

Accelerator complex status

End week 25 (Sunday 26th June 2016)

TI (Jesper Nielsen)

Here's the TI summary of a rather busy week...

<https://wikis.cern.ch/display/TIOP/2016/06/24/TI+summary+week+25%2C2016>

Linacs (Jean-Baptiste Lallement)

Linac2:

We had a 1 hour beam stop on Tuesday afternoon for the RF reference line amplifier exchange. During the stop, we did not manage to smooth the source pulse intensity (complain from the PS Booster that the intensity decreases during the pulse) playing with the different source parameters. We will try to sort it out this coming week.

The electrical glitch on Friday afternoon, at 14:20, entailed a 1 hours stop (colling water station down). Linac was back on his feet on 15:30.

Smooth operation over the week-end.

Linac3:

A short circuit was found on one oven filament during the oven refill on Monday. Beam was available to LERL on Tuesday morning. Excpeted on Firday afternoon with the electrical glitch that knocked down the Linac for 2 hours, operation was smooth over the week and the week-end.

AD (Lajos Bojtar)

- Tuesday and Wednesday there was problem with the injection kicker causing radiation alarms in the hall. The problem has fixed, it is stable now.
- Wednesday evening there was an intervention due to the C02 cavity, which didn't deliver any tension, but on the control system no fault was indicated. After a while the tension appeared again. The specialists are aware of the problem.
- Friday many systems went down due to the general power cut.

Booster (Jean-Francois Comblin)

This week, the PSB suffered 2 problems that are worth mentioning:

- Friday at 4 AM, the distributor of ring 2 tripped. The specialist changed a thyatron. At 11AM it tripped again. The specialist did not find the problem when the LHC was about to be filled, so we had to reset it every 2 minutes, hoping this would not disturb too much the LHC. Then the 400kV problem occurred, and the specialist found bad contacts in the some connectors, and tightened everything. To be followed-up as it tripped again Sunday (without consequence). Total downtime of 3h20, plus 3h20 of degraded beams.

- Since 1 week now, occasionally, there is a dip in the pulse coming from the Linac 2. This reduces the intensity for ring 1. To solve this, we have to inject more in that ring, meaning we also increase the transverse emittance, which is not ideal for LHC beams. Source specialists will take action Monday morning.

For the PSB, the total downtime for the 400 kV problem was 6 hours. The machine restarted 25 minutes after the green light of TI.

Otherwise, the MD studies continued. The one devoted to increase the intensity of Isolde beams is mainly finished. Gian Piero managed to extract $3.6E13$ protons ($3.3E13$ is the nominal intensity). Some fine-tuning of the extraction trajectories are needed to reduce a bit the losses. This should be done with agreement of Isolde, as they don't like we modify the BTY trajectories during the run.

PS (Denis Cotte)

Un début de semaine assez calme pour le PS avec quelques interruptions du faisceau dû au Linac2 ou au Booster.

Le principal évènement fut la coupure électrique de Vendredi, le PS a eu besoin de l'intervention de plusieurs piquets et spécialistes pour remettre en route les faisceaux vers 2h30 du matin Samedi.

L'opération EAST a été stable avec quelques demandes de steering de la part d'IRRAD.

Par moment IRRAD demandant moins de Spill, nous avons pu fournir les branches nord avec 1 ou 2 Spill de plus.

La calibration du moniteur radiation de TOF a été effectuée mardi après-midi. Retour du faisceau a sa position initiale après les tests.

Outre la coupure électrique, l'opération MTE a souffert d'un défaut sur le KFA21 samedi après-midi pendant 2h. Les comparateurs sont toujours réglés à $1150e10$ pour MTE.

Une version du faisceau BCMS avec Blow-Up transverse est disponible.

Le LHC a pris une version 48b du LHC25ns, le kicker d'extraction a été refermé autour des bunches.

Toute la semaine, le PS a souffert de coupure de la chaîne de sécurité TT2 à cause de pertes faisceau sur le moniteur PAXPT113.

La source du problème est identifiée : cavité C91 (10MHZ) qui ne pulse pas. Elle est en surveillance sur un oscilloscope.

En fin de semaine, le setting up du faisceau LHC 100ns a commencé et la cavité C40-77 restait à réparer.

SPS (Hannes Bartosik)

Week 25 was devoted to North Area physics production, LHC beam delivery and a series of machine studies on the high bandwidth feedback system with colleagues from the LARP collaboration.

Since the end of last week the cycle with the sort flat bottom is used for LHC filling. The fast debunching of the LHC beam observed occasionally in the last weeks could be resolved by the RF expert by replacing the 500 MHz frequency reference card. On Friday the LHC filling scheme was changed from injections of single batches of 72 bunches to trains of 2 times 48 bunches. Since some blow-up due to the rising edge of the MKP waveform was observed with the initial batch spacing of 225 ns, the batch spacing was increased to 250 ns in the following fills. The LHC also observed ghost bunches after the second batch, caused by re-captured beam at SPS acceleration. Some improvement was made by reducing the longitudinal emittance at SPS injection. Using the tune kicker for cleaning these ghosts at low energy in the SPS was not yet successful.

The BCMS beam was tested in the SPS. It has transverse emittances of about 1.6 μm for 1.15×10^{11} p/b at extraction. As confirmed in the SPS, the PS can reliably perform controlled transverse emittance blow-up using the transverse feedback system, in case requested by the LHC.

Progress was also made on the fixed target beam. The occasional beam dumps triggered by losses in T20 during the slow extraction due to an increased horizontal beam size could be traced back to a horizontal instability during the ramp. Beam stability was improved by increasing the octupole strength.

Since Wednesday evening the super cycle duration is reduced from 34 to 28 basic periods to improve the duty cycle for the North Area. However, the LHC cycle and its ramp to 450 GeV seems to have a larger impact on the spill quality. Sometimes the fixed target had to be switched off during LHC filling and LHC beam preparation.

The 65 Hz hump in spill is still present.

During the dedicated MD on Wednesday a vertical coupled bunch instability of a single batch of the 25 ns beam could be stabilised with the prototype high bandwidth feedback system in multi bunch mode.

LHC

Difficult week. Major time-out for repair of damage caused by flooding in point 3. Also saw 400 kV drop on Friday but escaped lightly. Otherwise excellent production and \sim design luminosity for the first time