

# Accelerator Complex Status

## End week 28 (Monday 17 July 2017)

### TI (Ronan Ledru):

<https://wikis.cern.ch/display/TIOP/2017/07/11/TI+Summary+Week+28>

### LINAC2 (Giulia Bellodi):

Both linacs had a very good week : at Linac2 we had 100% beam availability, and at Linac3 only a couple of source resets were needed and an intervention to exchange a quadrupole power supply module.

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### LEIR (Steen Jensen):

Issues

- Tuesday, July 11th2017
- Nothing to report
- Wednesday
- 10 minutes minutes: QFN2040 tripped => EPC piquet
- 1 hour: LN3 quad problem
- 20 minutes: QFN42 cooling water pressure => magnet piquet => OK
- CRF43 problem => switch to CRF41 & expert investigating
- Thursday
  
- Friday
- ITE.BHN20 and ITE.BHN30 cracked cables => LEIR in standby
- Saturday
- Nothing to report
- Sunday
- Nothing to report
- Monday
- Recabling ITE.BHN30 and ITE.BHN20,subject to cable availability
- Tuesday

Activities

Tue:LN3 MD

Wed:Setting up NOMINAL+ LLRF MD

Thu:Setting up NOMINAL

Fri:EARLY beam to SPS, then LEIR in standby

Sat:LEIR in standby

Sun:LEIR in standby

Mon:LEIR in standby

## PSB (Vincenzo Forte):

A very good week for the PSB with few faults (99.8% availability) and many MDs. All priorities of the week were followed up.

The long lasting tune measurement issue was finally solved.

BPMs in BTP line have less noise with respect to before the EYETS 2016-17.

Wirescanners and ring BPMs remain the main instruments to be investigated.

The R3V calibration was performed. However, some contradictory measurements were performed during the week: to be followed-up.

The new BPM system in the ring seems in better shape: dispersion measurements show good agreement to model for all the BPMs, but still some work due to MRP discrepancies is needed.

BHZ52 losses are under investigation (probably the move of a BLM in a close-by area will be necessary during the next technical stop).

BCMS 1.5 eVs has been set up in the PSB. Its injection in the PS is still under investigation: very preliminary measurements showed a huge horizontal emittance blow-up (~100%) after injection, with and without dispersion matching.

Several MDs were performed: losses at BHZ52, resonance correction for high intensity beams, Finemet revival on R4 (Alan exceeded  $1000e10$  p level in R4 for an ISOLDE cycle!), emittance measurements along the cycle, comparisons with sem-grids in BTM line and dispersion measurements in the ring.

## ISOLDE (Erwin Siesling):

Another very busy week at ISOLDE. With the production rate of the radioactive molecular beam  $72\text{SeCO}$  being too low to continue the run last week it was decided to do an (unplanned) target change this week to be ready for the second radioactive molecular beam,  $70\text{SeCO}$ , to the Miniball experiment.

The target group has been working very hard to get this new target ready and on Wednesday-morning it was clamped onto the GPS front-end after which a record setting up started to get the beam delivered as soon as possible at the Miniball set-up.

The complicated radioactive molecular beam ( $70\text{SeCO}$ ) is generated in the GPS target, transported to the REX-TRAP and the REX-EBIS where the molecule is broken up and the charge state of the Selenium boosted to  $70\text{Se}17+$  before accelerating it to 4.5 MeV/u in the REX and HIE Linac. Using the settings we had from the run last week ( $72\text{SeCO}$ ) we managed to set up this new target and the different parts of the accelerator in a record time. By Thursday-evening we were able to send the radioactive  $70\text{Se}$  beam to the Miniball users. Only a day late with regard to the schedule where originally no target change was foreseen.

The target production rate of the molecular beam is better than that of the previous target however analysis at the experiment showed that there is a large amount of Germanium contaminant in their received beam ( $70\text{SeCO}$  and  $66\text{GeS}$  are at the same mass). Since there is a high interest and the  $66\text{GeS}$  beam is as exotic as the original  $70\text{SeCO}$ , Miniball decided to change to  $66\text{Ge}$  instead. Friday the accelerators were optimised for the radioactive molecular  $66\text{GeS}$  beam. The radioactive  $66\text{Ge}16+$  is being send to the Miniball experiment since Friday-afternoon.

The machine (specially the REX-TRAP, REX-EBIS and the REX/HIE-ISOLDE linac) has been very stable during these days. Small hick-up of the IHS RF amplifier in the REX Linac part and an issue with the isolating transformer for the GPS HT platform (target heating went down) apart from very few RF amplifier trips. The target production rate of the molecular beam has expectedly decreased since Friday (to a factor 2 this Sunday-evening). We managed with some re-optimising and a slight increase of heating of the target to bring back up the number of particles per second seen at the experiment. The Miniball users are happily taking data.

### **PS (Ilias Efthymiopoulos):**

PS delivered beams to East Area (including IRRAD), nTOF, AD, and SPS and LHC when requested (not much!).

For nTOF beam we increased the operation level to  $\sim 8.10 \times 10^{12}$  ppp that is the best we can do maintaining the RP levels. The cumulative POT now reads  $7.24 \times 10^{18}$  that corresponds to 39.1% of the year. For SPS we operate at  $\sim 1.5 \times 10^{13}$  ppp and there are lots of studies ongoing to optimise the beam and the MTE extraction in view of the increased intensity later in the year. Some work was also done on the Xenon beam until the LEIR was in fault. No faults worth mentioning, few occasional strips that were reset.

On the MD side we had 6 MDs fill spread out during the week in several sessions. The list below:

MD1927 : space charge studies with LHC25ns beam  
MD1939 : KFA45 ss studie at FT  
MD2498 : MTE studies  
MD1941 : quadrupolar pick-up study  
MD2508 : remaching PSB R3 to PS  
MD2145 : transition studies without gamma jump

### **AD (aa):**

No down time at all and everything works very stably.

There is a small problem with the efficiency of the stochastic cooling on the first flattop, which is the reason we have slightly less beam extracted to the experiments ( $2.7 \times 10^7$  instead of  $3.0 \times 10^7$ ), but we actually have better stability at the moment than normal, so the experiments are pretty happy!

### **SPS (Francesco Maria Velotti):**

Very lively week for the SPS.

On Monday, there was BSRT calibration and VdM scan in the LHC (screen in TT10 needed to deliver beam with different emittances), hence more than a hour without FT beam. Also, repetitive trips of cavity 3 required an intervention (done on Tuesday, together with a fix for a magnet in TT2).

On Tuesday evening, XTAX.021.023 was not moving and the piquet was called. An access with robot was requested by EN/STI, hence the intensity on T2 was reduced and the FT beam stopped at 6:00 on Wednesday morning, as requested by RP. The EN/STI managed to make the TAX move again remotely (increasing the motion

speed), although still not possible to reach the interlock position. It was then decided to use the XTAX.021.025 as access element instead of 023 and operation was restarted. A visual inspection will be planned after the next TS, due to the 40h cool down needed. Reparation will be planned for the YETS, as in this situation it is still possible to run.

The damper for Q22 optics has also been set up and settings are now available to the operation crew.

This permitted to resume the SHiP MD, which was planned for Wednesday (although only half day was then used due to this). The optics for TT20/T6 for SHiP was tested and the beam was delivered to T6 target. Also the BGI influence on FT beam was tested, as possible way to measure the beam position in the cycle also when de-bunched. At the same time, the multi-bunch stability threshold MD was also carried out.

After the MD on Wednesday, it was tried, from the EPC experts, to deploy the FGC upgrade for the dynamic economy. In the process of re-start the main bends, a tripped occurred (completely unrelated to the upgrade ongoing). It was then decided to roll back and deploy the upgrade in another moment.

As a consequence of this trip, the SPS was then down for about 22h due to an insulation fault on a wire in a current measurement transformer inside 18kV Schneider cubicle EMD212/BE in the BE substation. This resulted in a false current measurement in one of the three phases, making the SEPAM protection relay believe that there is an earth fault in the 18kV system and tripping the 18kV circuit breaker. This trip, also damaged the bucket network of SMD12, which was then repaired by EPC experts during Wednesday night. At the same time, they also fixed connection cable which degraded the performances of BEQ3. This should bring the stability of NA and SMD back to nominal. The beam was finally back at about 18:00 on Thursday, after a careful restart of the mains.

On Friday, the MD on the wideband feedback restarted, which was then also extended to Saturday. This slightly reduced the SFT production duty cycle, as the Q22 cycle needs to be followed by a dummy MD cycle, in order to prevent trips of cavity 3. To be followed up.

The feedforward on the 200 MHz was also carried out on Friday and finalised by the end of the day.

During the weekend, the main problem was caused by receptive trips of TRX7, which was then solved by the RF piquet. To be also highlighted, the XTAX.021.025 got stuck during the weekend, but the EN/STI piquet fixed the issue remotely.

**LHC (M. Giovannozzi and M. Zerlauth):**

<https://twiki.cern.ch/twiki/bin/viewauth/LhcMachine/LhcSummaryWeeks2017>