Charged pion analysis

Simulation
- Acc. X Rec. efficiency with dead map

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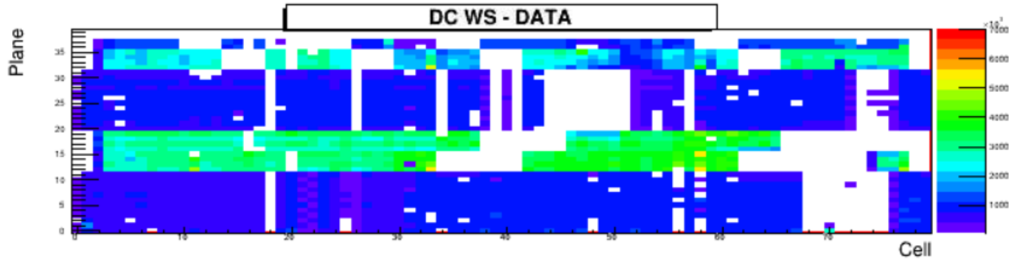
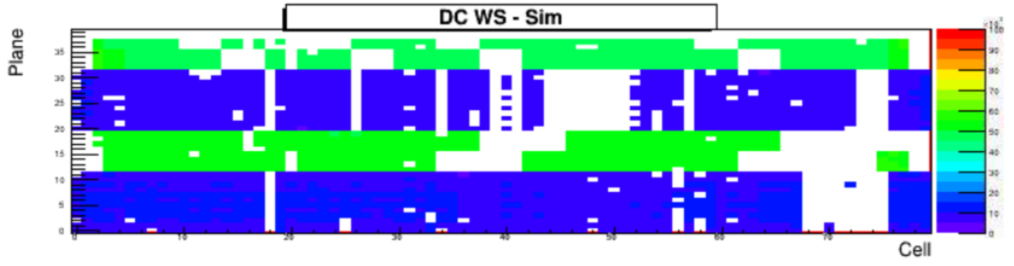
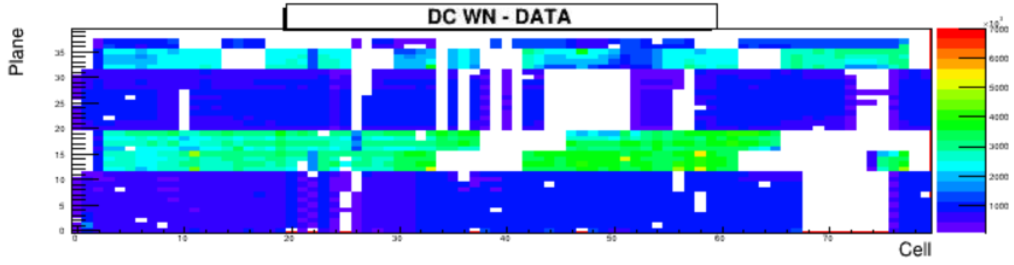
Dead map

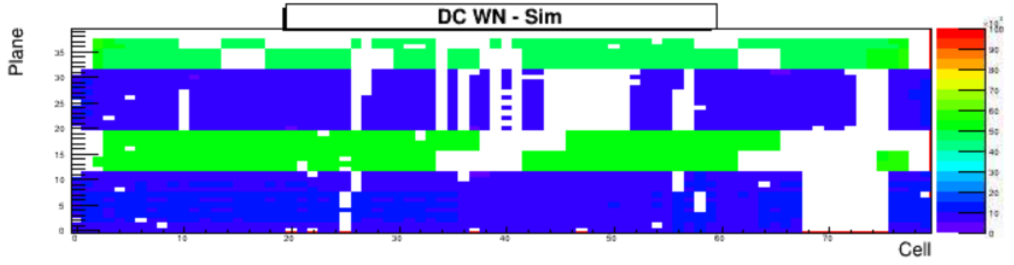
DC, PC, RICH for Run15

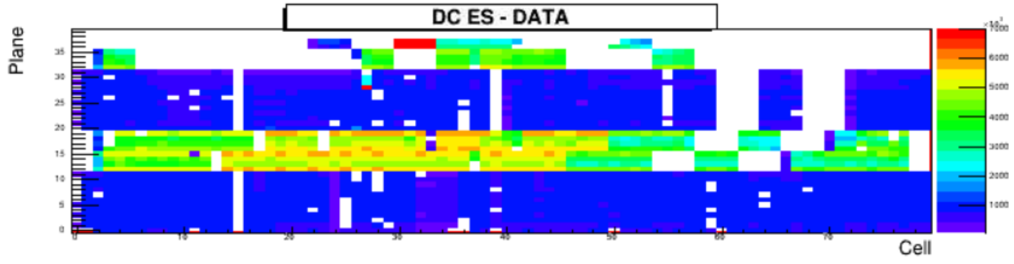
DC dead map

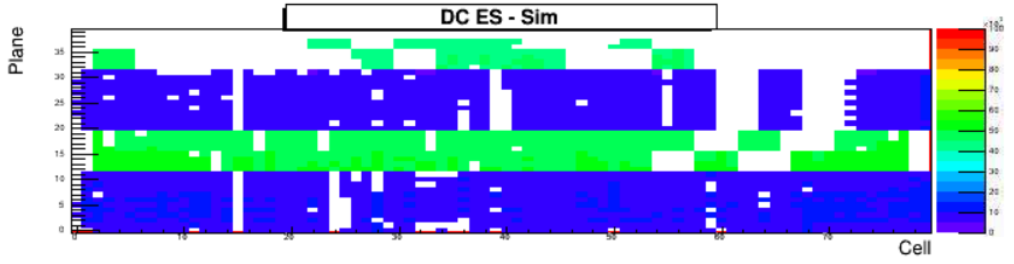

DC WS - DATA
Plane
Cell

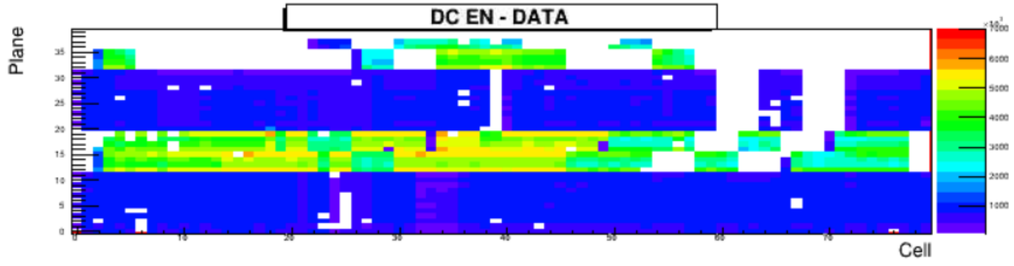

DC WS - Sim
Plane
Cell

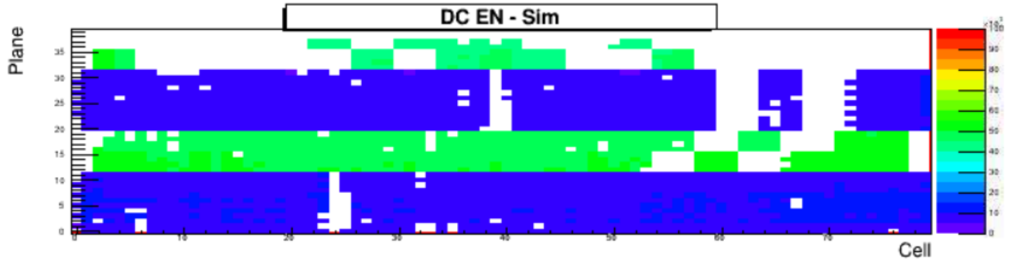

DC WN - DATA
Plane
Cell


DC WN - Sim
Plane
Cell

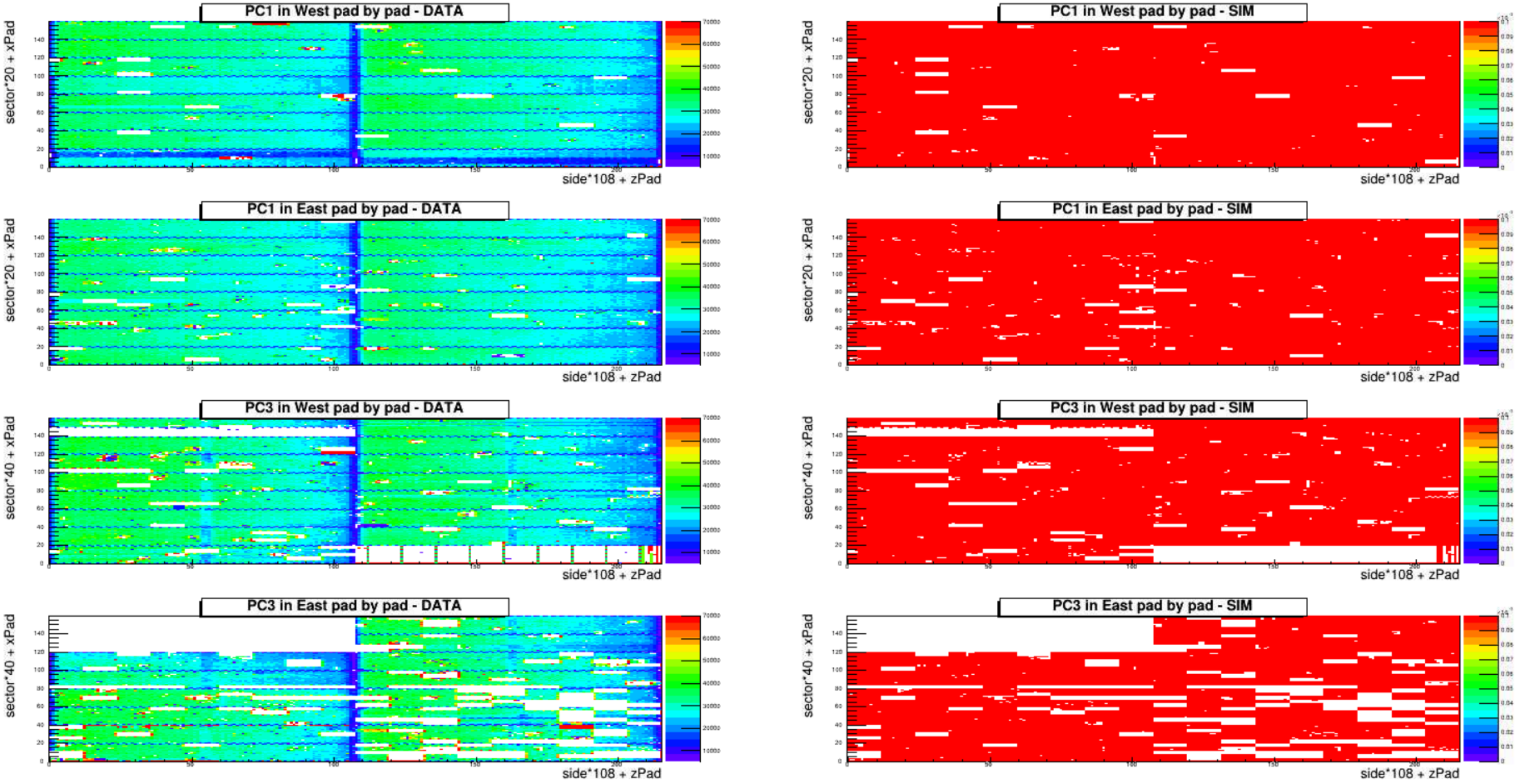

DC ES - DATA
Plane
Cell


DC ES - Sim
Plane
Cell

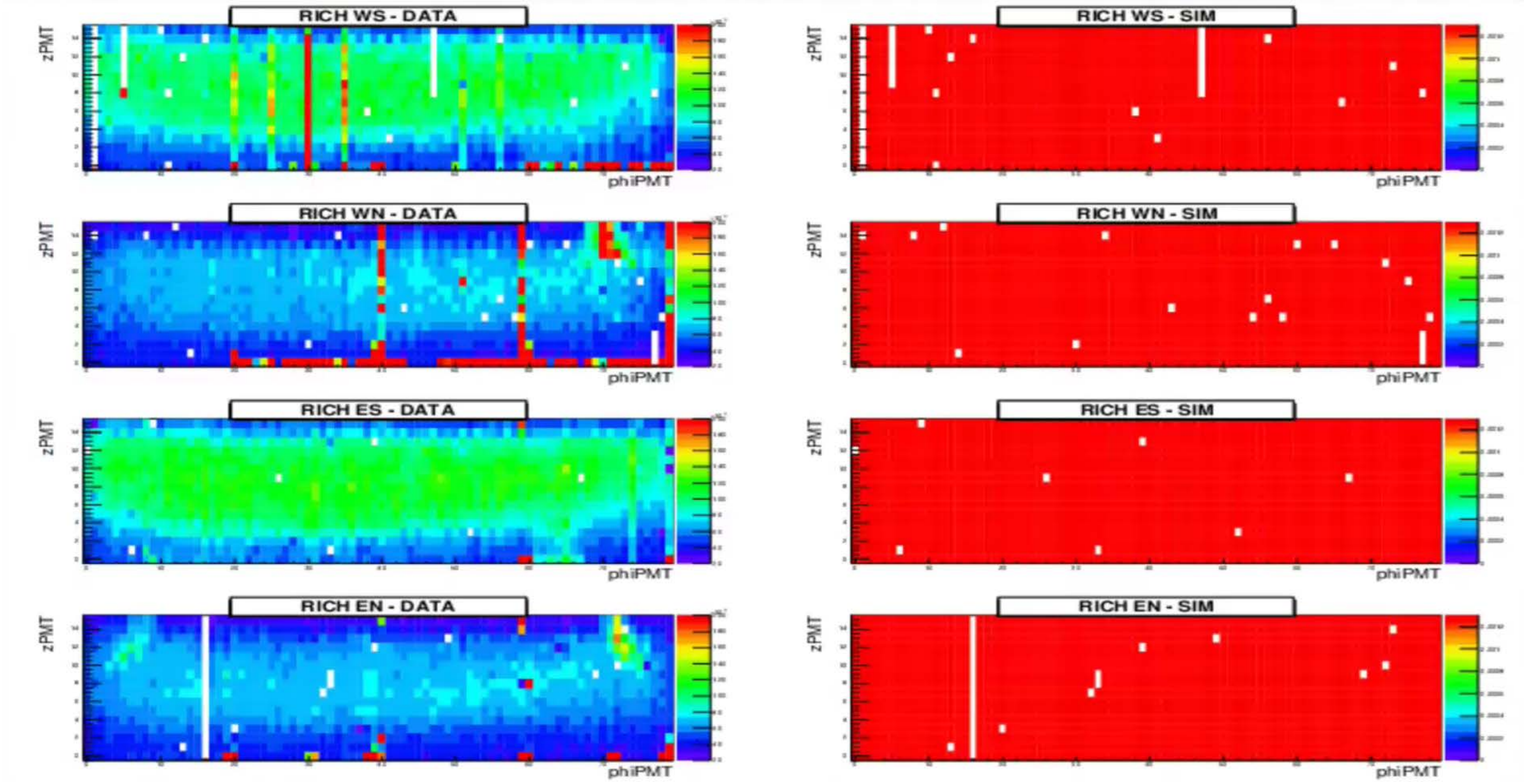

DC EN - DATA
Plane
Cell


DC EN - Sim
Plane
Cell

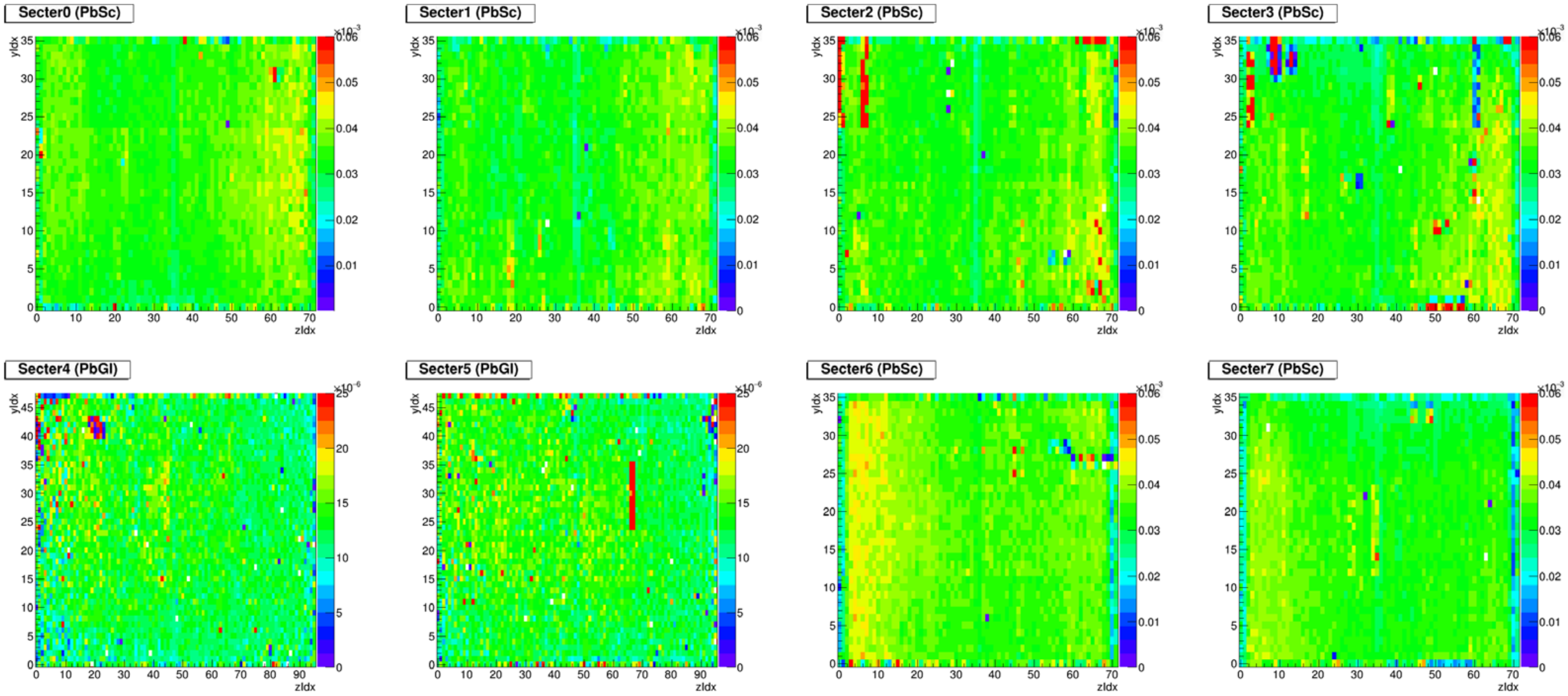
PC dead map


PC1 in West pad by pad - DATA
PC1 in West pad by pad - SIM
PC1 in East pad by pad - DATA
PC1 in East pad by pad - SIM
PC3 in West pad by pad - DATA
PC3 in West pad by pad - SIM
PC3 in East pad by pad - DATA
PC3 in East pad by pad - SIM
sector*20 + xPad
sector*40 + xPad
side*108 + zPad

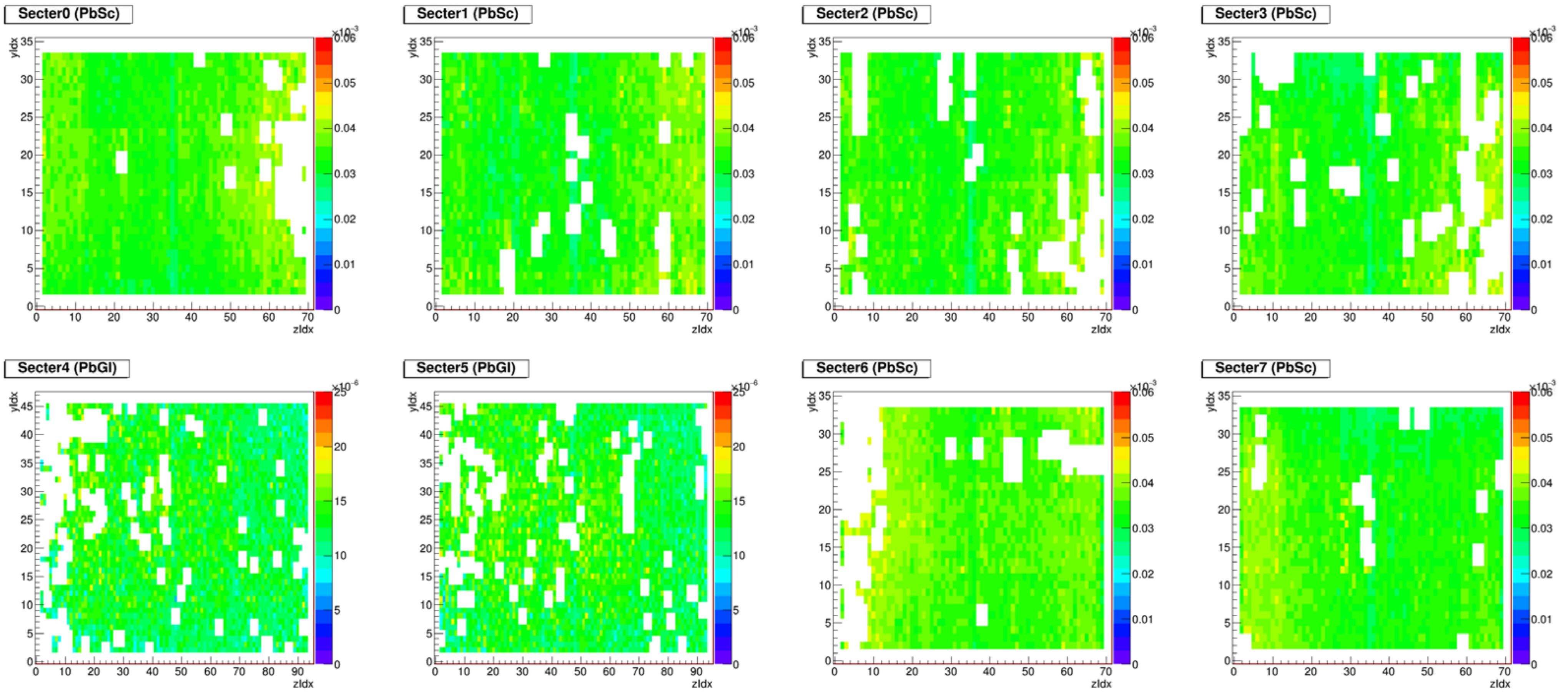
RICH dead map



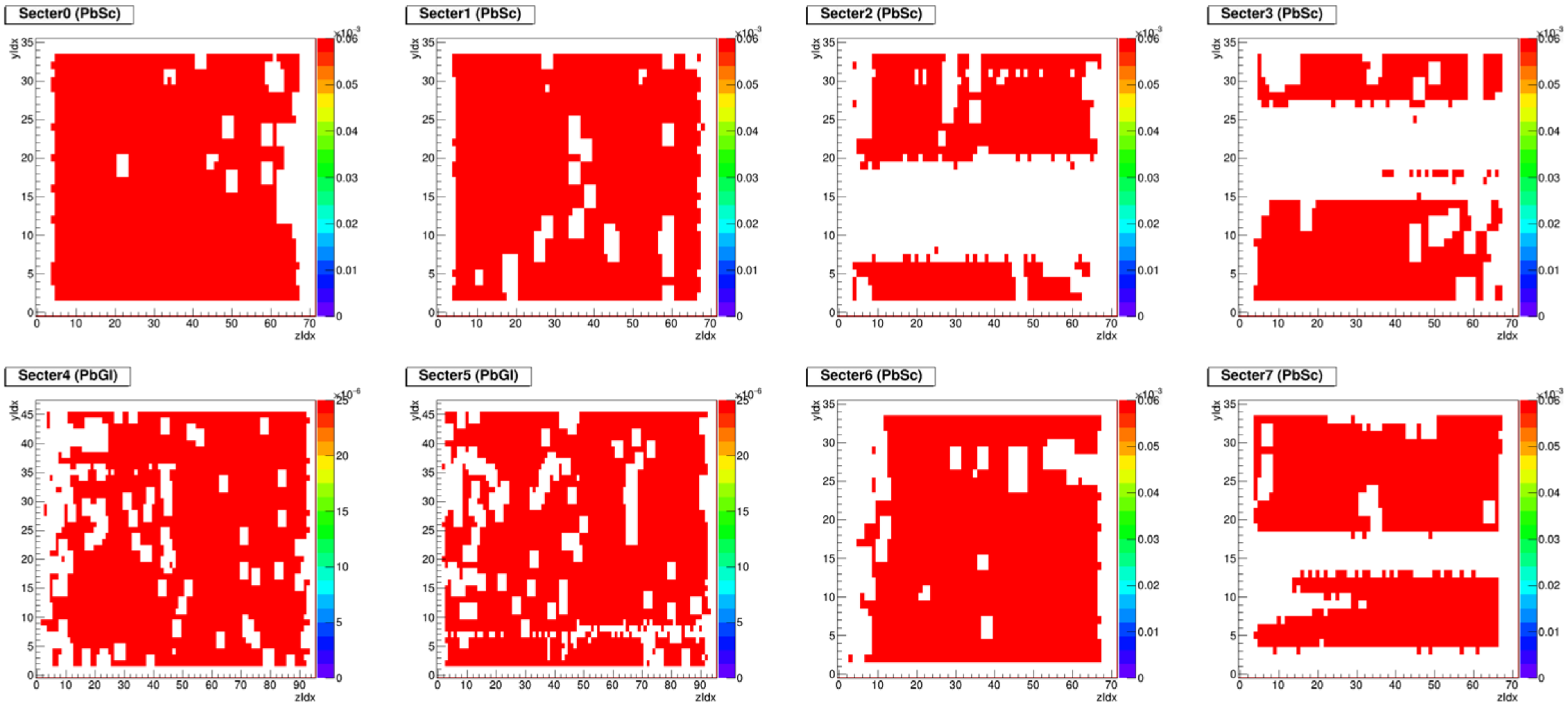
EMCal Distribution



EMCal Warnmap Check



EMCal hit distribution for Simulation



Acc. X Rec. efficiency

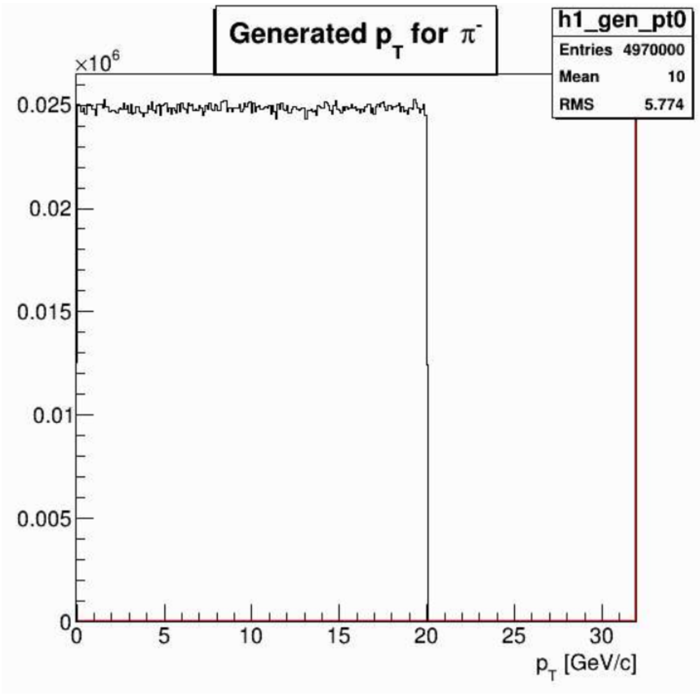
Without EMCal warnmap & Fiducial cut

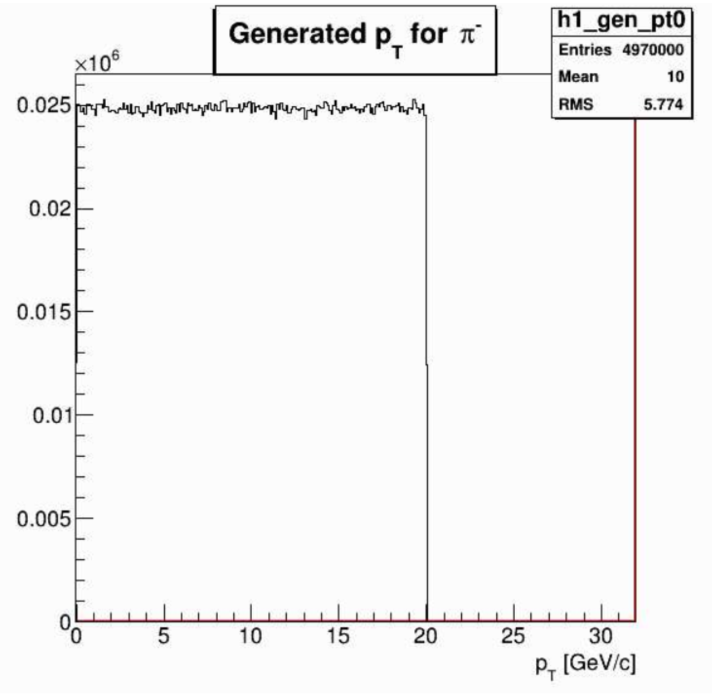
1. Single pi± generation

- Number of Pi± : 5,000,000 for each charge
- 0 < momentum < 20 GeV/c
- -0.5 < eta < 0.5
- 0 < pi < 2π
- Primary Vertex = (0,0,0)

Using Run15 without dead channels of DC, PC, RICH for test

2. Generated pions

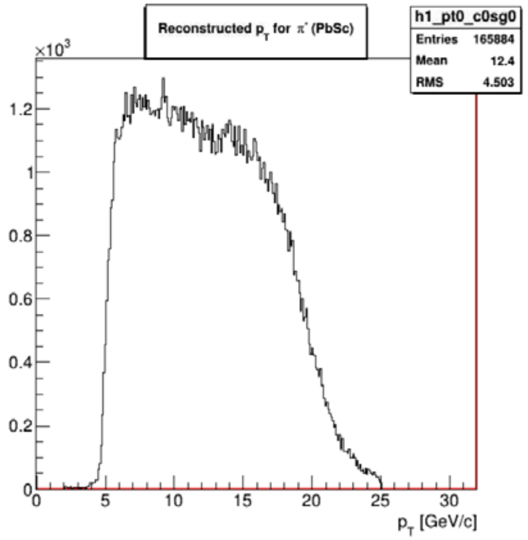


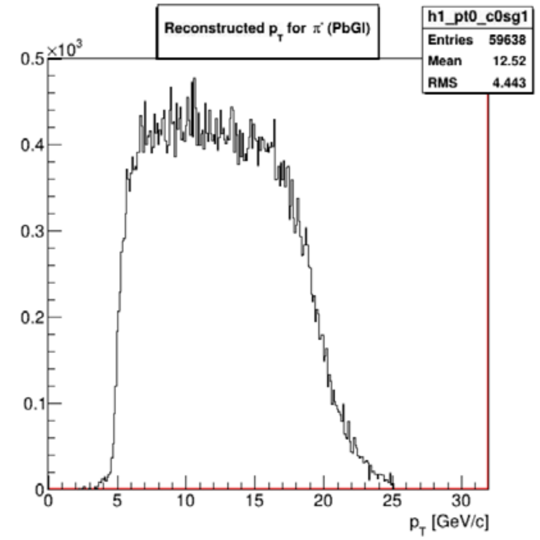


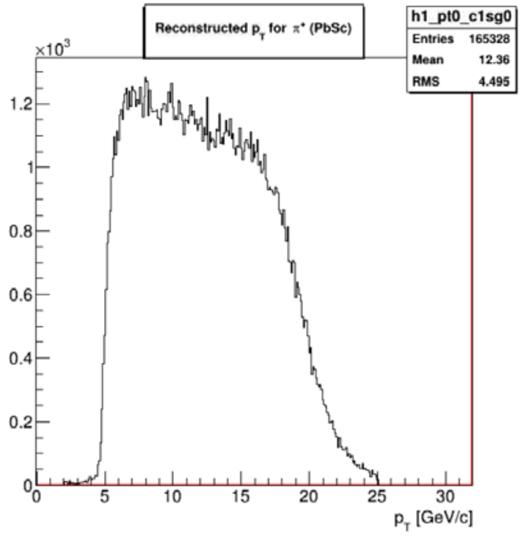
- $\pi^{\pm}$ Identication Cuts

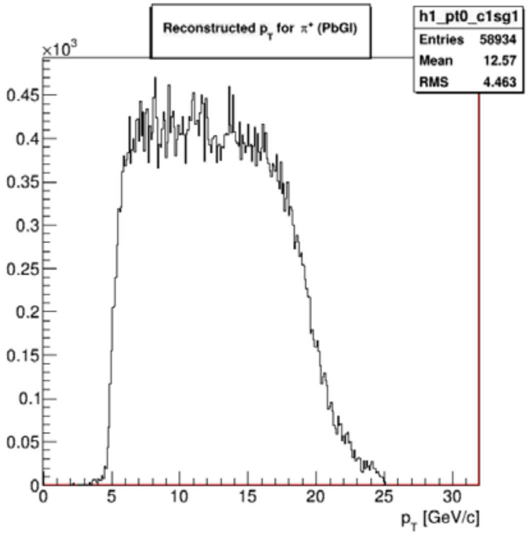
I. 2 < pT < 25 (GeV/c)
II. quality == 31 or 63
III. n1 >0
IV. $|BBCZ|<30\ (cm)$
V. $|DCZed|\ <\ 70\ (cm)$
VI. $Shower\ shape\ (prob)\ <\ 0.1$
VII. 0.2 < $emce/p$ < 0.8 sect > -9000

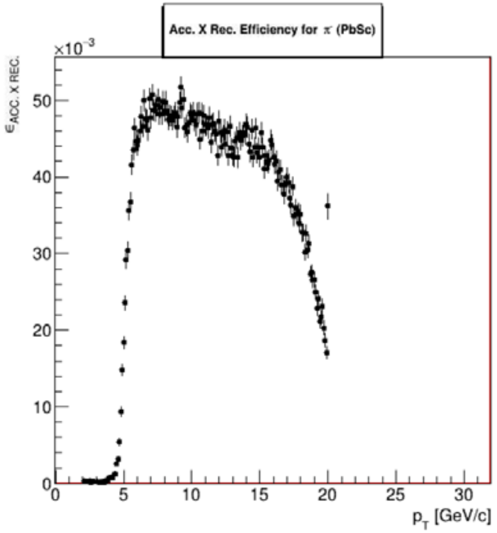
3. Reconstructed pions

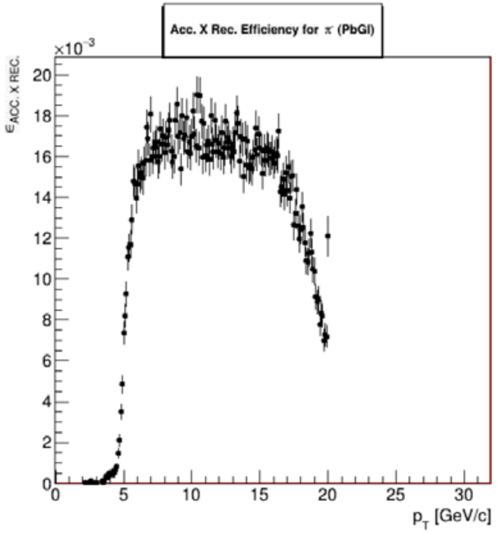


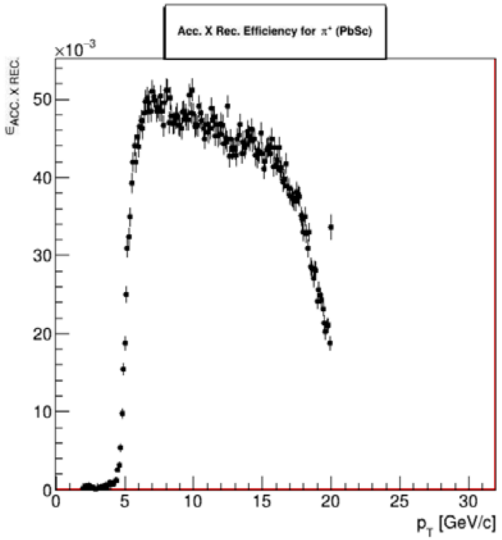


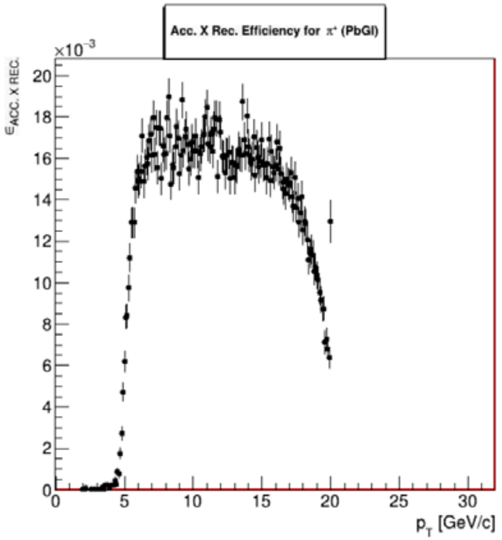




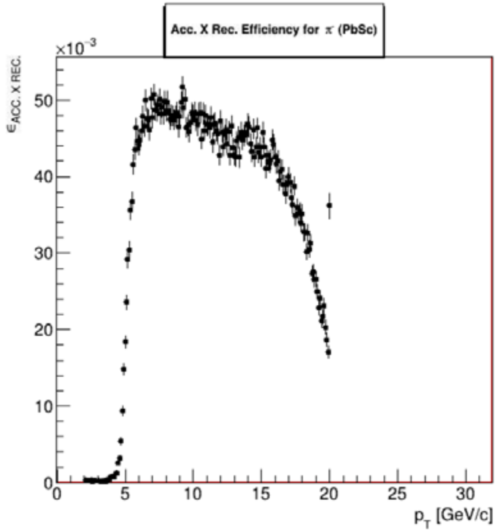


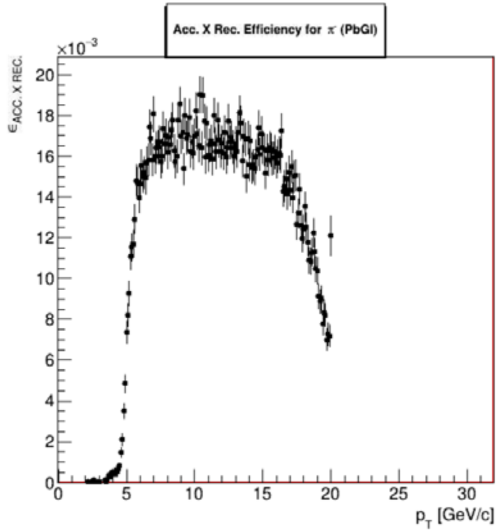




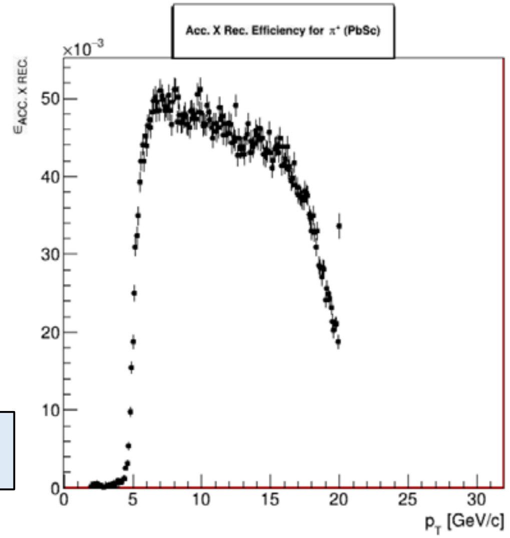


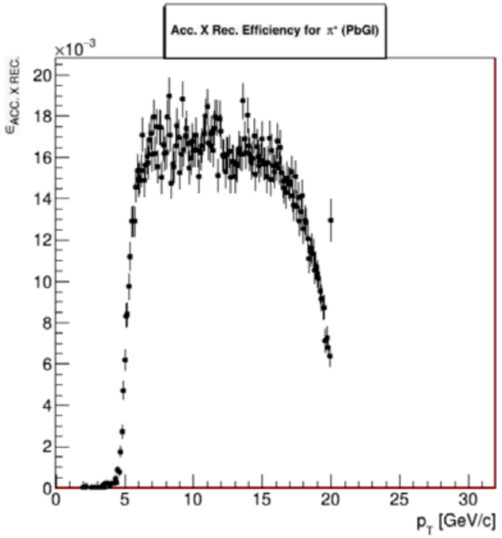
4. Compare with run13.



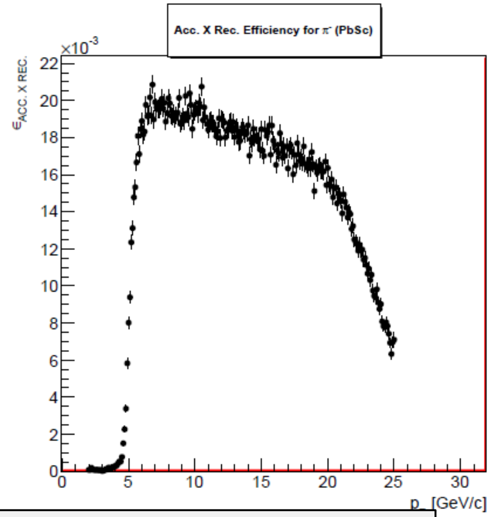


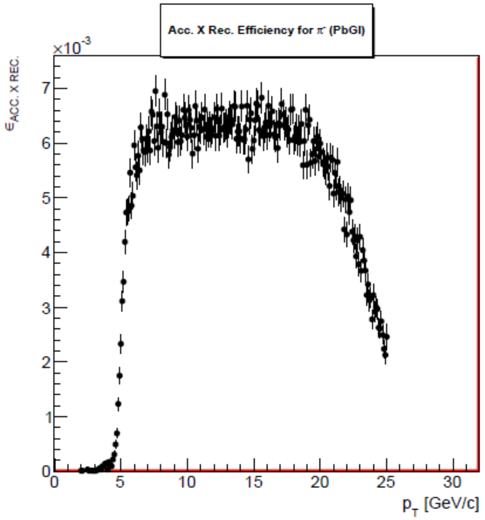
Run 15

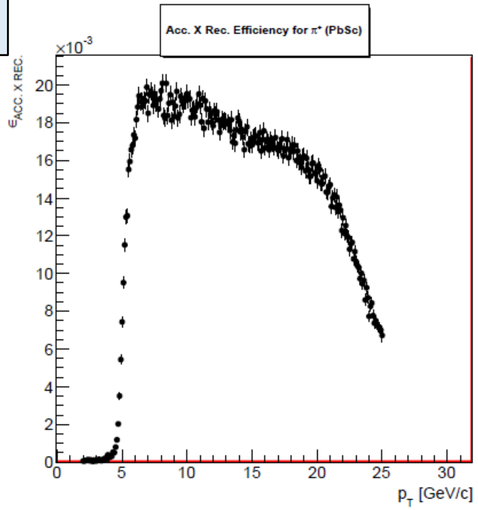


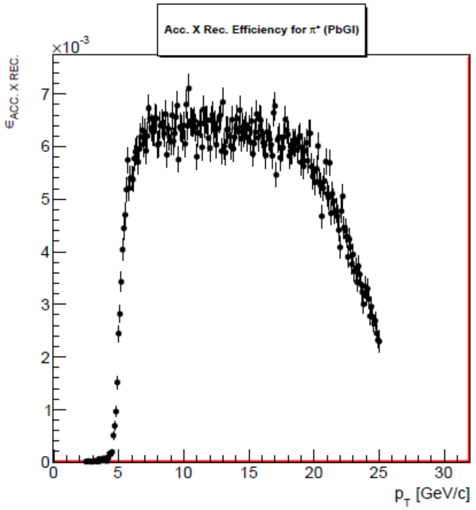


Run 13



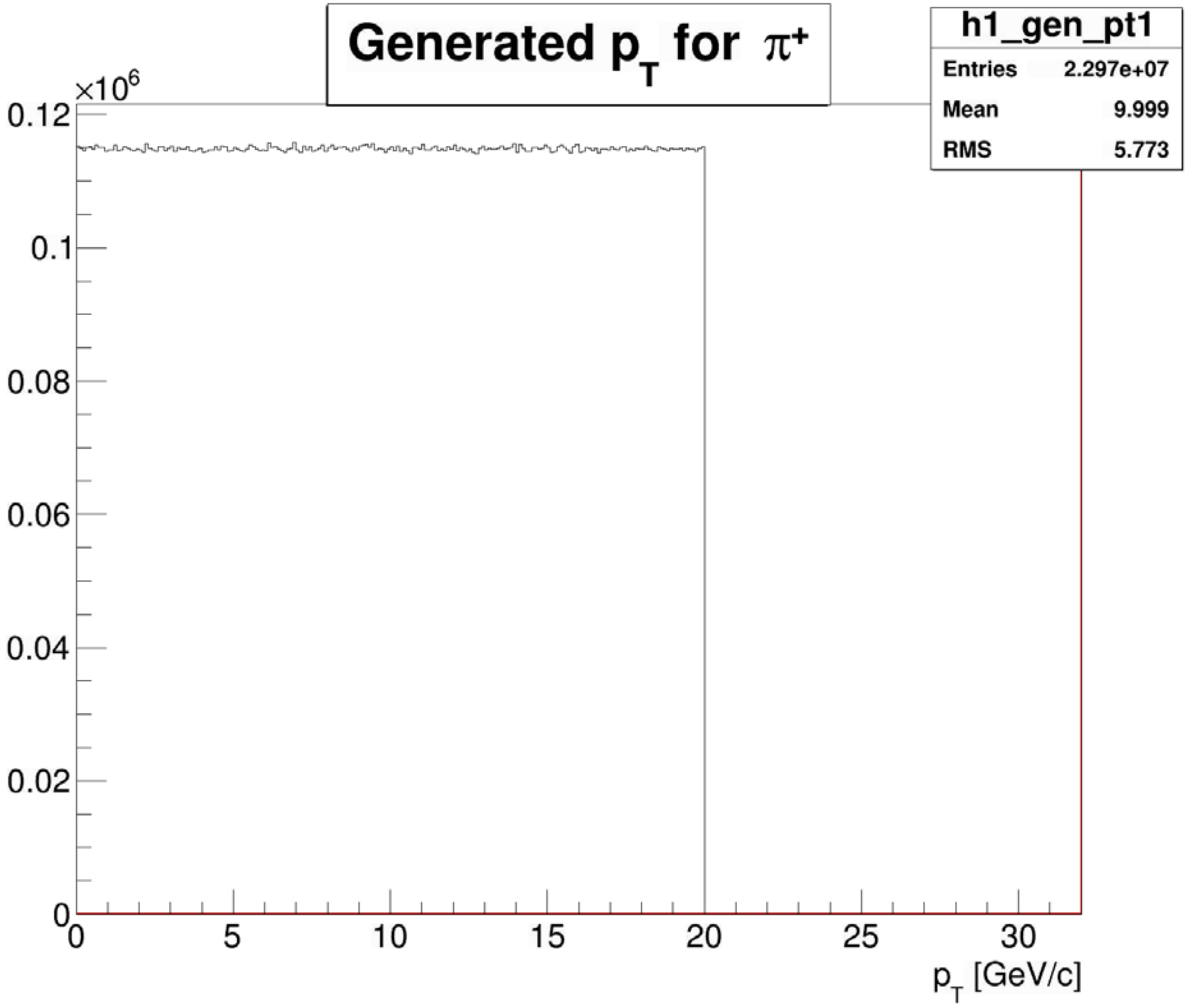




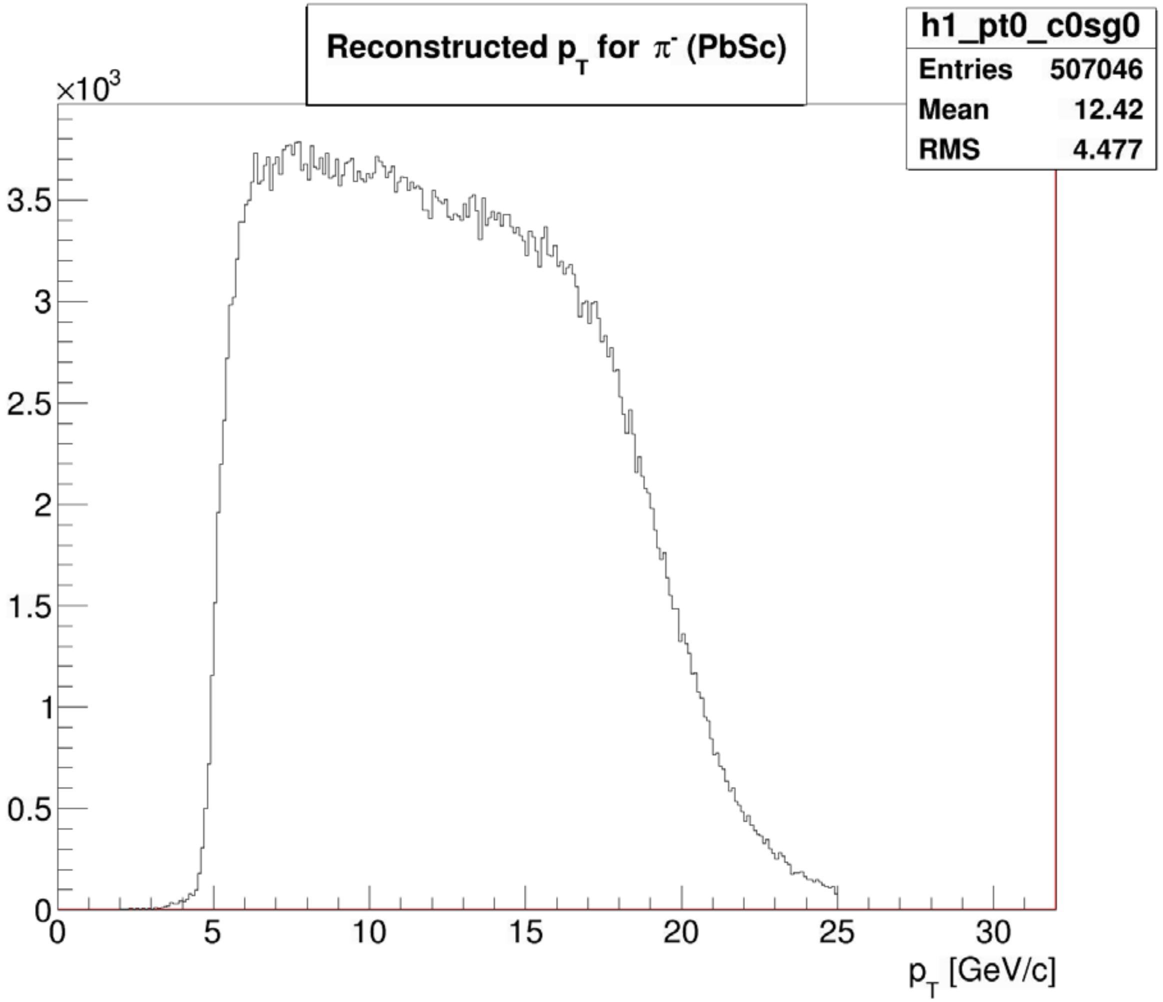


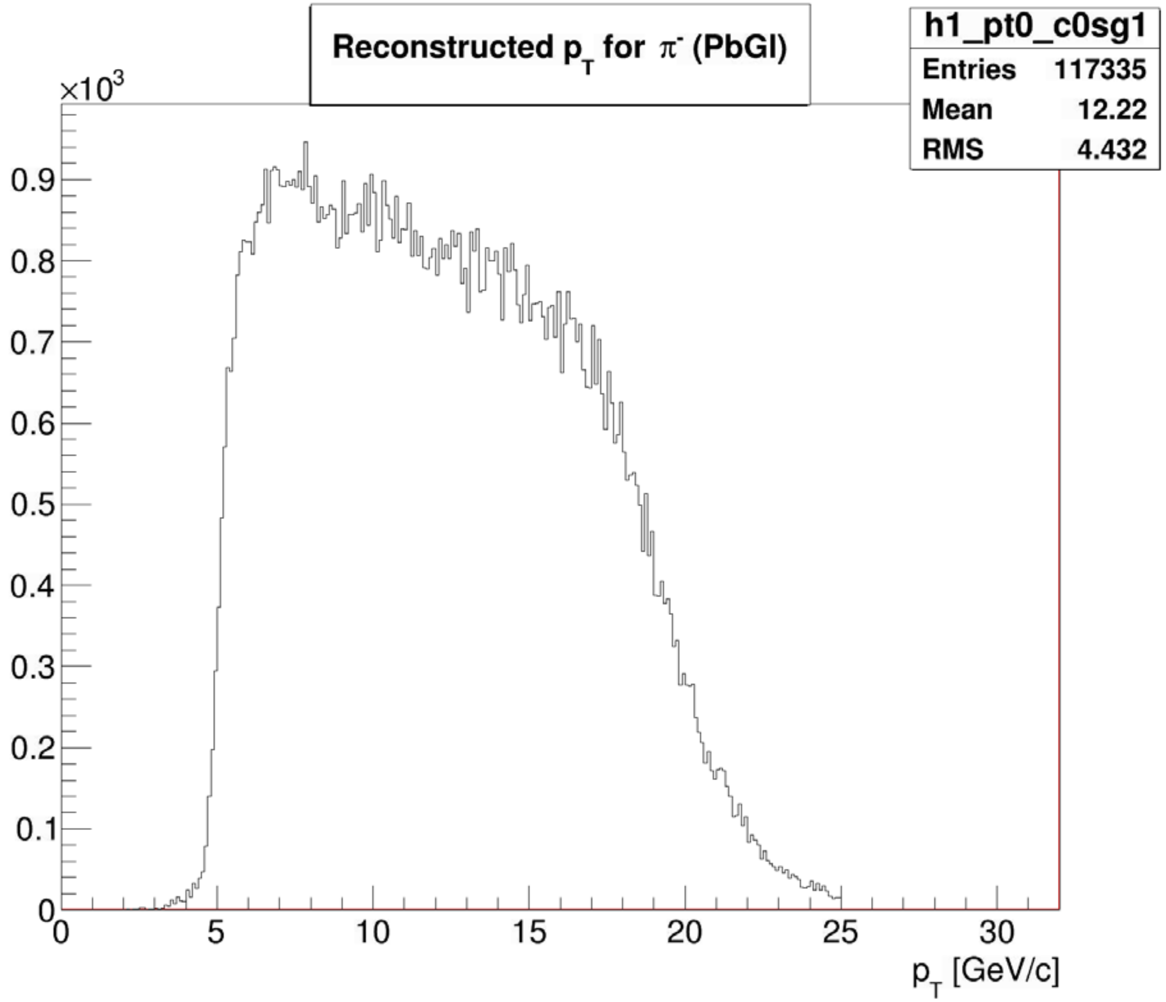
Taebong's analysis note

Generated pions

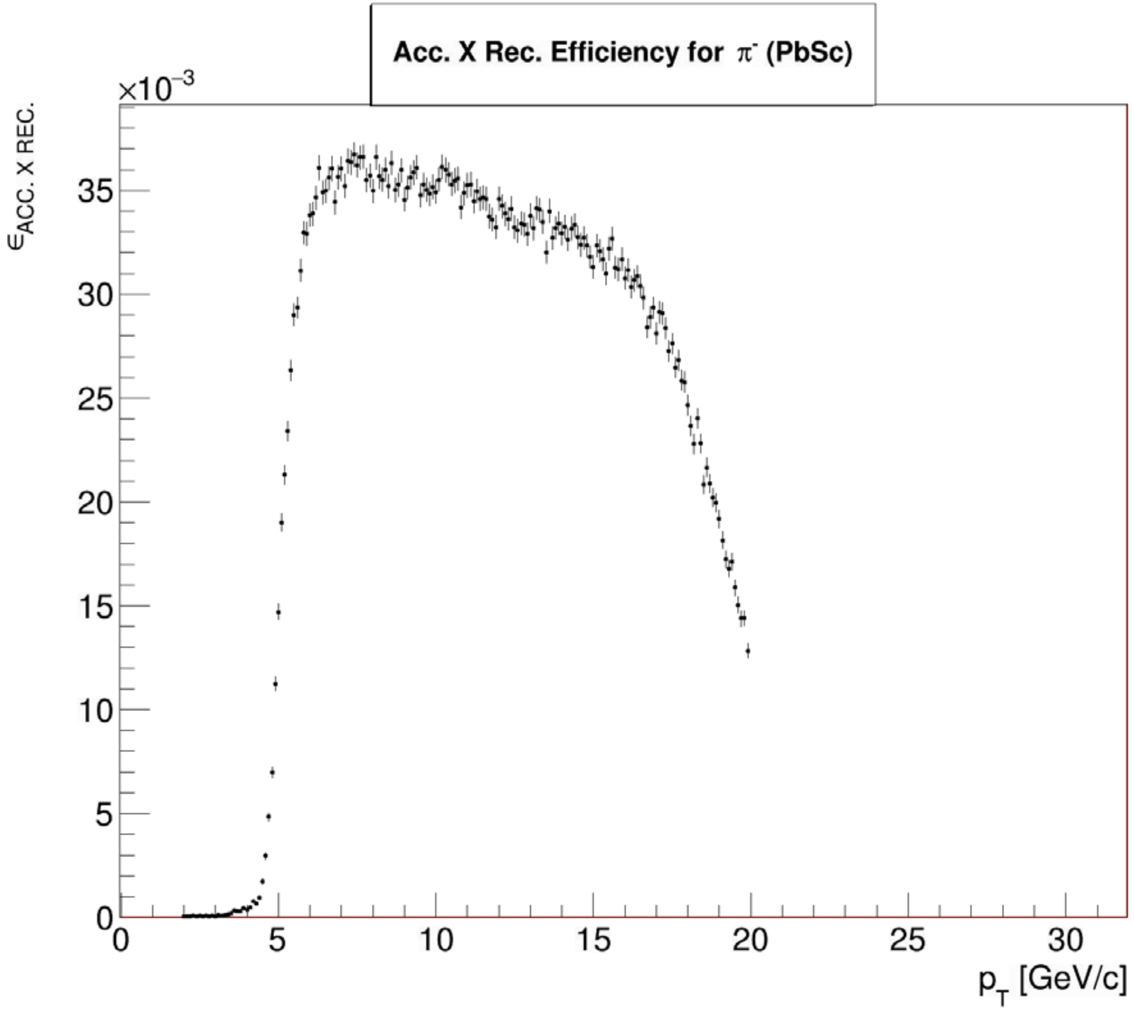


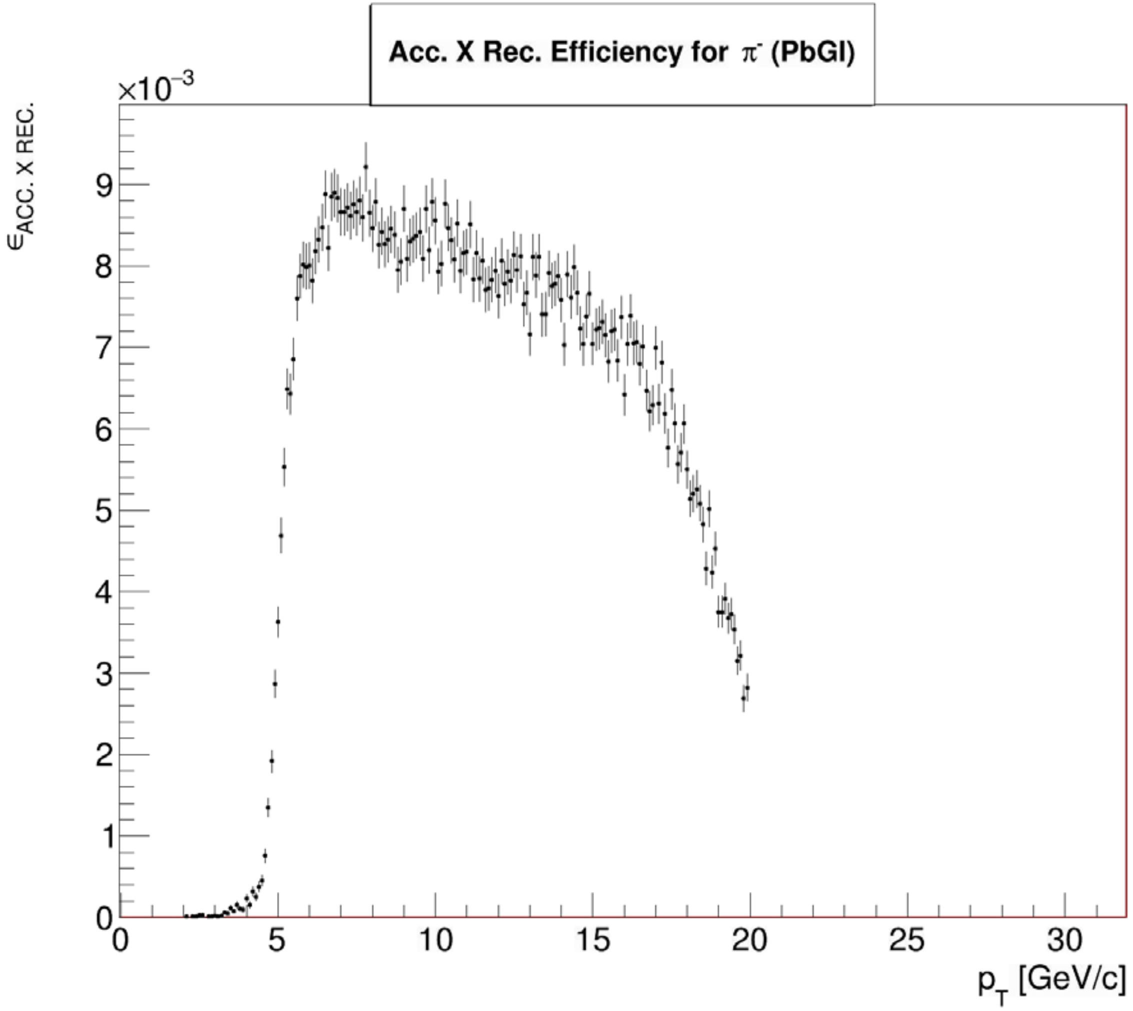
Reconstructed π⁻



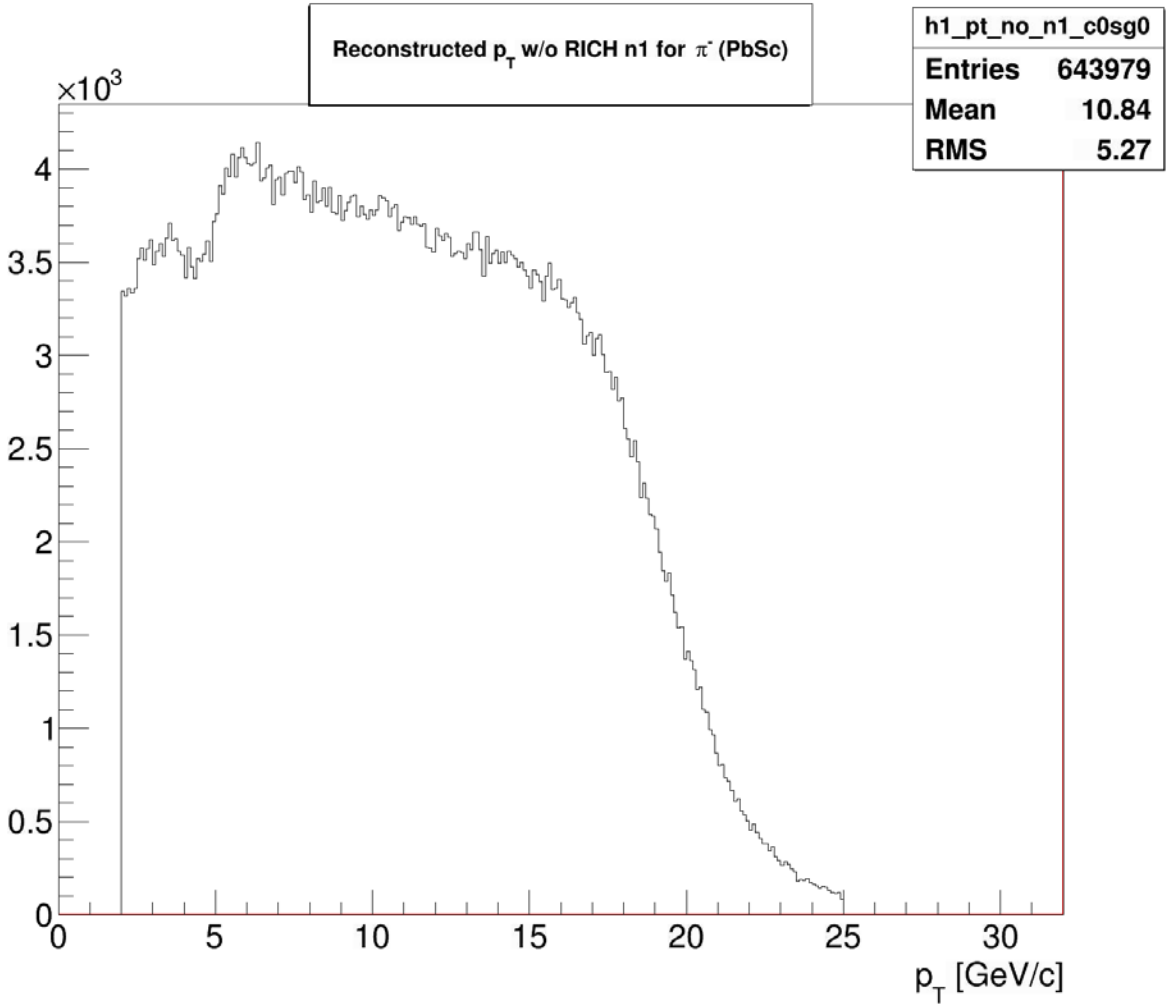


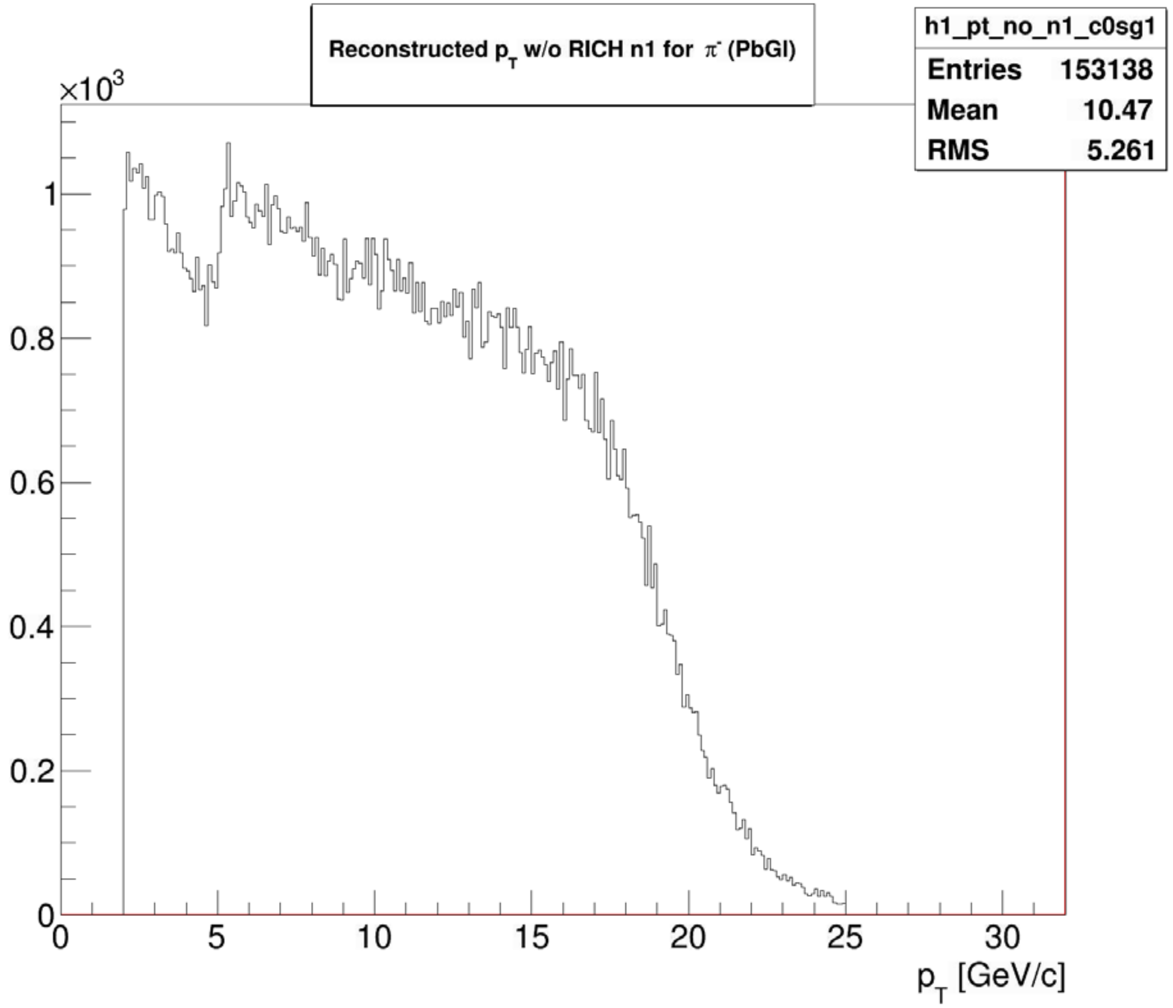
Acc. X Rec. efficiency for π^-



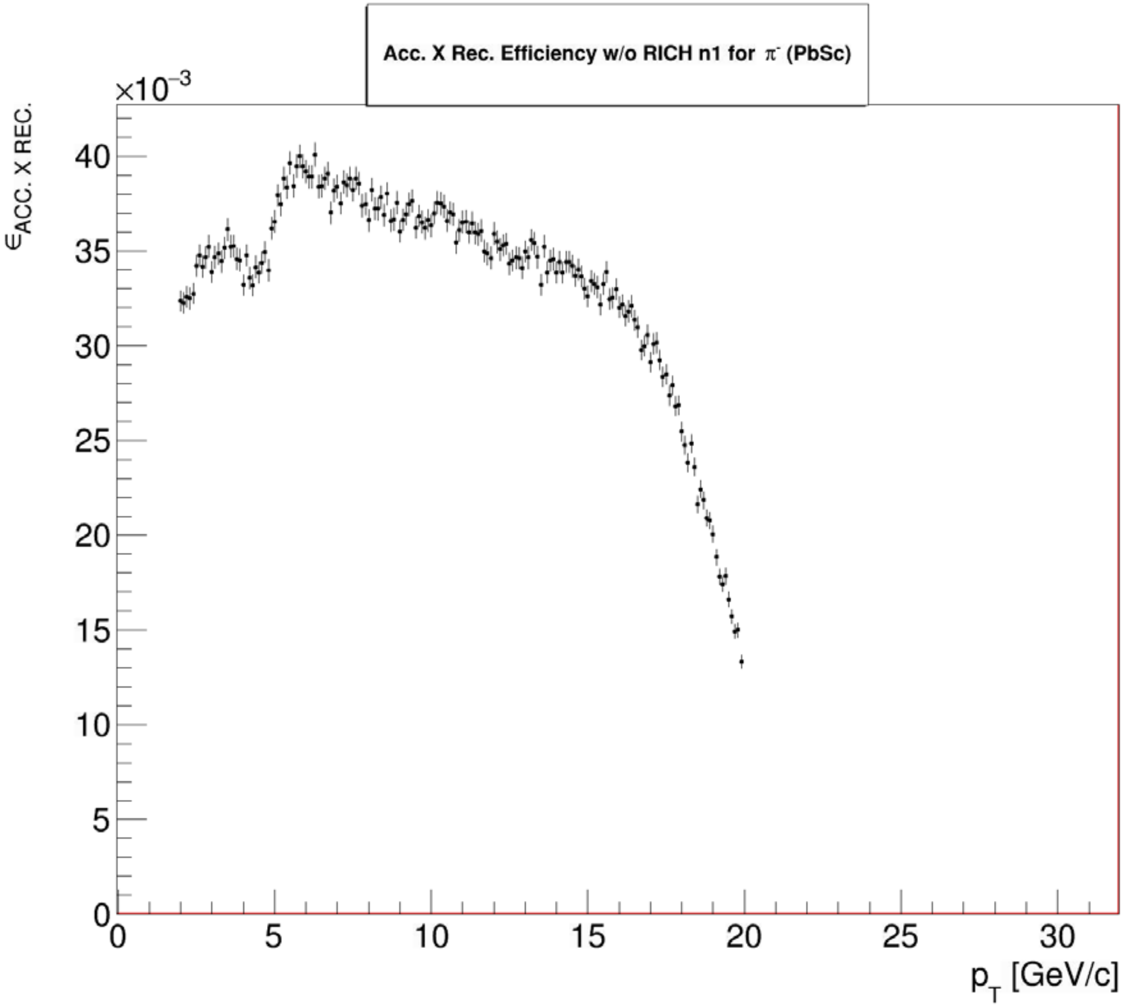


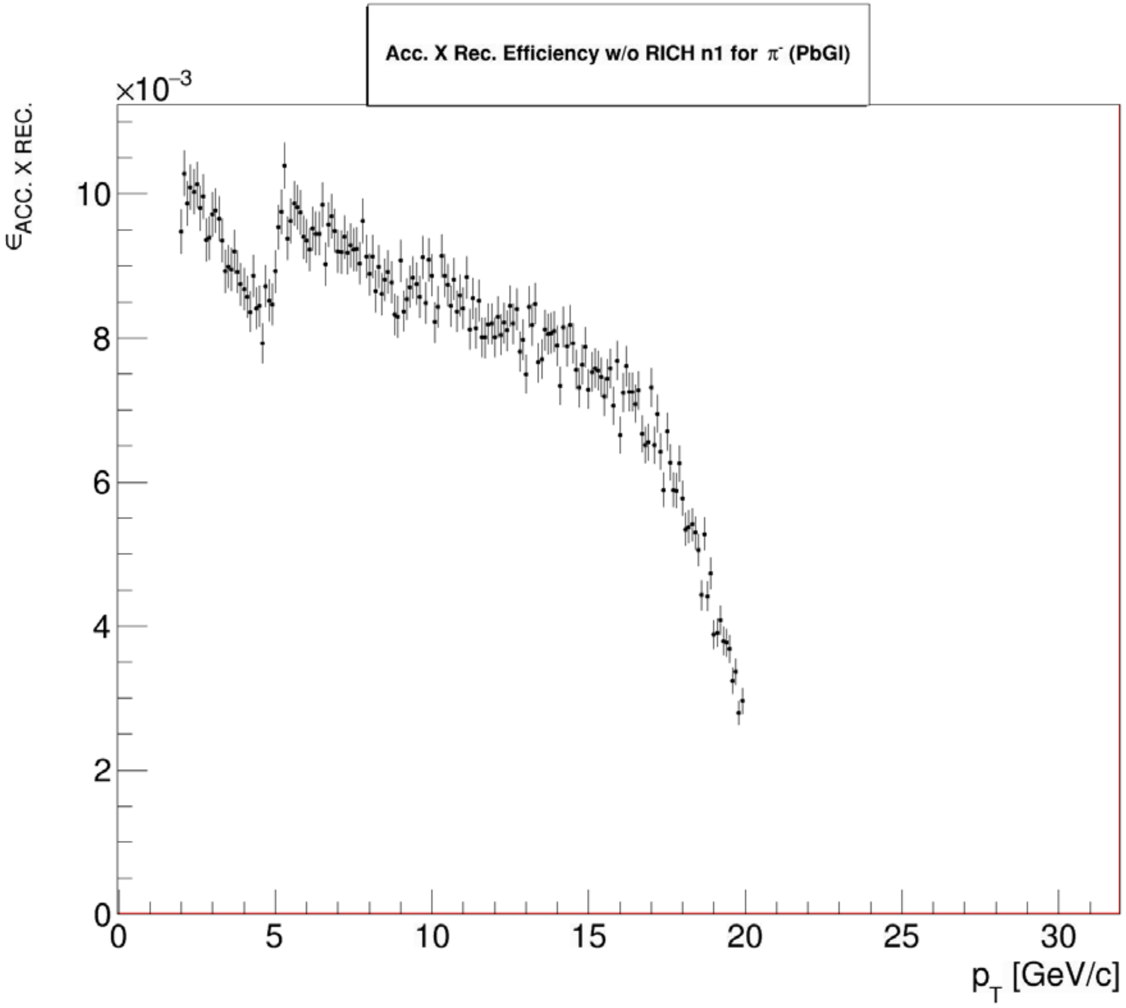
Reconstructed π^- without RICH n1 cut



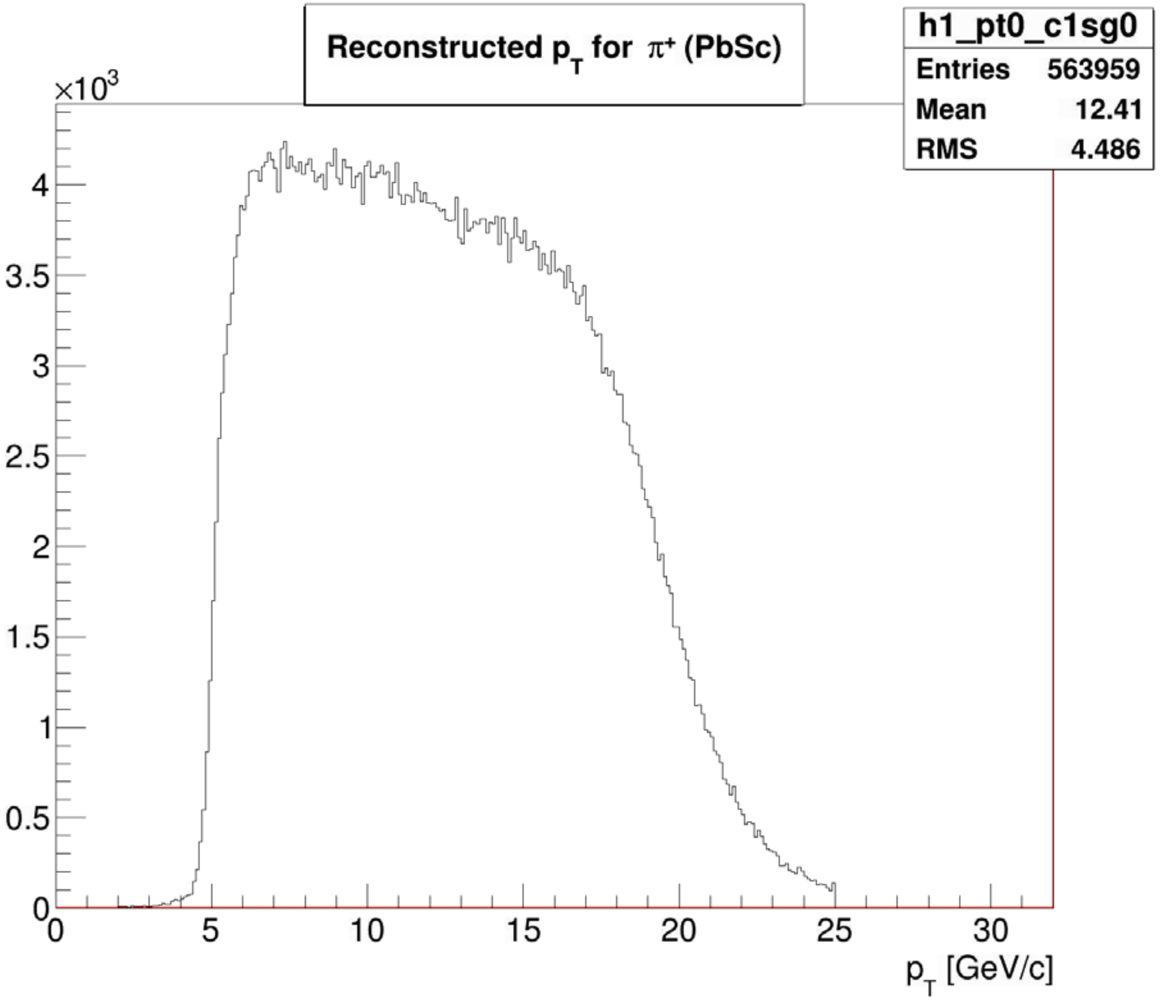


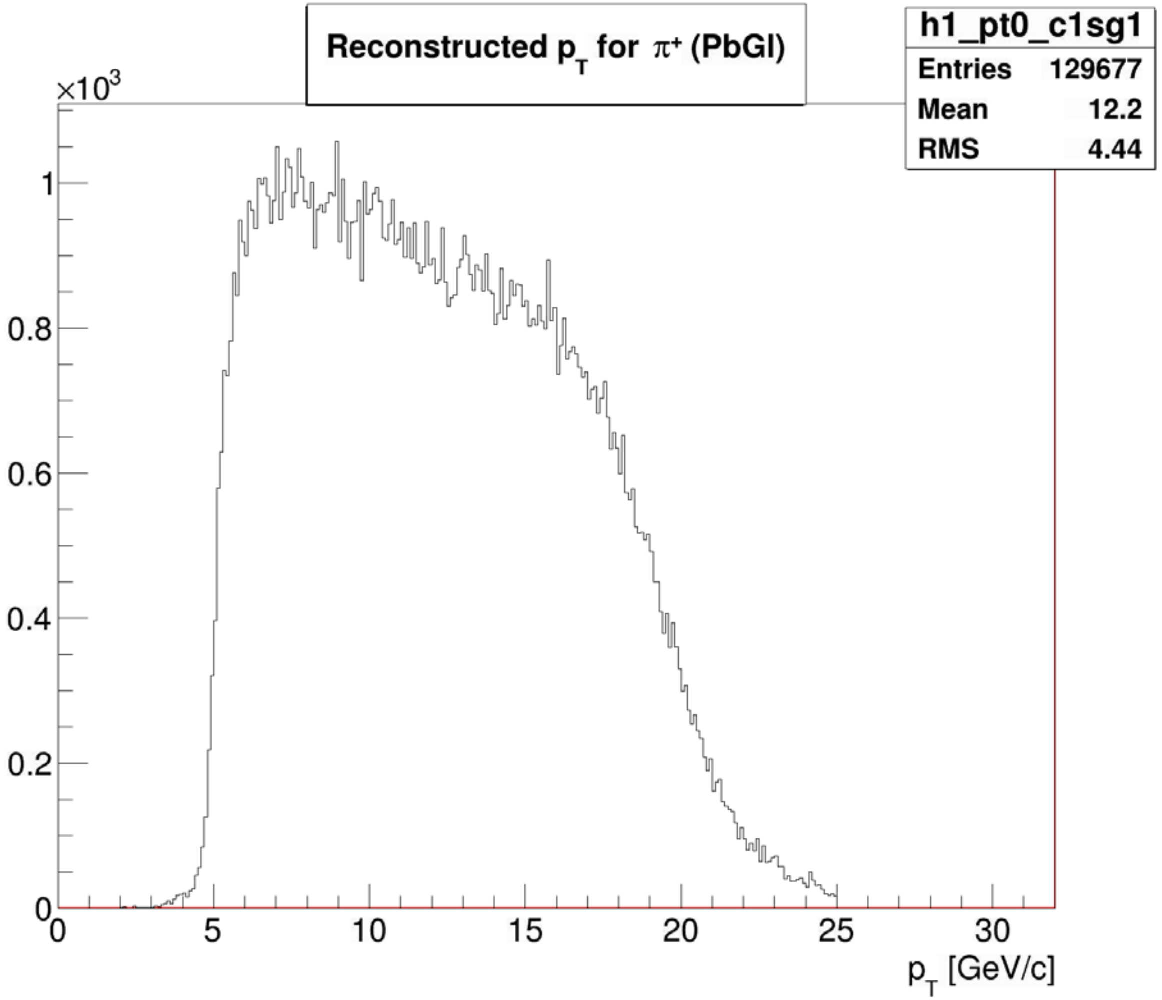
Acc. X Rec. efficiency for π^- without RICH



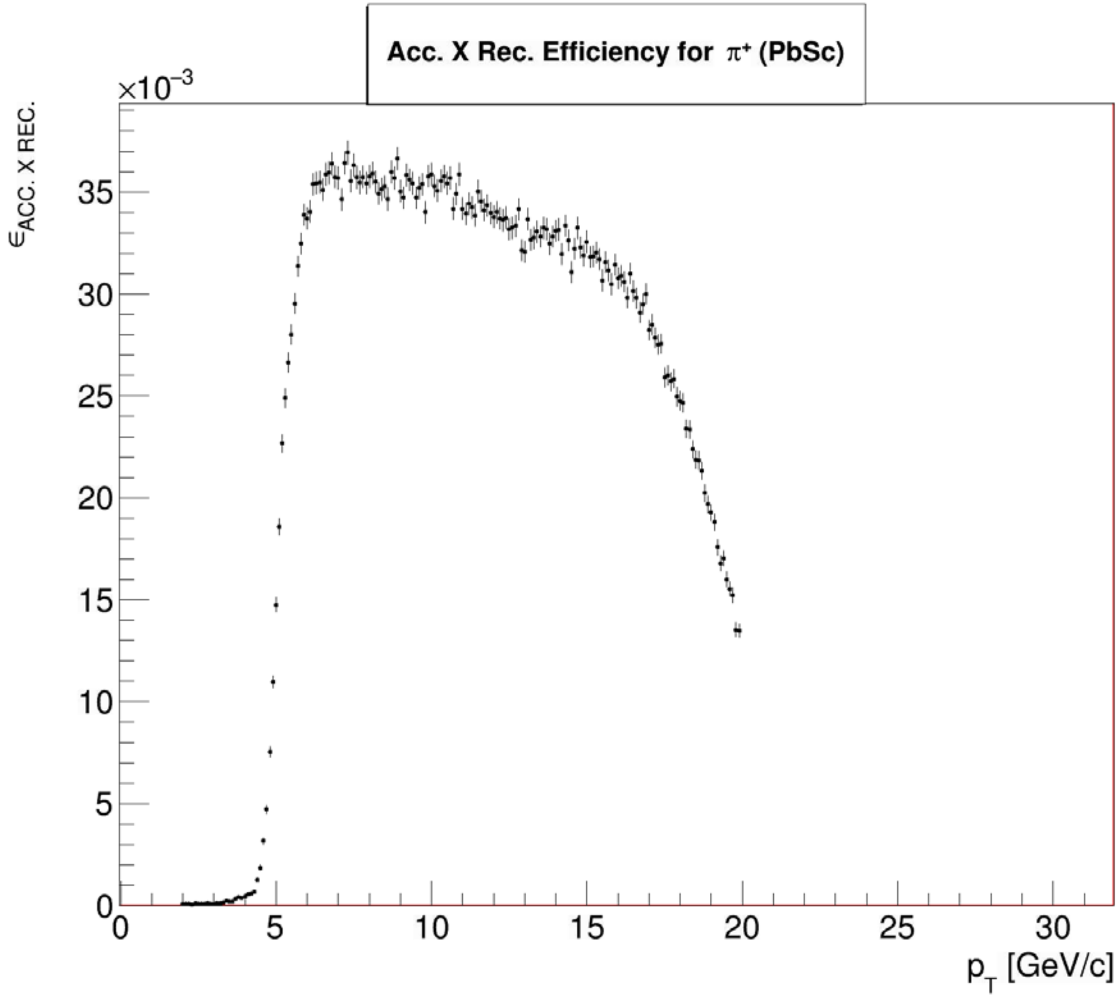


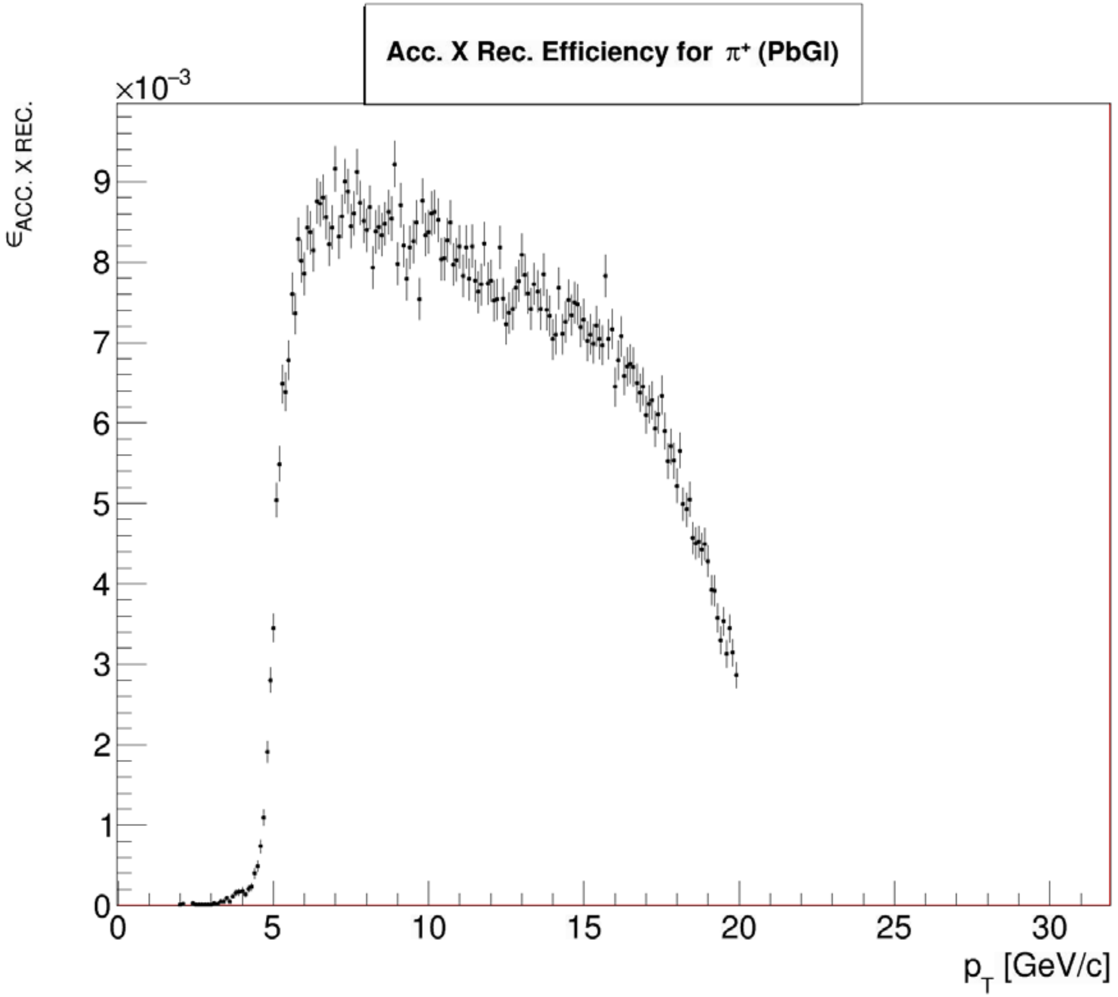
Reconstructed π^+



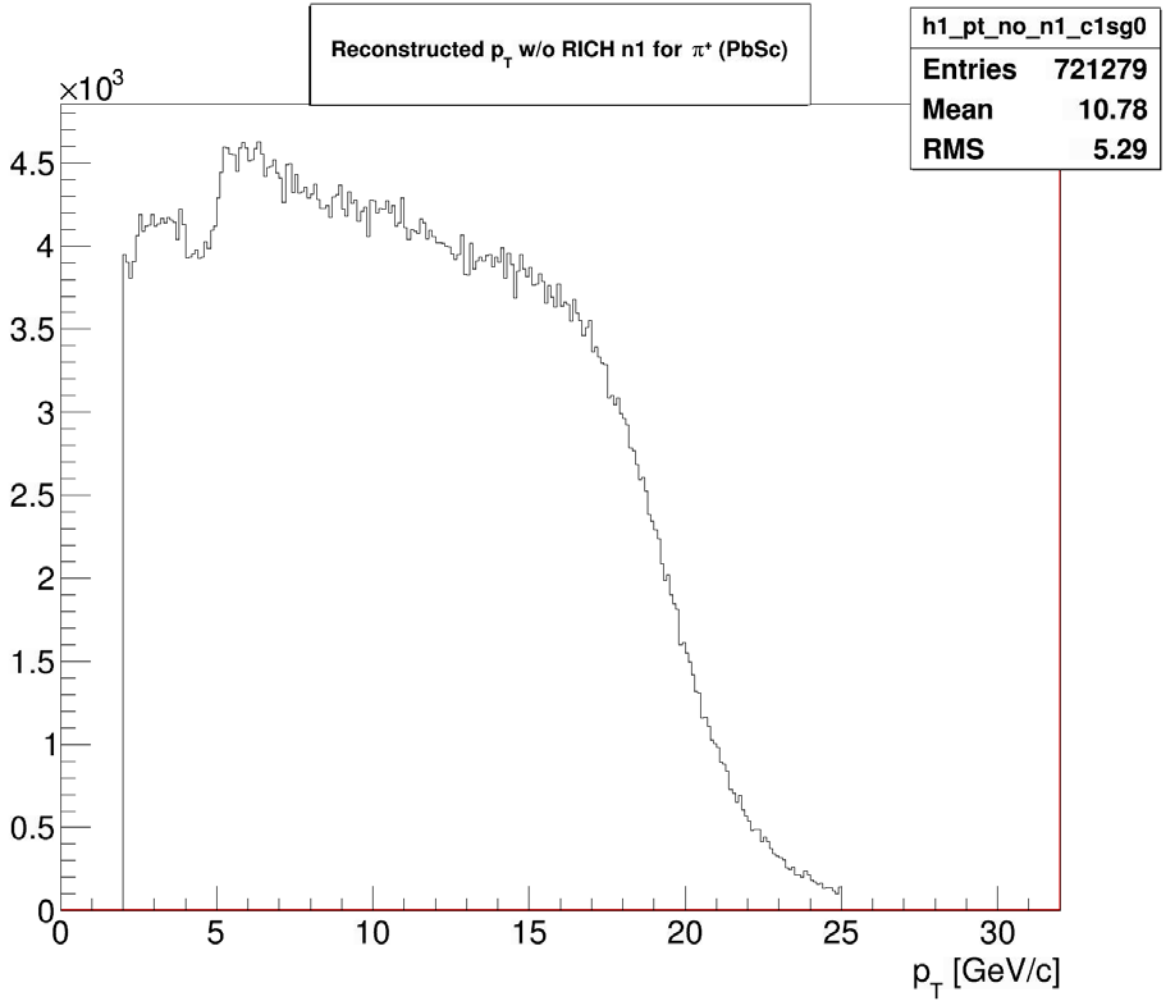


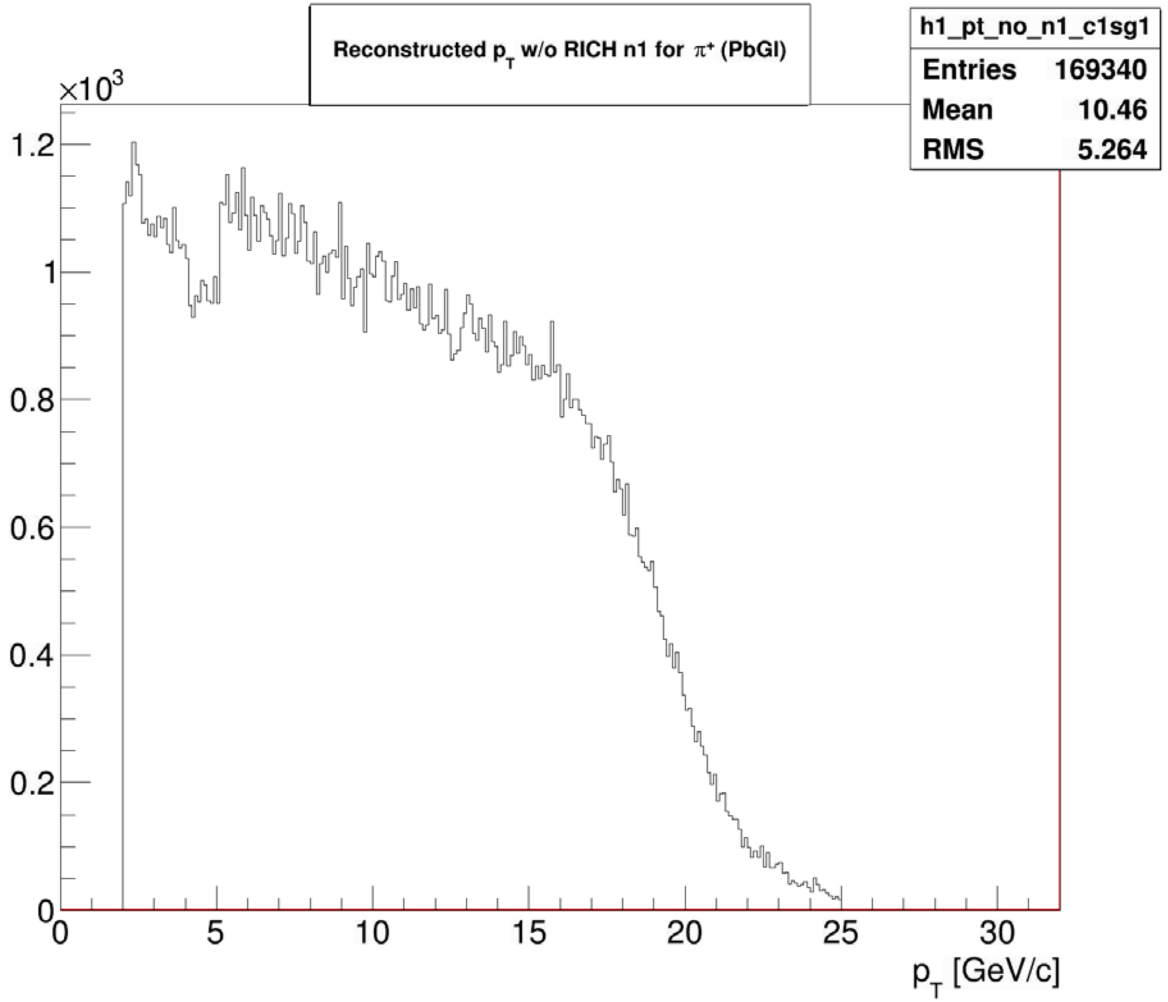
Acc. X Rec. efficiency for π^+



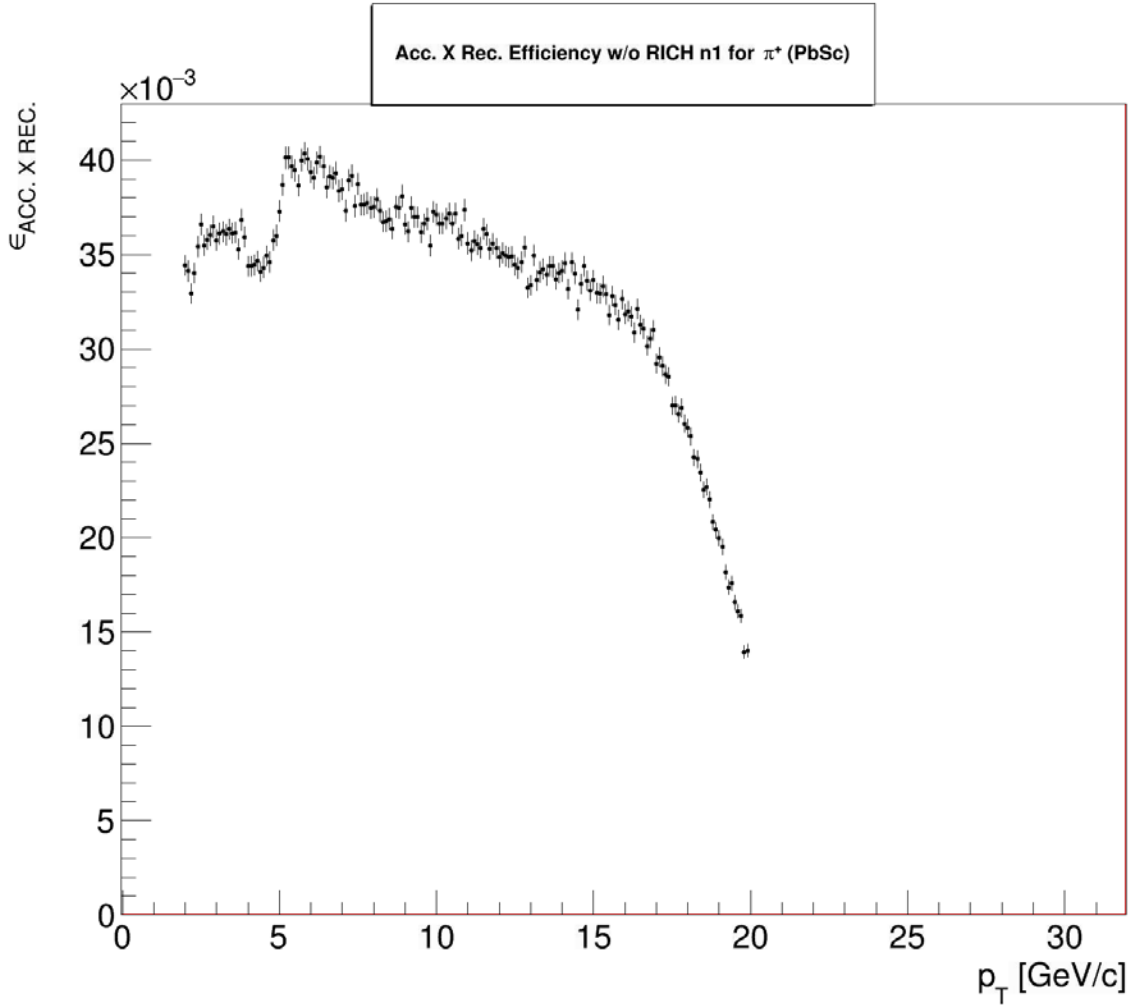


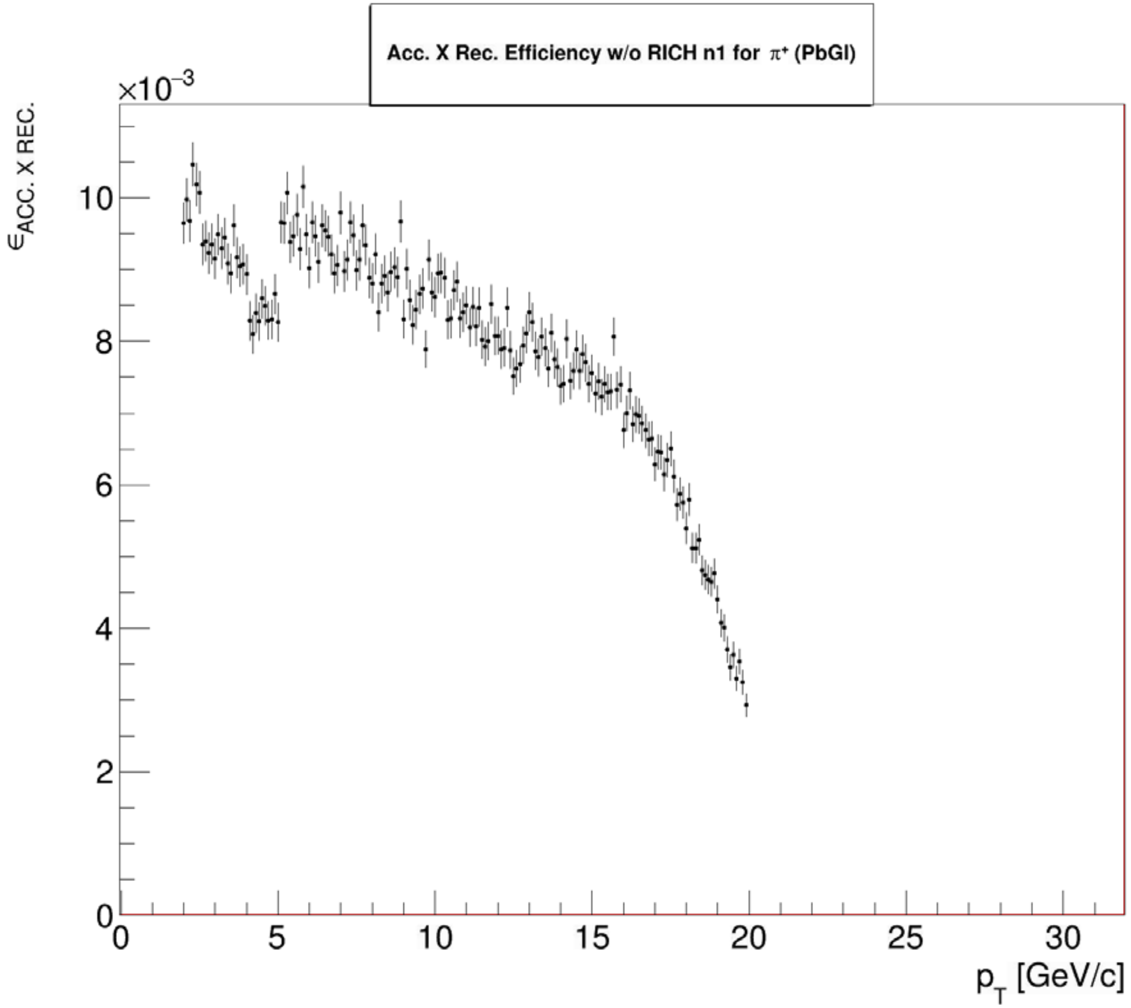
Reconstructed π^+ without RICH n1 cut



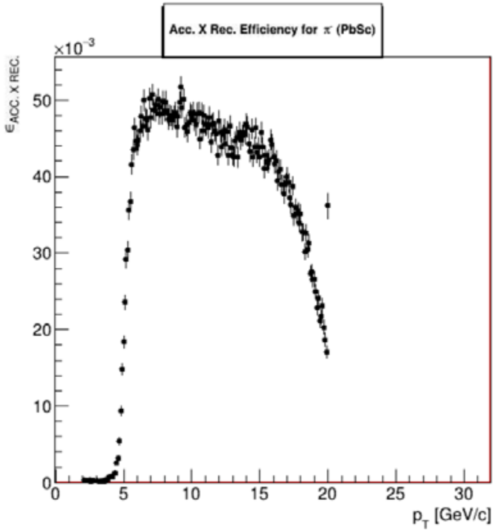


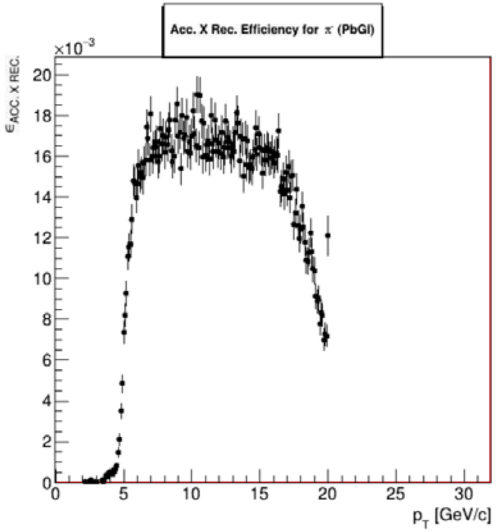
Acc. X Rec. efficiency for π⁺ without RICH



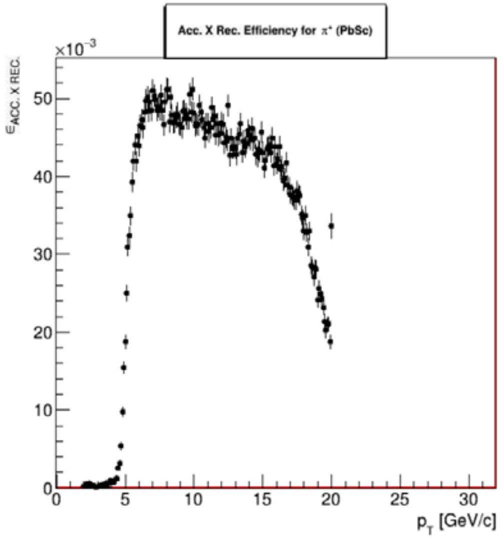


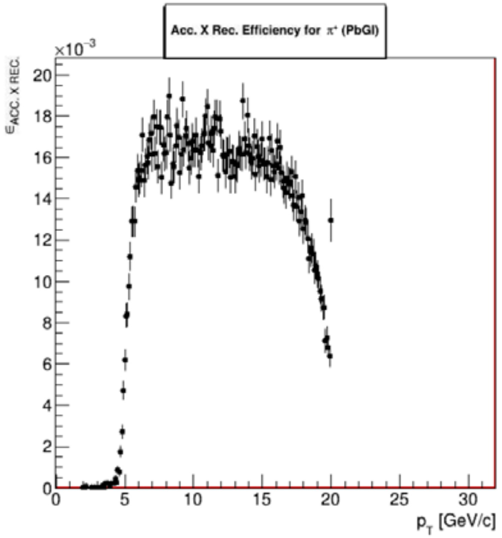
Comparision of masked EMCal warnmap or not



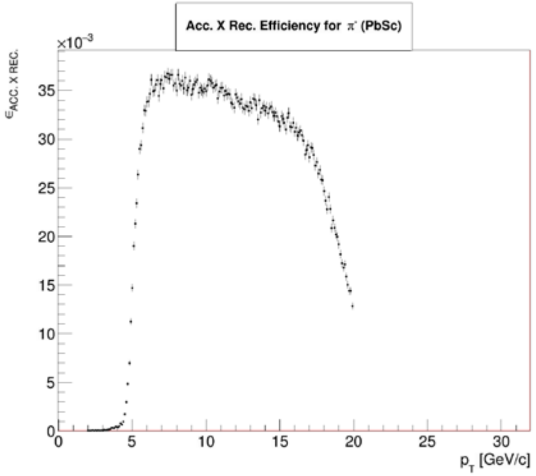


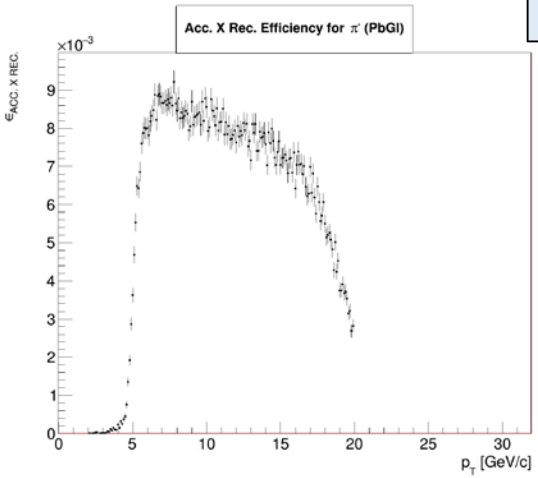
Without Warnmap

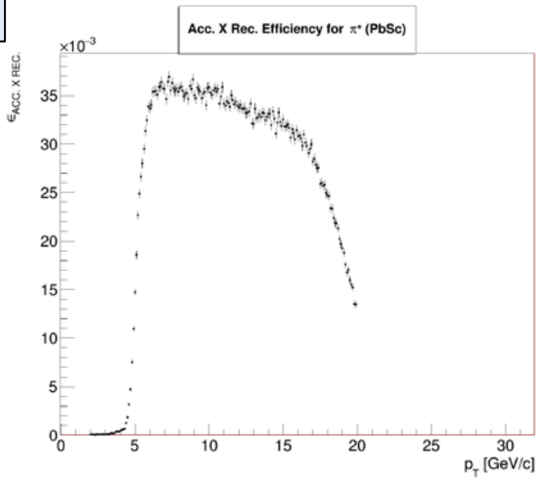


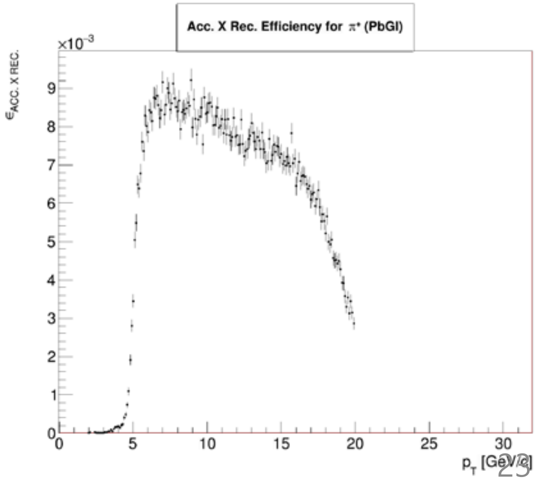


Applied Warnmap



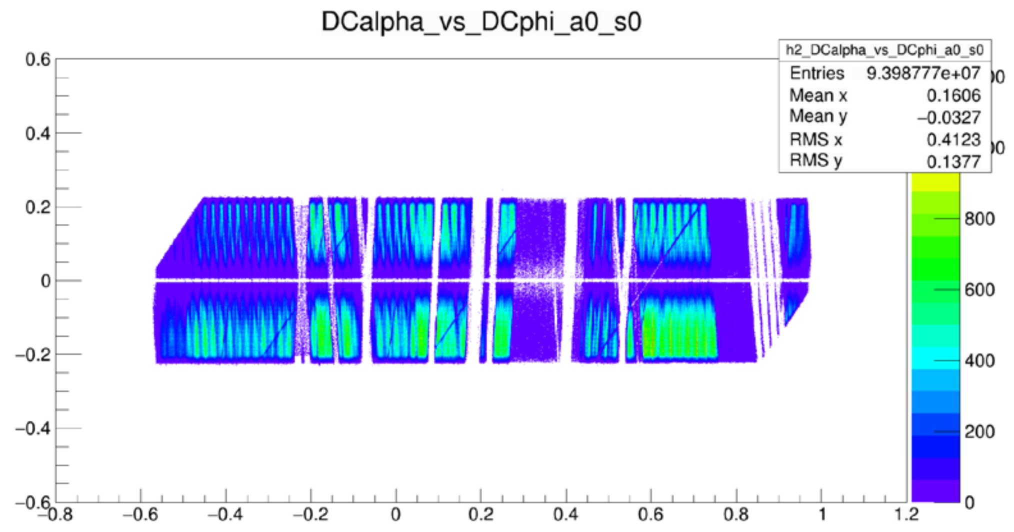


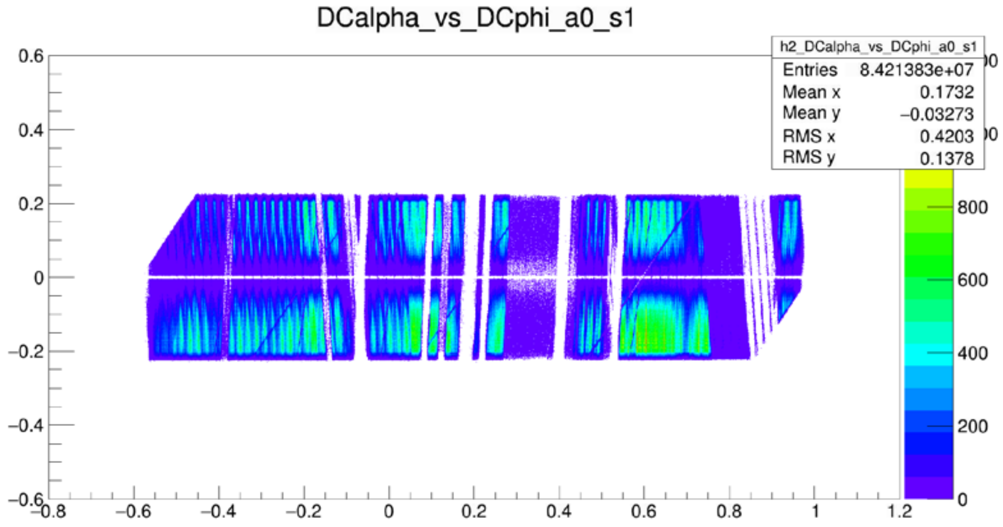




Fiducial cut

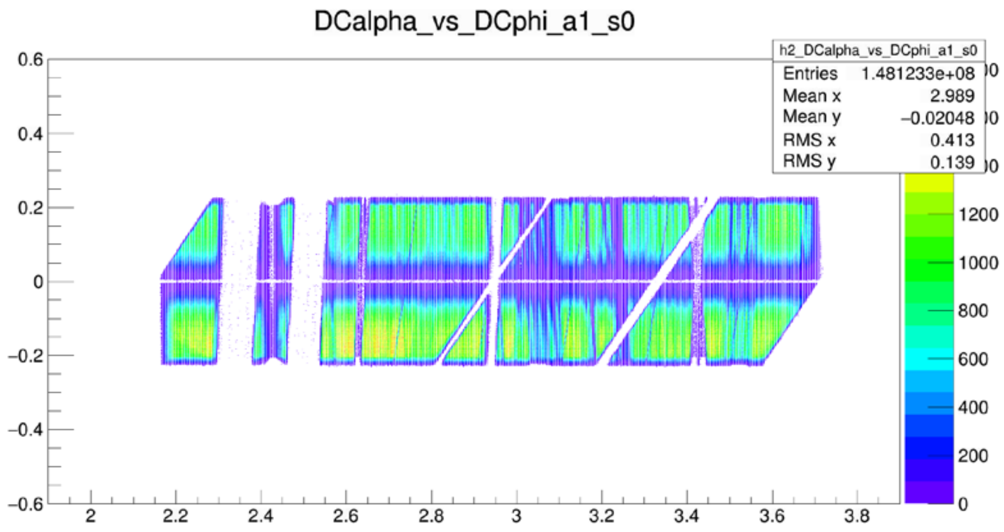
Comparision of masked EMCal warnmap or not

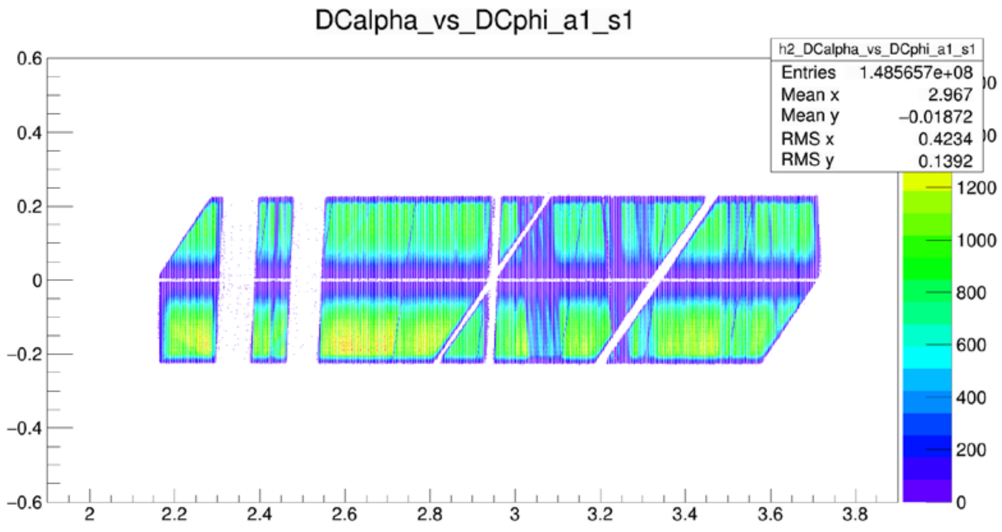




West

East





plan

1. Run QA	
2. calribration - EMCal gain matching (carried norbert) - PC calibration -	
3. Event selection - Convincing evidences of each cuts.	
4. Suvival rate true events Background rejection power	
4.1 trigger efficeiency calculation	
4.2 Simulation and recon_eff	12.01 ~ 05.07
5. Luminosity study	05.07 ~ 05.14
6. Cross section as function of pT compare with π^0	05.14 ~ 06.14
7. A_N spin anaysis +-	06.14 ~ 08.14
8. Systematic error	08.14 ~ 09.14
9. Preliminary	???

Thank you.

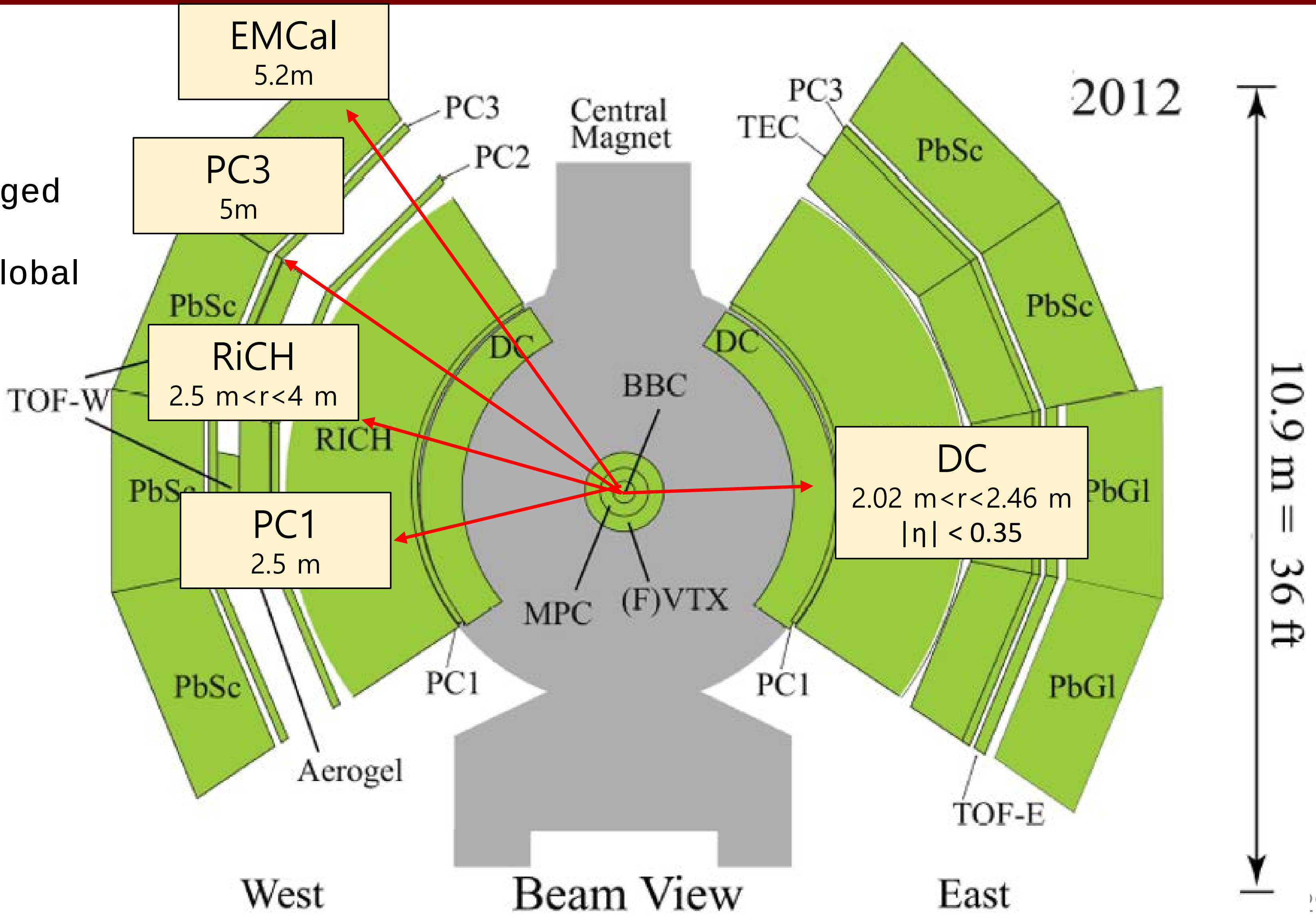
Back up

Drift Chamber for PHENIX

- **Main purpose:**
  - Precise measurement of the charged particle's momentum
  - Gives initial information for the global tracking in PHENIX

- **Acceptance:**
  - 2 arms 90º in ϕ each
  - ±90 cm in Z
  - 0.7 units of η

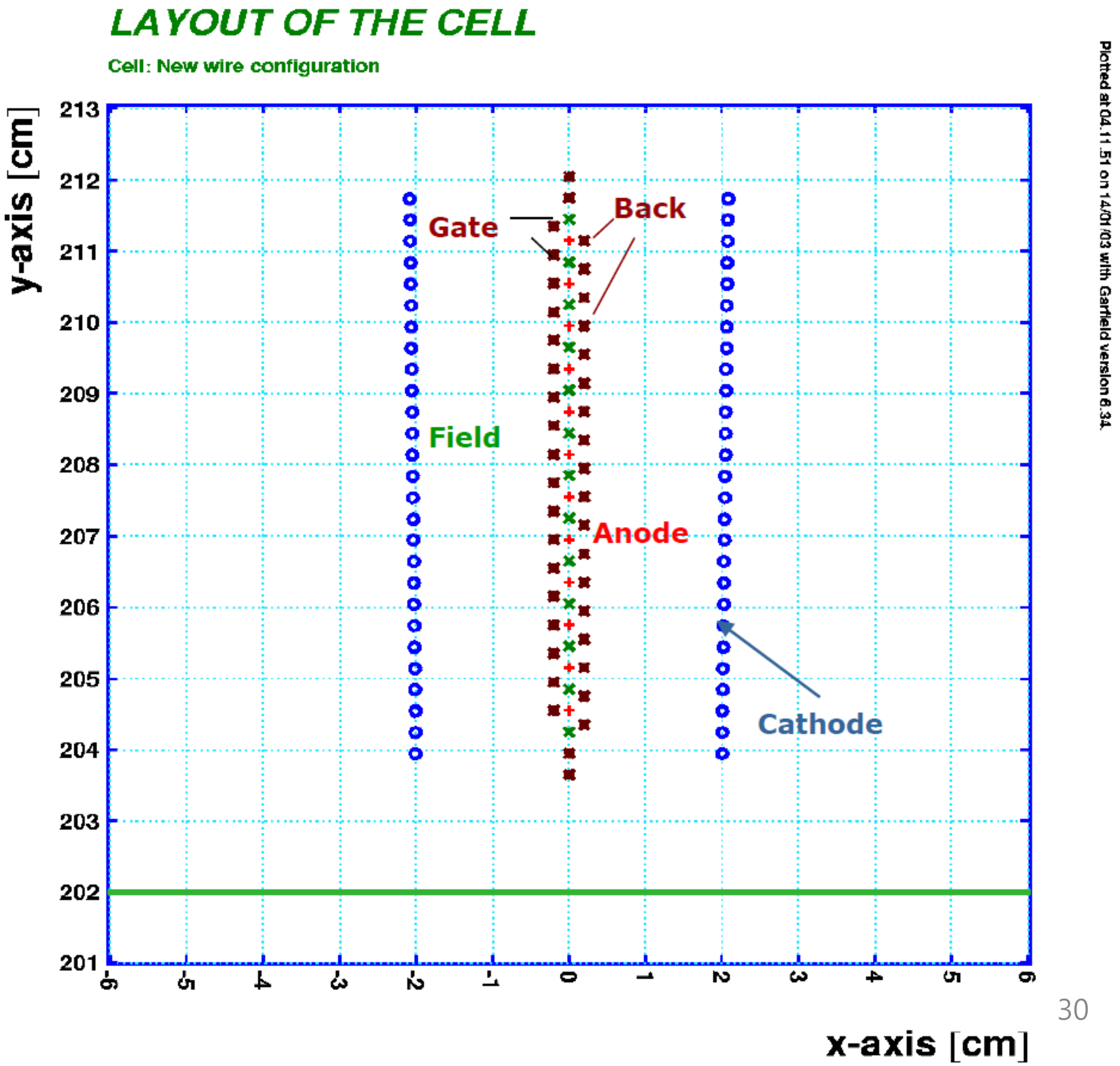
- **Location:**
  - Radial :2.02<R<2.48 m
  - Angular:
    - West: -34º < $\phi < 56º$
    - East : 125º < $\phi < 215º$



Drift field configuration

Specific field configuration around **anode wire** called drift region is created by “field forming” wires:

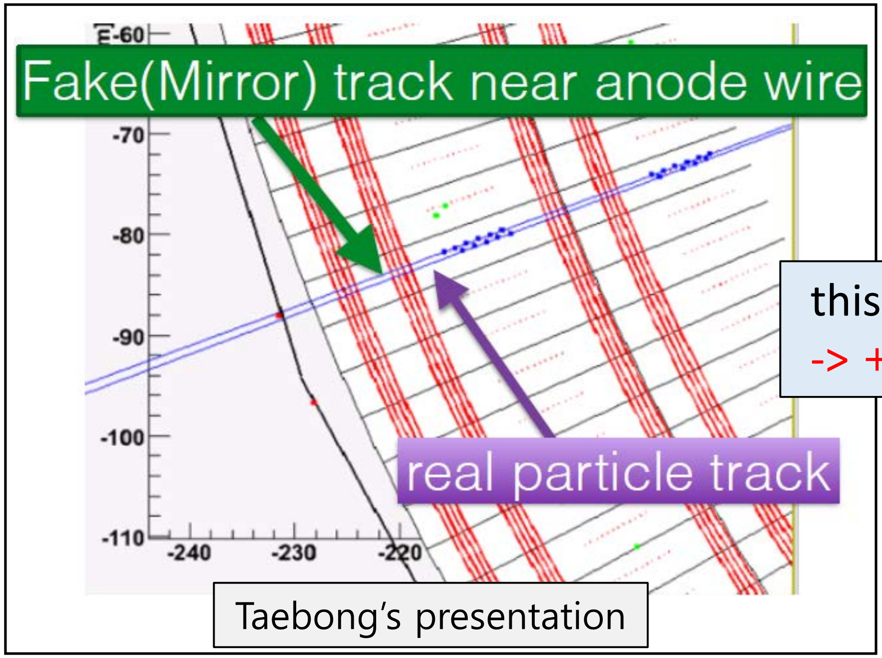
- **Cathode Wires** – Create uniform drift field between anode and cathode
- **Field Wires** – Create high electric field strength near the anode wire
- **Back Wires** – Stop drift from one side of the anode wire
- **Gate Wires** – Also create high field near the anode wire, Localize the drift region width



Drift Field Configuration

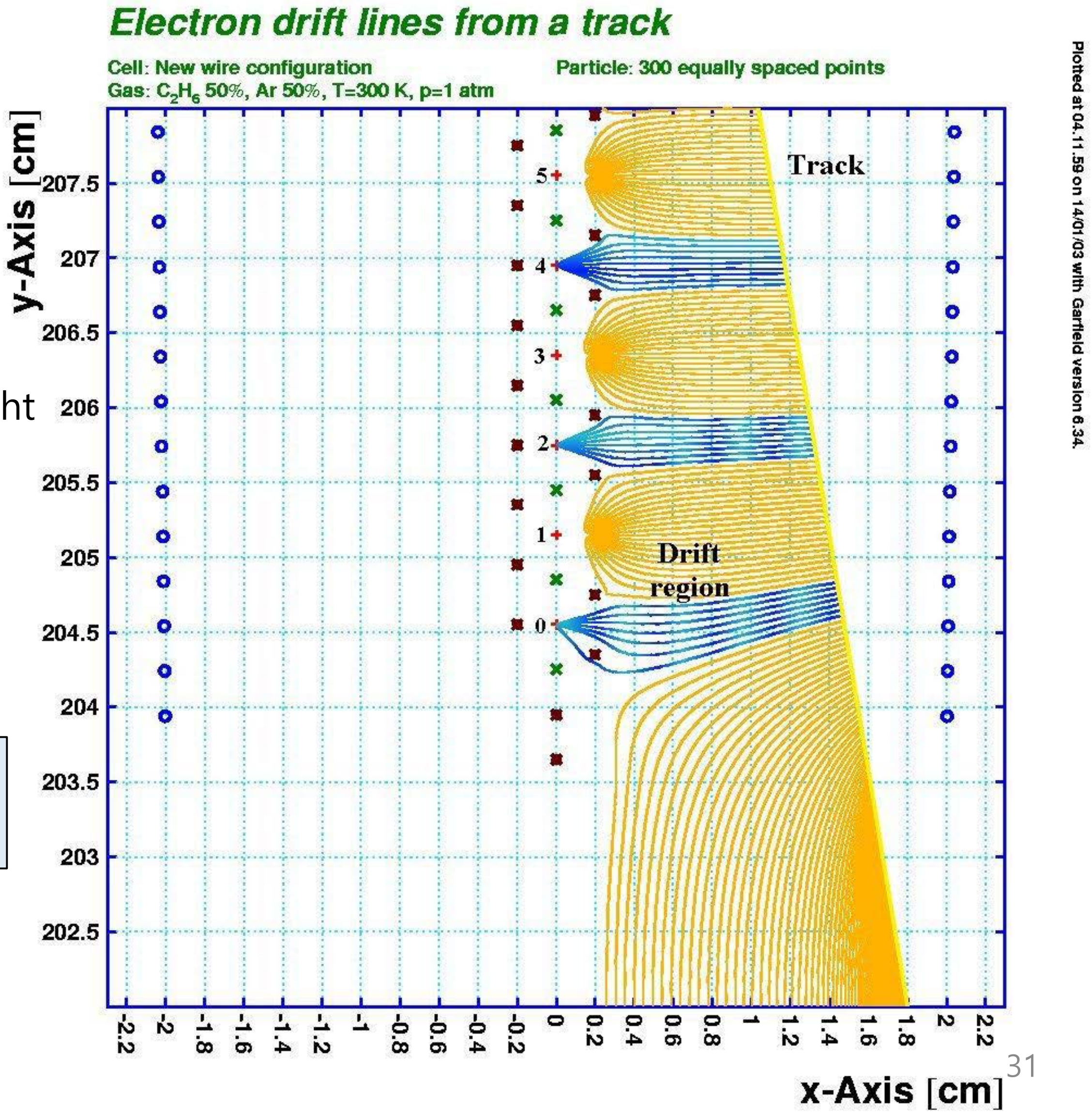
- Here is what happens when the charged particle passes through the wire cell
- Note that only even wires collect charge due to the **back wires** that block the odd anode wires !
- Back wires solves left-right ambiguity problem

-> But if High pT particle going through near anode wire region, left right ambiguity one more (fake) track might be reconstructed.



Taebong's presentation

this region should be masked
-> +-2mm from anode wire



Anode wire region

- define ϕ_{pair} angle

- If we require very narrow $\phi_{opening}$ angle of track pair and opposite sign, pair by fake and real track will survive.

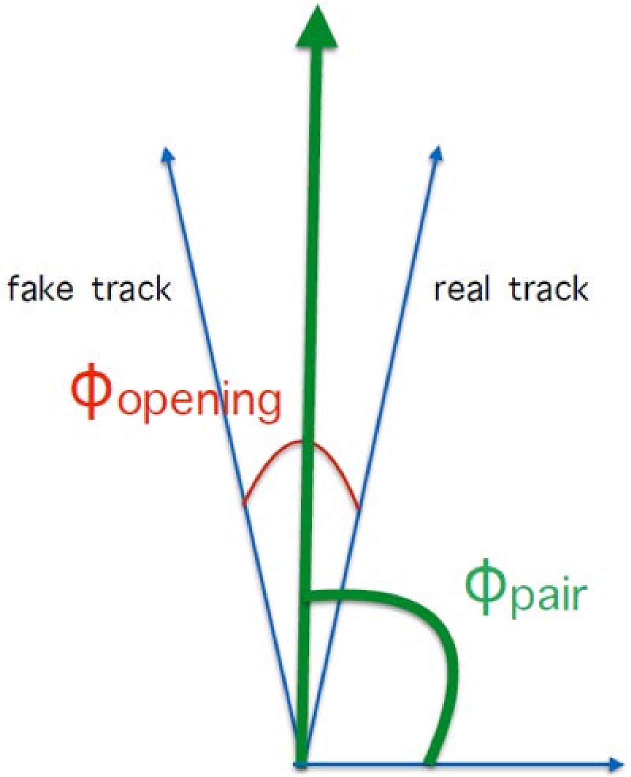
-> we can know anode wire position if drawing ϕ_{pair} distribution.

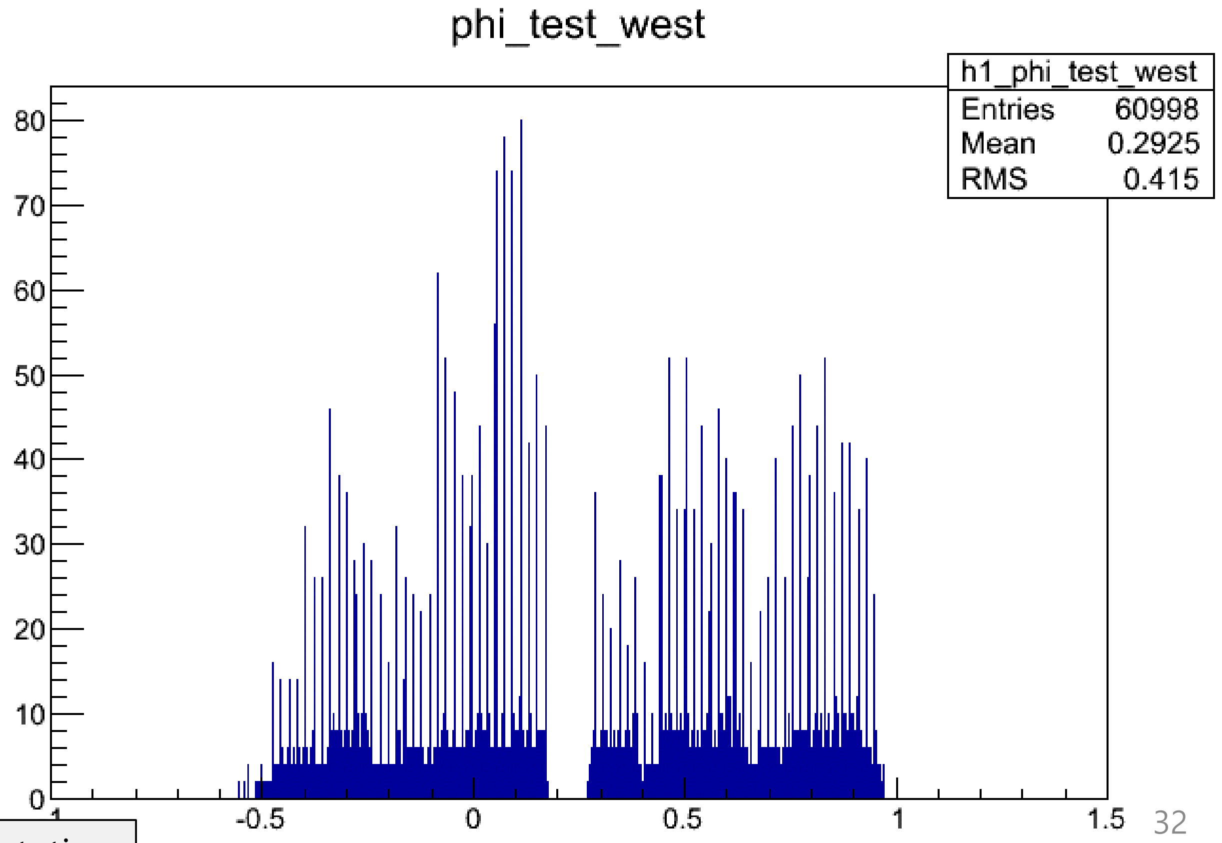
- Pair cuts

- opposite signed tracks in pair

- opening angle in phi < 0.002 [rad]

- DC track qualities in pair = 31 or 63 pT for each track in pair > 0.5 [GeV/c]





Taebong's presentation