

# LED tuning for PDS calibration

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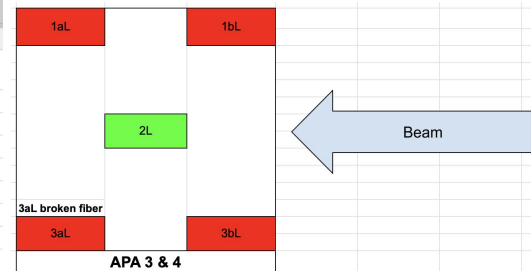
# Introduction

- A preliminary analysis has been performed for the following data
  - **10 runs** for endpoints 111, 112 & 113 (**APAs 3 and 4**) taken on 14/06/2024
  - **11 runs** for endpoint 109 (**APA 2**) taken on 17/06/2024
  - ~30 runs for endpoints 104, 105 & 107 (APA 1) taken on 17-18/06/2024 (**ongoing analysis**)
- A 270-nm LED, biased with 30 V, was used in every case
- For each APA, the data taking consists of a scan of the `pulse_bias_percent_270nm` - this is the variable that lets us tune the LED light intensity. Its span is `[0, 4095]`
- We acquired roughly
  - 7k waveforms per channel and per run for APA 1
  - 5k waveforms per channel and per run for APAs 2, 3 & 4
- The goal is to **find a minimal set of LED configurations that yield at least one proper charge histograms for every channel in all four APAs**

# APAs 3 & 4

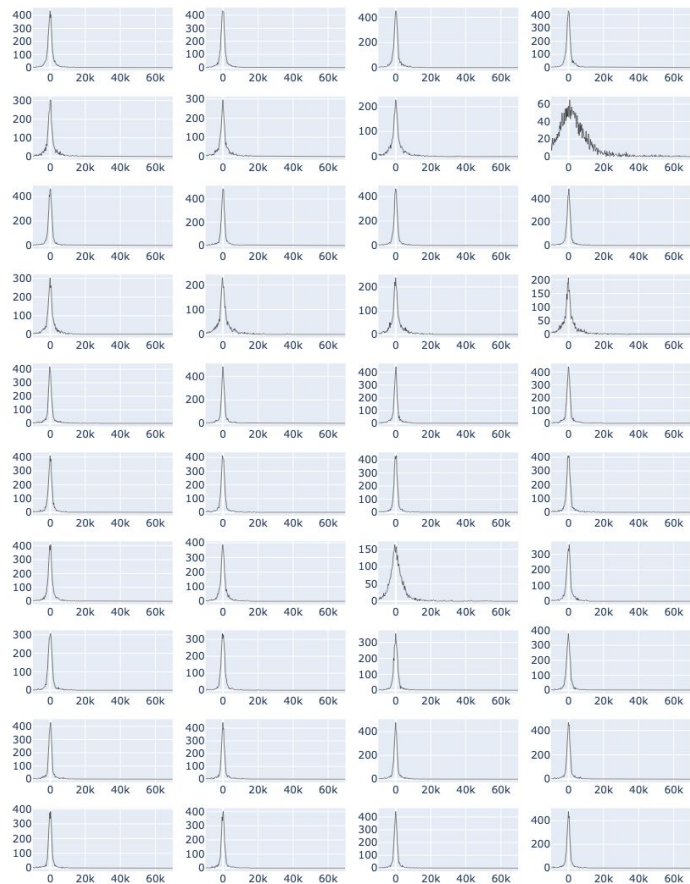
- A preliminary analysis of the data for **10 runs** with endpoints 111, 112 and 113 (**APAs 3 and 4**) taken on 14/06/2024 has been performed
  - Light was pointing to the center of APAs 3 & 4 plane (`channel_mask = 1`)
  - LED coupled to polymicro fiber - `ticks_width = 1` (4 ns)
  - 10 runs in total (27089-27098) - 90 seconds each
  - Scanning `pulse_bias_percent_270nm` from 400 to 2200 in steps of 200
  - 10 Hz DAQ trigger rate
  - 6250 Hz trigger ad-hoc 0x7
  - ~5000 waveforms per channel and per run
- For most channels, we found at least one LED configuration which yields a *proper* calibration charge histograms

Run number	Date	Start time	End/run time	Shifter	PDS expert	Active Endpoints	# triggers	type	Configuration
Changes in seed to correct a typo --> solved errors in APA34 configurations. THRESHOLD set back to 9000 and redout is back!! 🙌									
27089	14/06/2024	17:32	90 s	Iperez		111,112,113		LED	Calibration Run. Bias DCS:30V. Trigger ad-hoc 0x7 set to 6250Hz. 10Hz daq trigger rate. runtime 90 s. Tests 270nm: SSP_config. mask_channel:1, ticks_width:1, Pulse_bias_percent_270nm: 400
27090	14/06/2024	17:36	90 s	Iperez		111,112,113		LED	Pulse_bias_percent_270nm: 600
27091	14/06/2024	17:39	90 s	Iperez		111,112,113		LED	Pulse_bias_percent_270nm: 800
27092	14/06/2024	17:42	90 s	Iperez		111,112,113		LED	Pulse_bias_percent_270nm: 1000
27093	14/06/2024	17:46	90 s	Iperez		111,112,113		LED	Pulse_bias_percent_270nm: 1200
27094	14/06/2024	17:52	90 s	Iperez		111,112,113		LED	Pulse_bias_percent_270nm: 1400
27095	14/06/2024	17:54	90 s	Iperez		111,112,113		LED	Pulse_bias_percent_270nm: 1600
27096	14/06/2024	17:56	90 s	Iperez		111,112,113		LED	Pulse_bias_percent_270nm: 1800
27097	14/06/2024	17:59	90 s	Iperez		111,112,113		LED	Pulse_bias_percent_270nm: 2000
27098	14/06/2024	18:03	90 s	Iperez		111,112,113		LED	Pulse_bias_percent_270nm: 2200



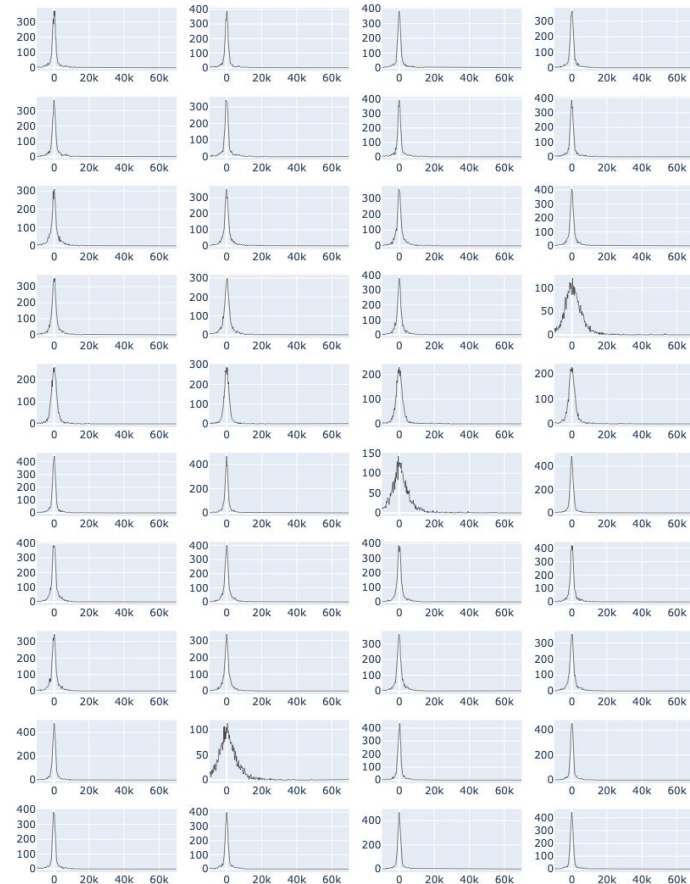
pulse\_bias\_percent\_270nm = 400

Run 27089 - apa\_3



- (1,1) - C. H. of 5667 Wf(s)
- (1,2) - C. H. of 5639 Wf(s)
- (1,3) - C. H. of 5622 Wf(s)
- (1,4) - C. H. of 5627 Wf(s)
- (2,1) - C. H. of 4629 Wf(s)
- (2,2) - C. H. of 4477 Wf(s)
- (2,3) - C. H. of 4411 Wf(s)
- (2,4) - C. H. of 4321 Wf(s)
- (3,1) - C. H. of 5608 Wf(s)
- (3,2) - C. H. of 5670 Wf(s)
- (3,3) - C. H. of 5680 Wf(s)
- (3,4) - C. H. of 5621 Wf(s)
- (4,1) - C. H. of 4765 Wf(s)
- (4,2) - C. H. of 4522 Wf(s)
- (4,3) - C. H. of 4335 Wf(s)
- (4,4) - C. H. of 4320 Wf(s)
- (5,1) - C. H. of 4907 Wf(s)
- (5,2) - C. H. of 5138 Wf(s)
- (5,3) - C. H. of 5272 Wf(s)
- (5,4) - C. H. of 5490 Wf(s)
- (6,1) - C. H. of 5097 Wf(s)
- (6,2) - C. H. of 5297 Wf(s)
- (6,3) - C. H. of 4907 Wf(s)
- (6,4) - C. H. of 5557 Wf(s)
- (7,1) - C. H. of 5635 Wf(s)
- (7,2) - C. H. of 5501 Wf(s)
- (7,3) - C. H. of 5177 Wf(s)
- (7,4) - C. H. of 4979 Wf(s)
- (8,1) - C. H. of 4368 Wf(s)
- (8,2) - C. H. of 4447 Wf(s)
- (8,3) - C. H. of 4575 Wf(s)
- (8,4) - C. H. of 4792 Wf(s)
- (9,1) - C. H. of 4863 Wf(s)
- (9,2) - C. H. of 5037 Wf(s)
- (9,3) - C. H. of 5405 Wf(s)
- (9,4) - C. H. of 5552 Wf(s)
- (10,1) - C. H. of 4299 Wf(s)
- (10,2) - C. H. of 4404 Wf(s)
- (10,3) - C. H. of 4688 Wf(s)
- (10,4) - C. H. of 4920 Wf(s)

Run 27089 - apa\_4



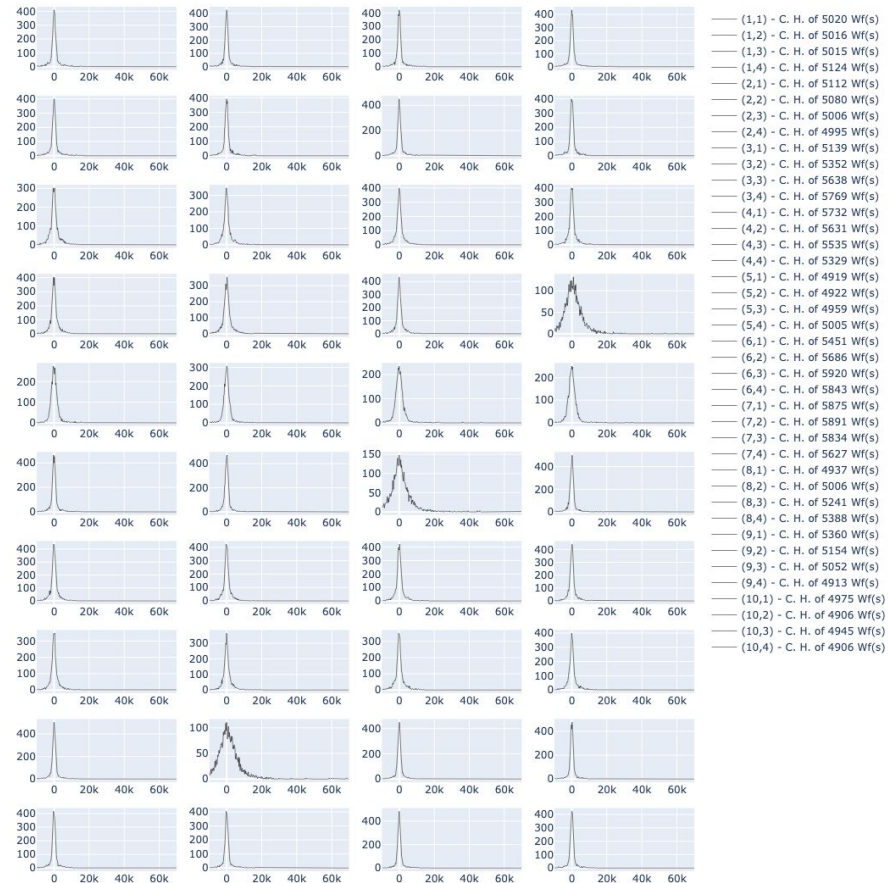
- (1,1) - C. H. of 4644 Wf(s)
- (1,2) - C. H. of 4625 Wf(s)
- (1,3) - C. H. of 4645 Wf(s)
- (1,4) - C. H. of 4789 Wf(s)
- (2,1) - C. H. of 4760 Wf(s)
- (2,2) - C. H. of 4665 Wf(s)
- (2,3) - C. H. of 4625 Wf(s)
- (2,4) - C. H. of 4646 Wf(s)
- (3,1) - C. H. of 4916 Wf(s)
- (3,2) - C. H. of 5136 Wf(s)
- (3,3) - C. H. of 5329 Wf(s)
- (3,4) - C. H. of 5466 Wf(s)
- (4,1) - C. H. of 5393 Wf(s)
- (4,2) - C. H. of 5320 Wf(s)
- (4,3) - C. H. of 5248 Wf(s)
- (4,4) - C. H. of 5063 Wf(s)
- (5,1) - C. H. of 4617 Wf(s)
- (5,2) - C. H. of 4648 Wf(s)
- (5,3) - C. H. of 4682 Wf(s)
- (5,4) - C. H. of 4730 Wf(s)
- (6,1) - C. H. of 5130 Wf(s)
- (6,2) - C. H. of 5275 Wf(s)
- (6,3) - C. H. of 5538 Wf(s)
- (6,4) - C. H. of 5505 Wf(s)
- (7,1) - C. H. of 5555 Wf(s)
- (7,2) - C. H. of 5471 Wf(s)
- (7,3) - C. H. of 5396 Wf(s)
- (7,4) - C. H. of 5260 Wf(s)
- (8,1) - C. H. of 4875 Wf(s)
- (8,2) - C. H. of 4882 Wf(s)
- (8,3) - C. H. of 5059 Wf(s)
- (8,4) - C. H. of 5119 Wf(s)
- (9,1) - C. H. of 5118 Wf(s)
- (9,2) - C. H. of 4984 Wf(s)
- (9,3) - C. H. of 4953 Wf(s)
- (9,4) - C. H. of 4885 Wf(s)
- (10,1) - C. H. of 4620 Wf(s)
- (10,2) - C. H. of 4705 Wf(s)
- (10,3) - C. H. of 4794 Wf(s)
- (10,4) - C. H. of 4837 Wf(s)

pulse\_bias\_percent\_270nm = 600

Run 27090 - apa\_3

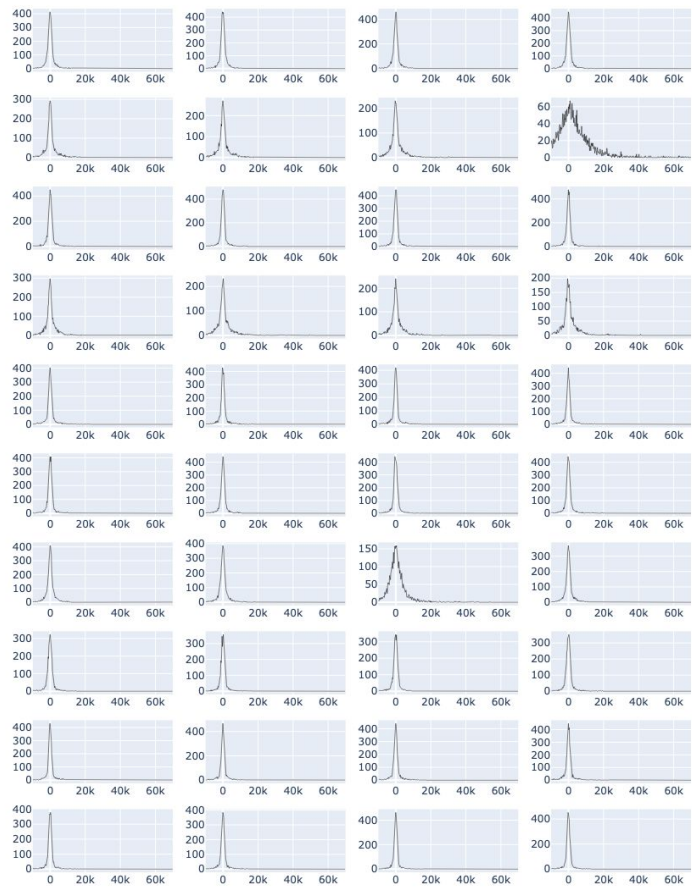


Run 27090 - apa\_4



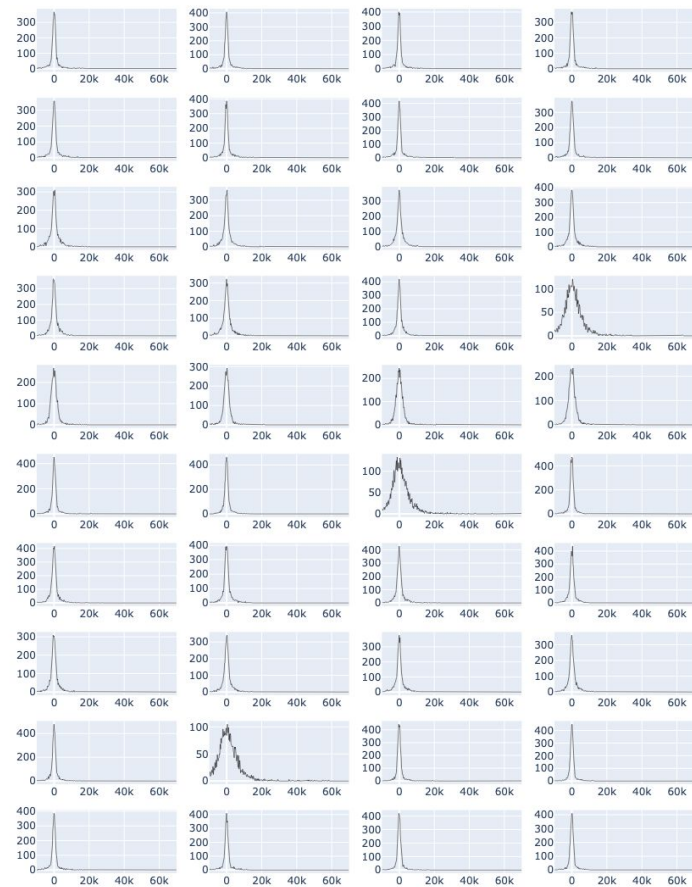
pulse\_bias\_percent\_270nm = 800

Run 27091 - apa\_3



- (1,1) - C. H. of 5615 Wf(s)
- (1,2) - C. H. of 5693 Wf(s)
- (1,3) - C. H. of 5699 Wf(s)
- (1,4) - C. H. of 5643 Wf(s)
- (2,1) - C. H. of 4529 Wf(s)
- (2,2) - C. H. of 4438 Wf(s)
- (2,3) - C. H. of 4422 Wf(s)
- (2,4) - C. H. of 4381 Wf(s)
- (3,1) - C. H. of 5500 Wf(s)
- (3,2) - C. H. of 5649 Wf(s)
- (3,3) - C. H. of 5658 Wf(s)
- (3,4) - C. H. of 5650 Wf(s)
- (4,1) - C. H. of 4601 Wf(s)
- (4,2) - C. H. of 4505 Wf(s)
- (4,3) - C. H. of 4429 Wf(s)
- (4,4) - C. H. of 4375 Wf(s)
- (5,1) - C. H. of 4835 Wf(s)
- (5,2) - C. H. of 5072 Wf(s)
- (5,3) - C. H. of 5166 Wf(s)
- (5,4) - C. H. of 5335 Wf(s)
- (6,1) - C. H. of 5117 Wf(s)
- (6,2) - C. H. of 5418 Wf(s)
- (6,3) - C. H. of 5534 Wf(s)
- (6,4) - C. H. of 5636 Wf(s)
- (7,1) - C. H. of 5647 Wf(s)
- (7,2) - C. H. of 5595 Wf(s)
- (7,3) - C. H. of 5212 Wf(s)
- (7,4) - C. H. of 4970 Wf(s)
- (8,1) - C. H. of 4344 Wf(s)
- (8,2) - C. H. of 4488 Wf(s)
- (8,3) - C. H. of 4645 Wf(s)
- (8,4) - C. H. of 4826 Wf(s)
- (9,1) - C. H. of 4751 Wf(s)
- (9,2) - C. H. of 4978 Wf(s)
- (9,3) - C. H. of 5272 Wf(s)
- (9,4) - C. H. of 5460 Wf(s)
- (10,1) - C. H. of 4292 Wf(s)
- (10,2) - C. H. of 4435 Wf(s)
- (10,3) - C. H. of 4728 Wf(s)
- (10,4) - C. H. of 4891 Wf(s)

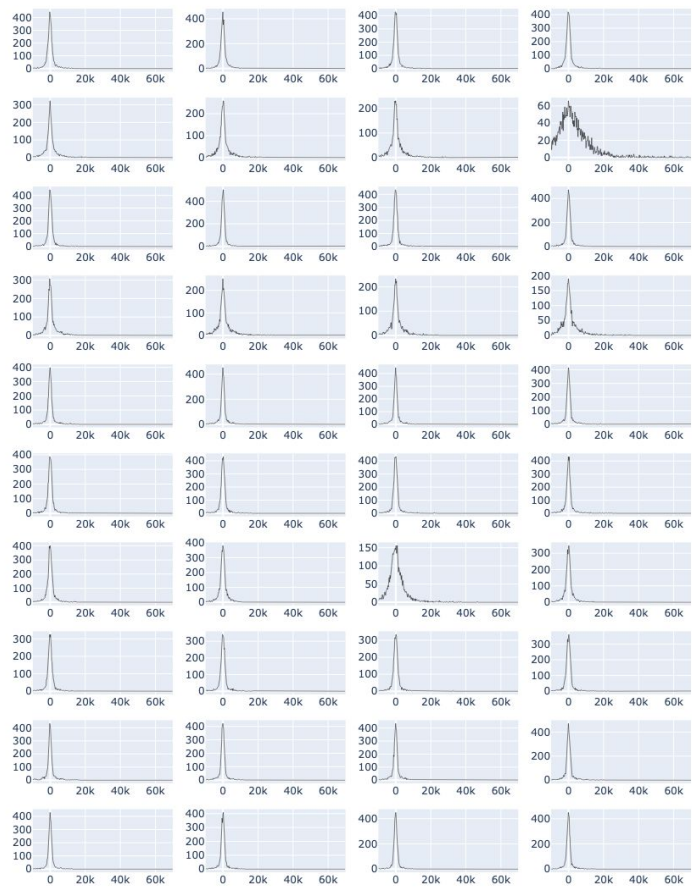
Run 27091 - apa\_4



- (1,1) - C. H. of 4601 Wf(s)
- (1,2) - C. H. of 4659 Wf(s)
- (1,3) - C. H. of 4790 Wf(s)
- (1,4) - C. H. of 4871 Wf(s)
- (2,1) - C. H. of 4887 Wf(s)
- (2,2) - C. H. of 4804 Wf(s)
- (2,3) - C. H. of 4739 Wf(s)
- (2,4) - C. H. of 4586 Wf(s)
- (3,1) - C. H. of 4945 Wf(s)
- (3,2) - C. H. of 5172 Wf(s)
- (3,3) - C. H. of 5409 Wf(s)
- (3,4) - C. H. of 5463 Wf(s)
- (4,1) - C. H. of 5413 Wf(s)
- (4,2) - C. H. of 5366 Wf(s)
- (4,3) - C. H. of 5290 Wf(s)
- (4,4) - C. H. of 5060 Wf(s)
- (5,1) - C. H. of 4687 Wf(s)
- (5,2) - C. H. of 4687 Wf(s)
- (5,3) - C. H. of 4715 Wf(s)
- (5,4) - C. H. of 4745 Wf(s)
- (6,1) - C. H. of 5195 Wf(s)
- (6,2) - C. H. of 5408 Wf(s)
- (6,3) - C. H. of 5579 Wf(s)
- (6,4) - C. H. of 5502 Wf(s)
- (7,1) - C. H. of 5598 Wf(s)
- (7,2) - C. H. of 5586 Wf(s)
- (7,3) - C. H. of 5556 Wf(s)
- (7,4) - C. H. of 5319 Wf(s)
- (8,1) - C. H. of 4675 Wf(s)
- (8,2) - C. H. of 4848 Wf(s)
- (8,3) - C. H. of 5071 Wf(s)
- (8,4) - C. H. of 5142 Wf(s)
- (9,1) - C. H. of 5143 Wf(s)
- (9,2) - C. H. of 5051 Wf(s)
- (9,3) - C. H. of 4953 Wf(s)
- (9,4) - C. H. of 4811 Wf(s)
- (10,1) - C. H. of 4532 Wf(s)
- (10,2) - C. H. of 4604 Wf(s)
- (10,3) - C. H. of 4631 Wf(s)
- (10,4) - C. H. of 4668 Wf(s)

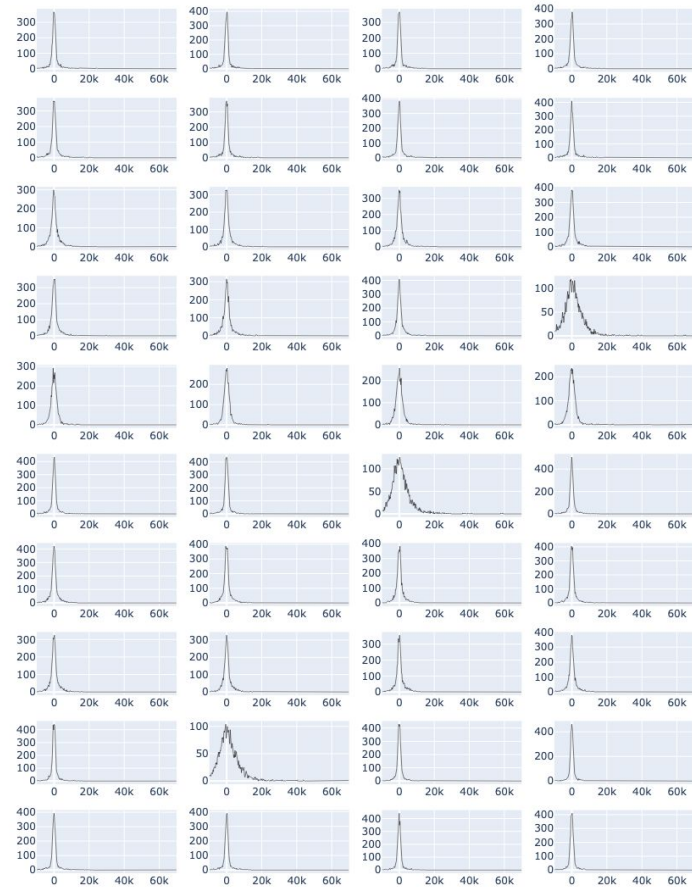
pulse\_bias\_percent\_270nm = 1000

Run 27092 - apa\_3



- (1,1) - C. H. of 5522 Wf(s)
- (1,2) - C. H. of 5615 Wf(s)
- (1,3) - C. H. of 5653 Wf(s)
- (1,4) - C. H. of 5643 Wf(s)
- (2,1) - C. H. of 4671 Wf(s)
- (2,2) - C. H. of 4576 Wf(s)
- (2,3) - C. H. of 4497 Wf(s)
- (2,4) - C. H. of 4405 Wf(s)
- (3,1) - C. H. of 5436 Wf(s)
- (3,2) - C. H. of 5559 Wf(s)
- (3,3) - C. H. of 5667 Wf(s)
- (3,4) - C. H. of 5687 Wf(s)
- (4,1) - C. H. of 4704 Wf(s)
- (4,2) - C. H. of 4629 Wf(s)
- (4,3) - C. H. of 4444 Wf(s)
- (4,4) - C. H. of 4419 Wf(s)
- (5,1) - C. H. of 4847 Wf(s)
- (5,2) - C. H. of 5042 Wf(s)
- (5,3) - C. H. of 5151 Wf(s)
- (5,4) - C. H. of 5292 Wf(s)
- (6,1) - C. H. of 5196 Wf(s)
- (6,2) - C. H. of 5456 Wf(s)
- (6,3) - C. H. of 5570 Wf(s)
- (6,4) - C. H. of 5664 Wf(s)
- (7,1) - C. H. of 5701 Wf(s)
- (7,2) - C. H. of 5642 Wf(s)
- (7,3) - C. H. of 5278 Wf(s)
- (7,4) - C. H. of 5074 Wf(s)
- (8,1) - C. H. of 4458 Wf(s)
- (8,2) - C. H. of 4582 Wf(s)
- (8,3) - C. H. of 4687 Wf(s)
- (8,4) - C. H. of 4877 Wf(s)
- (9,1) - C. H. of 4806 Wf(s)
- (9,2) - C. H. of 4960 Wf(s)
- (9,3) - C. H. of 5235 Wf(s)
- (9,4) - C. H. of 5372 Wf(s)
- (10,1) - C. H. of 4378 Wf(s)
- (10,2) - C. H. of 4534 Wf(s)
- (10,3) - C. H. of 4772 Wf(s)
- (10,4) - C. H. of 4916 Wf(s)

Run 27092 - apa\_4



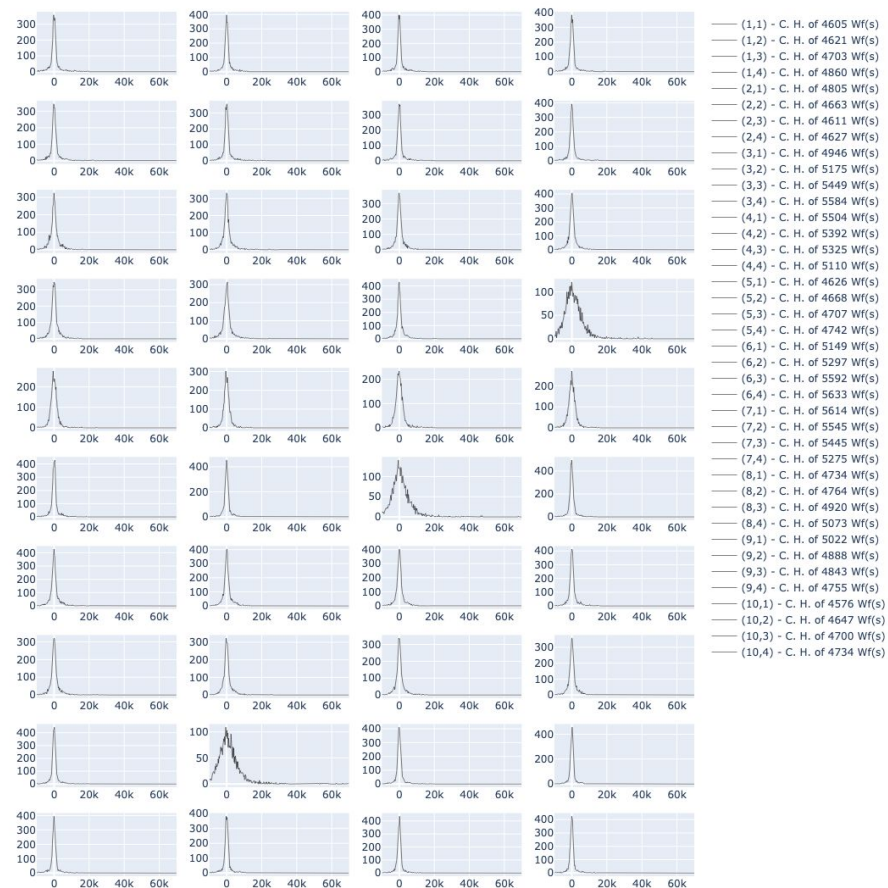
- (1,1) - C. H. of 4599 Wf(s)
- (1,2) - C. H. of 4655 Wf(s)
- (1,3) - C. H. of 4729 Wf(s)
- (1,4) - C. H. of 4874 Wf(s)
- (2,1) - C. H. of 4855 Wf(s)
- (2,2) - C. H. of 4742 Wf(s)
- (2,3) - C. H. of 4692 Wf(s)
- (2,4) - C. H. of 4607 Wf(s)
- (3,1) - C. H. of 4955 Wf(s)
- (3,2) - C. H. of 5209 Wf(s)
- (3,3) - C. H. of 5411 Wf(s)
- (3,4) - C. H. of 5472 Wf(s)
- (4,1) - C. H. of 5443 Wf(s)
- (4,2) - C. H. of 5387 Wf(s)
- (4,3) - C. H. of 5324 Wf(s)
- (4,4) - C. H. of 5118 Wf(s)
- (5,1) - C. H. of 4760 Wf(s)
- (5,2) - C. H. of 4727 Wf(s)
- (5,3) - C. H. of 4767 Wf(s)
- (5,4) - C. H. of 4784 Wf(s)
- (6,1) - C. H. of 5166 Wf(s)
- (6,2) - C. H. of 5316 Wf(s)
- (6,3) - C. H. of 5516 Wf(s)
- (6,4) - C. H. of 5524 Wf(s)
- (7,1) - C. H. of 5517 Wf(s)
- (7,2) - C. H. of 5507 Wf(s)
- (7,3) - C. H. of 5449 Wf(s)
- (7,4) - C. H. of 5250 Wf(s)
- (8,1) - C. H. of 4713 Wf(s)
- (8,2) - C. H. of 4827 Wf(s)
- (8,3) - C. H. of 5002 Wf(s)
- (8,4) - C. H. of 5120 Wf(s)
- (9,1) - C. H. of 5110 Wf(s)
- (9,2) - C. H. of 4974 Wf(s)
- (9,3) - C. H. of 4889 Wf(s)
- (9,4) - C. H. of 4764 Wf(s)
- (10,1) - C. H. of 4540 Wf(s)
- (10,2) - C. H. of 4634 Wf(s)
- (10,3) - C. H. of 4695 Wf(s)
- (10,4) - C. H. of 4710 Wf(s)

pulse\_bias\_percent\_270nm = 1200

Run 27093 - apa\_3



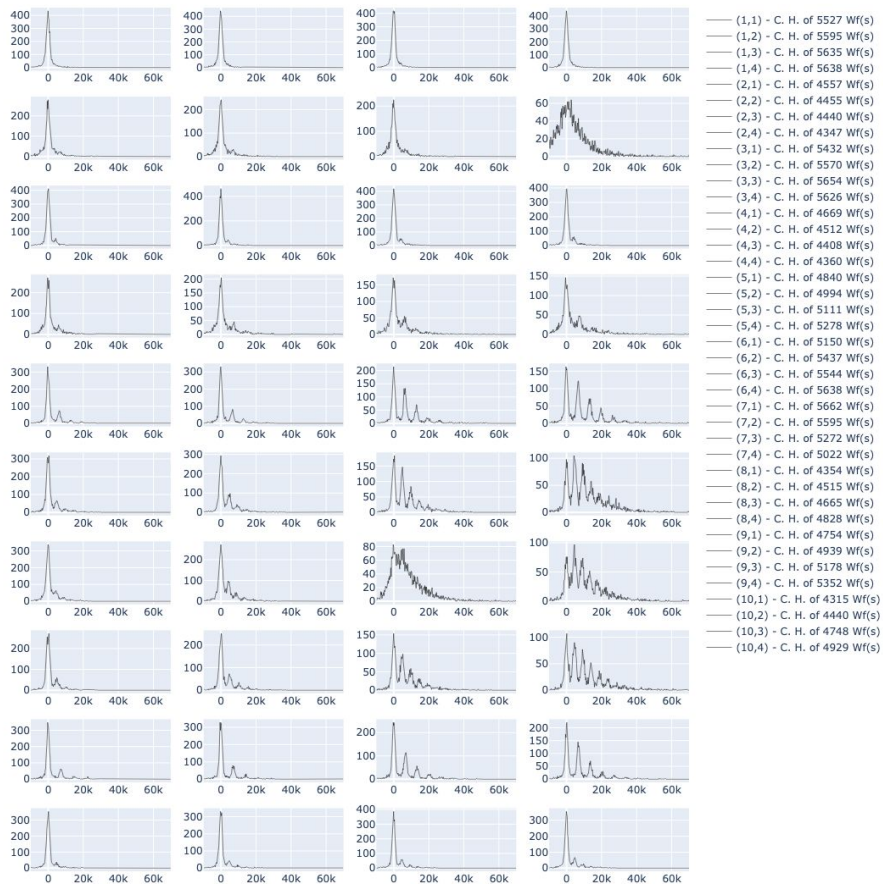
Run 27093 - apa\_4



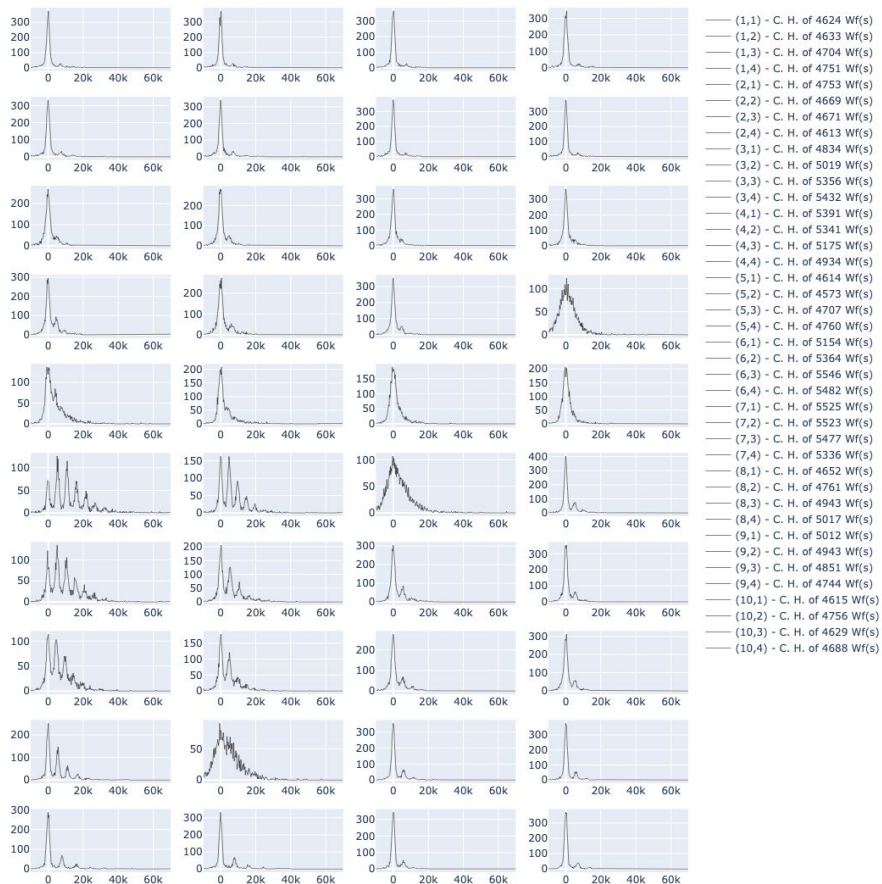


pulse\_bias\_percent\_270nm = 1400

Run 27094 - apa\_3

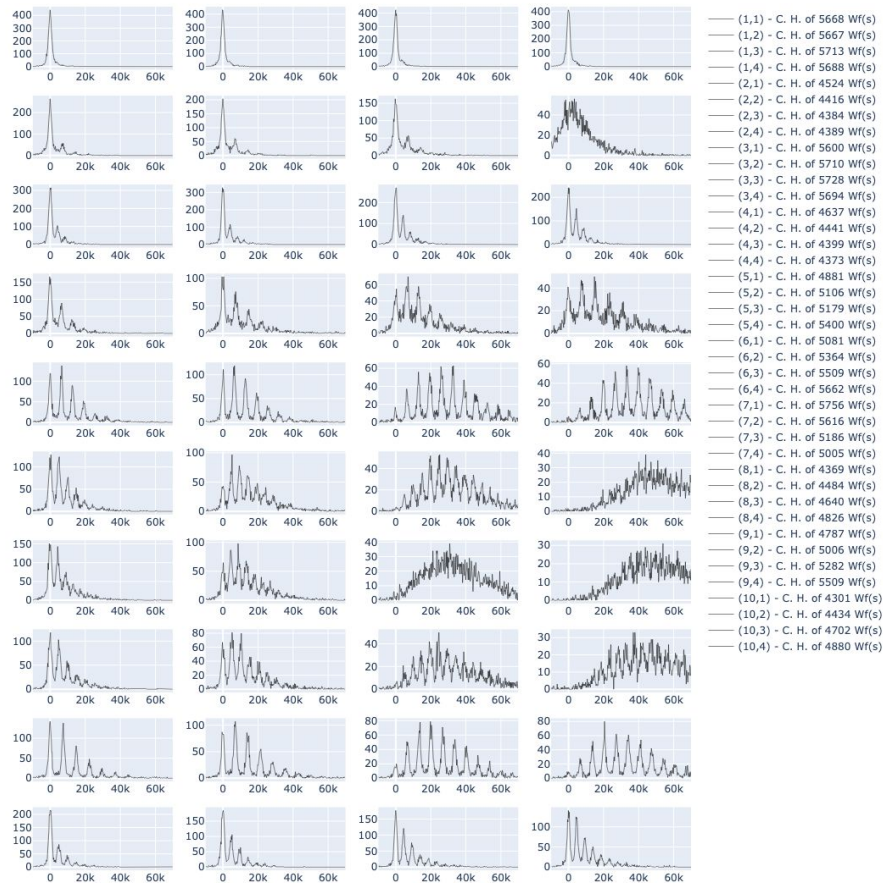


Run 27094 - apa\_4

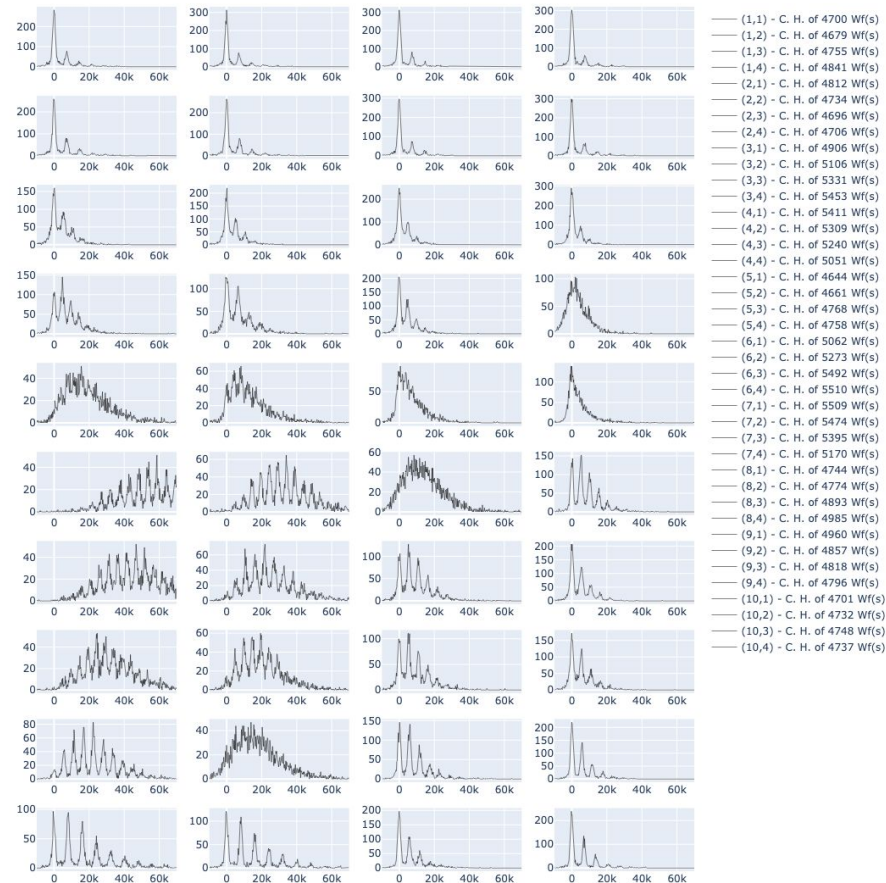


pulse\_bias\_percent\_270nm = 1600

Run 27095 - apa\_3

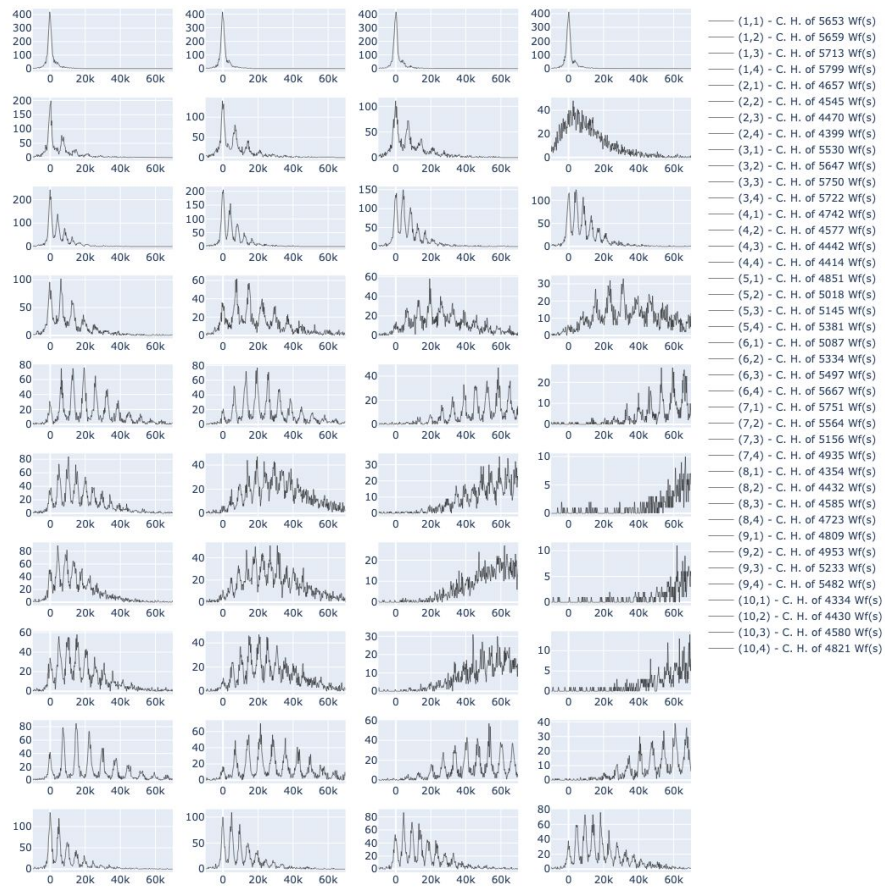


Run 27095 - apa\_4

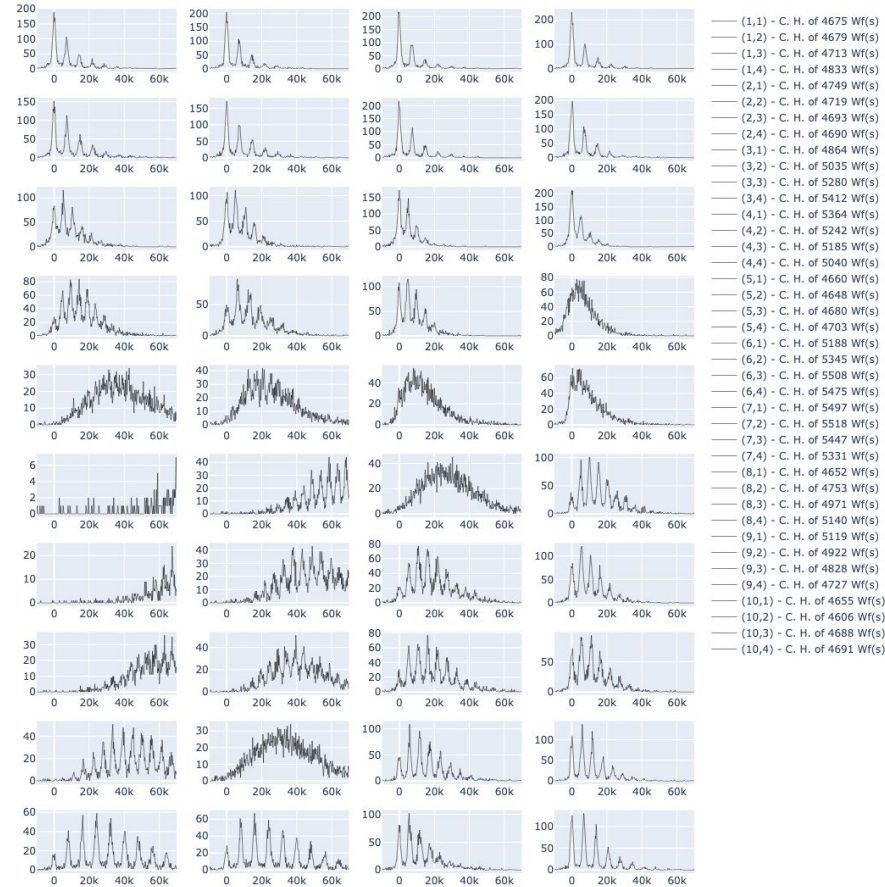


pulse\_bias\_percent\_270nm = 1800

Run 27096 - apa\_3

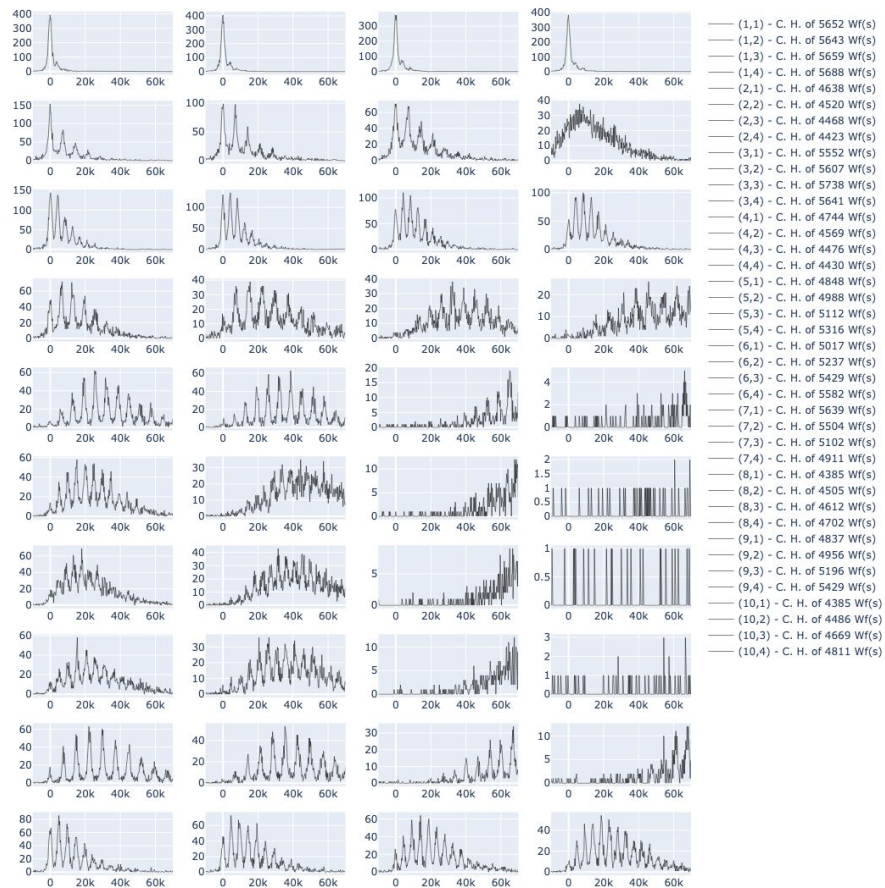


Run 27096 - apa\_4

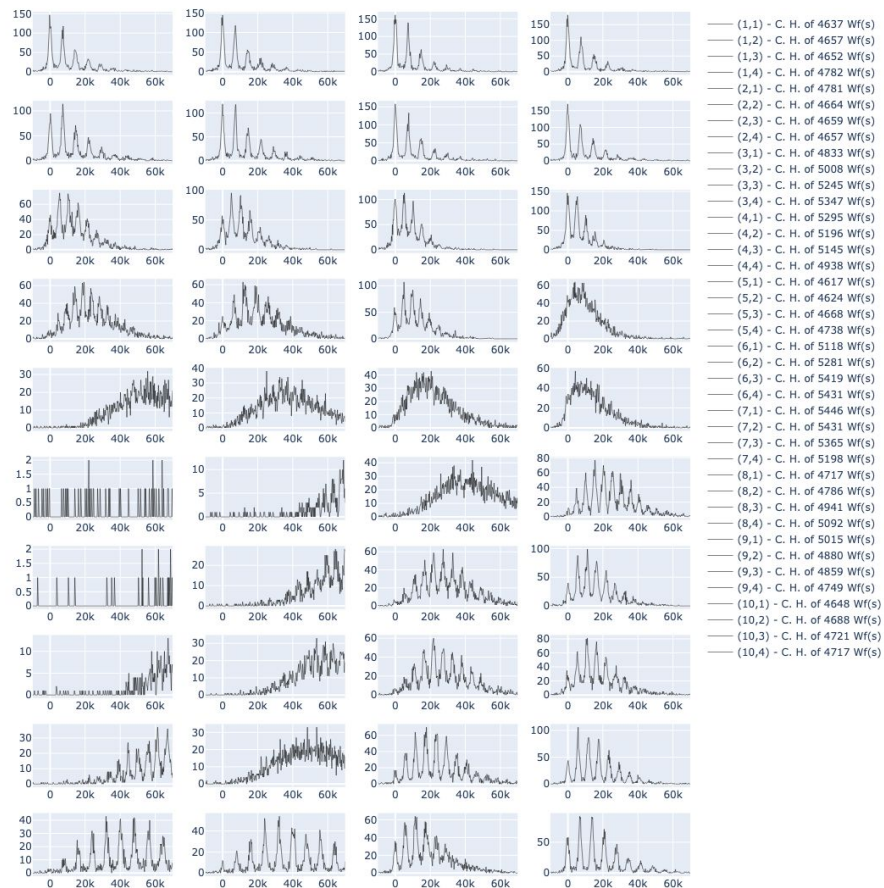


pulse\_bias\_percent\_270nm = 2000

Run 27097 - apa\_3

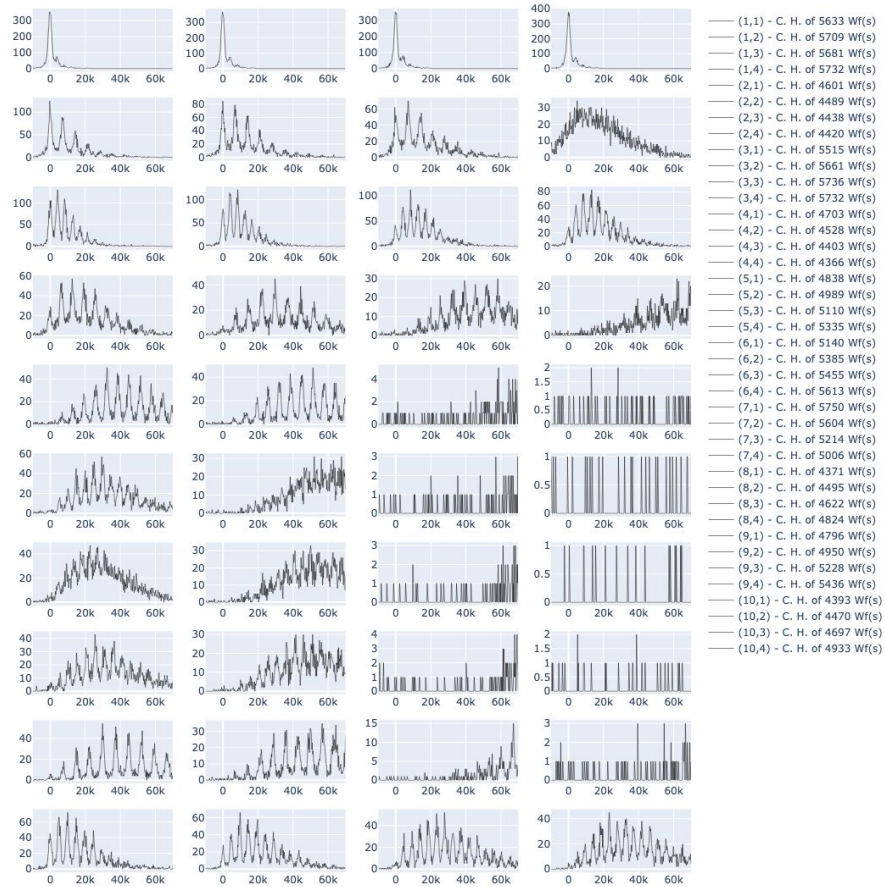


Run 27097 - apa\_4

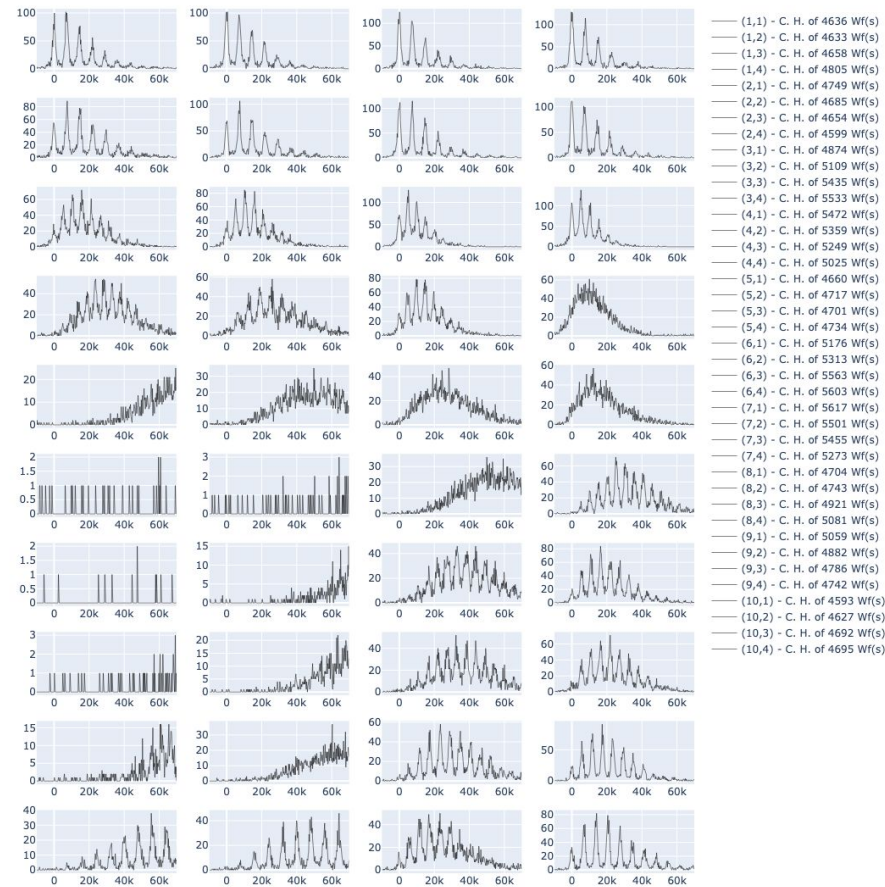


pulse\_bias\_percent\_270nm = 2200

Run 27098 - apa\_3



Run 27098 - apa\_4



Preliminary estimation of optimal `pulse_bias_percent_270nm` for calibration, per channel

APA 3

>>2200	>>2200	>>2200	>>2200
≥ 2200	2000	2000	-
2000-2200	≈ 2000	1800	1800
1800	1600-1800	1400-1600	1400-1600
1600	1600	≥ 1400	≥ 1400
1600	1400-1600	≥ 1400	≤ 1400
≥ 1600	1400-1600	-	≈ 1400
≥ 1600	≈ 1600	≥ 1400	≥ 1400
1600	≈ 1600	≥ 1400	≥ 1400
1800-2000	≈ 1800	1600-1800	≥ 1600

APA 4

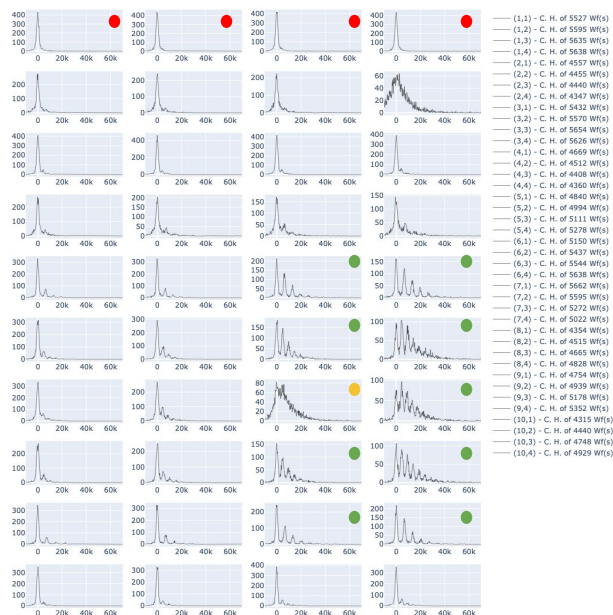
≤ 2200	≥ 2200	≥ 2200	≥ 2200
2000	2000	≤ 2200	≥ 2200
1600-1800	1800	2000	≥ 2200
≤ 1600	≥ 1600	≤ 1800	-
1400-1600	<1600	1600	1600-1800
<1400	1400	-	≤ 1600
≤ 1400	>1400	≤ 1600	1600-1800
≥ 1400	≥ 1400	1600	1600-1800
≥ 1400	-	≥ 1600	1600-1800
1600	≥ 1600	1600-1800	1800

These are the `pulse_bias_percent_270nm` which yield roughly the same amount of 0-PE and 1-PE events, but we could cope with worse (but viable) situations for the sake of reducing the amount of minimal LED configuration, p.e. :

# LED tuning proposal for APAs 3 & 4

pulse\_bias\_percent\_270nm = 1400

Run 27094 - apa\_3

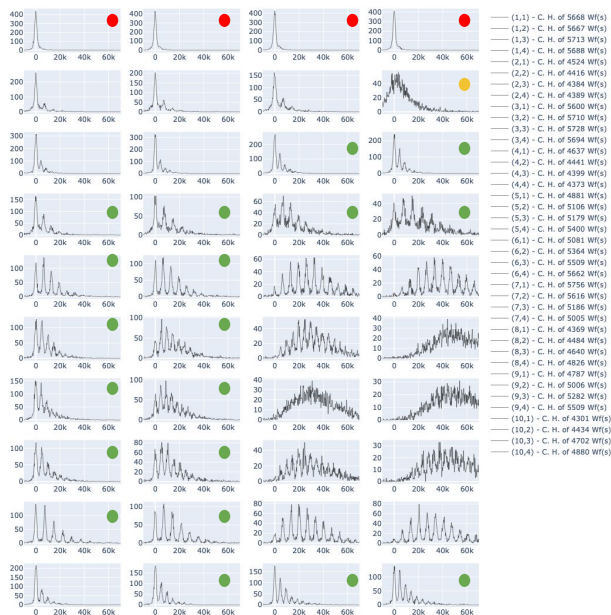


Run 27094 - apa\_4

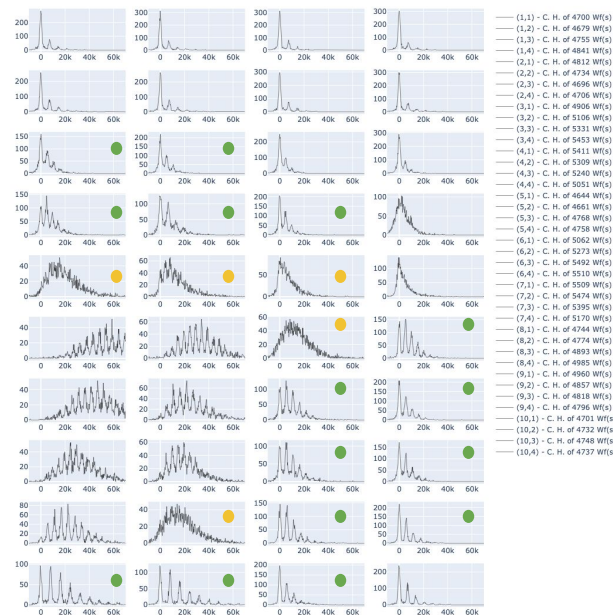


These are the pulse\_bias\_percent\_270nm which yield roughly the same amount of 0-PE and 1-PE events, but we could cope with worse (but viable) situations for the sake of reducing the amount of minimal LED configuration, p.e. :

Run 27095 - apa\_3



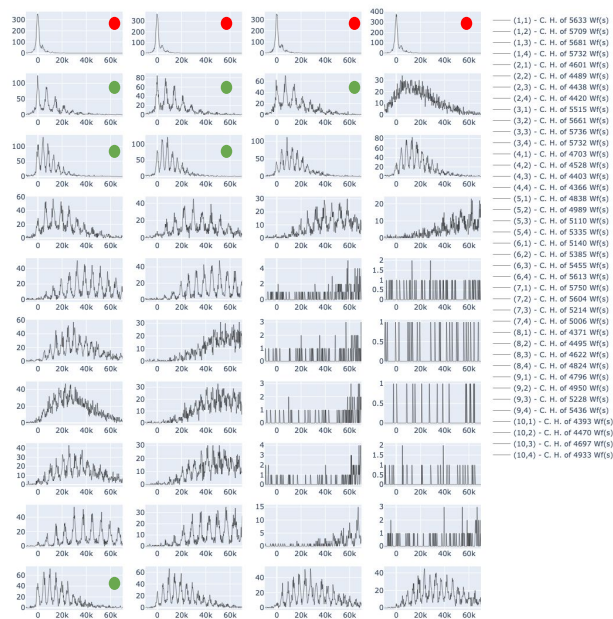
Run 27095 - apa\_4



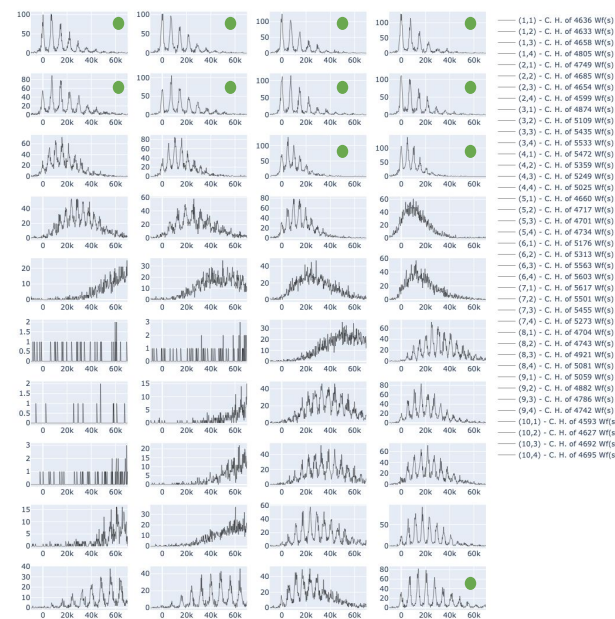
These are the pulse\_bias\_percent\_270nm which yield roughly the same amount of 0-PE and 1-PE events, but we could cope with worse (but viable) situations for the sake of reducing the amount of minimal LED configuration, p.e. :



Run 27098 - apa\_3



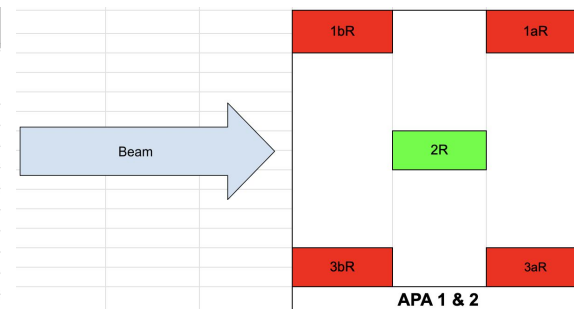
Run 27098 - apa\_4



These are the pulse\_bias\_percent\_270nm which yield roughly the same amount of 0-PE and 1-PE events, but we could cope with worse (but viable) situations for the sake of reducing the amount of minimal LED configuration, p.e. :

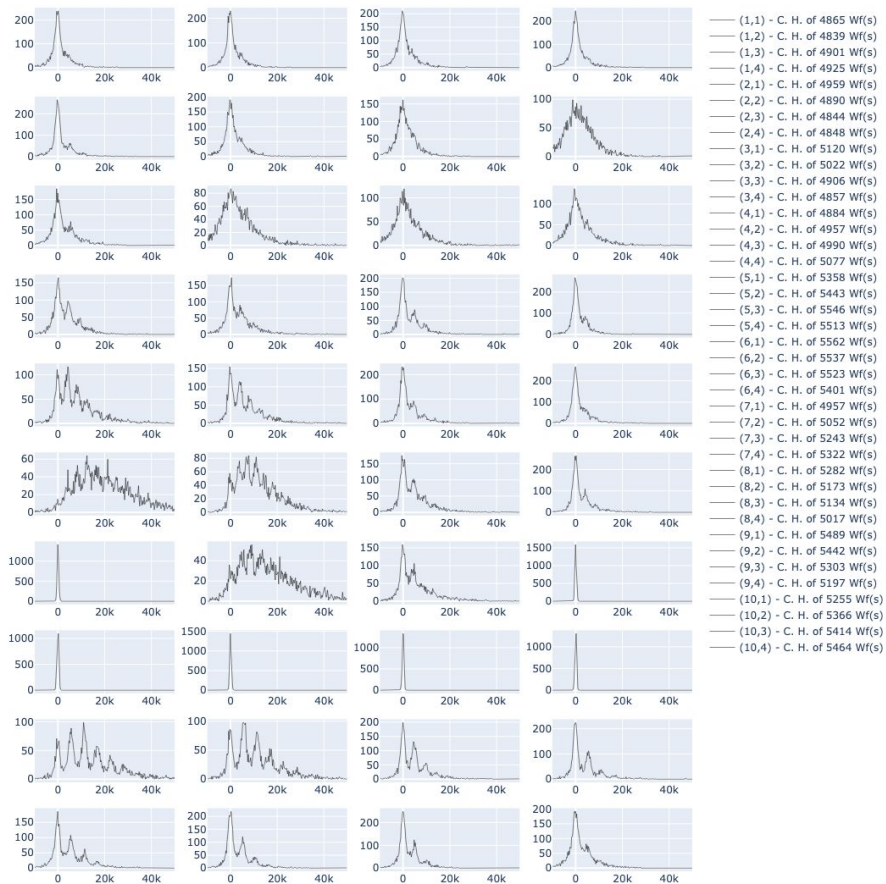
- A preliminary analysis of the data for **11 runs** with endpoint 109 (**APA 2**) taken on 17/06/2024 has been performed
  - Light was pointing to the center of APAs 1 & 2 plane (`channel_mask = 16`)
  - LED coupled to **tefzel** fiber - `ticks_width = 5` (20 ns)
  - **11 runs** in total (27120-27130) - 90 seconds each
  - Scanning `pulse_bias_percent_270nm` from 3090 to 4090 in steps of 100
  - 10 Hz DAQ trigger rate
  - 6250 Hz trigger ad-hoc 0x7
  - ~5000 waveforms per channel and per run
- We found almost no changes between different LED configurations - **tefzel** fiber might be attenuating the 270 nm LED light

Run number	Date	Start time	End/run time	Shifter	PDS expert	Active Endpoints	# triggers	type	Configuration
27120	17/06/2024	17:23	90 s	lperez		109		LED	LED run. APA2. Tests 270nm: SSP_config. <b>pulse_mode: single, pulse_bias_percent_270nm: 3090. Ch_mask: 16.</b> pulse1_width_ticks: 5. Bias DCS: 30V. Trigger ad-hoc 0x7 set to 6250Hz. 10Hz daq trigger rate. runtime 90 s.
27121	17/06/2024		90 s	lperez		109		LED	Pulse_bias_percent_270nm: 3190
27122	17/06/2024		90 s	lperez		109		LED	Pulse_bias_percent_270nm: 3290
27123	17/06/2024		90 s	lperez		109		LED	Pulse_bias_percent_270nm: 3390
27124	17/06/2024		90 s	lperez		109		LED	Pulse_bias_percent_270nm: 3490
27125	17/06/2024		90 s	lperez		109		LED	Pulse_bias_percent_270nm: 3590
27126	17/06/2024		90 s	lperez		109		LED	Pulse_bias_percent_270nm: 3690
27127	17/06/2024		90 s	lperez		109		LED	Pulse_bias_percent_270nm: 3790
27128	17/06/2024		90 s	lperez		109		LED	Pulse_bias_percent_270nm: 3890
27129	17/06/2024		90 s	lperez		109		LED	Pulse_bias_percent_270nm: 3990
27130	17/06/2024		90 s	lperez		109		LED	Pulse_bias_percent_270nm: 4090



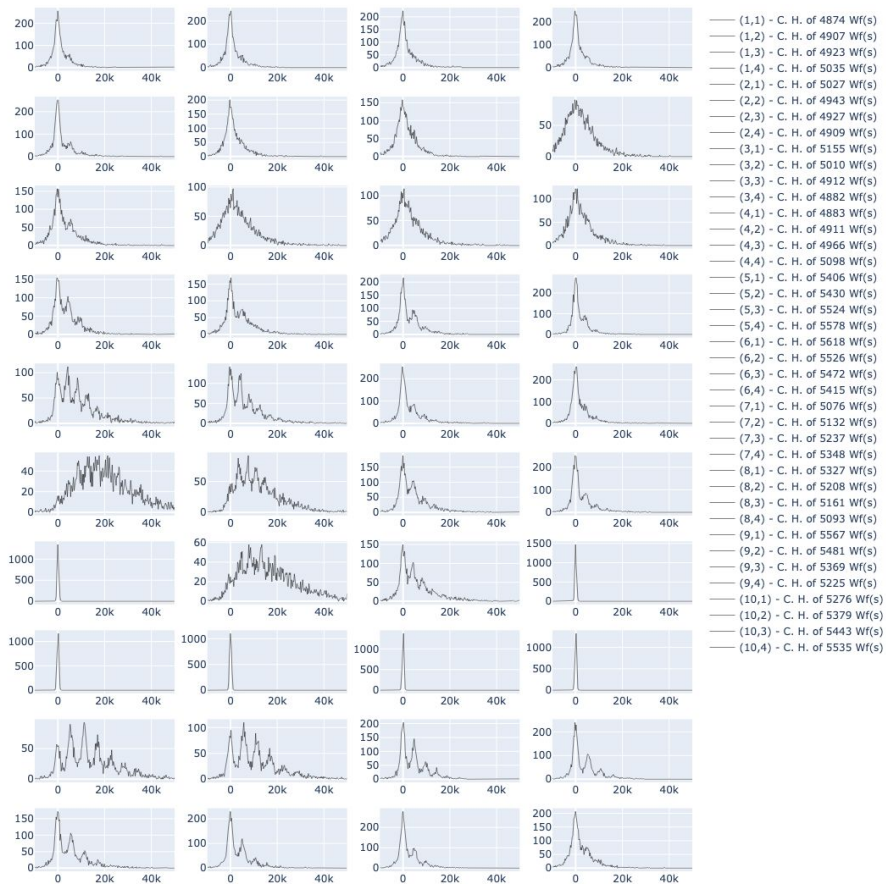
pulse\_bias\_percent\_270nm = 3090

Run 27120 - apa\_2



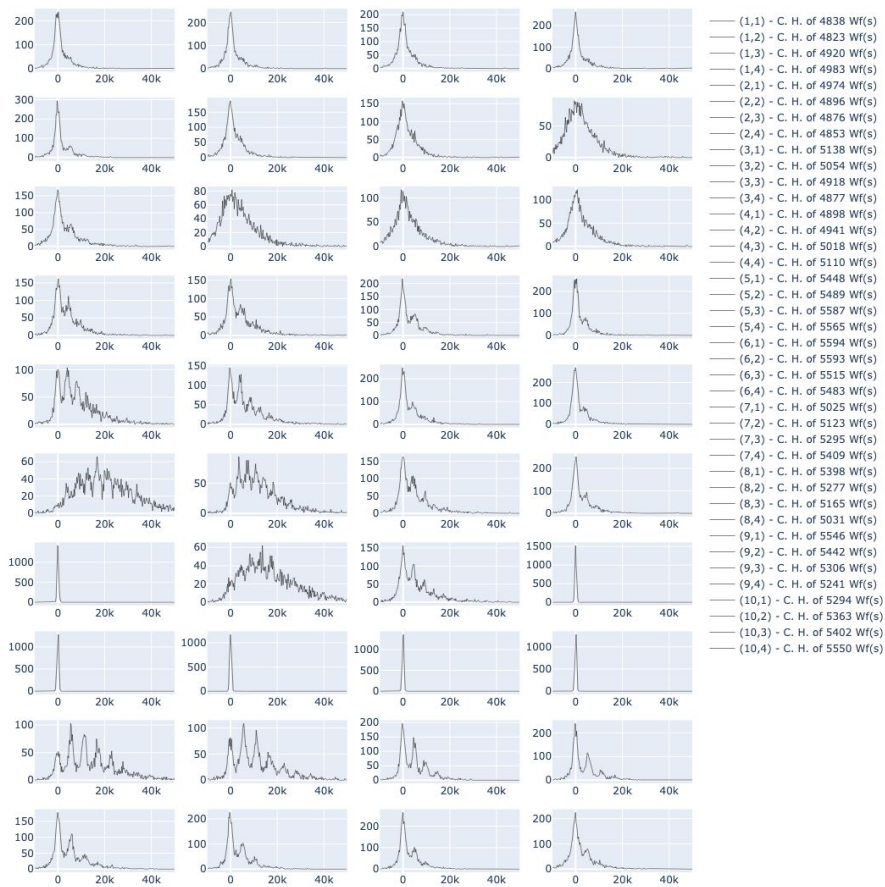
pulse\_bias\_percent\_270nm = 3190

Run 27121 - apa\_2



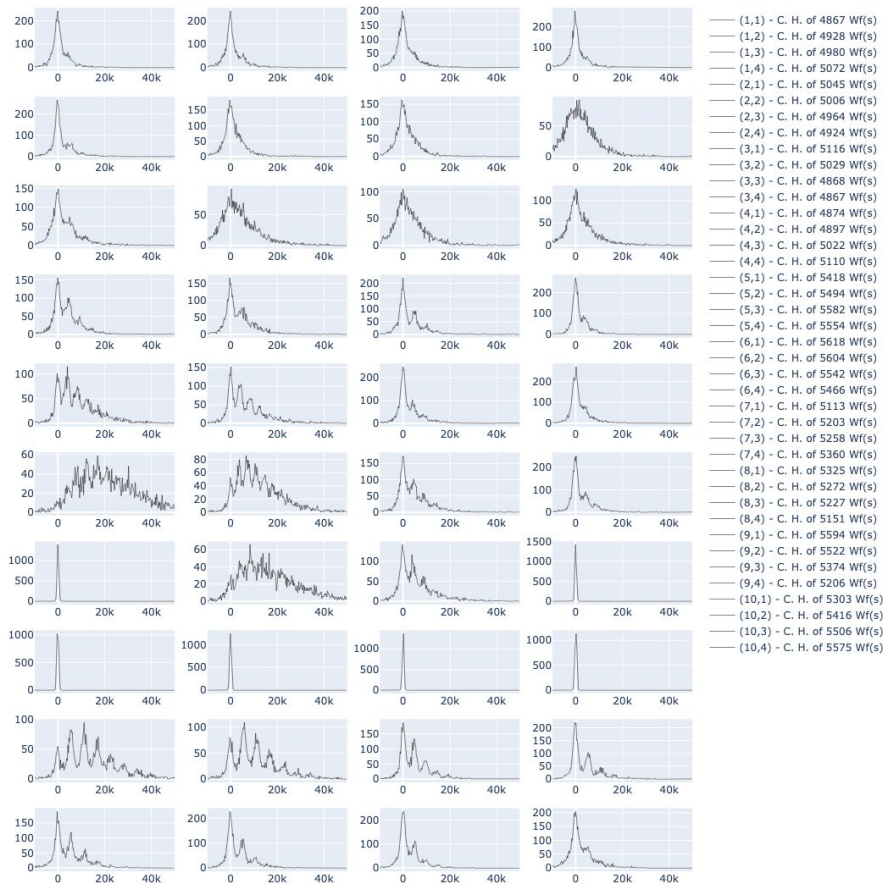
pulse\_bias\_percent\_270nm = 3290

Run 27122 - apa\_2



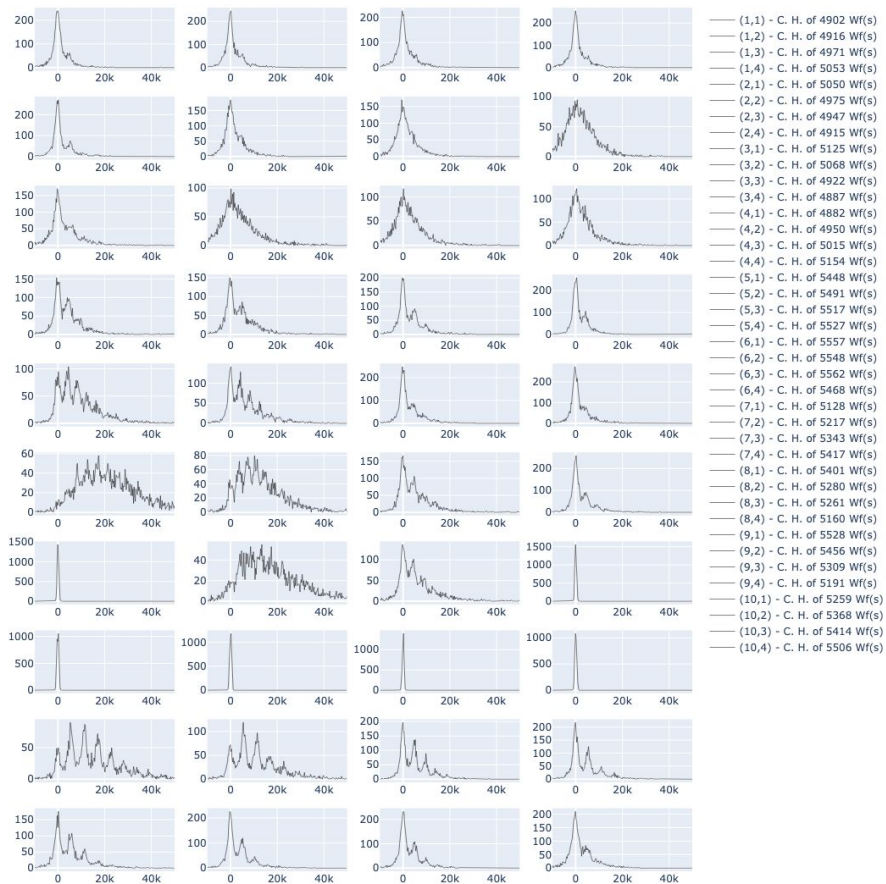
pulse\_bias\_percent\_270nm = 3390

Run 27123 - apa\_2



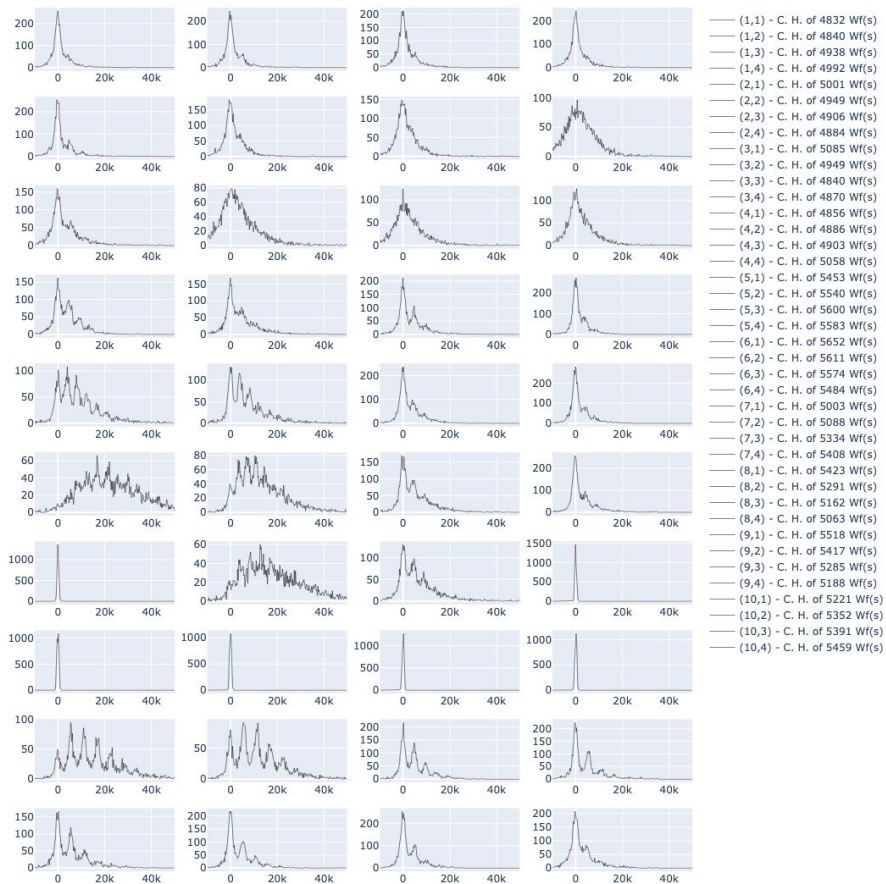
pulse\_bias\_percent\_270nm = 3490

Run 27124 - apa\_2



pulse\_bias\_percent\_270nm = 3590

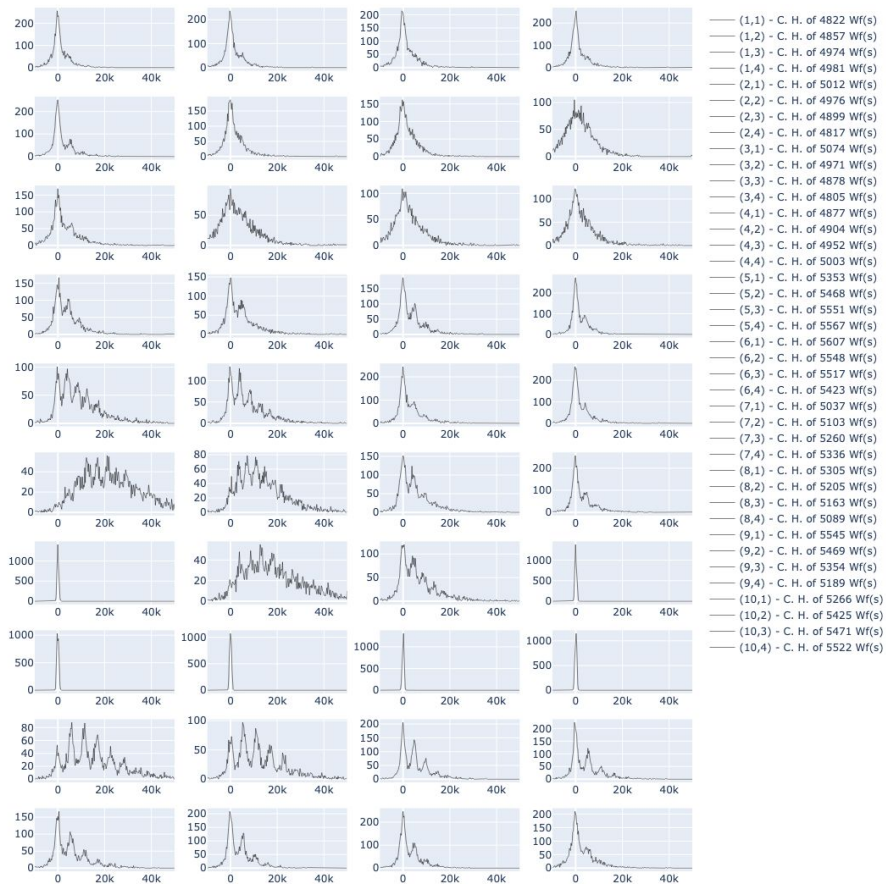
Run 27125 - apa\_2





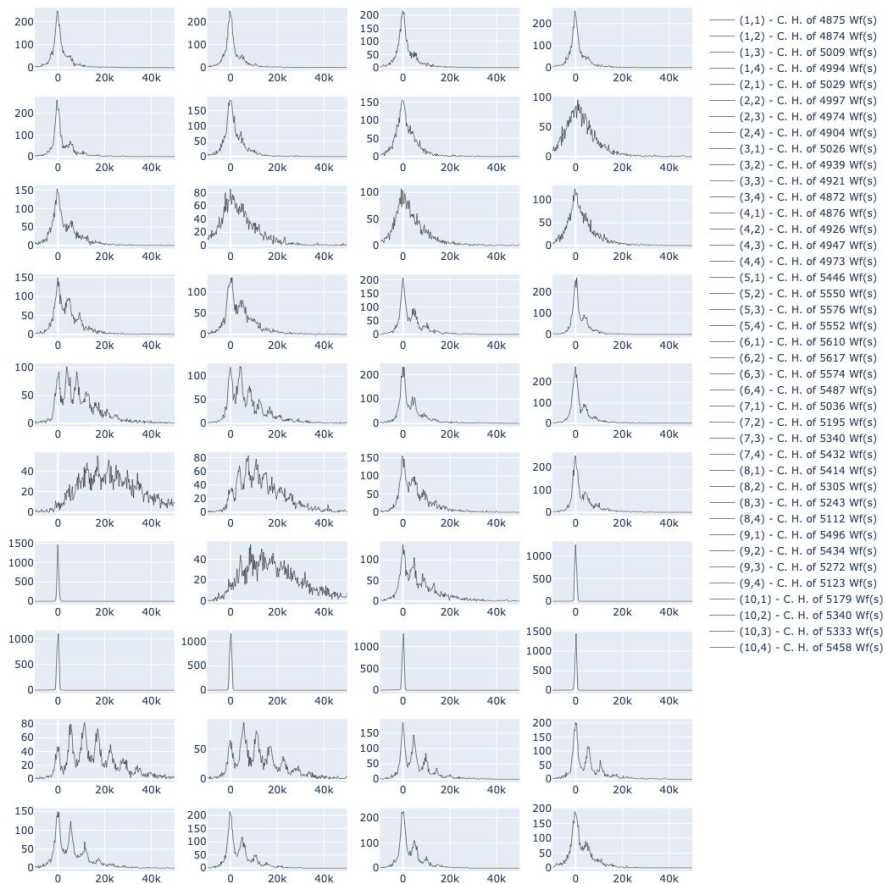
pulse\_bias\_percent\_270nm = 3690

Run 27126 - apa\_2



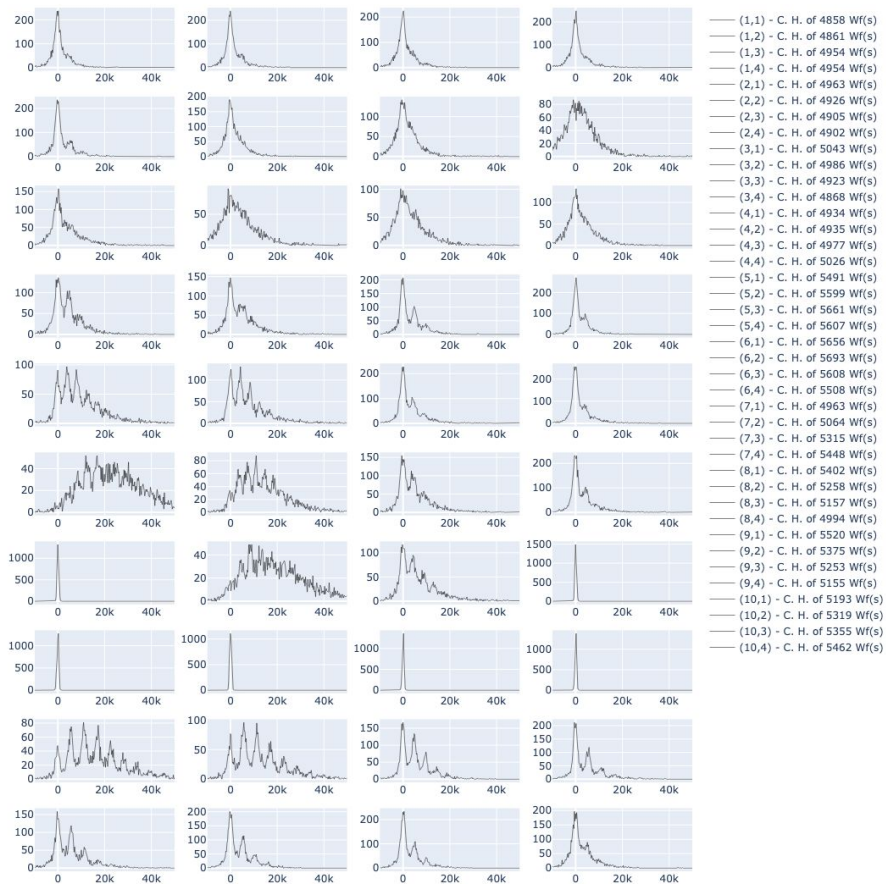
pulse\_bias\_percent\_270nm = 3790

Run 27127 - apa\_2



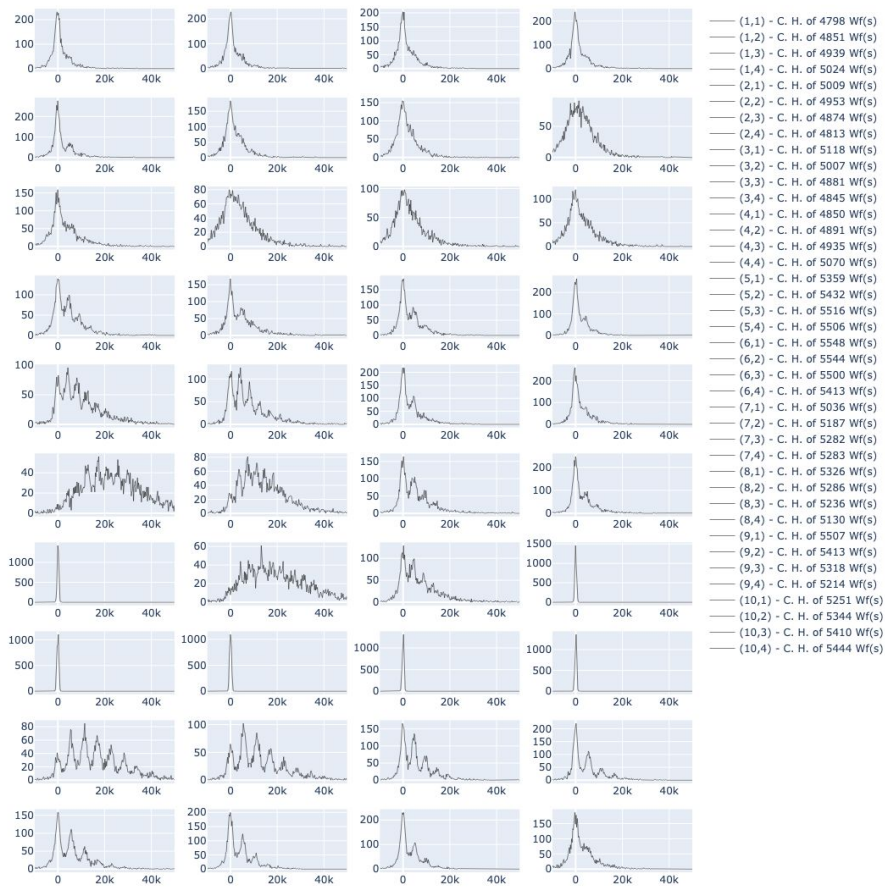
pulse\_bias\_percent\_270nm = 3890

Run 27128 - apa\_2



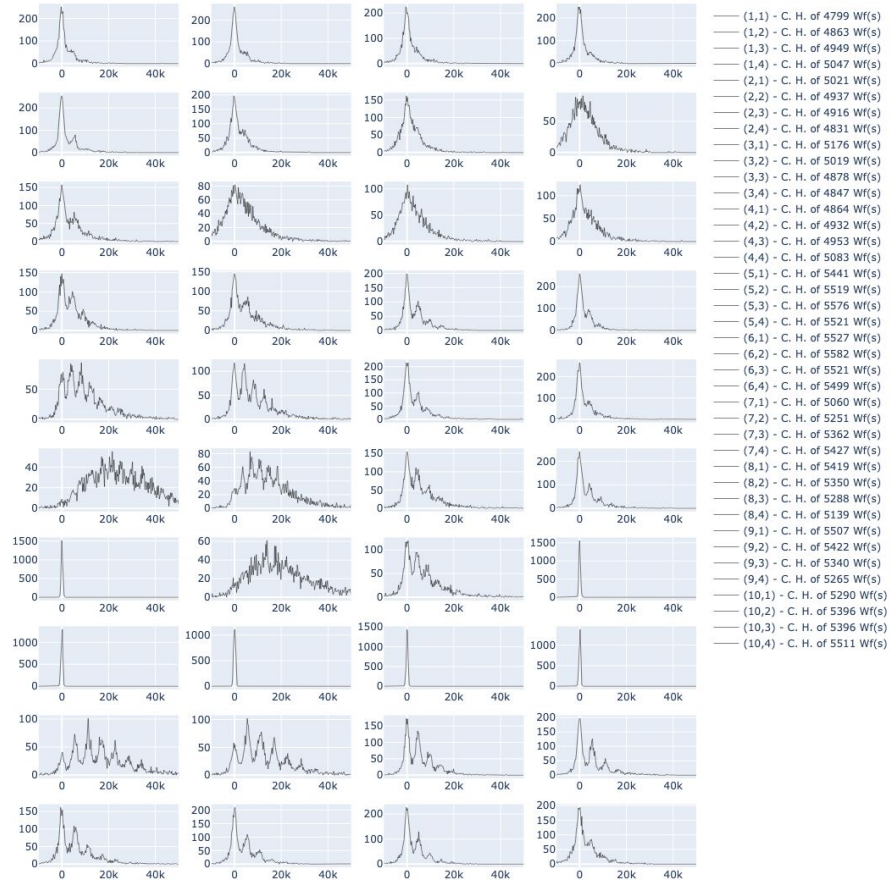
pulse\_bias\_percent\_270nm = 3990

Run 27129 - apa\_2



pulse\_bias\_percent\_270nm = 4090

Run 27130 - apa\_2

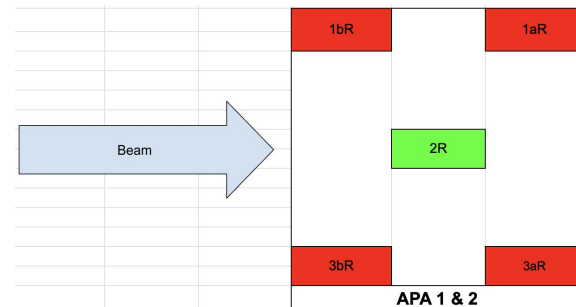


# APA 1

- **Ongoing analysis** of the data for some runs with endpoints 104, 105 & 107 (**APA 1**) taken on 17-18/06/2024
  - Light was pointing to the center of APAs 1 & 2 plane (`channel_mask = 10`)
  - LED coupled to **tefzel** fiber - `ticks_width = 5` (20 ns)
  - There are ~30 available runs - 180 seconds each
  - Scanning `pulse_bias_percent_270nm` from 500 to 4045 → But wider scan wrt APA 2
  - 20 Hz DAQ trigger rate
  - 20 Hz trigger ad-hoc 0x7
  - ~7000 waveforms per channel and per run
- Preliminary plots show that the detected amount of light
  - increases in the [1000, 3045] range of `pulse_bias_percent_270nm`,
  - but stays *roughly* the same in the [3045, 4095]
- The data seems *suitable* for calibration analysis, but the waveforms need to be aligned

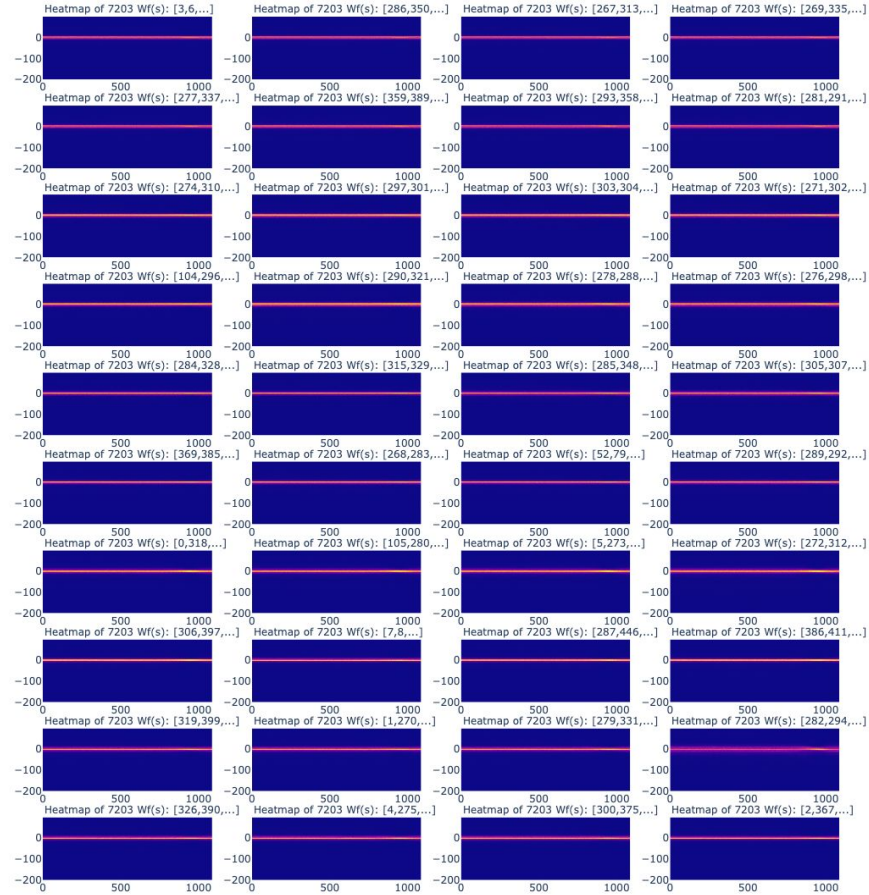
Run number	Date	Start time	End/run time	Shifter	PDS expert	Active Endpoints	# triggers	type	Configuration
27210	17/06/2024	180s	marroyav			104,105,107		LED	Calibration Run. Bias DCS:30V. Tests 270nm: SSP_config. pulse_mode:single, mask_channel:16, ticks_width:5, Pulse_bias_percent_270nm:4095. Trigger_ad-hoc 0x7:20Hz. 20Hz daq triger_rate.
27211	17/06/2024	180s	marroyav			104,105,107		LED	4045
27212	17/06/2024	180s	marroyav			104,105,107		LED	3995
27213	17/06/2024	180s	marroyav			104,105,107		LED	3945
27214	17/06/2024	180s	marroyav			104,105,107		LED	3895
27215	17/06/2024	180s	marroyav			104,105,107		LED	3845
27216	17/06/2024	180s	marroyav			104,105,107		LED	3795
27217	17/06/2024	180s	marroyav			104,105,107		LED	3745
27218	17/06/2024	180s	marroyav			104,105,107		LED	3695
27219	17/06/2024	180s	marroyav			104,105,107		LED	3645
27220	17/06/2024	180s	marroyav			104,105,107		LED	3595
27221	17/06/2024	180s	marroyav			104,105,107		LED	3545

⋮



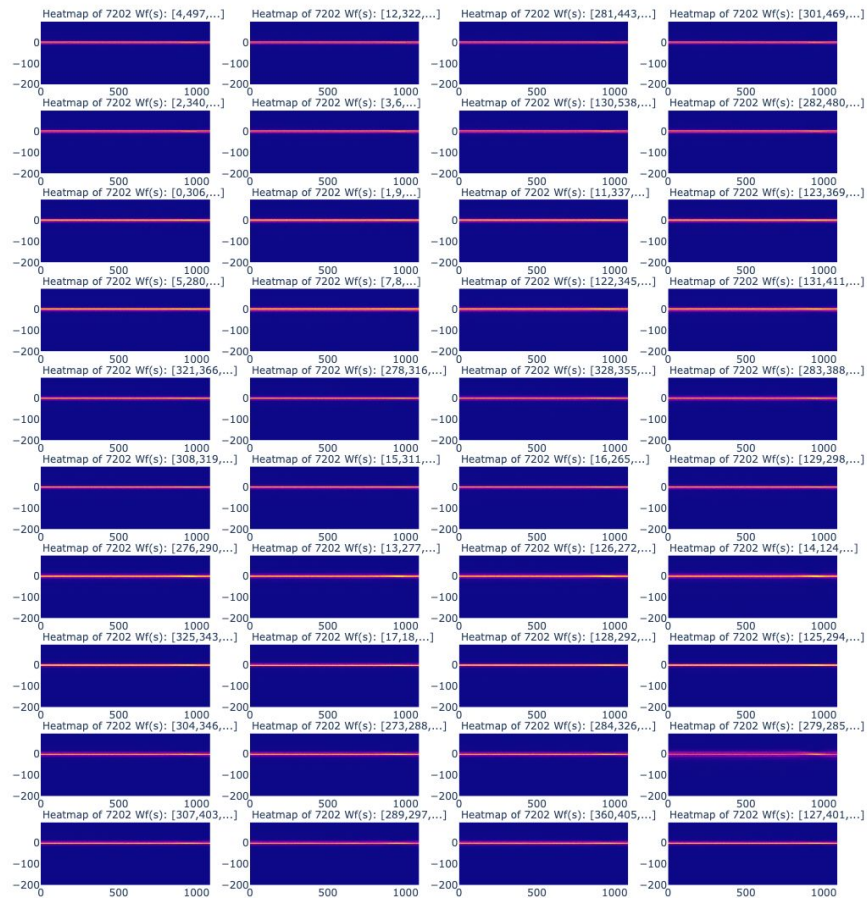
pulse\_bias\_percent\_270nm = 500

Run 27293 - apa\_1



pulse\_bias\_percent\_270nm = 1000

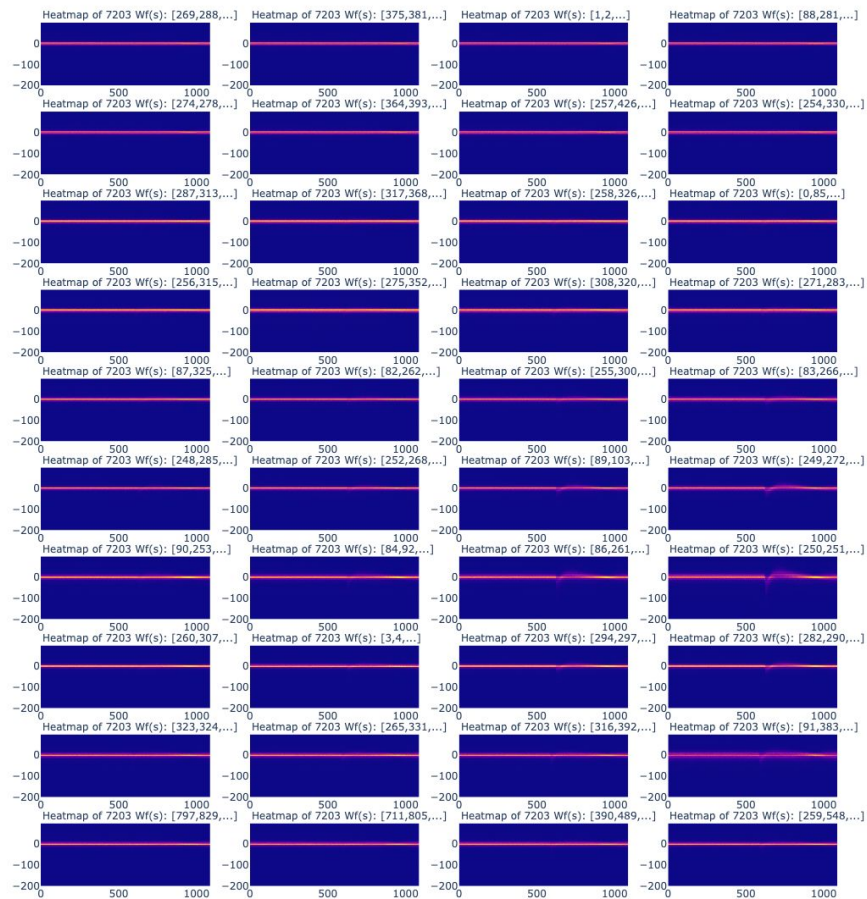
Run 27292 - apa\_1





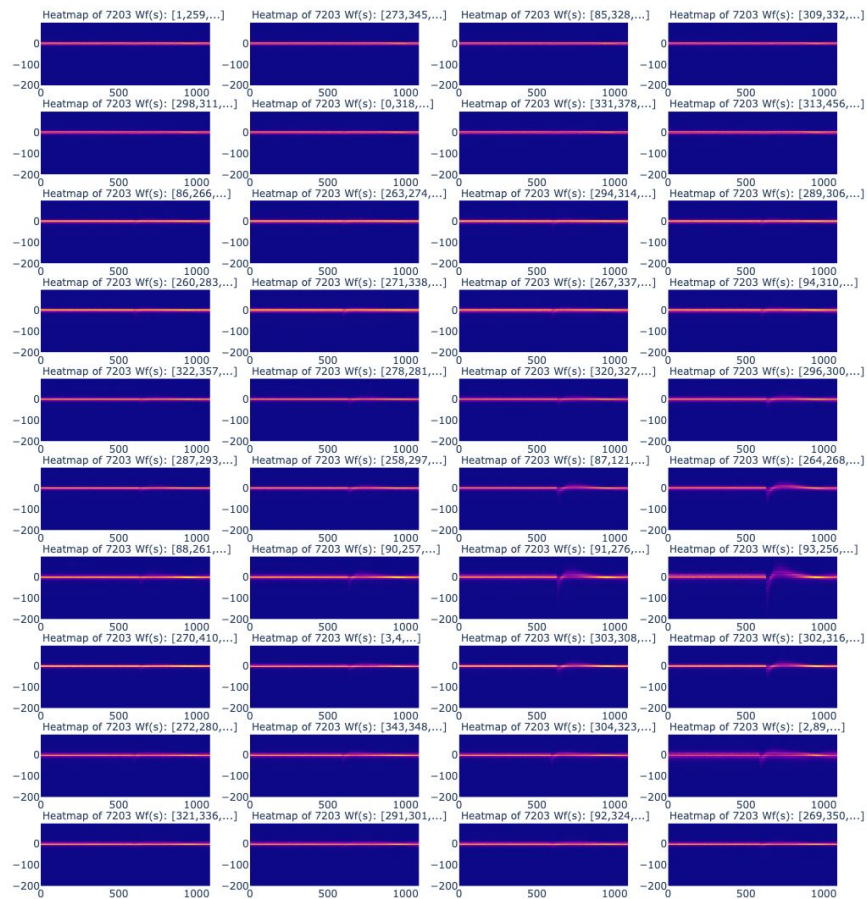
pulse\_bias\_percent\_270nm = 1500

Run 27291 - apa\_1



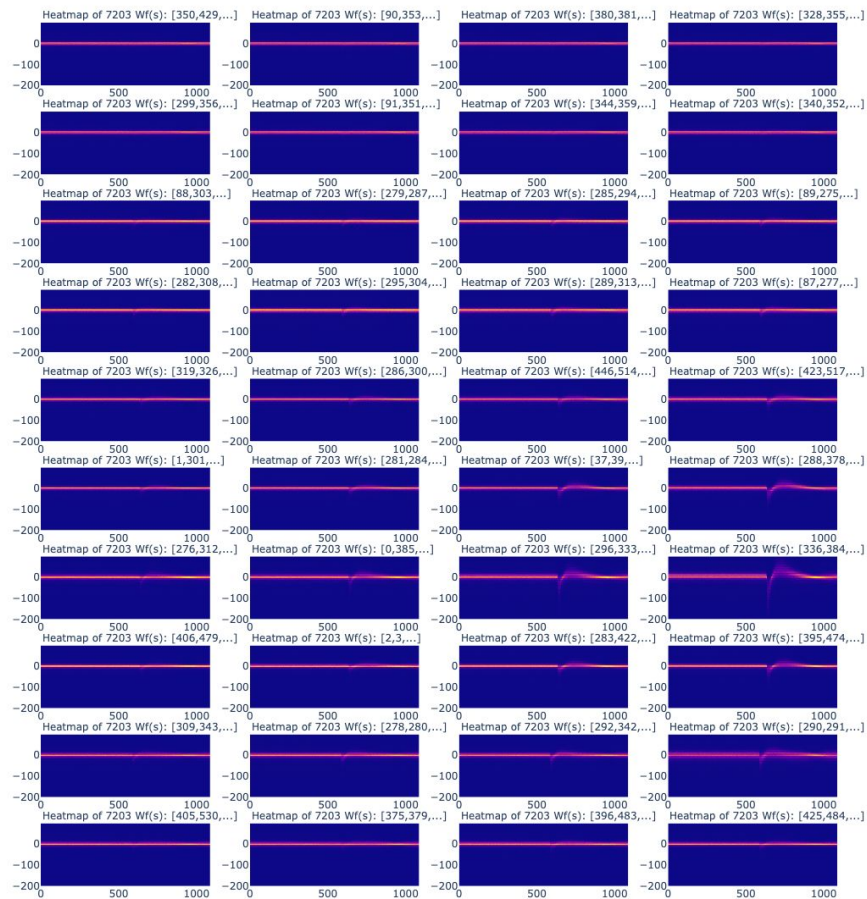
pulse\_bias\_percent\_270nm = 2000

Run 27290 - apa\_1



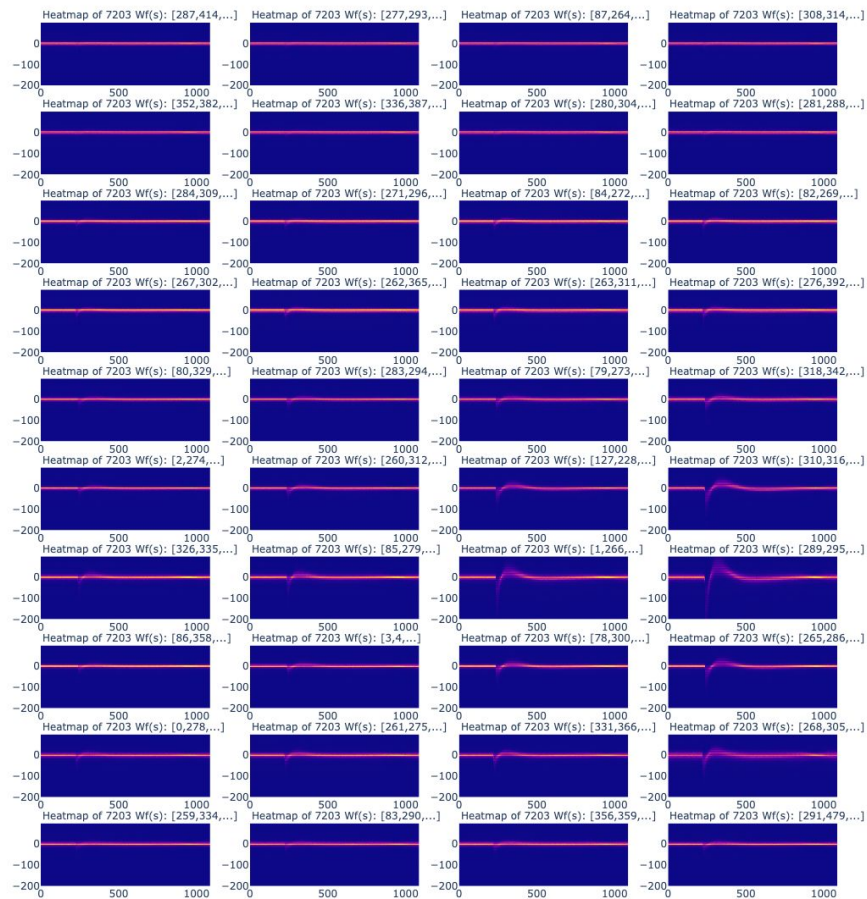
pulse\_bias\_percent\_270nm = 2500

Run 27288 - apa\_1



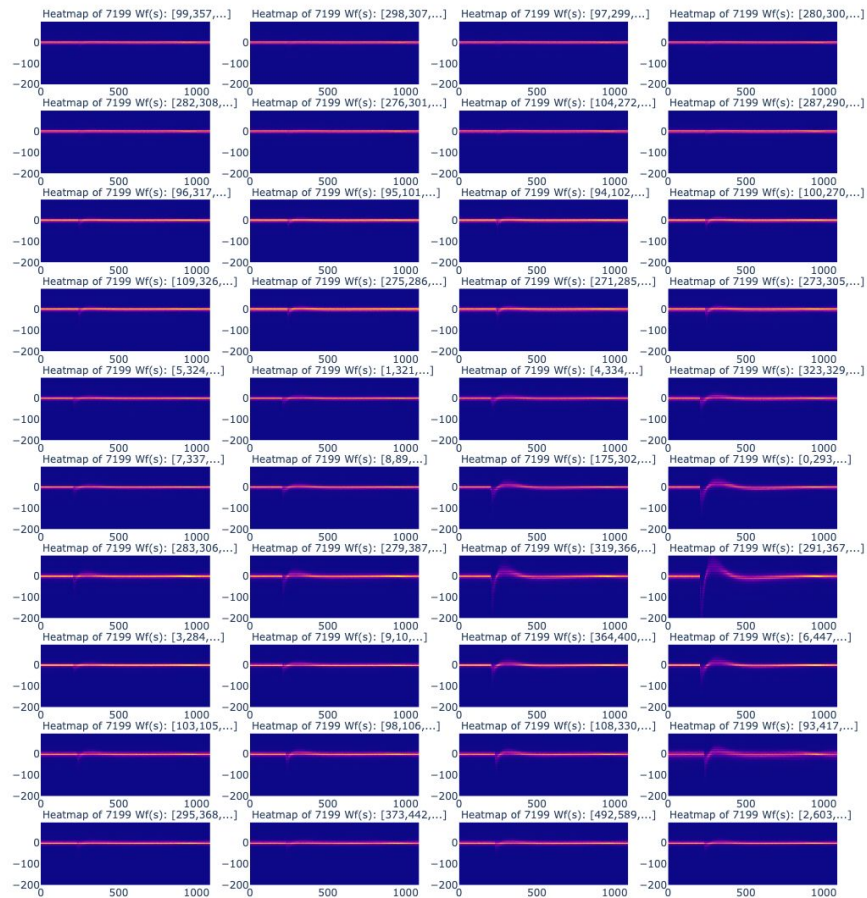
pulse\_bias\_percent\_270nm = 3045

Run 27222 - apa\_1



pulse\_bias\_percent\_270nm = 4095

Run 27210 - apa\_1



# Conclusions

- APAs 3 & 4
  - We have almost all the data we require to tune the LED for APAs 3 & 4 calibration
- APAs 1 & 2
  - With the centered **tefzel** fiber we seem to have reached a plateau of the detected light wrt the `pulse_bias_percent_270nm`
    - increasing `ticks_width` beyond 5 (20 ns) we may detect more light (indeed, we needed to increase it from 1 to 5 in the past to see some light in APA 2)
  - This plateau configuration for the centered fiber seems OK to calibrate some of the channels APAs 1 & 2, but we will need to use other LED/fiber to calibrate channels placed at some corners of the APAs
  - APA 1 waveform alignment is a pending task (offline analysis)