SVT Offline DQM

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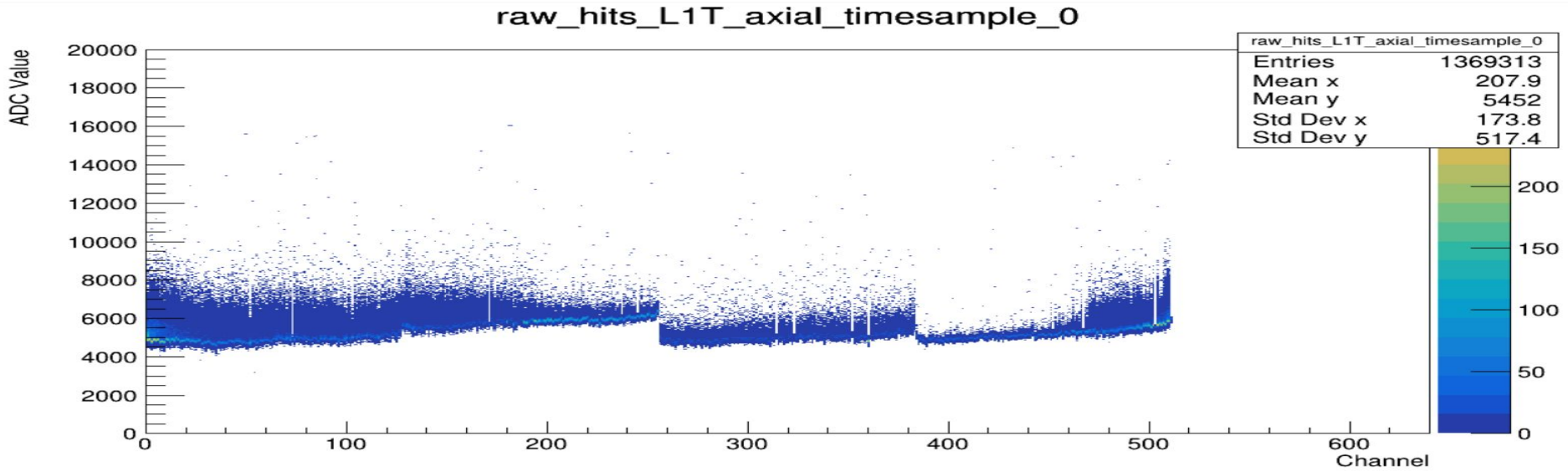
Introduction

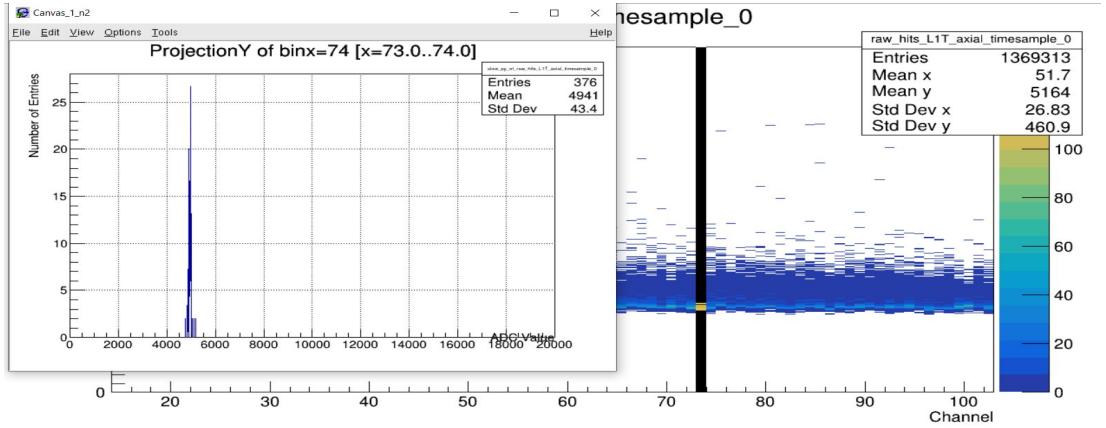
- Want simple analysis to do high level DQM of SVT data
- Fill 2D histograms with the ADC values for each channel with the SVTRawTrackerHits Collection
  - Looking at runs 10648 and 10710 in this presentation
- Calculate RMS of sample 0 per channel
  - Compare Hybrid RMS for each channel # over different runs
  - Use RMS values to define a channel as “dead”
  - Determine HV status (HV off will have higher RMS on average)
- Summarize the percentage of operational channels for each hybrid, and ultimately use this to determine run quality

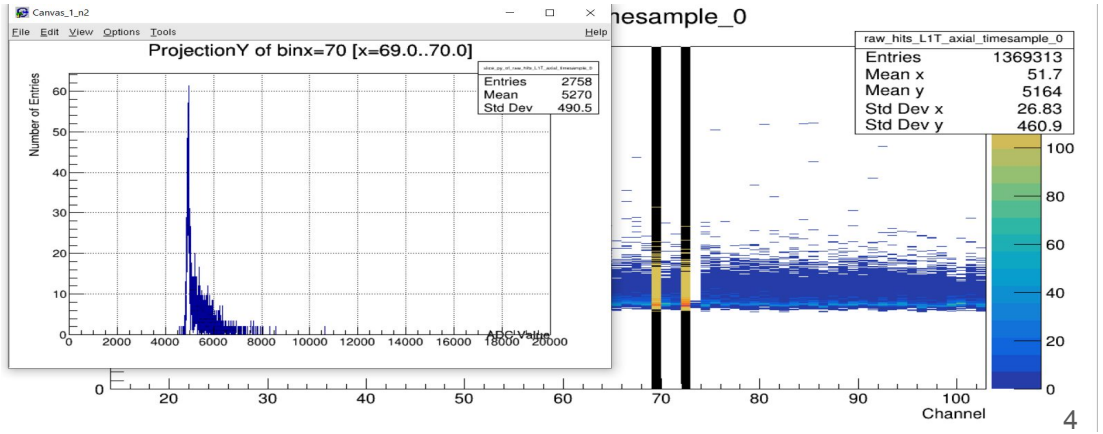


- Each channel on a hybrid is one x-axis bin
- Each hybrid has 6 of these, one for each time sample (0-5).
- This analysis only uses Time Sample 0, the ADC values of the channel before the trigger.
- The baseline has not been subtracted from these ADC values.

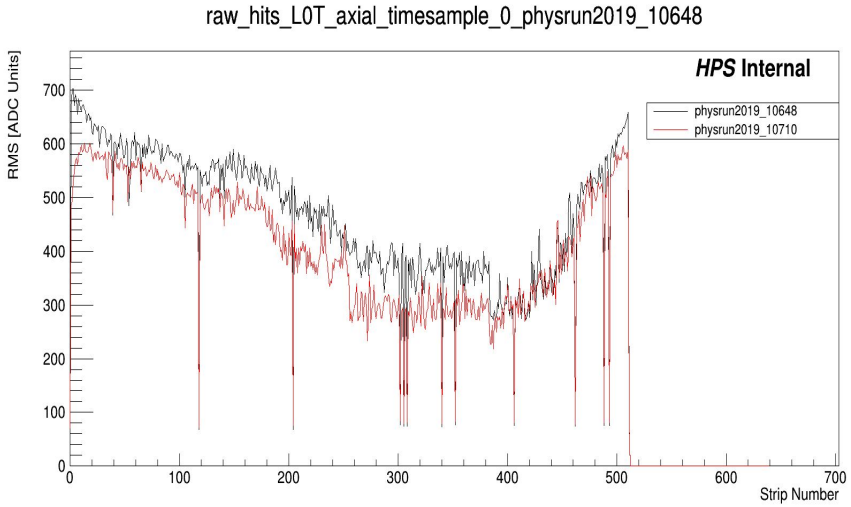
Determining RMS

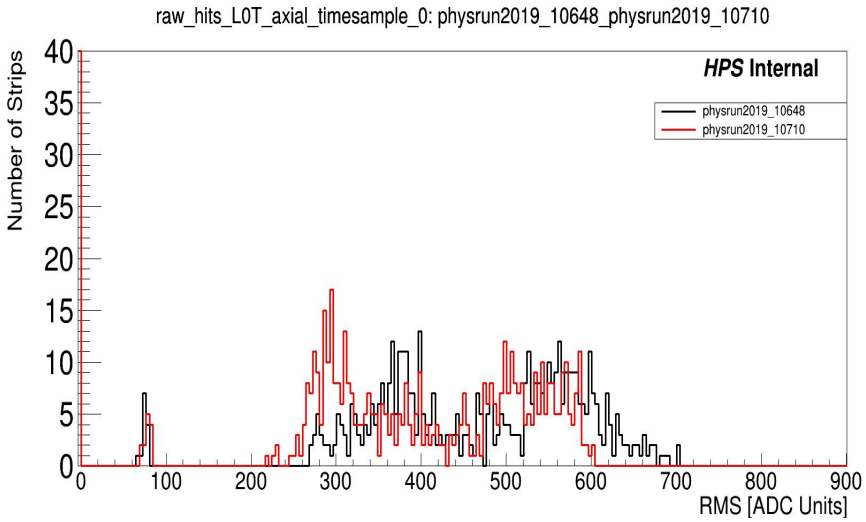
- For every Hybrid, the Y Projection of each bin (channel number) is extracted to determine the RMS of the ADC distribution
- A low value of RMS is indicative of a “dead channel”
    - The definition of “low” that encompasses all dead channels, and no live ones, is not yet defined. This brief analysis defines any RMS of <= 150 to be a dead channel
- A high value of RMS across a hybrid indicates the HV was off





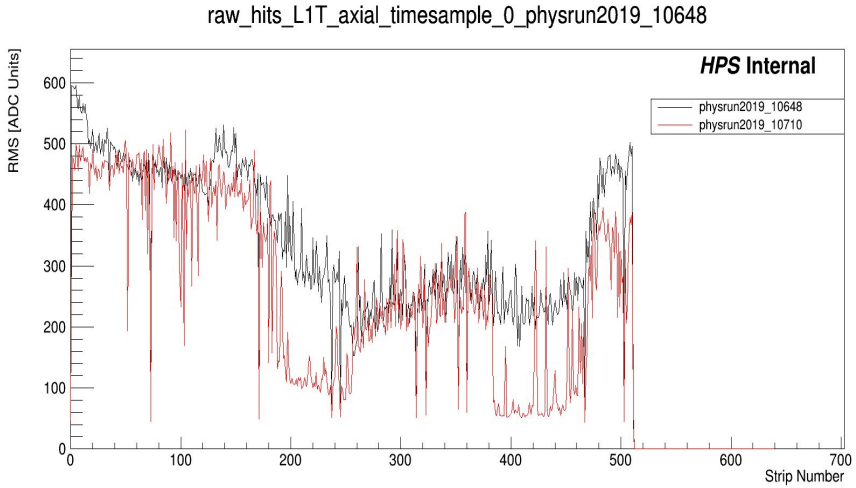
Comparison of L0T Axial in runs 10648 and 10710

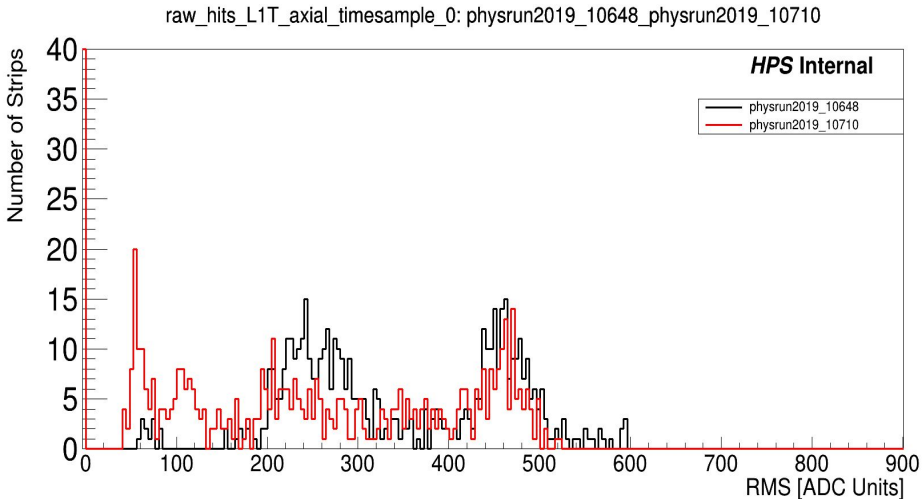




In this case it is clear how to select dead channels

Comparison of L1T Axial in runs 10648 and 10710



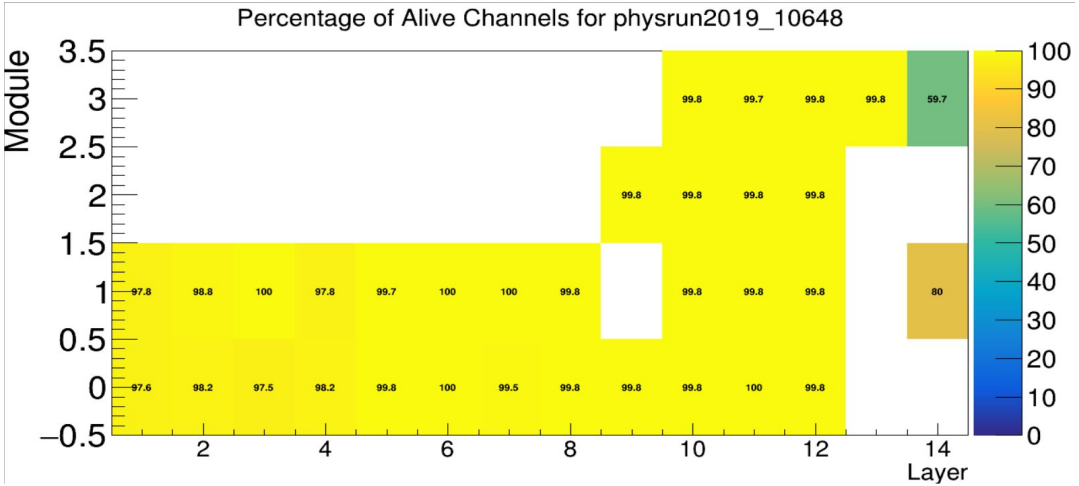


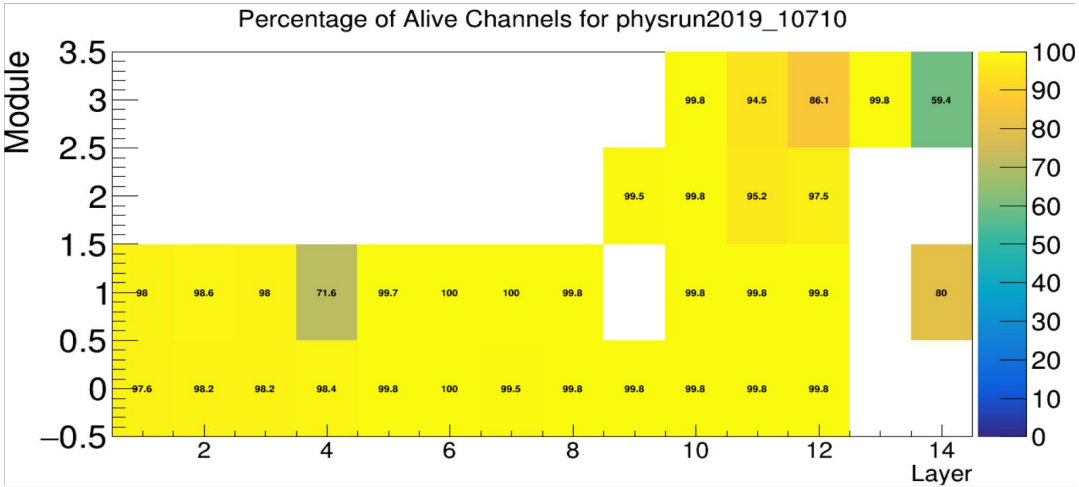
In this case, not so obvious how to define “dead” channel, in run 10710

Is it worth immediately investigating this case more? (Only in ~ last week of data)

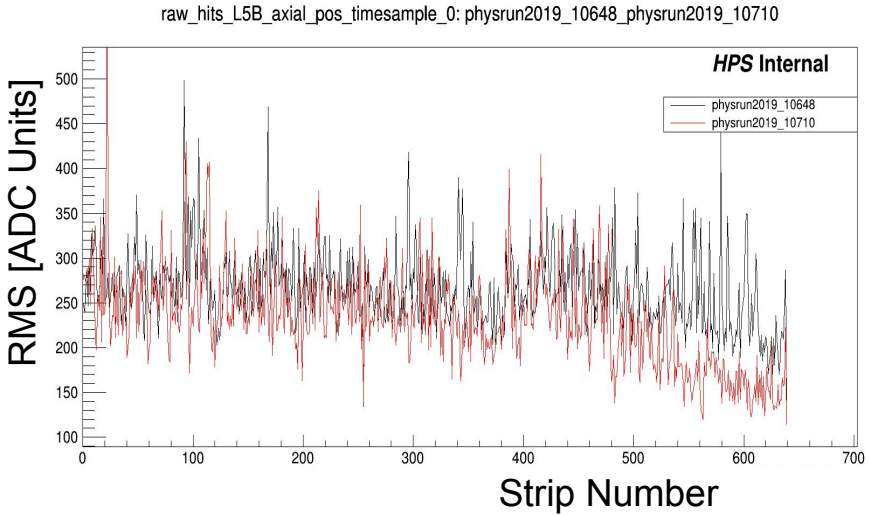
System Summary

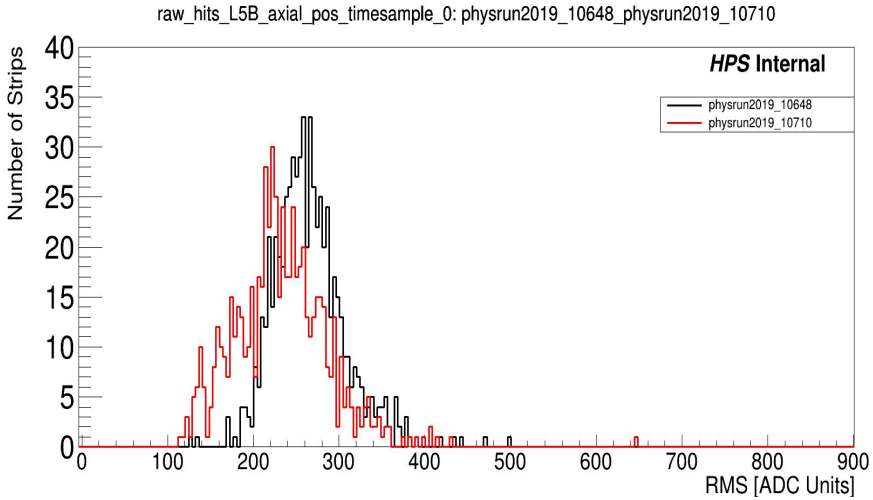
- This summary is a quick way to find potential issues that need a more careful look
- Here we see the summary for before and after the “straight through incident”



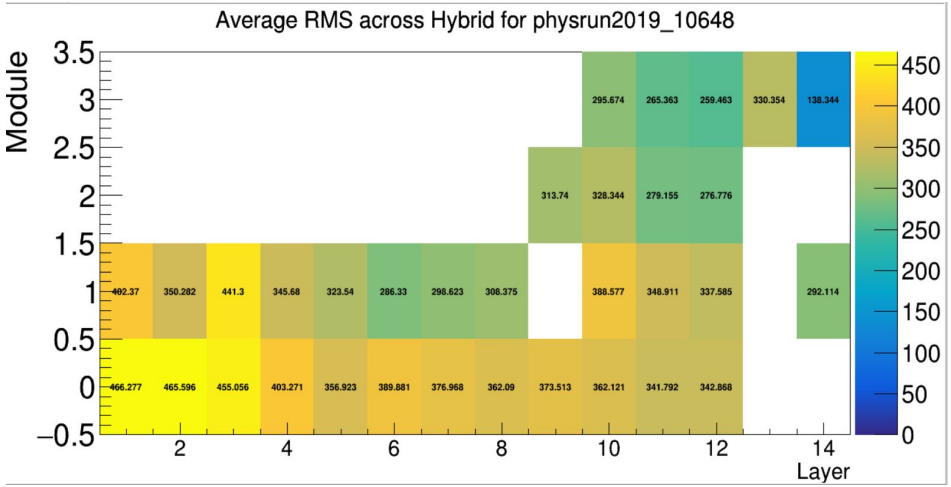


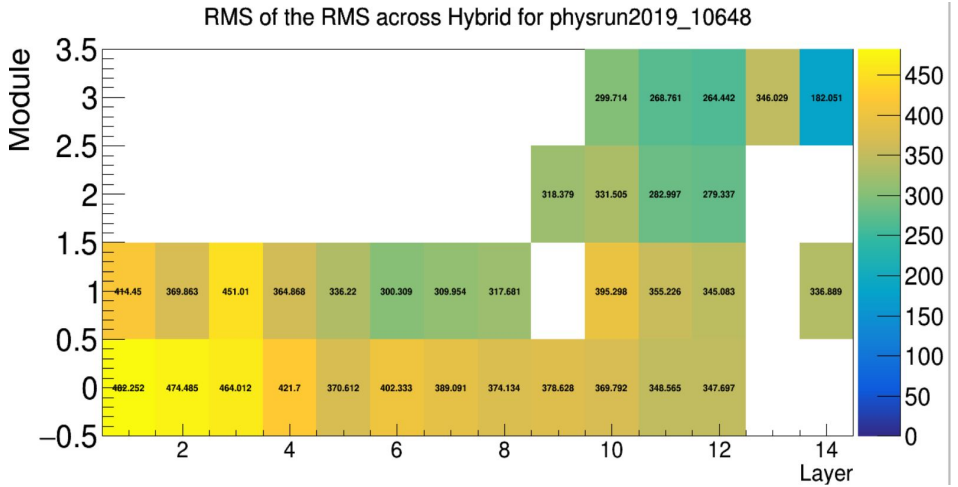
Comparison of L5B Axial in runs 10648 and 10710

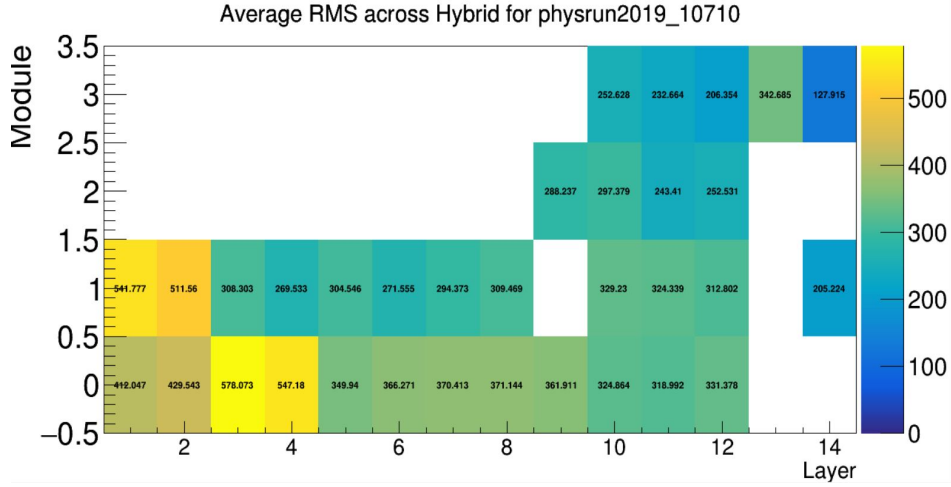


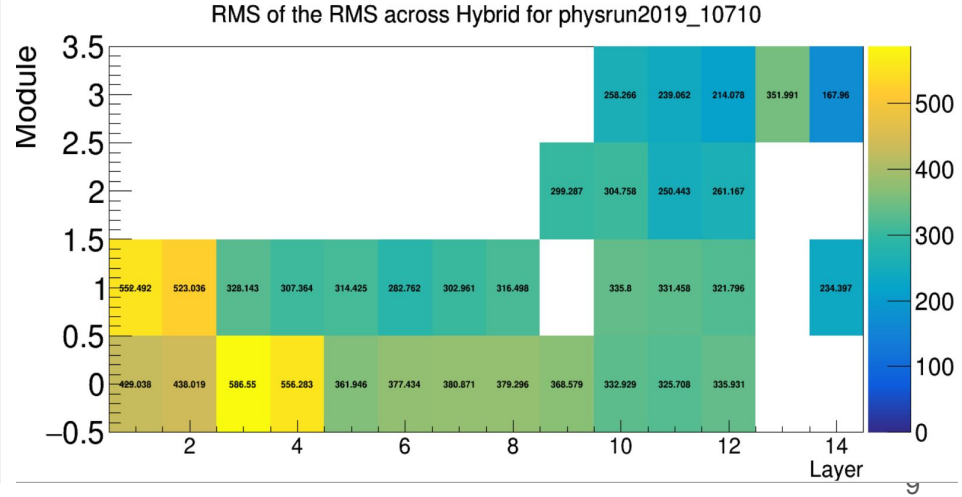


In this case, there are channels below the RMS 150 ADC unit threhsold that do not appear to actually be “dead”, maybe 100 would be better?


Average RMS across Hybrid for physrun2019_10648
Module
Layer
295.674 265.363 259.463 330.354 138.344
313.74 328.344 279.155 276.776
402.37 350.282 441.3 345.68 323.54 286.33 298.623 308.375 388.577 348.911 337.585 292.114
466.277 465.596 455.056 403.271 356.923 389.881 376.968 362.09 373.513 362.121 341.792 342.868


RMS of the RMS across Hybrid for physrun2019_10648
Module
Layer
299.714 268.761 264.442 346.029 182.051
318.379 331.505 282.997 279.337
414.45 369.863 451.01 364.868 336.22 300.309 309.954 317.681 395.298 355.226 345.083 336.889
482.252 474.485 464.012 421.7 370.612 402.333 389.091 374.134 378.628 369.792 348.565 347.697


Average RMS across Hybrid for physrun2019_10710
Module
Layer
252.628 232.664 206.354 342.685 127.915
288.237 297.379 243.41 252.531
541.777 511.56 308.303 269.533 304.546 271.555 294.373 309.469 329.23 324.339 312.802 205.224
412.047 429.543 578.073 547.18 349.94 366.271 370.413 371.144 361.911 324.864 318.992 331.378


RMS of the RMS across Hybrid for physrun2019_10710
Module
Layer
258.266 239.062 214.078 351.991 167.96
299.287 304.758 250.443 261.167
552.492 523.036 328.143 307.364 314.425 282.762 302.961 316.498 335.8 331.458 321.796 234.397
429.038 438.019 586.55 556.283 361.946 377.434 380.871 379.296 368.579 332.929 325.708 335.931

What's Next?

- Calculate offline baselines
  - Should finish this before "crawling" the data
- Run on more runs
- Compare dead channels to QA data
- Look through results for each run
  - Look through runs with any possibility of containing usable physics data
  - Update run quality spreadsheet
  - Start by looking at file close to beginning and end of each run
  - If end of run sees issues not seen at beginning, determine file # where issue begins
- Learn how to dump SVT position from MYA
- Decide on categorization strategy and build list of "golden" runs
- Longer term, look at pulse shapes and measure S/N and time resolution