TRK calibration issues (CERN2004 combined beamtest)

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Outlook

- Online-Offline comparison
- Pedestal evolution
- Failed calibrations
- Noise correlations
- Channel flags
- Conclusions

Online-Offline comparison

this comparison is based on a few runs when raw data was also taken (table)

the events used in the Online calibration are not in the data stream,

so we cannot use exactly the same events in Offline calibration!

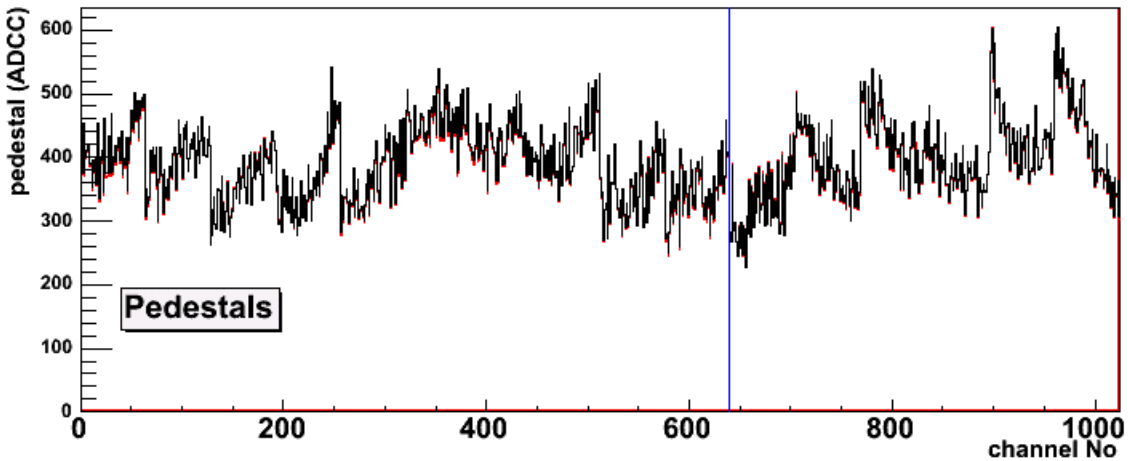
but these events are close in time

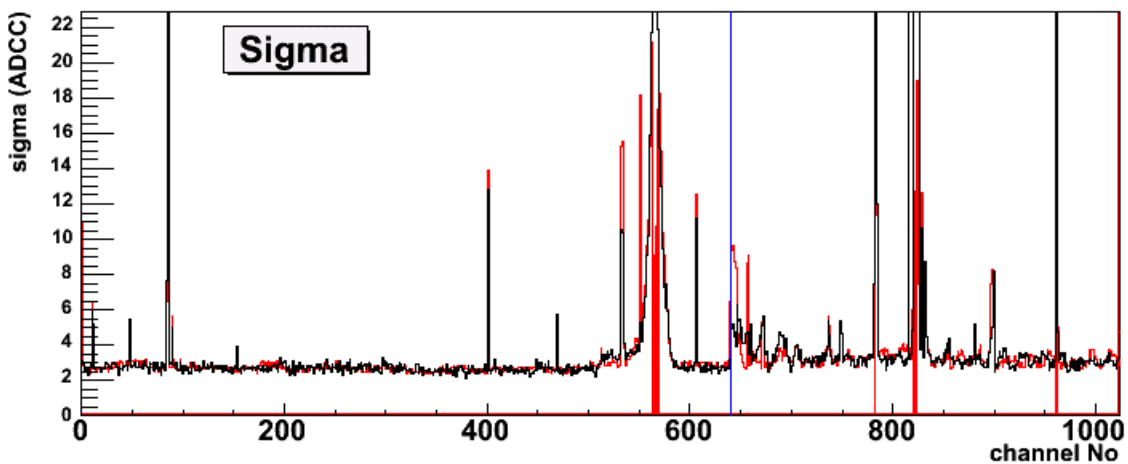
TDR	0	1	2	3	4	5	6	7	8	9	10	12	16	17	20	21
run (1000+)	41	40	38	39	44	42	37	53	47	45	36	46	52	49	50	48

only the runs where the latest version of the Online algorithm were tested

Online-Offline comparison

(example of a good agreement)





Online

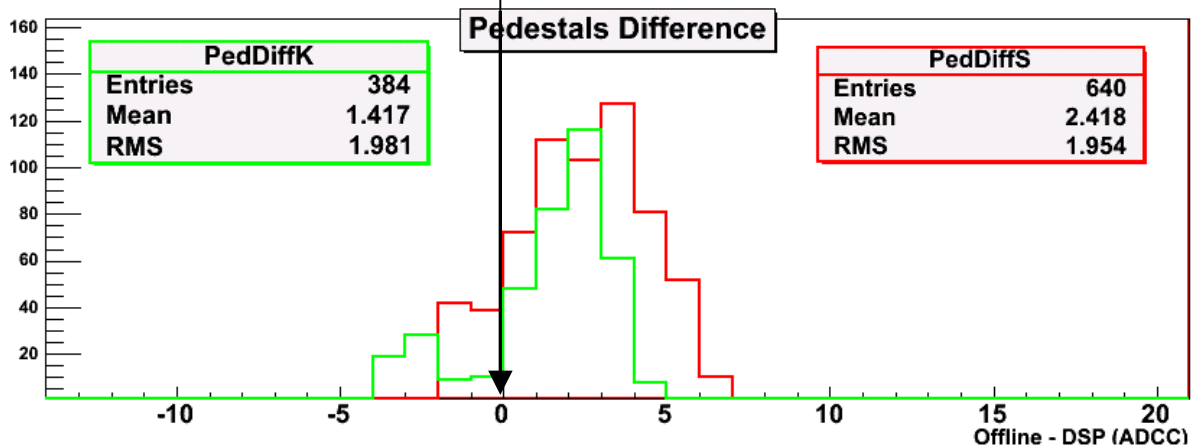
Offline

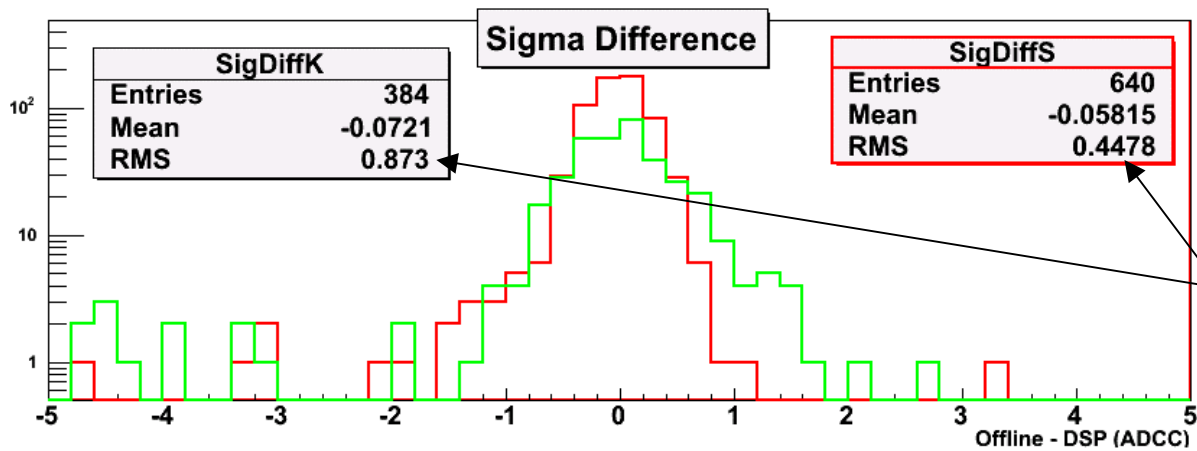
TDR 0

run 1041

Online-Offline comparison

good agreement:Offline pedestals are 1-2 ADCC higher than Online





S-side

K-side

TDR 0

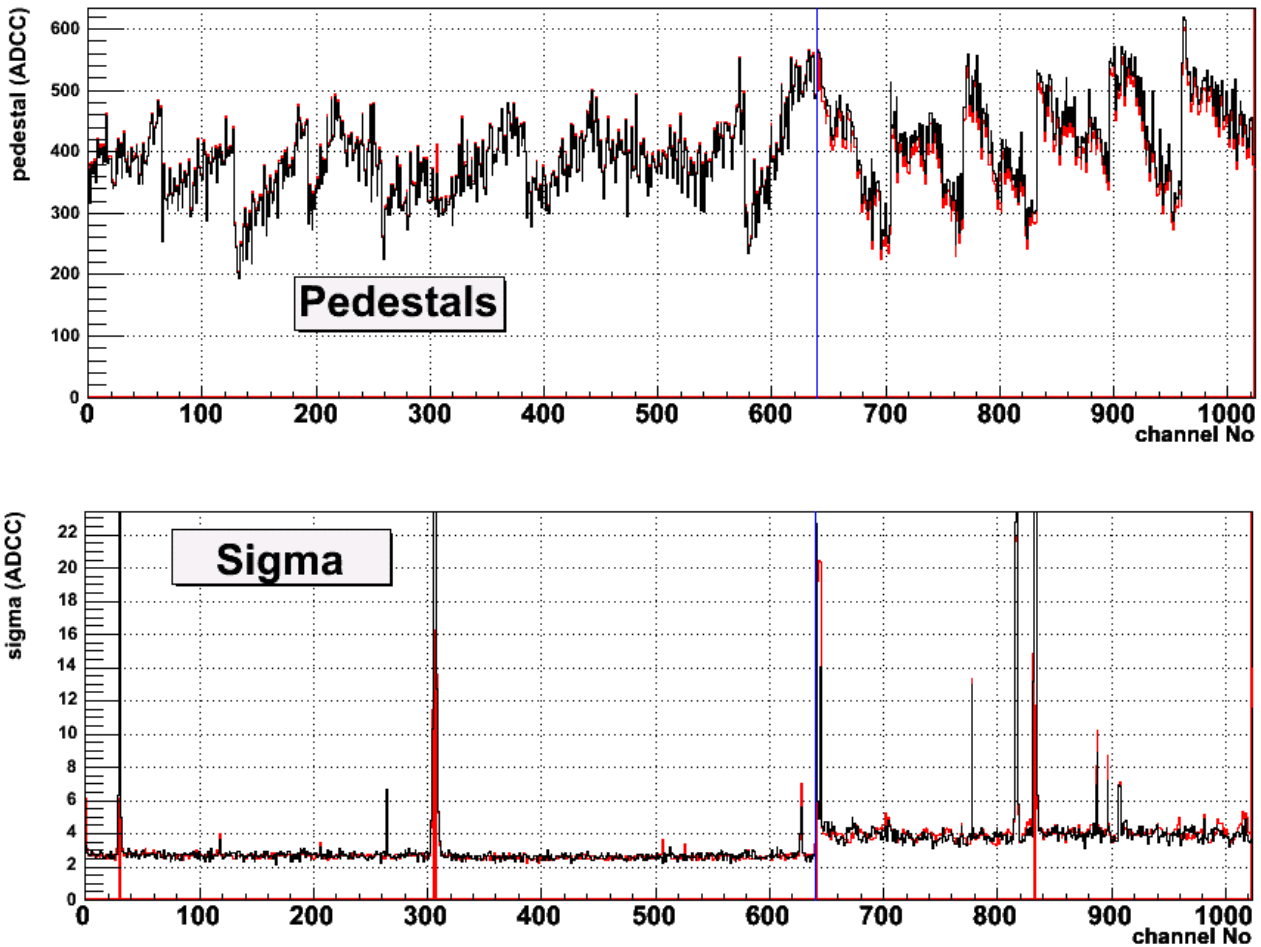
run 1041

sigma on S-side agree better than on K-side

but for other TDRs and runs...

Online-Offline comparison

another example



Online

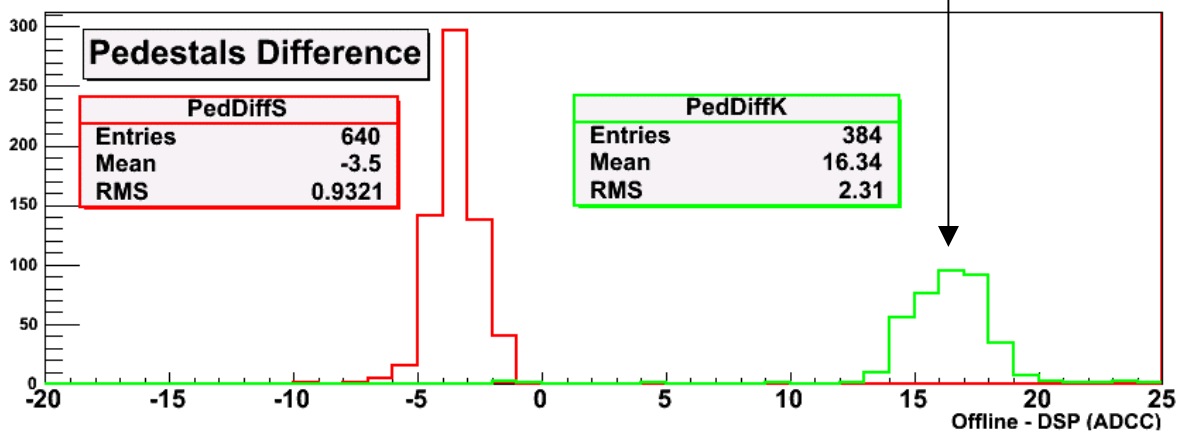
Offline

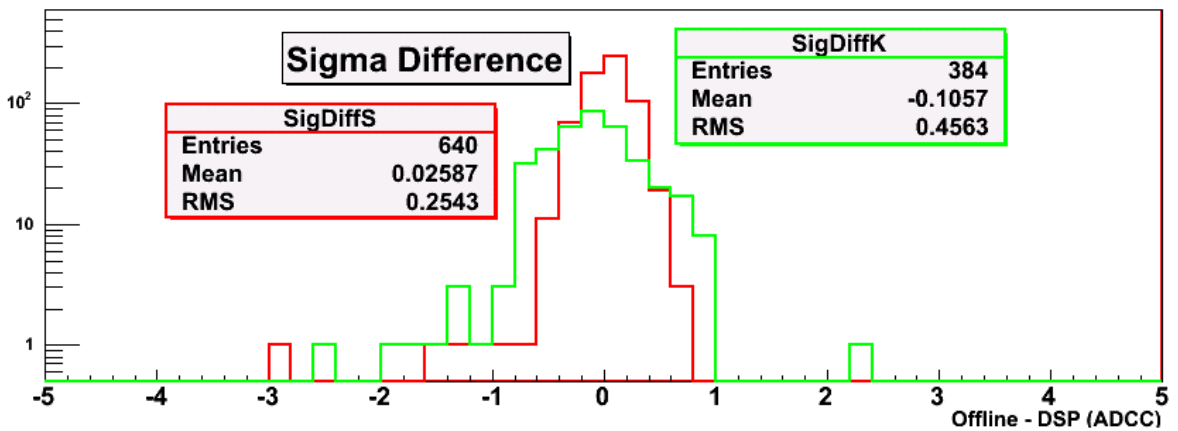
TDR 7

run 1053

Online-Offline comparison

Offline gives pedestals
by 16 ADCC highers!





S-side

K-side

TDR 7

run 1053

S-side pedestals

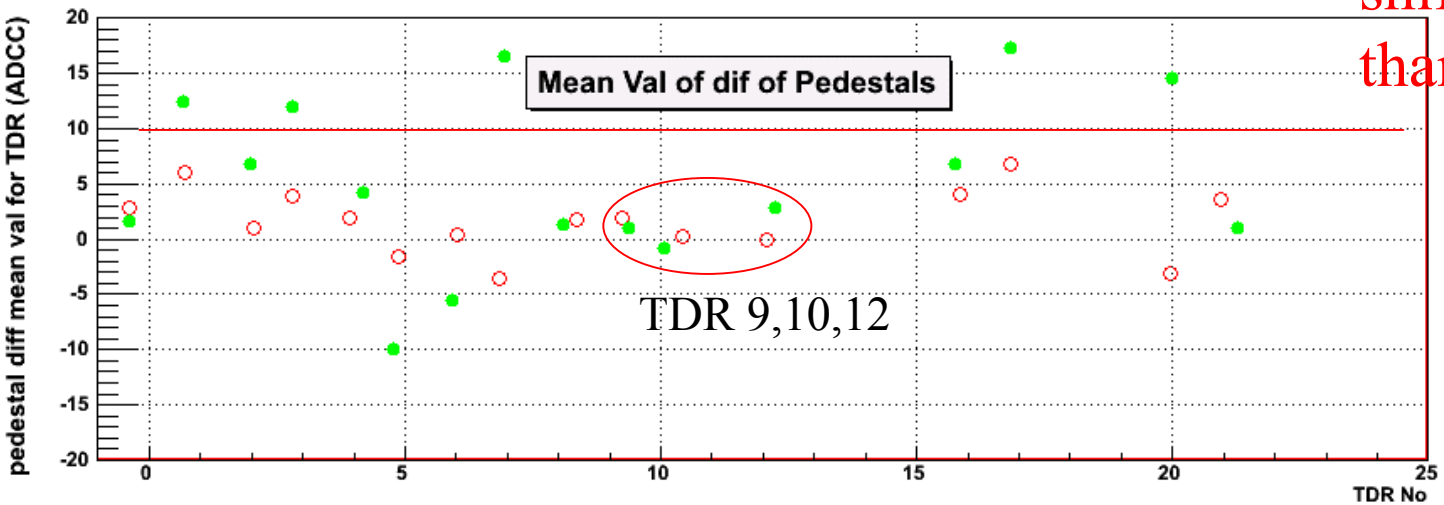
shifted coherently

K-side pedestals

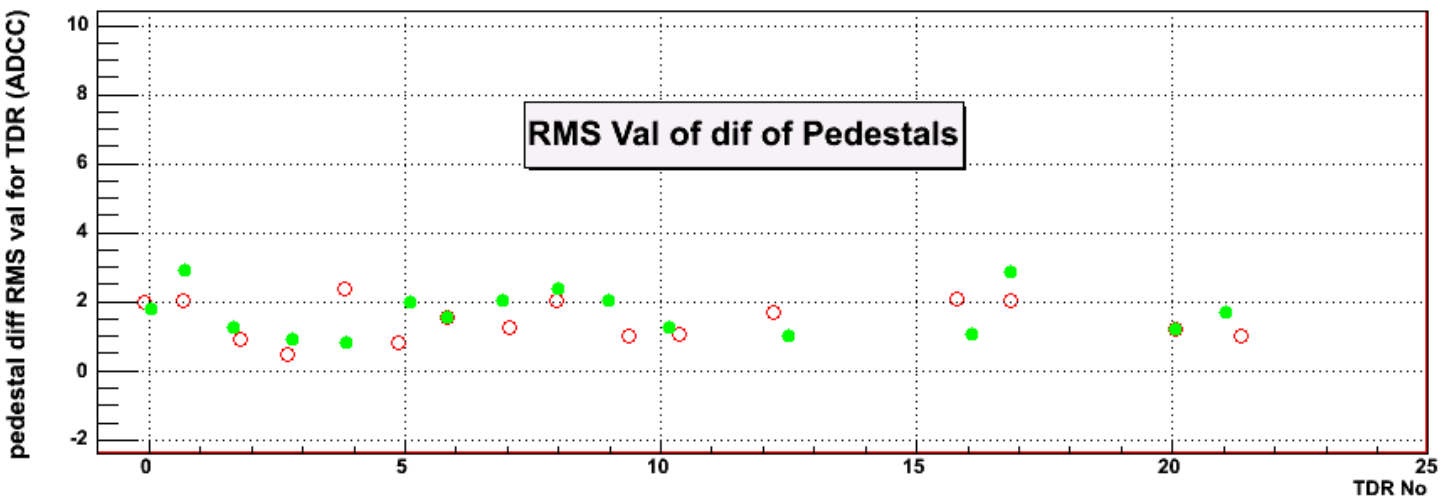
- also coherent shift

Online-Offline comparison

shift by more than 10 ADCC



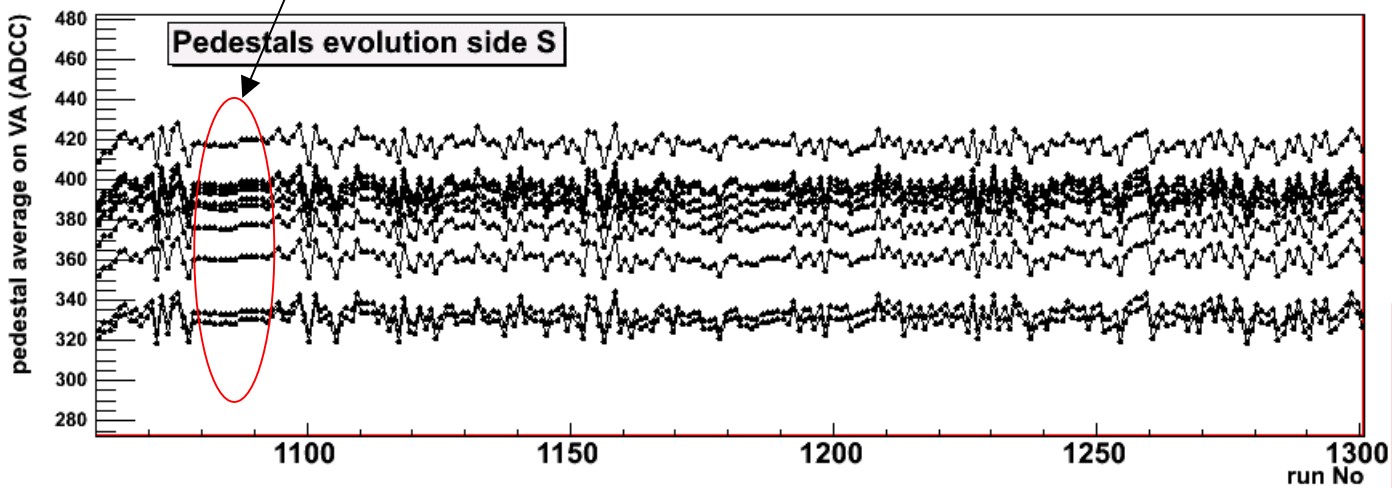
- S-side
- K-side



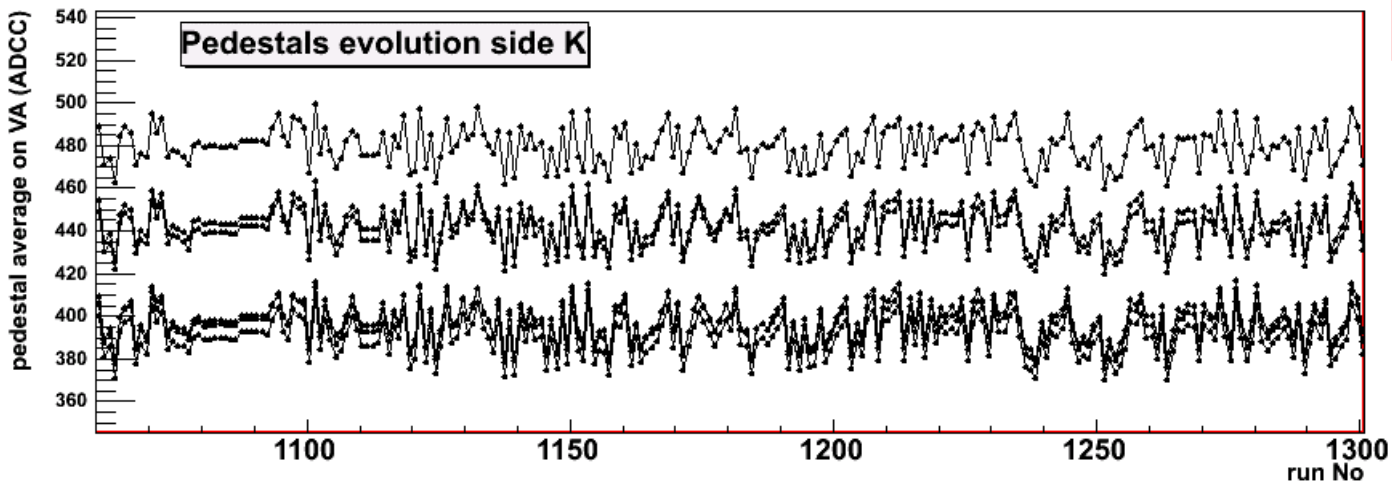
Are pedestals stable?

Pedestal evolution

stable period



the same pattern of changes



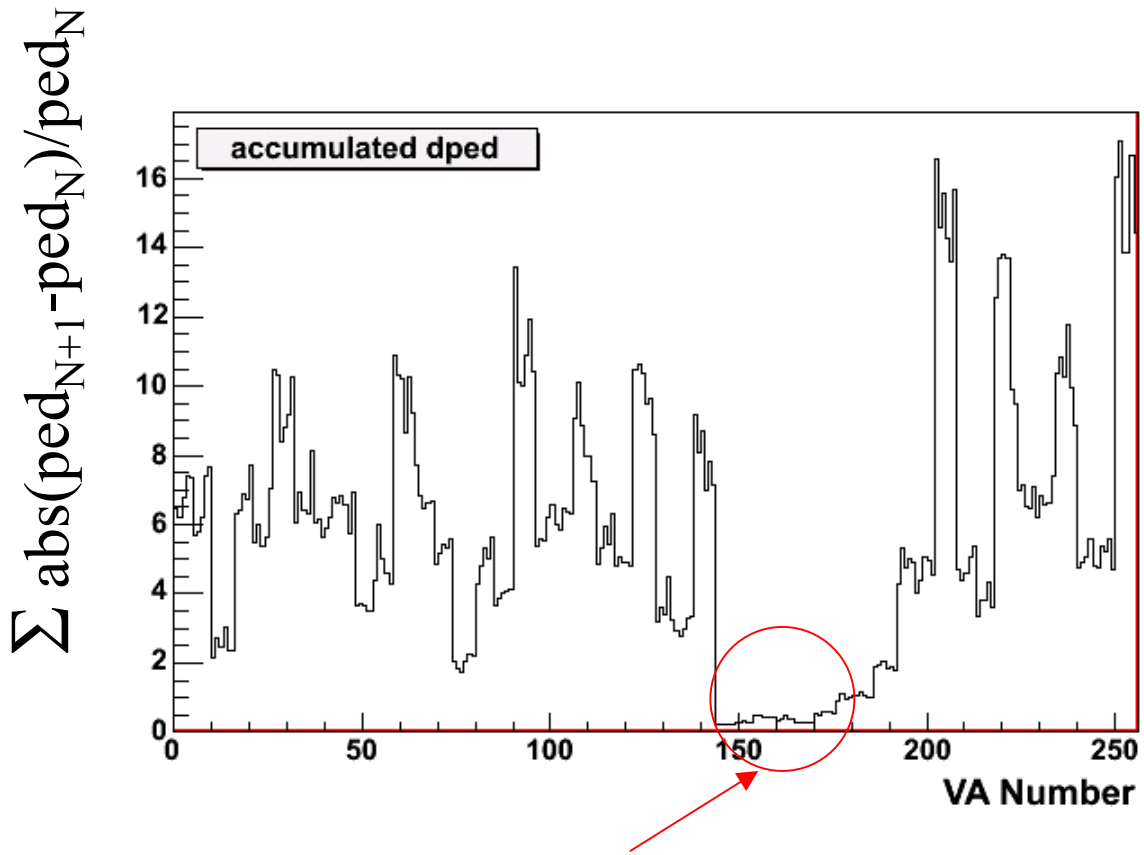
the same pattern of changes

Offline calibrations – pedestals averaged over VA

TDR 7 runs:

1020-1300

Run-to-run pedestal variation

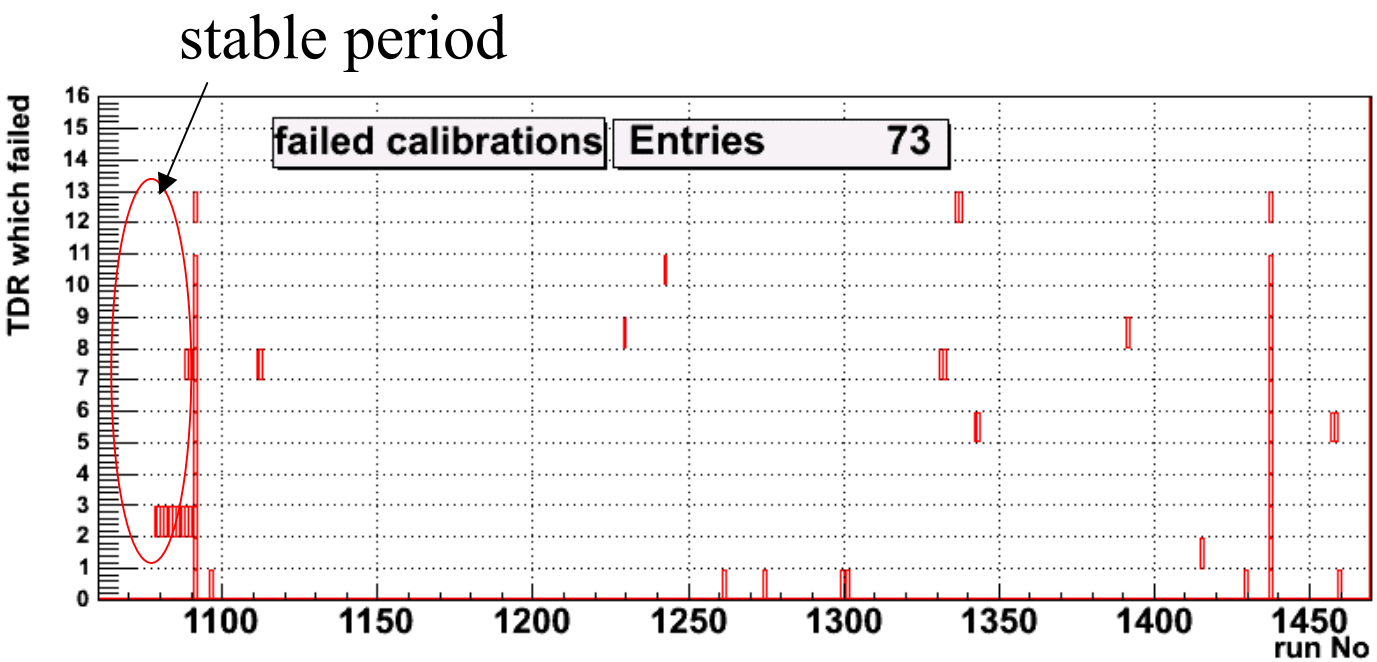


accumulated for calibrations of runs 1100-1200

TDR 9,10,12 – low variations (and good agreement DSP/Offline – slide 8)

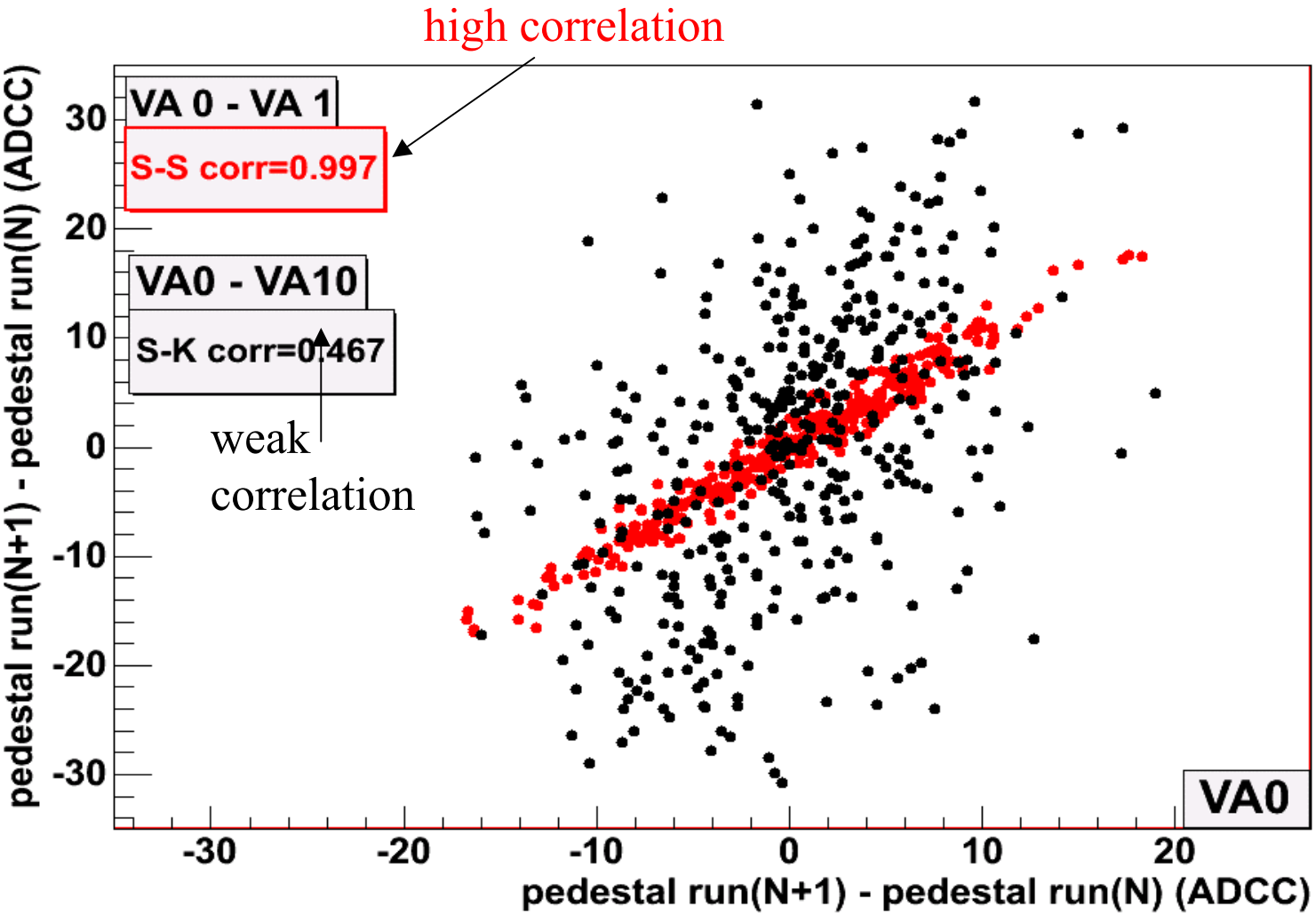
Failed calibrations

In the Online calibration files sometimes there are NO values for pedestals and sigmas. This is a symptom of TDR failure. Below a plot summarising which TDR failed during the calibration as a function of run number



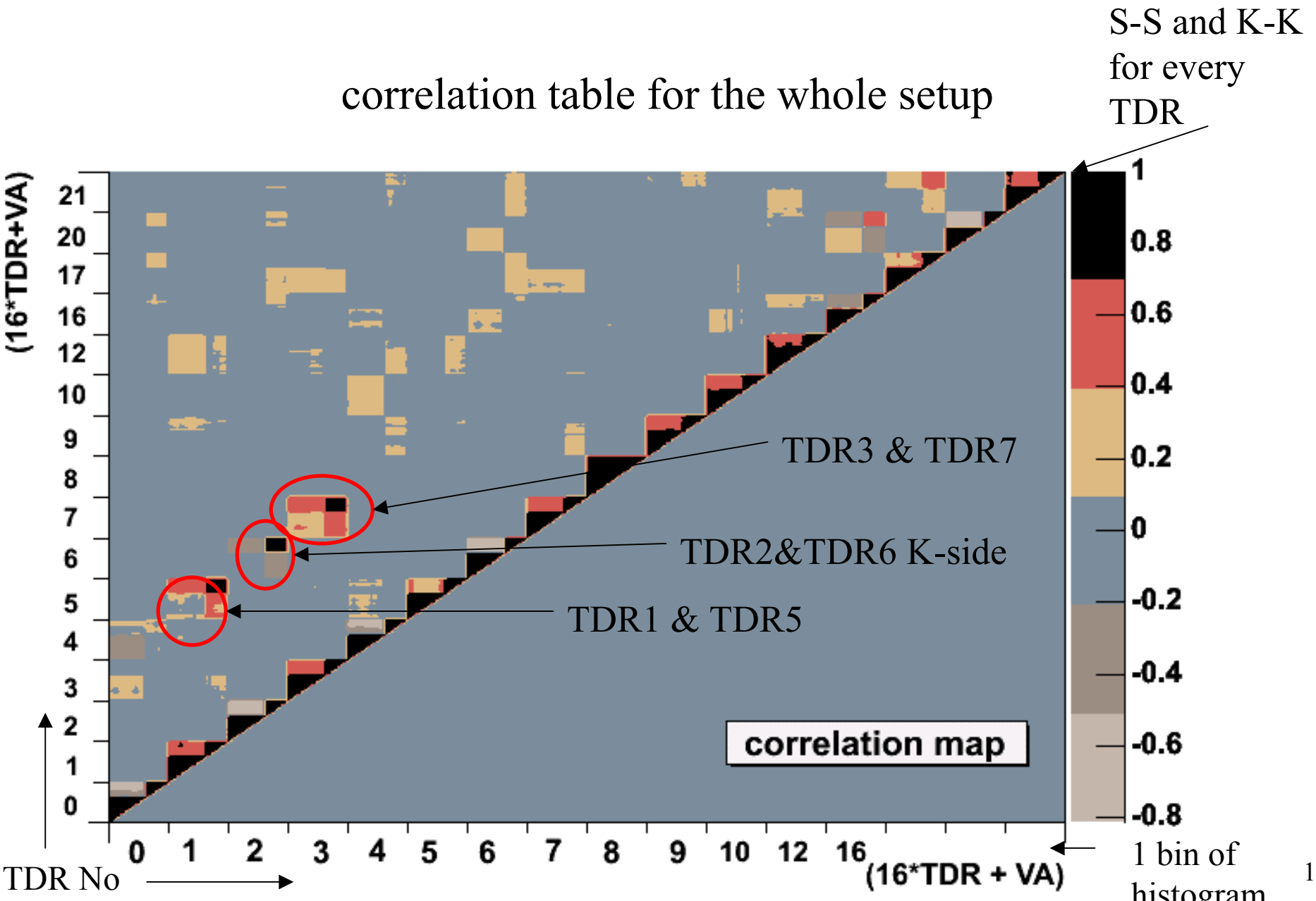
Correlations of variations of pedestals (S/K)

example for TDR 7 runs 1060-1460

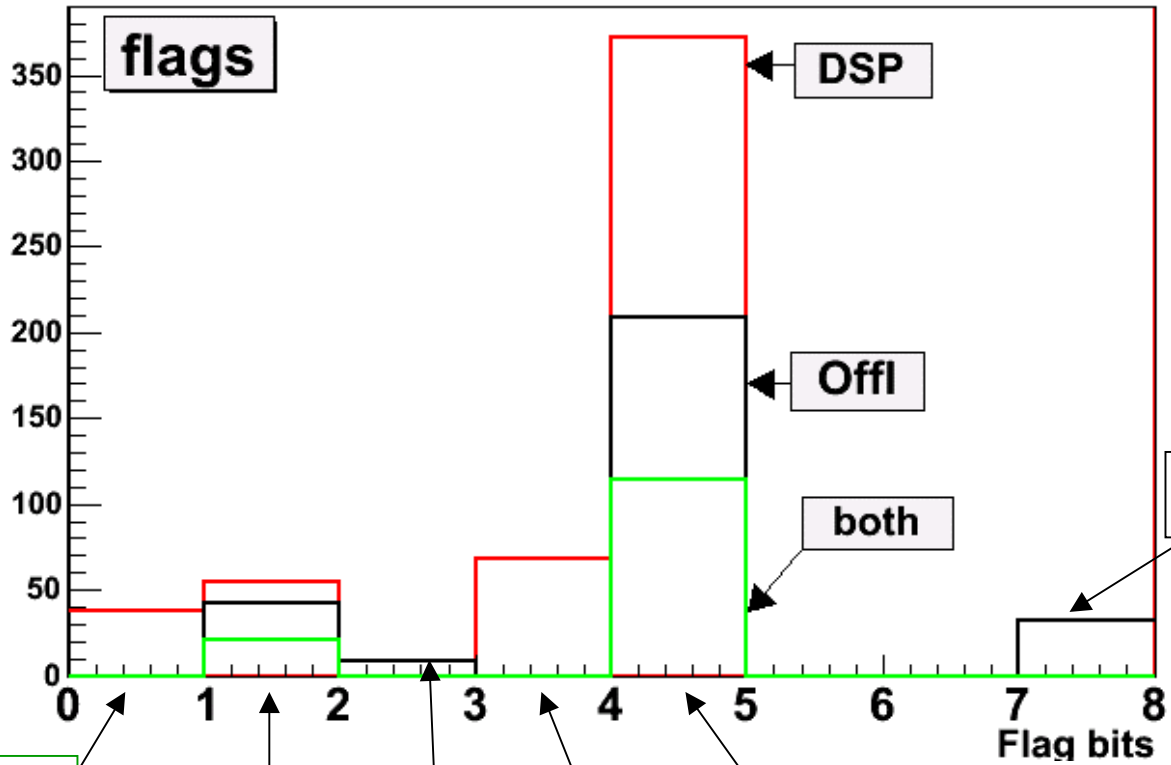


Correlations of variations of pedestals

correlation table for the whole setup



Dead and noisy channels



runs
1037-1053

non Gaussian
0.2%

$\sigma_{raw}<\sigma_{thr}^{1}$
0.2%

$\sigma_{raw}>\sigma_{thr}^{2}$
0.3% 0.3% 0.1%

$\sigma_{fin}<\sigma_{thr}^{3}$
0.4%

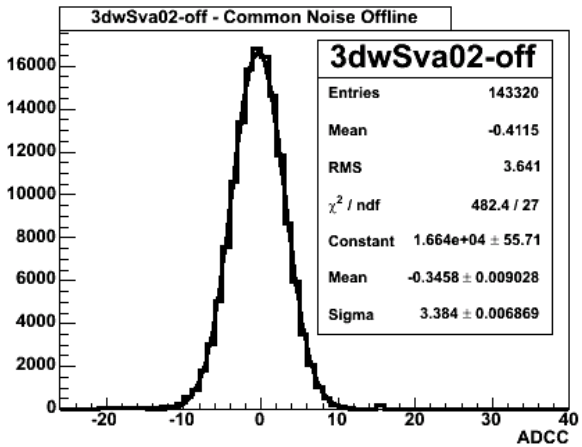
$\sigma_{fin}>\sigma_{thr}^{4}$
2.3% 1.3% 0.7%

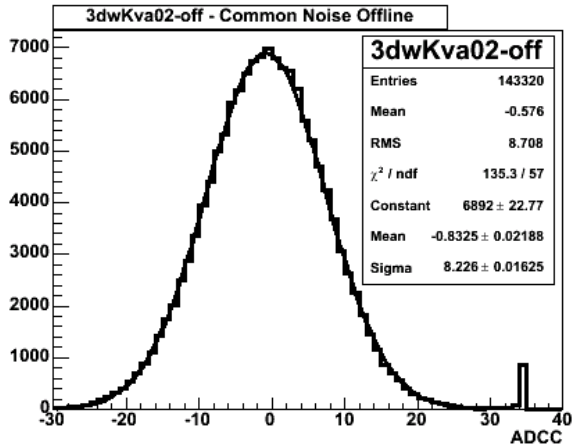
$ped-3\sigma_{raw}<5$

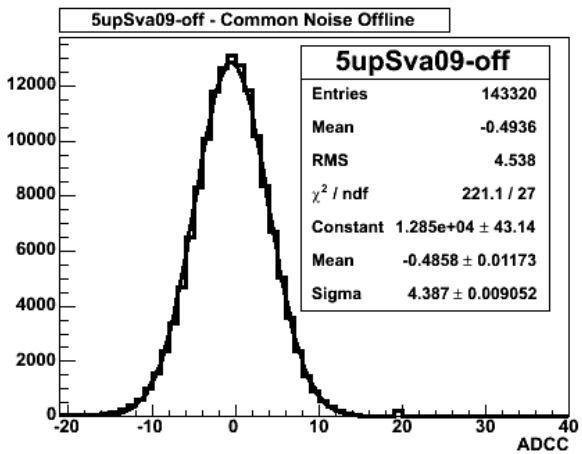
Conclusions

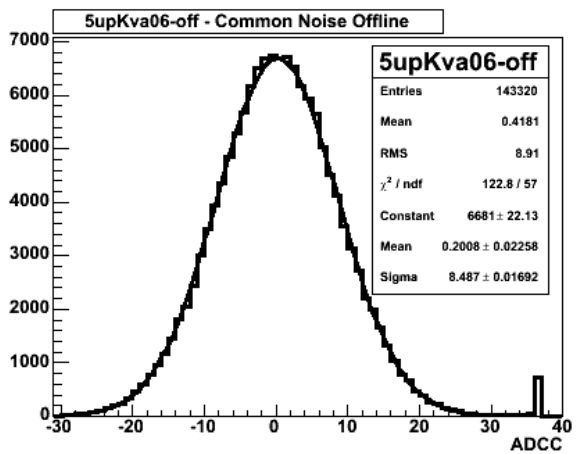
- Pedestals are not stable, noise in channel is stable
  → so Online-Offline comparison is limited
  (not the same events)
- Unstability of pedestals might limit gamma reconstruction efficiency → no match between calibration files and beam data
- However number of clusters is not correlated to the pedestal unstability (CN algorithm works so well?)
- DSP finds more dead/noisy channels than Offline algorithm

Common noise in DSP algo



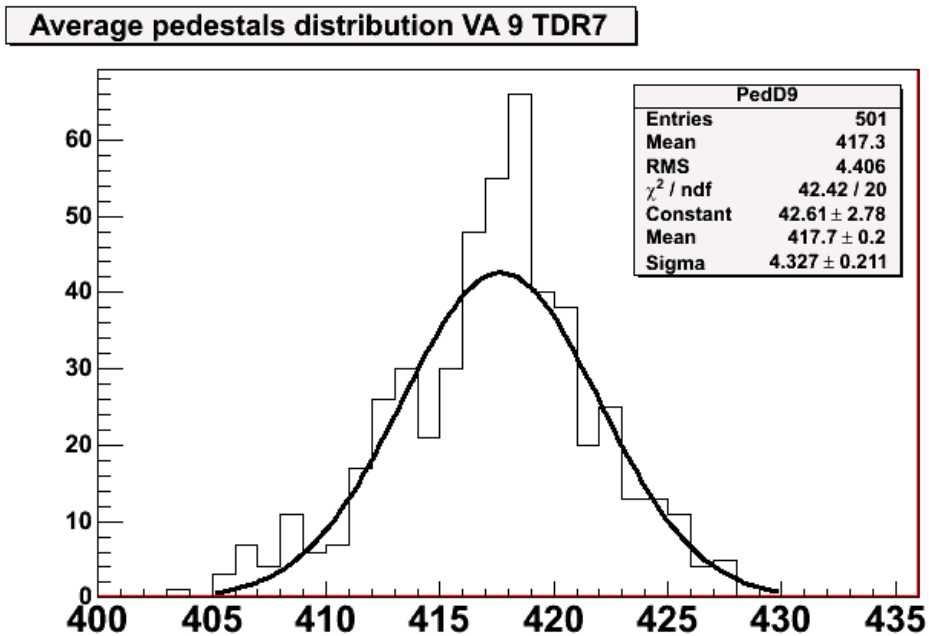






GSI 2003
beamtest data

Pedestal distribution



the widths of the Common noise distribution and pedestals distribution are similar for K/S sides