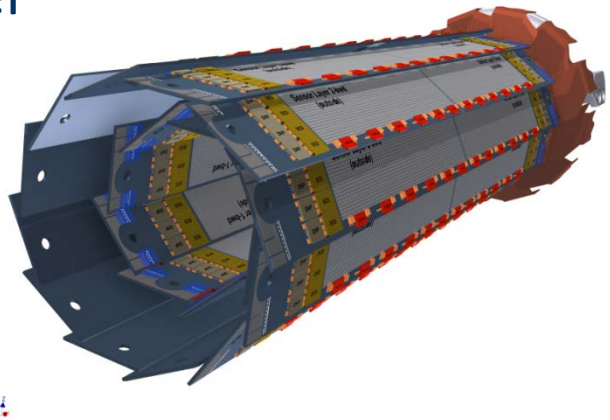
Power down sequence meeting

Philipp Leitl, Felix Müller

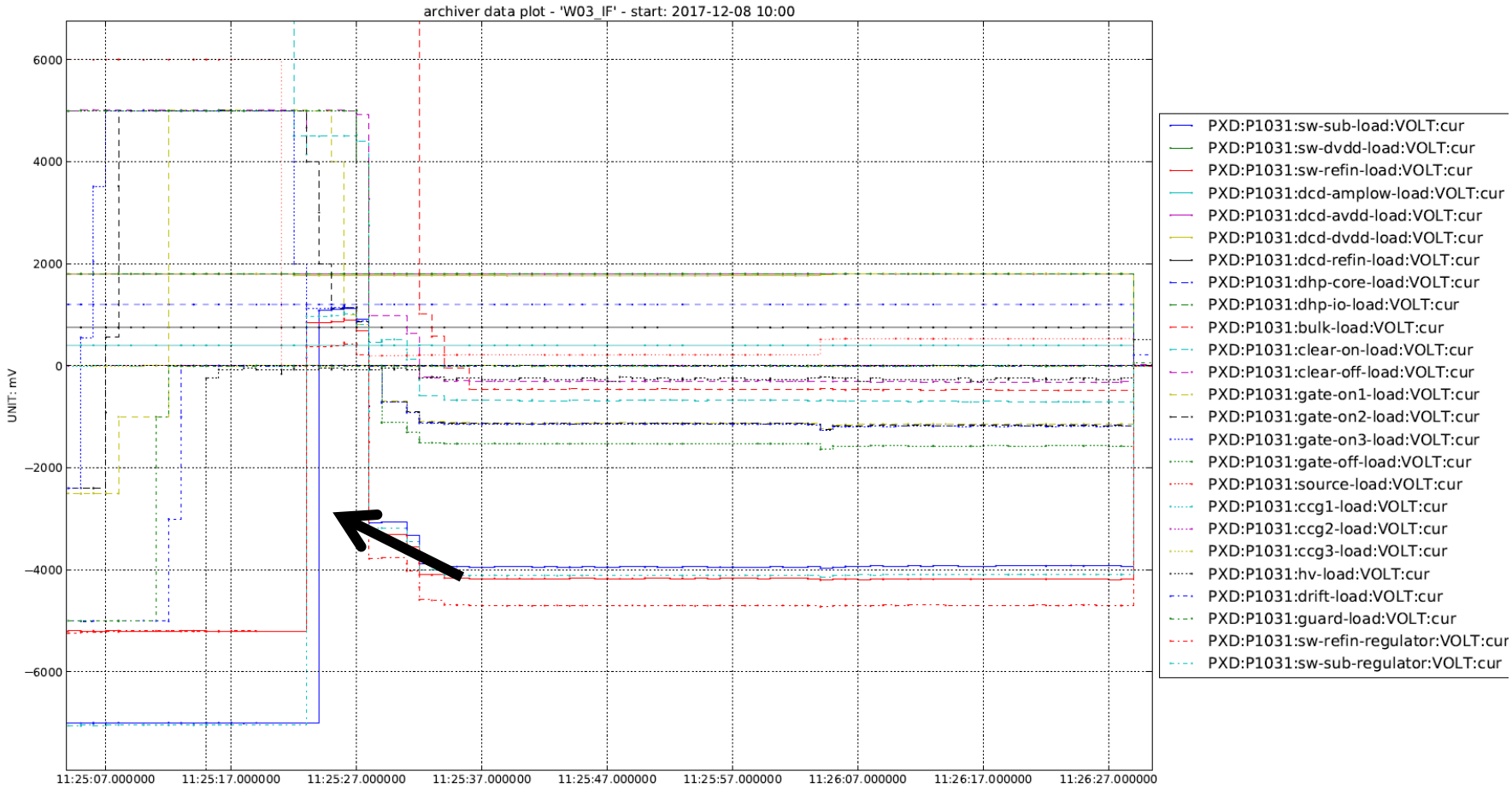
Jan 9th, 2018



What happened?

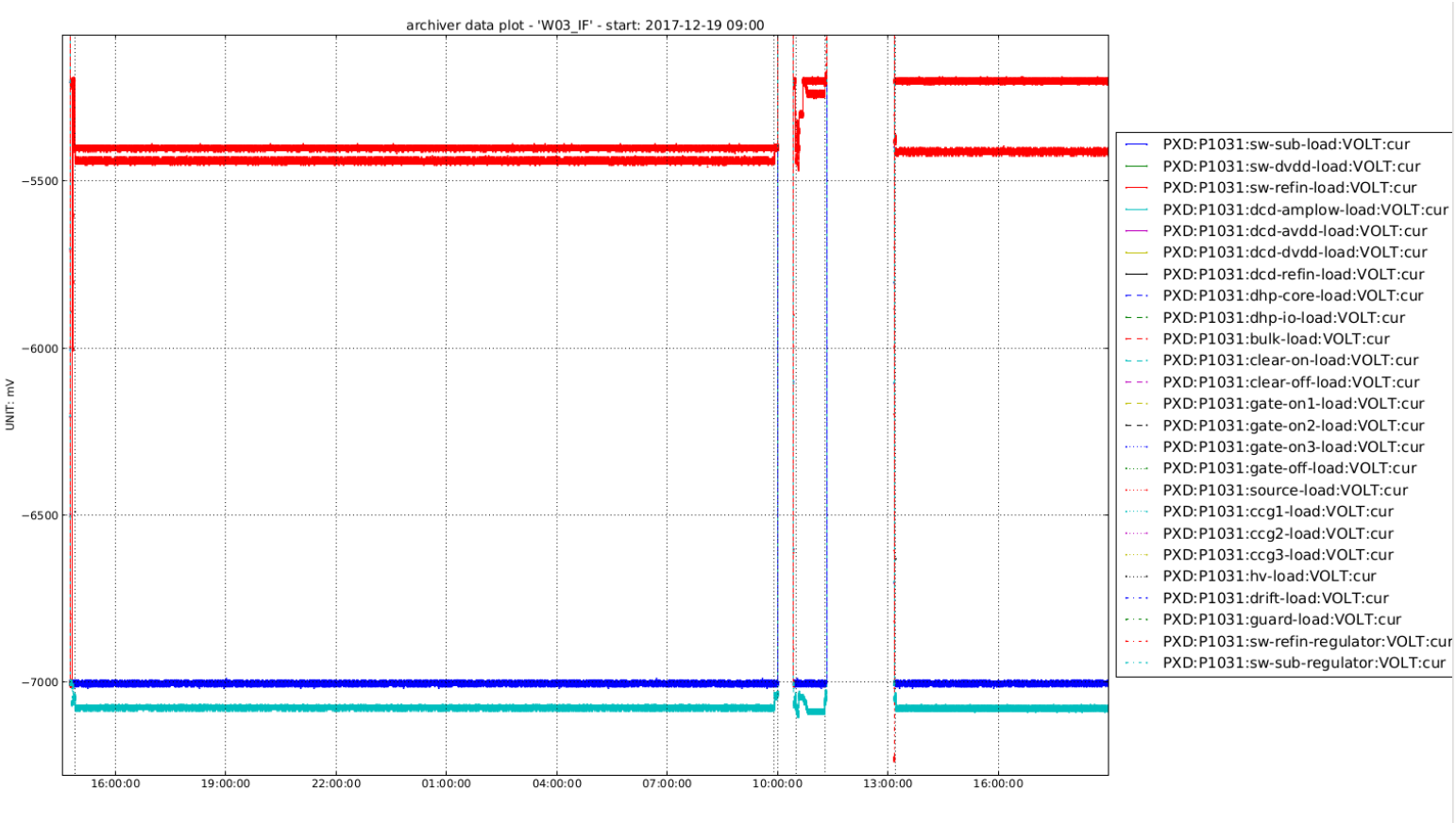
During the power down sequence the current limits of sw-sub and sw-refin were reached. Hence, the voltages raised from -7 V (sw-sub) and -5.2 V (sw-refin) to ~ +1 V. This partially destroyed the switchers.

This behavior occurred at W02_IF and W03_IF on Dec 8



Observations (1) W03_IF

Difference of sw-refin @ regulator and @ load is increased from ~40 mV to ~ 200 mV

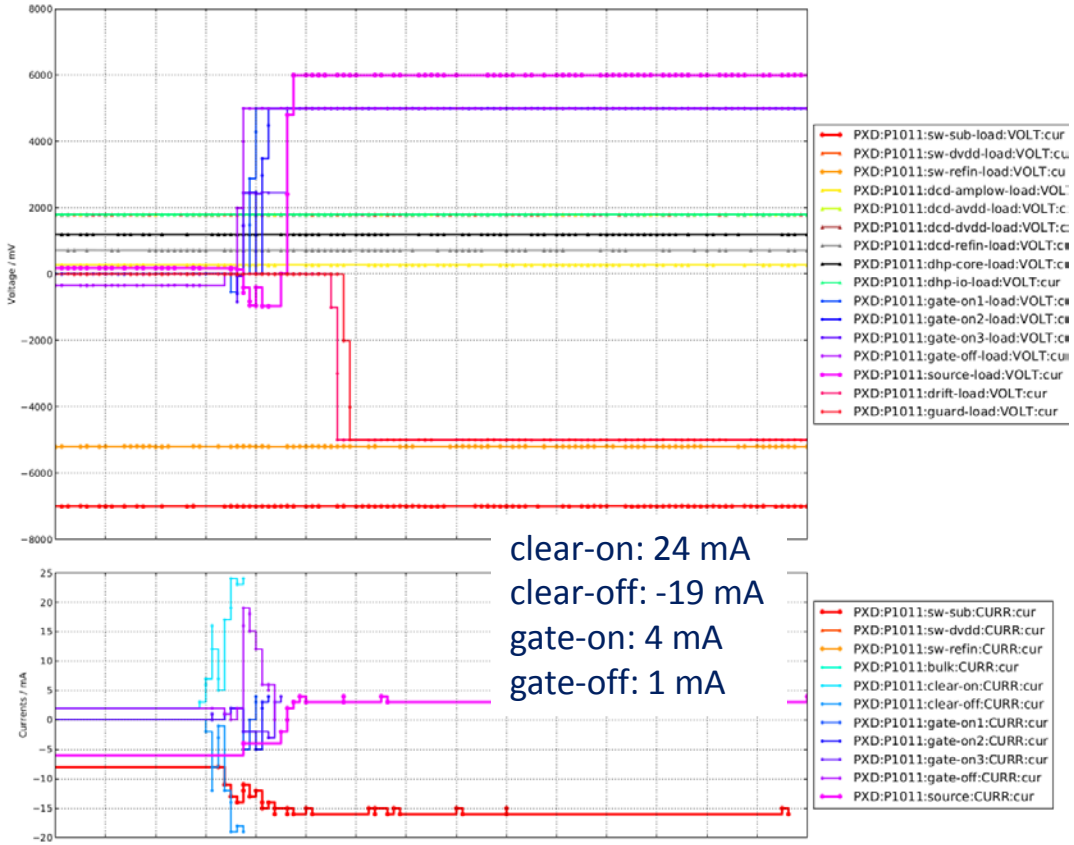


why is the voltage difference 200 mV although no current is flowing?
Which voltages are applied at the module?

Voltage at Regulator	Voltage at Load	Current	
-7086 mV	-7008 mV	-19 mA	sw-sub
2907 mV	1800 mV	20 mA	sw-dvdd
-5415 mV	-5203 mV	0 mA	sw-refin

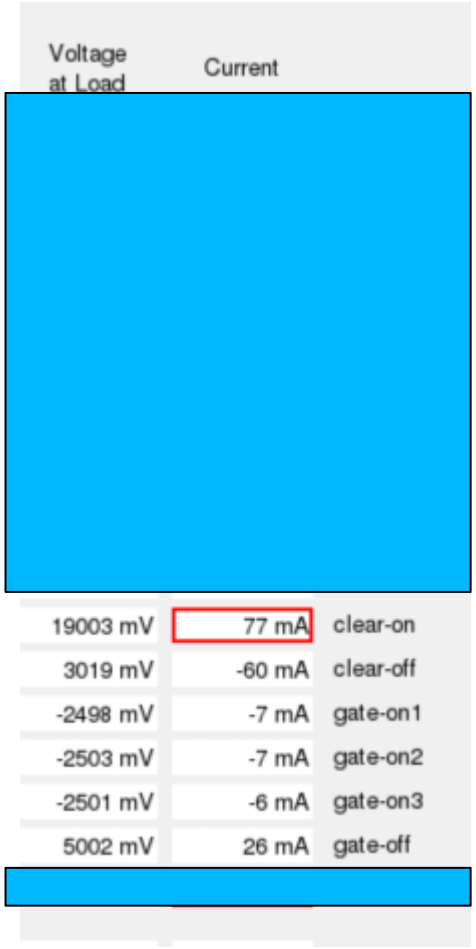
Increased clear-on, clear-off, gate-on, gate-off currents

past



clear-on: 24 mA
clear-off: -19 mA
gate-on: 4 mA
gate-off: 1 mA

now



How are the voltages sensed at the different domains?

Gate-GND:

- GateOn (GateLow)
- GateOff (GateHigh)
- CCG1, CCG2, CCG3
- Drift

Steer-GND:

- ClearOn (ClearHigh)
- ClearOff (ClearLow)
- Bulk
- HighVoltage (Backplane)
- Guard
- SW-SUB and SW-REFIN

DGND:

- SW-DVDD
- DHP-CORE
- DHP-IO
- DCD-DVDD

AGND:

- DCD-AVDD
- DCD-REFIN
- DCD-AMPLOW
- SOURCE

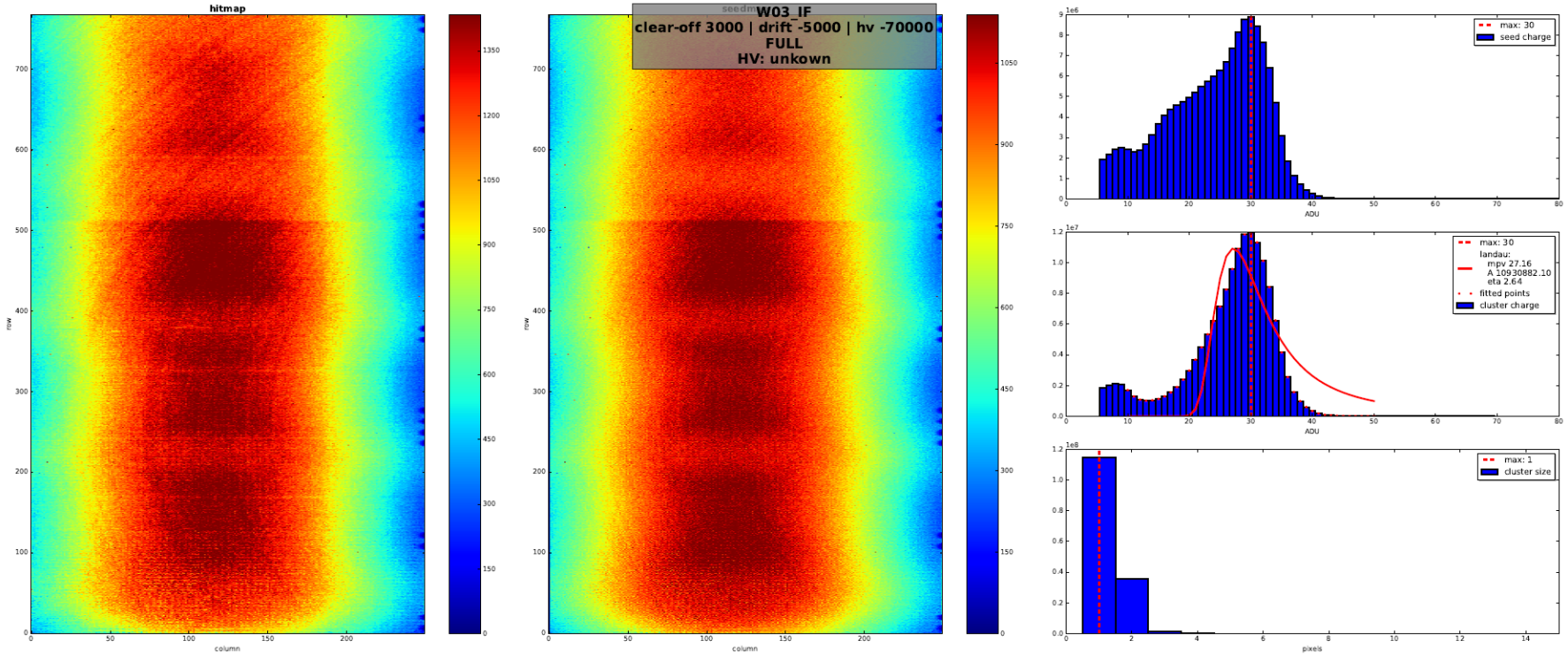
Voltage	Sensing - Location
sw-sub	Breakout Board / Dock Box
sw-dvdd	Module (before sw close to EOS)
sw-refin	Module (before sw close to EOS)
dcd-amplow	Module (mid of DCDs)
dcd-avdd	Module (mid of DCDs)
dcd-dvdd	Module (mid of DCDs)
dcd-refin	Module (mid of DCDs)
dhp-core	Module (mid of DHPs)
dhp-io	Module (mid of DHPs)
bulk	PS
clear-on	Module (before sw close to EOS)
clear-off	Module (before sw close to EOS)
gate-on1	Module (before sw close to EOS)
gate-on2	Module at Switcher 3/4
gate-on3	Module at Switcher at gluing edge
gate-off	Module (before sw close to EOS)

gate-on1	Module (before sw close to EOS)
gate-on2	Module at Switcher 3/4
gate-on3	Module at Switcher at gluing edge
gate-off	Module (before sw close to EOS)
source	Module between DEPFET and DCD
ccg1	PS / DockBox ?
ccg2	PS / DockBox ?
ccg3	PS / DockBox ?
hv	PS
drift	PS / DockBox ?
guard	PS
AGND	Module (mid of DCDs)
GNDD	Module (mid of DCDs)

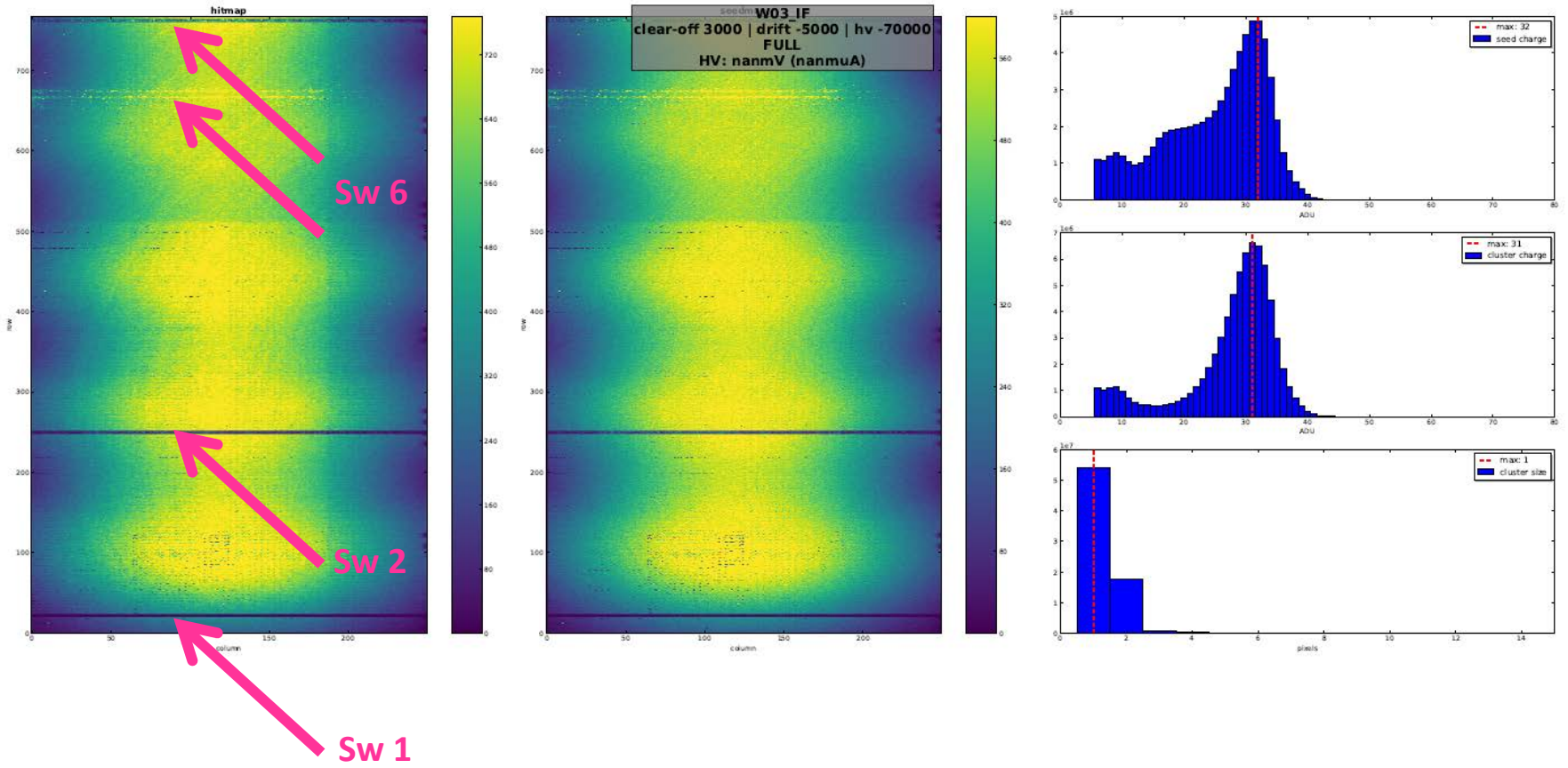
https://confluence.desy.de/display/BI/Voltage+Sensing

https://agira.desy.de/browse/BIIPXDH-161

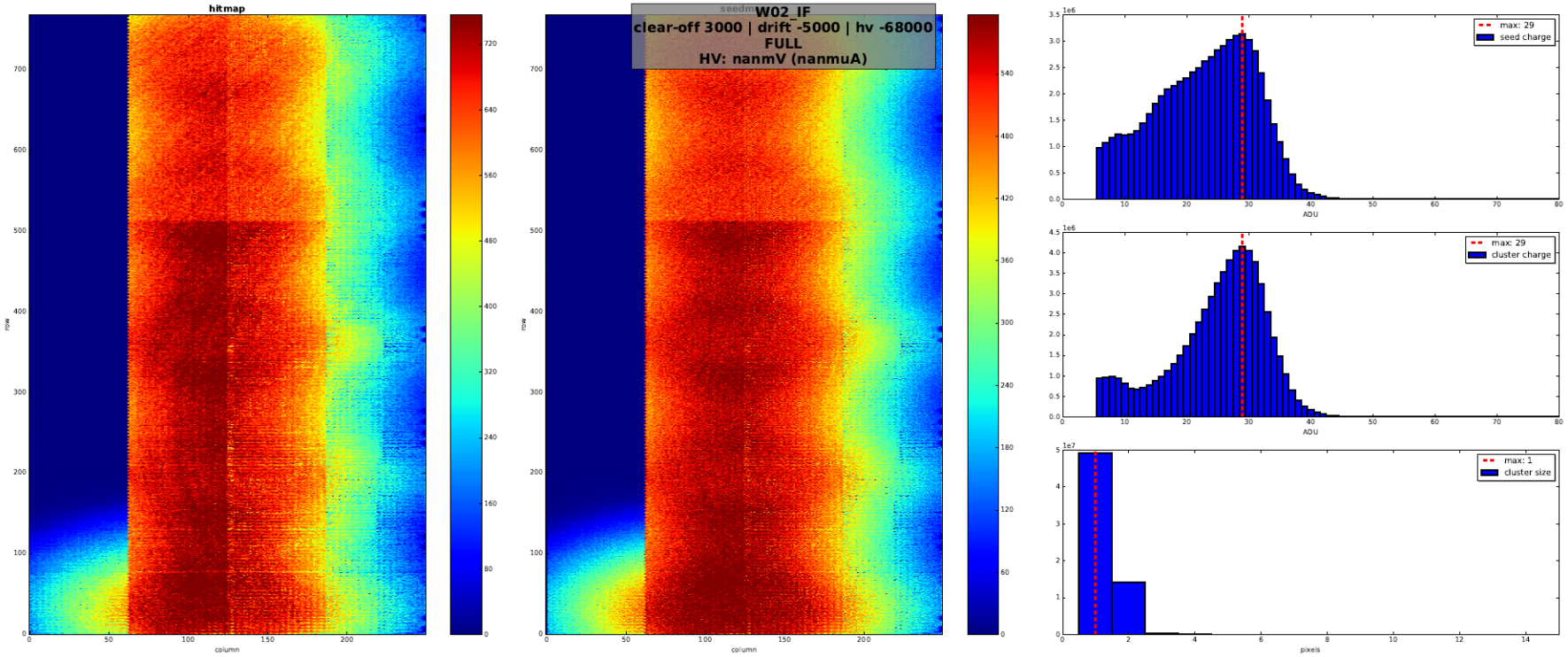
Comparison W03_IF (before accident)



Comparison W03_IF (after accident)

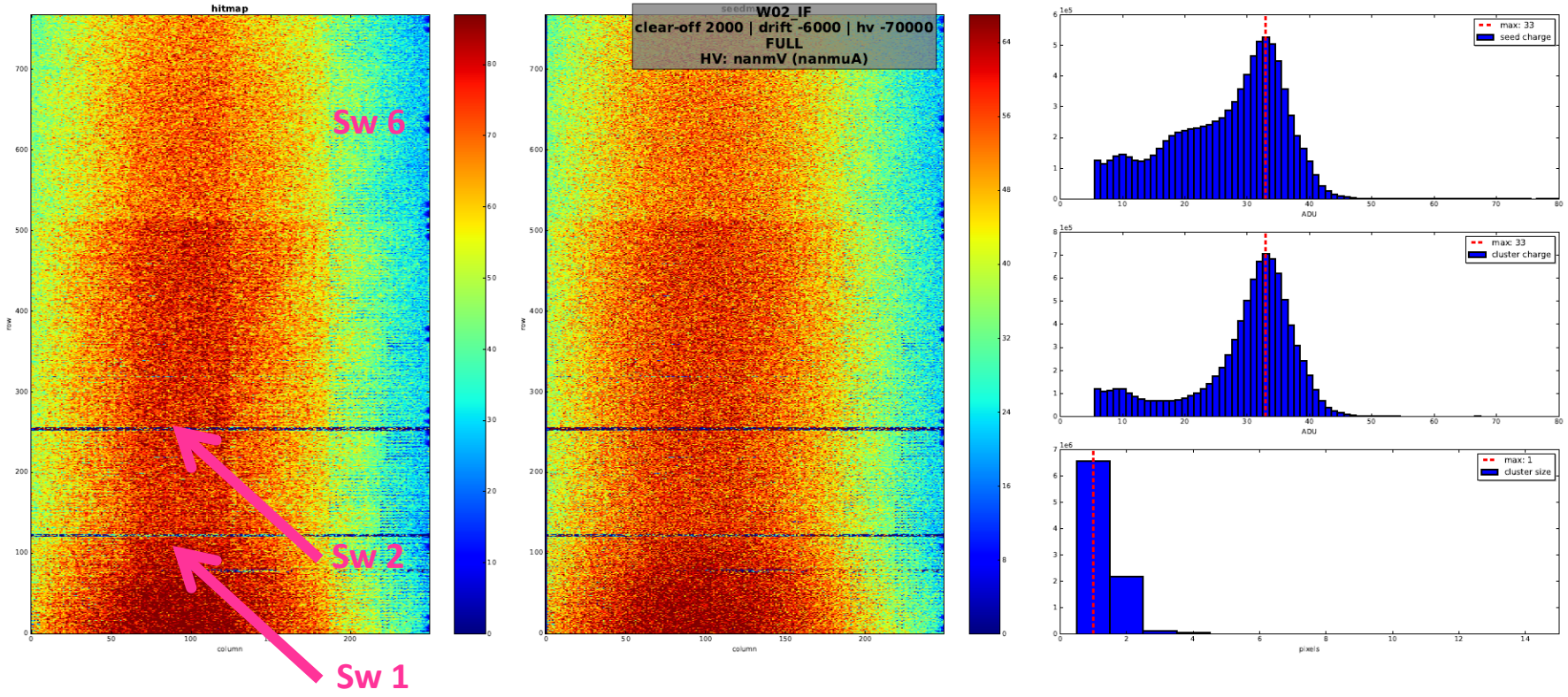


Comparison W02_IF (before accident)

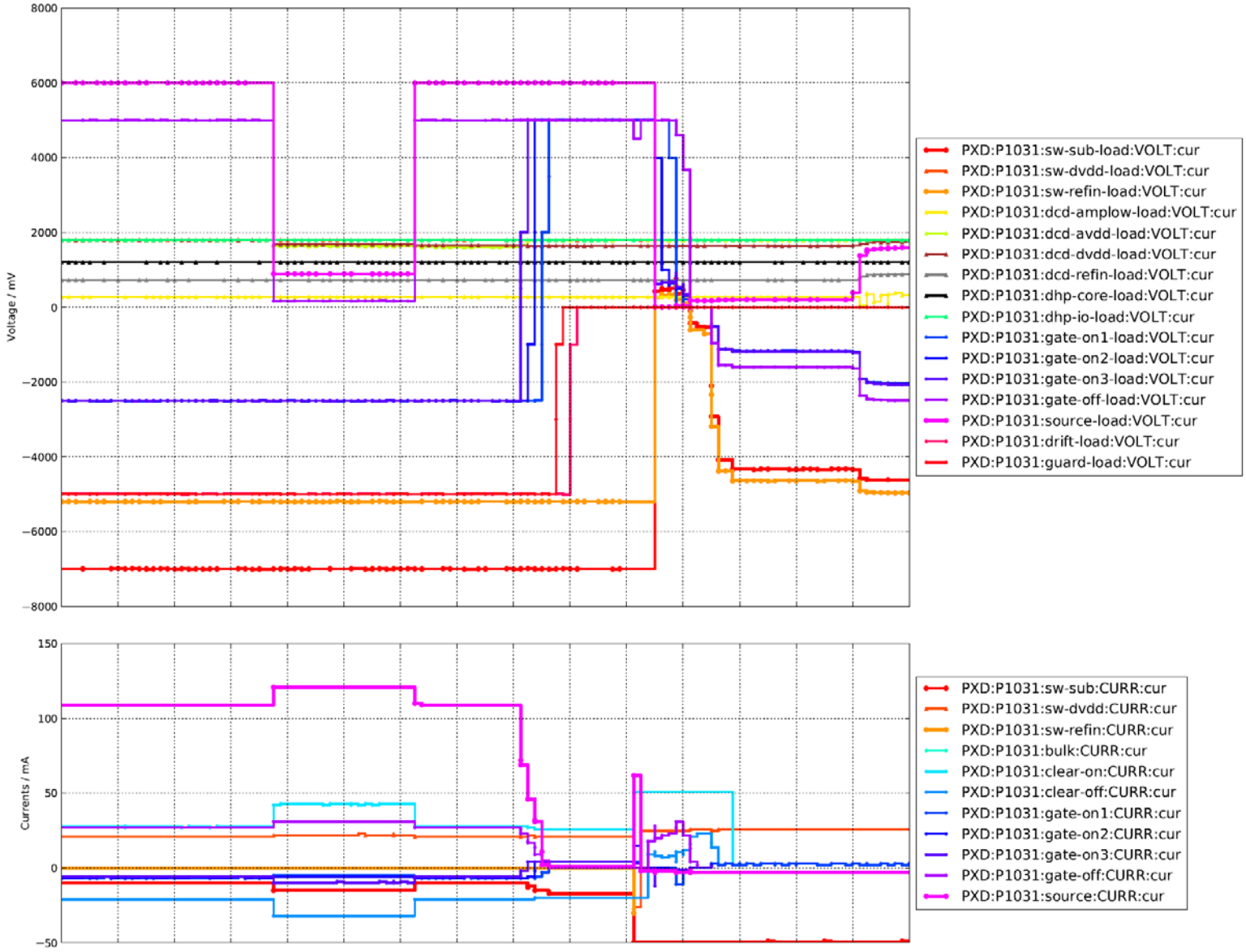


one link crashed – accident happend when repeating the scan. Therefore, power cycle should be done

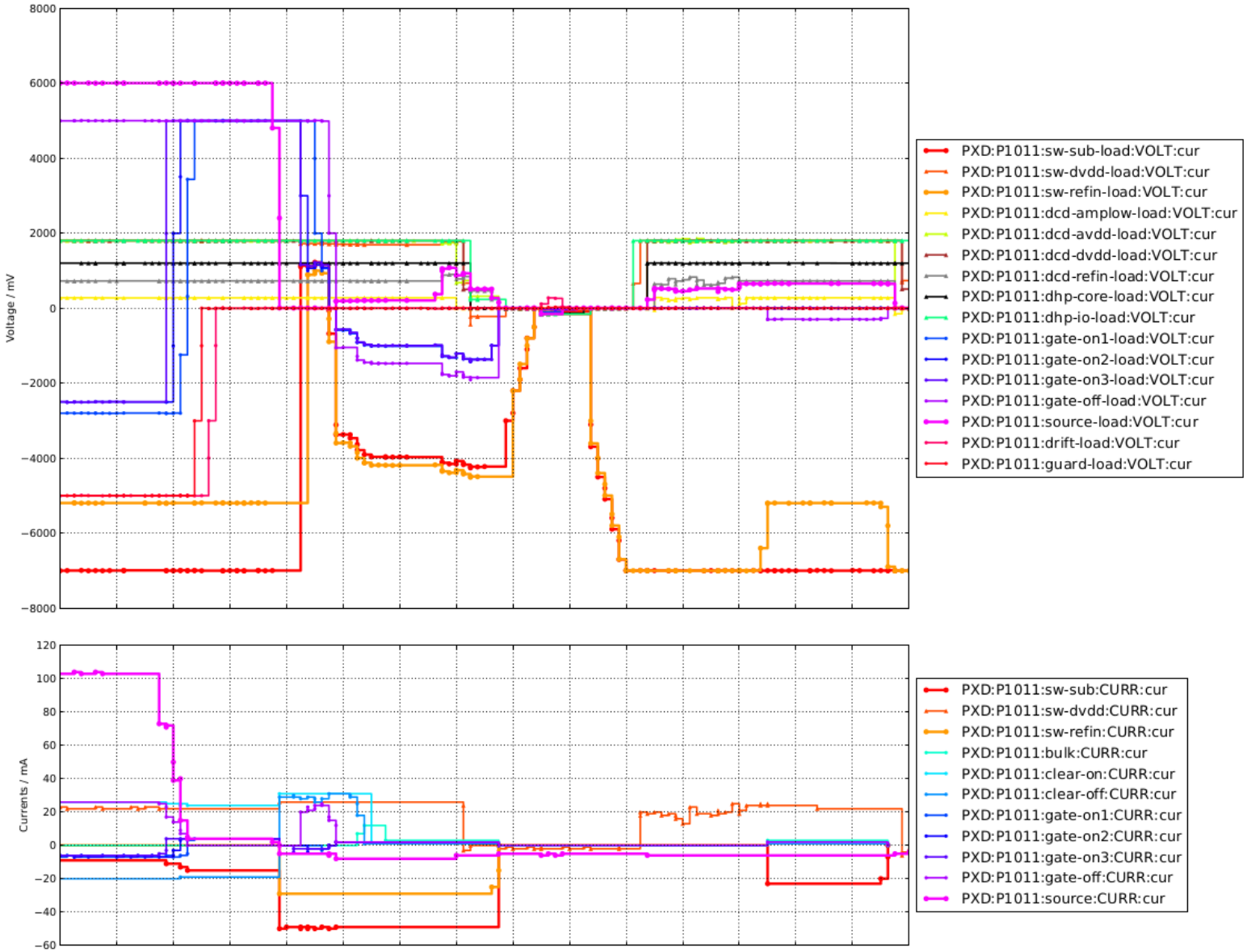
Comparison W02_IF (after accident)



Obervations in the past, Sep 14, 17:34 – unknown module



Obervations in the past, Sep 26, 14:45 – W08_IF



W02_IF – Nov 2, 2017 – W08_IF

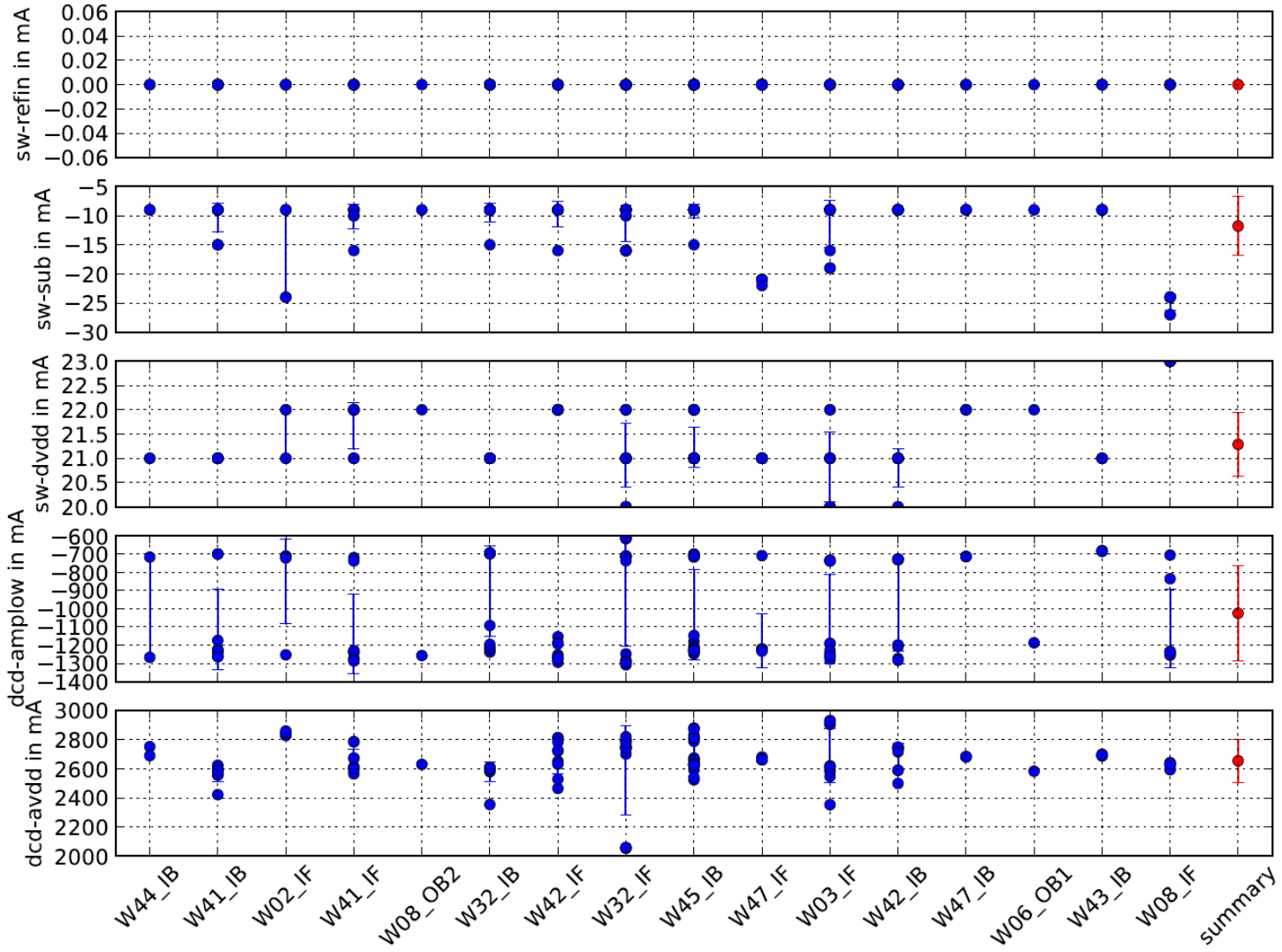
Conclusion

After investigations of all power down cycles since the archiver was set up. This switcher behavior occured once (begin of November) which did not destroy the switcher

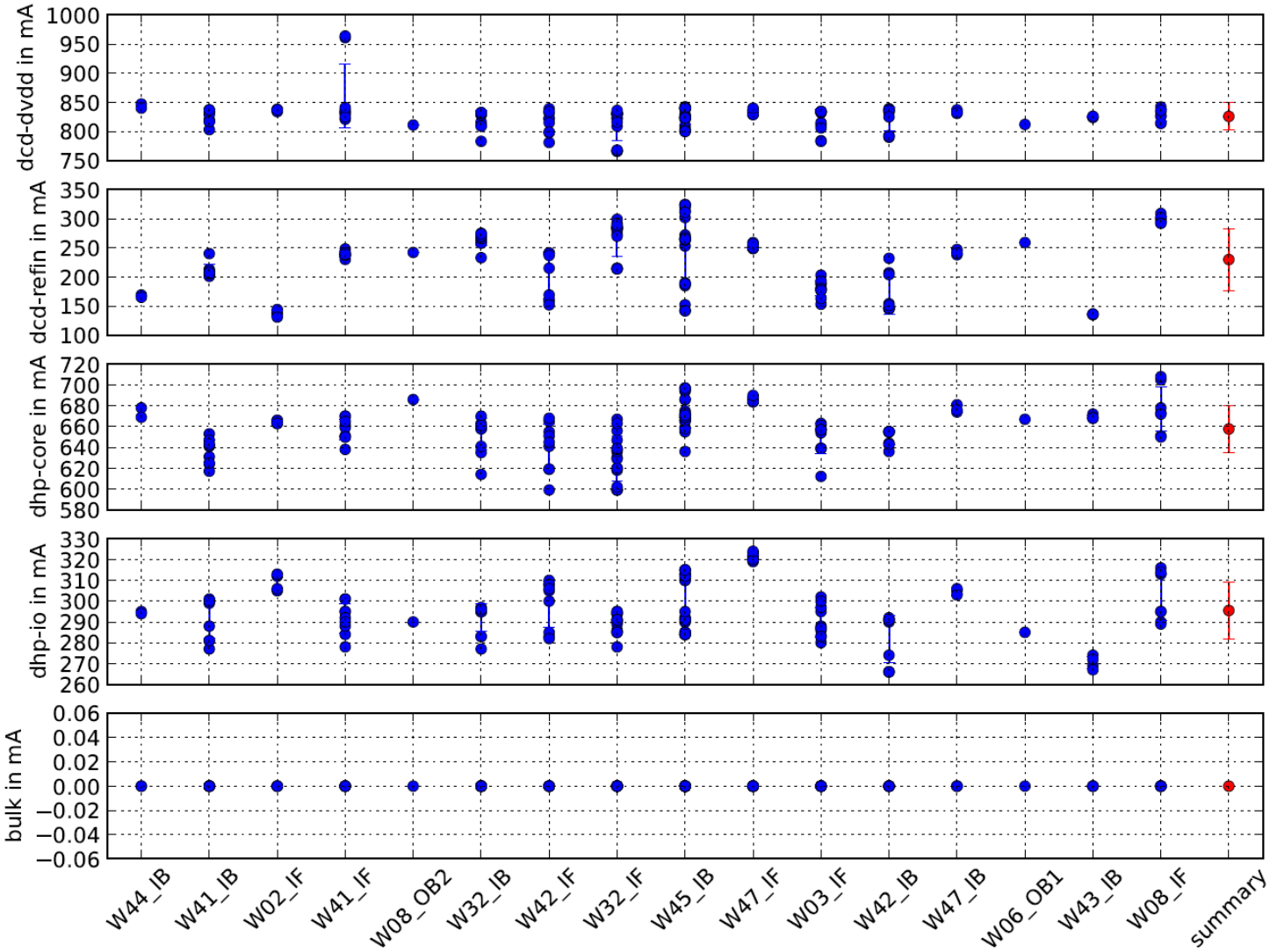
Ramp down source slower

Capcitors between sw-sub & source, sw-refin & source on Kaptons ? influences?

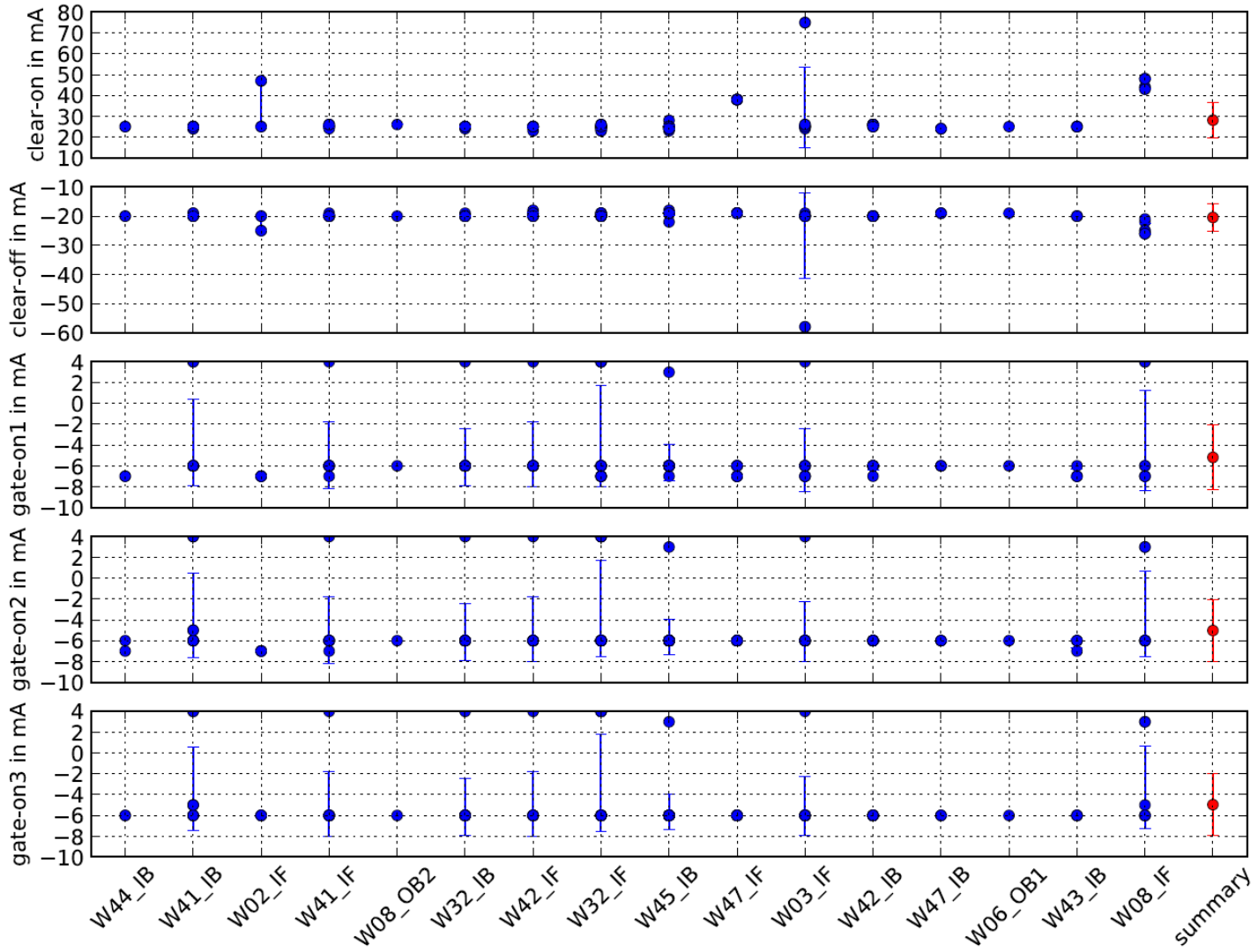
Default current consumptions



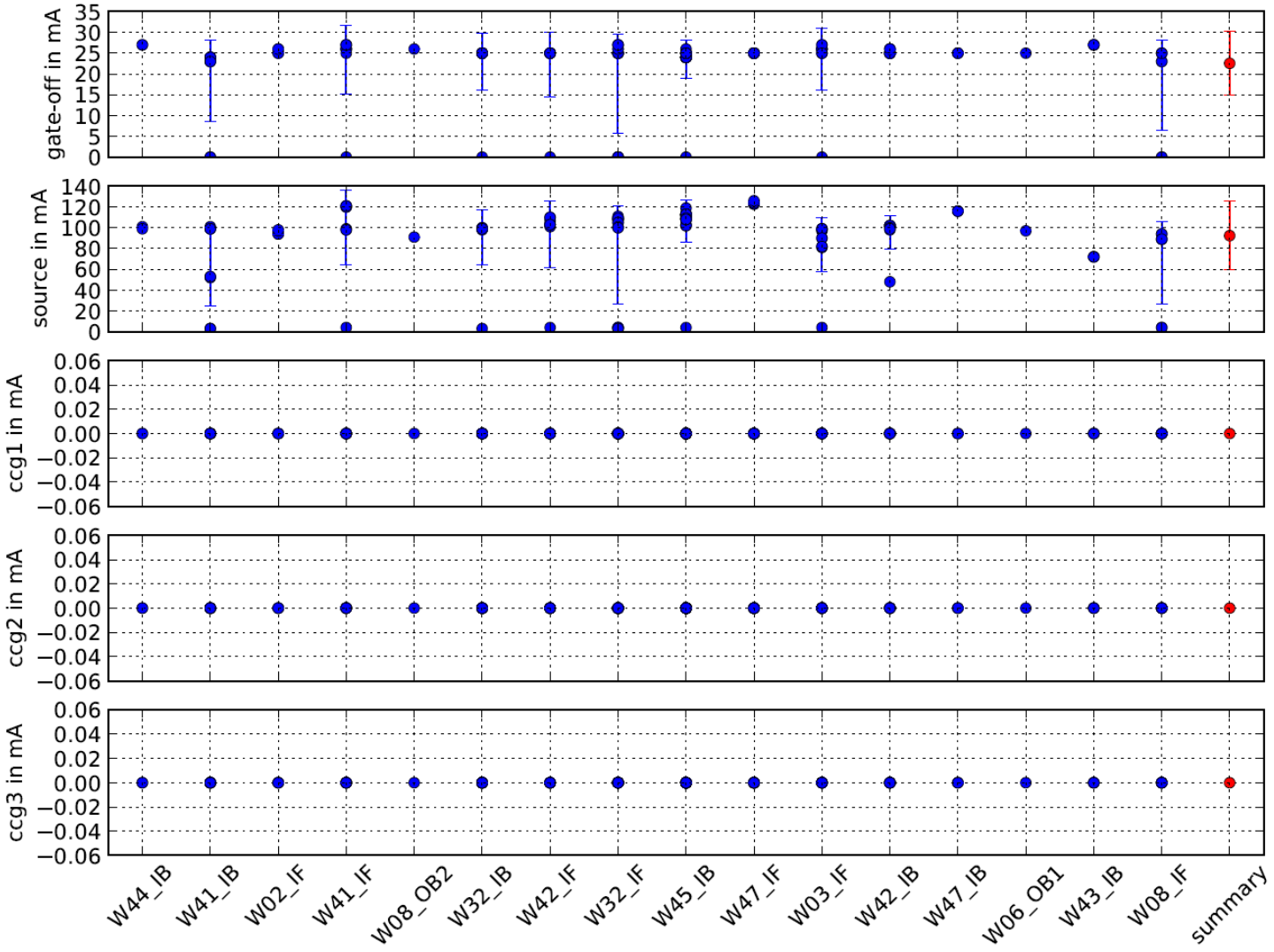
Default current consumptions



Default current consumptions



Default current consumptions



Default current consumptions