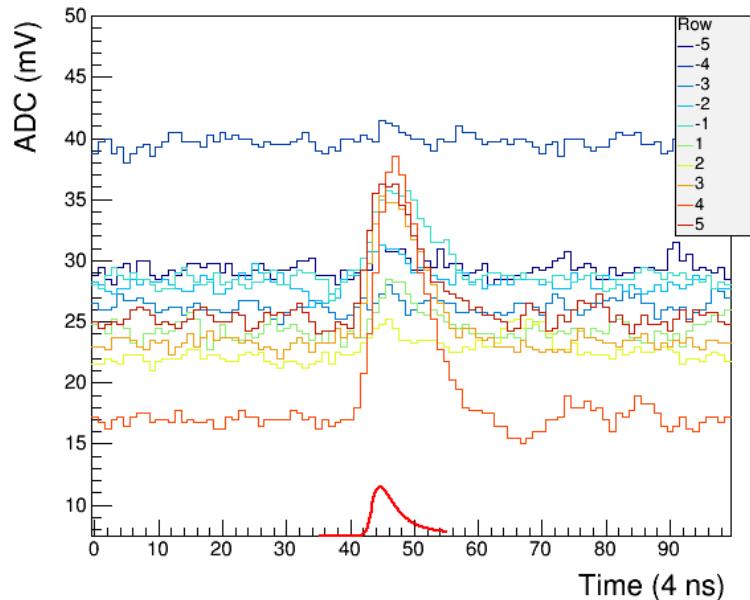


Cosmic Calibration Update

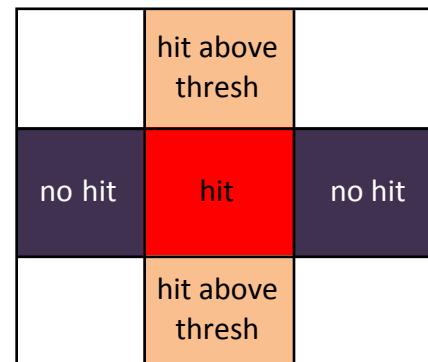
Holly Szumila

15 Dec 2014

- Data in **raw mode**
- **Integrating** cosmic signals and subtracting out a calculated pedestal (80ns window)
- Landau signal **fit** over polynomial background (only observed in some crystals)
- Crystal **threshold** is 2.5mV (FADC) to count as a MIP event



- **Geometric cut:** crystal must not have a hit crossing threshold in adjacent crystals in the same row and must have a hit in crystals directly above and/or below (strict, can be expanded to include diagonal)



$$A * \text{Landau}(x, B, C) + p_0 + p_1 * x + p_2 / x$$

A-Integral

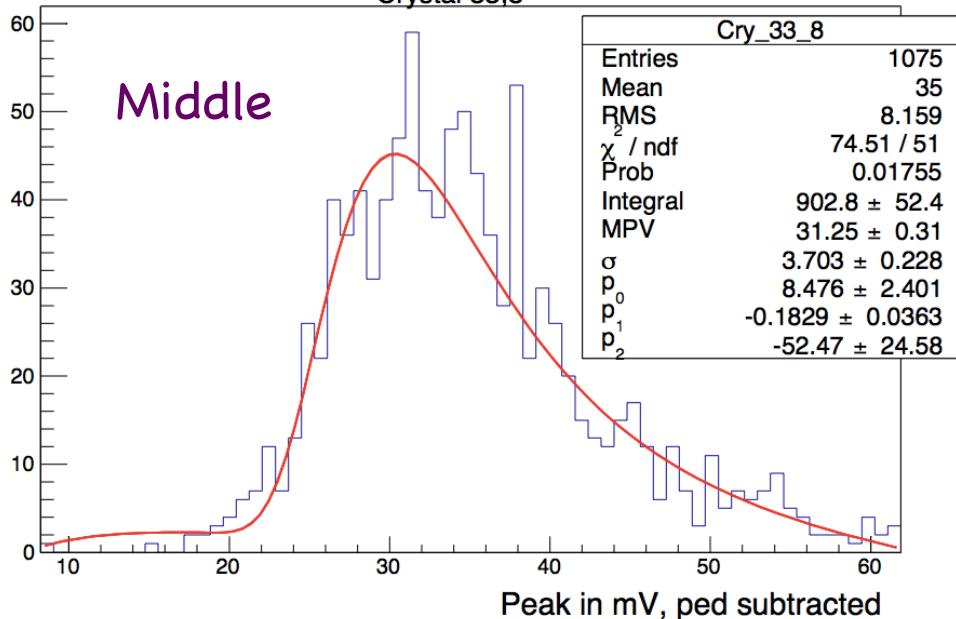
B-MPV, highest peak

C-Sigma

Background fit parameters

-p0, p1, p2

Crystal 33,8



Crystal 43,0

Edge

Cry_43_0	
Entries	536
Mean	23.34
RMS	7.777
χ^2 / ndf	34.37 / 44
Prob	0.8509
Integral	583.8 ± 79.1
MPV	20.03 ± 0.39
σ	3.425 ± 0.352
p_0	-16.31 ± 5.80
p_1	0.2283 ± 0.0854
p_2	154.4 ± 46.8

Peak in mV, ped subtracted

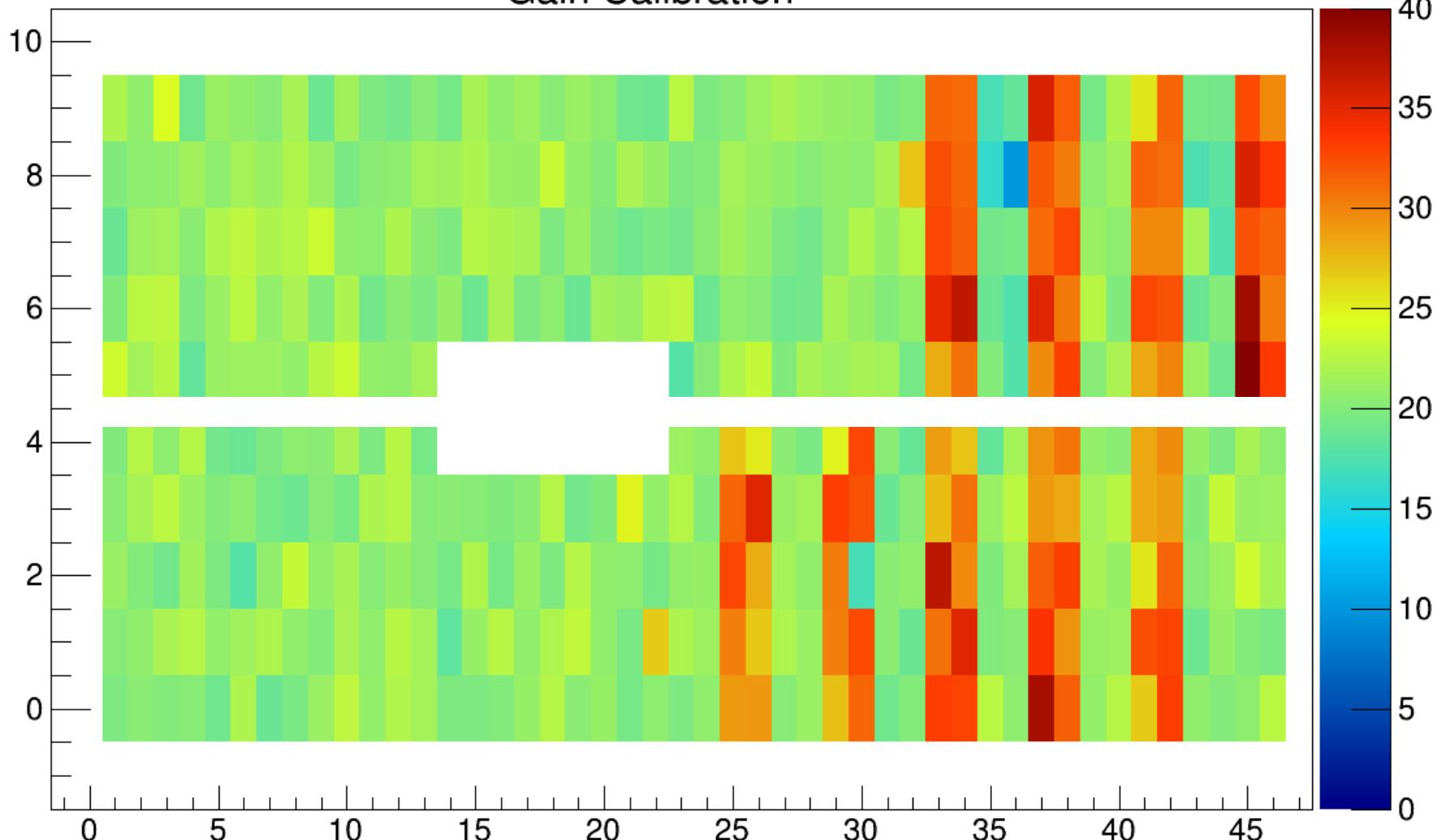
Crystal 45,0

Corner

Cry_45_0	
Entries	1154
Mean	23.16
RMS	9.467
χ^2 / ndf	43.74 / 53
Prob	0.8138
Integral	501.2 ± 81.5
MPV	22.66 ± 0.38
σ	3.14 ± 0.41
p_0	-26.01 ± 6.67
p_1	0.3267 ± 0.0954
p_2	410.1 ± 62.3

Peak in mV, ped subtracted

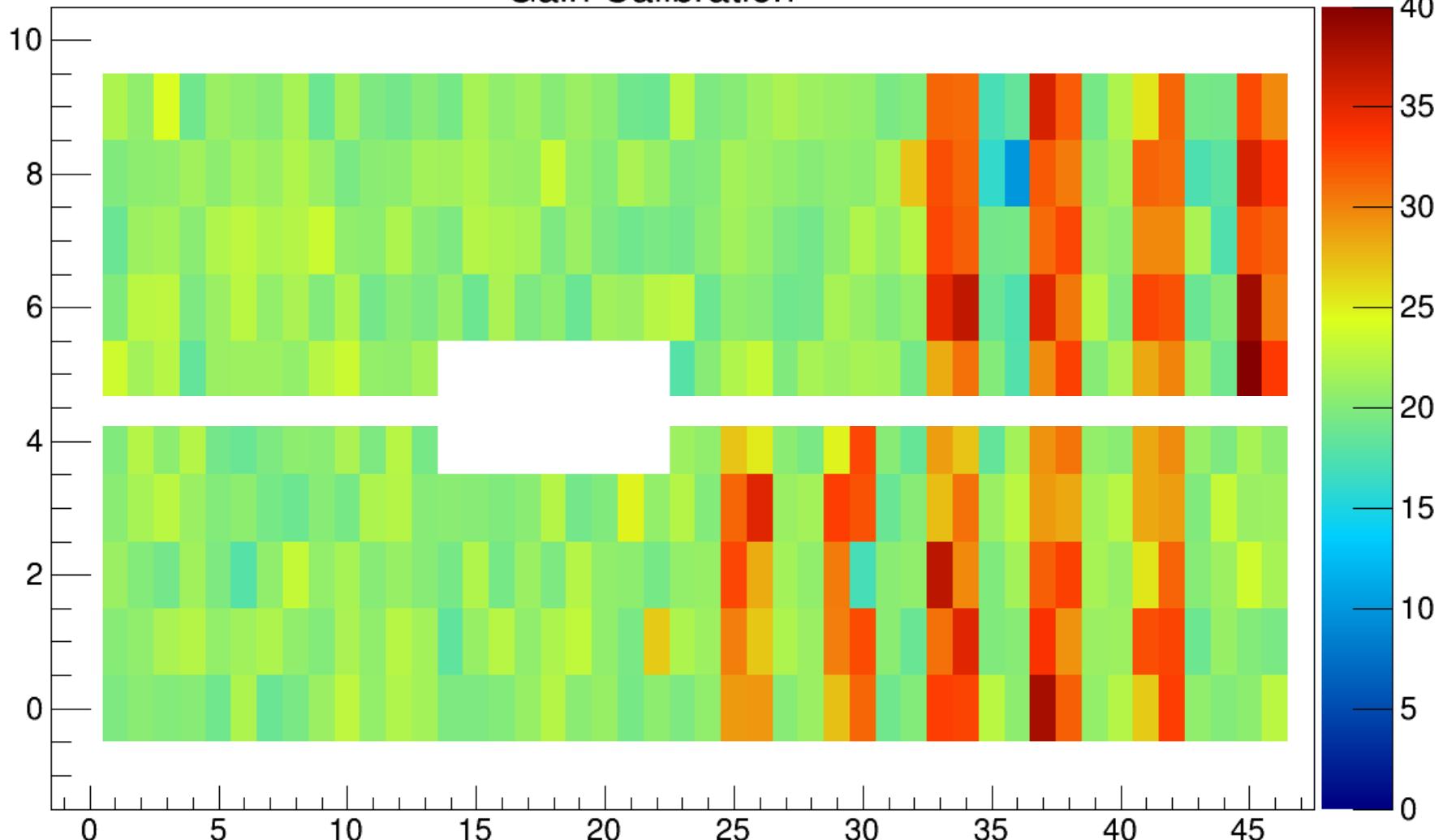
Gain Calibration



These are the peaks of the Landau fit in units of mV (FADC).

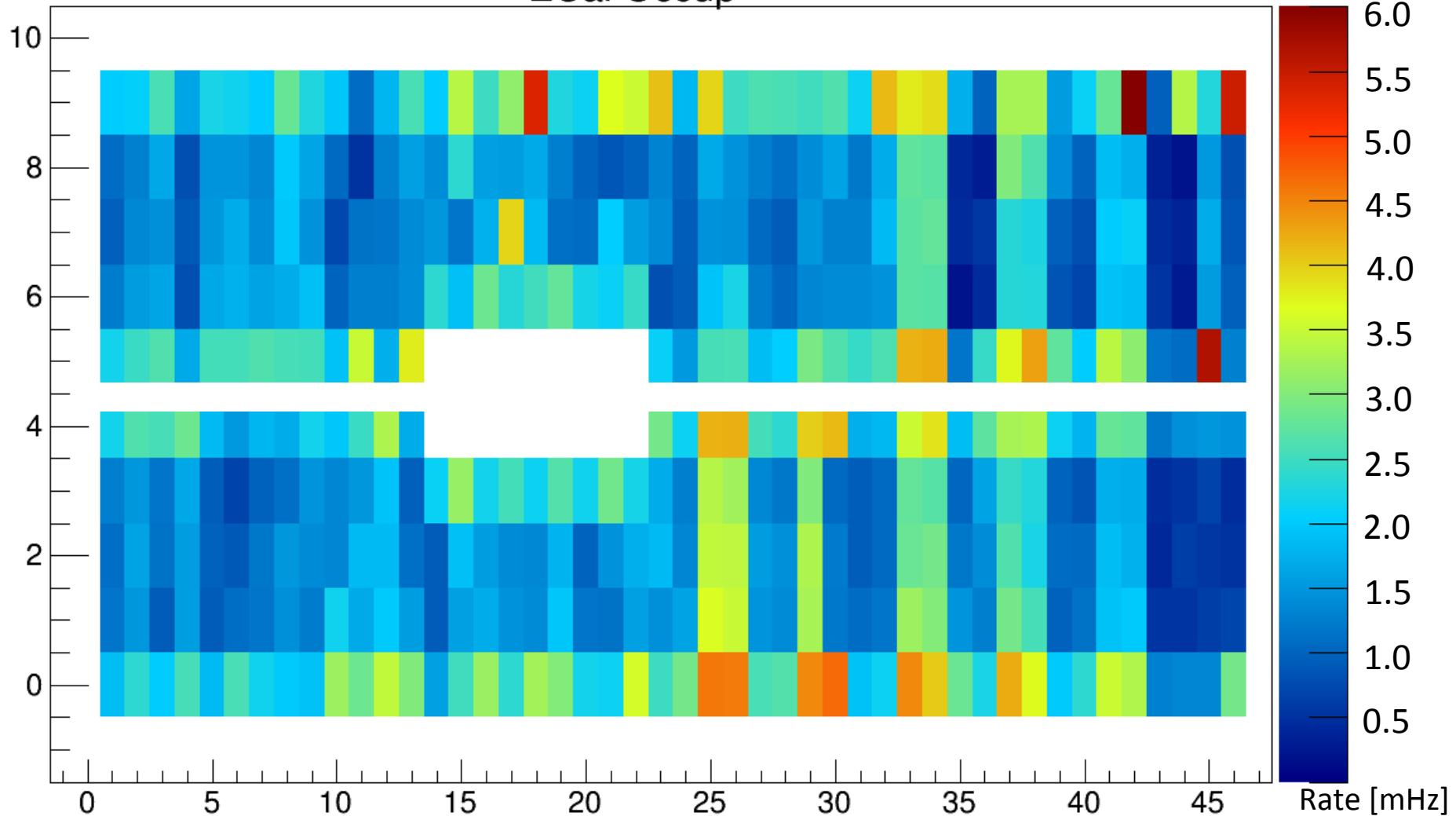
**Red groups are HV groups, outputting higher than nominal voltage, and groups in between output lower than nominal voltage

Gain Calibration



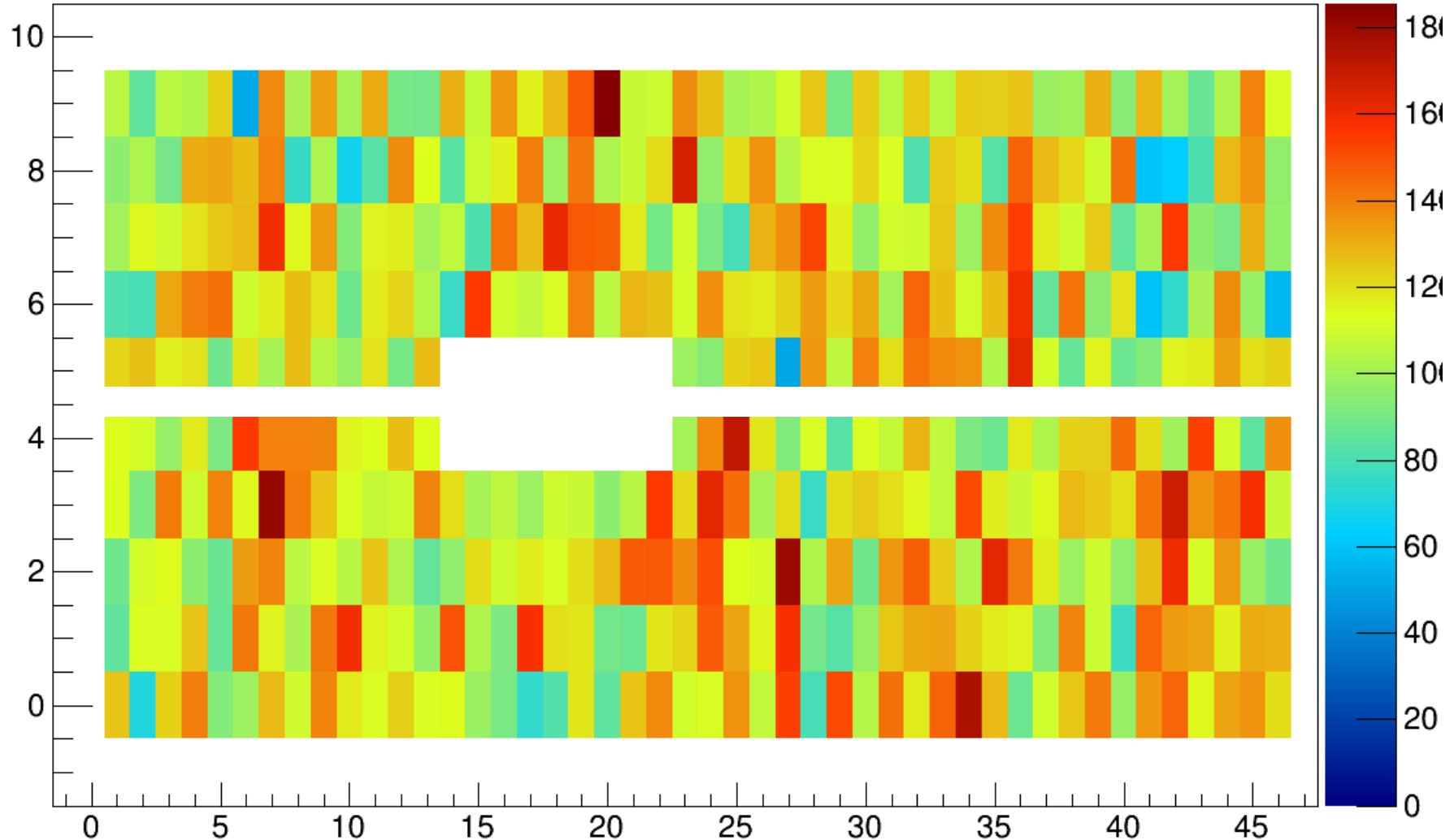
- Red groups correspond to HV groups, outputting higher than nominal voltage
- Groups in between red groups output lower than nominal voltage
- Discrepancy of voltage measured at the back of the mainframe

ECal Occup



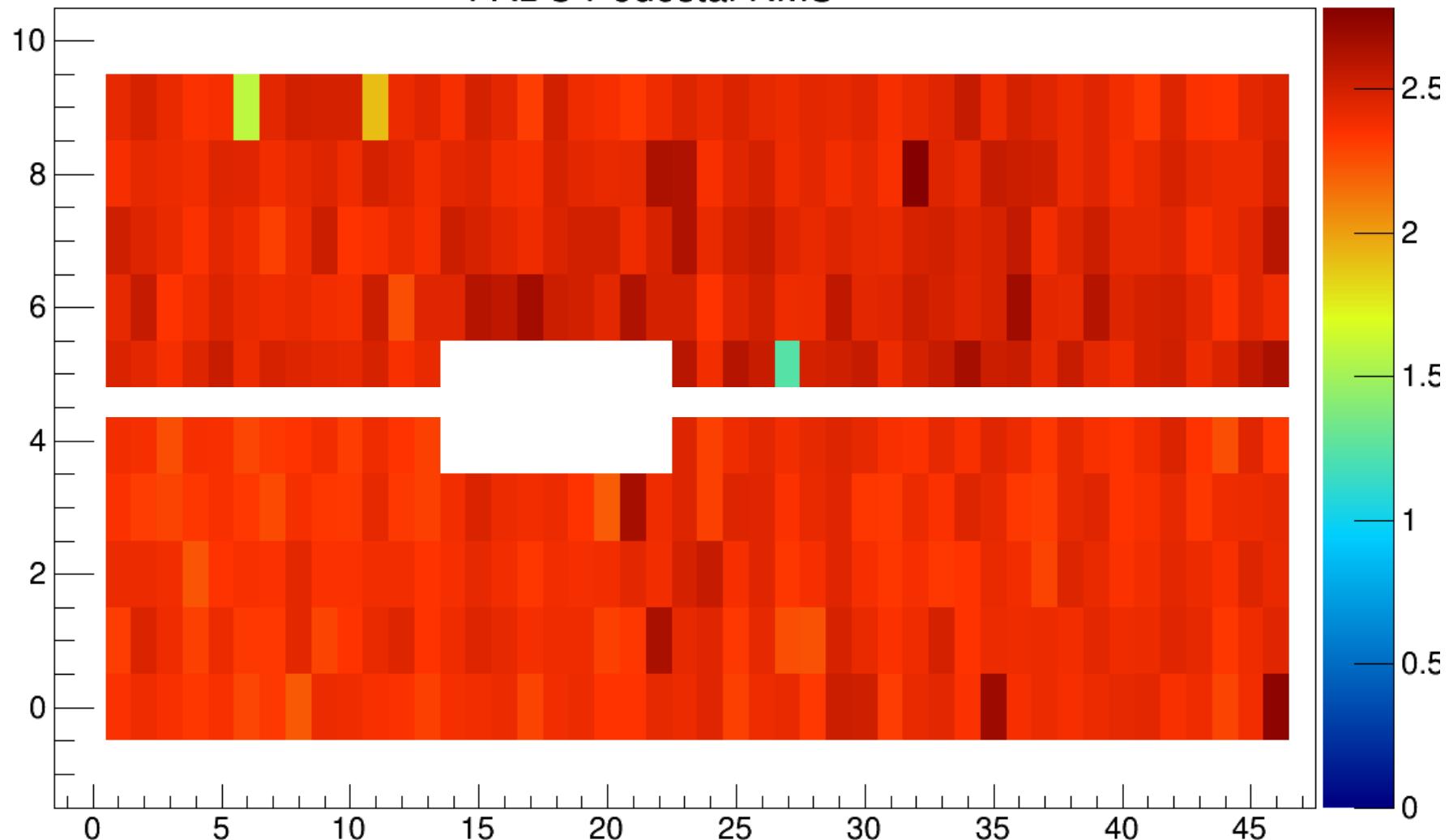
- Horizontal bands due to geometric cuts
- Triggering scintillators found to be shifted left

FADC Pedestals



Pedestals calculated from the front end of the time window in **units of FADC**

FADC Pedestal RMS



Time variation of the pedestal in **units of FADC**