

Accelerator Complex Status

End week 19 (Monday 14 May 2018)

TI (Ronan Ledru)

Details: <https://wikis.cern.ch/display/TIOP/2018/05/07/TI+Summary+Week+19>

LINAC2 (Rolf Wegner):

Linac2 had another impressive week of 100% availability.

LINAC3 (Rolf Wegner):

Linac3 is running quite well. The source is still conditioning, which requires frequent tuning to reach/keep intensity > 25 μ A.

Wednesday the ovens were refilled and beam was back on Wednesday afternoon.

Otherwise no interruption.

Many thanks to the source experts – Mike, Frederik and Detlef – for constantly watching and re-adjusting the source parameters, also last Thursday and during the weekend !

LINAC4 (Silvia Schuh):

The past week was characterized by a continued sets of measurements and a few hardware failures, while running different users and chopping patterns.

The frequent Watchdog trips over the past weekend (reported in W19) were understood as a combination of source intensity drift after cesiation plus SIS glitches plus Buncher3 dropping off. The steady current drop over weekend plus the unstably running gas injection, required the switch to second working point for the gas injection valve.

There was a Vacuum alarm in the evening of 7/5/2018 for PIMS1, as well as the evening of 10/5/2018 - for which a simple restart with the Sequencer did not work causing the linac to be down for both nights. The vacuum alarm for PIMS1 re-appeared twice on 11/5/2018.

An arc detector interlock on PIMS9-10 in the evening of 10/5/2018 caused the L4 to be off until 11/05/2018 - it needed a HW reset.

There were 3 trips of the source RF and continued SIS random trips.

Various tests and measurements on the chopper were performed:

The remnant current of the chopped beam is at the level of 0.16mA (~1% level), which is at the limit of BCT resolution (1% accuracy in measurements and 0.1mA minimum current).

The rise/fall times of the chopper have been measured to be at the level of a few ns (at the limit of device resolution again). The chopping difference between MD1 and MD5 has been measured.

A new version of cruise control application was used to test chopping away correctly an additional part of the beam head with the chopper alone. This allows

for 800 us in total between STARTCHOPPER and STOPCHOPPER - but this pulse-length pushes the operation to the predicted chopper limitations, where failures on the pulser unit were observed (protection fuses and power devices blown inside the units).

Further ToF tests with cavity detuning performed. Tests with stripping foils over night were continued and the LLRF setting-up on the debuncher was started.

Linac4 was switched off just before midnight on Friday 11/5/2018 in order to cool down for the start of the ETS RF intervention on Monday 14/5/2018.

PSB (Vincenzo Forte):

A good week for the PSB with 96.6% availability.

Several short faults occurred to power converters of different devices. Main blocking fault was a trip on multiple steerers in the BTP line on Wednesday afternoon, which was caused by a failure of the power supply of a pulse repeater. The problem was solved after ~3.5 hrs.

Preparation of LHCINDIV VdM beams (needed by LHC in week 24) in collaboration with PS OP was followed up.

Preparation of high intensity LHC cycles for PS and other MDs on BCMS25 brightness and MTE beams were performed, together with investigations on hotspot in Section 5 with ISOLDE, AD, LHC25 and BCMS beams. For such beams a vertical steerer in the ring (BR2.DVT13L4) plus some other fine tunings seemed to be effective in reduction of BLM readings.

PS (Denis Cotte):

The PS had a good week, delivering the scheduled Operational and MD beams. This week, PS beam availability is around 94%.

Nearly half of the downtime resulted from the injector side(~4h). On the PS side, the time was shared between septum magnet, power converters, and a faulty PLC in nTOF.

On Monday, ZT8.BHZ01 was found in error and un-resettable. First Line was called and manage to restart the power supply after replacing a faulty VERO power supply. (36min without beam for EAST_Irrad)

Wednesday was the septum day in PS, all three septum used to extract the beam in EAST AREA were down each in turn during the afternoon. PIPO and TE/ABT specialist restarted all of them. (3h45 without beam for EAST AREA)

Finally, Saturday morning, a faulty PLC on the TOF target cooling system triggered an external condition preventing the PS to send the beam to nTOF. TI called EN/CV piquet. He intervened and solved the problem. (1h15 downtime for nTOF)

All along the week, BCMS beams were delivered to SPS/LHC. Ion beam setting up continue in PS and MTE beam was optimized with an increased intensity around $1400e10$ ppp.

ISOLDE (Simon Mataguez):

On GPS, from Monday 07 evening we delivered Mg isotopes (from 20 kV to 50 kV) to IS634 (EC-SLI) users on the GHM line until Friday midday. Successful run performed in excellent target conditions. No problem to report on this separator.

On HRS, a new target was installed on Monday 07 afternoon and we started to deliver stable beam (78Kr) to the ISOLTRAP (IS642) users on Tuesday evening. Beam exit with large angle from the target. Wednesday proton Scan and yield measurements were done. Users have been taking beam since then; but they didn't get 70Br as they wanted. Saturday their turbo pump controller broke and this put an end to their experiment.

AD & ELENA ():

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SPS (Karel Cornelis)

Bad start of the week in the SPS. On Monday a cooling circuit in BA2 caused an electrical glitch stopping most of the systems in BA2. After the equipment was restarted, it turned out that a vacuum valve (they all closed due to the glitch) was stuck in. An access was needed to block the valve out. The sector valve is positioned between MST and MSE, one of the hottest places in the ring, which complicated the intervention.

Thursday being a holiday, the long duty cycle MD's were moved to Tuesday, where, amongst others, the synchronisation process with the CRAB cavities was attempted. HiramMat took beam on Monday and Tuesday evening and finished the BLM experiment. The ATLAS experiment, which was to take place the second half of the week, was postponed to this week.

On Wednesday the dedicated MD was reduced to 4 hours, the time being used for studies on the slow extraction.

On Wednesday also, we observed severe losses at transition after economy cycles. It turned out the radial position had moved very negative, and this was to a bad orbit at transition. We discovered a dying magnet adjacent to 3.04 with a weak short between windings. The missing kick at Bdot/B max oscillates between 100 microrad in the low duty cycle and 180 microrad in the high duty cycle. Since Wednesday it did not deteriorate.

The long "bridge" weekend was pretty productive, in spite of the BLM MD in LHC Friday afternoon and the AWAKE run.

LHC (Jorg Wenninger):

The week was devoted to operation with bunches intensities around 1.15×10^{11} ppb and peak luminosities around $1.8 \times 10^{34} \text{ cm}^{-2}\text{s}^{-1}$, with peaks just above $2 \times 10^{34} \text{ cm}^{-2}\text{s}^{-1}$ over the week-end. To counteract instabilities observed in [B1V](#) at injection, the octupoles were increased to 55A (-4.2u of knob) at injection and the chromaticity set to 15 in both planes. To improve lifetimes the octupoles were gradually lowered in the second half of the squeeze, and the chromaticity was lower by around 8 units (from the initial 15) at the start of stable beams. This brought improvements of the

beam lifetimes. Fills were typically kept for 12 hours, performing beta* levelling down to 25cm at the end of fills (after a few successful tests using the actual orbit as the new reference with were conducted in ADJUST, the new procedure is now also used in SB, smoothening the lumi fluctuations for ALICE).

On Tuesday another high beta test at injection was performed. The results are identical to the previous 2017 tests, namely that the background in the roman pots increased too rapidly after the scraping to be usable for a physics run.

A successful test was performed at injection for the qualification of the blind-able BLMs on Friday. Over the week-end, investigations into the (still higher) losses during the ramp continued, verifying amongst others a possible angular mis-alignment of primary collimators in IR7 (which could not be confirmed as the source of the losses).