

Accelerator Complex Status

End week 46 (Monday 19 November 2018)

TI (Jesper Nielsen)

Thu 15/11/18 12:13, Trip of SEQ3 compensator. EPC cam on-site and measured the capacitors, no anomalies were found. No weasels found either. The compensator was switched on again without problems after measurements and visual inspection.

Details: <https://wikis.cern.ch/display/TIOP/2018/11/19/TI+week+summary%2C+week+46>

CLEAR (Kyrre Sjobaek):

Monday 12/11 -- access

- Vented CLIC module and installed 3 new Next Torr pumps
- Installed new digital BTV in the tunnel for tests
- Repaired all roof light fixtures; the tunnel is no longer a dark cave
- Work on THz tests stand
- Potential new users for testing measurement techniques of stray fields in a realistic machine visited

Tuesday 13/11 -- access and tried to restart

- Started the new ion pumps (difficult due to slow pumping of outgassing during ion pump flushing)
- Removed mobile pumping group
- Replaced malfunctioning power converter
- Closed up and tried to restart the beam but could not due to malfunction in MKS11.

Wednesday 14/11

- Access in the morning to retrieve a piece of equipment
- THz studies
- New digital BTV works!
- Finished commissioning of "bump scan" for CLIC structure studies;

Thursday 15/11

- Beam for CLIC structure tests; high quality, stable, and well characterized
- New optics model works well
- Data of wake kick scans in CLIC structure with single bunch / 50pC
- Debugging of WFM cabling
- Stopped at midnight due to problems with MKS11

Friday 16/11

- Quick morning access to change components on THz table and check WFM connections; more shielding was installed for the digital BTV.
- THz tests in the morning/afternoon
- Tests of CLIC wake field monitors using 30 bunch trains / 1nC total

LINAC2 (Francesco Di Lorenzo):

On Monday at 15 o'clock the Linac 2 retired.

LINAC3 (Francesco Di Lorenzo):

On Tuesday in the morning around 4 o'clock the source has got less intensity. After several set up the source has been stable again around 2 o'clock PM. On Friday around 11 o'clock in the morning, we changed the position of the Stripper foil (From

arm 4 position 2 =146mm to arm 3 position 1). On Sunday around 13 o'clock the source has started to be unstable again , Frederik and Detlef worked to recover the stability but not substantial improvements. Thanks so much Fredrik to stay with me for all Sunday until 8 o'clock PM to supervise the source.

In generally the source has run very well for all week with a very good intensity. The source was stopped on Monday morning for an oven refill.

LINAC4 (Bettina Mikulec):

Tuesday last week the source was again caesiated and a controls card exchanged on PIMS11/12 to test the Kalman filter. It was found that a cavity resonance was excited, and therefore the RF team will work on a notch filter. It is important that the Kalman filter will be tested on each cavity type before the end of the run. Re-phasing of the linac was finished Tuesday evening.

During the week several faults happened, resulting in an availability of 89.6%. On Wednesday the source showed issues, and the RF team replaced the RF tube. Unfortunately this didn't help and an access was required - it was found that a soldered connector piece holding the inductor between the capacitor and the antenna had broken. It touched the ground leading to a short circuit; the team could quickly repair the inductor.

In the evening CCDTL5/6 tripped and could only be reset by the specialist.

On Thursday almost 6 hours were lost when trying to set up the beam to the temporary dump, as the horizontal bending magnet did not take the 'PSB' destination anymore; the EPC specialist had to roll back the last software change.

On Friday a few issues with the BCTs in the transfer line hampered the steering setup - solved in the evening.

Finally Friday evening steering to the temporary dump could be done using YASP. Ready to finally program a simulation of a future PSB commissioning supercycle with different cycle setups.

LEIR (Angela Saa Hernandez):

In general the week was quite fine with LEIR extracting an average of $9e10$ ions from the NOMINAL cycle (with peaks over $10e10$) towards LHC and $1.5e10$ ions from the EARLY cycle towards the fixed target experiments. The availability has been 85.8%, with a short fault (1.30h) due to a convertor of quadrupole ITE.QFN03 which had to be exchanged, and longer faults due to large intensity fluctuations from the source. LEIR had to be reoptimized for a lower intensity from Linac3 on Sunday evening. During this week the white-rabbit B-Train was also tested on operational cycles. It proved to be transparent to the beam, so it is now used by default, also during LHC fillings.

Finally, we also optimized a 3-bunch 75 ns cycle with maximum extracted intensities of $9.6e10$ charges. This cycle was send up to SPS.

PSB:

Stopped on Monday 12 November.

ISOLDE:

Production with primary beam was stopped on Monday 12 November.
From Thursday afternoon 7Be was delivered to XT03 at an energy of 5 MeV/u.
The target for this experiment was pre-irradiated at Isolde some weeks ago and now it is used to slowly extract the 7Be (half-life of 53 days).
No major issues to report apart from some RILIS adjustments during the run.

PS (Ana Guererro):

The first ion week in PS started with POPS trips on Tuesday causing a beam down time of 1h30m in the morning and 9h during the night and Wednesday morning. PIPO was called during the night and the specialist joined early in the morning. There were several problems, communication among some subsystems and fgc, several interlock cards were exchanged as well as a crate due to an auxiliary power supply failure. Beam was back on Wednesday at 14h.

On Tuesday at 13h30 the beam was stopped to carry out the end of proton RP survey. The switchyard was back on beam mode by 16h and 40 minutes later the PS. During the stop a camera was exchanged in the F61 line and the long standing frequent trip problem of the PFW was solved. The PR.PFN/I circuits could take the former slope on ion cycles with the power converter following well the reference. It was also tested on LHC cycles without issues.

The PS has produced and sent to SPS and LHC two type of nominal beams (ILHC100ns 4b & ILHC75ns 3b) and the 1b EARLY beam. To EAST area, a 1b EARLY beam and a nominal 2b beam with almost 8 times the intensity of the early beam have been sent. On Tuesday evening a calibration with the F61.FBCT (fast extraction) was done.

AD:

Stopped on Monday 12 November.

ELENA ():

Stopped on Monday 12 November.

The HT transformer for the local ion source is not available to produce ions.

SPS (Karel Cornelis and Reyes Alemany)

Beginning of the week: end of proton physics and start of the NA ion beam setting up. Beam was handover to north area physicist on Monday evening without issues.

On Tuesday instabilities of the ion source impacted the efficiency of the setting up of NA beam, around 1 out of 6 cycles could be used for setting up, which made the setting up operation very lengthy. On top of this PS POPS trip and gave 1.5 hours of down time.

On Wednesday 14.11.2018 important losses on the LHCION1 at start of the ramp and on the flat top appeared during the night. By reducing the QV the transmission got better and LHC could get the beam. However, later ADT tuning helped to fight the instabilities.

The NA beam got affected by a forced door in H8; 15' without beam.

On the injectors side two main faults affected the SPS operation:

- * 1.5 hours were lost because of the trip of a LEIR transfer line power converter that required the change of the power converter.

- * PS POPS trip gave a down time of 9 hours.

Thursday 15.11.2018: SPS Compensator trip and was down for 3 hours and 40 minutes. In the afternoon, problems with the power converters of BA4 gave a down time of almost four hours: First line put the spare power converter in service to fix the problem with the MPSH4140 (that caused a Dasy Chainé problem). When Dasy Chainé back a problem on an acquisition card on mugef appeared.

Friday 16.11.2018: Some RF low level functions had to be updated, as a consequence the ADT had to be re-setup. The only beam affected was LHC beam, but the setting up required the LHC cycle to be in the supercycle, which affected the duty cycle of NA physics.

Sunday 18.11.2018: Source problems since 14:00 needed intervention of Linac3 supervisor, once the source could be stabilised, LEIR supervisor came to re-optimize LEIR for lower intensities from source. At around 22:30 LHC could be filled with less intensity but rather stable conditions.

The 12 injections 3 bunches 75 ns beam has been set up in SPS, but not yet sent to LHC.

Otherwise, SPS has been smoothly delivering beam to NA and LHC.

LHC (M. Zerlauth & E. Bravin):

Despite the issue with the beam size at IR2, production continued and [VdM](#) scans for all experiments were made between Monday and Wednesday. The CMS scan had to be repeated as beams were dumped due to a yet not understood orbit excursion originating in Q1-Q5R2 (Fill7442), something which repeated a second/third time in fills 7447/7451. The ion intensities and luminosity increased, allowing for 4-5 hours of levelling in ALICE at 10^{27} cm⁻²s⁻¹ and 3 hours of levelling in ATLAS/CMS at 2.2×10^{27} cm⁻²s⁻¹. The typical fill length was 7 hours, with ALICE integrating 22 ub⁻¹, ATLAS and CMS just above 40 ub⁻¹ in such good fills. A waist scan was finally performed successfully on Sunday evening, indicating that the waist is at the correct position (at least the average waist over both beams and planes).

QPS thresholds of Q10.L8 and Q10.R8 were decreased from 100mV/20ms to 40mV/10ms to allow for an increase of the MF of related BLMs to accommodate for the BFPP losses in these magnets due to the target levelling value in LHCb.

The switch to 75ns was postponed to early next week.

On Sunday afternoon the source started to show signs of weakness and a significant reduction of the ion current.