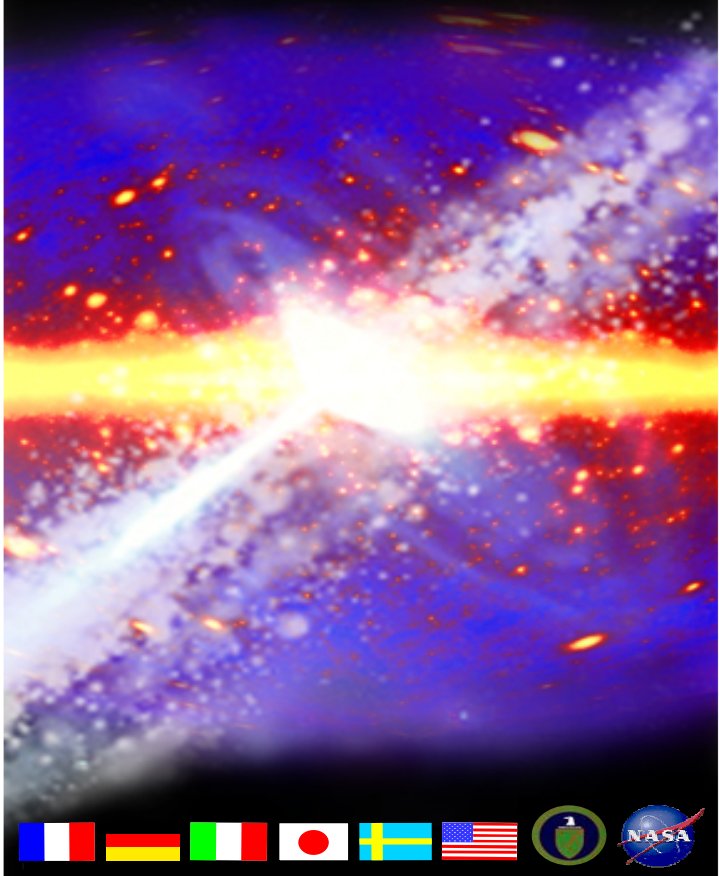


The logo for the Gamma-ray Large Area Space Telescope (GLAST) features the word "GLAST" in a stylized, metallic, 3D font. The letters are intertwined with a circular, orbital-like structure that suggests the telescope's path or field of view.

**Gamma-ray Large Area
Space Telescope**

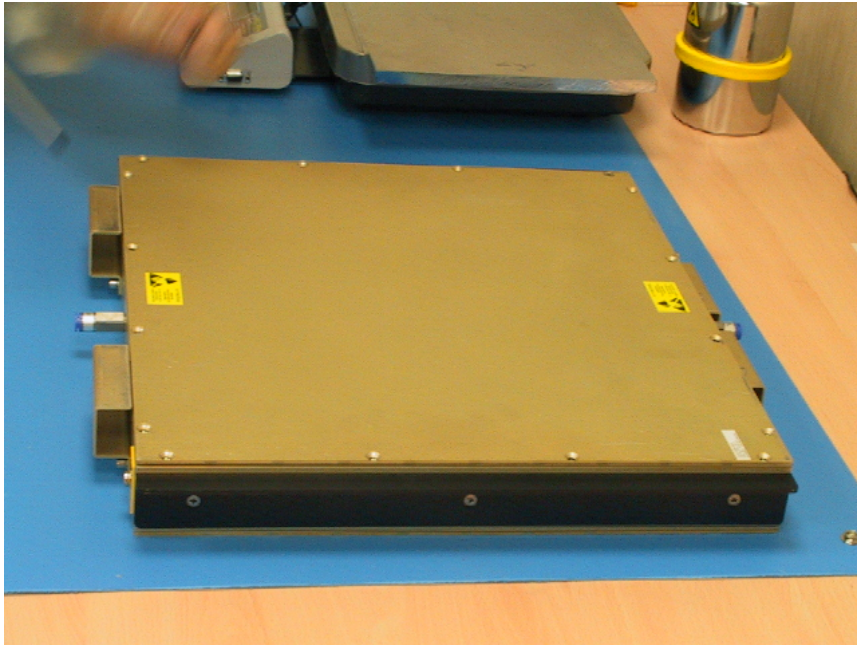


Latest and greatest from offline analysis with real TKR data

L. Baldini, M. Kuss, N. Omodei, C. Sgro

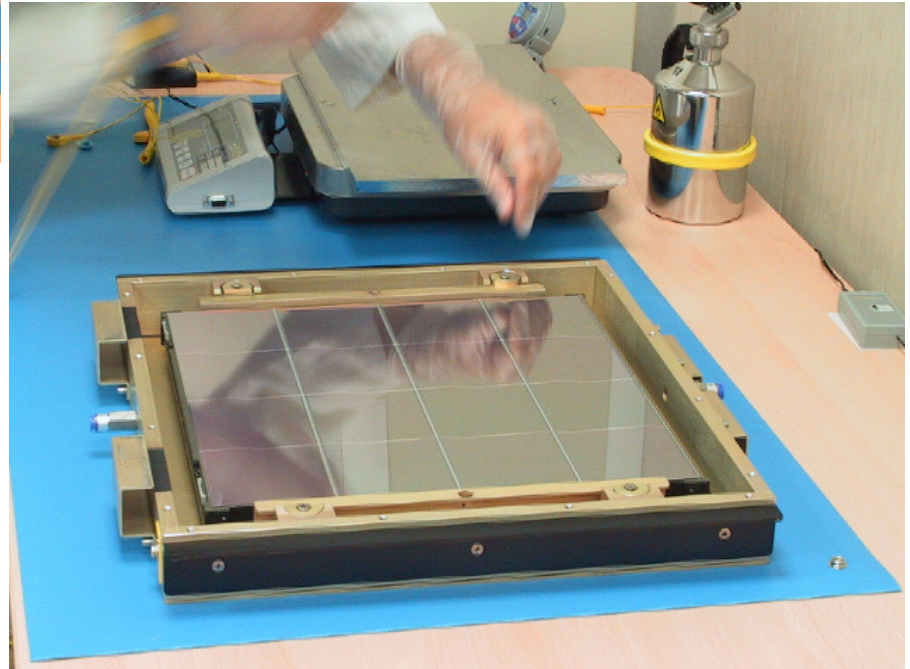
**Instrument Analysis Workshop 2
SLAC
September 27, 2004**

A different view on xmlGeoDBs: the trays...

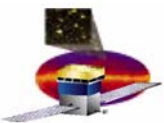


The tray shipping containers provide:

- ✓ Protection from contamination and accidental mishandling.
- ✓ Full testing capabilities (electrical connection possible without opening the box by means of connector savers.).



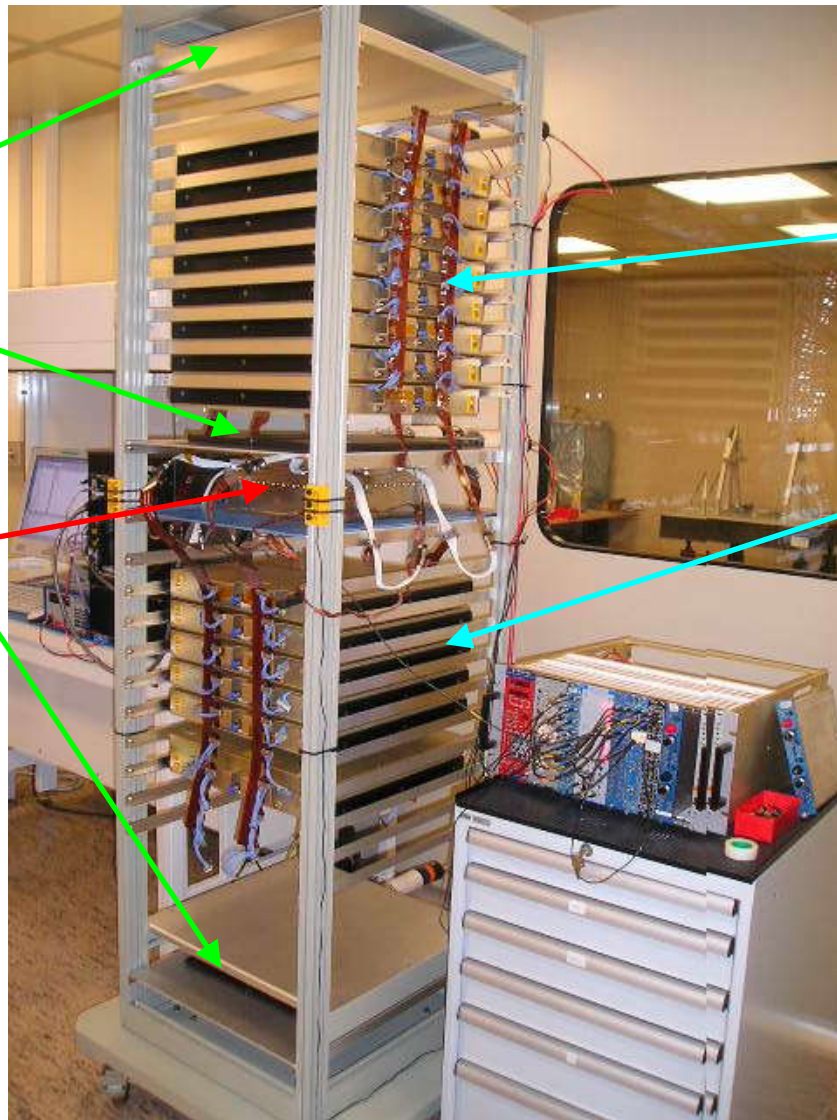
The trays are being removed from the boxes right before the final stacking into the tower assembly jig.



...and the stack!

Scintillators

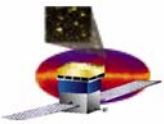
TEM + PSA



Stack (y part)

Stack (x part)

Electronics



Data taking trigger configurations

✓ **Three in a row:**

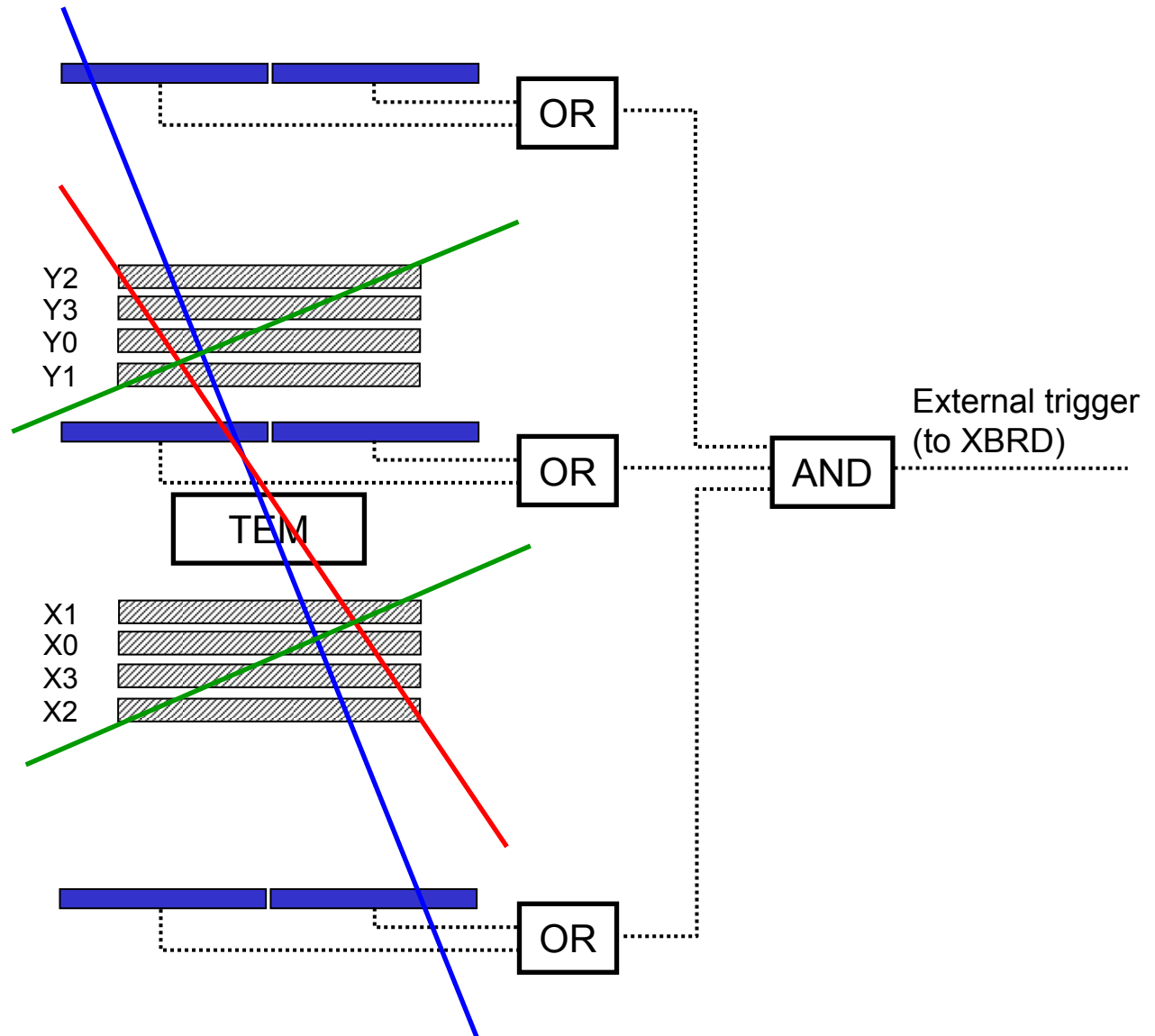
trigger on three consecutive X-Y planes - coincidence of 6 silicon layers - even though the layers involved are NOT close to each other.

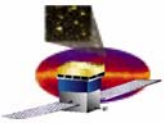
✓ **Stack X (Y) only:**

trigger on the coincidence of three consecutive X (Y) layers - all Y (X) layers forced to be ON.

✓ **External trigger:**

trigger on the coincidence of the three external scintillator planes.





RootAnalysis

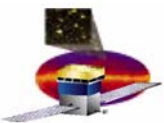
Standard approach: \Rightarrow *RootTreeAnalysis*. It reads mc, digi, and recon files, predefines histograms and writes them into another root file.

You need to hard-code:

- what to histogram
- dimensions and binning (no way to zoom on details later)
- cuts

Our approach: \Rightarrow *LeaningTower*. *runTreeMaker* fills all interesting quantities into one single tree. All the relevant information can be retrieved by means of some standard tools.

All the dimensions, binning and cuts can be easily modified interactively!



RootAnalysis/src/LeaningTower

runTreeMaker.cxx,
TreeMaker.cxx

merges digi and recon files into one single tree

loaded by compile.C:

Layer.cxx Tracker.cxx

contains geometry description of stack/tower

Event.cxx

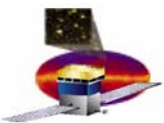
defines Event class

EventDisplay.cxx

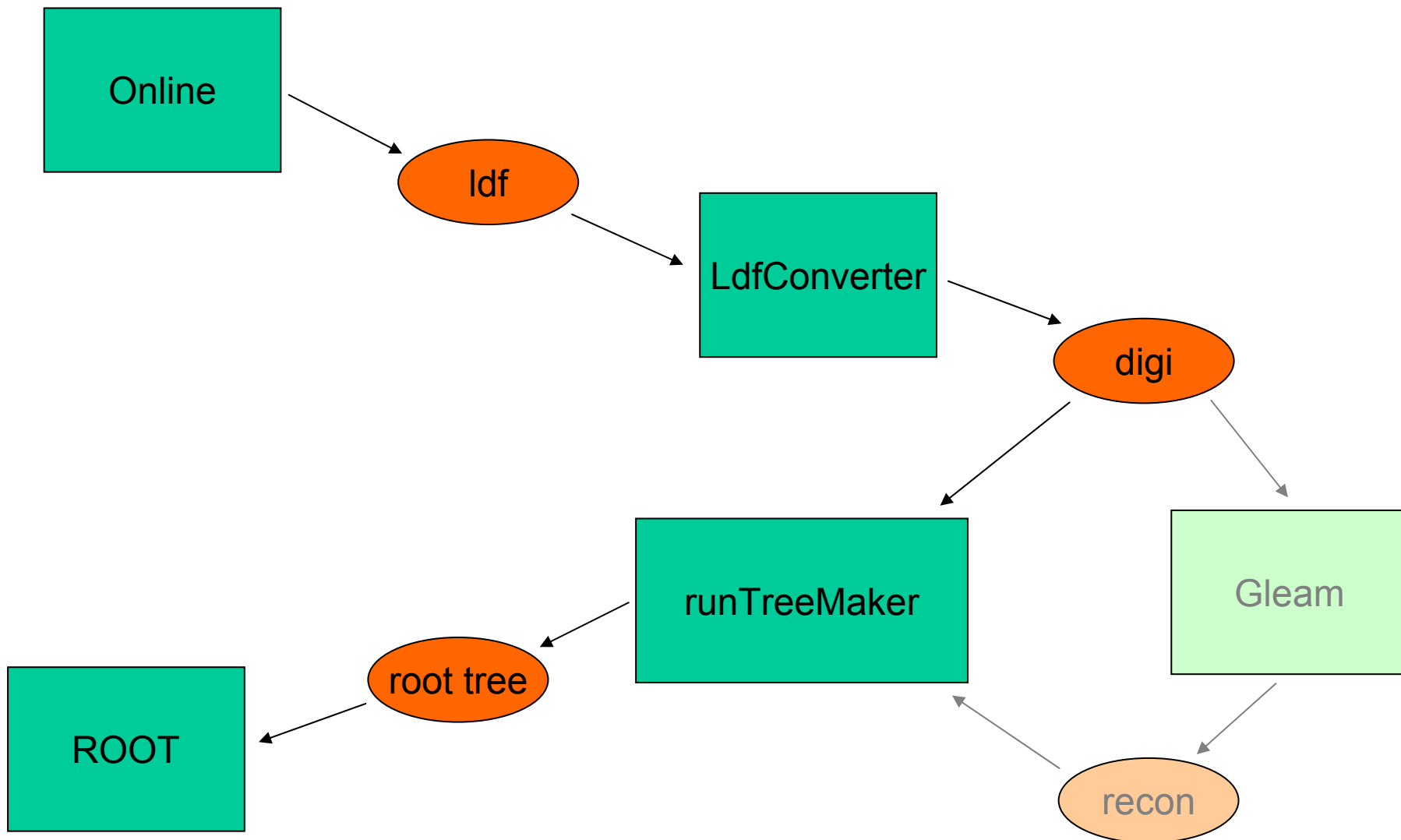
Event display (also residuals and efficiency estimate,
for now!)

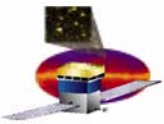
PlotMacros.C

collection of macros to ease plotting of
interesting quantities.



Analysis Flow

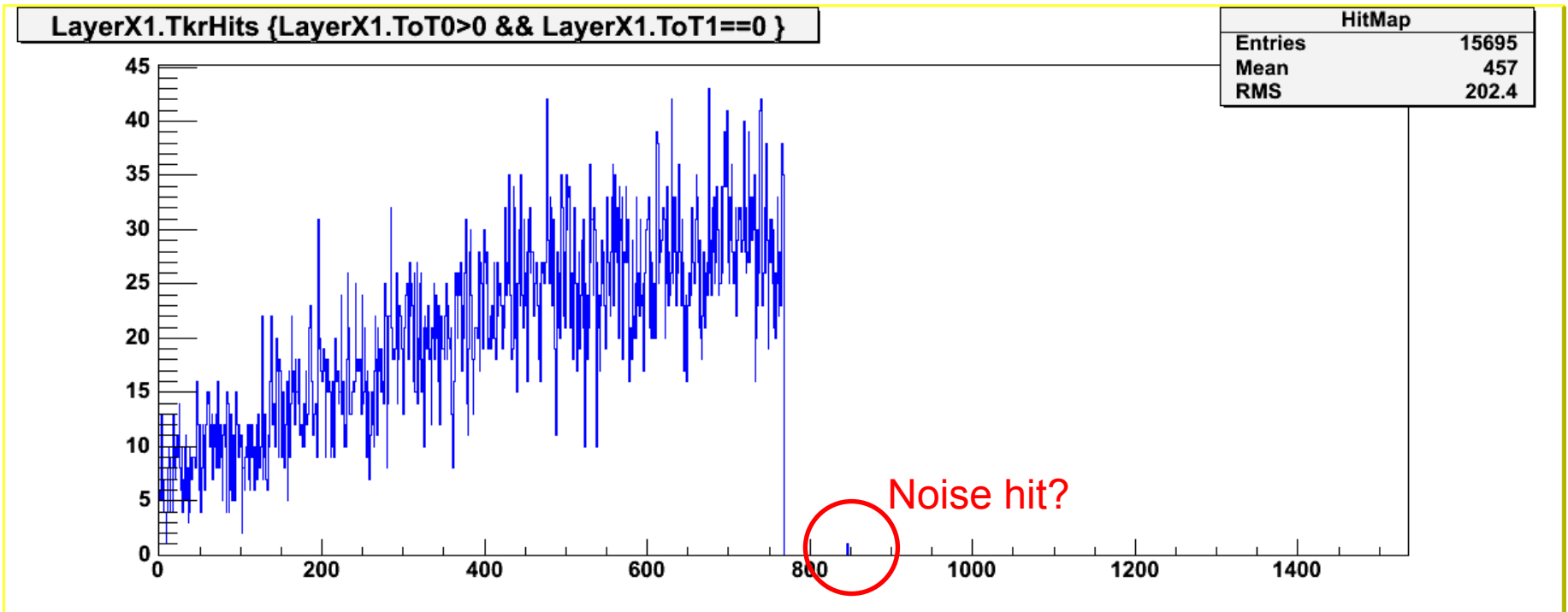


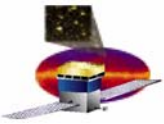


Few examples...

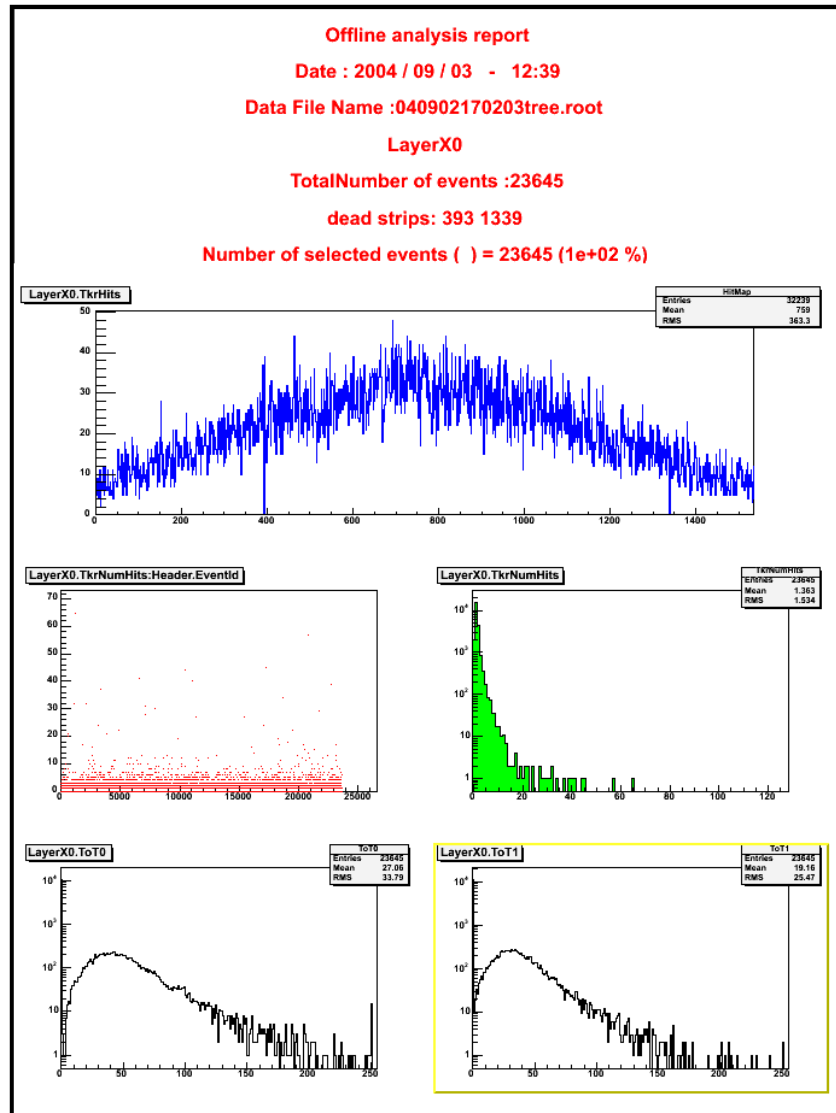
Plot a variable applying a cut on different specific variable from another layer:

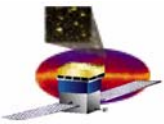
```
> AddHitMapX1(LayerX1.TkrHits>0 && LayerX1.ToT0>0 && LayerX1.ToT1==0) macros.  
> AddLayer("X1RootFile.root") // Load the data file.  
> AddHitMapX1(LayerX20.TkrHits>0 && LayerX1.TkrHits>0); the focus on layer X1.  
> PlotHitMap(); // Plot the hitmap.
```



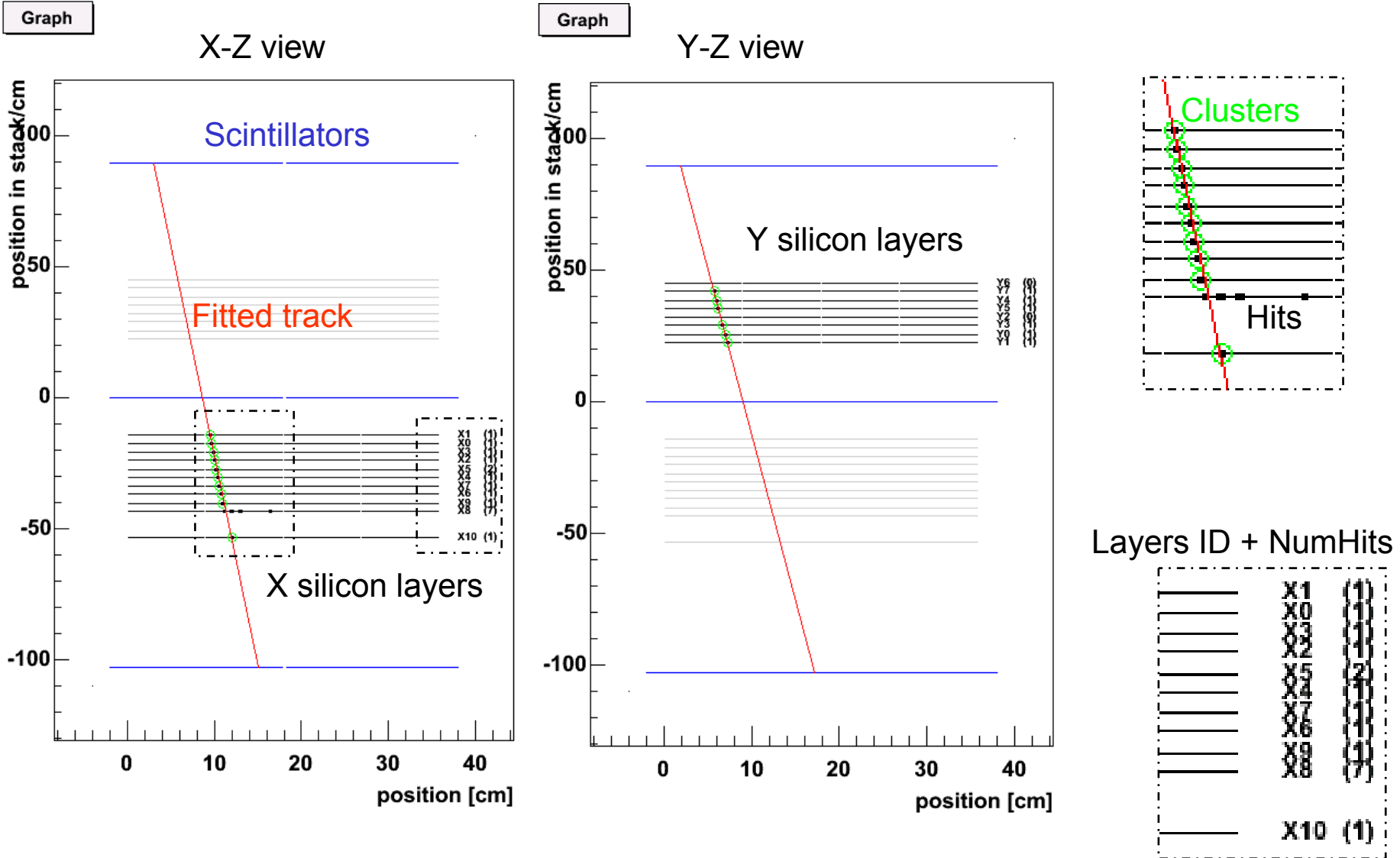


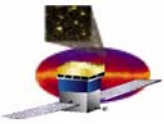
An example of Offline Report



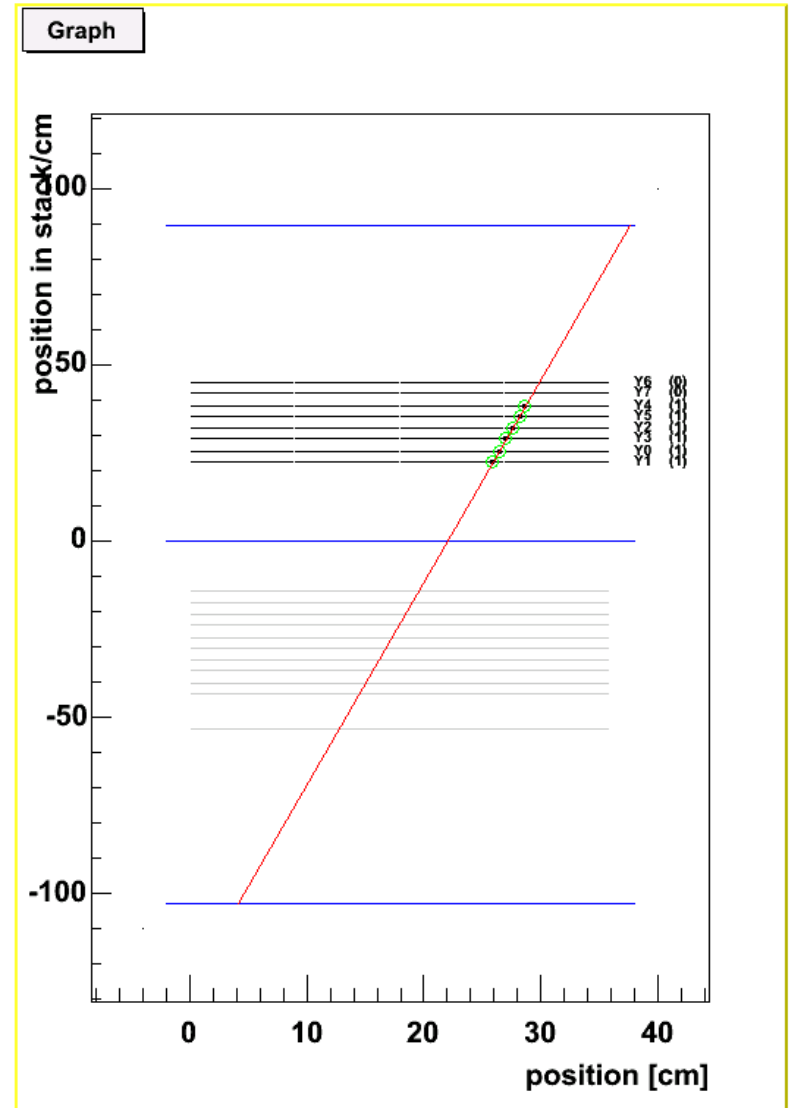
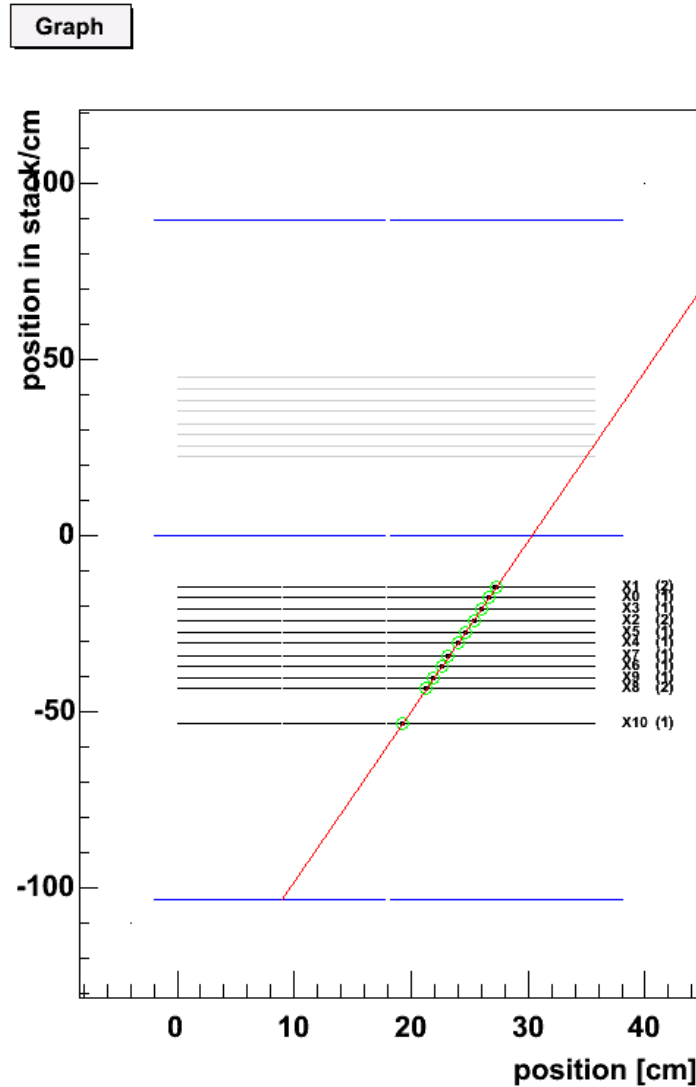


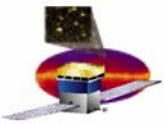
The event display





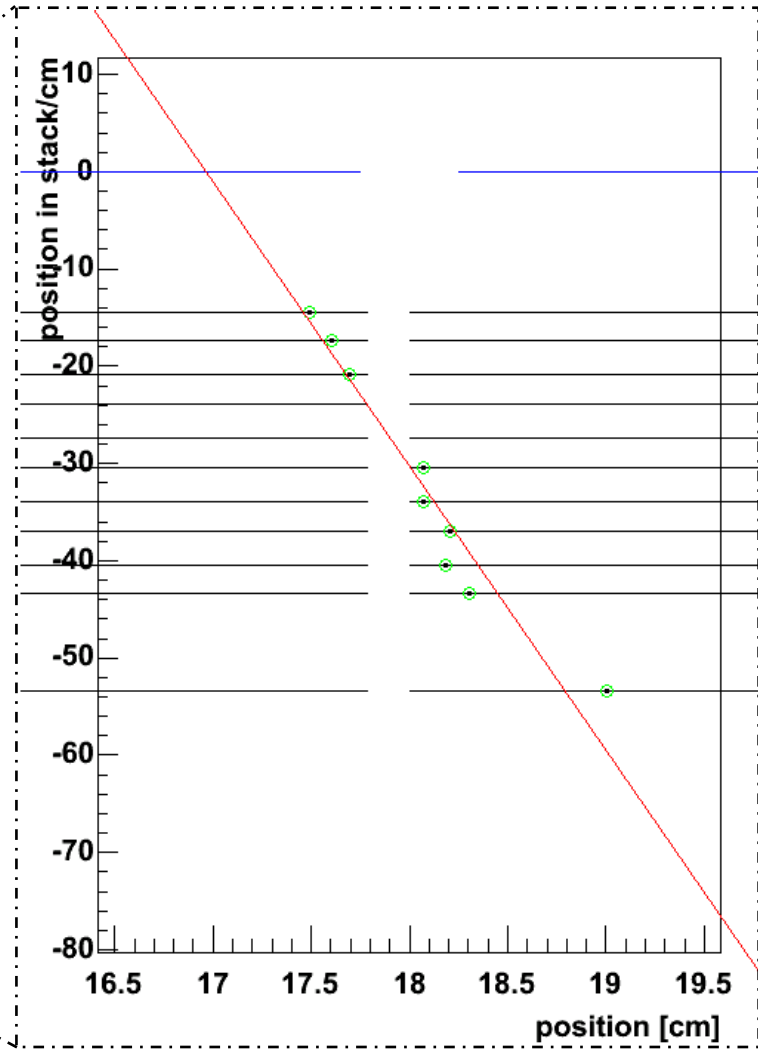
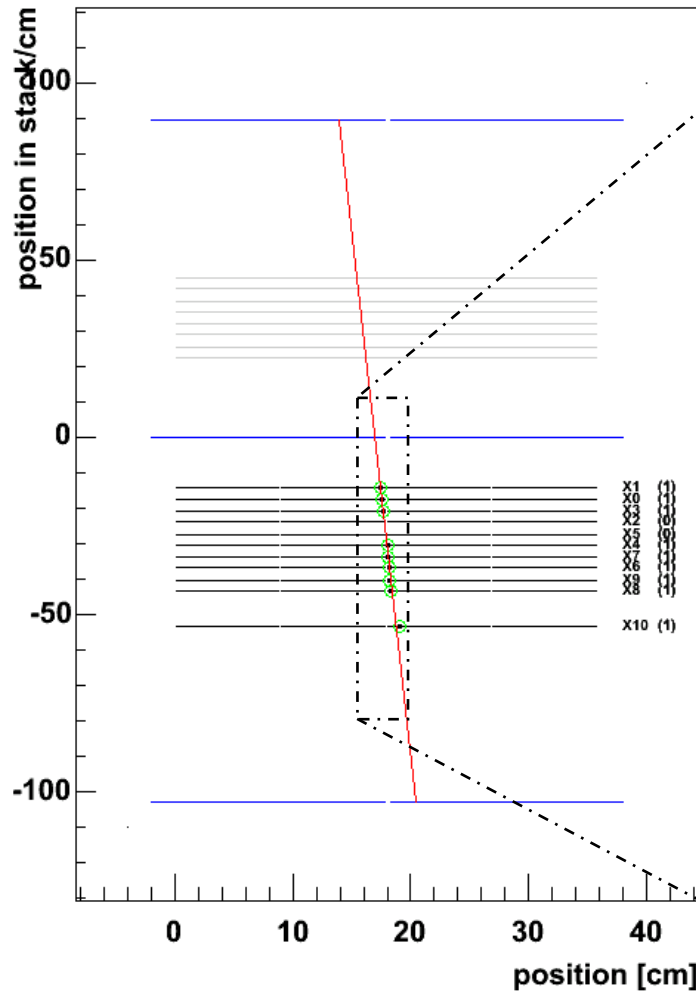
Some sample events

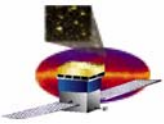




“Missing” hits: the cracks

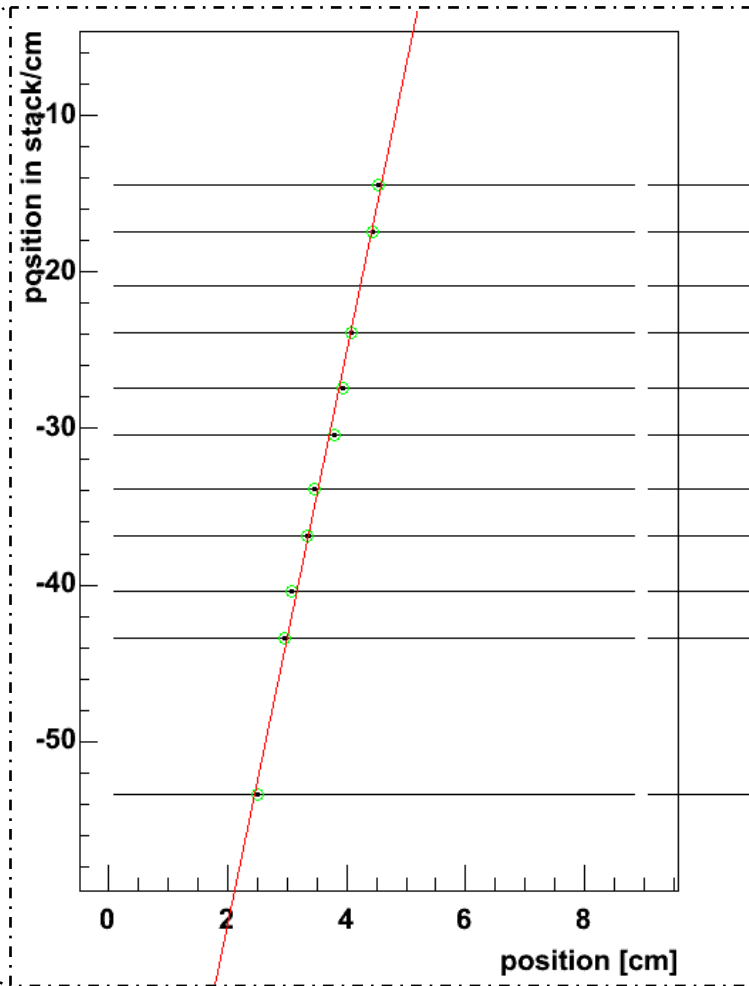
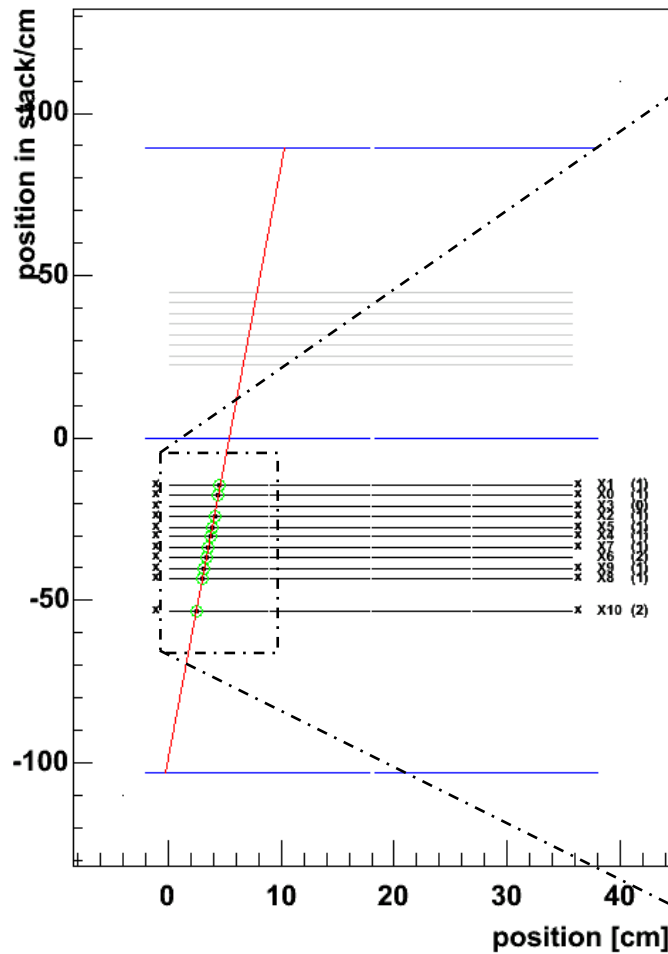
Graph

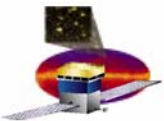




Hit inefficiencies (1)

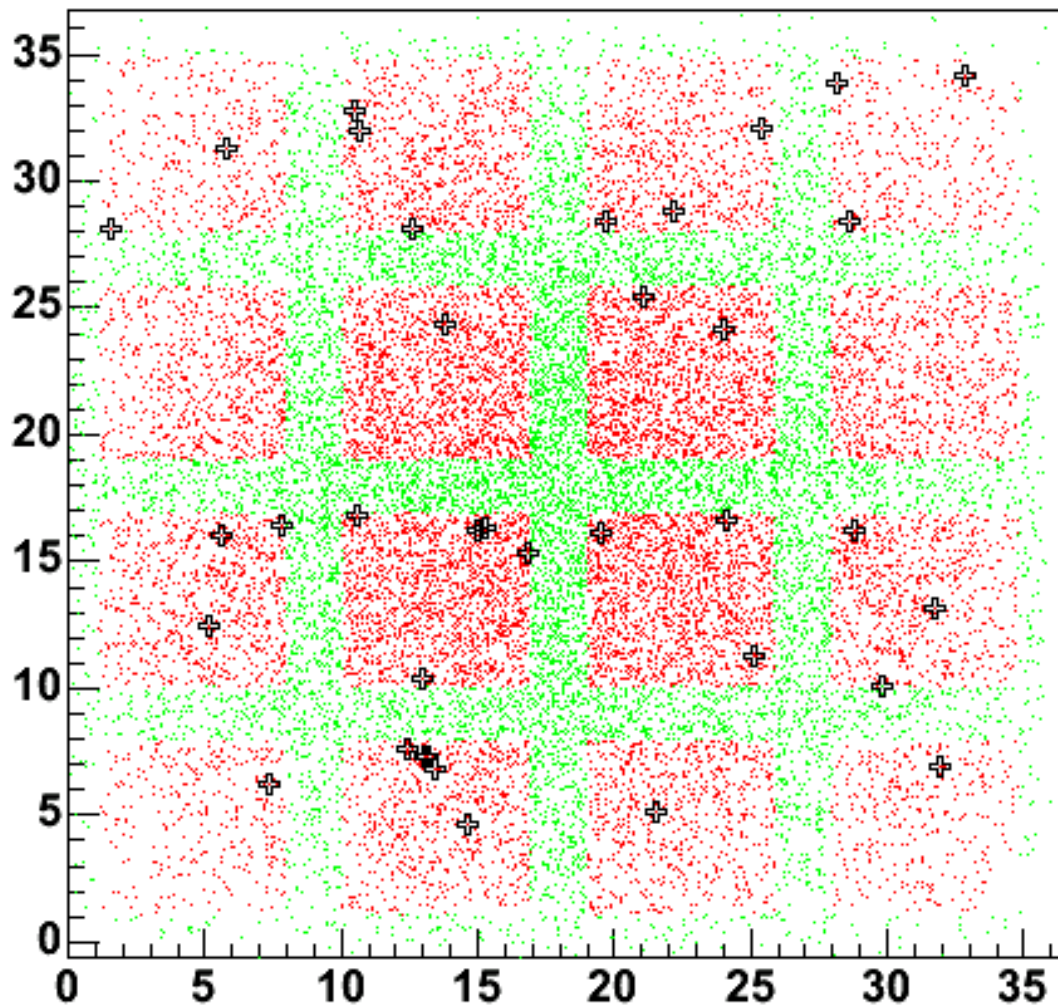
Graph

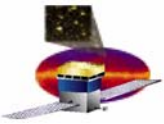




Hit inefficiencies (2)

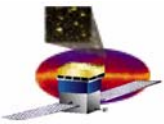
Graph



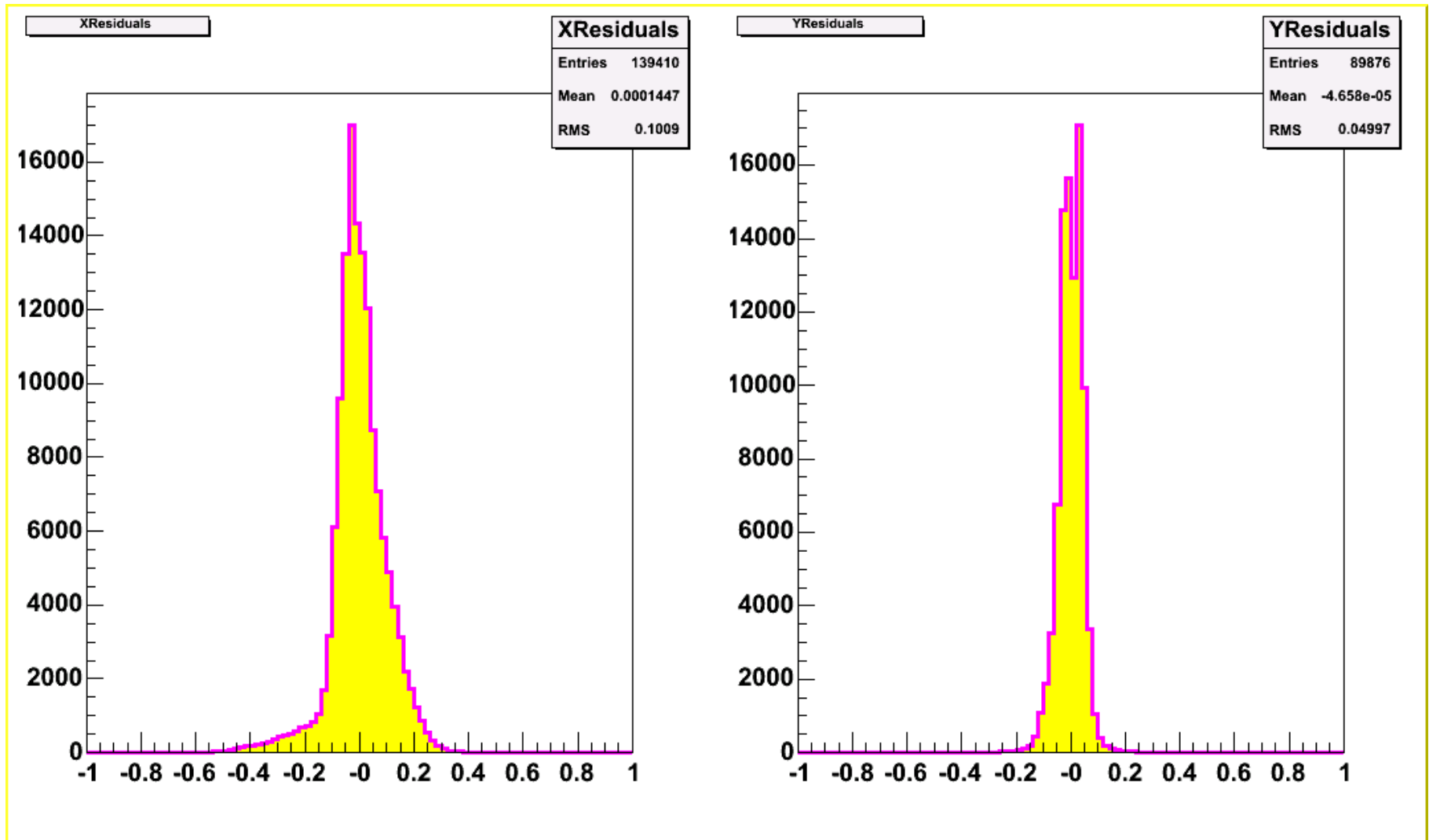


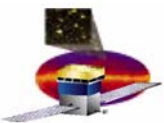
Detection efficiency measurement

Layer ID	Measured efficiency (23399 evts)	Number of bad channels
Y6	13.2 %	1399
Y7	92.9 %	253
Y4	94.9 %	230
Y5	98.9 %	25
Y2	95.8 %	143
Y3	97.5 %	77
Y0	99.8 %	0
Y1	95.2 %	165
X1	99.7 %	0
X0	99.7 %	2
X3	99.7 %	0
X2	99.6 %	3
X5	99.6 %	3
X4	99.6 %	0
X7	99.6 %	1
X6	99.6 %	0
X9	99.5 %	7
X8	99.4 %	19
X10	99.4 %	0

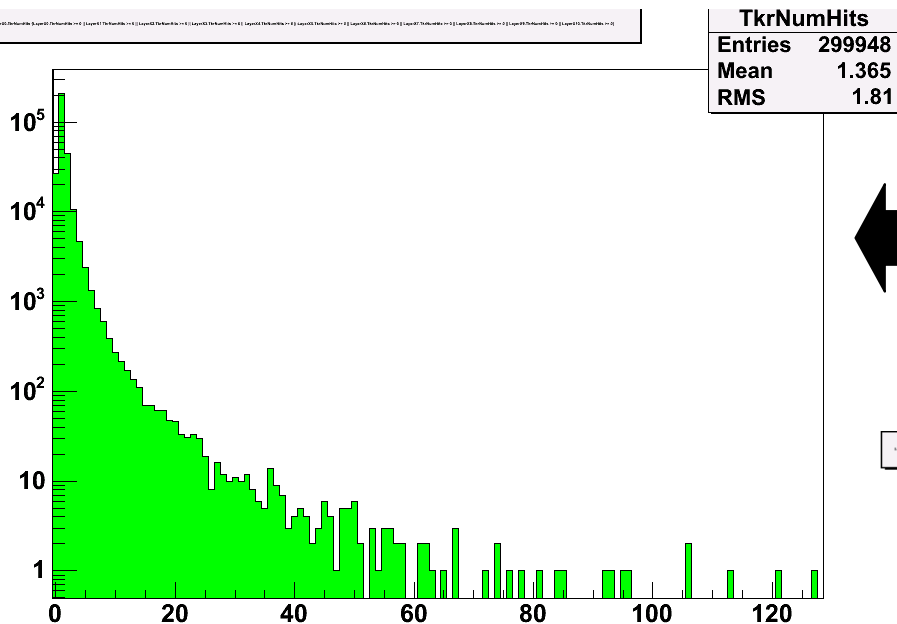


Residuals distributions

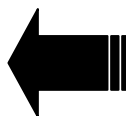




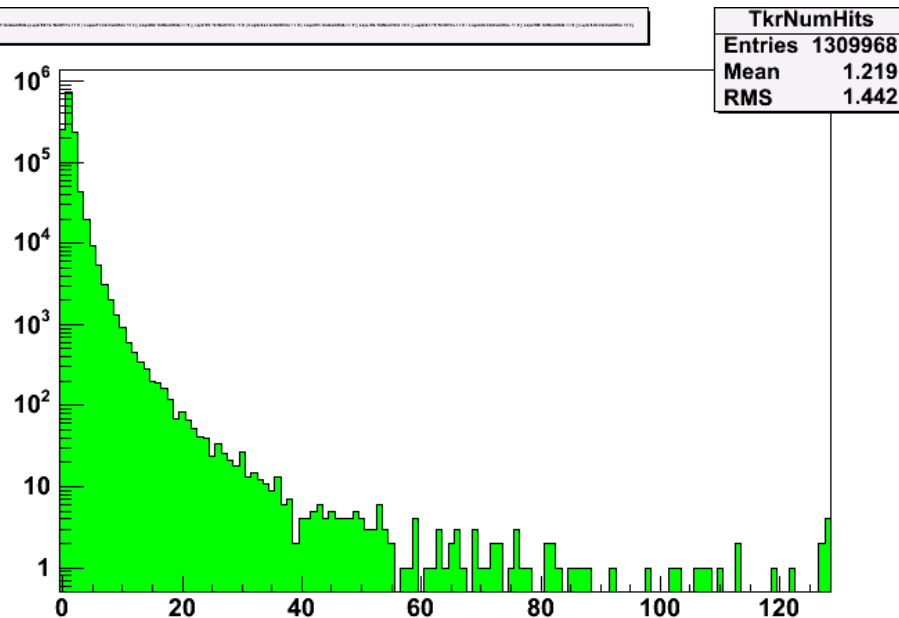
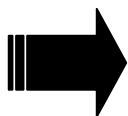
Events with large hit multiplicity (1)



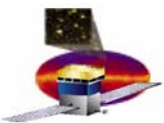
- ✓ External trigger
- ✓ 27274 events in ~ 15 h (0.5 Hz)
- ✓ 30 events with at least an X layer with more than 40 hits (Y layers neglected in the analysis)



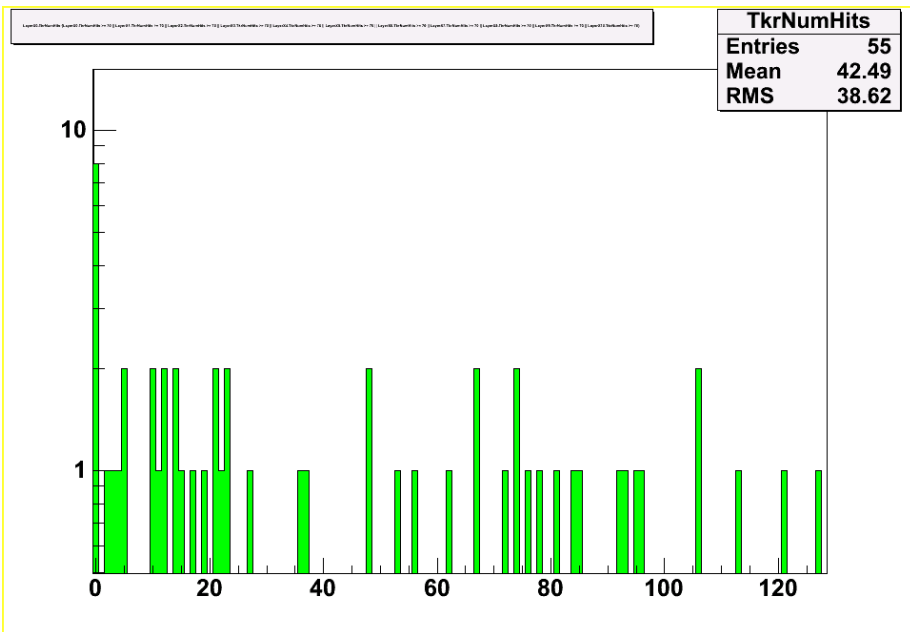
- ✓ Internal trigger (three in a row)
- ✓ 119088 events in ~ 13.5 h (2.5 Hz)
- ✓ 37 events with at least an X layer with more than 40 hits (Y layers neglected in the analysis)



The fraction of events with very high hit multiplicity doesn't scale with the trigger rate.



Events with large hit multiplicity (2)

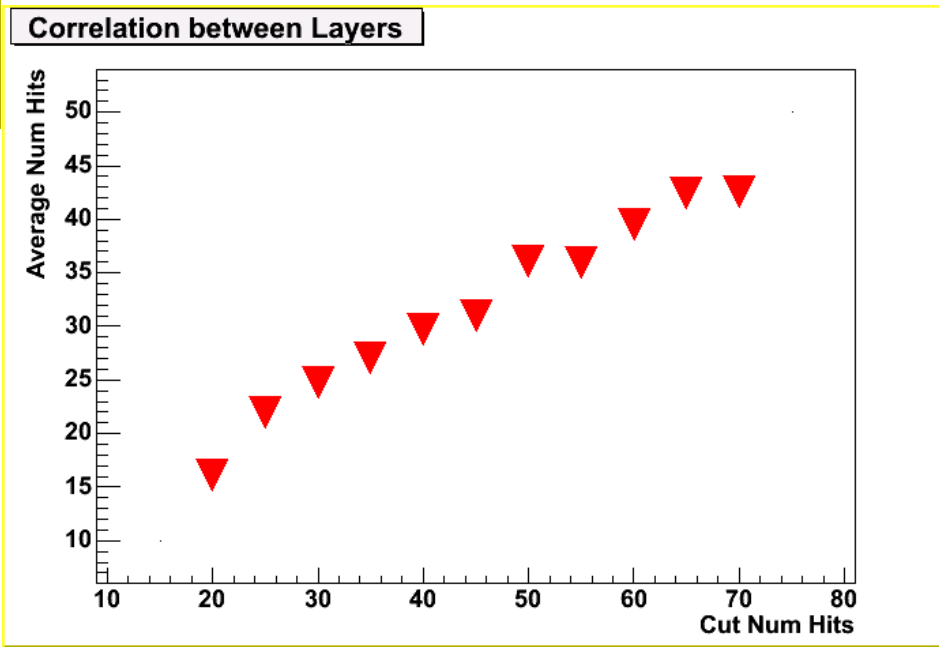


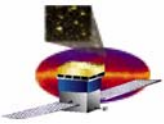
Investigate the hit correlation between different layers:

- ✓ Select those events having more than a given number of hits (20, 25 ... 70) on at least on layer.
- ✓ Fill a histogram with the hit multiplicity values from all the layers.

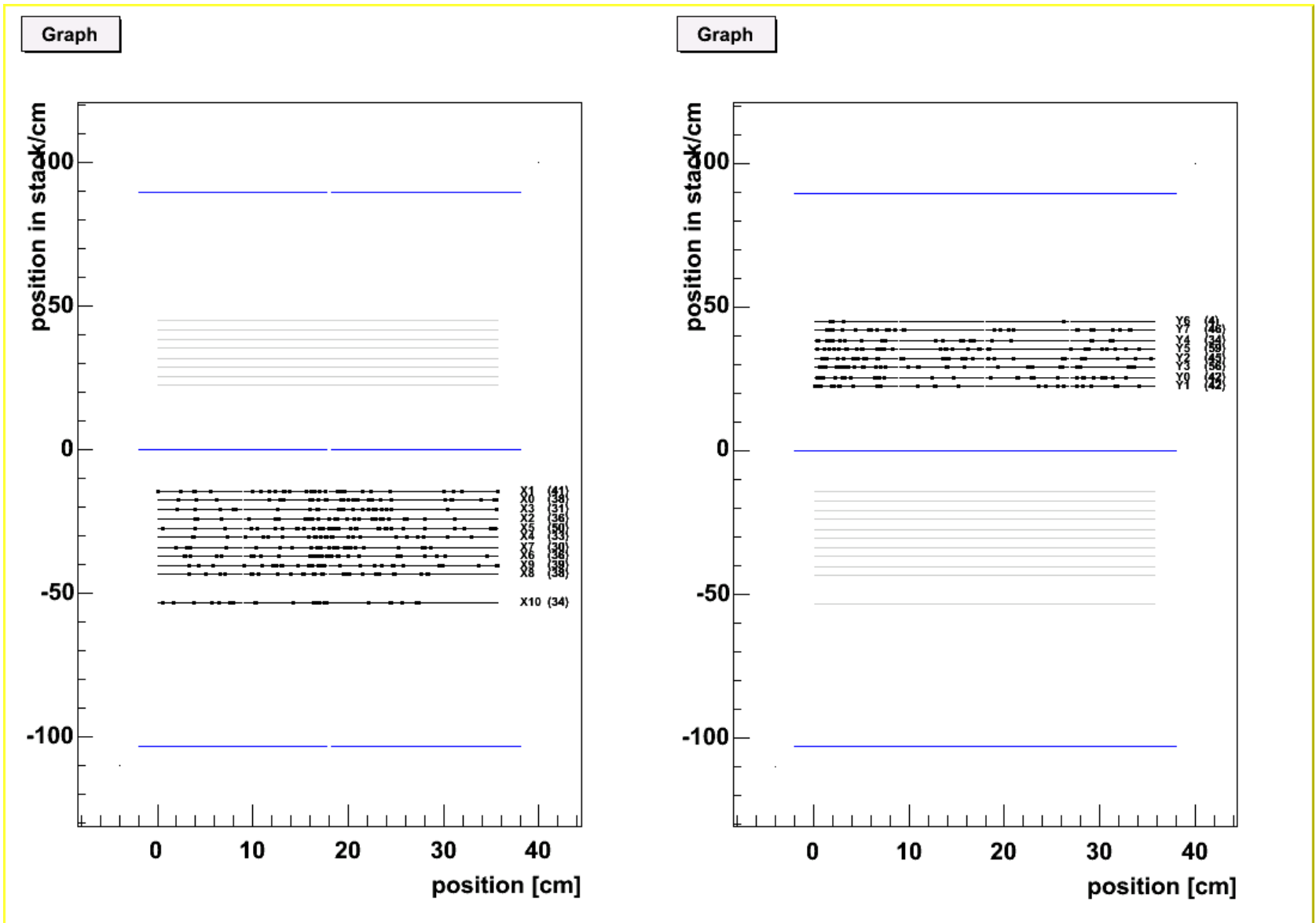
Hit multiplicity distribution on different layers **uncorrelated** between each other → mean value of the histogram slightly dependent on the cut.

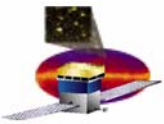
Hit multiplicity distribution on different layers **correlated** → mean value of the histogram strongly dependent on the cut.



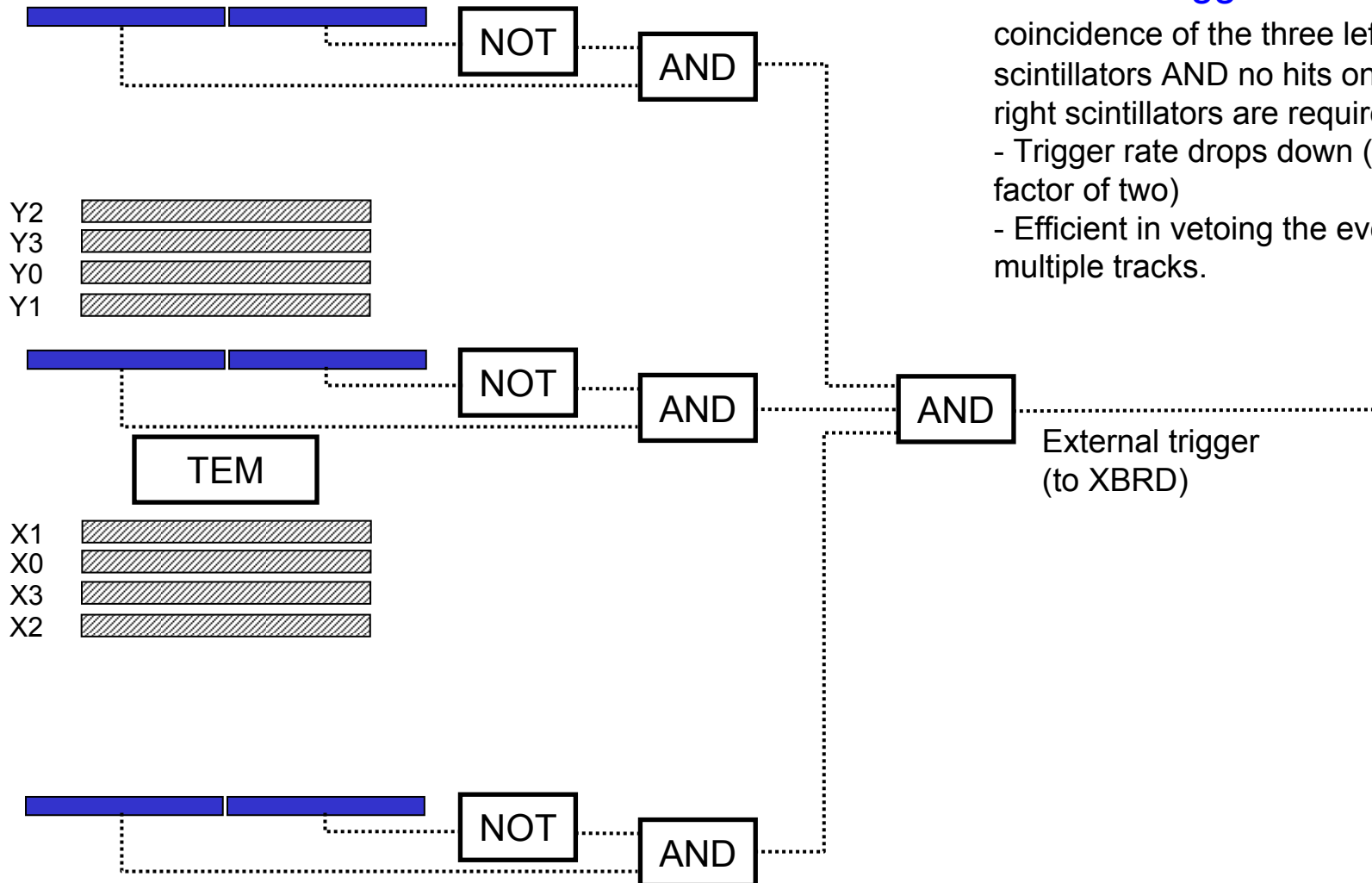


Events with large hit multiplicity (3)





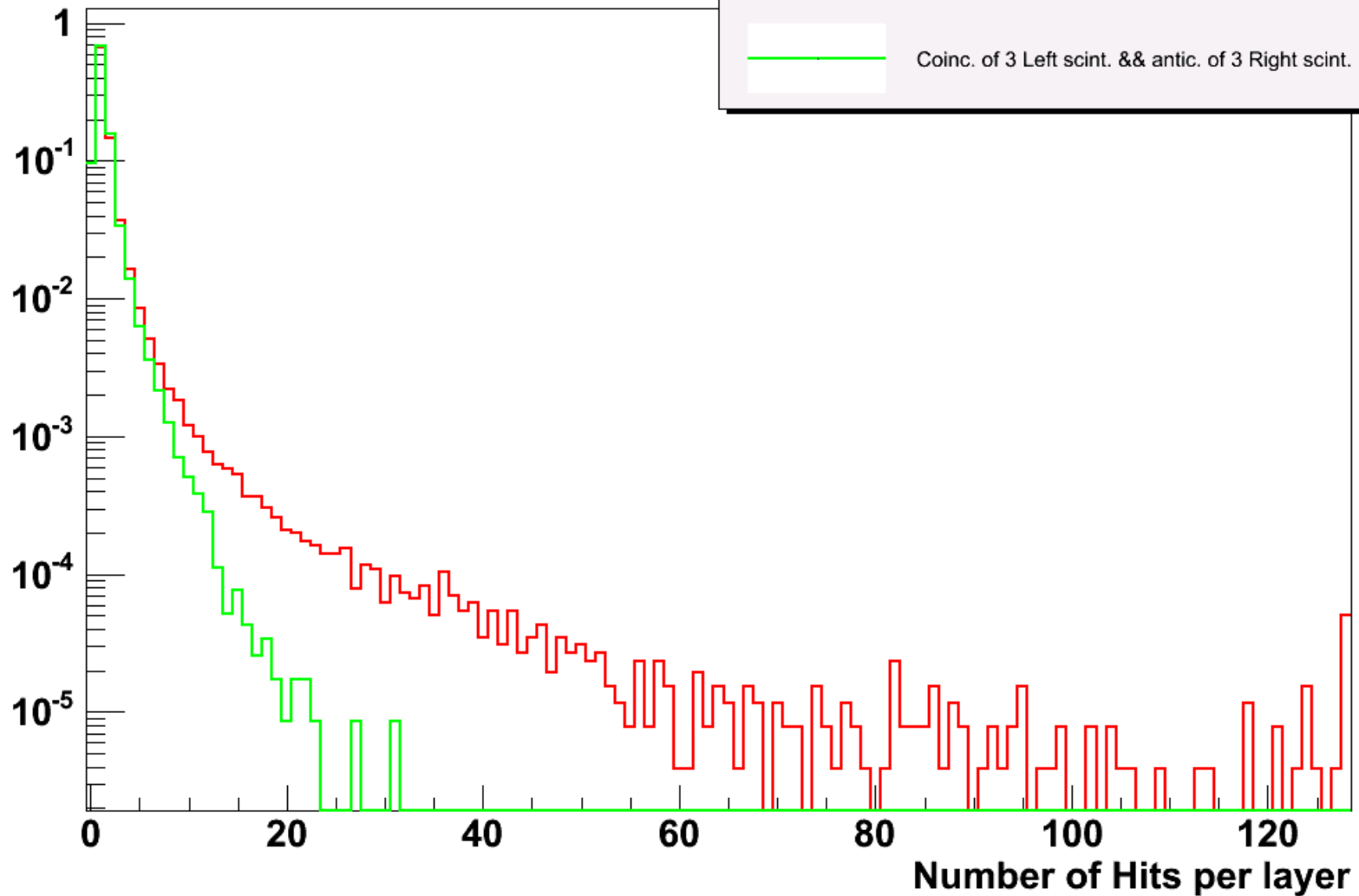
Showers veto trigger configuration

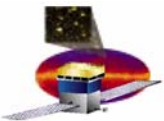


- ✓ External trigger with veto:
- coincidence of the three left scintillators AND no hits on the three right scintillators are required.
 - Trigger rate drops down (roughly a factor of two)
 - Efficient in vetoing the events with multiple tracks.

Hit multiplicity distribution after shower veto

Tkr Num hits distributions





glastserver@Pisa

GLAST Pisa Home Page - Mozilla

File Edit View Go Bookmarks Tools Window Help

Back Forward Reload Stop <http://glastserver.pi.infn.it/TkrElectricalTests.html> Search Print

Home Bookmarks Internet Lookup New&Cool

GLAST Silicon Tracker electrical tests

The following pages contain detailed information about the tests performed on the Tracker hardware at all the levels of integration.

Here is the GAST

General display | Single layer display

Event display - circular buffer and refresh settings: 15000 | Circular buffer size: 10 | Interval count: 1000

Data - circular buffer and refresh settings: 1000 | Circular buffer size: 60 | Interval count: 1000

Event display - XZ projection

Event display - YZ projection

Total number of hits

Three in row combinations

The figure displays four plots related to the event data. The top-left plot is an XZ projection showing z coordinate (cm) vs x coordinate (cm). The top-right plot is a YZ projection showing z coordinate (cm) vs y coordinate (cm). The bottom-left plot is a histogram of the total number of hits (19 layers) vs total number of hits. The bottom-right plot is a heatmap showing the number of trigger requests (0 to 500) for three in row combinations (GTCC) vs GTCC.

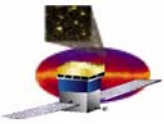
August 27, 2004. Event collected with a stack of 10 trays (no channels masked).

- [MCMs incoming tests](#)
- [Single trays tests](#)
- [Stacked trays tests](#)
- [Towers tests](#)
- [Screenshots](#)

• [View all EGSE test session](#)

Done

<http://glastserver.pi.infn.it/TkrElectricalTests.html>



Conclusions



...chasing for tower 0 data...