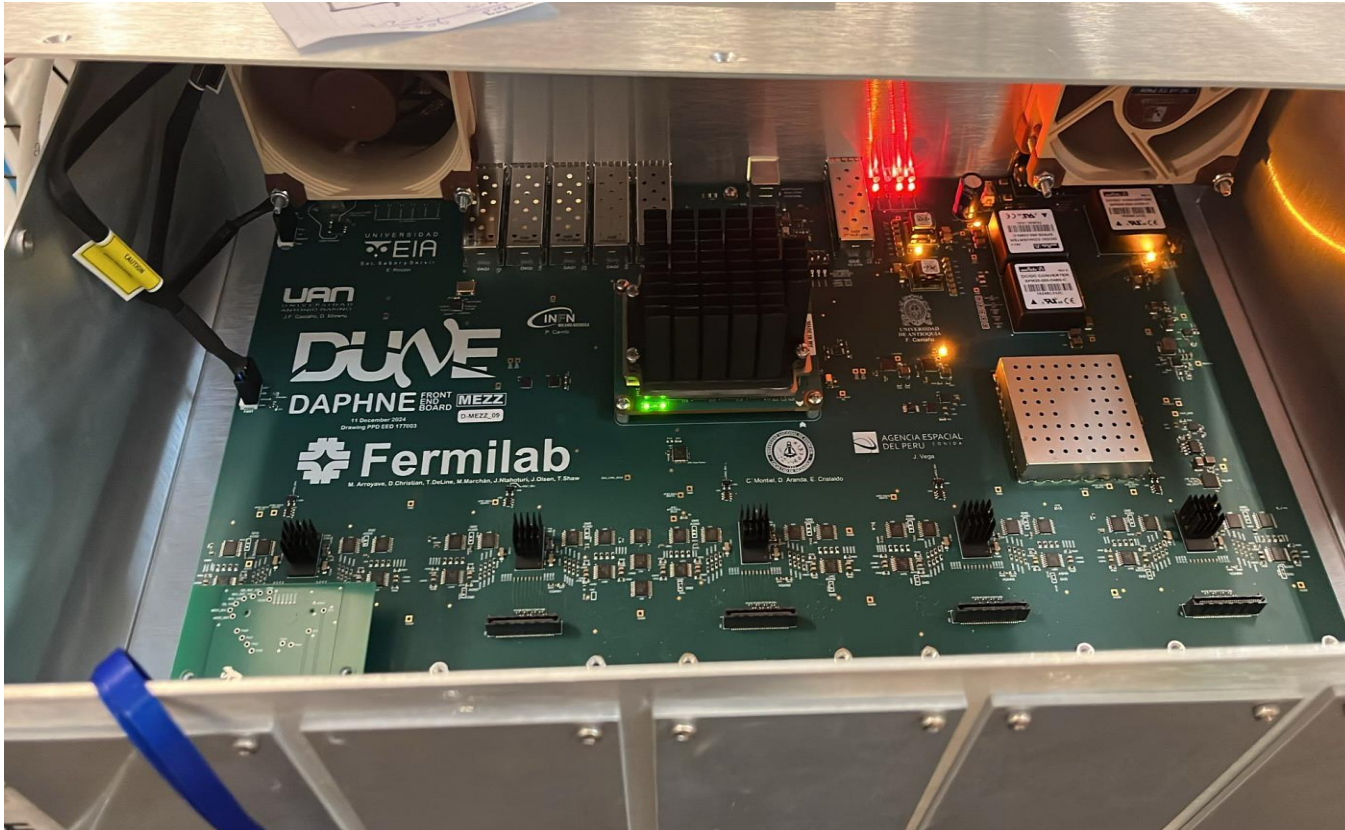


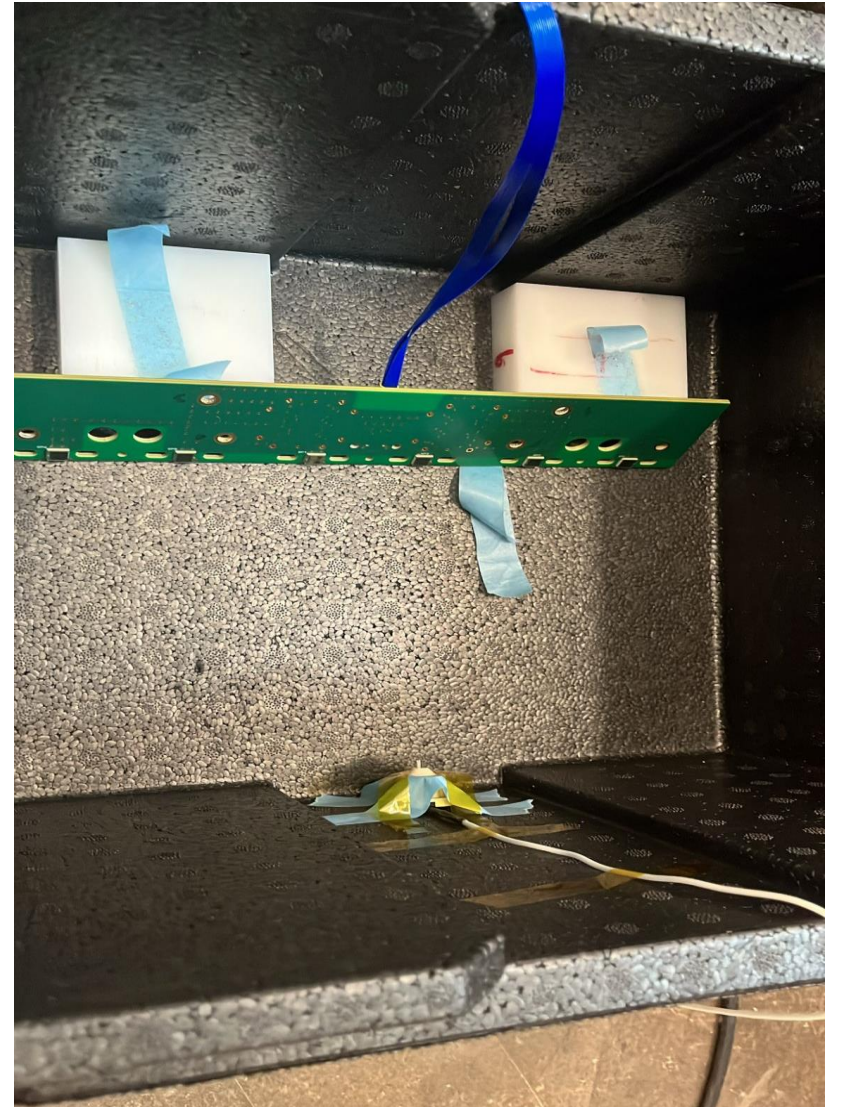
DAPHNE Configuration

Benan Ünal

Setup



DAPHNE board



Coldbox with SiPM and Pulser

Trigger types

Software trigger and Hardware trigger (not available to us)

Random Trigger

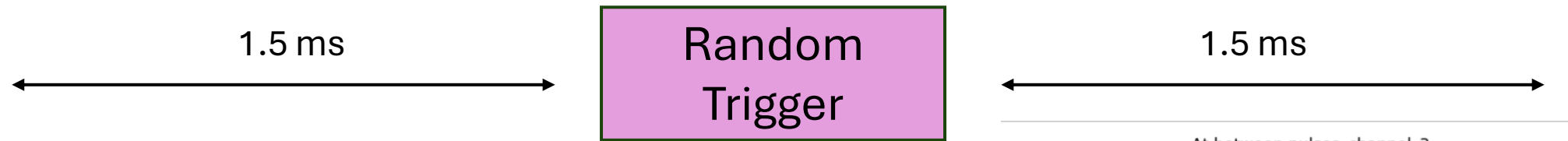
- Periodic random signal (300Hz / 3.3ms) that triggers the data acquisition

Self-Trigger Threshold

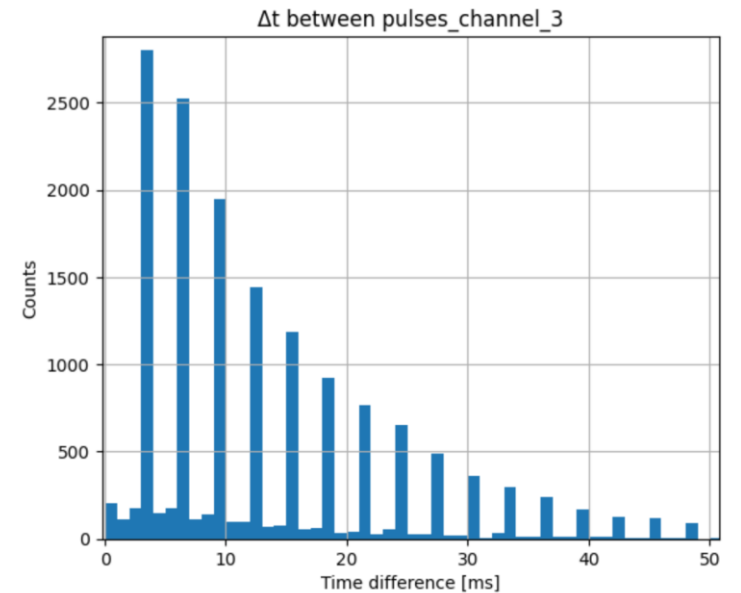
- Threshold is set as a configuration parameter depending on whether the system is cold or warm.
- Warm → more noise → higher threshold
- Cold → less noise → lower threshold
- Any signal (pulser/dark count) that exceeds the set threshold generates a waveform
- Self triggering algorithm:
 - moving average of 15 ticks compared to the next tick, if threshold is exceeded
frame is saved

Readout window

- Random trigger → save fixed time interval of samples before and after trigger → Waveform



- Fastest the pulser can run is 3 ms and Δt between consecutive peaks confirm this behavior



Configurations

	Object Name	gain	offset	trim	channel_id	stream_id
2	daphne_mezz-daphne-01-channel-0	1	2275	0	0	-1
3	daphne_mezz-daphne-01-channel-1	1	2275	0	1	-1
14	daphne_mezz-daphne-01-channel-2	1	2275	0	2	-1
25	daphne_mezz-daphne-01-channel-3	1	2275	0	3	-1
36	daphne_mezz-daphne-01-channel-4	1	2275	0	4	-1
37	daphne_mezz-daphne-01-channel-5	1	2275	0	5	-1
38	daphne_mezz-daphne-01-channel-6	1	2275	0	6	-1
39	daphne_mezz-daphne-01-channel-7	1	2275	0	7	-1
40	daphne_mezz-daphne-01-channel-8	1	2275	0	8	-1
41	daphne_mezz-daphne-01-channel-9	1	2275	0	9	-1
4	daphne_mezz-daphne-01-channel-10	1	2275	0	10	-1
5	daphne_mezz-daphne-01-channel-11	1	2275	0	11	-1

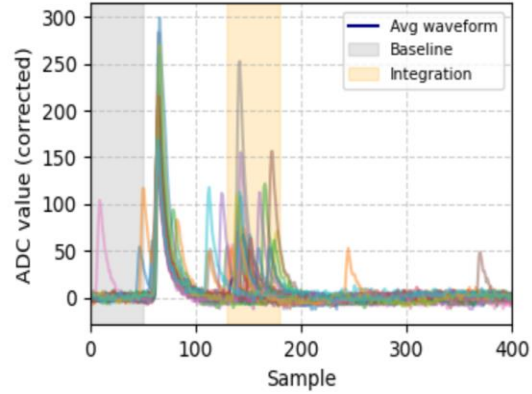
	Object Name	bias_ctrl	self_trigger_threshold	full_stream_channels	self_trigger_xcorr	tp_conf	compense
1	daphne-default-board	0	0		0	0	0
2	daphne_mezz-daphne-01-conf	4095	20		4160749570000	17881857	0

	Object Name	afe_id	attenuator	v_bias	adc	pga
1	daphne-default-afe	100	2666	0	daphne-default-adc	daphne-default-pga
2	daphne_mezz-daphne-01-afe-0	0	2999	1200	daphne_mezz-daphne-01-adc-0	daphne_mezz-daphne-01-pga-0
3	daphne_mezz-daphne-01-afe-1	1	2080	1200	daphne_mezz-daphne-01-adc-1	daphne_mezz-daphne-01-pga-1
4	daphne_mezz-daphne-01-afe-2	2	2226	1200	daphne_mezz-daphne-01-adc-2	daphne_mezz-daphne-01-pga-2
5	daphne_mezz-daphne-01-afe-3	3	1778	1200	daphne_mezz-daphne-01-adc-3	daphne_mezz-daphne-01-pga-3
6	daphne_mezz-daphne-01-afe-4	4	2999	1200	daphne_mezz-daphne-01-adc-4	daphne_mezz-daphne-01-pga-4

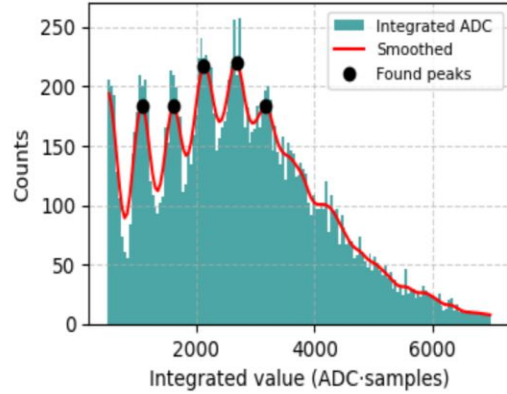
Run 000071, Channel 2
Baseline [0:50], Integration [130:180]

*Attenuator
= 2000 for
all data

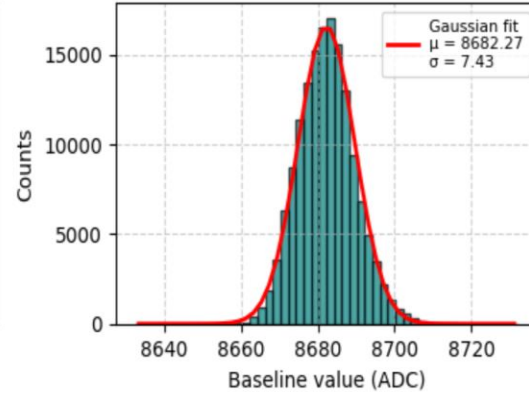
Channel 2: Avg corrected waveform



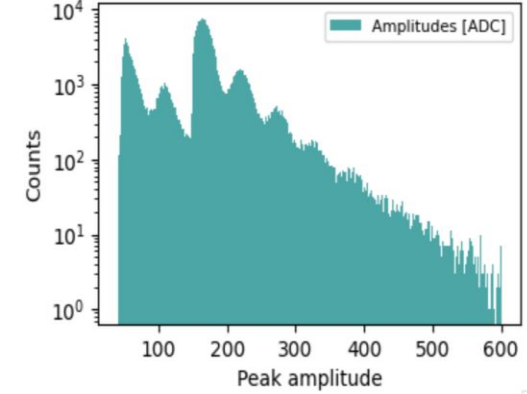
Channel 2: Integral spectrum
Number of entries 154135



Channel 2: Baseline spectrum



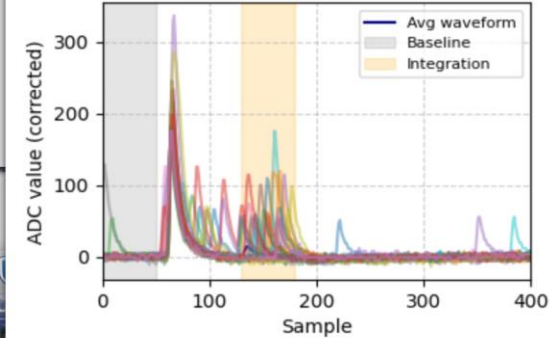
Channel 2: Peak amplitude histogram



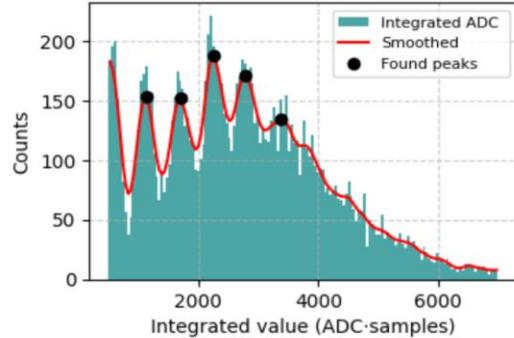
Avg. peak
spacing (gain)
= 520

Run 000071, Channel 3
Baseline [0:50], Integration [130:180]

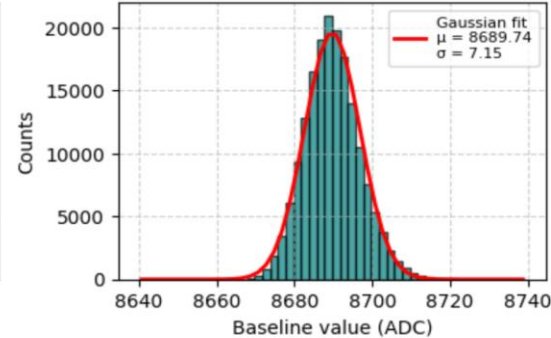
Channel 3: Avg corrected waveform



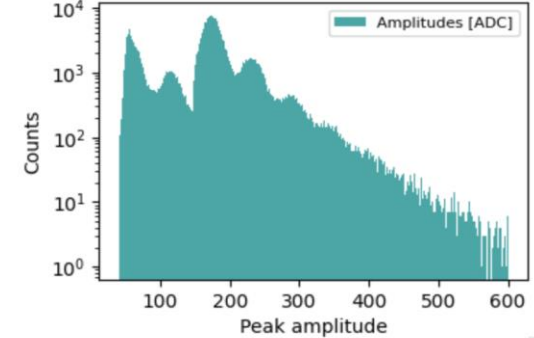
Channel 3: Integral spectrum
Number of entries 175857



Channel 3: Baseline spectrum

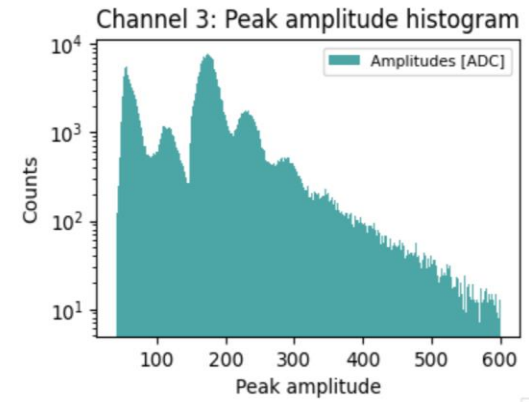
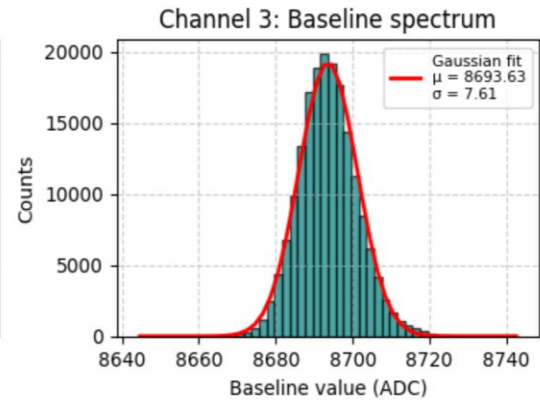
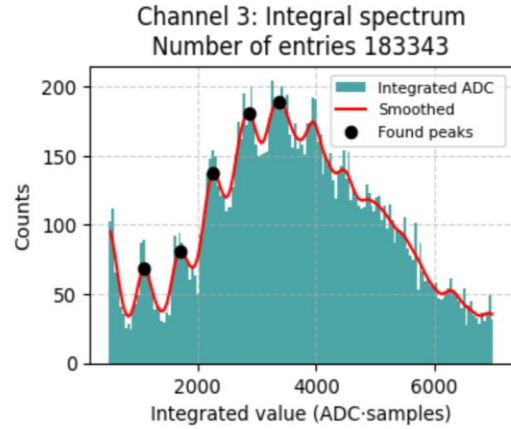
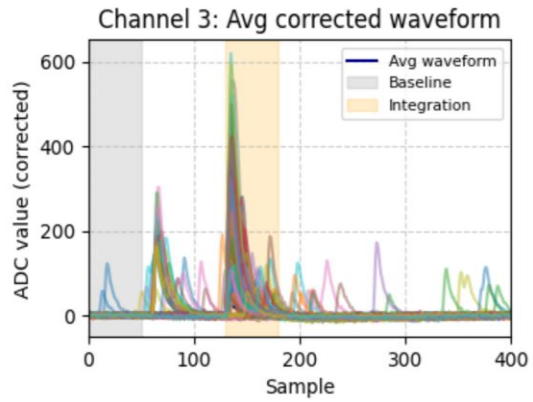


Channel 3: Peak amplitude histogram



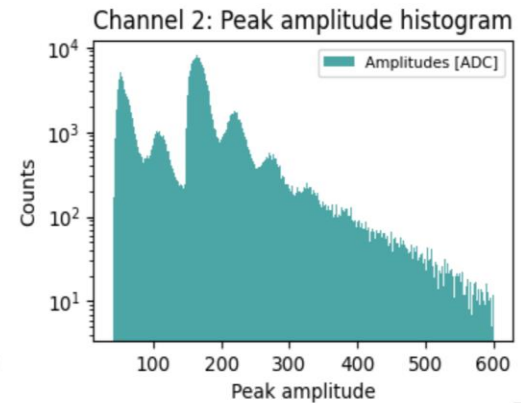
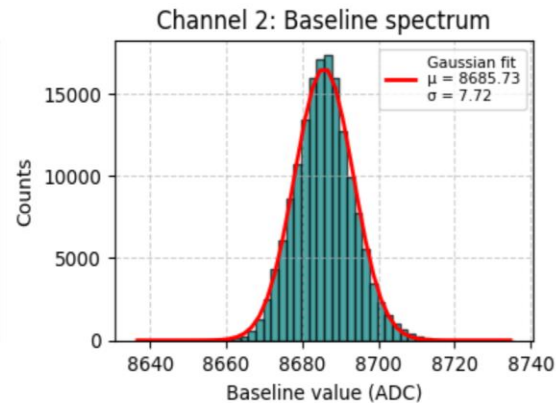
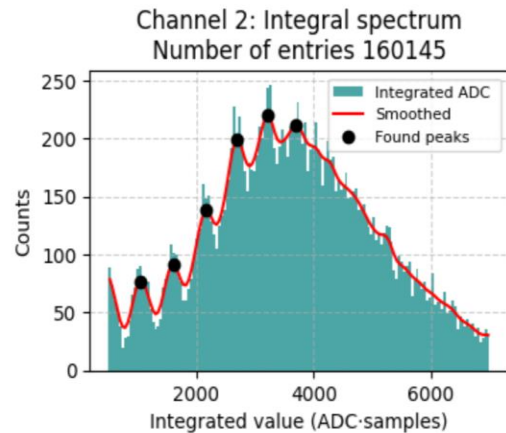
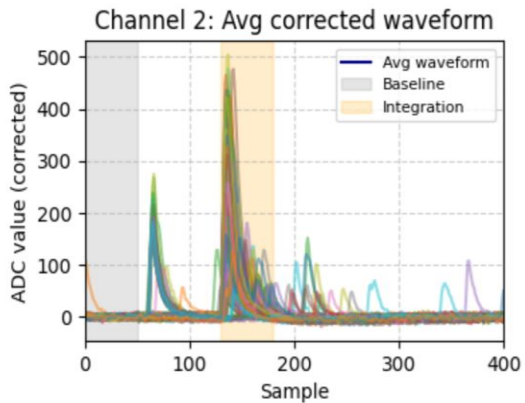
Avg. peak
spacing (gain)
= 563.3

Run 000070, Channel 3
Baseline [0:50], Integration [130:180]



Avg. peak spacing (gain)
= 574.2

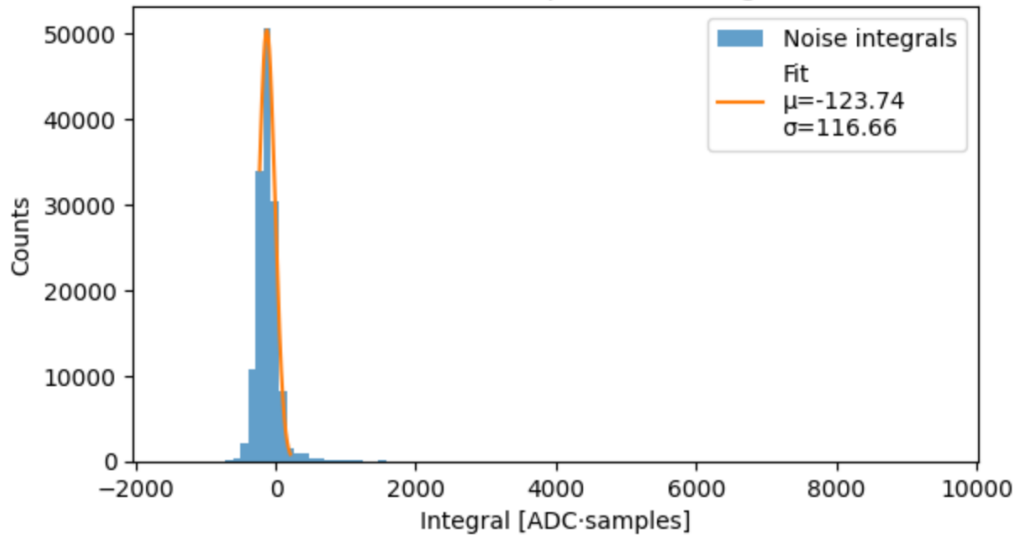
Run 000070, Channel 2
Baseline [0:50], Integration [130:180]



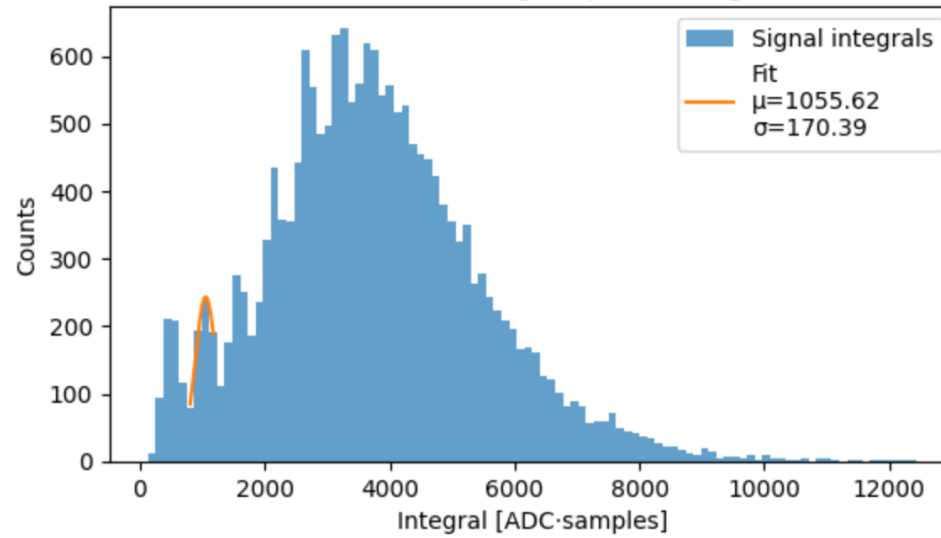
Avg. peak spacing (gain)
= 528.6

Run 000070, Channel 2: SNR (integral)

Channel 2: noise pedestal (integral)



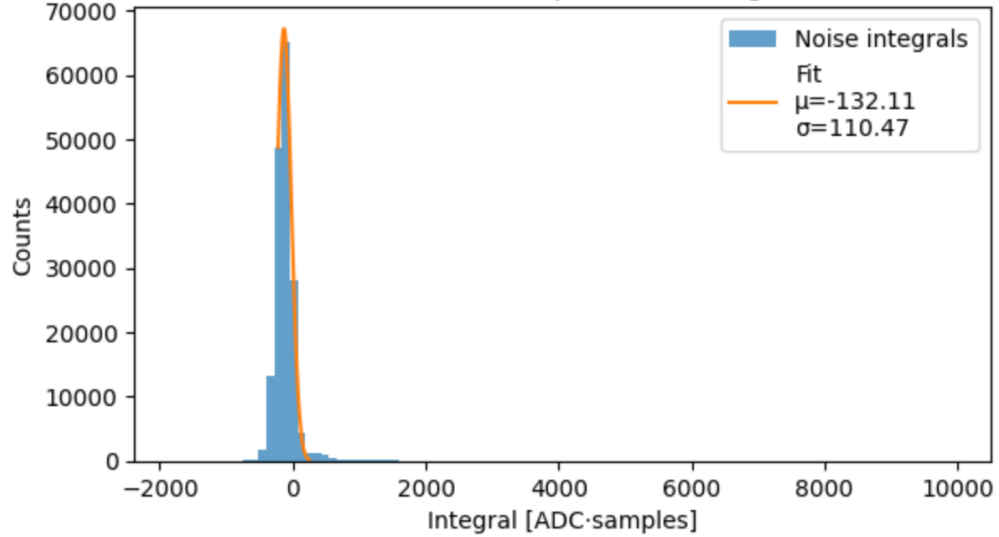
Channel 2: first signal peak (integral)



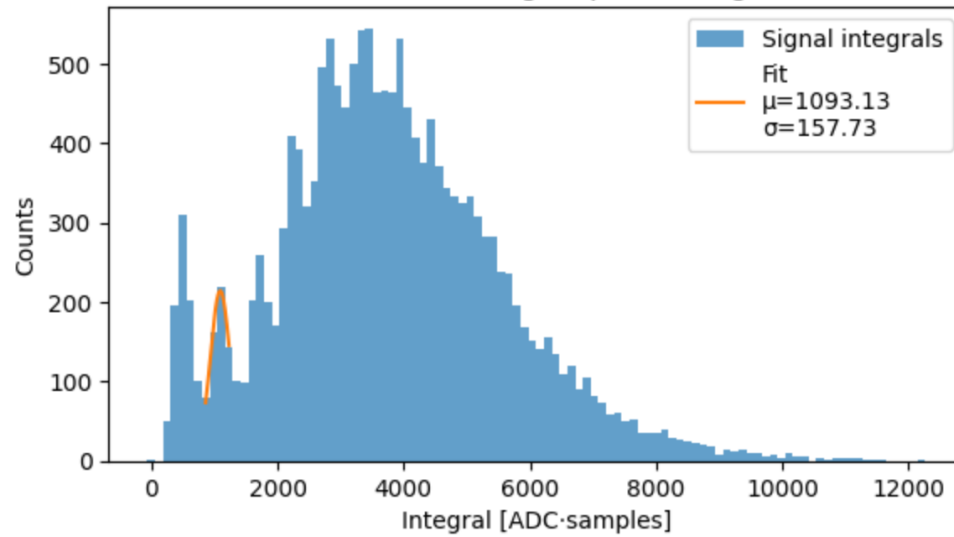
SNR with second photopeak = 5.71

Run 000070, Channel 3: SNR (integral)

Channel 3: noise pedestal (integral)



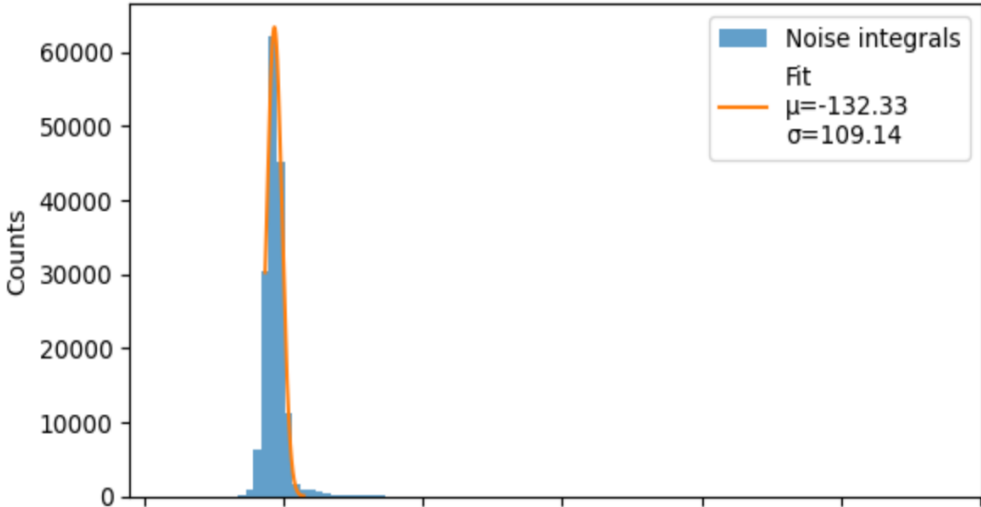
Channel 3: first signal peak (integral)



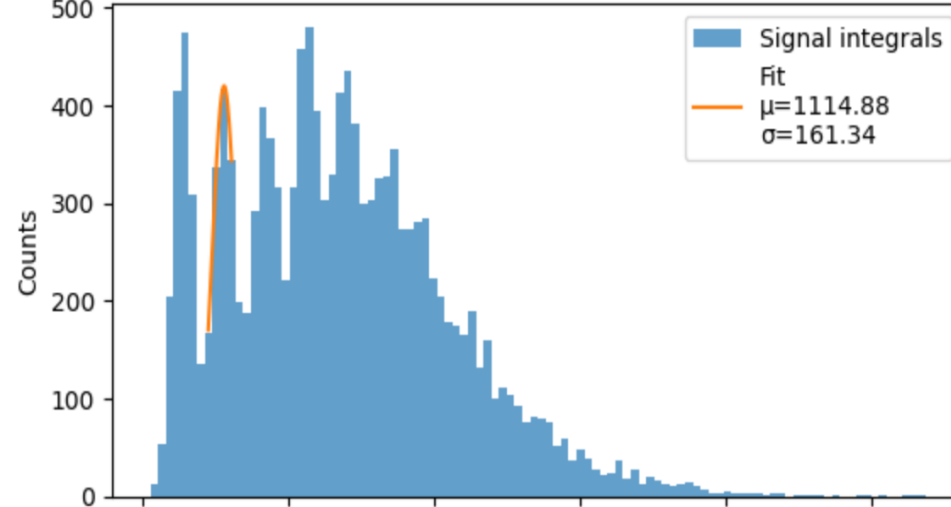
SNR with second photopeak = 6.36

Run 000071, Channel 3: SNR (integral)

Channel 3: noise pedestal (integral)



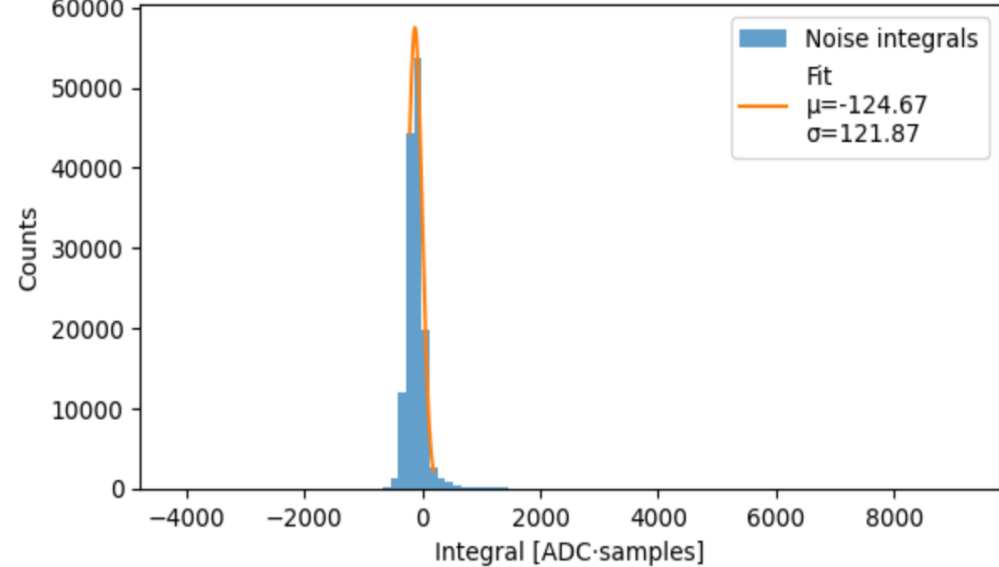
Channel 3: first signal peak (integral)



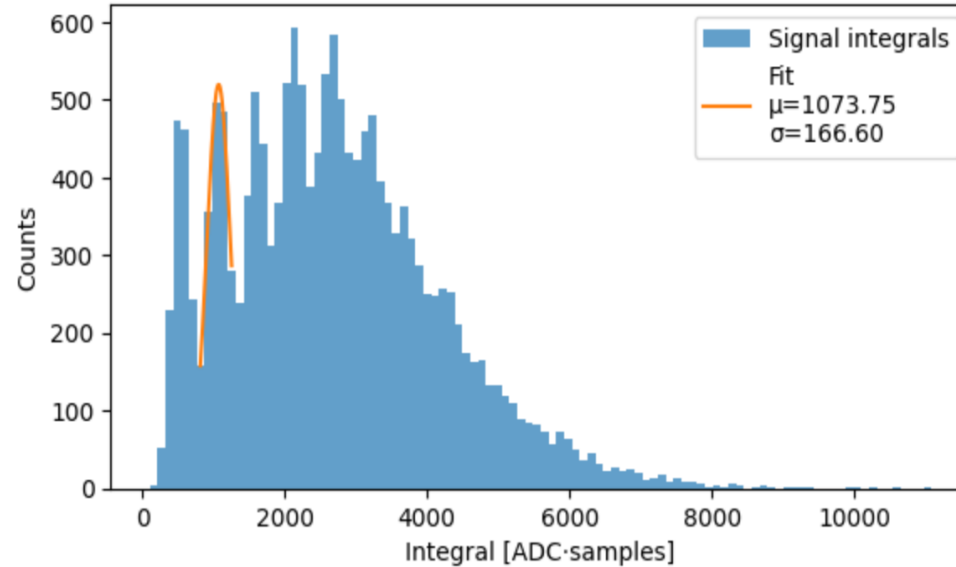
SNR with second photopeak = 6.40

Run 000071, Channel 2: SNR (integral)

Channel 2: noise pedestal (integral)



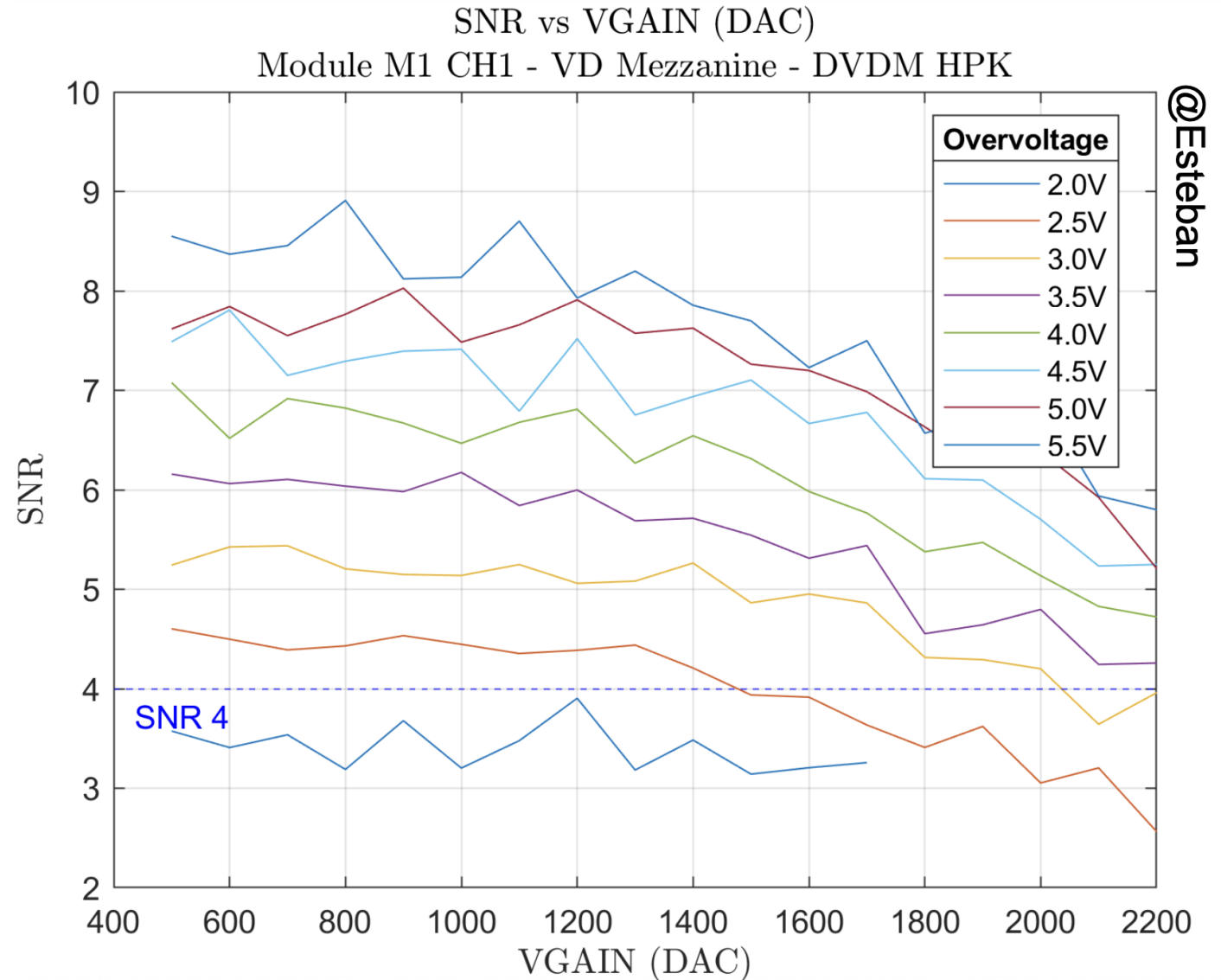
Channel 2: first signal peak (integral)



SNR with second photopeak = 5.80

What next...

- Find gains for different settings
- Find breakdown voltage
- Vgain vs SNR scans for different overvoltages to find optimal working conditions.
- Try to isolate peaks of waveforms
- Automate the process and see for all channels
- Move onto the TPC



Backup

Block Diagram

