

RICH-1 Planning and updates

Chandradoy Chatterjee

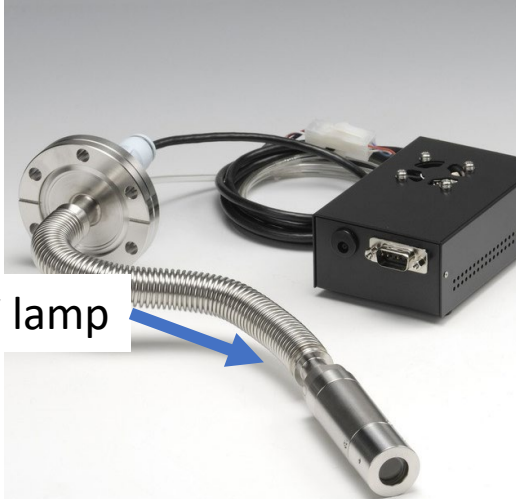
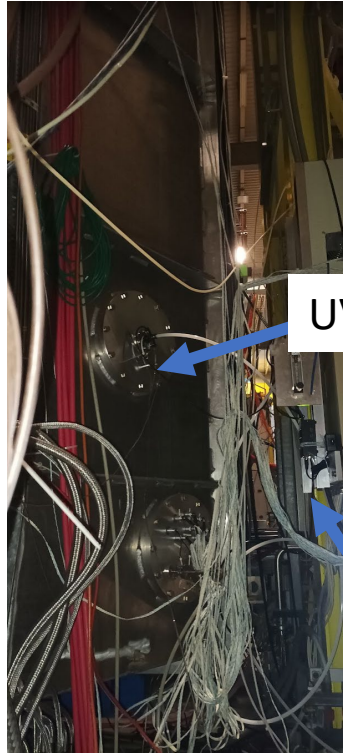
On Behalf of COMPASS Trieste RICH group



Activities to update

- 1)The Installation of the deuterium lamp
- 2)Radiator gas cleaning
- 3)Missing sectors in the top hybrid photon detectors.
- 4)Miscellaneous interventions foreseen in coming days.

Installation of UV light in RICH flange

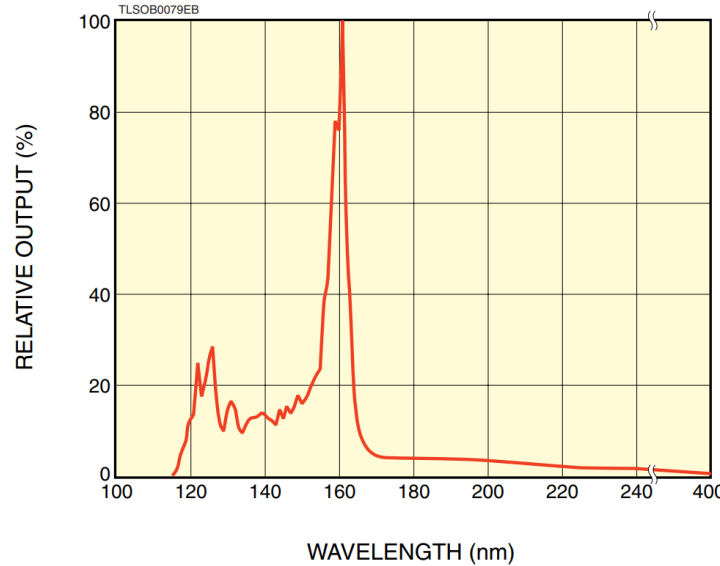


UV lamp

Power

HAMAMATSU L10706 S2D2 VUV LIGHT SOURCE UNIT

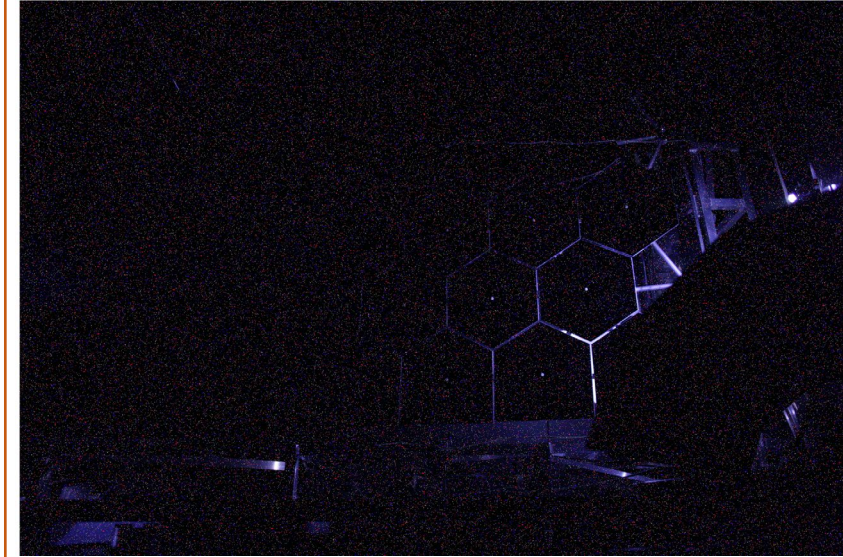
SPECTRAL DISTRIBUTION AT INITIAL LIGHTING (VUV region)



- ❖ Spectral Distribution : 115 to 400 nm (peak at ~160 nm)
- ❖ Acceptance +- 7.5 degrees
- ❖ Air Cooled (N2 flow is ensured)
- ❖ Continuous light source
- ❖ Guaranteed life (230 nm) 1 Kh

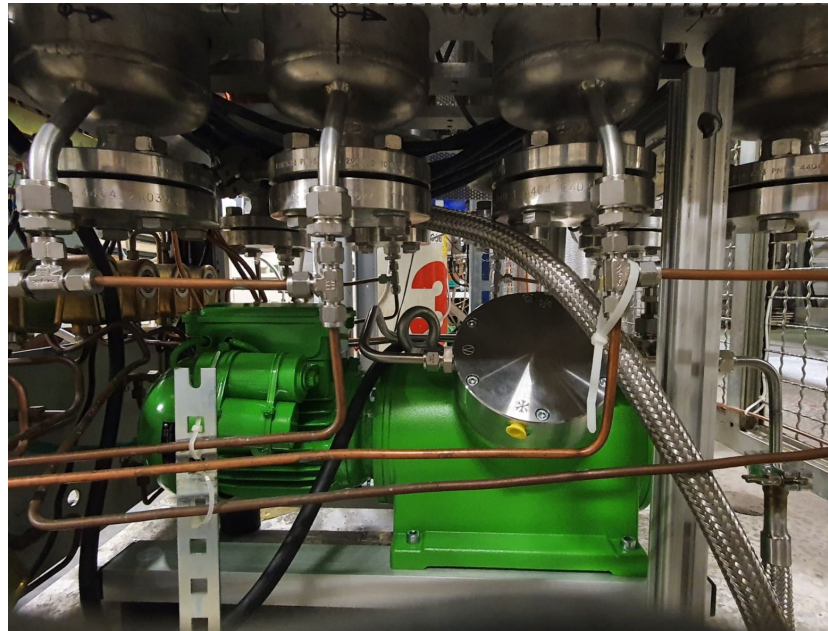
Further technical details:
https://www.hamamatsu.com/content/dam/hamamatsu-photonics/sites/documents/99_SALES_LIBRARY/etd/L10706_TLSZ1001E.pdf

Images taken with CLAM (1000 ISO, Highest Aperture 30s exposure)

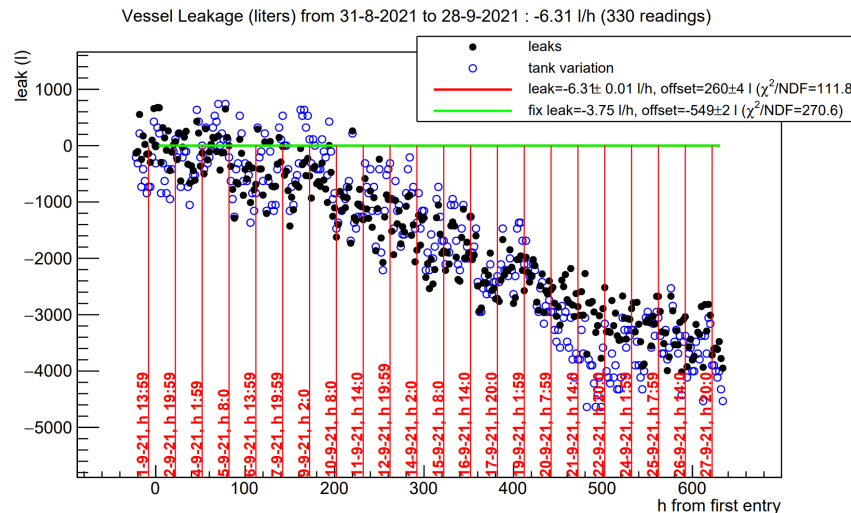


- The lens (Camera) cuts off wavelength at ~350 nm.
- Bottom detectors are more illuminated compared to the top ones.
- With available Ar:CO2 studies are foreseen.
- Data acquisition is yet to be understood.

Radiator Gas Cleaning



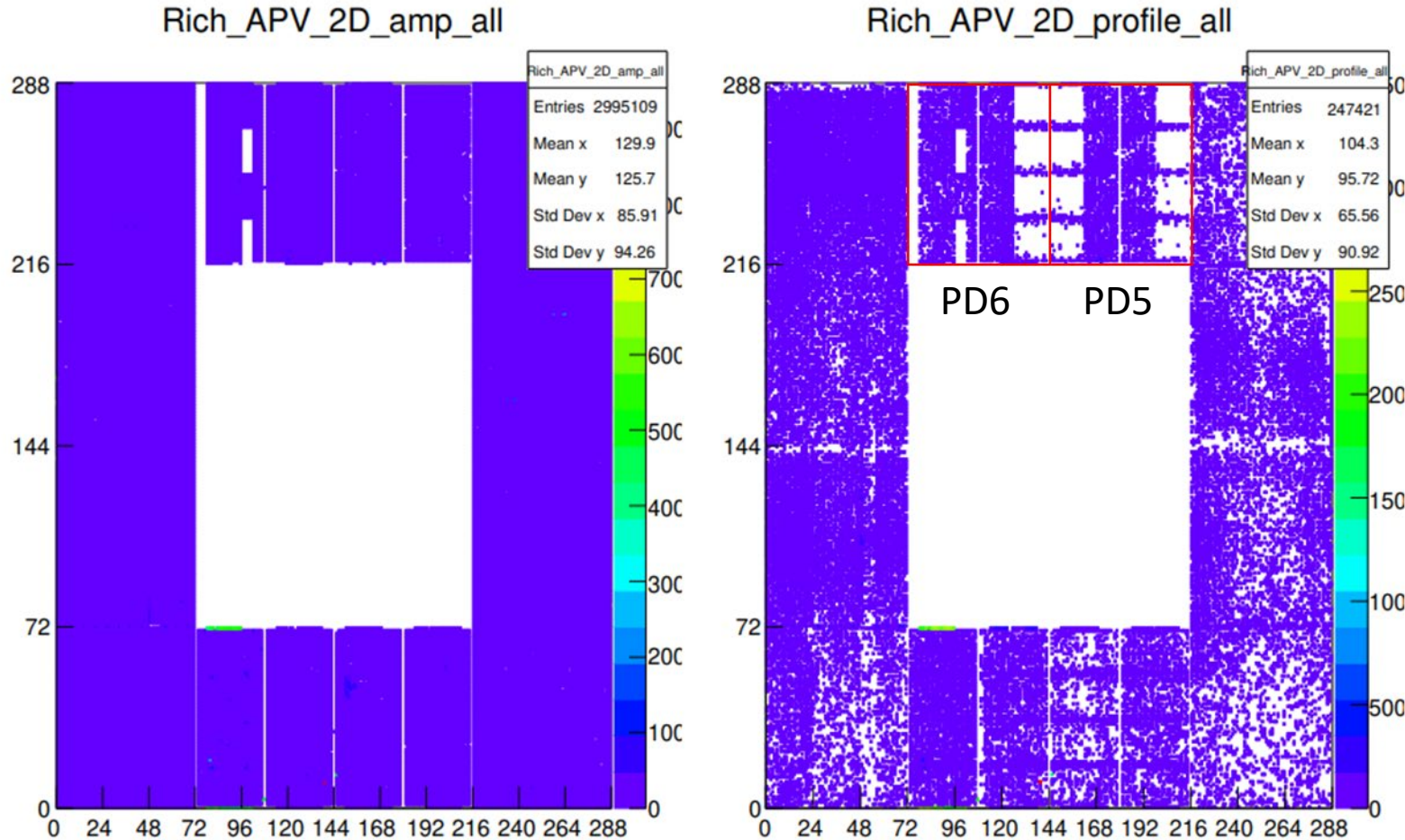
- ❑ New pumps for the precleaning. “Identical” to the old ones. Old ones are exhausted.
- ❑ Gas cleaning expected to start → End of February/Beginning of March.
- ❑ 2021 Status → We have cleaned and transferred 463 kg out of 606 kg of C4F10 (eff = 76.5%). We procured 630 kg.
 - From LHCb we had cleaned 154 kg (with 89% efficiency).
 - We had ~620 kg at our disposal.



- ❑ Loss due to leak (600 h) ~3600 l → 40 kg.
- ❑ Gas will be cleaned in 2022 → ~ half ton (LHCb) received about 350 kg to be cleaned → Sufficient for the run

Missing Sectors of the top hybrid detectors

Run 292808 Canvas_Rich_Apv_occupancies: APV4RICH_occupancies.cfg - Page 2 (14048 evts) Fri Oct 1 00:20:31 2021

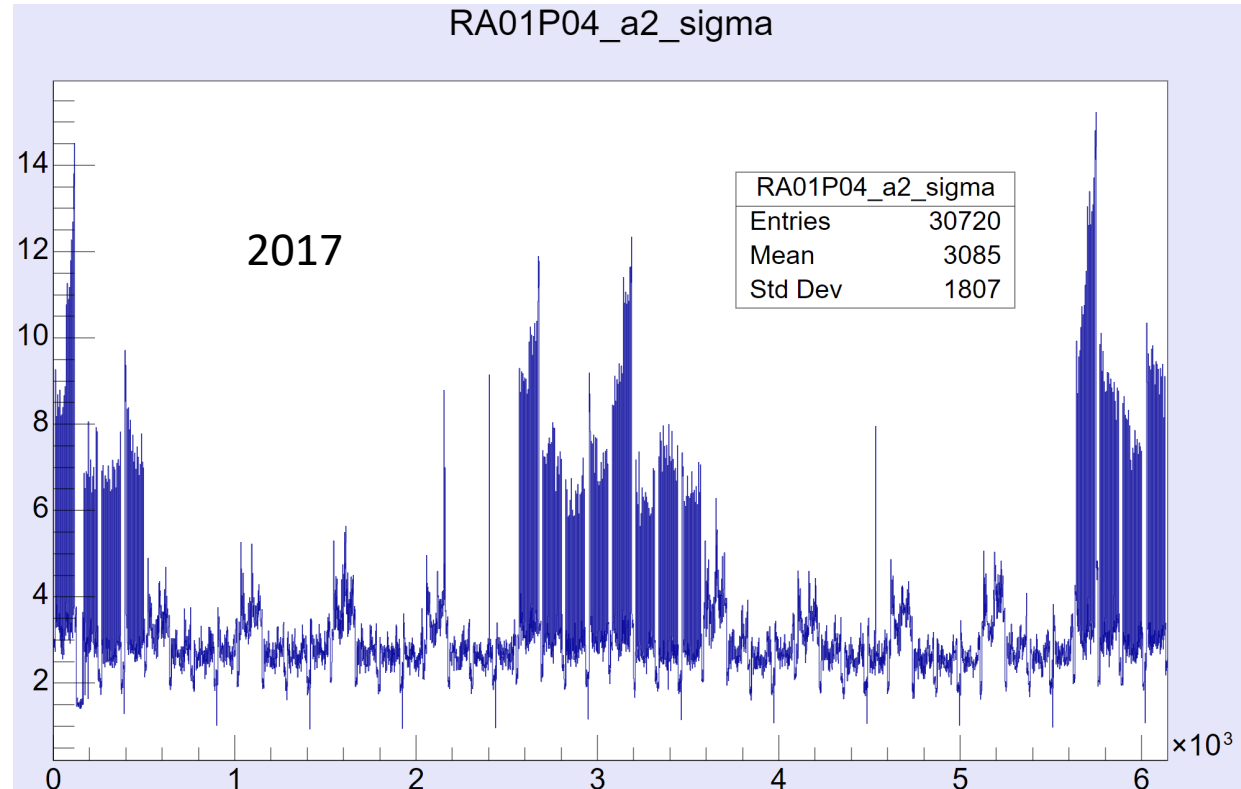
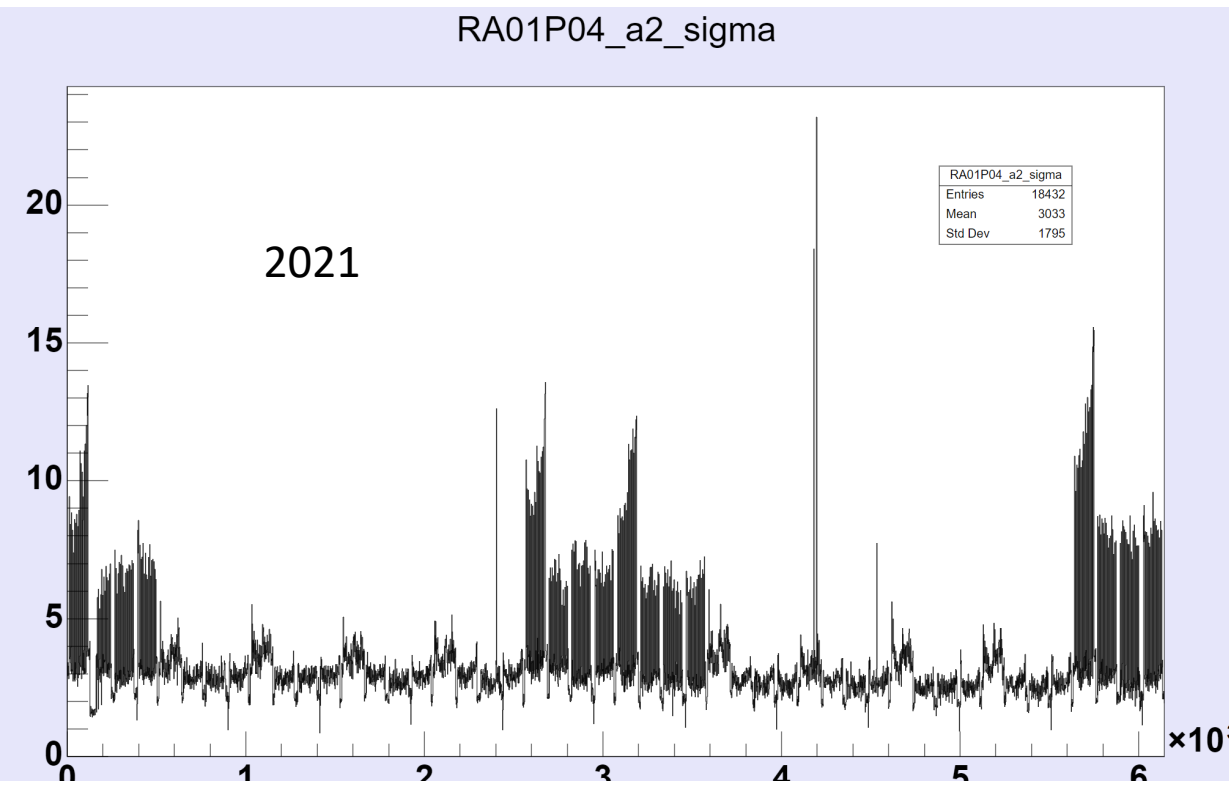


- The mechanical structures are visible (This have been observed in old data). Detailed studies were made on this feature.
- The missing parts matches with the voltage sectors.
- Pathologies have not been observed in data.
- Possible hypothesis are floating, interventions are foreseen once we locate the origin of the problem.

J U R A												S A L E V E																																			
548 RA01P00a				548 RA01P00b				548 RA01P00c				547 RA01H02a				547 RA01H02b				547 RA01H02c				547 RA01H04a				547 RA01H04b				547 RA01H04c				546 RA01P06a				546 RA01P06b				546 RA01P06c			
0	4	8	12	0	4	8	12	0	4	8	12	0	4	8	12	0	4	8	12	0	4	8	12	0	4	8	12	0	4	8	12	0	4	8	12	0	4	8	12								
0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38								
1	5	9	13	1	5	9	13	1	5	9	13	1	5	9	13	1	5	9	13	1	5	9	13	1	5	9	13	1	5	9	13	1	5	9	13	1	5	9	13								
0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a								
2	6	10	14	2	6	10	14	2	6	10	14	2	6	10	14	2	6	10	14	2	6	10	14	2	6	10	14	2	6	10	14	2	6	10	14	2	6	10	14								
0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c								
3	7	11	15	3	7	11	15	3	7	11	15	3	7	11	15	3	7	11	15	3	7	11	15	3	7	11	15	3	7	11	15	3	7	11	15	3	7	11	15								
0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e								
548 RA01P01c				548 RA01P01b				548 RA01P01a																546 RA01P07c				546 RA01P07b				546 RA01P07a															
3	7	11	15	3	7	11	15	3	7	11	15													3	7	11	15	3	7	11	15	3	7	11	15												
0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e													0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e												
2	6	10	14	2	6	10	14	2	6	10	14													2	6	10	14	2	6	10	14	2	6	10	14												
0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c													0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c												
1	5	9	13	1	5	9	13	1	5	9	13													1	5	9	13	1	5	9	13	1	5	9	13												
0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a													0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a												
0	4	8	12	0	4	8	12	0	4	8	12													0	4	8	12	0	4	8	12	0	4	8	12												
0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38													0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38												
550				550				550				550				550				549				549				549				548				547				546							
3	7	11	15	3	7	11	15	3	7	11	15	3	7	11	15	3	7	11	15	3	7	11	15	3	7	11	15	3	7	11	15	3	7	11	15	3	7	11	15								
0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e	0x26	0x2e	0x36	0x3e								
2	6	10	14	2	6	10	14	2	6	10	14	2	6	10	14	2	6	10	14	2	6	10	14	2	6	10	14	2	6	10	14	2	6	10	14	2	6	10	14								
0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c	0x24	0x2c	0x34	0x3c								
1	5	9	13	1	5	9	13	1	5	9	13	1	5	9	13	1	5	9	13	1	5	9	13	1	5	9	13	1	5	9	13	1	5	9	13	1	5	9	13								
0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a	0x22	0x2a	0x32	0x3a								
0	4	8	12	0	4	8	12	0	4	8	12	0	4	8	12	0	4	8	12	0	4	8	12	0	4	8	12	0	4	8	12	0	4	8	12	0	4	8	12								
0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38	0x20	0x28	0x30	0x38								
RA01P09c				RA01P09b				RA01P09a				RA01H11c				RA01H11b				RA01H11a				RA01H13c				RA01H13b				RA01H13a				RA01P15c				RA01P15b				RA01P15a			
550				549				549				550				550				550				549				549				549				548				547				546			

4*108 = 432 *4(FEEs) = 1728 are channels → active pads. → These 4 FEEs are connected to one ADC via a splitter. Each detector has 3 Splitters → Each Attached to 1 ADC. Therefore, any problem (say thresholding) will affect around 1/3rd of the detector.

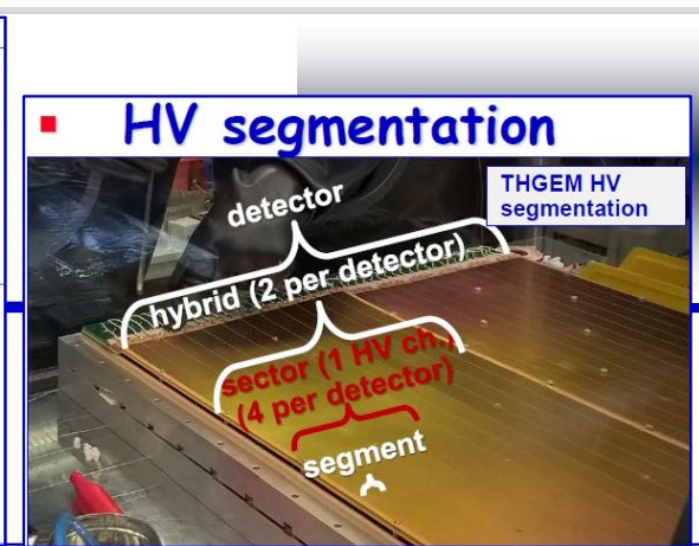
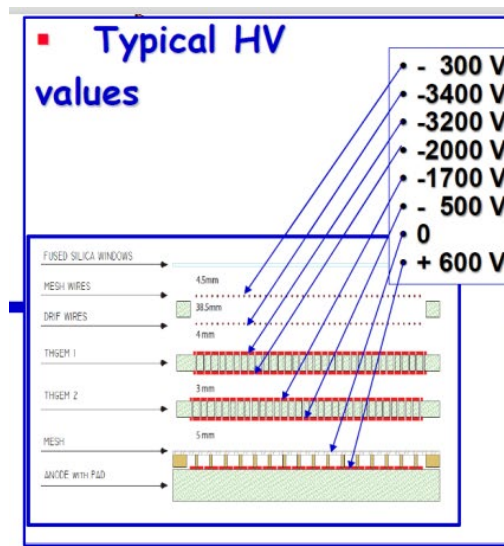
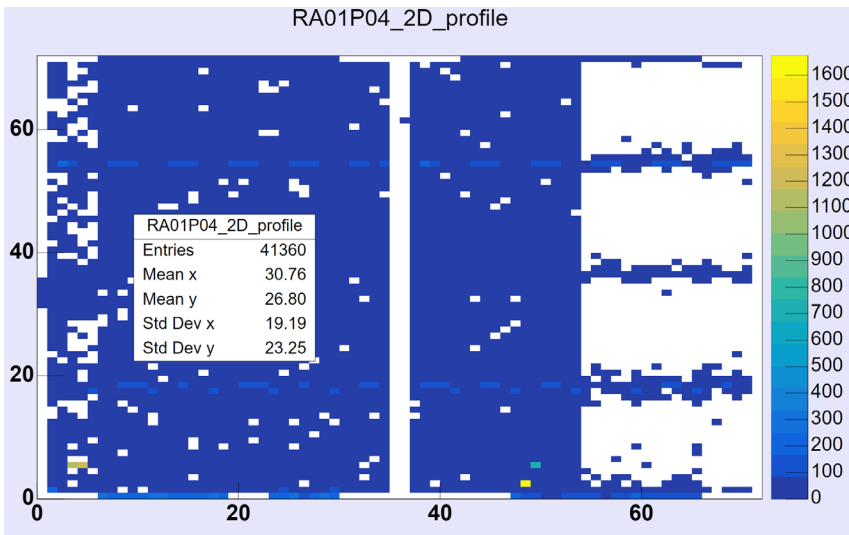
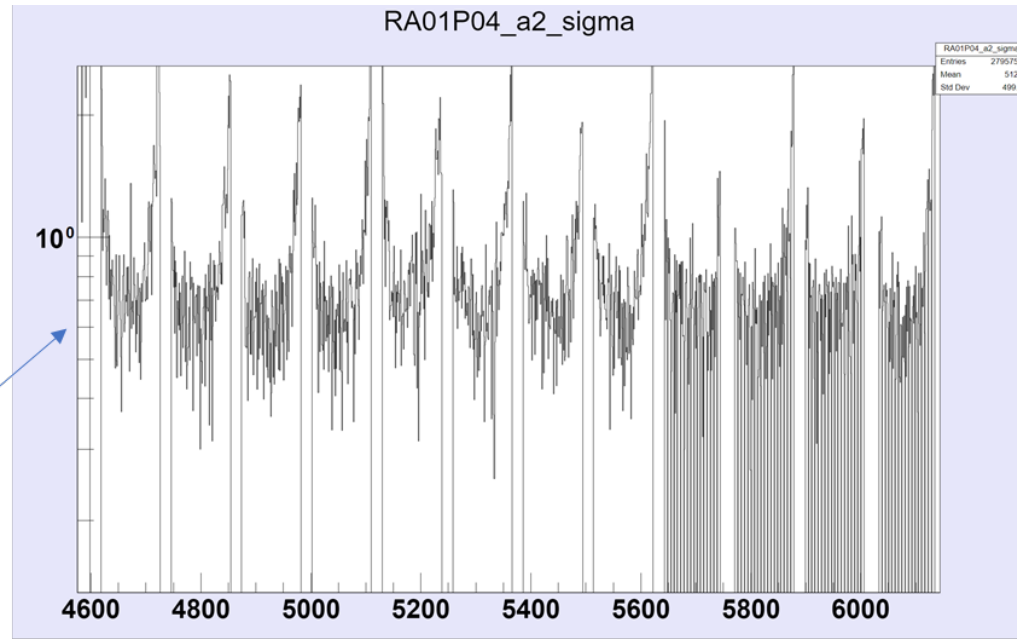
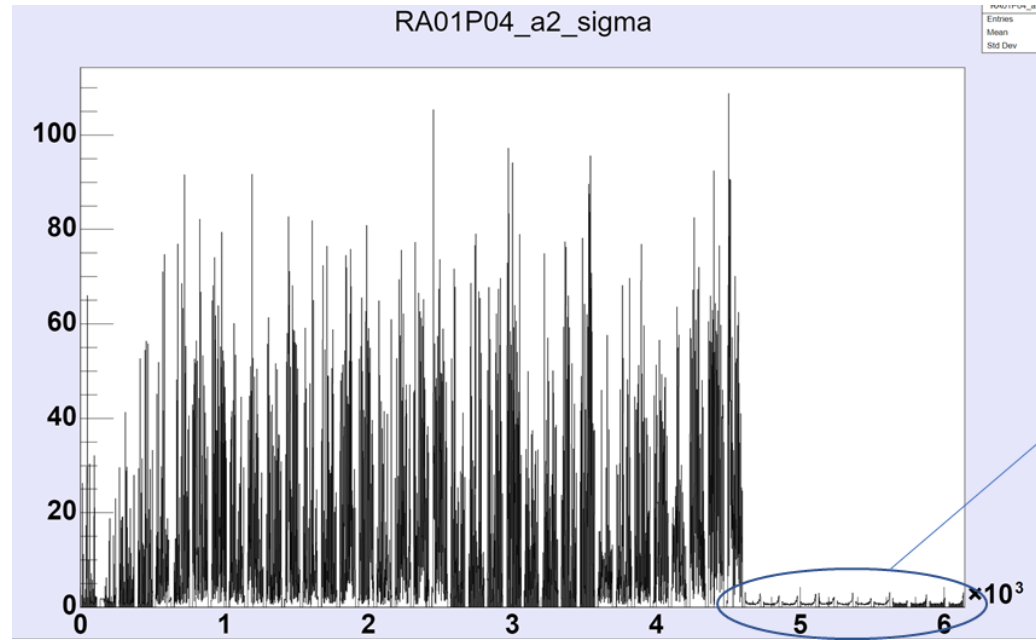
Pedestal Run (2021 and 2017)

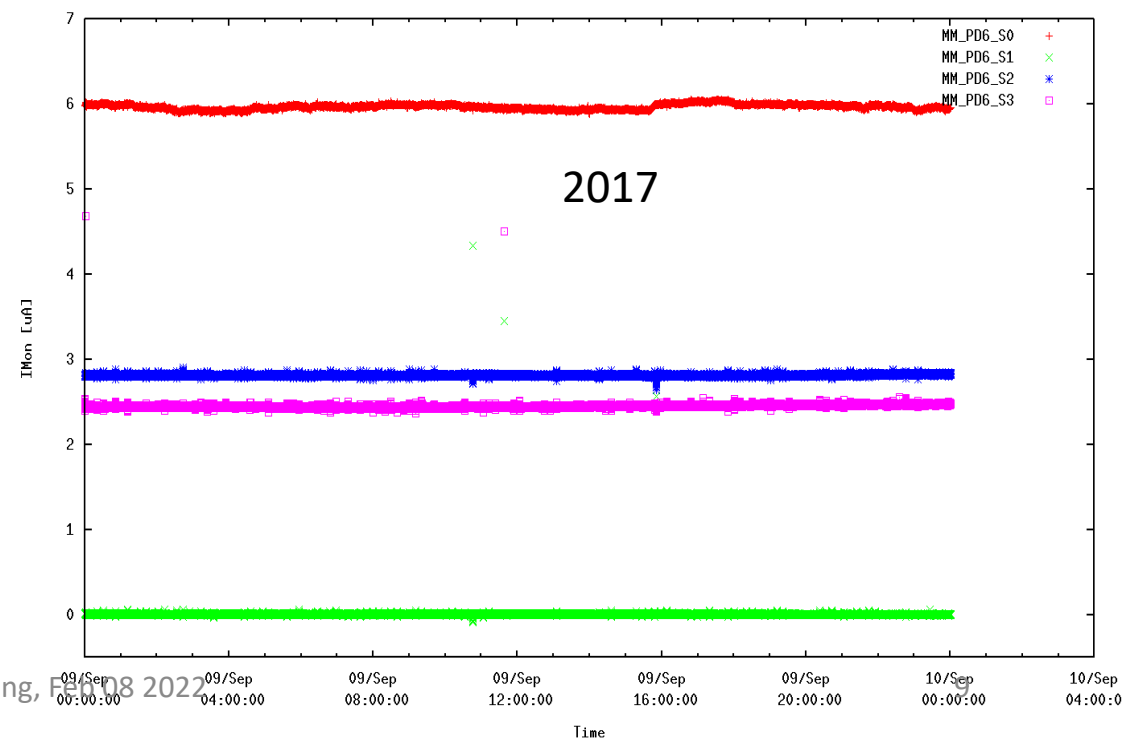
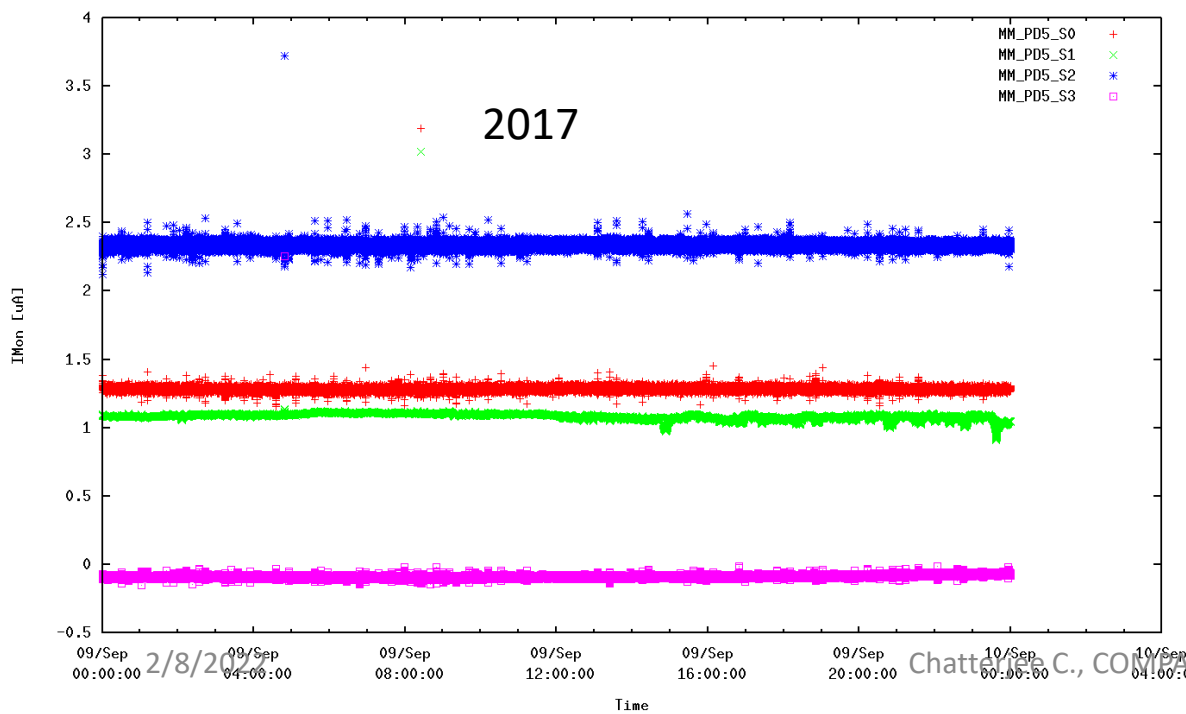
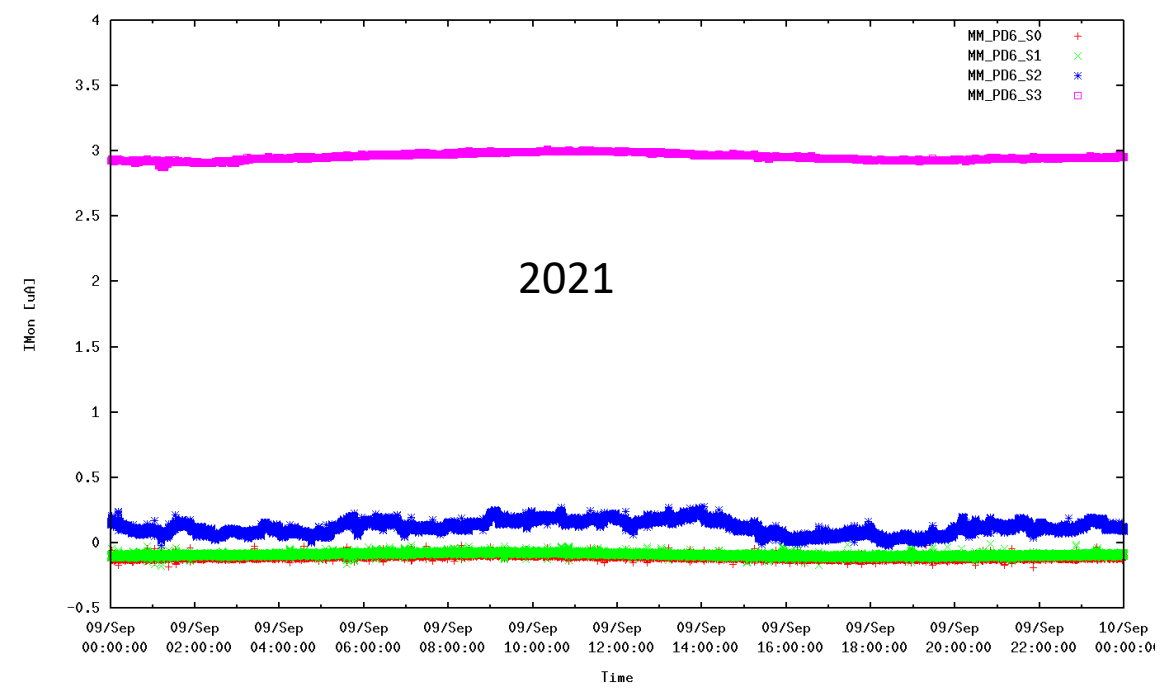
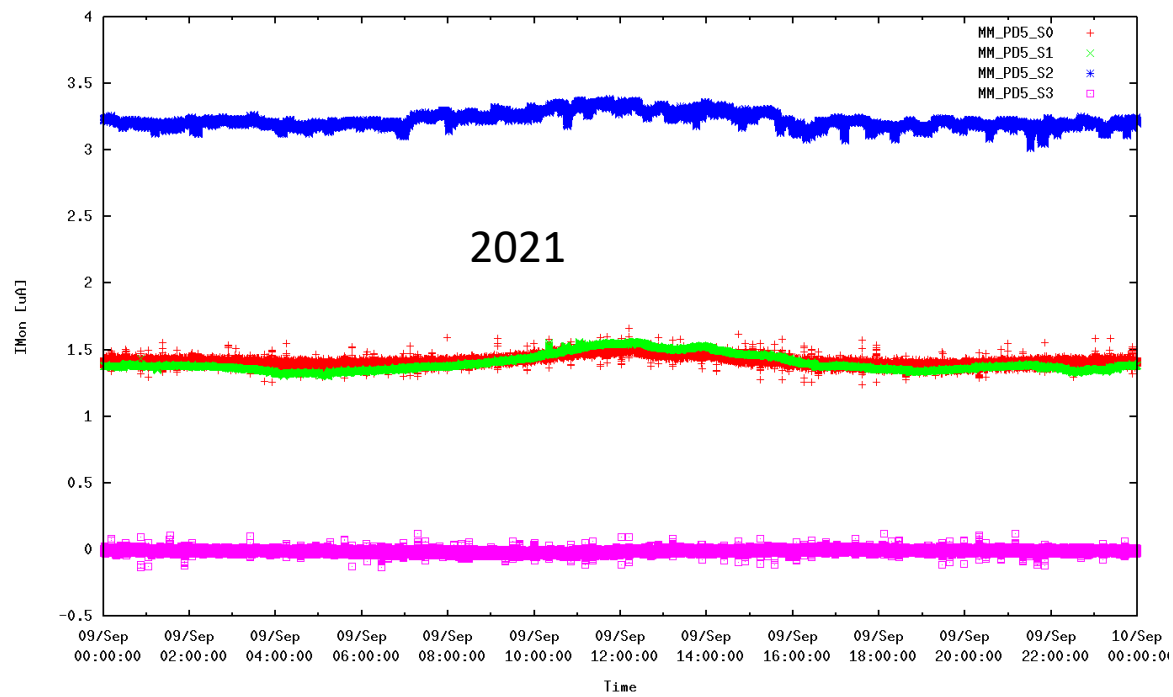


NO PATHOLOGY AS SUCH!!

Checked the ratio plot. **2021 is better than 2017** → in terms of noise control.

Run 292092 → Physics Run (10% APV header error → 547 (19%))





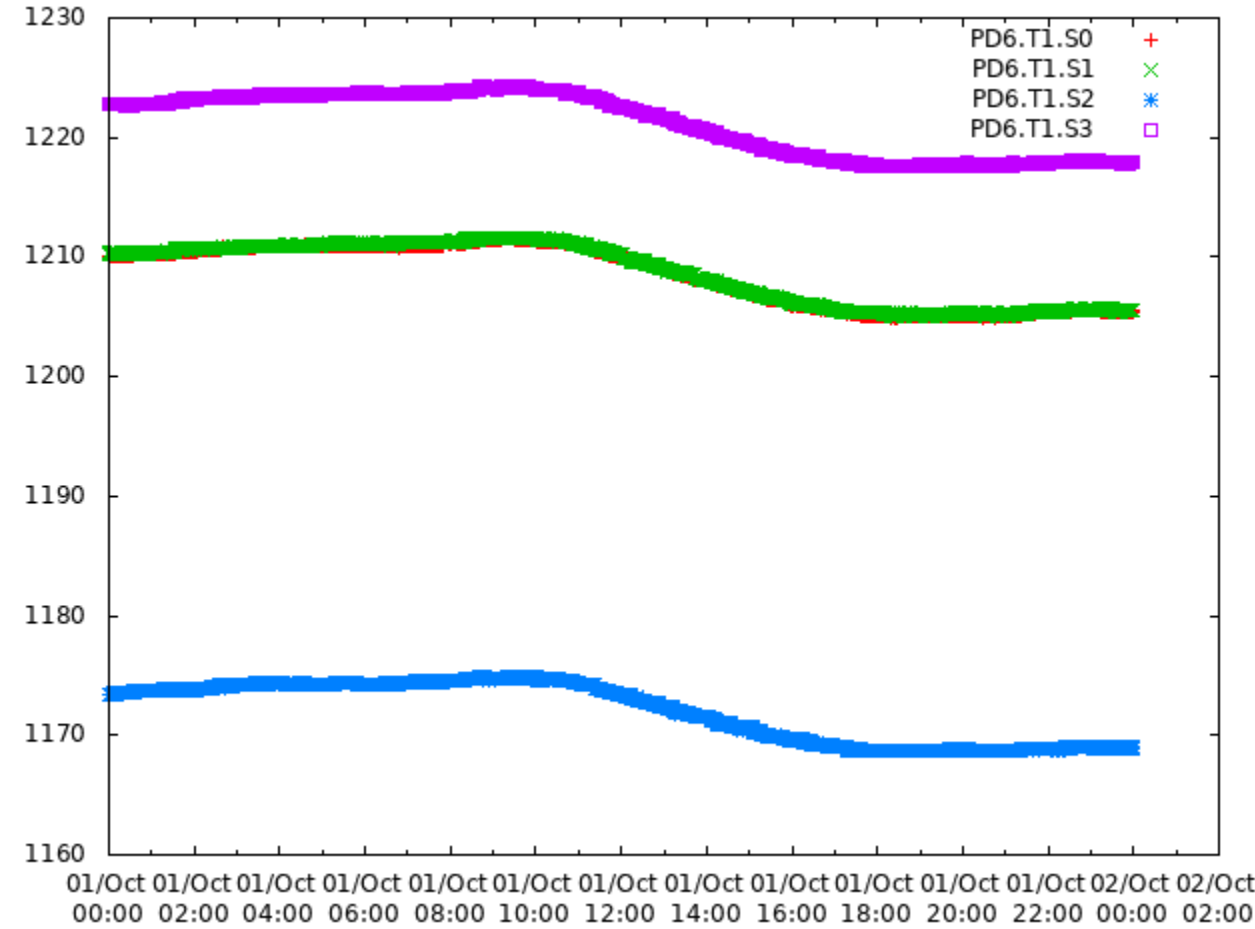
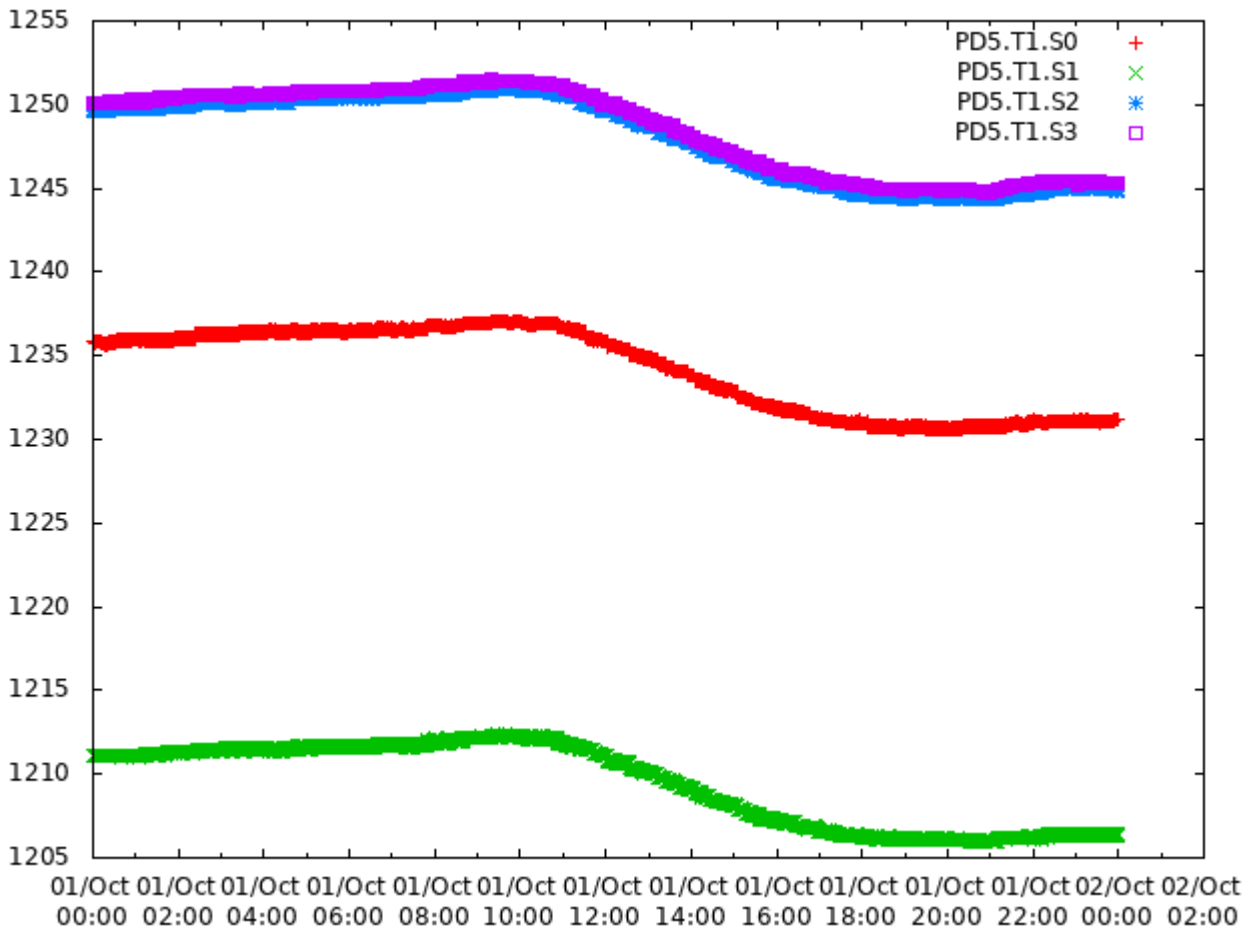
Miscellaneous Upcoming Interventions:

- Requalify the 3M storage tank → buffer in the gas system.
- Connect the LV power supplies for the upper PMTs.
- Connect the Rpi → Temperature Pressure control for the MWPC detectors.
- Putting the CLAM system in full operation.
- Replacement of UPS of the RICH-1 PLC.

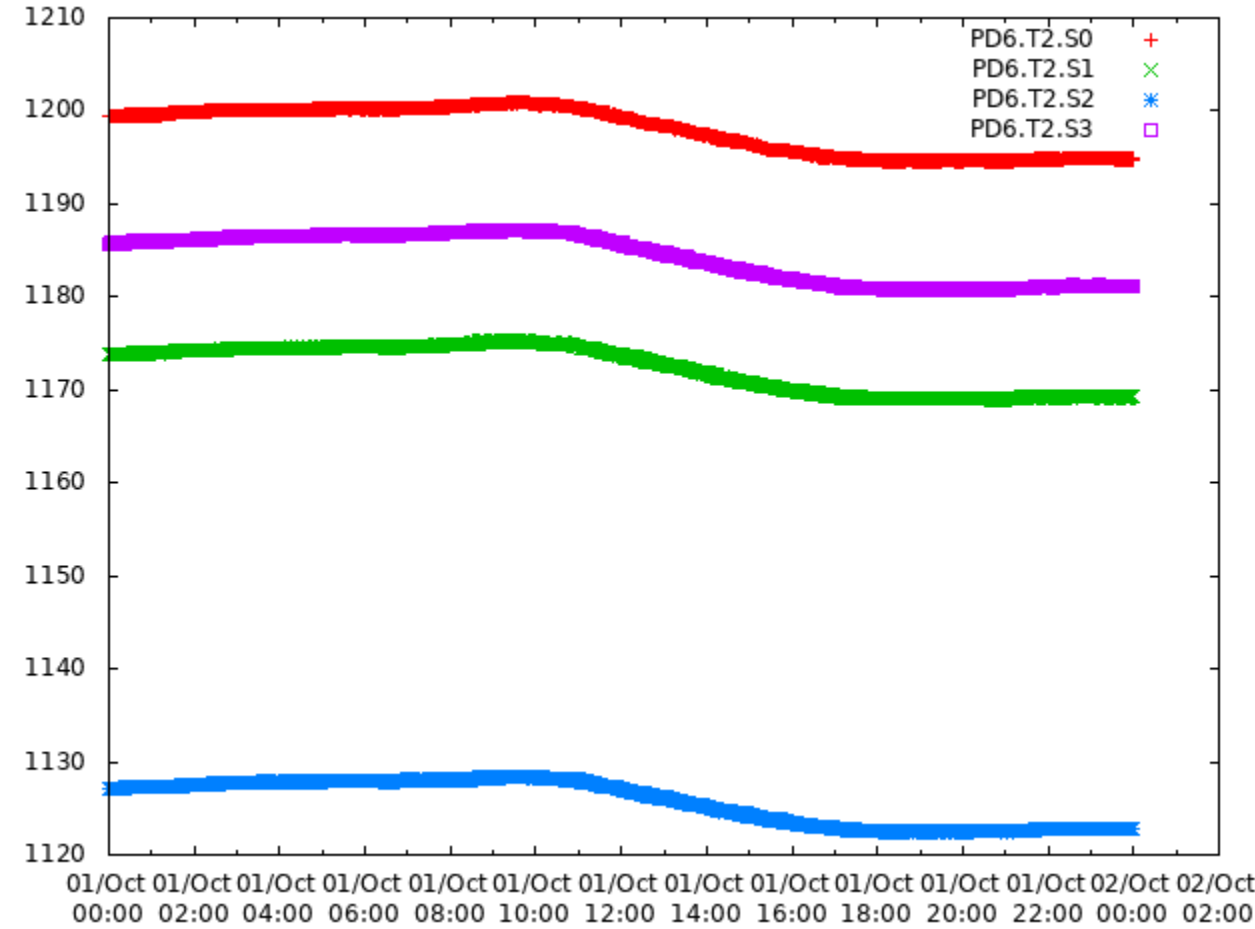
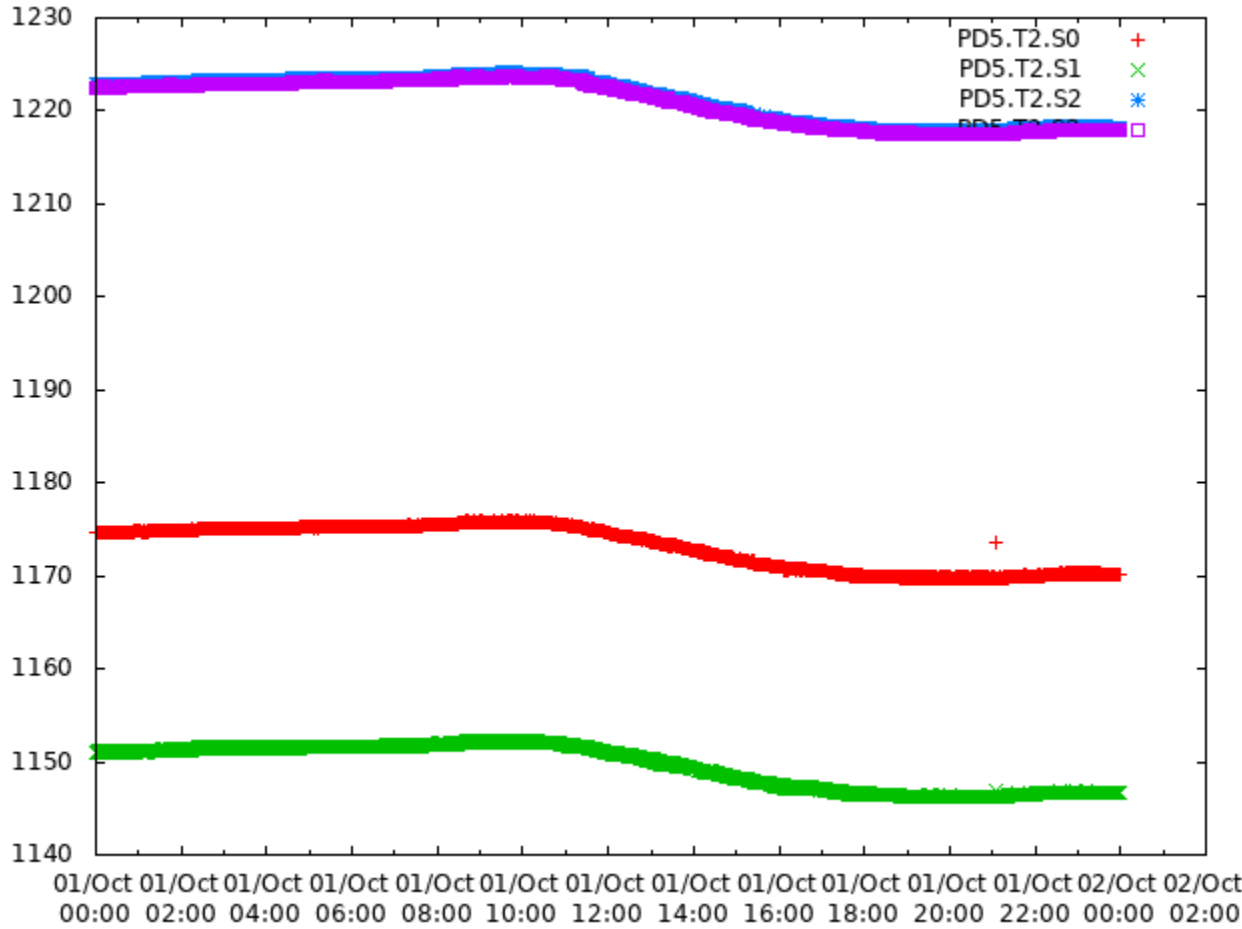
Wrap up

- I. UV lamp is installed → CLAM pictures are promising → further studies to help identifying pathologies and monitoring gaseous detectors.
- II. Around half ton of LHCb radiator gas is available will be cleaned. → Enough radiator gas for the run.
- III. The missing sectors of the hybrid photon detectors are under investigation. Interventions will be made ASAP.
- IV. Miscellaneous interventions are foreseen in coming days to address several replacements and maintenance.

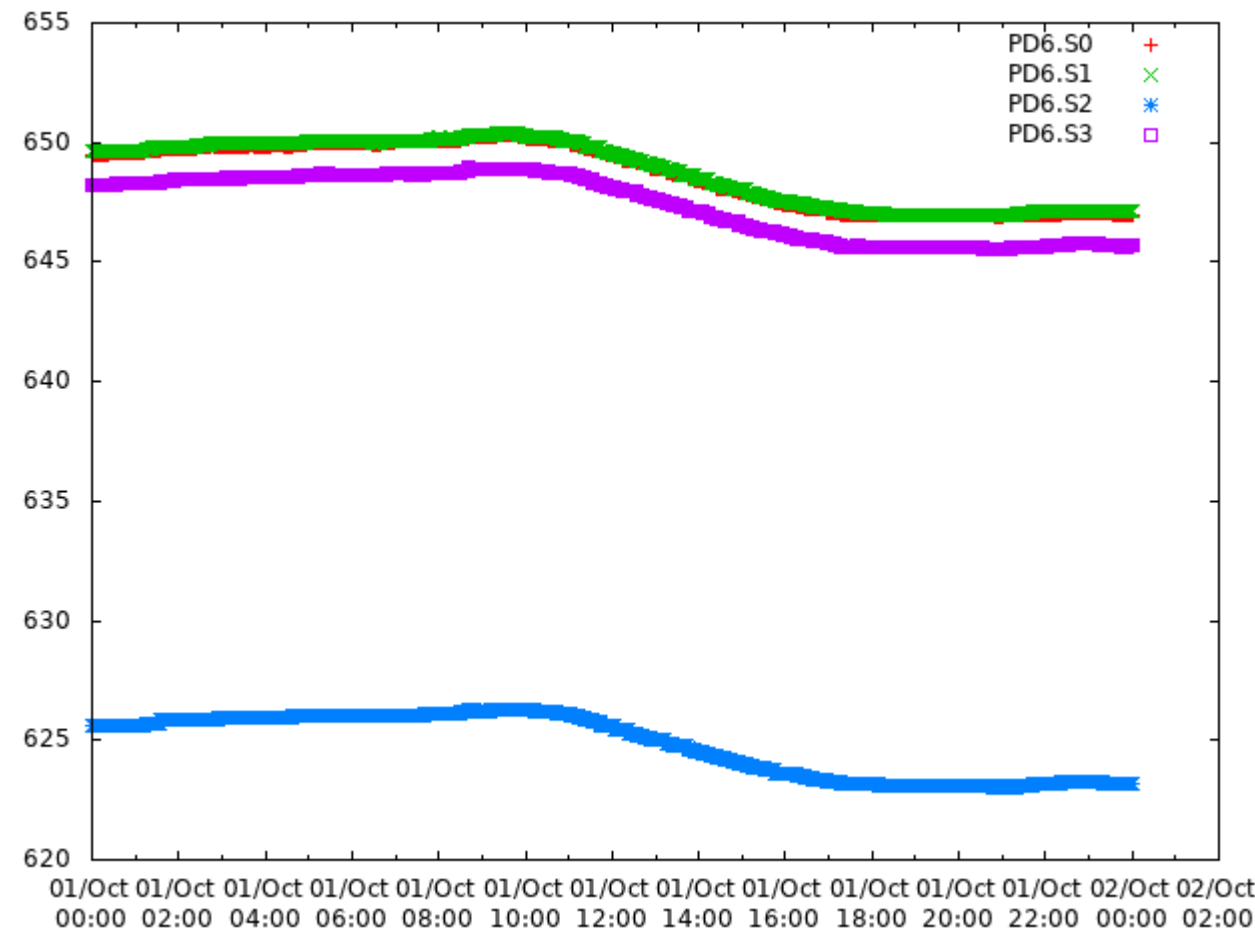
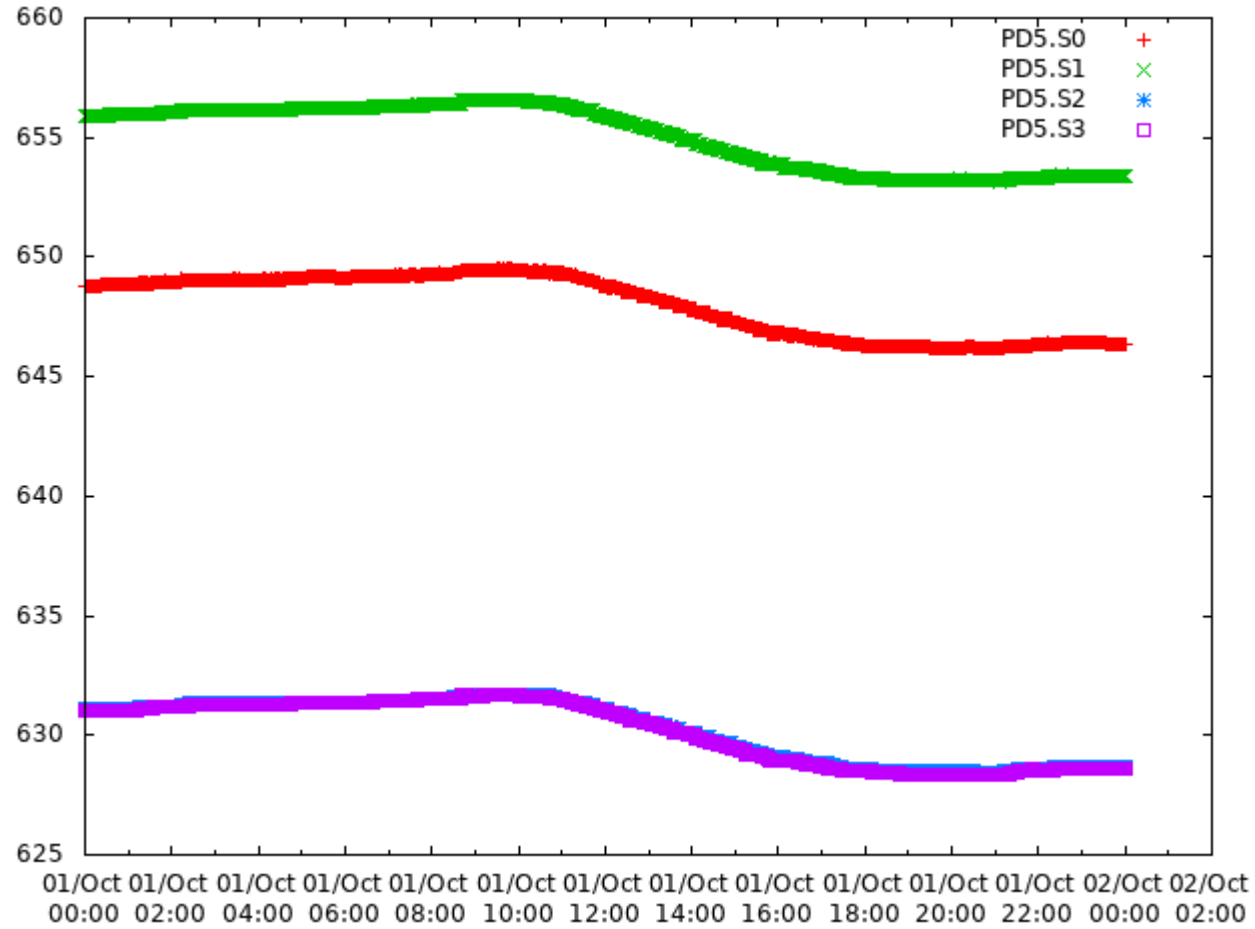
Back up slides



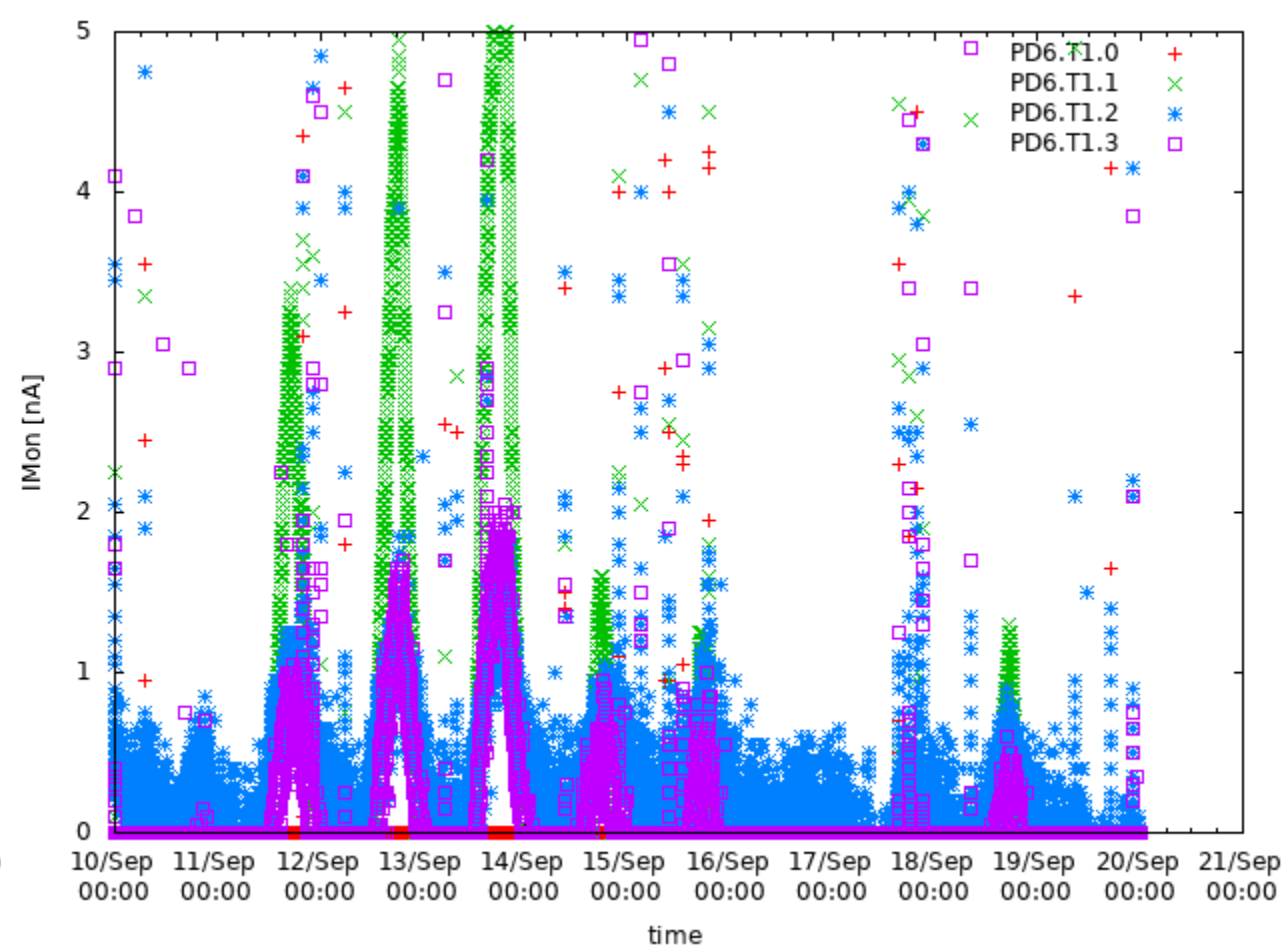
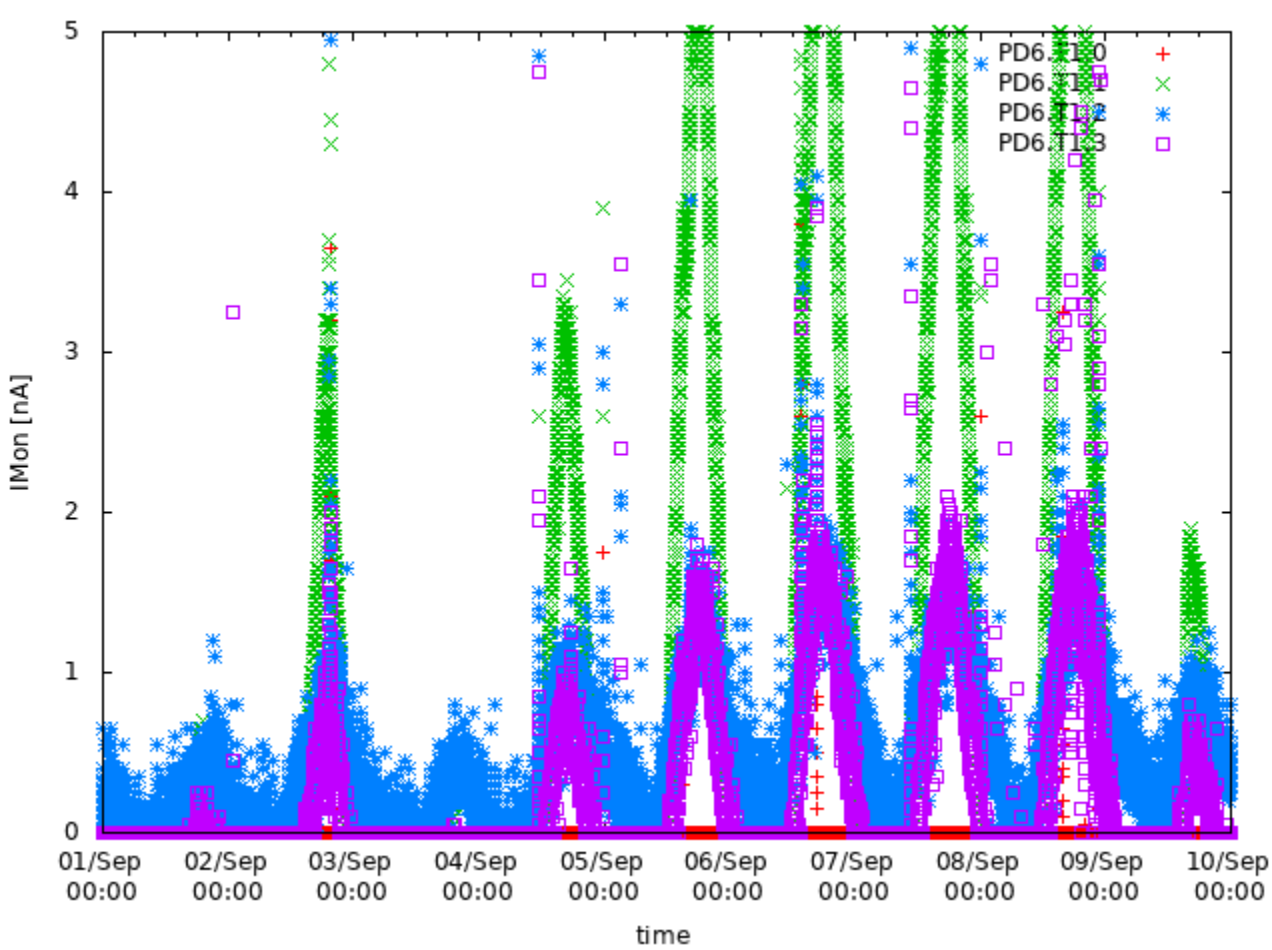
Delta V of Top THGEMs all sectors



Delta V of Bottom THGEMs all sectors



Delta V of Mesh all sectors



Top THGEM currents