

# DHH and DHE Status

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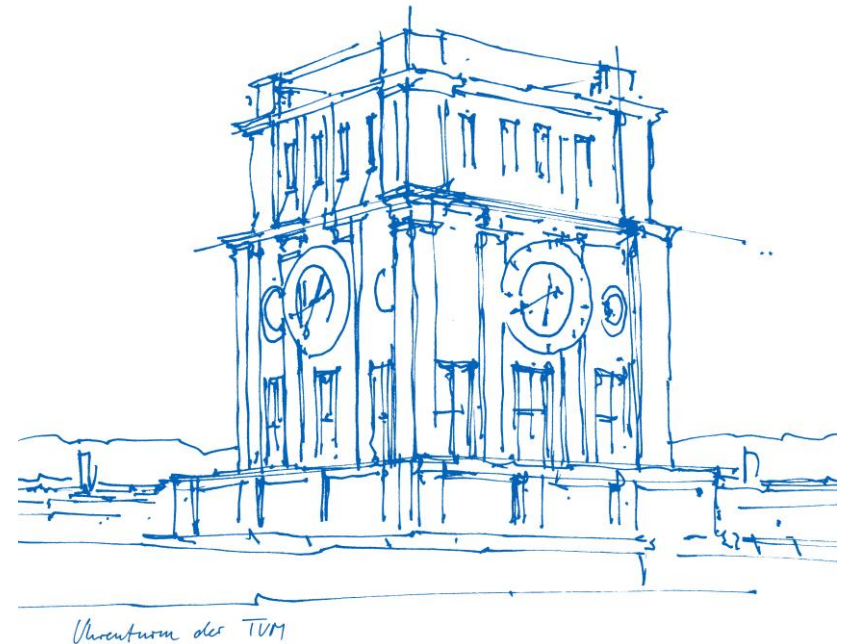
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TUM Department of Physics

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PXD Workshop and 23rd International Workshop  
on DEPFET Detectors and Applications

May 28-th, 2019



# DHE Firmware

DHE\_20190314\_1521 deployed on March 14-th

- Problem with first and last read out rows
- Problem with data throttling
- Limited diagnostics

DHE\_20190511\_1446 deployed on May 13

- Bug free so far
- Extended diagnostics
- DHP frame size limit is 2000 words
- Short reset during operation to recover DHP links
- Synchronization with DHP => frame and gate numbers reset at start of run otherwise free running

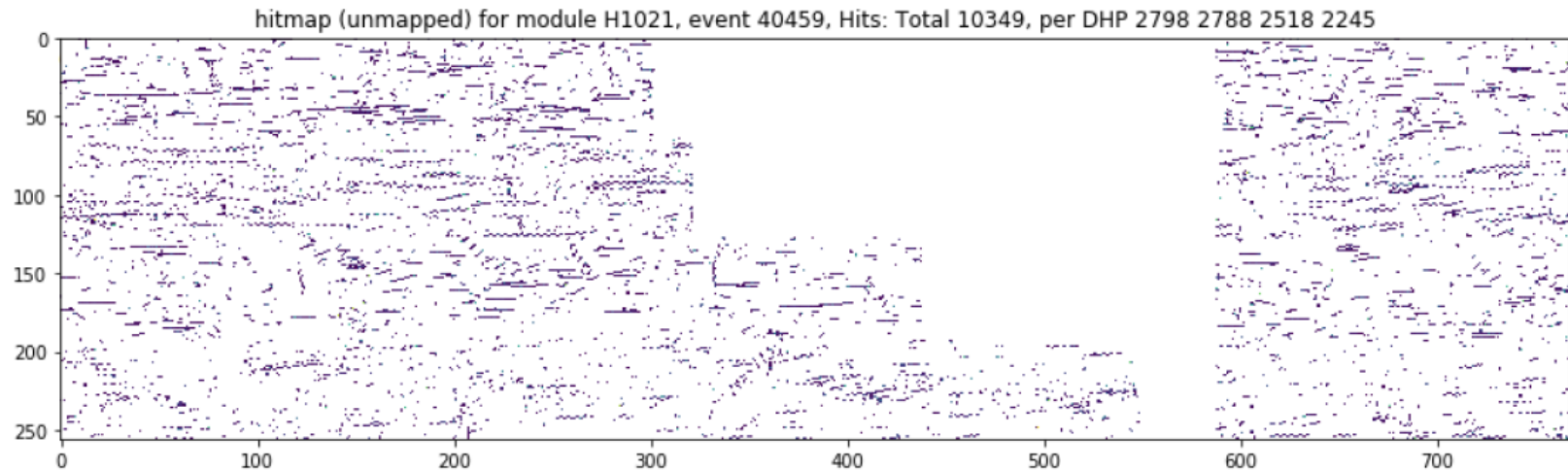
DHE\_20190512\_1110

- The same as 20190511\_1446 but with different DHPT synchronization logic
- Synchronization with DHP => frame and gate numbers are taken from first active DHP when no triggers otherwise free running
- During first test one DHE was not working reliably for unknown reason, repeated test on May 27-th was successful  
Possible cause : UCF interface or programming sequence

# Frame size limit

Maximum DHP frame size is limited to 2000 words

> 1616 pixels/DHP frame => not less than 3.3% occupancy



# DHE Error Word

Error register divided to 4 fields :

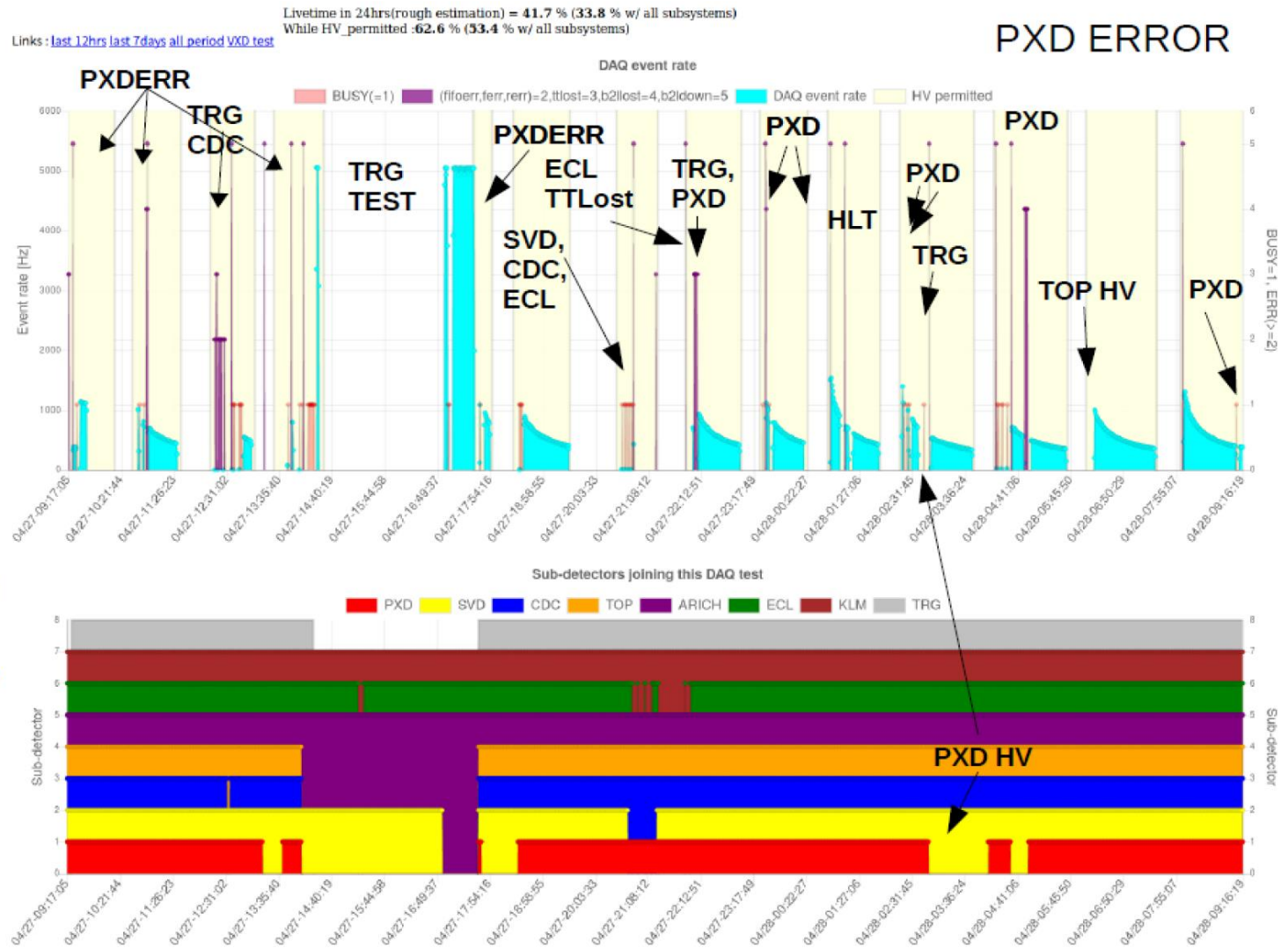
DHP3(31-24), DHP2(23-16), DHP1(15-8), DHP0(7-0)

8 bits divided to 2 fields : 3-0 – Start of event , 7-0 – End of Event

Error codes:

- x"0" – no errors
- x"1" – missing frame
- x"2" – timeout => GHOST frame
- x"3" – dhp link down
- x"4" – dhp masked
- x"5" – trigger number mismatch
- x"6" – data block too big

## PXD ERROR



28.04.2019  
OWL Shift

Negative  
Example for  
unstable  
operation

=> Improvement  
of firmware  
upgrade strategy

# Stopped runs by PXD for last 5 days

Runs 1020-1335, 21.05-27.05

PXD Run Summary Elog

Error Type	# of stopped runs	# Phy. runs	Comment
H1051 data drop	<b>19</b>		2 times/shift
Other modules data drop	8		
Others DHH errors	1		UCF link
DHP link(s) drop	3		No stop of run
Other errors	7		
Total	35	174	

H1051 data drop error synchronous with CLOCK SYNC ERROR in DHI50

# DHH To Do List

Minor changes in DHE firmware

- Improve DHP synchronization information

Test of GATED Mode

Improving UCF link stability

Investigation of DHI 58 CLOCK Sync problem causes H1051 data drop

Activities during shutdown , July 7-23

- Test of Load balancing DHC firmware
- Installation of IPMC in all DHH carrier cards => remote power cycle of DHH modules
- Installation of new PC instead of SHROUD

THANK YOU



# DHPT Problems

## 1. Case 1

- N consecutive high occupancy events take M frames to transmit data (  $M > N$  )
- After completion of data transmission DHP sends M-N empty frames with the same frame number => if trigger would arrive during this time the event will be empty

## 2. Case 2

- N consecutive high occupancy events may cause stop of DHPT, observed at TUM and DESY
- Recovery only by LONG RESET