

Accelerator complex status

End week 35 (Sunday 4th September 2016)

TI (Chris Wetton)

Summary for the last week:

<https://wikis.cern.ch/display/TIOP/2016/09/04/TI+summary+week+35%2C+2016>

Linacs (Richard Scrivens)

Linac2 operation was quite calm. The main issue was fluctuations in intensity, which were cured by returning the cathode heating to the value of the previous weeks. Still the cathode resistance is increasing, so an exchange in the technical stop is foreseen.

Linac3. The oven refill encountered several problems, and after it has been necessary to push the heating much more quickly to re-establish beam.

About 20% of the intensity was still missing at the end of last week, but could be recovered today (also by changing stripper foil).

Next week (i.e. 12 September) MDs on the source will take place with a second heating frequency (Travelling Wave Tube).

ISOLDE (Miguel Luis Lozano Benito)

It has been a good week at ISOLDE.

HRS shared its time between ISOLTRAP and COLLAPS. They both took beam without mayor problems.

On GPS a new target was installed on Friday afternoon. This target will be used this week for the first HIE-ISOLDE run of the year.

REX-ISOLDE started delivering stable beam (from residual EBIS gasses) to Miniball at $A/Q=3.67$ and full normal conducting energy (2.85 MeV/u). Few trips of some normal conducting cavities but other than that went smoothly.

LEIR (Django Manglunki)

A good week for LEIR, with two annoying issues eventually fixed (hopefully!), and a lot of different beams used for commissioning the other machines, or for MDs:

- After the source refill on Monday 29/08, the beam was back on Tuesday 30/9 afternoon. During the stop there were several interventions of TE/EPC. Also, a leak on the manifold for water cooling of the extraction septum ER.SMH40 was temporarily fixed. A definitive repair will take place during the technical stop.
- One of the trimming power supplies, ER.QFT23, which was tripping frequently during the last weeks, has eventually been fixed last Wednesday. On Wednesday evening however, the remotely acquired status was wrong, indicating the power supply was off, in local, with an

error, while it was obviously on, in remote, and correctly pulsing. This has been fixed on Thursday.

- There was an intervention by Matthias Haase on Friday on the power supply of RF cavity ER.CRF41, which needed a local reset whenever tripping. In principle remote resets should work again from now on.

Beams:

NOMINAL: ready for PS to optimize the 4 bunch beam with 100ns spacing which will be used during the p-Pb run in November.

EARLY: sent to SPS on Thursday & Friday for fixed target beam commissioning, and to the PS for regular lifetime measurements.

MDNOM: G.Franchetti is visiting from GSI, working on resonance compensation with Hannes and Alex.

MDOPTICS: Test of the new working point, below half integer (Alex, Hannes). Beam has been injected and is circulating. Potential for performance will be assessed in the coming weeks.

ANOMINAL: studies of instabilities/impedance model (Nicolo Biancacci)

- There is a doubt on the skew component of the combined functions sextupoles. Jerome has built a dedicated magnetic probe, currently under test, which will be used for a measurement campaign in the coming weeks.
- As a reminder, there will be no beam for LEIR during week 38 (September 19th-25th) when Linac3 tests the Travelling Wave Tube Amplifier. Conversely, there will be no Linac3 MD this week 36 (September 5th-11th)

Booster (Gian Piero Di Giovanni)

It was an overall good week for the PSB.

The week started on a positive note thanks to the work done by the Linac2 crew to stabilize the intensity fluctuations of the source. This work together with ISOLDE frequently requesting beam helped conditioning the source and allowed for good L2 intensity performance throughout the whole week.

Few technical issues worth reporting:

1) An issue with the 16 MHz cavity in Ring1. The operator had to call the expert (M. Haase) who replaced a 20V dc power-supply which was out of order. The total duration of the problem was 1 hour and 34 minutes. This is not really a downtime in terms of beam availability, but more an issue for the quality of the beam in ring1, as the cavity is used to control the longitudinal blow-up.

2) On Sunday, the power supply of a quadrupole in linac2, LA3.QDN15S, failed and the piquet had to exchange it. The total downtime amounted to 1 hour and 40 minutes, but LHC was already in stable beam since a while.

3) Few hours later, the extraction kicker of ring1, BE1.KFA14L1, tripped several times requesting the piquet's intervention. The total downtime was about 30 minutes. Again this issue did not affect LHC.

During the week we had few other failures, but every time a reset worked and the beam was back within minutes.

Otherwise, the MD studies continued as well as the usual tuning of the operational beams to improve performance, by minimizing losses.

PS (Rende Steerenberg)

The PS had an excellent week with an average beam availability of 94%.

The beam was off for about 2 hours due various issues with the LINAC2 and the PSB. The main problems in the PS were power converter related.

On Monday one of the PFW circuits tripped and could not be reset. The specialist was called and a small electronics board for the voltage regulation loop had to be replaced. This however caused 2 hours and 15 minutes down time for all users.

On Tuesday POPS tripped and since this was during working hours the specialist was called to diagnose the issue, which turned out to be an EMI problem, causing 50 minutes downtime. A second trip occurred Friday morning very early and was reset by the operations team, resulting in a downtime of about 20 minutes.

Following high losses in the LHC due to the satellite bunches that in large part are due to uncaptured beam at injection in the SPS tests were made during the week to use two instead of one 40 MHz cavities in the PS. Friday morning this was put in place operationally before the LHC filling. The losses in the LHC during injection dropped from about 40% to 50% of dump threshold to a few percent of dump threshold.

This of course means that there is no spare 40 MHz cavity, but in case of serious problems with one of the 40 MHz cavities, the operations team has a procedure to switch back to the situation with only one 40 MHz cavity.

SPS (Hannes Bartosik)

It was a very good week for the SPS with an availability of about 93% for the fixed target beam. A large fraction of the 7% downtime was due to Linac2 and the PS complex. On the SPS side, one hour without beam was caused by a fault on the bus bar of the mains and half an hour due to a trip of chain 13 and 15.

The intensity of the SFTPRO beam was usually kept at around $2e13$ ppp. Only on Monday the intensity had to be reduced due to large intensity fluctuations from Linac2 and on Friday, about 4 hours were spent with low intensity so that ABT experts could optimise the alignment of the ZS septa for reducing losses at extraction.

Enhanced losses during acceleration of the LHC 25 ns beam were encountered on Tuesday evening. It took a couple of hours until it was realised that a longitudinal phase noise excitation, which was used for calibration studies in the afternoon, was left active by mistake.

Throughout the week, relatively high losses due to satellite bunches were observed at LHC injection, almost reaching the dump threshold in some cases. They could be brought back to the usual level of around 30% of the dump threshold by optimising the RF phases at PS injection and at SPS injection. Significant improvement could be achieved when the PS deployed an optimised bunch rotation scheme with two 80 MHz cavities and both 40 MHz cavities on Friday: the satellite population and the LHC injection losses could be reduced by a factor 10 (i.e. to a few percent of the dump threshold) and furthermore the transmission of the LHC beam in the SPS was improved by about 2%, from 93% to 95%.

The commissioning of Pb-ion beams on Thursday and Friday was focused on the setting up of the fixed target cycles.