

Accelerator Complex Status

End week 40 (Monday 10 October 2016)

TI (Jesper Nielsen)

Full report at:

<https://wikis.cern.ch/display/TIOP/2016/10/07/TI+summary+Week+40,+2016>

Tuesday: The compass experiment had a problem with a spectrometer. In the TIOC it was clarified that Goliath circuit is not needed for Compass, Compass is supplied directly from BA82.

Saturday: Beam dump LHC due to a flow fault on the demineralized water station. The fault was occurred when an error was acknowledged on a valve, which made the valve close and open.

Sunday: TCR in LHC6 tripped and caused a beam dump of the LHC. TE-EPC and EN-CV will try and organize the exchange of the conductivity flowmeter during the day.

LINAC2 (Rolf Wegner):

Linac2 is running pretty well. 2 minor problems occurred during the week:

* An interlock of unknown reason stopped the source on Wednesday morning. A reset solved the problem. No further issue seen since then.

* Over the weekend, the number of missing pulses from the source steadily increased until the Hydrogen flow was increased on Sunday morning.

A detail: Last Monday we reduced the cathode heating from 48 A to 47 A but we went back to 48 A on Tuesday to reduce pulse-to-pulse intensity fluctuation from the source. Moreover the ZERO cycles were prolonged for the same reason.

The intensity to the PSB was typically between 135 and 140 mA.

LINAC3 (Rolf Wegner):

Linac3 is running pretty well. The ovens were refilled last Monday. Detlef worked hard to get 20 uA out of Linac3 until Tuesday evening and 30 uA on Wednesday. Since then Linac3 is running impressively stable. The oven1 heating power is with 21 W particularly high.

A rest of the RFQ amplifier was needed on Thursday.

The intensity at the end of Linac3 (BCT41) was typically between 35 and 40 uA.

LEIR (Django Manglunki):

A short but busy week for LEIR: from Wednesday to Friday, in addition to the operational EARLY and NOMINAL beams delivered to the PS, MDs took place on AMD (100ms injection rep rate), ANOMINAL (resonance compensation), and AMDRF (space charge mitigation by bunch flattening).

- After the source refill on Monday 3/10, a weak beam was only available for LEIR on Tuesday 4/10 in the evening.
- On Wednesday 5/10 morning, the Linac3 beam was back to specs and the NOMINAL beam started to be delivered to the PS for SPS beam commissioning in view of the LHC p-Pb run. At 10:40 all power supplies of the electron cooler as well as the transverse damper tripped, with no apparent reason. Everything could be reset and turned back on remotely

without problem, but the transverse damper fault was not displayed on the Laser Alarms; this is being followed up.

- On Friday 7/10 afternoon the CPU card was changed on the power supply of the operational RF cavity (ER.CRF41).
- Various equipment trips (RF cavity ER.CRF41, injection bumpers ER.DFH) on Sunday 9/10 could be reset remotely.

The NOMINAL beam has been kept running during the whole week-end, well inside LIU specs ($>7.5e8$ ions/bunch extracted towards the PS).

PSB (Jose-Luis Sanchez Alvarez):

It was a good week for the booster

The PSB suffered few problems that are worth mentioning:

Tuesday Isolde proton scan was delayed by 2 h. Robot KUKA send bad condition to the security chain and

Firstline did an intervention on the BTY.BVT101 power supplies.

Wednesday, RF specialist changed a NIM power supply of the cavity C04 ring 3 (Downtime: 1h)

During the week-end, the booster suffered of missing linac2 pulses.

Otherwise, the new orbit has been propagated (6 correctors) to all operational beams except for Isolde.

ISOLDE (Alberto Rodriguez):

Not a lot to report from Isolde. We spent most of the week preparing for the third HIE ISOLDE experiment.

We had a few problems that we solved during the week. The most important ones were:

- Due to a problem with the timing system, we couldn't get the Trap and the Ebis synchronized.
- The RF team had to adjust the 9 gap amplifier since it was not stable for the powers needed for this new experiment.
- We also spent quite a bit of time trying to find the source of a beam instability. But, we were not successful. We will need to address this problem at some other time.

On Friday we were planning to send beam to the users for the weekend. But, a vacuum leak developed in the laser window. The leak grew in size when the third stage of the lasers were applied. Even though, we could have run at a reduced intensity using only two laser stages, we decided not to do it to avoid irradiating the area where the intervention needs to take place (GPS separator area). We will replace the window tomorrow morning and hopefully send beam to the users in the afternoon.

PS (Rende Steerenberg):

The PS had a good week with an average beam availability of 92%.

The main faults causing down time were POPS with over 9 hours without beam and two smaller issues with the RF systems causing a cumulative down time of 2 hours.

The issue with POPS was due to a broken motor of a water cooling pump. Last week the pump started making more noise and a 2 hour intervention was

scheduled for Friday 07/10. Unfortunately, the motor broke during the night of Tuesday to Wednesday, just after midnight. The diagnostics required nevertheless quite some time and the EPC-piquet decided not to call the POPS specialists for a motor exchange. The acting PS machine supervisor nevertheless called the specialist who confirmed that the repair would have to wait until the morning. During the morning the motor was exchanged within 2 hours and the beams were back around 09:00.

On the RF side the main issue was a breakdown of one of the 10 MHz cavities (straight section 91) that required access in the PS, hence cool down etc. The total downtime was 1 hour and 50 minutes.

On the positive side the ions were delivered successfully to SPS for setting up. The CLOUD experiment in T11 also resume beam operation after the DSO test and release of the East Area T11 (secondary beam line) beam permit that was interrupted for some upgrades in the zone.

During the week all required MD beams for the LHC MD week were delivered with the required characteristics.

AD (Bertrand Lefort):

Machine availability during the week: 88.183 %

- E-Cooler failures is suspected to create orbit Jumps: When E-Cooler solenoid power supply trips, nearby correctors are magnetised in a way that the orbit is modified.
- Commissioning of the new orbit measurement system: preliminary results are really good and it could be deployed at AD really soon.

SPS (Verena Kain):

Week 40 was LHC MD week and hence difficult for the North Area concerning availability and beam quality. Some of the downtime could possibly have been avoided if discussed before (examples: users wanting to use the goliath magnet, but cooling circuit out of service and tripping all cooling of BA81, LHC request for BSRT calibration with screens in TT10 causing 2 h with no beam for fixed target!). Also otherwise many faults on various systems occurred in the SPS and the SPS injectors. The availability was only 81% (so far) .

Saturday late evening all of a sudden all types of beams were lost on the first turn with very small beam loss in location 224. Eventually it was found that one of the vertical bumper magnets, the one in 223, was not following the reference anymore. Instead of zero current at flat bottom it had an offset of 15 A. All together with piquet intervention this incident meant 6 1/2 h of downtime.

The special LHC MD beams of the high brightness single bunch with $2e+11$ in 1 um emittance could finally be produced when the tunes in both planes were increased by 0.05 at flat bottom to counteract issues due to the space charge tune spread. $8b+4e$ with nominal bunch intensity was also delivered for the LHC electron cloud MD.

On Wednesday progress could be made on the nominal LHC ion cycle with 7 injections. The bunch intensity after the first round of optimisation is $1.25e+10$ charges . The transverse damper setting up still needs verification. Also,

chromaticity needs to be measured through the cycle and scanned for optimal transmission. As usual with the long ion cycles the extraction BPM interlock of MOPOS did not work to start with. Only on Friday we finally managed together with the BI expert to have the interlocking measurement occurring at the right moment within the cycle. Trial extractions on the TT40/ TT60 TEDs could not be scheduled this week.

The location of the leak of demineralised water in BA2 has still not been identified. The FBCT intervention required for the UA9 run could not take place this week.

LHC (From the 8:30 meeting):

Last week the LHC had another successful week of MDs. The issue with the PS POPS caused some MD time to be lost, but otherwise the machine availability was ~ 89%.

Friday midnight the MD session finished and the machine was switched back to physics, with the usual intensity ramp up and some tests.

Sunday physics resumed with 2220 bunches per beam. Beam 1 behaved better than usual and this needs to be understood. The 17 hour fill was dumped due to a slow power abort of the RB in sector 6-7. Investigations ongoing.

The ALICE solenoid is down and further investigation by the EPC team is necessary.

Before the MD4 week triplet movements were observed right of 5 and this was . This was initially compensated with orbit corrections but Friday the triplet was realigned vertically and radially. The largest movement was about 70 micro meters. This nicely corrected the orbit.

Until the next MD block, which is then followed by a technical stop and the ion run, 2.5 weeks of physics with protons remains.

The experiments still want to make a test with high pile up and a reduced crossing angle test in ATLAS (with a few bunches).