

Accelerator Complex Status

End week 32 (Monday 14 August 2017)

TI (Jesper Nielsen)

Running quite well.

Tuesday 08/08 at 13:45 The LHC QPS tripped due to local thunderstorms, causing a quench in seven sectors of the cryogenics installation. No electrical disturbances were seen by either EDF or SIG. The resulting quench caused the loss of the LHC beam, and resulted in a four hour recuperation for the cryogenic's.

Saturday there was a fire alarm in UX25 (ALICE). The fire brigade intervened with EN-CV who found a broken ventilator bearing.

Details: <https://wikis.cern.ch/display/TIOP/2017/08/14/TI+Summary+Week+32>

LINAC2 (Giulia Bellodi):

Linac2 ran very smoothly until the weekend.

During the OP stop on Thursday morning the source HV column was cleaned and a dust sensor was installed in the cage to help with the diagnostics of source breakdowns.

On Saturday afternoon a fault in the power converter of the LTB.QSW40 quadrupole required the intervention of the EPC piquet (2hrs beam downtime). In the evening transmission out of the Linac started to be affected by very frequent breakdowns of the LI.BU01 buncher cavity. These had already started on Friday, but became increasingly frequent as of 22:00 on Saturday (several breakdowns per minute, lowering the delivered beam current to 100mA). The RF piquet was called overnight but could not diagnose the problem, after checking all the hardware. Further investigations were carried out remotely on Sunday morning, but these didn't shed further light. At this point it was agreed with the CCC to continue operation in this degraded mode until Monday morning, when all the RF team will restart investigations.

LINAC3 (Giulia Bellodi):

Linac3 had a very good week.

LEIR (Sergio Pasinelli):

Main tasks of the week:

Studies on the beams

EARLY beam sent to SPS for setting up

We have had some faults during the week:

- ER.QFN2040 & ER.QFT20 several trips
- CRF41 several trips
- ER.SMH40

Studies:

- Linac3/LEIR MD characterisation of beam parameters at injection
- Optimization of the NOMINAL cycle (multiple injections)

- ITE BPM studies with shorter pulse length
- E Cooler studies
- Space charge studies

EARLY beam was available Thursday and Friday for the SPS setting-up.

PSB (Alan Findlay):

It was a reasonable week but not such a good weekend for the PSB this week. The main PSB downtime of the week was the planned beam stop on Thursday to replace QDE power supply and check the spare parts required to fix the broken electromechanical switch used to swap these supplies. The supply was swapped and the ripple visible on the QDE circuit was removed.

In the shadow of the above beam break, the wirescanner team went into the machine to reset the R2 V scanner, which is now working normally again.

The RP team also took advantage of the break and did detailed radiation measurements around BHZ52 where they had highlighted a new hotspot during the last tech stop. This appears to show that the problem likely comes from R2, so we will now try to investigate in more detail knowing this.

Saturday afternoon 16H50 LTB.QSW40 dropped out taking the Linac beam with it, and this took the piquet 2 hours to fix.

Saturday night low intensity shots from L2 were observed by the OPs crew, investigations continued with the L2 Sup & L2 PiLLRF. After 3 hours of investigation the beam was delivered back to the users, but there were still low intensity shots from time to time.

Sunday Giulia & Rolf followed up the L2 issue and concluded a discussion with the whole L2 RF crew would be required on Monday, perhaps followed by an intervention to solve the problem.

Sunday afternoon a problem on R1 was evident for the MTE beam, as the phase between the cavities was no longer being controlled hence the splitting was destroyed. After painful diagnostic due to the ongoing issues on the LL frontends where there are no alarms or samplers generated, the PiLLRF was called to help. As the problem was considered rather complicated, Michael rebooted the frontend to solve the problem but not the source of the problem. This issue will be discussed once again at the RF piquet meeting on Monday morning.

There was the usual busy MD program throughout the week.

ISOLDE (Eleftherios Fadakis):

Since Tuesday 8th of August ISOLDE is providing ample beam of 140Sm^{34+} from GPS to Miniball(HIE-ISOLDE).

Here are the issues we have encountered:

- On midnight of Tuesday all super conducting cavities in cryo-module 1 (XLL2) tripped. The LHe level was found to be at 12% and showing in red in the inspector application. Luckily it was slowly recovering(10% in 1 hour). Wednesday morning after investigations by cryo and RF experts the report was that:
SRF05 of XLL2 was running in field emission regime and slightly increased the power dissipation of XLL2 by less than 10%.
This might have been a small increase but the main Lhe valve was set to open up until a conservative value of 33%.

It caused the Lhe levels to drop which in return caused the interlock of the amplifiers of XLL2 to kick in.

Actions taken after the incident:

Cryo experts increased the threshold to 36%.

RF experts restarted the amplifiers.

BE-OP needed to reduce the gradient of SRF05 and re phase the remaining 3 cavities. We were using all 5 cavities of XLL2 and the first three of XLH1.

Beam was given to the users at noon of Wednesday.

- 7GAP3 amplifier tripped 4 times in total. SRF02 and 04 both tripped twice. Several CA0 power supplies tripped twice.
- Target and line heating tripped but users were quick to restart them.
- On Thursday, 2h30 protons stop for an intervention on the PSB.
- On Friday during the target change the extraction electrode was inserted all the way in by itself and got stuck there.

We had to call C.Mitifiot who managed to retract it. This is a recurring incident. Christophe is suspecting the latest version of the FESA class and informed me that he is working on a new version.

On Sunday a 3h stop due to issues with LINAC 2.

PS (Frank Tecker):

The PS had a very good week, with beam availability above 93%. The majority of the downtime came from the injectors. On the PS side, the only major blocking problem was the WFW pole face winding that caused about 1:45 downtime. A problem on the C80-88 cavity during 2:30 caused a longitudinal tail in the LHC beam but the beam could be used anyway. A problem with the F61.DVT02 power converter stopped the EAST beams for 0:30.

A number of equipment could be reviewed during a scheduled 2:30 access (on PSB request) on Thursday. Wednesday had dedicated MDs for studies of the ralentisseur and the White Rabbit B-train distribution.

The LHC RF control was switched to the multi-harmonic sources (MHS). LHCprobe and LHCindiv MHS were mapped to operational beams.

The BCMS beam with constant bucket area is being routinely used as operational beam.

The wire of wire scanner 64V is broken. 85V is used for the operational measurements instead.

AD Q:

To come soon.

SPS (Francesco Velotti):

A very good week for the SPS started with the first setting up of the AWAKE cycle for the Friday official start. Modification to the BQM for AWAKE where tested

and the extraction to the upstream TED was performed. Also the FT cycle was optimised and settings were adjusted to cope with the AWAKE cycle in the SC. On Tuesday, some final modification on the WS electronic was done of both 416 and 519, and now the measurements bunch-by-bunch have drastically improved (see below screenshot) - thanks to the BI team. The BI team suggested also settings to perform measurements with LHC beams at FB and FT - 4700 V using screen 0 at 26 GeV and 3 or 4 at 450 GeV. Then we took LHC BCMS with higher intensity, 1.25×10^{11} p/b. This was just at the limit of the intensity interlock put in place on the BCT, in order to guarantee the required attenuation from TCDIs in case of failure.

On Wednesday, the dedicated MD was on collimation studies. The SPS was put in coast.

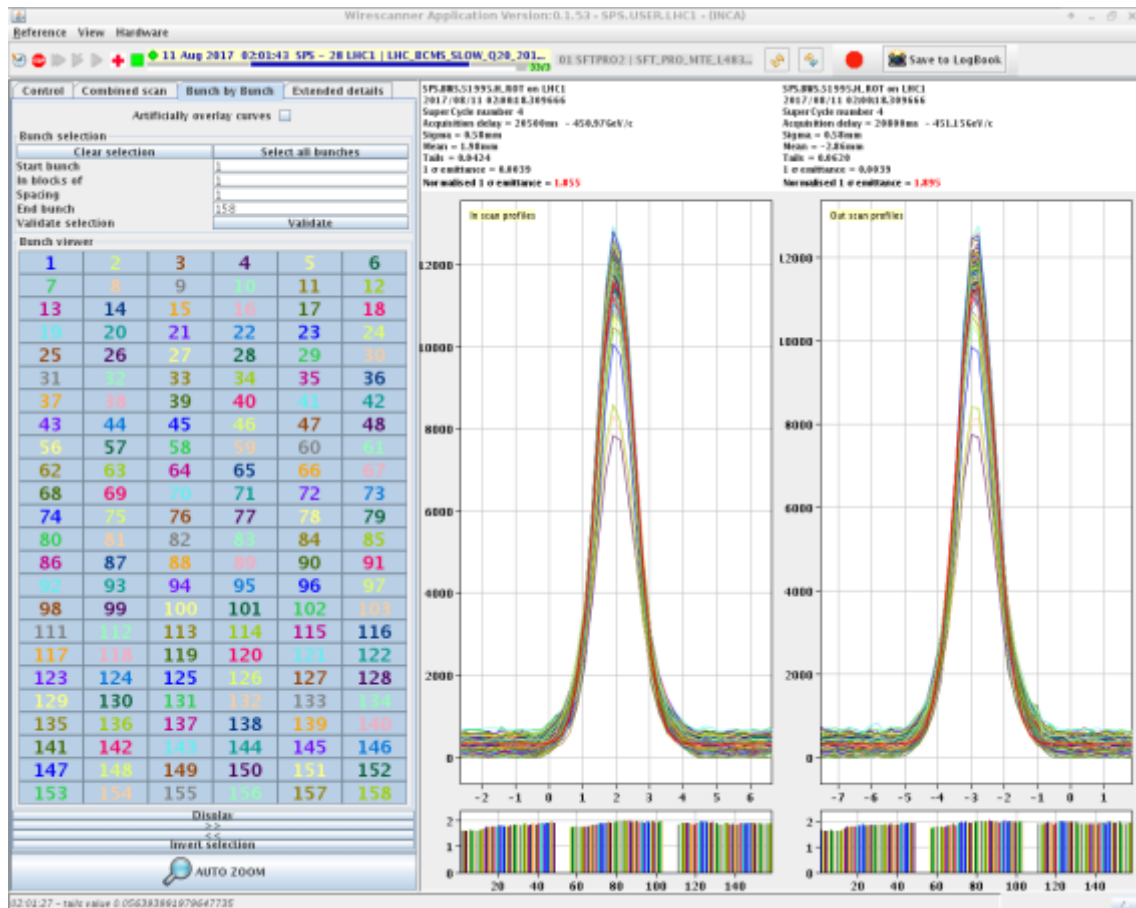
Thursday, the setting up of the RF for the SFTION cycle continued (also on Friday) and, probably, finished (one more day might still be needed though). The PSB requested an access for about 2h, hence, during this time with no beam, a few interventions were carried out: SMD10 was brought back from spare to nominal, fix of sextupole PC in BA5 and partially completed an intervention in TT61 (WANF) on a pump of a water collector - to be finished. In the afternoon, the AWAKE laser permit was signed and the petrol of the area was done - it was divided in two due to a pressure problem in the plasma cell while patrolling the area.

On Friday, after the beam permit was signed following the RP veto, the beam was extracted down to the AWAKE line. Also worth to be mentioned, 2 erratics on MKP PFN 6 (the same that had problems last week) were recorded - ABT experts informed.

The weekend was mainly dedicated to production, now with also AWAKE in the SC (on Sunday it was switched to a SC with 2 SFTPRO and 2 AWAKE as well). Intensity fluctuations due to LINAC2 problems caused hiccups in the beam quality delivered to the experiments.

As problems to follow up:

- the spectrometer in NA62 had heating problems which caused the piquet intervention. This did not solve the issue and in fact it was tripping with high frequency.
- SMD12 tripped and moved to spare (software problem). EPC experts informed and will work on this from Monday.



LHC (From 8:30 meeting, Coordinators: E. Bravin and W. Hofle):

The week started very well with a good production of luminosity over the weekend and the beginning of the week. The machine was so efficient that the MKI temperatures for B2 exceeded the interlock thresholds (> 50 degrees). Softstart tests with the MKIs at high temperature at the end of fills allowed to push the thresholds up slightly.

On Thursday the cryo regeneration in point 4 was scheduled and the beam screen regeneration was performed (increasing the beam screen temperature to 80K) too in order to make an attempt to mitigate the issue in 16L2. Following this several beams were dumped during acceleration at various energies. It was then decided to perform scrubbing at injection energy.

On Friday evening 600 bunches could be brought into stable beams. The subsequent fill with 1260 bunches was dumped due to a quench of the main bend C16L2, which required cryo recovery followed by further scrubbing. The vacuum pressure in 16L2 goes up abnormally high during the beam screen flushing and the magnet quench.

Sunday night a fill with 300 bunches was brought into stable beams again.

The summary of beam over the weekend:

Fill	Time of dump	Energy [TeV]	Unstable Beam	# bunches	I_b [E11p]	Bump [mm]
6063	10/08/2017 21:48	1.34	B1	2556	1.22 / 1.22	0.5
6064	11/08/2017 00:59	0.9	B1	2556	1.25 / 1.25	0.5
6065	11/08/2017 03:13	3.83	B2	1260	1.20 / 1.19	0.5
6066	11/08/2017 05:17	1.60	B2	1260	1.10 / 1.08	0.5
6067	11/08/2017 07:59	3.51	B1	1260	1.04 / 1.03	-1
6068	11/08/2017 10:37	6.5	-	300	1.10 / 1.10	0.5
6072	12/08/2017 04:02	6.5	-	601	1.06 / 1.05	0.5
6073	12/08/2017 12:15	6.5	B1*	1260	1.05 / 1.05	0.5
6075	13/08/2017 11:07	6.5	-	300	1.16 / 1.15	0.5
6079	14/08/2017 06:31	6.5	-	600	1.10 / 1.10	0.5

Monday morning filling for physics with 1263 bunches was started.