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# TRD Tracking and Visualization Status

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TRD Status Meeting  
Hauenstein  
6 - 7 June 2008

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# Outline

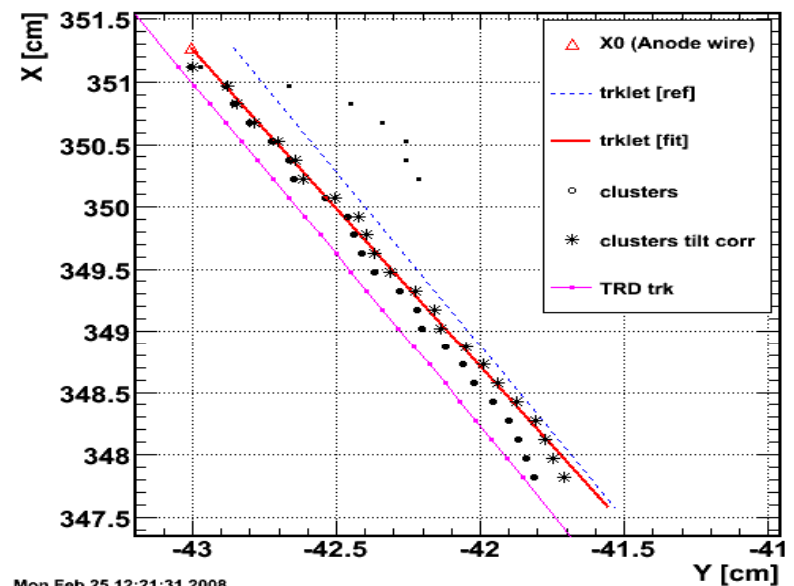
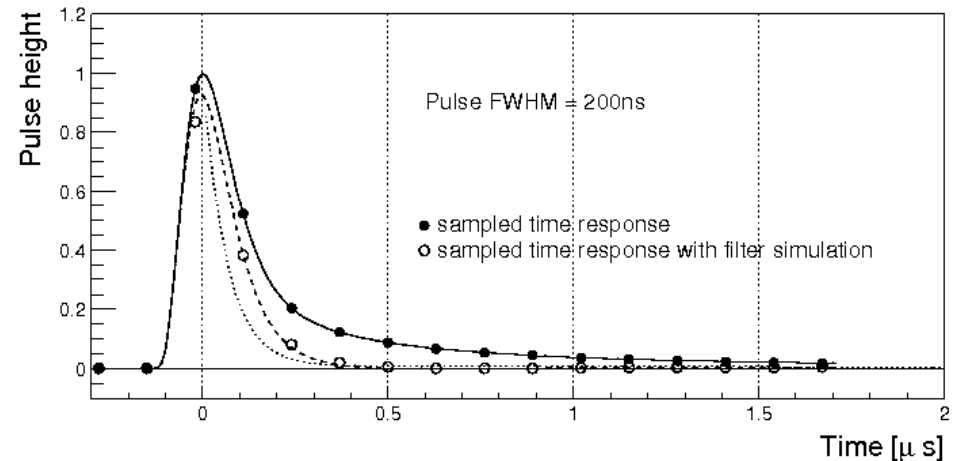
- Overview of the new tracking code
- Tracker performance
- Relation with other detector components
- Visualization

# New Tracking Tracklets

- TRD clusters are correlated over a range of 300ns (TRF).
- Tracklets are linear fits for clusters/track/detector
  - calibration aware
- The ESD tracks are updated in ( $\leq$ ) 6 *independent* positions.

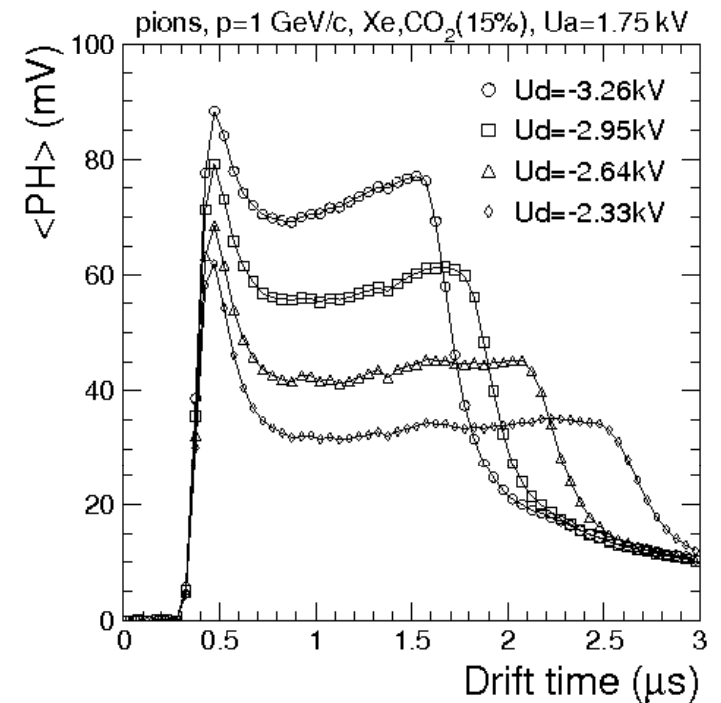
The new tracker is already half a year old !!

Markus Fasel is a major contributor



# New Tracking Miscellaneous

- Calibration/Alignment aware
  - clusters containers
  - dEdx
- Stand Alone TRD tracking
  - Integrated with the barrel tracking
  - Successfully run on data (TB, Muenster, P2)
  - HLT



# Tracking in Overview

	<b>pattern recognition</b>	<b>fit</b>
<b>stand alone</b>	<i>tracklet</i>	<i>track model</i>
<b>barrel</b>	<i>tracklet</i>	<i>Kalman fitter</i>
	<b>efficiency</b>	<b>resolution</b>

# TRD track models and use

## Riemann Tilt

$$(x - x_0)^2 + (y - y_0)^2 = r^2$$

$$z = z_0 + \frac{dz}{dx} (x - x_r)$$

$$y = y_c + (z_c - z) \cdot \text{tg}(\text{tilt})$$

## Straight Line Tilt

$$y = y_0 + \frac{dy}{dx} (x - x_r)$$

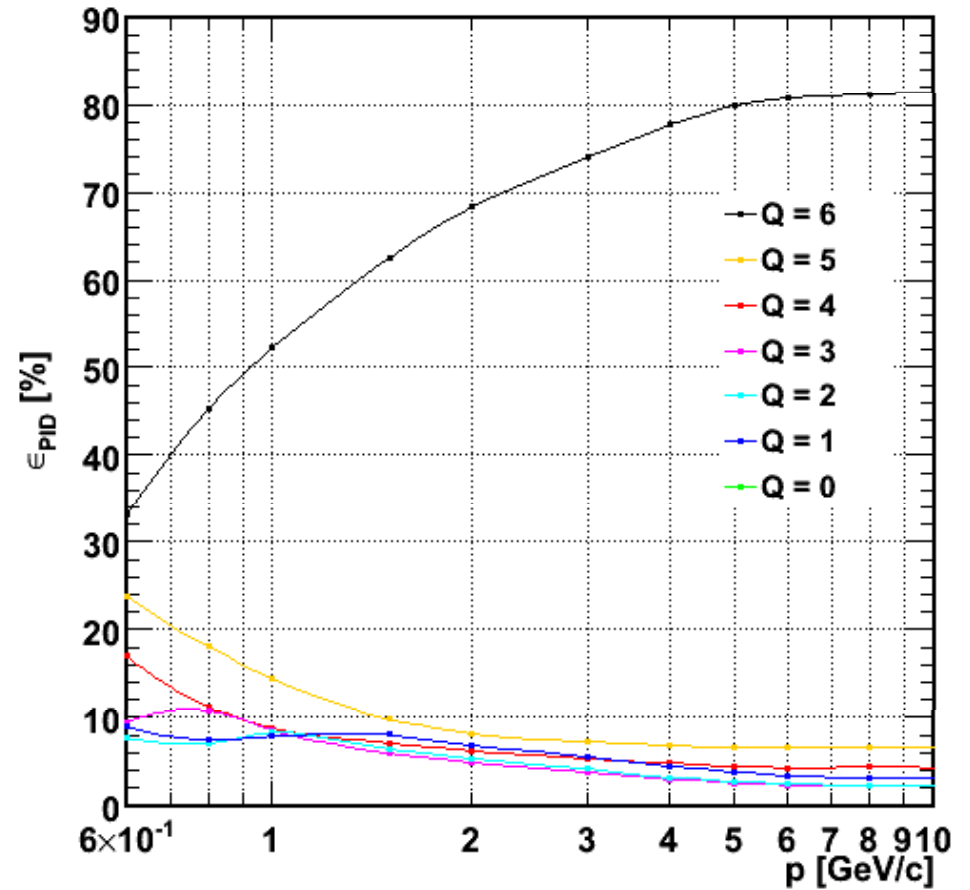
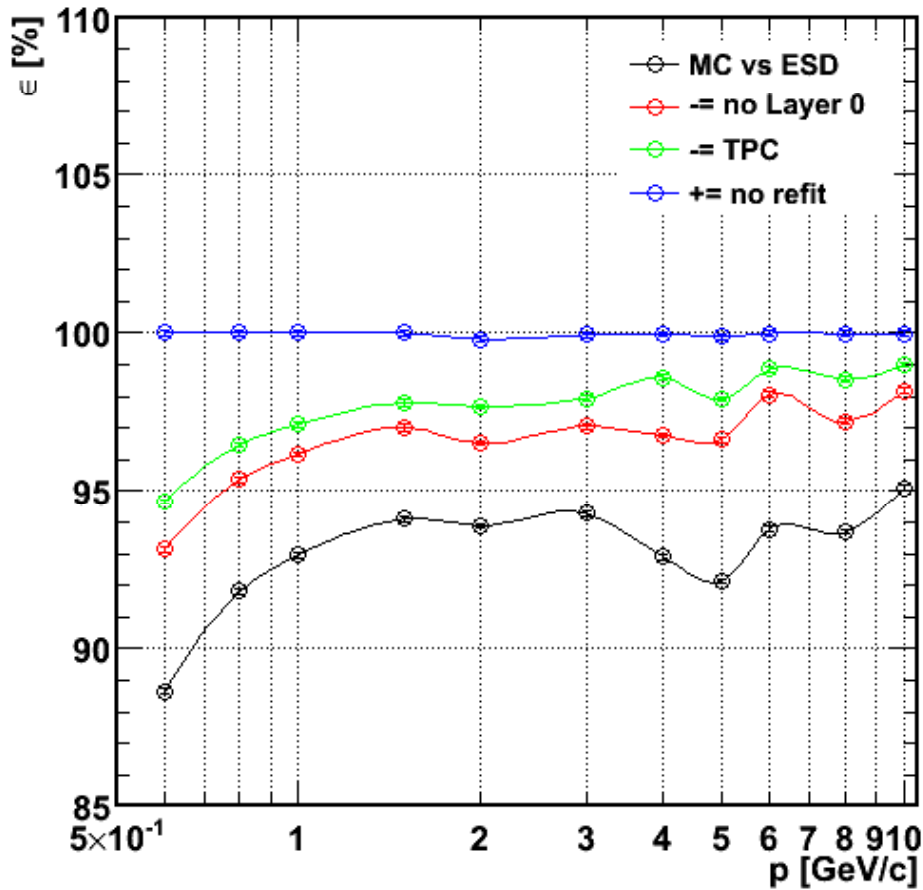
## User Interface

*FitRiemanTilt(AliTRDtrackV1 \*trk, AliTRDseedV1 \*tracklets, Bool\_t err, Int\_t np, AliTrackPoint \*p);*

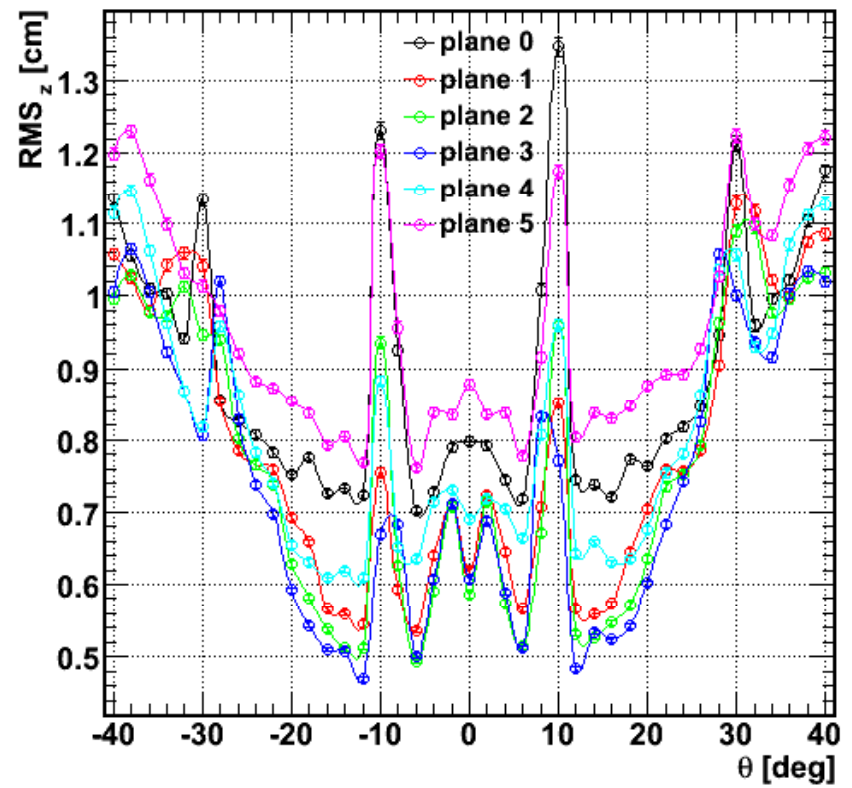
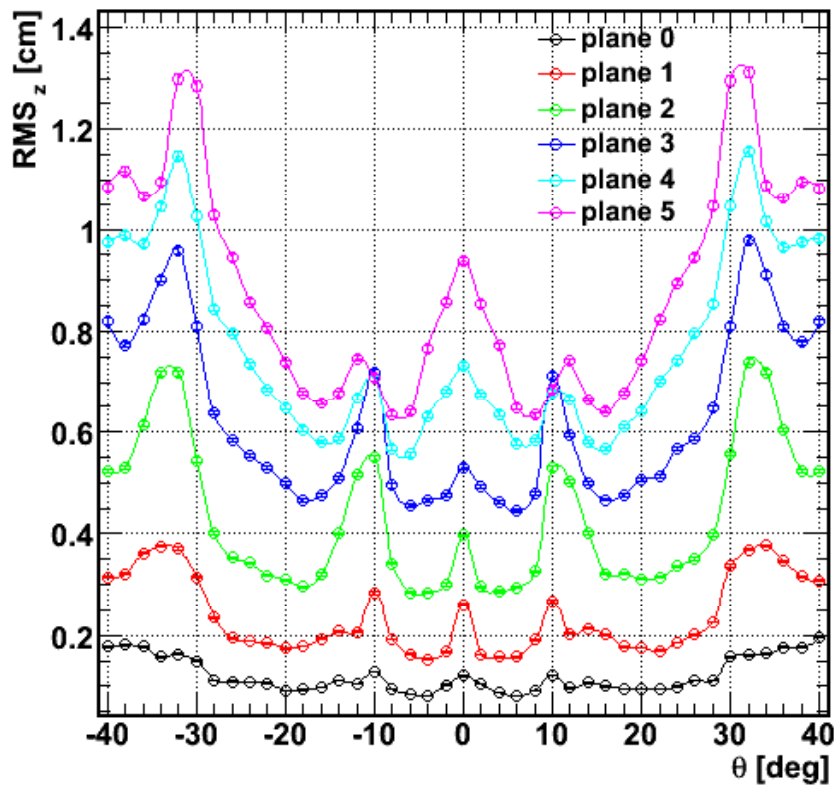
*FitLine(AliTRDtrackV1 \*trk, AliTRDseedV1 \*tracklets, Bool\_t err, Int\_t np, AliTrackPoint \*p);*

*FitKalman(AliTRDtrackV1 \*trk, AliTRDseedV1 \*tracklets, Bool\_t up, Int\_t np, AliTrackPoint \*p);*

# Tracking - Efficiency

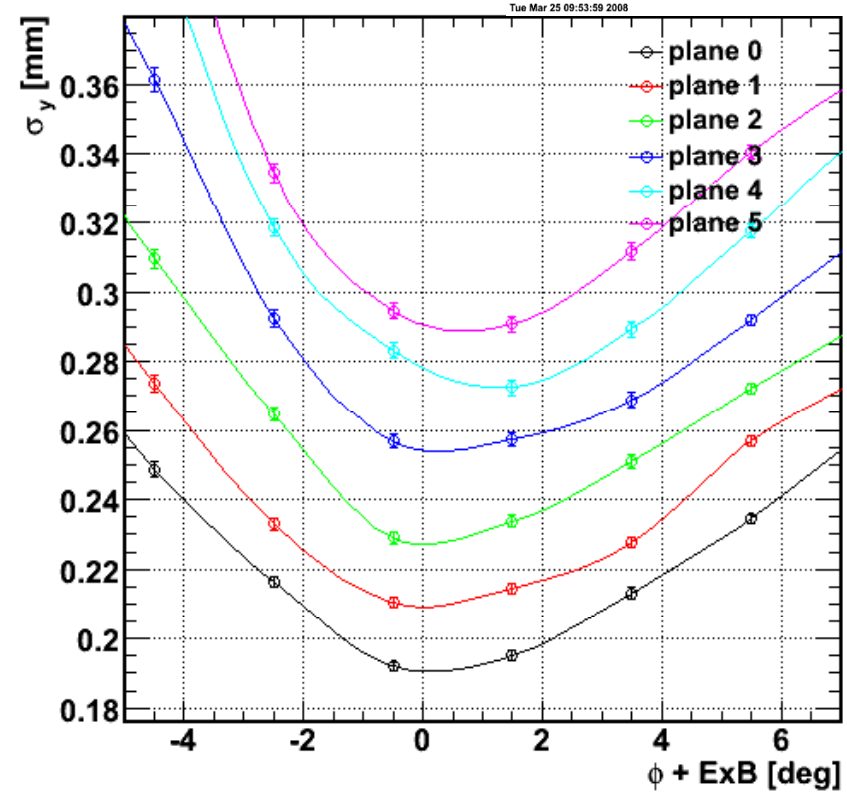
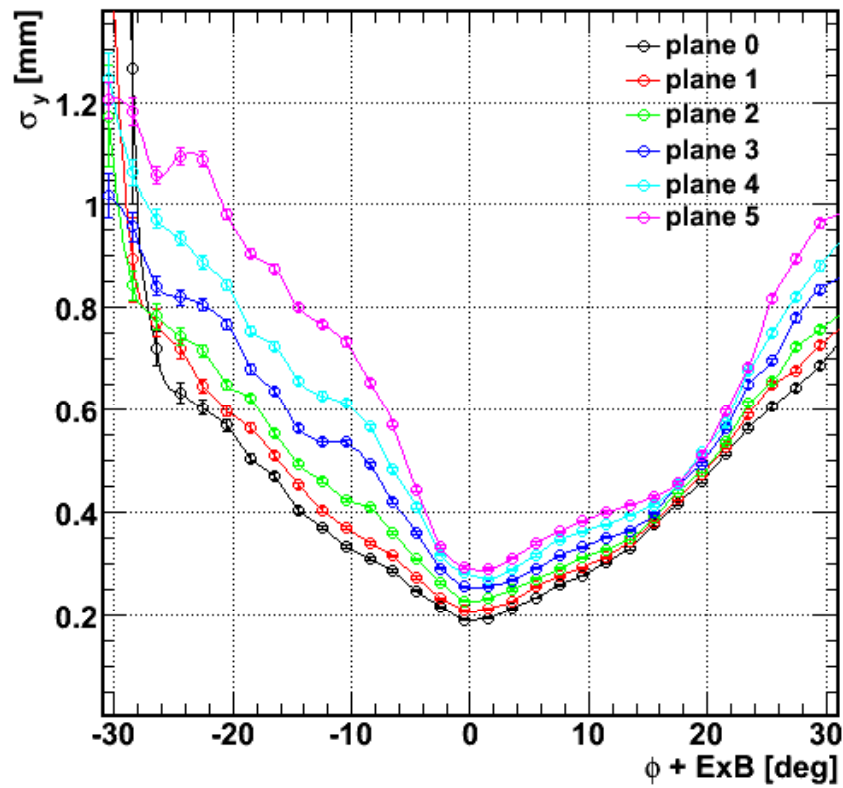
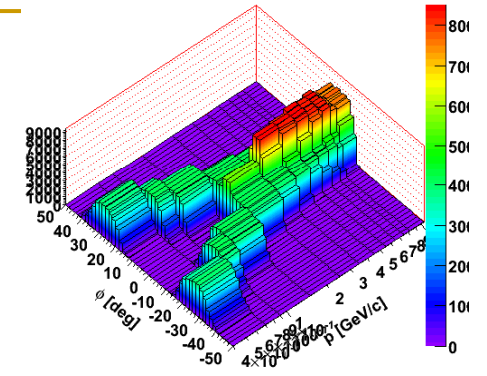


# Z resolution

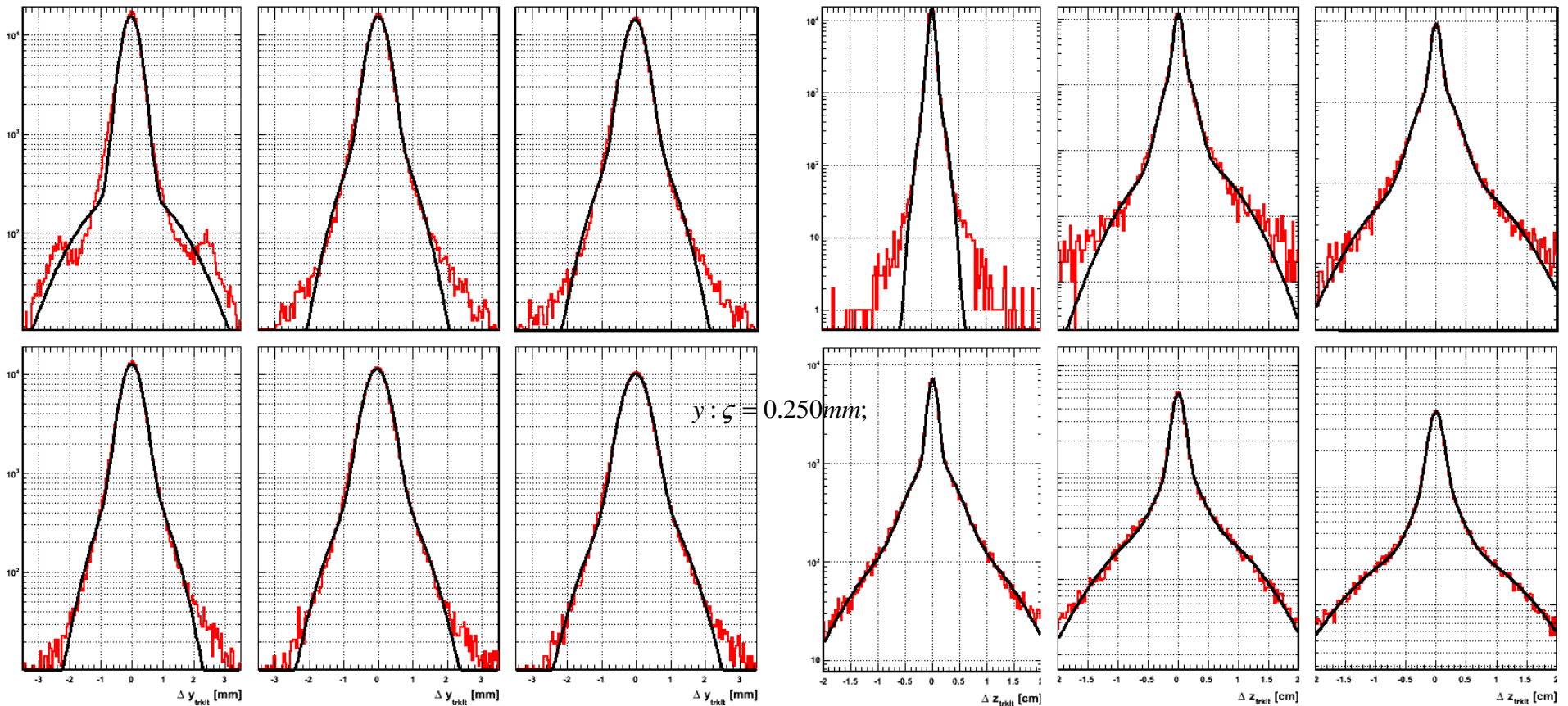




# Y resolution



# Multiple scattering ?!

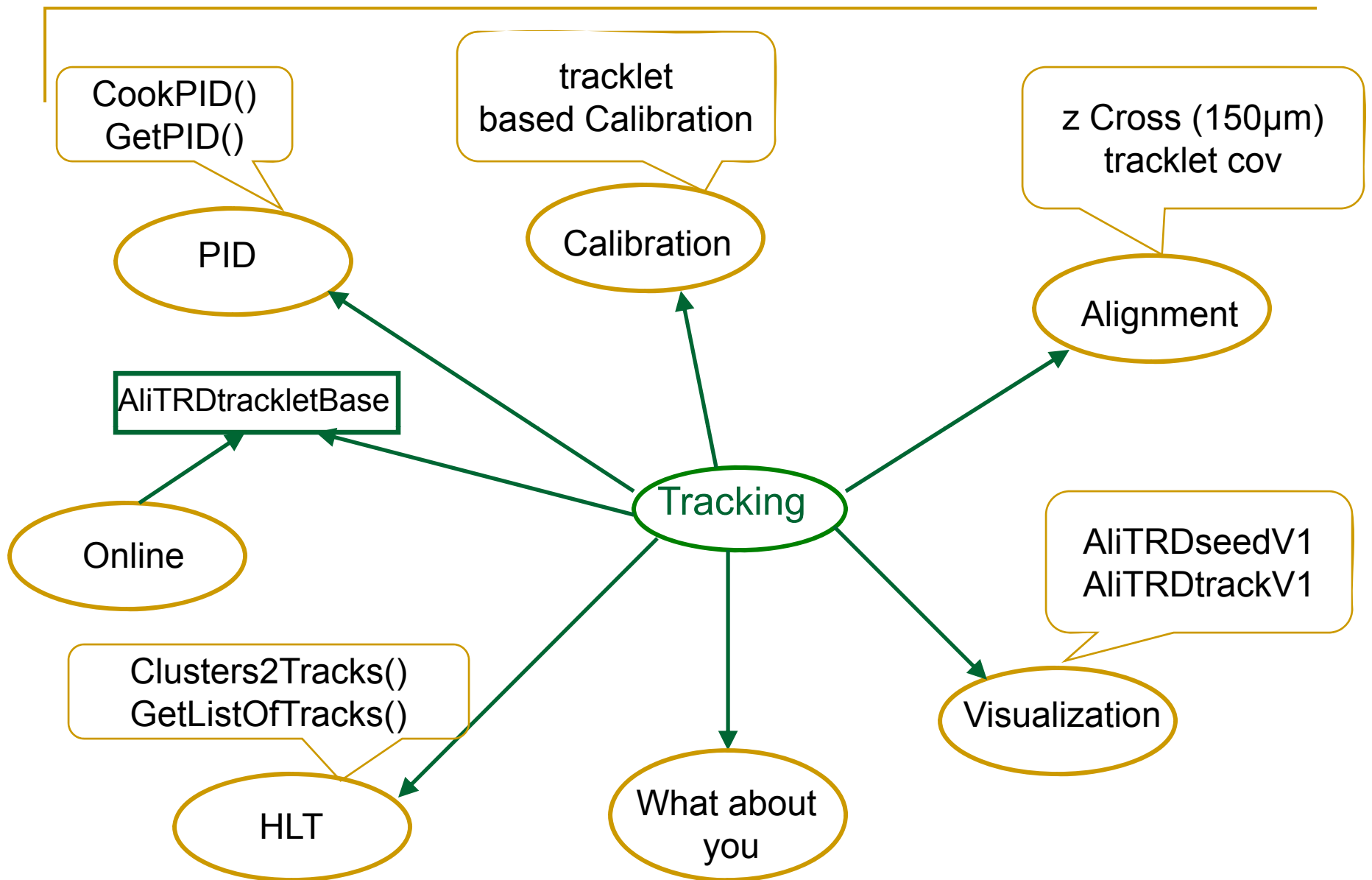


$$\Delta y = G_T(\eta, \zeta) + G_{MS}(\mu_i, \sigma_i), i = \overline{1,6}$$

$$\sigma_i^2 = \sigma_{ms}^2 + \sigma_{i-1}^2$$

$$y: \sigma_T = 0.250 \text{ mm}, \sigma_{MS} = 0.220 \text{ mm}$$

$$z: \sigma_T = 2 \text{ mm}, \sigma_{MS} = 0.5 \text{ mm}$$



# Visualization

## Wrappers

AliEveTRDHits  
AliEveTRDDigits  
AliEveTRDClusters  
AliEveTRDTracklet  
AliEveTRDTrack

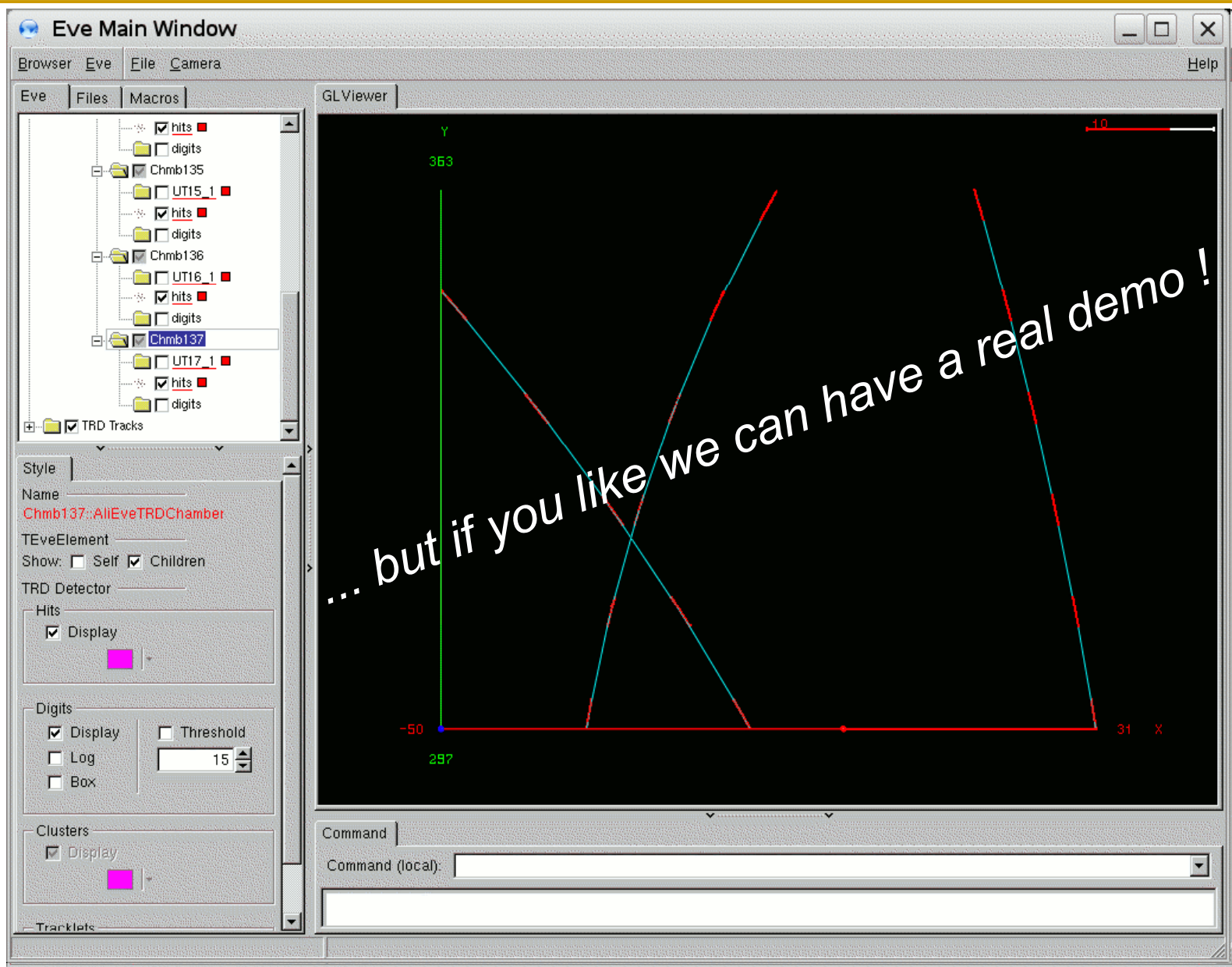
## Containers

AliEveTRDChamber(Node)  
AliEveTRDLoader  
AliEveTRDLoaderSim  
AliEveTRDLoaderRaw

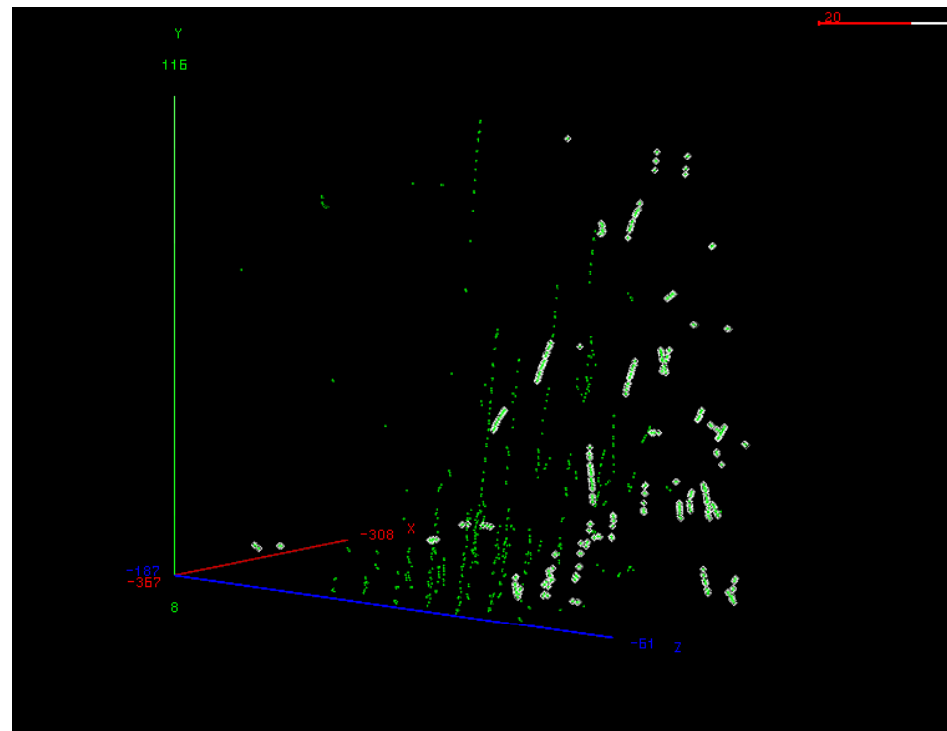
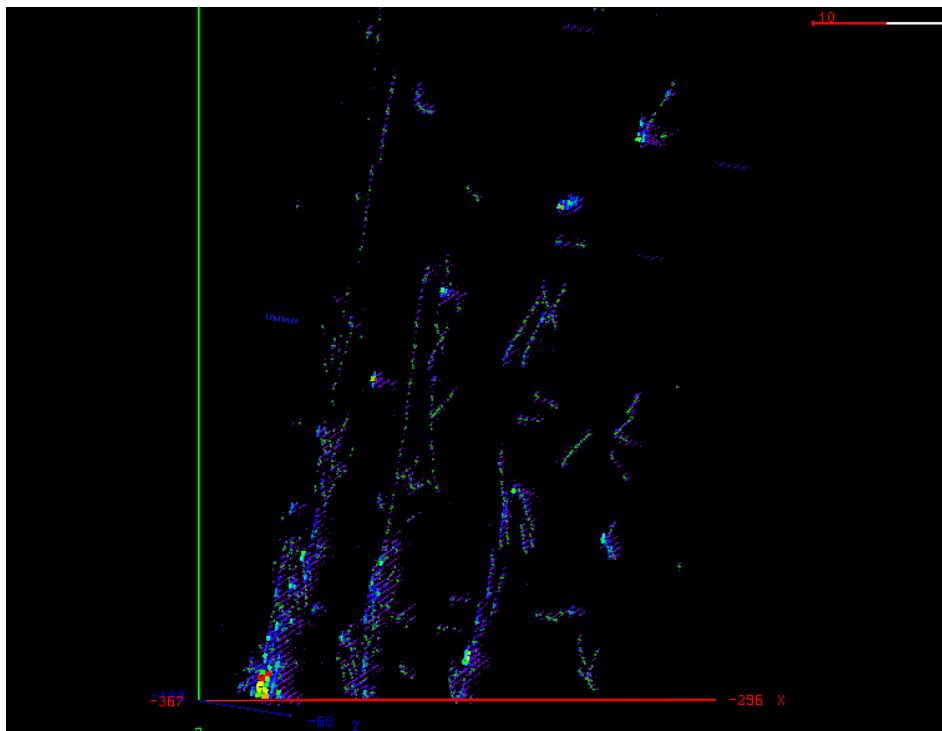
## Macros

trd\_detectors.C  
trd\_(raw)loader.C  
trd\_friend\_tracks.C  
*trd\_analyse.C*

"Demo"



# CR @ P2 run 33249/94



***No “specialist” settings for reconstruction & visualization !!***

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## Still to do ...

- Tracklet class (**AliTRDtracklet**)
  - independence from the old code
  - meet point with the online (AliTRDtrackletBase)
  - data size reduction (0.4+6+10 kB/track)
  - not yet in SVN
- Tracklet error parameterization
- Documentation / Macros / Quality
- ... continuous reaction to users ...