

Electronic Calibration Cards : #15, 77 (26/11/21)

Anna Ershova

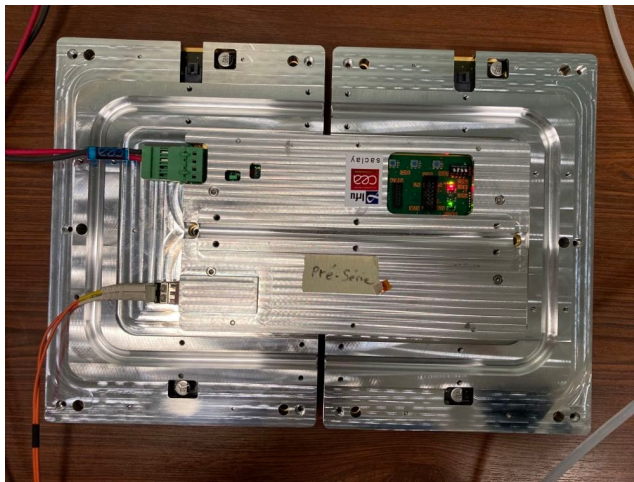
CEA

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13 Jan 2022

The setup picture

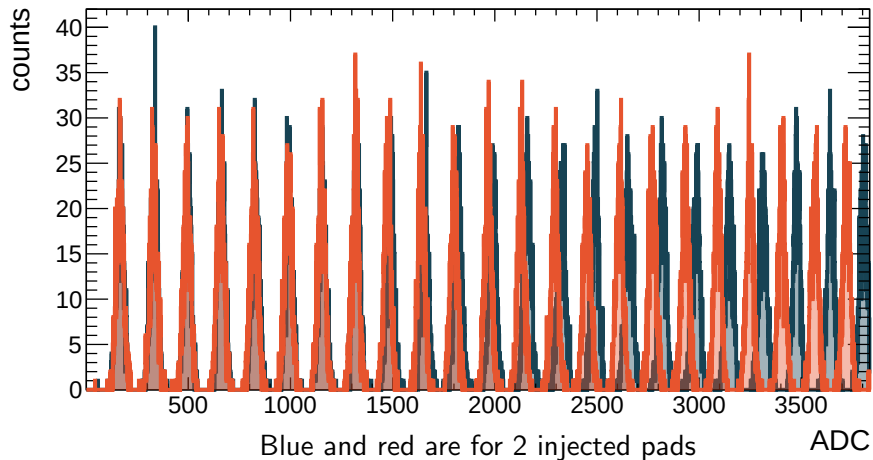
Electronics is calibrated through injection of one signal through an exciting capacitance



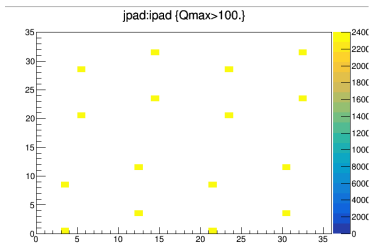
The cards are calibrated outside of the detector

Peaks displacement

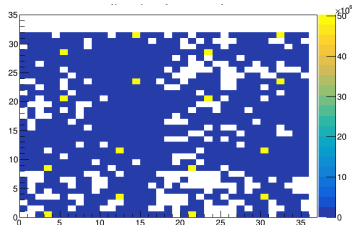
We see clearly, that the higher the injected amplitude, the higher the shift in the response between different pads. The shift is small (2%-2.5%) as expected



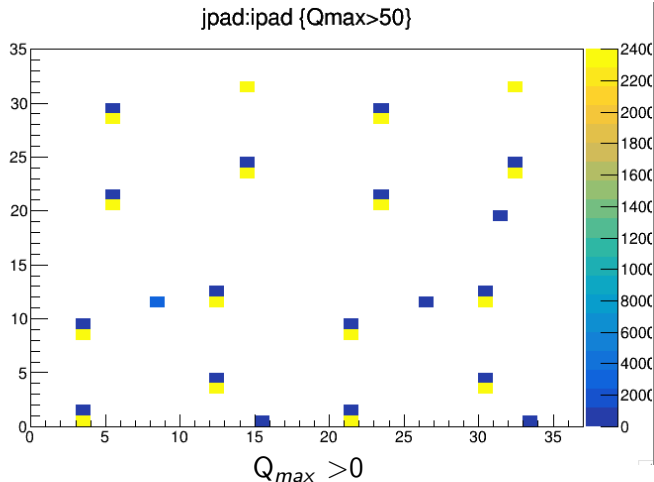
Injected pads in one file content: counts



$Q_{max} > 100$



no cut

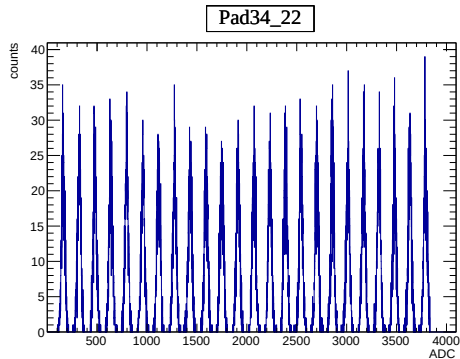


$Q_{max} > 0$

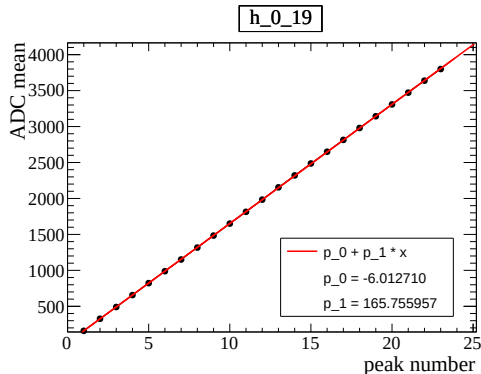
Visible cross-talk in neighbours

Calibration procedure

We go through **each pad**, find the ones with signal. We plot amplitude, extract **each peak** and fit it with the Gaussian distribution



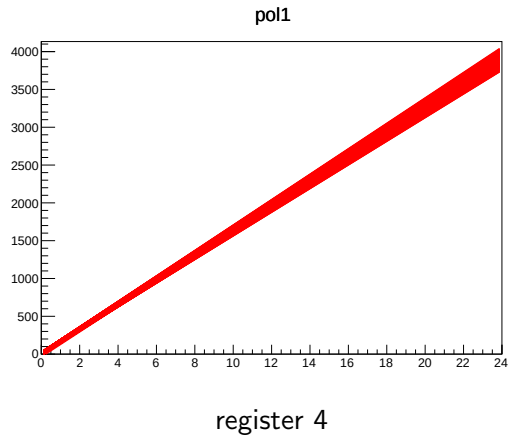
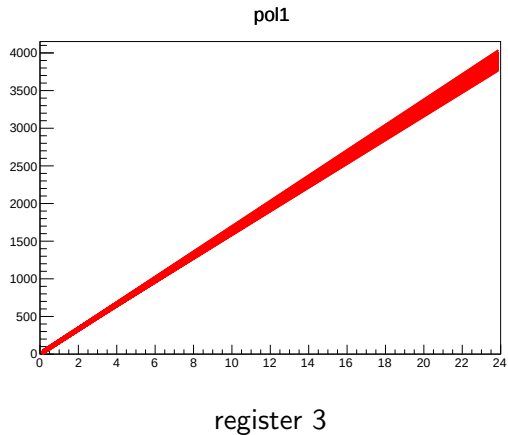
Example of peaks



Example of the calibration line

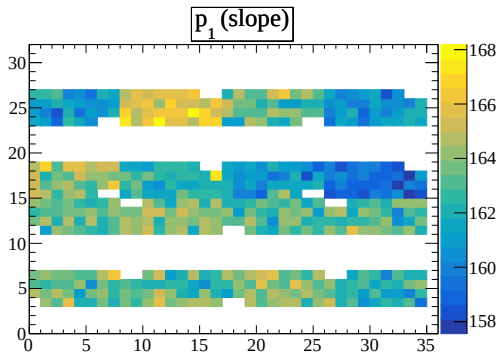
Calibration lines superimposed

Already by eye one can see the dispersion

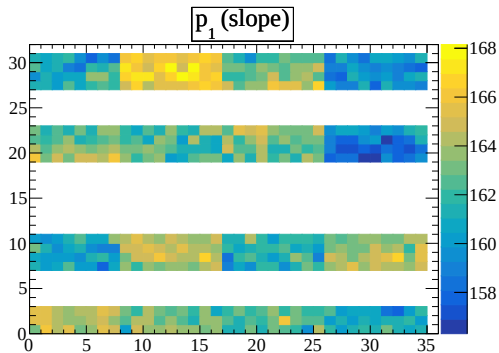


Slope

We do see differences between different ASIICs response

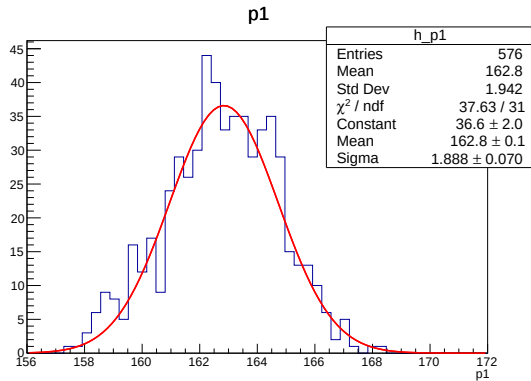


register 3

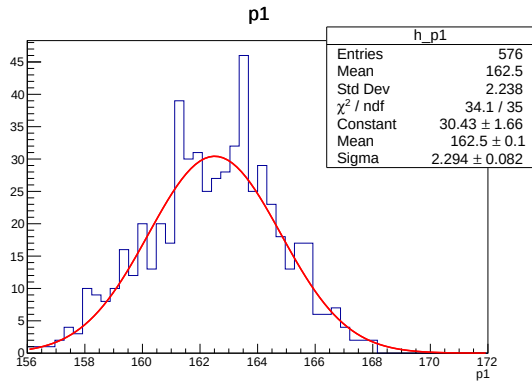


register 4

Slope



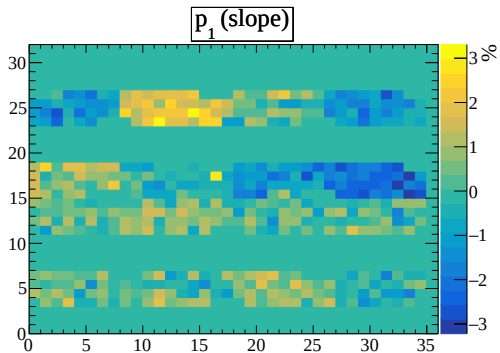
register 3
error is 1.2%



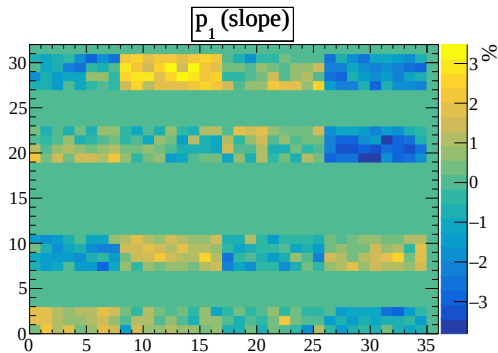
register 4
error is 1.4%

Slope, %

We do see differences between different ASIICs response

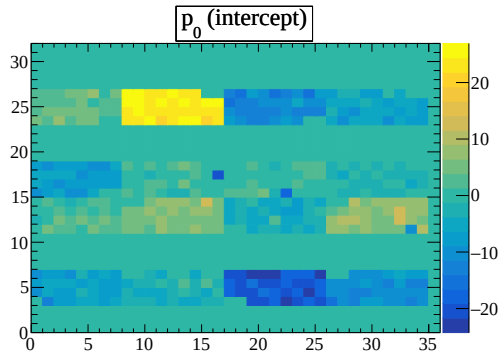


register 3

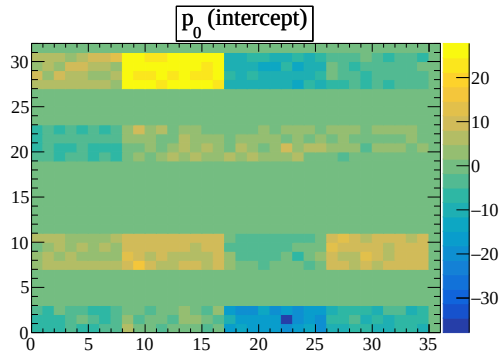


register 4

Intersept



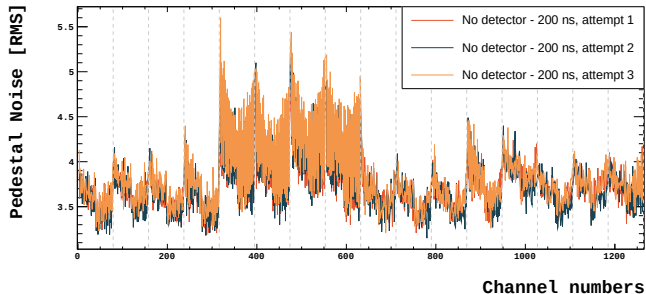
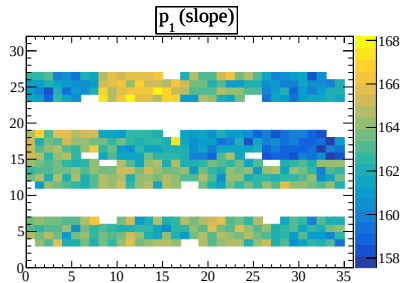
register 3



register 4

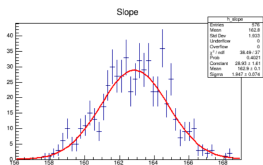
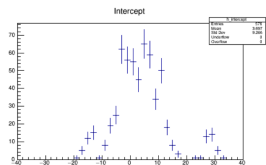
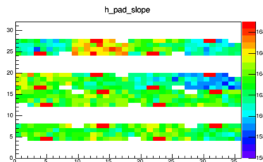
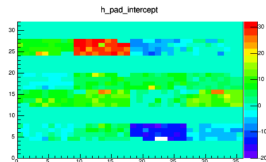
Pedestal studies

Dashed line — separation between different ASIICs

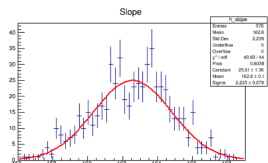
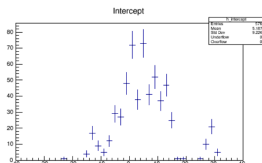
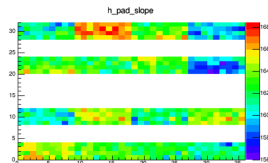
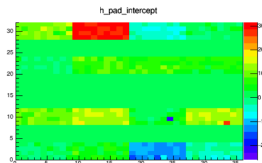


Cross-check

using a completely independent code, we got similar results



register 3



register 4

S. Hassani, D. Attié

Conclusion and open questions

- Although the global uniformity is 1.2-1.4%, we do see response difference between the neighbours asics that can be high up to 6-7%
 - The structure seen in the calibration data is the same as the one observed in the pulse of the mesh and the gain map
 - We need to decorrelate electronics response from detector response (in mesh pulsing, X-ray and cosmic data)
- ! Shall we calibrate all the cards before and after mounting them on the TPC? At CERN?
Or at J-PARC?
- ! Shall we foresee in-situ calibration during the data taking?