

Accelerator Complex Status

End week 39 (Monday 2 October 2017)

TI (Jesper Nielsen)

Quite good running of the infrastructure. Monday 25/09 at 15:01, A 400V breaker in SD4, powering the CRYO, tripped. The CRYO is powered from two sources and were therefore not impacted, but noted that they had no backup in case of failure. The trip was caused by a short circuit to lights powered from the same line.

Details: <https://wikis.cern.ch/display/TIOP/2017/09/25/TI+Summary+Week+39>

LINAC2 (Giulia Bellodi):

Nothing to report, 100% uptime.

LINAC3 (Giulia Bellodi):

- Several resets of the Thomson generator
- Source conditioning ongoing, beam still a bit unstable, but it is improving
- Wednesday 1h downtime to revert the RF PLC code to an older version in order to remove a pulse blocking routine installed the week before which did not work as expected.

LEIR (Nicolo Biancacci):

Monday:

- EARLY beam optimization with bumps in the transfer line to LEIR.
- ITE BPM studies with installed dipole corrector: orbit adjustment brought a positive increase of transmission into LEIR.

Tuesday:

- Optimization of MDNOM and NOMINAL beams from EARLY settings. ITE loop and ITH.DHZ21 were found to have different settings than EARLY in order to get beam in.
- CRF41 trip that could not be reset from working set. Fixed with HLRF expert intervention. CRF43 set to LOCAL for additional tests.
- Again observations of noise affecting the ER.MTR12-410 signal: past fix did not work.
- MCOL44 collimator stuck into the beam during in/out test: fixed with piquet intervention.
- Problem in K <-> current settings for ITH.DHZ21: trims in current to be avoided as they break the hierarchy.
- ITE BPM and instability MDs.
- Trip of RF Thomson fixed by reset.

Wednesday:

- Test of interlocks on number of injections -> update of the Linac3 PLC software to adapt the interlock scheme.
- ETL.MSF10 (SEM grid) stuck in the beam due to an error: solved by A.Guerrero.
- Transmission studies LEIR -> PS affected by gating issue in the PS BPMs: solved in the afternoon.

- Modulated capture, space charge and instability MDs.
- Trip of RF Thomson fixed by reset.

Thursday:

- ER.MCOL14 found in different position with respect to Tuesday's settings: piquet fixed the issue.
- Setup of beam transfer LEIR -> PS: achieved 97% transmission.
- ER.KFH34 went in state transition during OFF/ON switch: STANDBYFAULT+RESET+ON fixed the issue.
- Modulated capture, space charge and instability MDs.
- Successful tests on $h=3+6$ in NOMINAL cycle with CRF41 and on $h=(2+4)+6$ with both cavities.
- Trip of RF Thomson fixed by reset.

Friday:

- No beam to PS: fixed with trim on ETL.BHN20 achieving 99% in the transmission LEIR -> PS.
- Wobbly bunch seen during the ramp and at flat top. Some cycles affected, others not. Reason not fully understood: global check performed by A.Findlay to be continued.
- Trip of RF Thomson fixed by reset.
- Instability and cooling MDs.

Saturday/Sunday:

- Smooth operation.
- Trip of CRF41 fixed by reset.

PSB (Jean-Francois Comblin):

The availability of the Booster was 99% this week. The only fault occurred Wednesday at 5AM when the 2Mhz cavity of ring 3 tripped. The high-level RF piquet was called and the total downtime was 1h46.

The priority this week was given to the reduction of the emittance of the operational 8b4e LHC beams, in order to increase their brightness.

On the MD side, we had a busy week, with triple harmonic capture, dispersion measurements, ejection septum aperture scan, just to name a few.

ISOLDE (Eleftherios Fadakis):

HRS

The VITO experimental line finished taking beam (^{26}Na) from HRS on Wednesday morning.

GPS

On Wednesday afternoon, delivered beam ($^{140}\text{Nd}^{33+}$ $E=4.62\text{MeV/u}$) to MINIBALL in XT01.

Friday early afternoon users requested to change isotope, since their yield of ^{140}Nd was overwhelmed by ^{140}Sm . The machine scaled wonderfully and we were able to deliver $^{142}\text{Sm}^{33+}$ by the end of Friday.

Issues:

Target heating tripped on Wednesday. Restarted the power supply and continued taking beam.

On Friday and again on Sunday, several power supplies on both GPS and CAO

sectors tripped at the same time. This is a recurring issue investigated by the equipment owner. Restarted the power supplies and continued taking beam.

PS Q:

AD (Pierre Freyermuth):

It was a quite a difficult week for AD, at least compared to the very stable previous one.

It started Wednesday, when we lost some time prior the all-day PS dedicated MD due to a main trim power supply, which was quickly solved by first line though. Thursday night, an interlock tripped the horn power supply. The PS crew called the horn specialists, who came in and could confirm the equipment was working well, however a "position chariot" interlock was interlocking the horn. After calling Tommy Eriksson, I could not contact Sven De Man, responsible for the target zone but he was on holiday. Also M. Calviani could not be reached. Friday morning however, Sven was back and found that a drift of a position sensor was the reason of the interlock.

On Friday, a strange smell appeared in the AD hall, followed by the visit of firemen. We decide to make a short stop in order to check in the AD ring. Nothing to notice. The AD restart was a bit long due to the reported problem of 4 power supplies in the injection line. They ramp up very slowly being triggered by the AD cycle (2 min) instead of the basic period for example.

On Sunday, over the night, the recapture on the 300MeV/c plateau degraded, leading to a lower and unstable extracted intensity. It was partially solved by adjusting the electron-cooling, but required further investigation on Monday to recover the nice intensity of last week.

SPS (Francesco Velotti):

It was a pretty good week for the SPS with very good availability. On Monday, after the upgrade during the TS of the BCT, the filter was set up such that it should give measurements as before the TS, still to be benchmarked. The ABT experts clarified what is happening with the recurrent erratics we saw on PFN6. The erratics are actually happening and, for now, the threshold to rise an interlock has been raised to ease operations, as the cause was identified. This happens when the MKP is enabled but the pre-pulse is not there. The control application is now getting upgraded to avoid/highlight this. Also, following the re-alignment of the quadrupole during the TS, the orbit in the extraction regions was centred and, adjusting the scraping as well, losses in the TLs were brought back down.

On Tuesday, a change of an insulation transformer on the 800 MHz cavities caused a stop of 45 minutes for all LHC beams, this should theoretically solve the incompatibility of the certain cycles (e.g. LHC4) with other LHC beams, to be verified. Also, the BCS version of the 8b4e was taken in view of the LHC possible requests for week 40.

On Wednesday, the dedicated MD slot was devoted to the crystal assisted slow extraction. After consignment of the TED to EN-STI responsible, the machine was ready for the MD. Unfortunately, the good results from last year could not be reproduced.

Thursday, following the NA users request, the SFTPRO intensity was raised in order to guarantee the requested sharing of 55-35-150. The intensity before extraction is now up to 3.6×10^{13} p. Normalised losses are still very stable. Also, the firmware of the WS 519 was updated, which should reduce the rate of the needed reboots - to be verified during daily operation. To be noted too, during the night, a problem on SM2 came back and there was no possibility to deliver beam to COMPASS until the following morning, when the experts finally managed to solve the problem.

Thursday and Friday were dedicated to the setting up of the Xe54+ beam for the LHC physics. The beam was brought up to 450 GeV proton equivalent with a $\sim 75\%$ transmission, typical for these types of beams. On Friday afternoon, small problems on the wobbling PC and TBIU caused some downtime for the NA. Also, the LHC was filled with standard 8b4e with 1.35×10^{11} p/b intensity, making to stable beams.

During the weekend, at the next tentative to increase the intensity though, losses in 16L2 came back and a roll back to about 1.1×10^{11} p/b was necessary.

Many parallel MDs were carried out during the whole week. To be highlighted, the automatic aperture scan on the horizontal plane, together with the momentum acceptance evaluation for Q20 showed very promising results in view to understand the FB losses on the LHC beams.

LHC (S. Redaelli and M. Zerlauth):

Smooth operation with 8b4e and the 16L2 solenoid on, pushing successfully the bunch intensity towards 1.25×10^{11} in collision. The week recorded 47% of the time in stable beams, close to 100% machine availability and overall excellent production rate over $0.5 \text{ fb}^{-1} / \text{day}$. CMS did even request levelling as we exceeded the $1.5 \times 10^{34} \text{ cm}^{-2} \text{ s}^{-1}$ with the 8b4e and their pile-up became high.

The intensity increase was stopped Friday night following two 16L2 dumps in the ramp. The intensity was then lowered again by $\sim 15\%$.

The last 24 hours of the weekend were a bit perturbed by prematurely dumped beams. Fortunately, none of the dumps were related to the 16L2 issue, but were caused by various uncorrelated technical issues.

This week there will be tests with the BCS-8b4e beam initially without changing the abort gap keeper. If successful then an improved filling scheme will be applied, requiring a change to the abort gap keeper.