2023-24 EYETS planning meeting

16.2.2024

A.Tauro

EYETS 2023-24: access, cavern closure

- **Access perturbations:**
  - Individual System Test & DSO test: **15-16 February** → **no access UX25 cavern 15 February 13:00 PM - 16 February 18:00 PM**

- **March 1st: surprise organised by Klaus ☺☺☺**

- **Machine checkout** starts on Wednesday, March 6th
  - **Underground access** and **cavern visits** will stop on Tuesday, March 5th at 17:00

- EYETS will end on Monday, March 11th
  - **Physics restart** with beam on March 11th

- TE-VSC: reopen manual beampipe valve on Tuesday, March 5th

Detector's activities 1/2

- **TPC:**
  - Laser maintenance (week 5)
  - Check leaks
  - Replace some Wiener PS
  - Install current measurement devices on FC
  - Replace Ne

- **TRD:**
  - Inspection cooling loops in week 3 as some tightness degradation suspected
  - Replace LVPS
  - Inspection of the LV connections (L3 C-side) with the infrared camera for any hot spots A few connections inside the LV rack are 'warm' and need to be tightened

- **TOF:**
  - x24 three-phase Notch Filter units (CAEN A3000NF) reinstalled in the cavern on Jan 26th and fully operational → TOF is fully powered & all links UP

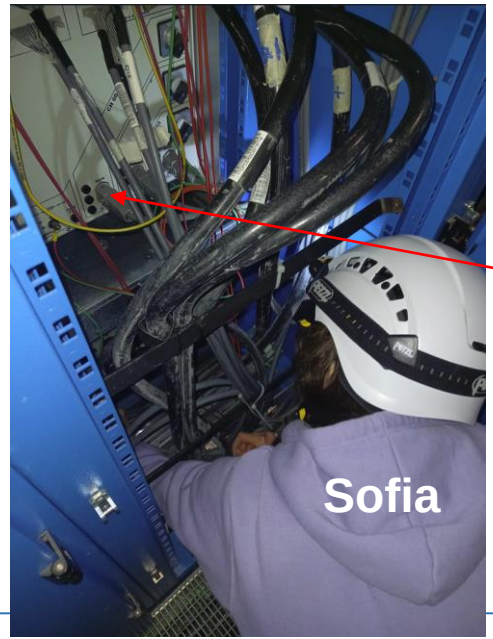
- **PHOS:** planned activities from 21 February to 6 March (4 people, one of which is a watcher)
  - Work in A17: extract burned Wiener LVPS, replace it with a spare one, validate low-volage operation of the PHOS module 2 which was affected by a broken Wiener
  - Work inside the L3 magnet: find and fix high-voltage short in module 1. Open feed-through flange, find and disconnect HV cable from FEE card which caused short current, verify HV current with switched FEE cards
  - Refill the crystal cooling plant with 11 liters of C6F14
  - PHOS crystal cooling plant is working at +15C now. We shall start cooling down to -25C after the HV trip repair. It will take the usual 2 weeks to reach the target temperature -25C, this is a remote operation without any need to go to the cavern.
  - Andre investigating with EN-EL to remove the crystal cooling plant differential current protection, which got triggered during the HI run → we cannot remove the differential protection

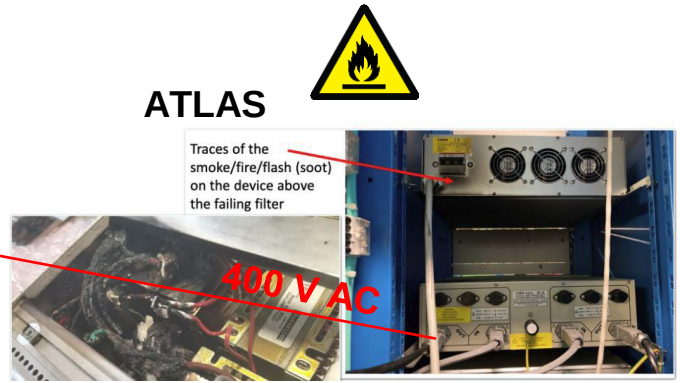
Detector's activities 2/2

- **FIT-A:**
  - Survey
  - Investigation of a problem with one FT0-A MCP-PMT → either on Feb 20th or on Feb 26th
- **FDD:**
  - Inspection?
- **EMCal:**
  - Replace FEE + TRUs + checks → 1-2 days next week
- **MFT:**
  - Replacement of the cooling filters in PP0
  - Addition of flow limiters on the pneumatic valves to avoid bumps when turning ON/OFF
  - Addition of a 200 liters tank to increase the buffer volume, to reduce the time between 2 pump starts
  - Replacement of the thermal pads on the RO boards affected by the viscous fluid on one quarter of MFT (H0F0). H1F1 to be done next week,
  - Replacement of the thermal pads on the RO boards affected by the viscous fluid on a second quarter of MFT (H1F1), IMPACT 227502 (The second half on O-side will be done later if needed, possibly next YETS)
- **MCH:**
  - **Station 1:** address RO issues → Orsay team onsite next week. The quadrant with a faulty sector will be exchanged during the next YETS
  - **Station 2:** improve the read-out stability of the quadrants → Indian team will come to CERN in week 9 (26/02 - 06/03)
  - **Stations 3-4-5:** work on ST3 (mainly CH6L) next week. Work on ST4-5 mostly done, except replacement of one SOLAR board (nacelle needed)
- **MID:**
  - Faulty RPC disconnected, removed from half plane and tested on January 17 and 18 – seems ok

TOF notch Filters refurbishment

- TOF has 24 Notch Filter units (CAEN A3000NF) filtering the three phase (400 V) supplying our 48 V power supplies (“Maciste”) in the cavern (balconies) + 2 spares
- All units have been refurbished in Viareggio in Dec and Jan, since some capacitors reached the EOL (provoking a start of fire x2 in ATLAS in the last few years):
  replacement of EOL caps done, fans replaced and overheating protection added → DONE

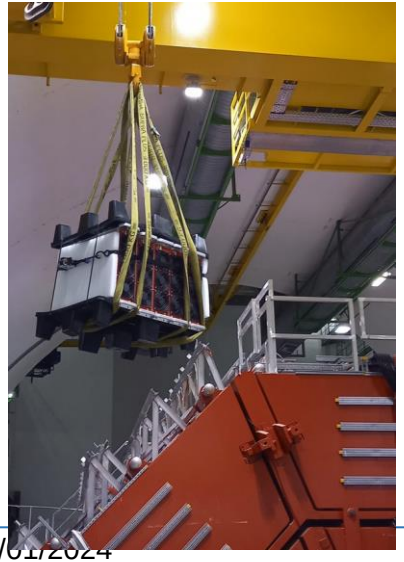


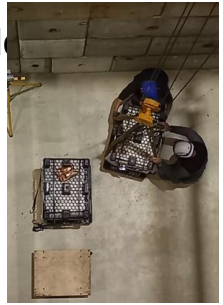


TOF notch Filters refurbishment

- **All units re-installed** in the cavern last Friday Jan 26 and are **operational** (dismounted on Nov 27)
- CAEN reports (informally) that:
  - **ALICE-TOF**: 50% caps were still intact*, **50% caps visible deformed (heat)**
  - ATLAS (x2-x3 power than TOF): 10% caps still intact*, 90% visible deformed

*those intact showed however a capacitance value degrad

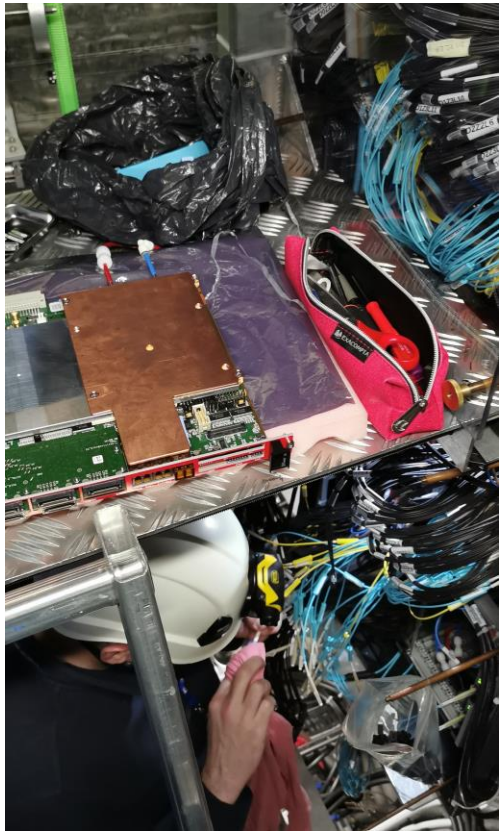


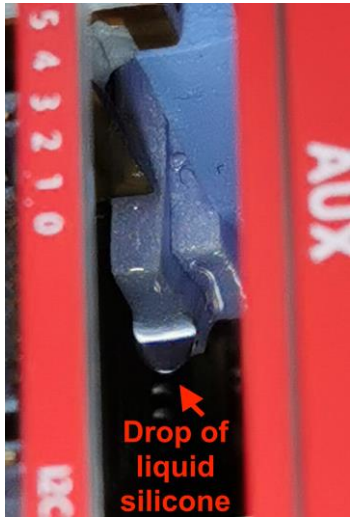


MFT status

- Replacement of the cooling filters in PP0
- Addition of flow limiters on the pneumatic valves to avoid bumps when turning ON/OFF (EN-CV)
- Addition of a 200 litres tank to increase the buffer volume, to reduce the time between 2 pump starts (EN-CV)
- Replacement of the thermal pads on the RO boards affected by the viscous fluid
  - One quarter (H0F0) done last week
  - Second quarter (H1F1) will be done **next week**
  - O-side crates will be done during the next EYETS (if needed)

→ Last intervention next week (1-2 days inside L3)

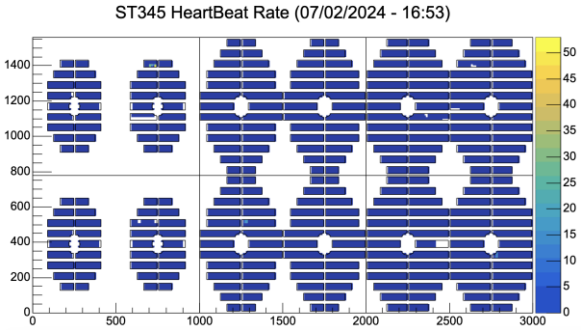


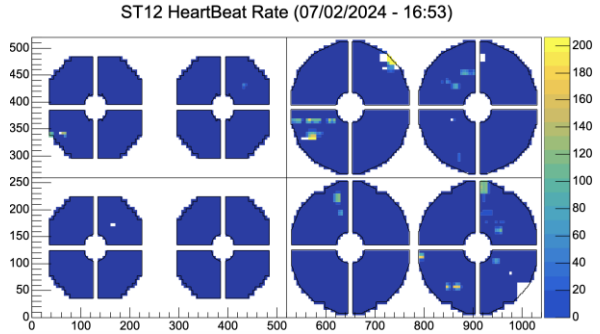


MCH status

- **Station 1:** address RO issues (few intermittent errors) → Orsay team onsite next week. The quadrant with a faulty sector will be exchanged during the next EYETS
- **Station 2:** improve the RO stability of the quadrants. Local shielding on the flat cables that present RO issue seems to fix the problem (to be confirmed with time). A few boards and connectors damaged at beginning of February → Indian team will come to CERN in week 9 (26/02 - 06/03)
- **Stations 3-4-5:** work on ST3 (mainly CH6L) next week. Work on ST4-5 mostly done, except replacement of one SOLAR board

→ Planned cavern interventions until March 6th





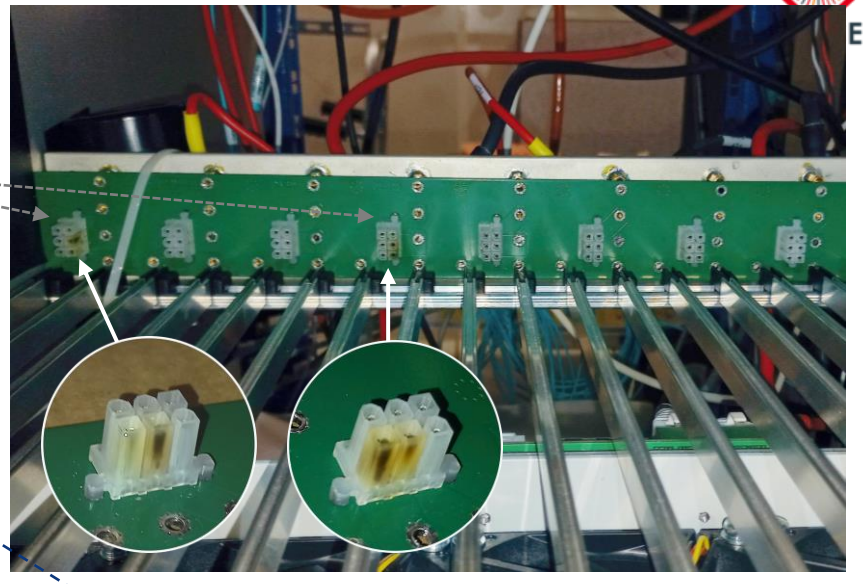
MID status

- Faulty RPC inspected in November
- RPC disconnected from half-plane and repaired in January
- Isobutane circulating since early January

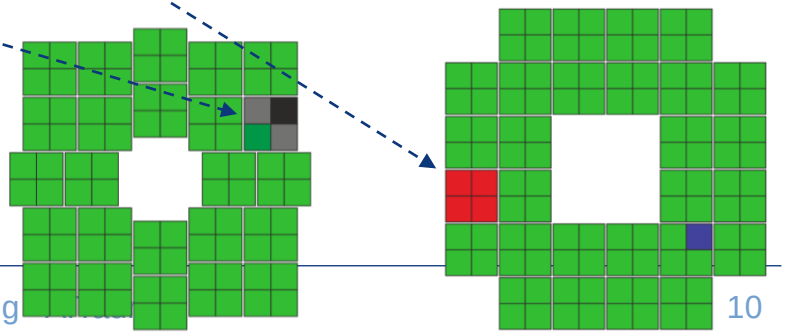
→ No other interventions foreseen until end of this EYETS

FIT status

- Replacement of two burned power connectors in the FEE crate & FEE modules:
  - FEE disassembly / resoldering in the lab / FEE assembly - successfully finished by Feb 6th
- Stress-bias recovery of the FTC-A4 MCP-PMT. It was masked out in 2023 due to a HV breakdown across the MCP. Successfully finished on Feb 12th – now monitoring how permanent the annealing effect is
- Investigation of the reason of the FTA-E2 MCP-PMT being spoiled with internal noise (highly likely increased ion backflow after a vacuum leak). Requires access to the Miniframe, planned for Feb 20th or Feb 26th
- FT0 **survey** done in January
- FT0 laser scans with solenoid on - planned for March 4th



FT0 photosensors' status by the end of 2023:



YETS activities Gas System

MCH:

- Humidifier construction and installation -> construction done and in use now
- Software updated for Humidifier -> Done
- System restarted on 05/02/2023

TRD:

- Install pressure sensor on pump filter -> will be done week 7 or 8
- Pump temperature sensors to fix -> week 7
- trap for humidity -> to be discourse

MID:

- Pump to repair to send to manufacturer -> The pump will arrive at CERN week 8 or 9, then installed
- Replace faulty sensor in distribution-> Done, leak test done too
- ALICE MID leak search in the exhaust -> to be finish

YETS activities Gas System

TOF:

- PURIF Change purif material for O2 trapping -> Done about 20-25% of molecularsieve remove and replaced by copper in the two purifier colomns.
- PURIF change regeneration gas (Ar/H2) -> Done
- PURIF Detection head to be installed (Ar/H2) -> Done
- PURIF Khrone flow sensors to be replaced -> Done
- ALICE TOF Pump/distribution leak test -> no leaks found on gas system

TPC:

- Commissioning of modified backup system -> February
- Find leak on pump and in case send to manufacturer -> To be tested again
- Purifier filter pressure sensor to be connected -> week 7 or 8

Standard maintenance:

- Filter cleaning -> on going
- Checking safety valves -> on going
- Humidifiers filling -> on going

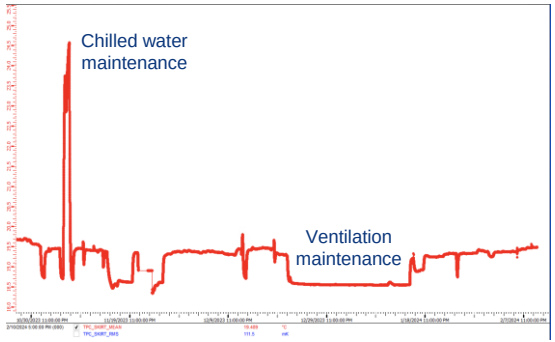
- **Flammable gases:** circulation of i-butane and ArH2 restarted after Xmas break, CH4 still will be restarted by mid-March

Mattia Verzeroli, Louis-Philippe De Menezes, EP-DT-FS

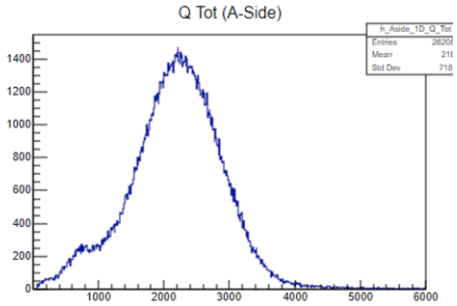
TPC gas issue

- A new **gas leak** appeared, possibly due to a large temperature excursion in the TPC during chilled water maintenance (Nov 6th, 2023)
  - Oxygen intake resulted in signal loss; leak hunted without success
- While trying to stop this leak, gas composition affected
  - Gain too low
- Subsequent maintenance of magnet ventilation: 10 days off
- After recovering the composition, removing O_2, and containing the leak, **unacceptable signal loss** still present
  - Suspect SF_6 intake while ventilation off
- Propose to **preventively replace the TPC gas**
  - Buy neon (now affordable) - one battery ordered
  - Flush with CO_2 for several days
  - Fill with Ne (1 week)
  - In parallel, try to analyse the gas

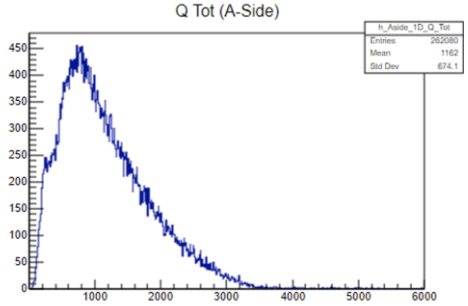
- Detailed presentation in TPC weekly meeting (https://indico.cern.ch/event/1382694/)



Temperature inside TPC (Celsius)



Kr spectrum (good) – 30 Oct 2023

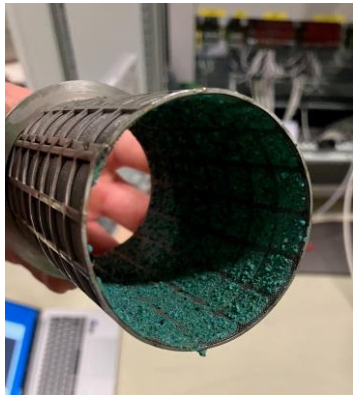


Kr spectrum (bad) – 20 Nov 2023

TOF/PHOS/EMCal cooling plant corrosion inhibitor

- Control cubicle replaced
- New PLC program based on PVSS Unicos
  - It requires a complete change of the DCS system as there is no Modbus communication anymore. All the value s are now shared through DIP
  - Users will have the same interface of EN-CV for the control of the plant
  - Already done for HMPID and TRD
- Maintenance
  - Replacement of the vacuum pump & modification to have a redundant one
  - Replacement of the chilled water valve
- Corrosion inhibitor injection
  - Injection during first week of January
  - Copper level being monitored closely – now 1.12 mg/l (was 1.8 last year)
  - The treatment helped to recover particles. Filters were already cleaned twice (last time this Tuesday)
- Plant was handed over to users on Monday 22nd January.

Point de prélèvement : TOF (cf. Greg)			
Date du prélèvement :		02 Fevrier 2024	
Date des analayses :		02 Fevrier 2024	
Analyse	Limite de détection	Mesuré	Unité
Conductivité	-	20.44	µS/cm
pH	-	6.9	
Turbidité	-	0	
TH	-	4	°f
TA	-	0	°f
TAC	-	1.5	°f
Zinc		0	mg/l
Fer	0,009 mg/L	0.054	mg/l
FerTotal		-	mg/l
Fer Filtré		-	mg/l
Cuivre	0,04 mg/L	1.12	mg/l
Aluminium	0,01 mg/L	0.005	mg/l



P2tech activities

- Clean SNIFFER tubes → Feb 14th PM
- Complete consolidation L3 flowmeters
- Laser cleaning HMPID frame → to be organized (Fabio, Philippe)





Magnets status

- **L3 transformer update:** towards end December we were informed by SY-EPC of a suspected water leak in one of the two L3 transformers (refurbished during LS2). Oil samples sent in January to three different labs, so far results only from one. The result shows a water content still a bit too high, but much better than in the analysis of last year. The dielectric breakdown voltage is within the normal values. SY-EPC will be able to reenergize the transformer if the reports from the other labs confirm these results. If this is not the case, a spare transformer will be installed.

- Maintenance of the L3 polarity switch complete (SY-EPC)

- **Magnet test on Monday March 4th from 10:00 to ~21:00, with a polarity inversion around 15:00**
  - Dipole magnet will be ramped down around 15:00
  - Laser calibration run for FV0 with solenoid ON and no beam
  - EP RD& Robotic activity in parallel

Other activities

- EN-HE:
  - Cranes load test in week 4 (23-24-25 January)
  - Maintenance UX25 crane aux hoist on Mon 29 January (use O-side nacelle)
  - Remove bateries nacelles on Tuesday 5 March

- EN-AA:
  - Maintenance PAD/MAD → no access UX25 18-19-22-23 January between 18:30 and 23:30
  - Maintenance UX25 cavern lift (AS-724) on Mon 5 Feb 6:00 AM to 8:00 AM
  - Installation new SG2 fire detection: 22-24 January
  - Fire, Gas and SNIFFER Maintenance – all done

ALICE Schedule Fire, Gas and SNIFFER Detection Systems EYETS 23-24			
4System	**Buildings**	**Dates**	**Comments**
Safety Test	Experimental Caverns UX25 + PX24	27/12/2023	All Day
CSAM Test	Experimental Caverns UX25	05/01/2024	From 8h00 to 13h00
BIW Test	Experimental Caverns UX25	12/02/2024	From 18h00 to 22h00
Gas Detection #1	Gas barrack SG2, CR5 and UX25 Cavern	01/11/2023 – 03/11/2023	Interlocks test of gas systems during maintenance duration 2 hours max in collaboration with EP/DT
Fire Detection #1	UX25 cavern and counting rooms	06/11/2023 TO 10/11/2023	
Fire Detection #2	UX25 Racks	18/01/2024 TO 24/01/2024	
SNIFFER #1	CR5 and UX25 cavern	14/02/2024	Test of level 3 alarms and DSS after all rotations are done
SNIFFER #2	CR5 and UX25 cavern	TBD	Air sampling network cleaning