

- Data Quality Monitoring
 - NOT status/health of ASICs, links, etc → EPICS
 - NOT online O(seconds) but close to O(minutes)
- DQM runs on Express Reco and Offline.
 - NOT on the event builder and not on the HLT (PXD data enters afterwards)
- Raw DQM (pixel based, (hardware) cluster based)
 - data rates, mean event size, fired pixels, plain distributions
- Cluster DQM (after clusterizer)
- Overlap with tracking and ROI calculating DQM
 - (efficiency of ROI selection etc)

- Histograms from within basf2 (Express Reco)
- How and where to show histograms → Belle 2 common
 - Automatic analysis and report back to operator? → Belle 2 common
- Where: CSS
- How: CSS widget and daq/basf2 modules/programs. Main code by Itoh-san and Konno-san
- What is doing technically: Take histograms from basf2 and serve them by Ethernet to CSS clients.
 - (Analysing histograms is a different but related story)
- Thus → if we want to monitor something, we have to unpack it and store it in basf2, make histograms within basf2
 - Unpack data → data objects → plot data
 - DQM code written (be)for DESY TB 2014: f.e. PXDDQMMModule, PXDRawDQMMModule, PXDROIDQMMModule

Navigator

- ladder_rawhits@L2_11_1.opi
- ladder_rawhits@L2_11_2.opi
- ladder_rawhits@L2_12_1.opi
- ladder_rawhits@L2_12_2.opi
- ladder_rawhits@L2_1_1.opi
- ladder_rawhits@L2_1_2.opi
- ladder_rawhits@L2_2_1.opi
- ladder_rawhits@L2_2_2.opi
- ladder_rawhits@L2_3_1.opi
- ladder_rawhits@L2_3_2.opi
- ladder_rawhits@L2_4_1.opi
- ladder_rawhits@L2_4_2.opi
- ladder_rawhits@L2_5_1.opi
- ladder_rawhits@L2_5_2.opi
- ladder_rawhits@L2_6_1.opi
- ladder_rawhits@L2_6_2.opi
- ladder_rawhits@L2_7_1.opi
- ladder_rawhits@L2_7_2.opi
- ladder_rawhits@L2_8_1.opi
- ladder_rawhits@L2_8_2.opi
- ladder_rawhits@L2_9_1.opi
- ladder_rawhits@L2_9_2.opi
- ladders_overview@PXDDQM.opi
- pxd_cluster_dqm@PXDDQM.opi
- pxd_geo_overview.opi
- pxdraw_data_overview@PXDDQM.opi
- pxdraw_roi_overview@PXDDQM.opi

pxd_geo_overview.opi

Back (Alt+Left)

PXD DQM Geometric Overview

Click Ladder to open DQM Overview

Click on box opens corresponding sensor OPI (done with precompiled OPIs)

pxd_cluster_dqm@PXDDQM.opi

PXDDQM \$(UP)

PXD DQM Cluster properties

Cluster Count

Seed and Cluster Charge

Cluster Sizes

Seed Charge

Cluster Charge

PXD DQM PXD Raw Data Overview

PXD Packets / Event

histo = pxdraw/hrawPxdPackets
bin = 9
value = 22720,00

Size of PXD Packets

Pixels / Event

ladder_rawhits@L1_1_1.opi

PXDDQM \$(UP)

PXD DQM Ladder 1.1.1 Raw Hits

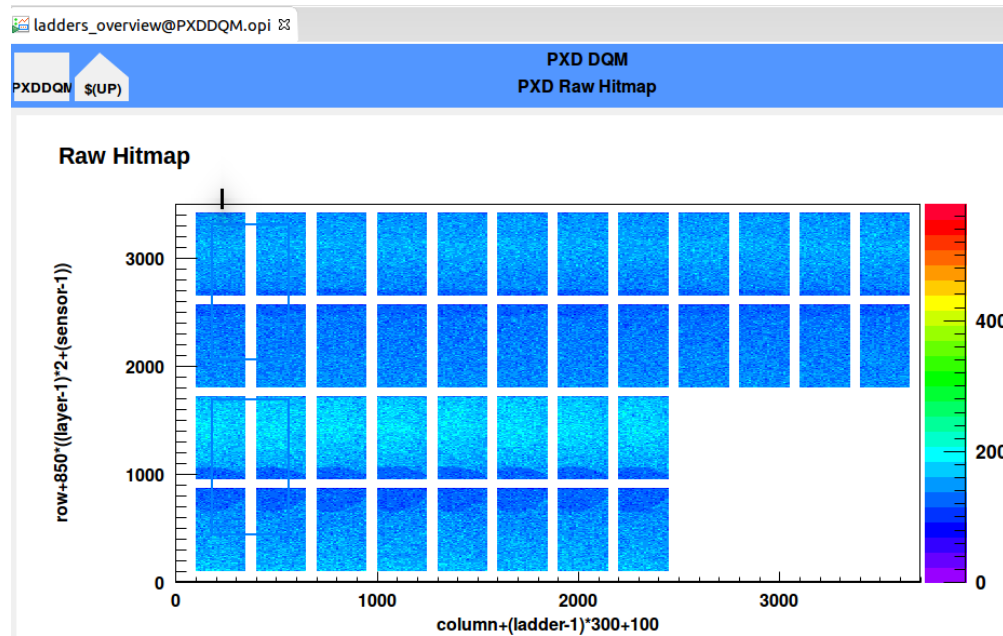
Hit Map Ladder 1.1.1

Charge Map Ladder 1.1.1

Pixel Charge for Ladder 1.1.1

Pixel Common Mode for Ladder 1.1.1

- ladder_rawhits@L2_9_2.opi
- ladders_overview@PXDDQM.opi
- pxd_cluster_dqm@PXDDQM.opi
- pxd_geo_overview.opi
- pxdraw_data_overview@PXDDQM.opi
- pxdraw_roi_overview@PXDDQM.opi



- Problems with large histograms... need rebinning
 - → no way to see a single hot pixel ... but thats not the goal (?)

- We have to see how this fits to the other systems
 - Prepare for TB, but keep full system in mind
 - More histos can be added on-demand, but before TB is preferred
- There are some issues with the histograms
 - number, size (esp. for 2d)
 - axis
- But nothing serious → Working!
- Remark:
 - Automatic analysis of histograms (e.g. fitting) can be done within the framework. But the results have to be transported as PVs (NSM → EPICS interface)
 - Showing the fit within CSS is not supported!

Considered histograms:

```
pxd/hPXDAverageSeedByStartRow1
pxd/hPXDAverageSeedByStartRow2
pxd/hPXDClusterCharge1
pxd/hPXDClusterCharge2
pxd/hPXDClusters1
pxd/hPXDClusters2
pxd/hPXDDigitCharge1
pxd/hPXDDigitCharge2
pxd/hPXDFired1
pxd/hPXDFired2
pxd/hPXDHitmapU1
pxd/hPXDHitmapU2
pxd/hPXDHitmapV1
pxd/hPXDHitmapV2
pxd/hPXDSeed1
pxd/hPXDSeed2
pxd/hPXDSeedCountsByStartRow1
pxd/hPXDSeedCountsByStartRow2
pxd/hPXDSeedCountsByU1
pxd/hPXDSeedCountsByU2
pxd/hPXDSeedCountsByV1
pxd/hPXDSeedCountsByV2
pxd/hPXDSize1
pxd/hPXDSize2
pxd/hPXDSizeU1
pxd/hPXDSizeU2
pxd/hPXDSizeV1
pxd/hPXDSizeV2
pxdraw/hrawPxdChargeMap_$(ID)
pxdraw/hrawPxdCount
pxdraw/hrawPxdHitMapAll
pxdraw/hrawPxdHitMap_$(ID)
pxdraw/hrawPxdHitsCharge_$(ID)
pxdraw/hrawPxdHitsCommonMode_$(ID)
pxdraw/hrawPxdPackets
pxdraw/hrawPxdPacketSize
pxdrawroi/hrawROIcount
pxdrawroi/hrawROIIDC_DHHID
pxdrawroi/hrawROItype
```