

Accelerator Complex Status

End week 30 (Monday 30th July 2018)

TI (R. Ledru)

Details: <https://wikis.cern.ch/display/TIOP/2018/07/30/TI+Summary+Week%2C+30>

LINAC2 (R. Wegener):

Linac2 is running quite well.

The power glitch on Saturday took down Linac2. The restart took ~5 hours since many systems were down and needed specialist interventions. Beam was back ~2 pm on Saturday.

Some further details:

- * the spark rate of the source decreased to ~10 per day (60 sparks since last Monday).
- * last Monday the broken turbo pump on tank 2 was exchanged (~3 hours down time)
- * The Linac2 RF tripped twice (1x Saturday, 1x Sunday) in the shadow of PSB problems (~30 min downtime)

LINAC3 (R. Wegener):

Linac3 was running very well until the power cut. Linac3 is being restarted now – also here many systems need specialist intervention.

Some further details:

- * Wednesday there was an interruption of ~20 min due to a source RF generator trip.
- * Mike has improved the peak power reading of the RF generator leading to a much cleaner signal.

LEIR ():

PSB (J.F. Comblin):

It was a difficult week for the Booster with more than 42 hours of cumulated downtime. Here are the main faults:

- Monday, a vacuum pump exchange in the Linac 2 causes 2h30 of beam stop.
- Thursday and Friday, the main power supply tripped several times, and 2 piquet interventions were needed. Downtime: 2 hours.

- Saturday at 8h53, a 18kV station tripped in Meyrin site. Mainly all the equipment of the Booster tripped. At 10h15, we had the green light to restart. The Linac 2 was ready at 14h17. We tried to inject the beam into the Booster a bit later, but encounter several problems: ring 3 not accelerated, some power supplies still in fault, or delivering wrong current. The longest one was to diagnose why the transverse feedback system was not working and how to power back its pick-ups.

- When we were about to give beam to the PS, the main power supply tripped. The TE-EPC piquet, together with the specialist, found one of the 4 groups with an over-tension fault. They replaced 2 blown fuses. When restarting, 34 fuses protecting the thyristors blew at their turn. The TE-EPC major event piquet was called. He organised the replacement of the fuses for Sunday 8h00. With the specialist they checked the MPS for short-circuits and none were found. Around 10h Sunday, all fuses were replaced. The MPS was then tested with ZERO cycles, 160MeV cycles, and finally 1.4GeV cycles. At 13h00, the MPS was up and running.

- 30 minutes later, the distributor of the ring 2 tripped. The TE-ABT piquet was called. With the specialist, they changed the thyatron. When restarting, a transformer burned. They exchanged the HV crate with a spare, without success: they did not manage to make the thyatron trigger. They finally took the working transformer from the spare crate to put it in the initial crate.

Finally, the Booster was back in operation Sunday around 22h, after 37 hours without physics.

Otherwise, all the beams for the LHC MD were delivered without any problem.

The Booster MD program was not too much affected: Optics measurements with ADT at 1.4 GeV, tune scans for horizontal instability, K-scan in BTM line, Finemet cavity setting up, study of losses at extraction from R4 when splitting beam, low level Interlocks tests.

ISOLDE (Eleftherios Fadakis):

It has been a very good and intense week at ISOLDE.

Main user was Miniball from HRS. Preparations was done with ^{238}U in the HRS part and $^{40}\text{Ar}^{9+}$ on HIE on Tuesday. First delivered beam was $^{222}\text{Ra}^{51+}$ at 4.3 MeV/u on Wednesday afternoon until Thursday morning. Then we set up for $^{228}\text{Ra}^{51+}$ at 4.3MeV/u which we delivered on Thursday evening until Friday morning. On Friday morning we switched back to $^{222}\text{Ra}^{51+}$ until noon when we switched to $^{142}\text{Ba}^{33+}$. To prepare the LINAC we went to $^{138}\text{Ba}^{32+}$ and early afternoon we delivered $^{142}\text{Ba}^{33+}$ at 4.19MeV/u. We finally prepared another set up of $^{142}\text{Ba}^{33+}$ at 3.3MeV/u. The users would alternate between the two set ups during the weekend.

At the same time, we were delivering ^{55}Mn in GLM for Solid State Physics.

This was truly a team work since Simon took care the GPS set up, Miguel created a masterpiece of a set-up from HRS to the REX LINAC, Niels put in place the slow extraction requested by the users. Finally, Alberto and myself were working on the HIE LINAC.

Saturday power cut, hit us quite hard. I would like to thank Fred for his help with the REX TRAP and REX EBIS recovery. Alberto and myself, needed a few hours to recover every system but we had to wait even longer for the LHe recovery in the cryomodules(they reached nominal temperature around 9p.m).

Once everything was in working order we verified transmission with stable beam. By 23:00 we were ready to receive protons.
A big thanks to all equipment owners for their intervention to bring back their system in working order.

PS (M. Fraser):

This week was running relatively smoothly for the PS until the weekend and the average weekly availability will struggle to make 70%. No beams could be delivered by the PS from Saturday morning until late Sunday evening due to a long sequence of major incidents in the injector complex. The problems started with an electrical glitch (probably related to the storm) at 7:30 am causing most devices in TT2 to trip and go to local mode. The piquet discovered a fault in an 18 kV transformer (EMD104) that took until 8:50 pm on Saturday to be repaired. For a short while longer, PS operation could continue to EAST until another electrical perturbation at 8:55 am on the Meyrin site caused the entire complex to go offline. The PS-OP team worked hard all weekend to recommission the PS, co-ordinating with a very busy piquet service and experts on best effort to get equipment back up and running. Although the PS was ready at 16:10 to deliver beam to EAST, the PSB was not stable on rings 2 and 3 due to issues with the TFB and correctors in the transfer line. Things got even worse later on Saturday evening when the PSB went offline for a further 24 hours due to major failures of its MPS and distributor. The PS could finally start setting-up beams to its users and SPS at about 10 pm last night. It was not possible to produce the LHC beam overnight due to numerous problems including instabilities on the SMH42 power converter, a major problem with the sequence manager (unable to edit the sequence) affecting all machines and on-going low-level problems with the 20, 40 and 80 MHz cavities.

Otherwise, the LHC MD week went relatively smoothly... On Tuesday, a faulty level switch in a cooling tower resulted in a temperature interlock tripping POPS needing a piquet intervention and causing almost 1 hour of downtime. On Wednesday, partially stripped ions were sent to the SPS and LHC during MD, with only a short amount of downtime coming from a blown fuse on the C80-08 cavity. Unrelated to the incident on Tuesday, on Wednesday TI reported a leak of about 20 l/hr on a cooling circuit in the ring; the leak is presently stable but needs further investigation and an access of 1 - 2 hours is requested (TI were too busy with the events of this weekend to check, will be done next week). On

Thursday, the 8b4e BCS was delivered to the SPS for LHC MD. On Friday the TOF beam had to be put back onto Ring 3 as losses were observed again on Ring 2.

AD ():

AD e-cooler repair:

G. Tranquille:

The electron cooler has been prepared for bake-out over the last three days. Bake-out should start this evening and reach the maximum temperature (250 degrees??) plateau on Sunday.

The ramp down will start on Monday morning and the filament of the electron gun will be activated when a stable temperature of 150 degrees is reached in the cooler.

If all goes well we could start removing the jackets and bake-out equipment as of Tuesday afternoon or Wednesday morning.

A minimum of three days is required for remounting and reconditioning the electron cooler.

P. Chigiato:

Today=Friday: Ramp up to 100C-125C then stabilization of the temperature. Stabilization and ramp rates to 25C/h to avoid or limit expansion problems.

Tomorrow: TE-VSC will restart the ramp up to 250C with permanent monitoring. Temperature dwell at 250°C until Monday morning

Monday: Morning -> Decrease T to 150C to allow cathode degassing. In the afternoon start temperature ramp for NEG strip (St707) activation at 350 C -> stable all night

Tuesday: Degassing process: Ion pumps, SVT gauges, sublimators and NEG wavers. It will take all day to finish all; then start cooling down.

Wednesday: T in the morning expected around 80 C (from past experience): first leak detection and residual gas scan.

Thursday: Room temperature. Final leak detection and residual gas analysis. Pinch-off of the pumping nipple. In the afternoon we'll remove all the bakeout racks, jackets and related materials

Friday: System ready for tests.

SPS (H. Bartosik):

It was a week with low beam availability for the North Area (less than 70%). The largest part of the downtime was caused by the injectors, most importantly during the weekend due to several issues in the Meyrin site caused by a power glitch on Saturday morning. Wednesday evening, about 3.5 hours downtime for the North Area were caused by a problem with the databus on the North Area power converters not allowing to change polarity on some magnets and causing glitches on others. In addition, the duty cycle for the North Area was reduced during several occasions of the week due to LHC filling and beam preparation.

The LHC was in MD period from Monday until Saturday morning. Providing the various beams for the LHC MDs went mostly very smooth, the highlight being the extraction of the partially stripped Pb81+ for lifetime measurements in the LHC. Only the low intensity BCMS beams for the heat load measurements in the LHC suffered from issues with RF in the PS and interlocked extraction BPMs in the SPS.

Not much beam could be provided to the LHC after the MD period. The LHC beam production was blocked first by the issues in the PSB over the weekend and later by a problem with the RF in the PS Sunday night.

The dedicated MD period on Wednesday in the SPS was very successful. In addition to the production of partially stripped ions for the LHC, several studies on the slow extraction such as Constant Optics Slow Extraction, optics measurements in TT20 as well as studies with the burst mode slow extraction could be performed.

Finally it should be mentioned that a new power supply for the TT20 BLMs was installed on Friday, replacing the one that was temporarily installed a few weeks ago after issues with the trips of the HV power supply. The exchange went rather smooth and a check of the BLM interlock trigger was completed successfully.

LHC (J. Wenninger):

MD week from Monday 06:00 to Saturday 06:00. The MDs were rather efficient, no significant downtime during the week.

The ALICE polarity was flipped to positive on Friday.

The last MD beam was dumped Saturday 06:20, and was followed by a short access for ATLAS. Electrical perturbations affected the PSB, LINAC2 and TT2, with beam back in the SPS only on Sunday evening at 22:00.

Regeneration of the cryo in point 4 was launched in the night between Saturday and Sunday, but problems with compressor reconnection delayed the recovery from 6 hours to ~22 hours. Cryo was back around midnight Sunday, but issues with RD1.LR5 (move to spare PC) and then with the PS 40/80 Mhz RF delayed first beam to Monday morning.