

Last results obtained with the
large GRPC prototype.



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Outline

- ✓ Data selection
- ✓ Tracking with two setups
- ✓ Large detector quality measurements
- ✓ Conclusions

Data time structure

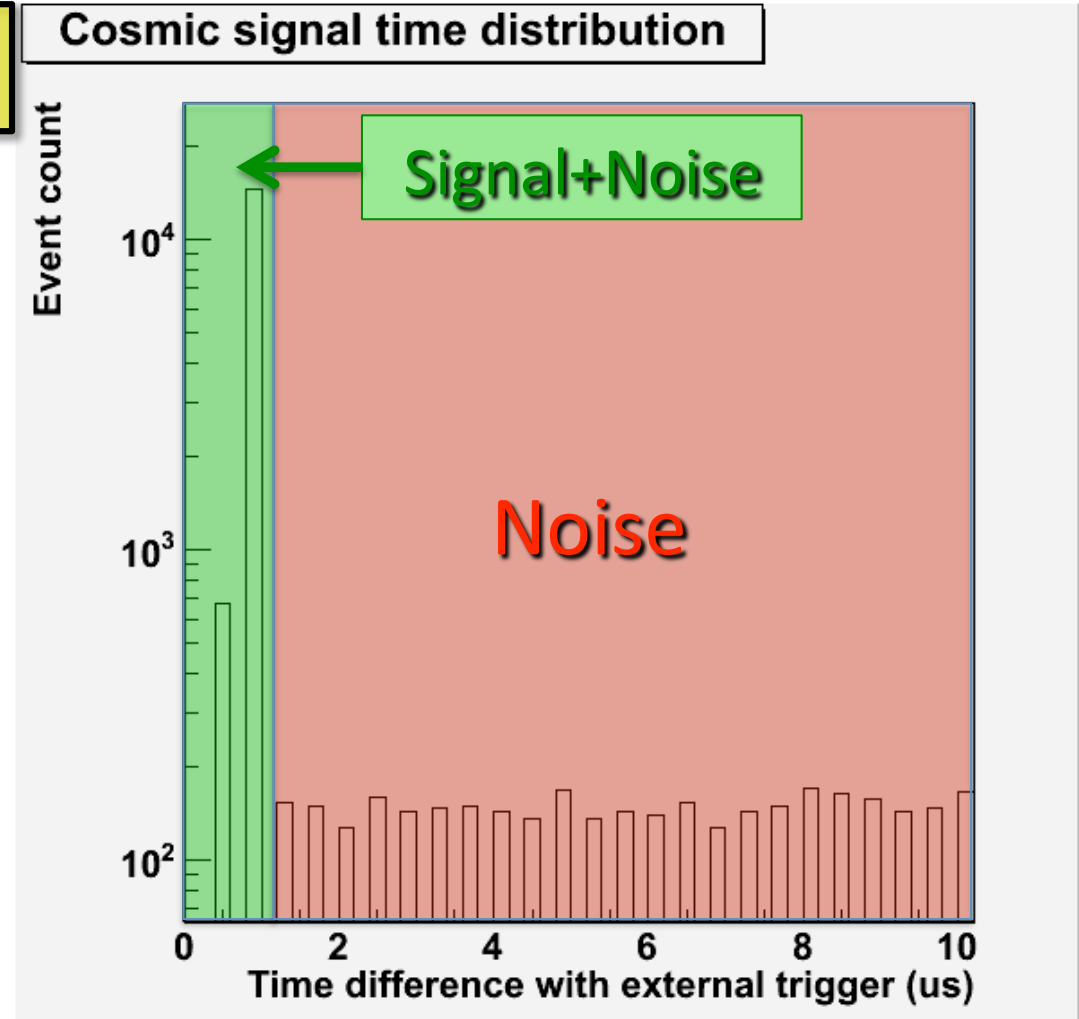
Clock period: **400ns**

Time selection for
cosmic related
events:

$0 < \text{EvTime} < 1.2 \mu\text{s}$

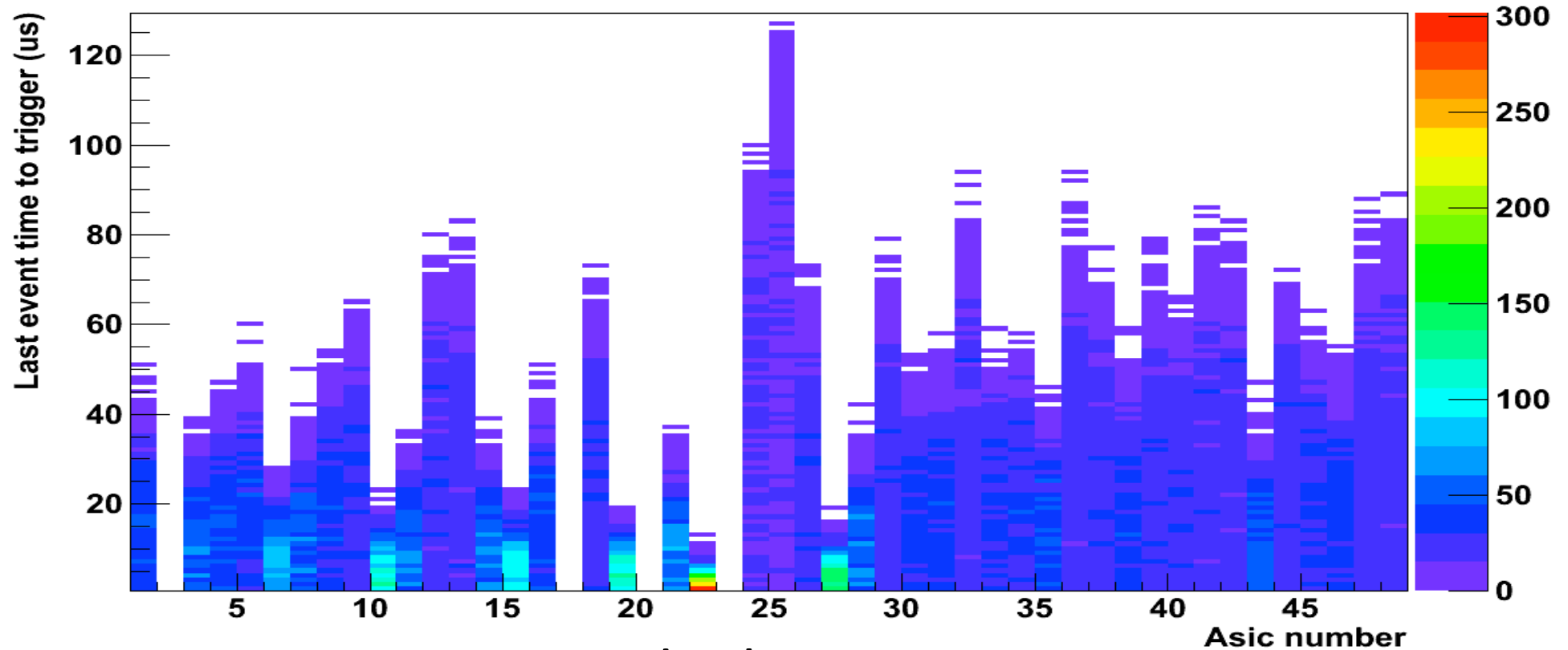
Noise contamination
ratio:

1%



Data time structure

Slab 10

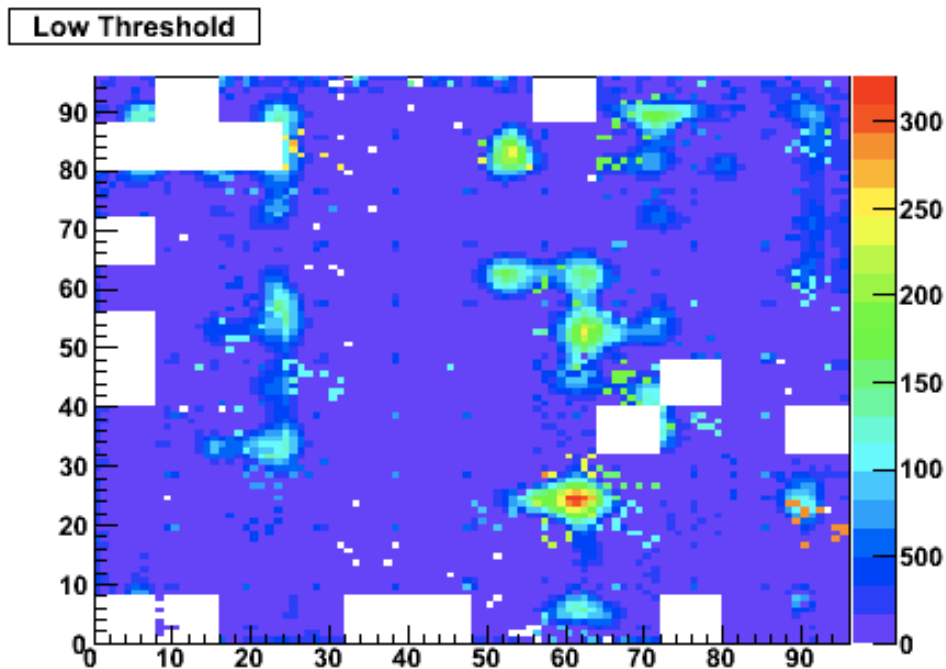


Large time depth -> Quiet ASIC

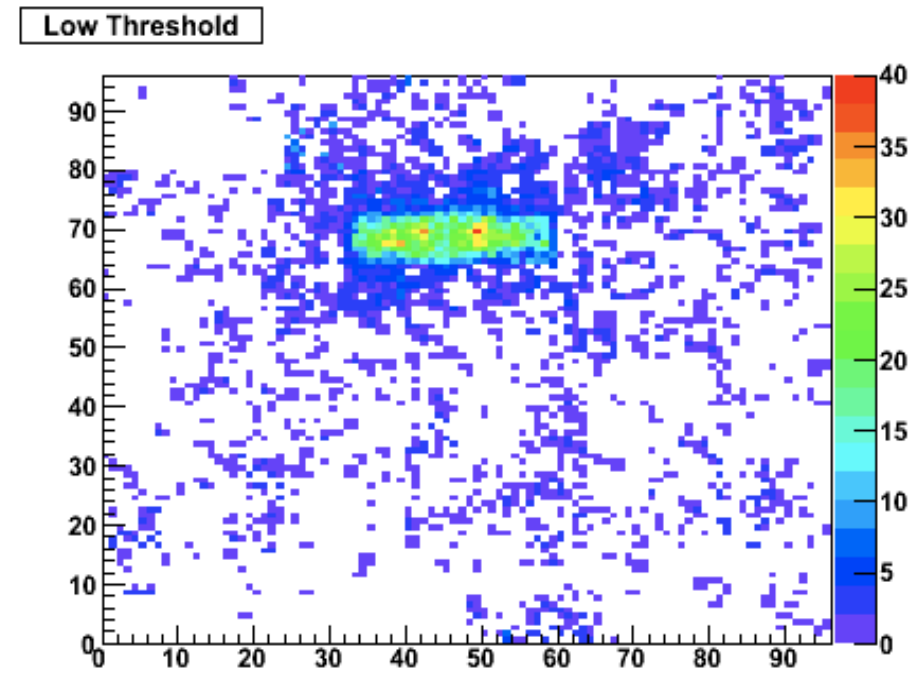
Short time depth -> Noisy ASIC

No data -> Dead ASIC

Time selection effect



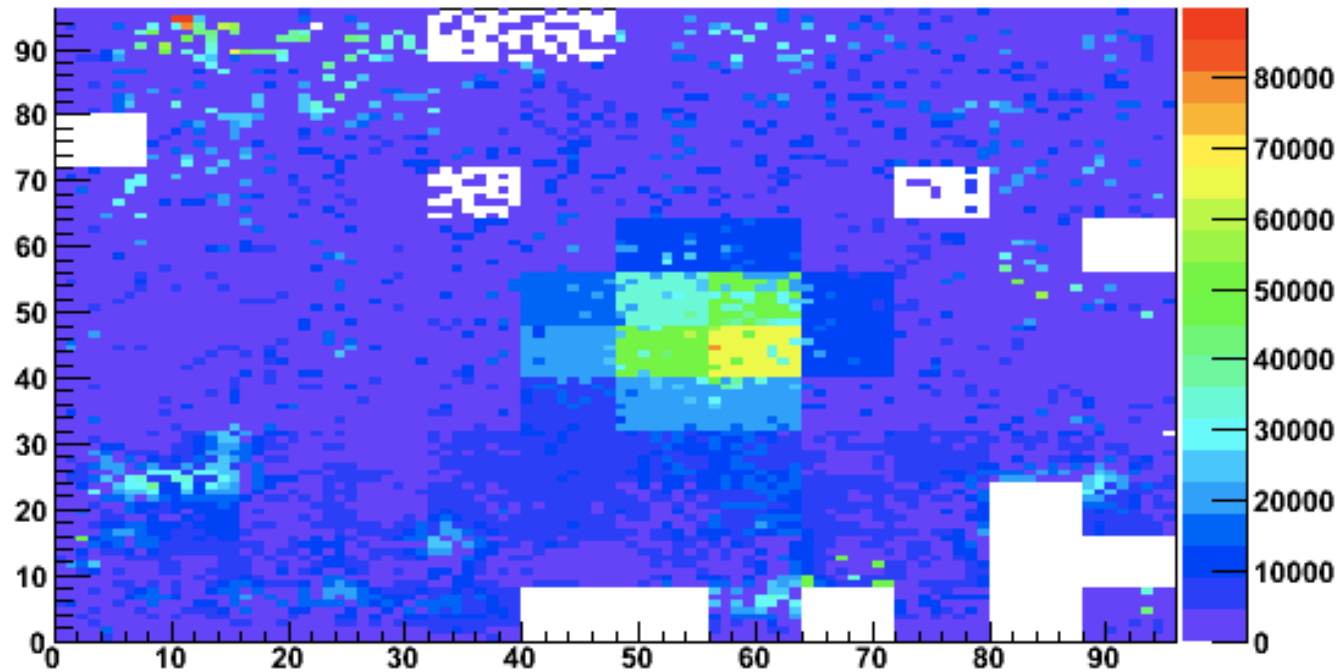
Noise (+ Signal)



Signal + 1% Noise

Grounding problems

Board2DLev1



During first tests we meet some problem with EMC. ASIC's thresholds were not stable.

- ✓ A serious work has been accomplished to optimise EMC, we got good conditions now.

Tracking

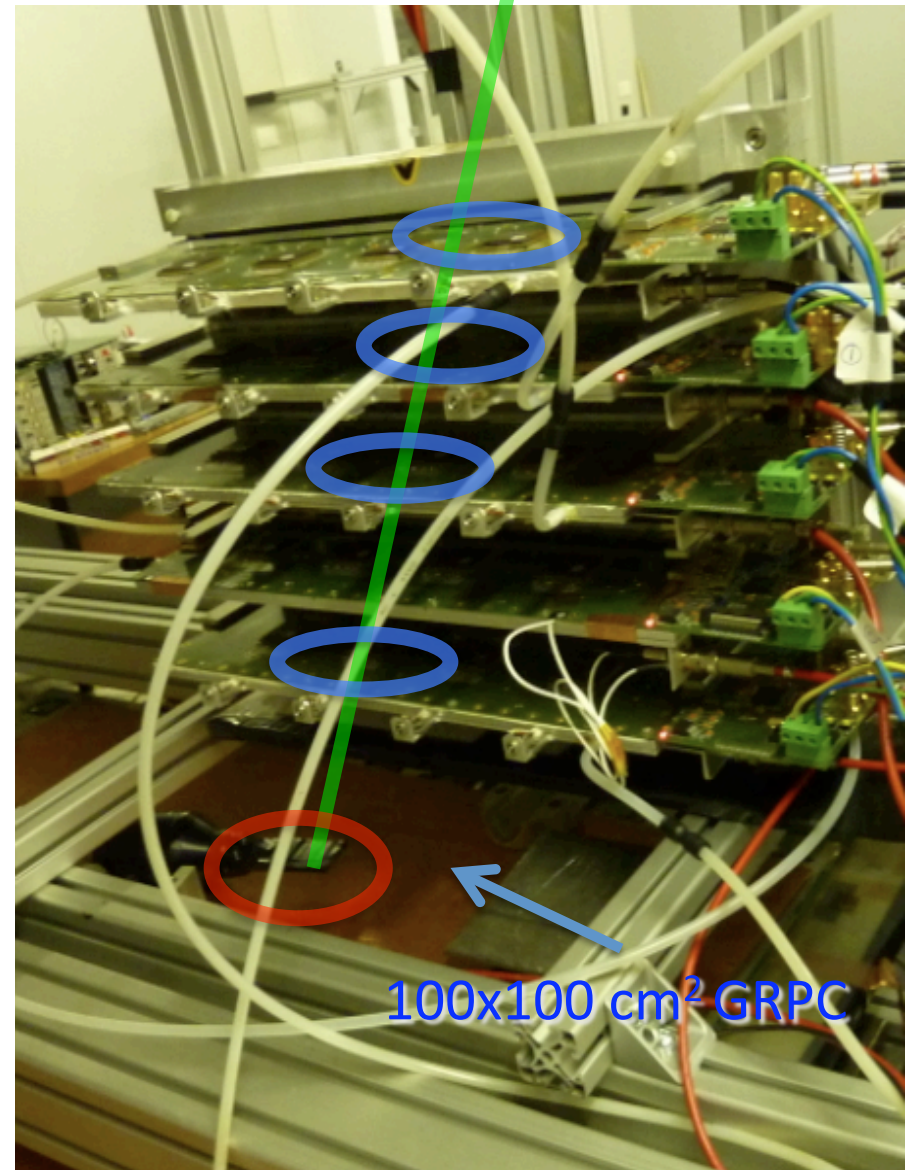
Two acquisitions setups:

Small chambers: Labview

Large chamber: Xdaq

Synchronisation:

Cosmic Trigger made
with scintillators
coincidence.



Tracking

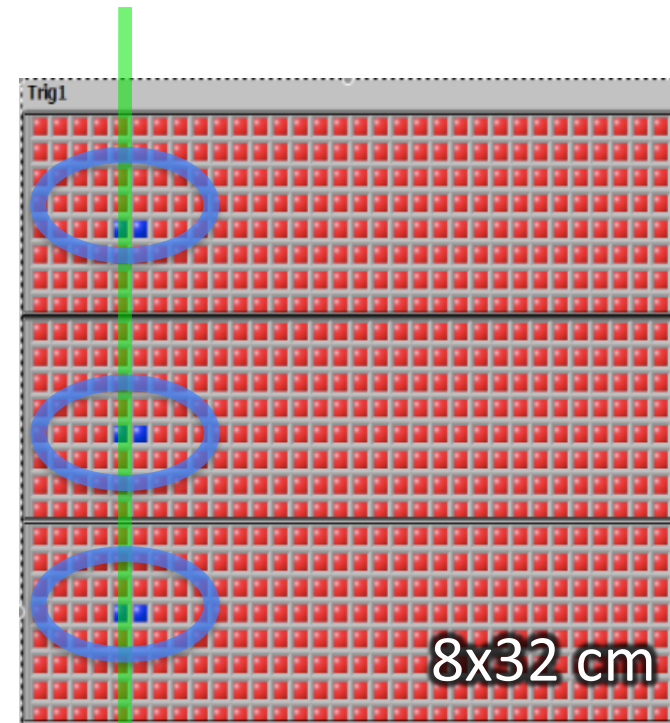
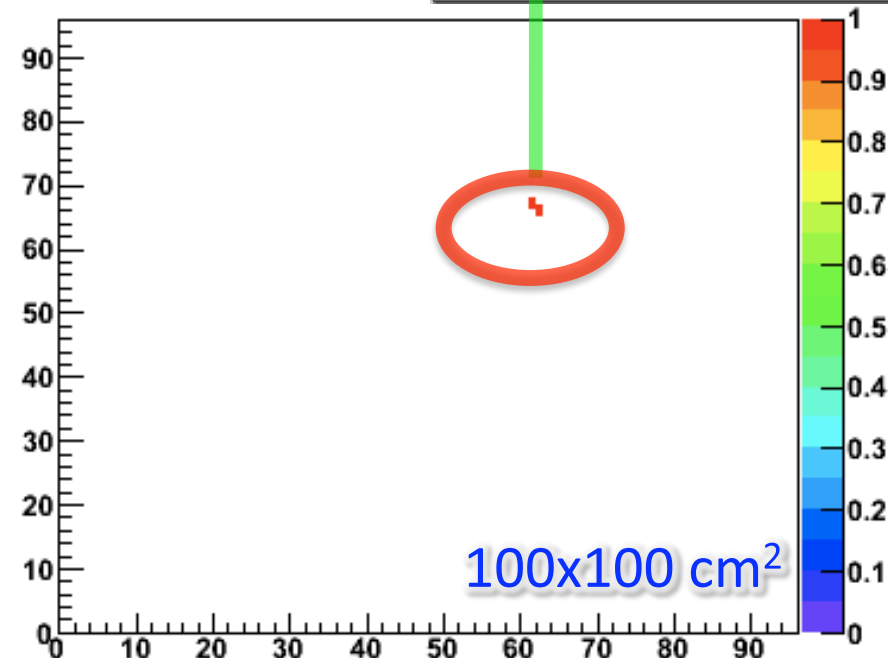
Two aquisitions setups:

Small chambers: Labview

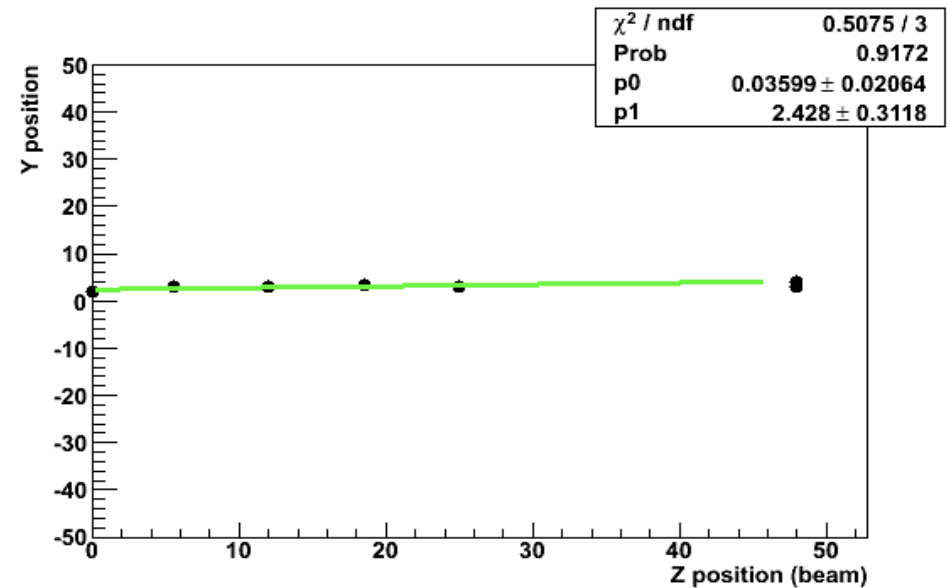
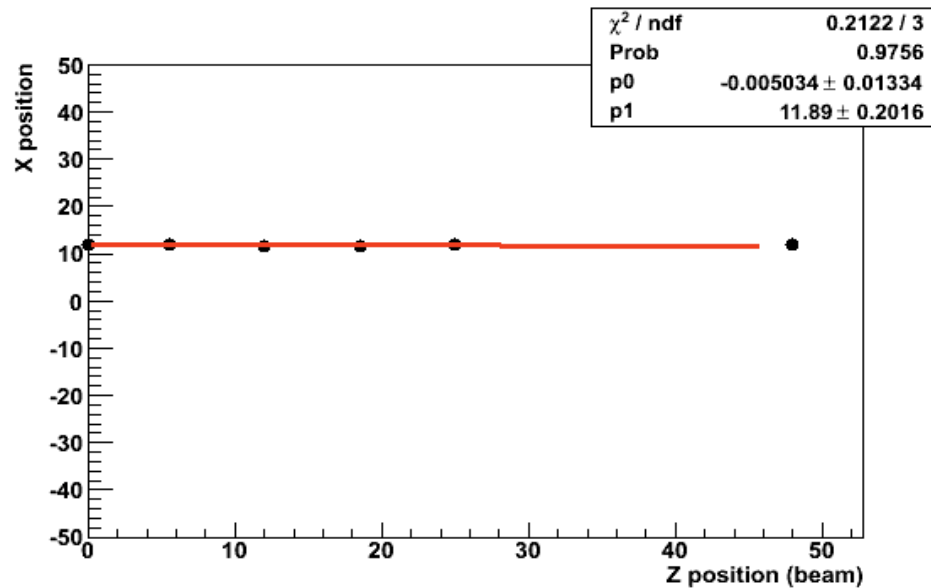
Large chamber: Xdaq



Board2DLev1



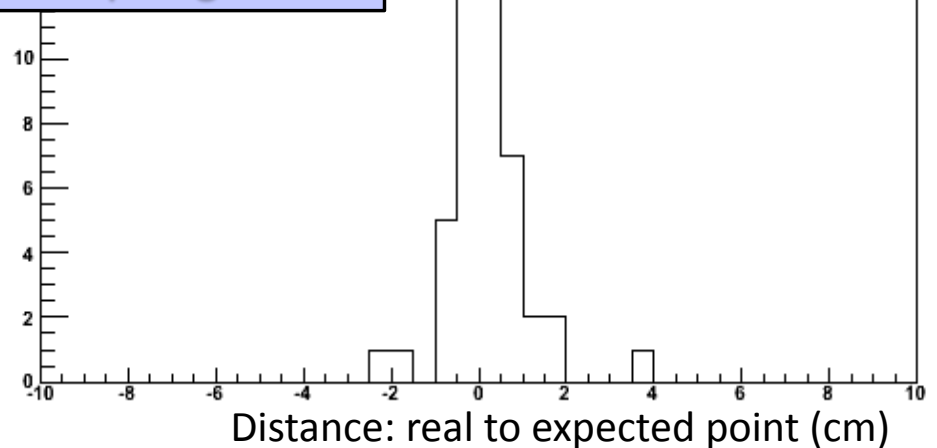
Tracking



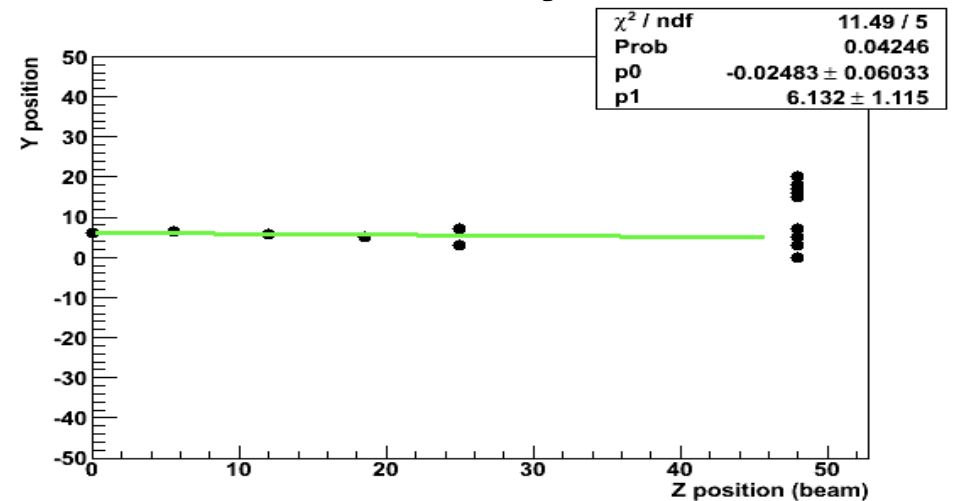
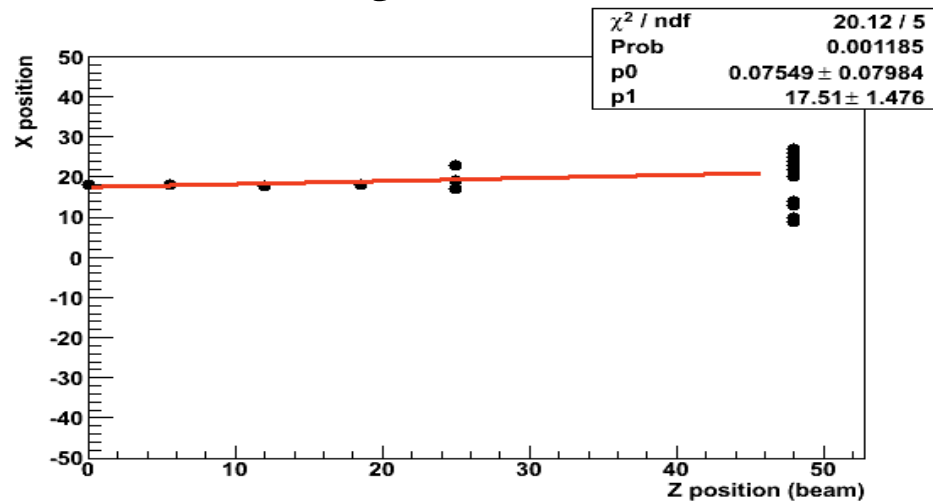
Offline reconstruction:

- ✓ Clustering in small chambers
- ✓ Fit track in small chambers
- ✓ Project point in Large chamber
- ✓ Check hit presence.

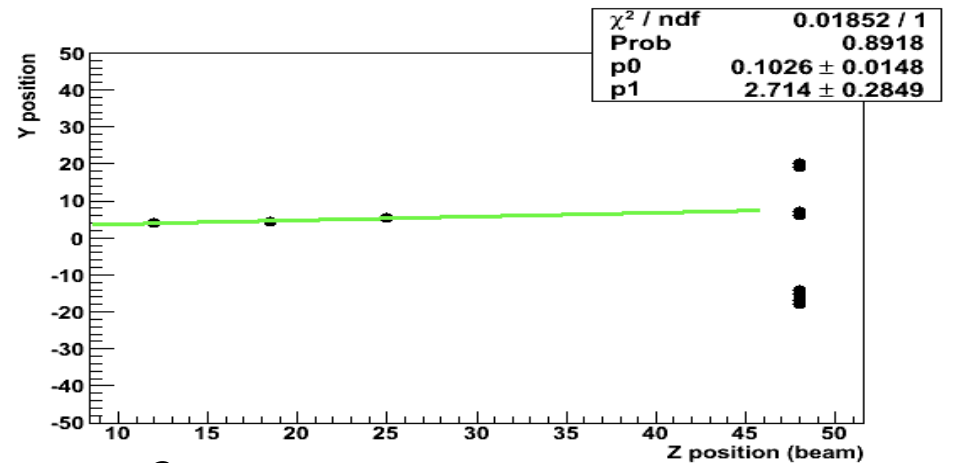
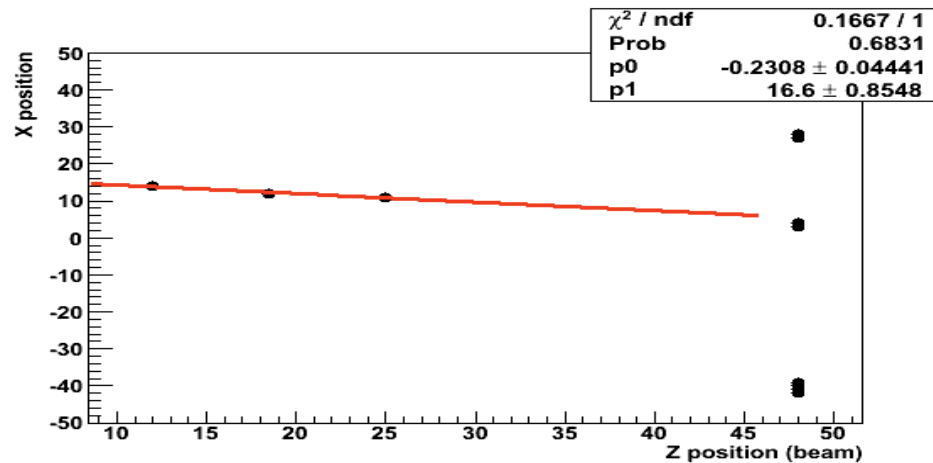
Setup Alignment



Rejected events from analysis



Small chambers internal interaction.



Out of small chamber ($8 \times 32 \text{ cm}^2$) interaction.

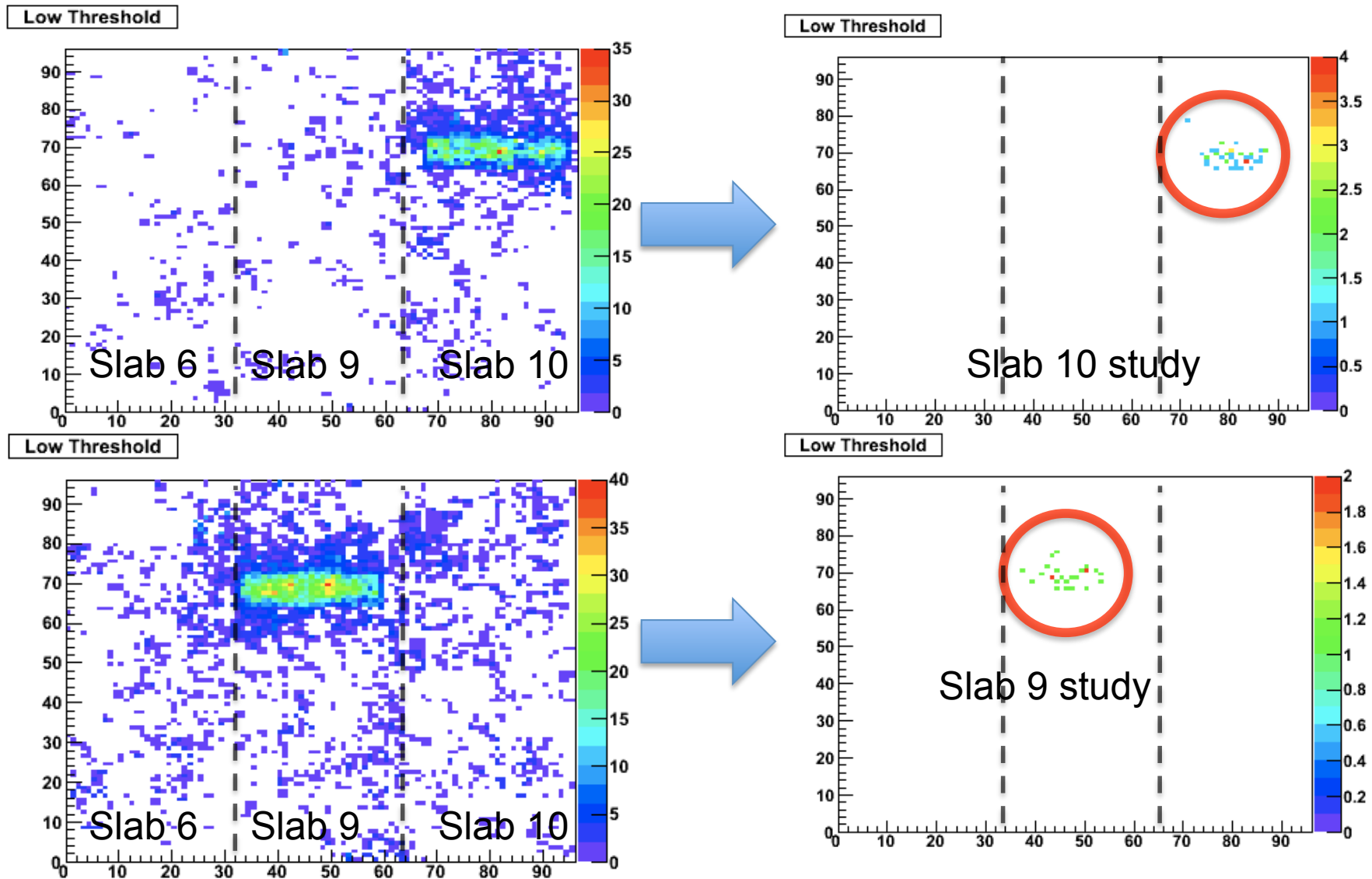
Why external interaction?



Laboratory inside
the acrylic dôme.

Low material budget,
not enough to get
only muons.

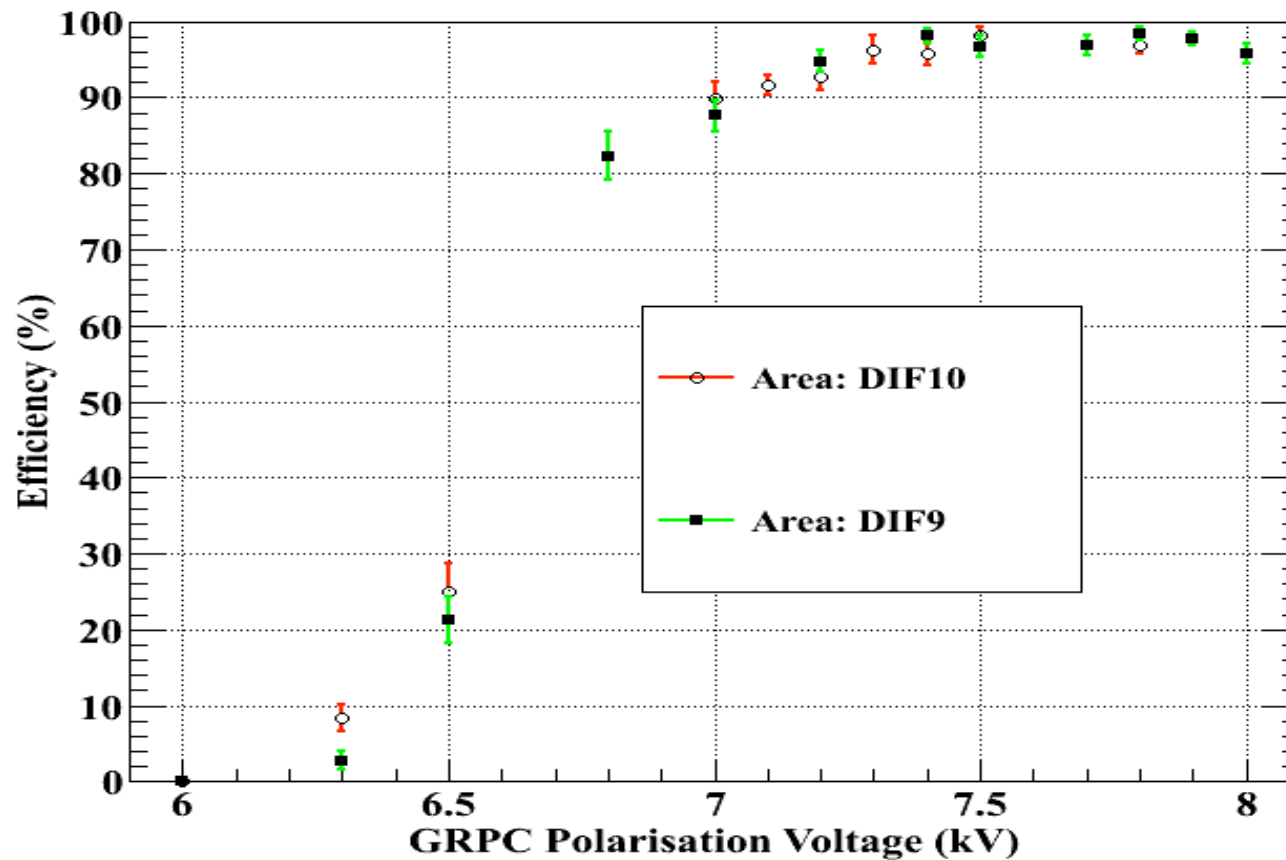
Track selection effect



We lose a bit of statistics, but we know event's origin with the track.

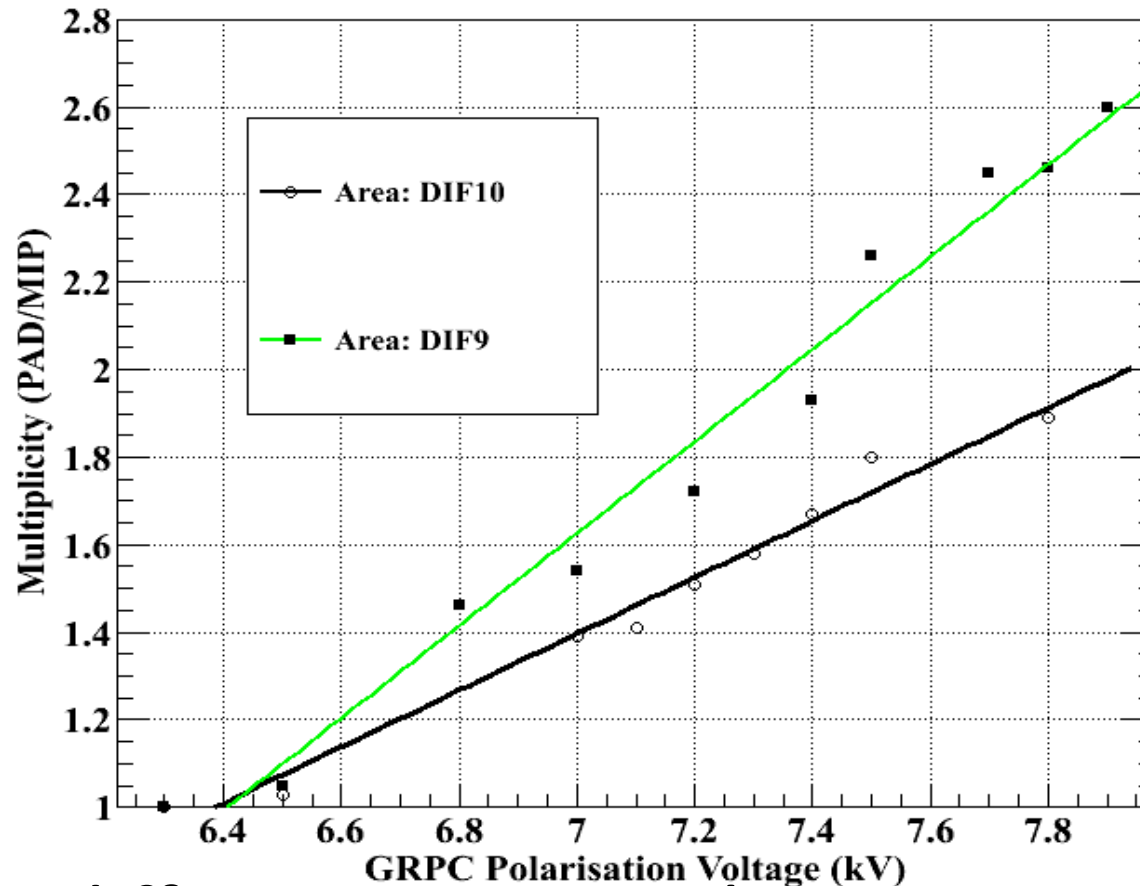
Efficiency homogeneity.

Efficiency Vs HV, in the two previous areas



Multiplicity study

Multiplicity Vs HV, in the two previous areas



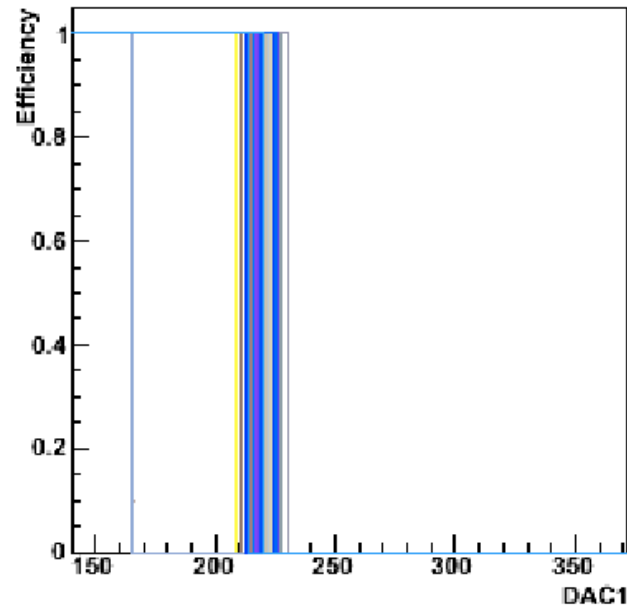
Slightly different... A complete scan need to be done to understand local effects.

Calibration

After solving some charge injection problems, we just finish our calibration process.

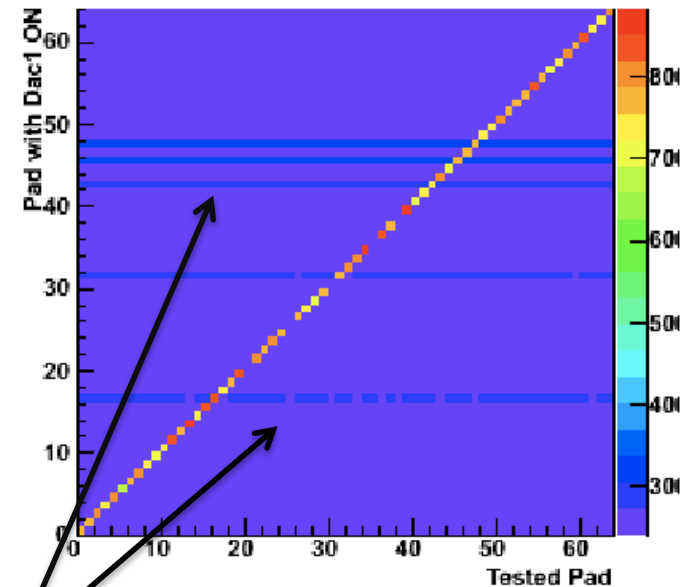
Efficiency Vs Threshold

Asic_10_Pad_1



Responding pad Vs Injected pad

Asic_10



Blue lines = noisy channels

Summary & Outlook

For now:

- Electronic groudng solve many problems.
- Signal selection and data reconstruction validated.
- Square meter shows very promising results.
- Firsts homogeneity measurement looks good.

Next steps:

- Make a complete efficiency/multiplicity map (pad by pad), of the square meter.
- Check the calibration effect on data quality.
- Start measurements with with HARDROC2 square meter.
- Go to test beam as soon as possible.