

Accelerator Complex Status

End week 47 (Monday 27 November 2017)

TI (Ronan Ledru)

Monday 20.11: Due to a failure of the pump PTB4306, EN-CV decreased the water temperature of SF4 primary water in order to have a spare pump. The RF circuit get into oscillation due to a bad setting of the PID

Thursday 23.11: Break of the rubber compensator on the fine water circuit in UW25.

The circuit has been restarted without fixing the problem, in case of failure of the second circuit, the spare parts is ready to be installed.

Details: <https://wikis.cern.ch/display/TIOP/2017/11/24/TI+Summary+week%2C+47>

LINAC2 (Francesco Di Lorenzo):

Linac2 has worked very well, no more than 12 (flashes over) during the week.

LINAC3 (Francesco Di Lorenzo):

Linac 3 has worked very well, some faults "on Monday, Tuesday, Friday and Sunday" with the RF generator in the source, solved by the reset.

On Tuesday in the afternoon, during the MD, the RF specialist "Giampaolo" has solved the problem of the ramping cavity's module.

in general, the Linac 3 has worked without problem.

LINAC4 (Greta Guidoboni):

- Pre-chopper intervention. Connector reparation on the chassis side of the "top hat". It showed signs of arching.

- RFQ interventions. Exchange of the anode module twice and cleaning of the oil tank where a contamination of aluminium particles was found.

- A lot of MDs:

- RF. Test of new firmware, FESA class and sequencer.

- Source. Gas regulation integration in the autopilot application.

- Chopper. Test to reach 600 us pulse length. Only 480 us were reached

and the investigation will continue in week 48.

- Bunch Shape Monitor measurements.

LEIR (Maria-Elena Angoletta):

The beam availability was very high and beams were delivered to physics and to MDs as expected.

Some small problems included:

a) Three consecutive trips of the new operational cavity CRF43 on Tuesday 21 afternoon, which needed to be restarted each time. The expert was called but the problem did not appear again.

b) The beam was stopped for about 10 minutes on Wed 22th afternoon owing to the too high number of injection in the supercycle, after it got changed. The problem was quickly spotted and solved, and it was a good life-size proof that this safety mechanism works.

All beams are now controlled via the CRF43 cavity, owing to the CRF41 cavity problems during the previous weekend. Operation with the new cavity required some optimisation such as the setup of the second harmonic servoloop on EARLY with the CRF43 cavity, done on Thu 24th. This was followed on Friday 25th by the setup of a shaping voltage function at low energy that allowed to improve the intensity by 10%.

On the MD side:

- a) Several MDs on setting up and calibrating the new LEIR orbit system took place.
- b) A combined LLRF + HLRF MD was carried out to try to understand the problems with the cavities (CRF41 and then briefly also CRF43) falling down. It was unfortunately not possible to understand the source of the problem as the problem did not show itself. However additional diagnostics features were put in place in case it happened again.
- c) An h=3+6 beam was setup to operate with the new cavity and phase pick-up. The new synchronisation algorithm allows to synchronise this h=3 beam with the standard h=1 (for LEIR) reference coming from the PS. This will allow the extraction tests of 3 bunches to the PS, foreseen for week 49.

PSB (Gian Piero Di Giovanni):

It was a good week for the PSB, but not an equivalent good week-end.

During the week, we had only few trips which could always be reset.

In the week-end we had multiple trips of the ring1 horizontal TFB, causing loss of intensity. The PSB operator always managed to reset it, but R. Louwerse and the piquet were contacted to have a look. The source of the problem seems to come from the power converter and the specialist is needed. He will be contacted today for an intervention. Overall the TFB issue did not account for major downtime, i.e. the PSB availability this week has been greater than 98%, but it was a rather painful for operation, as it had to be routinely brought back in operation.

We are also experiencing un-desired noise in our phase loop on ring2. After some initial checks, the origin of the issue is not yet completely clear. While this is not preventing the beam to circulate, it is something that our RF colleagues will likely keep investigating.

PS reported fluctuations in intensity for the EAST beams and the operator crew tracked it to an inhomogeneous setting of the kickers slow in ring3 for the bump at injection. Once the current was set to the same CCV for all beams the stability was recovered.

Finally, most of the effort during the week was invested in preparing the beams for the LHC MD week. As usual a large variety of MD were performed.

ISOLDE (Emanuele Matli):

Another good week at ISOLDE.

22Ne7+ and 28Mg9+ delivered to Miniball without major issues beside

the occasional trip of RF amplifiers and power supplies.

PS (Heiko Damerau):

An average week for the PS with a beam availability of about 95%.

No proton beams were delivered during 1h20 to repair the power converter of the injection bumper BSW43 on Monday afternoon.

The POPS FGC has been exchanged on Tuesday, but several trips causing 10 to 15 minutes downtime each still occurred thereafter. The experts have performed a detailed analysis showing that the issues started around the 03/10, but the root cause has not yet been identified.

On request of EAST Irrad, the intensity had been reduced down to $1E11$ ppp during few hours on Wednesday.

A magnet fault interlock on the extraction septum SMH16 caused 0h40 downtime, but could be reset by the power piquet.

Following a first stop on Monday morning for the 10 MHz cavity C10-86, again a mechanically broken gap relay needed to be exchanged on Thursday (2h40 downtime in total).

On Sunday, an intervention by the kicker piquet was required on KFA71, modules 1 and 6, which tripped several times earlier during the week. Since then the situation is stable.

Beams for the LHC MD, in particular the 50 ns beam and a lower intensity variant of the BCS_8b4e, have been prepared.

AD (Lajos Bojtar):

The AD was running this week very well, practically with 100 % uptime. We had a few smaller problems. One to worth mention is a power supply for a ring magnet called DR.BHZTR20.21. It had a stability or noise problem which caused big losses during one night, but the problem disappeared after. Later Asacusa complained about position fluctuations, which was also coming and going, probably due to the same reason. This is something for watch out for the supervisors in the coming weeks.

SPS (Verena Kain):

On Monday, the extraction momentum was changed to 71.7 ZGeV/c for the NA ions. The preparation was very efficient and NA61 could start taking data already early evening on Monday.

On Wednesday two dedicated MDs took place which required again to leave the ion beam mode. For the slow extraction loss reduction programme, slow extraction with dynamic bump was tried first time. And partially stripped ions were taken at different cycles with different flattop energies with EARLY and NOMINAL beam from LEIR. Despite the fact that the LHC was also in a

special run (high beta star run) which required frequent injections, the MDs were successful.

Since Thursday the AWAKE electron beam permit is valid and commissioning started.

The availability of the SPS was exceptional- no SPS equipment faults. The availability was > 95 % with various SPS injector issues such as frequent stops of the PS POPS.

Since Sunday afternoon the LHC is in MD. FT cycles are used in parallel with single bunch LHC cycles.

LHC (Enrico Bravin, Markus Zerlauth):

The 2,51 [TeV](#) run ended successfully Tuesday morning with around 175 hours of SB for ALICE. The machine then switched back to 6.5 [TeV](#) operation at low pile-up following two ramp up fills with 3 and 600 bunches. This mode of operation continued with long fills until Sunday 26th November at 11:30 which is also the end of the 2017 physics run.

Wednesday saw a third test of the high beta* at injection.

MD4 started around 16:00 on Sunday.