# Online monitoring of the second level of the Fast Track Trigger

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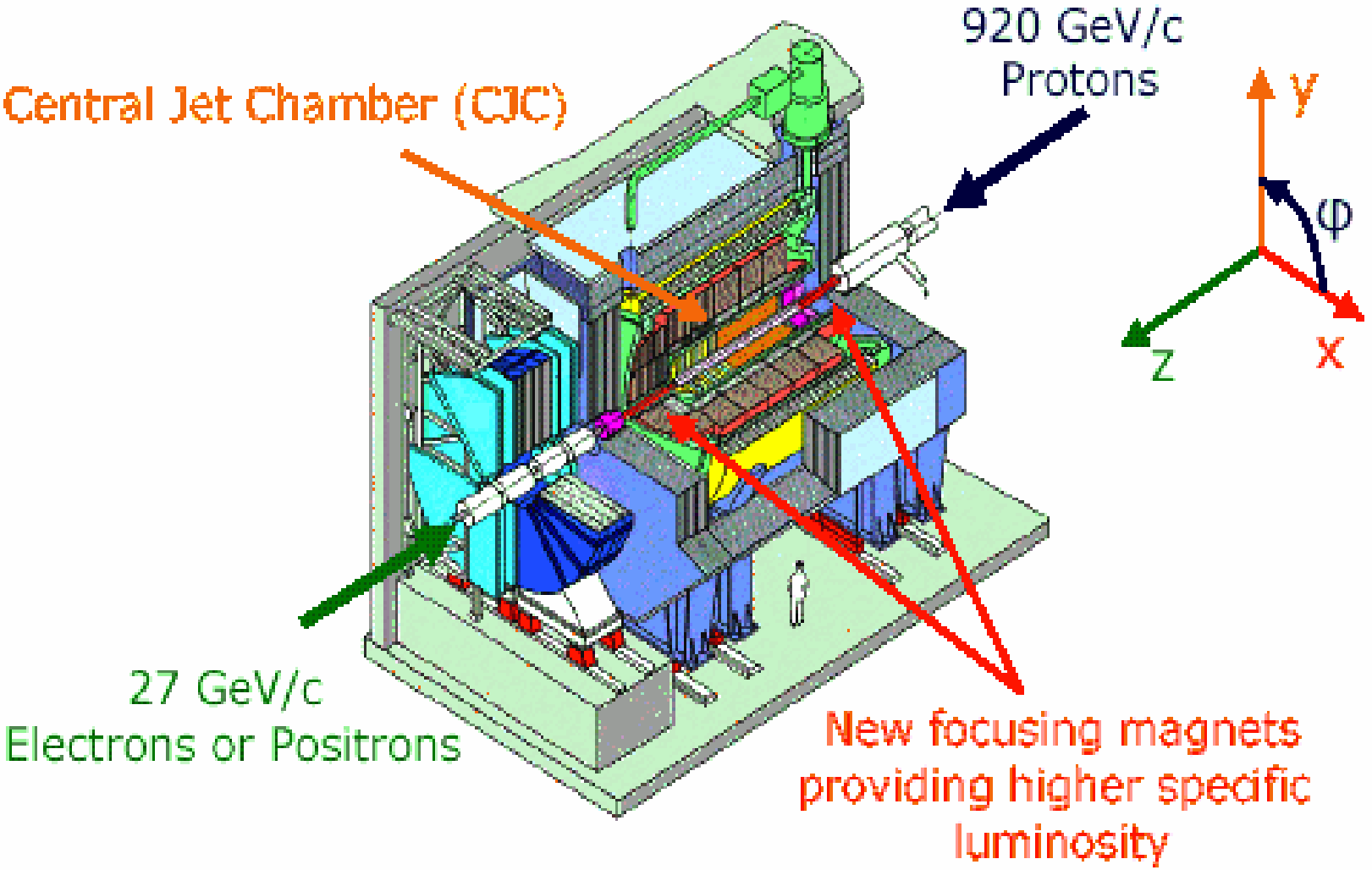
DESY Summerstudent program 2005

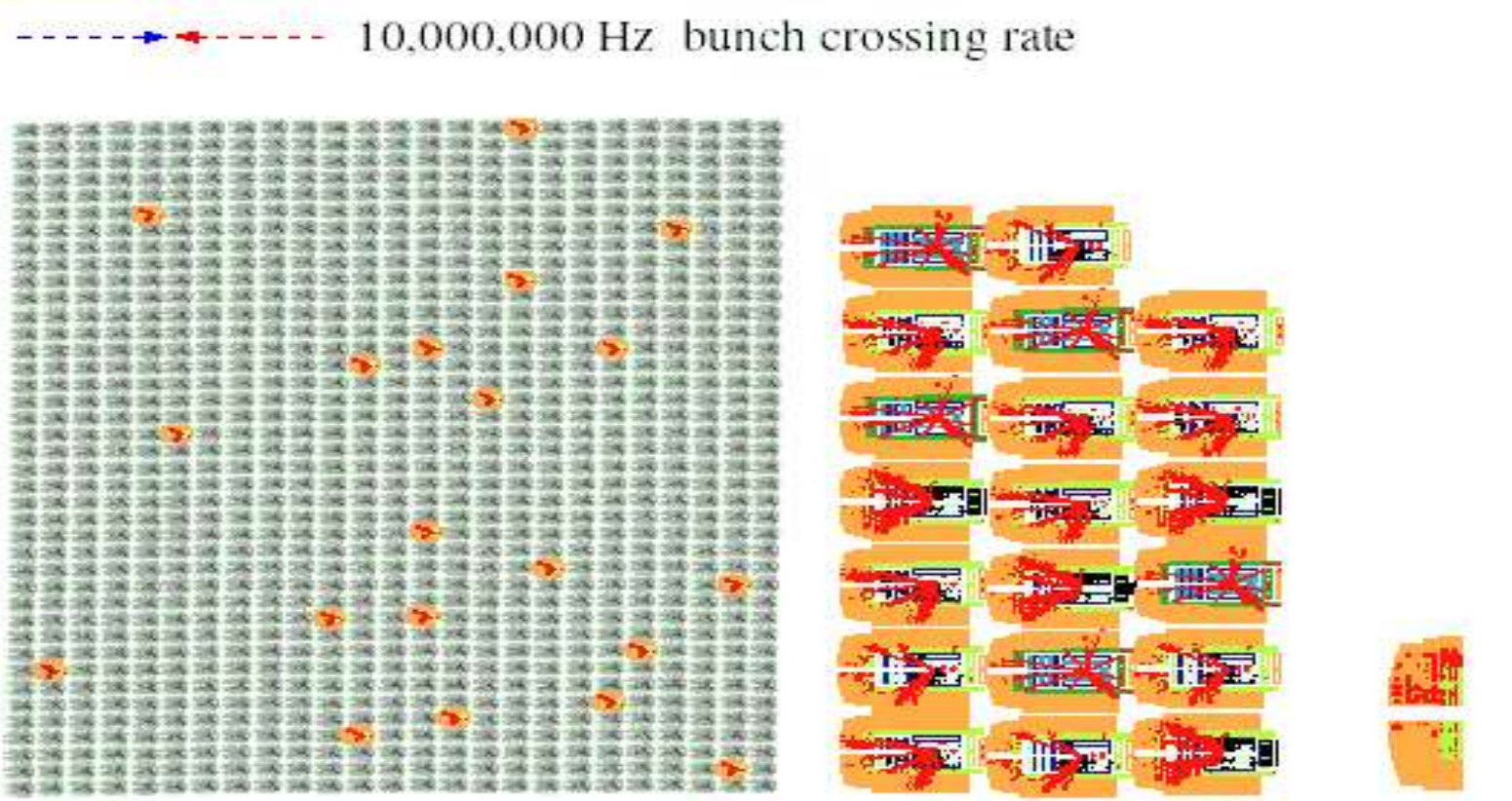
# Content

- Fast Track Trigger
- Online monitoring of the second level

# H1 detector


920 GeV/c
Protons
Central Jet Chamber (CJC)
y
φ
z
x
27 GeV/c
Electrons or Positrons
New focusing magnets
providing higher specific
luminosity

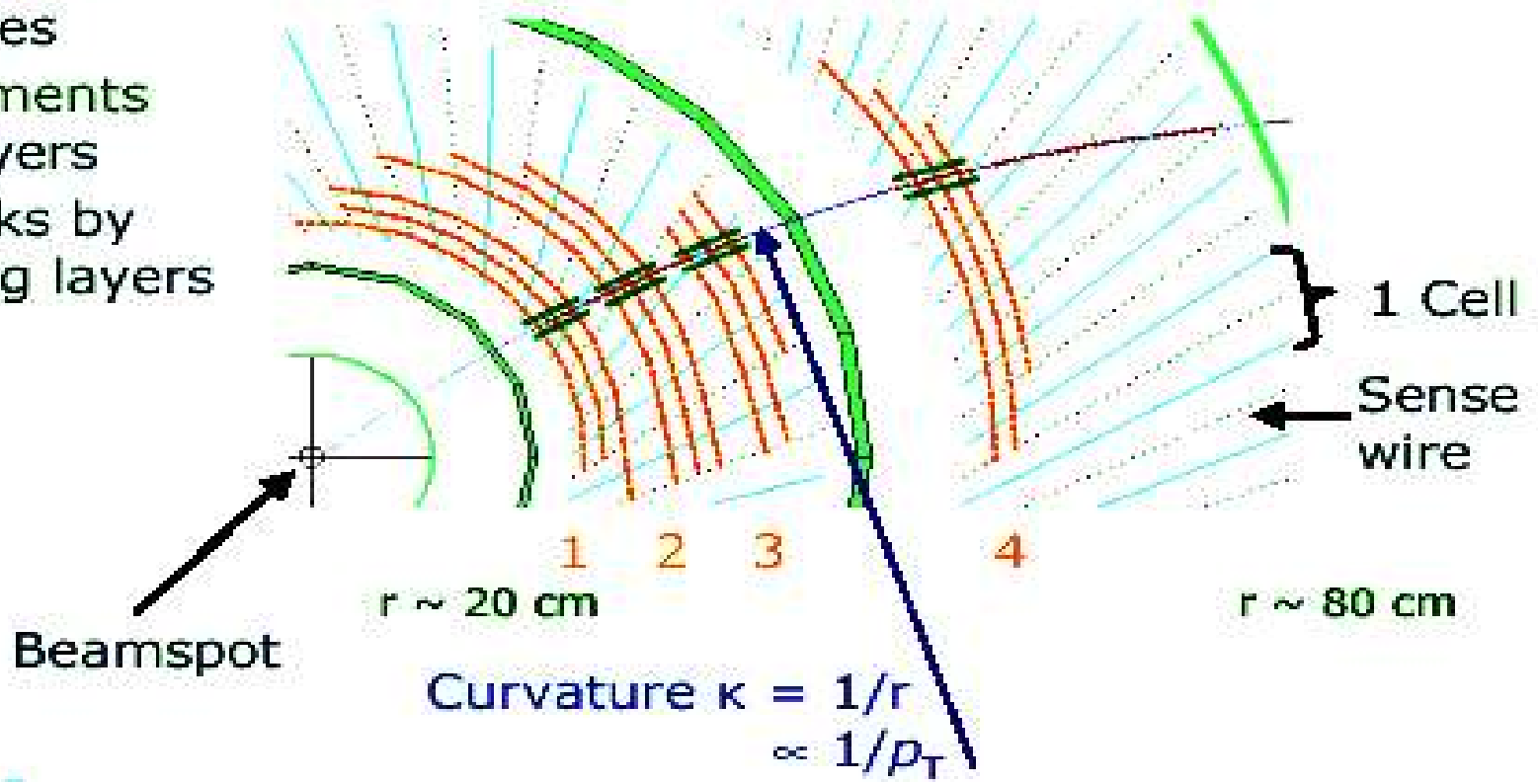
# Why do we need a trigger system?



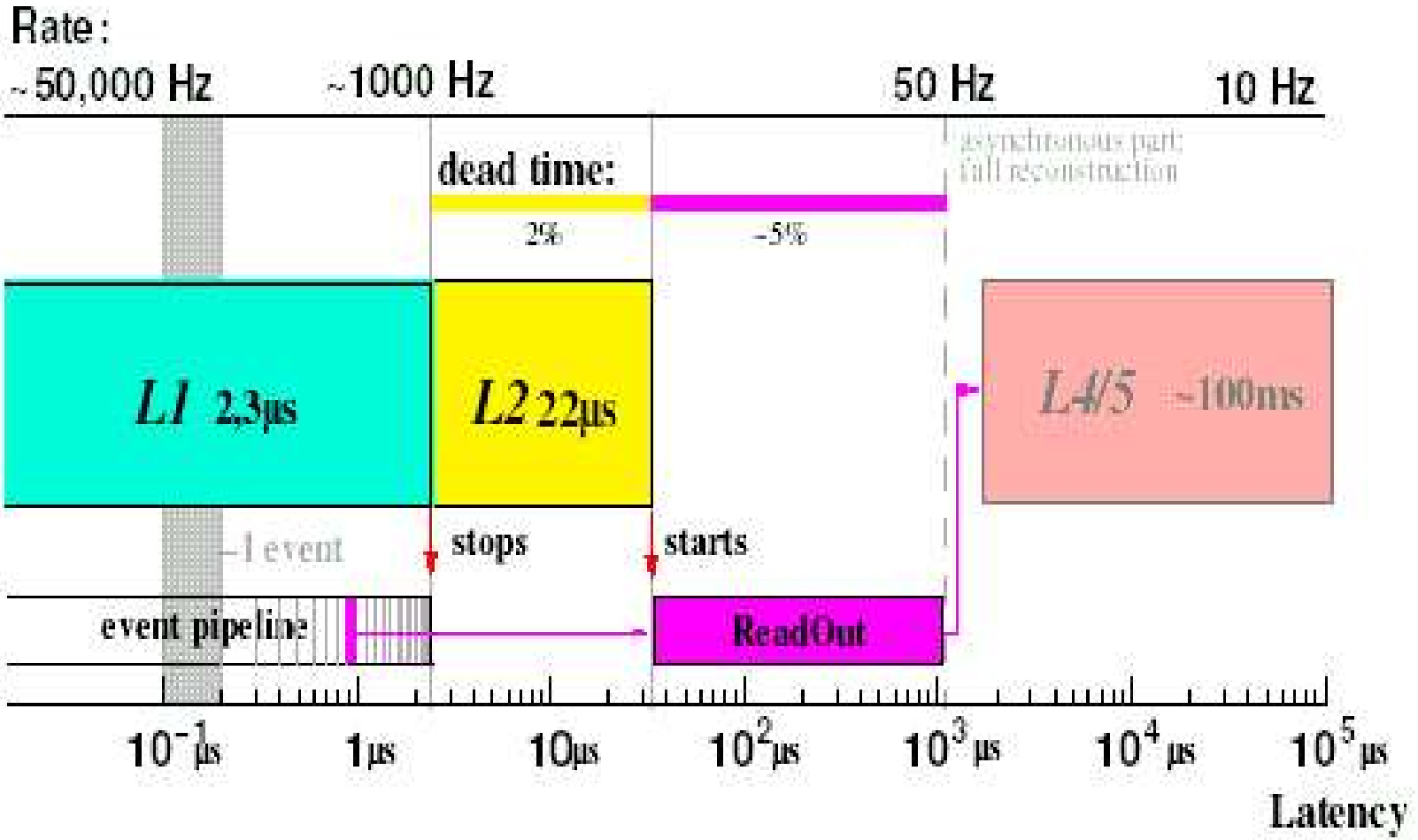
# The Fast Track Trigger

To filter out which events are interesting one can identify the tracks and the momentum of the particles. But at the time of decision the trigger has not the whole information of the detector.

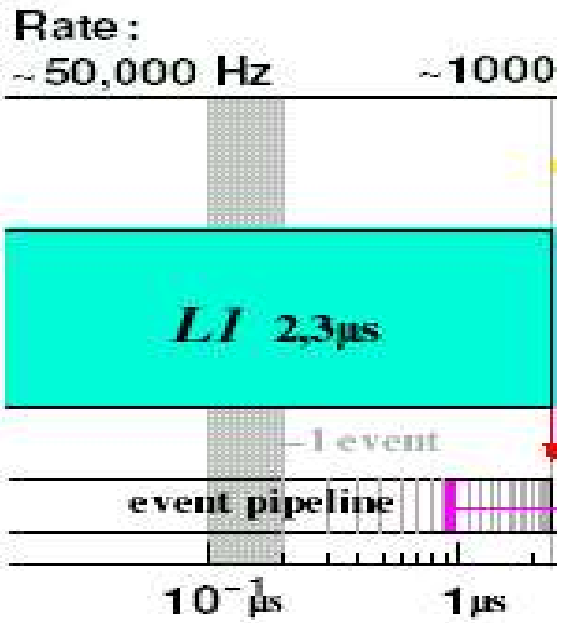
- Use Central Jet Chamber (CJC)
- Four layers of three wires
- Find segments within layers
- Find tracks by combining layers



# The H1 Trigger/Readout Scheme



# Level 1




At the first level the trigger has to decide if an interaction is interesting in 2.2 microseconds:

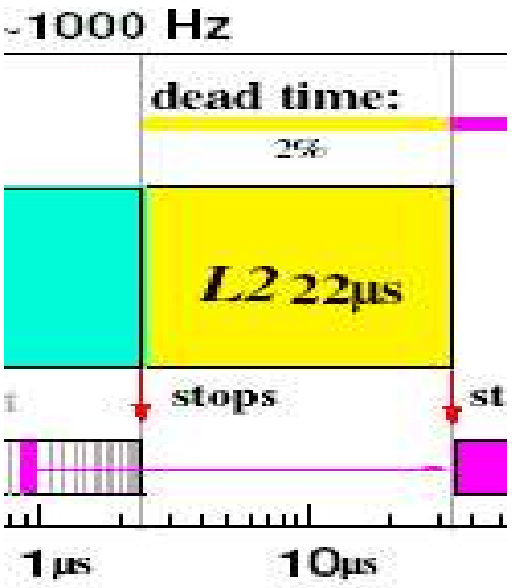
·Find coarse segments

·Link segments to tracks

·Take a trigger decision based on track quantities transverse to the beam

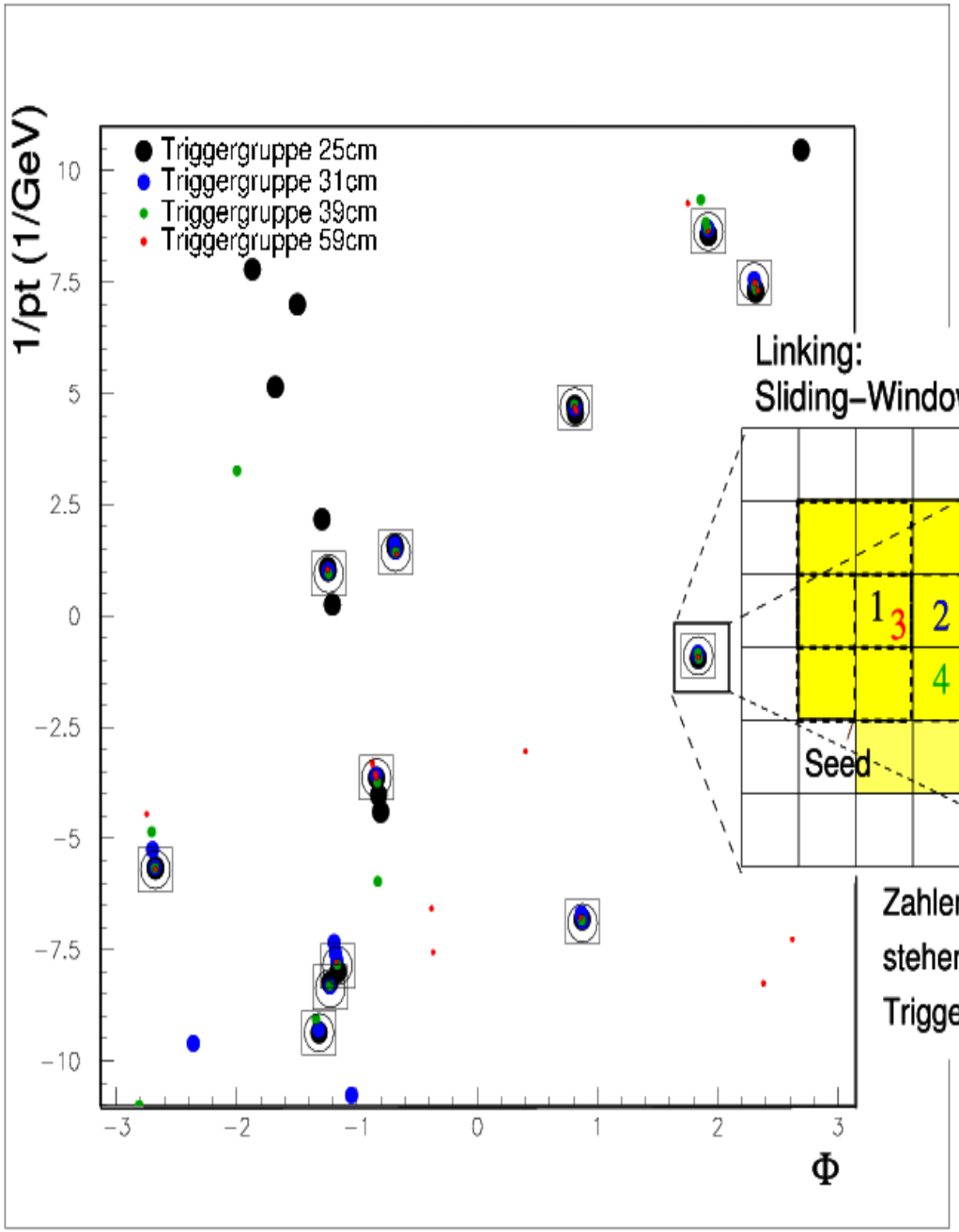
The L1 reconstruction is only in the r-Φ plane.

# Level 2




L2 measures more precisely and takes a trigger decision based on 3D tracks.
This level is able to reconstruct the tracks from refined track segments of L1.
Therefore the segments have to be linked together:

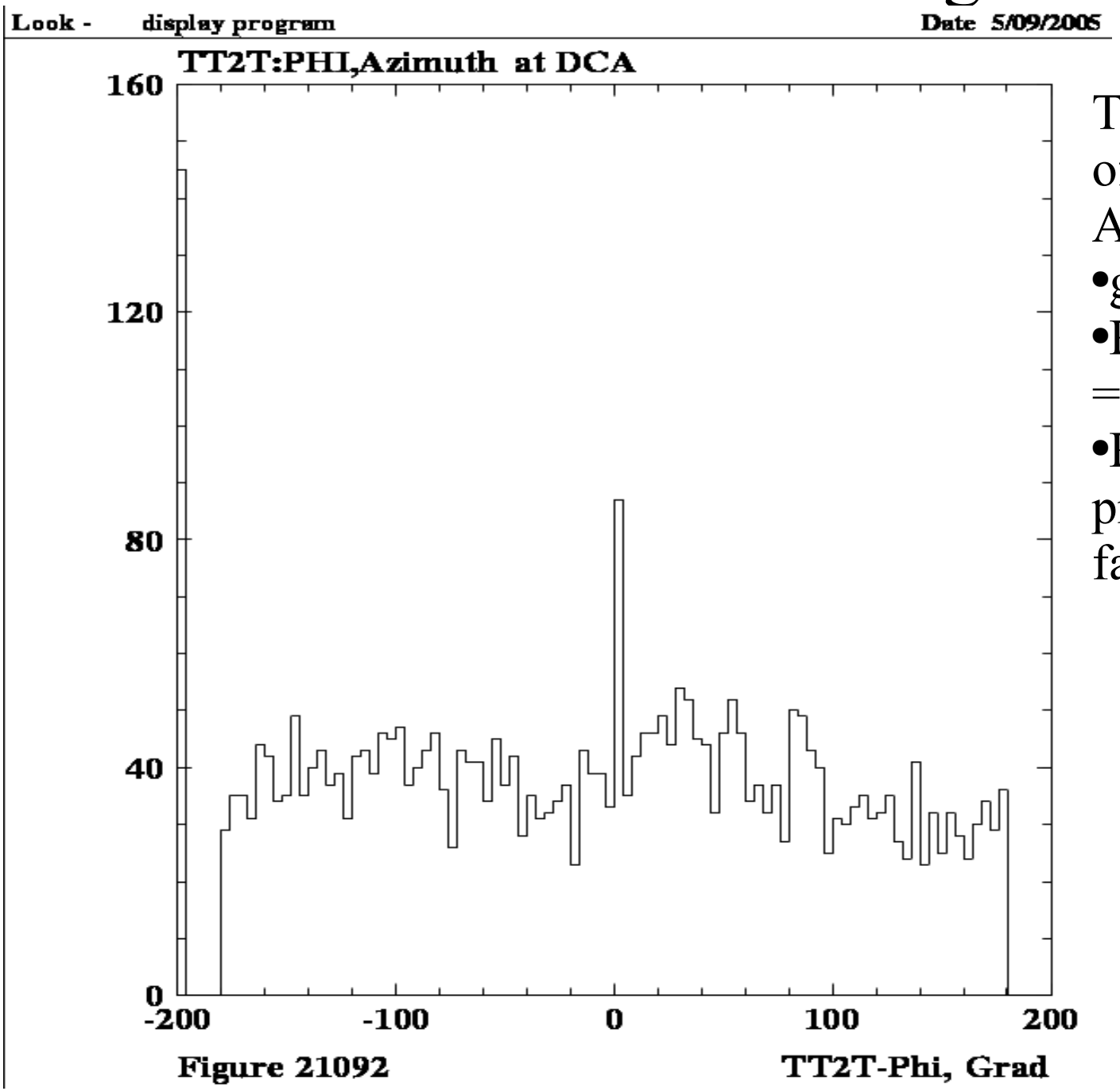
# L2 linking




L2 makes a φ versus 1/pt histogram and searches for segment clusters.
Up to 4 segments can be linked together.
To reconstruct a track one need at least 2 segments.

After linking two Fits are made: a circular fit from segments and then a fit in the longitudinal layer to get the coordinate Θ (polar angle between track and z axis).
Data stored in workbank TT2T.

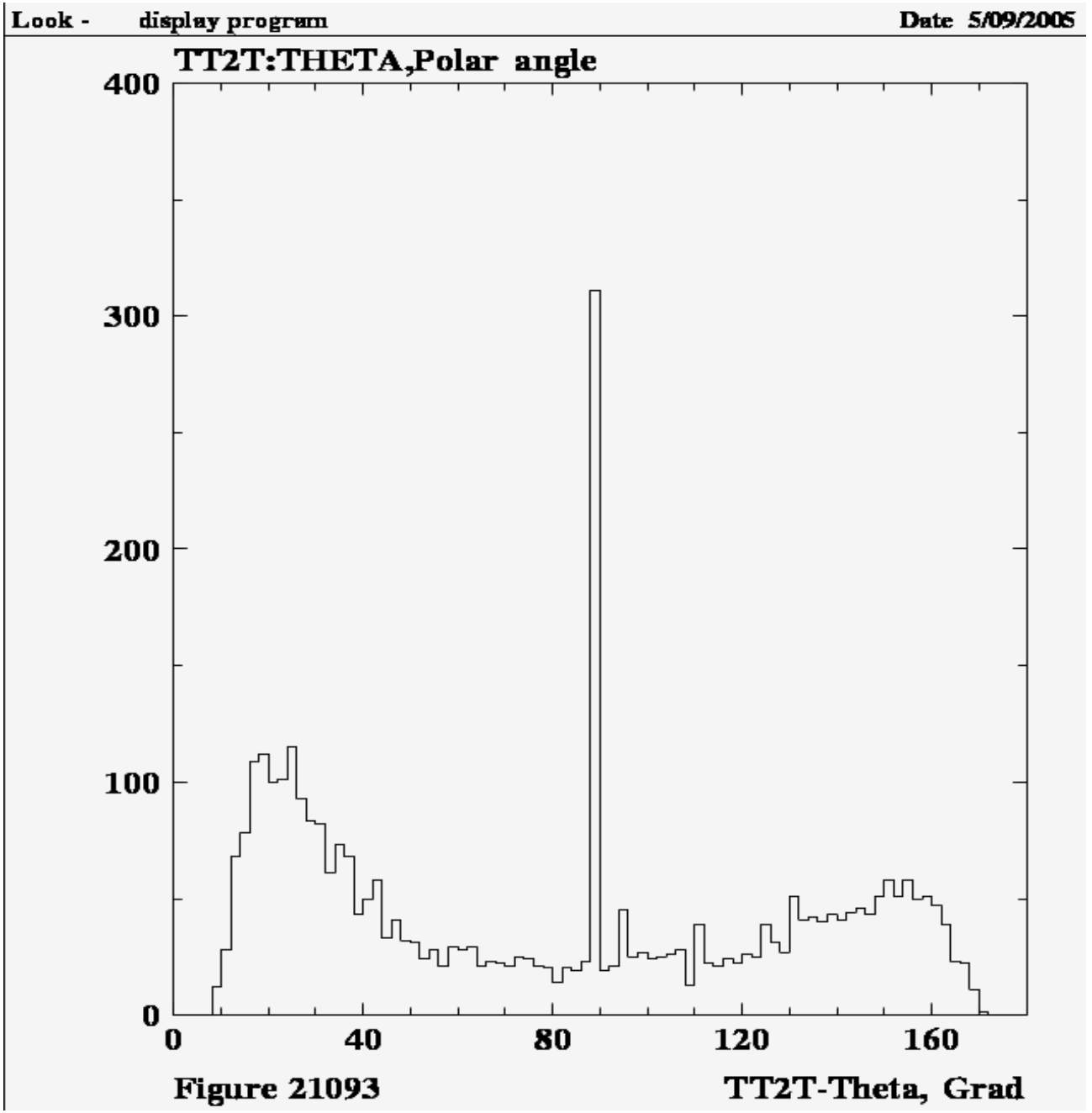
# Online monitoring of L2




This histogram shows φ of the workbank TT2T. As expected:

- goes from 180º to -180º
- Rotation-symmetric =>Flat
- Problem at 0º and -200º, probably a hardware fault.

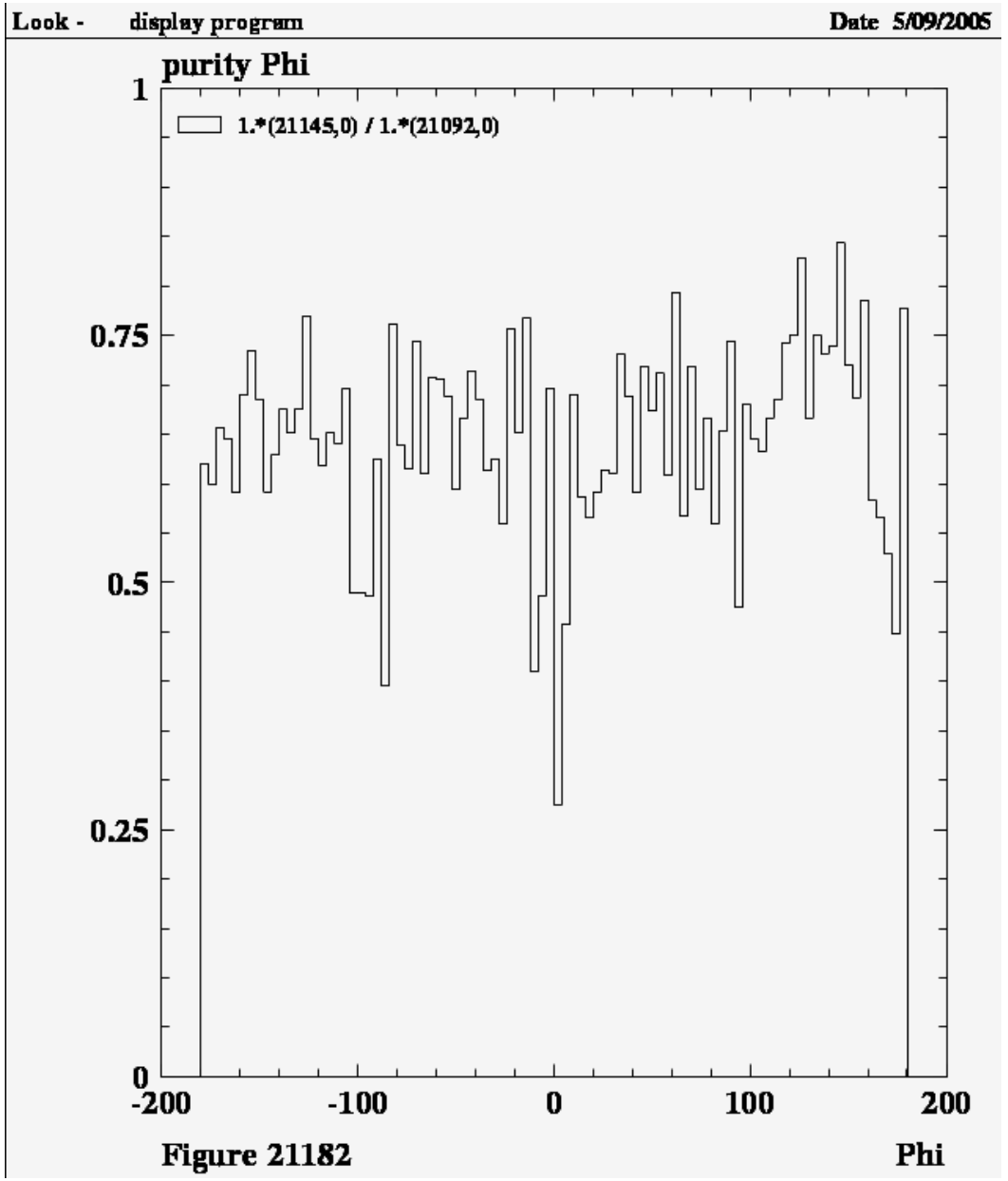
# Online monitoring of L2




This histogram shows Θ.

- Between 0º and 180º
- Distribution as expected: for Θ< 40º more tracks (proton direction)
- Problem at 90º same as φ

# Purity

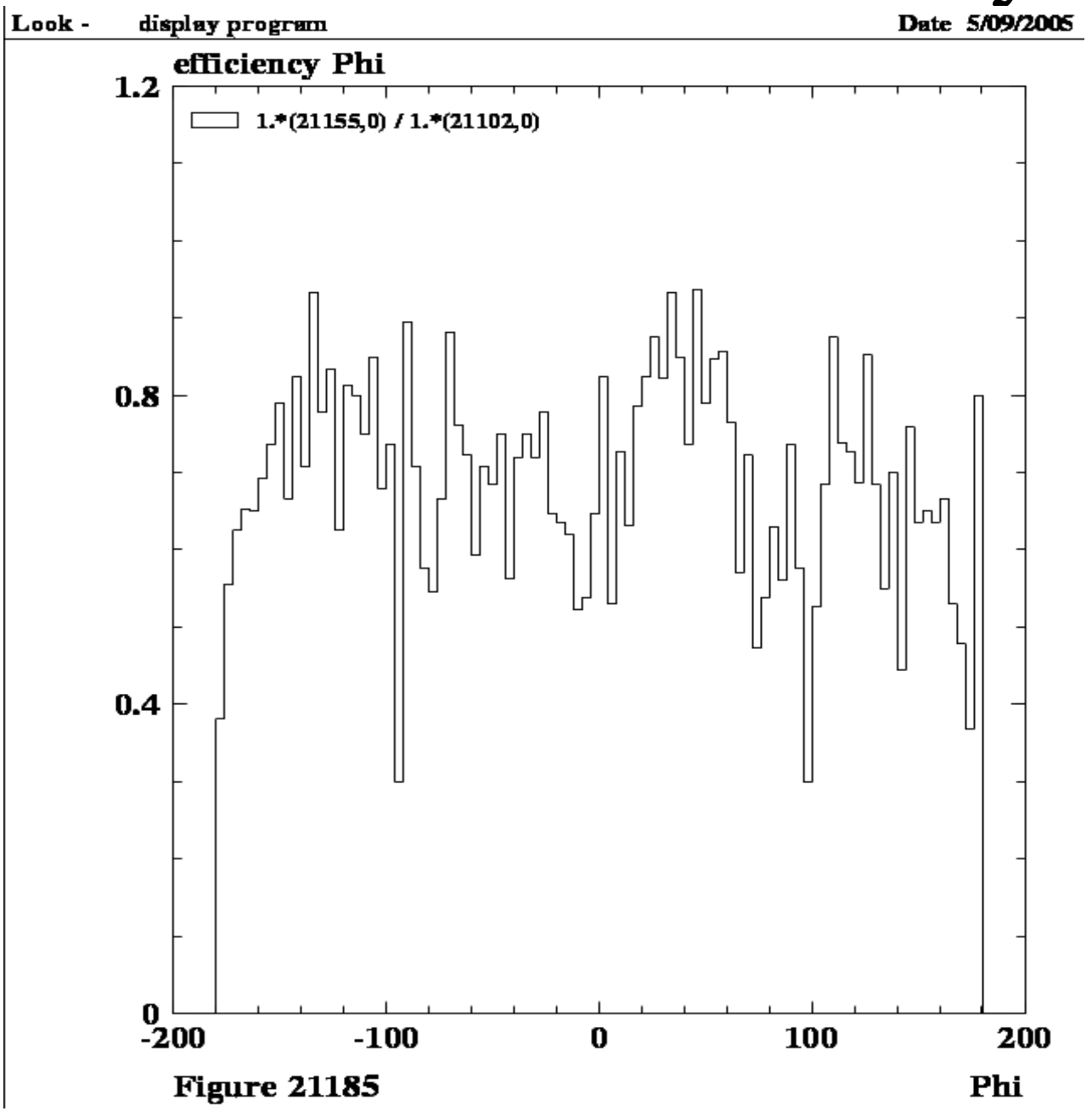



Here one can see the purity of φ.
Purity:
fraction oft TT2T data which have a corresponding offline reconstructed track .

Most are between 60 and 80%.

Rest: Fake tracks

# Efficiency




This histogram shows the efficiency: fraction of offline reconstructed tracks which are found in TT2T .

Between 60-90% with some holes.

Rest: tracks not found by FTT

End