First look at data
and
detector perfomances

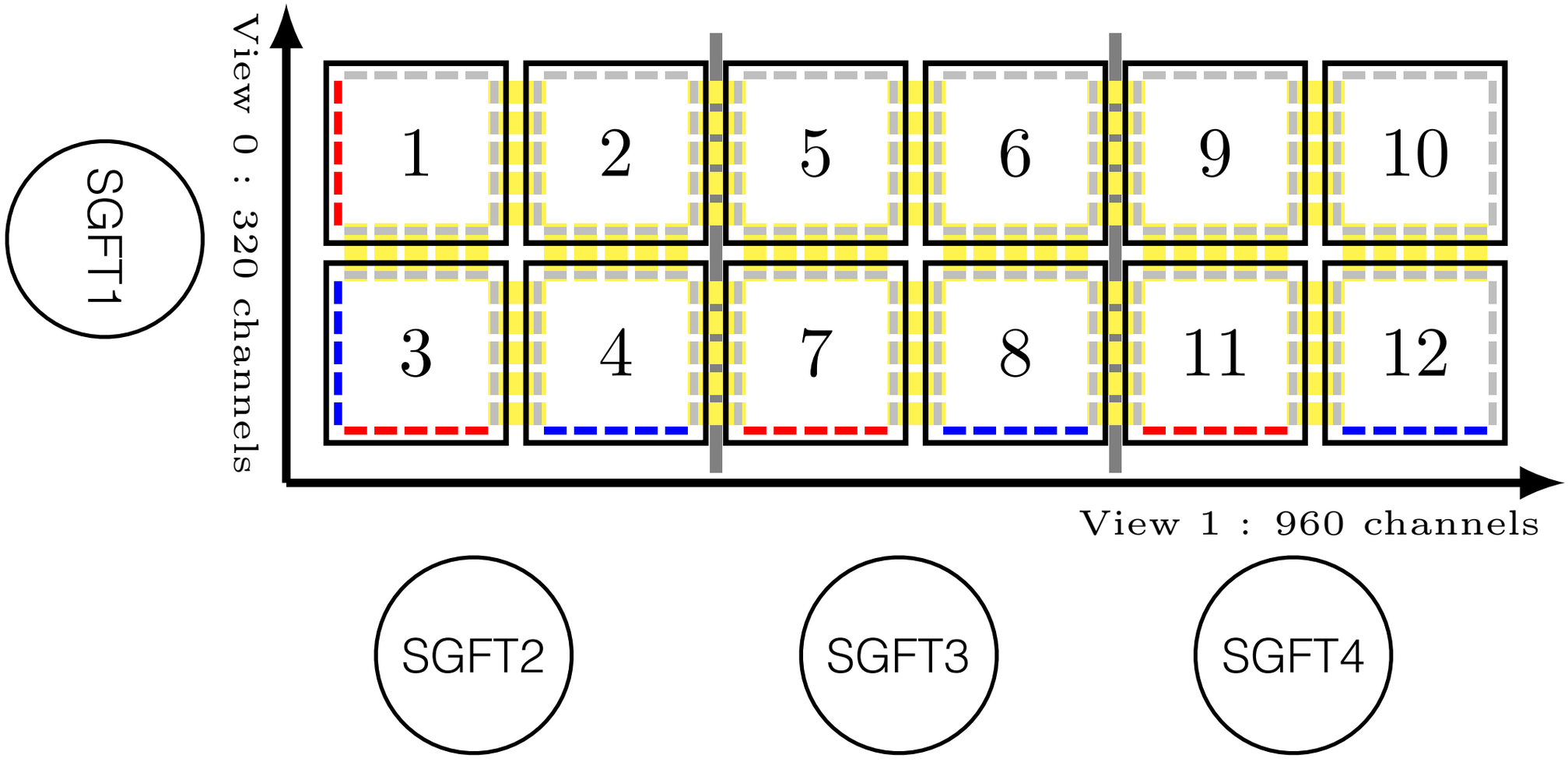
WA105 Collaboration Meeting

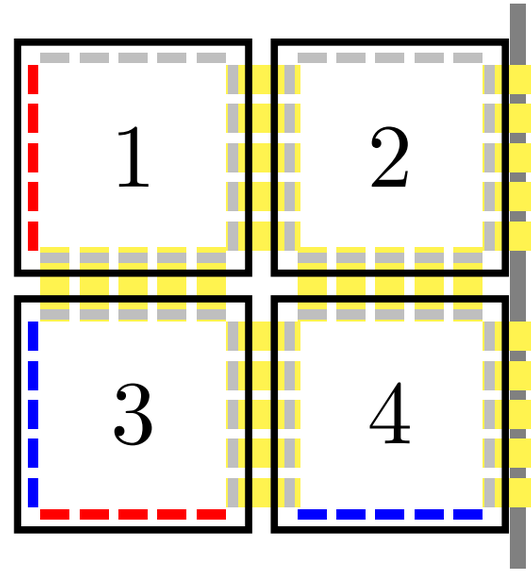
22 / 03 / 2017

Laura Zambelli
for the Laura's team
(Molina Bueno & Manenti)

(and many others)

Channel numbering reminder

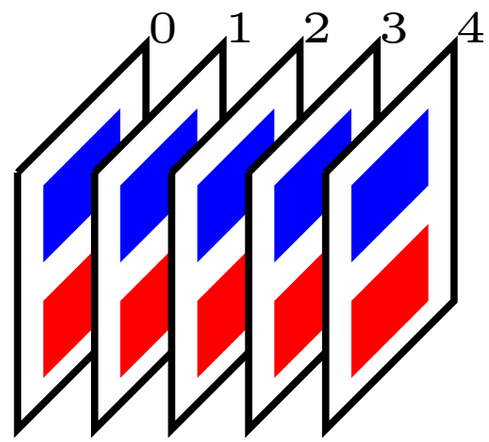




One SGFT holds 5 cards

One card reads 64 channels, divided in 2 connectors (32 channels each)

Each connector within a card connectors reads a different module



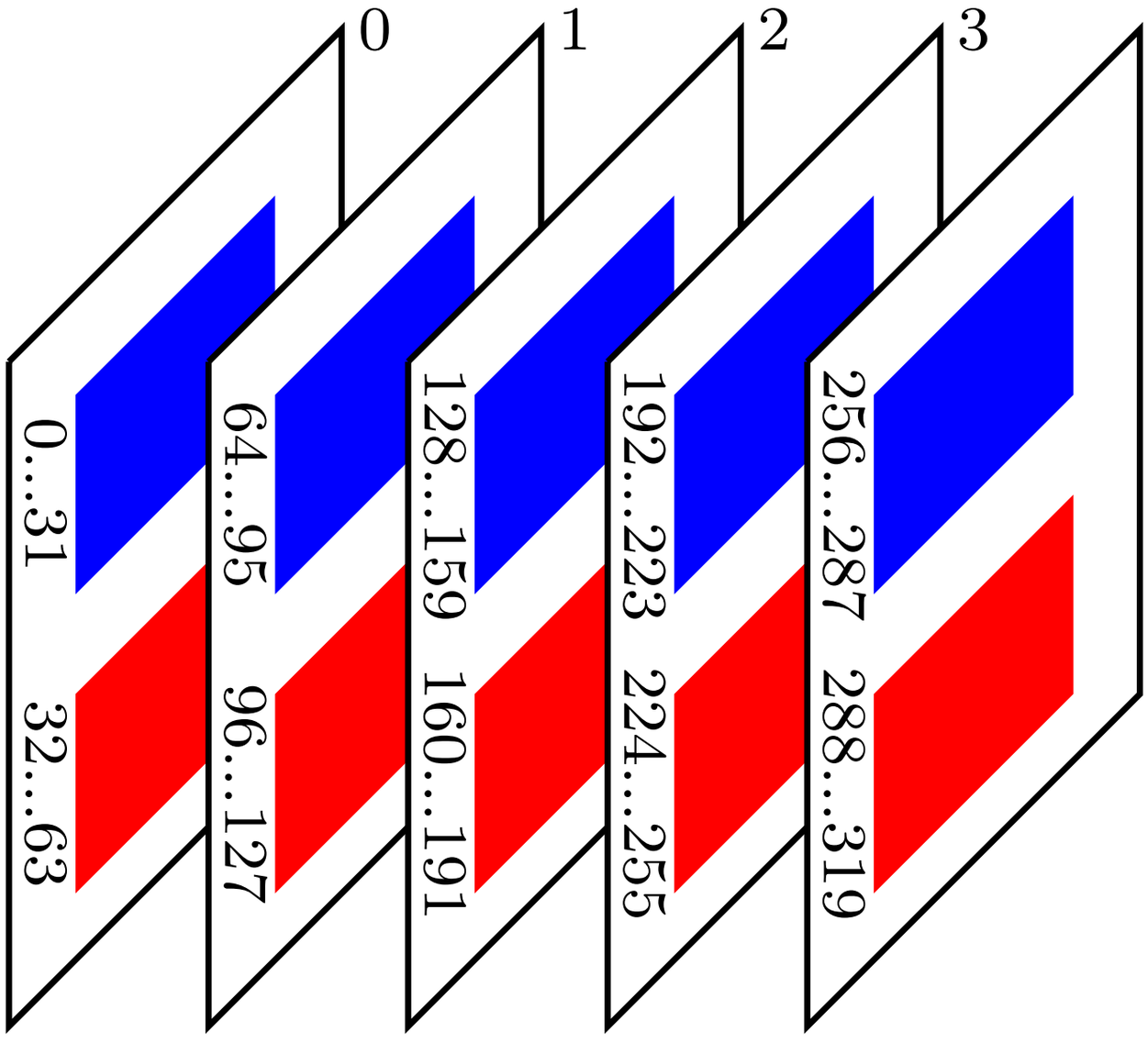
Channel numbering reminder

DAQ channels :

→ Counting at the card level

First card, first connector, first channel is DAQ #0

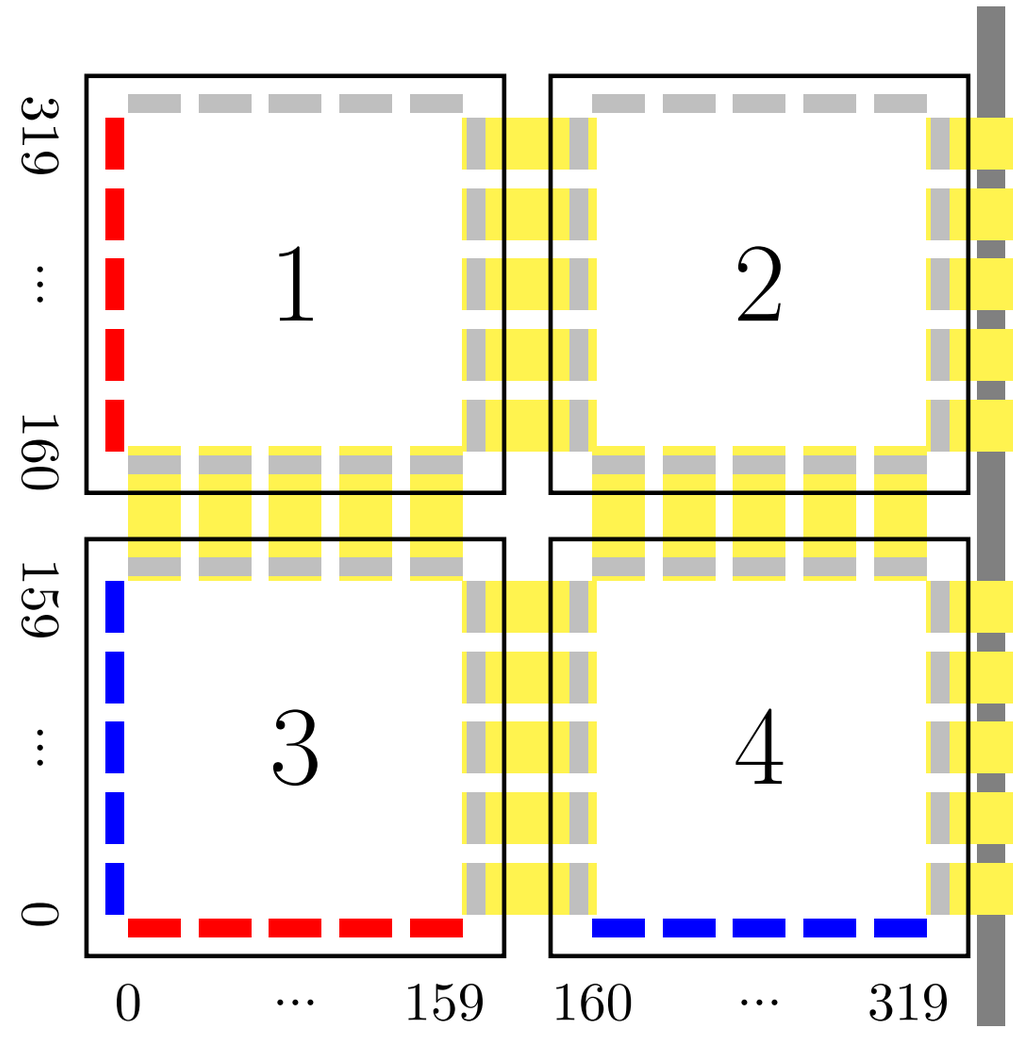
Then DAQ channels increase from top to bottom in each cards.



View channels :

→ Counting at the CRP level using right-handed coordinates

Origin at module 3 in both views

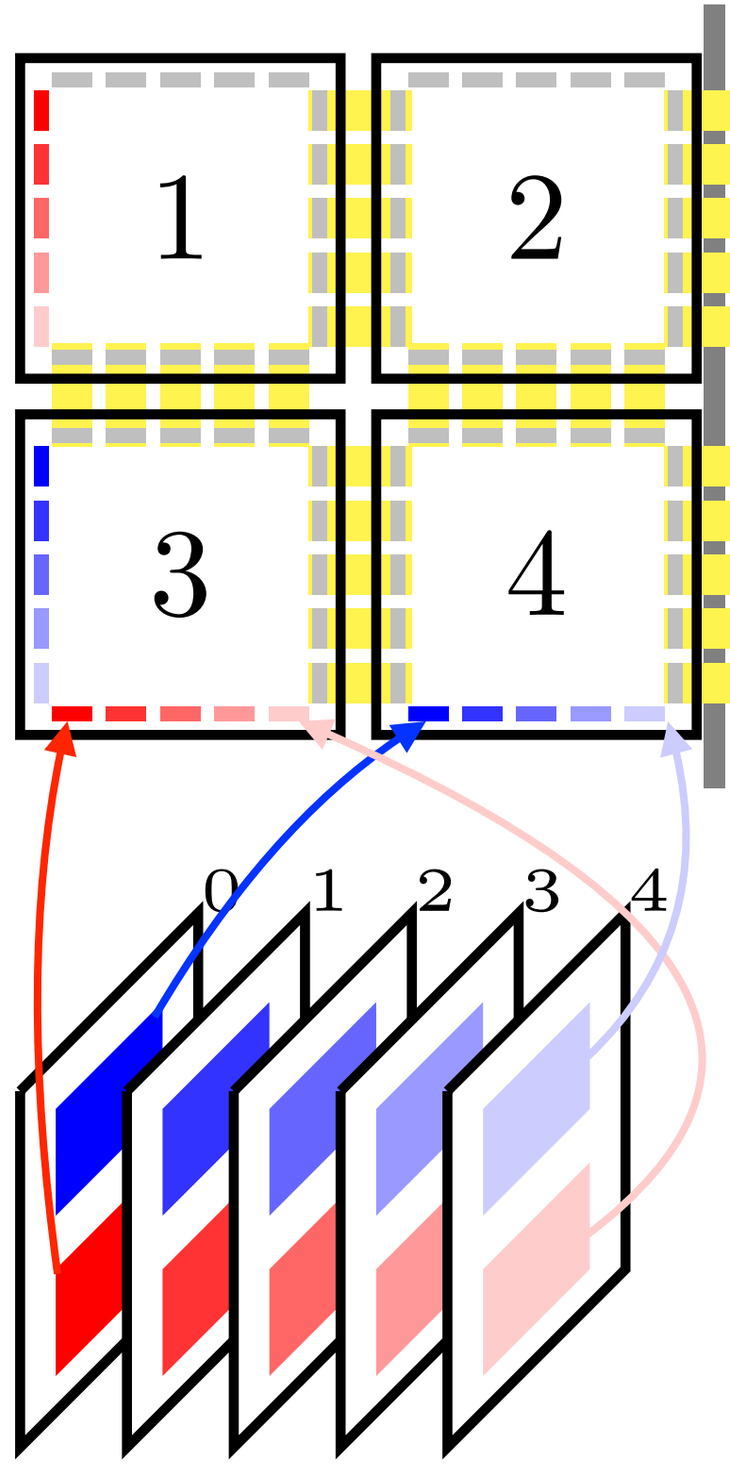


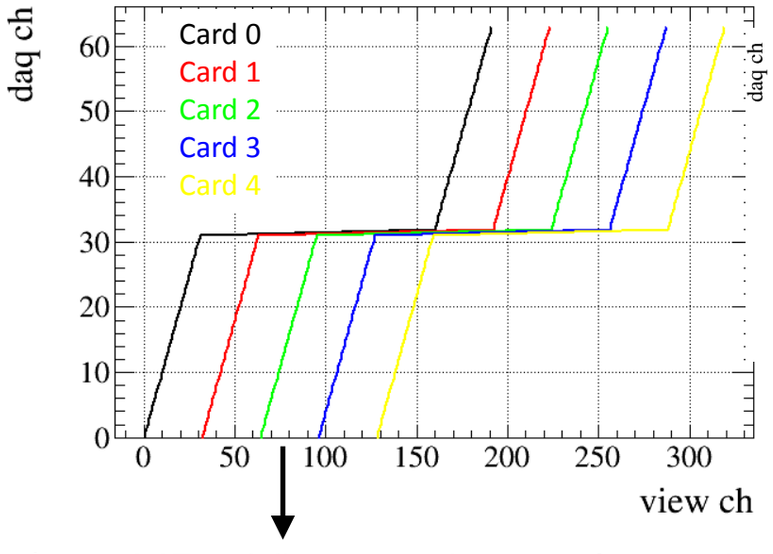
Channel numbering reminder - Mapping

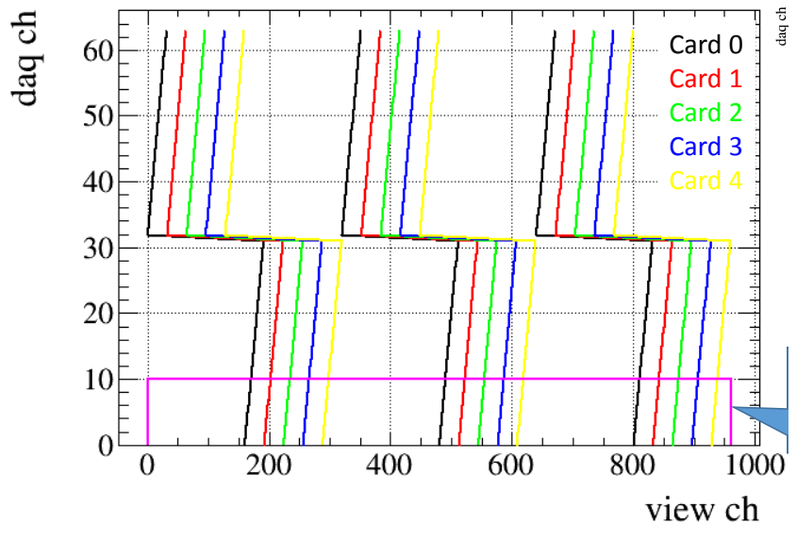
Top connectors reads the lower side (X, view 0) / right side (Y, view 1)

Bottom connectors reads the upper side (X, view0) / left side (Y, view 1)

Card	Card channels	DAQ Channels	View Channels X	View Channels Y
0	0~31 (top)	0~31	319~288	160~191
	32~63 (bottom)	32~63	159~128	0~31
4	0~31 (top)	256~287	191~610	288~319
	32~63 (bottom)	288~319	31~0	128~159







NB : View 0 channel numbering has been mirrored in order to have right handed coordinates

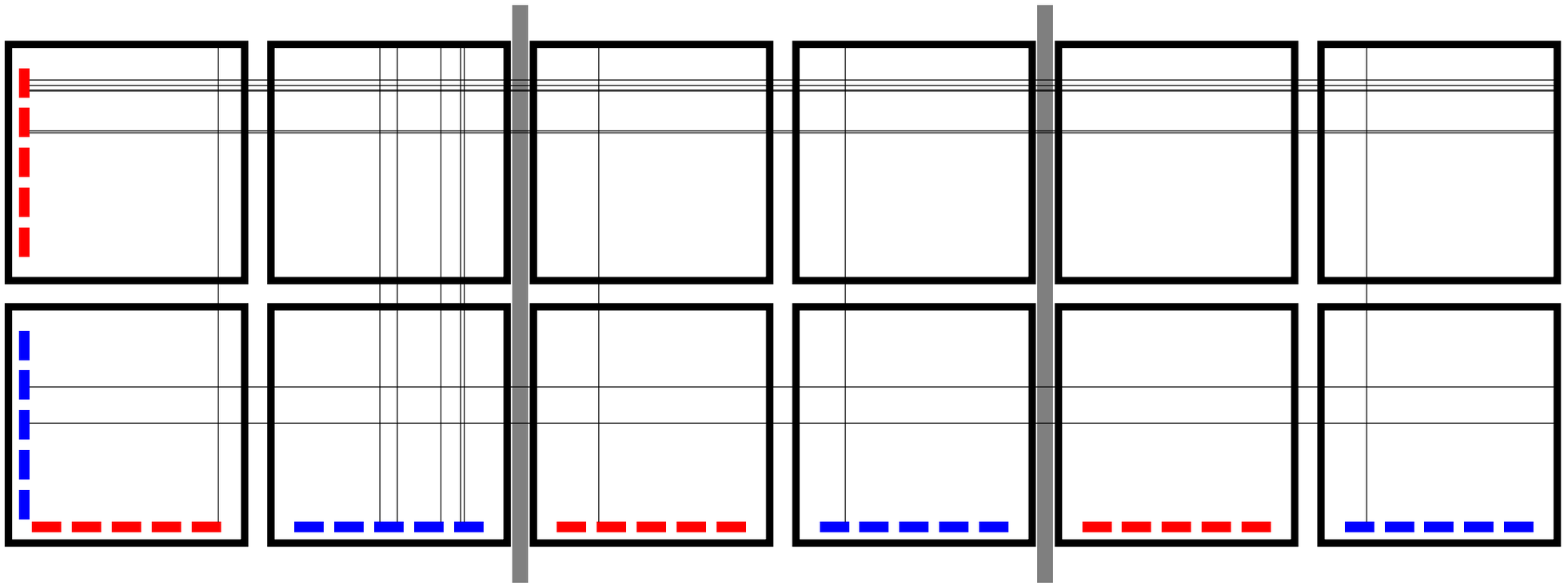
Problematic channels

As of measurements taken on Dec. 15th

View	SGFT	Card	Card Channel	DAQ Channel	View Channel
0	1	2	50	178	77
		3	5	197	218
			7	199	216
			46	238	49
		4	7	263	184
			8	264	183
			13	269	178
			19	275	172

View	SGFT	Card	Card Channel	DAQ Channel	View Channel
1	2	2	6	454	230
			25	473	249
		4	61	637	157
		3	29	541	285
		4	7	583	295
			11	587	299
	3	0	28	668	508
		1	34	738	354
	4	0	24	984	824

17 problematic channels out of 1280 → 1.3%



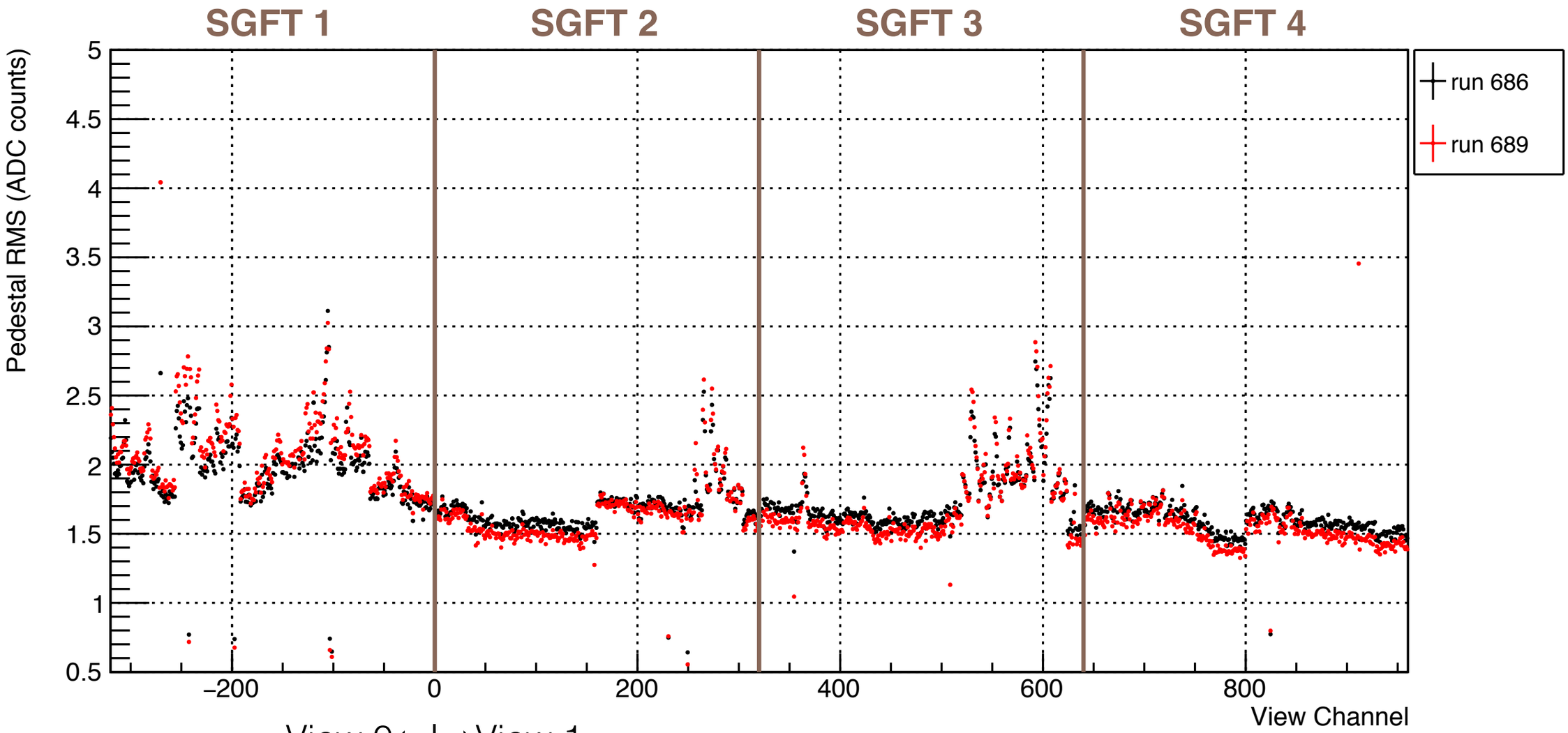
Noise measurements

With the following conditions :

- PMT PS ON at 0V
- LEM PS ON at 0V
- Cathode PS ON at 0V
- T probes and TC connected
- Level Meter connected
- CRP motorization connected, 24V circuit is OFF
- LED & Heaters disconnected
- Camera OFF & disconnected

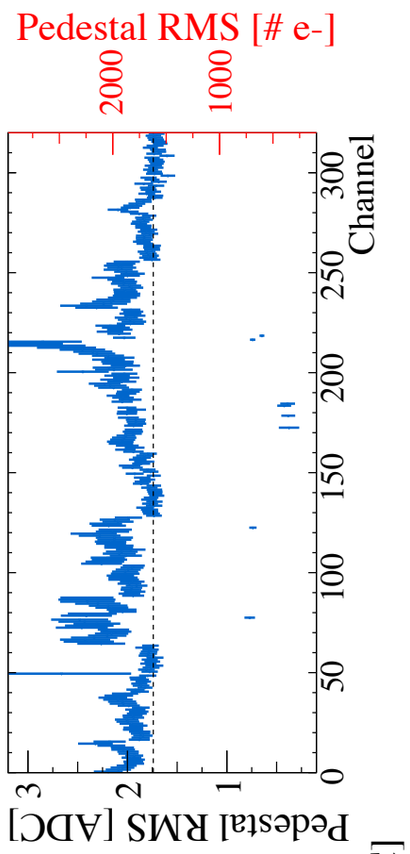
Lowest noise condition has a pedestal RMS of 1.74 ADC [run 686]

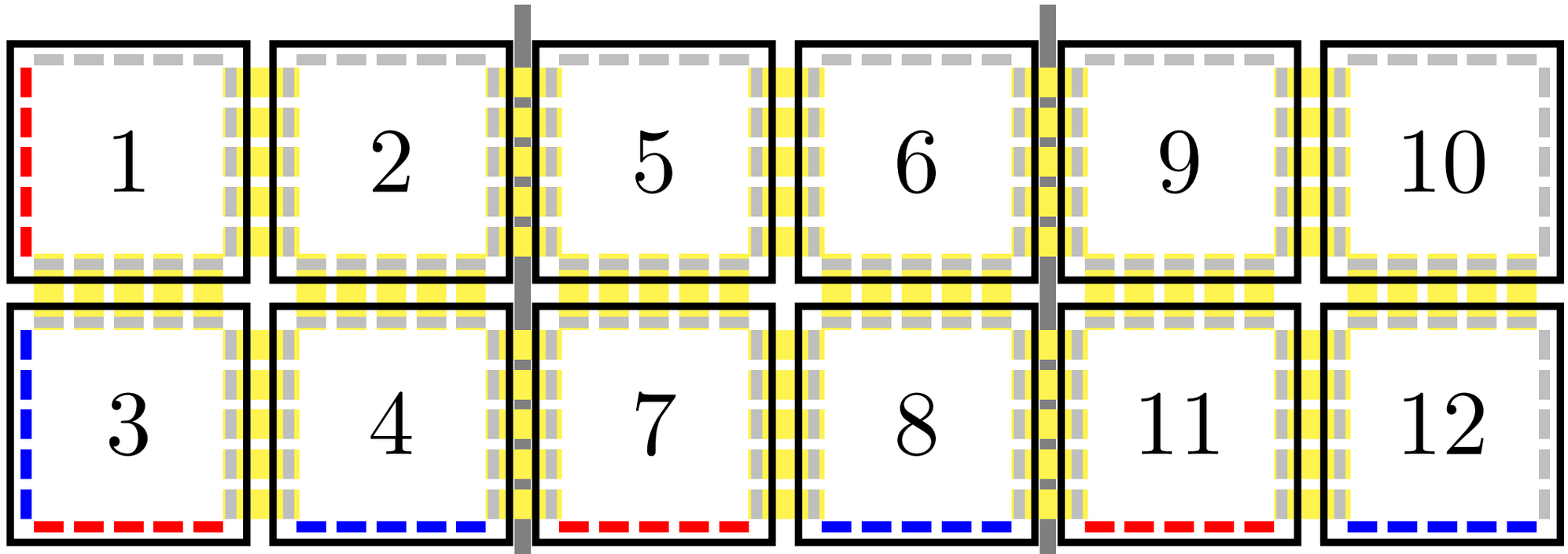
Measurement was reproduced 2 weeks later with same results [run 689]



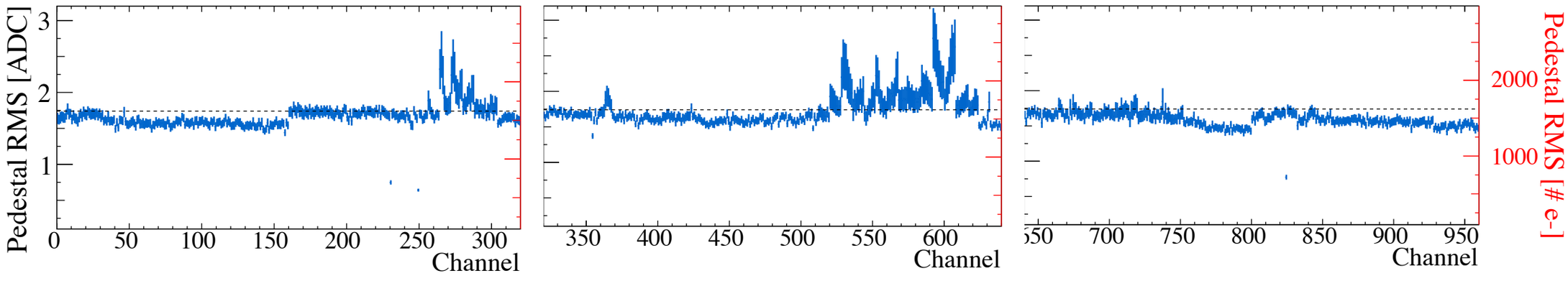
ELOG 108, 111, 143

Noise measurements



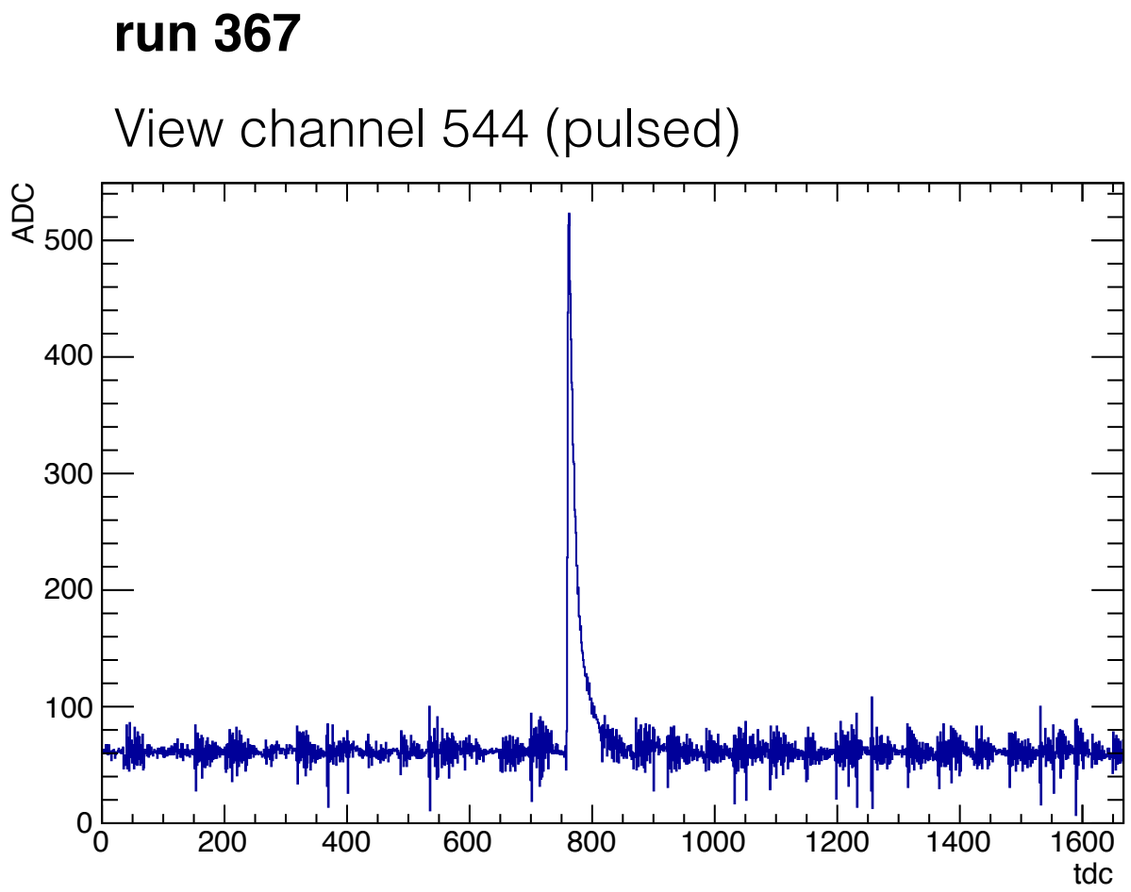


run 686



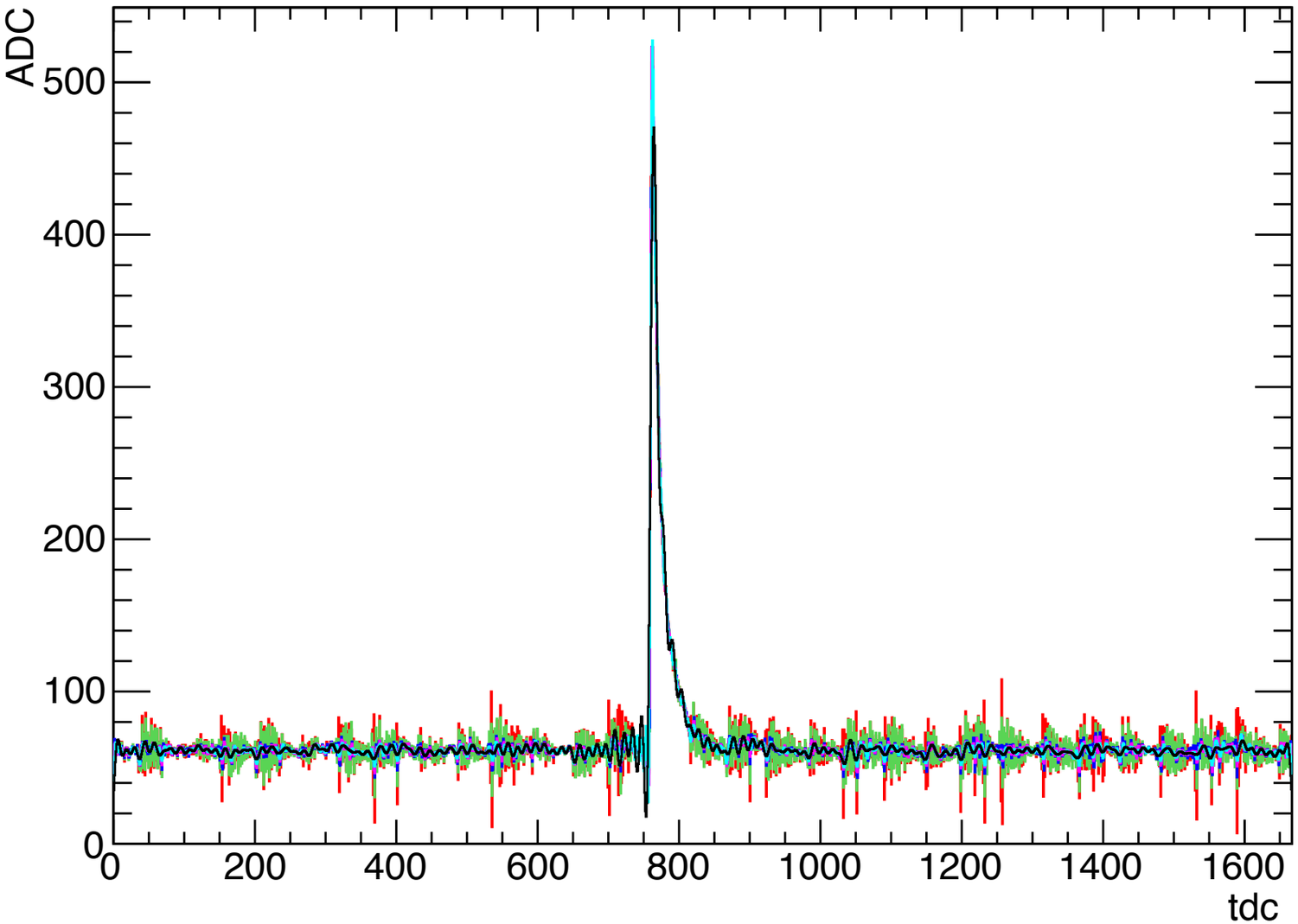
Pulsed measurements

- Pulsing connectors individually (group of 32 channels together).
- Or pulsing 20 connectors at the same time (at the calibration flange level)
- Each pulsing have been performed with an injection of 150 fC [~5mip]
- Signal contaminated with high frequency noise due to unshielded cable



FFT Filtering

The high frequencies can be easily removed with a cut in Fourier space without affecting the signal



no cuts

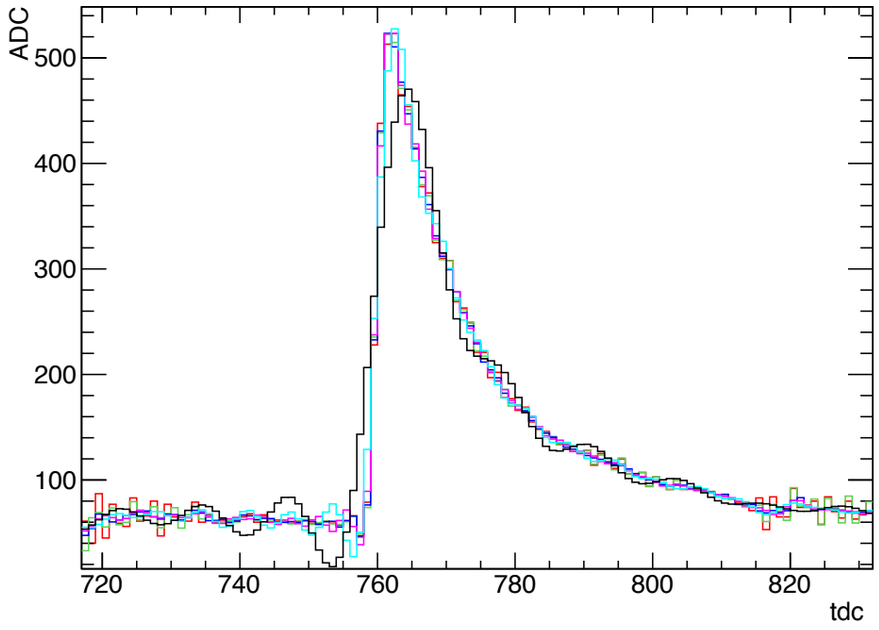
> 1 MHz cut

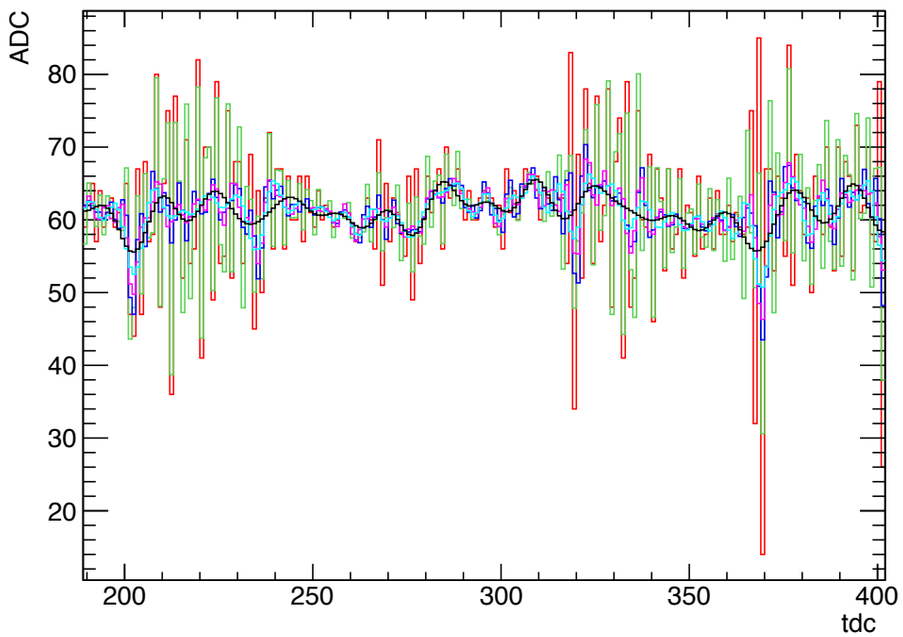
> 0.8 MHz cut

> 0.6 MHz cut

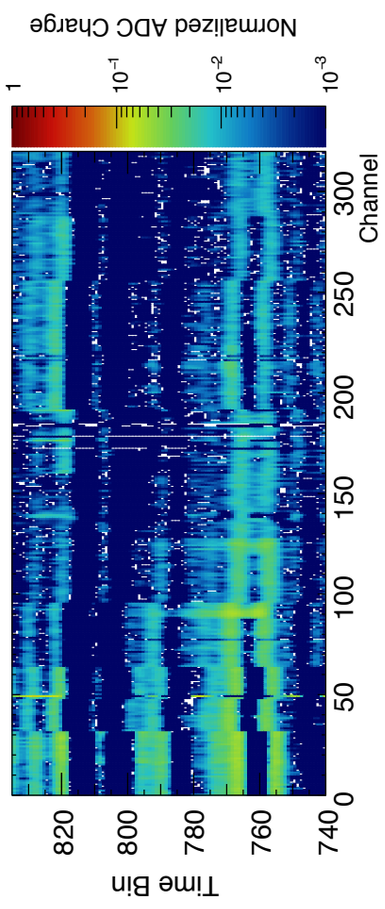
> 0.4 MHz cut

> 0.2 MHz cut

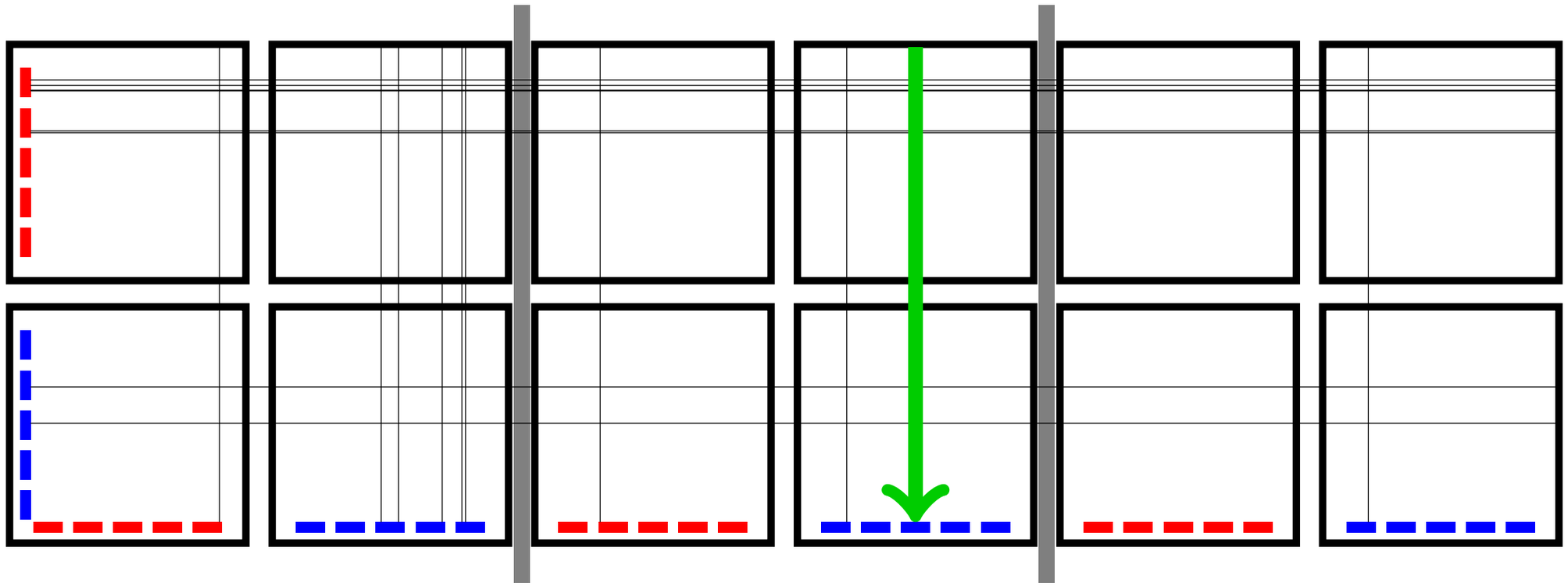




Pulsed data - single connector pulsed, 2D view

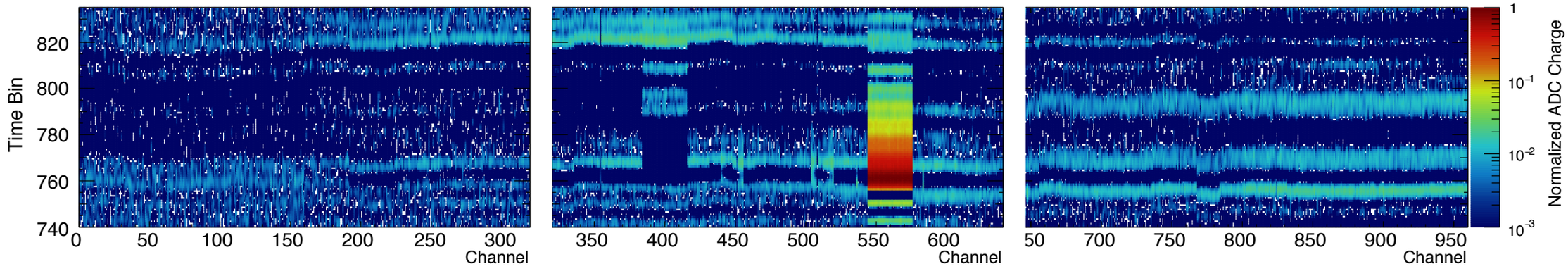


Top connector of card 2 in SGFT 3 is pulsed



run 367

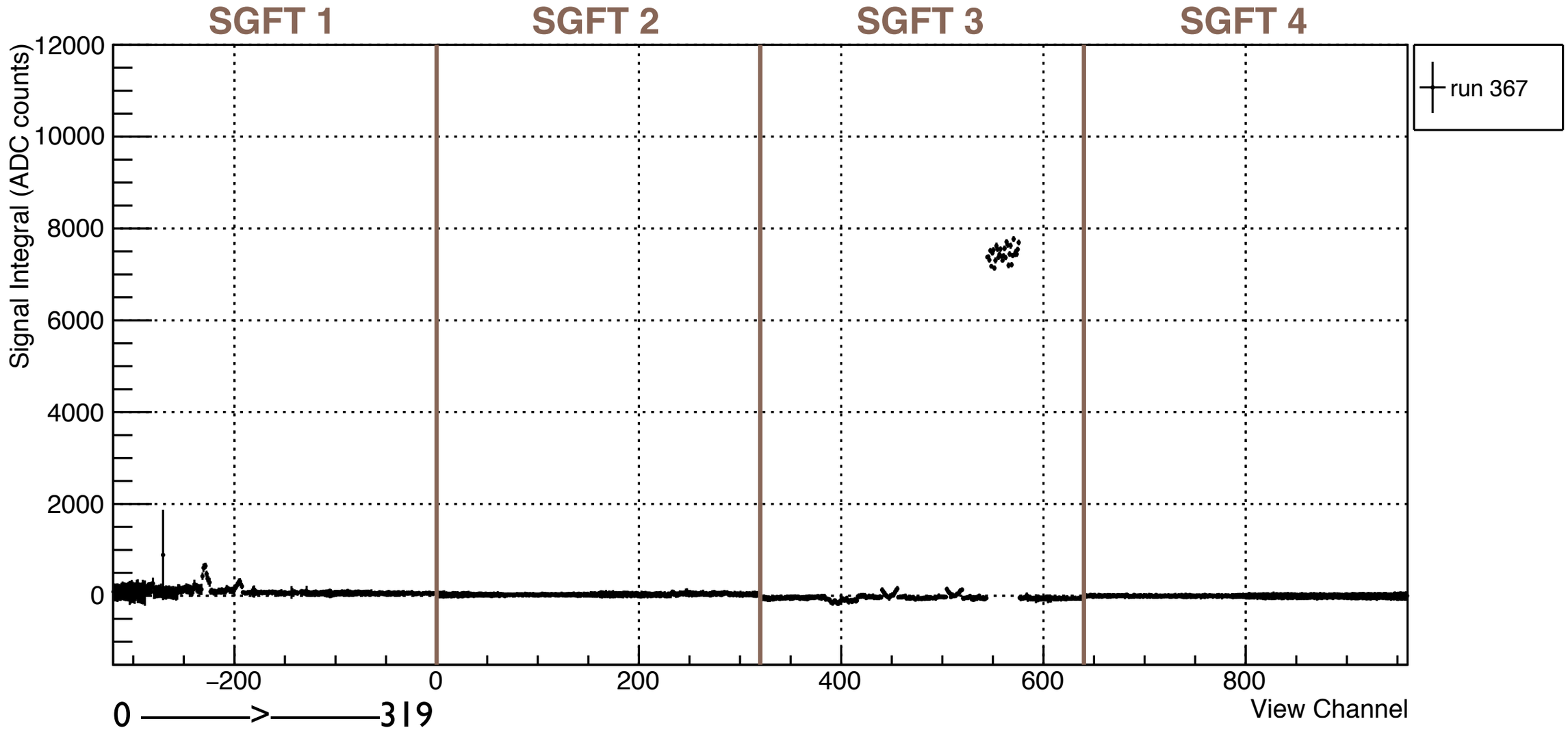
FFT filtered



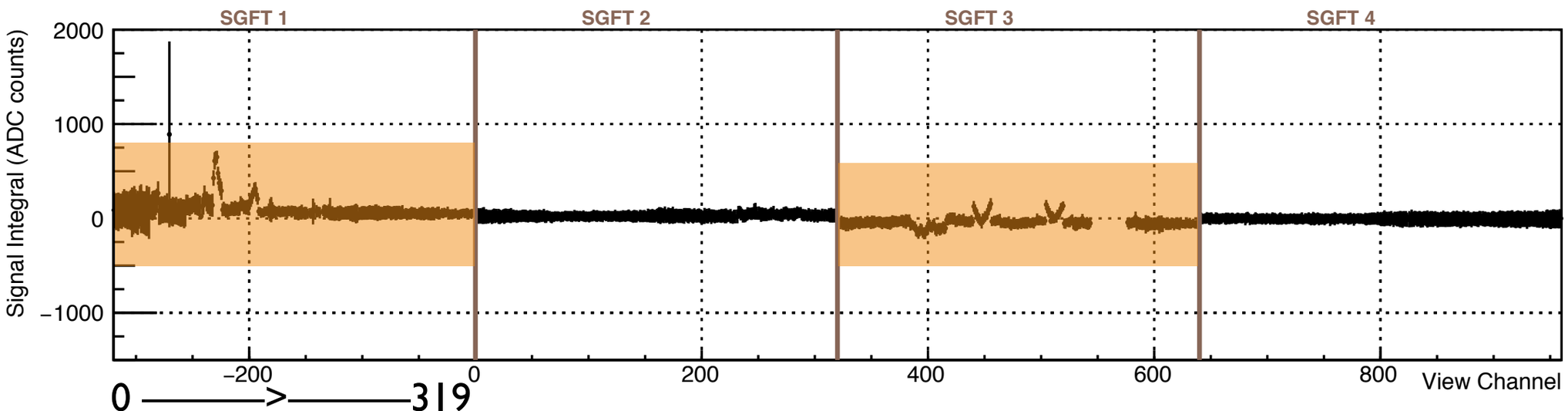
- Some noise remains → The cable has been changed to a shielded one meanwhile
- No strong cross talked observed (roughly 5%, see next slides)
- Counter connector in card seems to react to the pulse
- Characterization of the anode in progress (Pin & Caspar, previous talk)

Pulsed data - single connector pulsed

Looking at the integral of the waveforms in the pulsing time window in each channel

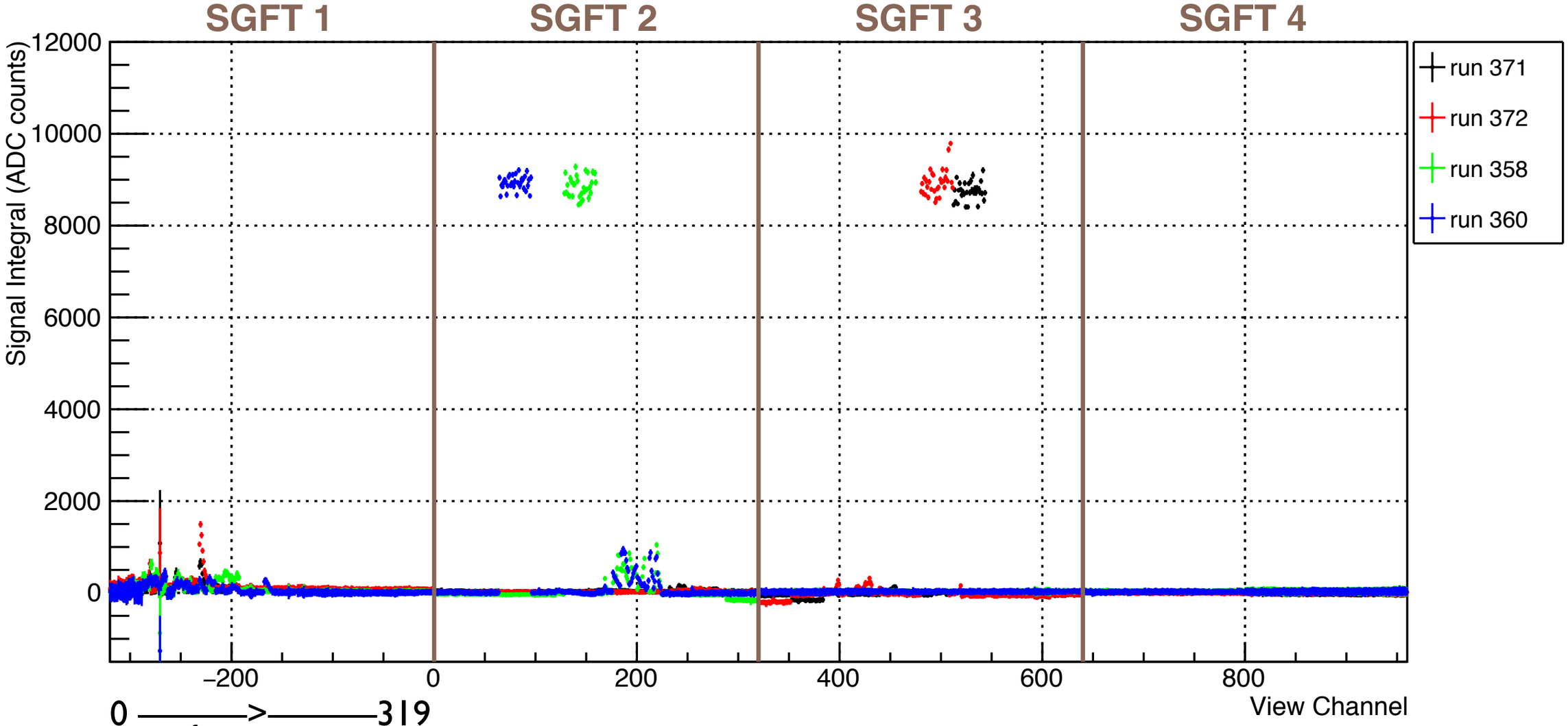


→ Little cross talk in the pulsed module and in the other view

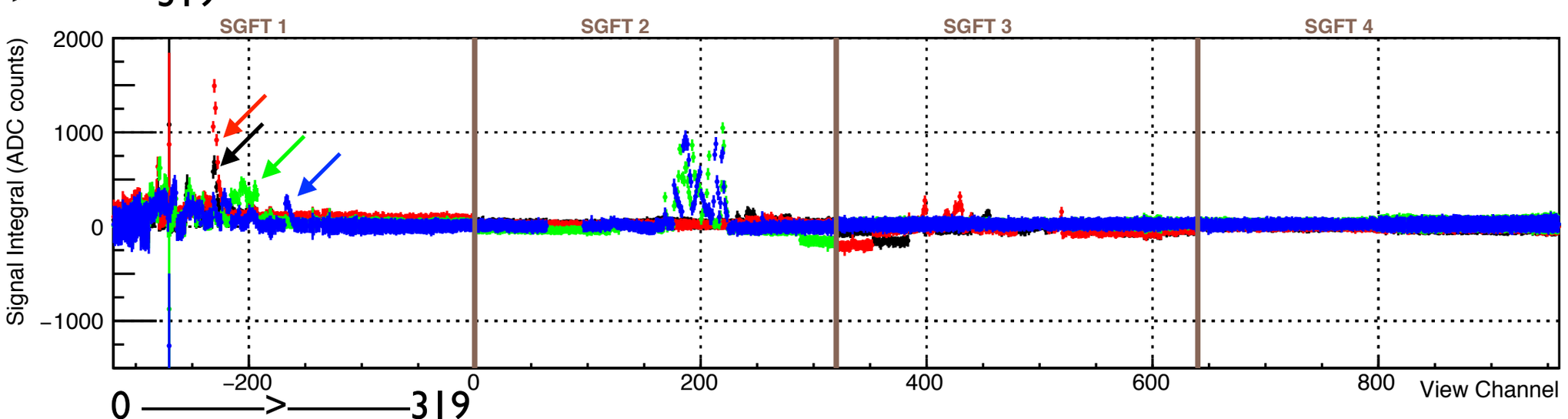


Pulsed data - Different connectors pulsed

Looking at the integral of the waveforms in the pulsing time window in each channel

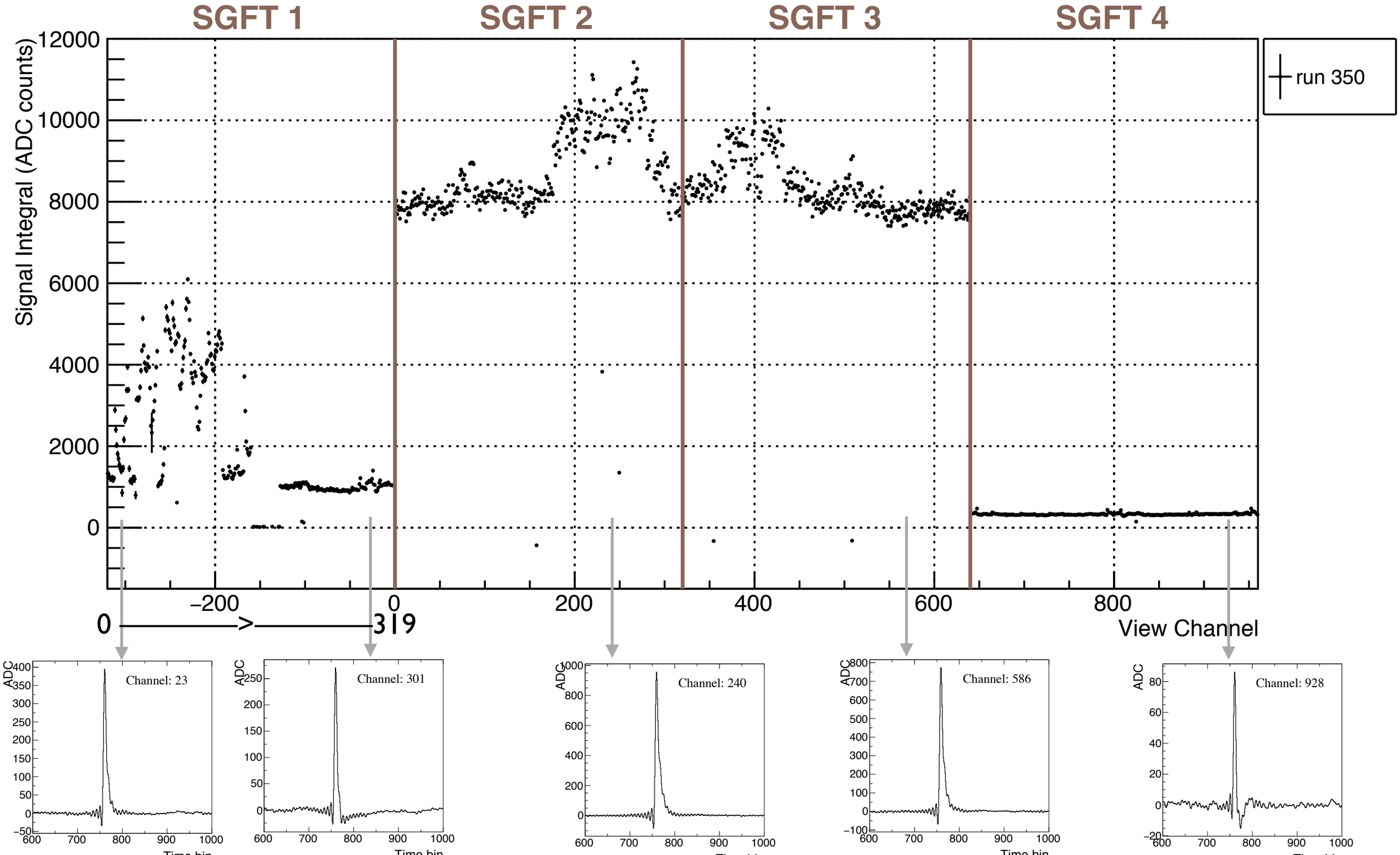


→The amount of cross talk in the other view seems to be independent from the pulsing position

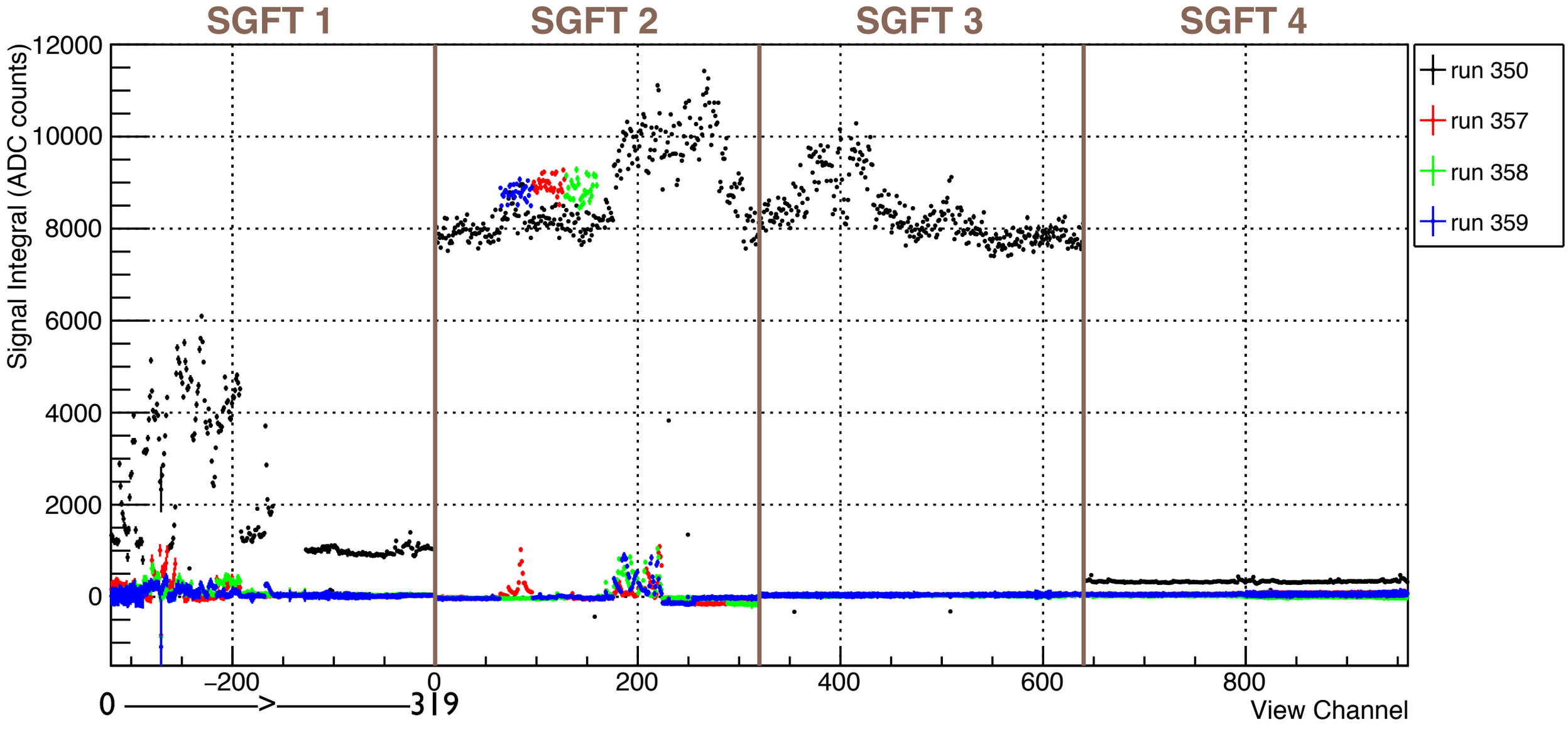


Pulsed data - All connectors in SGFT 2 & 3 pulsed

Using a different pulsing system, all channels in SGFT 2 & 3 were pulsed



Pulsed data - All conn. pulsed vs single conn. pulsed



Using a different pulsing system, all channels in SGFT 2 & 3 were pulsed

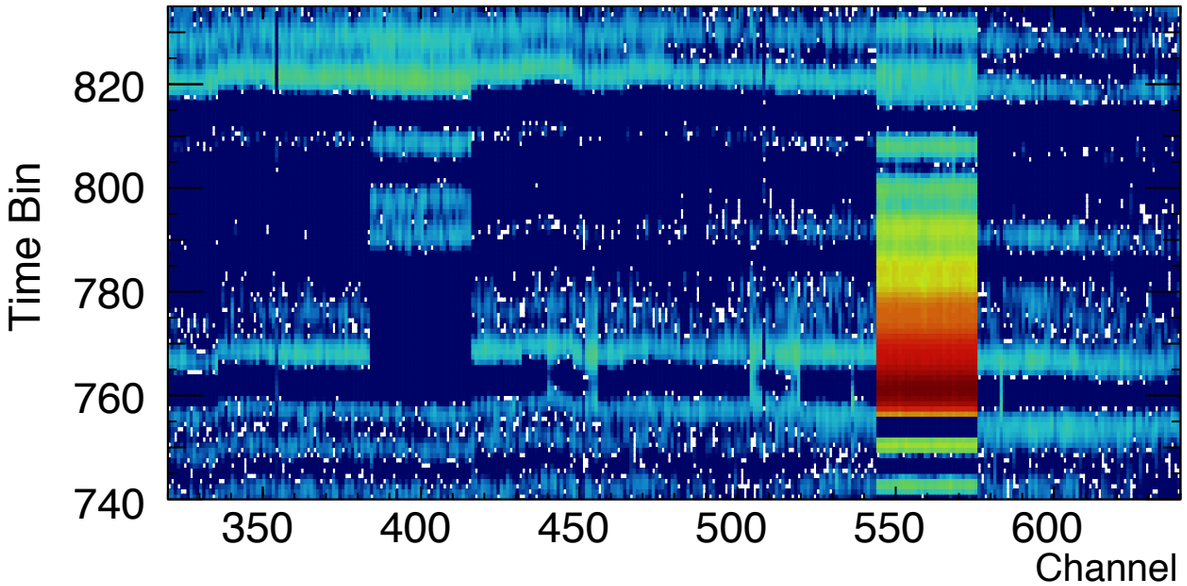
Compared to single connectors pulsed but the injected signal may be different

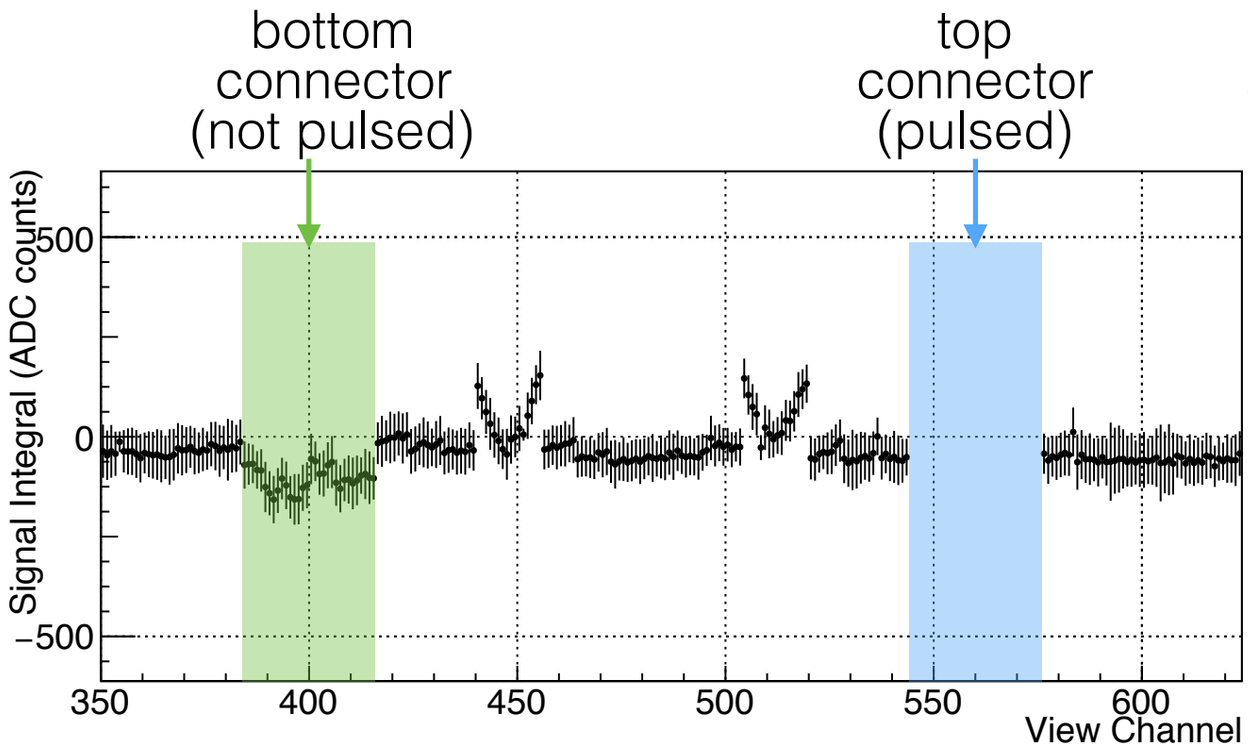
so no conclusions can be drawn from this plot at the moment !

Pulsed data - Counter reaction in the card ?

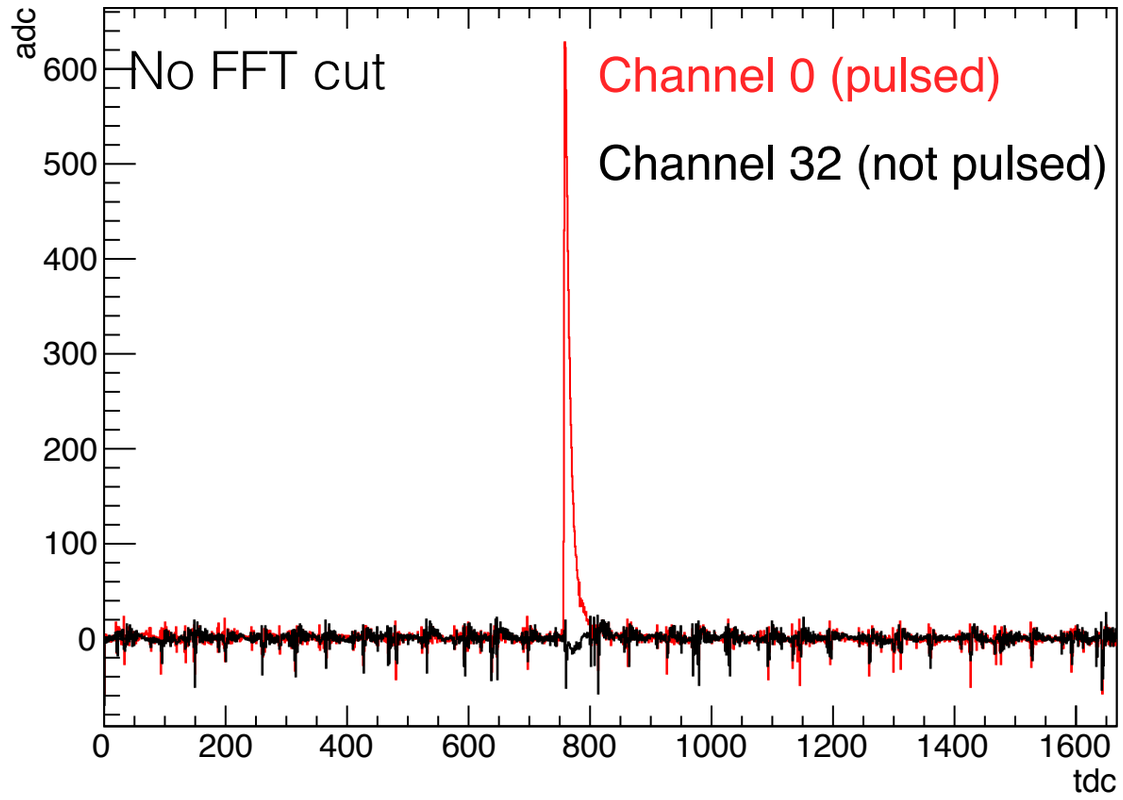
Example :

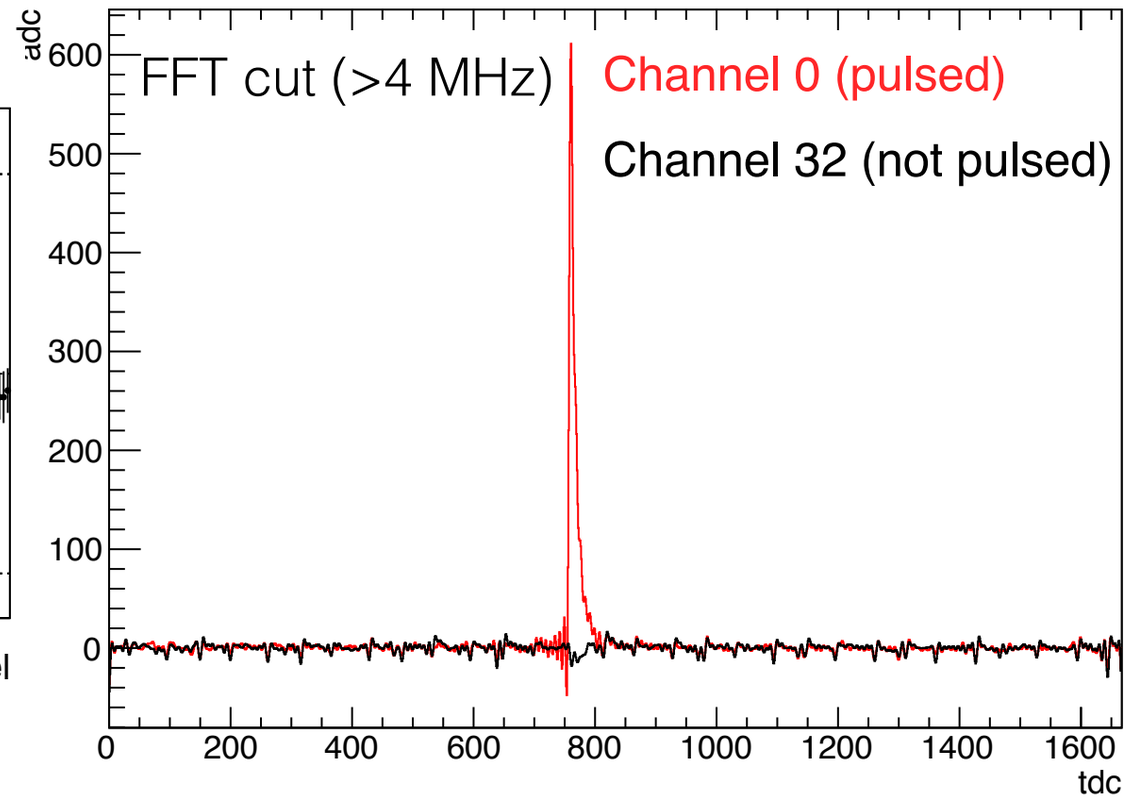
run 367, top connector of card 2 in SGFT 3 is pulsed





anti peak in the other connector ? [~1% amplitude]





Summary

- Only 1% of problematic channels observed
- Low noise level measured [~1.74 ADC] and reproduced later

- Pulsed data show a cross talk of about 5%, which needs to be further studied
- Final pulsing system needs to be installed with the new shielded cable
- As we have extra time before data taking, more data should be taken !

  (for example with different charge inputs)