

Accelerator Complex Status

End week 18 (Monday 8 May 2017)

TI (Jesper Nielsen)

Wednesday 18:03, Raw water in BA81 tripped 2 times. Level of water was low and caused an interlock on the circuit. Piquet on-site to restart first time, no leaks were found. Second time circuits were restarted directly from CCC.

Thursday 20:53, BA81 demineralised water circuit tripped on water leak alarm. On-site a hose was found disconnected. Magnet piquet called in to repair.

Friday 20:51, At 20:04 TI receives phone call from Fire Brigade about a flood alarm in lift shaft PX24.

TI also has a level two alarm "inondation ascenseur". Unfortunately no supervision is available.

LHC co-ordinate with ALICE GLIMOS and the Fire Brigade, but before the intervention took place, the alarms cleared. No access was done.

Full TI summary: <https://wikis.cern.ch/display/TIOP/2017/05/08/TI+Summary+Week%2C+18>

LINAC2 (Jean-Baptiste Lallement):

Very good and stable week – 100% availability.

LINAC3 (Jean-Baptiste Lallement):

The beam is ready and knocking at the LEIR's door.

PSB (Klaus Hanke):

A week without major technical faults, but a number of resets and reboots here and there.

The Booster suffered still from (RF?) problems in Rings 1 and 4 which hampered also the setting up of high intensity. On Wednesday morning there was a (planned) stop during which M. Haase could fix Ring 4 (found a broken feed-back which he repaired). This solved the Ring4 issue. During the stop the BI expert also did an access to the ring to look after some not working BLMs (one cable changed, and one not connected BLM connected).

On Thursday Matthias believed also to have an idea for the Ring1 problem (faulty cable or connector); we arranged for the access Thursday afternoon but in the last minute the LHC did not authorise us to stop; so this was postponed to the next morning. Matthias did the access, swapped cables etc., but unfortunately this time he could not solve the problem. So this problem persists...

Other than that setting up continued with the MTE beam (1000E10 ppp will be requested by the SPS this week and are available; we are further ramping up intensity). We also started setting up the STAGISO beam.

ISOLDE (Erwin Siesling):

HRS:

Setting-up with stable beam from a new UC surface target (first time this year)

started on Tuesday. Difficult setting up through the ISCOOL buncher and cooler. New standard settings had to be found after repair and several changes within the ISCOOL during the shutdown. Many thanks to EN-STI (Tim Giles and team) for their help.

Wednesday-evening and night was used for RILIS laser optimisation and stable beam to the CRIS experiment. During the RILIS laser tuning it was discovered that the laser window in the HRS MAG90 separator magnet was dirty and the laser efficiency hence very low. An intervention was planned for Thursday to change the window which by the way was found clean during the shutdown and had therefor not been changed.

Thursday the laser window was changed by the RILIS team and RP. During the venting of that sector HRS20 also the HRS10 (HRS Front-End) got vented unwanted. It dropped the target and line heating. After discussion with vacuum (Jose Ferreira Somoza) we concluded that the valve between HRS 20 and 10 is leaking, This valve is on the Front-End side and can only be replaced with the entire front-end. We will have to live with it. During the next HRS target change we will see what the influence is on HRS20 when venting HRS10 first. Luckily the target had survived and after the laser window change and pumping we were back in business.

Proton scan was done later that day with some minor hick-ups with the tapestation/beamgate. Physics started right after and CRIS started taking beam in the evening.

However, Thursday evening the HT source broke and no beam could be extracted from the HRS target anymore. We swapped for the HT source from GPS (GPS in standby anyway) and could continue.

The broken HT source was replaced by the spare by Jan Schipper and Thierry Gharsa and will be repaired.

As of Thursday-evening followed by the weekend the CRIS experiment has been taking radioactive Indium beam. The users are very satisfied.

GPS:

Radioactive run for IDS stopped Wednesday-morning. They had a successful run. Some stability measurements were done on the GPS separator magnet 70 by OP. No fluctuations found so far.

Target change for a used target (#575) was foreseen on Friday however a few problems occurred:

First the shutter would not give the closed ok signal on the previous target. With help of Christophe Mitifiot who was on holidays we could recalibrate after which the signals were ok.

Then when trying to pump on the used (from last year) target 575 a huge leak occurred and we had to stop pumping. Probably the joint on the target cone is damaged. The target was exchanged for the previous one again to exclude a leak on the Front-End and we will set up beam and adapt physics with the previous target #595.

HIE ISOLDE:

Beam commissioning at REX advancing well. The beam is passed the 7 Gap 2. Good progress and well on schedule.

From the installation side things go well too. We have finished all installation work and are ready as of today for the Hardware Commissioning of the HEBT lines.

All on schedule.

PS (Heiko Damarau):

The first week of physics of the 2017 run with beams from the PS already yielded an average availability for the user beams of about 90%. In parallel further beam optimization has taken place: a basic setting-up of the 25 ns variant (up to 48 bunches) for SPS/HiRadMat has been prepared. Horizontal emittance blow-up at the end of the flat-bottom is still observed though and the origin is being investigated. Beams for the EAST hall experiments (including the parasitic bunch for TOF), the dedicated cycle for TOF ($\sim 7E12$ ppp) and the beam AD ($1.1E13$ ppp) are delivered as requested, as well as low-intensity MTE beam ($3E12$ ppp) for setting-up in the SPS. The latter has now been prepared up to $1E13$ ppp. Downtime ($\sim 4h$) was caused by intermittent missing pulses of the injection septum which seems not yet fully solved. Various technical issues in the PS, notably a polarity inversion of a horizontal corrector, have been attacked in the shadow of two scheduled accesses in the PSB.

AD Q:

SPS (Verena Kain):

After the 1st of May weekend the slow extraction setting-up started on Tuesday morning, but was only finished in the evening. Due to an issue of the knob->k hierarchy, accidentally introduced during the hardware tests, the extraction sextuple strengths were wrong by a factor 2. And this took a while to figure out. During the night the beam was steered to the three North Area targets. In the following days the beam line physicists were setting up the lines behind the targets. Frequent stops for radiation cool down were required due to cooling issues of North Area magnets which needed access in TCC2.

On Wednesday EPC managed to resolve the problem of the QD 6 Hz oscillation of 50 mA amplitude. The damper setting was finished then and the intensity increased to $\sim 5 e+12$ with two injections. The transmission with this intensity is $> 97 \%$. The cycle still needs further optimisation. Every so often the beam becomes unstable in the vertical plane at around 1700 ms during acceleration. The damper has been verified, chromaticity and octupoles have been increased. The first set of ZS alignment has also been carried out. The losses at the TPST - the mask in front of the MST - could be significantly reduced.

LHC INDIV beam was prepared and extracted successfully towards the LHC. 25 ns commissioning has started with 12 and finally 48 bunches on the HiRadMat cycle. The transverse damper has been set up. The quality of the 48 bunches from the SPS injectors is however not sufficient yet. The experts have not been able yet to re-establish last year's longitudinal quality. The bunches are too long at injection. The beam dump team has started the cross-check of the temperature

evolution model and the MKE4 has had its first scrubbing after the LSS4 septa exchange this shutdown (and subsequent trip on vacuum interlock).

The coast cycle required for the MD on Wednesday has been commissioned this weekend. It is OK for Wednesday. A few features will have to be followed up by EPC with the new FGCs of the mains.

Many commissioning steps have been carried out as well during this week. The beam dump kicker waveform on the dump block was measured with the SEM grids, the active filter 50 Hz correction for the spill ripple was re-commissioned. Without the active correction on, the 50 Hz modulation is about 100 %. No 50 Hz bursts have been observed so far.

The 519 wirescanner is operational again. A timing cable had been disconnected.

LHC (Jorg Wenninger):

Excellent progress with cycle commissioning towards 40cm as well as optics measurements and corrections at 40cm. Beta beat after global correction <5% in both rings. A first corrections version dragged the current of one Q6 too far down, this was improved in a second iteration. Ramp and squeeze with local corrections works very smoothly. Coupling corrections during the squeeze required a special knob due to a coupling structure that developed over the ring and made reliable measurements in IR4 impossible.

The flat reference orbit was established with a nominal bunch. The IP bumps were then applied and tested throughout the cycle with probe bunches down to beta* of 30cm.

The aperture was measured at 40cm and the limits were found in the crossing planes as expected, the minimum is ~12 sigma. The CMS IP shift bump has now effect on the vertical aperture up to shifts of -2mm.

Issues with some FGCLite's (always the 1st on a given segment) not reacting to the RT trim has been identified as an index bug in the FGC GW. Fixed deployed during the access on Wednesday.

Decision after rMPP meeting and LMC to continue with the latest TSU firmware version, after an additional code validation and further exercising via ARM & DUMPs.

Kick-response measurements in the TLs revealed a forgotten update of the coupled TI2(8)-LHC ring optics model (which is part of the SPS LSA system) for injection steering which is still originating from the previous optics. New model is on the way.

The ballistic optics was commissioned and all measurements are finished.