

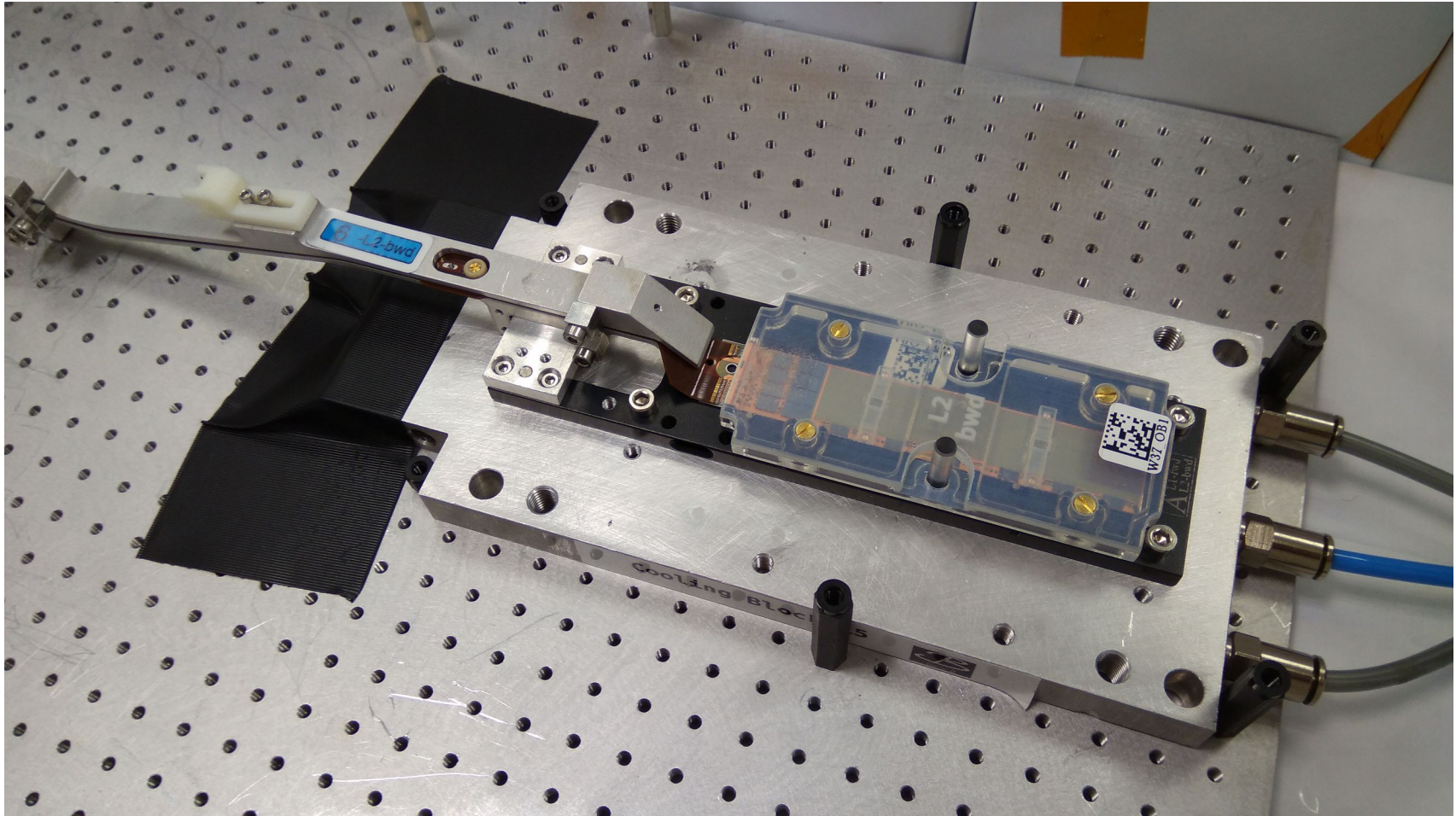
W37_OB1 BEAST module

DEPFET

Botho Paschen for DEPFET

2nd August 2017





Routine operation:

- 15 degree water cooled
- vacuum on
- for source tests: inner cover removed

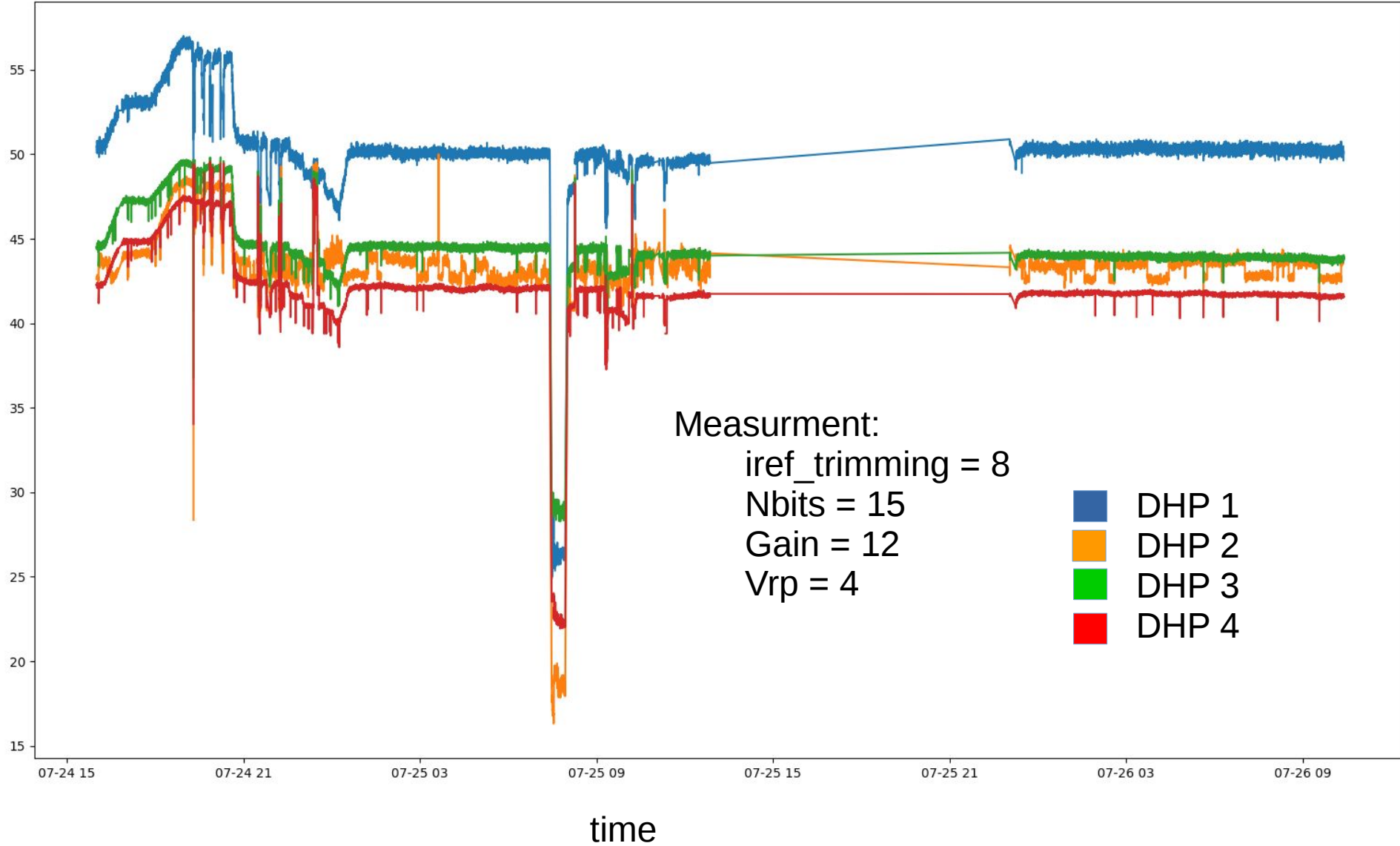
ALL tests performed at nominal
GCK frequency (76 MHz)

- HS links:
 - Bias = 225
 - Biasd = 125
 - Delay = 0
- DCD:
 - Amplow = 275 mV
 - Refin = 725 mV
 - Ipsource = 85
 - Ipsource_middle = 82
 - Ipsource2 = 80
 - IFBPBias = 75
 - EN = 90
- DCD data delays
 - Global = 0
 - Local = 4,5
- DCD offset delays
 - offset_frame_sync_dly = 0
 - offset_des_dly = 8
 - offset_dcd_dlys = 0
- Voltages:
 - Clear-On = 19 V
 - Clear-Off = 5 V
 - Gate-Off = 5 V
 - Source = 6 V
 - CCG = 0 V
 - Guard = 5 V
 - Bulk = 10 V
 - (HV = 70 V)
 - (Drift = 5 V)
 - (Gate-On = - 2.5 V)

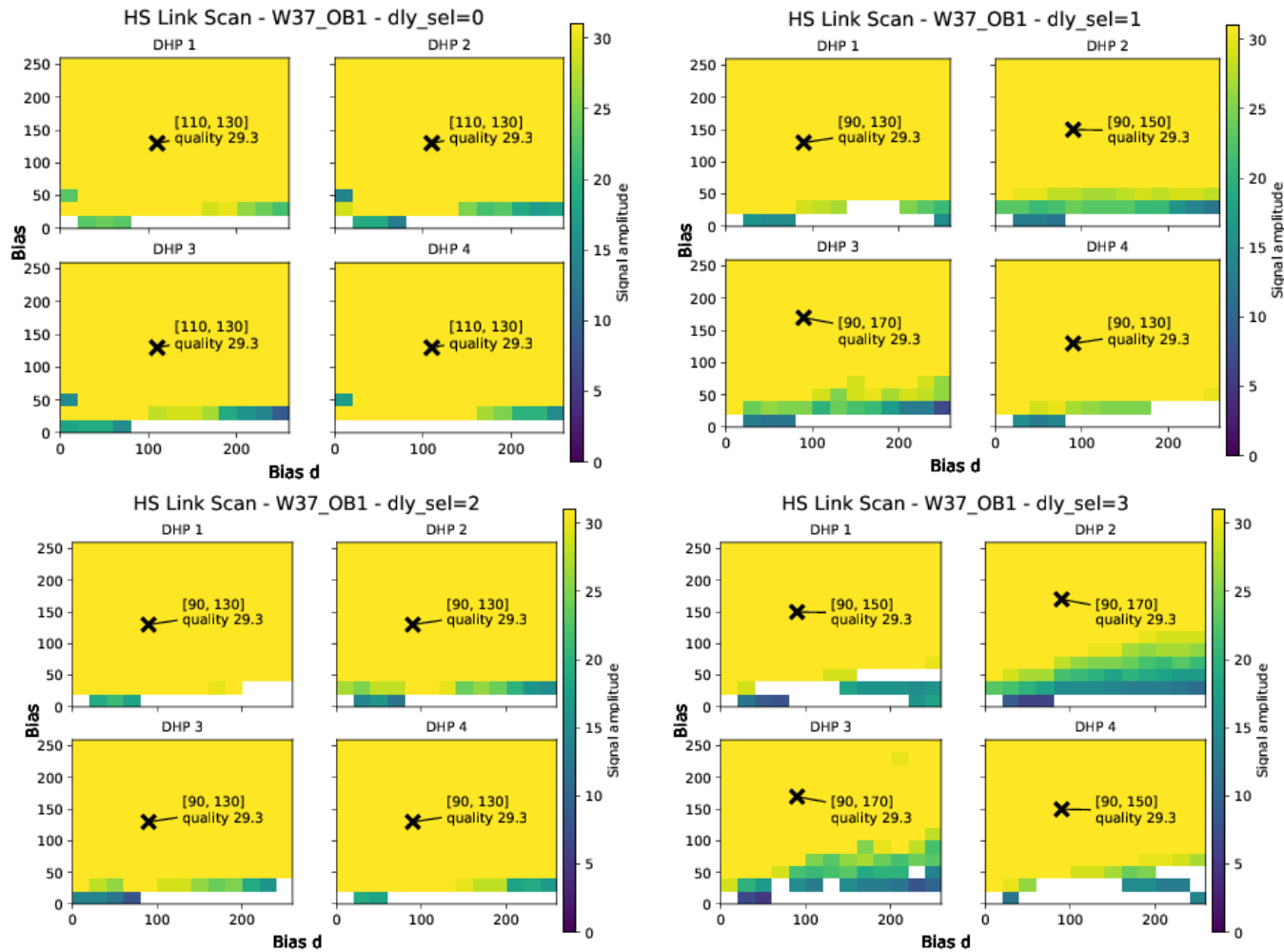
DHPT Temperature measurement



Temperature in C

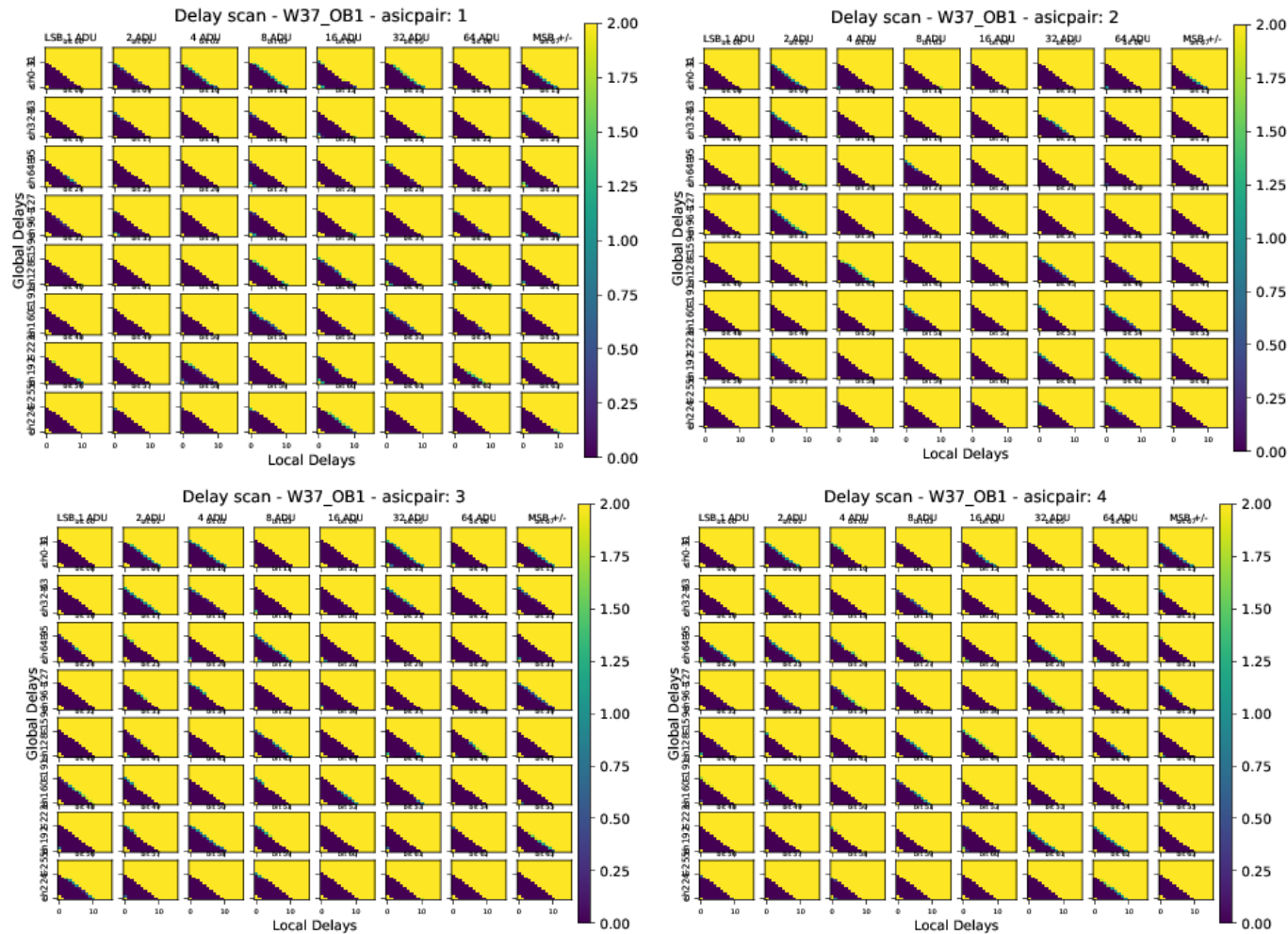


<https://elog.belle2.org/elog/PXD-Mass-Testing/233>



- used standard parameters dly=0, bias=220, biasd=130 throughout
- never had any trouble with the link stability

<https://elog.belle2.org/elog/PXD-Mass-Testing/245>



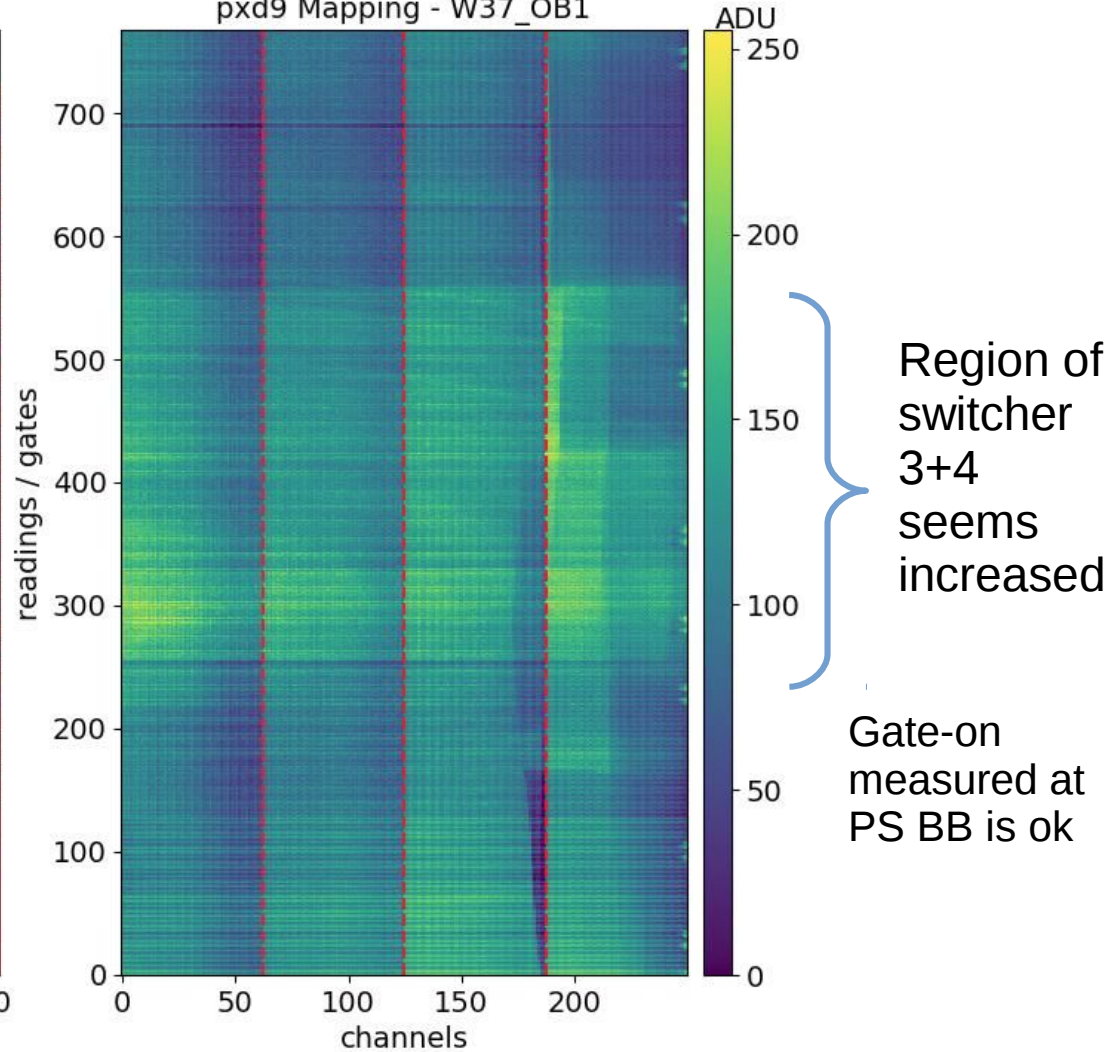
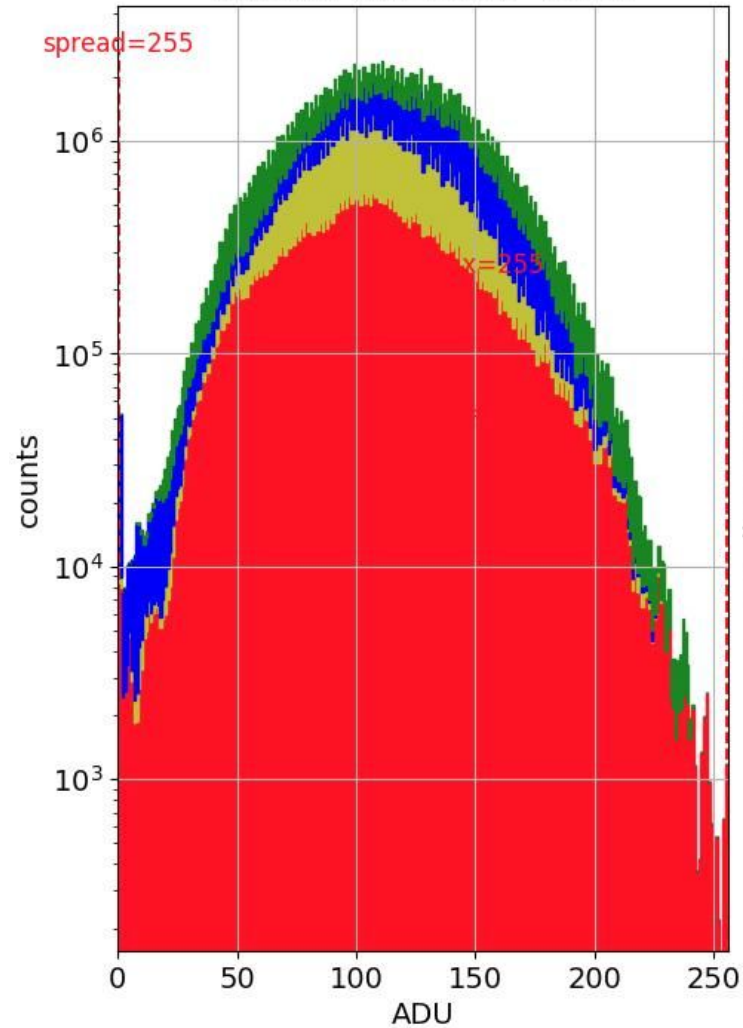
- used all standard parameters
- standard results obtained (global dly = 0, local dlys = 4,5)

Initial pedestals with gate-on = -1V

<https://elog.belle2.org/elog/PXD-Mass-Testing/165>

Pedestal Distribution - DCD0

pxd9 Mapping - W37_OB1

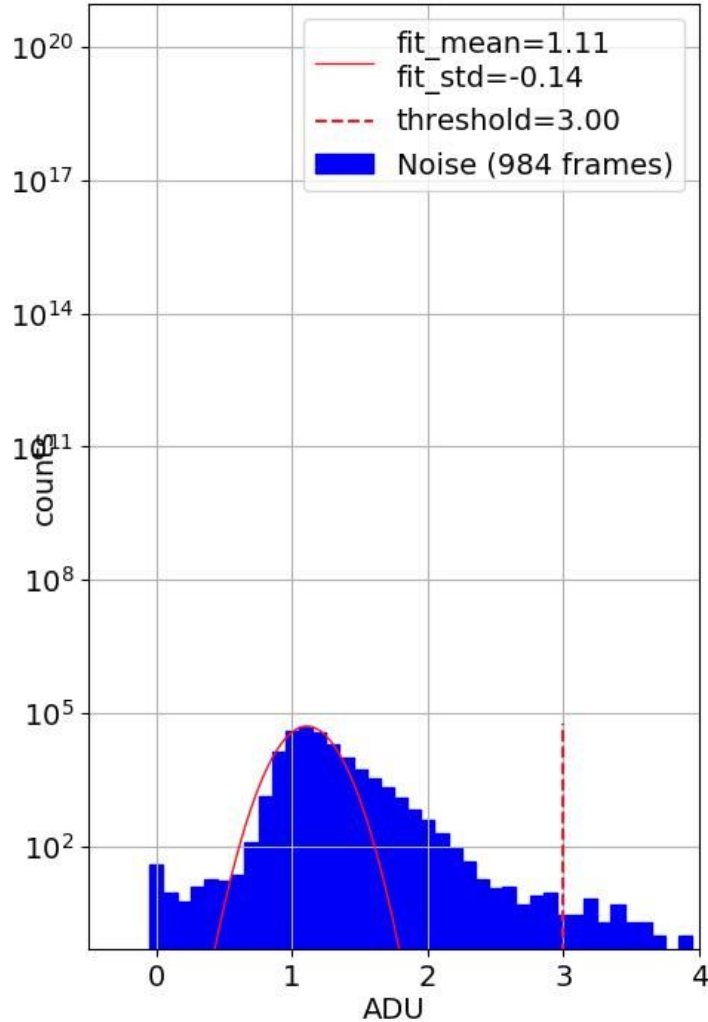


VNsubin = 12, 10, 8, 6

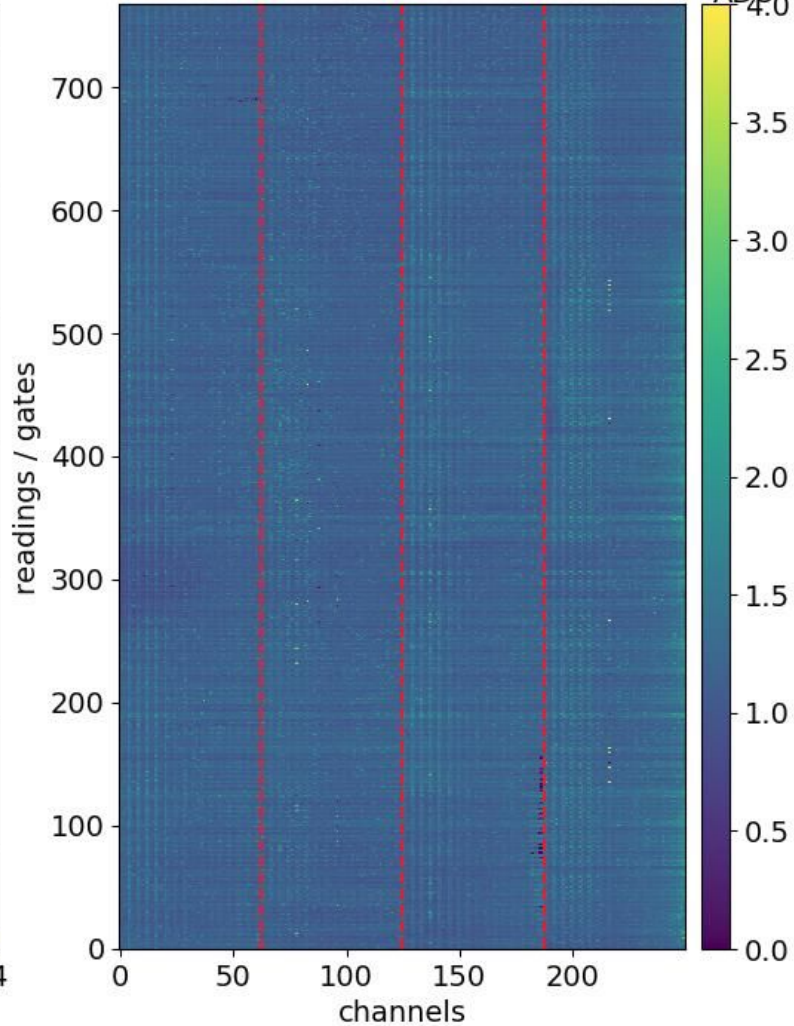
Initial pedestals with gate-on = -1V

<https://elog.belle2.org/elog/PXD-Mass-Testing/165>

Noise Distribution - DCD0



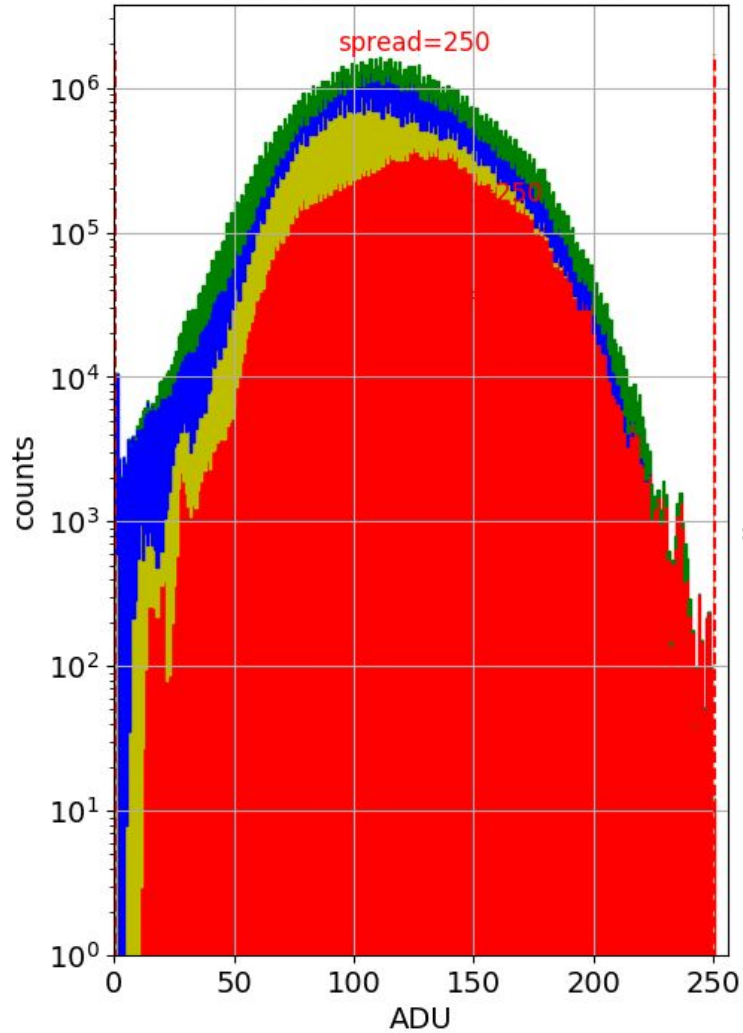
Noise of 984 frames - pxd9 Mapping - W37_Orb1



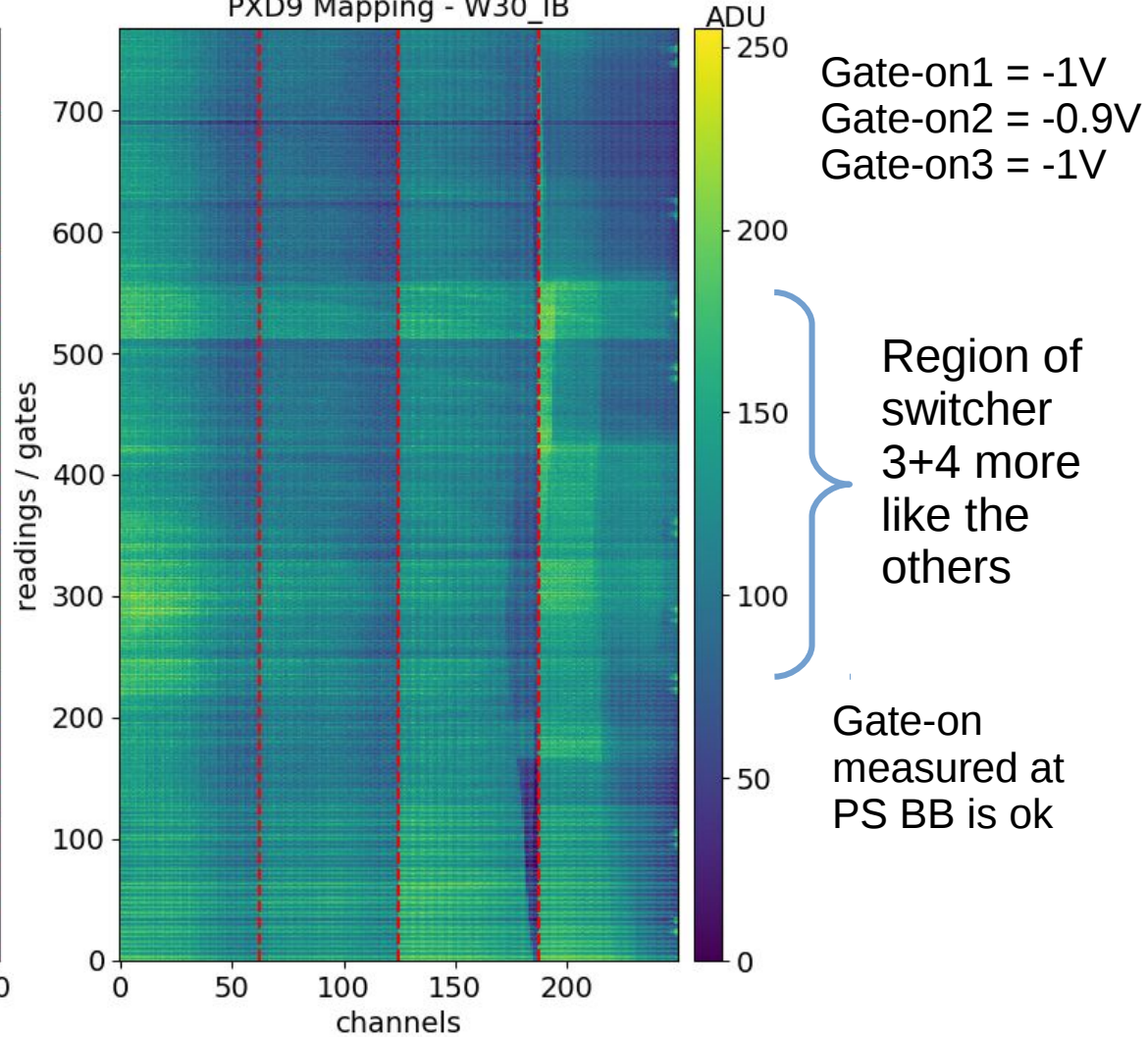
Left side of DCDs slightly noisier than right side, all DCD parameters standard

Initial pedestals with gate-on2 = -0.9 V

Pedestal Distribution - DCD0



PXD9 Mapping - W30_IB



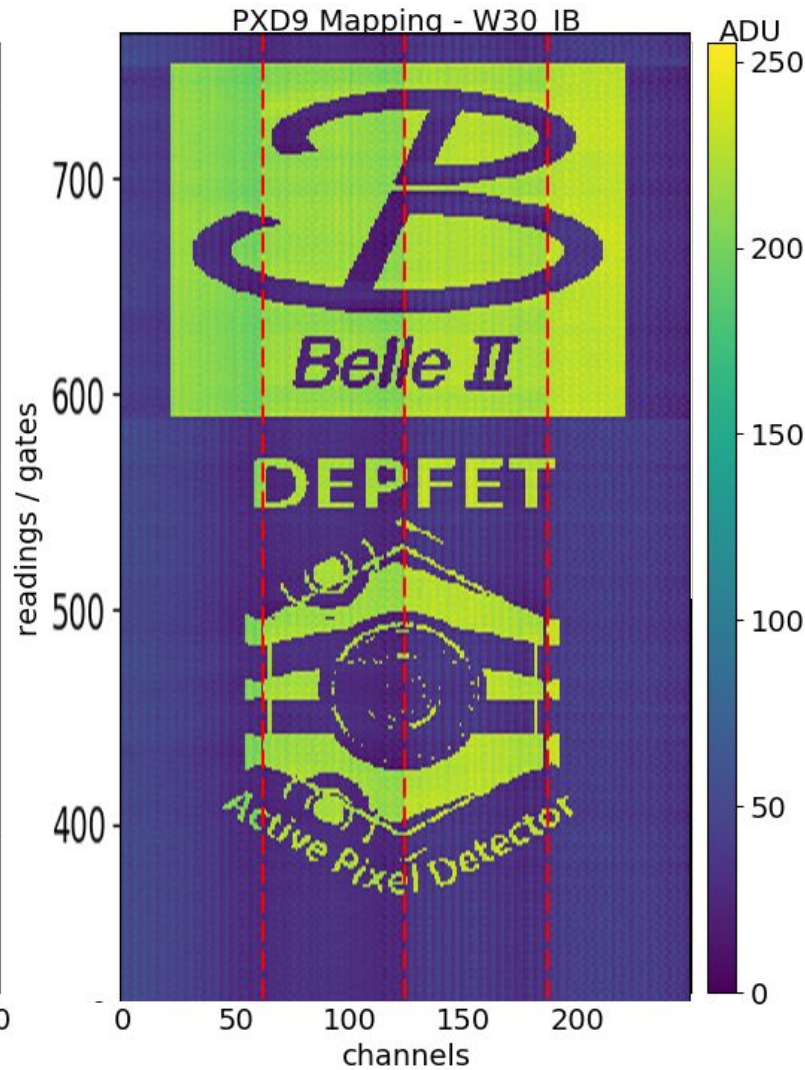
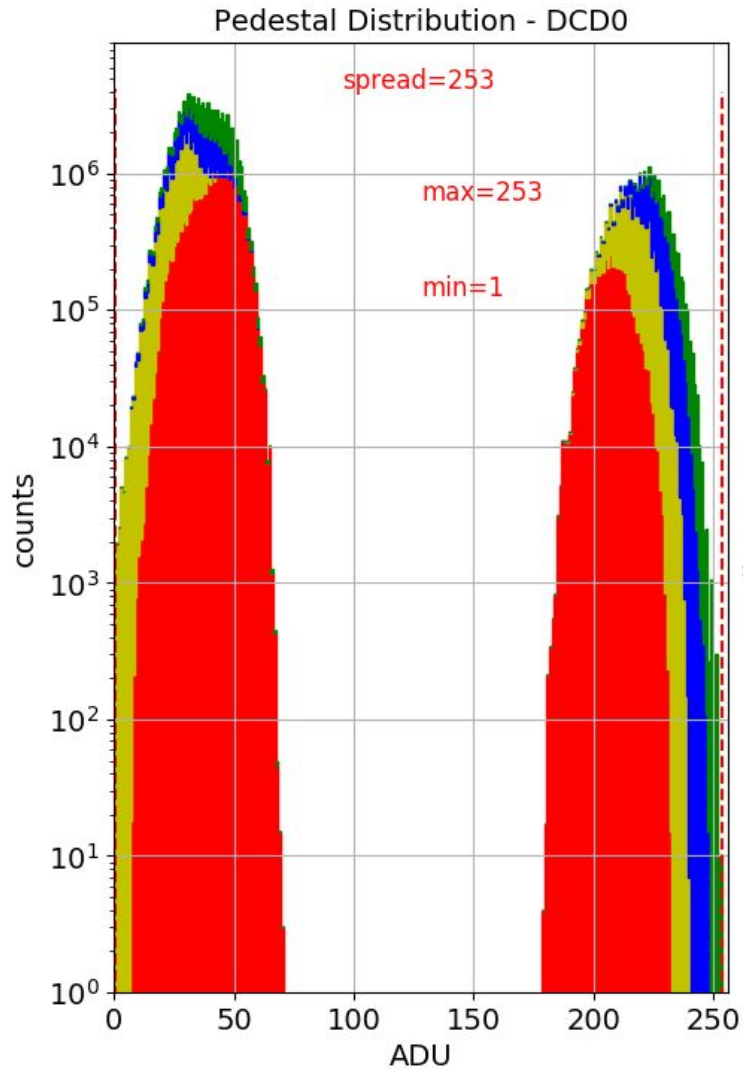
VNsubin = 11, 10, 8, 6

DCD offset delays determined

<https://elog.belle2.org/elog/PXD-Mass-Testing/282>



Extensive description of procedure!!



Gate-on1 = -1V
IPdac = 16
Vnsubin = 5

Serin deleted from sequence

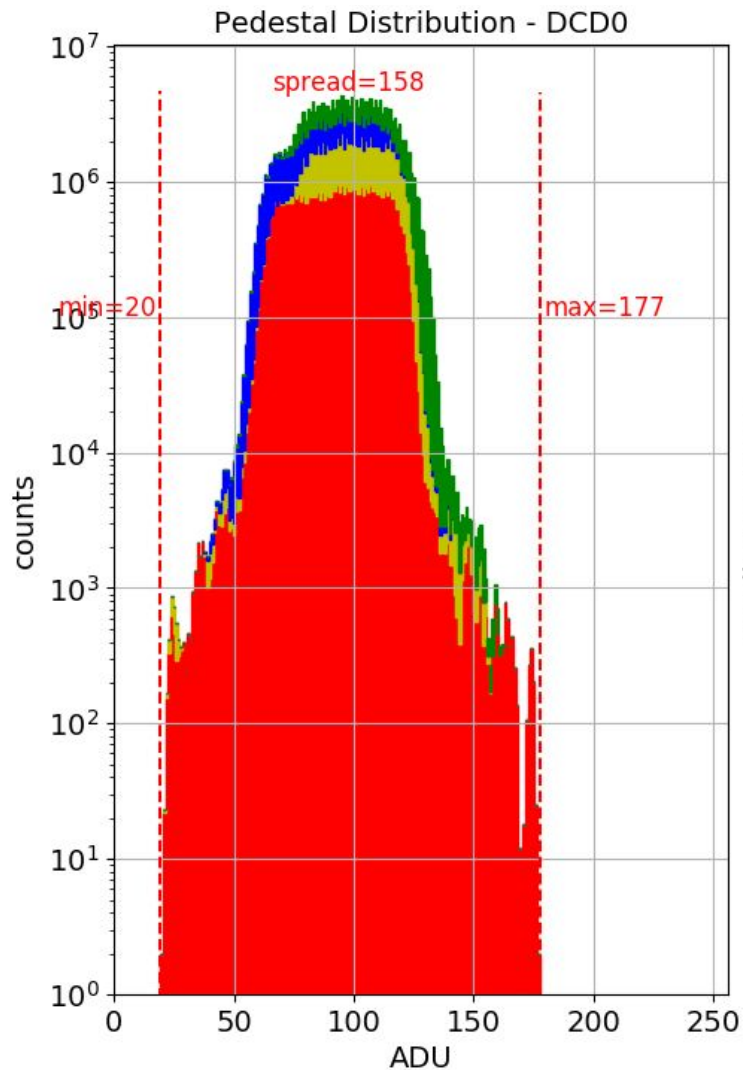
offset_fsync_dly 0
offset_des_dly 8
offset_dcd_dlys 0

Pedestal offset correction at - 1V Gate

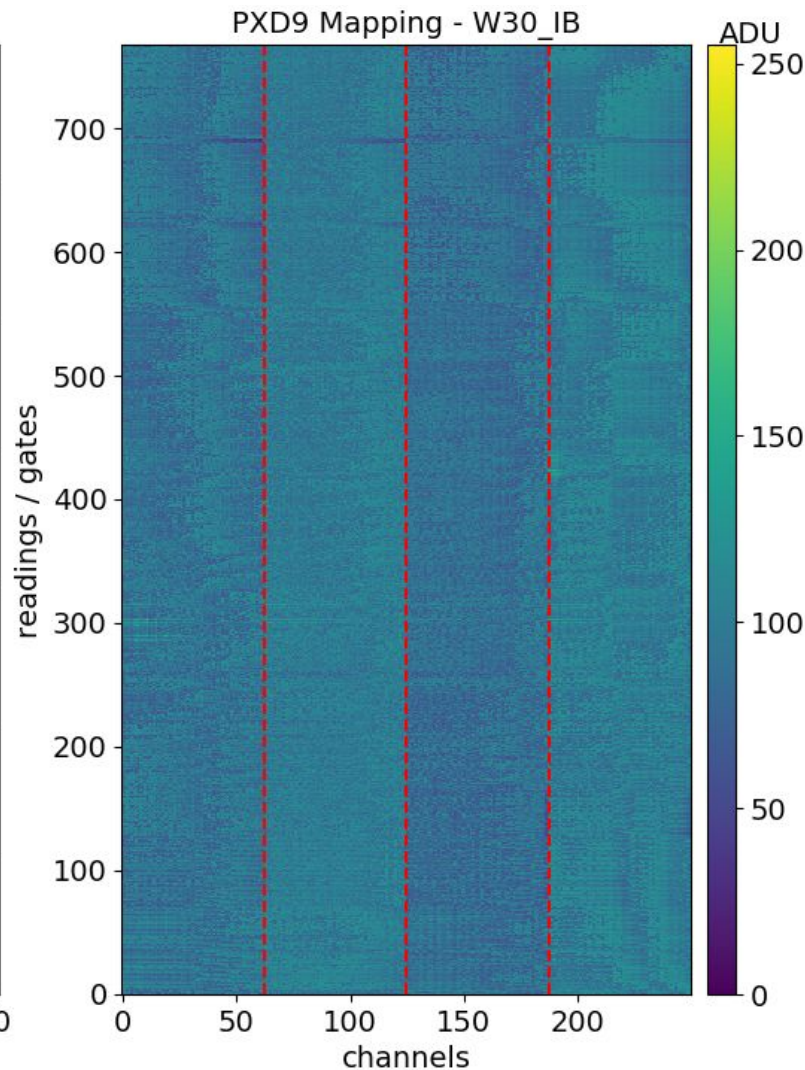
<https://elog.belle2.org/elog/PXD-Mass-Testing/290>



Extensive description of procedure!!



VNsubin = 17, 13, 12, 10



IPDAC = 15, 10, 12, 13

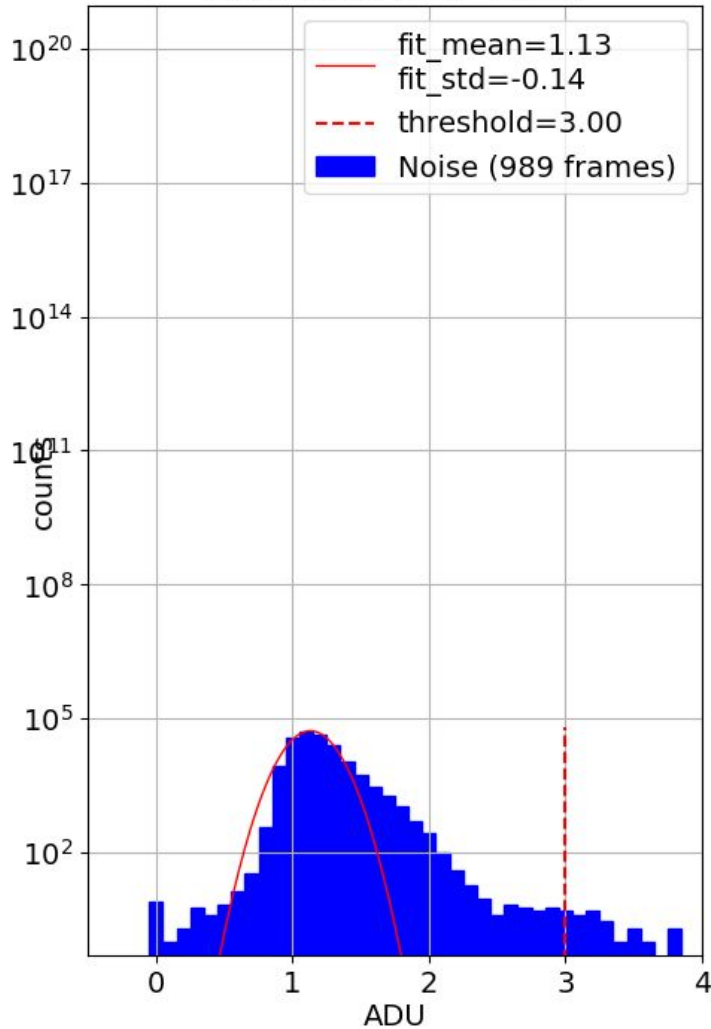
Pedestal offset correction at - 1V Gate

<https://elog.belle2.org/elog/PXD-Mass-Testing/290>



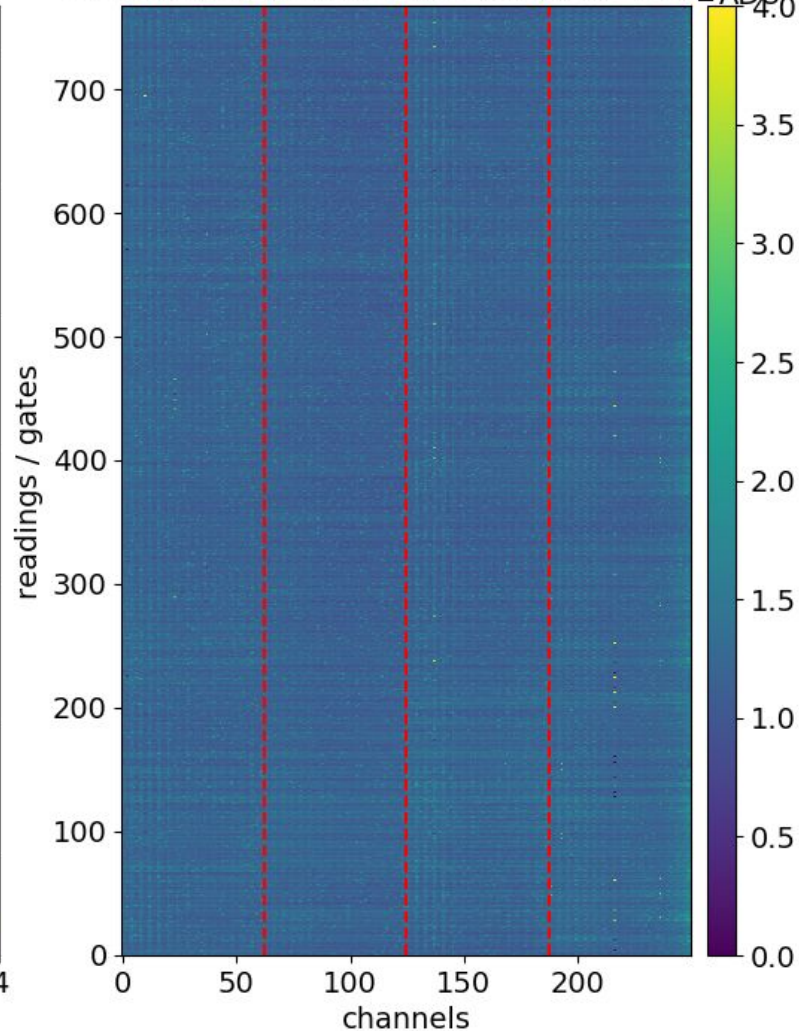
Extensive description of procedure!!

Noise Distribution - DCD0



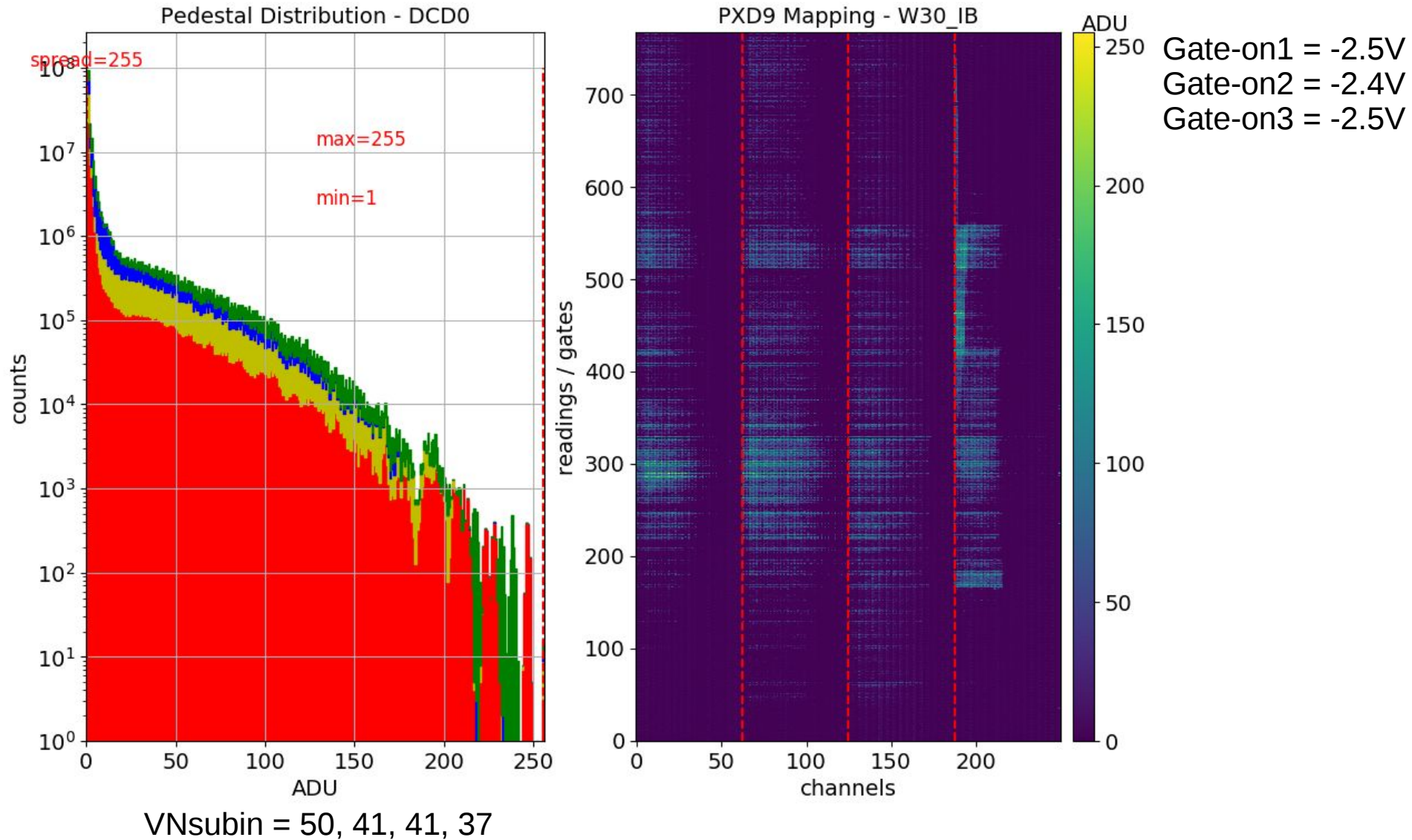
VNsubin = 17, 13, 12, 10

Noise of 989 frames - PXD9 Mapping - W30 IP



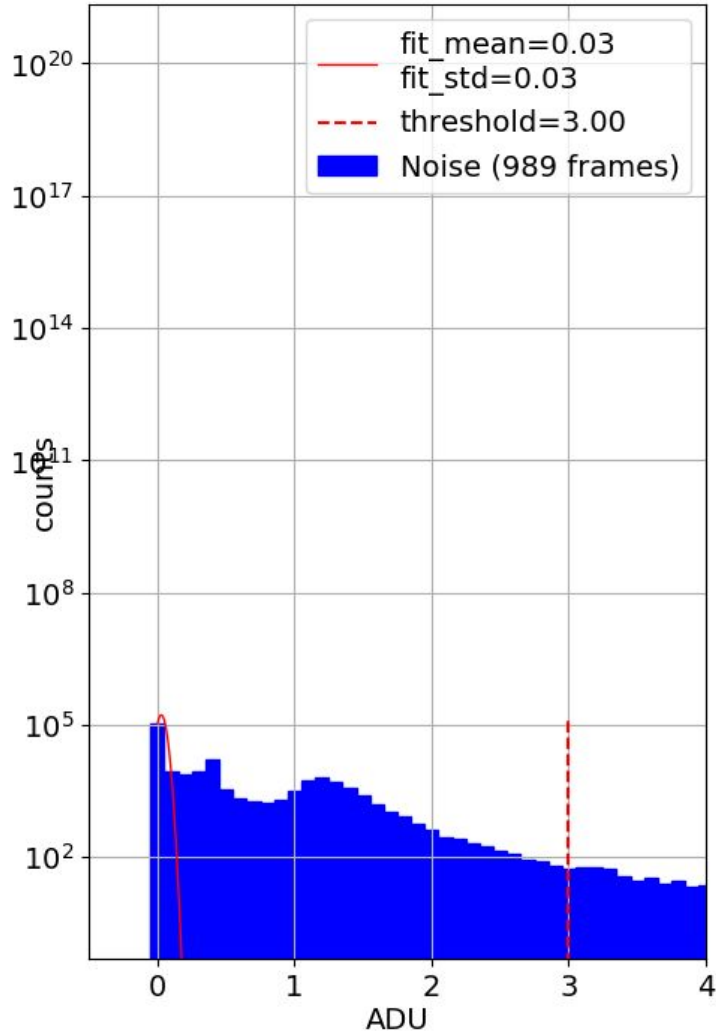
IPDAC = 15, 10, 12, 13

Pedestal offset correction at -2.5V Gate



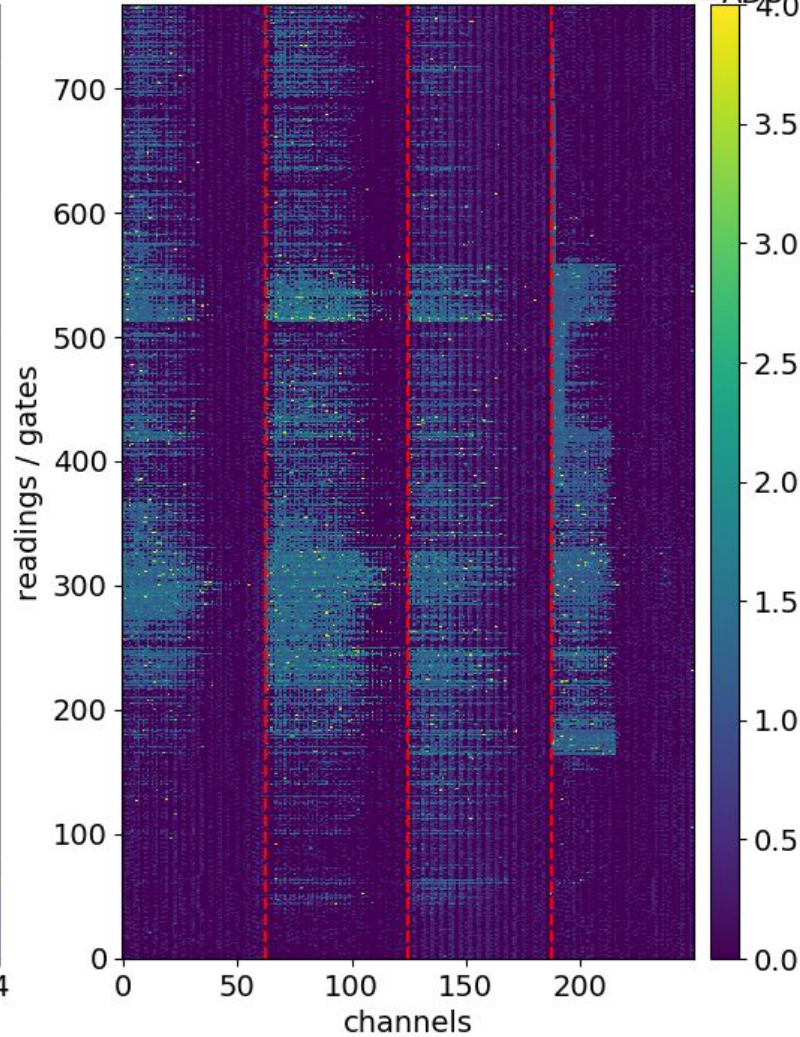
Pedestals at - 2.5V Gate

Noise Distribution - DCD0



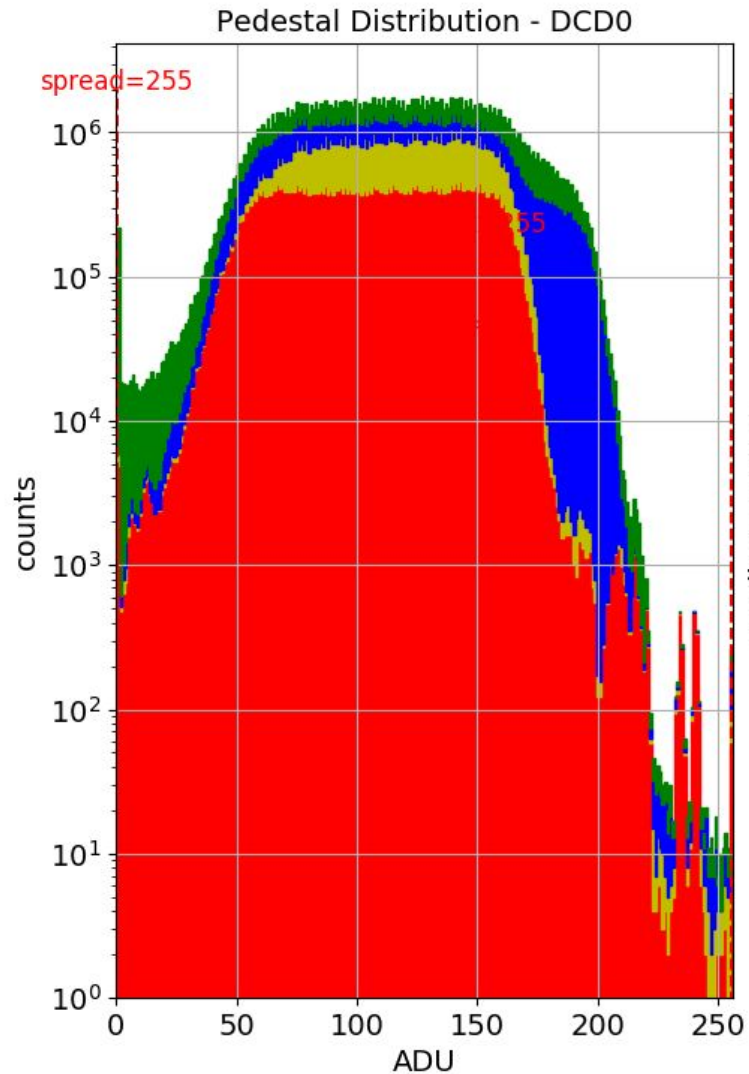
VNsubin = 17, 13, 12, 10

Noise of 989 frames - PXD9 Mapping - W30 - IR

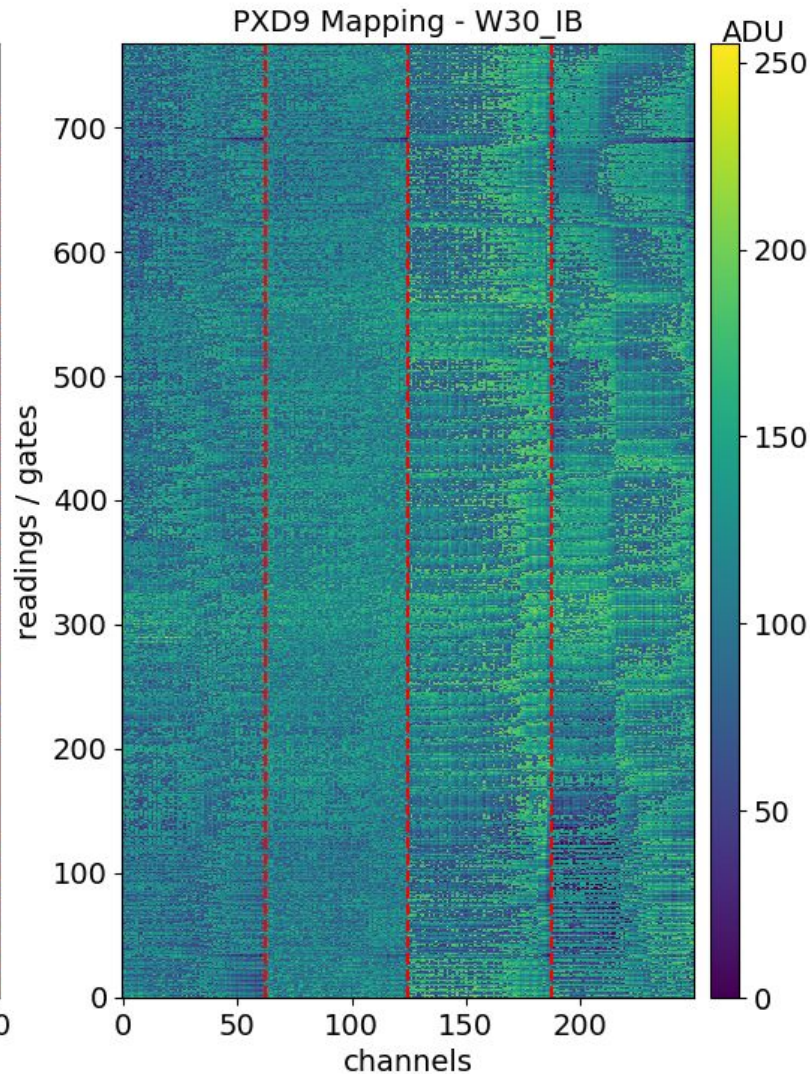


Gate-on1 = -2.5V
Gate-on2 = -2.4V
Gate-on3 = -2.5V

Pedestals with offset corr. at - 2.5V Gate



VNsubin = 50, 41, 40, 37



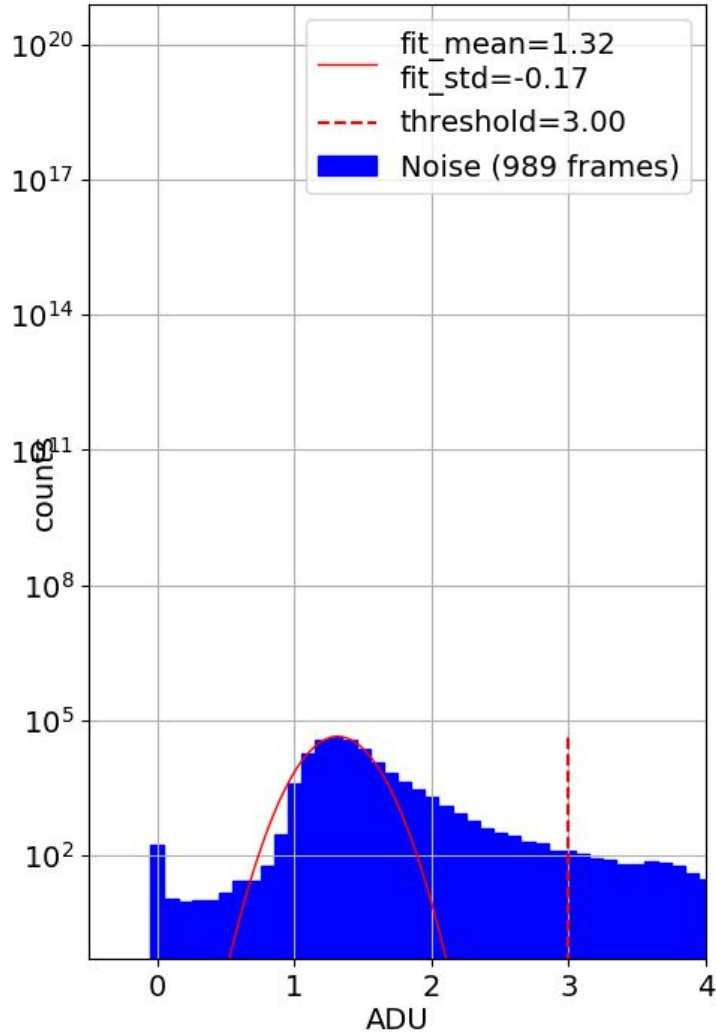
IPDAC = 30, 22, 35, 34

Gate-on1 = -2.5V
Gate-on2 = -2.4V
Gate-on3 = -2.5V

HV = - 70 V
Drift = - 5 V

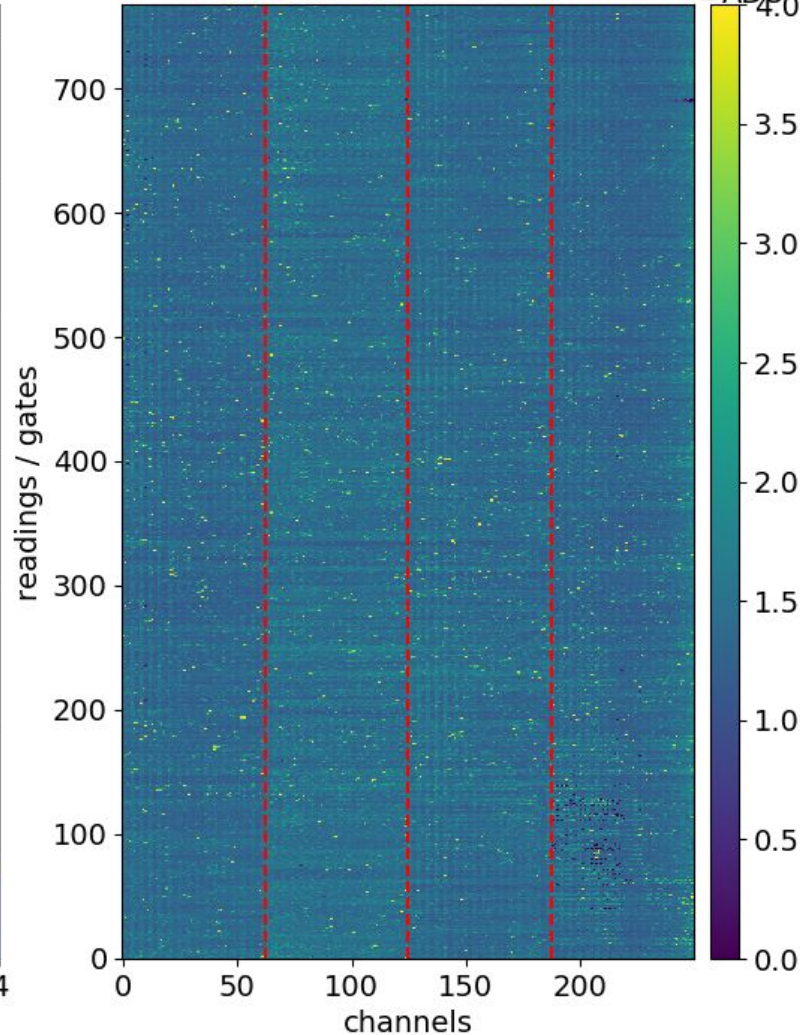
Pedestals with offset corr. at - 2.5V Gate

Noise Distribution - DCD0



VNsubin = 50, 41, 40, 37

Noise of 989 frames - PXD9 Mapping - W30 - IPD



IPDAC = 30, 22, 35, 34

Gate-on1 = -2.5V
Gate-on2 = -2.4V
Gate-on3 = -2.5V

HV = - 70 V
Drift = - 5 V

Sr90 source scan still not homogeneous

HV = - 64 V
Drift = - 7 V
Gate-On = - 2.5 V

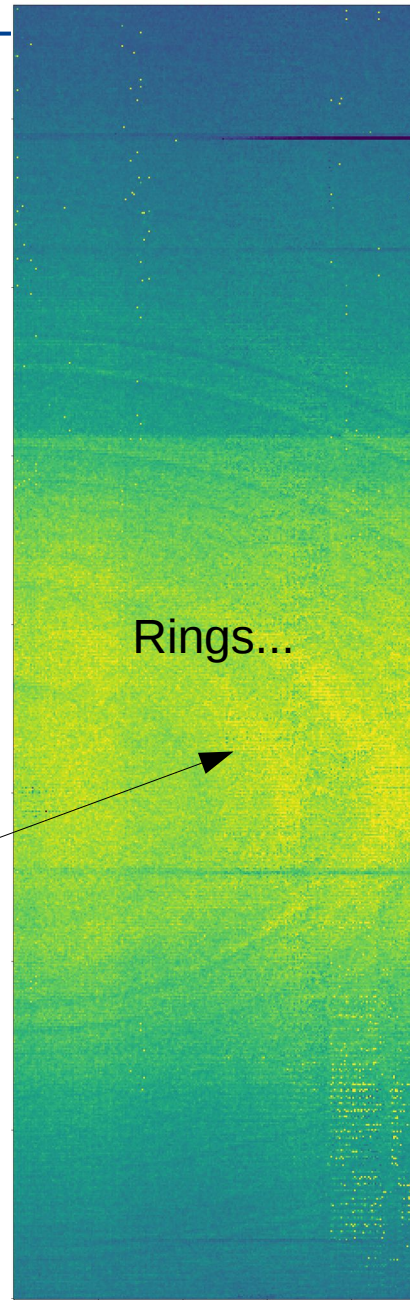
Larger pixels

- Some delicate tuning required
- Maybe Drift -8? How low can we go?

Sr90 source
over the
middle

15 kHz trigger
for 8 minutes with DHE autotrigger

Threshold 6
pedestal offset 10



Dead region

Rings...

Low
efficiency
gates

Sr90 hit maps

HV

-60 V

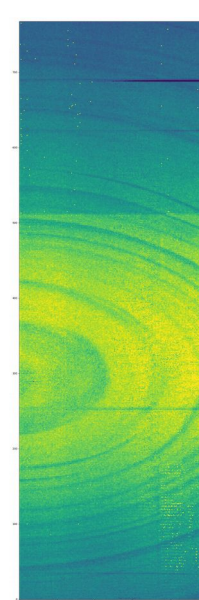
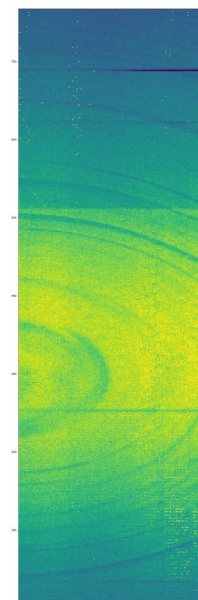
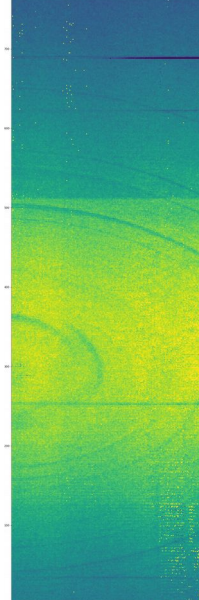
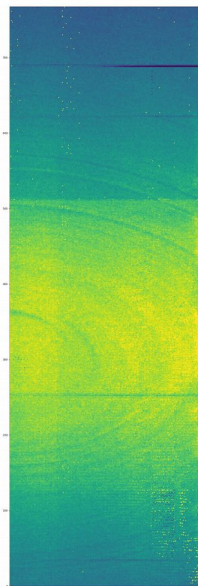
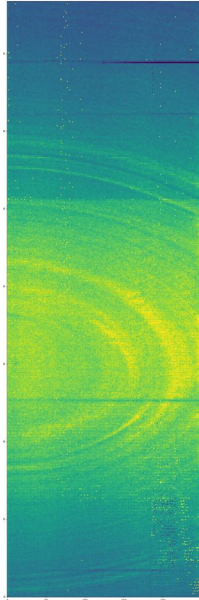
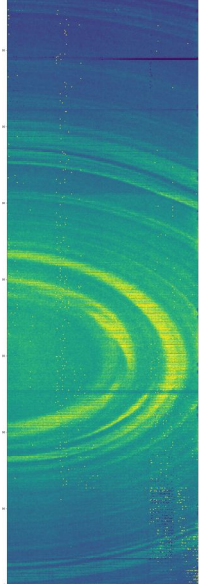
-62 V

-64 V

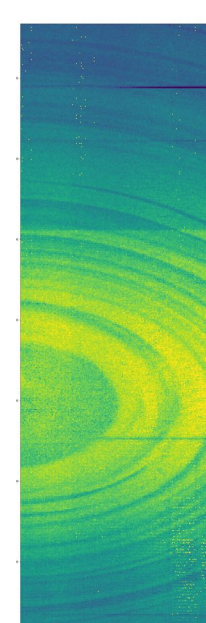
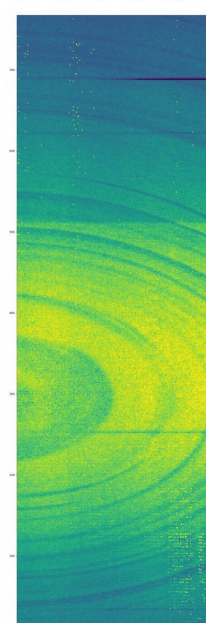
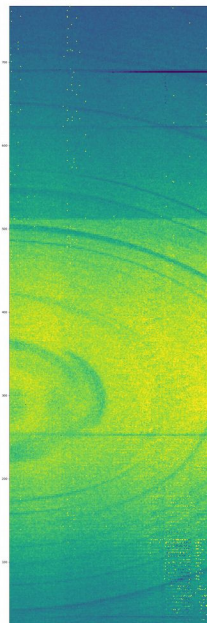
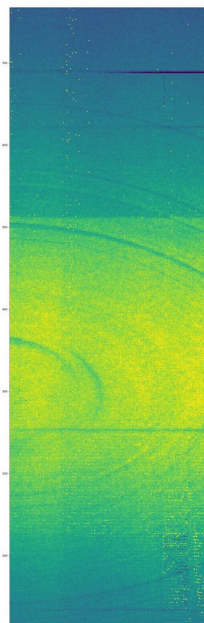
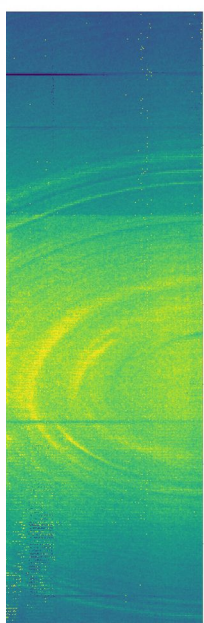
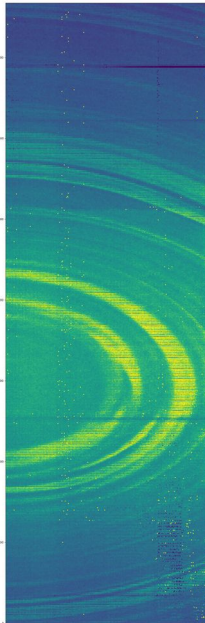
-66 V

-68 V

-70 V



Drift - 5 V



Drift - 4 V

Sr90 hit maps

HV

-60 V

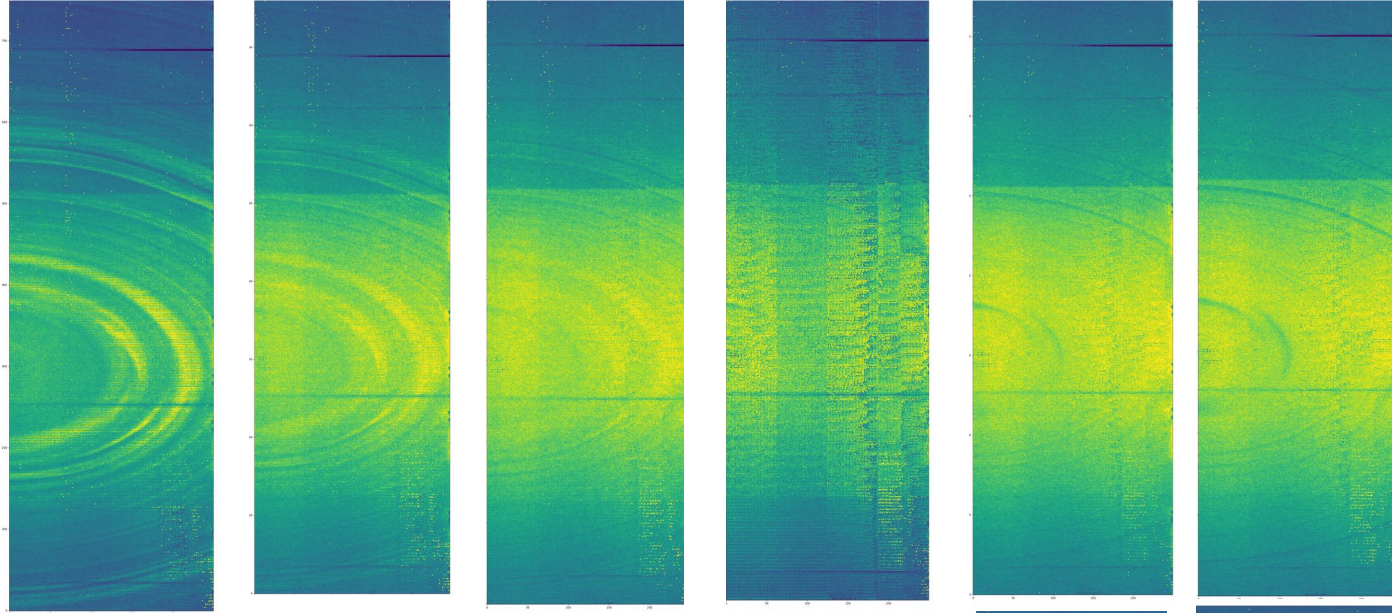
-62 V

-64 V

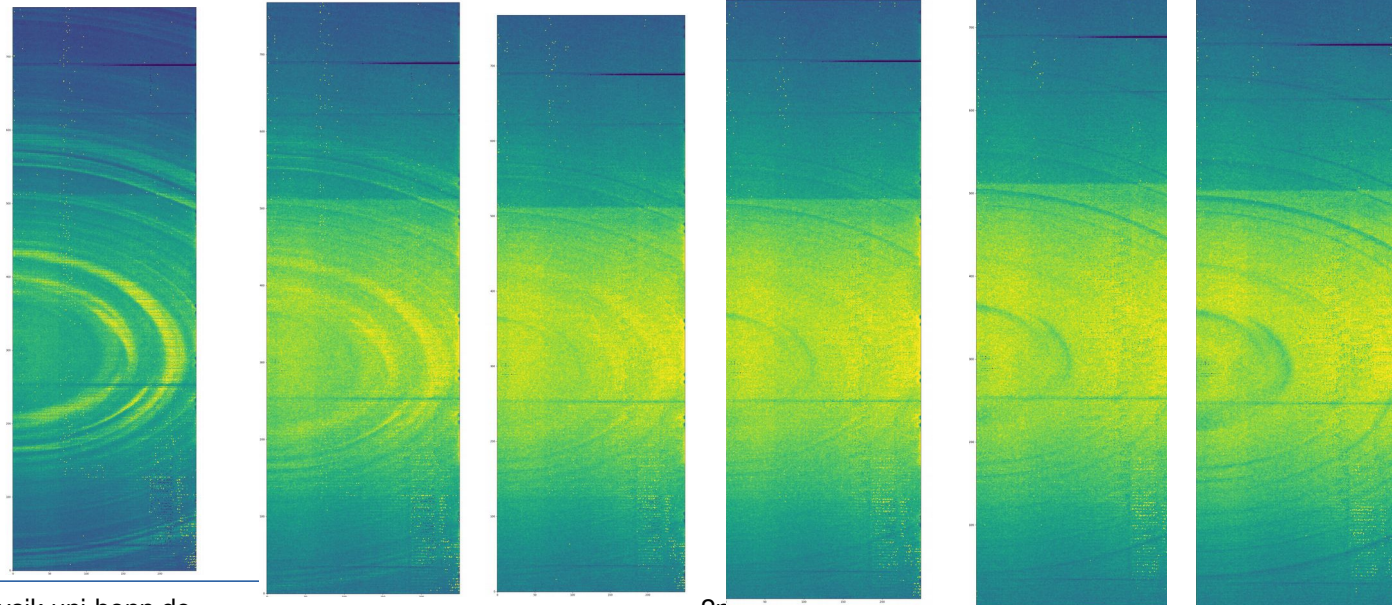
-66 V

-68 V

=70 V

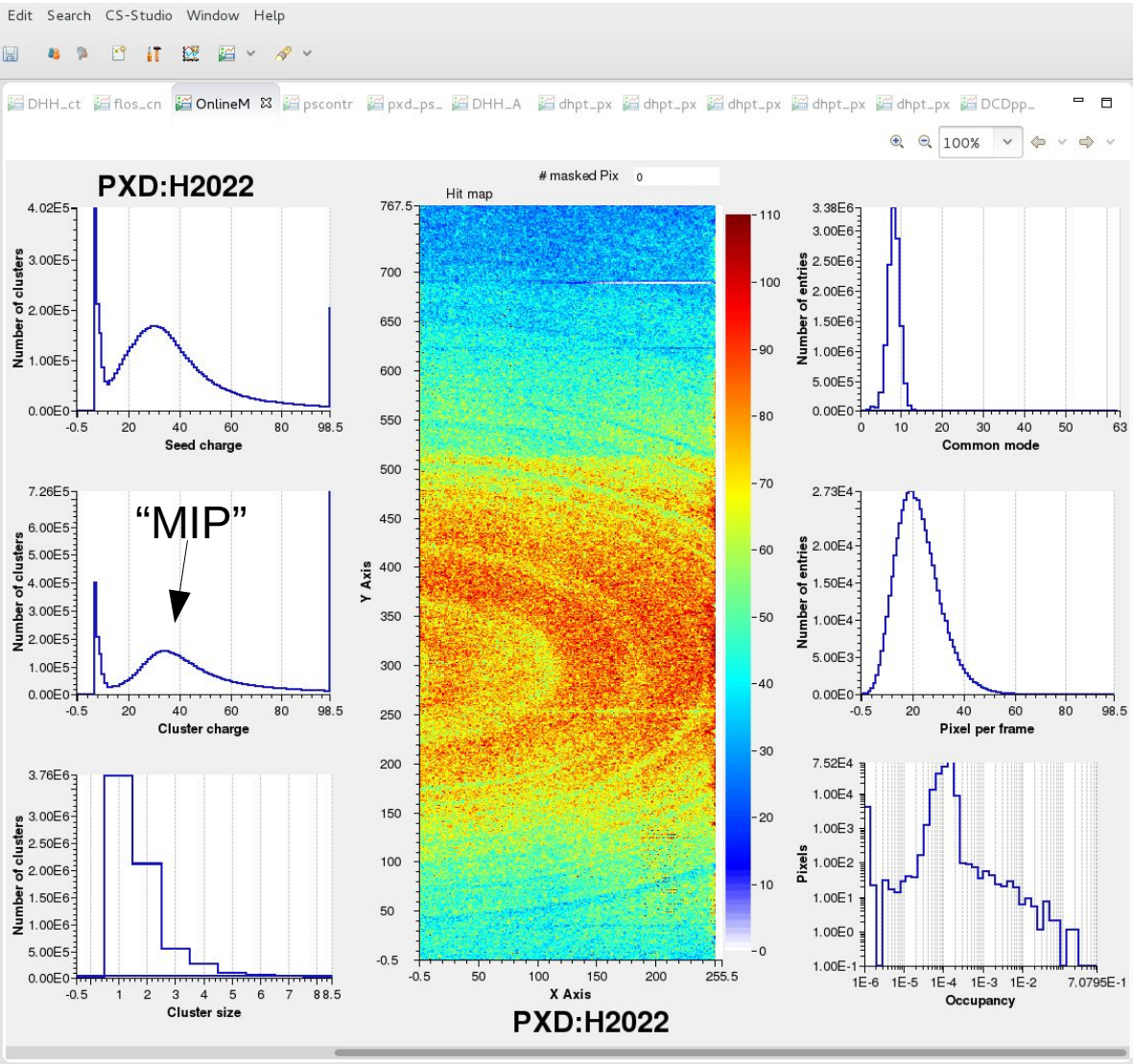


Drift – 7 V



Drift – 6 V

Gain and currents at Gate-on = - 2.5 V



2.0%] Tasks: 160, 1051 thr; 1 running
 3.4%] Load average: 0.84 1.24 1.10
 2.0%] Uptime: 23:02:11
 3.4%]
 Mem [||||| 12.6G/15.4G]
 SWP [||||| 2.14G/7.75G]

Channel Overview Unit P2022

Current State: **PEAK** Unit ID: 15

ERGENCY

	min.	Set Voltage	max.	Reg.	Voltage at Regulator	Voltage at Load	Current	
0 mA	-7100 mV	-7000 mV	0 mV	█	-7075 mV	-7003 mV	-9 mA	sw-sub
0 mA	0 mV	1800 mV	2000 mV	█	2848 mV	1805 mV	21 mA	sw-clvdd
0 mA	-7100 mV	-5200 mV	0 mV	█	-5233 mV	-5199 mV	0 mA	sw-refin
0 mA	0 mV	275 mV	500 mV	█	350 mV	274 mV	-1258 mA	dcd-amplov
0 mA	0 mV	1800 mV	2000 mV	█	4495 mV	1797 mV	2838 mA	dcd-avdd
0 mA	0 mV	1800 mV	2000 mV	█	3399 mV	1804 mV	831 mA	dcd-dvdd
0 mA	0 mV	725 mV	1300 mV	█	2263 mV	727 mV	276 mA	dcd-refin
0 mA	0 mV	1200 mV	1640 mV	█	2800 mV	1206 mV	652 mA	dhp-core
0 mA	0 mV	1800 mV	2000 mV	█	3265 mV	1798 mV	301 mA	dhp-io
0 mA	0 mV	10000 mV	10000 mV	█	10001 mV	9996 mV	0 mA	bulk
0 mA	0 mV	19000 mV	22000 mV	█	19065 mV	19009 mV	25 mA	clear-on
0 mA	0 mV	5000 mV	20000 mV	█	4900 mV	4998 mV	-19 mA	clear-off
0 mA	-4000 mV	-2500 mV	5000 mV	█	-2552 mV	-2502 mV	-6 mA	gate-on1
0 mA	-4000 mV	-2500 mV	5000 mV	█	-2463 mV	-2396 mV	-6 mA	gate-on2
0 mA	-4000 mV	-2500 mV	5000 mV	█	-2571 mV	-2499 mV	-6 mA	gate-on3
0 mA	0 mV	5000 mV	6000 mV	█	5079 mV	4998 mV	25 mA	gate-off
0 mA	0 mV	6000 mV	7000 mV	█	7078 mV	6000 mV	87 mA	source
0 mA	-5000 mV	0 mV	0 mV	█	-5 mV	-3 mV	1 mA	cog1
0 mA	-5000 mV	0 mV	0 mV	█	6 mV	-25 mV	0 mA	cog2
0 mA	-5000 mV	0 mV	0 mV	█	-5 mV	-3 mV	0 mA	cog3
0 mA	-80000 mV	-70000 mV	0 mV	█	-69900 mV	-69855 mV	0 mA	hv
0 mA	-6000 mV	-5000 mV	0 mV	█	-5004 mV	-5015 mV	0 mA	drift
0 mA	0 mV	0 mV	0 mV	█	-18 mV	-16 mV	0 mA	polycover
0 mA	-6000 mV	-5000 mV	0 mV	█	-4999 mV	-4996 mV	0 mA	guard

- ConfigDB entries 505 and 514 used
- Standard scans produce reliable dumps
- EPICS archiver was running continuously storing most system PVs every second or more often

- Vast amount of data available tens of GB of pedestal data, hundreds of GB of source scan data
- Online monitor very useful tool to check scan quality without interfering (attach to running BonnDAQ instance)