Accelerator complex status

End week 39 (Sunday 2nd October 2016)

TI (Ronan Ledru)

Here is the summary for the last week

https://wikis.cern.ch/display/TIOP/2016/10/01/TI+summary+Week+39%2C+2016

Linacs (Richard Scrivens)

Linac2

On Monday we pushed a bit the intensity of the proton source.

Linac3

Good intensity all week, but thanks to a lot of source tuning.

The source is running with the additional microwave generator in parallel.

LEIR (Maria Elena Angoletta)

A good week for LEIR.

Ions (with the NOMINAL beam) have been delivered to SPS for setting up on Wed 28. Typical intensities extracted from LEIR were of 7 E10 charges or above.

On Tuesday 27 the LEIR LLRF was upgraded to implement the requested interface with the future LEIR Schottky system. This will become ready to be tested later on in the fall but the RF team preferred to do the changes now, before the LHC start receiving the ion beams, to avoid downtime.

On Wed 28 there was also an MD on the two-cavity operation, a feature that has become possible since July 2016 with the commissioning of the new LLRF. The MD showed that the accelerating harmonics of the two cavities are now well aligned and has proven the validity of the new alignment method. Further MDs will now explore how bigger buckets obtained by using the two cavities together can minimise the LEIR space charge problems during the capture. It should be underlined that the two-cavities operation is for the moment approved as an MD feature only. A budget and manpower for replacing the LEIR hot spare with a new lab one will have to be found in case this feature should be required for normal operation.

On Thursday 29 the RF HLRF colleagues asked to move all operational beams to the cavity CRF43, since the CRF41 cavity is now often down and with faults that cannot be remotely reset. So the operational beams were moved to the new cavity, but without the optimisation of the LLRF parameters on NOMINAL the intensity extracted had dropped to 4 E10 charges.

On Friday 30 it was then decided to move back to CRF41 and to setup a NOMINAL cycle optimised with CRF43 as soon as possible.

On Sunday 3 evening the source is going to be switched off, in preparation for the oven refill that will take place on Monday 3.

On Tuesday October 4th morning a dedicated Linac3 MD is planned, so beam is expected back to LEIR on Tuesday 4 Oct afternoon. This time without beam in LEIR will be used by RF colleagues to attempt to modify/repair the CRF41 cavity controls so that it can be reset remotely. Additionally, Bi colleagues will make a machine access to remove a test amplifier in the LEIR extraction line.

ISOLDE (Eleftherios Fadakis)

Mainly vacuum issues which was causing electrostatic elements to trip. Leak on target that eventually stopped the experiment.

Week started with experiment IS548 taking beam from HRS through HIE reaching miniball.

On Wednesday 28th and Friday 30, we had an issue with the vacuum in REX. Vacuum spikes were causing several LINAC amplifiers to trip (one time it was amplifiers FRQ, BUNCHER, HIS. Second was 7GAP1,2,3). Vacuum experts are investigating. Users informed us about lower counts. After investigating a slight drift on the RFQ voltage was found. Once corrected counts went back to normal.

On Saturday 31st the SC XLL2 CAV2 tripped twice but was restarted immediately. Later that day the HRS target started developing a leak which caused vacuum spikes several times. They were tripping many electrostatic elements and forcing the valve just after the target to close. Reducing temperature of the line of the target did not seem to mend the situation. At 00:14 on Saturday target developed a big leak, after consulting with the vacuum expert we stopped heating the target and closed the valve. Experiment stopped.

Target change on GPS is planned for tomorrow morning. To be decieded for HRS.

AD (Bruno Dupuy)

No problem was recorded this week.

Several processes have been optimised.

The injection lines before and after the AD target and the injection were adjusted by iteration. Accordingly, the beam intensity is greater than 3.5E7 antiprotons by extraction (Eff:90%).

There are still some rarely wasted cycles.

- The absence of RF voltage on the C02 cavity was observed on the 3.5GeV flat top.
- The beam is lost randomly on the ramp between 300MeV and 100MeV.
- Several adjustments of the cathode voltage of the electron beam have been made which confirms an unstable 100MeV cycle.

Note: The sum of lost cycles remains inferior to the number of 'without injection' cycles caused by resending of the MTG sequences performed daily.

The orbit of the 100 MeV plateau stay stable but these observations still have needed time to be pertinent. "All things come to him who waits. especially in AD"

A new version of the Real Time Task for CGAFG has been tested successfully. Deployment expected in the next period of MD.

Booster (Elena Benedetto)

An extremely quiet week for the PSB.

On Thursday at ~12h, BT1.SMW1 tripped. Beam stopped for 2.5 hours (2h cool-down). The ABT specialist fixed a bad contact in the electrovalve.

Otherwise smoothly providing protons to the complex.

- Few beams prepared or fine-tuned for MDs in the PSB and in the PS.

- Final orbit correction campaign continued, with an improvement from 2mm down to <1.5mm (even 1mm!) rms orbit excursions, when adding the 2 extra correctors per plane per ring.

PS (Matthew Fraser)

It was an excellent week for the PS with 98% availability. A couple of minor faults caused a few minutes of downtown including a resettable POPS trip and a quick stop for an intervention on the RF. On request of the LHC co-ordination team the second 40 MHz cavity was deployed to other beams, including LHC25 12b and the MD 54b version of 8b4e. The extraction kicker was tightened around the 12b train as requested by LHC. Setting-up of the LHC25 80b beam continued and it was sent to the SPS where the satellites and injection oscillations along the train were much improved.

Ahead of the CLOUD run beams to the East Area were perturbed on Thursday morning for functional tests of the renovated T11 access system. The final DSO tests were completed on Friday morning. The warnings on the pressure of the cooling water circuit in the internal dump TDI48 reoccured this week. In agreement with EN-STI the dump was taken out of operation. A software modification to the SIS is to be completed shortly to ensure TDI47 triggers instead.

It was a busy week for MD studies following up the vertical emittance blow-up measured on the operational LHC25 BCMS beam. Preliminary results show quite some dispersion mismatch on ring 3 at injection to the PS, to be confirmed. The transverse damper feedback was successfully tested on the operational LHC beams including damping of injection oscillations. A decision to deploy the damper operationally will be made next week.

SPS (Karel Cornelis)

The week in the SPS started very smooth, as a continuation of the excellent week before. On Wednesday there were some difficulties filling the LHC. The beam had to be scraped much more than usual in order to keep the losses below the thresholds at the end of TI2. The reason for this is not clear but it is probably due to a bad steering combined with lowered BLM thresholds which were put in to protect the magnet with an inter-turn short.

On Thursday there was a long stop of about 10h to repair a water leak on the MSE power convertor. The intervention, which originally should take a couple of hours, turned out to be much more

tedious because a complex bus bar which had to be dismounted, in order to be able to reach the leak under the false flour. Most of the intervention was in the shadow of an LHC stop. After that, the machine resumed its cruising speed and the weekend was very good.

On the ion front we made progress with LHC injection cycle for the nominal beam.

Also AWAKE had a successful week. They managed to align the laser with the proton beam and to synchronize the laser pulses with the proton pulses.