

INFN GEM Update:

1/27/21-2/3/21

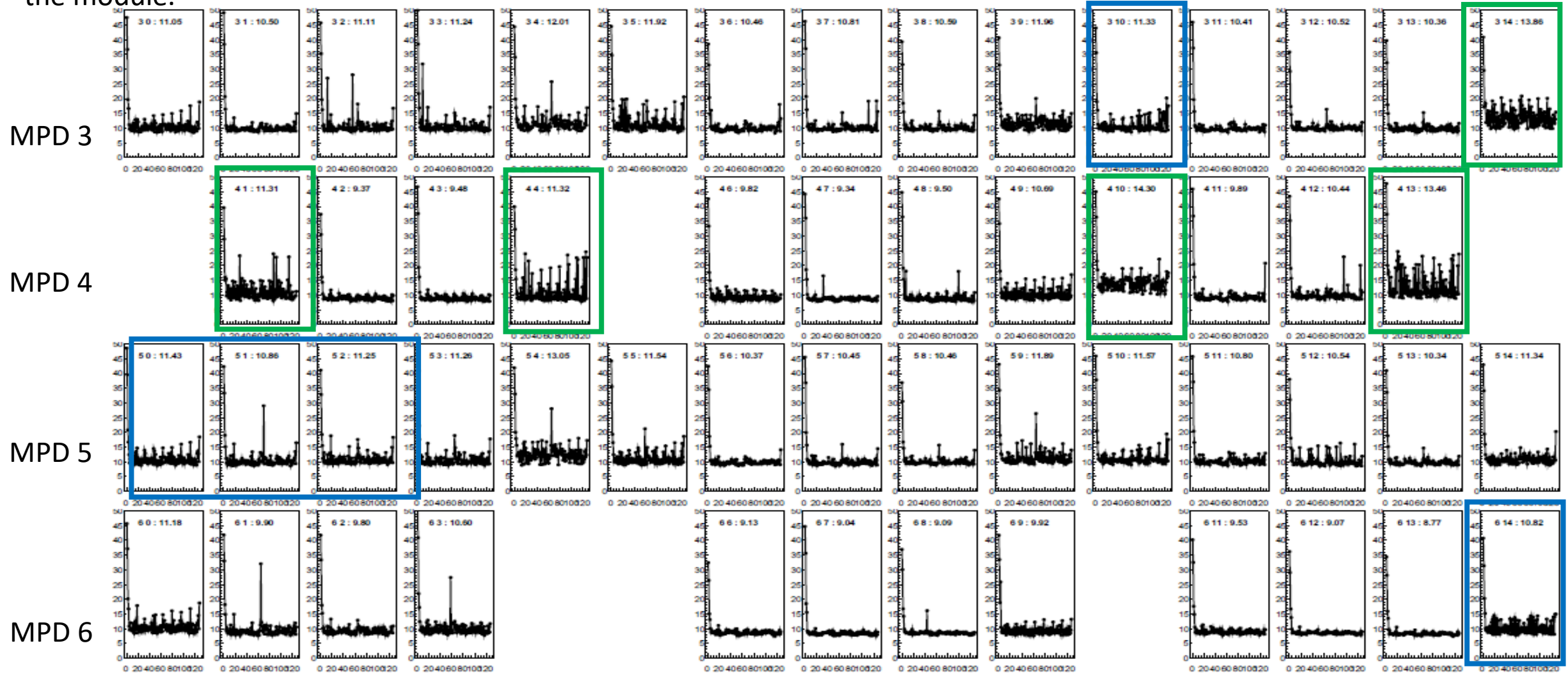
Ezekiel Wertz (onsite), Robert Perrino(remote), Evaristo Cisbani (remote), Holly Szumila-Vance (onsite), Chuck Long (onsite)

Recent Activities:

- Hardware (Jan. 27- Feb. 2)
 - Improved some noisy pedestal plots on chambers J0, J2, J3, and J4
 - Conducted multiple improvement methods for remaining noisy APV cards, remaining noisy cards are most likely a consequence of mismatched impedance or is inherent noise to modules. Current pedestal plots are considered acceptable.
 - Started inventorying electronics: APV cards, Backplanes, MPDs, etc
 - Temporarily resolved DAQ issues with MPDs 17 and 18 (<https://logbooks.jlab.org/entry/3865402>). Need to investigate source of problem.
 - Switched to AR/CO2 and ramped HV to 4000 V. Started taking cosmic data (final check before move for chambers J0,J2). Perform Latency scan on chamber J2.
- Analysis (Jan 29 – Feb. 2)
 - Finished adjusting presentation of Efficiency, Residual, and HV plots.

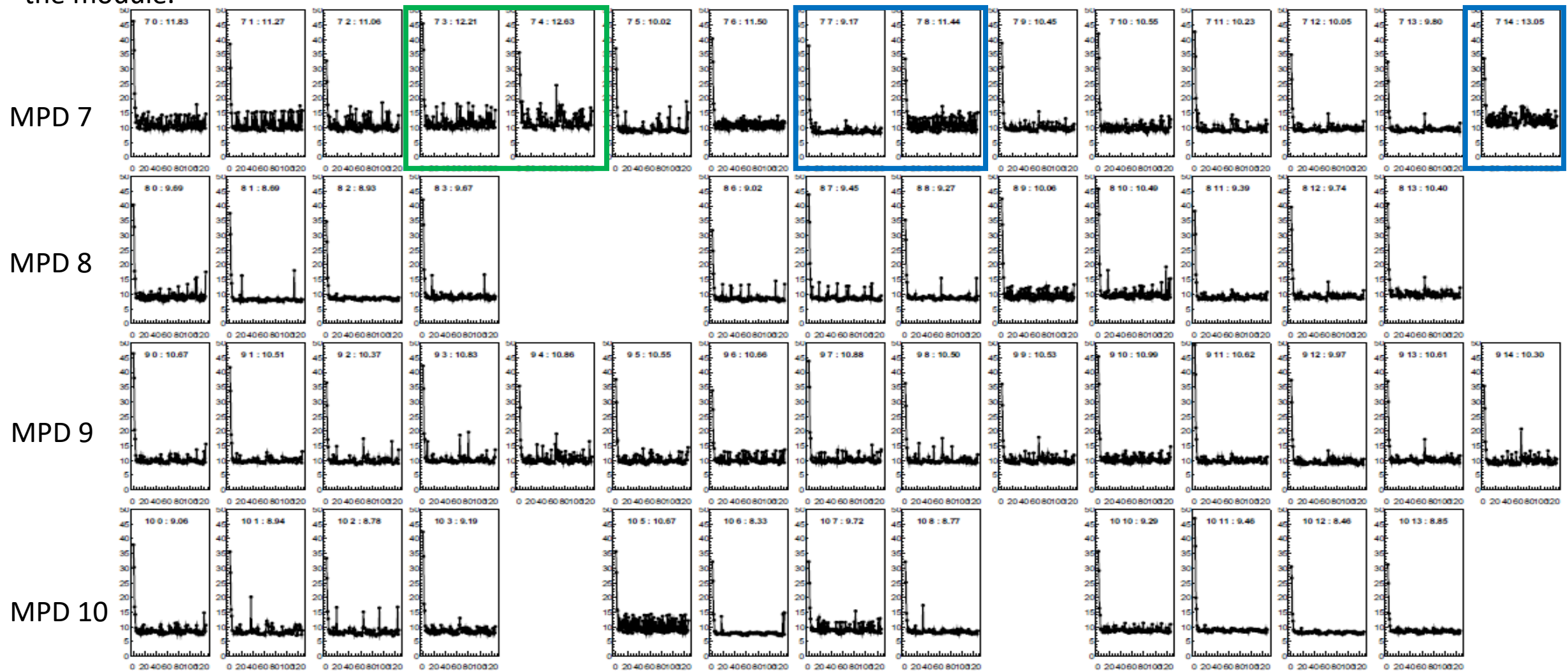
Pedestal RMS vs Channel #, Run 381 Feb 2, HV=0 V, N2 gas

- Plots for each APV card by MPD on Chamber J0.
- Blue is improved. Green is manipulated, but no improvement. Most likely due to impedance mismatch or noise inherent to the module.



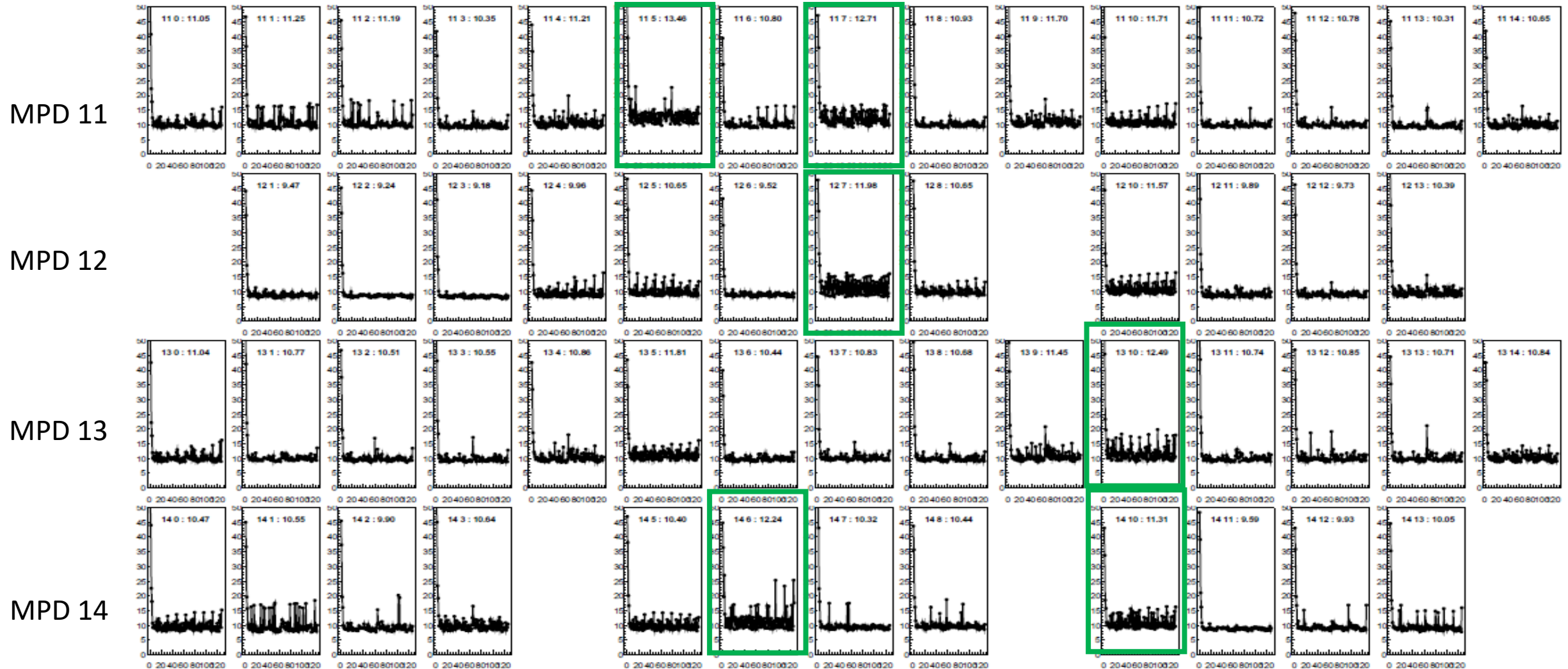
Pedestal RMS vs Channel #, Run 381 Feb 2, HV=0 V, N2 gas

- Plots for each APV card by MPD on Chamber J4.
- Blue is improved. Green is manipulated, but no improvement. Most likely due to impedance mismatch or noise inherent to the module.



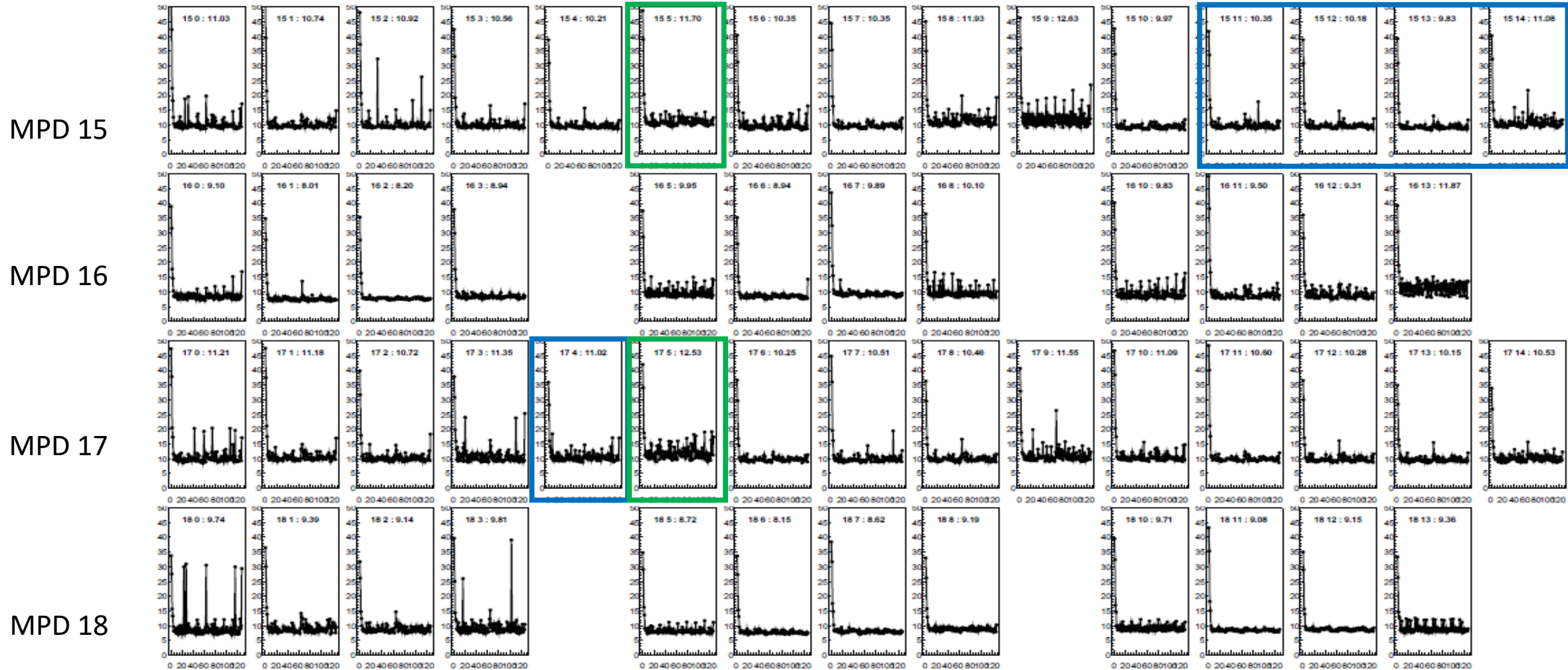
Pedestal RMS vs Channel #, Run 381 Feb 2, HV=0 V, N2 gas

- Plots for each APV card by MPD on Chamber J2.
- Blue is improved. Green is manipulated, but no improvement. Most likely due to impedance mismatch or noise inherent to the module.

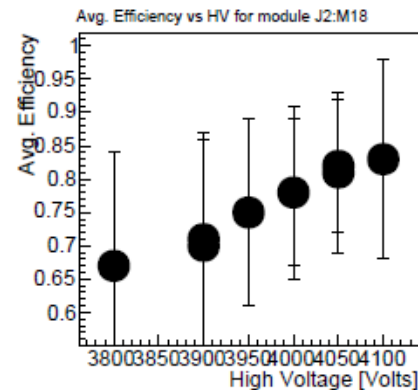
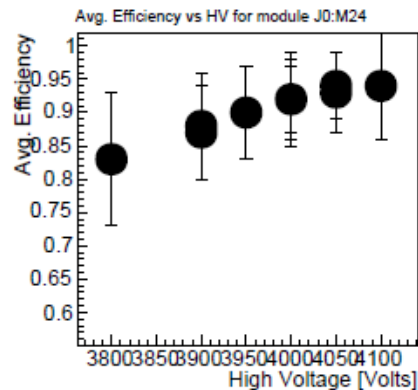
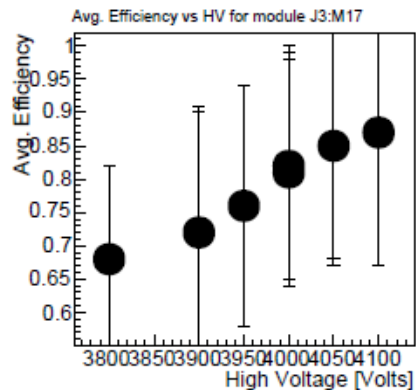
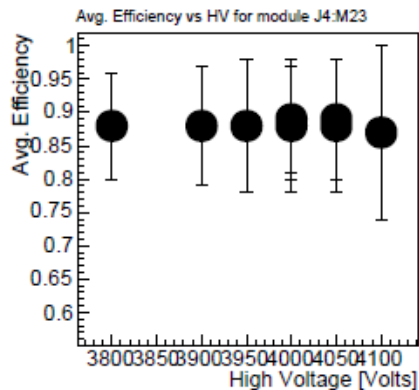
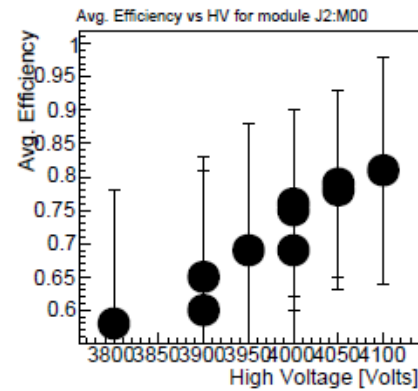
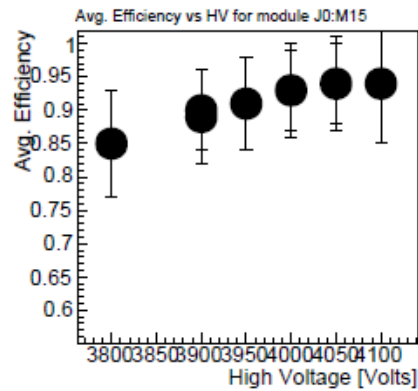
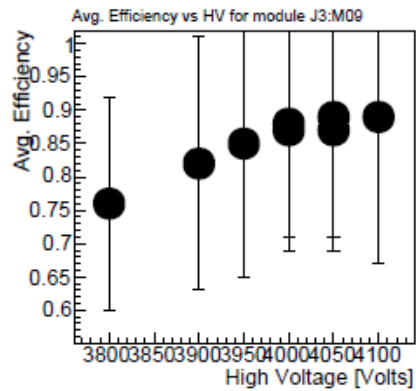
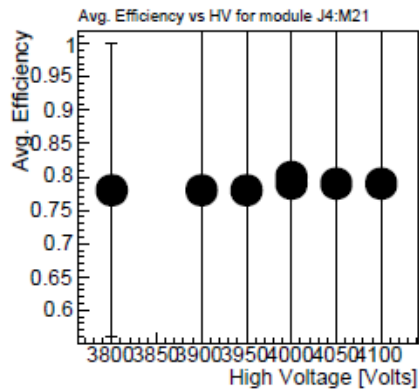
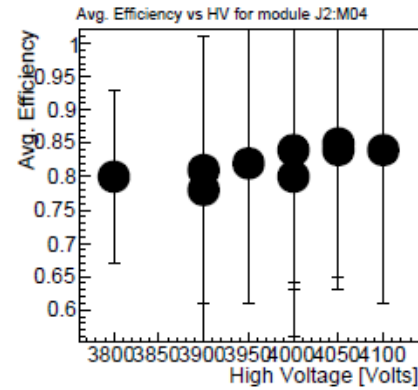
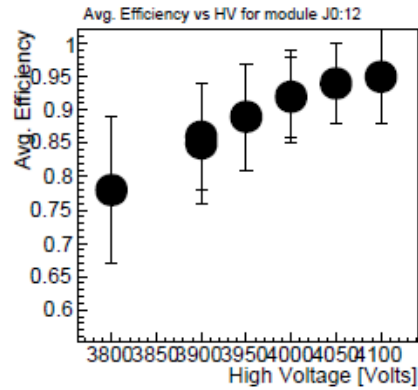
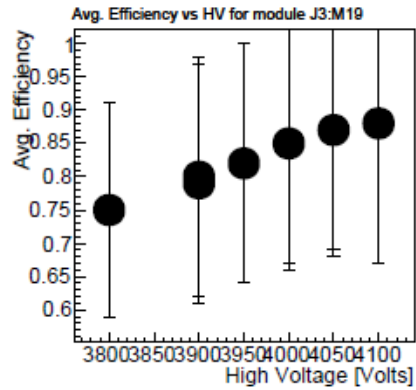
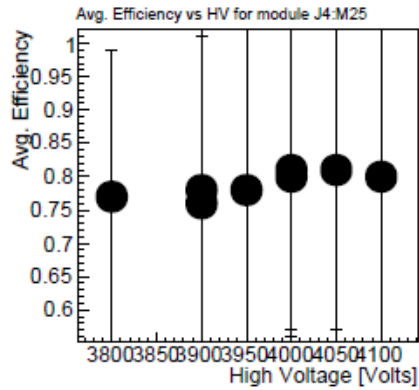


Pedestal RMS vs Channel #, Run 381 Feb 2, HV=0 V, N2 gas

- Plots for each APV card by MPD on Chamber J3.
- Blue is improved. Green is manipulated, but no improvement. Most likely due to impedance mismatch or noise inherent to the module.

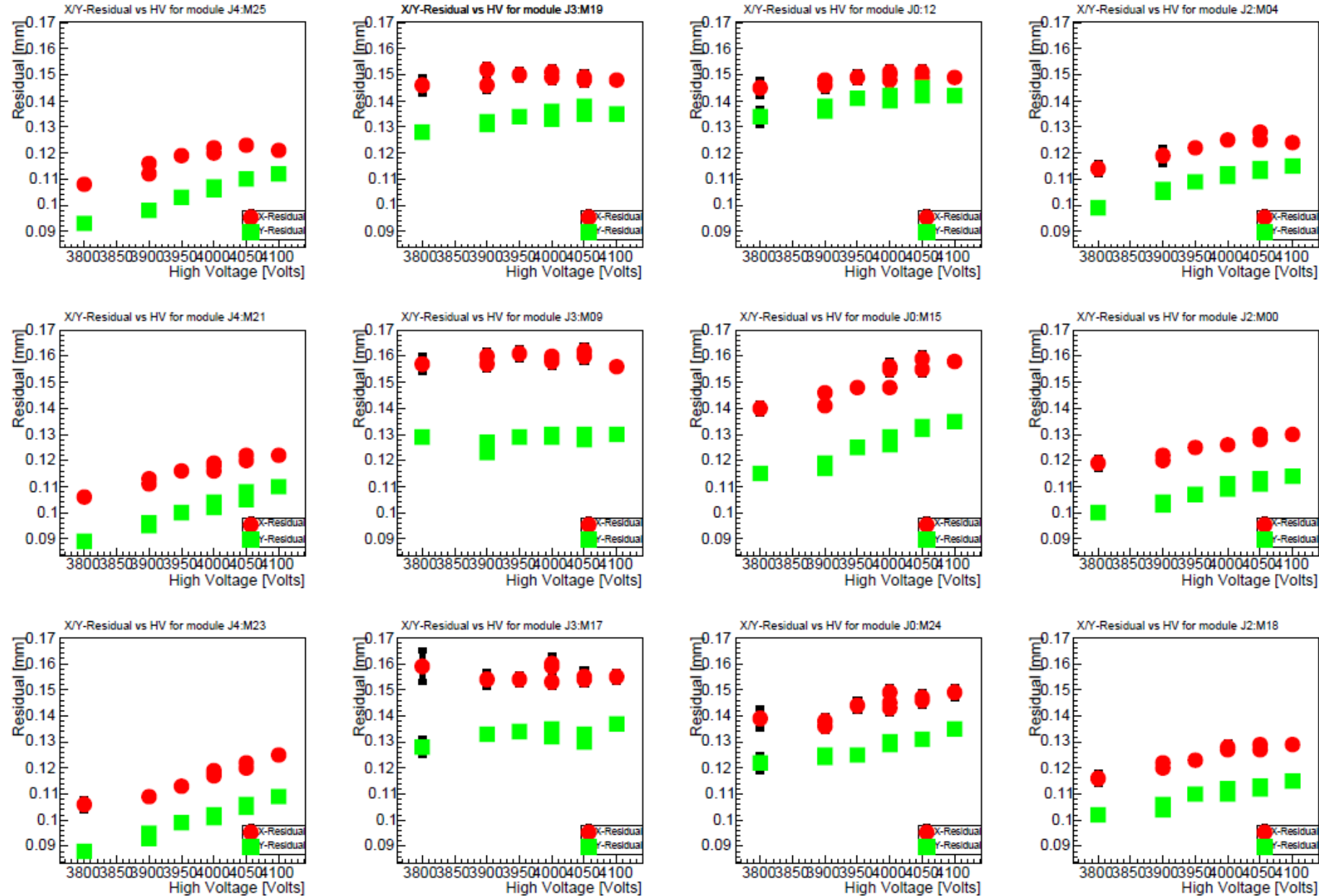


Avg. Efficiency vs HV



- Error bars represent the magnitude of variation of the efficiency per module. For chamber J4, plots are flat which is not normal
- Chamber J2 has an incorrect latency

X/Y Residual vs HV



- Data points are almost horizontal, which is what we expect.

What to do next?

- GEM Chambers
 - Cosmic Run check and latency scan
 - If cosmic data is good, prepare TEDF for moving of 2 GEM chambers: J0 and J2
- BigBite GEM Frame
 - Test $\frac{1}{4}$ " spacers on first position of BigBite frame.
 - Coordinate move of frame to TEDF with Jessie and Hall A Techs Wednesday (2/3)
 - Vertically test GEM frames and realistic chamber, before moving chambers
- Data Analysis:
 - Analyze recent cosmic data
 - Understand Andrew's alignment process vs my own.