

Accelerator complex status

End week 11 (Sunday 20th March 2016)

TI (Jesper Nielsen)

Weekly summary:

<https://wikis.cern.ch/display/TIOP/2016/03/14/TI+summary+week+11%2C+2016>

LINAC2 (Jean-Baptiste Lallement)

The week was dominated by the investigations on the source intensity issue.

On Monday afternoon, a 3:20 hours stop for RGA on the RFQ, PEC supply checks and exchange, cathode current path measurements. Inconclusive.

On Tuesday morning, a 1 hour stop. Expansion magnet checks and LEBT aligned at its initial (February) position. Inconclusive.

On Wednesday morning, 2:30 hours stop for gas detection, expansion magnet cup current verification, cathode heater controller exchange. Inconclusive. At noon, following a source flashover, the source current decreased suddenly by 20-30 mA. It was then decided to increase the arc current in order to deliver a minimum of 100 mA proton beam to the PSB.

On Thursday afternoon, a 3:45 hours stop for a RGA on the source. Inconclusive.

A small leak was nevertheless detected on the inlet tombac valve. The air trapped in a small volume upstream the valve was apparently injected into the source. The valve was exchanged and leak tight.

Since Thursday evening, the source beam current is constantly increasing. It looks like we have an efficient cathode training. On Sunday afternoon, the beam current delivered to the PSB was around 140 mA. Cathode heating and arc current parameters are still above the usual operational values, but given the promising source behaviour over the week-end, they could certainly be decreased toward more "acceptable" values in the coming day in order to preserve the cathode life time.

Booster (Gian Piero Di Giovanni)

It was an intense week for the PSB beam operation as the work to setup the requested beams continued at full speed.

The most relevant improvements with the respect to last week are for:

- LHC PROBE: improvements on the reducing the intensity fluctuations. Additional work is required but the beam was already taken by the downstream machines.
- LHC INDIV: optimized extraction trajectories to reduce losses. As for the LHC PROBE the beam was already taken from the downstream machines.
- LHC 25: completed the first round of setting-up. Reviewed the injection process, the longitudinal parameters, the orbit corrections and the extractions trajectories. The beam is

within the defined specification. More work is still needed, but this was a good start and the beam was already taken at the PS for setting up the machine, especially in the longitudinal plane.

- ISOGPS: continued the setting up.

The major issue from last week was coming from erratic beam losses in the PSB rings, as randomly the beam would not be ejected and it would be lost in the PSB rings. The issue was identified and fixed by Ioan Kozsar.

The major downtime for the PSB was due to a fault in the extraction septum, BE.SMH15L1, which required the intervention of the expert (J. Borburgh) in the middle of Tuesday (15 March) night to replace the head of the electro-valve. This resulted in slightly more than 3 hours beam stop.

Other than that, there are still few issues due to the commissioning phase which are being actively followed-up and are not impacting the beam availability: discrepancies HW ACQ Vs. CCV, problems in the instrumentation, etc, etc ...

Several experts profited from the planned interventions in the Linac2 tunnel to access the PSB tunnel for additional measurements and investigation of their equipment.

PS (Rende Steerenberg)

The PS had a rather successful week during which very good progress was made on all beams and the LHCINDIV, LHCPROBE, LHC 25 ns in particular. All these beams and a low intensity MTE beam became available to the SPS throughout the week. The intensity for the setting up of the nTOF beam was limited due to the LINAC2 source issue. When the source improved over the weekend the intensity was increased to about 6.5×10^{12} .

During this period of beam commissioning many smaller issues have been found and have been or are being solved. The 10 MHz cavities trip rather often when the LHC beam is in the super cycle. The specialists are looking into this issue.

SPS (Hannes Bartosik)

The horizontal aperture problem encountered during first beam injections at the end of last week could be resolved on Monday. Radiation hotspots were localized next to the dipole magnets 40930 and 51330, which were both exchanged during the Christmas stop. It turned out that the so-called "sabres", the tools required for the installation of the RF shields in the pumping ports, were forgotten in the machine when the magnets were exchanged (the vacuum group is now working on a modification of the tools such that the vacuum cannot be closed with the sabre left inside).

The rest of the week was devoted to the setup of the LHCPILLOT, SFTPRO2 (with low intensity MTE beam) and AWAKE cycles, as well as the "beam based alignment", i.e. the closed orbit correction at high energy by quadrupole displacements. By displacing 3 focusing and 5 defocusing quadrupoles, sufficient orbit correction at top energy (rms of about 2 mm) could be achieved for the fixed target beams and at the same time for the LHC beams with the Q20 optics.

The LHCPILLOT beam was successfully extracted to the TT40 and TT60 TEDs on Friday. Extraction tests to the TI2 and TI8 downstream TEDs are planned for Monday.