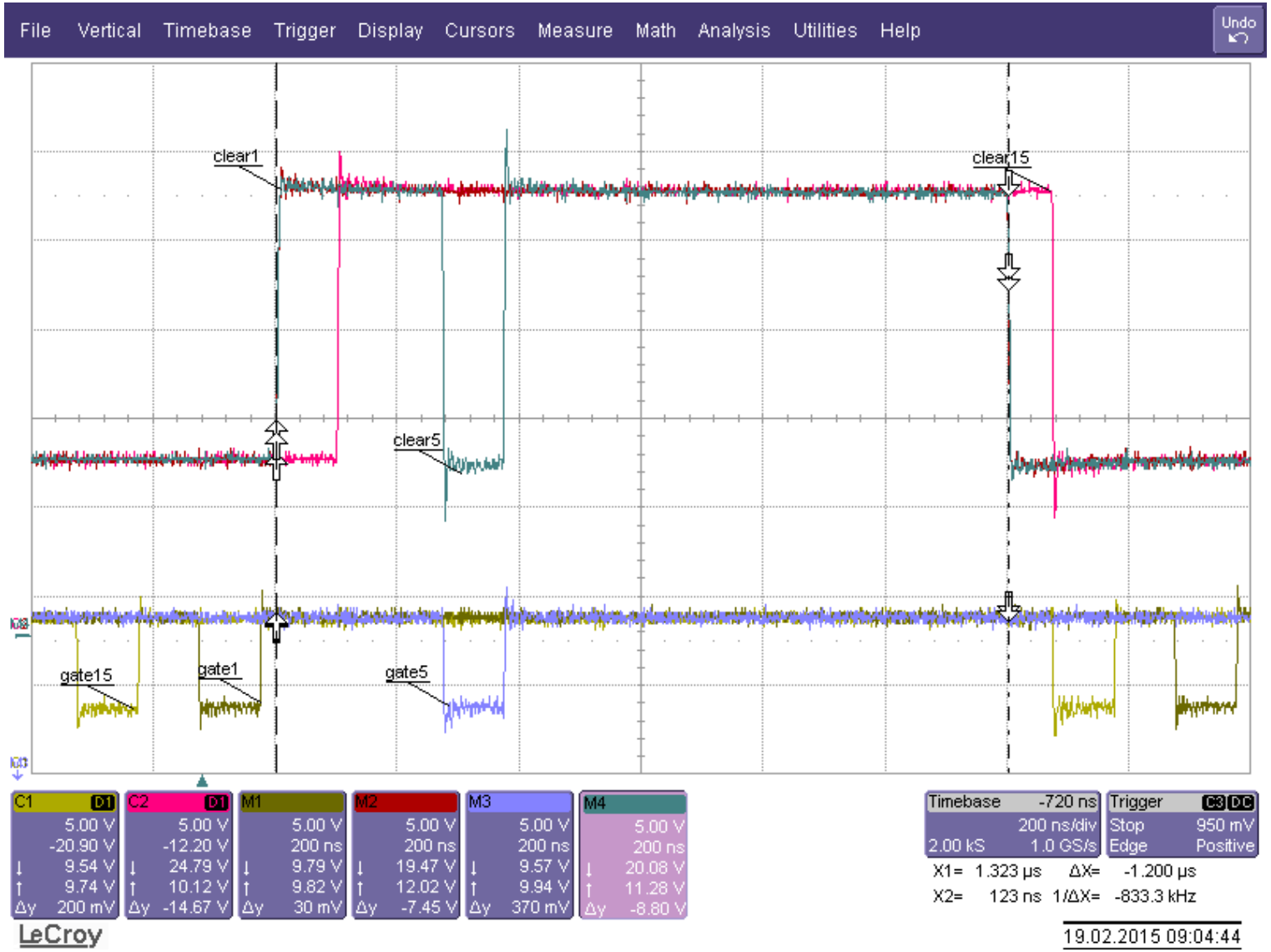
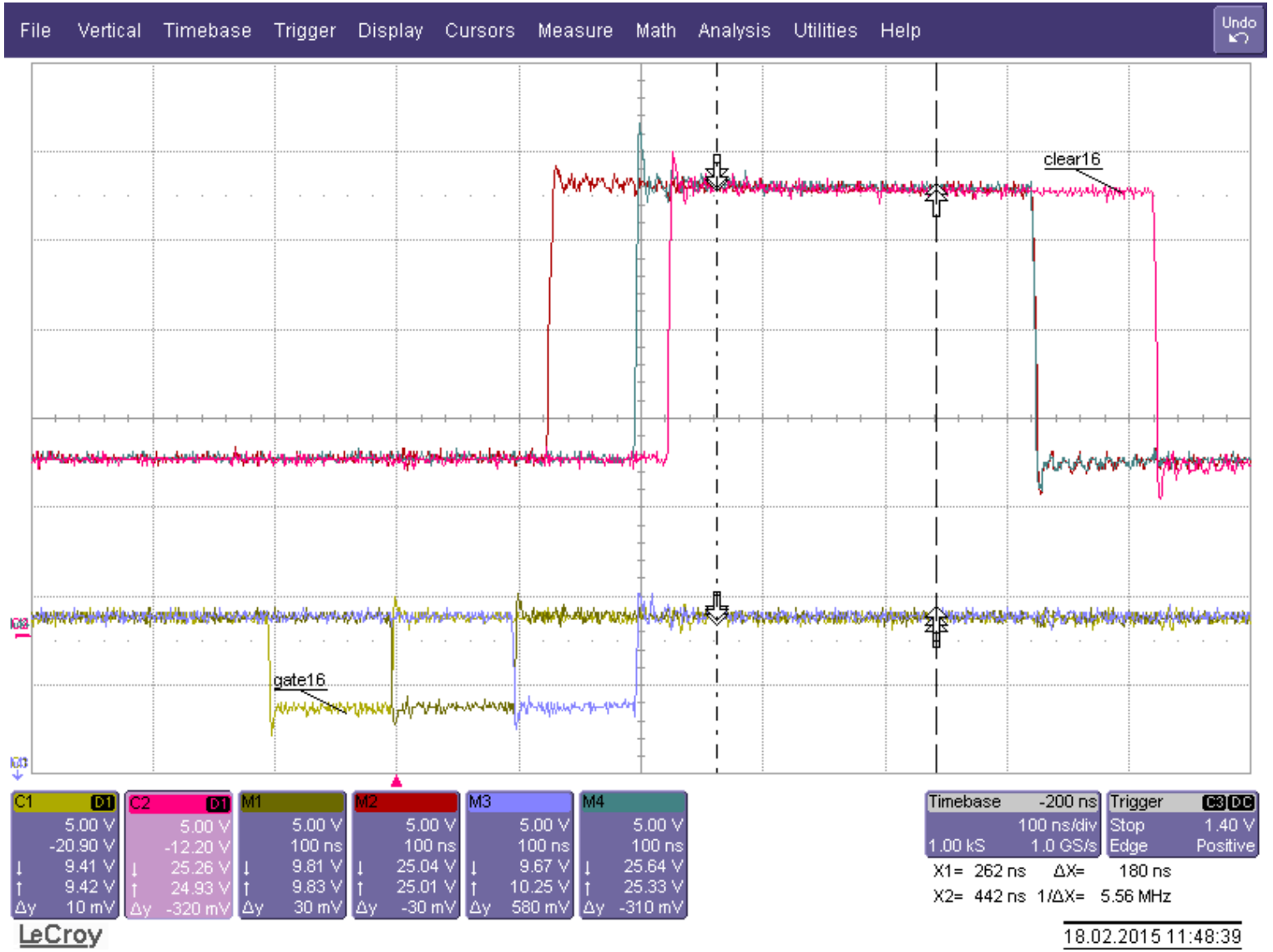
Gated Mode on Hybrid 4

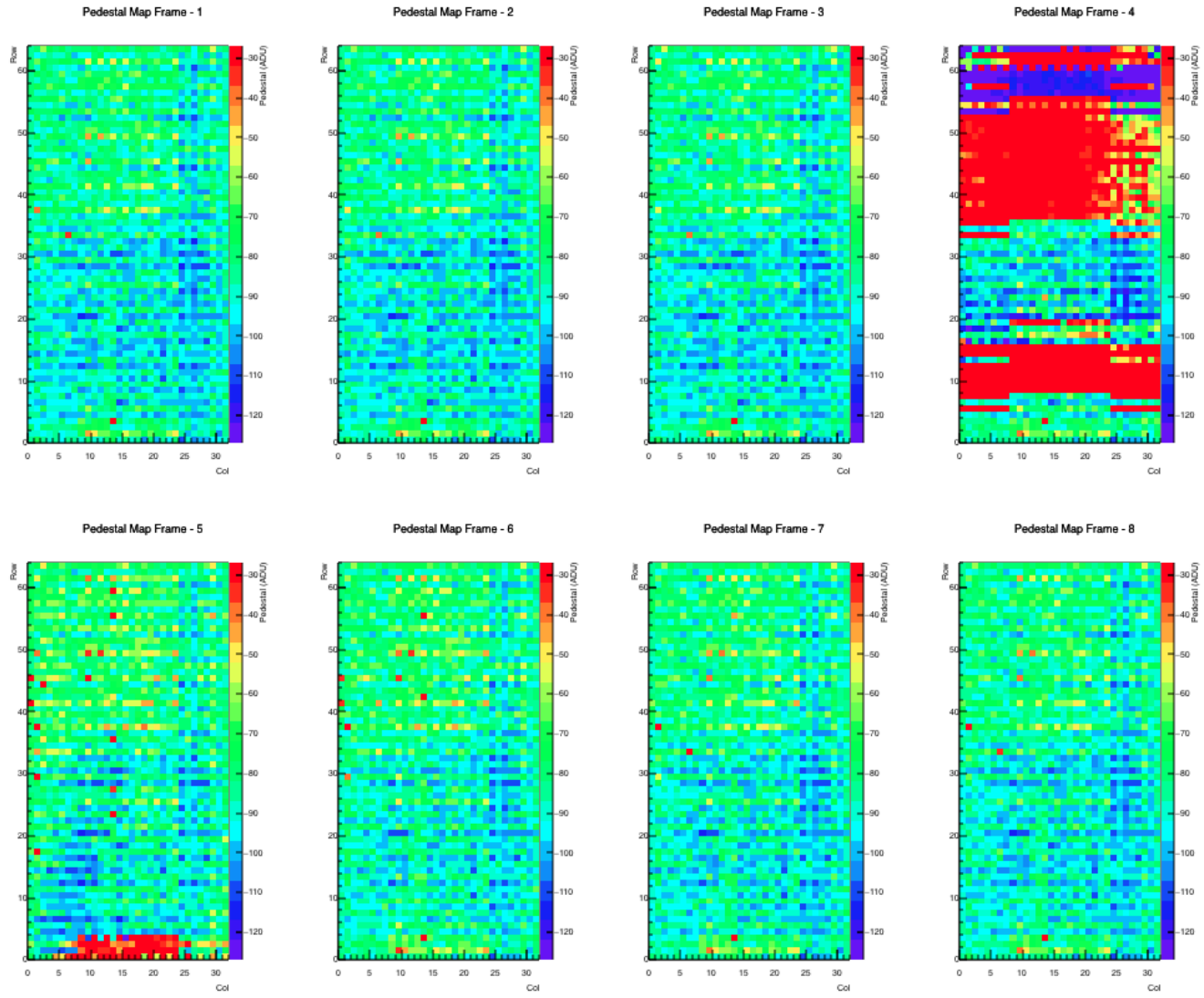
Gated Mode with RO – 1200ns



Gated Mode with RO – 400ns



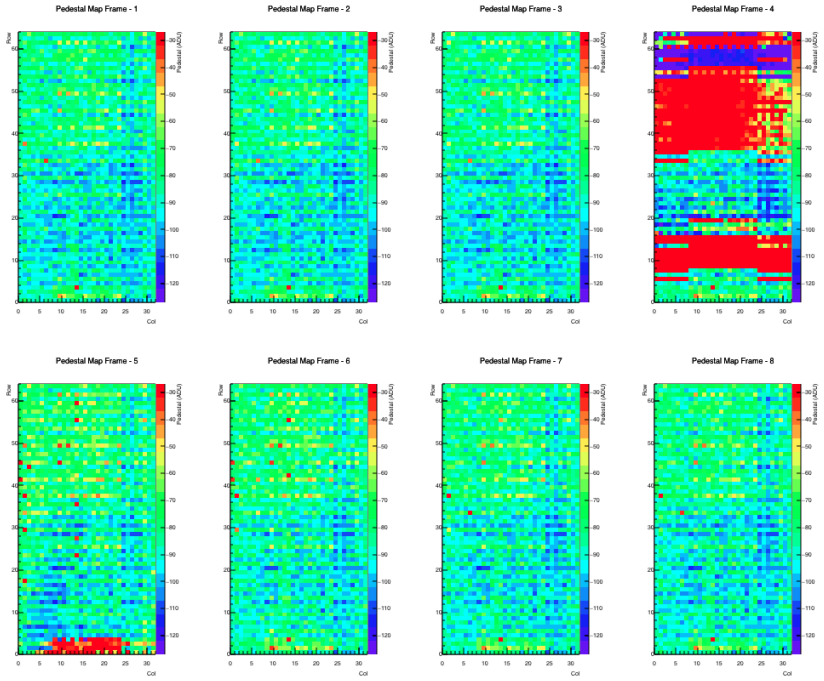
Gated Mode with Read Out – all Frames



Gate Mode with RO – 1200ns

Gated Mode with Read Out – all Frames

- Start of the gated mode shifted by ~ 100ns (one row) (may be due to bad FPGA delay setting)
- Question: how do the pedestals change?
- Would the analog CMC help



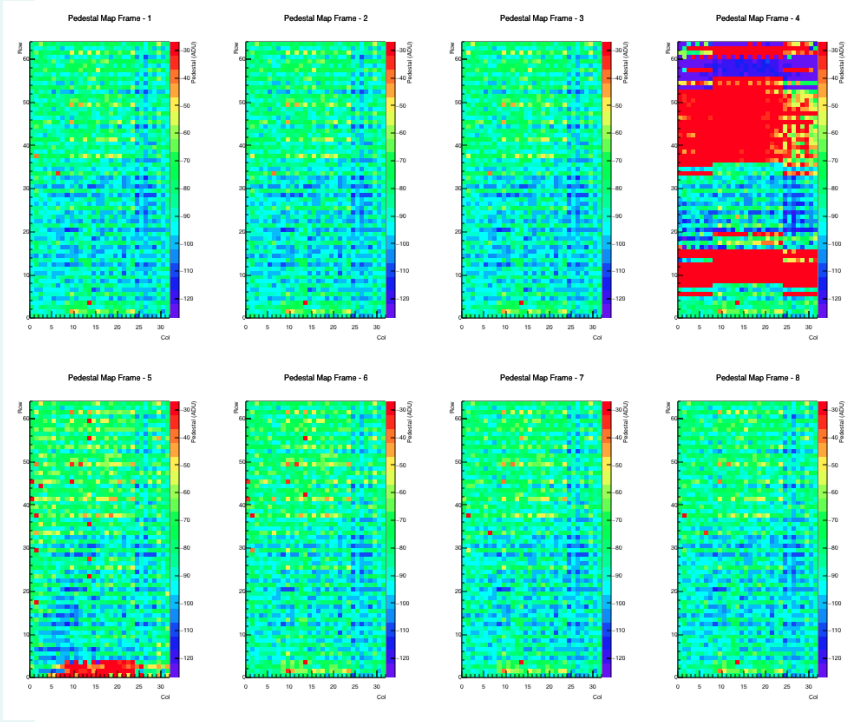
Gate Mode with RO – 1200ns

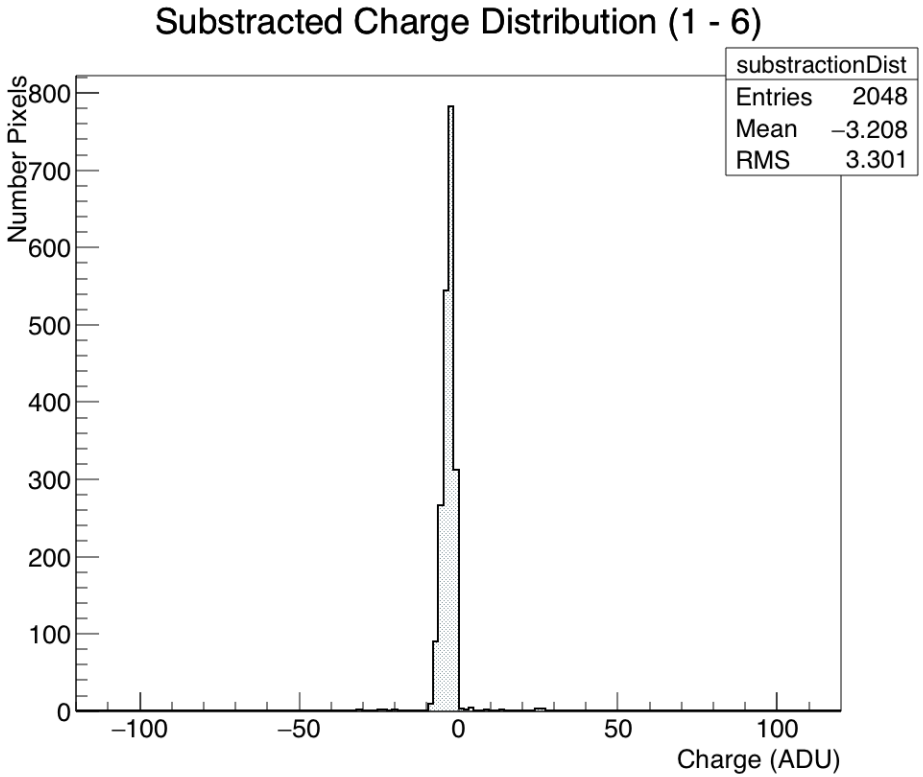
Pedestal and Common Mode

Three methods of pedestal and common mode correction:

1) Pedestal → offline CMC
2) Offline CMC → Pedestal
3) Analog CMC → Pedestal → offline CMC

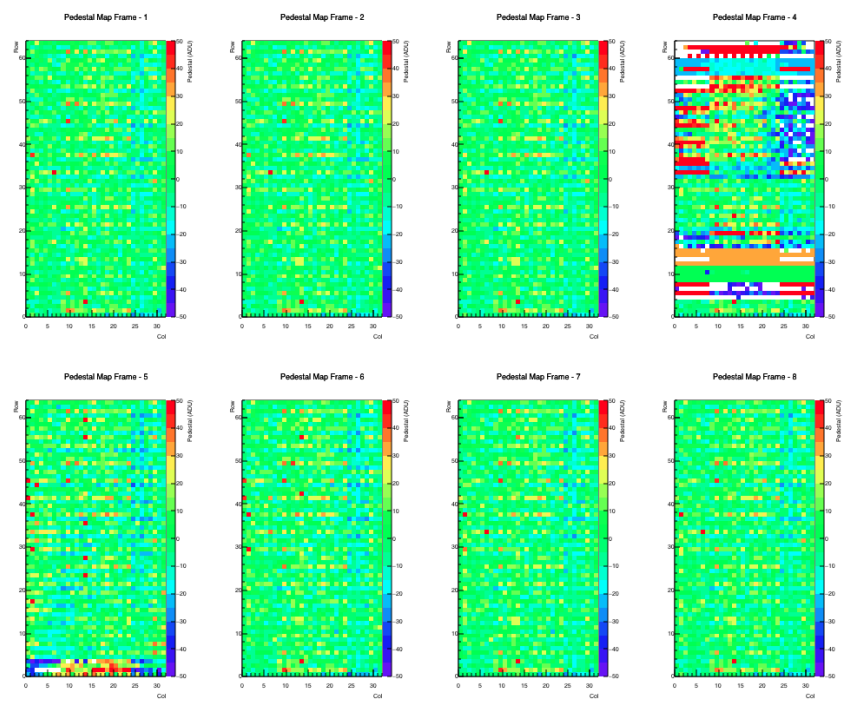
Pedestal → offline CMC



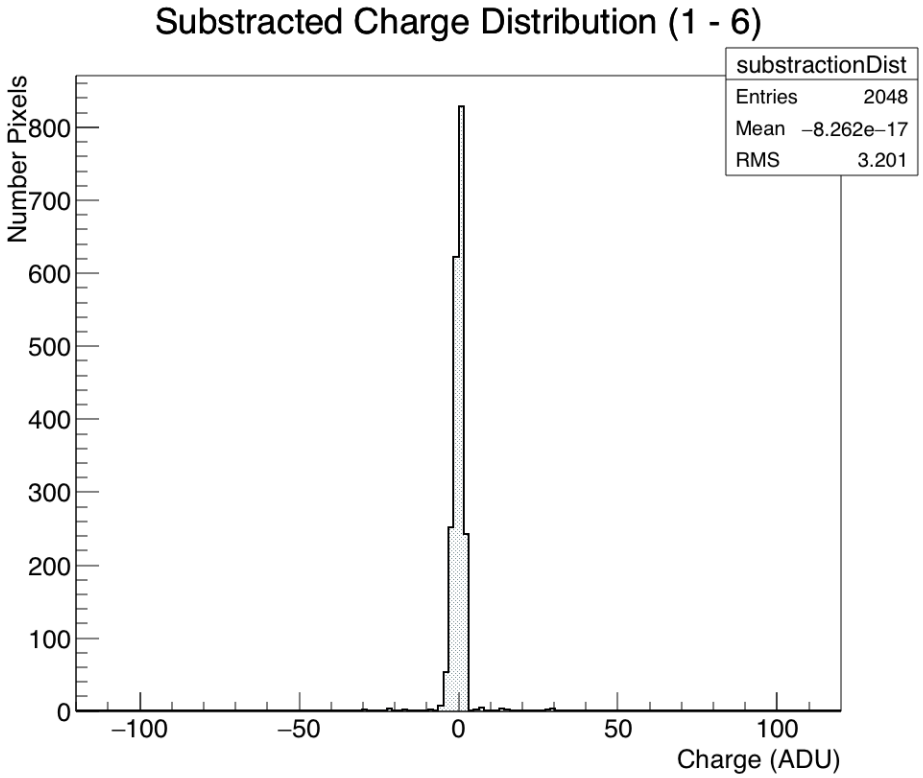


Gate Mode with RO – 1200ns

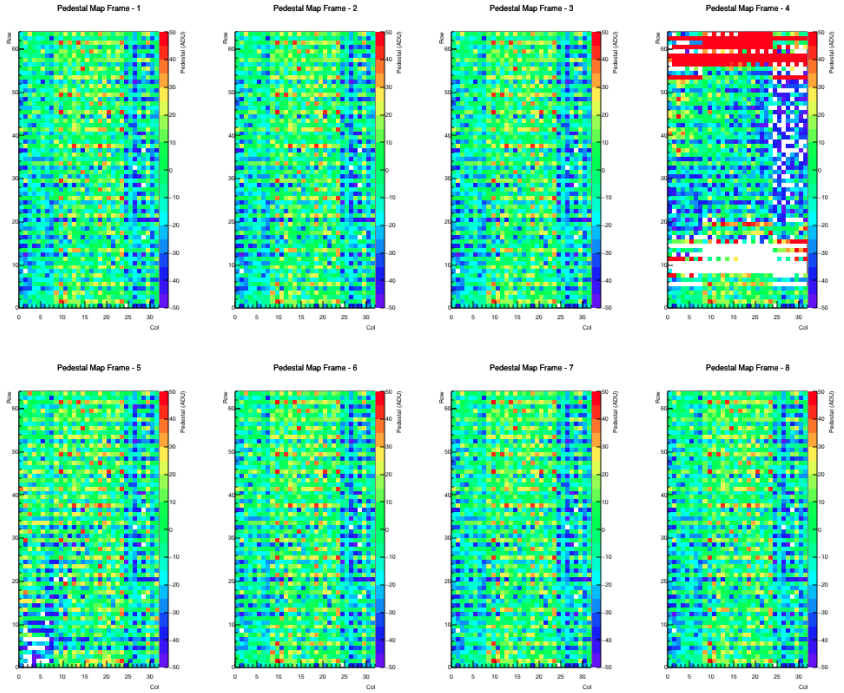
Offline CMC → Pedestal



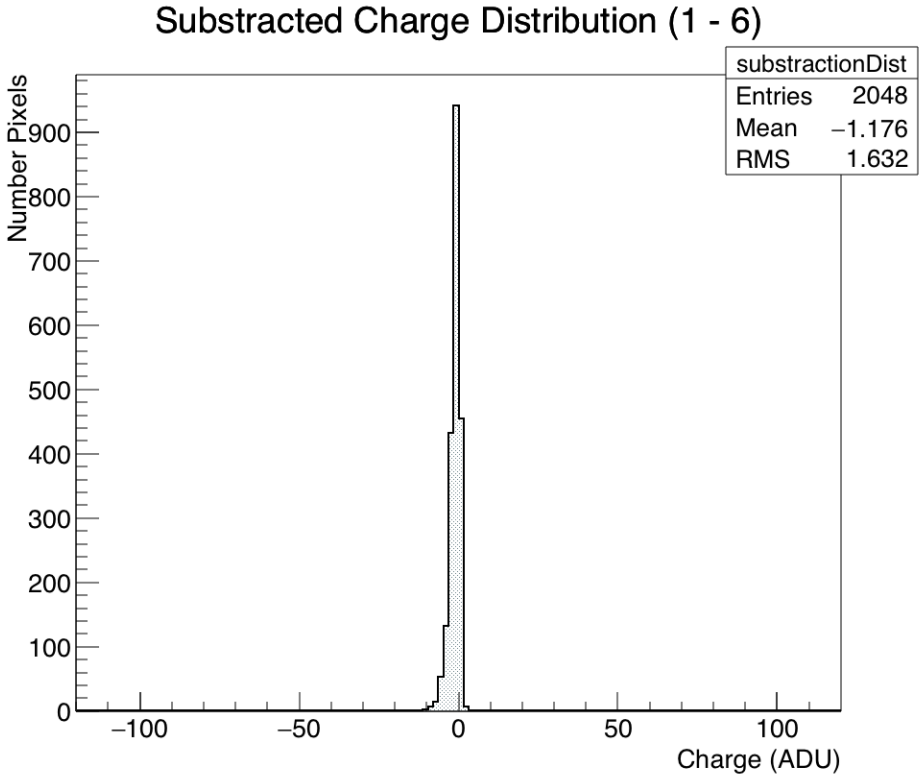
Gate Mode with RO – 1200ns



Analog CMC → Pedestal → offline CMC

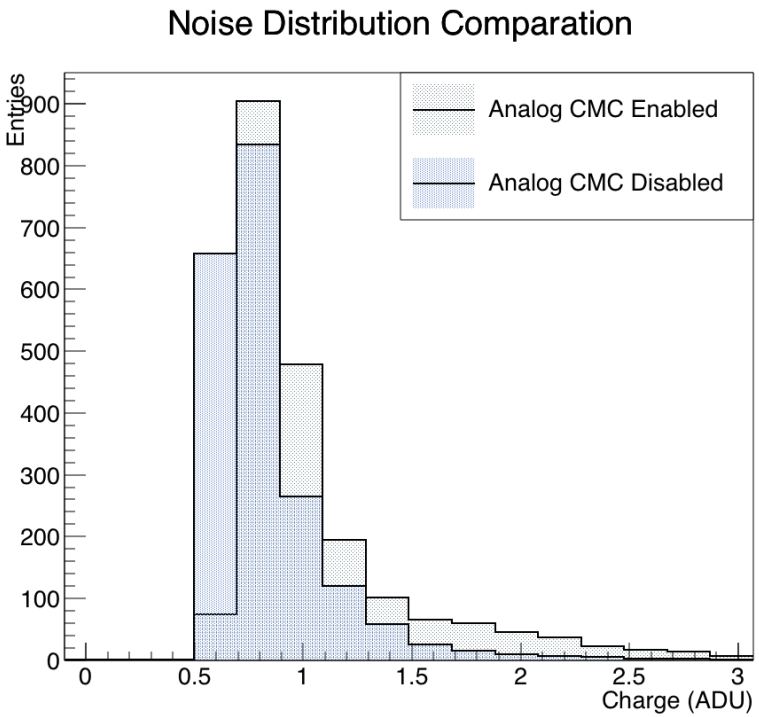


Gate Mode with RO – 1200ns



Analog Common Mode Correction in the DCDPP

- DCDPP provides an analog CMC which can be switched on and off by software
- TIA is disconnected from AmpLow (still the current of AmpLow changes only by less then 10% for 128 channels)
- VDDA current increases (for 256 channels we reach the current limit of the used power supply prototype)
- Noise increases when analog CMC is on

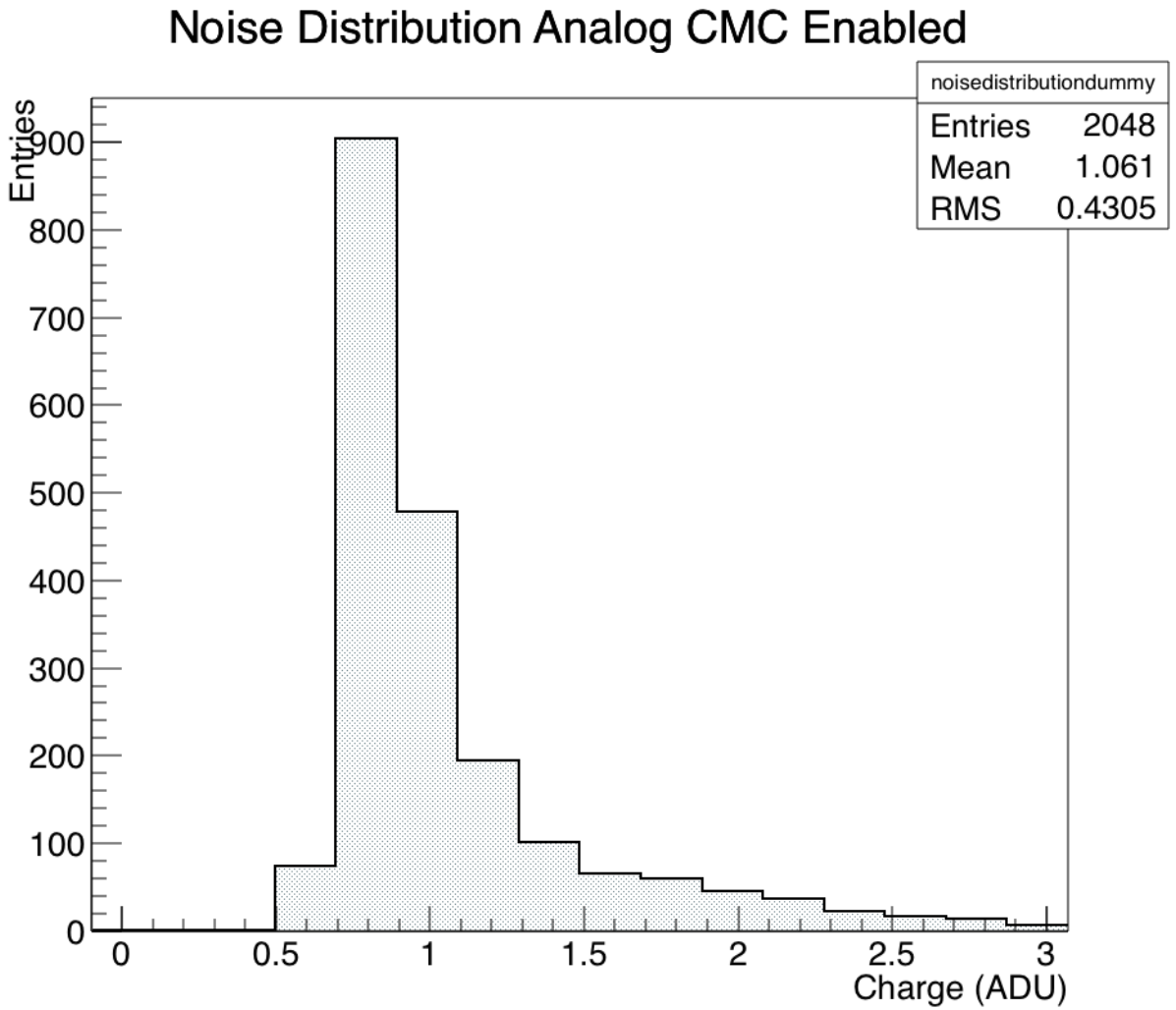


Summary

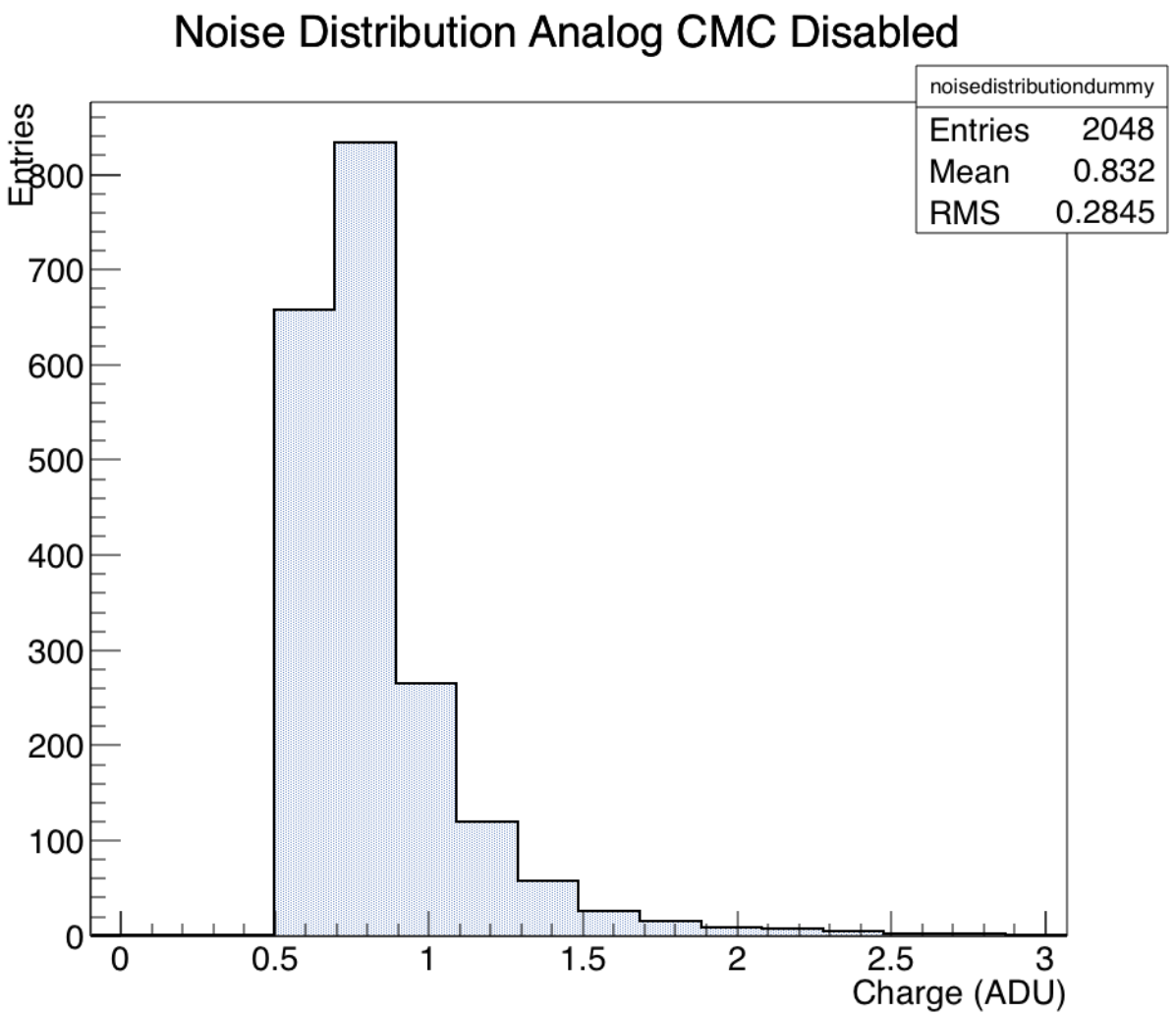
- Gated mode can be applied with the SWBv2 in a fast way (has to be confirmed for the capacitive load of a large matrix)
- Significant change of the pedestal during the gated mode
  - For the gate mode with RO: how to handle data in DHPT?
- Analog CMC seems to improve the pedestal variation (on a small increase of noise)
  - Analog CMC is also important to correct for inhomogeneous irradiation along z.
- We should write down how to test the analog CMC: setup, who and when

Backup

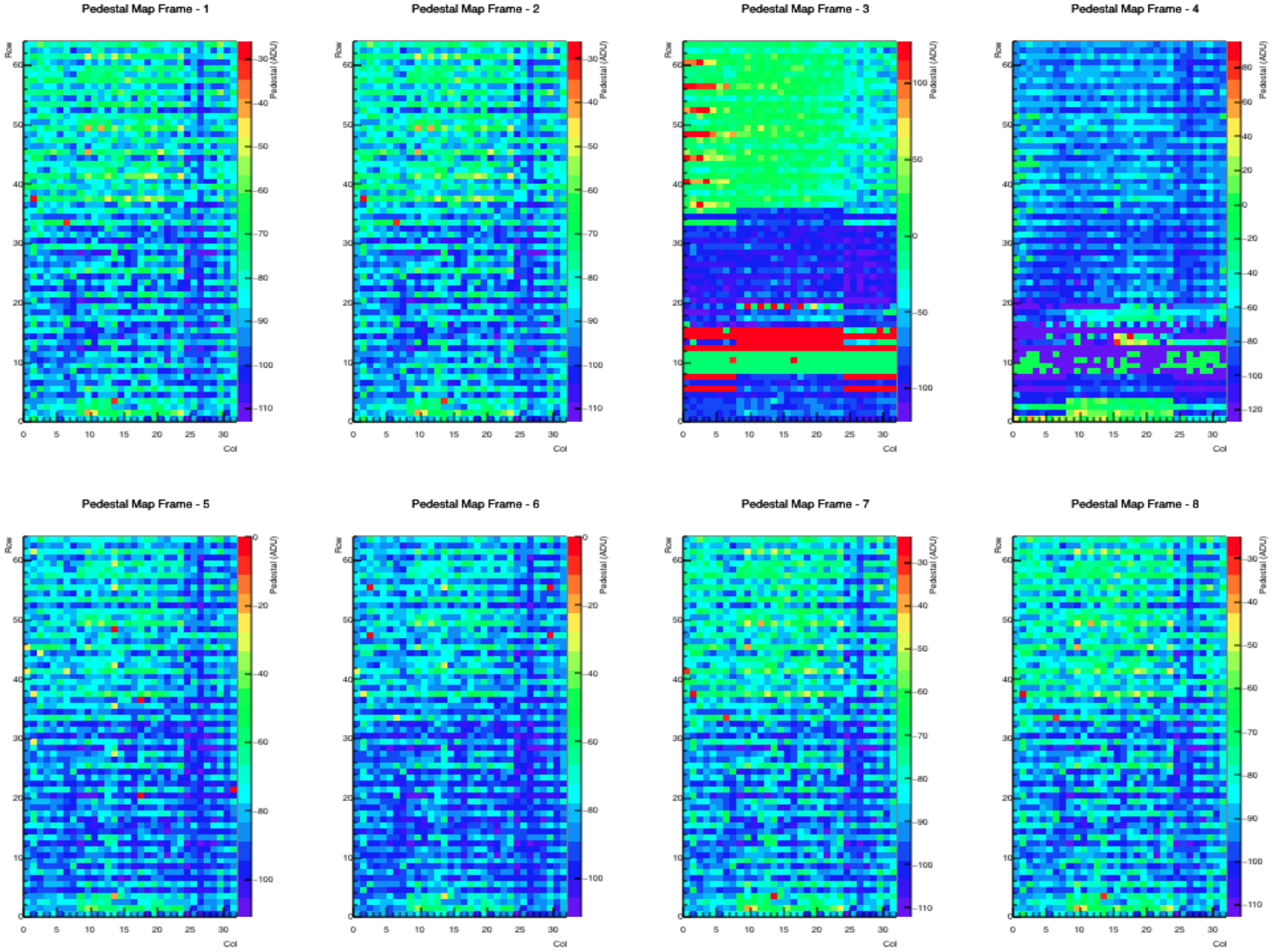
Analog CMC on



Analog CMC off

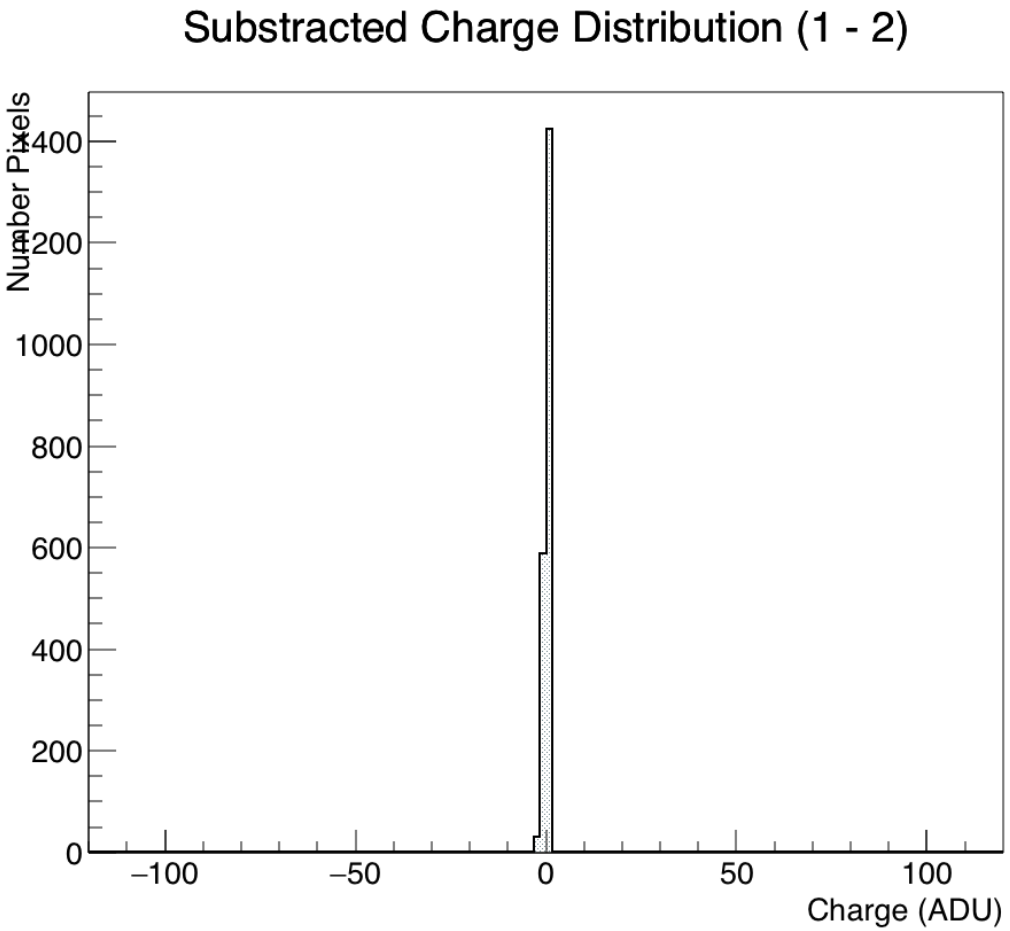


Gated Mode with Read Out – all Frames

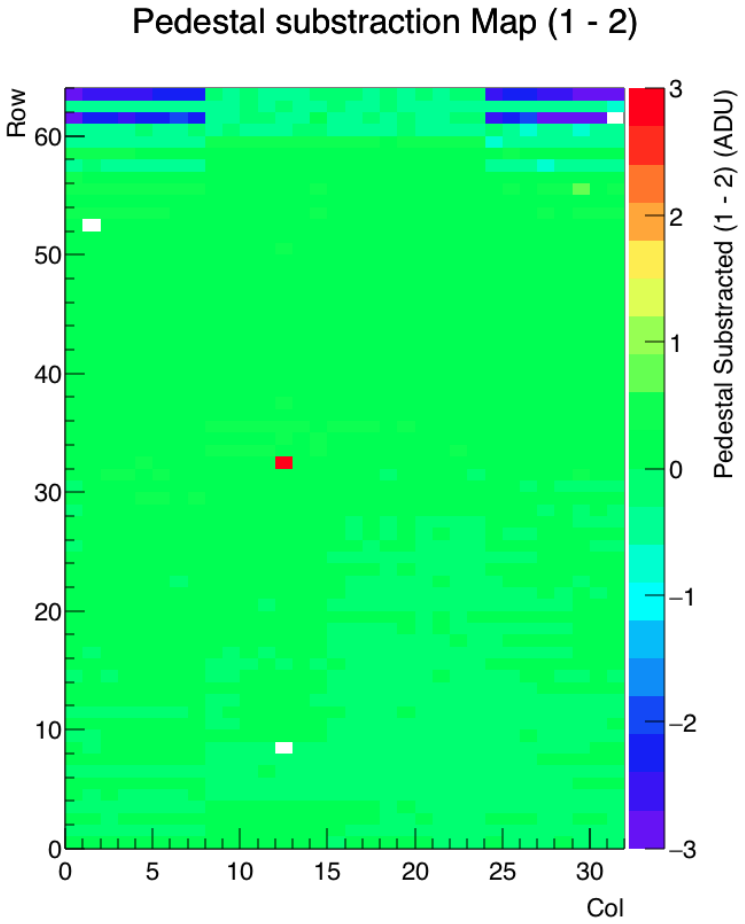


Gate Mode with RO 1600ns during frame 3

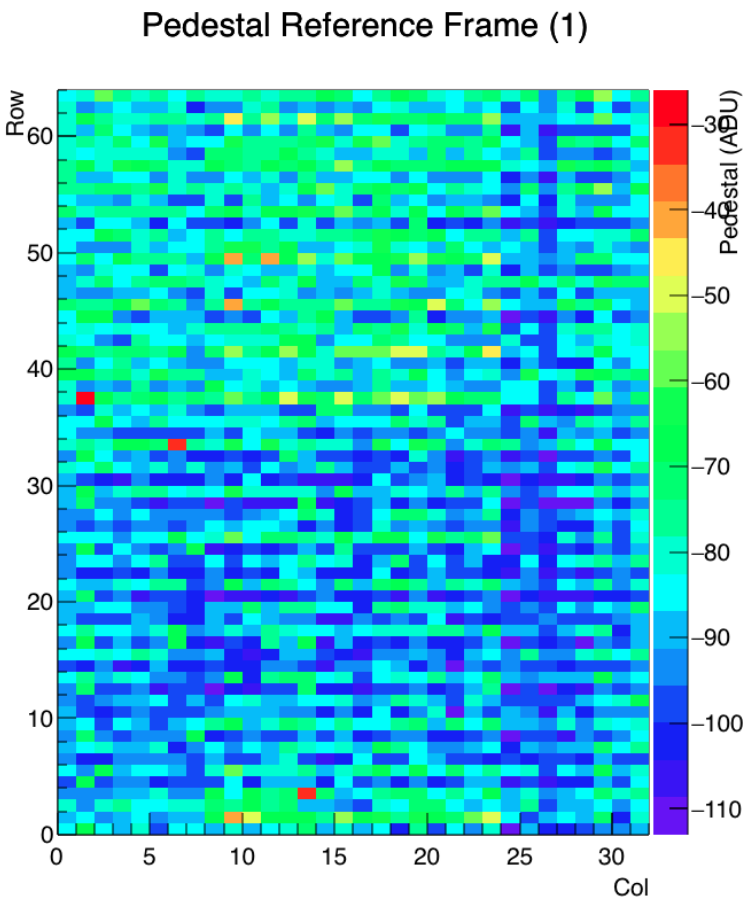
Subtracting Distribution Frame 1 – Frame 2

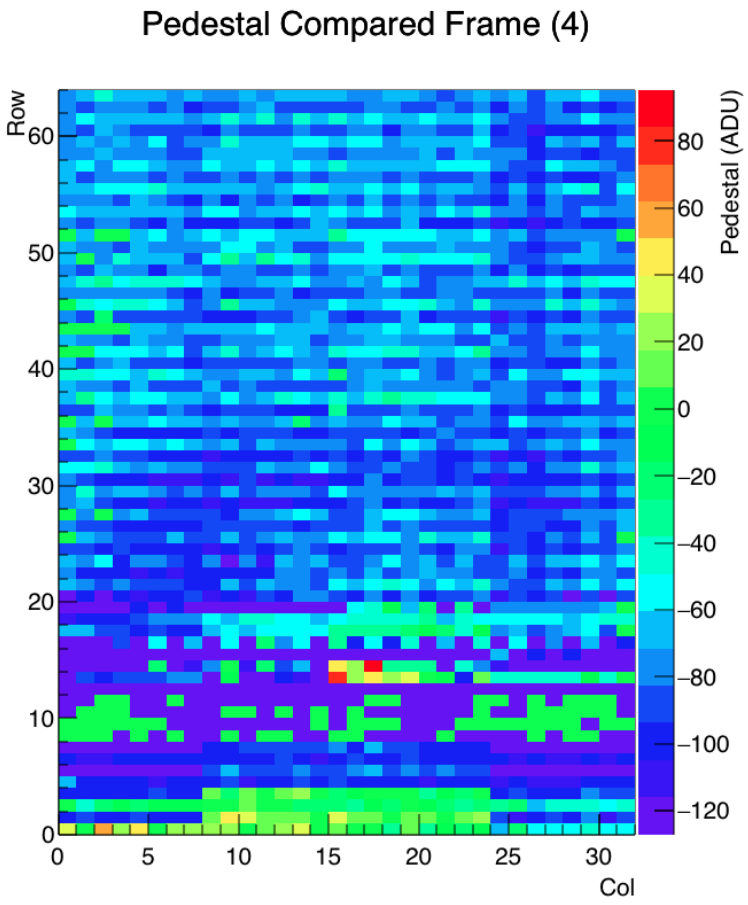


Subtraction Map Frame 1 – Frame 2

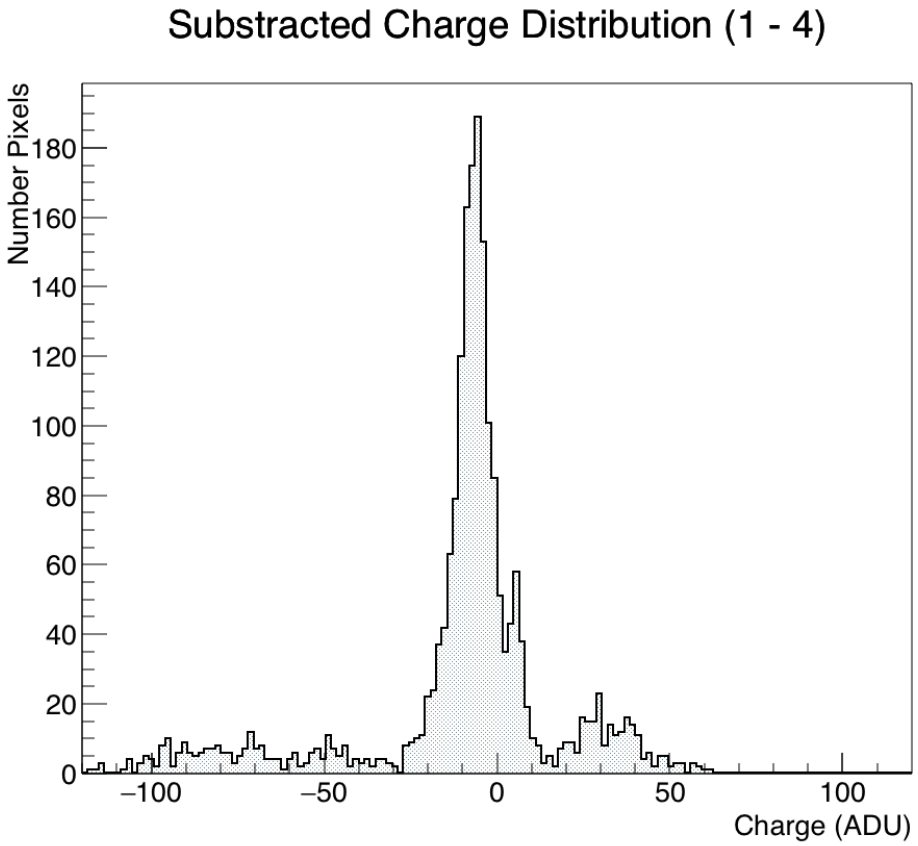


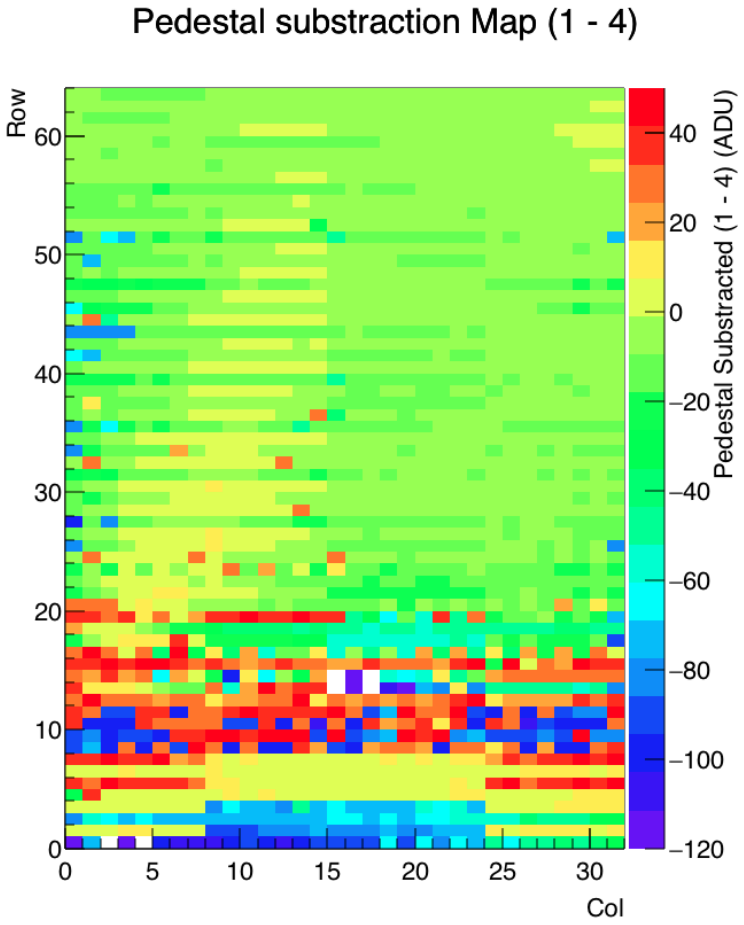
Comparison Pedestal Map R&C - Gated



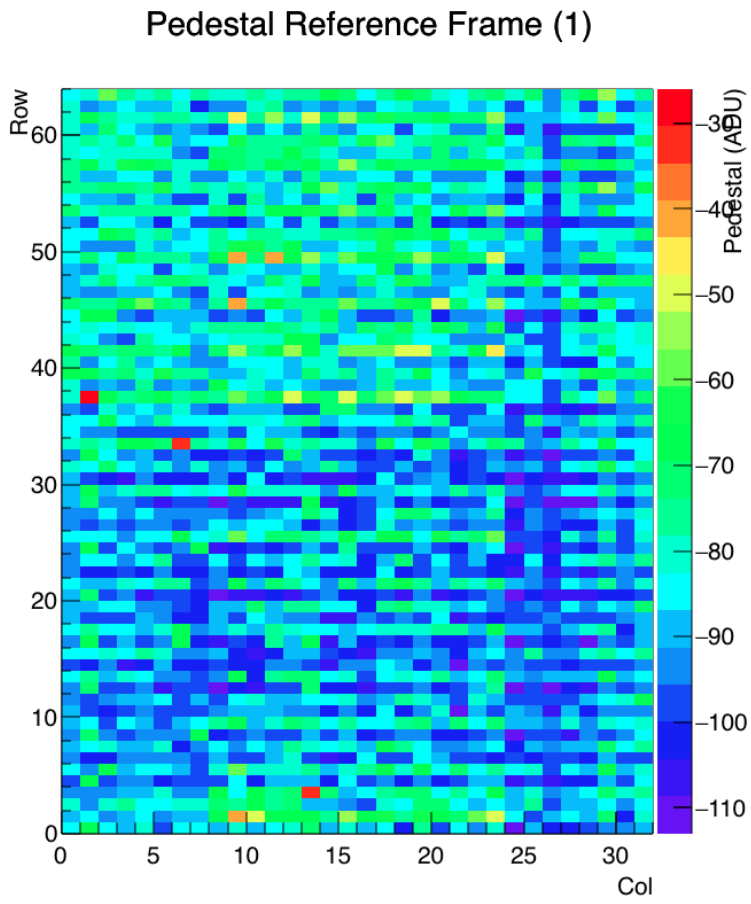


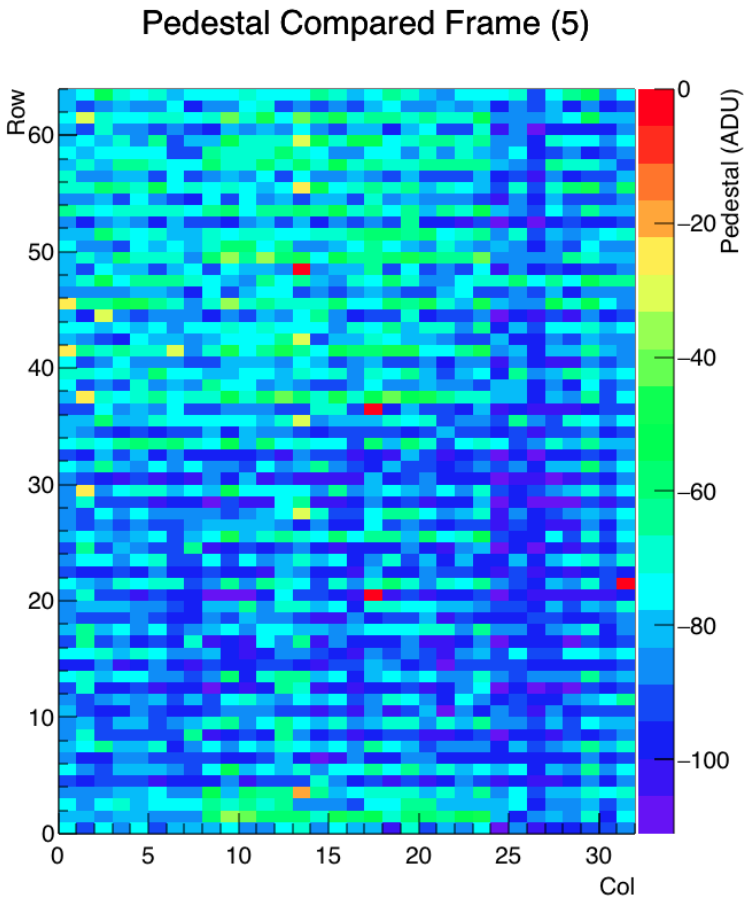
Subtracting Distribution Frame 1 – Frame 4



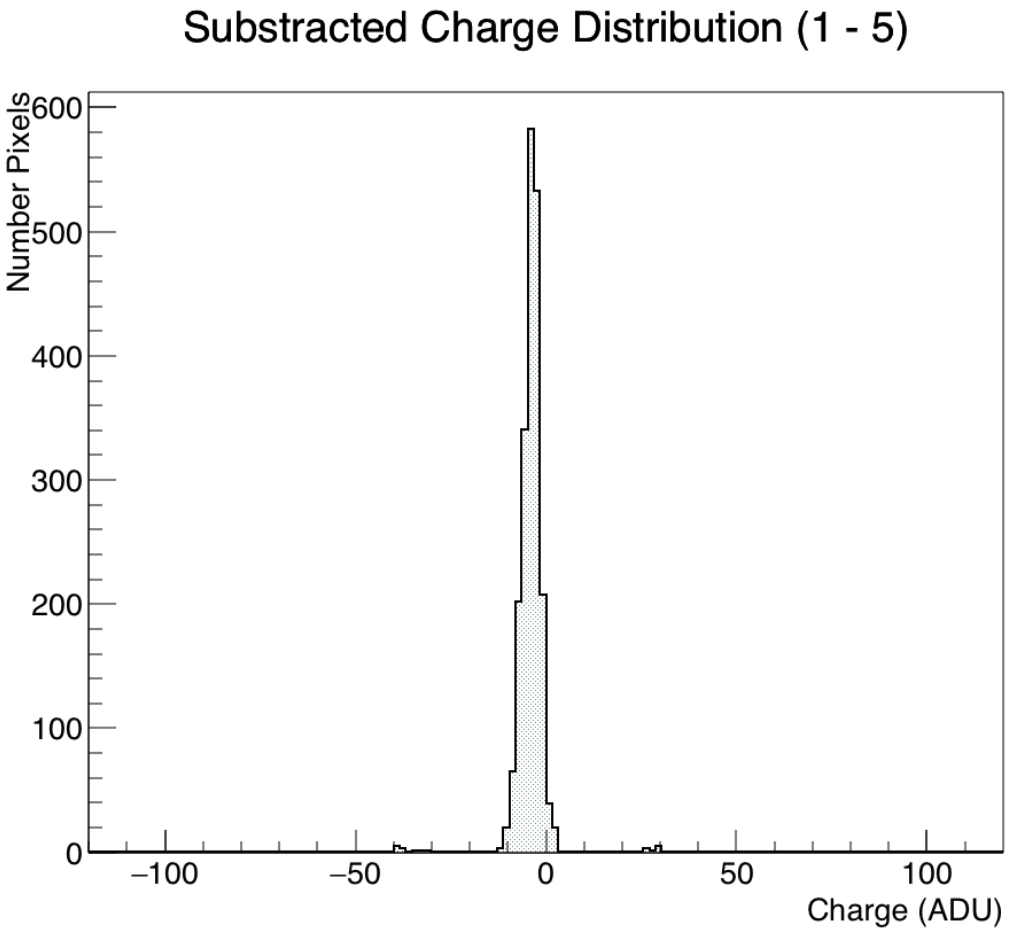


Comparison of Pedestal Map with normal mode after Gating (Frame 1 vs Frame 5)

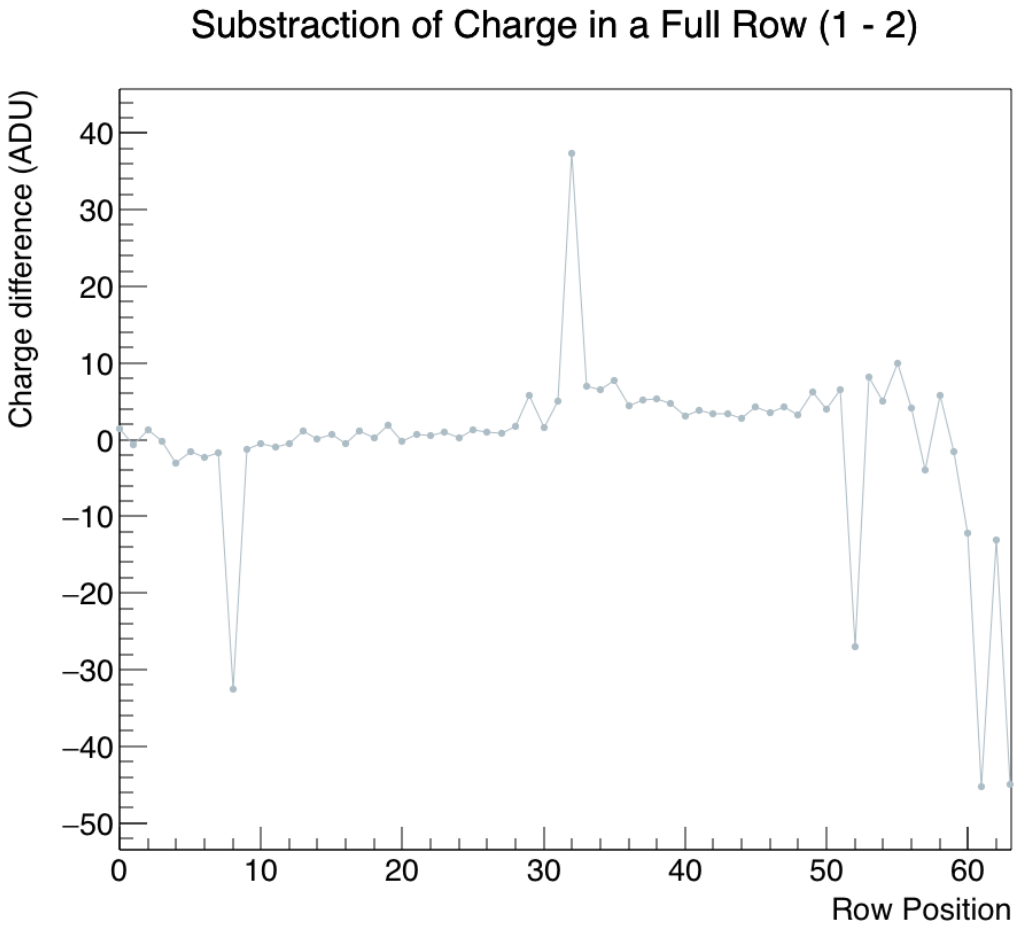




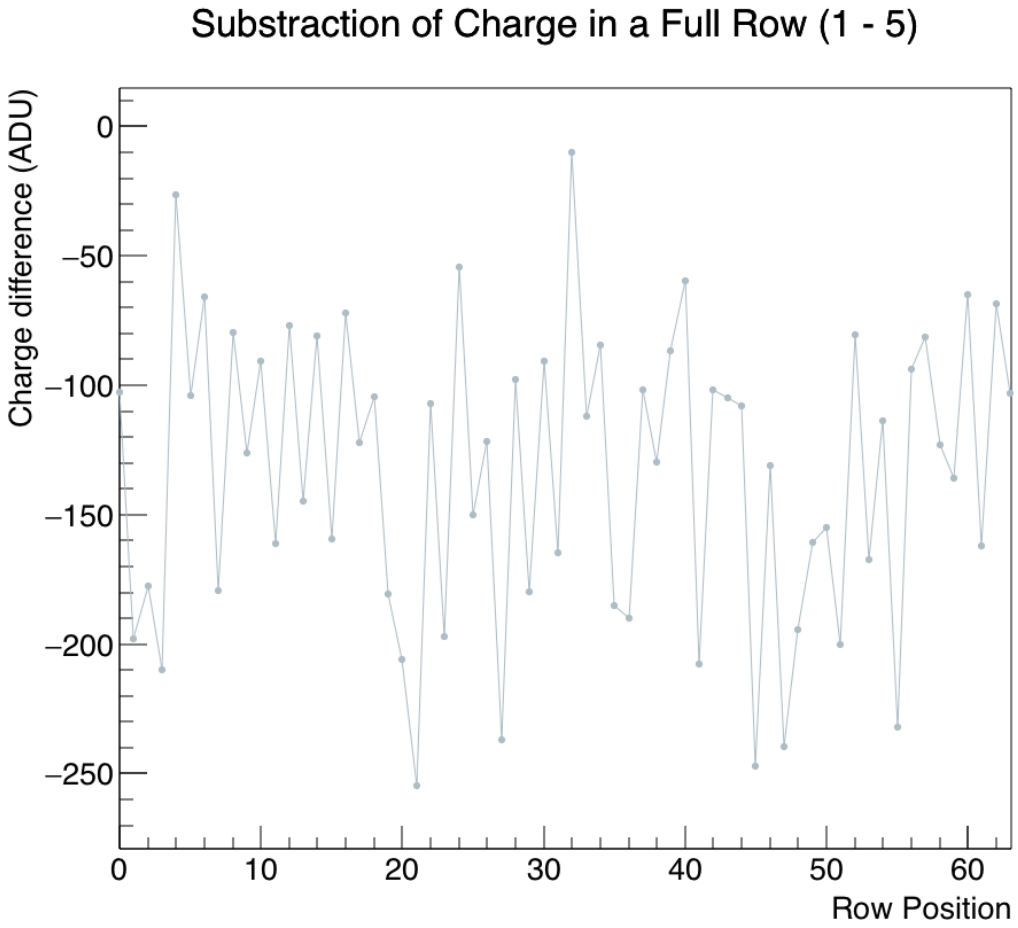
Subtracting Distribution Frame 1 – Frame 5



Subtract sum of rows of Frame 1 – Frame 2



Substract sum of rows of Frame 1 – Frame 5



Subtract sum of rows of Frame 1 – Frame 4