

Accelerator complex status

End week 41 (Sunday 12th October 2014)

TI (Jesper Nielsen)

<https://wikis/display/TIOP/2014/10/13/TI+summary+week+41%2C+2014>

ISOLDE (Pascal Fernier)

Good week for Isolde. Physicists happy.

GPS: target # 517 Ta

- Run @50kV pour IS 525 sur ligne LA1
- Physicists collected lot of data with 9Li and 11 Li
- Few collections Sunday with 183Ta with GHM and GLM lines.
- Minor problems with vacuum but nothing serious.
- MAG 70 is not working beam, is +/-5mm each time we change the mass.

HRS:

- Machine stopped with problems with the clamps – piston change should take place Monday morning.

LINACS (Detlef Kuchler)

Normal operation with only some small problems. On Tuesday we could slightly increase the intensity for both of the Linacs.

LEIR (Sergio Pasinelli)

Week dedicated to the beam stability & efficiency at the injection, orbit correction and improvement of the transfer line.

During these adjustments, we have been disturbed by controls errors on the power supplies and the well-known RF crate error. The controls errors on the power supplies are not understood by the EPC team and these converters stay under monitoring.

Until the end of this week, it was impossible to use YASP for the orbit correction because of the discrepancy between K parameter and the real correction in the GFA, but with the help of the LSA team, we have done the backward propagation from the GFA to K for the orbit corrections elements.

In order to keep a constant current in the orbit e-cooler correctors, we have asked the LSA team to add a new parameter (I_{ecool_corr}) in the hierarchy of the orbit correction at e-cooler.

I would like to remind you that the OASIS signals of the main quads are still weird since july/august. A solution is available but is stuck by a "budget code ping-pong" between CO and EPC. Thanks in advance for your help.

AD (Bruno Dupuy)

The week saw a great number of problems that slowed down progress with physics, some the problems were resolved some other not.

- The problems mainly involved transverse Schottky pickup amplifiers, this pickup has a dream, become a kicker... After thunderstorm we lost 37 hours to fix a bad cooling from 300 MeV to 100 MeV.
- The Injection kickers have been repaired by specialists.
- The C02 cavities dropped by over current (8 Reset, on the night of 12 to 13 Oct).
- ASACUSA complains about the positional stability of extraction. We have observed important position variation on GEM, the fluctuation seems to have mysteriously disappeared.

Booster (Klaus Hanke)

All physics and MD beams delivered, operation seems to enter into a more stable phase.

There were two major problems during the week:

Tuesday 7 Oct the extraction septum and BT.BHHZ10 tripped simultaneously, could be reset but tripped an hour later again. First the power piquet, then the magnet piquet were called. Eventually the magnet expert required access. Diagnostics: BT.BHZ10 was over heating due to a flow restriction. They believe that something had backed up behind the needle valve which is used to set the correct flow, when they opened it slightly it cleared the restriction. The extraction septum trip seems to be unrelated; will need further investigation during the technical stop. Overall down time 3:37, plus perturbations throughout the afternoon.

Saturday afternoon and throughout the evening losses during the cycle on Ring 4. There seems to be an instability which the transverse feedback is unable to correct. After lengthy investigations with the LL RF piquet, it was found that a setting of the TFB did not have the reference value, and setting it back to ref improved the situation significantly. However, there seems to be also a real physical instability on ring 4.

PS (Guido Sterbini)

It was a good week for the PS. In addition to the beams dedicated to the physics (East North beams, nToF, AD, SFTPRO CT), the first part of the week was focused of the LHC beams for the SPS MDs whilst the end of the week was devoted to the commissioning of the East South line (T8) and the Ar cycle serving the SPS. The wire scanners and the kickers KFA13 and KFA21 are still not available thus delaying the commissioning of the SFTPRO MTE beam.

On Tuesday, the operation was perturbed by a problem in the PSB (4 h downtime).

Wednesday was mainly dedicated to MDs. During a scheduled access in the East Area, POPS went down due to an overlook in the access procedure (30 min downtime). The Ar cycle was regulated in the longitudinal plane and the East Low intensity spill was tuned in preparation of the T8 commissioning.

On Thursday there were losses and perturbation for the AD beam at transition due to a problem of one of the cavity at 200 MHz used for the longitudinal blow-up (solved by the specialist). There was also an attempt to increase the Ar transmission from LEIR to PS but the improvement was marginal due to the difficulties to steer the beam extraction trajectory in LEIR.

On Friday the IRRAD beam permit was signed, the IRRAD patrol was done and the bending magnets deconsigned. The start of the commissioning was delayed but several interventions needed on the hardware (interlocks, vetos, unresettable devices, control issues): an access in the PS ring was required (3 h downtime). Finally the beam arrived on the end of T8 in the evening. During the night AD operation was hampered by a problem on its injection kicker (5 h downtime).

The weekend was mainly dedicated to improve the steering and the beam quality in T8.

SPS (Benoit Salvant)

The start of the week was very busy with a large variety of issues to solve in order to send the physics beams to the North Area targets, followed by very smooth running from Thursday afternoon onwards.

In general, it can be noted that:

- Rather stable physics conditions could be achieved on T2, T4 and T6 (with around $\{25, 17, 25\}e^{11}$ p sharing on Sunday night).
- Vacuum pressures in ZS and LSS1 (in particular MKP4) are high with 25 ns beam (72 bunches max so far with $1.2e^{11}$ p/b).
- The situation of instrumentation improved significantly (e.g. MOPOS, monitors in TT20, wire scanners, fast BCT).
- The damper commissioning was announced to be complete.

Issues to follow up include:

- The RF transmitters tripped many times per day (in particular TRX3 and TRX4 towards the end of the week).
- The injection trajectories often suffer from sudden changes despite the efforts in the PS.
- The hunt for aperture restrictions should continue
- Several faults turned out to be difficult to diagnose with the new systems (FGCs, access system). We need to get used to them.
- The switch from “access” to “beam on” sometimes require manual moving of the bends or the collimators.
- A blocked collimator in H6 (XCSH.041.064) requires intervention next week.

Here is the detailed report of the main events of the week:

On **Monday**, issues with the Servo spill and instrumentation (SEM grids) in the North area transfer lines were solved. Beams were sent to experiments behind T2 and T4 but the beam quality was low despite the operation team efforts (in particular on T4). No beam could be sent yet to T6 as there was an issue with one of the TAX (among others). The number of bunches was increased on the

parallel MD beam to continue scrubbing, reaching the maximum 72 bunches with 25 ns spacing. The vacuum pressure in LSS1 and ZS swiftly increased but did not reach the alarm thresholds.

On **Tuesday**, a quadrupole before the T4 target was found stuck at its maximum current and First Line fixed this. Tuning continued but was hampered by many issues external to SPS in the afternoon (PS extraction quadrupole power supplies stability, PSB magnet, and finally thunderstorms that brought down the mains and the RF transmitters several times and flooded the BA7 Monte Charge).

On **Wednesday**, the first dedicated MD of the year took place with LHC 25 ns beam commissioning and aperture measurements. An access was organized to exchange one transverse damper amplifier in the middle of the MD in agreement with the MD coordinators and the physics coordinator to take advantage of the reduced cooling time required by RP with no beam extracted from the PS. The MD was allowed to finish one hour later as a result. An aperture restriction was found in 313, and another one was feared around the injection region but was difficult to identify with the large injection losses. These large injection losses also hampered the 25 ns beam MD, and only 1 batch of 72 bunches could finally be injected and ramped, before longitudinal measurements were performed with 12 bunches. After the MD, the beam could not be sent right away to the North Area because of an MBE fault that took some time to diagnose, and was finally linked to a forced door (842) that needed to be rearmed (1.5 h lost for North area physics). The SMQD mains were put back in operation in the place of the spare SMQS at the occasion of the access.

On **Thursday**, transfer lines to target were resteeered and it was realized that the sign of the monitors around the T2 and T4 targets had opposed signs compared to before LS1. The beam was finally seen clearly on the target miniscans in both planes, and fine-tuning allowed reaching better quality beam. The injected intensity could then be increased but radiation issues in the experimental zones due to too relaxed collimator settings prevented to increase it further until something prevents the users from opening too much the collimators. The ion MD beam was inserted in the supercycle, but a problem with the RF settings affected the physics beam for 45 min, before the MKD early interlock was masked. This issue (linked also to the coexistence of FESA2 and FESA3) is likely to come back every time a new cycle is included in the supercycle. Several power supplies tripped simultaneously in TT10, and a surveillance was put on Friday afternoon to see what is happening, but no trips occurred since then. RF transmitters also tripped many times. Beam was otherwise stable with acceptable quality during the night (both Fixed Target and 72 bunches with 25 ns spacing). Also during the night, the damper commissioning was announced to be complete

On **Friday**, following several trips of the SMQD mains, it was replaced back with the SMQS after less than 2 days of operation. The fixed target beam was very stable and steering on T6 took place. There was a first attempt to see the Argon beam in the SPS on Friday afternoon, but many issues occurred in LEIR and PS, and finally beam was seen in BTV1001, but could not be injected into SPS yet.

During the **weekend**, the SPS ran very smoothly with the Fixed target beam in parallel with 72 bunches of 25 ns spacing. The vacuum and temperature of MKP4, as well as ZS pressure are increasing slowly, getting closer to the threshold. A third batch of kick response measurements took place to check if more can be done to improve the MOPOS situation. Two other faults on extraction elements were difficult to diagnose on Saturday evening: one required rebooting one of the three BA2 FGC servers, and the other one required resetting several access zones before finally finding the one that was inhibiting the chain.