

Accelerator complex status

End week 18 (Sunday 3rd May 2015)

TI (Jesper Nielsen)

Very busy week...

<https://wikis/display/TIOP/2015/05/04/TI+summary+week+18%2C+2015>

Linacs (Richard Scrivens)

Linac2:

- Change of the Hazermeyer control chassis (the power supply feeding the RFQ system) on Tuesday, the fault was causing many lost pulses.
- The emittance meter missing signals were repaired.

Linac3

- The vacuum of the low energy line was closed, and the source was switched on to start conditioning with the new plasma chamber.

Booster (Bettina Mikulec)

Busy week setting up beams and tweaking the machine to increase LHC beam performance.

Setting up: AD and MTE beam plus the transfer of the parasitic TOF beam (on an EAST cycle) to the PS.

Optimising: LHC50, LHC25, BCMS25.

Tuesday around 9:30pm losses were observed for the TOF beam before extraction. The operator suspected that it was related to synchronisation and called the LL-RF piquet, who discovered that the beating frequency was ~400 Hz too high for extraction to the PS (although the PS control value was set correctly). The situation suddenly returned to normal by itself. To be surveyed.

In the afternoon/evening of Wednesday HRS started a proton scan, but obtained strange results. Therefore we were asked to check the beam profile at the SEM grid at the end of the HRS line. Unfortunately we were not able to see any profile measurement there; trajectories, BLMs and transmission were OK though. For the BI HW specialist the SEM grid was working fine. In order not to risk damaging the target it was decided to wait for the FE-SW specialist (A. Guerrero), who was on shift that night. After lengthy investigations she found out that there must have been a cable inversion between the HRS and the target SEM grid used at the start of the year to set up the steering; in addition she found a gain inversion. It seems that in April, when the ISOLDE team found back the 'lost' cable of the HRS SEM grid in the target zone, the cable connections must have been mixed up. Finally, on Thursday morning, ISOLDE could proceed to the p scan and start taking data.

Friday morning ~15 min downtime due to an electrical glitch on the HV line.

On Saturday afternoon the vacuum piquet had to exchange a power supply of a vacuum pump in the ring.

Also in the afternoon we had to stop beam production for ~3h due to a router problem in building 513 that caused the loss of supervision and alarms.

Sunday morning, after an email exchange between the ISOLDE physics coordinator and RP, we were allowed to increase the average current sent to ISOLDE from 2 to 2.3 uA as well as the max. number of protons per pulse. HRS had a low-Z target on, and the users were suffering from too low yield. RP pointed out that these exceptions should be discussed the next time in advance.

The piquet Firstline had to exchange a fuse for a corrector in the HRS line.

PS (Guido Sterbini)

It was a good week for the PS. A lot of the work was done on the IRRAD beam setting up with the slow and fast extraction for the cross-calibration of the intensity measurements devices in the T8 line. Beam was sent also to the East North zone. The MTE extraction commissioning started and the AD and BCMS beam preparation is ongoing.

On Tuesday there was 1h 50 min downtime due to the scheduled intervention in Linac2. In the afternoon the beam was sent on the T8 line for setting up with slow and fast extractions.

On Wednesday the hardware checks of the T9, T10 and T11 lines took place. Concerning the IRRAD beam, it was found that the beam trajectories were not reproducible on the long period (investigation and test are ongoing).

On Thursday the East North beam permit was signed and the first beam was sent to the target. The setup of the parasitic TOF on the East beam continued.

On Friday there was a short interruption (10 min) due to the perturbation on the electrical network.

The longer downtime of the week was on Saturday afternoon (about 3 h) due to a problem with the technical network stopping the operation of the CERN accelerator complex (solved by the IT piquet).

On Sunday there was a 45 min downtime for a problem with the septum 16 (solved by the EPC piquet).

The issue of the missing pulses of the extraction kickers is still present.

SPS (Hannes Bartosik)

It was a relatively good week for the SPS. The LHCPROBE and LHCINDIV beams were delivered regularly to the LHC without major issues. The extraction of the fixed target beam to the North Area started on Monday. The main downtime for North Area physics was caused by broken BLMS at the SPS extraction septa and a problem on the technical network.

In more detail:

- Before starting the proton fixed target run, the BI group was contacted on Monday morning concerning the replacement of the 2 broken BLMS at the ZS extraction septa. However at

that point the replacement could not be done since spare BLMs were not ready. The extraction to the North Area started nevertheless in the afternoon, after problems with the main power supplies (water leak on SMD1 thyristor cooling circuit, water cooling interlock in BA2) had been sorted out. At around 19:00 Monday evening TE-ABT requested to stop the fixed target beam, since the protection of the ZS relies on the BLMs and the risk of extracting high intensity beams with 2 out of 5 ZS BLMs missing could not be taken.

- The replacement of the BLMs was performed during an intervention Tuesday morning (many thanks to the LHC crew for adapting their commissioning schedule to accommodate this intervention!). Around lunch time, just before the BLM intervention was finished, a manual emergency stop was triggered in BA6 after a strange noise and smoke was noticed on the circuit breaker EMD115/A6, which serves the power supply for the switching magnet 660004 at the beginning of the HiRadMat transfer line. Beam was back for the North Area at around 13:30.
- The first dedicated MD of 2015 took place on Wednesday. It was devoted to longitudinal instability studies with LHC beams. The recovery of the fixed target beam after the MD was very efficient.
- On Friday, a glitch in the 400 kV network tripped the SPS RF power resulting in about 40 minutes downtime.
- A problem with a router in the technical network caused about 3 hours downtime on Saturday.
- The transmitters of the 200 MHz cavities tripped several times between Friday and Sunday. In some cases the transmitters could not be reset and the RF power piquet had to be called. Two RF tubes have been put offline. They need to be replaced.

LHC beam commissioning:

- The commissioning of the nominal LHC 25 ns beam in the SPS started this week. The emittance of a single batch with nominal intensity was measured at around $3\mu\text{m}$ both at injection and at flat top. Operational vacuum interlock levels at the MKP4 injection kicker and the TIDVG internal beam dump are reached after a few cycles when accelerating and dumping 4 batches at 450 GeV.