

Accelerator Complex Status

End week 37 (Monday 17th September 2018)

TI (J. Nielsen)

Details: <https://wikis.cern.ch/display/TIOP/2018/09/17/TI+Summary%2C+Week+37>

LINAC2 (R. Wegener):

Linac2 is running very well, almost 100% availability. LT.BHZ30 tripped on Wednesday early morning and caused 1 minute downtime. Otherwise, an ion pump on the RFQ (LI.VPI4) had to be restarted twice but without beam interruption.

LINAC3 (R. Scrivens):

Linac3 was running well until Tuesday night when Tank 1 tripped. Wednesday early morning, the source intensity suddenly dropped and all tuning attempts failed. So the decision was taken to re-fill the oven already Wednesday afternoon (1 day ahead of the planning). After the re-fill the intensity increased, however it was difficult to keep it stable Thursday and Friday - Frederic and Richard worked very hard on it. Over the weekend the intensity stabilised and Frederic kept the source running in this regime.

LINAC4 (A. Lombardi):

A very good week for linac4 with much progress made. The following beam parameters agreed at the I4to operation workshop have been achieved at 3 MeV : 25mA current, 600 microsec pulse length , 2% pulse flatness on 100microsec beam, 2% stability shot-to-shot.

The flatness on a long beam of 600microsec is in progress (aim 5%)
The daily drift of the source is work in progress.

The phasing of the RF cavities from 3 MeV onwards is ongoing, with about 4 cavities missing still.

The milestone of a beam at 160MeV is expected for sept 21, according to plans.

LEIR (N. Biancacci):

Monday 10/09:

- Linac3 current recovery until 11:00, then standard LEIR operation.

Tuesday 11/09:

- Change of 6 Gauss observed at injection and flat top magnetic plateaux during WR-B train commissioning -> no correlated trim found, no evident effect on the beam, issue under observation/investigation.
- NOMINAL orbit optimization after capture.
- Frev acquisition missing from QMeter application -> fixed by M.Jaussi.
- New BHN10 function deployed to mitigate impact of temperature.

Wednesday 12/09:

- Check of emittance after capture -> optimized and comparable to July LIU performance.
- Linac3 source issue -> refill advanced (should have been on 13/09).
- BPM amplifier intervention in the ring (BI).

Thursday 13/09:

- Recovered Linac3 performance: high current -> LIU beams!
- Cycles efficiency optimization.
- Space charge and instability MDs.

Friday 14/09:

- Source intensity degradation in the night -> ramp up in the morning.
- Capture optimization on EARLY.
- LEIR-to-PS transfer study with new optics: good matching.

Saturday/Sunday 15-16/09:

- Linac3 MDs with new foils

PSB (J.P. di Giovanni):

Another superb week for the PSB with 99.7% availability and few minor faults, dominated by 30 minutes (total) trip of the extraction kicker (R3) and septum on Saturday morning.

The OP team was mainly involved in (smoothly) following up LHC MD beam requests, by using PSB beams wisely prepared in the previous weeks. Following a request from SPS on Thursday, PSB OPs promptly produced three versions of MD beams for the COLDEX run soon after the technical stop (LHC25, 8b4e and LHC50 versions with variable intensities).

Tests on the new TFB took place.

Many MDs happened during the week, as usual, regarding optics, RF, brightness and emittance studies. Kick response measurements were started in order to verify the response of the wideband pickup BTP.BPM15. A sampling of the extraction kicker flat-top with a short (rotated) bunch took place in the weekend.

ISOLDE (E. Fadakis):

It has been a very smooth week for operations.

Since Tuesday evening several different users in GPS take (55, 56, 57) Mn beam for solid state physics.

On HRS a set up was prepared until REX for next week's experiment. Then the HRS beam was used for MD of the new tape station which looks quite promising.

In parallel, Niels was performing measurements on REX/HIE-ISOLDE for his PhD thesis.

PS (I. Efthymiopoulos):

An excellent week for the PS machine with 97% uptime (Sunday evening). Only two major faults during the week: one on RF controls (broken pulse repeater channel) that caused a downtime of 4h20min for all beams, and a second again on controls where a wrong timing parameter caused operation of nTOF beams with low intensity until discovered and corrected. Few trips of POPS and RF cavities were fast recovered after reset of the equipment.

PS delivered beams to LHC (BCMS 48b with low-chromaticity tune enabled, and Pb54 ions), nTOF (8.20×10^{12} ppp), SPS FT beams (14.76×10^{12} ppp), EastArea (3.65×10^{12} ppp) and AWAKE (3.8×10^{11} ppp). Since Wednesday (12.09) various beams for the LHC MD3 were prepared and delivered on request, including versions of LHC25 beams with high ($>2.0 \mu\text{m}$) emittance in both planes at nominal intensity. Beams for the SPS/COLDEX experiment were prepared, namely LHC25#72b, LHC-8b4e and LHC50#36b at intensity steps between 0.8 and 1.4×10^{11} ppp.

According to the schedule of TS2, PS will gradually stop the beams as of today Monday 17/09 @07:30AM. Access to the PS complex is scheduled from Tuesday 18/09@09:00AM to Wednesday 19/09@12h00PM. Restart on 19/09@12:00 with the first beams for COLDEX as 14h00PM.

Last, this week we had 10 MDs scheduled at PS; all took data successfully during the week.

AD (L. Ponce):

Bad news concerning the problem with the e-cooler. The tests to switch it on Friday evening were not successful. More investigation are needed with experts on Monday.

NO BEAM over the week-end and probably till TS2.

SPS (K. Lee):

This was an eventful week for the SPS with, however, an availability beyond 90%. The week was dominated by the LHC MDs starting from Wednesday morning at 7 and lasting until Monday morning at 6.

Fixed target beams as well as AWAKE were taken at maximum duty cycle whenever it was possible to efficiently fit them around the LHC MDs. Page 1 was regularly updated with messages and plans for longer stable supercycle compositions to help the planning for the NA and AWAKE physics. Some time also had to be spent to prepare some of the special beams needed for the MDs such as the low intensity BCMS variant, for example. The overall LHC MD3 run was successfully completed with little downtime from the injectors and thus with a minimum loss of valuable LHC MD time. The largest fault in the SPS lasted a bit more than two hours and was due the MKE4 needing a reconditioning. In addition, the weeks long lasting problem with the 50 Hz bursts on the fixed target beams were finally identified on Monday. The problem came from the chromatic sextupoles where a faulty impulse transformer gave strong 50 Hz signals onto the LSFCs at random times. The element was exchanged and the problem finally fixed.

On Tuesday the preparation of the LHCION3 Q26 ion cycle had to be interrupted. It was found that the QD did not follow the programmed function. The problem was identified to be a voltage limitation on the transformers of the main quads. On Friday these voltage limits could be raised and this problem was also fixed. The Q26 ion cycle preparations continued.

The problem with the MKQs pulsing in the wrong cycle was also followed up. After some investigation, a faulty timing card was finally found to be the source for the erroneous pulsing. The card was exchanged and also this problem was thus finally fixed. Moreover, a hardware interlock was put in place to prevent this type of mis-pulsing of the MKQ in the future.

The radiation alarms in H6 continued to pose problems. Intensity on T4 had to be lowered after the change of wobbling.

HiRadMat had accesses planned over 3 days. These could not all be carried out as planned for various reasons but the main difficulty was to schedule the different accesses around the LHC MDs - a virtually impossible task as it turned out. The only days of access were finally Monday and Friday.

The high intensity MD at flat bottom was significantly penalized due to the investigation on Tuesday on the ions cycle. Only a few scans were made to study the longitudinal stability. Some of the time can perhaps be recuperated in the following weeks.

LHC (J. Wenninger):

Monday cryo stop in point 6 (~24 hours) initiated by a transparent intervention on the point 6 cooling towers. The cryo recovery was very long (20 h) due to the missing compressor. A large water leak in ATLAS that could not be fixed before TS2 initiated a change in program towards the ion cycle. Two ion commissioning shifts were inserted Tuesday afternoon and night.

Integrated luminosity status before MD3+TS2:

- ATLAS / CMS average : 53.4 fb⁻¹ in 2018, Run 2 total is 147 fb⁻¹
- LHCb : 2 fb⁻¹

The MD started Wednesday morning and was quite efficient, all MDs succeeded in obtaining some results.