Accelerator Complex Status

End week 22 (Tuesday 6 June 2017)

TI (Jesper Nielsen)
To come soon.

LINAC2 (Richard Scrivens):
During operation there was only a small stop of quadrupoles due to a water interlock. It only appeared once, and a check during the technical stop day showed nothing abnormal.
For Wednesday and Thursday work was done on the tank 1 intersection secondary vacuum to halt corrosion. The secondary vacuum is not fully leak tight, but is already back filled with N2. Some more work will be needed.
Also the RF interference on BCTs was mitigated with filters and they now read accurately.

LINAC3 (Richard Scrivens):
Only about 2 days of beam production was possible.
Monday and half of Tuesday was dedicated to repairing the RFQ amplifier (short circuited capacitor in the amplifier coupling cavity).
During Wednesday stop the pepper pot was installed and the source spare microwave generator reconnected.
Linac3 restarted on Thursday afternoon, and ran without problems the rest of the time (with some work on the source stability required next week).

LEIR (Sergio Pasinelli):
Tuesday
Linac3 was back around 12h
Due to the ITE.BHZ30 fault, the beam was not injected into LEIR until 16h.EPC expert was called

Wednesday
ITS1 works done during the TS (see Dominic file).

Thursday:
400KV stop until 14h
Restart LEIR but no beam injected. ITE.BHZ30 was again in fault. EPC expert called.
One of the main quad was down (ER.QFN2040 & ER.QFT20)

Friday
Recurrent main quad fault on ER.QFN2040 & ER.QFT20

Saturday:
Again fault on the main quad ER.QFN2040 & ER.QFT20.

PSB (Bettina Mikulec):

The week started finalizing the MTE high-intensity beam – the PS took it on Sunday, and the final verdict concerning the emittances still has to come from PS and SPS.
Injection energy matching was done on Monday; last year's injection frequency values were confirmed. The LHCINDIV beam was prepared on all 4 rings for PSB-PS energy matching measurements.
During Tuesday night the ejection septum was pulsing with 1000 A more than programmed à 2h30m piquet intervention; disruptions for UA9 run.
During the ITS1 on Wednesday the R1H and R4V wire scanners were successfully exchanged.
ITS1 had quite some disruptions for the PSB: after the restart on Thursday around 2pm BR2.C02 had issues with the HV; as a consequence 3 thyristors broke, but only 2 spares were available. It was decided to immediately set up TOF on R3 and the extraction and recombination for LHC25 for rings 3,4 and 1 (3+3 injection into the PS), and on Friday the rf team managed to put into operation the spare C04 power converter. BR2.C02 is working since, and the rf team will follow up the thyristor order, the setup of the Finemet cavity and the understanding of the HV problem.
A few power supplies tripped after the electrical glitch on Saturday.
Instrumentation issues to follow: stabilize orbit/trajectory system; tune measurements after FESA3 upgrade and R3V wire scanner acquisitions.

ISOLDE (Alberto Rodriguez):

ISOLDE low energy:
- Regarding HRS: A new target was installed last Monday. The separator was set-up on Tuesday. Stable beam to the COLLAPS users on Wednesday and Thursday (during the technical stop and intervention on the 400 kV electrical network). Radioactive beam (several Al isotopes) since Friday.
- Regarding GPS: No physics during the week. MD on Monday and Tuesday
- No mayor problems with the accelerator itself. Only a few issues with the RF amplifiers of the cooler/buncher, a couple of power converters and the controls of the separator dipoles. However, users have reported target yield lower than expected.

REX/HIE-ISOLDE:
- The tunnel was opened for three days this week to do some alignment measurements. After the measurements were completed, the controls of the vacuum sector valves were connected and tested.
- All the signatures were collected and the beam permit was fully approved on Thursday. Most likely, we will try to send beam through the cryomodules this coming Wednesday.

PS (Frank Tecker):

The PS had an eventful week, with the technical stop prolonged until 14:00 due to EDF work on the 400kV line. A POPS issue delayed the restart until 17:40. Since the restart, the beam was degraded for 20.5 hours due to a PSB ring 2

problem. This was mitigated by the common efforts of the PSB and PS teams to set up LHC 25ns 72 bunch beam with 3 + 3 bunch injection from the PSB and NTOF beam from PSB ring 3 reaching the nominal intensity.

The main issues in the PS were
- a LLRF H8/H16 switch that got stuck (2:45 downtime for LHC, AD)
- PFW (WDW+W8L) trips and regulation issues (0:45)
- a C10-96 circuit breaker (1:30, 0:30 for EAST1, EAST2, LHCIndiv_Awake)
- SMH16 vacuum interlock during MTE setup with higher intensity (1:20 except EAST)
- a KFA21 HV interlock, changing it to its spare (1:15 only MTE)
- ZT8.QDE01 (1:08 only EAST1).

Furthermore, there was 2:30 due to the PSB septum BE.SMH and during 1:35 Linac2 intermittently cut the beam on 2nd pulse.
During the technical stop, a vertical vacuum chamber misalignment in section SS01 by 1.5/2mm and SS20 by 3.5/5mm was corrected (partially in SS20).

LHC beam was delivered as norminal and 12 and 48 bunch BCMS. The operational high intensity MTE beam is ready for the SPS with 1.8e13. The Xenon ION cycle was prepared with the flat top field adjusted for the correct revolution frequency and the beam sent to the D3 dump. The NTOF integrated intensity follows the planning.

AD (Bertrand Lefort):

It was another good week for the AD.
We have suffered no down time.

SPS (Verena Kain):

On Monday the SPS delivered 72 bunches to the LHC for the pre-scrubbing and prepared BCMS 48 bunches for the physics fills planned during the COAST and the technical stop. Fixed target beam was stopped at 9:20 on Tuesday morning. The UA9 run started ~ 2 h later due to the filling with the LHC. UA9 had COASTs with Q26 and Q20 optics. The final filling for the LHC before the technical stop was finished at ~ 5:40. Unfortunately the LHC lost the beam shortly afterwards. One of the main goals of the technical stop in the SPS was to cure the main vertical aperture restrictions in the SPS that had been detected with the aperture measurement at the beginning of the run at locations 133 ad 511. MBB.13350 was exchanged as a non-optimum weld had been detected with an endoscopy at the end of the EYETS. The inspection of the pumping port next to MBB.51130 showed non-conform RF fingers. The non-conformity was repaired.

Beam was expected back at ~12:00 on Thursday. But due to an intervention on the 400 kV network, the restart was only possible from 14:00 on Thursday afternoon. Beam was finally back in the SPS at ~ 17:35 with lower intensity due to the missing ring 2 from PSB. AWAKE beam, LHC single bunches, fixed target beam and the low intensity MTE beam for aperture measurements were requested straight away. The aperture measurements revealed that indeed the

511 aperture restriction had been removed, but the 133 bottleneck is unchanged.
LHC also requested 72 bunches which could not be delivered because of an interlock problem with the "TI 8 BLM up" BIC input that could not be reset. It could be masked for lower intensity. Eventually the problem disappeared, but it is still not understood despite expert investigation on Friday.

The low level RF setting up on the LHC25NS cycle is not finished for 288 bunches. Experts were working on Monday and Friday afternoon when finally PSB ring 2 was back and the beam quality was adequate.
Friday from ~ 8:30 to ~ 19:00 another ZS scan was performed. The losses could be improved by moving mainly ZS3. The situation is however still not optimum.

The intensity on fixed target will not be increased before Wednesday due to the request of a North Area user for very stable conditions. AWAKE is running with ~ 3+e11, various scans transversely and longitudinally with proton beam versus laser are being carried out.

The BCMS emittances on Sunday were ~ 1.5-1.6 um with bunch intensity 1.1e+11. LHC wire scan measurements confirm the SPS bunch-by-bunch measurements.

LHC (Enrico Bravin & Massimo Giovannozzi):

This week saw significant downtime due to the injector technical stop and to cryogenics.
On Saturday the 300b intensity step was completed, but some outstanding loss maps, problems with one noisy BPM and optics measurements at 30 cm delayed the first fill with 600b to Sunday night.
In preparation for high intensity operation the full detuning scheme of the RF was tested and put into operation for the 600b intensity step.