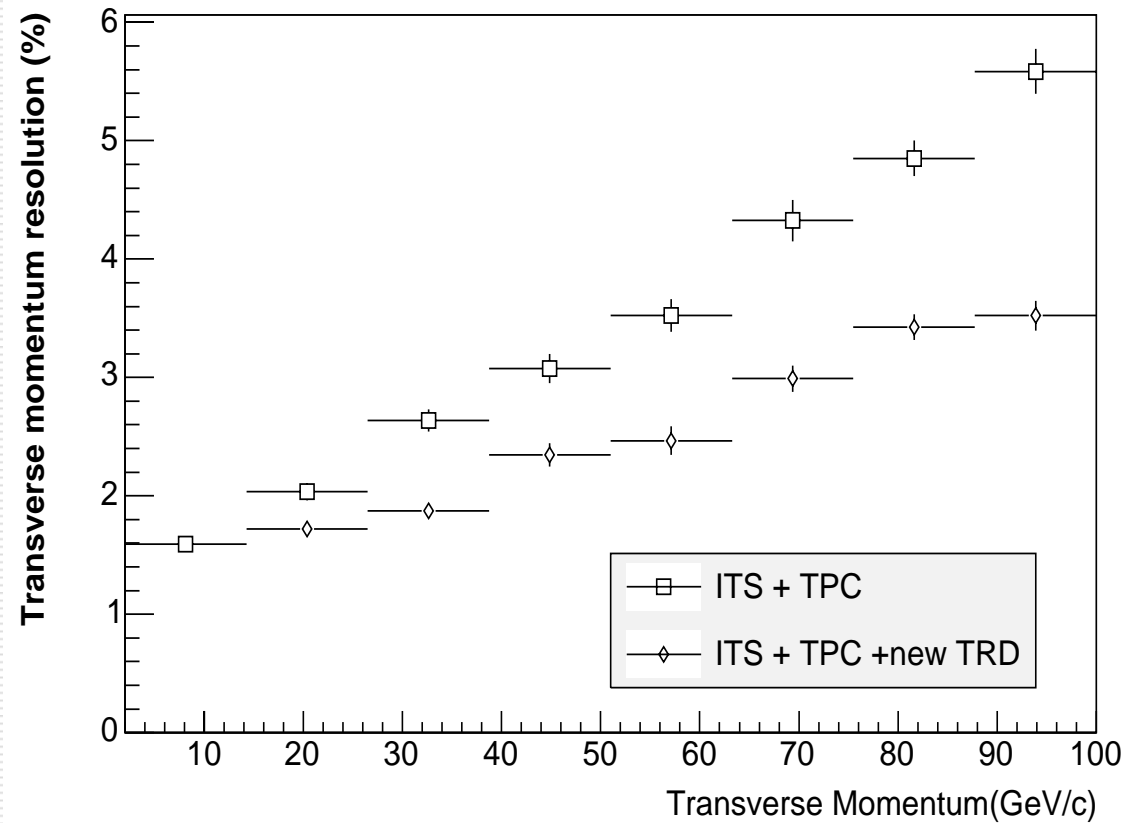 - ■ Not big progress in reconstruction part
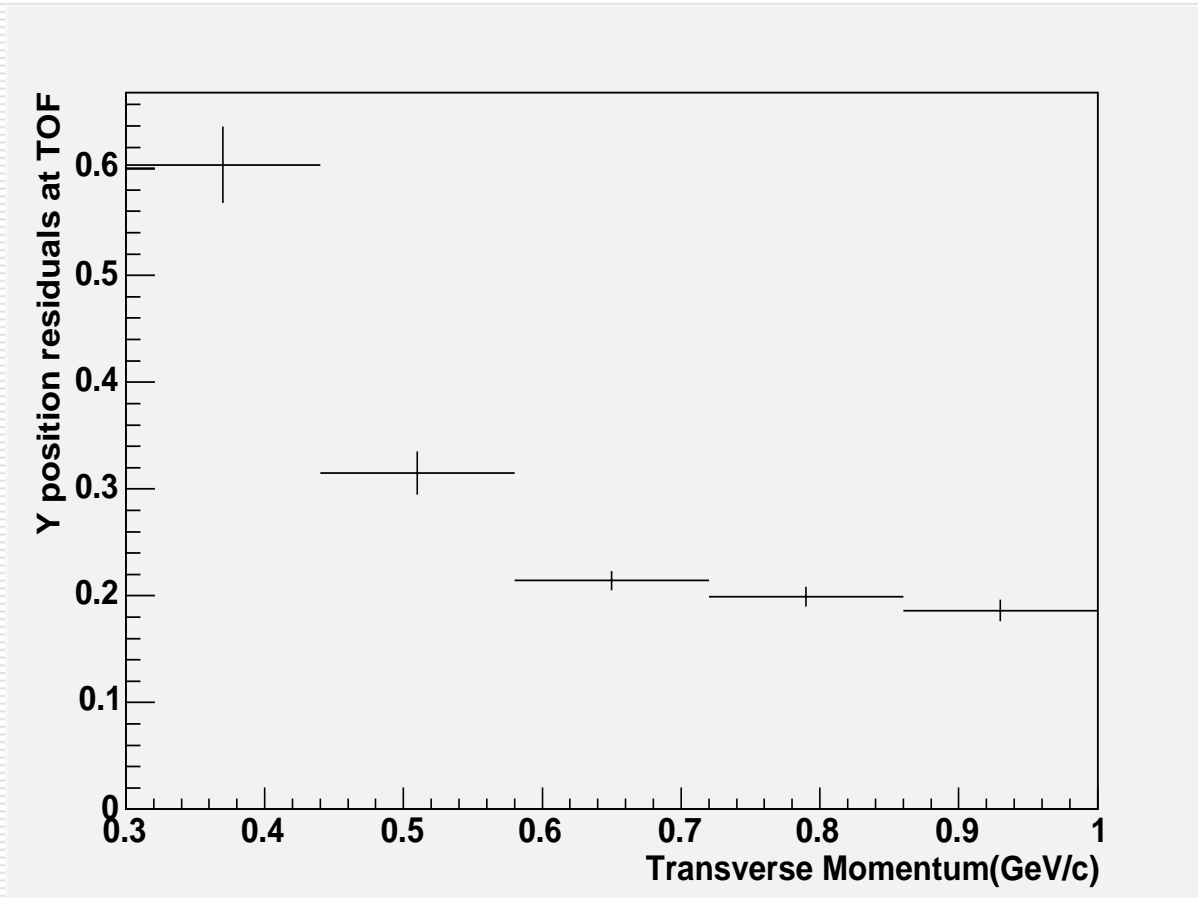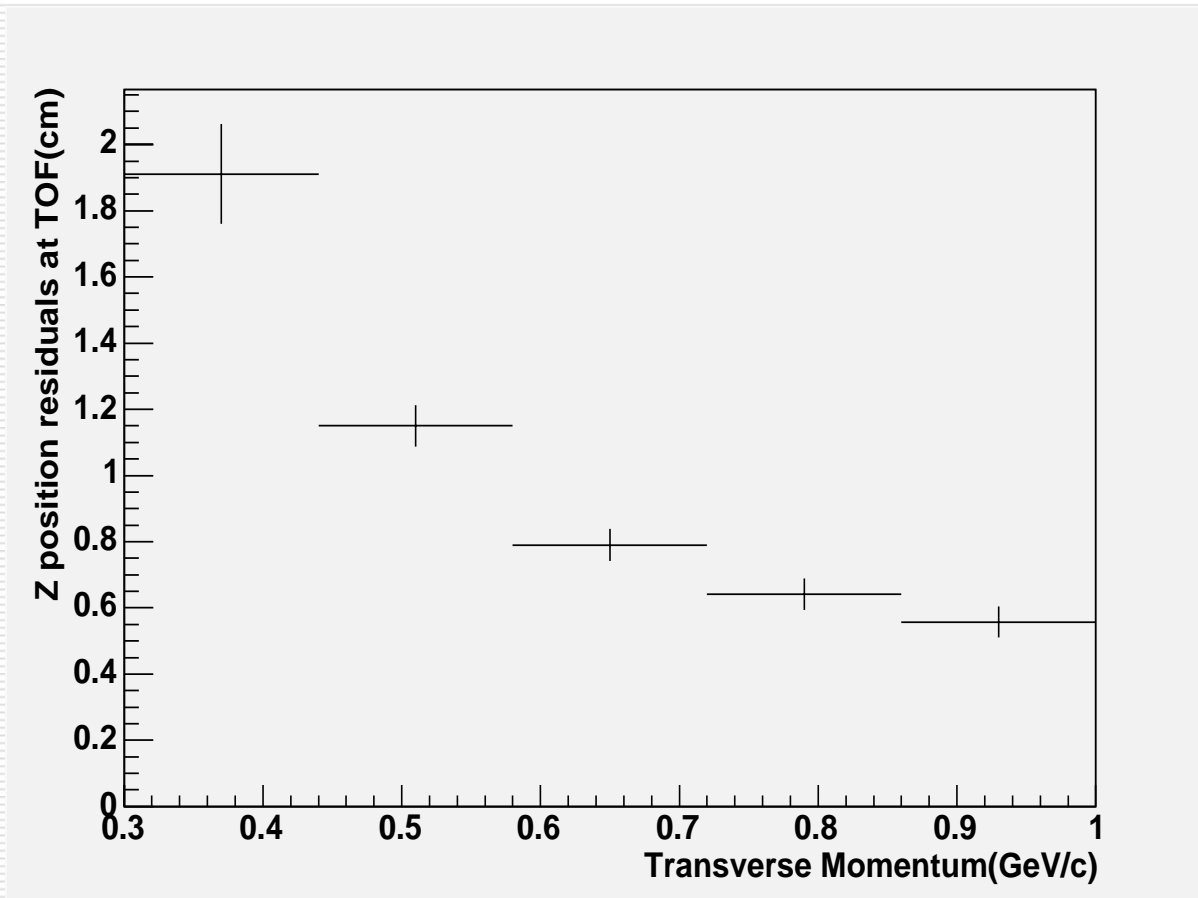
Pt resolution
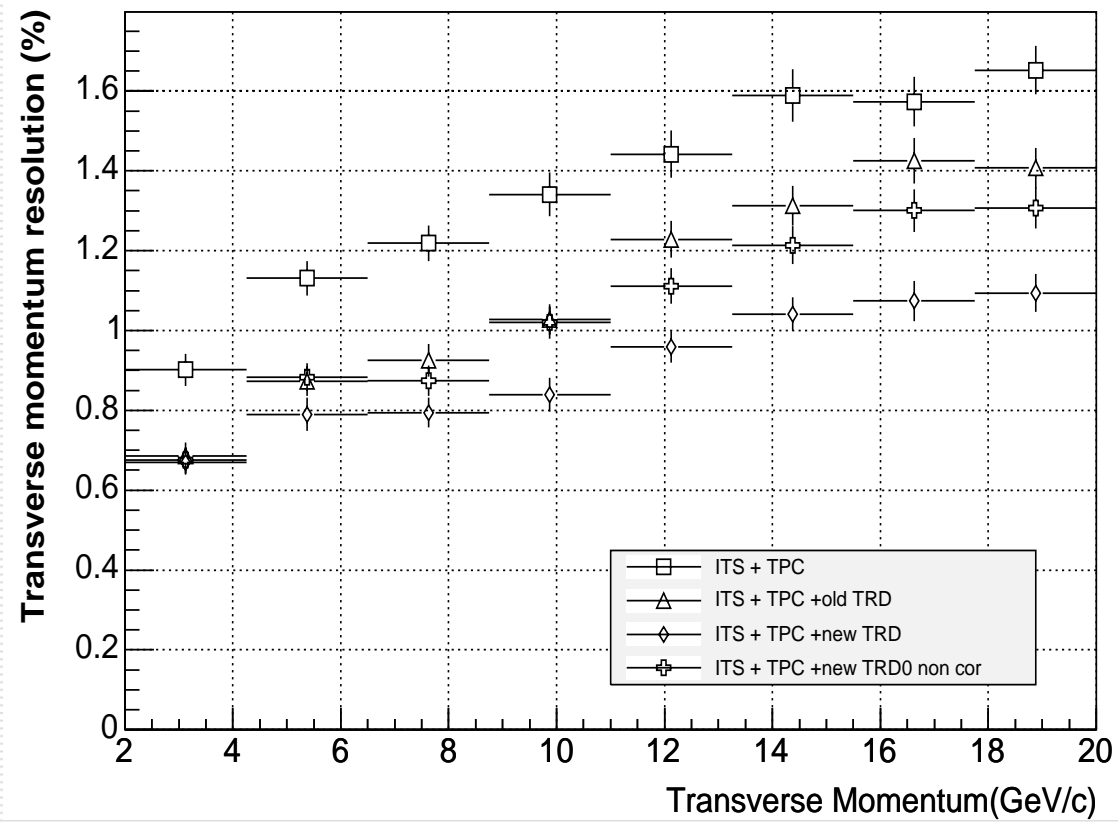
Pt resolution

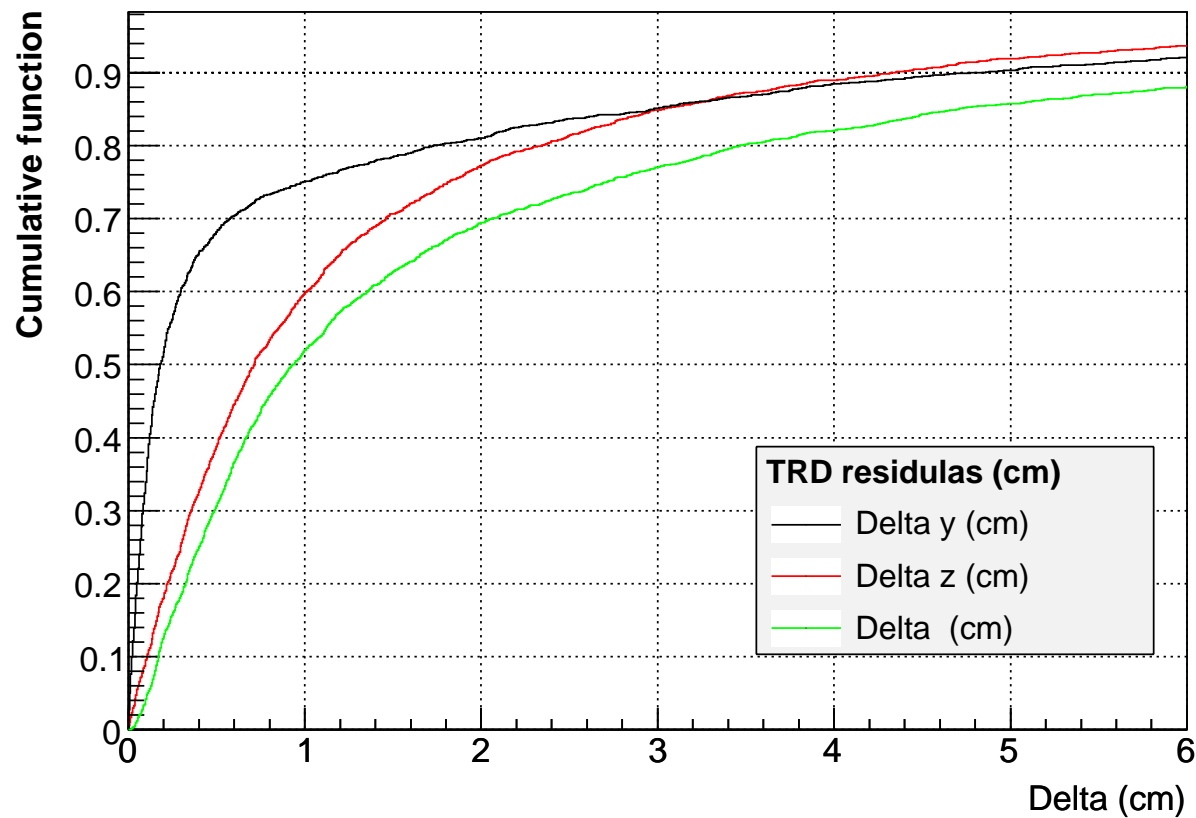# TRD tracking at high flux environment (central event dN/dy~5000)
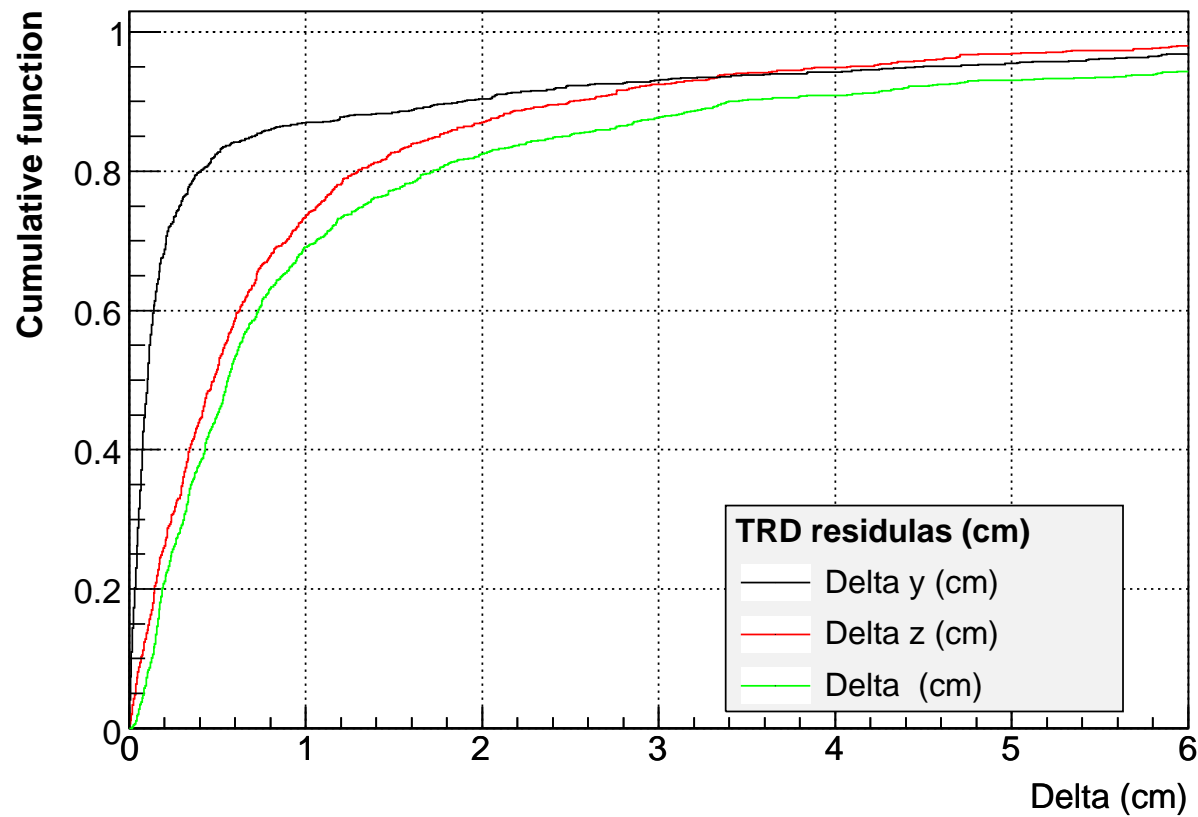
Y resolution (TOF layer)
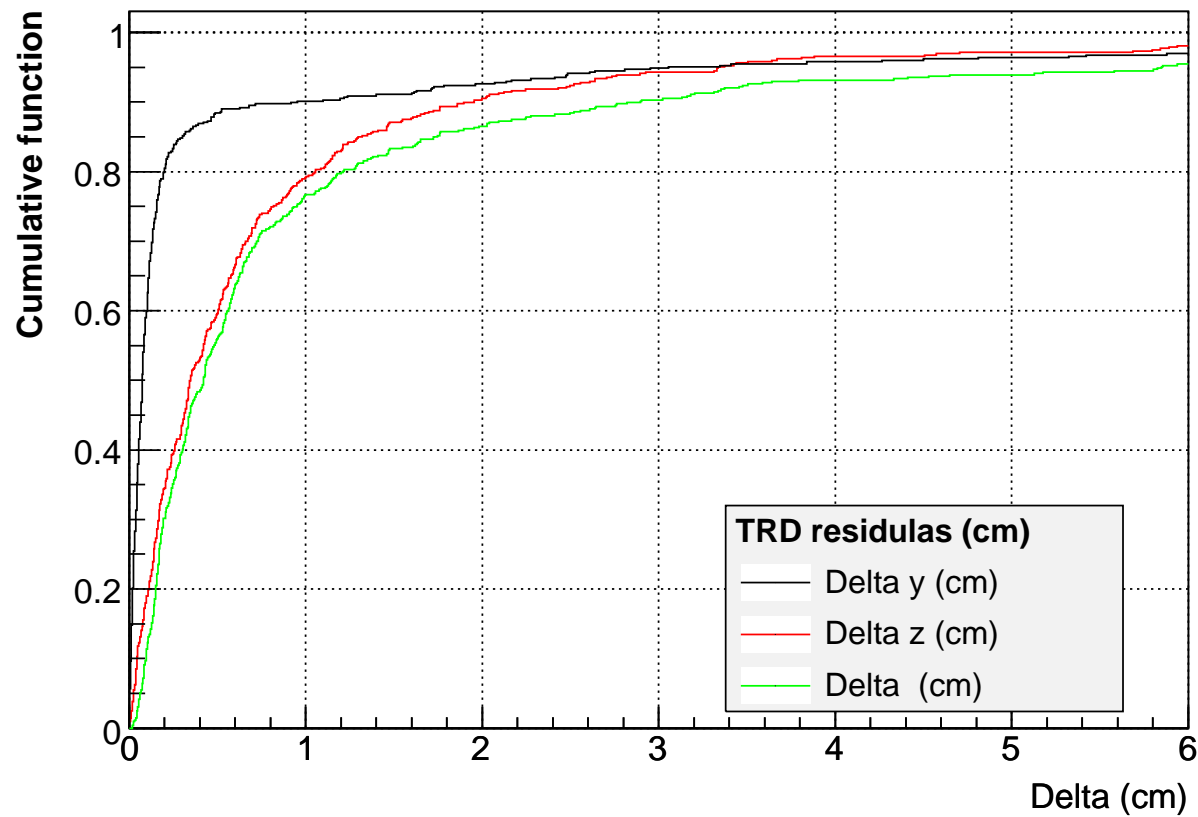
Z resolution (TOF layer)
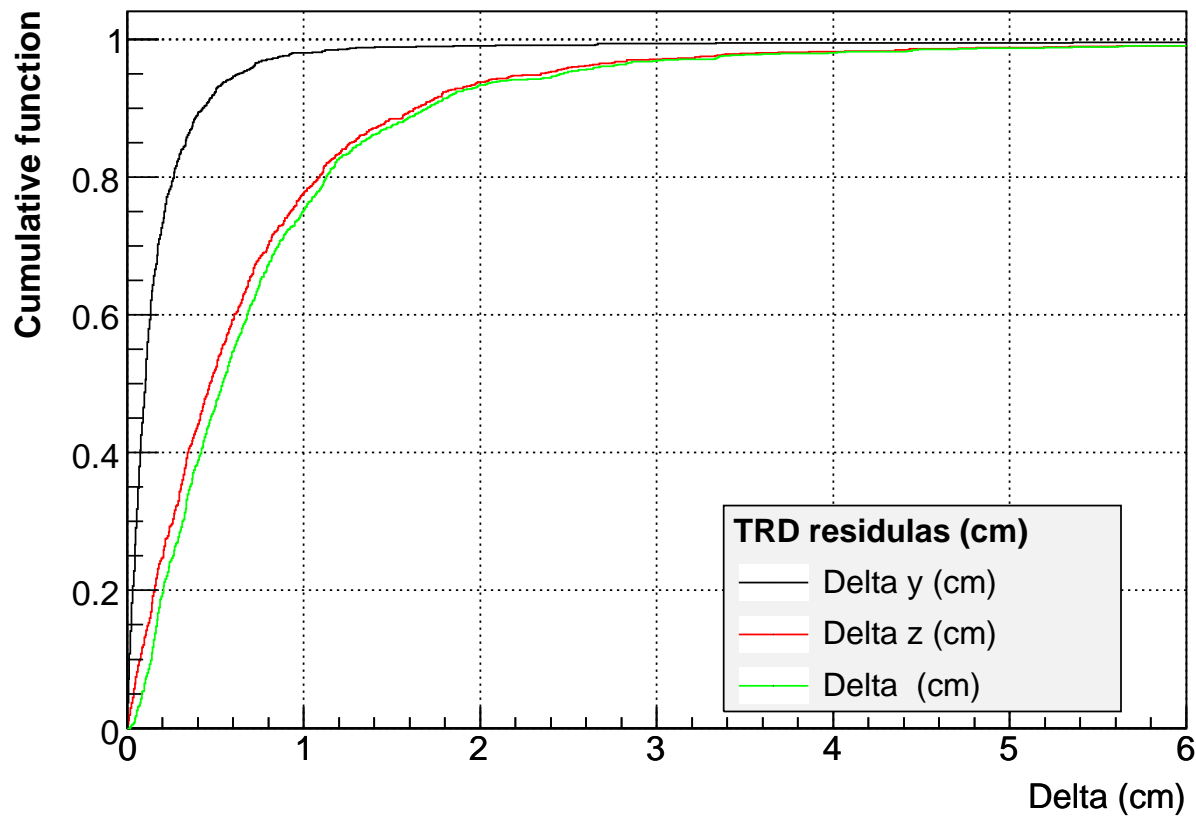
TOF matching (over 0.4 GeV)
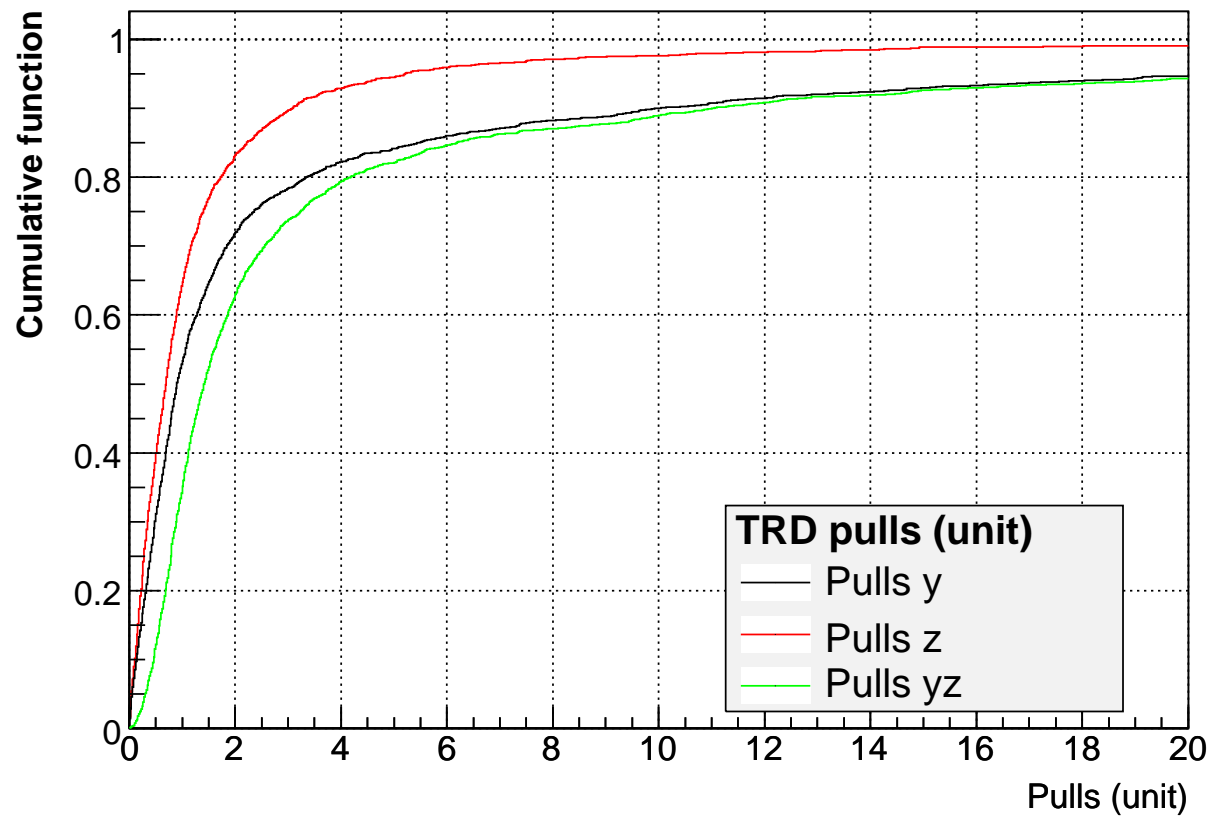
TOF matching (over 0.6 GeV)
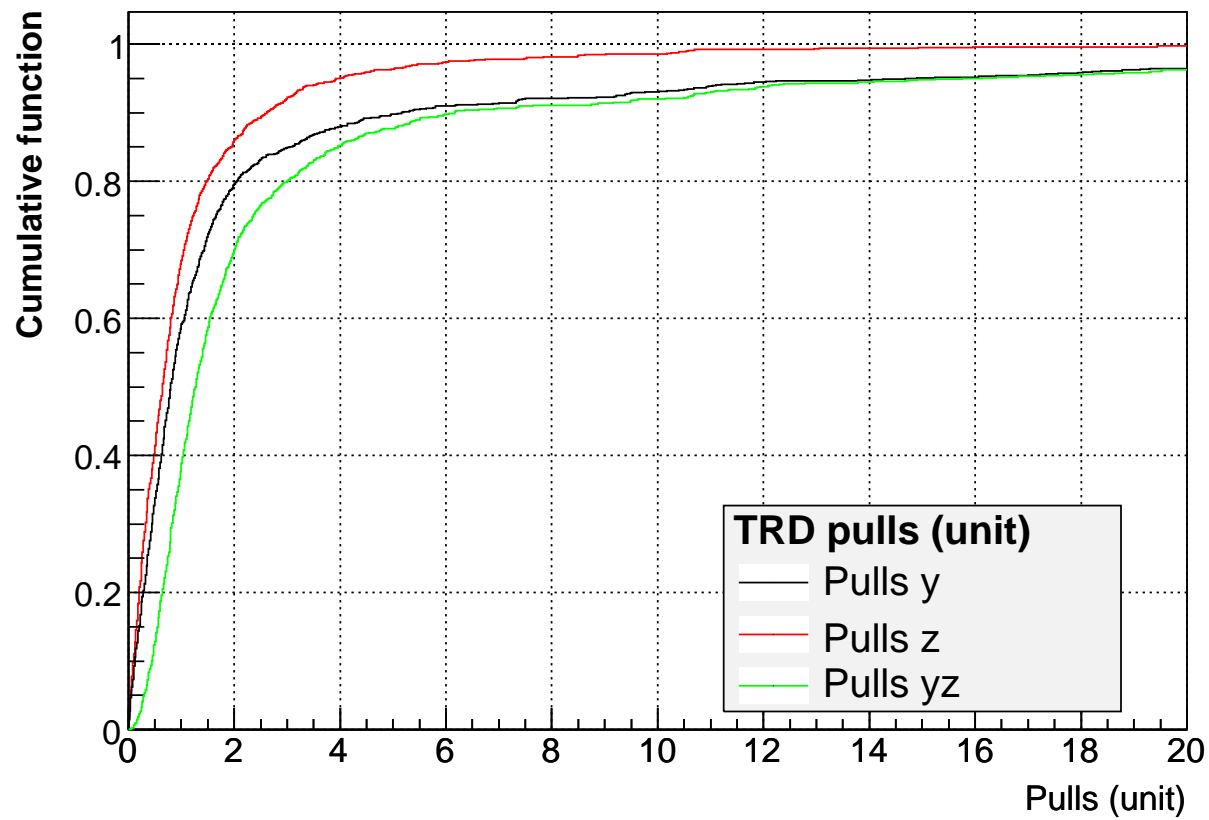
TOF matching (over 0.8 GeV)

TOF matching (not material cross – full)

TOF matching (Pt>0.4)

TOF matching (Pt>0.6)

TPC tracking - Updates

- ☐ Main focus:
  - ■ Optimization for V0 topologies
    - ☐ Tracking for deep secondary particles
    - ☐ Decreasing of the curvature cut
    - ☐ Increase of the angular acceptance
    - ☐ Seeding of highly inclined tracks
  - ■ Increase of the number of tracks from about ~12 000 for central Hijing to the ~18 000
  - ■ Additional post-processing necessary to remove non "interesting" information from the ESD
    - ☐ Before removing – define what is interesting
    - ☐ Memory and disk space restriction
  - ■ Increase of the pseudo rapidity range
  - ■ TPC - V0 finder implemented
    - ☐ Currently new ITS-TPC V0 finder used by default

TPC -ITS efficiency (Low flux environment)
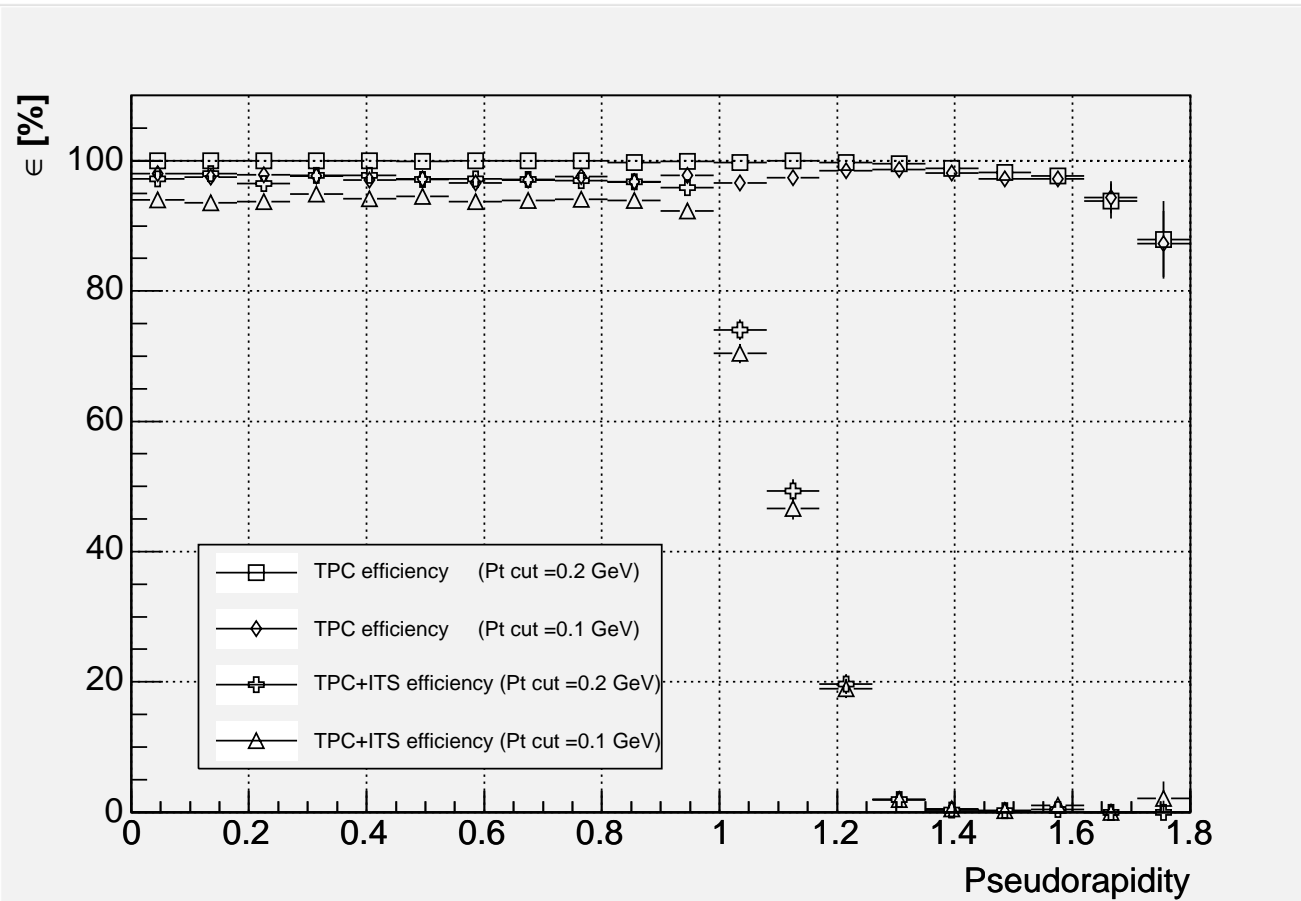
ITS tracking - Updates

- ☐ **Main focus**
  - ◼ New integrated V0 finder based on MIP
    - ☐ To be presented on Physics forum (date)
  - ◼ Increase of the efficiency
    - ☐ Parallel hypothesis in the ESD
      - ◼ Constrained track and unconstrained track
      - ◼ Expected improvement ~ 2 (presented 1.5 years ago) for primary tracks tracked with vertex constrain
      - ◼ Strategy used already used in the V0 finder
   - ☐ Using interpolation instead of the extrapolation

ITS tracking - Updates

- ☐ Strategy for HBT study
  1. Select primary tracks
     1. Normalized DCA and DCA to the primary vertex of the best unconstrained track as a criteria
  2. Use parameters of the best selected constrained tracks

- ❑ To be noticed: Best unconstrained and best constrained track hypothesis can use different sets of clusters
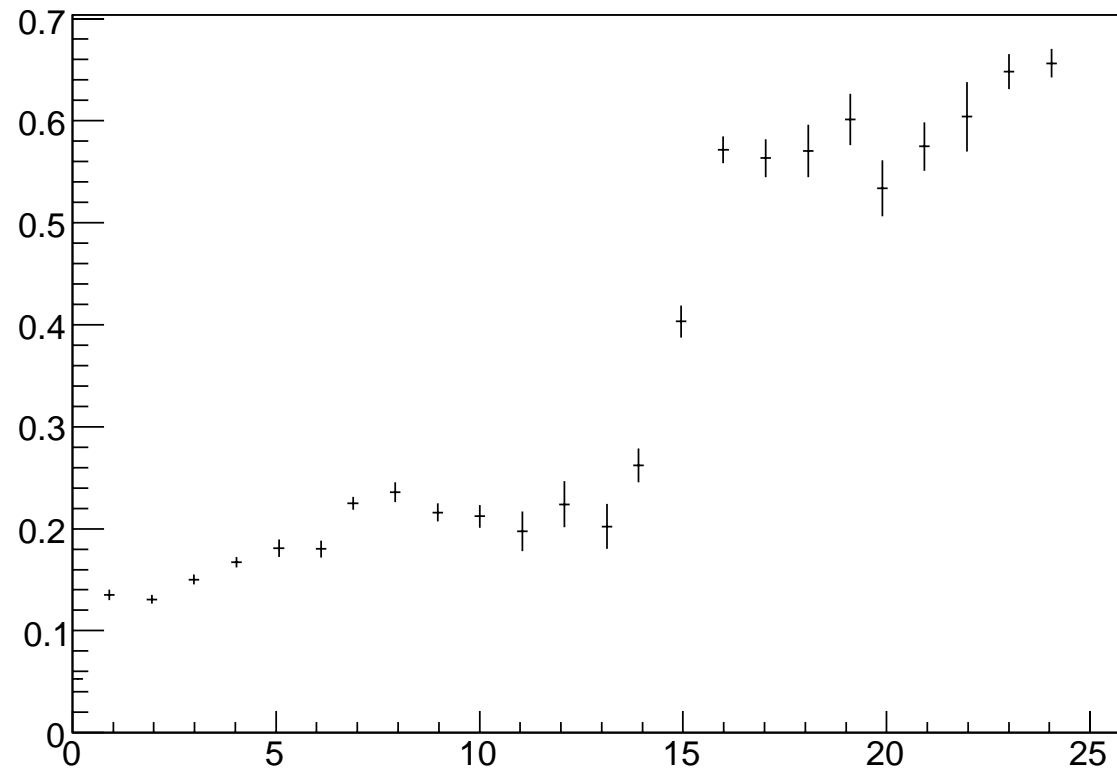
ITS tracking efficiency
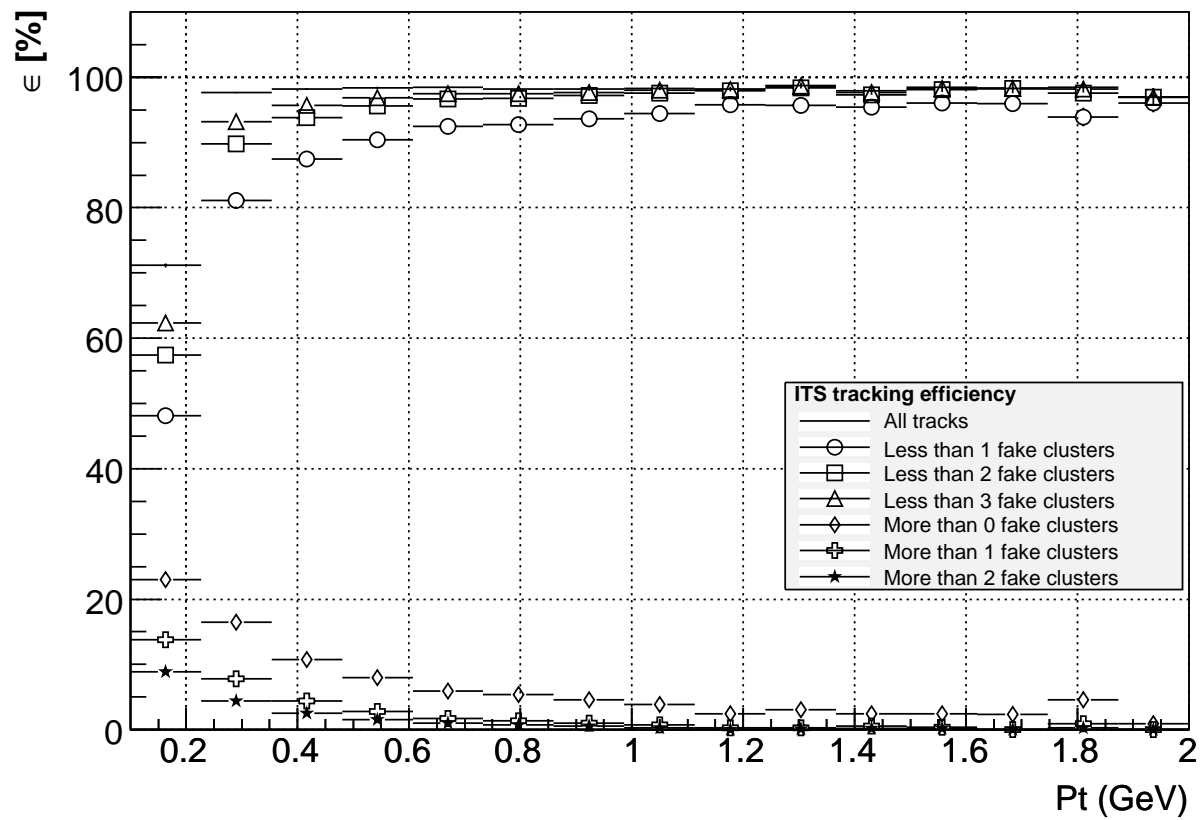
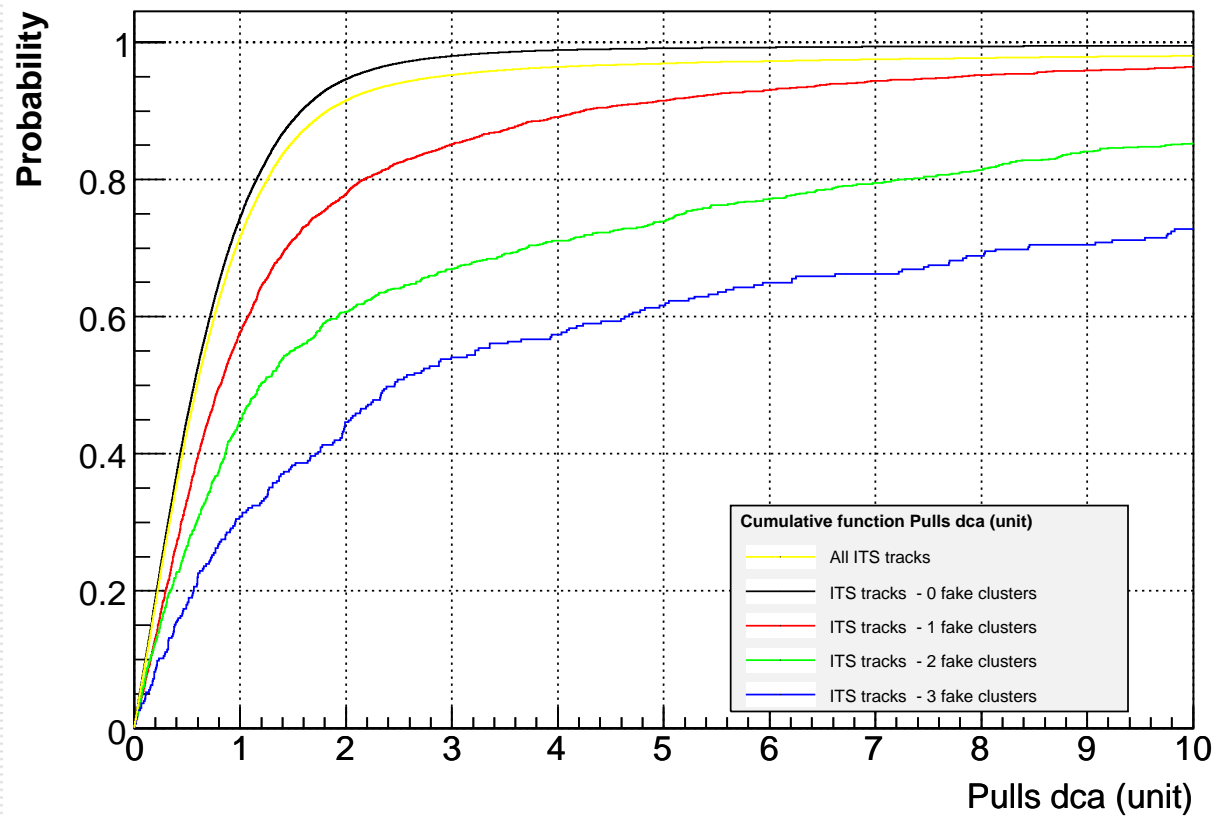# ITS tracking fake efficiency
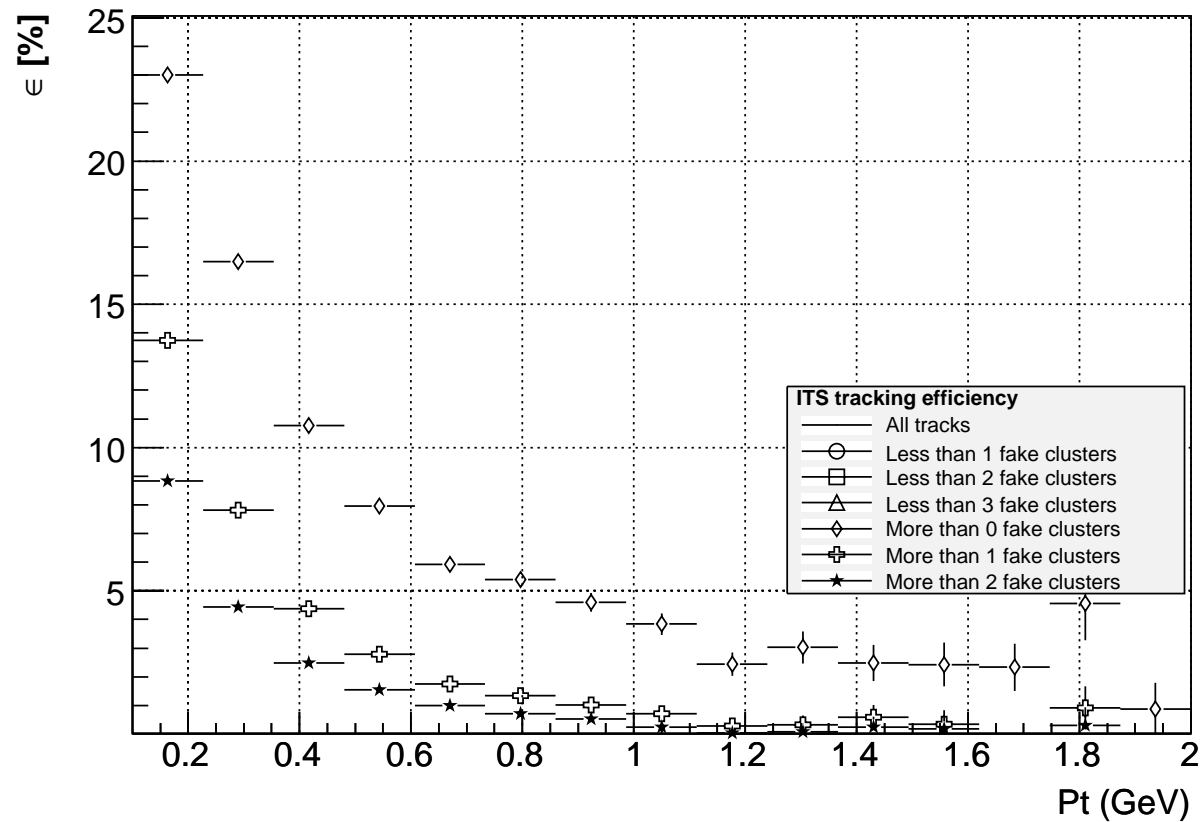
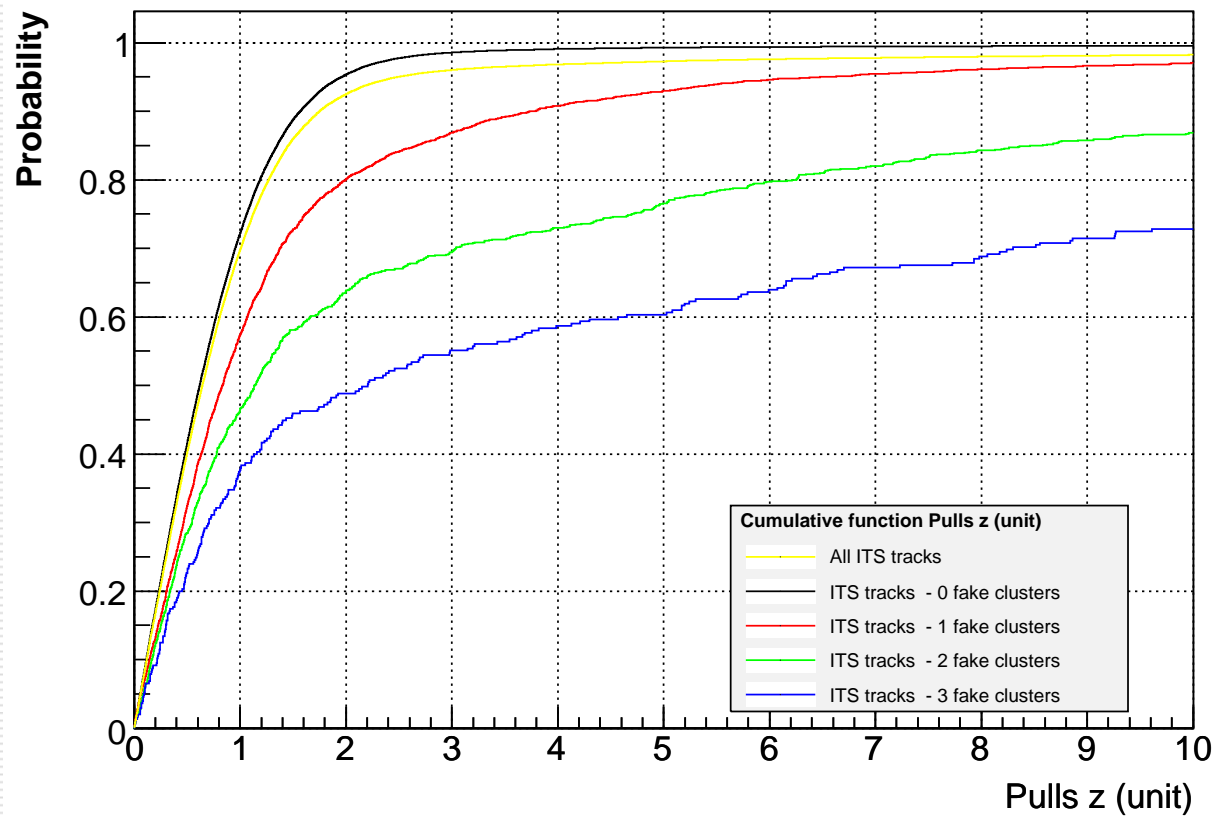# Fake ratio for secondary particles as function of radius.

RC.fESDTrack.fITSFakeRatio:int(VRadius) {fTPCOn&&fITSOn&&VRadius<25}
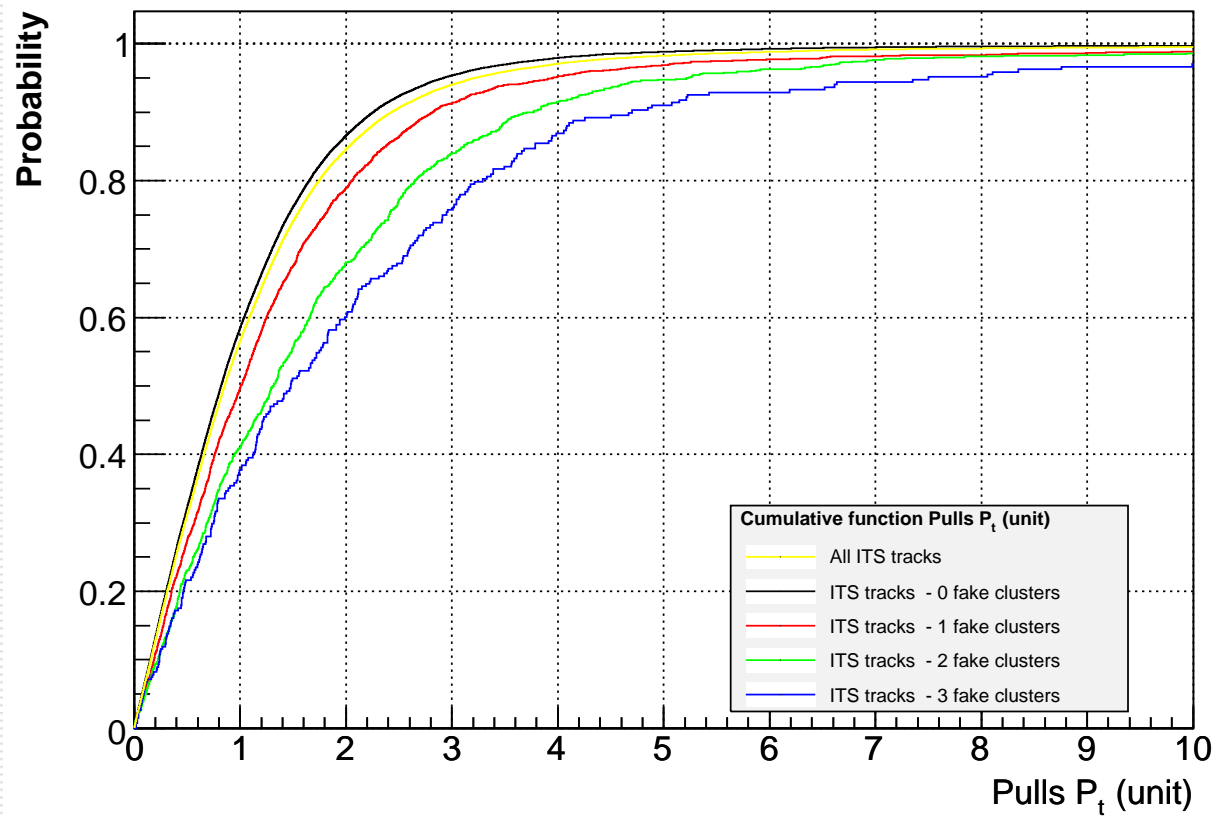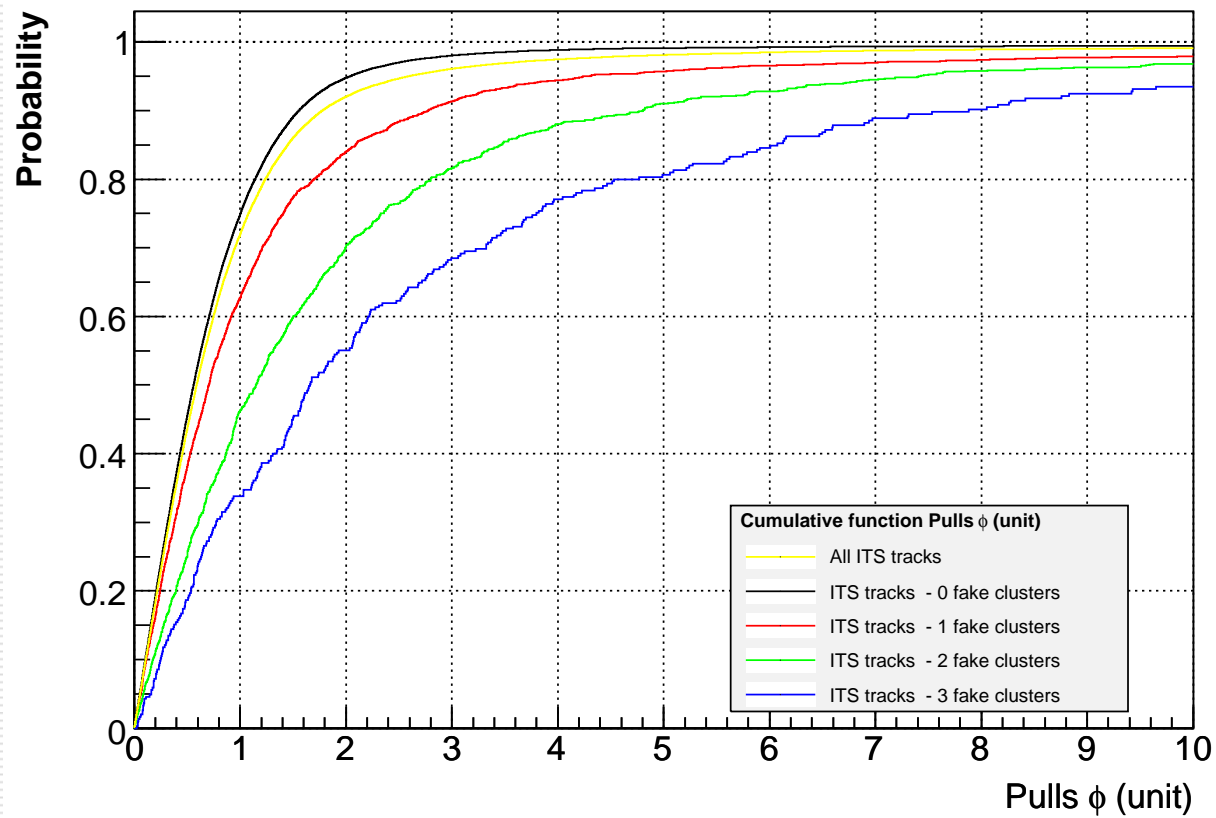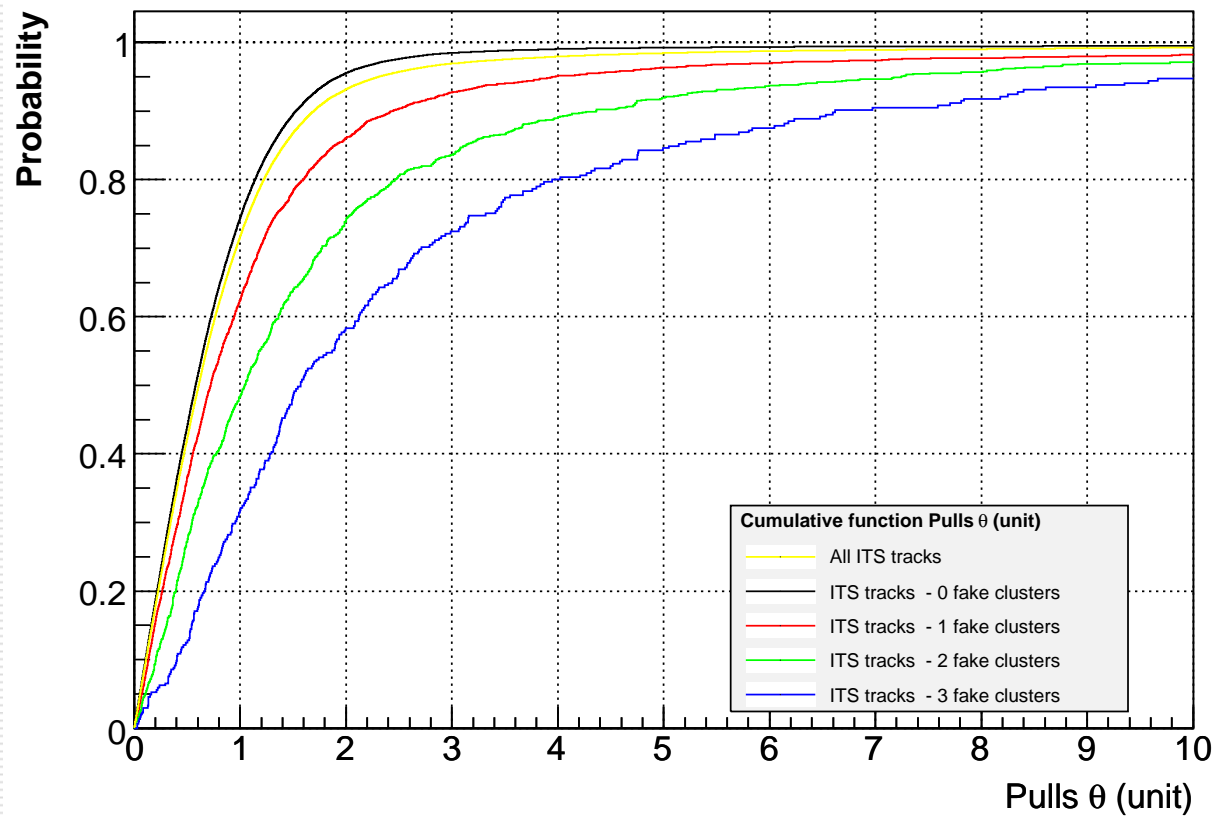
ITS DCA pulls

ITS z pulls

ITS Pt pulls

ITS phi angle pulls

ITS theta angle pulls

Conclussion

- ☐ TRD – TOF matching
  - ■ Space for improvements in TRD tracking for low momenta tracks
    - ☐ CPU consument algorithm like in ITS
    - ☐ Huge material budget in between TRD sectors – the improvement factor unknown

Conclusion

- ☐ TOF PID
    - ■ Integration of the track quality information to the PID likelihood
    - ■ PID likelihood
        - ☐ Sum of the partial likelihood
        - ☐ To be done during matching procedure
    - ■ For small fraction of track (long tracks, not crossing TRD frame) possibility go down to the 0.4 GeV

Conclusion

☐ TPC tracking

- ◼ ~ 100 % efficient (findable tracks)
- ◼ Scenarios - what is physically interesting should be defined
- ◼ Parameterization of different tracking scenarios

Conclusion

- ☐ ITS tracking
  - ■ New integrated V0 finder implemented
    - ☐ Fiducial volume from 0.5 cm – 200 cm
      - ■ ITS used also as veto detector
    - ☐ V0 track hypothesis independent of track hypothesis in ESD track container
  - ■ Proposal
    - ☐ Store 2 independent track hypothesis in ESD track container
      - ■ Best constrained track
      - ■ Best unconstrained track
    - ☐ Constrained and unconstrained tracks can use different sets of clusters