Accelerator complex status

End week 40 (Sunday 5th October 2014)

TI (Jesper Nielsen)

Weekly report at:

https://wikis/display/TIOP/2014/10/06/TI+summary+week+40%2C+2014

LEIR (Michael Bodendorfer)

Throughout the whole week, we have delivered beam to the PS with a longitudinal emittance within specification. For the beam intensity, please see the detailed day-by-day report and the newly discovered 24h oscillation. Overall, the machine performance is hard to reproduce from shot to shot. A fluctuation of injected intensity of 15% within minutes and 30% over several hours, disables any systematic fine tuning and may disguise other potential issues with electron cooling and RF-capture.

Tuesday:

1.) Extensive RF-MD identifies beam loss after RF-capture not being related to either the RF system nor the transverse feedback damper.

2.) Transverse MD corrects tune throughout the cycle and makes it more stable through the acceleration ramp.

Wednesday:

Again, the quadrupole power supplies are not stable (mainly ER.QFN1030). Large fluctuations observed in OASIS, up to 1% in OASIS channel voltage. Beam is extracted at less than 50% of expected intensity.

Thursday:

1.) For the first time, we suspect extracted intensity fluctuations with a period of 24h.

2.) Jorg Wenninger updates the YASP orbit corrector tool from changes which he made in AD and which have not yet been propagated into the LEIR YASP system.

Friday:

1.) We have changed the start of the phase loop of the RF system in LEIR at RF-capture to make it start 10ms after RF-capture. This gives the beam enough time to bunch at fixed frequency without phase loop interference.

2.) The PS demands a higher extraction energy from LEIR. LEIR will provide this higher extracted energy next week, as soon as the value of the extracted energy is provided exactly. A momentary estimation would result in an extracted field change of about 25 Gauss.

Saturday:

The oscillation of extracted intensity, first suspected on Thursday, is now clearly repeated since then and persists with a period of 24h. A first successful correlation attempt with vacuum

pressure fails after Friday, where the vacuum pressure remains low, but the extracted intensity continues to oscillate. We suspect that another mechanism, rather than the vacuum pressure, is responsible for the 24h oscillation in extracted intensity.

Sunday:

The zero cycle in LEIR was modified in order to make better whatever cycle follows. Beforehand, the zero cycle would disturb the following cycle so much that very little or no beam at all would be injected in LEIR. Now, the following cycles performs normally.

In the following week, we will concentrate on stabilizing the machine with respected to the injected intensity.

Booster (Elena Benedetto)

A difficult week for the PSB.

It started gently on **Tue. afternoon** with a 1h downtime for a TGM problem, the rack with timing distribution front-ends was down.

We discovered that the rise-time of the recombination kickers BT*.KFA10 and KFA20 is of the order of 140-150ns, instead of 93-105ns. This affects SFTPRO Ring1, with adjustments to be done on the kickers Fine Delays and on the trajectories to the PS, and probably also the AD beam. It is a concern for the preparation of the “longer” LHC bunches to mitigate SpaceCharge at PS injection (i.e. 327ns spacing – 220ns length = 107ns < 140ns). Kicker specialists are aware and investigating.

On **Thu. morning**, the distributor BI4.DIS tripped and had to be reset 4 or 5 times. A thyratron was changed (total downtime ~1h)

On **Thursday night** at 00:37 the MPS went down and it was impossible to reset it. Investigation till the morning with several piquet and experts called. Finally it was a problem with the WIC. Such problem can be reset within the application, but for unknown reasons, it was impossible to log in. The specialist had to come and restart the PLC itself. He will investigate and report once he finds what happened. After the MPS was back, all the FGC3 were in bad state. Piquet EPC-CO was called. One more hour, beam was back at 6:43.

On **Saturday morning** 3 hours downtime due to a problem on the B-train. Solved by the specialist who did some welding on the power supply of the pulse repeater of B up.

In the afternoon 4 hours downtime caused by Linac2 WatchDog problem (BTC not acquiring, called BI specialist and CO), then also Tank3 issue.

In the evening, a problem in the extraction toward Isolde: a flow-meter problem on BTY.BVT116 power-supply, causing several (12) trips during the **night of Saturday**, First Line and then OP going on site every time to do a reset. On Sunday morning the Piquet PO changed the flow-meter.

To finish on a positive note, many MDs (and MD setting-up) took place this week: beam shaving at 160 MeV, LLRF studies, beam based impedance measurements, extraction BPM checks, resonance identification, modelling of the injection line for YASP.

PS (Rende Steerenberg)

The PS has a rather good week.

Throughout the week there were quite a few issues with injection and extraction kickers that required resets and specialist interventions.

On Thursday the wire scanner in SS54 broke. This wire scanner was repaired about 1 week ago. BI has decided that in the PS wire scanner measurements are no longer allowed until further notice. A meeting on this subject will take place Monday morning 06/10.

The CHARM/IRRAD DSO test was completed and beam for commissioning is foreseen for 09/10.

The MTE setting up still stopped waiting for the repair of KFA13 and KFA21, which is foreseen to be completed for next week.

For more details on the PS we refer to the PS machine supervisor minutes:

https://edms.cern.ch/nav/P:CERN-0000077383:V0/P:CERN-0000112714:V0/TAB3

SPS (Verena Kain)

The DSO test for the north area took place Monday and Tuesday, Thursday afternoon for ECN3 and TCC8 and Friday to do the final checks for LOKN.

On Tuesday the vacuum leaking module containing a miniscan at the ZS was exchanged. Vacuum pumping and short ZS conditioning took in total until Wednesday afternoon.
Beam was back Wednesday afternoon.

Thursday evening we took out the TED in TT20 to go to the targets first time. We managed all the way to the second splitter, where the beam was lost. Further progress Thursday night was hampered due to an MPS issue in the booster.

Friday morning an intervention for damper H1 took place. During the intervention it turned out that a filament heater of the H1 amplifier was broken and needed to be repaired in the tunnel. The intervention will have to be scheduled middle/end of next week. The intervention has to be first carefully prepared and tested in the lab. Running with only one horizontal damper is OK up to intensities of about 2e+13.

Friday evening we finally managed to steer the beam to targets T2 and T4 for the NA physicists to start setting up the beam after the targets.
The weekend was dedicated to optimizing the girder positions of the extraction elements for loss reduction, check out instrumentation such as the servo spill BSI and delivering low intensity beam to the NA for setting up.