

# Accelerator Complex Status

## End week 15 (Monday 16 April 2018)

---

### TI (Ronan Ledru)

The SPS suffered over the weekend from cooling issues on the septa. On Monday 09.04 EN-CV cleaned up the filter of the BA6 septa circuit. Also on Monday there was an electrical perturbation on the SIG side of -7.66% during 500 ms.

On Friday 13.04 the transformer for ventilation in point 5 tripped due to a fault on the coil. The network was repowered from another circuit, with limited power and the faulty transformer was replaced. The system could be repowered from the replaced transformer by 17:30.

Details: <https://wikis.cern.ch/display/TIOP/2018/04/16/TI+Summary+Week+15>

### LINAC2 (Richard Scrivens):

Smooth operation, no major incidents.

### LINAC3 (Richard Scrivens):

Several issues

- The new pulsed converters were found to be misaligned to the beam time. OASIS signals had just been made available, but also these did not provide consistent timing information, and they also had to be debugged.
- There was no beam to high energy, which was found to be due to RF modifications that have changed the phase references. This re-optimization took a few days, but we think it is completed now.
- The spare microwave generator is being used, and its remote reset is not working – investigation continues on that.

The stripper foil setting up and debuncher setting up needs to be completed now. This should be finished in the next days.

### PSB (Vincenzo Forte):

A decent week for the PSB with 97.5% availability.

As priorities from the previous week, LHC50 and 100 ns, LHCINDIV VdM beams were re-established.

ISOLDE took beam during the week and many tests with beam took place. In particular, the new B-train performance was investigated and is now ready to be tested continuously during week for reliability on ISOLDE. The operational wirescanner calibrations were checked through several measurements. Beam for 160 MeV studies was resuscitated.

Tests on the prototype wirescanner took place at the beginning of the week without and with beam. Unfortunately tests with beam were not successful, as BI experts finally suspected 'broken wire' and will check with a quick (~30 mins) access on Wednesday during the dedicated optics tests for the BT-BTP line.

Major issues during the week:

- At injection with trips on BI.BVT and BI.DIS (solved by ABT piquet).
- The C16 cavity had a longer interruption yesterday.

- Repetitive trips of MPS and Bdl circuits are happening since yesterday afternoon (for now solved by resets but to be followed up).

### ISOLDE (Erwin Siesling):

It has been a busy week at ISOLDE with regard to operations but with very few faults. Quite some debugging was necessary during the HRS setting-up of a phenomenon we had not seen before at ISOLDE/ISCOOL but as soon as we had the machine going things went pretty smooth for the CRIS users and they are happily running with 115 Indium(stable) down to exotic 100 Indium from HRS.

Summary:

HRS:

A tapestation intervention on Monday to get the tape back onto its reel was followed by a proton scan on Tuesday when strange behaviour occurred with the radioactive beam with regard to the counts at the tapestation. We would measure either complete saturation of the tapestation detector or no counts at all. What was expected to be a tapestation or beamgate timing issue turned finally out to be an issue in the ISCOOL RFQ where a well occurred due to the specific settings of the electrodes inside. This then prevented short pulses created with the beamgate for measurements with the tapestation to come through. The problem kept us busy for two days before we figured out what was wrong. In the meantime setting-up with stable 115In for the CRIS experiment continued as well as the RILIS setting-up for Indium laser ionisation.

By Wednesday the experiment took radioactive Indium with non-optimised proton position on the target. Thursday CRIS continued with radioactive beam after we finally could do a proper proton scan and yield checks with the 'tapestation' issue solved and standard settings loaded for the ISCOOL RFQ.

We optimised the machine to the max to provide CRIS with the exotic Indium isotopes down to 100In.

They have been running happily over the weekend with full proton intensity from PSB. Only minor hick-ups. The extraction HT tripped three times during the whole week and one of the deflectors in the beamline (CA.KIK10) tripped once.

They will run until Tuesday.

GPS:

Last week GPS was used for mainly vacuum and functional tests of (used) targets. What seemed to be a short on the anode of one of the targets occurred to be a broken power-supply (GPS Anode1).

On Friday we had a problem with the GPS extraction HT staying interlocked due to a bad contact in the interlock cabling. This was swiftly solved by the specialists and they used the opportunity to verify the new HT power-supply at HRS and discovered a degrading resistor which they replaced before it would fail (presumably over the weekend). Many thanks for that! (to Jan Schipper and Thierry Gharsa TE-ABT-EC).

GPS getting ready for

Few technical issues:

Broken vacuum interlock cable for two deflectors (HRS.DHZ120/DVT12) in the HRS20 sector. BTY.QDE182 had a PPM issue on Friday. Trip of CAO.KIK10 once on Saturday-evening. Trip of the HRS HT once over weekend, twice during the week. Anode1 power-supply failure at GPS.

These faults did hardly hamper the physics and could be tackled in between runs.

### **PS (Denis Cotte):**

Une semaine un peu plus difficile que les précédentes pour la machine PS avec un taux de disponibilité des faisceaux d'environ 84%.

La principale cause de panne était liée au problème de refroidissement de l'aimant ZT10.QDE01 de la zone EST.

Afin de diagnostiquer le problème, un accès en zone primaire « EAST AREA » a été planifié Jeudi. Cette intervention priva la zone EST de tout faisceau pendant un peu plus de 12 heures. Même après le changement du filtre du circuit d'eau, le refroidissement de l'aimant restait insuffisant pour une opération à 550A. Une limitation du courant maximum à 500A sur cet aimant est mise à place en attendant une future intervention.

Mardi soir, le convertisseur F16.QFO165 tombait de nouveau empêchant tout faisceau dans la ligne TT2 pendant environ 2h. Le piquet TE/EPC bascula ce quadripôle sur l'alimentation de réserve.

Jeudi après-midi, un problème sur l'alimentation du rack CR5 du centre anneau (Bat 353) nous privait des cavités nécessaires à la production des faisceaux LHC. Son remplacement par les piquets LL/RF et EN/EL nécessita environ 1H40.

Finalement, tout au long de la semaine, le PS subissait aussi quelques brèves interruptions du faisceau depuis la machine Booster avec toutefois un arrêt un peu plus long de 2h pour le faisceau MTE dans l'après-midi de Samedi.

En fin de semaine, l'opération des faisceaux LHC avec deux cavités 40MHz restait problématique après intervention des piquets. On bascula alors sur le mode d'opération avec une seule cavité 40MHz au dépit d'une longueur de bunch un peu plus longue pour le SPS.

### **AD:**

The cubical for the horn power converter was replaced and is being commissioned. Beam expected on target early this week, but the start of physics is delayed until Monday 30 April.

### **SPS (Karel Cornelis)**

NA physics started last Monday at 19:00, about 10 hours late due to problems with the BLM's. During the weekend it was found that the BLM's in the transfer lines and the LSS's showed a suspect behaviour. Some would give crazy high readings, some would randomly change gain settings and some would not set the required gain on the amplifiers. By Monday evening, after many card changes, the splitter BLM's were in a state they could be trusted to send beam to North area. Every other gain setting

still turned out to be wrong but the BLM's were considered to be usable. On Tuesday the CPU was changed to an old one and the behaviour of the splitter BLM's turned back to normal. After more investigation of the BI experts, they concluded that the main source of the problems was due to an OS change during the YETS. By the end of the week, all systems were rolled back. Since then the BLM's started to behave as they should.

On Tuesday, FT physics was stopped from 9:00 to 11:00 for interventions in the north are. After that we could not restart the beam due to an RF problem. It turned out that a card was damaged because of a wrong setting in the Coast cycle we tested during the stop. The beam was only back at 14:30.

LHC was taking pilots and INDIV beams during the week. A 12 bunch BCMS was prepared and extracted to TED. We also scrubbed the SPS for some time with 4 batches of 25nsec accelerated beam. Longitudinal parameters were not perfect because of a missing cavity in the PS.

### **LHC (Markus Zerlauth & Elias Metral):**

While the longitudinal blow up worked reasonably for nominal bunches on the PPLP ramp, it again failed for probe bunches, probably because of the short initial bunch length. To establish a solid commissioning and operation baseline, it was therefore decided to switch back to the PELP ramp. Development on the PPLP ramp will continue in the background with the aim of using it later in the year.

Linear and non-linear optics studies and corrections were stopped on Wednesday following last beta\* measurements (no good correction could be established), with the estimated luminosity imbalance between ATLAS and CMS at the level of 1-2%. First collisions were established easily on Thursday 12th April thanks to a remarkable orbit reproducibility. Beams collided immediately in CMS, also ALICE and LHCb were easily found, only ATLAS was found ~300um off wrt to last year.

Setup and validation of injection protection was completed. The collimators (TCTs and TCLs) were aligned for end of squeeze and collisions. The RP alignment and calibrations were performed at 30 cm for crossing angles of 160, 131 and 130 urad, and at 27 cm and 25 cm at 130 urad.

The loss maps and validation campaign was initiated at injection, flat top, end of squeeze and collisions. A hierarchy breakage was again found

on **TCSG.D4L7.B1** in [B1V](#) (already happened at injection) at 6.5 [TeV](#), requiring a realignment of that collimator, including the angle, which solved the problem.

Various issues were encountered with RP and collimator settings for physics - the machine is ready for stable beams, but those settings are not.

