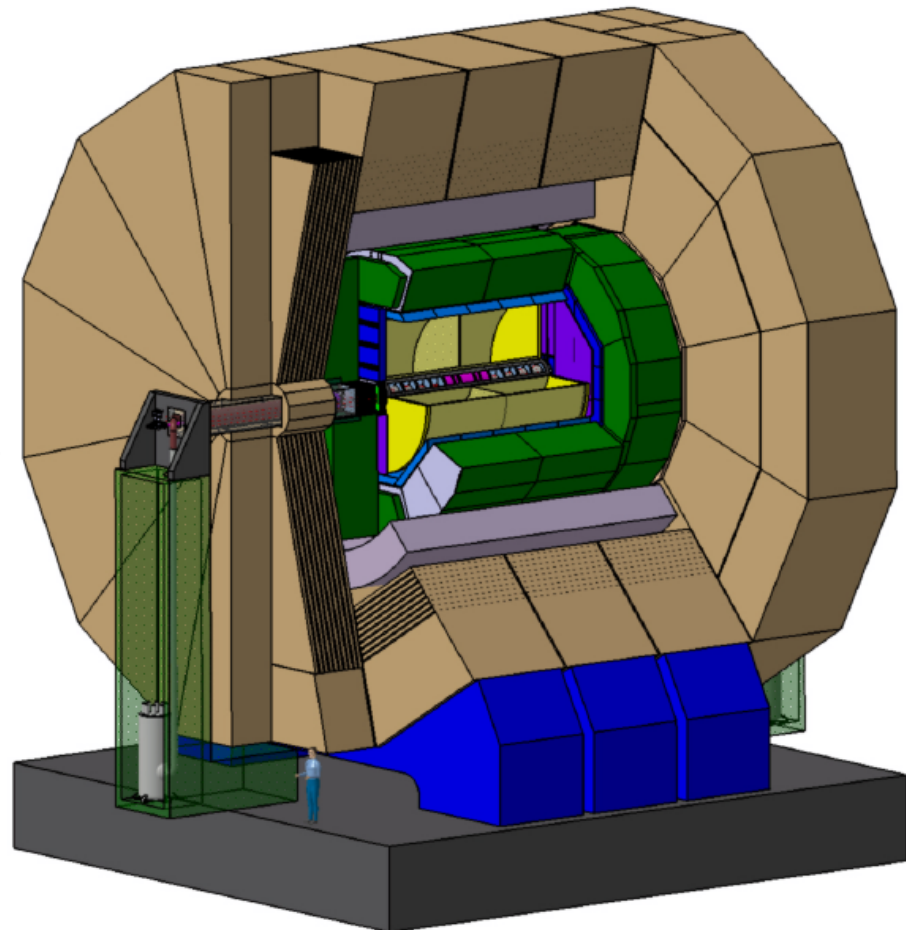


# A TPC at ILD: some issues

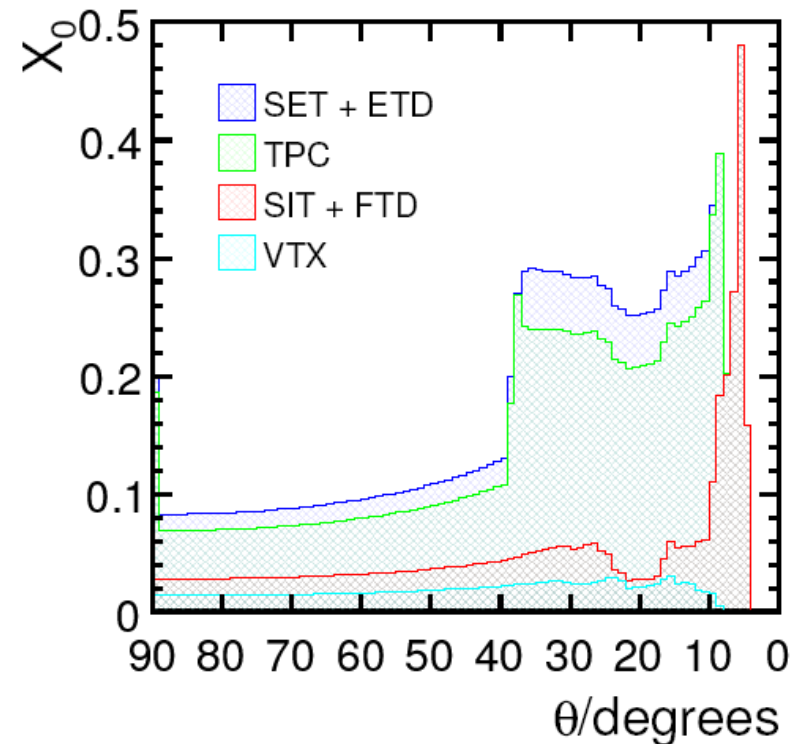
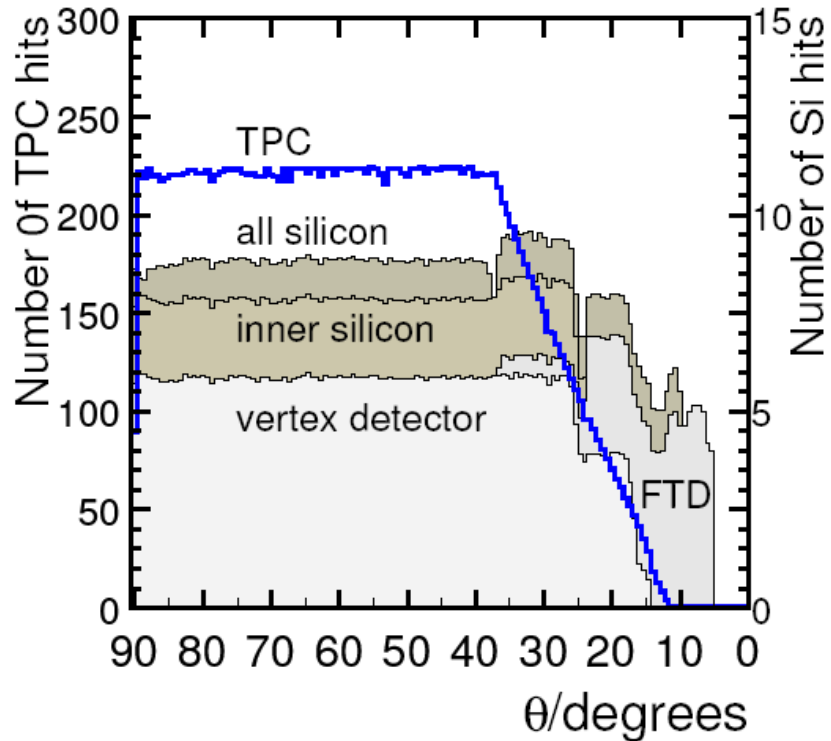
Central part of tracking in ILD

High performance:

- Excellent spatial resolution (<100  $\mu\text{m}$  over full drift)
- Excellent momentum resolution
- Large number of hits
- Stable operation



# Parameters of ILD-TPC



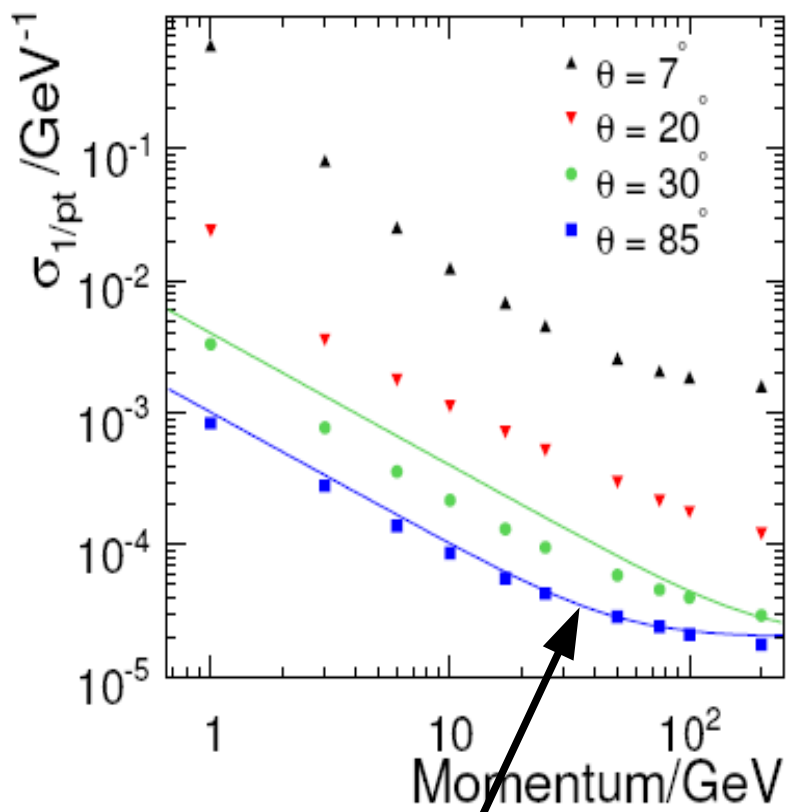
Number of hits vs  $\cos(\theta)$

>200 hits for large part of solid angle

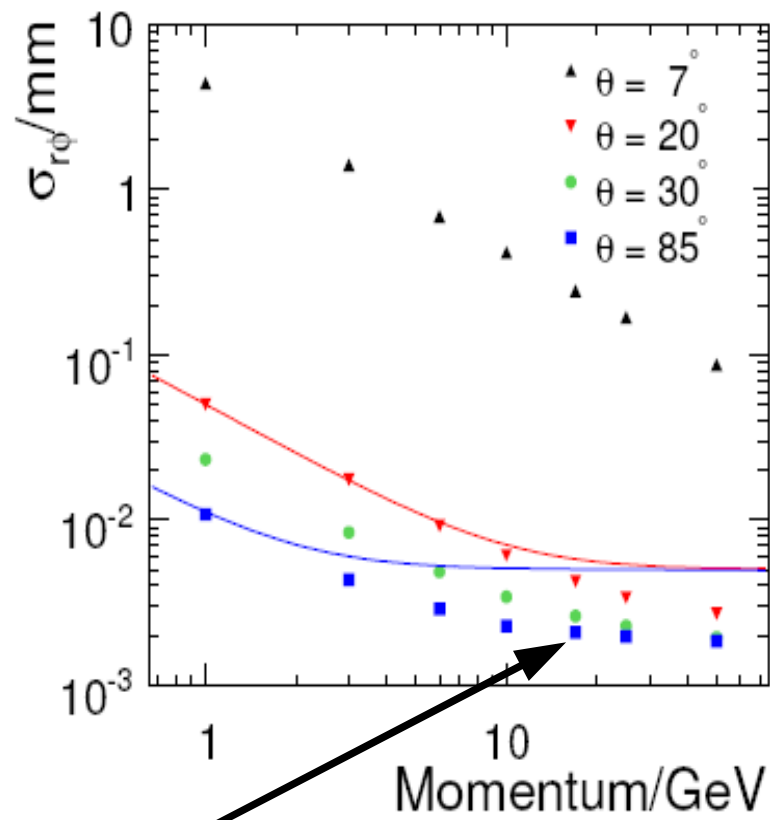
Assumed material budget:

Endplate is still significant (15%  $X_0$ )

# Simulated performance



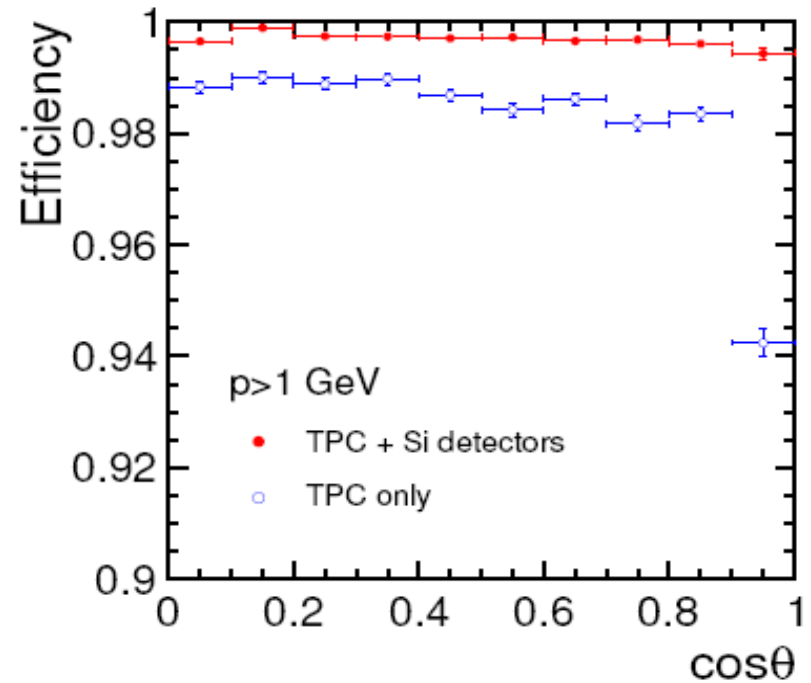
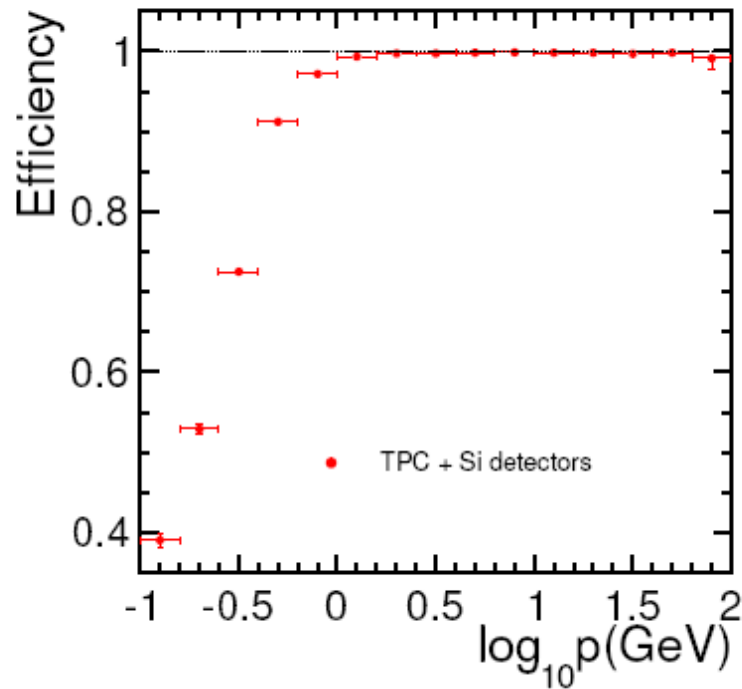
Simple theory



Full simulation

Anticipated momentum resolution and impact resolution for the complete ILD tracking system

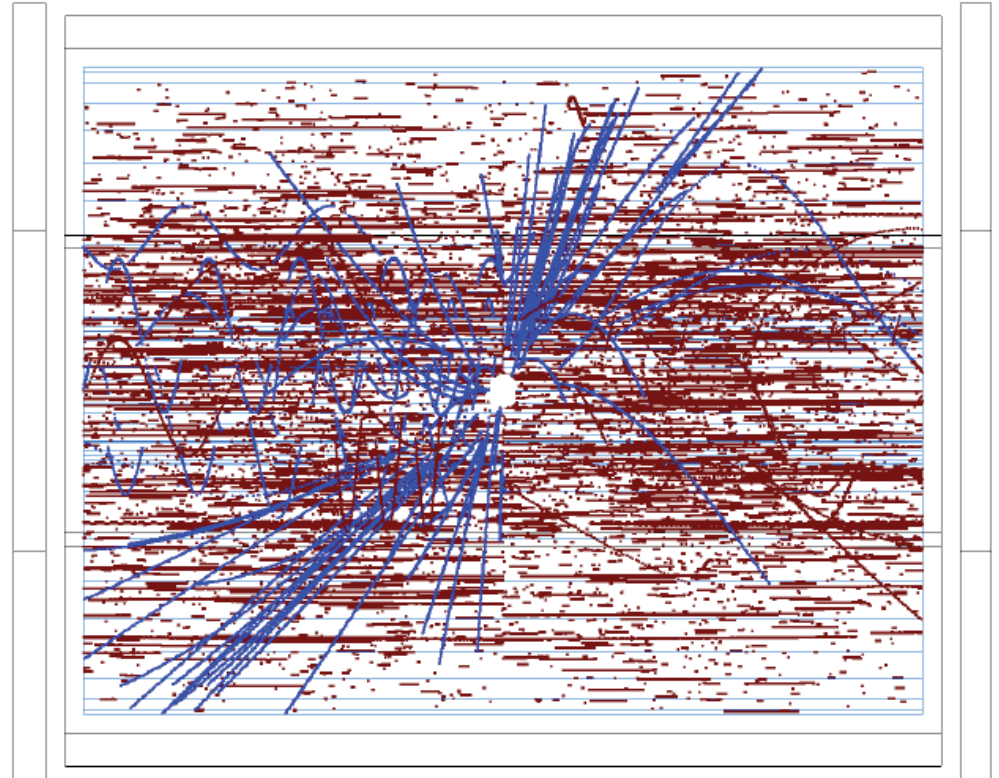
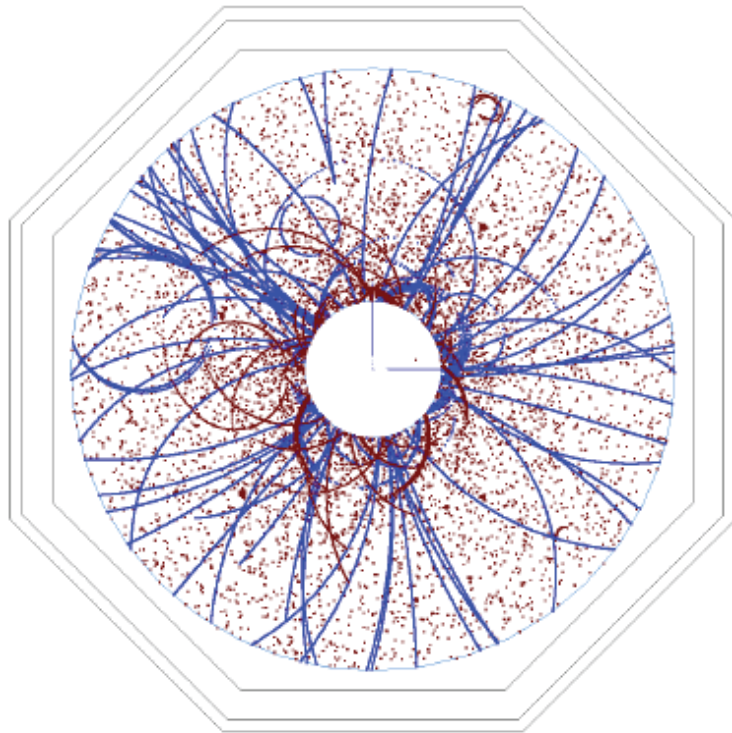
# Simulated performance



Tracking efficiency in tracking system:

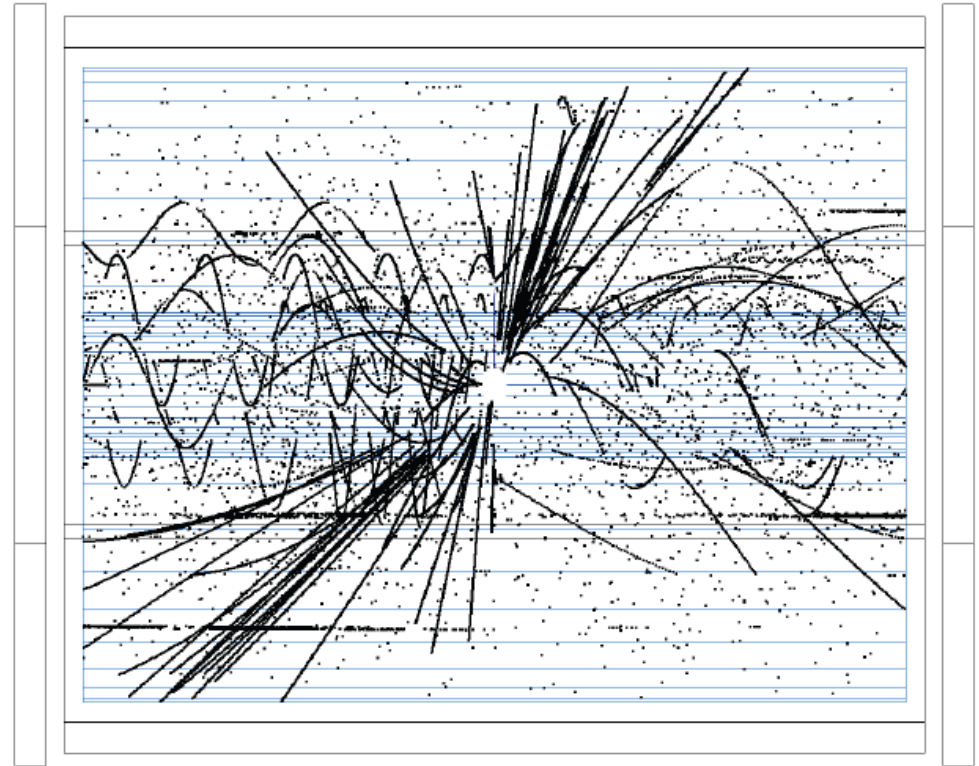
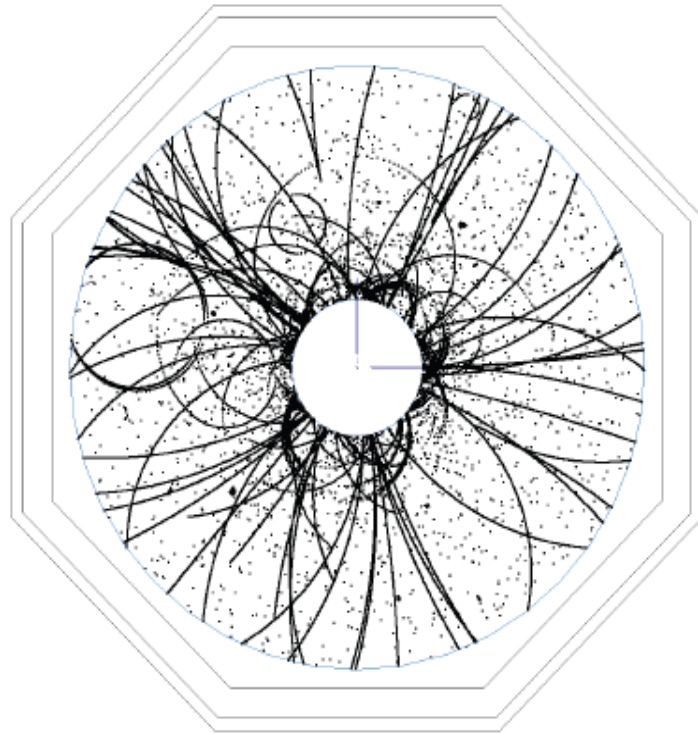
Performance at low momenta is still an issue: material and algorithm!

# Background in the TPC



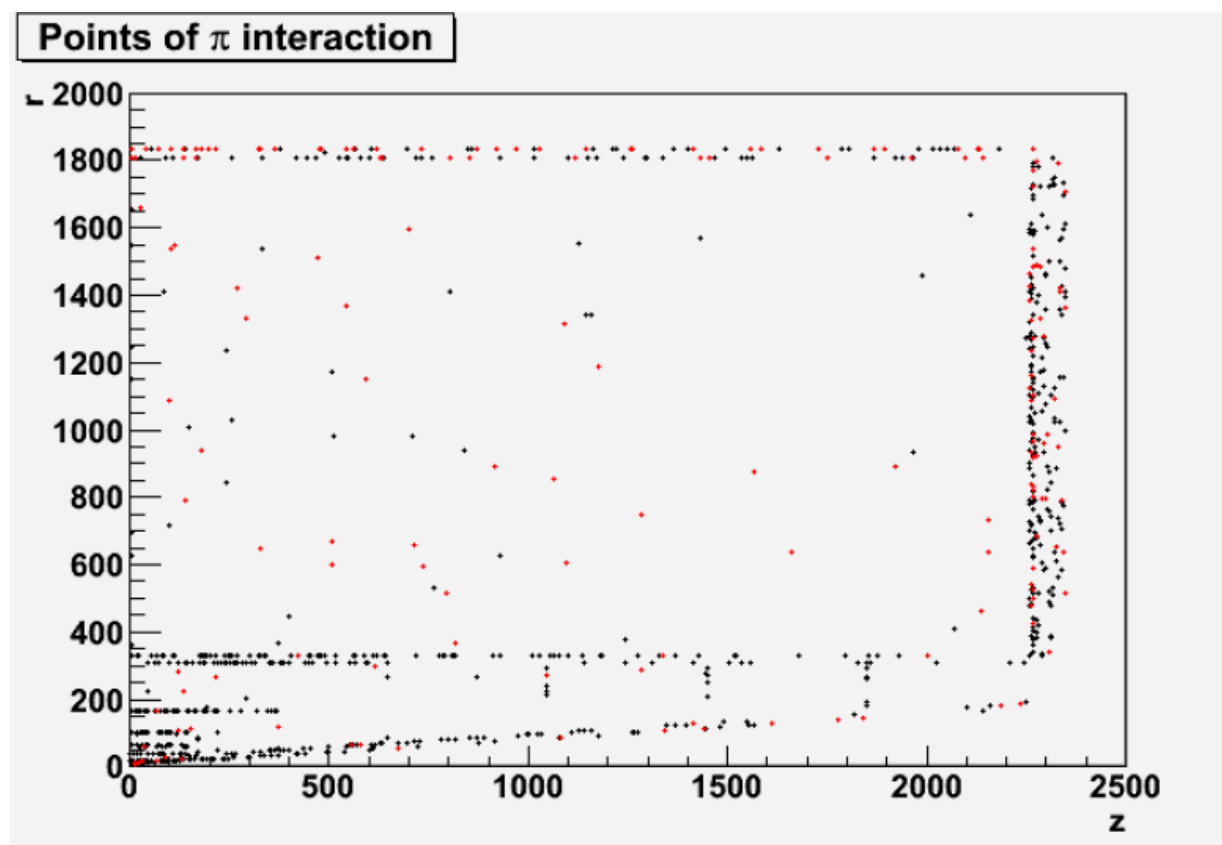
Background in the TPC before and after software removal, before tracking

# Background in the TPC



Background in the TPC before and after software removal, before tracking

# The role of material in the TPC



Location of reconstructed conversions in the TPC

Stresses the needs for minimised materials

# Material

Wall of the field cage:

See talk by Peter: Goal as stated in LOI seems possible, but is ambitious.

Main problem: need to understand better mechanical properties of light weight composite structures.

Endplate:

"advanced endplate" design

Significant less material than in current end plate is anticipated.

Design has just started.

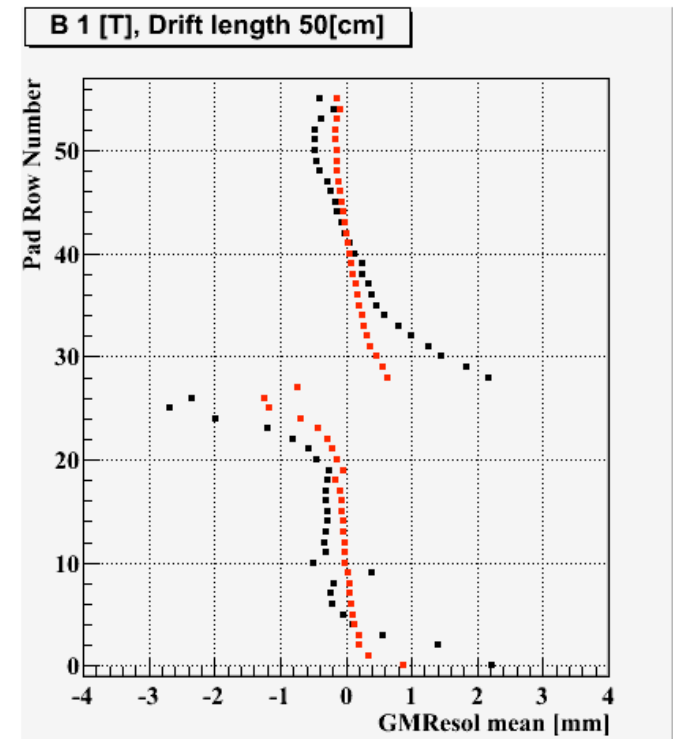


# Alignment

Very little work has been done on alignment so far:

- No consistent concept
- Need internal and external alignment
- Many ideas, including lasers
- No convincing idea on how to connect TPC to the rest of the detector

Simulation: need to control coherent displacement at the 5 $\mu$ m level



# Issues

Mechanical design of the system: realistic material estimate

Resolution: need realistic numbers from tests

Alignment: is only starting to be addressed: need a complete and convincing approach

Electronics: need to continue on the way to minimization

Power pulsing? Need for cooling?