Negative Signal Overview

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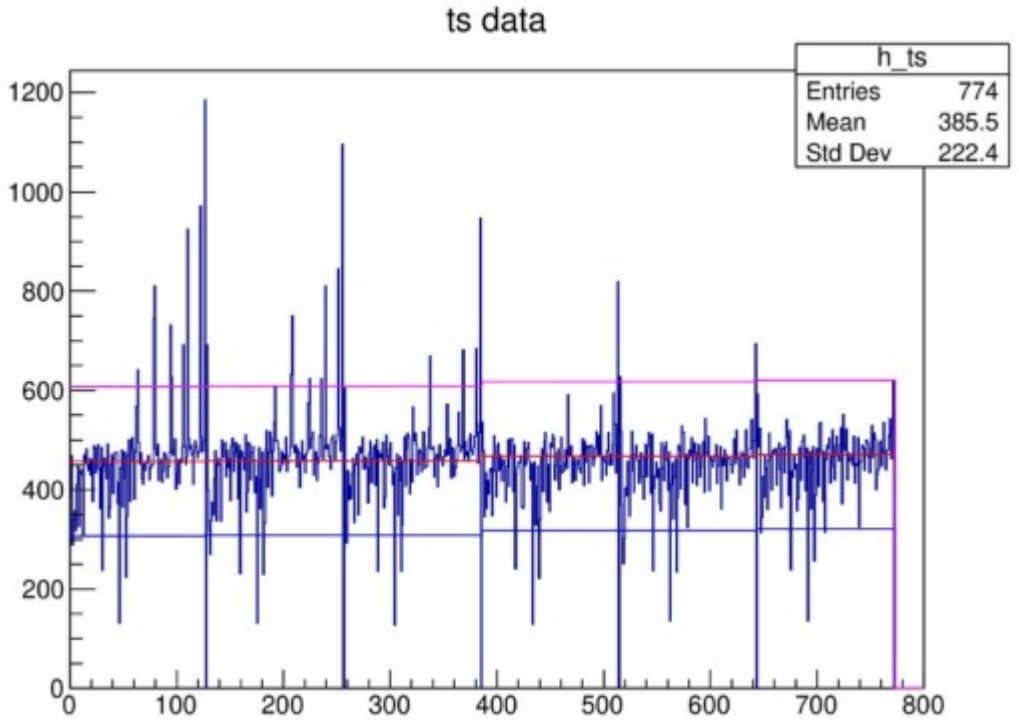
Raw Events Negative Signals

- Negative signals have only been seen in the hall setup.
- They would confuse the common mode calculation, and decrease the final result.

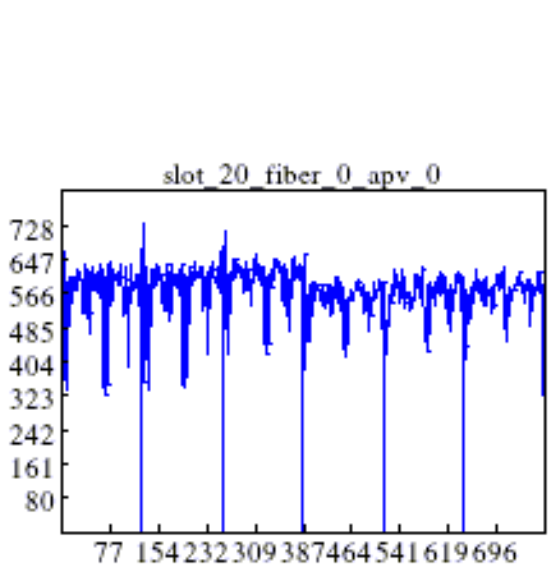


Current Available Data

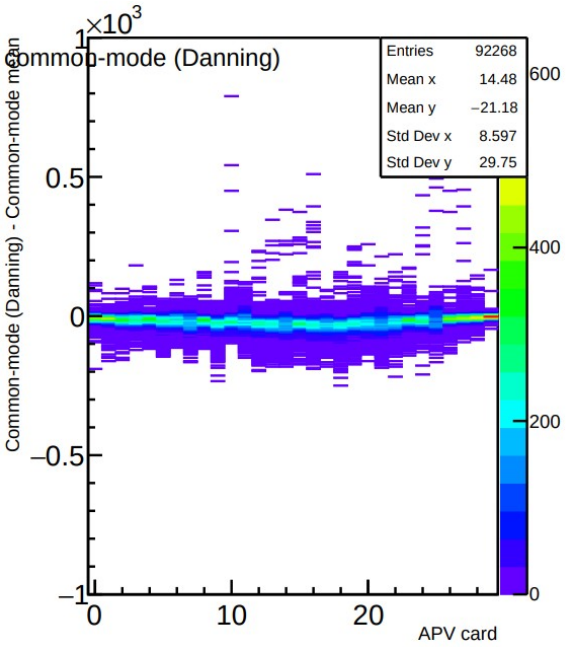
- 1, 3, and 5 uA runs on LH2, with only 50k events with zero suppression.
- 6M events cosmic run with full readout.
- Pedestal data

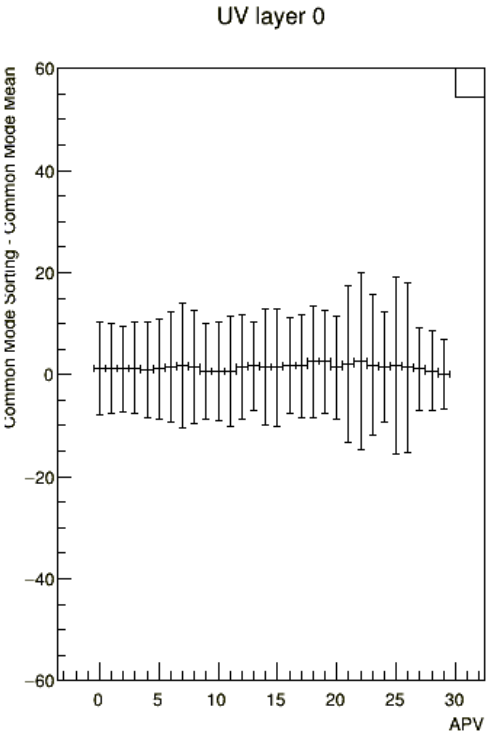
Full Readout Events

- Every 1/100 events have full readout, with no corrections.
- These events are used to make some histograms, but none of the data is saved.
- Will require more thorough analysis to understand the negative pulse impact.
- The plots shows how the online CM calculation compares to the pedestal CM calculation.
- Recall that signals greater than 50 ADC usually pass zero suppression.

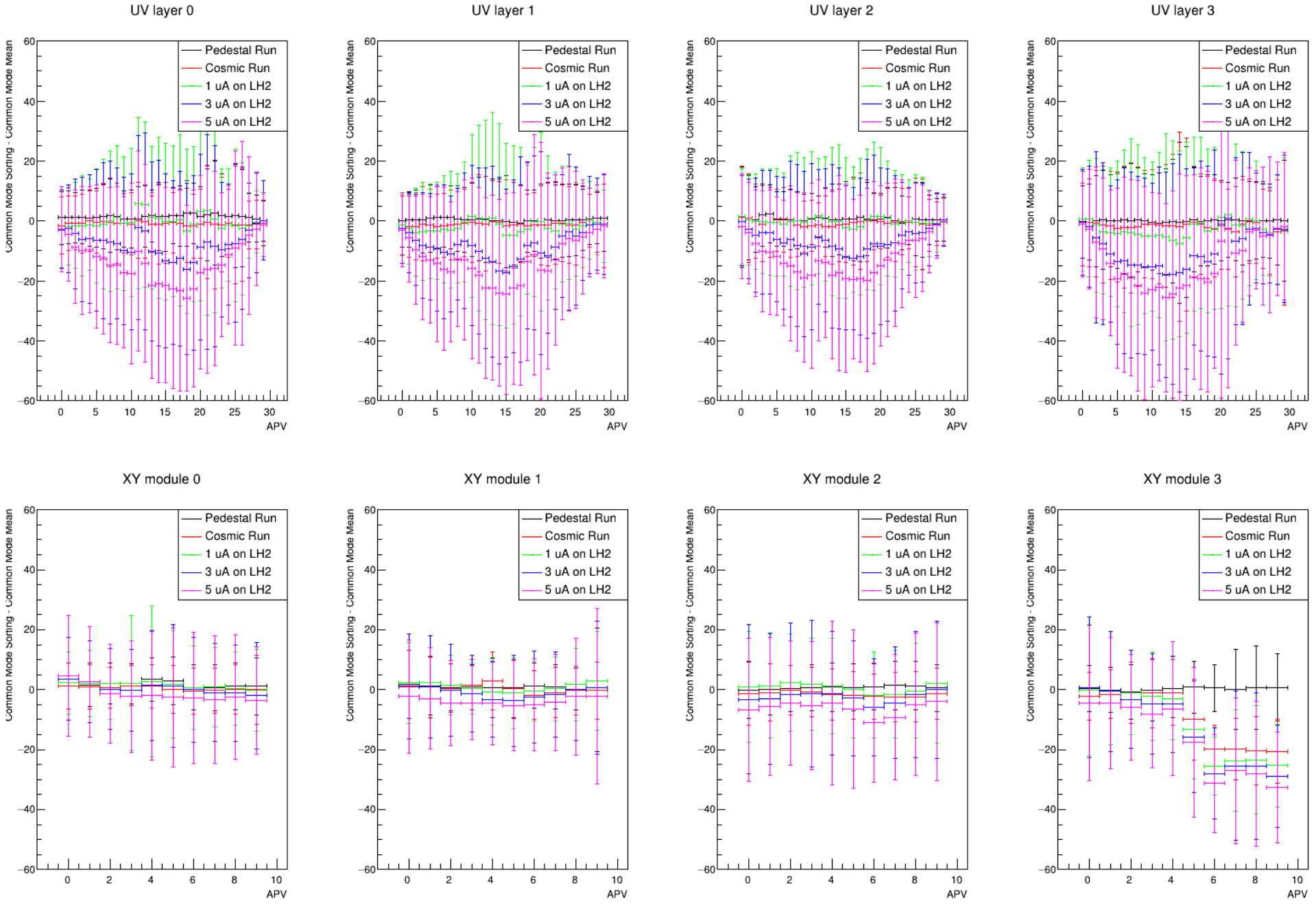


Analyzer



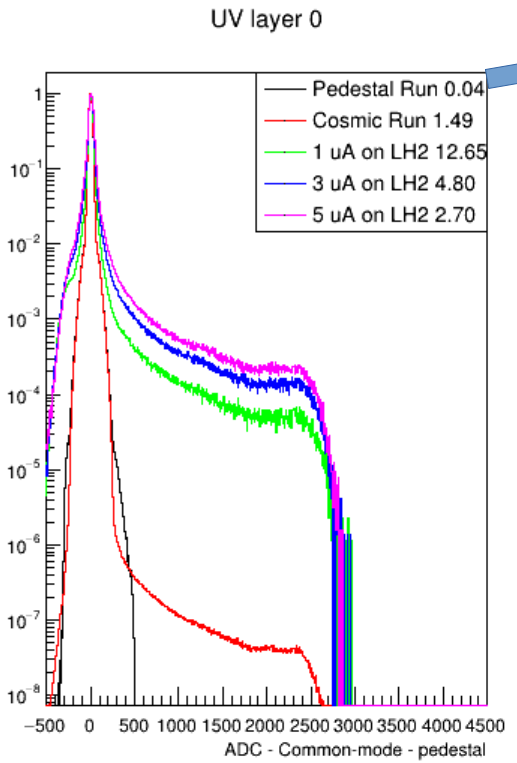


CM Distribution Sagging



Full Readout ADC Distributions

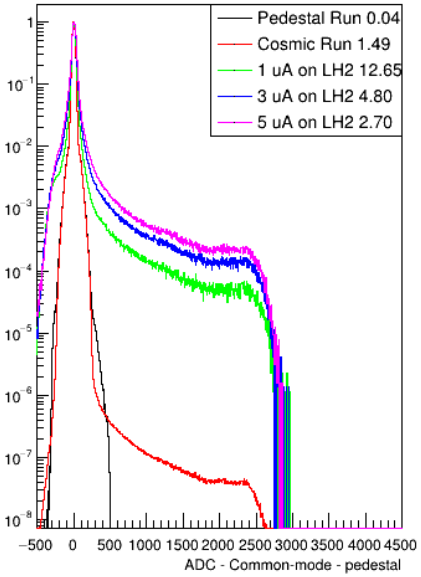
- The full ADC distribution can show the fraction of negative signals.
- The numbers in the legend show the fraction of negative signals to positive signals



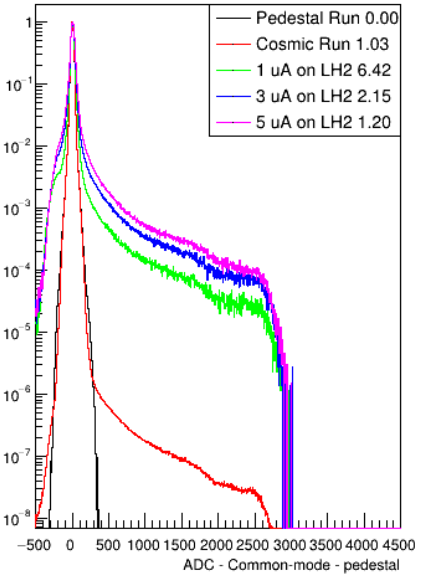
counts > 350 / # counts < -350

Full Readout ADC Distributions

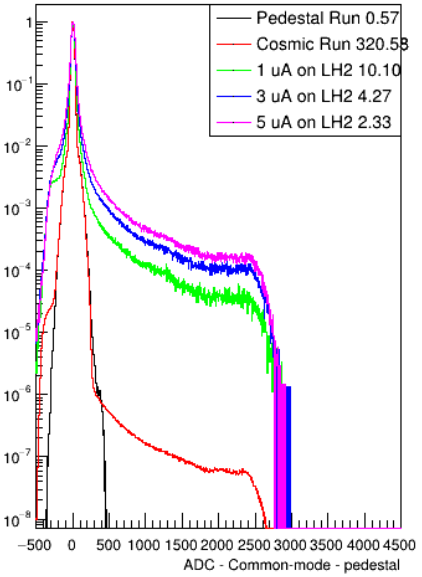
UV layer 0



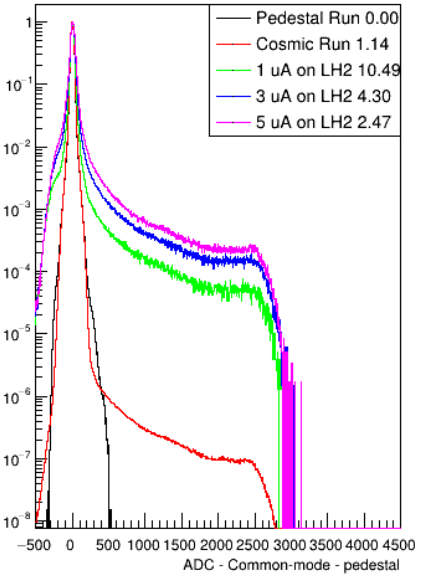
UV layer 1



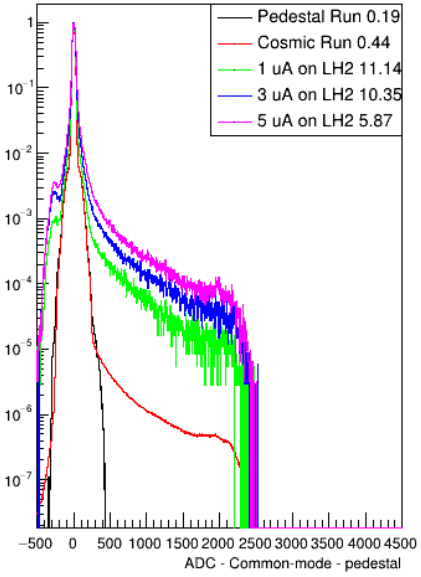
UV layer 2



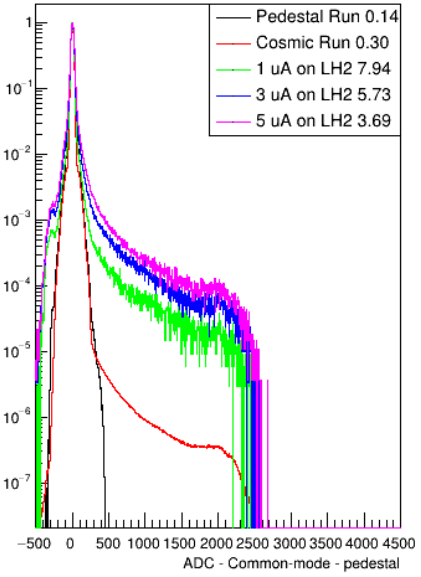
UV layer 3



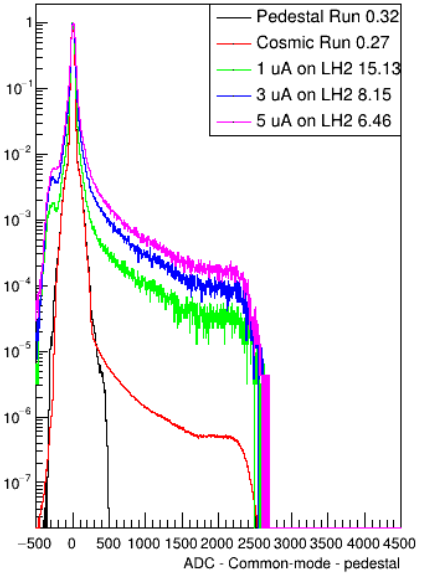
XY module 0



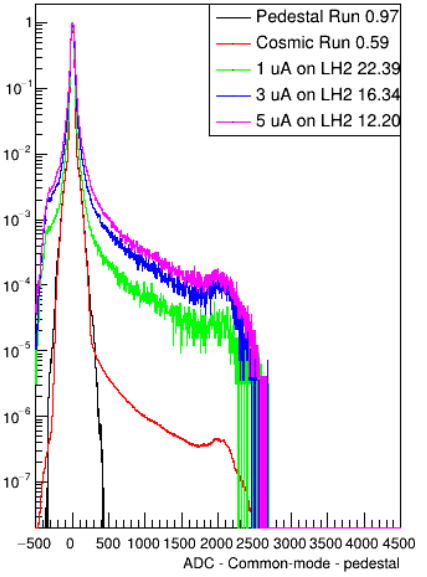
XY module 1



XY module 2

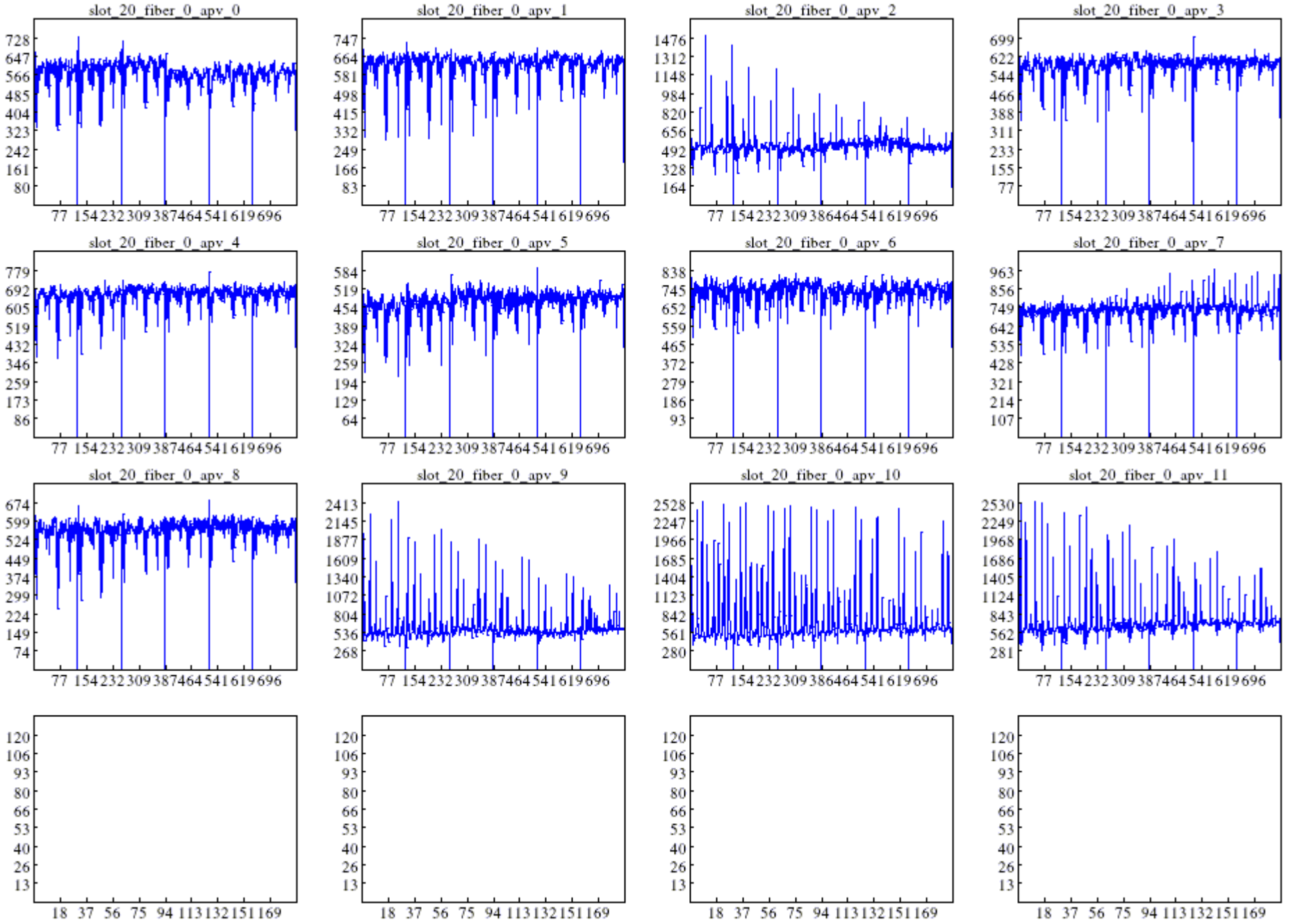


XY module 3

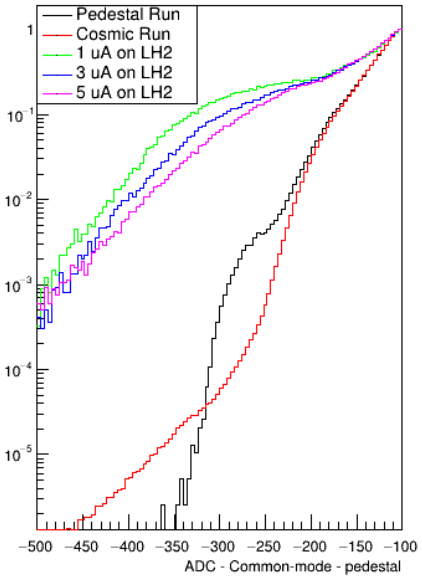


Thoughts

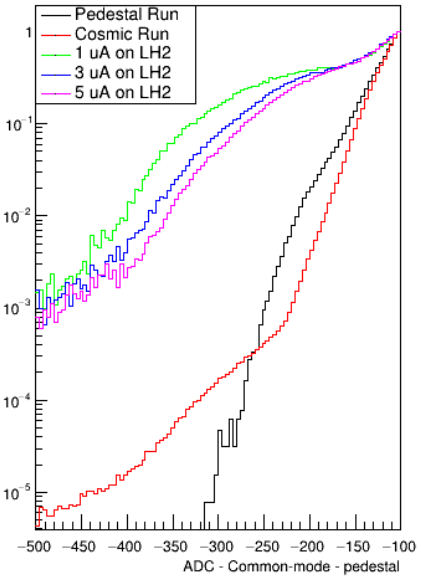
- The sagging of the CM clearly increases with beam current.
- Can get up to 30 ADC, and significantly effects our data.
  - This can likely be corrected using the 1/100 full readout events.
- It does not seem like the fraction of negative signals is increasing with beam current.
  - Seems contrary to the CM sagging.
  - Will need more statistics and more thorough analysis.
- Will be very useful to take cosmic data with full readout at different voltages.


slot_20_fiber_0_apv_0
728 647 566 485 404 323 242 161 80
77 154 232 309 387 464 541 619 696
slot_20_fiber_0_apv_1
747 664 581 498 415 332 249 166 83
77 154 232 309 387 464 541 619 696
slot_20_fiber_0_apv_2
1476 1312 1148 984 820 656 492 328 164
77 154 232 309 386 464 541 619 696
slot_20_fiber_0_apv_3
699 622 544 466 388 311 233 155 77
77 154 232 309 387 464 541 619 696
slot_20_fiber_0_apv_4
779 692 605 519 432 346 259 173 86
77 154 232 309 387 464 541 619 696
slot_20_fiber_0_apv_5
584 519 454 389 324 259 194 129 64
77 154 232 309 387 464 541 619 696
slot_20_fiber_0_apv_6
838 745 652 559 465 372 279 186 93
77 154 232 309 386 464 541 619 696
slot_20_fiber_0_apv_7
963 856 749 642 535 428 321 214 107
77 154 232 309 387 464 541 619 696
slot_20_fiber_0_apv_8
674 599 524 449 374 299 224 149 74
77 154 232 309 387 464 541 619 696
slot_20_fiber_0_apv_9
2413 2145 1877 1609 1340 1072 804 536 268
77 154 232 309 387 464 541 619 696
slot_20_fiber_0_apv_10
2528 2247 1966 1685 1404 1123 842 561 280
77 154 232 309 386 464 541 619 696
slot_20_fiber_0_apv_11
2530 2249 1968 1686 1405 1124 843 562 281
77 154 232 309 387 464 541 619 696
120 106 93 80 66 53 40 26 13
18 37 56 75 94 113 132 151 169
120 106 93 80 66 53 40 26 13
18 37 56 75 94 113 132 151 169
120 106 93 80 66 53 40 26 13
18 37 56 75 94 113 132 151 169
120 106 93 80 66 53 40 26 13
18 37 56 75 94 113 132 151 169

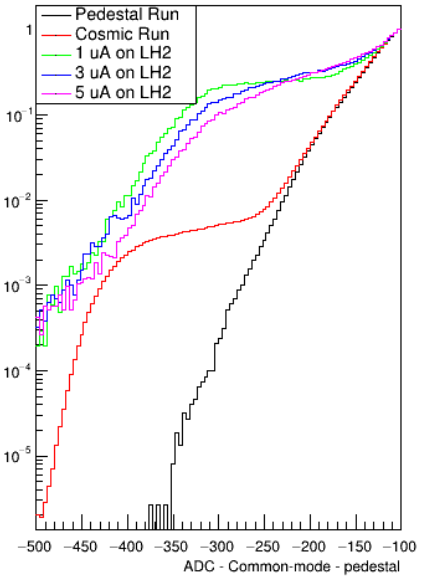
UV layer 0



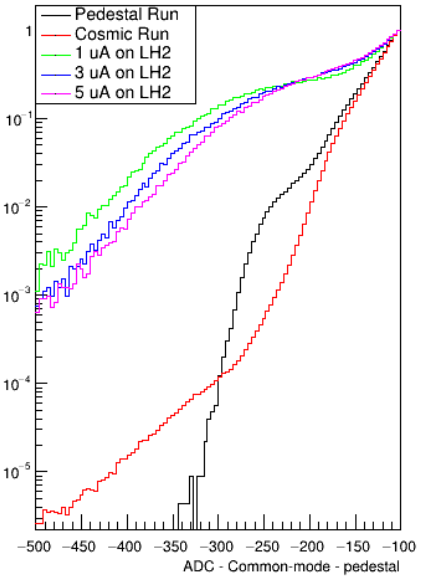
UV layer 1



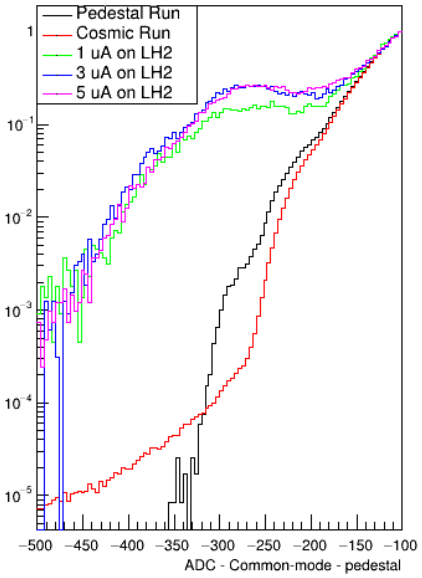
UV layer 2



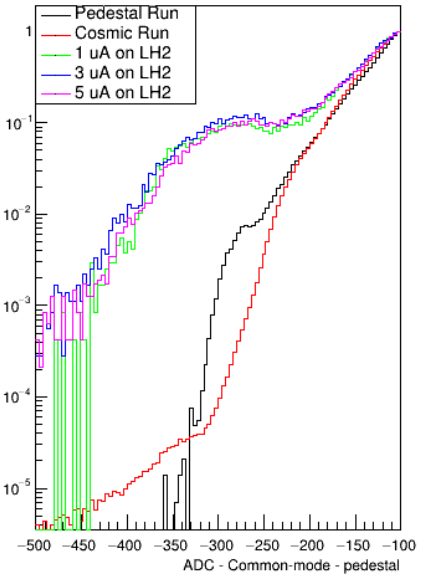
UV layer 3



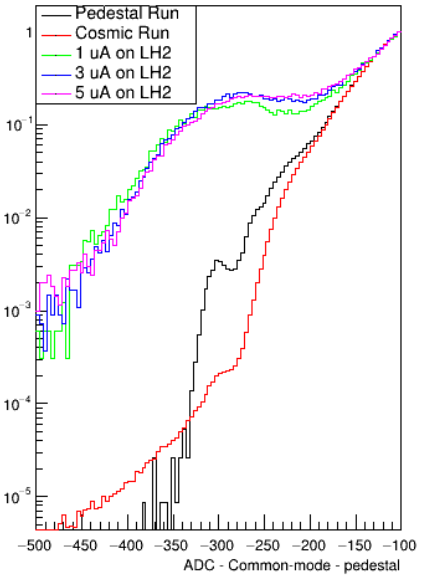
XY module 0



XY module 1



XY module 2



XY module 3