

Update of the EUDAQ RootMonitor

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Outline:

- 1 General New Implementations
- 2 GUI Modifications
- 3 New Plots
- 4 DUT Integration
- 5 Summary & Outlook

General New Implementations

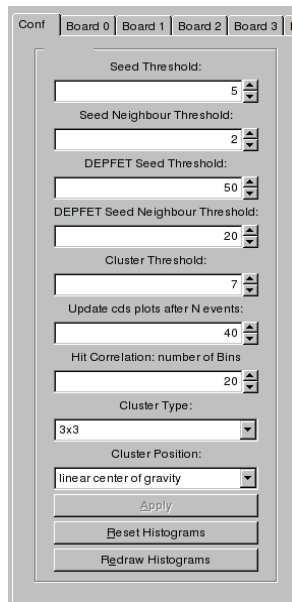
Added Reconstruction Algorithms

- **5 × 5 cluster** reconstruction (old version: 3 × 3 cluster)
- addition of a **neighbour threshold cut**
- cluster position determined with **linear centre of gravity** (old version: seed position)

- **different sensor types** (sizes) can be mixed in the telescope
 - ↪ possibility to specify sensor types (MIMOSA18, MIMOTEL, ...) in a **configuration file**, that will be read during start up
 - **reconstruction algorithms and histogram ranges were adapted!**

GUI Modifications (1/2)

- configuration tab was added to the GUI
- possible to change **online** reconstruction parameters:
 - 1 seed signal threshold (S/N)
 - 2 neighbour signal threshold (S/N)
 - 3 cluster signal threshold (S/N)
 - 4 cluster size
- possibility to choose different algorithms for cluster position reconstruction
- reset and redraw all histograms button



GUI Modifications (2/2)

- each histogram is linked to one or more pads
- pads can be disabled and enabled **online** with check boxes
- histograms belonging to disabled pads are filled in the background (information is not lost after disabling)

● **performance of online monitor increases if all unneeded pads are disabled!**

● canvases are updated and divided dynamically depending on the number of enabled pads

The screenshot shows a configuration window with three main sections:

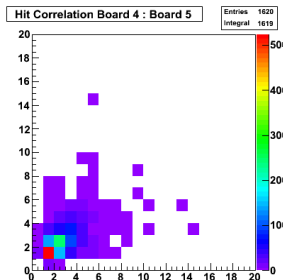
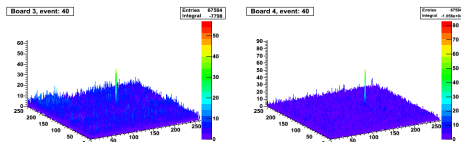
- Main Histograms:**
 - Number of Clusters
 - Hit Correlations
 - X Cluster Correlations
 - Y Cluster Correlations
 - X DEPFET Correlations
 - Y DEPFET Correlations
 - DEPFET adc
 - DEPFET hitmap
 - Raw Value
 - Cluster 2d
 - Delta x
 - Delta y
 - Number of Seeds
 - CDS Value
 - Noise
 - NoiseEventNr
 - Tracks 2D
 - Cluster Charge
 - Number of Tracks
- CDS Lego Plots:**
 - CDS Lego
- Board Displays:**
 - Cluster X
 - Cluster Y
 - Raw 2D
 - eudet deplet hitmap
 - CDS 2D
 - Cluster 2D
 - Raw Value
 - Noise 2D
 - Raw X
 - Raw Y
 - CDS Value
 - Noise
 - NoiseEventnr
 - Number of Seeds
 - Cluster Charge
 - Number of Clusters

New Plots (1/2)

- surface plot for the cds values (event-by-event) for each board

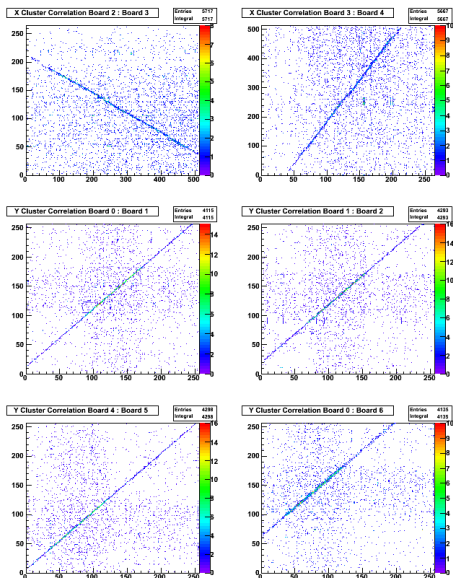
Hit Correlations

- data with very high hit multiplicity and large multiple scattering (e.g. Cadarache data) \implies no online track reconstruction possible
 - \rightarrow correlation between number of hits in each plane
 - \rightarrow number of bins can be adjusted **online**



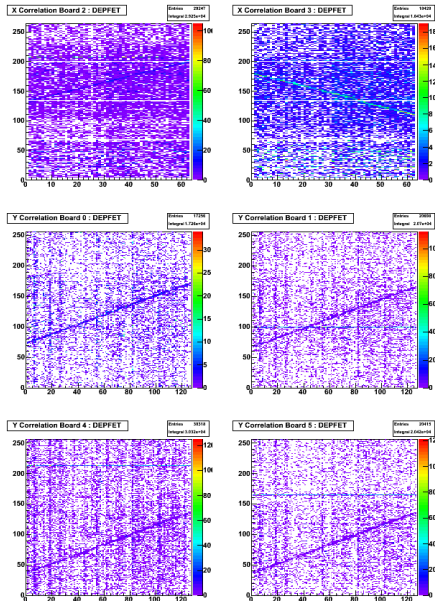
New Plots (2/2)

- correlation between cluster positions in X and Y direction between neighbour boards and between first and last board
- correlation can be seen as a straight line
- variation from a diagonal line can be interpreted as mis-alignment
- helpful to place the telescope into the beam
- the plots show correlation between telescope and Mimosas18 as DUT



DUT Integration

- sensor decoding of DEPFET was implemented in the online monitor
- cluster reconstruction using the DEPFET sensor
- ↳ possible to see directly correlations between the telescope and the DEPFET DUT
- test was successful at the PS and SPS test beams



Summary

- several improvements of the online event reconstruction have been implemented in the online monitor
- the graphical user interface was modified and the handling improved
- significant performance improvements were obtained
- new plots were implemented in order to make the data taking more comfortable

Outlook

- stability improvements are needed!
- time dependent plots in order to check telescope stability during test beam (noise vs time already implemented)