

Results on the Au TILE MEASUREMENTS

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TILE PRODUCTION

- 6 Au MULTIPIN with 4 soldering dots : ML-75-77-78-79-80-81
- 1 Au 2s3p with 4 soldering dots: TL 176
- 1 Au Plus with 4 soldering dots: PL 255

Test procedure

4s6p configuration except for tile 176 (2s3p)

Noise power spectrum @ 300K and 77K

IV RVS curve @300K and 77K

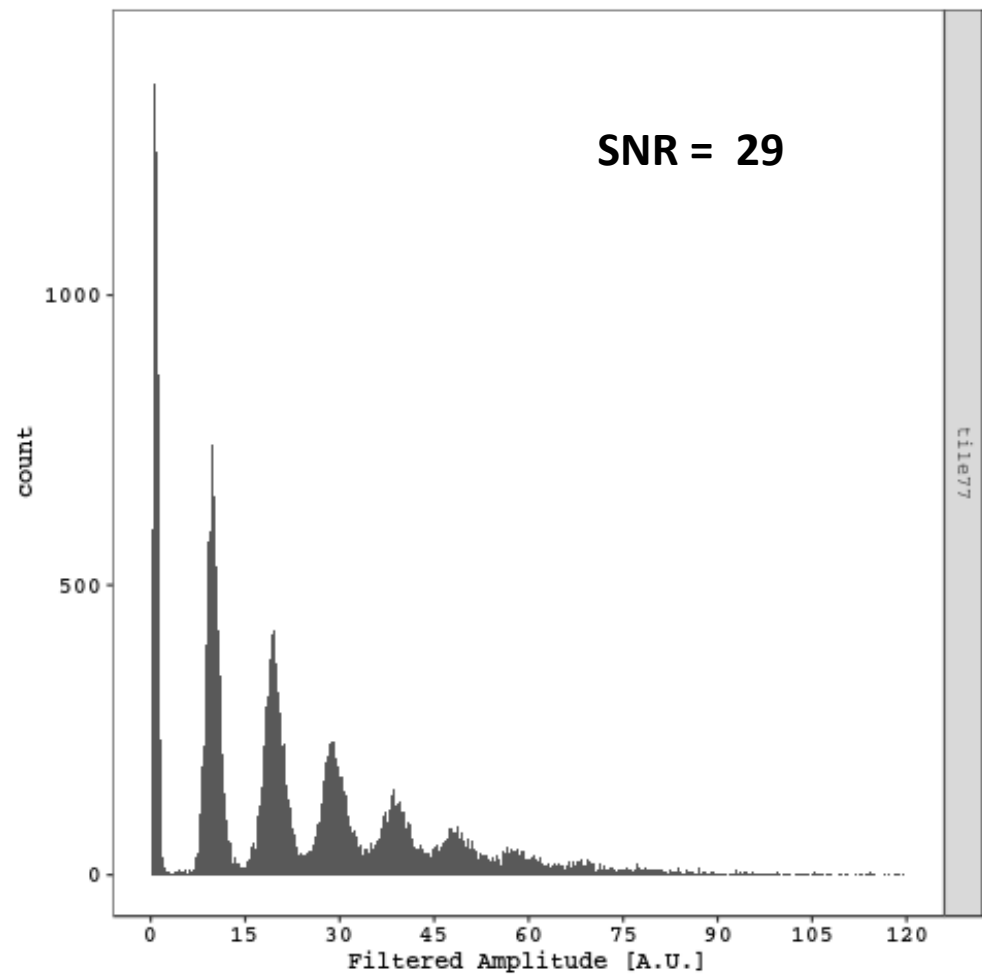
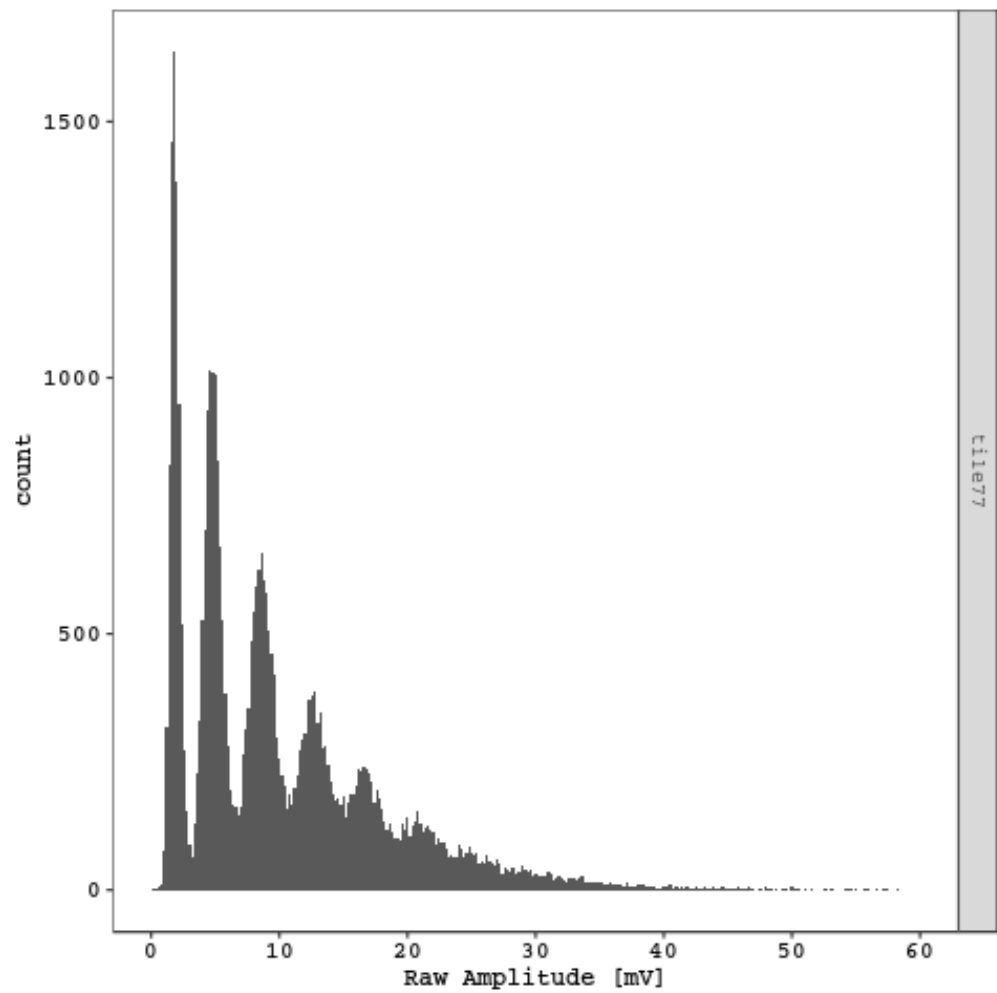
Data acquisition with laser at +7 VOV

Analysis: gain, SNR evaluation. Raw and ARMA analysis.

SUMMARY Au Tiles

Au Tiles	IV @300K & 77K	Gain (pVs)	SNR (Gain/ σ_N)	Raw & ARMA analysis
ML 77	OK	572	29	OK
ML 78	OK	590	28.5	OK
ML 79	OK	585	29	OK
ML 80	OK after disconnecting SiPM 17	587	30.5	OK
ML 75	OK	586	29.6	Filtered data, exhibit extra peaks with a slower tau recharge that are suppressed doing IV FWD @300K on single SiPMs (100 mA current injection)
ML 81	OK	573	30.5	Same behavior as ML75
TL 176		2250	29.9	OK
PL 255	134 V	534	30.5	OK

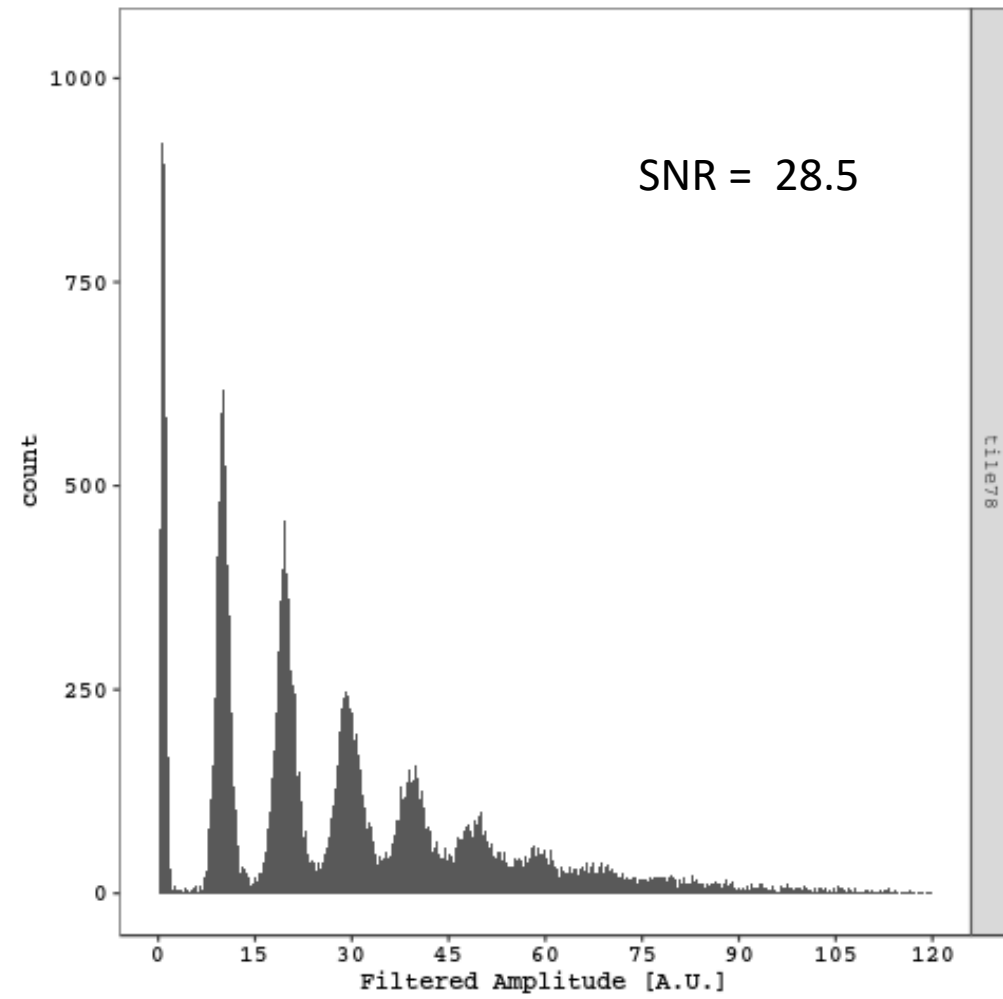
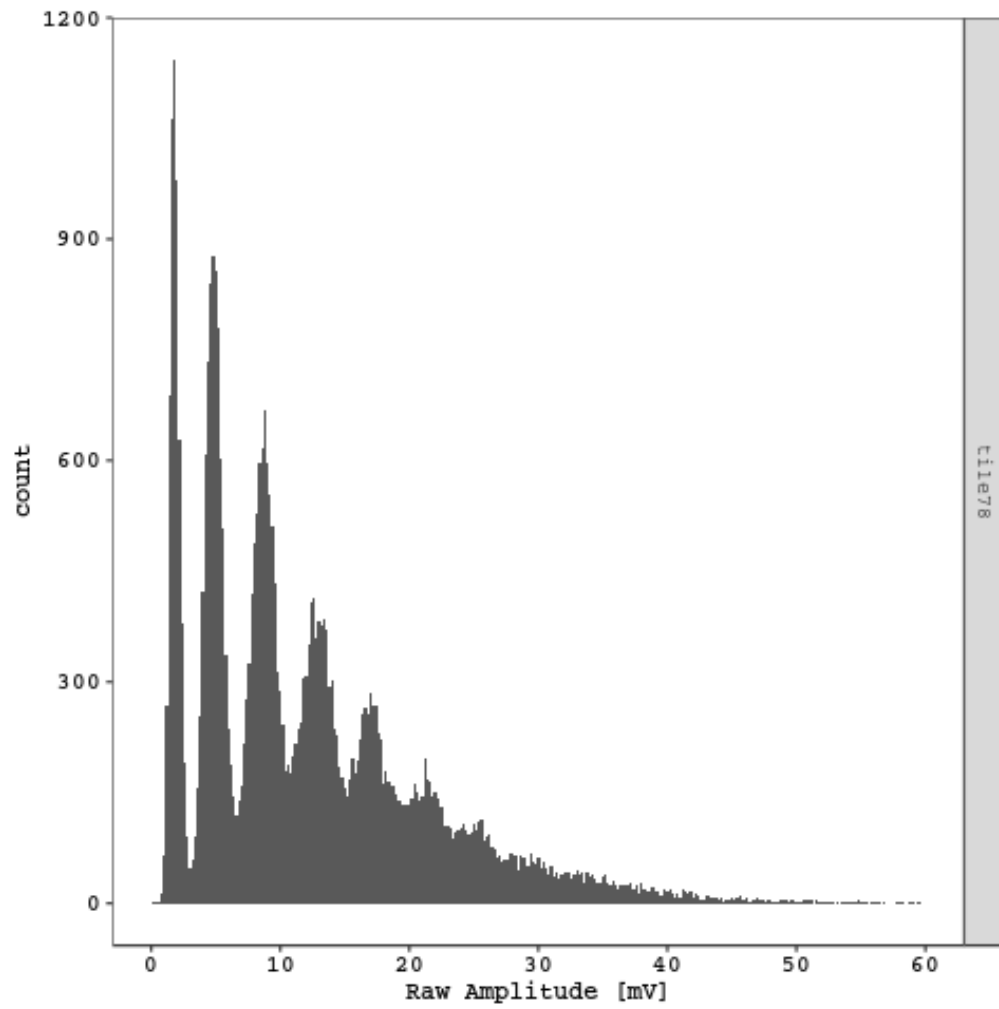
TILE 77



SNR = 29

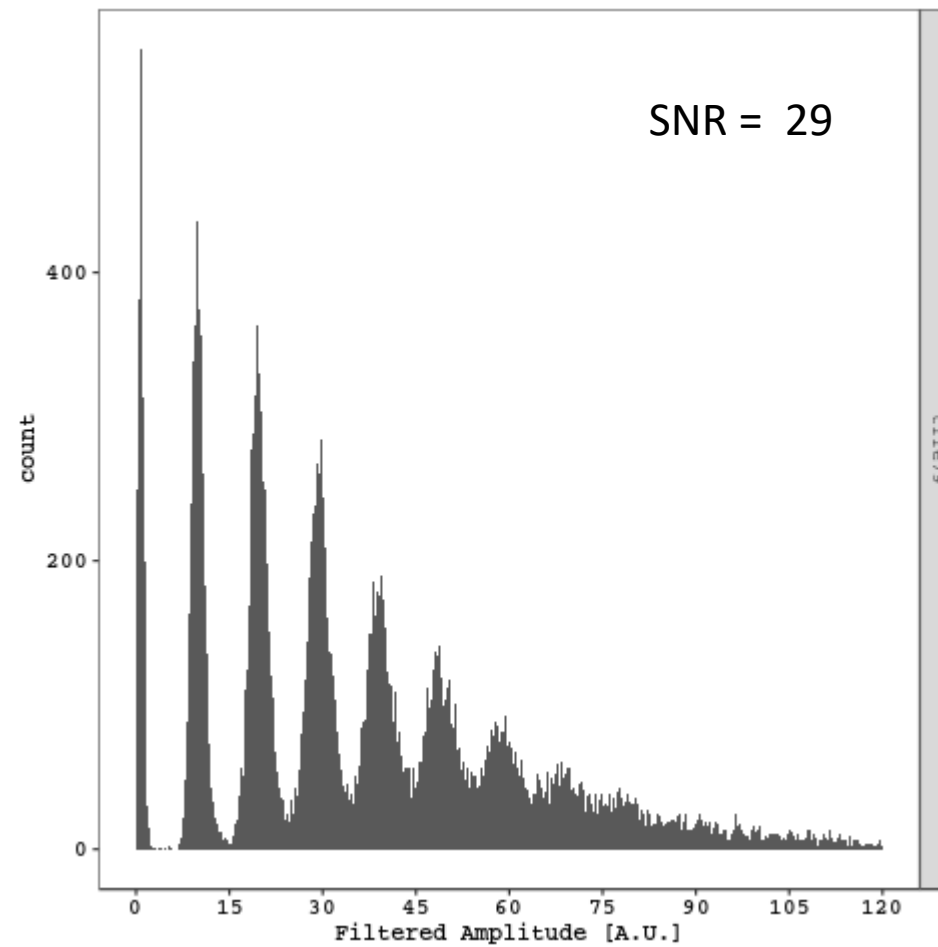
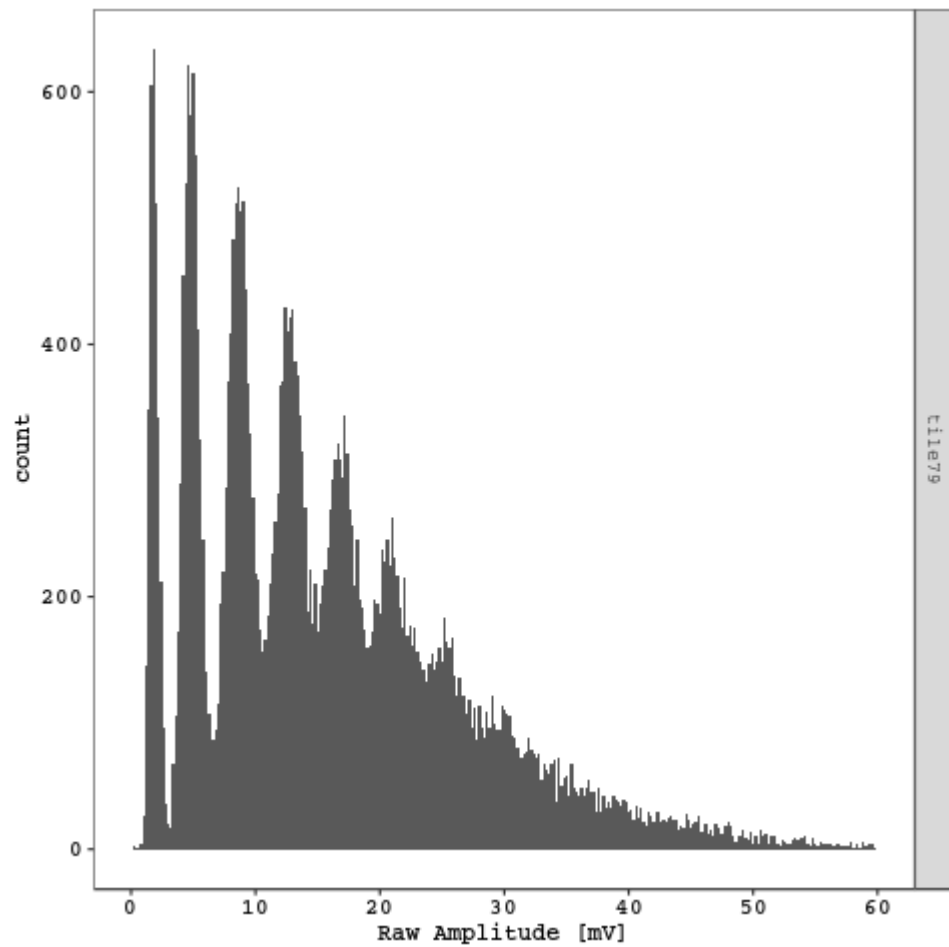
GAIN = 572 pVs

TILE 78



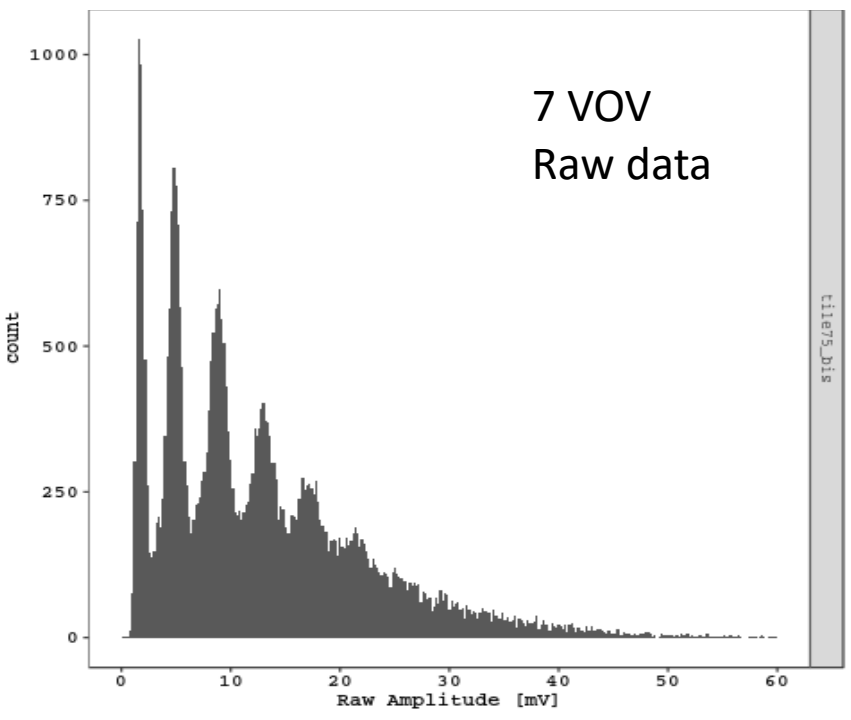
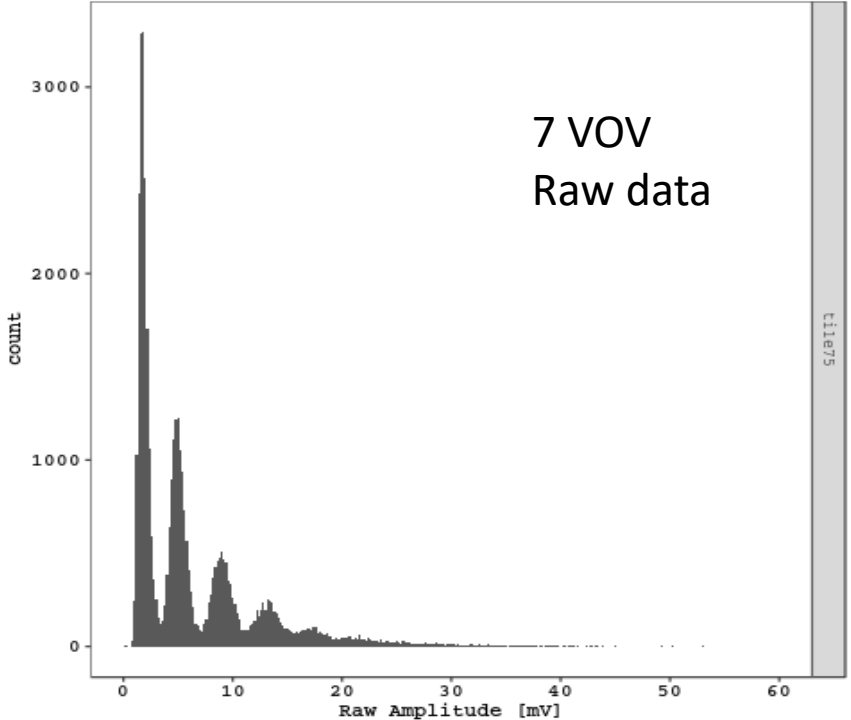
GAIN = 590 pVs

TILE 79



SNR = 29

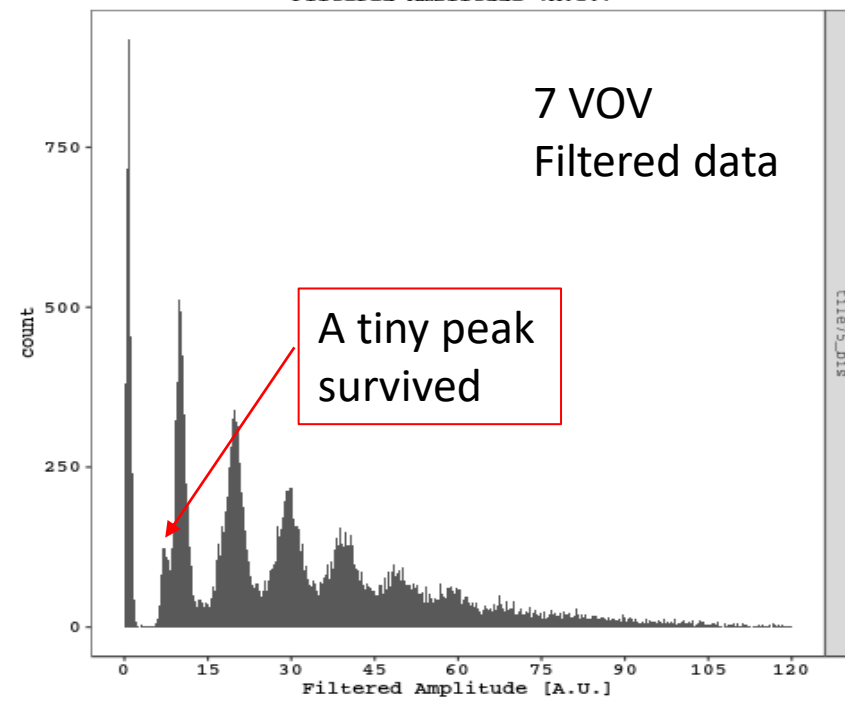
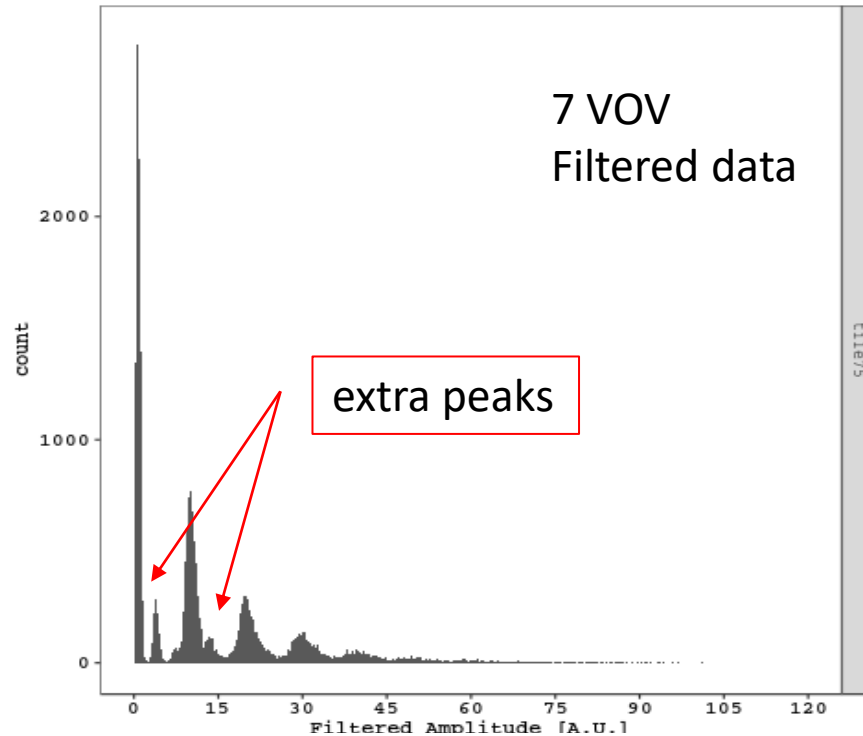
GAIN = 585 pVs



TILE 75

Before
single SiPM
IV forward

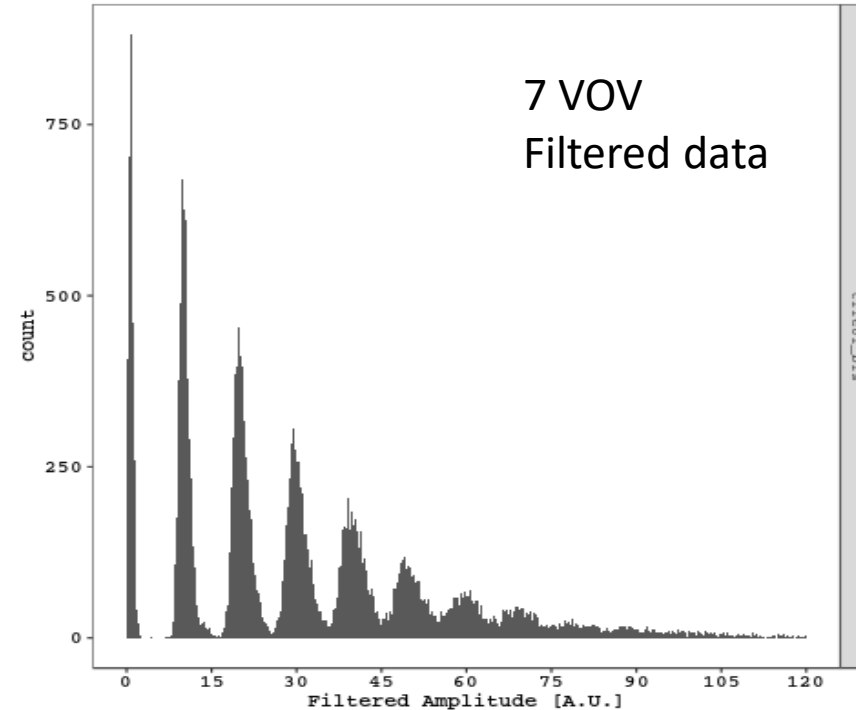
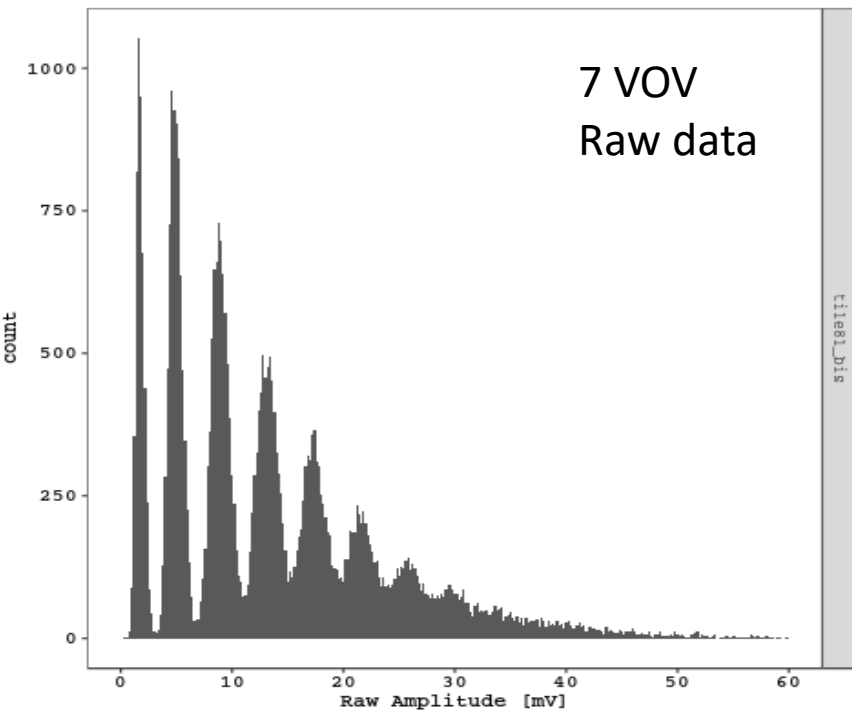
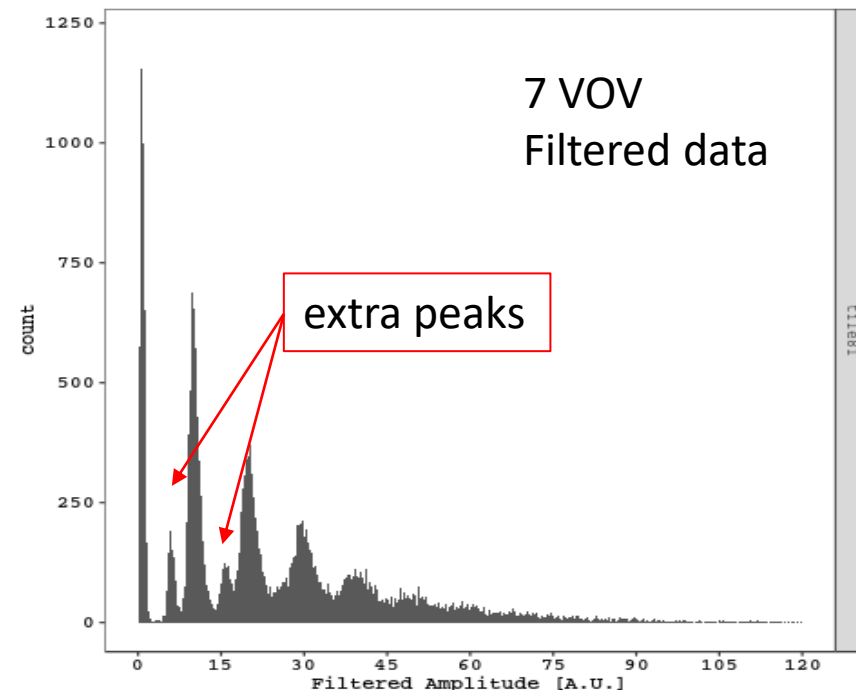
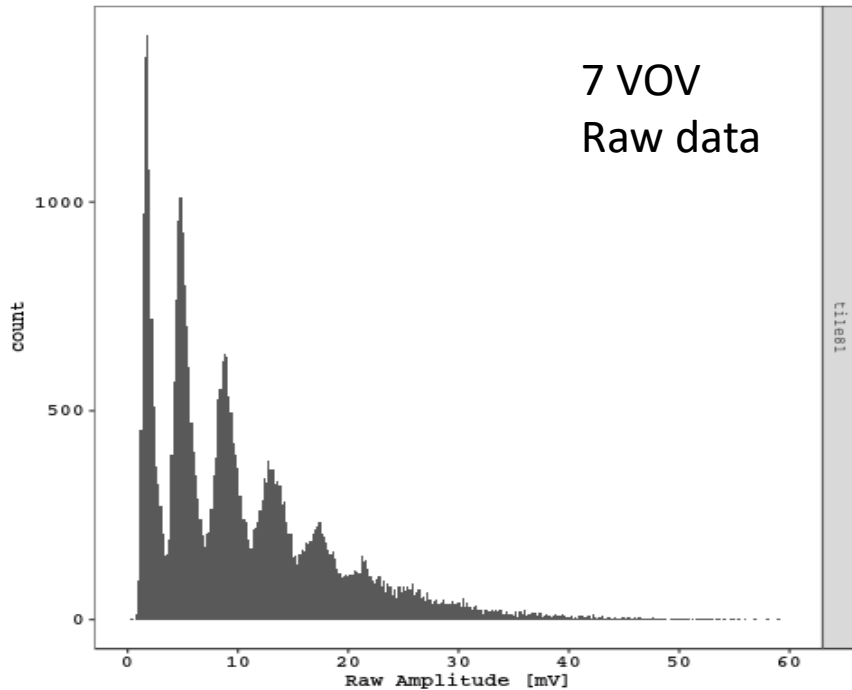
After
single SiPM
IV forward

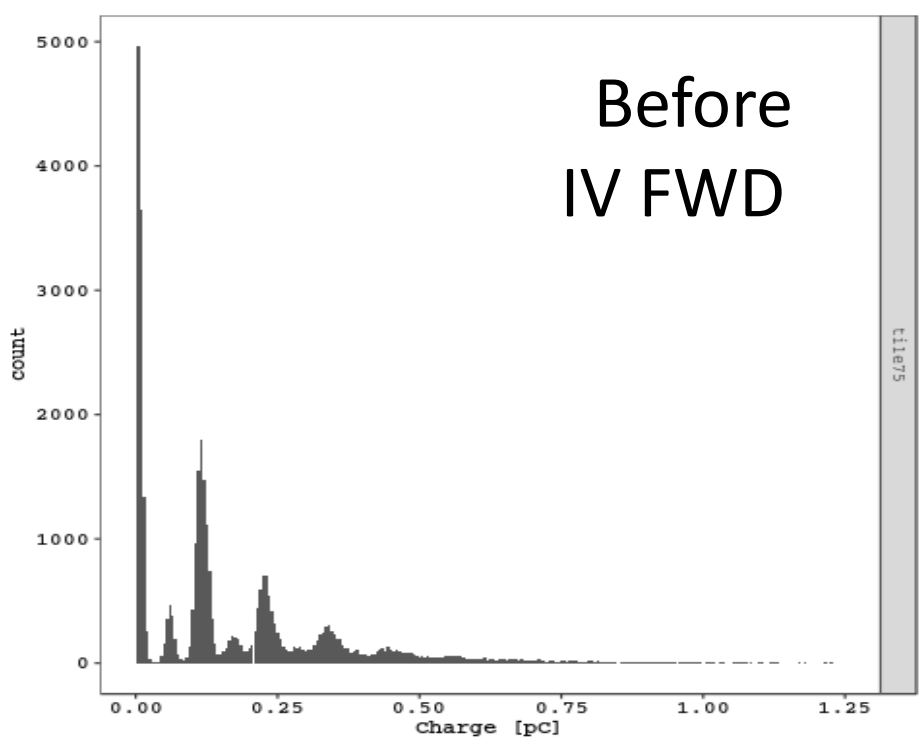


TILE 81

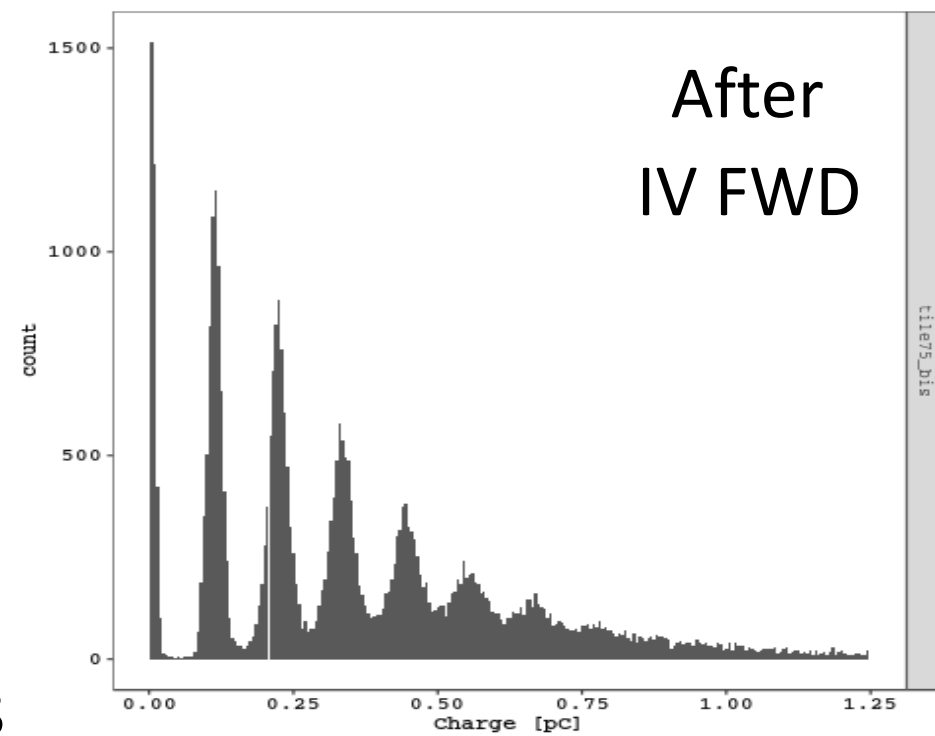
Before
single SiPM
IV forward

The extra peaks disappeared.

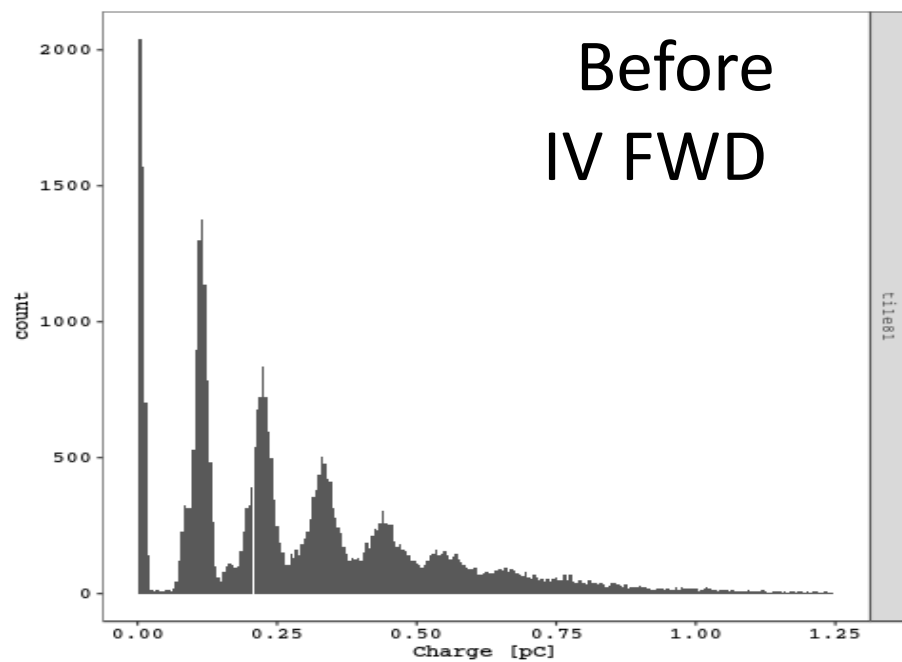




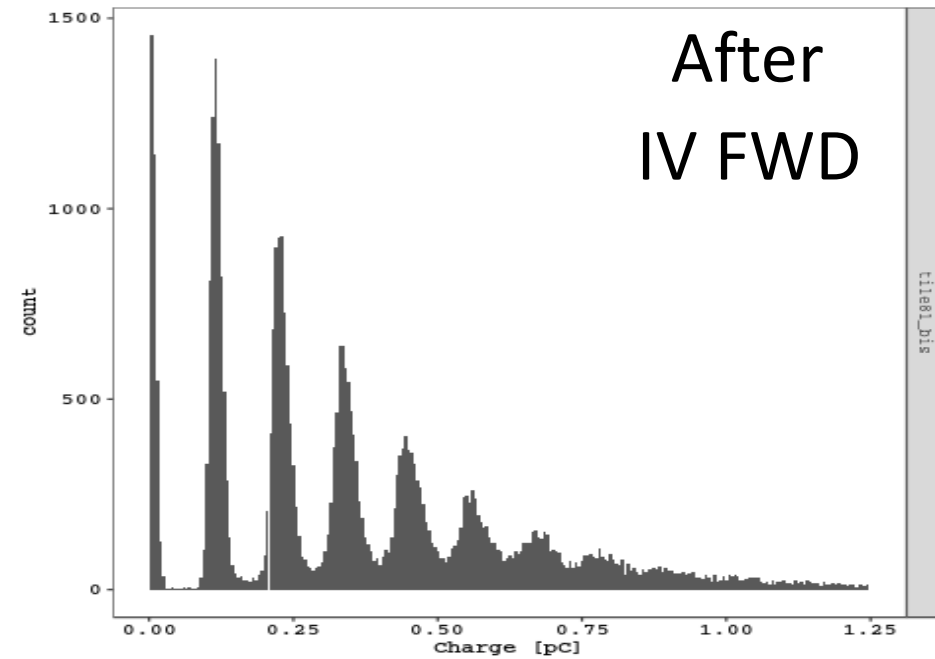
TILE 75



Charge Analysis



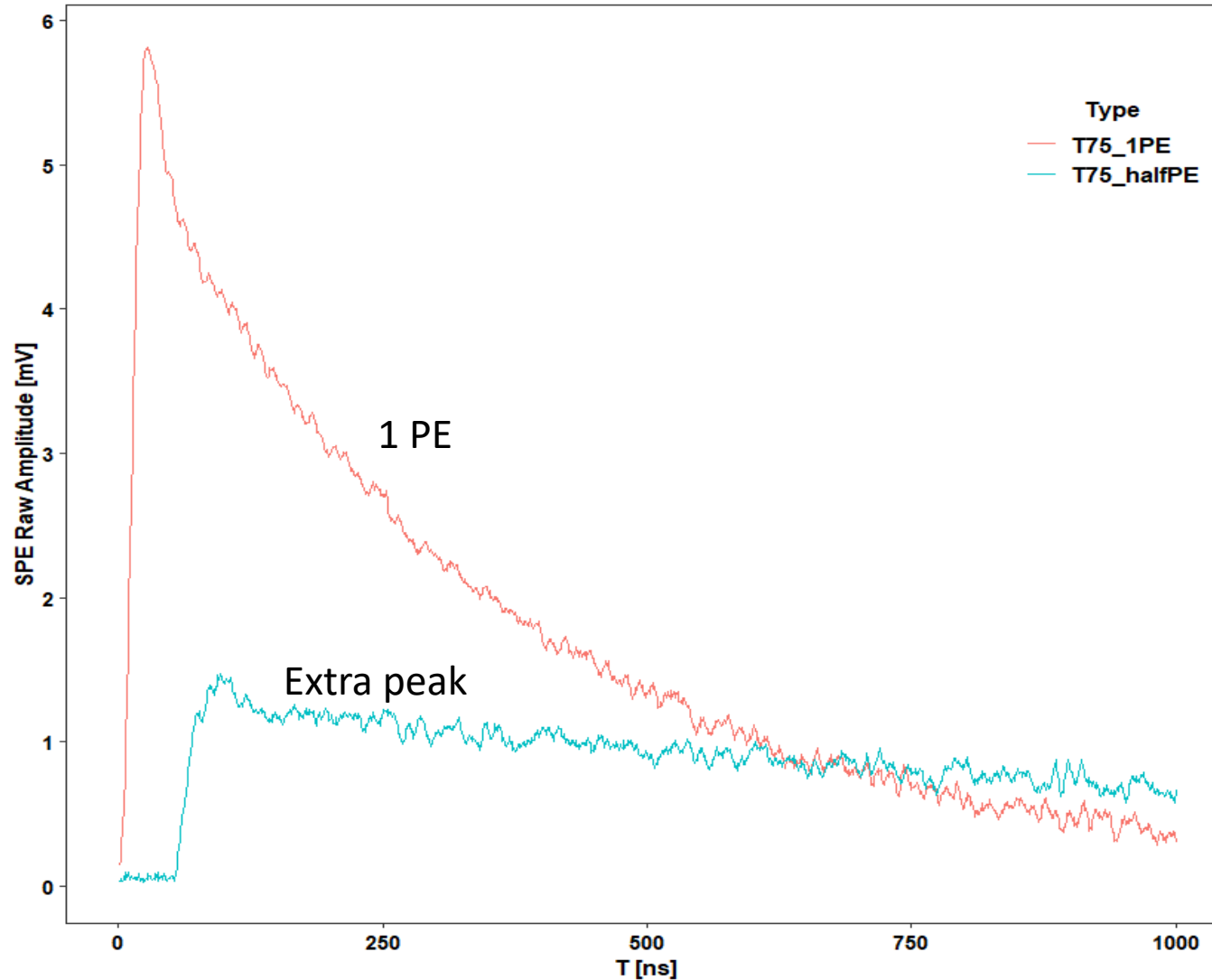
TILE 81



TILE 75

reference waveform

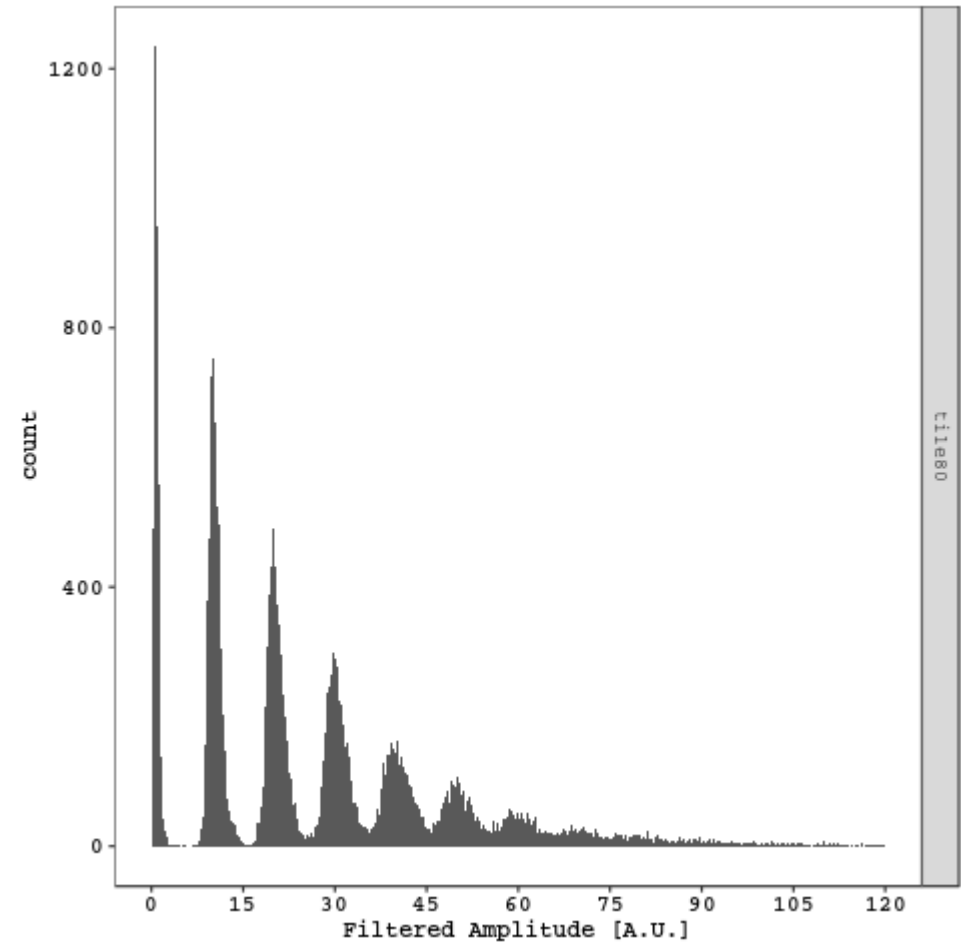
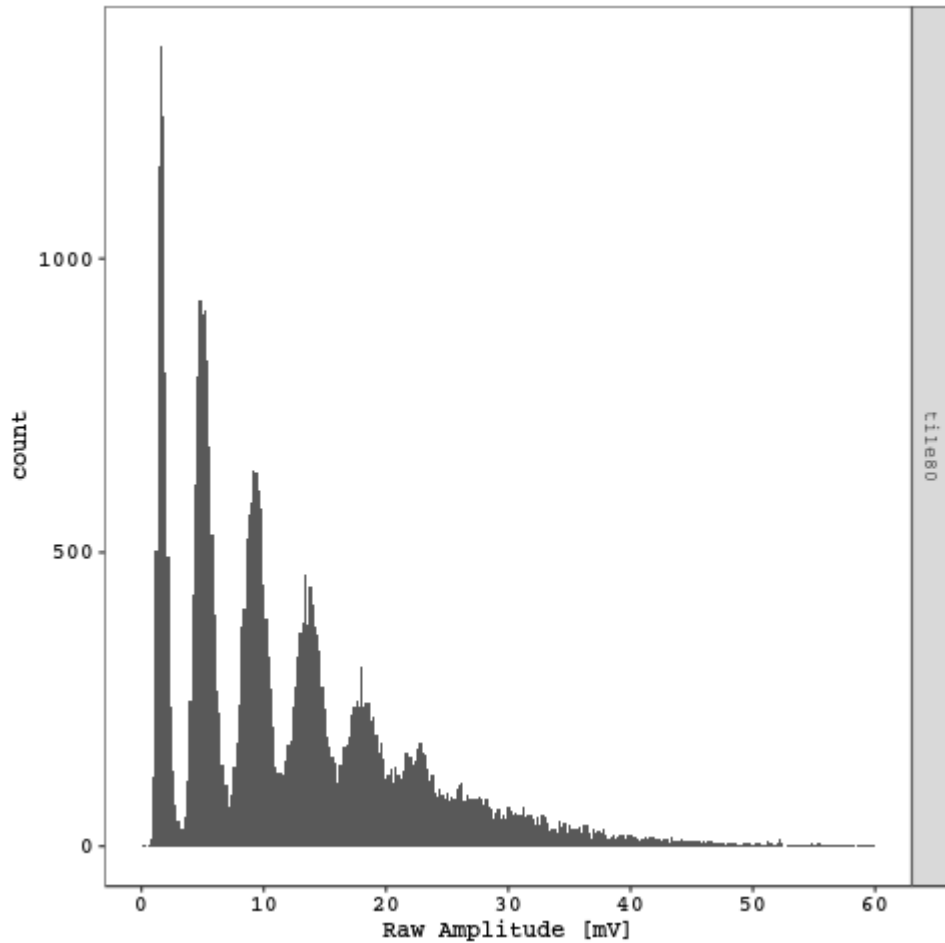
Extracted the reference waveform for the single PE and for the extra peak immediately before.



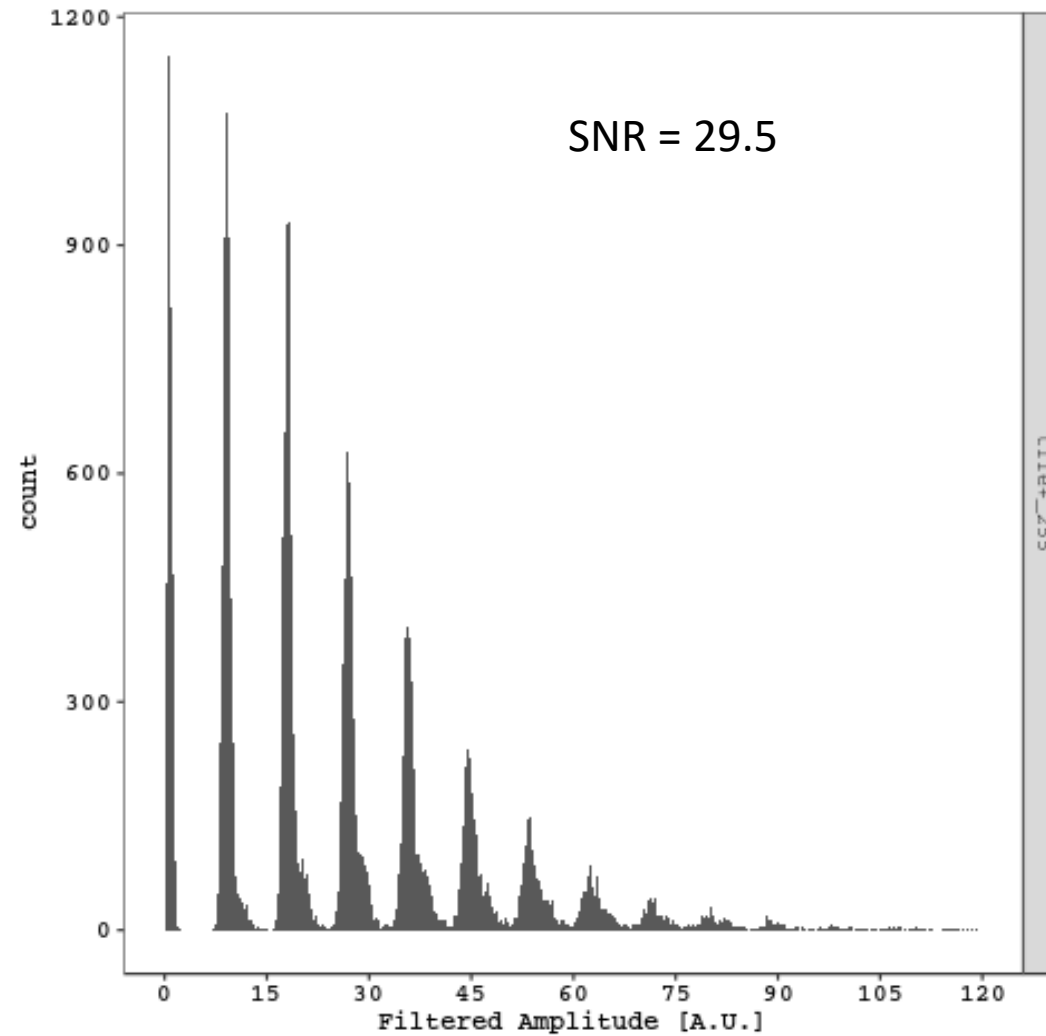
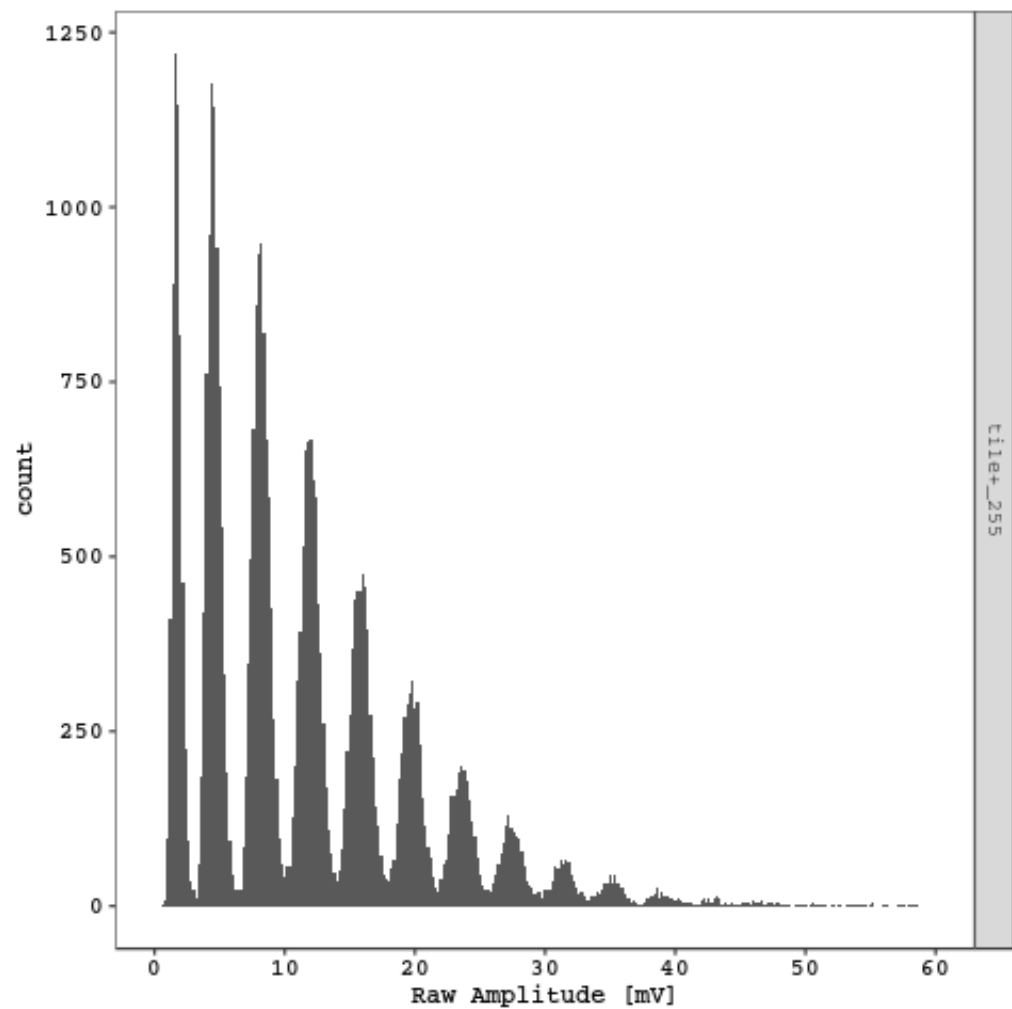
The extra peak has a slower tau recharge

TILE 80

After disconnecting the SiPM 17 that caused a short due to the cut off of the aluminum strip that connects the anode pads.

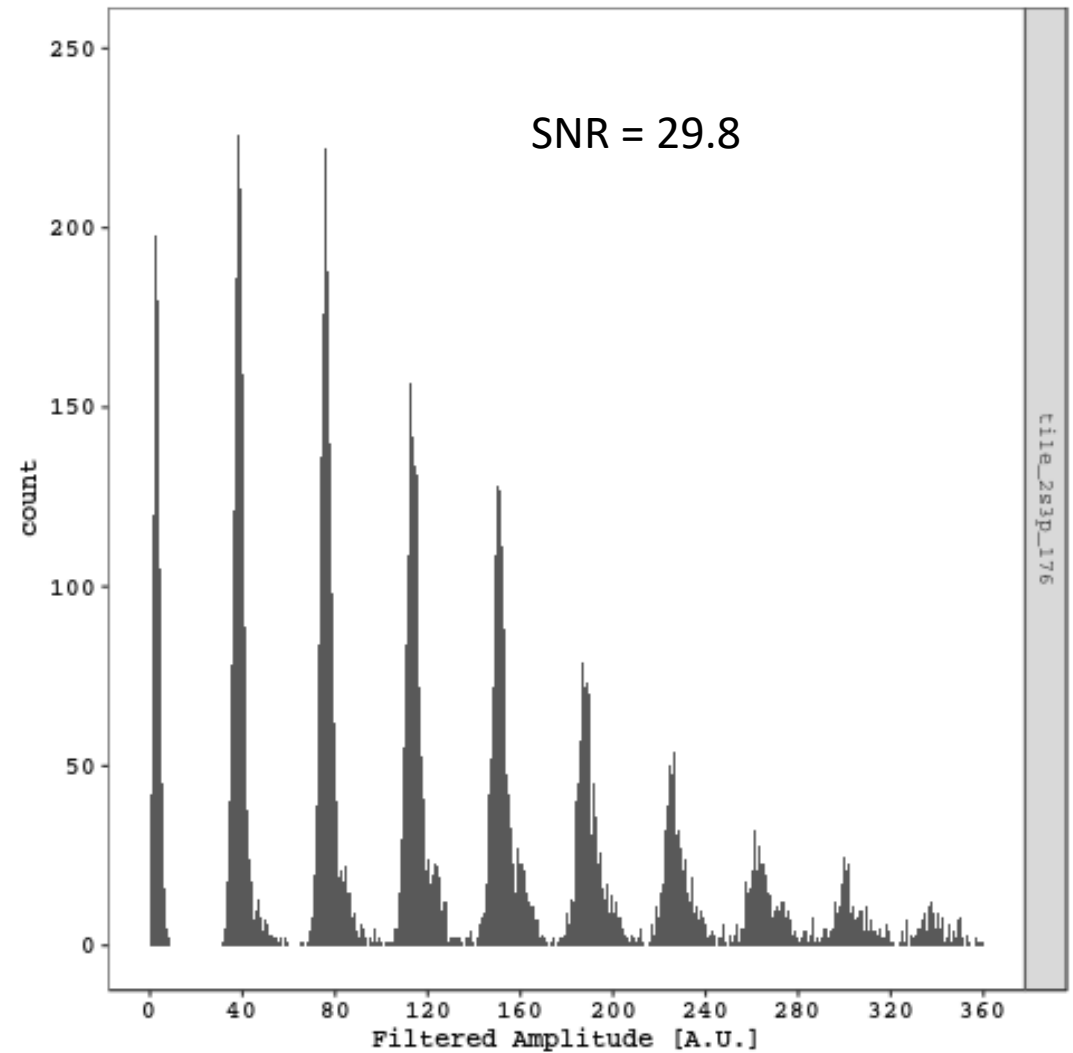
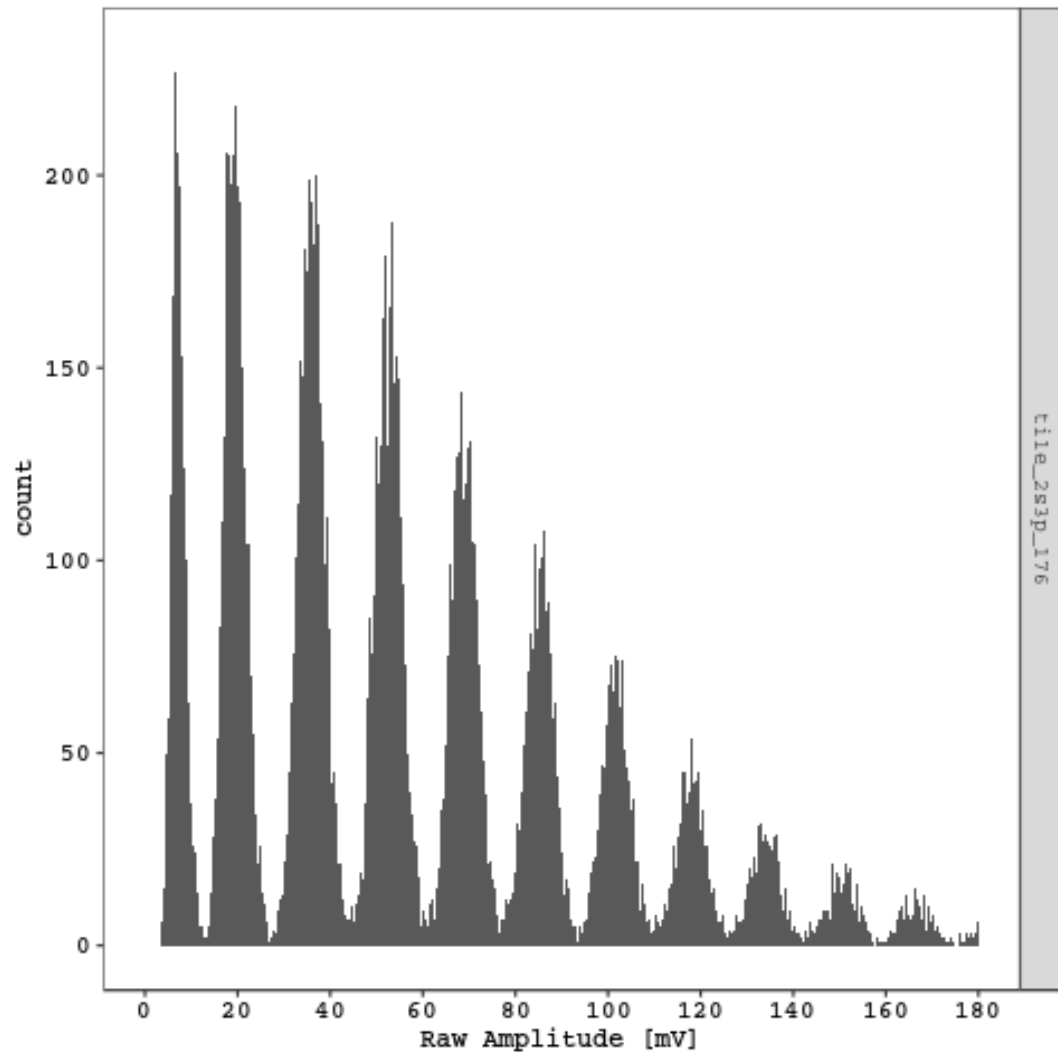


TILE PLUS 255



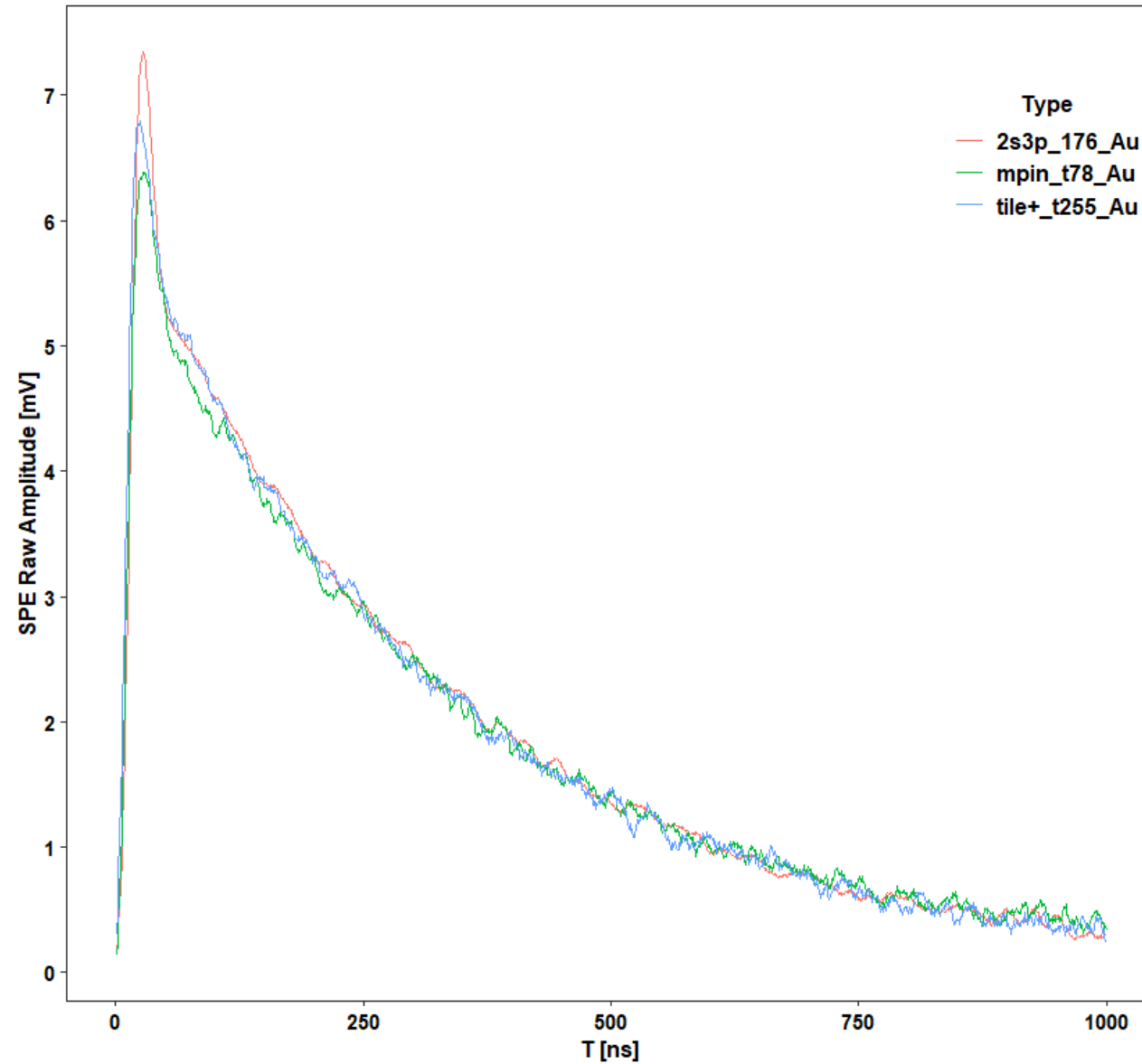
GAIN = 534 pVs

TILE 176 2s3p



GAIN = 2.25 nVs

Single PE reference waveform



Conclusions

- 8 Au tiles successfully tested in liquid nitrogen at + 7VOV.
- The extra peaks found on tile 75 and 81 have been suppressed after performing an IV FWD (100 mA).
- A tiny peak still survives on tile 75. We could try to inject a higher current (below the breaking limit) and see if the peak will be fully suppressed.
- We should monitor over the time the tiles that exhibited the extra peaks to check whether this phenomenon re-appears.
- We need to increase the statistics and produce more Au tiles to check how often the extra peaks occur.
- In the end, all the Au tiles work.