

PS-SPS Users Meeting for Week 25 held on June 20th, 2024

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Physics Coordination schedule:

- June 10th to June 20th: E. Barbara Holzer
 - June 21th to June 23rd: Martin Jäkel
 - June 24th: E. Barbara Holzer
 - June 25th to July 7th: Martin Jäkel
 - July 8th onwards: E. Barbara Holzer
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- Wednesday September 4th: User meeting exceptionally on zoom only for availability of the conference room (thursday September 5th is CERN holiday).
 - Updated user schedule soon to be published.
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News from the PS & SPS Physics Coordinator

E.B. Holzer, M.R. Jäkel

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- **User Schedules v2.0.2** (for most of the lines **until end of August**) released: see [User Webpage \(https://ps-sps-coordination.web.cern.ch/ps-sps-coordination/\)](https://ps-sps-coordination.web.cern.ch/ps-sps-coordination/)
 - Please get in contact, if you want to take one of the week still free before June - Tanja (tetiana.shulha@cern.ch) is collecting all requests.
 - 2024 injector schedule released [EDMS 2872566 \(https://edms.cern.ch/document/2872566/2.0\)](https://edms.cern.ch/document/2872566/2.0)
2024 approved LHC schedule [EDMS 2872429 \(https://edms.cern.ch/document/2872429/2.0\)](https://edms.cern.ch/document/2872429/2.0)
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Proton Run 2024

- AD/ELENA Physics Stop Monday 02.12.2024
- SPS NA Physics Stop protons Thursday 31.10.2024
- PS EA Physics Stop protons Wednesday 27.11.2024

Ion Run 2024

- SPS NA Physics Start 4.11.2024 (maybe earlier if set-up is fast) - Stop Pb ions Monday

2.12.2024 (6h)

- NA : Week 45-47 high energy
- NA : Week 48 low energy (no LHC running)
- PS EA Physics Start 6.11.2024 (tbd) - Stop Pb ions Monday 2.12.2024 (6h)
 - CHIMERA: 13.11-2.12
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Reminder: Beam time exceeding the limits of 2 weeks PS beam time and 1 week SPS beam time (added proton and ion beam time!) per year need the approval of one of these CERN committees: SPSC, LHCC, DRDC, INTC, RB or IEFEC. Consider joining a DRD collaboration, if you require more beam time.

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News from the Facilities Operations Meeting (FOM) (E.B. Holzer)

- Inspection of water leak in booster, probably Monday 24.6. with beam stop at 7:30
- SPS magnet was exchanged because of a vacuum leak --> will require scrubbing in the SPS
- Water leak on quadrupole QNL.X021.049 has become worse. The magnet needs to stay off, which limits the beam momentum in H2 to 150 GeV/c until the magnet exchange.
 - **Exchange to be planned:** Possibly end of July / beginning of August.
 - H2 beam line momentum limited to 150 GeV/c until further notice

Upcoming MDs:

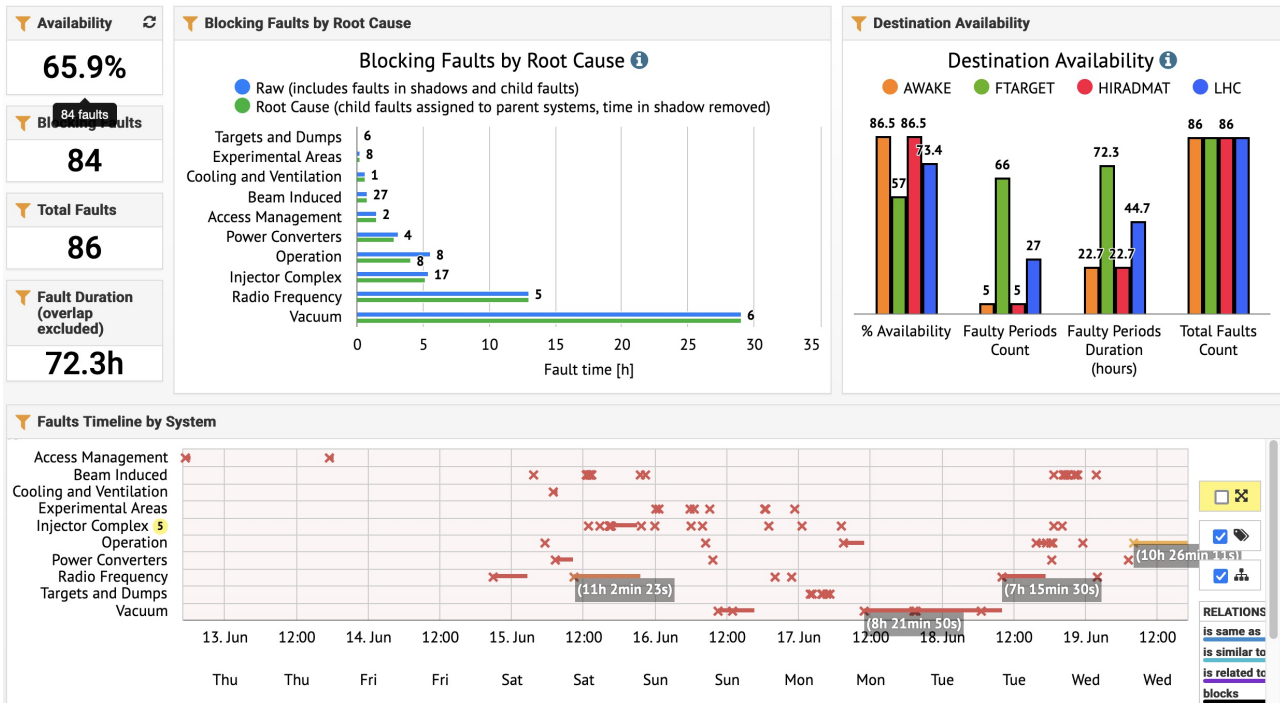
- Currently investigating the possibility to group dedicated SPS MDs during the necessary magnet exchange in H2. --> This would mean to postpone some of the dedicated SPS MDs currently scheduled until the end of July.
 - Week 25 : SPS Dedicated, 19/6 no extraction
 - LINAC4 and PSB high current MD in parallel - no beam for PS users between approximately 9:00 to 9:30 and 17:00 to 17:30
 - Week 26 : Dedicated: 26/6, extraction to TT20

PS Machine Report (Ewen Hamish Maclean)

- Relatively good availability (89.6%) and smooth restart for PS since end of TS
 - Access in PSB to check status of water leak found during TS
 - In PS some issues with injection kicker modules on Saturday and Tuesday. Operation continued with 3/4 modules, but slightly degraded as suffered from repeated trips of the remaining modules.
- On Tuesday morning attempted switch to TOF from 28->44 ns beam.
 - Found that beam sigma was too small - ~15mm vs 30mm typically. However was just above the SIS interlocks on beam size (14mm). Reverted to 28ns for now. Optics will need to be reworked for 44ns beams to increase the beam size, and SIS limits to be reviewed.
- Since end of TS observed large drifts of east asymmetry.

- autosteering trims on east beams ran out of strength, leading to observed drift
- autosteering corrector reset to zero on tuesday morning and beams recentered downstream. Autosteering trims conti

SPS Machine Report (Kevin Li)



- Review:

- Difficult restart after the TS!
- Cavity 6 lost Friday night and needed cleaning on Saturday all day - tried to set up degraded mode, but difficult due to significant RF power reduction
- Foil measurements done overnight!
- MBA.410 vacuum leak developed Sunday morning - leak detection confirmed leak; after careful risk assessment and expert consulting, decided to continue physics program until Monday morning --> dipole exchange + vacuum recovery
- Loss of cavity 3 towers all day; beam back for orbit measurements and setting up only in the evening, followed by difficulties to steer to targets; solved by 23:00 Tuesday
- Wednesday dedicated MD - evening re-did the crystal alignment and reduced intensity on T2 from 100 - 30 units;
- Noise regulation under closer investigation as 50 Hz regulation still difficult;

- Outlook:

- MDs restarting - dedicated MDs schedule will be reviewed in the coming days
- Plan for physics production for this week and for next week

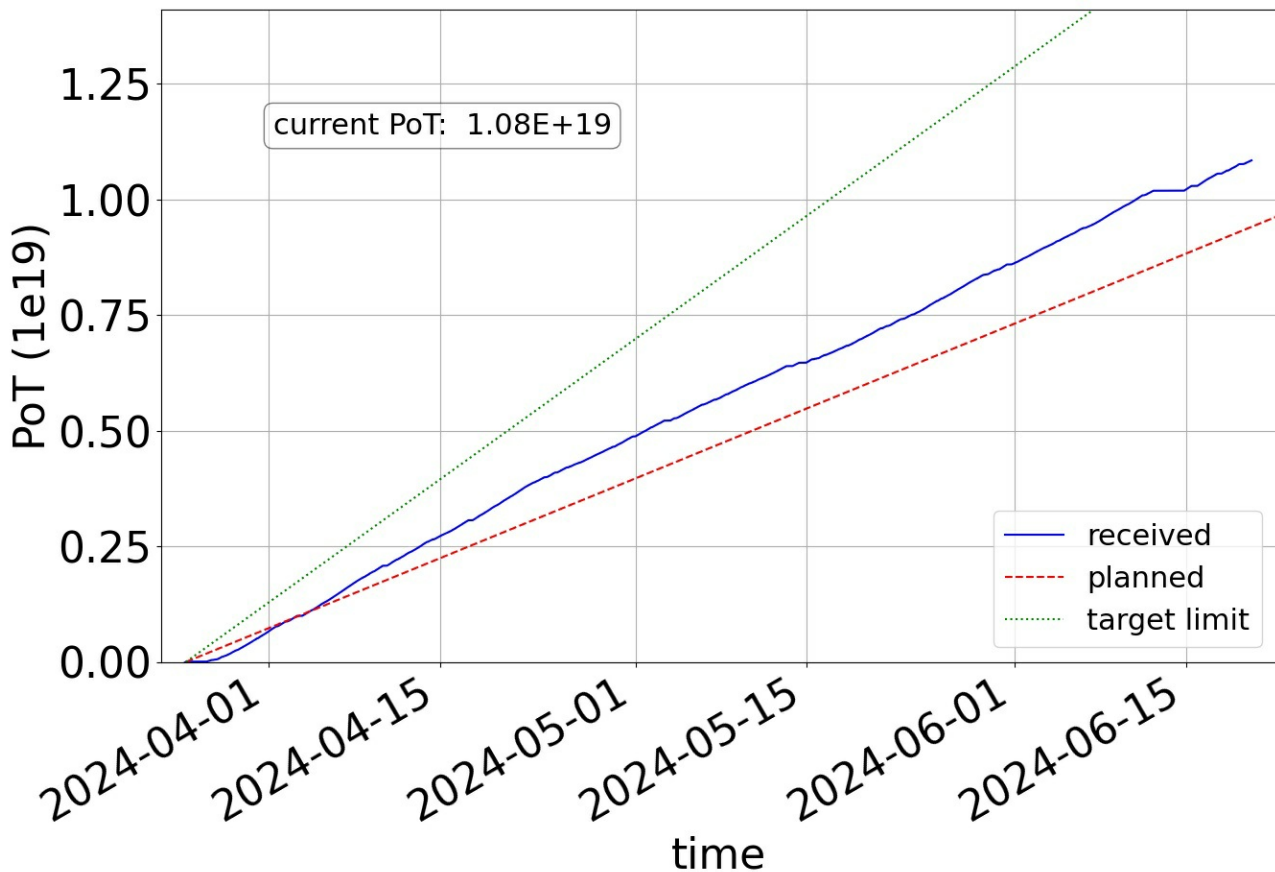
Safety (J.Devine)

We cannot inspect your experiment if you don't press submit on your ISIEC form! Please double check you have actually submitted it.
Here is the submission link (CERN login required before accessing the form): <https://ep-th-safety.web.cern.ch/form/isiec-form-v2>

Hot summer weather has arrived. There are specific rules for how to dress in experiment areas, they are defined in EDMS 2193556. In summary:
If you have to wear safety shoes (i.e. all beam line zones), long trousers are required. Short sleeves are tolerated, provided there is no risk of upper body injury - for work not work involving a risk of projectiles or working in proximity to sharp edges

nToF (M.Bacak and P.M.Milazzo)

Days without beam during technical stop have been used to set-up EAR1 and EAR2 for long measurements. Even though few issues with detectors it was possible a quick restart on 14.06. Preliminary test with a longer nominal bunch (44 ns) have been performed, but the beam size need some adjustment; optics will be investigated along next week.



Smooth data taking:
EAR1: Er(n, g)
EAR2: 97Mo(n, g)
NEAR: Activation measurements

East Area Beam Status (M. van Dijk)

On call number: **67500**

General: Following the TS the position of the proton beam on target for the east beams was quite offset which has been corrected. The correction was quite strong, the cause is being investigated.

T09: Good operation without issues.

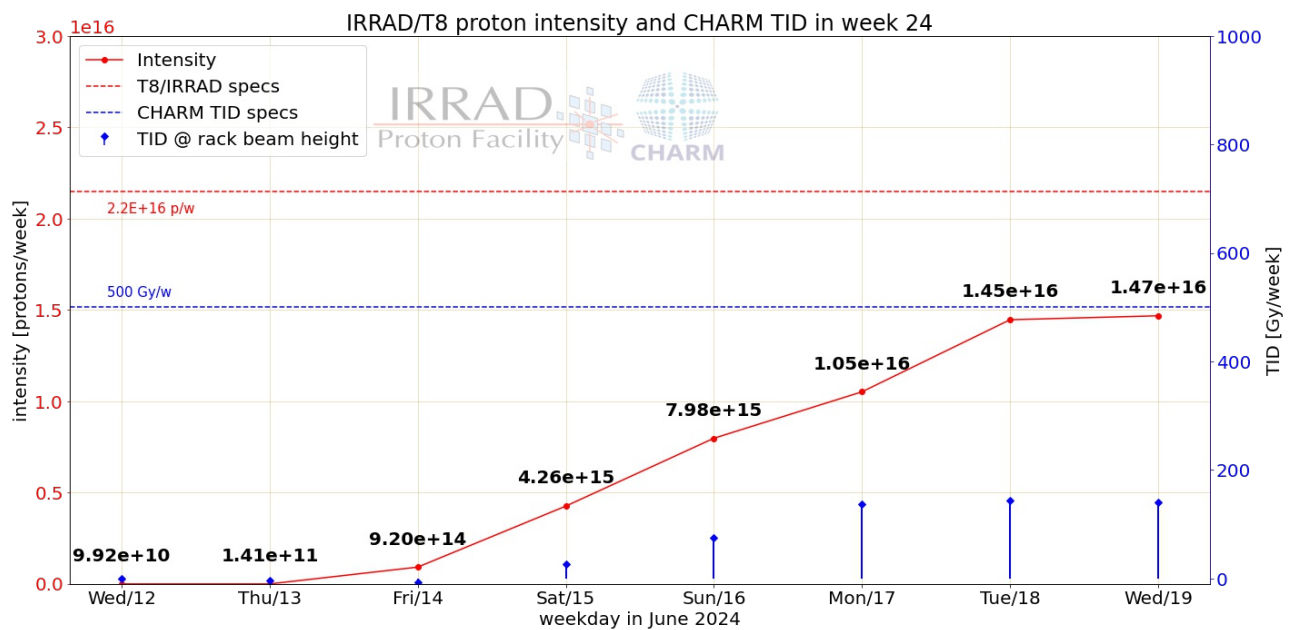
T10: Good operation.

T11: No user.

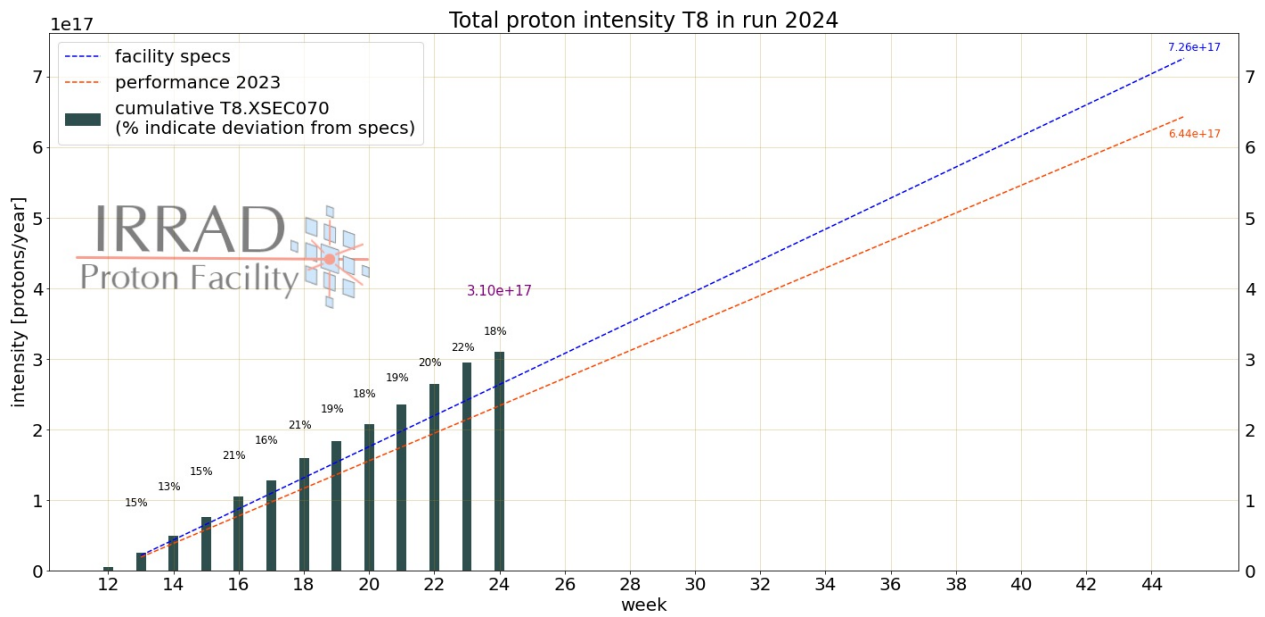
East Area Users Tour de Table

T8 Main: IRRAD/CHARM (F. Ravotti off-line)

Short irradiation week due to the TS1. Performed experiments requiring lower intensities than usual (HV Pover supply in CHARM and BI calibration in IRRAD). All other long-term experiments in IRRAD continued. We run with 60E10 pps for most of the days. Cumulated $\sim 1.5 \times 10^{16}$ p/w and reached TID below 200 Gy as requested by the CHARM user (see plot below).

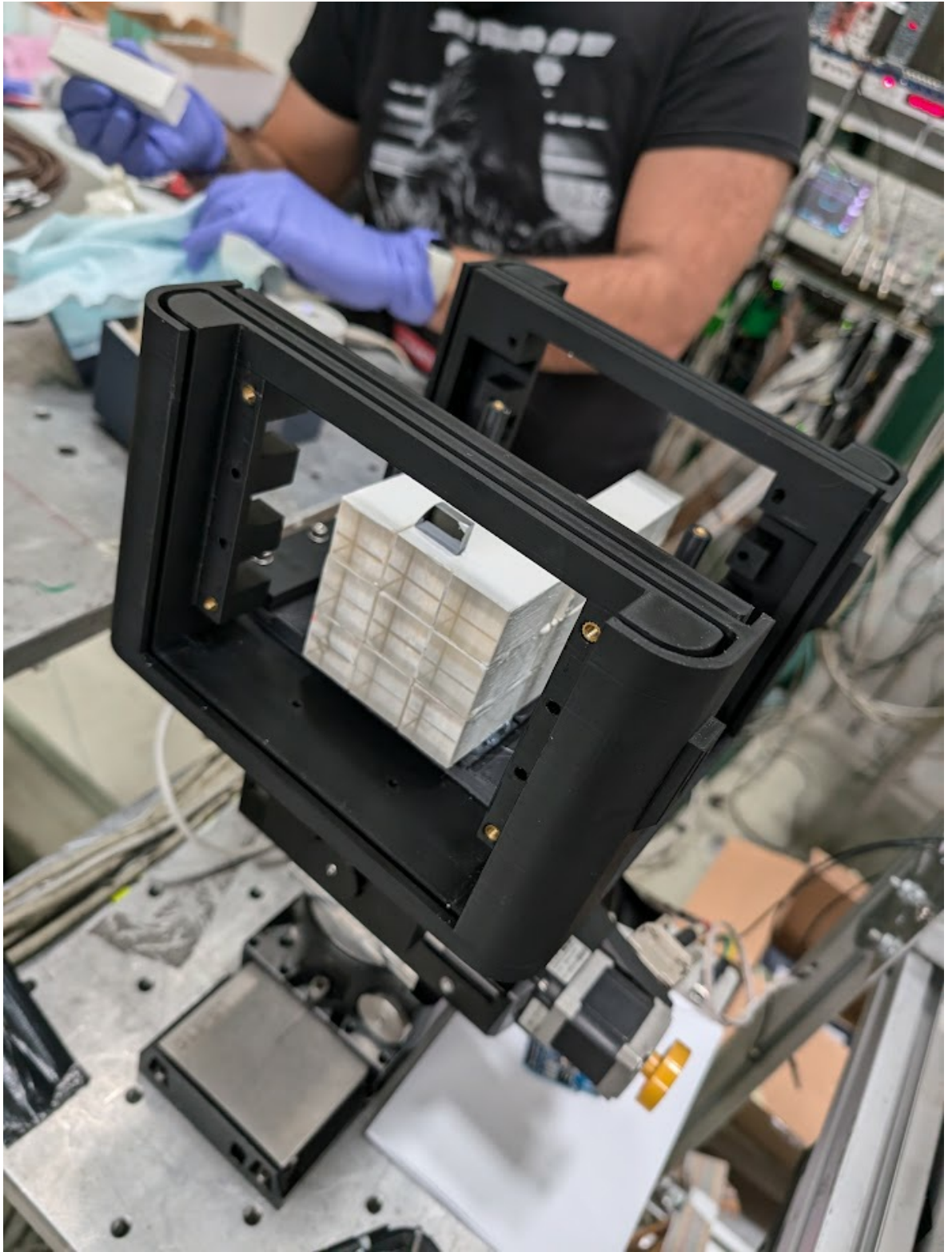


Beam center within +/- 2mm >63% and >81% of the time on the X and Y axis respectively. Access on Wednesday went well, new experiments installed. We run until next week.

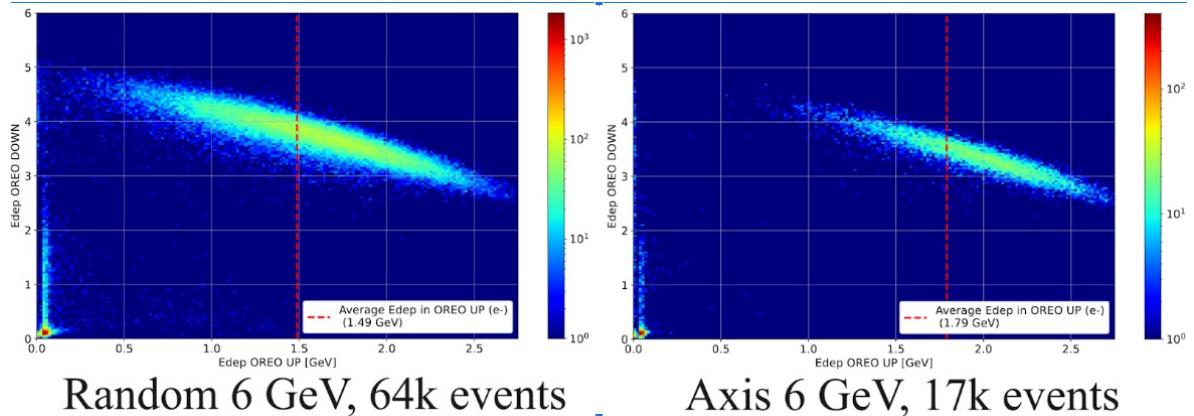


T9 Outgoing Main: E+BOOST (S. Carsi)

- OREO AND e+BOOST weeks were swapped, as both of them are experiments of the same team
- The **quality** of the beam was **very good** and **very stable** and allowed us to acquire **good data** to fully characterize OREO, a full prototype of **electromagnetic calorimeter** based on **oriented crystals**



- The axial orientation of the calorimeter may improve the **electron tagging** performance



- Yesterday we did the **setup change** and started the *e+BOOST* week. As agreed with Alex of the Safety dept. I sent him a couple of photos about the minor changes we did to our experimental setup
- In the following week we plan to orient and test different samples of oriented crystal for a **positron source** based on **oriented crystals**

T9 Main: OREO (S. Carsi)

See above

T9 Incoming Main: CALICE SCW AHCAL (Week 26) (B. Qi)

Preparation status

- Major task 1: energy response of crystal module
 - Crystal module with CAEN FERS-5200 readout system: generally well-prepared
 - Crystal module with MPT2321 readout chip: ongoing
 - New adapter board (under testing), DAQ parameters (to be refined)
- Major task 2: time resolution of crystal bars
 - Crystals and electronics have been tested and sent to CERN
 - New SiPM boards (almost finished), 3D print support (to be refined)

Other items

- Cooling system: still need a chiller at T9

T10 Main: ALICE TOF (Y.baek)

Taking data.

T10 Incoming Main: ALICE TIMING (Week 26) (M. Colocci)

Installation next Wed. Beam file as in April (+10 GeV hadron beam).

North Area Beam Status (M. van Dijk)

On call number: **67500**

Target Sharing, from Wednesday, 19.06.24:

T2 T4 T10 T6

30 42 21 30

H2: Smooth operation (limited to 150 GeV/c).

H4: Smooth operation.

H6: Good operation.

H8: Good operation when beam was available.

M2: Good operation in general. On Wednesday there was a small error to move one of the absorbers but this got fixed without intervention on site.

P42/K12: While beam was there, rather good operation. Another issue with MNP33, which the experts investigated in detail during the MD time. They were unfortunately not able to reproduce the problem, but will have a close look. On Saturday, during a short window of beam availability, the T10 target intensity monitor calibration was completed.

North Area Users Tour de Table

P42-K12:

Main: NA62 (Francesco Gonnella)

MNP33 Magnet

Several problems with NA62 spectrometer magnet (MNP33):

- The magnet struggles to come back after being switched off.
- Sometimes the current drops by about 10A

Johannes recommended not to do "set to beam ref" on Cesar control panel but rather call CCC and ask for the magnet piquet to investigate when we experience the problem.

Piquets were called several times and they are still investigating. Since last MD we haven't experienced any issue.

Reduced intensity on T10

Sometimes we needed to decrease the beam intensity (using a smaller hole in the P42 tax) to calibrate our Cedar, after an intervention to replace some on-board electronics. The procedure requires up to a couple of hours with stable beam.

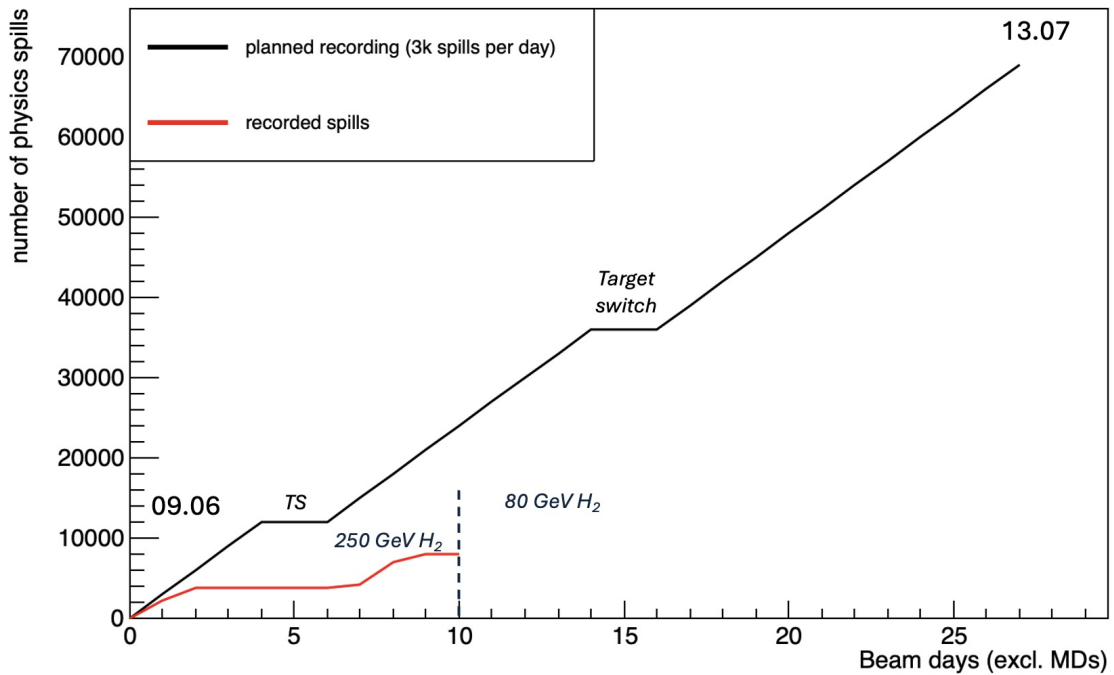
The calibration was successful but we recently found out that it might need further optimisation, so we might request again to decrease the intensity on T10 in the next future.

M2:

Main: AMBER (Thomas Poschl)

- Start of physics data taking on 09.06
- First period (W01): 250 GeV/c on Hydrogen target (~8k spills)
- End of W01 tonight; switched to 80 GeV/c on Hydrogen (W02) requires ~15k spills
- currently largely delayed in measurement plan due to issues on beam (as can be seen on attached figure). With the start date on 09.06, no spare day to fulfill physics goals present to SPSC are left and for each beam day in average 3k spills are required.

AMBER antiproton-measurement data-taking



- investigate all possible options of increase number of beam days for the measurement (e.g. also asked to shorten/ move dedicated MDs)

H2:

Main: LHCb ECAL (Daniele Manuzzi)

- We had the chance to anticipate installation and safety visit to last week
 - Gained some time
- Enough data taken in the weekend (GRAINITA project)
- No beam from Sunday night to Tuesday afternoon
- Took data on Tuesday night with Shashlik module to study e/π separation with double sided readout
 - Had to skip measurements at large incidence angle due to beam unavailability on Monday
- Started taking data with very new prototype of SpaCal last night
 - Very relevant for Run4

- Aim to energy, position, and time resolution determinations
- Using large beam ($4 \times 4 \text{ cm}^2$ FWHM) to scan $12 \times 12 \text{ cm}^2$ large modules
- Max energy needed: 100 GeV
- Some issues with the "loading beamfile" window
 - some line related to magnets get red sometimes;
 - looking at reference and measured values, we think the issue is negligible, but sometimes we had to force some magnet to go to the reference values
 - We will try to understand better today



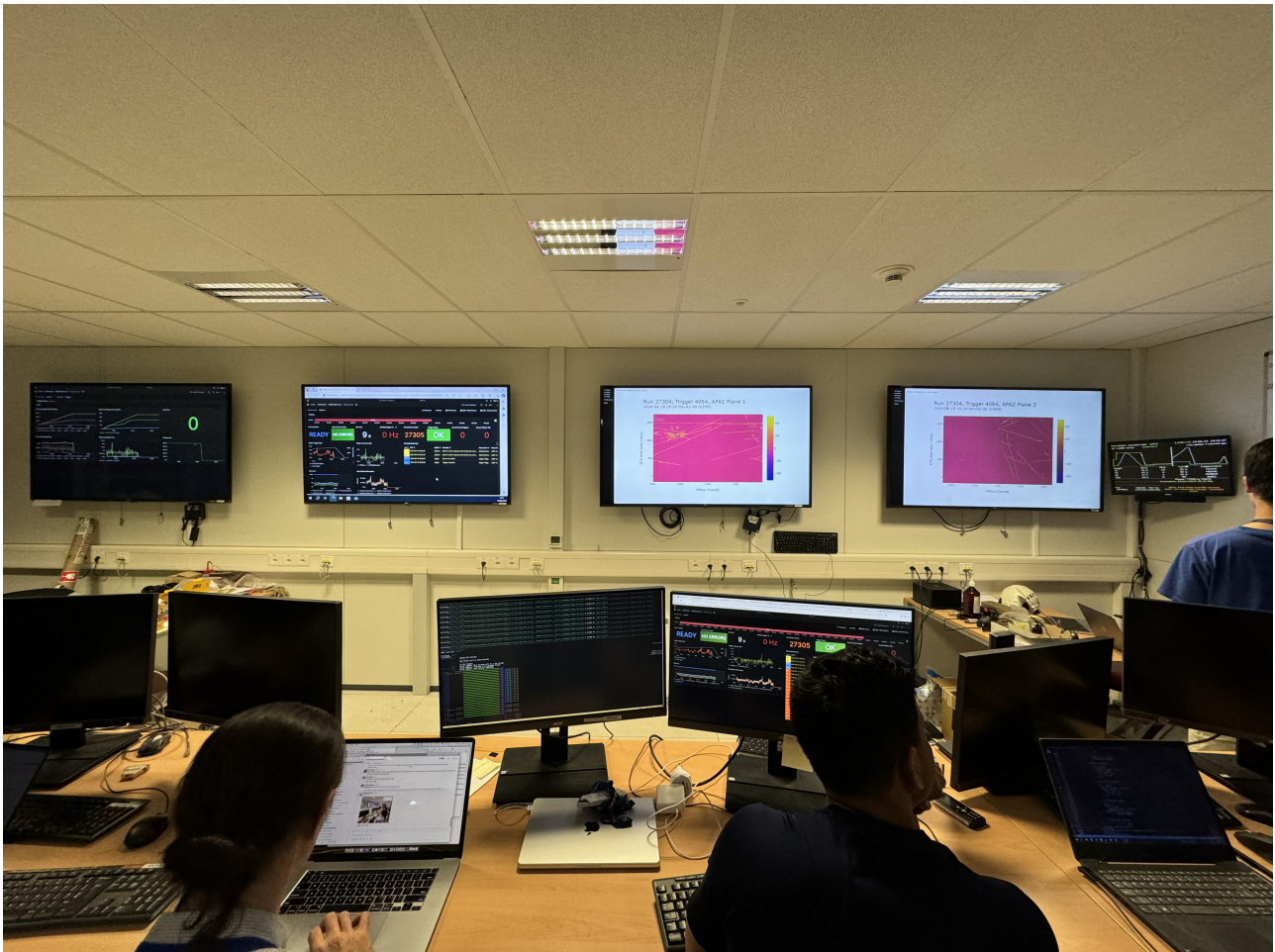
H4:

Outgoing Main: NA64e (Vladimir Poliakov)

Yesterday we finished our beam run on H4. The part of our detectors were dismantled. We recorded only 2.2×10^{10} positrons on target due to lack of beam significant time after long stop.

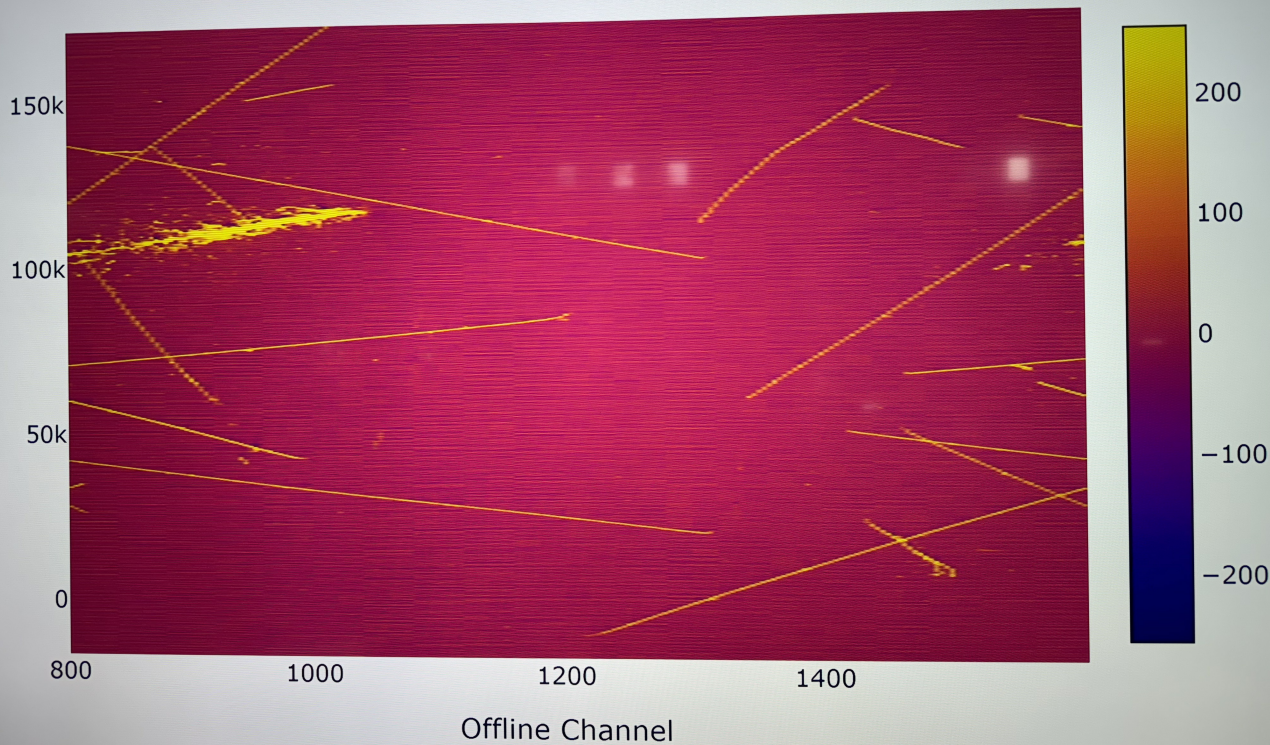
Main: NP04 (Christos Touramanis)

Beam arrived as expected yesterday around 6:30
NP04 TPC working well, nice events seen online
Collected 300k beam triggers 8pm-8am at +7 GeV/c
A very good start for the ProtoDUNE II programme!

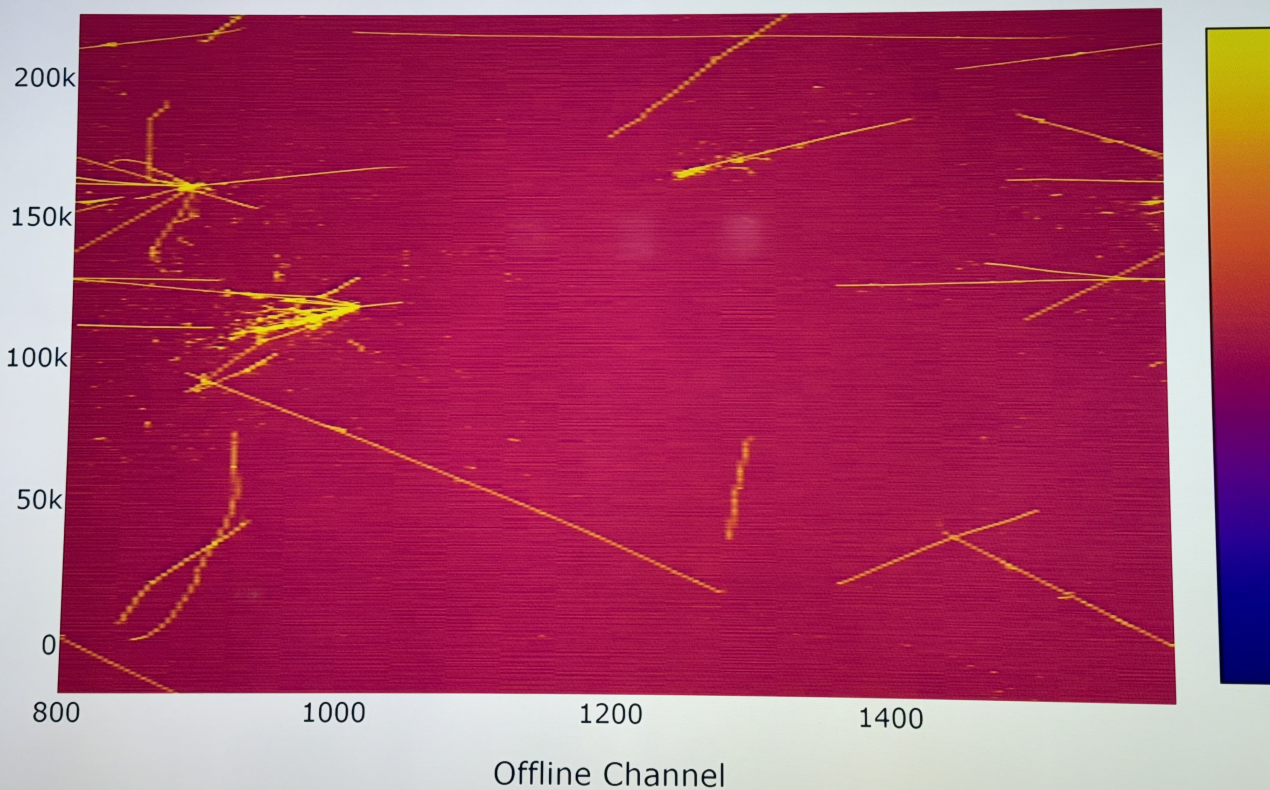


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Run 27304, Trigger 844, APA1 Plane 1
2024-06-19 18:49:46+02:00 (CERN)

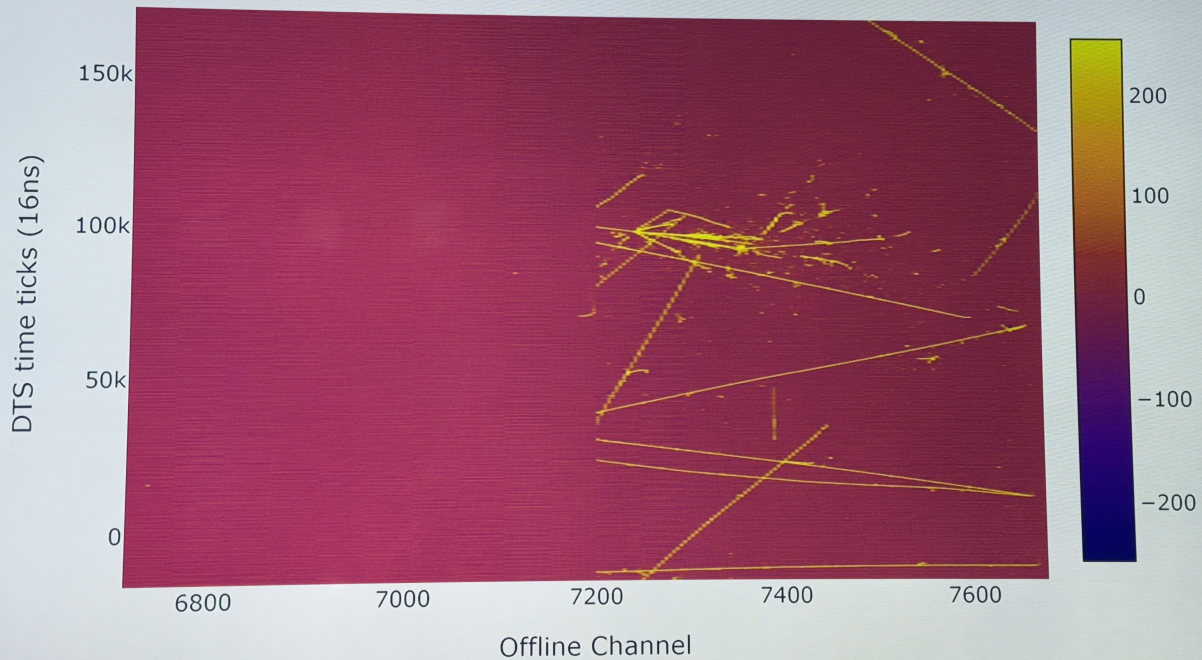


Run 27305, Trigger 1732, APA1 Plane 1
2024-06-19 19:39:35+02:00 (CERN)



Run 27307, Trigger 2694, APA2 Plane 2

2024-06-19 20:11:32+02:00 (CERN)



Incoming Main: DRD1 (Week 26) (Yorgos Tsipolitis, Karl Floethner, K. Kuznetsova)

Setups: 8 setups (see attached slides for more details)

- SETUP A, B: PICOSEC (F. Brunbauer, K. Gnanvo)
- SETUP C: MINNICTACTUS (P. Schwemling)
- SETUP D: STRAW (T. Enik, K. Kuznetsova)
- SETUP E: DRD1 GEM/VMM3a Tracker (K. Floethner)
- SETUP F: uGroove - USTC (Y. Zhou)
- SETUP G: MPGD HCAL (L. Longo, A. Pellecchia)
- SETUP H: FCC-muons (G. Cibinetto)

Beam Conditions: High Rate (as much as permitted by RP) Muons, Potentially few shifts (8h) high rate pions (to be confirmed).

Goliath: not required.

Installation: Wednesday 26 starting from 8am. Beam pipe to be removed from all area. Thanks in advance for all the help that we will need.

Flammable gases: same as in April test beam (see attached slides for more details).

Survey: Planned for Wednesday early afternoon.

Safety Visit: Wednesday 4pm. Safety for Flammable gases to be agreed.

Incoming Parallel: GIF++ (Week 26) (P. Martinengo)

Preparation proceeding smoothly, 8 setups

H6:

Outgoing Main: EP PIXEL (Younes Otarid)

Not much data taking due to the unfortunate circumstances.

Despite the 2 weeks of high rate available in H6 (weeks 34/35) already well served with weeks 31 and 39, and anyway reaching the limit in terms of available person power and data-analysis bandwidth.

But possibility to run parasitically to CMS PIXEL is currently being discussed.

Main: CMS PIXEL (Branislav Ristic)

- Recommissioned our setup and taking good data with our first batch
- Agreed with EP PIXEL to release beam to them for the nights so they can recover some of the lost beam time
 - they use a high-intensity beam that is incompatible with our telescope
- Now waiting for arrival of samples for IRRAD. Transport service is keeping delaying us.

Parallel+Incoming Main: ATLAS ITK PIXEL (Week 26) (Andre Rummler)

We have since one week ongoing DAQ development with experts on-site. Very useful investigation of desync ongoing which hopefully will make our data taking more efficient in the future. But at least a few more days needed as unexpected desync sources were found. A "simple" batch consisting of 2 ITkpixV1.1 SCCs and two quads is mounted which requires only moderate cooling. Currently multiple ITkpixV2 are in work (one wirebond rework at University Genova; one currently in transit) and will be inserted as soon as possible. Switch to irradiated batch afterwards; likely only next Wednesday as it requires a long access to install the secondary cooling circuit.

H8:

Outgoing Main: ATLAS MICROMEGAS (Valerio D., Ralf H., Fabian V., Theo A., Foteini K., Nikos K., Michaela A., Spyros K., Stavros M.)

- Successful test beam!
- Many problems with new DAQ and SPS downtime but managed to finish our program in 3 high-efficient data-taking shifts
- Beam delivered as expected, high intensity pion spills perfect for our data taking: 1 spill = >300k events = 1 run
- 690 runs taken, spanning the surface of 3000 cm² of our detector every ~5 cm
- Long analysis ongoing due to alignment needed for every position
- Preliminary results are good! < 70 um resolution for 0° tracks, and good tracking efficiencies.
- Setup dismantled quickly on Wednesday morning
- Delivery of equipment to BB5 requested on edh

Main: STI/UA9 (Francesca Galluccio)

It has been a quite poor week for UA9/STI.

- Further to the Swissgrid and beam problems, we had no trigger until Monday morning because a cable had remained disconnected after an intervention in the rack room few weeks before, therefore we could not even profit of the degraded mode beam delivery. Since yesterday evening we are taking data.
- We had some exchanges with PAN representative and Maarten helped finding a possible way to run together with them. Thanks a lot!!
We will be happy to have some extra time in week 26 in order to recover a bit the delay accumulated last week, and to be ready with the detector in October.

We have planned a longer intervention (~4 hours) with the EHN1 Survey group next Wednesday for the alignment of our alignment mirrors.
This time should go on top of PAN installation time.

Incoming Main: PAN (Week 26) (Please Put Your name here)

Parasitic Users

H4 Incoming: MINICACTUS (Week 26) (Please Put Your Name Here)

H6: ATLAS MALTA (Please Put Your Name Here)

H4 Incoming: STRAW TRACKER RD (Temur Enik, Katerina Kuznetsova)

- measurements with the upgraded reference tracker readout
 - new Tiger-based FEBs with upgraded firm and soft -ware (Torino)
 - tested at H8 beam dump
- measurements with an improved straw array
- performance studies with overpressure (DUNE STT program)

H8 Outgoing: UA9 (Please Put Your name here)

H6 Incoming: CMS MTD ETL (Week 26) (F. Siviero)

- Testing of LGAD sensors for ETL, using discrete electronics
- Main setup with 6 slots of small LGAD prototypes (single pad, 1x2, 2x2 arrays) for timing, charge collection and efficiency; second setup with four slots of 16x16 Sensors (4 cm²), mainly for survival test and current monitor. The two setups will run in parallel. All devices are new, not irradiated.
- We will need the AIDA telescope and the PI-stage that sits between the two groups of telescope planes. We will not need any other movable stages, but it would be useful to have an extra table (we will have many instruments).
- We will use a cold box, we will bring our own water-based chiller, to operate the sensors at +15°C. We will need nitrogen.
- All sensors will operate < 300V with current < 100 uA. We will use two PMTs as trigger, operated at 1 kV.

AoB

Minutes by the respective speakers, edited by E. B. Holzer, M. Jäkel, T. Shulha, and M. Schwinzerl

