

## Accelerator complex status

### End week 46 (Sunday 15<sup>th</sup> November 2015)

#### TI (Peter Sollander)

TI summary:

<https://wikis.cern.ch/display/TIOP/2015/11/16/TI+summary+week+46,+2015>

Busy week for the TI operators due to the technical stop, but only one major event last Monday with the SPS BA6 UPS breakdown causing 1.5 hour downtime.

#### Linacs (Jean-Baptiste Lallement)

##### Linac2:

A pretty good week.

On Monday and Saturday, tank1 RF had to be reset: 2 times 3 minutes down time.

##### Linac3:

Intensity delivered to LEIR slowly decreased over the week.

Both ovens were refilled on Friday morning. Beam back to LEIR on Friday afternoon.

20-22  $\mu$ A are currently delivered to LEIR.

#### LEIR (Sergio Pasinelli)

Another week with the crash program for the LEIR gurus.

They have found a way to avoid pressure rise in extraction region by implementing a horizontal bump in the straight section of the extraction region.

They have optimized the MDNOM and NOMINAL cycles by increasing the injection bumps and modifying the RF voltage.

They have done optics measurements in the injection line (Kick response).

##### Day to day operation:

Tuesday we have had a leak on the water coil circuit of the extraction septum SMH40. Specialists have fixed the leak Wednesday/Friday by "rebrassing", on site, the water connector.

Wednesday we have had a "time to time" error on the quad ITE.QFN01.

Piquet PO, EPC CO and CO Timing specialists have been involved in order to fix the quad. The error was created by a dysfunction of the G64 crate. Piquet PO has changed the crate with the spare.

Thursday LEIR has provided beams for PS & SPS for their MD's and optimizations.

Friday Linac 3 has refilled the source.

No problems during the weekend.

## **AD (Lars Varming Joergensen)**

Week 46 was a very uneventful and successful week at the AD.

We started the week with an MD devoted to set up the multi-turn extraction for the ASACUSA experiment. This was successful in implementing a six bunch extraction that has subsequently been used by ASACUSA for the rest of the week. This was implemented by running a macro and a few simple cycle changes, so that it was easy for the operators to handle.

Time was also spent during the week on setting up the exact kicker timing for ASACUSA as their currently running experiment is critically dependent on a clean leading edge of the bunch. During this it was discovered that the kicker timing appears to move up to 25 ns per day (jitter). This is not normally visible as the bunch is normally sitting in the middle of the kicker signal about 300 ns from the edge.

Apart from the MD session on Monday we only lost beam due to problems in the AD injector chain!

We ejected 3-3.2 e& for the normal experiment and somewhat less for ASACUSA (see above)

## **Booster (Klaus Hanke)**

A reasonably good week for the PSB with only minor technical issues but a lot of last-minute MD activity.

The only stops worth mentioning were

- Wednesday 1,5 h for PS access
- Friday 12' (a power supply for the injection steerers tripped, a broken card was changed by the piquet)
- Friday evening 2h stop for PS access in the switchyard

On the MD side good results could be achieved by the RF team who managed to replace the C16 harmonics with the Finemet prototype cavities, which gives us confidence that all three RF systems of the PSB can be replaced by this new technology.

## **PS (Gabriel Metral)**

Début de semaine perturbée par un problème de refroidissement sur un aimant de TT2 (F16.QFO215) qui a généré 8h d'arrêt faisceau pour TOF, AD et SPS.

Un arrêt de 3H30 pour changement d'un relay gap sur la cavité 36 a été nécessaire Vendredi soir.

Les ions sont maintenant injectés et accélérés avec plus de  $3e10$  charges par cycle.

Des mesures ont été faites pour comprendre les variations de trajectoires observées sur l'injection des ions. Il semble que ETL.BHN10 soit l'équipement fautif (a suivre)

Faisceau MTE servi en plus haute intensité pour cette dernière semaine  $1800e10$  puis  $2000e10$ .

Faisceaux servi : AD, TOF, EAST, SFTPRO, LHC, COLDEX, Ion Nominal

## SPS (Hannes Bartosik)

The SPS had a dense program for the last week with high intensity proton beams in 2015: setting up of the nominal LHC ion cycle on Monday and Thursday, extractions to the HiRadMat experimental area Monday evening to Tuesday night and Thursday evening to Friday evening, and 24 hours dedicated COLDEX run on Wednesday.

The intensity of the SFTPRO beam for the North Area was increased as requested by NA62. The PS provided the MTE beam with up to  $2 \times 10^{13}$  ppp and after optimisation a transmission of up to 93% could be reached in the SPS. Significant downtime was accumulated along the week:

- No beam from the PS during 4 hours Monday afternoon and another 4 hours in the night due a fault on a thermoswitch of a TT2 quadrupole
- On Thursday a heater module on the generator 2 of the MKP injection kicker had to be exchanged resulting in 1 hour downtime
- Friday evening the PS could not deliver beam for 3 hours due to problems with the 10 MHz cavity
- Saturday afternoon a high voltage cable on the ZS extraction septum broke and had to be exchanged, the North Area beam had to be stopped for 1 hour

Great progress was made on the setting up of the nominal LHC ion cycle with 12 injections.

- ABT achieved a batch spacing of 225 ns by deploying a horizontal closed orbit bump in the injection region to allow using only the 3 fast injection kickers
- The transmission to flat top was optimised by tune corrections on flat bottom and by optimising the phase loop gain on the ramp (in particular after transition)

First attempts of extracting the LHCION1 pilot cycle towards the TT60 TED on Sunday were unsuccessful due to problems with the FRev distribution. The RF specialist could not resolve the problem yet, but will continue investigating Monday morning.

## ISOLDE (Jose Alberto Rodriguez Rodriguez)

Very busy week here at ISOLDE with the whole OP team stretched very thin, often working late and making a big effort to deliver as much re-accelerated radioactive beam as possible to the Miniball experimental station.

### For GPS/TRAP/EBIS/REX/HIE-ISOLDE:

2015/11/10 – Tuesday:

- No beam until 11:00 due to target change in HRS
- Beam ( $^{76}\text{Zn}^{22+}$  at 4 MeV/u) delivered between 11:00 and 18:00
- Breeding time changed to 97 ms to increase the repetition rate to 10 Hz at ~16:00
- Beam energy switched to 2.85 MeV/u (~18:00-19:30)
- Beam delivered during the rest of the evening and night

2015/11/11 – Wednesday:

- New scalable machine set-up ( $^{74}\text{Zn}^{21+}$  at 4 MeV/u) between 8:00 and 11:00
- Beam delivery until 15:00
- Superconducting solenoid in TRAP refilled (downtime ~45 mins)
- Beam delivery until 17:15
- Beam energy switched to 2.85 MeV/u beam delivered during the rest of the evening and night

#### 2015/11/12 – Thursday:

- Set-up of  $74\text{Zn}^{21+}$  at 4 MeV/u to Miniball (~8:00-9:00)
- After only ~1.5 hours of beam delivery, we had a problem keeping the SRF cavities locked. The expert was called and eventually found out that the source of the problem was the LLRF was not able to reach FESA class that controls the tuners of the cavities. The reason was tracked down to an intervention in the computer network meant for LHC (HIE-ISOLDE was forgotten).
- Delivery of  $74\text{Zn}^{21+}$  beam at 4 MeV/u to Miniball resumed a bit before 14:00 and continued until 20:00.
- Amplifier for IH structure tripped during the Wed-Thu night (~45 mins downtime)

#### 2015/11/13 – Friday:

- No beam during the intervention and irradiation of target for MEDICIS
- Delivery of  $74\text{Zn}^{21+}$  at 4 MeV/u to Miniball from ~12:30 to ~19:15.
- Switch to  $22\text{Ne}^{7+}$  at 2.9 MeV/u for the weekend

#### 2015/11/14 – Saturday:

- Delivery of  $22\text{Ne}^{7+}$  at 2.9 MeV/u to Miniball during the whole day.
- Amplifier for IH structure tripped (~30 mins downtime)

#### 2015/11/15 – Sunday:

- $22\text{Ne}^{7+}$  at 2.9 MeV/u finished at ~8:30 in the morning. Experiment officially completed.

#### 2015/11/16 – Monday:

- Commissioning of several beam diagnostics drives using  $14\text{N}^{4+}$  at 4MeV/u beam from the EBIS
- Not yet well understood vacuum incident. Pressure in the sector before the Miniball experimental station raised to ~1 mbar. Valves closed before gas reached the preceding vacuum sector. The leak detection afterwards didn't show any problem.
- Laser tests by the RILIS team
- FC and beam profile monitors in GPS, CA0, CBO, CCO and RCO sectors tested
- Problems opening the door of the Faraday cage in the target area (probably the piston). Target change postponed to Tuesday after intervention with the TELEMARX robot.

### **For HRS:**

#### 2015/11/10 – Tuesday:

- Target change in the morning. Target and line heated-up during the day

#### 2015/11/11 – Wednesday:

- HRS and cooler/buncher set-up and tuning in continuous mode using stable beam
- Problem with BSC4830 and BSC4820 found

#### 2015/11/12 – Thursday:

- Set-up of the line and collection in LA2 by TG started at ~20:15 after HIE-ISOLDE run
- Transmission problem through the cooler/buncher found by TG (~1:00-4:00)
- Beam tuning to the CRIS experimental station (in non-bunched mode) during the rest of the night

#### 2015/11/13 – Friday:

- Intervention in the target area (~8:30-10:00) to install a MEDICIS target for short irradiation test (~12:00-12:30)
- HRS line and cooler/buncher set-up using stable beam
- Broken RF amplifier in the cooler/buncher identified as the source of the transmission problem found the night before. Amplifier fixed at ~17:00.
- Stable and radioactive beam delivered to CRIS experimental station after HIE-ISOLDE run (after ~19:15)
- Problem with the gating pulse used to trigger the cooler/buncher at ~00:30. Solved at ~2:00

#### 2015/11/14 – Saturday:

- Several radioactive beams to the CRIS experimental station (by users, no OP intervention)
- Beam lost at ~17:30 (from ~100pA to ~20pA). Recovered after changing the bias voltage of the cooler/buncher and re-optimizing the line (reported by users) at ~19:00

2015/11/15 – Sunday:

- Several radioactive beams to the CRIS experimental station (by users, no OP intervention)

2015/11/16 – Monday:

- Radioactive beam to the CRIS experimental station stopped at 8:00 a couple of hours after protons from the Booster were stopped
- Target irradiated during the weekend removed in preparation for installation in the GPS front-end