

# VHMPID L0 trigger Status report

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Data sample:

pp@10 TeV, MB, B=0.5 T  
1,5 Mevents

Track cuts:

No kinks

Only tracks from module's acceptance

Acceptance:

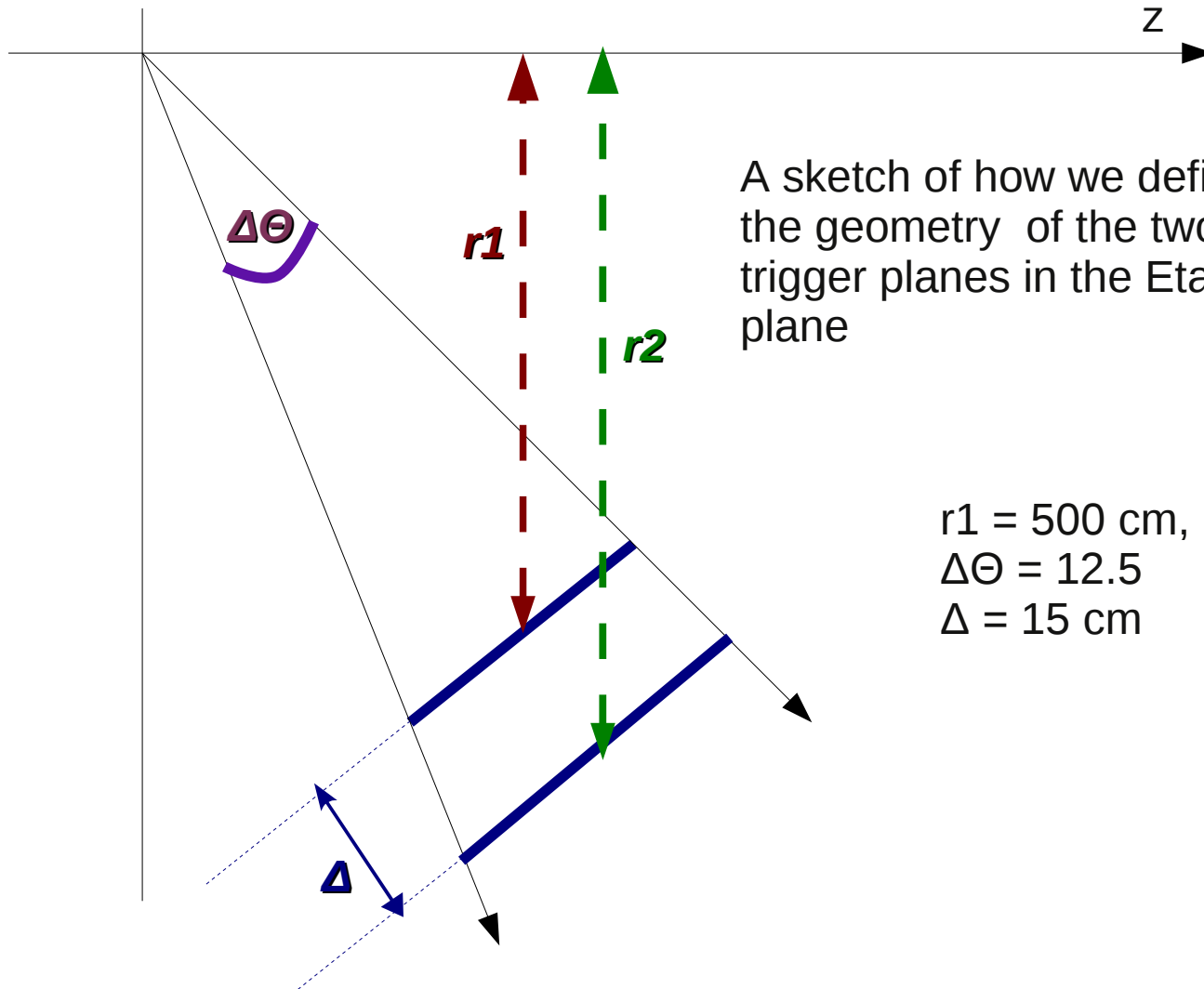
$\Theta \sim 22.5$

$\Phi \sim 20.$

# Introduction

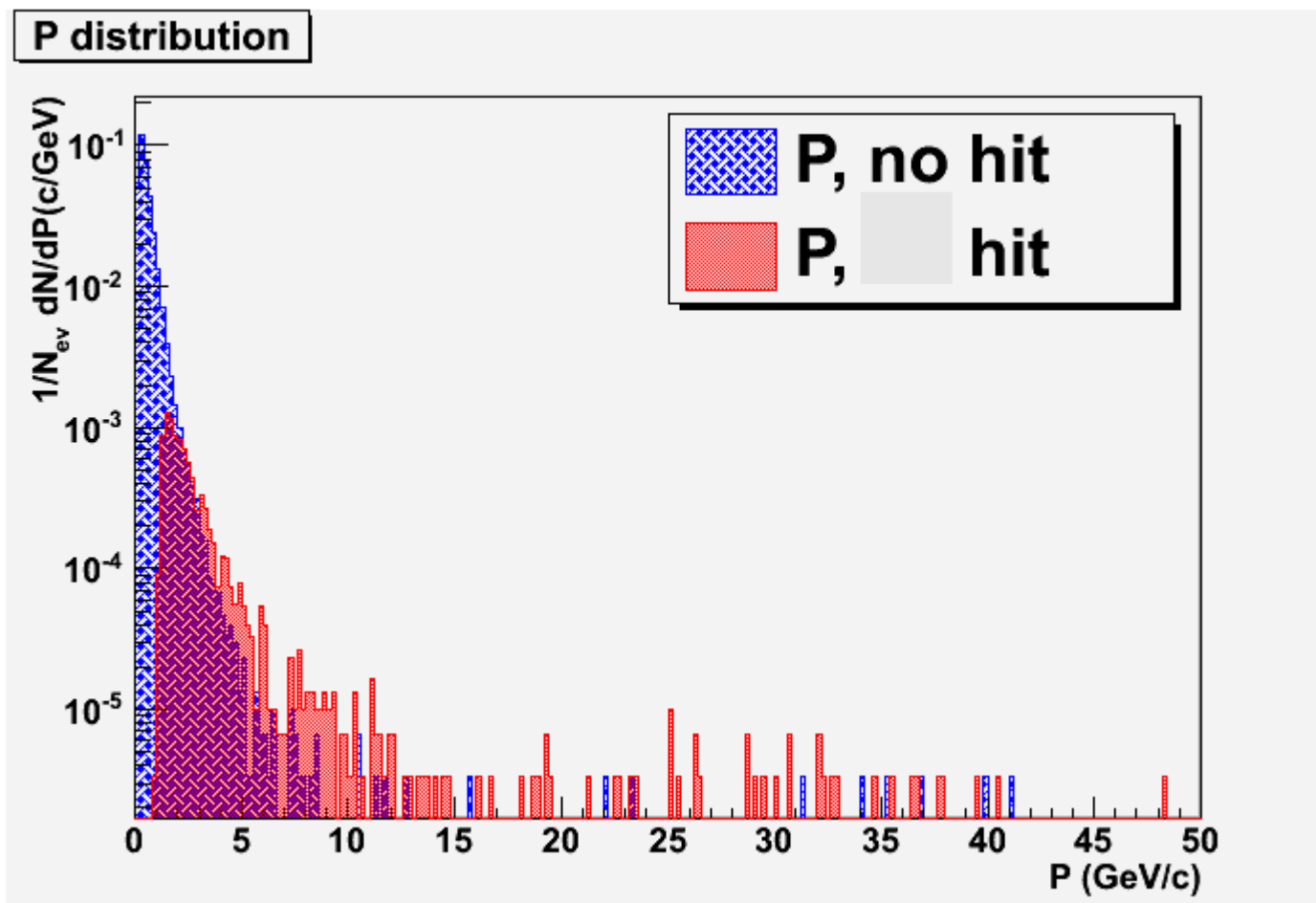
- Last time:
  - Study of particle properties inside acceptance of one module (Eta  $\sim$  22.5, Phi  $\sim$  20.)
  - Possible triggering strategy
    - #Hits  $>$  0
    - Possibility to cut out low-momentum particles ( $p <$  2 GeV/c)
- Task
  - Investigate the hit pattern on the planes situated in space

# Geometry of the trigger



$r1 = 500 \text{ cm}$ ,  $r2 = 514 \text{ cm}$   
 $\Delta\Theta = 12.5$   
 $\Delta = 15 \text{ cm}$

# Momentum

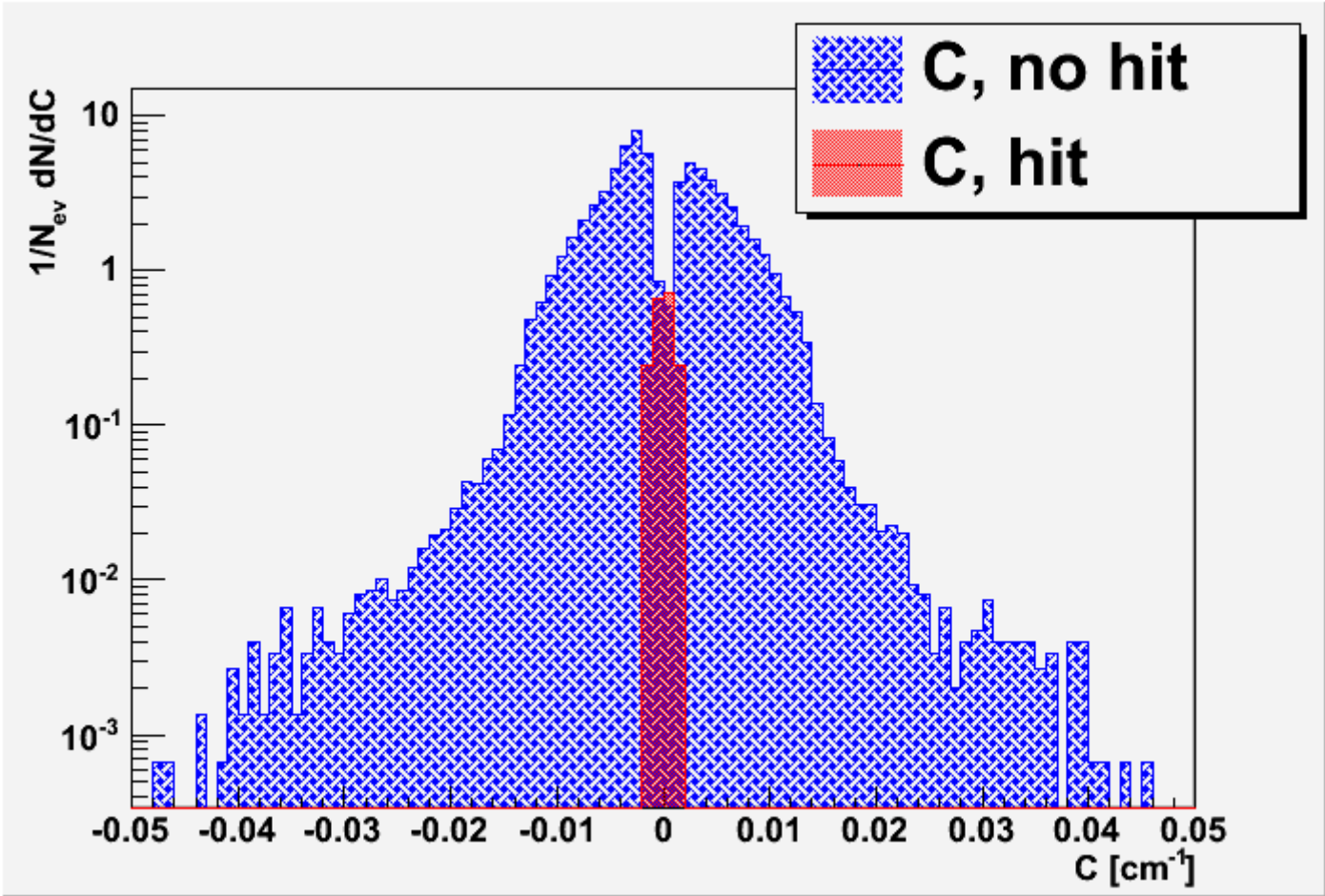


Momentum distribution of tracks inside the module acceptance, based on whether it is a “hit” or “no hit”.

We see that the “hit” flag selects tracks with  $p > 1 \text{ GeV}/c$

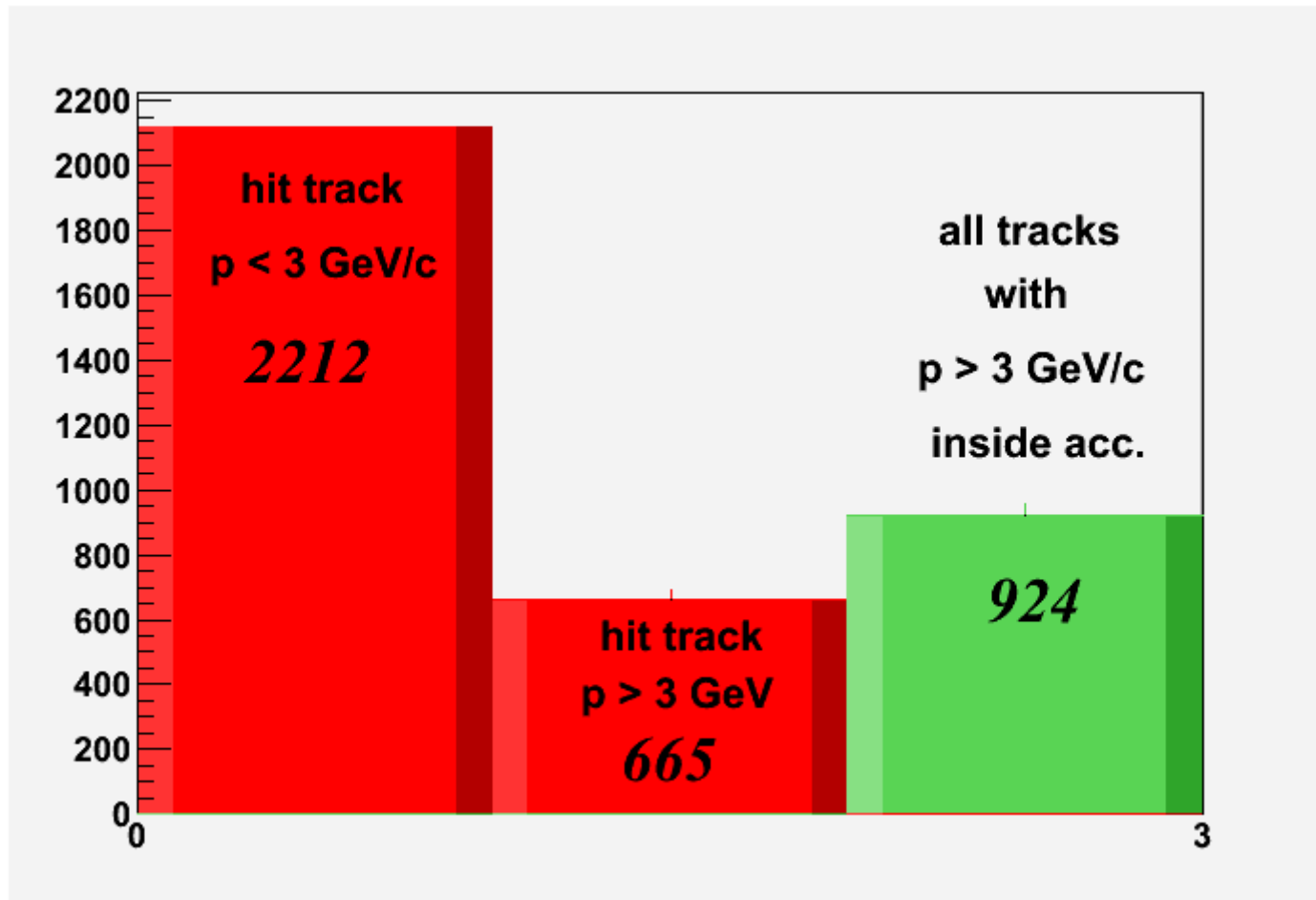
If a track hits both planes within the acceptance - “hit” track.  
If it does hit either of planes in acceptance - “no hit” track.

# Curvature of tracks



The curvature plot complements the momentum plot.

# Purity and efficiency



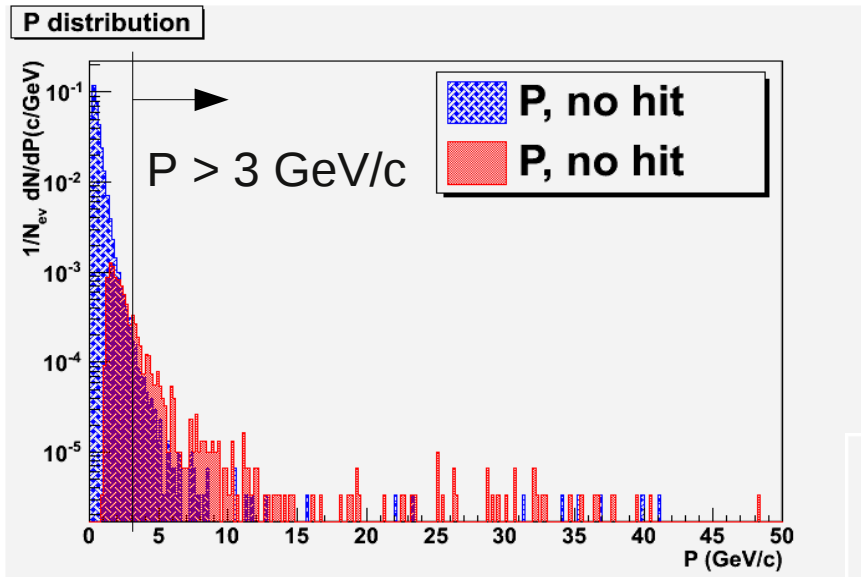
Purity: ~23%

Eff: 72 %

$$\text{Purity} = \frac{\text{Number of tracks}(p > 3 \text{ GeV}/c)}{\text{Number of hit tracks}}$$

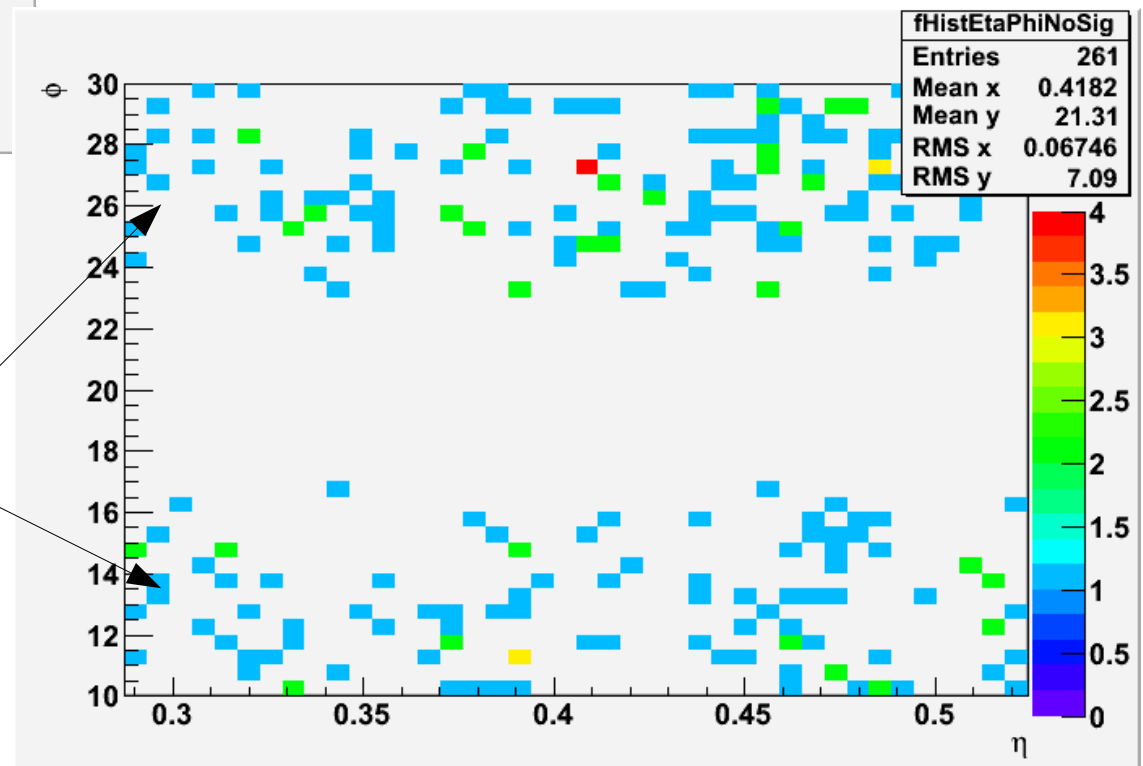
$$\text{Efficiency} = \frac{\text{Number of hit tracks}(p > 3 \text{ GeV}/c)}{\text{Number of tracks}(p > 3 \text{ GeV}/c) \text{ inside module's acceptance}}$$

# No-hit tracks, $p > 3 \text{ GeV}/c$



There are tracks with  $p > 3 \text{ GeV}/c$  that do not leave a hit in the detector

This is because they are at the edge of phi acceptance of the module



# Summary and outlook

- Geometry introduction
  - L0; far from interaction point, low momentum tracks will not reach it
    - Distance – natural filter
    - Using only “hit” flag we achieved purity ~ 23 %
    - Purity does not depend on number of trigger planes
- Outlook
  - Design segmentation to be able to distinguish two hits from each other and see whether it can further improve the selection