Status of the AGIPD calibration activities.

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Outlook

- The droop check procedure for the 352 analogue storage cells
- Examples of cell droop distributions
- Examples of droop curves for all 352 cells
- Conclusions

Droop check procedure

Measurements of the droop (charge loss) over 100ms of all 352 cells per pixel.
Measurements performed on AGIPD04 (16x16 pixel) with sensor on chip at room temperature.

AGIPD 04 Chip test box gui interface

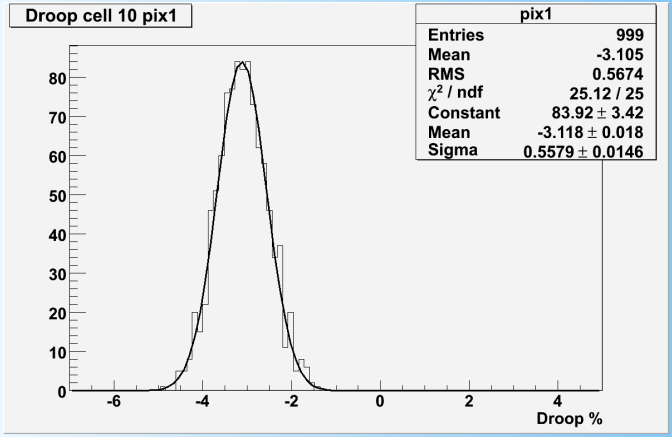
Averaging the output of the ADC over 10 samples (10x oversampling)

Droop check procedure

Test procedure:

- Set a reference cell in which no charge will be injected
- Set the cell in which charge will be injected and inject charge in the cell
- Read both cells in all the pixels
- Recharge and read again after a Δt over which the droop will occur

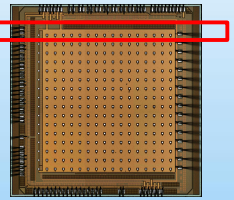
Δt (ms)= 0.1 – 0.2 – 1 - 5 – 20 – 50 - 100

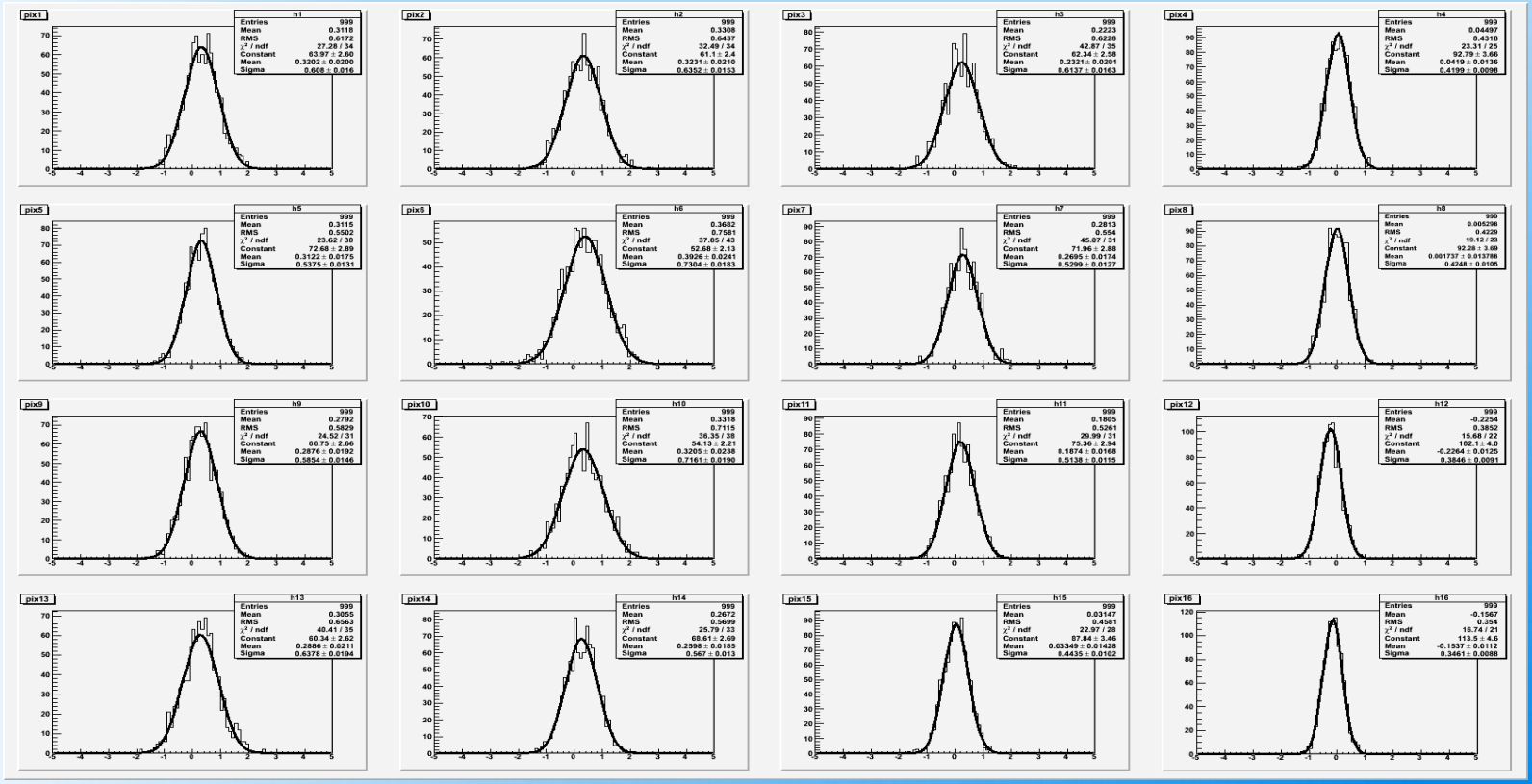


Droop distribution over 1000 frames for 1 cell (cell #10) in pixel 1.

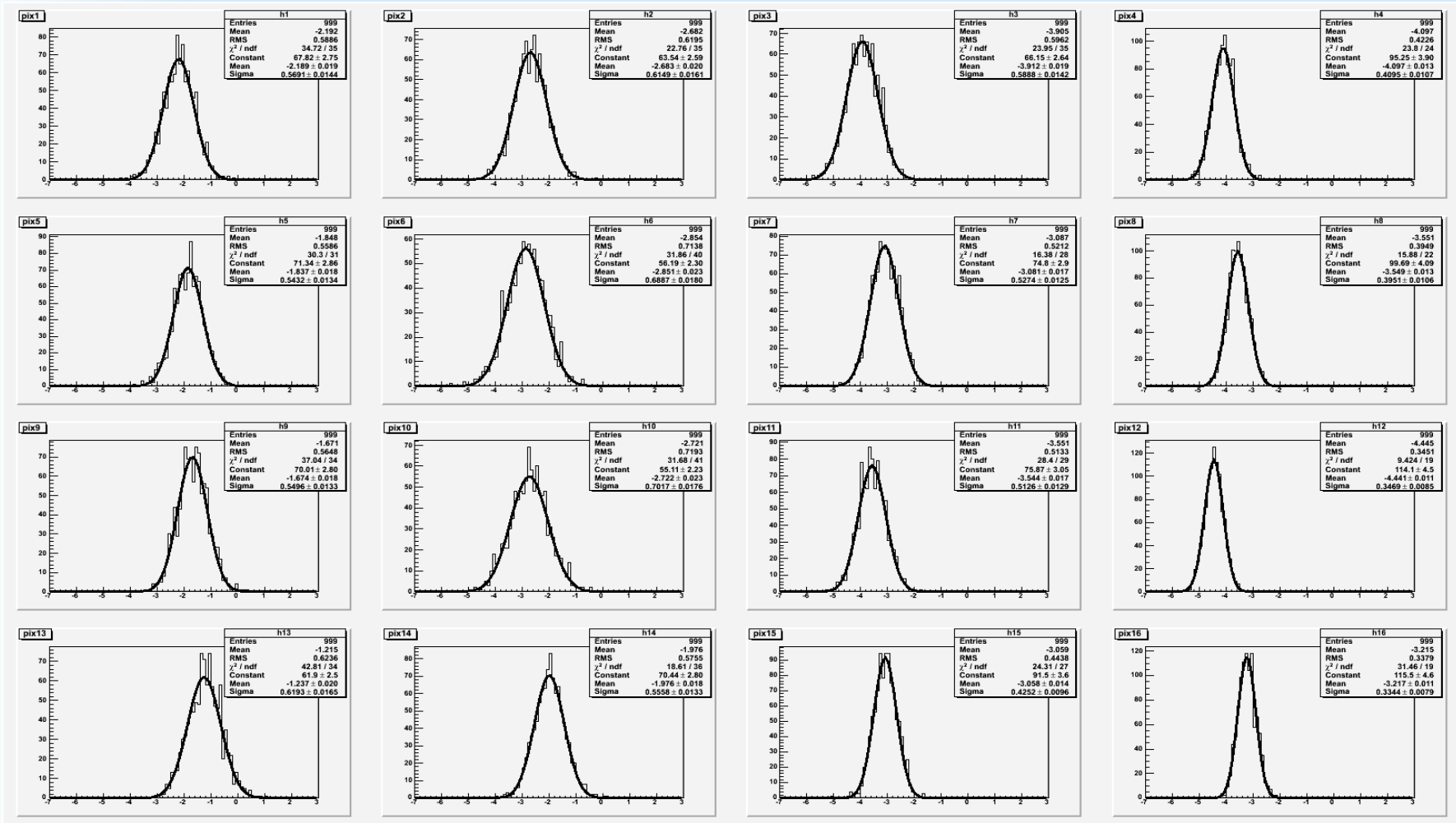
Cell 10, 0.1ms pixel distribution

Distribution over 1 row (16 pixels)

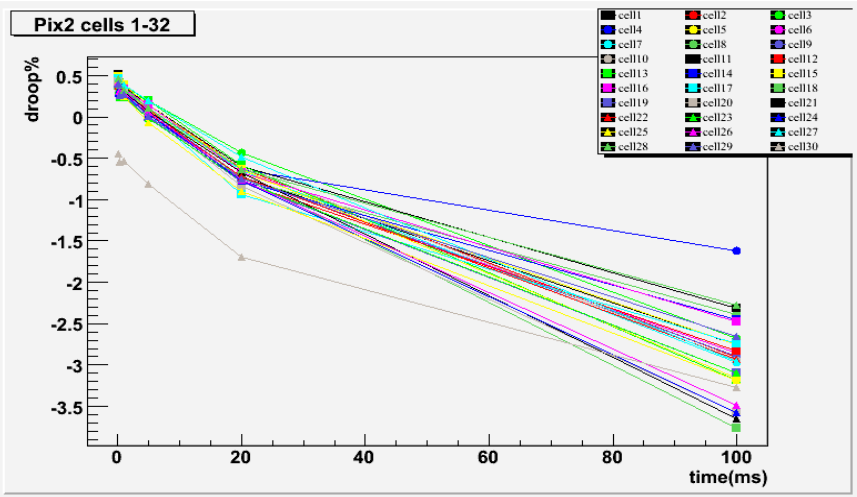


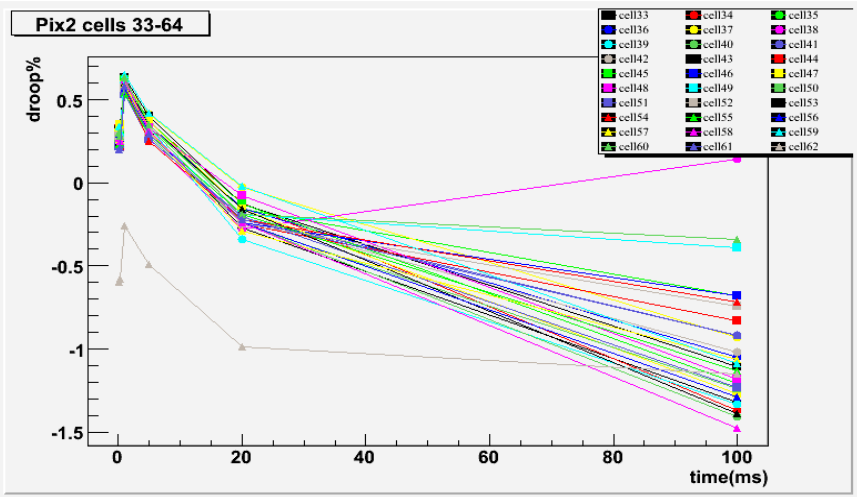


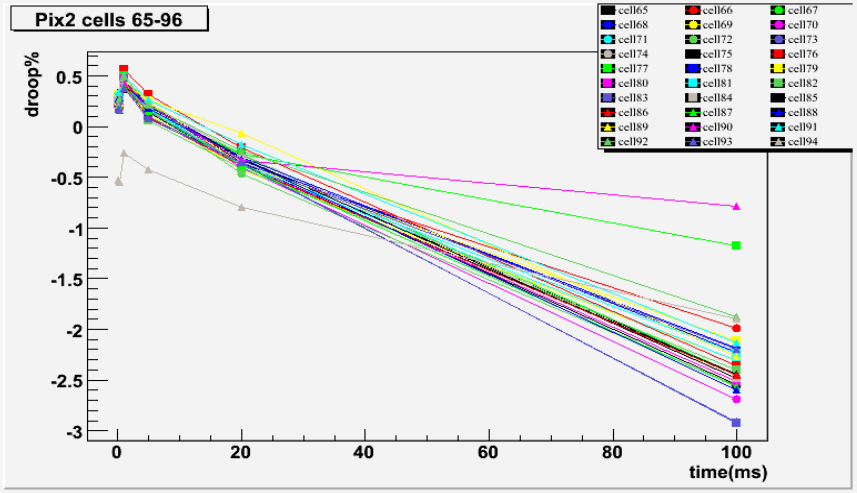
Cell 10, 100ms pixel distribution

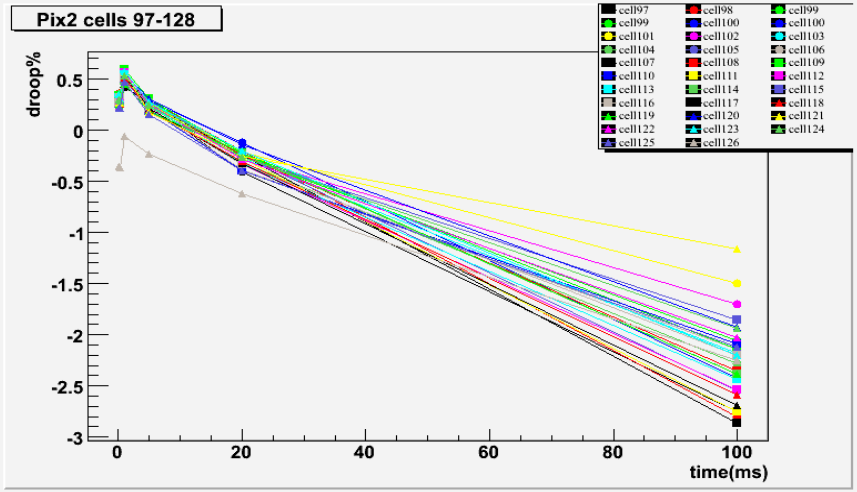


Pix 2 cell 1-128 droop curve

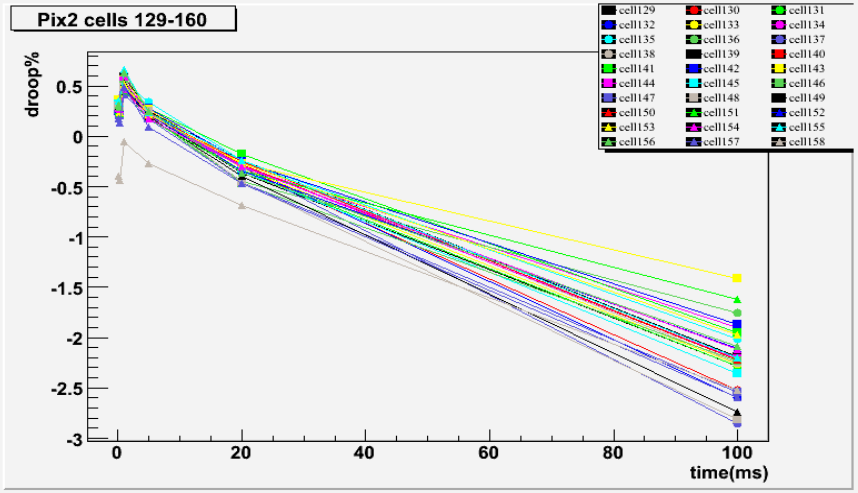


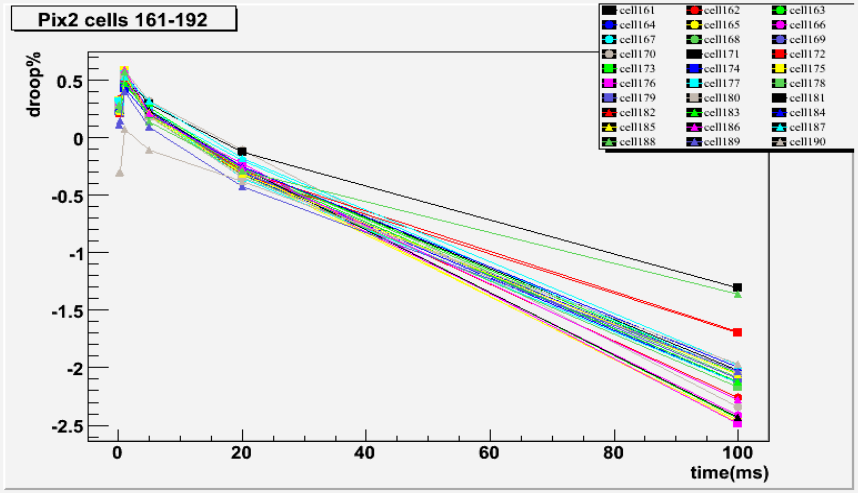


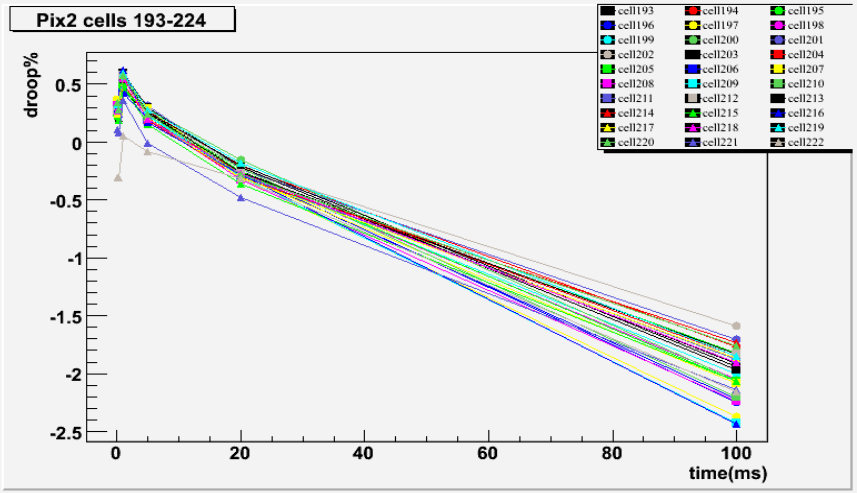


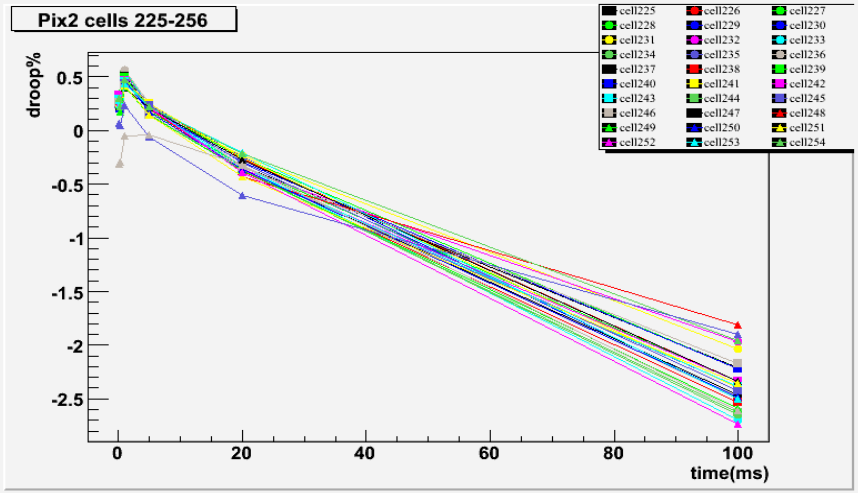


Pix 2 cell 129-256 droop curve

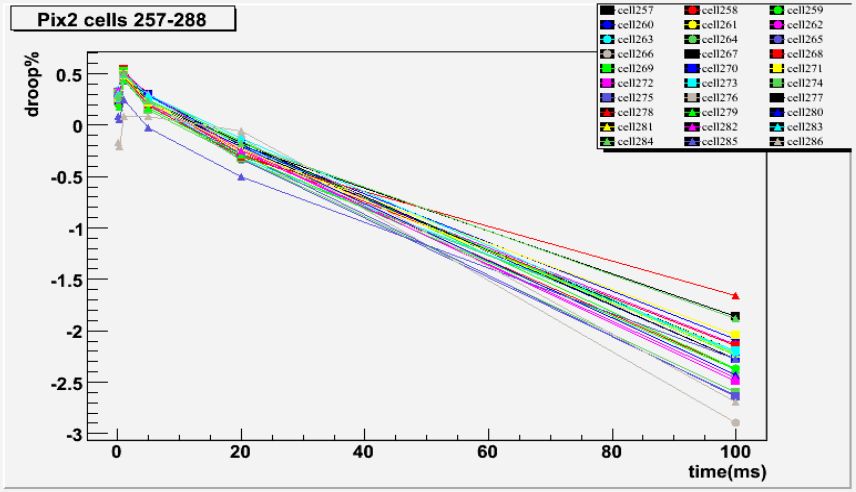


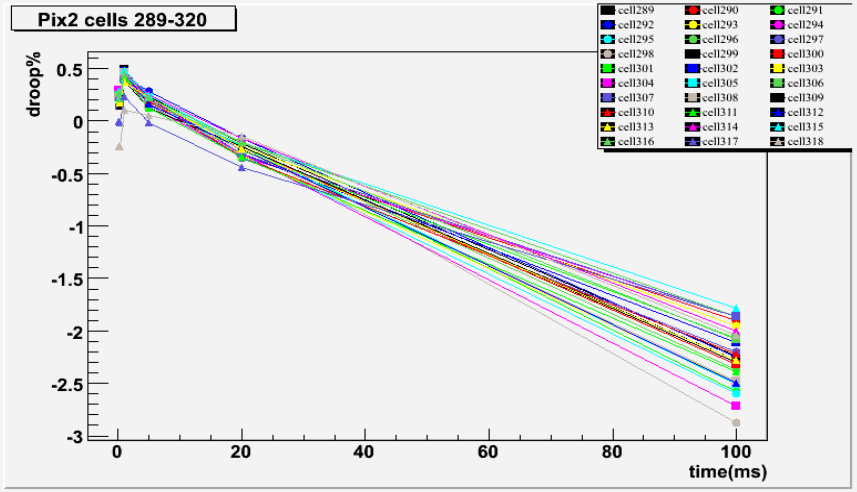


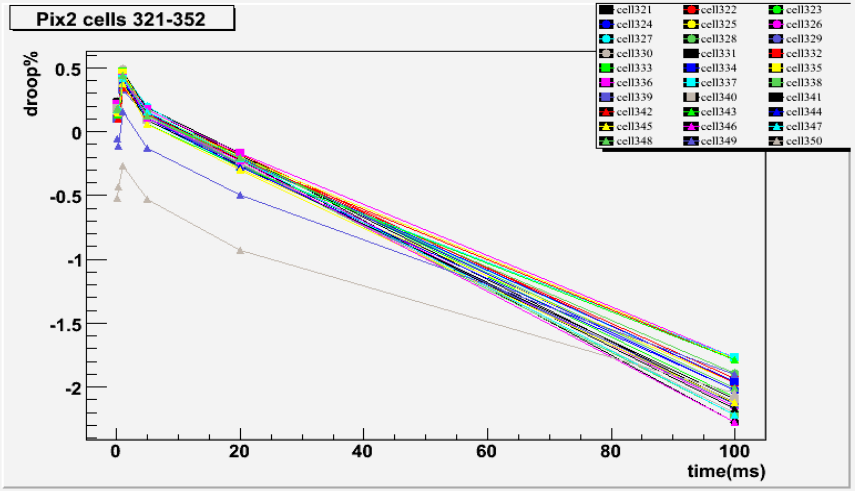




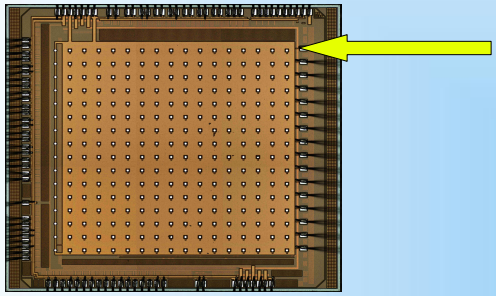
Pix 2 cell 256-352 droop curve

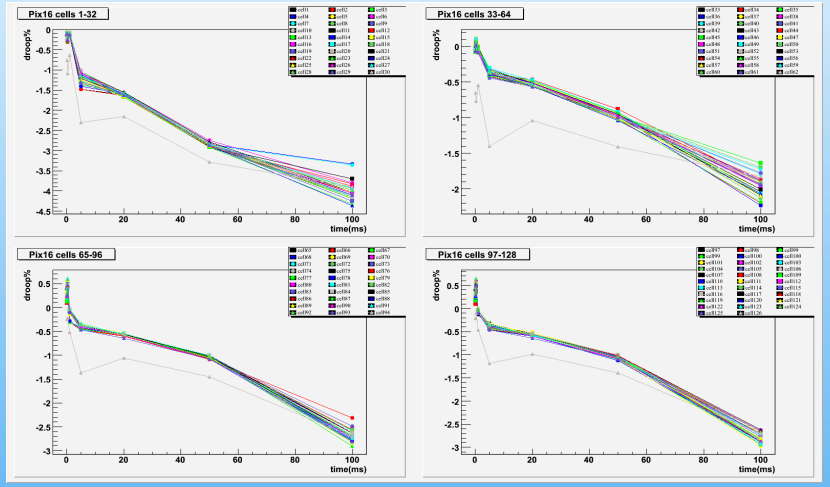


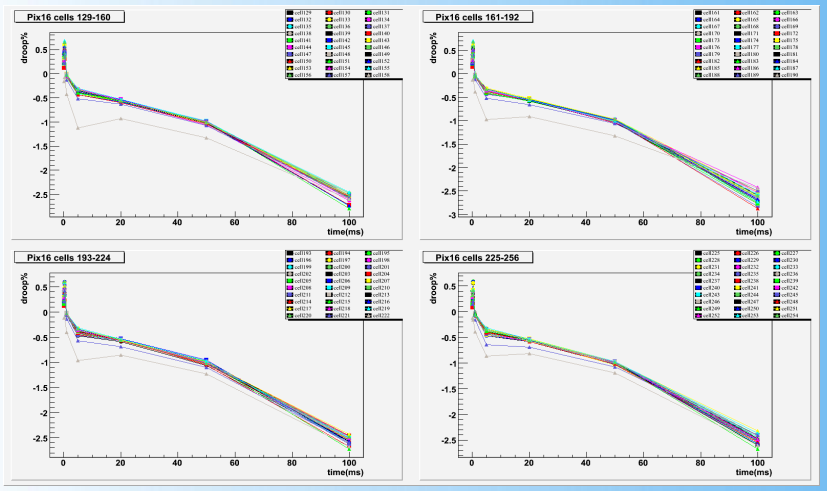


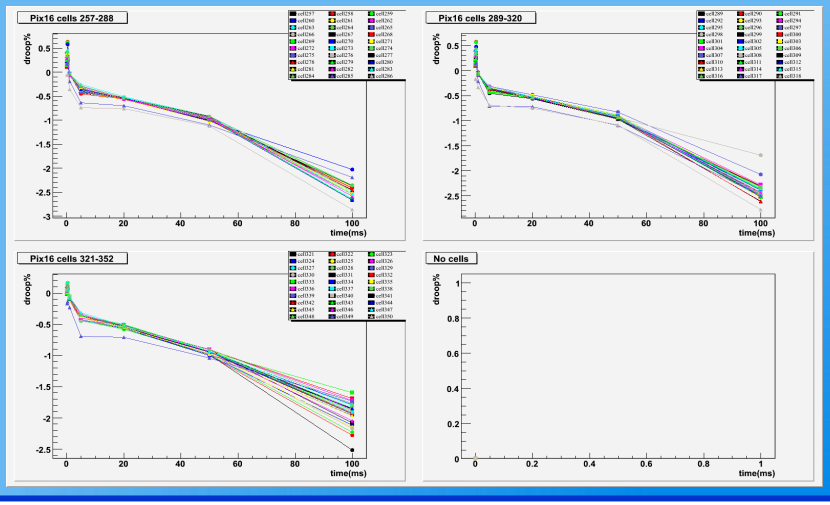


Pix 16 cell 1-352 droop curve

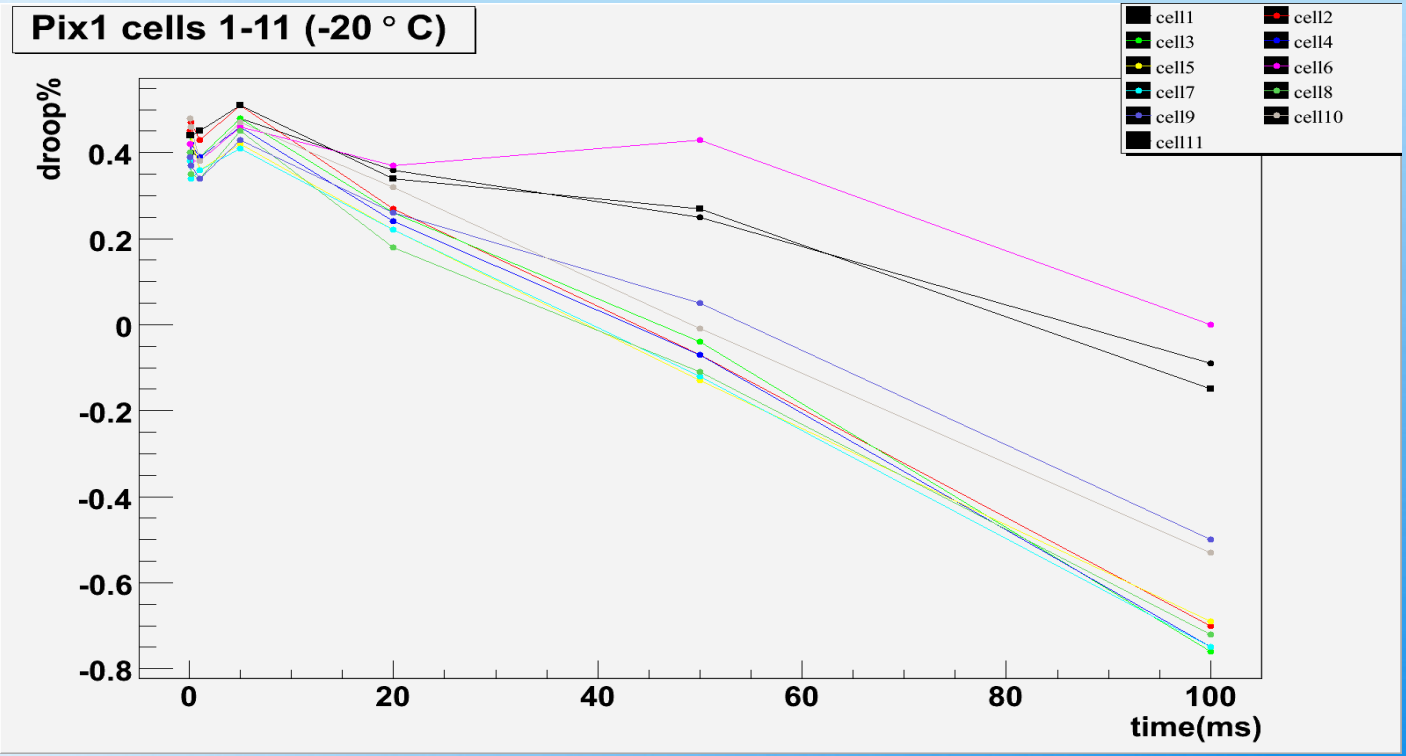








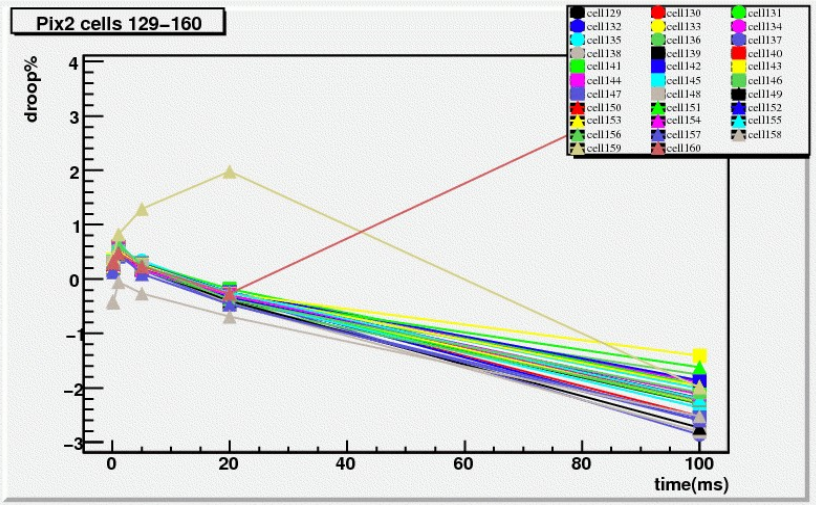
Some results at -20° C

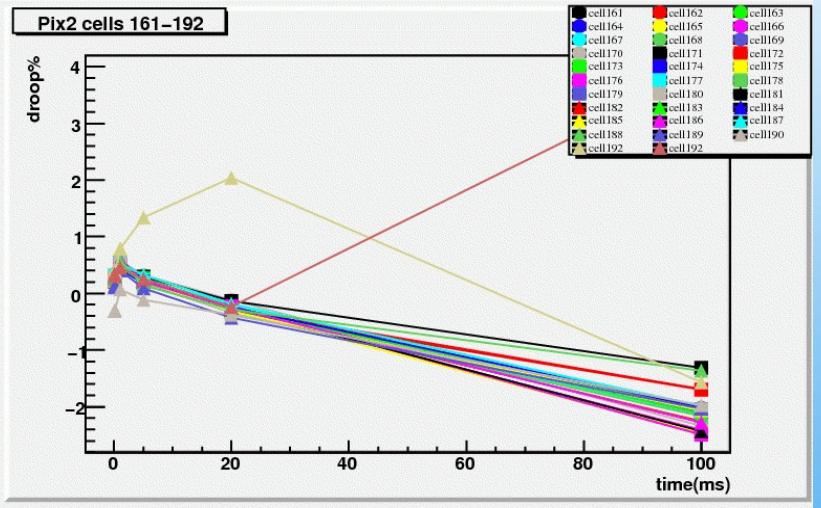


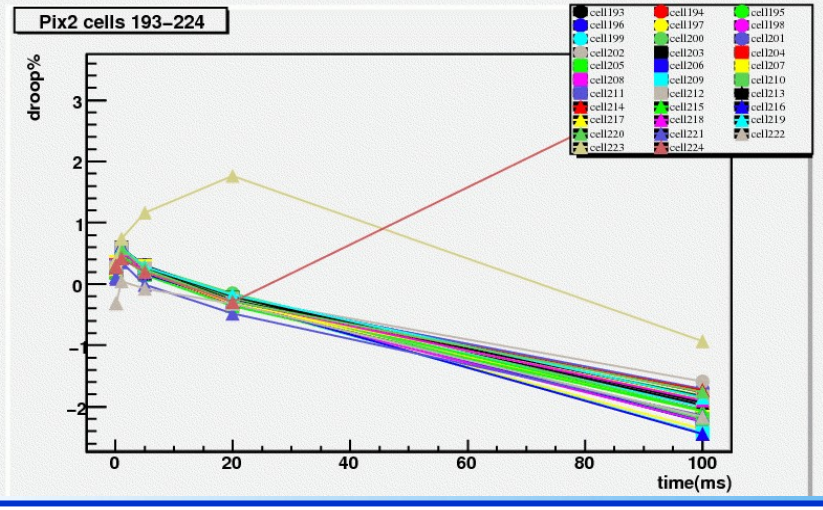
Conclusions

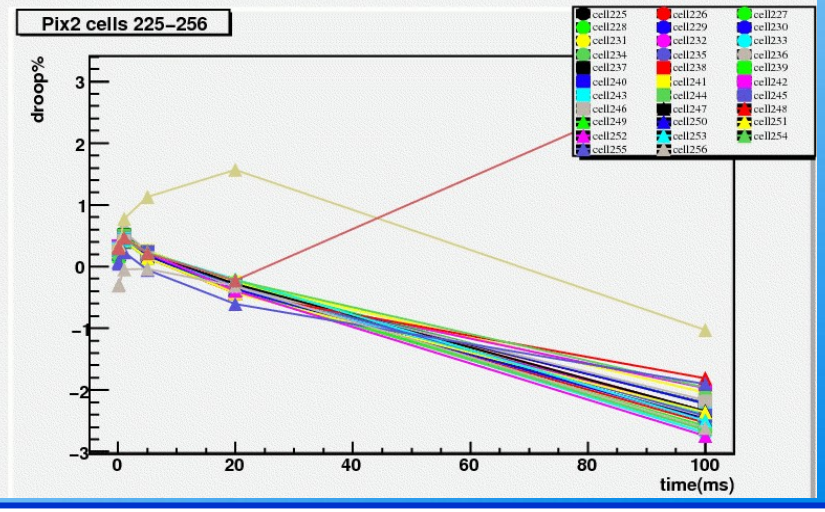
- The droop curve for all the 352 cells was measured on AGIPD04.
- A droop <4 % was observed up to 100ms at room temperature (improved from previous measurements).
- The uncertainties introduced by the droop correction will be below the poissonian error in the detector dynamic range.
- Further analysis will be performed at different radiation levels.

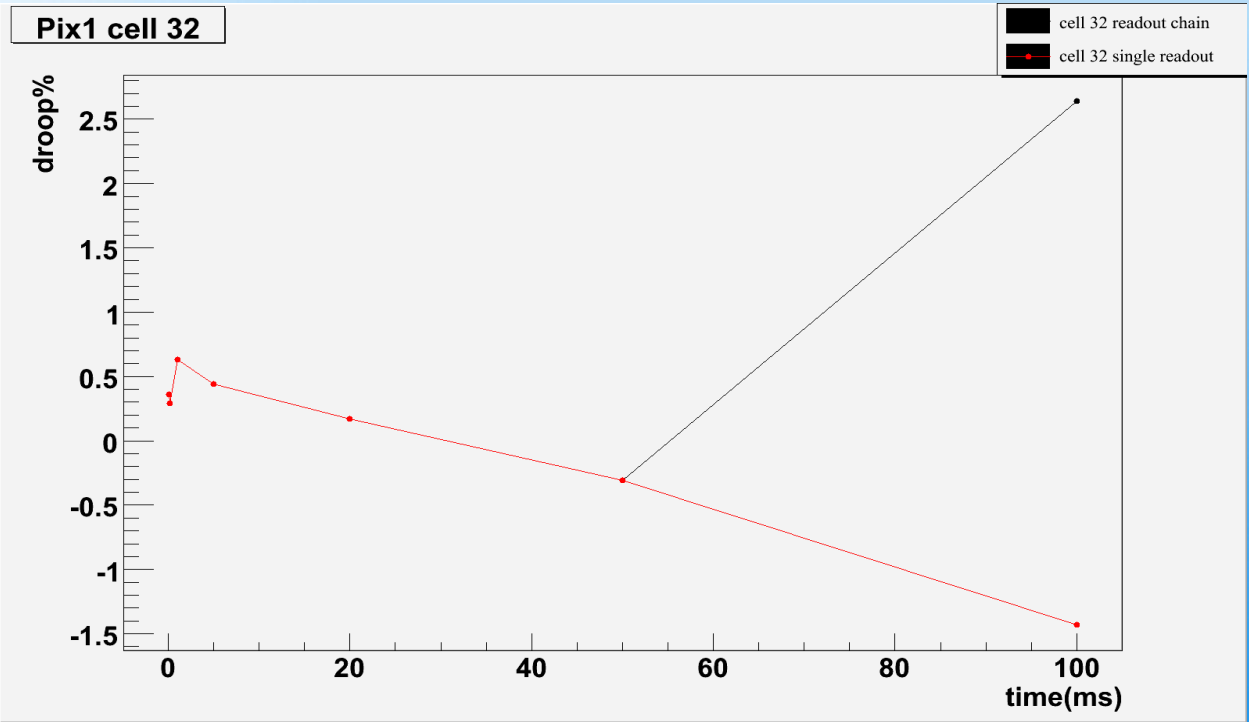
BACKUP

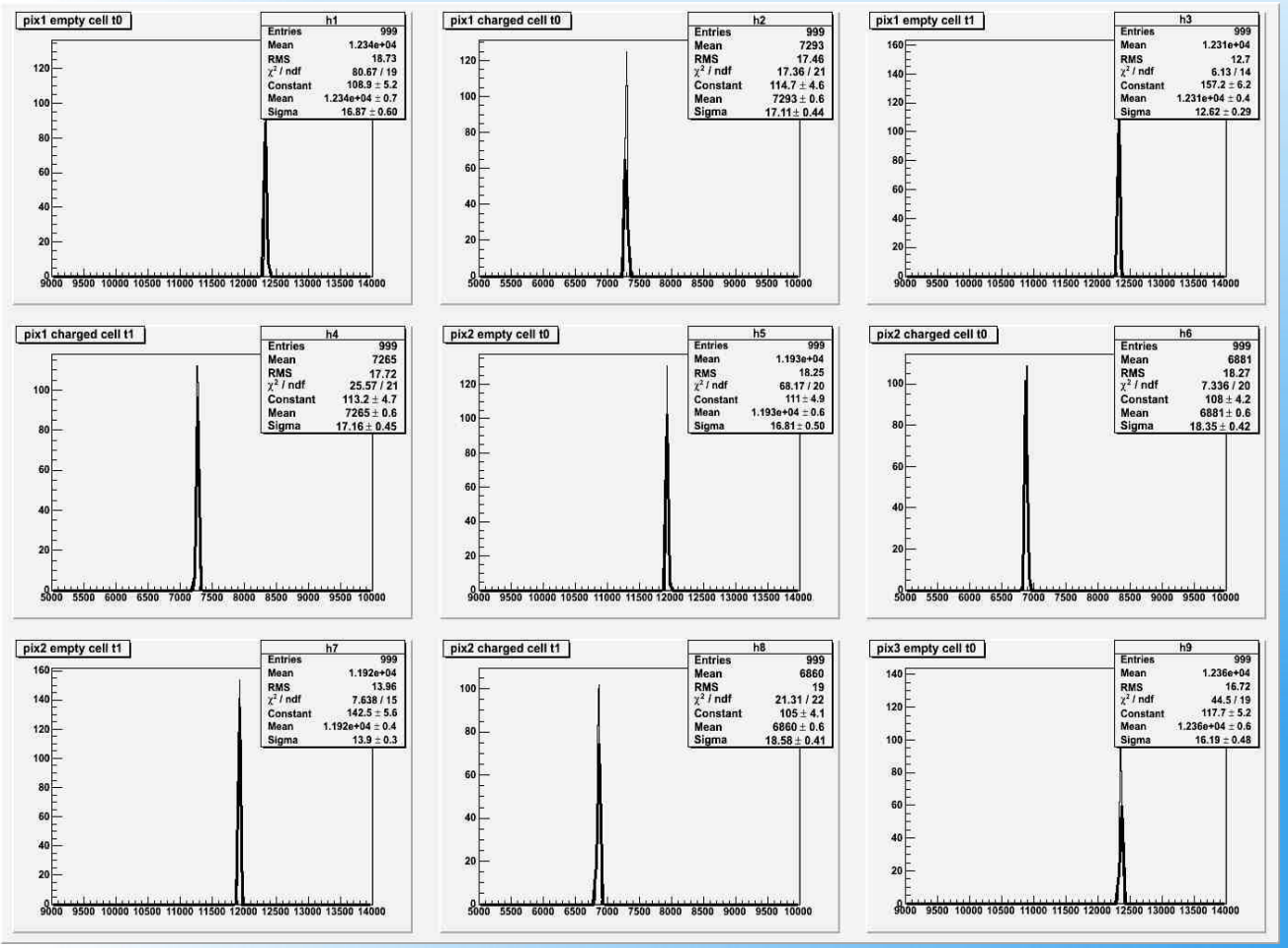

Pix2 cells 129–160
droop%
time(ms)


Pix2 cells 161–192
droop%
time(ms)


Pix2 cells 193–224
droop%
time(ms)


Pix2 cells 225–256
droop%
time(ms)


Pix1 cell 32
cell 32 readout chain
cell 32 single readout
droop%
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
0
20
40
60
80
100
time(ms)



Empty cells vs charged cells

Distribution of digital(gain) and analog (st. cell) signal over 1000 frames