

INFN GEM Update:

Hardware Update

1/13/21-1/20/21

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Recent Activities:

- Hardware (Jan. 13-14)
 - Resolve DAQ errors and take a pedestal run to assess noise.
 - Evaristo provides spreadsheet about noise patterns and ways to reduce noise at pedestal level.
 - Begin work on all chambers to reduce noise.
 - Noticed frame was missing fasteners after coming back from welding. Jessie checked with welders and not there.
 - Assembled UV spare frame in Test Lab
 - Used spare fasteners to attach and tighten roller mount to BigBite frame
- Analysis (Jan. 15,18)
 - Created a macro to make Avg Efficiency vs HV, X-Residual vs HV, and Y-Residual vs HV. Macro still requires some debugging.
- Hardware (Jan. 19)
 - Continued work on noise reduction.
 - Resolved DAQ problems, was cable connection problem for MPDs 17,18.
 - Jessie takes short carbon fiber pieces for drilling.

Missing Fasteners?



Top Track mount 2nd from the back right side without fasteners Dec. 23 2020



Top Track mount 2nd from the back left side without fasteners Dec. 23 2020



Top Track mount 2nd from the back right side with fasteners Jan. 14 2021

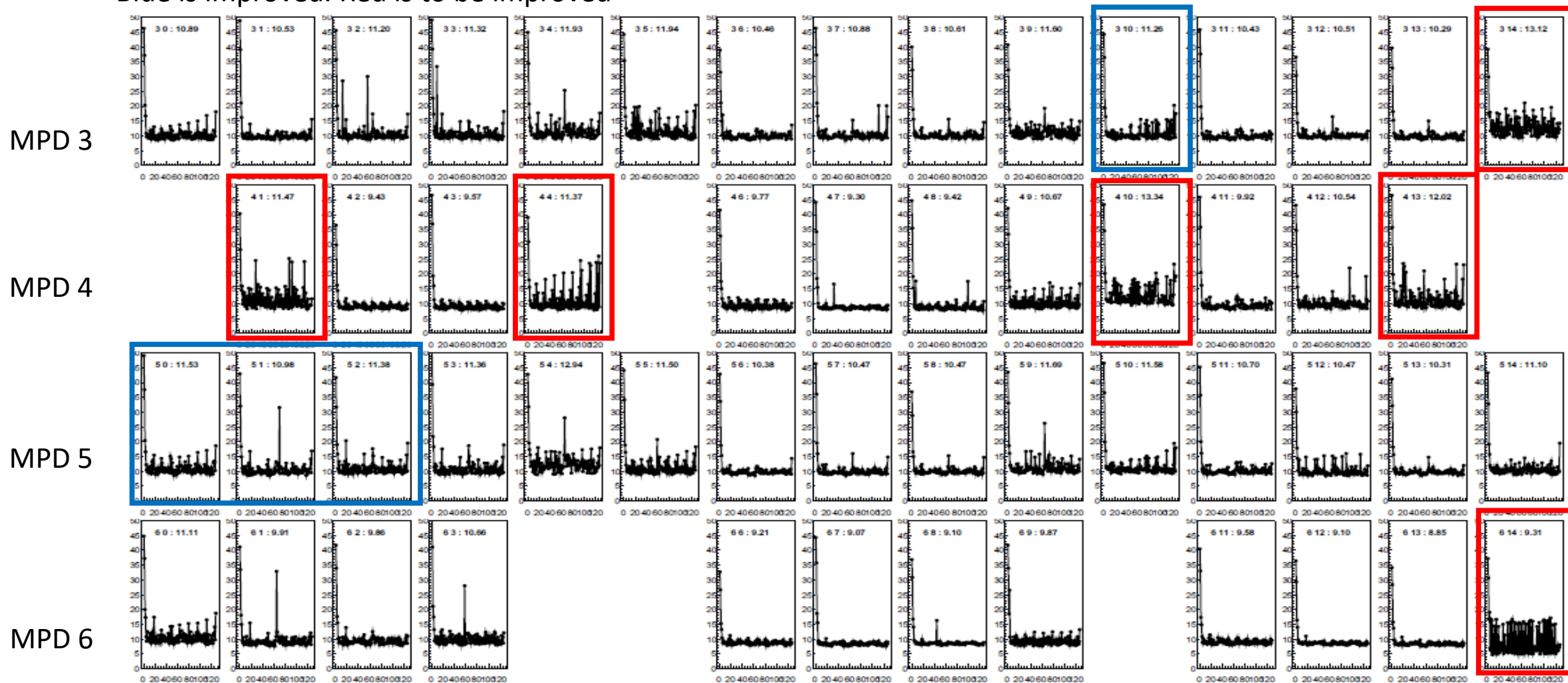


Top Track mount 2nd from the back left side with fasteners Jan. 14 2021

- Dec 17. all fasteners tight, Hall A Techs take frame to be welded
- Dec 23. frame returns with missing fasteners on just track mount on top 2nd from the back. All other fasteners there
- Jan 13. call Jessie and he is going to try and find old fasteners
- Jan 14. Have enough spare fasteners so put them on the BigBite GEM frame

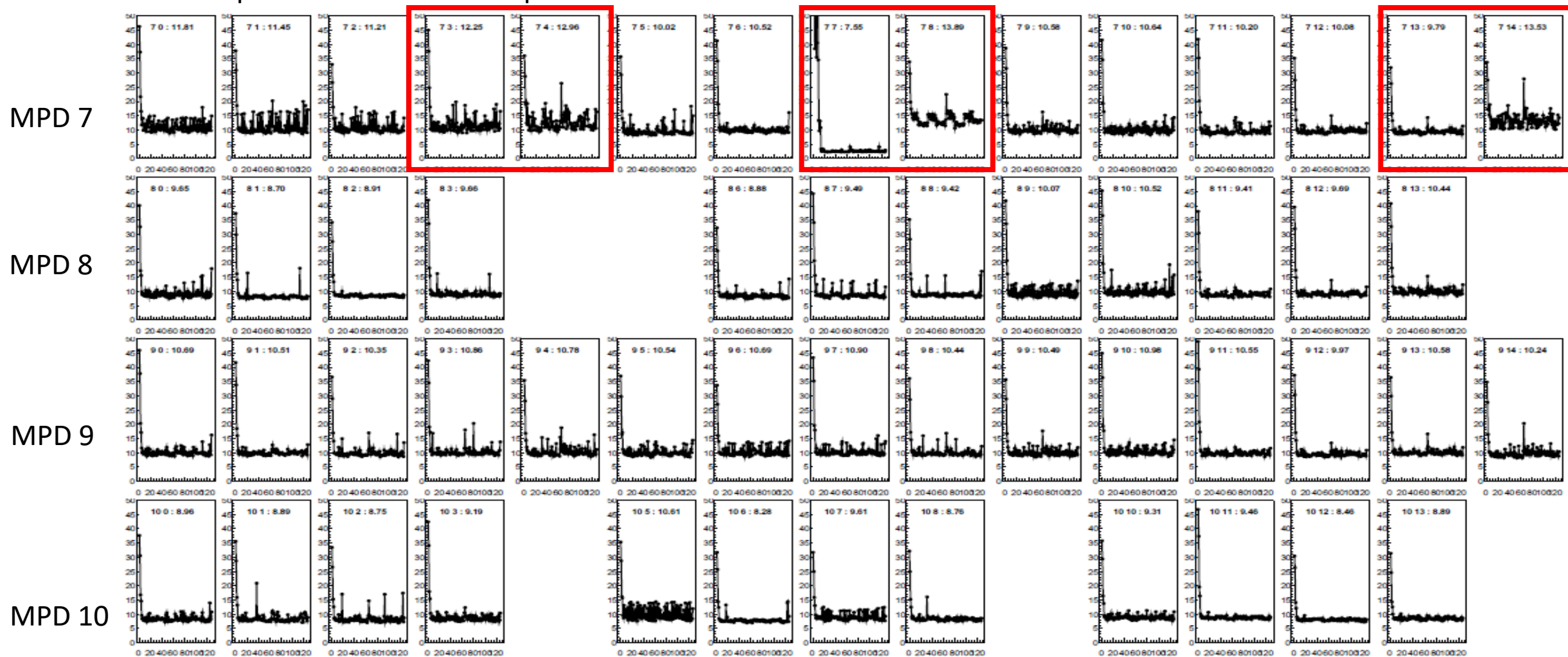
Pedestal RMS vs Channel #, Run 317 Jan 14, HV=0 V, N2 gas

- Plots for each APV card by MPD on Chamber J0.
- Blue is improved. Red is to be improved



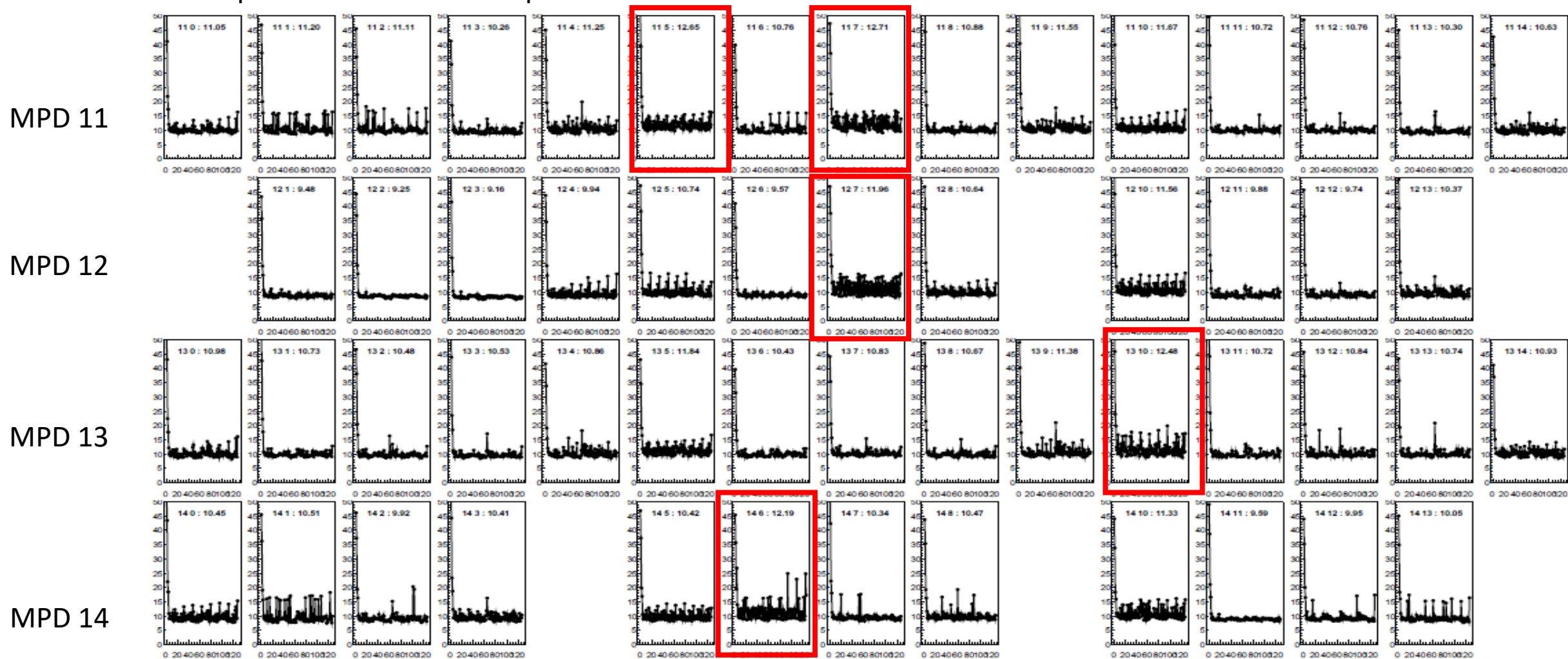
Pedestal RMS vs Channel #, Run 315 Jan 13, HV=0 V, N2 gas

- Plots for each APV card by MPD on Chamber J4.
- Blue is improved. Red is to be improved



Pedestal RMS vs Channel #, Run 315 Jan 13, HV=0 V, N2 gas

- Plots for each APV card by MPD on Chamber J2.
- Blue is improved. Red is to be improved

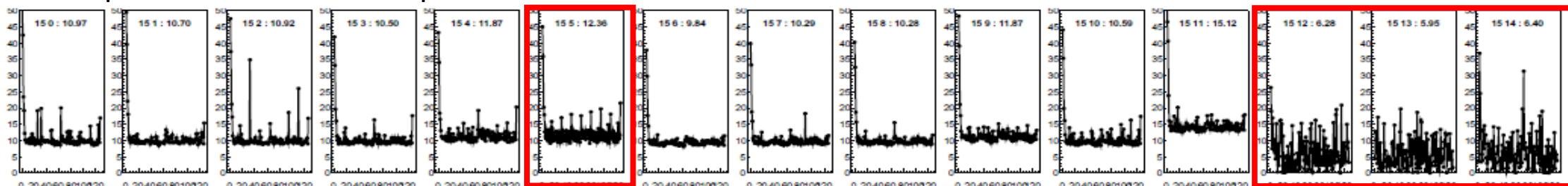


Pedestal RMS vs Channel #, Run 315 Jan 13, HV=0 V, N2 gas

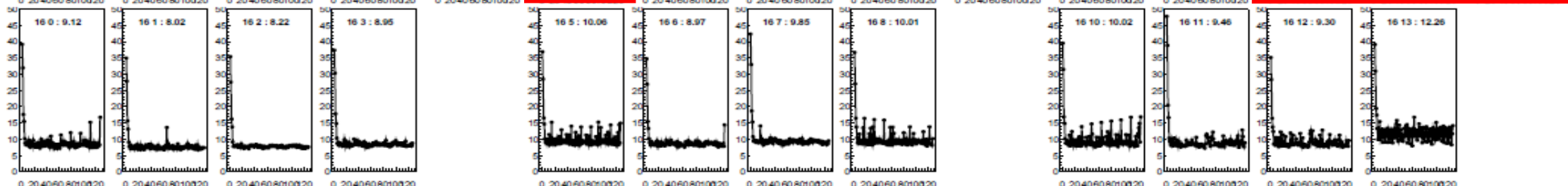
- Plots for each APV card by MPD on Chamber J3.

- Blue is improved. Red is to be improved

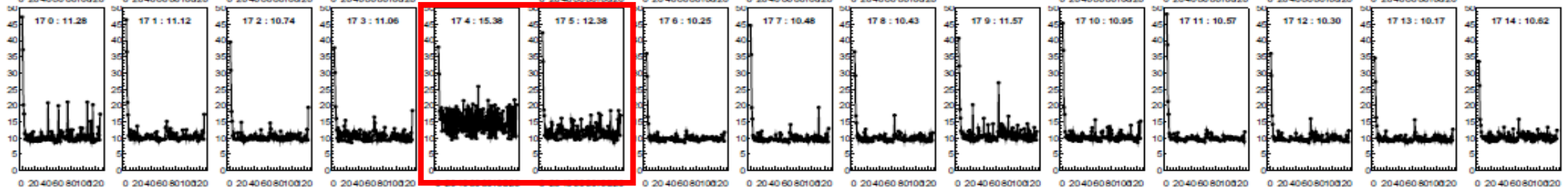
MPD 15



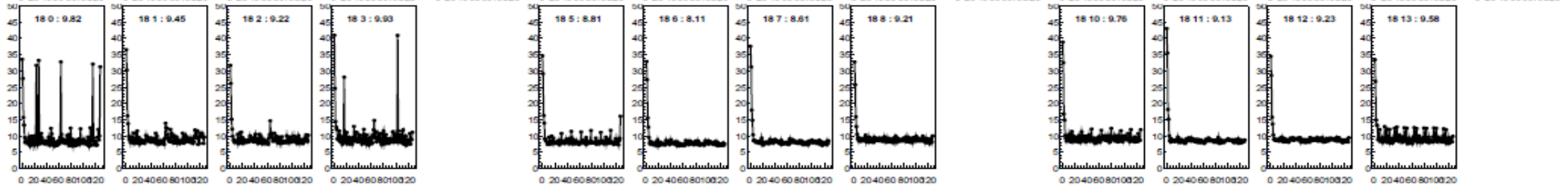
MPD 16



MPD 17



MPD 18



What to do next?

- GEM Chambers
 - Systematic reduction of noisy cards for all chambers, priority is J0 and J2. Based off of noise patterns we can determine how to alter hardware (APV connections, grounding, noisy sector of module).
 - Cosmic Run check and latency scan
- BigBite GEM Frame
 - Receive next set of drilled short pieces from Hall A staff.
 - Test UV GEM in BigBite frame.
 - Test realistic INFN chamber in BigBite frame.
 - Test $\frac{1}{4}$ " spacers on first position of BigBite frame.
 - Do some final checks and organize move to TEDF.
- Data Analysis:
 - Resolve issues with plot macro.
 - Understand Andrew's alignment process vs my own.