Accelerator Complex Status

End week 17 (Monday 2 May 2022)

Technical Infrastructure (Jesper Nielsen):

Statistics:

- About 6'000 alarms.
- 547 phone calls (366 incoming, 181 outgoing).
- 97 ODM created.

Events worth mentioning:

- Tue. 22.04, Region-wide problem with Orange, caused problems to reach some Orange mobile phone numbers.
- Wed. 27.04, Electrical disturbance leading to Booster trip of finemet cavities and several magnets. SPS had trip of cavities. EDF dispatching Lyon confirmed they had a problem during switching operations on the network.
- Thu. 28.04, Pre-alarm and alarm ODH at UX15. Some seconds later, evacuation of UX15. Fire Brigade on-site and able to see that one sensor dipped to ~15% and then reached normal values again.
- Fri. 29.04, SPS stopped due to a water leak on a magnet in the TDC2.
- Sat. 30.04, CRYO trip of QURC in the morning, should be back with conditions again Sunday.

Details: https://wikis.cern.ch/display/TIOP/2022/05/02/TI+week+summary,+Week+17

LINAC 4 (Jose Luis Sanchez Alvarez)

There was a very good beam availability of 99.86% this week at the LINAC 4.
The 3 stops are:

- Monday: chopper sparked (4 min. downtime)
- Tuesday: RFQ breakdown protection triggered. Level1 recovery (2 min. downtime)
- Saturday: RFQ modulator tripped. Power converter Fault (8 min. downtime).

PS Booster (Foteini Asvesta):

It was a very good week for the PSB with an availability of 98.5%, dominated by the R4 stop last Monday for the new LLRF framework release (as reported in the previous FOM), which improved the voltage spikes issues experienced in the past few weeks. In addition, an electrical disturbance on Wednesday afternoon caused faults on all the Finemet cavities, the Transverse Feedback system and the BTY quadrupoles but they all recovered within a few minutes.
The ejection trajectories were reviewed for multiple users by the op crew reducing losses observed mostly after the energy matching with the PS.
Concerning the LHC beam, the new 3eVs variant was used in the PS showing an improvement in terms of brightness on their side. Furthermore, profile measurements of the operational variant were conducted in coordination with both the PS and the SPS, to further study the observed tails and blow-up along the chain.
Finally, measurements and refinements on all operational users continued as usual.

ISOLDE (Eleftherios Fadakis):

For ISOLDE it has been a good week with no major issues.

On **GPS**, Target #634 LIST, delivered Ti isotopes until last Monday.
GLM took stable Fr isotopes until Friday.

Niels took beam emittance measurements until the time the target failed.
Target manifested a leak on Saturday night.
Was planned to do a target change today. New target #534 Sn VD5.

On **HRS**, Target #754 UC. COLLAPS was interested in Te isotopes. Setup at 40kV and in bunching mode ready Tuesday (26/04) .
This was a RILIS enabled run.
Contacted C. Mittifiot to perform a re calibration of the extraction electrode which corrected the beam profile.
Proton scan and yield check performed Wednesday 27/04
Vertical position of the BTY.DVT324 is inverted. To shoot on the converter which is physically below the ISOLDE target.
We need to put +100A to divert the beam down.
Saturday users started taking beam from target.

PS (Matthew Fraser):

The PS had an excellent week with about 97% availability. The BCT problem causing the SIS to cut operation last weekend was caused by missing timing signals and fixed by recabling during an intervention on Monday morning. A few other minor issues caused downtime, including a crash of the FGCs controlling the low energy quadrupoles due to an update of the RBAC database and a settings error caused the RF stable phase program to take the wrong harmonic number when swapping in the spare C11 cavity on Tuesday.

n_TOF started commissioning parasitic bunches whilst the OP team homogenised the settings on the three different EAST users at 300e10 ppb, including beam size and bunch length on target.

Work also continued on the LHC25 beam type. The 3 eVs longitudinal emittance beam was taken from the PSB and setup with an intensity of 1.9e11 ppb at extraction from the PS. Wirescanner measurements showed promising results on the beam brightness at flat-top in comparison to the 2 eVs beam, with the vertical emittance remaining significantly brighter.

Although a preventative exchange of PI.SMH42 is being discussed between experts, it was well behaved this week with no further vacuum interlocks.

The OP team also supported SY-STI in commissioning the internal dumps TDI47 and 48 and validating their performance at an intensity of 1800e10 protons at 26 GeV with LHC25.

PS - East Area ():

No report.

AD - ELENA (Laurette Ponce):

The week has been punctuated by problems with the DR.BHZ-TRIm power converter, which appeared during the Eastern week-end. Several intervention done by EPC to try yo identify the problem, with installation of a scope, without success. This prevent the planned activity to improve 2 GeV/c stochastic cooling on Wednesday.
The beginning of the week was dedicated to adjust the ELENA LLRF, optimize 100 keV plateau to minimize transverse emittances and synchronize the Hminus cycle to ease further optimization in parallel of physics.
Physics run started on Thursday morning as planned, but was unfortunately interrupted on Friday night due to problem on BHZ-TRIM power supply which cannot be repaired by the piquet during the week-end.

SPS (Stephane Cettour Cave):

Monday

- SFTPRO
    - Increased intensity on SFTPRO at 1.5e13 - transmission 97%
    - Sharing
        - T2: 20e11
        - T4: 40e11
        - T6: 40e11
    - Reduced losses in BA80 with optimiser which is working fine on Splitter 1
    - Crystal setting up in LSS2 in volume reflection – it reduced significantly the losses on extraction channel
    - Issue with RF low level
        - Bad quality of the extraction spill (sometimes we had a fast slow extraction)
        - To limit the risk burned of the ZS wire we set for all the night a very slow extraction start
        - Tuesday morning, we will call all the Rf team to work together to understand this issue and solve it
- AWAKE
    - Set up amplitude modulation all cavities on AWAKE cycle

Tuesday

- SFTPRO
    - RF low level team working on the issue
        - They found a fixe for the bug in the FESA CLASS beam control (thanks for the high reactivity)
    - Optic measurement on TT20
- Parallel MD working fine

Wednesday

- SFTPRO
    - Issue with BEC fast on SBDS
- MD longitudinal blow up on SFTPRO MD cycle
    - Setting up longitudinal blow up on fixed target
- Coast cycle for Crab cavity
    - Setting up cycle (energy, tune, chroma, orbit…)
    - Test instrumentations, FGC, all working fine
    - RF radial steering, total voltage did not work
    - RF Low level and power set up the crab cavity
    - The MD team had can take some data in coast

Thursday

- SFTPRO
    - Following the longitudinal blowup MD on SFTPRO MD
        - Setup the settings on the operational fixed target cycle
- Issue
    - SBDS team try to found the BEC issue from 15h00 to 18h00
        - Issue on the divider on the PFN MKDV2
        - An intervention have been planned Friday morning
    - Johannes called us to said that we have a big water leak in TDC2
        - Need to stop the NA beam at 19h00 to cool down the radiation level
        - Intervention has been planned on Friday morning
        - We stop the NA beam at 19h00 to cool down the radioactivity level

Friday

- AWAKE
    - Working on the voltage jump, cavities conditioning
        - 1 bunch at 3e11 p/b - length is ~1.05ns
- Issues
    - Access to TDC2
        - Water leak come from the collimator “TCSC.211708” before splitter 1
        - High level of radiation > 20mSv/h
        - Leak on the hose connection of TCSC cooling system
        - No beam for all the weekend for NA and more (i.e. at earliest towards mid/end next week TBC..)
    - SBDS intervention
        - ABT team replaced the divider in the PFN MKDV2 from 9h00 to 12h00 but unfortunately this not solved the issue
        - At the 14h00 the ABT team returned on ECA5 to try to find the issue but after some manipulation the BEC fault disappears for 1h00 so for the moment we stay like this, and we wait and see

Summary

- Increased intensity on fixed target at 1.5e13 with a good transmission 97%
- Put in service of the crystal in volume reflection mode in the NA extraction channel
- RF low level on the extraction spill issue solved
- Reduced losses on the NA transfer line
- TCSC water leak no beam for NA till ~mid or end of week TBC..
    - Need to wait radiation level decreasing
- SDBS issue with spurious BEC still ongoing wait and see (already changed the divider in PFN MKDV2)
- Coast cycle working fine it miss the trim on RF (expert working on it) but ready for next week
- AWAKE cycle ready for physics 1e11 p/b and 3e11p/b - bunch length ~1.05ns
- Hiradmat cycle ready for physics still to do some adjustment when the PS will do the Hiradmat cycle with a transverse emittance of ~2.5um
- SPS gave the beam to the LHC except Thursday afternoon and Friday morning due to SBDS interventions

Next Week

- LHC
    - Monday morning LHC will ask for indiv beam we prepared one pilot cycle with an INDIV beam
- SFTPRO
    - If issue on TCSC is solved- increased intensity
        - T2:25e11 p/b
        - T4:70e11 p/b
        - T6:50e11 p/b
- AWAKE
    - Run AWAKE
- Hiradmat
    - Ask PS to have the new cycle 72bunches 1.2e11p/b, 25ns, with transverse emittance at ~2.5um
- Wednesday
    - Coast crab cavity

- **Maybe need to discuss with MD coordinator to plan a maximum of MD this week like we don't have SFTPRO and when SFTPRO go back we would do one week or more of SFTPRO dedicated to catch up the loose time**.

SPS North Area ():

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AWAKE ():

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LINAC 3 ():

YETS.

LEIR ():

YETS.

CLEAR (R. Corsini & P. Korysko):

Last week was dedicated to VHEE Dosimetry for focused electron beam in a Water Phantom, in collaboration with the University of Manchester. The aim was to show longitudinal dose deposition peaks in a water phantom
corresponding to a transverse beam waist. Dosimetry is done by a series of films, while setting up is done by a YAG screen in water. In-air tests showed that the optics could produce a nice small waist as expected, while scattering and possibly screen resolution made more difficult to find good conditions in water. Several series of measurements were taken, and they will be fully analyzed in the next weeks. MKS11 was mostly stable and working well (compared to week 16) but a few issues persist (trips and phase drift).
Full operation reports can be found in the CLEAR Weekly Operation Meeting series, here:
https://indico.cern.ch/category/10682/

LHC (Jörg Wenninger & LHC Coordination webpage):

Monday began with the first successful ramp to 6.8 TeV - at the first attempt. 2 days later the beams were brought to the end of the squeeze at 30 cm and the first optics measurements were performed to determine the local triplet corrections. The beta-beat on the virgin machine reached 150% at 30 cm. Commissioning of the ballistic optics for IT BPM calibration was less successful due to massive coupling on beam 1 and unfortunate availability. But the beams were brought to 6.5 TeV with the hope that the ramp could be ready after another cleaning cycle.
Splashes were delivered to ALICE, ATLAS and CMS. The ADT BPM setup is completed for beam 1.
The machine was stopped 1/2 day on Wednesday for the visit of the President of the Swiss Confederation, while the weekend was lost almost entirely due to a cryoplant issue in point 8.