

Accelerator Complex Status

End week 14 (Monday 9 April 2018)

TI (Jesper Nielsen)

A rather good week for the technical infrastructure.

Thursday 05.04 at 11:24 the GPN network was interrupted for almost 1 hour causing some issues with starting applications on the CCC consoles.

On Saturday 07.04 at 01:50 the BA6, circuit SEPTA (FDED-00016) lost pressure over several days and caused trouble this weekend in the SPS where the interlock on the SEPTAs needed adjusting several times in order not to trip. Intervention planned first thing Monday morning.

Monday 09.04 at 05:28 an EN/EL intervention in UA87 was required to assist TE-EPC to replace fuses in canalis ERK123/87 and also in the breaker ERD123/87, powering it. A big short circuit in a power converter was the cause.

Details: <https://wikis.cern.ch/display/TIOP/2018/04/03/TI+Summary+Week+14>

LINAC2 (Detlef Kuchler):

The machine had an excellent week. 100% uptime.

The issue of the vacuum interlocks was solved on Tuesday. The interlock was connected to an ion pump which is near to its end of life and showed some erratic behaviour. The interlock was moved over to another ion pump on the same tank. A similar problem appeared already last year and as all the pumps have the same age it is likely to happen again.

LINAC3 (Detlef Kuchler):

This was/should have been the first weeks of beam set-up in the linac.

But first failed the microwave generator Sairem2 due to a cooling issue of the klystron. We are preparing in cooperation with the company a more solid solution. Meanwhile the beam is produced with the spare generator Sairem1. In addition the controls of the ramping cavity/de-buncher (soft- and hardware) are not working properly. The RF team is working on it but up to now the reason is unknown (no changes were made during the YETS).

When it was tried to send the beam down the linac a timing misalignment of the new FGC3 power converters in the ITF line was diagnosed. EPC is working on it.

PSB (Gian Piero Di Giovanni):

It was a good week for the PSB with > 99% availability.

The main downtime (~45 minutes) was due to one of the recombination kickers, BT4.KFA10, which took longer time to reset and required the intervention of the expert. Otherwise few trips which could always be quickly reset.

Few of the pending instrumentation issues were fixed during the week including the calibration of the wire scanner in R1V, such that now the instrument is back in operation.

The setting up of LHC100ns advanced well. This LHC special beam will be needed after the 1st technical stop in June.

PSB operators started babysitting the Linac4 beam quality run during nights and week-ends. The Linac4 operation during working hours is led by ABP.

Finally several studies ongoing despite the MD official season has yet to start: preparation of the reliability run of phase noise longitudinal blow-up, beam-based investigation of the calibration of the wire scanners, and preparation of an alternative high intensity version of the MTE beam based on ISOLDE beam and tests on the closure of the PSB extraction bump.

ISOLDE (Eleftherios Fadakis):

Week 15 will be the start of physics for ISOLDE. The first users are CRIS, taking beam from HRS. They have been taking stable beam since Friday afternoon with no major issue. Set up performed on 85Rb. Thursday the 5th, ABT performed tests on their new high tension power supply while taking protons. It is currently connected to HRS. They were satisfied with the results and we are waiting the final report. The power supply was tested with different voltages (30 to 60kV) and different proton intensities (1E12ppp to 3E13ppp). Tomorrow is foreseen for proton scan and yield measurements. For HIE-ISOLDE on Tuesday the 3rd, a fault was discovered on the RF power line for cavity 3 in the last cryomodules. As a consequence this cavity cannot be powered but it can be bypassed with the beam. It is not a show stopper for the physics run.

PS (Heiko Damerou):

A very good week for the PS with beam availability above 97%.

About 1h10 were lost to diagnose the consequences caused by wrong distribution of the magnetic field from the White Rabbit B-train, aborting the cycle execution at certain slots in the super-cycle. This was fixed by a cold restart of the field measurement front-end. On

Saturday morning most beams could not be delivered during 0h55 due an issue with the power converter of F16.QFO165. Finally, on Sunday morning POPS required an intervention by the power piquet to restart after a trip causing 1h17 downtime.

The 25 ns BCMS beams (12 and 48 bunches) have been prepared up to nominal intensity per bunch. Tests of the high-intensity single-bunch beam for AWAKE have started in PSB and PS.

The MTE beam has been delivered at 4E12 ppp until Saturday, when the intensity was doubled on the request of the SPS. It has been tested in the PS by the operations team up to 1.8E13 ppp.

AD (Tommy Eriksson):

Thursday the AD suffered from another incident, this time with the magnetic horn power supply in B195, a fire broke out in one of the 6 cubicles. The fire brigade came quickly to put it out and safety issues were clarified together with OP, RP and HSE. The damage is not too serious with particular safety problems but the damaged cubicle has to be replaced by a spare unit. A meeting was organised by TE/ABT Thursday evening for initial assessment and planning.

At present, it looks like the restart will have 1 to 2 weeks of additional delay. Next meeting will be held Tuesday (10/04) morning where we will have a detailed planning available.

SPS (Francesco Velotti)

The last week of commissioning before re-start of NA physics was full of surprises. The week started continuing the scrubbing with LHC standard beams up to 3 batches accelerated to flat top. Interruptions were due to the TIDVG temperature, vacuum at the diffuser (installed in LSS2) and MKP temperature.

On Tuesday, a second batch on the SFTPRO, still with reduced intensity, was taken and the beam parameters were adjusted accordingly. The SE could be performed and the first spills with the new mains regulation tested. The first version was not satisfactory due to the delay introduced to allow the filtering of the 50 Hz noise (mainly on the QF). Work was done (2 iterations) and finally a good compromise was achieved between noise and function tracking. At the same time, a proper optimisation of the FT beam was performed and transmission to flat top of about 98% was finally achieved.

On Wednesday, the recurrent WIC problem in TI2 was solved - the magnet MBIIV.20834 was found with functions on many different cycles - the functions were re-loaded and the problem was fixed.

On Thursday, the second iteration of the ZS alignment was performed with consequent losses reduction in LSS2. Also, the new diffuser installed in LSS2 was successfully tested showing the expected losses reduction.

Wednesday and Thursday were also characterised by the final iterations of the longitudinal setting up for the high intensity LHC beams. Only the longitudinal dumper is still missing to being set up.

During the last days of the week and the weekend recurrent problems on the water cooling circuit of the BA6 septa was observed. The limits in pressures were a few times adjusted (increased) by the expert to let the system run over the weekend. An intervention at the beginning of the week is needed to replace the filter. The SFTPRO intensity was increased to match the requirements for the first days of physics ($\sim 1.3e13$). Doing so, BLMs at the second splitter location were observed (Saturday evening) to be missing. The expert was called for investigation (the beam was stopped) but no solid solution was found, hence there was no beam to the NA from Saturday evening (only a few times the beam was put back for diagnosis purposes) waiting for Monday morning when E. Effinger will be back. After further investigation, we found that all LSS BLMs (most likely also TI2 and TI8) behave strangely - losses (in Gray) are lower when monitor gains are set to "x2" (factor of 2 lower...). These readings (with x2 gains) are much more inline with previous years measurements (and hence thresholds).

LHC (Jorg Wenninger):

Easter Monday the beam was squeezed for the first time to 30cm. The optics was measured along the cycle and found to be fully reproducible down to 30 cm. Optics studies progressed extremely well during the week with measurements at 25 cm (no correction of linear optics required) and NL corrections of α_4 . Beta* at 25 cm was measured.

The collimators were aligned at injection, and the aperture at injection was found between 12.2 and 13 sigma, consistent with 2017 measurements. The IR6 and dump channel apertures were found to be correct. The aperture at 30cm and 25 cm was checked with a CMS IP shift of -2 mm and was found consistent with the 2017 results. The final aperture will be measured when the beams collide and all correction are applied. Collimators were also aligned at flat top.

Nominal bunches were ramped to FT with longitudinal blowup on Friday while this always failed for probes - which was surprising as this was never observed before. On Sunday however even the nominal bunch blowup failed, and it became clear that the blowup generated mainly huge tail growth while leaving the core untouched. A comparison with a successful PELP ramp of the VdM cycle then put the finger on the fast start and fast voltage rise of the PPLP ramp. Noise tuning was performed until better conditions were found, more work required as still far from optimal. All FMCM MPS were completed at injection and at 6.5 TeV.