Charged pion analysis

Simulation

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Purpose

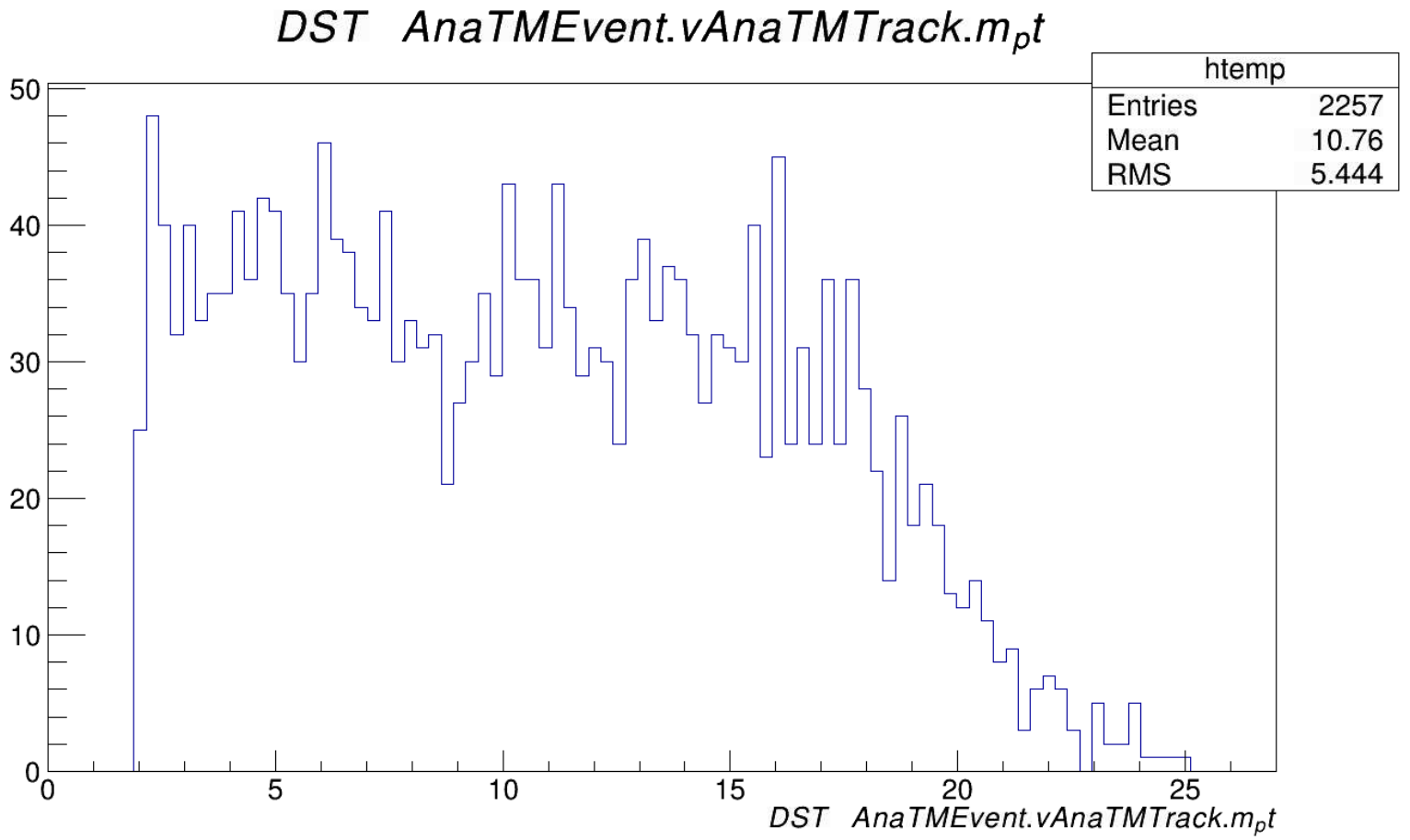
- $^{1}/_{\sqrt{Y}} \propto$ size of the error bar
- $Y_{\pi^{\pm}} = Y_{\pi^{0}} \times \frac{\varepsilon_{\pi^{\pm}}^{trig}}{\varepsilon_{\pi^{0}}^{trig}} \times \varepsilon_{\pi^{\pm}}^{track}$
- $\varepsilon_{\pi^{\pm}}^{track} = \varepsilon_{reco}^{DC} \times \varepsilon_{reco}^{PC3} \times \varepsilon_{reco}^{RICH}$

1. Single pi± generation

- Number of Pi± : 10000 for each
- 0 < momentum < 20 GeV/c
- -0.5 < eta < 0.5
- 0 < pi < 2π
- Primary Vertex = (0,0,0)

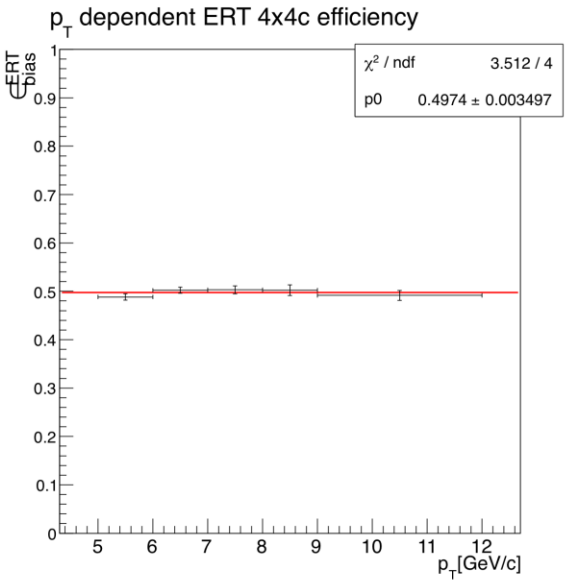
Using Run13 dead channel of DC, PC, RICH for test

2. Distribution (pT)

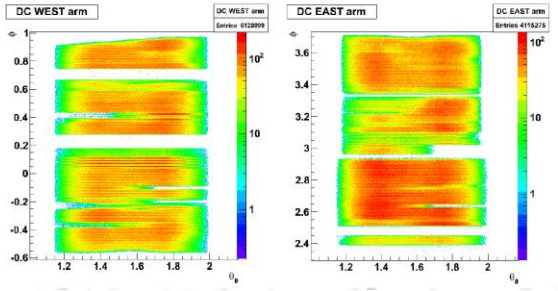


Progress & Next step

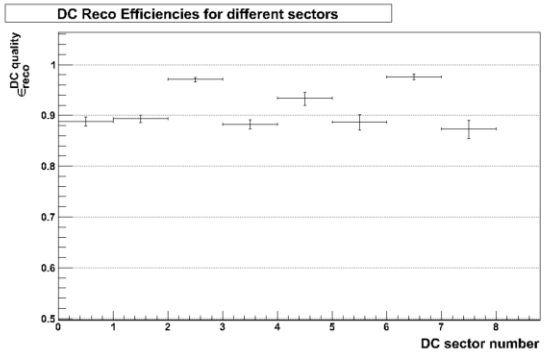
Geo.acc

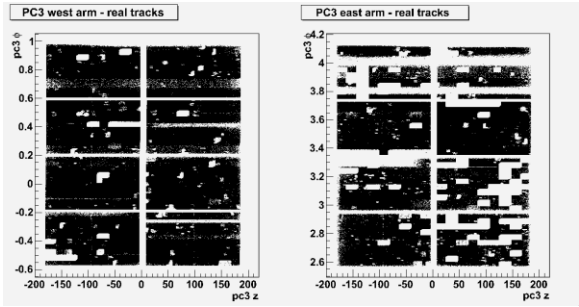


Trigger

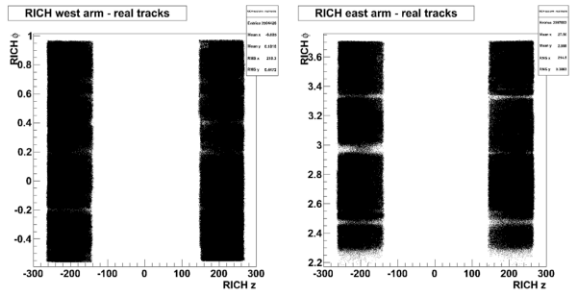


DC



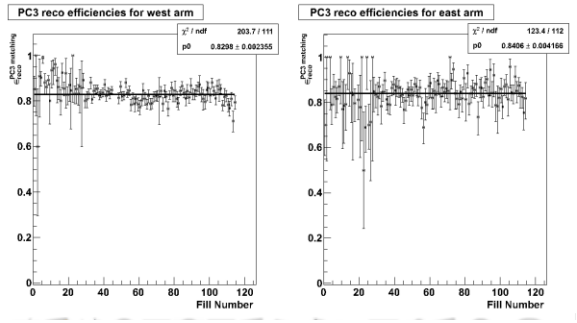


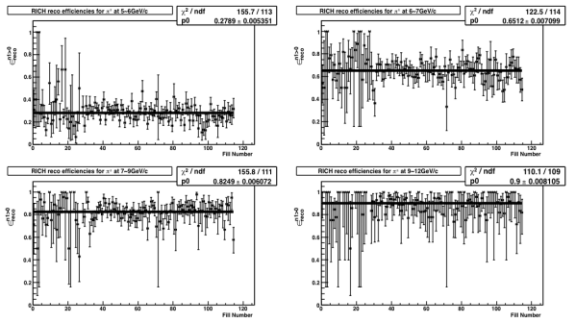
PC



RICH

Simulation





recon.eff

Sook Hyun's Thesis

Thank you.

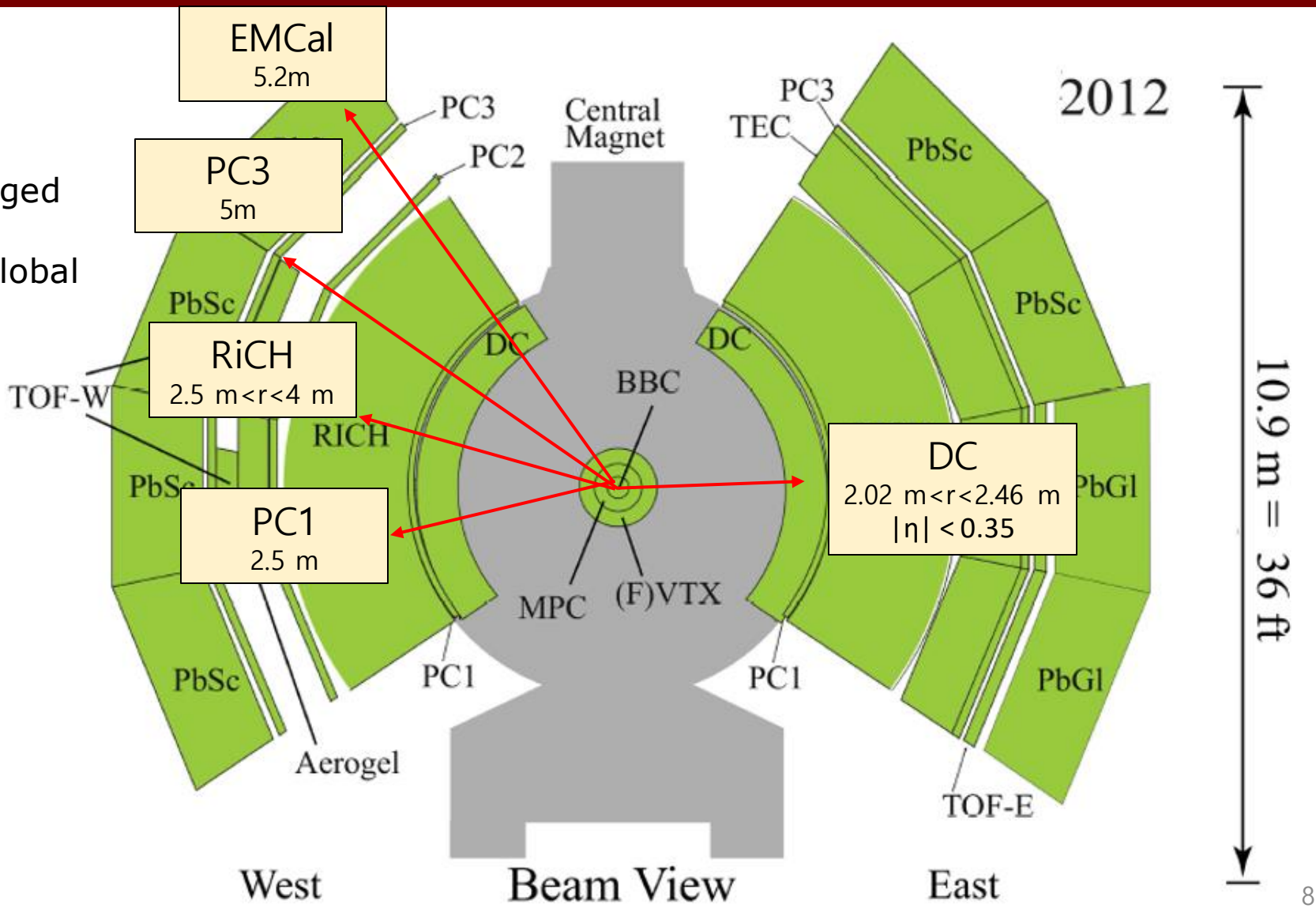
Back up

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

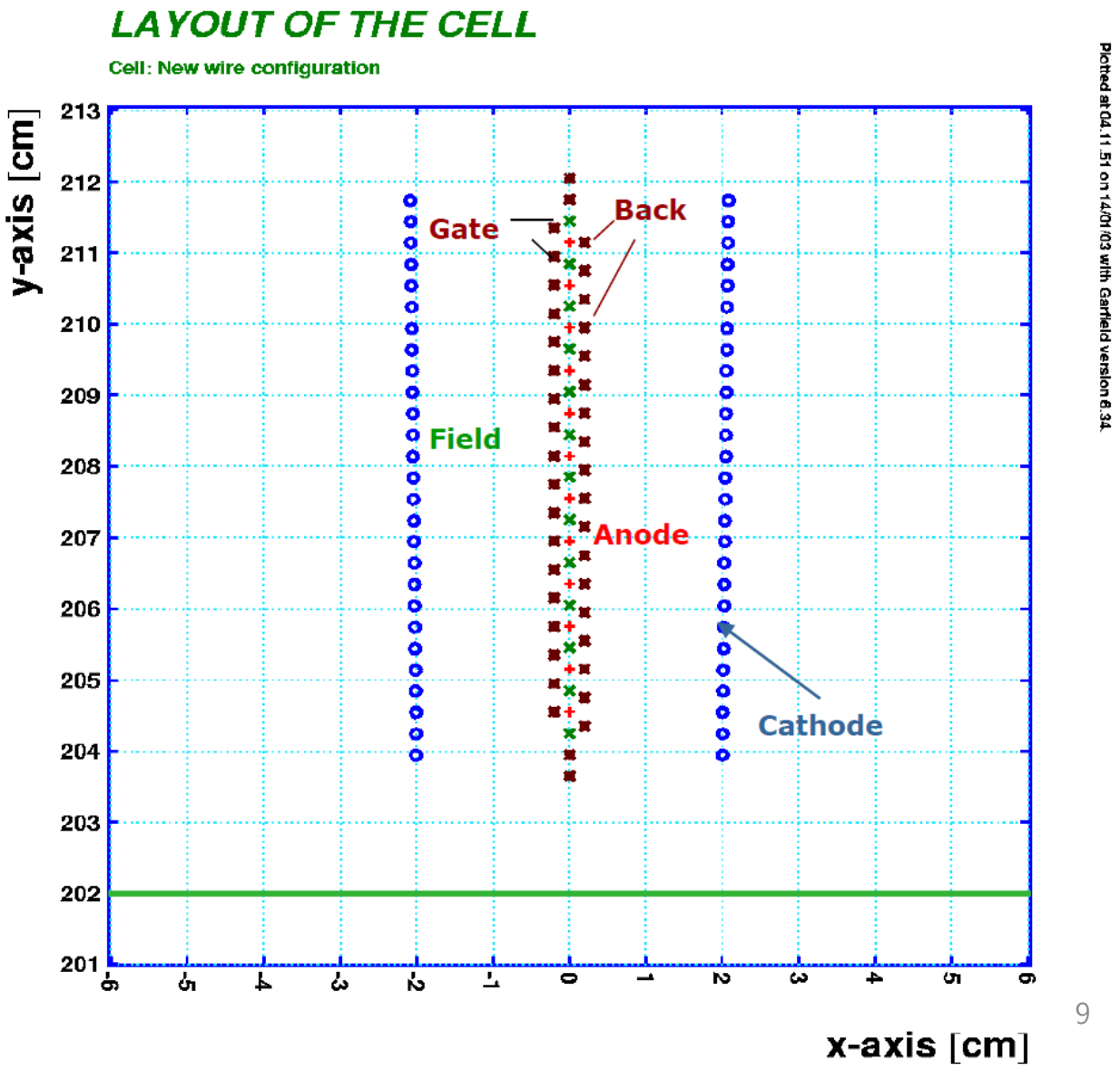
- Location:
  - Radial :2.02<R<2.48 m
  - Angular:
    - West: -34º < ϕ < 56º
    - East : 125º < ϕ < 215º



Drift field configuration

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

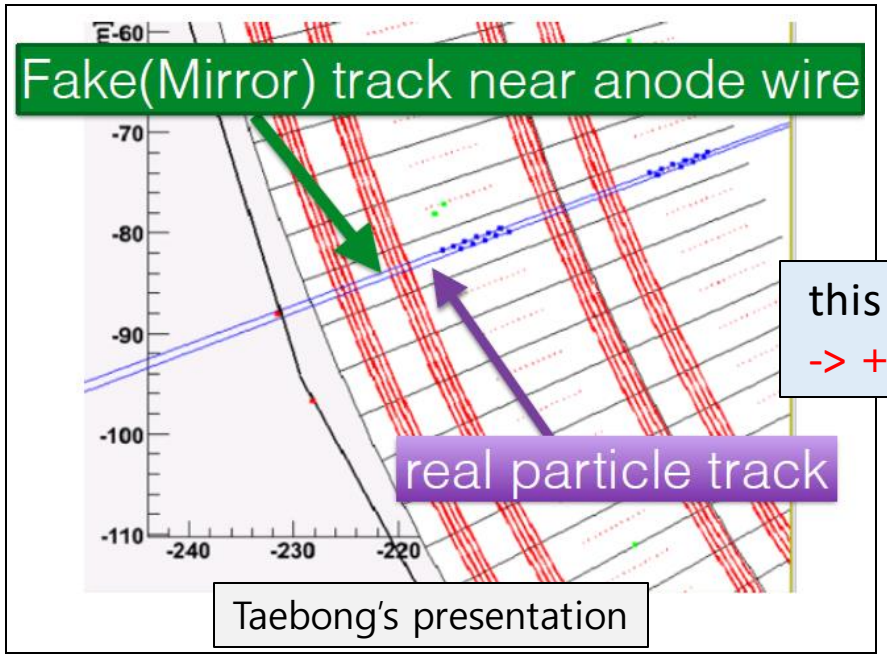
- **Cathode Wires** – Create uniform drift field between anode and cathode
- **Field Wires** – Create high electric field strength near the anode wire
- **Back Wires** – Stop drift from one side of the anode wire
- **Gate Wires** – Also create high field near the anode wire, Localize the drift region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



Drift Field Configuration

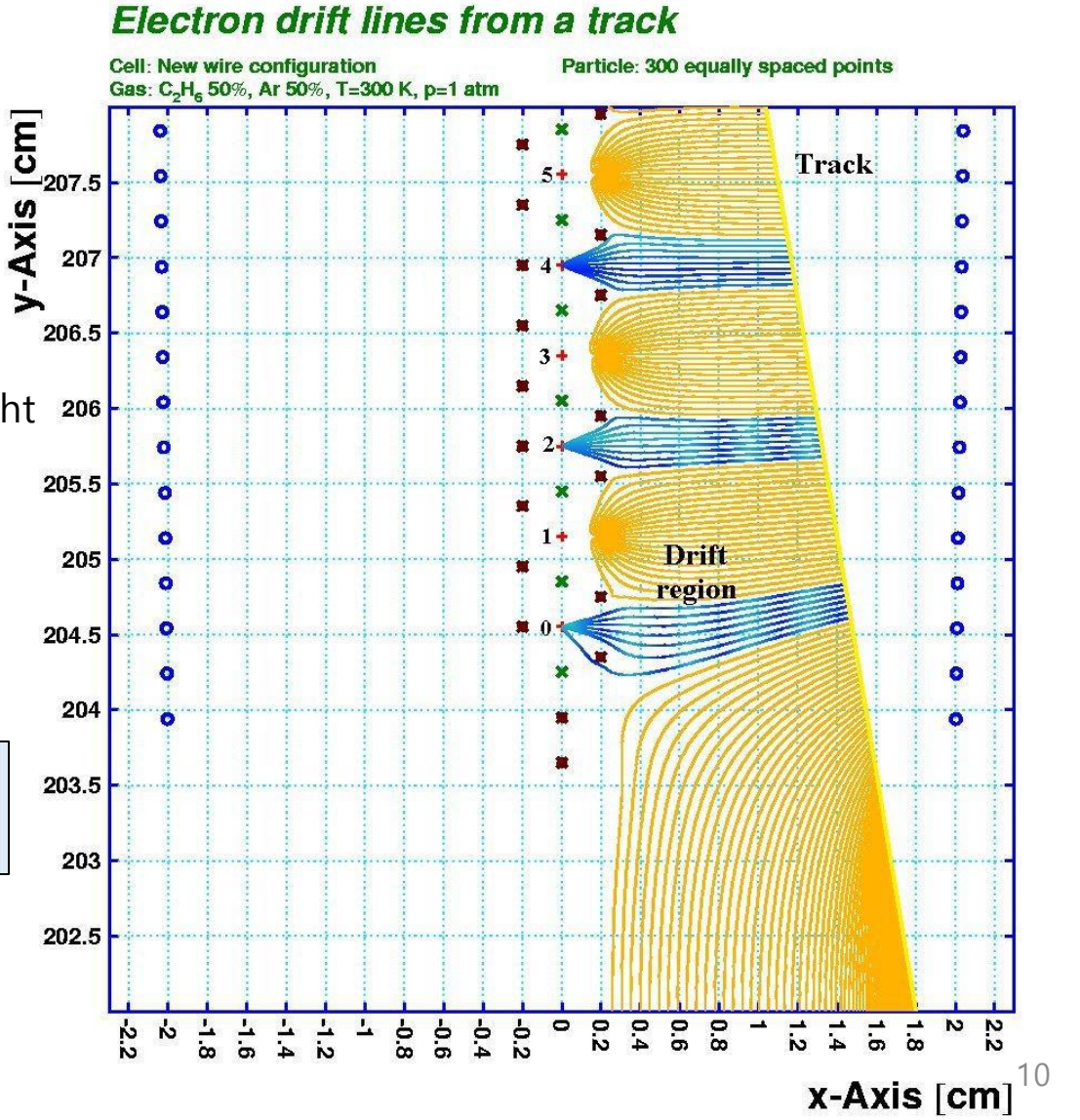
- Here is what happens when the charged particle passes through the wire cell
- Note that only even wires collect charge due to the **back wires** that block the odd anode wires !
- Back wires solves left-right ambiguity problem

-> 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.

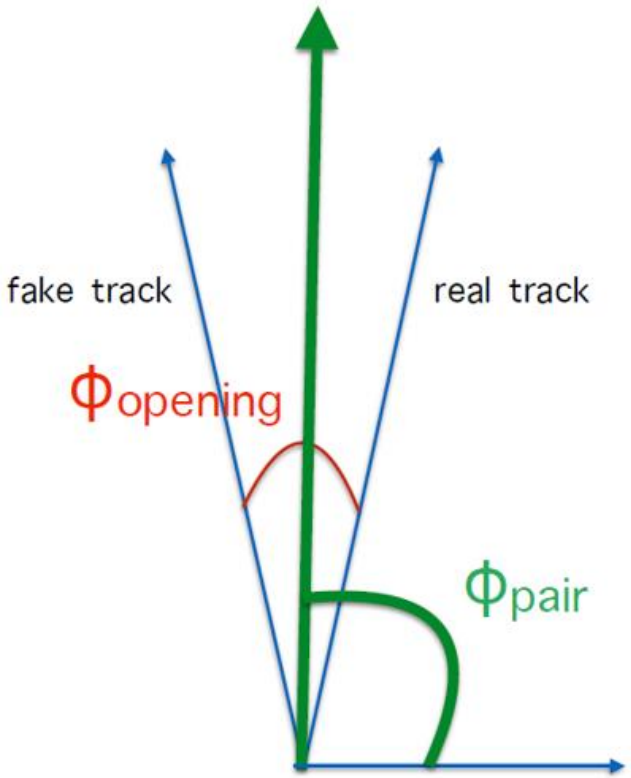
-> we can know anode wire position if drawing ϕ_{pair} distribution.

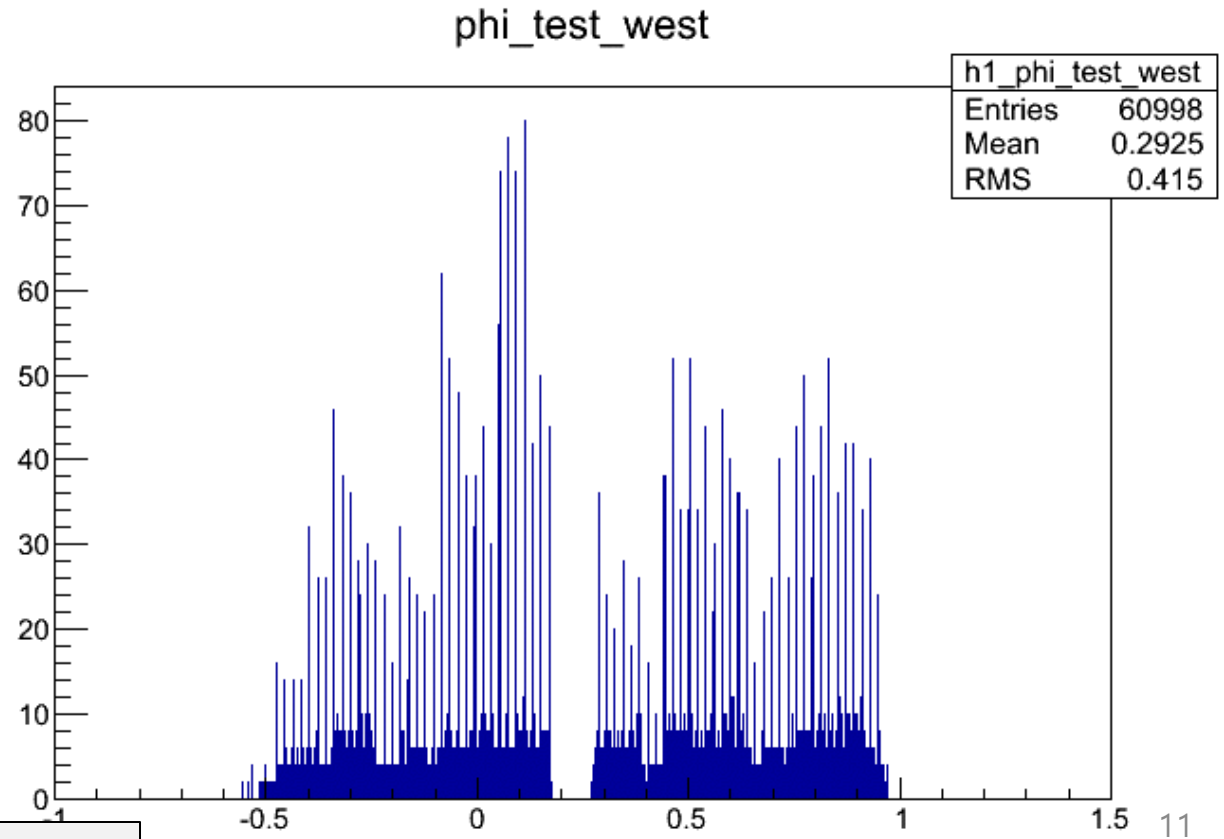
- Pair cuts

- 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