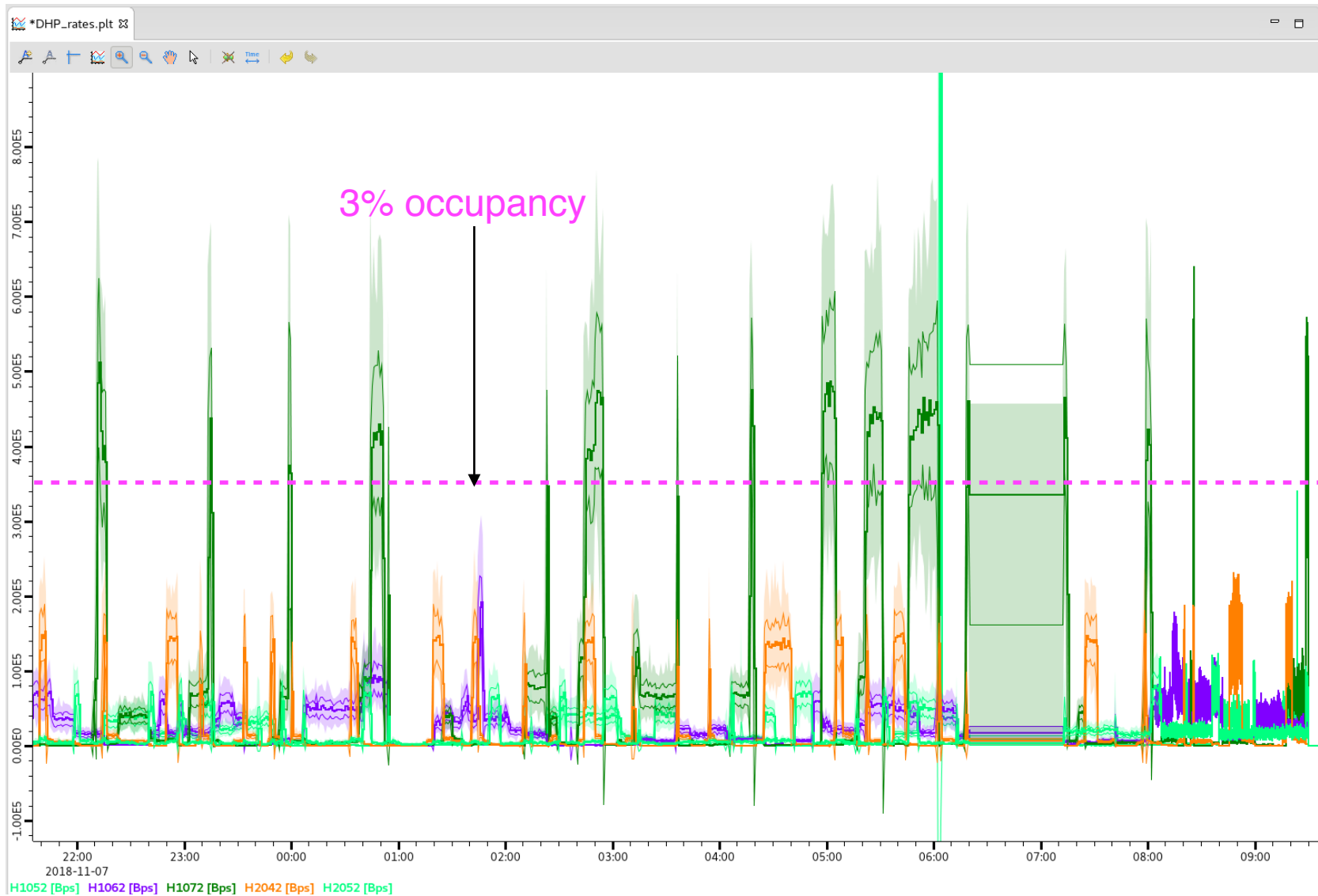


# **PXD Commissioning Status and Installation Readiness**

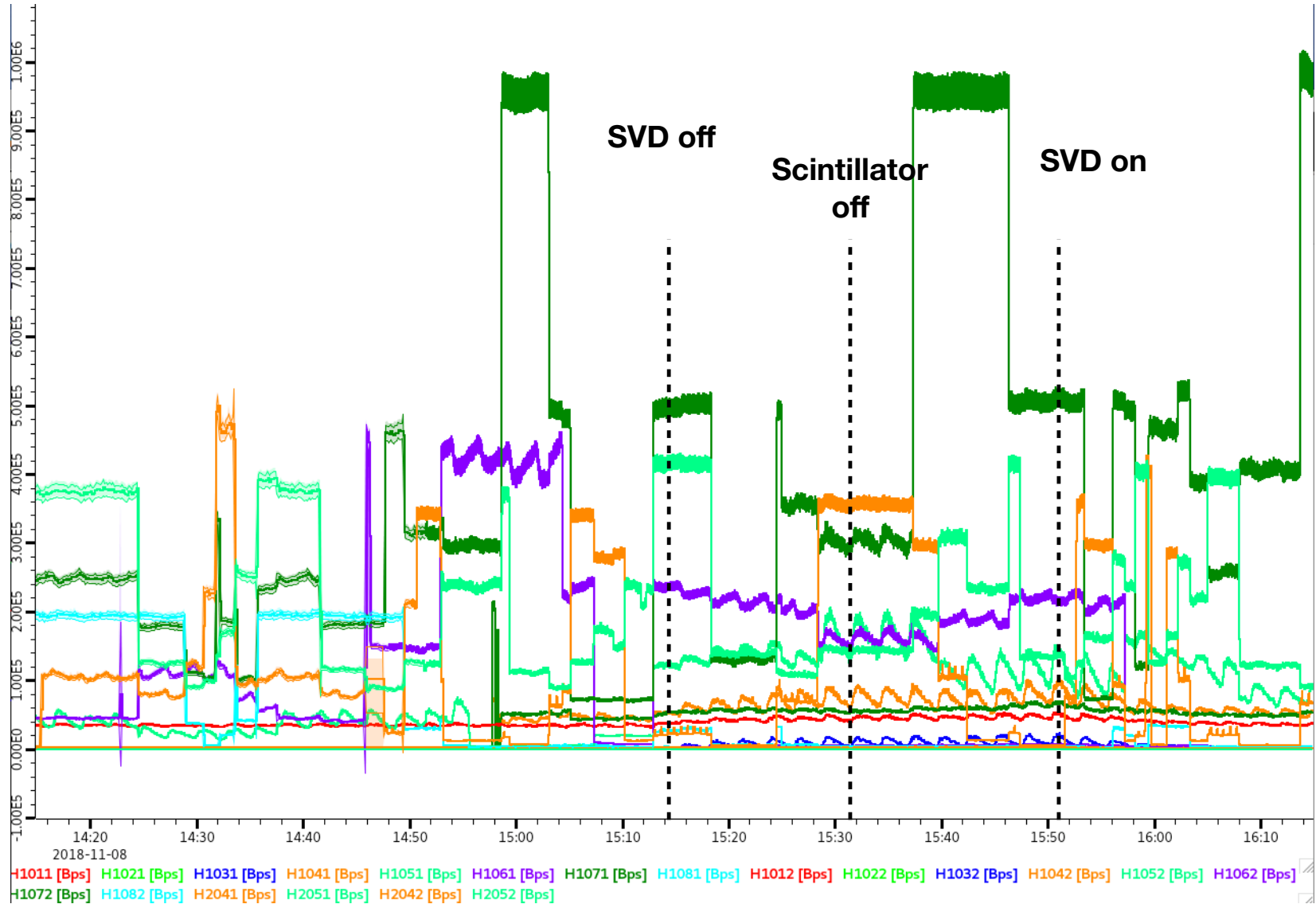
# Sudden Jumps in Data Rate seen in Backward Modules

H1052,1062,1072,2052 are connected to DHH40, 1082,2042 to DHH30



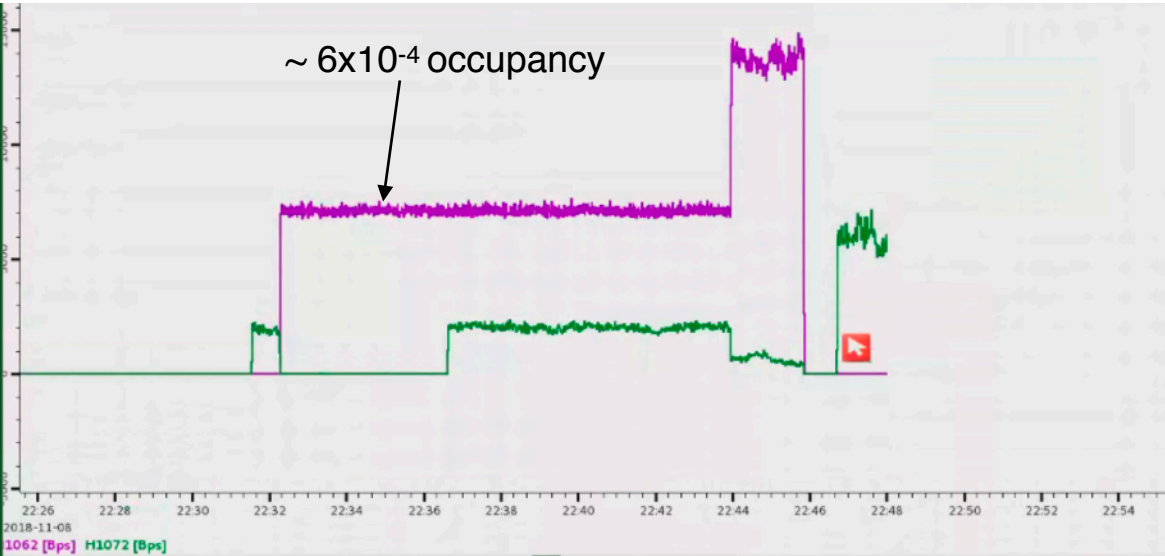
# SVD and Scintillators

Not correlated to SVD/Scintillator operation



# Swapping DHH Modules

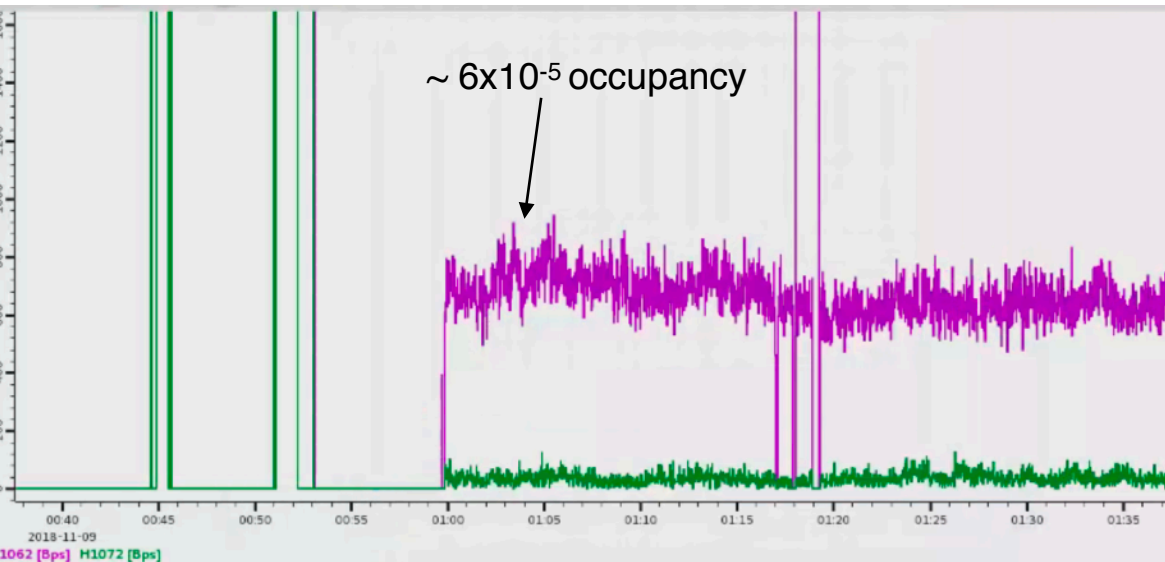
$\sim 6 \times 10^{-4}$  occupancy



Modules connected to DHH40

Jumps occur spontaneously and can also be provoked by DHC reset (only if more than 1 module in operation and not always ...)

$\sim 6 \times 10^{-5}$  occupancy



Modules connected to DHH50

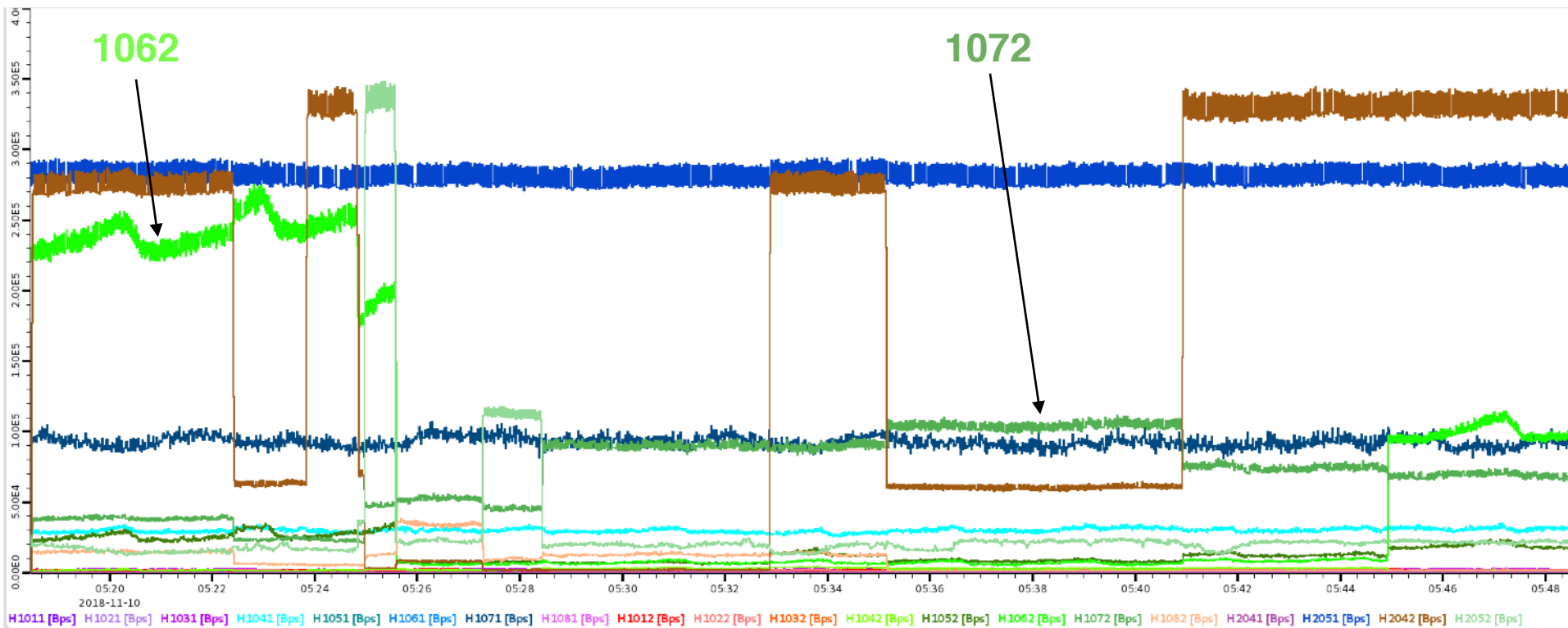
No jumps observed anymore

Very low data rate in 1072 after re-calibrating/loading offsets and pedestals

Need time to do this for all modules

# Cross Check after swapping back to DHH40

Jumps again seen in both modules and in other modules connected to this DHH

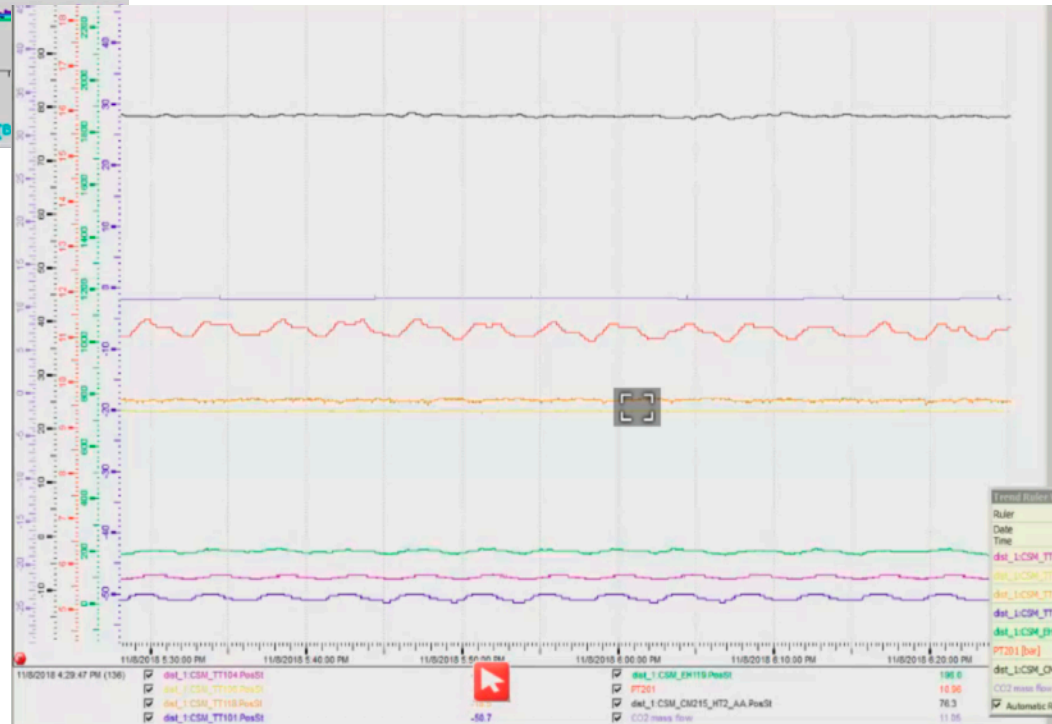


Conclusion: the effect can clearly be associated to specific DHHs  
Will try to reproduce and study behaviour in lab set-up  
Most likely due to some loss of synchronisation  
Might also cause occasional OVP triggers observed in 4 modules

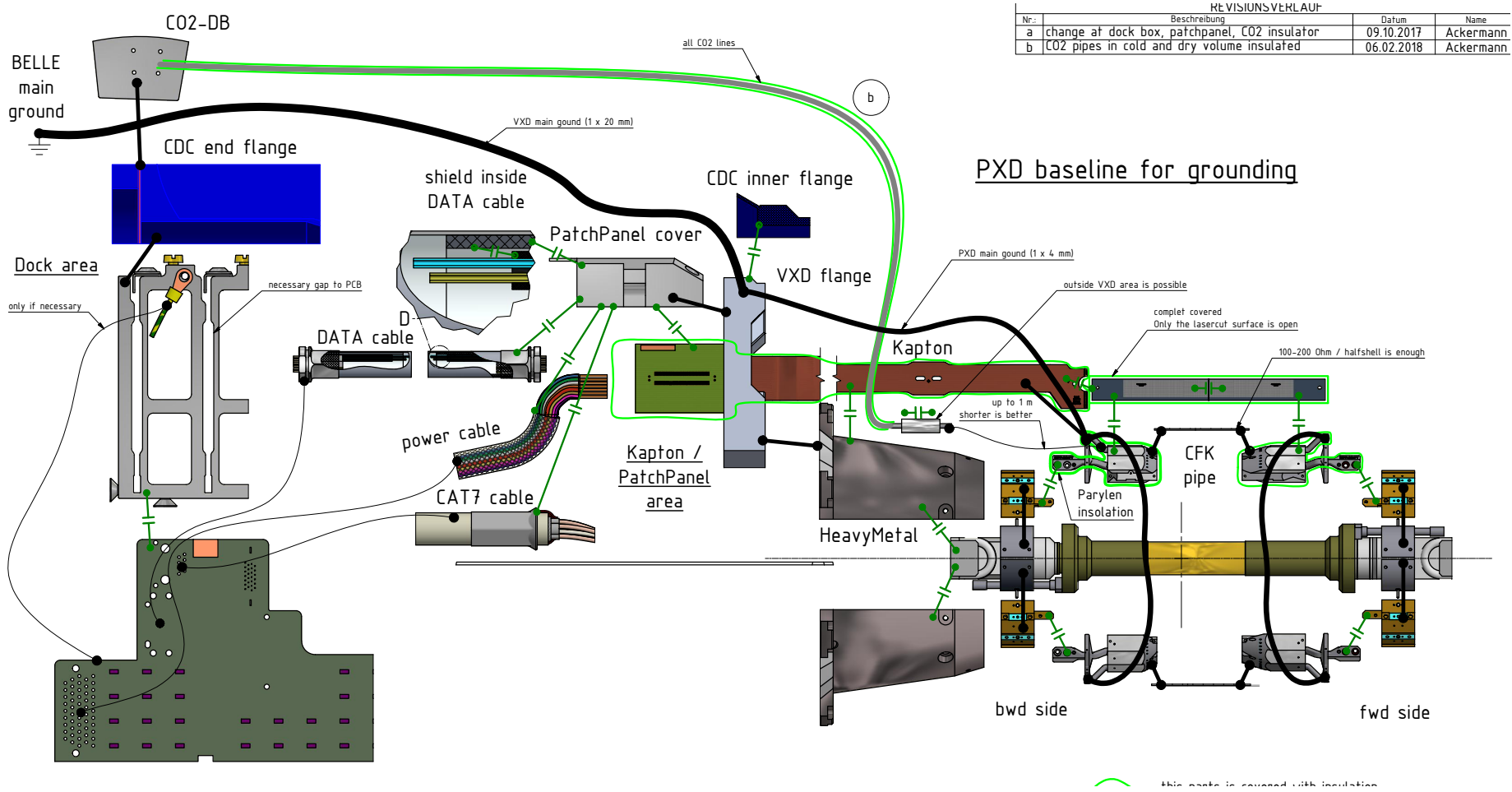
# Correlation of Noise Variations with MARCO Operation

- In the last days MARCO starts behaving somewhat abnormal
  - 3 minutes time constant also observed in chiller regulation
  - amplitude of these oscillations correlated with total heat load
- Unclear how long MARCO will stay operational ...

- Found unintended connection between CO<sub>2</sub> flexlines and VXD end-flange
  - ceramic insulators are effectively by-passed
- Difficult to avoid this contact in B4
- In Belle II CO<sub>2</sub> dock boxes will be electrically insulated from CDC

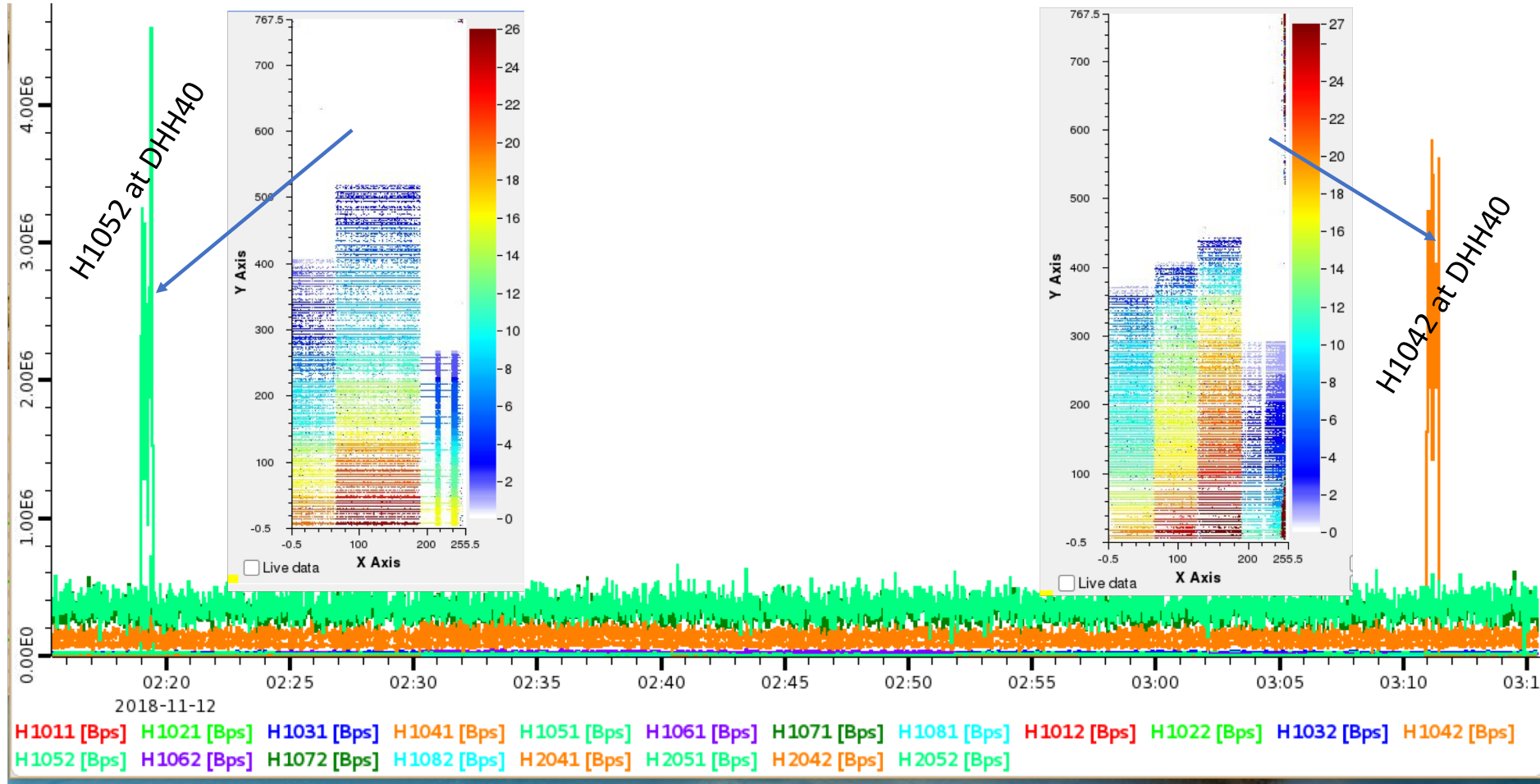


# PXD Grounding Scheme



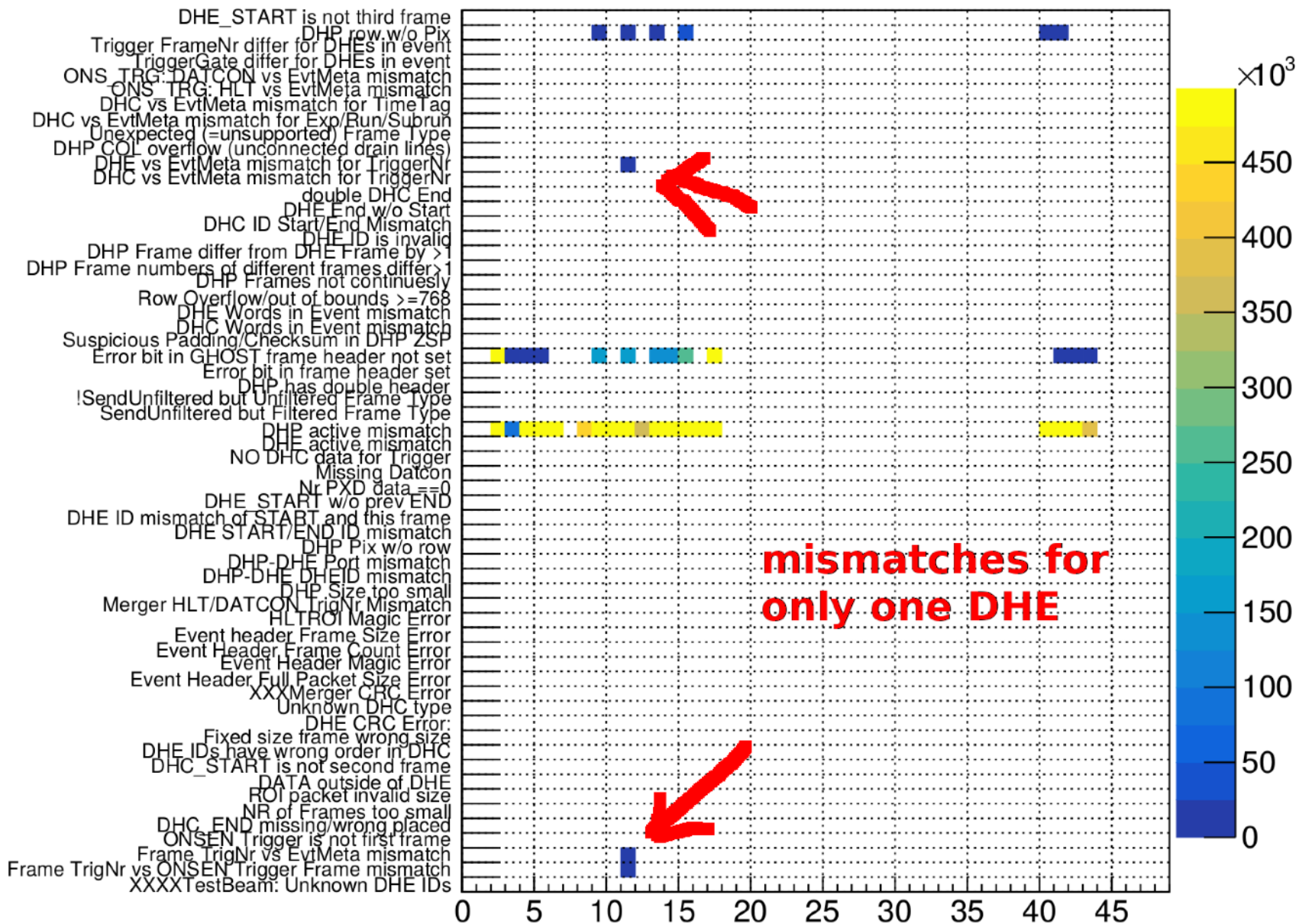
# PXD Hit Maps during Cosmic Run

Very distinct pattern should help to find origin of the problem





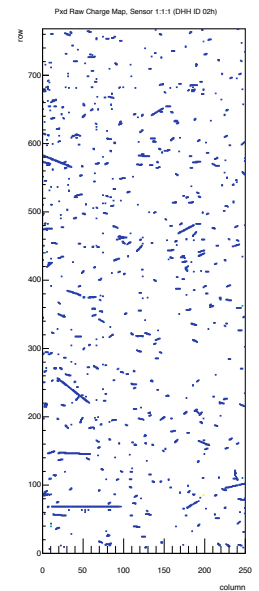
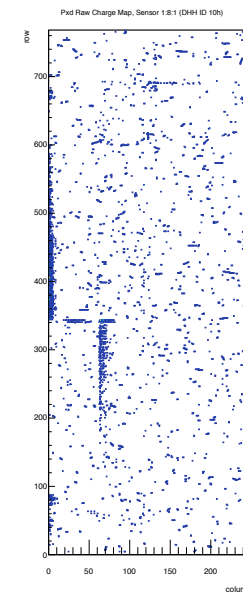
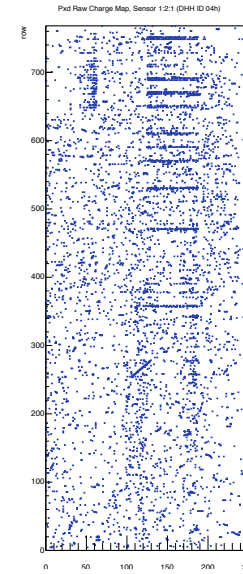
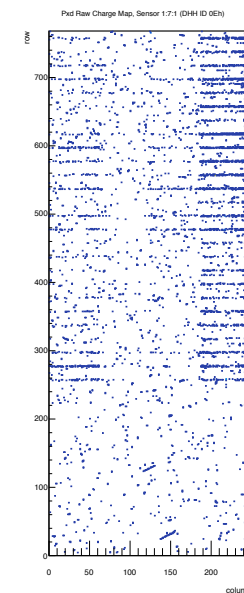
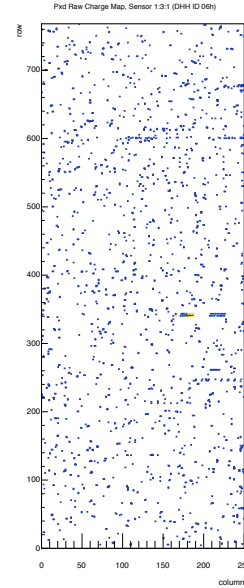
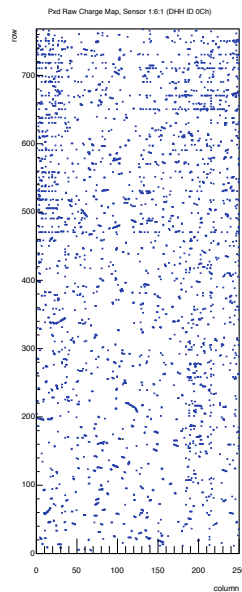
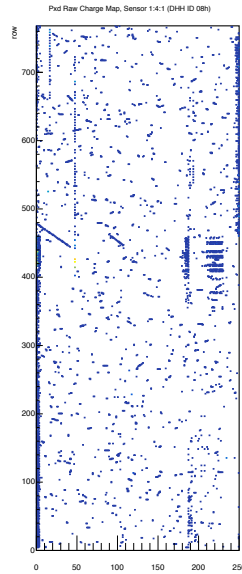
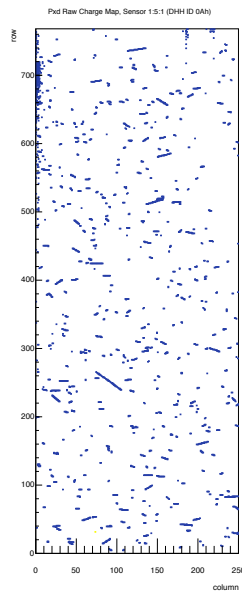
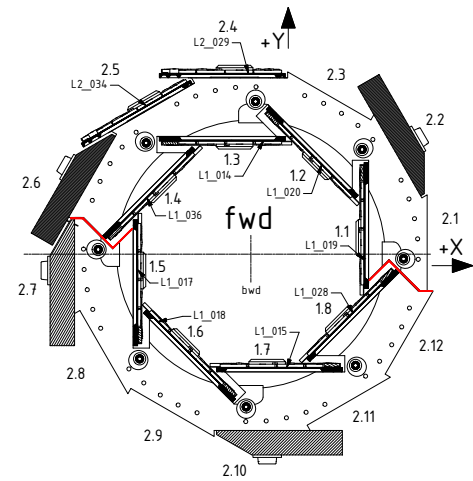
# Error Statistics Run 190



mismatches for only one DHE

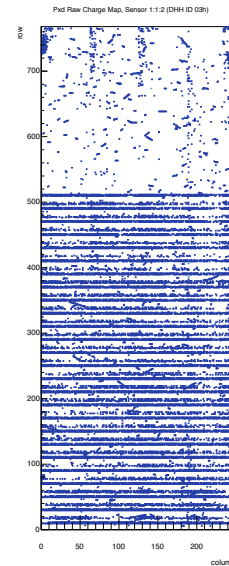
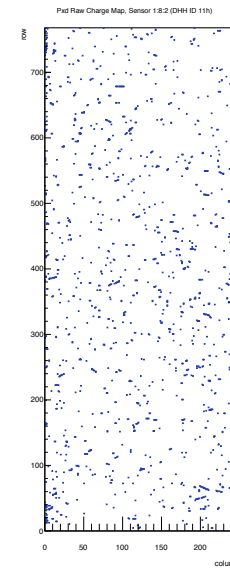
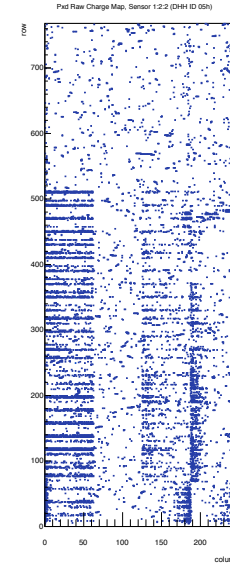
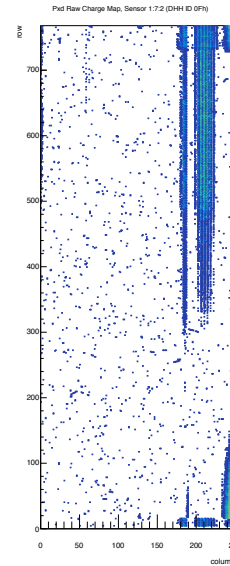
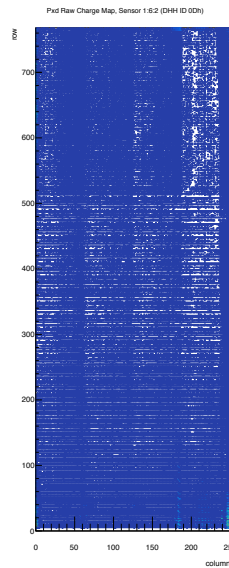
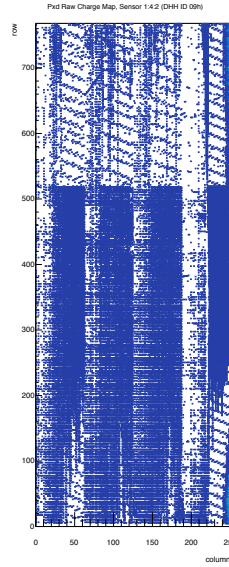
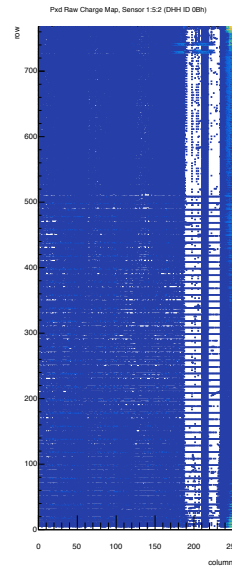
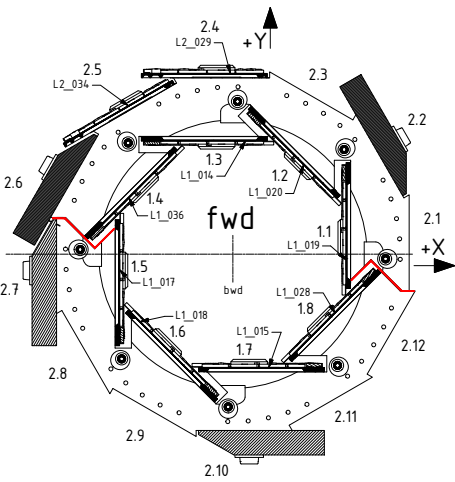
# L1 Forward Modules for Run 190

- Charge integral per pixel for ~ 7 hours of data taking
  - ~ 500 k events
  - no masking applied



# L1 Backward Modules for Run 190

- Charge integral per pixel for ~ 7 hours of data taking
  - ~ 500 k events
  - no masking applied

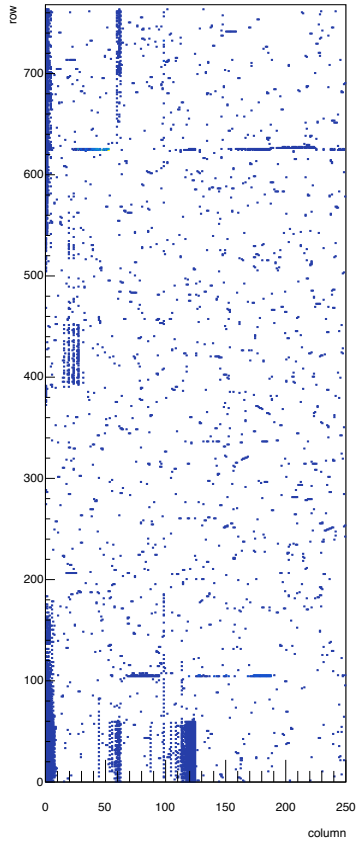


- A few noisy events can screw up the entire map

# L2 Modules for Run 190

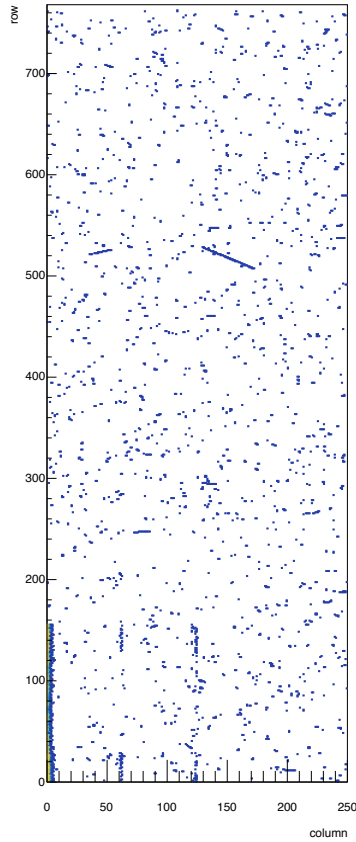
## 2.5.2

Pxd Raw Charge Map, Sensor 2.5:2 (DHH ID 2Bh)



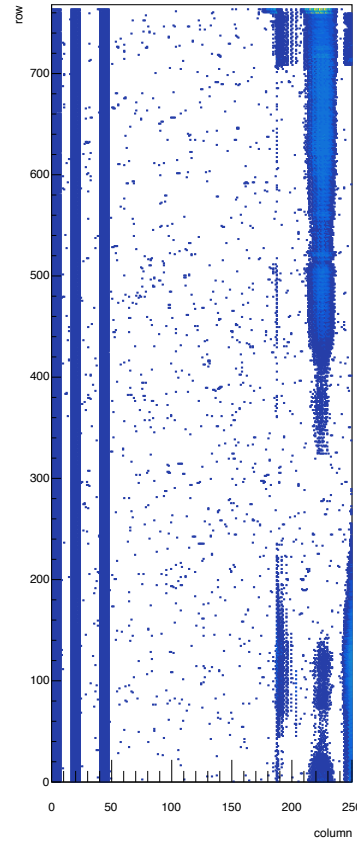
## 2.5.1

Pxd Raw Charge Map, Sensor 2.5:1 (DHH ID 2Ah)



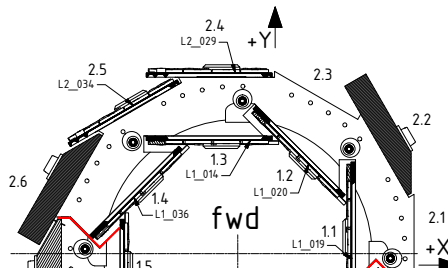
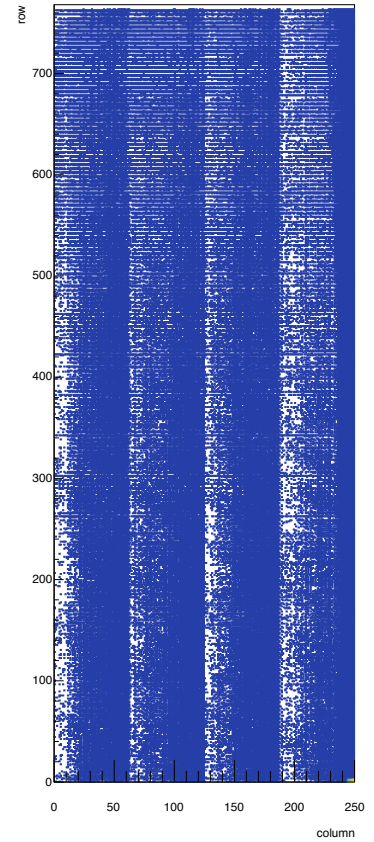
## 2.4.2

Pxd Raw Charge Map, Sensor 2.4:2 (DHH ID 29h)



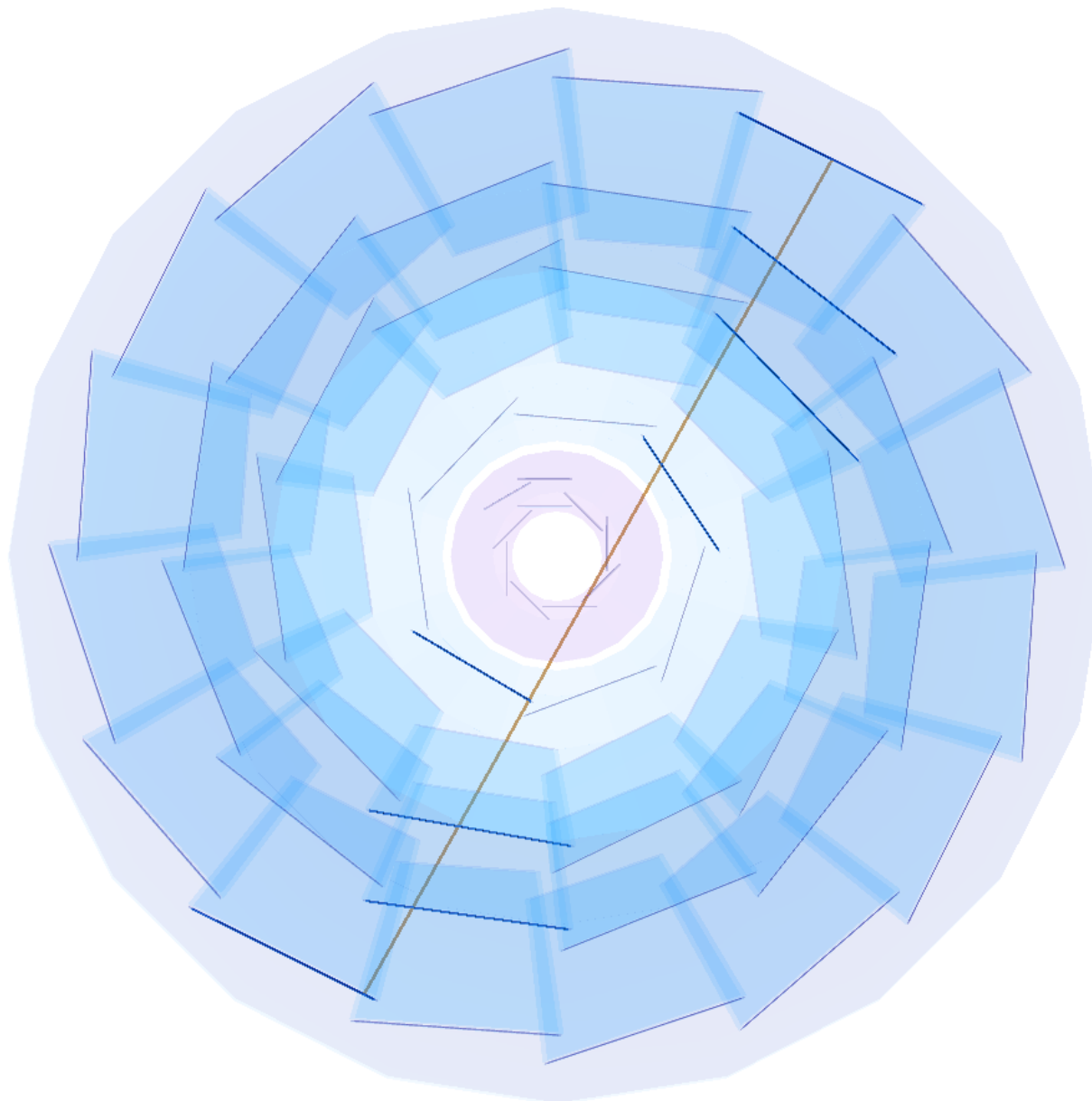
## 2.4.1

Pxd Raw Charge Map, Sensor 2.4:1 (DHH ID 28h)

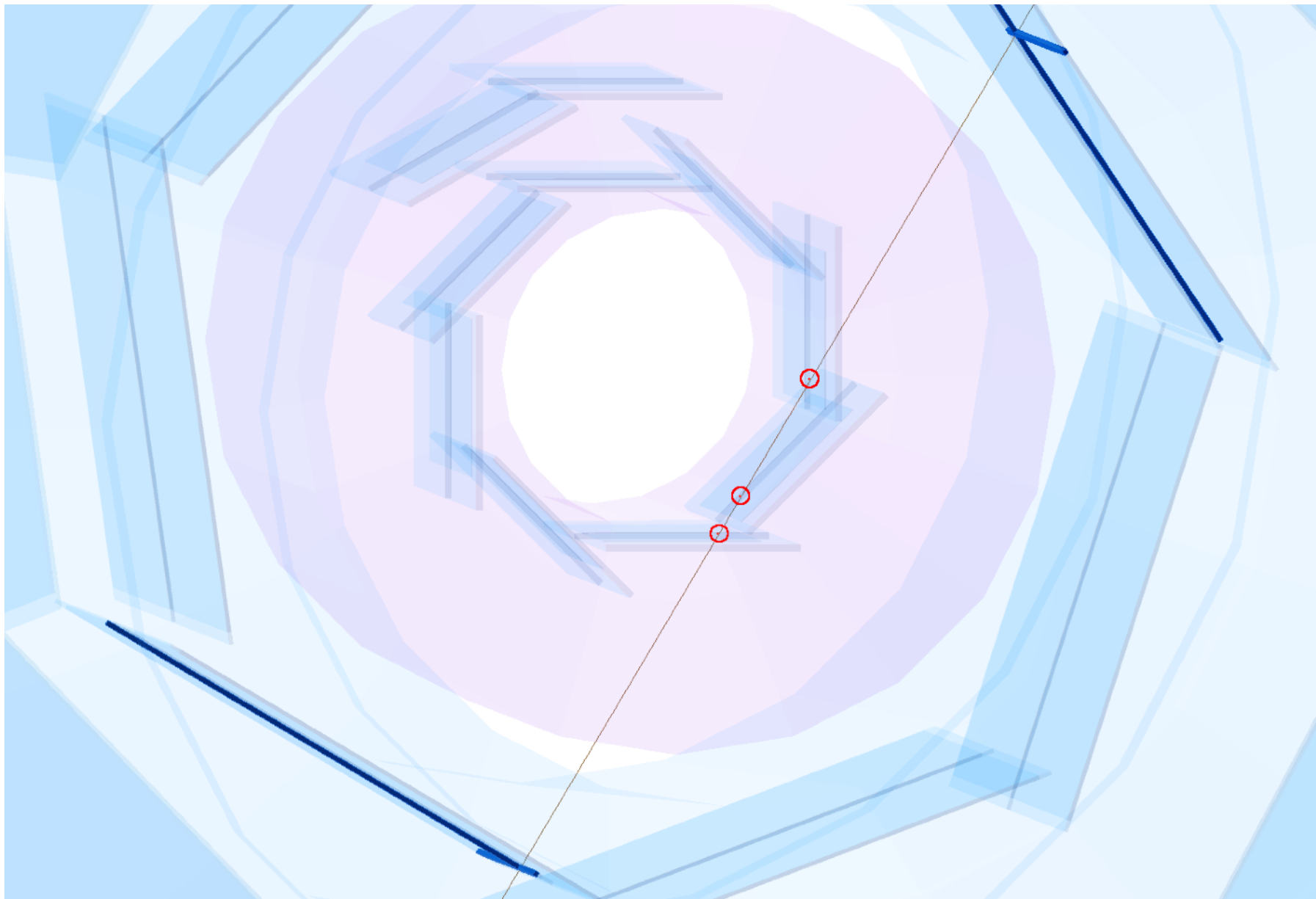


# VXD Cosmic Event

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# VXD Cosmic Event



# High Rate Test

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- Trigger rate limited to 3 kHz (304 $\mu$ s veto from FTSW)
- Main problem: trigger mis-match in DHC resulting from high occupancy (too low thresholds) in combination with old DHH firmware
  - repeat test once new firmware available
  - next week test of new overlapping trigger firmware at DESY set-up
- One occurrence of event mis-match
  - still investigating if due to bug in ONSEN or on EB side

# Summary and Next Steps

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- Effective time for commissioning much reduced due to DHH issues and mainly due to operational problems with MARCO
- Not all issues could be resolved, but there is no evidence that there are problems with the detector itself
- No compelling reason to delay VXD installation
- Further investigations of these problems will continue
- At KEK
  - Try to reproduce some of the back-end issues at KEK
    - ▶ use spare ladder
    - ▶ discuss how to make use of phase 2 modules
- At DESY
  - Study pedestal / JTAG instabilities → started already
  - Test new overlapping trigger firmware → next week
  - Make system operation more user-friendly and test all new scripts and procedures as far as possible
    - ▶ Software workshop with 16 participants held this Monday
    - ▶ Merge phase 2 developments with phase 3 scripts