Accelerator Complex Status

End week 21 (Tuesday 28 May 2018)

TI (Jesper Nielsen)

Details:

LINAC2 (Detlef Kuchler):

Linac2 had an availability of 98.8% this week. Main issues were the repair of the Frank James of Tank1 on Tuesday and a series of trips of LT.DVT10 over the weekend.

LINAC3 (Detlef Kuchler):

Linac3 source was difficult to operate until Thursday morning as the oven was running
out of lead (crucible was completely empty at the moment of the refill!).
Thursday the oven was refilled. Beam back Thursday afternoon @ 16:21. After some retuning
on Friday the source showed excellent stability over the weekend.
The issue with the SEM grids in the linac could on Friday finally be traced down to a wrongly set built-in timing.

PSB (Simon Albright):

It was a very quiet week for the PSB with no major down time and 97.8% availability. With the exception of the dedicated MD and a stop of Linac2 our longest downtime was just over an hour for BE2.KFA14L1, which required a piquet intervention on Tuesday afternoon. Otherwise we had a few minor faults of a few minutes in length.

The White Rabbit B-Train reliability run was restarted on Wednesday morning with the ISOLDE beams after the CO and RF teams found a work around for the firmware bug. The reliability run will continue to look for other possible problems whilst a fix for the firmware is identified. The Finemet cavity is gradually being revived and starting to show good performance again.

The BCMS variants for the LHC e-cloud studies have started being set up with good progress being made on all variants. As usual there were also several MDs through the week, in particular the PSB-PS transfer line MD team have found an optics they can use which allows us to continue providing beam to ISOLDE and doing parallel MDs.

PS (Anna Guerrero):

This week there was a major problem with the injection septum SMH42 starting

Wednesday night and lasting round 17 hours. It took some time to diagnose the problem. Finally the septa specialist had to intervene during several hours to exchange first the stripline and afterwards a connection in the feedthrough. The cause seems to be a short circuit likely producing an arc that burnt the stripline.
Two other faults worth mentioning, several times during the week F16.DVT123 remained blocked several minutes, producing big losses then returning to normal behavior after several minutes. By the time PIPO arrived the issue was gone.
On thursday they exchanged the VERO power converter and no issues have followed since. The total beam down time towards TT2 almost reached ~2h. PIPO did an intervention on BHZ377 too during the Wednesday dedicated MD which stopped the beam to SPS for 30min. In the PS the MD for PSB-PS injection matching studies took place. The optics in the BT and BTP lines was modified for this occasion, then switched back.
Regarding the weekly beams, all operational beams were played normally. During the weekend the VdM beam was revisited and two other beams for the LHC MD period prepared: LHC25ns and BCMS low intensity. Work on a 75ns ion beam is also ongoing.

ISOLDE (Eleftherios Fadakis):

The week has been smooth for ISOLDE with no major issues.
On HRS VITO stopped taking radioactive beam on Wednesday morning.
At GPS the new #653 UC Ta target has been providing the IDS experiment with stable beam(65Cu) on Tuesday afternoon. Radioactive beam is delivered (74Cu, 76Cu, 78Cu and 79Cu) since Wednesday evening. Small issue on Thursday, with beam losses in the BTY line, when we directed protons onto the converter. The PSB operator spread out the pulses thus delivering the desired proton current without agitating any BLM.
Apart from some issues on their experimental station(tape broke and lost a few hours to repair it) users have been taking beam without interruptions.

AD (Bertrand Lefort):

— Tuesday : C10-25 cavity has tripped several time due to an interlock coming from the TUN power Supply. No real impact on beam for physics. Specialist have solved the problem.

— Wednesday : The PS MD took most of the day. The machine restarted normally around 19:00.

— Thursday : PS down during 17 hours. Access people use this time to connect ALPHA's new access door to the safety PLC. In order to avoid possible brutal shutdown of the machine caused by an intrusion alarm we decided to turn off the AD. Bad idea… Once shutdown we've discovered that a broken relay on the RF system was prevents us to do any access to the AD RING (bad EIS condition). We also experienced an issue with the E-cooler solenoid power supplies that was not restartable. This is one of the worst thing that can happen in AD because it is known that solenoid strong currents can create residual magnetic fields in the nearby correctors… it took us 5h46min to restore the beam in the machine.

— Friday : morning shift was dedicated to ELENA commissioning but part of the beam time was used to keep recovering from the E-cooler solenoids collateral damages. A new bump has been inserted in the E-cooler region to boost the cooling performances. During the evening it was detected that the ejected beam was jumping chaotically in both planes. it was due to 2 different problems :
— A Failing Quad power supply that was going continuously ON/OFF/ON/…
— A wrong E-cooler energy

— Sunday : Moving beam again in the vertical plane. The building 195 is overheating due to the failure of the air extraction system. The problem vanished few minutes after opening 2 doors to create a drought.

ELENA (Christian Carli):

Commissioning with antiprotons from the AD on Monday, Tuesday (afternoon taking some beam time from an experiment, which was not ready) and Friday (not on Wednesday, as no antiprotons were available due to a dedicated PS MD):

Working point and deceleration optimizations on Monday allowed to decelerate more than 50 % of the injected beam to the intermediate plateau and to see a small quantity of beam (without cooling) all along the second ramp. There are clear signs for coupling of the two transverse planes even without the solenoids of the cooler. Limitations encountered (and to be fixed and improved) are that the Q-meter does not always provide clear results and the working point tuning range accessible via the cycle editor. Preliminary measurements with the scraper give surprisingly large emittances in ELENA (knowing the emittances measured in the AD are small and that the injection mis-steering can now be well corrected).

Poor transfer between AD and ELENA on Friday probably related to the AD problems and retuning during the night from Thursday to Friday.

First tests with beam of an ELENA transfer line profile monitor using injected beam. Data could be transferred successfully from the electronics nearby the monitor to the acquisition crate (by optical fiber) and to the FESA class under development by BE/BI. No profile seen so far. The tests will be continued this week.

Commissioning with H- beam from the source:

Quite some time required on Tuesday to bring the injected intensity to the "usual" levels, then switch to antiprotons.

On Wednesday, quadrupole scan using a BTV at the injection (data to be evaluated) and electron cooler heat run requested by TE/EPC.

On Thursday, the new 100 keV isolation transformer broke (see below).

Problems (unfortunately serious):

Exciter for the Q-meter: The interpretation made from observations by BE/BI is that an electrode ("strip-line") inside the vacuum chamber for the excitation in the horizontal plane detached on one side and touches another electrode underneath for the vertical excitation. The tune measurement is operational as the beam can be excited with the remaining electrodes; nevertheless we are not sure about the impact on the available aperture. For the moment, I am optimistic that it is not

necessary to open the vacuum system for inspections and repair before the end of this run. Investigations by X-ray to better understand are proposed by BE/BI (good idea!).

Source: the 100 kV isolation transformer broke as well. In consequence, we will re-install the transformer used last year and reduce the energy again to 85 keV, see with EN/EPC whether the procurement of the 100 keV isolation transformer using oil as insulator can be sped up and probably take many antiproton shifts during the next week.

SPS (Karel Cornelis)

The main event last week was the 17h stop on Thursday due to the PS injection septum failure. For the SPS the week was rather smooth. After the MD on Wednesday there were some problems with a wobbling interlock caused by a test version being implemented in the power converter controls. Two highlights to mention for last week : a CRAB cavity MD, coronated with success last Wednesday and ions (nominal beam) were accelerated with good transmission up to 200GeV on Friday.

LHC (Elias Metral & Markus Zerlauth)

Production continued / re-started smoothly after recovery from the 16L2 storm.
The availability degraded during the second half of the week, the first important downtime was due to the PS septum on Thursday (at the end of which we did the P4 filter regeneration), followed by cryo system issues in points 6 and 8 (Friday evening to Saturday midday) and a cold compressor problem in point 2 (early morning to evening on Sunday).
A first test of the combined ramp and desqueeze to 67m was performed on Friday, interrupted due to an issue with the settings (understood and fixed).
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