

Accelerator complex status

End week 24 (Sunday 19th June 2016)

TI (Ronan Ledru)

TI summary of the week:

<https://wikis.cern.ch/display/TIOP/2016/06/20/TI+summary+week+24%2C+2016>

LEIR (Sergio Pasinelli)

During the week the LEIR team and gurus have worked on several topics.

- 1) In collaboration with the PS RF team, the energy matching with PS was performed with success (only 2 iteration!).
- 2) Transverse Feedback:
 - a. re-cabling of PU41 and PU42. They were inverted.
 - b. the gain of the PU41 and PU42 is now controlled with a function generator.
- 3) First tests on the new Straight Field Compensation which control the ETL.BHN10 was done. More tests are needed before deployment.
- 4) MD have been done on the multi-injections cycle.
- 5) Recurrent electronic fault on the injection septum SHM11. Fault cannot be reset from CCC. Need to call specialist in order to reboot the control chassis.
- 6) Test on the new LLRF was postponed.
- 7) LEIR access point maintenance (Wednesday + Thursday)
- 8) Monday 20th June Linac 3 source refill.

ISOLDE (Erwin Siesling)

HRS:

Running UC2C target #572. A leak on the target prevented the users to run over long period with full proton intensity. Despite this the run was still successful, also tests by RILIS were done to extract Eu from this target for later use at GPS were successful. However when cooling down the target the leak worsened and this target cannot be re-used.

The run stopped on Thursday for the change at GPS for negative ions.

Time was used on Friday by EN-STI-ECE (Christophe Mitifiot) to tackle successfully the communication problems we had with the electrode, clamps and shutter for the HRS front-end. The solution will also be implemented at a later stage at GPS.

Also investigations by TE-EPC (Michal Dudek, Julien Parra-Lopez) were carried out on the HRS and GPS target heating PLCs. No obvious reason was found for the communication issue from last week. However a malfunctioning Ethernet port (not in use) has been isolated from the PLC at HRS. From OP (Eleftherios Fadakis) we are pushing for a solution where the FESA is able to provide information when the PLC is down (presently AQN values get frozen giving the impression all is fine even though the power supplies are off and PLC is down).

Next HRS target change foreseen coming Wednesday.

Issues:

Apart from the vacuum issues in the target we only had the HRS separator magnets cycling stopping once on Tuesday morning.

GPS:

Preparations for the negative ion run during the week. This involved:

Swapping of polarity of all electrostatic power supplies (OP), polarity of the GPS HT (TE-ABT), polarity of the DC power for the line heating as well as the separator magnet (TE-EPC) and turning the hall probes in the GPS separator magnet by 180 degrees (OP, RP).

The negative ion target #576 was mounted on the GPS front-end on Thursday morning.

Special thanks go to Jan Schipper and Thierry Gharsa (TE-ABT) for their hard work and for coming in very early on Thursday so the equipment installation and polarity swap on the GPS HT could finish in time to provide the users stable Iodine beam later that day.

Setting-up with radioactive beam on Friday was not straight forward. Very low count were seen on radioactive Iodine and other released masses. Despite these difficulties the users obtained successful results over the weekend.

The run will last until Wednesday when polarities will be swapped back to normal. Target change foreseen next week.

Issues:

A few times the protons were not available from PSB (Linac down, etc).

When going from low (^{35}Cl) to high masses (^{127}I) the GPS separator magnet would slightly move away from calibration which for very low intensities meant we could not see the beam anymore.

This issue will be discussed in the Isolde Technical meeting on Tuesday.

AD (Lars Joergensen)

The AD had a pretty good week with only a few problems.

As ASACUSA and ATRAP were our only customers this week, they sometimes struggled to use all the beam time, hence we were able to schedule an extra MD session for Thursday night.

The orbit on Flat top 1 was measured as well as at a couple of position on the ramp from FT1 to FT2. A first attempt to measure the acceptances was also made.

During the night between Saturday and Sunday one of the modules in the injection kicker went into fault. This seemed to be re-settable, but the AD was behaving strangely. After a long intervention on Sunday, it turned out that the thyatron switch was broken. The other modules should have been able to compensate for the loss of one module but it also turned out that there was a bug in the software for the automatic re-balancing of the load. This bug was fixed by the intervention of A. Antoine. The switch will have to be replaced in the coming days.

Otherwise the AD delivered about 3.2×10^7 anti-protons per shot this week.

Booster (Elena Benedetto)

Quiet operation for the PSB this week: beam fine tuning, adjustments to make users happy and a lot of MDs as usual (mostly RF, optics and injection optimization).

In the second part of the week we experienced a decrease of the current from the source, which is normal since Isolde has not been taking beam for a few days. During the weekend however, after the Linac2 RF issue, the source current went even lower, especially for Rings 2,1 (in the tail of the

pulse), requiring readjustment of the LHC beams (injection of ~3 turns instead of ~2) and slightly larger emittances than what normally delivered. All measures were put in place to train the source and the situation is slowly improving...

For this week, I'd like to mention the significant advancements in the validation/debugging of the new Turn-by-Turn pick-up electronics, presently available on only 3 BPMs on Ring2. We are performing the final tests to either identify possible showstoppers or to confirm the decision to deploy the full system during the EYETS 2016-17. So far so good...the final decision by the end of the month.

PS (Matthew Fraser)

It was a steady week for the PS with most of the downtime caused by problems upstream. Minor issues in the PS included a few kicker and cavity trips, and an RP monitor tripping TT2, which was probably caused by bad MTE spills.

A variety of LHC beams were provided for tests and commissioning: probe bunches were provided for AWAKE commissioning and 80 bunch and 48 bunch LHC25 (nominal, i.e. not BCMS) beams were delivered to the SPS for injection tests with trains of up to 2 batches. First injections showed the 80th bunch had a large amplitude in TT2 and SPS but after fine tuning of the KFA71 start time all 80 bunches were successfully transferred to the SPS. A first RF set-up of the LHC ion cycle (EARLY) was carried out and work continued on the LHC25 BCMS beam.

nTOF continued to take beam during the nights. EAST operation was smooth with some requests to improve steering and fix the spill quality monitor. MTE continued below the interlock limit of $1050E10$ ppp and preparations continued for the high-intensity MTE version in view of the upcoming RP measurement/validation of PS extraction region; $\sim 2100E10$ ppp could be extracted to D3.

On Friday intensity fluctuations and trips of Linac2 (RF problem with phasing of tanks 1,2 and 3) made it difficult to regulate the MTE spill and interlocking of intensity (on PS internal dump). Over the weekend repeated RP alarms in the AD caused by a fault on the injection kicker caused some downtime before stable operation was resumed in co-ordination with the AD supervisor.

Two glitches on the electrical network on Saturday and Sunday afternoons caused cavity trips that were recovered quickly.

SPS (Verena Kain)

Another busy week in the SPS.

The LHC is now filled with the LHC4 cycle with the shorter flat bottom with only two injections. Apart from being shorter and the potential reduction of the filling time eventually, it also has beneficial effects on beam quality. Transmission is better and the re-captured uncaptured beam populates less of the SPS circumference. The LHC beams seem to occasionally suffer from fast debunching, the origin of which is not understood yet. During the MD on Wednesday it was noticed that the single 800 MHz cavity used for the operational LHC cycle could have a negative effect on lifetime. Further studies are necessary to conclude.

The AWAKE proton line saw first beam this week after several issues had been overcome. One issue is still remaining and concerns the BETS. Currently AWAKE and LHC cannot be run in the same

supercycle if the LHC cycle has LHC static destination and dynamic destination SPS_DUMP. Under these circumstances the extraction kicker RCPS would charge to the LHC higher voltage, but not discharge or only slowly after the cycle. The voltage at the moment of the AWAKE cycle would then still be too high. The first shots were done with only AWAKE in the supercycle. To be followed up.

Also the BPMs in TT41 are not fully commissioned yet. Luckily the line did not need much steering. It is very well aligned.

Before the weekend the SPS took two times 48 bunches, standard beam, with 250 ns spacing. The beam looks good (~ 2.5 μm emittance along the entire bunch train). It was not accelerated yet in line with the beam dump limitations.

No changes for the fixed target beams. The 65 Hz hump was very large towards the end of the week. Running with the QS to check the effect on the 60 - 70 Hz ripple should still be envisaged.

The SPS had a very good availability this week with more than 90 % for the fixed target beam.

One main dipole and main quadrupole were eaten as part of the celebration of the 40th birthday of the SPS in the night from Friday to Saturday.