



First PXD6 Results with DCD-B Readout

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● Overview

Fist results of the PXD6 with DCD-B Read-out.

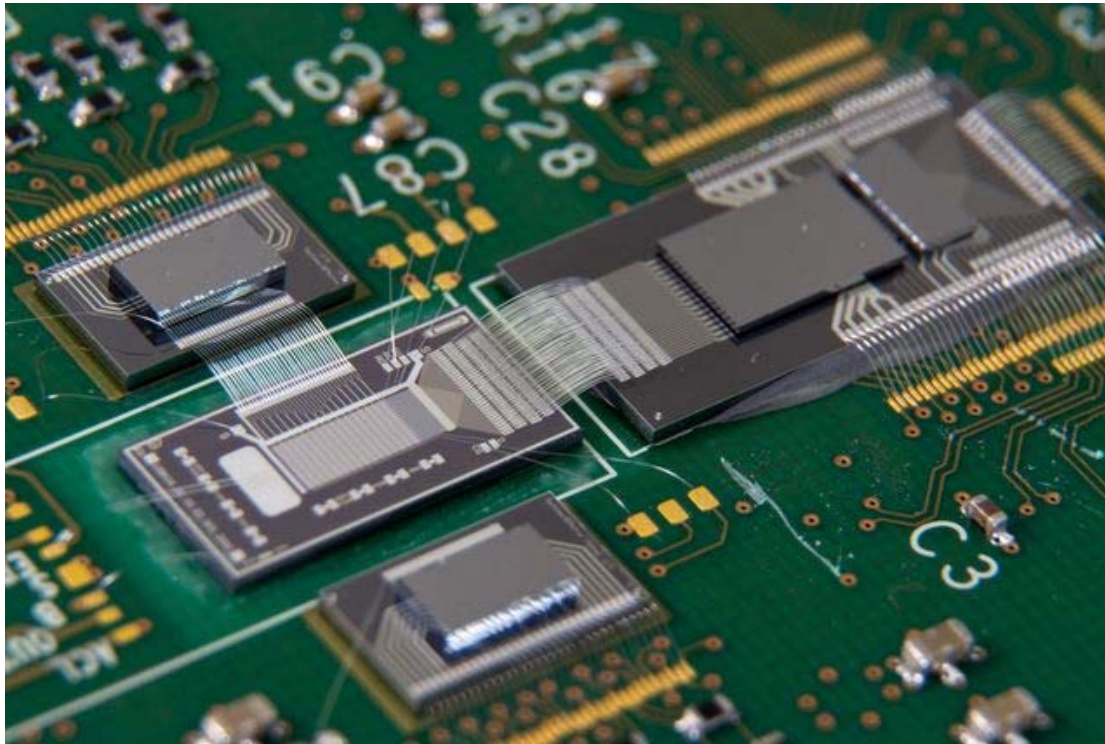
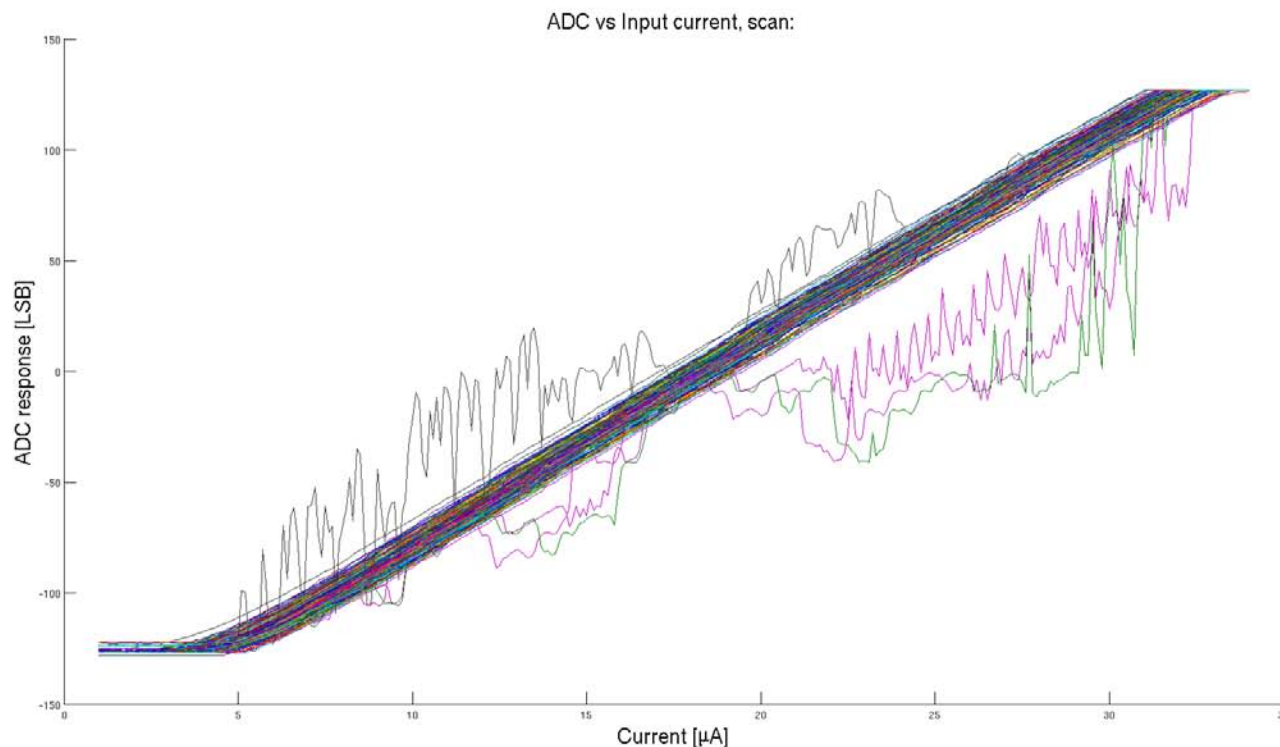


Photo by Manuel Koch

Photo of the Hybrid 4.1.05 showing DCD-B, Switcher B and PXD6 Matrix (Matrix is D07, Wafer #2, 128x16 ST SD SCG Z050)

● DCD-B Calibration

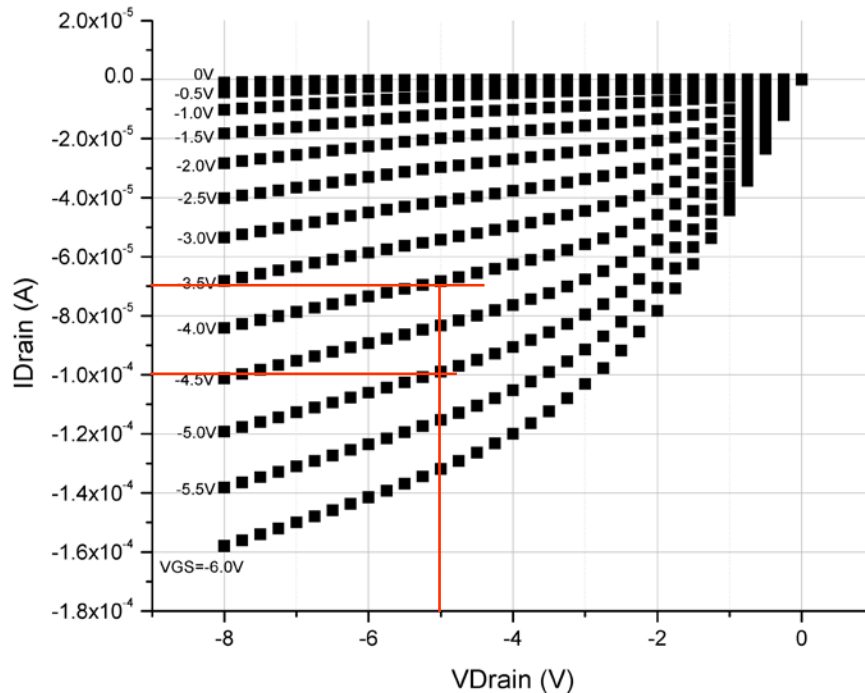
DCD-B channel calibration was done at University of Bonn:



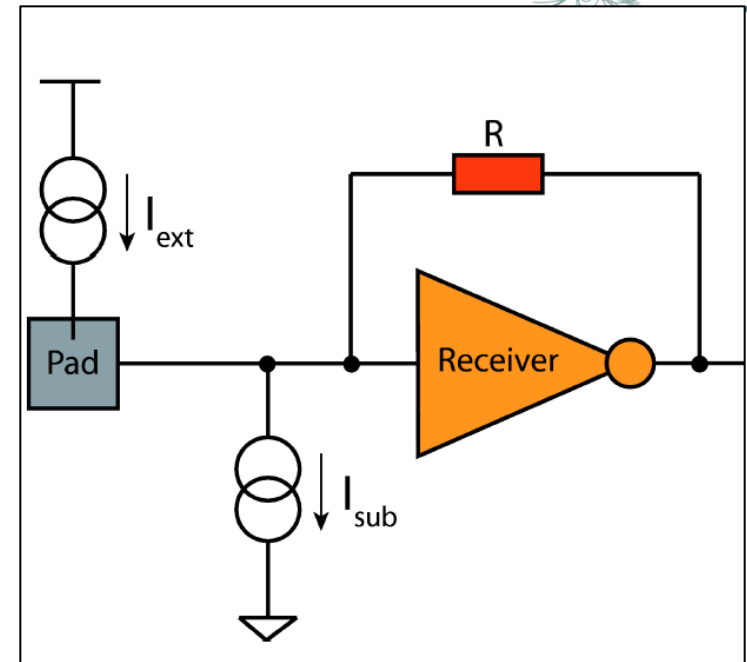
Graph of the ADC Transfer Curves.

- Hybrid + ini File were received in Munich in the Week after Ringberg
- 4 Channels not functional
- Setting were check with ADC transfer curves of individual ADCs in MUC.

● Limitation on SNR



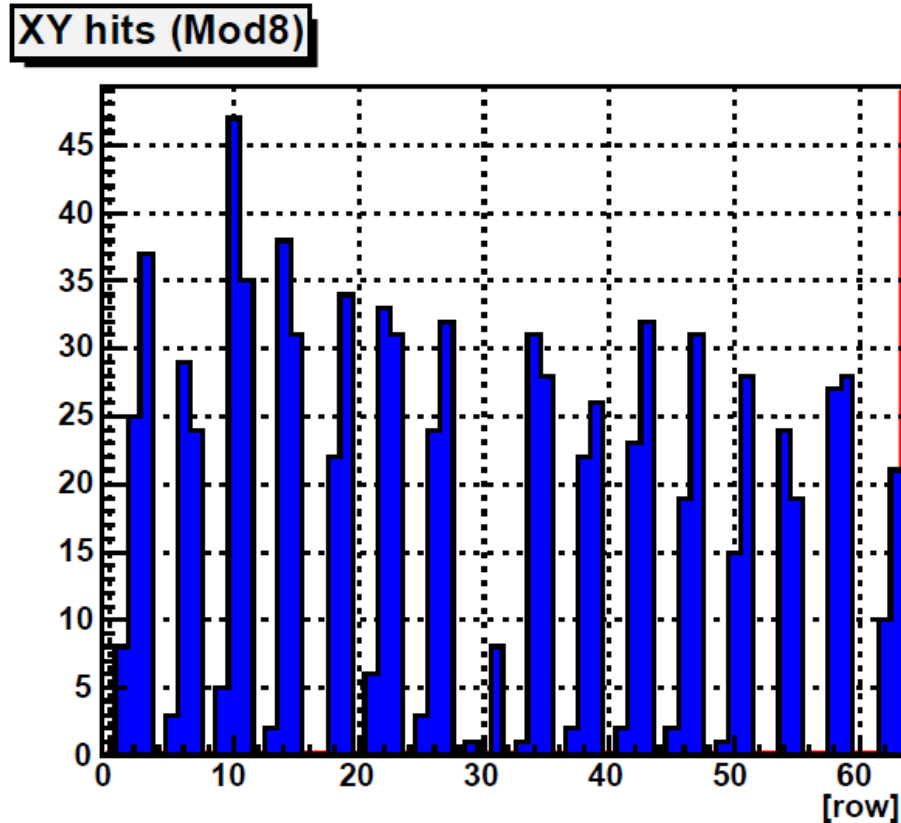
PXD5 - characteristic



Simplified Input of the DCD-B

- PxD5 and PxD6 drain current are expected to be around $100\mu\text{A}$ (same W/L) without irradiation
- DCD-B internal current source is designed for $70\mu\text{A}$ and thus limits the DEPFET drain current – TC1 is designed for $140\mu\text{A}$
- g_q is proportional to Drain current \rightarrow less SNR expected for DCD Readout

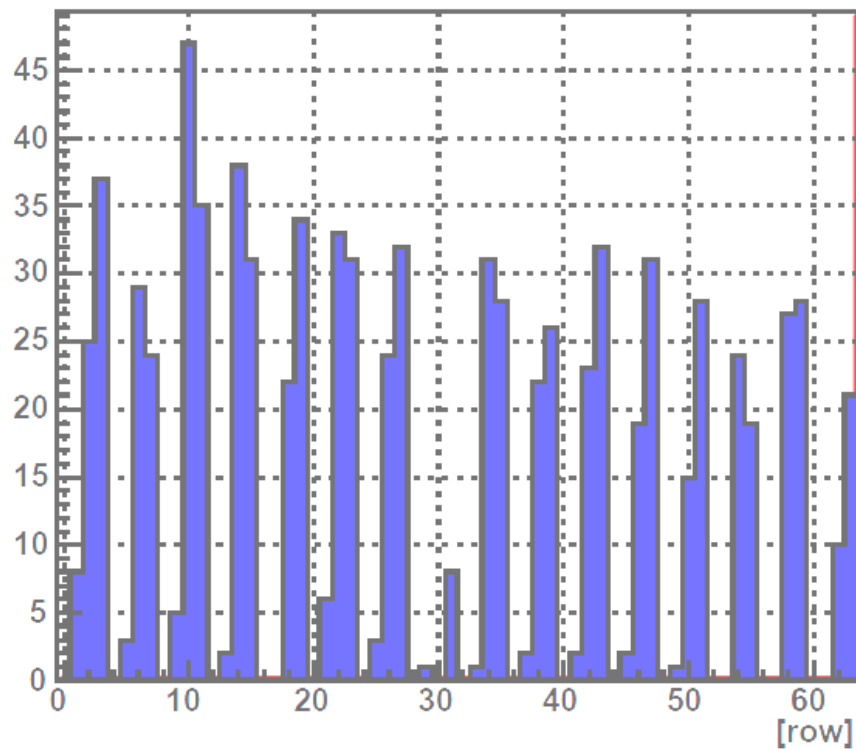
● Hits vs. Matrix Row



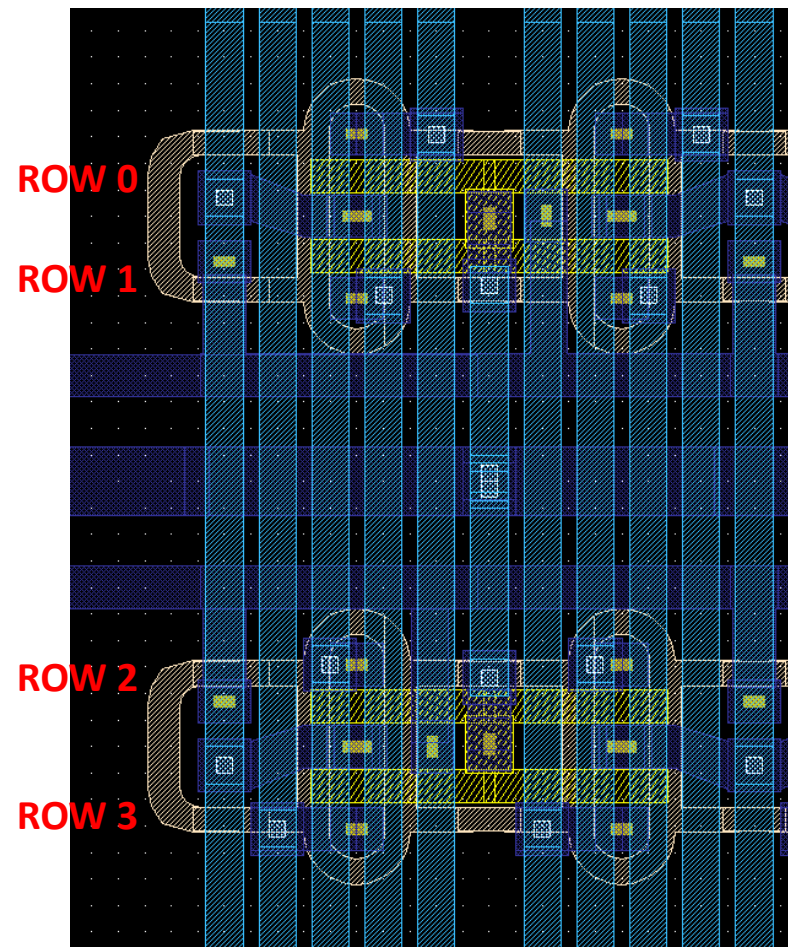
- $\frac{1}{4}$ of all rows are masked because their pedestal value is out of the ADC range
 - Starting with the first geometrical row and then repeating every 4th row
- The next row is less sensitive
- Row 32 and 33 are masked in addition

Hits vs. Matrix Row

XY hits (Mod8)



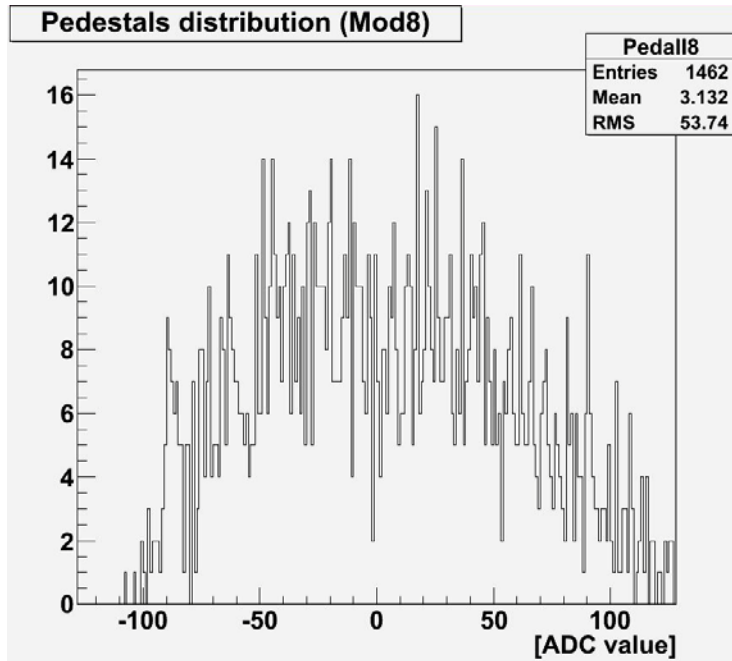
Sub-section of the PXD6 D07 (ST SD SCG) Layout



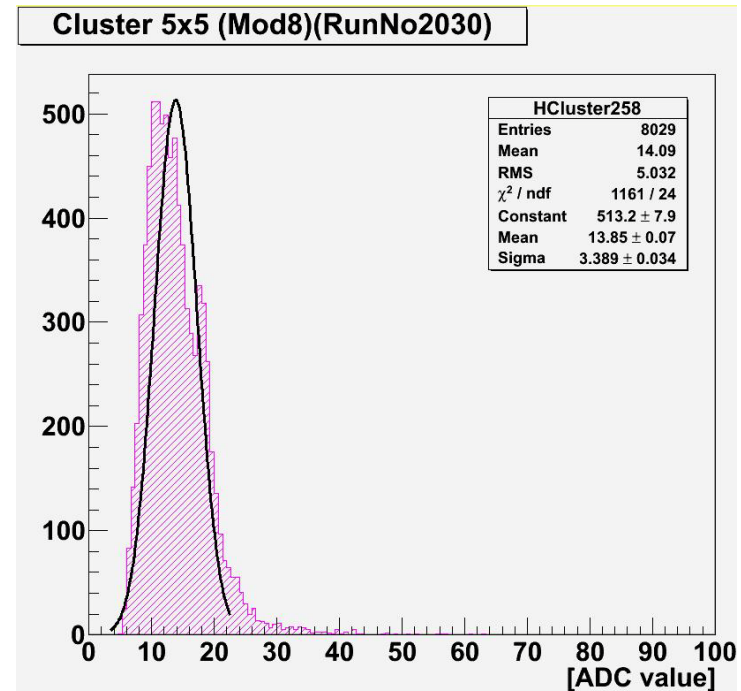
➤ Impact on the Cluster Size: only 2 x 2 clusters are used (charge loss for bigger clusters)

● Dynamic Pedestal Correction

- Dynamic Pedestal Correction is implemented in DAQ
- Due to the rows with pedestal value of -127, a fixed mean target for the pedestal calibration was used



Pedestal Distribution after calibration – still over a large ADC range

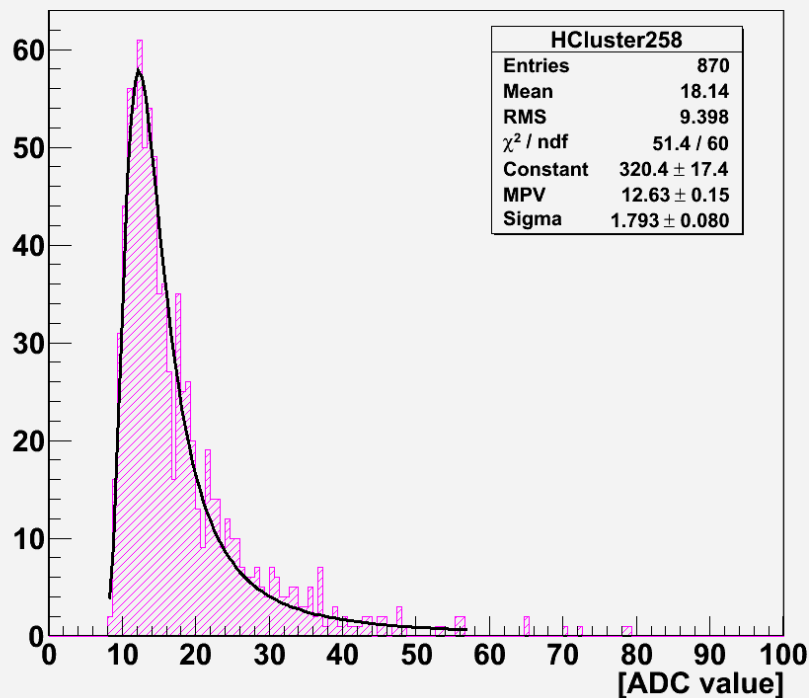


Cd-109 Spectrum with dynamic Pedestal Correction

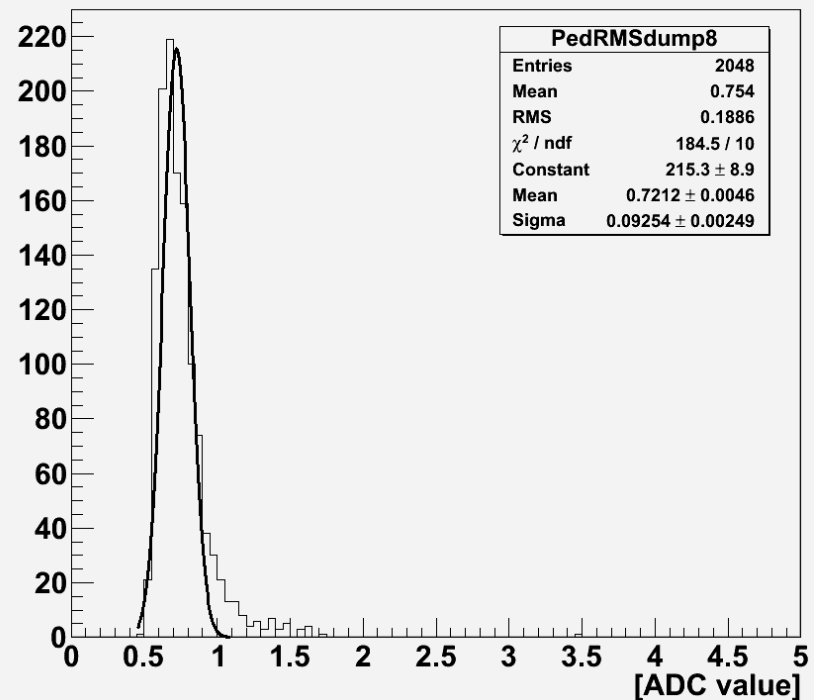
Based on ADU/e- conversion from Sr-Source a Mean Value of 19 ADU is expected – charge loss due to the 2x2 cluster; S/R = 18

● Sr-Source Spectrum

Cluster 5x5 (Mod8)(RunNo0)



All chan. Noise distribution (Mod8)



- SNR = 17.5
- Noise @ 320ns Row Readout = 228e-
- PXD voltage scan – for the optimization of the working point – has to be completed
- Due to the insensitive rows, the clustering only gives 2 x 2 clusters

● Summary



- DAQ – including Online-Monitor and dynamic Pedestal Correction is running!
- First Source measurements of PXD6 were performed at 320ns Row-Readout time (100MHz DCD-B timing) ... fast timing is in preparation
- Investigations on the Hits-vs.-Matrix Rows are ongoing
- Thanks to all the people involved at the University of Bonn and University of Heidelberg!