Monitoring of cell to cell inhomogeneity and transfer into simulation

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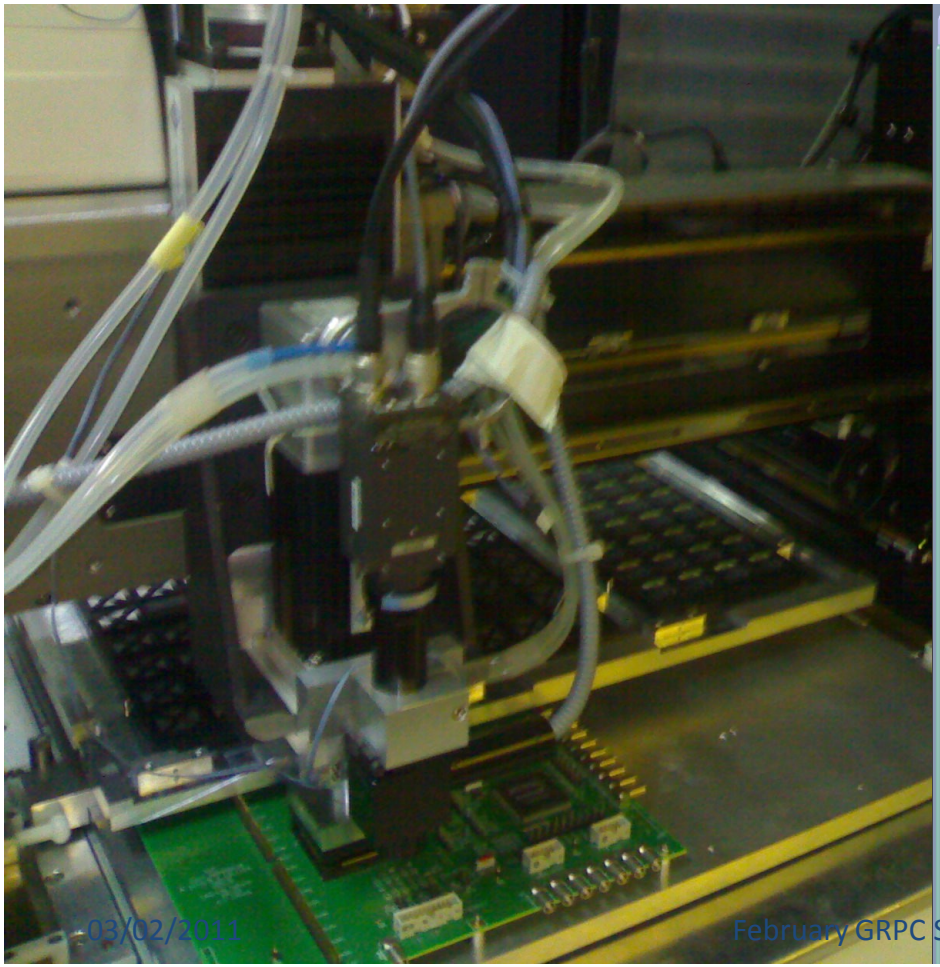
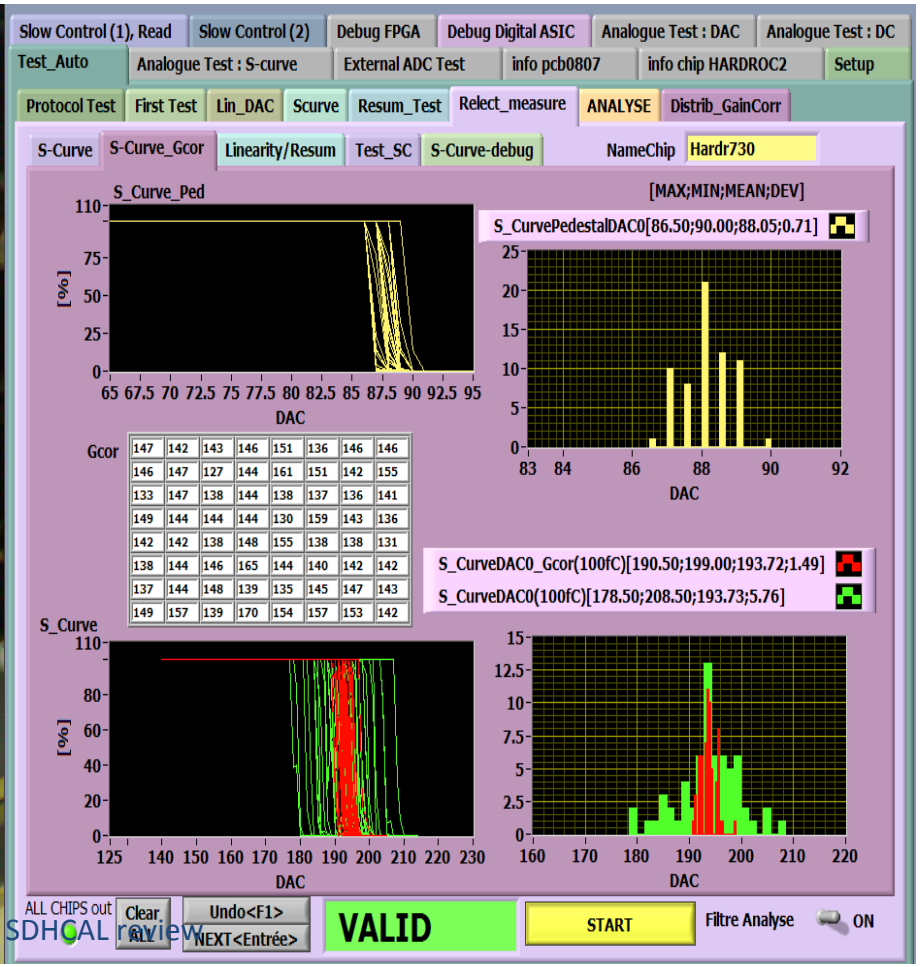
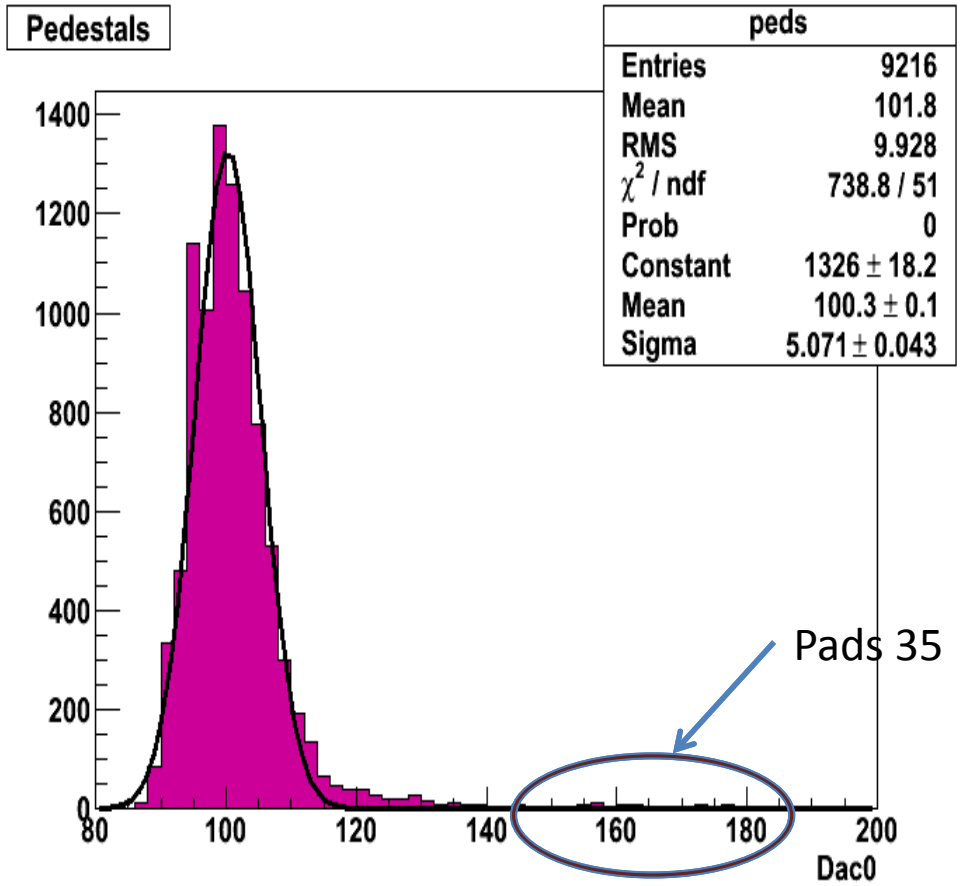
Electronics: ASICs test facility

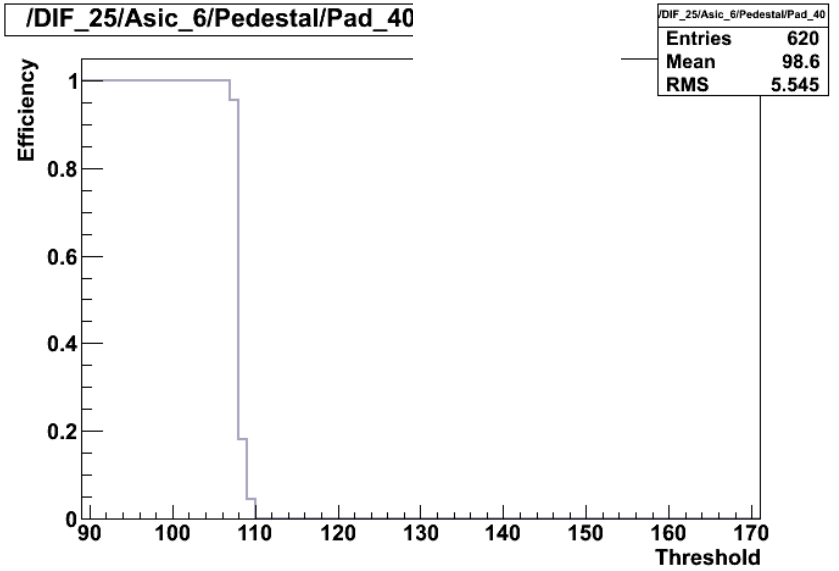
- The ASICs have been tested by R. della Negra using Labview-based application (cf. N. Seguin)
- The resulting gain correction is used as input for "on detector" calibration

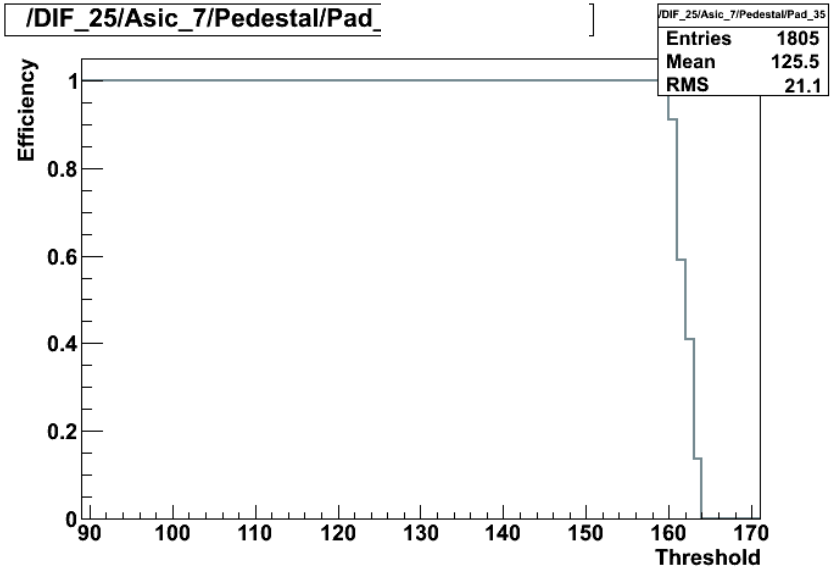




Pedestals on detector



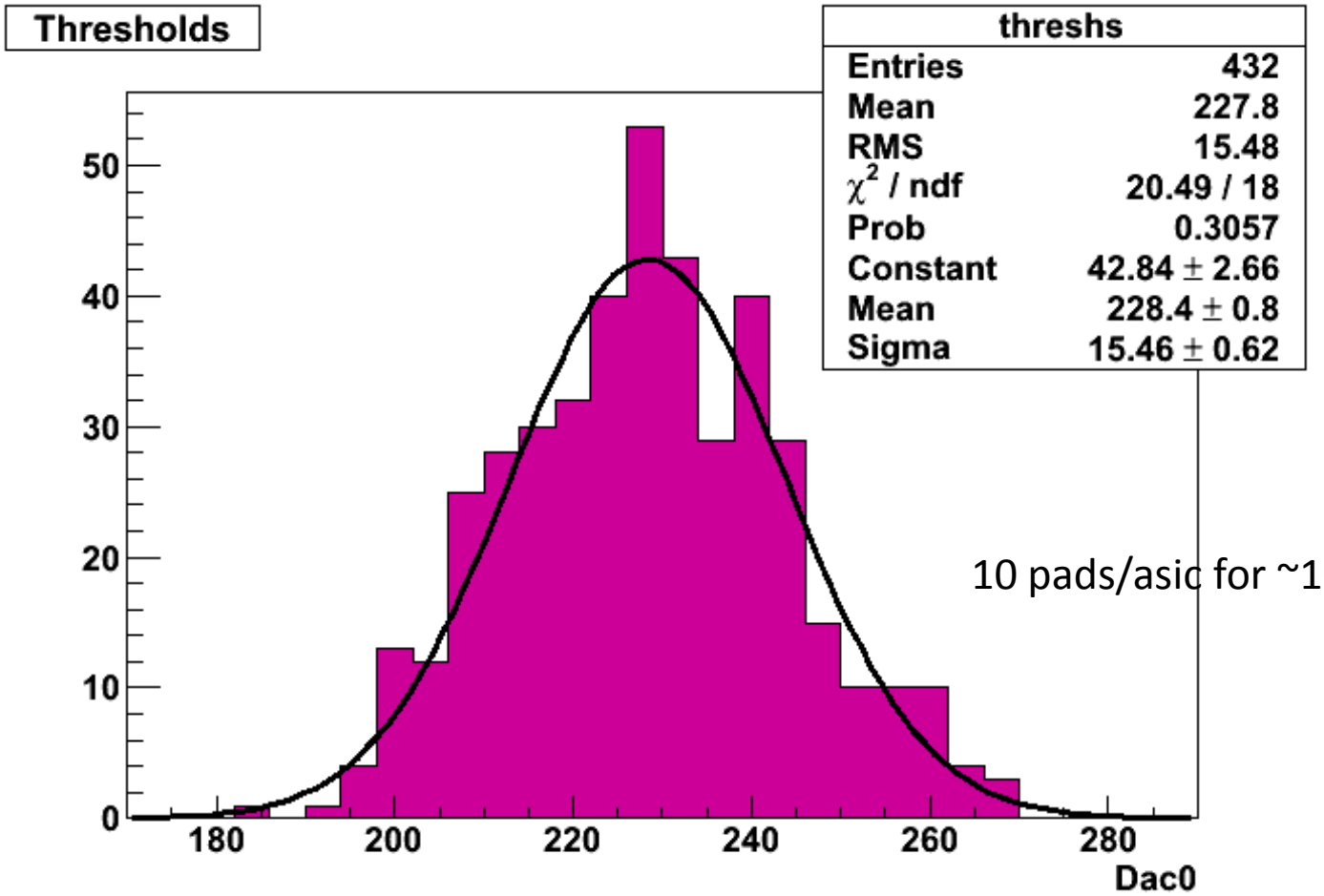




On detector calibration

- From R. della Negra 1st threshold 1.015 DAC/fC
- Set asic DAC0 threshold =average pedestal+100
- Check of threshold dispersion
- Charge injection **not** an absolute calibration due to unprecise injected charge knowledge

Threshold uniformity



10 pads/asic for ~100fC (?)

Dispersion ~7.5% (compared to 5% at ASIC test level)

Mean threshold-Mean Ped=125DAC

Ideas for threshold monitoring

- Stability of charge injection threshold vs time for DAC0/1 and 2 (not absolute calibration)
- Stability of MIP threshold vs HV (for DAC0 and DAC1)
- Stability of ratios of number of pads above threshold 0 1 & 2 for given energy pions

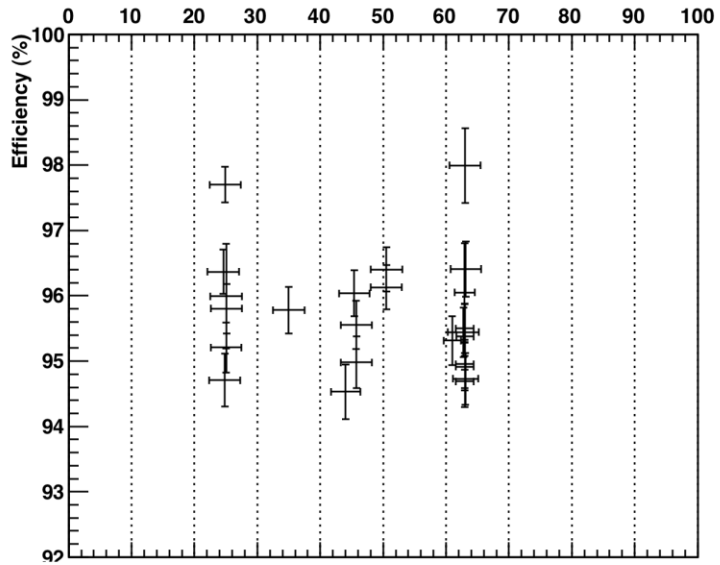
Uniformity measurement

To be done with cosmics as soon as we have 4 chambers

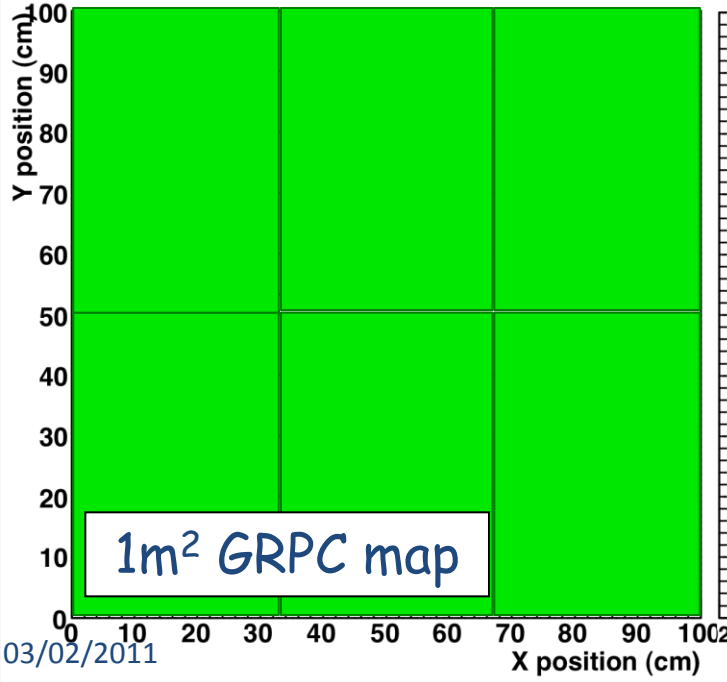
- Associate 3 collinear coincident clusters and predict in 4th chamber.
  - Will allow multiplicity and efficiency uniformity measurement
  - 1 cosmic/cm^2/min -> Threshold scan over 120 DAC with ~10 tracks per pad in 20h

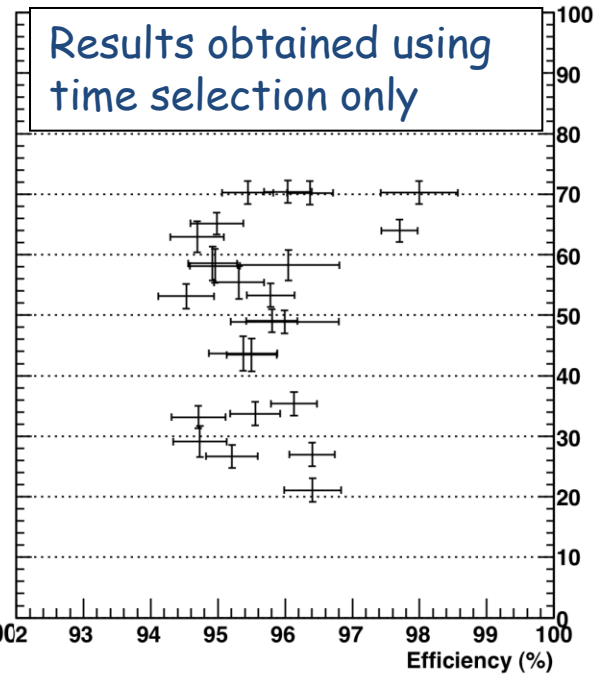
➔Measurement of MIP peak withDAC0 & DAC1

Efficiency homogeneity studies

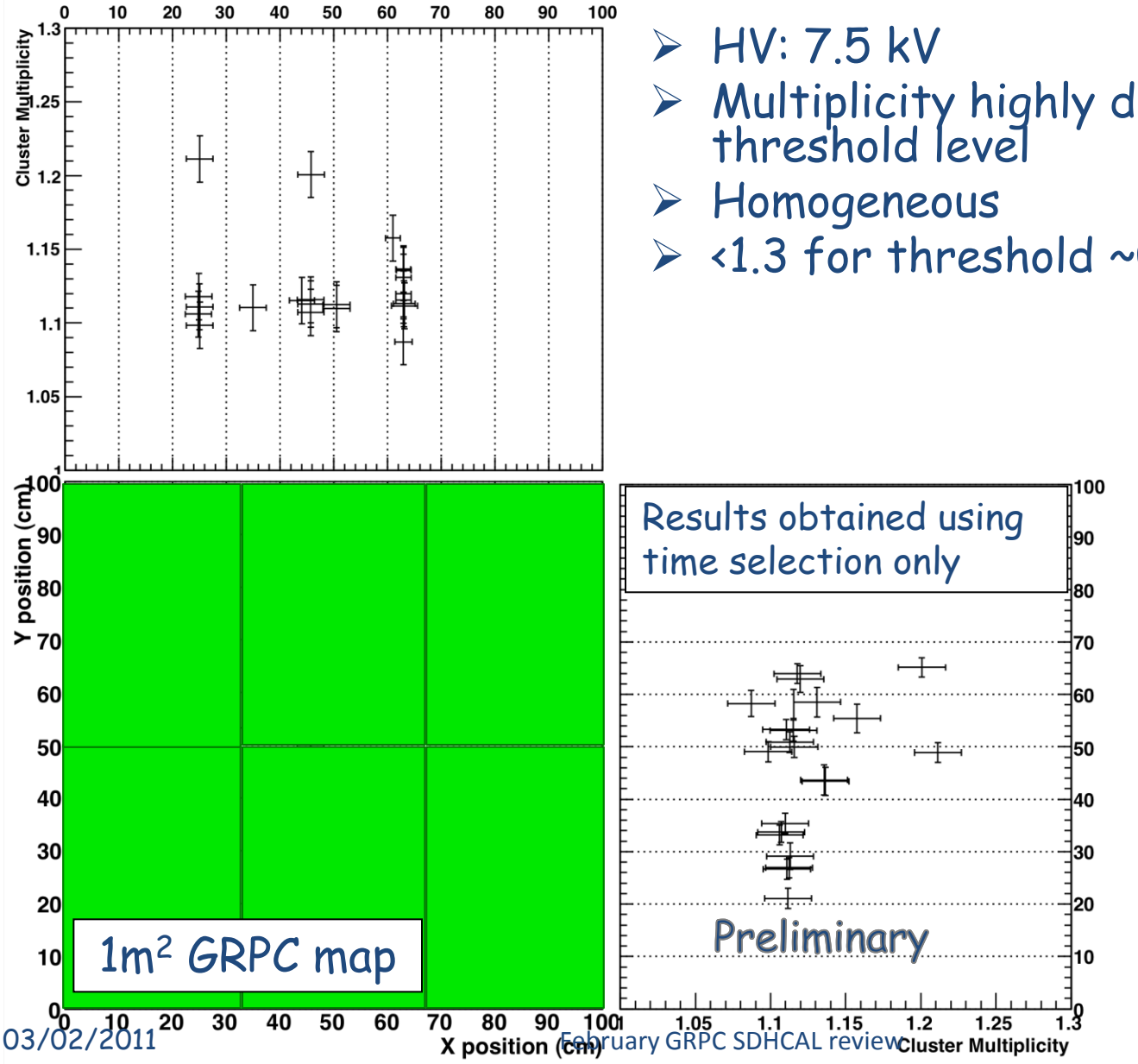


- HV: 7.5 kV
- Position scan area
- Homogeneous
- >95%





Multiplicity homogeneity studies

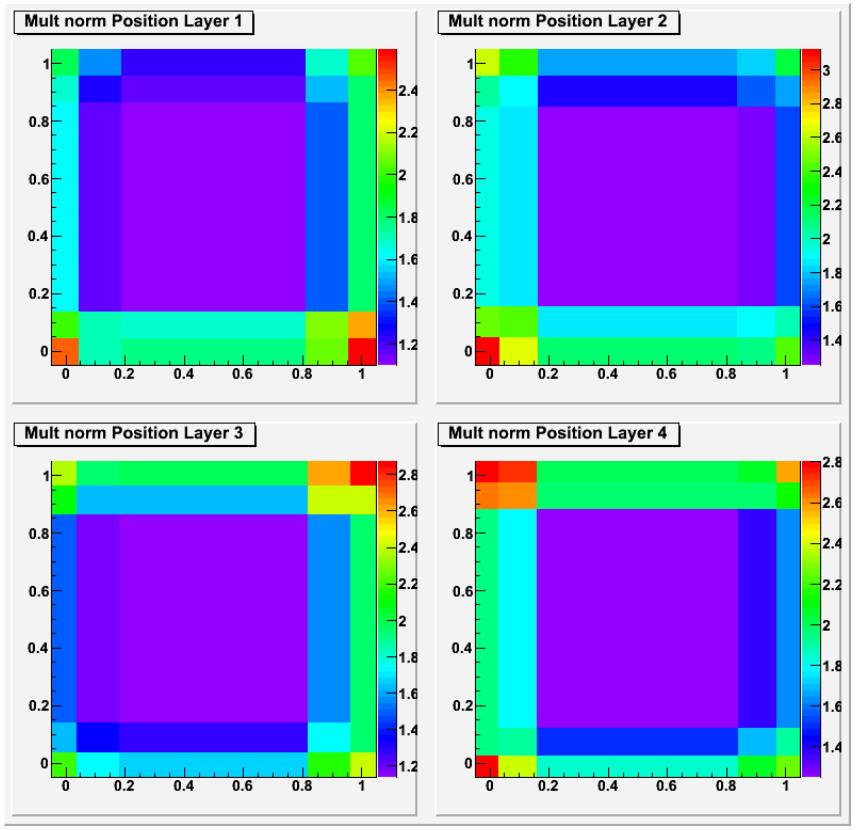


- HV: 7.5 kV
- Multiplicity highly depends on threshold level
- Homogeneous
- <1.3 for threshold ~0.25 MIP

R. Kieffer

Inhomogeneity in simulation

- Dispersion of threshold/multiplicity can be added at the digitization level
- Idea to introduce pad multiplicity vs track position in simulation :
  - Divide cells in 3x3 cells (Mokka) and compute probability of neighboring pads to be hit at digitization level (Marlin) as a function of the track entry sub-pad.
  - M2 student starting end Feb to work on measurement/implementation.



K. Belkhadi

Conclusion

- This is work in progress…
- Charge injection calibration can be improved by better impedance matching
- Will start using LPC Volcano data to start cosmic uniformity measurements