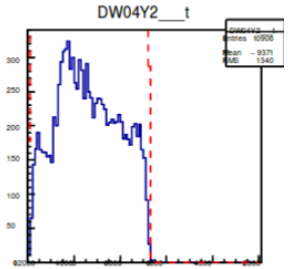
Weekly report – 24 August to 31 August

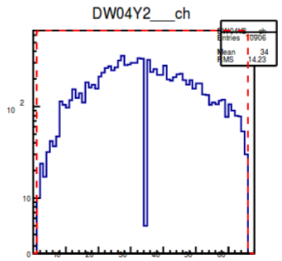
Antonín Květoň

August 31, 2018

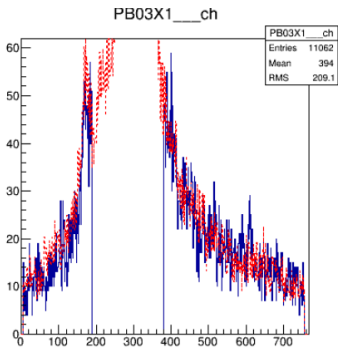
Detector issues

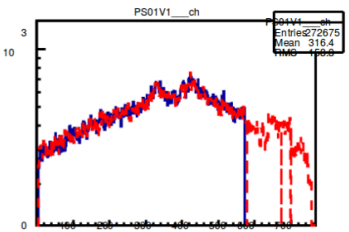
- W45 – DW04Y2 faulty from Sunday 6:00 to Tuesday 20:30

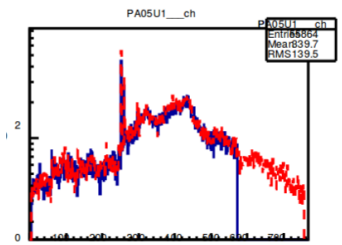


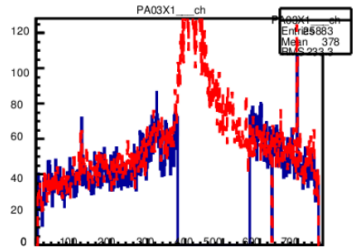


- MWPC – intermittent issues on 449 port 10, 452 port 10, 454 port 4, 460 port 7 – all except for 460 seem to be recovered now



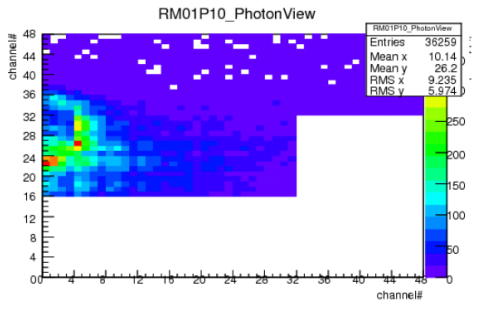






Detector issues

- STRAWS – Srcid323, Port 15 – recovered on Thursday
- BeamMon – U plane completely gone between 4:30 and 11:30 on Sunday
- RW – port 0/geoid 5, port 0/geoid 6, port 6/geoid 0 – the issue remains
- ECAL2 – bad blocks in two large regions, power supply exchanged on Thursday
- RICH – srcid 501 started throwing errors on Friday, 6:30 – being worked on



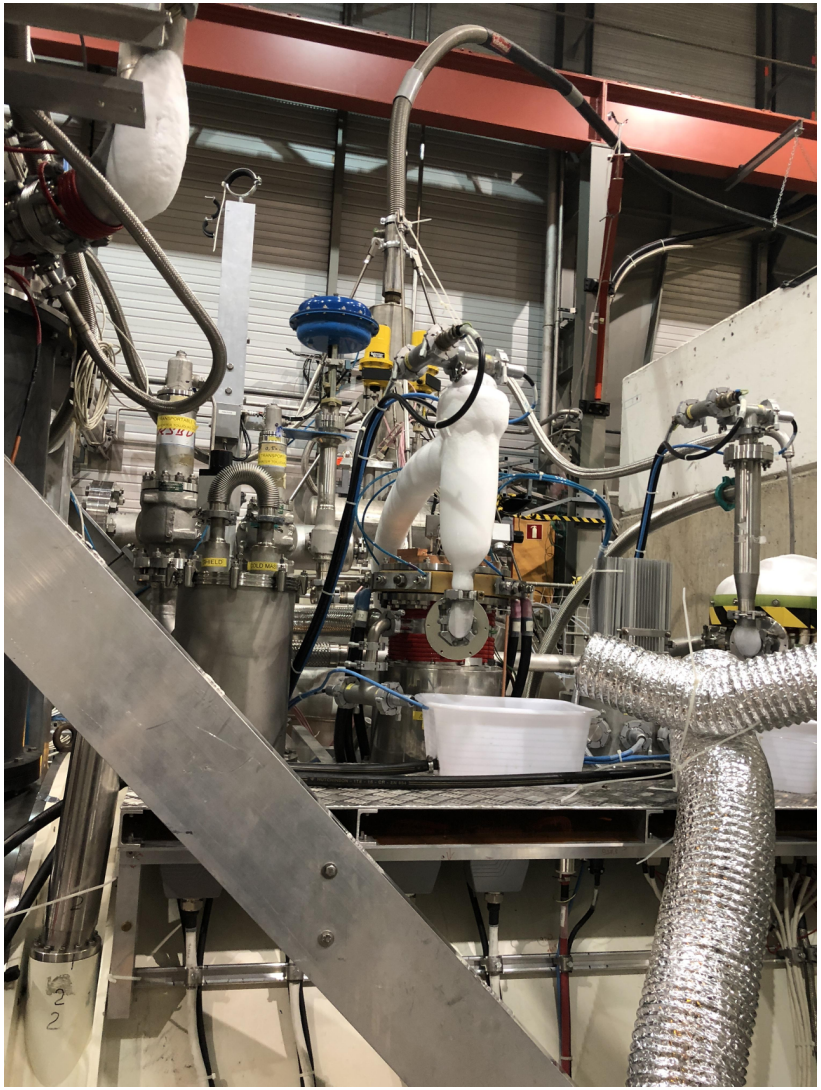
Incidents

- Sunday – ice found to be covering the upstream helium outlet on the magnet – this was caused by a broken fuse on the heater → fuse replaced on tuesday and a new probe was added to better diagnose this in the future
- Monday – major water leak near 888 (more on this later)
- Monday – minor water leak near Quad 33 → flexible pipe exchanged on tuesday
- SM1 problems (Monday 6:00 to 9:00 – power converter issue, Wednesday 1:10 to 2:10)
- Wednesday night – loss of the end of spill signal
  - The signal was degraded because of a bad connector in the CERN barrack in 888 where the timing is generated → signal bypassed for the night and the connector was exchanged the next day
  - Loose cable connection in the trigger logic → cable exchanged
- Friday night – trigger timing lost → recovered by Moritz

Accesses

- Sunday – 11:00 to 11:30 and 14:30 to 15:20 – BeamMon, RW, MWPC, W45
- Monday – 9:00 to 12:15 (no beam) – W45, MWPC, RW
- Very frequent accesses during the water leak situation

Ice status on Sunday



Water leak

- Monday 15:50 – Massive water leak underground near 888, water flooding a tunnel just before our area
- CV arrived to investigate the situation
- Shortly after, the supply of raw/chilled/distilled water to the entire North Area was cut, only the tap water supply was spared
- The CT2 cooling tower was also completely stopped
- The Fire brigade pumped the water out (over $100 m^3$)

Water leak

Water leak consequences

- We lost all cooling as a result, including the AC in the pump room and the DAQ barrack
- The cryo compressor had to be stopped
- Since the cryo was not operational (and also since Sylvain from EP-DT advised us to switch the magnet off to avoid fast discharge at full current in case the ice reaches the flowmeter), the magnets have been switched off
- The diffusion pump was moved to tap water
- The still heater was stopped in order to minimize consumption of He4
- Due to absence of cooling in the pump room, most of He3 was recovered and the root pump switched off
- All pccoqaXX and pccore16-18 were switched off
- The doors were left open overnight and argon flow increased on all detectors as a result of the temperature drop

Water leak recovery

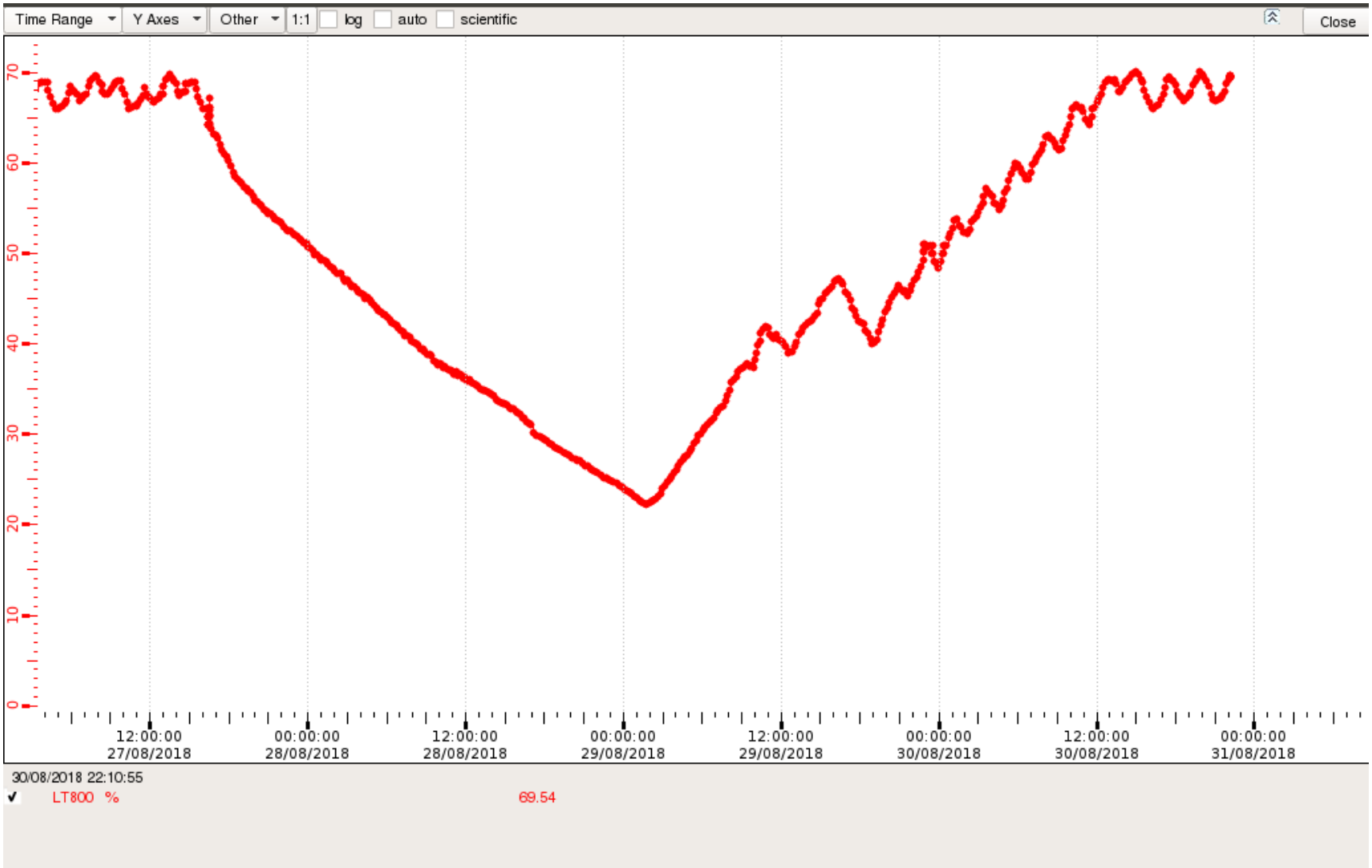
- Tuesday morning – Johannes Bernhard helped us out and provided concrete blocks as well as crane operators in case the water flow was not resumed in time and we needed to connect an emergency dewar to the fridge. Many thanks!
- Tuesday 10:00 – Water leak fixed, refilling started
- Tuesday 11:30 – DAQ cooling switched to the winter backup chiller by Annika
- Tuesday 13:20 – chilled water temperature started dropping $\rightarrow$ 888 AC started working again (including the pump room)
- Tuesday 15:00 – chilled water supply fully restored

Water leak recovery

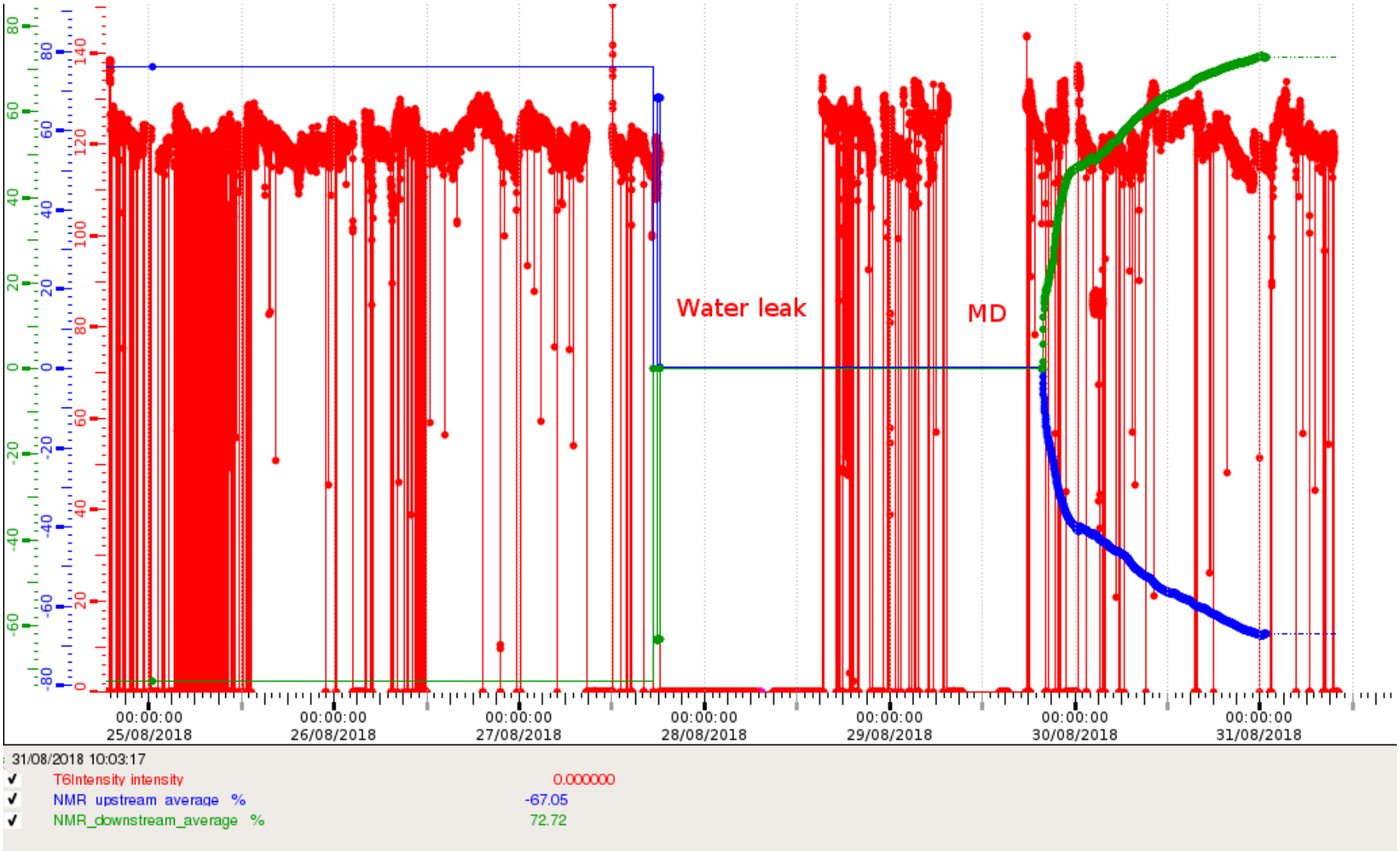
- Tuesday afternoon – Vincent & Michael went to the cryo control room to discuss the status of cryo restart. The liquifier circuit had to be flushed. At the time, it was uncertain whether it would be possible to do by midnight and restore the flow of He4. If that would have not been possible, two 500l dewars from Cryolab would have been delivered on Wednesday, one in the morning, and one in the afternoon (many thanks to Johan Bremer and Michel Cugnet!)
- Our gratitude also belongs to Michael Jeckel and Nori for the help they provided
- Wednesday 02:30 – Helium flow recovered
- Wednesday 09:50 – Diffusion pump briefly stopped by Nori to switch back to raw water from tap water
- Wednesday 20:15 – Target back in bussiness, polarizing started
- Friday 01:20 – Went to dipole, resumed physics data taking

The faulty pipe

LT800 buffer dewar %



Beam + polarization



Data recording

Alignment

Done on Wednesday, new period 18W13 started

Trigger efficiency runs

3818 good spills recorded

DY spills recorded as of Thursday, 22:34:15

9347 good DY spills recorded

DY spills recorded since Friday, 01:51 (new period)

1388 good DY spills recorded

Thank you!

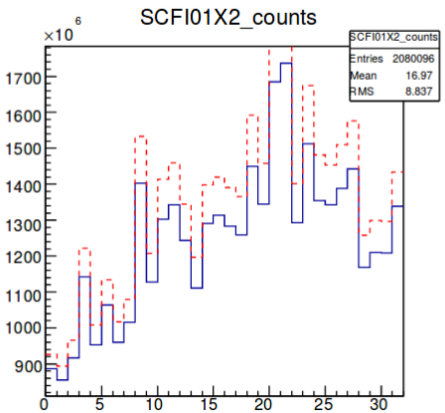
Thanks to Vincent, the detector experts and the shifters! Best of luck to Johannes!

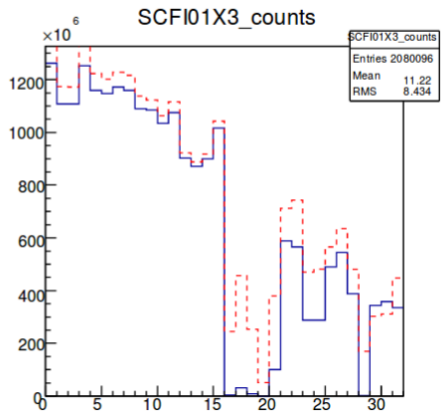
Backup Slides

Backup slides

Friday

- 11:30 - 11:30 – no beam (PS access)
- 11:00 RW ports 5 and 6 reincluded by Antonio
- 15:10 - 18:50 – no beam (PS access)
- Reduced SCIFI counts (scaler) – intermittently persists as of sunday/monday



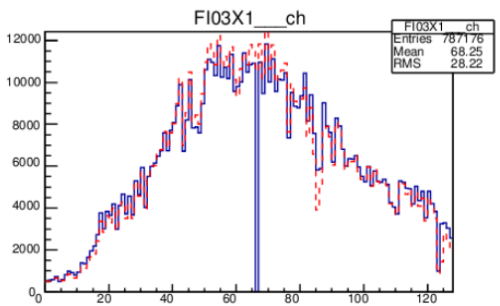


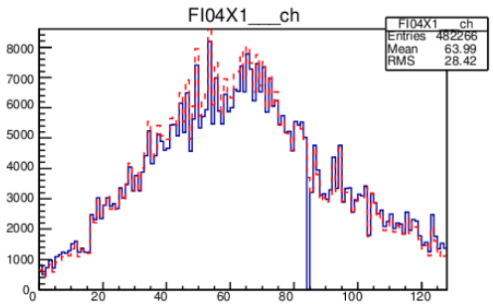
Problematic source ids

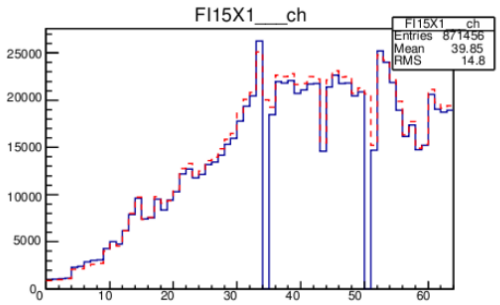
260 (DC), 432 (RW)

Saturday

- Afternoon – RW became quite problematic – a decision was made to only reload it between runs (if the problem is port 6, error type: GeSiCA: spill was skipped)
- 21:50 – New dead channels on SCI-FIs:







Problematic source ids

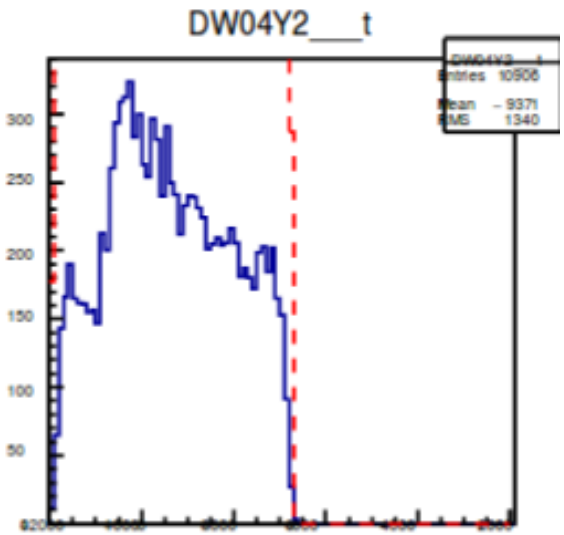
258 (DC), 432 (RW), 381 (PMM), Straws (trips)

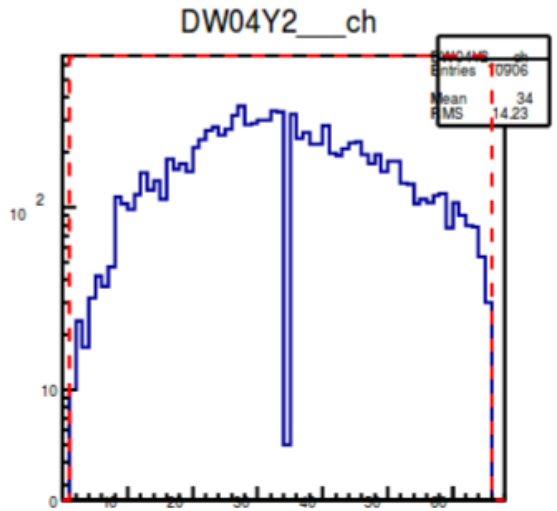
Saturday

- 23:25 – DCS communication loss with:
  - CAEN HV crates for Trigger (H1) and RICH
  - VME crate for RW
- SM1 and SM2 network power switches restarted $\rightarrow$ H1 and RW problems still remained
- Afterwards, the OPC server was restarted by Ana Sofia $\rightarrow$ H1 solved, RW remained
- The pccofe was however accessible, so we decided to just mask the alerts and run like this overnight
- This is just monitoring and had no effect on data acquisition

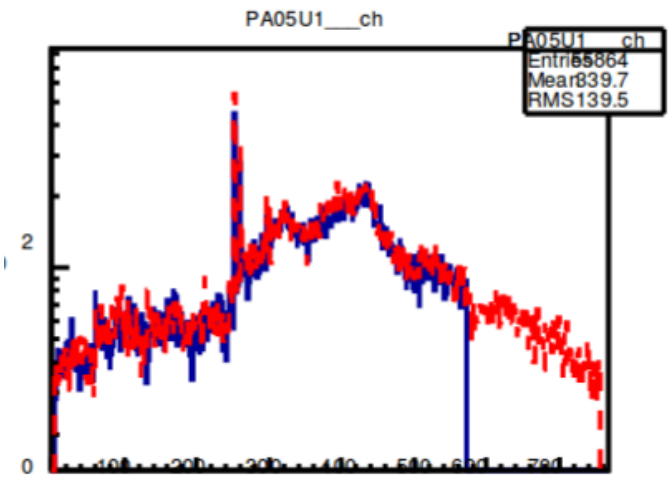
Sunday

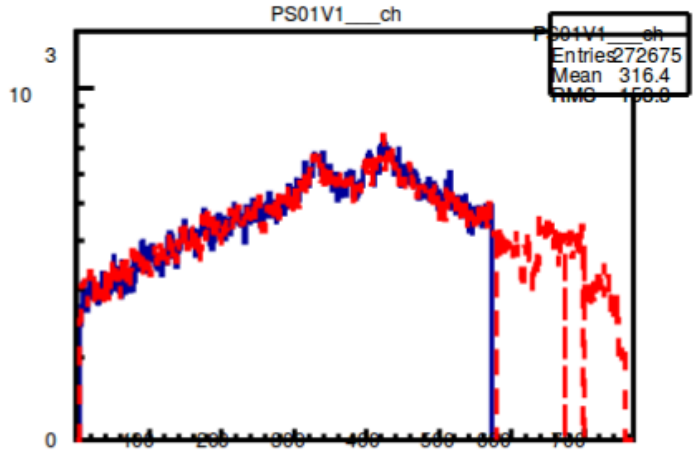
- ! 4:30 – SCIFI15 (BeamMon), plane U completely lost, the shift crew could not reach the expert
- ! 6:00 – W45: DW04Y2 significantly under reference (reloading, powercycling the HV did not solve the problem)



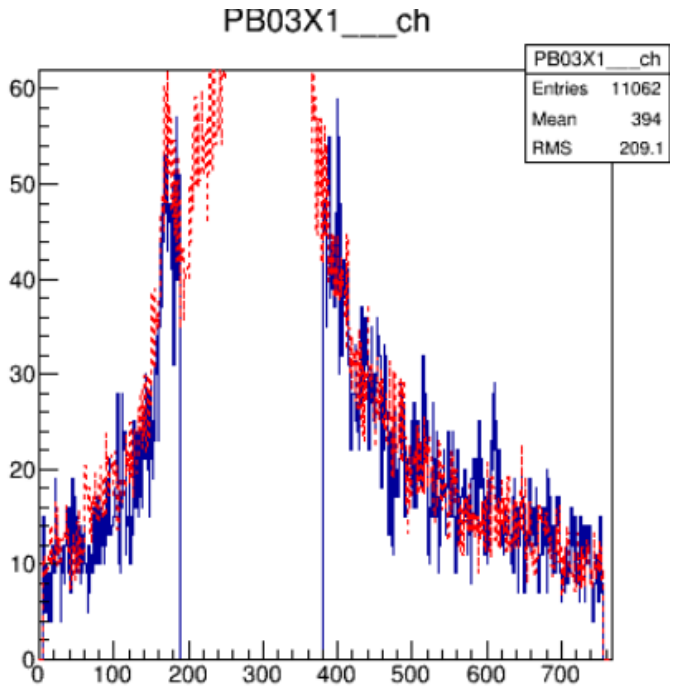


- 7:21 – MWPC: Problem on two different FE cards induced errors on all source ids → port 7 on srcid 460 (PS01V1) and port 4 on srcid 454 (PA05U1) excluded from the DB





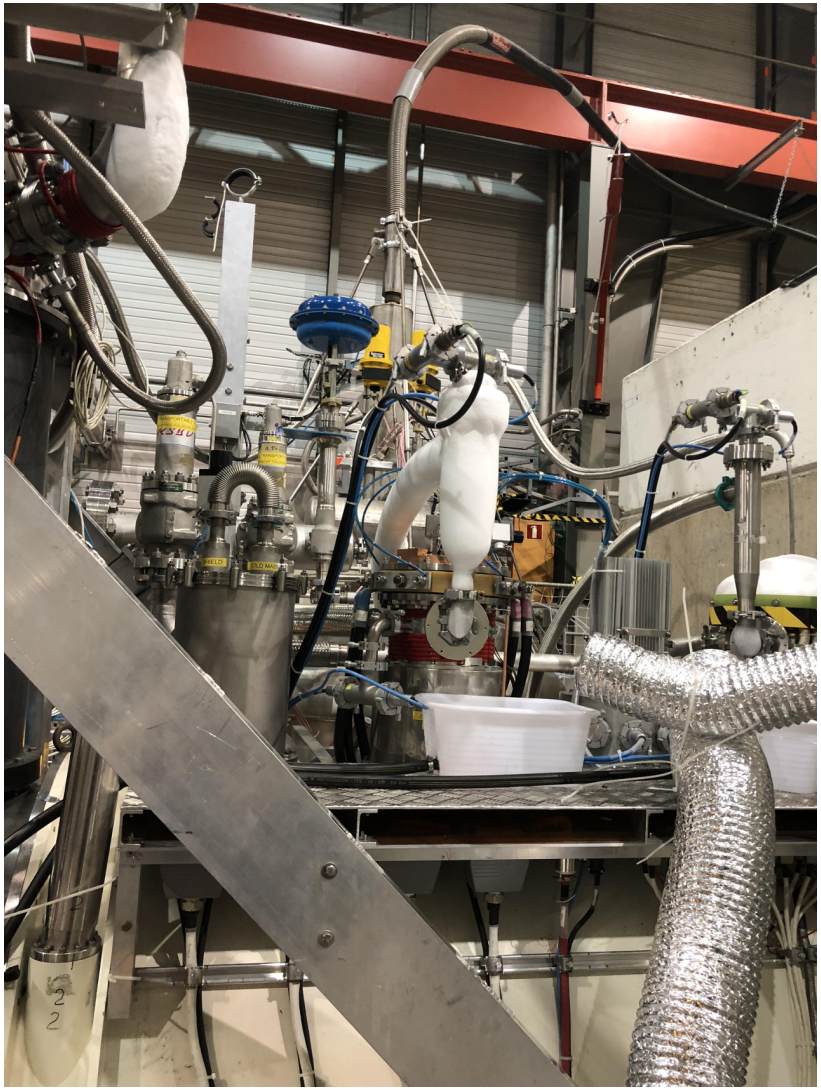
- Around 9:00 – Another MWPC issue (intermittent): middle of srcid 449 port 10 (PB03X1) lost



Sunday

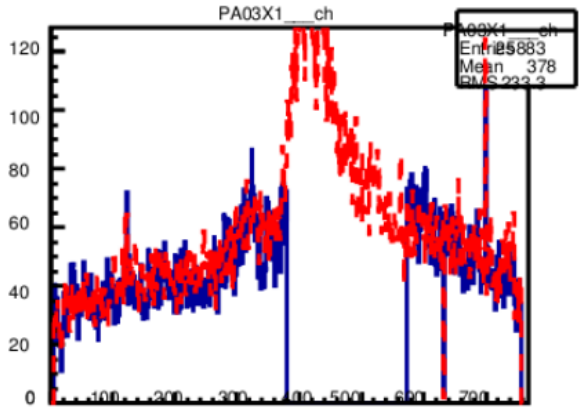
- 11:00 to 11:30: access for MWPC, BeamMon, RW
  - ✓ BeamMon issue fixed by replugging the Gandalf module
  - ✓ RW vme communication issue fixed by powercycling the crate
  - × MWPC issues remain
- 14:30 to 15:20 access for MWPC, W45
  - ✓ MWPC 454 port 4 fixed
  - × W45 – the issue persists (the cable for 4Y2 neg was exchanged, but this did not fix the problem. Might be a connection issue between the distribution box and wires, which will take more time to investigate and fix.)
  - × MWPC 460 port 7 not fixed
  - × MWPC 449 port 10 (PB03X1) not fixed

Sunday – ice status



Sunday

- 20:35 – Port 10 of srcID 452 (MWPC – PA03X1) was flooding the entire multiplexer with errors → port excluded



- 21:00 – Port 10 of srcID 449 (MWPC – PB03X1) recovered itself after a reload → port reincluded
- 21:15 – Communication lost for DC04 thresholds → solved by Vincent by rebooting pccofe20

Monday

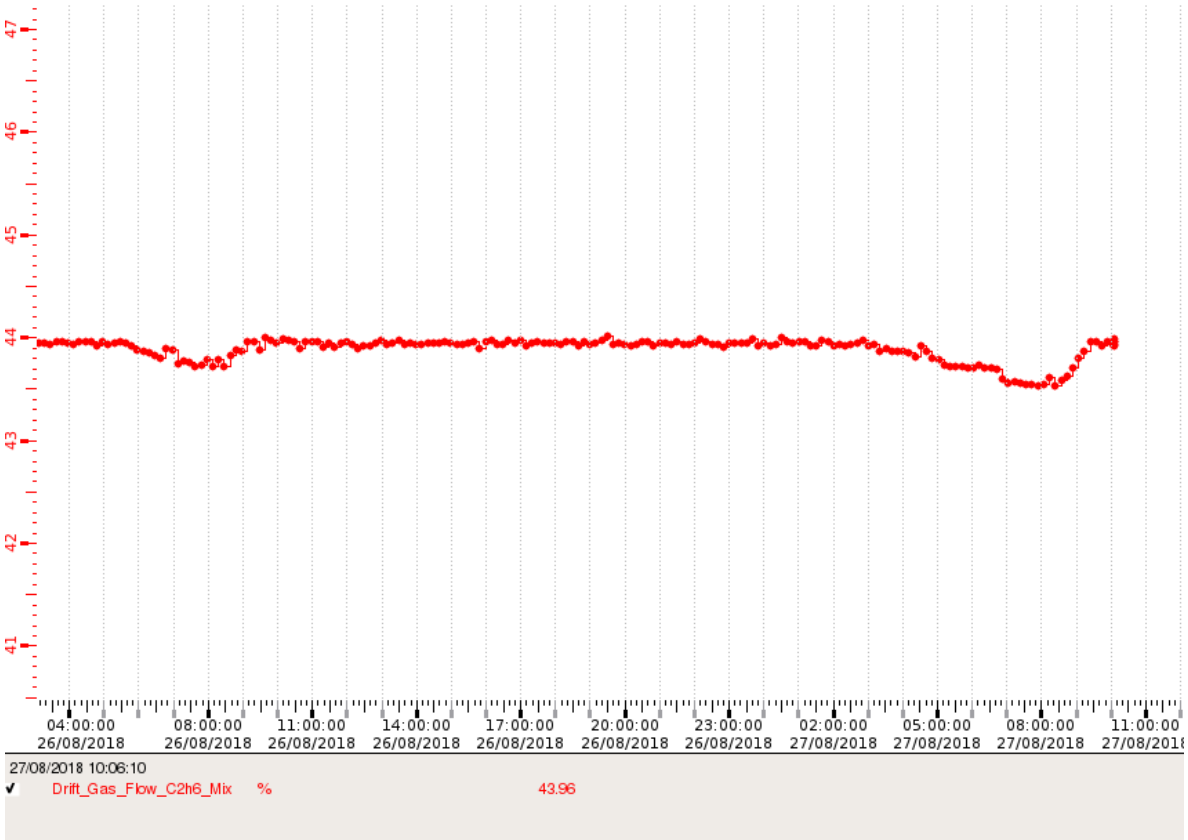
- 2:20 – DCS lost comunication with a large amount of equipment → recovered by Ana Sofia by restarting:
  - network power switches near SM1 and SM2
  - lnxpool25 switch for DC00-04 thresholds
  - OPC managers CAEN1 and CAEN2
- ! 6:08 – SM1 problem: field from Hall probe: 0.18 mV. It was not possible to recover in CESAR → CCC called, turned out to be a power converter problem.
- 9:00 – SM1 problem fixed by the first line piquet, but no one called us (Vincent only found out at 12:00)
- 9:35 – 12:06 – No beam (access system failure)

Monday

- 9:00 – 12:15 Access for RW, MWPC, W45
  - ✓ MWPC 452 port 10 fixed
  - ✓ MWPC 454 port 4 fixed, more work to be done during the MD
  - × W45 – the issue persists. Annika swapped the cable for the U plane with the one for the Y plane. The Y plane remained faulty, which means the issue is likely inside the distribution box. She will investigate it further during the MD
  - × RW – The connector on port 0 was cleaned, but the problem persists. The cable will be exchanged during the MD
  - × MWPC 460 port 7 replugged, but not fixed – still excluded
  - During the access, Vincent noticed that water is dripping again near Quad 33 – TE/MSC/MNC came to inspect it, the leak is coming from the flexible pipe. The leak is quite small, so the decision is to wait with the exchange of the pipe until the MD
  - Quad 21 also stopped responding during access, which was promptly solved by the CCC first line piquet

Monday

- Vincent reduced the gas flow to DC05, which was bubbling quite well, in order not to reach the 12l/h limit on C2H6 flow. Otherwise, the PLC could not maintain the gas mixture properly.



Spills taken so far

2018-08-24 11:00:00 and 2018-08-27 14:13:21

9007 good spills recorded

Monday 16:00 – 24:00 – Water leak

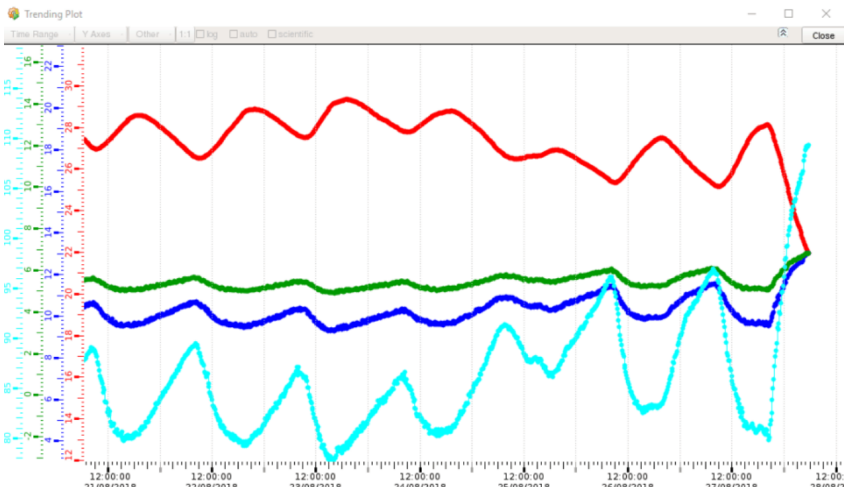
- 15:50 – Massive water leak underground near 888, water flooding a tunnel just before our area
- CV arrived to investigate the situation
- Shortly after, the supply of raw/chilled/distilled water to the entire North Area was cut, only the tap water supply was spared
- The CT2 cooling tower was also completely stopped
- The Fire brigade pumped the water out (over $100 m^3$)

Monday 16:00 – 24:00 – Water leak consequences

- We lost all cooling as a result, including the AC in the pump room and the DAQ barrack
- The cryo compressor had to be stopped
- Since the cryo was not operational (and also since Sylvain from EP-DT advised us to switch the magnet off to avoid fast discharge at full current in case the ice reaches the flowmeter), the magnets have been switched off
- The diffusion pump was moved to tap water
- The still heater was stopped in order to minimize consumption of He4
- Due to absence of cooling in the pump room, most of He3 was recovered and the root pump switched off
- All pccoqaXX and pccore16-18 have been switched off
- Many DCS alarms masked for the night to keep the relevant alarms visible

Tuesday 00:00 – 08:00

- Gas problems during the night – argon flow increased on all detectors:
  - 01:20 – MW1 and RichWall argon flow alarm - oscillating around max value 490 l/h
  - 04:50 – MW1 and RichWall argon increased up to 495 l/h, percentage of CO2 in gas mixture still ok
  - 05:44 – W45: CF4 flow crossed the alarm threshold (masked by Annika, total flow reduced in the morning)
  - 06:35 – DC: the percentage of C2H6 in gas mixture decreased, causing an alarm



- red – temperature W01 down
- blue – CF4
- green – CO2
- teal – Argon

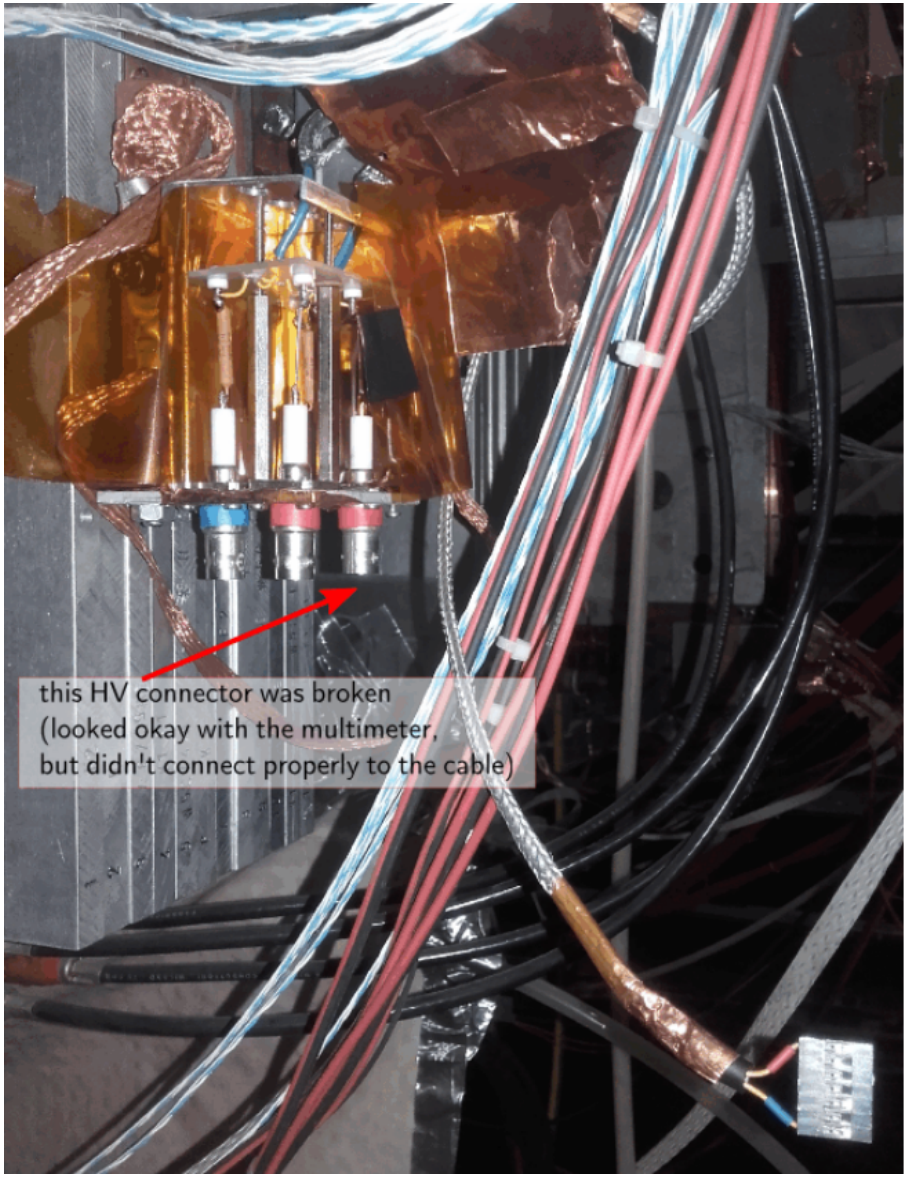
Tuesday 08:00 – 16:00

- 10:00 – water leak fixed, refilling started
- 11:05 – Hodoscope HV switched off by Moritz
- 11:30 – DAQ cooling switched to the winter backup chiller by Annika
- 13:20 – 888 AC started working again (including the pump room)
- 15:40 – Trigger switched on again
- W45 investigation ongoing

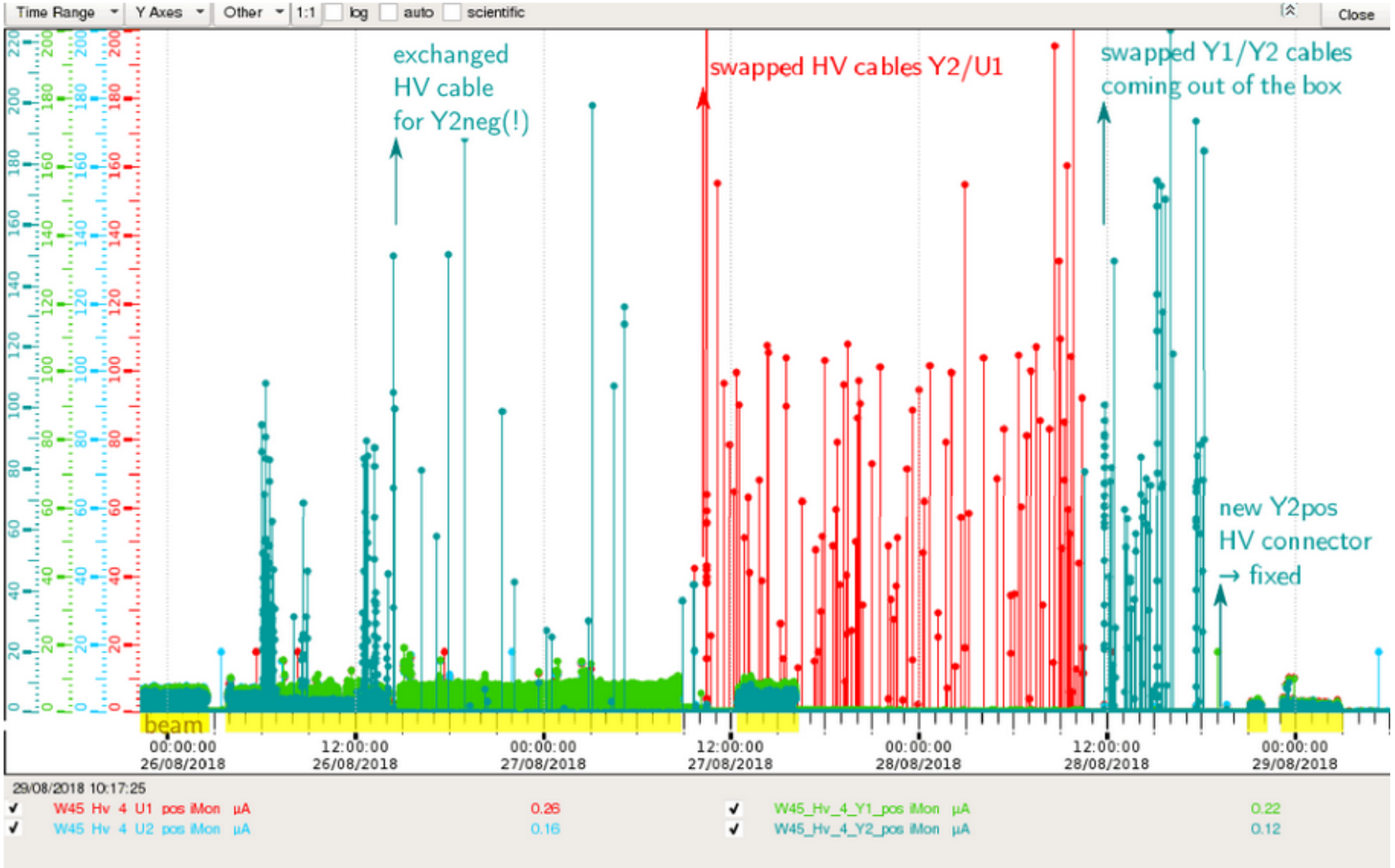
Tuesday 15:00 – 24:00 – Water leak recovery

- 15:00 – chilled water supply restored
- 16:00 – beam back, air target
- Afternoon – Vincent & Michael went to the cryo control room to discuss the status of cryo restart. The liquifier circuit had to be flushed. At the time, it was uncertain whether it would be possible to do by midnight and restore the flow of He4. If that would have not been possible, two 500l dewars would have been delivered on wednesday, one in the morning, and one in the afternoon (many thanks to Johan Bremer!)
- 20:30 – W45 problem fixed: turned out to be a faulty connector on the HV distribution box on the chamber
- Late evening – alignment started by Vincent, but could not be finished immediately because we lost the end of spill signal

The faulty W45 connector



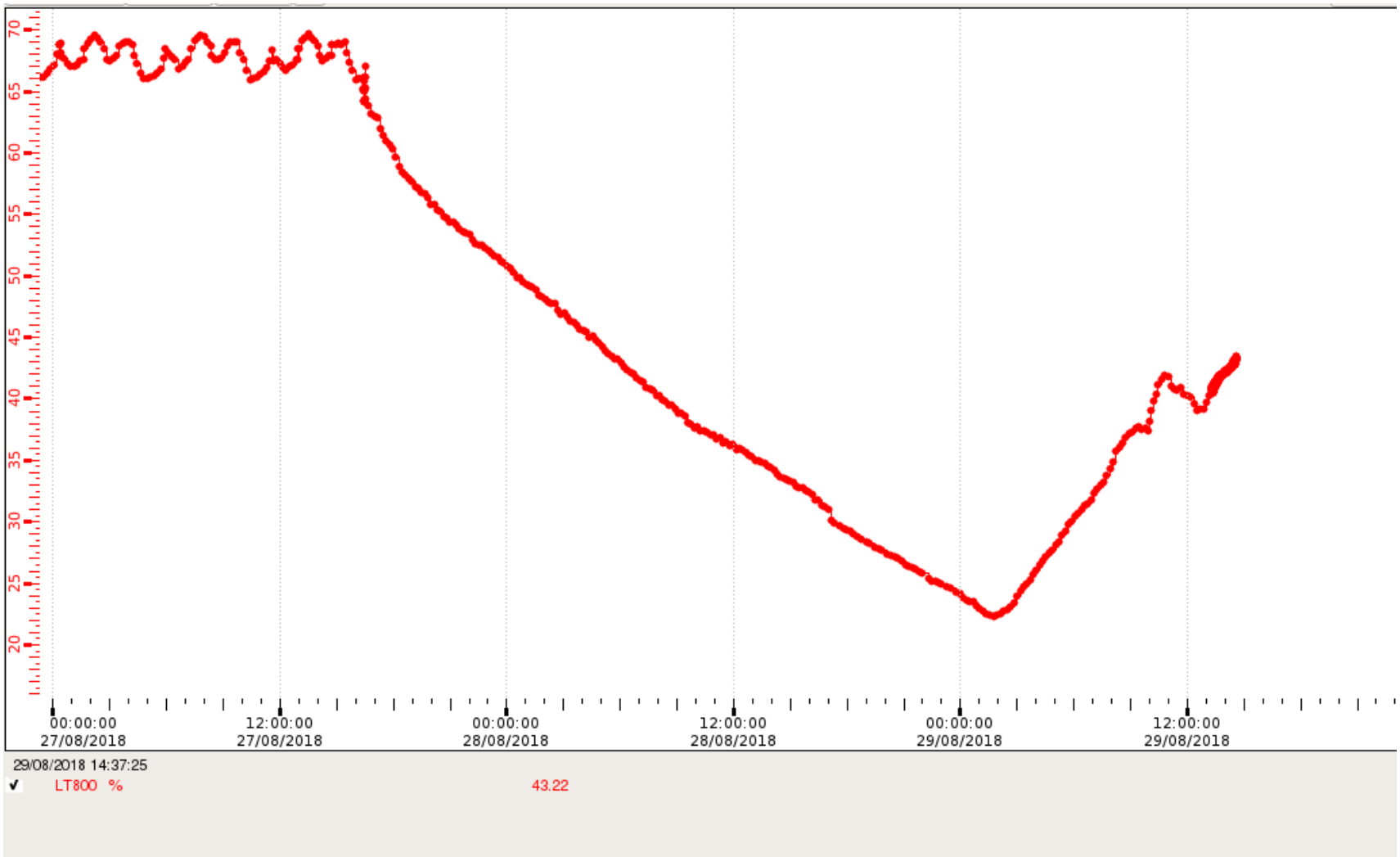
W45 troubleshooting history



Wednesday 00:00 – 08:00

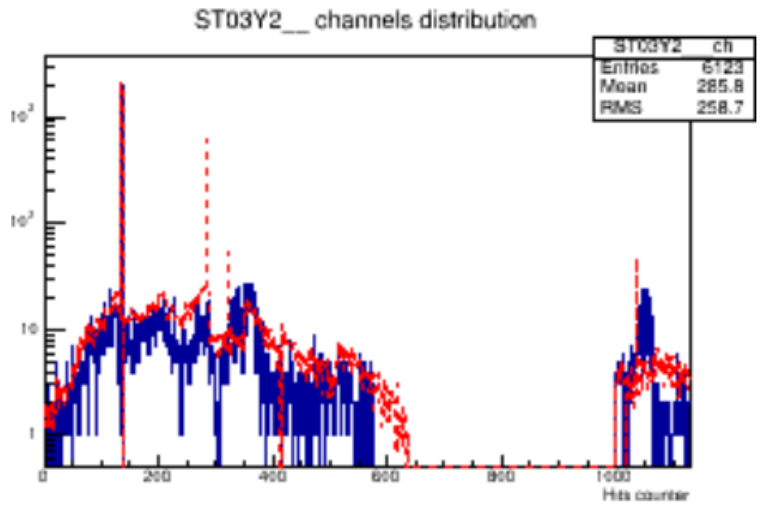
- 01:13 – End of spill signal recovered by Vincent, Moritz, Josef and two CCC piquets. Two issues were found:
  - End of spill signal delivered by CERN degraded because of a bad connector in the CERN barrack in 888 where the timing is generated → signal bypassed with the end of spill signal from the veto barrack for the night, problem fixed today and reverted to original state
  - Loose cable connection in the trigger logic → cable exchanged
- 01:13 – SM1 could not be turned on → piquet called
- 02:10 – SM1 back on
- 02:20 – alignment with SM1, SM2 ON
- 02:30 – Helium flow recovered → no need for the dewar from CryoLab

LT800 status as of 14:37: 43%



Wednesday 02:00 – 09:00

- 02:47 – STRAW problem: Port 15 (SrcID 323) $\rightarrow$ port excluded



Wednesday 09:00 – 16:00: MD

- 09:50 – Diffusion pump stopped by Nori to switch back to raw water from tap water
- 13:30 – STRAW problem resolved by Karolína (magic spray)
- 14:00 – New period 18W13 started by Vladimir Frolov
- 14:00 to 14:30: Chilled water supply cut again, briefly
- 15:16 – ECAL2: bad contacts in FEM 1, FEM 16 fixed by Vladimir Poliakov
- 15:30 – XSwitch connected to MUX5, MUX2 by Vladimir Frolov
- Work in progress on RW and MWPC

Wednesday 16:00 – 24:00

- (Tuesday) – Ice situation: Laurent from EP-DT came to check the flowmeter and the heater on the turret: it was a broken fuse. The fuse was replaced, the flowmeter reset and a new probe was added in order to recognize such problems in the future.
- 16:30 – STRAW problem (323, port 15) reappeared → excluded from the DB (according to Karolína, this problem is not serious, as this is at the top of the detector where there are not many hits)... recovered itself again later and was reincluded by Vincent
- 17:25 – Refilling material dewars done
- 17:30 – MWPC srcid 460, port 7 reincluded in the DB by Ottavio
- 19:30 – Solenoid ramping started
- 20:00 – Beam back, trigger efficiency study started

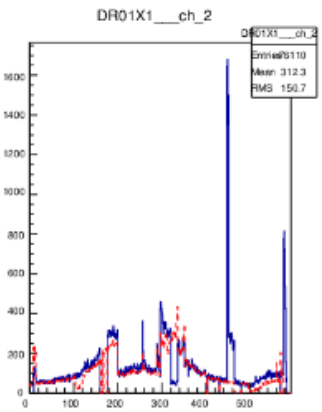
Wednesday 16:00 – 24:00

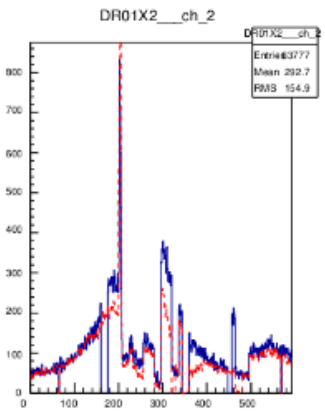
- 20:15 – Target fully operational again:
  - Coldbox restarted $\rightarrow$ 3He-4He mixture condensed to the mixing chamber
  - Cryostat refilled to normal level
  - Polariztion restarted (- in upstream, + in downstream)

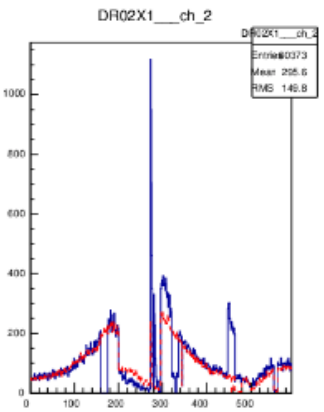
Thursday 00:00 – 16:00

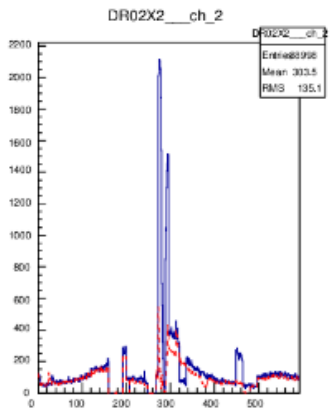
- 09:20 to 09:37 and 10:53 to 11:30 – accesses for ECAL2, power supply change needed
- 14:40 – Access for ECAL2, MW1 problems (Vincent also made use of this to measure the amplifier output on CEDAR)
- 15:16 – ECAL2 problem fixed
- Current problems: MW1, RW, DC

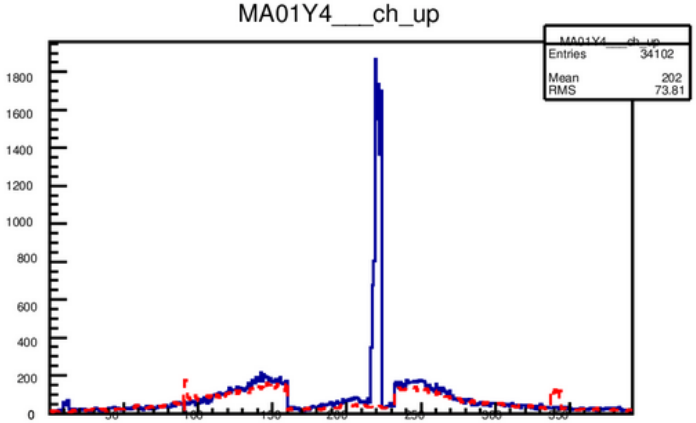
Current problems

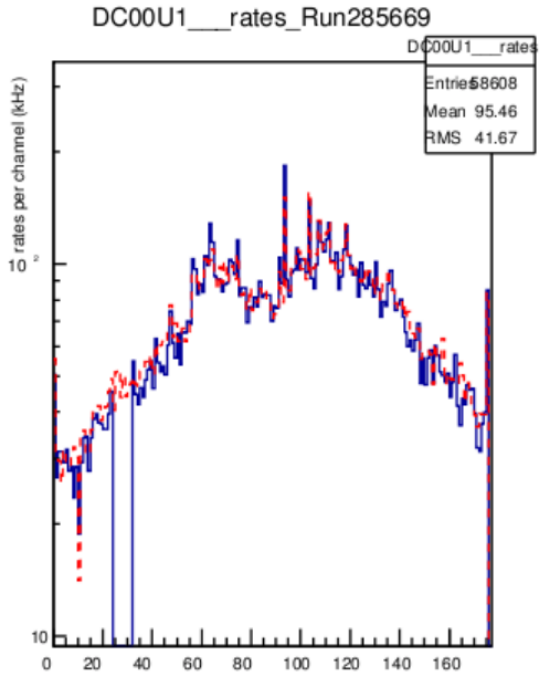












Current PTgt status

- LT800 dewar level: 70%
- Polarization: -60% upstream, 67% downstream