

Accelerator Complex Status

End week 24 (Monday 19 June 2017)

TI (Jesper Nielsen)

A rather busy week with quite a few electrical perturbations, two on Wednesday and one early Thursday morning.

Tuesday 03:41: Stop of CRYO in LHC4, caused by a problem with compressed air. A small amount of helium was released, and seen by the ODH sensors in the tunnel.

Tuesday 16:30: A trip of the cooling water in UW25 caused a trip of ALICE magnets. The cause was not found on-site, where a manual restart was necessary. It is not excluded that high temperatures in the pump room and electrical cabinets could be the cause. Investigations are still ongoing.

Saturday 11:32 Cooling towers stopped in the North Area, restarted quickly by TI with CV on the phone. Agreed with CV to leave in manual mode until Monday.

Sunday 21:38: Problems with GPN network, which was down CERN wide for 1,5 hours. The problem was a overload on the DNS server.

Details: <https://wikis.cern.ch/display/TIOP/2017/06/19/TI+Summary+Week%2C+24>

LINAC2 (Jean-Baptiste Lallement):

Linac2 had a good week with just 10 minute downtime due to the thunderstorm on Wednesday afternoon.

LINAC3 (Jean-Baptiste Lallement):

Linac3 had a good week as well. The source tripped for 10 minutes on Monday because of an interlock on the solenoids cooling water temperature as the chilled water production stopped. The linac went also down for 15 minutes because of the thunderstorm on Wed. afternoon.

LEIR (Sergio Pasinelli):

Calm week.

Tuesday: Linac3 MD during all the day.

Wednesday: LLRF H/W clean-up and setup. LLRF team has removed old crate, switch etc.. and setup the servo loop and the beam.

Thursday: Some validation tests was done on new ITE pick-ups.

Saturday: Linac 3 down (Thomson generator tripped off). Xeneric samplers were down on the crates (dleigen, cfv-363-cbsyn ,cfv-250-cpow)

Sunday: ER.QFN2040 has tripped.

During the week EARLY was available for PS and NOMINAL was accelerated but not extracted.

PSB (Vincenzo Forte):

97.5% availability for the PSB on week 24 and smooth operation apart main faults on Wednesday, due to few electrical glitches, and an MPS blackout on Thursday due to an issue on the interface keyboard of a converter.

Operational beams within specification and other beams prepared for LHC MDs, like high intensity LHC50 and high intensity doublets, which are urgent for setup in PS and SPS.

Some problems for tune measurements on R1 and R2 (followed up by BE/BI and Alan), probably due to an unexpected drift in time of the kicked signal on the tune BPM. A workaround has been found to perform measurements but investigations are still on-going.

A BPM (BTP.BPM20) in BTP line seems to have noise issues.

PSB-PS energy matching has been performed.

Since Thursday the Linac4 ABP team is in the CCC-PSB island to re-start the Linac4 and train the PSB OP team.

ISOLDE (Emanuele Matli):

GPS

On Tuesday switch from Mg to In.

End of the run Wednesday morning a 9:30.

Friday morning target change (#601 removed, #603 installed).

Problems controlling shutter and clamps. C. Mitifiot needed to recalibrate both.

This was due to last week's problem with the PLC when an old configuration was restored but no calibration was done in order not to perturb operation.

Preliminary set up at 50kV to YGP.BFC4900.

HRS

Target installed and set upon Monday.

CRIS taking beam from Tuesday.

Issues with stability of RFQ probably due to overheating of the amplifier.

In the evening large oscillations in beam intensity caused by a problem with YHRS.QP330-NEG (AQN oscillating between CCV and ZERO). Piquet first line intervention but everything back to normal after removing and reinstalling the power supply: another badly connected cable (see later problem with YHRS.QP180)?

Wednesday new proton scan and yield checks in the morning. Beam back to CRIS in the evening. Recurring problems with the separator magnet.

Thursday PSB MPS problem interrupt the beam for ~2h

Slits got stuck and required intervention of the expert to reset the position.

On Friday new check of the status of the separator after a week of unstable beam conditions.

The cable of YHRS.QP180 was found not properly connected and the separator retuned.

Beam back to CRIS in the late afternoon and for the w/e.

End of run Monday morning.

HIE

Monday and Tuesday beam commissioning.

Wednesday and Thursday access to tunnel for alignment.

Friday recover from access.

PS (Denis Cotte):

Une bonne semaine pour le PS avec une disponibilité d'un peu plus de 95%.

Les principales sources de pannes cette semaine étaient due :

- _ absence de faisceaux du PSB (3h)
- _ problème avec des convertisseurs (principalement les doublets et le SMH16 et des perturbations électriques pour 3h)
- _ déclenchement du SMH57 à cause de la température trop élevée du circuit d'eau de refroidissement. (faisceaux à destination de la zone EST pour 1h40)
- _ déclenchement sur des cavités 10MHz du PS.

Toute la semaine, les faisceaux pour nos différents utilisateurs (TOF, EAST, AD, MTE, LHC) ont été délivré.

A noté que l'émittance du faisceau standart LHC25ns délivré à HIRADMAT était un peu grosse (environ 3 um.rad). Problème en cours d'investigation.

Mercredi après midi, plusieurs déclenchements due aux orages affectaient principalement les cavités du PS.

Jeudi, durant une panne sur la MPS booster, un accès a été planifié dans le PS_Ring pour réparer le relai gap de la cavité 10MHz C76.

Suite à cette intervention, le redémarrage de POPS à nécessité l'intervention du spécialiste. POPS à aussi déclenché Vendredi, mais un reset et redémarrage depuis la CCC à été effectué avec succes.

Vendredi aussi, un "energy matching" entre Booster-PS à été effectué sur un faisceau de type LHCINDIV.

Pendant le week-end, le setting-up des faisceaux LHC25ns_8b4e et LHC25ns_Doublets ont bien avancé.

AD (Lars Joergensen):

The AD had another very good week.

The only real issue was some strange setting for the magnets just before the AD Target. After the PS was down on Thursday, when it came back the AD was only ejecting half of what it does normally. Everything was thoroughly checked both at the AD (with 4 AD operators frantically checking what was wrong) and the PS side (2 operators with a little help from RF (Haiko) as well). We found nothing wrong anywhere. In the early evening Bruno had the idea to optimize a bit before the target (although the beam seem to hit the target like normal). He very quickly recovered the full beam at the AD. This seemed to work well apart from a 4 hour period during the night. Friday at lunch time the beam suddenly halved again. The PS had not changed anything for 40-50 minutes they claimed, but after going back to the original settings for the three 'Bruno' magnets, the beam was back.

We have still not figured out what the root cause of this really was, so it is probably something we should keep an eye on.

SPS (Verena Kain):

The SPS had an availability of 89.5 % in week 24 with roughly 5.5 h downtime caused by the SPS injectors, followed by a bit more than 4 h of downtime for extraction systems with the ZS sparks and the MKE extraction kicker of LSS4 no trigger issue.

This was also the last week for the first AWAKE run this year. One of the highlights this week was the successful bunch rotation MD which delivered bunch lengths of ~ 200 ps (1 sigma) for the AWAKE experiment. The frequent MKE extraction kicker no trigger issues are understood, albeit not solved yet. The extraction is intermittently inhibited while the PFNs are already charged due to power converter interlocks (this was solved) and also FMCM interlocks on the TT41 RBI. The latter one will have to be followed up next week.

Fixed target physics continued with $\sim 3e+13$ extracted. The normalised losses on the ZS are increasing again and ZS is frequently sparking. ABT will have to be contacted next week.

The LHC is now taking 3 batches of BCMS beam with 225 ns batch spacing. The reduction to 200 ns is foreseen for next week. The bunch intensity was increased to $1.2e+11$ towards the end of the week. The emittances are typically 1.6 to 1.7 μm .

HiRadMat28 for the LIU transfer line collimators and the new TDI in the LHC was carried out this week. Up to 288 bunches of 25 ns standard beam were extracted on to different graphite and C-C materials. The experiment is essentially finished. One of the measurement systems did however not work as expected for one of the materials. It will be decided next week whether another series of shots will be requested for this jaw. HiRadMat was run with 2 800 MHz cavities, but was frequently longitudinally unstable. The transverse emittances were also too large (~ 3 μm) from the PS. The spot size measurement in the line with a dedicated screen at the target location needs further studies to understand the systematics. Currently we cannot rely on this measurement.

LHC (J. Wenninger and M. Zerlauth):

After a short 10b fill to checkout the cycle (with orbit FB completely fixed), a last 600b fill was made with 96b/injection and a crossing angle leveling test in Adjust. The week was devoted to intensity ramp up with the 900b, 1225b, 1561b and 1741b steps. The peak luminosity reached $\sim 1.1E34$ $\text{cm}^{-2}\text{s}^{-1}$. The beam-screen heat load at 6.5 TeV reached 120 W/hc on average in S12 which is the highest sector. Crossing angle leveling was inserted for the first time in stable beams in the first 1225b fill. RF full detuning is the baseline in all fills and works very well. Operation is smooth, very good lifetimes in collision, no strong loss spikes when beams start colliding. Lifetimes optimized with tune scans. First adjustment of horizontal tunes included in functions (B1 +3E-3 and B2 +2E-3).

The integrated luminosity is now ~ 1.6 fb^{-1} .

The main faults affected the cryogenic system on Tuesday (point 4, compressed air pressure sensor) and storms hit the machine between Wednesday and Thursday. Two powering events in 2nd and 3rd fill for 1225b require offline follow-up (dump on

losses after trip of non-interlock skew quad circuit RQS.A81 and 4th occurrence of a spurious interlock in RQ10.L8 since 2015). Over the weekend 2 fills were dumped by an interlock on the discharge thyristor temperature of RB12, an EPC intervention after the second event discovered a water leak on the thyristor cooling plate that can only be repaired on Monday.

Blindable BLMs and collimator BPMs were tested between physics fills. Additional collimation tests done for scraping with primaries (reached 3 sigma for both beams) and for TCL scans.