

Accelerator Complex Status

End week 39 (Monday 1st October 2018)

TI (C. Pruneaux)

Details:

<https://wikis.cern.ch/display/TIOP/2018/10/01/TI+Summary%2C+Week+39>

LINAC2 (J.B. Lallement):

Linac2 had a perfect week with 100% availability.

LINAC3 (J.B. Lallement):

During the Linac3 source oven refill, a water leak was found on the cooling circuit of the source wave guide. The polymer team was asked to fix the leak and the repair delayed the linac restart by 24 hours. The beam was back to LEIR on Friday early afternoon (unfortunately, the wave guide still shows a small leak -- to be followed-up).

LINAC4 (J.B. Lallement):

Many activities and measurements took place this week at the Linac4. The 160 MeV operation resumed on Monday and the beam was made available for tests of: emittance measurements application, laser stripping emittance setting-up, stripping foils test stand, beam steering, grids tests... A synchronization issue between beam and magnet pulses was identified and temporarily fixed. An access was given on Wednesday to the source team to confirm the main cause of the ion source intensity pulse and pulse to pulse instabilities. Up to now, all is OK to start the reliability run on this coming Thursday.

LEIR (S. Hirlander):

It was a relatively short week for LEIR.

On Tuesday (25th of September) the improvement of the new fast ramp cycle continued. Also, tests of the first turn measurements were carried out. Repeated trips of the EE.BHN1020 during the night were observed, and on Wednesday (26th of September) the magnet piquet was called. A short access was needed, and a pressure signal was identified giving a (wrong) signal of an open circuit. An MD on bunched beam cooling was done in the afternoon, which revealed some insights. On Thursday (27th of September) the scheduled oven refill in Linac3 was carried out. During this time an access for inspection of unterminated cables connected on the ER.KQFHV31 was accomplished. A portable VNA was used to measure the response of the cables connected to the ER.KQFHV31 (the old BTF kicker). A clear pattern of reflection at a frequency close to the expected 1.9 MHz

and multiples was seen. The cables are 93m long, and simulations of the response of the kicker and cables were done to reproduce the influence on the beam. The mismatch was seen in both planes. There was also a mode at ~600kHz but this, somehow, was not having an impact on the beam. Based on this the KQF31 was left disconnected, and 50 Ohm terminated. Also, two other devices were checked: 1.) The ER.UQFHV41 (old BTF pickup - a single resonance at ~2MHz without multiples was observed). The device is an array of strip lines which looked open terminated. There was a connected amplifier, which should mitigate the eventual reflections. 2.) The ER.KQF12 (BBQ kicker) with very short cables going to the closeby amplifier did not show low-frequency modes from the mismatch. In Addition, the Schottky (vertical) was checked to further clear out possible sources of mismatched connections. The amplifier connected to the low beta Schottky (the one at the end of SS2) offered a very poor matching (~-7dB). On the contrary, the high beta Schottky was well matched (<-30dB). In any case, the amplifiers connected to this devices should mitigate any detrimental effect of mismatch. A quick test with beam matching the low beta Schottky and measuring if there is any positive effect on the beam activity is foreseen. Due to a water leak problem, which was fixed and needed 24h to rest, there was no beam until Friday (28th of September). On Friday midday (28th of September) everything was back without significant additional changes. First test runs were carried out in the afternoon on reinforcement machine learning to optimize the machine. The weekend was calm.

PSB (J.F. Comblin):

During the last access in the Booster, a water leak was found on the bending magnet BR.BHZ16. We agreed with the specialist that an access was needed to repair it, to avoid further problems. It was planned Friday morning together with a PS access.

The main issue of the week was an intermittent problem with the 4 MHz cavity of the ring 3. From time to time, the tension on the cavity stayed at its maximum value during a few minutes, and then came back to normal. The RF specialists found that the pre-driver was faulty and profited of the access of Friday to change it.

Wednesday we also had ejection problems causing big losses and radiation alarms. We had to stop all the beams to the PS during 2h30. The root cause was a broken multiplexer in the PS central building, that disturbed the synchronization between the PSB and PS.

Despite all these problems, It was a good week for the Booster with an availability of 96.9%.

ISOLDE (J. Rodriguez):

It has been a really good week at ISOLDE. The first experiment at the ISOLDE Solenoid Spectrometer (ISS) is almost done. We started delivering 28Mg9+ with

an energy of 9.47 MeV/u last Wednesday and we will continue until tomorrow morning. The linac has been remarkably stable and there were no significant sources of downtime even though we were using 19 SRF cavities at fairly high gradients.

In parallel, we have been delivering $^{199}\text{Hg}^+$ to the Solid State Physics station at the end of the GLM line for most of the week. Everything worked very well for them as well.

PS (M. Fraser):

It was a good week for the PS with about 95% availability. Since the weekend and for most of the week we ran with POPS in degraded mode and without the C81 cavity until its amplifier could be fixed in an intervention planned on Friday morning, which was delayed by 2 hours due to problems experienced in the LHC during filling. In parallel, the RF team could work on a fast tuner on SS08 and EN-CV could inspect a sump under one of the lifts. The access took longer than expected at 2h 50 minutes due to an issue with the C11 that needed another short access to fix but the machine could be restarted with POPS back in operational mode. SMH57 and KFA21 delayed the FT programmes on restart for 30 and 50 minutes, respectively. The reason for the trips of the PFW circuit PR.WFNP since start-up after ITS2 was investigated by TE-EPC throughout the week without success. The problem is presently solved by reducing the ramp rate at the end of LHC cycles; trips in the week were caused by LHC-type MD beams being mapped without the reduced rate being implemented. During the week n-TOF reported satellite particles in front of the main bunch with an experiment particularly sensitive to pre-triggers being set up. Optimisation of the bunch rotation before extraction, which is thought to populate the satellite bunches, is underway. On Tuesday, different emittance INDIV beams were sent to the LHC for a BSRT calibration. MD beams were sent to the SPS, including low intensity MTE beams (50 and 200 and 400e10 ppp) on Wednesday and the high intensity LHC25 BCMS (up to 2.3e11) beam on Thursday. The PS went down on Wednesday morning when a power supply on a LLRF multiplexer stopped the PS being able to synchronise with the PSB. The issue caused almost 3 hours of downtime but was fixed by the LLRF piquet. On Friday, the PS provided a 16b LHC25 beam for HiRadMat physics. In other MD news, BE-BI provided the first turn-by-turn acquisitions of an LHC beam for 30 turns after injection on the SEM grid 52.

AD (XX.XX):

Cathode replacement.

SPS (F. Velotti):

Rather productive week for the SPS - even though we had all 4 physics clients active this week and a very dense MD plan. Availability finally above 90%.

AWAKE: From Monday until Wednesday evening, AWAKE took protons for the last days of their run 3. It was mainly devoted to the debugging of the instrumentation and plasma physics.

LHC: On Tuesday there was a fill for BSRT calibration and all was almost straight forward for the SPS, as all different beam characteristics were adjusted in the PSB already. There was a tentative for a test of a new collimation scheme for high beta at injection but, due to cryogenic problems, this was postponed. Other than that, normal fills with BCMS beam.

HiRadMat: two experiments completed this week, i.e. PROTRAD and TIDVG-SiBlock. They took a maximum of 72 bunches and this was handled only with the short HiRadMat cycle to increase the NA duty cycle. On Friday evening, a first session was carried out in the shade of the LHC problems and finished off Saturday morning. They took all the shots foreseen with the beam characteristics requested. They will be back Monday for HiRadMat 43.

SFTPRO: Until Friday morning, we kept running with the highest intensity seen this year on the SFTPRO cycle, i.e. 3.3×10^{13} ppp. On Friday, after the programmed stop of PS and PSB, we re-started with reduced intensity, 2.8×10^{13} ppp, to satisfy the requests for the targets sharing. During the weekend, the main issue of this week reviled itself. The SFTPRO was stopped frequently from the SIS due to normalised losses larger than thresholds on ZS3 since Saturday night. After investigation with the operators, it was discovered that the server of the ZS motors was down since Friday. It was rebooted but apparently some of the anode positions had drifted. All was brought back to normal but this needs followup.

MD: Very fruitful week also for the MD users. On Wednesday, dedicated slow extraction MDs took place: SE with octupoles, SHiP cycle setting up, crystal ZS shadowing and ripple compensation using main quadrupoles. The new test BDF target was not put in place and the beam never reached T6 properly. The main issue was found during the steering to T6 as high losses were provoked in TT82. It was then decided that for the next MD the steering has to be carried out the evening before. The HI MD of Thursday also was very successful giving clear insights on transverse instability thresholds and also on the effectiveness of the reconfigured machine octupoles.

LHC (J. Wenninger):

Back to nominal operation on Monday. BSRT calibration fill on Tuesday evening. On Wednesday loss of cryogenics conditions in point 8, only recovered Friday in the early morning. The first fill following the cryo stop was dumped in the squeeze by a UFO on beam 1 in S78 (17R7) that also quenched 5 magnets (4 dipoles and 1 quadrupole). Over the weekend further reduction of the octupoles, at -1.5 (knob) a fill was dumped during ADJUST due to beam oscillations with a period of ~ 50 ms. Stopped octupole reduction, re-increased knob to -1.8 for the collision BP.