

Accelerator Complex Status

End week 23 (Tuesday 11 June 2018)

TI (Ronan Ledru)

Despite the many thunderstorms, a good week for the technical infrastructure operation, without major issue affecting the operational machines.

Details: <https://wikis.cern.ch/display/TIOP/2018/06/11/TI+Summary+Week+23>

LINAC2 (Richard Scrivens):

Good running for Linac2, the LT.BHZ30 power converter had to be switched to the spare on Thursday, causing 3h downtime.

LINAC3 (Richard Scrivens):

At Linac3, on Monday, couplers were added to ramping system cavities for the future new LLRF system, and optimizing with LEIR could make some gain in injection efficiency. Some studies were made into the stripper foils that are in service in order to decide what should be changed at the technical stop.

On Thursday there was an oven refill, and on Friday to Sunday tests were made using nitrogen gas injection into the source, instead of oxygen (which could improve oven lifetime if good source beam performance is possible). On Saturday it was seen that significant amounts of iron was being sputtered so the switch back to oxygen was made.

LEIR ():

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PSB (Fanouria Antoniou):

A nice week for the PSB with an availability of 96.8% corresponding to a total downtime of 6.1h. The main downtime came from a trip in LT.BHZ30 which resulted to no beam from LINAC2 for 3h26min, followed by a trip in BTM.QNO05 which requested the piquet intervention and lasted 1h59min. Due to a problem in the WR distribution in R4, all rings were switched back to the old Btrain system. The problem will be followed up this week.

Focus was given in the preparation of the LHC eCloud MD beams this week, with 18E10 p/ring, 36E10 p/ring, 60E10 p/ring and 72E10 p/ring.

Several MD studies also took place in the PSB, focusing on: MTE optimization, K-scan in BTM line, Alternative working points in the PSB (Q4Q3 and Q3Q5 optics), Optics studies at 160MeV, new Transverse Feedback System, non-PPM fully matched optics from PSB to PS and Tune Scans.

PS (Ilias Efthymiopoulos):

Smooth running for the PS with an overall availability of 96.9% including a 3.2h stop of PSB fault - net PS availability of 97.7%

A total down time of 5.3h registered for the week, including as mentioned above

3.2h of beam non-availability from PSB. The remaining 1.38h is attributed to problems with the power supplies (0.88h including a trip of POPs), controls (0.33h, including a freeze of the sequence editor blocking temporarily the injection to LHC), and RF trips (0.16h).

PS provided beams to LHC (BCMS 48b beams, LHCINDIV), East Area Users (3.5 e12 ppp), AD (14.2 e12 ppp), nTOF(7.7 e12 ppp), and as of Friday morning to SPS-FT (16.2 e12 ppp).

Work on the pb-ion beam from LEAR was done during the week, for the tests to provide a Pb81 beam to SPS using a new stripper foil in TT2 line.

A rich MD program with 12 activities was scheduled and completed during the week, including a the dedicated one to study the PSB-to-PS beam transfer optics.

A variant of the SFTPRO beam with $h=1$ synchronisation between PSB and PS was prepared that allows bunch identification between the machines. It will be delivered to SPS as of this week.

ISOLDE (Emanuele Matli):

It has been a very good week at Isolde from the operation point of view.

HRS has been delivering Scandium all week to Collaps without major issues.

There has been an intervention to replace the laser window in the separator area and a few interruptions of protons from the PSB.

Recurring problem with HRS.QP180

Vacuum in sector HRS40 increased to $8E-6$ (probably due to no pumping from neighbouring sectors during laser intervention) and tripped several elements. The active interlock Bit in the knob was "Interlock" and not "Vacuum".

GPS target change on Friday needed recalibration of the clamps: control system was showing them in status unknown when they looked closed locally.

Basic set up of the separator to get some beam after the separator to allow the target group to make some mass scans during the weekend.

On HIE side we continued with the beam commissioning reaching an energy of 9.5MeV/u. During the weekend we sent Ne22+ at a lower energy of 6.16MeV/u to Miniball.

AD (Lajos Bojtár):

The AD was working well this week with good intensity. There was one unstable power supply, this was replaced by the FL. Apart from that remains the problem with the cooling performance since the previous week. We see a longer bunch length 180 ns instead of 150ns and increased transverse emittances about 1 [π mm mrad] instead of 0.5 in both planes. This is not bad, but worse than we had before, despite of the time we spent with optimization of the beam alignment.

ELENA (Sergio Pasinelli):

Monday Pbar:

Quads scans in the injection line with and without bunch rotation.

Orbit on 35 MeV/c flat-top without and with ECooler magnetic system. Reasonable deceleration efficiency with cooler and compensation down to 35 MeV/c.

Tune measurement with ECooler ON.

The power supply of the ECooler filament went in fault.

Tuesday H-:

We have put the calculated values in LNS et LNI quads in order to reduce the mismatch

Source beam very unstable and beam is moving on the injection BTV. We have spent a lot of time to recover a good situation.

Wednesday Pbar:

Shift cancelled due to a dedicated MD in the injectors. By chance the LHC lost the beam and we have had 1 1/2 hours of Pbar. We have spent this time to compensate the coupling introduced by the ECooler solenoid.

Wednesday H-:

We have used the calculated values in LNS et LNI quads in order to reduce the mismatch. Same story with the source. It is moving ...

Thursday H-:

Access in the machine in order to work on the power supply fault of the ECooler. The first diagnostic done by the specialist was "maybe a shortcut of the filament" but after intervention they found aluminium shavings around the flange connector. After the cleaning of the connectors the power supply restart without any error. The electron beam energy has been successfully increased to 100 eV with 2.25 mA of current and losses below 10 μ A.

Measurements and installation on the Longitudinal PU in the transfer line.

SEM work done by the specialist. Used a pick-up signal in order to adjust the acquisition trigger of the SEM.

Friday Pbar:

Following the new calculated optic in the line LNI and after several tune and orbit correction, we have a good beam efficiency until the end of the 2 flat-top. Few particles are seen on the last flat-top.

Work on the LPU in extraction line has continued.

Deconsignation of the Beam stopper in the LNE50 line.

SPS (Verena Kain)

This week was dedicated to the repair of the MBE2103 power converter, MDs in the SPS as well as LHC MD preparation.

The EPC and EN-EL team had finished the repair and commissioning of the converter for the MBE2103 Friday early afternoon. The DSO test had already been carried out the day before. It has less voltage available in the new configuration with the bypass of the broken auto-transformer and the ramp-down and up need modified functions. They have been trimmed in on the current level. The new link rule needs to be prepared as soon as possible to allow trimming the connected circuits.

The scrubbing weekend had much improved the emittance evolution of the high intensity LHC beams at flat bottom. Still the blow up is more than 10 %. Another MD during the week showed that larger chromaticity indeed leads to larger emittance blow-up.

On Wednesday partially stripped ions of charge state 80 and 81+ were studied in TT10 to understand for which species higher intensities can be achieved. This is a study in view of the gamma factory proposal.

ZS4 started showing increased vacuum activity again. To avoid exchanging the broken tank, pumping was increased and the “cloche” was equipped with a better seal. Another ~ 10 days would have been necessary to exchange ZS4 despite the already long time without beam.

On Wednesday evening an attempt was made to understand the LHC BCMS horizontal coupled bunch instabilities at flattop that caused two magnet quenches in the LHC in the last weeks. The test procedure was cross-checked with MPP. As first step the functioning of the BLM hardware interlock in LSS4 and LSS6 was to be verified. Unfortunately it turned out that they never triggered a beam dump. The test was postponed and the software interlock put in place by the expert. Only on Friday the fix could be released and BLMs in LSS4,6,2 and 1 were tested again. The fast hardware interlock is working. It dumps the beam in roughly 90 turns for the slower cases.

The BLM thresholds in LSS4 and LSS6 will have to be re-visited. They are different for all users and are too high in comparison to the typical operational losses. The clean-up is ongoing...

The Q22 450 GeV cycle was prepared with INDIV and the COAST was tested. Unfortunately no trims are possible in COAST currently due to a timing upgrade with this particular side effect. Before the UA9 run the timing team will deliver a bug fix. This timing version is already running for a long time, but only now the COAST could be tested.

The various versions of low intensity 25 ns beams for the LHC MD were taken in the SPS. They are all available. 6×10^{10} per bunch is difficult and shows the signs of e-cloud emittance blow-up if not carefully adjusted.

LHC (Stefano Redaelli & Elias Metral)

Standard operation continued over the week, but the overall efficiency was again not at its best.

A UFO lead to a quench of 8 magnets (1 magnet by direct quench, 2 by EM coupling and 5 from the warm Helium wave) on Thursday that took around 15 hours to recover.